



Catalog M100



RoHS
COMPLIANT 

All Metric Small Parts

Over 5,600 Components • 100% RoHS Compliant

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All Metric Small Parts

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M100 • INTRODUCTION



ALL METRIC SMALL PARTS (**aMsp**) is a new division of Designatronics, Inc. that is all RoHS compliant.

The Designatronics family of companies is comprised of the following organizations:

- Sterling Instrument (**SI**)
- Stock Drive Products (**SDP**)
- TECHNO Inc.
- Quality Transmission Components (**QTC**)
- Quality Bearings & Components (**QBC**)
- Advanced Antivibration Components (**AAC**)
- P & G Manufacturing

Some of these organizations have been involved in the manufacturing and/or the marketing of mechanical components, through their catalogs beginning with Sterling Instrument in 1961, offering precision drive components. This was followed in 1971 by Stock Drive Products offering commercial quality drive components and engineering supplies. As a result of subsequent offerings via other divisions, an inventory exceeding 150,000 different components is at the disposal of the engineering population, who are the main users and specifiers of these items.

Our product lines, which we manufacture and/or market at the present time, concentrate on components used in the design of mechanisms and devices which contain moving parts. We are proud to be able to state that the list of our customers contains the majority of FORTUNE 500 Companies providing such equipment.

The reasons for establishing the new **aMsp** division are multifold:

Firstly, we are successfully servicing the design engineering and manufacturing population providing components used

for the mechanisms themselves. These mechanisms, however, are housed in enclosures which require accessible, standardized components available from stock. Our enlarged facilities and engineering staff enable us to branch out into components such as: handles, knobs, levers, hinges, etc., which can contribute not only to quality but to the styling of the equipment as well.

Secondly, globalization of the U.S. economy is dictating compliance to **RoHS** (see the following explanation of RoHS), and as a result, components chosen by designers must be compliant to **RoHS** directives. All items offered by **aMsp** are compliant to **RoHS**. Therefore, the use of **aMsp** components will eliminate the need for research and requests for certification.

Thirdly, all parts offered are METRIC. We started marketing metric components in 1971. The "metrication" of America is progressing rapidly and at this time all governmental entities specify the use of metric dimensions.

We hope that Designatronics, Inc., by establishing **aMsp**, will provide an additional service to the engineers and designers by offering an extensive selection of components and accessories previously not available from one source.



Hitoshi Tanaka

Hitoshi Tanaka, D.Eng.Sc.
President
All Metric Small Parts

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A BRIEF EXPLANATION OF RoHS

On January 27, 2003, the European Parliament and the Council of the European Union issued **DIRECTIVE 2002/95/EC** on the restriction of the use of certain HAZARDOUS SUBSTANCES in electrical and electronic equipment.

The acronym **RoHS** (**R**estriction **o**f the use of certain **H**azardous **S**ubstances) was assigned as a reference to this particular Directive. Specifically, the **RoHS** Directive calls for the elimination of the use of six environmentally hazardous substances. This restriction is for materials being sold in the market place effective July of 2006 and are as follows: *lead (Pb), mercury (Hg), cadmium (Cd), hexavalent chromium (Cr[VI]), polybrominated biphenyls (PBB) and polybrominated diphenyl ether (PBDE)*.

The stated objective of the Directive is to approximate the laws of the Member States with regard to the restriction of use of certain hazardous substances in electrical and electronic equipment as well as to contribute to the protection of human health and the environmentally sound recovery and disposal of **Waste Electrical and Electronic Equipment (WEEE)**. By definition, electrical and electronic equipment or "**EEE**" is any equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields. As a result, the following groups of products are affected: large and small household appliances, IT and telecommunications equipment, consumer electronics, lighting equipment (including light bulbs and luminaries in households), electrical and electronic tools (except large scale stationary industrial tools), toys, leisure and sports equipment, medical devices (except implanted and infected products), monitoring and control instruments and automatic dispensers.

These product groups are also subject to the Directives **WEEE 2002/96/EC** (Waste Electrical and Electronic Equipment) as well as **ELV Directive 2000/53/EC** (End of Life Vehicle).

There are specific products which are excluded from the scope of **RoHS** and **WEEE** Directives. These products pertain to equipment which in part do not fall within the scope of the Directive. These items include: ignition controls for combustion engines, pneumatic tools, light bulbs in medical equipment, measurement and control equipment, car radios, and munitions.

For the purposes of the **RoHS** regulations, the following maximum concentration values of banned materials are permitted: 0.1% (maximum) by weight in homogeneous materials for *lead (Pb), mercury (Hg), hexavalent chromium (Cr[VI]), polybrominated biphenyls (PBB) and polybrominated diphenyl ether (PBDE)* and of 0.01% (maximum) by weight in homogeneous materials for *cadmium (Cd)* shall be allowed.

Lead may exist as an intentional additive if it is used as an alloying element of copper (maximum concentration of 4% by weight), aluminum (maximum concentration 0.4% by weight) or steel (maximum concentration of 0.35% by weight).

For additional information, we suggest that the following sources be contacted: www.rohs.gov.uk or Underwriters Lab. Inc. 1-877-854-3577.

M100 • TERMS & CONDITIONS OF SALE

As used herein, "**Seller**" means All Metric Small Parts. "**Buyer**" means any person ordering goods from Seller after March 31, 2006; and "**person**" means any individual, corporation, company or other entity.

ORDERING: Goods may be ordered by:

- (a) Telephone to: (516) 302-0152
- (b) FAX to: (516) 302-0153
- (c) Mail to:
2101 Jericho Turnpike, P.O. Box 5416,
New Hyde Park, NY 11042-5416
- (d) UPS/other courier to: same as above
- (e) E-mail to: amspsupport@amsp.biz

Office hours are 9am – 5pm, EST, Monday – Friday. You may fax to (516) 302-0153 or E-mail to: amspsupport@amsp.biz at any time. When ordering, specify part numbers, quantities, desired delivery date and shipping method. For larger production quantities, Seller will provide written quote of price and delivery on request. Seller will provide current price/stock status on any catalog item by telephone or fax request. Quotes for modified catalog parts or custom-made parts are available on request. Please send sketches or prints.

MINIMUM ORDER:

Orders shipping to addresses within the USA, \$20 + freight. Orders shipping outside of the USA, \$50 + freight. There is an additional charge of \$10.00 for orders below the minimum. There is no minimum order size for eStore online orders.

PRICES:

Prices shall be as in effect at time of purchase order or as agreed to in writing by Seller. Prices listed in its catalog or elsewhere are subject to change without notice. Please contact Seller to confirm price. Prices do not include freight, duties, special handling, certification, insurance or taxes, which are all the Buyer's responsibility.

CREDIT:

Bank and three trade references are required for new accounts. Until the account is approved, the Seller may require cash in advance, payment by approved credit card or C.O.D.; C.O.D. orders are subject to an additional handling charge.

TERMS:

For open accounts, terms are net 30 days, F.O.B. our plant. Open accounts are invoiced for goods/freight when shipped. Seller accepts VISA®, Master Card®, American Express®, and Discover®. Buyers paying by credit card are charged for goods/freight when shipped, subject to credit card approval. All past due amounts shall bear interest at one and one-half percent (1.5%) per month or the highest legal rate, whichever is less; and Seller may recover all costs, including attorneys' fees, incurred to collect any past due amount.

SHIPMENT; RISK OF LOSS:

Seller will ship goods as directed by the Buyer or determined by the Seller, usually UPS, DHL or FedEx; in any case at the Buyer's expense. Seller will endeavor to meet promised delivery dates. Buyer shall bear all risk of loss and damage after goods are delivered to carrier, including any loss or damage in transit.

RETURNS; EXCHANGES; SHORTAGES:

Buyer must get return authorization in writing. Seller must approve returns and exchanges in writing. Returns must be requested within 15 days after receipt of goods. Returned goods will be inspected and a restocking charge may be made. No credit will be allowed on custom-made, used or modified parts or parts purchased on a quantity basis. Shortages must be reported within 10 days after receipt; and if so reported, Seller will make up shortages at its cost.

M100 • TERMS & CONDITIONS OF SALE

TECHNICAL & PRODUCT INFORMATION:

Seller disclaims responsibility for errors or omissions in any technical or product information contained in its catalogs or other sales materials. Buyer is solely responsible for determining if goods are suitable for purposes intended by Buyer and its customers and future users.

LIMITED WARRANTY:

Seller warrants that all goods it sells will be free from material defects in manufacturing and workmanship by Seller: **PROVIDED THIS LIMITED WARRANTY SHALL EXPIRE ONE (1) YEAR AFTER SHIPMENT F.O.B. OUR PLANT (the "Warranty Period") AND SHALL NOT APPLY:**

(a) unless Seller receives written notice of the breach of warranty within 30 days after discovery of the defect or nonconformance and in any event within the one (1) year Warranty Period; and

(b) to any goods which have been (i) repaired, altered or improperly installed, (ii) subject to improper storage, (iii) damaged during or after transit, (iv) used or incorporated with or into any other product, machine or equipment after Buyer or anyone using the goods has, or reasonably should have, knowledge of the defect or nonconformance, or (v) manufactured, fabricated or assembled by anyone other than Seller.

ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE, ARE DISCLAIMED.

BUYER'S REMEDIES:

At Seller's option, if it breaches the warranty set forth above, it may either (a) repair or replace defective or nonconforming goods or parts or (b) repay the price it received for goods, whichever it elects. As a condition precedent to either remedy, Buyer shall have paid the price of the goods and made them available for inspection at Buyer's place or business or returned them

at Seller's request and cost and by the carrier it designates. **BUYER SHALL HAVE NO OTHER REMEDY AGAINST THE SELLER, AND ALL OTHER REMEDIES ARE WAIVED, INCLUDING ANY RIGHT TO RECOVER CONSEQUENTIAL OR INCIDENTAL DAMAGES.** The limited warranty set forth above and these remedies shall extend only to Buyer and not to any subsequent buyer or user of the goods. In no event shall Seller's liability for breach exceed the price paid for by the goods by Buyer.

GOVERNING LAW; EXCLUSIVE JURISDICTION:

This contract shall be governed by the substantive laws of New York, without regard to choice of law principles. **The State and Federal Courts in Nassau County, New York, shall have the exclusive jurisdiction and venue to adjudicate rights and duties under this contract.**

PERIOD OF LIMITATIONS:

An action for breach of this contract, including breach of the limited warranty set forth above, or any other action relating to goods shipped by Seller or ordered by Buyer, must be commenced within one (1) year after the cause of action accrued.

MISCELLANEOUS:

All orders placed with Seller after March 31, 2006, constitutes acceptance of these Terms and Conditions. All conflicting, inconsistent and additional terms and conditions are rejected unless contained in writing and signed by an officer of Seller. Buyer may not assign any rights or remedies under this contract without Seller's prior written consent. If any part or provision of these Terms and Conditions is held to be invalid or unenforceable, such part or provision shall be deemed omitted, and that shall not affect the validity or enforceability of any other part or provision hereof. These Terms and Conditions may be found at:

www.amsmp.biz/eStore/termsofuse.aspx.

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SECTION 1

Handles MAK

1



1



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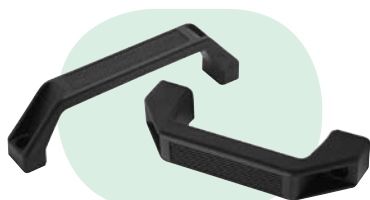
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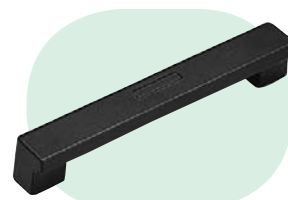
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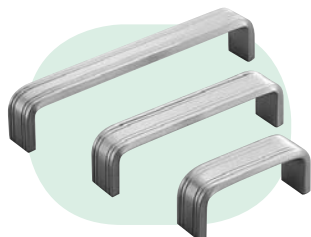
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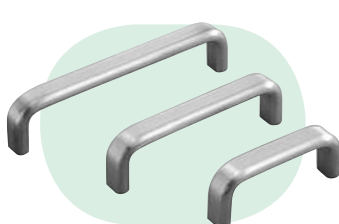
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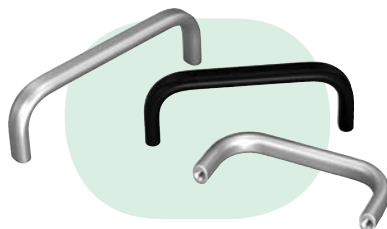
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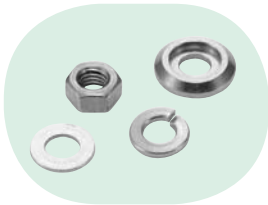
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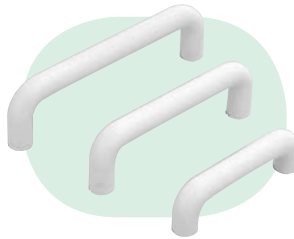
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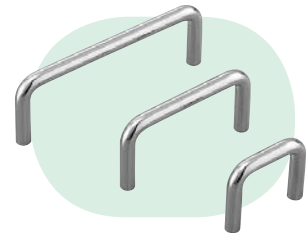
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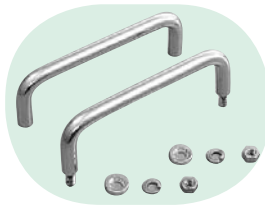
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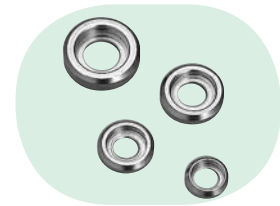
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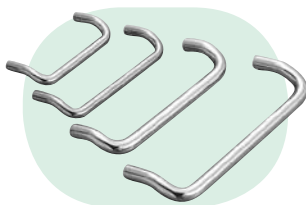
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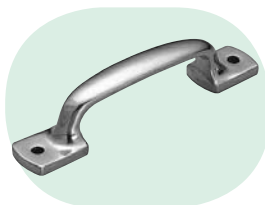
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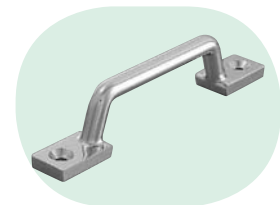
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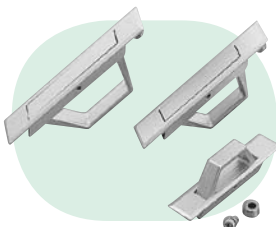
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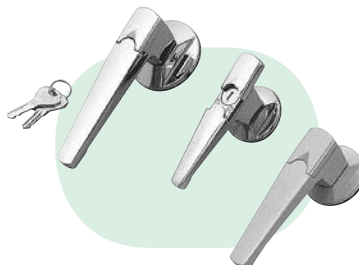
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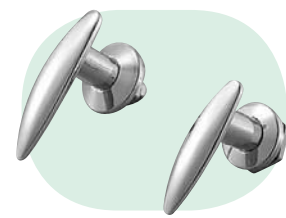
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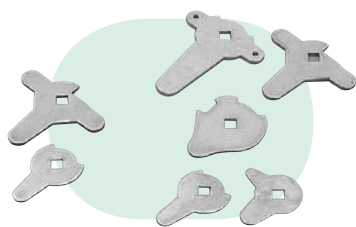


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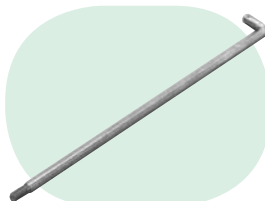
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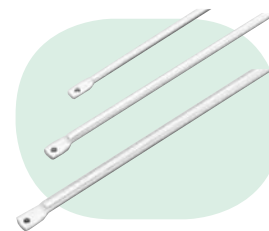
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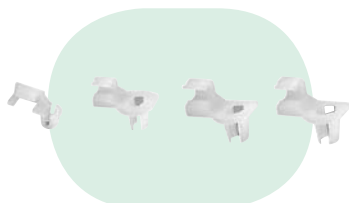
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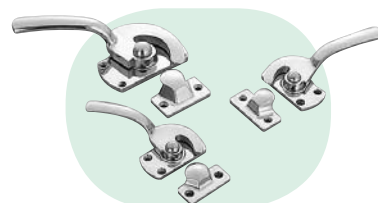
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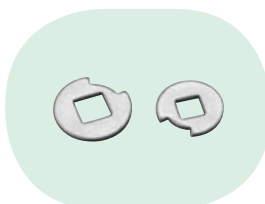
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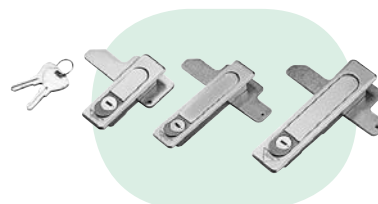
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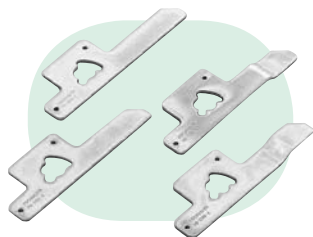
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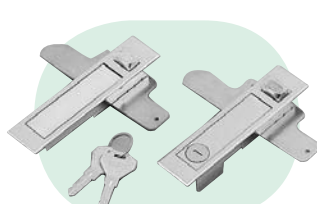
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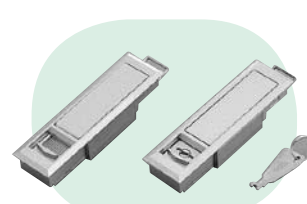
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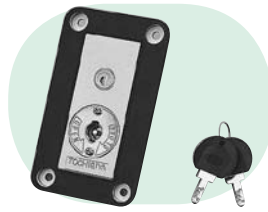
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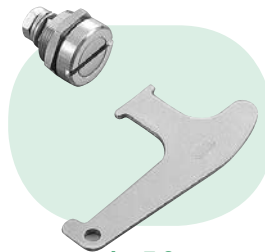
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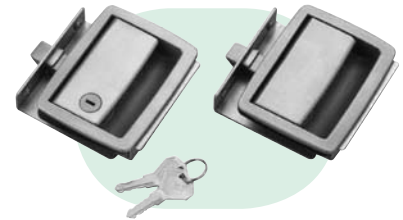
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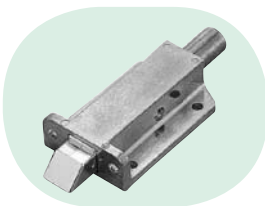
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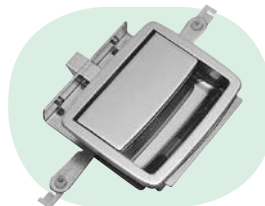
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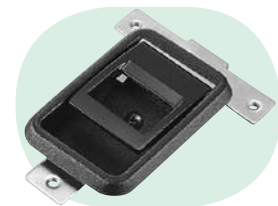
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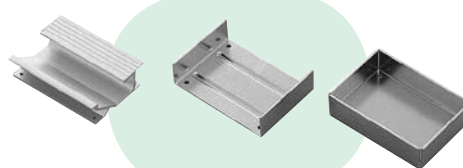
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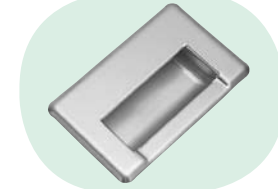
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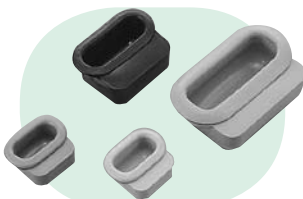
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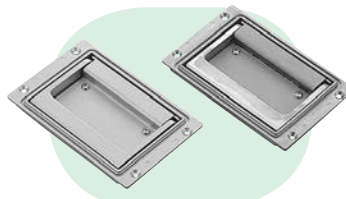
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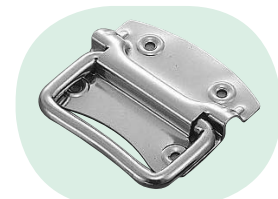
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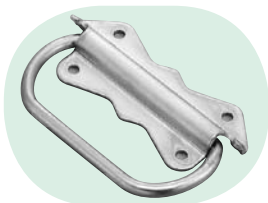


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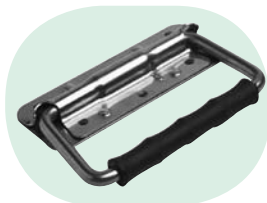


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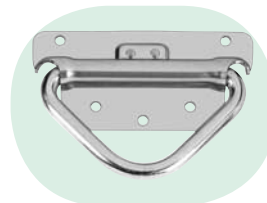
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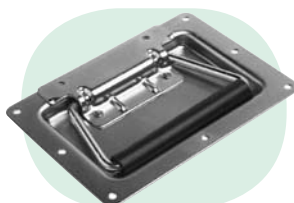
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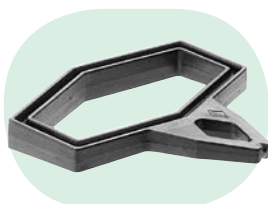
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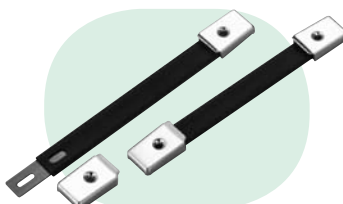
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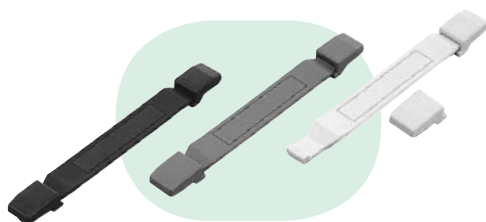
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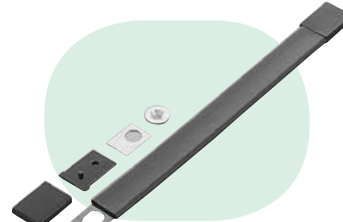
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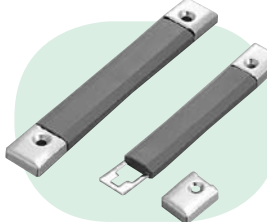
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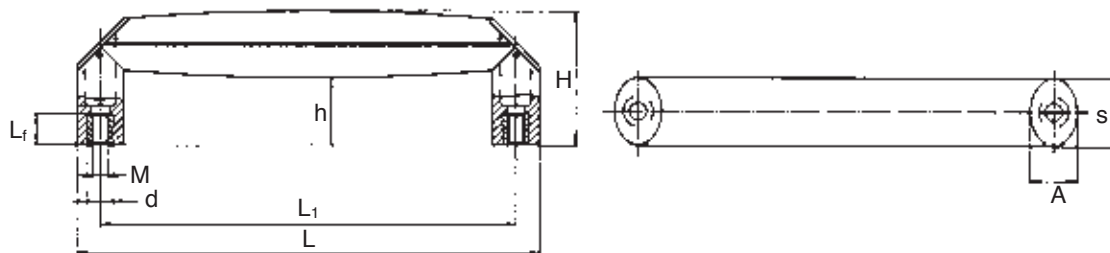


Fig. 1

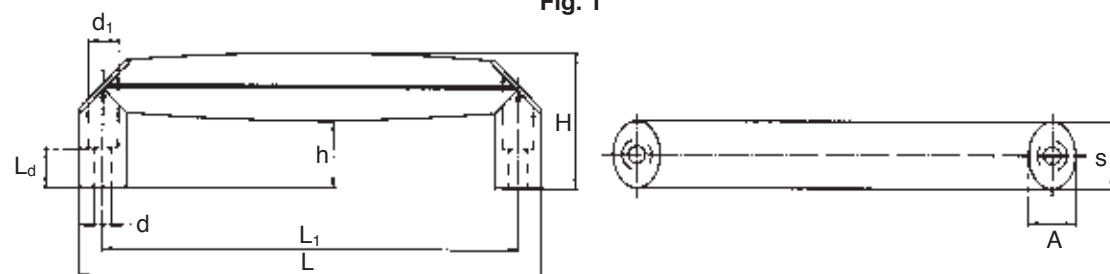


Fig. 2

Fig. 1 • HANDLE – Nylon 6, Anthracite Gray
• THREADED INSERTS – Brass, Nickel Plated

Catalog Number	L ₁	L	M	L _f	d
MAKX1FM6301	106.5	123.2	M6	11	9
MAKX1FM6302	145.5	162.2			
MAKX1FM6303	185.2	201	M8		
Catalog Number	H	h	A	s	Weight g
MAKX1FM6301	48	24	17	24	64
MAKX1FM6302					81
MAKX1FM6303					84

Fig. 2 • HANDLE – Nylon 6, Anthracite Gray • THROUGH HOLES

Catalog Number	L ₁	L	d	L _d	d ₁
MAKX1FM6304	106.5	123.2	6.4	14	11
MAKX1FM6305	145.5	162.2			
MAKX1FM6306	185.2	201			
Catalog Number	H	h	A	s	Weight g
MAKX1FM6304	48	24	17	24	57
MAKX1FM6305					75
MAKX1FM6306					94

HANDLES, BOW-TYPE

RoHS
COMPLIANT

1

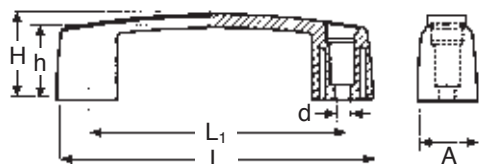


Fig. 1

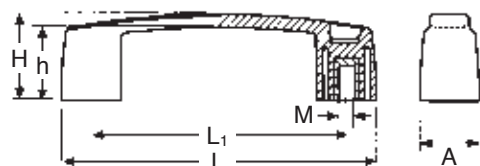


Fig. 2

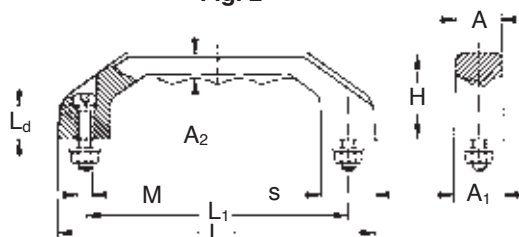


Fig. 3

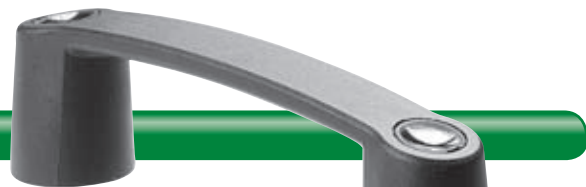


Fig. 1



Fig. 2

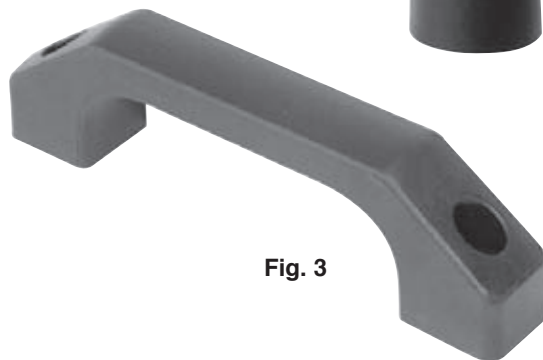


Fig. 3

Fig. 1 • **HANDLE** – Nylon 6, Glass Filled, Black • **THROUGH HOLES**

Catalog Number	L ₁	L	d	H	h	A	Weight g
MAKX2FM1220	94	120	6.5	35	29	17	31
MAKX2FM1221	117	145		40	34	19	47
MAKX2FM1222	132	163	8.5	45	38	20	57
MAKX2FM1223	180	213		50	43	22	86

Fig. 2 • **HANDLE** – Nylon 6, Glass Filled, Black • **THREADED INSERTS** – Steel, Zinc Plated

Catalog Number	L ₁	L	M	H	h	A	Weight g
MAKX2FM1230	94	120	M6	35	29	17	48
MAKX2FM1231	117	145		40	34	19	79
MAKX2FM1232	132	163	M8	45	38	20	90
MAKX2FM1233	180	213		50	43	22	157

Fig. 3 • **HANDLE** – Nylon 6, Glass Filled, Black • **THROUGH HOLES**

Catalog Number	L ₁	L	M	L _d	H	A	A ₁	A ₂	s	Weight g
MAKX2FM1240	120	146	M6	15	39	20.5	23	10.5	24	63
MAKX2FM1241	140	170		16	45	24	27	12	28	125
MAKX2FM1242	160	194	M8	20	52	27.5	31	13.5	32	169

NOTE: Supplied without mounting hardware.

HANDLES, BOW-TYPE

RoHS
COMPLIANT

1

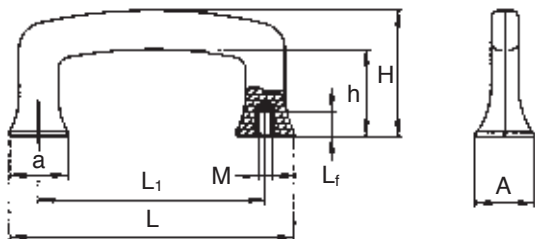


Fig. 1

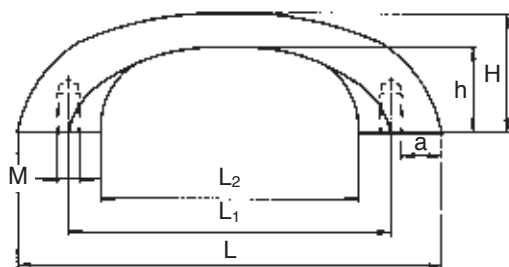


Fig. 2



Fig. 1

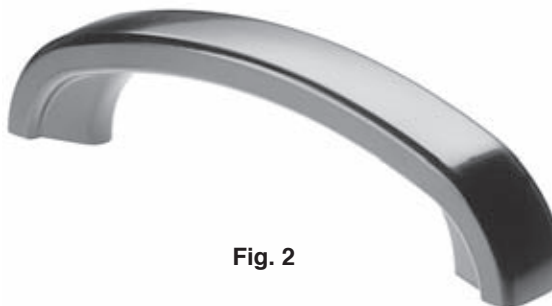


Fig. 2

Fig. 1 • **HANDLE** – Bakelite, Black • **THREADED INSERTS** – Brass

Catalog Number	L ₁	L	M	L _f	H	h	A	a	Weight g
MAKX3FM1201	99.5	125	M6	11	55	38	11	11	67
MAKX3FM1202	132	158	M5		49	32			85

Fig. 2 • **HANDLE** – Bakelite, Black • **THREADED HOLES WITHOUT INSERTS**

Catalog Number	L ₁	L	L ₂	M	H	h	a	Weight g
MAKX3FM1204	85	112	75		31	22	19	22
MAKX3FM1205	125	148	102	M6	36	27	23	46
MAKX3FM1206	160	186	138		41	30	24	67

Fig. 1 • **HANDLE** – Bakelite, Reinforced, Black • **THREADED INSERTS** – Brass

Catalog Number	L ₁	L	M	L _f	H	h	A	a	Weight g
MAKX3FM1297	99.5	125	M6	11	55	38	11	11	67
MAKX3FM1298	132	158	M5		49	32			85

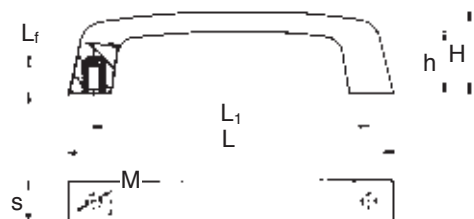


Fig. 1

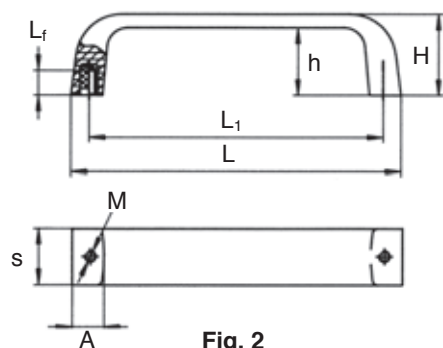


Fig. 2

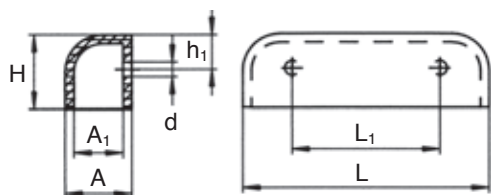


Fig. 3

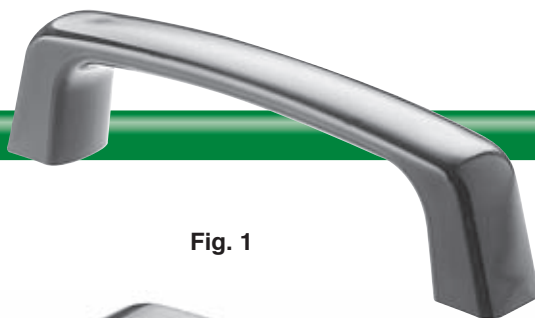


Fig. 1

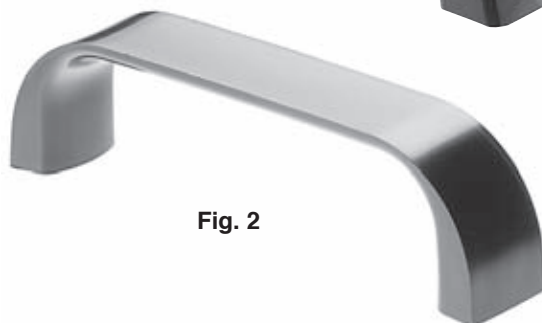


Fig. 2

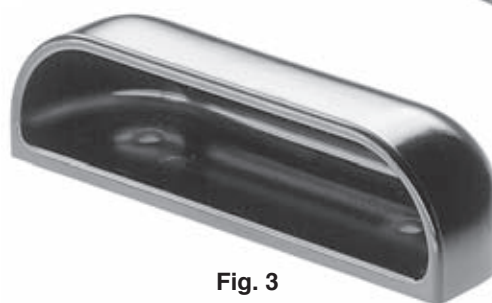


Fig. 3

Fig. 1 • BOW-TYPE HANDLE – ABS, Black • THREADED INSERTS – Steel, Zinc Plated

Catalog Number	L ₁	L	M	L _f	H	h	A	s	Weight g
MAKX4FM1213	110	130	M6	15	33	25	17	17	32

Fig. 2 • BOW-TYPE HANDLE – Nylon 6, Black • THREADED INSERTS – Brass

Catalog Number	L ₁	L	M	L _f	H	h	A	s	Weight g
MAKX4FM1214	130	146	M5	11	36	30	14	24	38

Fig. 3 • SHELL HANDLE – Bakelite, Black • TWO REINFORCED HOLES

Catalog Number	L ₁	L	d	H	h ₁	A	A ₁	Weight g
MAKX4FM1301	60	100	6	30	15	27	20	34

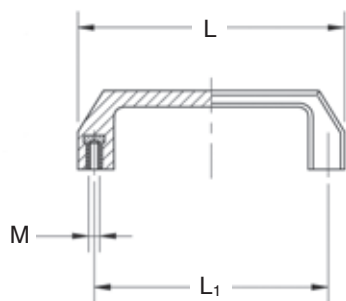


Fig. 1

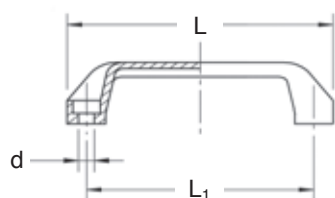


Fig. 2

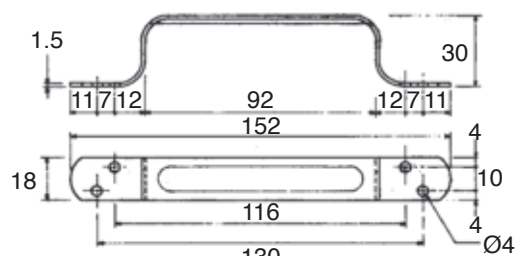


Fig. 3



Fig. 1



PATTERN (A)

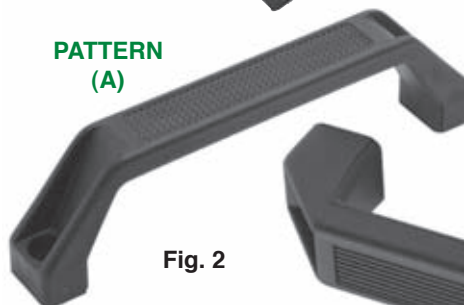


Fig. 2



PATTERN (B)



Fig. 3

Fig. 1 • HANDLE – Techno Polymer f.r., Black Matt Finish • **THREADED INSERT** – Brass

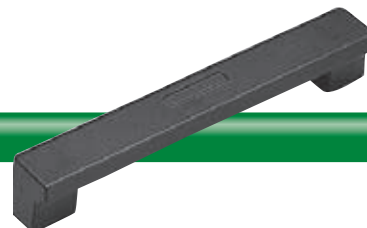
Catalog Number	L ₁	L	M	Height
MAKY4FM201H05	105	120	M5	37
MAKY4FM201H10			M6	
MAKY4FM201H15	117	135	M6	37
MAKY4FM201H20			M8	

Fig. 2 • HANDLE – Techno Polymer f.r., Black Matt Finish • **THROUGH HOLE**

Catalog Number	Pattern	L ₁	L	d	Height
MAKY4FM201K05	A	117	135	9	42
MAKY4FM201K10	B	130	160	8.5	50
MAKY4FM201K15	A	175	195	9	42

Fig. 3 • HANDLE – Steel, Zinc Plated

Catalog Number
MAKY4FM604015JB

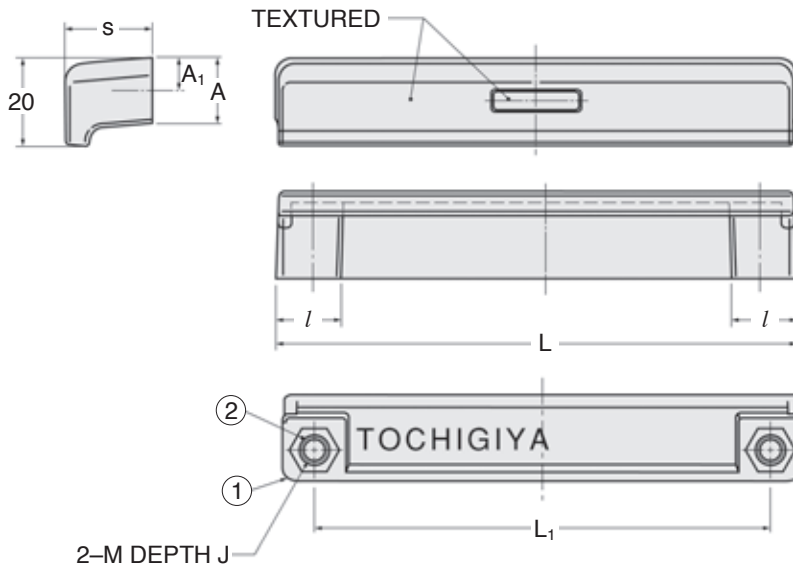


• **APPLICATIONS**

Measuring instruments /
Telecommunication devices

• **CHARACTERISTICS**

Made of plastic material which
has excellent salt-resistance and
dielectric strength.



THE FIGURE SHOWS **MAKT05M2THA312-1**.

THE SHAPE OF **MAKT05M1THA312-2** IS
SLIGHTLY DIFFERENT FROM THIS FIGURE.

• **PARTS LIST**

No.	Part Name	Material	Finish	Qty.
1	Grip	ABS	Black	1
2	Insert	Brass	Degreased	2

• **PULLS**

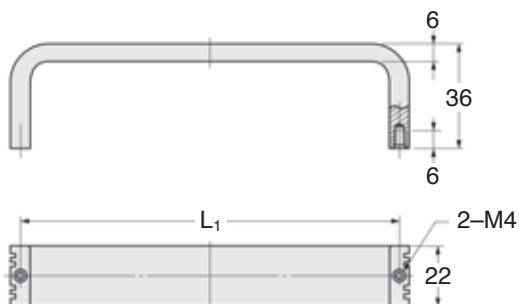
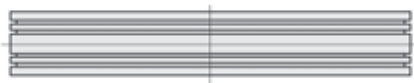
Catalog Number	L	L ₁	l	M	A ₁	A	s	J	Net Weight g
MAKT05M1THA312-2	88	75	13	M5	7	13	17	10	24
MAKT05M2THA312-1	121	106	15	M6	7.5	15	20	13	36

NOTE: Not to be used in extreme temperature.

HANDLES, GRAB

RoHS
COMPLIANT

1



• HANDLES – Stainless Steel, Brushed Finish

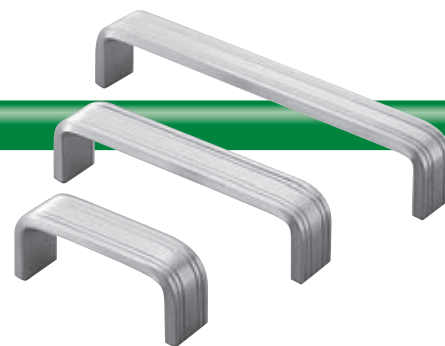
Catalog Number	L ₁	Net Weight g
MAKT06MTHA226-1	80	127.4
MAKT06MTHA226-2	130	175.2
MAKT06MTHA226-3	180	223.3
MAKT06MTHA226-4	230	270.8

• APPLICATIONS

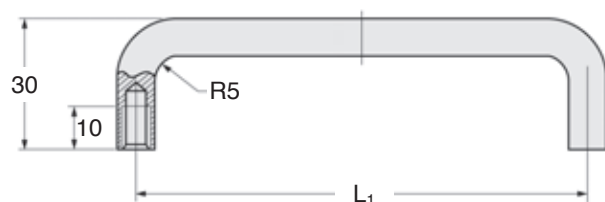
Distribution boards / Devices related to food industry /
Chemical instruments

• CHARACTERISTICS

A simple design with four grooves and a brushed finish.
The stainless steel construction provides excellent
corrosion resistance.



All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts



• HANDLES – Stainless Steel, Satin Finish

Catalog Number	L ₁	Allowable Vertical Load kN (kgf)	Net Weight g
MAKT07M1THA233-4	70	2.94 (300)	81.7
MAKT07M2THA233-3	100	2.35 (240)	104.5
MAKT07M3THA233-2	130	1.86 (190)	127.5
MAKT07M4THA233-1	150	1.57 (160)	143.8

• APPLICATIONS

Food processors / Office automation appliances /
Office utility equipment

• CHARACTERISTIC

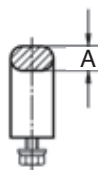
The handle has an elegant matte satin finish.



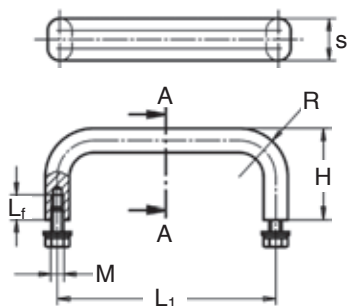
HANDLES, PULL

RoHS
COMPLIANT

1

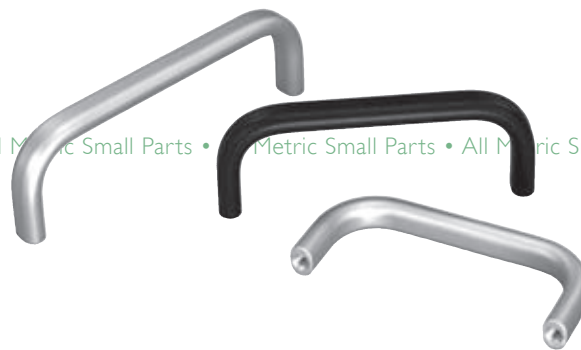


Cross Section
View A-A



• **HANDLE** – Stainless Steel, Semimatte Finish • **RECTANGULAR PROFILE**

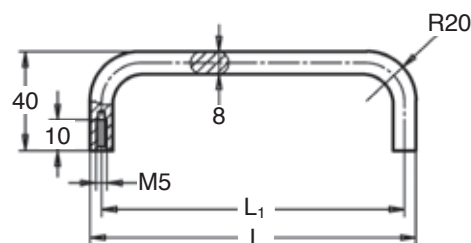
Catalog Number	L ₁	M	L _f	H	A	s	R	Load-bearing Capacity N	Approx. Weight g
MAKL69M2410005	100	M5	10	40	8	12	22	1000	105
MAKL69M2412005	120								118
MAKL69M2415005	150								138
MAKL69M2418005	180								158
MAKL69M2425005	250								205
MAKL69M2410006	100	M6	12	45	10	19.5	24		216
MAKL69M2412006	120								241
MAKL69M2415006	150								279
MAKL69M2418006	180								318
MAKL69M2425006	250								407



All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

• **HANDLE** – Aluminum, Natural Color Anodized or Black Anodized, Matte Finish

Catalog Number		L ₁	L	Load-bearing Capacity N	Approx. Weight g
Black Anodized	Natural Color Anodized				
MAKL69M18055051	MAKL69M18055053	55	63	500	24
MAKL69M18088051	MAKL69M18088053	88	96		30
MAKL69M18100051	MAKL69M18100053	100	108		32
MAKL69M18120051	MAKL69M18120053	120	128		37
MAKL69M18180051	MAKL69M18180053	180	188		50
MAKL69M18200051	MAKL69M18200053	200	208		55
MAKL69M18235051	MAKL69M18235053	235	243		64
MAKL69M18250051	MAKL69M18250053	250	258		68





• **HANDLE – 304 Stainless Steel, Buff Polished**

Catalog Number	L ₁	L	M	L _f	H	h	A	Weight g
MAKN5FMUNFS080	80	90	M5	10	37	27	10	76
MAKN5FMUNFSH080					45	35		86
MAKN5FMUNFS100	100	110	M5	10	37	27	10	88
MAKN5FMUNFSH100					45	35		98
MAKN5FMUNFS125	125	135	M5	10	37	27	10	103
MAKN5FMUNFSH125					45	35		113
MAKN5FMUNFS160	160	170	M5	10	37	27	10	125
MAKN5FMUNFSH160					45	35		135
MAKN5FMUNFS200	200	210	M5	10	37	27	10	150
MAKN5FMUNFSH200					45	35		160
MAKN5FMUNFS250	250	260	M5	10	37	27	10	180

NOTE: Can be used with bezel **MKAN1NMLY16A**.

• **HANDLE – Steel, Chrome Plated**

Catalog Number	L ₁	L	M	L _f	H	h	A	Weight g
MAKN6FMUNF080CR	80	90	M5	10	37	27	10	76
MAKN6FMUNFH080CR					45	35		86
MAKN6FMUNF100CR	100	110	M5	10	37	27	10	88
MAKN6FMUNFH100CR					45	35		98
MAKN6FMUNF125CR	125	135	M5	10	37	27	10	103
MAKN6FMUNFH125CR					45	35		113
MAKN6FMUNF160CR	160	170	M5	10	37	27	10	125
MAKN6FMUNFH160CR					45	35		135
MAKN6FMUNF200CR	200	210	M5	10	37	27	10	150
MAKN6FMUNFH200CR					45	35		160
MAKN6FMUNF250CR	250	260	M5	10	37	27	10	180

NOTE: Can be used with bezel **MKAN1NMLY16A**.



• **HANDLE – Aluminum, Buff Polished**

Catalog Number	L ₁	L	M	L _f	H	h	A	Weight g
MAKN7FMUNFABF080	80	90	M5	10	37	27	10	27
MAKN7FMUNFABF100	100	110						31
MAKN7FMUNFABF125	125	135						36
MAKN7FMUNFABF160	160	170						44

NOTE: Can be used with bezel **MKAN1NMLY16A**.

• **HANDLE – Aluminum, Electrostatic Coating, Black Matte Finish**

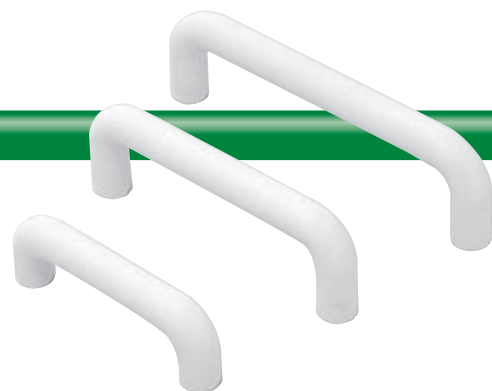
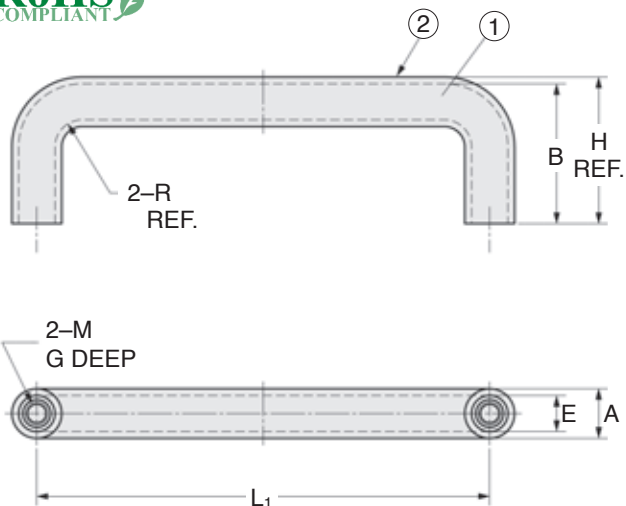
Catalog Number	L ₁	L	M	L _f	H	h	A	Weight g
MAKN7FMUNFABK080	80	90	M5	10	37	27	10	27
MAKN7FMUNFABK100	100	110						31
MAKN7FMUNFABK125	125	135						36
MAKN7FMUNFABK160	160	170						44

NOTE: Can be used with bezel **MKAN1NMLY16A**.

HANDLES, GRAB

RoHS
COMPLIANT

1



• APPLICATIONS

Measuring instruments / Telecommunication equipment

• CHARACTERISTIC

These handles are coated with elastomer.

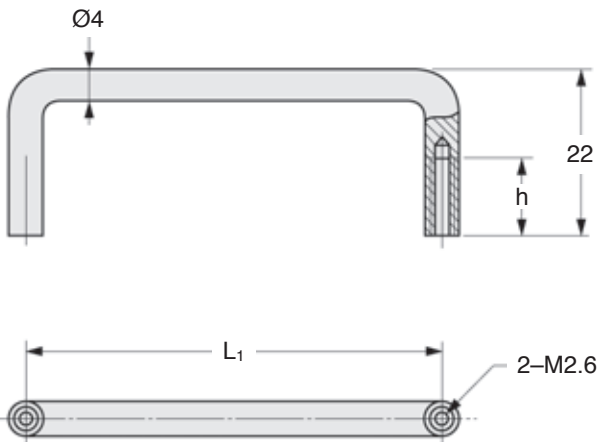
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Handle	Brass	Chrome Plated	1
2	Coating	Elastomer	Ivory	

• HANDLES

Catalog Number	L ₁	M	H REF.	B	A	E	G	R REF.	Net Weight g
MAKT08M1THA4394	40	M4	23.5	22	Ø9	Ø6	8	4.5	16.9
MAKT08M2THA4393	60	M5			Ø11	Ø8	10	6	36.7
MAKT08M3THA4392	80		31.5	30	12	52.2			
MAKT08M4THA4391	100		32.5	31	13	61.3			

All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts



• APPLICATIONS

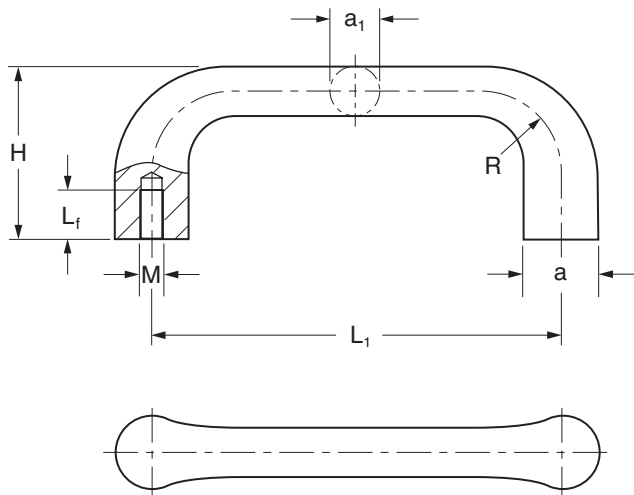
Measuring instruments / Telecommunication devices

• CHARACTERISTIC

Appropriate size can be selected for various devices.

• HANDLES – Brass, Chrome Plated or Stainless Steel, Buffed

Catalog Number	L ₁	h	Allowable Vertical Load N (kgf)	Net Weight g	Catalog Number	L ₁	h	Allowable Vertical Load N (kgf)	Net Weight g
Brass					Stainless Steel				
MAKT09MA2121	20	10	300 (30.6)	5	MAKT09MA212SUS1	20	8	318.8 (32.5)	4.7
MAKT09MA2122	37		157 (16)	6.8	MAKT09MA212SUS2	37		274.7 (28)	6.3
MAKT09MA2123	55		100 (10.2)	8.7	MAKT09MA212SUS3	55		235.4 (24)	8.1



• **HANDLE** – Cast Iron, Deburred & Tumbled or Additional Black Powder Coating

Catalog Number		L_1 ± 0.5	M	L_f	H	a	a_1	R	Load-Bearing Capacity N
Tumbled	Powder-Coated, Black								
MAKL68M9510006	MAKL68M95100061	100	M6	12	42	18	12	20	1000
MAKL68M9511208	MAKL68M95112081	112	M8	15	47	20	14	22	
MAKL68M9512510	MAKL68M95125101	125	M10	18	53	22	16	24	
MAKL68M9514012	MAKL68M95140121	140	M12	20	59	25	18	26	

HANDLES, PULL - Long

RoHS
COMPLIANT

1

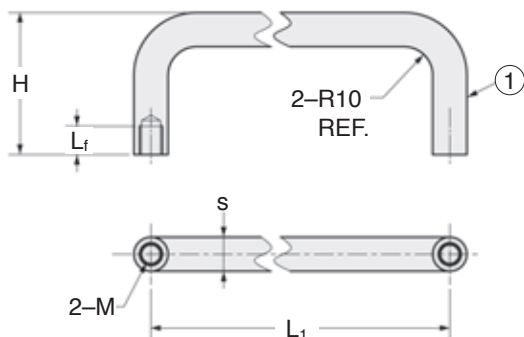


Fig. 1

• PARTS LIST

No.*	Part Name	Material		Finish		Qty.
		...THA239..	...THA240S..	...THA239..	...THA240S..	
1	Handle	Stainless Steel		Buffed		1
2	Bezel	—	Stainless Steel	—	Bright Barrel Polished	2
3	Spring Washer				—	
4	Hexagonal Nut					

*Parts 2, 3 & 4 are not included in ...THA-239..

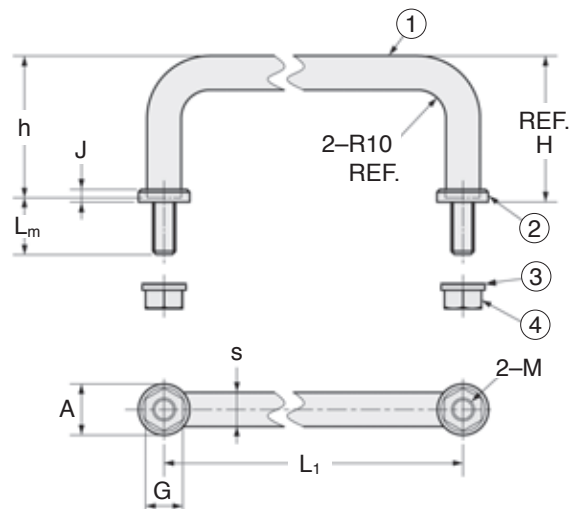


Fig. 2

Fig. 1 • HANDLES

Catalog Number	L ₁	M	L _f	H	s	Net Weight g
MAKT10M1THA2398	68	M5	8	30	Ø7	30.1
MAKT10M2THA2397	100				Ø9	67
MAKT10M3THA2396	110	M6	8	40	Ø10	97
MAKT10M4THA2395	120					102.7
MAKT10M5THA2394	150	M8	10	50	Ø12	187.3
MAKT10M6THA2393	188					222.7
MAKT10M7THA2392	238					266.4
MAKT10M8THA2391	288					309

Fig. 2 • HANDLES

Catalog Number	L ₁	M	L _m	H REF.	h	J	A	G	s	Net Weight g
MAKT10M1THA240S8	68	M5	11	31	30	3	Ø10 Ø13	8	Ø7 Ø9	40
MAKT10M2THA240S7	100									77.5
MAKT10M3THA240S6	110	M6	11	41.5	40	3.5	Ø15	10	Ø10	117
MAKT10M4THA240S5	120									123.5
MAKT10M5THA240S4	150	M8	20	51.5	50	4.5	Ø18	13	Ø12	231
MAKT10M6THA240S3	188									265
MAKT10M7THA240S2	238									309.5
MAKT10M8THA240S1	288									354

• APPLICATIONS

Distribution boards /
Distribution panels / Control Boards

• CHARACTERISTICS

These long pull series handles
are slightly different sizes
from ...THA-31.. Series

Bezels are shown on page 1–22.

Fig. 1
Tapped Feet

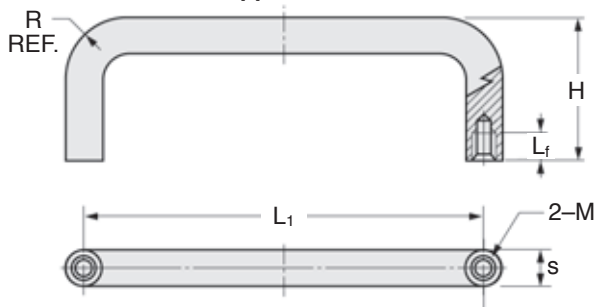
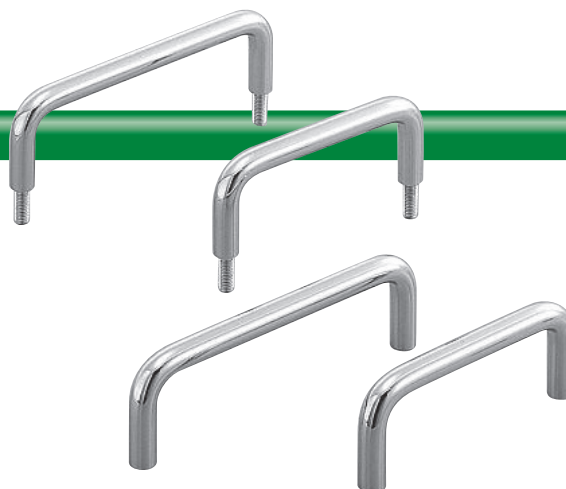
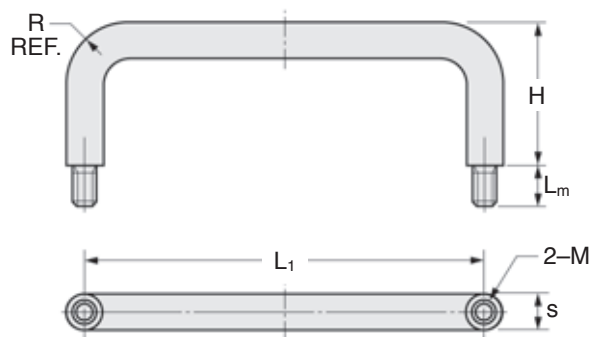


Fig. 2
Screwed Feet



• **APPLICATIONS**

Measuring instruments / Telecommunication devices

• **CHARACTERISTIC**

Appropriate size can be selected for various devices.

See page 1–22 for applicable bezels.

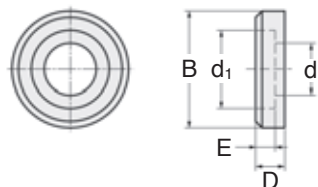
• **HANDLE – Brass, Chrome Plated**

Catalog Number	Allowable Vertical Load N (kgf)	Net Weight g	Catalog Number	Allowable Vertical Load N (kgf)	Net Weight g	L ₁	M	H	L _f	L _m	R	s
Fig. 1 Tapped Feet			Fig. 2 Screwed Feet									
MAKT11MTHA3101TF	1.18 (120)	15	MAKT11MTHA3101SF	1.18 (120)	18.5	40	M4	22	8	13	10.5	Ø6
MAKT11MTHA3102TF		32.5	MAKT11MTHA3102SF		40.5	60		22	10			
MAKT11MTHA3103TF	2.94 (300)	38.5	MAKT11MTHA3103SF	2.45 (250)	47	70	M5	25	10		14	Ø8
MAKT11MTHA3104TF		47.5	MAKT11MTHA3104SF		55	80		30	12			
MAKT11MTHA3105TF	4.41 (450)	90	MAKT11MTHA3105SF	2.94 (300)	103	90	M6	40	16		17.5	Ø10
MAKT11MTHA3106TF	2.94 (300)	56	MAKT11MTHA3106SF	2.45 (250)	64.5	100	M5	31	13		14	Ø8
MAKT11MTHA3107TF		90	MAKT11MTHA3107SF		103	100		35	16			
MAKT11MTHA3108TF	4.41 (450)	110	MAKT11MTHA3108SF	2.94 (300)	124	120	M6	40			17.5	Ø10
MAKT11MTHA3109TF	1.77 (180)	77	MAKT11MTHA3109SF	1.77 (180)	86		M5	31	13		14	Ø8
MAKT11MTHA3110TF		130	MAKT11MTHA3110SF	2.94 (300)	145.5	150		40	16	20	17.5	Ø10
MAKT11MTHA3111TF	2.94 (300)	127	MAKT11MTHA3111SF		139			32	15	19		
MAKT11MTHA3112TF		136	MAKT11MTHA3112SF	2.45 (250)	152	160	M6	40	20	20	17.5	Ø10
MAKT11MTHA3113TF	3.43 (350)	224	MAKT11MTHA3113SF		240.5	180						
MAKT11MTHA3114TF		242	MAKT11MTHA3114SF		258	200		45	20	20	21	Ø12

BEZELS

RoHS
COMPLIANT

1



• APPLICATIONS

Can be used with **MAKT10M..THA239..**
& **MAKT10M..THA240S..** handles.

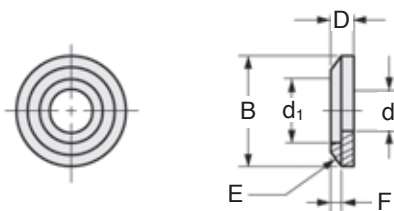
• CHARACTERISTIC

Bezels to be used with pull handles.

• BEZEL – Stainless Steel, Brightened Barrel Polishing

Catalog Number	Size	d	d ₁	B	D	E	Net Weight g	Applicable Model
MKAT01M1THA427-4	Ø7	Ø5.5	Ø7.2	Ø10	3	2	1.1	MAKT10M1THA2398
MKAT01M2THA427-3	Ø9	Ø5.5	Ø9.2	Ø13			1.9	MAKT10M2THA2397
MKAT01M3THA427-2	Ø10	Ø6.5	Ø10.2	Ø15	3.5	3	3	MAKT10M3THA2396, 4THA2395
MKAT01M4THA427-1	Ø12	Ø8.5	Ø12.2	Ø18	4.5		5.6	MAKT10M5... ~ 8...

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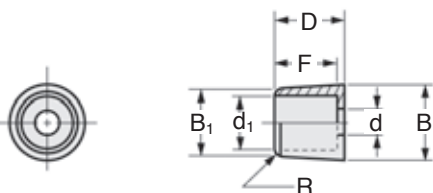
• CHARACTERISTIC

Improved appearance can be obtained by using these bezels with **MAKT11MTHA31...** series handles.

• BEZEL – Brass, Chrome Plated

Catalog Number	Size	d	d ₁	B	D	E	F	Net Weight g	Applicable Model
MKAT02MTHA268-1	Ø6	Ø4.5	Ø6.2	Ø10	2.5	1X45°	1	1	MAKT11MTHA3101
MKAT02MTHA268-2	Ø8	Ø5.5	Ø8.2	Ø12				1.5	MAKT11MTHA3102~4, 6, 9
MKAT02MTHA268-3	Ø10	Ø6.5	Ø10.2	Ø16	3	1.5X45°	1.5	3	MAKT11MTHA3105, 7, 8, 10~12
MKAT02MTHA268-4	Ø12		Ø12.2					3	MAKT11MTHA3113,14

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• CHARACTERISTIC

Improved appearance can be obtained by using these bezels with **MAKT11MTHA31...** series handles.

• BEZEL – Brass, Chrome Plated

Catalog Number	Size	d	d ₁	B	B ₁	D	R	F	Net Weight g	Applicable Model
MKAT03MTHA269-1	Ø6	Ø4.2	Ø6.2	Ø9	Ø7.5	8	1	6.5	2	MAKT11MTHA3101
MKAT03MTHA269-2	Ø8	Ø5.5	Ø8.2	Ø12	Ø9.5	10	1.2	8.5	3.5	MAKT11MTHA3102~4, 6, 9
MKAT03MTHA269-3	Ø10	Ø6.5	Ø10.2	Ø15	Ø12	12	1.5	10.5	7	MAKT11MTHA3105, 7, 8, 10~12
MKAT03MTHA269-4	Ø12		Ø12.2	Ø16	Ø13				6.5	MAKT11MTHA3113,14

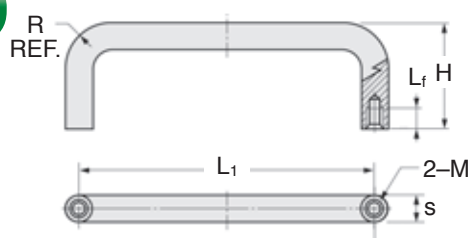


Fig. 1
Tapped Feet

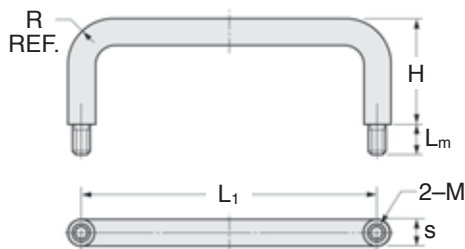


Fig. 2
Screwed Feet

• **APPLICATIONS**

Measuring instruments /
Telecommunication devices

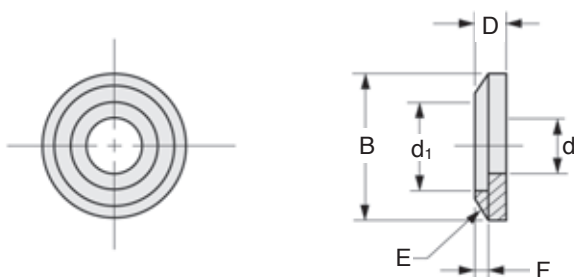
• **CHARACTERISTIC**

Appropriate size can be selected for
various devices.

• **HANDLE – Stainless Steel, Buffed**

Catalog Number	Allowable Vertical Load	Net Weight	Catalog Number	Allowable Vertical Load	Net Weight	L ₁	M	H	L _f	L _m	R	s
Fig. 1 Tapped Feet	kN (kgf)	g	Fig. 2 Screwed Feet	kN (kgf)	g							
MAKT12MTHA31S1TF	1.18 (120)	4.5	MAKT12MTHA31S1SF	1.28 (130)	6	20	M2.6		5		6	Ø4
MAKT12MTHA31S2TF	1.18 (120)	14	MAKT12MTHA31S2SF	1.28 (130)	17	40		22		7		
MAKT12MTHA31S3TF	1.67 (170)	18.5	MAKT12MTHA31S3SF	1.57 (160)	21	60	M4		7		11	Ø6
MAKT12MTHA31S4TF	1.37 (140)	26	MAKT12MTHA31S4SF	1.37 (140)	30	80		30				
MAKT12MTHA31S5TF		55.5	MAKT12MTHA31S5SF		62	100		35	10	10	14	Ø8
MAKT12MTHA31S6TF	2.45 (250)	68	MAKT12MTHA31S6SF	2.45 (250)	73.5	120	M5	40			15	
MAKT12MTHA31S7TF		82	MAKT12MTHA31S7SF		88.5	100		30				
MAKT12MTHA31S8TF		104	MAKT12MTHA31S8SF		113.5	120	M6	40	11	11	17	Ø10

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• **CHARACTERISTIC**

To be used with stainless steel handles to enhance their appearance.

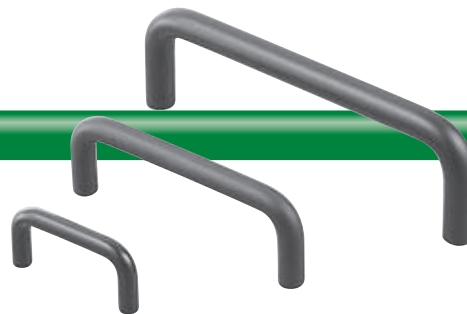
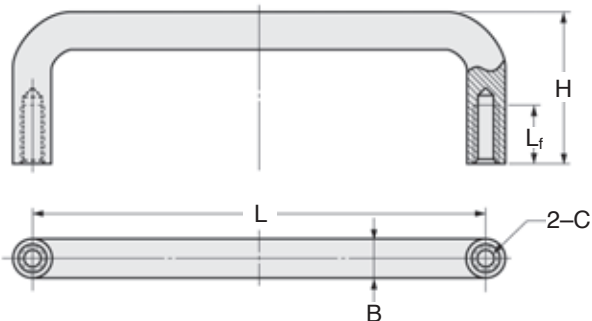
• **BEZEL – Stainless Steel**

Catalog Number	Size	d	d ₁	B	D	E	F	Net Weight g	Applicable Model
MKAT04MTHA270-1	Ø4	Ø2.8	Ø4.2	Ø6	2	0.5	1	0.25	MAKT12MTHA31S1
MKAT04MTHA270-2	Ø6	Ø4.3	Ø6.2	Ø10	2.5	1	1	1	MAKT12MTHA31S2~4
MKAT04MTHA270-3	Ø8	Ø5.3	Ø8.2	Ø12				1.5	MAKT12MTHA31S5,6
MKAT04MTHA270-4	Ø10	Ø6.3	Ø10.2	Ø16	3	1.5	1.5	3	MAKT12MTHA31S7,8

HANDLES & BEZELS

RoHS
COMPLIANT

1



• APPLICATIONS

Measuring instruments / Telecommunication devices

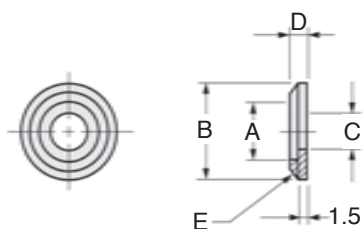
• CHARACTERISTIC

Black colored handles match black colored devices.

• HANDLE – Brass, Special Lubricant Coating, Black

Catalog Number	L	H	C	L _f	B	Allowable Vertical Load kN (kgf)	Net Weight g
MAKT52MTHA2161	40	22	M4	8	Ø6	1.18 (120)	14.6
MAKT52MTHA2162	60		M5	10	Ø8	2.94 (300)	33.1
MAKT52MTHA2163	70	25		12			39.1
MAKT52MTHA2164	80	30		13			47.3
MAKT52MTHA2165	100	31		16			56.4
MAKT52MTHA2166	120	40	M6	16	Ø10	4.41 (450)	109.6

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• APPLICATION

Use with black pull handles, **MAKT52MTHA2...**

• CHARACTERISTIC

Enhance the appearance of handles by adding these bezels.

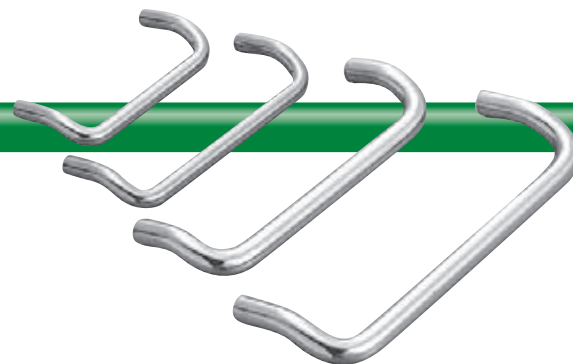
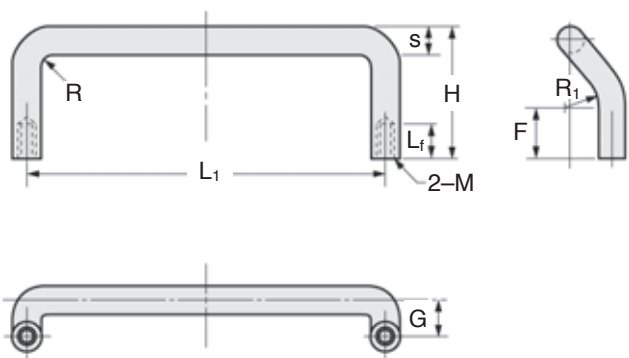
• BEZEL – Brass, Special Lubricant Coating, Black

Catalog Number	A	B	C	D	E	Net Weight g	Applicable Model
MKAT10MTHA2711	Ø6.2	Ø10	Ø4.5	2.5	1 X 45°	1.1	MAKT52MTHA2161
MKAT10MTHA2712	Ø8.2	Ø12	Ø5.5	2.5	1 X 45°	1.5	MAKT52MTHA2162~5
MKAT10MTHA2713	Ø10.2	Ø16	Ø6.5	3	1.5 X 45°	3.2	MAKT52MTHA2166

HANDLES, PULL

RoHS
COMPLIANT

1



• APPLICATIONS

Measuring instruments / Telecommunication devices

• CHARACTERISTICS

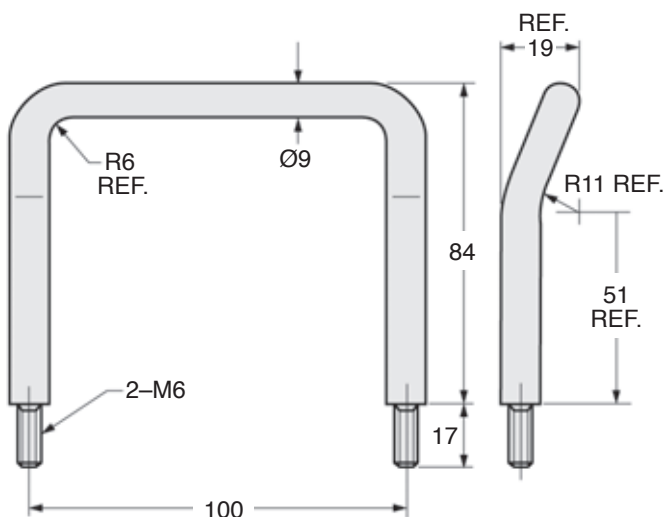
Handle is bent for easy gripping.

Can be used as a guard on equipment

• HANDLE – Stainless Steel, Polished

Catalog Number	L ₁	M	H	L _f	F	G	R	R ₁	s	Net Weight g
MAKT14MTHA32-1	60	M4	30	7	11	10	5	8	Ø6	23
MAKT14MTHA32-2	80	M4	31.5	7	12.5	10	5	8	Ø6	28
MAKT14MTHA32-3	100	M5	33.5	10	13	10.5	6.5	10	Ø8	57
MAKT14MTHA32-4	120	M5	40	10	21	10	6.5	10	Ø8	70.5

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• APPLICATIONS

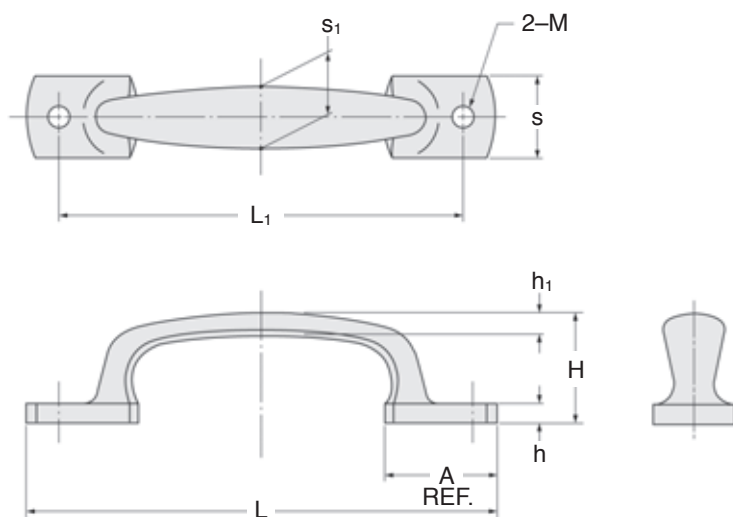
Measuring instruments / Telecommunication devices

• CHARACTERISTIC

Because of the sloping angle near the grip, it is easier to grab even when installed near an obstacle.

• HANDLE – Stainless Steel, Buffed

Catalog Number	Net Weight g
MAKT14MTHA291	131.5



• **APPLICATIONS**

Kitchen equipment / Food industries /
Medical instruments / Vessels / Vehicles

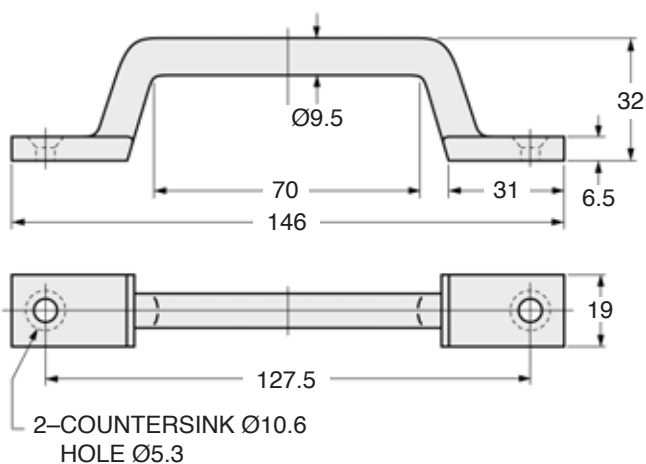
• **CHARACTERISTICS**

Stainless steel handle for use outdoors. It has excellent resistance against heat, salt, chemical, acid and corrosion.

• **HANDLE – Stainless Steel, Buffed**

Catalog Number	L	L ₁	M	H	h	h ₁	A	s	s ₁	Net Weight g
MAKT15M1THA424-3	120	105	Ø5.5	30	5	6	29	20	16	85
MAKT15M2THA424-1	145	125	Ø6.5	32	6	7	35	25	19	150

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• **APPLICATIONS**

Measuring instruments /
Telecommunication devices

• **CHARACTERISTICS**

Can be installed from front of panel. It is an easy-to-grip handle with its inclined sides.

• **HANDLE – Zinc Die Cast, Chrome Plated**

Catalog Number	Allowable Vertical Load N (kgf)	Net Weight g
MAKT16MTHA-5	587 (60)	98

HANDLES, FLUSH PULL

RoHS
COMPLIANT

1

APPLICATIONS

Measuring instruments / Controller devices

INSTALLATION INSTRUCTIONS

1. Hook the 45° beveled bottom of the handle into the panel opening (see Fig. 1)
2. While holding the handle against the panel, insert the screw with the pan head washer (see Fig. 2)

CHARACTERISTICS

A rotary pull developed to simplify the installation as its primary concept. The appearance of the handle was also revised. It is suitable for various types of boxes where a short handle is required.

NOTE

Since the handle is designed to be rotated, make sure to allow room for rotation.

PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Housing	Zinc Die Cast	Chrome Plated (Satin Finish)	1
2	Handle			
3	Pan Head Washer	Steel	Zinc Plated	
4	Screw with Washer			
5	Spring Pin	Stainless Steel	—	

SIZE LIST FOR INSTALLATION HOLE

MAKT00MTHA236-1

Panel Thickness	l	l_1	h
1.6	60.1	50.1	13
2.0	60.5	50.5	
2.3	60.8	50.8	

SIZE LIST FOR INSTALLATION HOLE

MAKT00MTHA236-2

Panel Thickness	l	l_1	h
1.6	71.0	60.0	15
2.0	71.4	60.4	
2.3	71.7	60.7	

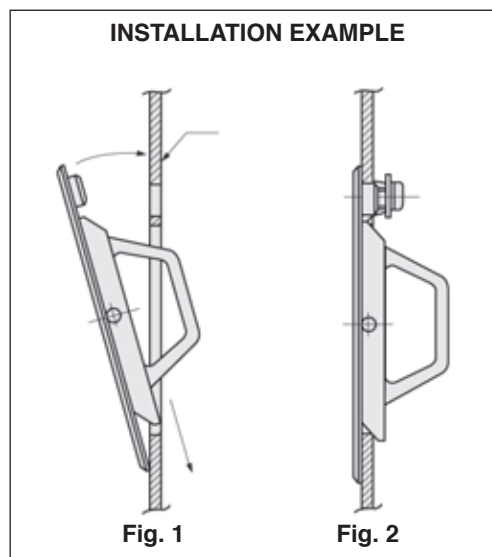
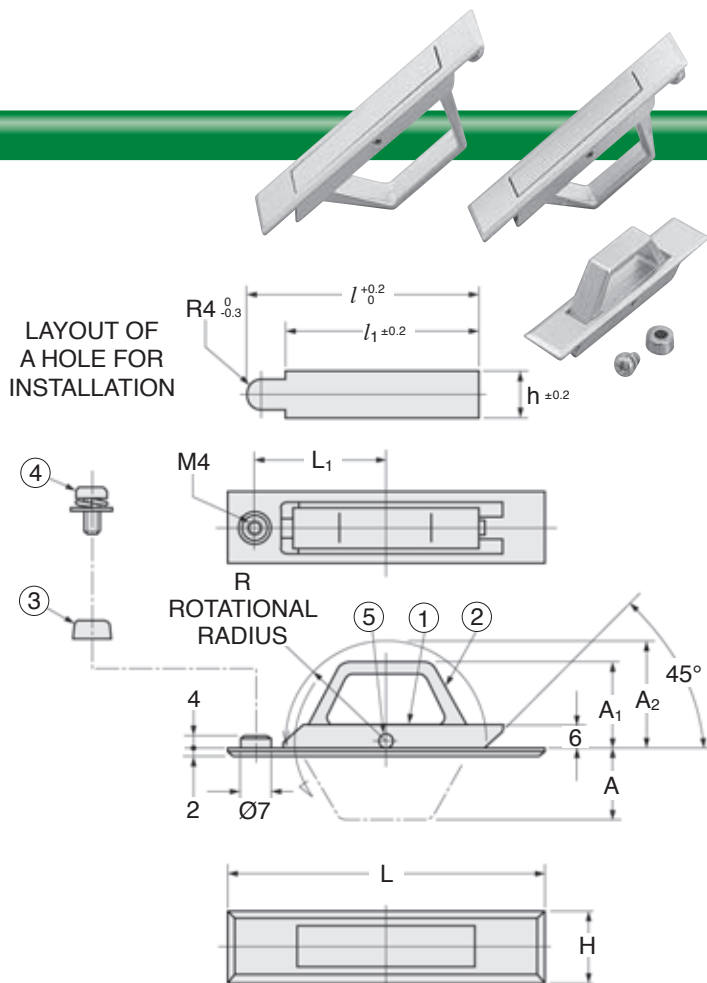
SIZE LIST FOR INSTALLATION HOLE

MAKT00MTHA236-3

Panel Thickness	l	l_1	h
1.6	83.0	73.0	17
2.0	83.4	73.4	
2.3	83.7	73.7	

HANDLES

Catalog Number	L	L ₁	H	A	A ₁	A ₂	R	Allowable Load N (kgf)	Net Weight g
MAKT00MTHA236-1	76	31	15	17	21	27	25	98.1 (10)	40.5
MAKT00MTHA236-2	88	37	18	21	25	32	30	147 (15)	58.7
MAKT00MTHA236-3	100	42.5	20	26.5	30.5	37	35	196 (20)	79.3



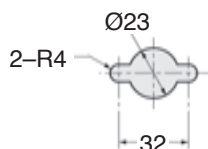
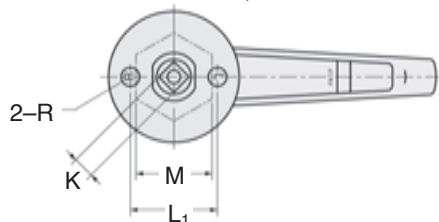
HANDLES, TURN TYPE



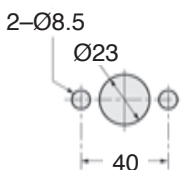
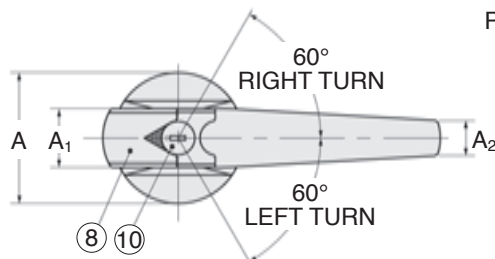
• PARTS LIST

No.	Part Name	Material		Finish		Qty.
		A330 · A330B	A330S · A330SB	A330 · A330B	A330S · A330SB	
1	Square Hole Washer	Steel	Stainless Steel	Zinc Plated	—	1
2	Square Hole Washer					
3	Flat Washer					
4	Phillips Hexagon Head Bolt with Washer					
5	Toothed Lock Washer					
6	Handle	Zinc Die Cast		See Table Below		
7	Handle Seat					
8	Cap					
9	Mounting Nut	Zinc Die Cast / Stainless Steel	Zinc Plated	Barrel Polishing		
10	Lock		Zinc Plated / —	—		
11	Packing*	Rubber		Black		2
12	Key	Brass		Nickel Plated		

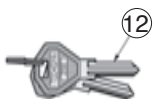
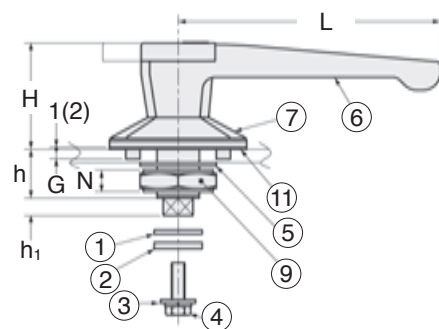
*For ...330S1K and ...330S1, material is elastomer.



LAYOUT OF HOLE FOR
INSTALLATION
PRODUCT NO. 2K, 2, 3K, 3



LAYOUT OF HOLES FOR
INSTALLATION
PRODUCT NO. 1K OR 1



• APPLICATIONS

Distribution boards / Distribution panels /
Control boards / Various types of boxes

• CHARACTERISTICS

Selection can be made from zinc die cast,
stainless steel, with or without key and
painted color.

• SPECIFICATIONS

The figure shows the right 60° turn type.
By rotating the handle seat 180°, the unit is
changed to the left 60° turn type.

• HANDLES

Catalog Number	Key No.	Finish	Net Weight g
MAKT24MA3301K	200	Chrome Plated	516
MAKT24MA3301	No Key		514
MAKT24MA3302K	200		354
MAKT24MA3302	No Key		356
MAKT24MA3303K	200	Paint (Ivory)	314
MAKT24MA3303	No Key		310
MAKT24MA330B1K	200		507
MAKT24MA330B1	No Key		508
MAKT24MA330B2K	200	Paint (Ivory, Clear)	351
MAKT24MA330B2	No Key		353
MAKT24MA330B3K	200		310
MAKT24MA330B3	No Key		310
MAKT24MA330C1K	200	Buffed	511
MAKT24MA330C2K	200		351
MAKT24MA330C3K	200		312
MAKT24MA330S1K	200	Paint (Ivory)	566
MAKT24MA330S1	No Key		582
MAKT24MA330S2K	200		408
MAKT24MA330S2	No Key		403
MAKT24MA330S3K	200	Paint (Ivory)	350
MAKT24MA330S3	No Key		346
MAKT24MA330SB2K	200		412
MAKT24MA330SB2	No Key		402

• SIZE LIST

Catalog Number	L	L ₁	H	h	h ₁	M	K	N	G	A	A ₁	A ₂	R
...3K	80	32	44.6	14.8	5	30	8	7	1.5	Ø46	23	12	Ø7
...3			44.5										
...2K	100		44.6	14.3						Ø48	25	15	
...2			44.5										
...1K	120	40	48.7 (49.7)	22.4 (21.4)	8	35	10	10	4.5 (3.5)	Ø60	27	16	Ø8
...1			48.6 (49.6)										

www.allmetricsmallparts.com Dimensions in () are for ...330S1K and ...330S1.

HANDLES, TURN TYPE

RoHS
COMPLIANT

1

• APPLICATIONS

Distribution boards / Distribution panels /
Control boards / Various types of boxes

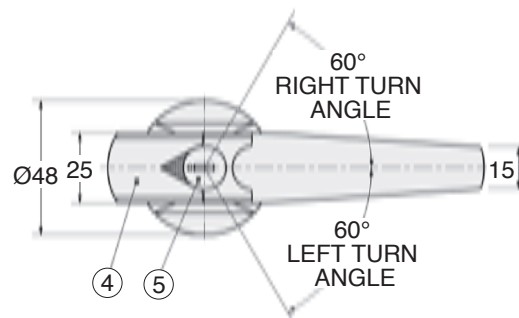
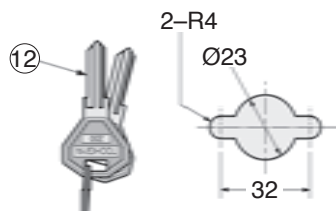
• CHARACTERISTIC

These handles are easier to grip due to
their longer neck design.

• SPECIFICATION

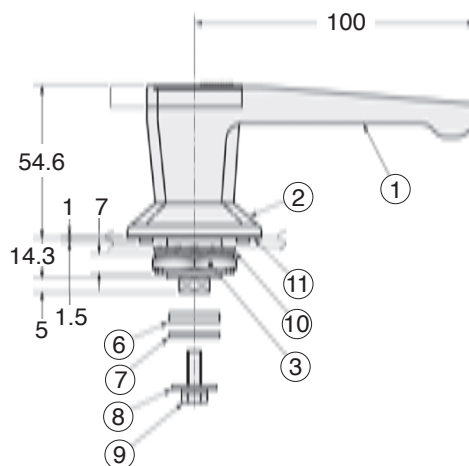
The figure shows the right 60° turn type.
By rotating the handle seat 180°, the unit is
changed to the left 60° turn type.

LAYOUT OF A HOLE
FOR INSTALLATION



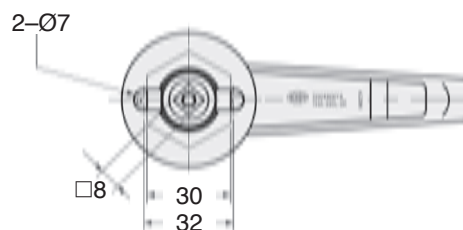
• PARTS LIST

No.	Part Name	Material		Finish		Qty.
		A330L • A330LB	A330LS • 330LSB	A330L • A330LB	A330LS • 330LSB	
1	Handle	Zinc Die Cast	Stainless Steel	See Table Below		1
2	Handle Seat			Below		
3	Mounting Nut			Zinc Plated	Barrel Polished	
4	Cap			See Table Below		
5	Lock	Zinc Die Cast / Stainless Steel		Zinc Plated / —	—	
6	Square Hole Washer	Steel		Zinc Plated		
7	Square Hole Washer					
8	Flat Washer					
9	Phillips Head Hexagonal Bolt with Washer					
10	Toothed Lock Washer					
11	Packing	Rubber		Black		
12	Key	Brass		Nickel Plated		2



• HANDLES

Catalog Number	Key No.	Finish	Net Weight g
MAKT24MA330L2K	200	Chrome Plated	396
MAKT24MA330L2	No Key	Paint (Ivory)	394
MAKT24MA330LB2K	200	Paint (Ivory)	394
MAKT24MA330LB2	No Key	Buffed	454
MAKT24MA330LS2K	200	Paint (Ivory)	477
MAKT24MA330LS2	No Key	Buffed	454
MAKT24MA330LSB2K	200	Paint (Ivory)	480
MAKT24MA330LSB2	No Key	Buffed	480



HANDLES, FIXED TYPE

RoHS
COMPLIANT

1

• APPLICATIONS

Distribution boards / Distribution panels /
Control boards / Various types of boxes

• CHARACTERISTICS

Same as turn type **MAKT24MA330L...**
series but without ability to turn. Used on
double doors in conjunction with turn type.

• NOTE

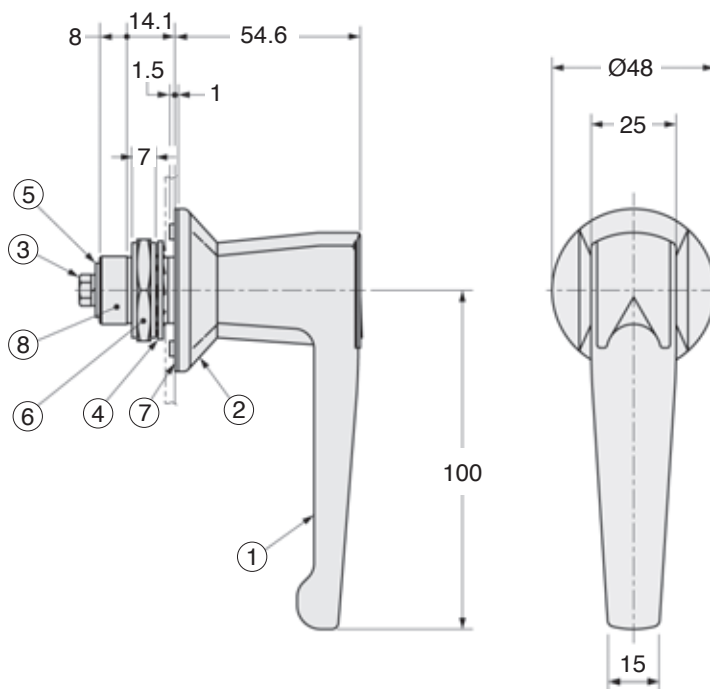
Do not remove the phillips head hexagon
bolt with washer listed as ③ in the parts list.

• PARTS LIST

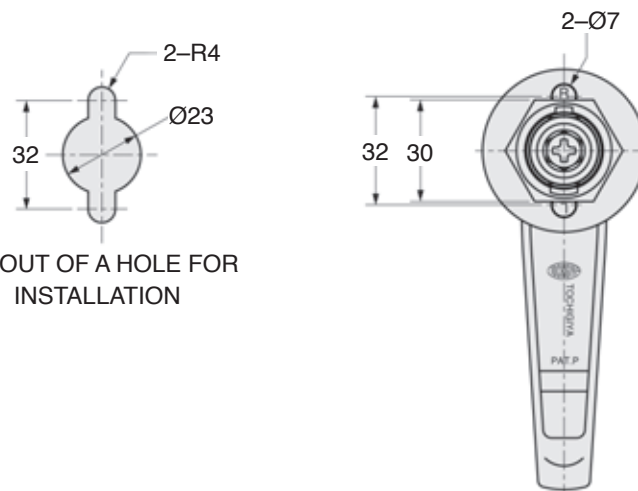
No.	Part Name	Material	Finish	Qty.
1	Handle	Stainless Steel	See Table Below	1
2	Handle Seat			
3	Phillips Head Hexagon Bolt with Washer		—	
4	Toothed Lock Washer		—	
5	Flat Washer		—	
6	Mounting Nut	Rubber	Barrel Polishing	
7	Packing		Black	
8	Square Hole Spacer		—	
		Stainless Steel	—	

• HANDLES

Catalog Number	Finish	Net Weight g
MAKT24MA330LSF2	Buffed	480
MAKT24MA330LSFB2	Paint (Ivory)	487



LAYOUT OF A HOLE FOR
INSTALLATION



HANDLES, FIXED TYPE

RoHS
COMPLIANT

1

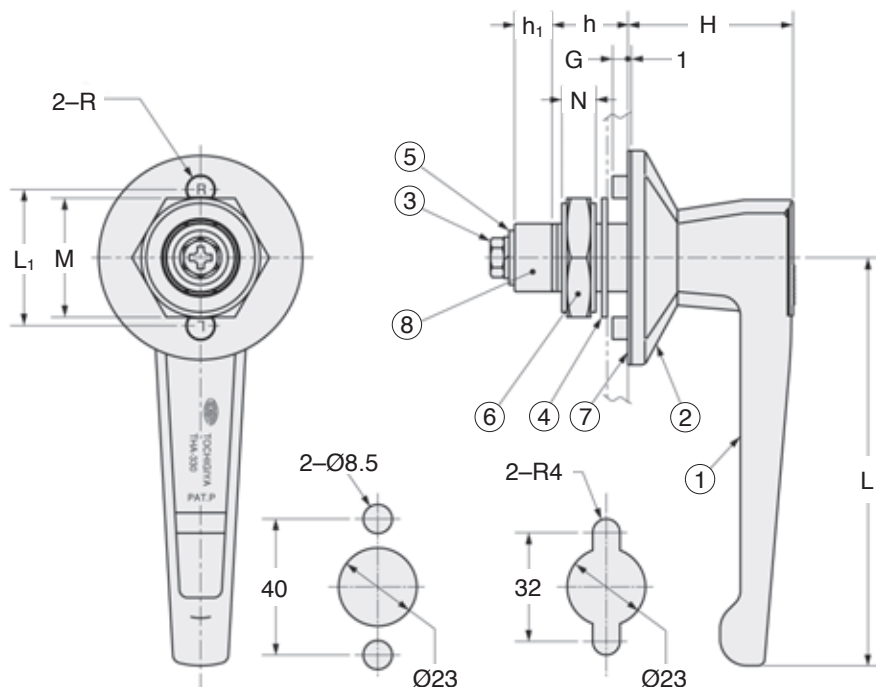
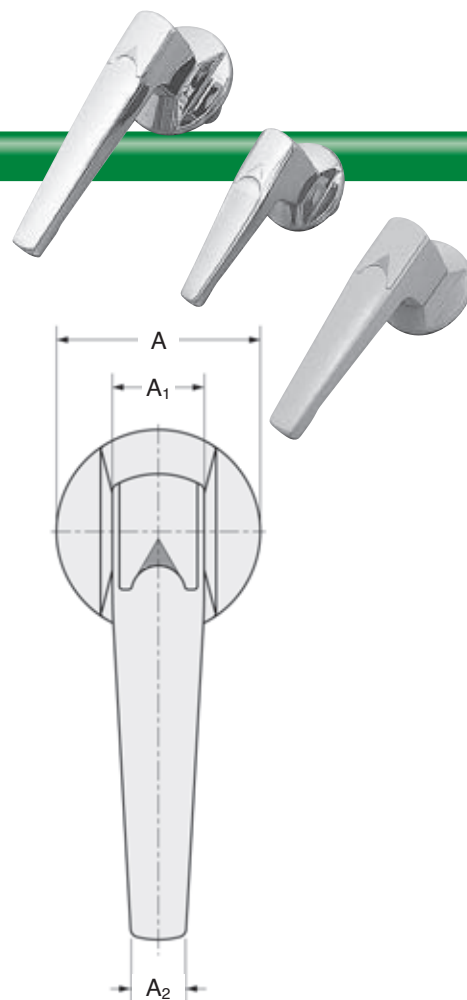


Fig. 1

Fig. 2

LAYOUT OF HOLES FOR INSTALLATION



• PARTS LIST

No.	Part Name	Material		Finish		Qty.
		A330F · A330FB	A330SF	A330F · A330FB	A330SF	
1	Handle	Zinc Die Cast	Stainless Steel	See Table Below	See Table Below	1
2	Handle Seat					
3	Phillips Head Hexagon Bolt with Washer	Steel		Zinc Plated	—	
4	Toothed Lock Washer					
5	Flat Washer					
6	Mounting Nut	Zinc Die Cast		Barrel Polishing		
7	Packing*	Rubber	Rubber	Black	Black	
8	Square Hole Spacer	Zinc Die Cast	Stainless Steel	Zinc Plated	—	

* ...M3A330SF1, packing material is Elastomer.

• APPLICATIONS

Distribution boards / Distribution panels /
Control boards / Various types of boxes

• CHARACTERISTICS

Same as turn type **MAKT24MA330...** series but without ability to turn. Used on double doors in conjunction with turn type.

• NOTE

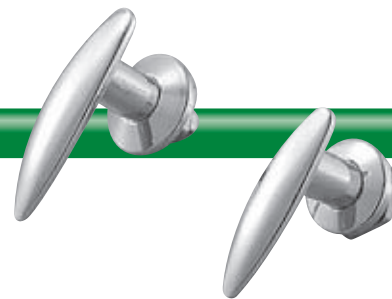
Do not remove the phillips head hexagon bolt with washer listed as ③ in the parts list.

• HANDLES

Catalog Number	Finish	Fig.	L	L ₁	H	h	h ₁	M	N	G	A	A ₁	A ₂	R	Net Weight g
MAKT24M1A330F3	Chrome Plated	2	80	32	44.5	14.7	8	30	7	1.5	Ø46	23	12	Ø7	318
MAKT24M2A330F2		1	100	40	48.6	14.1	11	35	10	4.5	Ø48	25	15	Ø8	364
MAKT24M3A330F1	Paint (Ivory)	1	120	40	48.6	22.35	11	35	10	4.5	Ø60	27	16	Ø8	514
MAKT24M1A330FB3		2	80	32	44.5	14.7	8	30	7	1.5	Ø46	23	12	Ø7	312
MAKT24M2A330FB2		1	100	40	48.6	14.1	11	35	10	4.5	Ø48	25	15	Ø8	356
MAKT24M3A330FB1	Buffed	1	120	40	48.6	22.35	11	35	10	4.5	Ø60	27	16	Ø8	510
MAKT24M1A330SF3		2	80	32	44.5	14.7	8	30	7	1.5	Ø46	23	12	Ø7	356
MAKT24M2A330SF2		1	100	40	48.6	14.1	11	35	10	4.5	Ø48	25	15	Ø8	411
MAKT24M3A330SF1		1	120	40	49.6	21.35	11	35	10	3.5	Ø60	27	16	Ø8	583

HANDLES - Dual Swing

RoHS
COMPLIANT



1

• APPLICATIONS

Distribution boards / Distribution panels

• CHARACTERISTIC

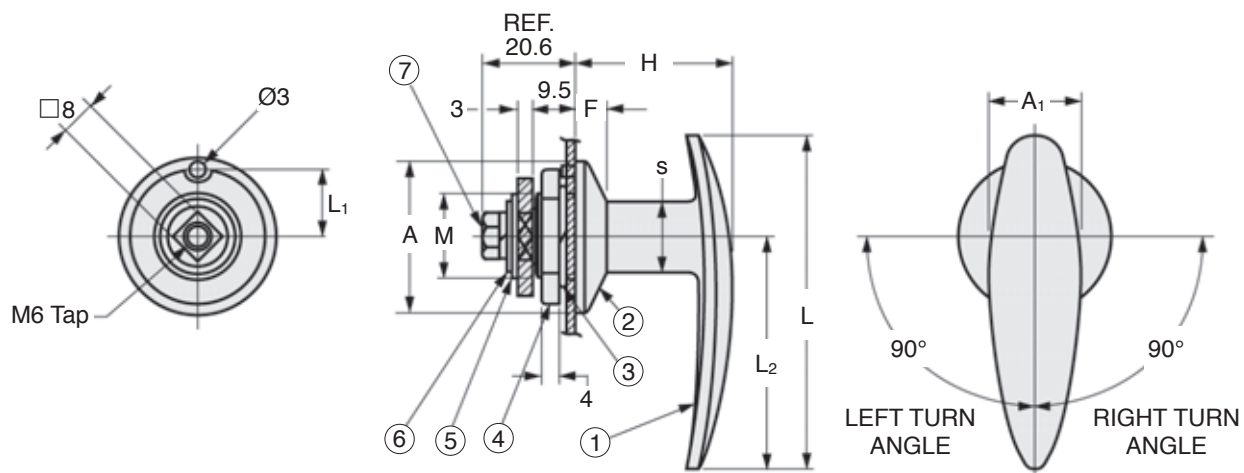
The handle can be used for both left and right sides.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Handle	Zinc Die Cast	Chrome Plated	1
2	Sleeve			
3	Ring Washer	Steel Wire	Zinc Plated	
4	Mounting Nut	Zinc Die Cast		
5	Square Hole Washer	Steel		
6	Washer			
7	Hexagon Bolt with Washer			



LAYOUT OF HOLES FOR INSTALLATION



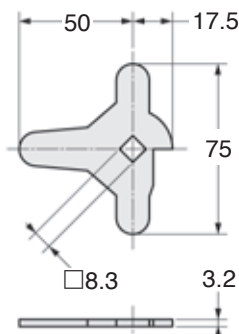
• HANDLES

Catalog Number	L	L ₁	L ₂	M	H	A	A ₁	F	s	R	Net Weight g
MAKT25M1THA225-2	65	13	45	M18 X 1	33	Ø30	17	6	Ø15.2	Ø18.2	97.2
MAKT25M2THA225-1	75	14.5	52	M19 X 1	36	Ø34	20	7	Ø16.2	Ø19.5	118

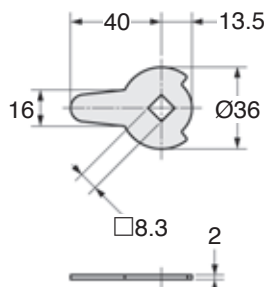
CAMS, OPTIONAL

RoHS
COMPLIANT

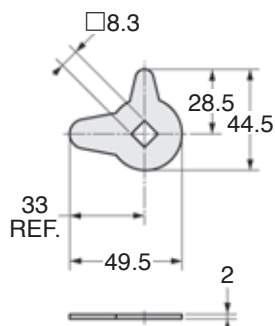
1



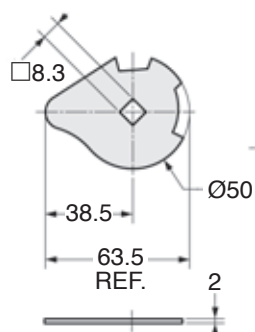
MAKT35M6A2661



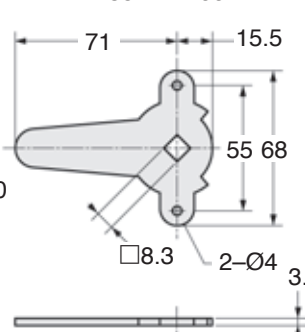
MAKT35M2A266SUS2
MAKT35M1A2662



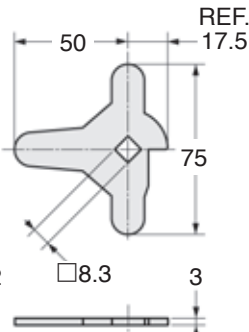
MAKT35M3A2663



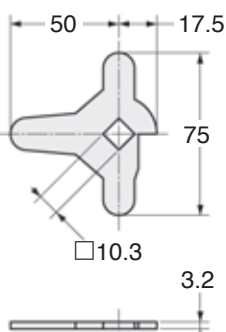
MAKT35M4A2664



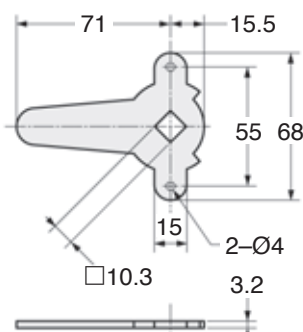
MAKT35M7A2665



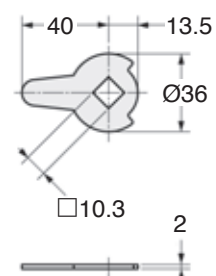
MAKT35M5A266SUS1



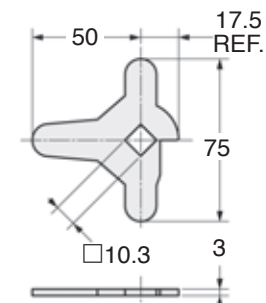
MAKT35M4A2671



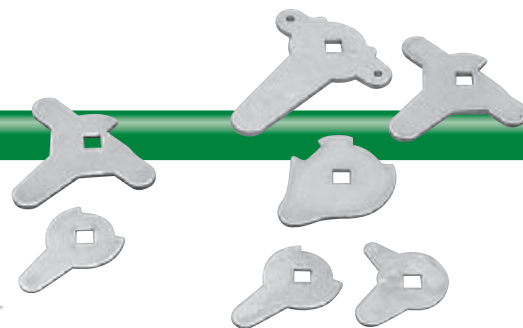
MAKT35M5A2672



MAKT35M1A2673
MAKT35M2A267SUS3



MAKT35M3A267SUS1



• APPLICATION

Various types of handles.

• CHARACTERISTIC

Many sizes and shapes are offered to fit different applications.

• PARTS LIST

Model No.	Material	Finish
...A266SUS...	Stainless Steel	—
...A266...	Steel	Zinc Plated

• CAMS

Catalog Number	Net Weight g
MAKT35M1A266SUS2	
MAKT35M2A2662	17
MAKT35M3A2663	
MAKT35M4A2664	34.5
MAKT35M5A266SUS1	43.5
MAKT35M6A2661	48.5
MAKT35M7A2665	62

All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts



• PARTS LIST

Model No.	Material	Finish
...A267SUS...	Stainless Steel	—
...A267...	Steel	Zinc Plated

• CAMS

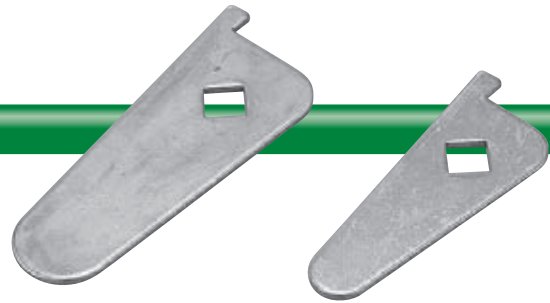
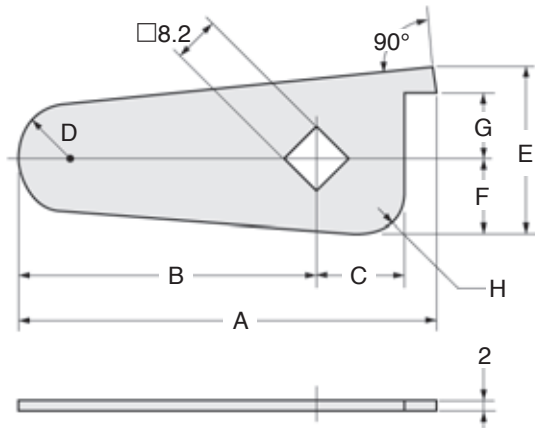
Catalog Number	Net Weight g
MAKT35M1A2673	16
MAKT35M2A267SUS3	16.5
MAKT35M3A267SUS1	44.5
MAKT35M4A2671	47
MAKT35M5A2672	60

• APPLICATION

Various types of handles.

• CHARACTERISTIC

Many sizes and shapes are offered to fit different applications.

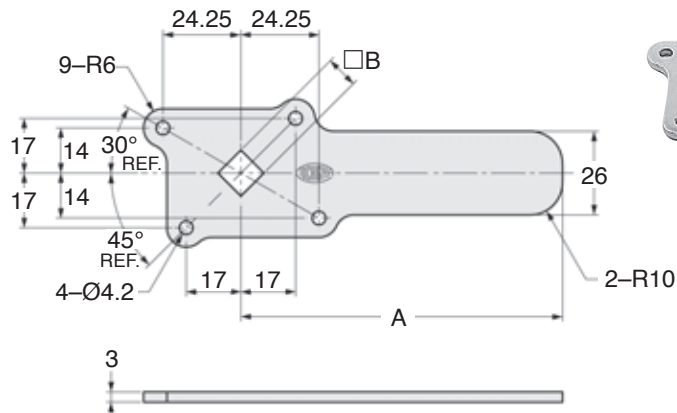


- **APPLICATION**
Various types of handles.
- **CHARACTERISTIC**
Select the size to fit the application.

• **CAM** – Steel, Zinc Plated Finish

Catalog Number	A	B	C	D	E	F	G	H	Net Weight g
MAKT35M1THA2232	78	56	16	R10	31	14	12	R8	25.8
MAKT35M2THA2231	65	44	15	R6	25	12	8	R7	15.4

All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts



- **APPLICATION**
Various types of handles.
- **CHARACTERISTICS**
Size can be selected for various mounting locations.
Two different strokes are available depending upon position of rod.
(For 60° handle rotation ~ 28 mm stroke)
(For 90° handle rotation ~ 34 mm stroke)

• **CAM** – Stainless Steel, Barrel Polishing Finish

Catalog Number	A	B	Net Weight g
MAKT35M1THA4266	80	8.1	78
MAKT35M2THA4265	100	8.1	88
MAKT35M3THA4264		10.1	

RODS

RoHS
COMPLIANT

1

• APPLICATIONS

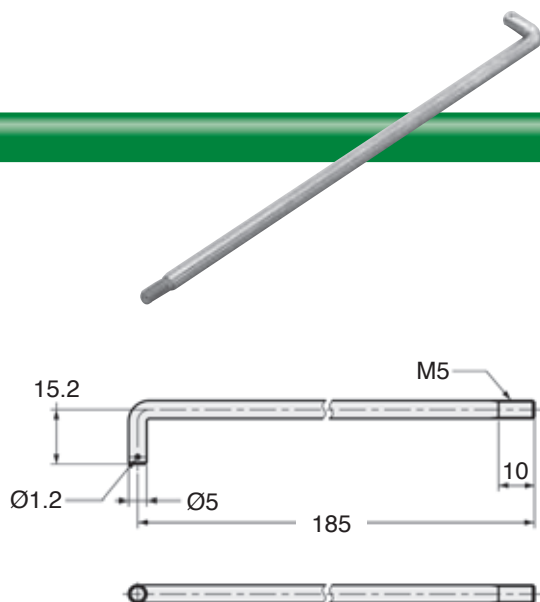
Paddle latches / Various types of handles

• CHARACTERISTICS

Can be used with paddle latches or handles to make a 2- or 3-point lock. Use with slam latch **MAKT44MTHA315**.

• ROD – Steel, Zinc Plated

Catalog Number	Net Weight g
MAKT53MTHA316	30



All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

• APPLICATIONS

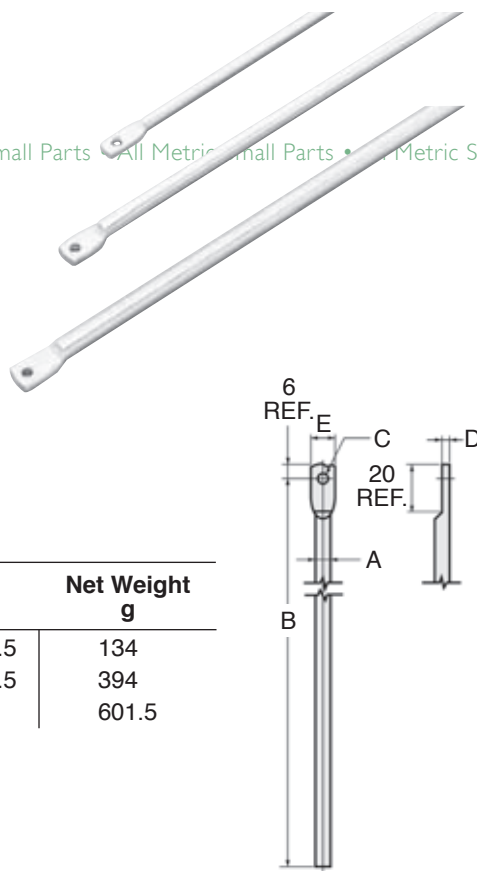
Distribution boards / Distribution panels / Boxes for controllers

• CHARACTERISTIC

Standard rod sizes are offered which can be used with various door locks for boxes.

• ROD – Steel, Zinc Plated

Catalog Number	A	B	C	D	E	Net Weight g
MAKT54MTHA2491	Ø6	600		3	Approx. 9.5	134
MAKT54MTHA2492	Ø8	1000	Ø4.2	4	Approx. 12.5	394
MAKT54MTHA2493	Ø9	1200		4.5	Approx. 14	601.5



RETAINERS, ROD

RoHS
COMPLIANT

1

• APPLICATIONS

Distribution boards / Distribution panels /
Best for transfer mechanism with a rod

• CHARACTERISTICS

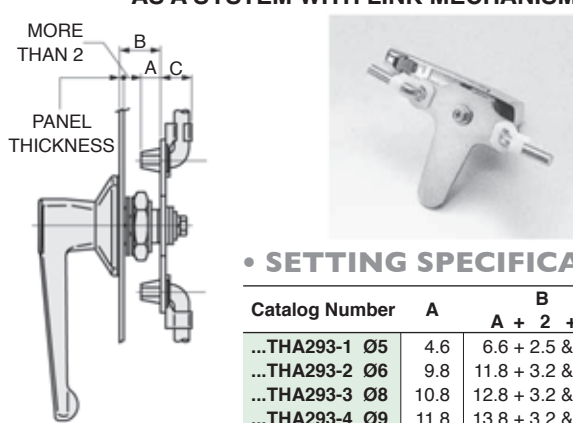
A bushing for connecting a rod with simple snap-on installation avoiding any staking. It is a bushing with which steady movement of a rod can be obtained, preventing operational failure caused by loosening of staking. Achieve cost reduction with this labor saving retainer.

• MATERIAL CHARACTERISTICS

Water absorption or moisture absorption is one of the characteristics of polyamide (nylon-made) products. For this reason, water absorption treatment is made for stabilizing their characteristics. As a result, the products may show the following phenomena depending on the temperature and humidity of their storage. However, its functionality is maintained.

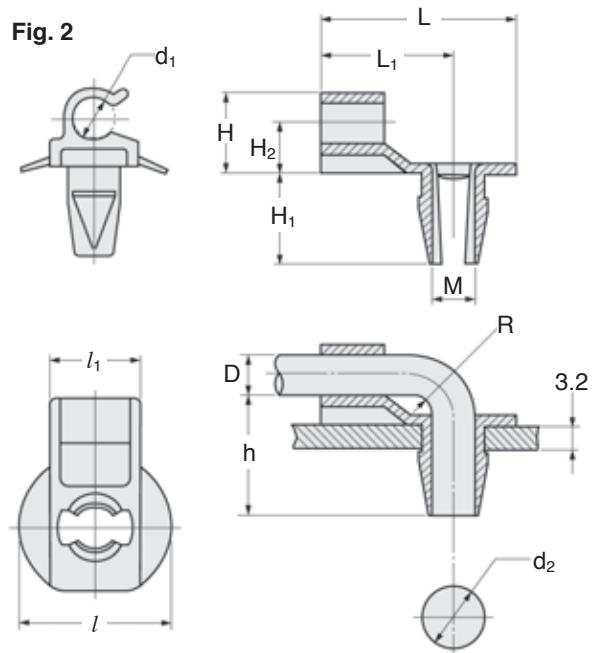
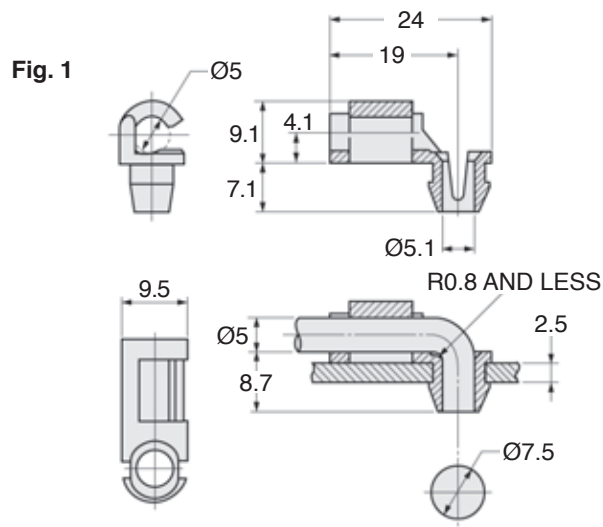
1. Since nylon-made products absorb and exhaust water content continuously if they are stored in a bag, color of the dye for a carton box may be absorbed into the product through the bag. In this case, melamine, the yellow dye for a carton box, is absorbed in the air as moisture content, which may be absorbed into the product. For the worst case, the product may show yellowish color.
2. Nylon made products sometimes show a bluish color. It is because heat-resistant material reacts with water content. This is another characteristic of nylon.

APPLICATION EXAMPLE OF A UTILITY MODEL AS A SYSTEM WITH LINK MECHANISM



• SETTING SPECIFICATION

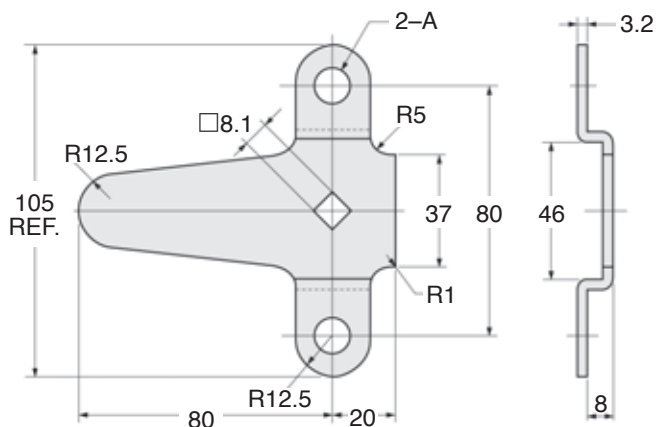
Catalog Number	A	B A + 2 + Panel Thick.	C
...THA293-1 Ø5	4.6	6.6 + 2.5 & over	11.6
...THA293-2 Ø6	9.8	11.8 + 3.2 & over	14.7
...THA293-3 Ø8	10.8	12.8 + 3.2 & over	18.2
...THA293-4 Ø9	11.8	13.8 + 3.2 & over	19.2



LAYOUT OF PROCESSED ROD AND A HOLE FOR INSTALLATION

• RETAINER – Nylon, Natural Color Finish

Catalog Number	Fig.	L	L ₁	H	H ₁	H ₂	l	l ₁	h	M	R	D or d ₁	d ₂	Net Weight g
MAKT27MTHA293-1	1	See dimensions in drawing above												0.6
MAKT27MTHA293-2	2	28	19	11.5	13	7	Ø21	13	17	Ø6.2	4 and less	Ø6	Ø9	1.2
MAKT27MTHA293-3		30	21	15	14	9	Ø22	15	19	Ø8.3	5 and less	Ø8	Ø11	1.8
MAKT27MTHA293-4		32	22	16	15	9.5	Ø24	16	20	Ø9.3	5 and less	Ø9	Ø12	2



• **APPLICATIONS**

Distribution boards / Distribution panels / Control boards

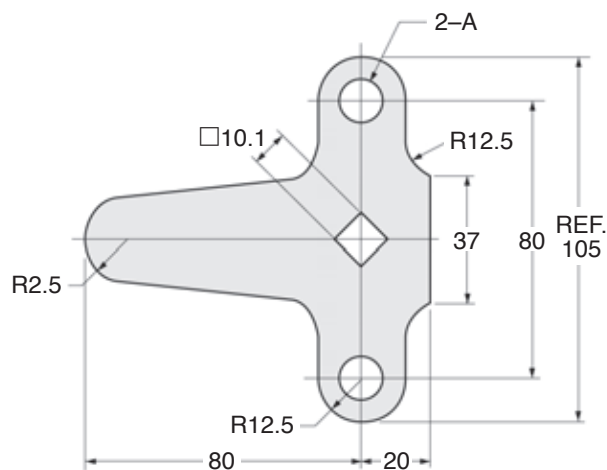
• **CHARACTERISTIC**

Use the cam with a push-in type rod retainer to save installation time.

• **CAM – Steel, Zinc Plated**

Catalog Number	Applicable Model	A	For Rod Diameter	Net Weight g
MAKT35MTHA4012	MAKT27MTHA 2932	Ø9	Ø6	115.3
MAKT35MTHA4013	MAKT27MTHA 2933	Ø11	Ø8	113.5
MAKT35MTHA4014	MAKT27MTHA 2934	Ø12	Ø9	112.9

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• **APPLICATIONS**

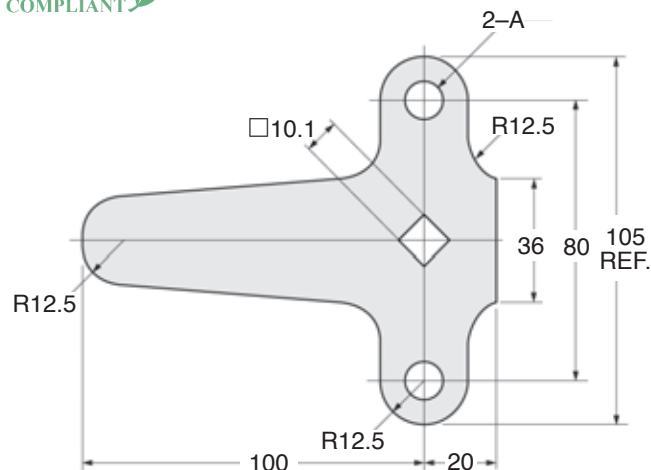
Distribution boards / Distribution panels / Control boards

• **CHARACTERISTIC**

Use the cam with a push-in type rod retainer to save installation time.

• **CAM – Steel, Zinc Plated**

Catalog Number	Applicable Model	Plate Thickness	A	For Rod Diameter	Net Weight g
MAKT35MTHA4022	MAKT27MTHA 2932	3.2	Ø9	Ø6	113.8
MAKT35MTHA4023	MAKT27MTHA 2933		Ø11	Ø8	111.3
MAKT35MTHA4024	MAKT27MTHA 2934		Ø12	Ø9	109.3



• **APPLICATIONS**

Distribution boards / Distribution panels / Control boards

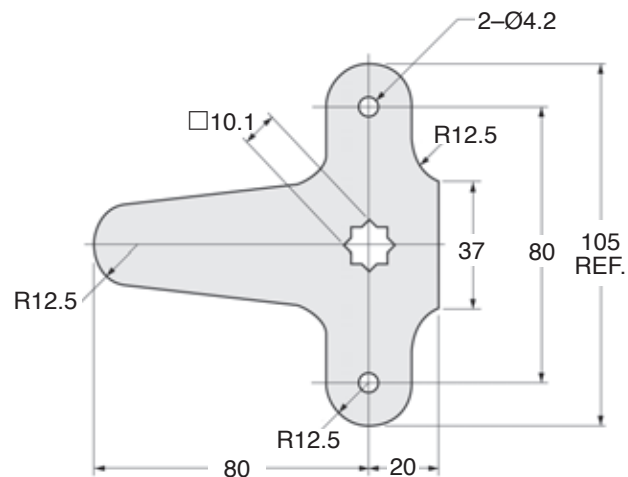
• **CHARACTERISTIC**

Use the cam with a push-in type rod retainer to save installation time.

• **CAM – Steel, Zinc Plated**

Catalog Number	Applicable Model	Plate Thickness	A	For Rod Diameter	Net Weight g
MAKT35MTHA4032	MAKT27MTHA 2932	3.2	Ø9	Ø6	126.7
MAKT35MTHA4033	MAKT27MTHA 2933		Ø11	Ø8	125.6
MAKT35MTHA4034	MAKT27MTHA 2934		Ø12	Ø9	123.9

All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts



• **APPLICATIONS**

Distribution boards / Distribution panels / Control boards

• **CHARACTERISTIC**

With its double squared installation hole, the installation angle can be adjusted with each turn of 45°.

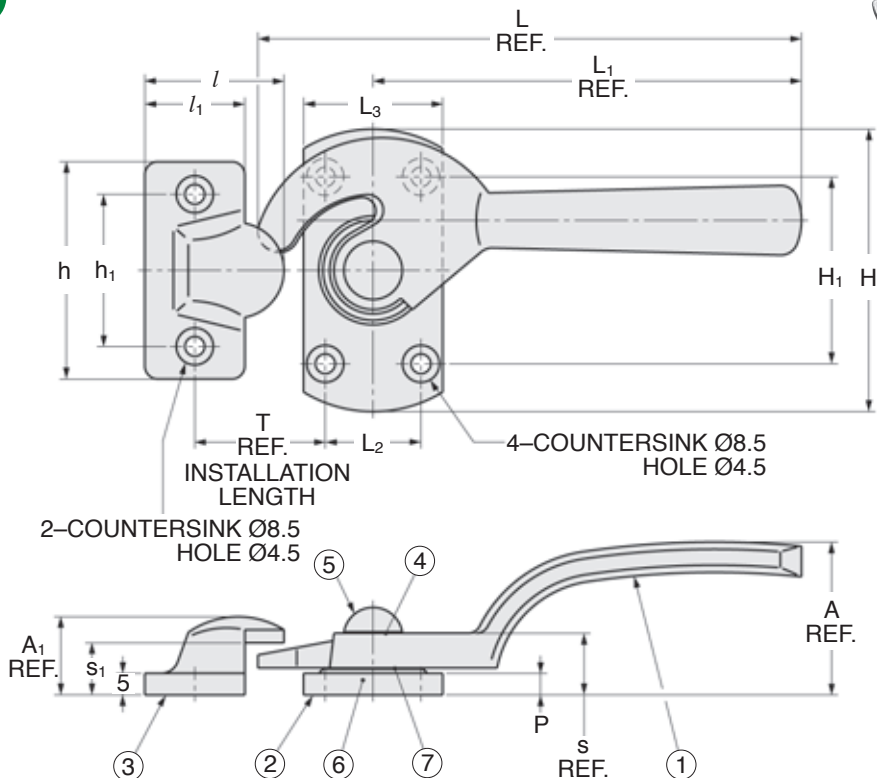
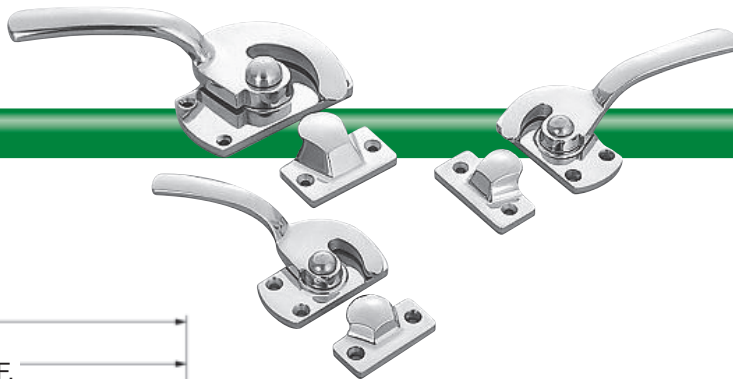
• **CAM – Steel, Zinc Plated**

Catalog Number	Plate Thickness	Net Weight g
MAKT35MTHA404	3.2	114.1

HANDLES, LIFT LEVER

RoHS
COMPLIANT

1



• APPLICATIONS

Thermostatic chambers / Refrigerators /
Small doors for various types of sealed storage

• CHARACTERISTIC

Handle is made of stainless steel and has
excellent corrosion resistance.

• OPERATION INSTRUCTIONS

Tighten until proper position is attained.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Handle	Stainless Steel	Buffed	1
2	Base			
3	Keeper			
4	Wave Washer			
5	Rivet			
6	Washer			
7	Plate Spring			
			—	

• HANDLES

Catalog Number		L Ref.	L ₁ Ref.	L ₂	L ₃	H	H ₁	l	l ₁
Right-Hand Type	Left-Hand Type								
MAKT26M1THA4305R	MAKT26M1THA4305L	90	68	17	30	55	37	30	20
MAKT26M2THA4304R	MAKT26M2THA4304L	110	83	20		60	40		
MAKT26M3THA4303R	MAKT26M3THA4303L	125	98.5	22	32	65	43	32	23
MAKT26M4THA4302R	MAKT26M4THA4302L	140	111.4	25	40	80	52	35	24
MAKT26M5THA4301R	MAKT26M5THA4301L	170	127	34	45	90	70	40	28

Catalog Number		h	h ₁	A Ref.	A ₁ Ref.	s Ref.	s ₁	P	T Ref.	Net Weight g
Right-Hand Type	Left-Hand Type									
MAKT26M1THA4305R	MAKT26M1THA4305L	45	32	27.1	14.5	12.6	10	5	28	139
MAKT26M2THA4304R	MAKT26M2THA4304L			35.2		13.2				166
MAKT26M3THA4303R	MAKT26M3THA4303L	50	35	35.2	18	14.2	12	5	30	230
MAKT26M4THA4302R	MAKT26M4THA4302L		34	43.6	17	14.6		6	34	298
MAKT26M5THA4301R	MAKT26M5THA4301L	52	40	48.6	19	17.6	14	6	43	528

HANDLES, LIFT LEVER

RoHS
COMPLIANT

1

• APPLICATIONS

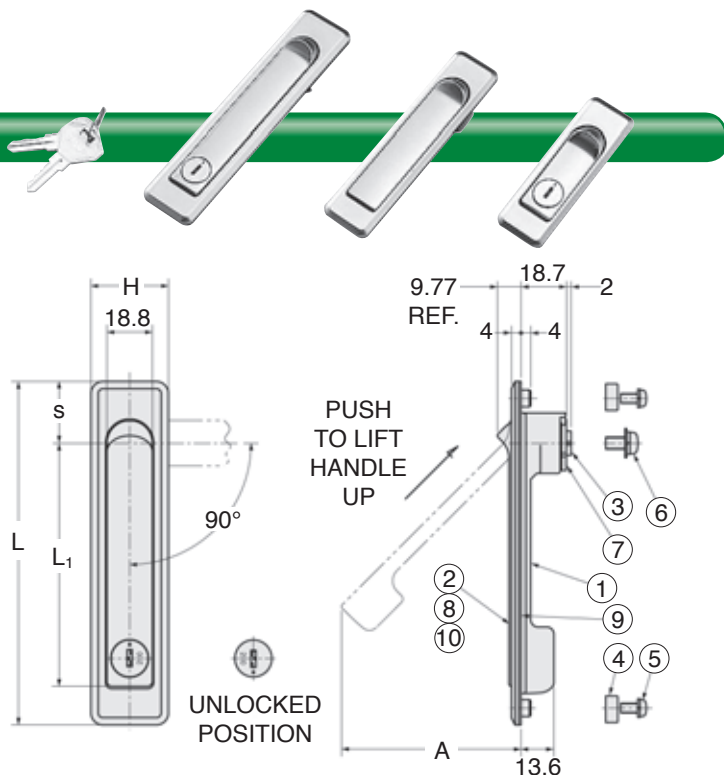
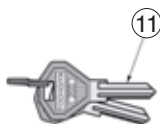
Distribution boards / Distribution panels /
Control boards / Telecommunication devices /
Office automation appliances

• CHARACTERISTICS

A cylinder lock type handle. Operational difficulties caused by the cam resistance are eliminated and waterproofing is added.

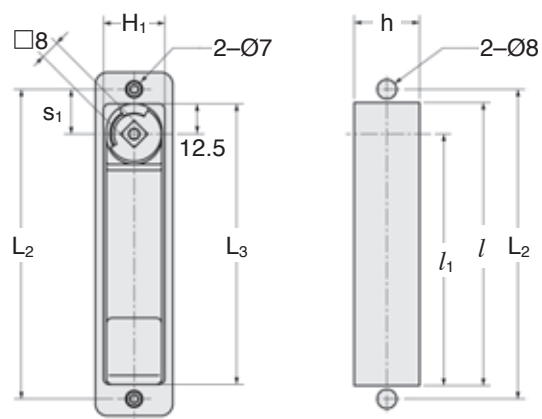
• SPECIFICATIONS

It can swing to the left or to the right by changing the position of the cam. Inserting and removing the key can be done at both locked and unlocked positions. (2-point take off).
Applicable panel thickness: 0.8 to 2.3.



• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Case	Zinc Die Cast	Chrome Plated (Dull Finish)	1
2	Handle			
3	Shaft			
4	Mounting Spacer			
5	Phillips Pan Head Screw with Washer	Steel	Zinc Plated	2
6	Phillips Pan Head Screw with Washer			
7	Rotation Control Cam			
8	Pin	Stainless Steel	—	1
9	Packing	Rubber	Black	
10	Lock	Stainless Steel / Zinc Die Cast	— / Zinc Plated	2
11	Key	Brass	Nickel Plated	



LAYOUT OF HOLE
FOR INSTALLATION

See page 1-42 for applicable cams.

• HANDLES

Catalog Number	L	L ₁	L ₂	L ₃	H	H ₁	l	l ₁	h	A REF.	s	s ₁	Net Weight g
MAKT31M1THA5053	86	45.5	72	61	28	23	62	49	24	35.29	25	18	160
MAKT31M2THA5053K													172
MAKT31M3THA5052	119	78.5	105	94			95	82		58.63			190
MAKT31M4THA5052K													200
MAKT31M5THA5051	142	100.5	128	116	32	25.4	117	104	27	74.19	25.5	18.5	230
MAKT31M6THA5051K													242

HANDLES, LIFT LEVER

RoHS
COMPLIANT

1

• APPLICATIONS

Distribution boards / Distribution panels /
Control boards / Various types of boxes

• CHARACTERISTICS

Push of the button makes the lever pop up. The lever lifts out gently, yet avoids the operational failure caused by foreign matter.

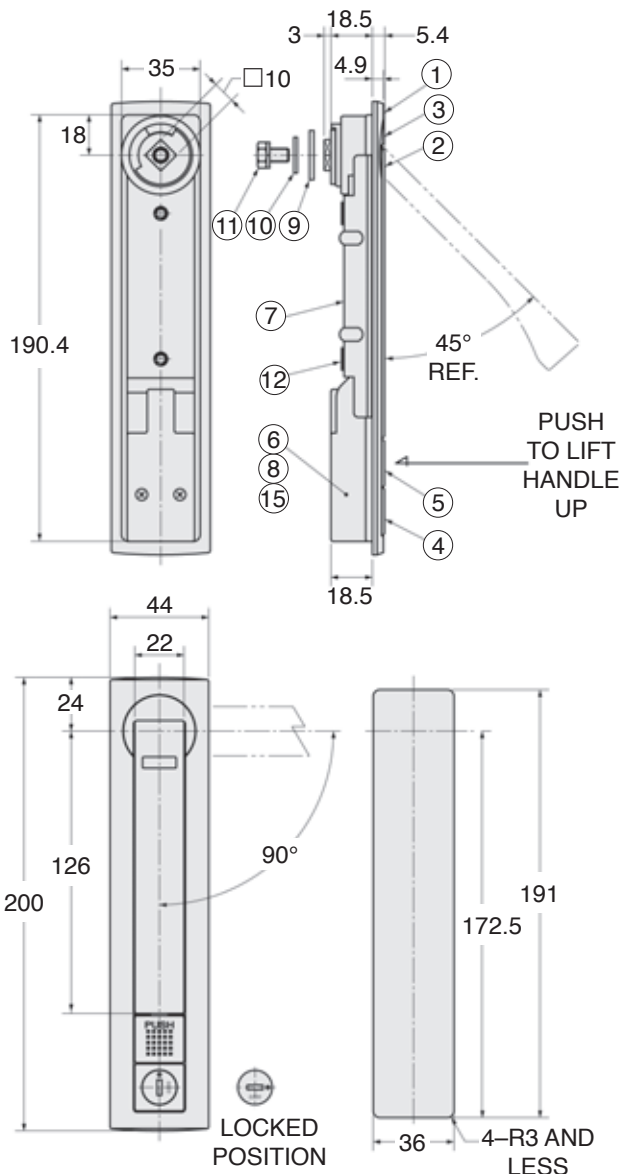
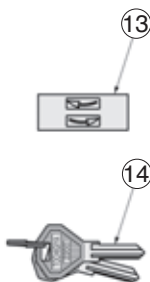
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Case	Zinc Die Cast	Painted (Ivory)	1
2	Lever			
3	Shaft			
4	Cylinder Case			
5	Push Button			
6	Latch	Steel	Nickel Plated	1
7	Bracket			
8	Cam Stopper			
9	Square Hole Washer			
10	Flat Washer			
11	Phillips Head Hexagon Bolt with Washer	Steel	Nickel Plated	2
12	Phillips Head Countersunk Screw			
13	Direction Marker Seal	—	—	1
14	Key	Brass	Nickel Plated	
15	Lock	Stainless Steel / Zinc Die Cast	— / Zinc Plated	1

See page 1—42 for applicable cams.

• HANDLES

Catalog Number	Key	Net Weight g
MAKT32M1THA4161	Without	672
MAKT32M2THA4161K	With	694



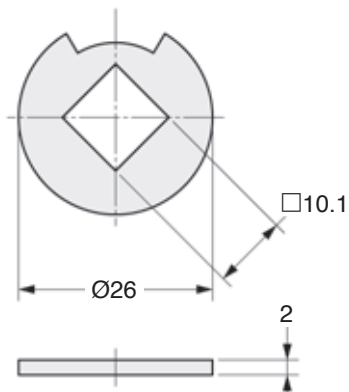
THE FIGURE SHOWS
MAKT32MTHA4161K

LAYOUT OF HOLE
FOR INSTALLATION

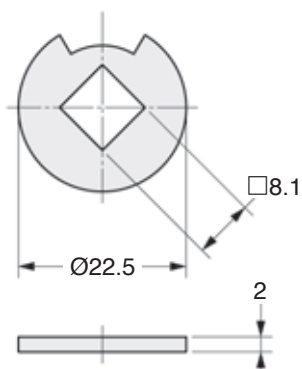


1

MAKT35MT3041



MAKT35MT3042



• **APPLICATIONS**

Distribution boards / Distribution panels /
Control boards / Doors of various cabinets.

• **CHARACTERISTICS**

By replacing these cams with cams that originally came with the handle, one can change it to the nonrotating handle. It is used on one side of a double door on which locking or unlocking is not needed.

• **FOR USE WITH**

MAKT32M..THA416..

MAKT31M..THA505..

MAKT29M..HA506..

• **CAM** – Stainless Steel, Barrel Polished

Catalog Number	Net Weight g
MAKT35MT3041	5.8
MAKT35MT3042	

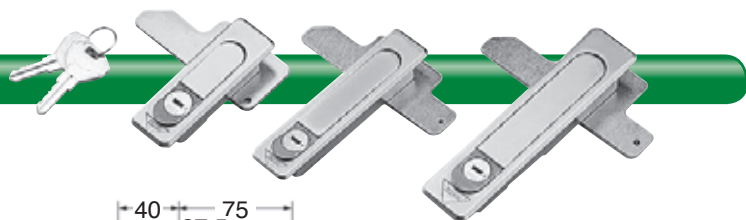


Fig. 1

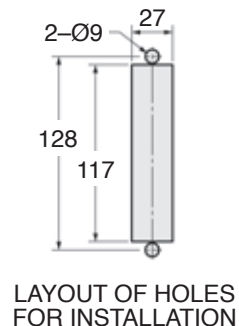
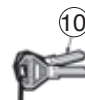
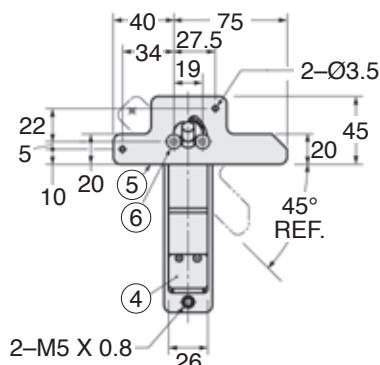
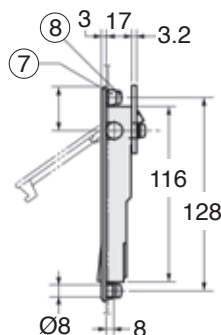
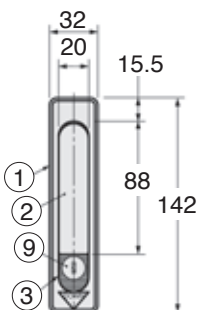


Fig. 2

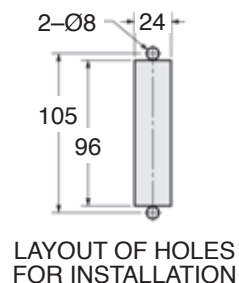
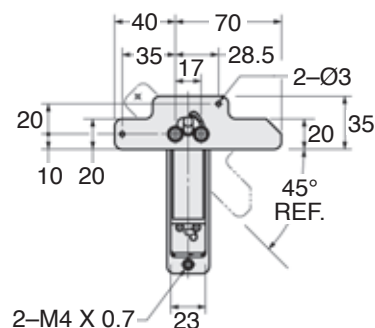
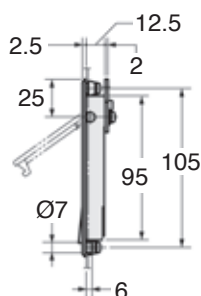
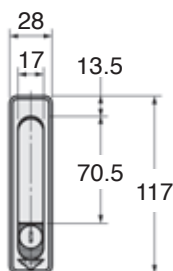
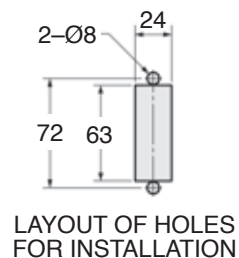
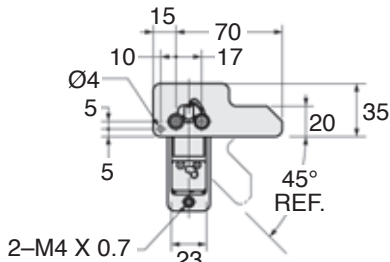
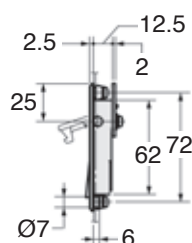
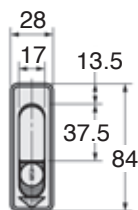


Fig. 3



• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Base	Zinc Die Cast	Chrome Plated Dull Finish	1
2	Handle			
3	Latch			
4	Latch Cover	Stainless Steel	Barrel Polished	2
5	Mounting Hardware			
6	Screw with Washer			
7	Countersunk Washer	Steel	Zinc Plated	2
8	Screw			
9	Lock	Stainless Steel / Zinc Die Cast	— / Zinc Plated	1
10	Key			
		Brass	Nickel Plated	2

NOTE: The handles are shown with key number 200.

• APPLICATIONS

Distribution boards / Distribution panels / Office automation appliances / Various types of boxes

• CHARACTERISTIC

Handle includes a lock and key for better theft protection.

• HANDLES

Fig.	Catalog Number Without Key	Net Weight g	Catalog Number With Key No. 200	Net Weight g	Included Cam Model No.	Applicable Cams Shown On Page 1-45
3	MAKT33M1THA5403	146	MAKT33M1THA5403K	160	T-302-0	MAKT35MT3020
2	MAKT33M2THA5402	202	MAKT33M2THA5402K	214	T-301-0	MAKT35MT3010
1	MAKT33M3THA5401	346	MAKT33M3THA5401K	354	T-300-0	MAKT35MT3000

Fig. 1

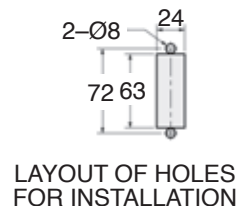
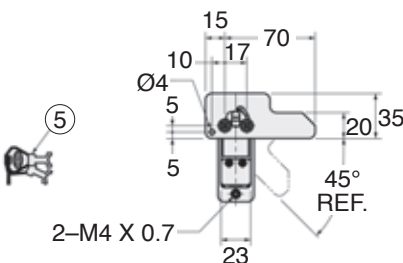
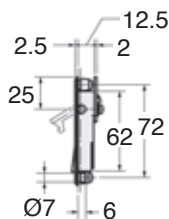
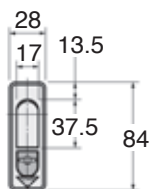


Fig. 2

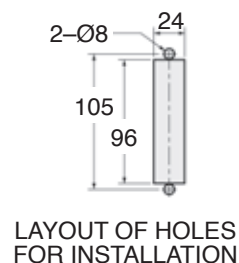
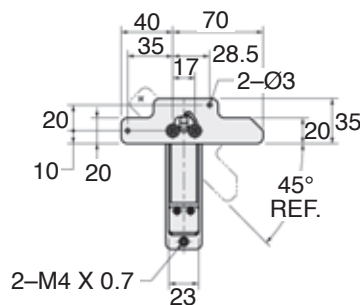
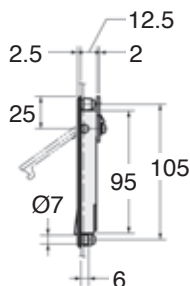
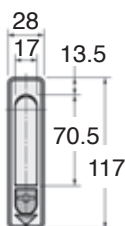
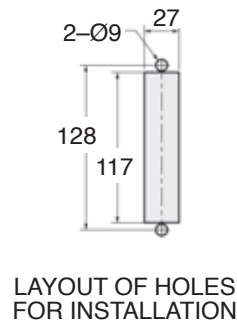
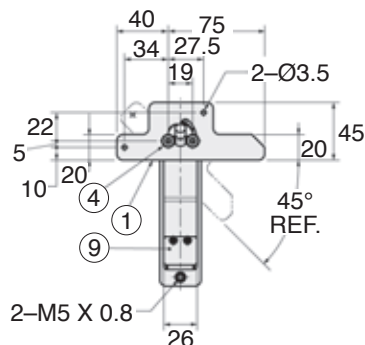
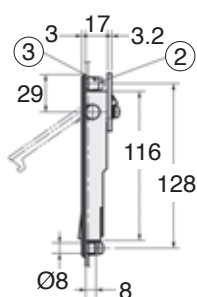
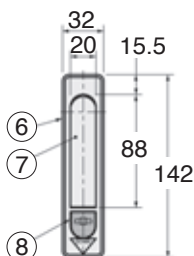


Fig. 3



• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Cam	Steel	Nickel Plated	1
2	Phillips Pan Head Screw with Washer			2
3	Pan Shaped Washer			
4	Phillips Pan Head Screw			
5	Key			
6	Base	Zinc Die Cast	Chrome Plated (Dull Finish)	1
7	Handle			
8	Latch			
9	Latch Cover	Stainless Steel	Barrel Polishing	

• HANDLES

Fig.	Catalog Number Without Key	Net Weight g	Catalog Number With Key No. 408A	Net Weight g	Applicable Plate Thickness
1	MAKT34M1A408AN3	140	MAKT34M2A408AN3K	150	0.6 ~ 2.3
2	MAKT34M3A408AN2	194	MAKT34M4A408AN2K	208	
3	MAKT34M5A408AN1	338	MAKT34M6A408AN1K	348	0.6 ~ 3.2

• APPLICATIONS

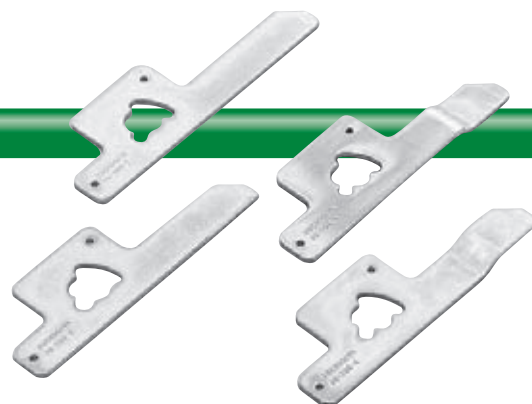
Distribution boards / Distribution panels / Control boards /
Telecommunication devices / Office automation appliances / Office utilities /
Various types of doors for boxes

• CHARACTERISTICS

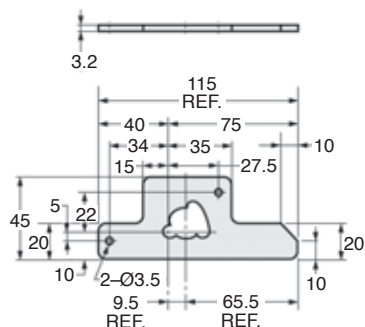
This specially designed lock is much more secure than traditional flush handle locks. The improved design and surface finish gives a fresh and sophisticated appearance. It is a modified version of handle ...A408 and has better operability, due to a higher strength handle and modified latch shape.

• SPECIFICATIONS

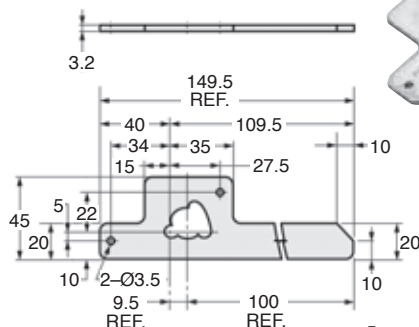
It can be used for both swing to the left and to the right by changing the position of the cam. Turn angle of the key is 180°. (2 points take off.)



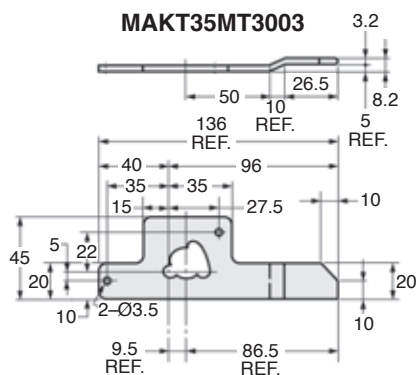
MAKT35MT3000



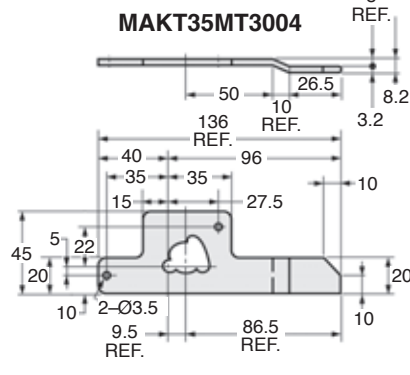
MAKT35MT3001



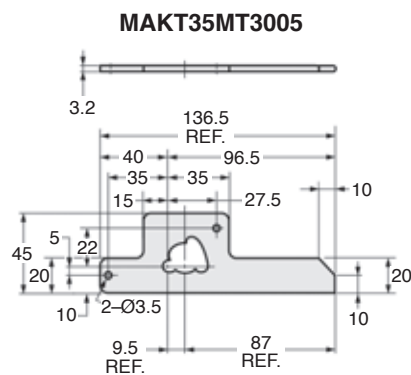
MAKT35MT3003



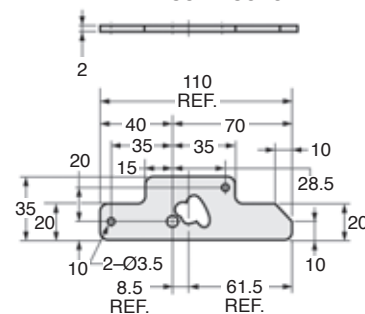
MAKT35MT3004



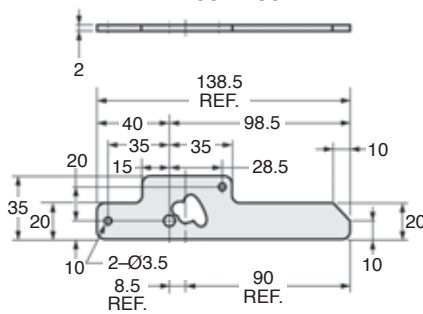
MAKT35MT3005



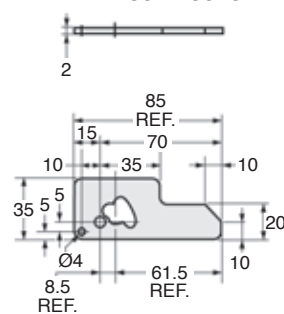
MAKT35MT3010



MAKT35MT3011



MAKT35MT3020

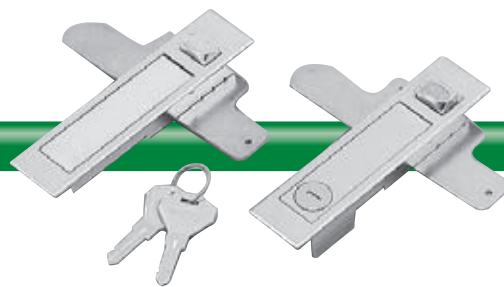


• **CAM** – Steel, Zinc Plated

Catalog Number	Applicable Model	Net Weight g
MAKT35MT3000	MAKT34M..A408AN.. MAKT33M3THA5401K	78
MAKT35MT3001		92
MAKT35MT3003		86
MAKT35MT3004		
MAKT35MT3005		
MAKT35MT3010	MAKT34M..A408AN.. MAKT33M2THA5402K MAKT33M1THA5403K	42
MAKT35MT3011		51
MAKT35MT3020		34

INSTALLATION EXAMPLE





1

• APPLICATIONS

Distribution boards / Distribution panels /
Control boards / Telecommunication devices /
Office automation appliances / Dust boxes /
Other various types of doors for boxes

• CHARACTERISTICS

Improved operability compared with ordinary
flush handles. A nonslip finish is added to the
push button. Security is enhanced while dust-
proofing the lock, by using the keyed version
with shutter mechanism.

• SPECIFICATION

Lock at 12 o'clock position and unlock at 3
o'clock position. Key can be inserted and
removed at both positions. Available with key
No. 200.

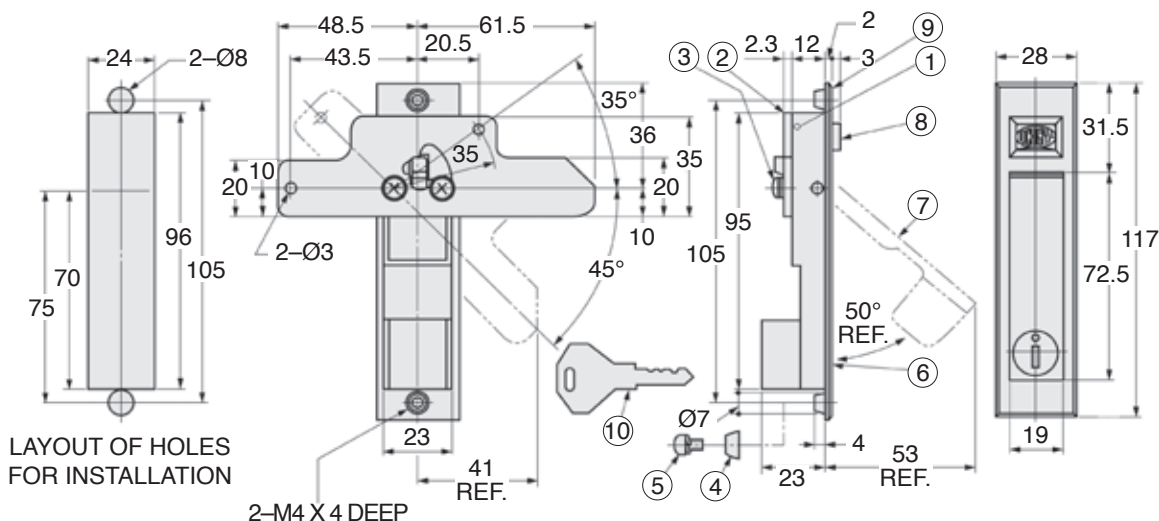
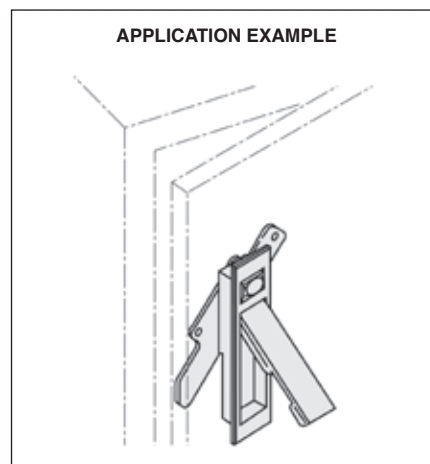
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1*	Cover	Steel	Zinc Plated	1
2*	Cam			2
3*	Set Screw			
4*	Pan Shaped Washers			
5*	Set Screw	Zinc Die Cast	Satin Finish	1
6	Rotor			
7	Handle			
8	Push Button			
9	Body	Brass	Nickel Plated	2
10	Key			

*For catalog number **MAKT36MTHA296-2K** numbers 1 thru 5 in the parts list are nickel plated.

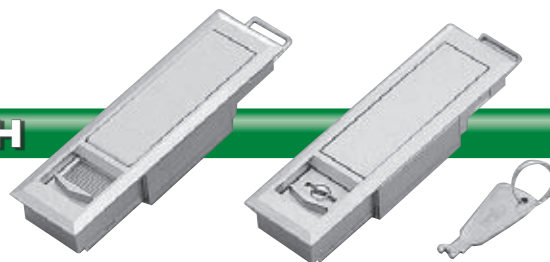
• HANDLES

Catalog Number	Key No.	Net Weight g
MAKT36MTHA296-2	No Key	188
MAKT36MTHA296-2K*	2200	245



HANDLES, FLUSH-LIFT LEVER LATCH

RoHS
COMPLIANT



1

• APPLICATIONS

Vessels / Vehicles / Railcars / Transporter devices /
General industrial machines / Machine tools /
Distribution boards / Distribution panels

• CHARACTERISTICS

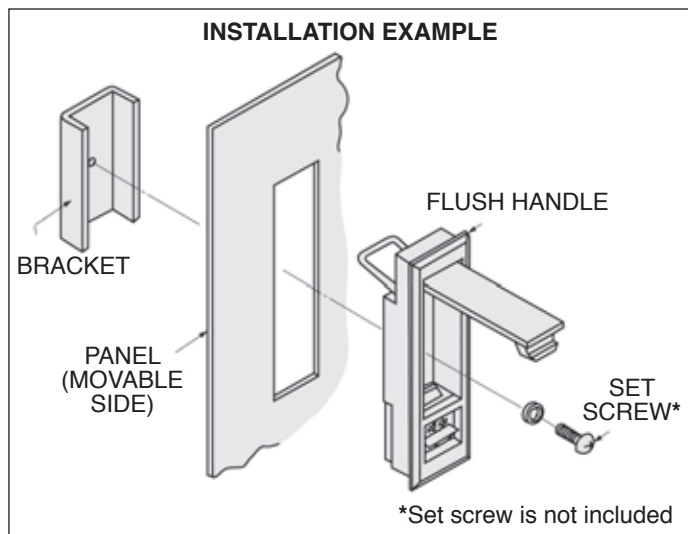
The unit locks by hooking the arm and swinging upward.
The spring force resists vibration and has a sealing effect.
The one screw with bracket simplifies the installation.

• SPECIFICATION

This key is used exclusively for **MAKT38MTHA234-**.

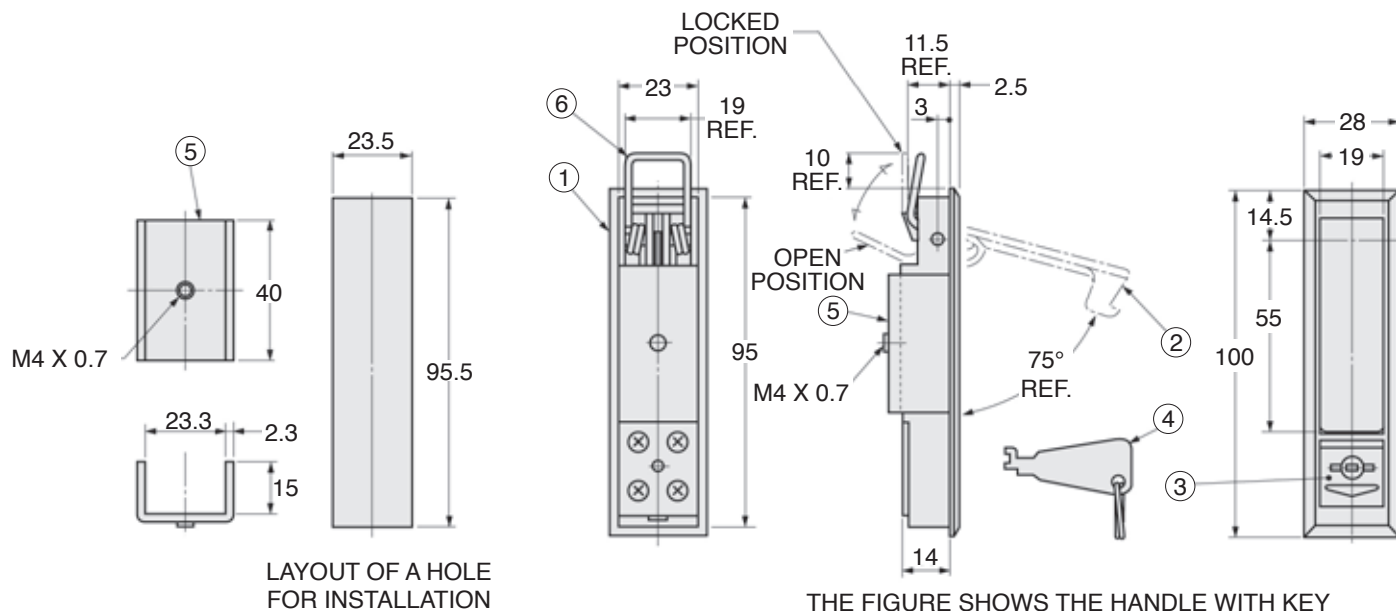
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Housing	Zinc Die Cast	Chrome Plated (Satin Finish)	1
2	Handle			
3	Latch			
4	Key	Steel	Nickel Plated	
5	Bracket		Zinc Plated	
6	Arm	Stainless Steel	—	



• HANDLES

Catalog Number	Type	Net Weight g
MAKT38MTHA234-1	With Key	180.8
MAKT38MTHA234-2	No Key	174.4



HANDLES, FLUSH LIFT LEVER

RoHS
COMPLIANT



1

• APPLICATIONS

Information board / Rack for communication equipment / Server rack (If using for EMI shielding rack application, it is important to install an EMI countermeasure device on the rack.)

• CHARACTERISTICS

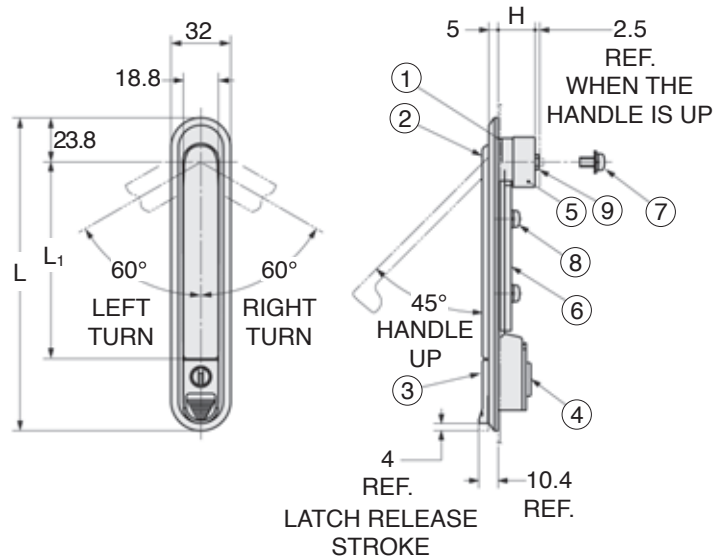
Swing direction can be switched by rotating the cap assembly. When the handle is folded into the closed position, the cam is pulled in by the lift mechanism. The shallow depth of the unit from the mounting surface allows efficient use of the interior space.

• SPECIFICATIONS

The cap can be installed 180° rotated from the diagram shown to allow the handle swing to the left 60°. The key can be inserted or removed at the locked or unlocked positions (2-point take off). The locking cam is not supplied. Please order separately.

• CAUTION

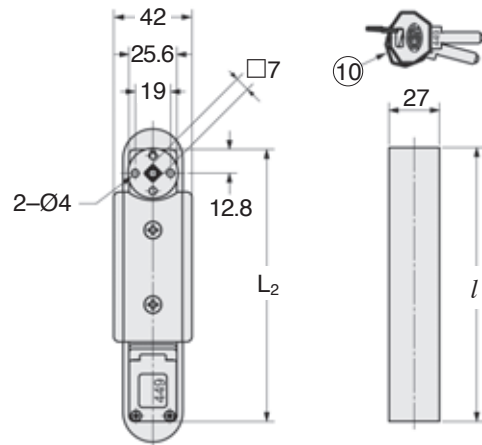
After attaching a cam, the attaching screw should be locked in place to prevent loosening.



• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Case	Zinc Die Cast	Painted, Black	1
2	Handle		Painted Black, Chrome Plated	
3	Latch (lock)		Painted Black, Chrome Plated	
4	Latch Cover		Zinc Plated	
5	Cap	Steel	Zinc Plated	2*
6	Attaching Plate			
7	Screw with Washer			
8	Screw with Washer*	Stainless Steel	—	1
9	Pin			
10	Key	Brass / Polypropylene	Nickel Plated / Black	2

*For catalog number **MAKT30M1HA449B3K** the quantity is 1.



LAYOUT OF HOLE
FOR INSTALLATION

• HANDLES

Catalog Number	Key No.	Max. Panel Thickness	L	L ₁	L ₂	H	l	Net Weight g
MAKT30M1HA449B3K	449	1.2	118	55.5	96	20.2	97	296
MAKT30M2HA449B2K			138	75.5	116	19.8	117	341
MAKT30M3HA449B1K			168	105.5	146	19.6	147	404

A silver metal door handle with a black cable and a key, set against a green and white background.

1

- **APPLICATIONS**

Communication equipment (digital devices, magnetic disk devices) / Other EMI shielded control boards

- **CHARACTERISTICS**

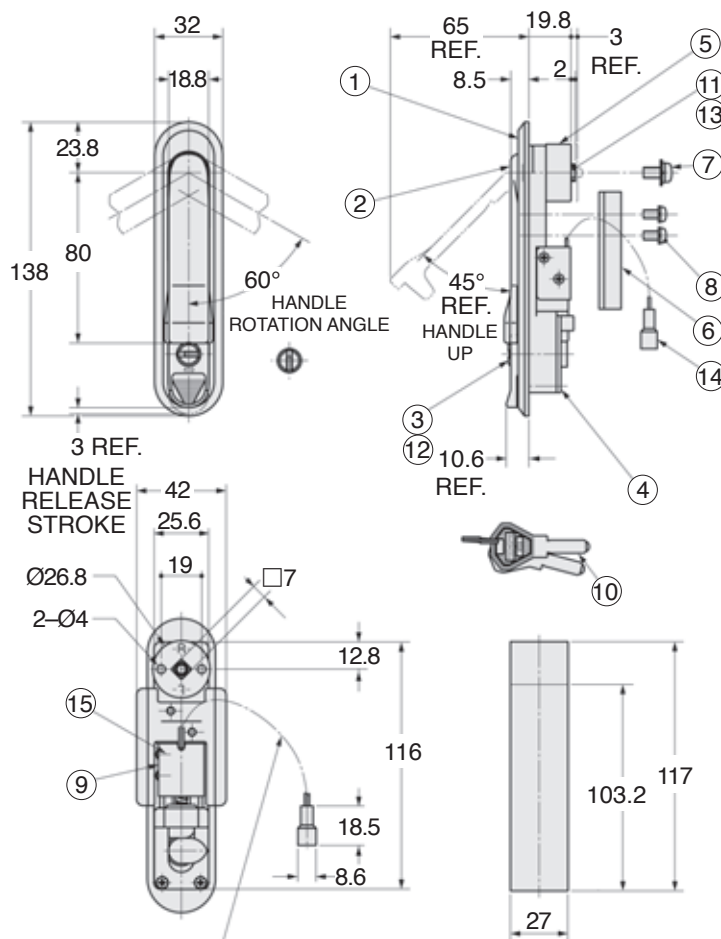
When the electrical power is on, a solenoid keeps it unlocked. When the power is off, it remains locked. In case of emergency, a key can be used to unlock the handle. When the handle is folded into the closed position, the cam is pulled in resulting in a tighter sealed door that does not rattle. The shallow depth of the unit from the mounting surface allows efficient use of the interior space. The key is a dimple type design making the lock difficult to tamper with.

• SPECIFICATIONS

By reorienting the cap, it is possible to reverse the swing direction of the handle. The locking cam is not supplied. Please purchase separately.

- **CAUTION**

After attaching a cam, the attaching screw should be locked in place to prevent loosening. For use in EMI shielded racks, it is important to install an EMI countermeasure device on the rack. The maximum allowable pressure on the cam (not supplied) is 30N (3 kgf) at 43 mm in the horizontal direction from the center of the rotation of the handle. When unlocking manually, the handle will spring out as the key is turned. Exercise caution not to hit fingers. (While pulling down on the latch, position the fingers operating the key away from the handle.)



LEAD WIRE LENGTH: 200

LAYOUT OF HOLE FOR INSTALLATION

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Case	Zinc Die Cast	Chrome Plated (Dull Finish)	1
2	Handle			
3	Latch			
4	Latch Cover			
5	Cap			
6	Mounting Plate			
7	Screw with Washer	Steel	Zinc Plated	
8	Screw with Washer			
9	Solenoid Cover	Brass	Nickel Plated	1
10	Key			2
11	Pin	Stainless Steel	—	1
12	Latch Spring			
13	Pin Spring	Steel Wire		
14	Relay Plug	Nylon		
15	Solenoid	—	Zinc Plated	

• SOLENOID SPECIFICATION

Voltage V	Duty Cycle	Resistance Ω	Power Consumption W	Current mA	Max. Continuous Operation (sec.)
12 DC	25% on 75% off	24	6	500	30

- **HANDLE**

Catalog Number	Key No.	Max. Panel Thickness	Net Weight g
MAKT28MTHA459	459	1.2	399

HANDLES, LIFT LEVER

RoHS
COMPLIANT



1 APPLICATIONS

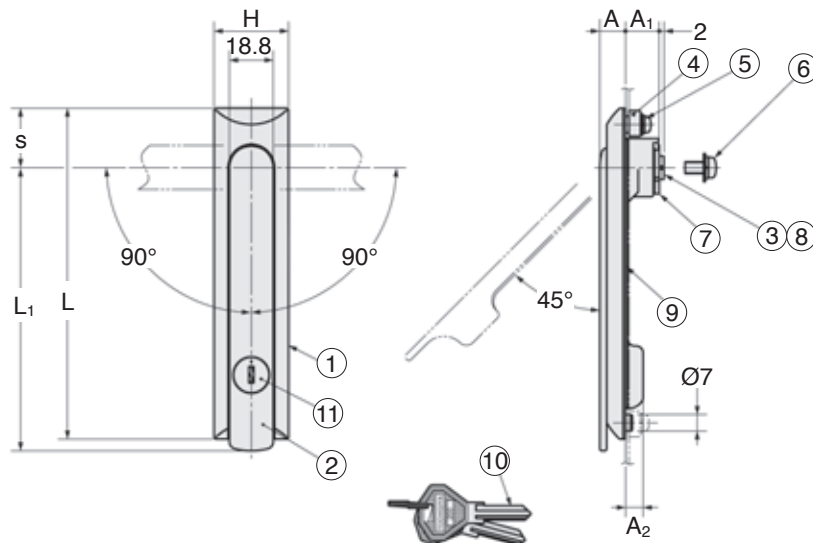
Distribution boards / Distribution panels /
Control boards / Various types of boxes

CHARACTERISTICS

Flush type lever handle that is opened by pulling up with finger tips. Same installation holes as ...**THA408AN** and ...**THA505** for easy exchange. Waterproof versions have "w" after "506" in the part number.

SPECIFICATIONS

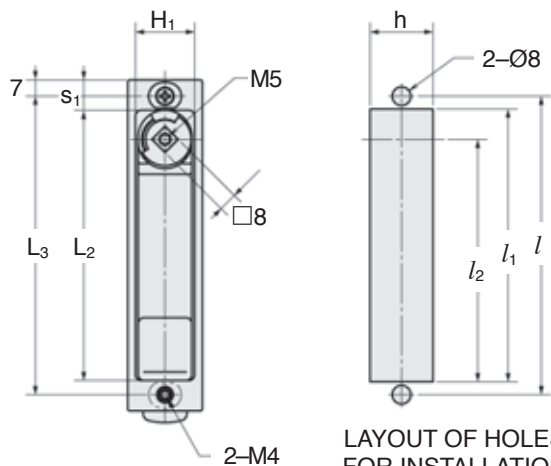
By reorienting the motion control cam, the swing can be switched between right and left. The key rotates 180°. The key can be inserted or removed at the locked or unlocked positions (2-point take off). The locking cam is not supplied. Please order separately.



PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Case	Zinc Die Cast	Chrome Plated (Dull Finish)	1
2	Handle			
3	Shaft	Steel	Zinc Plated	2
4	Attaching Hardware			
5	Screw with Washer			
6	Screw with Washer	Stainless Steel	—	1
7	Rotation Control Cam			
8	Pin	Elastomer	Gray	1
9*	Packing	Brass	Nickel Plated	2
10	Key	Stainless Steel / Zinc Die Cast	— / Zinc Plated	1

*Included only with catalog numbers containing "w".



LATCHES, FLUSH-HANDLE, Compression Type



• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Case	Zinc Die Cast	Chrome Plated Dull Finish	1
2	Handle			
3	Latch			
4	Shaft Guide			
5	Cap			
6	Rotor	Zinc Die Cast / Stainless Steel	Zinc Plated / —	1
7	Latch Cover	Steel	Chrome Plated	
8	Countersunk Washers		Nickel Plated	
9	Pan Head Screw and Spring Washers			
10	Pan Head Screw and Flat Spring Washer	Stainless Steel	—	4
11	E-Ring			
12	Keys	Brass	Nickel Plated	1
				2

• APPLICATIONS

EMI shielding racks for information devices such as digital equipment / Magnetic disk devices / Control boards / Railcars / Aircraft

• CHARACTERISTICS

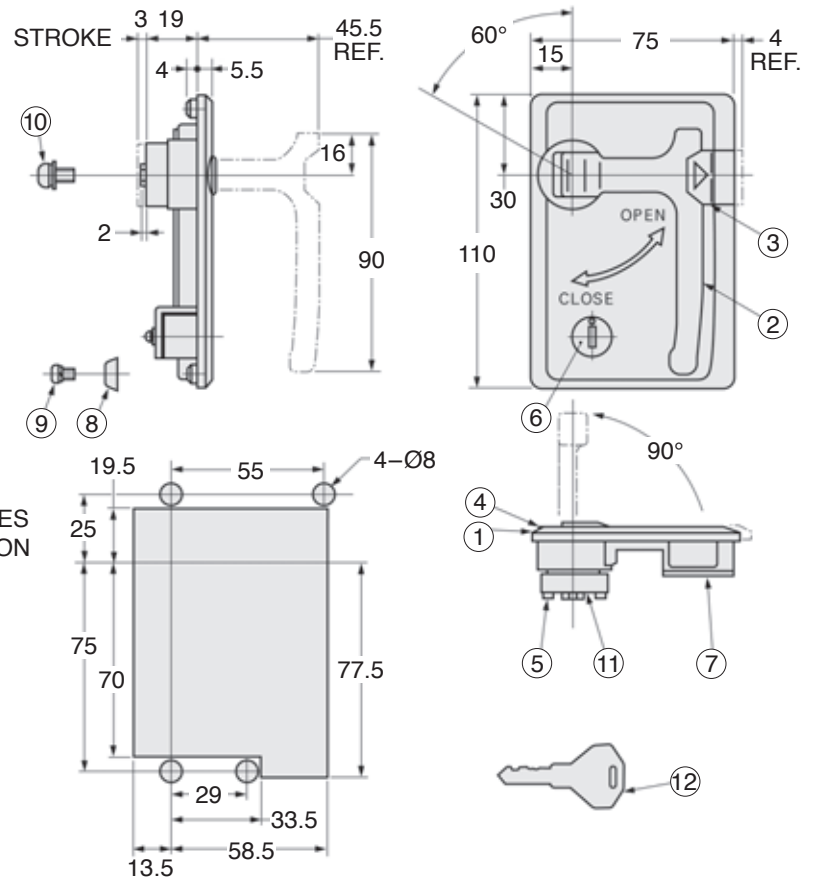
When the handle is returned to the stored position, the cam is pulled in. There is no play when the door is closed while enhancing the EMI effect. The unit has a clean appearance, due to its superior space-saving design.

• LATCHES

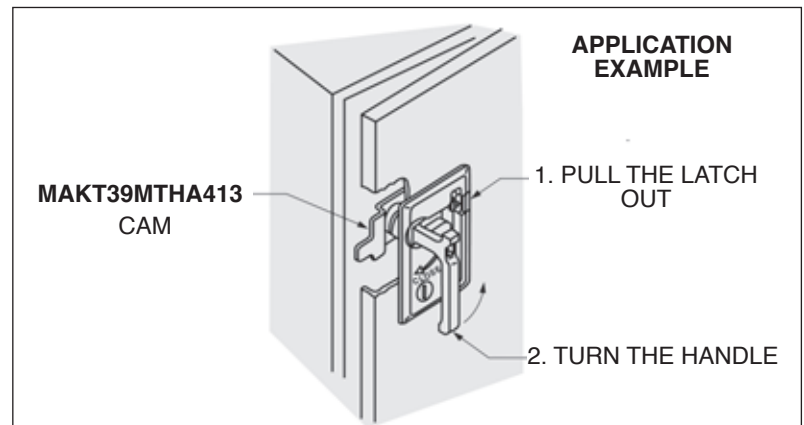
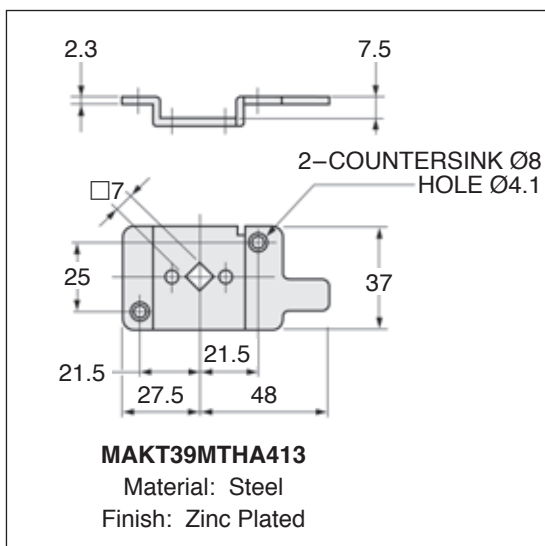
Catalog Number	Key No.	Net Weight g
MAKT39MTHA450-1	No Key	362
MAKT39MTHA450-1K	2200	318

• CAM

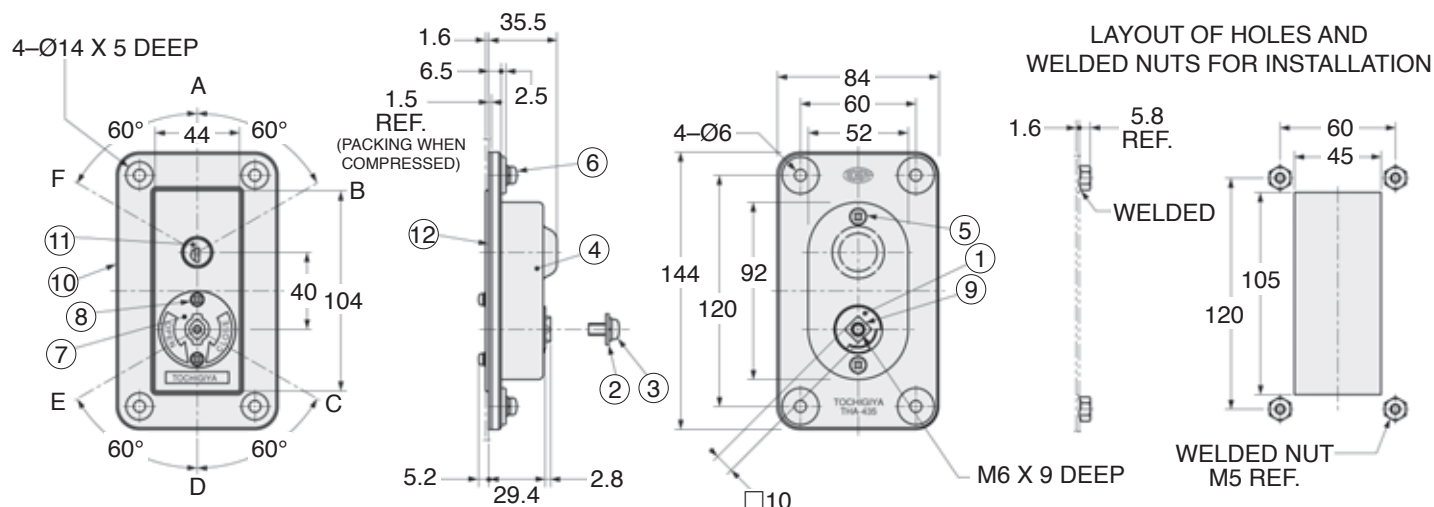
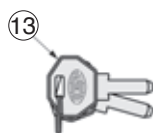
Catalog Number	Net Weight g
MAKT39MTHA413	47



LAYOUT OF HOLES FOR INSTALLATION



1



No.	Part Name	Material	Finish	Qty.
1	Rotation Control Cam	Steel	Zinc Plated	1
2	Flat Washer			
3	Phillips Pan Head Screw with Washer			
4	Cover			
5	Phillips Countersunk Screw			2
6	Phillips Pan Head Screw with Washer	Stainless Steel	—	4
7	Directional Indication Plate			One Set
8	Phillips Pan Head Screw with Washer			2
9	Shaft			Barrel Polishing
10	Base	Die Cast Aluminum	Paint (Silver)	1
11	Lock	—	—	
12	Packing	Elastomer	Black	2
13	Key	Nickel Silver / Polypropylene	— / Black	

Catalog Number	Key No.	Net Weight g
MAKT49MTHA435	E5000	458

Distribution boards / Distribution panels / Control boards /
Measuring instruments

- Uses a double key system for improving security.

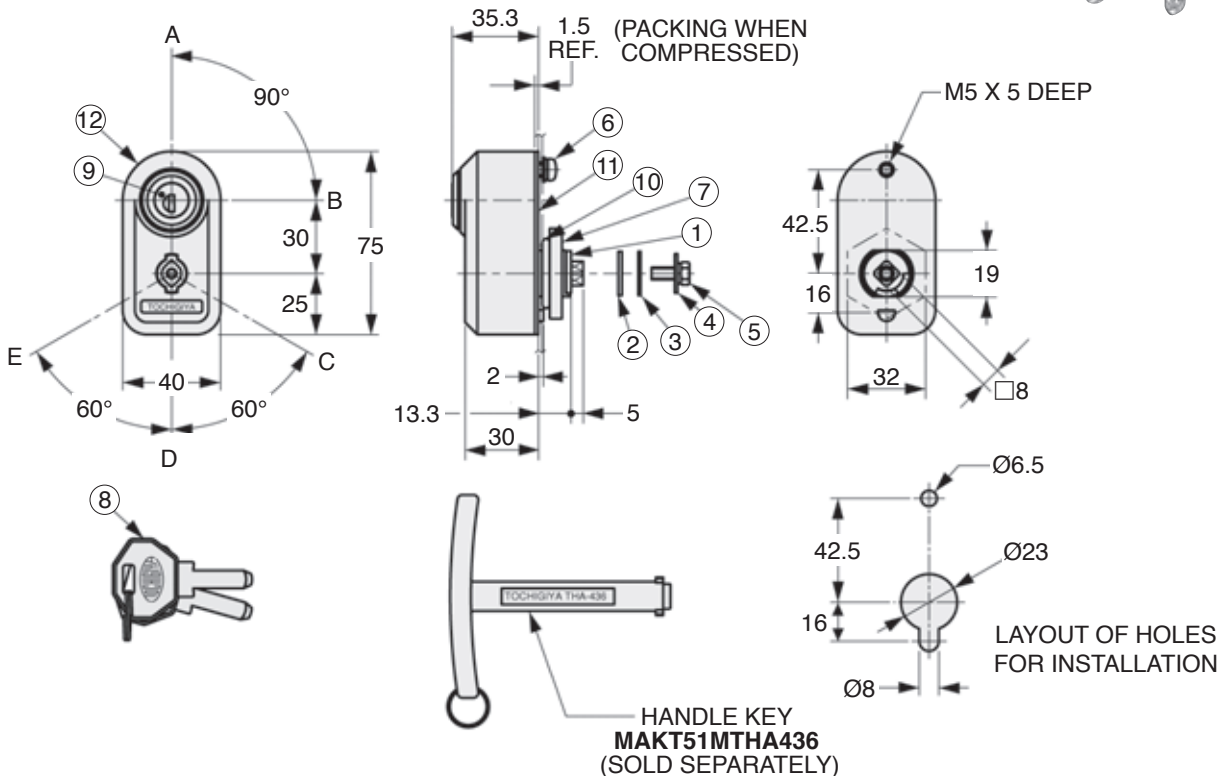
When installing, tighten the packing evenly and take an antiloosening measure. Also pay attention to the orientation of the packing (front/back) when installing. The handle key **MAKT51THA436** is sold separately.

To open: Insert and unlock with the key after which use the handle key, **MAKT5IMTHA436**, to open.

To close: Lock with the handle key, **MAKT5IMTHA436**, first, remove the handle key, then lock with the key.

The turn angle of the key is 60° between points A and B.
The turn can be made between point A and F by changing the cam. The key can be removed at point A only.
The handle key rotation is 60° between points D and C.
The turn angle can be made to 60° between points D and E by changing the cam.
The handle key can be removed at point D only.

HANDLE, KEY LATCH - Double Key



• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Rotation Control Cam	Steel	Zinc Plated	1
2	Square Hole Washer (A)			
3	Square Hole Washer (B)			
4	Flat Washer			
5	Cross Hole Hexagon Head Bolt with Washer	Brass		
6	Cross Hole Pan Head Screw with Washer			
7	Mounting Nut			
8	Key	Nickel Silver / Polypropylene	— / Black	2
9	Lock	—	—	1
10	Ring Washer	Piano Wire		
11	Packing	Rubber		
12	Case	Aluminum Die Cast	Black Paint (Silver)	

• APPLICATIONS

Distribution boards / Distribution panels /
Control boards / Measuring instruments

• CHARACTERISTIC

A double key system for improved security.

• NOTE

Apply antiloosening treatment for parts (5) and (6) after installation. The handle key, **MAKT51MTHA436**, is sold separately.

• OPERATION INSTRUCTIONS

To open: Unlock with the key first, then use the handle key, **MAKT51MTHA436**, to open.

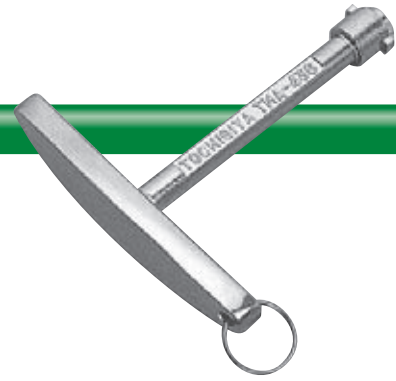
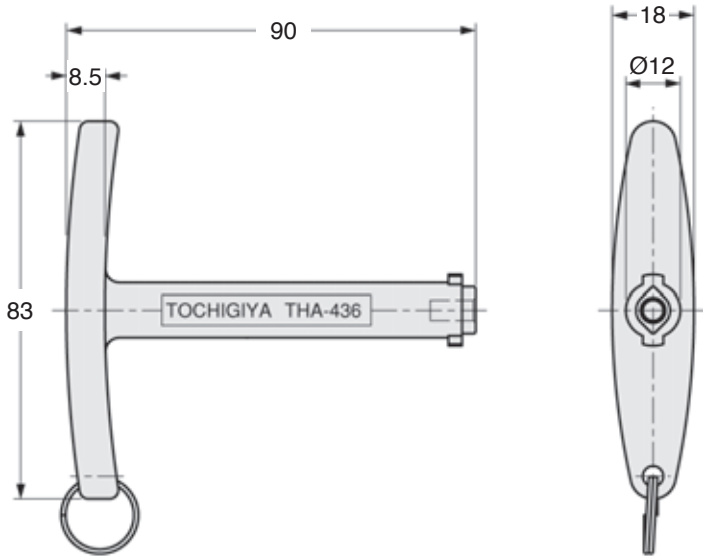
To close: Lock with the handle key, **MAKT51MTHA436**, first; remove the handle key, then lock with the key.

• SPECIFICATION

The turn angle of the key is 90° between points A and B. The key can be removed at point A only. The handle key rotation is 60° between points D and C. The turn angle can be made to 60° between points D and E by changing the cam. The handle key can be removed at point D only.

• HANDLE

Catalog Number	Key No.	Range of Panel Thickness	Net Weight g
MAKT50MTHA437	E5000	1.4 ~ 3.2	241



• **APPLICATIONS**

Used on **MAKT49MTHA435** or **MAKT50MTHA437**

• **CHARACTERISTIC**

A handle key for the double key lock.

• **HANDLE** – Stainless Steel, Electrolytic Polishing Finish

• **RING** – Stainless Steel

Catalog Number	Net Weight g
MAKT51MTHA436	104.5

HANDLE, KEY LATCH

1

• APPLICATIONS

Small distribution boards / Small distribution panels /
Control boards

• CHARACTERISTICS

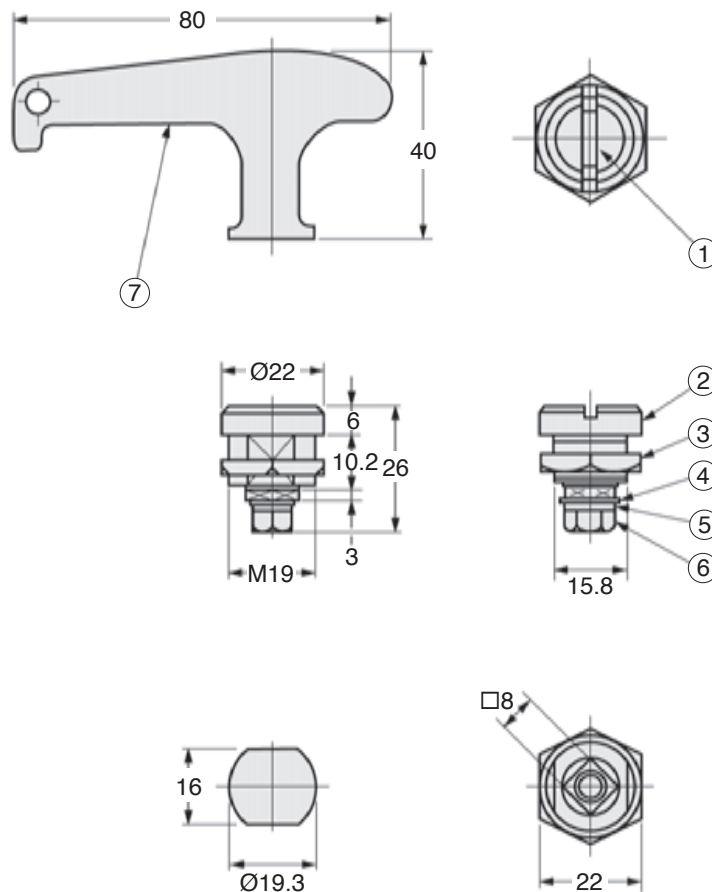
Heat-resistant, salt-resistant, chemical-resistant, and
acid-resistant. The handle contains a built-in detent
mechanism and protrudes slightly from the mounting
surface.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Rotational Axis	Stainless Steel	—	1
2	Mounting Seat			
3	Mounting Nut			
4	Washer			
5	Spring Washer			
6	Hexagon Bolt			
7	Key Handle		Barrel Polishing	

• HANDLE

Catalog Number	Net Weight g
MAKT48MTHA184	60.1



LAYOUT OF HOLE FOR INSTALLATION

LATCHES, PADDLE - Stainless Steel

RoHS
COMPLIANT



1

• APPLICATIONS

Distribution boards / Distribution panels / Control boards / Industrial machinery

• CHARACTERISTICS

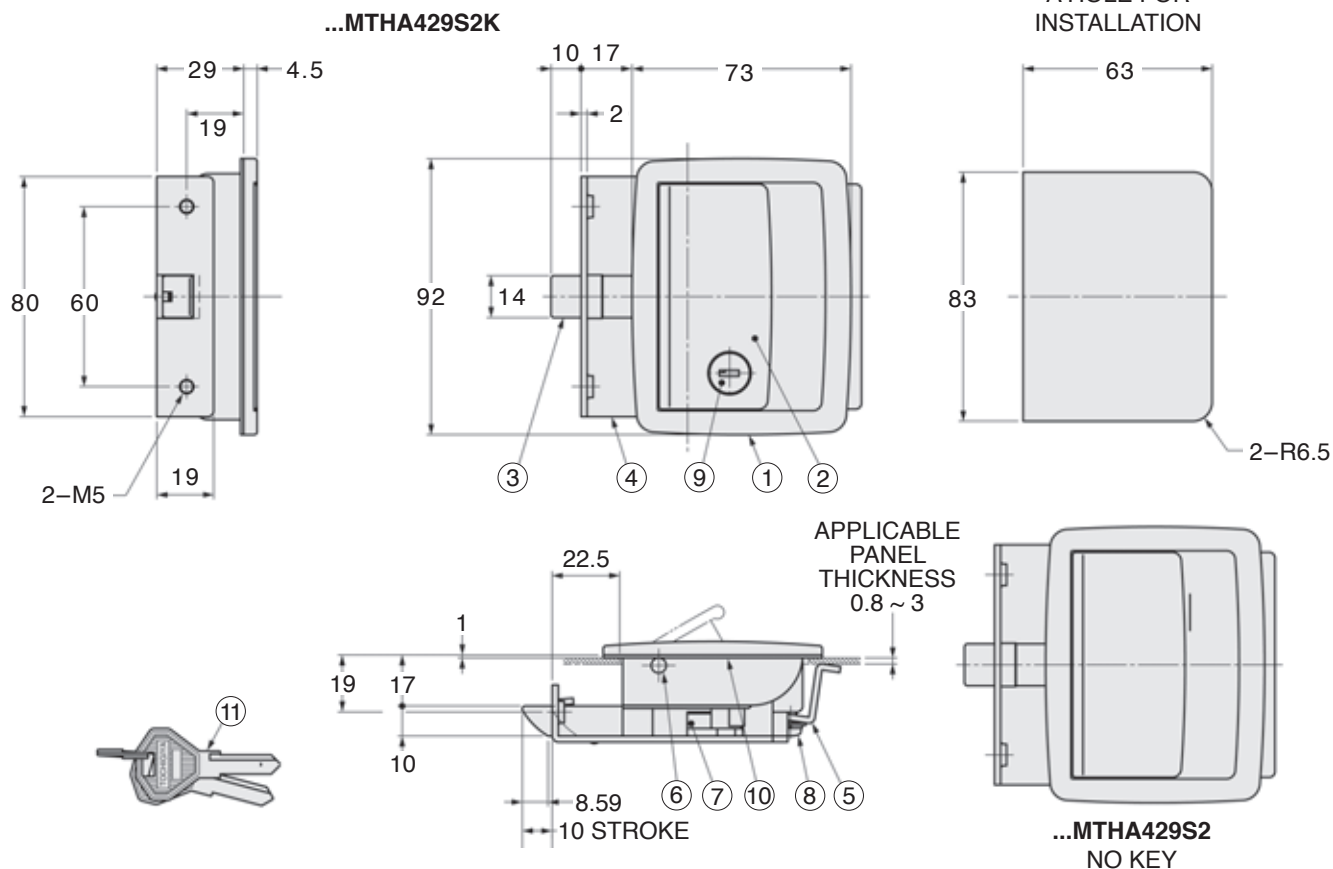
Same as the ...MTHA429.. series, except in stainless steel. Can be installed without disassembling the unit.

• LATCHES

Catalog Number	Key No.	Net Weight g
MAKT41MHA429S2	R200	657
MAKT41MHA429S2K	No Key	639

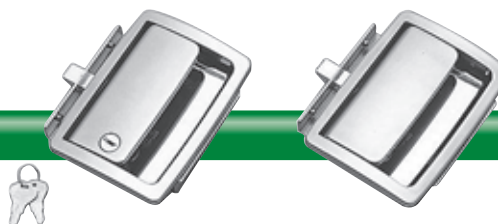
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Case	Stainless Steel	Bead Blast	1
2	Handle		Barrel Polishing	
3	Latch			
4	Base			
5	Mounting Bracket			
6	Pin			
7	Spring			
8	Screws and Flat Washers	Rubber	Black	2
9	Lock			1
10	Packing			1
11	Keys	Brass	Nickel Plated	2



LATCHES, PADDLE, 1-Point Locking

RoHS
COMPLIANT



1

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Case	Zinc Die Cast	Chrome Plated, Dull Finish	1
2	Handle		Chrome Plated, Satin Finish	
3	Lock		Chrome Plated	
4	Latch		—	
5	Pin	Stainless Steel	—	2
6	Base	Steel	Zinc Plated	
7	Mounting Bracket		—	
8	Cross-Hole Pan Head Screws and Washers		—	
9	Spring	Stainless Steel	—	1
10	Packing	Rubber	Black	2
11	Keys	Brass	Nickel Plated	2

• APPLICATIONS

Distribution boards / Distribution panels /
Control boards / Machine tools

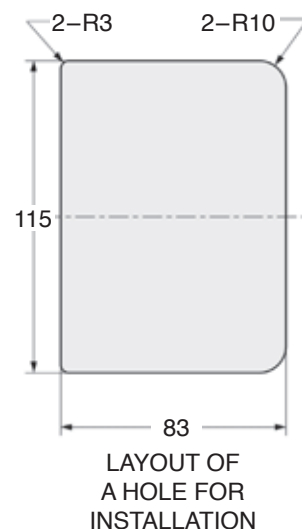
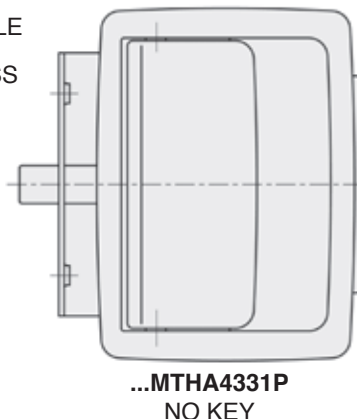
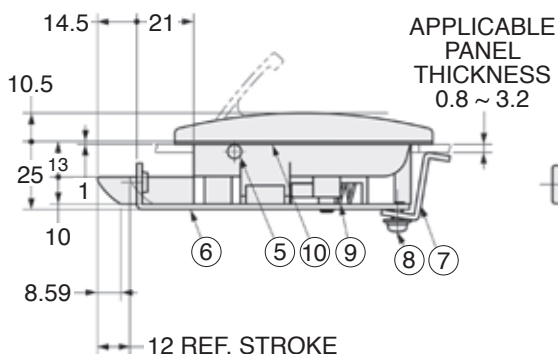
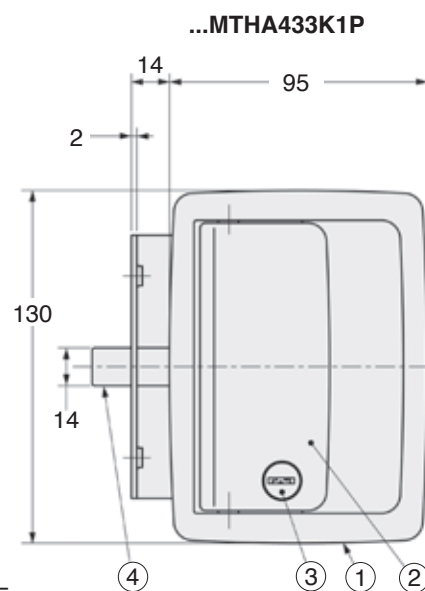
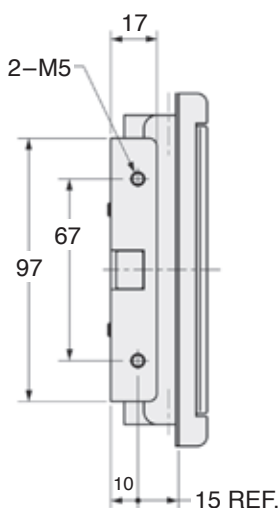
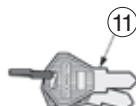
• CHARACTERISTIC

This flush-type latch protrudes slightly from the mounting surface and is usable for both left and right sides.

• LATCHES

Catalog Number	Key No.	Net Weight g
MAKT41MTHA433K1P	282	894
MAKT41MTHA4331P	No Key	874

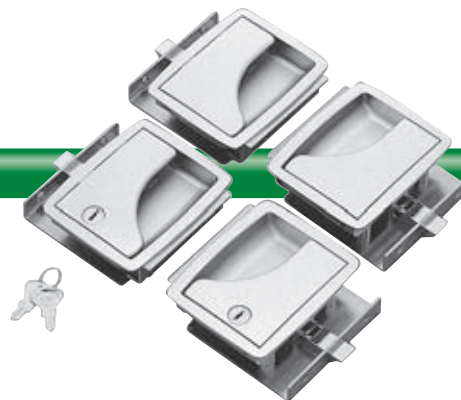
NOTE: Both latch and handle move independently.



LATCHES, PADDLE

RoHS
COMPLIANT

1



• APPLICATIONS

Distribution boards / Distribution panels / Control boards / Vehicle related devices / Machine tools

• CHARACTERISTICS

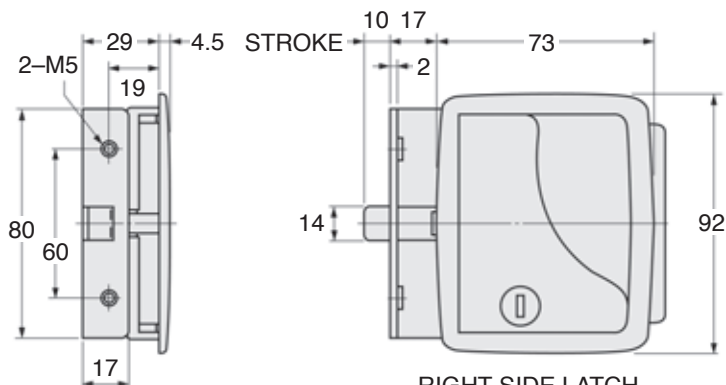
A door can be opened by pulling on the handle and closed by simply pushing on the door. When the door is not latched properly, the handle remains in the raised position, giving a visual confirmation of closure. These paddle latches are fairly dust and waterproof and can be installed without disassembling the unit.

• PARTS LIST

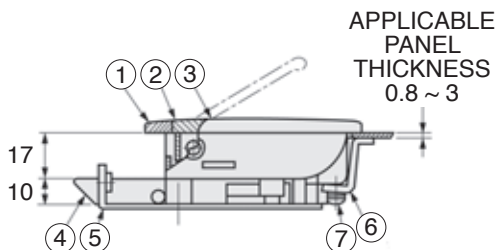
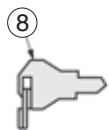
No.	Part Name	Material	Finish	Qty.
1	Case	Zinc Die Cast	Chrome Plated	1
2	Lever		Satin Finish	
3	Rotor		Chrome Plated	
4	Latch		Chrome Plated	
5	Base	Steel	Zinc Plated	2
6	Mounting Bracket			
7	Pan Head Screws			
8	Keys	Brass	Nickel Plated	

• LATCHES

Catalog Number	Specifications	Key No.	Net Weight g
MAKT42MTHA281-1	Right-Side Latch	282	469
MAKT42MTHA281-2		No Key	452
MAKT42MTHA281-3	Left-Side Latch	282	469
MAKT42MTHA281-4		No Key	452

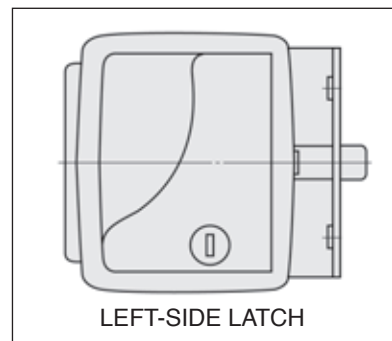
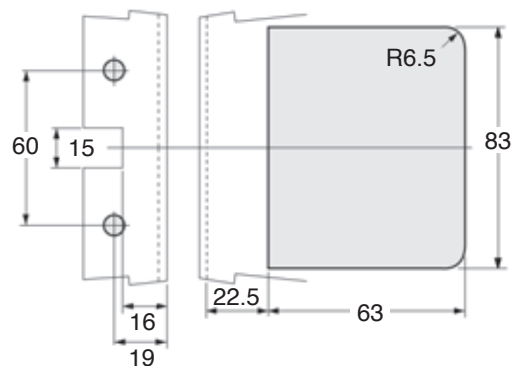


RIGHT-SIDE LATCH

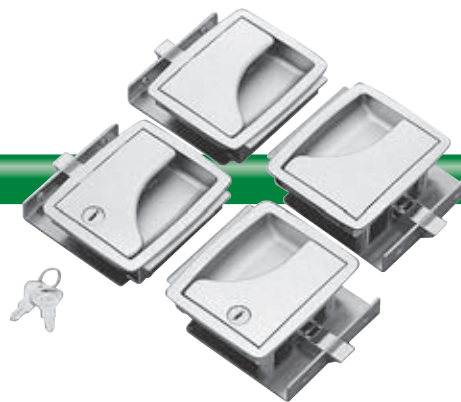


THE FIGURE SHOWS THE LATCH WITH KEY

LAYOUT OF A HOLE FOR INSTALLATION



LEFT-SIDE LATCH



• APPLICATIONS

Distribution boards / Distribution panels / Control boards / Vehicle related devices / Machine tools

• CHARACTERISTICS

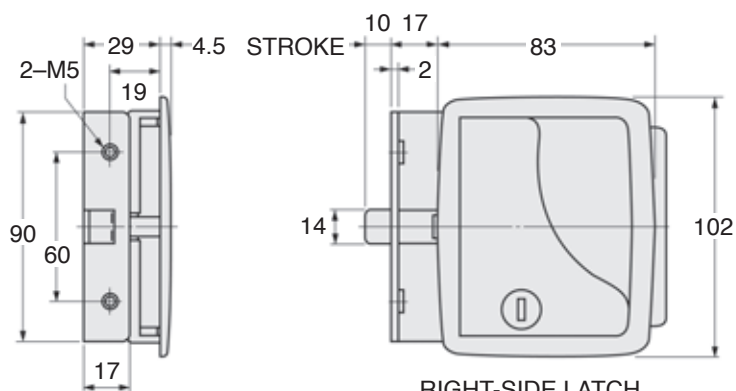
A door can be opened by pulling on the handle and closed by simply pushing on the door. When the door is not latched properly, the handle remains in the raised position, giving a visual confirmation of closure. These paddle latches are fairly dust and waterproof and can be installed without disassembling the unit.

• PARTS LIST

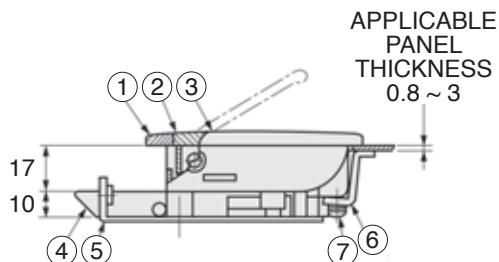
No.	Part Name	Material	Finish	Qty.
1	Case	Zinc Die Cast	Chrome Plated Satin Finish	1
2	Lever			
3	Rotor		Chrome Plated	
4	Latch			
5	Base	Steel	Zinc Plated	2
6	Set Plate			
7	Pan Head Screws	Brass	Nickel Plated	
8	Keys			

• LATCHES

Catalog Number	Specifications	Key No.	Net Weight g
MAKT42MTHA282-1	Right-Side Latch	282	615
MAKT42MTHA282-2		No Key	600
MAKT42MTHA282-3	Left-Side Latch	282	615
MAKT42MTHA282-4		No Key	600

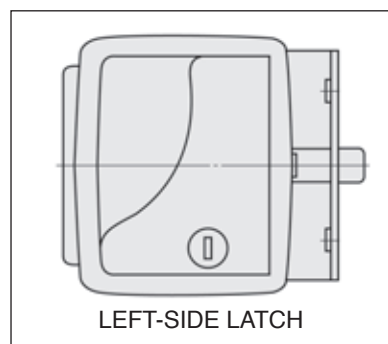
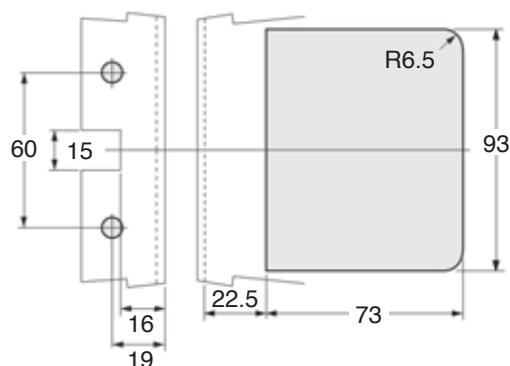


RIGHT-SIDE LATCH



THE FIGURE SHOWS THE LATCH WITH KEY

LAYOUT OF A HOLE FOR INSTALLATION



LEFT-SIDE LATCH

LATCHES, PADDLE, 1-Point Locking

RoHS
COMPLIANT



1 • APPLICATIONS

Distribution boards / Distribution panels / Control boards / Vehicle related devices / Machine tools

• CHARACTERISTIC

A door can be opened by pulling on the handle and closed by simply pushing on the door. When the door is not latched properly, the handle remains in the raised position alerting the user that the door remained open. These paddle latches are more dust and water resistant than the ...MTHA282.. series and can be installed without disassembling the unit.

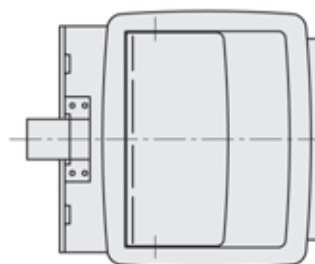
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Case	Zinc Die Cast	Chrome Plated, Dull Finish	1
2	Handle		Chrome Plated, Satin Finish	
3	Lock		Chrome Plated	
4	Latch	Stainless Steel	—	
5	Pin			
6	Spring			
7	bracket	Steel	Zinc Plated	2
8	Base			
9	Mounting Bracket			
10	Pan Head Screws	Elastomer	Gray	1
11	Packing			
12	Keys	Brass	Nickel Plated	2

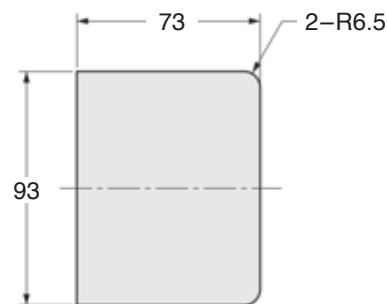
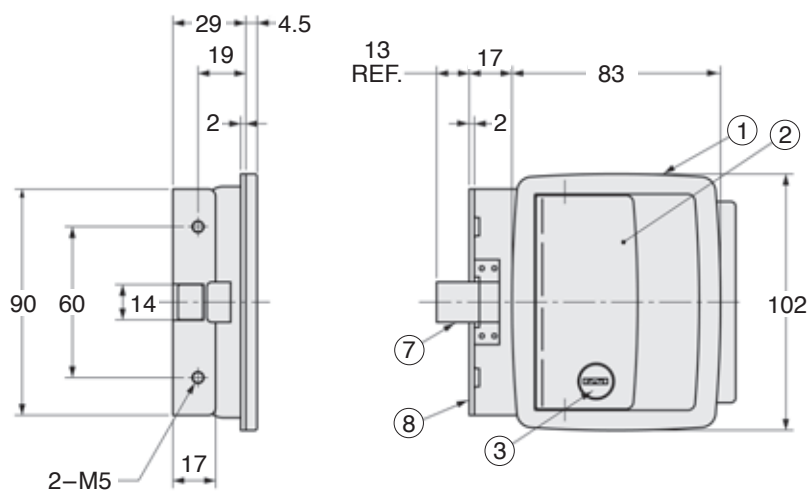
• LATCHES

Catalog Number	Key No.	Net Weight g
MAKT44MTHA429-1	No Key	656
MAKT44MTHA429-1K	282	672

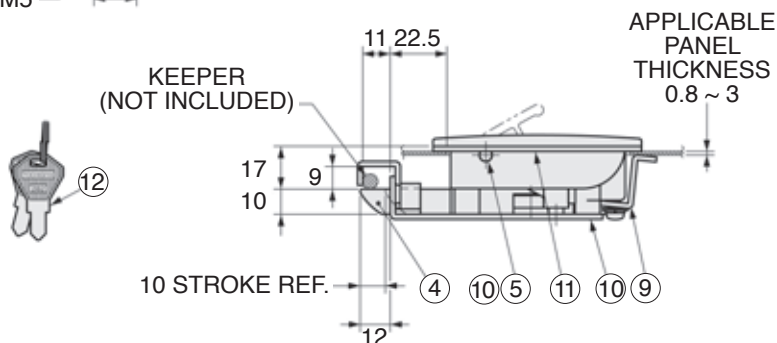
...MTHA429-1
NO KEY



...MTHA429-1K

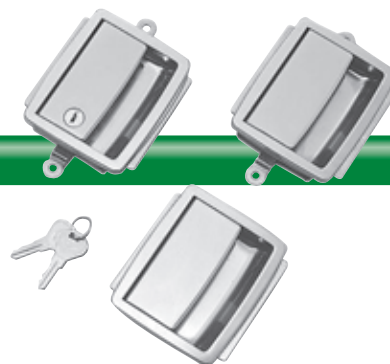


LAYOUT OF
A HOLE FOR
INSTALLATION



LATCHES, PADDLE, 2-Point Locking

RoHS
COMPLIANT



1

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Case	Zinc Die Cast	Chrome Plated, Dull Finish	1
2	Handle		Chrome Plated, Dull Finish	
3	Lock		Chrome Plated, Satin Finish	
4	Pin		Chrome Plated, Satin Finish	
5	Spring	Stainless Steel	—	1
6	Mounting Bracket		—	
7	Mounting Bracket		—	
8	Pan Head Screws		—	
9	Arm	Steel	Zinc Plated	4
10	Arm			
11	Arms			
12	Base			
13	Packing	Elastomer	Gray	1
14	Keys	Brass	Nickel Plated	2

• LATCHES

Catalog Number	Key No.	Net Weight g
MAKT44MTHA4291KP	282	678
MAKT44MTHA42912P	No Key	662
MAKT44MTHA4291F	No Latch	648

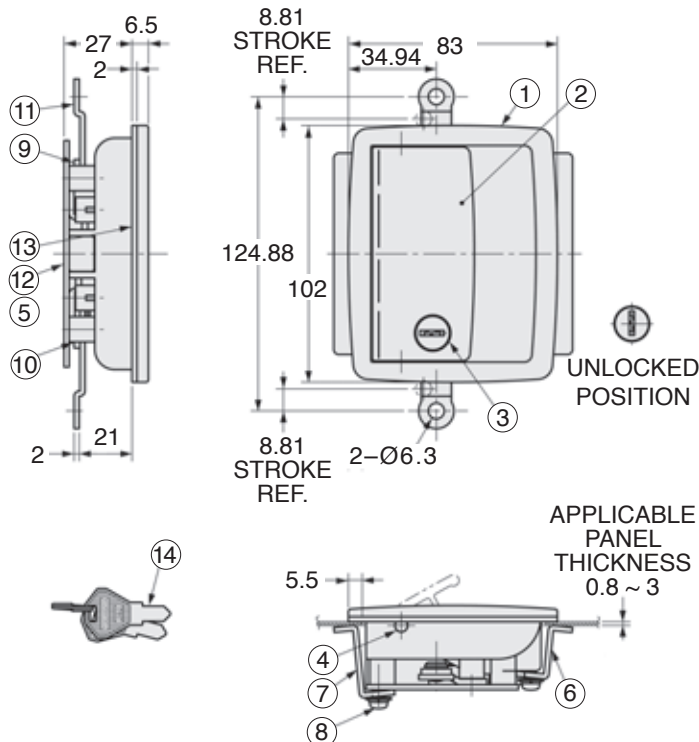
• APPLICATIONS

Distribution boards / Distribution panels /
Control boards / Vehicle related devices /
Machine tools

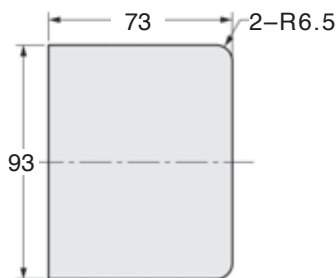
• CHARACTERISTICS

The paddle latch allows for 2-point locking with the use of a rod (not included). The flush-type latch protrudes slightly from the mounting surface and can be installed on the left or right side. Model ...MTHA4291F, is used on one side of a double door.

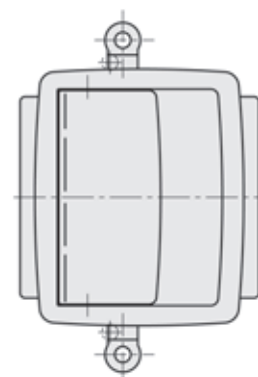
...MTHA4291KP



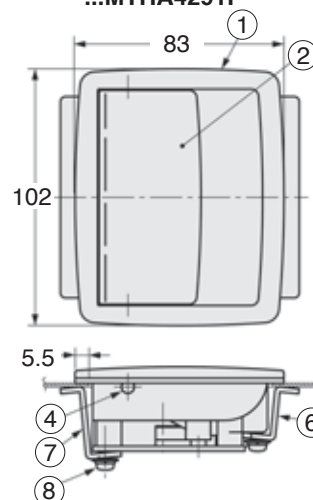
LAYOUT OF
A HOLE FOR
INSTALLATION



...MTHA42912P



...MTHA4291F



1

- APPLICATIONS

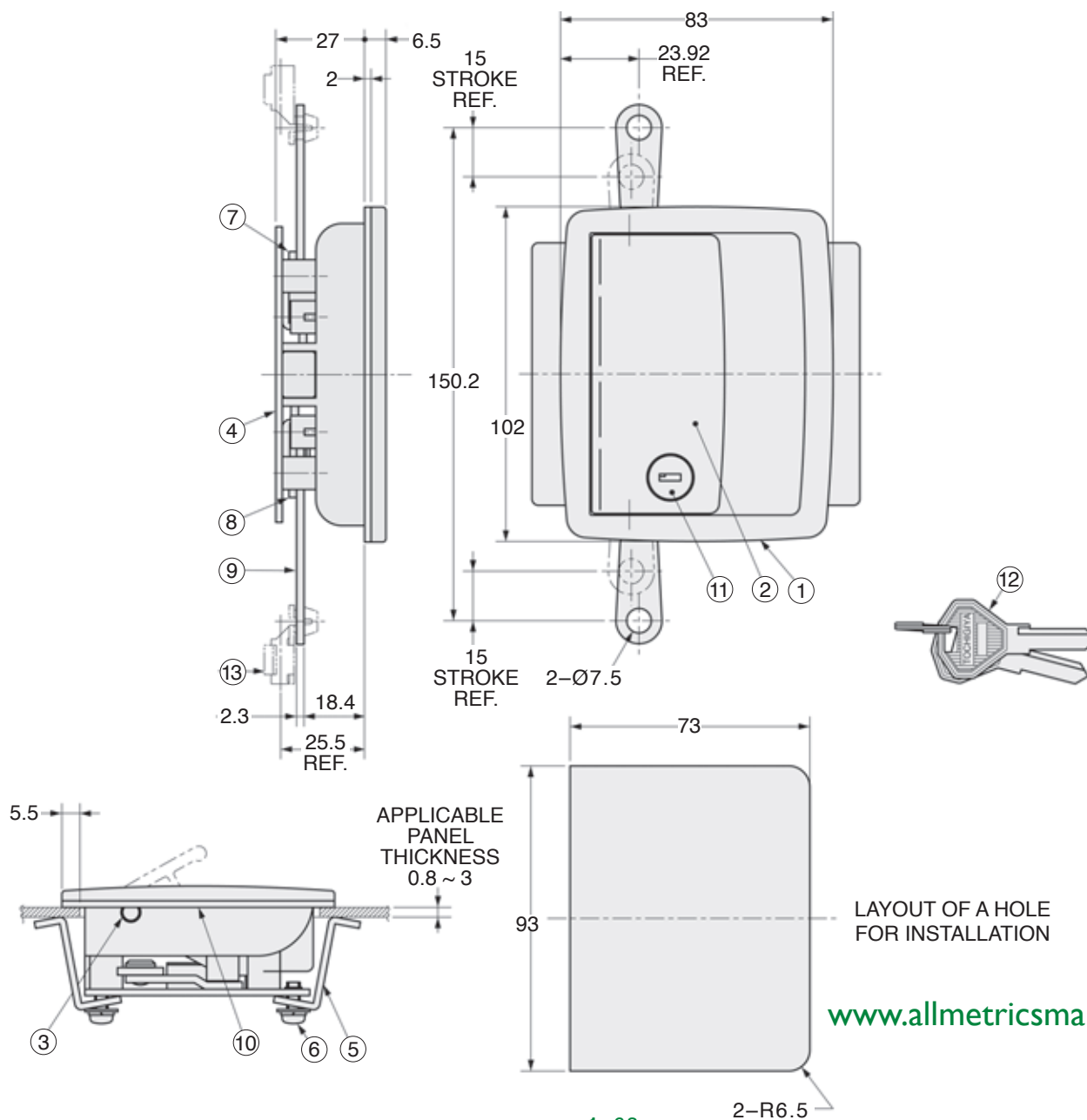
- **CHARACTERISTICS**

The paddle latch allows for 2-point locking with the use of a rod (not included). Plastic is used for the case and handle to make the latch lighter than the ...MTHA429.. series.

- **LATCH**

Catalog Number	Key No.	Net Weight g
MAKT44MA429P1K2P	R200	395

*Rod Retainers are **MAKT27MTHA293-1**, Sold Separately.



LATCHES, PADDLE, 2-Point Locking

RoHS
COMPLIANT



1

• LATCHES

Catalog Number	Max. Plate Thickness	Key No.	Net Weight g
MAKT41MTHA433K2P	0.8	282	962
MAKT41MTHA4332P		No Key	940
MAKT41MTHA433F		No Latch	876

NOTE: When installing, make sure that the markings "2P" and "LOCK" are visible. Apply antiloosening treatment to the cross-hole countersunk screws (part no. 7) after installation. The emergency release is only available on model **MAKT41MTHA4332P**.

• APPLICATIONS

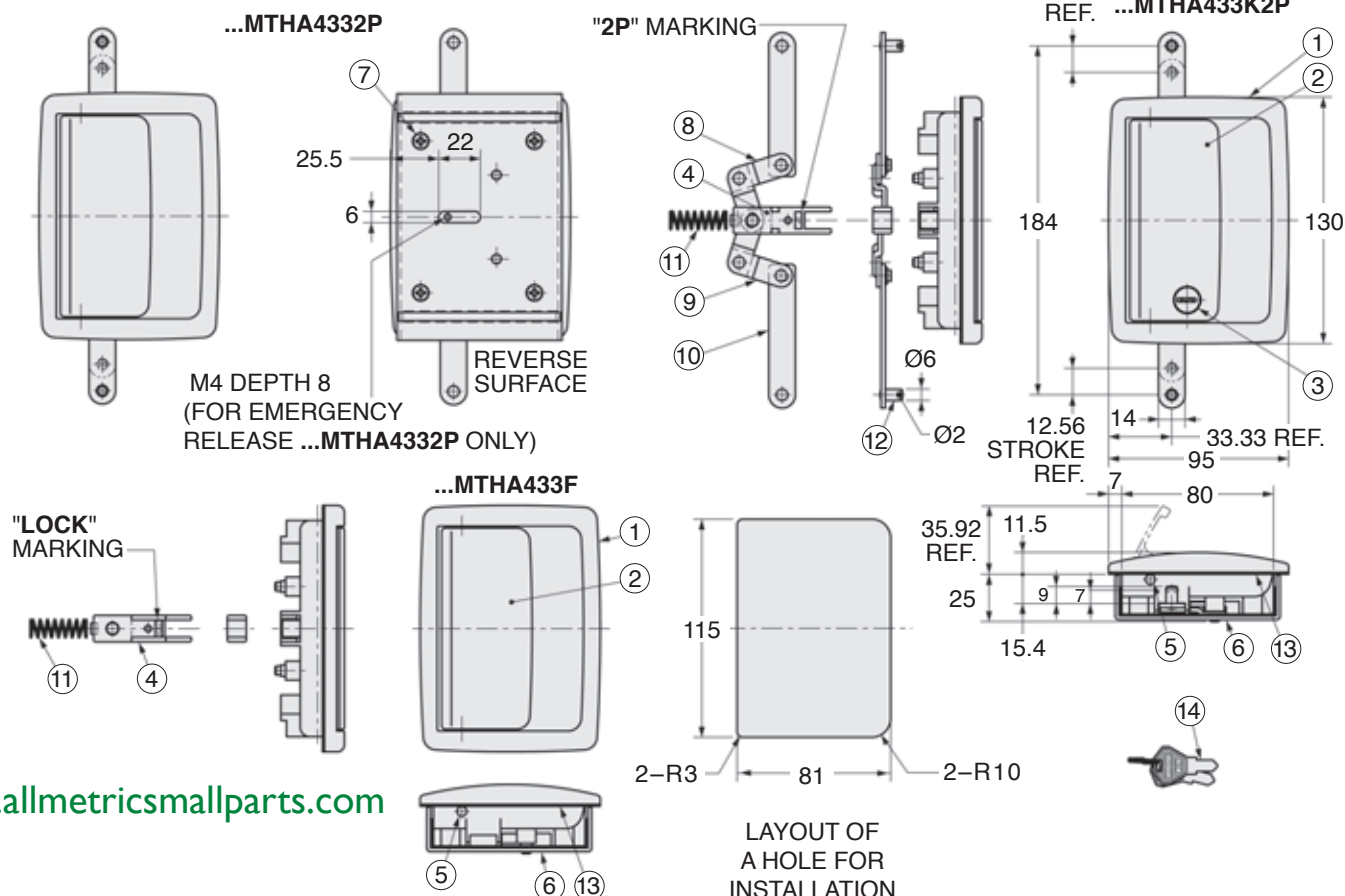
Distribution boards / Distribution panels /
Control boards / Machine tools

• CHARACTERISTICS

The paddle latch allows for 2-point locking with the use of a rod (not included). The flush-type latch protrudes slightly from the mounting surface and can be installed on the left or right side. Model **...MTHA433F**, is used on one side of a double door.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Case	Zinc Die Cast	Chrome Plated, Dull Finish	1
2	Handle		Chrome Plated, Satin Finish	
3	Lock		Chrome Plated	
4	Joint	Stainless Steel	—	1
5	Pin		—	
6	Bracket	Steel	Zinc Plated	4
7	Cross-Hole Countersunk Screws			
8	Arm			
9	Arm			
10	Arms	Stainless Steel	—	2
11	Spring			
12	Bosses	Rubber	Black	2
13	Packing			
14	Keys	Brass	Nickel Plated	2



LATCHES, PADDLE, 3-Point



• APPLICATIONS

1

Distribution boards / Distribution panels /
Control boards / Vehicle related devices /
Machine tools

• CHARACTERISTICS

A link mechanism is added to the paddle latch ...**MTHA282**; using this with the slam latch, **MAKT43MTHA284**, a rod retainer is attached to the ends of the arms connecting to the slam latch (see application example to the right). Simply push the rod into the rod retainer.

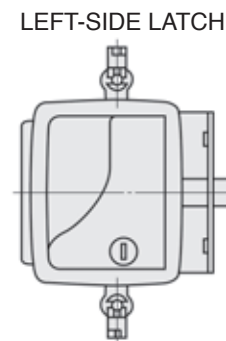
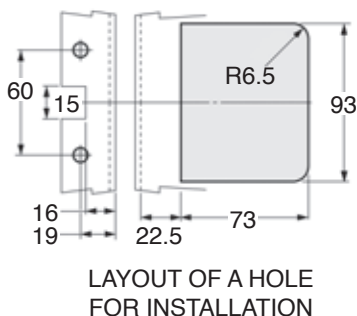
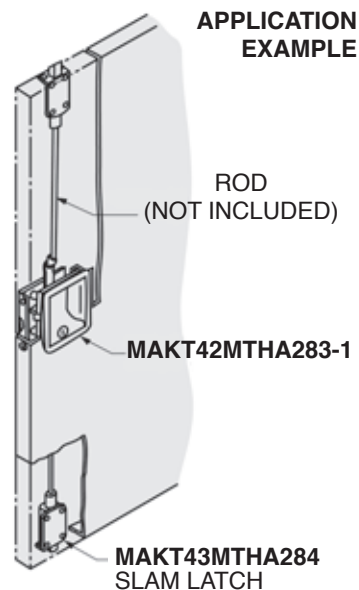
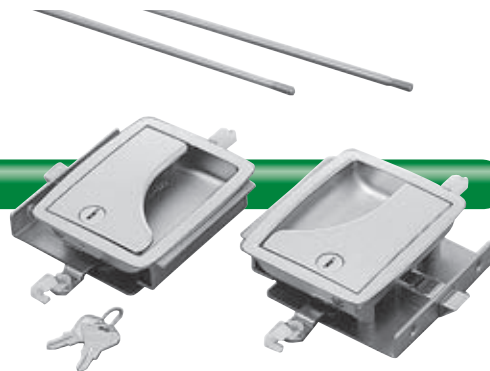
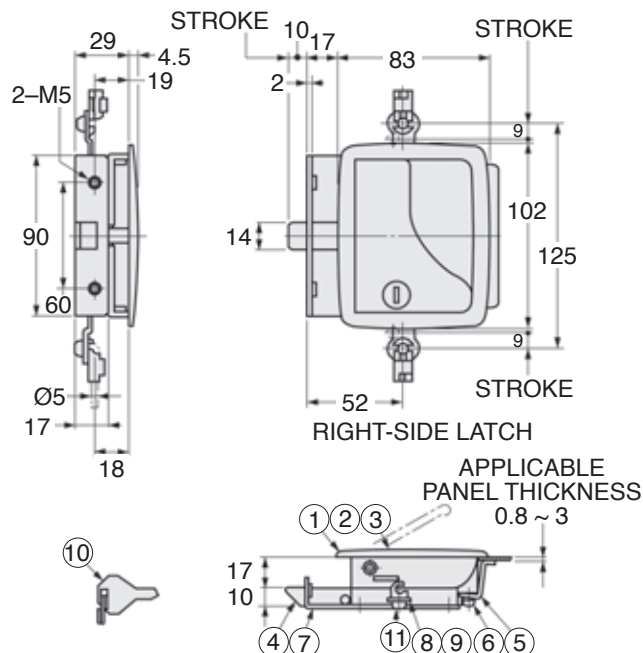
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Case	Zinc Die Cast	Chrome Plated Satin Finish	1
2	Lever			
3	Rotor		Chrome Plated	
4	Latch			
5	Mounting Bracket	Steel	Zinc Plated	2
6	Pan Head Screws			
7	Base			
8	Arm			1
9	Arm			
10	Keys	Brass	Nickel Plated	2
11	Rod Retainers*	Nylon	Natural Color	

*Rod Retainers are **MAKT27MTHA293-1**, Sold Separately.

- **LATCHES**

Catalog Number	Specifications	Key No.	Net Weight g
MAKT42MTHA283-1	Right-Side Latch	282	597
MAKT42MTHA283-2	Left-Side Latch		



• **APPLICATIONS**

Distribution boards / Distribution panels / Control boards / Vehicle related devices / Cabinets

• **CHARACTERISTIC**

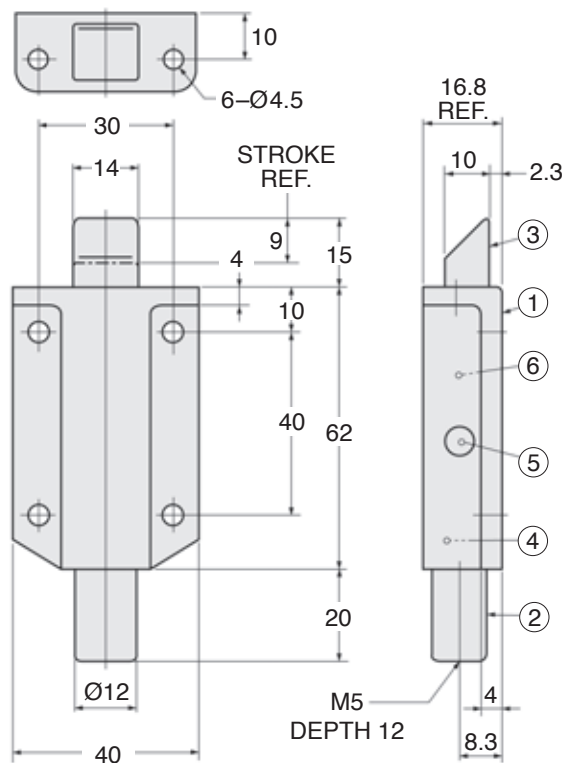
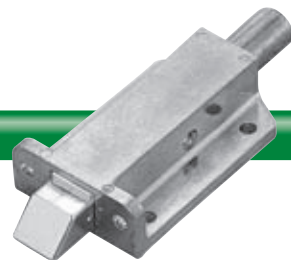
In order to ensure the engagement of the latch, the latch stroke can be verified by the movement of the rod.

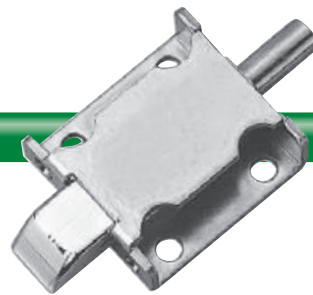
• **PARTS LIST**

No.	Part Name	Material	Finish	Qty.
1	Case	Zinc Die Cast	Zinc Plated	1
2	Rod		Chrome Plated	
3	Latch		Stainless Steel	
4	Spring			
5	Spring Pin			
6	Block	Brass		

• **LATCH**

Catalog Number	Net Weight g
MAKT43MTHA284	167.3





1

• **APPLICATIONS**

Panel latches / Various types of handles

• **CHARACTERISTIC**

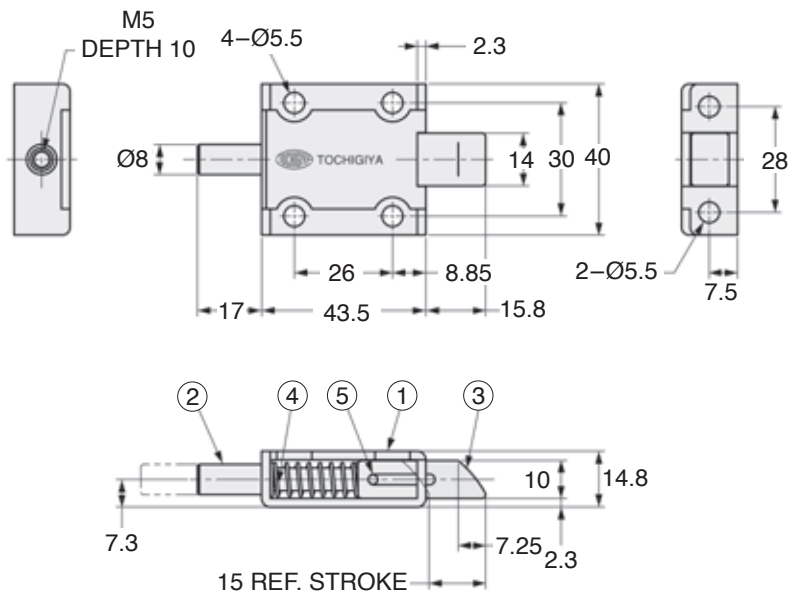
The paddle latch is shock resistant since the rod and latch move independently.

• **PARTS LIST**

No.	Part Name	Material	Finish	Qty.
1	Case	Steel	Zinc Plated	1
2	Rod			
3	Latch	Zinc Die Cast	Chrome Plated	
4	Spring	Piano Wire	Zinc Plated	
5	Spring Pin	Stainless Steel	—	

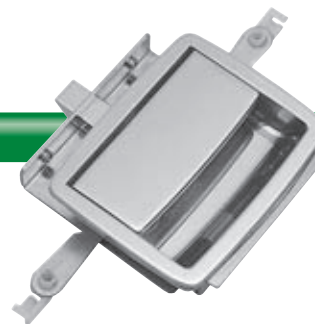
• **LATCH**

Catalog Number	Net Weight g
MAKT44MTHA315	88



LATCH, PADDLE, 3-Point Locking

RoHS
COMPLIANT



• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Case	Zinc Die Cast	Chrome Plated, Dull Finish	1
2	Handle			
3	Latch			
4	Pin	Steel	Zinc Plated	2
5	Base			
6	Mounting Hardware			
7	Small Screws and Flat Washers			
8	Arm			
9	Arm			
10	Arms			
11	Rod Retainers*	Nylon	Natural Color	2
12	Packing	Elastomer	Gray	1

*Rod Retainers are **MAKT27MTHA293-1**, Sold Separately.

• APPLICATIONS

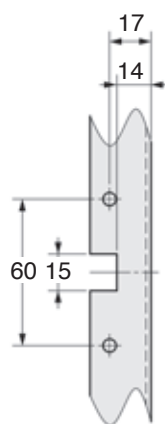
Distribution boards / Distribution panels / Control boards / Vehicle related devices / Machine tools

• CHARACTERISTICS

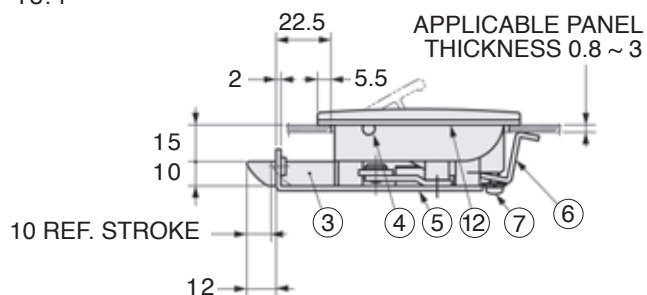
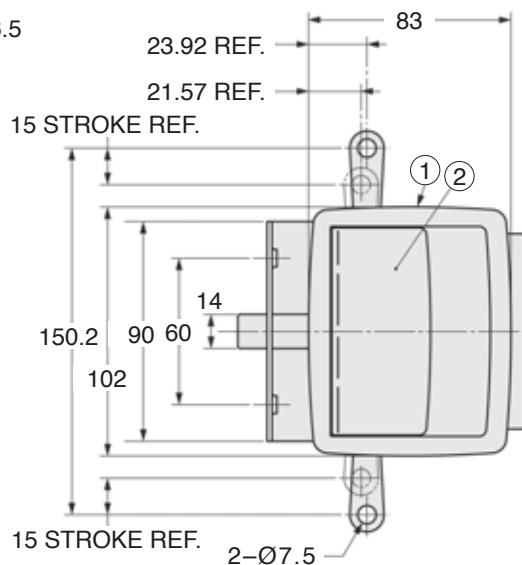
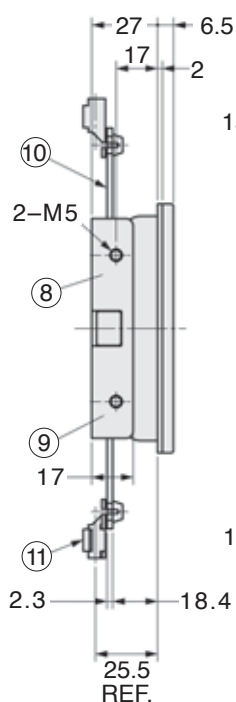
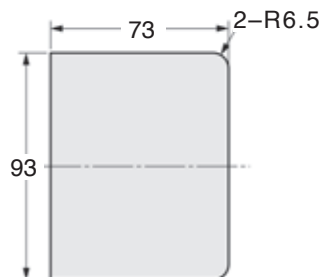
Three-point locking is possible with the use of a rod. The latch can be made more stable by increasing the latch stroke to 15 mm.

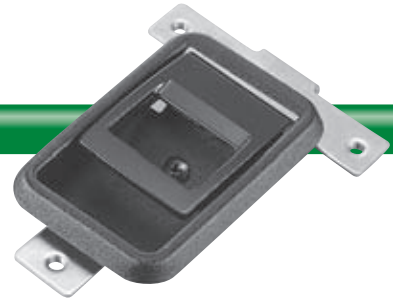
• LATCH

Catalog Number	Key No.	Net Weight g
MAKT41MHA42913PL	No Key	680



LAYOUT OF A HOLE FOR INSTALLATION





1

• **APPLICATIONS**

Doors for construction machines / Operator cabs

• **CHARACTERISTIC**

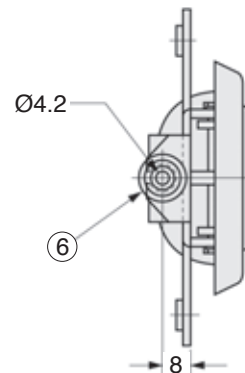
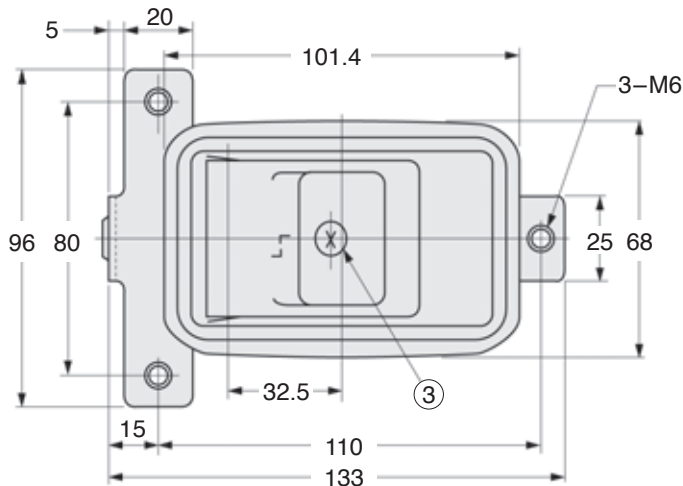
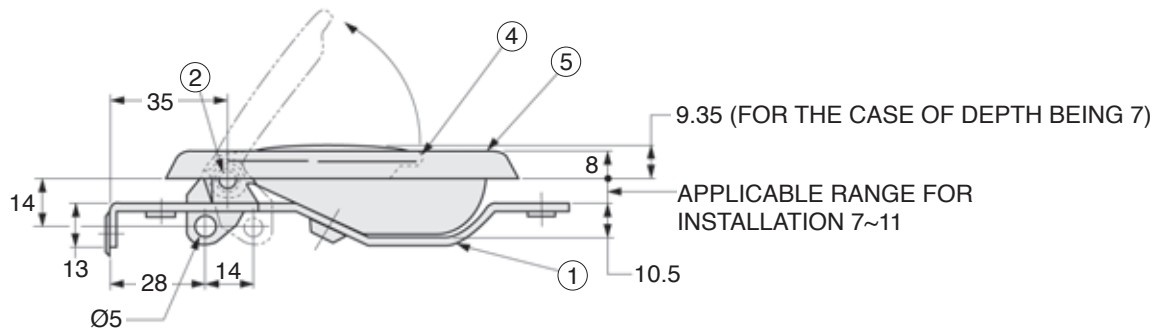
An interior handle for doors of construction machines, such as operator cab doors. Lifting the handle up unlocks the door.

• **HANDLE**

Catalog Number	Net Weight g
MAKT46MTHA298	220

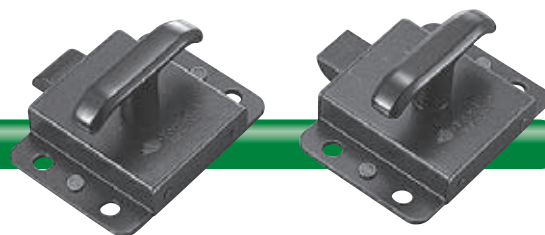
• **PARTS LIST**

No.	Part Name	Material	Finish	Qty.
1	Mounting Plate for Handle	Steel	Zinc Plated	1
2	Shaft		Black Galvanized	
3	Cross Hole Countersunk Screw			
4	Handle	Zinc Die Cast	Black Paint	
5	Handle Cover	Steel		
6	Washer	Brass		



HANDLES, TEE HANDLE SLAM LATCH

RoHS
COMPLIANT



1

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Case	Steel	Galvanized, Black	1
2	Cover			
3	Guide Pin		Zinc Plated	2
4	Rivet			
5	Pan Head Screw	Zinc Die Cast	Galvanized, Black	1
6	Latch		Black Paint	
7	Cam		Zinc Plated	
8	Handle	Piano Wire	Zinc Plated	2
9	Spring			

• APPLICATIONS

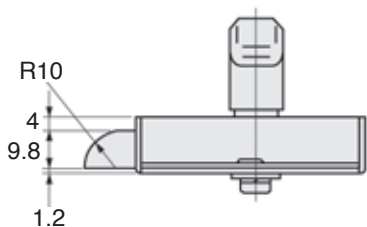
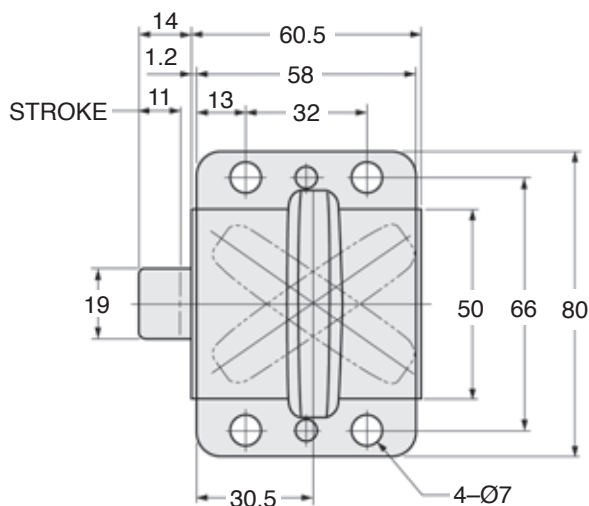
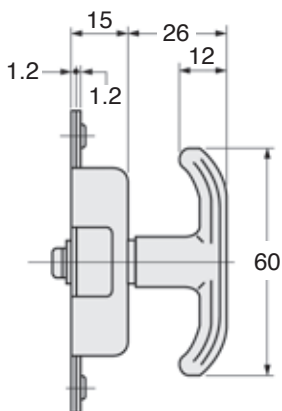
Construction machines (windshields on operator cabs) /
Machine tools / Maintenance inlets

• CHARACTERISTICS

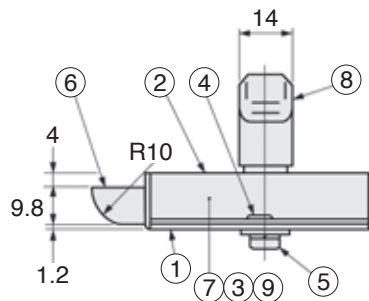
Two types, push-in and pull-out, are available. The latch will retract when the handle is rotated approximately 55°. It can be mounted on the right or left side. The handle can easily be replaced.

• HANDLES

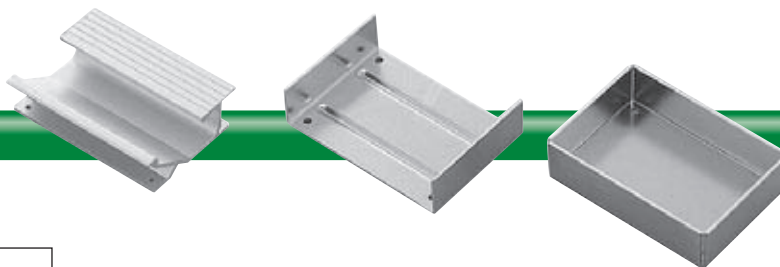
Catalog Number	Type	Net Weight g
MAKT45MTHA299-1	Push-in the handle to close	260
MAKT45MTHA299-2	Pull-in the handle to close	



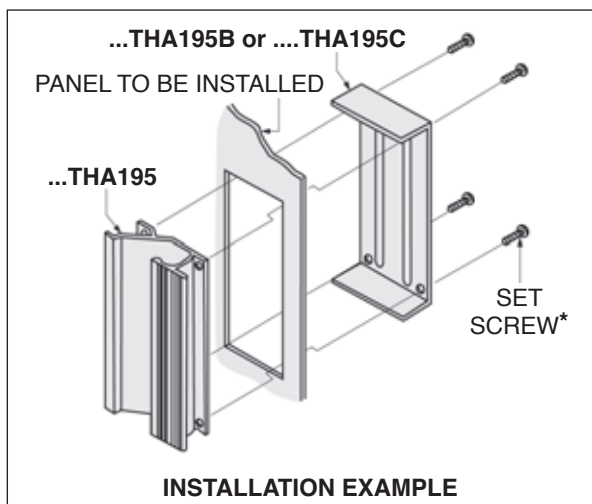
MAKT45MTHA299-2



MAKT45MTHA299-1



1



*Set Screws not included.

• APPLICATIONS

Measuring instruments / Controller devices /
Office utility equipment

• CHARACTERISTICS

The pull has a small protrusion on the surface, approx. 2 mm.
Two types of brackets are available.

• BRACKET SETS

Catalog Number	Set Component	Allowable Load N (kgf)
MAKT01MTHA195001	...THA195-1 ...THA195B-1	—
MAKT01MTHA195002	...THA195-2 ...THA195B-2	294 (30)
MAKT01MTHA195003	...THA195-1 ...THA195C-1	—
MAKT01MTHA195004	...THA195-2 ...THA195C-2	—

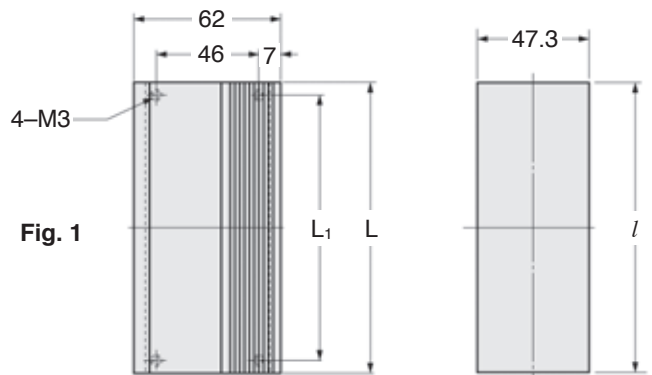
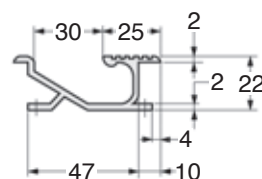


Fig. 1



LAYOUT OF A HOLE
FOR INSTALLATION

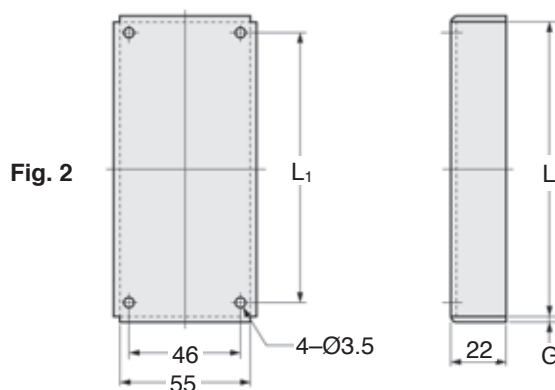


Fig. 2

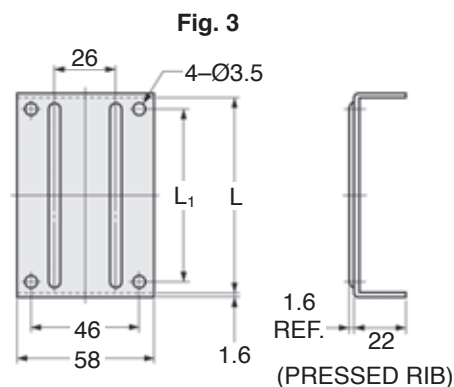
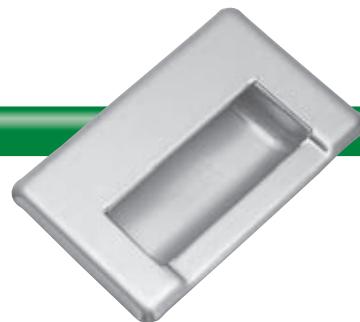


Fig. 3

Fig. 1 • **HANDLE** – Aluminum, White Alumite Brushed Finish

Fig. 2 & Fig. 3 • **BRACKET** – Steel, Bright Zinc Plated Finish

Catalog Number	Fig.	L	L ₁	l	G	Net Weight g
MAKT01MTHA195-1	1	80	70	—	—	55.1
MAKT01MTHA195-2		120	110	—	—	82.8
MAKT01MTHA195B-1	2	80.5	70	80.5	1.6	118.2
MAKT01MTHA195B-2		120.5	110	120.5	1.8	192
MAKT01MTHA195C-1	3	80.5	70	80.5	See	85.9
MAKT01MTHA195C-2		120.5	110	120.5	Drawing	114.2



1

• **APPLICATIONS**

Measuring instruments / Medical equipment

• **CHARACTERISTICS**

Both the threaded stud type and the nut type are offered.

Please choose according to your installation preference.

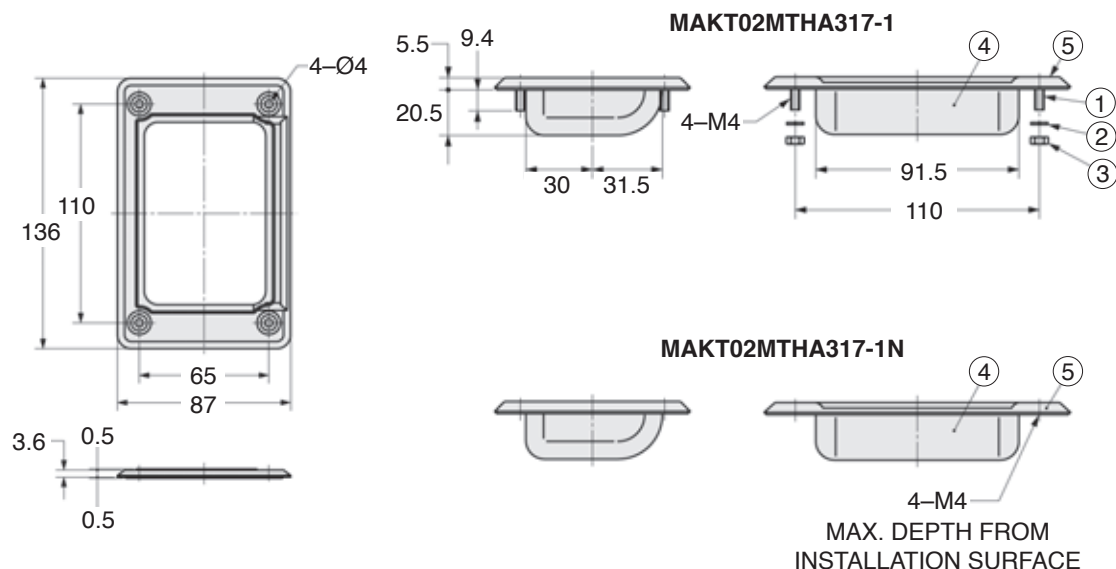
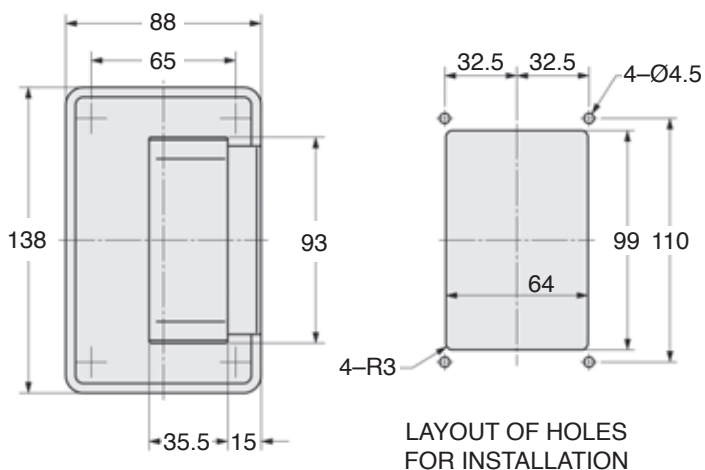
• **PARTS LIST**

No.	Part Name		Material	Finish	Qty.
	...THA317-1	...THA317-1N			
1	Threaded Stud	Hexagonal Nut	Stainless Steel	—	4
2	Spring Washer*	—			
3	Nut*	—			
4	Case	—			
5	Cover	—	Brushed	—	1

*Numbers 2 & 3 in the parts list are for catalog number **MAKT02MTHA317-1** only.

• **PULLS**

Catalog Number	Net Weight g
MAKT02MTHA317-1N	177
MAKT02MTHA317-1	185



PULLS, FLUSH - With Threaded Studs

RoHS
COMPLIANT



1

• APPLICATIONS

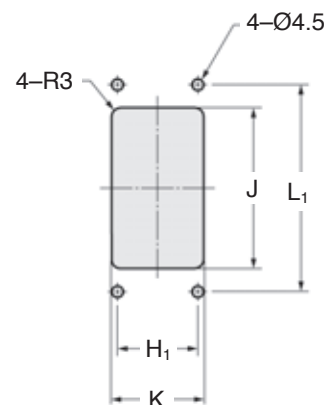
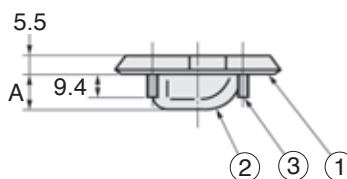
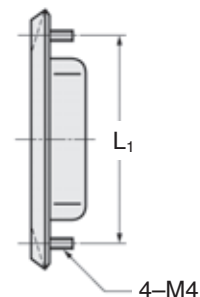
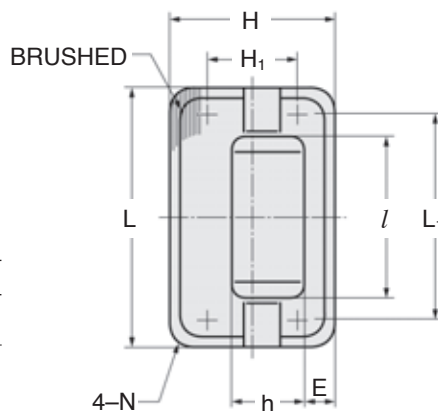
Devices for food-related industries / Cabinets /
Measuring instruments

• CHARACTERISTIC

The embedded stainless steel construction
provides excellent corrosion resistance.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Cover	Stainless Steel	Brushed	1
2	Case		—	—
3	Threaded Studs		—	4



LAYOUT OF HOLES
FOR INSTALLATION

• PULLS

Catalog Number	L	L ₁	H	H ₁	l	h	J	K	E	A	N	Net Weight g
MAKT03M1THA425-3	94	76	60	32	60	28	63	43	12	12	R7	82
MAKT03M2THA425-2	111	88	64.5	38	70	28	73	42	13	14.5	R10	100
MAKT03M3THA425-1	138	110	88	65	95	36.5	99	64	13.5	20.5	R10	168

PULLS, FLUSH - With Nuts



1

• APPLICATIONS

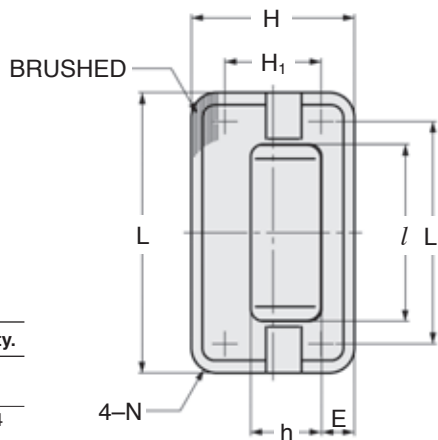
Devices for food related industries / Cabinets /
Measuring instruments

• CHARACTERISTIC

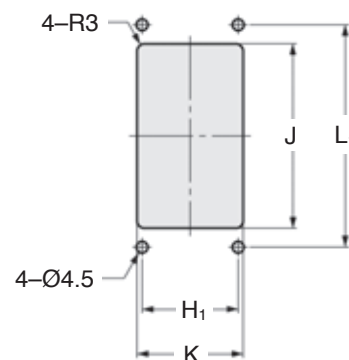
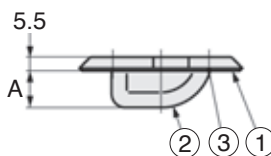
The embedded stainless steel construction
provides excellent corrosion resistance.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Cover	Stainless Steel	Brushed	1
2	Case		—	—
3	Hexagon Nuts		—	4



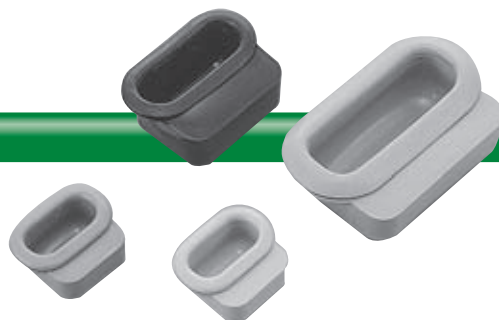
4-M4
(MAXIMUM
DEPTH IS 4
FROM PANEL
SURFACE)



LAYOUT OF HOLES
FOR INSTALLATION

• PULLS

Catalog Number	L	L ₁	H	H ₁	I	h	J	K	E	A	N	Net Weight g
MAKT03M1THA4253N	94	76	60	32	60	28	63	43	12	12	R7	80
MAKT03M2THA4252N	111	88	64.5	38	70	28	73	42	13	14.5	R10	96
MAKT03M2THA4251N	138	110	88	65	95	36.5	99	64	13.5	20.5	R10	166



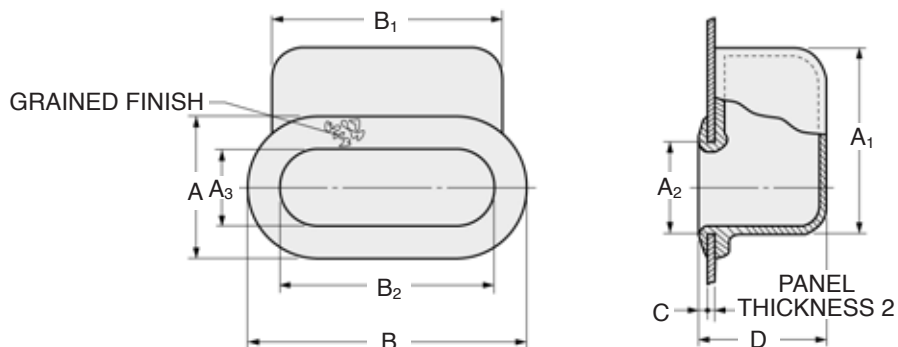
1

• APPLICATIONS

Rear panels / Front panels / Interior panels /
Inspection holes / Distribution boards /
General industrial machines

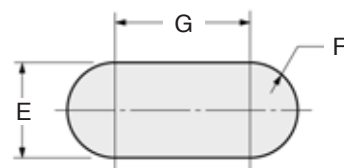
• CHARACTERISTICS

One hole is all you need to install these
handles. Four color choices are available.



• PULLS

Catalog Number	Material	Color	Net Weight g
MAKT04MTHA173-1	Elastomer	Grayish Green	83
MAKT04MTHA173-1A		Black	
MAKT04MTHA173-1B		Beige	
MAKT04MTHA173-1G		Gray	
MAKT04MTHA173-2		Grayish Green	38.7
MAKT04MTHA173-2A		Black	
MAKT04MTHA173-2B		Beige	
MAKT04MTHA173-2G		Gray	
MAKT04MTHA173-3		Grayish Green	20.2
MAKT04MTHA173-3A		Black	
MAKT04MTHA173-3B		Beige	
MAKT04MTHA173-3G		Gray	



LAYOUT OF A HOLE FOR INSTALLATION

Catalog Number	A	A ₁	A ₂	A ₃	B	B ₁	B ₂	C	D	E	F REF.	G
MAKT04MTHA173-1	58	64	38	30	120	96	92	6	43	39	19.5	67
MAKT04MTHA173-1A												
MAKT04MTHA173-1B												
MAKT04MTHA173-1G												
MAKT04MTHA173-2	40	52	26	22	80	66	62	3	37	27	13.5	40
MAKT04MTHA173-2A												
MAKT04MTHA173-2B												
MAKT04MTHA173-2G												
MAKT04MTHA173-3	34	40	22	18	55	43	39	4	30	23	11.5	24
MAKT04MTHA173-3A												
MAKT04MTHA173-3B												
MAKT04MTHA173-3G												

HANDLES, FLUSH

RoHS
COMPLIANT



1

• PARTS LIST

No.	Part Name	Material	Finish		Qty.
			...MTHA172-1	...MTHA172-2	
1	Flange Cover	Aluminum Alloy	Melamine Baked Hammered Silver Tone	—	1
2	Handle		—	—	
3	Cover	Steel	Chrome Plated	—	2
4	Truss Screws		Zinc Plated	—	
5	Hexagonal Nuts	Brass	Nickel Plated	—	2
6	Flat Washers		—	—	
7	Support	ABS	Black	—	1
8	Spring	Stainless Steel	—	—	
9	Spring		—	—	
10	Cushion	Polyurethane	Clear	—	1

• APPLICATIONS

Controller devices / Measuring instruments

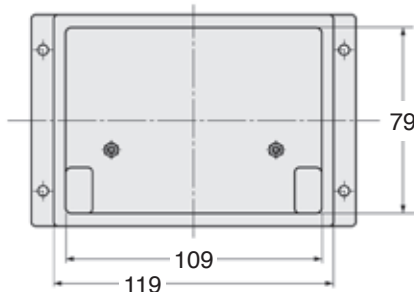
• CHARACTERISTICS

High grade Melamine baked finish. Installation can be made either from the front or from the rear of the panel. Installation surface becomes flush after installation.

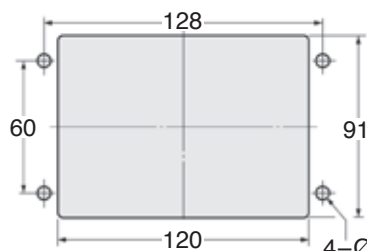
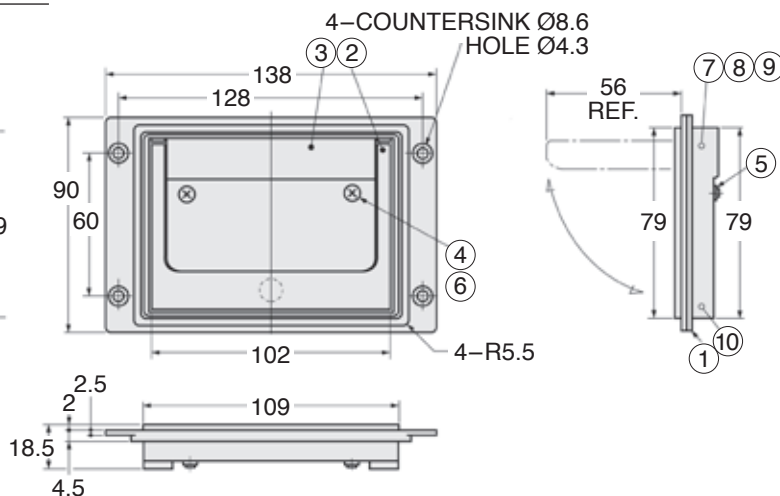
• HANDLES

Catalog Number	Allowable Load N (kgf)	Net Weight g
MAKT40MTHA172-1	245 (25)	232.6
MAKT40MTHA172-2		

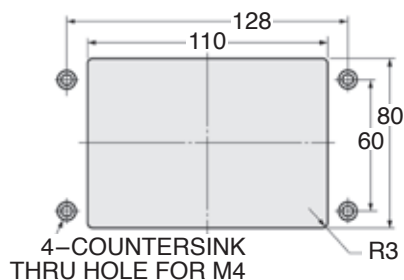
REAR



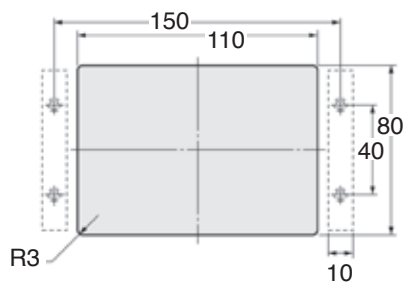
FRONT



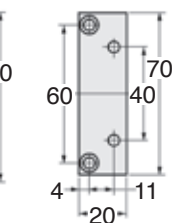
LAYOUT OF HOLES FOR INSTALLATION (ATTACHING FROM THE FRONT OF THE PANEL)



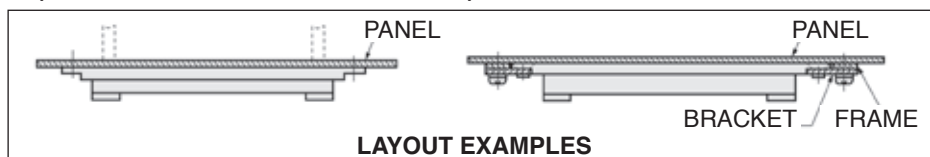
LAYOUT OF HOLES FOR INSTALLATION (ATTACHING FROM THE REAR OF THE PANEL)



LAYOUT OF HOLES FOR INSTALLATION (ATTACHING WITH BRACKET FROM THE REAR OF THE PANEL)



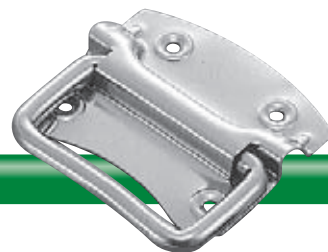
BRACKET (CUSTOM-MADE)



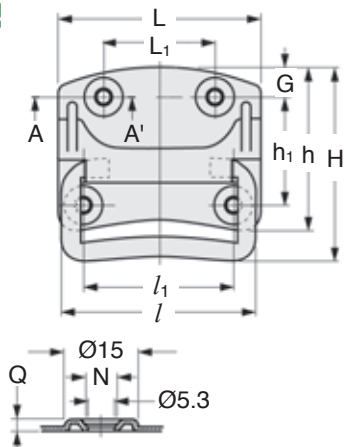
LAYOUT EXAMPLES

HANDLES, CHEST

RoHS
COMPLIANT



1



AA' Section



- **APPLICATIONS**

Measuring instruments / Small boxes

- **CHARACTERISTIC**

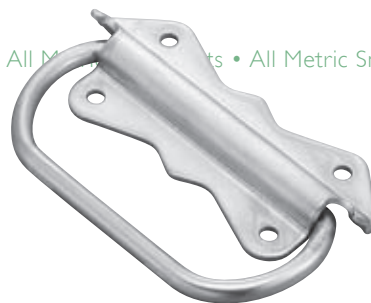
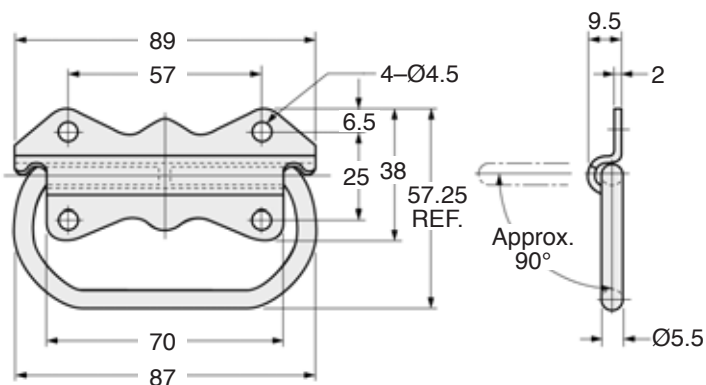
Typical handles for carrier boxes.

- **HANDLE – Stainless Steel**

Catalog Number	L	L ₁	I	I ₁	H	h	h ₁	G
MAKT17MTHA92-3	84	46	81	64	81	67	44	12
MAKT17MTHA93-3	92	50	89	70	93	77	47	17

Catalog Number	J	K	s	N REF.	Q Approx.	Allowable Load N (kgf)	Net Weight g
MAKT17MTHA92-3	11.5	1	Ø8	Ø6.5	Ø2.5	98.1 (10)	109.7
MAKT17MTHA93-3	13	1.2	Ø9	Ø8	Ø2.2	157 (16)	164.1

All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts



- **APPLICATIONS**

Measuring instruments / Small boxes

- **CHARACTERISTIC**

A round shaped handle with an accent on the base plate.

- **HANDLE – Steel, Zinc Plated**

Catalog Number	Allowable Load N (kgf)	Net Weight g
MAKT18MTHA30	177 (18)	83

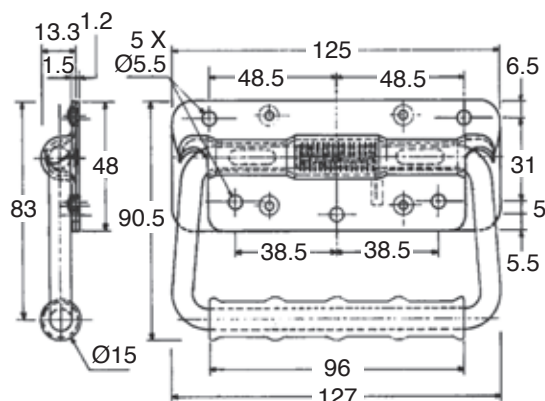


Fig. 1

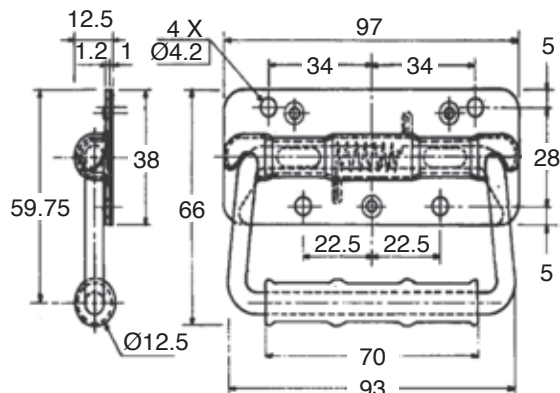


Fig. 2



MAKYAFM6040U13PC
MAKEAFM6040U13JB



MAKYAFM6040U53PC

Fig. 2



MAKYAFM6040U14JB*
MAKEAFM6040U14PC*

Fig. 1

- **HANDLE** – Stainless Steel • **GRIP** – Polyethylene
- **BODY** – Stainless Steel, With Piano Wire Torsion Spring

Catalog Number	Fig.	Width	Max. Load N (kgf)
MAKYAFM6040U13PC MAKEAFM6040U14PC*	1	127	400 (40.8)
MAKYAFM6040U53PC	2	93	300 (30.6)

*Without piano wire torsion spring.

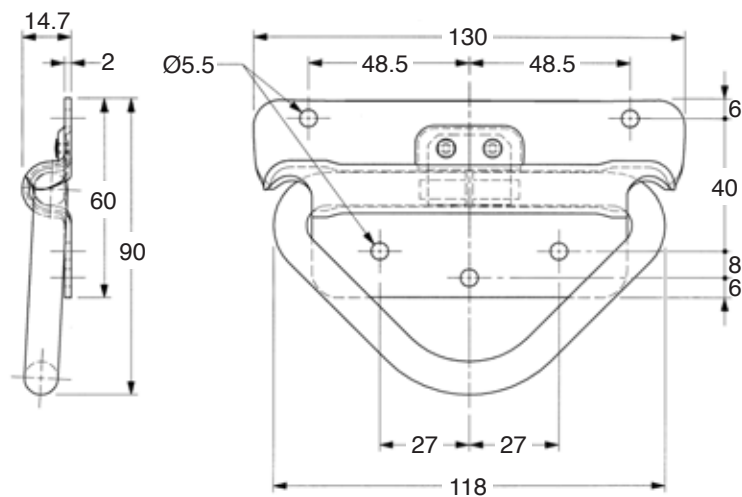
- **HANDLE** – Steel, Zinc Plated • **GRIP** – Polyethylene
- **BODY** – Steel, Zinc Plated, With Piano Wire Torsion Spring

Catalog Number	Fig.	Width	Max. Load N (kgf)
MAKEAFM6040U13JB MAKYAFM6040U14JB*	1	127	400 (40.8)

*Without piano wire torsion spring.

HANDLE, SLINGING RING

RoHS
COMPLIANT



• **HANDLE** – Stainless Steel

Catalog Number

MAKE01M6040U80PC

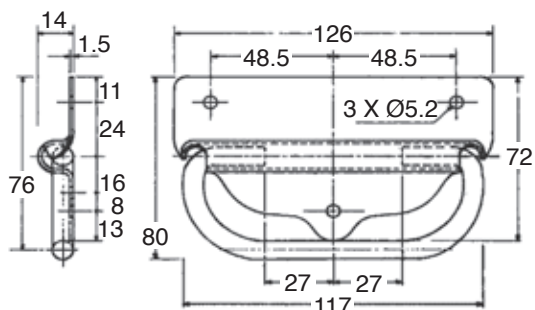


Fig. 1



Fig. 1

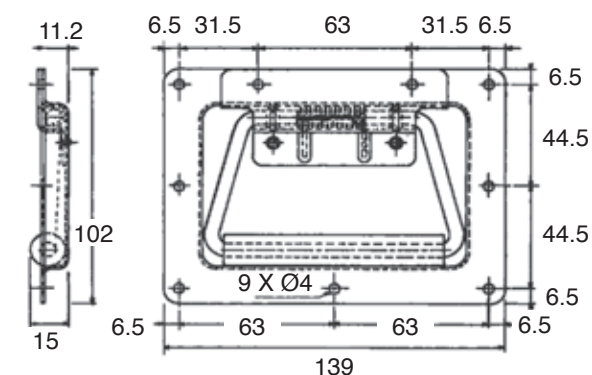


Fig. 2

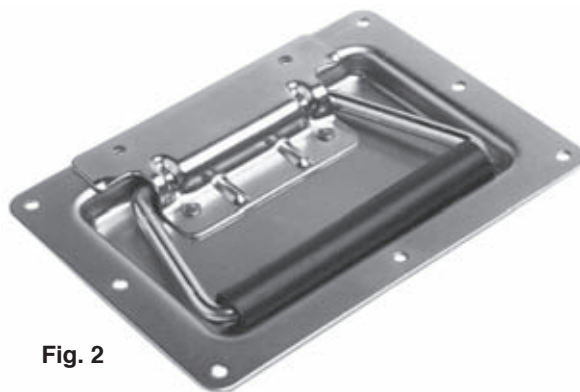


Fig. 2

Fig. 1 • HANDLE – Steel, Zinc Plated

Catalog Number	Width	Max. Load N (kgf)
MAKYAFM6040U11JB	117	400 (40.8)

Fig. 2 • HANDLE – Steel, Zinc Plated

- **GRIP** – Polyethylene
- **BODY** – Steel, Zinc Plated, With Piano Wire Torsion Spring

Catalog Number	Width	Max. Load N (kgf)
MAKYAFM6040U41JB	139	400 (40.8)



Fig. 1

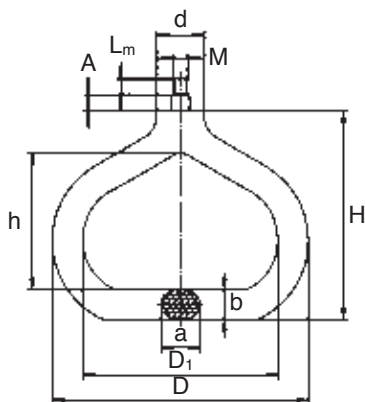


Fig. 1

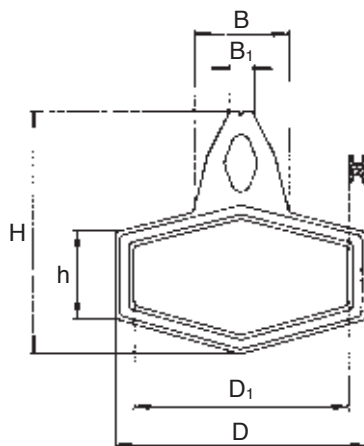


Fig. 2



Fig. 2

Fig. 1 • HANDLE – Nylon 6, Gray • **SCREW** – Steel, Zinc Plated

Catalog Number	D	D ₁	H	d	L _m	h
MAKX9MM9701	110	86	88	21	7	59

Catalog Number	A	a	b	M	Weight g
MAKX9MM9701	7	17	12	M6	58

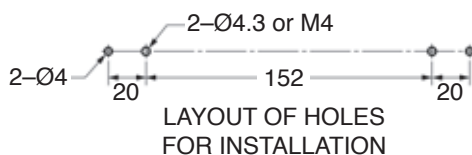
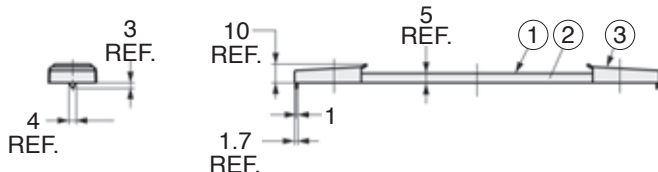
Fig. 2 • HANDLE WITH LOOP – Polyethylene, Black

Catalog Number	D	D ₁	H	h	B	B ₁	Weight g
MAKX9NM9702	110	93	106	38	42	10	24

HANDLES, CARRYING

RoHS
COMPLIANT

...THA318-2
SPIKED BOTTOM



• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Grip	Elastomer	Black	1
2	Plate Spring	Tempered Material	—	1
3	Mounting End	Steel	Chrome Plated	2

• HANDLES

Catalog Number	Allowable Load N (kgf)	Spiked Bottom	Net Weight g
MAKT19MTHA318-2	300 (30)	Yes	42.8
MAKT19MTHA318-1	300 (30)	No	43.5

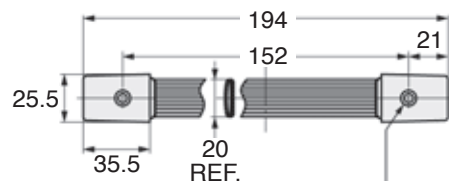
• APPLICATIONS

Measuring instruments / Telecommunication devices

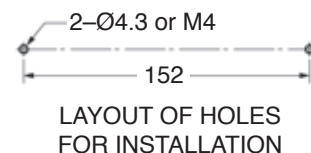
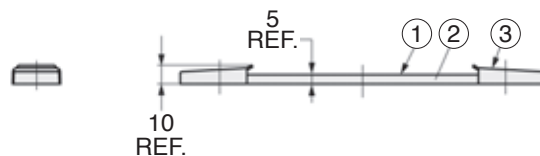
• CHARACTERISTIC

A plate spring is used in the handle.

...THA318-1
SMOOTH BOTTOM



2-COUNTERSINK HOLES Ø8.2
THRU HOLES Ø4.7



All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

• APPLICATIONS

Measuring instruments / Telecommunication devices

• CHARACTERISTIC

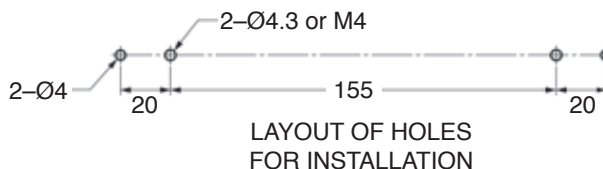
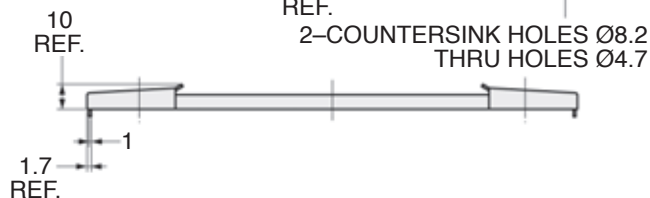
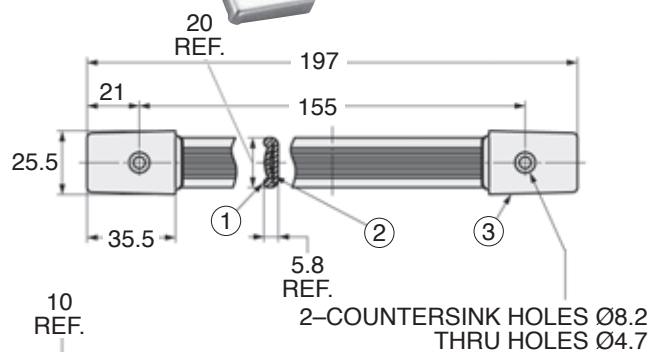
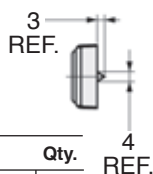
A plate spring is used in the handle.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Grip	Elastomer	Black	1
2	Plate Spring	Tempered Material	—	1
3	Mounting End	Steel	Chrome Plated	2

• HANDLE

Catalog Number	Allowable Load N (kgf)	Net Weight g
MAKT19MTHA319	250 (25)	45.6



HANDLES



1

• APPLICATIONS

Measuring instruments / Telecommunication devices

• CHARACTERISTIC

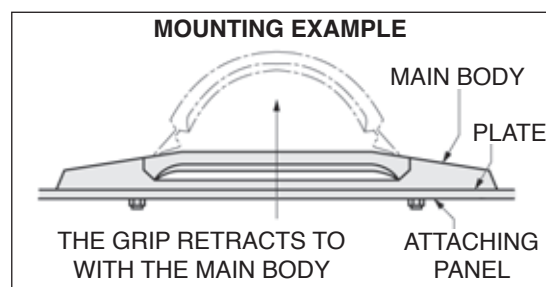
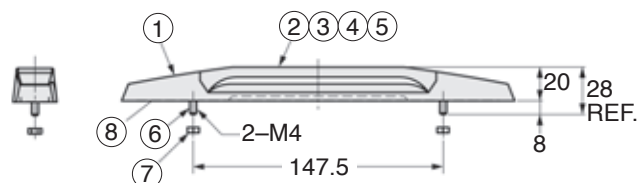
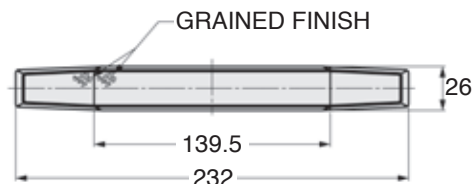
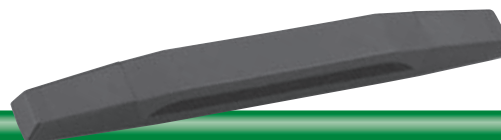
A plate spring is used in the handle.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Handle Body	Elastomer	Black	1
2	Grip	ABS		
3	Plate Spring	Tempered Material	—	2
4	Rivet	ETP Copper	—	
5	Arm	Steel	Nickel Plated	2
6	Stud		Zinc Plated	
7	Hexagonal Nut		—	
8	Plate	—	—	1

• HANDLE

Catalog Number	Allowable Load N (kgf)	Net Weight g
MAKT20MTHA323	192 (20)	88



All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

• APPLICATIONS

Small measuring instruments or power supplies /
Various types of carrying cases

• CHARACTERISTICS

1. A labor saving handle using a push-in type mechanism.
2. With application of value engineering methodology, it uses only three parts.

• INSTALLATION INSTRUCTION

Push mounting end ② into holes to complete the installation.

INSTALLATION EXAMPLE

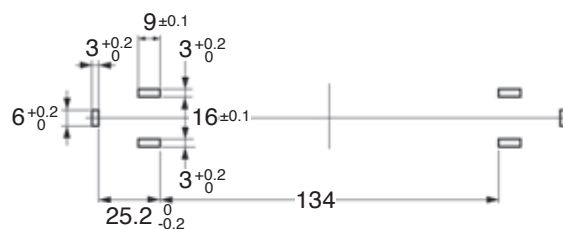
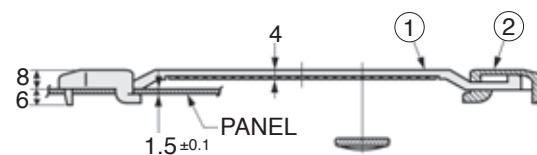
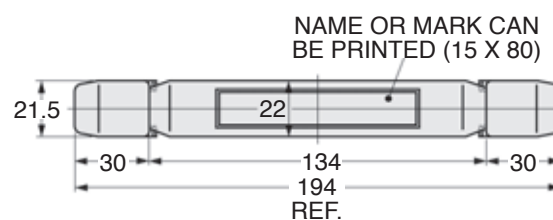


• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Grip	Elastomer	—	1
2	Mounting End	Acetal	—	2

• HANDLES

Catalog Number	Color (Grip & Holder)	Allowable Load N (kgf)	Net Weight g
MAKT21MTHA246-1	Black	78.5 (8)	23.2
MAKT21MTHA246-2	Gray		
MAKT21MTHA246-3	Ivory		



LAYOUT OF HOLES FOR INSTALLATION

HANDLE, CARRYING

RoHS
COMPLIANT

1

• APPLICATIONS

Various types of portable testing devices / Measuring instruments /
Office utilities / Optical devices / Medical instruments

• CHARACTERISTICS

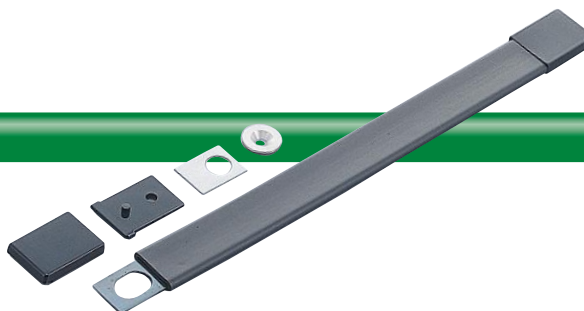
Handle has a sleek appearance; set screws are not visible from the outside. Suitable for any application due to its protrusion-free surface.

• PARTS LIST

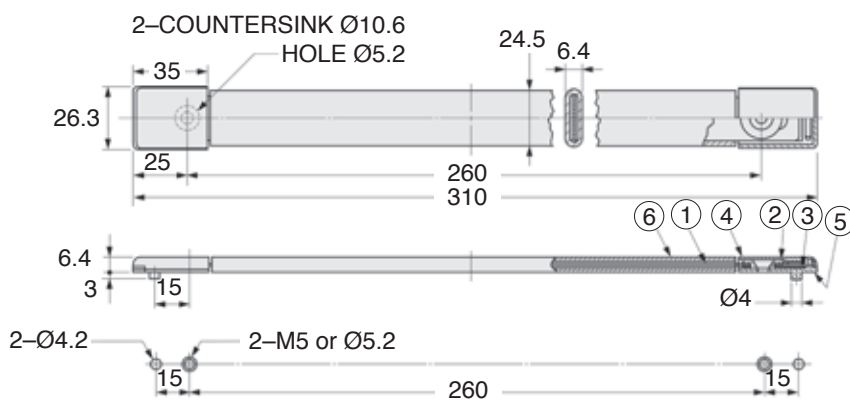
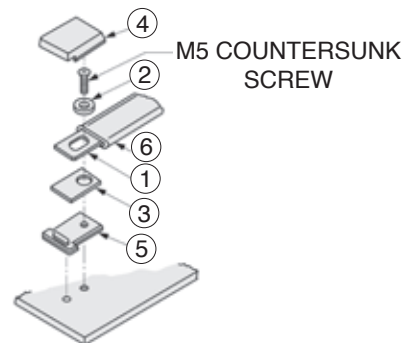
No.	Part Name	Material	Finish	Qty.
1	Plate Spring	Stainless Steel	—	1
2	Support		Natural Finish	2
3	Spacer			
4	End Cover	ABS	Black	1
5	Base	Elastomer		
6	Grip			

• HANDLE

Catalog Number	Allowable Vertical Load N (kgf)	Net Weight g
MAKT22MTHA238	638 (65)	75.2



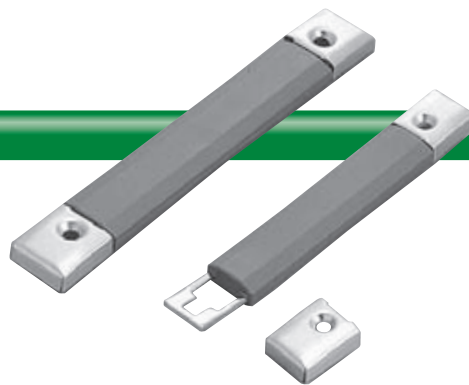
INSTALLATION EXAMPLE



LAYOUT OF HOLES FOR INSTALLATION

HANDLES, CARRYING

RoHS
COMPLIANT



1

• APPLICATIONS

Measuring instruments / Telecommunication devices

• CHARACTERISTIC

A plate spring is used in the handle.

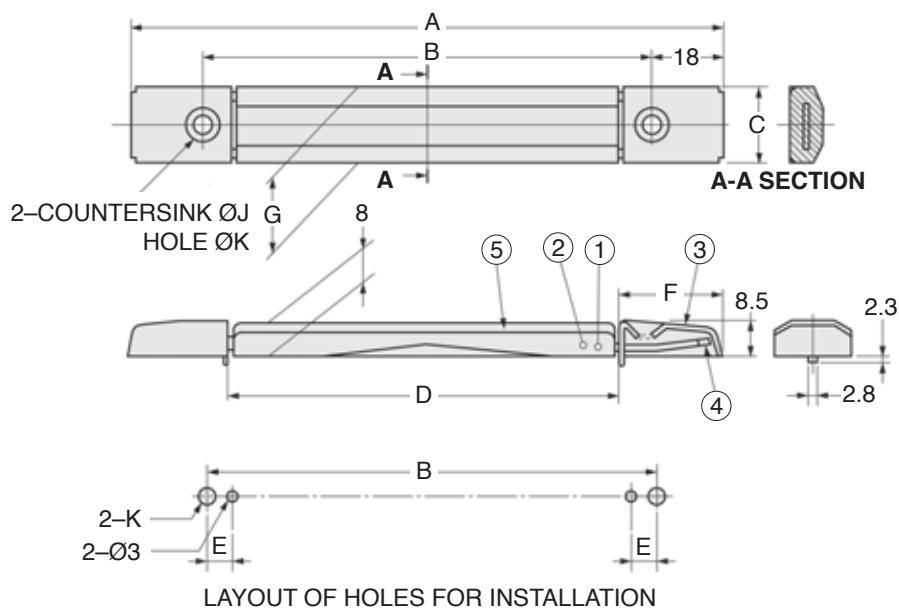
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Plate Spring	Steel	—	1
2	Rivet			4
3	Cover Plate	Brass	Chrome Plated, Satin Finish	2
4	Mounting End		Nickel Plated	
5	Molded Handle	Elastomer	—	1

• HANDLES

Catalog Number	Allowable Vertical Load N (kgf)	Net Weight g
MAKT23M1THA185-2	245 (25)	48
MAKT23M2THA185-1	294 (30)	65

Catalog Number	A Ref.	B	C	D	E	F	G	J	K
MAKT23M1THA185-2	148	112	20	98	6.5	25	20	Ø8.6	Ø4.3
MAKT23M2THA185-1	174	138	24	122	7.5	26	24	Ø10.6	Ø5.3



HANDLES, CARRYING

RoHS
COMPLIANT

1

• APPLICATIONS

Measuring instruments / Telecommunication devices

• CHARACTERISTIC

A plate spring is used in the handle.

• PARTS LIST

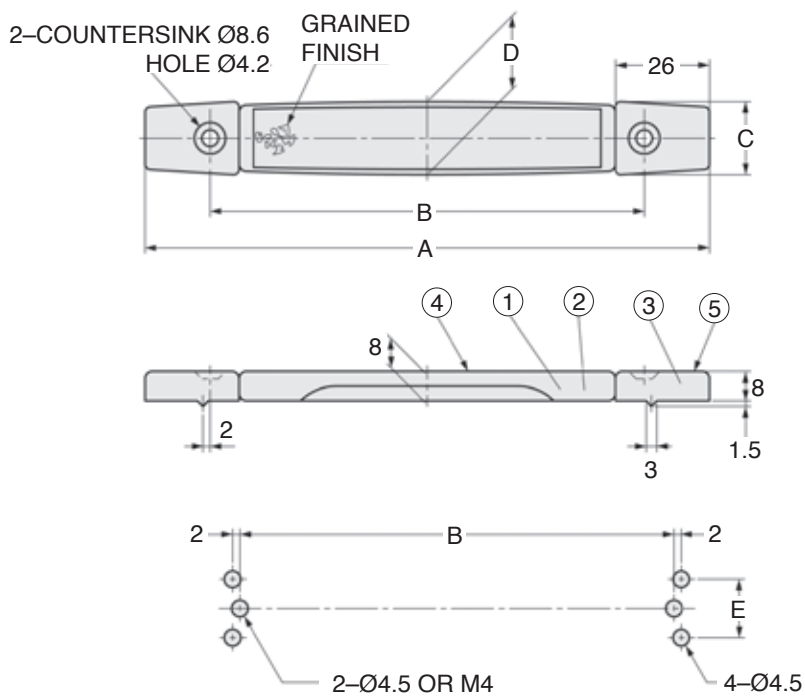
No.	Part Name	Material	Finish	Qty.
1	Plate Spring	Steel	—	1
2	Rivet		Zinc Plated	4
3	Mounting End	Stainless Steel	Barrel Polishing	2
4	Molded Handle	Elastomer	Brown Gray	1
5	Cover Plate	Brass	Chrome Plated, Satin Finish	2



• HANDLES

Catalog Number	Allowable Vertical Load N (kgf)	Net Weight g
MAKT23MTHA192-1	294 (30)	45
MAKT23MTHA192-2	441 (45)	66

Catalog Number	A	B	C	D	E
MAKT23MTHA192-1	156	120	20	20	16
MAKT23MTHA192-2	196	160	24	25	20



LAYOUT OF HOLES FOR INSTALLATION



Handwheels, Cranks & Grips

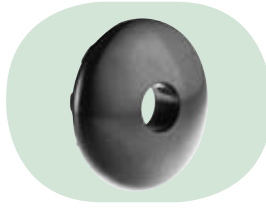
MGA - MHA



2



2-5



2-6



2-7



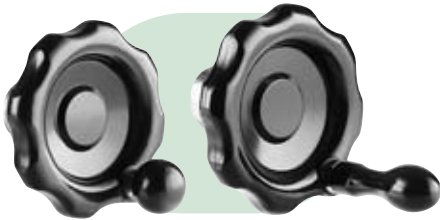
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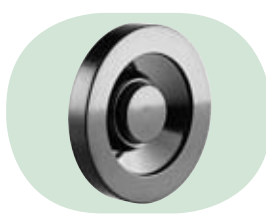
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2-10



2-11 & 2-12



2-13



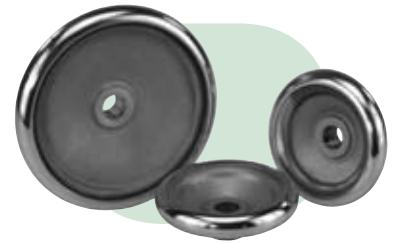
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2-16



2-17



2-18



2-19



2-20



2-21

2



2-22



2-23 & 2-24



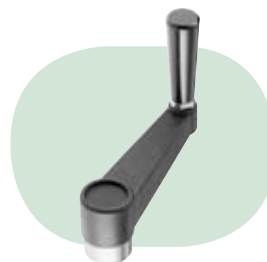
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2-27 & 2-28



2-29



2-30



2-31



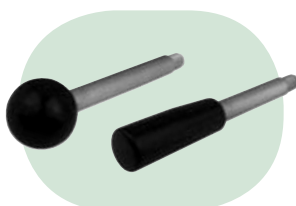
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2-33



2-34



2-35



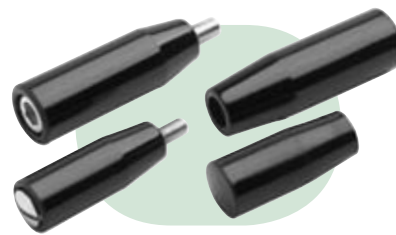
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2-37



2-38

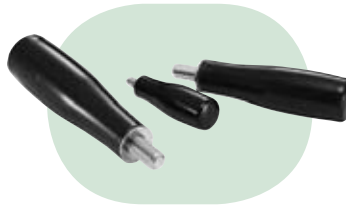


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2



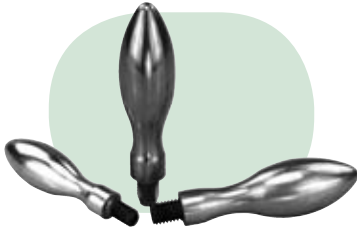
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2-40



2-41



2-42



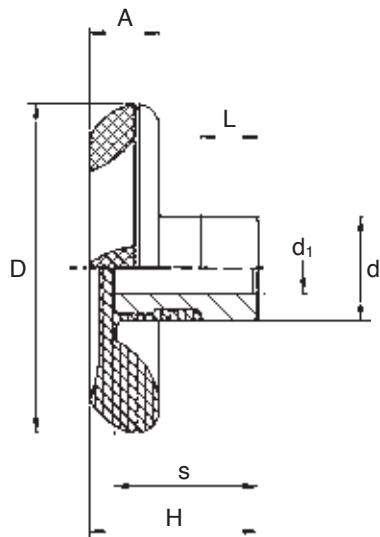
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2-44

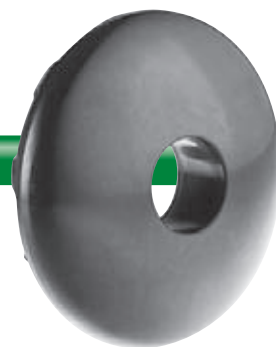


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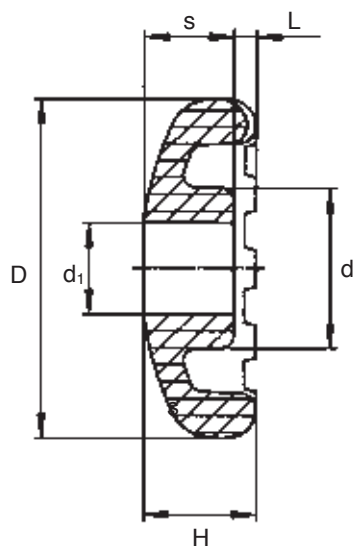


• **HANDWHEEL** – Nylon 6, Anthracite Gray • **HUB** – Steel, Zinc Plated

Catalog Number	D	H	A	s	d	d ₁	L	Weight g
MGAX6FM6801	80	41	17	35	25	10	14	154
MGAX6FM6802						12		145
MGAX6FM6803						14		132
MGAX6FM6804	100	41.5	19	35	25	10	14	188
MGAX6FM6805						12		178
MGAX6FM6806						14		168
MGAX6FM6807	125	42	20	35	25	10	14	252
MGAX6FM6808						12		243
MGAX6FM6809						14		231
MGAX6FM6810	160	42	23	35	32	12	14	446
MGAX6FM6811						14		436
MGAX6FM6812						16		412
MGAX6FM6813	160	42	23	35	32	18	14	413
MGAX6FM6814						20		381



2

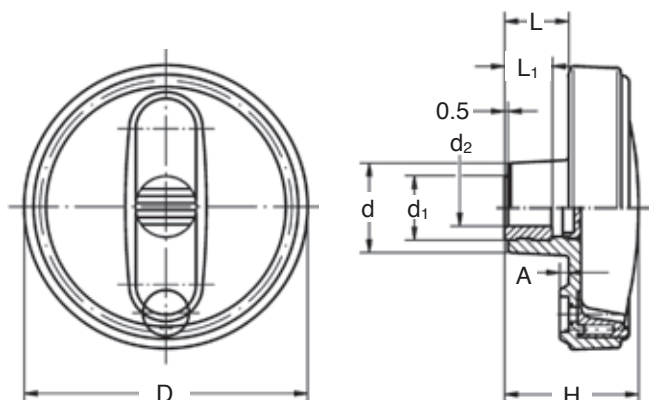


• **HANDWHEEL** – Bakelite, Black • **THROUGH HOLE**

Catalog Number	D	H	s	d	d ₁ (+0.1/0)	L	Weight g
MGAX8FM2901	60	20	16	28	16	4	40
MGAX8FM2902	80	25	20	38	22	5	80
MGAX8FM2903	95	30	25	45	26	5	150



2



• **CHARACTERISTICS**

This modern, attractive handwheel combines quality, durability, strength, ergonomics and safety into one product. Superior design ensures precision adjustments, ergonomic handling and safe operation.

• **HANDWHEEL** – Thermoplastic • **INSERTS** – Steel, Black Oxide Finish

Catalog Number	Size	D	H	A	L	L ₁	d	d ₁	d ₂ * H7	Approx. Weight g
MGAL00M62108008	1	80	37.5	2.5	17.5	13	25	19	8	74
MGAL00M62210010	2	100	44	3	20		28		10 12	125
MGAL00M62210012										
MGAL00M62312512	3	125	53	4	23.5	18.5	35	25	12	229
MGAL00M62416014	4	160	64.5	5.6	28		45		14 16	425
MGAL00M62416016										

*Tolerances: 8 & 10 mm +0.015 / 0
12 to 16 mm +0.018 / 0

HANDWHEELS, WITH GRIP

RoHS
COMPLIANT

2

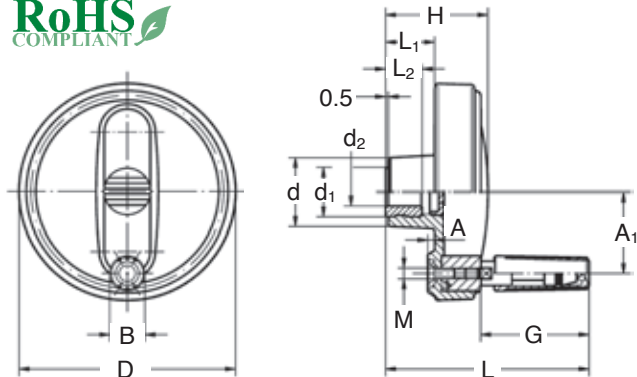


Fig. 1
With Revolving Grip

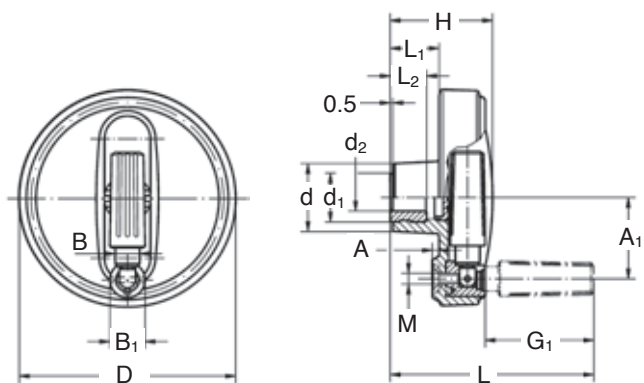


Fig. 2
With Foldaway Grip



• CHARACTERISTICS

The wheels can be secured by many methods: keyway, cross-pinning and set screw or socket head bolt and washer for threaded shaft applications.

- **HANDWHEEL WITH REVOLVING OR FOLDAWAY GRIP** – Thermoplastic
- **INSERT** – Steel, Black Oxide Finish

Catalog Number		Size	D	H	A	A ₁	d	d ₁	d ₂ ** H7	L
Fig.1* With Revolving Grip	Fig. 2 With Foldaway Grip									
MGAL00M63108008	MGAL00M64108008	1	80	37.5	2.5	30	25	19	8	75
MGAL00M63210010	MGAL00M64210010	2	100	44	3	38	28		10	90
MGAL00M63210012	MGAL00M64210012								12	
MGAL00M63312512	MGAL00M64312512	3	125	53	4	47.5	35	25	12	109
MGAL00M63416014	MGAL00M64416014	4	160	64.5	5.6	62	45		14	144
MGAL00M63416016	MGAL00M64416016								16	

Catalog Number		L ₁	L ₂	M	G (Fig. 1 Only)	G ₁ (Fig. 2 Only)	B	B ₁ (Fig. 2 Only)	Approx. Weight g
Fig.1* With Revolving Grip	Fig. 2 With Foldaway Grip								
MGAL00M63108008	MGAL00M64108008	17.5	13	M4	40	40	13	13	101
MGAL00M63210010	MGAL00M64210010	20		M5	49.5	49	16	16	178
MGAL00M63210012	MGAL00M64210012		23.5	M6	60	59.5	20	20	318
MGAL00M63312512	MGAL00M64312512	28	18.5	M8	83.5	83.5	25	26	636
MGAL00M63416014	MGAL00M64416014								
MGAL00M63416016	MGAL00M64416016								

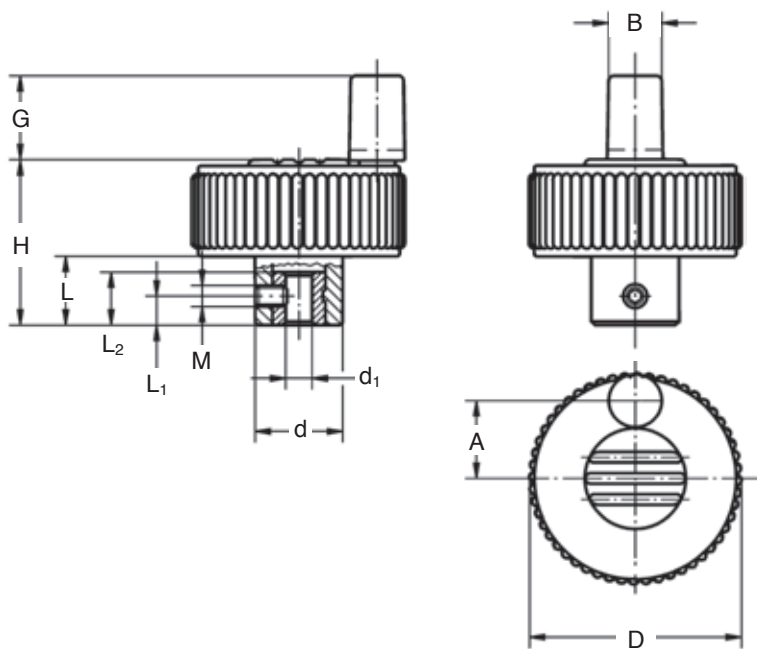
*NOTE: Hub covers and wheels with revolving grips come unassembled.

**Tolerances: 8 & 10 mm +0.015 / 0
12 to 16 mm +0.018 / 0

www.allmetricsmallparts.com



2



• CHARACTERISTICS

Attractive design and excellent ergonomic features make this positioning wheel a trendsetting product. Positioning wheels are durable, attractive and offer a firm, safe grip. Novo-Grip positioning wheels improve ease and performance in all applications.

• WITHOUT TAPPED SET SCREW HOLE • NOVO-GRIP

• HANDWHEEL – Thermoplastic, Anthracite Gray* • INSERT – Steel, Blue Chromated

Catalog Number*	Size	D	H	A	d	d ₁	L	L ₂	G	B
MGAL01M682106 ☐	1	40	31	15	16.5	6	13	10	16	10
MGAL01M682206 ☐	2	50	36	18.5	18	6	15	10		
MGAL01M682308 ☐	3	60	41	25	22	8	17	14		

• WITH TAPPED HOLE & SET SCREW • NOVO-GRIP

• HANDWHEEL – Thermoplastic, Anthracite Gray* • INSERT – Steel, Blue Chromated

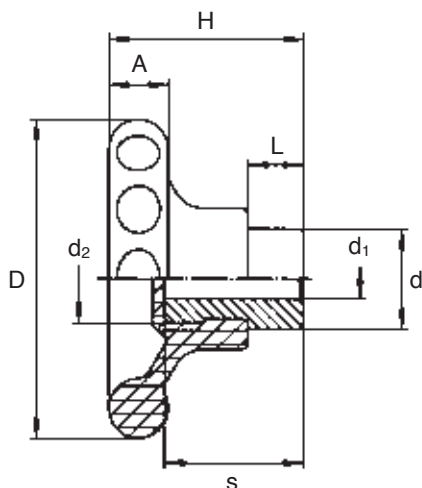
Catalog Number*	Size	D	H	A	d	d ₁	L	L ₁	L ₂	G	B	M
MGAL01M681106 ☐	1	40	31	15	16.5	6	13	5.5	10	16	10	M4
MGAL01M681206 ☐	2	50	36	18.5	18	6	15	5.5	10			
MGAL01M681308 ☐	3	60	41	25	22	8	17	8	14			

*To complete the catalog number add the desired cap color at the end. **GRAY = 5, RED = 6, YELLOW = 7.**

No color code is required for anthracite gray.



2



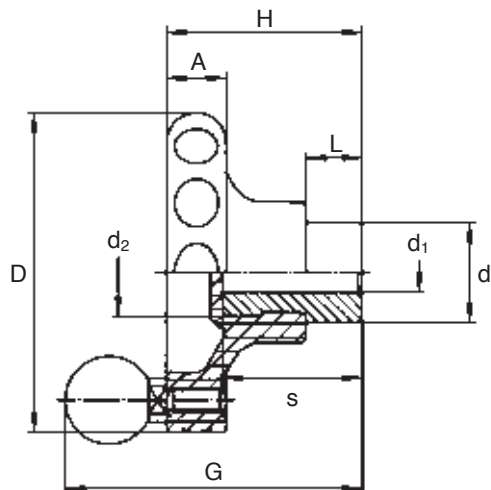
• **HANDWHEEL** – Bakelite, Black • **HUB** – Steel, Zinc Plated

Catalog Number	D	H	A	s	d	d ₁	d ₂	L	Weight g
MGAX1FM1601	80	49	15	35	25	10	20	14	162
MGAX1FM1602						12			154
MGAX1FM1603						14			150
MGAX1FM1604	100	55	17	35	25	10	20	14	212
MGAX1FM1605						12			198
MGAX1FM1606						14			205
MGAX1FM1607	125	59	18	35	25	10	20	14	270
MGAX1FM1608						12			270
MGAX1FM1609						14			262

HANDWHEELS, SCALLOP WITH KNOB



2

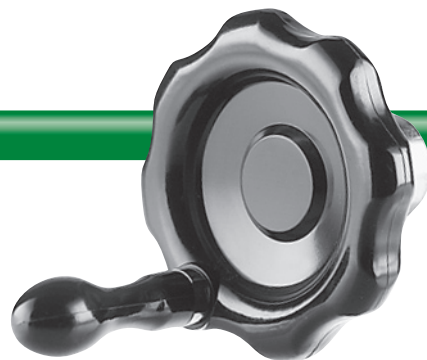


- **WHEEL** – Bakelite, Black • **HUB** – Steel, Zinc Plated
- **REVOLVING KNOB** – Bakelite, Black, Spherical Ø22 mm

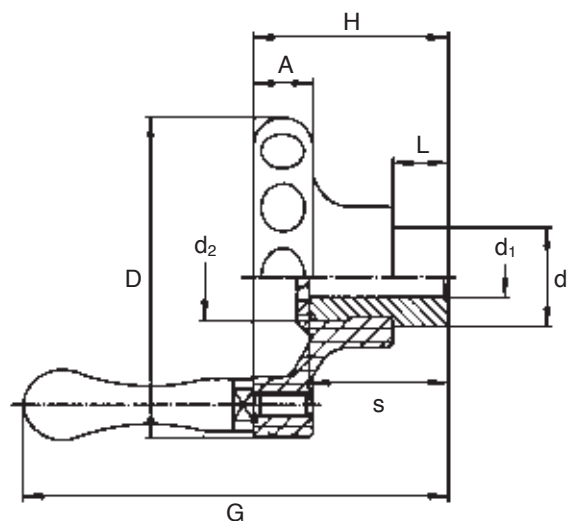
Catalog Number	D	H	A	s	d
MGAX1FM2801	80	49	15	35	25
MGAX1FM2802					
MGAX1FM2803					
MGAX1FM2804	100	55	17	35	25
MGAX1FM2805					
MGAX1FM2806					
MGAX1FM2807	125	59	18	35	25
MGAX1FM2808					
MGAX1FM2809					

Catalog Number	d ₁	d ₂	L	G	Weight g
MGAX1FM2801	10	20	14	76	184
MGAX1FM2802	12				174
MGAX1FM2803	14				162
MGAX1FM2804	10	20	14	82	230
MGAX1FM2805	12				218
MGAX1FM2806	14				202
MGAX1FM2807	10	20	14	86	296
MGAX1FM2808	12				290
MGAX1FM2809	14				276

HANDWHEELS, SCALLOP WITH GRIP



2



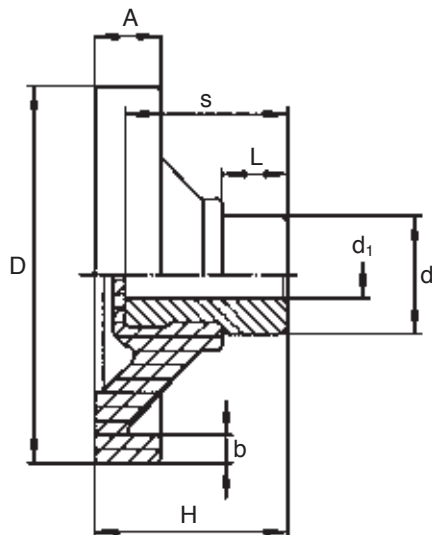
- **WHEEL** – Bakelite, Black • **HUB** – Steel, Zinc Plated
- **GRIP** – Bakelite, Black • **SCREW** – Steel, Zinc Plated

Catalog Number	D	H	A	s	d	d ₁
MGAX1FM1801	80	49	15	35	25	10
MGAX1FM1802						12
MGAX1FM1803						14
MGAX1FM1804	100	55	17	35	25	10
MGAX1FM1805						12
MGAX1FM1806						14
MGAX1FM1807	125	59	18	35	25	10
MGAX1FM1808						12
MGAX1FM1809						14

Catalog Number	d ₂	L	G	Grip Included	Weight g
MGAX1FM1801	20	14	107	MHAX4MM2301	196
MGAX1FM1802					186
MGAX1FM1803					176
MGAX1FM1804	20	14	113	MHAX4MM2301	244
MGAX1FM1805					232
MGAX1FM1806					218
MGAX1FM1807	20	14	127	MHAX4MM2302	332
MGAX1FM1808					318
MGAX1FM1809					312



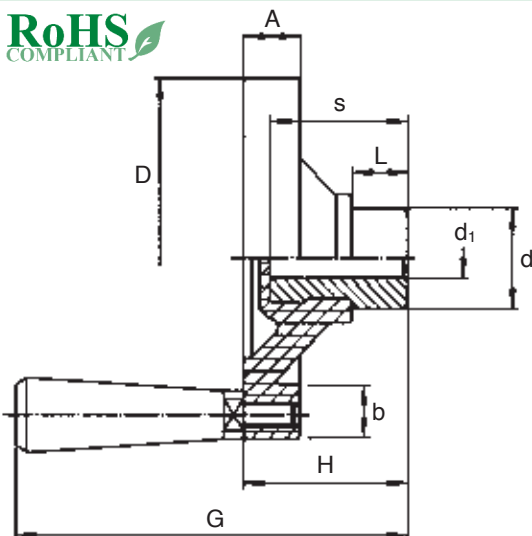
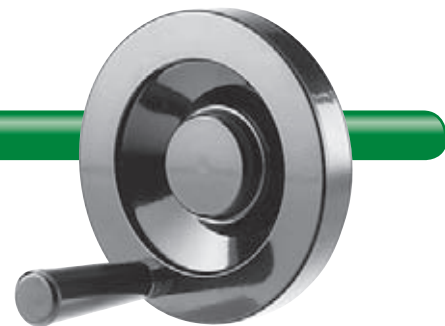
2



• **HANDWHEEL** – Bakelite, Black • **HUB** – Steel, Zinc Plated

Catalog Number	D	H	A	s	d	d ₁	L	b	Weight g
MGAX7FM09817	80	41	14	35	25	10	14	6	170
MGAX7FM09818						12			160
MGAX7FM09819						14			150
MGAX7FM19801	100	43	17	35	25	10	14	7	205
MGAX7FM19802						12			200
MGAX7FM19803						14			190
MGAX7FM19804	125	44	18	35	25	10	14	8	280
MGAX7FM19805						12			270
MGAX7FM19806						14			260
MGAX7FM19807	160	50	20	35	32	12	14	12.5	440
MGAX7FM19808						14			430
MGAX7FM19809						16			420
MGAX7FM19810						18			400
MGAX7FM19811						20			390
MGAX7FM19812	200	56	22	35	40	16	14	12.5	780
MGAX7FM19813						18			760
MGAX7FM19814						20			740
MGAX7FM19815	250	67	23	40	50	20	16	16	1380
MGAX7FM19816						25			1330

HANDWHEELS, DISK WITH GRIP

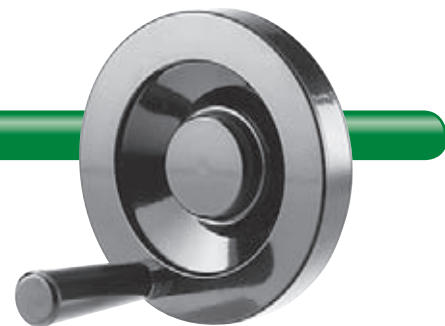


- **HANDWHEEL** – Bakelite, Black • **HUB** – Steel, Zinc Plated
- **REVOLVING GRIP** – Bakelite, Black

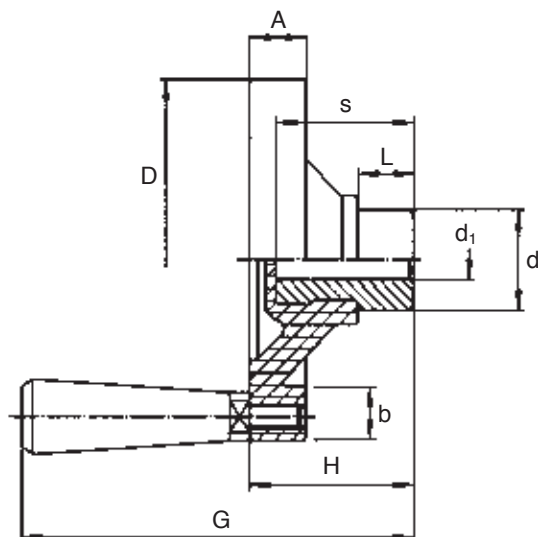
Catalog Number	D	H	A	s	d	d ₁
MGAX7FM09917	80	41	14	35	25	10
MGAX7FM09918						12
MGAX7FM09919						14
MGAX7FM19901	100	43	17	35	25	10
MGAX7FM19902						12
MGAX7FM19903						14
MGAX7FM19904	125	44	18	35	25	10
MGAX7FM19905						12
MGAX7FM19906						14
MGAX7FM19907	160	50	20	35	32	12
MGAX7FM19908						14
MGAX7FM19909						16
MGAX7FM19910						18
MGAX7FM19911						20

Catalog Number	L	b	G	Grip Included	Weight g
MGAX7FM09917	14	6	98	MHAX3MM1414	205
MGAX7FM09918					195
MGAX7FM09919					185
MGAX7FM19901	14	7	100	MHAX3MM1414	245
MGAX7FM19902					235
MGAX7FM19903					225
MGAX7FM19904	14	8	102	MHAX3MM1414	320
MGAX7FM19905					310
MGAX7FM19906					300
MGAX7FM19907	14	12.5	119	MHAX3MM1415	510
MGAX7FM19908					500
MGAX7FM19909					490
MGAX7FM19910					470
MGAX7FM19911					450

HANDWHEELS, DISK WITH GRIP



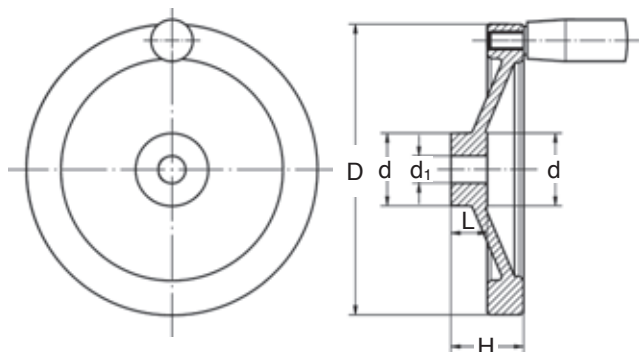
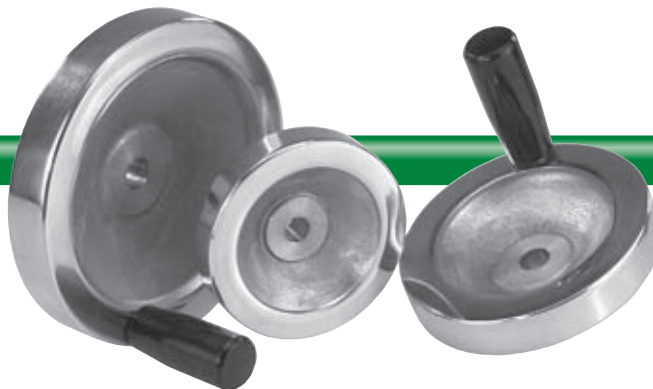
2



- **HANDWHEEL** – Bakelite, Black • **HUB** – Steel, Zinc Plated
- **REVOLVING GRIP** – Bakelite, Black

Catalog Number	D	H	A	s	d	d ₁
MGAX7FM19912	200	56	22	35	40	16
MGAX7FM19913						18
MGAX7FM19914						20
MGAX7FM19915	250	67	23	40	50	20
MGAX7FM19916						25

Catalog Number	L	b	G	Grip Included	Weight g
MGAX7FM19912	14	12.5	125	MHAX3MM1415	840
MGAX7FM19913					820
MGAX7FM19914					800
MGAX7FM19915	16	16	136	MHAX3MM1425	1440
MGAX7FM19916					1390



2

• **HANDWHEEL** – Aluminum • **WHEEL RIM** – Turned & Polished

Catalog Number	d ₁	Catalog Number	d ₁	D	H	d	L	Approx. Weight g
MGAL04M750080X10	10	MGAL04M750080X12	12	80	31	25	16	175
MGAL04M750100X10		MGAL04M750100X12		100	34	31	17	270
MGAL04M750125X12	12	MGAL04M750125X14	14	125	37	30	18	490
MGAL04M750140X14	14	MGAL04M750140X15	15	140	34	34	19	510
MGAL04M750160X15	15	MGAL04M750160X16	16	160	40	40	20	780
MGAL04M750200X18	18	MGAL04M750200X20	20	200	46	50	24	1340
MGAL04M750250X22	22	MGAL04M750250X24	24	250	49		28	1950

• **HANDWHEEL** – Aluminum • **WHEEL RIM** – Turned & Polished

• **STATIONARY GRIP** – Bakelite, Black • DIN 7708 • **SCREW** – Galvanized Steel

Catalog Number	d ₁	Catalog Number	d ₁	D	H	d	L	Fixed Cylindrical Grip	Approx. Weight g
MGAL04M752080X10	10	MGAL04M752080X12	12	80	31	25	16	Ø18 X M6 X 40	195
MGAL04M752100X10		MGAL04M752100X12		100	34	31	17		290
MGAL04M752125X12	12	MGAL04M752125X14	14	125	37	30	18	Ø21 X M8 X 50	530
MGAL04M752140X14	14	MGAL04M752140X15	15	140	34	34	19		590
MGAL04M752160X15	15	MGAL04M752160X16	16	160	40	40	20	Ø26 X M10 X 80	860
MGAL04M752200X18	18	MGAL04M752200X20	20	200	46	50	24		1420
MGAL04M752250X22	22	MGAL04M752250X24	24	250	49	50	28	Ø28 X M12 X 90	2065

• **HANDWHEEL** – Aluminum • **WHEEL RIM** – Turned & Polished

• **REVOLVING GRIP** – Bakelite, Black • DIN 7708 • **SCREW** – Galvanized Steel

Catalog Number	d ₁	Catalog Number	d ₁	D	H	d	L	Revolving Cylindrical Grip	Approx. Weight g
MGAL04M754080X10	10	MGAL04M754080X12	12	80	31	25	16	Ø18 X M6 X 40	205
MGAL04M754100X10		MGAL04M754100X12		100	34	31	17		300
MGAL04M754125X12	12	MGAL04M754125X14	14	125	37	30	18	Ø22 X M8 X 56	540
MGAL04M754140X14	14	MGAL04M754140X15	15	140	34	34	19		620
MGAL04M754160X15	15	MGAL04M754160X16	16	160	40	40	20	Ø26 X M10 X 80	890
MGAL04M754200X18	18	MGAL04M754200X20	20	200	46	50	24		1450
MGAL04M754250X22	22	MGAL04M754250X24	24	250	49	50	28	Ø31 X M12 X 102	2125

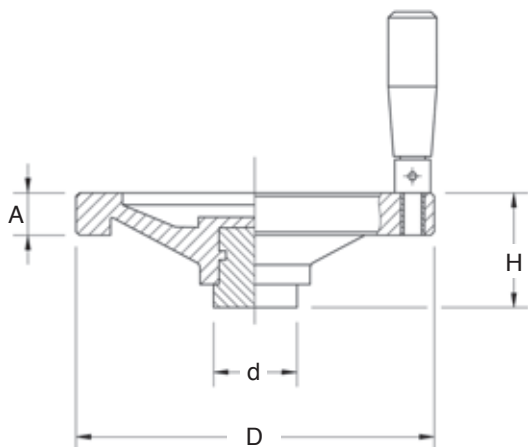


Fig. 1

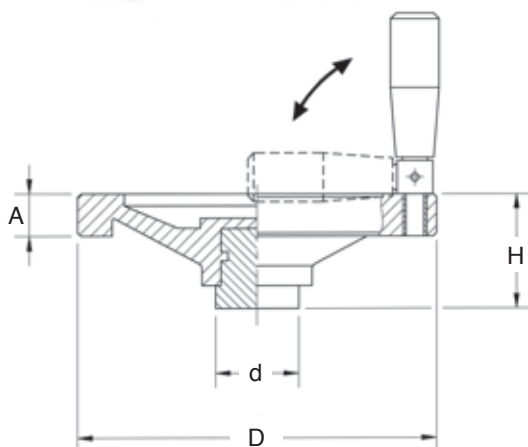


Fig. 2



Fig. 1



Fig. 2

Fig. 1 • HANDWHEEL WITH REVOLVING GRIP – Bakelite, Black

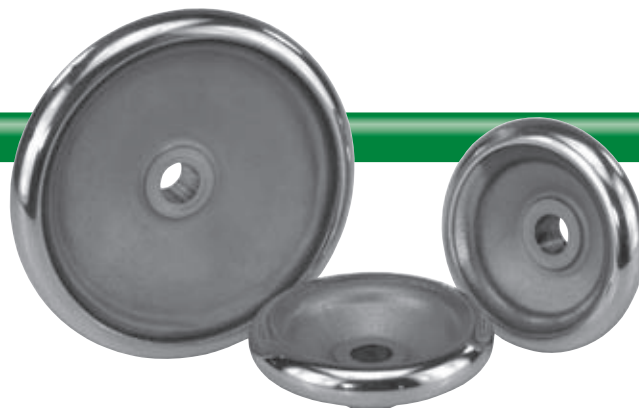
• **HUB** – Steel, UNI 5105, Zinc Plated

Catalog Number	D	H	A	d
MGAY7FM201DP30	115	42	15	32
MGAY7FM201DP35	155	50	18	35

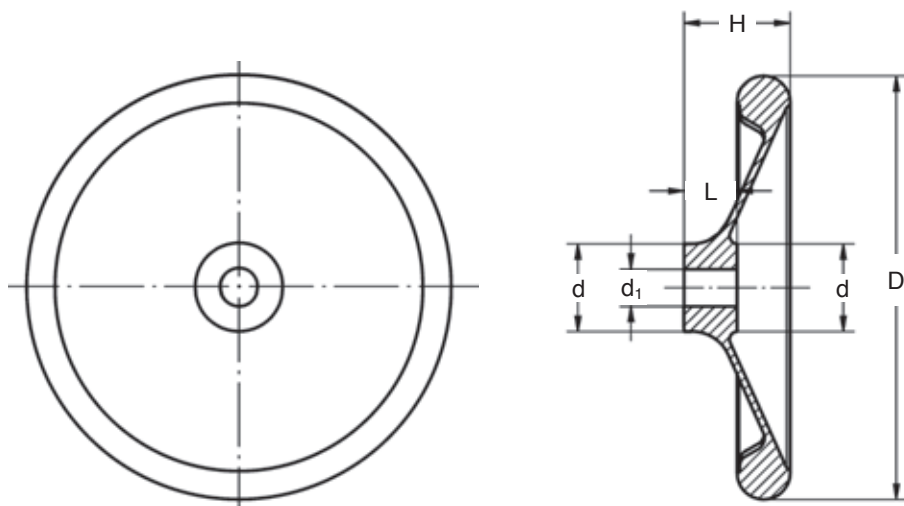
Fig. 2 • HANDWHEEL WITH FOLDAWAY REVOLVING GRIP – Bakelite, Black

• **HUB** – Steel, UNI 5105, Zinc Plated

Catalog Number	D	H	A	d
MGAY7FM201DP50	115	42	15	32
MGAY7FM201DP55	155	50	18	35



2

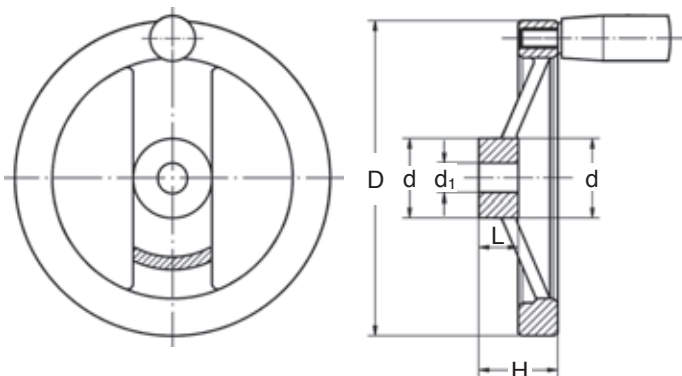
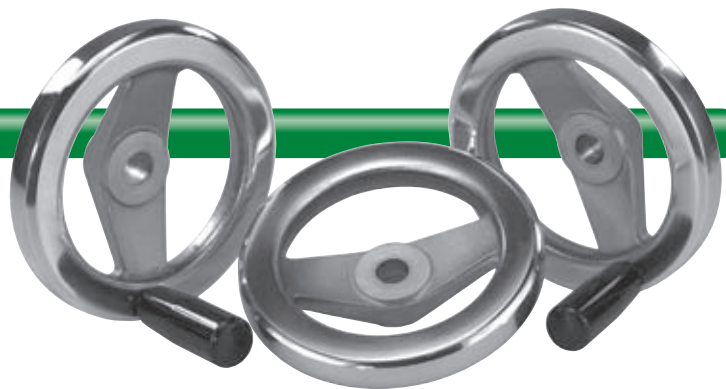


• **HANDWHEEL** – Aluminum • **WHEEL RIM** – Turned & Polished • Similar to DIN 950

Catalog Number	d ₁	Catalog Number	d ₁	D	d	L	H	Approx. Weight g
MGAL06M790080X10	10	MGAL06M790080X12	12	80	24	16	30	150
MGAL06M790100X10		MGAL06M790100X12		100	25	17	31	220
MGAL06M790120X12	12	MGAL06M790120X14	14	120	26	18	32	250
MGAL06M790160X14	14	MGAL06M790160X16	16	160	33	20	40	660
MGAL06M790200X18	18	MGAL06M790200X22	22	200	39	24	42	1100
MGAL06M790250X22	22	MGAL06M790250X26	26	250	48	28	60	2000

HANDWHEELS, TWO-SPOKE

RoHS
COMPLIANT



• **HANDWHEEL** – Aluminum • **WHEEL RIM** – Turned & Polished

Catalog Number	d ₁	Catalog Number	d ₁	D	H	d	L	Approx. Weight g
MGAL05M770080X10	10	MGAL05M770080X12	12	80	28	24	16	160
MGAL05M770100X10		MGAL05M770100X12	12	100	33	26	17	250
MGAL05M770125X12	12	MGAL05M770125X14	14	125	33.5	31	18	380
MGAL05M770160X14	14	MGAL05M770160X16	16	160	39	36	20	600
MGAL05M770200X18	18	MGAL05M770200X20	20	200	45	42	24	1020
MGAL05M770250X22	22	MGAL05M770250X26	26	250	51	48	28	1700

• **HANDWHEEL** – Aluminum • **WHEEL RIM** – Turned & Polished

• **STATIONARY GRIP** – Bakelite, Black • DIN 7708 • **SCREW** – Galvanized Steel

Catalog Number	d ₁	Catalog Number	d ₁	D	H	d	L	Fixed Cylindrical Grip	Approx. Weight g
MGAL05M772080X10	10	MGAL05M772080X12	12	80	28	24	16	Ø18 X M6 X 40	180
MGAL05M772100X10		MGAL05M772100X12	12	100	33	26	17		270
MGAL05M772125X12	12	MGAL05M772125X14	14	125	33.5	31	18	Ø21 X M8 X 50	420
MGAL05M772160X14	14	MGAL05M772160X16	16	160	39	36	20	Ø26 X M10 X 80	680
MGAL05M772200X18	18	MGAL05M772200X20	20	200	45	42	24	Ø26 X M10 X 80	1100
MGAL05M772250X22	22	MGAL05M772250X26	26	250	51	48	28	Ø28 X M12 X 90	1815

• **HANDWHEEL** – Aluminum • **WHEEL RIM** – Turned & Polished

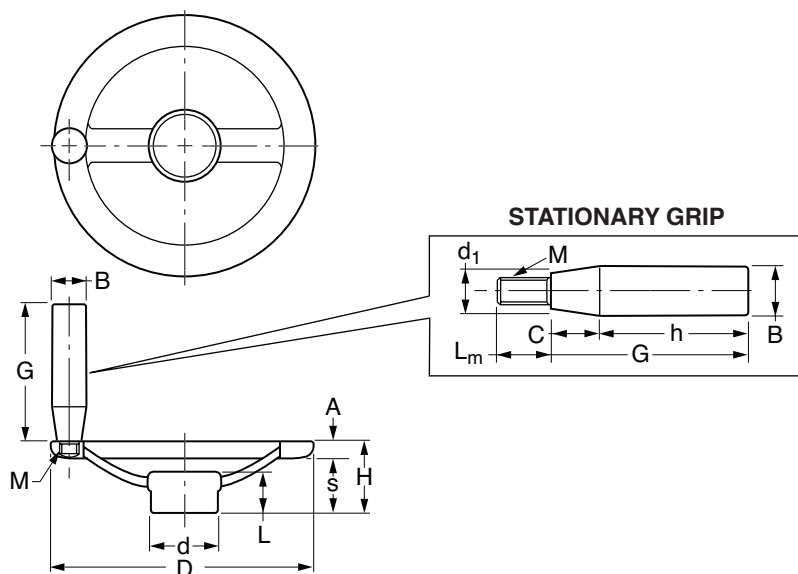
• **REVOLVING GRIP** – Bakelite, Black • DIN 7708 • **SCREW** – Galvanized Steel

Catalog Number	d ₁	Catalog Number	d ₁	D	H	d	L	Revolving Cylindrical Grip	Approx. Weight g
MGAL05M774080X10	10	MGAL05M774080X12	12	80	28	24	16	Ø18 X M6 X 40	190
MGAL05M774100X10		MGAL05M774100X12	12	100	33	26	17		280
MGAL05M774125X12	12	MGAL05M774125X14	14	125	33.5	31	18	Ø22 X M8 X 56	430
MGAL05M774160X14	14	MGAL05M774160X16	16	160	39	36	20	Ø26 X M10 X 80	710
MGAL05M774200X18	18	MGAL05M774200X20	20	200	45	42	24	Ø26 X M10 X 80	1130
MGAL05M774250X22	22	MGAL05M774250X26	26	250	51	48	28	Ø31 X M12 X 102	1875

HANDWHEELS, OFFSET & STATIONARY GRIP



2



• HANDWHEEL – Stainless Steel

Catalog Number	D	H	A	s	d	L	No. of Spokes	M	Weight g
MGAN2FMHSM080	80	28	8	20	26	17	2	M5	260
MGAN2FMHSM100	100	30	8	22	26	18	2	M5	320
MGAN2FMHSM125	125	34	8	26	32	20	2	M6	500
MGAN2FMHSM160	160	42	10	32	36	24	2	M8	900
MGAN2FMHSM200	200	42	11	31	42	24	2	M10	1300
MGAN2FMHSM250	250	53	13	40	50	34	3		2400

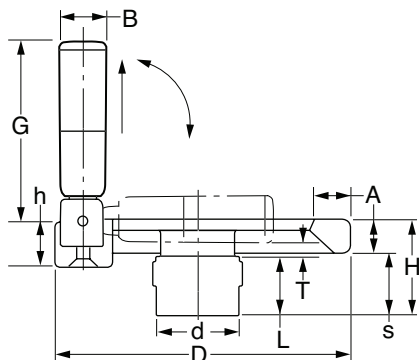
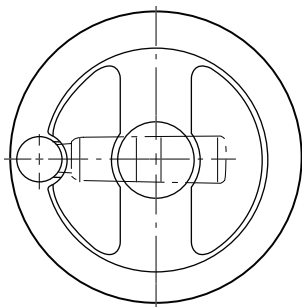
• STATIONARY GRIP – Stainless Steel

Catalog Number	B	M	L _m	d ₁	G	h
MHAN3MMGSS05	10	M5	6	8	40	30
MHAN3MMGSS06	13	M6	7	10	50	37
MHAN3MMGSS08	16	M8	8	12	64	49
MHAN3MMGSS10	20	M10	10	15	70	50

Catalog Number	C	Weight g	Applicable Model
MHAN3MMGSS05	10	25	MGAN2FMHSM080, MGAN2FMHSM100
MHAN3MMGSS06	13	50	MGAN2FMHSM125, MGAF2NMHSM140
MHAN3MMGSS08	15	100	MGAN2FMHSM160
MHAN3MMGSS10	20	150	MGAN2FMHSM200, MGAN2FMHSM250

HANDWHEELS WITH RETRACTABLE REVOLVING GRIP

2



• HANDWHEEL – Cast Iron • REVOLVING GRIP – Bakelite, Black

Catalog Number	D	B	G	h	H	A
MGAN4FMHSN125	125	23	76.5	19	44	15
MGAN4FMHSN160	160		74	21.5	52	16
MGAN4FMHSN200	200	26	91.5	18.5	56	17
MGAN4FMHSN250	250		85	25.5	62	19
MGAN4FMHSN315	315		86	24.5	66	21

Catalog Number	s	d	L	T	Weight g
MGAN4FMHSN125	29	35	30	2.5	850
MGAN4FMHSN160	36	40	35		1300
MGAN4FMHSN200	39	48	40	2.5	2060
MGAN4FMHSN250	43	52	40		2960
MGAN4FMHSN315	45	63	45		4770

HANDWHEELS, THREE-SPOKE

RoHS
COMPLIANT

2

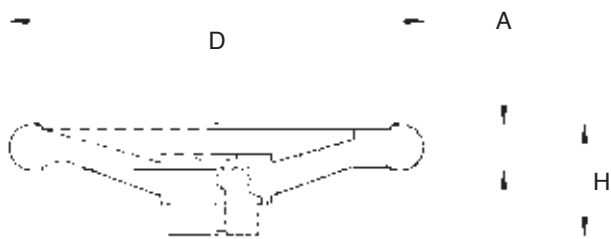


Fig. 1

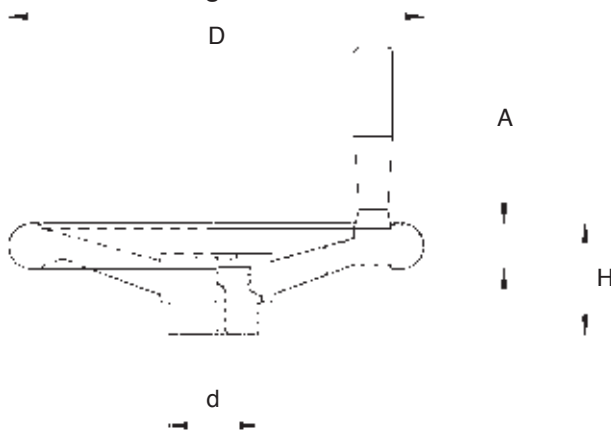


Fig. 2

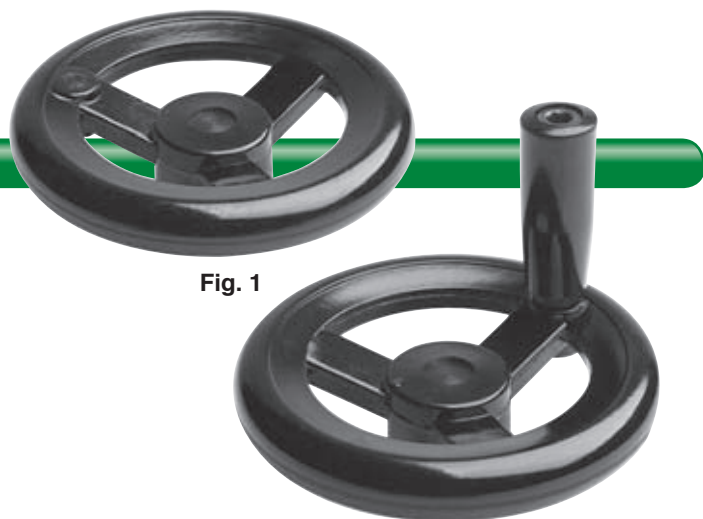


Fig. 1

Fig. 2

Fig. 1 • HANDWHEEL – Bakelite, Black
• **HUB – Steel, UNI 5105, Zinc Plated**

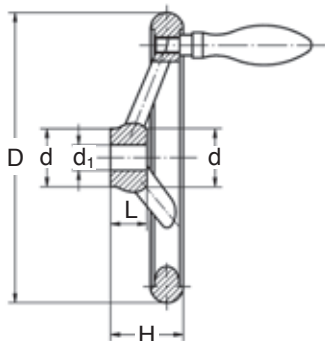
Catalog Number	D	H	A	d
MGAY5FM201D05	90	32	16	25
MGAY5FM201D10	120	40	18	28
MGAY5FM201D15	160	45	20	38
MGAY5FM201D25	200	60	24	40

Fig. 2 • HANDWHEEL WITH REVOLVING GRIP – Bakelite, Black
• **HUB – Steel, UNI 5105, Zinc Plated**

Catalog Number	D	H	A	d
MGAY5FM201D55	90	32	16	25
MGAY5FM201D60	120	40	18	28
MGAY5FM201D65	160	45	20	38
MGAY5FM201D70	180	65	26	36
MGAY5FM201D75	200	60	24	40

HANDWHEELS

RoHS
COMPLIANT



2

- **HANDWHEEL** – Aluminum • **WHEEL RIM** – Turned & Polished
- **HUB** – Steel, Black Oxide Finish • DIN 950

Catalog Number	d ₁	Catalog Number	d ₁	D	H	d	L	No. of Spokes	Approx. Weight g
MGAL03M730080X10	10	MGAL03M730080X12	12	80	29	24	16	3	125
MGAL03M730100X10		MGAL03M730100X12		100	33	26	17		220
MGAL03M730125X12	12	MGAL03M730125X14	14	125	36	28	18		305
MGAL03M730140X14	14	MGAL03M730140X16	16	140	39	30	19		400
MGAL03M730160X14	14	MGAL03M730160X16	16	160	40	32	20		530
MGAL03M730180X16	16	MGAL03M730180X18	18	180	43	35	22		675
MGAL03M730200X18	18	MGAL03M730200X22	22	200	45	38	24	5	900
MGAL03M730250X22	22	MGAL03M730250X26	26	250	50	45	28		1570

- **HANDWHEEL** – Aluminum • **WHEEL RIM** – Turned & Polished
- **HUB** – Steel, Black Oxide Finish • DIN 950 • **STATIONARY GRIP** – Aluminum, Polished • DIN 39 Style E

Catalog Number	d ₁	Catalog Number	d ₁	D	H	d	L	No. of Spokes	Stationary Machine Grip	Approx. Weight g
MGAL03M732080X10	10	MGAL03M732080X12	12	80	29	24	16	3	Ø16 X M6 X 50	145
MGAL03M732100X10		MGAL03M732100X12		100	33	26	17			240
MGAL03M732125X12	12	MGAL03M732125X14	14	125	36	28	18		Ø20 X M8 X 64	340
MGAL03M732140X14	14	MGAL03M732140X16	16	140	39	30	19			440
MGAL03M732160X14	14	MGAL03M732160X16	16	160	40	32	20		Ø25 X M10 X 80	610
MGAL03M732180X16	16	MGAL03M732180X18	18	180	43	35	22			755
MGAL03M732200X18	18	MGAL03M732200X22	22	200	45	38	24	5		980
MGAL03M732250X22	22	MGAL03M732250X26	26	250	50	45	28		Ø32 X M12 X 100	1705

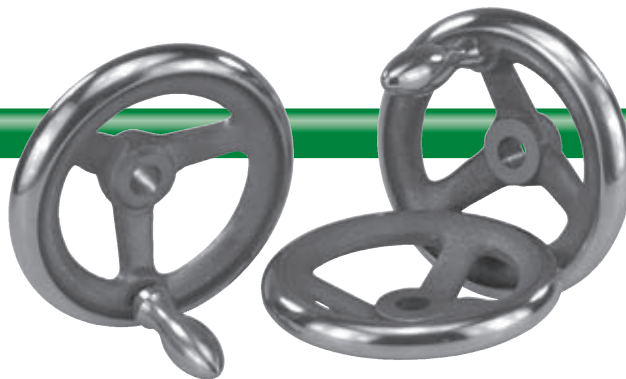
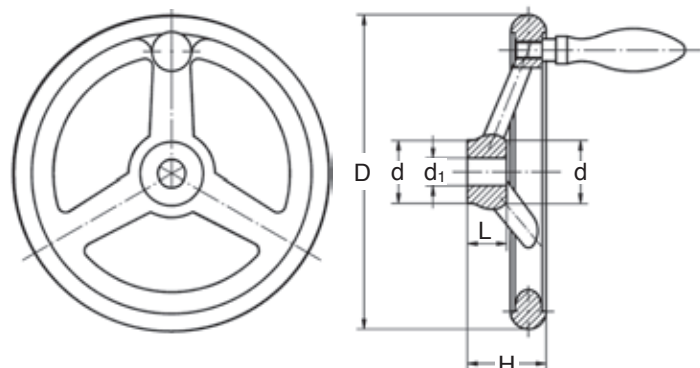
- **HANDWHEEL** – Aluminum • **WHEEL RIM** – Turned & Polished
- **HUB** – Steel, Black Oxide Finish • DIN 950 • **REVOLVING GRIP** – Aluminum, Polished • DIN 98 Style E

Catalog Number	d ₁	Catalog Number	d ₁	D	H	d	L	No. of Spokes	Revolving Machine Grip	Approx. Weight g
MGAL03M734080X10	10	MGAL03M734080X12	12	80	29	24	16	3	Ø16 X M6 X 54.5	145
MGAL03M734100X10		MGAL03M734100X12		100	33	26	17			240
MGAL03M734125X12	12	MGAL03M734125X14	14	125	36	28	18		Ø20 X M8 X 67	340
MGAL03M734140X14	14	MGAL03M734140X16	16	140	39	30	19			440
MGAL03M734160X14	14	MGAL03M734160X16	16	160	40	32	20		Ø25 X M10 X 83	610
MGAL03M734180X16	16	MGAL03M734180X18	18	180	43	35	22			755
MGAL03M734200X18	18	MGAL03M734200X22	22	200	45	38	24	5		980
MGAL03M734250X22	22	MGAL03M734250X26	26	250	50	45	28		Ø32 X M12 X 105.5	1705

HANDWHEELS

RoHS
COMPLIANT

2



• **HANDWHEEL** – Cast Iron, Gray • **WHEEL RIM** – Turned & Polished • DIN 950

Catalog Number	d ₁	Catalog Number	d ₁	D	H	d	L	No. of Spokes	Approx. Weight g
MGAL02M710080X10	10	MGAL02M710080X12	12	80	29	24	16	3	350
MGAL02M710100X10		MGAL02M710100X12		100	33	26	17		600
MGAL02M710125X12	12	MGAL02M710125X14	14	125	36	28	18		800
MGAL02M710140X14	14	MGAL02M710140X16	16	140	39	30	19		1000
MGAL02M710160X14	14	MGAL02M710160X16	16	160	40	32	20		1350
MGAL02M710180X16	16	MGAL02M710180X18	18	180	43	35	22		1600
MGAL02M710200X18	18	MGAL02M710200X22	22	200	45	38	24	5	2300
MGAL02M710250X22	22	MGAL02M710250X26	26	250	50	45	28		4250

• **HANDWHEEL** – Cast Iron, Gray • **WHEEL RIM** – Turned & Polished • DIN 950

• **STATIONARY GRIP** – Steel. Polished • DIN 39 Style E

Catalog Number	d ₁	Catalog Number	d ₁	D	H	d	L	No. of Spokes	Stationary Machine Grip	Approx. Weight g
MGAL02M712080X10	10	MGAL02M712080X12	12	80	29	24	16	3	Ø16 X M6 X 50	400
MGAL02M712100X10		MGAL02M712100X12		100	33	26	17			650
MGAL02M712125X12	12	MGAL02M712125X14	14	125	36	28	18		Ø20 X M8 X 64	890
MGAL02M712140X14	14	MGAL02M712140X16	16	140	39	30	19			1090
MGAL02M712160X14	14	MGAL02M712160X16	16	160	40	32	20		Ø25 X M10 X 80	1530
MGAL02M712180X16	16	MGAL02M712180X18	18	180	43	35	22			1780
MGAL02M712200X18	18	MGAL02M712200X22	22	200	45	38	24	5		2480
MGAL02M712250X22	22	MGAL02M712250X26	26	250	50	45	28		Ø32 X M12 X 100	4610

• **HANDWHEEL** – Cast Iron, Gray • **WHEEL RIM** – Turned & Polished • DIN 950

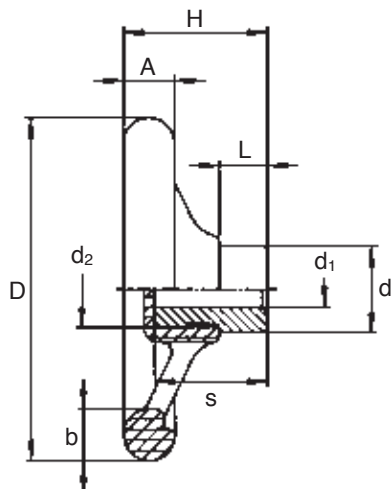
• **REVOLVING GRIP** – Steel. Polished • DIN 98 Style E

Catalog Number	d ₁	Catalog Number	d ₁	D	H	d	No. of Spokes	Revolving Machine Grip	Approx. Weight g	
MGAL02M714080X10	10	MGAL02M714080X12	12	80	29	24	16	3	Ø16 X M6 X 54.5	400
MGAL02M714100X10		MGAL02M714100X12		100	33	26	17			650
MGAL02M714125X12	12	MGAL02M714125X14	14	125	36	28	18		Ø20 X M8 X 67	890
MGAL02M714140X14	14	MGAL02M714140X16	16	140	39	30	19			1090
MGAL02M714160X14	14	MGAL02M714160X16	16	160	40	32	20		Ø25 X M10 X 83	1530
MGAL02M714180X16	16	MGAL02M714180X18	28	180	43	35	22			1780
MGAL02M714200X18	18	MGAL02M714200X22	22	200	45	38	24	2480		
MGAL02M714250X22	22	MGAL02M714250X26	26	250	50	45	28	5	Ø32 X M12 X 105.5	4610

HANDWHEELS, THREE-SPOKE



2



• **HANDWHEEL** – Bakelite, Black • **HUB** – Steel, Zinc Plated

Catalog Number	D	H	A	s	d
MGAX5FM1901	100	42	15	35	25
MGAX5FM1902					
MGAX5FM1903					
MGAX5FM1904	125	47	16	35	25
MGAX5FM1905					
MGAX5FM1906					
MGAX5FM1907	160	52	21	35	32
MGAX5FM1908					
MGAX5FM1909					
MGAX5FM1910	160	52	21	35	32
MGAX5FM1911					

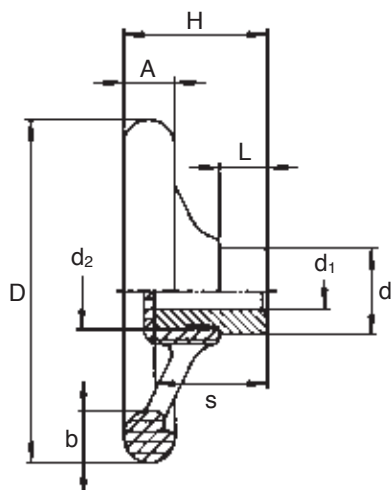
Catalog Number	d ₁	d ₂	L	b	Weight g
MGAX5FM1901	10	20	14	15	190
MGAX5FM1902	12				160
MGAX5FM1903	14				148
MGAX5FM1904	10	20	14	18	214
MGAX5FM1905	12				204
MGAX5FM1906	14				192
MGAX5FM1907	10	25	12	22	390
MGAX5FM1908	12				380
MGAX5FM1909	14				380
MGAX5FM1910	15	25	12	22	370
MGAX5FM1911	16				360

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HANDWHEELS, THREE-SPOKE



2

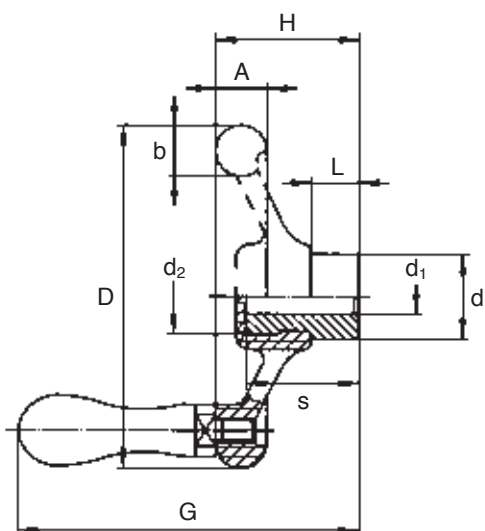


• **HANDWHEEL** – Bakelite, Black • **HUB** – Steel, Zinc Plated

Catalog Number	D	H	A	s	d
MGAX5FM1912	160	52	21	35	32
MGAX5FM1913					
MGAX5FM1914	200	54	24	35	40
MGAX5FM1915					
MGAX5FM1916					
MGAX5FM1917	250	59	28	40	50
MGAX5FM1918					
MGAX5FM1919					
MGAX5FM1920	315	67	32	45	60
MGAX5FM1921					
MGAX5FM1922					

Catalog Number	d ₁	d ₂	L	b	Weight g
MGAX5FM1912	18	25	12	22	345
MGAX5FM1913	20				330
MGAX5FM1914	16	33	14	26	640
MGAX5FM1915	18				620
MGAX5FM1916	20				600
MGAX5FM1917	18	43	14	30	1180
MGAX5FM1918	20				1150
MGAX5FM1919	25				1100
MGAX5FM1920	25	48	16	35	1750
MGAX5FM1921	28				1650
MGAX5FM1922	32				1620

HANDWHEELS, THREE-SPOKE WITH GRIP



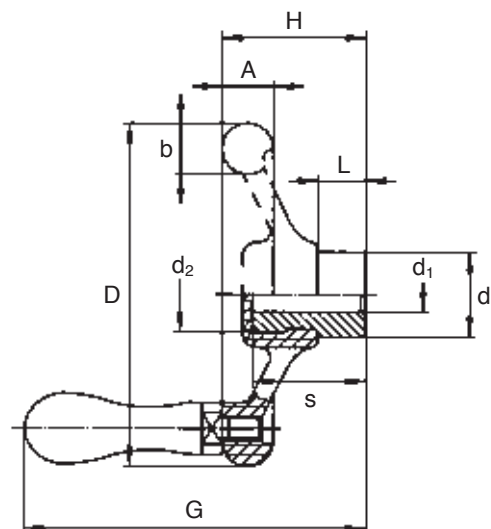
• **HANDWHEEL** – Bakelite, Black • **HUB** – Steel, Zinc Plated • **GRIP** – Bakelite, Black

Catalog Number	D	H	A	s	d	d ₁	d ₂
MGAX5FM2101	100	42	15	35	25	10	20
MGAX5FM2102						12	
MGAX5FM2103						14	
MGAX5FM2104	125	47	16	35	25	10	20
MGAX5FM2105						12	
MGAX5FM2106						14	
MGAX5FM2107	160	52	21	35	32	10	25
MGAX5FM2108						12	
MGAX5FM2109						14	
MGAX5FM2110	160	52	21	35	32	15	25
MGAX5FM2111						16	

Catalog Number	L	b	G	Grip Included	Weight g
MGAX5FM2101	14	15	100	MHAX4MM2301	220
MGAX5FM2102					188
MGAX5FM2103					178
MGAX5FM2104	14	18	105	MHAX4MM2301	240
MGAX5FM2105					226
MGAX5FM2106					220
MGAX5FM2107	12	22	120	MHAX4MM2302	430
MGAX5FM2108					420
MGAX5FM2109					420
MGAX5FM2110	12	22	120	MHAX4MM2302	410
MGAX5FM2111					400

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HANDWHEELS, THREE-SPOKE WITH GRIP



• **HANDWHEEL** – Bakelite, Black • **HUB** – Steel, Zinc Plated • **GRIP** – Bakelite, Black

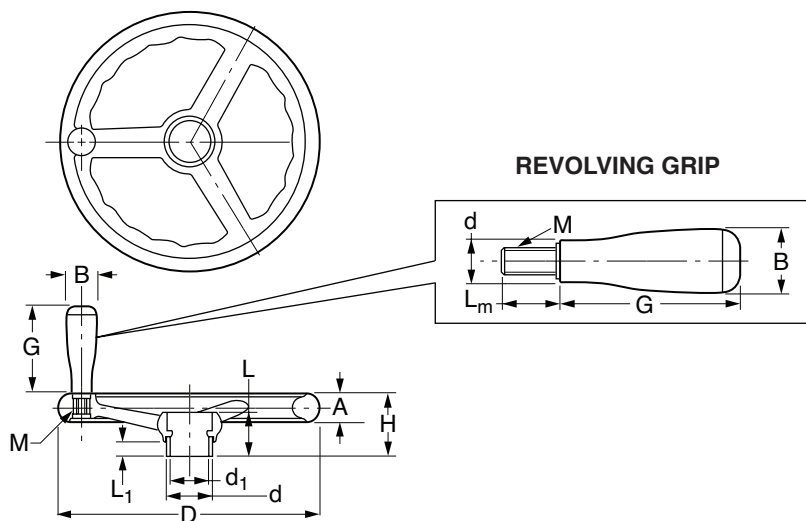
Catalog Number	D	H	A	s	d	d ₁	d ₂
MGAX5FM2112	160	52	21	35	32	18	25
MGAX5FM2113						20	
MGAX5FM2114	200	54	24	35	40	16	33
MGAX5FM2115						18	
MGAX5FM2116						20	
MGAX5FM2117	250	59	28	40	50	18	43
MGAX5FM2118						20	
MGAX5FM2119						25	
MGAX5FM2120						25	
MGAX5FM2121	315	67	32	45	60	28	48
MGAX5FM2122						32	

Catalog Number	L	b	G	Grip Included	Weight g
MGAX5FM2112	12	22	120	MHAX4MM2302	390
MGAX5FM2113					370
MGAX5FM2114	14	26	140	MHAX4MM2303	710
MGAX5FM2115					680
MGAX5FM2116					670
MGAX5FM2117	14	30	145	MHAX4MM2303	1230
MGAX5FM2118					1210
MGAX5FM2119					1170
MGAX5FM2120	16	35	153	MHAX4MM2303	1850
MGAX5FM2121					1770
MGAX5FM2122					1700

HANDWHEELS, OFFSET & REVOLVING GRIP

RoHS
COMPLIANT

2



• **HANDWHEEL** – Nylon 6, Black • **HUB** – Steel • **THREADED INSERT** – Steel, Trivalent Chromium Plated

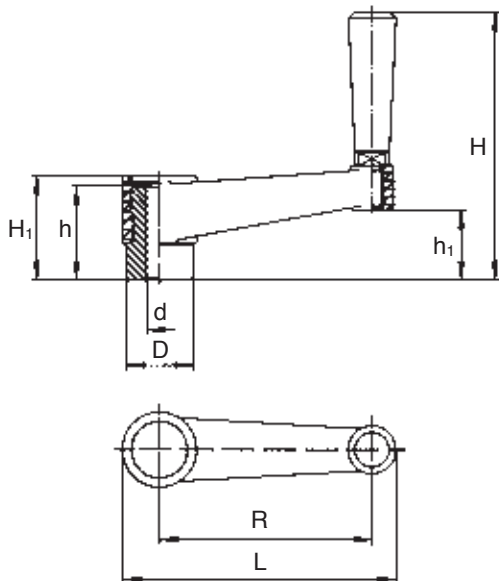
Catalog Number	D	H	A	L ₁	d	d ₁	L	No. of Spokes	M	Weight g
MGAN3FMPH080	80	40	14	10	24	18	26	3	M5	130
MGAN3FMPH100	100	44	15	10	28	22	29	3	M5	200
MGAN3FMPH125	125	48	16	10	32	26	30	3	M6	280
MGAN3FMPH140	140	54	17	10	34	26	35	3	M6	400
MGAN3FMPH160	160	57	18	10	36	28	36	3	M8	440
MGAN3FMPH200	200	64	22	12	38	30	42	3	M10	670
MGAN3FMPH250	250	66	26	15	44	36	42	5	M10	980

• **REVOLVING GRIP** – Nylon 6, Black • **SCREW** – Steel, Unichrome Plated

Catalog Number	B	M	L _m	d	G	Weight g	Applicable Model
MHAN4MMGTR1805	18	M5	10	12	50	25	MGAN3FMPH80, MGAN3FMPH100
MHAN4MMGTR1906	19	M6	13	13	65	30	MGAN3FMPH125, MGAN3FMPH140
MHAN4MMGTR1805	24	M8	15	17	80	60	MGAN3FMPH160
MHAN4MMGTR2408	28	M10	20	20	95	100	MGAN3FMPH200, MGAN3FMPH250



2



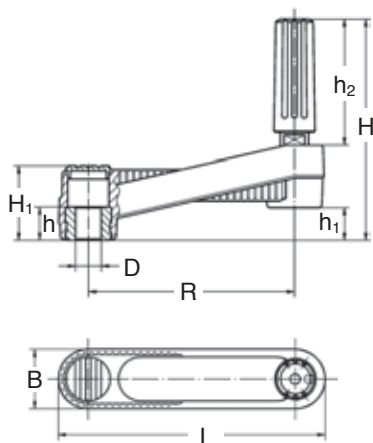
• **CRANK** – Nylon 6, Glass Filled, Black • **HUB** – Steel, Zinc Plated • **REVOLVING HANDLE** – Bakelite, Black

Catalog Number	R	L	H	H ₁	h	h ₁	D	d	Weight g
MGAX9FM4001	100	124	101	39	35	27	25	10	160
MGAX9FM4002								12	150
MGAX9FM4003								14	140
MGAX9FM4004	80	103	100	39	35	26	25	10	150
MGAX9FM4005								12	140
MGAX9FM4006								14	130

HAND CRANK

RoHS
COMPLIANT

2



• CHARACTERISTICS

These attractive hand cranks are ergonomically designed to perform in any application offering strength, durability, and precision performance.

• NOTE

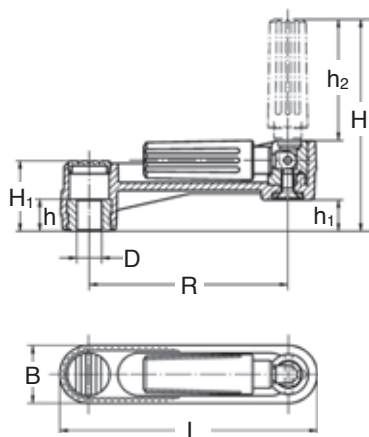
The hub cover is supplied unassembled and snaps into place within seconds to hide the base assembly. These hand cranks can be secured to a shaft by: keyway, cross-pinning and set screw or socket hex nut and washer for threaded shaft applications.

• **CRANK** – Thermoplastic, Anthracite Gray • **HUB** – Steel, Black Oxide Finish

• **REVOLVING HANDLE** – Thermoplastic, Anthracite Gray

Catalog Number	Size	R	L	H	H ₁	h	h ₁	h ₂	B	D	Approx. Weight g
MGAL65M003108	1	80	104	85.5	29	13	13	49	24	8	110
MGAL65M003210	2	100	129	105	36		16	59.5	29	10	210
MGAL65M003212										12	
MGAL65M003312	3	125	161	140	44	18.5	19.5	83.5	36	12	405

All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts



• **CRANK** – Thermoplastic, Anthracite Gray • **HUB** – Steel, Black Oxide Finish

• **FOLDAWAY HANDLE** – Thermoplastic, Anthracite Gray

Catalog Number	Size	R	L	H	H ₁	h	h ₁	h ₂	B	D	Approx. Weight g
MGAL65M001108	1	80	104	85.5	29	13	13	49	24	8	100
MGAL65M001210	2	100	129	105	36		16	59.5	29	10	190
MGAL65M001212										12	
MGAL65M001312	3	125	161	140	44	18.5	19.5	83.5	36	12	370



Fig. 1

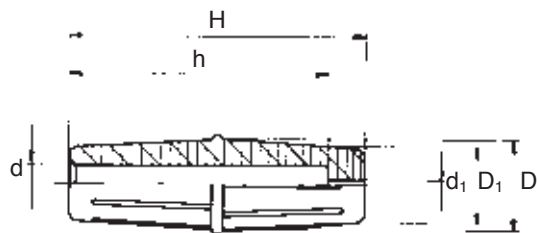


Fig. 1

Fig. 2



Fig. 3

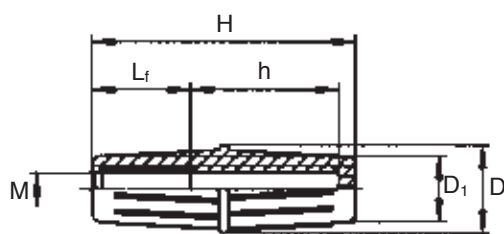


Fig. 2

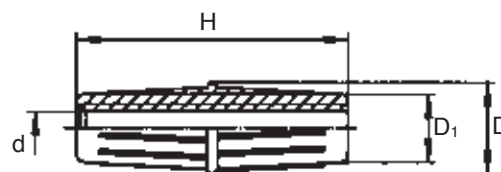


Fig. 3

Fig. 1 • GRIP – Bakelite, Black • **BLIND HOLE**

Catalog Number	D	D ₁	H	d ± 0.1	d ₁	h	Weight g
MHAX1FM1401	27	20	80	9.9	2	70	36
MHAX1FM1402	32	25	90	11.9	3	80	60
MHAX1FM1403	38	28	100	13.9	3	90	88

Fig. 2 • GRIP – Bakelite, Black • **THREADED HOLE WITHOUT INSERT**

Catalog Number	D	D ₁	H	L _f	h	M	Weight g
MHAX1FM1404	32	25	90	30	55	M16 X 1	55

Fig. 3 • GRIP – Bakelite, Black • **THROUGH HOLE**

Catalog Number	D	D ₁	H	d ± 0.1	Weight g
MHAX1FM1405	38	28	100	13.9	88

Fig. 1 • GRIP – Reinforced Bakelite, Black • **BLIND HOLE**

Catalog Number	D	D ₁	H	d ± 0.1	d ₁	h	Weight g
MHAX1FM1496	27	20	80	9.9	2	70	36
MHAX1FM1497	32	25	90	11.9	3	80	60
MHAX1FM1498	38	28	100	13.9	3	90	88

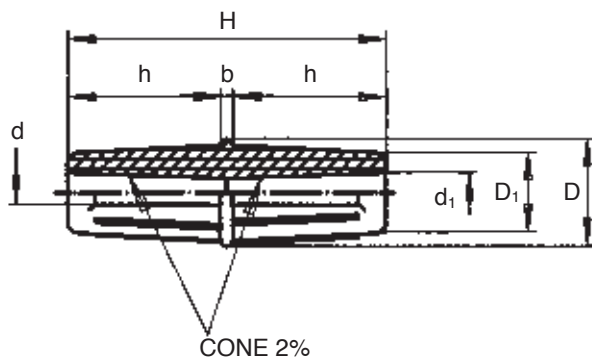


Fig. 1

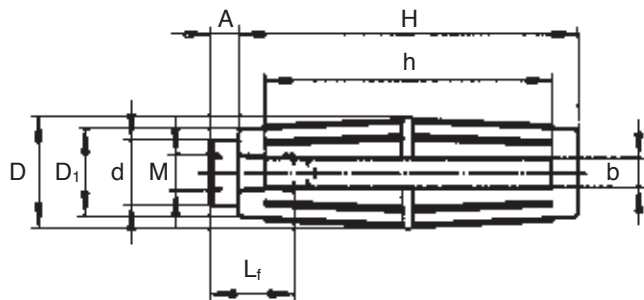


Fig. 2

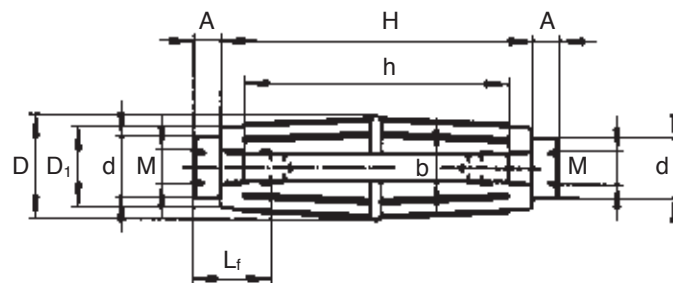


Fig. 3

Fig. 1 • GRIP – Bakelite, Black • THROUGH HOLE

Catalog Number	D	D ₁	H	d	d ₁	h	b	Weight g
MHAX1FM3501	13	10	50	4	4	22	1.5	5
MHAX1FM3504	26	19	85	6	12	36	2	34
MHAX1FM3507	32	25	90	8	17	38	2	50

Fig. 2 • GRIP – Bakelite, Black • THREADED HOLE WITHOUT INSERT

Catalog Number	D	D ₁	H	d _(0,-0.3)	L _f
MHAX1FM3505	34	29	111	18	30

Catalog Number	h	A	b	M	Weight g
MHAX1FM3505	91	11	8	M10	120

Fig. 3 • GRIP – Bakelite, Black
• THREADED HOLES, BOTH SIDES WITHOUT INSERT

Catalog Number	D	D ₁	H	d _(0,-0.3)	L _f
MHAX1FM3506	34	29	111	18	30

Catalog Number	h	A	b	M	Weight g
MHAX1FM3506	91	11	8	M10	122

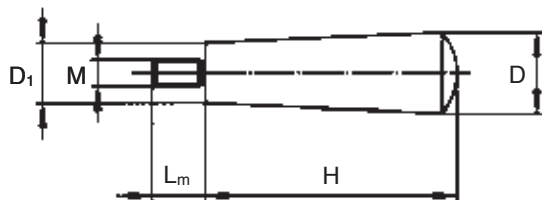


Fig. 1

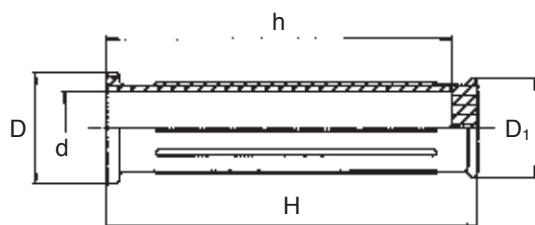


Fig. 2

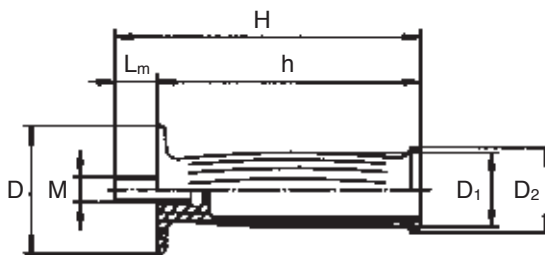


Fig. 3

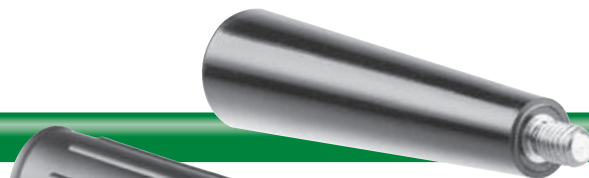


Fig. 1

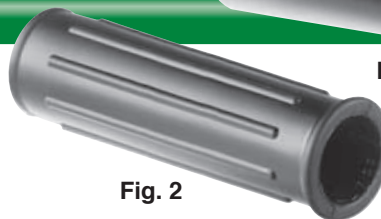


Fig. 2

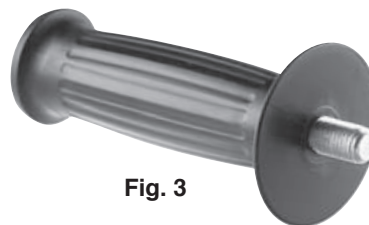


Fig. 3

Fig. 1 • **GRIP** – Bakelite, Black • **SCREW** – Steel, Zinc Plated

Catalog Number	D	D ₁	H	L _m	M	Weight g
MHAX2MM1406	12	9	40	8	M4	9
MHAX2MM1407				7	M5	
MHAX2MM1408	15	11	50	8	M6	18
MHAX2MM1409				7	M5	30
MHAX2MM1410	18	13	64	8	M6	27
MHAX2MM1411	21	15	72	10	M6	44
MHAX2MM1412					M8	55
MHAX2MM1413	25	17	90	10	M8	70

Fig. 2 • **GRIP** – Polyvinyl Chloride, Black • **BLIND HOLE**

Catalog Number	D	D ₁	H	d	h	Weight g
MHAX2FM1421	35	31	117	27	105	32

Fig. 3 • **GRIP** – Nylon 6, Black • **SCREW** – Steel, Zinc Plated

Catalog Number	D	D ₁	D ₂	H	L _m	h	M	Weight g
MHAX2MM1422	60	35	40	147	20	127	M12	110

GRIPS, STATIONARY

RoHS
COMPLIANT

2

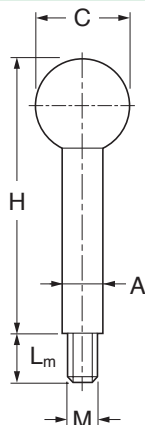


Fig. 1

Ball Knobs

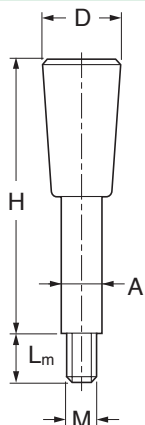


Fig. 2

Taper Knobs

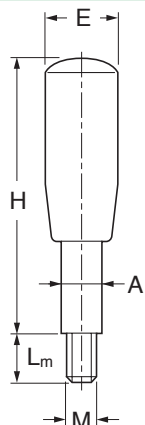


Fig. 3

Cylindrical Knobs

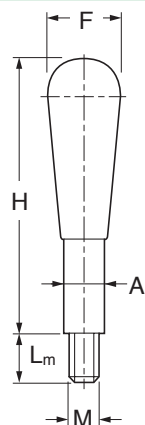


Fig. 4

Ellipse Knobs



Fig. 1

Fig. 3

• **GRIP** – Bakelite, Black • **SCREW** – Steel, Matte Silver

Catalog Number		A	M	C	D	L _m	H
Fig. 1	Fig. 2						
MHAH0MM116006063	MHAH1MM116106063						63
MHAH0MM116006080	MHAH1MM116106080	8	M6	22	16	9	80
MHAH0MM116006100	MHAH1MM116106100						100
MHAH0MM116008080	MHAH1MM116108080						80
MHAH0MM116008100	MHAH1MM116108100	10	M8	27	20	11	100
MHAH0MM116008125	MHAH1MM116108125						125
MHAH0MM116010100	MHAH1MM116110100						100
MHAH0MM116010125	MHAH1MM116110125	12	M10	34	25	14	125
MHAH0MM116010160	MHAH1MM116110160						160
MHAH0MM116012125	MHAH1MM116112125						125
MHAH0MM116012160	MHAH1MM116112160	14	M12	35	32	16	160
MHAH0MM116012200	MHAH1MM116112200						200
MHAH0MM116014160	MHAH1MM116114160						160
MHAH0MM116014200	MHAH1MM116114200	16	M14	40	40	18	200
MHAH0MM116014250	MHAH1MM116114250						250

Catalog Number		A	M	E	F	L _m	H
Fig. 3	Fig. 4						
MHAH2MM116206063	MHAH3MM116306063						63
MHAH2MM116206080	MHAH3MM116306080	8	M6	18	22	9	80
MHAH2MM116206100	MHAH3MM116306100						100
MHAH2MM116208080	MHAH3MM116308080						80
MHAH2MM116208100	MHAH3MM116308100	10	M8	21	25	11	100
MHAH2MM116208125	MHAH3MM116308125						125
MHAH2MM116210100	MHAH3MM116310100						100
MHAH2MM116210125	MHAH3MM116310125	12	M10	23	30	14	125
MHAH2MM116210160	MHAH3MM116310160						160
MHAH2MM116212125	MHAH3MM116312125						125
MHAH2MM116212160	MHAH3MM116312160	14	M12	26	35	16	160
MHAH2MM116212200	MHAH3MM116312200						200
MHAH2MM116214160							160
MHAH2MM116214200	—	16	M14	28	—	18	200
MHAH2MM116214250							250

GRIPS, STATIONARY

RoHS
COMPLIANT

2

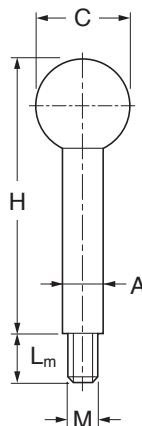


Fig. 1

Ball Knobs

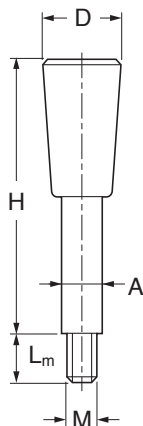


Fig. 2

Taper Knobs

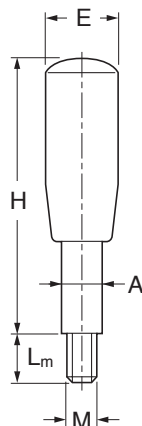


Fig. 3

Cylindrical Knobs

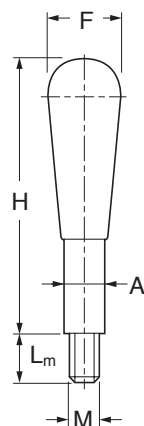


Fig. 4

Ellipse Knobs

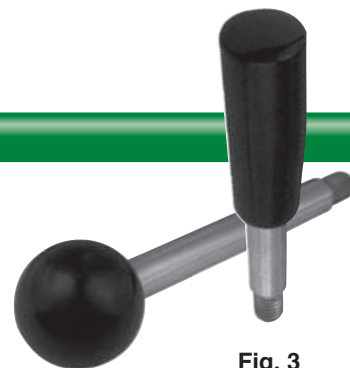


Fig. 1

Fig. 3

• **GRIP** – Bakelite, Black • **SCREW** – Stainless Steel

Catalog Number		A	M	C	D	L _m	H
Fig. 1	Fig. 2						
MHAH4MM117006063	MHAH5MM117106063						63
MHAH4MM117006080	MHAH5MM117106080	8	M6	22	16	9	80
MHAH4MM117006100	MHAH5MM117106100						100
MHAH4MM117008080	MHAH5MM117108080						80
MHAH4MM117008100	MHAH5MM117108100	10	M8	27	20	11	100
MHAH4MM117008125	MHAH5MM117108125						125
MHAH4MM117010100	MHAH5MM117110100						100
MHAH4MM117010125	MHAH5MM117110125	12	M10	34	25	14	125
MHAH4MM117010160	MHAH5MM117110160						160
MHAH4MM117012125	MHAH5MM117112125						125
MHAH4MM117012160	MHAH5MM117112160	14	M12	35	32	16	160
MHAH4MM117012200	MHAH5MM117112200						200
MHAH4MM117014160	MHAH5MM117114160						160
MHAH4MM117014200	MHAH5MM117114200	16	M14	40	40	18	200
MHAH4MM117014250	MHAH5MM117114250						250

Catalog Number		A	M	E	F	L _m	H
Fig. 3	Fig. 4						
MHAH6MM117206063	MHAH7MM117306063						63
MHAH6MM117206080	MHAH7MM117306080	8	M6	18	22	9	80
MHAH6MM117206100	MHAH7MM117306100						100
MHAH6MM117208080	MHAH7MM117308080						80
MHAH6MM117208100	MHAH7MM117308100	10	M8	21	25	11	100
MHAH6MM117208125	MHAH7MM117308125						125
MHAH6MM117210100	MHAH7MM117310100						100
MHAH6MM117210125	MHAH7MM117310125	12	M10	23	30	14	125
MHAH6MM117210160	MHAH7MM117310160						160
MHAH6MM117212125	MHAH7MM117312125						125
MHAH6MM117212160	MHAH7MM117312160	14	M12	26	35	16	160
MHAH6MM117212200	MHAH7MM117312200						200
MHAH6MM117214160							160
MHAH6MM117214200	—	16	M14	28	—	18	200
MHAH6MM117214250							250

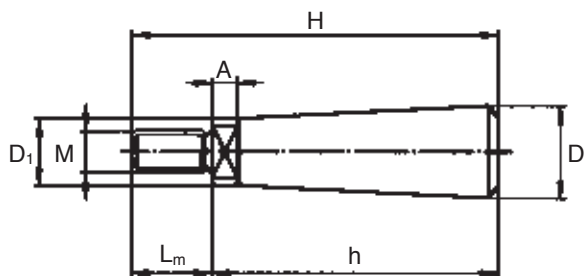


Fig. 1

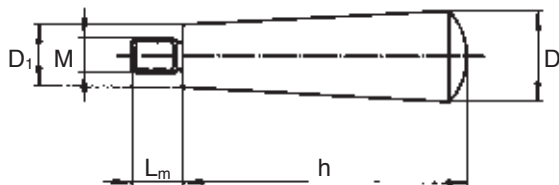


Fig. 2

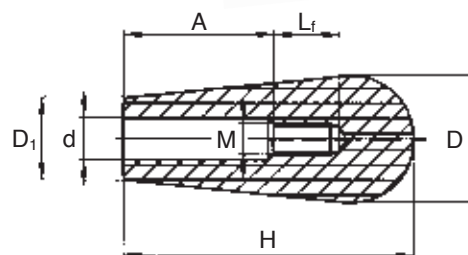


Fig. 3

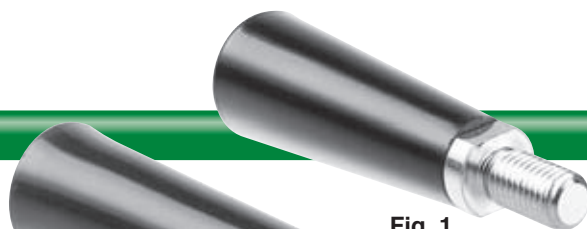


Fig. 1

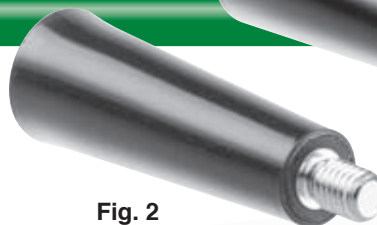


Fig. 2

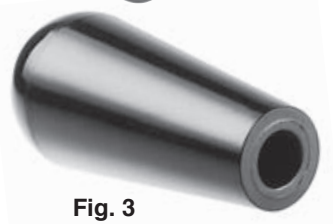


Fig. 3

Fig. 1 • **REVOLVING GRIP** – Bakelite, Black • **SCREW** – Steel, Zinc Plated

Catalog Number	D	D ₁	H	L _m	h	A	M	Weight g
MHAX3MM1414	18	13	73	16	57	5	M8	34
MHAX3MM1415	23	16	89	20	69	5	M10	67
MHAX3MM1425	28	20	121	25	96	5	M10	110
MHAX3MM1426							M12	115

Fig. 2 • **GRIP** – Polypropylene, Black • **SCREW** – Steel, Zinc Plated

Catalog Number	D	D ₁	h	L _m	M	Weight g
MHAX3MM1417	16	11	50	9	M6	19

Fig. 3 • **GRIP** – Bakelite, Black • **THREADED HOLE WITHOUT INSERT**

Catalog Number	D	D ₁	H	d	L _f	A	M	Weight g
MHAX3FM4301	25	16	58	8	14	29	M6	25
MHAX3FM4302	30	19	70	10	17	35	M8	42
MHAX3FM4303	35	22	81	12	22	41	M10	67



Fig. 1

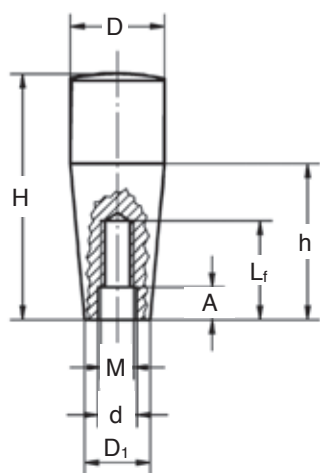


Fig. 2

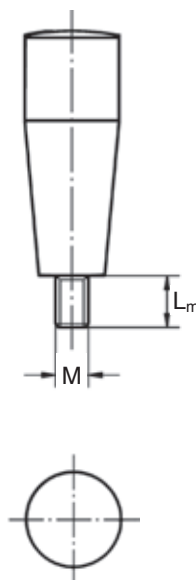


Fig. 3

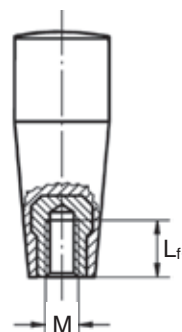


Fig. 1 • **GRIP** – Bakelite, Black • **PRESS FIT THREADED INSERT** – Galvanized Steel

Fig. 2 • **GRIP** – Bakelite, Black • **THREADED INSERT** – Steel, Copper Plated* or Brass*

Fig. 3 • **GRIP** – Bakelite, Black • **SCREW** – Galvanized Steel

Catalog Number			D	D ₁	H	d	L _r	L _{r1}	L _m	h	A	M
Fig. 1	Fig. 2	Fig. 3										
—	MHAL63M20205**	—	17	15	45	—	—	10	—	26	—	M5
MHAL63M20106	MHAL63M20206**	MHAL63M20306		13		6.2	14	9	18		2	M6
MHAL63M20108	—	—				8.2	16	—	—		2	
MHAL63M201081	MHAL63M20208*	MHAL63M20308	23	18	60	8.5	24	14	12	38	8	M8
—	MHAL63M202081*	—	28			—	—		—		—	
MHAL63M20110	—	MHAL63M20310	29	21	70	10.5	28	—	20	42	10	M10

*Bushing in copper plated steel

**Bushing in brass

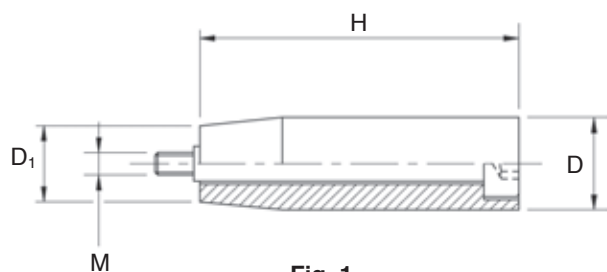


Fig. 1

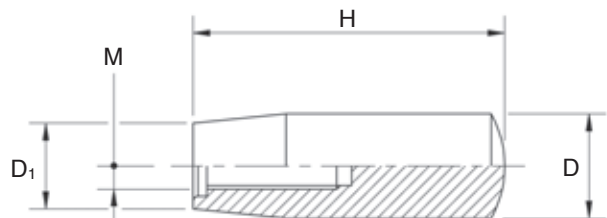


Fig. 2

**SOCKET
HEAD
SCREW**

**SLOTTED
HEAD
SCREW**



Fig. 1



Fig. 2

Fig. 1 • REVOLVING GRIP – Bakelite, Black • **SCREW** – Steel, Zinc plated

Catalog Number	D	D ₁	H	M	Screw
MHAY3MM201E05	20	16	37	M6	Socket
MHAY3MM201E10	21	15	48		Slotted
MHAY3MM201E15	23	17	63	M8	Slotted
MHAY3MM201E20	26	19	78	M10	Socket
MHAY3MM201E25	28	20	85		

Fig. 2 • STATIONARY GRIP – Bakelite, Black
• **THREADED HOLE WITHOUT INSERT**

Catalog Number	D	D ₁	H	M
MHAY3FM201G05	21	15	50	M6
MHAY3FM201G10				M8
MHAY3FM201G15				M10
MHAY3FM201G20	23	17	65	M8
MHAY3FM201G25				M10
MHAY3FM201G30	26	19	80	M10
MHAY3FM201G35				M12
MHAY3FM201G40	28	20	90	M10
MHAY3FM201G45				M12

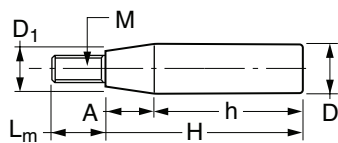


Fig. 1

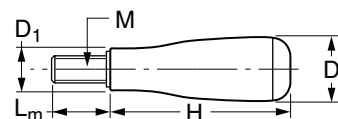


Fig. 2

Fig. 1



Fig. 2

Fig. 1 • **STATIONARY GRIP** – Stainless Steel

Catalog Number	D	D ₁	H	L _m	h	A
MHAN3MMGSS05	10	8	40	6	30	10
MHAN3MMGSS06	13	10	50	7	37	13
MHAN3MMGSS08	16	12	64	8	49	15
MHAN3MMGSS10	20	15	70	10	50	20

Catalog Number	M	Weight g	Applicable Model
MHAN3MMGSS05	M5	25	MGAN2FMHSM80, MGAN2FMHSM100
MHAN3MMGSS06	M6	50	MGAN2FMHSM125, MGAN2FMHSM140
MHAN3MMGSS08	M8	100	MGAN2FMHSM160
MHAN3MMGSS10	M10	150	MGAN2FMHSM200, MGAN2FMHSM250

Fig. 2 • **REVOLVING GRIP** – Nylon 6, Black • **SCREW** – Steel, Trivalent Chromium Plated

Catalog Number	D	D ₁	H	L _m	M	Weight g	Applicable Model
MHAN4MMGTR1805	18	12	50	10	M5	25	MGAN3FMPH80, MGAN3FMPH100
MHAN4MMGTR1906	19	13	65	13	M6	30	MGAN3FMPH125, MGAN3FMPH140
MHAN4MMGTR2408	24	17	80	15	M8	60	MGAN3FMPH160
MHAN4MMGTR2810	28	20	95	20	M10	100	MGAN3FMPH200, MGAN3FMPH250

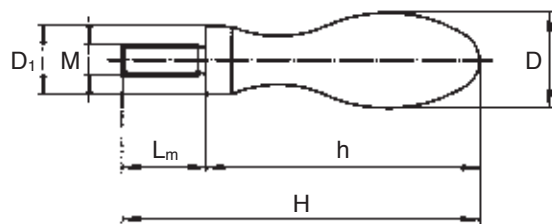


Fig. 1

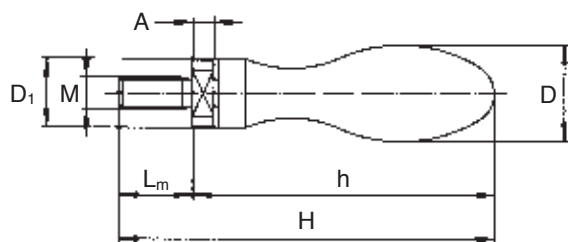


Fig. 2

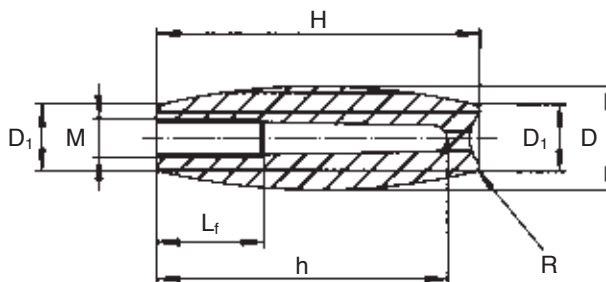


Fig. 3

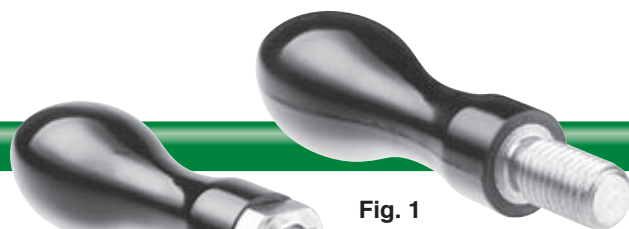


Fig. 1

Fig. 2



Fig. 3

Fig. 1 • **GRIP** – Bakelite, Black • **SCREW** – Steel, Zinc Plated

***GRIP** – Nylon 6, Black • **SCREW** – Steel, Zinc Plated

Catalog Number	D	D ₁	H	L _m	h	M	Weight g
MHAX4MM2201	23	14	80	12	68	M8	35
MHAX4MM2203	28	20	101	20	81	M10	50
MHAX4MM2204	28	20	106	25	81	M12	78
*MHAX4MM2210	20	13	77	13	64	M8	27

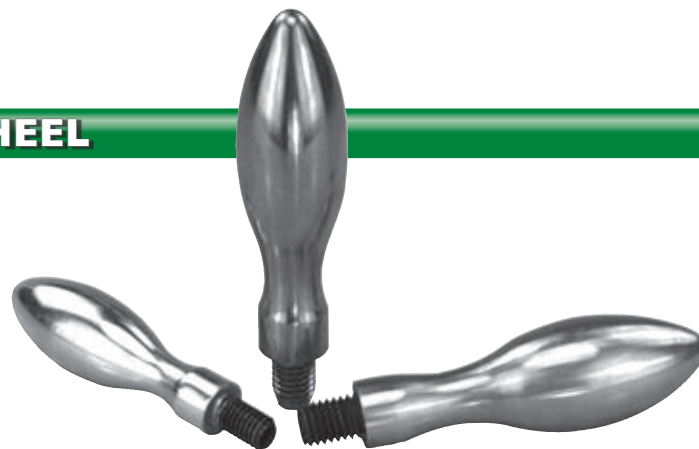
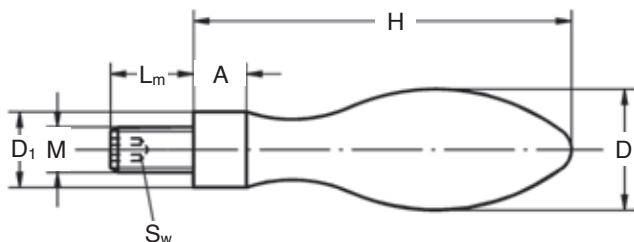
Fig. 2 • **REVOLVING GRIP** – Bakelite, Black • **SCREW** – Steel, Zinc Plated

Catalog Number	D	D ₁	H	L _m	h	A	M	Weight g
MHAX4MM2301	18	13	74	16	58	5	M8	32
MHAX4MM2302	22	16	88	20	68	5	M10	60
MHAX4MM2303	28	20	111	25	86	5	M10	93
MHAX4MM2304	28	20	111	25	86	5	M12	98
MHAX4MM2305	14	10	60	14	46	3.6	M6	15

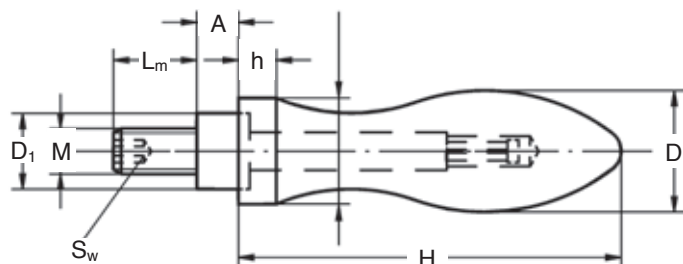
Fig. 3 • **GRIP** – Bakelite, Black • **THREADED HOLE WITHOUT INSERT**

Catalog Number	D	D ₁	H	L _f	h	R	M	Weight g
MHAX4FM4401	16	10	50	16	45	2	M6	10
MHAX4FM4402	20	13	60	20	52	2.5	M8	20
MHAX4FM4403	25	19	75	26	67	3	M10	40
MHAX4FM4404	30	20	90	30	80	3.5	M12	67
MHAX4FM4405	35	24	100	35	90	4	M14	97

Stationary Grips



Revolving Grips

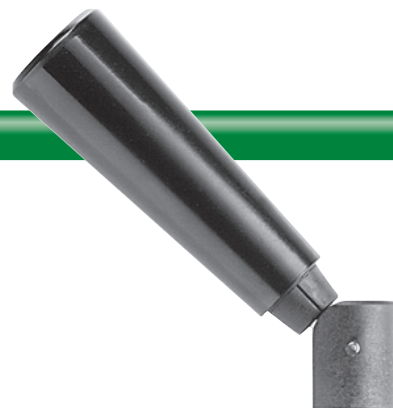


• **STATIONARY GRIP** – Steel or Aluminum, Polished • **SCREW** – Steel, Black Oxide Finish • DIN 39 Style E

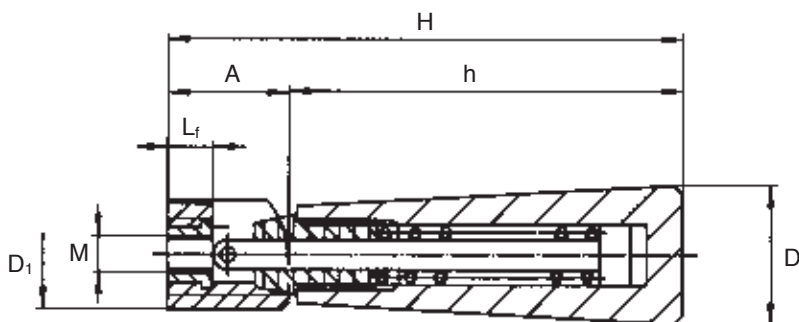
Catalog Number		D	D ₁	H	L _m	A	S _w	M	Approx. Weight g	
Steel	Aluminum								Steel	Alum.
MHAL62M910616050	MHAL62M920616050	16	10	50	11	7	3	M6	45	20
MHAL62M910820064	MHAL62M920820064	20	13	64	13	8	4	M8	90	35
MHAL62M911025080	MHAL62M921025080	25	16	80	14	10	5	M10	180	75
MHAL62M911232100	MHAL62M921232100	32	20	100	21	13	6	M12	360	130
MHAL62M911636112	MHAL62M921636112	36	22	112	26	14	8	M16	525	210

• **REVOLVING GRIP** – Steel or Aluminum, Polished • **SCREW** – Galvanized Steel, Blue Chromated • DIN 98 Style E

Catalog Number		D	D ₁	D ₂	H	L _m	h	A	S _w	M	Approx. Weight g	
Steel	Aluminum										Steel	Alum.
MHAL63M080616055	MHAL63M080616055	16	10	14	49	11	5	5.5	3	M6	55	35
MHAL63M080820067	MHAL63M080820067	20	13	18	61	13	6	6	4	M8	105	55
MHAL63M081025083	MHAL63M081025083	25	16	21	75	14	6.5	8	5	M10	190	95
MHAL63M081232105	MHAL63M081232105	32	20	26	95	21	8	10.5	6	M12	390	195
MHAL63M081636117	MHAL63M081636117	36	22	29	106	26	9	11	8	M16	550	280



2

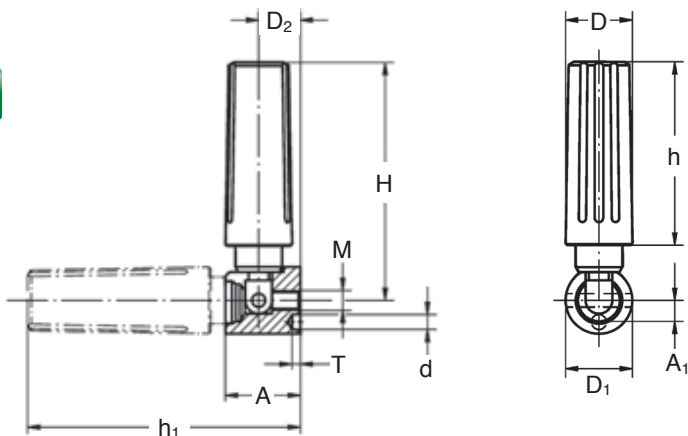


• **REVOLVING GRIP** – Bakelite, Black • **THREADED INSERT** – Brass

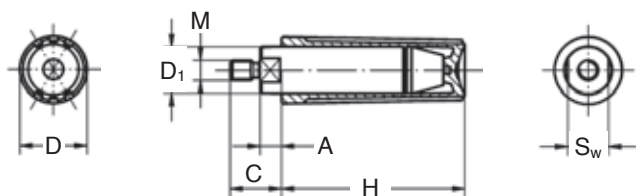
Catalog Number	D	D ₁	H	L _r	h	A	M	Weight g
MHAX5FM1423	23	18	85	7	65	20	M6	52



Foldaway Grips



Revolving Grips



• **CHARACTERISTICS**

These grips are ergonomically designed with great versatility. Engineered for strength, durability and precision performance.

• **NOTE**

Revolving grips are supplied assembled and can be fitted to handwheels, cranks or any other operating element. Dimension (d) in the illustration for foldaway grips is a positioning hole.

• **REVOLVING GRIP** – Thermoplastic, Anthracite Gray • **SCREW** – Steel, Black Oxide Finish

Catalog Number	D	D ₁	H	C	A	S _w	M	Approx. Weight g
MHAL63M25104	13	9	35	11	5	8	M4	13.3
MHAL63M25205	16	11	44	13	5.5	10	M5	25
MHAL63M25306	20	14	55	14	5	12	M6	50
MHAL63M25408	25	18	70.5	25	13	15	M8	102.8

• **FOLDAWAY GRIP** – Thermoplastic, Anthracite Gray • **THREADED INSERT** – Steel, Black Oxide Finish

Catalog Number	D	D ₁	D ₂	H	d	h	h ₁	A	A ₁	T	M	Approx. Weight g
MHAL6FM26104	13	13	8	47	2.5	35	54.5	14.5	4.3	4.5	M4	28
MHAL6FM26205	16	16	10	58	3.5	44	67	18	5.3	4.5	M5	51
MHAL6FM26306	20	20	12.5	71.5	4.5	55	82	22.5	6.5	6	M6	101
MHAL6FM26408	25	26	16	98.5	5.5	70.5	112.5	29	9	6.5	M8	225

SECTION
3

Levers
MPA

3





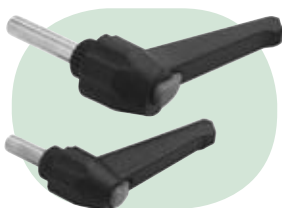
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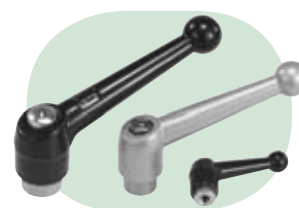
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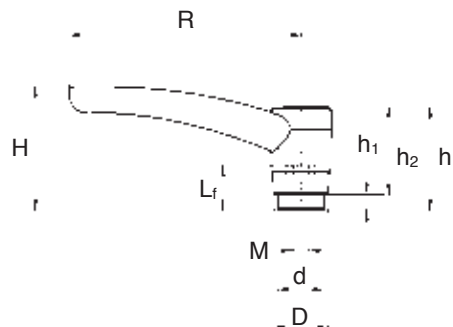
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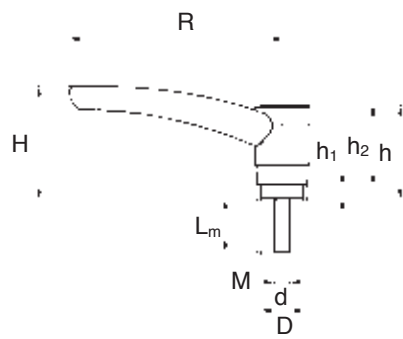


- **LEVER** – Nylon 6, Anthracite Gray
- **THREADED INSERT** – Brass, Nickel Plated
- **ENGAGING MECHANISM**

Catalog Number	L _f	R	H	h	h ₁
MPAX1FM6904 MPAX1FM6905	15	80	42.1	35.3	5.4
MPAX1FM6906 MPAX1FM6907	18	100	47.3	38.3	5.4
MPAX1FM6929 MPAX1FM6930 MPAX1FM6941	11	60	36	31.3	4.3
MPAX1FM6966 MPAX1FM6967 MPAX1FM6968	11	45	33.9	29.3	4.3

Catalog Number	h ₂	D	d	M	Weight g
MPAX1FM6904 MPAX1FM6905	29.9	18.8	16	M6 M8	25 27
MPAX1FM6906 MPAX1FM6907	32.9	23.8	20.8	M10 M12	49 42
MPAX1FM6929 MPAX1FM6930 MPAX1FM6941	27	17.9	14.8	M4 M5 M6	15 19 19
MPAX1FM6966 MPAX1FM6967 MPAX1FM6968	25	14.3	11.8	M4 M5 M6	13 12 13

LEVERS, CLAMPING - Adjustable



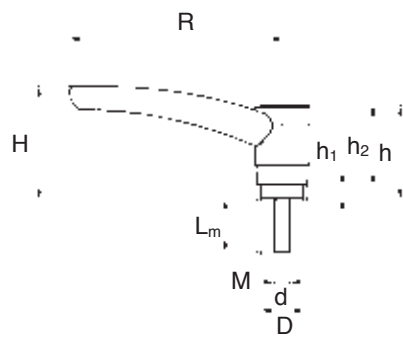
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- **LEVER** – Nylon 6, Anthracite Gray
- **SCREW** – Steel, Zinc Plated
- **ENGAGING MECHANISM**

Catalog Number	L _m	R	H	h	h ₁
MPAX1MM6910	10				
MPAX1MM6911	15	45	33.9	29.3	4.3
MPAX1MM6912	20				
MPAX1MM6913	12				
MPAX1MM6914	16	45	33.9	29.3	4.3
MPAX1MM6915	20				
MPAX1MM6916	25				
MPAX1MM6918	12	45	33.9	29.3	4.3
MPAX1MM6919	16				
MPAX1MM6920	20				
MPAX1MM6921	25	45	33.9	29.3	4.3
MPAX1MM6922	32				
MPAX1MM6923	40				

Catalog Number	h ₂	D	d	M	Weight g
MPAX1MM6910					14
MPAX1MM6911	25	14.3	11.8	M4	15
MPAX1MM6912					15
MPAX1MM6913					15
MPAX1MM6914	25	14.3	11.8	M5	15
MPAX1MM6915					16
MPAX1MM6916					16
MPAX1MM6918					16
MPAX1MM6919	25	14.3	11.8	M6	16
MPAX1MM6920					17
MPAX1MM6921					18
MPAX1MM6922	25	14.3	11.8	M6	19
MPAX1MM6923					20

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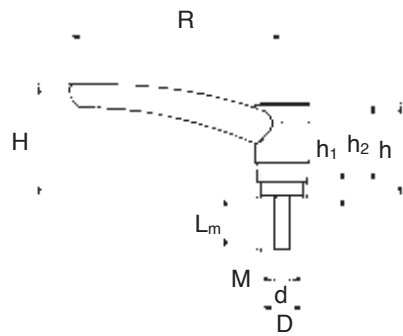


- **LEVER** – Nylon 6, Anthracite Gray
- **SCREW** – Steel, Zinc Plated
- **ENGAGING MECHANISM**

Catalog Number	L _m	R	H	h	h ₁
MPAX1MM6924	20	80	42.1	35.3	5.4
MPAX1MM6925	20				
MPAX1MM6926	30				
MPAX1MM6927	25	100	47.3	38.3	5.4
MPAX1MM6928	30				
MPAX1MM6931	15	60	36	31.3	4.3
MPAX1MM6932	15				
MPAX1MM6933	20				
MPAX1MM6934	20				
MPAX1MM6935	25	80	42.1	35.3	5.4
MPAX1MM6936	25				
MPAX1MM6937	30	100	47.3	38.3	5.4
MPAX1MM6938	50				

Catalog Number	h ₂	D	d	M	Weight g
MPAX1MM6924	29.9	18.8	16	M6	32
MPAX1MM6925				M8	35
MPAX1MM6926				M8	39
MPAX1MM6927	32.9	23.8	20.8	M10	65
MPAX1MM6928				M12	75
MPAX1MM6931	27	17.9	14.8	M4	21
MPAX1MM6932				M5	22
MPAX1MM6933				M4	21
MPAX1MM6934				M5	23
MPAX1MM6935	29.9	18.8	16	M6	33
MPAX1MM6936				M8	37
MPAX1MM6937	32.9	23.8	20.8	M10	68
MPAX1MM6938					79

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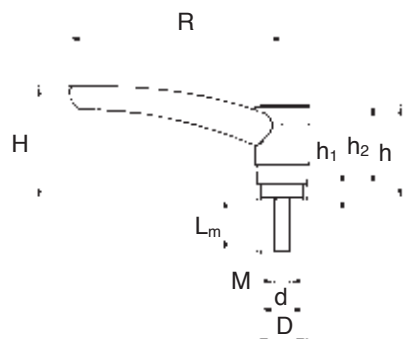
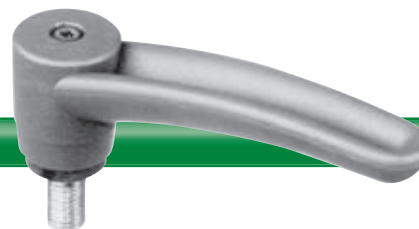
- **LEVER** – Nylon 6, Anthracite Gray
- **SCREW** – Steel, Zinc Plated
- **ENGAGING MECHANISM**

Catalog Number	L _m	R	H	h	h ₁
MPAX1MM6939	40	100	47.3	38.3	5.4
MPAX1MM6940	20	60	36	31.3	4.3
MPAX1MM6942	10				
MPAX1MM6943	12				
MPAX1MM6945	25				
MPAX1MM6946	10	60	36	31.3	4.3
MPAX1MM6947	12				
MPAX1MM6948	16				
MPAX1MM6949	25				
MPAX1MM6953	20	100	47.3	38.3	5.4
MPAX1MM6954	25				
MPAX1MM6956	50				
MPAX1MM6957	60				

Catalog Number	h ₂	D	d	M	Weight g
MPAX1MM6939	32.9	23.8	20.8	M12	83
MPAX1MM6940	27	17.9	14.8	M6	23
MPAX1MM6942				M4	21
MPAX1MM6943				M5	22
MPAX1MM6945				M5	23
MPAX1MM6946	27	17.9	14.8	M6	22
MPAX1MM6947					22
MPAX1MM6948					23
MPAX1MM6949					24
MPAX1MM6953	32.9	23.8	20.8	M12	69
MPAX1MM6954					72
MPAX1MM6956					90
MPAX1MM6957					100

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LEVERS, CLAMPING - Adjustable

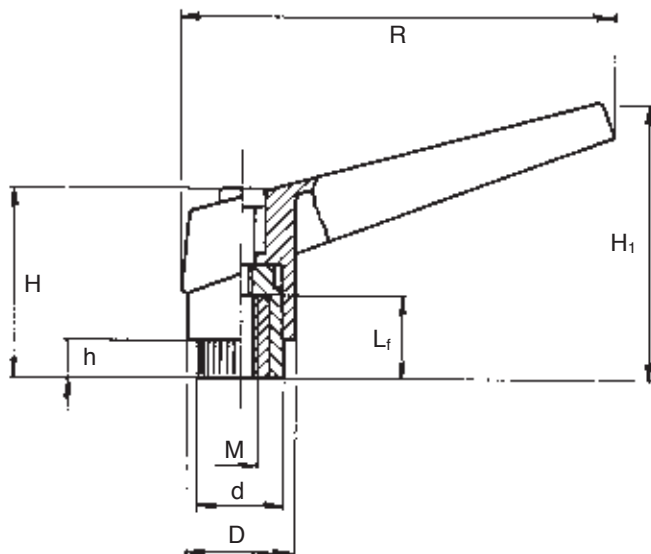


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- **LEVER** – Nylon 6, Anthracite Gray
- **SCREW** – Steel, Zinc Plated
- **ENGAGING MECHANISM**

Catalog Number	L _m	R	H	h	h ₁
MPAX1MM6984	32	60	36	31.3	4.3
MPAX1MM6985	40				
MPAX1MM6986	50				
MPAX1MM6987	10	80	42.1	35.3	5.4
MPAX1MM6988	12				
MPAX1MM6989	16				
MPAX1MM6991	40	80	42.1	35.3	5.4
MPAX1MM6992	50				
MPAX1MM6993	63				
MPAX1MM6994	16	100	47.3	38.3	5.4
MPAX1MM6995	20				
MPAX1MM6997	40				
MPAX1MM6998	63				

Catalog Number	h ₂	D	d	M	Weight g
MPAX1MM6984	27	17.9	14.8	M6	26
MPAX1MM6985					27
MPAX1MM6986					29
MPAX1MM6987	29.9	18.8	16	M8	33
MPAX1MM6988					33
MPAX1MM6989					35
MPAX1MM6991	29.9	18.8	16	M8	41
MPAX1MM6992					44
MPAX1MM6993					49
MPAX1MM6994	32.9	23.8	20.8	M10	62
MPAX1MM6995					64
MPAX1MM6997					74
MPAX1MM6998					85

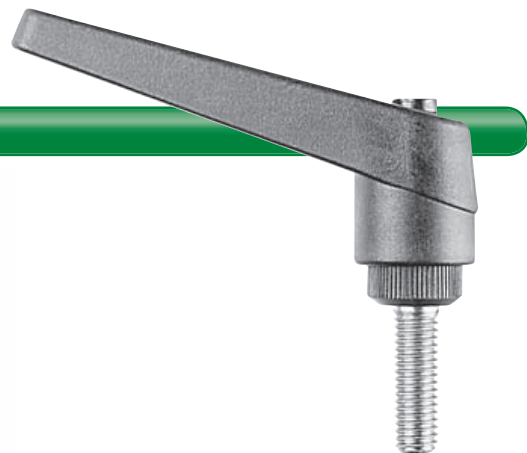
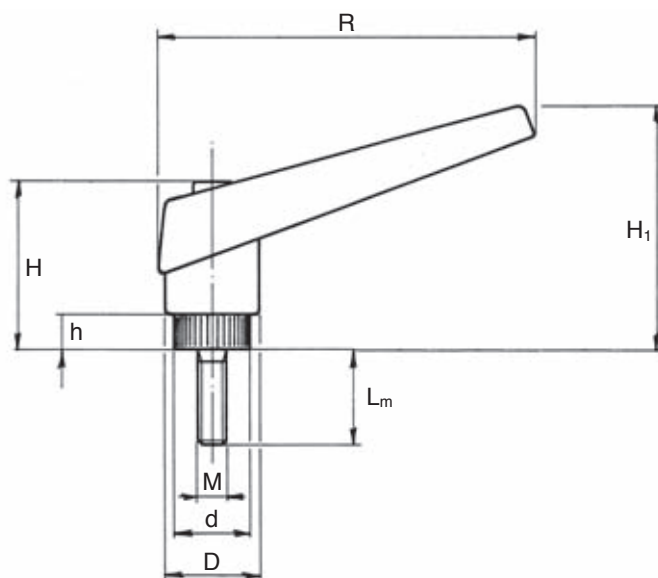


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- **LEVER** – PBT, Glass Filled, Black • **THREADED INSERT** – Brass, Nickel Plated
- **ENGAGING MECHANISM**

Catalog Number	L _f	R	H	H ₁	h	D	d	M	Weight g
MPAX2FM9404	15	80	35	50	7	20	16	M6	25
MPAX2FM9405								M8	27
MPAX2FM9406	18	100	38	58	8.5	24	20.8	M10	44
MPAX2FM9407								M12	37
MPAX2FM9429	11	60	31	42	5	17	14.8	M4	12
MPAX2FM9430								M5	16
MPAX2FM9441								M6	16
MPAX2FM9466	11	45	26	31.2	4	14	11.8	M4	12
MPAX2FM9467								M5	11
MPAX2FM9468								M6	12

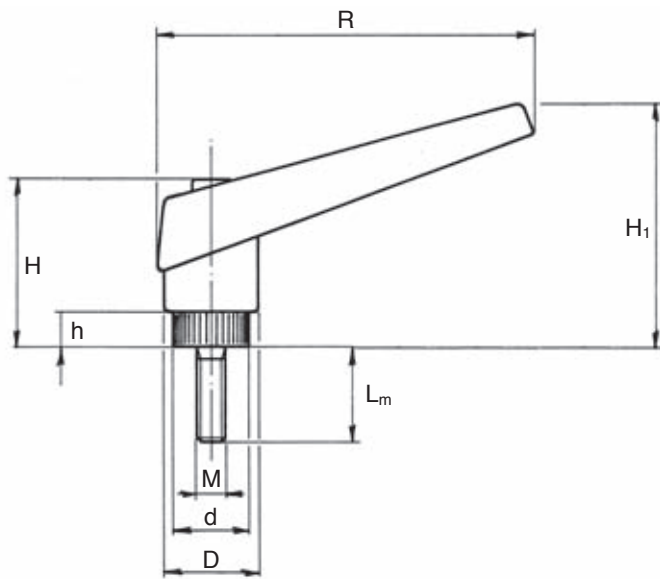
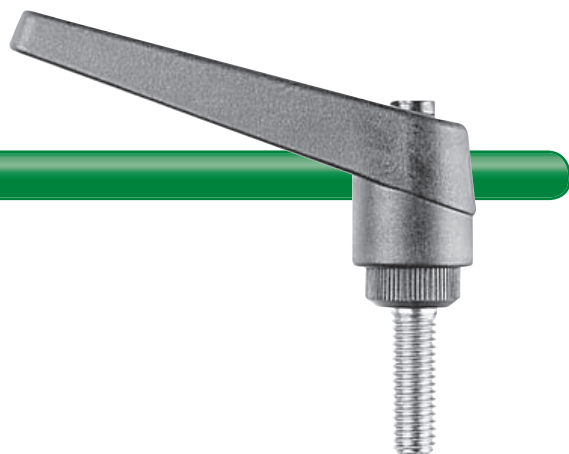
LEVERS, CLAMPING



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• **LEVER** – PBT, Glass Filled, Black • **SCREW** – Steel, Zinc Plated • **ENGAGING MECHANISM**

Catalog Number	L _m	R	H	H ₁	h	D	d	M	Weight g
MPAX2MM9424	20							M6	32
MPAX2MM9425	20	80	35	50	7	20	16	M8	35
MPAX2MM9426	30							M8	39
MPAX2MM9427	25	100	38	58	8.5	24	20.8	M10	60
MPAX2MM9428	30							M12	70
MPAX2MM9431	15							M4	18
MPAX2MM9432	15	60	31	42	5	17	14.8	M5	19
MPAX2MM9433	20							M4	18
MPAX2MM9434	20							M5	20
MPAX2MM9435	25	80	35	50	7	20	16	M6	33
MPAX2MM9436								M8	37
MPAX2MM9437	30	100	38	58	8.5	24	20.8	M10	63
MPAX2MM9438	50							M10	74
MPAX2MM9439	40							M12	78
MPAX2MM9440	20							M6	20
MPAX2MM9442	10	60	31	42	5	17	14.8	M4	18
MPAX2MM9443	12							M5	19
MPAX2MM9445	25							M5	20
MPAX2MM9446	10								19
MPAX2MM9447	12	60	31	42	5	17	14.8	M6	19
MPAX2MM9448	16								20
MPAX2MM9449	25								21
MPAX2MM9453	20	100	38	58	8.5	24	20.8	M12	64
MPAX2MM9454	25								67
MPAX2MM9456	50								85
MPAX2MM9457	60								95
MPAX2MM9484	32	60	31	42	5	17	14.8	M6	23
MPAX2MM9485	40								24
MPAX2MM9486	50								26
MPAX2MM9487	10	80	35	50	7	20	16	M8	33
MPAX2MM9488	12								



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• **LEVER** – PBT, Glass Filled, Black • **SCREW** – Steel, Zinc Plated • **ENGAGING MECHANISM**

Catalog Number	L _m	R	H	H ₁	h	D	d	M	Weight g
MPAX2MM9489	16	80	35	50	7	20	16	M8	35
MPAX2MM9491	40								41
MPAX2MM9492	50								44
MPAX2MM9493	63								49
MPAX2MM9494	16	100	38	58	8.5	24	20.8	M10	57
MPAX2MM9495	20								59
MPAX2MM9497	40								69
MPAX2MM9498	63								80
MPAX2MM9510	10	45	26	31.2	4	14	11.8	M4	13
MPAX2MM9511	15								14
MPAX2MM9512	20								14
MPAX2MM9513	12	45	26	31.2	4	14	11.8	M5	14
MPAX2MM9514	16								14
MPAX2MM9515	20								15
MPAX2MM9516	25								15
MPAX2MM9518	12	45	26	31.2	4	14	11.8	M6	15
MPAX2MM9519	16								15
MPAX2MM9520	20								16
MPAX2MM9521	25								17
MPAX2MM9522	32								18
MPAX2MM9523	40								19

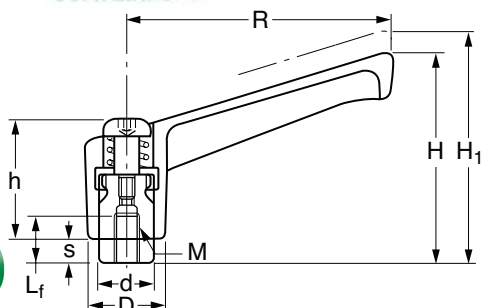


Fig. 1

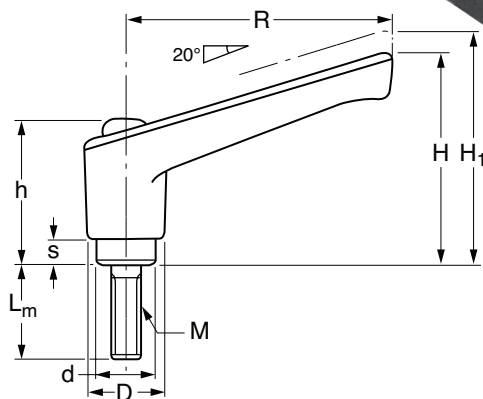


Fig. 2

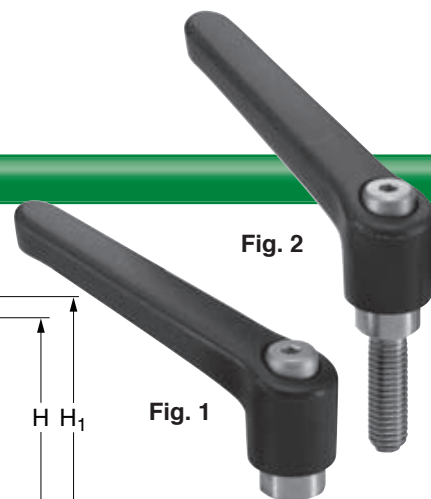


Fig. 2

Fig. 1 • **LEVER** – Nylon 6, Black • **THREADED INSERT** – Hardened Steel or Stainless Steel

Catalog Number		L _f	R	H	H ₁	h	s
Hardened Steel Insert	Stainless Steel Insert						
MPAN4FMLEF0608	MPAN4FMLEFS0608	8	45	35.5	39	24.5	4.2
MPAN4FMLEF0810	MPAN4FMLEFS0810	10	63	46.3	50.3	31	6.5
MPAN4FMLEF1014	MPAN4FMLEFS1014	14	78	55.4	59.4	36	8
MPAN4FMLEF1217	MPAN4FMLEFS1217	17	92	66	70	43	11

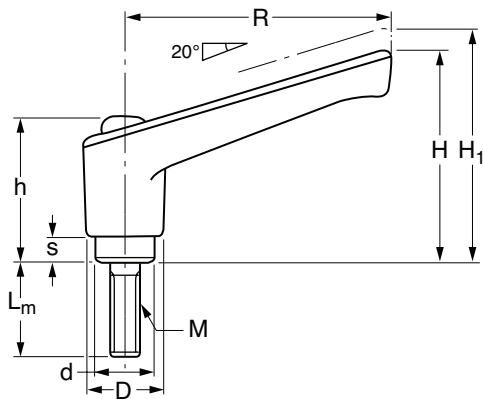
Catalog Number		D	d	M	F Max. N	Weight g
Hardened Steel Insert	Stainless Steel Insert					
MPAN4FMLEF0608	MPAN4FMLEFS0608	13	10	M6	70	14
MPAN4FMLEF0810	MPAN4FMLEFS0810	17.5	13.5	M8	120	30
MPAN4FMLEF1014	MPAN4FMLEFS1014	21	16	M10	200	50
MPAN4FMLEF1217	MPAN4FMLEFS1217	25	19	M12	290	70

Fig. 2 • **LEVER** – Nylon 6, Black • **SCREW** – Hardened Steel or Stainless Steel

Catalog Number		L _m	R	H	H ₁	h	s
Hardened Steel Screw	Stainless Steel Screw						
MPAN4MMLEM0612	MPAN4MMLEMS0612	12					
MPAN4MMLEM0616	MPAN4MMLEMS0616	16	45	35.5	39	24.5	4.2
MPAN4MMLEM0620	MPAN4MMLEMS0620	20					
MPAN4MMLEM0625	MPAN4MMLEMS0625	25					
MPAN4MMLEM0632	MPAN4MMLEMS0632	32	45	35.5	39	24.5	4.2
MPAN4MMLEM0640	MPAN4MMLEMS0640	40					

Catalog Number		D	d	M	F Max. N	Weight g
Hardened Steel Screw	Stainless Steel Screw					
MPAN4MMLEM0612	MPAN4MMLEMS0612					19
MPAN4MMLEM0616	MPAN4MMLEMS0616	13	10	M6	70	20
MPAN4MMLEM0620	MPAN4MMLEMS0620					21
MPAN4MMLEM0625	MPAN4MMLEMS0625					22
MPAN4MMLEM0632	MPAN4MMLEMS0632	13	10	M6	70	23
MPAN4MMLEM0640	MPAN4MMLEMS0640					25

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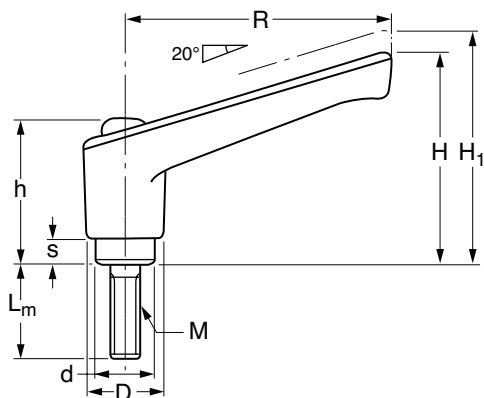


• **LEVER** – Nylon 6, Black • **SCREW** – Hardened Steel or Stainless Steel

Catalog Number		L _m	R	H	H ₁	h	s
Hardened Steel Screw	Stainless Steel Screw						
MPAN4MMLEM0816	MPAN4MMLEMS0816	16					
MPAN4MMLEM0820	MPAN4MMLEMS0820	20	63	46.3	50.3	31	6.5
MPAN4MMLEM0825	MPAN4MMLEMS0825	25					
MPAN4MMLEM0832	MPAN4MMLEMS0832	32					
MPAN4MMLEM0840	MPAN4MMLEMS0840	40	63	46.3	50.3	31	6.5
MPAN4MMLEM0850	MPAN4MMLEMS0850	50					
MPAN4MMLEM1016	—	16					
MPAN4MMLEM1020	MPAN4MMLEMS1020	20	78	55.4	59.4	36	8
MPAN4MMLEM1025	MPAN4MMLEMS1025	25					
MPAN4MMLEM1032	MPAN4MMLEMS1032	32					
MPAN4MMLEM1040	MPAN4MMLEMS1040	40	78	55.4	59.4	36	8
MPAN4MMLEM1050	MPAN4MMLEMS1050	50					
MPAN4MMLEM1063	MPAN4MMLEMS1063	63					

Catalog Number		D	d	M	F Max. N	Weight g
Hardened Steel Screw	Stainless Steel Screw					
MPAN4MMLEM0816	MPAN4MMLEMS0816					39
MPAN4MMLEM0820	MPAN4MMLEMS0820	17.5	13.5	M8	120	41
MPAN4MMLEM0825	MPAN4MMLEMS0825					43
MPAN4MMLEM0832	MPAN4MMLEMS0832					45
MPAN4MMLEM0840	MPAN4MMLEMS0840	17.5	13.5	M8	120	48
MPAN4MMLEM0850	MPAN4MMLEMS0850					52
MPAN4MMLEM1016	—					67
MPAN4MMLEM1020	MPAN4MMLEMS1020	21	16	M10	200	68
MPAN4MMLEM1025	MPAN4MMLEMS1025					72
MPAN4MMLEM1032	MPAN4MMLEMS1032					77
MPAN4MMLEM1040	MPAN4MMLEMS1040	21	16	M10	200	81
MPAN4MMLEM1050	MPAN4MMLEMS1050					87
MPAN4MMLEM1063	MPAN4MMLEMS1063					95

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3

• **LEVER** – Nylon 6, Black • **SCREW** – Hardened Steel or Stainless Steel

Catalog Number		L _m	R	H	H ₁	h	s
Hardened Steel Screw	Stainless Steel Screw						
MPAN4MMLEM1225	MPAN4MMLEMS1225	25					
MPAN4MMLEM1232	MPAN4MMLEMS1232	32					
MPAN4MMLEM1240	MPAN4MMLEMS1240	40	92	66	70	43	11
MPAN4MMLEM1250	MPAN4MMLEMS1250	50					
MPAN4MMLEM1263	MPAN4MMLEMS1263	63					

Catalog Number		D	d	M	F Max. N	Weight g
Hardened Steel Screw	Stainless Steel Screw					
MPAN4MMLEM1225	MPAN4MMLEMS1225					133
MPAN4MMLEM1232	MPAN4MMLEMS1232					140
MPAN4MMLEM1240	MPAN4MMLEMS1240	25	19	M12	290	148
MPAN4MMLEM1250	MPAN4MMLEMS1250					158
MPAN4MMLEM1263	MPAN4MMLEMS1263					170

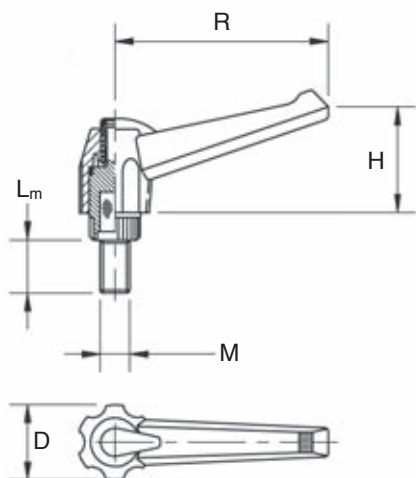


Fig. 1

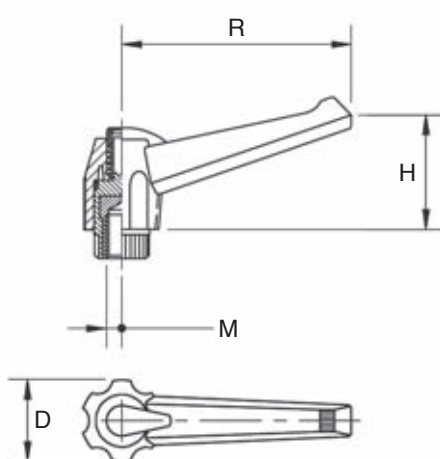


Fig. 2



Fig. 1



Fig. 2

Fig. 1 • **LEVER** – Polymer, Black With Red Button • **Screw** – Steel, Zinc Plated

Catalog Number	L _m	R	H	D	M
MPAY5MM201L10	20	40	24	18	M6
MPAY5MM201L15	20				M6
MPAY5MM201L20	20	60	32	21	M8
MPAY5MM201L25	30				M8
MPAY5MM201L30	40				M8
MPAY5MM201L40	30	80	42	30	M8
MPAY5MM201L45	30				M10
MPAY5MM201L50	40				M10

Fig. 2 • **LEVER** – Polymer, Black With Red Button
• **THREADED INSERT** – Brass

Catalog Number	R	H	D	M
MPAY5FM201M05	40	24	18	M5
MPAY5FM201M10				M6
MPAY5FM201M15	60	32	21	M6
MPAY5FM201M20				M8
MPAY5FM201M30	80	42	30	M8
MPAY5FM201M35				M10
MPAY5FM201M40				M12

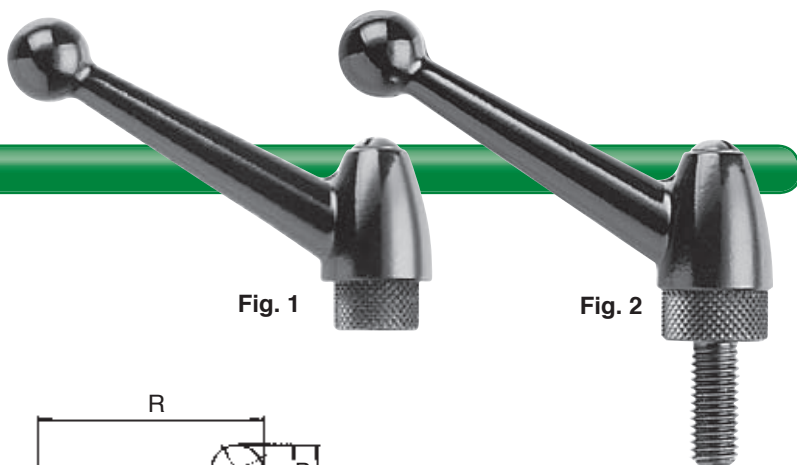


Fig. 1

Fig. 2

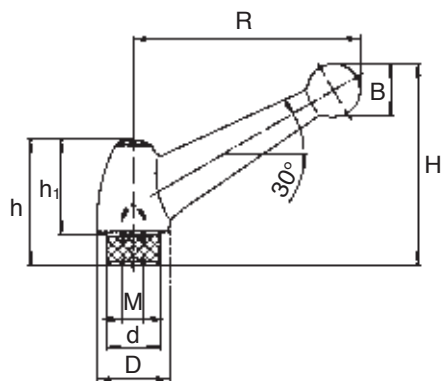


Fig. 1

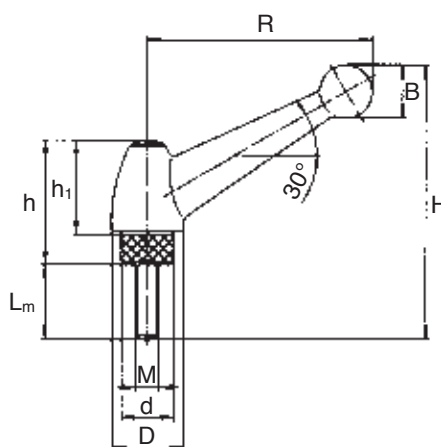


Fig. 2

Fig. 1 • **LEVER** – Aluminum, Die-Casting, Black

• **THREADED INSERT** – Steel, Black Oxide • **ENGAGING MECHANISM**

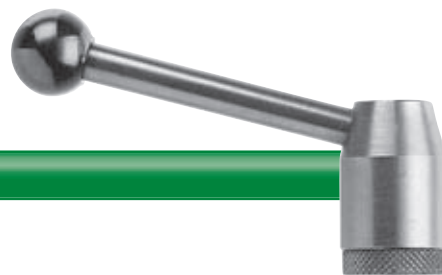
Catalog Number	R	H	h	h ₁	D	d	B	M	Weight g
MPAX3FM9408	40	34	25	19	15	10	9	M4	16
MPAX3FM9409								M5	
MPAX3FM9410	60	53	33	25	19	14	14	M6	40
MPAX3FM9411						18		M8	42
MPAX3FM9412	80	67	45	35	28	22	18	M10	105
MPAX3FM9413						26		M12	
MPAX3FM9414	96	83	57	42	32	30	22	M14	292

Fig. 2 • **LEVER** – Aluminum, Die-Casting, Black

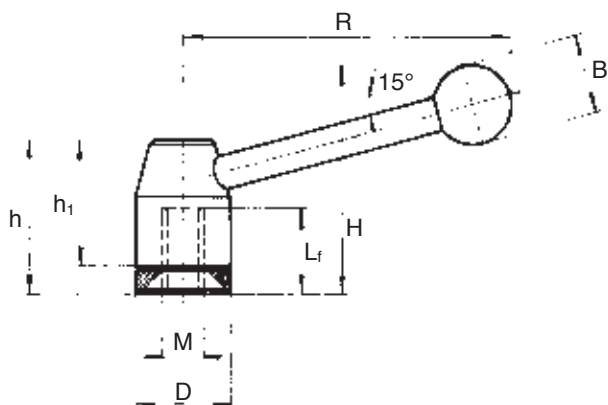
• **SCREW** – Steel, Black Oxide • **ENGAGING MECHANISM**

Catalog Number	Lm	R	H	h	h ₁
MPAX3MM9415	20	60	53	33	25
MPAX3MM9416	20				
MPAX3MM9417	30	80	67	45	35
MPAX3MM9418	20				

Catalog Number	D	d	B	M	Weight g
MPAX3MM9415	19	14	14	M6	47
MPAX3MM9416		18		M8	54
MPAX3MM9417		18		M8	58
MPAX3MM9418	28	22	18	M10	125



3

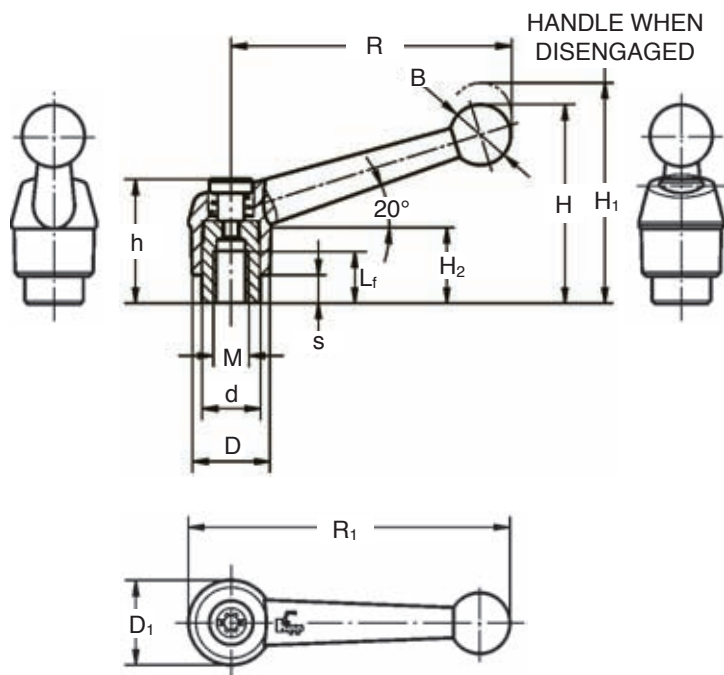


• **LEVER** – Steel, Black Oxide • **THREADED INSERT** – Steel, Black Oxide • **ENGAGING MECHANISM**

Catalog Number	L _r	R	H	h	h ₁	D	B	M	Weight g
MPAX3FM9419	15	60	41	26	22	14	14	M6	42
MPAX3FM9420	20	70	49	31.5	26.5	18	18	M8	74
MPAX3FM9421		77	53			22		M10	100
MPAX3FM9422	25	108	72	43	37	28	28	M12	225
MPAX3FM9423								M14	220



3

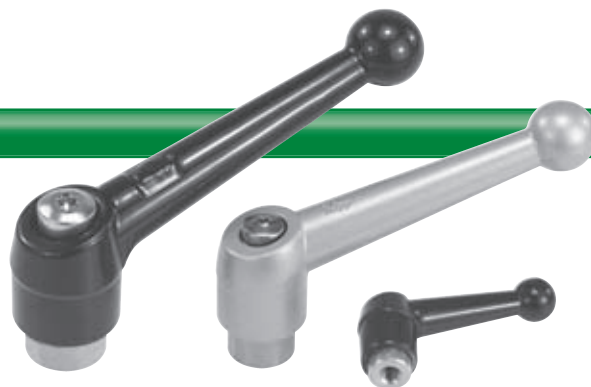


**LIFT TO
DISENGAGE**

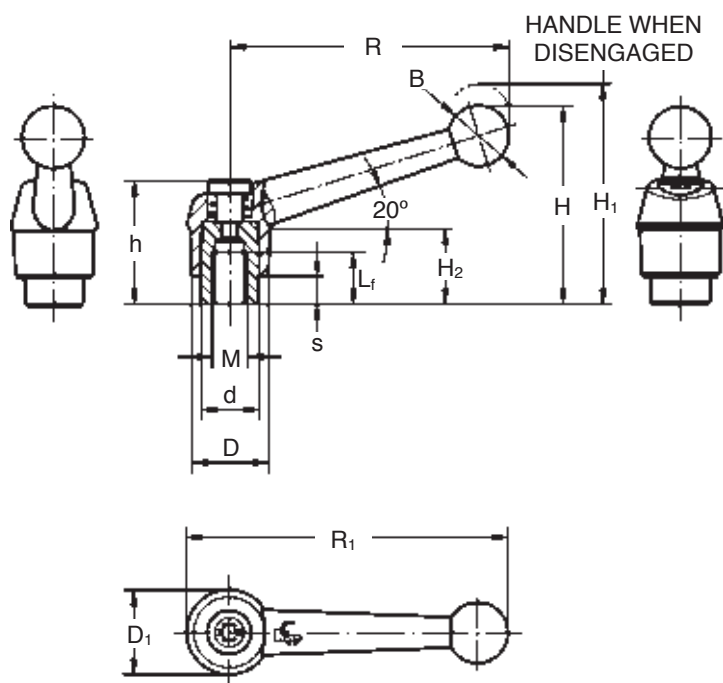


- **LEVER** – Zinc Die Cast, Powder-Coated, Black or Silver Finish • DIN 1743
- **INSERTS & INTERNAL COMPONENTS** – Steel, Black Oxide Finish

Catalog Number		Size	L _f	R	R ₁	H	H ₁	H ₂	h	s	D	D ₁	d	B	M	Approx. Weight g
Satin Finish Black	Metallic Finish Silver															
MPAL64M101041	MPAL64M101043	1	9	39	46	32.5	35.5	15	24.5	4	13	14	10	10.5	M4	30
MPAL64M101051	MPAL64M101053														M5	
MPAL64M101061	MPAL64M101063														M6	
MPAL64M102061	MPAL64M102063	2	12	64	73	45.5	49.5	16.5	28.5	6.5	18	18.5	13.5	15.5	M6	80
MPAL64M102081	MPAL64M102083														M8	
MPAL64M103081	MPAL64M103083	3	14	79	90	57.5	61.5	23	37	10	21	22	16	17	M8	120
MPAL64M103101	MPAL64M103103														M10	
MPAL64M104101	MPAL64M104103	4	17	95	108	67	72	26	42.5	10	25	26	19	19	M10	190
MPAL64M104121	MPAL64M104123														M12	
MPAL64M105121	MPAL64M105123	5	23	110	126	79	84	32	49	12	30	31	23	22	M12	300
MPAL64M105161	MPAL64M105163														M16	



3



**LIFT TO
DISENGAGE**



- **LEVER** – Zinc Die Cast, Powder-Coated, Black or Silver Finish • DIN 1743
- **INSERTS & INTERNAL COMPONENTS** – Stainless Steel, Natural Finish

Catalog Number		Size	L _f	R	R ₁	H	H ₁	H ₂	h	s	D	D ₁	d	B	M	Approx. Weight g
Satin Finish Black	Metallic Finish Silver															
MPAL64M111051	MPAL64M111053	1	9	39	46	32.5	35.5	15	24.5	4	13	14	10	10.5	M5 M6	30
MPAL64M111061	MPAL64M111063															
MPAL64M112061	MPAL64M112063	2	12	64	73	45.5	49.5	16.5	28.5	6.5	18	18.5	13.5	15.5	M6 M8	80
MPAL64M112081	MPAL64M112083															
MPAL64M113081	MPAL64M113083	3	14	79	90	57.5	61.5	23	37	10	21	22	16	17	M8 M10	120
MPAL64M113101	MPAL64M113103															
MPAL64M114101	MPAL64M114103	4	17	95	108	67	72	26	42.5		25	26	19	19	M10 M12	190
MPAL64M114121	MPAL64M114123															
MPAL64M115121	MPAL64M115123	5	23	110	126	79	84	32	49	12	30	31	23	22	M12 M16	300
MPAL64M115161	MPAL64M115163															



3

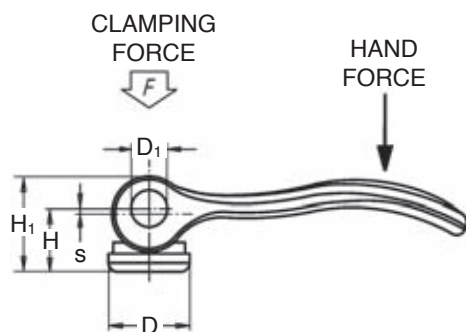


Fig. 1

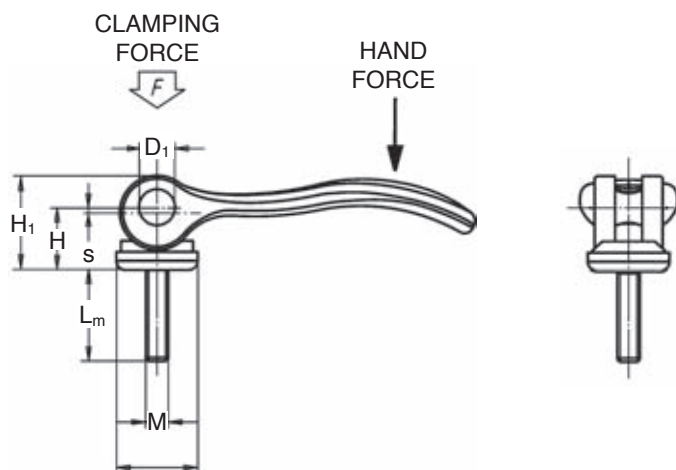


Fig. 2

Fig. 1 • **LEVER** – Cast Aluminum, Powder-Coated, Black • **THRUST WASHER** – Nylon, Fiberglass Reinforced
• **HINGE PINS** – Stainless Steel • **THREADED INSERT** – Steel

Catalog Number	Size	R ±1	R ₁	H	H ₁	D	D ₁	B	B ₁	M	Clamping Force F Approx. N	Hand Force Approx. N	s Throw	Approx. Weight g
MPAL32M101105	1	70.4	79.2	14.5	22	18	9	21.5	15	M5	4000	120	1.2	29
MPAL32M101106										M6				
MPAL32M201108	2	96	108	18	28.5	27	11	33.2	24	M8	8000	350	1.5	91

Fig. 2 • **LEVER** – Cast Aluminum, Powder-Coated, Black • **THRUST WASHER** – Nylon, Fiberglass Reinforced
• **HINGE PINS** – Stainless Steel • **SCREW** – Steel, Blue Chromated

Catalog Number*	Size	L _m Screw Length				M	Clamping Force F Approx. N	Hand Force Approx. N	s Throw
MPAL32M101105X□□	1	20	—	40	—	M5	4000	120	1.2
MPAL32M101106X□□		20	—	40	—	M6			
MPAL32M201108X□□	2	—	25	—	50	M8	8000	350	1.5
MPAL32M201110X□□		—	25	—	50	M10			

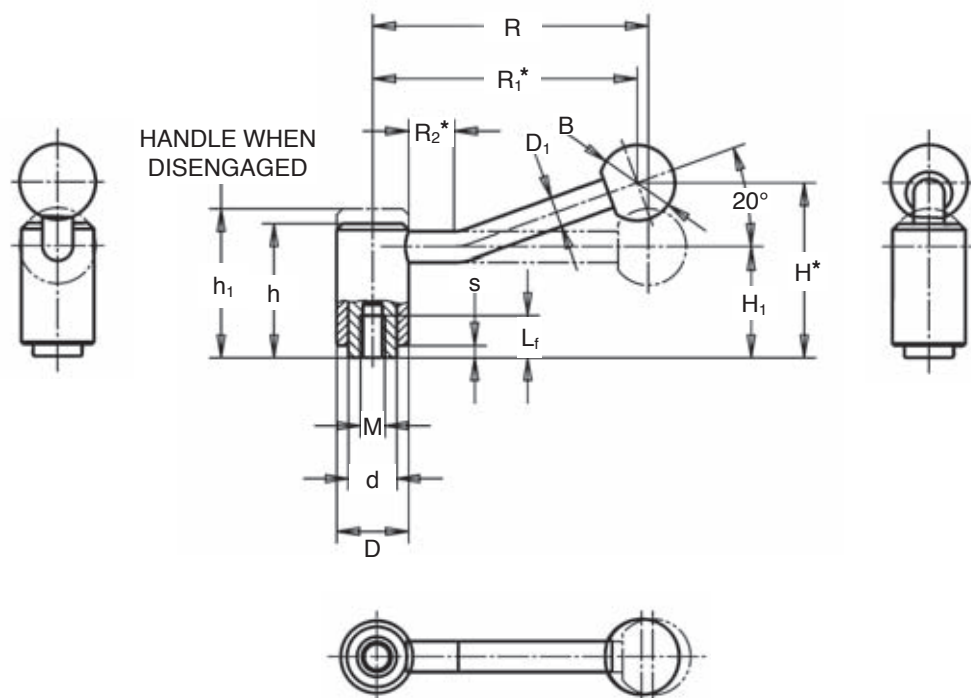
*To complete part number fill boxes with L_m dimension.

LEVERS, ADJUSTABLE TENSION

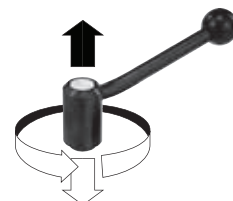
RoHS
COMPLIANT



3



LIFT TO
DISENGAGE



• **LEVER** – Steel, Powder-Coated, Black • **KNOB** – Plastic, Black • **THREADED INSERT** – Steel

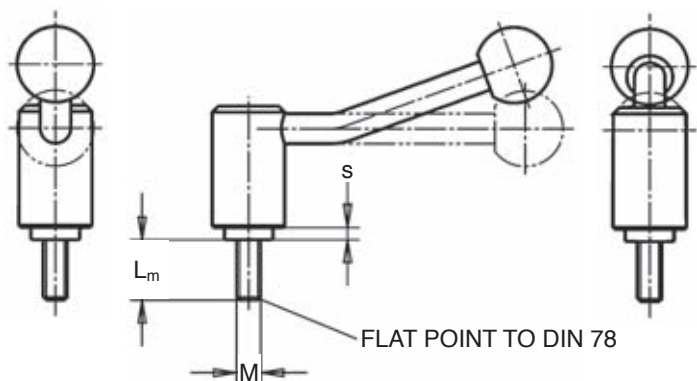
Catalog Number		Size	L _f	R	R ₁ [*]	R ₂ [*]	H [*]	H ₁	h	h ₁	s	D	D ₁	d	B	M	Approx. Weight g
0 Degrees	20 Degrees																
MPAL63M701082	MPAL63M701081	1	14	92	88	15	58.5	37	44.5	49.5	4.5	24	10	16	25	M8 M10	170
MPAL63M701102	MPAL63M701101						68.5	42	51.5	57.5	5.5	28	12	19		M10 M12	260
MPAL63M702102	MPAL63M702101	2	17	111	106		81	47	58	65	6	33	13	23	32	M12 M16	400
MPAL63M702122	MPAL63M702121																
MPAL63M703122	MPAL63M703121	3	23	134.5	128.5		89.5	56.5	85	76.5	7.5	41	30		M16	670	
MPAL63M703162	MPAL63M703161																M20
MPAL63M704162	MPAL63M704161	4	27	134												M24	1000
MPAL63M704202	MPAL63M704201																
MPAL63M704242	MPAL63M704241																

*Dimension H, R₁ & R₂ applies to 20° levers only.

LEVERS, ADJUSTABLE TENSION

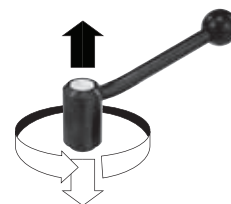


3



NOTE: For more drawing specifications, refer to previous page.

**LIFT TO
DISENGAGE**



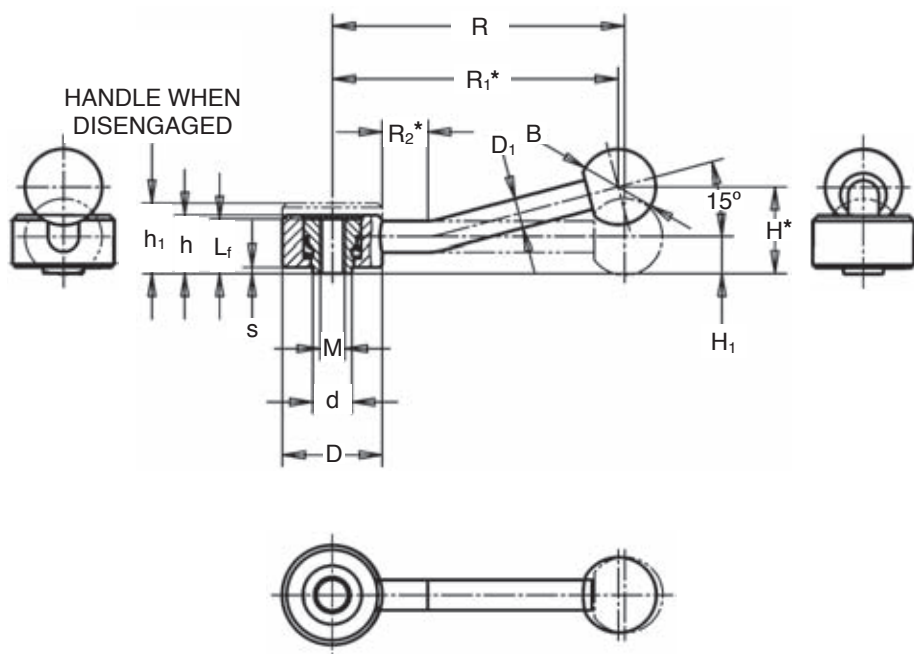
• **LEVER** – Steel, Powder-Coated, Black • **KNOB** – Plastic, Black • **SCREW** – Steel

Catalog Number*		Size	L _m Screw Length										s	M
0 Degrees	20 Degrees													
MPAL63M801082X ☐	MPAL63M801081X ☐	1	15	20	25	30	40	50	60	—	—	—	4	M8
MPAL63M801102X ☐	MPAL63M801101X ☐		15	20	25	30	40	50	60	—	—	—		M10
MPAL63M801122X ☐	MPAL63M801121X ☐		15	20	25	30	40	50	60	—	—	—		M12
MPAL63M802122X ☐	MPAL63M802121X ☐	2	—	20	25	30	40	50	60	—	—	—	5	M12
MPAL63M803122X ☐	MPAL63M803121X ☐	3	—	20	25	30	40	50	60	70	80	90		M12
MPAL63M803162X ☐	MPAL63M803161X ☐		—	20	25	30	40	50	60	70	80	90		M16
MPAL63M804162X ☐	MPAL63M804161X ☐	4	—	—	—	30	40	50	60	70	80	90	6	M16
MPAL63M804202X ☐	MPAL63M804201X ☐		—	—	—	30	40	50	60	70	80	90		M20
MPAL63M804242X ☐	MPAL63M804241X ☐		—	—	—	30	40	50	60	70	80	90		M24

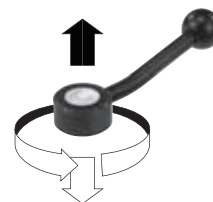
*To complete part number fill boxes with L_m dimension.

LEVERS, ADJUSTABLE TENSION - Low Profile

RoHS
COMPLIANT



LIFT TO
DISENGAGE



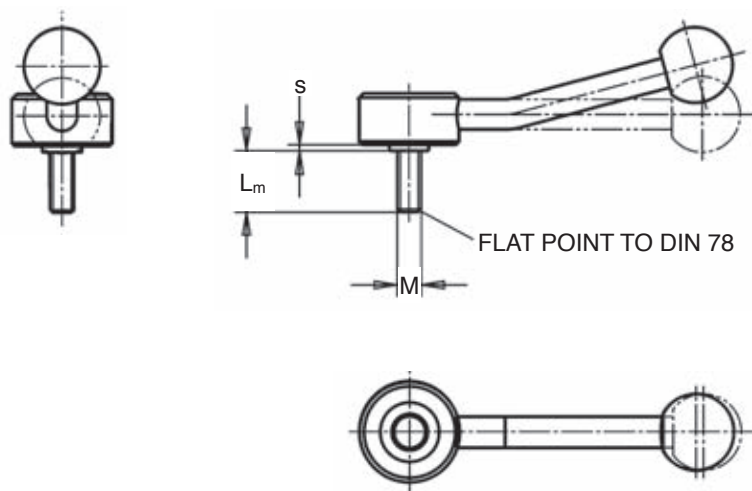
• **LEVER** – Steel, Black Oxide Finish • **KNOB** – Plastic, Black • **THREADED INSERT** – Steel

Catalog Number		Size	L _f	R	R ₁ [*]	R ₂ [*]	H [*]	H ₁	h	h ₁	s	D	D ₁	d	B	M	Approx. Weight g
0 Degrees	15 Degrees																
MPAL63M901061	MPAL63M901062	1	18	102	100	15	29	12	19	23	2	33	10	13	25	M6 M8	160
MPAL63M901081	MPAL63M901082																
MPAL63M902101	MPAL63M902102	2	21	131	127		38	13.5	22	26	41	12	19	30	M10 M12	290	
MPAL63M902121	MPAL63M902122																
MPAL63M903121	MPAL63M903122	3	27	148	145		48	17	28	33	45	14	23	37	M12 M16	450	
MPAL63M903161	MPAL63M903162																

*Dimension H, R₁ & R₂ applies to 15° levers only.

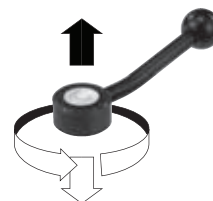
LEVERS, ADJUSTABLE TENSION - Low Profile

3



NOTE: For more drawing specifications, refer to previous page.

LIFT TO
DISENGAGE



• **LEVER** – Steel, Black Oxide Finish • **KNOB** – Plastic, Black • **SCREW** – Steel

Catalog Number*		Size	L _m Screw Length								s	M
0 Degrees	15 Degrees											
MPAL64M001081X ☐	MPAL64M001082X ☐	1	15	20	25	30	40	50	60	2	M8	
MPAL64M001101X ☐	MPAL64M001102X ☐		15	20	25	30	40	50	60		M10	
MPAL64M002101X ☐	MPAL64M002102X ☐	2	—	20	25	30	40	50	60		M12	
MPAL64M002121X ☐	MPAL64M002122X ☐		—	20	25	30	40	50	60			M16
MPAL64M003121X ☐	MPAL64M003122X ☐	3	—	20	25	30	40	50	60			
MPAL64M003161X ☐	MPAL64M003162X ☐		—	20	25	30	40	50	60			

*To complete part number fill boxes with L_m dimension.



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SECTION
4

Knobs
MMA

4

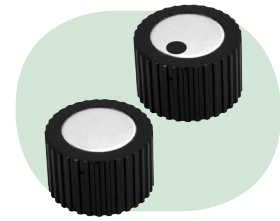




4-5



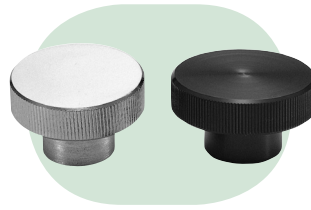
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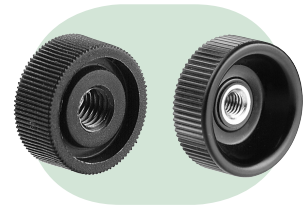
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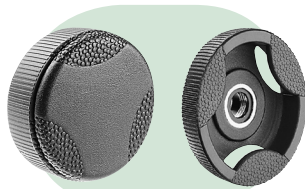
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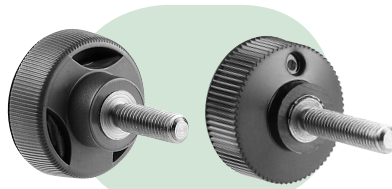
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4-8



4-9



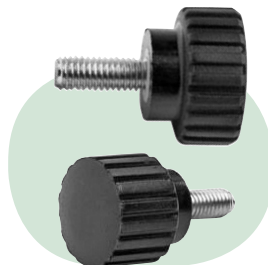
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4-12 & 4-13



4-14



4-15



4-16



4-17



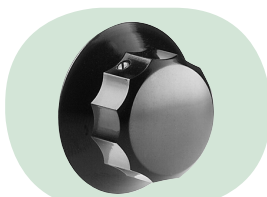
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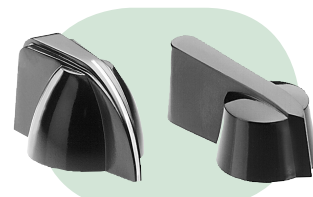
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4-20



4-21



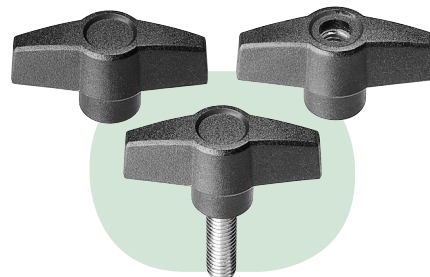
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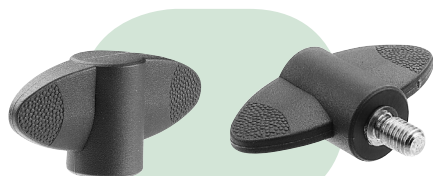
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4-21



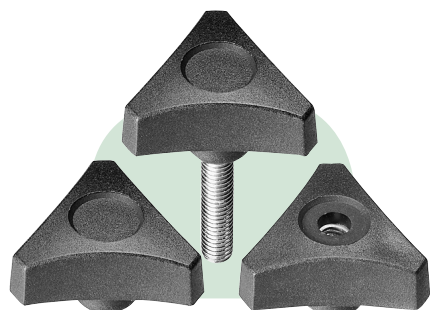
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4-23



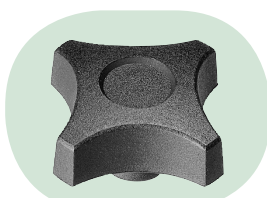
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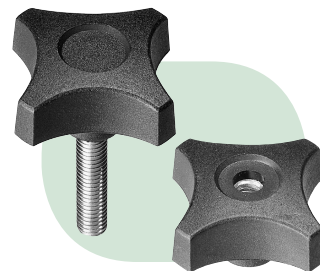
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4-26



4-26



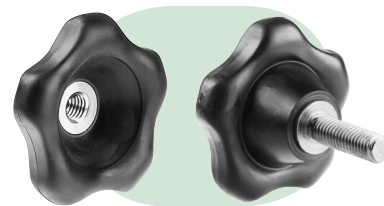
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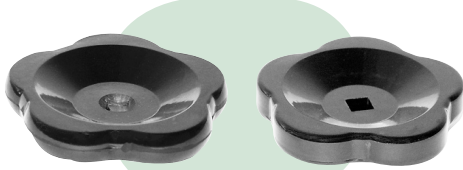
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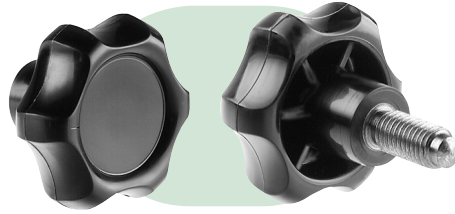
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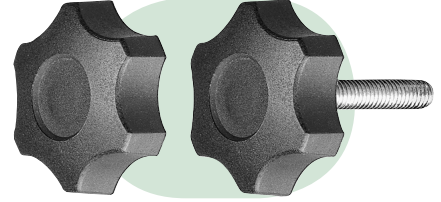
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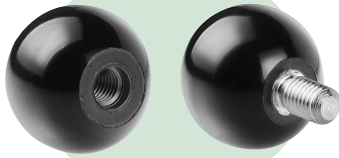
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4-34 & 4-35



4-36



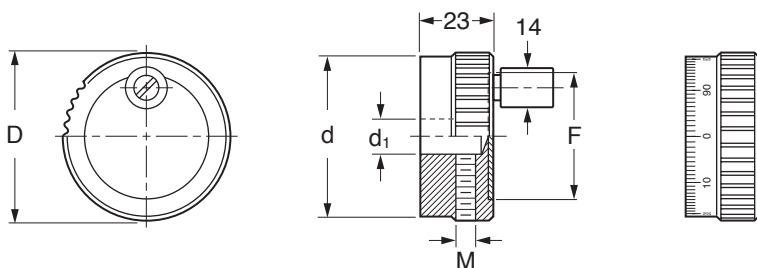
4-37 thru 4-40



4-41 & 4-42



4-43



4

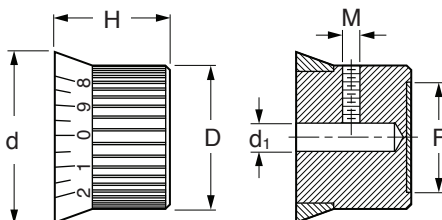
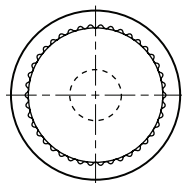
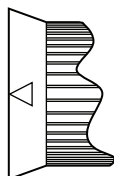
- **KNOB** – Aluminum, Black Matte Finish • **SCALE** – White Engraving
- **HANDLE** – Plastic, Black • **CAP** – Aluminum • **MOUNTING HOLE**

Catalog Number

Without Handle & Scale	With Handle	With 0-100 Scale	With Handle & Scale	D	d	d ₁	F	M
MMAH0FM30905010	MMAH0FM30915010	MMAH0FM30925010	MMAH0FM30935010	52	50		39.1	M5
MMAH0FM30906010	MMAH0FM30916010	MMAH0FM30926010	MMAH0FM30936010	62	60	Ø10	51.7	M5
MMAH0FM30907010	MMAH0FM30917010	MMAH0FM30927010	MMAH0FM30937010	72	70		65.1	M6

All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

MMAH3FM7040...
WITH ARROW



MMAH3FM7041...
WITH SCALE

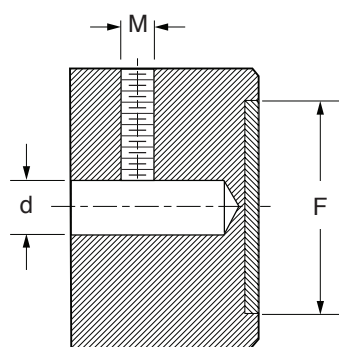
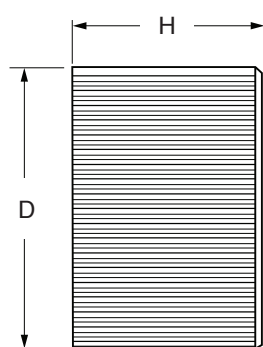
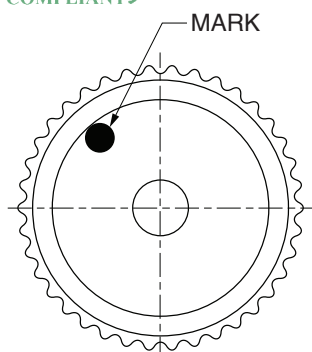


- **KNOB** – Aluminum, Black Matte Finish • **SCALE** – White Engraving
- **CAP** – Aluminum • **MOUNTING HOLE**

Catalog Number

With Arrow	With 0-10 Scale	D	H	d	d ₁	F	M
MMAH3FM7040346	MMAH3FM7041346	27	26	34	Ø6	18.3	M4
MMAH3FM7040416	MMAH3FM7041416	34	30	41		26.1	M5
MMAH3FM7040508	MMAH3FM7041508	42	34	50	Ø8	32	M5
MMAH3FM7040608	MMAH3FM7041608	52	38	60		39.1	

4 KNOBS, CONTROL

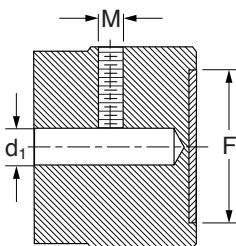
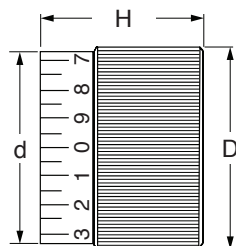
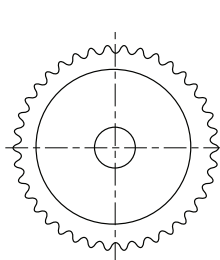
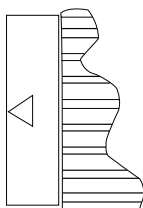


• **KNOB** – Aluminum, Black Matte Finish • **CAP** – Aluminum • **MOUNTING HOLE**

Catalog Number		D	H	d	F	M
With Mark	Without Mark					
MMAH1FM7020276	MMAH1FM7021276	27	17	Ø6	18.3	M4
MMAH1FM7020346	MMAH1FM7021346	34	20	Ø6	26.1	M5
MMAH1FM7020428	MMAH1FM7021428	42	23	Ø8	32	M5
MMAH1FM7020528	MMAH1FM7021528	52	25	Ø8	39.1	M5

All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

**MMAH2FM7030...
WITH ARROW**



**MMAH2FM7031...
WITH SCALE**

• **KNOB** – Aluminum, Black Matte Finish • **SCALE** – White Engraving
• **CAP** – Aluminum • **MOUNTING HOLE**

Catalog Number		D	H	d	d ₁	F	M
With Arrow	With 0-10 Scale						
MMAH2FM7030256	MMAH2FM7031256	27	26	25	Ø6	18.3	M4
MMAH2FM7030326	MMAH2FM7031326	34	30	32	Ø6	26.1	M5
MMAH2FM7030408	MMAH2FM7031408	42	34	40	Ø8	32	M5
MMAH2FM7030508	MMAH2FM7031508	52	38	50	Ø8	39.1	M5

KNOB, KNURLED

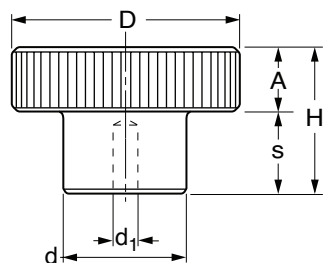


Fig. 1

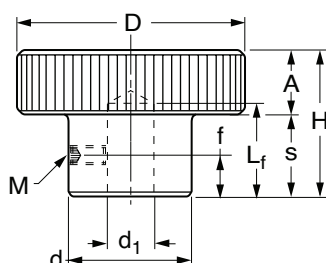


Fig. 2



Fig. 1

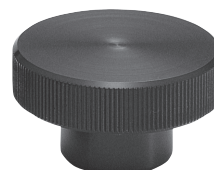


Fig. 2

Fig. 1 • **KNOB** – Cast Iron, Chrome Plated • **BLIND HOLE**

Catalog Number	D	H	d	d ₁	s	A	Weight g
MMANFFMFS40N	40	28	22	5	15	13	250
MMANFFMFS50N	50	32	27		18	14	415
MMANFFMFS63N	63	40	35		25	15	750

Fig. 2 • **KNOB** – Aluminum, Black Anodized • **BLIND HOLE & SET SCREW**

Catalog Number	D	H	d	d ₁ +0.04 0	L _f
MMANFFMHAK40R08N	40	25	22	8	15
MMANFFMHAK40R10N	50	28	27	10	18
MMANFFMHAK40R12N	63	32	35	12	22
MMANFFMHAK40R16N	80	40	45	16	28

Catalog Number	s	A	f	M	Weight g
MMANFFMHAK40R08N	13	12	6.5	M5	45
MMANFFMHAK40R10N	15	13	7.5		77
MMANFFMHAK40R12N	18	14	9		146
MMANFFMHAK40R16N	25	15	12.5	M6	234

KNOB, KNURLED

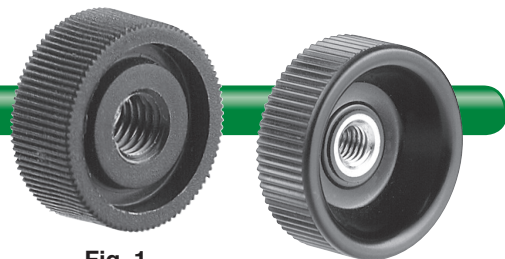


Fig. 1

Fig. 2

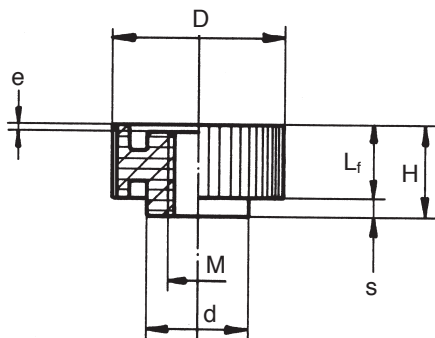


Fig. 1

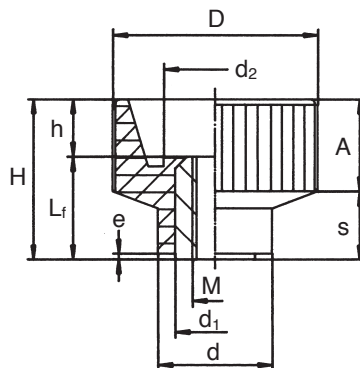


Fig. 2

Fig. 1 • KNOB – Nylon 6, Black • THREADED HOLE WITHOUT INSERT

Catalog Number	D	H	d	L _f	s	e	M	Weight g
MMAXGFM2601	15	8	9	6.5	1.5	0.5	M4	1
MMAXGFM2602							M5	
MMAXGFM2603							M6	

Fig. 2 • KNOB – Bakelite, Black • THREADED INSERT – Brass, Nickel Plated

Catalog Number	D	H	d	d ₁	d ₂	h
MMAXGFM2604	18	13	10	7	10	4
MMAXGFM2605	20	14	12	8		
MMAXGFM2606	24	16	13	8	10	6
MMAXGFM2607				9		
MMAXGFM2608	30	18	15	9	12	7
MMAXGFM2609				11		
MMAXGFM2610	35	19	18	10	14	8
MMAXGFM2611				11		
MMAXGFM2612				14		

Catalog Number	L _f	s	A	e	M	Weight g
MMAXGFM2604	9	5	8	0.5	M4	4
MMAXGFM2605	10	6	8	0.5	M5	6
MMAXGFM2606	10	7	9	0.5	M5	7
MMAXGFM2607					M6	
MMAXGFM2608	11	7	11	0.5	M6	12
MMAXGFM2609			11		M8	13
MMAXGFM2610			12		M7	16
MMAXGFM2611			12		M8	16
MMAXGFM2612			12		M10	18

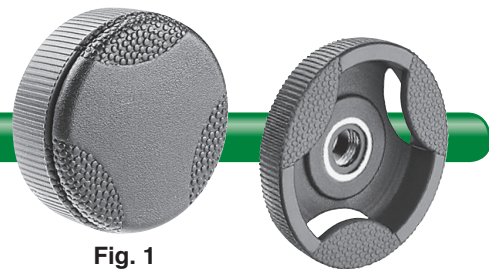


Fig. 1

Fig. 3

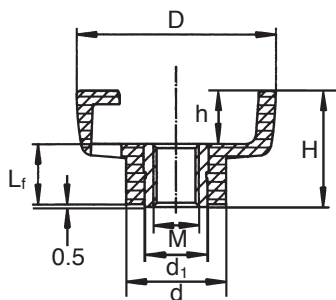


Fig. 1 LESS CAP

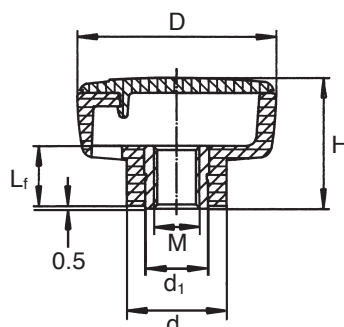


Fig. 2 WITH CAP

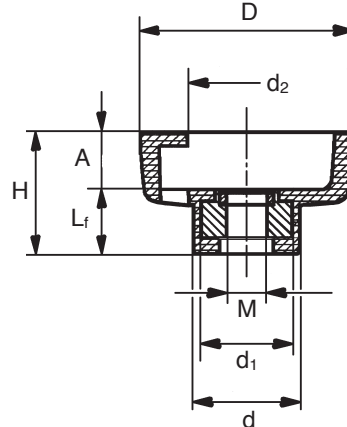


Fig. 3

Fig. 1 • KNOB (LESS CAP) – Nylon 6, Anthracite Gray
• **THREADED INSERT – Brass, Nickel Plated**

Catalog Number	D	H	d	d ₁	h	L _f	M	Weight g
MMAXHFM6501	20	13	11	7	4	9	M4	4
MMAXHFM6502				8			M5	5
MMAXHFM6503	25	15	13	8	4.2	8	M5	7
MMAXHFM6504				9			M6	8
MMAXHFM6505	30	18	15	8	7	11	M5	9
MMAXHFM6506				9			M6	10
MMAXHFM6507				11			M8	10
MMAXHFM6508	35	20	17.5	11	9.5	10.5	M8	14
MMAXHFM6509				14			M10	16

Fig. 2 • KNOB (WITH CAP) – Nylon 6, Anthracite Gray
• **THREADED INSERT – Brass, Nickel Plated**

Catalog Number	D	H	d	d ₁	L _f	M	Weight g
MMAXHFM6501WC	20	15	11	7	9	M4	4
MMAXHFM6502WC				8		M5	5
MMAXHFM6503WC	25	18	13	8	8	M5	7
MMAXHFM6504WC				9		M6	8
MMAXHFM6505WC	30	21	15	8	11	M5	9
MMAXHFM6506WC				9		M6	10
MMAXHFM6507WC				11		M8	10
MMAXHFM6508WC	35	24	17.5	11	10.5	M8	14
MMAXHFM6509WC				14		M10	16

Fig. 3 • KNOB – Nylon 6, Anthracite Gray • LOCK NUT INSERT – Steel, Zinc Plated • DIN 985

Catalog Number	D	H	d	d ₁	d ₂	L _f	A	M	Weight g
MMAXHFM650502	30	17.5	15	8.8	15	10.5	7	M5	9
MMAXHFM650602				11				M6	10
MMAXHFM650802	35	20	17.5	14.4	17	10.5	9.5	M8	14

KNOBS, KNURLED

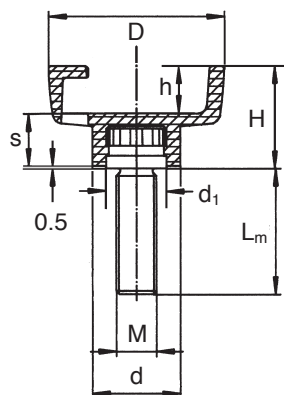
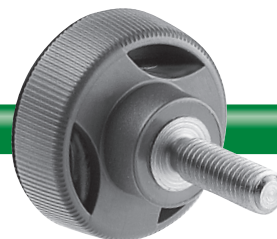


Fig. 1 LESS CAP

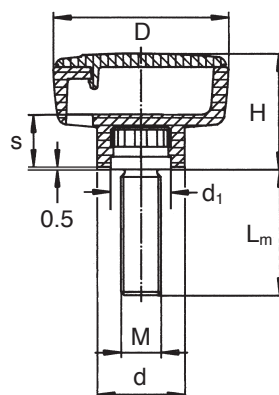


Fig. 2 WITH CAP

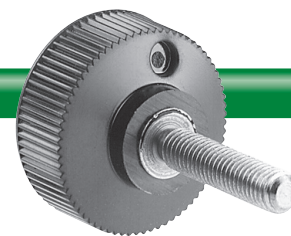
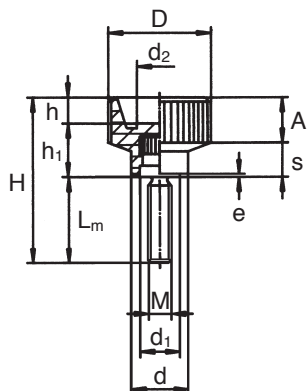
Fig. 1 • KNOB (LESS CAP) – Nylon 6, Anthracite Gray • SCREW – Steel, Zinc Plated

Catalog Number	D	H	d	d ₁	L _m	s	M	h	Weight g
MMAXHMM6601	20	13	11	7	15	9	M4	4	5
MMAXHMM6602				7	20		M4		6
MMAXHMM6603				8	10		M5		6
MMAXHMM6604				8	18		M5		7
MMAXHMM6605				8	25		M5		9
MMAXHMM6610	25	15	13	8	10	8	M5	4.2	9
MMAXHMM6611				10	10		M6		10
MMAXHMM6612				10	20		M6		12
MMAXHMM6613				10	28		M6		13
MMAXHMM6620	30	18	15	10	10	11	M6	7	12
MMAXHMM6621				10	20		M6		14
MMAXHMM6622				10	28		M6		15
MMAXHMM6623				12	25		M8		21
MMAXHMM6624				12	32		M8		23
MMAXHMM6630	35	20	17.5	12	12	10.5	M8	9.5	20
MMAXHMM6631				12	25		M8		24
MMAXHMM6632				14	30		M10		33

Fig. 2 • KNOB (WITH CAP) – Nylon 6, Anthracite Gray • SCREW – Steel, Zinc Plated

Catalog Number	D	H	d	d ₁	L _m	s	M	Weight g
MMAXHMM6601WC	20	15	11	7	15	9	M4	5
MMAXHMM6602WC				7	20		M4	6
MMAXHMM6603WC				8	10		M5	6
MMAXHMM6604WC				8	18		M5	7
MMAXHMM6605WC				8	25		M5	9
MMAXHMM6610WC	25	18	13	8	10	8	M5	9
MMAXHMM6611WC				10	10		M6	10
MMAXHMM6612WC				10	20		M6	12
MMAXHMM6613WC				10	28		M6	13
MMAXHMM6620WC	30	21	15	10	10	11	M6	12
MMAXHMM6621WC				10	20		M6	14
MMAXHMM6622WC				10	28		M6	15
MMAXHMM6623WC				12	25		M8	21
MMAXHMM6624WC				12	32		M8	23
MMAXHMM6630WC	35	24	17.5	12	12	10.5	M8	20
MMAXHMM6631WC				12	25		M8	24
MMAXHMM6632WC				14	30		M10	33

KNOB, KNURLED



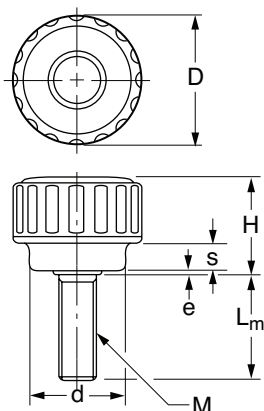
4

• **KNOB** – Bakelite, Black • **SCREW** – Steel, Zinc Plated

Catalog Number	D	H	d	d ₁	d ₂	h	h ₁
MMAXGMM2701	18	29	10	7	10	4	10
MMAXGMM2702		34					
MMAXGMM2703	20	25	12	8	10	4	11
MMAXGMM2704		33					
MMAXGMM2705		40					
MMAXGMM2706	24	26	13	8	10	6	10
MMAXGMM2707		36		10			
MMAXGMM2708		44		10			
MMAXGMM2709	30	28	15	10	12	7	11
MMAXGMM2710		38		10			
MMAXGMM2711		46		10			
MMAXGMM2712		43		12			
MMAXGMM2713		50		12			
MMAXGMM2714	35	32	18	12	14	8	12
MMAXGMM2715		45		12			
MMAXGMM2716		50		14			

Catalog Number	L _m	s	A	e	M	Weight g
MMAXGMM2701	15	6	8	0.5	M4	5
MMAXGMM2702	20					6
MMAXGMM2703	10	6	9	0.5	M5	7
MMAXGMM2704	18					8
MMAXGMM2705	25	6	9	0.5	M5	9
MMAXGMM2706	10					
MMAXGMM2707	20	7	9	0.5	M6	12
MMAXGMM2708	28					13
MMAXGMM2709	10	7	11	0.5	M6	14
MMAXGMM2710	20					16
MMAXGMM2711	28					17
MMAXGMM2712	25	7	11	0.5	M8	22
MMAXGMM2713	32					24
MMAXGMM2714	12	8	12	0.5	M8	22
MMAXGMM2715	25				M8	25
MMAXGMM2716	30				M10	35

KNOB, DIMPLED - Stainless Steel Screw

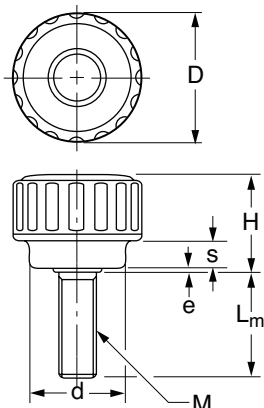


4

• **KNOB** – Nylon 6, Black Matte Finish • **SCREW** – Stainless Steel

Catalog Number	D	H	d	L _m	s	e	M	Weight g
MMANDMMKDMS16310	16	11	11	10	2	0.3	M3	5...6
MMANDMMKDMS16316				16				
MMANDMMKDMS16410	16	11	11	10	2	0.3	M4	5...6
MMANDMMKDMS16416				16				
MMANDMMKDMS16510	16	11	11	10	2	0.3	M5	6...7
MMANDMMKDMS16516				16				
MMANDMMKDMS16520				20				
MMANDMMKDMS20510	20	14	15	10	4	0.3	M5	10...12
MMANDMMKDMS20516				16				
MMANDMMKDMS20520				20				
MMANDMMKDMS20610	20	14	15	10	4	0.3	M6	10...14
MMANDMMKDMS20616				16				
MMANDMMKDMS20620				20				
MMANDMMKDMS20625				25				
MMANDMMKDMS25520	25	18	19	20	6	0.3	M5	17...19
MMANDMMKDMS25525				25				
MMANDMMKDMS25616	25	18	19	16	6	0.3	M6	18...20
MMANDMMKDMS25620				20				
MMANDMMKDMS25625				25				
MMANDMMKDMS25816	25	18	19	16	6	0.3	M8	20...26
MMANDMMKDMS25820				20				
MMANDMMKDMS25825				25				
MMANDMMKDMS32616	32	18	24	16	6	0.3	M6	24...27
MMANDMMKDMS32620				20				
MMANDMMKDMS32816	32	18	24	16	6	0.3	M8	27...32
MMANDMMKDMS32820				20				
MMANDMMKDMS32825				25				

KNOBS, DIMPLED - Steel Screw

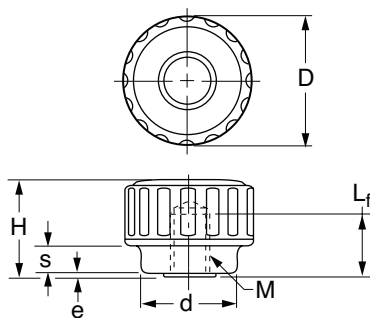


4

• **KNOB** – Nylon 6, Black Matte Finish • **SCREW** – Steel, Trivalent Chromium Plated

Catalog Number	D	H	d	L _m	s	e	M	Weight g
MMANDMMKDM16310	16	11	11	10	2	0.3	M3	5...6
MMANDMMKDM16316				16				
MMANDMMKDM16410	16	11	11	10	2	0.3	M4	5...6
MMANDMMKDM16416				16				
MMANDMMKDM16510	16	11	11	10	2	0.3	M5	6...7
MMANDMMKDM16516				16				
MMANDMMKDM16520				20				
MMANDMMKDM20510	20	14	15	10	4	0.3	M5	10...12
MMANDMMKDM20516				16				
MMANDMMKDM20520				20				
MMANDMMKDM20610	20	14	15	10	4	0.3	M6	10...14
MMANDMMKDM20616				16				
MMANDMMKDM20620				20				
MMANDMMKDM20625				25				
MMANDMMKDM25616	25	18	19	16	6	0.3	M6	18...20
MMANDMMKDM25625				25				
MMANDMMKDM25825	25	18	19	25	6	0.3	M8	20...26
MMANDMMKDM32816	32	18	24	16	6	0.3	M8	27...32
MMANDMMKDM32825				25				

4 KNOBS, DIMPLED



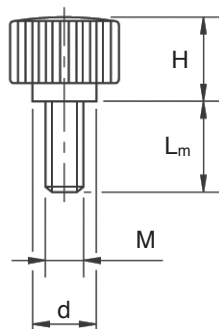
• KNOB – Nylon 6, Black Matte Finish • THREADED INSERT – Stainless Steel

Catalog Number	D	H	d	L _f	s	e	M	Weight g
MMANDFMKDFS1603	16	11	11	5	2	0.3	M3	4
MMANDFMKDFS1604							M4	4
MMANDFMKDFS1605							M5	3
MMANDFMKDFS2005	20	14	15	6	4	0.3	M5	6
MMANDFMKDFS2006							M6	
MMANDFMKDFS2505	25	18	19	9	6	0.3	M5	10
MMANDFMKDFS2506							M6	
MMANDFMKDFS3206	32	18	24	8	6	0.3	M6	15
MMANDFMKDFS3208							M8	

• KNOB – Nylon 6, Black Matte Finish • THREADED INSERT – Steel, Trivalent Chromium Plated

Catalog Number	D	H	d	L _f	s	e	M	Weight g
MMANDFMKDF1603	16	11	11	5	2	0.3	M3	4
MMANDFMKDF1604							M4	4
MMANDFMKDF1605							M5	3
MMANDFMKDF2005	20	14	15	6	4	0.3	M5	6
MMANDFMKDF2006							M6	
MMANDFMKDF2506	25	18	19	9	6	0.3	M6	10
MMANDFMKDF3206	32	18	24	8	6	0.3	M6	15
MMANDFMKDF3208							M8	

KNOBS, DIMPLED



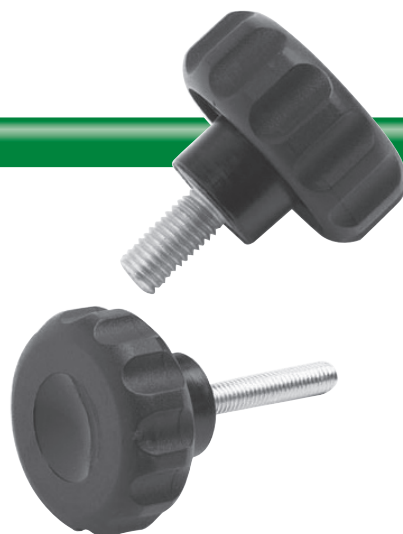
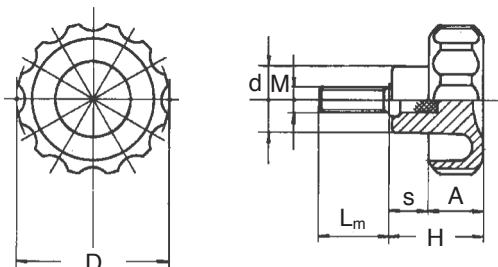
4

• **KNOB** – Bakelite, Black • **SCREW** – Steel, Zinc Plated

Catalog Number	D	H	d	L _m	M
MMAYDMM201P05 MMAYDMM201P06	15	11	10	10	M4 M5
MMAYDMM201P11 MMAYDMM201P12	18	18	12	13	M5 M6
MMAYDMM201P21 MMAYDMM201P22	24	18	16	16	M6 M8

KNOB, DIMPLED

4



• **KNOB** – High-Performance Thermoplastic, Black • **SCREW** – Steel, Zinc Plated

Catalog Number	D	H	d	L _m	s	A	M
MMAYDMM201AW002	20	15	12	15	6	9	M4
MMAYDMM201AW011				10			M5
MMAYDMM201AW013				20			M5
MMAYDMM201AW022				15			M6
MMAYDMM201AW024				25			M6
MMAYDMM201AW026				35			M6
MMAYDMM201AW032	30	21	16	15	8.5	12.5	M5
MMAYDMM201AW042				15			M6
MMAYDMM201AW044				25			M6
MMAYDMM201AW046				35			M6
MMAYDMM201AW052				15			M8
MMAYDMM201AW054				25			M8
MMAYDMM201AW056				35			M8
MMAYDMM201AW062	40	27	20	15	11	16	M6
MMAYDMM201AW064				25			M6
MMAYDMM201AW066				35			M6
MMAYDMM201AW073				20			M8
MMAYDMM201AW075				30			M8
MMAYDMM201AW077				40			M8
MMAYDMM201AW085				30			M10
MMAYDMM201AW093	50	32	23	20	13	19	M8
MMAYDMM201AW095				30			M8
MMAYDMM201AW097				40			M8
MMAYDMM201AW102				20			M10
MMAYDMM201AW104				30			M10
MMAYDMM201AW106				40			M10
MMAYDMM201AW117	60	36	26	40	14.5	21.5	M10

KNOB, DIMPLED

Fig. 1

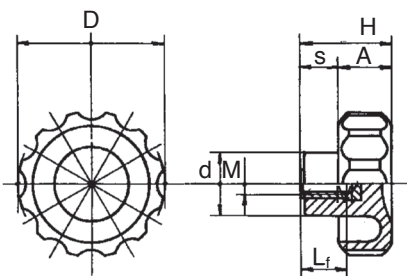


Fig. 2

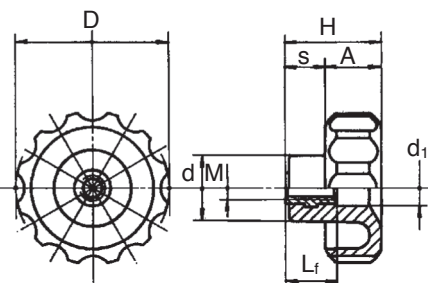


Fig. 1



Fig. 2



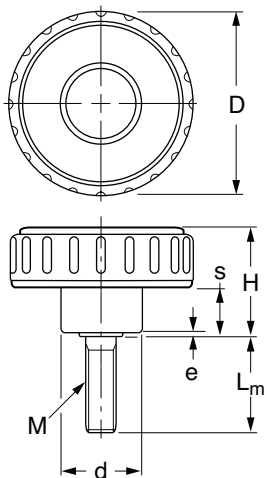
Fig. 1 • **KNOB** – High-Performance Thermoplastic, Black • **THREADED INSERT** – Brass

Catalog Number	D	H	d	L _f	s	A	M
MMAYDFM201BW001	20	15	12	8	6	9	M4
MMAYDFM201BW011							M5
MMAYDFM201BW021							M6
MMAYDFM201BW031	30	21	16	8	8.5	12.5	M5
MMAYDFM201BW041							M6
MMAYDFM201BW051							M8
MMAYDFM201BW061	40	27	20	8	11	16	M6
MMAYDFM201BW071							M8
MMAYDFM201BW081							M10
MMAYDFM201BW091	50	32	23	8	13	19	M8
MMAYDFM201BW101							M10
MMAYDFM201BW111	60	36	26	8	14.5	21.5	M10
MMAYDFM201BW121							M12

Fig. 2 • **KNOB** – High-Performance Thermoplastic, Black
• **THREADED INSERT** – Brass • **THROUGH HOLE**

Catalog Number	D	H	d	d ₁	L _f	s	A	M
MMAYDFM201BWP011	20	15	12	8	10	6	9	M5
MMAYDFM201BWP021								M6
MMAYDFM201BWP031	30	21	16	10	10	8.5	12.5	M5
MMAYDFM201BWP041								M6
MMAYDFM201BWP051								M8
MMAYDFM201BWP061	40	27	20	12	15	11	16	M6
MMAYDFM201BWP071								M8
MMAYDFM201BWP081								M10
MMAYDFM201BWP091	50	32	23	14	20	13	19	M8
MMAYDFM201BWP101								M10
MMAYDFM201BWP111	60	36	26	14	20	14.5	21.5	M10
MMAYDFM201BWP121								M12

KNOBS, DIMPLED - Large Type



4

• **KNOB** – Nylon 6, Black Matte Finish • **SCREW** – Steel, Trivalent Chromium Plated or Stainless Steel

Catalog Number		D	H	d	L _m	s	e	M	Weight g
Steel Screw	Stainless Steel Screw								
MMANDMMRM320510	MMANDMMRMS320510	32	22	15	10	10	0.3	M5	13
MMANDMMRM320516	MMANDMMRMS320516				16				14
MMANDMMRM320520	MMANDMMRMS320520				20				15
MMANDMMRM400610	MMANDMMRMS400610	40	25	17	10	11	0.3	M6	20
MMANDMMRM400620	MMANDMMRMS400620				20				22
MMANDMMRM500816	MMANDMMRMS500816	50	30	20	16	13.5	0.3	M8	36
MMANDMMRM500820	MMANDMMRMS500820				20				38
MMANDMMRM631030	MMANDMMRMS631030	63	35	23	30	15	0.3	M10	78
MMANDMMRM631050	MMANDMMRMS631050				50				90

KNOB, DIMPLED - Large Type

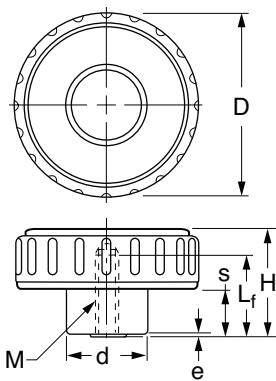


Fig. 1

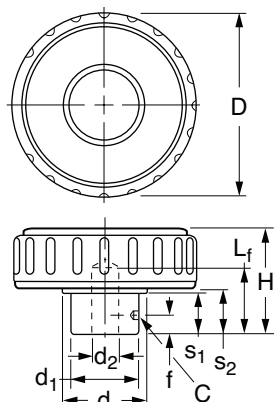


Fig. 2

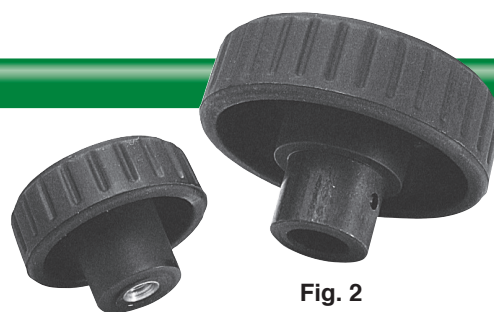


Fig. 1

Fig. 2

Fig. 1 • **KNOB** – Nylon 6, Black Matte Finish

• **THREADED INSERT** – Steel, Trivalent Chromium Plating or Stainless Steel

Catalog Number		D	H	d	L _f
Steel Insert	Stainless Steel Insert				
MMANDFMRF3205	MMANDFMRFS3205	32	22	15	10
MMANDFMRF4006	MMANDFMRFS4006	40	25	17	15
MMANDFMRF5008	MMANDFMRFS5008	50	30	20	18
MMANDFMRF6310	MMANDFMRFS6310	63	35	23	20

Catalog Number		s	e	M	Weight g
Steel Insert	Stainless Steel Insert				
MMANDFMRF3205	MMANDFMRFS3205	10	0.3	M5	15
MMANDFMRF4006	MMANDFMRFS4006	11	0.3	M6	17
MMANDFMRF5008	MMANDFMRFS5008	13.5	0.3	M8	27
MMANDFMRF6310	MMANDFMRFS6310	15	0.3	M10	55

Fig. 2 • **KNOB** – Nylon 6, Black Matte Finish • **HUB** – Steel, Black Oxide • **PILOT HOLE FOR PINNING**

Catalog Number	D	H	d	d ₁	d ₂	L _f	s ₁	s ₂
MMANDFMRR4008	40	25	19	14	8	15	9	11
MMANDFMRR5010	50	32	22	17	10	19	13	15.5
MMANDFMRR6312	63	40	26	21	12	23	17	20

Catalog Number	f	C	Weight g
MMANDFMRR4008	7	2.8	31
MMANDFMRR5010	8	2.8	48
MMANDFMRR6312	10	3.8	89

KNOBs, ASSORTED



Fig. 1



Fig. 2



Fig. 3

Color Code Color

B Black
R Red
G Gray
Y Yellow

Using data below, insert desired Head Color Code in the box in the catalog number:

MMAA6FM G 8398935 is a Gray Six-Lobed Knob with a 38 mm Head Dia. for an M8 Screw.

Method of Assembly to MD0912MQB series Cap Screws



1. Preassemble into ribbed retaining socket.
2. Simply press screw to shear and lock.

4

Fig. 1 • **KNURLED KNOB** – Delrin 500

Priced per 100 pieces

Catalog Number	Fits Screw	D	s	D ₁
MMAAJFM 8398928	M3	9.6	4.4	8.3
MMAAJFM 8398929	M4	13	5.5	9.8
MMAAJFM 8398930	M5	16	6.5	11.5
MMAAJFM 8398931	M6	19	7.6	13
MMAAJFM 8398932	M6	26	7.8	13
MMAAJFM 8398933	M8	26	9.8	16

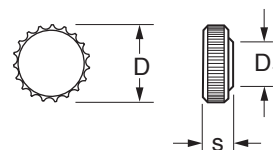


Fig. 1

Fig. 2 • **SIX-LOBED KNOB** – Delrin 500

Priced per 100 pieces

Catalog Number	Fits Screw	D	s	D ₁
MMAA6FM 8398934	M6	38	12.2	14.1
MMAA6FM 8398935	M8		10	16
MMAA6FM 8398936	M10		12.5	19.5

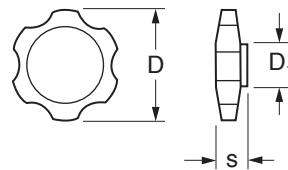


Fig. 2

Fig. 3 • **WING KNOB** – Delrin 500

Priced per 100 pieces

Catalog Number	Fits Screw	D	s	D ₁
MMAA1FM 8398937	M5	26	6.6	12
MMAA1FM 8398938	M6	30	7.8	13.5
MMAA1FM 8398939	M8	38	10	16.5
MMAA1FM 8398940	M10	45	12.5	20

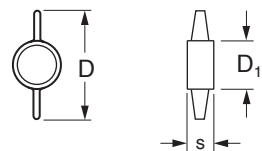
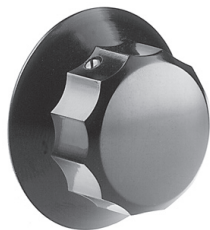


Fig. 3

• ASSORTED KNOB KITS

Catalog Number	Description
MMAAJFMKIT005	300-piece Knurled Knob kit; 25 black, 15 red and 10 gray of each size: M3, M4, M5, M6 X 19, M6 X 26 and M8 in plastic case
MMAA6FMKIT006	150-piece Six-Lobed Knob kit; 25 black and 25 grey of each size: M6, M8 and M10 in plastic case.
MMAA1FMKIT007	300-piece Wing Knob kit; 25 black, 25 red and 25 gray of each size: M5, M6, M8 and M10 in plastic case.

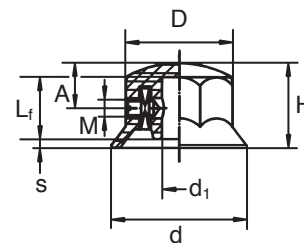




• **TURNING KNOB** – Bakelite, Black • **BLIND HOLE OR**
* **INTERIOR SURFACE & SET SCREW** – Steel, Black Oxide

Catalog Number	D	H	d	d ₁	L _f
MMAXBFM2401	19	15	24	6.1	11
MMAXBFM2402	28	20	40	6.1	14.5
* MMAXBFM2403	43	22	52	6.1	16

Catalog Number	s	A	M	Weight g
MMAXBFM2401	1.7	5.5	M3	5
MMAXBFM2402	2.5	8	M3	11
* MMAXBFM2403	1.3	14	M5	34



4



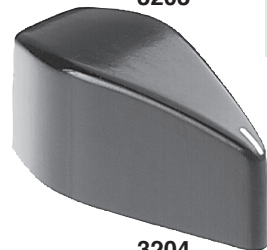
3201



3202



3203

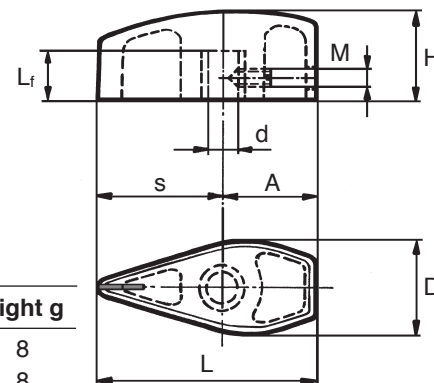


3204

• **ARROW KNOB** – Bakelite, Black
• **INSERT WITHOUT THREAD** – Brass
• **SET SCREW** – Steel, Black Oxide

Catalog Number	D	H	L _f	L
MMAXBFM3201	19	16	10	32
MMAXBFM3202		14.5		36
MMAXBFM3203		17		44
MMAXBFM3204		18.5		45

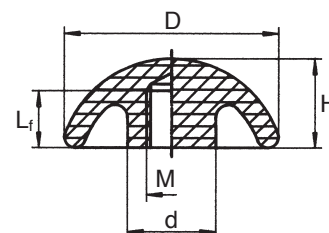
Catalog Number	s	A	d	M	Weight g
MMAXBFM3201	16	16			8
MMAXBFM3202	11.5	24.5			8
MMAXBFM3203	24	20	6	M4	10
MMAXBFM3204	25.5	19.5			14



• **SEMISPHERICAL KNOB** – Bakelite, Black
• **THREADED HOLE WITHOUT INSERT**

Catalog Number	D	H	d	L _f
MMAXBFM4601	37.5	16	16	11

Catalog Number	M	Weight g
MMAXBFM4601	M10	11



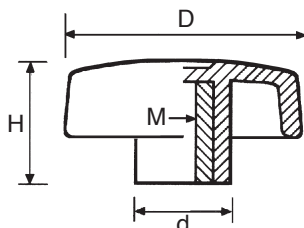


Fig. 1

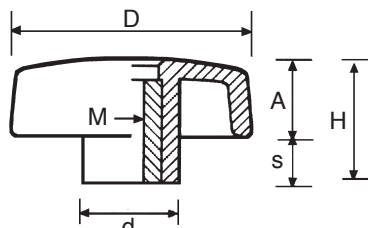


Fig. 2

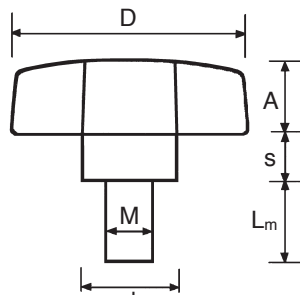


Fig. 3

Fig. 1

Fig. 2

Fig. 3

Fig. 1 • KNOB – Nylon 6, Black • THREADED INSERT – Steel, Zinc Plated

Catalog Number	D	H	d	s	A	M	Weight g
MMAX1FM5301	28	13	11	3	10	M5	5
MMAX1FM5302	40	20	15	8	12	M6	12
MMAX1FM5303	50	24		9	15	M8	13
MMAX1FM5304	60	30	19	12	18	M10	27

Fig. 2 • KNOB – Nylon 6, Black • THREADED INSERT – Steel, Zinc Plated • THROUGH HOLE

Catalog Number	D	H	d	s	A	M	Weight g
MMAX1FM5319	28	13	11	3	10	M5	4
MMAX1FM5320	40	20	15	8	12	M6	10
MMAX1FM5321	50	24		9	15	M8	11
MMAX1FM5322	60	30	19	12	18	M10	24

Fig. 3 • KNOB – Nylon 6, Black • SCREW – Steel, Zinc Plated

Catalog Number	D	H	d	s	L _m	A	M	Weight g
MMAX1MM5305	28	13	11	3	10	10	M5	6
MMAX1MM5306					15			6
MMAX1MM5307					20			7
MMAX1MM5308	40	20	15	8	15	12	M6	13
MMAX1MM5309					20			13
MMAX1MM5310					25			14
MMAX1MM5311					35			16
MMAX1MM5312	50	24	15	9	20	15	M8	24
MMAX1MM5313					25			25
MMAX1MM5314					35			27
MMAX1MM5315					40			29
MMAX1MM5316	60	30	19	12	20	18	M10	43
MMAX1MM5317					30			48
MMAX1MM5318					40			53

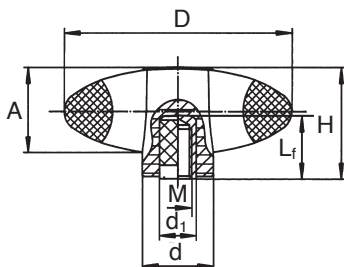


Fig. 1

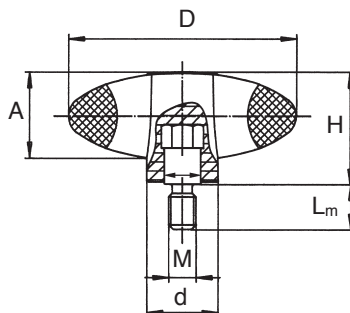


Fig. 2

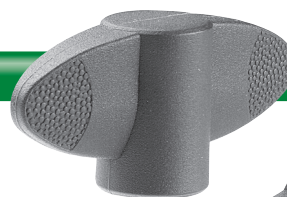


Fig. 1



Fig. 2

Fig. 1 • KNOB – Nylon 6, Anthracite Gray • THREADED INSERT – Brass

Catalog Number	D	H	d	d ₁	L _f	A	M	Weight g
MMAX2FM7000	35	17	11	7	7	13	M4	4
MMAX2FM7001	35	17	11	7	7	13	M5	4
MMAX2FM7010	50	24	15.6	8	12	19	M6	10
MMAX2FM7011	50	24	15.6	8	12	19	M6	10
MMAX2FM7012	50	24	15.6	10	16	19	M8	13
MMAX2FM7020	70	33.5	18	13	20	26	M10	22
MMAX2FM7021	70	33.5	18	13	20	26	M10	29

Fig. 2 • KNOB – Nylon 6, Anthracite Gray • SCREW – Steel, Zinc Plated

Catalog Number	D	H	d	d ₁	L _m	A	M	Weight g
MMAX2MM7002	35	17	11	7	15	13	M4	6
MMAX2MM7003				8	18		M5	7
MMAX2MM7004				8	10		M4	7
MMAX2MM7005	35	17	11	8	20	13	M4	7
MMAX2MM7006					10		M5	7
MMAX2MM7007					25		M5	9
MMAX2MM7013	50	24	15.6	8	18	19	M5	13
MMAX2MM7014				8	10		M6	14
MMAX2MM7015				10	14		M8	21
MMAX2MM7016	50	24	15.6	8	10	19	M5	12
MMAX2MM7017					25		M5	14
MMAX2MM7018					20		M6	14
MMAX2MM7019					32		M6	16
MMAX2MM7022	70	33.5	18	10	14	26	M8	30
MMAX2MM7023				12	18		M10	41
MMAX2MM7024				12	20		M8	29
MMAX2MM7025	70	33.5	18	12	30	26	M8	32
MMAX2MM7026				12	40		M8	35
MMAX2MM7027				14	25		M10	44
MMAX2MM7028				14	30		M10	46
MMAX2MM7029				14	40		M10	51
MMAX2MM7030				12	20	19	M8	22
MMAX2MM7031	50	24	15.6	12	30			24
MMAX2MM7032					40			27

KNOB, THREE-LOBED

4

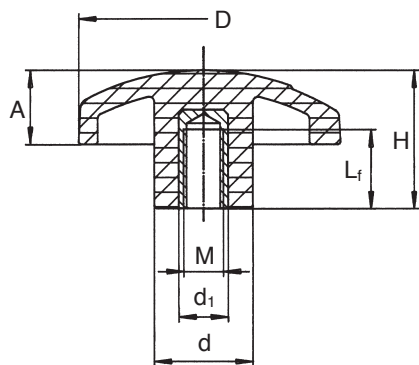


Fig. 1

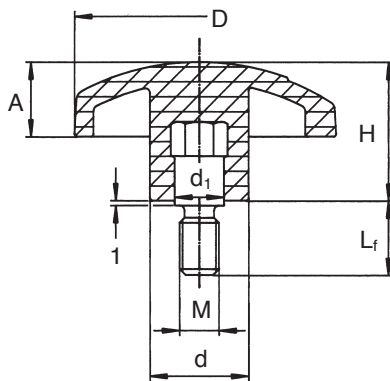


Fig. 2

Fig. 1

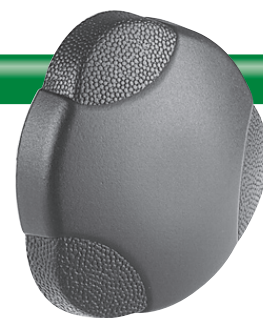


Fig. 2

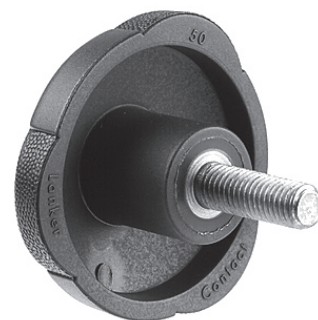


Fig. 1 • **KNOB** – Nylon 6, Anthracite Gray • **THREADED INSERT** – Brass

Catalog Number	D	H	d	d ₁	L _f	A	M	Weight g
MMAX3FM6401	40	22.4	16	8	12	12	M6	18
MMAX3FM6402				10	11		M8	16
MMAX3FM6405	50	28	20	10	16	15	M8	36
MMAX3FM6406				13	16		M10	32
MMAX3FM6409	60	33.6	24	13	20	18.4	M10	58
MMAX3FM6410				15	21		M12	52

Fig. 2 • **KNOB** – Nylon 6, Anthracite Gray • **SCREW** – Steel, Zinc Plated

Catalog Number	D	H	d	d ₁	L _f	A	M	Weight g
MMAX3MM6403	40	22.7	16	8	10	12	M6	23
MMAX3MM6404				10	14		M8	26
MMAX3MM6407	50	28	20	10	14	15	M8	44
MMAX3MM6408				12	18		M10	46
MMAX3MM6411	60	33.3	24	14	18	18.4	M10	77
MMAX3MM6412					25		M12	84
MMAX3MM6413	40	22.7	16	8	20	12	M6	25
MMAX3MM6414				8	32		M6	27
MMAX3MM6415				10	25		M8	29
MMAX3MM6416				10	35		M8	32
MMAX3MM6417	50	28	20	12	25	15	M8	47
MMAX3MM6418				12	30		M8	49
MMAX3MM6419				12	40		M8	52
MMAX3MM6420				14	30		M10	54
MMAX3MM6421				14	40		M10	59
MMAX3MM6422	60	33.3	24	14	30	18.4	M10	66
MMAX3MM6423					40		M10	87
MMAX3MM6424					30		M12	89
MMAX3MM6425					40		M12	95

KNOB, TRIANGULAR

RoHS
COMPLIANT

4

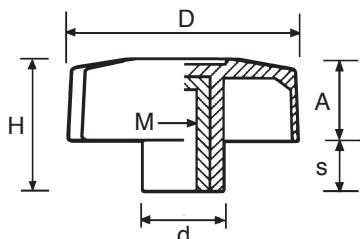


Fig. 1

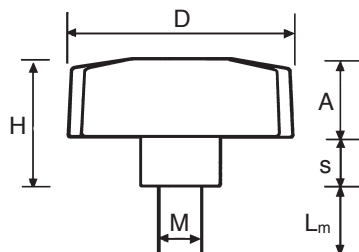


Fig. 2

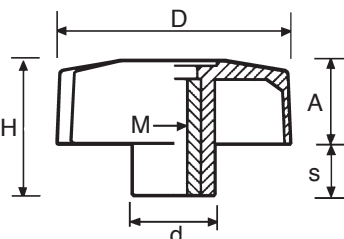


Fig. 3

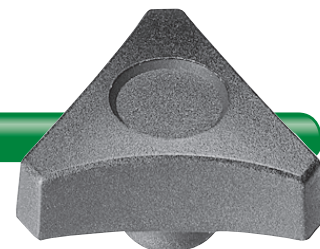


Fig. 1

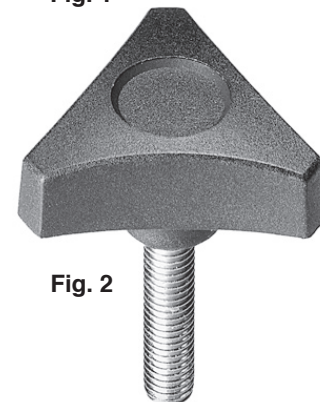


Fig. 2

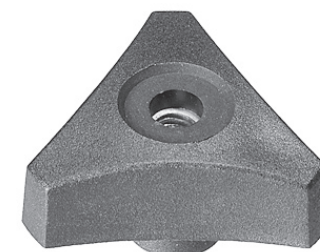


Fig. 3

Fig. 1 • **KNOB** – Nylon 6, Black • **THREADED INSERT** – Steel, Zinc Plated

Catalog Number	D	H	d	s	A	M	Weight g
MMAX4FM5401	28	17	11	6	11	M5	7
MMAX4FM5402	40	20	15	8	12	M6	13
MMAX4FM5403	50	24	15	9	15	M8	15
MMAX4FM5404	60	30	19	12	18	M10	30

Fig. 2 • **KNOB** – Nylon 6, Black • **SCREW** – Steel, Zinc Plated

Catalog Number	D	H	d	L _m	s	A	M	Weight g
MMAX4MM5405	28	17	11	10	6	11	M5	7
MMAX4MM5406				15				7
MMAX4MM5407				20				8
MMAX4MM5408	40	20	15	15	8	12	M6	14
MMAX4MM5409				20				15
MMAX4MM5410				25				16
MMAX4MM5411				35				17
MMAX4MM5412	50	24	15	20	9	15	M8	25
MMAX4MM5413				25				27
MMAX4MM5414				35				29
MMAX4MM5415				40				31
MMAX4MM5416	60	30	19	20	12	18	M10	47
MMAX4MM5417				30				51
MMAX4MM5418				40				56

Fig. 3 • **KNOB** – Nylon 6, Black • **THREADED INSERT** – Steel, Zinc Plated
• **THROUGH HOLE**

Catalog Number	D	H	d	s	A	M	Weight g
MMAX4FM5419	28	17	11	6	11	M5	7
MMAX4FM5420	40	20	15	8	12	M6	13
MMAX4FM5421	50	24	15	9	15	M8	15
MMAX4FM5422	60	30	19	12	18	M10	30

KNOB, FOUR-LOBED

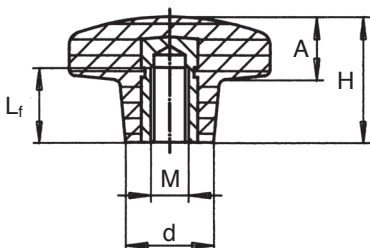


Fig. 1

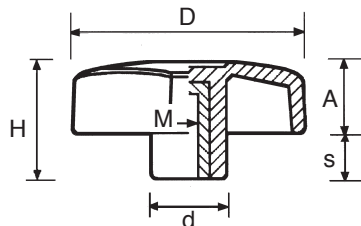


Fig. 2

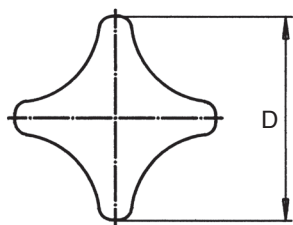


Fig. 1



Fig. 2

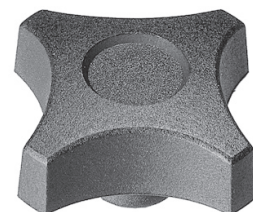


Fig. 1 • **KNOB** – Bakelite, Black • **THREADED INSERT** – Steel, Zinc Plated • DIN 6335

Catalog Number	D	H	d	L _r	A	M	Weight g
MMAX5FM4801	32	20	14	12	10	M6	11
MMAX5FM4802	40	26	17	15	12	M8	19
MMAX5FM4803	50	33	22	20	14	M10	33
MMAX5FM4804	63	40	27	25	18	M12	60
MMAX5FM4805	80	52	34	25	25	M16	135

Fig. 2 • **KNOB** – Nylon 6, Black • **THREADED INSERT** – Steel, Zinc Plated

Catalog Number	D	H	d	s	A	M	Weight g
MMAX5FM5601	28	17	11	6	11	M5	7
MMAX5FM5602	40	20	15	8	12	M6	12
MMAX5FM5603	50	24	19	9	15	M8	16
MMAX5FM5604	60	30	19	12	18	M10	31

KNOB, FOUR-LOBED

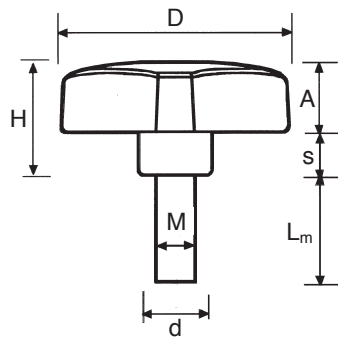


Fig. 1

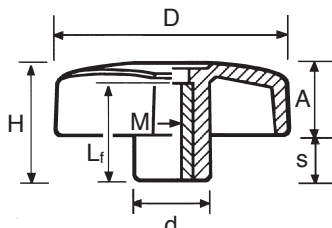


Fig. 2

Fig. 1

Fig. 2

Fig. 1 • **KNOB** – Nylon 6, Black • **SCREW** – Steel, Zinc Plated

Catalog Number	D	H	d	L _m	s	A	M	Weight g
MMAX5MM5605	28	17	11	10	6	11	M5	7
MMAX5MM5606				15				8
MMAX5MM5607				20				9
MMAX5MM5608	40	20	15	15	8	12	M6	13
MMAX5MM5609				20				14
MMAX5MM5610				25				16
MMAX5MM5611				35				17
MMAX5MM5612	50	24	15	20	9	15	M8	26
MMAX5MM5613				25				28
MMAX5MM5614				35				31
MMAX5MM5615				40				33
MMAX5MM5616	60	30	19	20	12	18	M10	47
MMAX5MM5617				30				52
MMAX5MM5618				40				57

Fig. 2 • **KNOB** – Nylon 6, Black • **THREADED INSERT** – Brass • **THROUGH HOLE**

Catalog Number	D	H	d	L _f	s	A	M	Weight g
MMAX5FM5619	28	17	11	14.5	6	11	M5	7
MMAX5FM5620	40	20	15	17.5	8	12	M6	12
MMAX5FM5621	50	24	19	21.5	9	15	M8	16
MMAX5FM5622	60	30	19	27.5	12	18	M10	31

KNOB, FIVE- & THREE-LOBED

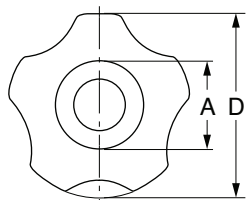


Fig. 1

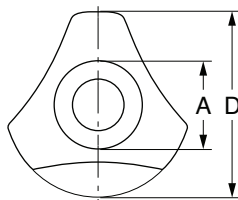


Fig. 2

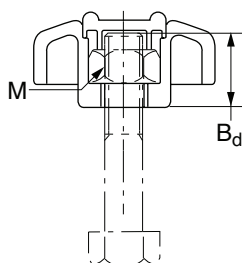
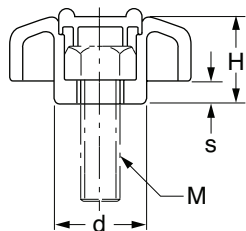


Fig. 1

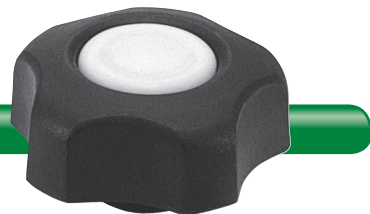


Fig. 2



To use: First, place a hex nut or the hex head of a bolt into the hexagonal hole of the knob. Next, push 2 of the 3 tabs of the cap into the knob. Finally, press the third tab into the knob with a spatula or a flat surface. If using a nut in the knob, take care not to extend the bolt too far into the knob.

Fig. 1 • **KNOB** – Nylon 66, Black • **CAP** – Polypropylene, White or Orange

Catalog Number	D	A	H	d	s	B _d	M	Weight g
MMANEFMSK34WH MMANEFMSK34YW	34	15	16	18	4	14	M6	5
MMANEFMSK38WH MMANEFMSK38YW	38	18	18	20	4	15	M8	10
MMANEFMSK43WH MMANEFMSK43YW	43	21	22	22	6	18	M10	15
MMANEFMSK53WH MMANEFMSK53YW	53	25	22	26	4	14	M12	20

Fig. 2 • **KNOB** – Nylon 66, Black • **CAP** – Polypropylene, White or Orange

Catalog Number	D	A	H	d	s	B _d	M	Weight g
MMANEFMSS37WH MMANEFMSS37YW	37	15	16	16	3.5	14	M6	5
MMANEFMSS42WH MMANEFMSS42YW	42	18	19	20	4.5	15	M8	10
MMANEFMSS47WH MMANEFMSS47YW	47	21	23	23	6	18	M10	15

NOTE: WH - White Cap
YW - Orange Cap

KNOBS, FIVE-LOBED

4

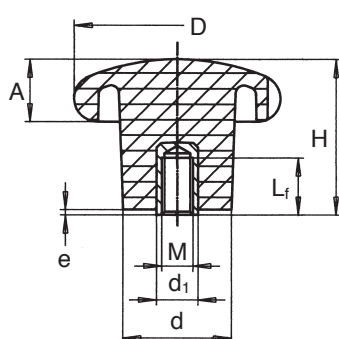


Fig. 1

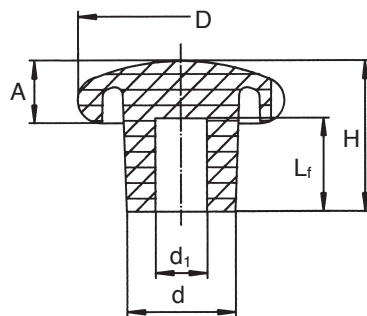


Fig. 2

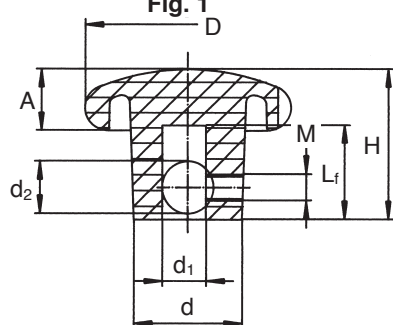


Fig. 3

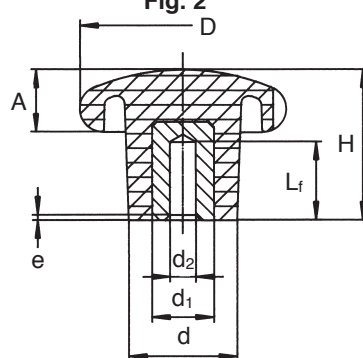


Fig. 4

Fig. 2

Fig. 4

Fig. 1

Fig. 3

Fig. 1 • **KNOB** – Bakelite, Black • **THREADED INSERT** – Brass

Catalog Number	D	H	d	d ₁	L _f	A	e	M	Weight g
MMAX6FM1500	40	30	21	8	12	12	1	M6	24
MMAX6FM1501	40	30	21	10	16	12	1	M8	25
MMAX6FM1502	50	36	21	10	16	14	1	M8	35
MMAX6FM1503	60	44	24	13	20	17	1	M10	61
MMAX6FM1504	60	44	24	15	25	17	1	M12	65

Fig. 2 • **KNOB** – Bakelite, Black • **BLIND HOLE**

Catalog Number	D	H	d	d ₁ (+0.1/0)	L _f	A	Weight g
MMAX6FM1509	40	29	21	10	18	12	19
MMAX6FM1510	50	35	21	12	23	14	28
MMAX6FM1511	60	43	24	12	28	17	47

Fig. 3 • **KNOB** – Bakelite, Black • **BLIND D-HOLE** • **SET SCREW** – Steel, Zinc Plated

Catalog Number	D	H	d	d ₁	d ₂ (+0.1/0)	L _f	A	M	Weight g
MMAX6FM1512	40	29	21	8.5	10	18	12	M4	20
MMAX6FM1513	50	35	21	10	12	23	14	M4	29
MMAX6FM1514	60	43	24	10	12	28	17	M5	48

Fig. 4 • **KNOB** – Bakelite, Black • **INSERT WITHOUT THREAD** – Brass

Catalog Number	D	H	d	d ₁	d ₂ (+0.1/0)	L _f	A	e	Weight g
MMAX6FM1515	40	30	21	12	5	15	12	1	34
MMAX6FM1516	50	36	21	12	5	15	14	1	43
MMAX6FM1517	60	44	24	14	6	24	17	1	74

KNOB, FIVE-LOBED

4

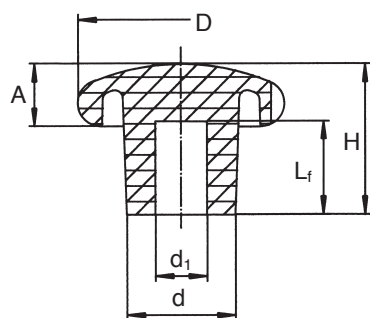


Fig. 1

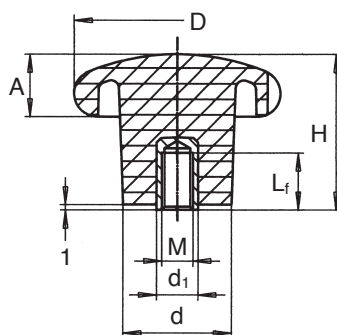


Fig. 2

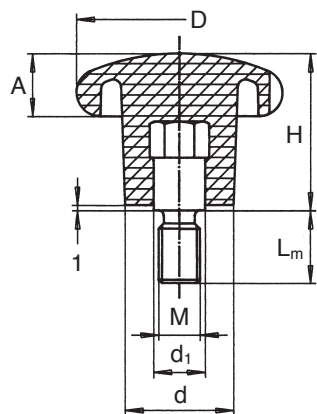


Fig. 3

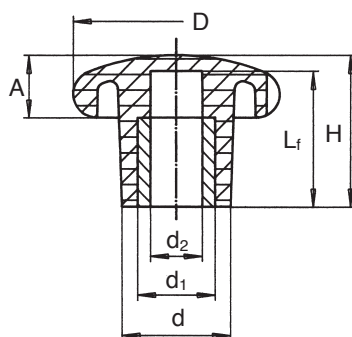


Fig. 4

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 1 • **KNOB** – Nylon 6, Black • **BLIND HOLE**

Catalog Number	D	H	d	d ₁ (+0.1/0)	L _f	A	Weight g
MMAX6FM1518	50	36	21	10	23	15	14

Fig. 2 • **KNOB** – Nylon 6, Black • **THREADED INSERT** – Brass

Catalog Number	D	H	d	d ₁	L _f	A	M	Weight g
MMAX6FM1519	50	36	21	12	16	15	M8	17

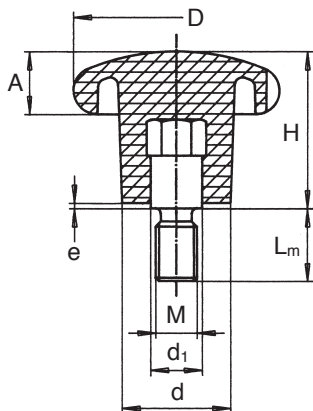
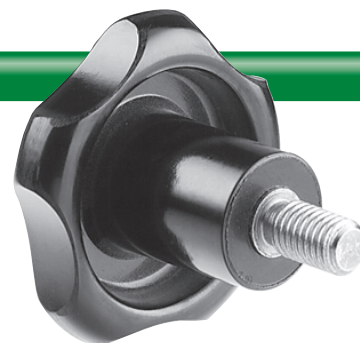
Fig. 3 • **KNOB** – Nylon 6, Black • **SCREW** – Steel, Zinc Plated

Catalog Number	D	H	d	d ₁	L _m	A	M	Weight g
MMAX6MM1520	50	36	21	10	14	15	M8	18

Fig. 4 • **KNOB** – Nylon 6, Black • **INSERT WITHOUT THREAD** – Brass

Catalog Number	D	H	d	d ₁	d ₂ (+0.1/0)	L _f	A	Weight g
MMAX6FM1521	50	36	21	15	10	32	15	24

KNOBS, FIVE-LOBED



4

• **KNOB** – Bakelite, Black • **SCREW** – Steel, Zinc Plated

Catalog Number	D	H	d	d ₁	L _m	A	e	M	Weight g
MMAX6MM1505	40	30	21	10	14	12	1	M8	86
MMAX6MM1506	50	36	21	10	14	14	1	M8	43
MMAX6MM1507	60	44	24	12	18	17	1	M10	72
MMAX6MM1508				14	25			M12	85
MMAX6MM1555					10			M6	34
MMAX6MM1556					20			M6	43
MMAX6MM1557	40	30	21	10	32	12	1	M6	73
MMAX6MM1559					25			M8	38
MMAX6MM1560					35			M8	41
MMAX6MM1561	50	36	21	10	25	14	1	M8	48
MMAX6MM1562					35				52
MMAX6MM1563				12	30			M10	81
MMAX6MM1564				12	40			M10	85
MMAX6MM1565	60	44	24	14	30	17	1	M12	99
MMAX6MM1566				14	40			M12	106

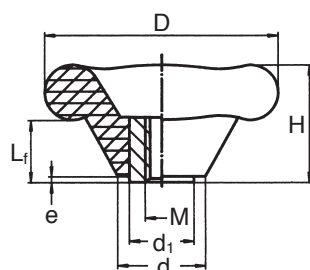


Fig. 1

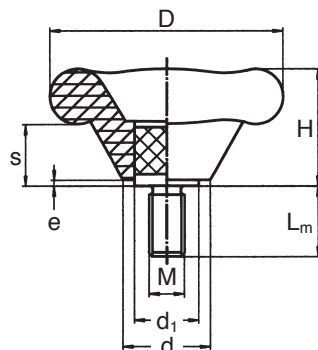


Fig. 2



Fig. 1



Fig. 2

Fig. 1 • **KNOB** – Polystyrene, Reinforced, Black • **THREADED INSERT** – Brass

Catalog Number	D	H	d	d ₁	L _r	e	M	Weight g
MMAX7FM3601	40	20	15	11	11	1	M4	16
MMAX7FM3602							M6	14
MMAX7FM3603							M8	13
MMAX7FM3610							M5	15

Fig. 2 • **KNOB** – Polystyrene, Reinforced, Black • **SCREW** – Steel, Zinc Plated

Catalog Number	D	H	d	d ₁	L _m	s	e	M	Weight g
MMAX7MM3604	40	20	15	11	18	11	1	M5	18
MMAX7MM3605					12			M6	17
MMAX7MM3606					20			M6	19
MMAX7MM3607					16			M8	20
MMAX7MM3608					20			M8	22
MMAX7MM3609					25			M8	24

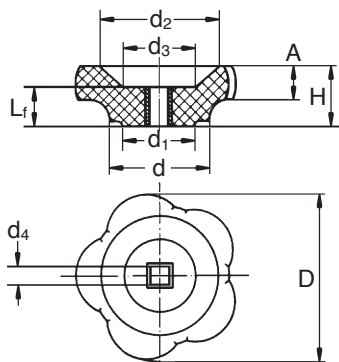


Fig. 1

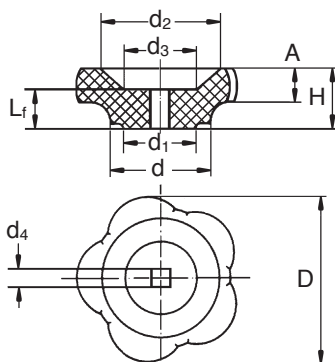


Fig. 2

Fig. 1

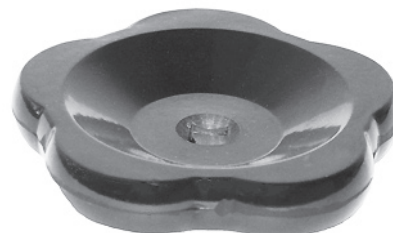


Fig. 2

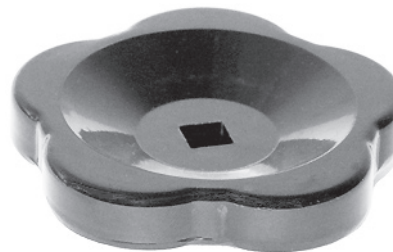


Fig. 1 • **KNOB** – Bakelite, Black • **SQUARE HOLE WITH INSERT** – Brass

Catalog Number	D	H	d	d ₁	d ₂	d ₃	d ₄	L _f	A	Weight g
MMAX7FM3410	50	18	30		36	22	6 X 6		10	26
MMAX7FM3411	63	20	34	22	47	24	7 X 7	12	11	43
MMAX7FM3412	80	22	38		58	28	8 X 8		12	72
MMAX7FM3413	100	25	42	28	74	30	9 X 9	14	14	128

Fig. 2 • **KNOB** – Bakelite, Black • **SQUARE HOLE WITHOUT INSERT**

Catalog Number	D	H	d	d ₁	d ₂	d ₃	d ₄	L _f	A	Weight g
MMAX7FM3420	50	18	30	22	36	22	6 X 6	12	10	25
MMAX7FM3421							7 X 7			
MMAX7FM3422	63	20	34	22	47	23	6 X 6	12	11	42
MMAX7FM3423						24	7 X 7			
MMAX7FM3424	80	22	38	28	58	28	8 X 8	14	12	71
MMAX7FM3425							9 X 9			

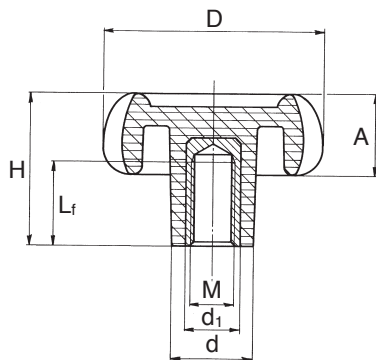


Fig. 1

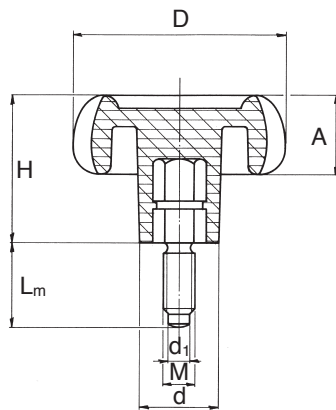


Fig. 2

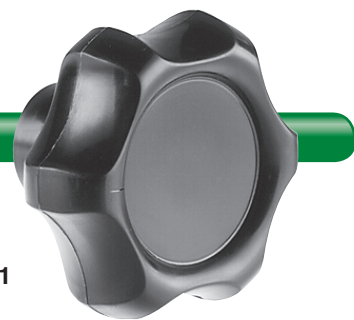


Fig. 1



Fig. 2

Fig. 1 • **KNOB** – Nylon 6, Black • **THREADED INSERT** – Brass

Catalog Number	D	H	d	d ₁	L _f	A	M	Weight g
MMAX6FM4501	40	28	16	8	12	15	M6	16
MMAX6FM4502				10	16		M8	19

Fig. 2 • **KNOB** – Nylon 6, Black • **SCREW** – Steel, Zinc Plated

Catalog Number	D	H	d	d ₁	L _m	A	M	Weight g
MMAX6MM4503	40	28	16	4	16	15	M6	23
MMAX6MM4504					20			26
MMAX6MM4505	40	28	16	6	25	15	M8	28
MMAX6MM4506					35			31

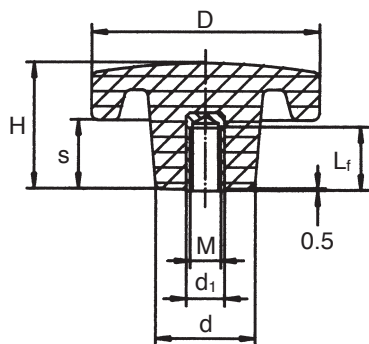


Fig. 1

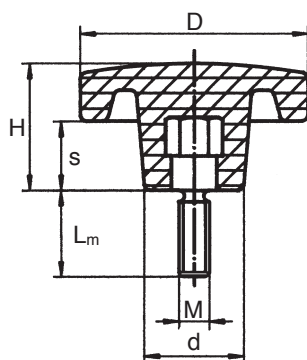


Fig. 2

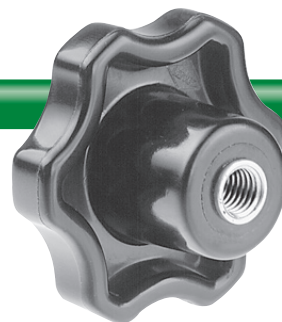


Fig. 1



Fig. 2

Fig. 1 • **KNOB** – Bakelite, Black • **THREADED INSERT** – Brass

Catalog Number	D	H	d	d ₁	L _f	s	M	Weight g
MMAX6FM4701	40	25	20	10	16	14	M8	14
MMAX6FM4702	50	30	22	10	16	17	M8	17
MMAX6FM4703	60	35	26	13	20	18	M10	18
MMAX6FM4704	75	40	32	15	25	24	M12	24

Fig. 2 • **KNOB** – Bakelite, Black • **SCREW** – Steel, Zinc Plated

Catalog Number	D	H	d	L _m	s	M	Weight g
MMAX6MM4705	40	25	20	14	14	M8	31
MMAX6MM4706	50	30	22	14	17	M8	45
MMAX6MM4707	60	33	26	18	18	M10	70
MMAX6MM4708	75	40	32	25	24	M12	130

KNOBS, SCALLOP

RoHS
COMPLIANT

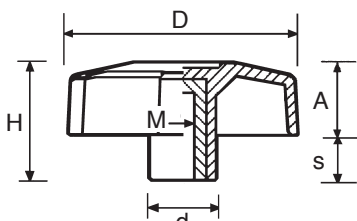


Fig. 1

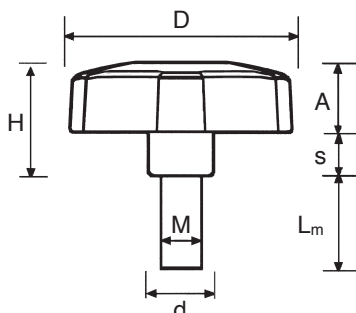


Fig. 2

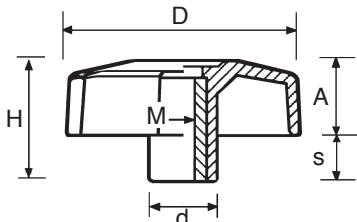


Fig. 3



Fig. 2



Fig. 1

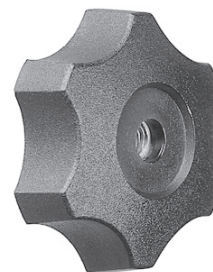


Fig. 3

Fig. 1 • KNOB – Nylon 6, Black • THREADED INSERT – Brass

Catalog Number	D	H	d	s	A	M	Weight g
MMAX8FM5501	28	17	11	6	11	M5	7
MMAX8FM5502	40	20	15	8	12	M6	15
MMAX8FM5503	50	24	15	9	15	M8	18
MMAX8FM5504	60	30	19	12	18	M10	35

Fig. 2 • KNOB – Nylon 6, Black • Screw – Steel, Zinc Plated

Catalog Number	D	H	d	L _m	s	A	M	Weight g
MMAX8MM5505	28	17	11	10	6	11	M5	8
MMAX8MM5506				15				9
MMAX8MM5507				20				10
MMAX8MM5508	40	20	15	15	8	12	M6	15
MMAX8MM5509				20				16
MMAX8MM5510				25				17
MMAX8MM5511				35				18
MMAX8MM5512	50	24	15	20	9	15	M8	28
MMAX8MM5513				25				30
MMAX8MM5514				35				32
MMAX8MM5515				40				34
MMAX8MM5516	60	30	19	20	12	18	M10	49
MMAX8MM5517				30				55
MMAX8MM5518				40				60

Fig. 3 • KNOB – Nylon 6, Black • THROUGH HOLE & THREADED INSERT – Brass

Catalog Number	D	H	d	s	A	M	Weight g
MMAX8FM5519	28	17	11	6	11	M5	7
MMAX8FM5520	40	20	15	8	12	M6	15
MMAX8FM5521	50	24	15	9	15	M8	18
MMAX8FM5522	60	30	19	12	18	M10	35

KNOBs, SPHERICAL



Fig. 1



Fig. 2

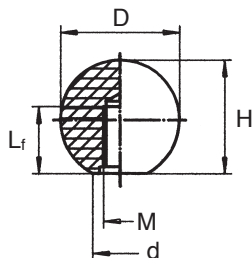


Fig. 1

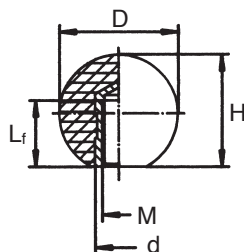


Fig. 2

Fig. 1 • **KNOB** – Bakelite, Black • **THREADED HOLE WITHOUT INSERT**

Catalog Number	D	H	d	L _f	M	Weight g
MMAX9FM1001	12	11	5	8	M4	1
MMAX9FM1002	16	15	9			3
MMAX9FM1003	18	17	10	10	M5	4
MMAX9FM1004	20	18.5				5
MMAX9FM1005	22	20.3	12	13	M6	7
MMAX9FM1006	25	23	15	12		10
MMAX9FM1007	28	26	15	20	M8	13
MMAX9FM1008	30	28		18		17
MMAX9FM1009	36	34	15	22	M6	33
MMAX9FM1010	36	34	16	20		31
MMAX9FM1011	40	37	19	25	M10	42
MMAX9FM1012	45	43.5	17	20		64
MMAX9FM1013	45	43.5	17	27		62
MMAX9FM1014	50	48.5	22	25	M12	83
MMAX9FM1015	56	53.8	22	20		125

Fig. 2 • **KNOB** – Bakelite, Black • **THREADED INSERT** – Steel, Zinc Plated

Catalog Number	D	H	d	L _f	M	Weight g
MMAX9FM1016	16	15.3	7	9	M4	4
MMAX9FM1017	18	16.5	10			5
MMAX9FM1018	20	18.5	9	10	M5	8
MMAX9FM1019	22	20.2	12	11	M6	10
MMAX9FM1020	25	24	10	12		14
MMAX9FM1021	28	26.5	15	16	M8	19
MMAX9FM1022	30	28.5				23
MMAX9FM1023	36	34.2	16			42
MMAX9FM1024	40	38.1	17	20	M10	62
MMAX9FM1025	45	43.2	18			75
MMAX9FM1026	45	43.2	18			85
MMAX9FM1027	50	48	22	22	M12	105
MMAX9FM1028	56	53	22			150



Fig. 1



Fig. 2

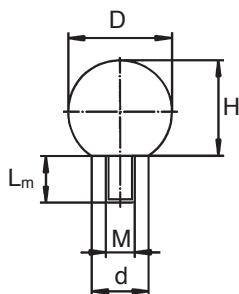


Fig. 1

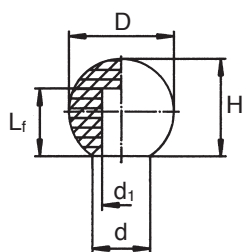


Fig. 2

Fig. 1 • **KNOB** – Bakelite, Black • **SCREW** – Steel, Zinc Plated

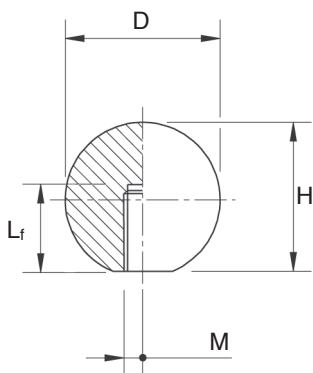
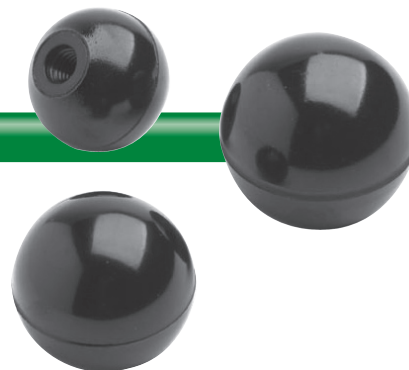
Catalog Number	D	H	d	L _m	M	Weight g
MMAX9MM1029	16	15.3	9	8	M4	5
MMAX9MM1030	18	17.5	10	9	M5	10
MMAX9MM1031	22	20.2	12	10	M6	11
MMAX9MM1032	28	26	14	14	M8	24
MMAX9MM1033	30	28	14	14	M8	27
MMAX9MM1034	36	34.2	16	18	M10	60
MMAX9MM1035	40	38.1	17	18	M10	70
MMAX9MM1036	45	43.2	17	18	M10	90
MMAX9MM1037	45	43.2	17	25	M12	100
MMAX9MM1038	56	53.8	22	25	M12	160

Fig. 2 • **KNOB** – Polypropylene, Black • **PLAIN HOLE***

Catalog Number	D	H	d	d ₁	L _f	for Shaft h9	Weight g
MMAX9FM1039	22	20	12	8	14	8	4
MMAX9FM1040	28	26	14	10	20	10	13
MMAX9FM1041	30	28	16	10	22	10	17
MMAX9FM1042	30	28	16	12	22	12	16
MMAX9FM1044	40	38	17	14	26	14	26
MMAX9FM1045	40	38	17	14	28	14	25
MMAX9FM1046	45	43	18	16	28	16	35

*To fit with hammer strike.

KNOB, SPHERICAL



4

• **KNOB** – Bakelite or Nylon, Black • **THREADED HOLE WITHOUT INSERT**

Catalog Number	Material	D	H	L _r	M
MMAY9FM201C00 MMAY9FM201C05	Nylon	20	19	11	M5 M6
MMAY9FM201C10 MMAY9FM201C15	Nylon	25	24	16	M6 M8
MMAY9FM201C20 MMAY9FM201C25	Bakelite	30	28		M8 M10
MMAY9FM201C30 MMAY9FM201C35	Bakelite	35	33		M8 M10
MMAY9FM201C40 MMAY9FM201C45	Bakelite	40	38	23	M10 M12
MMAY9FM201C50 MMAY9FM201C55	Bakelite	50	47	25	M12 M16

KNOB, SPHERICAL

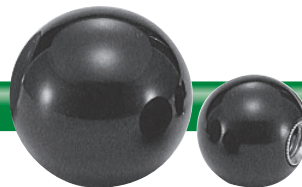


Fig. 1

Fig. 2

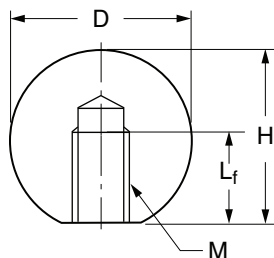


Fig. 1

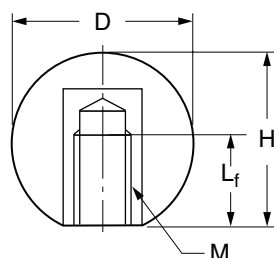


Fig. 2

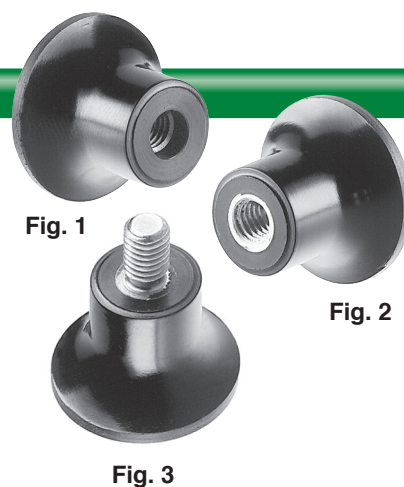
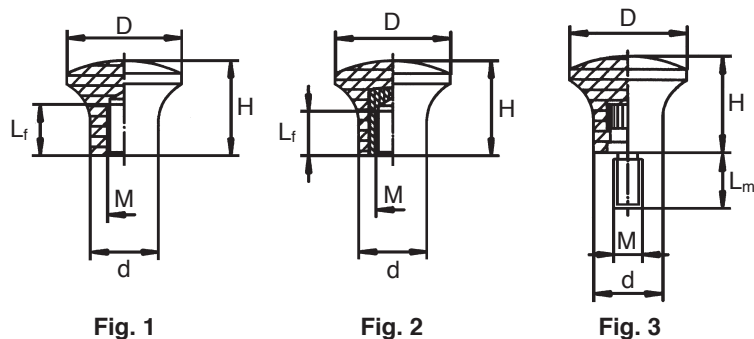
Fig. 1 • **KNOB** – Bakelite, Black • **THREADED HOLE WITHOUT INSERT**

Catalog Number	D	H	L _f	M	Weight g
MMAN9FMPB2006BK	20	18	10	M6	7
MMAN9FMPB2008BK				M8	
MMAN9FMPB2506BK	25	23	10	M6	15
MMAN9FMPB2508BK			12	M8	
MMAN9FMPB3008BK	30	28	16	M8	30
MMAN9FMPB3010BK			18	M10	30
MMAN9FMPB3508BK	35	32	16	M8	40
MMAN9FMPB3510BK			18	M10	40
MMAN9FMPB4010BK	40	37	18	M10	55
MMAN9FMPB4012BK			18	M12	50

Fig. 2 • **KNOB** – Bakelite, Black • **THREADED INSERT** – Brass

Catalog Number	D	H	L _f	M	Weight g
MMAN9FMPC2006BK	20	18	10	M6	7
MMAN9FMPC2506BK	25	23	10	M6	15
MMAN9FMPC2508BK			12	M8	
MMAN9FMPC3008BK	30	28	12	M8	30
MMAN9FMPC3010BK			15	M10	30
MMAN9FMPC3508BK	35	32	12	M8	40
MMAN9FMPC3510BK			15	M10	40
MMAN9FMPC4010BK	40	37	15	M10	55
MMAN9FMPC4012BK			15	M12	50

KNOB, MUSHROOM-SHAPED



4

Fig. 1 • KNOB – Bakelite, Black • THREADED HOLE WITHOUT INSERT

Catalog Number	D	H	d	L _f	M	Weight g
MMAXAFM1101	17	14	10	10	M4	2
MMAXAFM1102	21	17	12	11	M5	4
MMAXAFM1103	25	21	14	12	M6	6
MMAXAFM1104	29	25	16	14	M8	10
MMAXAFM1105	33	29	18	14	M8	15

Fig. 2 • KNOB – Bakelite, Black • THREADED INSERT – Brass

Catalog Number	D	H	d	L _f	M	Weight g
MMAXAFM1106	17	14	10	7	M4	3
MMAXAFM1107	17	14	10	7	M5	4
MMAXAFM1108	21	17	12	11	M5	9
MMAXAFM1109	21	17	12	11	M6	7
MMAXAFM1110	25	21	14	11	M6	10
MMAXAFM1111	29	25	16	16	M8	14
MMAXAFM1112	33	29	18	16	M8	19
MMAXAFM1113	45	38	21	11	M6	48

Fig. 3 • KNOB – Bakelite, Black • SCREW – Steel, Zinc Plated

Catalog Number	D	H	d	L _m	M	Weight g
MMAXAMM1114	17	14	10	8	M4	4
MMAXAMM1115	21	17	12	9	M5	7
MMAXAMM1116	21	17	12	10	M6	9
MMAXAMM1117	25	21	14	10	M6	12
MMAXAMM1118	33	29	18	14	M8	24

KNOB, MUSHROOM-SHAPED

4

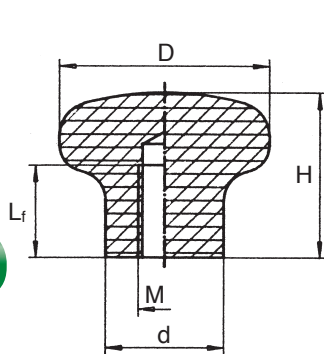


Fig. 1

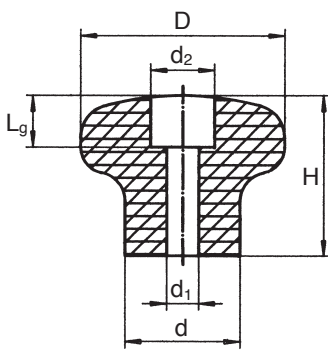


Fig. 2

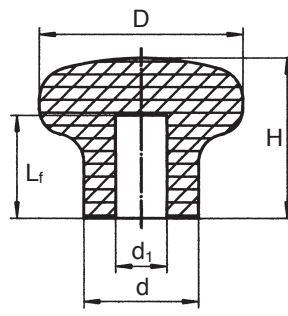


Fig. 3

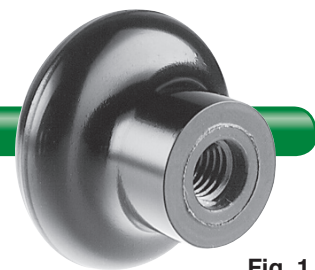


Fig. 1



Fig. 2



Fig. 3

Fig. 1 • KNOB – Bakelite, Black • THREADED HOLE WITHOUT INSERT

Catalog Number	D	H	d	L _f	M	Weight g
MMAXAFM3101	32	25	18	16	M8	14
MMAXAFM3102	45	30	21	18	M10	33
MMAXAFM3103	52	35	24		M12	55

Fig. 2 • KNOB – Bakelite, Black • THROUGH HOLE

Catalog Number	D	H	d	d ₁	d ₂	L _g	Weight g
MMAXAFM3104	32	25	18	5.5	10.2	10	14

Fig. 3 • KNOB – Bakelite, Black • BLIND HOLE

Catalog Number	D	H	d	d ₁	L _f	Weight g
MMAXAFM3105	52	35	24	10	20.5	56

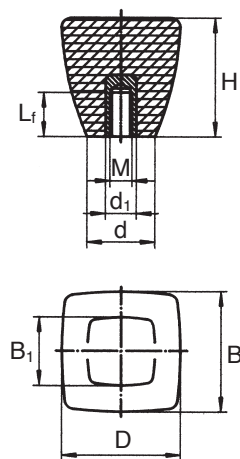


Fig. 1

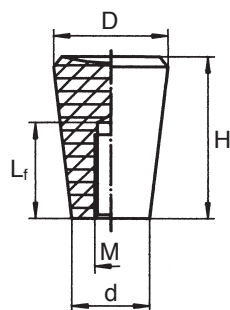


Fig. 2

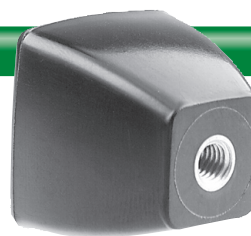


Fig. 1



Fig. 2

Fig. 1 • **CUBICAL KNOB** – Bakelite, Black • **THREADED INSERT** – Brass

Catalog Number	D	B	B ₁	H	d
MMAXCFM4902	35	35	20	35	20
MMAXCFM4903	45	45	25	45	25

Catalog Number	d ₁	L _f	M	Weight g
MMAXCFM4902	8	11	M6	49
MMAXCFM4903	10	16	M8	100

Fig. 2 • **GEARSHIFT KNOB** – Bakelite, Black
• **THREADED HOLE WITHOUT INSERT**

Catalog Number	D	H	d	L _f	M	Weight g
MMAXCFM9301	20	30	12	15	M5	8
MMAXCFM9302				16	M6	
MMAXCFM9303	25	38	15	19	M6	16
MMAXCFM9304					M8	15
MMAXCFM9305	30	46	18	16	M8	28
MMAXCFM9306				19	M10	26
MMAXCFM9307	35	53	21	19	M8	43
MMAXCFM9308				19	M10	42
MMAXCFM9309				25	M12	42



SECTION 5

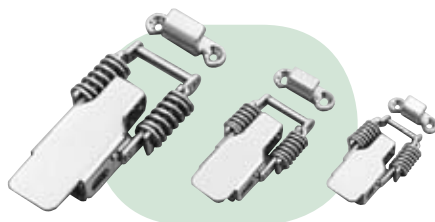
Latches MNA

5

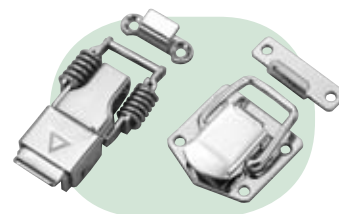




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5-8 thru 5-10



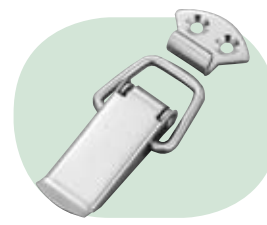
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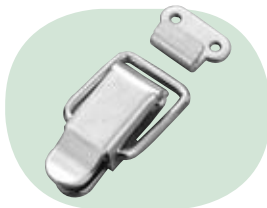
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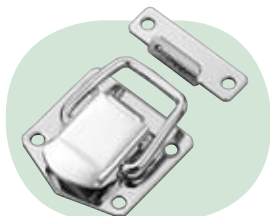
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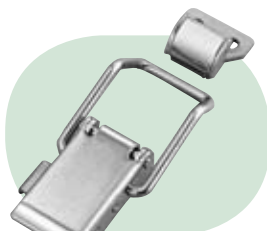
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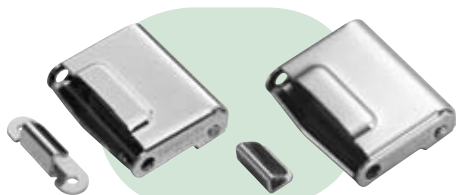
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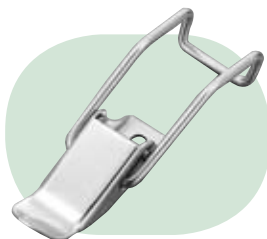
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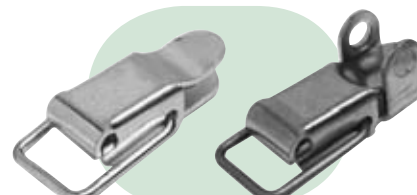
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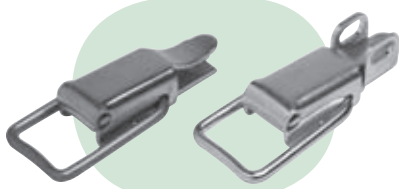
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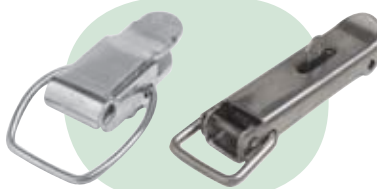
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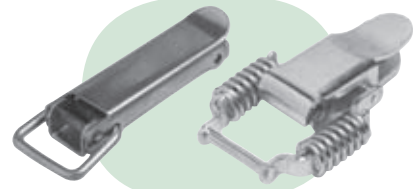
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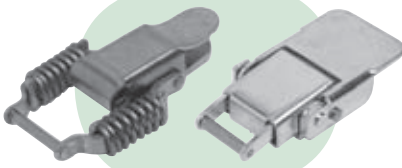
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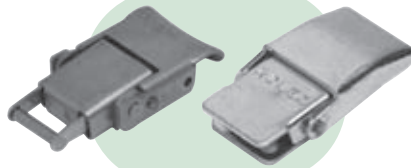
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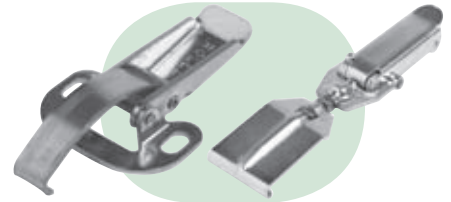
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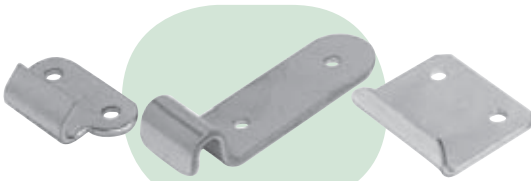
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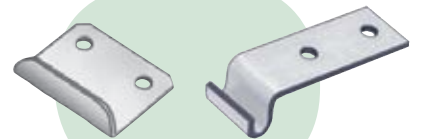
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5-30 thru 5-32



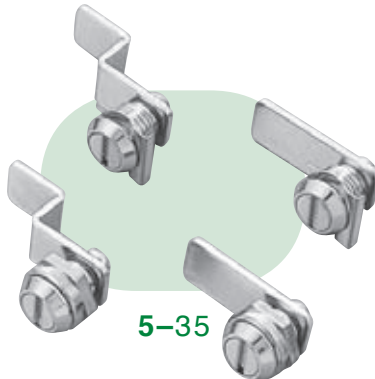
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5-33



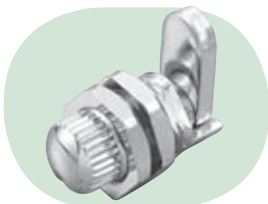
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5-35



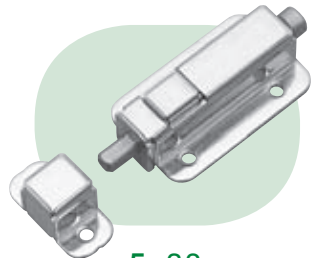
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5-37



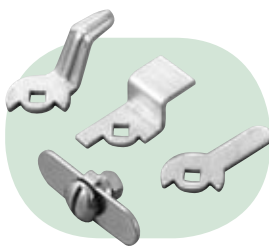
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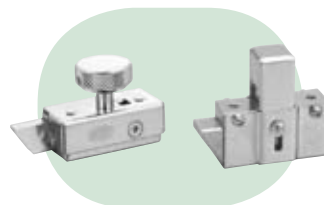
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5-39



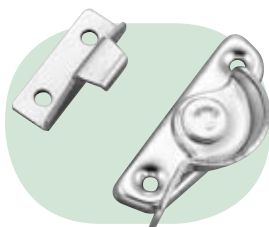
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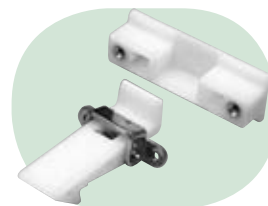
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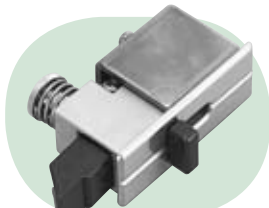
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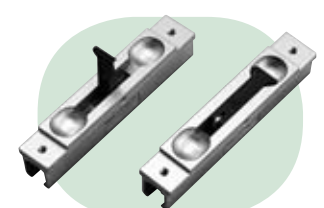
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5-43

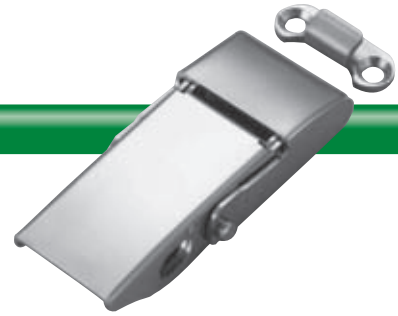


5-44



5-45

LATCH, PULL-DOWN, Stainless Steel



• APPLICATIONS

Various types of boxes / Transportation equipment

• CHARACTERISTICS

Because springs are used, a tightening force is applied when the latch is closed. Since the latch is made of stainless steel it has excellent corrosion resistance. The holes for a padlock are on the side, preserving the appearance even when there is no lock.

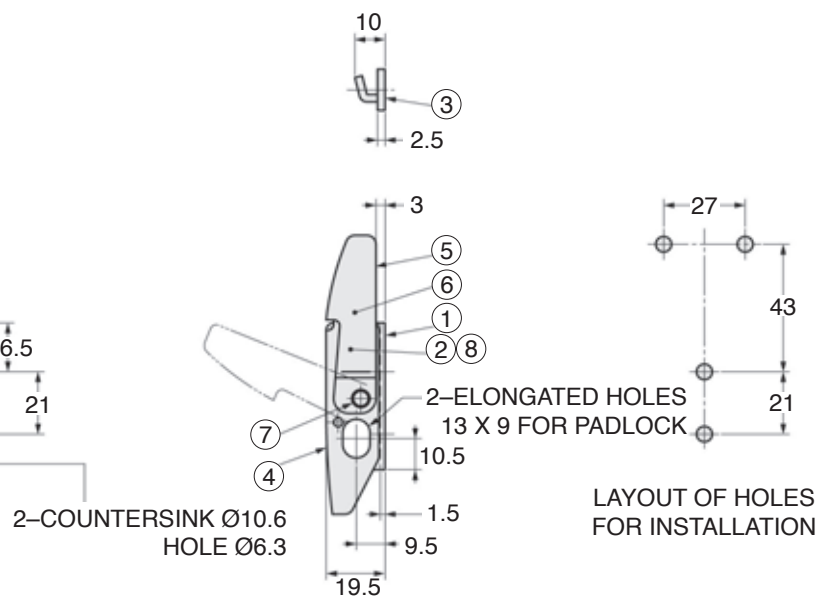
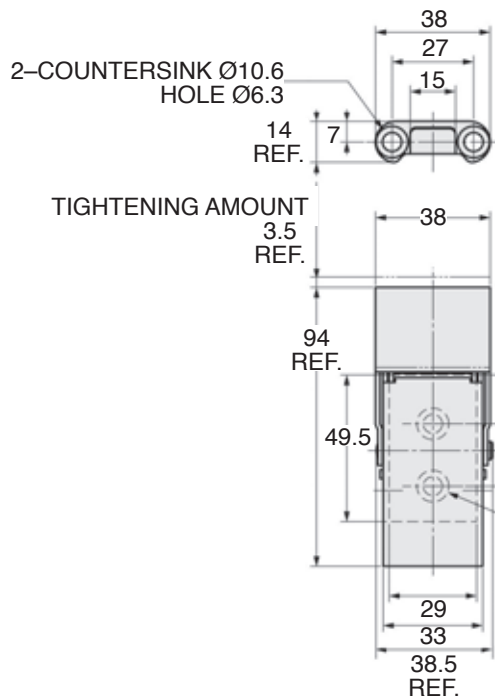
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Base	Stainless Steel	Barrel Polishing	1
2	Spring Mount			
3	Strike Plate			
4	Lever		Shiny Barrel Polishing	
5	Arm			
6	Pin		—	2
7	Pin			
8	Spring			

NOTE: Use M5 flat head screws for mounting

• LATCH

Catalog Number	Tightening Force N (kgf)	Net Weight g
MNAT00MTL349	245 (25)	145



LATCH, PULL-DOWN, Stainless Steel



• APPLICATIONS

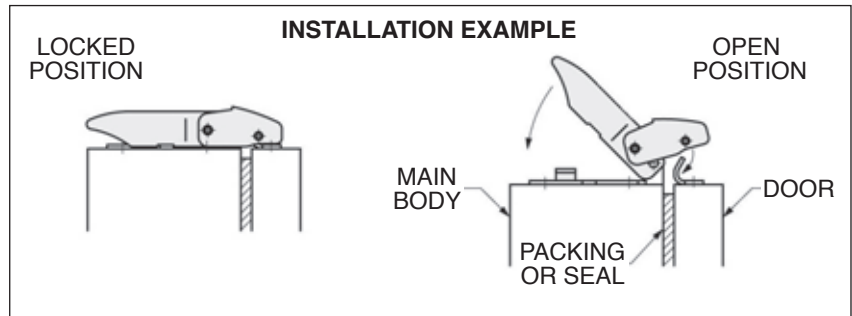
Distribution boards / Distribution panels / Control boards / Boxes

• CHARACTERISTIC

Since there is no need to install cams and rods, the space can be used more efficiently.

• PARTS LIST

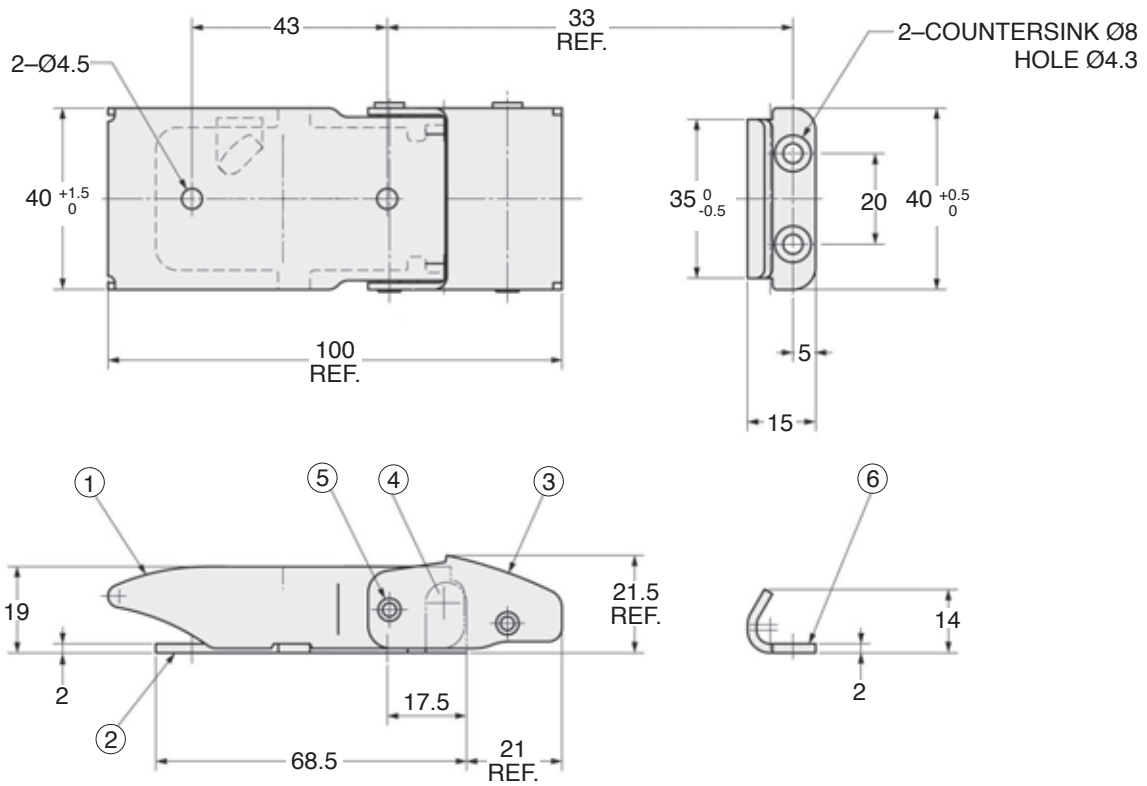
No.	Part Name	Material	Finish	Qty.
1	Lever	Stainless Steel	Bead Blast	1
2	Base			
3	Arm			
4	Pin			
5	Pin	Barrel Polishing		2
6	Strike Plate			1



• LATCH

Catalog Number	Allowable Load N (kgf)	Net Weight g
MNAT01MTL346	294.3 (30)	153

NOTE: The arm is rigid in the locked position. Use antishock material such as packing on the door.



LATCHES, PULL-DOWN, Stainless Steel

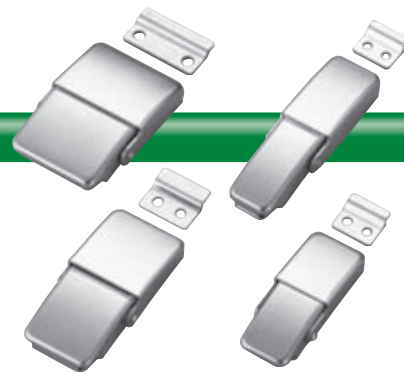


• APPLICATIONS

Measuring instruments / Communication equipment /
Medical devices / Assorted cases and boxes

• CHARACTERISTICS

The strike plate and mounting screws are hidden under the cover enhancing the design of the latch. The stainless steel material has excellent corrosion resistance.



• PARTS LIST

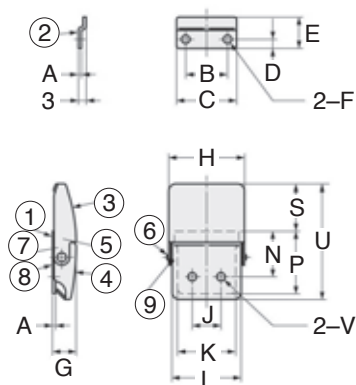
No.	Part Name	Material	Finish	Qty.
1	Base	Stainless Steel	Barrel Polishing	1
2	Strike Plate			
3	Arm		Shiny Barrel Polishing	
4	Lever			
5	Pin		—	
6	Pin			
7	Flat Spring			
8	Rivet			
9	Washer	Nylon	Primary Color	2

• LATCHES

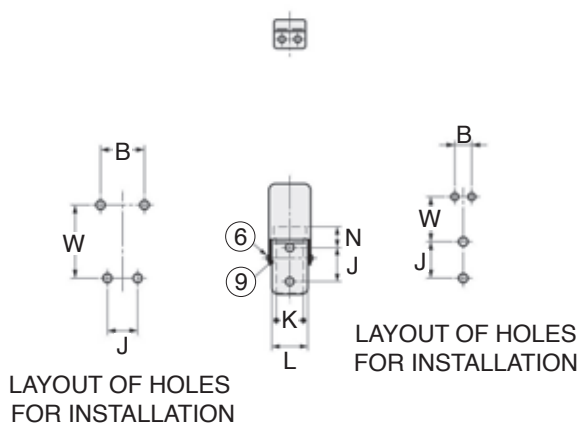
Catalog Number	Allowable Load N (kgf)	A	B	C	D	E	F	G	H	J	K	L
MNAT02MTL345-1	190 (19.4)	1.2	16	23	3.5	12	Ø3.2	9	29	11	22.2	26.4
MNAT02MTL345-2	70 (7.1)	1	6	12		11	Ø2.6		15.6	14	9.2	13
MNAT02MTL345-3	80 (8.2)		7	15	3.8	13	Ø2.8	8	22	12	16.4	19.8
MNAT02MTL345-4	50 (5.1)		6	12	3.5	11	Ø2.6		16	13	10.4	13.8

Catalog Number	N	P	S	U	V	W	Net Weight g
MNAT02MTL345-1	17.5	24	17.8	44	Ø3.2	26	22.4
MNAT02MTL345-2	12	30	25.3	56	Ø3.6	29	15
MNAT02MTL345-3	15.5	31.5	15.3	47	Ø3.1	21	15
MNAT02MTL345-4	8	25.5	16.1	42	Ø3.2	16	10

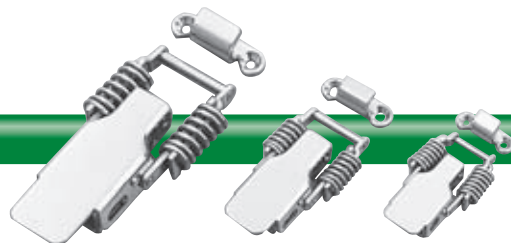
MNAT02MTL345-1



MNAT02MTL345-2~4



LATCHES, TENSION - Lockable



• APPLICATIONS

Distribution panels / Control boards / Distribution boards /

Measuring instruments / Transporter boxes

• CHARACTERISTICS

The appearance of the latch is superior to the ordinary tension latch. A padlock can be inserted into the holes on the side to lock it. When a lock is not used, the holes on the side will not deface its appearance. When latched, the mounting screws are covered so that the latch cannot be unscrewed.

• PARTS LIST

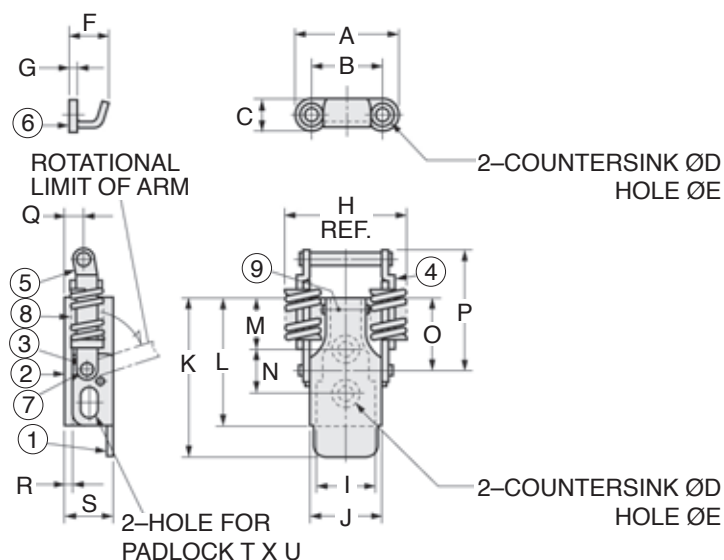
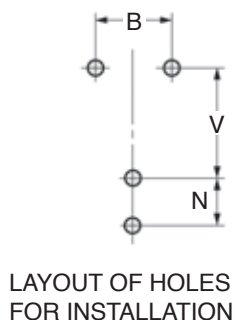
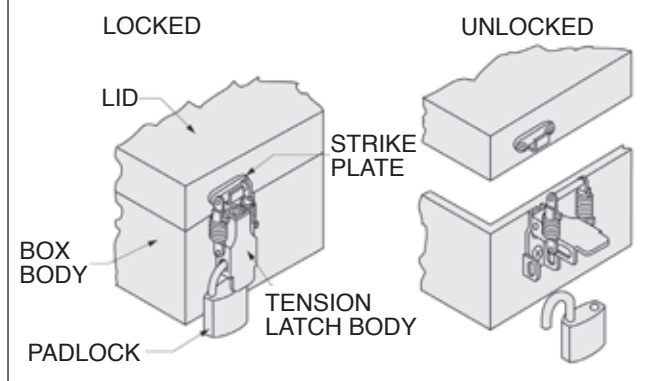
No.	Part Name	Material	Finish	Qty.
1	Lever	Stainless Steel	Barrel Polishing	1
2	Base			1
3	Arm			2
4	Arm			1
5	Arm			1
6	Strike Plate			1
7	Pin		—	2
8	Spring			1
9	Pin			1

• LATCHES

Catalog Number	Tightening Force N (kgf)	A	B	C	D	E	F	G	H	I	J	K
MNAT2NMTL11J-1	Approx. 74.6 (7.6)	26	18	8	6	3.2	10	2	30	15.5	18	37.5
MNAT2NMTL11J-2	Approx. 118 (12)	32	22	10	8	4.3			36	18	22	50
MNAT2NMTL11J-3	Approx. 196 (20)	44	32	12	8.6		15	3	50	26.5	30.8	75

Catalog Number	L	M	N	O	P	Q	R	S	T	U	V	Net Weight g
MNAT2NMTL11J-1	31	15	12	17	31.5	4.5	1.5	12	5.5	6	30	29.8
MNAT2NMTL11J-2	40	16	14	23	37.75	5	2	14		9	31	55.4
MNAT2NMTL11J-3	54	19	25	27	54.9	7	2.5	20	6.5	12	47	145

INSTALLATION EXAMPLE



LATCHES

RoHS
COMPLIANT

• APPLICATIONS

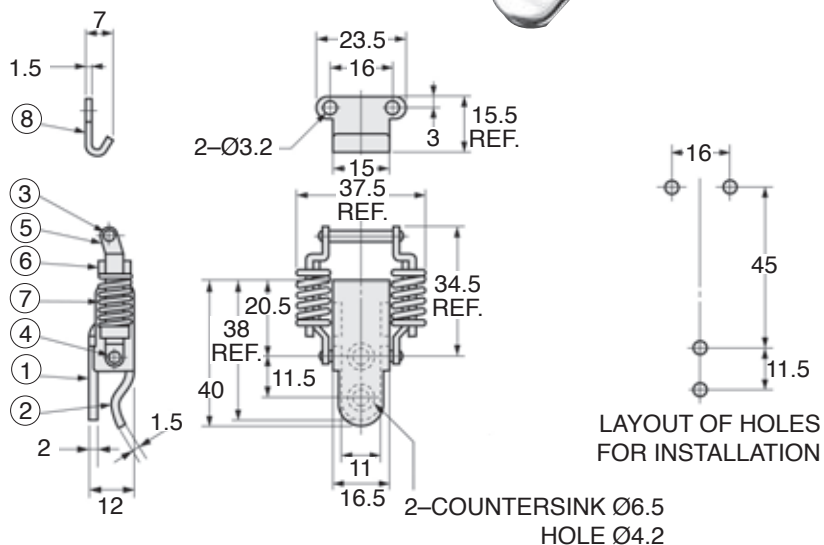
Measuring instruments / Machine tools /
Construction machines / Vehicles

• CHARACTERISTICS

Since the latch is made of stainless steel, it has excellent corrosion resistance. Springs help to insure tight latching.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Base	Stainless Steel	Barrel Polishing	1
2	Lever			
3	Pin			
4	Pin			2
5	Arm			
6	Arm			
7	Spring			
8	Strike Plate			1



• LATCH, TENSION - Small

Catalog Number	Tightening Force N (kgf)	Net Weight g
MNAT2NMTL11F	Approx. 108 (11)	35.5

NOTE: Countersunk holes on the mounting side should be deburred before using screws or rivets.

All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

• APPLICATIONS

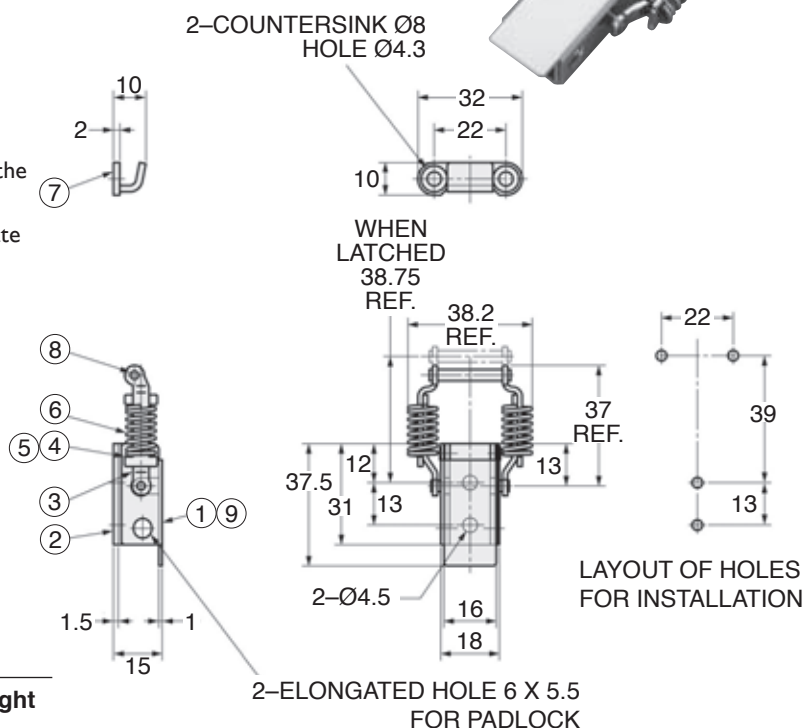
Distribution boards / Control boards / Distribution panels /
Measuring instruments / Transporting boxes

• CHARACTERISTICS

This attractive lockable tension latch has springs to ensure a tight closure. Since the holes for a padlock are on the side, the appearance is not ruined even when there is no lock. When it is latched, the arm covers the screw holes of the strike plate preventing the tampering of screws.

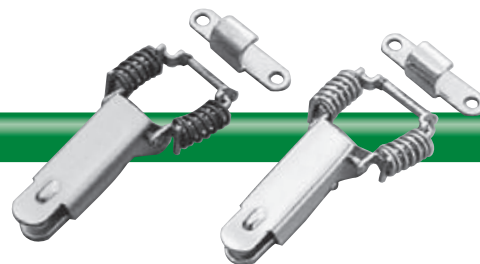
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Lever	Stainless Steel	Barrel Polishing	1
2	Base			
3	Arm			
4	Arm			2
5	Arm			1
6	Spring			2
7	Strike plate			1
8	Pin	—	—	2
9	Pin			1



• LATCH, TENSION - Lockable

Catalog Number	Tightening Force N (kgf)	Net Weight g
MNAT2NMTL351-001	Approx. 98.1 (10)	41.1



- APPLICATIONS

Measuring instruments / Machine tools

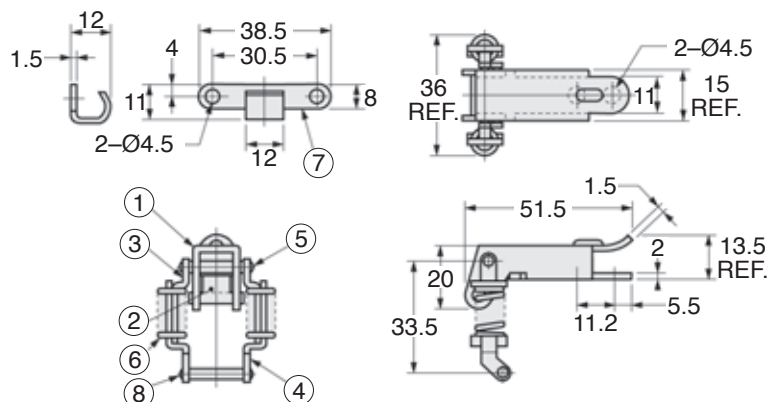
- **CHARACTERISTICS**

Can be mounted in the corner of an object.

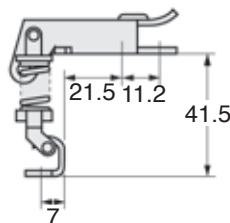
An excellent vibration-free performance due to its springs.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Lever	Stainless Steel	Barrel Polishing	1
2	Base			2
3	Arm			1
4	Arm			2
5	Arm			1
6	Spring		—	
7	Strike Plate		—	
8	Pin		—	



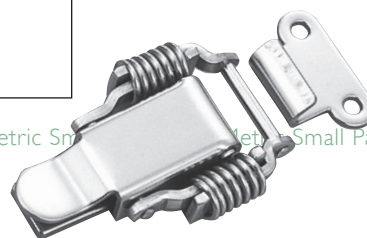
INSTALLATION EXAMPLE INSTALLATION WITH THE STRIKE PLATE ⑦



- **LATCH, L-STYLE**

Catalog Number	Tightening Force N (kgf)	Net Weight g
MNAT2NMTL11G-2	Approx. 137 (14)	42

All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts



- **APPLICATIONS**

Measuring instruments / Machine tools

- **CHARACTERISTICS**

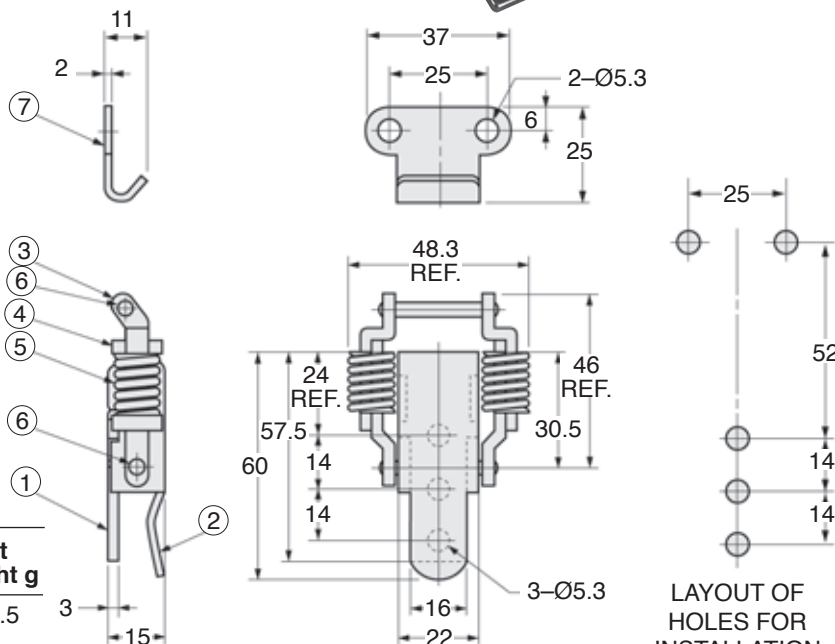
Springs help to insure tight latching. The stainless steel construction has excellent corrosion and chemical resistance.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Base	Stainless Steel	Barrel Polishing	1
2	Lever			
3	Arm			2
4	Arm			
5	Spring			
6	Pin			
7	Strike Plate			
				1

- **LATCH, LARGE**

Catalog Number	Tightening Force N (kgf)	Net Weight g
MNAT2NMTL11H	Approx. 157 (16)	100.5



LAYOUT OF HOLES FOR INSTALLATION

LATCHES



- APPLICATIONS

Distribution panels / Control boards /
Distribution boards / Measuring instruments

- **CHARACTERISTIC**

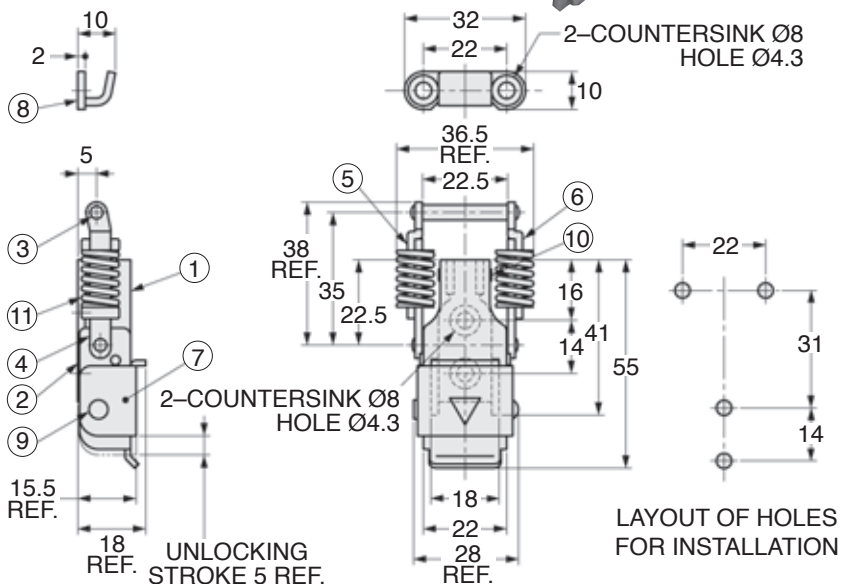
The locking mechanism prevents the latch opening from vibration.

- **NOTE**

The attaching surface side should be deburred when using countersunk screws or rivets.

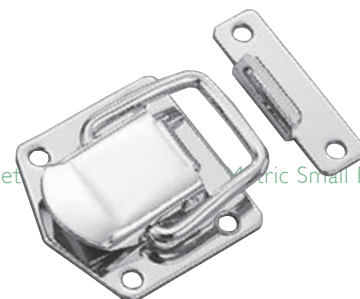
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Lever	Stainless Steel	Barrel Polishing	1
2	Base			
3	Pin			
4	Arm			
5	Arm			
6	Arm		—	2
7	Slide			
8	Strike Plate			
9	Stopper Pin			
10	Pin			
11	Spring			



- **LATCH, LOCKING** - Stainless Steel

Catalog Number	Closing Strength N (kgf)	Net Weight g
MNAT37MTL322	138 (14)	75



All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

• APPLICATIONS

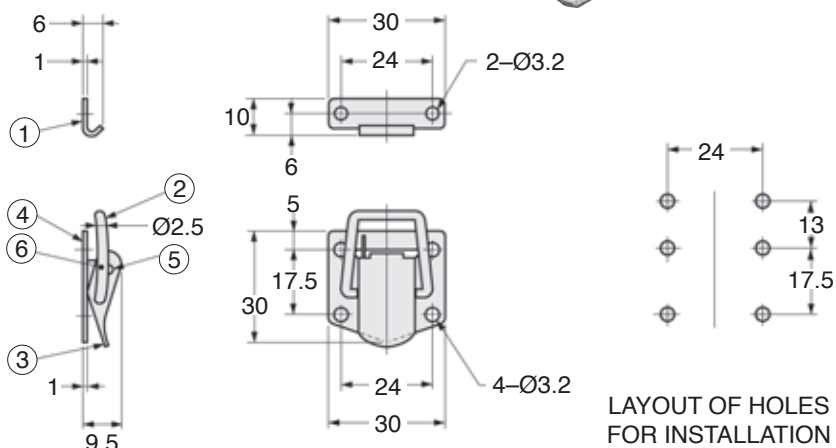
Measuring instruments / Various types of boxes

- **CHARACTERISTIC**

The lever stays stationary even when it is in the unlatched position.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Strike Plate	Brass	Nickel Plated	1
2	Arm			
3	Lever			
4	Base			
5	Pin			
6	Spring	Piano Wire		



- **LATCH, PULL-DOWN**

Catalog Number	Allowable Load N (kgf)	Net Weight g
MNAT09MTL80	68.7 (7)	15

LATCH, TENSION



• APPLICATIONS

Measuring instruments / Machine tools / Construction machines / Vehicles

• CHARACTERISTIC

This tension latch is a large vibration-free catch fastener.

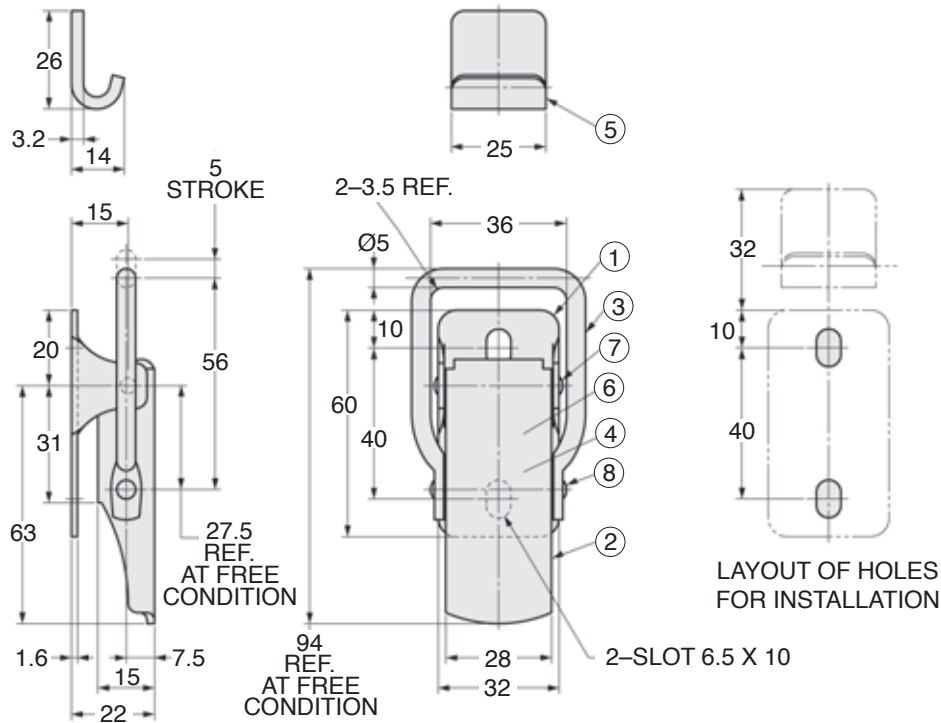
• PARTS LIST

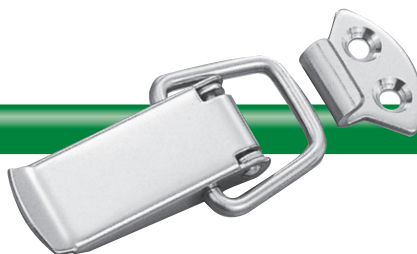
No.	Part Name	Material	Finish	Qty.
1	Base	Steel	Bright Zinc Plated	1
2	Lever			
3	Arm			
4	Spring Holder Plate			
5	Strike Plate	Piano Wire		1
6	Spring			2
7	Pin	Stainless Steel	—	1
8	Pin			

5

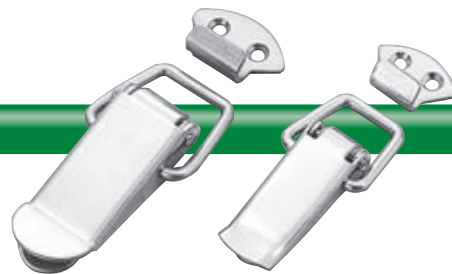
• LATCH

Catalog Number	Tightening Force N (kgf)	Net Weight g
MNAT10MTL126	Approx. 265 (27)	149





LATCHES, PULL-DOWN



• APPLICATIONS

Measuring instruments / Control boards / Distribution panels / Machine tools

• CHARACTERISTIC

The latch is made of stainless steel and has excellent corrosion and chemical resistance.

• PARTS LIST

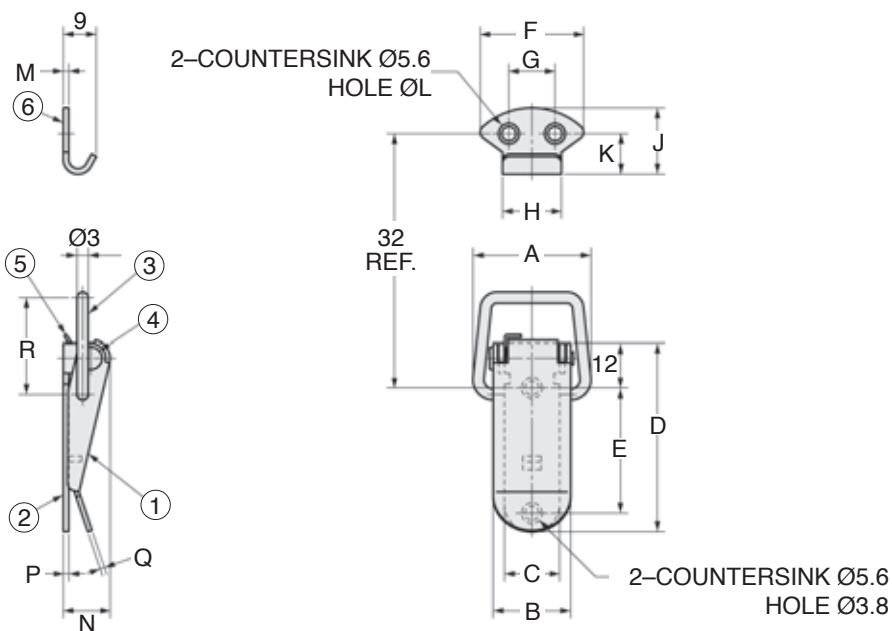
No.	Part Name	Material	Finish	Qty.
1	Lever	Stainless Steel	—	1
2	Base			
3	Arm			
4	Pin			
5	Spring			
6	Strike Plate			

• LATCHES

5

Catalog Number	A	B	C	D	E	F	G	H	J	K	L
MNAT04MTL154-1	26	16	13.5	40	23	23	10	13	16	10.5	3.4
MNAT04MTL154-2	32	21	15	51 REF.	34	28	12.5	16	18	11	3.8

Catalog Number	M	N	P	Q	R	Allowable Load N (kgf)	Net Weight g
MNAT04MTL154-1	1.2	9.8	1	0.8	22.6	157 (16)	17.4
MNAT04MTL154-2	1.5	12.7	1.5	1.2	27.5	98.1 (10)	35.4



THE FIGURE SHOWS MNAT04MTL154-2. THE SHAPE OF MNAT04MTL154-1 IS SLIGHTLY DIFFERENT FROM MNAT04MTL154-2.

LATCHES, PULL-DOWN



• APPLICATIONS

Measuring instruments / Machine tools

• CHARACTERISTIC

A low-cost pull-down latch.

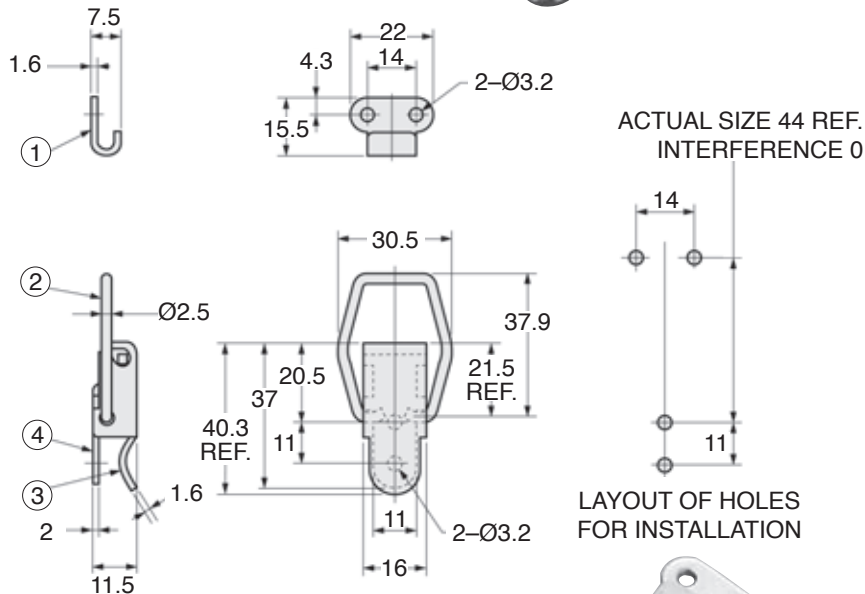
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Strike Plate	Steel	Zinc Plated	1
2	Arm			
3	Lever			
4	Base			

• HEXAGONAL LATCH

Catalog Number	Net Weight g
MNAT06MTL58	26

NOTE: Use a packing or seal for a cushion.



All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

• APPLICATIONS

Measuring instruments / Machine tools

• CHARACTERISTIC

A low-cost pull-down latch.

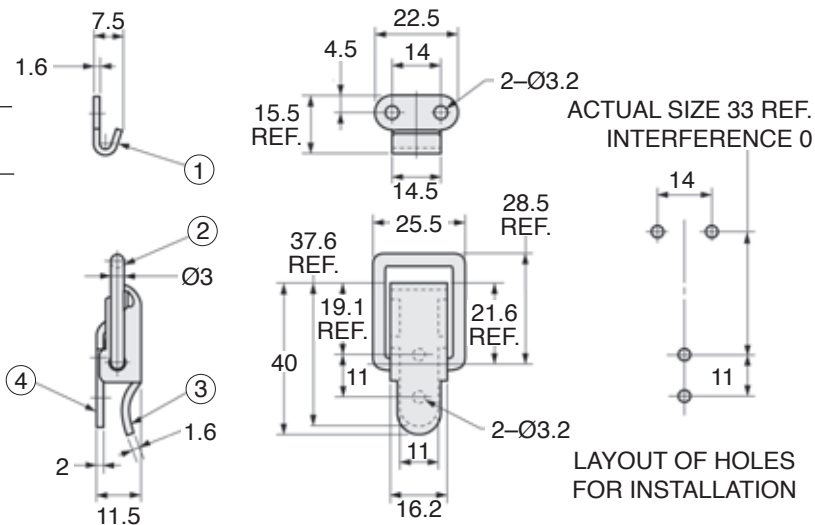
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Strike Plate	Steel	Bright Zinc Plated	1
2	Arm			
3	Lever			
4	Base			

• RECTANGULAR LATCH

Catalog Number	Allowable Load N (kgf)	Net Weight g
MNAT06MTL57	200 (20.4)	26

NOTE: Use a packing or seal for a cushion.



LATCHES, PULL-DOWN, Ring



• APPLICATIONS

Measuring instruments / Machine tools / Railcars / Vehicles /
Special equipped vehicles

• CHARACTERISTIC

The longer lever makes it easy to open and close the latch.

• PARTS LIST

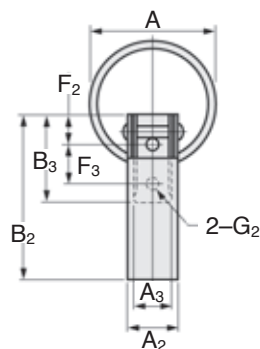
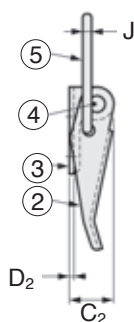
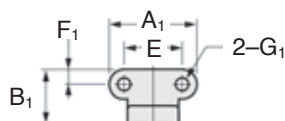
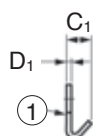
No.	Part Name	Material	Finish	Qty.
1	Strike Plate	Steel	Zinc Plated	1
2	Lever			
3	Base			
4	Pin			
5	Arm	Piano Wire		

• LATCHES

5

Catalog Number	A	A ₁	A ₂	A ₃	B ₁	B ₂	B ₃	C ₁	C ₂	D ₁	D ₂
MNAT07M1TL116-2	Ø27	23.5	12	9.5	17	³⁸ REF.	24	7.5	10.5	1.6	1
MNAT07M2TL116-1	Ø55	37.5	21.5	17.2	22	72	38	11	19	2	1.6

Catalog Number	E	F ₁	F ₂	F ₃	G ₁	G ₂	H	J	Allowable Load N (kgf)	Net Weight g
MNAT07M1TL116-2	16	3.25	8	10	Ø3.2	Ø3.2	31	2	90 (9.17)	16
MNAT07M2TL116-1	25	6	13	17	Ø5.2	Ø5.2	55.5	3.5	350 (35.7)	70.5



LAYOUT OF HOLES
FOR INSTALLATION

LATCHES, PULL-DOWN



• APPLICATIONS

Measuring instruments / Various types of boxes

• CHARACTERISTIC

The lever stays stationary even when it is in the unlatched position.

• PARTS LIST

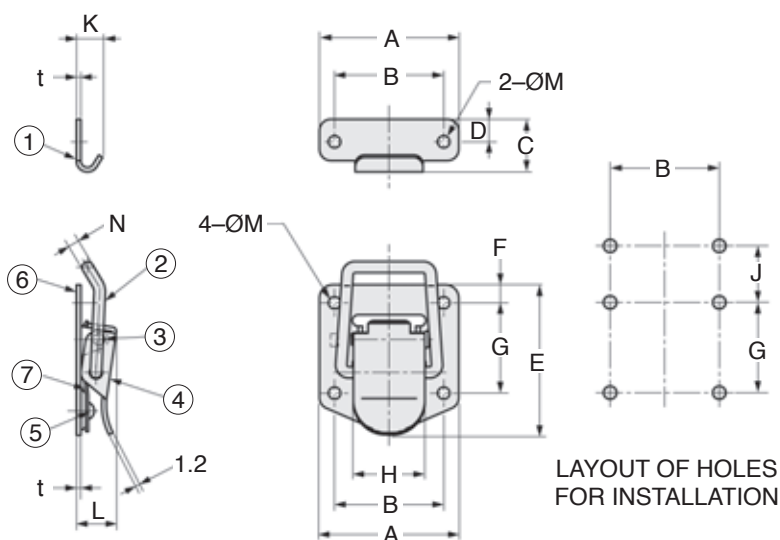
No.	Part Name	Material	Finish	Qty.
1	Strike Plate	Brass	Nickel Plated	1
2	Arm			
3	Pin			
4	Lever			
5	Rivet			
6	Base			
7	Plate Spring	Phosphor Bronze		

• LATCHES

5

Catalog Number	A	B	C	D	E	F	G	H	J	K	L Ref.
MNAT09M1TL217-3	25	20	10.5	4	25	3.8	15	12.5	11.5	5	6.3
MNAT09M2TL217-2	30	24	10		30	5	17.5	16	12.5	6	9
MNAT09M3TL217-1	37	29	14	6	40	4.8	24	19	15	7	10.6

Catalog Number	M	N	t	Allowable Load N (kgf)	Net Weight g
MNAT09M1TL217-3	2.8	Ø2	1	50 (5.10)	11.4
MNAT09M2TL217-2	3.2	Ø2.5		80 (8.15)	15.6
MNAT09M3TL217-1		Ø3	1.2		32.5



THE FIGURE SHOW MNAT09MTL217-1. THE SHAPES OF THE ARM ② AND THE LEVER ④ OF MNAT09MTL217-2 AND MNAT09MTL217-3 ARE SLIGHTLY DIFFERENT FROM THE FIGURE SHOWN

LATCH, PULL-DOWN

RoHS
COMPLIANT



• APPLICATIONS

Measuring instruments / Telecommunication devices / Machine tools /
Various types of boxes

• CHARACTERISTICS

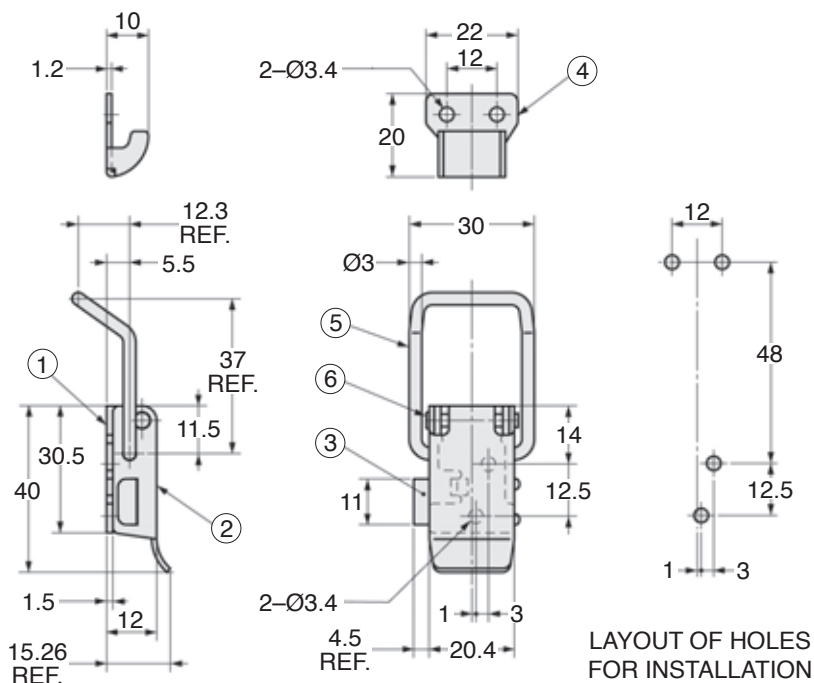
You can lock the lever by gently pressing the lever down, which eliminates the worry that it may unlatch from vibration. To open, lift the lever while pressing on the push button on the side. The latch is made of stainless steel and has excellent corrosion and chemical resistance.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Base	Stainless Steel	Barrel Polishing	1
2	Lever			
3	Push Button			
4	Strike Plate			
5	Arm		—	
6	Pin			

• LATCH

Catalog Number	Net Weight g
MNAT08MTL314	36



LATCH, PULL-DOWN, Stainless Steel



• APPLICATIONS

Measuring instruments / Control boards / Distribution panels /
Distribution boards

• CHARACTERISTICS

The strike plate and mounting screws are hidden under the cover enhancing the design of the catch. The use of springs absorbs the vibration.

• PARTS LIST

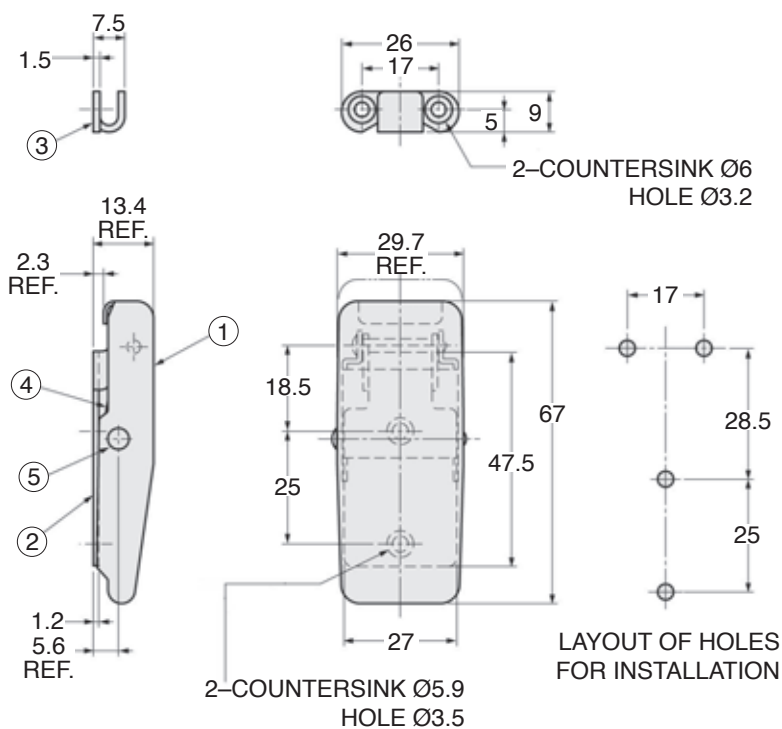
No.	Part Name	Material	Finish	Qty.
1	Lever	Stainless Steel	Barrel Polishing	1
2	Base			
3	Strike Plate			
4	Arm		—	2
5	Pin			

5

• LATCH

Catalog Number	Tightening Force N (kgf)	Net Weight g
MNAT03MTL329-1	Approx. 52 (5.3)	46.8

NOTE: Countersunk holes on the mounting side should be deburred before using screws or rivets.



HANDLES, SNAP-IN LATCH



• APPLICATIONS

Control boards / Control boxes / Boxes for gauge boards

• CHARACTERISTIC

Handle is made of stainless steel and has excellent corrosion resistance.

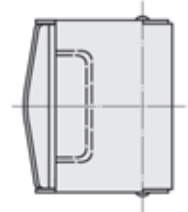
• OPERATION INSTRUCTIONS

Lift up the lock first before opening the lid. To lock, first close the lid all the way.

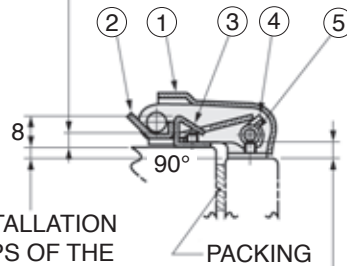
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Cover	Stainless Steel	Barrel Polished	1
2	Lock			
3	Strike Plate			
4	Spring			
5	Pin		—	

MNAT25MTL296-1



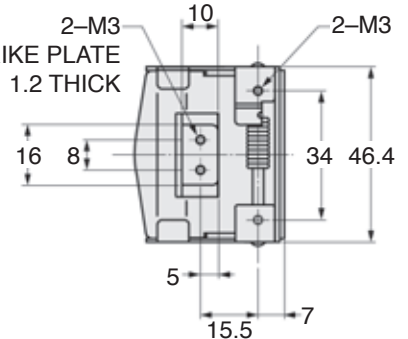
PROTRUSION OF SCREW HEAD SHOULD BE 3.2 OR LESS



INSTALLATION GAPS OF THE STRIKE PLATE 2~3.5

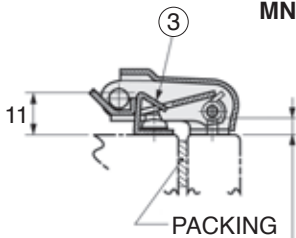
PROTRUSION OF SCREW HEAD SHOULD BE 4 OR LESS

2-M3 STRIKE PLATE 1.2 THICK

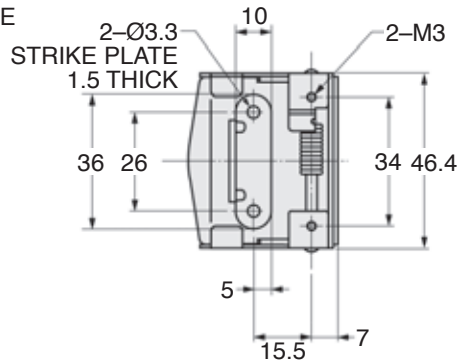


LAYOUT OF HOLES FOR INSTALLATION

MNAT25MTL296-2



PROTRUSION OF SCREW HEAD SHOULD BE 4 OR LESS

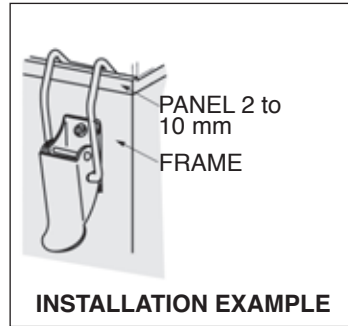


LAYOUT OF HOLES FOR INSTALLATION

LATCH, CLAM

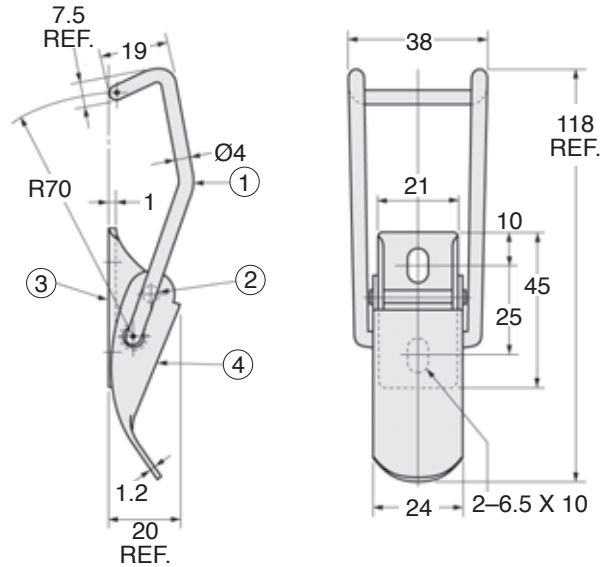


- **APPLICATIONS**
Measuring instruments / Machine tools
- **CHARACTERISTICS**
Latch is made of stainless steel and has excellent corrosion and chemical resistance. No strike plate is required.



• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Arm	Stainless Steel	Barrel Polishing	1
2	Pin			
3	Base			
4	Lever			



• LATCH

Catalog Number	Allowable Load N (kgf)	Net Weight g
MNAT12MTL141	78.5 (8)	54.2

All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

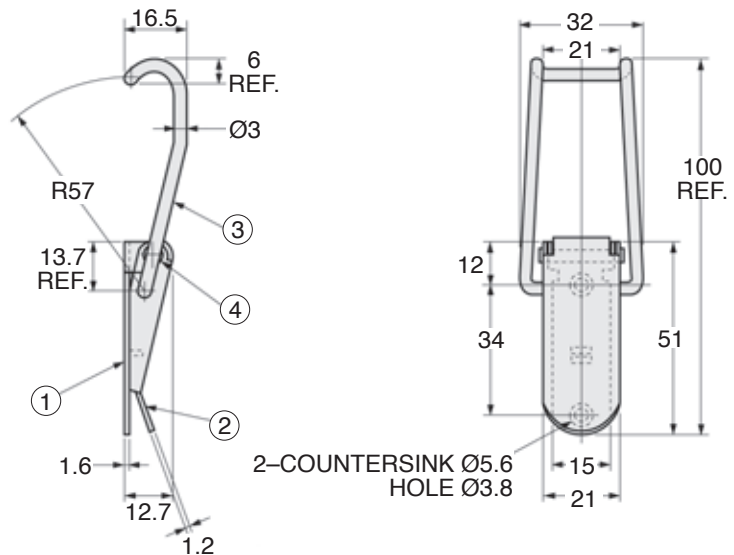
- **APPLICATIONS**
Measuring instruments / Machine tools
- **CHARACTERISTIC**
No strike plate is required.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Base	Steel	Bright Zinc Plated	1
2	Lever		Chrome Plated	
3	Arm			
4	Pin	Stainless Steel	—	

• LATCH

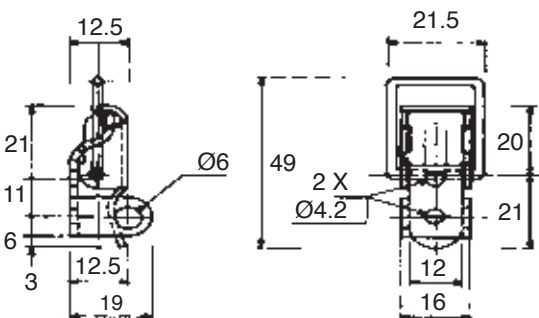
Catalog Number	Net Weight g
MNAT12MTL198	34.2



LATCHES, TOGGLE, 49 & 82 mm

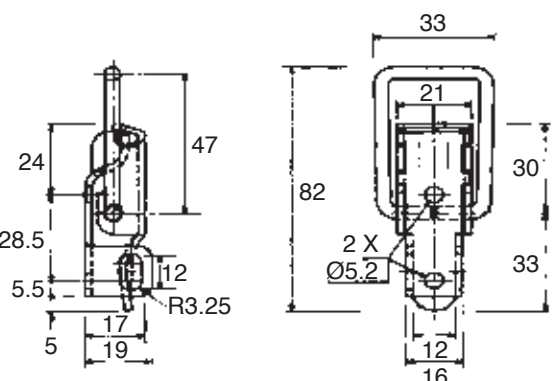
RoHS
COMPLIANT

For industrial use

CATALOG NUMBER (49 mm)		Use With Strike Plate Catalog Number: MNAY5NM61001.., MNAY5NM61004.., MNAY5NM61005.. MNAY5NM61007.., MNAY5NM61008.., MNAY5NM61011..
Stainless Steel	Steel, Zinc Plated	
MNAY1NM600U042PC	MNAY1NM600U042JB	
MNAY1NM600U043PC	MNAY1NM600U043JB	
		

For force up to 250 N (25.5 kgf)

For industrial use

CATALOG NUMBER (82 mm)		Use With Strike Plate Catalog Number: MNAY5NM61002.., MNAY5NM61003.., MNAY5NM61006.. MNAY5NM61012.., MNAY5NM61013.., MNAY5NM61014..
Stainless Steel	Steel, Zinc Plated	
MNAY1NM600U044PC	MNAY1NM600U044JB	
MNAY1NM600U045PC	MNAY1NM600U045JB	
		

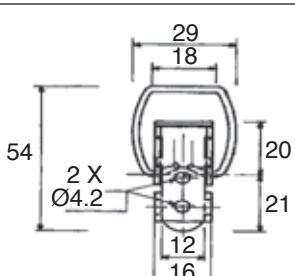
For force up to 300 N (30.6 kgf)

LATCHES, TOGGLE, 54 & 122 mm



• FLEXIBLE WIRE

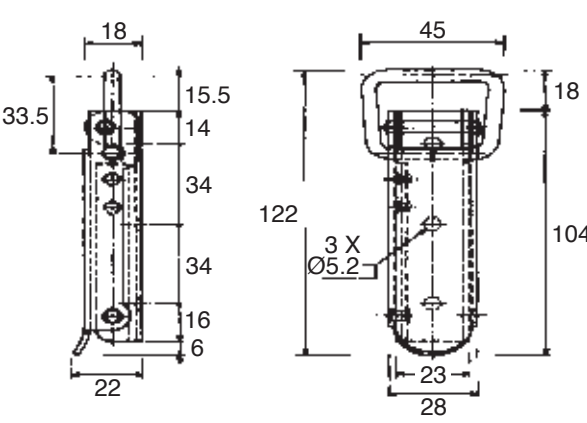
The curved link provides resistance under shock loads

CATALOG NUMBER (54 mm)		Use With Strike Plate Catalog Number: MNAY5NM61001.., MNAY5NM61004.., MNAY5NM61005.. MNAY5NM61007.., MNAY5NM61008.., MNAY5NM61011..
Stainless Steel	Steel, Zinc Plated	
MNAY1NM601U032PC	MNAY1NM601U032JB	 For force up to 250 N (25.5 kgf)
		

5

• RIGID WIRE

For packing case applications, vehicles, etc.

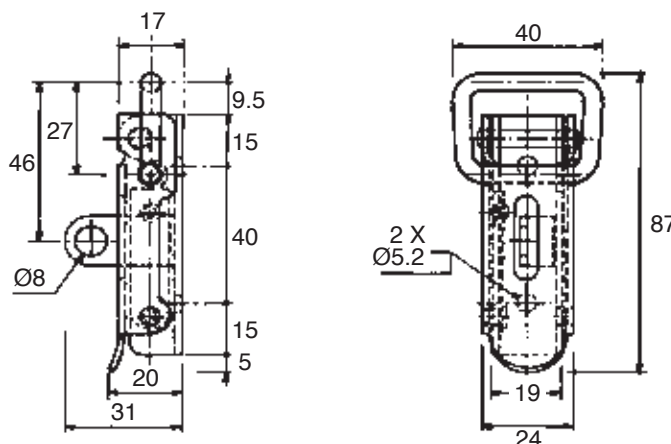
CATALOG NUMBER (122 mm)		Use With Strike Plate Catalog Number: MNAY5NM61012.., MNAY5NM61013.., MNAY5NM61014.. MNAY5NM61016.., MNAY5NM61017..
Stainless Steel	Steel, Zinc Plated	
MNAY1NM602U015PC	MNAY1NM602U015JB	 For force up to 3000 N (306 kgf)
		
MNAY1NM602U014PC	MNAY1NM602U014JB	
		

LATCHES, TOGGLE, 87 & 59 mm

RoHS
COMPLIANT

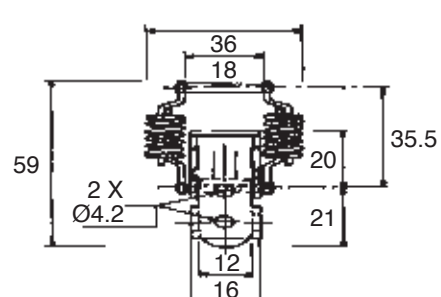
• RIGID WIRE

For packing case applications, vehicles, etc.

CATALOG NUMBER (87 mm)		Use With Strike Plate Catalog Number: MNAY5NM61002.., MNAY5NM61006.., MNAY5NM61012.. MNAY5NM61013.., MNAY5NM61014..
Stainless Steel	Steel, Zinc Plated	
MNAY1NM602U077PC	MNAY1NM602U075JB	 For force up to 2500 N (255 kgf)
MNAY1NM602U073PC	MNAY1NM602U073JB	

• SPRING LOADED

Vibrationproof, gasket pull-ups

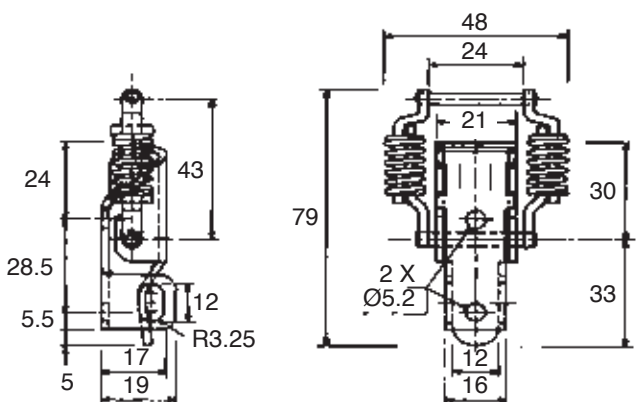
CATALOG NUMBER (59 mm)		Use With Strike Plate Catalog Number: MNAY5NM61004.., MNAY5NM61005.., MNAY5NM61007.. MNAY5NM61008..
Stainless Steel	Steel, Zinc Plated	
MNAY2NM604U022PC	MNAY2NM604U022JB	 For force up to 300 N (30.6 kgf)

LATCHES, TOGGLE, 79 & 61 mm



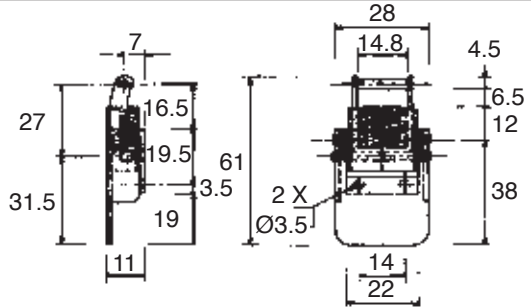
• SPRING LOADED

Vibrationproof, gasket pull-ups

CATALOG NUMBER (79 mm)		Use With Strike Plate Catalog Number: MNAY5NM61002.., MNAY5NM61005.., MNAY5NM61006.. MNAY5NM61008.., MNAY5NM61012..
Stainless Steel	Steel, Zinc Plated	
MNAY2NM604U024PC	MNAY2NM604U024JB	
		
MNAY2NM604U025PC	MNAY2NM604U025JB	For force up to 450 N (45.9 kgf)
		

• CONCEALED

Vibrationproof

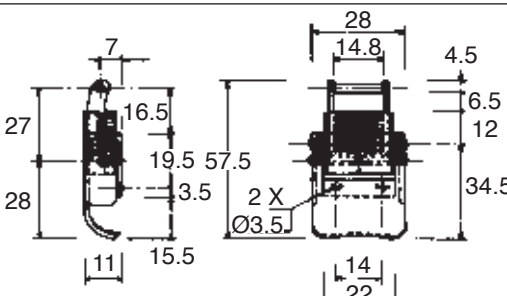
CATALOG NUMBER (61 mm)		Use With Strike Plate Catalog Number: MNAY5NM61005.., MNAY5NM61007.., MNAY5NM61011..
Stainless Steel	Steel, Zinc Plated	
MNAY3NM605U028PC	MNAY3NM605U028JB	 For force up to 300 N (30.6 kgf)
		

LATCHES, TOGGLE, 57.5 & 38 mm

RoHS
COMPLIANT

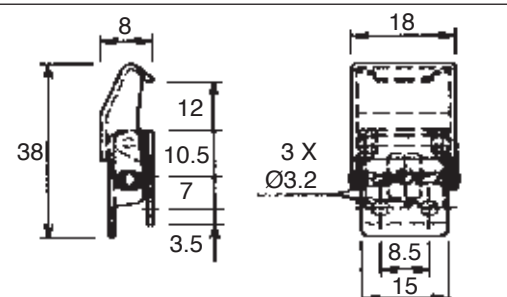
• CONCEALED

Vibrationproof

CATALOG NUMBER (57.5 mm)		Use With Strike Plate Catalog Number: MNAY5NM61005.., MNAY5NM61007.., MNAY5NM61011..
Stainless Steel	Steel, Zinc Plated	
MNAY3NM605U029PC	MNAY3NM605U029JB	 For force up to 300 N (30.59 kgf)
		

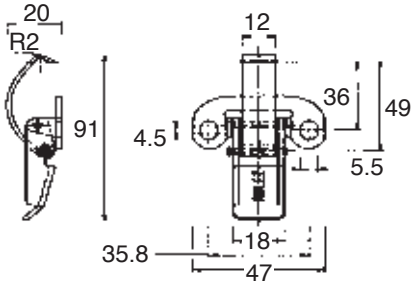
• CONCEALED

Vibrationproof

CATALOG NUMBER (38 mm)		Use With Strike Plate Catalog Number: MNAY5NM61001.., MNAY5NM61004.., MNAY5NM61005.. MNAY5NM61007.., MNAY5NM61008.., MNAY5NM61011..
Stainless Steel	Steel, Zinc Plated	
MNAY3NM605U200PC	MNAY3NM605U200JB	 For force up to 400 N (40.79 kgf)
		

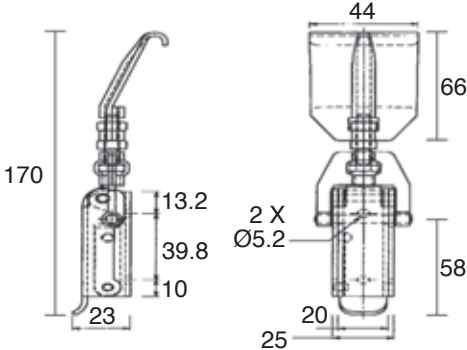
• **CLAW LINKS**

For special applications

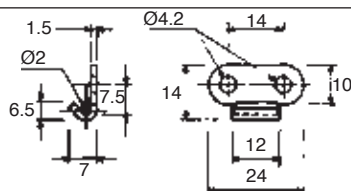
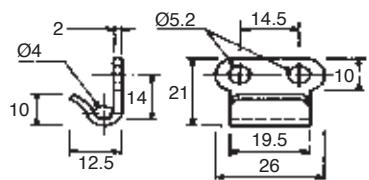
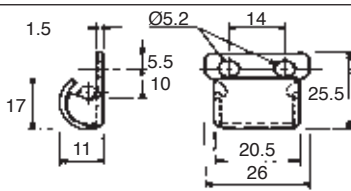
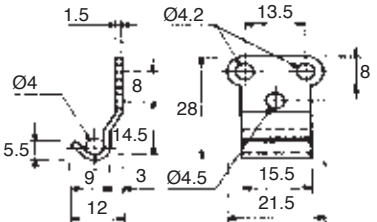
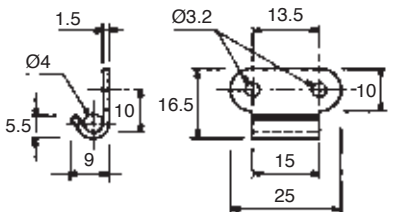
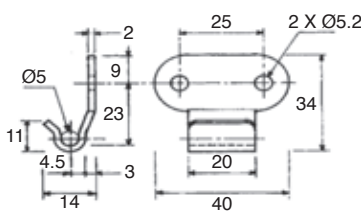
CATALOG NUMBER		
Stainless Steel	Steel, Zinc Plated	
MNAY4NM607U435PC	MNAY4NM607U435JB	
		Use With Strike Plate Catalog Number: MNAY5NM61001.., MNAY5NM61004.., MNAY5NM61005.. For force up to 1300 N (132.56 kgf)

• **ADJUSTABLE • SOFT OPENING**

For gasket pull-ups; adjustable from 0 to 6 mm

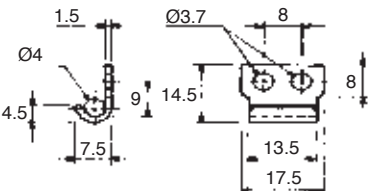
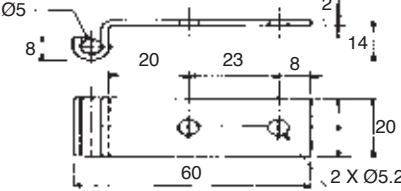
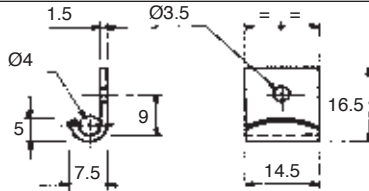
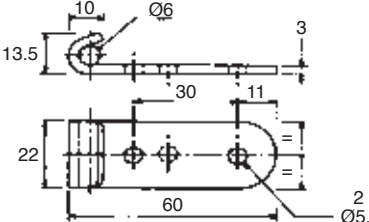
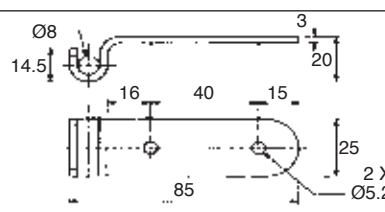
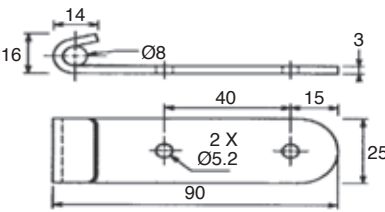
CATALOG NUMBER	Use With StrikePlate Catalog Number: MNAY5NM61018..
Steel, Zinc Plated	
MNAY4NM608U364JB	
	 170 44 66 13.2 39.8 10 23 2 X Ø5.2 58 20 25
For force up to 3000 N (305.9 kgf)	

LATCHES, TOGGLE STRIKE PLATES

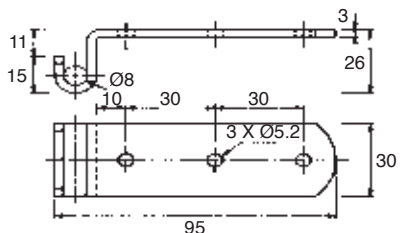
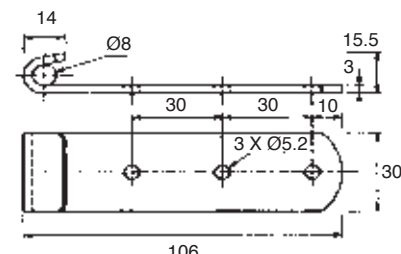
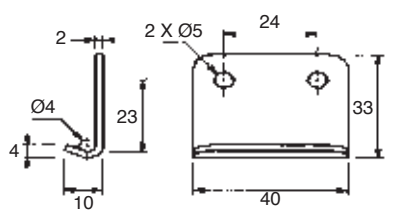
SIZE	CATALOG NUMBER			Use With Toggle Latch Catalog Number
	Stainless Steel	Steel, Zinc Plated		
24 X 14	MNAY5NM61001PC	MNAY5NM61001JB		MNAY1NM600U042.. MNAY1NM600U043.. MNAY1NM601U032.. MNAY3NM605U200.. MNAY4NM607U435..
				
26 X 21	MNAY5NM61002PC	MNAY5NM61002JB		MNAE01M600U635.. MNAY1NM600U044.. MNAY1NM600U045.. MNAY1NM601U032.. MNAY1NM602U073.. MNAY1NM602U075.. MNAY1NM602U077.. MNAY2NM604U024.. MNAY2NM604U025..
				
26 X 25.5	MNAE04M61003PC	MNAY5NM61003JB		MNAY1NM600U044.. MNAY1NM600U045.. MNAY2NM604U024.. MNAY2NM604U025..
				
21 X 28		MNAY5NM61004JB		MNAY1NM600U042.. MNAY1NM600U043.. MNAY1NM601U032.. MNAY2NM604U022.. MNAY2NM604U024.. MNAY2NM604U025.. MNAY3NM605U200.. MNAY2NM607U435..
				
25 X 16.5	MNAY5NM61005PC	MNAY5NM61005JB		MNAY1NM600U042.. MNAY1NM600U043.. MNAY1NM601U032.. MNAY2NM604U022.. MNAY2NM604U024.. MNAY2NM604U025.. MNAY3NM605U028.. MNAY3NM605U029.. MNAY3NM605U200.. MNAY4NM607U435..
				
40 X 34	MNAY5NM61006PC	MNAY5NM61006JB		MNAY1NM600U044.. MNAY1NM600U045.. MNAY1NM601U032.. MNAY1NM602U073.. MNAY1NM602U075.. MNAY1NM602U077.. MNAY2NM604U024.. MNAY2NM604U025..
				

LATCHES, TOGGLE STRIKE PLATES

RoHS
COMPLIANT

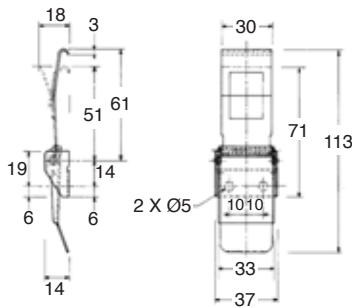
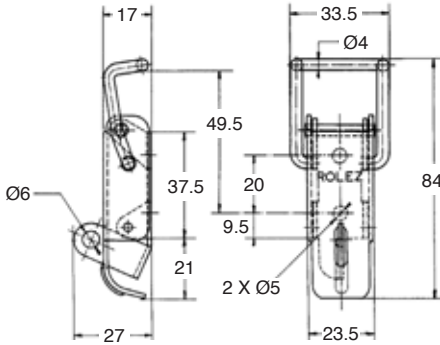
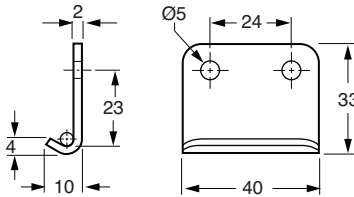
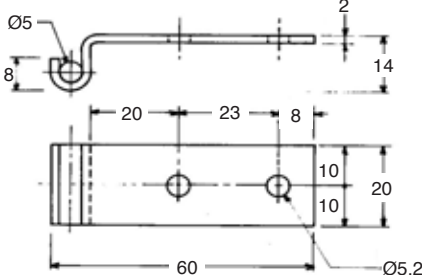
SIZE	CATALOG NUMBER			Use With Toggle Latch Catalog Number
	Stainless Steel	Steel, Zinc Plated		
17.5 X 14.5	MNAY5NM61007PC	MNAY5NM61007JB		MNAY1NM600U042.. MNAY1NM600U043.. MNAY1NM601U032.. MNAY2NM604U022.. MNAY3NM605U028.. MNAY3NM605U029.. MNAY3NM605U200..
				
60 X 20	MNAY5NM61008PC	MNAY5NM61008JB		MNAY1NM600U042.. MNAY1NM600U043.. MNAY1NM601U032.. MNAY2NM604U022.. MNAY2NM604U024.. MNAY2NM604U025.. MNAY3NM605U200..
				
14.5 X 16.5		MNAY5NM61011JB		MNAY1NM600U042.. MNAY1NM600U043.. MNAY1NM601U032.. MNAY3NM605U028.. MNAY3NM605U029.. MNAY3NM605U200..
				
22 X 60	MNAY5NM61012PC	MNAY5NM61012JB		MNAY1NM600U044.. MNAY1NM600U045.. MNAY1NM602U014.. MNAY1NM602U015.. MNAY1NM602U073.. MNAY1NM602U075.. MNAY1NM602U077.. MNAY2NM604U024.. MNAY2NM604U025..
				
25 X 85	MNAY5NM61013PC	MNAY5NM61013JB		MNAY1NM600U044.. MNAY1NM600U045.. MNAY1NM602U014.. MNAY1NM602U015.. MNAY1NM602U073.. MNAY1NM602U075.. MNAY1NM602U077..
				
25 X 90	MNAY5NM61014PC	MNAY5NM61014JB		MNAY1NM600U044.. MNAY1NM600U045.. MNAY1NM602U014.. MNAY1NM602U015.. MNAY1NM602U073.. MNAY1NM602U075.. MNAY1NM602U077..
				

LATCHES, TOGGLE STRIKE PLATES

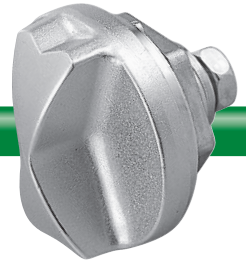
SIZE	CATALOG NUMBER Steel, Zinc Plated		Use With Toggle Latch Catalog Number
30 X 95	MNAY5NM61016JB		
30 X 106	MNAY5NM61017JB		
40 X 33	MNAY5NM61018JB		

LATCHES, TOGGLE & STRIKE PLATES

5

SIZE	CATALOG NUMBER		Use With Catalog Number
	Stainless Steel	Steel, Zinc Plated	
	MNAE03M607U81PC		
			
	MNAE01M600U635PC	MNAE01M600U635JB	
			
40 X 33	MNAE04M61018PC		
			
60 X 20	MNAE04M61009PC		
			

HANDLE, GRIP LATCH

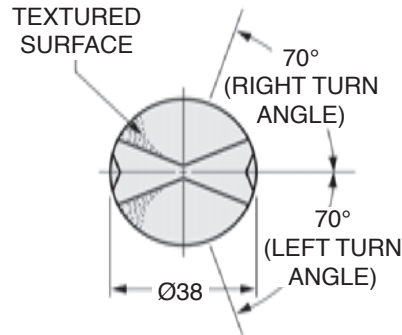


• APPLICATIONS

Doors for small devices / Controller boxes /
Distribution panels / Distribution boards

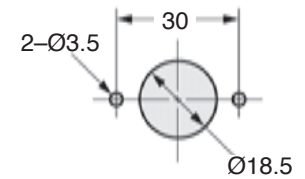
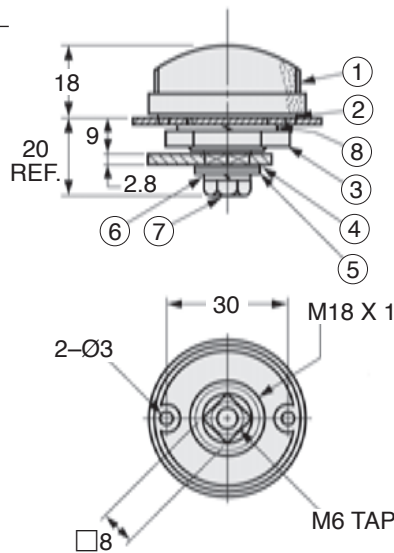
• CHARACTERISTICS

The handle contains a dial shaped grip. The simple appearance and two-tone surface treatment enhances the appearance of the device.



• PARTS LIST

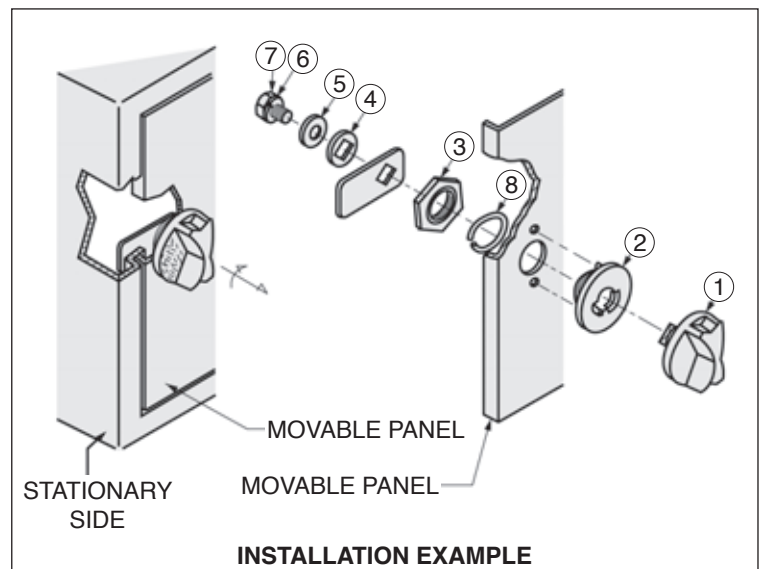
No.	Part Name	Material	Finish	Qty.
1	Handle	Zinc Die Cast	Chrome Plated	1
2	Flange			
3	Hexagonal Nut			
4	Square Hole Washer	Steel	Zinc Plated	
5	Washer			
6	Spring Washer			
7	Hexagon Bolt			
8	Ring Washer	Steel Wire		

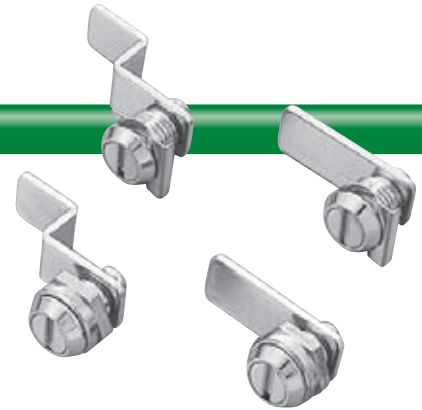


LAYOUT OF HOLES
FOR INSTALLATION
(BOTH LEFT AND RIGHT SIDE)

• HANDLE

Catalog Number	Net Weight g
MNAT16MTHA227	88





• APPLICATIONS

Disaster prevention devices / Distribution boards /
Distribution panels / Control boards

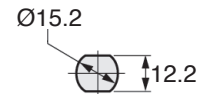
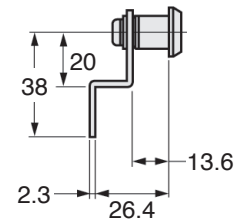
• CHARACTERISTICS

An easy-to-use latch with carefully selected mechanism and type to get small but appropriate performance as box lid pawls for disaster prevention devices. Just turn it with a small coin in the slot on the front of the body. It even has a detent action tactile feedback of clicking at the end of a stroke. A retainer mounting type is available to reduce the installing process.

• SPECIFICATIONS

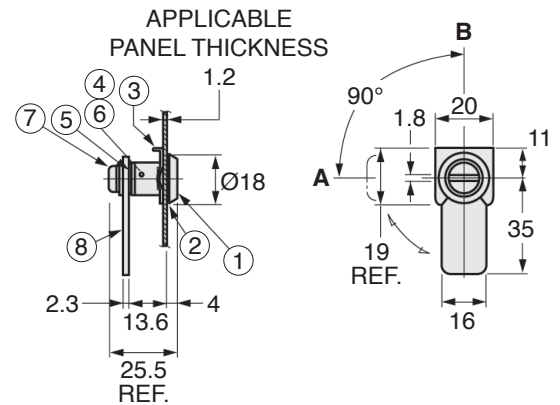
1. Rotational angle from **A** to **B** for the coin slot is 90°.
2. The position of the lever can be changed in 90° movements.
3. The lever for **MNAT14MTL265-2** and **MNAT14MTL265B-2** is bent in a crankshaft shape.

MNAT14MTL265-2
MNAT14MTL265B-2



LAYOUT OF A HOLE
FOR INSTALLATION

MNAT14MTL265B-1



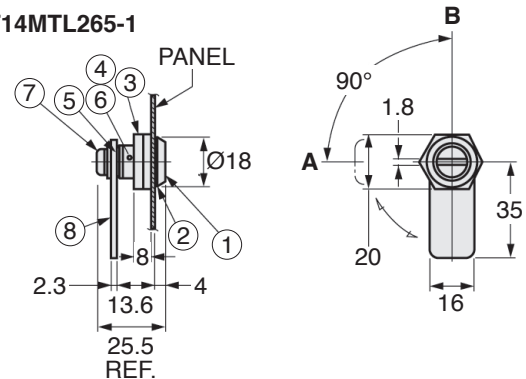
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Slit Shaft	Zinc Die Cast	Chrome Plated	1
2	Sleeve		Zinc Plated	
3	...MTL265...: Nut	Stainless Steel	—	2
4	Spring			
5	Stopper Retainer			
6	Ball	Steel	Zinc Plated	1
7	Screw with Washer			
8	Lever			

• LATCHES

Catalog Number	Net Weight g
MNAT14MTL265B-1	30.5
MNAT14MTL265B-2	33.9
MNAT14MTL265-1	36
MNAT14MTL265-2	40

MNAT14MTL265-1



LATCH, PANEL - Coin Slotted



• APPLICATIONS

Vehicles / Disaster prevention devices /
Distribution boards / Control boards /
Doors for any kind of maintenance board.

• CHARACTERISTICS

The lever is staked onto the body preventing it from loosening by vibration. Can use either a right- or a left-side door by changing the orientation of the mounting holes. A simple lock to operate using a coin or an equivalent.

• INSTALLATION

Remove the mounting nut and the toothed washer from the body. Insert the body into a mounting hole, the tip of the lever first. Put the mounting nut and the toothed washer in from the lever end. Then tighten the mounting nut securely.

• SPECIFICATIONS

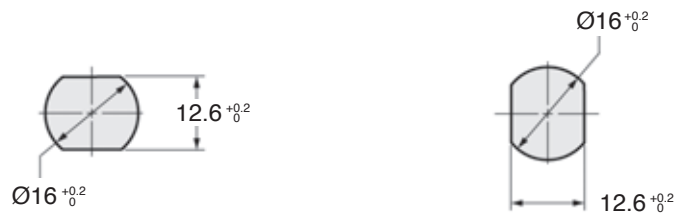
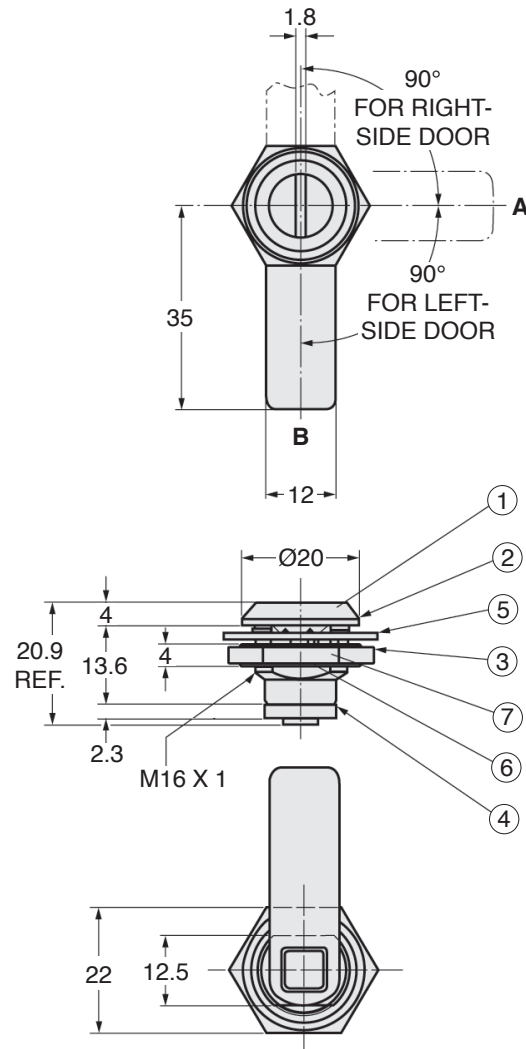
A rotation of the coin slot and the lever points **A** & **B** is 90°. A detent mechanism is at point **A** & **B**. Panel thickness for mounting is 2 mm max.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Slotted Head	Zinc Die Cast	Chrome Plated	1
2	Case		Chrome Plated	
3	Mounting Nut	Steel	Zinc Plated	
4	Lever		Zinc Plated	
5	Toothed Washer	Stainless Steel	—	2
6	Spring		—	
7	Ball		—	

• HANDLE

Catalog Number	Net Weight g
MNAT14MTL302	35



FOR RIGHT-SIDE DOOR

FOR LEFT-SIDE DOOR

LAYOUT OF HOLES FOR INSTALLATION



• **APPLICATION**

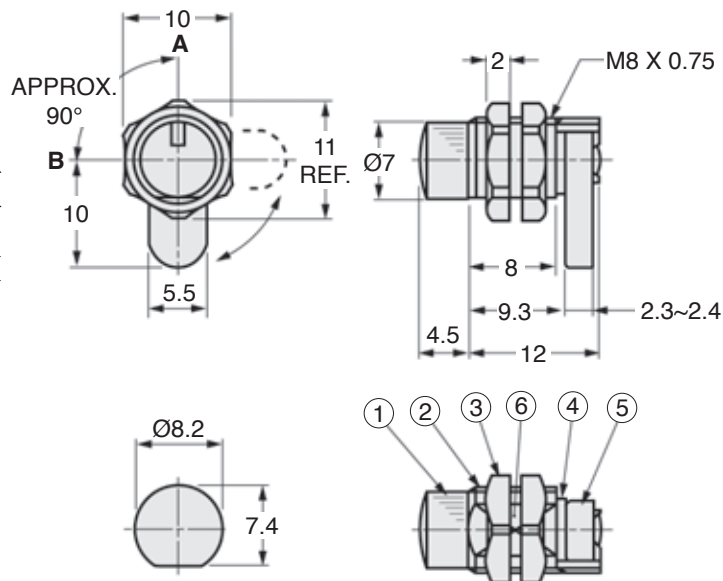
Measuring instruments

• **CHARACTERISTIC**

A small and space saving fastener.

• **PARTS LIST**

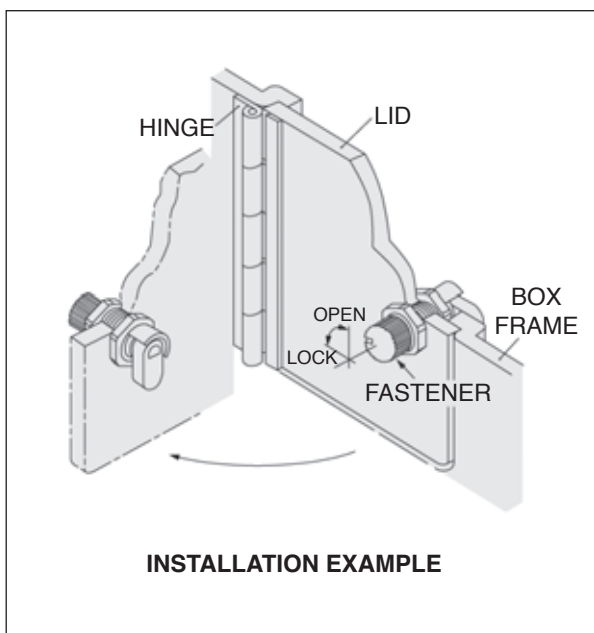
No.	Part Name	Material	Finish	Qty.
1	Knob	Brass	Chrome Plated	1
2	Sleeve			
3	Mounting Nut		Nickel Plated	2
4	Collar			
5	Latch	Stainless Steel	—	1
6	Spring			

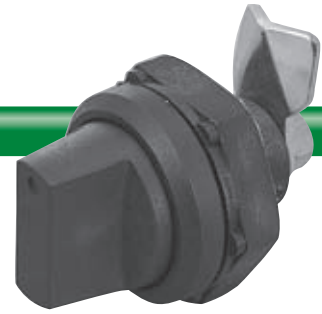


LAYOUT OF A HOLE
FOR INSTALLATION

• **HANDLE**

Catalog Number	Net Weight g
MNAT14MTL211	6.3





• **APPLICATIONS**

Control boxes / Various types of light-weight doors

• **CHARACTERISTIC**

Play in the door, when closed, is eliminated by the built-in spring of the latch.

• **PARTS LIST**

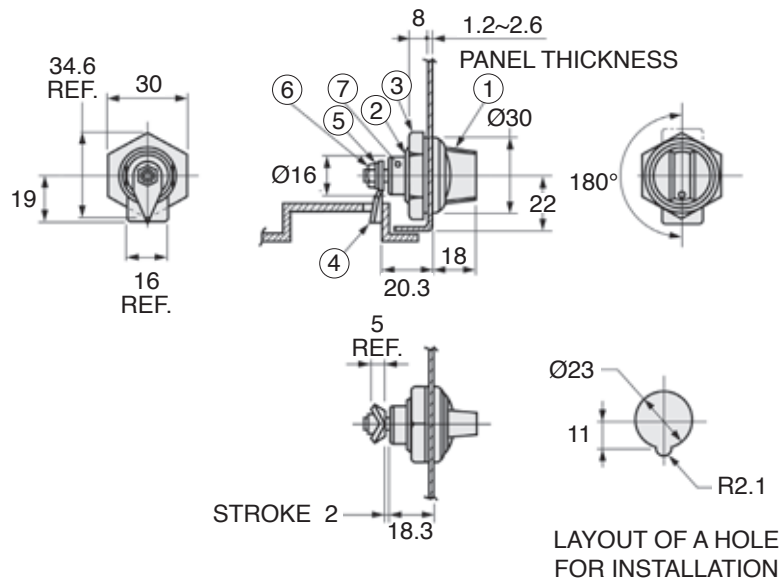
No.	Part Name	Material	Finish	Qty.
1	Knob	Plastic / Steel	Black / Zinc Plated	1
2	Housing	Plastic	Black	
3	Mounting Nut			
4	Lever	Steel	Zinc Plated	
5	Locking Washer			
6	Hexagonal Nut			
7	Spring	Stainless Steel	—	

5

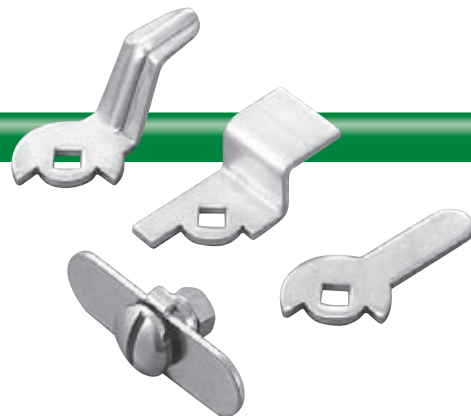
• **HANDLE**

Catalog Number	Draw-In Force N (kgf)	Net Weight g
MNAT13MTL284	11.8 (1.2) ~ 18.6 (1.9)	35

NOTE: Tightening torque for the mounting nut ③ should be 2 N · m (20 kgf · cm) or less.



LATCHES, PANEL - Coin Slotted



• APPLICATIONS

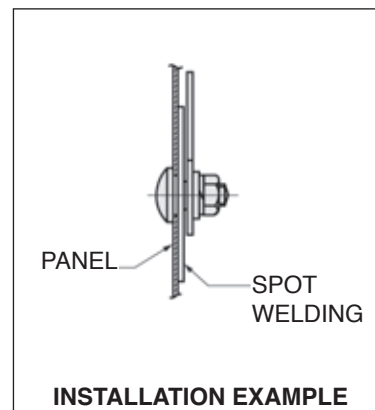
Measuring instruments / Distribution panels

• CHARACTERISTIC

Use a screwdriver or a coin to turn this simple lock.

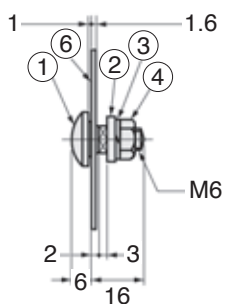
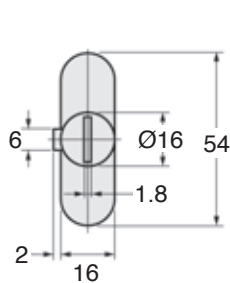
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Slotted Head Screw	Brass	Nickel Plated	1
2	Spacer		—	
3	Spring Washer		Bright Zinc Plated	
4	Hexagonal Nut	Steel	Zinc Plated	
5A	Lever			
5B	Lever			
5C	Lever			
6	Attaching Plate			

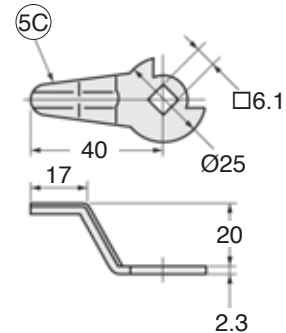
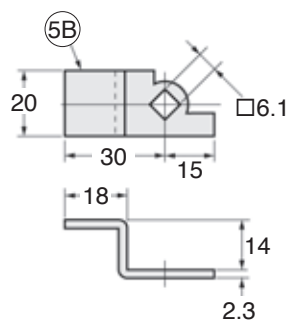
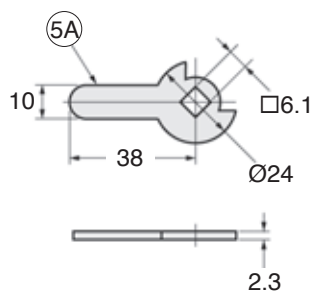
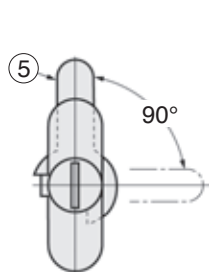
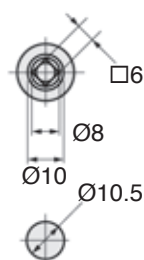


• LATCH SETS

Catalog Number	Set Includes Following Parts	Net Weight g
MNAT15MTL94-001	① ② ③ ④ 5A ⑥	34.2
MNAT15MTL94-002	① ② ③ ④ 5B ⑥	40.2
MNAT15MTL94-003	① ② ③ ④ 5C ⑥	38.2
MNAT15MTL94-004	① ② ③ ④ ⑥	24.2



LAYOUT OF A HOLE FOR INSTALLATION





- **APPLICATION**

Machine tools

- **CHARACTERISTIC**

This simple latch operates by drawing in the latch when the dial is turned clockwise and drawing out the latch when the dial is let go.

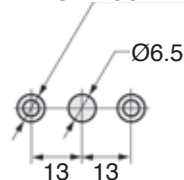
• PARTS LIST

No.	Part Name	Material	Finish	Qty.		
1	Dial	Brass	Chrome Plated	1		
2	Shaft		Nickel Plated			
3	Spacer					
4	Pin					
5	Latch	Piano Wire	Zinc Plated	1		
6	Spring					
7	Spring	Steel				
8	Base					
9	Cover					
10	Cam					
11	Countersunk Screw	Steel	—	4		
12	Set Screw			1		

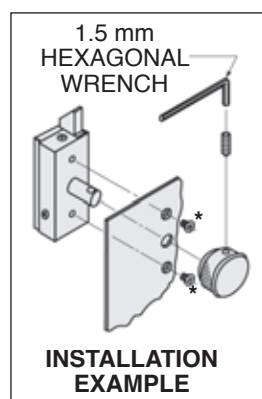
- **LATCH, DIAL**

Catalog Number	Net Weight g
MNAT28MTL223	66.1

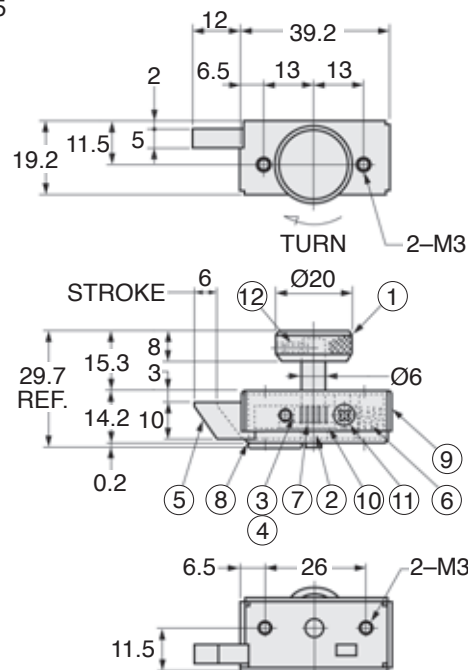
2-COUNTERSINK Ø6.5
HOLE Ø3.2



LAYOUT OF HOLES FOR INSTALLATION



*Marked parts are not included.



- **APPLICATION**

Machine tools

- **CHARACTERISTICS**

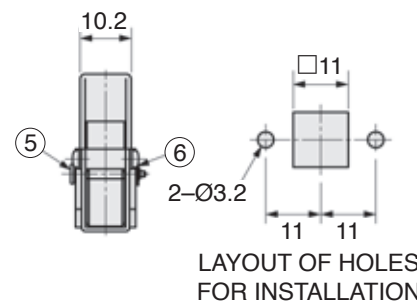
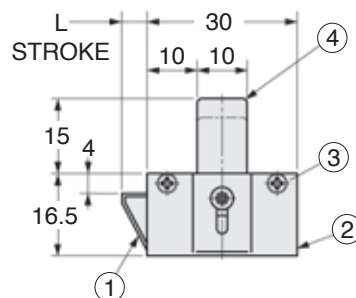
The latch can be opened simply by pressing the button. Just closing the door makes the latch lock.

• PARTS LIST

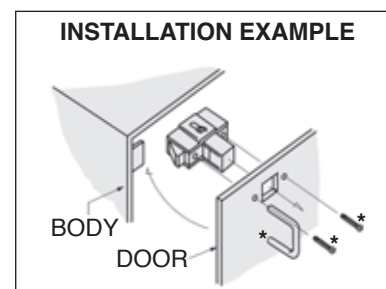
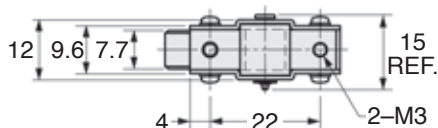
No.	Part Name	Material	Finish	Qty.
1	Latch	Stainless Steel	Barrel Polish	1
2	Case	Brass	Nickel Plated	
3	Base			
4	Push Button			
5	Rivet	Stainless Steel	—	
6	Pushnut			

- **LATCHES, SLAM**

Catalog Number	L Ref.	Net Weight g
MNAT29MTL135	5	34.7
MNAT29MTL135L	6.3	



LAYOUT OF HOLES FOR INSTALLATION



*Marked parts are not included

STOPPER, SNAP



• APPLICATIONS

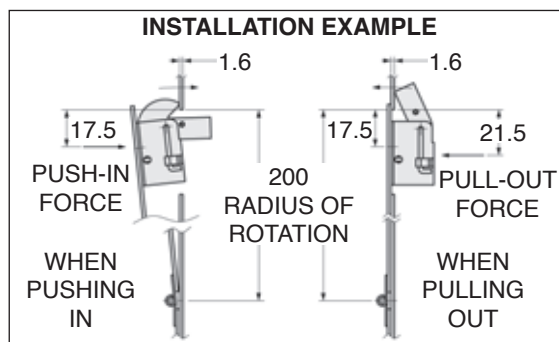
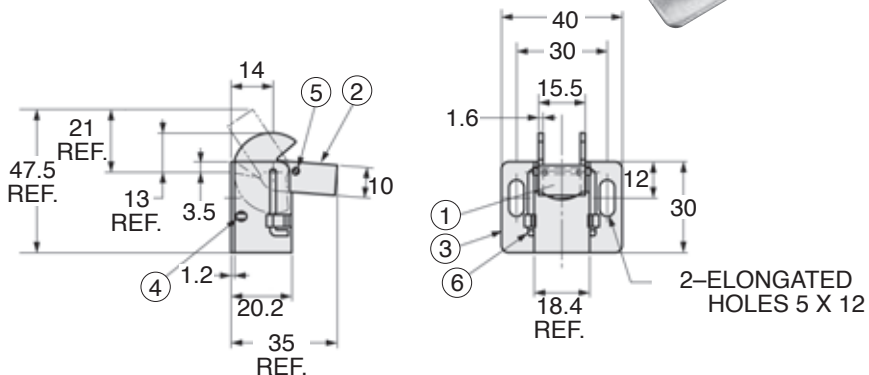
Various type of machine tools / Packaging machines /
Small storage boxes

• CHARACTERISTICS

Just push a lid in to make it hold in place with this turnover type stopper. Vibration can be absorbed, since tensile force of the spring holds the latch.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Spring	Piano Wire	Zinc Plated	1
2	Latch	Steel		
3	Housing			
4	Pin			
5	Pin			
6	Pin			2



• STOPPER

Catalog Number	Push-in Strength N (kgf) for 1.6 Thickness	Pull-out Strength	Net Weight g
MNAT33MTL249	Approx. 40 (4)	Approx. 50 (5)	33.4

LATCH, CRESCENT

• APPLICATIONS

Vessels / Vehicles / Machine tools

• CHARACTERISTIC

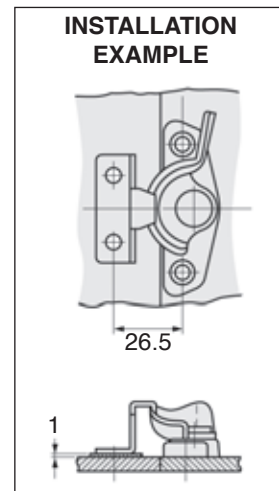
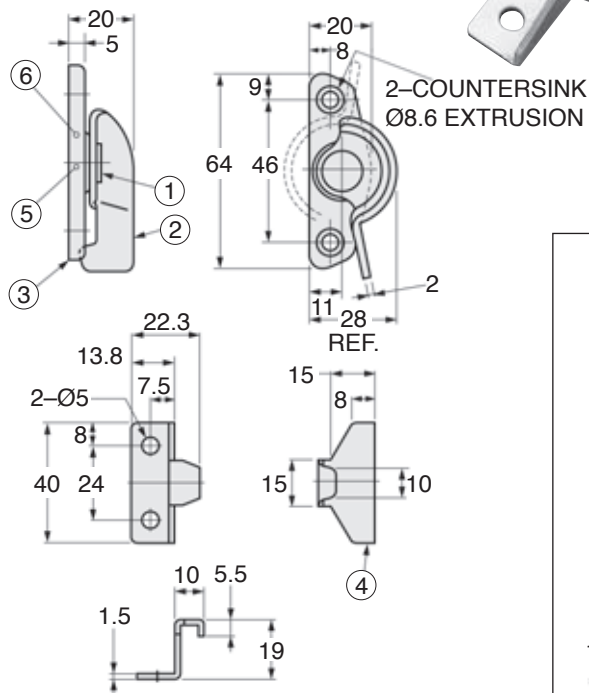
The latch is made of stainless steel to get more effective anticorrosion and chemical resistance.

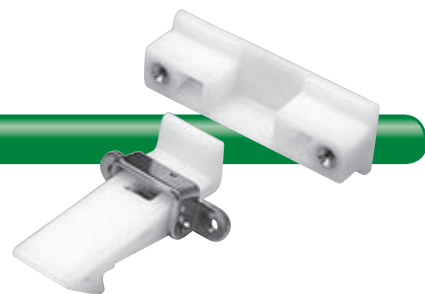
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Pivot Pin	Stainless Steel	—	1
2	Lever			
3	Base			
4	Strike Plate			
5	Cam			
6	Spring	Piano Wire		

• LATCH

Catalog Number	Net Weight g
MNAT34MTL153	45.7





• APPLICATIONS

Machine tools / Telecommunication devices /
Small cabinet doors

• CHARACTERISTICS

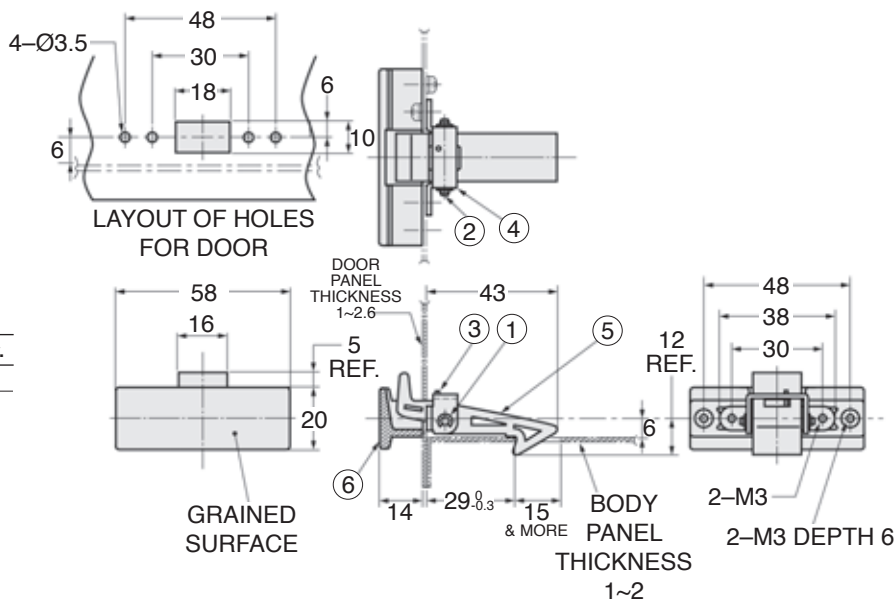
The handle and latch are combined into one piece. Just push the door in to make it lock.

• OPERATION INSTRUCTIONS

To unlock, pull the handle out while pressing the latch lever. Make sure that the latch lever is pressed in completely.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	E-Ring	Stainless Steel	—	2
2	Pin			
3	Spring			
4	Catch	Steel	Nickel Plated	1
5	Latch	Acetal	Primary Color	
6	Handle	Acetal / Brass		



- **LATCH, PUSH**

Catalog Number	Net Weight g
MNAT30MTL298	30



All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

- APPLICATIONS

Vehicles / Tool boxes / Machine tools / Doors for any kind of storage

- **CHARACTERISTIC**

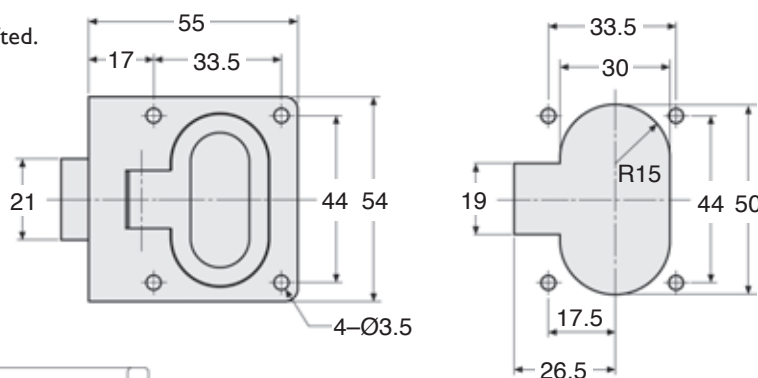
Lift up position of the handle keeps the latch in the retracted position.

- **NOTE**

To make the latch lock, close the door while the latch handle is lifted. Then push the handle down into the body.

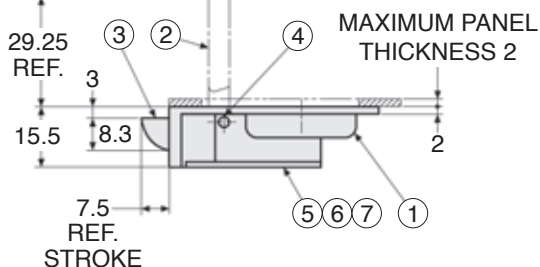
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Body	Die Cast Aluminum	Silver Paint	1
2	Handle		Chemical Conversion	
3	Latch	Stainless Steel	—	
4	Pin			
5	Spring			
6	Cover	Steel	Zinc Plated	4
7	Phillips Head Countersunk Screw			



- **LATCH, FLUSH RING**

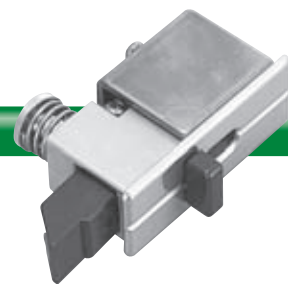
Catalog Number	Net Weight g
MNAT32MTL299	58



LAYOUT OF HOLES FOR INSTALLATION

LATCH, SLAM - Double Action

RoHS
COMPLIANT



• APPLICATIONS

Distribution boards / Distribution panels / Control boards /
Various types of boxes

• CHARACTERISTIC

When the door is very tall or wide and there are two or more latches, a latch can be kept open while reaching others.

• OPERATION INSTRUCTIONS

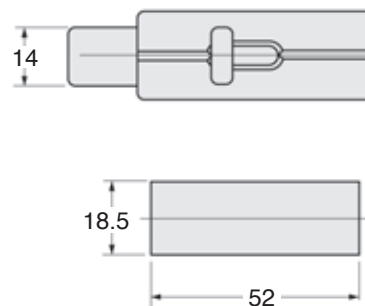
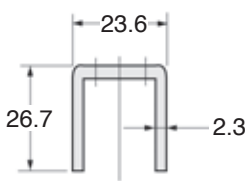
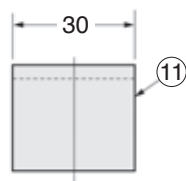
1. The door is locked when the door is closed by the mechanism of the latch. The lock pin hits the preinstalled angle and gets pushed in. (**Fig. 1**)
2. When opening, slide the lever. The latch will remain retracted (open-hold mechanism). (**Fig. 2**)
3. Opening the door allows the latch to return to the original position.
4. The lever and the latch move together. When the lock pin is not used, it can be used as an ordinary latch.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Case	Zinc Die Cast	Nickel Plated (Dull Finish)	1
2	Case		Nickel Plated	
3	Stop Holder		Nickel Plated	
4	Cap		Nickel Plated	
5	Latch	Acetal	Black	—
6	Lock Pin	Brass	—	
7	Spring	Stainless Steel	—	
8	Spring		—	
9	Spring		—	
10	Spring Pin	Steel	Zinc Plated	4
11	Bracket		Zinc Plated	
12	Pan Head Small Screw		Zinc Plated	

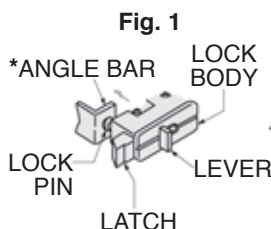
• LATCH

Catalog Number	Net Weight g
MNAT31MTL260	131

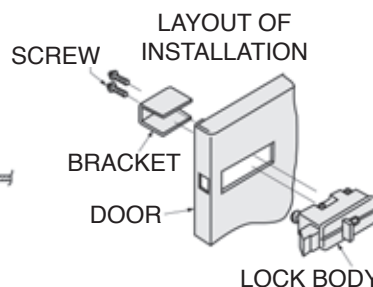
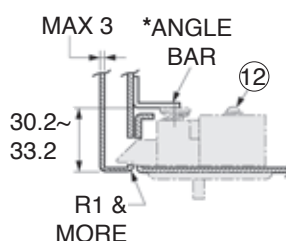


LAYOUT OF A HOLE FOR INSTALLATION

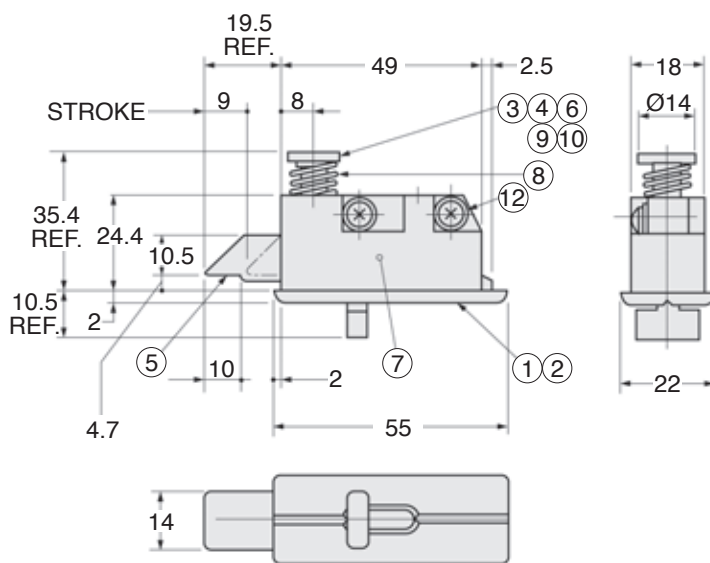
INSTALLATION EXAMPLE



AN EXAMPLE OF TWO ...TL260 ARE USED AT THE TOP AND THE BOTTOM OF THE DOOR.



*Angle bar is not included.



LATCH, PUSH-PULL



• APPLICATION

Double doors

• CHARACTERISTICS

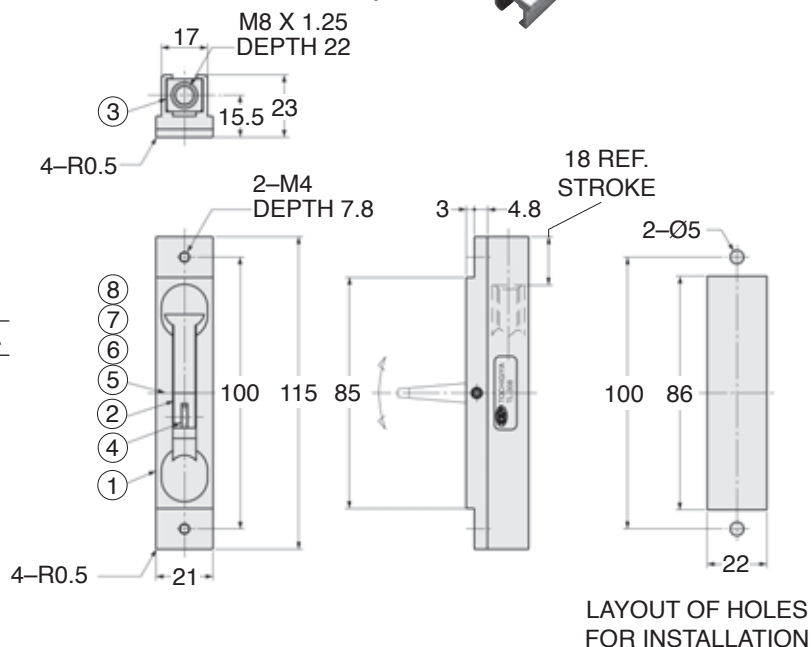
To install, embed latch in a door. Can be locked and unlocked with a rod through lever operation.

Use rod below: **MNAT35M.TL408...**

(Rod sold separately)

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Base	Die Cast Aluminum	Silver Metallic	1
2	Lever	Acetal	Black	
3	Slider		White	
4	Arm			
5	Spring	Stainless Steel	—	
6	Wave-shaped Spring Pin			
7	Wave-shaped Spring Pin			
8	Wave-shaped Spring Pin			



• LATCH

Catalog Number	Net Weight g
MNAT35MTL308	66

• APPLICATION

Use with push-pull latch above, **MNAT35MTL308**.



• ROD – Steel, Zinc Plated

Catalog Number	A	Net Weight g
MNAT35M1TL4082	150	98.5
MNAT35M2TL4081	550	345



100% RoHS 
COMPLIANT

www.allmetricsmallparts.com

Phone: (516) 302-0152

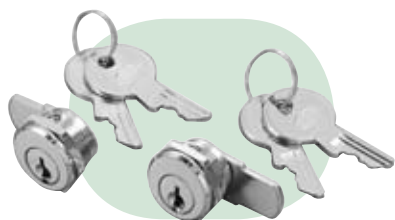
FAX: (516) 302-0153

SECTION 6

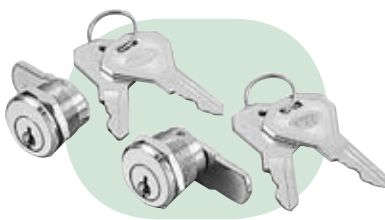
Locks MNB

6





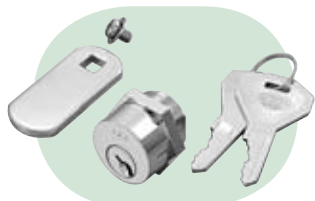
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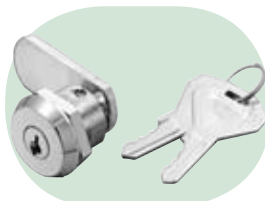
6-6



6-7



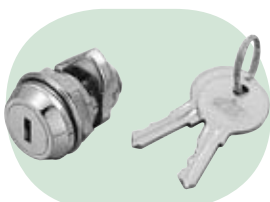
6-8



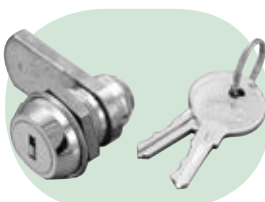
6-9



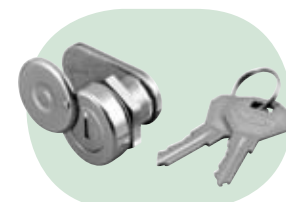
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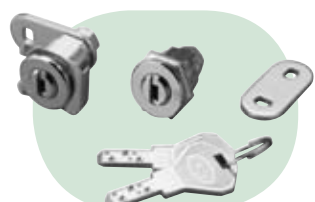
6-11



6-12



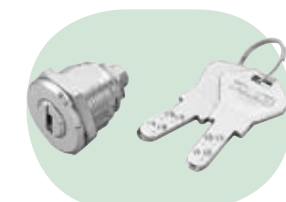
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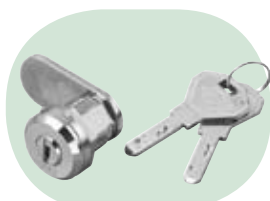
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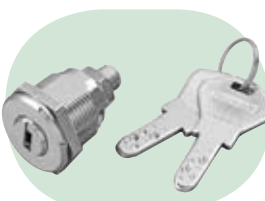
6-15



6-16 & 6-17



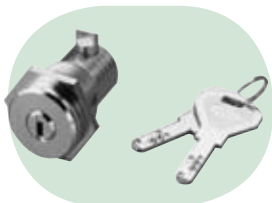
6-18



6-19



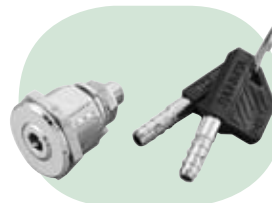
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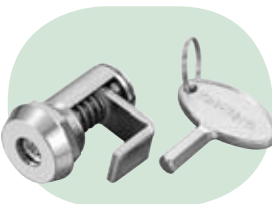
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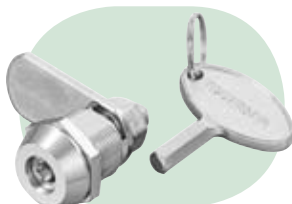
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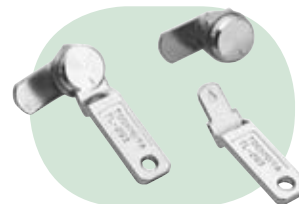
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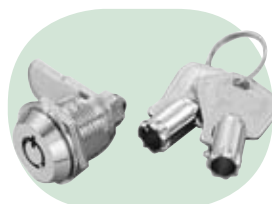
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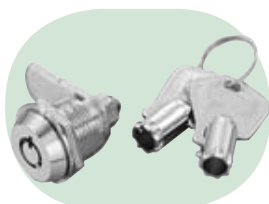
6-25



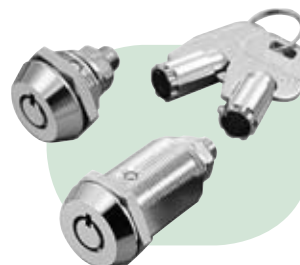
6-26



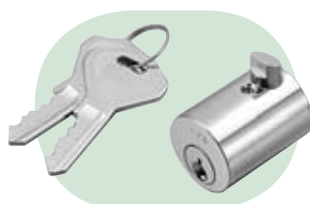
6-27



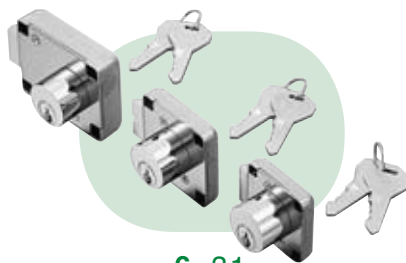
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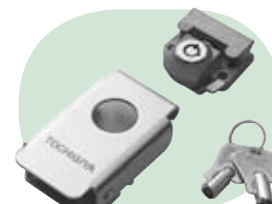
6-29



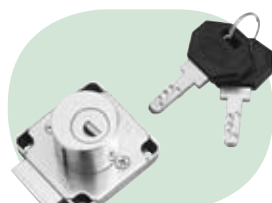
6-30



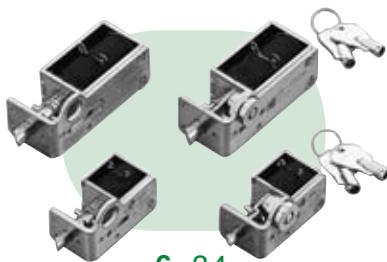
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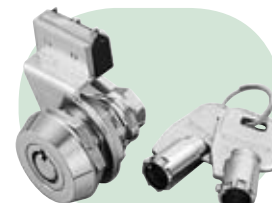
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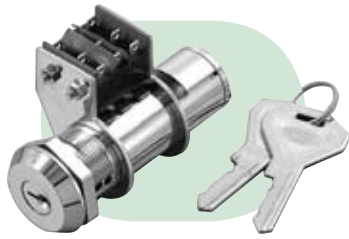
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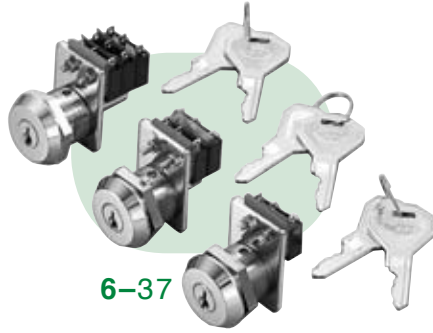
6-34



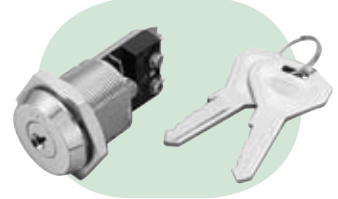
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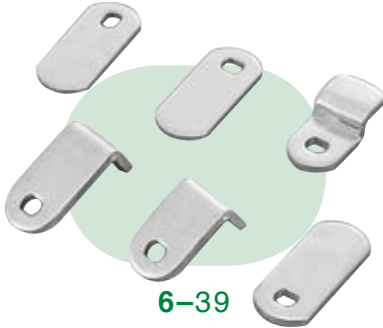
6-36



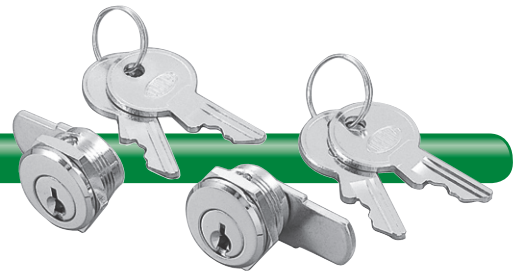
6-37



6-38



6-39



• **APPLICATIONS**

Small cabinets / Various types of small devices

• **CHARACTERISTIC**

A simple, low-cost lock.

• **SPECIFICATIONS**

1. The rotational angle of the key is 90° between points **A** and **B**.
2. The key can be inserted and removed only at point **A**.

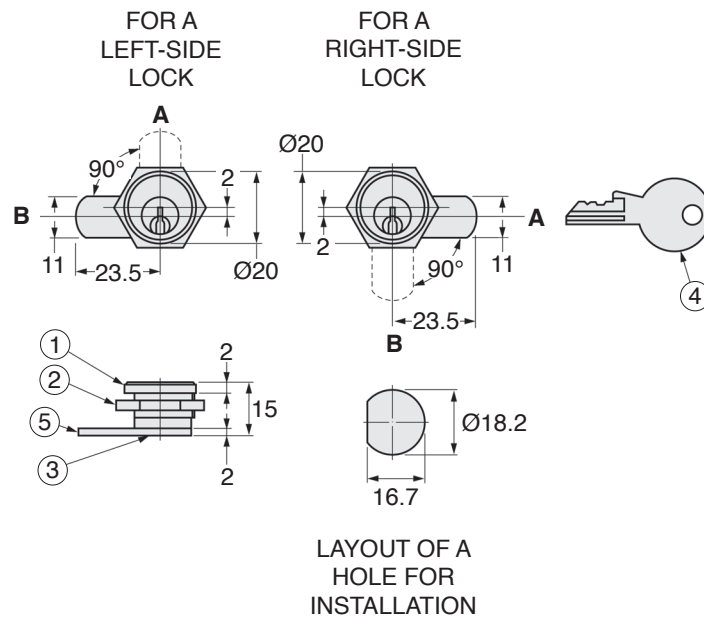
• **PARTS LIST**

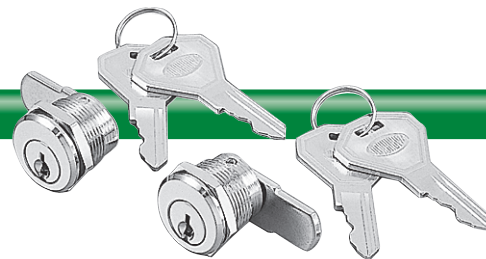
No.	Part Name	Material	Finish	Qty.
1	Lock Body	Brass	Chrome Plated	1
2	Nut		Nickel Plated	
3	Set Screws			2
4	Keys			
5	Lever	Steel	Zinc Plated	1

• **LOCKS**

Catalog Number	Specifications	Key No.	Net Weight g
MNBT10MTL110-1	Left-Side Lock	110	41.5
MNBT10MTL110-2	Right-Side Lock		

6





• APPLICATIONS

Small cabinets / Various types of small devices

• CHARACTERISTIC

A simple, low-cost lock.

• SPECIFICATIONS

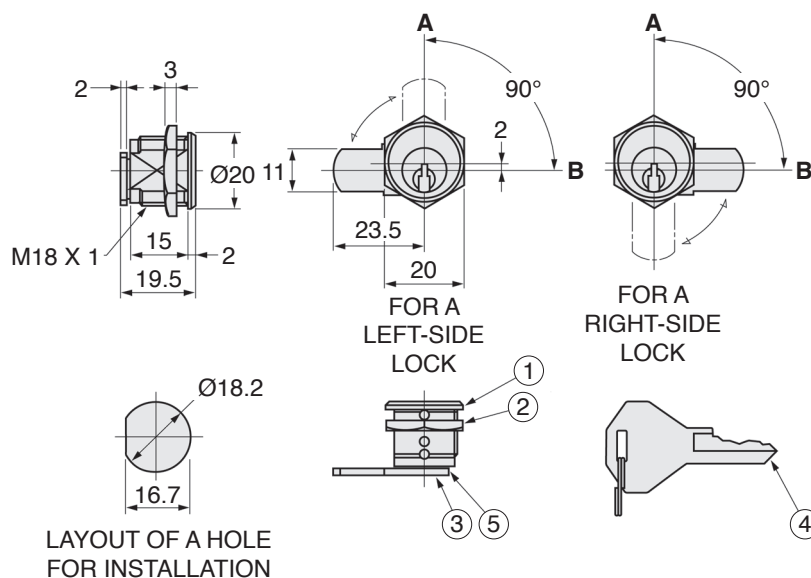
1. The rotational angle of the key is 90° between points **A** and **B**.
2. The key can be inserted or removed only at point **A**.
3. The key number is identical for both locks in stock.

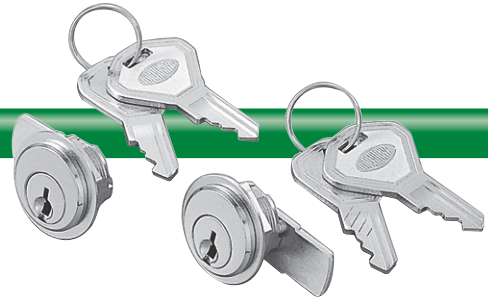
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Lock Body	Brass	Chrome Plated	1
2	Nut		Nickel Plated	
3	Set Screws			2
4	Keys			
5	Lever	Steel	Bright Zinc Plated	1

• LOCKS

Catalog Number	Specifications	Key No.	Net Weight g
MNBT11MTL121-1	Left-Side Lock	121	51.9
MNBT11MTL121-2	Right-Side Lock		





• **APPLICATIONS**

Small cabinets / Various types of small devices

• **CHARACTERISTIC**

This lock is thin, simple and economical.

• **SPECIFICATIONS**

1. The rotational angle of the key is 120° between points **A** and **B**.
2. The key can be inserted or removed only at point **A**.
3. The key number is identical for both locks in stock.

• **PARTS LIST**

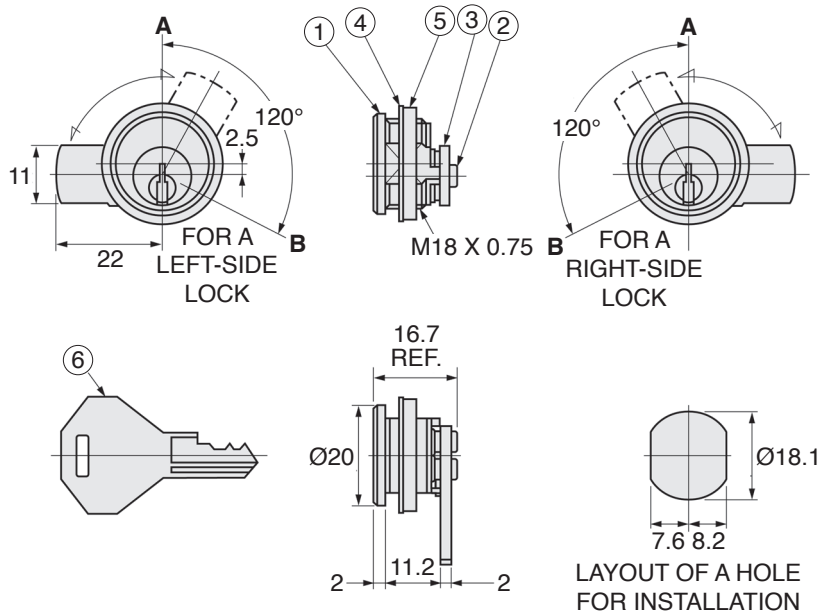
No.	Part Name	Material	Finish	Qty.
1	Lock Body	Zinc Die Cast	Chrome Plated	1
2	Pan Head Screws	Steel	Zinc Plated	2
3	Lever		*	1
4	Flat Washer		Bright Zinc Plated	
5	Nut	Brass	Nickel Plated	2
6	Keys			

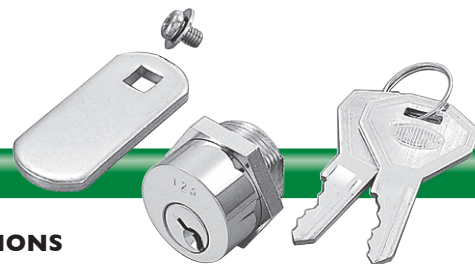
*...MTL210-1 is Zinc Plated

...MTL210-2 is Bright Zinc Plated

• **LOCKS**

Catalog Number	Specifications	Key No.	Net Weight g
MNBT12MTL210-1	Left-Side Lock	T210	39.5
MNBT12MTL210-2	Right-Side Lock		





• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Lock Body	Brass	Chrome Plated	1
2	Hexagonal Nut		Nickel Plated	
3	Keys	Steel	Zinc Plated	2
4	Set Screw		Bright Zinc Plated	
5	*Lever			1

*Lever sold separately.

• LOCKS

Catalog Number	Component	Key No.	Net Weight g
MNBT14MTL123-001	Switch Lock with Lever, Type A	123	107.5
MNBT14MTL123-002	Switch Lock with Lever, Type B	2633	

• APPLICATIONS

Theft prevention devices / Boxes

• CHARACTERISTIC

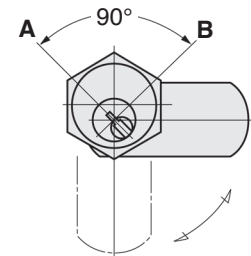
Since the surface of the lock is flat, it can be installed flush with the surface of the panel.

• SPECIFICATIONS

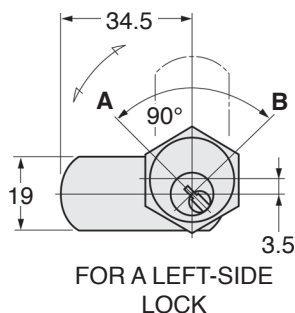
1. The rotational angle of the key is 90° between points **A** and **B**.
2. The key can be inserted and removed at points **A** and **B** for ... **MTL123-001**, and only at point **A** for ... **MTL123-002**.
3. The orientation of the locks (clockwise or counterclockwise) can be changed by setting the lever at different positions.

6

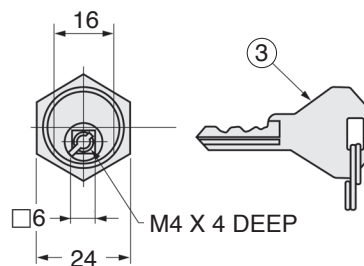
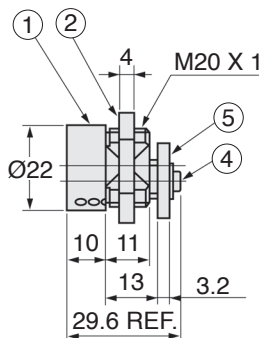
...MTL123-001



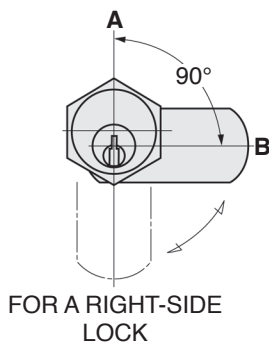
FOR A RIGHT-SIDE LOCK



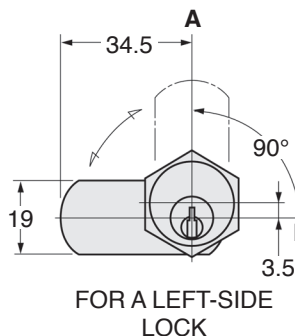
FOR A LEFT-SIDE LOCK



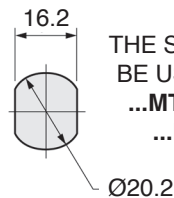
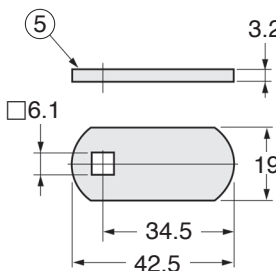
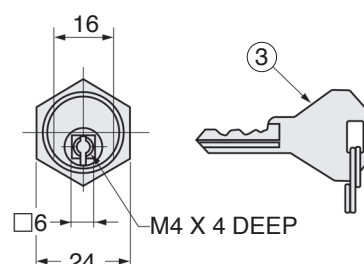
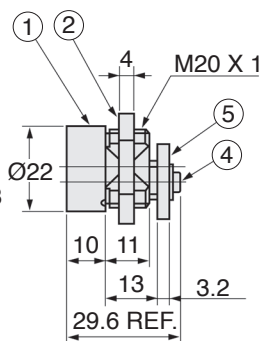
...MTL123-002



FOR A RIGHT-SIDE LOCK

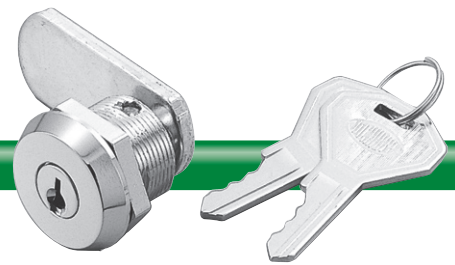


FOR A LEFT-SIDE LOCK



THE SAME HOLE CAN BE USED FOR BOTH ...MTL123-001 AND ...MTL123-002.

LAYOUT OF A HOLE FOR INSTALLATION



• APPLICATIONS

Small cabinets / Various types of small devices

• CHARACTERISTIC

The lock contains a detent mechanism to get a locking action confirmation.

• SPECIFICATIONS

1. The rotational angle of the key is 90° between points **A** and **B**.
2. The key can be inserted and removed only at point **A**
3. The lever can be mounted at every 90° point.

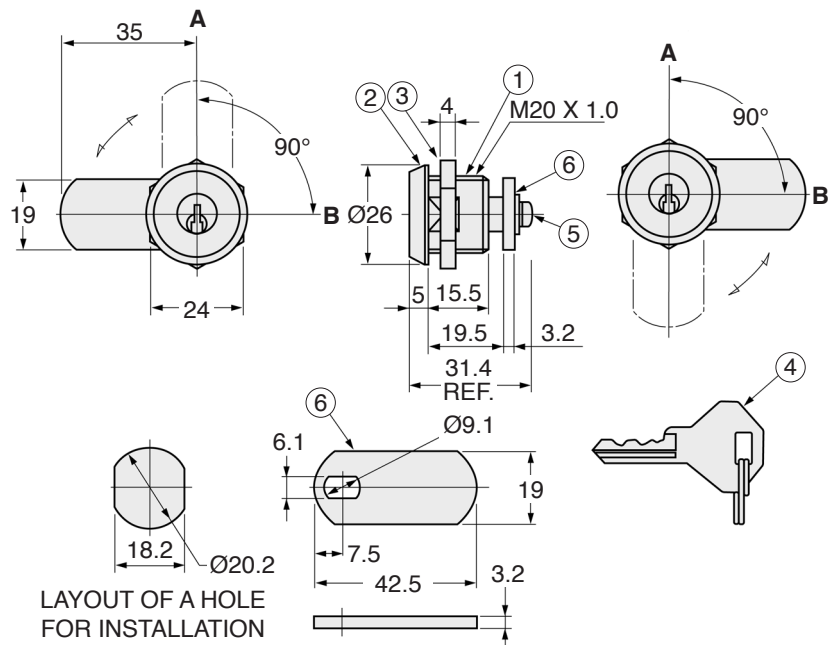
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Lock Body	Brass	Chrome / Nickel Plated	1
2	Face Nut		Chrome Plated	
3	Hexagonal Nut		Nickel Plated	2
4	Keys	Steel	—	
5	Set Screw		Bright Zinc Plated	1
6	Lever			

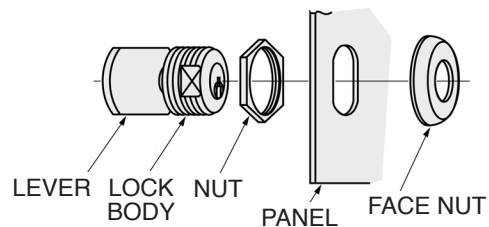
• LOCK

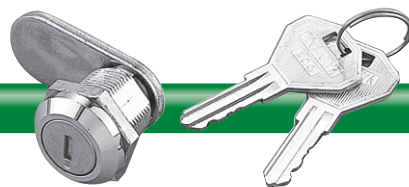
Catalog Number	Key No.	Net Weight g
MNBT13MTL122-001	122	89.9

6



INSTALLATION EXAMPLE





• APPLICATIONS

Distribution boards / Distribution panels / Locks for lids and doors in electrical facilities

• CHARACTERISTICS

For convenience, this lock uses the same key (No. 200) as the ones used for cabinet handle latches. The shutter on the keyhole reduces the chance of foreign material getting into the lock.

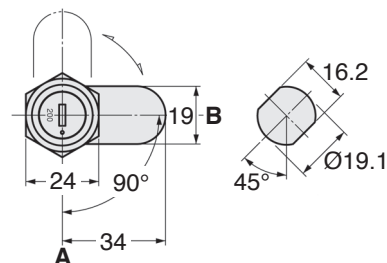
• SPECIFICATIONS

1. The rotational angle of the key is 90° between points **A** and **B**.
2. The key can be inserted or removed at points **A** and **B**.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Lock	Stainless Steel / Zinc Die Cast	— / Zinc Plated	1
2	Case	Zinc Die Cast	Chrome Plated	
3	Attaching Nut			
4	Rotation Control Cam			
5	Pan Head with Cross Hole Small Screw with Washer	Steel	Zinc Plated	
6	Lever			
7	Keys	Brass	Nickel Plated	2

LAYOUT OF A HOLE FOR
INSTALLATION (AT PANEL SURFACE)



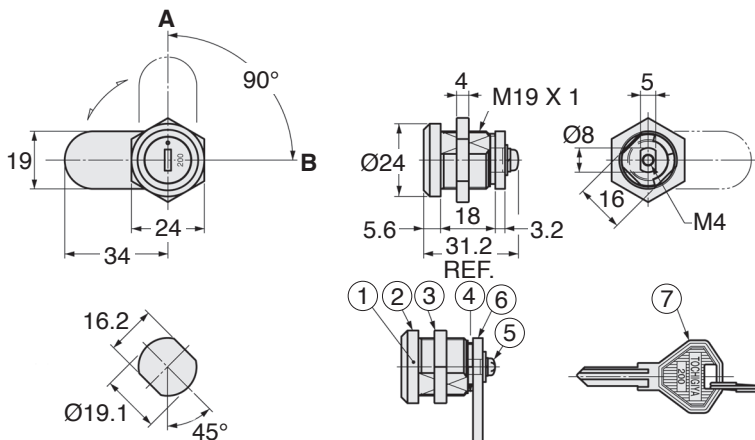
FOR A RIGHT-SIDE LOCK
(WITHOUT REORIENTING THE CAM)

• LOCK

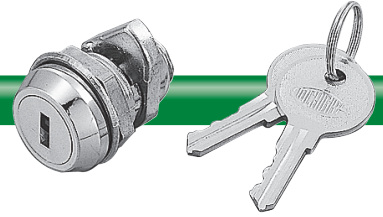
Catalog Number	Key No.	Net Weight g
MNBT16MTL305	200	74

NOTE: Care should be taken not to drop the rotation control cam while changing the lever or the orientation.

LAYOUT OF A HOLE FOR
INSTALLATION (AT PANEL SURFACE)



FOR A LEFT-SIDE LOCK



• **APPLICATIONS**

Boxes / Various types of small devices

• **CHARACTERISTIC**

The lock is extra strong due to the thick lever.

• **SPECIFICATIONS**

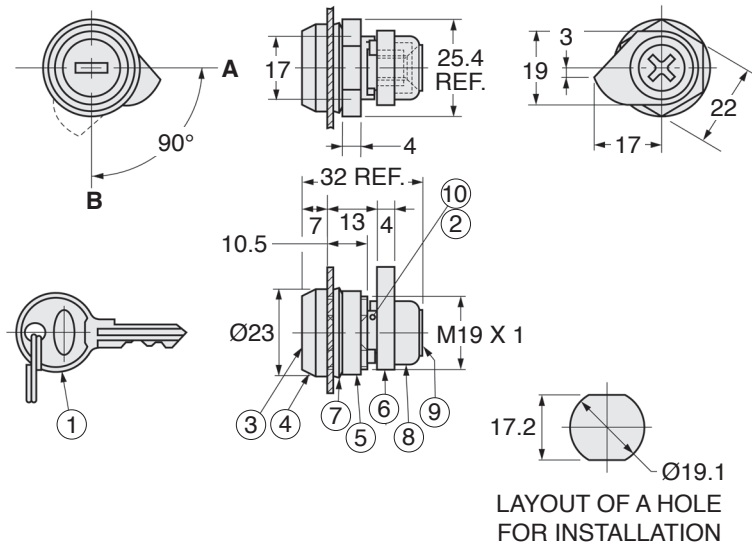
1. The rotational angle of the key is 90° between points **A** and **B**.
2. The key can be inserted or removed at points **A** and **B**.

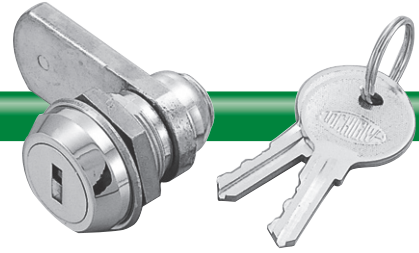
• **LOCK**

Catalog Number	Key No.	Net Weight g
MNBT08MTL64	500	65.8

• **PARTS LIST**

No.	Part Name	Material	Finish	Qty.			
1	Keys	Brass	Nickel Plated	2			
2	Tumblers		—	5			
3	Inner Tube	Zinc Die Cast	Chrome Plated	1			
4	Outer Tube						
5	Hexagonal Nut		Zinc Plated				
6	Lever	Steel					
7	Countersunk Washer						
8	Bowl-Shaped Washer						
9	Flat Head Screw	Phosphor Bronze	—	5			
10	Springs						





• APPLICATIONS

Small cabinets / Various types of small devices

• CHARACTERISTIC

The lock is extra strong due to the thick lever.

• SPECIFICATIONS

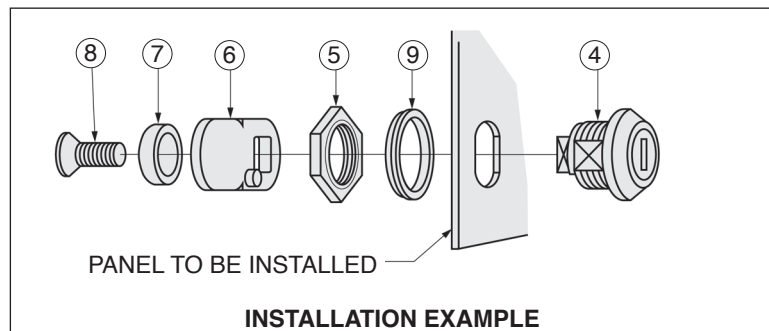
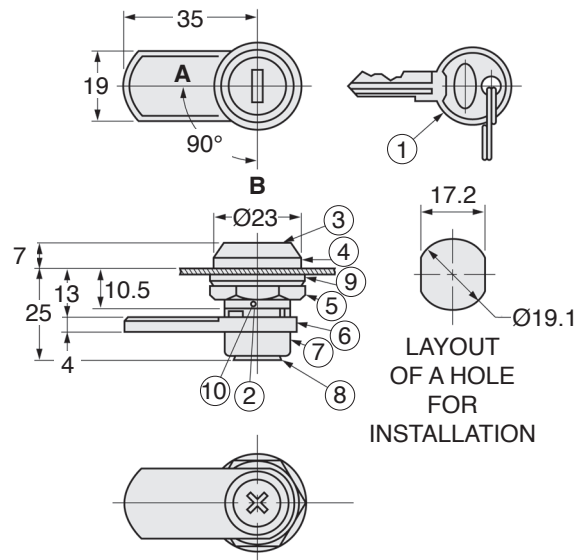
1. The rotational angle of the key is 90° between points **A** and **B**.
2. The key can be inserted or removed at points **A** and **B**.
3. The lever can be installed with either a clockwise or counterclockwise rotation.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.			
1	Keys	Brass	Nickel Plated	2			
2	Tumblers		—	5			
3	Inner Tube	Zinc Die Cast	Chrome Plated	1			
4	Outer Tube						
5	Hexagonal Nut		Zinc Plated				
6	Lever	Steel					
7	Bowl-Shaped Washer						
8	Flat Head Screw						
9	Countersunk Washer	Phospher Bronze	—	5			
10	Springs						

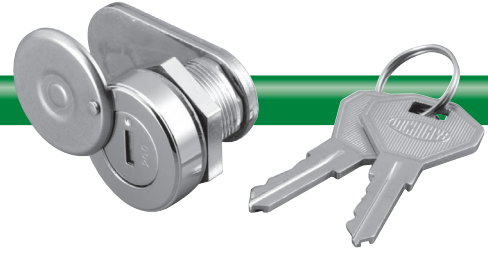
• LOCK

Catalog Number	Key No.	Net Weight g
MNBT09MTL167	500	76.2



LOCK, CAM, Capped-Cylinder

RoHS
COMPLIANT



• APPLICATIONS

Small cabinets / Various small equipment

• CHARACTERISTIC

The revolving cap minimizes dust buildup inside the lock.

• SPECIFICATIONS

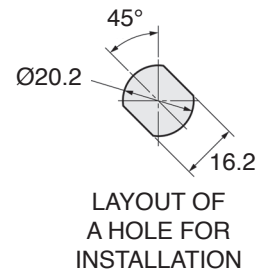
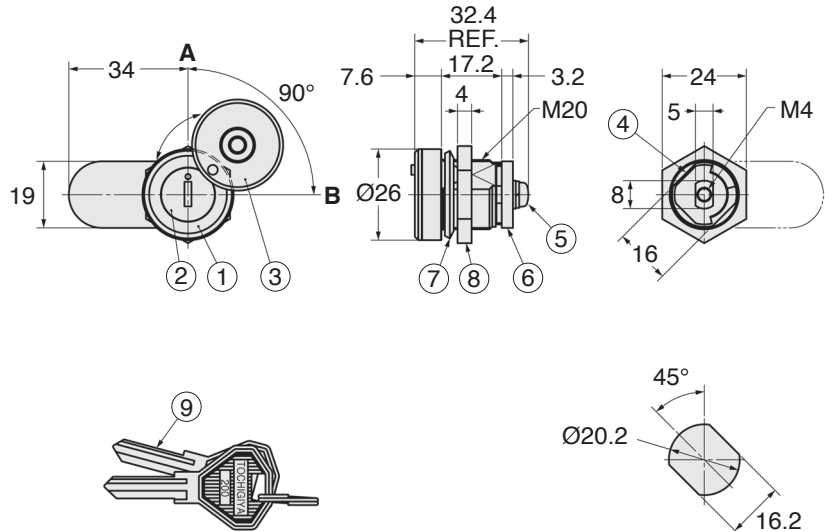
1. The rotational angle of the key is 90° between points **A** and **B**.
2. The key can be inserted or removed at points **A** and **B**.

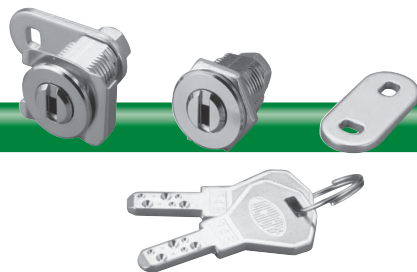
• PARTS LIST

No.	Part Name	Material	Finish	Qty.	
1	Case	Zinc Die Cast	Chrome Plated	1	
2	Lock	Zinc Die Cast / Stainless Steel	Zinc Plated / –		
3	Cap	Stainless Steel	Barrel Polishing		
4	Rotation Control Cam		–		
5	Phillips Head Screw				
6	Lever				
7	Countersunk Washer	Steel	Zinc Plated	2	
8	Attaching Nut	Brass	Nickel Plated		
9	Keys				

• LOCK

Catalog Number	Key No.	Net Weight g
MNBT34MTL342	200	52.2





• APPLICATIONS

Communication devices / Control boards / Office equipment

• CHARACTERISTICS

Developed for miniaturized equipment. Smaller diameter and length than ...MTL247, but with the same security level and reversible keys. Two styles are available: one with a retainer for a quick assembly and the other with the traditional hex nut. One can reverse the lever by switching the orientation when assembling.

• SPECIFICATIONS

1. The rotational angle of the key is 90° between points **A** and **B**.
2. The key can be inserted or removed only at point **A**.
(Two-point inserting locks are not available.)

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Lock	Brass	Chrome Plated	1
2	Keys		Nickel Plated	2
3	Retainer for ...MTL348-1 Attaching Nut for ...MTL348-2	Stainless Steel	—	1
4	Rotational Control Cam	Steel	Zinc Plated	
5	Lever			
6	Lock Washer			
7	Hex Nut			

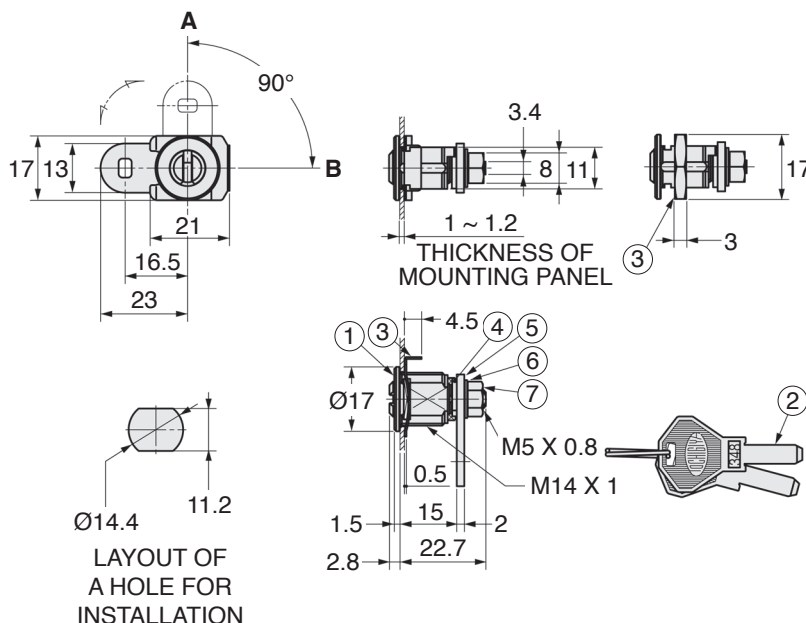
6

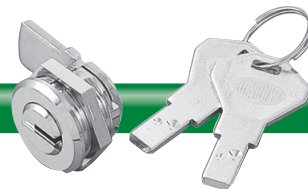
• LOCKS

Catalog Number	Key No.	Net Weight g
MNBT31MTL348-1	348	40
MNBT31MTL348-2		

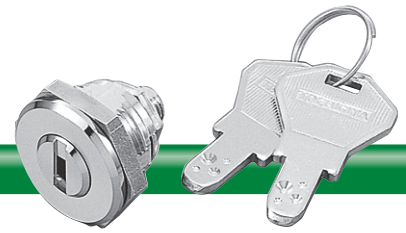
...MTL348-1

...MTL348-2





LOCK, CAM, Short-Type



• APPLICATIONS

Automatic vending machines / Ticket machines /
Information devices / Office automation devices

• CHARACTERISTICS

One of the locks in the **...MTL247** series; the position of the lever is shortened by 4.1 mm, which is the same as cam lock **...MTL110**. Since the lock uses a flat-type key, a large variety of keys are available unlike pin-type key locks.

• SPECIFICATIONS

1. The rotational angle of the key is 90° between points **A** and **B**.
2. The key can be inserted or removed only at point **A**.
(Two-point inserting locks are not available.)
3. The key number is identical for the locks in stock.

• PARTS LIST

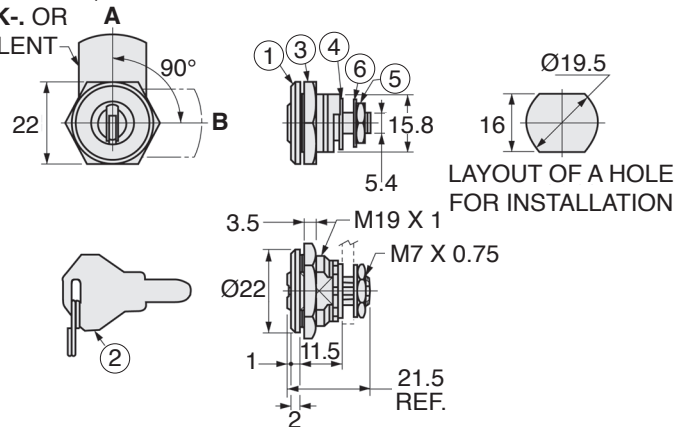
No.	Part Name	Material	Finish	Qty.
1	Lock Body	Brass	Chrome Plated	1
2	Keys		Nickel Plated	2
3	Large Nut			
4	Rotation Control Cam	Steel	Zinc Plated	1
5	Small Nut			
6	Washer			

6

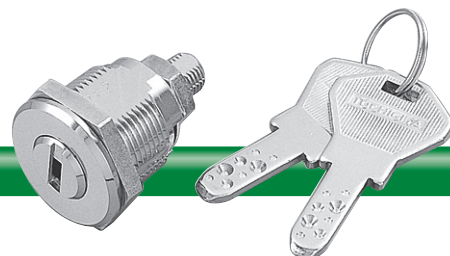
• LOCK

Catalog Number	Key No.	Net Weight g
MNBT05MTL251	251	43.2

LEVER
(SOLD SEPARATELY)
**...MTL96K- OR
EQUIVALENT**



See last page in this section for Cam Lock Levers.



• APPLICATIONS

Automatic vending machines / Ticket machines /
Information devices / Office automation devices

• CHARACTERISTICS

One of the locks in the **...MTL247** series; the position of the lever is lengthened by 1.8 mm, which is the same as cam lock **...MTL96**. The lock uses a reversible type key for smooth operation. It is suitable for small devices that have less extrusion on the mounting surface.

• SPECIFICATIONS

1. The rotational angle of the key is 90° between points **A** and **B**.
2. The key can be inserted or removed only at point **A**.
(Two-point inserting locks are not available.)
3. The key number is identical for the locks in stock.

• PARTS LIST

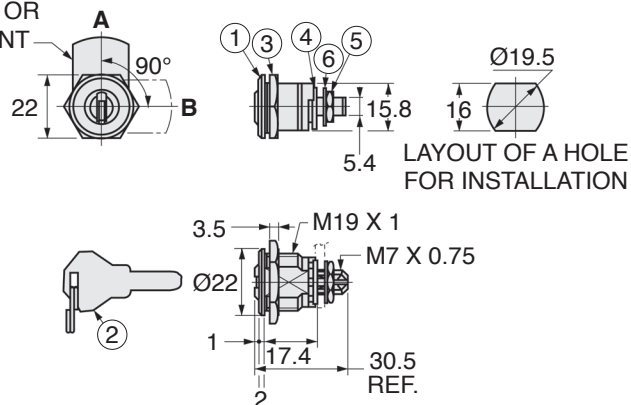
No.	Part Name	Material	Finish	Qty.	
1	Lock Body	Brass	Chrome Plated	1	
2	Keys		Nickel Plated	2	
3	Large Nut	Steel	Zinc Plated	1	
4	Rotation Control Cam				
5	Small Nut		Bright Zinc Plated		
6	Washer				

6

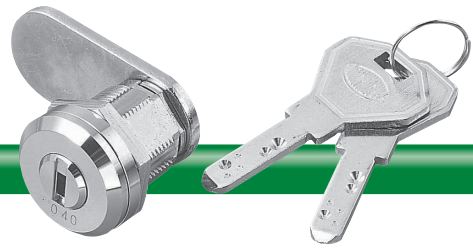
• LOCK

Catalog Number	Key No.	Net Weight g
MNBT05MTL252	252	56.8

LEVER
(SOLD SEPARATELY)
**...MTL96K- OR
EQUIVALENT**



See last page in this section for Cam Lock Levers.



• APPLICATIONS

Distribution boards / Distribution panels /
Control boards

• SPECIFICATIONS

1. The rotational angle of the key is 90° between points **A** and **B**.
2. The key can be inserted or removed at points **A** and **B**.

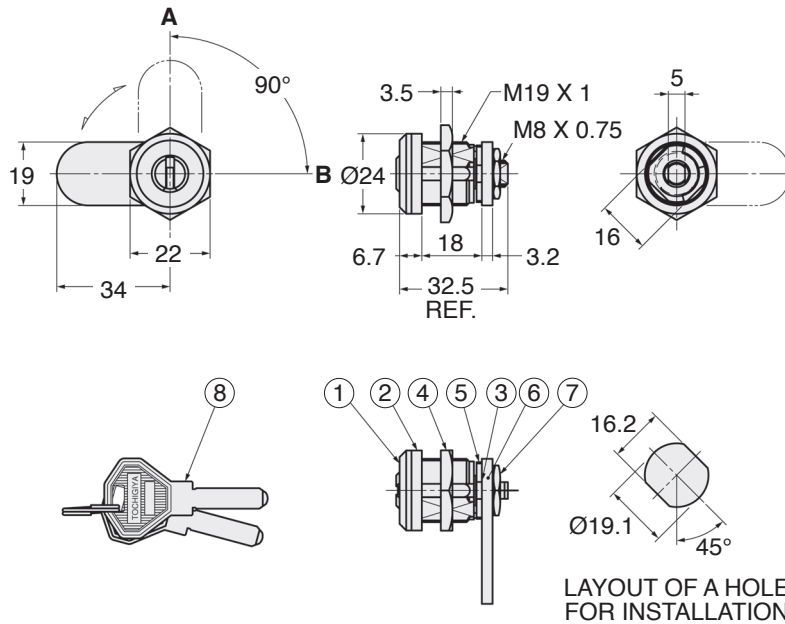
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Lock	Zinc Die-Cast	Chrome Plated	1
2	Collar			
3	Wave Washer	Stainless Steel	—	
4	Attaching Nut	Steel	Zinc Plated	
5	Rotation Control Cam			
6	Lever			
7	Hex Nut			
8	Keys	Brass	Nickel Plated	2

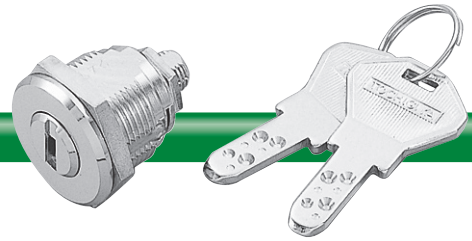
• LOCK

Catalog Number	Key* No.	Net Weight g
MNBT33MTL326	001 ~ 150	80

*Key number is randomly assigned between 001~150 and cannot be specified.



LOCK, CAM - Reversible Key



• APPLICATIONS

Automatic vending machines / Ticket machines /
Theft prevention devices

• CHARACTERISTIC

The lock uses a reversible type key for smooth operation.

• SPECIFICATIONS

1. The rotational angle of the key is 90° between points **A** and **B**.
2. The key can be inserted or removed only at point **A**.
(Two-point inserting locks are not available.)
3. The key number is identical for the locks in stock.

• PARTS LIST

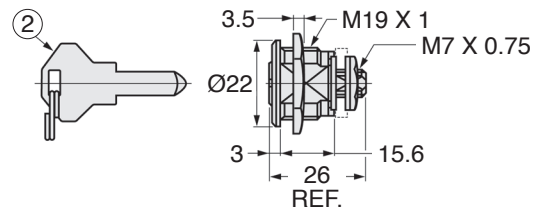
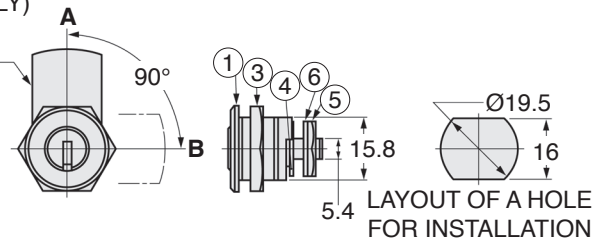
No.	Part Name	Material	Finish	Qty.	
1	Lock Body	Brass	Chrome Plated	1	
2	Keys		Nickel Plated	2	
3	Large Nut	Steel	Zinc Plated	1	
4	Rotation Control Cam				
5	Small Nut		Bright Zinc Plated		
6	Washer				

• LOCK

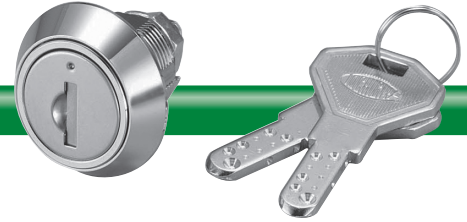
Catalog Number	Key No.	Net Weight g
MNBT05MTL247	247	52.2

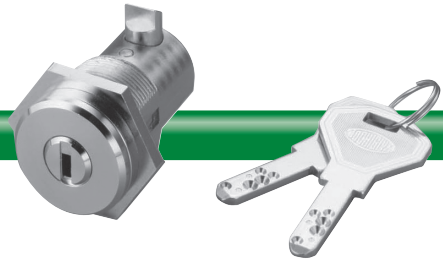
6

LEVER
(SOLD SEPARATELY)
...MTL96K- OR
EQUIVALENT



See last page in this section for Cam Lock Levers.





• **APPLICATIONS**

Small cabinet / Various small tools / Boxes

• **CHARACTERISTICS**

Can be locked without a key. For smooth operation, it is possible to use the same key as for ...**MTL326**. (available on special order)

• **SPECIFICATIONS**

1. Lock can opened between points **A** and **B** or between points **A** and **D**.
2. The key can be inserted or removed only at point **A**.

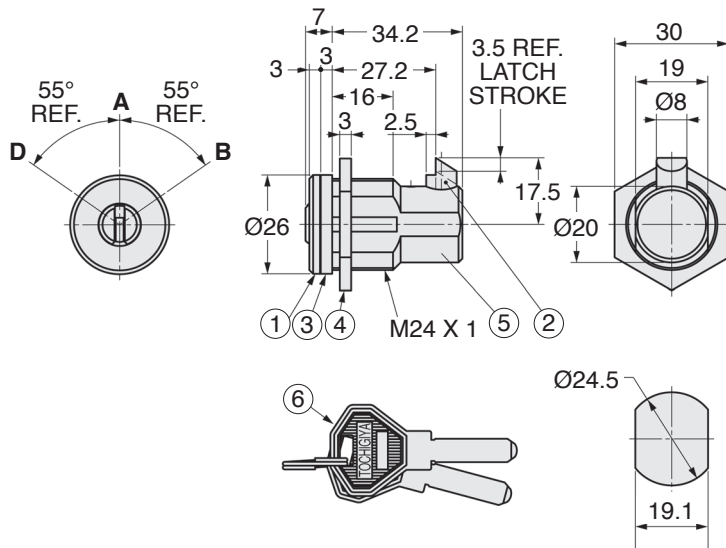
• **PARTS LIST**

No.	Part Name	Material	Finish	Qty.
1	Lock	Zinc Die Cast	Chrome Plated	1
2	Latch			
3	Spacer			
4	Attaching Nut	Carbon Steel	—	1
5	Latch Spring	Stainless Steel		
6	Keys	Brass	Nickel Plated	2

• **LOCK**

Catalog Number	Key* No.	Net Weight g
MNBT32MTL347	001 ~ 150	115

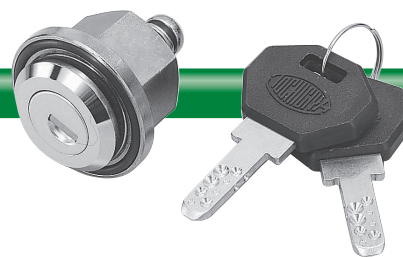
*Key number is randomly assigned between 001~150 and cannot be specified.



LAYOUT OF A HOLE
FOR INSTALLATION

LOCK, CAM - Waterproof

RoHS
COMPLIANT



• APPLICATIONS

Distribution boards / Distribution panels / Control boards

• CHARACTERISTIC

The cam lock is waterproof.

• SPECIFICATIONS

1. The rotational angle of the key is 90° between points **A** and **B**.
2. The key can be inserted or removed only at point **A**.

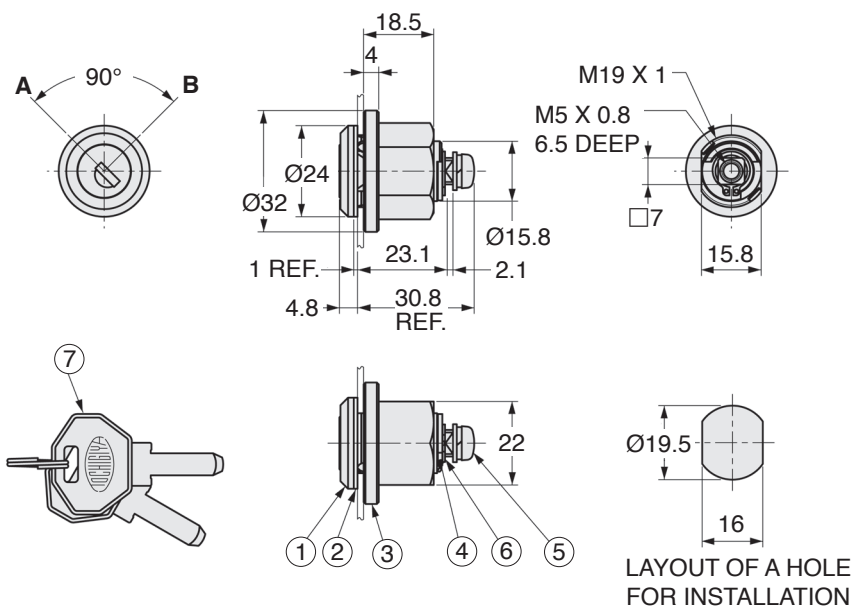
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Body	Zinc Die Cast / Stainless Steel	Chrome Plated / Zinc Plated / –	1
2	Packing	Rubber	Black	
3	Attaching Nut	Zinc Die Cast	Zinc Plated	
4	Rotation Control Cam	Steel		
5	Pan Head Screw with Washer			
6	C-Shaped Snap Ring	Stainless Steel	—	2
7	Keys	Nickel Silver / Polypropylene	—	

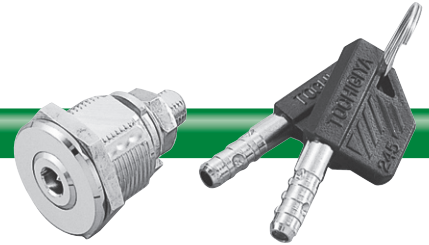
6

• LOCK

Catalog Number	Key No.	Applicable Panel Thickness	Net Weight g
MNBT01MTL324	E5000	1.4 ~ 3.2	87.3



LOCK, CAM, Ball-Type Key



• APPLICATIONS

Automatic vending machines / Ticket machines /
Theft prevention devices

• CHARACTERISTIC

The installation method is compatible to that of the ...MTL96. series. However, the innovative design of the ball-type key provides exceptional operability and security, which is suitable for antitheft devices. The unique design structure makes the lock highly tamper-resistant.

• SPECIFICATIONS

1. The rotational angle of the key is 90° between points **A** and **B**.
2. The key can be inserted or removed only at point **A**.
(Two-point inserting locks are not available.)
3. The key number is identical for the locks in stock.

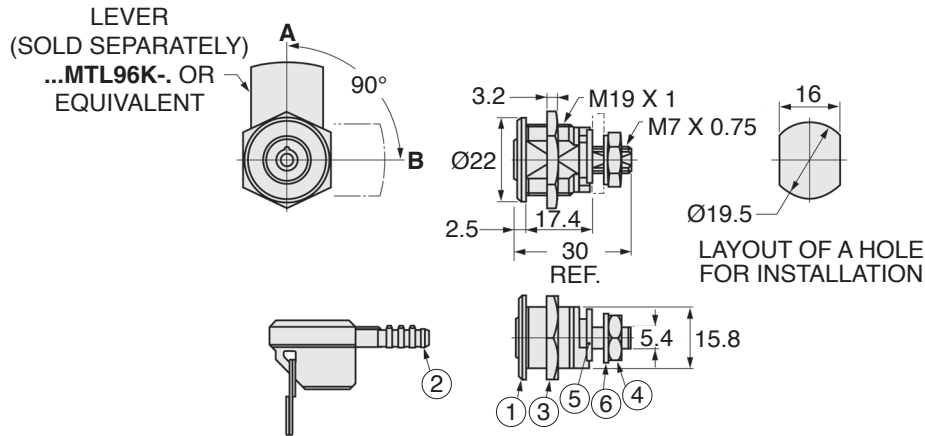
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Lock Body	Brass	Chrome Plated	1
2	Keys	Brass / ABS	Nickel Plated / Black	2
3	Large Nut	Steel	Zinc Plated	1
4	Small Nut		Bright Zinc Plated	
5	Rotation Control Cam			
6	Washer			

• LOCK

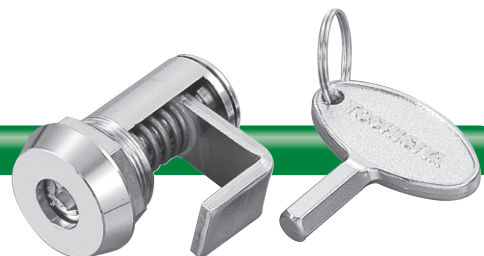
Catalog Number	Key No.	Net Weight g
MNBT03MTL245	245	50.8

6



See last page in this section for Cam Lock Levers.

RoHS
COMPLIANT



Machine tools / Distribution panels

This simple latch utilizes a hexagonal wrench key.

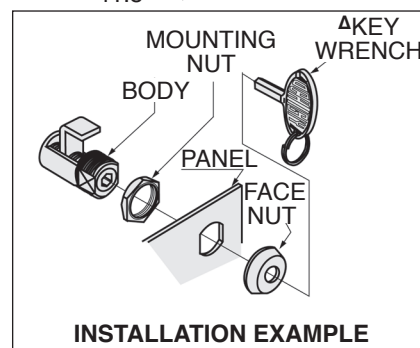
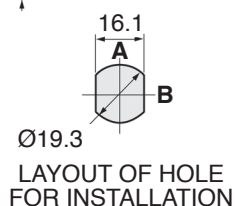
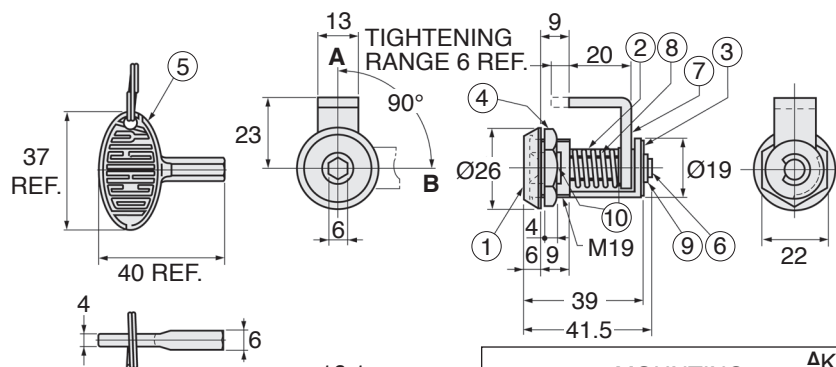
Catalog Number	Name	Net Weight g
MNBT19MTL190-1	Wrench-Operated Latch	72.9
MNBT20MTL193-2	ΔKev Wrench	16.4

ΔThe key wrench is sold separately.

No.	Part Name	Material	Finish	Qty.
1	Face Nut	Brass	Chrome Plated	1
2	Body		Nickel Plated	
3	Guide			
4	Mounting Nut	Zinc Die Cast	Zinc Plated	—
5	*Key Wrench		Nickel Plated	
6	Main Shaft	Steel	Chrome Plated	1
7	Latch		Zinc Plated	
8	Spring	Stainless Steel	—	
9	E-Ring			
10	Washer	Nylon	Primary Color	2

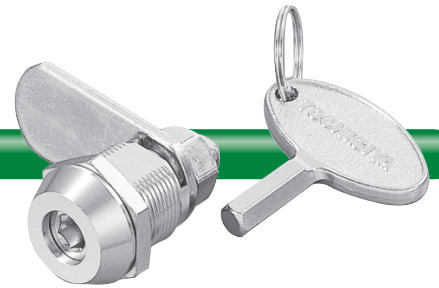
*The key wrench is sold separately.

THE LATCH TIGHTENS AT **B** BY
TURNING THE KEY WRENCH
CLOCKWISE, AND IT
RELEASES AT **A** BY TURNING
THE KEY WRENCH
COUNTERCLOCKWISE



LOCKS, KEY WRENCH-OPERATED

RoHS
COMPLIANT



• APPLICATIONS

Machine tools / Distribution panels

• CHARACTERISTIC

This simple latch utilizes a hexagonal wrench key.

• LOCKS

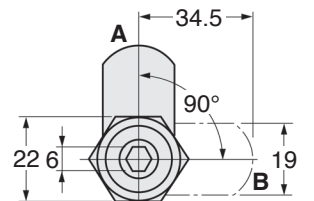
Catalog Number	Name	Net Weight g
MNBT20MTL193-1	Wrench-Operated Lock	69.4
MNBT20MTL193-2	Key Wrench	16.4

ΔThe key wrench is sold separately.

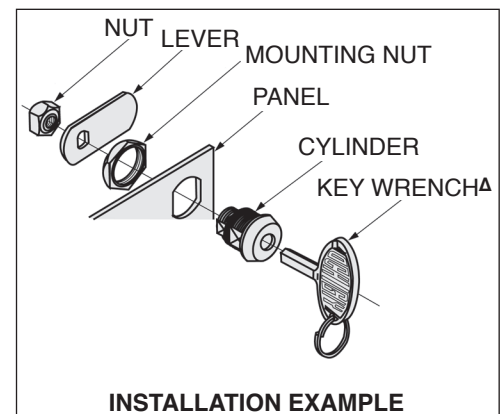
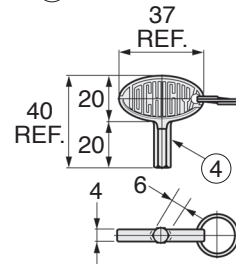
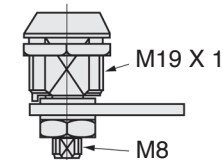
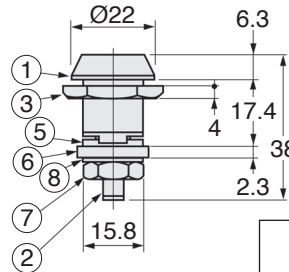
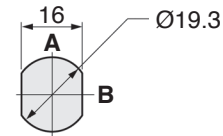
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Cylinder	Brass	Chrome Plated	1
2	Shaft	Zinc Die Cast	Zinc Plated	
3	Mounting Nut		Nickel Plated	
4	*Key Wrench			—
5	Cam	Steel	Zinc Plated	1
6	Lever			
7	Nut			
8	Washer	Stainless Steel	—	

*The key wrench is sold separately.



LAYOUT OF HOLE FOR INSTALLATION



LOCK, CAM - Handle Key Type



• APPLICATIONS

Small control boards / Switch boxes / Various types of storage boxes

• CHARACTERISTIC

A keyhole is set at the lower part of the body and is invisible from the front, making the lock tamper-resistant.

• SPECIFICATIONS

1. The operational angle of the key is 80° between points **A** and **B**.
2. The key can be inserted and removed only at point **A**.
3. By reversing the rotation control cam front to back, the operational angle of the key becomes 80° between points **A** and **D**.
4. It has detent mechanisms at point **A** and **B(D)**.

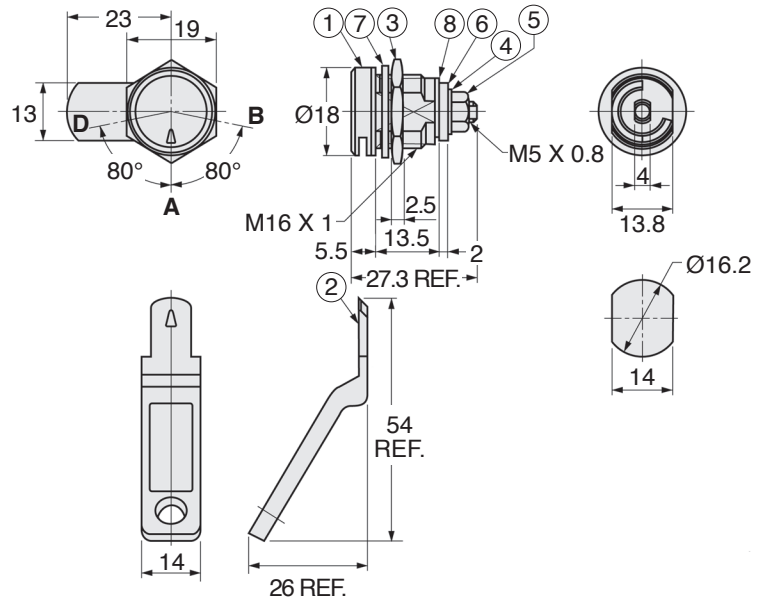
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Lock Body	Zinc Die Cast	Chrome Plated	1
2	Key		Nickel Plated	
3	Attaching Nut	Steel	Zinc Plated	
4	Toothed Lock Washer			
5	Hexagonal Nut			
6	Lever			
7	Spacer			
8	Rotating Control Cam	Bright Zinc Plated		

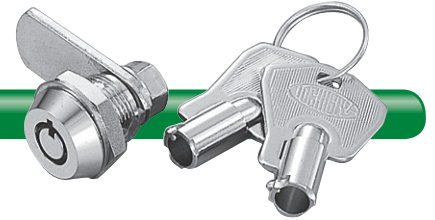
6

• LOCK

Catalog Number	Key No.	Net Weight g
MNBT21MTL293	293	47



LOCK, CAM - Circular Keyway, Miniature



• APPLICATIONS

Office automation appliances / Information devices / Automatic vending machines / Theft-detering devices

• CHARACTERISTICS

The miniature cam lock is two sizes smaller than the ordinary pipe-key type cam lock. The diameter of the cylinder style key is even smaller than the width of a plate-key type cylinder lock. It performs and functions completely the same as the larger cam model and is also tamper- and theft-resistant.

• SPECIFICATIONS

1. The rotational angle of the key is 90° between points **A** and **B**.
2. The key can be inserted or removed only at point **A**.
3. The key number is identical for all the locks in stock.

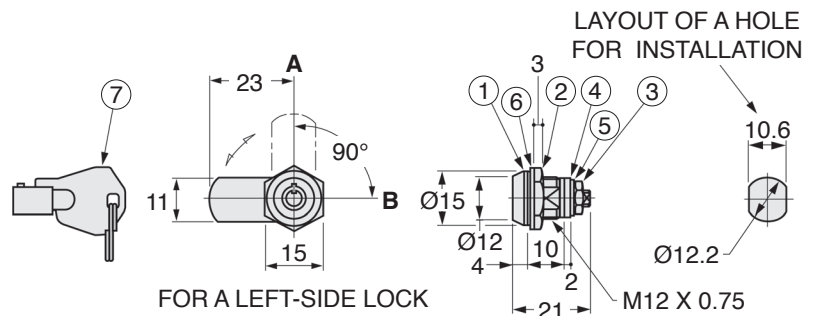
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Lock Body	Brass	Chrome Plated	1
2	Attaching Nut	Steel	Zinc Plated	
3	Hexagonal Nut			
4	Lever			
5	Toothed Washer			
6	Spacer			
7	Keys	Brass / Steel	Nickel Plated	2

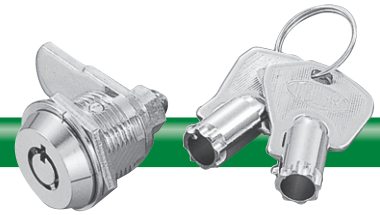
6

• LOCK

Catalog Number	Key No.	Net Weight g
MNBT17MTL225	225	31.4



LOCK, CAM - Circular Keyway, Small



• APPLICATIONS

Office automation appliances / Information devices / Automatic vending machines / Theft-detering devices

• CHARACTERISTICS

Because the cam is one size smaller than the ordinary pipe-key type cam lock, it is ideal for smaller sized devices. It performs and functions completely the same as the larger cam model and is also tamper- and theft-resistant.

• SPECIFICATIONS

1. The rotational angle of the key is 90° between points **A** and **B**.
2. The key can be inserted or removed only at point **A**.
3. The key number is identical for all the locks in stock.

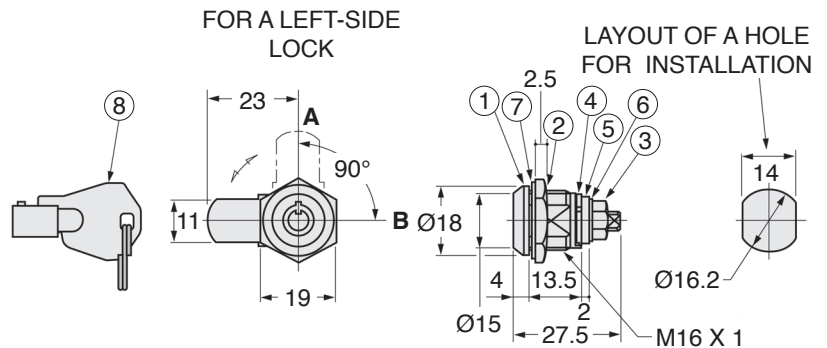
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Lock Body	Brass	Chrome Plated	1
2	Attaching Nut	Steel	Zinc Plated	
3	Hexagonal Nut			
4	Rotation Control Cam			
5	Lever			
6	Toothed Washer			
7	Spacer			
8	Keys	Brass / Steel	Nickel Plated	2

6

• LOCK

Catalog Number	Key No.	Net Weight g
MNBT17MTL224	224	45.8



LOCKS, CAM - Circular Keyway



• APPLICATIONS

Automatic vending machines / Ticket vending machines /
Exchange machines

• CHARACTERISTICS

Model ...**MTL96S-1** has a shorter cam than model ...**MTL96L**.
The lock is specialized for limited space applications and is tamper-
and theft-resistant. Keys are supplied for controlled access.

• SPECIFICATIONS

1. The rotational angle of the key is 90°, between points **A** and **B**.
2. The key can be inserted or removed only at point **A**.
3. Custom-made keys are available on special request.

Fig. 1

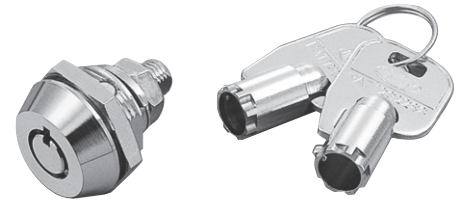


Fig. 2



Fig. 1 • LOCK - Short

Catalog Number	Key No.	Net Weight g
MNBT07MTL96S-1	G3401	62

Fig. 2 • LOCK - Long

Catalog Number	Key No.	Net Weight g
MNBT07MTL96L	K1161	95.6

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Lock	Brass	Chrome Plated	1
2	Attaching Nut	Steel	Zinc Plated	
3	Hexagonal Nut	Steel	Zinc Plated	2
4	Keys	Carbon Steel / Steel	Nickel Plated	

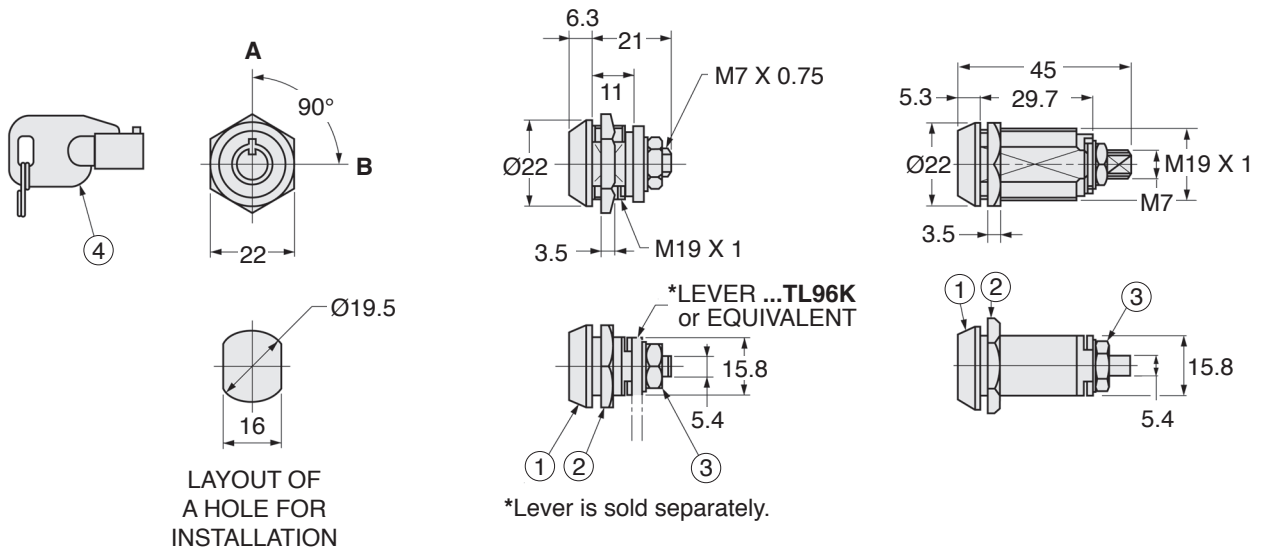
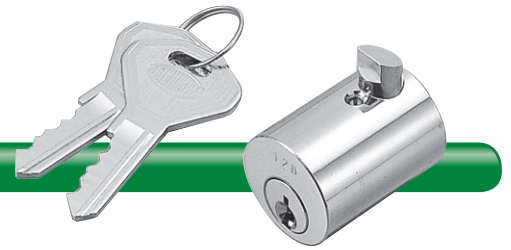


Fig. 1

Fig. 2

See last page in this section for Cam Lock Levers.



• **APPLICATIONS**

Boxes / Tables

• **CHARACTERISTIC**

The lock contains a spring loaded mechanism.

• **SPECIFICATIONS**

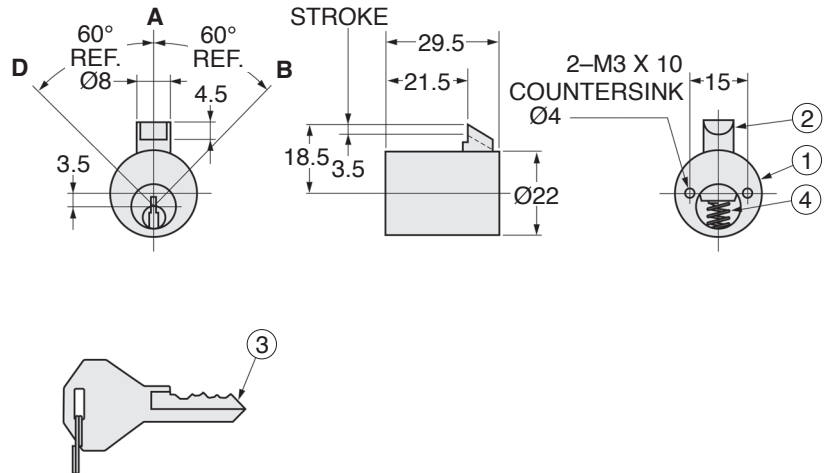
1. The unit will lock without a key.
2. Both clockwise (**A** to **B**) and counterclockwise (**A** to **D**) rotations will lock the unit.
3. The key can be inserted and removed only at point **A**.

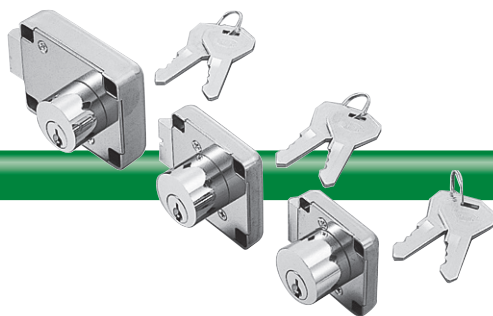
• **PARTS LIST**

No.	Part Name	Material	Finish	Qty.
1	Key Body	Brass	Chrome Plated	1
2	Latch		Nickel Plated	2
3	Keys	Stainless Steel	—	1
4	Coil Spring		—	1

• **LOCK**

Catalog Number	Key No.	Net Weight g
MNBT24MTL128	128	100.4





• APPLICATIONS

Distribution boards / Distribution panels / Control boards /
Office utilities / Various types of lockers / Traffic signals

• CHARACTERISTICS

Closing the door automatically locks it. The key is used for
unlocking only. An automatic mechanism returns the key to the
position where it can be inserted or removed.

• SPECIFICATIONS

1. The rotational angle of the key is 36°, 41° and 39°, for
...MTL275-1, ...MTL275-2 and ...MTL275-3, respectively,
between points **A** and **B**.
2. The key can be inserted and removed only at point **A**.
3. The key number is identical for all of the locks in stock.

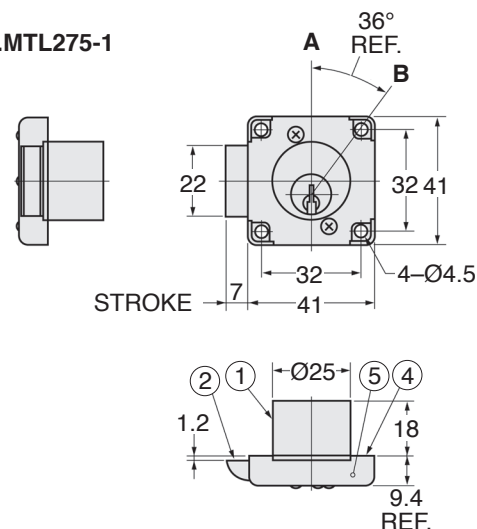
• LOCKS

Catalog Number	Key No.	Net Weight g
MNBT22MTL275-1	275	147.4
MNBT22MTL275-2		180.4
MNBT22MTL275-3		240.6

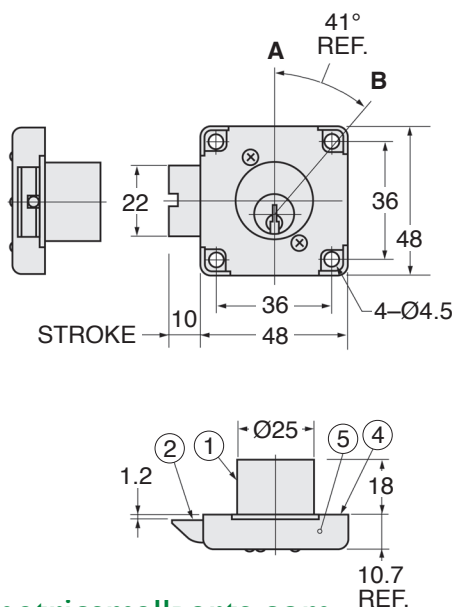
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Lock Body	Brass	Chrome Plated	1
2	Latch		Nickel Plated	2
3	Keys	Stainless Steel	—	2
4	Case		—	1
5	Latch Spring			

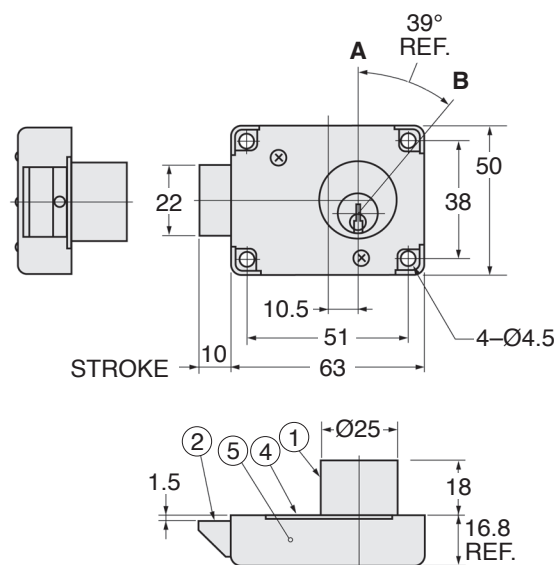
...MTL275-1



...MTL275-2



...MTL275-3





• **APPLICATIONS**

Distribution boards / Distribution panels / Control boards /
Storage boxes on vehicles / Transporter cases / Various types
of storage cases

• **CHARACTERISTICS**

This very professional looking lock has secure locking and anti-vibration mechanisms built in, preventing unintentional opening from vibration and shock. The minitype tubular cylinder lock also improves antitheft protection.

• **INSTALLATION**

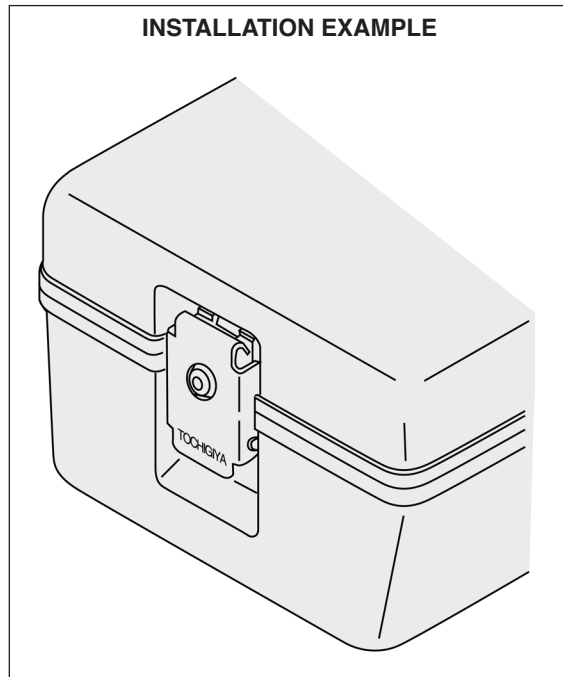
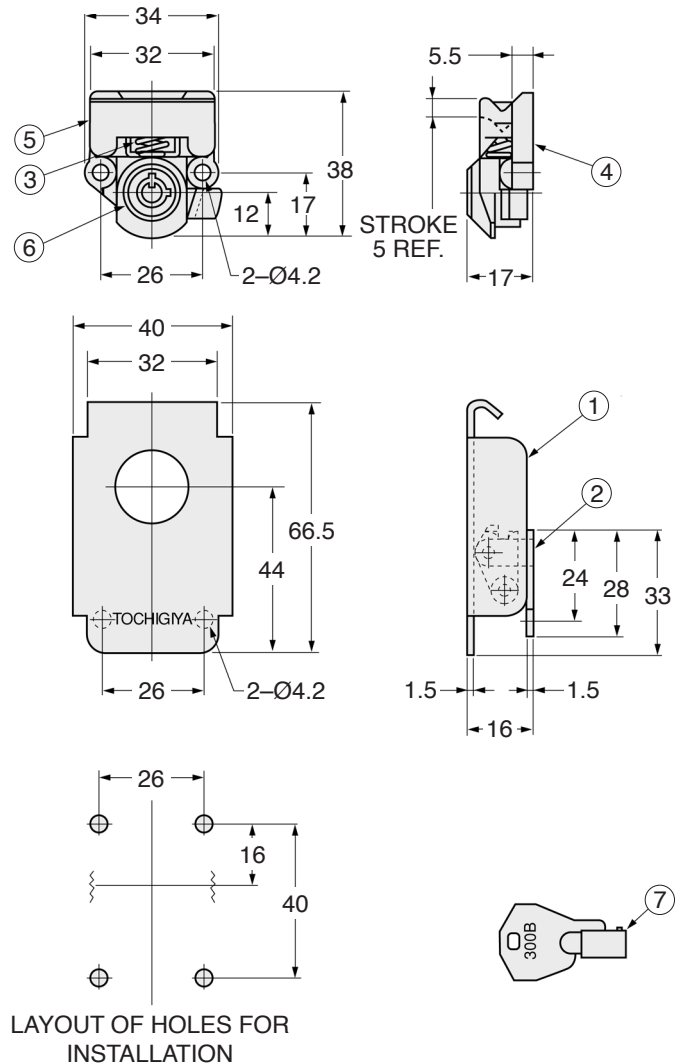
The strike plate and strike plate base should be attached on the same level plane. Normal operation or proper locking may not occur if there is a gap between the two attaching planes.

• **PARTS LIST**

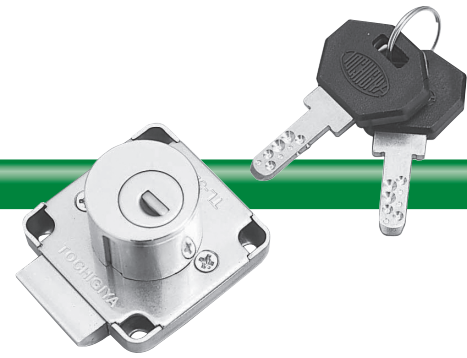
No.	Part Name	Material	Finish	Qty.
1	Catch Lever	Stainless Steel	Barrel Polishing	1
2	Catch Base			
3	Spring		—	
4	Strike Plate Base	Aluminum	Trivalent Chromate Coating	
5	Strike Plate			
6	Lock Assembly	Brass	Chrome Plated	2
7	Key	Steel / Brass	Nickel Plated	

• **LOCK**

Catalog Number	Tightening Force N (kgf)	Key No.	Net Weight g
MNBT00MTL300B	Approx. 32.4 (3.3)	300B	102



LOCK, CAM - Automatic Latching



• APPLICATIONS

Distribution boards / Distribution panels / Control boards

• CHARACTERISTIC

Simply close the door to lock. The key is used for opening the door only. After the key is turned, it will return to the insertion point by its automatic return mechanism.

• SPECIFICATIONS

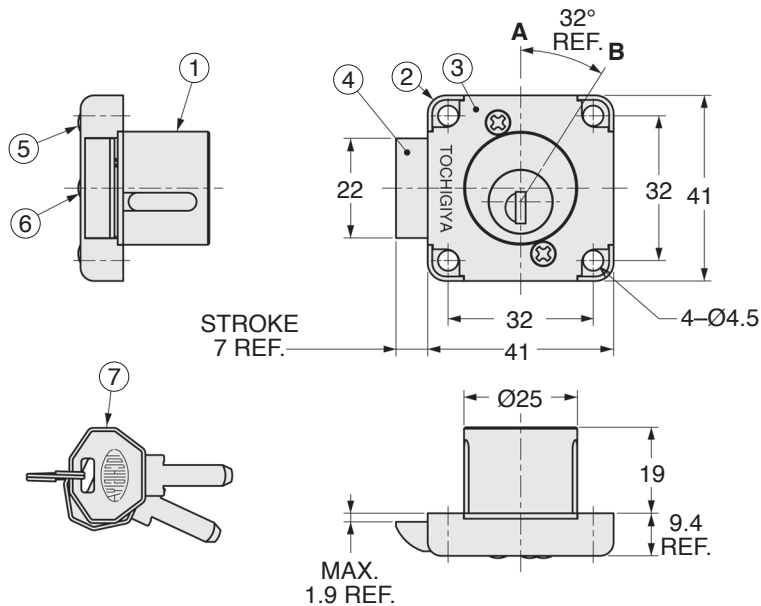
1. The rotational angle of the key is 32° between points **A** and **B**.
2. The key can be inserted or removed only at point **A**.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Body	Zinc Die Cast / Stainless Steel	Zinc Plated / Chrome Plated / -	1
2	Case	Stainless Steel	Barrel Polishing	
3	Cover		Chrome Plated	
4	Latch	Brass	Nickel Plated	2
5	Spacers			1
6	Latch Stopper Pin			2
7	Keys	Nickel Silver / Polypropylene	Nickel Plated / Black	

• LOCK

Catalog Number	Key No.	Net Weight g
MNBT02MTL325	E5000	136



LATCHES, SOLENOID



• APPLICATIONS

Distribution boards / Distribution panels / Control boards / Lockers

• CHARACTERISTIC

To operate the solenoid latch, push the door in to close position and use the power switch to open. In case of an emergency, models ...MTL258-1 and ...MTL259-1 have keys to mechanically open the lock.

• SWITCH PERFORMANCE

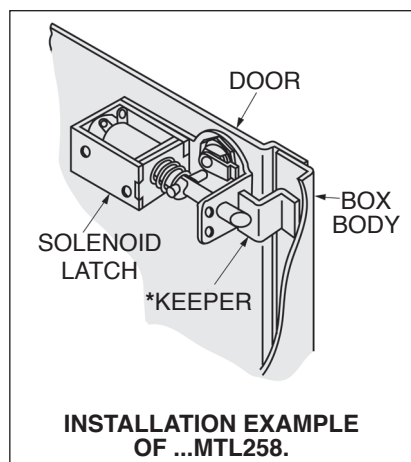
Switch	Solenoid
On	Latch is pulled in (unlocked position)
Off	Latch is in locking position

• GENERAL DESCRIPTION OF SOLENOID

	...MTL258	...MTL259
Rated Voltage	DC 24V (Continuous Rating)	
Power Consumption	3W	5W
Holding Force N (kgf)	0.98 (0.1) ~ 6.87 (0.7)	1.96 (0.2) ~ 15.7 (1.6)

• LATCHES

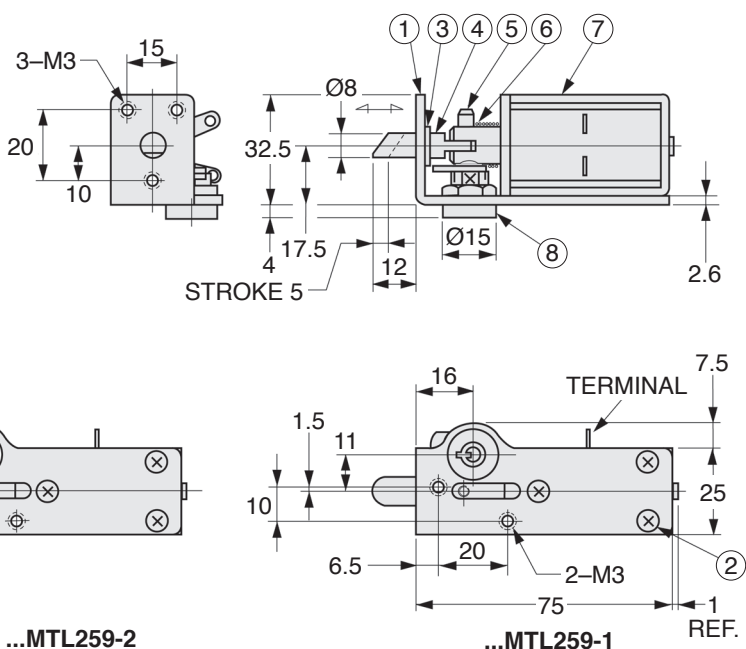
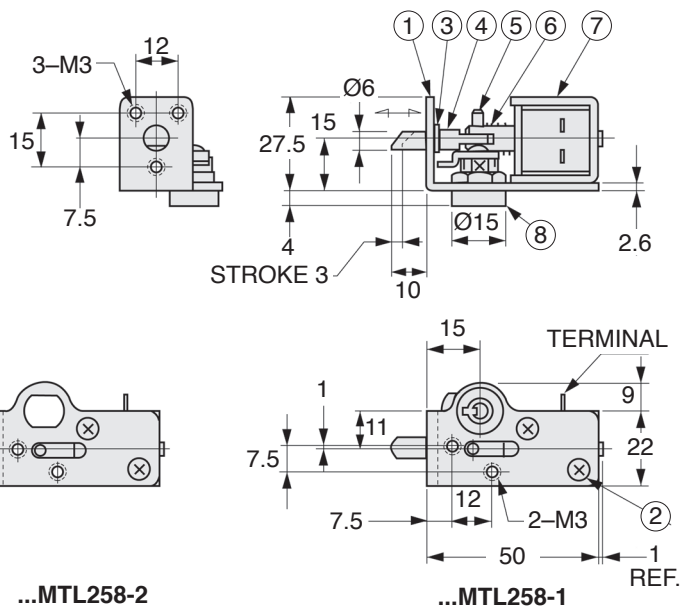
Catalog Number	Specifications	Net Weight g
MNBT29MTL258-1	With Key	128.1
MNBT29MTL258-2	Without Key	85
MNBT29MTL259-1	With Key	249.8
MNBT29MTL259-2	Without Key	221.8



*Not supplied

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Base	Steel	Zinc Plated	1
2	Countersunk Screw			
3	E-Ring	Stainless Steel	—	
4	Latch			
5	Spring Pin			
6	Spring			
7	Solenoid	—	Chrome Plated	
8	Lock	Brass		



LOCK, CAM - Key Switch



• APPLICATIONS

Measuring instruments / Office automation devices

• CHARACTERISTIC

A tubular cylinder lock.

• SPECIFICATIONS

1. The key can be inserted or removed only at point **A**.
2. The key number is identical for the locks in stock.

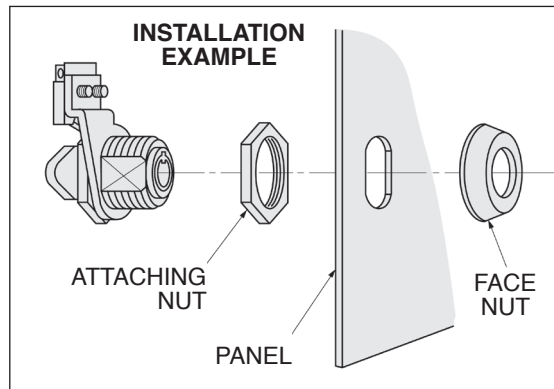
• LOCK

Catalog Number	Key No.	Net Weight g
MNBT27MTL155	E6431	99.8

6

• KEY INSERT AND CONTACT FORM OF MICROSWITCH

Position	Contact Form	Key Insert
Point A		YES
Point B		NO

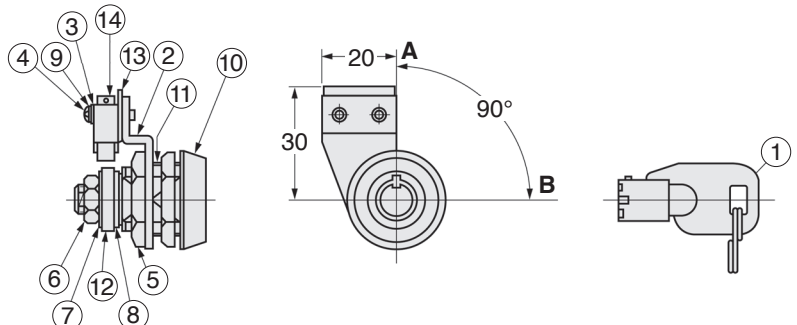
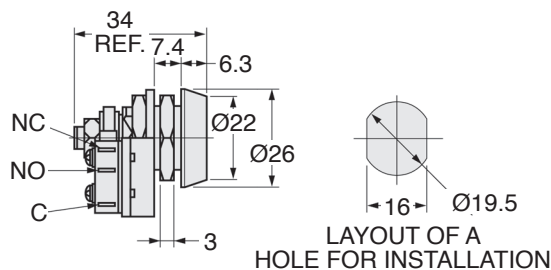


• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Keys	Steel	Nickel Plated	2
2	Bracket		Zinc Plated	1
3	Washers			2
4	Pan Head Screws			
5	Attaching Nut		Bright Zinc Plated	1
6	Nut			
7	Internal Lock Washer	Spring Steel	Zinc Plated	2
8	Stopper Cam			
9	Spring Washers	Brass	Chrome Plated	1
10	Face Nut		Nickel Plated	
11	Lock		—	
12	Switch Cam	Varnished Cloth	—	1
13	Microspacer			
14	Microswitch	—	—	—

• GENERAL PROPERTIES OF MICROSWITCH

Product Name	Matsushita Electric Works FS-T Model Microswitch AVL-3225
Type	Single-Pole Switching
Terminal	Plate Solder Terminal
Rating	250V AC 5A, 30V DC 5A, 125V DC 0.4A (Resistance Load COS $\phi \geq 1$)
Mechanical Life Expectancy	Over 10,000,000 Operations (60 Operations/Min)
Electrical Life Expectancy	Over 50,000 Operations (20 Operations/Min) (Rated Load)
Insulation Resistance	100M Ω Min. (At 500V DC) with Insulation-Resistance Tester
Dielectric Strength	1,000V AC for 1 Min Between Noncontinuous Terminals. 1,500V AC for 1 Min Between Each Terminal and Terminal on Noncurrent-Carrying Metal. 1,500V AC for 1 Min Between Current-Carrying Metal Part and Ground.
Contact Resistance	Initial Value 50m Ω Max. (6 to 8V DC 1A with Voltage Drop Method)
Operating Temperature	-25°C to 80°C (Providing there is no Icing)
Operating Humidity	85% Max.



LOCK, CAM - Key Switch



• APPLICATIONS

Measuring instruments / Office automation devices

• CHARACTERISTIC

The lock has a key switch with an automatic return mechanism.

• SPECIFICATIONS

1. The key can be inserted or removed only at point **A**.
2. The return mechanism engages anywhere between points **B** and **C**. Once the key is turned to point **C**, it automatically returns to point **B**.
3. The key number is identical for the locks in stock.

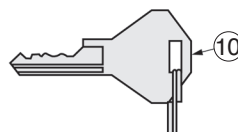
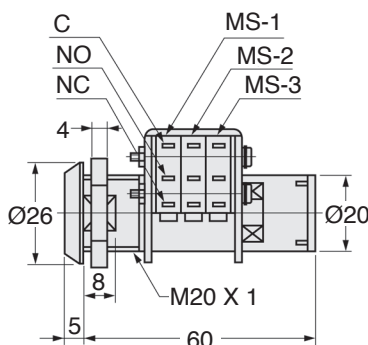
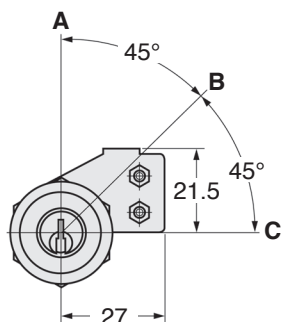
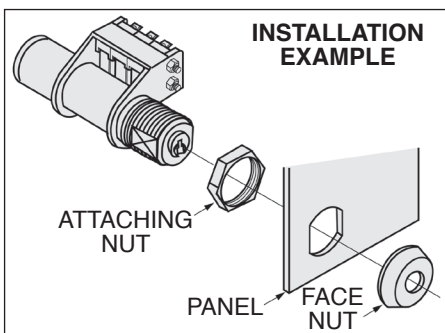
• LOCK

Catalog Number	Key No.	Net Weight g
MNBT25MTL143	143	199.6

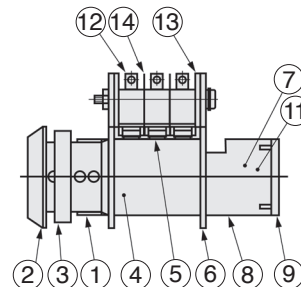
6

• CONTACT FORM OF MICROSWITCHES

Position	MS-1	MS-2	MS-3
Point A			
Point B			
Point C			



LAYOUT OF A HOLE FOR INSTALLATION



• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Lock Body	Brass	Chrome/Nickel Plated*	1
2	Face Nut		Chrome Plated	
3	Attaching Nut		Nickel Plated	
4	Cam			
5	Pins			3
6	Bracket for Switch			1
7	Return Shaft			
8	Holder			
9	Cover			
10	Keys		2	
11	Spring	Stainless Steel	1	
12	Microswitches	—	3	
13	Insulator	Fiber	2	
14	Insulator	Varnished Cloth		

*Chrome Plated Cylinder and Nickel Plated Case.

• GENERAL PROPERTIES OF MICROSWITCHES

Product Name	Matsushita Electric Works FS-T Model Microswitch AVL-3225
Type	Single-Pole Switching
Terminal	Plate Solder Terminal
Rating	250V AC 5A, 30V DC 5A, 125V DC 0.4A (Resistance Load COS $\phi \geq 1$)
Mechanical Life Expectancy	Over 10,000,000 Operations (60 Operations/Min)
Electrical Life Expectancy	Over 50,000 Operations (20 Operations/Min) (Rated Load)
Insulation Resistance	100M Ω Min. (At 500V DC) with Insulation-Resistance Tester
Dielectric Strength	1,000V AC for 1 Min Between Noncontinuous Terminals. 1,500V AC for 1 Min Between Each Terminal and Terminal on Noncurrent-Carrying Metal. 1,500V AC for 1 Min Between Current-Carrying Metal Part and Ground.
Contact Resistance	Initial Value 50m Ω Max. (6 to 8V DC 1A with Voltage Drop Method)
Operating Temperature	-25°C to 80°C (Providing there is no Icing)
Operating Humidity	85% Max.

LOCKS, CAM - Key Switch



• APPLICATIONS

Measuring instruments / Office automation devices

• CHARACTERISTIC

Easy installation

• SPECIFICATIONS

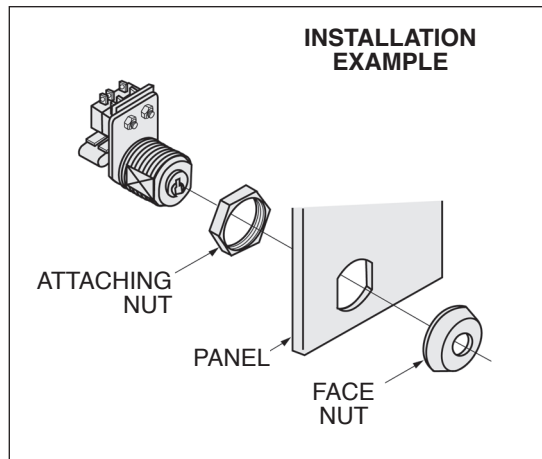
1. The rotational angle of the key is 90° between points **A** and **B**.
2. The key can be inserted or removed only at point **A**.
3. The key number is identical for the locks in stock.

• LOCKS

Catalog Number	L	Key No.	Net Weight g
MNBT26MTL142-1	29	142	93.6
MNBT26MTL142-2	35.5		100.8
MNBT26MTL142-3	42		108.4

• CONTACT FORM OF MICROSWITCHES

Position	MS-1	MS-2	MS-3
Point A	C ● NC ● NG	C ● NC ● NO	C ● NC ● NO
Point B	C ● NC ● NO	C ● NC ● NO	C ● NC ● NO



• PARTS LIST

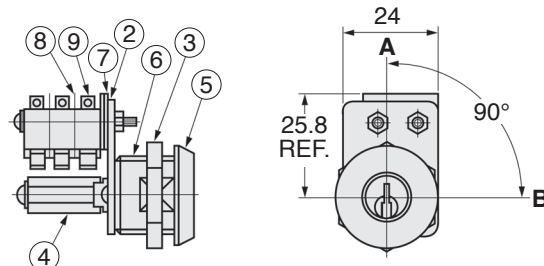
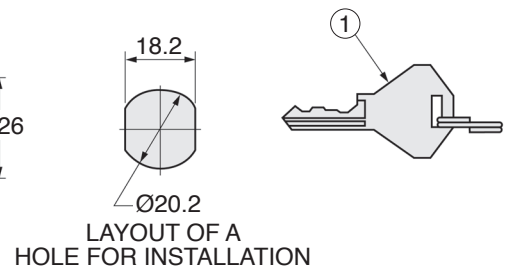
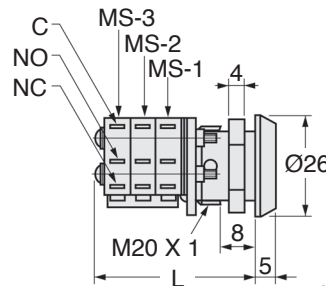
No.	Part Name	Material	Finish	Qty.
1	Keys	Brass	Nickel Plated	2
2	Bracket For Switch			1
3	Attaching Nut			
4	Cam			
5	Face Nut			
6	Lock Body			
7	Insulators	Fiber	—	2
8	Insulator(s)	Varnished Cloth		*
9	Microswitch(es)	—		**

* Quantity of Insulators for Model: ...MTL142-1 is n/a, ...MTL142-2 is 1, ...MTL142-3 is 2.

** Quantity of Microswitches for Model: ...MTL142-1 is 1, ...MTL142-2 is 2, ...MTL142-3 is 3.

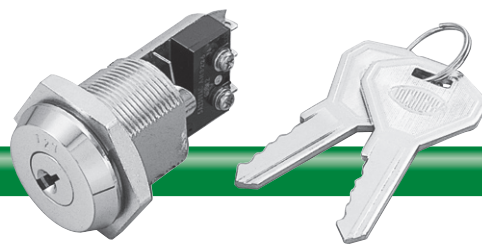
• GENERAL PROPERTIES OF MICROSWITCHES

Product Name	Matsushita Electric Works FS-T Model Microswitch AVL-3225
Type	Single-Pole Switching
Terminal	Plate Solder Terminal
Rating	250V AC 5A, 30V DC 5A, 125V DC 0.4A (Resistance Load COS $\phi \geq 1$)
Mechanical Life Expectancy	Over 10,000,000 Operations (60 Operations/Min)
Electrical Life Expectancy	Over 50,000 Operations (20 Operations/Min) (Rated Load)
Insulation Resistance	100M Ω Min. (At 500V DC) with Insulation-Resistance Tester
Dielectric Strength	1,000V AC for 1 Min Between Noncontinuous Terminals. 1,500V AC for 1 Min Between Each Terminal and Terminal on Noncurrent-Carrying Metal. 1,500V AC for 1 Min Between Current-Carrying Metal Part and Ground.
Contact Resistance	Initial Value 50m Ω Max. (6 to 8V DC 1A with Voltage Drop Method)
Operating Temperature	-25°C to 80°C (Providing there is no Icing)
Operating Humidity	85% Max.



MODEL ...MTL142-3 SHOWN

LOCK, CAM - Key Switch



• APPLICATIONS

Measuring instruments / Office automation devices / Information devices

• CHARACTERISTICS

Room saving design with its streamlined appearance. Since the microswitch is unified with the body, installation can be made simply with a nut.

• SPECIFICATION

I. The key can be inserted or removed at points **A** and **B**.

• LOCK

Catalog Number	Key No.	Net Weight g
MNBT28MTL127	127	112.6

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Keys	Brass	Nickel Plated	2
2	Attaching Nut			
3	Lock Body		Chrome Plated	1
4	Microswitch	—	—	
5	Pan Headed Screws	Steel	Zinc Plated	2
6	Washers			

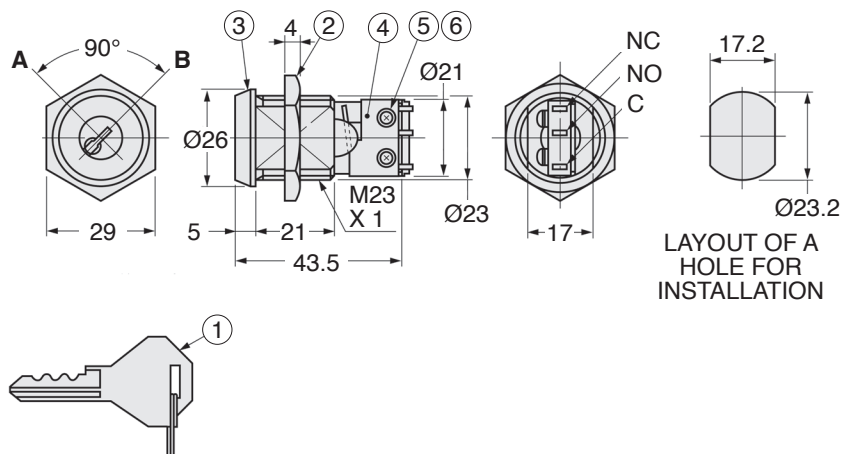
• GENERAL PROPERTIES OF THE MICROSWITCH

Product Name	Matsushita Electric Works FS-T Model Microswitch AVL-3225
Type	Single-Pole Switching
Terminal	Plate Solder Terminal
Rating	250V AC 5A, 30V DC 5A, 125V DC 0.4A (Resistance Load COS $\phi \geq 1$)
Mechanical Life Expectancy	Over 10,000,000 Operations (60 Operations/Min)
Electrical Life Expectancy	Over 50,000 Operations (20 Operations/Min) (Rated Load)
Insulation Resistance	100M Ω Min. (At 500V DC) with Insulation-Resistance Tester
Dielectric Strength	1,000V AC for 1 Min Between Noncontinuous Terminals. 1,500V AC for 1 Min Between Each Terminal and Terminal on Noncurrent-Carrying Metal. 1,500V AC for 1 Min Between Current-Carrying Metal Part and Ground.
Contact Resistance	Initial Value 50m Ω Max. (6 to 8V DC 1A with Voltage Drop Method)
Operating Temperature	-25°C to 80°C (Providing there is no Icing)
Operating Humidity	85% Max.

6

• CONTACT FORM OF THE MICROSWITCH

Position	
Point A	C • NC • NO
Point B	C • NC • NO

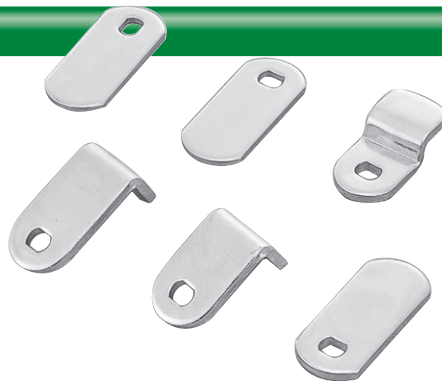


CAM LOCK LEVERS

RoHS
COMPLIANT

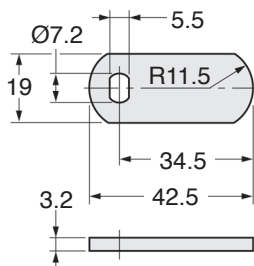
• CAM LOCK LEVERS

Catalog Number	Material	Finish	Net Weight g
MNBT06MTL96K-1	Steel	Bright	17.5
MNBT06MTL96K-2			19
MNBT06MTL96K-3			21
MNBT06MTL96K-4			14.5
MNBT06MTL96K-5		Zinc Plated	12
MNBT06MTL96K-6			

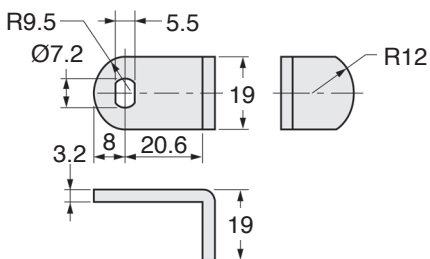


6

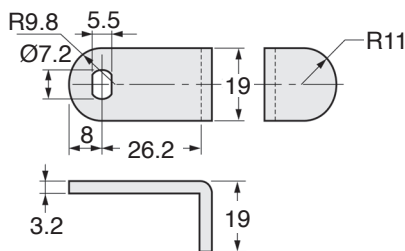
...MTL96K-1



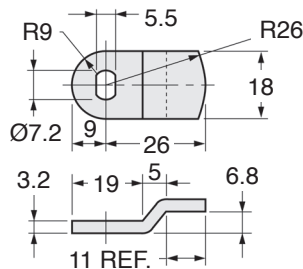
...MTL96K-2



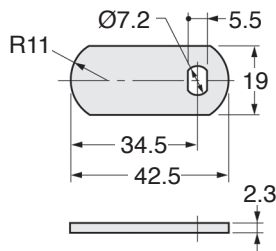
...MTL96K-3



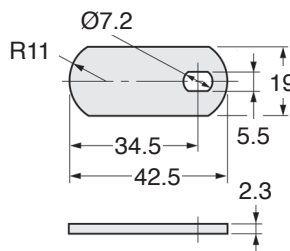
...MTL96K-4



...MTL96K-5



...MTL96K-6



These levers can be used with: MNBT03MTL245, MNBT05MTL247, MNBT05MTL251, MNBT05MTL252, MNBT07MTL96L, MNBT07MTL96S-1

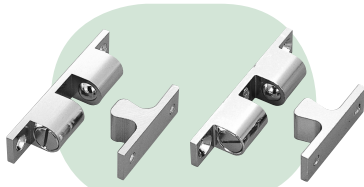


SECTION 7

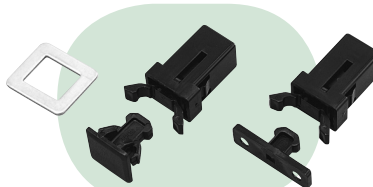
Catches MNC

7

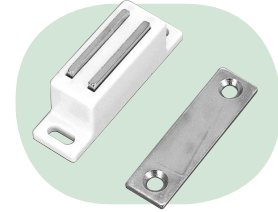




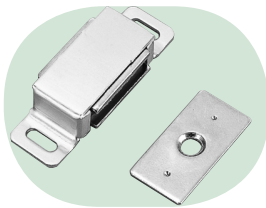
7-3 thru 7-6



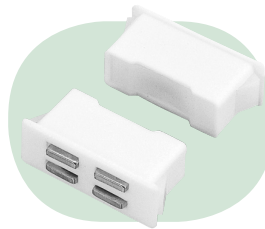
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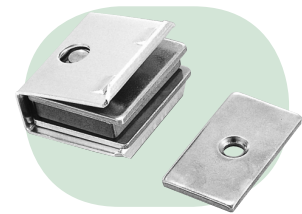
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7-8



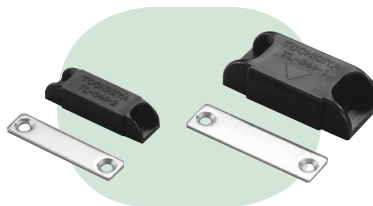
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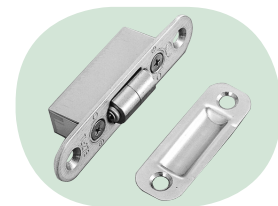
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7-10



7-11



7-12



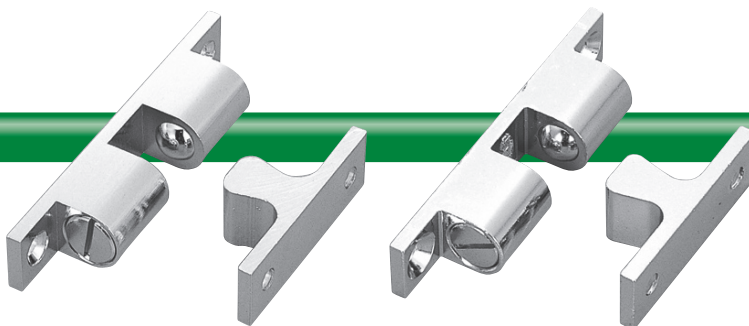
7-12



7-13

CATCHES, BALL

RoHS
COMPLIANT



• APPLICATIONS

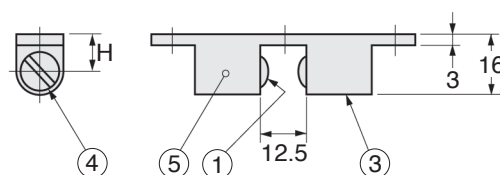
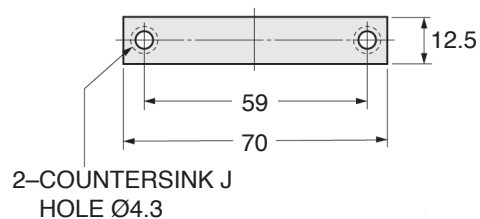
Measuring instruments / Machine tools

• CHARACTERISTIC

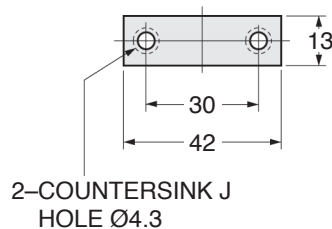
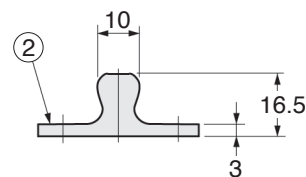
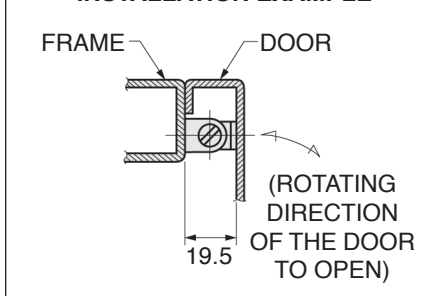
The catch can be mounted so that the strike plate enters it straight on or from the side.

• PARTS LIST

No.	Part Name	MNCT02MTL91-1		MNCT02MTL91-2		Qty.
		Material	Finish	Material	Finish	
1	Ball	Steel	Nickel Plated	Steel	Nickel Plated	2
2	Strike Plate	Brass		Zinc Die Cast	Chrome Plated	1
3	Housing					
4	Set Screw	Steel Wire	Bright Zinc Plated	Steel Wire	Nickel Plated	2
5	Spring					

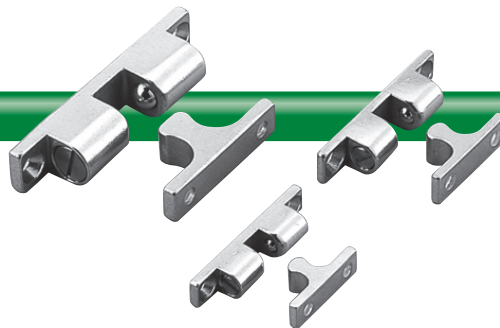


INSTALLATION EXAMPLE



• CATCHES

Catalog Number	Pullout Strength N (kgf)	H	J	Net Weight g
MNCT02MTL91-1	Approx. 34.3 (3.5)	10	Ø6.5	78
MNCT02MTL91-2	Approx. 19.6 (2)	9.75	Ø8.6	62



• APPLICATIONS

Measuring instruments / Machine tools

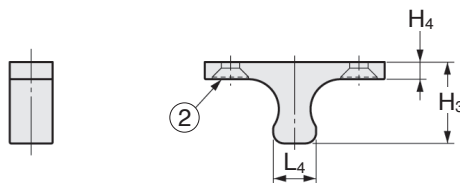
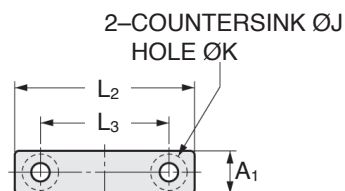
• CHARACTERISTICS

Made with stainless steel to get better anticorrosive protection.

The catch can be mounted so that the strike plate enters it straight on or from the side.

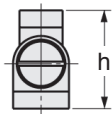
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Housing	Stainless Steel	—	1
2	Strike Plate			
3	Spring			2
4	Pin			
5	Set Screw			

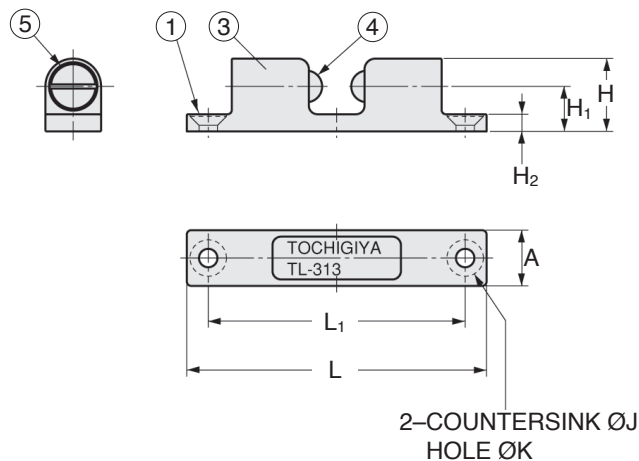
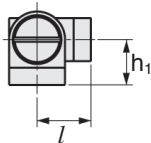


7

INSTALLATION EXAMPLE 1



INSTALLATION EXAMPLE 2

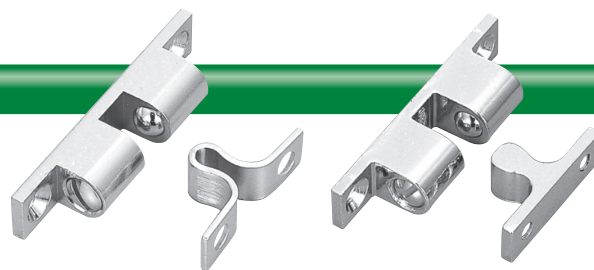


• CATCHES

Catalog Number	Pullout Strength N (kgf)	L	L ₁	L ₂	L ₃	L ₄	H	H ₁	H ₂
MNCT02M1TL313-3	Approx. 19.6 (2)	43	35	25	16	5.4	10	6	2.5
MNCT02M2TL313-2	Approx. 29.4 (3)	50	40	30	20	7	12	7.5	2.5
MNCT02M3TL313-1	Approx. 44.1 (4.5)	70	60	42	30	10	17	10.5	4

Catalog Number	H ₃	H ₄	l Ref.	h Ref.	h ₁ Ref.	A	A ₁	J	K	Net Weight g
MNCT02M1TL313-3	11	2.5	7.5	13.5	7	8	7.5	6.5	3.3	18
MNCT02M2TL313-2	13.5	2.5	8.5	16	7.5	10	9	8.2	4.3	26
MNCT02M3TL313-1	19	4	12.5	23	10.5	13	10	8.5	4.3	75

CATCHES, BALL



• APPLICATIONS

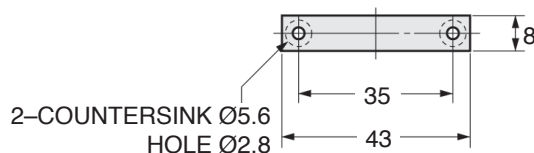
Measuring instruments / Machine tools

• CHARACTERISTIC

The catch can be mounted so that the strike plate enters it straight on or from the side.

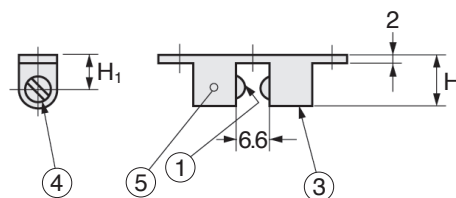
• NOTE

Beveling must be processed to the attached side when using countersunk screws or rivets to fix the ball catch.

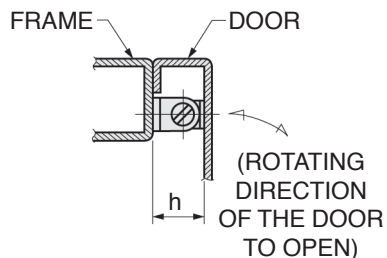


• PARTS LIST

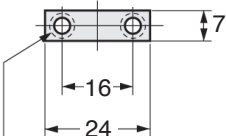
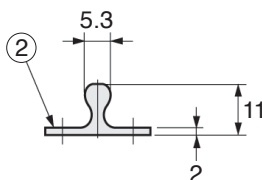
No.	Part Name	MNCT02MTL42-1		MNCT02MTL42-2		Qty.
		Material	Finish	Material	Finish	
1	Ball	Steel	Nickel Plated	Steel	Nickel Plated	2
2	Strike Plate			Zinc Die Cast	Chrome Plated	1
3	Housing	Brass		Brass	Nickel Plated	2
4	Set Screw			Stainless Steel	—	
5	Spring	Steel Wire				



INSTALLATION EXAMPLE

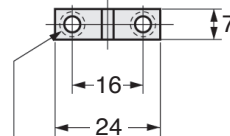
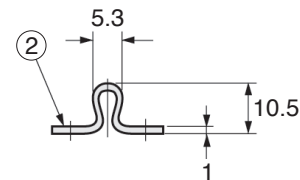


MNCT02MTL42-2



2-COUNTERSINK Ø5.6
HOLE Ø2.8

MNCT02MTL42-1



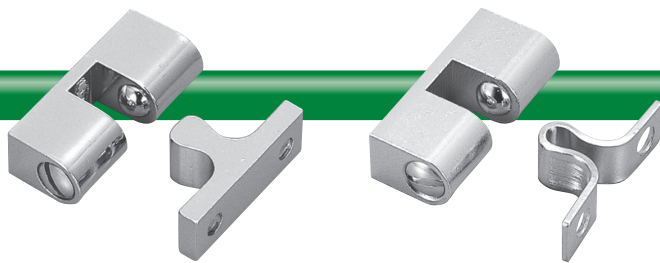
2-COUNTERSINK Ø5.6
HOLE Ø3.8

• CATCHES

Catalog Number	Pullout Strength N (kgf)	H	H ₁	h	Net Weight g
MNCT02MTL42-1	Approx. 9.81 (1)	10	6	13	14.5
MNCT02MTL42-2	Approx. 23.5 (2.4)	12	8	14.3	15.8

CATCHES, BALL

RoHS
COMPLIANT



• APPLICATIONS

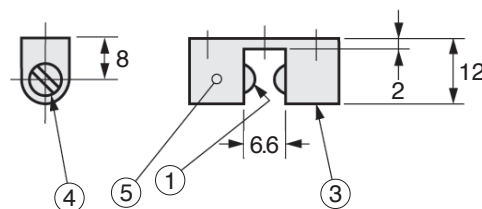
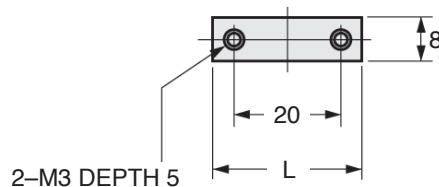
Measuring instruments / Machine tools

• CHARACTERISTIC

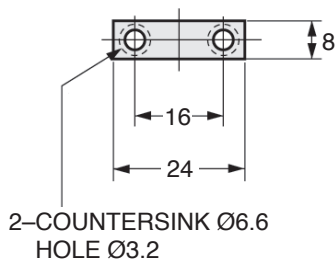
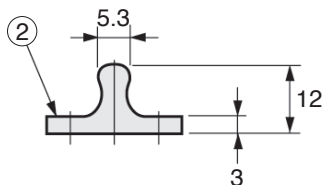
The catch can be mounted so that the strike plate enters it straight on or from the side.

• PARTS LIST

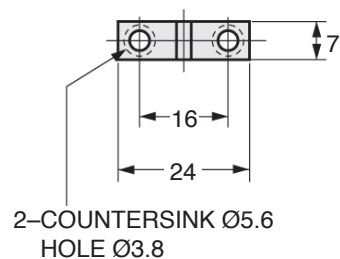
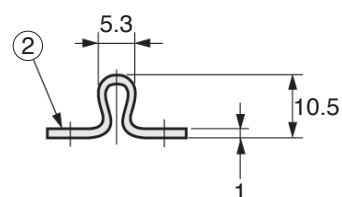
No.	Part Name	MNCT02MTL60-1		MNCT02MTL60-2		Qty.
		Material	Finish	Material	Finish	
1	Ball	Steel	Nickel Plated	Steel	Nickel Plated	2
2	Strike Plate			Zinc Die Cast	Chrome Plated	1
3	Housing	Brass		Brass	Nickel Plated	2
4	Set Screw			Stainless Steel	—	
5	Spring	Steel Wire				



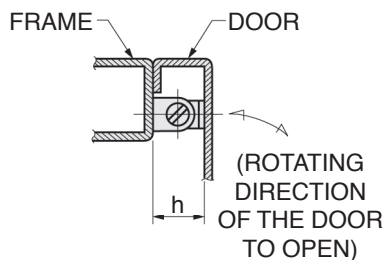
MNCT02MTL60-2



MNCT02MTL60-1



INSTALLATION EXAMPLE



• CATCHES

Catalog Number	Pullout Strength N (kgf)	L	h	Net Weight g
MNCT02MTL60-1	Approx. 9.81 (1)	26.6	13.5	15.5
MNCT02MTL60-2	Approx. 19.6 (2)	28	16	17

• APPLICATIONS

Audio devices / Home appliances

• CHARACTERISTIC

A single touch catch with one operation for two actions.
(One push to lock and another push to open)

• SPECIFICATION

Permissible temperature: -10°C to +60°C

• NOTE

Do not apply an excess pressure (impact) onto the body while locking or unlocking the door as it may become damaged.

• SPACER INSTALLATION INSTRUCTIONS

When installing the spacer, ...TL235... ,set the carved seal side out. It is a spacer for ...TL297-2 body and for the push-in type strike plate and it is applicable to the plate thickness of 1.6 mm, 1.2 mm, and 1 mm.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Case	Acetal	Black	1
2	Strike Plate			
3	Latch	Nylon		
4	Guiding Lever	Stainless Steel	—	
5	Spring	Piano Wire	Zinc Plated	

ATTENTION

1. The offset length of centerline of body (10.8 mm direction) and the strike plate should be ± 0.15 mm or less
2. When it is installed on a door the catch body (10.8 mm direction) should be mounted in a parallel direction with a rotating axis of the door.
3. It should not be pulled off with an excess force.

• CATCHES

Catalog Number	Holding Force N (kgf)	Net Weight g
MNCT03M1TL297-1	Approx. 34.5 (3.5)*	2.5
MNCT03M2TL297-2		2.9

*The strength was taken as for initial horizontal direction value at standard temperature.

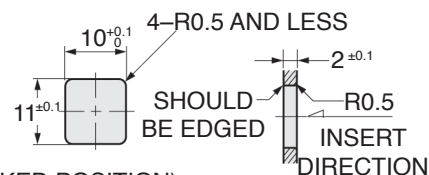
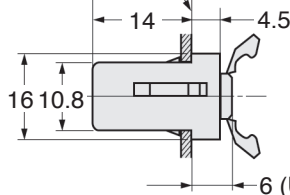
• USE ONLY FOR ...TL297-2

• SPACER – Stainless Steel

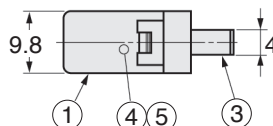
Catalog Number	A
MNCT03M3TL235-4	0.4
MNCT03M4TL235-5	0.8
MNCT03M5TL235-6	1

...TL297-1 CATCH BODY

REFERENCE SURFACE
(FRONT SURFACE OF THE
PLATE TO BE INSTALLED)

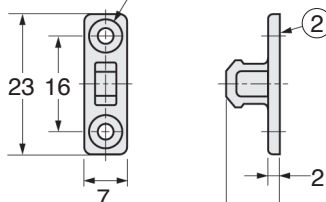


LAYOUT OF HOLE FOR
INSTALLING THE BODY

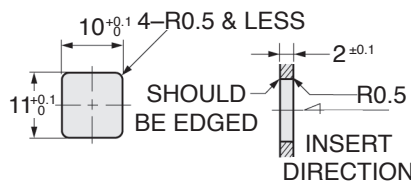
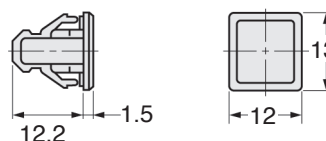


STRIKE PLATE NO.1 (FOR A SCREW-ON TYPE)

2-COUNTERSINK Ø5.6
HOLE Ø2.6

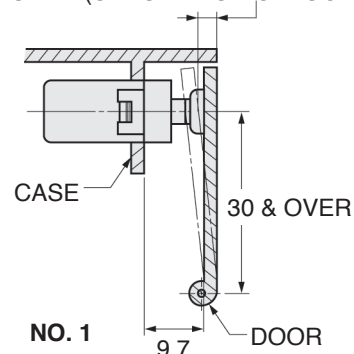


STRIKE PLATE NO.2 (FOR A PUSH-IN TYPE)

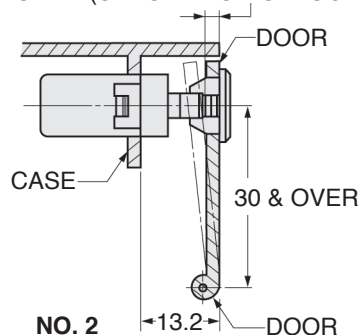


LAYOUT OF HOLE FOR
THE STRIKE PLATE NO. 2

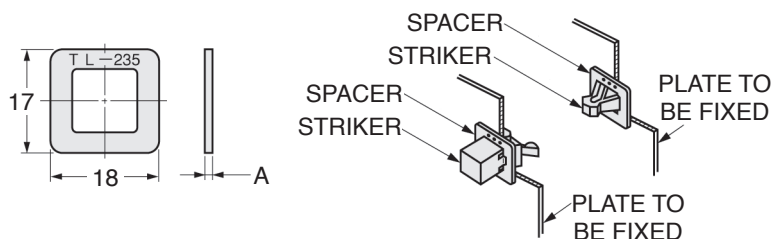
SHOULD BE PRESSED 3 mm AND
OVER (STROKE FOR UNLOCK)



SHOULD BE PRESSED 3 mm AND
OVER (STROKE FOR UNLOCK)



INSTALLATION EXAMPLES



CATCHES, MAGNETIC

RoHS
COMPLIANT

• APPLICATIONS

Measuring instruments / Office automation appliances / Furniture

• CHARACTERISTICS

No need for any screw or adhesive agent for installation. Installation can be completed by pushing the catch into the hole to set. The models can accommodate five different panel thicknesses.

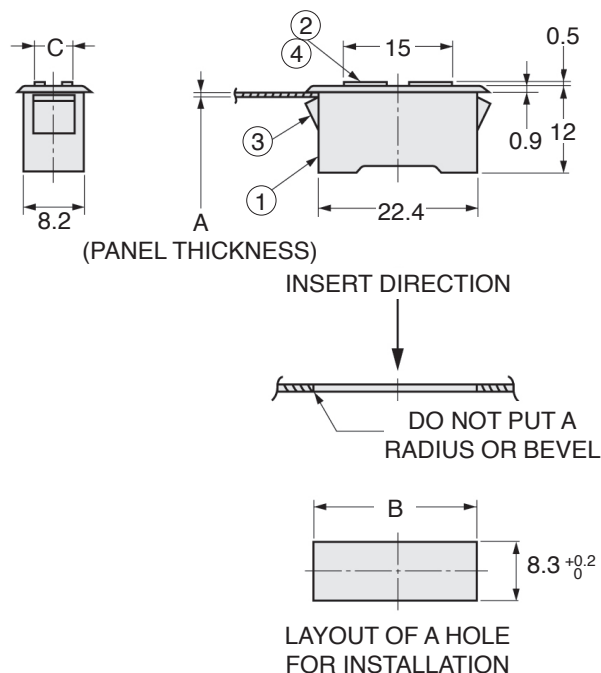
• PARTS LIST

No.	Part Name	Material	Finish				Qty.
			..MTL295-1	..MTL295-1S	..MTL295-2	..MTL295-2S	
1	Case	Nylon	White	Gray	White	Gray	1
2	Yoke	Steel	Zinc Plated				2
3	Stopper Spring	Acetal	Primary		Blue		1
4	Magnet	Ferrite					

• CATCHES

Catalog Number	Holding Force Approx. N (kgf)	C	Net Weight g
MNCT09MTL295-1	Over 12.8 (1.3)	5.3	5.6
MNCT09MTL295-1S	Over 21.6 (2.2)	5.8	6.2
MNCT09MTL295-2	Over 12.8 (1.3)	5.3	5.6
MNCT09MTL295-2S	Over 21.6 (2.2)	5.8	6.2

Catalog Number	A (Panel Thickness)	B Opening
MNCT09MTL295-1	0.5 ±0.05	22.6 ^{+0.15} ₀
MNCT09MTL295-1S	0.8 ±0.05	23.7 ^{+0.15} ₀
MNCT09MTL295-2	1.0 ±0.05	22.7 ±0.1
MNCT09MTL295-2S	1.2 ±0.05	23.5 ±0.1
	1.4 ±0.05	24.0 ±0.1



CATCHES, MAGNETIC

RoHS
COMPLIANT

• APPLICATIONS

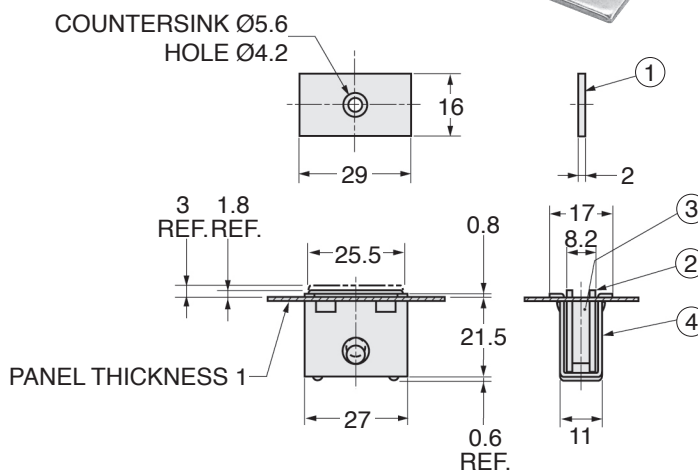
Measuring instruments / Office automation appliances / Furniture

• CHARACTERISTIC

An easy-to-install push-in type catch.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Strike Plate	Steel	Bright Zinc Plated	1
2	Yoke			2
3	Magnet	Ferrite	—	1
4	Magnet Holder	Aluminium		



• CATCH

Catalog Number	Holding Force N (kgf)	Net Weight g
MNCT06MTL185	Approx. 29.4 (3)	33.2

LAYOUT OF A HOLE FOR INSTALLATION



7

All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

• APPLICATIONS

Kitchen appliances / Medical instruments

• CHARACTERISTIC

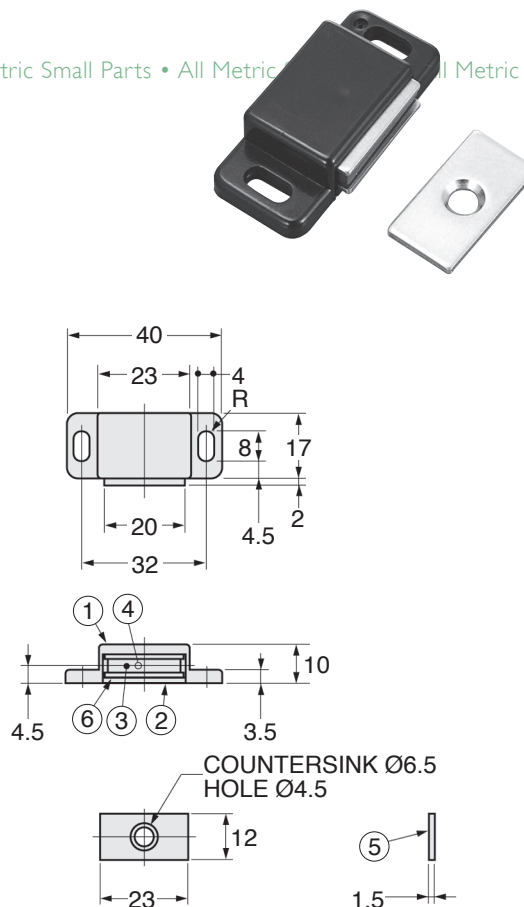
By using stainless steel for the yoke and strike plate, a better anticorrosive effect is obtained, in comparison to an ordinary magnetic catch.

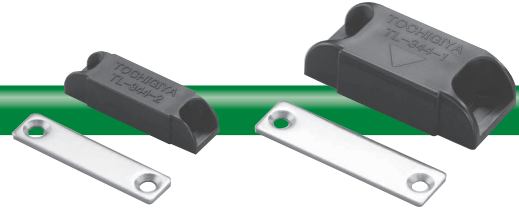
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Housing	Polyethylene	Black	1
2	Base			
3	Magnet	Ferrite		
4	Flat Spring	Stainless Steel	—	2
5	Strike Plate			
6	Yoke			

• CATCH

Catalog Number	Holding Force N (kgf)	Net Weight g
MNCT10MTL268	Approx. 24.5 (2.5)	14.4





• APPLICATIONS

Cleanroom / Cleanbooth equipment / Devices used near water

• CHARACTERISTICS

Magnet is enclosed inside plastic. There is no contamination from magnetic powder. Suitable for cleanroom applications and equipment used around water.

• SPECIFICATIONS

MNCT01MTL344-2 does not have a specified attaching surface.
Both surfaces may be used (no back plate).

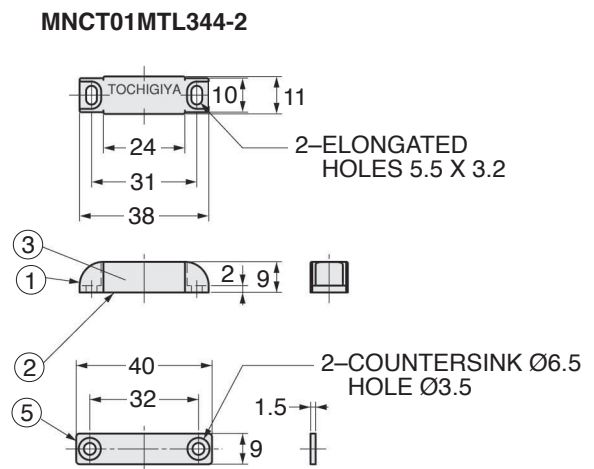
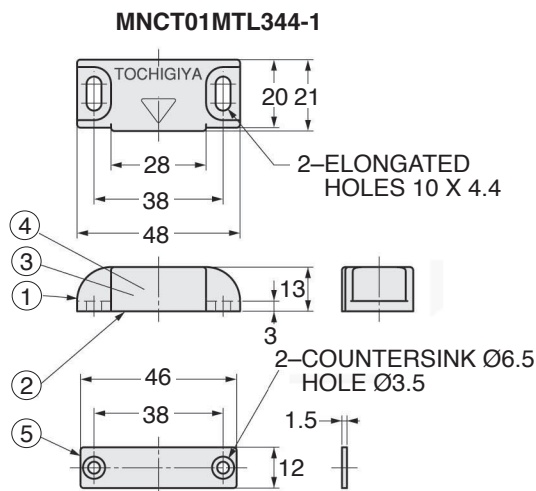
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Housing	Acetal	Black	1
2	Cover			
3	Magnet	Neogium	Nickel Plated	
4	Back Plate	Steel		
5	Strike Plate	Stainless Steel	—	

• CATCHES

Catalog Number	Holding Force N (kgf)	Net Weight g
MNCT01MTL344-1	Approx. 23 (2.3)	29
MNCT01MTL344-2	Approx. 13 (1.3)	14

NOTE: Due to the construction of these catches, the area of magnetic field is larger than the ordinary magnetic catches. Therefore, care should be exercised for their handling and storage. Also, these catches do not have the usual yoke cushion, so the user must be careful not to cause shock impact when closing the door.



NOTE: Catalog number **MNCT01MTL344-2** does not have a back plate.



• APPLICATIONS

Kitchen equipment / Science devices / Distribution boards / Distribution panels / Measuring instruments

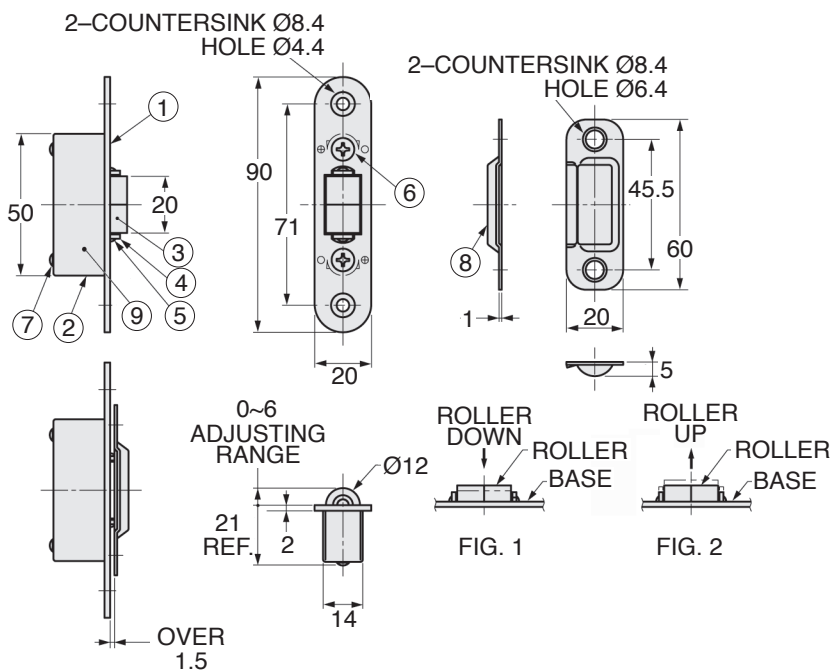
• CHARACTERISTICS

Roller height is adjustable for smoother opening and closing action. Made of stainless steel for better anticorrosive performance.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.	
1	Base	Stainless Steel	Hairline	1	
2	Case		—		
3	Roller				2
4	Roller Carrier				
5	Pin				1
6	Phillips Head Screw*				
7	Washer				2
8	Strike Plate				1
9	Spring				2

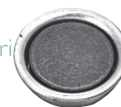
***NOTE:** When adjusting roller, be sure roller remains parallel to the base. ⊕ Direction: Roller to be Drawing In
○ Direction: Roller to be Drawing Out



- **CATCH, ROLLER**

Catalog Number	Net Weight g
MNCT11MTL279	74

All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts



- **APPLICATIONS**

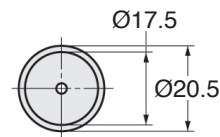
Measuring instruments / Office automation appliances / Furniture

- **CHARACTERISTIC**

An embedded type catch to maximize available space.

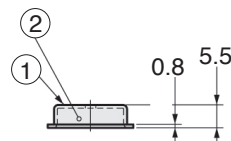
• PARTS LIST

No.	Part Name	Material	Finish
1	Housing	Steel	Bright Zinc Plated
2	Magnet	Ferrite	—



• **CATCH, MAGNETIC**

Catalog Number	Holding Force N (kgf)	Net Weight g
MNCT05MTL172	Approx. 4.91 (0.5)	6.3



MAGNETIC CATCH & BRACKET



• APPLICATIONS

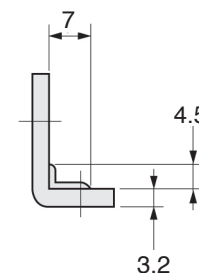
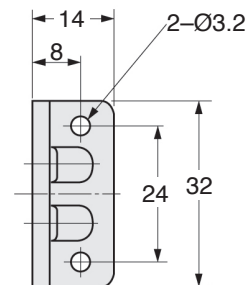
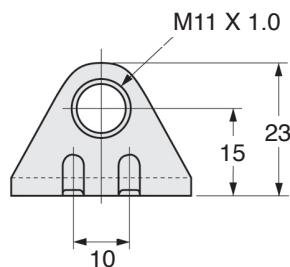
Measuring instruments / Office automation appliances / Furniture

• CHARACTERISTIC

A special bracket for easy installation of **MNCT04MTL294**.

• BRACKET – Steel, Black Paint

Catalog Number	Net Weight g
MNCT04MTL188	16.3



All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

7

• APPLICATIONS

Measuring instruments / Office automation appliances / Furniture

• CHARACTERISTIC

The door can be opened or closed with a single-touch operation.

• SPECIFICATIONS

1. Stroke for unlock: approx. 3.5 mm.
2. Initial thrust force from lock to unlock condition: approx. 8.83 N (0.9 kgf)
3. Torque for nuts: 0.29 N • m (3 kgf • cm) or less.

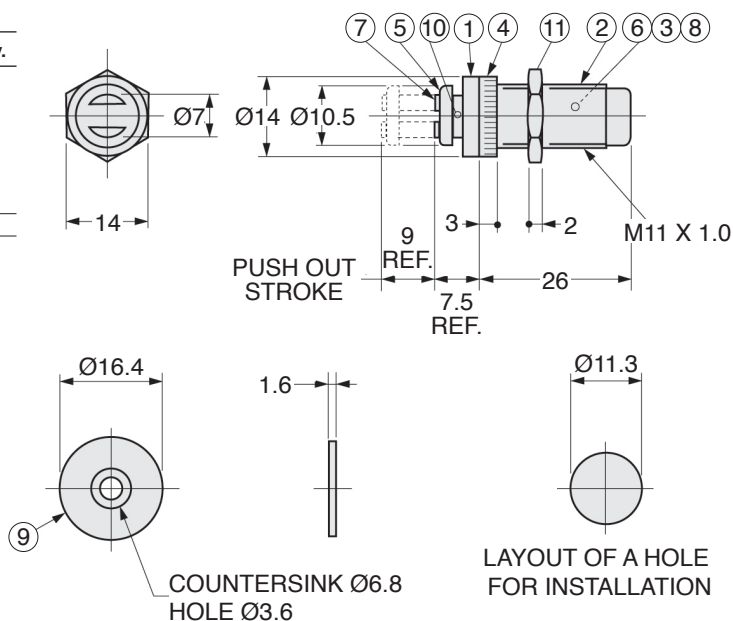


• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Base	ABS	Black	1
2	Case			
3	Spring Receiver			
4	Spacer	Nylon		
5	Slide	PC	Red	
6	Rotary	Steel	Black Colored Nickel Plated	2
7	Yoke		—	
8	Spring		Zinc Plated	
9	Strike Plate	Ferrite	—	1
10	Magnet		Zinc Plated	
11	Nut	Zinc Die Cast	Zinc Plated	

• CATCH

Catalog Number	Net Weight g
MNCT04MTL294	8.95





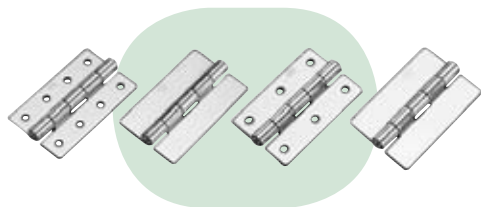
www.allmetricsmallparts.com

SECTION
8

Hinges
MLA



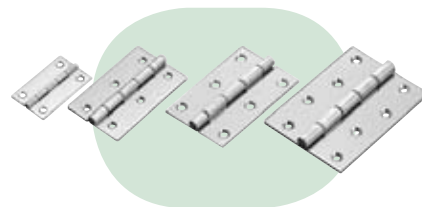
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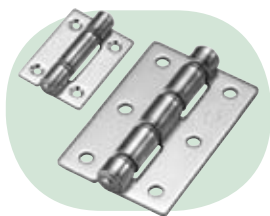
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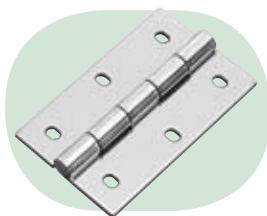
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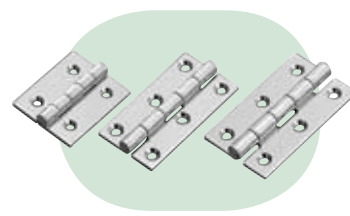
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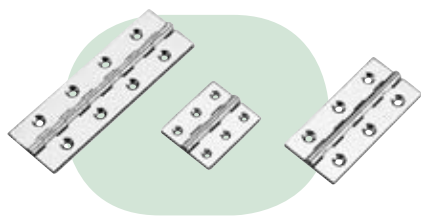
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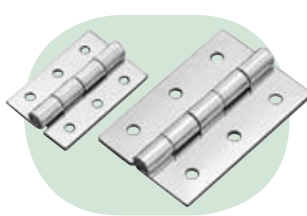
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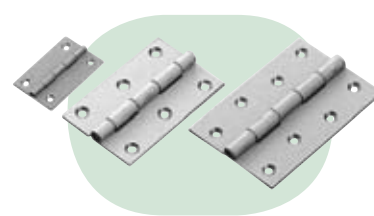
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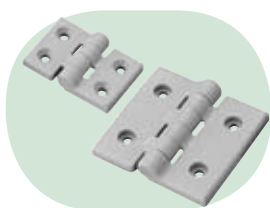
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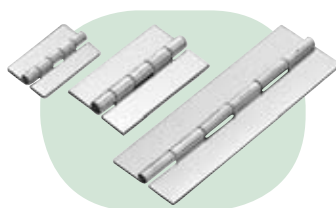
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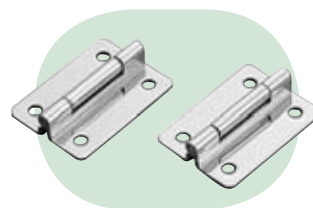
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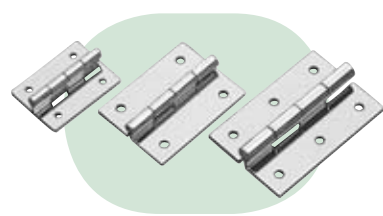
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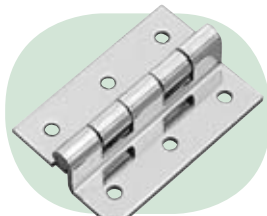
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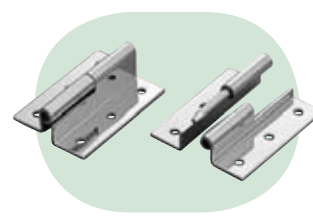
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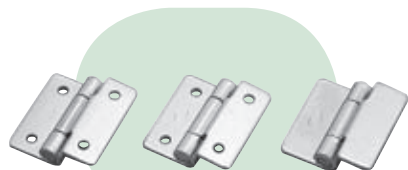
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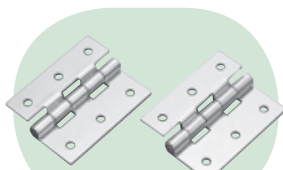
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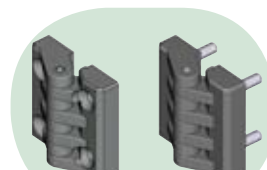
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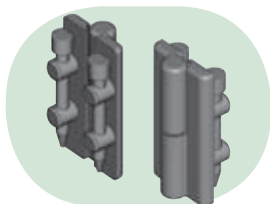
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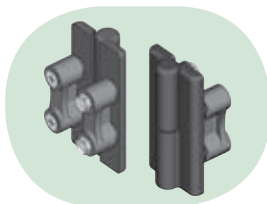
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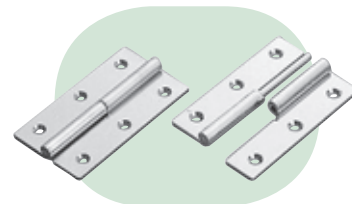
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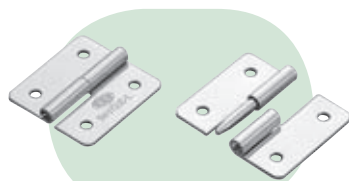
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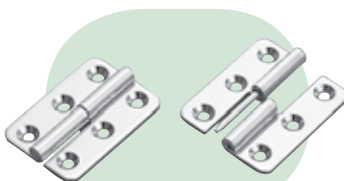
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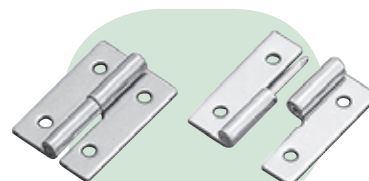
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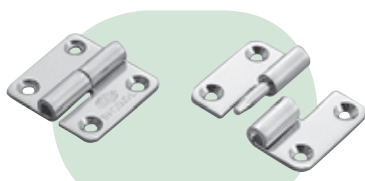
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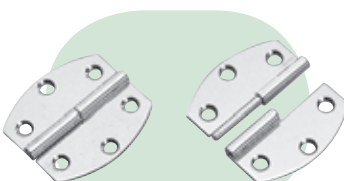
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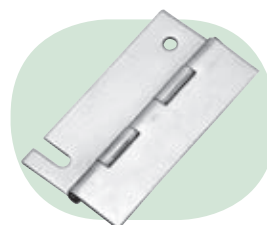
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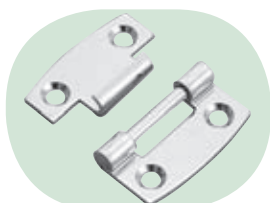
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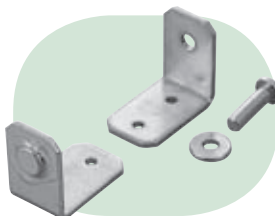
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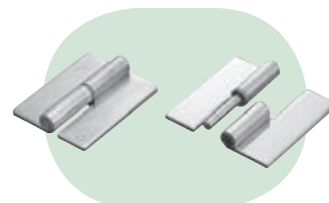
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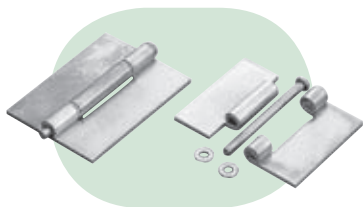
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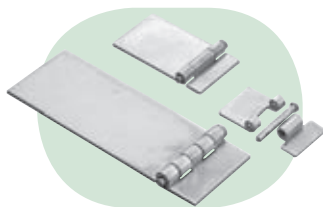
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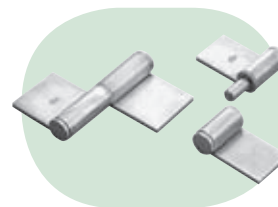
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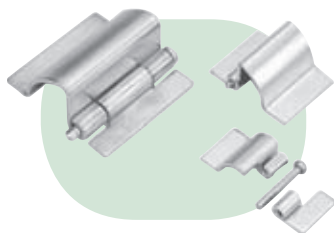
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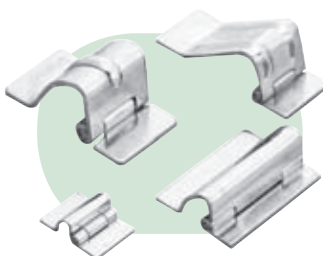
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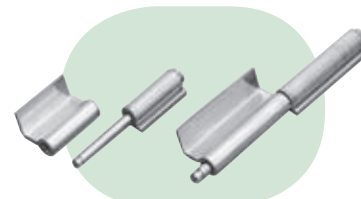
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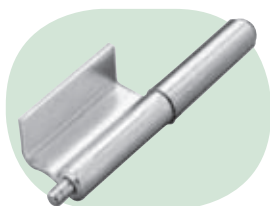
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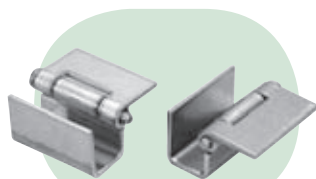
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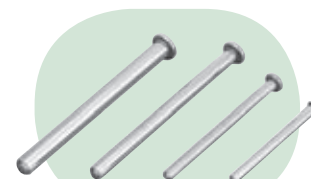
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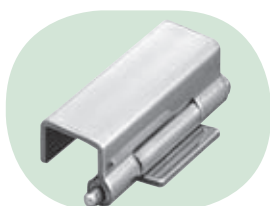
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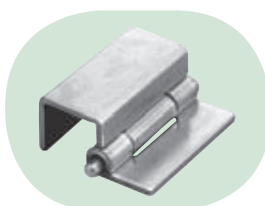
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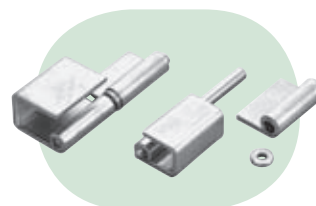
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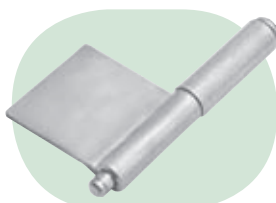
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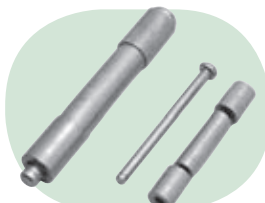
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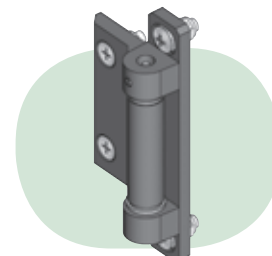
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8-40



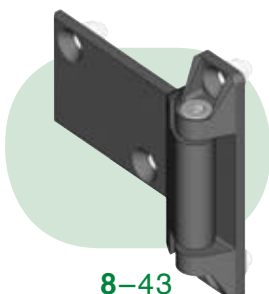
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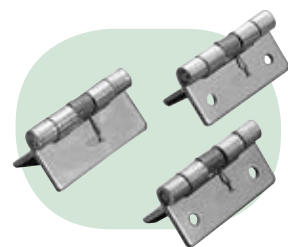
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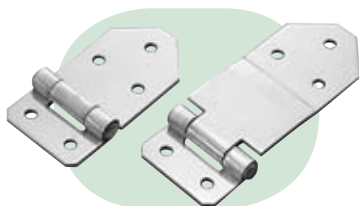
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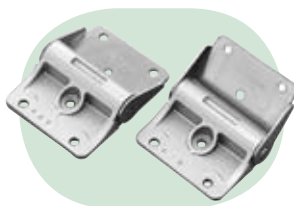
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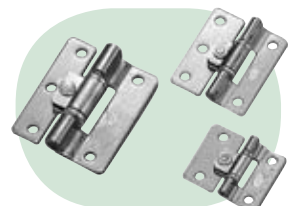
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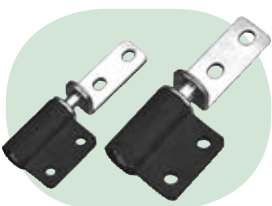
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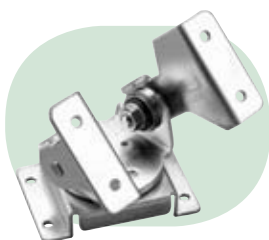
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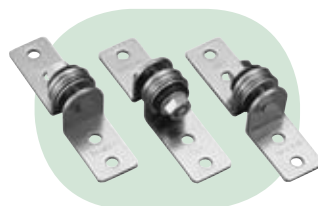
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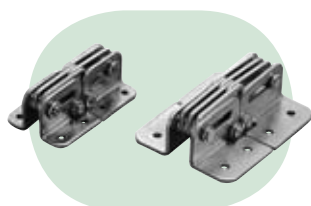
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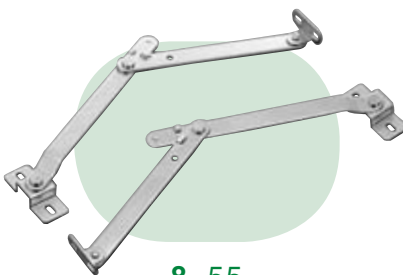
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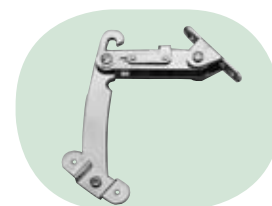
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8-54



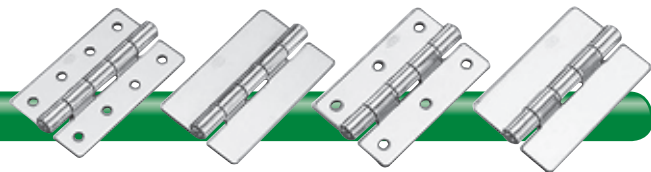
8-55



8-56 thru 8-58

HINGES, FLAT - Stainless Steel

RoHS
COMPLIANT



• APPLICATIONS

Medical instruments / Machine tools / Exterior cases

• CHARACTERISTIC

Made of stainless steel, having excellent corrosion and chemical resistance.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Stainless Steel	Buffing	1
2	Hinge Piece		—	
3	Pin		—	

Fig. 1

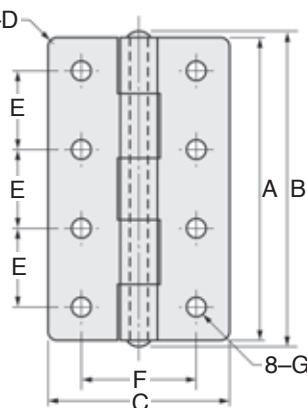


Fig. 2

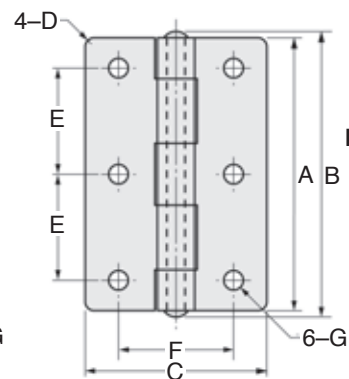


Fig. 1 • HINGES

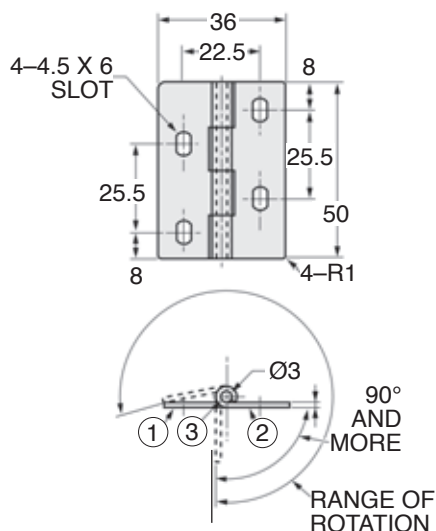
Catalog Number	Type	A	B Ref.	C	D	E	F	G	H	J	Net Weight g
MLAT17M1TH127-1	With Holes	100	104.2	60	R3	26	38	Ø6.4	3	Ø6	194
MLAT17M2TH127-2	Without Holes					—	—	—			200

8

Fig. 2 • HINGES

Catalog Number	Type	A	B Ref.	C	D	E	F	G	H	J	Net Weight g
MLAT17M1TH127-3	With Holes	90	94.2	60	R3	35	38	Ø6.4	3	Ø6	174
MLAT17M2TH127-4	Without Holes					—	—	—			180

All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts



• APPLICATIONS

Exterior devices / Kitchen equipment /
Telecommunication devices

• CHARACTERISTIC

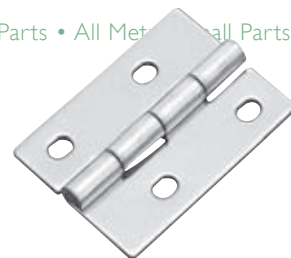
Made of stainless steel, having excellent corrosion and chemical resistance.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Stainless Steel	—	1
2	Hinge Piece			
3	Pin			

• HINGE

Catalog Number	Net Weight g
MLAT18M1TH-31	27.5



HINGES, FLAT - Stainless Steel

RoHS
COMPLIANT

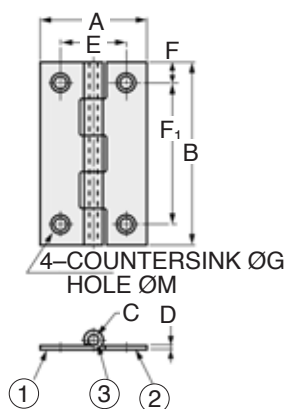
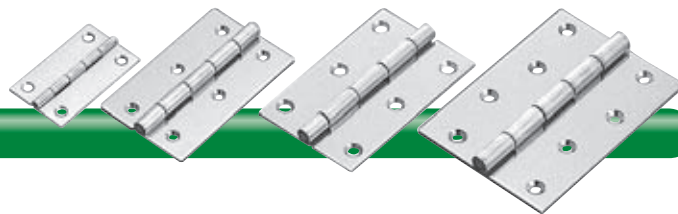


Fig. 1

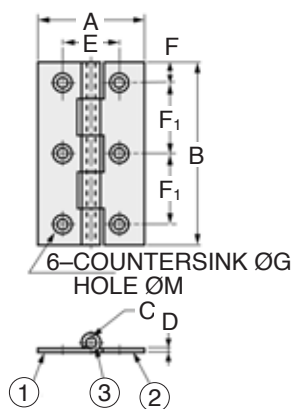


Fig. 2

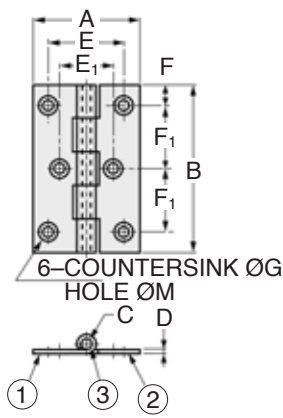


Fig. 3

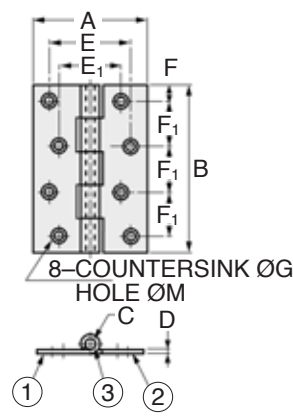


Fig. 4

• APPLICATION

Various types of industrial machines

• CHARACTERISTIC

Choose the size from a wide variety of selections.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Stainless Steel	—	1
2	Hinge Piece			
3	Pin			

Fig. 1 • HINGES

Catalog Number	A	B	C	D	E	F	F ₁	G	M	Number of Segments	Net Weight g
MLAT10MTHTM84SUS	18.5	25	Ø2	0.8	12	3.5	18	Ø4.4	Ø3.1	4	4.3
MLAT10MTHTM85SUS	21.5	32			14	4	24	Ø5.6	Ø4.3		6
MLAT10MTHTM86SUS	26	38			16	5	28				8
MLAT10MTHTM87SUS	30	51			19	6	39			5	12

Fig. 2 • HINGES

Catalog Number	A	B	C	D	E	F	F ₁	G	M	Number of Segments	Net Weight g
MLAT10MTHTM88SUS	41.5	64	Ø3	1.2	20	6.5	25.5	Ø6.5	Ø4.3	5	31.8
MLAT10MTHTM89SUS	48	76	Ø4	1.5	24	8	30		Ø3.7		56.5

Fig. 3 • HINGES

Catalog Number	A	B	C	D	E	E ₁	F	F ₁	G	M	Number of Segments	Net Weight g
MLAT10MTHTM90SUS	56	89	Ø5	1.5	41	34	10.5	34	Ø8.6	Ø5.8	5	84

Fig. 4 • HINGES

Catalog Number	A	B	C	D	E	E ₁	F	F ₁	G	M	Number of Segments	Net Weight g
MLAT10MTHTM91SUS	71.5	102	Ø5	2	50	40	9	28	Ø8.6	Ø4.9	5	153

Fig. 1

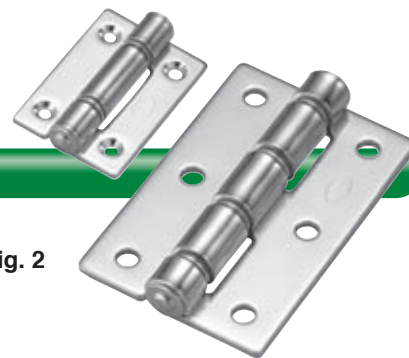


Fig. 2

• **APPLICATIONS**

Electronics / Semiconductor machines / Engineering equipment /
Experimental facility

• **CHARACTERISTICS**

The existence of the high-performance bushings between the hinge pieces and the pin reduces the generation of metal powder from rubbing. Also, the reduction of the friction leads to smoother opening and closing of the hinge. For superior rust resistance, the hinge pieces and the pin are made of stainless steel.

• **SPECIFICATIONS**

Operating Temperature Range: -40° to +80°C Conforms to UL
94HB flammability standards

• **PARTS LIST**

No.	Part Name	Material	Finish	Qty.	
				...1TH142-2	...1TH142-1
1	Hinge Piece	Stainless Steel	Electropolishing	1	1
2	Hinge Piece				
3	Pin				
4	Washer				
5	Washer	Acetal	-	2	4
6	Flange Bushing				
7	Flange Bushing				

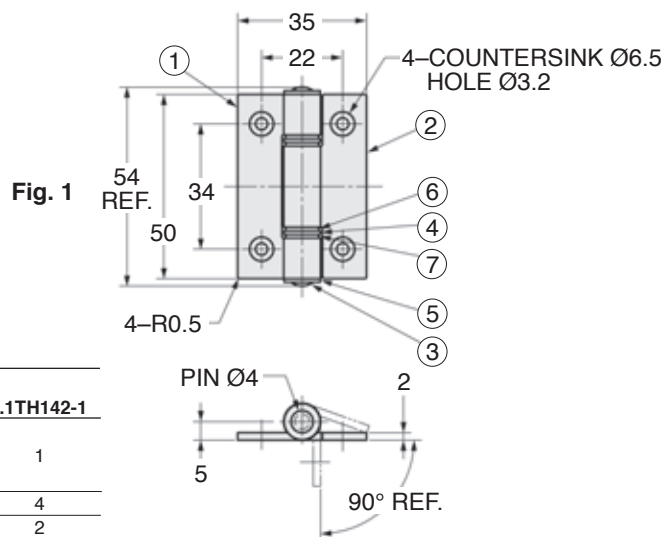
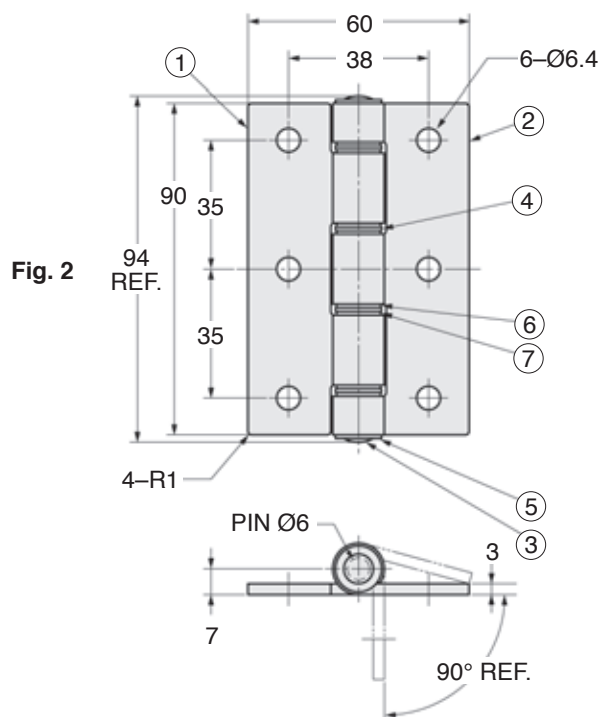


Fig. 1 • **HINGE** – Countersunk Holes

Catalog Number	Net Weight g
MLAT01M1TH142-2	42.7

Fig. 2 • **HINGE**

Catalog Number	Net Weight g
MLAT01M2TH142-1	182.6



HINGE, FLAT - Brass, Nickel Plated

RoHS
COMPLIANT

• APPLICATIONS

Distribution boards / Distribution panels /
Telecommunication devices

• CHARACTERISTICS

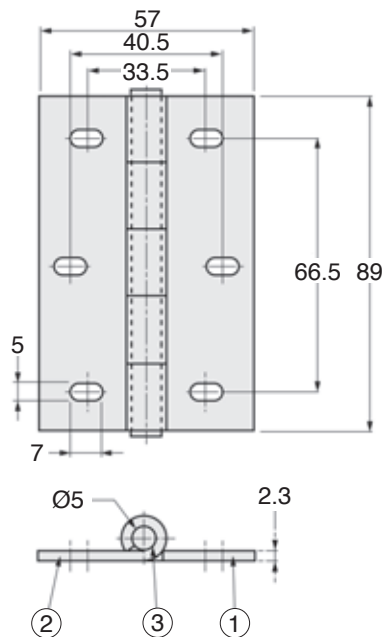
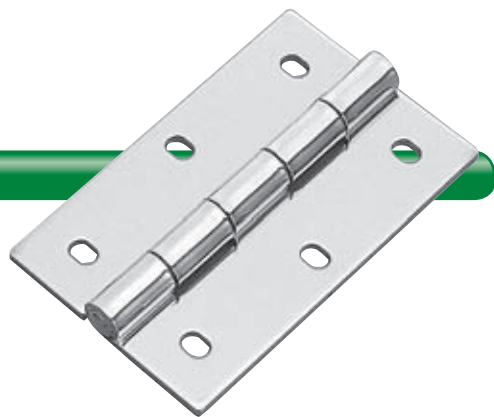
Slots are made as holes for installations.
The slots absorb positioning gaps between
movable and fixed sides.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Brass	Nickel Plated	1
2	Hinge Piece			
3	Pin			

• HINGE

Catalog Number	Net Weight g
MLAT18M2TH-30	137.5



HINGES, FLAT - Brass, Nickel Plated

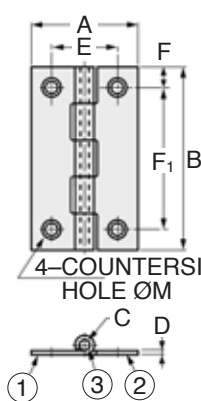
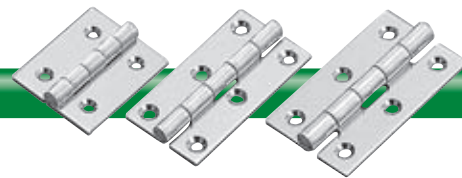


Fig. 1

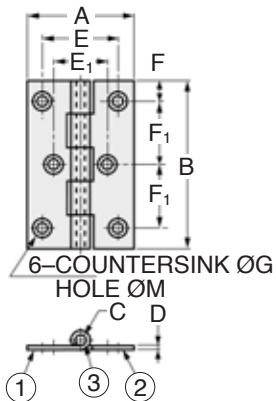


Fig. 2

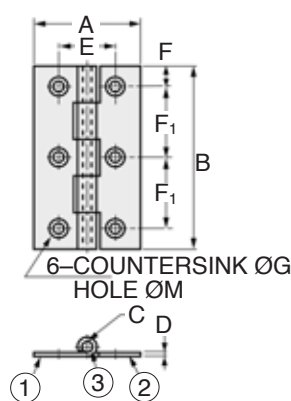


Fig. 3

• APPLICATION

Various types of industrial machines

• CHARACTERISTIC

Choose the size from a wide variety of selections.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Brass	Nickel Plated	1
2	Hinge Piece			
3	Pin			

Fig. 1 • HINGE – 4 Holes, Straight

Catalog Number	A	B	C	D	E	F	F ₁	G	M	Number of Segments	Net Weight g
MLAT13M1THTM-2	20	30	Ø2	1	12	5	20	Ø4.4	Ø3.2	4	6.5
MLAT13M2THTM-6	32	40	Ø3	1.5	18	8	24	Ø5.6	Ø3.3	5	22.5

Fig. 2 • HINGE – 6 Holes, Offset

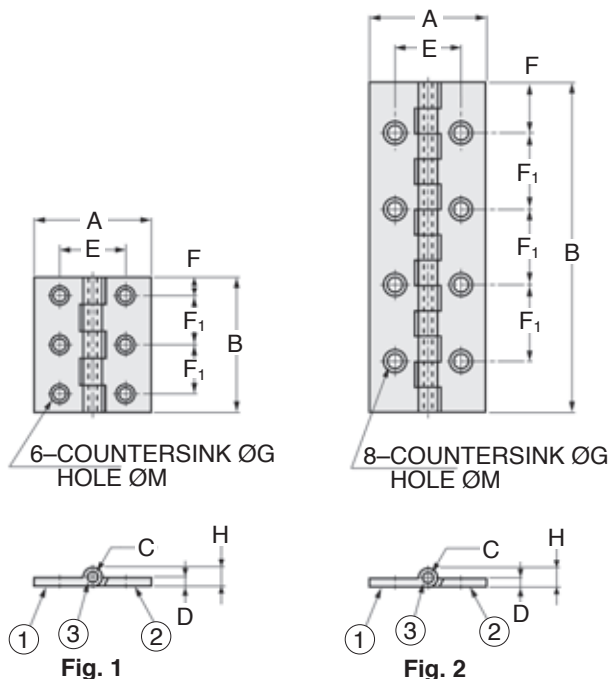
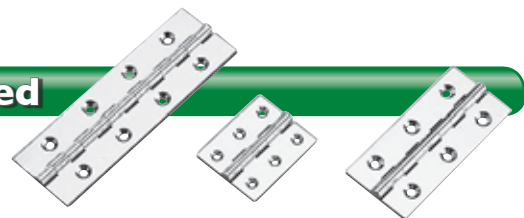
Catalog Number	A	B	C	D	E	E ₁	F	F ₁	G	M	Number of Segments	Net Weight g
MLAT13M3THTM-8	30	58	Ø3	1.5	20	15	6	23	Ø6.5	Ø3.8	5	31.5

Fig. 3 • HINGE – 6 Holes, Straight

Catalog Number	A	B	C	D	E	F	F ₁	G	M	Number of Segments	Net Weight g
MLAT13M4THTM-17	18	45	Ø1.5	0.5	11	4	18.5	Ø4.4	Ø3.5	6	4.5
MLAT13M5THTM-4	26	38	Ø2	1	16	5.5	13.5	Ø5	Ø3.3	4	10.5
MLAT13M6THTM-7	30	50	Ø3	1.5	19	5	20	Ø5.6		5	27
MLAT13M7THTM-9	35	60	Ø4		21	7	23	Ø6.5	Ø3.8		39.5
MLAT13M8THTM-10			Ø3	1.2	19	8	22		Ø4.3		29
MLAT13M9THTM-12	40	75		1.5	22	9	28.5	Ø8.6	Ø5.8		48

HINGES, CATCH-OFF - Brass, Nickel Plated

RoHS
COMPLIANT



• APPLICATION

Measuring instruments

• CHARACTERISTIC

By using drawn material, the diameters of the pin and spine of the hinge are minimized.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Brass	Nickel Plated	1
2	Hinge Piece			
3	Pin			

8

Fig. 1 • HINGES

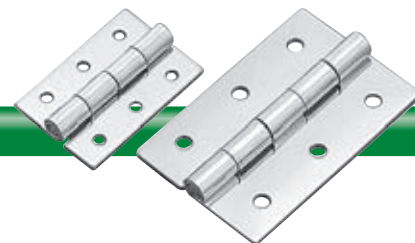
Catalog Number	A	B	C	D	E	F	F ₁	G	H	M	Number of Segments	Net Weight g
MLAT14M1THTM-92	41	50	Ø3.2	3	25	7	18	Ø6.5	6.3	Ø3.2	5	55
MLAT14M2THTM-15		76				8	30	Ø8.6		Ø4.6		83
MLAT14M3THTM-93		90				15						98

Fig. 2 • HINGES

Catalog Number	A	B	C	D	E	F	F ₁	G	H	M	Number of Segments	Net Weight g
MLAT14M4THTM-94	41	130	Ø3.2	3	25	20	30	Ø8.6	6.3	Ø4.6	13	144

HINGES, FLAT - Brass, Nickel Plated

RoHS
COMPLIANT



• APPLICATION

Various types of devices

• CHARACTERISTIC

Choose the size from a wide variety of selections.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Brass	Nickel Plated	1
2	Hinge Piece			
3	Pin			

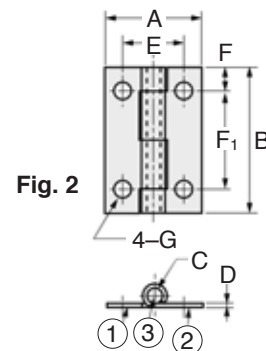
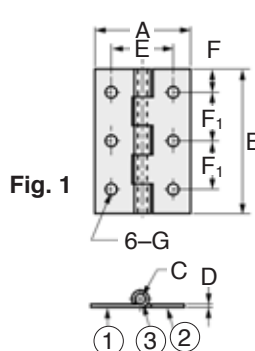


Fig. 1 • HINGE – Straight Holes

Catalog Number	A	B	C	D	E	F	F ₁	G	Number of Segments	Net Weight g
MLAT14M1THTM-5	26	40	Ø3	1.5	17	7	13	Ø3.2	4	19.5
MLAT14M2THTM-11	40	60	Ø4		26	10	20	Ø4.3	5	44

Fig. 2 • HINGE – Straight Holes

Catalog Number	A	B	C	D	E	F	F ₁	G	Number of Segments	Net Weight g
MLAT14M3THTM-19	16	30	Ø1.5	0.5	9	4.25	21.5	Ø2.7	4	3
MLAT14M4THTM-16	20	25	Ø2	1	12	5.5	14	Ø2.8		5.5
MLAT14M5THTM-1		30	Ø3		13	5	20	Ø3.2		9

HINGES, FLAT - Galvanized Steel

RoHS
COMPLIANT

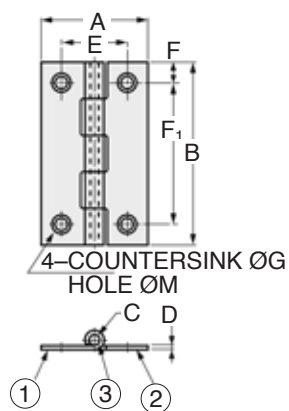
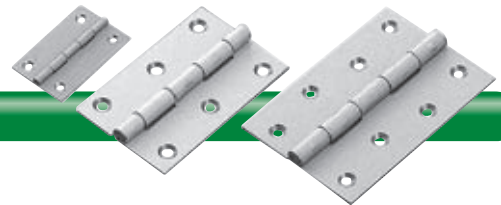


Fig. 1

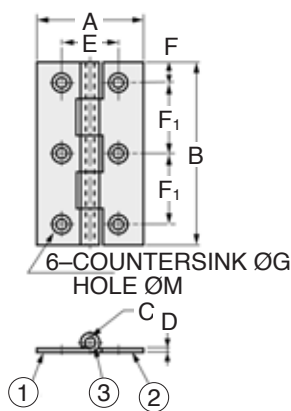


Fig. 2

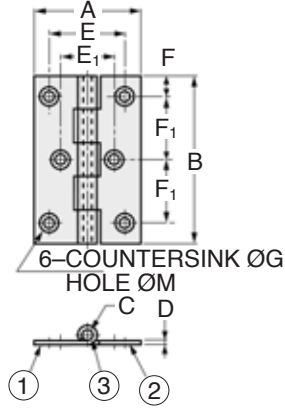


Fig. 3

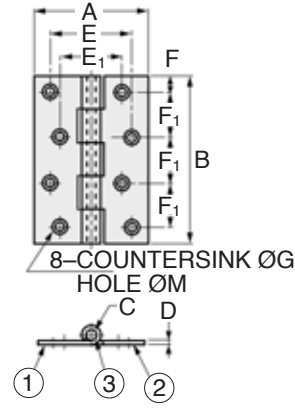


Fig. 4

• APPLICATION

Various types of industrial machines

• CHARACTERISTIC

Choose the size from a wide variety of selections.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Galvanized	—	1
2	Hinge Piece	Sheet Steel		
3	Pin	Steel		

Fig. 1 • HINGES

Catalog Number	A	B	C	D	E	F	F ₁	G	M	Number of Segments	Net Weight g
MLAT11MTHTM-84	18.5	25	Ø2	0.8	12	3.5	18	Ø4.4	Ø3.1	4	4
MLAT11MTHTM-85	21.5	32			14	4	24	Ø5.6	Ø4.3		5.7
MLAT11MTHTM-86	26	38			16	5	28				8
MLAT11MTHTM-87	30	51			19	6	39			5	12

Fig. 2 • HINGES

Catalog Number	A	B	C	D	E	F	F ₁	G	M	Number of Segments	Net Weight g
MLAT11MTHTM-88	41.5	64	Ø3	1.2	20	6.5	25.5	Ø6.5	Ø4.3	5	31.5
MLAT11MTHTM-89	48	76	Ø4	1.5	24	8	30		Ø3.7		60.5

Fig. 3 • HINGES

Catalog Number	A	B	C	D	E	E ₁	F	F ₁	G	M	Number of Segments	Net Weight g
MLAT11MTHTM-90	56	89	Ø5	1.6	41	34	10.5	34	Ø8.6	Ø5.8	5	88

Fig. 4 • HINGES

Catalog Number	A	B	C	D	E	E ₁	F	F ₁	G	M	Number of Segments	Net Weight g
MLAT11MTHTM-91	71.5	102	Ø5	2	50	40	9	28	Ø8.6	Ø4.9	5	150.5

HINGES, NYLON

RoHS
COMPLIANT

• APPLICATIONS

Lightweight cases / Various types of boxes

• CHARACTERISTICS

Resin is light and useful where lightweight components are needed. The hinge pieces are resin (ivory color) and the pin is 304 stainless steel.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Nylon	Ivory	2
2	Cap			
3	Pin	Stainless Steel	—	1

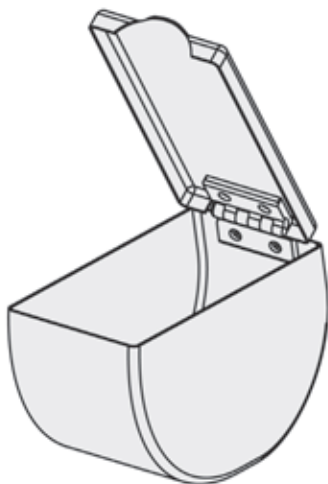
Fig. 1 • HINGE – Countersunk Holes

Catalog Number	Net Weight g
MLAT02M1TH141-2	19

Fig. 2 • HINGE – Counterbored Holes

Catalog Number	Net Weight g
MLAT02M2TH141-1	58.2

INSTALLATION EXAMPLE



CONSTRUCTION MACHINERY
CONSOLE BOX

Fig. 1

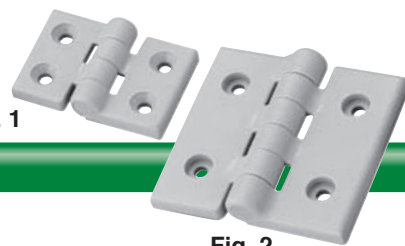


Fig. 2

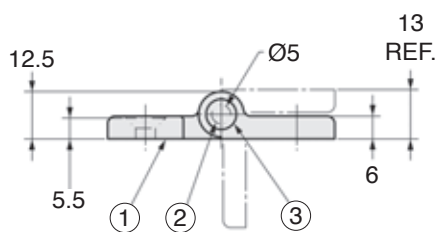
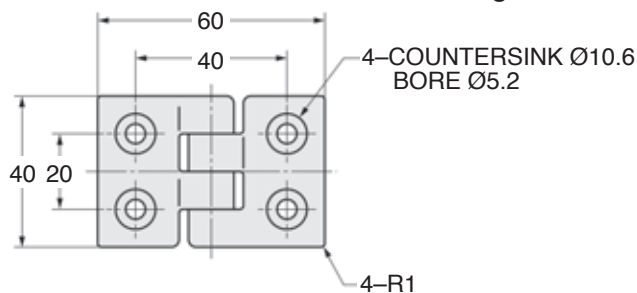


Fig. 1

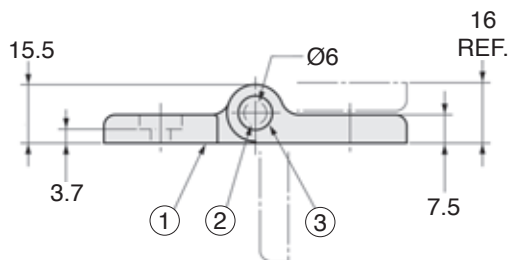
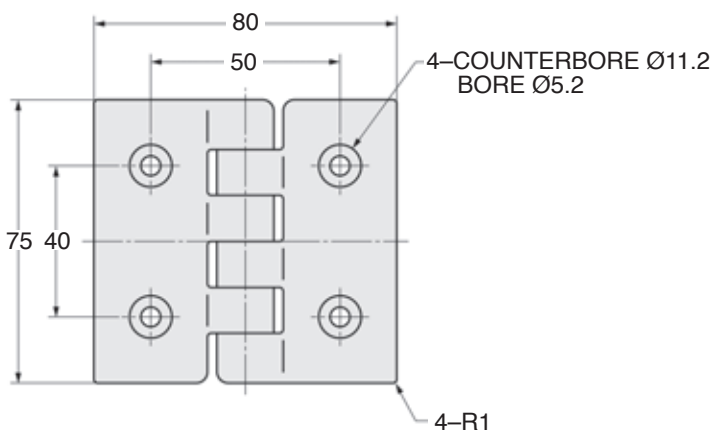


Fig. 2

HINGES, FLAT - Stainless Steel



• APPLICATION

Various types of industrial machines

• CHARACTERISTIC

Choose the size from a wide variety of selections.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Stainless Steel	—	1
2	Hinge Piece			
3	Pin			

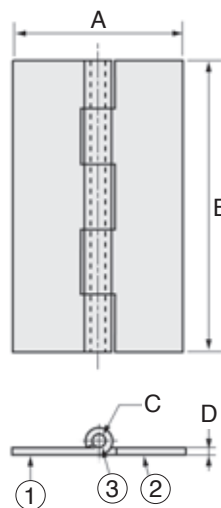


Fig. 1

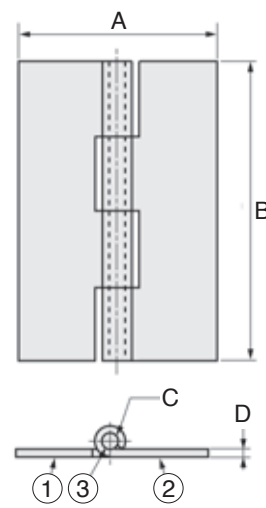


Fig. 2

Fig. 1 • HINGES

Catalog Number	A	B	C	D	Number of Segments	Net Weight g
MLAT09M01THTM-55	30	50	Ø3	1.5	5	26
MLAT09M02THTM-65		51	Ø2	0.8		12.5
MLAT09M03THTM-56	35	50	Ø3	1.5	3	27.5
MLAT09M04THTM-54	40	45		1.2		23.5
MLAT09M05THTM-57		75	Ø4	1	5	37
MLAT09M06THTM-66	41.5	64	Ø3	1.2		34
MLAT09M07THTM-58	45	75	Ø4	2		73
MLAT09M08THTM-67	48	76		1.5		58
MLAT09M09THTM-68	56	89	Ø5			85
MLAT09M10THTM-69	71.5	102		2		154

Fig. 2 • HINGES

Catalog Number	A	B	C	D	Number of Segments	Net Weight g
MLAT09M11THTM-62	18.5	25	Ø2	0.8	4	4.5
MLAT09M12THTM-63	21.5	32				6.5
MLAT09M13THTM-64	26	38				8.5
MLAT09M14THTM-61	40	500	Ø3	1.5	40	308
MLAT09M15THTM-59	50	150	Ø4		6	124
MLAT09M16THTM-60		200		1.2	16	131

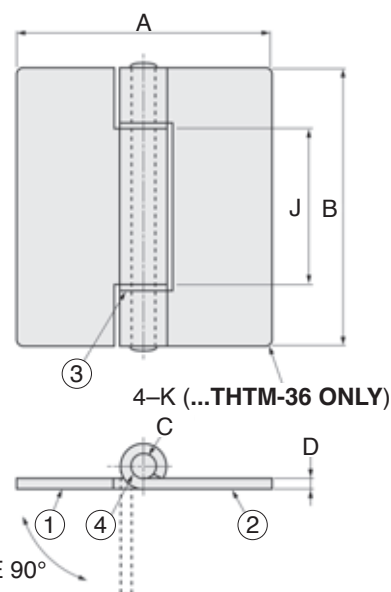
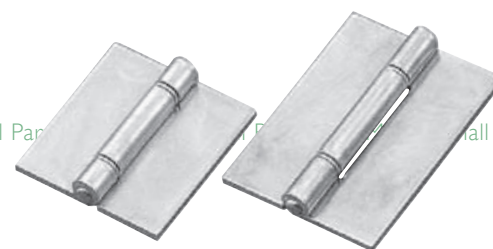
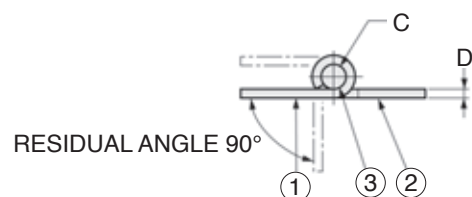
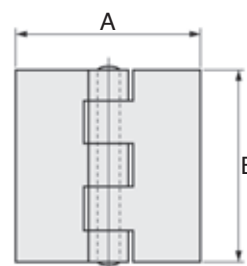
ing Holes



The image shows two views of a metal hinge. On the left, the hinge is shown from the side, highlighting the cylindrical pin and the two rectangular leaves. On the right, the hinge is shown from the front, showing the four circular rivets that connect the leaves. The metal has a brushed, silver-colored finish.

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Stainless Steel	Brushed Finish	1
2	Hinge Piece		—	
3	Pin		—	

Catalog Number	A Ref.	B	C	D	Net Weight g
MLAT15M1TH94SU-1	50	51	Ø6	2.5	77.2
MLAT15M1TH94SU-2	63	64	Ø7	3	142.9
MLAT15M1TH94SU-3	74	76			184
MLAT15M1TH94SU-4	87	89	Ø8		257.1
MLAT15M1TH94SU-5	100	101.6		421.2	
MLAT15M1TH94SU-6	118	127	Ø11	4	685
MLAT15M1TH94SU-7	142	152	Ø12		961.5



No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Steel	Bright Zinc Plated	1
2	Hinge Piece			2
3	Washer			
4	Pin	Stainless Steel	—	1

Catalog Number	A	B	C	D	J	K	Net Weight g
MLAT16M1THTM-36	70	75	Ø6	3.2	42	R2	184
MLAT16M2THTM-37	75	90			50	—	230
MLAT16M2THTM-38		100			—	254	

8-16

HINGES, FLAT - Brass



• APPLICATION

Various types of devices

• CHARACTERISTIC

Choose the size from a wide variety of selections.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Brass	—	1
2	Hinge Piece			
3	Pin			

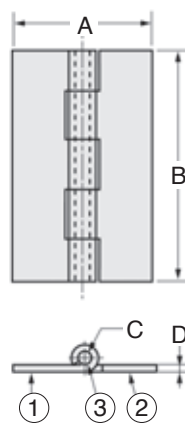
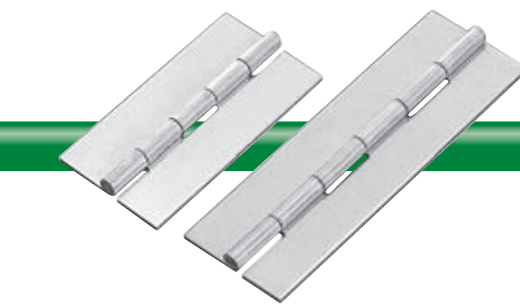


Fig. 1

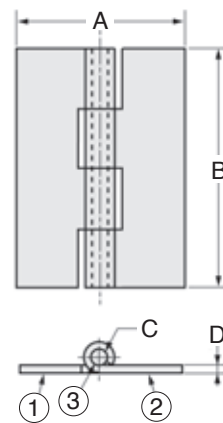


Fig. 2

Fig. 1 • HINGES

Catalog Number	A	B	C	D	Number of Segments	Net Weight g
MLAT13M01THTM-35	16	15	Ø1.8	1	3	3
MLAT13M02THTM-20	20	20	Ø1.5			4.5
MLAT13M03THTM-50	25	33	Ø3			11
MLAT13M04THTM-24	26	40	Ø2	1.5	5	18.5
MLAT13M05THTM-25	30	50	Ø3			28
MLAT13M06THTM-26		58				32
MLAT13M07THTM-52	40	80				54

Fig. 2 • HINGES

Catalog Number	A	B	C	D	Number of Segments	Net Weight g
MLAT13M08THTM-27	14	90	Ø1	0.5	12	7.5
MLAT13M09THTM-28	15	120			16	10.5
MLAT13M10THTM-31	18	400			Ø1.5	32
MLAT13M11THTM-21	20	30	Ø2	1	4	6.5
MLAT13M12THTM-23		50			40	12
MLAT13M13THTM-32		500				40
MLAT13M14THTM-22	26	38			4	11
MLAT13M15THTM-29	28	140		10	43	
MLAT13M16THTM-30	30	300		0.8	24	78
MLAT13M17THTM-33		600		1	48	197
MLAT13M18THTM-53	40	120	Ø3	1.5	6	82.5
MLAT13M19THTM-34	45	600			30	460
MLAT13M20THTM-51	50		Ø4	2	20	700

HINGES, FLAT - Galvanized Steel, No Mounting Holes

RoHS
COMPLIANT

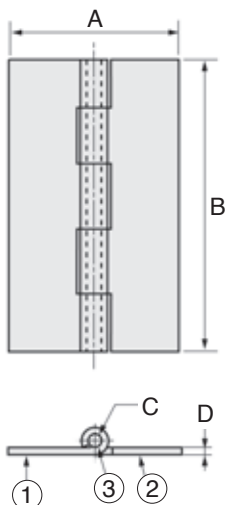


Fig. 1

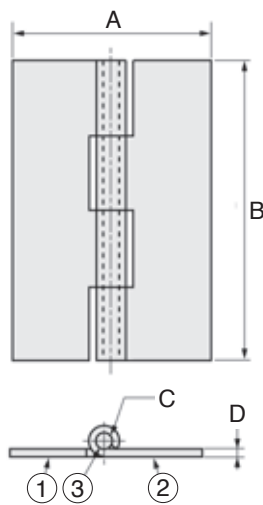


Fig. 2

• APPLICATION

Various types of devices

• CHARACTERISTIC

Choose the size from a wide variety of selections.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Galvanized sheet steel	—	1
2	Hinge Piece	Galvanized sheet steel	—	
3	Pin	Steel	—	

Fig. 1 • HINGES

Catalog Number	A	B	C	D	Number of Segments	Net Weight g
MLAT12M01THTM-72	16	15	Ø2	1	3	3
MLAT12M02THTM-73	20	20				4.5
MLAT12M03THTM-76	26	40				19
MLAT12M04THTM-77	30	50	Ø3	1.6	5	27.5
MLAT12M05THTM-78		60				32
MLAT12M06THTM-79	40	80				52.5

Fig. 2 • HINGES

Catalog Number	A	B	C	D	Number of Segments	Net Weight g
MLAT12M07THTM-74	20	30	Ø2	1	4	6.5
MLAT12M08THTM-82		400	Ø1.5	0.5	32	50
MLAT12M09THTM-83		500	Ø2	1	40	113.5
MLAT12M10THTM-75	26	35			4	9.5
MLAT12M11THTM-48	30	600		0.8	48	145
MLAT12M12THTM-81		300			24	73.5
MLAT12M13THTM-47	40	500	1	40	185	
MLAT12M14THTM-80		120	Ø3	1.6	6	79.5
MLAT12M15THTM-49	45	600			30	430
MLAT12M16THTM-70		750	Ø3.5			580
MLAT12M17THTM-71		1000			40	770

NOTE: The number of segments may not be exactly as shown in the figures. Please refer to the tables above.

HINGES, FLAT - Raised Hinge Pin



• APPLICATIONS

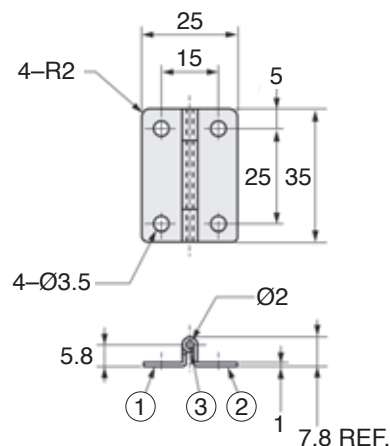
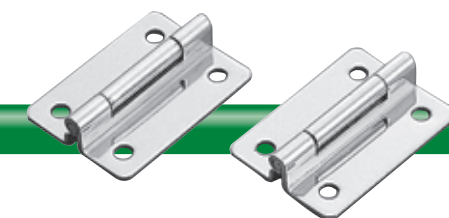
Measuring instruments /
Telecommunication devices

• CHARACTERISTIC

It is suitable for a thick door
or a place with steps.

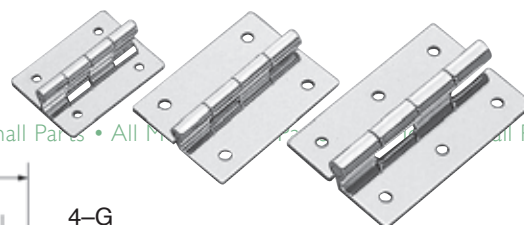
• PARTS LIST

No.	Part Name	Material		Finish		Qty.
		...TH25	...TH25SUS	...TH25	...TH25SUS	
1	Hinge Piece	Brass	Stainless Steel	Nickel Plated	Polished	1
2	Hinge Piece					
3	Pin					



• HINGES

Catalog Number	Net Weight g
MLAT23MTH25	11.5
MLAT23MTH25SUS	10



8

• APPLICATIONS

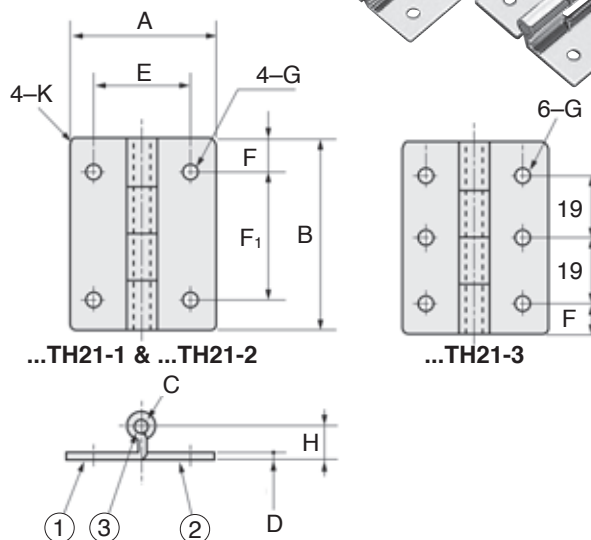
Measuring instruments /
Telecommunication devices

• CHARACTERISTIC

It is suitable for a thick door
or a place with steps.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Brass	Nickel Plated	1
2	Hinge Piece			
3	Pin			



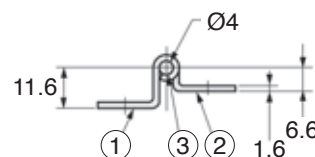
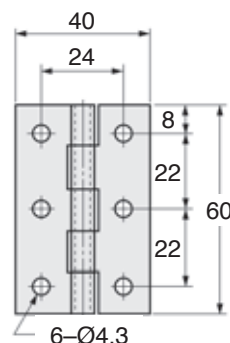
• HINGES

Catalog Number	A	B	C	D	E	F	F ₁	G	H	K	Net Weight g
MLAT23MTH21-1	23	30	Ø2	0.8	15	5	20	Ø2.2	5	R1	8
MLAT23MTH21-2	30	40		1	20	5	28		5.2		14
MLAT23MTH21-3	33	50	Ø3	1.2	21	6	—	Ø3.2	6.3	R0.5	25.5

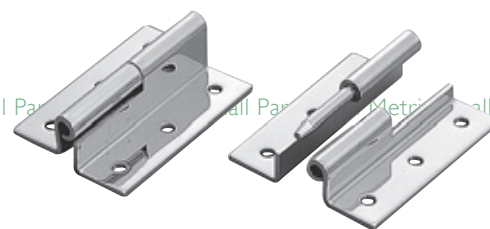
Measuring instruments / Telecommunication devices

It is suitable for a thick door or a place with a step.

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Brass	Nickel Plated	1
2	Hinge Piece			
3	Pin			



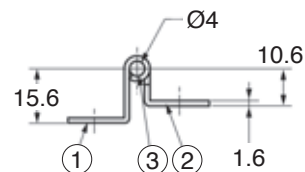
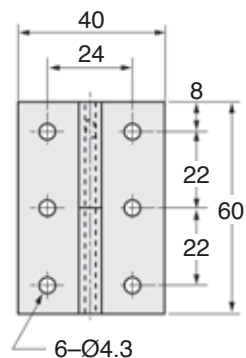
Catalog Number	Net Weight g
MLAT22MTH29	53



Distribution boards / Distribution panels / Measuring instruments

It is suitable for a box with a step.

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Brass	Nickel Plated	1
2	Hinge Piece			
3	Pin			



Catalog Number	Net Weight g
MLAT32MTH19-L	59.5
MLAT32MTH19-R	

THE FIGURE SHOWS LEFT TYPE

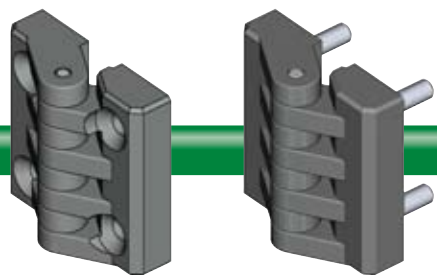
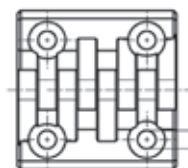
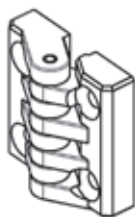
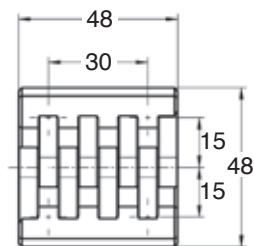
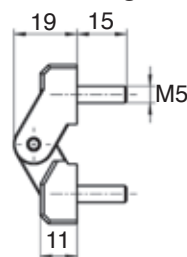
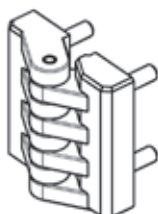


Fig. 1



Ø5.5 X 90°
COUNTERSINK

Fig. 2



- **HINGE** – Polyamide, Black
- **PIN** – Steel, Zinc Plated

Catalog Number	Fig.	Applicable Screw
MLAE02M1056U37	1	Countersunk Screw M5
MLAE02M1056U38	2	Threaded Studs M5

8

All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

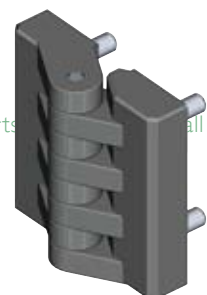
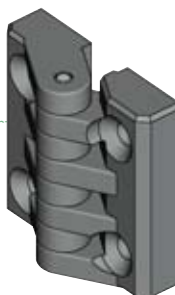
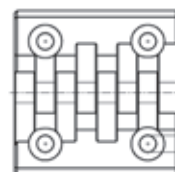
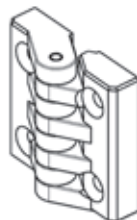
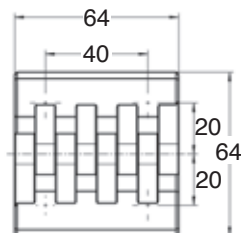
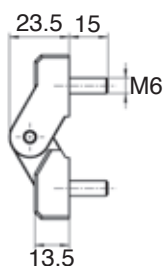
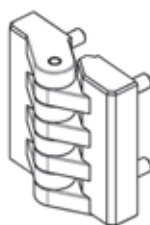


Fig. 1



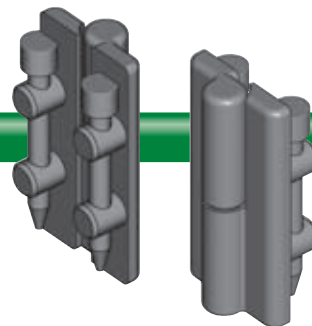
Ø6.5 X 90°
COUNTERSINK

Fig. 2



- **HINGE** – Polyamide, Black
- **PIN** – Steel, Zinc Plated

Catalog Number	Fig.	Applicable Screw
MLAE02M1056U39	1	Countersunk Screw M6
MLAE02M1056U40	2	Threaded Studs M6



- **CHARACTERISTICS**

Quick assembling: Hinge is fixed just by knocking in the clamping pins.

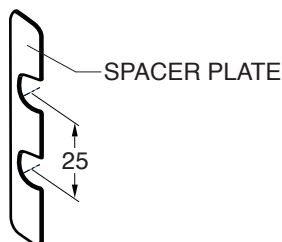
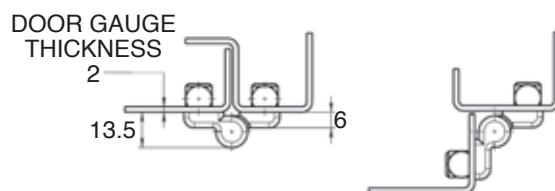
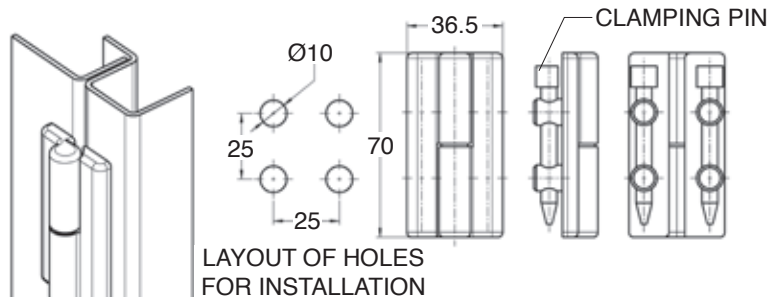
Releasing force in Z direction: 1500 N

- **NOTE**

Spacer plate has to be ordered separately for different door gauges.

- **HINGE** – Zinc Die Cast, Black Powder Coated
- **CLAMPING PIN** – Polyamide, Black
- **HINGE PIN** – Stainless Steel

Catalog Number	Type
MLAE01M1056U33	Left
MLAE01M1056U35	Right



- **SPACER PLATE**

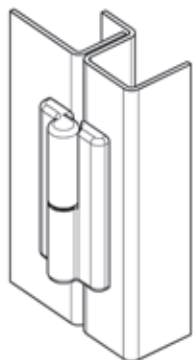
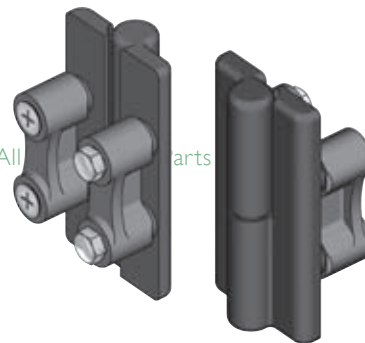
Catalog Number	For Door Gauge Thickness
MLAE01M103903	1
MLAE01M103902	1.5

8

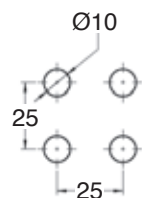
All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

- **HINGE** – Zinc Die Cast, Black Powder Coated
- **PIN** – Stainless Steel

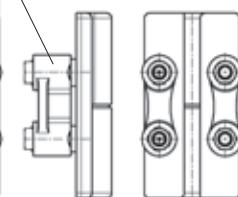
Catalog Number	Type
MLAE01M1056U43	Left
MLAE01M1056U44	Right



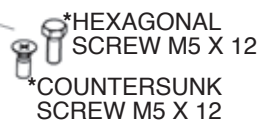
LAYOUT OF HOLES FOR INSTALLATION



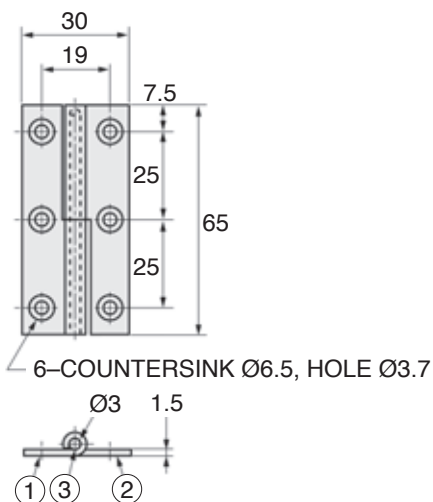
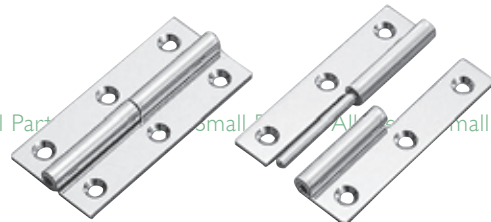
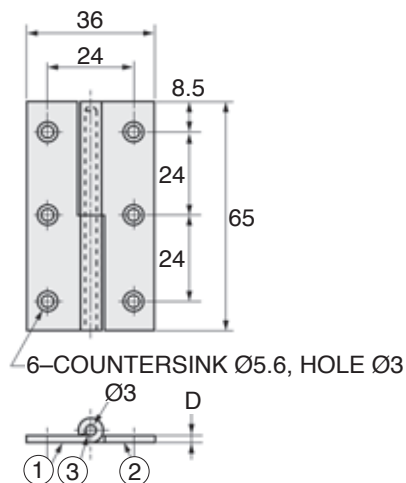
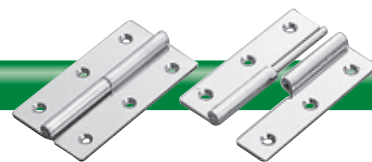
FASTENING BOW

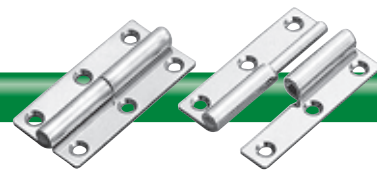


DOOR GUAGE THICKNESS



*Items are not supplied.





HINGES, LIFT-OFF



• APPLICATIONS

Office automation appliances / Telecommunication devices /
Measuring instruments

• CHARACTERISTICS

A door can be removed by taking the hinge off.
Easy installation.

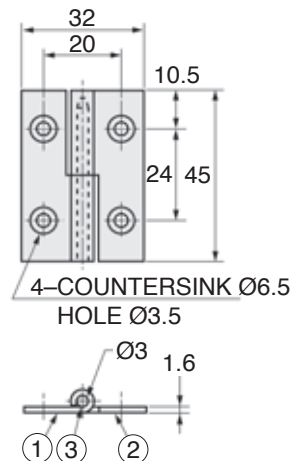
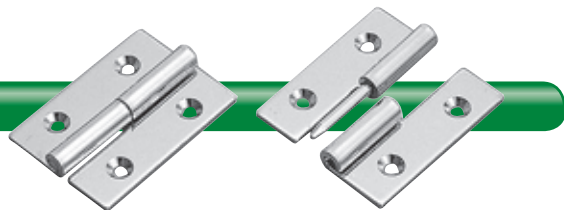
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Brass	Nickel Plated	1
2	Hinge Piece			
3	Pin			

• HINGES

Catalog Number	Net Weight g
MLAT30MTH18-L	27.5
MLAT30MTH18-R	

NOTE: When using countersunk screws or rivets to attach the hinge, the mounting surface should also be countersunk.



THE FIGURE SHOWS LEFT TYPE

• APPLICATIONS

Office automation appliances / Telecommunication devices /
Measuring instruments

• CHARACTERISTICS

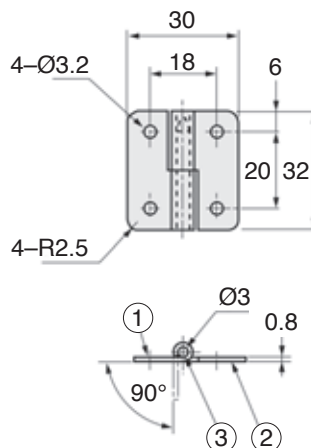
A door can be removed by taking the hinge off.
Easy installation.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Stainless Steel	Barrel Polishing	1
2	Hinge Piece			
3	Pin		—	

• HINGE – Compact, Stainless Steel

Catalog Number	Net Weight g
MLAT28MTH11SUS-L	8.4
MLAT28MTH11SUS-R	



THE FIGURE SHOWS LEFT TYPE



HINGES, LIFT-OFF - Stainless Steel, Narrow Width



• APPLICATIONS

Measuring instruments / Telecommunication devices

• CHARACTERISTICS

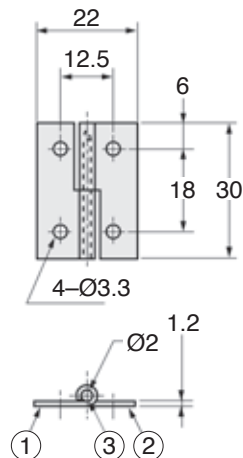
It is suitable for a small door. A door can be removed by taking the hinge off.

• PARTS LIST

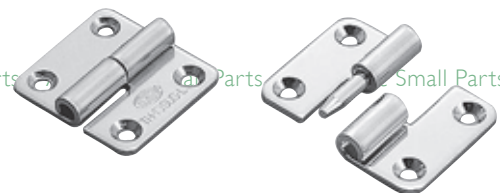
No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Stainless Steel	Polishing	1
2	Hinge Piece		—	
3	Pin		—	

• HINGE – Narrow Width

Catalog Number	Type	Net Weight g
MLAT27MTH37SUS-L	With Holes	7.5
MLAT27MTH37SUS-R		



THE FIGURE SHOWS LEFT TYPE



All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

8

• APPLICATIONS

Office automation appliances / Telecommunication devices /
Measuring instruments

• CHARACTERISTICS

A door can be removed by taking the hinge off.
Easy installation.

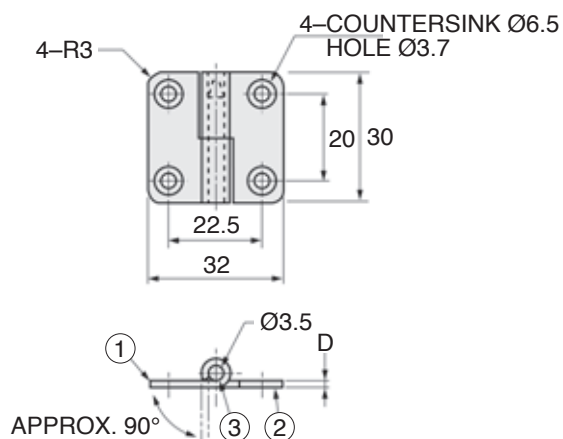
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Stainless Steel	Barrel Polishing	1
2	Hinge Piece		—	
3	Pin		—	

• HINGES

Catalog Number	D	Net Weight g
MLAT28MTH10SUS-L	1.5	15.2
MLAT28MTH10SUS-R		

NOTE: When using countersunk screws or rivets to attach the hinge, the mounting surface should also be countersunk.



THE FIGURE SHOWS LEFT TYPE

HINGES

RoHS
COMPLIANT

• APPLICATIONS

Measuring instruments / Telecommunication devices

• CHARACTERISTICS

The door can be removed at an approximate angle of 40°.

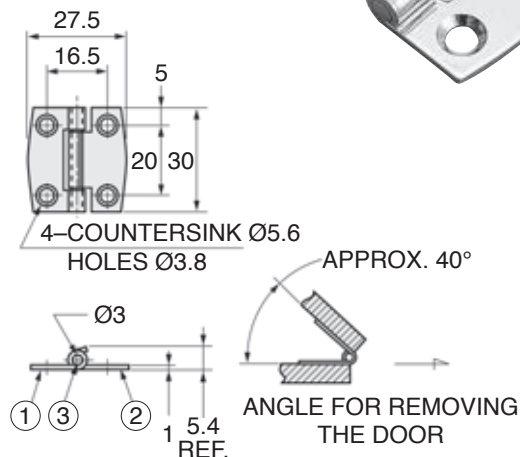
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Brass	Nickel Plated	1
2	Hinge Piece			
3	Pin			

• HINGE – Hooked

Catalog Number	Net Weight g
MLAT41MTH17	9

NOTE: When using countersunk screws or rivets to attach the hinge; the mounting surface should also be countersunk.



All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

8

• APPLICATIONS

Control boards / Distribution panels /
Various types of cabinets / Office utilities

• CHARACTERISTICS

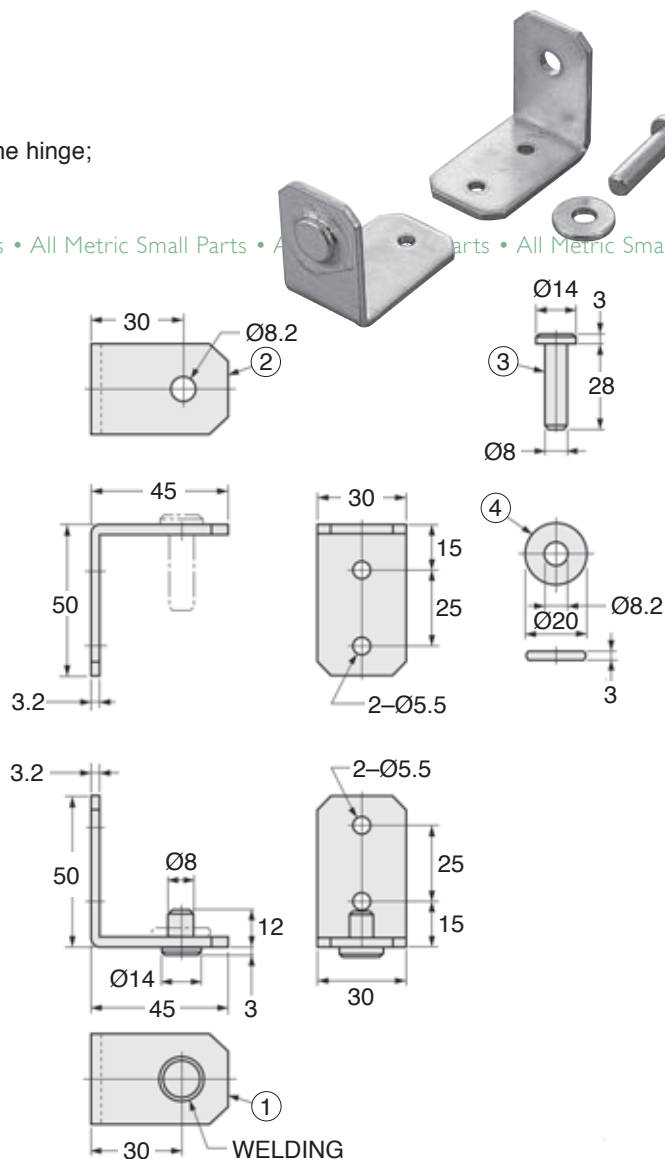
Both upper pin and lower pin act as bearings; smooth rotation can be obtained. A door can be easily removed by taking off the upper pin. Easy installation.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Steel	Zinc Plated	1
2	Hinge Piece			
3	Pin			
4	Flat Washer			

• HINGE – Pivot

Catalog Number	Allowable Load N (kgf)	Net Weight g
MLAT43MTH50	196 (20)	155



HINGES, LIFT-OFF - Flag Style, Heavy-Duty



• APPLICATIONS

Distribution boards / Devices in various types of facilities

• CHARACTERISTICS

It is suitable for a heavy door and a dustproof container.

• PARTS LIST

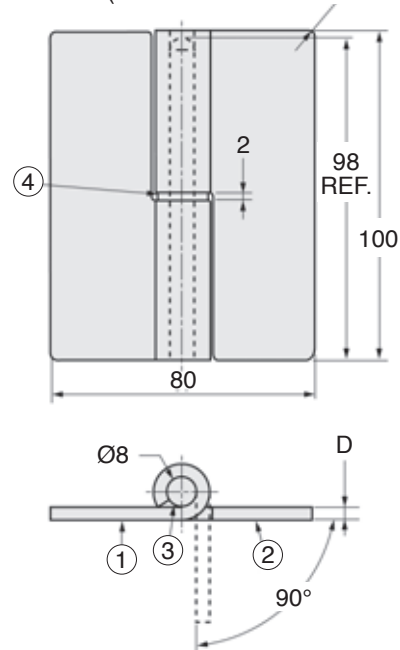
No.	Part Name	Material		Finish		Qty.
		...TH51SUS	...TH51	...TH51SUS	...TH51	
1	Hinge Piece	Stainless Steel	Steel	Polishing	Bright Zinc Plated	1
2	Hinge Piece		Steel	Polishing	Bright Zinc Plated	
3	Pin		Stainless Steel	—	—	
4	Washer	Stainless Steel	—	—	—	

• HINGE – Dustproof

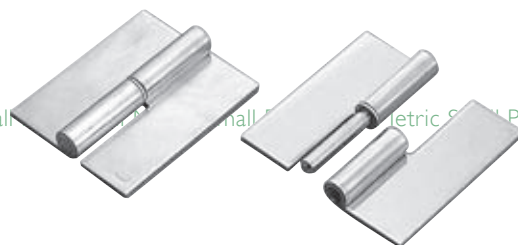
Catalog Number	Type	D	Net Weight g
MLAT31MTH51SUSL	Left	4	355
MLAT31MTH51SUSR	Right		
MLAT31MTH51L	Left	4.5	400
MLAT31MTH51R	Right		



4-R3 (...TH51L & ...TH51R ONLY)



THE FIGURE SHOWS LEFT TYPE



• APPLICATIONS

Distribution boards / Devices in various types of facilities

• CHARACTERISTIC

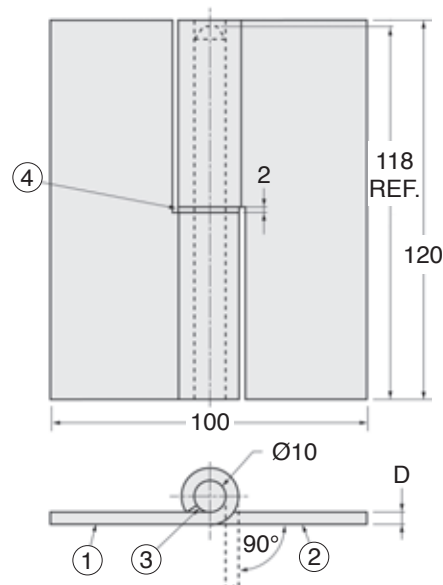
A hinge suitable for a heavy door.

• PARTS LIST

No.	Part Name	Material		Finish		Qty.
		...TH58SUS	...TH58	...TH58SUS	...TH58	
1	Hinge Piece	Stainless Steel	Steel	Polishing	Bright Zinc Plated	1
2	Hinge Piece		Steel	Polishing	Bright Zinc Plated	
3	Pin		Stainless Steel	—	—	
4	Washer	Stainless Steel	—	—	—	

• HINGES

Catalog Number	Type	D	Net Weight g
MLAT31MTH58SUSL	Left	4	545
MLAT31MTH58SUSR	Right		
MLAT31MTH58L	Left	4.5	607
MLAT31MTH58R	Right		



THE FIGURE SHOWS LEFT TYPE

HINGES, LIFT-OFF - Steel, Zinc Plated



• APPLICATIONS

Distribution boards / Distribution panels /
Control boards / Machine tools / Construction machines

• CHARACTERISTICS

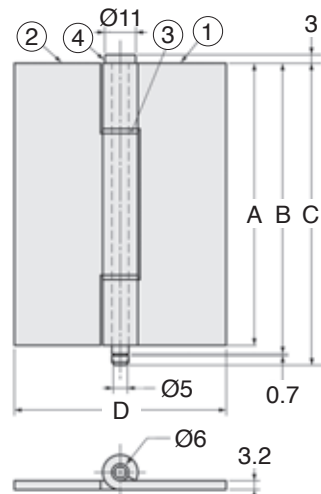
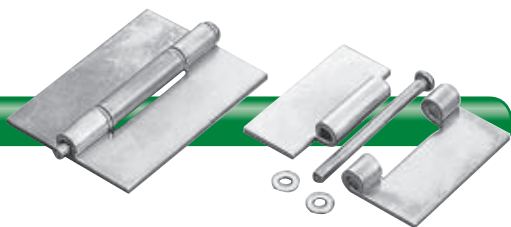
Mounts to a heavy door. The pin is removable and its movement is smooth with the use of washers.

• PARTS LIST

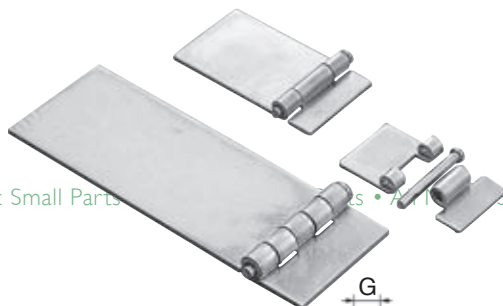
No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Steel	Zinc Plated	1
2	Hinge Piece			1
3	Washer	Carbon Steel		2
4	Pin			1

• HINGES

Catalog Number	A	B	C	D	Net Weight g
MLAT26M1TH66-3	75	76	80	70	182
MLAT26M2TH66-2	90	91	95	75	231
MLAT26M3TH66-1	100	103	107		257



THE PIN CAN BE REMOVED



8

All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

• APPLICATIONS

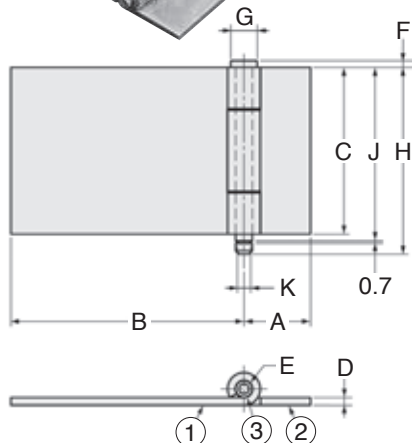
Distribution boards / Distribution panels /
Control boards / Machine tools / Construction machines

• CHARACTERISTIC

The hinge piece can be bent as needed to suit the application.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Steel	Zinc Plated	1
2	Hinge Piece			
3	Pin	Carbon Steel		



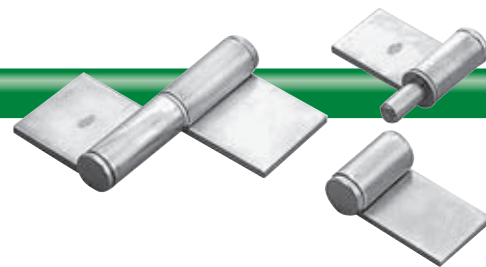
THE PIN CAN BE REMOVED

• HINGES

Catalog Number	A	B	C	D	E	F	G	H	J	K	Number of Segments	Net Weight g
MLAT26M1TH67-3	20	30	38	2.3	Ø5	2	Ø8	45	41	Ø4	3	50
MLAT26M2TH67-2		70	50					56	52			99.5
MLAT26M3TH67-1	30	155	65	3.2	Ø6	3	Ø11	70	66	Ø5	5	341

HINGES, LIFT-OFF - Steel, Zinc Plated

RoHS
COMPLIANT



• APPLICATIONS

Distribution boards / Machine tools /
Construction machines

• CHARACTERISTIC

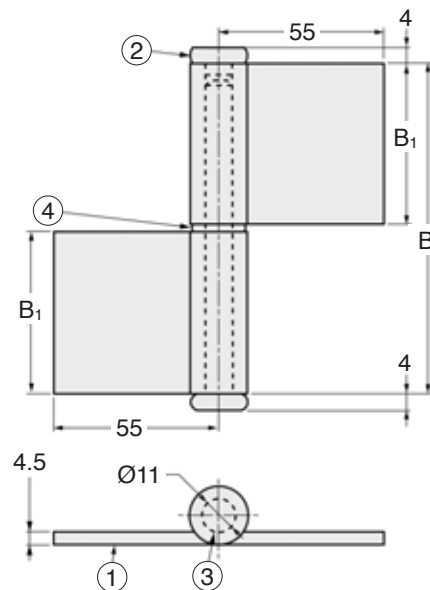
A hinge suitable for a heavy door.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Steel	Zinc Plated	2
2	Rivet			1
3	Pin			
4	Flat Washer			

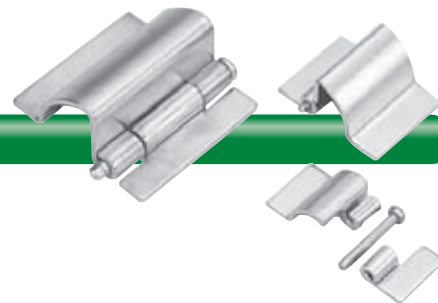
• HINGES

Catalog Number	Type	B	B ₁	Net Weight g
MLAT24MTH60-1L	Left	75	36.5	321
MLAT24MTH60-1R	Right			
MLAT24MTH60-2L	Left	100	49	420
MLAT24MTH60-2R	Right			
MLAT24MTH60-3L	Left	150	74	635
MLAT24MTH60-3R	Right			



THE FIGURE SHOWS LEFT TYPE

HINGES, LIFT-OFF - Steel, Zinc Plated



• APPLICATIONS

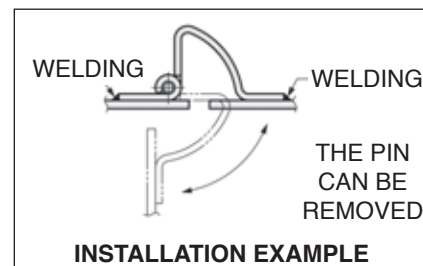
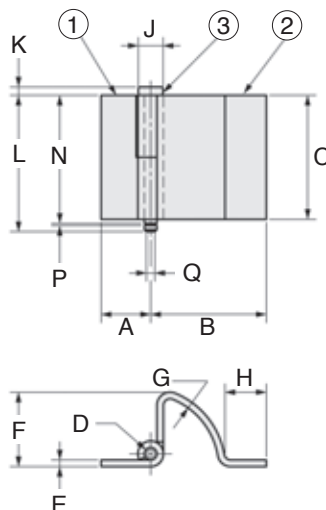
Distribution boards / Distribution panels /
Telecommunication devices

• CHARACTERISTICS

The hinge is not visible from the outside.
Select from a wide variety of sizes.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Steel	Zinc Plated	1
2	Hinge Piece			
3	Pin	Carbon Steel		



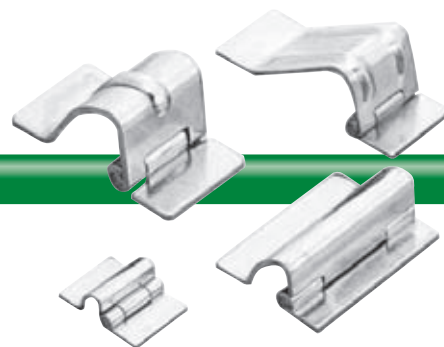
The figure is for the left type.
...TH54-4 thru ...TH54-7 are
a slightly different shape than
...TH54-1 thru ...TH54-3.

• HINGES

Catalog Number	A	B	C	D	E	F	G	H
MLAT38MTH54-1L	12	24	20	Ø3	1.6	12	R10	9
MLAT38MTH54-1R		28	25			18	R18	10
MLAT38MTH54-2L			30					
MLAT38MTH54-2R								
MLAT38MTH54-3L								
MLAT38MTH54-3R	15	40	40	Ø5	2	26	R24	12
MLAT38MTH54-4			50					
MLAT38MTH54-5	25	63	60	Ø6	3.2	35	R30	17
MLAT38MTH54-6	27	75	65	Ø8		50	R40	20

Catalog Number	J	K	L	N	P	Q	Net Weight g
MLAT38MTH54-1L	Ø6	2	23	21	0.5	Ø2	15.5
MLAT38MTH54-1R			28	26			23
MLAT38MTH54-2L							
MLAT38MTH54-2R			33	31	27.5		
MLAT38MTH54-3L							
MLAT38MTH54-3R							
MLAT38MTH54-4	Ø8		44	41	0.7	Ø4	66.5
MLAT38MTH54-5			56	52			83
MLAT38MTH54-6	Ø11	3	65	61		Ø5	224
MLAT38MTH54-7	Ø14		70	66	0.9		Ø7

HINGES, CONCEALED - Steel, Zinc Plated

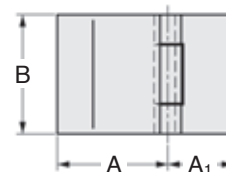
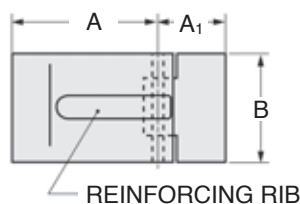


• APPLICATIONS

Distribution boards / Distribution panels /
Telecommunication devices

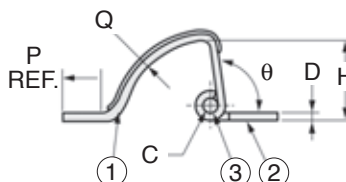
• CHARACTERISTICS

The hinge is not visible from the outside.
Select from a wide variety of sizes.

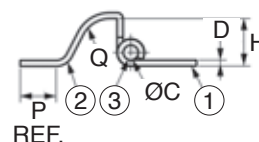


• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Steel	Zinc Plated	1
2	Hinge Piece			
3	Pin			



THE PIN IS SET OUTSIDE



MLAT37M1TH27-2 ONLY

• HINGES

Catalog Number	A	A ₁	B	C	D	H	P Ref.	Q	θ	Rib	Net Weight g
MLAT37M1TH27-2	18.5	11	20	Ø2.5	1	8	6	R5	90°	no	7.5
MLAT37M2TH27-1	55	14.5	26	Ø3.5		22	13	—	100°	two lines	22.5
MLAT37M3TH27-10	35	13.5	40	Ø3	1.6	21	8	R18	95°	no	44
MLAT37M4TH27-12	26	12	50			15	8.5	R16		one line at the center	63.5
MLAT37M5TH27-13	44	20	32	Ø3	2.3	25	11	R21	90°	no	25.5
MLAT37M6TH27-16	24	10	30		1.6	15	6.5	R12			14.5
MLAT37M7TH27-17		13	25		1.2	10.5	9	R13			

HINGES, ANGLED - Concealed Hinge



• APPLICATIONS

Distribution boards / Distribution panels /
Control boards / Telecommunication devices

• CHARACTERISTICS

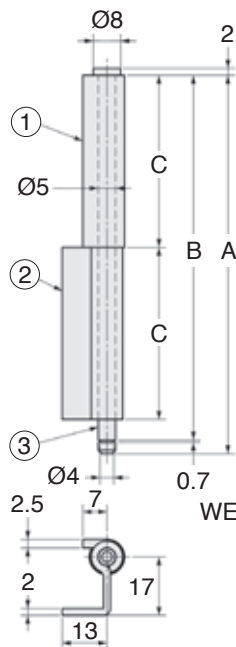
Made of stainless steel, having excellent corrosion
and chemical resistance.

• PARTS LIST

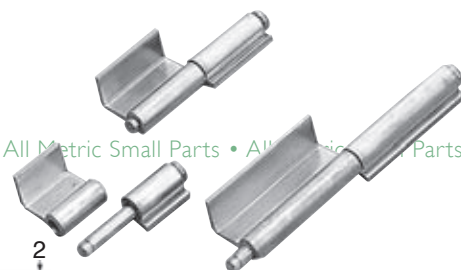
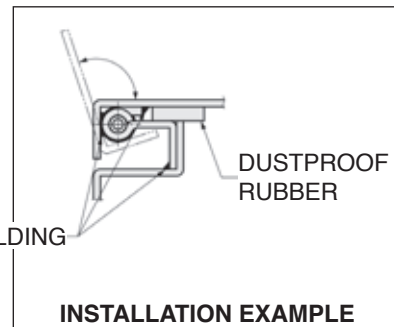
No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Stainless Steel	—	1
2	Hinge Piece			
3	Pin			

• HINGES

Catalog Number	A	B	C	Net Weight g
MLAT36M1TH93-2	65	61	30	47
MLAT36M2TH93-1	110	106	50	78



THE PIN CAN BE
REMOVED



8

• APPLICATIONS

Distribution boards / Distribution panels /
Control boards / Telecommunication devices

• CHARACTERISTICS

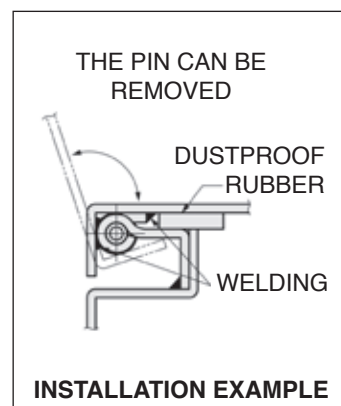
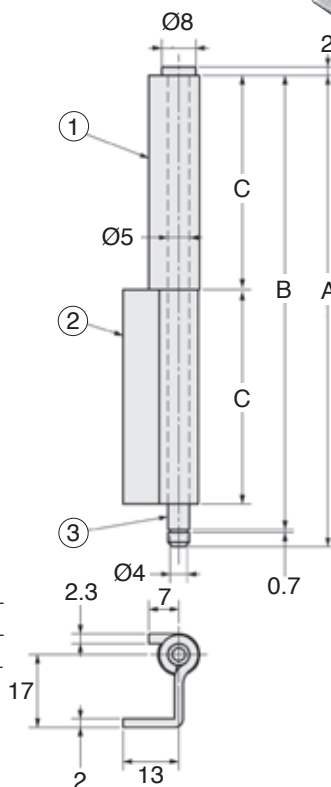
The pin can be removed. Easy installation.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Steel	Zinc Plated	1
2	Hinge Piece			
3	Pin			

• HINGES

Catalog Number	A	B	C	Net Weight g
MLAT36M1TH73-3	44	41	20	31.5
MLAT36M2TH73-2	65	61	30	46.5
MLAT36M3TH73-1	110	106	50	77



HINGES, ANGLED - Steel, Zinc Plated



• APPLICATIONS

Distribution boards / Distribution panels /
Control boards / Telecommunication devices

• CHARACTERISTICS

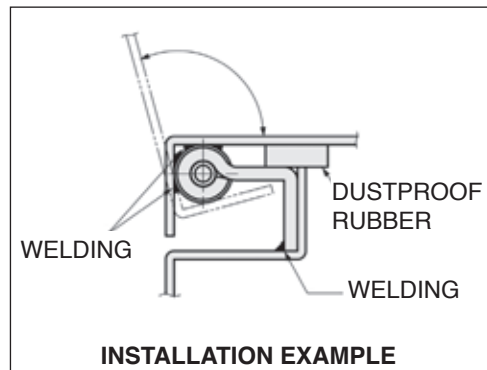
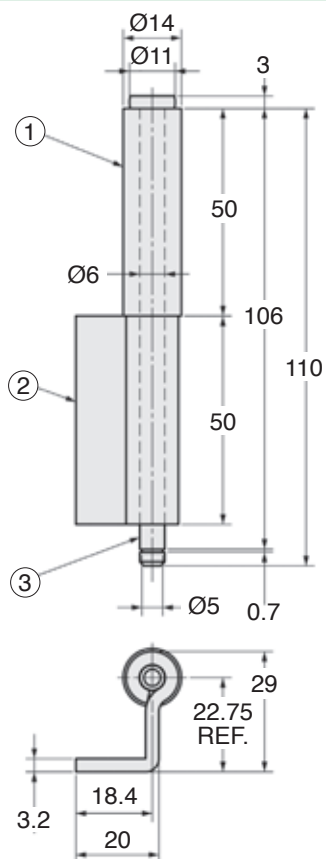
The pin can be removed. Easy installation.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Steel	Zinc Plated	1
2	Hinge Piece			
3	Pin	Carbon Steel		

• HINGE

Catalog Number	Net Weight g
MLAT36MTH71	150.5



8

All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

• APPLICATIONS

Distribution boards / Distribution
panels / Control boards /
Telecommunication devices

• CHARACTERISTICS

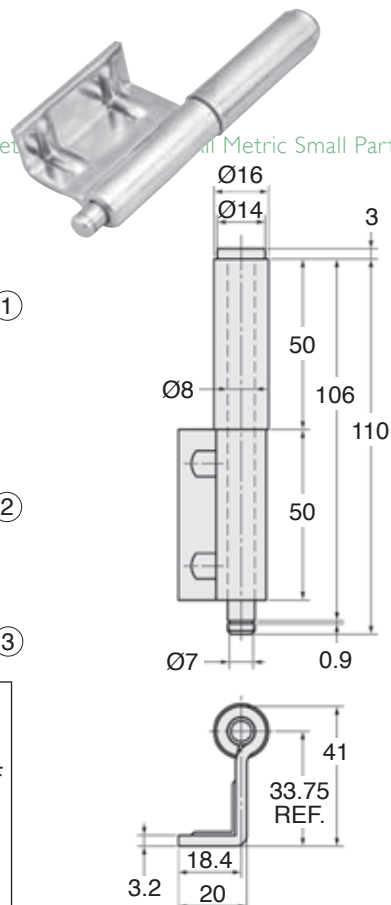
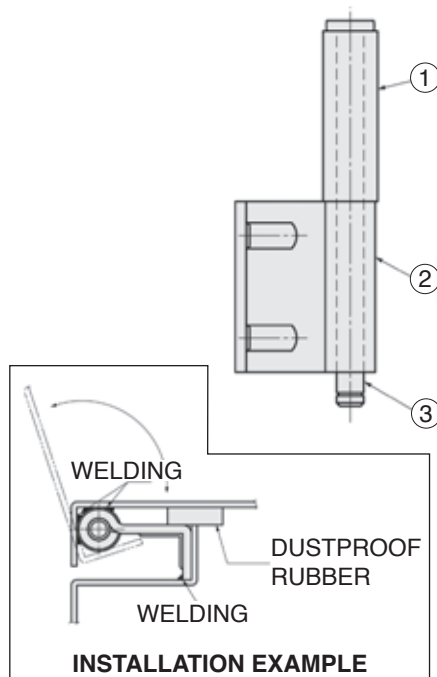
The pin can be removed. Easy installation.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Steel	Zinc Plated	1
2	Hinge Piece			
3	Pin	Carbon Steel		

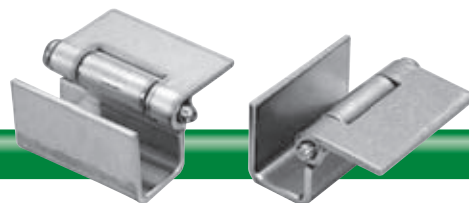
• HINGE

Catalog Number	Net Weight g
MLAT36MTH72	200.5



HINGES

RoHS
COMPLIANT



• APPLICATIONS

Distribution boards / Distribution panels /
Control boards / Telecommunication devices

• CHARACTERISTICS

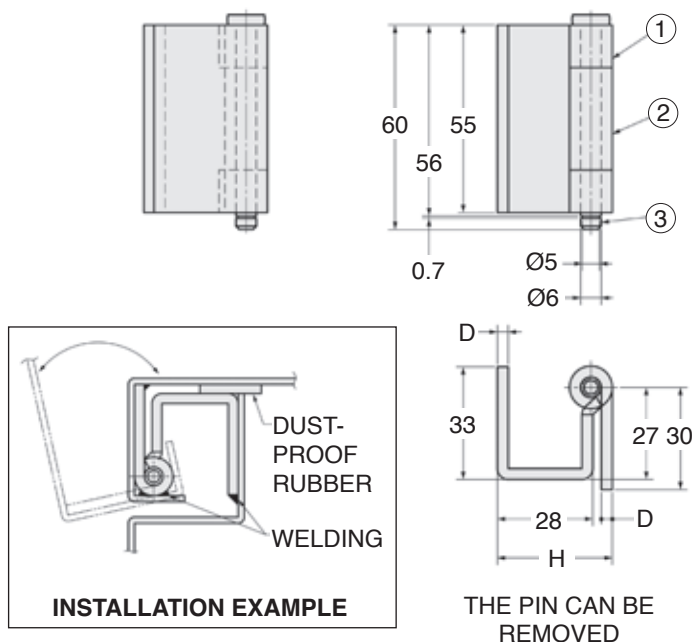
The pin can be removed. Easy installation.

• PARTS LIST

No.	Part Name	Material		Finish		Qty.
		...TH81	...TH81SUS	...TH81	...TH81SUS	
1	Hinge Piece	Steel	Stainless Steel	Zinc Plated	—	1
2	Hinge Piece	Steel	Stainless Steel	Zinc Plated	—	
3	Pin	Carbon Steel	Stainless Steel	Zinc Plated	—	

• HINGE – Channeled, Concealed

Catalog Number	D	H	Net Weight g
MLAT33MTH81	3.2	33.7	184
MLAT33MTH81SUS	3	33.5	169.5



8

All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

• APPLICATIONS

Replacement of steel made hinge pins as an
anticorrosive countermeasure / Rotational
axes for any part in mechanisms / General applications

• CHARACTERISTICS

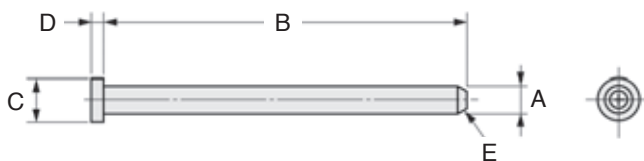
Made of stainless steel, having excellent
corrosion resistance.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Pin	Stainless Steel	—	1

• PINS

Catalog Number	A	B	C	D	E	Net Weight g
MLAT39MTH100-1	Ø5	65	Ø8	2	1 X 45°	10.4
MLAT39MTH100-2	Ø6	85	Ø11	3		20.8
MLAT39MTH100-3	Ø8	110	Ø14			46
MLAT39MTH100-4	Ø10		Ø16		1.5 X 45°	71.7



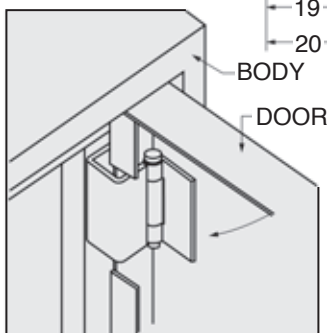
2

Distribution boards / Distribution panels /
Control boards / Telecommunication devices

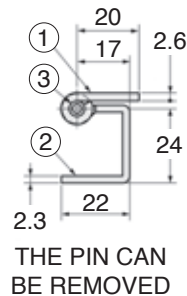
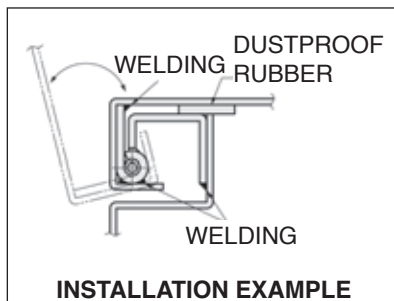
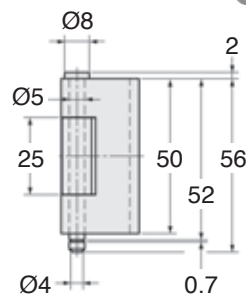
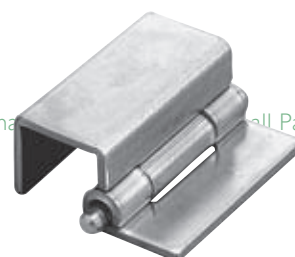
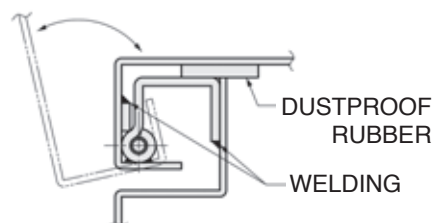
The pin can be removed. Easy installation.

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Stainless Steel	—	1
2	Hinge Piece			
3	Pin			

Catalog Number	Net Weight g
MLAT33M1TH83	57.5



INSTALLATION EXAMPLE



Distribution boards / Distribution panels /
Control boards / Telecommunication devices

The pin can be removed. Easy installation.

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Steel	Zinc Plated	1
2	Hinge Piece			
3	Pin	Carbon Steel		

Catalog Number	Net Weight g
MLAT33M2TH75	91.5

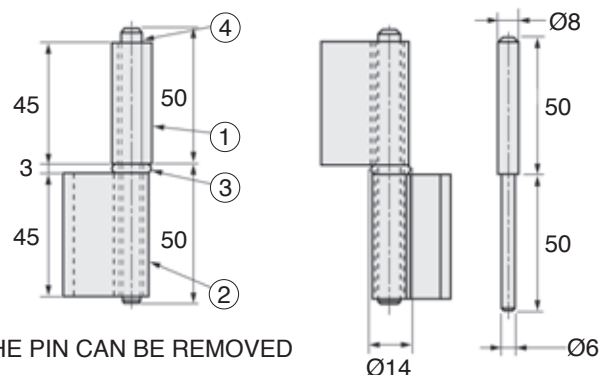
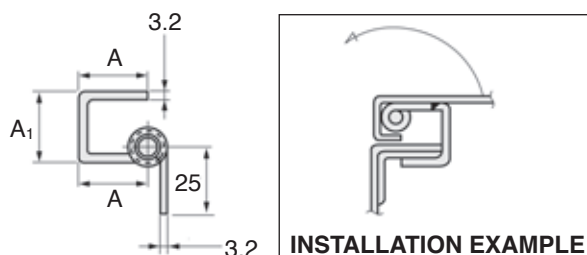
This image shows three different types of metal cable clamps and a small washer. The clamps are made of polished metal and are designed to secure cables. One clamp is shown with a cable inserted, while the other two are shown without. A small washer is also visible next to the clamps.

Distribution boards / Distribution panels /
Telecommunication devices

A dowel pin is not needed to hold the hinge pieces in place. The pin is made with two diameters. The lower portion is smaller while the plate thickness of the hinge pieces is the same. Either side of the door can be used. The flat washer enables the door to rotate with a light touch.

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Steel	Zinc Plated	1
2	Hinge Piece			
3	Flat Washer			
4	Pin	Stainless Steel	—	

Catalog Number	A	A ₁	Net Weight g
MLAT34M1TH52-3	25	23	195
MLAT34M2TH52-2	35	28	225
MLAT34M3TH52-1	45	33	252



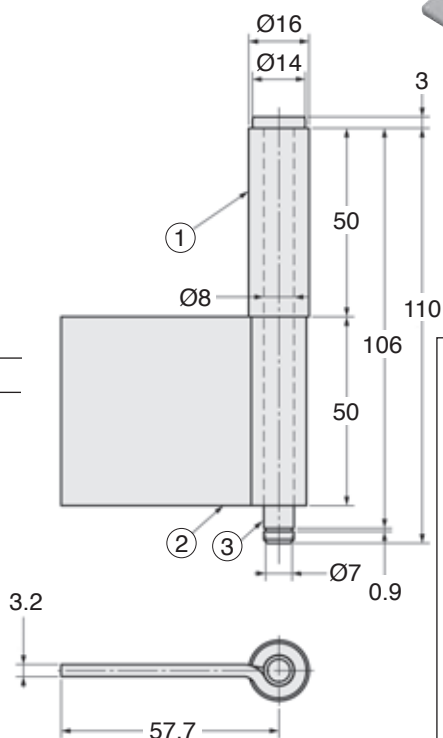
THE PIN CAN BE REMOVED

Distribution boards / Distribution panels /
Control boards / Telecommunication devices

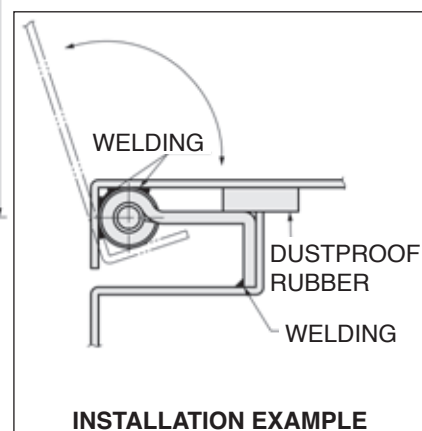
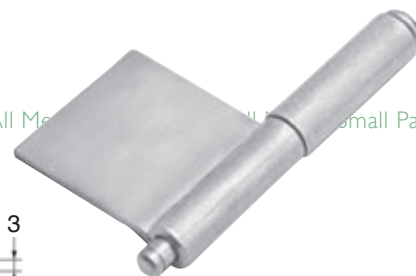
The plate may be bent to fit the space available for installation.

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Steel	Zinc Plated	1
2	Hinge Piece			
3	Pin	Carbon Steel		

Catalog Number	Net Weight g
MLAT35MTH74	211



THE PIN CAN BE REMOVED



HINGES, PIPE



• APPLICATIONS

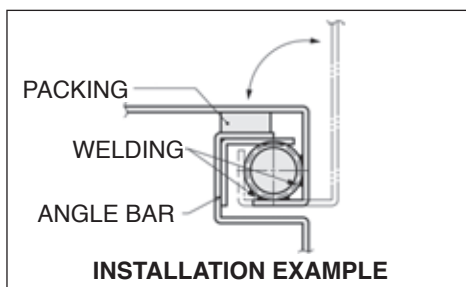
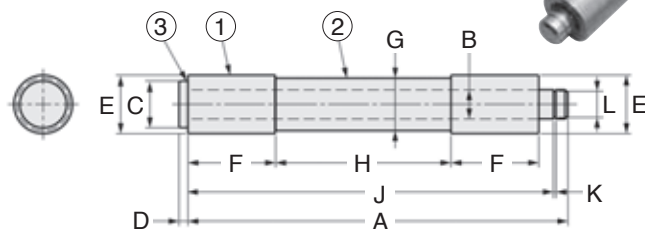
Distribution boards / Distribution panels /
Control boards

• CHARACTERISTICS

This concealed hinge can only be installed by means of welding. Installation space is saved, due to the hinge's pipe-shape.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Collar Piece	Steel	—	2
2	Collar Piece			1
3	Pin	Carbon Steel	Zinc Plated	1



• HINGE – I-Type

Catalog Number	A	B	C	D	E	F	G	H	J	K	L	Net Weight g
MLAT42M1TH56-4	65	Ø5	Ø8	2	Ø12	15	Ø10	30	61	0.7	Ø4	45.5
MLAT42M2TH56-3	85	Ø6	Ø11	3	Ø14	20	Ø12	40	81		Ø5	85
MLAT42M2TH56-2	110	Ø10	Ø16		Ø18	25	Ø16	50	105	0.9	Ø9	184
MLAT42M2TH56-1	130				Ø20	30	Ø18	60	125			272.5

8

All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

• APPLICATIONS

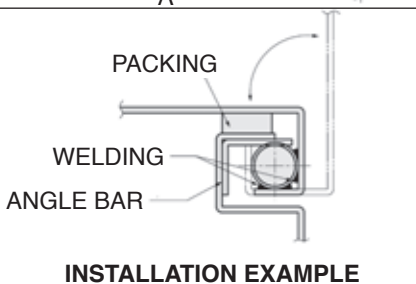
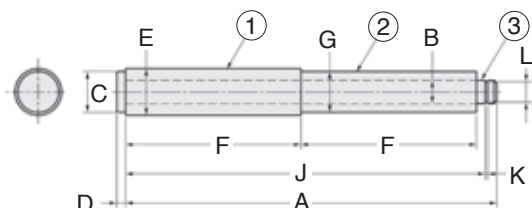
Distribution boards / Distribution panels /
Control boards

• CHARACTERISTICS

This concealed hinge can only be installed by means of welding. Installation space is saved, due to the hinge's pipe-shape.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Collar Piece	Steel	—	1
2	Collar Piece			
3	Pin	Carbon Steel	Zinc Plated	1



• HINGE – II-Type

Catalog Number	A	B	C	D	E	F	G	J	K	L	Net Weight g
MLAT42M1TH57-4	65	Ø5	Ø8	2	Ø12	30	Ø10	61	0.7	Ø4	46
MLAT42M2TH57-3	85	Ø6	Ø11	3	Ø14	40	Ø12	81		Ø5	85
MLAT42M2TH57-2	107					50		103			106
MLAT42M2TH57-1	127	Ø8	Ø14			Ø16	60	Ø14	123	0.9	Ø7

HINGES, 180° 2D-SCREW-ON

RoHS
COMPLIANT

• CHARACTERISTICS

Hinge can be right-handed or left-handed by flipping the section that mounts to the door.
Hinge pin is self-gripping.

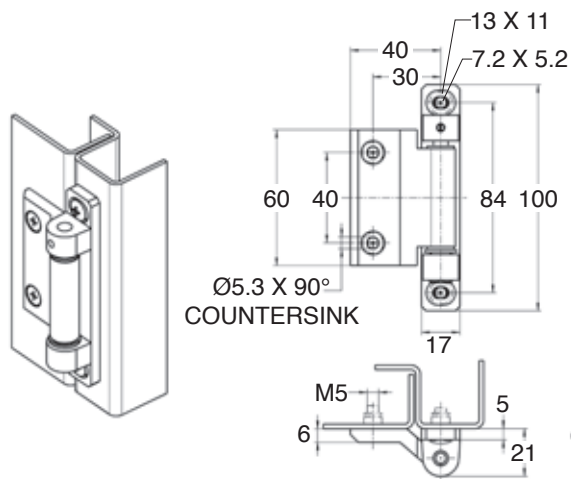


Fig. 1

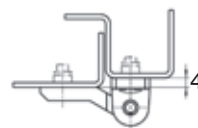


Fig. 2

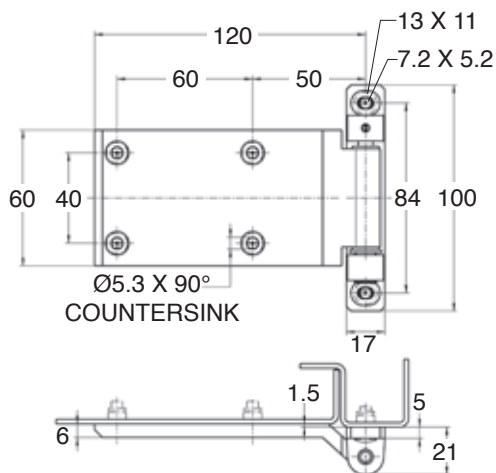
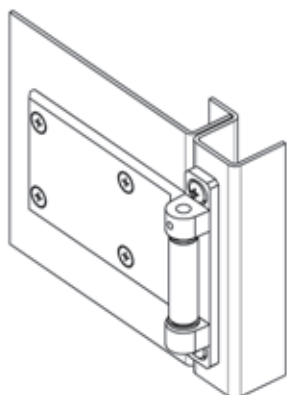
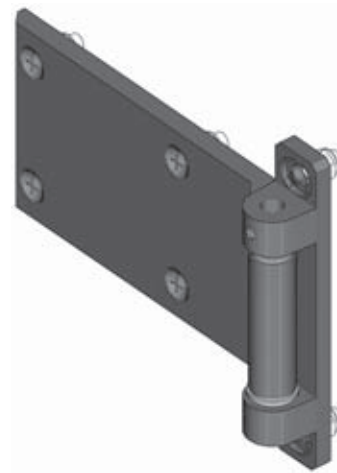


Fig. 3

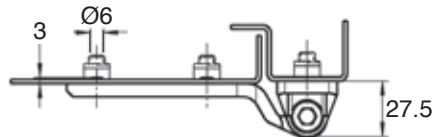
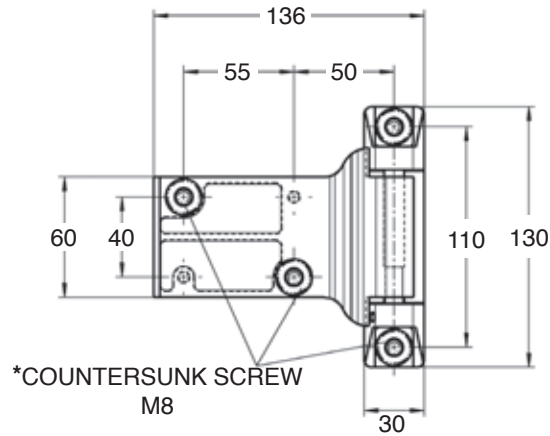
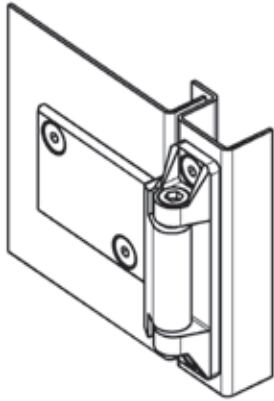
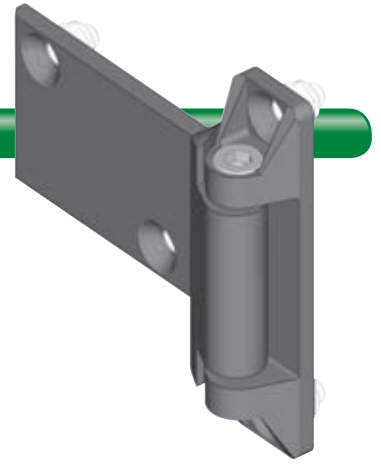


- **HINGE** – Zinc Die Cast, Black Powder Coated • **AXLE** – Brass, Nickel Plated
- **WASHER** – Mild Steel, Zinc Plated • **BUSHING** – Polyamide

Catalog Number

Fig. 1	Fig. 2	Fig. 3
MLAE03M1054U3301	MLAE03M1054U3401	MLAE03M1054U3501

Tolerances: All vertical dimensions ± 1.6
All horizontal dimensions ± 1



*Not Included.

- **HINGE** – Zinc Die Cast, Black Powder Coated
- **SHAFT & SCREW** – Stainless Steel

Catalog Number	Type
MLAE04M1054U31	Right
MLAE04M1054U32	Left

Tolerances: All vertical dimensions ± 2.5
All horizontal dimensions ± 1
All depth dimensions ± 1

HINGES, POSITIONING SPRING



• APPLICATIONS

Office automation appliances /
Telecommunication devices /
Measuring instruments

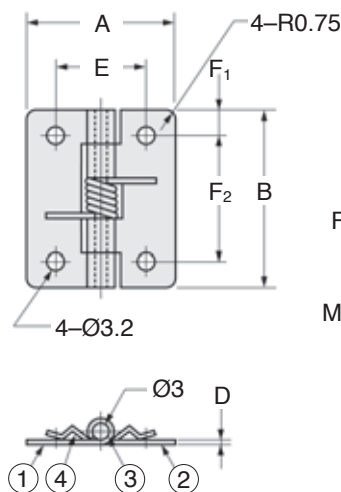
• CHARACTERISTICS

Spring is set with the pin. The spring load is measured at a hole for installation.

• PARTS LIST – Fig. 1

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Steel	Bright Zinc Plated	1
2	Hinge Piece			
3	Pin			
4	Spring	Stainless Steel	—	

Fig. 1 • HINGE – Without Holes



MEASURING POSITIONS OF SPRING LOAD



Fig. 1

Fig. 2

Fig. 3

Catalog Number	A	B	D	d	Reference Spring Load N (kgf)			Net Weight g
					a	b	c	
MLAT44MTH61-1	32	25	1.2	10	3.92 (.4)	6.38 (.65)	8.83 (.9)	10
MLAT44MTH61-2		38	1.6			6.87 (.7)	7.85 (.8)	20
MLAT44MTH61-3	38	51		12.5	4.91 (.5)		8.83 (.9)	31.5

• PARTS LIST – Fig. 2

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Brass	Nickel Plated	1
2	Hinge Piece			
3	Pin			
4	Spring	Stainless Steel	—	

Fig. 2 • HINGE – With Holes

Catalog Number	A	B	D	E	F ₁	F ₂	d	Reference Spring Load N (kgf)			Net Weight g
								a	b	c	
MLAT44MTH61B-1	32	25	1.2	20	5.5	14	10	3.92 (.4)	6.38 (.65)	8.83 (.9)	11
MLAT44MTH61B-2		38	1.5		6	26			6.87 (.7)	7.85 (.8)	20.5
MLAT44MTH61B-3	38	51		25	9.5	32	12.5	4.91 (.5)		8.83 (.9)	32.5

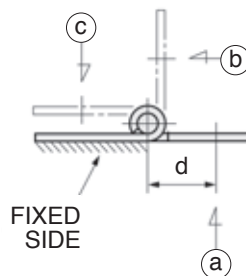
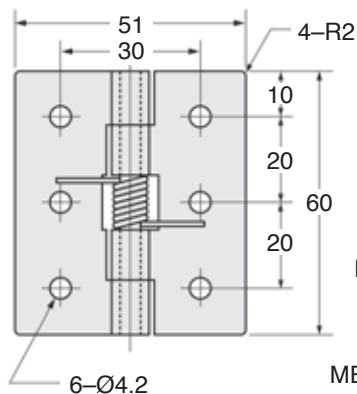
• PARTS LIST – Fig. 3

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Stainless Steel	—	1
2	Hinge Piece			
3	Spring			
4	Pin			

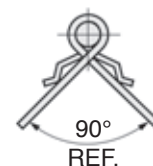
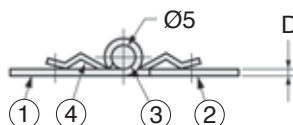
Fig. 3 • HINGE – With Holes

Catalog Number	A	B	D	E	F ₁	F ₂	d	Reference Spring Load N (kgf)			Net Weight g
								a	b	c	
MLAT44MTH61SUS-1	32	25	1.2	20	5.5	14	10	3.92 (.4)	6.38 (.65)	8.83 (.9)	10
MLAT44MTH61SUS-2		38	1.5		6	26			6.87 (.7)	7.85 (.8)	19
MLAT44MTH61SUS-3	38	51		25	9.5	32	12.5	4.91 (.5)		8.83 (.9)	29.5

HINGES, POSITIONING SPRING - With Holes



MEASURING POSITIONS OF SPRING LOAD



FREE STATE

• APPLICATIONS

Office automation appliances /
Telecommunication devices /
Measuring instruments

• CHARACTERISTICS

Spring is set with the pin. The spring load is measured at a hole for installation.

• PARTS LIST

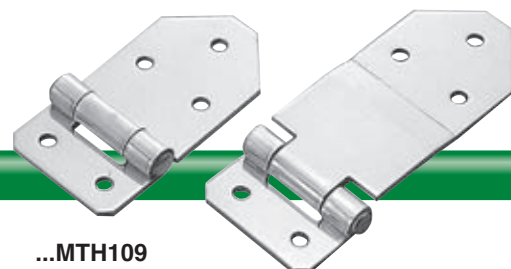
No.	Part Name	Material		Finish		Qty.
		...TH63B	...TH63SUS	...TH63B	...TH63SUS	
1	Hinge Piece	Brass	Stainless Steel	Nickel Plated	Barrel Polishing	1
2	Hinge Piece					
3	Pin					
4	Spring	Stainless Steel	—			

8

• HINGES

Catalog Number	D	d	Reference Spring Load N (kgf)			Net Weight g
			a	b	c	
MLAT44MTH63B	1.5	15	4.91 (.5)	6.87 (.7)	9.81 (1)	57.5
MLAT44MTH63SUS						53

HINGES, STRAP - Stainless Steel



• APPLICATIONS

Trucks / Fire engines / Container trucks /
Freezers / Food related boxes

• CHARACTERISTICS

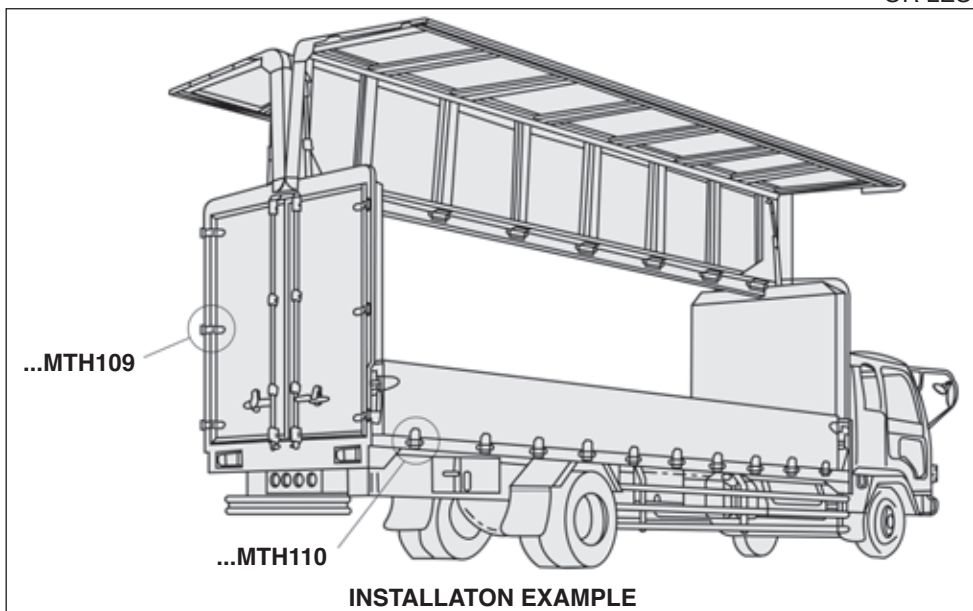
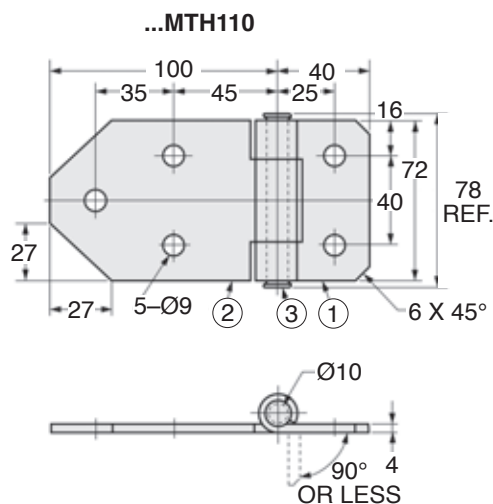
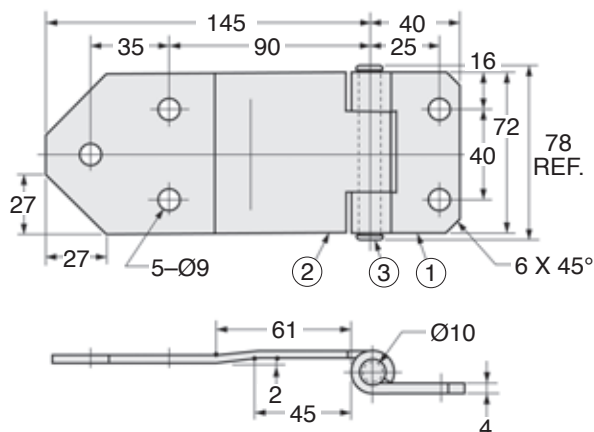
The large hinge is designed for outfitting special equipment vehicles. It is suitable for use on the rear fence of a truck bed, or a door to a (truck) container (see installation example below). Corrosion-resistant stainless steel is used for the hinge. The smaller hinge is suitable for use on the side fence of a truck bed.

• PARTS LIST

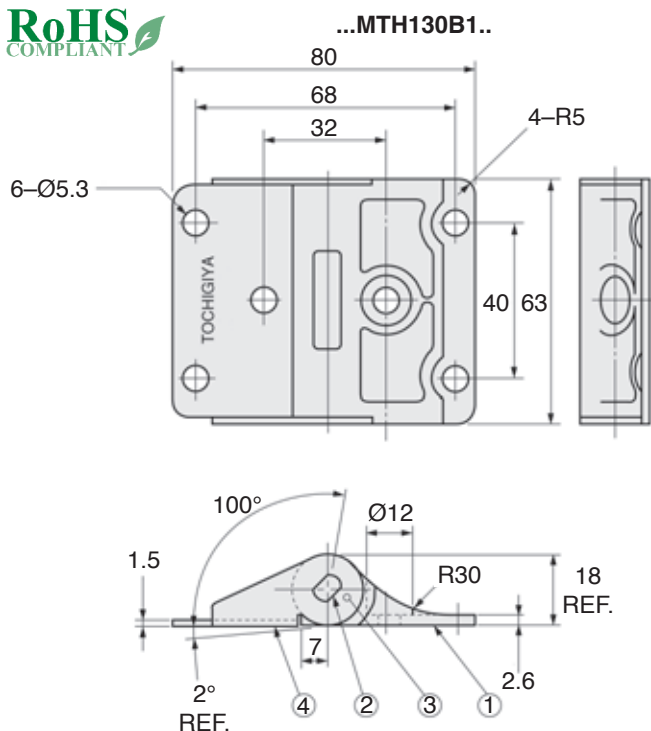
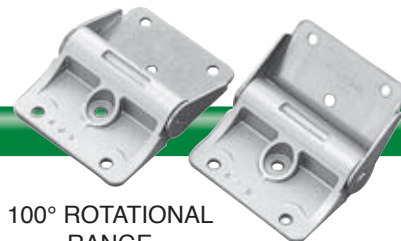
No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Stainless Steel	Buffing	1
2	Hinge Piece		—	
3	Pin		—	

• HINGES

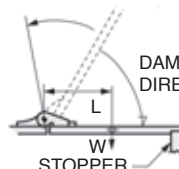
Catalog Number	Net Weight g
MLAT40MTH109	475.7
MLAT40MTH110	376.5



HINGES, VISCOUS DAMPENED

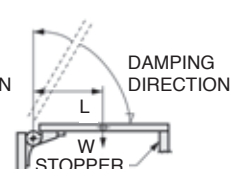


100° ROTATIONAL
RANGE

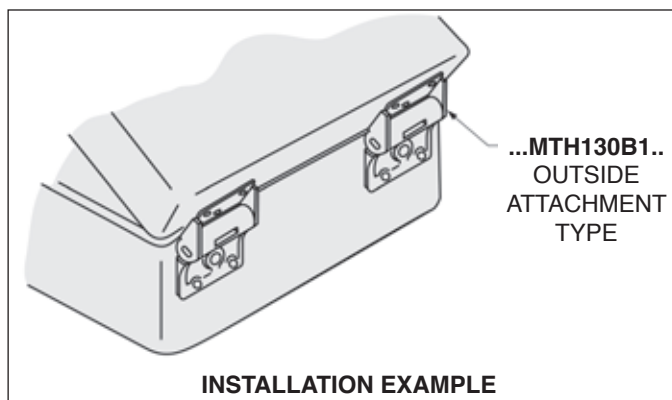


...MTH130B1..
OUTSIDE
ATTACHMENT

100° ROTATIONAL
RANGE



...MTH130B2..
INSIDE
ATTACHMENT



• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Body	Aluminum Die Cast	Silver Paint	1
2	Pin	Steel	Nickel Plated	
3	Silicon Oil	—	—	—
4	Hinge Piece	Stainless Steel	Barrel Polishing	1

1. Permissible Temperature Range: -20°C to +40°C.

2. Durability: At least 20,000 cycles (1 cycle: Open and Close, Room Temp.: 23°C).

3. Damping in one direction only.

• HINGES

Catalog Number	Attachment	Max. Moment Load N · m (kgf · cm)	Net Weight g
MLAT08MTH130B112	Outside	1.18 (12)	98
MLAT08MTH130B124		2.35 (24)	
MLAT08MTH130B212	Inside	1.18 (12)	
MLAT08MTH130B224		2.35 (24)	

- NOTES:**
1. Do not apply excess force in the damping direction.
 2. A stopper / stoppers should be placed to prevent the lid from rotating beyond the rotational range.
 3. Use no more than 2 hinges per one lid.

• Maximum Moment Load

MLAT08MTH130B112	1 piece	W X L = 1.18 N · m (12 kgf · cm)
	2 pieces	W X L = 2.35 N · m (24 kgf · cm)
MLAT08MTH130B124	1 piece	W X L = 2.35 N · m (24 kgf · cm)
	2 pieces	W X L = 4.71 N · m (48 kgf · cm)

• APPLICATIONS

Office automation appliances / Medical instruments
Telecommunication devices / Various types of storage cases such as transporter cases / Aircrafts / Hand baggage racks on vehicles / Audio-visual devices

• CHARACTERISTICS

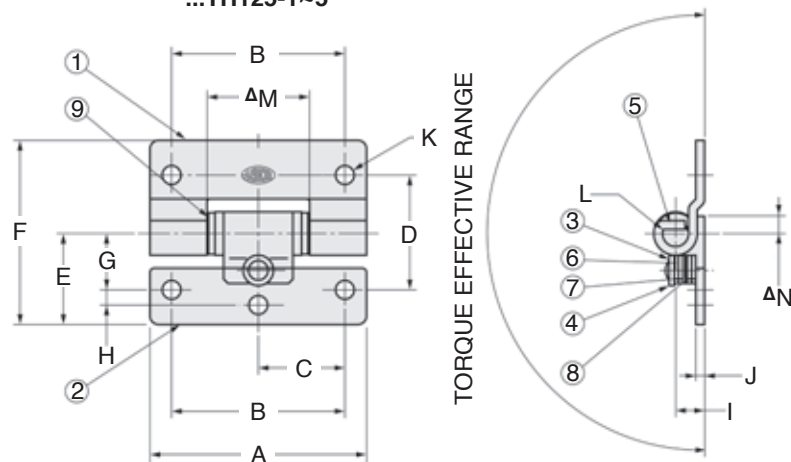
Soft and Silent: It is a light weight and compact dampened hinge designed to have higher torque, by using a newly developed rotary mechanism. Since damping force to the rotational movement of hinge is applied by viscous resistance of the oil, the rotation becomes slow and soft.

Safety: Since lids can be opened or closed slowly and quietly, it is possible to take countermeasures to prevent injuries or damages from closing shocks and noises.

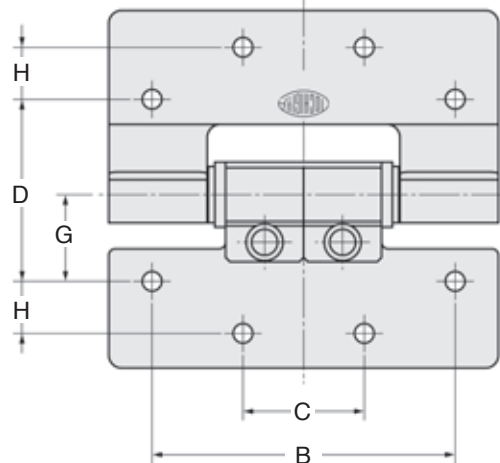
HINGES, FRICTION - Stainless Steel

RoHS
COMPLIANT

...TH125-1~5



...TH125-H



• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Hinge Piece	Stainless Steel	Barrel Polishing	1
2	Hinge Piece			
3	Countersunk Rivet		—	1**
4	Washer for Caulking			
5	Pin			
6	Body	Acetal	Black Primary Color	1**
7	*Spacer			
8	Plug			
9	Thrust Washer			

*The spacer is not used in MLAT05M6TH125-5.

**For MLAT05M6TH125-H, quantity is 2.

• APPLICATIONS

Medical instruments / Audio devices

• CHARACTERISTIC

Rotation can be stopped at any angle.

• SPECIFICATIONS

Effective torque range is 180° from mounting surface.

Permissible Temperature Range: -10°C to +50°C

Durability: 20,000 cycles (At Room Temp., 12 sec/cycle).

For the ...TH125-H model only:

Permissible Temperature Range: 0°C to +40°C.

Durability: 20,000 cycles (At Room Temp., 16 sec/cycle).

• HINGES

Catalog Number	A	B	C	D	E	F	G	H	I
MLAT05M1TH125-5	28	20	—	22.5	19.5	34	13	—	4.3
MLAT05M2TH125-4	40	30	15	25	20	35	15		5
MLAT05M3TH125-3	50	40	20	26.5	21	42.5	13	3	7
MLAT05M4TH125-2									
MLAT05M5TH125-1									
MLAT05M6TH125-H	90	70	28	42	40	82.5	20	12	9.5

Catalog Number	J	K	L	ΔM	ΔN Ref.	Torque (At Room Temp.) N · m (kgf · cm)	Net Weight g
MLAT05M1TH125-5	1.2	4-Ø4.3	Ø3	14.2	2.1	0.34 ^{+0.10} ₀ (3.5 ⁺¹ ₀)	12
MLAT05M2TH125-4		5-Ø4.3	Ø4	17.2	2	0.69 ^{+0.20} ₀ (7 ⁺² ₀)	21
MLAT05M3TH125-3	2	5-Ø4.3	Ø6	23.7	4	1.08 ^{+0.39} ₀ (11 ⁺⁴ ₀)	51
MLAT05M4TH125-2						1.37 ^{+0.39} ₀ (14 ⁺⁴ ₀)	
MLAT05M5TH125-1						1.96 ^{+0.39} ₀ (20 ⁺⁴ ₀)	
MLAT05M6TH125-H	2.5	8-Ø4.5	Ø8	44.5	7.5	4.9 ^{±0.98} (50 ^{±10})	196

NOTES: 1. Use no more than 2 hinges per one lid.

2. The pin should be placed horizontally.

3. The hinge should be set on a panel avoiding Δ-marked lengths on the figure.

4. Avoid applications where the operation is continuous.

HINGES, FRICTION

RoHS
COMPLIANT

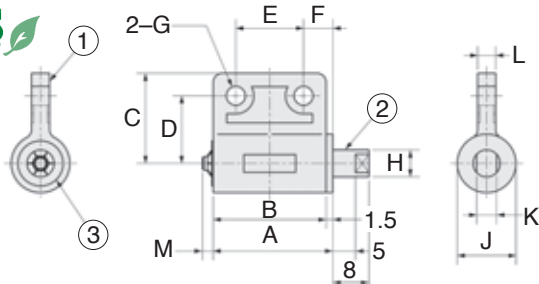


Fig. 1 HINGE

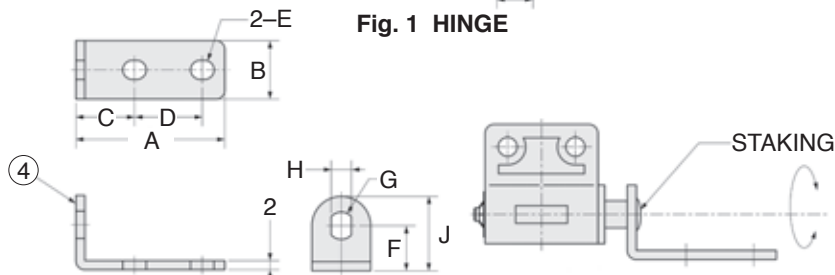
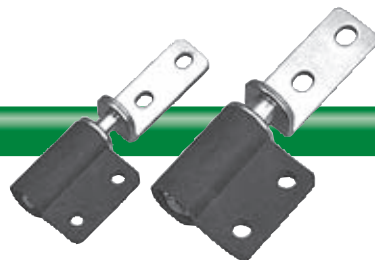


Fig. 2 BRACKET

ASSEMBLED PRODUCT

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Case	Nylon	Black	1
2	Pin	Stainless Steel	—	
3	Push Nut		—	
4	Bracket		Barrel Polishing	

• APPLICATIONS

Medical instruments /
Office automation appliances / Audio devices

• CHARACTERISTICS

Using low frictional resistance of nylon material, the hinge has structures that minimize metal powder and noise generation while reducing friction. Attached part can be stopped at any inclination.

• Specifications for Bracket Assembled to Hinge

Catalog Number	Item No.	Torque N·m (kgf·cm)	Net Weight g
MLAT07M1TH134-4A	1	0.34 ±0.05 (3.5 ±0.5)	6.5
MLAT07M2TH134-3A	2	0.69 ±0.10 (7 ±1)	11.5
MLAT07M3TH134-2A	3	1.08 ±0.15 (11 ±1.5)	16
MLAT07M4TH134-1A	4	1.37 ±0.2 (14 ±2)	22

Fig. 2 • BRACKET

Item No.	A	B	C	D	E	F	G	H	J Ref.
1	22.5	8	8.5	10	4.2 X 3.2	8	Ø3.05	2.25	12
2	27	10	10	13			Ø4.05	2.95	13
3	30.5	11	11.5	14	5.2 X 4.2	10	Ø5.05	3.65	15.5
4	33	13	13	15			Ø6.05	4.45	16.5

Fig. 1 • HINGE

Item No.	A Ref.	B	C	D	E	F	G	H	J	K	L	M
1	19.5	18	11	7.5	10	5.5	Ø3.2	Ø3	Ø8	2.2	3	1.8
2	22.5	21	15	11	13			Ø4	Ø10	2.9		
3	25.5	24	18	13	14	6.5	Ø4.2	Ø5	Ø11	3.6	4	2.1
4	26.5	25	20	15	15			Ø6	Ø13	4.4		2.4

NOTES: 1. Do not stake the hinge and the bracket afterward.
2. Do not use more than 2 hinges per one lid.

3. The pin should be placed horizontally.
4. Avoid applications where the operation is continuous.

HINGES, FRICTION

RoHS
COMPLIANT

ASSEMBLED PRODUCT

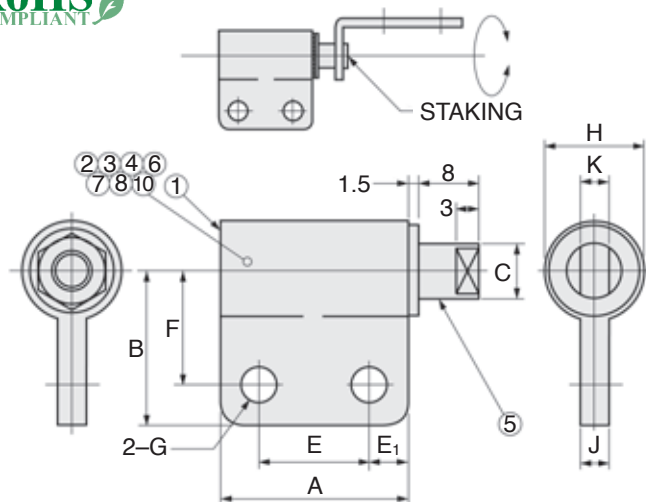


Fig. 1 HINGE

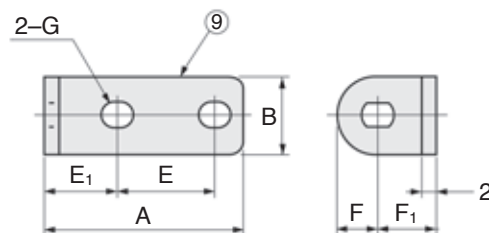
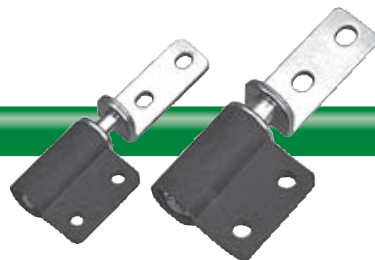


Fig. 2 BRACKET

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Case	Nylon	Black	1
2	Plug	Acetal	—	
3	Molded Washer	Carbon Steel	Nickel Plated	
4	Socket	Carbon Steel	Nickel Plated	
5	Pin	Carbon Steel	Nickel Plated	
6	Washer	Carbon Steel	Nickel Plated	
7	Countersunk Washer	Carbon Steel	Nickel Plated	
8	Nut	Carbon Steel	Nickel Plated	
9	Bracket	Carbon Steel	Nickel Plated	
10	Countersunk Spring	Steel	—	2

• APPLICATIONS

Personal computers / Word processors / Office automation appliances / Medical instruments / Audio devices / Measuring instruments / Precision instruments

• CHARACTERISTICS

Using low frictional resistance of nylon material, the hinge has structures that minimize metal powder and noise generation while reducing friction. Attached part can be stopped at any inclination.

• Specifications for Bracket Assembled to Hinge

Catalog Number	Item No.	Torque N·m (kgf·cm)	Net Weight g
MLAT06M1TH122-4A	1	0.34 ±0.05 (3.5 ±0.5)	7.5
MLAT06M2TH122-3A	2	0.69 ±0.10 (7 ±1)	12
MLAT06M3TH122-2A	3	1.08 ±0.15 (11 ±1.5)	17.5
MLAT06M4TH122-1A	4	1.37 ±0.2 (14 ±2)	24.4

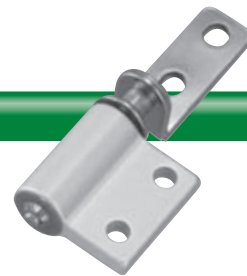
Fig. 2 • BRACKET

Item No.	A	B	E	E ₁	F	F ₁	G
1	22.5	8	10	8.5	4	8	4.2 X 3.2
2	27	10	13	10	5	8	4.2 X 3.2
3	30.5	11	14	11.5	5.5	10	5.2 X 4.2
4	33	13	15	13	6.5	10	5.2 X 4.2

Fig. 1 • HINGE

Item No.	A	B	C	E	E ₁	F	G	H	J	K
1	18	11	Ø3	10	4	7.5	Ø3.2	Ø8	3	2.2
2	21	15	Ø4	13	4	11	Ø3.2	Ø10	3	2.9
3	24	18	Ø5	14	5	13	Ø4.2	Ø11	4	3.6
4	25	20	Ø6	15	5	15	Ø4.2	Ø13	4	4.4

NOTES: 1. Do not stake the hinge and the bracket afterward. 2. Do not use more than 2 hinges per one lid. 3. The pin should be placed horizontally. 4. Avoid applications where the operation is continuous.



• APPLICATIONS

Medical instruments / Office automation appliances /
Audio devices

• CHARACTERISTICS

Using low frictional resistance of nylon material, the hinge has structures that minimize metal powder and noise generation while reducing friction. Attached part can be stopped at any inclination.

• NOTE

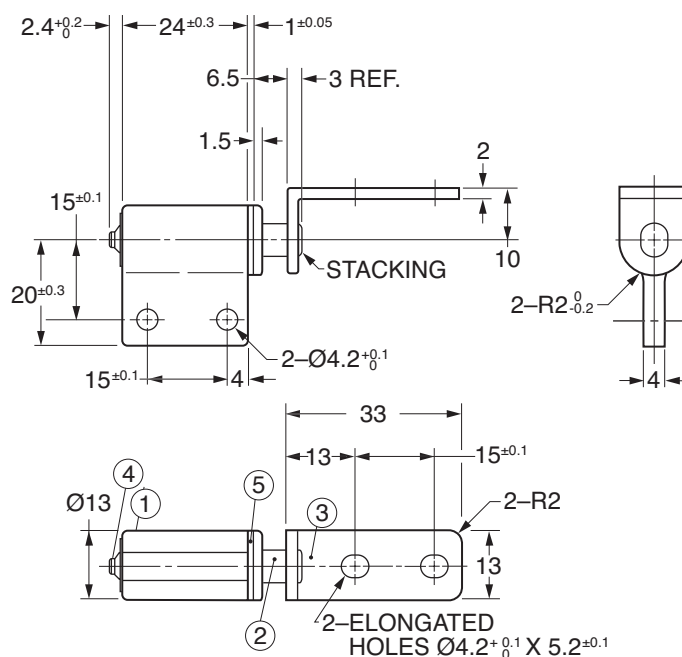
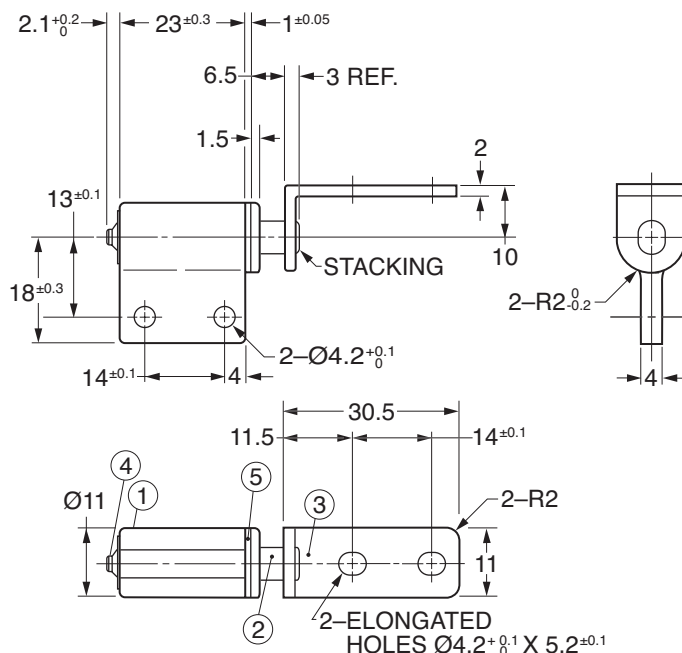
1. Do not use more than two hinges per cover
2. Do not use in continuous operation.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Case	Aluminum	Anodized	1
2	Pin	Stainless Steel	—	
3	Bracket		Barrel Polishing	
4	Push Nut	Nylon	—	
5	Plug		Black	

MLAT46M2TH1442A

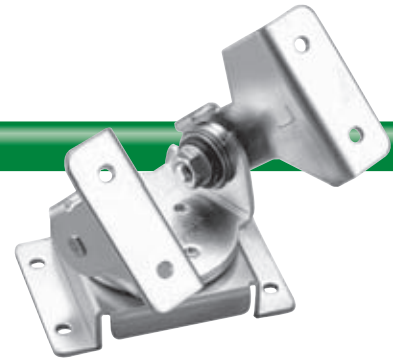
Torque 1.08 ± 0.15 N·m (11 ± 1.5 kgf·cm)



MLAT46MTH1441A

Torque 1.37 ± 0.2 N·m (14 ± 2 kgf·cm)

HINGE, DOUBLE PIVOT - Free Stopping



• APPLICATIONS

Displays / Office automation equipment / Various display screens

• CHARACTERISTICS

The hinge can be positioned to any desired angle. With two pivots, it can be situated in any position; front-to-back (tilt) and right-to-left (swivel).

• HINGE

Catalog Number	Torque N·m (kgf·cm)		Net Weight g
	Tilt Direction	Swivel Direction	
MLAT03MTH145	5.88 ±0.98 (60 ±10)	2.45 ±0.49 (25 ±5)	289

NOTE: Use hinge within its torque limits. Do not adjust torque (i.e., loosening the nut).

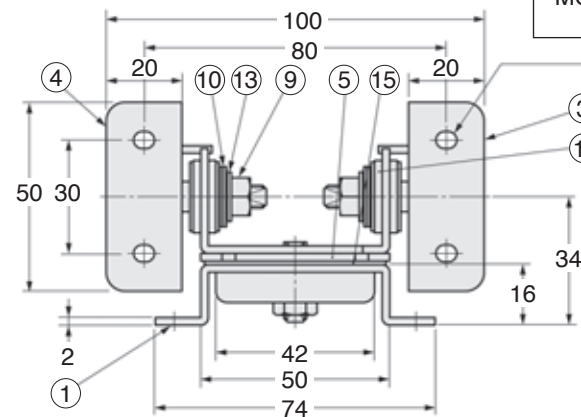
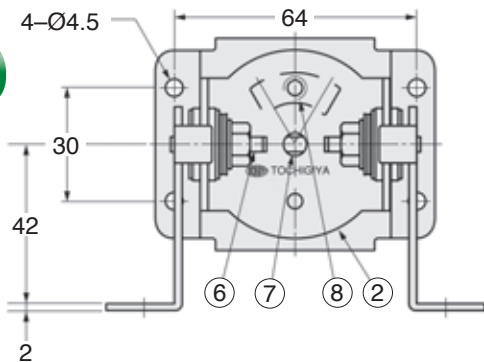
The unit is to be mounted with the fixed bracket down.
For upside-down or sidewall mounting, please consult aMSP.

Use the left- and right-tilting brackets as a pair, and mount only one object. Do not use for continuous motion applications.

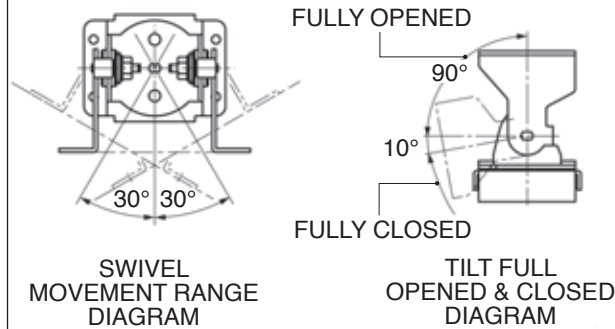
• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Fixed Bracket	Steel	Bright Zinc Plated	1
2	Rotating Bracket			
3	Tilting Bracket (L)			
4	Tilting Bracket (R)			
5	Secondary Bracket			
6	Tilting Pin			2
7	Swiveling Pin			1
8	Stopper Pin			3
9	Hex Nut			6
10	Belleville Spring Washer	Stainless Steel	Black Oxide	5
11	Disc		—	3
12	Plug Holder		—	5
13	Washer	Acetal	Black	1
14	Thrust Plug			
15	Thrust Washer			

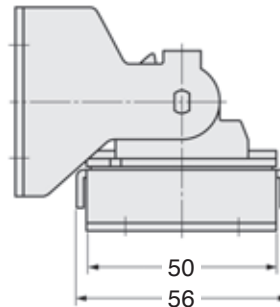
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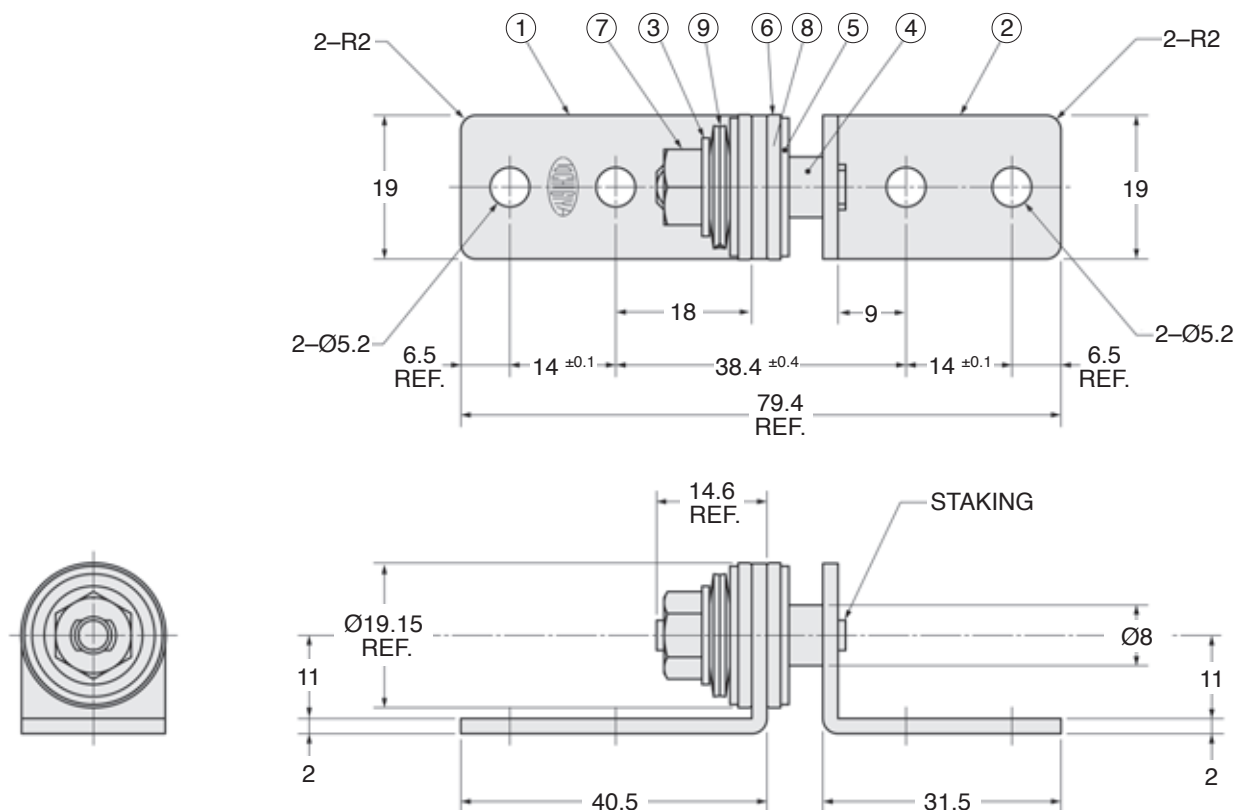
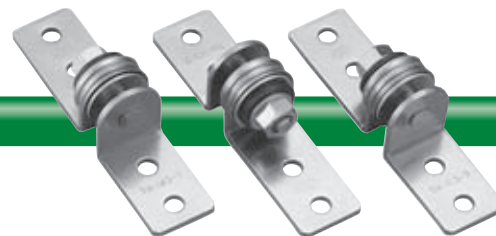


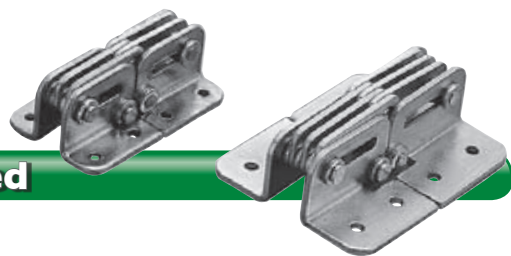
INSTALLATION EXAMPLE



4-ELONGATED HOLES
5.5 X 4.5







HINGES, LINKED - Steel, Bright Zinc Plated



• APPLICATIONS

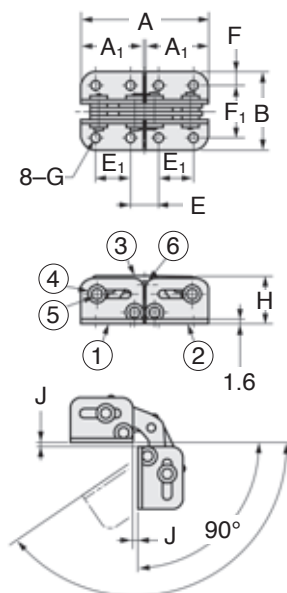
Distribution boards / Distribution panels /
Telecommunication devices

• CHARACTERISTIC

Lid can be opened approximately 145°.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Base Piece	Steel	Bright Zinc Plated	2
2	Base Piece			
3	Arm			6 (...TH28-1)
4	Washer			4 (...TH28-2)
5	Shaft			20 (...TH28-1)
6	Shaft			16 (...TH28-2)



MAXIMUM APPROX. 145°

LAYOUT OF ROTATIONAL MOVEMENT

• HINGES

Catalog Number	A Ref.	A ₁	B	E Ref.	E ₁	F	F ₁	G	H	J Ref.	Net Weight g
MLAT45MTH28-1	57	28	*45.6	15	14	7.25	*31.1	Ø3.3	21	3.3	70.5
MLAT45MTH28-2	47	23	29	11	13	4.5	20	Ø3	17.5	1.5	43

*Reference

SUPPORT BRACE, LIFTING LID

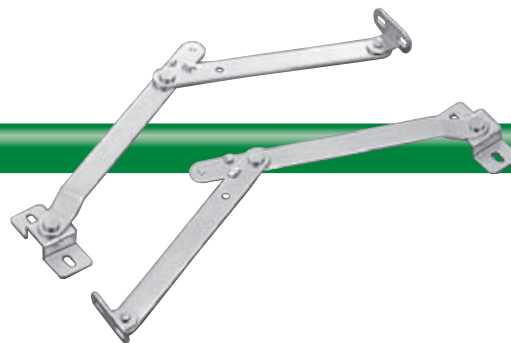
RoHS
COMPLIANT

• APPLICATIONS

Cabinets / Furniture

• CHARACTERISTIC

A limit stop is built in at the center part of the brace.

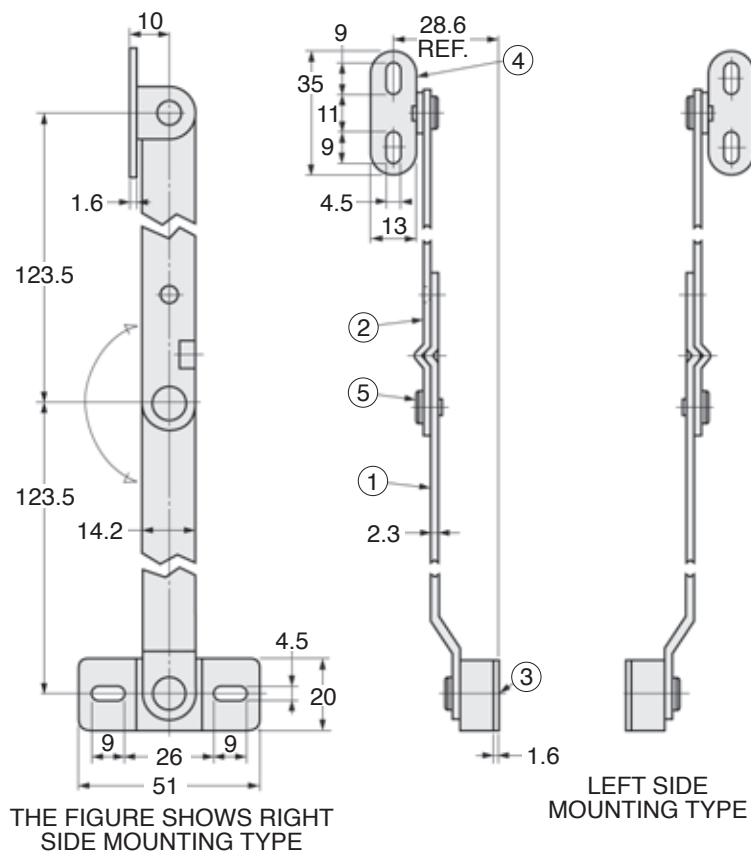


• PARTS LIST

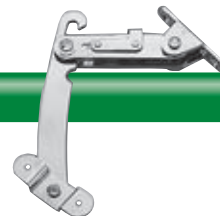
No.	Part Name	Material	Finish	Qty.
1	Arm	Steel	Zinc Plated	1
2	Arm			
3	Bracket			
4	Bracket			
5	Rivet			3

• BRACES

Catalog Number	Type	Allowable Load N (kgf)	Net Weight g
MLAT00MTM92-L	Left	83.4 (8.5)	99.4
MLAT00MTM92-R	Right		



OPEN DOOR KEEPER



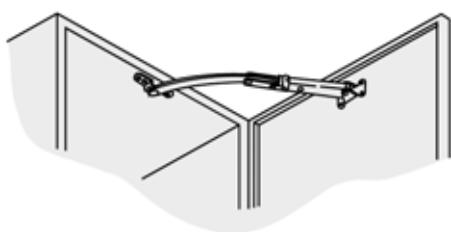
• APPLICATIONS

Distribution panels / Distribution boards /
Large and heavy doors such as cubicles

• CHARACTERISTICS

A door can be kept securely in the open position. The lock can be released with a single touch by sliding the stopper on the front of the keeper. Smart looking appearance with its built-in spring.

INSTALLATION EXAMPLE



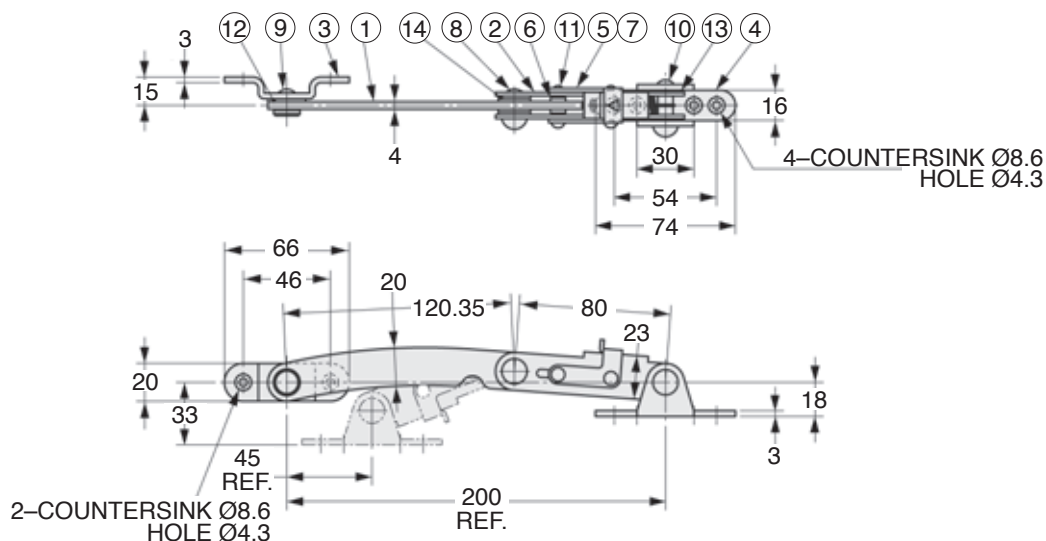
...TM223.. RIGHT SIDE MOUNTING TYPE

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Arm	Stainless Steel	Barrel Polishing	1
2	Arm			
3	Bracket			
4	Bracket			
5	Stopper			
6	Roller		—	2
7	Spring			
8	Pivot Pin			
9	Pivot Pin			
10	Pivot Pin			
11	Pin			
12	Spacer			
13	Spacer			
14	Flat Washer			

• KEEPER

Catalog Number	Type	Allowable Tensile Load N (kgf)	Allowable Compressive Load N (kgf)	Net Weight g
MLAT00MTM223-2L	Left	1000 (102)	800 (81.5)	288
MLAT00MTM223-2R	Right			



THE FIGURE SHOWS THE RIGHT SIDE MOUNTING TYPE.
THE LEFT SIDE MOUNTING TYPE IS THE MIRROR IMAGE OF
THE RIGHT SIDE MOUNTING TYPE.

OPEN DOOR KEEPER



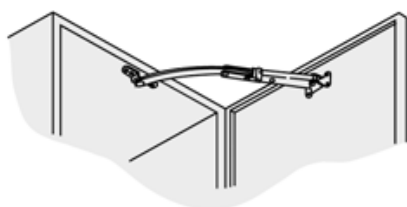
• APPLICATIONS

Distribution panels / Distribution boards /
Large and heavy doors such as cubicles

• CHARACTERISTICS

A door can be kept securely in the open position. The lock can be released with a single touch by sliding the stopper on the front of the keeper. This feature makes it useful for exterior applications. Smart looking appearance with its built-in spring.

INSTALLATION EXAMPLE



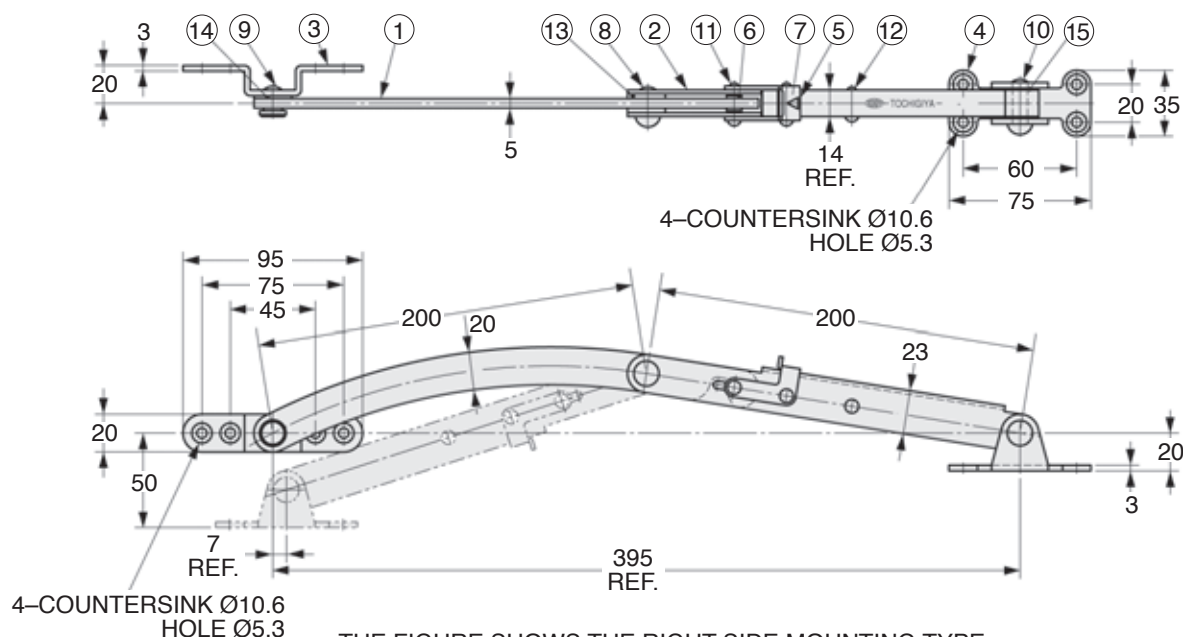
...TM223.. RIGHT SIDE MOUNTING TYPE

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Arm	Stainless Steel	Barrel Polishing	1
2	Arm			
3	Bracket			
4	Bracket			
5	Stopper			
6	Roller			
7	Spring		—	2
8	Pivot Pin			
9	Pivot Pin			
10	Pivot Pin			
11	Pin			
12	Pin			
13	Spacer			
14	Spacer			
15	Spacer			

• KEEPERS

Catalog Number	Type	Allowable Tensile Load N (kgf)	Allowable Compressive Load N (kgf)	Net Weight g
MLAT00MTM223-1L	Left	1500 (153)	500 (51)	514
MLAT00MTM223-1R	Right			



THE FIGURE SHOWS THE RIGHT SIDE MOUNTING TYPE.
THE LEFT SIDE MOUNTING TYPE IS THE MIRROR IMAGE OF
THE RIGHT SIDE MOUNTING TYPE.

OPEN DOOR KEEPER

• APPLICATIONS

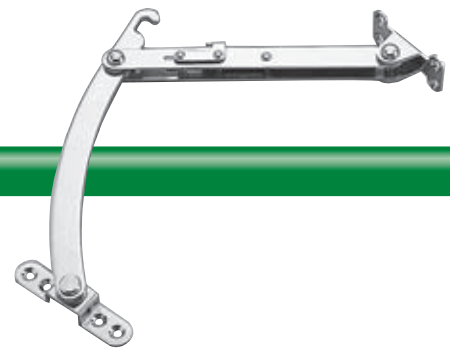
Distribution panels / Distribution boards / Large and heavy doors such as cubicles / Cabinets which need frequent access

• CHARACTERISTICS

A sister product of ...TM223... With its locking mechanism, a door can be held securely in its open position. The door can be closed by simply pushing on the door. Smart looking appearance with its built-in spring. Suitable for short duration opening and closing on interior doors.

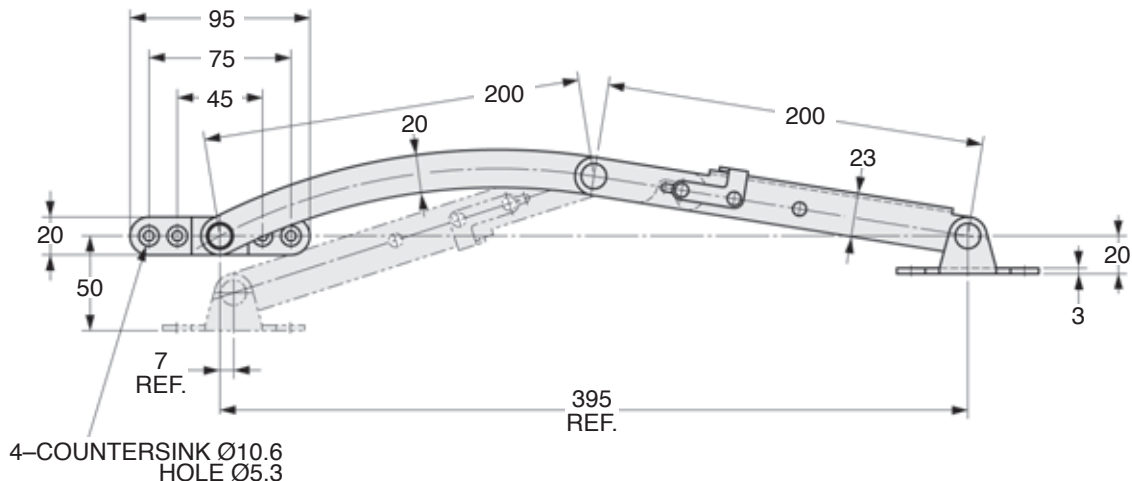
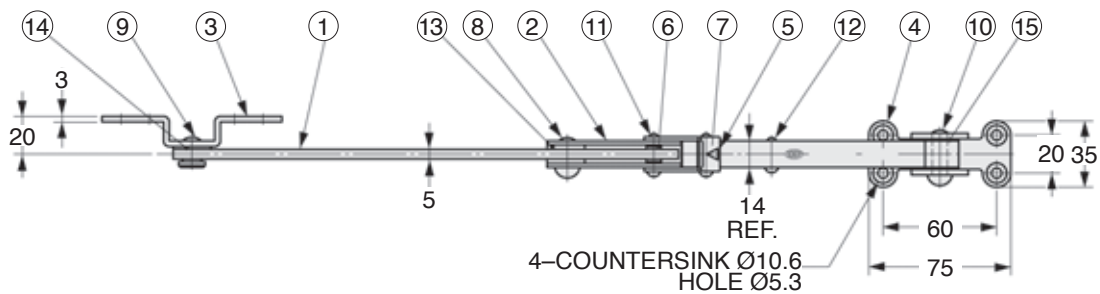
• KEEPERS

Catalog Number	Type	Allowable Tensile Load N (kgf)	Net Weight g
MLAT00MTM224-L	Left	1500 (153)	513.5
MLAT00MTM224-R	Right		



• PARTS LIST

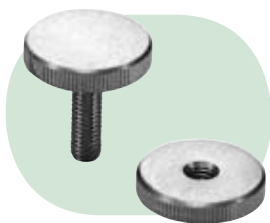
No.	Part Name	Material	Finish	Qty.
1	Arm	Stainless Steel	Barrel Polishing	1
2	Arm			
3	Bracket			
4	Bracket			
5	Stopper			
6	Roller			
7	Spring		—	2
8	Pivot Pin			
9	Pivot Pin			
10	Pivot Pin			
11	Pin			
12	Pin			
13	Spacer			
14	Spacer			
15	Spacer			



THE FIGURE SHOWS THE RIGHT SIDE MOUNTING TYPE.
THE LEFT SIDE MOUNTING TYPE IS THE MIRROR IMAGE OF
THE RIGHT SIDE MOUNTING TYPE.

Hardware





9-6



9-7



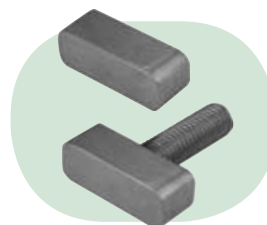
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9-8



9-9



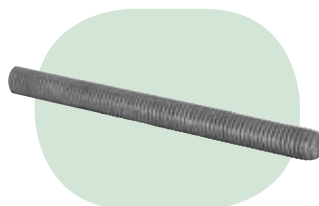
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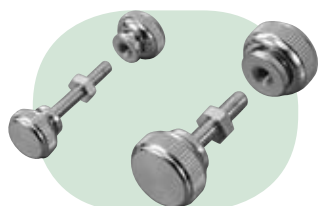
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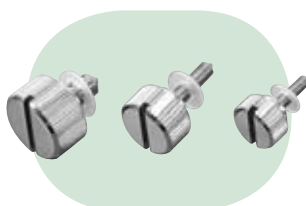
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9-13



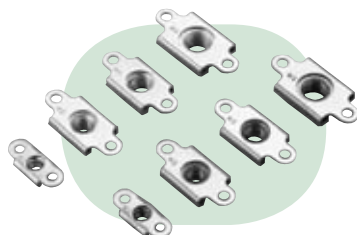
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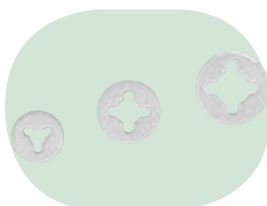
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9-17



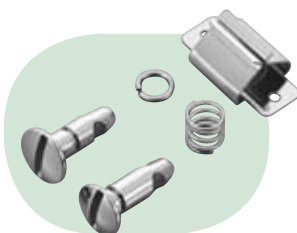
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9-19



9-20



9-21



9-22 thru 9-25



9-26 thru 9-30



9-31 thru 9-35



9-36 & 9-37



9-38



9-39



9-40 & 9-41



9-42



9-43



9-44



9-45



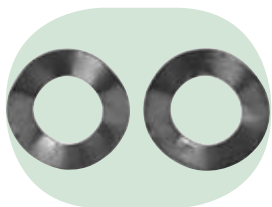
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9-47



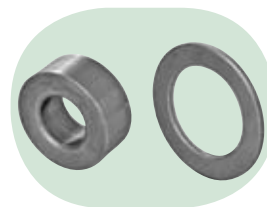
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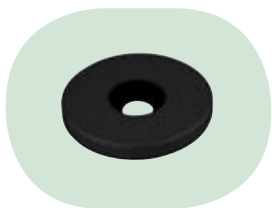
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9-49



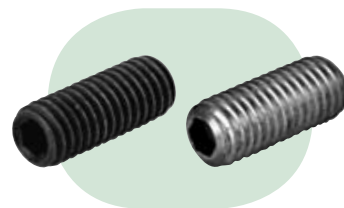
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9-51



9-52 & 9-53



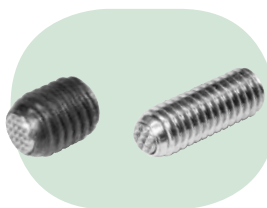
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9-55



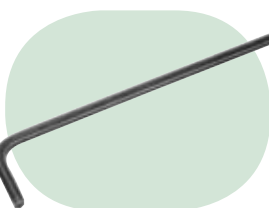
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9-57



9-58



9-59



9-60



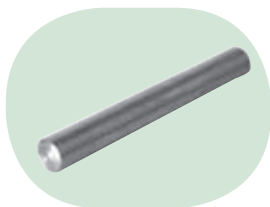
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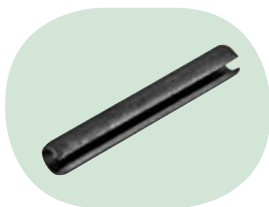
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9-64



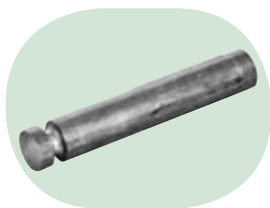
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9-67



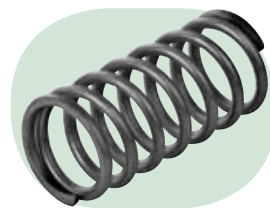
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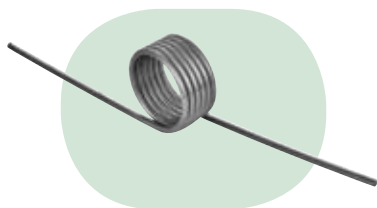
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9-70 & 9-71



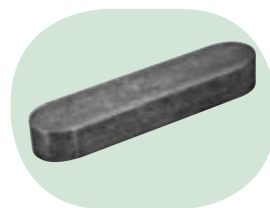
9-72 & 9-73



9-74



9-75



9-76

NUTS & SCREWS, KNURLED

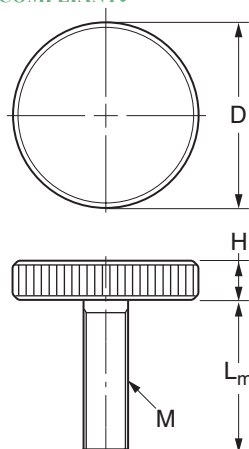


Fig. 1

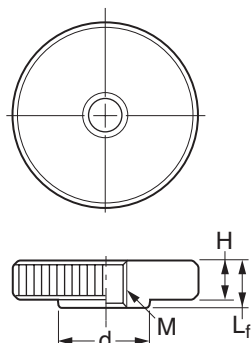


Fig. 2



Fig. 1



Fig. 2

Fig. 1 • **SCREW** – Stainless Steel, Buff Polished

Catalog Number	D	M	H	L _m	Weight g
MJAN2MMKUMS1206	12	M3	2.5	6	2...4
MJAN2MMKUMS1210				10	
MJAN2MMKUMS1216				16	
MJAN2MMKUMS1606	16	M4	3.5	6	5...7
MJAN2MMKUMS1610				10	
MJAN2MMKUMS1616				16	
MJAN2MMKUMS2010	20	M5	4	10	12...13
MJAN2MMKUMS2016				16	
MJAN2MMKUMS2020				20	
MJAN2MMKUMS2410	24	M6	5	10	20...25
MJAN2MMKUMS2416				16	
MJAN2MMKUMS2420				20	
MJAN2MMKUMS2425				25	
MJAN2MMKUMS2430				30	
MJAN2MMKUMS3016	30	M8	6	16	40...46
MJAN2MMKUMS3020				20	
MJAN2MMKUMS3025				25	
MJAN2MMKUMS3030				30	
MJAN2MMKUMS3620	36	M10	8	20	78...90
MJAN2MMKUMS3625				25	
MJAN2MMKUMS3630				30	
MJAN2MMKUMS3640				40	

Fig. 2 • **NUT** – Stainless Steel, Buff Polished • **THREADED HOLE**

Catalog Number	D	M	H	L _f	d	Weight g
MJAN2FMKUFS12	12	M3	2.5	3	6	2
MJAN2FMKUFS16	16	M4	3.5	4	8	5
MJAN2FMKUFS20	20	M5	4	5	10	10
MJAN2FMKUFS24	24	M6	5	6	12	18
MJAN2FMKUFS30	30	M8	6	8	16	34
MJAN2FMKUFS36	36	M10	8	10	20	64

NUTS & SCREWS, KNURLED

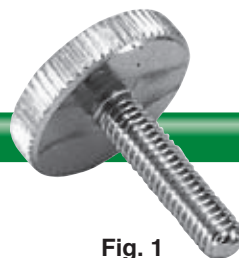


Fig. 1



Fig. 2

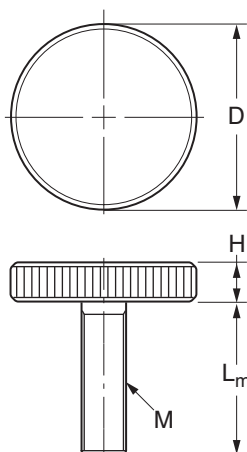


Fig. 1

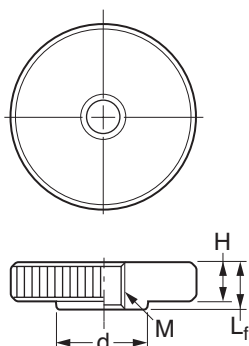


Fig. 2

Fig. 1 • **SCREW** – Steel, Buff Polished & Chrome Plated

Catalog Number	D	M	H	L _m	Weight g
MJAN2MMKUM1206	12	M3	2.5	6	2...4
MJAN2MMKUM1210				10	
MJAN2MMKUM1216				16	
MJAN2MMKUM1606	16	M4	3.5	6	5...7
MJAN2MMKUM1610				10	
MJAN2MMKUM1616				16	
MJAN2MMKUM2010	20	M5	4	10	12...13
MJAN2MMKUM2016				16	
MJAN2MMKUM2020				20	
MJAN2MMKUM2410	24	M6	5	10	20...25
MJAN2MMKUM2416				16	
MJAN2MMKUM2420				20	
MJAN2MMKUM2425				25	
MJAN2MMKUM2430				30	
MJAN2MMKUM3016	30	M8	6	16	40...46
MJAN2MMKUM3020				20	
MJAN2MMKUM3025				25	
MJAN2MMKUM3030				30	
MJAN2MMKUM3620	36	M10	8	20	78...90
MJAN2MMKUM3625				25	
MJAN2MMKUM3630				30	
MJAN2MMKUM3640				40	

Fig. 2 • **NUT** – Steel, Buff Polished & Chrome Plated • **THREADED HOLE**

Catalog Number	D	M	H	L _r	d	Weight g
MJAN2FMKUF12	12	M3	2.5	3	6	2
MJAN2FMKUF16	16	M4	3.5	4	8	5
MJAN2FMKUF20	20	M5	4	5	10	10
MJAN2FMKUF24	24	M6	5	6	12	18
MJAN2FMKUF30	30	M8	6	8	16	34
MJAN2FMKUF36	36	M10	8	10	20	64

NUTS & SCREWS, KNURLED

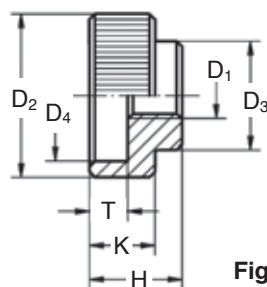


Fig. 1



Fig. 1

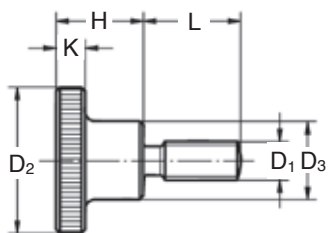


Fig. 2



Fig. 2

Fig. 1 • **NUT** – Steel, Free-Cutting, Black Oxide Finish or Stainless Steel, Natural Finish • DIN 6303

Catalog Number		D ₁	D ₂	D ₃	D ₄	H	K	T	Approx. Weight g
Steel	Stainless Steel								
MJAL60M10105	MJAL60M101052	M5	20	14	15	12	8	5	16
MJAL60M10106	MJAL60M101062	M6	24	16	18	14	10	6	27
MJAL60M10108	MJAL60M101082	M8	30	20	24	17	12	7	50
MJAL60M10110	MJAL60M101102	M10	36	28	30	20	14	8	83
MJAL60M10112	MJAL60M101122	M12	40	32	34	24	16	10	123

Fig. 2 • **SCREW** – Steel, Free-Cutting, Black Oxide Finish or Stainless Steel, Natural Finish • DIN 464

ΔCatalog Number		D ₁	D ₂	D ₃	H	K	L Length					
Steel	Stainless Steel											
MJAL60M9004X ☐	MJAL60M90042X ☐	M4	16	8	9.5	3.5	10	16	20 [*]	—	—	—
MJAL60M9005X ☐	MJAL60M90052X ☐	M5	20	10	11.5	4	10	16	20 [*]	—	—	—
MJAL60M9006X ☐	MJAL60M90062X ☐	M6	24	12	15	5	10	16	20	25 [*]	—	—
MJAL60M9008X ☐	MJAL60M90082X ☐	M8	30	16	18	6	—	16	20	25	30 [*]	—
MJAL60M9010X ☐	MJAL60M90102X ☐	M10	36	20	23	8	—	—	20	25	30	40 [*]

Δ To complete the part number, add desired length.

*The knurled thumb screw is supplied with no undercut.

NUTS & SCREWS, KNURLED

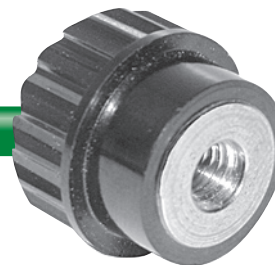


Fig. 1

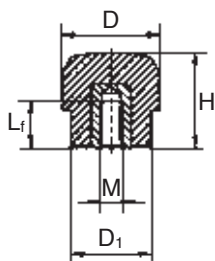


Fig. 1

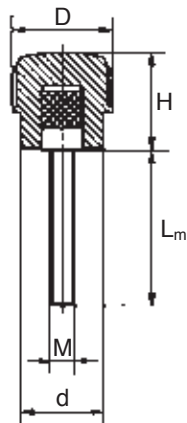


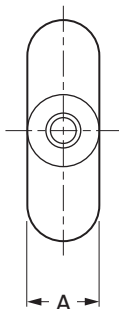
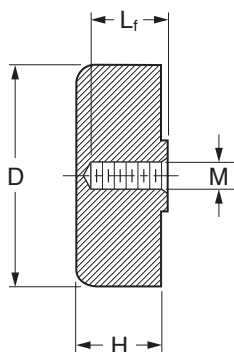
Fig. 2

Fig. 1 • **NUT** – Bakelite, Black • **THREADED INSERT** – Brass, Nickel Plated

Catalog Number	D	M	H	L _f	d	Weight g
MJAX1FM3301	17	M4	16.5	8	14	5

Fig. 2 • **NUT** – Bakelite, Black • **SCREW** – Steel, Zinc Plated

Catalog Number	D	M	H	L _m	d	Weight g
MJAX1MM3302	17	M4	16.5	26	14	7

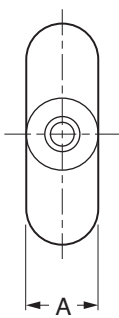
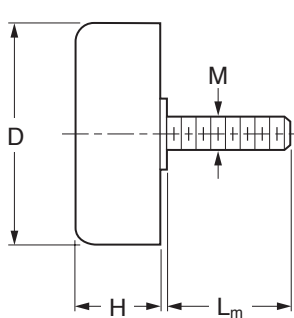


• **NUT – Stainless Steel**

Catalog Number	D	M	H	L _f	A
MKAH3FM80602506	25	M6	10	7	8
MKAH3FM80603008	30	M8	12	9	10
MKAH3FM80603510	35	M10	14	11	12

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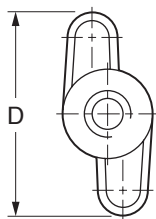
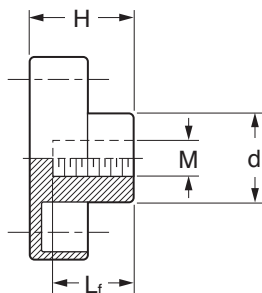


• **SCREW – Stainless Steel**

Catalog Number	D	M	H	L _m	A
MKAH3MM80500610	25	M6	8	10	10
MKAH3MM80500620				20	
MKAH3MM80500630				30	
MKAH3MM80500820	30	M8	10	20	12
MKAH3MM80500830				30	
MKAH3MM80500840				40	
MKAH3MM80501030	35	M10	12	30	14
MKAH3MM80501040				40	
MKAH3MM80501050				50	

NUTS & SCREWS, WING

RoHS
COMPLIANT



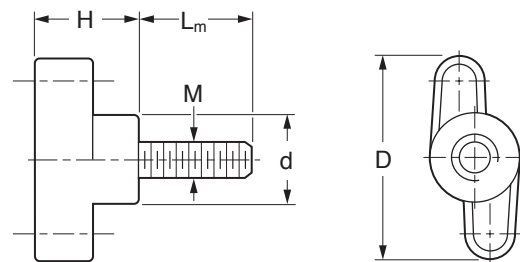
- **WING NUT**
- **BODY** – Plastic, Black • **INSERT** – Steel, Zinc Plated

Catalog Number	D	M	H	L _r	d
MKAH0FM80623506	35	M6	18	14	Ø15.6
MKAH0FM80623508		M8			
MKAH0FM80624508	45	M8	24	18	Ø20
MKAH0FM80624510		M10			

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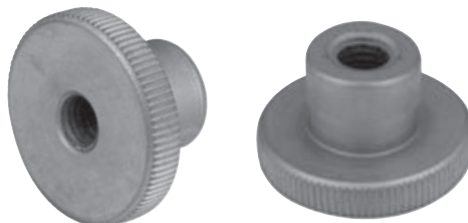
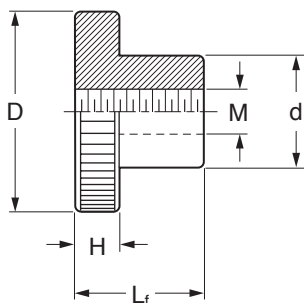
- **WING SCREW**
- **BODY** – Plastic, Black • **SCREW** – Steel, Zinc Plated

Catalog Number	D	M	H	L _m	d
MKAH0MM806130610	35	M6	18	10	Ø15.6
MKAH0MM806130615				15	
MKAH0MM806130620				20	
MKAH0MM806130625				25	
MKAH0MM806130630				30	
MKAH0MM806130810	35	M8	18	10	Ø15.6
MKAH0MM806130815				15	
MKAH0MM806130820				20	
MKAH0MM806130825				25	
MKAH0MM806130830				30	
MKAH0MM806130835				35	
MKAH0MM806140815	45	M8	24	15	Ø20
MKAH0MM806140820				20	
MKAH0MM806140825				25	
MKAH0MM806140830				30	
MKAH0MM806140835				35	
MKAH0MM806140840				40	
MKAH0MM806141015	45	M10	24	15	Ø20
MKAH0MM806141020				20	
MKAH0MM806141025				25	
MKAH0MM806141030				30	
MKAH0MM806141035				35	
MKAH0MM806141040				40	
MKAH0MM806141045				45	



NUTS, KNURLED

RoHS
COMPLIANT

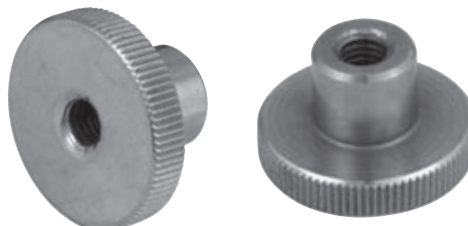
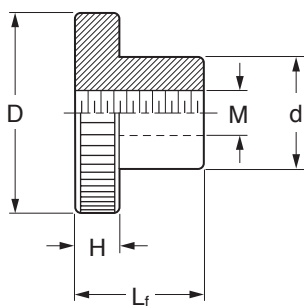


• NUT – Steel, Matte Silver

Catalog Number	D	M	H	L _f	d
MJAH1FM811012	12	M3	2.5	7.5	6
MJAH1FM811016	16	M4	3.5	9.5	8
MJAH1FM811020	20	M5	4	11.5	10
MJAH1FM811024	24	M6	5	15	12
MJAH1FM811030	30	M8	6	18	16
MJAH1FM811036	36	M10	8	23	20
MJAH1FM811040	40	M12	10	25	22

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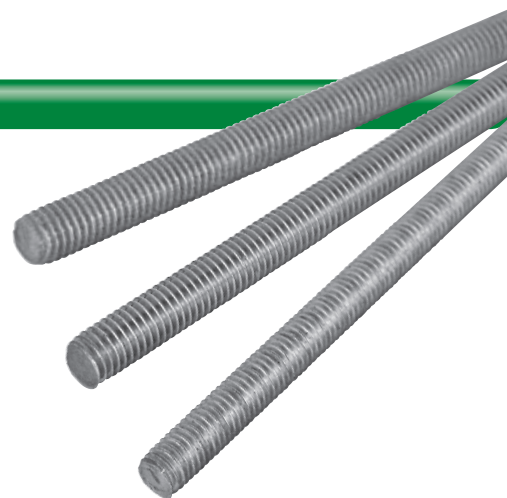


• NUT – Stainless Steel

Catalog Number	D	M	H	L _f	d
MJAH2FM812016	16	M4	3.5	9.5	8
MJAH2FM812020	20	M5	4	11.5	10
MJAH2FM812024	24	M6	5	15	12
MJAH2FM812030	30	M8	6	18	16

RODS, THREADED

RoHS
COMPLIANT



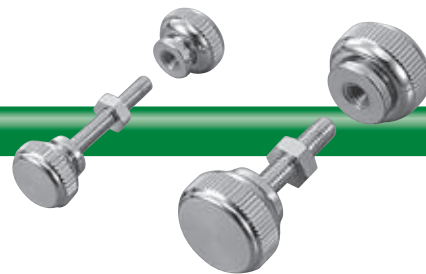
• **ROD** – Brass, Mild Steel, Stainless Steel • DIN 975

Priced Per
Meter (39.37 in.)

Catalog Number			Thread Size
Brass	Mild Steel	Stainless Steel	
—	—	MKAABMMX020	M2 X 0.4
—	*MKAABMMC023	—	M2.3 X 0.4
—	—	MKAABMMX025	M2.5 X 0.45
—	MKAABMMC026	—	M2.6 X 0.45
MKAABMMB030	—	MKAABMMX030	M3 X 0.5
MKAABMMB040	—	MKAABMMX040	M4 X 0.7
MKAABMMB050	MKAABMMC050	MKAABMMX050	M5 X 0.8
MKAABMMB060	MKAABMMC060	MKAABMMX060	M6 X 1
MKAABMMB080	MKAABMMC080	MKAABMMX080	M8 X 1.25
—	MKAABMMC100	—	M10 X 1.5
MKAABMMB120	MKAABMMC120	—	M12 X 1.75

*Will be discontinued when present stock is depleted.

NUTS & SCREWS, KNURLED - Brass

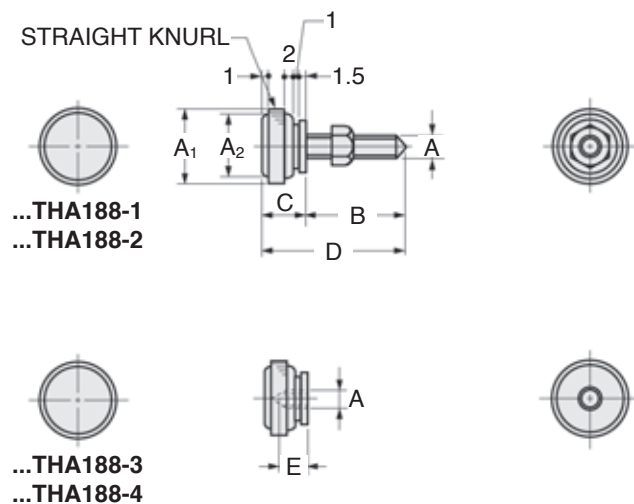


- **APPLICATIONS**

Small boxes / Small devices

- **CHARACTERISTIC**

Available as a screw type or a nut type.



- **SCREW** – Brass, Chrome Plated • **NUT** – Brass, Nickel Plated

Catalog Number	A	A ₁	A ₂	B	C	D	E	Net Weight g
MKAT04MTHA188-1	M4	Ø16	Ø15	20	10	30	—	15.5
MKAT04MTHA188-2	M3	Ø11	Ø10	—	8	28	—	6
MKAT04MTHA188-3	M4	Ø16	Ø15	—	10	—	6	12.5
MKAT04MTHA188-4	M3	Ø11	Ø10	—	8	—	4	4

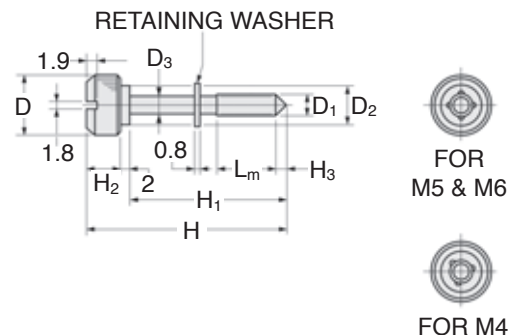
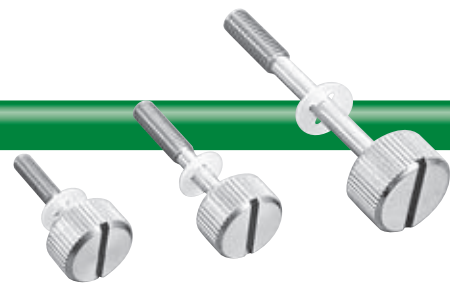
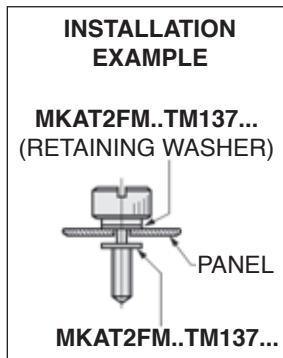
SCREWS, KNURLED

• APPLICATIONS

Measuring instruments / Machine tools

• CHARACTERISTICS

These are each supplied with one **MKAT2FM..TM137...** series retaining washer, which can be used to prevent the screw from falling off. If the washer is under the head of the screw, the washer will avoid scratching the mounting surface. The stainless steel screws have excellent corrosion and chemical resistance. For shorter screws, please see **..TL233...** series.



• LONG SCREW – Stainless Steel • WASHER – Nylon, Natural Color

Catalog Number	Nominal Size	D	D ₁	D ₂	D ₃	H	H ₁	H ₂	H ₃	L _m	Net Weight g
MKAT02MTL215-1	M4 X 20	15	M4	10	Ø3	30	20	8	2	12	13
MKAT02MTL215-2	M4 X 30					40	30				13.4
MKAT02MTL215-3	M5 X 30					40	30				14.6
MKAT02MTL215-4	M5 X 40					50	40				15.2
MKAT02MTL215-5	M6 X 40	18	M6	12	Ø4.5	52	40	10	3	15	26.1
MKAT02MTL215-6	M6 X 50					62	50				27.3

All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

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• APPLICATIONS

Measuring instruments / Distribution panels

• CHARACTERISTICS

These are the shorter versions of **...TL112..** series knurled screws. Available in chrome plated brass or stainless steel. They can be used as pull knobs by attaching nuts. One **MKAT2FMTM147..** series of washer is supplied with each screw.

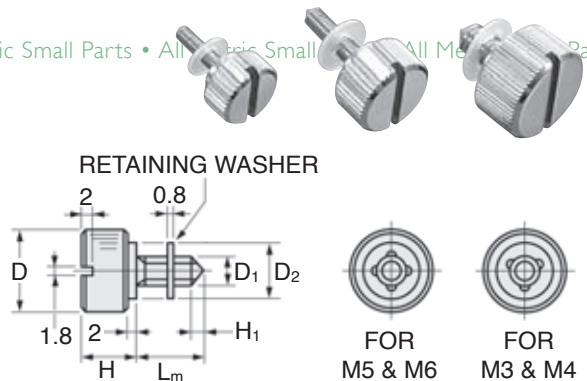
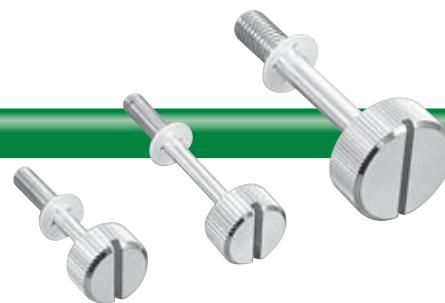


Fig 1 • SCREW – Brass, Chrome Plated • WASHER – Nylon, Natural Color

Fig 2 • SCREW – Stainless Steel • WASHER – Nylon, Natural Color

Catalog Number	Net Weight g	Catalog Number	Net Weight g	Nominal Size	D	D ₁	D ₂	H	H ₁ Ref.	L _m
Fig. 1 Brass		Fig. 2 Stainless Steel								
MKAT03MTL233-1	6.2	MKAT03MTL233SUS1	5.8	M3 X ⁸ ₁₂	Ø12	M3	Ø8	8	1.5	8 ₁₂
MKAT03MTL233-2	6.5	MKAT03MTL233SUS2	5.9							
MKAT03MTL233-3	13	MKAT03MTL233SUS3	12	M4 X ¹⁰ ₁₅	Ø15	M4	Ø10	10	2	10 ₁₅
MKAT03MTL233-4	13.6	MKAT03MTL233SUS4	12.5							2.5
MKAT03MTL233-5	14	MKAT03MTL233SUS5	13	M5 X ¹⁰ ₁₅	Ø18	M5	Ø12	12	3	10 ₁₅
MKAT03MTL233-6	14.8	MKAT03MTL233SUS6	13.1							
MKAT03MTL233-7	23.7	MKAT03MTL233SUS7	21.9	M6 X ¹⁰ ₁₅		M6				
MKAT03MTL233-8	24.6	MKAT03MTL233SUS8	22.8							

SCREWS, KNURLED - Long



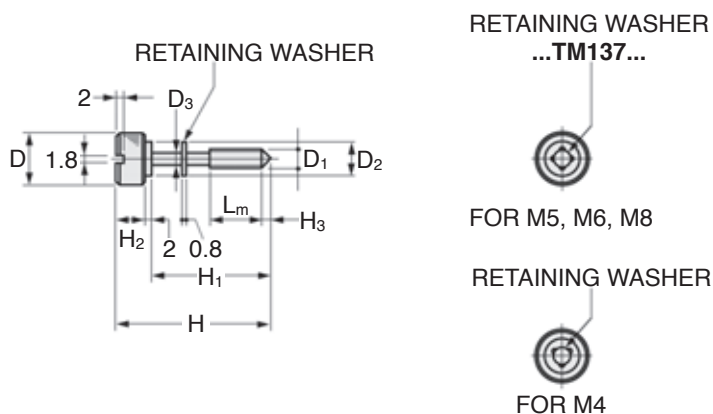
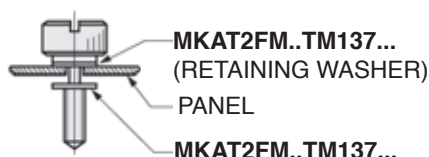
• APPLICATIONS

Measuring instruments / Machine tools /
Industrial machines or devices

• CHARACTERISTICS

Each screw is supplied with one **MKAT2FM..TM137...** series retaining washer, which can be used to prevent the screw from falling off. If the washer is under the head of the screw, the washer will not scratch the mounting surface. Some of the screw sizes are also available in **...TL215...** stainless steel series. For shorter screws, please see **...TL233...** series.

INSTALLATION EXAMPLE



• SCREW – Brass, Chrome Plated • WASHER – Nylon, Natural Finish

9

Catalog Number	Nominal Size	D ₁	D	D ₂	D ₃	H	H ₁	H ₂	H ₃	L _m	Net Weight g
MKAT01MTL112-420	20	M4	15	10	Ø3	30	20	8	2	12	13.5
MKAT01MTL112-425	M4 X 25					35	25			12	13.9
MKAT01MTL112-430	30					40	30			15	14.2
MKAT01MTL112-520	M5 X 20	M5	15	10	Ø3.8	30	20	8	2.5	12	14.5
MKAT01MTL112-525	25					35	25			15	15.3
MKAT01MTL112-530	M5 X 30					40	30				15.5
MKAT01MTL112-535	35					45	35				16.1
MKAT01MTL112-540	40					50	40				16.5
MKAT01MTL112-625	25	M6	18	12	Ø4.5	37	25	10	3	15	26.2
MKAT01MTL112-630	30					42	30				26.5
MKAT01MTL112-635	M6 X 35					47	35				27.4
MKAT01MTL112-640	40					52	40				28
MKAT01MTL112-645	45					57	45				28.7
MKAT01MTL112-650	50					62	50				29
MKAT01MTL112-835	35	M8	24	14	Ø6	47	35	10	4	15	48.6
MKAT01MTL112-840	M8 X 40					52	40				49
MKAT01MTL112-845	45					57	45				50.6
MKAT01MTL112-850	50					62	50				52

NUTS, FLOATING



• APPLICATIONS

Measuring instruments / Machine tools

• CHARACTERISTIC

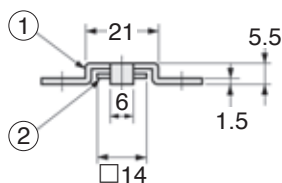
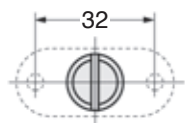
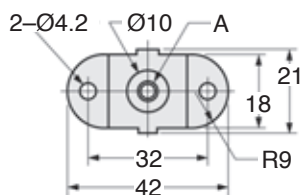
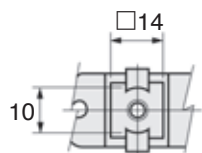
It is possible to fasten the screw even when the holes of the two panels are slightly misaligned.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Nut Retainer	Stainless	Barrel	1
2	Square Nut	Steel	Polish	

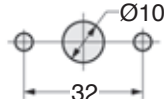
• NUTS

Catalog Number	A	Net Weight g
MKAT07MTL216-1	M4	11.1
MKAT07MTL216-2	M5	
MKAT07MTL216-3	M6	10.9

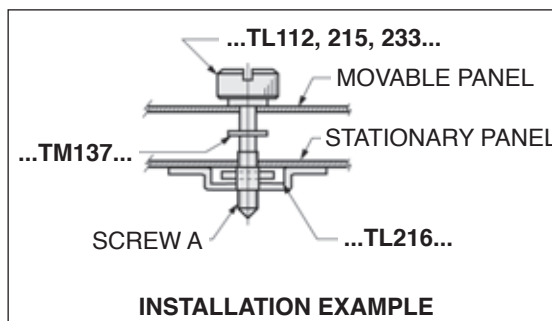


DIMENSION "A" IS COUNTERSUNK

LAYOUT OF A HOLE FOR MOVABLE PANEL



LAYOUT OF HOLES FOR STATIONARY PANEL



NUTS, FLOATING

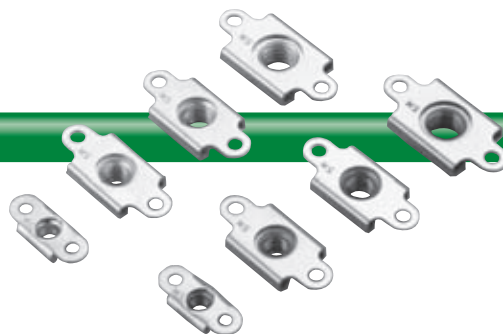


• APPLICATIONS

Vehicles / Aircraft / Measuring instruments /
Office automation appliances

• CHARACTERISTICS

It is a small, locking, floating nut plate, which was developed to save space. The floating nut allows the screw to be fastened even when the holes of the two panels are slightly misaligned. It is available in steel ...TL227.. or stainless steel ...TL264..



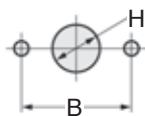
• NUT & NUT RETAINER – Steel, Zinc Plated

Catalog Number	A	B	C	D	F	H	J	Net Weight g
MKAT08MTL227-1	16	10.8	8	6.5	3.3	Ø4.2	M3	0.5
MKAT08MTL227-2	23	18	12	10	5	Ø6.6	M4	1.5
MKAT08MTL227-3							M5	
MKAT08MTL227-4	25	20	14	12		Ø8.4	M6	2

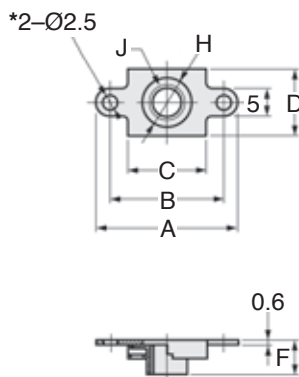
• NUT & NUT RETAINER – Stainless Steel, Barrel Polish

Catalog Number	A	B	C	D	F	H	J	Net Weight g
MKAT08MTL264-1	16	10.8	8	6.5	3.3	Ø4.2	M3	0.5
MKAT08MTL264-2	23	18	12	10	5	Ø6.6	M4	1.45
MKAT08MTL264-3							M5	1.40
MKAT08MTL264-4	25	20	14	12		Ø8.4	M6	1.85

9

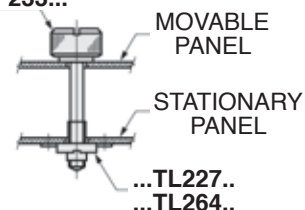


LAYOUT OF HOLES FOR
STATIONARY PANEL



INSTALLATION EXAMPLE

...TL112, 215, 233...



*FOR CATALOG NUMBERS ...TL227-1 AND
...TL264-1, 2-HOLES OF Ø2.25

• APPLICATIONS

Use with various types of bolts, screws and fasteners

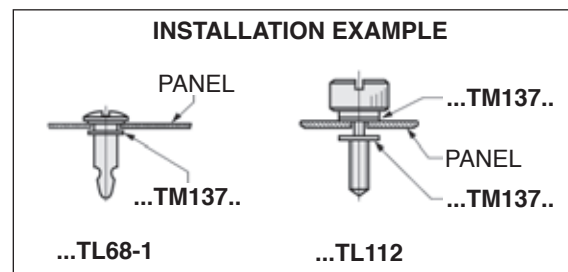
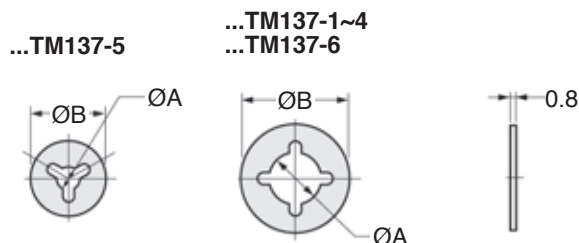
• CHARACTERISTICS

Just putting these washers on the tips of screws prevents the screws from falling off the panel while installing equipment.

The nylon washers also prevent scratches on panels if used under the screw heads or between the panels and nuts.

• WASHER – Nylon, Natural Color

Catalog Number	A	B	Net Weight g	For Use With Screw
MKAT2FM1TM137-5	3.1	10	0.06	...TL112, -215 M4
MKAT2FM2TM137-4	3.9		0.05	...TL112, -215 M5
MKAT2FM3TM137-3	4.6	12	0.08	...TL112, -215 M6
MKAT2FM4TM137-6	5	10	0.04	...TL68-1
MKAT2FM5TM137-2	6.1	14	0.1	...TL112 M8
MKAT2FM6TM137-1	6.5		0.09	—



All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

• APPLICATIONS

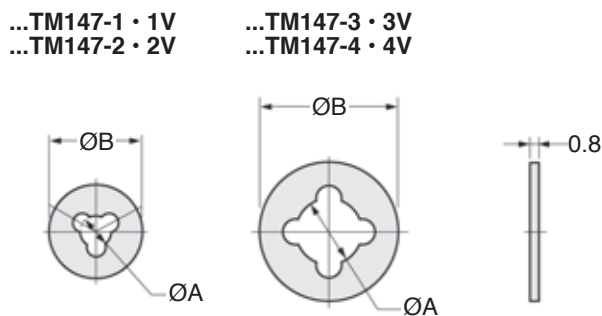
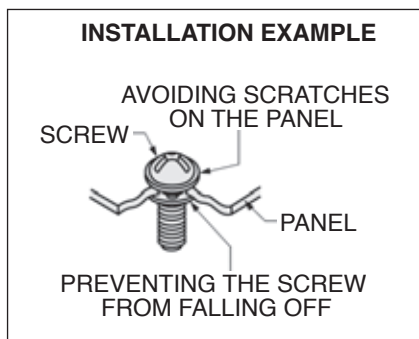
Use with various types of bolts, screws and fasteners

• CHARACTERISTICS

Just putting these washers on the tips of screws prevents the screws from falling off the panel while installing equipment. The nylon washers also prevent scratches on panels if used under the screw heads or between the panels and nuts.

Available for UL standardized washers using UL approved material.

9



• WASHER – Nylon, Natural Color

Catalog Number	Catalog Number Meet UL Standard (94V-0)	A	B	Net Weight g	For Use With Screw
MKAT2FMTM147-1	MKAT2FMTM147-1V	2.6	8	0.04	M3
MKAT2FMTM147-2	MKAT2FMTM147-2V	3.6	10	0.06	M4
MKAT2FMTM147-3	MKAT2FMTM147-3V	4.6	12	0.08	M5
MKAT2FMTM147-4	MKAT2FMTM147-4V	5.6			M6

FASTENER, FRACTIONAL TURN - With Receptacle



• APPLICATIONS

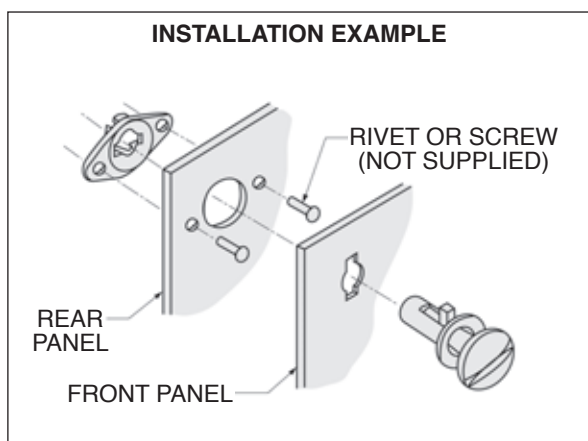
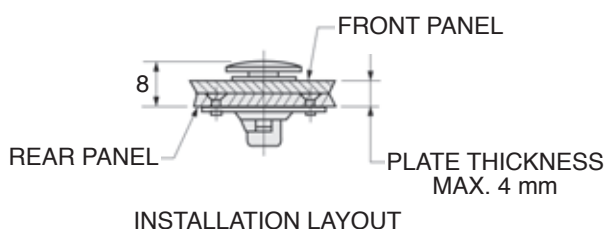
Measuring instruments / Distribution panels / Machine tools

• CHARACTERISTIC

Even in a released position, the fastener will not fall off.

• PARTS LIST

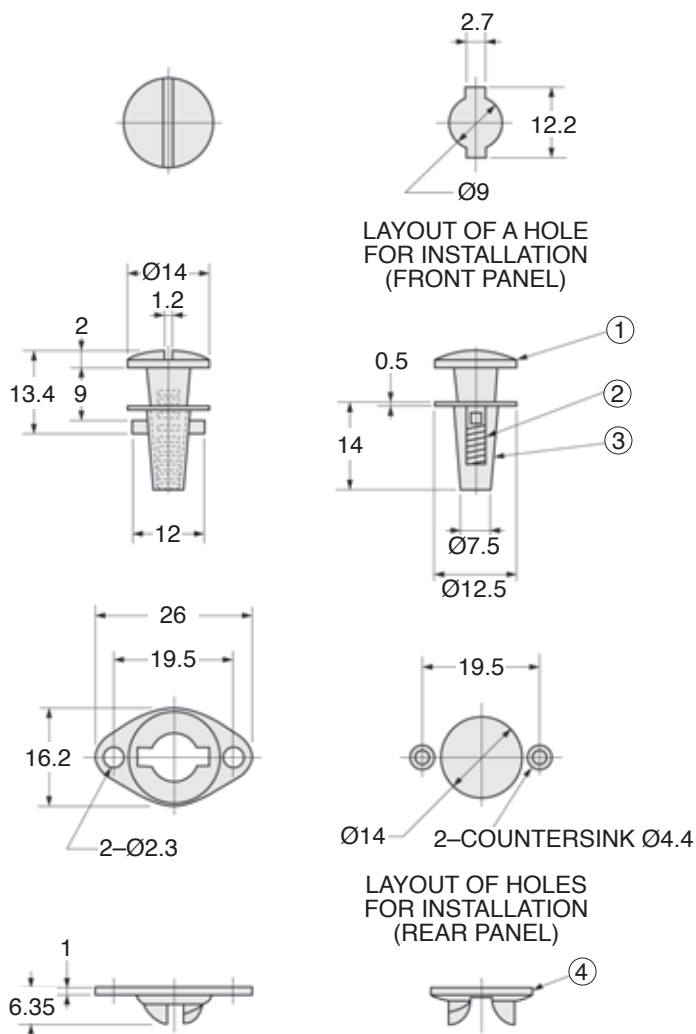
No.	Part Name	Material	Finish	Qty.
1	Fastener Head	Steel	Bright Zinc Plated	1
2	Spring			
3	Holder			
4	Receptacle			



NOTE: By rotating the screw 90°, the front panel can be removed.

• FASTENER

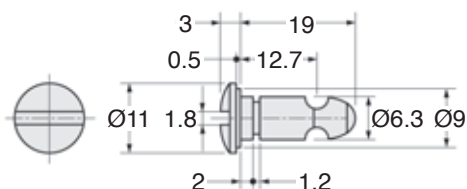
Catalog Number	Net Weight g
MKAT06MTL69	8



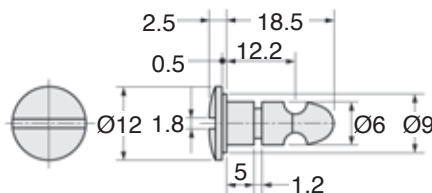
STUDS, 1/4 TURN OVAL SLOTTED - With Retainer



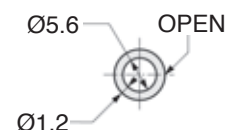
1A
STUD FOR
MKAT05MTL68-001



1B
STUD FOR
MKAT05MTL68-002



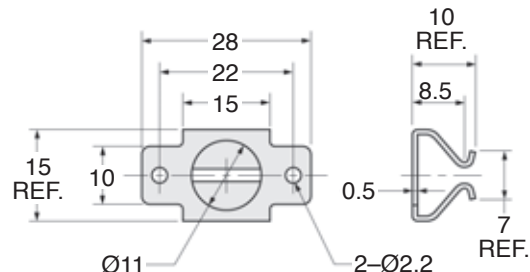
2
RING



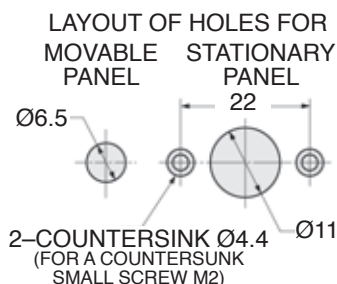
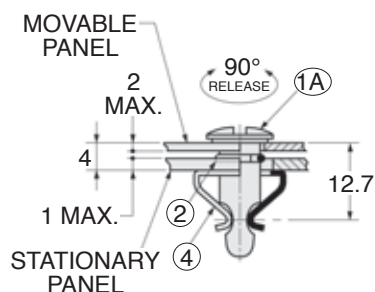
3
SPRING



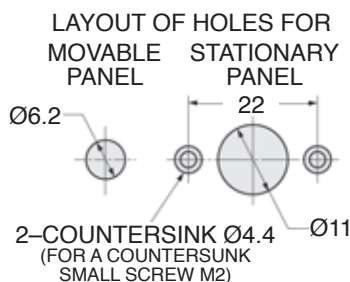
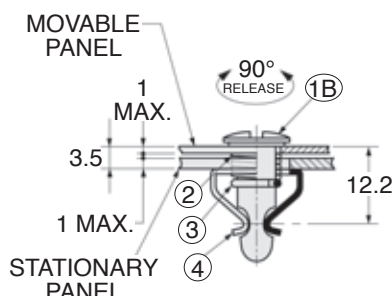
4
RETAINER



INSTALLATION EXAMPLE
MKAT05MTL68-001



INSTALLATION EXAMPLE
MKAT05MTL68-002



• MKAT05MTL68-001 SET WITHOUT SPRING

Catalog Number	No.	Part Name	Material	Finish	Net Weight g
MKAT05MTL68-001	1A	Stud	Brass	Nickel Plated	5.5
	2	Ring	Piano Wire		0.2
	4	Retainer	Phosphor Bronze	—	3

• MKAT05MTL68-002 SET WITH SPRING

Catalog Number	No.	Part Name	Material	Finish	Net Weight g
MKAT05MTL68-002	①B	Stud	Brass	Nickel Plated	5
	②	Ring	Piano Wire		0.2
	③	Spring			0.4
	④	Retainer	Phosphor Bronze	—	3

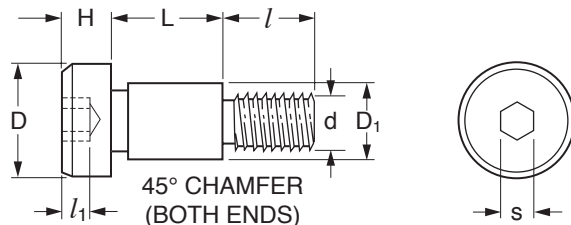
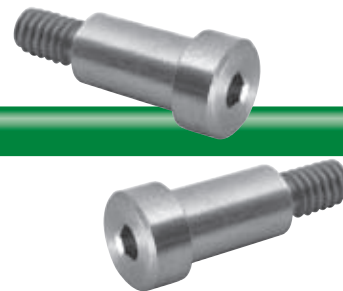
• APPLICATIONS

Measuring instruments /
Machine tools

• CHARACTERISTIC

A simple fastener allows locking
and unlocking action with a 1/4
turn of the stud.

SCREWS, SOCKET HEAD SHOULDER



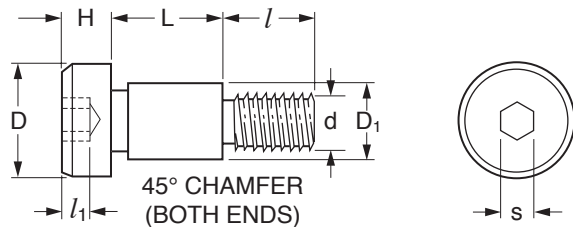
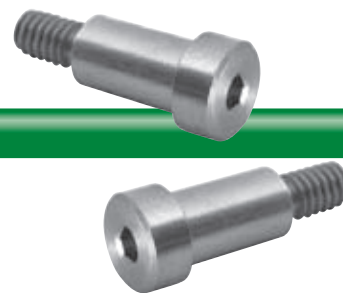
• SCREW – 303 Stainless Steel

Catalog Number	d Thread Size	ØD	D ₁ *	H	L +0.2 +0.05	l	s	l ₁
MKAA3MM0304	M3 X 0.5	6	4	3	4	4	2	1.6
MKAA3MM0305					5			
MKAA3MM0306					6			
MKAA3MM0308	M3 X 0.5	6	4	3	8	4	2	1.6
MKAA3MM0310					10			
MKAA3MM0404	M4 X 0.7	8	5	4	4	5	2.5	2
MKAA3MM0405					5			
MKAA3MM0406					6			
MKAA3MM0408	M4 X 0.7	8	5	4	8	5	2.5	2
MKAA3MM0410					10			
MKAA3MM0412					12			
MKAA3MM0414	M4 X 0.7	8	5	4	14	5	2.5	2
MKAA3MM0416					16			
MKAA3MM0420					20			
MKAA3MM0425	M4 X 0.7	8	5	4	25	5	2.5	2
MKAA3MM0430					30			
MKAA3MM0504	M5 X 0.8	10	6	5	4	6	3	2.4
MKAA3MM0505					5			
MKAA3MM0506					6			
MKAA3MM0508	M5 X 0.8	10	6	5	8	6	3	2.4
MKAA3MM0510					10			
MKAA3MM0512					12			

*D₁ Tolerance: 4, 5 & 6 mm -0.030, -0.078

Continued on the next page

SCREWS, SOCKET HEAD SHOULDER



• SCREW – 303 Stainless Steel

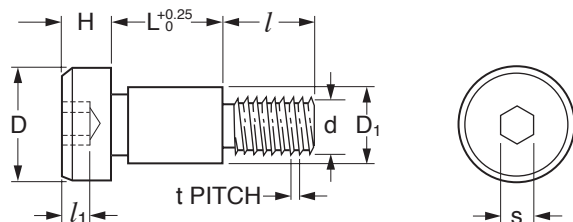
Catalog Number	d Thread Size	D Dia.	D ₁ *	H	L +0.2 +0.05	l	s	l ₁
MKAA3MM0514	M5 X 0.8	10	6	5	14	6	3	2.4
MKAA3MM0516					16			
MKAA3MM0520					20			
MKAA3MM0525	M5 X 0.8	10	6	5	25	6	3	2.4
MKAA3MM0530					30			
MKAA3MM0606	M6 X 1	12	8	6	6	11	4	3.2
MKAA3MM0608					8			
MKAA3MM0610					10			
MKAA3MM0612	M6 X 1	12	8	6	12	11	4	3.2
MKAA3MM0616					16			
MKAA3MM0620					20			
MKAA3MM0608A	M6 X 1	12	10	6	8	11	4	3.2
MKAA3MM0610A					10			
MKAA3MM0612A					12			
MKAA3MM0616A					16			
MKAA3MM0808	M8 X 1.25	14	10	7	8	12	5	4
MKAA3MM0810					10			
MKAA3MM0812					12			
MKAA3MM0816					16			
MKAA3MM1012A	M10 X 1.5	20	12	8	12	16	6	4.8
MKAA3MM1016A					16			
MKAA3MM1020					20			
MKAA3MM1025					25			

*D₁ Tolerance:
 6 mm -0.030, -0.078
 8 mm -0.040, -0.098
 10 & 12 mm -0.050, -0.120



SCREWS, SOCKET HEAD SHOULDER

RoHS
COMPLIANT



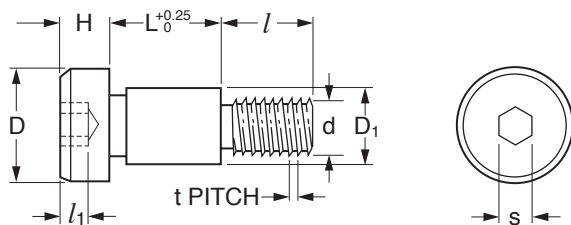
• SCREW – Steel • STANDARD SHOULDER LENGTH SERIES

Catalog Number	d Thread Size	L Length	D	D ₁ *	H	s	l ₁	l	t
MKAA4MM0505 MKAA4MM0506	M5	5 6	12	6	4	3.5	2.4	6	0.8
MKAA4MM0608 MKAA4MM0610	M6	8 10	14	8	4	4.5	3.2	8	1
MKAA4MM0810 MKAA4MM0812	M8	10 12	16	10	5	6	4	10	1.25
MKAA4MM1016	M10	16	20	12	6	7	4.8	12	1.5

*D₁ Tolerance: Thread Size M5 -0.01 to -0.04
M6 & M8 -0.013 to -0.049
M10 -0.016 to -0.059

SCREWS, SOCKET HEAD SHOULDER

RoHS
COMPLIANT



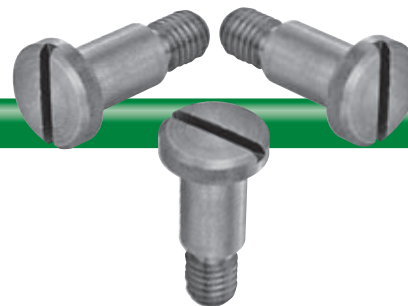
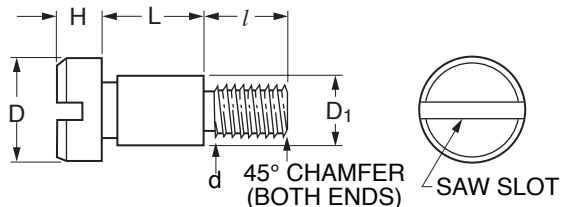
• SCREW – Steel • LONG SHOULDER LENGTH SERIES

Catalog Number	d Thread Size	L Length	D	D ₁ *	H	s	l ₁	l	t
MKAA4MML0510	M5	10	10	6	4.5	3	2	9.5	0.8
MKAA4MML0512		12							
MKAA4MML0516		16							
MKAA4MML0520		20							
MKAA4MML0525		25							
MKAA4MML0530		30							
MKAA4MML0540		40							
MKAA4MML0612	M6	12	13	8	5.5	4	2.4	11	1
MKAA4MML0616		16							
MKAA4MML0620		20							
MKAA4MML0625		25							
MKAA4MML0630		30							
MKAA4MML0640		40							
MKAA4MML0650		50							
MKAA4MML0816	M8	16	16	10	7	5	3.3	13	1.25
MKAA4MML0820		20							
MKAA4MML0825		25							
MKAA4MML0830		30							
MKAA4MML0840		40							
MKAA4MML0850		50							
MKAA4MML0860		60							
MKAA4MML0870		70							
MKAA4MML0880		80							
MKAA4MML1016	M10	16	18	12	8	6	4.2	16	1.5
MKAA4MML1020		20							
MKAA4MML1025		25							
MKAA4MML1030		30							
MKAA4MML1040		40							
MKAA4MML1050		50							
MKAA4MML1060		60							
MKAA4MML1070		70							
MKAA4MML1080		80							

*D₁ Tolerance: Thread Size M5 -0.01 to -0.04
M6 & M8 -0.013 to -0.049
M10 -0.016 to -0.059

SCREWS, SLOTTED HEAD SHOULDER

RoHS
COMPLIANT

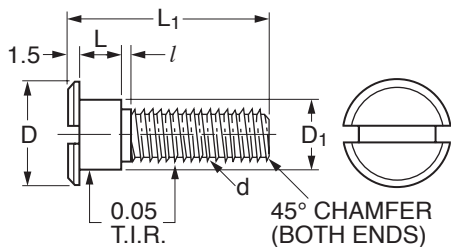
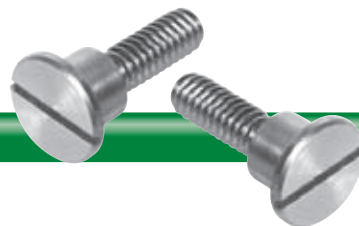


• SCREW – 303 Stainless Steel

Catalog Number	d Thread Size	L Length	D Dia.	D ₁ * d10	L +0.2 +0.05	l
MKAA5MM0304	M3 X 0.5	6	4	3	4	4
MKAA5MM0305					5	
MKAA5MM0306					6	
MKAA5MM0308					8	
MKAA5MM0310					10	
MKAA5MM0404	M4 X 0.7	8	5	4	4	5
MKAA5MM0405					5	
MKAA5MM0406					6	
MKAA5MM0408					8	
MKAA5MM0410					10	
MKAA5MM0412					12	
MKAA5MM0414					14	
MKAA5MM0416					16	
MKAA5MM0420					20	
MKAA5MM0425					25	
MKAA5MM0430					30	
MKAA5MM0504	M5 X 0.8	10	6	5	4	6
MKAA5MM0505					5	
MKAA5MM0506					6	
MKAA5MM0508					8	
MKAA5MM0510					10	
MKAA5MM0512					12	
MKAA5MM0514					14	
MKAA5MM0516					16	
MKAA5MM0520					20	
MKAA5MM0525					25	
MKAA5MM0530					30	
MKAA5MM0606	M6 X 1	12	8	6	6	11
MKAA5MM0608					8	
MKAA5MM0610					10	
MKAA5MM0612					12	
MKAA5MM0616					16	
MKAA5MM0620					20	
MKAA5MM0608A	M6 X 1	12	10	6	8	11
MKAA5MM0616A					16	
MKAA5MM0808	M8 X 1.25	14	10	7	8	12
MKAA5MM0810					10	
MKAA5MM0816					16	
MKAA5MM1012	M10 X 1.5	20	12	8	12	16
MKAA5MM1016					16	
MKAA5MM1025					25	

*D₁ Tolerance (d10): 4, 5 & 6 mm -0.030, -0.078
 8 & 10 mm -0.040, -0.098
 12 mm -0.050, -0.120

SCREWS, SLOTTED HEAD SHOULDER



• SCREW – 303 Stainless Steel • SHALLOW HEAD

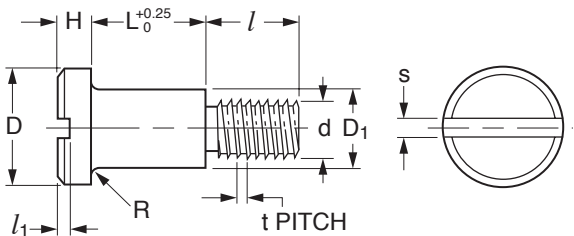
Catalog Number	d Thread Size	D	D ₁ * f9	L	L ₁	l
MKAA6MMCF1	M2 X 0.4	5	3	3.75	11.5	0.6
MKAA6MMCF2	M3 X 0.5	6	4	3.75	13.5	0.75
MKAA6MMCF3				4.75	14.5	
MKAA6MMCF4	M5 X 0.8	8	6	18.5	1.2	
MKAA6MMCF5	M6 X 1	10	8	4.75	22.5	1.5

*D₁ Tolerance: 3 mm to 6 mm -0.010, -0.040
8 mm -0.013, -0.049

SCREWS, SLOTTED HEAD SHOULDER

RoHS
COMPLIANT

Shallow Head



• **SCREW** – Steel • DIN 923

Priced Per 100 Pieces

Catalog Number	d Thread Size	L Length	D	D ₁ h ₉	H
MD0923MCO03X002	M3	2	7	4	1.8
MD0923MCO03X0025		2.5			
MD0923MCO03X003		3			
MD0923MCO03X004		4			
MD0923MCO03X005		5			
MD0923MCO03X006		6			
MD0923MCO03X008		8			
MD0923MCO03X010		10			
MD0923MCO04X002	M4	2	8.5	5.5	2.4
MD0923MCO04X0025		2.5			
MD0923MCO04X003		3			
MD0923MCO04X004		4			
MD0923MCO04X005		5			
MD0923MCO04X006		6			
MD0923MCO04X008		8			
MD0923MCO04X010		10			
MD0923MCO04X012		12			
MD0923MCO04X016		16			

TOLERANCE:

L Shoulder Length	Tolerance
2, 2.5, 3	+0.10 +0.06
4, 5, 6, 8, 10	+0.15 +0.07
12, 16	+0.2 +0.1

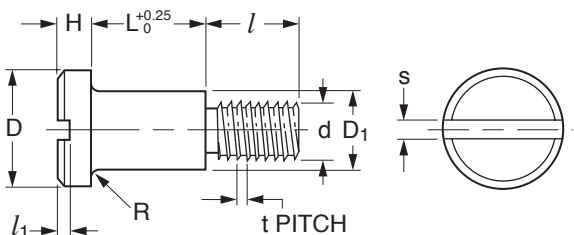
9

Catalog Number	s	l ₁ Min.	l Max.	R Max.	t
MD0923MCO03X002	0.8	0.9	4.5	0.1	0.5
MD0923MCO03X0025					
MD0923MCO03X003					
MD0923MCO03X004					
MD0923MCO03X005					
MD0923MCO03X006					
MD0923MCO03X008					
MD0923MCO03X010					
MD0923MCO04X002	1	1.2	6	0.2	0.7
MD0923MCO04X0025					
MD0923MCO04X003					
MD0923MCO04X004					
MD0923MCO04X005					
MD0923MCO04X006					
MD0923MCO04X008					
MD0923MCO04X010					
MD0923MCO04X012					
MD0923MCO04X016					

SCREWS, SLOTTED HEAD SHOULDER

RoHS
COMPLIANT

Shallow Head



• **SCREW** – Steel • DIN 923

Priced Per 100 Pieces

Catalog Number	d Thread Size	L Length	D	D ₁ h ₉	H
MD0923MCO05X0025	M5	2.5	11	7	2.7
MD0923MCO05X003		3			
MD0923MCO05X004		4			
MD0923MCO05X005		5			
MD0923MCO05X006		6			
MD0923MCO05X008		8			
MD0923MCO05X010		10			
MD0923MCO05X012		12			
MD0923MCO05X016	M6	16	13	8	3.1
MD0923MCO06X003		3			
MD0923MCO06X004		4			
MD0923MCO06X005		5			
MD0923MCO06X006		6			
MD0923MCO06X008		8			
MD0923MCO06X010		10			
MD0923MCO06X012		12			
MD0923MCO06X016		16			
MD0923MCO06X020		20			

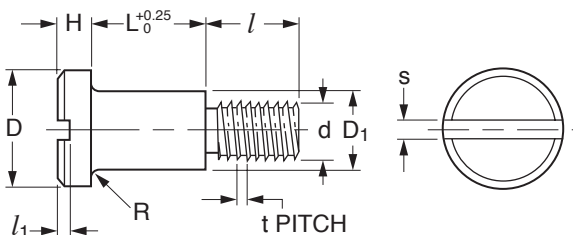
TOLERANCE:

L Shoulder Length	Tolerance
2.5, 3	+0.10 +0.06
4, 5, 6, 8, 10	+0.15 +0.07
12, 16, 20	+0.2 +0.1

9

Catalog Number	s	l ₁ Min.	l	R Max.	t
MD0923MCO05X0025	1.2	1.3	7	0.2	0.8
MD0923MCO05X003					
MD0923MCO05X004					
MD0923MCO05X005					
MD0923MCO05X006					
MD0923MCO05X008					
MD0923MCO05X010					
MD0923MCO05X012					
MD0923MCO05X016	1.6	1.5	9	0.25	1
MD0923MCO06X003					
MD0923MCO06X004					
MD0923MCO06X005					
MD0923MCO06X006					
MD0923MCO06X008					
MD0923MCO06X010					
MD0923MCO06X012					
MD0923MCO06X016					
MD0923MCO06X020					

Continued on the next page



• **SCREW** – Steel • DIN 923

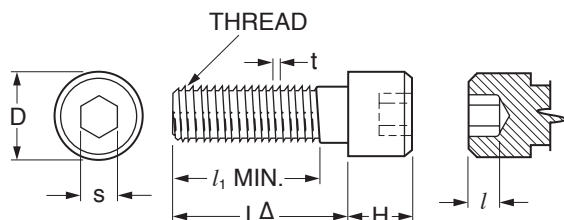
Priced Per 100 Pieces

Catalog Number	d Thread Size	L Length	D	D ₁ h9	H
MD0923MCO08X004	M8	4	16	10	3.8
MD0923MCO08X005		5			
MD0923MCO08X006		6			
MD0923MCO08X008		8			
MD0923MCO08X010		10			
MD0923MCO08X012		12			
MD0923MCO08X016		16			
MD0923MCO08X020		20			
MD0923MCO08X025		25			

TOLERANCE:

L Shoulder Length	Tolerance
4, 5, 6, 8, 10	+0.15 +0.07
12, 16, 20, 25	+0.2 +0.1

Catalog Number	s	l ₁ Min.	l	R Max.	t
MD0923MCO08X004	2	1.9	11	1.4	1.25
MD0923MCO08X005					
MD0923MCO08X006					
MD0923MCO08X008					
MD0923MCO08X010					
MD0923MCO08X012					
MD0923MCO08X016					
MD0923MCO08X020					
MD0923MCO08X025					



• **SCREW** – 304 Stainless Steel • DIN 912

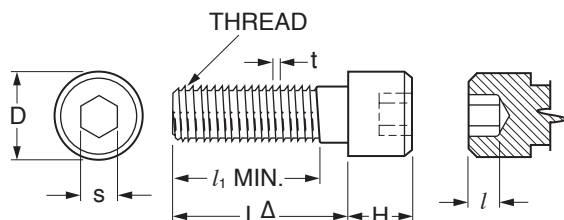
Priced Per 100 Pieces

Catalog Number	Thread Size	L ^Δ Length	t	D	H	s	l	l ₁ Min.
*MD0912MXO016X003	M1.6	3	0.35	3	1.7	1.5	0.7	15
*MD0912MXO016X004		4						
*MD0912MXO016X005		5						
*MD0912MXO016X006		6						
*MD0912MXO016X008		8						
MD0912MXO020X004	M2	4	0.4	3.8	2	1.5	1	16
MD0912MXO020X005		5						
MD0912MXO020X006		6						
MD0912MXO020X008		8						
MD0912MXO020X010		10						
MD0912MXO025X005	M2.5	5	0.45	4.5	2.5	2	1.1	17
MD0912MXO025X006		6						
MD0912MXO025X008		8						
MD0912MXO025X010		10						
MD0912MXO025X012		12						
MD0912MXO030X006	M3	6	0.5	5.5	3	2.5	1.3	18
MD0912MXO030X008		8						
MD0912MXO030X010		10						
MD0912MXO030X012		12						
MD0912MXO030X016		16						
MD0912MXO040X008	M4	8	0.7	7	4	3	2	20
MD0912MXO040X010		10						
MD0912MXO040X012		12						
MD0912MXO040X016		16						
MD0912MXO040X020		20						
MD0912MXO040X025		25						
MD0912MXO040X030		30						

*M1.6 material is 316 Stainless Steel.

ΔScrew is fully threaded unless L length is greater than l₁.

Continued on the next page



• **SCREW** – 304 Stainless Steel • DIN 912

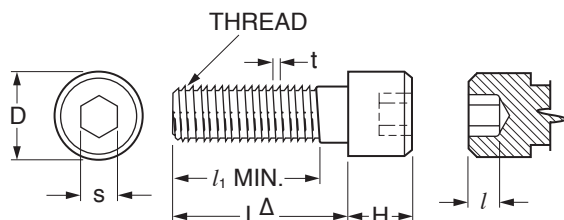
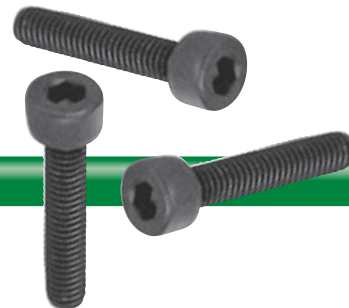
Priced Per 100 Pieces

Catalog Number	Thread Size	L ^Δ Length	t	D	H	s	l	l ₁ Min.
MD0912MXO050X010	M5	10	0.8	8.5	5	4	2.5	22
MD0912MXO050X012		12						
MD0912MXO050X016		16						
MD0912MXO050X020		20						
MD0912MXO050X025		25						
MD0912MXO050X030		30						
MD0912MXO050X035		35						
MD0912MXO060X012	M6	12	1	10	6	5	3	24
MD0912MXO060X016		16						
MD0912MXO060X020		20						
MD0912MXO060X025		25						
MD0912MXO060X030		30						
MD0912MXO060X035		35						
MD0912MXO060X040		40						
MD0912MXO060X045		45						
MD0912MXO060X050		50						
MD0912MXO080X012	M8	12	1.25	13	8	6	4	28
MD0912MXO080X016		16						
MD0912MXO080X020		20						
MD0912MXO080X025		25						
MD0912MXO080X030		30						
MD0912MXO080X035		35						
MD0912MXO080X040		40						
MD0912MXO080X045		45						
MD0912MXO080X050		50						
MD0912MXO080X055		55						
MD0912MXO080X060		60						
MD0912MXO100X040	M10	40	1.5	16	10	8	5	32

^ΔScrew is fully threaded unless L length is greater than l₁.

SCREWS, SOCKET HEAD CAP

RoHS
COMPLIANT



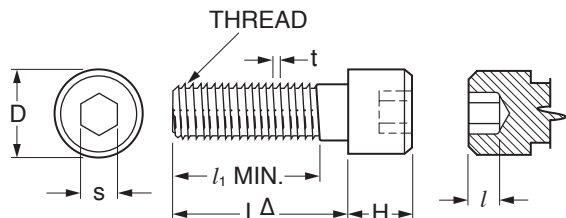
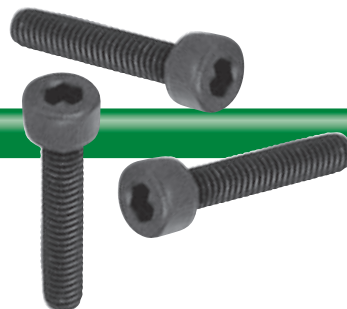
• **SCREW** – High-Tensile Steel, Grade 12.9, Black Oxide Finish • DIN 912

Priced Per 100 Pieces

Catalog Number	Thread Size	L ^Δ Length	t	D	H	s	l	l ₁ Min.
MD0912MQB020X004	M2	4	0.4	3.8	2	1.5	1	16
MD0912MQB020X005		5						
MD0912MQB020X006		6						
MD0912MQB020X008		8						
MD0912MQB020X010		10						
MD0912MQB025X005	M2.5	5	0.45	4.5	2.5	2	1.1	17
MD0912MQB025X006		6						
MD0912MQB025X008		8						
MD0912MQB025X010		10						
MD0912MQB025X012		12						
MD0912MQB030X006	M3	6	0.5	5.5	3	2.5	1.3	18
MD0912MQB030X008		8						
MD0912MQB030X010		10						
MD0912MQB030X012		12						
MD0912MQB030X016		16						
MD0912MQB040X008	M4	8	0.7	7	4	3	2	20
MD0912MQB040X010		10						
MD0912MQB040X012		12						
MD0912MQB040X016		16						
MD0912MQB040X020		20						
MD0912MQB040X025		25						

^ΔScrew is fully threaded unless L length is greater than l₁.

Continued on the next page



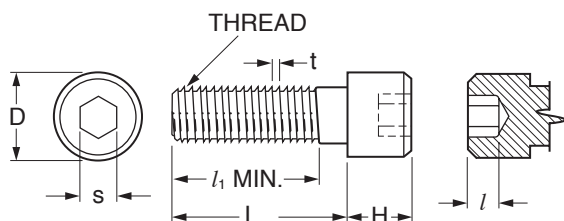
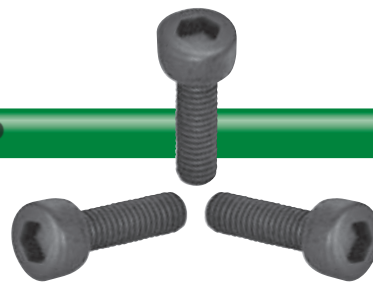
• **SCREW** – High-Tensile Steel, Grade 12.9, Black Oxide Finish • DIN 912

Priced Per 100 Pieces

Catalog Number	Thread Size	L ^Δ Length	t	D	H	s	l	l ₁ Min.
MD0912MQB050X010	M5	10	0.8	8.5	5	4	2.5	22
MD0912MQB050X012		12						
MD0912MQB050X016		16						
MD0912MQB050X020		20						
MD0912MQB050X025		25						
MD0912MQB050X030		30						
MD0912MQB050X035		35						
MD0912MQB060X012	M6	12	1	10	6	5	3	24
MD0912MQB060X016		16						
MD0912MQB060X020		20						
MD0912MQB060X025		25						
MD0912MQB060X030		30						
MD0912MQB060X035		35						
MD0912MQB060X040		40						
MD0912MQB060X045		45						
MD0912MQB060X050		50						
MD0912MQB080X016	M8	16	1.25	13	8	6	4	28
MD0912MQB080X020		20						
MD0912MQB080X025		25						
MD0912MQB080X030		30						
MD0912MQB080X035		35						
MD0912MQB080X040		40						
MD0912MQB080X055		55						
MD0912MQB080X060		60						
MD0912MQB080X065		65						
MD0912MQB080X070		70						

^ΔScrew is fully threaded unless L length is greater than l₁.

SCREWS, MOLY COATED SOCKET HEAD CAP



• **SCREW** – High-Tensile Steel, Grade 12.9

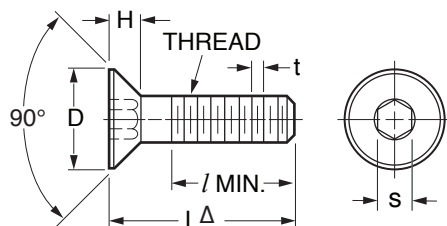
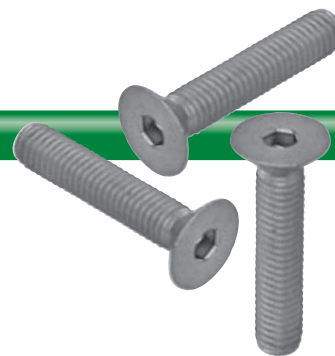
Coated with Dry Molybdenum Disulfide • DIN 912

Priced Per 100 Pieces

Catalog Number	Thread Size	L Length	t	D	H	s	l ₁	l Ref.
MD0912MQBM020X10	M2	10	0.4	3.8	2	1.5	1	0.7
MD0912MQBM025X06	M2.5	6	0.45	4.5	2.5	2	1.1	0.9
MD0912MQBM025X08		8						
MD0912MQBM025X10		10						
MD0912MQBM025X12		12						
MD0912MQBM030X06	M3	6	0.5	5.5	3	2.5	1.3	1
MD0912MQBM030X08		8						
MD0912MQBM030X10		10						
MD0912MQBM030X12		12						
MD0912MQBM030X16	M4	16	0.7	7	4	3	2	1.4
MD0912MQBM040X08		8						
MD0912MQBM040X10		10						
MD0912MQBM040X12		12						
MD0912MQBM040X16		16						
MD0912MQBM040X20		20						

These screws are ideal for use with aluminum to prevent galling of threaded holes.

SCREWS, SOCKET HEAD CAP



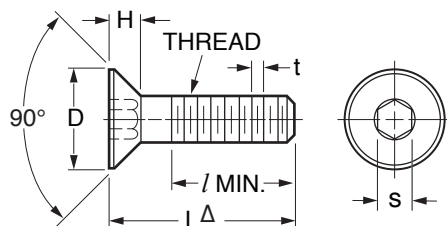
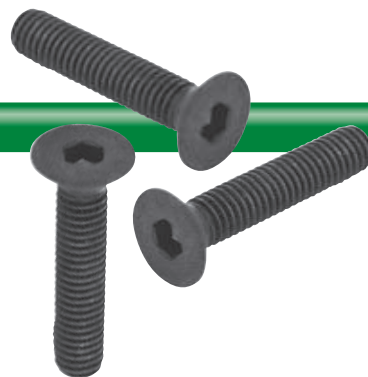
• SCREW – 304 Stainless Steel • DIN 7991

Priced Per 100 Pieces

Catalog Number	Thread Size	L ^Δ Length	t	D	H	s	l Min.
MD7991MXO040X012	M4	12	0.7	8	2.3	2.5	14
MD7991MXO040X016		16					
MD7991MXO040X020		20					
MD7991MXO050X010	M5	10	0.8	10	2.8	3	16
MD7991MXO050X012		12					
MD7991MXO050X016		16					
MD7991MXO050X020		20					
MD7991MXO050X025		25					
MD7991MXO050X030		30					
MD7991MXO060X012	M6	12	1	12	3.3	4	18
MD7991MXO060X020		20					
MD7991MXO080X012	M8	12	1.25	16	4.4	5	22
MD7991MXO080X020		20					
MD7991MXO080X025		25					
MD7991MXO080X030		30					

^Δ Screw is fully threaded unless L length is greater than l.

SCREWS, SOCKET HEAD CAP



- **SCREW** – High-Tensile Steel, Grade 10.9
Black Oxide Finish • DIN 7991

Priced Per 100 Pieces

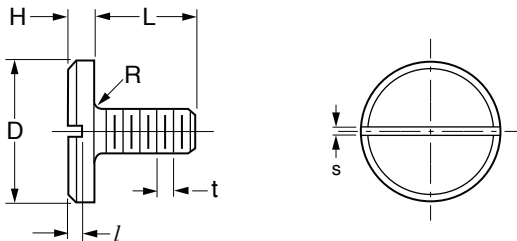
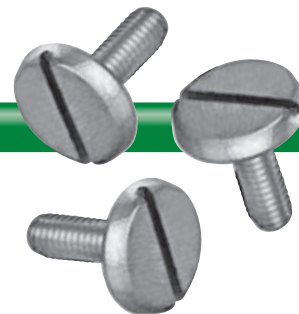
Catalog Number	Thread Size	L Δ Length	t	D	H	s	l Min.
MD7991MQB040X008	M4	8	0.7	8	2.3	2.5	14
MD7991MQB040X010		10					
MD7991MQB040X012		12					
MD7991MQB040X016		16					
MD7991MQB040X020		20					
MD7991MQB040X025		25					
MD7991MQB040X030		30					
MD7991MQB050X012	M5	12	0.8	10	2.8	3	16
MD7991MQB050X020		20					
MD7991MQB050X025		25					
MD7991MQB050X030		30					
MD7991MQB050X040		40					
MD7991MQB050X050		50					
MD7991MQB060X008	M6	8	1	12	3.3	4	18
MD7991MQB060X010		10					
MD7991MQB060X012		12					
MD7991MQB060X016		16					
MD7991MQB060X025		25					
MD7991MQB060X030		30					
MD7991MQB060X035		35					
MD7991MQB060X040		40					
MD7991MQB060X050		50					
MD7991MQB080X010	M8	10	1.25	16	4.4	5	22
MD7991MQB080X012		12					
MD7991MQB080X016		16					
MD7991MQB080X020		20					
MD7991MQB080X025		25					
MD7991MQB080X030		30					
MD7991MQB080X035		35					
MD7991MQB080X040		40					
MD7991MQB080X050		50					

Δ Screw is fully threaded unless L length is greater than l.

SCREWS, SLOTTED HEAD

RoHS
COMPLIANT

Large Shallow Head



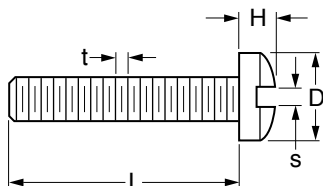
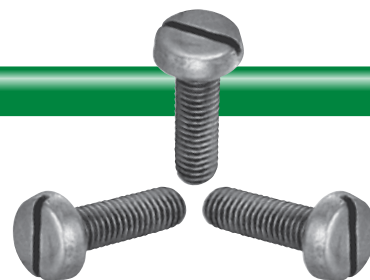
• **SCREW** – Steel • DIN 921

Priced Per 100 Pieces

Catalog Number	Thread Size	L Length	t	D	H	s	l Min.	R Max.
MD0921MCO03X005	M3	5	0.5	8	1.8	0.8	0.9	0.1
MD0921MCO03X006		6						
MD0921MCO03X008		8						
MD0921MCO03X010		10						
MD0921MCO04X005	M4	5	0.7	12	2.4	1	1.2	0.2
MD0921MCO04X006		6						
MD0921MCO04X008		8						
MD0921MCO04X010		10						
MD0921MCO04X012		12						
MD0921MCO05X008	M5	8	0.8	16	2.7	1.2	1.3	0.2
MD0921MCO05X010		10						
MD0921MCO05X012		12						
MD0921MCO05X016		16						
MD0921MCO06X010	M6	10	1	20	3.1	1.6	1.5	0.25
MD0921MCO06X012		12						
MD0921MCO06X016		16						
MD0921MCO08X010	M8	10	1.25	25	3.8	2	1.9	0.4

MACHINE SCREWS, PAN HEAD

RoHS
COMPLIANT



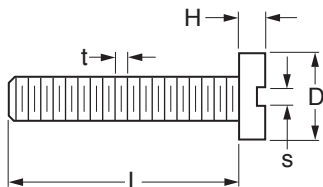
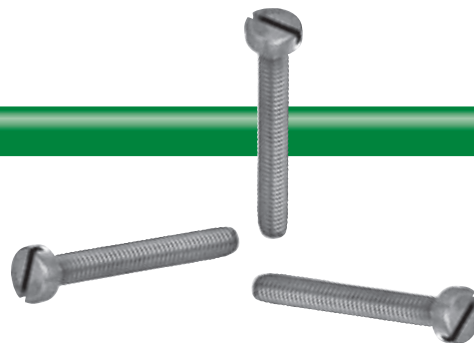
• **SCREW** – 304 Stainless Steel • DIN 85

Priced Per 100 Pieces

Catalog Number	Thread Size	L Length	t	D	H	s
MD0085MXO020X006	M2	6	0.4	3.7	1.2	0.5
MD0085MXO020X010		10				
MD0085MXO025X006	M2.5	6	0.45	5	1.5	0.6
MD0085MXO025X008		8				
MD0085MXO025X010		10				
MD0085MXO025X012		12				
MD0085MXO025X016		16				
MD0085MXO025X020		20				
MD0085MXO025X025		25				
MD0085MXO030X006	M3	6	0.5	6	1.8	0.8
MD0085MXO030X008		8				
MD0085MXO030X016		16				
MD0085MXO030X020		20				
MD0085MXO030X030		30				
MD0085MXO040X006	M4	6	0.7	8	2.4	1
MD0085MXO040X010		10				
MD0085MXO040X012		12				
MD0085MXO040X016		16				
MD0085MXO040X020		20				
MD0085MXO040X025		25				
MD0085MXO040X030		30				
MD0085MXO050X008	M5	8	0.8	10	3	1.2
MD0085MXO050X010		10				
MD0085MXO050X012		12				
MD0085MXO050X016		16				
MD0085MXO050X020		20				
MD0085MXO050X025		25				
MD0085MXO050X030		30				
MD0085MXO060X012	M6	12	1	12	3.6	1.6
MD0085MXO060X030		30				

MACHINE SCREWS, FILLISTER HEAD

RoHS
COMPLIANT



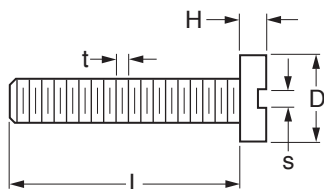
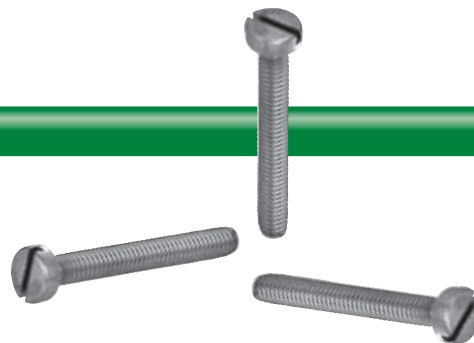
• **SCREW** – 304 Stainless Steel • DIN 84

Priced Per 100 Pieces

Catalog Number	Thread Size	L Length	t	D	H	s
MD0084MXO016X004 MD0084MXO016X006	M1.6	4 6	0.35	3	1	0.4
MD0084MXO020X003 MD0084MXO020X004 MD0084MXO020X005 MD0084MXO020X006 MD0084MXO020X008 MD0084MXO020X010 MD0084MXO020X016 MD0084MXO020X020	M2	3 4 5 6 8 10 16 20	0.4	3.8	1.3	0.5
MD0084MXO025X005 MD0084MXO025X006 MD0084MXO025X008 MD0084MXO025X010 MD0084MXO025X012 MD0084MXO025X016 MD0084MXO025X020	M2.5	5 6 8 10 12 16 20	0.45	4.5	1.6	0.6
MD0084MXO030X005 MD0084MXO030X006 MD0084MXO030X008 MD0084MXO030X010 MD0084MXO030X012 MD0084MXO030X020 MD0084MXO030X025	M3	5 6 8 10 12 20 25	0.5	5.5	2	0.8
MD0084MXO035X008 MD0084MXO035X012 MD0084MXO035X016	M3.5	8 12 16	0.6	6	2.5	0.9

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MACHINE SCREWS, FILLISTER HEAD



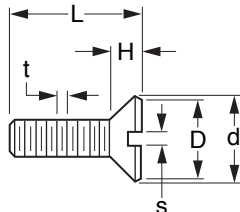
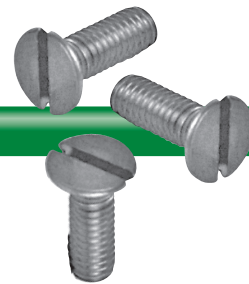
• **SCREW** – 304 Stainless Steel • DIN 84

Priced Per 100 Pieces

Catalog Number	Thread Size	L Length	t	D	H	s
MD0084MXO040X006	M4	6	0.7	7	2.6	1
MD0084MXO040X008		8				
MD0084MXO040X010		10				
MD0084MXO040X012		12				
MD0084MXO040X016		16				
MD0084MXO040X020		20				
MD0084MXO040X025		25				
MD0084MXO040X030		30				
MD0084MXO040X035		35				
MD0084MXO040X040		40				
MD0084MXO050X010	M5	10	0.8	8.5	3.3	1.2
MD0084MXO050X012		12				
MD0084MXO050X016		16				
MD0084MXO050X020		20				
MD0084MXO050X025		25				
MD0084MXO050X030		30				
MD0084MXO050X035		35				
MD0084MXO050X040		40				
MD0084MXO060X008	M6	8	1	10	3.6	1.6
MD0084MXO060X010		10				
MD0084MXO060X012		12				
MD0084MXO060X016		16				
MD0084MXO060X020		20				
MD0084MXO060X025		25				
MD0084MXO060X030		30				

MACHINE SCREWS, 90° FLAT HEAD

RoHS
COMPLIANT

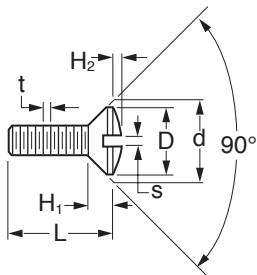
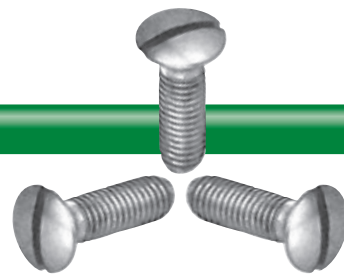


• **SCREW** – 304 Stainless Steel • DIN 963

Priced Per 100 Pieces

Catalog Number	Thread Size	L Length	t	D	d (c'sink)	H	s
MD0963MXO020X004	M2	4	0.4	3.8	4.6	1.2	0.5
MD0963MXO020X005		5					
MD0963MXO020X006		6					
MD0963MXO020X008		8					
MD0963MXO020X010		10					
MD0963MXO020X012		12					
MD0963MXO025X004	M2.5	4	0.45	4.7	5.7	1.5	0.6
MD0963MXO025X006		6					
MD0963MXO025X008		8					
MD0963MXO025X010		10					
MD0963MXO025X012		12					
MD0963MXO025X016		16					
MD0963MXO025X020		20					
MD0963MXO030X005	M3	5	0.5	5.6	6.5	1.65	0.8
MD0963MXO030X006		6					
MD0963MXO030X008		8					
MD0963MXO030X010		10					
MD0963MXO030X012		12					
MD0963MXO030X016		16					
MD0963MXO030X020		20					
MD0963MXO030X025		25					
MD0963MXO040X006	M4	6	0.7	7.5	8.6	2.2	1
MD0963MXO040X008		8					
MD0963MXO040X010		10					
MD0963MXO040X012		12					
MD0963MXO040X016	M5	16	0.8	9.2	10.4	2.5	1.2
MD0963MXO050X008		8					
MD0963MXO050X010		10					
MD0963MXO050X012		12					
MD0963MXO050X016		16					
MD0963MXO050X020		20					

MACHINE SCREWS, OVAL HEAD



• **SCREW** – 304 Stainless Steel • DIN 964

Priced Per 100 Pieces

Catalog Number	Thread Size	L Length	t	D	d (c'sink)	H ₁	H ₂ & s
MD0964MXO020X006	M2	6	0.4	3.8	4.6	1.2	0.5
MD0964MXO020X010		10					
MD0964MXO020X012		12					
MD0964MXO020X020		20					
MD0964MXO025X006	M2.5	6	0.45	4.7	5.7	1.5	0.6
MD0964MXO025X008		8					
MD0964MXO025X010		10					
MD0964MXO030X005	M3	5	0.5	5.6	6.5	1.65	0.8
MD0964MXO030X006		6					
MD0964MXO030X008		8					
MD0964MXO030X010		10					
MD0964MXO030X016		16					
MD0964MXO030X020		20					
MD0964MXO030X025		25					
MD0964MXO040X006	M4	6	0.7	7.5	8.6	2.2	1
MD0964MXO040X008		8					
MD0964MXO040X025		25					
MD0964MXO040X030		30					
MD0964MXO050X010	M5	10	0.8	9.2	10.4	2.5	1.2
MD0964MXO050X016		16					
MD0964MXO050X020		20					
MD0964MXO050X025		25					
MD0964MXO050X030		30					

WASHERS

RoHS
COMPLIANT



ALUMINUM



COPPER



FIBER

Priced Per 100 Pieces

Catalog Number			I.D. X O.D.	Thickness
Aluminum	Copper	Fiber*		
MKAY2NMRRL0610	MKAY2NMRRA0610	MKAY2NMRRF0610	06 X 10	1.5
—	—	MKAY2NMRRF0612	06 X 12	1
MKAY2NMRRL0812	MKAY2NMRRA0812	MKAY2NMRRF0812	08 X 12	1.5
—	—	MKAY2NMRRF0914	09 X 14	1
MKAY2NMRRL1016	MKAY2NMRRA1016	MKAY2NMRRF1016	10 X 16	1.5
MKAY2NMRRL1218	MKAY2NMRRA1218	MKAY2NMRRF1218	12 X 18	
MKAY2NMRRL1319	MKAY2NMRRA1319	—	13.5 X 19	
MKAY2NMRRL1420	MKAY2NMRRA1420	MKAY2NMRRF1420	14 X 20	
MKAY2NMRRL1622	MKAY2NMRRA1622	MKAY2NMRRF1622	16 X 22	
MKAY2NMRRL1722	MKAY2NMRRA1722	—	17 X 22	
MKAY2NMRRL1824	MKAY2NMRRA1824	MKAY2NMRRF1824	18 X 24	
MKAY2NMRRL2026	MKAY2NMRRA2026	—	20 X 26	
MKAY2NMRRL2127	MKAY2NMRRA2127	—	21.5 X 27	
MKAY2NMRRL2228	MKAY2NMRRA2228	MKAY2NMRRF2228	22 X 28	
MKAY2NMRRL2430	MKAY2NMRRA2430	MKAY2NMRRF2430	24 X 30	
—	—	MKAY2NMRRF2632	26.5 X 32	
MKAY2NMRRL2733	MKAY2NMRRA2733	—	27 X 33	
—	—	MKAY2NMRRF3238	32 X 38	
MKAY2NMRRL3340	MKAY2NMRRA3340	—	33.5 X 40	
MKAY2NMRRL4250	MKAY2NMRRA4250	—	42 X 50	
MKAY2NMRRL4855	MKAY2NMRRA4855	—	48 X 55	

*Oil absorbing insulating properties.

WASHER KITS, ASSORTED

RoHS
COMPLIANT



• ALUMINUM WASHER KITS

Catalog Number

MKAY2NM330RRLC



• COPPER WASHER KITS

Catalog Number

MKAY2NM331RRAC

9

Pieces	I.D. X O.D.	Thickness
50	6 X 10	1.5
	6 X 12	
	8 X 12	
	8 X 14	
	10 X 14	
	10 X 16	
14	12 X 16	
13	12 X 18	
	13.5 X 18	
10	14 X 20	
	16 X 22	
	17 X 22	
	18 X 24	
	20 X 26	
	22 X 28	



• FIBER WASHER KITS

Catalog Number

MKAY2NM332RRFC



Fig. 1



Fig. 2

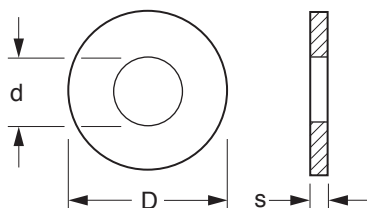


Fig. 1

• **FLAT WASHER** – Steel, Zinc Plated or Stainless Steel • DIN 125

Priced Per
100 Pieces

Catalog Number		d	D	s	Nominal Screw Size
Steel	Stainless Steel				
MD0125MCA025	MD0125MXO025	2.7	6.5	0.5	M2.5
MD0125MCA030	MD0125MXO030	3.2	7		M3
MD0125MCA040	MD0125MXO040	4.3	9	0.8	M4
MD0125MCA050	MD0125MXO050	5.3	10	1	M5
MD0125MCA060	MD0125MXO060	6.4	12.5	1.6	M6
MD0125MCA080	MD0125MXO080	8.4	16		M8

Fig. 2

• **SINTERED THRUST WASHERS**

Oil-Impregnated Bronze, Self-Lubricating

Catalog Number	d ±0.13	D ±0.25	s ±0.07
MKAA2FM0316	3.2	9.5	1.6
MKAA2FM0416	4.3		
MKAA2FM0516	5.3	12.5	
MKAA2FM0616	6.4	12.5	1.6
MKAA2FM0816	8.4	19	
MKAA2FM1016	10.5	19	1.6
MKAA2FM1032			3.2
MKAA2FM1316	13	25	1.6
MKAA2FM1332			3.2

WASHERS, SPLIT LOCK



Fig. 1

Fig. 2

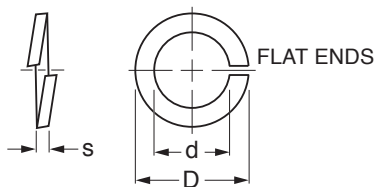


Fig. 1

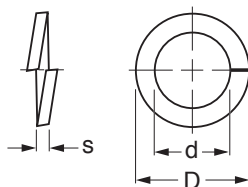


Fig. 2

Fig. 1 • For Use With Pan Head Screws

• **WASHER** – Spring Steel or Stainless Steel • DIN 127 B

Priced Per 100 Pieces

Catalog Number		Screw Size Ref.	d	D	s
Spring Steel	Stainless Steel				
MD0127MQB020	MD0127MXO020	M2	2.1	4.4	0.5
MD0127MQB025	MD0127MXO025	M2.5	2.6	5.1	0.6
MD0127MQB030	MD0127MXO030	M3	3.1	6.2	0.8
MD0127MQB040	MD0127MXO040	M4	4.1	7.6	0.9
MD0127MQB050	MD0127MXO050	M5	5.1	9.2	1.2
MD0127MQB060	MD0127MXO060	M6	6.1	11.8	1.6
MD0127MQB080	MD0127MXO080	M8	8.1	14.8	2
MD0127MQB100	MD0127MXO100	M10	10.2	18.1	2.2
MD0127MQB120	MD0127MXO120	M12	12.2	21.1	2.5

Fig. 2 • For Use With Socket & Cheese Head Screws

• **WASHER** – Spring Steel or Stainless Steel • DIN 7980

Priced Per 100 Pieces

Catalog Number		Screw Size Ref.	d	D	s
Spring Steel	Stainless Steel				
MD7980MQB030	MD7980MXO030	M3	3.1	5.6	1
MD7980MQB040	MD7980MXO040	M4	4.1	7	1.2
MD7980MQB050	MD7980MXO050	M5	5.1	8.8	1.6
MD7980MQB060	MD7980MXO060	M6	6.1	9.9	1.6
MD7980MQB080	MD7980MXO080	M8	8.1	12.7	2

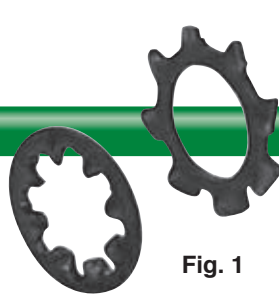


Fig. 1

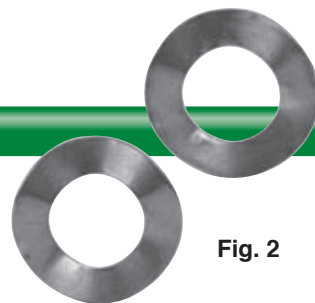
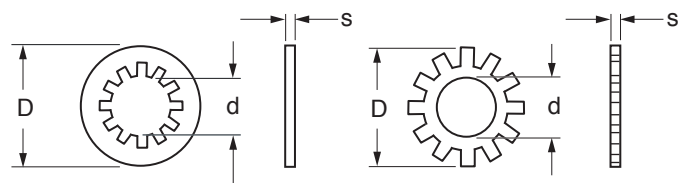


Fig. 2



INTERNAL "I" SERIES

EXTERNAL "E" SERIES

Fig. 1

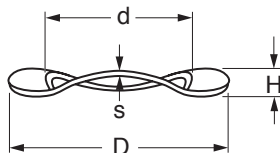


Fig. 2

Fig. 1 • **LOCK WASHER** – Spring Steel • DIN 6797

Priced Per 100 Pieces

Catalog Number		Nominal Screw Size	d	D	s
Internal	External				
MD6797MQZI020	MD6797MQZE020	2	2.2	4.5	0.3
MD6797MQZI025	MD6797MQZE025	2.5	2.7	5.5	0.4
MD6797MQZI030	MD6797MQZE030	3	3.2	6	0.4
MD6797MQZI040	MD6797MQZE040	4	4.3	8	0.5
MD6797MQZI050	MD6797MQZE050	5	5.3	10	0.6
MD6797MQZI060	MD6797MQZE060	6	6.4	11	0.7
MD6797MQZI080	MD6797MQZE080	8	8.4	15	0.8

Fig. 2

• **WAVE SPRING WASHER** – Beryllium Copper or Stainless Steel

Priced Per
100 Pieces

Catalog Number		d	D	s	H		Nominal Screw Size
Beryllium Copper	Stainless Steel				Min.	Max.	
MD4463MEA046X016	MD4463MXP046X016	2.2	4.6	0.16	0.38	0.53	M2
MD4463MEA058X016	MD4463MXP058X016	2.7	5.8	0.16	0.38	0.53	M2.5
MD4463MEA064X016	MD4463MXP064X016	3.2	6.4	0.16	0.46	0.61	M3
MD4463MEA081X028	MD4463MXP081X028	4.3	8.1	0.28	0.69	0.84	M4
MD4463MEA092X030	MD4463MXP092X030	5.3	9.2	0.3	0.74	0.89	M5
MD4463MEA115X040	MD4463MXP115X040	6.4	11.5	0.4	0.99	1.14	M6
MD4463MEA150X040	MD4463MXP150X040	8.4	15	0.4	1.25	1.4	M8
MD4463MEA196X055	MD4463MXP196X055	10.5	19.6	0.55	1.55	1.7	M10
MD4463MEA220X055	MD4463MXP220X055	13	22	0.55	1.65	1.9	M12
MD4463MEA278X070	MD4463MXP278X070	17	27.8	0.7	2.16	2.41	M16

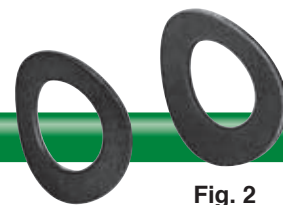


Fig. 1

Fig. 2

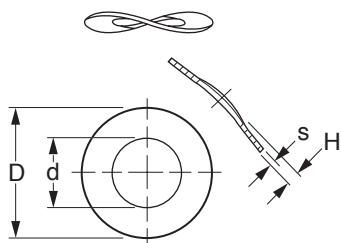


Fig. 1

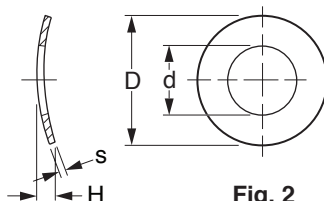


Fig. 2

Fig. 1 • Wave Spring Washers

- **WASHER** – Spring Steel, HRC 43...50, Black Oxide Finish
- DIN 137 Type B

Priced Per 100 Pieces

Catalog Number	d* H14	DΔ js16	H min.	s	For Screw Size
MD0137MQB080	3.2	8	0.8	0.5 ±0.05	M3
MD0137MQB090	4.3	9	1		M4
MD0137MQB110	5.3	11	1.1		M5
MD0137MQB120	6.4	12	1.3		M6
MD0137MQB150	8.4	15	1.5	0.8 ±0.06	M8
MD0137MQB210	10.5	21	2.1	1 ±0.07	M10
MD0137MQB240	13	24	2.5	1.2 ±0.07	M12
MD0137MQB300	17	30	3.2	1.6 ±0.08	M16
MD0137MQB360	21	36	3.7	1.8 ±0.1	M20
MD0137MQB440	25	44	4.1		M24

*d Tolerance (H14): 3.2 to 5.3 mm +0.30
6.4 & 8.4 mm +0.36
10.5 to 17 mm +0.43
21 & 25 mm +0.52

ΔD Tolerance (js16): 8 & 9 mm ±0.45
11 to 15 mm ±0.55
21 & 30 mm ±0.65
36 & 44 mm ±0.80

Fig. 2 • Curved Spring Washers

- **WASHER** – Spring Steel, HRC 43...50, Black Oxide Finish
- DIN 137 Type A

Priced Per 100 Pieces

Catalog Number	d* H14	DΔ js16	H min.	s	For Screw Size
MD0137MQA045	2.2	4.5	0.5	0.3	M2
MD0137MQA055	2.8	5.5	0.55		M2.5
MD0137MQA060	3.2	6	0.65	0.4	M3
MD0137MQA080	4.3	8	0.8	0.5	M4
MD0137MQA100	5.3	10	0.9		M5
MD0137MQA110	6.4	11	1.1		M6
MD0137MQA150	8.4	15	1.7		M8
MD0137MQA180	10.5	18	2	0.8	M10

*d Tolerance (H14): 2.2 & 2.8 mm +0.25
3.2 to 5.3 mm +0.30
6.4 & 8.4 mm +0.36
10.5 mm +0.43

ΔD Tolerance (js16): 4.5 to 6 mm ±0.38
8 & 10 mm ±0.45
11 to 18 mm ±0.55

SPACERS, SHAFT & SHIM

RoHS
COMPLIANT

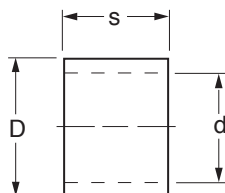


Fig. 1

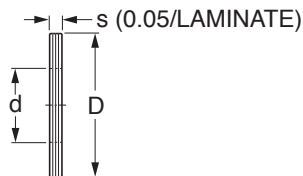


Fig. 2

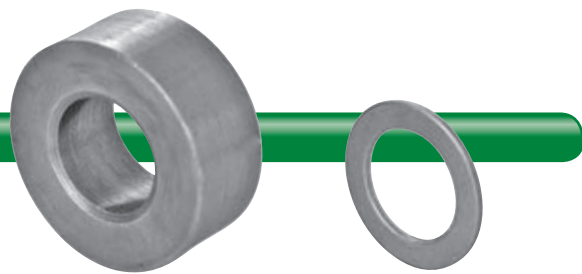


Fig. 1

Fig. 2

Fig. 1 • **SHAFT SPACER** – Steel

Priced Per 100 Pieces

Catalog Number	d	D	s
MKAACFMC03060H2	3	6	0.25
MKAACFMC0306005			0.5
MKAACFMC0306030			3
MKAACFMC0306050			5
MKAACFMC0306100			10
MKAACFMC0408005	4	8	0.5
MKAACFMC0408010			1
MKAACFMC0408030			3
MKAACFMC0408050			5
MKAACFMC0408100			10
MKAACFMC05100H2	5	10	0.25
MKAACFMC0510005			0.5
MKAACFMC0510010			1
MKAACFMC0510030			3
MKAACFMC0510050			5
MKAACFMC0510100			10
MKAACFMC06120H2	6	12	0.25
MKAACFMC0612005			0.5
MKAACFMC0612010			1
MKAACFMC0612030			3
MKAACFMC0612050			5
MKAACFMC0612100			10
MKAACFMC08140H2	8	14	0.25
MKAACFMC0814005			0.5
MKAACFMC0814010			1

Catalog Number	d	D	s
MKAACFMC0814030	8	14	3
MKAACFMC0814050			5
MKAACFMC0814100			10
MKAACFMC10160H2	10	16	0.25
MKAACFMC1016005			0.5
MKAACFMC1016010			1
MKAACFMC1016030			3
MKAACFMC1016050			5
MKAACFMC1016100			10
MKAACFMC10180H2	10	18	0.25
MKAACFMC1018010			1
MKAACFMC1018050			5
MKAACFMC1018100			10
MKAACFMC1220005	12	20	0.5
MKAACFMC1220010			1
MKAACFMC1220030			3
MKAACFMC1220050			5
MKAACFMC1220100			10
MKAACFMC12240H2	12	24	0.25
MKAACFMC1224005			0.5
MKAACFMC1224010			1
MKAACFMC1224030			3
MKAACFMC1224050			5
MKAACFMC1224100			10

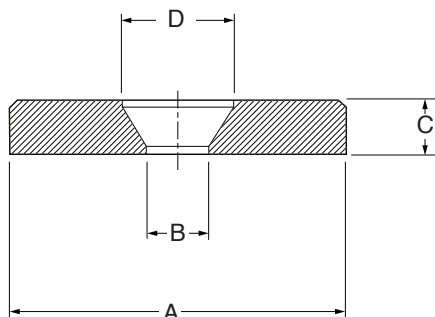
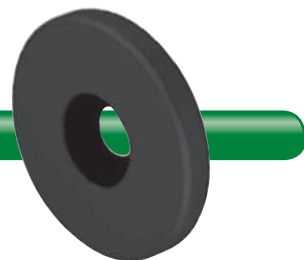
Fig. 2

• **SHIM SPACER** – Laminated Brass

Priced Per
100 Pieces

Catalog Number	d	D	s
MKAACFMB0306	3	6	0.8
MKAACFMB0408	4	8	
MKAACFMB0510	5	10	
MKAACFMB0612	6	12	
MKAACFMB0814	8	14	
MKAACFMB1016	10	16	
MKAACFMB1218	12	18	

WASHERS, COUNTERSUNK

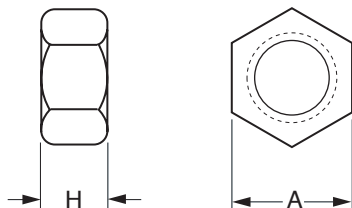
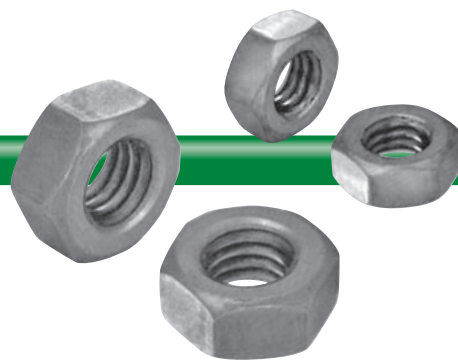


• COUNTERSUNK WASHER – Steel, Matte Black

Catalog Number	A	B	C	D
MKAH2FM909016	16	4.3	3	8
MKAH2FM909020	20			
MKAH2FM909022	22	5.3	3.5	10
MKAH2FM909025	25			
MKAH2FM909028	28			
MKAH2FM909032	32	6.4	4	12
MKAH2FM909036	36		5	
MKAH2FM909040	40			
MKAH2FM909045	45		6	
MKAH2FM909052	52			

NUTS, HEXAGONAL

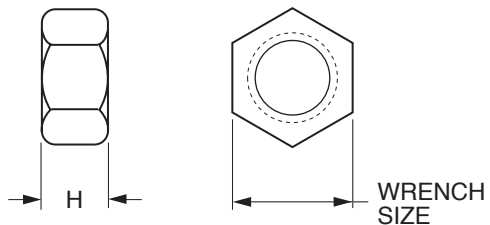
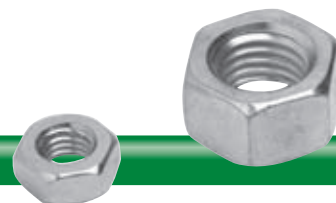
RoHS
COMPLIANT



• **NUT** – Alloy Steel or Stainless Steel • DIN 934

Priced Per 100 Pieces

Catalog Number		Thread Size	A Flats	H Height
Alloy Steel	Stainless Steel			
MD0934MQO016	MD0934MXO016	M1.6 X 0.35	3.2	1.3
MD0934MQO020	MD0934MXO020	M2 X 0.4	4	1.6
MD0934MQO025	MD0934MXO025	M2.5 X 0.45	5	2
MD0934MQO030	MD0934MXO030	M3 X 0.5	5.5	2.4
MD0934MQO035	MD0934MXO035	M3.5 X 0.6	6	2.8
MD0934MQO040	MD0934MXO040	M4 X 0.7	7	3.2
MD0934MQO050	MD0934MXO050	M5 X 0.8	8	4
MD0934MQO060	MD0934MXO060	M6 X 1	10	5
MD0934MQO080	MD0934MXO080	M8 X 1.25	13	6.5
MD0934MQO100	MD0934MXO100	M10 X 1.5	17	8
MD0934MQO120	MD0934MXO120	M12 X 1.75	19	10

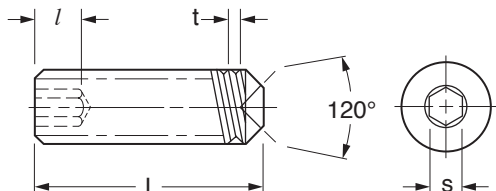
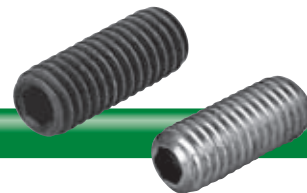


• **NUTS** – Steel, Zinc Plated • UNI 5588-65

Catalog Number	H Height	Wrench Size	Thread
MKAY1FM07634	6.5	13	M8
MKAY1FM17269	8	17	M10
MKAY1FM17270	10	19	M12
MKAY1FM17275	13	24	M16
MKAY1FM17276	16	30	M20

SET SCREWS, SOCKET HEAD

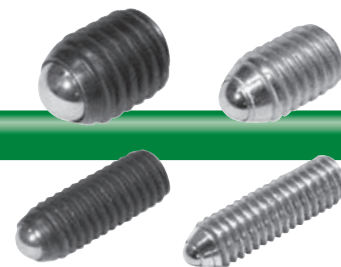
RoHS
COMPLIANT



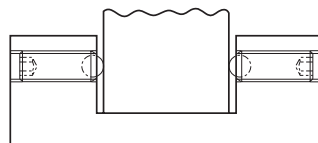
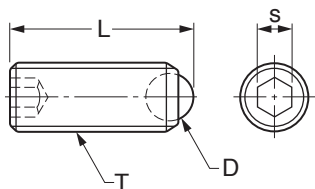
- **CUP POINT SET SCREW** – Hardened Steel or
304 Stainless Steel • DIN 916 Priced Per 100 Pieces

Catalog Number		Thread Size	L Length	t	l	s
Hardened Steel	304 Stainless Steel					
MD0916MQB020X003	MD0916MXO020X003	M2	3	0.4	1.6	0.9
MD0916MQB020X004	MD0916MXO020X004		4			
MD0916MQB020X005	MD0916MXO020X005		5			
MD0916MQB025X003	MD0916MXO025X003	M2.5	3	0.45	1.3	1.3
MD0916MQB025X004	MD0916MXO025X004		4			
MD0916MQB025X005	MD0916MXO025X005		5			
MD0916MQB025X006	MD0916MXO025X006		6			
MD0916MQB030X003	MD0916MXO030X003	M3	3	0.5	1.5	1.5
MD0916MQB030X004	MD0916MXO030X004		4			
MD0916MQB030X005	MD0916MXO030X005		5			
MD0916MQB030X006	MD0916MXO030X006		6			
MD0916MQB030X008	MD0916MXO030X008		8			
MD0916MQB040X004	MD0916MXO040X004	M4	4	0.7	2	2
MD0916MQB040X005	MD0916MXO040X005		5			
MD0916MQB040X006	MD0916MXO040X006		6			
MD0916MQB040X008	MD0916MXO040X008		8			
MD0916MQB040X010	MD0916MXO040X010		10			
MD0916MQB050X005	MD0916MXO050X005	M5	5	0.8	2.5	2.5
MD0916MQB050X006	MD0916MXO050X006		6			
MD0916MQB050X008	MD0916MXO050X008		8			
MD0916MQB050X010	MD0916MXO050X010		10			
MD0916MQB050X012	MD0916MXO050X012		12			
MD0916MQB060X006	MD0916MXO060X006	M6	6	1	3	3
MD0916MQB060X008	MD0916MXO060X008		8			
MD0916MQB060X010	MD0916MXO060X010		10			
MD0916MQB060X012	MD0916MXO060X012		12			
MD0916MQB060X016	MD0916MXO060X016		16			
MD0916MQB080X008	MD0916MXO080X008	M8	8	1.25	4	4
MD0916MQB080X010	MD0916MXO080X010		10			
MD0916MQB080X012	MD0916MXO080X012		12			
MD0916MQB080X016	MD0916MXO080X016		16			
MD0916MQB080X020	MD0916MXO080X020		20			

SCREWS, ROLLING-BALL TIP SET



Example of application to fasten workpiece that damages easily.

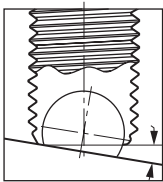
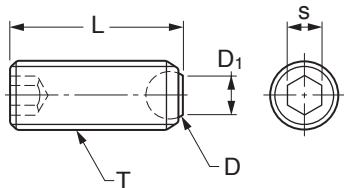
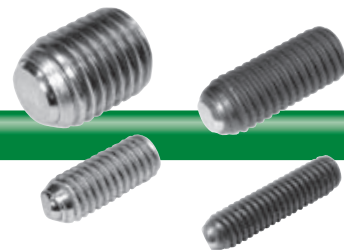


- **SCREW** – Carbon Steel, Black Oxide Finish; 304 Stainless Steel
- **BALL** – Carbon Steel, HRC 56...60; 440C Stainless Steel, HRC 55...60

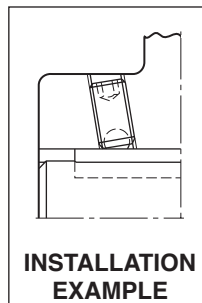
Catalog Number		T Thread Size	L Length	D	s Hex Size	Mass g
Carbon Steel	Stainless Steel					
MKAS7MMC0305	MKAS7MMY0305	M3 X 0.5	5.2	1.5	1.5	0.3
MKAS7MMC0310	MKAS7MMY0310		10.2			0.6
MKAS7MMC0407	MKAS7MMY0407	M4 X 0.7	6.5	2.5	2	0.4
MKAS7MMC0411	MKAS7MMY0411		10.5			0.7
MKAS7MMC0417	MKAS7MMY0417		16.5			1
MKAS7MMC0509	MKAS7MMY0509	M5 X 0.8	8.6	3	2.5	0.8
MKAS7MMC0513	MKAS7MMY0513		12.6			1.3
MKAS7MMC0521	MKAS7MMY0521		20.6			2.3
MKAS7MMC0611	MKAS7MMY0611	M6 X 1	10.8	4	3	1.5
MKAS7MMC0617	MKAS7MMY0617		16.8			2.5
MKAS7MMC0621	MKAS7MMY0621		20.8			3.4
MKAS7MMC0626	MKAS7MMY0626		25.8			4
MKAS7MMC0811	MKAS7MMY0811	M8 X 1.25	11.2	5.5	4	2.5
MKAS7MMC0813	MKAS7MMY0813		13.2			3.2
MKAS7MMC0821	MKAS7MMY0821		21.2			5.7
MKAS7MMC0826	MKAS7MMY0826		26.2			7.7
MKAS7MMC0831	MKAS7MMY0831		31.2			9
MKAS7MMC1014	MKAS7MMY1014	M10 X 1.5	13.7	7	5	5
MKAS7MMC1018	MKAS7MMY1018		17.7			7
MKAS7MMC1022	MKAS7MMY1022		21.7			9.5
MKAS7MMC1027	MKAS7MMY1027		26.7			11
MKAS7MMC1037	MKAS7MMY1037		36.7			16
MKAS7MMC1218	MKAS7MMY1218	M12 X 1.75	18	8.5	6	10
MKAS7MMC1222	MKAS7MMY1222		22			12.5
MKAS7MMC1232	MKAS7MMY1232		32			20
MKAS7MMC1242	MKAS7MMY1242		42			28
MKAS7MMC1623	MKAS7MMY1623	M16 X 2	23.3	12	8	22
MKAS7MMC1628	MKAS7MMY1628		28.3			28
MKAS7MMC1638	MKAS7MMY1638		38.3			41
MKAS7MMC1653	MKAS7MMY1653		53.3			48

SCREWS, FLAT-BALL TIP SET

RoHS
COMPLIANT



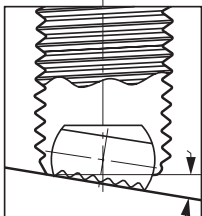
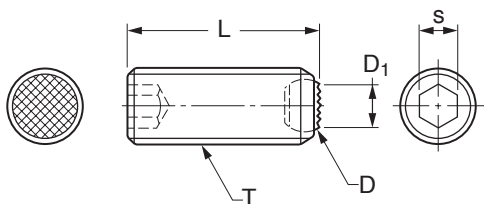
The ball can rotate
up to 9° to securely
fasten the object.



- **SCREW** – Carbon Steel, Black Oxide Finish; 304 Stainless Steel
- **BALL** – Carbon Steel, HRC 56...60; 440C Stainless Steel, HRC 55...60

Catalog Number		T Thread Size	L Length	D	D ₁	s Hex Size	Mass g
Carbon Steel	Stainless Steel						
MKAS9MMC0406	MKAS9MMY0406	M4 X 0.7	6	2.5	2	2	0.4
MKAS9MMC0410	MKAS9MMY0410		10				0.7
MKAS9MMC0416	MKAS9MMY0416		16				1
MKAS9MMC0508	MKAS9MMY0508	M5 X 0.8	8	3	2.5	2.5	0.8
MKAS9MMC0512	MKAS9MMY0512		12				1.3
MKAS9MMC0520	MKAS9MMY0520		20				2.3
MKAS9MMC0610	MKAS9MMY0610	M6 X 1	10	4	3.2	3	1.5
MKAS9MMC0616	MKAS9MMY0616		16				2.5
MKAS9MMC0620	MKAS9MMY0620		20				3.4
MKAS9MMC0625	MKAS9MMY0625		25				4
MKAS9MMC0810	MKAS9MMY0810	M8 X 1.25	10	5.5	4.5	4	2.5
MKAS9MMC0812	MKAS9MMY0812		12				3.2
MKAS9MMC0820	MKAS9MMY0820		20				5.7
MKAS9MMC0825	MKAS9MMY0825		25				7.7
MKAS9MMC0830	MKAS9MMY0830		30				9
MKAS9MMC1012	MKAS9MMY1012	M10 X 1.5	12	7	6	5	5
MKAS9MMC1016	MKAS9MMY1016		16				7
MKAS9MMC1020	MKAS9MMY1020		20				9.5
MKAS9MMC1025	MKAS9MMY1025		25				11
MKAS9MMC1035	MKAS9MMY1035		35				16
MKAS9MMC1216	MKAS9MMY1216	M12 X 1.75	16	8.5	7.2	6	10
MKAS9MMC1220	MKAS9MMY1220		20				12.5
MKAS9MMC1230	MKAS9MMY1230		30				20
MKAS9MMC1240	MKAS9MMY1240		40				28
MKAS9MMC1620	MKAS9MMY1620	M16 X 2	20	12	10.7	8	22
MKAS9MMC1625	MKAS9MMY1625		25				28
MKAS9MMC1635	MKAS9MMY1635		35				41
MKAS9MMC1650	MKAS9MMY1650		50				48

SCREWS, DIAMOND-KNURLED TIP SET



The ball can rotate up to 9° to securely fasten the object

- **SCREW** – Carbon Steel, Black Oxide Finish; 304 Stainless Steel
- **BALL** – Carbon Steel, HRC 56...60; 440C Stainless Steel, HRC 55...60

Catalog Number		T Thread Size	L Length	D	D ₁	s Hex Size	Mass g
Carbon Steel	Stainless Steel						
MKAS8MMC0610	MKAS8MMY0610	M6 X 1	10	4	3.2	3	1.5
MKAS8MMC0616	MKAS8MMY0616		16				2.5
MKAS8MMC0620	MKAS8MMY0620		20				3.4
MKAS8MMC0625	MKAS8MMY0625		25				4
MKAS8MMC0810	MKAS8MMY0810	M8 X 1.25	10	5.5	4.5	4	2.5
MKAS8MMC0812	MKAS8MMY0812		12				3.2
MKAS8MMC0820	MKAS8MMY0820		20				5.7
MKAS8MMC0825	MKAS8MMY0825		25				7.7
MKAS8MMC0830	MKAS8MMY0830		30				9
MKAS8MMC1012	MKAS8MMY1012	M10 X 1.5	12	7	6	5	5
MKAS8MMC1016	MKAS8MMY1016		16				7
MKAS8MMC1020	MKAS8MMY1020		20				9.5
MKAS8MMC1025	MKAS8MMY1025		25				11
MKAS8MMC1035	MKAS8MMY1035		35				16
MKAS8MMC1216	MKAS8MMY1216	M12 X 1.75	16	8.5	7.2	6	10
MKAS8MMC1220	MKAS8MMY1220		20				12.5
MKAS8MMC1230	MKAS8MMY1230		30				20
MKAS8MMC1240	MKAS8MMY1240		40				28
MKAS8MMC1620	MKAS8MMY1620	M16 X 2	20	12	10.7	8	22
MKAS8MMC1625	MKAS8MMY1625		25				28
MKAS8MMC1635	MKAS8MMY1635		35				41
MKAS8MMC1650	MKAS8MMY1650		50				48

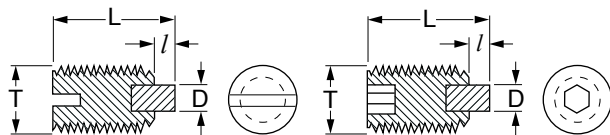
SCREWS, NYLON TIPPED SET



Fig. 1



Fig. 2



SLOTTED STYLE

Fig. 1

SOCKET STYLE

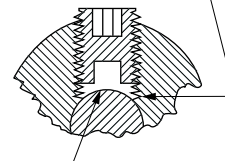
Fig. 2

Fig. 1 • SLOTTED STYLE

- **SCREW** – Stainless Steel • **TIP** – Nylon
- **SELF-LOCKING** • **NONMARRING**

Catalog Number	T Thread Size	L	l	D
MKAAAMMSL030050	M3 X 0.5	5	0.8	1.6
MKAAAMMSL040070	M4 X 0.7	7	1.2	2.4
MKAAAMMSL050110	M5 X 0.8	11	1.2	2.4
MKAAAMMSL060075	M6 X 1	7.5	1.6	3.2

COMPRESSES INTO THREADS
BECOMING SELF-LOCKING



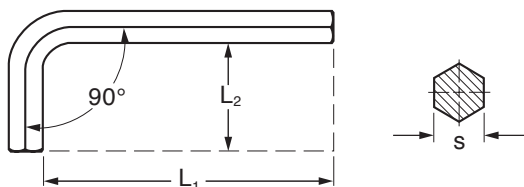
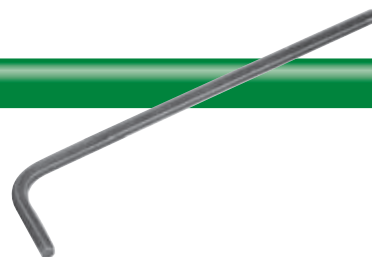
CONFORMS TO SHAFT
WITHOUT MARRING

Fig. 2 • SOCKET STYLE

- **SCREW** – Stainless Steel • **TIP** – Nylon
- **SELF-LOCKING** • **NONMARRING**

Catalog Number	T Thread Size	L	l	D
MKAAAMMSO020040	M2 X 0.4	4	0.8	0.8
MKAAAMMSO020050		5		
MKAAAMMSO020060		6		
MKAAAMMSO020070		7		
MKAAAMMSO030040	M3 X 0.5	4	0.8	1.6
MKAAAMMSO030050		5		
MKAAAMMSO030060		6		
MKAAAMMSO030070		7		
MKAAAMMSO040050	M4 X 0.7	5	1.2	2.4
MKAAAMMSO040070		7		
MKAAAMMSO040110		11		
MKAAAMMSO040150		15		
MKAAAMMSO050070	M5 X 0.8	7	1.2	2.4
MKAAAMMSO050110		11		
MKAAAMMSO050150		15		
MKAAAMMSO050210		21		
MKAAAMMSO060075	M6 X 1	7.5	1.6	3.2
MKAAAMMSO060115		11.5		
MKAAAMMSO060175		17.5		
MKAAAMMSO060265		26.5		
MKAAAMMSO100145	M10 X 1.5	14.5	2.4	4.8
MKAAAMMSO100225		22.5		
MKAAAMMSO100325		32.5		

WRENCHES, HEXAGONAL



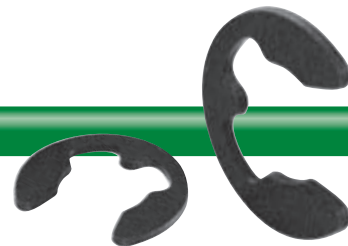
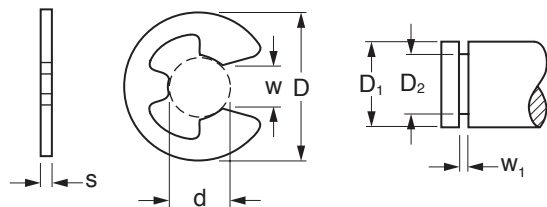
• **WRENCH** – High-Tensile Steel, Black Oxide Finish • DIN 911

Catalog Number	s	L ₁	L ₂	Set Screw Size
MD0911MQB007X03	0.71	30	7	M1.4 & M1.6
MD0911MQB009X03	0.89	30	12	M2 & #2-56
MD0911MQB013X04	1.27	40	15	M2.5 & #4-40
MD0911MQB015X05	1.5	50	15	M3
MD0911MQB020X05	2	55	16	M4
MD0911MQB025X06	2.5	60	20	M5
MD0911MQB030X06	3	65	20	M6
MD0911MQB040X07	4	72	25	M8
MD0911MQB050X08	5	80	28	M10
MD0911MQB060X09	6	90	32	M12 & M14

Catalog Number	Description
MD0911MQBHEXSET	Set of 10 Pieces (0.71 to 6)

E-RINGS, EXTERNAL

RoHS
COMPLIANT



• **RING** – Carbon Spring Steel, Oil-Dipped • DIN 6799 Priced Per 100 Pieces

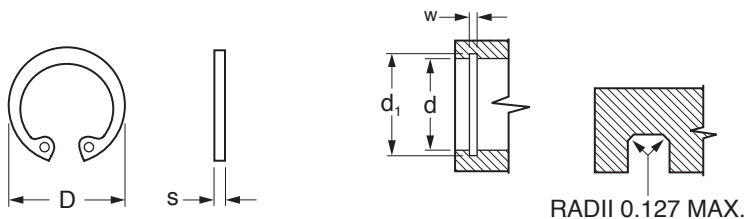
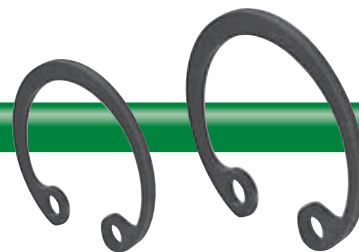
Catalog Number	Free Ring			D ₁ Shaft Diameter	Groove Diameter	
	w Gap	d Dia.	D Dia.		D ₂	Tolerance
MD6799MQB008	0.58	0.8	2	1	0.8	-0.06
MD6799MQB012	1.01	1.2	3	1.4	1.2	
MD6799MQB015	1.28	1.5	4	2	1.5	
MD6799MQB019	1.61	1.9	4.5	2.5	1.9	
MD6799MQB023	1.94	2.3	6	3	2.3	
MD6799MQB032	2.7	3.2	7	4	3.2	-0.07
MD6799MQB040	3.34	4	9	5	4	
MD6799MQB050	4.11	5	11	6	5	
MD6799MQB060	5.26	6	12	7	6	
MD6799MQB070	5.84	7	14	8	7	-0.09
MD6799MQB080	6.52	8	16	9	8	
MD6799MQB090	7.63	9	18.5	10	9	
MD6799MQB100	8.32	10	20	11	10	
MD6799MQB120	10.45	12	23	13	12	-0.11

9

Catalog Number	Groove Width		Ring Thickness		Ring Thrust Strength-kg
	w ₁	Tolerance	s	Tolerance	Safety Factor = 4
MD6799MQB008	0.24	+0.02	0.2	±0.02	2
MD6799MQB012	0.34		0.3		4
MD6799MQB015	0.44		0.4		7
MD6799MQB019	0.54	+0.03	0.5		10
MD6799MQB023	0.64		0.6		14
MD6799MQB032	0.64		0.6	±0.02	20
MD6799MQB040	0.74		0.7		30
MD6799MQB050		40			
MD6799MQB060		50			
MD6799MQB070	0.94	+0.03	0.9	±0.02	60
MD6799MQB080	1.05	+0.06	1	±0.03	70
MD6799MQB090	1.15	+0.06	1.1	±0.03	80
MD6799MQB100	1.25	+0.06	1.2	±0.03	90
MD6799MQB120	1.35	+0.06	1.3	±0.03	100

RETAINING RINGS, INTERNAL

RoHS
COMPLIANT



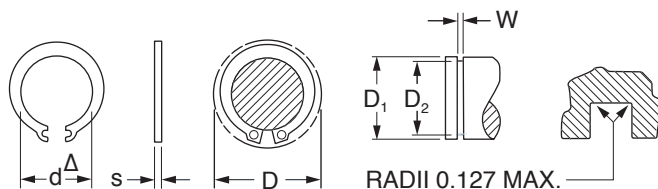
• **RING** – Carbon Spring Steel, Oil-Dipped • DIN 472 Priced Per 100 Pieces

Catalog Number	Free Diameter		Housing Diameter	Groove Diameter	
	D	Tolerance	d	d ₁	Tolerance
MD0472MQB008	8.7	+0.36	8	8.4	+0.09
MD0472MQB009	9.8	-0.10	9	9.4	0
MD0472MQB010	10.8	+0.36 -0.10	10	10.4	+0.11 0
MD0472MQB011	11.8		11	11.4	
MD0472MQB012	13		12	12.5	
MD0472MQB013	14.1		13	13.6	
MD0472MQB014	15.1		14	14.6	
MD0472MQB015	16.2		15	15.7	
MD0472MQB016	17.3		16	16.8	
MD0472MQB017	18.3	+0.42	17	17.8	+0.11/0
MD0472MQB018	19.5	-0.13	18	19	+0.13/0
MD0472MQB019	20.5		19	20	+0.13/0
MD0472MQB020	21.5	+0.42	20	21	+0.13
MD0472MQB021	22.5	-0.13	21	22	0
MD0472MQB022	23.5		22	23	
MD0472MQB024	25.9	+0.42	24	25.2	+0.21
MD0472MQB025	26.9	-0.21	25	26.2	0

Catalog Number	Groove Width	Ring Thickness		Ring Thrust Strength-kg
	w +0.14 0	s	Tolerance	
MD0472MQB008 MD0472MQB009	0.9	0.8	0 -0.05	204
MD0472MQB010 MD0472MQB011 MD0472MQB012	1.1	1	0 -0.06	408
MD0472MQB013 MD0472MQB014 MD0472MQB015 MD0472MQB016				428 459 510 561
MD0472MQB017 MD0472MQB018 MD0472MQB019				612 663 693
MD0472MQB020 MD0472MQB021 MD0472MQB022				734 775 816
MD0472MQB024 MD0472MQB025	1.3	1.2		1417 1489

RETAINING RINGS, EXTERNAL

RoHS
COMPLIANT



• **RING** – Carbon Spring Steel, Oil-Dipped • DIN 471 Priced Per 100 Pieces

Catalog Number	Free Diameter		D Ring Clear.	D ₁ Shaft Diameter	Groove Diameter	
	d	Tolerance			D ₂	Tolerance
Δ MD0471MQB003	2.7	+ 0.06 - 0.12	7.4	3	2.8	- 0.04
Δ MD0471MQB004	3.7	+ 0.08	8.8	4	3.8	- 0.04
Δ MD0471MQB005	4.7	- 0.15	10.7	5	4.8	
Δ MD0471MQB006	5.6		12.2	6	5.7	
Δ MD0471MQB007	6.5	+ 0.09	13.8	7	6.7	- 0.06
Δ MD0471MQB008	7.4	- 0.18	15.2	8	7.6	
Δ MD0471MQB009	8.4		16.4	9	8.6	
MD0471MQB010	9.3	+ 0.15 - 0.30	17.6	10	9.6	- 0.11
MD0471MQB011	10.2	+ 0.18 - 0.36	18.6	11	10.5	- 0.11
MD0471MQB012	11		19.6	12	11.5	
MD0471MQB013	11.9		20.8	13	12.4	
MD0471MQB014	12.9		22	14	13.4	
MD0471MQB015	13.8		23.2	15	14.4	
MD0471MQB016	14.7		24.4	16	15.2	

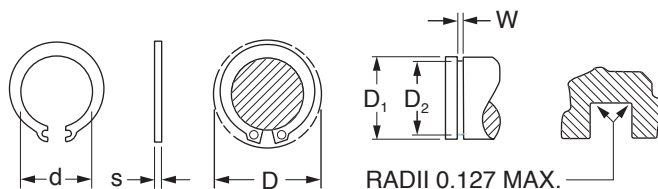
Catalog Number	Groove Width		s Ring Thick. - 0.06	Ring Thrust Strength-kg Safety Factor = 4
	w	Tolerance		
Δ MD0471MQB003	0.5	+0.14	0.4	68
Δ MD0471MQB004	0.5	+0.14	0.4	90
Δ MD0471MQB005	0.7		0.6	176
Δ MD0471MQB006	0.8		0.7	252
Δ MD0471MQB007	0.9	+0.14	0.8	341
Δ MD0471MQB008	0.9		0.8	390
Δ MD0471MQB009	1.1		1	560
MD0471MQB010	1.1	+0.14	1	622
MD0471MQB011	1.1	+0.14	1	685
MD0471MQB012				747
MD0471MQB013				809
MD0471MQB014				872
MD0471MQB015				935
MD0471MQB016				996

Δ These rings only have slotted holes for retaining ring pliers.

See next page for larger sizes

RETAINING RINGS, EXTERNAL

RoHS
COMPLIANT



• **RING** – Carbon Spring Steel, Oil Dipped • DIN 471

Catalog Number	Free Diameter		D Ring Clear.	D ₁ Shaft Diameter	Groove Diameter	
	d	Tolerance			D ₂	Tolerance
MD0471MQB019	17.5	+0.10 -0.36	27.2	19	18	-0.11
MD0471MQB021	19.5	+0.13 -0.42	29.6	21	20	-0.21
MD0471MQB022	20.5	+0.13 -0.42	30.8	22	21	-0.21
MD0471MQB026	24.2	+0.21 -0.42	35.5	26	24.9	-0.21
MD0471MQB032	29.6	-0.42	43	32	30.3	-0.25
MD0471MQB040	36.5	+0.39 -0.90	52.6	40	37.5	-0.25
MD0471MQB047	43.5	-0.90	61.6	47	44.5	-0.25
MD0471MQB062	57.8	+0.46 -1.10	77.8	62	59	-0.3
MD0471MQB075	70.5	-1.10	92.8	75	72	-0.3
MD0471MQB090	84.5	+0.54 -1.30	108.5	90	86.5	-0.35
MD0471MQB120	113	-1.30	143.1	120	116	-0.54

9

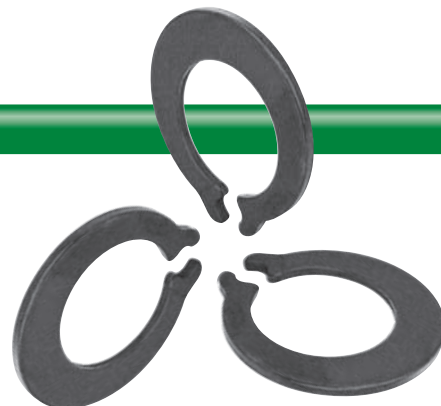
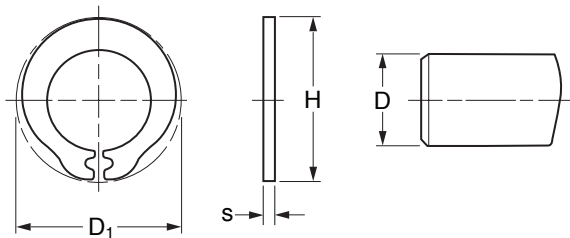
Catalog Number	Groove Width		S Ring Thick. - 0.06	Ring Thrust Strength-kg Safety Factor = 4
	w	Tolerance		
MD0471MQB019	1.3	+0.14	1.2	1631
MD0471MQB021	1.3	+0.14	1.2	1811
MD0471MQB022	1.3	+0.14	1.2	1901
MD0471MQB026	1.3	+0.14	1.2	2475
MD0471MQB032	1.6	+0.14	1.5	4725
MD0471MQB040	1.85	+0.14	1.75	8572
MD0471MQB047	1.85	+0.14	1.75	10125
MD0471MQB062	2.15	+0.14	2	15975
MD0471MQB075	2.65	+0.14	2.5	19350
MD0471MQB090	3.15	+0.18	3*	27225
MD0471MQB120	4.15	+0.18	4*	41625

NOTE: The items on this page are sold with unit of EACH.

See previous page for smaller sizes

*Tolerance: -0.075

RINGS, GROOVELESS RETAINING

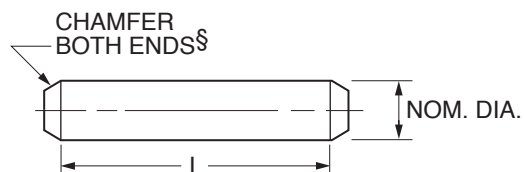
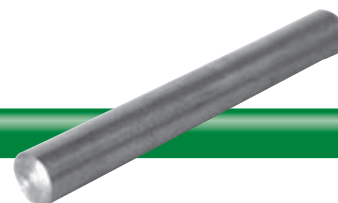


- **RING** – Spring Steel HRC 46...52, Black Oxide Finish
- **EXTERNAL • FOR AXIAL ASSEMBLY • NO GROOVE REQUIRED**

Catalog Number	D* Shaft Dia.	D ₁ Ring Clearance	H Ring Height	Thickness		Allowable Axial Load N
				s	Tol.	
MKA5DNMGR555-020	2	5.8	5.2	0.5	±0.03	50
MKA5DNMGR555-025	2.5	6.5	5.9	0.6		60
MKA5DNMGR555-030	3	7.4	6.8	0.7		75
MKA5DNMGR555-040	4	9	8.3	0.8		100
MKA5DNMGR555-050	5	10.2	9.75	0.8	±0.04	130
MKA5DNMGR555-060	6	11.4	11.1	1		170
MKA5DNMGR555-070	7	12.8	12.5	1		180
MKA5DNMGR555-080	8	14.8	14.3	1.2		200
MKA5DNMGR555-100	10	17.5	16.9	1.2	±0.05	250
MKA5DNMGR555-120	12	21	20.6	1.5		300
MKA5DNMGR555-160	16	28.5	26.5	1.5		500
MKA5DNMGR555-200	20	35	33.25	1.75		750

*Shaft Tolerance (h9): 2 to 3 mm -0.025
(h11): 4 to 6 mm -0.075
(h11): 7 to 10 mm -0.090
(h11): 12 to 16 mm -0.110
(h11): 20 mm -0.130

PINS, PRECISION DOWEL



§Chamfer or rounded ends at aMsp option

• **PIN** – 304 Stainless Steel • DIN 7/ISO 2338

CATALOG NUMBER DESIGNATION:

M D 0 0 0 7 M X 0 0 **X 0**

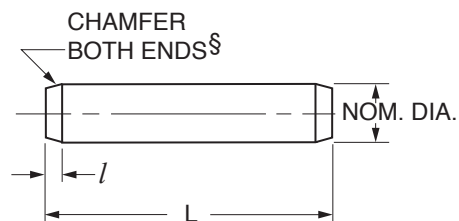
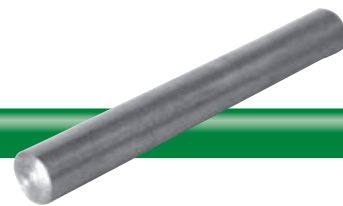
Priced Per
100 Pieces

Nominal Diameter m6*						L Length Code mm	Length Tolerance
2	2.5	3	4	5	6		
Diameter Code							
20	25	30	40	—	—	06	± 0.25
20	25	30	40	50	—	08	
20	25	30	40	50	60	10	
20	25	30	40	50	60	12	± 0.5
20	25	30	40	50	60	14	
—	25	30	40	50	60	16	
20	25	30	40	50	60	20	
—	25	30	40	50	60	24	
—	—	—	40	50	60	40	
—	—	—	—	50	60	50	± 0.75
—	—	—	—	—	60	60	

*Nominal Diameter Tolerance: 2 to 3 mm +0.008 / +0.002
4 to 6 mm +0.012 / +0.004

PINS, PRECISION DOWEL

RoHS
COMPLIANT



§Chamfer or rounded ends at aMsp option

Nominal Diameter	1	1.5	2	2.5	3	4	5	6
<i>l</i>	0.48	0.62	0.78	0.95	1.1	1.4	1.7	2.1

• **PIN** – Hardened Steel, HRC 58-62 • DIN 6325/ISO 8734

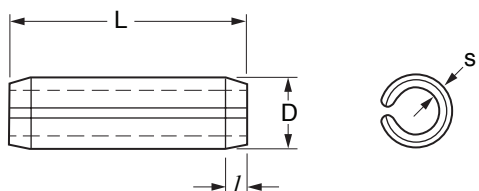
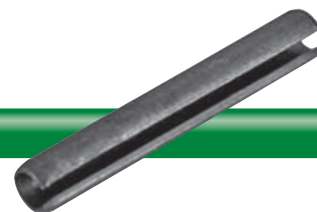
CATALOG NUMBER DESIGNATION:

M D 6 3 2 5 M Q 0 0 X 0

Priced Per
100 Pieces

Nominal Diameter m6*								L Length Code mm	Length Tolerance
1	1.5	2	2.5	3	4	5	6		
Diameter Code									
10	—	—	—	—	—	—	—	04	± 0.25
10	15	20	25	30	—	—	—	05	
10	15	20	25	30	40	50	—	06	
10	15	20	25	30	40	50	60	08	
10	15	20	25	30	40	50	60	10	
10	15	20	25	30	40	50	60	12	± 0.50
—	15	20	25	30	40	50	60	14	
—	15	20	25	30	40	50	60	16	
—	15	20	25	30	40	50	60	20	
—	15	20	25	30	40	50	60	24	
—	15	20	25	30	40	50	60	25	
—	15	20	25	30	40	50	60	28	
—	15	20	25	30	40	50	60	30	
—	15	20	25	30	40	50	60	32	
—	—	20	25	30	40	50	60	35	
—	—	20	25	30	40	50	60	36	± 0.75
—	—	20	25	30	40	50	60	40	
—	—	—	25	—	40	50	60	45	
—	—	—	25	30	40	50	60	50	
—	—	—	—	—	—	50	60	55	
—	—	—	—	30	—	50	60	60	
—	—	—	—	—	—	—	60	70	
—	—	—	—	—	—	—	60	80	

*Nominal Diameter Tolerance: 1 to 3 mm +0.008 / +0.002
4 to 6 mm +0.012 / +0.004



• **PIN** – Hardened Steel, Black Oxide Finish or Stainless Steel • DIN 1481/ISO 8752

CATALOG NUMBER DESIGNATION:

M D 1 4 8 1 M 0 X 0

Material Code

Steel, Hardened
Black Oxide Finish **QB**

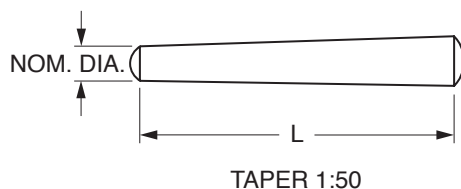
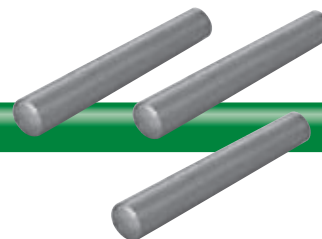
Stainless Steel **XO**

Priced Per
100 Pieces

Nominal Diameter m6*						L Length Code mm
1*	1.5*	2	2.5	3	4	
Diameter Code						
10	15	—	—	—	—	04
10	15	20	—	—	—	05
10	15	20	25	—	—	06
10	15	20	25	30	—	08
10	15	20	25	30	40	10
—	15	20	25	30	40	12
—	15	20	25	30	40	14
—	—	20	25	30	40	16
—	—	20	25	30	40	18
—	—	—	25	30	40	20
—	—	—	25	30	40	22
—	—	—	—	30	40	24
—	—	—	—	30	40	26
—	—	—	—	—	40	28
—	—	—	—	—	40	30

Nominal Diameter	s Wall Thickness	l Chamfer	D Free Diameter
1	0.2	0.15	1.2
1.5	0.3	0.25	1.7
2	0.4	0.35	2.3
2.5	0.5	0.4	2.8
3	0.6	0.5	3.3
4	0.8	0.65	4.4

*Stainless Steel is not available in 1 & 1.5 mm diameters.



• **PIN** – Steel • DIN I/ISO 2339

CATALOG NUMBER DESIGNATION:

M D 0 0 0 1 M C 0 0 **X**

Priced Per
100 Pieces

Nominal Diameter						L Length Code mm
1	1.5	2	2.5	3	4	
Diameter Code						
10	—	20	—	—	—	008
10	15	20	25	30	—	010
10	15	20	25	30	—	012
10	15	20	25	30	40	014
10	15	20	25	30	40	016
10	15	20	25	30	40	018
—	15	20	25	30	40	020
—	15	20	25	30	40	022
—	15	20	25	30	40	024
—	15	20	25	30	40	026
—	—	20	25	30	40	028
—	—	20	25	30	40	030
—	—	—	25	30	40	032
—	—	—	25	30	40	036
—	—	—	25	30	40	040
—	—	—	—	30	40	045
—	—	—	—	30	40	050
—	—	—	—	—	40	060

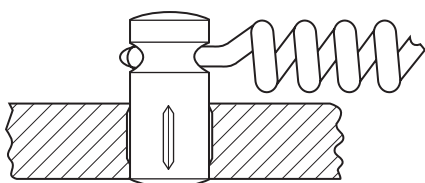
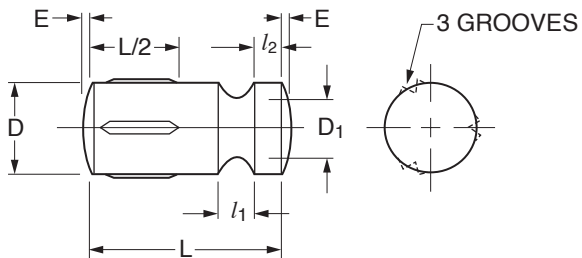
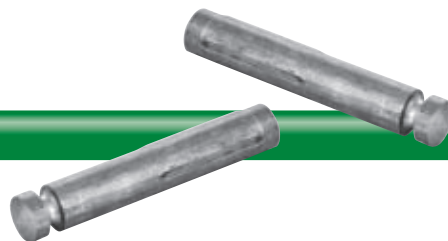
• **PIN** – 303 Stainless Steel • DIN I/ISO 2339

CATALOG NUMBER DESIGNATION:

M D 0 0 0 1 M X 0 0 **X**

Priced Per
100 Pieces

Nominal Diameter						L Length Code mm
1	1.5	2	2.5	3	4	
Diameter Code						
10	—	—	—	—	—	008
10	15	20	—	—	—	010
10	15	20	—	30	—	012
10	15	20	—	30	—	014
10	15	20	25	30	40	016
10	15	20	25	30	—	018
—	15	20	25	30	40	020
—	—	20	25	30	40	024
—	—	20	25	30	40	026
—	—	20	25	30	40	030
—	—	—	25	30	40	036
—	—	20	25	30	40	040
—	—	—	—	—	40	045
—	—	20	—	30	40	050
—	—	—	—	—	40	060



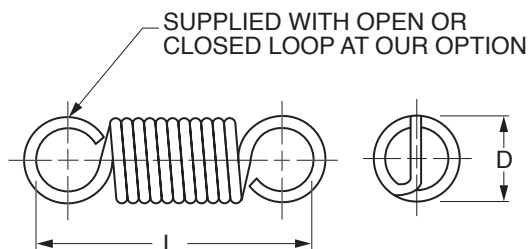
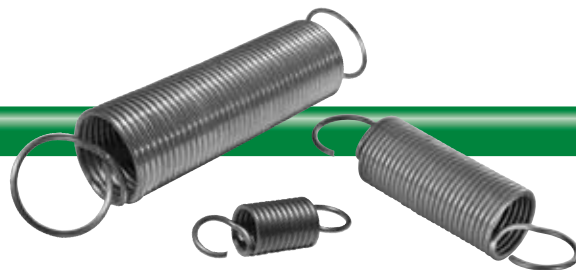
• **POST** – Carbon Steel • DIN 1469 Type C

Priced Per 100 Pieces

Catalog Number	D	Hole Tolerance	L	l_1	D_1	l_2	E Crown Height
MKASENM3010	3	H9 +0.025	10	1	1.5	1	0.4
MKASENM3012			12				
MKASENM3016			16				
MKASENM3020			20				
MKASENM3025			25				
MKASENM4012	4	H11 +0.075	12	1.4	2.4	1.4	0.5
MKASENM4016			16				
MKASENM4020			20				
MKASENM4025			25				
MKASENM4030	5	H11 +0.075	30	1.6	2.8	1.6	0.6
MKASENM5012			12				
MKASENM5016			16				
MKASENM5020			20				
MKASENM5025			25				
MKASENM5030	6	H11 +0.075	30	1.6	3.8	1.6	0.8
MKASENM6016			16				
MKASENM6020			20				
MKASENM6025			25				
MKASENM6030			30				

SPRINGS, EXTENSION

RoHS
COMPLIANT



- **SPRING** – 302 Stainless Steel, Spring Temper
- **CROSSOVER LOOPS OR MACHINE LOOPS • CLOSE WOUND**

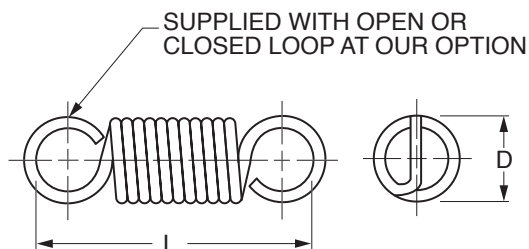
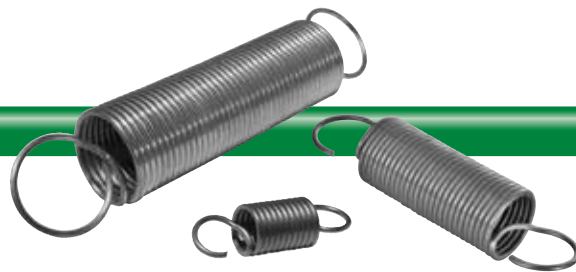
Catalog Number	D O.D.	Wire Dia.	L Free Length	Max. Load N	Max. Extension	Spring Rate N/mm
MKASFNM025025009	2.5	0.25	9.5	2.04	13.49	0.14
MKASFNM025025012			12.5		21.24	0.089
MKASFNM025025015			15.5		28.79	0.066
MKASFNM030035017	3	0.35	17	4.08	18.04	0.202
MKASFNM030035021			21		23.93	0.152
MKASFNM030035025			25		29.99	0.121
MKASFNM030035030			30		37.15	0.097
MKASFNM030035035			35		45.26	0.08
MKASFNM045045017	4.5	0.45	17	5.71	20.32	0.255
MKASFNM045045021			21		28.91	0.179
MKASFNM045045025			25		37.43	0.138
MKASFNM045045030			30		48.71	0.107
MKASFNM045045035			35		59.27	0.087
MKASFNM045060017	4.5	0.6	17	13.08	10	1.153
MKASFNM045060021			21		14.08	0.818
MKASFNM045060025			25		18.16	0.635
MKASFNM045060030			30		23.3	0.495
MKASFNM045060035			35		28.42	0.406
MKASFNM063055019	6.3	0.55	19	7.33	23.44	0.283
MKASFNM063055022			22		32.25	0.206
MKASFNM063055025			25		40.96	0.162
MKASFNM063055030			30		55.45	0.12
MKASFNM063055035			35		69.95	0.095
MKASFNM063075019	6.3	0.75	19	16.33	10.35	1.381
MKASFNM063075022			22		13.95	1.025
MKASFNM063075025			25		17.54	0.816
MKASFNM063075030			30		23.51	0.608
MKASFNM063075035			35		29.53	0.484
MKASFNM063080019	6.3	0.8	19	20.41	9.19	1.927
MKASFNM063080022			22		12.33	1.437
MKASFNM063080025			25		15.45	1.147
MKASFNM063080030			30		20.68	0.856
MKASFNM063080035			35		25.89	0.684

NOTE: Supplied right- or left-hand wound at our option.
Loop orientation may vary.

Continued on the next page

SPRINGS, EXTENSION

RoHS
COMPLIANT

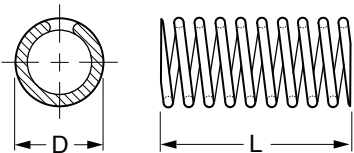
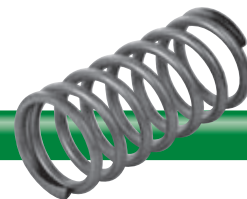


- **SPRING** – 302 Stainless Steel, Spring Temper
- **CROSSOVER LOOPS OR MACHINE LOOPS • CLOSE WOUND**

Catalog Number	D O.D.	Wire Dia.	L Free Length	Max. Load N	Max. Extension	Spring Rate N/mm
MKASFNM080075025	8	0.75	25	13.91	26.25	0.477
MKASFNM080075030			30		37.99	0.33
MKASFNM080075035			35		49.63	0.252
MKASFNM080075040			40		61.32	0.204
MKASFNM095095025	9.5	0.95	25	21.66	15.78	1.205
MKASFNM095095030			30		24.68	0.77
MKASFNM095095035			35		33.58	0.566
MKASFNM095095040			40		42.58	0.446
MKASFNM095120025	9.5	1.2	25	44.98	10.06	3.903
MKASFNM095120030			30		15.3	2.567
MKASFNM095120035			35		20.54	1.913
MKASFNM095120040			40		25.79	1.523
MKASFNM095150025	9.5	1.5	25	81.63	5.71	12.165
MKASFNM095150030			30		8.43	8.24
MKASFNM095150035			35		11.15	6.23
MKASFNM095150040			40		13.87	5.01
MKASFNM095150045			45		16.59	4.188
MKASFNM125120030	12.5	1.2	30	32.65	17.03	1.728
MKASFNM125120040			40		36.87	0.798
MKASFNM125120050			50		56.65	0.519
MKASFNM125120060			60		76.39	0.385
MKASFNM125160030	12.5	1.6	30	73.51	8.95	7.116
MKASFNM125160035			35		13.52	4.712
MKASFNM125160040			40		18.09	3.522
MKASFNM125160045			45		22.65	2.813
MKASFNM125160050			50		27.22	2.34
MKASFNM125160055			55		31.78	2.004
MKASFNM190160050	19	1.6	50	47.4	42.08	1.02
MKASFNM190160060			60		67.15	0.639
MKASFNM190160070			70		95.2	0.466
MKASFNM190160080			80		117.18	0.367
MKASFNM190160090			90		142.09	0.302
MKASFNM190160100			100		167.12	0.257
MKASFNM190160130			130		243.08	0.177

NOTE: Supplied right- or left-hand wound at our option.
Loop orientation may vary.

SPRINGS, COMPRESSION



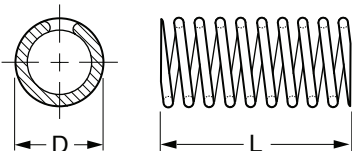
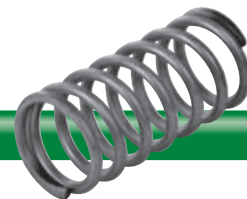
- **SPRING** – 302 Stainless Steel, Spring Temper
- **RIGHT-HAND WOUND • SQUARE AND GROUND ENDS**

Catalog Number	D O.D.	Wire Dia.	L Free Length	Approx. Load at Solid Hgt. N	Approx. Solid Height	Spring Rate N/mm
*MKASGNM022025006	2.25	0.25	6.5	2.92	2.4	0.69
*MKASGNM022025008			8		2.8	0.55
*MKASGNM022025009			9.5		3.2	0.46
*MKASGNM022025011			11		3.6	0.39
*MKASGNM022025012			12.5		4	0.34
MKASGNM030035006	3	0.35	6.5	6.78	2.4	1.59
MKASGNM030035008			8		2.8	1.26
MKASGNM030035009			9.5		3.2	1.05
MKASGNM030035011			11		3.6	0.89
MKASGNM030035012			12.5		4	0.78
MKASGNM030050006	3	0.5	6.5	17.08	3.76	6.25
MKASGNM030050008			8		4.52	4.91
MKASGNM030050009			9.5		5.26	4.04
MKASGNM030050011			11		6.02	3.43
MKASGNM030050012			12.5		6.76	2.98
MKASGNM046035008	4.6	0.35	8	4.08	1.6	0.65
MKASGNM046035011			11		1.98	0.46
MKASGNM046035014			14		2.36	0.36
MKASGNM046035017			17		2.74	0.29
MKASGNM046045008	4.6	0.45	8	9	2.31	1.58
MKASGNM046045011			11		2.9	1.11
MKASGNM046045014			14		3.51	0.86
MKASGNM046045017			17		4.09	0.7
MKASGNM046055008	4.6	0.55	8	14.7	3.23	3.08
MKASGNM046055011			11		4.14	2.14
MKASGNM046055014			14		5.05	1.65
MKASGNM046055017			17		5.99	1.33
MKASGNM046060008	4.6	0.6	8	19.58	3.56	4.42
MKASGNM046060011			11		4.6	3.07
MKASGNM046060014			14		5.66	2.35
MKASGNM046060017			17		6.71	1.91

*Ends squared, not ground

Continued on the next page

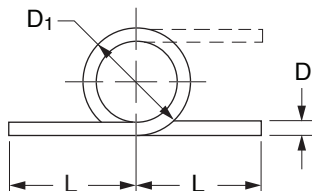
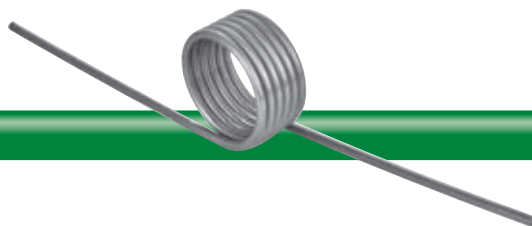
SPRINGS, COMPRESSION



- **SPRING** – 302 Stainless Steel, Spring Temper
- **RIGHT-HAND WOUND • SQUARE AND GROUND ENDS**

Catalog Number	D O.D.	Wire Dia.	L Free Length	Approx. Load at Solid Hgt. N	Approx. Solid Height	Spring Rate N/mm
MKASGNM046080008	4.6	0.8	8	46.56	4.95	15.31
MKASGNM046080011			11		6.53	10.42
MKASGNM046080014			14		8.1	7.9
MKASGNM046080017			17		9.68	6.36
MKASGNM060060011	6	0.6	11	12.25	3.73	1.68
MKASGNM060060014			14		4.5	1.29
MKASGNM060060017			17		5.26	1.04
MKASGNM060080011	6	0.8	11	36.74	4.93	6.05
MKASGNM060080014			14		5.97	4.58
MKASGNM060080017			17		7.04	3.69
MKASGNM060110011	6	1.1	11	78.47	7.49	22.31
MKASGNM060110014			14		9.3	16.64
MKASGNM060110017			17		11.1	13.26
MKASGNM060110019			19		12.29	11.69
MKASGNM060110022			22		14.1	9.91
MKASGNM075080011	7.5	0.8	11	27.82	3.96	3.96
MKASGNM075080014			14		4.72	3
MKASGNM075080017			17		5.49	2.42
MKASGNM075080021			21		6.5	1.92
MKASGNM075080025			25		7.52	1.59
MKASGNM075095011	7.5	0.95	11	44.98	5.05	7.55
MKASGNM075095014			14		6.07	5.67
MKASGNM075095017			17		7.11	4.55
MKASGNM075095021			21		8.51	3.6
MKASGNM075095025			25		9.88	2.97
MKASGNM090110017	9	1.1	17	58.81	6.99	5.87
MKASGNM090110021			21		8.28	4.62
MKASGNM090110025			25		9.58	3.82
MKASGNM120140025	12	1.4	25	73.55	10.49	5.06
MKASGNM150160030	15	1.6	30	84.97	11.4	4.57
MKASGNM183200040	18.3	2	40	143.77	15.04	5.76

SPRINGS, TORSION



- **SPRING** – 302 Stainless Steel, Spring Temper
- **LEFT-HAND WOUND • 180° DEFLECTION**

Catalog Number	D Wire Dia.	Mandrel Size	D ₁ O.D.	L	Min.* Axial Space	Torque N • cm
MKASHNM030180027	0.3	2.77	4.24	12.7	1.5	0.5
MKASHNM038180027	0.38		4.67	19.05	1.9	1.1
MKASHNM046180035	0.46	3.56	5.51	19.05	2.77	1.6
MKASHNM053180039	0.53	3.96	6.3	25.4	3.22	2.6
MKASHNM064180051	0.64	5.16	7.75	25.4	3.84	4.4
MKASHNM076180063	0.76	6.35	10.03	25.4	4.6	7.2
MKASHNM089180071	0.89	7.14	11.46	31.75	5.38	11.3
MKASHNM102180087	1.02	8.71	13.18	50.8	6.15	15.8
MKASHNM122180103	1.22	10.31	15.72		7.42	29
MKASHNM137180116	1.37	11.68	16.61	50.8	9.91	36.9
MKASHNM160180138	1.6	13.89	19.48		11.68	58

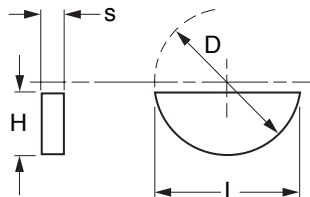
*Space required on application to allow for operation of the spring.

NOTE: Right-hand wound and special springs available on special order.



KEYS, WOODRUFF

RoHS
COMPLIANT

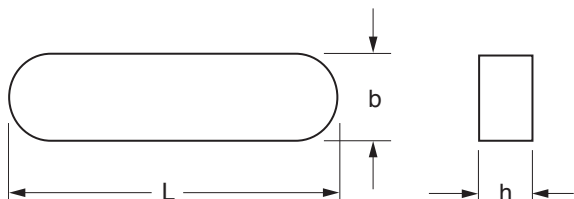


• KEY – Carbon Steel • DIN 6888

Catalog Number	Width		Height		L Length	D Dia.	For Shaft Dia.	
	s	Tol.	H	Tol.			Over	To
MKAAINM01507	1.5	-0.025	2.6	-0.1	6.76	7	4	6
MKAAINM02007	2							
MKAAINM02010	2	-0.025	3.7	-0.12	9.66	10	6	8
MKAAINM02013			5		12.65	13		
MKAAINM02510	2.5	-0.025	3.7	-0.12	9.66	10	8	10
MKAAINM03010	3							
MKAAINM03013	3	-0.025	5	-0.12	12.65	13	8	10
MKAAINM03016			6.5	-0.15	15.72	16		
MKAAINM03019			7.5	-0.15	18.57	19		
MKAAINM04013	4	-0.03	5	-0.12	12.65	13	10	12
MKAAINM04016			6.5	-0.15	15.72	16		
MKAAINM04019			7.5	-0.15	18.57	19		
MKAAINM04022			9	-0.15	21.68	22		
MKAAINM05016	5	-0.03	6.5	-0.15	15.72	16	12	17
MKAAINM05019			7.5		18.57	19		
MKAAINM05022			9		21.63	22		
MKAAINM05025			10		24.49	25		
MKAAINM06022	6	-0.03	9	-0.15	21.63	22	17	22
MKAAINM06025			10	-0.15	24.49	25		
MKAAINM06028			11	-0.18	27.35	28		
MKAAINM08028	8	-0.036	11	-0.18	27.35	28	22	30
MKAAINM08032			13		31.43	32		
MKAAINM10032	10	-0.036	13	-0.18	31.43	32	30	38
MKAAINM10045			16		43.08	45		

KEYS, SQUARE MACHINE - Round Ended

RoHS
COMPLIANT



• **KEY** – Carbon Steel • DIN 6885A

Catalog Number	b* Width h9	h Height	L Length
MKAAJNM030306	3	3	6
MKAAJNM030308			8
MKAAJNM030310			10
MKAAJNM030314			14
MKAAJNM030320			20
MKAAJNM030325			25
MKAAJNM040408	4	4	8
MKAAJNM040410			10
MKAAJNM040414			14
MKAAJNM040416			16
MKAAJNM040420			20
MKAAJNM040425			25
MKAAJNM050510	5	5	10
MKAAJNM050514			14
MKAAJNM050516			16
MKAAJNM050520			20
MKAAJNM050525			25
MKAAJNM050536			36
MKAAJNM060610	6	6	10
MKAAJNM060614			14
MKAAJNM060616			16
MKAAJNM060620			20
MKAAJNM060628			28
MKAAJNM060636			36

Catalog Number	b* Width h9	h Height	L Length
MKAAJNM080710	8	7	10
MKAAJNM080716			16
MKAAJNM080720			20
MKAAJNM080725			25
MKAAJNM080736			36
MKAAJNM080745			45
MKAAJNM100825	10	8	25
MKAAJNM100828			28
MKAAJNM100836			36
MKAAJNM100845			45
MKAAJNM100856			56
MKAAJNM120828	12	8	28
MKAAJNM120836			36
MKAAJNM120845			45
MKAAJNM120856			56
MKAAJNM120863			63
MKAAJNM140936	14	9	36
MKAAJNM140945			45
MKAAJNM140956			56
MKAAJNM140963			63
MKAAJNM161056	16	10	56
MKAAJNM161063			63

*b Width Tolerance:

3 mm	-0.025
4, 5 & 6 mm	-0.030
8 & 10 mm	-0.036
12, 14 & 16 mm	-0.043

SECTION
10

Plungers & Pins
MSA



10



10-4 & 10-5



10-6 & 10-7



10-8 & 10-9



10-10



10-11



10-12



10-13



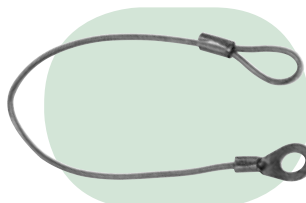
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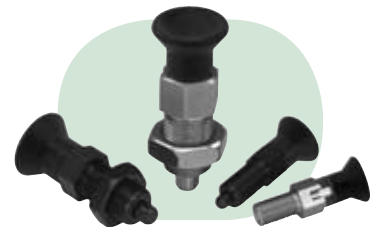
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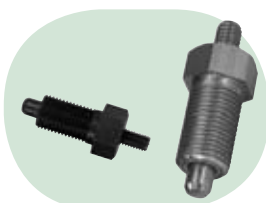
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10-15



10-16



10-17

SPRING PLUNGERS WITH LONG-LOK THREAD SYSTEM

LONG-LOK
the most advanced locking thread system



LONG-LOK Advantages

1. Vibration Resistant

The integrated LONG-LOK thread system secures Spring Plungers effectively and economically. No loosening or falling out after impact or vibrations.

2. High-Loosening Torque Required

As LONG-LOK threads are inserted into your tapped hole in a clockwise direction, the advanced locking system begins to expand in the opposite direction. This expansion creates a high degree of resistance or holding force which in turn requires a great deal of torque to loosen.

3. Secure in Every Position

The LONG-LOK system allows a plunger to be secured in any position, within the threaded hole.

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4. Save Assembly Time and Cost

The LONG-LOK thread system does not require any additional components. This will improve assembly time, lower cost and reduce your required storage space.

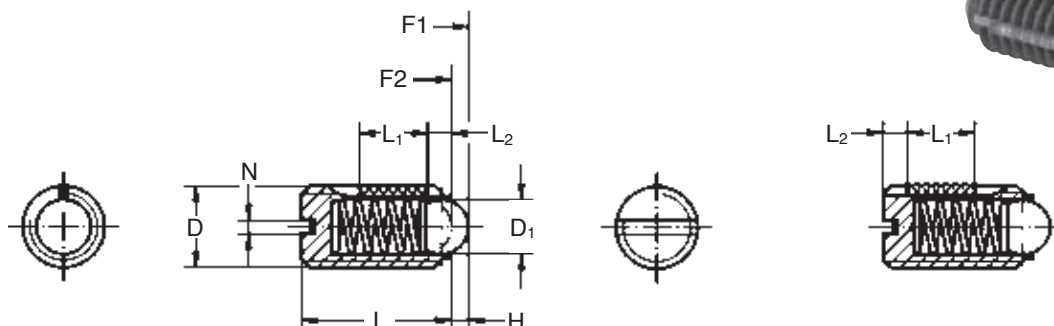
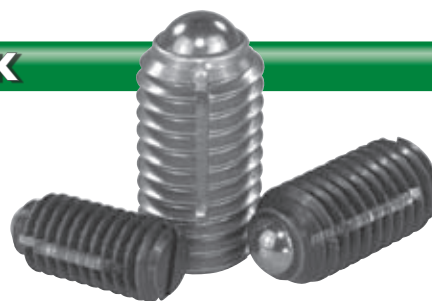
5. For Repeated Use

When using the LONG-LOK system for the first time, it will require a slightly higher tightening torque. After repeated use, the torque value remains nearly constant for approximately 20 uses.

6. Wide Variety of Solutions

LONG-LOK Plungers will perform in any application; from M3 to M16 thread sizes, light pressure to high pressure, steel or stainless steel.

PLUNGERS, SPRING - Ball Type, LONG-LOK



Applies to models
with D = M3, M4, M5, M6

• STANDARD END PRESSURE • SLOTTED

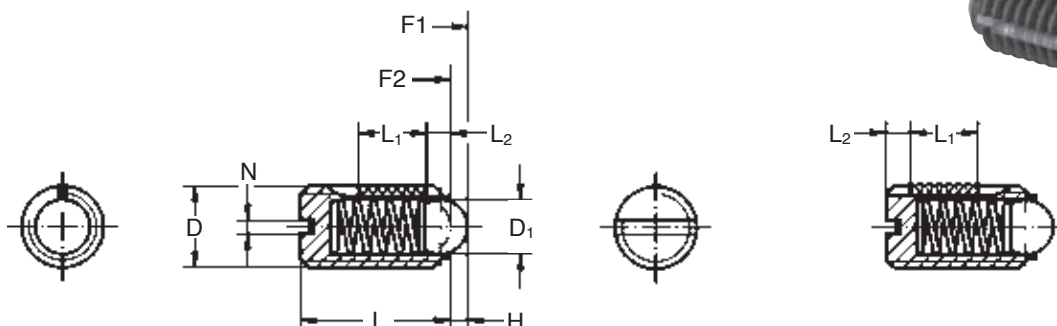
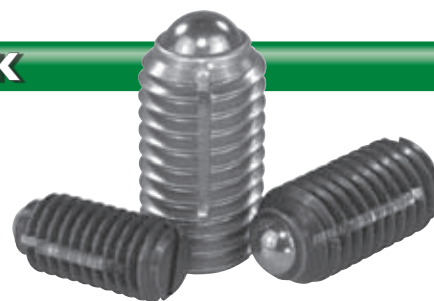
- **BODY** – Steel, Black Oxide Finish • **SPRING** – Spring Steel • **BALL** – Steel,
- **BODY** – Stainless Steel, Natural Finish • **SPRING** – Stainless Steel • **BALL** – Stainless Steel, Hardened, Natural Finish
- **LONG-LOK THREAD SYSTEM** – Nylon

Catalog Number		D	D ₁	L	L ₁ ±0.5	L ₂	H	N	Spring Force	
Steel	Stainless Steel								Initial F1 Approx. N	Final F2 Approx. N
MSAL04M0103	MSAL04M1103	M3	1.5	7	4	Approx. two thread turns	0.5	0.4	1.5	3
MSAL04M0104	MSAL04M1104	M4	2.5	9	5		0.8	0.6	4	10
MSAL04M0105	MSAL04M1105	M5	3	12	6		0.9	0.8	6	11
MSAL04M0106	MSAL04M1106	M6	3.5	14	7		1	1	9	13
MSAL04M0108	MSAL04M1108	M8	5	16	8		1.5	1.2	15	30
MSAL04M0110	MSAL04M1110	M10	6	19	9		2	1.6	20	35
MSAL04M0112	MSAL04M1112	M12	8	22	10		2.5	2	30	55
MSAL04M0116	MSAL04M1116	M16	10	24	14		3.5	2.5	65	125

10

Catalog Number		Tightening Torque Max. Approx. Nm	Loosening Torque Min. After Third Unscrewing Approx. Nm	Approx. Weight g
Steel	Stainless Steel			
MSAL04M0103	MSAL04M1103	0.10	0.07	0.2
MSAL04M0104	MSAL04M1104	0.18	0.12	0.6
MSAL04M0105	MSAL04M1105	0.12	0.08	0.9
MSAL04M0106	MSAL04M1106	0.43	0.21	1.5
MSAL04M0108	MSAL04M1108	1.09	0.37	3.5
MSAL04M0110	MSAL04M1110	1.36	0.62	7
MSAL04M0112	MSAL04M1112	2.03	1.36	10
MSAL04M0116	MSAL04M1116	3.95	2.95	24

PLUNGERS, SPRING - Ball Type, LONG-LOK



Applies to models
with D = M3, M4, M5, M6

• HEAVY END PRESSURE • SLOTTED

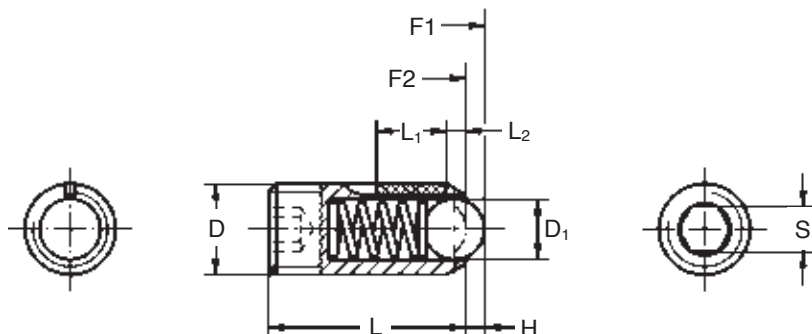
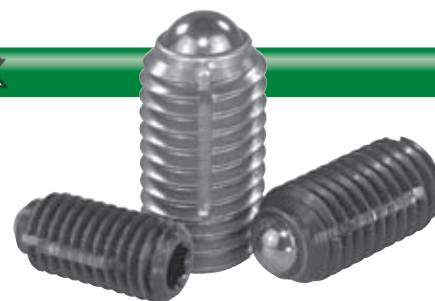
- **BODY** – Steel, Black Oxide Finish • **SPRING** – Spring Steel • **BALL** – Steel,
- **BODY** – Stainless Steel, Natural Finish • **SPRING** – Stainless Steel • **BALL** – Stainless Steel, Hardened, Natural Finish
- **LONG-LOK THREAD SYSTEM** – Nylon

Catalog Number		D	D ₁	L	L ₁ ±0.5	L ₂	H	N	Spring Force	
Steel	Stainless Steel								Initial F1 Approx. N	Final F2 Approx. N
MSAL04M01203	MSAL04M11203	M3	1.5	7	4	Approx. two thread turns	0.5	0.4	5	7
MSAL04M01204	MSAL04M11204	M4	2.5	9	5		0.8	0.6	12	22
MSAL04M01205	MSAL04M11205	M5	3	12	6		0.9	0.8	19	30
MSAL04M01206	MSAL04M11206	M6	3.5	14	7		1	1	28	40
MSAL04M01208	MSAL04M11208	M8	5	16	8		1.5	1.2	47	73
MSAL04M01210	MSAL04M11210	M10	6	19	9		2	1.6	66	100
MSAL04M01212	MSAL04M11212	M12	8	22	10		2.5	2	66	120
MSAL04M01216	MSAL04M11216	M16	10	24	14		3.5	2.5	90	180

10

Catalog Number		Tightening Torque Max. Approx. Nm	Loosening Torque Min. After Third Unscrewing Approx. Nm	Approx. Weight g
Steel	Stainless Steel			
MSAL04M01203	MSAL04M11203	0.10	0.07	0.2
MSAL04M01204	MSAL04M11204	0.18	0.12	0.6
MSAL04M01205	MSAL04M11205	0.12	0.08	0.9
MSAL04M01206	MSAL04M11206	0.43	0.21	1.5
MSAL04M01208	MSAL04M11208	1.09	0.37	3.5
MSAL04M01210	MSAL04M11210	1.36	0.62	7
MSAL04M01212	MSAL04M11212	2.03	1.36	10
MSAL04M01216	MSAL04M11216	3.95	2.95	24

PLUNGERS, SPRING - Ball Type, LONG-LOK



• STANDARD END PRESSURE • HEXAGON SOCKET

• **BODY** – Steel, Black Oxide Finish • **SPRING** – Spring Steel • **BALL** – Steel, Hardened

• **BODY** – Stainless Steel, Natural Finish • **SPRING** – Stainless Steel • **BALL** – Stainless Steel, Hardened, Natural Finish

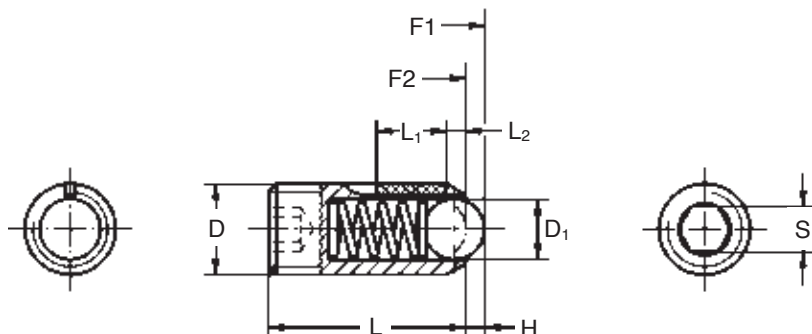
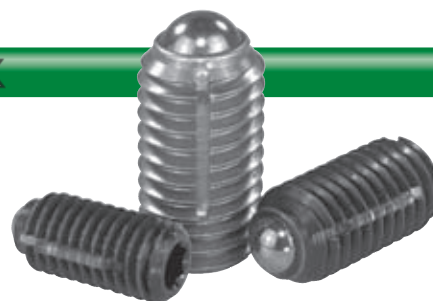
• **LONG-LOK THREAD SYSTEM** – Nylon

Catalog Number		D	D ₁	L	L ₁ ±0.5	L ₂	H	S	Spring Force	
Steel	Stainless Steel								Initial F1 Approx. N	Final F2 Approx. N
MSAL06M3103	MSAL06M3603	M3	1.5	9	4	Approx. two thread turns	0.5	1.5	1.5	3
MSAL06M3104	MSAL06M3604	M4	2.5	10	5		0.8	2	4	10
MSAL06M3105	MSAL06M3605	M5	3	14	6		0.9	3	6	11
MSAL06M3106	MSAL06M3606	M6	3.5	15	7		1		9	13
MSAL06M3108	MSAL06M3608	M8	5	18	8		1.5	4	15	30
MSAL06M3110	MSAL06M3610	M10	6	23	9		2	5	20	35
MSAL06M3112	MSAL06M3612	M12	8	26	10		2.5	6	30	55
MSAL06M3116	MSAL06M3616	M16	10	33	14		3.5	8	65	125

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Catalog Number		Tightening Torque Max. Approx. Nm	Loosening Torque Min. After Third Unscrewing Approx. Nm	Approx. Weight g
Steel	Stainless Steel			
MSAL06M3103	MSAL06M3603	0.1	0.07	0.23
MSAL06M3104	MSAL06M3604	0.18	0.12	0.46
MSAL06M3105	MSAL06M3605	0.12	0.08	1.27
MSAL06M3106	MSAL06M3606	0.44	0.21	2
MSAL06M3108	MSAL06M3608	1.1	0.38	4
MSAL06M3110	MSAL06M3610	1.3	0.6	8
MSAL06M3112	MSAL06M3612	2	1.3	12
MSAL06M3116	MSAL06M3616	3.9	3	31

PLUNGERS, SPRING - Ball Type, LONG-LOK

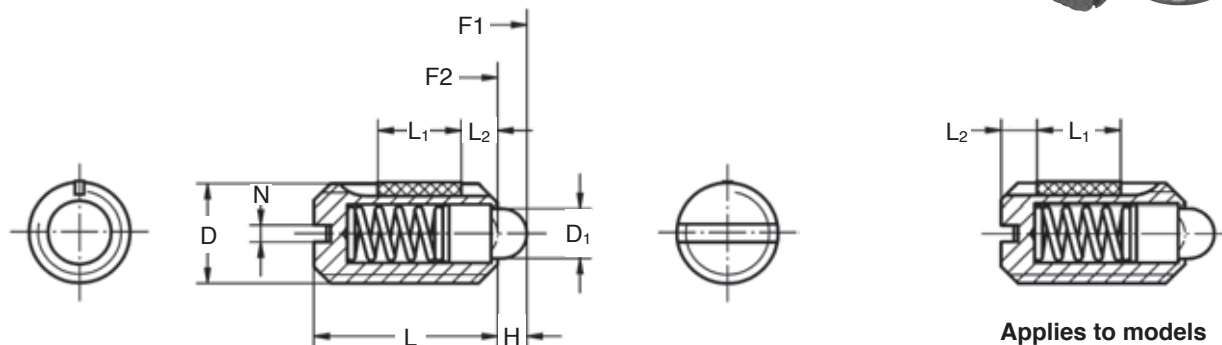
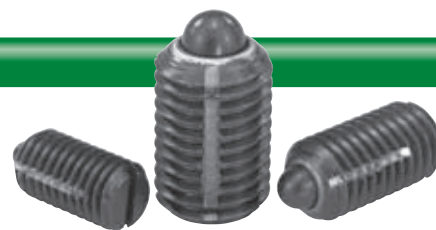


- **HEAVY END PRESSURE • HEXAGON SOCKET**
- **BODY** – Steel, Black Oxide Finish • **SPRING** – Spring Steel • **BALL** – Steel, Hardened
- **BODY** – Stainless Steel, Natural Finish • **SPRING** – Stainless Steel • **BALL** – Stainless Steel, Hardened, Natural Finish
- **LONG-LOK THREAD SYSTEM** – Nylon

Catalog Number		D	D ₁	L	L ₁ ±0.5	L ₂	H	S	Spring Force	
Steel	Stainless Steel								Initial F1 Approx. N	Final F2 Approx. N
MSAL06M31203	MSAL06M36203	M3	1.5	9	4	Approx. two thread turns	0.5	1.5	5	7
MSAL06M31204	MSAL06M36204	M4	2.5	10	5		0.8	2	12	22
MSAL06M31205	MSAL06M36205	M5	3	14	6		0.9	3	19	30
MSAL06M31206	MSAL06M36206	M6	3.5	15	7		1		28	40
MSAL06M31208	MSAL06M36208	M8	5	18	8		1.5	4	47	73
MSAL06M31210	MSAL06M36210	M10	6	23	9		2	5	66	100
MSAL06M31212	MSAL06M36212	M12	8	26	10		2.5	6	66	120
MSAL06M31216	MSAL06M36216	M16	10	33	14		3.5	8	90	180

Catalog Number		Tightening Torque Max. Approx. Nm	Loosening Torque Min. After Third Unscrewing Approx. Nm	Approx. Weight g
Steel	Stainless Steel			
MSAL06M31203	MSAL06M36203	0.1	0.07	0.23
MSAL06M31204	MSAL06M36204	0.18	0.12	0.46
MSAL06M31205	MSAL06M36205	0.12	0.08	1.27
MSAL06M31206	MSAL06M36206	0.44	0.21	2
MSAL06M31208	MSAL06M36208	1.1	0.38	4
MSAL06M31210	MSAL06M36210	1.3	0.6	8
MSAL06M31212	MSAL06M36212	2	1.3	12
MSAL06M31216	MSAL06M36216	3.9	3	31

PLUNGERS, SPRING - Pin Type, LONG-LOK



Applies to models
with D = M4, M5, M6

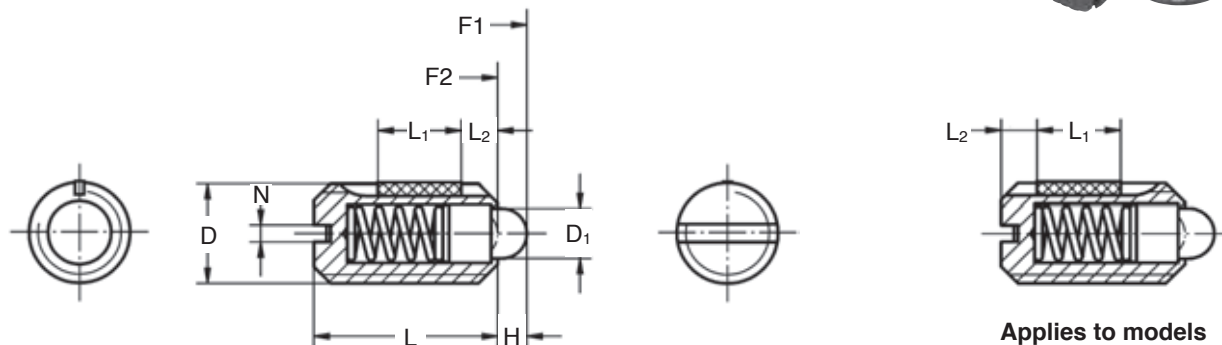
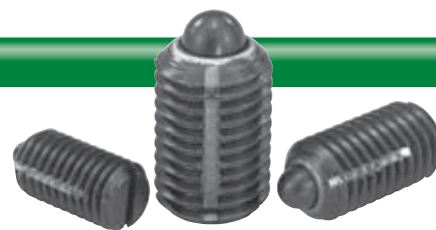
- **LIGHT END PRESSURE • SLOTTED**
- **BODY** – Steel, Black Oxide Finish • **SPRING** – Spring Steel • **PIN** – Steel, Hardened
- **BODY** – Stainless Steel, Natural Finish • **SPRING** – Stainless Steel • **PIN** – Stainless Steel, Hardened, Natural Finish
- **LONG-LOK THREAD SYSTEM** – Nylon

Catalog Number		D	D ₁	L	L ₁ ±0.5	L ₂	H	N	Spring Force	
Steel	Stainless Steel								Initial F1 Approx. N	Final F2 Approx. N
MSAL05M21104	MSAL05M26104	M4	1.8	9	5	Approx. two thread turns	1.5	0.6	3	10
MSAL05M21105	MSAL05M26105	M5	2.4	12	6		2	0.8		
MSAL05M21106	MSAL05M26106	M6	2.7	14	7		2	1	4	10
MSAL05M21108	MSAL05M26108	M8	4	16	8			1.2	7	15
MSAL05M21110	MSAL05M26110	M10	4.5	19	9		2.5	1.6	9	16
MSAL05M21112	MSAL05M26112	M12	6	22	10		3.5	2	14	26
MSAL05M21116	MSAL05M26116	M16	8.5	24	14	4.5	2.5	22	50	

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Catalog Number		Tightening Torque Max. Approx. Nm	Loosening Torque Min. After Third Unscrewing Approx. Nm	Approx. Weight g
Steel	Stainless Steel			
MSAL05M21104	MSAL05M26104	0.18	0.12	0.39
MSAL05M21105	MSAL05M26105	0.12	0.08	1
MSAL05M21106	MSAL05M26106	0.44	0.21	1.7
MSAL05M21108	MSAL05M26108	1.1	0.38	4
MSAL05M21110	MSAL05M26110	1.36	0.62	7
MSAL05M21112	MSAL05M26112	2.11	1.41	13
MSAL05M21116	MSAL05M26116	3.95	3.05	24

PLUNGERS, SPRING - Pin Type, LONG-LOK



Applies to models
with D = M4, M5, M6

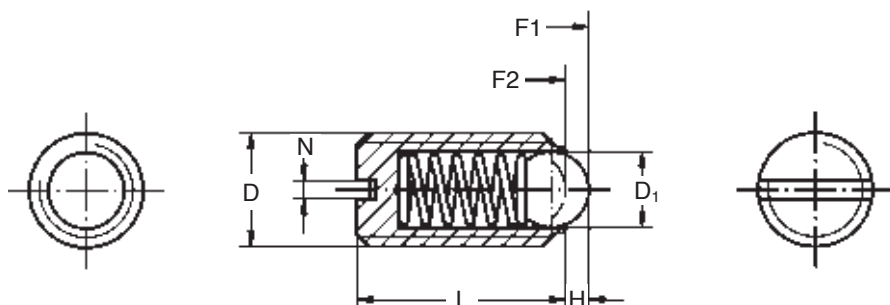
- **STANDARD END PRESSURE • SLOTTED**
- **BODY** – Steel, Black Oxide Finish • **SPRING** – Spring Steel • **PIN** – Steel, Hardened
- **BODY** – Stainless Steel, Natural Finish • **SPRING** – Stainless Steel • **PIN** – Stainless Steel, Hardened, Natural Finish
- **LONG-LOK THREAD SYSTEM** – Nylon

Catalog Number		D	D ₁	L	L ₁ ±0.5	L ₂	H	N	Spring Force	
Steel	Stainless Steel								Initial F1 Approx. N	Final F2 Approx. N
MSAL05M2104	MSAL05M2604	M4	1.8	9	5	Approx. two thread turns	1.5	0.6	6	20
MSAL05M2105	MSAL05M2605	M5	2.4	12	6		2	0.8		
MSAL05M2106	MSAL05M2606	M6	2.7	14	7		2	1	7	20
MSAL05M2108	MSAL05M2608	M8	4	16	8			1.2	15	30
MSAL05M2110	MSAL05M2610	M10	4.5	19	9		2.5	1.6	20	35
MSAL05M2112	MSAL05M2612	M12	6	22	10		3.5	2	30	55
MSAL05M2116	MSAL05M2616	M16	8.5	24	14		4.5	2.5	45	100

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Catalog Number		Tightening Torque Max. Approx. Nm	Loosening Torque Min. After Third Unscrewing Approx. Nm	Approx. Weight g
Steel	Stainless Steel			
MSAL05M2104	MSAL05M2604	0.18	0.12	0.39
MSAL05M2105	MSAL05M2605	0.12	0.08	1
MSAL05M2106	MSAL05M2606	0.44	0.21	1.7
MSAL05M2108	MSAL05M2608	1.1	0.38	4
MSAL05M2110	MSAL05M2610	1.36	0.62	7
MSAL05M2112	MSAL05M2612	2.11	1.41	13
MSAL05M2116	MSAL05M2616	3.95	3.05	24

PLUNGERS, SPRING - Ball Type, Slotted



• STANDARD END PRESSURE

- **BODY** – Steel, Black Oxide Finish • **SPRING** – Spring Steel • **BALL** – Steel, Hardened
- **BODY** – Stainless Steel, Natural Finish • **SPRING** – Stainless Steel • **BALL** – Stainless Steel

Catalog Number		D	D ₁	L	H	N	Spring Force		Approx. Weight g
Steel	Stainless Steel						Initial F1 approx. N	Final F2 approx. N	
MSAL01M0003	MSAL01M1003	M3	1.5	7	0.5	0.4	1.5	3	0.2
MSAL01M0004	MSAL01M1004	M4	2.5	9	0.8	0.6	4	10	0.6
MSAL01M0005	MSAL01M1005	M5	3	12	0.9	0.8	6	11	0.9
MSAL01M0006	MSAL01M1006	M6	3.5	14	1	1	9	13	1.5
MSAL01M0008	MSAL01M1008	M8	5	16	1.5	1.2	15	30	3.5
MSAL01M0010	MSAL01M1010	M10	6	19	2	1.6	20	35	7
MSAL01M0012	MSAL01M1012	M12	8	22	2.5	2	30	55	10
MSAL01M0016	MSAL01M1016	M16	10	24	3.5	2.5	65	125	24
MSAL01M0020	MSAL01M1020	M20	12	30	4.5	2.5	80	160	44.3

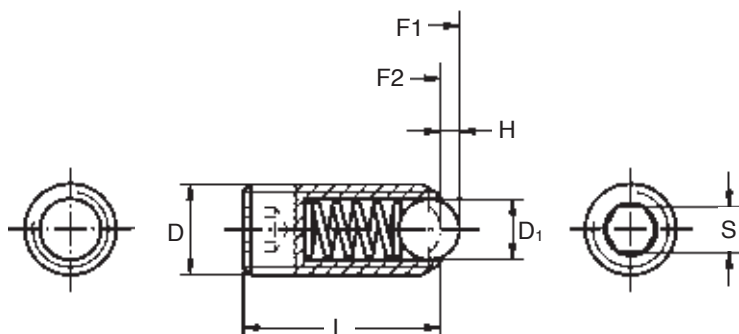
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• HEAVY END PRESSURE

- **BODY** – Steel, Black Oxide Finish • **SPRING** – Spring Steel • **BALL** – Steel, Hardened
- **BODY** – Stainless Steel, Natural Finish • **SPRING** – Stainless Steel • **BALL** – Stainless Steel

Catalog Number		D	D ₁	L	H	N	Spring Force		Approx. Weight g
Steel	Stainless Steel						Initial F1 approx. N	Final F2 approx. N	
MSAL01M00203	MSAL01M10203	M3	1.5	7	0.5	0.4	5	7	0.2
MSAL01M00204	MSAL01M10204	M4	2.5	9	0.8	0.6	12	22	0.6
MSAL01M00205	MSAL01M10205	M5	3	12	0.9	0.8	19	30	0.9
MSAL01M00206	MSAL01M10206	M6	3.5	14	1	1	28	40	1.5
MSAL01M00208	MSAL01M10208	M8	5	16	1.5	1.2	47	73	3.5
MSAL01M00210	MSAL01M10210	M10	6	19	2	1.6	66	100	7
MSAL01M00212	MSAL01M10212	M12	8	22	2.5	2	66	120	10
MSAL01M00216	MSAL01M10216	M16	10	24	3.5	2.5	90	180	24
MSAL01M00220	MSAL01M10220	M20	12	30	4.5	2.5	115	240	44.3

PLUNGERS, SPRING - Ball Type, Hex Socket



• STANDARD END PRESSURE

- **BODY** – Steel, Black Oxide Finish • **SPRING** – Spring Steel • **BALL** – Steel, Hardened
- **BODY** – Stainless Steel, Natural Finish • **SPRING** – Stainless Steel • **BALL** – Stainless Steel, Hardened

Catalog Number		D	D ₁	L	H	S	Spring Force		Approx. Weight g
Steel	Stainless Steel						Initial F1 Approx. N	Final F2 Approx. N	
MSAL03M3003	MSAL03M3503	M3	1.5	9	0.5	1.5	1.5	3	0.23
MSAL03M3004	MSAL03M3504	M4	2.5	10	0.8	2	4	10	0.46
MSAL03M3005	MSAL03M3505	M5	3	14	0.9	3	6	11	1.27
MSAL03M3006	MSAL03M3506	M6	3.5	15	1	3	9	13	2
MSAL03M3008	MSAL03M3508	M8	5	18	1.5	4	15	30	4
MSAL03M3010	MSAL03M3510	M10	6	23	2	5	20	35	8
MSAL03M3012	MSAL03M3512	M12	8	26	2.5	6	30	55	12
MSAL03M3012	MSAL03M3516	M16	10	33	3.5	8	65	125	31
MSAL03M3020	MSAL03M3520	M20	12	43	4.5	10	80	160	64
MSAL03M3024	MSAL03M3524	M24	15	48	5.5	12	90	180	100

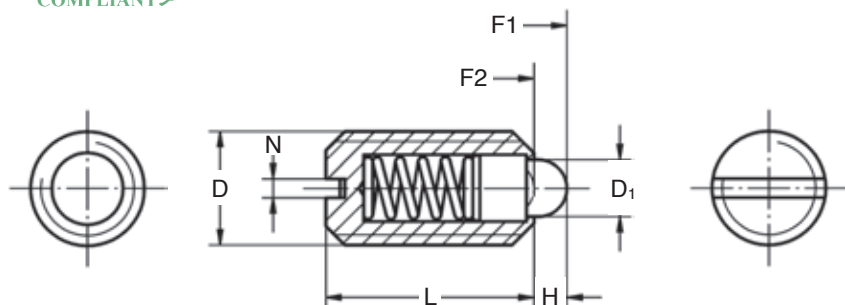
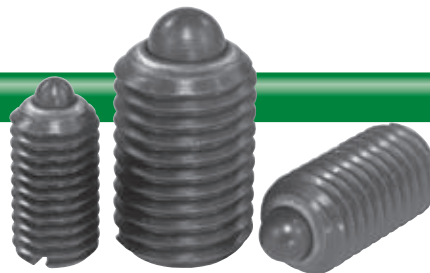
10. HEAVY END PRESSURE

- **BODY** – Steel, Black Oxide Finish • **SPRING** – Spring Steel • **BALL** – Steel, Hardened
- **BODY** – Stainless Steel, Natural Finish • **SPRING** – Stainless Steel • **BALL** – Stainless Steel, Hardened

Catalog Number		D	D ₁	L	H	S	Spring Force		Approx. Weight g
Steel	Stainless Steel						Initial F1 Approx. N	Final F2 Approx. N	
MSAL03M30203	MSAL03M35203	M3	1.5	9	0.5	1.5	5	7	0.23
MSAL03M30204	MSAL03M35204	M4	2.5	10	0.8	2	12	22	0.46
MSAL03M30205	MSAL03M35205	M5	3	14	0.9	3	19	30	1.27
MSAL03M30206	MSAL03M35206	M6	3.5	15	1	3	28	40	2
MSAL03M30208	MSAL03M35208	M8	5	18	1.5	4	47	73	4
MSAL03M30210	MSAL03M35210	M10	6	23	2	5	66	100	8
MSAL03M30212	MSAL03M35212	M12	8	26	2.5	6	66	120	12
MSAL03M30216	MSAL03M35216	M16	10	33	3.5	8	90	180	31
MSAL03M30220	MSAL03M35220	M20	12	43	4.5	10	115	240	64
MSAL03M30224	MSAL03M35224	M24	15	48	5.5	12	130	270	100

PLUNGERS, SPRING - Pin Type, Slotted

RoHS
COMPLIANT



• STANDARD END PRESSURE

- **BODY** – Steel, Black Oxide Finish • **SPRING** – Spring Steel • **PIN** – Steel, Hardened
- **BODY** – Stainless Steel, Natural Finish • **SPRING** – Stainless Steel • **PIN** – Stainless Steel, Natural Finish, Hardened

Catalog Number		D	D ₁	L	H	N	Spring Force		Approx. Weight g
Steel	Stainless Steel						Initial F1 Approx. N	Final F2 Approx. N	
MSAL02M2004	MSAL02M2504	M4	1.8	9	1.5	0.6	6	20	0.39
MSAL02M2005	MSAL02M2505	M5	2.4	12	2	0.8			1
MSAL02M2006	MSAL02M2506	M6	2.7	14	2	1	7	20	1.7
MSAL02M2008	MSAL02M2508	M8	4	16		1.2	15	30	4
MSAL02M2010	MSAL02M2510	M10	4.5	19	2.5	1.6	20	35	7
MSAL02M2012	MSAL02M2512	M12	6	22	3.5	2	30	55	13
MSAL02M2016	MSAL02M2516	M16	8.5	24	4.5	2.5	45	100	24
MSAL02M2020	MSAL02M2520	M20	10	30	6.5		60	120	46.3

• LIGHT END PRESSURE

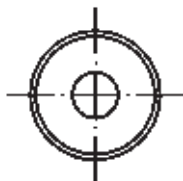
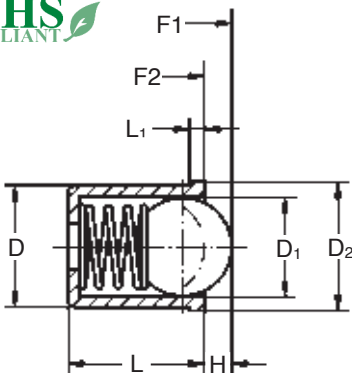
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- **BODY** – Steel, Black Oxide Finish • **SPRING** – Spring Steel • **PIN** – Steel, Hardened
- **BODY** – Stainless Steel, Natural Finish • **SPRING** – Stainless Steel • **PIN** – Stainless Steel, Natural Finish, Hardened

Catalog Number		D	D ₁	L	H	N	Spring Force		Approx. Weight g
Steel	Stainless Steel						Initial F1 Approx. N	Final F2 Approx. N	
MSAL02M20104	MSAL02M25104	M4	1.8	9	1.5	0.6	3	10	0.39
MSAL02M20105	MSAL02M25105	M5	2.4	12	2	0.8			1
MSAL02M20106	MSAL02M25106	M6	2.7	14	2	1	4	10	1.7
MSAL02M20108	MSAL02M25108	M8	4	16		1.2	7	15	4
MSAL02M20110	MSAL02M25110	M10	4.5	19	2.5	1.6	9	16	7
MSAL02M20112	MSAL02M25112	M12	6	22	3.5	2	14	26	13
MSAL02M20116	MSAL02M25116	M16	8.5	24	4.5	2.5	22	50	24
MSAL02M20120	MSAL02M25120	M20	10	30	6.5		30	60	46.3

PLUNGERS, SPRING - Push Fit

RoHS
COMPLIANT

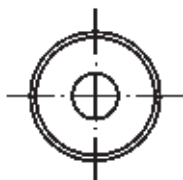
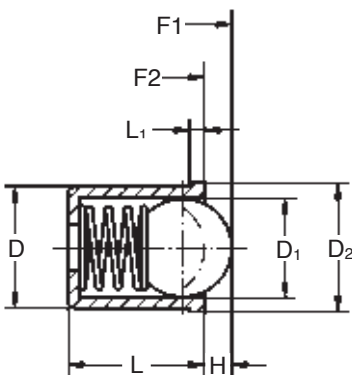


- **BODY** – Stainless Steel, Natural Finish • **SPRING** – Stainless Steel
- **BALL** – White Plastic or Hardened Stainless Steel, Natural Finish

Catalog Number		D +0.08	D ₁	D ₂	L	L ₁	H	Spring Force		Approx. Weight g
Stainless Steel Ball	Plastic Ball							Initial F1 Approx. N	Final F2 Approx. N	
MSAL07M7004	MSAL07M70304	4	3	4.6	5	1	0.8	3	7	0.3
MSAL07M7005	MSAL07M70305	5	4	5.6	6		1	4		0.6
MSAL07M7006	MSAL07M70306	6	5	6.5	7	1	1.5	6	12	1
MSAL07M7008	MSAL07M70308	8	6.5	8.5	9		1.8			2
MSAL07M7010	MSAL07M70310	10	8	12	13.5	2.5	2.7	10	20	6
MSAL07M7012	MSAL07M70312	12	10	14	16		3.5	15	25	10

All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

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- **BODY** – Thermoplastic, Black • **SPRING** – Stainless Steel
- **BALL** – White Plastic or Hardened Stainless Steel, Natural Finish

Catalog Number		D +0.1	D ₁	D ₂	L	L ₁	H	Spring Force		Approx. Weight g
Stainless Steel Ball	Plastic Ball							Initial F1 Approx. N	Final F2 Approx. N	
MSAL07M7104	MSAL07M71204	4	3	4.6	5	1	0.7	3	7	0.17
MSAL07M7105	MSAL07M71205	5	4	5.6	6		1	4		0.35
MSAL07M7106	MSAL07M71206	6	5	6.5	7		1.5	6	12	0.66
MSAL07M7108	MSAL07M71208	8	6.5	8.5	9		1.8			1.46

PINS, BALL LOCK, Self-Locking



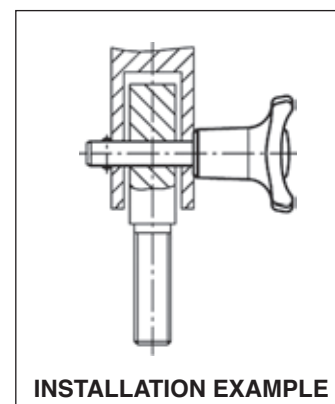
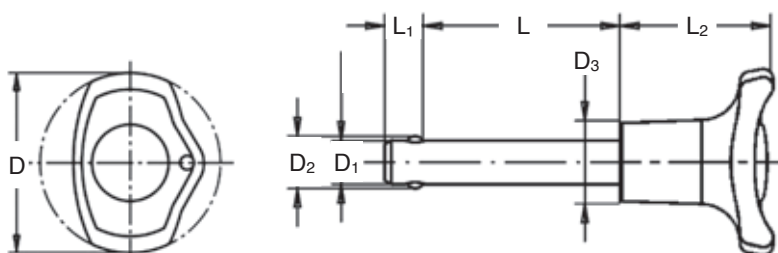
• CHARACTERISTICS

Ball lock pins allow instant bolting of two workpieces.
Two spring pressure balls automatically lock the pin in place. Pressing the red push button will release the ball and unlock the pin.

• ACCESSORIES

Pin Retaining Ring: **MRAL31M9923**

Pin Retaining Cable: **MRAL31M990...**



- **GRIP** – Thermoplastic, Black • **PUSH BUTTON** – Thermoplastic, Red
- **PIN & BALLS** – Stainless Steel, Natural Finish

Catalog Number ^Δ	D	D ₁ -0.04 -0.08	D ₂	D ₃	L ₁	L ₂	Receiving Hole H11*	Breaking Force Double-edged N	Working Force Double-edged N
MSAL31M9338050 ☐	38	5	5.5	16	6	32.5	5	24000	9000
MSAL31M9338060 ☐		6	7		7		6	35000	13000
MSAL31M9338080 ☐		8	9.5		8		8	63000	23000
MSAL31M9347100 ☐	47	10	12	23	9	40	10	100000	35000
MSAL31M9347120 ☐		12	14.5		10		12	144000	51000
MSAL31M9347160 ☐		16	19		13		16	257000	90000

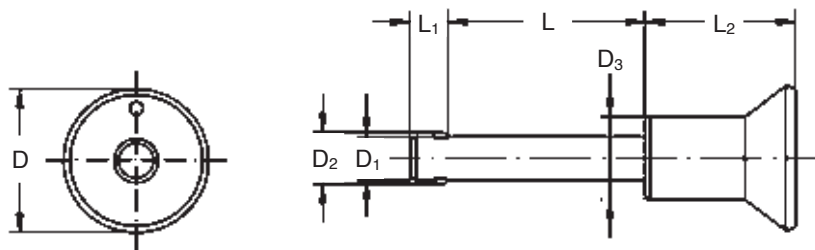
^ΔTo complete the part number, add desired length from table below.

*Tolerance (H11): 5 & 6 mm +0.075 / 0
8 & 10 mm +0.090 / 0
12 & 16 mm +0.110 / 0

Catalog Number	L Length +0.6 0											
MSAL31M9338050 ☐	10	15	20	25	30	—	—	—	—	—	—	—
MSAL31M9338060 ☐	10	15	20	25	30	35	40	45	50	—	—	—
MSAL31M9338080 ☐	—	—	20	25	30	35	40	45	50	—	—	—
MSAL31M9347100 ☐	—	—	20	25	30	35	40	45	50	60	—	—
MSAL31M9347120 ☐	—	—	—	25	30	35	40	45	50	60	70	80
MSAL31M9347160 ☐	—	—	—	—	30	35	40	45	50	60	70	80

PINS, BALL LOCK & ACCESSORIES

RoHS
COMPLIANT



• BALL LOCK PIN, BUTTON HEAD STYLE SELF-LOCKING – Stainless Steel, Natural Finish

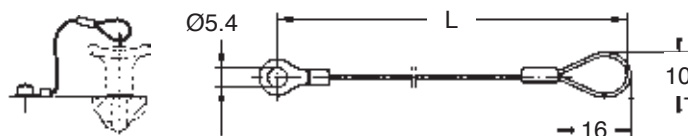
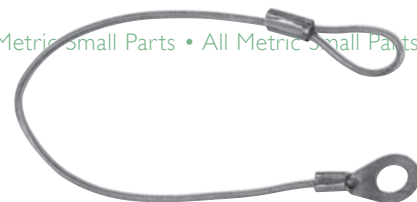
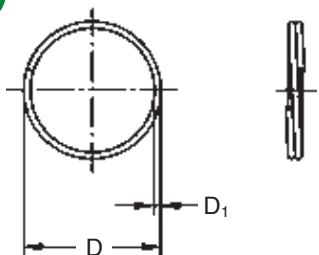
Catalog Number ^Δ	D	D ₁ -0.04 -0.08	D ₂	D ₃	L ₁	L ₂	Receiving Hole H11	Breaking Force Double-edged N	Working Force Double-edged N
MSAL31M9423050 □□	25	5	5.5	14	6	26.5	5	24000	9000
MSAL31M9423060 □□		6	7		7		6	35000	13000
MSAL31M9423080 □□		8	9.5		8		8	63000	23000
MSAL31M9431100 □□	33	10	12	19	9	34.6	10	100000	35000
MSAL31M9431120 □□		12	14.5		10		12	144000	51000

Catalog Number ^Δ	L +0.6 Length 0											
MSAL31M9423050 □□	10	15	20	25	30	—	—	—	—	—	—	—
MSAL31M9423060 □□	10	15	20	25	30	35	40	45	50	—	—	—
MSAL31M9423080 □□	—	—	20	25	30	35	40	45	50	—	—	—
MSAL31M9431100 □□	—	—	20	25	30	35	40	45	50	60	—	—
MSAL31M9431120 □□	—	—	—	25	30	35	40	45	50	60	70	80

^ΔTo complete the part number, add desired L length from table above.

All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts • All Metric Small Parts

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• PIN RINGS – Stainless Steel

Catalog Number	D	D ₁
MRAL31M9915	15	1
MRAL31M9919	19	
MRAL31M9923	23	1.2
MRAL31M9928	28	1.7

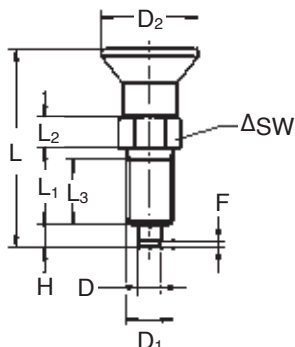
• PIN RETAINING CABLES – Stainless Steel

Catalog Number	L
MRAL31M990150	150
MRAL31M990200	200
MRAL31M990300	300

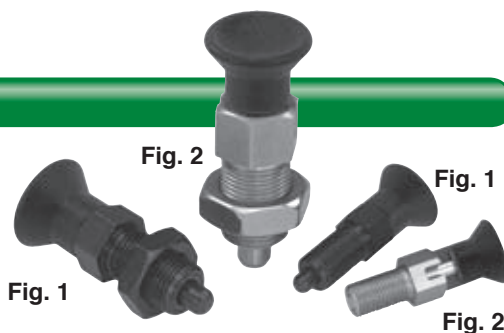
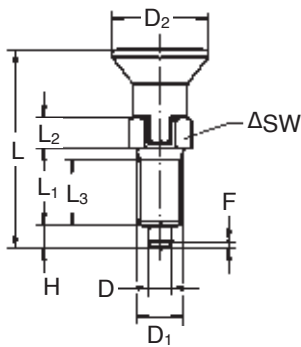
PLUNGERS, PULL KNOB INDEXING

RoHS
COMPLIANT

STYLE A
WITHOUT LOCKING SLOT



STYLE C
WITH LOCKING SLOT



• CHARACTERISTICS

Indexing plungers are used to prevent any change in locking position due to lateral forces. A new locking position can only be set after the bolt has been manually disengaged. Style C is recommended for applications in which gradual disengagement of the locking bolt is desired, without any relocking of the locking pin.

Fig. 1 • PLUNGER – Steel, Black Oxide Finish • KNOB – Thermoplastic
• LOCKING PIN GROUND & HARDENED

Catalog Number		Size	D -0.02 -0.04	D ₁	D ₂	L	L ₁	L ₂	L ₃	H
Style A	Style C									
MSAL08M891105	MSAL08M893105	1	5	M10 X 1	21	43.5	17	7	15	5
MSAL08M891206	MSAL08M893206	2	6	M12 X 1.5	25	51.7	20	8	17	6
MSAL08M891308	MSAL08M893308	3	8	M16 X 1.5	33	68	26	10	23	8
MSAL08M891410	MSAL08M893410	4	10	M20 X 1.5		74	28	12	25	10

Catalog Number		ΔSW	F X 30°	Spring Force	
Style A	Style C			Initial F1 Approx. N	Final F2 Approx. N
MSAL08M891105	MSAL08M893105	13	1.3	5	12
MSAL08M891206	MSAL08M893206	14	1.8	6	14
MSAL08M891308	MSAL08M893308	19	2.3	15	35
MSAL08M891410	MSAL08M893410	22	2.8		40

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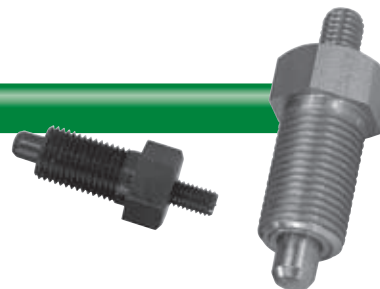
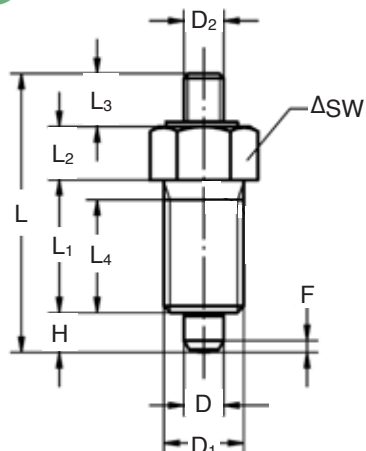
Fig. 2 • PLUNGER – Stainless Steel, Natural Finish • KNOB – Thermoplastic
• LOCKING PIN GROUND & HARDENED

Catalog Number		Size	D -0.02 -0.04	D ₁	D ₂	L	L ₁	L ₂	L ₃	H
Style A	Style C									
MSAL08M8901105	MSAL08M8903105	1	5	M10 X 1	21	43.5	17	7	15	5
MSAL08M8901206	MSAL08M8903206	2	6	M12 X 1.5	25	51.7	20	8	17	6
MSAL08M8901308	MSAL08M8903308	3	8	M16 X 1.5	33	68	26	10	23	8
MSAL08M8901410	MSAL08M8903410	4	10	M20 X 1.5		74	28	12	25	10

Catalog Number		ΔSW	F X 30°	Spring Force	
Style A	Style C			Initial F1 Approx. N	Final F2 Approx. N
MSAL08M8901105	MSAL08M8903105	13	1.3	5	12
MSAL08M8901206	MSAL08M8903206	14	1.8	6	14
MSAL08M8901308	MSAL08M8903308	19	2.3	15	35
MSAL08M8901410	MSAL08M8903410	22	2.8		40

ΔSW indicates dimension across flat.

PLUNGERS, INDEXING



• CHARACTERISTICS

Indexing plungers are used to prevent any change in locking position due to lateral forces. A new locking position can only be set after the bolt has been manually disengaged. Special grips can be fitted on the threaded head. These pins are also suitable for automated actuation of the locking bolt by a pneumatic cylinder or bowden cable.

- **PLUNGER WITH LOCKING PIN** – Steel, Hardened, Black Oxide Finish or Stainless Steel, Hardened, Natural Finish
- **THREADED HEAD • WITHOUT LOCKING NUT**

Catalog Number		Size	D -0.02 -0.04	D ₁	D ₂	L	L ₁	L ₂	L ₃
Steel	Stainless Steel								
MSAL09M921105	MSAL09M9201105	1	5	M10 X 1	M4	37	17	7	8
MSAL09M921206	MSAL09M9201206	2	6	M12 X 1.5	M6	42	20	8	
MSAL09M921308	MSAL09M9201308	3	8	M16 X 1.5	M8	56	26	10	12
MSAL09M921410	MSAL09M9201410	4	10	M20 X 1.5		62	28	12	

Catalog Number		L ₄	H	ΔSW	F X 30°	Spring Force	
Steel	Stainless Steel					Initial F1 Approx. N	Final F2 Approx. N
MSAL09M921105	MSAL09M9201105	15	5	13	1.3	5	12
MSAL09M921206	MSAL09M9201206	17	6	14	1.8	6	14
MSAL09M921308	MSAL09M9201308	23	8	19	2.3	15	35
MSAL09M921410	MSAL09M9201410	25	10	22	2.8		40

ΔSW Indicates dimension across flats.



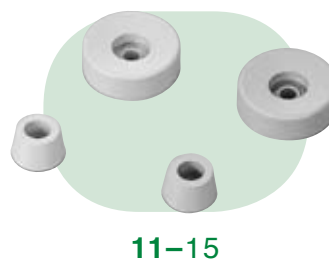
www.allmetricsmallparts.com

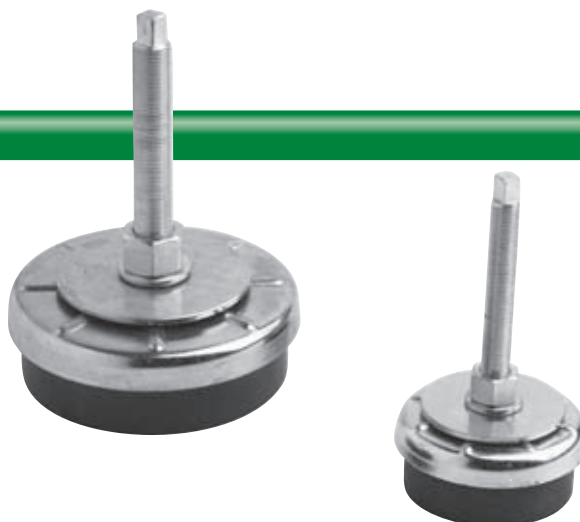
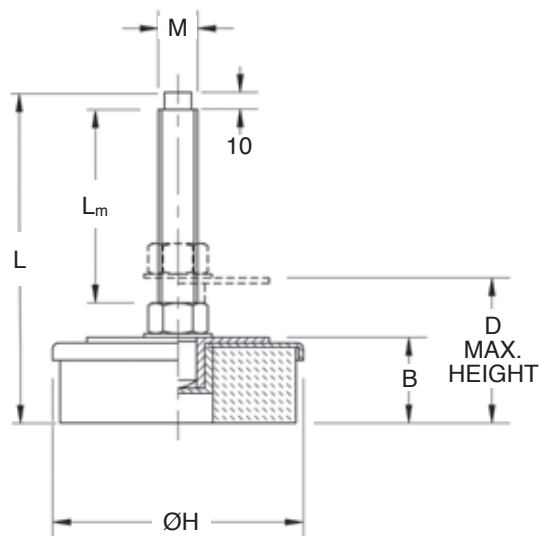
SECTION
11

Leveling Mounts & Support Feet
MVA



11





- **ISOLATOR** – Nitrile Rubber Compound • **BASE** – Steel, Zinc Plated
- **BOLT, NUT & WASHER** – Steel, Zinc Plated

Catalog Number	ØH	L	D	B	M	L _m	Across Bolt Flats	Maximum Load N (kgf)	
MVAYMKM080	80	140	47	35	M12 X 1.25	72	8	5000	(510)
MVAYMKM120	120	150	53	40	M16 X 1.5		10	10000	(1020)
MVAYMKM160	160	180	65	50	M20 X 1.5	103	12	20000	(2039)
MVAYMKM200	200	192	75	60				40000	(4079)

MOUNTS, SUCTION FOOT & LEVELING

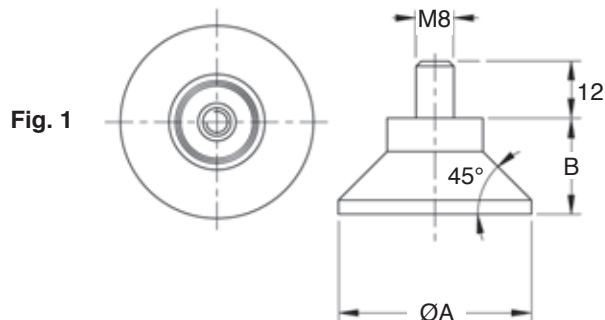


Fig. 1

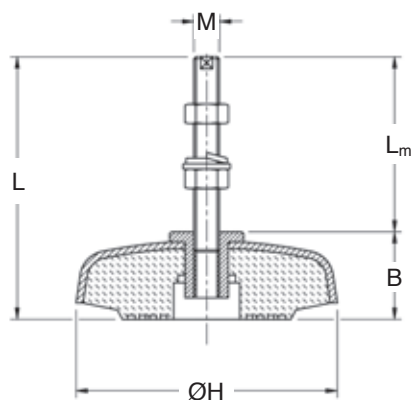


Fig. 2



Fig. 1



Fig. 2

Suction Foot Mounts

Fig. 1 • **ISOLATOR** – PVC, Black
• **SCREW** – Steel, Zinc Plated

Catalog Number	ØA	B	Maximum Load N (kgf)
MVAYPVM1	40	20	1000 (102)
MVAYPVM2		30	
MVAYPVM3	50	20	1500 (153)
MVAYPVM4		30	

Leveling Mounts

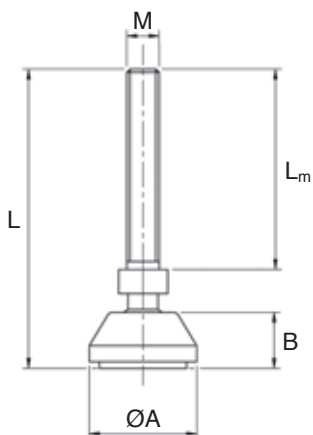
Fig. 2 • **ISOLATOR** – Nitrile Rubber Compound • **BASE** – Steel, Zinc Plated
• **BOLT, NUTS & WASHERS** – Steel, Zinc Plated

Catalog Number	L	ØH	B	M	L _m	Across Bolt Flats	Maximum Load N (kgf)
MVAYTEM080	94	80	29	M12	65	8	5000 (510)
MVAYTEM110	144	110	34	M14	110	10	10000 (1019)
MVAYTEM140	155	140	45	M16	110	12	15000 (1529)
MVAYTEM200	224	200	74	M20	150	16	30000 (3059)

MOUNTS, ADJUSTABLE FOOT, 40 mm

RoHS
COMPLIANT

Moderate Antivibration

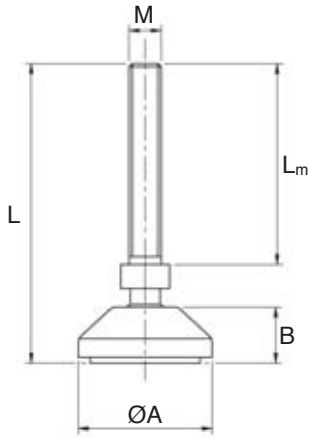


- **ISOLATOR** – Polyamide, Fiberglass Reinforced
- **LATERAL ADJUSTMENT** – Approx. 15°
- **SWIVEL SPINDLE** • **ANTISLIP PLATE**

Catalog Number	A	B	L	M	L _m	Swivel Spindle Material	Max. Load N (kgf)
MVAYNAM40/08 MVAYNAM40/08X	40	22	98	M8	65	Steel, Zinc Plated Stainless Steel	5000 (510)
MVAYNAM40/10 MVAYNAM40/10L MVAYNAM40/10X MVAYNAM40/10XL MVAYNAM40/10Y MVAYNAM40/10YL	40	22	93 148 93 148 100 160	M10	60 115 60 115 60 120	Steel, Zinc Plated Steel, Zinc Plated Stainless Steel Stainless Steel Steel, Zinc Plated, Nylon Ball Steel, Zinc Plated, Nylon Ball	5000 (510)
MVAYNAM40/12 MVAYNAM40/12L MVAYNAM40/12X MVAYNAM40/12XL MVAYNAM40/12Y MVAYNAM40/12YL	40	22	96 163 96 163 100 160	M12	63 130 63 130 60 120	Steel, Zinc Plated Steel, Zinc Plated Stainless Steel Stainless Steel Steel, Zinc Plated, Nylon Ball Steel, Zinc Plated, Nylon Ball	5000 (510)
MVAYNAM40/14	40	22	98	M14	65	Steel, Zinc Plated	5000 (510)
MVAYNAM40/16 MVAYNAM40/16L MVAYNAM40/16X MVAYNAM40/16XL	40	22	112 167 112 167	M16	75 130 75 130	Steel, Zinc Plated Steel, Zinc Plated Stainless Steel Stainless Steel	5000 (510)

MOUNTS, ADJUSTABLE FOOT, 50 mm

Moderate Antivibration



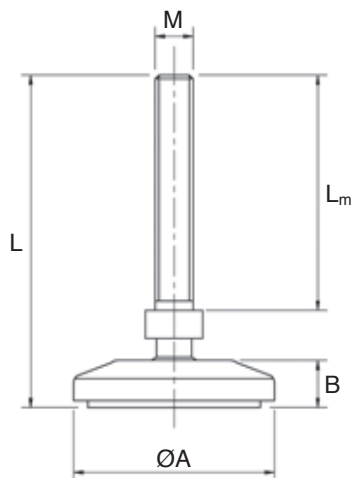
- **ISOLATOR** – Polyamide, Fiberglass Reinforced • **LATERAL ADJUSTMENT** – Approx. 15°
- **SWIVEL SPINDLE** • **ANTISLIP PLATE**

Catalog Number	A	B	L	M	L _m	Swivel Spindle Material	Max. Load N (kgf)
MVAYNAM50/08 MVAYNAM50/08X	50	22	98	M8	65	Steel, Zinc Plated Stainless Steel	5000 (510)
MVAYNAM50/10 MVAYNAM50/10L MVAYNAM50/10X MVAYNAM50/10XL MVAYNAM50/10Y MVAYNAM50/10YL	50	22	93 148 93 148 100 160	M10	60 115 60 115 60 120	Steel, Zinc Plated Steel, Zinc Plated Stainless Steel Stainless Steel Steel, Zinc Plated, Nylon Ball Steel, Zinc Plated, Nylon Ball	5000 (510)
MVAYNAM50/12 MVAYNAM50/12L MVAYNAM50/12X MVAYNAM50/12XL MVAYNAM50/12Y MVAYNAM50/12YL	50	22	96 163 96 163 100 160	M12	63 130 63 130 60 120	Steel, Zinc Plated Steel, Zinc Plated Stainless Steel Stainless Steel Steel, Zinc Plated, Nylon Ball Steel, Zinc Plated, Nylon Ball	5000 (510)
MVAYNAM50/14	50	22	98	M14	65	Steel, Zinc Plated	5000 (510)
MVAYNAM50/16 MVAYNAM50/16L MVAYNAM50/16X MVAYNAM50/16XL	50	22	112 167 112 167	M16	75 130 75 130	Steel, Zinc Plated Steel, Zinc Plated Stainless Steel Stainless Steel	5000 (510)

MOUNTS, ADJUSTABLE FOOT, 80 mm

RoHS
COMPLIANT

Moderate Antivibration



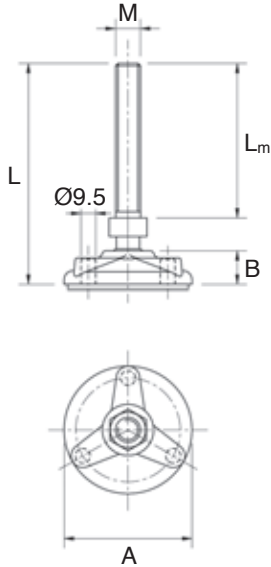
- **ISOLATOR** – Polyamide, Fiberglass Reinforced • **LATERAL ADJUSTMENT** – Approx. 15°
- **SWIVEL SPINDLE** • **ANTISLIP PLATE**

Catalog Number	A	B	L	M	L _m	Swivel Spindle Material	Max. Load N (kgf)
MVAYNAM80/08 MVAYNAM80/08X	80	19	96	M8	65	Steel, Zinc Plated Stainless Steel	10000 (1020)
MVAYNAM80/10 MVAYNAM80/10L MVAYNAM80/10X MVAYNAM80/10XL MVAYNAM80/10Y MVAYNAM80/10YL	80	19	91 146 91 146 98 158	M10	60 115 60 115 60 120	Steel, Zinc Plated Steel, Zinc Plated Stainless Steel Stainless Steel Steel, Zinc Plated, Nylon Ball Steel, Zinc Plated, Nylon Ball	10000 (1020)
MVAYNAM80/12 MVAYNAM80/12L MVAYNAM80/12X MVAYNAM80/12XL MVAYNAM80/12Y MVAYNAM80/12YL	80	19	94 161 94 161 98 158	M12	63 130 63 130 60 120	Steel, Zinc Plated Steel, Zinc Plated Stainless Steel Stainless Steel Steel, Zinc Plated, Nylon Ball Steel, Zinc Plated, Nylon Ball	10000 (1020)
MVAYNAM80/14	80	19	96	M14	65	Steel, Zinc Plated	10000 (1020)
MVAYNAM80/16 MVAYNAM80/16L MVAYNAM80/16X MVAYNAM80/16XL MVAYNAM80/20 MVAYNAM80/20L	80	19	110 165 110 165 120 175	M16 M20	75 130 75 130 85 140	Steel, Zinc Plated Steel, Zinc Plated Stainless Steel Stainless Steel Steel, Zinc Plated Steel, Zinc Plated	10000 (1020)

MOUNTS, ADJUSTABLE FIXABLE FOOT, 80 mm



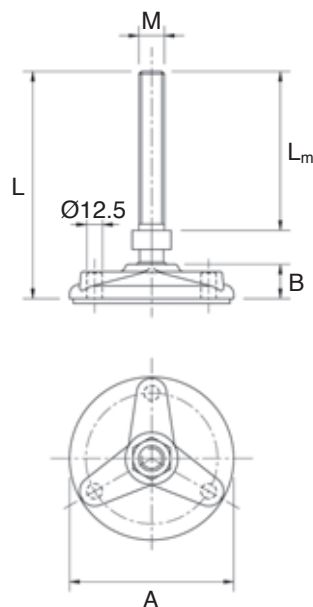
Moderate Antivibration



- **ISOLATOR** – Polyamide, Fiberglass Reinforced • **LATERAL ADJUSTMENT** – Approx. 15°
- **SWIVEL SPINDLE** • **ANTISLIP PLATE**

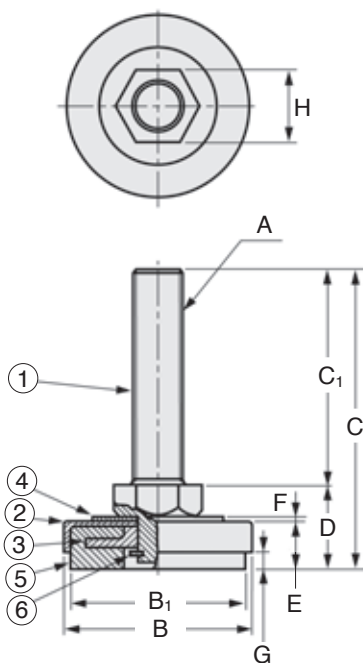
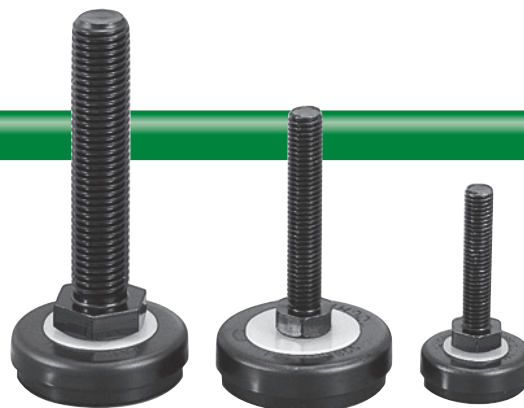
Catalog Number	A	B	L	M	L _m	Swivel Spindle Material	Max. Load N (kgf)
MVAYNFM080/08	80	24	101	M8	65	Steel, Zinc Plated	12000 (1224)
MVAYNFM080/08X						Stainless Steel	
MVAYNFM080/10	80	24	96	M10	60	Steel, Zinc Plated	12000 (1224)
MVAYNFM080/10L			151		115	Steel, Zinc Plated	
MVAYNFM080/10X			96		60	Stainless Steel	
MVAYNFM080/10XL			151		115	Stainless Steel	
MVAYNFM080/10Y			103		60	Steel, Zinc Plated, Nylon Ball	
MVAYNFM080/10YL			163		120	Steel, Zinc Plated, Nylon Ball	
MVAYNFM080/12	80	24	99	M12	63	Steel, Zinc Plated	12000 (1224)
MVAYNFM080/12L			166		130	Steel, Zinc Plated	
MVAYNFM080/12X			99		63	Stainless Steel	
MVAYNFM080/12XL			166		130	Stainless Steel	
MVAYNFM080/12Y			103		60	Steel, Zinc Plated, Nylon Ball	
MVAYNFM080/12YL			163		120	Steel, Zinc Plated, Nylon Ball	
MVAYNFM080/14	80	24	101	M14	65	Steel, Zinc Plated	12000 (1224)
MVAYNFM080/16	80	24	115	M16	75	Steel, Zinc Plated	12000 (1224)
MVAYNFM080/16L			170		130	Steel, Zinc Plated	
MVAYNFM080/16X			115		75	Stainless Steel	
MVAYNFM080/16XL			170		130	Stainless Steel	
MVAYNFM080/20			125	M20	85	Steel, Zinc Plated	
MVAYNFM080/20L			180		140	Steel, Zinc Plated	

MOUNTS, ADJUSTABLE FIXABLE FOOT, 100 mm



- **ISOLATOR** – Polyamide, Fiberglass Reinforced • **LATERAL ADJUSTMENT** – Approx. 15°
- **SWIVEL SPINDLE** • **ANTISLIP PLATE**

Catalog Number	A	B	L	M	L _m	Swivel Spindle Material	Max. Load N (kgf)
MVAYNFM100/12	100	24	99	M12	63	Steel, Zinc Plated	14000 (1428)
MVAYNFM100/12L			166		130	Steel, Zinc Plated	
MVAYNFM100/12X			99		63	Stainless Steel	
MVAYNFM100/12XL			166		130	Stainless Steel	
MVAYNFM100/12Y			103		60	Steel, Zinc Plated, Nylon Ball	
MVAYNFM100/12YL			163		120	Steel, Zinc Plated, Nylon Ball	
MVAYNFM100/14	100	24	101	M14	65	Steel, Zinc Plated	14000 (1428)
MVAYNFM100/16	100	24	115	M16	75	Steel, Zinc Plated	14000 (1428)
MVAYNFM100/16L			170		130	Steel, Zinc Plated	
MVAYNFM100/16X			115		75	Stainless Steel	
MVAYNFM100/16XL			170	M20	130	Stainless Steel	
MVAYNFM100/20			125		85	Steel, Zinc Plated	
MVAYNFM100/20L			180		140	Steel, Zinc Plated	



• **APPLICATIONS**

Computers / Boxes for Measuring instruments /
Office automation appliances / Medical instruments

• **CHARACTERISTICS**

This adjustable foot has rubber on the contact surface, effectively preventing slippage. Can be combined with casters to assist mobility. Five different standard screw sizes are available for various applications.

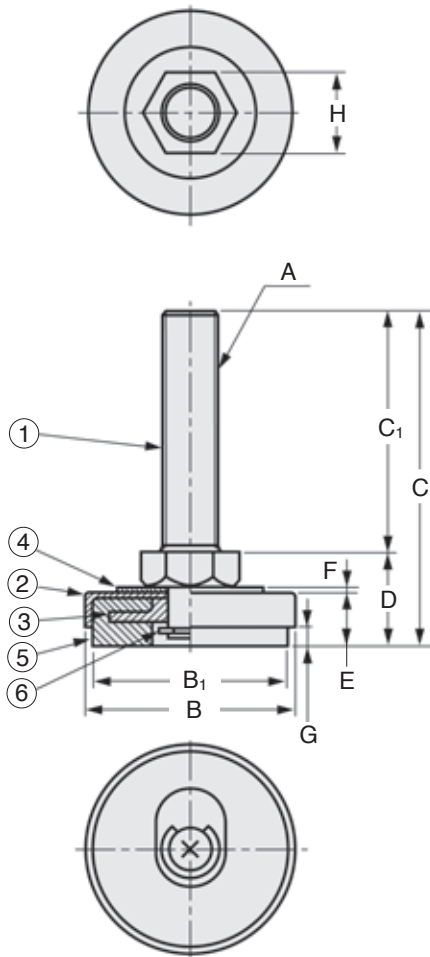
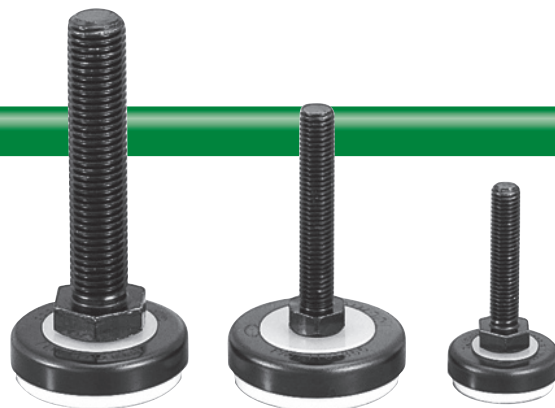
• **PARTS LIST**

No.	Part Name	Material	Finish	Qty.
1	Threaded Stud	Carbon Steel	Black Zinc Plated	1
2	Cover	Steel	Zinc Plated	
3	Core		Natural Color	
4	Washer	Nylon	Black	
5	Foot	Rubber	—	
6	E-ring	Stainless Steel	—	

• **MOUNTS**

Catalog Number	A	B	B ₁	C	C ₁	D	E	F	G	H
MVAT0MM1TM73-3	M8 X 1.25	Ø37.7	Ø34	78.5	60	18.5	12.5	1	4	13
MVAT0MM2TM73-2	M10 X 1.5			70.5	50	20.5				17
MVAT0MM3TM73-4	M12 X 1.75	Ø60.5	Ø56	95	70	25	16		5	19
MVAT0MM4TM73-5	M16 X 2			97		27				24
MVAT0MM5TM73-1	M20 X 2.5			127	100	27				30

Catalog Number	Max. Vertical Compressive Load N (kgf)	Net Weight g
MVAT0MM1TM73-3	3430 (350)	70
MVAT0MM2TM73-2		84
MVAT0MM3TM73-4	4410 (450)	217
MVAT0MM4TM73-5		279
MVAT0MM5TM73-1		413



• **APPLICATIONS**

Medical instruments / Screen printers / Semiconductor equipment

• **CHARACTERISTICS**

Similar to ...TM73 leveling mounts but modified with rubber which has less tendency for stain transfer. Reduces unsightly marks on the shop and office floor.

• **SPECIFICATIONS**

Test for stain transfer is based on JIS K-6403 Appendix using the test plate of white painted board. Evaluation is according to JIS L-0805 gray scale for staining.

Test Results: ...TM73W Series: grade 5

...TM73 Series: about grade 3

Actual results may vary depending on the contact surface and environment.

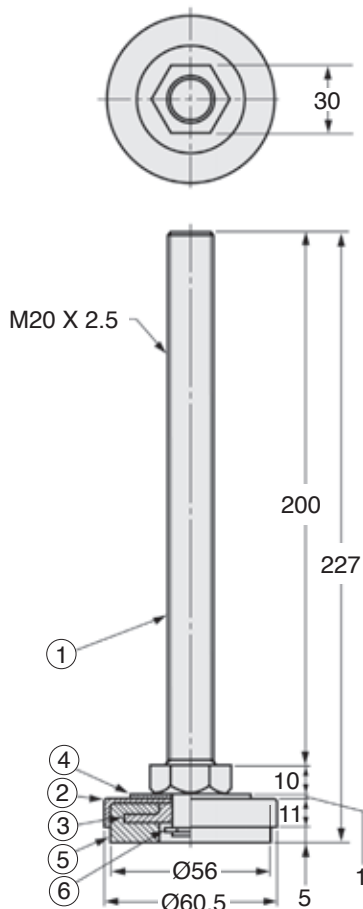
• **PARTS LIST**

No.	Part Name	Material	Finish	Qty.
1	Threaded Stud	Carbon Steel	Black Zinc Plated	1
2	Cover	Steel		
3	Core		Zinc Plated	
4	Washer	Nylon	Natural Color	
5	Foot	Silicon Rubber	White	
6	E-ring	Stainless Steel	—	

11 • MOUNTS

Catalog Number	A	B	B ₁	C	C ₁	D	E	F	G	H	Max. Vertical Compressive Load N (kgf)	Net Weight g	
MVAT0MM1TM73W-3	M8 X 1.25	Ø37.7	Ø34	78.5	60	18.5	12.5	1	4	13	3430 (350)	70.6	
MVAT0MM2TM73W-2	M10 X 1.5			70.5	50	20.5				17		84	
MVAT0MM3TM73W-4	M12 X 1.75	Ø60.5	Ø56	95	70	25	16		5	19	4410 (450)	217.6	
MVAT0MM4TM73W-5	M16 X 2			97		27				24		278.4	
MVAT0MM5TM73W-1	M20 X 2.5			127	100	27						30	413.2

MOUNT, LEVELING - Long Stud Model



• APPLICATIONS

Transporter devices / Maintenance devices /
Other general industrial machines.

• CHARACTERISTICS

This part is the same as **MVAT0MM5TM73-1** except for a longer threaded stud. It is suitable for use with casters which are relatively large in diameter. The foot is made of silicone rubber to reduce scuffing of the floor. See page (11–11) for how it is tested for resistance to stain.

• NOTE

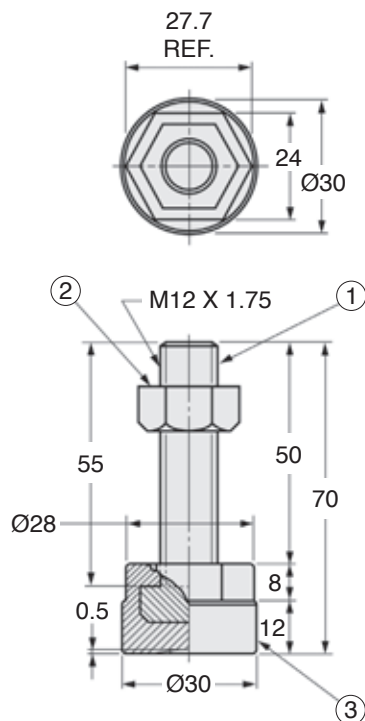
A threaded stud shorter than 200 mm is available on special request.

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Threaded Stud	Carbon Steel	Black Zinc Plated	1
2	Cover	Steel	Zinc Plated	
3	Core		Natural Color	
4	Washer	Nylon	White	
5	Foot	Silicon Rubber	—	
6	E-ring	Stainless Steel	—	

• MOUNT

Catalog Number	Net Weight g
MVAT1MMTM73L	618



• **APPLICATIONS**

Vending machines / Machine tools

• **CHARACTERISTIC**

A low-cost level adjuster for a heavyweight object.

• **NOTE**

Do not apply any compressive load on it while adjusting a level.

• **PARTS LIST**

No.	Part Name	Material	Finish	Qty.
1	Hex. Head Bolt	Steel	Bright Zinc Plated	1
2	Hexagonal Nut			
3	Foot	Polyethylene	Black	

• **MOUNT**

Catalog Number	Max. Vertical Compressive Load N (kgf)	Net Weight g
MVAT2MMTM94	3920 (400)	81

FOOT, K-TYPE RUBBER

RoHS
COMPLIANT

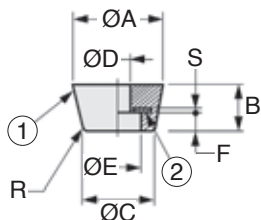


Fig. 1
Cone Type

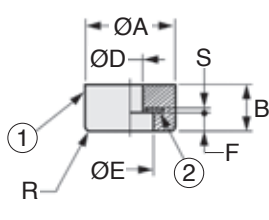


Fig. 2
Flat Type

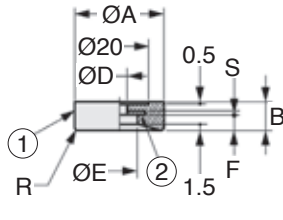
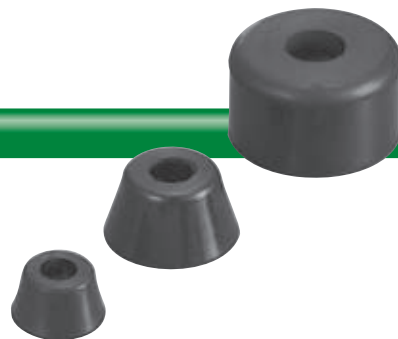


Fig. 3
K12W



• APPLICATIONS

Machine tools / Measuring instruments /
Telecommunication devices / Computers

• CHARACTERISTICS

A single screw is all you need to install.
A foot for various industrial devices.

NOTE: Figures show models with washers.

• PARTS LIST

No.	Part Name	Material	Finish	Qty
1	Foot	Rubber	Black	1
2	Washer	Stainless Steel	—	

• FOOT

Catalog Number	Net Weight g	Catalog Number	Net Weight g	Fig.	A	B	C	D	E	F	R	S
Without Washer		With Washer										
MVAT4FM01K7	0.6	MVAT4FM01K7W	0.7	1	10	8	9	3	6	5	—	0.5
MVAT4FM02K11	0.7	MVAT4FM02K11W	0.8		12	6	10	3	6	3	1	
MVAT4FM03K5	1.8	MVAT4FM03K5W	1.9		16	9	13	3	8	6	—	0.8
MVAT4FM04K3	2.2	MVAT4FM04K3W	2.2			12	10	2*	4	5	—	0.5
MVAT4FM05K10	2.3	MVAT4FM05K10W	2.5	2	17	10	15	3.5	10	7	1	0.8
MVAT4FM06K17	3.1	MVAT4FM06K17W	3.9		20	8	—	4.5	9.5	4		
MVAT4FM07K2	3.4	MVAT4FM07K2W	3.5			11	15	3.5	8	—		
MVAT4FM08K13	3.8	MVAT4FM08K13W	3.8			9	—	4	8	3	2	
MVAT4FM09K4	3.8	MVAT4FM09K4W	3.9	1	22	12	16	3	8	5	—	0.8
MVAT4FM10K14	5.3	MVAT4FM10K14W	5.5	2		9	—	3	8	3.5	1	
MVAT4FM11K6	5.8	MVAT4FM11K6W	6	1		14	18	4	9	8	—	
MVAT4FM12K15	11.3	MVAT4FM12K15W	16.4	2		26	20	—	3	12	8	
MVAT4FM13K12	7.3	MVAT4FM13K12W	8.2	3	30	9	—	5.2	12	5	1	0.8
MVAT4FM14K1	9.7	MVAT4FM14K1W	10.5	1		15	22	3	10	8	2	
MVAT4FM15K8	10	MVAT4FM15K8W	10.6	1		16	20	4	10	7	2	
MVAT4FM16K9	16.5	MVAT4FM16K9W	18	1		20	26	5	12	8	1.5	
MVAT4FM17K16	29	MVAT4FM17K16W	30.2	2	40	22	—	6.5	14	6.5	4	

*D = 2.2 for ...04K3W.

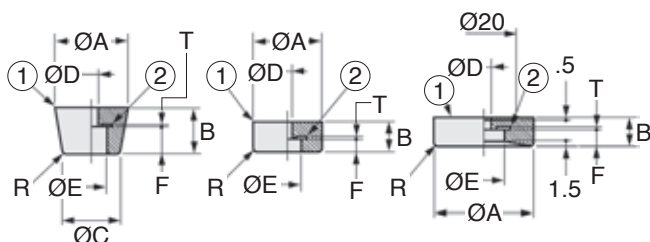
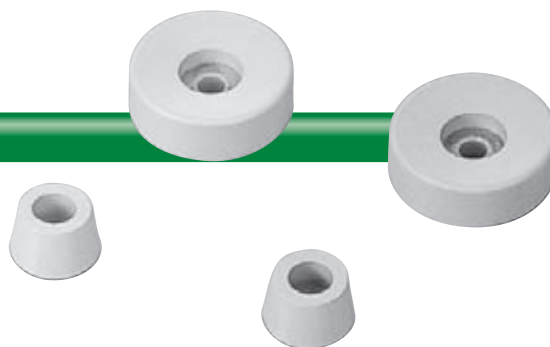


Fig. 1
Cone Type
(With Washer)

Fig. 2
Flat Type
(With Washer)

Fig. 3
CK-12, UK-12
(With Washer)

• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Foot	Rubber	—	1
2	Washer	Steel	Zinc Plated	

• APPLICATIONS

CK-Type: Medical instruments / Physical and chemical devices /
Measuring instruments

UK-Type: Office automation appliances / Office utilities /
Measuring instruments

• CHARACTERISTICS

CK-Type: Stain transfer resistance is improved compared with ordinary
products. Available with stain transfer index of grade 4.

UK-Type: It uses UL standard approved material. It can be used as a part
of devices for export.

• SPECIFICATIONS

CK-Type: Stain transfer index: ...CK Series: grade 3 as compared
to our standard ...K Series (page 11–14) which is grade 2
Actual results may vary depending on the contact surface
and environment.

1. Test method: JIS K-6403 Appendix.

2. Test plate: White Paint Board.

3. Evaluation: JIS L-0805 Gray Scale for Assessing Staining.

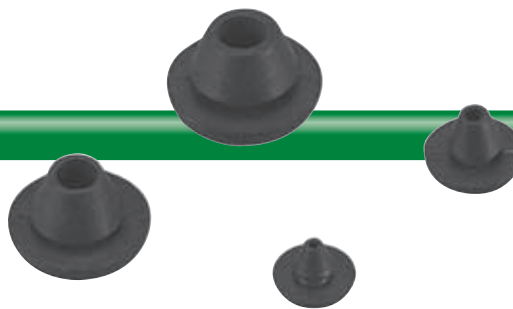
UK-Type: Fire Resistance (UL Standard) - 94V-0

• RUBBER FOOT CK-TYPE • MATERIAL – SBR – Rubber

Catalog Number	Fig.	A	B	C	D	E	F	R	T	Net Weight g	Hardness	Color
MVAT3FM1CK7	1	10	8	9	3	6	5	—	0.5	0.7	60±5°	Gray
MVAT3FM2CK11		12	6	10				1				
MVAT3FM3CK5		16	9	13				—				
MVAT3FM4CK17	2	20	8	—	4.5	9.5	4	1	0.8	3.7	60±5°	Gray
MVAT3FM5CK12	3	30	9	—	5.2	12	5			8.5		

• RUBBER FOOT UK-TYPE • MATERIAL – CR – Rubber

Catalog Number	Fig.	A	B	C	D	E	F	R	T	Net Weight g	Hardness	Color
MVAT3FM1UK7	1	10	8	9	3	6	5	—	0.5	0.7	60±5°	Yellow Ocher
MVAT3FM2UK11		12	6	10				1				
MVAT3FM3UK5		16	9	13				—				
MVAT3FM4UK17	2	20	8	—	4.5	9.5	4	1	0.8	3.9	60±5°	Yellow Ocher
MVAT3FM5UK12	3	30	9	—	5.2	12	5			9.1		

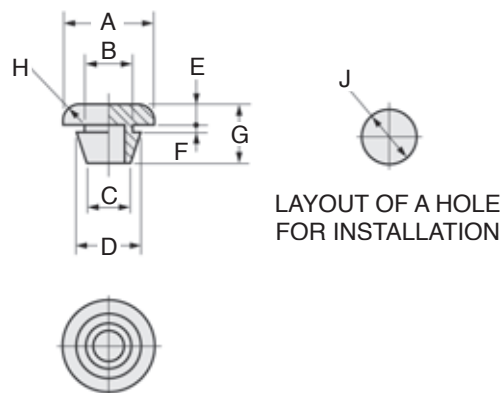


• APPLICATIONS

Machine tools / Office automation appliances /
Home appliances / Transport machines

• CHARACTERISTICS

Easy to install. Creates an instant cushion by simply
pressing the rubber foot into a hole to fix.

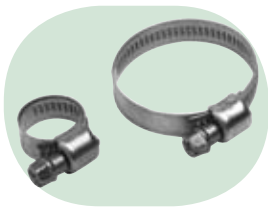


• FOOT – Rubber, Black

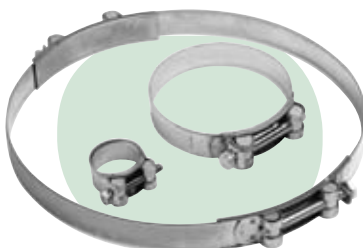
Catalog Number	A	B	C	D	E	F	G	H	J	Hardness	Net Weight g
MVAT5FMTM9601	Ø8	Ø3	Ø2	Ø4	2	1	6	R2	Ø3.4	70°±5°	0.2
MVAT5FMTM9602						1.2	6.2				
MVAT5FMTM9603						1.6	6.6				
MVAT5FMTM9604	Ø10	Ø4	Ø3	Ø5.5	3	1	8	R3	Ø4.4		0.3
MVAT5FMTM9605						1.2	8.2				0.4
MVAT5FMTM9606						1.6	8.6				
MVAT5FMTM9607	Ø12	Ø5	Ø4	Ø7		1	8	R3	Ø5.4		0.5
MVAT5FMTM9608						1.2	8.2				
MVAT5FMTM9609						1.6	8.6				0.6
MVAT5FMTM9610	Ø14	Ø6	Ø5	Ø9		1	10	R4	Ø6.6	55°±5°	1
MVAT5FMTM9611						1.2	10.2				
MVAT5FMTM9612						1.6	10.6				
MVAT5FMTM9613	Ø16	Ø8	Ø7	Ø11	4	1	10	R4	Ø8.6		1.4
MVAT5FMTM9614						1.2	10.2				
MVAT5FMTM9615						1.6	10.6				
MVAT5FMTM9616	Ø18	Ø10	Ø9	Ø13		1	11		Ø10.6		1.9
MVAT5FMTM9617						1.2	11.2				2.1
MVAT5FMTM9618						1.6	11.6				

Miscellaneous

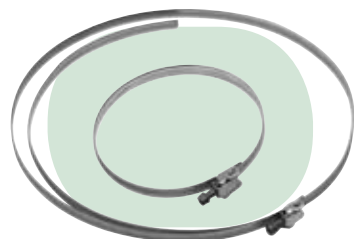




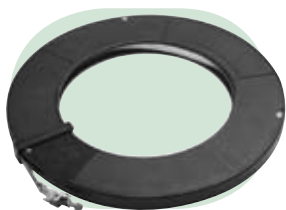
12-3



12-4 & 12-5



12-6



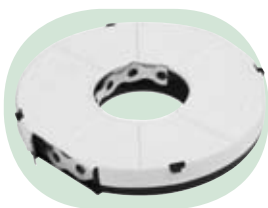
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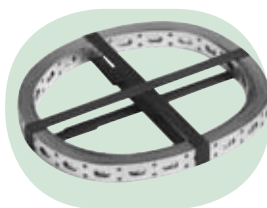
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12-6



12-7



12-7



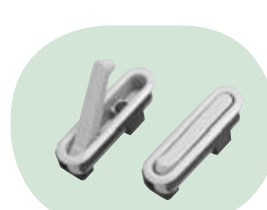
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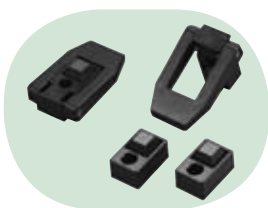
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12-9



12-10



12-11

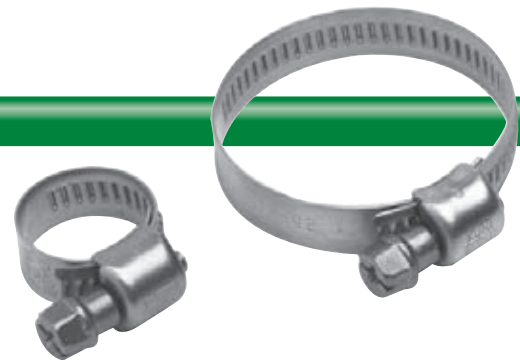
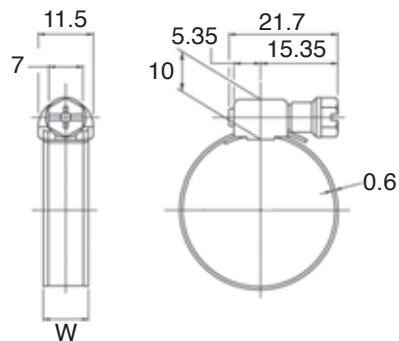


12-12



12-13

CLAMPS, 5 & 9 mm BAND

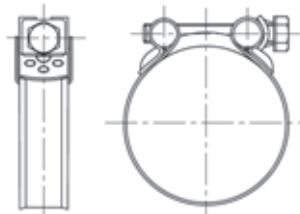


• BAND • HOUSING • SCREW, 7 mm HEX HEAD SLOTTED

Catalog Number		Diameter Min. – Max.	W Band mm	Max. Working Torque N•m (kgf•m)
• BAND – Stainless Steel AISI 304 • HOUSING & SCREW – Carbon Steel, Nickel Plated	• BAND, HOUSING & SCREW – Stainless Steel, AISI 304 VV4			
MRAY1NMM007	—	07 – 11	5	0.4 (.041)
MRAY1NMM008	MRAY1NMMX008	08 – 16	9	4.5 (.459)
MRAY1NMM009	—	09 – 14		
MRAY1NMM010	MRAY1NMMX010	10 – 17		
MRAY1NMM012	MRAY1NMMX012	12 – 20		
MRAY1NMM015	MRAY1NMMX015	15 – 25		
MRAY1NMM016	MRAY1NMMX016	16 – 24	9	4.5 (.459)
MRAY1NMM019	MRAY1NMMX019	19 – 28		
MRAY1NMM020	MRAY1NMMX020	20 – 32		
MRAY1NMM025	MRAY1NMMX025	25 – 40		
MRAY1NMM026	MRAY1NMMX026	25 – 45		
MRAY1NMM032	MRAY1NMMX032	32 – 50	9	4 (.408)
MRAY1NMM040	MRAY1NMMX040	40 – 60		
MRAY1NMM050	MRAY1NMMX050	50 – 70		
MRAY1NMM058	MRAY1NMMX058	58 – 75		
MRAY1NMM060	MRAY1NMMX060	60 – 80		
MRAY1NMM070	MRAY1NMMX070	70 – 90	9	4 (.408)
MRAY1NMM080	MRAY1NMMX080	80 – 100		
MRAY1NMM090	MRAY1NMMX090	90 – 110		
MRAY1NMM100	MRAY1NMMX100	100 – 120		
MRAY1NMM110	MRAY1NMMX110	110 – 130		
MRAY1NMM120	MRAY1NMMX120	120 – 140	9	4 (.408)
MRAY1NMM140	MRAY1NMMX140	140 – 160		

CLAMPS, BOLT

RoHS
COMPLIANT



- **BAND** – Steel, Zinc Plated
- **SCREW, HEX HEAD** – 8.8 Steel
- **BARRELS** – F-212 Steel

Catalog Number	Diameter Min. – Max.	Band mm	Max. Working Torque N•m (kgf•m)
MRAY1NMN023	23 – 25	20 X 0.8	9.5 (0.97)
MRAY1NMN026	26 – 28		
MRAY1NMN029	29 – 31		
MRAY1NMN032	32 – 35		
MRAY1NMN036	36 – 39		
MRAY1NMN040	40 – 43		
MRAY1NMN044	44 – 47		
MRAY1NMN048	48 – 51		
MRAY1NMN052	52 – 55		
MRAY1NMN056	56 – 59	23 X 1.2	23 (2.35)
MRAY1NMN060	60 – 63		
MRAY1NMN064	64 – 67		
MRAY1NMN068	68 – 73		
MRAY1NMN074	74 – 79		
MRAY1NMN080	80 – 85		
MRAY1NMN086	86 – 91		
MRAY1NMN092	92 – 97	30 X 1.7	46 (4.69)
MRAY1NMN098	98 – 103		
MRAY1NMN104	104 – 112		
MRAY1NMN113	113 – 121		
MRAY1NMN122	122 – 130		
MRAY1NMN131	131 – 139		
MRAY1NMN140	140 – 148		
MRAY1NMN149	149 – 161		
MRAY1NMN162	162 – 174		
MRAY1NMN175	175 – 187		
MRAY1NMN188	188 – 200		
MRAY1NMN201	201 – 213		
MRAY1NMN214	214 – 226		
MRAY1NMN227	227 – 239		
MRAY1NMN240	240 – 252		
MRAY1NMN248	248 – 260		

Continued on the next page

CLAMPS, BOLT

RoHS
COMPLIANT

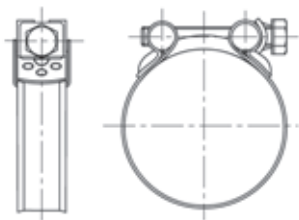


Fig. 1

Fig. 1 • **DOUBLE LOCKING BAND** – Steel, Zinc Plated

- **SCREW, HEX HEAD** – 8.8 Steel
- **BARRELS** – F-212 Steel

Catalog Number	Diameter Min. – Max.	Band mm	Max. Working Torque N•m (kgf•m)
MRAY1NMND260	260 – 280	30 X 1.7	46 (4.69)
MRAY1NMND280	280 – 300		
MRAY1NMND300	300 – 325		
MRAY1NMND325	325 – 350		
MRAY1NMND350	350 – 375		
MRAY1NMND375	375 – 400		
MRAY1NMND400	400 – 425		
MRAY1NMND425	425 – 450		
MRAY1NMND450	450 – 475		
MRAY1NMND475	475 – 500		



Fig. 2

Fig. 2 • **BAND** – Stainless Steel, AISI 304 • DIN 1.4301

- **SCREW, CLASS A2 HEX HEAD**
- **BARRELS** – Stainless Steel, AISI 303

Catalog Number	Diameter Min. – Max.	Band mm	Max. Working Torque N•m (kgf•m)
MRAY1NMNX032	32 – 35	23 X 1.2	11 (1.12)
MRAY1NMNX036	36 – 39		
MRAY1NMNX040	40 – 43		
MRAY1NMNX044	44 – 47		
MRAY1NMNX048	48 – 51		
MRAY1NMNX052	52 – 55		
MRAY1NMNX056	56 – 59		
MRAY1NMNX060	60 – 63		
MRAY1NMNX064	64 – 67		
MRAY1NMNX068	68 – 73		
MRAY1NMNX074	74 – 79		
MRAY1NMNX080	80 – 85		
MRAY1NMNX086	86 – 91		
MRAY1NMNX092	92 – 97		
MRAY1NMNX098	98 – 103		
MRAY1NMNX104	104 – 112		
MRAY1NMNX113	113 – 121		
MRAY1NMNX122	122 – 130		
MRAY1NMNX131	131 – 139		
MRAY1NMNX140	140 – 148	30 X 1.7	
MRAY1NMNX149	149 – 161		
MRAY1NMNX162	162 – 174		
MRAY1NMNX175	175 – 187		
MRAY1NMNX188	188 – 200		

CONTINUOUS BAND & CLAMPS



- **CONTINUOUS TOOTHED BAND** – Stainless Steel, AISI 430
- **CLAMP HOUSING** – Stainless Steel
- **SCREW, 7 mm HEX HEAD SLOTTED** – Steel, Zinc Plated

Catalog Number	Diameter Min. – Max.	Band mm	Max. Working Torque N•m (kgf•m)
MRAY1NMVN040	25 – 40	9 X 0.6	4 (.408)
MRAY1NMVN045	25 – 45		
MRAY1NMVN050	32 – 50		
MRAY1NMVN060	40 – 60		
MRAY1NMVN070	50 – 70		
MRAY1NMVN080	60 – 80		
MRAY1NMVN090	60 – 90		
MRAY1NMVN110	60 – 110		
MRAY1NMVN135	60 – 135		
MRAY1NMVN145	60 – 145		
MRAY1NMVN170	60 – 170		
MRAY1NMVN215	60 – 215		
MRAY1NMVN270	60 – 270		
MRAY1NMVN325	60 – 325		
MRAY1NMVN380	60 – 380		
MRAY1NMVN425	60 – 425		
MRAY1NMVN525	60 – 525		
MRAY1NMVN660	60 – 660		



- **30 m CONTINUOUS TOOTHED BAND** – Stainless Steel, AISI 430

Catalog Number	Band mm	Length m
MRAY1NMNAV30	9 X 0.6	30



- **CLAMP HOUSING, MULTI-DIRECTIONAL** – Stainless Steel
- **SCREW, 7 mm HEX HEAD SLOTTED** – Steel, Zinc Plated

**Band Clamps
Catalog Number**

MRAY1NMUS0N

Sold in Boxes of 50 Pieces



- **CONTINUOUS TOOTHED BAND** – Stainless Steel, AISI 430
- **CLAMP HOUSING, MULTI-DIRECTIONAL** – Stainless Steel
- **SCREW, 7 mm HEX HEAD SLOTTED** – Steel, Zinc Plated

Autoblock Kit Catalog Number

MRAY1NMNAV3

Includes: 3 m Band & 8 Band Clamps

BANDING, PERFORATED

RoHS
COMPLIANT

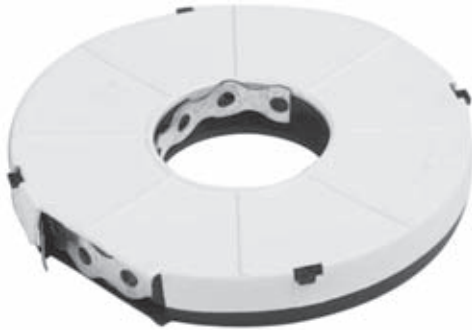


Fig. 1



Fig. 2

Fig. 1 • **ROUNDED BAND** – Steel, Zinc Plated

Catalog Number	Band mm	Roll Length m	Max. Strength N (kgf)
MRAY5NMBPP12	12 X 0.8	10	480 (48.9)
MRAY5NMBPP17	17 X 0.8		660 (67.3)
MRAY5NMBPP26	26 X 1		1410 (143.8)

All-purpose suspension band for various kinds of pipe.

Fig. 1 • **ROUNDED BAND** – Aluminum
• **LOW CORROSION RESISTANCE**

Catalog Number	Band mm	Roll Length m	Max. Strength N (kgf)
MRAY5NMBPA12	12 X 1	10	180 (18.4)
MRAY5NMBPA17	17 X 1		240 (24.5)

Low corrosion plants.

Fig. 1 • **ROUNDED BAND** – Stainless Steel, AISI 316 INOX
• **GOOD CORROSION RESISTANCE**

Catalog Number	Band mm	Roll Length m	Max. Strength N (kgf)
MRAY5NMBPX12	12 X 0.8	10	570 (58.1)
MRAY5NMBPX17	17 X 0.8		900 (91.8)

High corrosion plants.

Fig. 2 • **MULTI HOLE BAND** – Steel, Zinc Plated

Catalog Number	Hole Shape	Band mm	Roll Length m	Max. Strength N (kgf)
MRAY5NMBPM176/PV	Oval	17 X 0.6	10	1050 (107.1)
MRAY5NMBPM258/PV		25 X 0.75		2000 (203.9)
MRAY5NMBPM176/RD	Round	17 X 0.6	10	1050 (107.1)
MRAY5NMBPM258/RD		25 X 0.75		2000 (203.9)

All-purpose suspension band for various kinds of pipe.

TAPE



Fig. 1 • TAPE – Aluminum, Self-Adhesive
• **TEMPERATURE RANGE** – -10° to +80°C

Catalog Number	Thickness μm	Width mm	Length m
MRAY4NMN30H050	30	50	45
MRAY4NMN30H075		75	
MRAY4NMN30H100		100	
MRAY4NMN40H050	40	50	
MRAY4NMN40H075		75	
MRAY4NMN40H100		100	
MRAY4NMN50H050	50	50	
MRAY4NMN50H075		75	

For taping joints and seams against steam moisture and vapor.



Fig. 1

Fig. 2 • TAPE – Aluminum, Self-Adhesive, Reinforced
• **TEMPERATURE RANGE** – -10° to +80°C
• **TENSILE STRENGTH** – 160N/25 mm

Catalog Number	Thickness μm	Width mm	Length m
MRAY4NMNRH050	9	50	45
MRAY4NMNRH075		75	
MRAY4NMNRH100		100	



Fig. 2

Fig. 3 • TAPE – Polyethylene, Self-Adhesive
• **ADHESIVE** – Rubber/Resin
• **TEMPERATURE RANGE** – +5° to 30°C

Catalog Number	Thickness mm	Width mm	Length m
MRAY4NMNTM25	0.25	50	25

Bonds to most surfaces, water-resistant.



Fig. 3

CABLE TIES & ACCESSORIES

RoHS
COMPLIANT



- **TIE** – UL Listed 6.6 Nylon, Self-Locking
- **TEMPERATURE RANGE** – -40° to +85°C

Priced Per 100 Pieces

Catalog Number		Length X Width	Diameter Max.	Min. Tightness N
White	Black			
MRAY3NMRB080/2	MRAY3NMRN080/2	80 X 2.5	15	80
MRAY3NMRB102/2	MRAY3NMRN102/2	102 X 2.5	19	
MRAY3NMRB140/2	MRAY3NMRN140/2	140 X 2.5	34	
MRAY3NMRB160/2	MRAY3NMRN160/2	160 X 2.5	40	
MRAY3NMRB202/2	MRAY3NMRN202/2	202 X 2.5	50	
MRAY3NMRB140/3	MRAY3NMRN140/3	140 X 3.6	34	180
MRAY3NMRB202/3	MRAY3NMRN202/3	202 X 3.6	50	
MRAY3NMRB302/3	MRAY3NMRN302/3	302 X 3.6	77	
MRAY3NMRB120/4	MRAY3NMRN120/4	120 X 4.8	25	220
MRAY3NMRB160/4	MRAY3NMRN160/4	160 X 4.8	40	
MRAY3NMRB186/4	MRAY3NMRN186/4	186 X 4.8	46	
MRAY3NMRB200/4	MRAY3NMRN200/4	200 X 4.8	50	
MRAY3NMRB250/4	MRAY3NMRN250/4	250 X 4.8	60	
MRAY3NMRB286/4	MRAY3NMRN286/4	286 X 4.8	75	
MRAY3NMRB368/4	MRAY3NMRN368/4	368 X 4.8	100	
MRAY3NMRB428/4	MRAY3NMRN428/4	428 X 4.8	115	
MRAY3NMRB202/7	MRAY3NMRN202/7	202 X 7.6	48	540
MRAY3NMRB292/7	MRAY3NMRN292/7	292 X 7.6	75	
MRAY3NMRB368/7	MRAY3NMRN368/7	368 X 7.6	100	
MRAY3NMRB450/7	MRAY3NMRN450/7	450 X 7.6	125	
MRAY3NMRB525/9	MRAY3NMRN525/9	525 X 9	150	790
MRAY3NMRB702/9	MRAY3NMRN702/9	702 X 9	185	
MRAY3NMRB798/9	MRAY3NMRN798/9	798 X 9	230	



- **CABLE TIE MOUNTING BASE** – UL Listed 6.6 Nylon
- **ADHESIVE BACK**

Priced Per 100 Pieces

Catalog Number		Base mm	Hole mm
White	Black		
MRAY3NMBB19	MRAY3NMBN19	19 X 19	4
MRAY3NMBB28	MRAY3NMBN28	28 X 28	5



- **CABLE TIE GUN**

Catalog Number	For Nylon Tie Width mm
MRAY3NM25	2.5 to 4.8
MRAY3NM36	3.6 to 9

www.allmetricsmallparts.com

HANGER HOOK

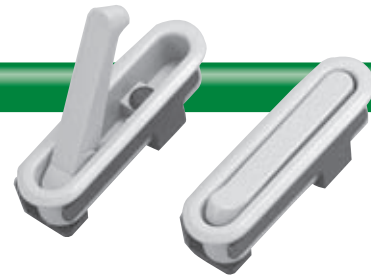


• APPLICATIONS

Vehicles / Furniture

• CHARACTERISTICS

Compact, storable hanger for coats and hats. To use, simply pull down the hanger to hook clothing. When not needed, store away for a neat appearance.

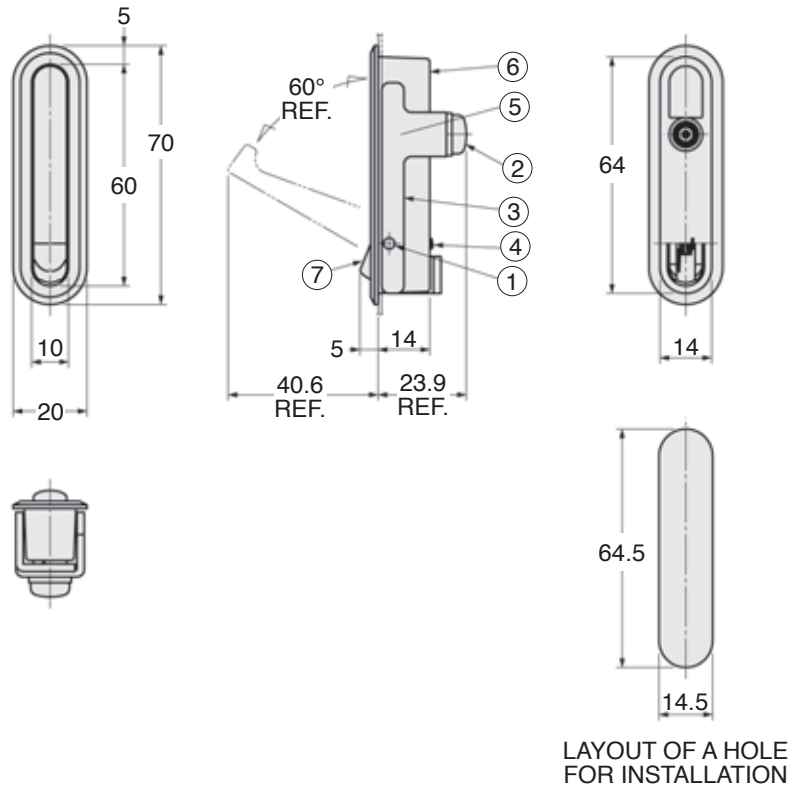


• PARTS LIST

No.	Part Name	Material	Finish	Qty.
1	Pin	Steel	Zinc Plated	1
2	Screw with Washer		Zinc Plated Black	
3	Mounting Bracket	Stainless Steel	—	
4	Spring		—	
5	Plug Cushion	Rubber	Black	
6	Housing	Aluminium	Painted Light Beige	
7	Hanger		Painted Light Beige	

• HANGER HOOK

Catalog Number	Applicable Panel Thickness	Net Weight g
MRAT01MTM262	1.0 ~ 3.2	50



PULL-UP STAND & PLASTIC FOOT



• APPLICATIONS

Measuring instruments / Office automation appliances / Precision instruments

• CHARACTERISTICS

These are used to make the operation panels more visible to users. The arm of ...TM174 can be retracted under while the device is not in use. A built in mechanism holds the arm in either open or closed position. ...TM175 can be used by itself as a rubber foot.

• PULL-UP STAND

Catalog Number	Allowable Load N (kgf)	Net Weight g
MRAT05MTM174	29.4 (3)	12.5

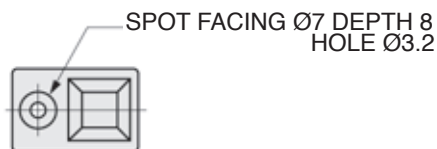
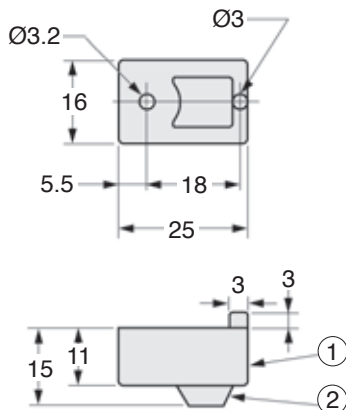
No.	Part Name	Material	Finish	Qty.
1	Arm	Polycarbonate	Black	1
2	Base			
3	Pin	Stainless Steel	—	
4	Cushion	Urethane	Black	

• PLASTIC FOOT

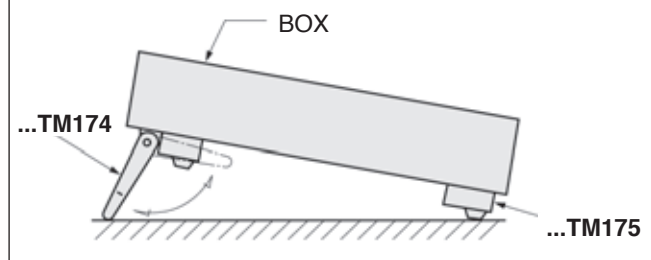
Catalog Number	Net Weight g
MRAT05MTM175	4.5

No.	Part Name	Material	Finish	Qty.
1	Base	Polycarbonate	Black	1
2	Cushion	Urethane		

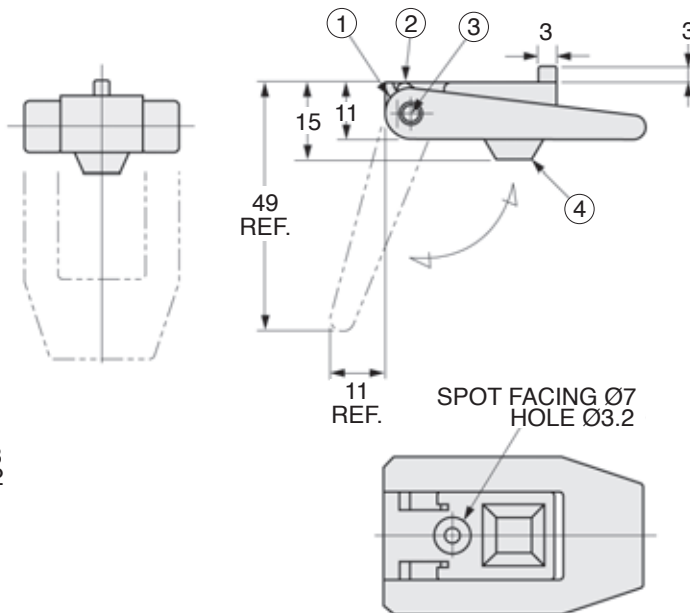
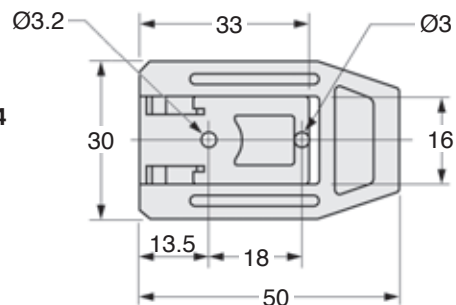
MRAT05MTM175



INSTALLATION EXAMPLE



MRAT05MTM174



WHEELS & ROLLERS

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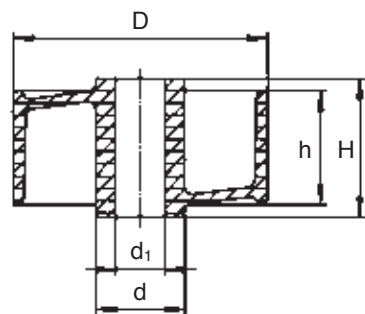


Fig. 1

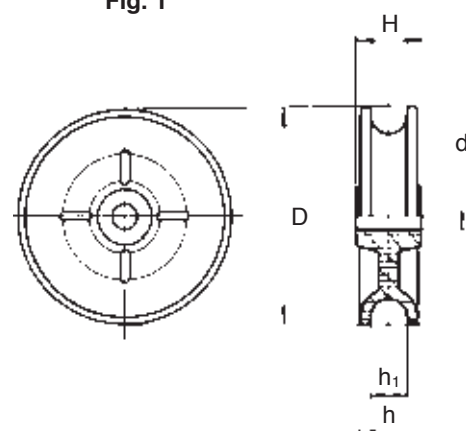


Fig. 2

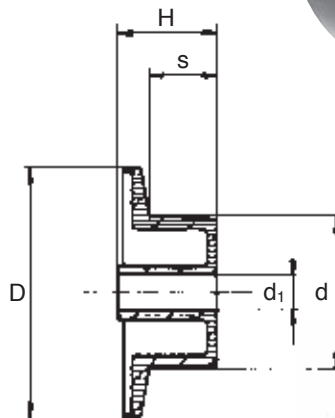


Fig. 3



Fig. 1



Fig. 2



Fig. 3

Fig. 1 • **WHEEL** – Nylon 6, Gray

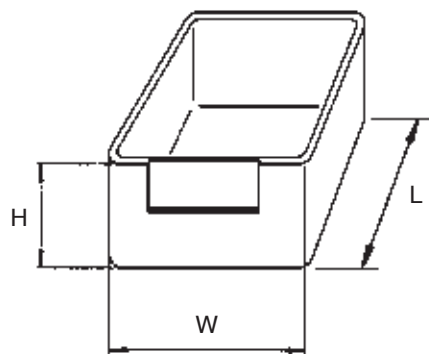
Catalog Number	D	H	d	d ₁	h	Weight g
MRAX9NM7601	63	34	22	12.2	28	57
MRAX9NM7602	80	37	22	12.2	32	95
MRAX9NM7603	100	39	24	12.2	32	140

Fig. 2 • **ROLLER** – Nylon 6, Black or Natural

Catalog Number	D	H	d	h	h ₁	Color	Weight g
MRAX9NM7604	30	11.3	5.1	10	6	Black	7
MRAX9NM7605	50	15.5	6.1	14	8.5	Black	15
MRAX9NM7606	55	20.7	11	20.5	11	Natural	24
MRAX9NM7607	60	19.5	8.1	15	10	Black	20
MRAX9NM7610	100	27	12	22	17	Natural	65

Fig. 3 • **WHEEL** – Nylon 6, Black

Catalog Number	D	H	d	d ₁	s	Weight g
MRAX9NM7609	56	22	40	8.2	15	17



• **CASE** – Polystyrene, Reinforced, Green

Catalog Number	L	W	H	Weight g
MRAX8NM7101	60	30	30	10
MRAX8NM7102	60	60	30	15
MRAX8NM7103	120	60	30	32
MRAX8NM7104	120	120	30	54
MRAX8NM7105	60	60	52	24
MRAX8NM7106	120	60	52	45
MRAX8NM7107	120	120	52	70
MRAX8NM7108	240	120	52	190



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FRACTIONAL AND DECIMAL INCH & METRIC EQUIVALENTS

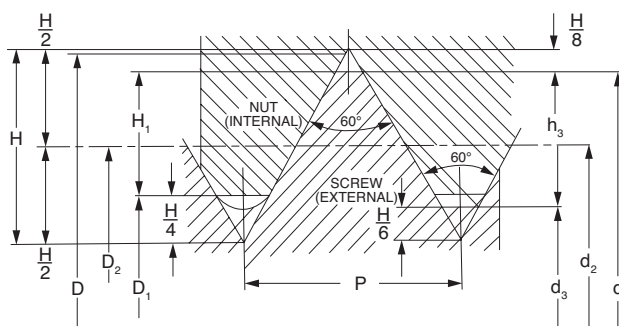
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INCH		METRIC	
Fractional	Decimal	mm	
	.00394	.1	
	.00787	.2	
	.01181	.3	
1/64	.015625	.3969	
	.01575	.4	
	.01969	.5	
	.02362	.6	
	.02756	.7	
1/32	.03125	.7938	
	.0315	.8	
	.03543	.9	
	.03937	1.00	
	.046875	1.1906	
1/16	.0625	1.5875	
	.078125	1.9844	
	.07874	2.00	
3/32	.09375	2.3813	
	.109375	2.7781	
	.11811	3.00	
1/8	.125	3.175	
	.140625	3.5719	
	.15625	3.9688	
	.15748	4.00	
	.171875	4.3656	
3/16	.1875	4.7625	
	.19685	5.00	
	.203125	5.1594	
7/32	.21875	5.5563	
	.234375	5.9531	
	.23622	6.00	
1/4	.2500	6.35	
	.265625	6.7469	
	.27559	7.00	
	.28125	7.1438	
	.296875	7.5406	
5/16	.3125	7.9375	
	.31496	8.00	
	.328125	8.3344	
	.34375	8.7313	
	.35433	9.00	
	.359375	9.1281	
3/8	.375	9.525	
	.390625	9.9219	
	.3937	10.00	
	.40625	10.3188	
	.421875	10.7156	
	.43307	11.00	
7/16	.4375	11.1125	
	.453125	11.5094	

INCH		METRIC	
Fractional	Decimal	mm	
	.46875	11.9063	
	.47244	12.00	
	.484374	12.3031	
1/2	.5000	12.70	
	.51181	13.00	
	.515625	13.0969	
	.53125	13.4938	
	.546875	13.8907	
	.55118	14.00	
	.5625	14.2875	
	.578125	14.6844	
	.59055	15.00	
	.59375	15.0813	
	.609375	15.4782	
	.625	15.875	
	.62992	16.00	
	.640625	16.2719	
	.65625	16.6688	
	.66929	17.00	
	.671875	17.0657	
	.6875	17.4625	
	.703125	17.8594	
	.70866	18.00	
	.71875	18.2563	
	.734375	18.6532	
	.74803	19.00	
	.7500	19.05	
	.765625	19.4469	
	.78125	19.8438	
	.7874	20.00	
	.796875	20.2407	
	.8125	20.6375	
	.82677	21.00	
	.828125	21.0344	
	.84375	21.4313	
	.859375	21.8282	
	.86614	22.00	
	.875	22.225	
	.890625	22.6219	
	.90551	23.00	
	.90625	23.0188	
	.921875	23.4157	
	.9375	23.8125	
	.94488	24.00	
	.953125	24.2094	
	.96875	24.6063	
	.98425	25.00	
	.984375	25.0032	
1	1.0000	25.4001	

STANDARDS FOR METRIC THREADS

RoHS
COMPLIANT



$$H = 0.86603P$$

$$h_3 = 0.61343P$$

$$H_1 = 0.54127P$$

$$r = \frac{H}{6} = 0.14434P$$

$$d_2 = d - 0.64953P \text{ (EFFECTIVE PITCH DIAMETER)}$$

$$D_1 = d - 2H_1 \text{ (MINOR DIAMETER — INTERNAL)}$$

$$d_3 = d - 2h_3 \text{ (MINOR DIAMETER — EXTERNAL)}$$

$$D = \text{(MAJOR DIAMETER)}$$

d Basic Thread Designation	Pitch mm	Threads per inch	Tap Drill mm	Basic Pitch Diameter $d_2 = D_2$	Minor Diameter Limits			
					d_3 — External		D_1 — Internal	
					Min.	Max.	Min.	Max.
M1	0.25	101.6	0.75	0.83762	0.622	0.693	0.729	0.785
M1.6	0.35	72.6	1.25	1.37267	1.063	1.151	1.221	1.321
M2	0.4	63.5	1.6	1.74019	1.394	1.430	1.567	1.679
M2.5	0.45	56.5	2.05	2.20772	1.825	1.928	2.013	2.138
M3	0.5	50.8	2.5	2.67524	2.256	2.367	2.453	2.599
M3.5	0.6	42.3	2.9	3.11029	2.615	2.743	2.850	3.010
M4	0.7	36.3	3.3	3.54534	2.979	3.119	3.242	3.422
M5	0.8	31.8	4.2	4.01286	3.842	3.995	4.134	4.334
M6	1	25.4	5	5.35048	4.563	4.747	4.917	5.153
M8	1.25	20.3	6.75	7.18810	6.230	6.438	6.647	6.912
M10	1.5	16.9	8.5	9.02572	7.888	8.128	8.376	8.676

NOTE: Above limits are based on DIN 13 Sheet 13 for medium tolerance class.

For external threads

M1 Tolerance 6h

M1.6 and up Tolerance 6g

For internal threads

M1 Tolerance 5H

M1.6 and up Tolerance 6H

MISCELLANEOUS CONVERSION FACTORS

Linear	1 inch	25.400 millimeters (mm)	1 statute mile	1.6093 kilometers (km)
	1 inch	2.54 centimeters (cm)	1 millimeter	0.03937 inches (in.)
	1 foot	12 inches (in.)	1 centimeter	0.3937 inches (in.)
	1 foot	0.333 yards (yd.)	1 inch	0.08333 feet (ft.)
	1 foot	0.3048 meters (m)	1 meter	3.2808 feet (ft.)
	1 yard	36 inches (in.)	1 inch	0.02778 yards (yd.)
	1 yard	3 feet (ft.)	1 centimeter	0.01094 yards (yd.)
	1 yard	91.44 centimeters (cm)	1 meter	1.0936 yards (yd.)
	1 yard	0.9144 meters (m)	1 kilometer	3281 feet (ft.)
	1 statute mile	5280 feet (ft.)	1 kilometer	1094 yards (yd.)
	1 statute mile	1760 yards (yd.)	1 kilometer	0.6214 statute mile
Area	1 sq. inch	6.4516 sq. centimeters	1 sq. centimeter	0.15500 sq. inch
	1 sq. foot	144 sq. inches	1 sq. inch	0.00694 sq. feet
	1 sq. foot	929.03 sq. centimeters	1 sq. centimeter	0.00108 sq. feet
	1 sq. foot	0.092903 sq. meters	1 sq. meter	10.764 sq. feet
	1 sq. yard	9 sq. feet	1 sq. foot	0.1111 sq. yards
	1 sq. yard	0.83612 sq. meters	1 sq. meter	1.196 sq. yards
Volume	1 cu. inch	0.0005787 cu. feet	1 gallon	0.1337 cu. feet
	1 cu. inch	0.004329 gallons (gal.)	1 gallon	3.785 liters (l)
	1 cu. inch	16.39 cu. centimeters	1 gallon	231 cu. inches
	1 cu. inch	0.00001639 cu. meters	1 cu. centimeter	0.06102 cu. inches
	1 cu. inch	0.0164 liters (l)	1 cu. meter	61023 cu. inches
	1 cu. foot	1728 cu. inches	1 liter	61.017 cu. inches
	1 cu. foot	7.481 gallons (gal.)	1 cu. meter	35.31 cu. feet
	1 cu. foot	0.0283 cu. meters	1 liter	0.03531 cu. feet
	1 cu. foot	28.32 liters (l)	1 cu. foot	0.0370 cu. yards
	1 cu. yard	27 cu. feet	1 cu. meter	1.30873 cu. yards
	1 cu. yard	0.76410 cu. meters	1 liter	2.11327 pints (pt.)
	1 pint	0.4732 liters (l)	1 pint	0.50 quarts (qt.)
	1 quart	2 pints (pt.)	1 gallon	4 quarts (qt.)
	1 quart	0.25 gallons (gal.)	1 cu. inch	0.017316 quarts (qt.)
	1 quart	57.75 cu. inches	1 cu. foot	29.9222 quarts (qt.)
	1 quart	0.03342 cu. feet	1 liter	1.057 quarts (qt.)
	1 quart	0.9464 liters (l)	1 liter	0.2642 gallons (gal.)
Weight	1 ounce	28.35 grams (g)	1 gram	0.03527 ounces (oz.)
	1 ounce	0.02835 kilograms (kg)	1 kilogram	35.274 ounces (oz.)
	1 pound	16 ounces (oz.)	1 ounce	0.0625 pounds (lb.)
	1 pound	453.6 grams (g)	1 gram	0.002205 pounds (lb.)
	1 pound	0.4536 kilograms (kg)	1 kilogram	2.2046 pounds (lb.)
Pressure	1 pound/ sq. inch	0.070307 kg/sq. cm	1 kilogram/sq. cm	14.223 pounds/sq. in.
	1 pound/sq. foot	4.8824 kilograms/sq. m	1 kilogram/sq. meter	0.2048 pounds/sq. ft.
	1 pound/sq. yard	0.54249 kilograms/sq. m	1 kilogram/sq. meter	1.8433 pounds/sq. yd.
	1 ounce/cu. inch	1.7300 grams/cu. cm	1 gram/cu. cm	0.57803 ounces/cu. in.
	1 pound/cu. foot	16.019 kilograms/cu. m	1 kilogram/cu. meter	0.062428 pounds/cu. ft.

Continued on the next page

MISCELLANEOUS CONVERSION FACTORS

Quantity	Conventional		SI Unit	Conversion Factors
	Inch Unit	Metric Unit		
Length	inch inch	meter m	metre m	1 inch = 25.4 mm 1 mm = 0.03937 inch 1 m = 3.2808 ft. 1 ft. = 0.3048 m
Area	square inch inch ²	square centimeter cm ²	square metre m ²	1 inch ² = 6.4516 cm ² 1 cm ² = 0.155 inch ² 1 m ² = 10.764 ft. ² 1 ft. ² = 0.092903 m ²
Mass	pound mass lb.	kilogram mass kg	kilogram mass kg	1 lb. = 0.45359237 kg 1 kg = 2.2046 lb.
Force	pound force lbf	kilogram mass kg	newton N	1 lbf = 0.45359237 kgf 1 lbf = 4.44822 N 1 kgf = 2.2046 lbf 1 kgf = 9.80665 N 1 N = 0.1019716 kgf 1 N = 0.224809 lbf
Stress Pressure	pounds per square inch lbf/inch ²	kilogram per square centimeter kgf/cm ²	pascal N/m ² (Pa)	1 MPa (megapascal) = 10 ⁶ N/m ² = N/mm ² 1 kPa (kilopascal) = 10 ³ N/m ² 1 lbf/inch ² = 0.070307 kgf/cm ² 1 lbf/inch ² = 7.0307 • 10 ⁻⁴ kgf/mm ² 1 lbf/inch ² = 6.8947 • 10 ⁻³ N/mm ² (MPa) 1 kgf/cm ² = 14.2233 lbf/inch ² 1 kgf/cm ² = 9.80665 • 10 ⁻² N/mm ² (MPa)
Torque Work	inch • pounds lbf • inch	kilogram- meters kgf • m	newton- metres N • m	1 lbf • inch = 1.1521 kgf • cm 1 kgf • cm = 0.8679 lbf • inch 1 lbf • inch = 0.1129848 N • m 1 kgf • m = 9.80665 N • m 1 kgf • cm = 9.80665 • 10 ⁻² N 1 N • m = 8.85 lbf • inch 1 N • m = 10.19716 kgf • cm
Power	lbf • ft/min	kgf • m/s	N • m/s	1 kW = 1000 N • m/s 1 kW = 60,000 N • m/min. 1 kW = 44,220 lbf • ft./min. 1 kW = 1.34 hp 1 hp = 75 kgf • m/s 1 hp = 44,741 N • m/min. 1 hp = 33,000 lbf • ft./min. 1 hp = 0.7457 kW
Velocity	feet per second ft./sec	meters per second m/sec	metres per second m/s	1 ft./sec = 0.3048 m/sec 1 inch/sec = 2.54 cm/sec 1 ft./min. = 0.00508 m/sec 1 mile/hr = 0.44704 m/sec 1 km/hr = 0.27777 m/sec 1 mile/hr = 1.609344 km/hr
Acceleration	feet per second square ft./sec ²	meters per second square m/sec ²	metres per second square m/s ²	1 ft./sec ² = 0.3048 m/sec ²

ISO-METRIC TOLERANCE CHARTS

FOR EXTERNAL MEASUREMENTS (SHAFTS)*

Measurements in μm ($1\mu\text{m} = 0.001\text{mm}$)

μm +150 +100 +50 0 -50 -100 -150 External Dimensions (Shafts) Graph Represents Range From 3 – 6 mm																
Designation	s6	r6	n6	m6	j6	h5	h6	h8	h9	h11	g5	g6	f7	f8	e8	d11
from > 1	+20	+16	+10	+8	+4	0	0	0	0	0	-2	-2	-6	-6	-14	-20
to $\leq$ 3	+14	+10	+4	+2	-2	-4	-6	-14	-25	-60	-6	-8	-16	-20	-28	-80
from > 3	+27	+23	+16	+12	+6	0	0	0	0	0	-4	-4	-10	-10	-20	-30
to $\leq$ 6	+19	+15	+8	+4	-2	-5	-8	-18	-30	-75	-9	-12	-22	-28	-38	-105
from > 6	+32	+28	+19	+15	+7	0	0	0	0	0	-5	-5	-13	-13	-25	-40
to $\leq$ 10	+23	+19	+10	+6	-2	-6	-9	-22	-36	-90	-11	-14	-28	-35	-47	-130
from > 10	+39	+34	+23	+18	+8	0	0	0	0	0	-6	-6	-16	-16	-32	-50
to $\leq$ 14	+28	+23	+12	+7	-3	-8	-11	-27	-43	-110	-14	-17	-34	-43	-59	-160
from > 14	+48	+41	+28	+21	+9	0	0	0	0	0	-7	-7	-20	-20	-40	-65
to $\leq$ 24	+35	+28	+15	+8	-4	-9	-13	-33	-52	-130	-16	-20	-41	-53	-73	-195
from > 24	+59	+50	+33	+25	+11	0	0	0	0	0	-9	-9	-25	-25	-50	-80
to $\leq$ 30	+43	+34	+17	+9	-5	-11	-16	-39	-62	-160	-20	-25	-50	-64	-89	-240
from > 30	+72	+60														
to $\leq$ 40	+53	+41														
from > 40	+78	+62														
to $\leq$ 50	+59	+43														
from > 50	+93	+73														
to $\leq$ 65	+71	+51														
from > 65	+101	+76														
to $\leq$ 80	+79	+54														
from > 80	+117	+88														
to $\leq$ 100	+92	+63														
from > 100	+125	+90														
to $\leq$ 120	+100	+65														
from > 120	+133	+93														
to $\leq$ 140	+108	+68														
from > 140																
to $\leq$ 160																
from > 160																
to $\leq$ 180																

*Per DIN 58700 sheet 1 p. 2.

ISO-METRIC TOLERANCE CHARTS

FOR INTERNAL MEASUREMENTS (HOLES)*

Measurements in μm ($1\mu\text{m} = 0.001\text{mm}$)

																		μm
	Graph Represents Range From 3 – 6 mm																	+150
																	+100	
																	+50	
																	0	
																		-50
								Internal Dimensions (Holes)										-100
																		-150
Z8	X8	S7	H6	H7	H8	H10	H11	G6	G7	F8	F9	E9	D10	D11	CD10	C11	Designation	
-26	-20	-14	+6	+10	+14	+40	+60	+8	+12	+20	+31	+39	+60	+80	+74	+120	from > 1	
-40	-34	-24	0	0	0	0	0	+2	+2	+6	+6	+14	+20	+20	+34	+60	to ≤ 3	
-35	-28	-15	+8	+12	+18	+48	+75	+12	+16	+28	+40	+50	+78	+105	+94	+145	from > 3	
-53	-46	-27	0	0	0	0	0	+4	+4	+10	+10	+20	+30	+30	+46	+70	to ≤ 6	
-42	-34	-17	+9	+15	+22	+58	+90	+14	+20	+35	+49	+61	+98	+130	+114	+170	from > 6	
-64	-56	-32	0	0	0	0	0	+5	+5	+13	+13	+25	+40	+40	+56	+80	to ≤ 10	
-50	-40																from > 10	
-77	-67	-21	+11	+18	+27	+70	+110	+17	+24	+43	+59	+75	+120	+160	—	+205	to ≤ 14	
-60	-45	-39	0	0	0	0	0	+6	+6	+16	+16	+32	+50	+50	—	+95	from > 14	
-87	-72																to ≤ 18	
-73	-54																from > 18	
-106	-87	-27	+13	+21	+33	+84	+130	+20	+28	+53	+72	+92	+149	+195	—	+240	to ≤ 24	
-88	-64	-48	0	0	0	0	0	+7	+7	+20	+20	+40	+65	+65	—	+110	from > 24	
-121	-97																to ≤ 30	
-112	-80																from > 30	
-151	-119	-34	+16	+25	+39	+100	+160	+25	+34	+64	+87	+112	+180	+240	—	+120	to ≤ 40	
-136	-97	-59	0	0	0	0	0	+9	+9	+25	+25	+50	+80	+80	—	+290	from > 40	
-175	-136															+130	to ≤ 50	
-172	-122	-42														+330	from > 50	
-218	-168	-72	+19	+30	+46	+120	+190	+29	+40	+76	+104	+134	+220	+290	—	+140	to ≤ 65	
-210	-146	-48	0	0	0	0	0	+10	+10	+30	+30	+60	+100	+100	—	+340	from > 65	
-256	-192	-78														+150	to ≤ 80	
-258	-178	-58														+390	from > 80	
-312	-232	-93	+22	+35	+54	+140	+220	+34	+47	+90	+123	+159	+260	+340	—	+170	to ≤ 100	
-310	-210	-66	0	0	0	0	0	+12	+12	+36	+36	+72	+120	+120	—	+400	from > 100	
-364	-264	-101														+180	to ≤ 120	
-365	-248	-77														+450	from > 120	
-428	-311	-117														+200	to ≤ 140	
-415	-280	-85	+25	+40	+63	+160	+250	+39	+54	+106	+143	+185	+305	+395	—	+460	from > 140	
-478	-343	-125	0	0	0	0	0	+14	+14	+43	+43	+85	+145	+145	—	+210	to ≤ 160	
—	-310	-93														+480	from > 160	
	-373	-133														+230	to ≤ 180	

Nominal Range in mm

*Per DIN 58700 sheet 1 p. 3.

ISO-METRIC TOLERANCE CHARTS

Expressed in thousandths of a millimeter

RUNNING & SLIDING FITS			d, e — LOOSE CLEARANCE					f — AVERAGE RUNNING			
LOCATIONAL FITS			g — LOCATIONAL CLEARANCE					h — LOCATIONAL TRANSITION			
FORCE FITS			k — LIGHT DRIVE					p, s — MEDIUM DRIVE			
Dia.		NOMINAL SIZE RANGE IN INCHES & MILLIMETERS									
		> =	.039 to .118 in.	.118 to .236 in.	.236 to .394 in.	.394 to .709 in.	.709 to 1.181 in.	1.181 to 1.969 in.	1.969 to 3.150 in.	3.150 to 4.724 in.	4.724 to 7.087 in.
		> =	1 to 3mm	3 to 6mm	6 to 10mm	10 to 18mm	18 to 30mm	30 to 50mm	50 to 80mm	80 to 120mm	120 to 180mm
	FITS	VALUES (From / To) IN THOUSANDTHS OF A mm									
Hole	H6	+6 0	+8 0	+9 0	+11 0	+13 0	+16 0	+19 0	+22 0	+25 0	
Shaft	g5	-2 -6	-4 -9	-5 -11	-6 -14	-7 -16	-9 -20	-10 -23	-12 -27	-14 -32	
	h5	0 -4	0 -5	0 -6	0 -8	0 -9	0 -11	0 -13	0 -15	0 -18	
	k5	+4 0	+6 +1	+7 +1	+9 +1	+11 +2	+13 +2	+15 +2	+18 +3	+21 +3	
	p5	+10 +6	+17 +12	+21 +15	+26 +18	+31 +22	+37 +26	+45 +32	+52 +37	+61 +43	
Hole	H7	+10 0	+12 0	+15 0	+18 0	+21 0	+25 0	+30 0	+35 0	+40 0	
Shaft	f6	-6 -12	-10 -18	-13 -22	-16 -27	-20 -33	-25 -41	-30 -49	-36 -58	-43 -68	
	g6	-2 -8	-4 -12	-5 -14	-6 -17	-7 -20	-9 -25	-10 -29	-12 -34	-14 -39	
	h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16	0 -19	0 -22	0 -25	
	k6	+6 0	+9 +1	+10 +1	+12 +1	+15 +2	+18 +2	+21 +2	+25 +3	+28 +3	
	p6	+12 +6	+20 +12	+24 +15	+29 +18	+35 +22	+42 +26	+51 +32	+59 +37	+68 +43	
Hole	H8	+14 0	+18 0	+22 0	+27 0	+33 0	+39 0	+46 0	+54 0	+63 0	
Shaft	e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89	-60 -106	-72 -126	-85 -148	
	f8	-6 -20	-10 -28	-13 -35	-16 -43	-20 -53	-25 -64	-30 -76	-36 -90	-43 -106	
	h8	0 -14	0 -18	0 -22	0 -27	0 -33	0 -39	0 -46	0 -54	0 -63	
	s8	+29 +15	+37 +19	+45 +23	+55 +28	+68 +35	+82 +43	+99 +53	+125 +71	+155 +92	
Hole	H9	+25 0	+30 0	+36 0	+43 0	+52 0	+62 0	+74 0	+87 0	+100 0	
Shaft	e9	-14 -39	-20 -50	-25 -61	-32 -75	-40 -92	-50 -112	-60 -134	-72 -159	-85 -185	
	h9	0 -25	0 -30	0 -36	0 -43	0 -52	0 -62	0 -74	0 -87	0 -100	
Hole	H11	+60 0	+75 0	+90 0	+110 0	+130 0	+160 0	+190 0	+220 0	+250 0	
Shaft	d11	-20 -80	-30 -105	-40 -130	-50 -160	-65 -195	-80 -240	-100 -290	-120 -340	-145 -395	
	h11	0 -60	0 -75	0 -90	0 -110	0 -130	0 -160	0 -190	0 -220	0 -250	

ISO-METRIC TOLERANCE CHARTS

Expressed in inches

RUNNING & SLIDING FITS			d, e — LOOSE CLEARANCE					f — AVERAGE RUNNING			
LOCATIONAL FITS			g — LOCATIONAL CLEARANCE					h — LOCATIONAL TRANSITION			
FORCE FITS			k — LIGHT DRIVE					p, s — MEDIUM DRIVE			
Dia.		NOMINAL SIZE RANGE IN INCHES & MILLIMETERS									
		> =	.039 to .118 in.	.118 to .236 in.	.236 to .394 in.	.394 to .709 in.	.709 to 1.181 in.	1.181 to 1.969 in.	1.969 to 3.150 in.	3.150 to 4.724 in.	4.724 to 7.087 in.
		> =	1 to 3mm	3 to 6mm	6 to 10mm	10 to 18mm	18 to 30mm	30 to 50mm	50 to 80mm	80 to 120mm	120 to 180mm
	FITS	VALUES (From / To) IN INCHES									
Hole	H6	+0.00024 .00000	+0.00031 .00000	+0.00035 .00000	+0.00043 .00000	+0.00051 .00000	+0.00063 .00000	+0.00075 .00000	+0.00087 .00000	+0.00098 .00000	
Shaft	g5	-0.00008 -0.00024	-0.00016 -0.00035	-0.00020 -0.00043	-0.00024 -0.00055	-0.00028 -0.00063	-0.00035 -0.00079	-0.00039 -0.00091	-0.00047 -0.0106	-0.00055 -0.0126	
	h5	.00000 -0.00016	.00000 -0.00020	.00000 -0.00024	.00000 -0.00031	.00000 -0.00035	.00000 -0.00043	.00000 -0.00051	.00000 -0.00059	.00000 -0.00071	
	k5	+0.00016 .00000	+0.00024 +0.00004	+0.00028 +0.00008	+0.00035 +0.00008	+0.00043 +0.00008	+0.00051 +0.00008	+0.00059 +0.00012	+0.00071 +0.00012	+0.00083 +0.00016	
	p5	+0.00039 +0.00024	+0.00067 +0.00047	+0.00083 +0.00059	+0.0102 +0.00071	+0.0122 +0.00087	+0.0146 +0.0102	+0.0177 +0.0126	+0.0205 +0.0146	+0.0240 +0.0169	
Hole	H7	+0.00039 .00000	+0.00047 .00000	+0.00059 .00000	+0.00071 .00000	+0.00083 .00000	+0.00098 .00000	+0.0118 .00000	+0.0138 .00000	+0.0157 .00000	
Shaft	f6	-0.00024 -0.00047	-0.00039 -0.00071	-0.00051 -0.00087	-0.00063 -0.0106	-0.00079 -0.0130	-0.00098 -0.0161	-0.0118 -0.0193	-0.0142 -0.0228	-0.0169 -0.0268	
	g6	-0.00008 -0.00031	-0.00016 -0.00047	-0.00020 -0.00055	-0.00024 -0.00067	-0.00028 -0.00079	-0.00035 -0.00098	-0.00039 -0.0114	-0.00047 -0.0134	-0.00055 -0.0154	
	h6	.00000 -0.00028	.00000 -0.00031	.00000 -0.00035	.00000 -0.00043	.00000 -0.00051	.00000 -0.00063	.00000 -0.00075	.00000 -0.00087	.00000 -0.00098	
	k6	+0.00024 +0.00000	+0.00035 +0.00004	+0.00039 +0.00004	+0.00047 +0.00004	+0.00059 +0.00008	+0.00071 +0.00008	+0.00083 +0.00008	+0.00098 +0.00012	+0.0110 +0.00012	
	p6	+0.00047 +0.00024	+0.00079 +0.00047	+0.00094 +0.00059	+0.0114 +0.00071	+0.0138 +0.00087	+0.0165 +0.0102	+0.0201 +0.0126	+0.0232 +0.0146	+0.0268 +0.0169	
Hole	H8	+0.00055 .00000	+0.00071 .00000	+0.00087 .00000	+0.0106 .00000	+0.0130 .00000	+0.0154 .00000	+0.0181 .00000	+0.0213 .00000	+0.0248 .00000	
Shaft	e8	-0.00055 -0.0110	-0.00079 -0.0150	-0.00098 -0.0185	-0.0126 -0.0232	-0.0157 -0.0287	-0.0197 -0.0350	-0.0236 -0.0417	-0.0283 -0.0496	-0.0335 -0.0583	
	f8	-0.00024 -0.00079	-0.00039 -0.0110	-0.00051 -0.0138	-0.00063 -0.0169	-0.00079 -0.0209	-0.00098 -0.0252	-0.0118 -0.0299	-0.0142 -0.0354	-0.0169 -0.0417	
	h8	.00000 -0.00055	.00000 -0.00071	.00000 -0.00087	.00000 -0.0106	.00000 -0.0130	.00000 -0.0154	.00000 -0.0181	.00000 -0.0213	.00000 -0.0248	
	s8	+0.0114 +0.00059	+0.0146 +0.00075	+0.0177 +0.00091	+0.0217 +0.0110	+0.0268 +0.0138	+0.0323 +0.0169	+0.0390 +0.0209	+0.0492 +0.0280	+0.0610 +0.0362	
Hole	H9	+0.00098 .00000	+0.0118 .00000	+0.0142 .00000	+0.0169 .00000	+0.0205 .00000	+0.0244 .00000	+0.0291 .00000	+0.0343 .00000	+0.0394 .00000	
Shaft	e9	-0.00055 -0.0154	-0.00079 -0.0197	-0.00098 -0.0240	-0.0126 -0.0295	-0.0157 -0.0362	-0.0197 -0.0441	-0.0236 -0.0528	-0.0283 -0.0626	-0.0335 -0.0728	
	h9	.00000 -0.00098	.00000 -0.0118	.00000 -0.0142	.00000 -0.0169	.00000 -0.0205	.00000 -0.0244	.00000 -0.0291	.00000 -0.0343	.00000 -0.0394	
Hole	H11	+0.0236 .00000	+0.0295 .00000	+0.0354 .00000	+0.0433 .00000	+0.0512 .00000	+0.0630 .00000	+0.0748 .00000	+0.0866 .00000	+0.0984 .00000	
Shaft	d11	-0.00079 -0.0315	-0.0118 -0.0413	-0.0157 -0.0512	-0.0197 -0.0630	-0.0256 -0.0768	-0.0315 -0.0945	-0.0394 -0.1142	-0.0472 -0.1339	-0.0571 -0.1555	
	h11	.00000 -0.0236	.00000 -0.0295	.00000 -0.0354	.00000 -0.0433	.00000 -0.0512	.00000 -0.0630	.00000 -0.0748	.00000 -0.0866	.00000 -0.0984	

INCH TO METRIC CONVERSIONS - Small Values



inches	mm
.001	0.0254
.002	0.0508
.003	0.0762
.004	0.1016
.005	0.1270
.006	0.1524
.007	0.1778
.008	0.2032
.009	0.2286

inches	mm
.01	0.254
.02	0.508
.03	0.762
.04	1.016
.05	1.270
.06	1.524
.07	1.778
.08	2.032
.09	2.286

inches	mm
.1	2.54
.2	5.08
.3	7.62
.4	10.16
.5	12.70
.6	15.24
.7	17.78
.8	20.32
.9	22.86

inches	inches									
	.0000	.0001	.0002	.0003	.0004	.0005	.0006	.0007	.0008	.0009
	millimeters (mm)									
0	0	0.00254	0.00508	0.00762	0.01016	0.01270	0.01524	0.01778	0.02032	0.02286
.001	0.02540	0.02794	0.03048	0.03302	0.03556	0.03810	0.04064	0.04318	0.04572	0.04826
.002	0.05080	0.05334	0.05588	0.05842	0.06096	0.06350	0.06604	0.06858	0.07112	0.07366
.003	0.07620	0.07874	0.08128	0.08382	0.08636	0.08890	0.09144	0.09398	0.09652	0.09906
.004	0.10160	0.10414	0.10668	0.10922	0.11176	0.11430	0.11684	0.11938	0.12192	0.12446
.005	0.12700	0.12954	0.13208	0.13462	0.13716	0.13970	0.14224	0.14478	0.14732	0.14986
.006	0.15240	0.15494	0.15748	0.16002	0.16256	0.16510	0.16764	0.17018	0.17272	0.17526
.007	0.17780	0.18034	0.18288	0.18542	0.18796	0.19050	0.19304	0.19558	0.19812	0.20066
.008	0.20320	0.20574	0.20828	0.21082	0.21336	0.21590	0.21844	0.22098	0.22352	0.22606
.009	0.22860	0.23114	0.23368	0.23622	0.23876	0.24130	0.24384	0.24638	0.24892	0.25146
.010	0.25400	0.25654	0.25908	0.26162	0.26416	0.26670	0.26924	0.27178	0.27432	0.27686
.011	0.27940	0.28194	0.28448	0.28702	0.28956	0.29210	0.29464	0.29718	0.29972	0.30226
.012	0.30480	0.30734	0.30988	0.31242	0.31496	0.31750	0.32004	0.32258	0.32512	0.32766
.013	0.33020	0.33274	0.33528	0.33782	0.34036	0.34290	0.34544	0.34798	0.35052	0.35306
.014	0.35560	0.35814	0.36068	0.36322	0.36576	0.36830	0.37084	0.37338	0.37592	0.37846
.015	0.38100	0.38354	0.38608	0.38862	0.39116	0.39370	0.39624	0.39878	0.40132	0.40386
.016	0.40640	0.40894	0.41148	0.41402	0.41656	0.41910	0.42164	0.42418	0.42672	0.42926
.017	0.43180	0.43434	0.43688	0.43942	0.44196	0.44450	0.44704	0.44958	0.45212	0.45466
.018	0.45720	0.45974	0.46228	0.46482	0.46736	0.46990	0.47244	0.47498	0.47752	0.48006
.019	0.48260	0.48514	0.48768	0.49022	0.49276	0.49530	0.49784	0.50038	0.50292	0.50546
.020	0.50800	0.51054	0.51308	0.51562	0.51816	0.52070	0.52324	0.52578	0.52832	0.53086

METRIC TO INCH CONVERSIONS - Small Values



mm	inches
0.01	.00039
0.02	.00079
0.03	.00118
0.04	.00157
0.05	.00197
0.06	.00236
0.07	.00276
0.08	.00315
0.09	.00354

mm	inches
0.1	.00394
0.2	.00787
0.3	.01181
0.4	.01575
0.5	.01969
0.6	.02362
0.7	.02756
0.8	.03150
0.9	.03543

mm	inches
1	.03937
2	.07874
3	.11811
4	.15748
5	.19685
6	.23622
7	.27559
8	.31496
9	.35433

mm	millimeters (mm)									
	0	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009
	inches									
0	.00000	.00004	.00008	.00012	.00016	.00020	.00024	.00028	.00031	.00035
0.010	.00039	.00043	.00047	.00051	.00055	.00059	.00063	.00067	.00071	.00075
0.020	.00079	.00083	.00087	.00091	.00094	.00098	.00102	.00106	.00110	.00114
0.030	.00118	.00122	.00126	.00130	.00134	.00138	.00142	.00146	.00150	.00154
0.040	.00157	.00161	.00165	.00169	.00173	.00177	.00181	.00185	.00189	.00193
0.050	.00197	.00201	.00205	.00209	.00213	.00217	.00220	.00224	.00228	.00232
0.060	.00236	.00240	.00244	.00248	.00252	.00256	.00260	.00264	.00268	.00272
0.070	.00276	.00280	.00283	.00287	.00291	.00295	.00299	.00303	.00307	.00311
0.080	.00315	.00319	.00323	.00327	.00331	.00335	.00339	.00343	.00346	.00350
0.090	.00354	.00358	.00362	.00366	.00370	.00374	.00378	.00382	.00386	.00390
0.100	.00394	.00398	.00402	.00406	.00409	.00413	.00417	.00421	.00425	.00429
0.110	.00433	.00437	.00441	.00445	.00449	.00453	.00457	.00461	.00465	.00469
0.120	.00472	.00476	.00480	.00484	.00488	.00492	.00496	.00500	.00504	.00508
0.130	.00512	.00516	.00520	.00524	.00528	.00531	.00535	.00539	.00543	.00547
0.140	.00551	.00555	.00559	.00563	.00567	.00571	.00575	.00579	.00583	.00587
0.150	.00591	.00594	.00598	.00602	.00606	.00610	.00614	.00618	.00622	.00626
0.160	.00630	.00634	.00638	.00642	.00646	.00650	.00654	.00657	.00661	.00665
0.170	.00669	.00673	.00677	.00681	.00685	.00689	.00693	.00697	.00701	.00705
0.180	.00709	.00713	.00717	.00720	.00724	.00728	.00732	.00736	.00740	.00744
0.190	.00748	.00752	.00756	.00760	.00764	.00768	.00772	.00776	.00780	.00783
0.200	.00787	.00791	.00795	.00799	.00803	.00807	.00811	.00815	.00819	.00823

TEMPERATURE CONVERSIONS



When converting from FAHRENHEIT TO CELCIUS OR CELCIUS TO FAHRENHEIT:

Locate temperature reading in center column.

Read (°C) Celcius to the left and (°F) Fahrenheit to the right

-459.4 to 0			0 to 100						100 to 1000					
°C		°F	°C		°F	°C		°F	°C		°F	°C		°F
-273	-459.4		-17.8	0	32	10.0	50	122.0	38	100	212	260	500	932
-268	-450		-17.2	1	33.8	10.6	51	123.8	43	110	230	266	510	950
-262	-440		-16.7	2	35.6	11.1	52	125.6	49	120	248	271	520	968
-257	-430		-16.1	3	37.4	11.7	53	127.4	54	130	266	277	530	986
-251	-420		-15.6	4	39.2	12.2	54	129.2	60	140	284	282	540	1004
-246	-410		-15.0	5	41.0	12.8	55	131.0	66	150	302	288	550	1022
-240	-400		-14.4	6	42.8	13.3	56	132.8	71	160	320	293	560	1040
-234	-390		-13.9	7	44.6	13.9	57	134.6	77	170	338	299	570	1058
-229	-380		-13.3	8	46.4	14.4	58	136.4	82	180	356	304	580	1076
-223	-370		-12.8	9	48.2	15.0	59	138.2	88	190	374	310	590	1094
-218	-360		-12.2	10	50.0	15.6	60	140.0	93	200	392	316	600	1112
-212	-350		-11.7	11	51.8	16.1	61	141.8	99	210	410	321	610	1130
-207	-340		-11.1	12	53.6	16.7	62	143.6	100	212	413.6	327	620	1148
-201	-330		-10.6	13	55.4	17.2	63	145.4	104	220	428	332	630	1166
-196	-320		-10.0	14	57.2	17.8	64	147.2	110	230	446	338	640	1184
-190	-310		-9.4	15	59.0	18.3	65	149.0	116	240	464	343	650	1202
-184	-300		-8.9	16	60.8	18.9	66	150.8	121	250	482	349	660	1220
-179	-290		-8.3	17	62.6	19.4	67	152.6	127	260	500	354	670	1238
-173	-280		-7.8	18	64.4	20.0	68	154.4	132	270	518	360	680	1256
-169	-273	-459.4	-7.2	19	66.2	20.6	69	156.2	138	280	536	366	690	1274
-168	-270	-454	-6.7	20	68.0	21.1	70	158.0	143	290	554	371	700	1292
-162	-260	-436	-6.1	21	69.8	21.7	71	159.8	149	300	572	377	710	1310
-157	-250	-418	-5.6	22	71.6	22.2	72	161.6	154	310	590	382	720	1328
-151	-240	-400	-5.0	23	73.4	22.8	73	163.4	160	320	608	388	730	1346
-146	-230	-382	-4.4	24	75.2	23.3	74	165.2	166	330	626	393	740	1364
-140	-220	-364	-3.9	25	77.0	23.9	75	167.0	171	340	644	399	750	1382
-134	-210	-346	-3.3	26	78.8	24.4	76	168.8	177	350	662	404	760	1400
-129	-200	-328	-2.8	27	80.6	25.0	77	170.6	182	360	680	410	770	1418
-123	-190	-310	-2.2	28	82.4	25.6	78	172.4	188	370	698	416	780	1436
-118	-180	-292	-1.7	29	84.2	26.1	79	174.2	193	380	716	421	790	1454
-112	-170	-274	-1.1	30	86.0	26.7	80	176.0	199	390	734	427	800	1472
-107	-160	-256	-0.6	31	87.8	27.2	81	177.8	204	400	752	432	810	1490
-101	-150	-238	0.0	32	89.6	27.8	82	179.6	210	410	770	438	820	1508
-96	-140	-220	0.6	33	91.4	28.3	83	181.4	216	420	788	443	830	1526
-90	-130	-202	1.1	34	93.2	28.9	84	183.2	221	430	806	449	840	1544
-84	-120	-184	1.7	35	95.0	29.4	85	185.0	227	440	824	454	850	1562
-79	-110	-166	2.2	36	96.8	30.0	86	186.8	232	450	842	460	860	1580
-73	-100	-148	2.8	37	98.6	30.6	87	188.6	238	460	860	466	870	1598
-68	-90	-130	3.3	38	100.4	31.1	88	190.4	243	470	878	471	880	1616
-62	-80	-112	3.9	39	102.2	31.7	89	192.2	249	480	896	477	890	1634
-57	-70	-94	4.4	40	104.0	32.2	90	194.0	254	490	914	482	900	1652
-51	-60	-76	5.0	41	105.8	32.8	91	195.8				488	910	1670
-46	-50	-58	5.6	42	107.6	33.3	92	197.6				493	920	1688
-40	-40	-40	6.1	43	109.4	33.9	93	199.4				499	930	1706
-34	-30	-22	6.7	44	111.2	34.4	94	201.2				504	940	1724
-29	-20	-4	7.2	45	113.0	35.0	95	203.0				510	950	1742
-23	-10	14	7.8	46	114.8	35.6	96	204.8				516	960	1760
-17.8	0	32	8.3	47	116.6	36.1	97	206.6				521	970	1778
			8.9	48	118.4	36.7	98	208.4				527	980	1796
			9.4	49	120.2	37.2	99	210.2				532	990	1814
						37.8	100	212.0				538	1000	1832

TEMPERATURE CONVERSIONS



When converting from FAHRENHEIT TO CELSIUS OR CELSIUS TO FAHRENHEIT:

Locate temperature reading in center column.

Read (°C) Celsius to the left and (°F) Fahrenheit to the right

1000 to 2000						2000 to 3000					
°C		°F	°C		°F	°C		°F	°C		°F
538	1000	1832	816	1500	2732	1093	2000	3632	1371	2500	4532
543	1010	1850	821	1510	2750	1099	2010	3650	1377	2510	4550
549	1020	1868	827	1520	2768	1104	2020	3668	1382	2520	4568
554	1030	1886	832	1530	2786	1110	2030	3686	1388	2530	4586
560	1040	1904	838	1540	2804	1116	2040	3704	1393	2540	4604
566	1050	1922	843	1550	2822	1121	2050	3722	1399	2550	4622
571	1060	1940	849	1560	2840	1127	2060	3740	1404	2560	4640
577	1070	1958	854	1570	2858	1132	2070	3758	1410	2570	4658
582	1080	1976	860	1580	2876	1138	2080	3776	1416	2580	4676
588	1090	1994	866	1590	2894	1143	2090	3794	1421	2590	4694
593	1100	2012	871	1600	2912	1149	2100	3812	1427	2600	4712
599	1110	2030	877	1610	2930	1154	2110	3830	1432	2610	4730
604	1120	2048	882	1620	2948	1160	2120	3848	1438	2620	4748
610	1130	2066	888	1630	2966	1166	2130	3866	1443	2630	4766
616	1140	2084	893	1640	2984	1171	2140	3884	1449	2640	4784
621	1150	2102	899	1650	3002	1177	2150	3902	1454	2650	4802
627	1160	2120	904	1660	3020	1182	2160	3920	1460	2660	4820
632	1170	2138	910	1670	3038	1188	2170	3938	1466	2670	4838
638	1180	2156	916	1680	3056	1193	2180	3956	1471	2680	4856
643	1190	2174	921	1690	3074	1199	2190	3974	1477	2690	4874
649	1200	2192	927	1700	3092	1204	2200	3992	1482	2700	4892
654	1210	2210	932	1710	3110	1210	2210	4010	1488	2710	4910
660	1220	2228	938	1720	3128	1216	2220	4028	1493	2720	4928
666	1230	2246	943	1730	3146	1221	2230	4046	1499	2730	4946
671	1240	2264	949	1740	3164	1227	2240	4064	1504	2740	4964
677	1250	2282	954	1750	3182	1232	2250	4082	1510	2750	4982
682	1260	2300	960	1760	3200	1238	2260	4100	1516	2760	5000
688	1270	2318	966	1770	3218	1243	2270	4118	1521	2770	5018
693	1280	2336	971	1780	3236	1249	2280	4136	1527	2780	5036
699	1290	2354	977	1790	3254	1254	2290	4154	1532	2790	5054
704	1300	2372	982	1800	3272	1260	2300	4172	1538	2800	5072
710	1310	2390	988	1810	3290	1266	2310	4190	1543	2810	5090
716	1320	2408	993	1820	3308	1271	2320	4208	1549	2820	5108
721	1330	2426	999	1830	3326	1277	2330	4226	1554	2830	5126
727	1340	2444	1004	1840	3344	1282	2340	4244	1560	2840	5144
732	1350	2462	1010	1850	3362	1288	2350	4262	1566	2850	5162
738	1360	2480	1016	1860	3380	1293	2360	4280	1571	2860	5180
743	1370	2498	1021	1870	3398	1299	2370	4298	1577	2870	5198
749	1380	2516	1027	1880	3416	1304	2380	4316	1582	2880	5216
754	1390	2534	1032	1890	3434	1310	2390	4334	1588	2890	5234
760	1400	2552	1038	1900	3452	1316	2400	4352	1593	2900	5252
766	1410	2570	1043	1910	3470	1321	2410	4370	1599	2910	5270
771	1420	2588	1049	1920	3488	1327	2420	4388	1604	2920	5288
777	1430	2606	1054	1930	3506	1332	2430	4406	1610	2930	5306
782	1440	2624	1060	1940	3524	1338	2440	4424	1616	2940	5324
788	1450	2642	1066	1950	3542	1343	2450	4442	1621	2950	5342
793	1460	2660	1071	1960	3560	1349	2460	4460	1627	2960	5360
799	1470	2678	1077	1970	3578	1354	2470	4478	1632	2970	5378
804	1480	2696	1082	1980	3596	1360	2480	4496	1638	2980	5396
810	1490	2714	1088	1990	3614	1366	2490	4514	1643	2990	5414
			1093	2000	3632				1649	3000	5432

MISCELLANEOUS CONVERSION FACTORS

To Convert	Into	Multiply By	To Convert	Into	Multiply By
Amperes/sq. cm	Amperes/sq. in.	6.452	Cubic feet	Cu. yards	0.03704
Amperes/sq. in.	Amperes/sq. cm	0.1550	Cubic feet	Gallons (U.S. liq.)	7.48052
Ampere-hours	Coulombs	3600	Cubic feet	Liters	28.32
Ampere-turns	Gilberts	1.257	Cubic feet/ min.	Cu. cms/sec.	472
Ampere-turns/cm	Ampere-turns/in.	2.540	Cubic inches	Cu. centimeters	16.39
Ampere-turns/cm	Gilberts/cm	1.257	Cubic inches	Cu. feet	5.787 X 10 ⁻⁴
Ampere-turns/in.	Ampere-turns/cm	0.3937	Cubic inches	Gallons (U.S. liq.)	4.329 X 10 ⁻³
Ampere-turns/in.	Gilberts/cm	0.4950	Cubic inches	Liters	0.01639
Angstrom unit	Inches	3937 X 10 ⁻⁹	Cubic inches	Quarts (U.S. liq.)	0.01732
Angstrom unit	Microns (mus)	1 X 10 ⁻⁴	Cubic meters	Gallons (U.S. liq.)	264.2
Atmospheres	Cms of mercury	76	Cubic meters	Liters	1000
Atmospheres	Ft. of water (4°C)	33.90	Cubic meters	Pints (U.S. liq.)	2113
Atmospheres	In. of mercury (0°C)	29.92	Days	Seconds	86400
Atmospheres	Pounds/sq. in.	14.70	Degrees/sec.	Radians/sec.	0.01745
Bars	Atmospheres	0.9869	Degress/sec.	Revolutions/min.	0.1667
Bars	Dynes/sq. cm	10 ⁶	Degrees/sec.	Revolutions/sec.	2.778 X 10 ⁻³
Bars	Pounds/sq. in.	14.50	Degrees (angle)	Quadrants	0.01111
Btu	Ergs	1.0550 X 10 ¹⁰	Degrees (angle)	Radians	0.01745
Btu	Foot-pounds	778.3	Degrees (angle)	Seconds	3600
Btu	Gram-calories	252	Dyne/cm	Erg/sq. millimeter	0.01
Btu	Horsepower-hrs.	3.931 X 10 ⁻⁴	Dyne/ sq. cm	Atmospheres	9.869 X 10 ⁻⁷
Btu	Joules	1054.8	Dyne/ sq. cm	In. of mercury (0°C)	2.953 X 10 ⁻⁵
Btu	Kilowatt-hrs.	2.928 X 10 ⁻⁴	Dynes	Grams	1.020 X 10 ⁻³
Btu/hr.	Foot-pounds/sec.	0.2162	Dynes	Joules/cm	10 ⁻⁷
Btu/hr.	Gram-cal./sec.	0.0700	Dynes	Joules/m (Newtons)	10 ⁻⁵
Btu/hr.	Horsepower-hrs.	3.929 X 10 ⁻⁴	Dynes	Pounds	2.248 X 10 ⁻⁶
Btu/hr.	Watts	0.2931	Dynes/ sq. cm	Bars	10 ⁻⁶
Btu/min.	Foot-pounds/sec.	12.96	Erg/sec.	Dyne-cm/sec.	1.0
Btu/min.	Horsepower	0.02356	Ergs	Btu	9.480 X 10 ⁻¹¹
Btu/min.	Kilowatts	0.01757	Ergs	Dyne-centimeters	1.0
Btu/min.	Watts	17.57	Ergs	Foot-pounds	7.367 X 10 ⁻⁸
Calories, gram (mean)	Btu (mean)	3.9685 X 10 ⁻³	Ergs	Grams-calories	0.2389 X 10 ⁻⁷
Candle/ sq. in.	Lamberts	.4870	Ergs	Grams-cms	1.020 X 10 ⁻³
Centigrade	Fahrenheit	(°C x 9/5) + 32°	Ergs	Joules	10 ⁻⁷
Centiliters	Liters	0.01	Ergs	Watt-hours	0.2778 X 10 ⁻¹⁰
Centimeters	Feet	3.281 X 10 ⁻²	Ergs/sec.	Btu/min.	5.688 X 10 ⁻⁹
Centimeters	Meters	0.01	Ergs/sec.	Foot-pounds/sec.	7.3756 X 10 ⁻⁸
Centimeters	Inches	0.3937	Ergs/sec.	Horsepower	1.341 X 10 ⁻¹⁰
Centimeters	Millimeters	10	Ergs/sec.	Kilowatts	10 ⁻¹⁰
Centimeter-dynes	Centimeter-grams	1.020 X 10 ⁻³	Farads	Microfarads	10 ⁶
Centimeter-dynes	Pound-feet	7.376 X 10 ⁻⁸	Faradays	Ampere-hours	26.80
Centimeters/sec.	Feet/sec.	0.03281	Faradays	Coulombs	9.649 X 10 ⁴
Centimeters/sec. ²	Feet/sec. ²	0.03281	Feet	Centimeters	30.48
Circular mils	Sq. centimeters	5.067 X 10 ⁻⁶	Feet	Meters	0.3048
Circular mils	Sq. mils	0.7854	Feet	Millimeters	304.8
Circular mils	Sq. inches	7.854 X 10 ⁻⁷	Feet of water	Atmospheres	0.02950
Circumference	Radians	6.283	Feet of water	Inches of mercury	0.8826
Coulombs	Faradays	1.036 X 10 ⁻⁵	Feet of water	Kilograms/sq. cm	0.03048
Coulombs/ sq. cm	Coulombs/ sq. in.	64.52	Feet of water	Pounds/sq. in.	0.4335
Coulombs/ sq. in.	Coulombs/ sq. cm	0.1550	Feet/min.	Centimeters/sec.	0.5080
Cubic centimeters	Cu. inches	0.06102	Feet/min.	Miles/hr.	0.01136
Cubic centimeters	Gallons (U.S. liquid)	2.642 X 10 ⁻⁴	Feet/sec.	Centimeters/sec.	30.48
Cubic centimeters	Liters	0.001	Feet/sec. ²	Meters/sec. ²	0.3048
Cubic centimeters	Quarts (U.S liq.)	1.057 X 10 ⁻³	Feet/sec. ²	Miles/h • s	0.6818
Cubic foot	Cu. Inches	1728	Foot-candles	Lumens/sq. meter	10.764
Cubic foot	Cu. meters	0.02832	Foot-pounds	Btu	1.286 X 10 ⁻³

Continued on the next page

MISCELLANEOUS CONVERSION FACTORS

To Convert	Into	Multiply By
Foot-pounds	Ergs	1.356×10^{-7}
Foot-pounds	Gram-calories	0.3238
Foot-pounds	Joules	1.356
Foot-pounds/min.	Btu/min.	1.286×10^{-3}
Foot-pounds/min.	Foot-pounds/sec.	0.01667
Foot-pounds/min.	Horsepower	3.030×10^{-5}
Foot-pounds/min.	Kg-calories/min.	3.24×10^{-4}
Foot-pounds/min.	Kilowatts	2.260×10^{-5}
Foot-pounds/sec.	Btu/min.	0.07717
Foot-pounds/sec.	Horsepower	1.818×10^{-3}
Foot-pounds/sec.	Kilowatts	1.356×10^{-3}
Gallons	Cu. feet	0.1337
Gallons	Cu. inches	231
Gallons	Liters	3.785
Gallons of water	Pounds of water	8.3453
Gausses	Lines/sq. in.	6.452
Gausses	Webers/sq. cm	10^{-8}
Gausses	Webers/sq. in.	6.452×10^{-8}
Gilberts	Ampere-turns	0.7958
Gilberts/cm	Ampere-turns/cm	0.7958
Gilberts/cm	Ampere-turns/in.	2.021
Grams	Dynes	980.7
Grams	Joules/cm	9.807×10^{-5}
Grams	Kilograms	0.001
Grams	Milligrams	1000
Grams	Ounces (avdp)	0.03527
Grams	Pounds	2.205×10^{-3}
Grams/cu. cm	Pounds/cu. ft.	62.43
Grams/cu. cm	Pounds/cu. in.	0.03613
Gram-calories	Btu	3.9683×10^{-3}
Gram-calories	Ergs	4.1868×10^7
Gram-calories	Foot-pounds	3.0880
Gram-calories	Horsepower-hrs.	1.5596×10^{-6}
Gram-calories	Watt-hrs.	1.1630×10^{-3}
Gram-calories/sec.	Btu-hr.	14.286
Gram-centimeters	Btu	9.297×10^{-8}
Gram-centimeters	Ergs	980.7
Gram-centimeters	Joules	9.807×10^{-5}
Henries	Millihenries	1000
Horsepower	Btu/min.	42.44
Horsepower	Foot-pounds/min.	33000
Horsepower	Foot-pounds/sec.	550
Horsepower	Kg-calories/min.	10.68
Horsepower	Watts	745.7
Horsepower-hrs.	Btu	2547
Horsepower-hrs.	Ergs	2.6845×10^{13}
Horsepower-hrs.	Foot-pounds	1.98×10^6
Horsepower-hrs.	Gram-calories	641190
Horsepower-hrs.	Joules	2.684×10^6
Horsepower-hrs.	Kilowatt-hrs.	0.7457
Hours	Weeks	5.952×10^{-3}
Inches	Centimeters	2.540
Inches	Millimeters	25.40
Inches	Mils	1000
Inches of mercury	Atmospheres	0.03342
Inches of mercury	Feet of water	1.133

To Convert	Into	Multiply By
Inches of mercury	pounds/sq. in.	0.4912
Joules	Btu	9.480×10^{-4}
Joules	Ergs	10^7
Joules	Foot-pounds	0.7376
Joules	Kilogram-calories	2.389×10^{-4}
Joules	Watt-hrs.	2.778×10^{-4}
Kilograms	Grams	1000
Kilograms	Pounds	2.205
Kilograms	Tons (short)	1.102×10^{-3}
Kilograms/sq. cm	Pounds/sq. in.	14.22
Kilogram-calories	Btu	3.968
Kilogram-calories	Foot-pounds	3088
Kilogram-calories	Joules	4186
Kilogram-calories	Kilowatt-hrs.	1.163×10^{-3}
Kilolines	Maxwells	1000
Kilometers	Meters	1000
Kilometers	Miles	0.6214
Kilometers/hr.	Feet/sec.	0.9113
Kilometers/hr.	Miles/hr.	0.6214
Kilometers/hr. ²	Centimeters/sec. ²	27.78
Kilometers/hr. ²	Feet/sec. ²	0.9113
Kilometers/hr. ²	Miles/hr. ²	0.6214
Kilowatts	Btu/min.	56.92
Kilowatts	Foot-pounds/sec.	737.6
Kilowatts	Horsepower	1.341
Kilowatts	Kg-calories/min.	14.34
Kilowatts	Watts	1000
Kilowatt-hrs.	Btu	3413
Kilowatt-hrs.	Foot-pounds	2.655×10^6
Kilowatt-hrs.	Gram-calories	859850
Kilowatt-hrs.	Horsepower-hrs.	1.341
Kilowatt-hrs.	Joules	3.6×10^6
Lines/sq. cm	Gausses	1.0
Lines/sq. in.	Gausses	0.1550
Lines/sq. in.	Webers/sq. in.	10^{-8}
Liters	Cu. centimeters	1000
Liters	Cu. feet	0.03531
Liters	Cu. inches	61.02
Liters	Gallons (U.S. liq.)	0.2642
Lumens	Spher. candle power	0.07958
Lumens	Watts	0.001496
Lumens/sq. ft.	Foot-candles	1.0
Lumens/sq. ft.	Lumens/sq. meter	10.76
Maxwells	Kilolines	0.001
Maxwells	Webers	10^{-8}
Megohms	Ohms	10^6
Meters	Centimeters	100
Meters	Feet	3.281
Meters	Inches	39.37
Meters	Kilometers	0.001
Meters	Yards	1.094
Meters/min.	Feet/sec.	0.05468
Meters/sec.	Feet/sec.	3.281
Meters/sec.	Kilometers/hr.	3.6
Meters/sec.	Miles/hr.	2.237
Meters/sec. ²	Feet/sec./sec.	3.281

Continued on the next page

MISCELLANEOUS CONVERSION FACTORS



To Convert	Into	Multiply By	To Convert	Into	Multiply By
Meters/sec. ²	Kilometers/hr. ²	3.6	Revolutions	Degrees	360
Meters/sec. ²	Miles/hr. ²	2.237	Revolutions	Radians	6.283
Microfarads	Farads	10 ⁻⁶	Revolutions/min.	Degrees/sec.	6
Microhms	Megohms	10 ⁻¹²	Revolutions/min.	Radians/sec.	0.1047
Microhms	Ohms	10 ⁻⁶	Revolutions/min. ²	Radians/sec. ²	1.745 X 10 ⁻³
Microns	Meters	1 X 10 ⁻⁶	Revolutions/min. ²	Revolutions/sec. ²	2.778 X 10 ⁻⁴
Miles (statute)	Centimeters	1.609 X 10 ⁵	Revolutions/sec.	Degrees/sec.	360
Miles (statute)	Feet	5280	Revolutions/sec.	Radians/sec.	6.283
Miles (statute)	Inches	6.336 X 10 ⁴	Revolutions/sec. ²	Radians/sec. ²	6.283
Miles (statute)	Kilometers	1.609	Seconds (angles)	Degrees	2.778 X 10 ⁻⁴
Miles/hr.	Feet/min.	88	Seconds (angles)	Minutes	0.01667
Miles/hr.	Feet/sec.	1.467	Slugs	Pounds	32.17
Miles/hr.	Meters/min.	26.82	Square centimeters	Circular mils	1.973 X 10 ⁵
Miles/h•s	Centimeters/sec. ²	44.70	Square centimeters	Sq. inches	0.1550
Miles/h•s	Feet/sec. ²	1.467	Square centimeters	Sq. meters	0.0001
Miles/h•s	Kilometers/h•s	1.609	Square centimeters	Sq. millimeters	100
Millimicrons	Meters	1 X 10 ⁻⁹	Square feet	Circular mils	1.833 X 10 ⁸
Milligrams	Grams	0.001	Square feet	Sq. centimeters	929
Millihenries	Henries	0.001	Square feet	Sq. inches	144
Milliliters	Liters	0.001	Square inches	Circular mils	1.273 X 10 ⁶
Millimeters	Centimeters	0.1	Square inches	Sq. centimeters	6.452
Millimeters	Inches	0.03937	Square inches	Sq. millimeters	645.2
Millimeters	Mils	39.37	Square inches	Sq. mils	10 ⁶
Mils	Centimeters	2.540 X 10 ⁻³	Square meters	Sq. centimeters	10 ⁴
Mils	Inches	0.001	Square meters	Sq. feet	10.76
Minutes (angles)	Degrees	0.01667	Square meters	Sq. inches	1550
Minutes (angles)	Radians	2.909 X 10 ⁻⁴	Square meters	Sq. millimeters	10 ⁶
Ohms	Megohms	10 ⁻⁶	Square millimeters	Circular mils	1973
Ounces	Grams	28.349527	Square millimeters	Sq. centimeters	0.01
Ounces	Pounds	0.0625	Square millimeters	Sq. inches	1.550 X 10 ⁻³
Ounces (fluid)	Cu. inches	1.805	Square mils	Circular mils	1.273
Ounces (fluid)	Liters	0.02957	Square mils	Sq. centimeters	6.452 X 10 ⁻⁶
Pints (liquid)	Cu. centimeters	473.2	Square mils	Sq. inches	10 ⁻⁶
Pints (liquid)	Cu. feet	0.01671	Temp. (°C) + 273°	Absolute temp. (°C)	1.0
Pints (liquid)	Cu. inches	28.87	Temp. (°C) + 17.78°	Temperature (°F)	1.8
Pints (liquid)	Gallons	0.125	Temp. (°F) + 460°	Absolute temp. (°F)	1.0
Pints (liquid)	Liters	0.4732	Temp. (°F) - 32°	Temperature (°C)	5/9
Pints (liquid)	Quarts (liquid)	0.5	Tons (short)	Ounces	32000
Poise	Grams/cm. sec.	1.00	Tons (short)	Pounds	2000
Pounds	Dynes	44.4823 X 10 ⁴	Volts/inch	Volts/cm	0.39370
Pounds	Grams	453.5924	Watts	Btu/hr.	3.4129
Pounds	Kilograms	0.4536	Watts	Btu/min.	0.05688
Pounds	Ounces	16	Watts	Ergs/sec.	107
Pounds of water	Cu. feet	0.01602	Watts	Foot-pounds/sec.	0.7378
Pounds of water	Cu. inches	27.68	Watts	Horsepower	1.341 X 10 ⁻³
Pounds of water	Gallons	0.1198	Watts	Kg-calories/min.	0.01433
Pound-feet	Centimeter-dynes	1.356 X 10 ⁷	Watts	Kilowatts	0.001
Pound-feet	Centimeter-grams	13825	Watt-hours	Btu	3.413
Pound-feet	Meter-kilograms	0.1383	Watt-hours	Ergs	3.60 X 10 ¹⁰
Pounds/cu. in.	Grams/cu. cm	27.68	Watt-hours	Foot-pounds	2656
Pounds/cu. in.	Pounds/cu. ft.	1728	Watt-hours	Gram-calories	859.85
Pounds/sq. in.	Atmospheres	0.06804	Watt-hours	Horsepower-hrs.	1.341 X 10 ⁻³
Pounds/sq. in.	Feet of water	2.307	Watt-hours	Kilogram-calories	0.8605
Pounds/sq. in.	Inches of mercury	2.036	Watt-hours	Kilowatt-hrs.	0.001
Pounds/sq. in.	Pounds/sq. ft.	144	Webers	Maxwells	10 ⁸
Quarts (liquid)	Gallons	0.25	Webers	Kilolines	10 ⁵
Quarts (liquid)	Liters	0.9463	Webers/sq. in.	Gausses	1.550 X 10 ⁷
Radians	Degrees	57.30	Webers/sq. in.	Lines/sq. in.	10 ⁸
Radians/sec.	Degrees/sec.	57.30	Webers/sq. in.	Webers/sq. cm	0.1550
Radians/sec./sec.	Revs./sec./sec.	0.1592	Yards	Meters	0.9144

CONVERSION OF WEIGHT



Ounces into Grams

ADVP Ounces	Grams	ADVP Ounces	Grams	ADVP Ounces	Grams	ADVP Ounces	Grams
1	28.350	26	737.088	51	1445.826	76	2154.564
2	56.699	27	765.437	52	1474.175	77	2182.913
3	85.049	28	793.787	53	1502.525	78	2211.263
4	113.398	29	822.136	54	1530.874	79	2239.612
5	141.748	30	850.486	55	1559.224	80	2267.962
6	170.097	31	878.835	56	1587.573	81	2296.311
7	198.447	32	907.185	57	1615.923	82	2324.661
8	226.796	33	935.534	58	1644.272	83	2353.010
9	255.146	34	963.884	59	1672.622	84	2381.360
10	283.495	35	992.233	60	1700.971	85	2409.709
11	311.865	36	1020.583	61	1729.321	86	2438.059
12	340.194	37	1048.932	62	1757.670	87	2466.408
13	368.544	38	1077.282	63	1786.020	88	2494.758
14	396.893	39	1105.631	64	1814.369	89	2523.108
15	425.243	40	1133.981	65	1842.719	90	2551.457
16	453.592	41	1162.330	66	1871.069	91	2579.807
17	481.942	42	1190.680	67	1899.418	92	2608.156
18	510.291	43	1219.029	68	1927.768	93	2636.506
19	538.641	44	1247.379	69	1956.117	94	2664.855
20	566.990	45	1275.729	70	1984.467	95	2693.205
21	595.340	46	1304.078	71	2012.816	96	2721.554
22	623.690	47	1332.428	72	2041.166	97	2749.904
23	652.039	48	1360.777	73	2069.515	98	2778.253
24	680.389	49	1389.127	74	2097.865	99	2806.603
25	708.738	50	1417.476	75	2126.214	100	2834.952

Grams into Ounces

Grams	ADVP Ounces	Grams	ADVP Ounces	Grams	ADVP Ounces	Grams	ADVP Ounces
1	0.035274	26	0.917123	51	1.798972	76	2.680821
2	0.070548	27	0.952397	52	1.834247	77	2.716095
3	0.105822	28	0.987671	53	1.869520	78	2.751369
4	0.141096	29	1.022945	54	1.904794	79	2.786643
5	0.176370	30	1.058219	55	1.940068	80	2.821917
6	0.211644	31	1.093493	56	1.975342	81	2.857191
7	0.246918	32	1.128767	57	2.010616	82	2.892465
8	0.282192	33	1.164041	58	2.045890	83	2.927739
9	0.317466	34	1.199315	59	2.081164	84	2.963013
10	0.352740	35	1.234589	60	2.116438	85	2.998287
11	0.388014	36	1.269863	61	2.151712	86	3.033561
12	0.423288	37	1.305137	62	2.186986	87	3.068835
13	0.458562	38	1.340411	63	2.222260	88	3.104109
14	0.493835	39	1.375685	64	2.257534	89	3.139383
15	0.529109	40	1.410958	65	2.292808	90	3.174657
16	0.564383	41	1.446232	66	2.328081	91	3.209931
17	0.599657	42	1.481506	67	2.363355	92	3.245205
18	0.634931	43	1.516780	68	2.398629	93	3.280478
19	0.670205	44	1.552054	69	2.433903	94	3.315752
20	0.705479	45	1.587328	70	2.469177	95	3.351026
21	0.740753	46	1.622602	71	2.504451	96	3.386300
22	0.776027	47	1.657876	72	2.539725	97	3.421574
23	0.811301	48	1.693150	73	2.574999	98	3.456848
24	0.846575	49	1.728424	74	2.610273	99	3.492122
25	0.881849	50	1.763698	75	2.645547	100	3.527396

MULTIPLIERS FOR SI UNITS



TORQUE

Multiply By							To Obtain
dy • cm	g • cm	N • m x 10 ⁻⁴	N • m	oz • in	lb • in	lb • ft	
1	980.7	1000	10 ⁷	7.062 x 10 ⁴	1.130 X 10 ⁶	1.356 X 10 ⁷	dy • cm
1.020 X 10 ⁻³	1	1.020	1.020 X 10 ⁴	72.01	1.152 X 10 ³	1.383 X 10 ⁴	g • cm
10 ⁻³	9.807 X 10 ⁻¹	1	10 ⁴	70.62	1.130 X 10 ³	1.356 X 10 ⁴	N • m X 10 ⁻⁴
10 ⁻⁷	9.807 X 10 ⁻⁵	10 ⁻⁴	1	7.062 X 10 ⁻³	0.1130	1.356	N • m
1.416 X 10 ⁻⁵	1.389 X 10 ⁻²	1.416 X 10 ⁻²	141.6	1	16	192	oz • in
8.850 X 10 ⁻⁷	8.681 X 10 ⁻⁴	8.850 X 10 ⁻⁴	8.850	6.250 X 10 ⁻²	1	12	lb • in
7.375 X 10 ⁻⁸	7.234 X 10 ⁻⁵	7.375 X 10 ⁻⁵	0.7375	5.208 X 10 ⁻³	8.333 X 10 ⁻²	1	lb • ft

PREFIXES FOR SI UNITS

Multiple and Submultiple	Prefix	Symbol
1,000,000,000,000 = 10 ¹²	tera	T
1,000,000,000 = 10 ⁹	giga	G
1,000,000 = 10 ⁶	mega	M
1,000 = 10 ³	kilo	k
100 = 10 ²	hecto	h
10 = 10	deka	da
0.1 = 10 ⁻¹	deci	d
0.01 = 10 ⁻²	centi	c
0.001 = 10 ⁻³	milli	m
0.000 001 = 10 ⁻⁶	micro	μ
0.000 000 001 = 10 ⁻⁹	nano	n
0.000 000 000 001 = 10 ⁻¹²	pico	p
0.000 000 000 000 001 = 10 ⁻¹⁵	femto	f
0.000 000 000 000 000 001 = 10 ⁻¹⁸	atto	a

GREEK ALPHABET

A	α	Alpha
B	β	Beta
Γ	γ	Gamma
Δ	δ	Delta
E	ε	Epsilon
Z	ζ	Zeta
H	η	Eta
Θ	θ	Theta
I	ι	Iota
K	κ	Kappa
Λ	λ	Lambda
M	μ	Mu
N	ν	Nu
Ξ	ξ	Xi
O	ο	Omicron
Π	π	Pi
P	ρ	Rho
Σ	ς	Sigma
T	τ	Tau
Υ	υ	Upsilon
Φ	φ	Phi
X	χ	Chi
Ψ	ψ	Psi
Ω	ω	Omega

POWER

Multiply By			To Obtain
oz • in • rpm	watts	hp	
1	1352	1.008 X 10 ⁶	oz • in • rpm
7.345 X 10 ⁻⁴	1	745.7	watts
9.917 X 10 ⁻⁷	1.341 X 10 ⁻³	1	hp

INERTIA

Multiply By				To Obtain
g • cm ²	kg • m ²	oz • in • s ²	oz • in ²	
1	10 ⁷	7.062 X 10 ⁴	182.9	g • cm ²
10 ⁻⁷	1	7.062 X 10 ⁻³	1.829 X 10 ⁻⁵	kg • m ²
1.416 X 10 ⁻⁵	141.6	1	2.590 X 10 ⁻³	oz • in • s ²
5.467 X 10 ⁻³	5.467 X 10 ⁴	386.09	1	oz • in ²

MATERIAL SYMBOLS – Alphabetical Order by Material



GENERIC MATERIAL	SYMBOL
Acrylonitrile Butadiene Styrene	ABS
Acrylonitrile Styrene Acrylate	ASA
Alkyd Molding Compound	AMC
Aluminium and Aluminium Alloy	AL
Austenitic Stainless Steel Material	SUS301
Austenitic Stainless Steel Material	SUS303
Austenitic Stainless Steel Material	SUS304
Austenitic Stainless Steel Material	SUS305
Austenitic Stainless Steel Material	SUS316
Austenitic Stainless Steel Material	SUS420
Carbon Steel Wires for Cold Heading and Cold Forging	SWCH
Cellulose Acetate	CA
Cellulose Acetate Butyrate	CAB
Cellulose Acetate Propionate	CAP
Chloroprene Rubber	CR
Diallyl Phthalate	DAP
Dough Molding Compound	MC
Epoxy	EP
Ethylene Vinyl Acetate	EVA
Ethylene/Propylene/Diene	EPDM
Ethylene/Propylene/Diene Monomer	EPDM
Ethylene/Propylene	E/P
Ethylene/Tetrafluoroethylene	E/TFE
Ethylene/Vinyl Acetate	E/VAC
Ferritic Stainless Steel Material	SUS430
Hard Drawn Steel Wires	SW
High Carbon Steel Wire Rods	SWRH
Liquid Crystal Polymer	LCP
Low Carbon Steel Wire Rods	SWRM
Melamine-Formaldehyde	MF
Melamine/Phenolic	M/P
Methyl Methacrylate Butadiene Styrene	MMBS
Natural Rubber	NR
Neoprene (Chloroprene Butadiene) Rubber	CBR
Nitrile Rubber	NBR
Perfluoro Alkoxy Alkene	PFA
Perfluoroethylene Propylene	FEP
Phenol-Formaldehyde (Phenolic)	PF
Piano Wire Rods	SWP
Polyamide (Nylon)	PA
Polyamide Imide	PAI
Polyarylate	PAR
Polybutadiene Rubber	PBR

GENERIC MATERIAL	SYMBOL
Polybutylene Terephthalate	PBT
Polycarbonate	PC
Polycarbonate/Acrylic	PC/A
Polychlorotrifluoroethylene	PCTFE
Polyester	PER
Polyether Imide	PEI
Polyetheretherketone	PEEK
Polyethersulfone	PES
Polyethylene	PE
Polyethylene Terephthalate	PET
Polyimide	PI
Polymethyl Methacrylate	PMMA
Polymethyl Pentene	PMP
Polyoxymethylene (Acetal)	POM
Polyphenylene Ether	PPE
Polyphenylene Oxide	PPHOX
Polyphenylene Sulfide	PPS
Polypropylene	PP
Polystyrene	PS
Polysulfone	PSU
Polytetrafluoroethylene	PTFE
Polyurethane	PUR
Polyvinyl Acetate	PVAC
Polyvinyl Chloride	PVC
Polyvinyl Fluoride	PVF
Polyvinylidene Fluoride	PVDF
Precipitation-hardened Stainless Steel Material	SUS631
Screws, Washers and General Commercial Parts Made of Stainless Steel	SUS
Sheet Molding Compound	SMC
Silicon Rubber	Q
Silicone Molding Compound	SIR
Silicone Rubber	SI
Spring Steels	SUP
Styrene (Butadiene) Rubber	SBR
Styrene Acrylonitrile	AS
Styrene Maleic Anhydride	SMA
Styrene/Butadiene	S/B
Styrene/Methylmethacrylate	S/MMA
Thermo Elastomeric	TEE
Thermoplastic Elastomer	TPE
Unsaturated Polyester	UP
Urea-Formaldehyde	UF
Urethane Rubber	U

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Polyethersulfone	PES
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Phenol-Formaldehyde (Phenolic)	PF
Perfluoro Alkoxy Alkene	PFA
Polyimide	PI
Polymethyl Methacrylate	PMMA

GENERIC MATERIAL	SYMBOL
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Unsaturated Polyester	UP



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