Jacks Pumps Cutters Presses Cylinders Puller
Spreaders Torque tools Nut splitters Hole punch
Moving skates Crimping tools Bolt tensioners Hydro
pumps Toughlift jacking systems Jacks Pumps Cut
Presses
Nut splitters Hole punchers Moving skates Crim
tools Bolt tensioners Hydrotest pumps Toughlift jac
systems Jacks Pumps Cutters Presses Cylinders P
kits Spreaders Torque tools Nut splitters
punchers Moving skates Crimping tools Bolt tensi

Hi-Force®

HYDRAULIC TOOLS

HI-FORCE COMPANY INFORMATION

OUR MISSION STATEMENT

To support our valued customers through the design, manufacture and supply of first class products and services of exceptional quality, to assist them to gain competitive advantage in their markets.

To sustain our vision and mission by constantly seeking improvement via continuous education and learning, and the application of the best available technology and business practices.

To provide a pleasant, nurturing and growth orientated environment, which encourages our employees to be highly productive and to grow both personally and professionally.

To develop diversified markets, that provide stability, and adequate financial returns and allow us to achieve our vision and provide opportunities for existing and future employees.

HI-FORCE CATALOGUES

This new 2010 catalogue along with our other product specific brochures is available in several languages including Chinese, Dutch, French, German, Italian, Portuguese, Russian and Spanish. To request copies of our catalogue(s) contact your local sales representative, or alternatively you can access our catalogues online! Simply go to www.hi-force.com.

Hi-Force®

CONTENTS

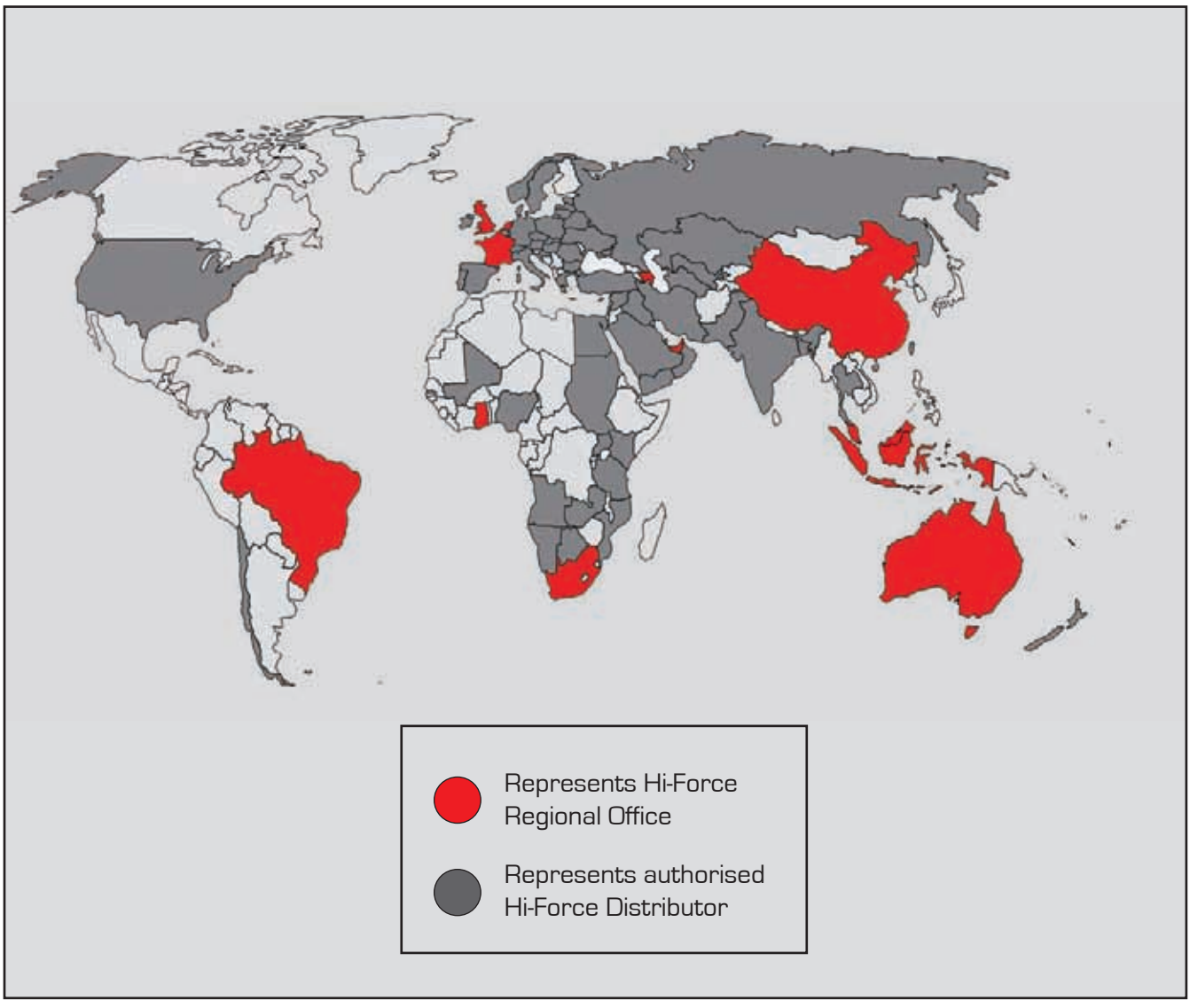
ABOUT HI-FORCE, PRODUCTS & MARKETS

A

Welcome to the Hi-Force 2010 catalogue, comprising of 188 pages, packed full of product and technical information from the fastest growing hydraulic tools manufacturer in the world today.

An increase of 64 pages compared to our summer 2007 catalogue is testament to the tremendous growth taking place at Hi-Force worldwide. In the past two years we have expanded our regional office network, from 9 to 13 offices, as part of our global plan to ensure that users of our products are never too far from a representative Hi-Force office. Additional offices are now established in Brazil, China, France and Ghana in support of our already existing offices in Australia, Azerbaijan, Indonesia, Malaysia, Netherlands, South Africa, UAE (2) and the UK. Continual expansion of our Regional Office network is central to our future plans and feasibility studies are already underway for the opening of an additional two Hi-Force regional offices, within the next 2 years.

Fully supporting our regional office activities are our officially appointed and authorised distributors, operating in over 100 countries worldwide. Additional distributor appointments are an ongoing process, to ensure that Hi-Force products and services are available to end users in every country in the world.



ABOUT HI-FORCE, PRODUCTS & MARKETS

During the past two years Hi-Force has invested a significant amount of money in several "state of the art" Mori Seiki CNC Machines. Our latest addition, a brand new 5 axis machine, capable of machining very complex and critical parts accurately and efficiently, with zero defects time after time, was received in mid 2009. Hi-Force is totally committed to manufacturing products of the highest quality, using the best machinery available, to ensure that our products meet the most stringent quality requirements possible, whilst also retaining a competitive price in the global market for hydraulic tools. Our research, development and design office is working hard and continuing to expand, ensuring that our products remain at the leading edge of currently available hydraulic tool technology.

In July 2010 our UK head office relocates to a brand new, state of the art facility, close by to our existing facilities in Daventry, UK. Our new home, which is almost three times as big as our current facilities, will enable us to combine all of our manufacturing and production facilities under one roof, along side our sales, marketing, training, assembly, logistics and administration departments. There is no doubt that the huge investment in facilities, personnel, product design and manufacturing capabilities, that we are making today, will see Hi-Force continue to grow at a significant rate over the coming years. With almost 30 years of hydraulic tool manufacturing and technical sales experience in place, we believe that Hi-Force is certainly a company that can be trusted with your current and future demands for hydraulic tools, safe in the knowledge that when you need us we will be ready to support you worldwide, 24 hours a day, 7 days a week, 365 days per year.

ABOUT HI-FORCE, PRODUCTS & MARKETS

Hi-Force products are in use every day in a wide variety of industries including Oil & Gas, Petrochemical & Refining, Power Generation, Steel & Aluminium Plants, Paper Mills, Sugar Refineries, Railways, Mining, Construction, Ship Building & Ship Repair, Aerospace, Defence, Heavy Engineering and the many thousands of industrial service companies supporting these market sectors. Hi-Force hydraulic tools continually satisfy the demands of industry during construction, production, breakdown and routine shutdown repair and maintenance. Every year more and more companies continue to join the ever growing list of satisfied Hi-Force hydraulic tool users.

We are very proud of our latest edition of the Hi-Force hydraulic tools catalogue which now includes over 1700 products. New products featured include pull cylinders, new generation split flow pumps, machine lift jacks, spring assisted return bolt tensioners, hydraulic tensioner nuts, hydrotest pumps with onboard chart recorder, battery operated crimping tools and large capacity nut splitters. Additionally our innovative BoltRight software, designed to accurately calculate the correct torque and tension figures for a wide variety of bolted joints, is now available in multiple languages including Chinese, Dutch, French, Italian, Portuguese and Russian with the addition of further language options an ongoing process. The continuous expansion of the Hi-Force product range enables us to offer our valued customers a “one stop” solution for all of their hydraulic tool requirements.

ABOUT HI-FORCE, PRODUCTS & MARKETS

Hi-Force is fully committed to improving levels of technical capability, both within our own workforce and also throughout our distributor network, and we believe that training is a key element to help us in achieving our goals. Hi-Force continues to invest considerable time and money in the establishment of first class technical sales and service training courses for both our distributors and product users. Courses are held on a regular basis at our UK head office and at our regional offices worldwide. Please contact your local Hi-Force office for further information.

Our Sales & Marketing teams provide the essential link between Hi-Force and our customers, to ensure that our 30 years of expertise and experience continues to anticipate the needs of tomorrow's market today! Another key link with our customers is provided by our Regional Office service centres, each fully equipped with the latest "state of the art" service, repair, calibration and testing facilities ensuring that the after sales service provided for Hi-Force products is second to none in the industry. Additionally, over the past few years many of our authorised distributors have established their own accredited Hi-Force Service Centre, further enhancing the Hi-Force "Global Brand, Local Service" philosophy. The appointment of additional strategically placed service centres, authorised by and compliant with Hi-Force's strict levels of competence, is continuing year on year.

May I thank you on behalf of everyone at Hi-Force, for taking the time to read this section of our catalogue, which is by far the biggest we have ever produced. I am confident that the products and technical information, detailed on the following pages, will greatly assist you when selecting the most suitable Hi-Force tool for the application at hand. We are justifiably very proud of our achievements to date, none of which could have been realised without the continued support of our many customers and distributors worldwide. Be assured Hi-Force will continually strive to improve in everything we do.

This is why we say:

» Hi-Force ...
Precisely ! «

Kevin P. Brown
Group Managing Director

QUALITY & SAFETY

A

All Hi-Force products are designed and manufactured to meet or exceed the requirements of current national and international standards and codes of practice, which are essential to ensure that Hi-Force manufactures hydraulic tools and equipment of the highest possible quality, both today, and in the future. All items are manufactured in accordance with the quality assurance requirements of ISO9001:2008 as verified by our certificate of registration number A21 438, originally issued in January 1998 and valid until November 2012 at which time it will be renewed for a further three year period.

All Hi-Force tools are permanently marked with their respective model number and a unique serial number, which are both traceable to an individually issued test certificate. Every Hi-Force tool manufactured is individually tested in accordance with the latest international test procedures, applicable to hydraulic tools and equipment.

All Hi-Force products are covered by a comprehensive warranty against material and/or workmanship defects. All warranty claims must, in the first instance, be registered via our website online warranty claim registration procedure at www.hi-force.com/warranty. The procedure is easy to complete and enables Hi-Force to provide an initial response, within 48 hours of registration of the warranty claim. Following a detailed evaluation of the online warranty claim by our technical department, claims can, in most cases, be approved immediately avoiding the need for costly and time consuming return shipment of the faulty items to Hi-Force. Dependant on whether the approval is to repair or replace, Hi-Force will authorise the warranty through your local authorised Hi-Force Distributor or Service Centre.

Hi-Force reserves the right to request the return of defective or faulty product for a more detailed evaluation and inspection should the information provided in the online warranty claim prove inconclusive. All warranty claim rejections will be supported by a report explaining the reasons why warranty has not been approved.

High pressure hydraulic power provides one of the simplest means of applying a high force in confined spaces, however respect for common sense safety precautions is essential at all times. Every Hi-Force employee is fully conversant with all Hi-Force safety procedures, applicable to the safe operation and use of our products and we feel it is our duty to ensure that all users of hydraulic tools are equally aware of these procedures. With every product that we supply, we provide operation and maintenance instructions to ensure that all operators are equally aware of these safety issues.

AFAQ EAQA

CERTIFICATE OF REGISTRATION

This is to certify that the Quality Management System of

Hi-Force Ltd

Bentley Way
Daventry
Northants
NN11 8GH
UK

For

The Design, Manufacture and Supply of a Wide Range of Hydraulic and Pneumatic Tools and Equipment

Has been assessed by AFAQ-EAQA and complies with the Quality Management System requirements of

ISO 9001:2008

CERTIFICATE NO.	ORIGINAL DATE OF CERTIFICATION	DATE OF ISSUE	DATE OF EXPIRY
A21 438	01 January 1998	27 November 2008	26 November 2012

APPROVED BY

MYRIAM AUGEREAU-LANDAIS
MANAGING DIRECTOR
AFAQ-EAQA LTD

Hi-Force®

CYLINDERS

B

SELECTION TABLE FOR HI-FORCE STANDARD RANGE CYLINDERS

Choice of 114 standard cylinder models and unlimited specials made to order, Hi-Force will provide the best cylinder for the job !

Cylinder stroke in mm	Nominal lifting capacity of cylinder in tonnes												
	4.5	10 - 11	14.5	20 - 25	29 - 33	50 - 61	73 - 110	147–152	203	247-260	326	398	520
6	HPS50	HVL10		HVL20	HVL30	HVL50	HVL100						
10		HPS100											
11				HPS200									
12					HPS300								
15						HPS500							
16							HPS750						
16	HPS51						HPS1000	HPS1500					
25	HSS51	HSS101			HLS301	HLS501	HLS1001	HLS1501					
25		HHS101											
40		HLS101											
44				HLS201									
45								HFL1502		HFL2502			HFL5002
50	HSS52	HHS102	HSS152	HHS202	HHS302	HFL502	HHR1002	HLS1502	HFG2002				
50						HFG502	HFL1002	HFG1502					
50							HFG1002						
51				HSS252	HHR302	HSS502							
56		HSS102											
60					HLS302	HLS502	HLS1002						
75	HSS53												
76						HHS603	HHS1003						
76						HHR603	HHR1003						
100	HSS54	HSS104	HSS154				HFG1004	HFG1504					
102				HSS254		HSS504	HSS1004						
102						HFG504							
125	HSS55												
150		HSS106	HSS156	HHS206	HHR306	HFG506	HHS1006	HFG1506			HFG3006		
150				HSS256		HHS606	HFG1006						
151												HFG4006	
152		HHS106		HDA256	HHS306	HSS506	HSS756	HDA1506	HDA2006		HDA3006	HDA4006	HDA5006
152					HAS306	HAS506	HAS1006		HFG2006				HFG5006
152						HDA506	HDA1006						
152						HHR606	HHR1006						
153							HSS1006						
176	HSS57												
203						HSS508		HHR1508		HHR2508			
205					HSS308								
206		HSS108											
228	HSS59												
250		HSS1010	HSS1510	HSS2510									
254						HHR6010	HSS10010						
305		HSS1012			HHR3012			HDA15012	HDA20012				
330						HDA5013	HDA10013						
330						HSS5013							
356				HSS2514									
457				HSS2518									

Cylinder Range	Page	Main characteristics of Hi-Force cylinder range				
		Cylinder principle	Return action	Piston feature	Saddle	Stroke limiting device
HVL	11	single acting	load/gravity return	solid piston	integrated	stop ring
HPS	12	single acting	spring assisted return	solid piston	integrated	stop ring
HLS	13	single acting	spring assisted return	solid piston	integrated	stop ring
HSS	14-15	single acting	spring assisted return	solid piston	several options available	stop ring
HAS	16	single acting	spring assisted return	solid piston	flat saddle	stop ring
HHS	17	single acting	spring assisted return	hollow piston	several options available	stop ring
HHR	18	double acting	hydraulic return	hollow piston	several options available	stop ring
HDA	19	double acting	hydraulic return	solid piston	several options available	stop ring
HFL	20	single acting	load/gravity return	threaded piston & lock ring	tilting saddle	restriction port
HFG	21	single acting	load/gravity return	threaded piston & lock ring	tilting saddle	restriction port

HVL - SINGLE ACTING VERY LOW HEIGHT PANCAKE CYLINDERS

Capacities from 10 to 104 tonnes

Stroke length 6mm

Working pressure 700 Bar

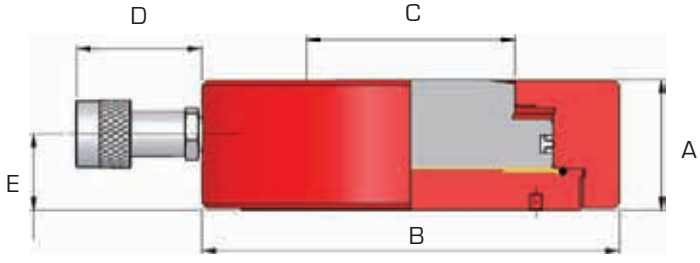
The HVL pancake cylinder range combines a very low closed height with a 6mm stroke, providing a precise adjusting and lifting force in very confined work areas. Ideally suited for applications requiring alignment of machinery, turbines, heavy structures etc... All models are single acting, load return design. The base of all HVL cylinders must be fully supported during use.

- Single acting load return
- Nitrocarburised piston rod
- Low friction bearing surfaces
- Anti-extrusion seals

HVL10 also available with 400mm extension hose and coupling.
Please add suffix 'H' to model no.

Did you know .....

Hi-Force HVL pancake cylinders are the lowest closed height hydraulic cylinders available on the market.
If you don't have the space, we have the solution !



Note: All models, excluding HVL100, are fitted with extension nipple for required coupling clearance (drawing is without coupling extension nipple).

Model number	Capacity tonnes	Stroke mm	Oil cap. cm^3	Cyl. eff. area cm^2	Weight kg
HVL10	10	6	9	14.4	1.6
HVL20	20	6	17	28.6	2.6
HVL30	32	6	27	45.6	3.0
HVL50	50	6	43	71.3	7.2
HVL100	104	6	88	146.5	15.6

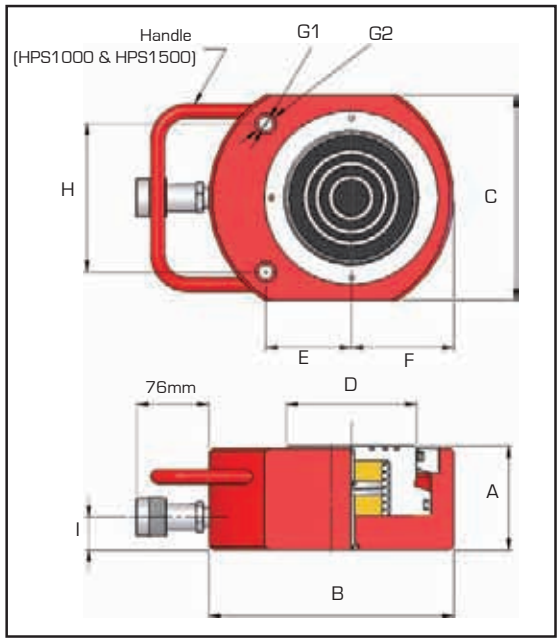
Dimensions in mm				
A	B	C	D	E
28	87	38	111	16.0
32	104	52	111	19.0
34	120	60	111	19.5
45	158	75	111	29.0
65	200	100	76	37.0

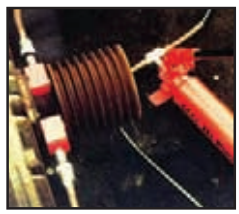
HPS - SINGLE ACTING LOW HEIGHT PAD CYLINDERS

- Capacities from 4.5 to 147 tonnes
- Stroke lengths from 6 to 16mm
- Working pressure 700 Bar

The HPS pad cylinder range offers the best capacity, closed height and stroke length combination, spring assisted return cylinders in the industry. Ideally suited for applications where a low closed height and maximum possible stroke is of prime importance, these highly versatile cylinders are extensively used for maintenance, structural weld positioning, rigging, flange separating and many other applications.

- Single acting, spring assisted return
- Nitrocarburised piston rod
- Low friction bearing surfaces
- Anti-extrusion seals





Model number	Capacity tonnes	Stroke mm	Oil cap. cm^3	Cyl. eff. area cm^2	Weight kg
HPS50	4.5	6	4	6.4	0.8
HPS51	4.5	16	10	6.4	0.9
HPS100	10	10	14	14.4	1.6
HPS200	20	11	31	28.6	2.6
HPS300	32	12	55	45.6	4.2
HPS500	50	15	107	71.3	6.6
HPS750	73	16	164	102.7	10.4
HPS1000	109	16	245	153.4	23.2
HPS1500	147	16	330	206.2	28.5

Dimensions in mm									
A	B	C	D	E	F	G1	G2	H	I
32	60	38	24	20	19	5.6	9.75	26	19
42	60	38	24	20	19	5.6	9.75	26	19
46	81	56	38	34	28	6.8	11.25	37	19
52	100	76	51	40	39	8.8	14.25	50	19
59	115	95	60	46	48	8.8	14.25	52	19
67	140	114	70	54	60	10.8	17.25	67	20
81	165	140	82	67	70	13.0	19.00	76	21
91	215	180	114	75	90	12.8	19.00	130	29
100	215	191	114	83	95	13.0	19.00	117	29

HLS - SINGLE ACTING LOW HEIGHT CYLINDERS

Capacities from 10 to 147 tonnes

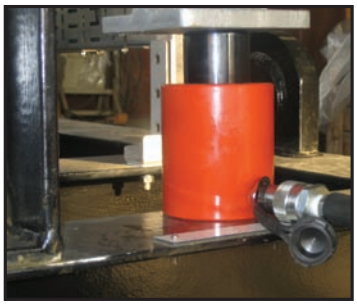
Stroke lengths from 25 to 60mm

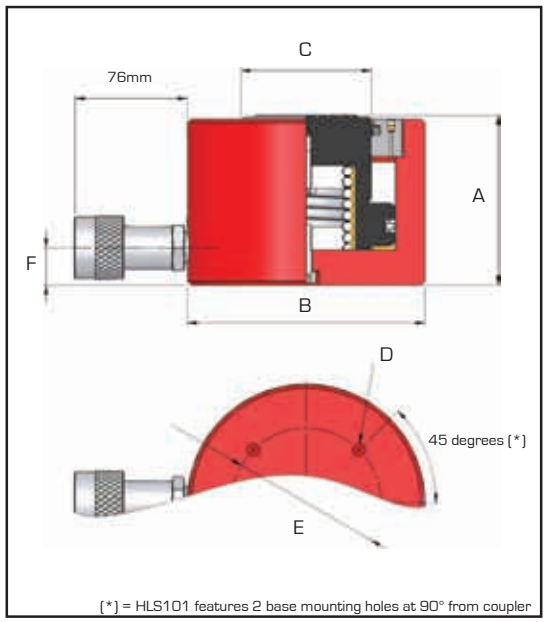
Working pressure 700 Bar

B

The HLS low height cylinder range is the most widely used Hi-Force cylinder design in the world today. All models have spring assisted return pistons and combine low closed height with optimum stroke lengths. Offering a compact, powerful force for a wide variety of applications in many industries including power generation, ship building & repair, construction, railways, mining, steel works, oil & gas and many others. The HLS range offers a compact, portable option in an inexpensive package.

- Spring assisted return
- Nitrocarburised piston rod
- Low friction bearing surfaces
- Anti-extrusion seals





Model number	Capacity tonnes	Stroke mm	Oil cap. cm^3	Cyl. eff. area cm^2	Weight kg
HLS101	10	40	58	14.4	2.4
HLS201	20	44	126	28.6	4.8
HLS301	32	25	114	45.6	5.0
HLS302	32	60	274	45.6	7.0
HLS501	50	25	178	71.3	8.4
HLS502	50	60	428	71.3	10.4
HLS1001	109	25	384	153.4	19.8
HLS1002	109	60	921	153.4	24.0
HLS1501	147	25	516	206.2	37.0
HLS1502	147	50	1031	206.2	42.0

Dimensions in mm					
A	B	C	D	E	F
95	70	38	M8	40	19
102	90	51	M8	60	19
83	102	60	M8	80	19
119	102	60	M8	80	19
91	127	70	M8	80	20
126	127	70	M8	80	20
108	178	114	M12	140	30
143	178	114	M12	140	30
130	216	114	M12	165	41
155	216	114	M12	165	41

HSS - SINGLE ACTING MULTI-PURPOSE CYLINDERS

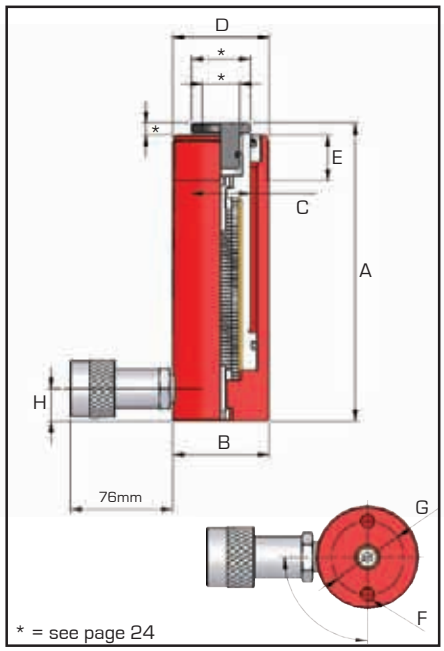
Capacities from 4.5 to 109 tonnes

Stroke lengths from 25 to 457mm

Working pressure 700 Bar

The HSS single acting multi-purpose cylinder range offers the widest choice of stroke lengths and lifting capacities available, and provides an excellent choice for maintenance, production, fabrication and construction applications. All models are provided with a collar thread and thread protector, cylinder base and piston rod mountings for easy fixturing, making the HSS range the most versatile and adaptable multi-purpose cylinders available. Major user industries include power generation, railways, steelworks, mining, shipyards and oil & gas.

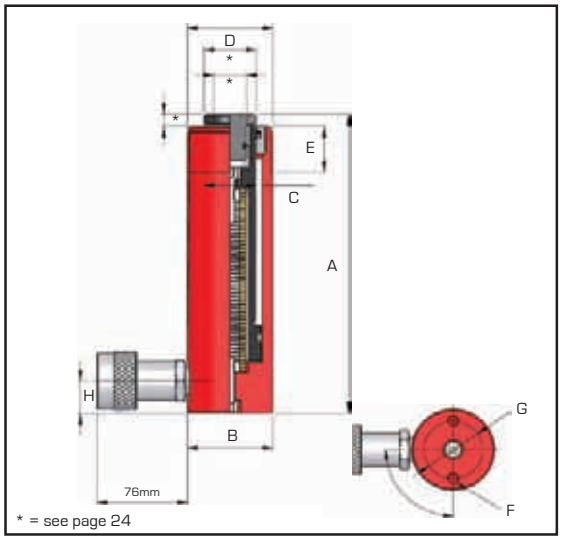
- Spring assisted return
- Nitrocarburised piston rod
- Low friction bearing surfaces
- Anti-extrusion seals
- Collar threads withstand full load
- Piston rod thread on all models up to 30t
- Base mounting holes on all models (except HSS308)
- Optional piston rod saddles (see page 23)
- Collar thread protector supplied as standard



Model number	Capacity tonnes	Stroke mm	Oil cap. cm^3	Cyl. eff. area cm^2	Weight kg
HSS51	4.5	25	16	6.4	1.0
HSS52	4.5	50	32	6.4	1.2
HSS53	4.5	75	48	6.4	1.4
HSS54	4.5	100	64	6.4	1.5
HSS55	4.5	125	80	6.4	1.8
HSS57	4.5	176	113	6.4	2.0
HSS59	4.5	227	146	6.4	2.4
HSS101	10	25	36	14.4	1.8
HSS102	10	56	81	14.4	2.4
HSS104	10	100	144	14.4	3.0
HSS106	10	150	217	14.4	4.2
HSS108	10	206	297	14.4	5.0
HSS1010	10	250	361	14.4	5.4
HSS1012	10	305	440	14.4	6.2

Dimensions in mm (unless otherwise stated)							
A	B	C	D	E	F	G	H
107	38	24	1 ½"-16un	28	M6	25	19
132	38	24	1 ½"-16un	28	M6	25	19
157	38	24	1 ½"-16un	28	M6	25	19
182	38	24	1 ½"-16un	28	M6	25	19
207	38	24	1 ½"-16un	28	M6	25	19
258	38	24	1 ½"-16un	28	M6	25	19
308	38	24	1 ½"-16un	28	M6	25	19
100	57	35	2 ¼"-14un	27	M8	40	19
131	57	35	2 ¼"-14un	27	M8	40	19
175	57	35	2 ¼"-14un	27	M8	40	19
225	57	35	2 ¼"-14un	27	M8	40	19
281	57	35	2 ¼"-14un	27	M8	40	19
325	57	35	2 ¼"-14un	27	M8	40	19
379	57	35	2 ¼"-14un	27	M8	40	16

HSS - SINGLE ACTING MULTI-PURPOSE CYLINDERS

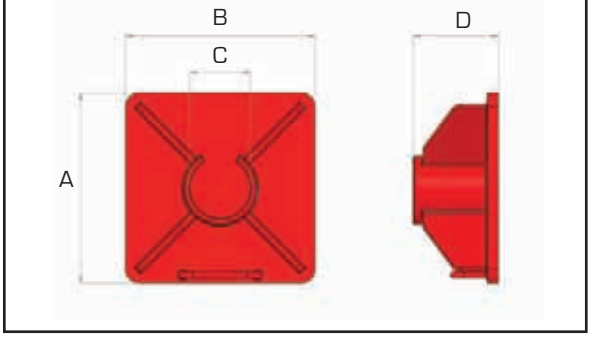


* = see page 24

Model number	Capacity tonnes	Stroke mm	Oil cap. cm^3	Cyl. eff. area cm^2	Weight kg
HSS152	14.5	50	101	20.3	3.4
HSS154	14.5	100	203	20.3	5.0
HSS156	14.5	150	304	20.3	6.6
HSS1510	14.5	250	507	20.3	8.8
HSS252	25	51	178	34.9	6.5
HSS254	25	102	356	34.9	8.0
HSS256	25	150	524	34.9	9.6
HSS2510	25	250	874	34.9	12.6
HSS2514	25	356	1242	34.9	16.8
HSS2518	25	457	1597	34.9	21.4
HSS308	29	205	860	41.9	18.6
HSS502	50	51	364	71.3	13.0
HSS504	50	102	728	71.3	16.8
HSS506	50	152	1084	71.3	20.0
HSS508	50	203	1448	71.3	23.2
HSS5013	50	330	2354	71.3	33.6
HSS756	73	152	1561	102.7	31.0
HSS1004	109	102	1565	153.4	41.6
HSS1006	109	153	2347	153.4	49.8
HSS10010	109	254	3896	153.4	65.5

Dimensions in mm (unless otherwise stated)							
A	B	C	D	E	F	G	H
154	70	41	2 3/4"-16un	39	M10	48	19.0
204	70	41	2 3/4"-16un	39	M10	48	19.0
254	70	41	2 3/4"-16un	39	M10	48	19.0
354	70	41	2 3/4"-16un	39	M10	48	19.0
174	86	54	3 5/16"-12un	49	M12	60	25.0
225	86	54	3 5/16"-12un	49	M12	60	25.0
273	86	54	3 5/16"-12un	49	M12	60	25.0
374	86	54	3 5/16"-12un	49	M12	60	25.0
480	86	54	3 5/16"-12un	49	M12	60	25.0
611	86	54	3 5/16"-12un	49	M12	60	25.0
374	102	57	3 5/16"-12un	50	-	-	50.0
150	127	79	5"-12un	55	M12	85	20.0
201	127	79	5"-12un	55	M12	85	20.0
251	127	79	5"-12un	55	M12	85	20.0
302	127	79	5"-12un	55	M12	85	20.0
429	127	79	5"-12un	55	M12	85	20.0
272	146	95	5 3/4"-12un	45	M12	115	31.5
223	185	114	6 7/8"-12un	50	M12	146	32.0
274	185	114	6 7/8"-12un	50	M12	146	32.0
375	185	114	6 7/8"-12un	50	M12	146	32.0

Load spreading base plates



Model No	For Cylinder Capacity	Dimensions in mm A	B	C	D
HSS5BP	4.5 t	200	200	40.3	118
HSS10BP	10 t	230	230	58.6	120
HSS15BP	14.5 t	254	254	71.3	122
HSS25BP	25 t	280	280	89.0	126

HAS - SINGLE ACTING LIGHTWEIGHT ALUMINIUM CYLINDERS

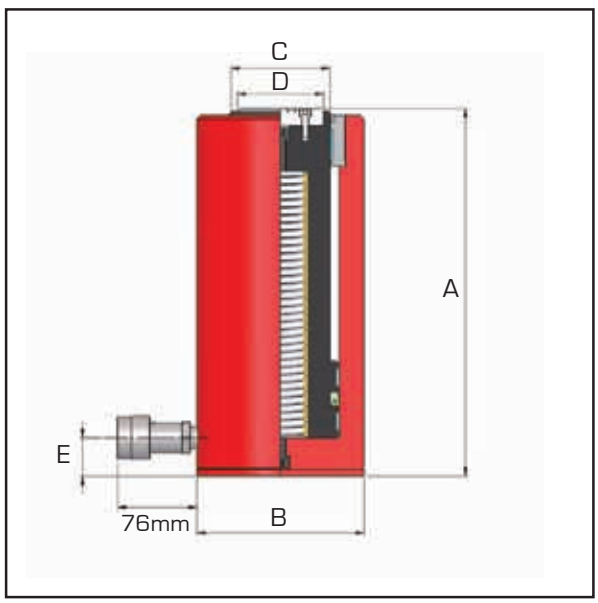

HAS506

- Working pressure 700 Bar
- Capacities from 32 to 110 tonnes
- Stroke length 152mm

The HAS range of single acting, lightweight, aluminium cylinders is specifically designed for applications where weight and ease of positioning are features of prime importance. With an average weight of approximately 50% of comparable capacity steel construction cylinders, all models are supplied with a hard anodised, wear resistant, piston rod and cylinder body and a steel cylinder base protection plate. Available lifting capacities range from 32 to 110 tonnes capacity, at maximum working pressure of 700 Bar. All models are commonly used in a wide variety of industrial applications in shipyards, steel mills, construction and power plants. Other capacities and stroke length options available on request.

Please Note.....

Aluminum cylinders offer the benefit of greatly reduced weight compared to conventional steel cylinders. However, due to the inherent nature of the material, are not recommended for use in high cycle production applications. The recommended life cycle is estimated at approximately 5000 operations at maximum pressure, which in most lifting and maintenance applications represents a more than acceptable period of usage.



Model number	Capacity tonnes	Stroke mm	Oil cap. cm^3	Cyl. eff. area cm^2	Weight kg
HAS306	32	152	672	44.2	6.0
HAS506	51	152	1077	70.9	9.0
HAS1006	110	152	2340	153.9	23.0

Dimensions in mm (unless otherwise stated)				
A	B	C	D	E
282	104	60	50	20
287	135	80	70	25
317	195	110	100	35

HHS - SINGLE ACTING HOLLOW PISTON CYLINDERS

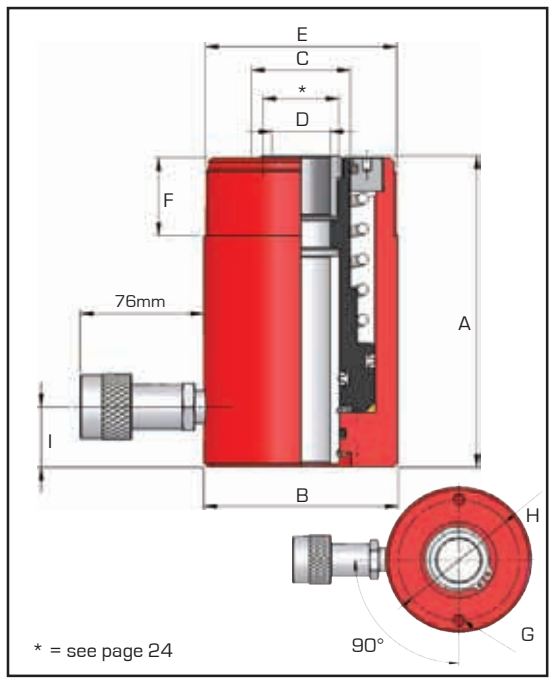
Capacities from 11 to 102 tonnes

Stroke lengths from 25 to 152mm

Working pressure 700 Bar

The HHS single acting hollow piston cylinder range is extremely versatile for use in tooling, maintenance and tensioning applications. Specifically designed with a hollow piston to enable a rod or cable to be passed through the entire cylinder length for applications where a pulling force is required, the HHS range is used extensively in post-tensioning and pre-stressing applications as well as testing of various bonded or mechanical anchoring systems. HHS cylinders can also be used for general lifting applications, when fitted with readily available interchangeable hardened steel piston rod saddles.

- Spring assisted return
- Nitrocarburised piston rod
- Low friction bearing surfaces
- Anti-extrusion seals
- Optional piston rod saddles (see page 23)
- Collar thread protector supplied as standard



Model number	Capacity tonnes	Stroke mm	Oil cap. cm^3	Cyl. eff. area cm^2	Weight kg
HHS101	11	25	39	15.8	2.8
HHS102	11	50	79	15.8	3.0
HHS106	11	152	240	15.8	10.2
HHS202	23	50	167	33.3	7.0
HHS206	23	150	500	33.3	13.8
HHS302	33	50	233	46.7	10.6
HHS306	33	152	710	46.7	19.2
HHS603	61	76	651	85.7	28.0
HHS606	61	150	1285	85.7	40.6
HHS1003	102	76	1088	143.1	64.0
HHS1006	102	150	2147	143.1	75.0

Dimensions in mm (unless otherwise stated)								
A	B	C	D	E	F	G	H	I
110	70	38	20	2 ¾"-16un	30	M8	51	19
140	70	38	20	2 ¾"-16un	30	M8	51	19
297	70	38	20	2 ¾"-16un	30	M8	51	19
160	100	51	30	3 ⅞"-12un	40	M8	82.5	31
306	100	51	30	3 ⅞"-12un	40	M8	82.5	31
165	115	60	35	4 ½"-12un	40	M8	92	31
320	115	60	35	4 ½"-12un	40	M8	92	31
226	160	92	55	6 ¼"-12un	59	M12	130	31
315	160	92	55	6 ¼"-12un	59	M12	130	31
276	213	127	81	8 ⅜"-12un	60	M16	178	45
350	213	127	81	8 ⅜"-12un	60	M16	178	45

HHR - DOUBLE ACTING HOLLOW PISTON CYLINDERS

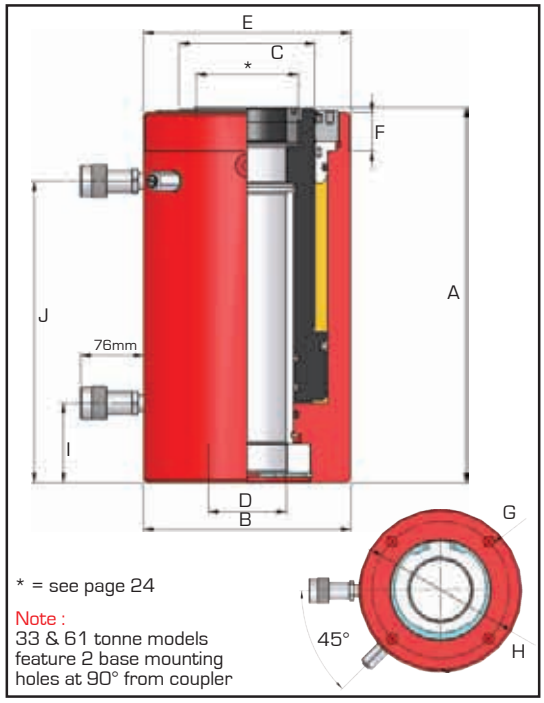
Capacities from 33 to 247 tonnes

Stroke lengths from 50 to 305mm

Working pressure 700 Bar

The HHR double acting hollow piston cylinder range incorporates all of the design features of the HHS range with the added benefit of double acting design, which greatly enhances speed of operation and performance particularly in the longer length stroke options. Additionally a substantial hydraulic pulling force is available in the piston retraction mode of operation. Standard range models are featured in this catalogue, however other stroke and tonnage options are available on request.

- Double acting design
- Nitrocarburised piston rod
- Annular area overload protection valve
- Low friction bearing surfaces
- Anti-extrusion seals
- Optional piston rod saddles (see page 23)
- Collar thread protector supplied as standard



* = see page 24

Note :
33 & 61 tonne models feature 2 base mounting holes at 90° from coupler

Model number	Capacity Push tonnes	Pull tonnes	Stroke mm	Oil cap. cm³	Cyl. eff. area cm²	Weight kg
HHR302	33	24	51	238	46.7	12.2
HHR306	33	24	150	701	46.7	17.6
HHR3012	33	24	305	1424	46.7	25.7
HHR603	61	38	76	652	85.7	30.6
HHR606	61	38	152	1304	85.7	41.6
HHR6010	61	38	254	2179	85.7	52.5
HHR1002	102	43	50	715	143.1	61.3
HHR1003	102	43	76	1087	143.1	68.5
HHR1006	102	43	152	2174	143.1	90.0
HHR1508	152	71	203	4320	212.8	170.0
HHR2508	247	76	203	7039	346.5	269.0

Dimensions in mm (unless otherwise stated)										
A	B	C	D	E	F	G	H	I	J
180	115	60.3	35	4 ½"-12un	40	M8	92	28	119
279	115	60.3	35	4 ½"-12un	40	M8	92	28	218
434	115	60.3	35	4 ½"-12un	40	M8	92	28	373
239	160	92	55	6 ¼"-12un	45	M12	130	31	166
315	160	92	55	6 ¼"-12un	45	M12	130	31	242
417	160	92	55	6 ¼"-12un	45	M12	130	31	344
283	213	140	80	8 ⅜"-12un	40	M16	178	82	208
310	213	140	80	8 ⅜"-12un	40	M16	178	82	234
386	213	140	80	8 ⅜"-12un	40	M16	178	82	310
503	270	184	102	n/a	n/a	n/a	n/a	98	389
505	350	254	150	n/a	n/a	n/a	n/a	98	389

HDA - HIGH TONNAGE DOUBLE ACTING CYLINDERS

Capacities from 25 to 520 tonnes

Stroke lengths from 152 to 330mm

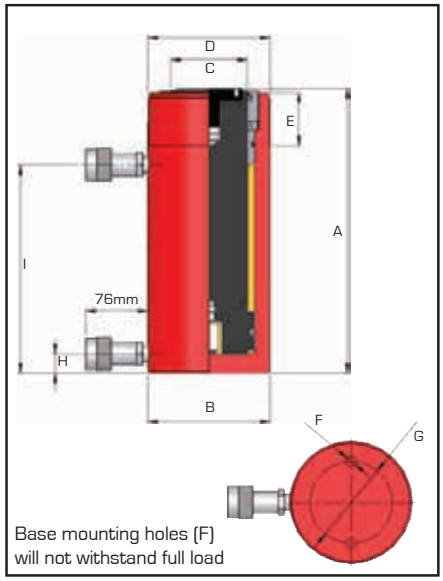
Working pressure 700 Bar

The HDA double acting cylinder range offers the utmost in versatility and durability. Specifically designed for heavy duty lifting, construction and maintenance applications as well as presswork and industrial production, the double acting design provides substantial pulling force in the piston retraction mode as well as providing fast, controlled retraction for continuous duty cycle operation. All models up to 152 tonnes are supplied with flat saddle, piston rod threads and collar threads as standard. Models from 203 tonnes and upwards are supplied without collar thread and piston rod thread, however include replaceable tilting saddle as standard. Standard range models are featured in this catalogue, however other stroke and tonnage options are available on request.

- Internal annular area overload protection valve
- Low friction bearing surfaces
- Nitrocarburised piston rod
- Anti-extrusion seals
- Base mounting holes*
- Optional piston rod saddles (see page 23)

*Base mounting holes are for location of cylinder only. They are not designed to resist the full capacity of the cylinder

Up to 152 tonnes :	From 203 tonnes :
Flat saddle	Tilting saddle
Piston rod thread	Piston without thread
Collar thread with protector	Excluding collar thread



Model number	Capacity Push tonnes	Capacity Pull tonnes	Stroke mm	Oil cap. litres	Cyl. eff. area cm²	Weight kg
HDA256	25	10	152	0.53	34.9	15.0
HDA506	50	15	152	1.08	71.3	28.4
HDA5013	50	15	330	2.35	71.3	42.6
HDA1006	109	36	152	2.33	153.3	64.5
HDA10013	109	36	330	5.06	153.3	89.0
HDA1506	152	79	152	3.26	214.2	90.0
HDA15012	152	79	305	6.53	214.2	120.5
HDA2006	203	-	152	4.33	285.2	129.8
HDA20012	203	-	305	8.69	285.2	167.4
HDA3006	326	-	152	6.95	457.4	193.0
HDA4006	398	-	152	8.49	558.9	286.0
HDA5006	520	-	152	11.09	729.9	372.0

Dimensions in mm (unless otherwise stated)								
A	B	C	D	E	F*	G	H	I
287	92	50	3 5/16"-12un	53	M10	60	30	212
295	127	79	5"-12un	55	M12	85	20	216
473	127	79	5"-12un	55	M12	85	20	394
304	178	114	6 7/8"-12un	51	M12	146	30	226
482	178	114	6 7/8"-12un	51	M12	146	30	404
310	210	114	8"-12un	55	M16	160	35	231
463	210	114	8"-12un	55	M16	160	35	384
356	254	140	Optional	Optional	M20	185	43	238
509	254	140	Optional	Optional	M20	185	43	391
409	312	165	Optional	Optional	M20	158	50	262
431	360	216	Optional	Optional	M24	203	55	277
470	397	203	Optional	Optional	M24	203	65	300

HFL - SINGLE ACTING LOW HEIGHT FAILSAFE LOCK RING CYLINDERS

Capacities from 50 to 520 tonnes

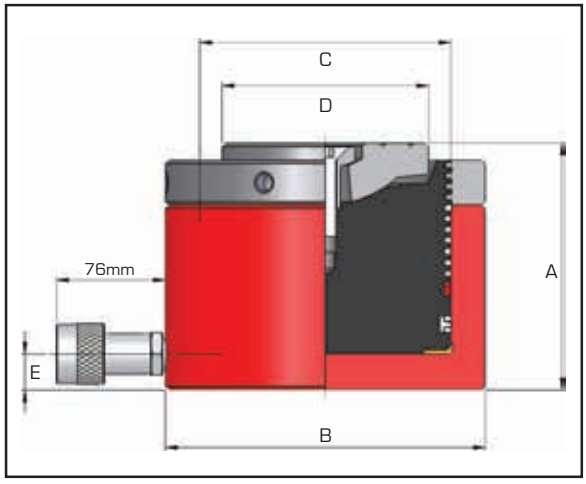
Stroke lengths from 45 to 51mm

Working pressure 700 Bar

The HFL low height single acting failsafe lock ring cylinder range combines all the versatility and efficiency of hydraulic power with the safety of mechanical load support, offering a sustainable lifting force in very confined work areas. Ideally suited for applications requiring load holding for extended periods, such as bridge support work. The HFL range features a single acting load return piston, threaded throughout it's stroke length to suit the threaded mechanical load holding lock ring. All models are suitable for vertical lifting only and are supplied with tilting saddles as standard.

- Single acting load return design
- Nitrocarburised cylinder bore and piston rod
- Low friction bearing surfaces
- Anti-extrusion seals
- Tilting saddle fitted as standard
- Overstroke restrictor port

See pages 25-44 for pumps suitable for use with all Hi-Force cylinders



Model number	Capacity tonnes	Stroke mm	Oil cap. litres	Cyl. eff. area cm^2	Weight kg
HFL502	50	51	0.36	71.3	14.2
HFL1002	109	50	0.77	153.4	25.1
HFL1502	152	45	1.07	214.3	44.0
HFL2502	260	45	1.65	366.1	69.4
HFL5002	520	45	3.29	729.9	186.0

Dimensions in mm				
A	B	C	D	E
125	127	95	70	19
137	178	140	115	20
150	216	165	135	28
159	273	216	130	31
192	400	305	180	43

HFG - SINGLE ACTING FAILSAFE LOCK RING CYLINDERS

Capacities from 50 to 520 tonnes

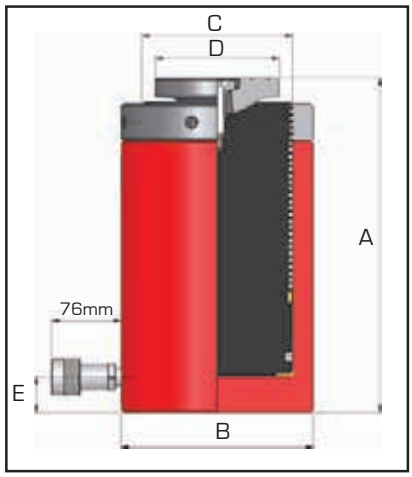
Stroke lengths from 50 to 152mm

Working pressure 700 Bar

B

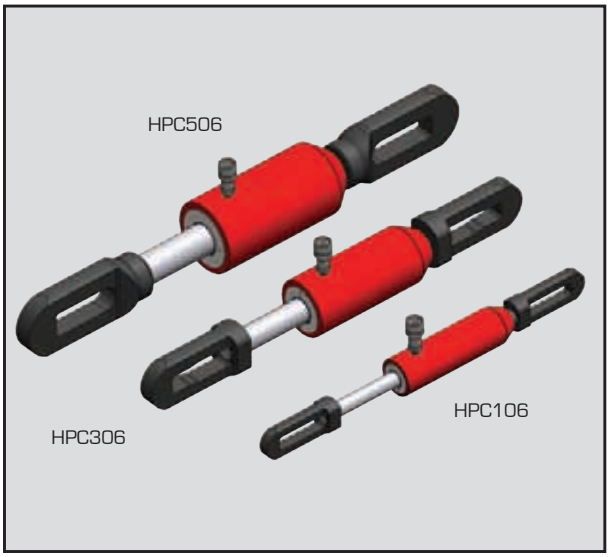
The HFG single acting failsafe lock ring cylinder range combines all the versatility and efficiency of hydraulic power with the safety of mechanical load support. Ideally suited for applications requiring sustained load holding for extended periods, such as bridge support work, the HFG range features a single acting, load return piston, threaded throughout it's stroke length to suit the threaded mechanical load holding lock ring. Simply jack up the load, wind down the mechanical lock ring until it comes into contact with the cylinder body, release the hydraulic pressure and sustain the load mechanically. All models are suitable for vertical lifting only and are supplied with tilting saddles as standard to reduce the risk of side loading the cylinder. Standard models are featured in this catalogue, however other stroke and tonnage options are available on request.

- Single acting load return design
- Nitrocarburised cylinder bore and piston rod
- Low friction bearing surfaces
- Anti-extrusion seals
- Tilting saddle fitted as standard
- Overstroke restrictor port



Model number	Capacity tonnes	Stroke mm	Oil cap. litres	Cyl. eff. area cm^2	Weight kg	Dimensions in mm A	B	C	D	E
HFG502	50	50	0.36	71.3	15.4	172	127	95	70	25.0
HFG504	50	102	0.73	71.3	20.6	224	127	95	70	25.0
HFG506	50	150	1.07	71.3	25.0	272	127	95	70	25.0
HFG1002	109	50	0.77	153.4	33.5	184	178	140	115	27.5
HFG1004	109	100	1.53	153.4	47.5	240	178	140	115	27.5
HFG1006	109	150	2.30	153.4	61.5	311	178	140	115	27.5
HFG1502	152	50	1.07	214.3	69.5	238	216	165	135	42.0
HFG1504	152	100	2.14	214.3	84.0	288	216	165	135	42.0
HFG1506	152	150	3.21	214.3	89.5	338	216	165	135	42.0
HFG2002	203	50	1.42	258.1	95.4	261	254	190	135	50.0
HFG2006	203	152	4.33	285.1	137.0	362	254	190	135	50.0
HFG3006	326	150	6.87	457.7	228.5	417	310	241	150	50.0
HFG4006	398	151	8.44	559.0	308.5	459	342	267	180	70.0
HFG5006	520	152	11.10	729.9	457.0	498	400	305	180	80.0

HPC - SINGLE ACTING PULL CYLINDERS



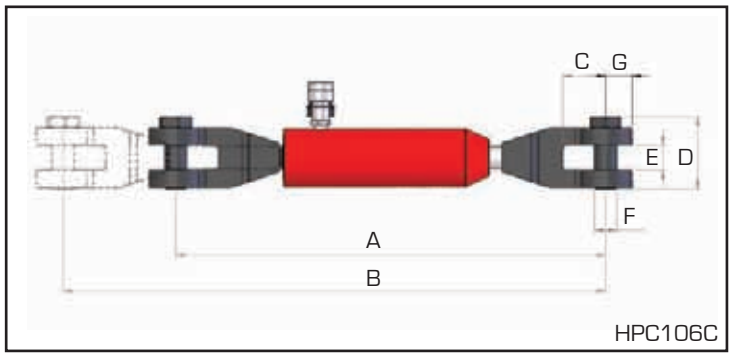
Working pressure 700 Bar

Capacities from 10 to 50 tonnes

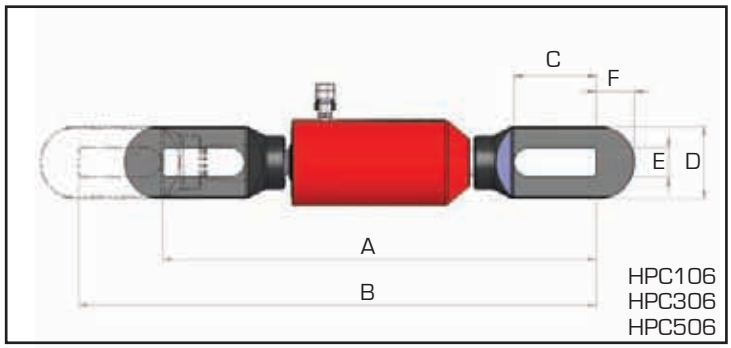
Stroke length 152mm

The HPC pull cylinder range comprises of four models, with capacities ranging from 10 tonnes to 50 tonnes of pulling force. All models are 700 Bar maximum working pressure and feature a single acting, spring assisted return piston, with a 152mm stroke length. Fitted with easily replaceable machined pulling eyes on the piston rod and cylinder base, the 10 tonnes capacity version can also be supplied with clevis eye attachments. Typical applications for HPC pull cylinders are plate alignment prior to welding in shipyards, cable tensioning and heavy load moving using chains or wire ropes.

- Spring assisted return
- Surface treated piston rod
- Replaceable pulling and clevis eyes
- Piston wiper prevents contamination



HPC106C



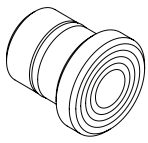
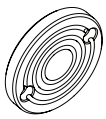
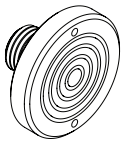
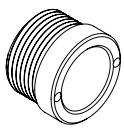
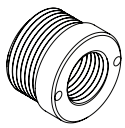
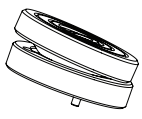
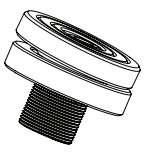
HPC106
HPC306
HPC506

Hand and powered pumps suitable for use with HPC range pull cylinders are detailed on pages 25 to 44.

Model number	Capacity tonnes	Stroke mm	Oil cap. cm^3	Cyl. eff. area cm^2	Weight kg
HPC106	10	152	228	15.0	12.0
HPC106C	10	152	228	15.0	15.5
HPC306	30	152	636	41.8	31.0
HPC506	50	152	1078	71.0	54.0

Dimensions in mm						
A	B	C	D	E	F	G
578	730	114	67	30	33	-
581	733	58	99	35	30	36
672	825	145	105	39	51	-
785	937	149	130	52	69	-

CYLINDER SADDLES

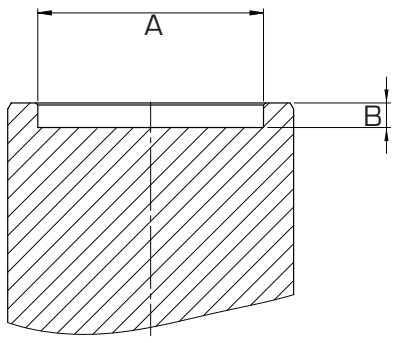
Fitted as standard					Available options			
Cylinder range	Cylinder capacity	Saddle model No.	See figure		Cylinder range	Cylinder capacity	Saddle model No.	See figure
HAS	32	**HA30**	2	Fig. 1 	HAS	32	**HAT30**	6
HAS	51	**HA50**	2		HAS	51	**HAT50**	6
HAS	110	**HA100**	2		HAS	110	**HAT100**	6
HSS	4.5	**HA5**	1		HSS	4.5	-	-
HSS	10	**HA10**	1		HSS	10	**HAT10**	8
HSS	14.5	**HA15**	1	Fig. 2 	HSS	14.5	-	-
HSS	25	**HA25**	1		HSS	25	**HAT25**	8
HSS	29	**HA25**	1		HSS	29	-	-
HSS	50	**HA50**	2		HSS	50	**HAT50**	6
HSS	73	**HA75**	2		HSS	73	**HAT75**	6
HSS	109	**HA100**	2	Fig. 3 	HSS	109	**HAT100**	6
HHS	11	**HA102**	4		HHS	11	**HA102T**	5
HHS	23	**HA202**	4		HHS	23	**HA202T**	5
HHS/R	33	**HA302**	4		HHS/R	33	**HA302T**	5
HHS/R	61	**HA603**	4		HHS/R	61	**HA603T**	5
HHS/R	102	**HA1003**	4	Fig. 4 	HHS/R	102	**HA1003T**	5
HHR	152	**HA1508**	4		HHR	152	**HA1508T**	5
HHR	247	**HA2508**	4		HHR	247	**HA2508T**	5
HDA	25	**HD25**	3		HDA	25	**HD25T**	8
HDA	50	**HD50**	3	Fig. 5 	HDA	50	**HD50T**	8
HDA	109	**HD100**	3		HDA	109	**HD100T**	8
HDA	152	**HD150**	3		HDA	152	**HD150T**	8
HDA	203	**HD200**	3		HDA	203	**HD200T**	8
HDA	326	**HD300T**	6		HDA	326	**HD300**	2
HDA	398	**HD400T**	6	Fig. 6 	HDA	398	**HD400**	2
HDA	520	**HD500T**	6		HDA	520	**HD500**	2
HFG	50	**TS50**	7		HFG	50	-	-
HFG	109	**TS100**	7		HFG	109	-	-
HFG	152	**TS150**	7		HFG	152	-	-
HFG	203	**TS200**	7	Fig. 7 	HFG	203	-	-
HFG	326	**TS300**	7		HFG	326	-	-
HFG	398	**TS400**	7		HFG	398	-	-
HFG	520	**TS500**	7		HFG	520	-	-
HFL	50	**TS50**	7	Fig. 8 	HFL	50	-	-
HFL	109	**TS100**	7		HFL	109	-	-
HFL	152	**TS150**	7		HFL	152	-	-
HFL	260	**TS250**	7		HFL	260	-	-
HFL	520	**TS500**	7		HFL	520	-	-

PISTON ROD THREAD SPECIFICATIONS

HSS Cylinder Range

Cylinder Range	Figure	Dimensions in mm A	B	C	Thread Size D
HSS5	3	-	-	20	¾"-16UNF
HSS10	3	-	-	14	1"-8UNC
HSS15	3	-	-	14	1"-8UNC
HSS25	3	-	-	30	1½"-16UN
HSS30	3	-	-	30	1½"-16UN
HSS50	1	70	11.0	-	-
HSS75	1	80	12.0	-	-
HSS100	1	100	12.0	-	-

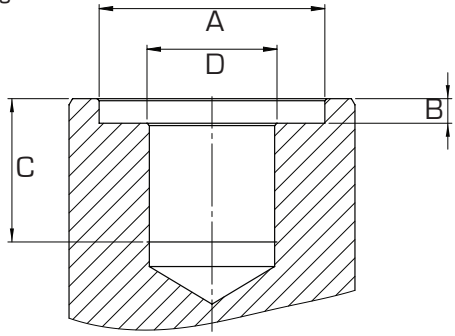
Fig. 1



HAS Cylinder Range

Cylinder Range	Figure	Dimensions in mm A	B	C	Thread Size D
HAS30	1	50	10.0	-	-
HAS50	1	70	11.0	-	-
HAS100	1	100	12.0	-	-

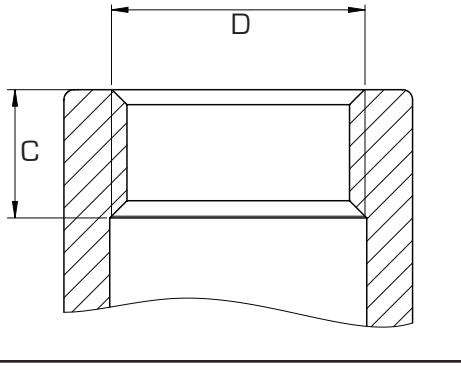
Fig. 2



HDA Cylinder Range

Cylinder Range	Figure	Dimensions in mm A	B	C	Thread Size D
HDA25	2	45	9.0	35	1"-12UNF
HDA50	2	70	11.0	45	1"-12UNF
HDA100	2	100	12.0	55	1¾"-12UNF
HDA150	2	100	12.0	52	3⅜"-16UN
HDA200	2	110	12.0	70	2½"-12UN
HDA300	1	150	25.0	-	-
HDA400	1	180	25.0	-	-
HDA500	1	180	25.0	-	-

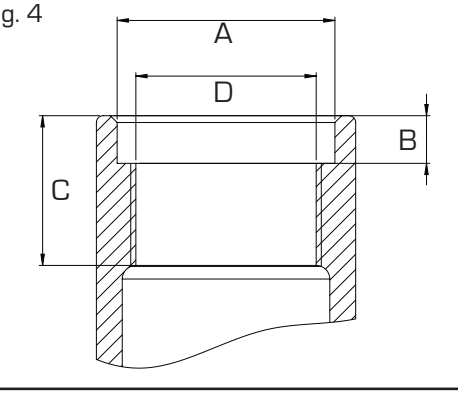
Fig. 3



HHS Cylinder Range

Cylinder Range	Figure	Dimensions in mm A	B	C	Thread Size D
HHS11	4	32	7.0	21	M28x1.5
HHS23	4	43	10.0	31	M39x1.5
HHS33	4	52	10.0	31	M48x1.5
HHS61	4	80	10.0	31	M70x1.5
HHS102	4	114	12.0	38	M105x2

Fig. 4



HHR Cylinder Range

Cylinder Range	Figure	Dimensions in mm A	B	C	Thread Size D
HHR33	4	52	10.0	32	M48x1.5
HHR61	4	80	10.0	32	M70x1.5
HHR102	4	114	12.0	38	M105x2
HHR1508	4	170	13.5	50	M150x3
HHR2508	4	242	13.5	74	M220x3

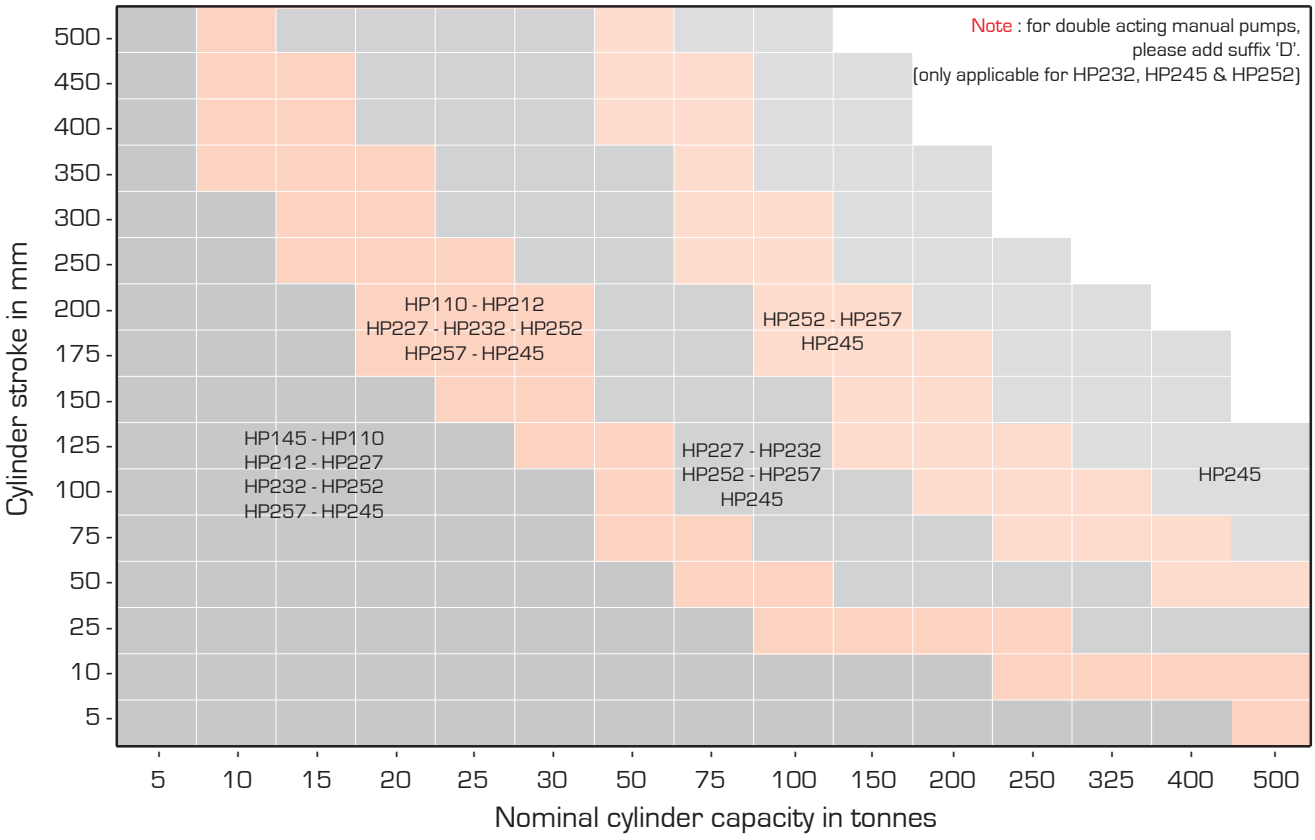
Hi-Force®

PUMPS

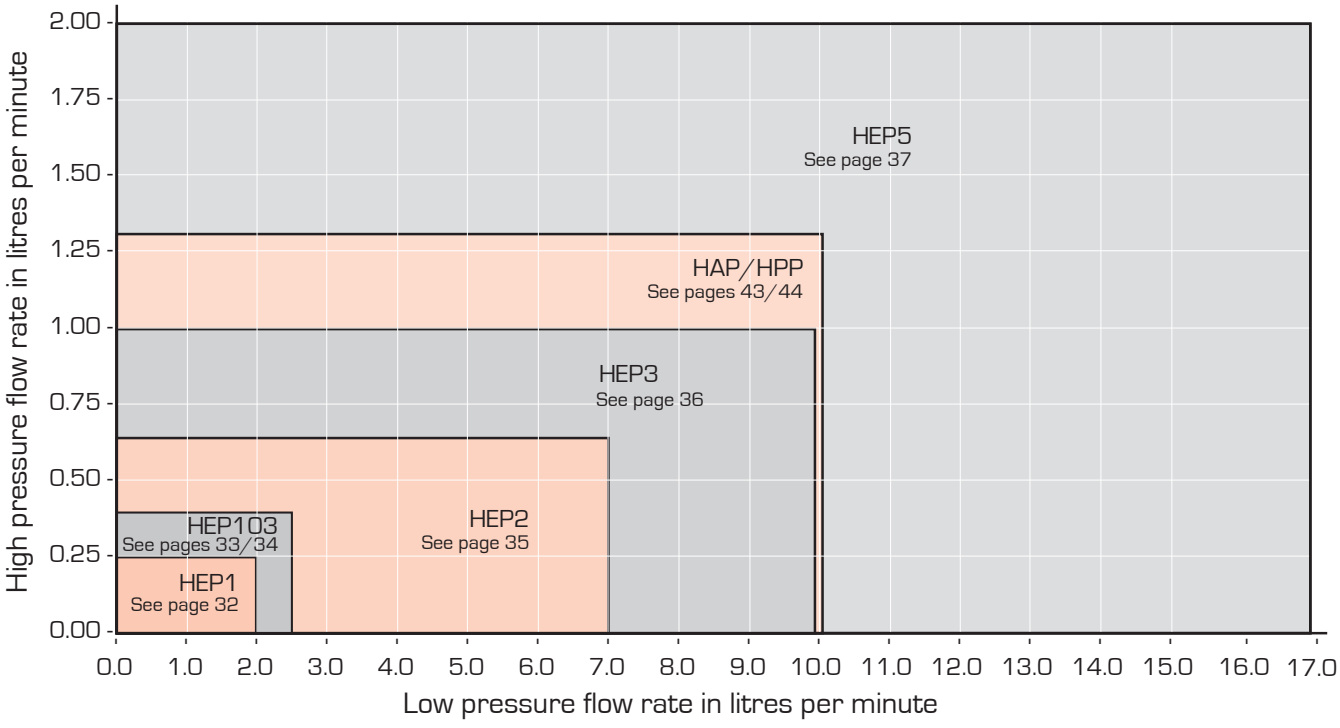
C

SELECTION TABLE FOR HI-FORCE HYDRAULIC PUMPS

MANUAL PUMPS



POWERED PUMPS



HP - MANUALLY OPERATED PUMPS - STEEL

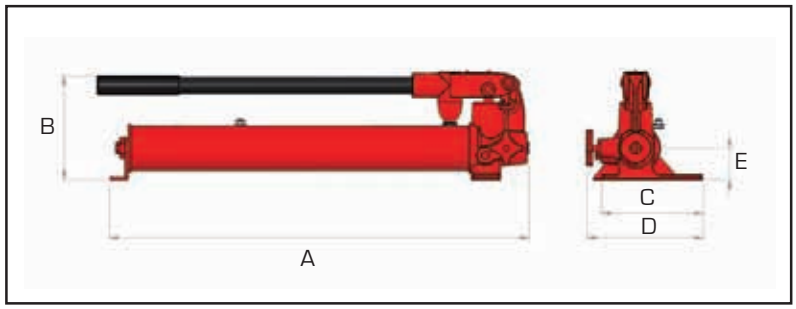
Single or two speed operation

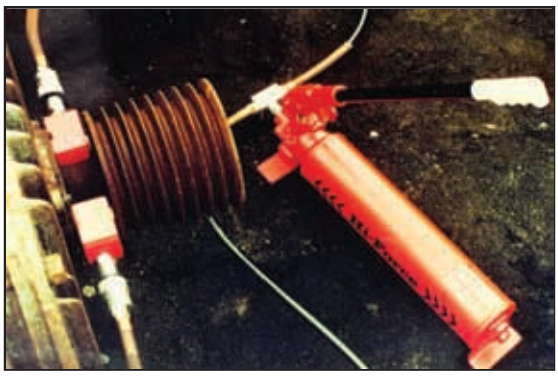
Choice of control valves

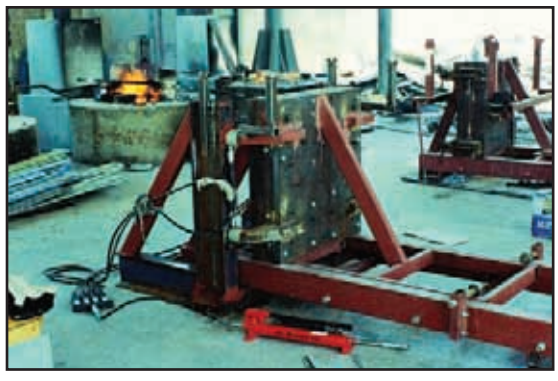
Working pressure 700 Bar

The HP manually operated pump range offers a choice of single or two speed operation and all models are supplied complete with a pre-filled oil reservoir, ready for immediate use. All models have a maximum working pressure of 700 Bar and the range includes pump models suitable for use with either single acting cylinders or tools. The HP range offers the ideal solution for applications where completely independent, portable hydraulic power is required. With low handle effort characteristics for easy operation, all models are of strong durable construction. Hi-Force HP manually operated pumps have a proven track record industry wide and offer excellent value for money in portable hydraulic power. A full range of system components suitable for use with HP manually operated pumps is detailed on pages 49 - 56.

- Oil reservoir capacity up to 5 litres
- Durable steel construction
- External pressure release valve
- Factory set safety relief valve
- Changeover pressure for two speed models is 14 Bar







Model number	Valve type	Displacement per stroke cm³ 1st stage	2nd stage	Usable oil cap. litres	Handle effort kg	Weight kg
Single speed hand operated pumps for single acting cylinders and tools						
HP145	2-way	2.9	-	0.45	45	4.6
HP110	2-way	2.9	-	1.0	45	5.6
Two speed hand operated pumps for single acting cylinders and tools						
HP227	2-way	12.9	2.3	2.3	38	10.5
HP257	2-way	12.9	2.3	5.0	38	15.2

Dimensions in mm A	B	C	D	E
360	128	145	134	40
560	128	145	134	40
544	168	145	135	53
545	168	145	135	53

HP - MANUALLY OPERATED PUMPS - ALUMINIUM

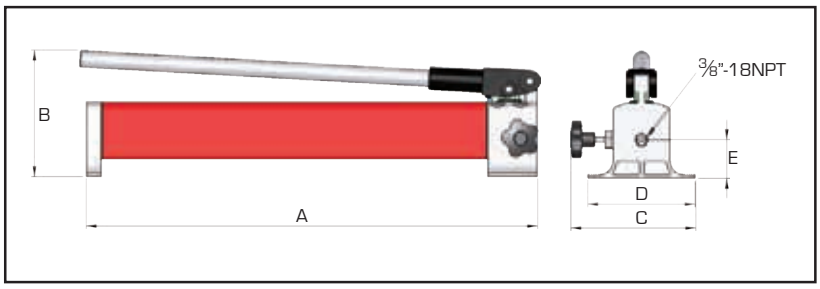
Two speed operation

Working pressure 700 Bar

Five models with choice of control valve

The HP manually operated aluminium pump range offers two speed operation and all models are supplied complete with a pre-filled oil reservoir, ready for immediate use. All models have a maximum working pressure of 700 Bar and the range includes pump models suitable for use with either single or double acting cylinders and tools. The HP range offers the ideal solution for applications where completely independent, portable hydraulic power is required. With low handle effort characteristics for easy operation and lightweight design, all models are of strong durable construction. Hi-Force HP manually operated pumps have a proven track record industry wide and offer excellent value for money in portable hydraulic power.

- Oil reservoir capacity up to 5 litres
- Lightweight aluminium construction
- External pressure release valve
- Factory set safety relief valve
- Changeover pressure 14 Bar



Model number	Valve type	Displacement per stroke cm³ 1st stage	2nd stage	Usable oil cap. litres	Handle effort kg	Weight kg
Two speed hand operated pumps for single acting cylinders and tools						
HP212	2-way	12.9	2.3	1.0	40	4.0
HP232	2-way	12.9	2.3	2.0	40	6.9
HP252	2-way	12.9	2.3	5.0	40	9.6
Two speed hand operated pumps for double acting cylinders and tools						
HP232D	4-way	12.9	2.3	2.0	40	8.7
HP252D	4-way	12.9	2.3	5.0	40	13.6

Dimensions in mm A	B	C	D	E
536	142	115	100	40
536	160	140	140	51
585	160	150	140	51
555	160	180	140	32/74
600	160	180	140	32/74

HP - MANUALLY OPERATED PUMPS - HIGH FLOW


HP245D

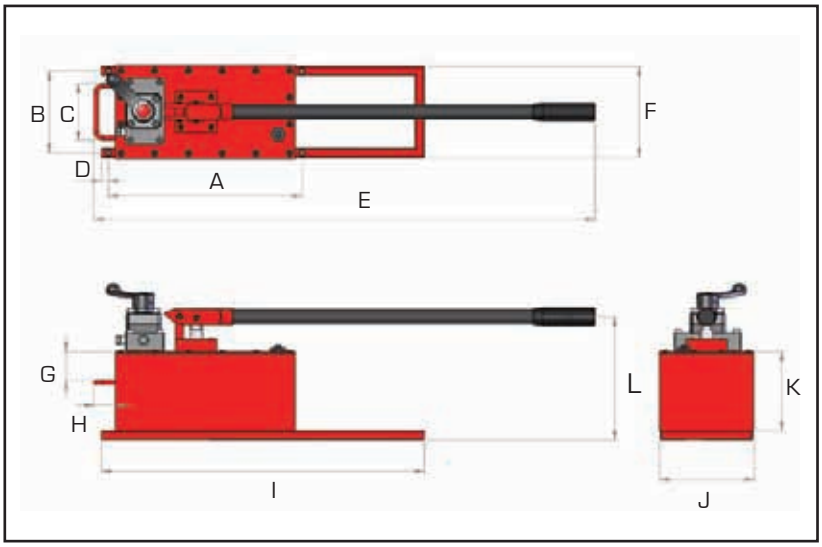
High flow manual pump

Working pressure 700 Bar

2 stage with semi automatic change-over

The HP245 range of high flow, two speed, manually operated pumps is ideally suited for applications where high tonnage cylinders are to be used on sites, without any available electric or compressed air power supply. Both models are suitable for working pressures up to 700 Bar and the very high, low pressure displacement (113 cm^3 per stroke), enables fast piston extension (and retraction) under no load. These high performance pumps are also ideally suited to multiple cylinder lifting applications where a larger volume of oil is required to complete the job. Available with a 2-way valve for single acting cylinders or a 4-way valve for double acting cylinders, both models are supplied with a pre-filled 10 litre oil reservoir and are ready for immediate use.

- Durable steel construction
- Factory set safety relief valve
- Changeover pressure 28 Bar
- Low handle effort characteristics
- 10 litres of usable oil capacity



Model number	Valve type	Displacement per stroke cm^3 1st stage	Displacement per stroke cm^3 2nd stage	Usable oil cap. litres	Handle effort kg	Material	Weight kg
Two speed hand operated pump for single acting cylinders and tools							
HP245	2-Way	113	4	10	40	Steel	29.5
Two speed hand operated pump for double acting cylinders and tools							
HP245D	4-Way	113	4	10	40	Steel	31.0

Model number	Dimensions in mm A	B	C	D	E	F	G	H	I	J	K	L
HP245	420	175	124	15	1046	200	63	47	700	205	173	270
HP245D	420	175	124	15	1046	200	63	47	700	205	173	270

XHP - MANUALLY OPERATED ULTRA HIGH PRESSURE PUMP

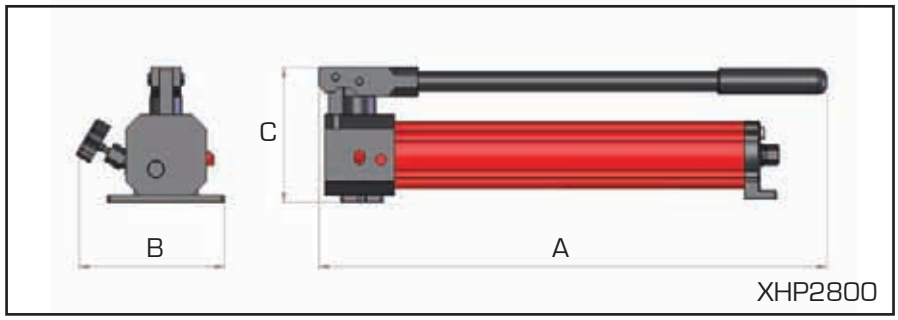
Compact design

Two speed operation

Working pressure up to 2800 Bar

- Lightweight aluminium construction
- Factory set safety relief valve
- External pressure release valve
- Low handle effort
- XHP1500 includes gauge as standard, optional gauge kit for XHP2800.

The XHP range of manually operated ultra high pressure hydraulic pumps is suitable for use in a wide range of high pressure applications, such as oil injection for bushing removal, valve testing, calibration work, laboratory burst and proof testing, etc. The two speed operation, with automatic changeover from low to high presssure at 14 Bar, provides easy and low handle effort operation. The XHP1500 features an integrated gauge as standard, the optional gauge kit for the XHP 2800 includes a three metre long high pressure hose with swivel fittings on both ends. Both gauges provide accurate and reliable pressure readings.



Pump specification :

Model number	Working pressure bar	Usable oil capacity litres	Displacement per stroke (cm^3) 1st stage	2nd stage	Outlet port	Weight kg
XHP1500	1500	0.7	20.0	1.00	¼" BSP	7.0
XHP2800	2800	1.0	14.0	0.65	¾"-16 UNF	6.9

Pump only Dimensions in mm A	B	C
610	170	180
620	170	157

Optional gauge kit (for XHP2800 only) :

Model number	Inner scale reading PSI	Outer scale reading Bar	Inlet port	Outlet port	Weight kg
XHP2800GK	0-45000	0-3000	9/16"-18 UNF	9/16"-18 UNF	1.5

Pump incl. gauge kit Dimensions in mm Length	Width	Height
748	170	237

Supplied including adaptor to fit ¾"-16 UNF pump outlet port and 3 m. hose assembly with swivel fittings on both ends

POWERED PUMPS - GENERAL INFORMATION

Hi-Force offers a comprehensive range of powered pumps with a choice of either an electric driven motor, air driven motor or petrol driven motor. Depending on the required usage, please refer to the following guidelines for correct pump range selection. All models detailed below are 700 Bar maximum working pressure.

Page 32

Light		The HEP1 series two stage electric driven hydraulic mini pump range offers a choice of 110 or 240 Volt motor, with both models being suitable for 700 Bar maximum working pressure. The two stage design offers a low pressure flow rate up to 2 litres/min with automatic changeover to high pressure, with a flow rate up to 0.25 litres/min. Incorporating a 2-way solenoid valve and internal safety overload valve, both models are extremely compact & lightweight, suitable for use with single acting Hi-Force cylinders or tools.

Pages 33 & 34

Standard		The HEP103 series two stage electric driven hydraulic pump range offers a choice of 110 or 240 Volt electric driven motors. All models are suitable for 700 Bar maximum working pressure. The two stage design offers a low pressure flow rate up to 2.5 litres/min with automatic changeover to high pressure, with a flow rate up to 0.35 litres/min. Available with manual or solenoid valve options, suitable for both single acting and double acting cylinders and tools in a wide variety of applications.

Page 35

Intermediate		The HEP2 series two stage electric driven hydraulic pump range offers a low pressure flow rate of 7 litres/min with automatic changeover to high pressure flow rate of 0.65 litres/min up to 700 Bar with a choice of 110, 240 or 380/440 Volt motor options. With 2, 3 or 4-way manual and electric solenoid valve options the HEP2 series is suitable for a wide range of applications and is the most commonly selected Hi-Force electric pump. All HEP2 series pumps are also fitted with an externally adjustable pressure relief valve for easy adjustment up to the maximum working pressure of 700 Bar.

Page 36

Continuous		The HEP3 series two stage electric driven hydraulic pump range has all the features of the HEP2 series, but with an increased flow of 10 litres/min at low pressure and 1 litre/min at high pressure (up to 700 Bar) these pumps are particularly useful when operating high tonnage or long stroke cylinders. Both HEP2 and HEP3 range of electric pumps are fitted with totally enclosed, fan cooled, low noise, electric motors, making them ideal for quiet in-works operation or outdoor site use in most environments.

Page 37

Heavy duty		The HEP5 series two stage electric driven hydraulic pump range offers the highest flow rate combination in the Hi-Force range. Offering a low pressure flow rate of 17 litres/min with automatic changeover to a superb high pressure flow rate of 2 litres/min. The HEP5 offers all the features of the HEP2 and HEP3 series with the addition of a 2.2 kW high speed, heavy duty motor, making it the ideal pump unit for all heavy duty applications, requiring a high flow and intensive usage over longer time periods.

Pages 39 & 40

Intermediate		The HSP series electric driven split flow hydraulic pump range offers users the opportunity to operate up to 12 independent hydraulic outlets from within a single pump assembly. With easy to operate controls HSP series pumps are ideally suited for synchronous lift applications particularly where there is uneven load distribution between the multiple jacking points. All models are 380/440 volt three phase electrical supply operation.

Pages 41 & 42

Light		The AHP11 series of air driven single stage pumps offer an economical and faster working alternative to basic hand operated pumps. Available with both 2-way and 4-way manually operated control valves AHP series pumps incorporate an ergonomically designed pedal offering the operator the choice of hand or foot operated control (excludes 4-way valve models). Remote air powered pendant control options also available.

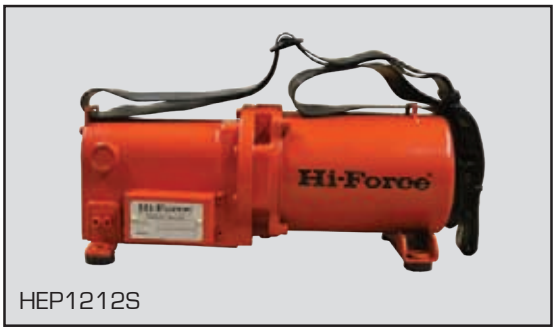
Page 43

Intermediate		The HAP series two stage air driven hydraulic pump range offers a low pressure flow rate of 10 litres/min, with automatic changeover to high pressure flow rate, of 1.3 litres/min up to the 700 Bar maximum working pressure. The modular construction of these pumps ensures that many similar features to the HEP2 & HEP3 series are included with the air motor driven motive force being the principle design difference.

Page 44

Intermediate		The HPP series two stage petrol engine driven hydraulic pump range offers all the modular design and performance characteristics of the HAP series with the only principle difference being the change of motive force from air driven to petrol engine driven. HPP series pumps are ideally suited for job site locations where electrical or compressed air power supply are not readily available.

HEP1 - ELECTRIC DRIVEN LIGHTWEIGHT MINI PUMPS WITH CARRYING STRAP



HEP1212S

Working pressure 700 Bar

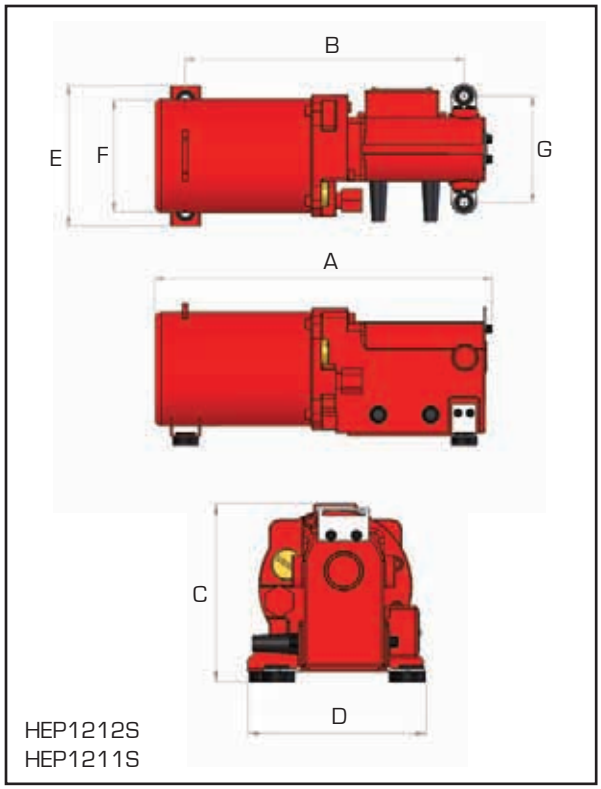
Two-stage design, changeover pressure 10 Bar

Extremely compact, lightweight & powerful

The HEP1 range of two stage electric driven hydraulic mini pumps, offers the smallest and lightest weight, electric powered pump in the Hi-Force product range. Available with a choice of 110 volt or 240 volt single phase electric motor, both models feature an electric solenoid operated valve, complete with remote hand pendant controller and 3 metre control cable as standard. The two stage design of these pumps incorporates an automatic changeover from low to high pressure ensuring that an optimum pressure and flow rate combination is achievable from an extremely compact pump.

- 110 or 240V single phase motor options
- Internal safety overload valve
- Supplied with carrying strap

Model number	Motor voltage	Maximum pressure bar	Maximum flow rate l/min 1st stage	2nd stage	Valve type	Usable oil cap. litres	Weight kg
HEP1211S	110 V - 1 Ph	700	2.00	0.2	2-way	0.8	7.5
HEP1212S	240 V - 1Ph	700	2.00	0.2	2-way	0.8	7.5



HEP1212S
HEP1211S

Model number	Dimensions in mm A	B	C	D	E	F	G
HEP1212S	333	269	140	139	138	110	105
HEP1211S	333	269	140	139	138	110	105

HEP103 - ELECTRIC DRIVEN TWO STAGE COMPACT PUMPS

HEP103442

- Working pressure 700 Bar
- Choice of valve options
- Compact, lightweight & powerful

The HEP103 range of two stage electric driven hydraulic pumps is suitable for a wide variety of applications and pumps are available in either 110 volt or 240 volt single phase electric motor options. Both voltage options also offer a choice of manual or electrically operated control valves, available as 2-way, 3-way or 4-way options with additional features like open centre, closed centre and locking valve designs available. Maximum working pressure is 700 Bar with automatic low to high pressure changeover fitted as standard. All models are supplied complete with a glycerine filled hydraulic pressure gauge, pre-filled 4 litre usable oil capacity reservoir with oil sight level gauge and an integral carrying handle for easy transportation of these lightweight, compact and versatile pumps to the job site.

Model number	Motor voltage	Maximum pressure Bar	Maximum flow rate l/min 1st stage	2nd stage	Changeover pressure Bar	Remote pendant functions	Usable oil capacity litres	Weight kg
Models featuring 2-way solenoid valve, normally closed (hold function), suitable for use with single acting cylinders and tools, requiring hold.								
HEP103241LS	110 V - 1 Ph	700	2.50	0.35	150	advance/retract	4	19.2
HEP103242LS	240 V - 1 Ph	700	2.50	0.35	150	advance/retract	4	19.2
Models featuring 2-way solenoid valve, normally open (auto retract function), suitable for use with single acting cylinders and tools, requiring auto retract.								
HEP103241S	110 V - 1Ph	700	2.50	0.35	150	advance/retract	4	20.5
HEP103242S	240 V - 1 Ph	700	2.50	0.35	150	advance/retract	4	20.5
Models featuring 3-way manually operated valve, suitable for use with single acting cylinders and tools.								
HEP103341	110 V - 1Ph	700	2.50	0.35	150	motor on/off	4	18.1
HEP103342	240 V - 1 Ph	700	2.50	0.35	150	motor on/off	4	18.1
Models featuring 4-way manually operated valve, suitable for use with double acting cylinders and tools.								
HEP103441	110 V - 1Ph	700	2.50	0.35	150	motor on/off	4	18.1
HEP103442	240 V - 1 Ph	700	2.50	0.35	150	motor on/off	4	18.1
Models featuring 4-way solenoid valve, locking feature on A and B port, suitable for use with double acting cylinders and tools, requiring hold.								
HEP103441LS	110 V - 1Ph	700	2.50	0.35	150	advance/retract	4	20.5
HEP103442LS	240 V - 1 Ph	700	2.50	0.35	150	advance/retract	4	20.5

Note: All motors are dual frequency (50/60 Hz)

HEP103 - ELECTRIC DRIVEN TWO STAGE COMPACT PUMPS

HEP103442LS

Working pressure 700 Bar

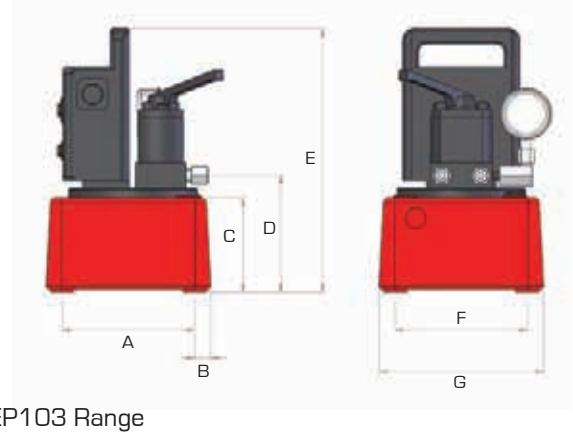
Choice of valve options

Compact, lightweight & powerful

- Integral carrying handle
- Pressure gauge and remote control fitted as standard
- Suitable for single and double acting cylinders and hydraulic tools
- All models are fitted with dual frequency (50/60 Hz) motor

Did you know .....

Hi-Force manufactures powered pumps with flow rates up to 17 litres per minute in low pressure and 2 litres per minute up to 700 Bar.
See pages 35 to 37 for more details



HEP103 Range

All models	Dimensions in mm
A	170.0
B	19.0
C	117.5
D	141.5
E	342.0
F	170.0
G	212.0

HEP2 - ELECTRIC DRIVEN PUMPS - GENERAL DUTY MEDIUM FLOW

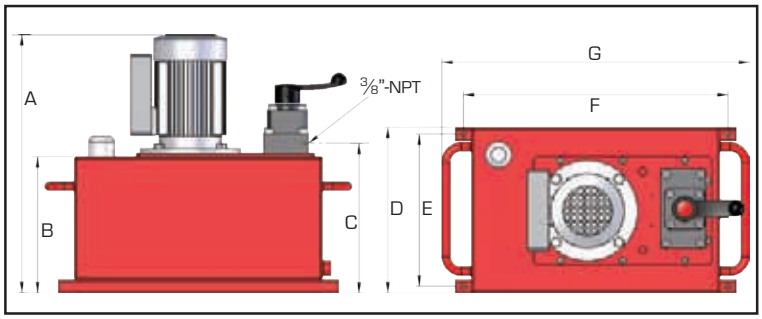

HEP207214

Low pressure flow rate 7 l/min. up to 70 Bar

High pressure flow rate 0.65 l/min. up to 700 Bar

Two stage hydraulic pump unit

- Externally adjustable pressure relief valve
- Manual valve with load holding feature fitted as standard
- Solenoid valve options available



Model number	Valve type	Oil cap. litres	Motor kW	Motor voltage	Weight kg	Dimensions in mm A	B	C	D	E	F	G
HEP207111	P-T Plate	10	1.5	110 / 115 V - 1Ph	47.0	498	198	230	246	221	368	438
HEP207112	P-T Plate	10	1.5	220 / 240 V - 1Ph	47.0	498	198	230	246	221	368	438
HEP207114	P-T Plate	10	1.5	380 / 440 V - 3Ph	47.0	498	198	230	246	221	368	438
HEP207121	P-T Plate	25	1.5	110 / 115 V - 1Ph	63.0	527	227	259	306	281	490	570
HEP207122	P-T Plate	25	1.5	220 / 240 V - 1Ph	63.0	527	227	259	306	281	490	570
HEP207124	P-T Plate	25	1.5	380 / 440 V - 3Ph	63.0	527	227	259	306	281	490	570
HEP207211	2-way	10	1.5	110 / 115 V - 1Ph	47.5	498	198	230	246	221	368	438
HEP207212	2-way	10	1.5	220 / 240 V - 1Ph	47.5	498	198	230	246	221	368	438
HEP207214	2-way	10	1.5	380 / 440 V - 3Ph	47.5	498	198	230	246	221	368	438
HEP207221	2-way	25	1.5	110 / 115 V - 1Ph	63.5	527	227	259	306	281	490	570
HEP207222	2-way	25	1.5	220 / 240 V - 1Ph	63.5	527	227	259	306	281	490	570
HEP207224	2-way	25	1.5	380 / 440 V - 3Ph	63.5	527	227	259	306	281	490	570
HEP207311	3-way	10	1.5	110 / 115 V - 1Ph	47.5	498	198	230	246	221	368	438
HEP207312	3-way	10	1.5	220 / 240 V - 1Ph	47.5	498	198	230	246	221	368	438
HEP207314	3-way	10	1.5	380 / 440 V - 3Ph	47.5	498	198	230	246	221	368	438
HEP207321	3-way	25	1.5	110 / 115 V - 1Ph	63.5	527	227	259	306	281	490	570
HEP207322	3-way	25	1.5	220 / 240 V - 1Ph	63.5	527	227	259	306	281	490	570
HEP207324	3-way	25	1.5	380 / 440 V - 3Ph	63.5	527	227	259	306	281	490	570
HEP207411	4-way	10	1.5	110 / 115 V - 1Ph	47.5	498	198	230	246	221	368	438
HEP207412	4-way	10	1.5	220 / 240 V - 1Ph	47.5	498	198	230	246	221	368	438
HEP207414	4-way	10	1.5	380 / 440 V - 3Ph	47.5	498	198	230	246	221	368	438
HEP207421	4-way	25	1.5	110 / 115 V - 1Ph	63.5	527	227	259	306	281	490	570
HEP207422	4-way	25	1.5	220 / 240 V - 1Ph	63.5	527	227	259	306	281	490	570
HEP207424	4-way	25	1.5	380 / 440 V - 3Ph	63.5	527	227	259	306	281	490	570

Note: For optional extras please see page 38

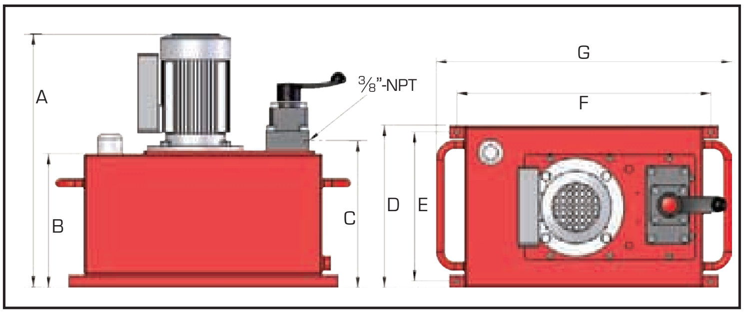
HEP3 - ELECTRIC DRIVEN PUMPS - GENERAL DUTY HIGH FLOW

Low pressure flow rate 10 l/min. up to 70 Bar

High pressure flow rate 1 l/min. up to 700 Bar

Two stage hydraulic pump unit

- Externally adjustable pressure relief valve
- Manual valve with load holding feature fitted as standard
- Solenoid valve options available



Model number	Valve type	Oil cap. litres	Motor kW	Motor voltage	Weight kg	Dimensions in mm A	B	C	D	E	F	G
HEP310121	P-T Plate	25	2.2	110 / 115 V - 1Ph	63.5	527	227	259	306	281	490	570
HEP310122	P-T Plate	25	2.2	220 / 240 V - 1Ph	63.5	527	227	259	306	281	490	570
HEP310124	P-T Plate	25	2.2	380 / 440 V - 3Ph	63.5	527	227	259	306	281	490	570
HEP310141	P-T Plate	40	2.2	110 / 115 V - 1Ph	88.5	636	336	368	306	281	490	560
HEP310142	P-T Plate	40	2.2	220 / 240 V - 1Ph	88.5	636	336	368	306	281	490	560
HEP310144	P-T Plate	40	2.2	380 / 440 V - 3Ph	88.5	636	336	368	306	281	490	560
HEP310221	2-way	25	2.2	110 / 115 V - 1Ph	64.0	527	227	259	306	281	490	570
HEP310222	2-way	25	2.2	220 / 240 V - 1Ph	64.0	527	227	259	306	281	490	570
HEP310224	2-way	25	2.2	380 / 440 V - 3Ph	64.0	527	227	259	306	281	490	570
HEP310241	2-way	40	2.2	110 / 115 V - 1Ph	89.0	636	336	368	306	281	490	560
HEP310242	2-way	40	2.2	220 / 240 V - 1Ph	89.0	636	336	368	306	281	490	560
HEP310244	2-way	40	2.2	380 / 440 V - 3Ph	89.0	636	336	368	306	281	490	560
HEP310321	3-way	25	2.2	110 / 115 V - 1Ph	64.0	527	227	259	306	281	490	570
HEP310322	3-way	25	2.2	220 / 240 V - 1Ph	64.0	527	227	259	306	281	490	570
HEP310324	3-way	25	2.2	380 / 440 V - 3Ph	64.0	527	227	259	306	281	490	570
HEP310341	3-way	40	2.2	110 / 115 V - 1Ph	89.0	636	336	368	306	281	490	560
HEP310342	3-way	40	2.2	220 / 240 V - 1Ph	89.0	636	336	368	306	281	490	560
HEP310344	3-way	40	2.2	380 / 440 V - 3Ph	89.0	636	336	368	306	281	490	560
HEP310421	4-way	25	2.2	110 / 115 V - 1Ph	64.0	527	227	259	306	281	490	570
HEP310422	4-way	25	2.2	220 / 240 V - 1Ph	64.0	527	227	259	306	281	490	570
HEP310424	4-way	25	2.2	380 / 440 V - 3Ph	64.0	527	227	259	306	281	490	570
HEP310441	4-way	40	2.2	110 / 115 V - 1Ph	89.0	636	336	368	306	281	490	560
HEP310442	4-way	40	2.2	220 / 240 V - 1Ph	89.0	636	336	368	306	281	490	560
HEP310444	4-way	40	2.2	380 / 440 V - 3Ph	89.0	636	336	368	306	281	490	560

Note: For optional extras please see page 38

Hi-Force®

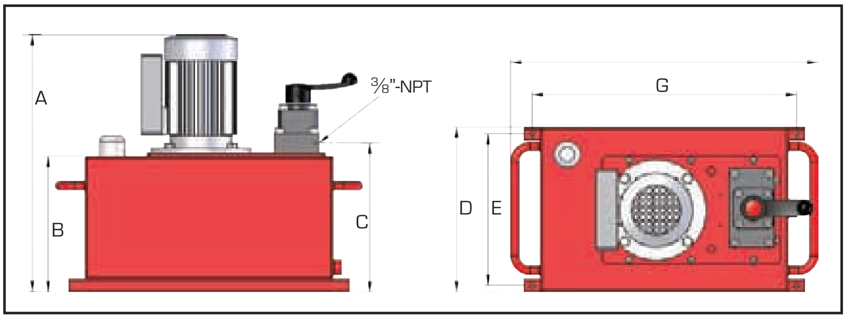
HEP5 - ELECTRIC DRIVEN PUMPS - HEAVY DUTY HIGH FLOW

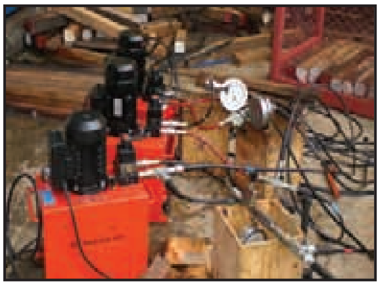

HEP517464

- Low pressure flow rate 17 l/min up to 70 Bar
- High pressure flow rate 2 l/min up to 700 Bar
- Two stage hydraulic pump unit

C

- Manual valve with load holding feature fitted as standard
- Externally adjustable pressure relief valve
- Solenoid valve options available





Model number	Valve type	Oil cap. litres	Motor kW	Motor voltage	Weight kg	Dimensions in mm						
						A	B	C	D	E	F	G
HEP517142	P-T Plate	40	2.2	220 / 240	88.5	636	336	368	306	281	490	560
HEP517144	P-T Plate	40	2.2	380 / 440	88.5	636	336	368	306	281	490	560
HEP517162	P-T Plate	60	2.2	220 / 240	120.0	657	357	389	406	381	513	583
HEP517164	P-T Plate	60	2.2	380 / 440	120.0	657	357	389	406	381	513	583
HEP517242	2-way	40	2.2	220 / 240	89.0	636	336	368	306	281	490	560
HEP517244	2-way	40	2.2	380 / 440	89.0	636	336	368	306	281	490	560
HEP517262	2-way	60	2.2	220 / 240	120.0	657	357	389	406	381	513	583
HEP517264	2-way	60	2.2	380 / 440	120.0	657	357	389	406	381	513	583
HEP517342	3-way	40	2.2	220 / 240	89.0	636	336	368	306	281	490	560
HEP517344	3-way	40	2.2	380 / 440	89.0	636	336	368	306	281	490	560
HEP517362	3-way	60	2.2	220 / 240	120.0	657	357	389	406	381	513	583
HEP517364	3-way	60	2.2	380 / 440	120.0	657	357	389	406	381	513	583
HEP517442	4-way	40	2.2	220 / 240	89.0	636	336	368	306	281	490	560
HEP517444	4-way	40	2.2	380 / 440	89.0	636	336	368	306	281	490	560
HEP517462	4-way	60	2.2	220 / 240	120.0	657	357	389	406	381	513	583
HEP517464	4-way	60	2.2	380 / 440	120.0	657	357	389	406	381	513	583

Note: For optional extras please see page 38

POWERED PUMP ACCESSORIES

Protective roll frame

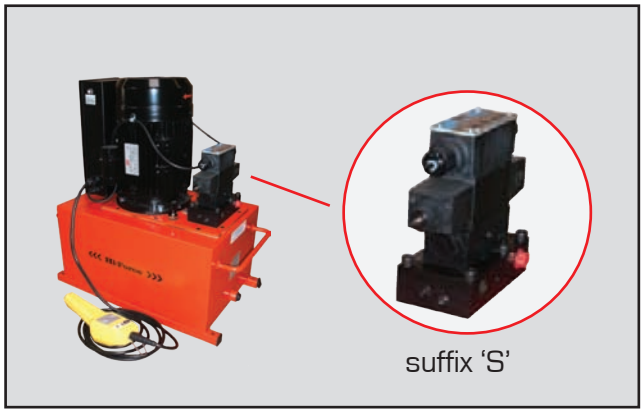
Model number	For all HEP and HAP models
PPA10RF	All pumps with 10L tank
PPA25RF	All pumps with 25L tank
PPA40RF	All pumps with 40L tank
PPA60RF	All pumps with 60L tank

All pumps can be supplied with roll frame factory fitted.
Just suffix pump model number with 'P'.

Wheel trolley

Model number	For all HEP, HAP and HPP models
PPA40WT	Wheel trolley for all 25 and 40 litre model pumps.
PPA60WT	Wheel trolley for all 60 litre model pumps.

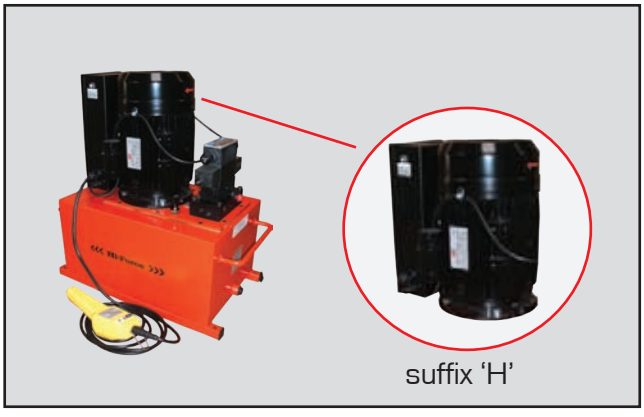
All pumps can be supplied with wheel trolley factory fitted.
Just suffix pump model number with 'WT'.



Low voltage solenoid valve with hand pendant controller

Suffix	Description
S	All HEP2, 3 and 5 series electric pumps can be supplied with low voltage (24V) solenoid valve, either in 3-way or 4-way versions, both featuring a locking feature and remote pendant control as standard

To order pump with solenoid valve,
just suffix pump model number with 'S'.



60Hz Electric Motor

Suffix	Description
H	All HEP2, 3 and 5 series electric pumps can be supplied with an electric motor suitable for 60 Hz.

To order pump with 60Hz motor,
just suffix pump model number with 'H'.

HSP - ELECTRIC DRIVEN SPLIT FLOW MULTI-OUTLET PUMPS

HSP44E104

- Working pressure 700 Bar
- Multiple outlet valve options
- Precise control to achieve synchronised lift

The HSP range of electric driven, split flow, hydraulic pumps is designed to deliver equal volumes of oil from each individual control valve regardless of any variations in the hydraulic pressure. The range offers a selection of outlet valve configurations ranging from a 2-outlet model with manually operated directional control valves, through to a 12-outlet model with electric solenoid operated valves. Each valve outlet is connected directly to an independent internal piston pump which is driven by a common electric motive force. This technology allows each internal piston pump to deliver an equal amount of oil flow per minute regardless of any variations in the required operating pressure at each control valve outlet. With HSP split flow pumps lifting and positioning large, unevenly weighted loads using multiple jacking points in a synchronised, level lift and controlled manner is easily achievable. Individual control of each valve on all electric valve versions, is via a specially made electric control box with easily identifiable on/off switches for each applicable valve plus a synchronised lift control button for all of the selected control valves. There is also a remote hand pendant control system supplied which can easily be wired to the pump mounted control box. Model HSP24M54 is fitted with two pump mounted, manually operated 4-way valves, which can easily be activated by a single operator. Maximum working pressure of all HSP pumps is 700 Bar with an externally adjustable pressure relief valve for easy pressure adjustment between 70 and 700 Bar. Electric motors are 380/440 volt three phase operation and individual oil outlet flows range from 0.6 to 1.8 litres per minute. A full range of system components is available and detailed on pages 49 to 56.

Model number	Valve configuration	Valve type	Oil Capacity Litres	Oil flow per outlet l/min	Motor voltage	Weight kg
Version with manual control valve						
HSP24M54	2 x 4-way	manual	50	0.9	380 / 440	178
Versions with low voltage (24 V) control valve, control box and pendant						
HSP24E54	2 x 4-way	electric	50	0.9	380 / 440	180
HSP34E104	3 x 4-way	electric	100	1.8	380 / 440	335
HSP44E104	4 x 4-way	electric	100	1.1	380 / 440	274
HSP64E104	6 x 4-way	electric	100	0.9	380 / 440	335
HSP84E104	8 x 4-way	electric	100	0.9	380 / 440	370
HSP104E104	10 x 4-way	electric	100	0.7	380 / 440	414
HSP124E104	12 x 4-way	electric	100	0.6	380 / 440	460

Note: 3-way valve options available on request

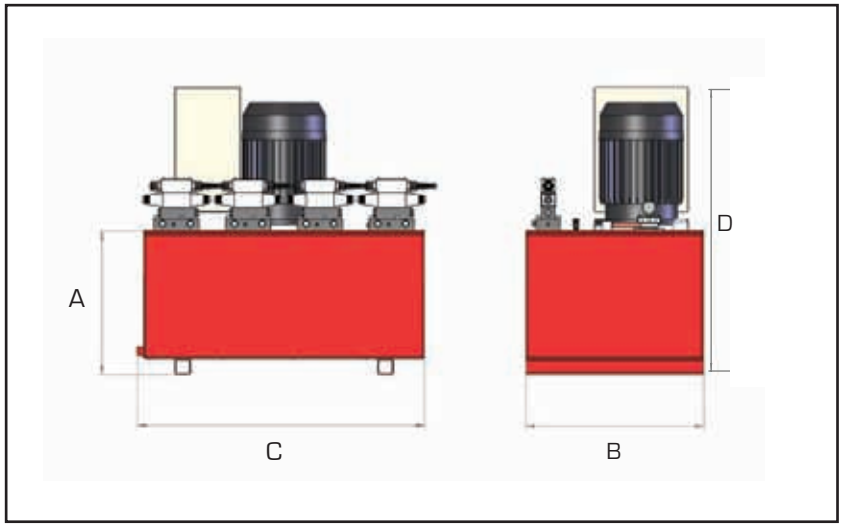
HSP - ELECTRIC DRIVEN SPLIT FLOW PUMPS

Choice of manual or electric valve options

Reservoir capacity 50 or 100 litres

Consistent single speed flow rate

- Working pressure 700 Bar
- Equal output flow regardless of pressure
- Control panel with selector switches for each individual outlet, allowing for single or multiple (synchronised) operation
- Externally adjustable pressure relief valve for control of maximum system pressure
- Customised models are available on request



Model number	Dimensions in mm A	B	C	D
HSP24M54	406	570	640	817
HSP24E54	406	570	640	817
HSP34E104	406	570	1370	867
HSP44E104	459	570	920	867
HSP64E104	406	570	1370	867
HSP84E104	426	700	1020	887
HSP104E104	406	750	1250	867
HSP124E104	406	750	1520	867

AHP11 - AIR DRIVEN SINGLE STAGE HAND OR FOOT OPERATED PUMPS

Working pressure 700 Bar

Operates from standard 7 Bar air supply

Compact, lightweight & powerful

C

The AHP11 single stage air powered hydraulic pump range provides an economical, portable alternative to manually operated hydraulic pumps. Designed to operate from a standard 7 Bar compressed air supply, these versatile compact pumps are ideally suited for use with Hi-Force hydraulic cylinders and tools in maintenance and construction applications. The ergonomically designed pump treadle can be operated by hand or foot for better versatility. With a choice of reservoir capacities, all models are supplied pre-filled with hydraulic oil ready for immediate use. A full range of system components suitable for use with AHP11 series pumps is detailed on pages 49 - 56.

- Choice of 2-way or 4-way control valves
- Internal safety overload valve
- Reservoir oil sight level gauge
- Standard oil reservoir capacities up to 10 litres

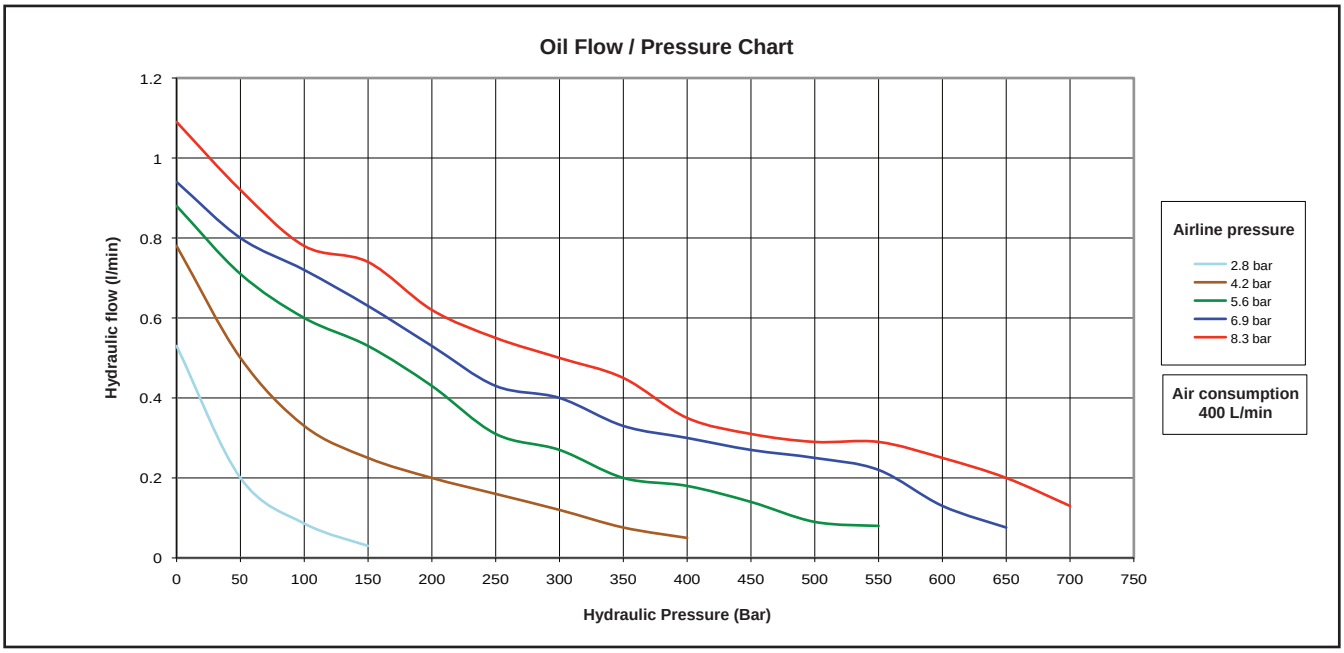
OPTIONAL REMOTE PENDANT:

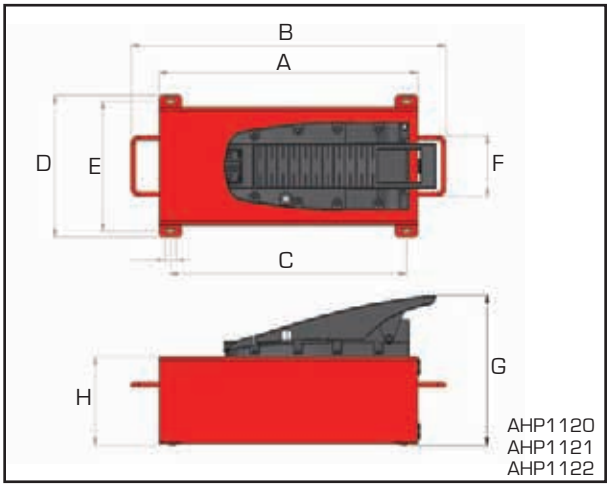
Please suffix model number with 'R' for remote pendant options to suit AHP1120, AHP1121 and AHP1122.

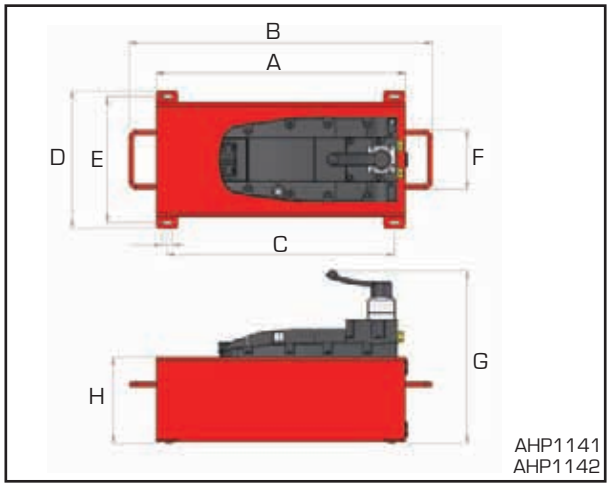
Model number	Maximum pressure bar	Maximum flow rate l/min	Valve type	Usable oil capacity litres	Air inlet connection G	Oil outlet connection NPTF	Weight kg
AHP1120	700	0.8	2-way	2.4	1/4"	3/8"	4.7
AHP1121	700	0.8	2-way	5.0	1/4"	3/8"	9.0
AHP1122	700	0.8	2-way	10.0	1/4"	3/8"	17.8
AHP1141	700	0.8	4-way	5.0	1/4"	3/8"	9.5
AHP1142	700	0.8	4-way	10.0	1/4"	3/8"	18.3

AHP11 - AIR DRIVEN SINGLE STAGE HAND OR FOOT OPERATED PUMPS

- Working pressure 700 Bar
- Operates from standard 7 Bar air supply
- Compact, lightweight & powerful







Model number	Dimensions in mm							
	A	B	C	D	E	F	G	H
AHP1120	365	*	237	157	66-90	*	210	125
AHP1121	420	*	380	240	220	*	223	114
AHP1122	464	560	*	210	*	108	274	158
AHP1141	420	*	380	240	220	*	265	114
AHP1142	464	560	*	210	*	*	315	158

*Not applicable

HAP - AIR DRIVEN PUMPS - GENERAL DUTY HIGH FLOW


HAP21026

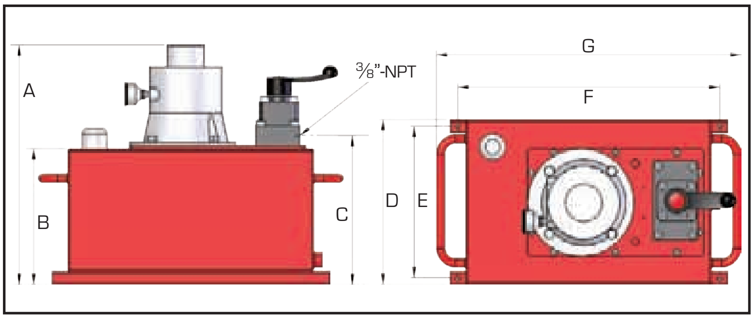
Low pressure flow rate 10 litres/min up to 70 Bar

High pressure flow rate 1.3 litres/min

Working pressure 700 Bar

The HAP two stage air powered hydraulic pump range offers a low pressure flow of 10 litres/min with automatic changeover to 700 Bar high pressure flow rate of 1.3 litres/min. Driven by a powerful 3 kW rotary air motor with a maximum air consumption of 2.4m ^{3}per minute at 7 Bar inlet air pressure, the HAP range offers a choice of pump mounted or remote control valves (page 55) and oil reservoirs all fitted with filler and drain plugs. A full range of system components suitable for use with HAP pump units is detailed on pages 49 - 56.

- Two stage hydraulic pump unit
- Powerful air motor
- Externally adjustable pressure relief valve
- Choice of control valves
- Manual valve with load holding feature fitted as standard



Model number	Valve type	Oil cap. litres	Motor kW	Weight kg	A	B	C	D	E	F	G
HAP21011	P-T Plate	10	3.0	41.5	393	198	230	246	221	368	438
HAP21012	P-T Plate	25	3.0	57.5	422	227	259	306	281	490	570
HAP21014	P-T Plate	40	3.0	71.5	531	336	368	306	281	490	560
HAP21016	P-T Plate	60	3.0	96.5	552	357	389	406	381	513	583
HAP21021	2-way	10	3.0	42.0	393	198	230	246	221	368	438
HAP21022	2-way	25	3.0	58.0	422	227	259	306	281	490	570
HAP21024	2-way	40	3.0	72.0	531	336	368	306	281	490	560
HAP21026	2-way	60	3.0	97.0	552	357	389	406	381	513	583
HAP21031	3-way	10	3.0	42.0	393	198	230	246	221	368	438
HAP21032	3-way	25	3.0	58.0	422	227	259	306	281	490	570
HAP21034	3-way	40	3.0	72.0	531	336	368	306	281	490	560
HAP21036	3-way	60	3.0	97.0	552	357	389	406	381	513	583
HAP21041	4-way	10	3.0	42.0	393	198	230	246	221	368	438
HAP21042	4-way	25	3.0	58.0	422	227	259	306	281	490	570
HAP21044	4-way	40	3.0	72.0	531	336	368	306	281	490	560
HAP21046	4-way	60	3.0	97.0	552	357	389	406	381	513	583

(Columns A–G: Dimensions in mm)

Note: For optional extras, please see page 38

HPP - PETROL ENGINE DRIVEN PUMPS - GENERAL DUTY HIGH FLOW

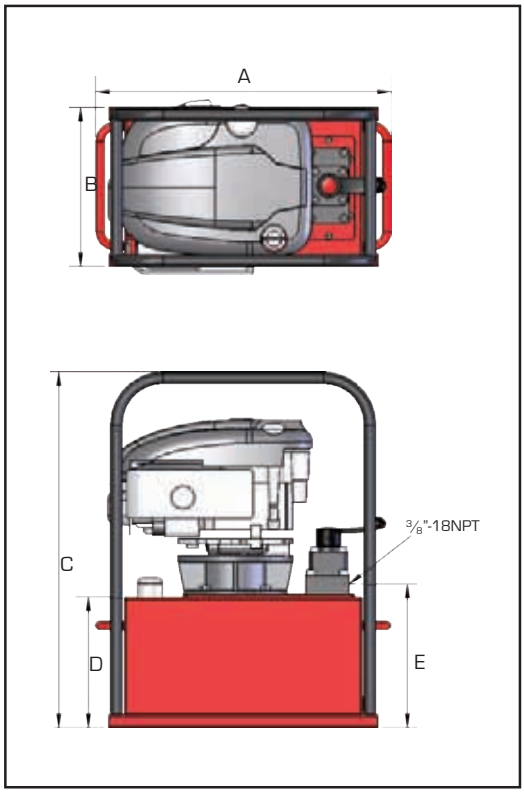

HPP21042

Low pressure flow rate 10 litres/min up to 70 Bar

High pressure flow rate 1.3 litres/min

Working pressure 700 Bar

The HPP range of two stage petrol engine driven hydraulic pumps is ideally suited for applications in locations where there is no electricity or compressed air supply available. The range has similar reservoir and valve options (excluding solenoid valves) as electric and air powered pumps. All models are 700 Bar maximum working pressure and offer a low pressure flow rate of 10 litres/min with automatic changeover to a high pressure flow rate of 1.3 litres/min. Powered by a 3.35 kW rated four stroke engine, the HPP range provides reliable, independent hydraulic power. All models are fitted with a protective roll bar carrying frame for easy transportation and handling. A full range of system components suitable for use with HPP pumps is detailed on pages 49 - 56.



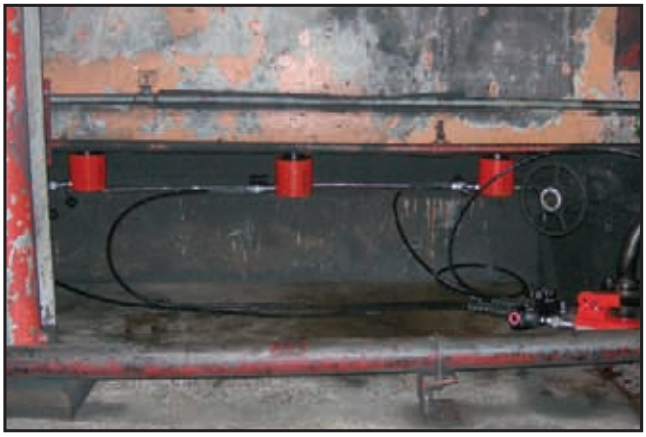
- Two stage hydraulic pump unit
- Powerful 3.35 kW four stroke petrol engine
- Externally adjustable pressure relief valve
- Roll bar protection frame included
- Manual valve with load holding feature fitted as standard

Model number	Valve type	Oil cap. litres	Motor kW	Weight kg	Dimensions in mm A	B	C	D	E
HPP21012	P-T Plate	25	3.35	70.5	570	306	686	227	259
HPP21014	P-T Plate	40	3.35	85.5	560	306	795	336	368
HPP21016	P-T Plate	60	3.35	113.5	583	406	816	357	389
HPP21022	2-way	25	3.35	71.0	570	306	686	227	259
HPP21024	2-way	40	3.35	86.0	560	306	795	336	368
HPP21026	2-way	60	3.35	114.0	583	406	816	357	389
HPP21032	3-way	25	3.35	71.0	570	306	686	227	259
HPP21034	3-way	40	3.35	86.0	560	306	795	336	368
HPP21036	3-way	60	3.35	114.0	583	406	816	357	389
HPP21042	4-way	25	3.35	71.0	570	306	686	227	259
HPP21044	4-way	40	3.35	86.0	560	306	795	336	368
HPP21046	4-way	60	3.35	114.0	583	406	816	357	389

Hi-Force®

PUMP AND CYLINDER SETS

D



PCS - PUMP AND CYLINDER SETS

Working pressure 700 Bar

Capacities from 4.5 to 109 tonnes

Stroke lengths from 10 to 153mm

D

Hi-Force PCS pump and cylinder sets provide the simplest and most cost effective way to start your job immediately. All sets comprise of a Hi-Force hydraulic cylinder (wide choice available), suitable Hi-Force manual pump and a two metre hose with high flow, quick release coupler.

- 18 standard sets
- Cylinders are spring assisted return design
- Manual pumps include factory set relief valve
- Optional piston rod (tilting) saddles are available for most cylinder models (see page 23)

Multi-cylinder sets as well as optional extras to compliment your set, (such as storage boxes and gauges) are detailed on pages 47 & 48.

Set		Pump		Cylinder			Hose		
Model number	Cylinder capacity tonnes	Model number	Capacity litres	Model number	Stroke mm	Closed height mm	Model number	Length metres	Weight kg
PCS50	4.5	HP110	1.0	HPS51	16	42	HC2	2.0	7.4
PCS53	4.5	HP110	1.0	HSS53	75	157	HC2	2.0	8.0
PCS100	10	HP110	1.0	HPS100	10	46	HC2	2.0	8.2
PCS101	10	HP110	1.0	HLS101	40	95	HC2	2.0	9.0
PCS102	10	HP110	1.0	HSS102	56	131	HC2	2.0	9.0
PCS106	10	HP110	1.0	HSS106	150	225	HC2	2.0	10.8
PCS200	20	HP110	1.0	HPS200	11	52	HC2	2.0	9.4
PCS201	20	HP110	1.0	HLS201	44	102	HC2	2.0	11.3
PCS256	25	HP110	1.0	HSS256	150	273	HC2	2.0	16.0
PCS300	32	HP110	1.0	HPS300	12	59	HC2	2.0	10.8
PCS302	32	HP110	1.0	HLS302	60	119	HC2	2.0	13.6
PCS502	50	HP110	1.0	HLS502	60	126	HC2	2.0	17.0
PCS506	50	HP232	2.0	HSS506	152	251	HC2	2.0	31.0
PCS1002	109	HP232	2.0	HLS1002	60	143	HC2	2.0	35.5
PCS1006	109	HP252	5.0	HSS1006	153	274	HC2	2.0	66.0
PCS202H	23	HP110	1.0	HHS202	50	160	HC2	2.0	13.9
PCS302H	33	HP110	1.0	HHS302	50	165	HC2	2.0	17.2
PCS603H	61	HP232	2.0	HHS603	76	226	HC2	2.0	34.6

Note : Models PCS202H, PCS302H & PCS603H are supplied with a hollow piston cylinder.

PCM - PUMP AND MULTIPLE CYLINDER SETS


PCM902

Each kit includes multiple cylinders

Working pressure 700 Bar

Capacities from 4.5 to 50 tonnes

Hi-Force PCM pump and multiple cylinder sets provide a complete lifting or pushing system. All sets comprise of a number of Hi-Force hydraulic cylinders, a suitable Hi-Force manual pump, two metre hose(s) with high flow, quick release coupler and all required system components (as applicable) to build your complete hydraulic system.

- 6 standard sets
- Cylinders are spring assisted return design
- Manual pumps include factory set relief valve
- Optional piston rod (tilting) saddles are available for most cylinder models (see page 23)

Set	Pump		Cylinders included				Hose(s)			System components		
	Qty	Model	Qty	Model	Cap	Stroke	Qty	Model	Length	Qty	Model	Description
PCM901	1	HP212	1	HLS101	10t	40mm	1	HC2	2m			
			1	HLS201	20t	44mm				-	-	-
			1	HLS302	32t	60mm						
PCM902	1	HP212	1	HPS51	4.5t	16mm	1	HC2	2m			
			1	HPS100	10t	10mm				-	-	-
			1	HPS200	20t	11mm						
			1	HPS300	32t	12mm				-	-	-
			1	HPS500	50t	15mm						
PCM903	1	HP212	2	HPS200	20t	11mm	2	HC2	2m	1	HF17	Adaptor
										1	HM2C	Manifold
PCM904	1	HP232	4	HLS302	32t	60mm	4	HC2	2m	1	HF17	Adaptor
										1	HM4C	Manifold
PCM905	1	HP232	4	HLS502	50t	60mm	4	HC2	2m	1	HF17	Adaptor
										1	HM4C	Manifold
PCM906	1	HP232	4	HSS256	25t	150mm	4	HC2	2m	1	HF17	Adaptor
										1	HM4C	Manifold

Note: All manifolds are controlled versions with needle valves on each outlet port for precise control of the cylinder(s).

PCS & PCM OPTIONAL EXTRAS

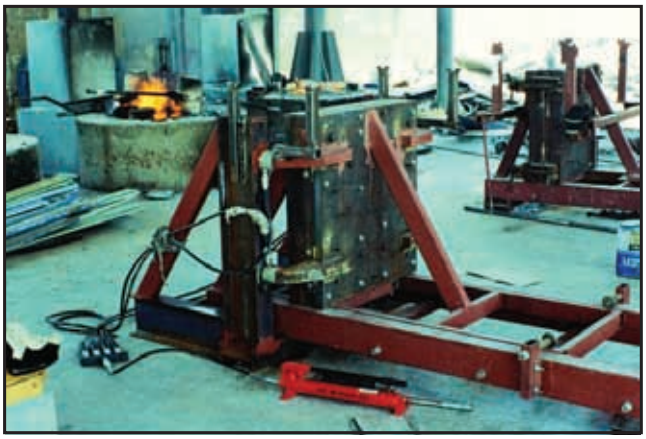
Metal storage and transport box

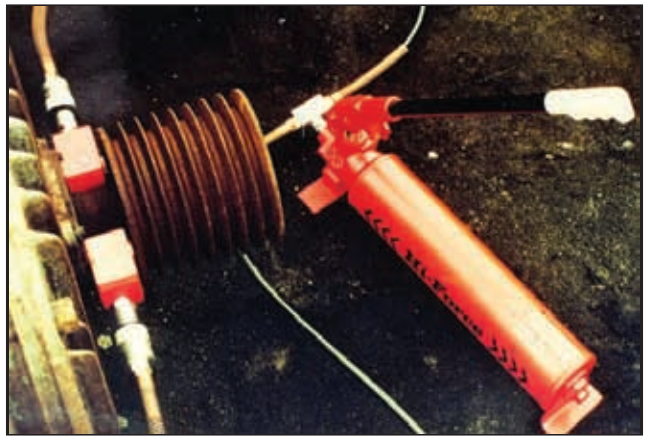
Model	Dimensions in mm Length	Width	Height	For set
FSB1	640	360	150	PCS50 to PCS502, PCM901 and PCM902
MSB1	890	300	210	PCS506 to PCS603H, PCM903 to PCM906

Gauge and gauge block kit

Model	Description
HG1K	100mm dry gauge 0-700 Bar / 0-10000 PSI and gauge mounting block
HG63K	63mm glycerine filled gauge 0-700 Bar / 0-10000 PSI and gauge mounting block

Subsitute the manual hydraulic pump for an electric driven or air driven pump.
Contact your local dealer or regional office for more information.





Hi-Force®

SYSTEM COMPONENTS

E

HIGH PRESSURE HYDRAULIC HOSES - BLACK

Working pressure 700 Bar

4:1 Factor of safety

Special lengths available on request

E

Hi-Force high pressure hydraulic hoses provide the vital, high quality, safe connection for your hydraulic equipment. Available in black and red and supplied complete with an ergonomically designed protective strain reliever at both ends, Hi-Force high pressure hoses are suitable for working pressures up to 700 Bar with a 4 : 1 factor of safety.

Tip for double acting systems ...

By using black hoses for the advance lines and red hoses (see next page) for the retract lines, identification is made easy and the possibility of incorrectly connected hoses is reduced.

Hose bore is 6.6mm and outside diameter is 12.7mm for all models:

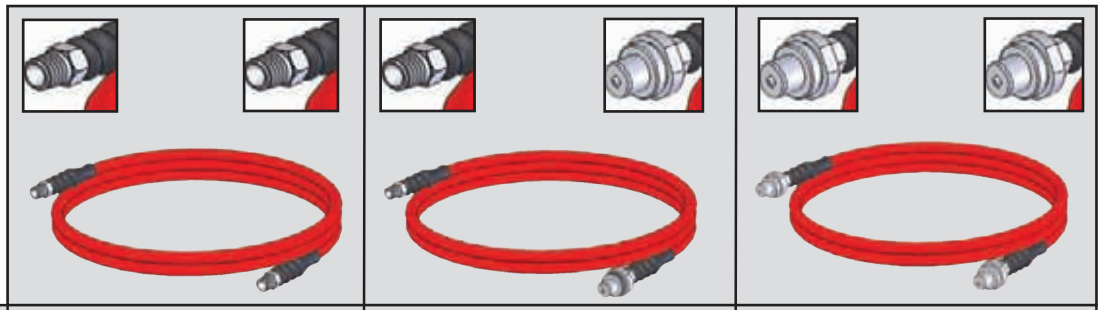
Length Metres	No couplers 3/8" - 18 NPT male fittings both ends	3/8"- 18 NPT male fitting one end with CM1 coupler fitted one end	CM1 male couplers fitted both ends
0.5	HH0.5	HC0.5	HC0.5C
1.0	HH1	HC1	HC1C
2.0	HH2	HC2	HC2C
3.0	HH3	HC3	HC3C
4.0	HH4	HC4	HC4C
5.0	HH5	HC5	HC5C
6.0	HH6	HC6	HC6C
10.0	HH10	HC10	HC10C
12.0	HH12	HC12	HC12C
15.0	HH15	HC15	HC15C
20.0	HH20	HC20	HC20C
25.0	HH25	HC25	HC25C
30.0	HH30	HC30	HC30C

HIGH PRESSURE HYDRAULIC HOSES - RED


HC10R

- Choice of hose end combinations
- Hand grip protective strain relievers
- Plastic protective end caps included

Hose bore is 6.6mm and outside diameter is 12.7mm for all models:



Length Metres	No couplers 3/8" - 18 NPT male fittings both ends	3/8"- 18 NPT male fitting one end with CM1 coupler fitted one end	CM1 male couplers fitted both ends
0.5	HH0.5R	HC0.5R	HC0.5CR
1.0	HH1R	HC1R	HC1CR
2.0	HH2R	HC2R	HC2CR
3.0	HH3R	HC3R	HC3CR
4.0	HH4R	HC4R	HC4CR
5.0	HH5R	HC5R	HC5CR
6.0	HH6R	HC6R	HC6CR
10.0	HH10R	HC10R	HC10CR
12.0	HH12R	HC12R	HC12CR
15.0	HH15R	HC15R	HC15CR
20.0	HH20R	HC20R	HC20CR
25.0	HH25R	HC25R	HC25CR
30.0	HH30R	HC30R	HC30CR

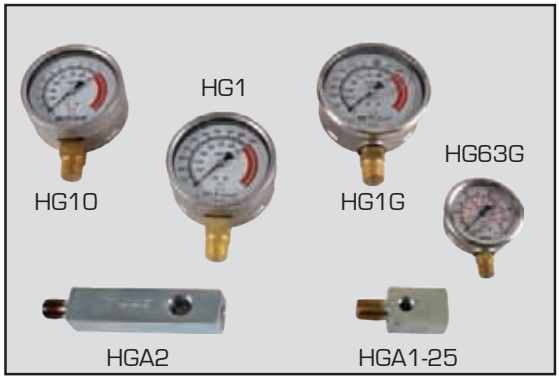
HYDRAULIC OIL


HF046-5 HF032-1

Hi-Force premium grade hydraulic oil is specially formulated for use with Hi-Force hydraulic tools, providing optimum performance throughout all working conditions.

Model number	Capacity litres	For use with
HF032-1	1	Manually operated pumps
HF032-5	5	Manually operated pumps
HF032-25	25	Manually operated pumps
HF046-1	1	Powered pumps
HF046-5	5	Powered pumps
HF046-25	25	Powered pumps

PRESSURE GAUGES & GAUGE MOUNTING BLOCKS



- Clear precise dual scale readings
- Manufactured to EN837-1
- Calibration certificates on request

Hi-Force hydraulic pressure gauges are your "window" to the system and are recommended for use within all hydraulic systems to allow the user to constantly monitor the system pressure. Hi-Force hydraulic pressure gauges are manufactured to EN837-1 and are accurate to +/- 1% of full scale. Standard range models up to 109 tonnes are featured in this catalogue, however gauges to suit Hi-Force high tonnage cylinders & digital pressure gauges are available on request. Always specify Hi-Force pressure gauges for use with your Hi-Force hydraulic tools.

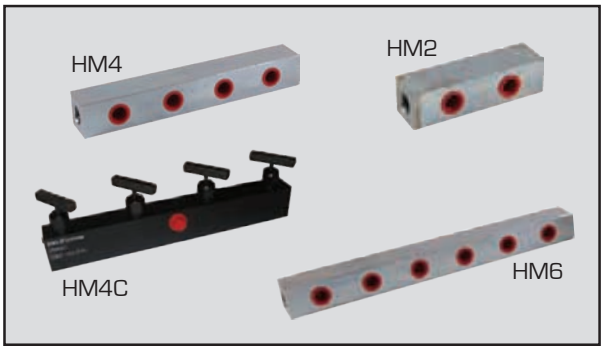
Gauges :

Model number	Gauge diameter mm	Gauge type	Reading Inner scale	Reading Outer scale	Inlet thread	Compatible Hi-Force cylinders	Weight kg
HG63G	63	glycerine	0-700 Bar	0-10.000 Psi	¼"-18NPT	All models	0.2
HG1	100	dry	0-700 Bar	0-10.000 Psi	½"-14NPT	All models	0.9
HG1G	100	glycerine	0-700 Bar	0-10.000 Psi	½"-14NPT	All models	1.0
HG5	100	dry	0-700 Bar	0-4.5 tonnes	½"-14NPT	All 4.5 tonnes models	0.9
HG10	100	dry	0-700 Bar	0-10 tonnes	½"-14NPT	All 10 tonnes models	0.9
HG11	100	dry	0-700 Bar	0-11 tonnes	½"-14NPT	All 11 tonnes models	0.9
HG20	100	dry	0-700 Bar	0-20 tonnes	½"-14NPT	All 20 tonnes models	0.9
HG23	100	dry	0-700 Bar	0-23 tonnes	½"-14NPT	All 23 tonnes models	0.9
HG25	100	dry	0-700 Bar	0-25 tonnes	½"-14NPT	All 25 tonnes models	0.9
HG32	100	dry	0-700 Bar	0-32 tonnes	½"-14NPT	All 32 tonnes models	0.9
HG33	100	dry	0-700 Bar	0-33 tonnes	½"-14NPT	All 33 tonnes models	0.9
HG50	100	dry	0-700 Bar	0-50 tonnes	½"-14NPT	All 50 tonnes models	0.9
HG61	100	dry	0-700 Bar	0-61 tonnes	½"-14NPT	All 61 tonnes models	0.9
HG102	100	dry	0-700 Bar	0-102 tonnes	½"-14NPT	All 102 tonnes models	0.9
HG109	100	dry	0-700 Bar	0-109 tonnes	½"-14NPT	All 109 tonnes models	0.9
HG2	150	dry	0-700 Bar	0-10.000 Psi	½"-14NPT	All models	1.6
HG2G	150	glycerine	0-700 Bar	0-10.000 Psi	½"-14NPT	All models	1.7

Gauge mounting blocks :

	Dimensions						
Model number	Length mm	Width mm	Height mm	Gauge thread	Inlet thread	Outlet thread	Weight kg
HGA1	75	32	32	½"-14NPT	⅜"-18NPT male	⅜"-18NPT female	0.25
HGA2	170	32	32	½"-14NPT	⅜"-18NPT male	⅜"-18NPT female	0.85
HGA1-25	75	32	32	¼"-18NPT	⅜"-18NPT male	⅜"-18NPT female	0.30
HGA2-25	170	32	32	¼"-18NPT	⅜"-18NPT male	⅜"-18NPT female	0.90

MANIFOLDS



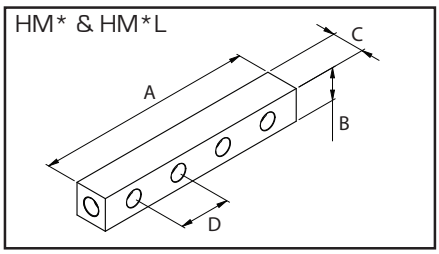
Working pressure 700 Bar

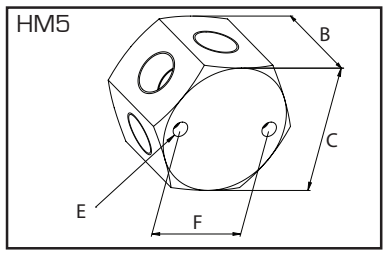
Choice of open or controlled manifolds

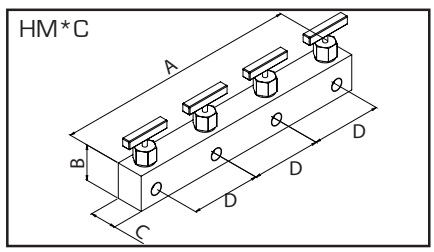
2, 4, 5, 6 or 8 outlet port models available

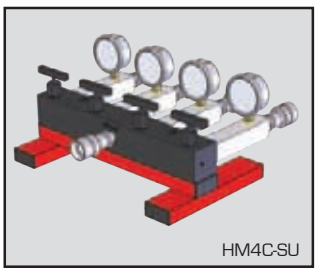
Hi-Force manifolds are designed specifically to allow easy control of the direction of flow of the hydraulic fluid within the system. Supplied either as open manifold blocks or with individual needle type shut off/throttle valves on each 3/8" NPT outlet, Hi-Force manifolds provide even greater versatility in your hydraulic system. The range offers 9 models with a choice of up to 8 outlets per manifold and all models are suitable for 700 Bar maximum working pressure.

Model number	Type	Design	Number of outlets	Female Threads Inlet	Female Threads Outlet	Weight kg	Dimensions in mm A	B	C	D	E	F
HM2	manifold	parallel	2	3/8"-18NPT	2 x 3/8"-18NPT	1.0	114	32	32	50	-	-
HM4	manifold	parallel	4	3/8"-18NPT	4 x 3/8"-18NPT	1.5	214	32	32	50	-	-
HM5	manifold	hexagon	5	3/8"-18NPT	5 x 3/8"-18NPT	0.7	-	41	51	-	M6	38
HM6	manifold	parallel	6	3/8"-18NPT	6 x 3/8"-18NPT	2.0	314	32	32	50	-	-
HM8	manifold	parallel	8	3/8"-18NPT	8 x 3/8"-18NPT	2.5	414	32	32	50	-	-
HM4L	manifold	extended parallel	4	3/8"-18NPT	4 x 3/8"-18NPT	2.4	394	32	32	110	-	-
HM6L	manifold	extended parallel	6	3/8"-18NPT	6 x 3/8"-18NPT	3.7	614	32	32	110	-	-
HM2C	controlled manifold	parallel	2	3/8"-18NPT	2 x 3/8"-18NPT	2.0	150	51	38	100	-	-
HM4C	controlled manifold	parallel	4	3/8"-18NPT	4 x 3/8"-18NPT	3.5	350	51	38	100	-	-

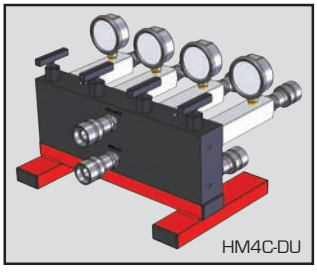







HM4C-SU

Model no.	Description
HM4C-SU	4-Way controlled manifold unit, suitable for single acting systems. Supplied complete with four pressure gauges, reading 0-700 bar, female coupler on inlet port and four female couplers on outlet ports. All mounted on a sturdy framework.


HM4C-DU

Model no.	Description
HM4C-DU	4-Way controlled manifold unit, suitable for double acting systems. Supplied complete with four pressure gauges, reading 0-700 bar, female coupler on inlet port and four female couplers on outlet ports. Also included is a 4-way open manifold for return flow, again with female couplers on inlet and outlet ports. All mounted on a sturdy framework.

HIGH PRESSURE COUPLERS AND FITTINGS

Hi-Force high pressure couplers and fittings are designed for easy system connection and assembly of your Hi-Force hydraulic equipment. All Hi-Force couplers and fittings are suitable for 700 Bar maximum working pressure. Hi-Force recommends the use of threaded dust caps with quick connect couplers to protect the thread of the coupler and at the same time prevent any contaminants entering your hydraulic system. Always specify Hi-Force couplers and fittings for use with your Hi-Force hydraulic tools.

Safety first !

Be sure to use genuine Hi-Force couplers and fittings which are designed to withstand the full 700 bar working pressure.

Large selection of standard adaptors

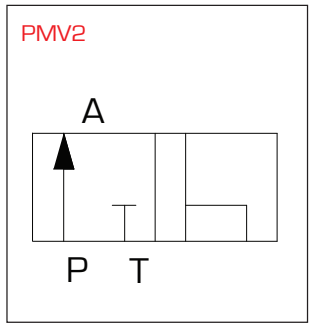
Working pressure 700 Bar

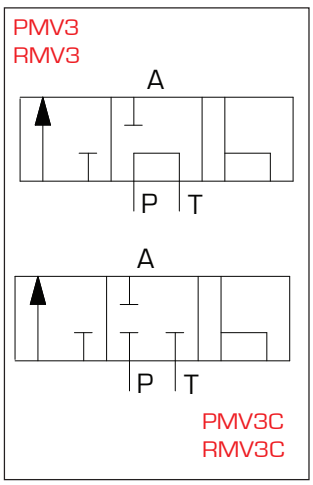
Model number	See picture	Description	Thread specification
HF7	1	Nipple	¼" NPT male to ¼" NPT male
HF8	5	Adaptor	¼" NPT female to ¼" NPT female
HF10	2	Elbow	⅜" NPT female to ⅜" NPT female
HF12	3	Equal tee	⅜" NPT female
HF13	4	Cross	⅜" NPT female
HF14	5	Adaptor	⅜" NPT female to ⅜" NPT female
HF15	5	Reducer	⅜" NPT female to ¼" NPT female
HF16	6	Elbow	⅜" NPT female to ⅜" NPT male
HF17	1	Nipple	⅜" NPT male to ⅜" NPT male
HF19	1	Long nipple	⅜" NPT male to ⅜" NPT male
HF24	7	Adaptor	⅜" NPT male to ⅜" BSP female
HF27	1	Nipple	¼" NPT male to ⅜" NPT male
HF30	7	Reducer	⅜" NPT male to ¼" NPT female
HF31	8	Tee	⅜" NPT female to ⅜" NPT male
HF33	7	Reducer	⅜" NPT male to ¼" BSPT female
HF55	7	Reducer	⅜" NPT female to ¼" NPT male
HF69	7	Adaptor	½" BSP male to ⅜" NPT female
CF1	9	Female coupler	⅜" NPT male
CM1	10	Male coupler	⅜" NPT female
CMF1	9 + 10	Complete coupler	⅜" NPT
CF2	9	Female coupler	¼" NPT male
CM2	10	Male coupler	¼" NPT female
CMF2	9 + 10	Complete coupler	¼" NPT
CFD1	11	Metal dust cap for CF1	
CMD1	12	Metal dust cap for CM1	
CFD2	11	Metal dust cap for CF2	
CMD2	12	Metal dust cap for CM2	
PPC1	13	Moulded universal dust cap to suit CF1 & CM1	

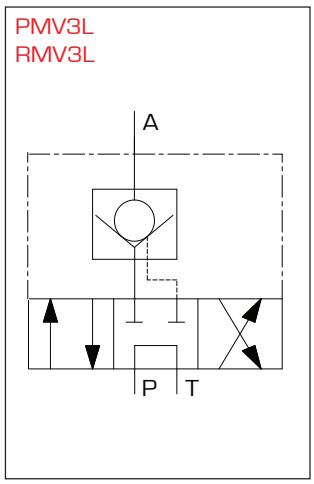
DIRECTIONAL CONTROL VALVES

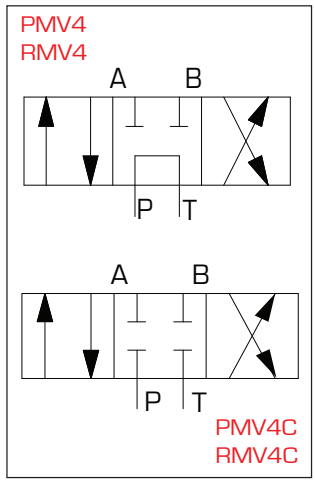
- Working pressure 700 Bar
- Pump or remote mounted design
- Manual or solenoid options available

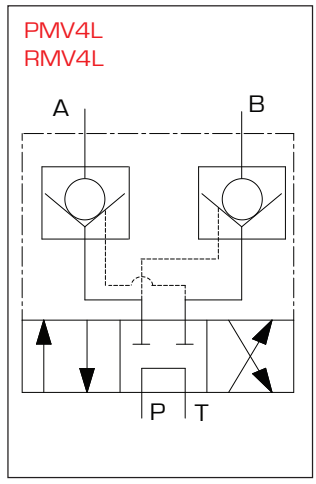
Hi-Force control valves are designed to provide precise control of the hydraulic system either by accurate pressure or directional flow control. The PMV range of pump mounted valves is identical to the valves fitted to the Hi-Force powered pumps featured on pages 35 - 37, 39 - 40, 43, 44 and can be easily interchanged, making your powered pump even more versatile. The RMV range allows for remote mounting away from the pump. Always specify Hi-Force control valves for use with your Hi-Force hydraulic tools. Flow control values are featured on the next page.







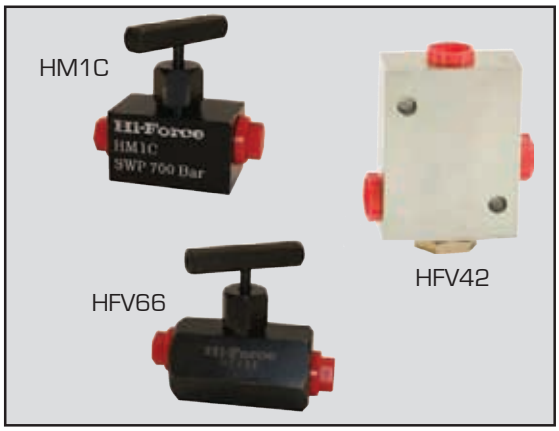




Directional control valves :

Description	Model number			
	Manual valve no load holding	Manual valve with load holding	Solenoid valve 24V incl. control	Manual valve closed centre
Pump mounted, 2-way, 2 position valve	**PMV2**	-	-	-
Pump mounted, 3-way, 3 position valve	**PMV3**	**PMV3L**	**PMV3S**	**PMV3C**
Pump mounted, 4-way, 3 position valve	**PMV4**	**PMV4L**	**PMV4S**	**PMV4C**
Remote mounted, 3-way, 3 position valve	**RMV3**	**RMV3L**	**RMV3S**	**RMV3C**
Remote mounted, 4-way, 3 position valve	**RMV4**	**RMV4L**	**RMV4S**	**RMV4C**

FLOW CONTROL VALVES

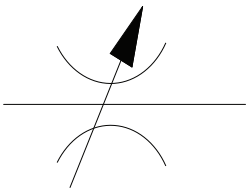


Working pressure 700 Bar

3/8" 18 NPT connections

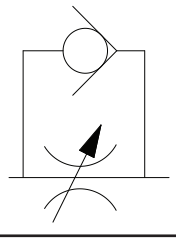
Ensures system safety and control

E


HM1C

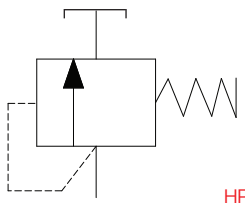
Manual shut off valve with needle type flow control. Used for load holding and throttling functions. Can also be used as a gauge isolator.

Model Number	Dimensions in mm Height	Length	Width
HM1C	82	64	38


HFV66

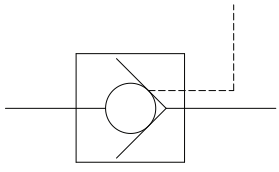
Manual check valve used for automatic load locking, with precise manual load lowering feature.

Model Number	Dimensions in mm Height	Length	Width
HFV66	86	75	47


HPV152

Adjustable pressure relief valve, for pressure setting from 55 to 700 Bar. Supplied complete with return line hose.

Model Number	Dimensions in mm Height	Length	Width
HPV152	102	64	32


HFV42

Pilot operated check valve used as a safety valve for double acting cylinders. Pilot port connects to cylinder retract line.

Model Number	Dimensions in mm Height	Length	Width
HFV42	84	64	32

Hi-Force®

JACKS

F

JAH & JAS - ALUMINIUM JACKS

Capacities from 10 to 60 tonnes

Stroke lengths from 75 to 305mm

Internal safety overload device

The JAH and JAS ranges of lightweight aluminium jacks offers a wide variety of capacities and lift height options. Available as either plain ram lifting jacks, with or without "failsafe" mechanical lock ring, or optional low height claw lifting design, all models are constructed predominantly of lightweight aluminium alloy with all critical functioning parts manufactured from high quality steel. Used extensively in maintenance, construction, heavy plant and machinery applications, these high quality jacks are the proven industry standard.

F

- Lightweight construction
- Stroke limiting device
- Available as plain ram jack, claw jack or "failsafe" locking ring design

Model number	Jack capacity tonnes	Claw capacity tonnes	Stroke mm	Weight kg	Dimensions in mm Closed height	Toe height	Base length	Base width
Jack with plain piston								
JAS103	10	-	75	4.3	131	-	162	75
JAS105	10	-	125	5.7	181	-	162	75
JAH620	20	-	152	11	263	-	178	121
JAH1220	20	-	305	17	438	-	246	121
JAH630	30	-	152	16	263	-	203	140
JAH1230	30	-	305	24	451	-	273	140
JAH660	60	-	152	28	293	-	251	190
JAH1260	60	-	305	44	500	-	342	190
Jack with plain piston & lifting claw & with extended base								
JAH620C	20	8	152	15	280	67	246	121
JAH1220C	20	8	305	23	456	67	246	121
JAH630C	30	12	152	21	281	73	273	140
JAH1230C	30	12	305	32	472	73	273	140
JAH660C	60	24	152	44	327	73	342	190
JAH1260C	60	24	305	65	540	73	342	190
Jack with "failsafe" locking ring								
JAH620SR	20	-	152	13	289	-	178	121
JAH1220SR	20	-	305	19	464	-	246	121
JAH630SR	30	-	152	17	292	-	203	140
JAH1230SR	30	-	305	25	479	-	273	140
JAH660SR	60	-	152	30	330	-	251	190
JAH1260SR	60	-	305	46	536	-	342	190

Note: JAS103 and JAS105 feature spring assisted piston retraction.

Hi-Force®

JCS - STEEL COMPACT JACKS - SOLID PISTON


JCS10

Capacities from 10 to 30 tonnes

Operate in any position

Lightweight and compact

The Hi-Force JCS range of compact jacks is ideally suited for applications requiring a lifting or positioning force in confined spaces. Lightweight, easy to operate and manufactured from high grade steel, all models incorporate a spring assisted return, wear coated piston. The pumping mechanism rotates through 360° providing maximum versatility in any application. With the removable operating handle measuring only 240mm in length, these compact lifting jacks will fit in any toolbox.

- Spring assisted return piston
- Multi-position pump mechanism
- Internal safety overload valve
- Nitrocarburised piston rod
- Sealed hydraulic system

F

Model number	Capacity tonnes	Stroke mm	Weight kg	Dimensions in mm Length	Closed Height	Piston Dia.	Max handle height	Width
JCS10	10	35	4.5	240	76	38	266	70
JCS20	20	41	7.5	257	96	51	271	90
JCS30	30	45	8.8	281	107	51	281	100

JCH - STEEL COMPACT JACKS - HOLLOW PISTON


JCH13

Capacity of 13 and 21 tonnes

Operate in any position

Lightweight and compact

The JCH range of compact jacks is of similar design to the JCS range detailed above, however JCH models feature a hollow piston design for even greater versatility. Suitable for use in tooling, maintenance and tensioning applications, the hollow piston centre hole design allows a rod or cable to be passed through the jack for applications where a pulling force is required. With many common parts to the JCS range these multi-purpose JCH jacks can also be used for general lifting applications.

Model number	Capacity tonnes	Stroke mm	Weight kg	Dimensions in mm Length	Closed Height	Piston Dia.	Max handle height	Centre Hole	Width
JCH13	13	41	7.5	257	99	51	271	25	90
JCH21	21	45	8.8	281	110	51	281	30	100

JSS - STEEL BOTTLE JACKS

- Capacities from 3 to 100 tonnes
- Strong rigid steel construction
- Suitable for industrial and automotive use

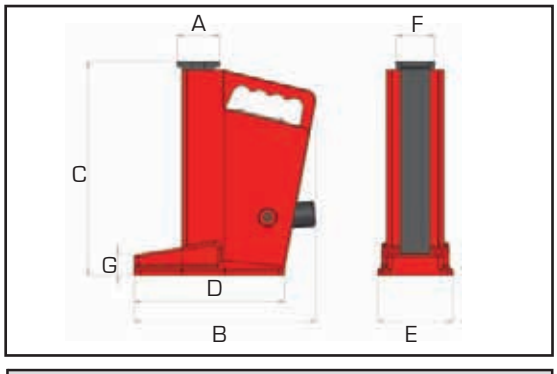
The Hi-Force JSS range of steel bottle jacks offers capacities from 3 to 100 tonnes, with stroke lengths from 135 to 195mm. Models up to 16 tonnes capacity feature a screw extension to span the gap between the piston ram cap and the load. All models are supplied with a tubular operating lever.

Model number	Capacity tonnes	Stroke mm	Screw extension mm	Weight kg	Dimensions in mm Closed height	Piston diameter	Base length	Base width
JSS35	3	135	70	3.0	195	28	118	100
JSS55	5	135	90	4.0	200	32	122	107
JSS106	10	174	90	7.0	243	43	135	130
JSS166	16	178	95	10.0	255	53	160	150
JSS207	20	190	-	15.0	280	56	120	165
JSS327	32	190	-	22.0	285	71	152	190
JSS507	50	195	-	32.0	300	85	177	217
JSS1007	100	195	-	69.0	340	117	265	240

HCJ - STEEL TOE JACK

- Capacity 5 tonnes
- Strong rigid steel construction
- Toe guided over full stroke length

The Hi-Force HCJ5 toe jack offers a full 5 tonnes capacity either on the piston head or the fully integrated toe. The low height toe is guided over the full stroke length of the jack, reducing the effects of side loading. The piston is enclosed within the toe and is not exposed during operation. These features make the HCJ5 a truly multi-purpose jack which can easily and safely be used in the most difficult conditions, including underground mining applications.



Model number	Jack capacity tonnes	Toe capacity tonnes	Stroke mm	Weight kg	Dimensions in mm A	B	C	D	E	F	G
HCJ5	5	5	175	18	64	255	327	219	114	57	41

HMJ - STEEL MACHINE LIFT JACKS

HMJ10

Capacities of 10 and 25 tonnes

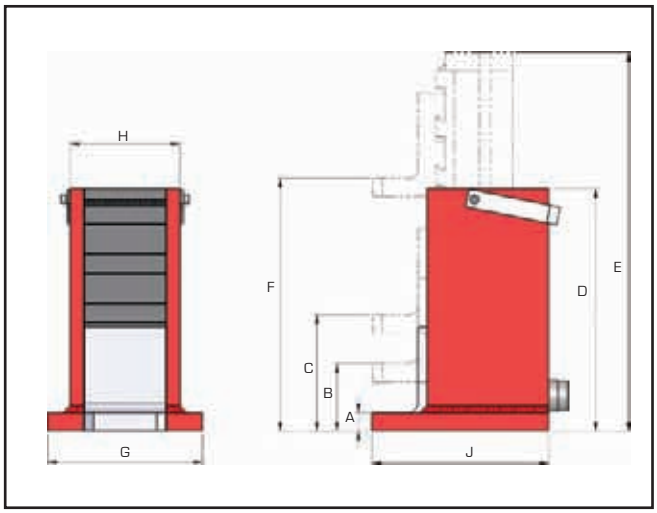
Working pressure 700 Bar

Minimum toe height as low as 21mm

F

The HMJ range of hydraulic machine lifting jacks are designed specifically for lifting heavy equipment and machinery where a minimum low height lifting access point is available. The low height lifting toe is precision guided throughout its lifting stroke to reduce friction and prevent the hydraulic cylinder from potential side loading. Both models are 700 Bar maximum working pressure and incorporate a 150mm hydraulic lift with a lifting toe, which can be preset at three different initial lifting positions, for even greater flexibility. Suitable manual or powered pumps for use with HMJ jacks can be found on pages 25 to 44 of this catalogue.

- Multi-position lifting toe
- Remote operation gives improved operator safety
- Stroke length 150mm
- Can be used for simultaneous multiple lift point applications
- See pages 25 to 44 for compatible pumps
- See pages 49 to 56 for system components



Model number	Capacity Toe tonnes	Capacity Head tonnes	Stroke mm	Weight kg	Dimensions in mm A	B	C	D	E	F	G	H	J
HMJ10	10	10	150	22.6	21	75	129	267	417	279	172	122	196
HMJ25	25	25	150	37.2	30	108	186	315	465	336	202	152	226

HYDRAULIC JACK APPLICATIONS

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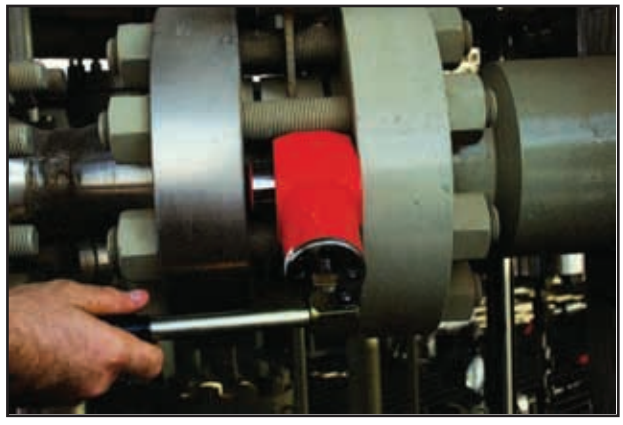

Hi-Force®

TORQUE TOOLS

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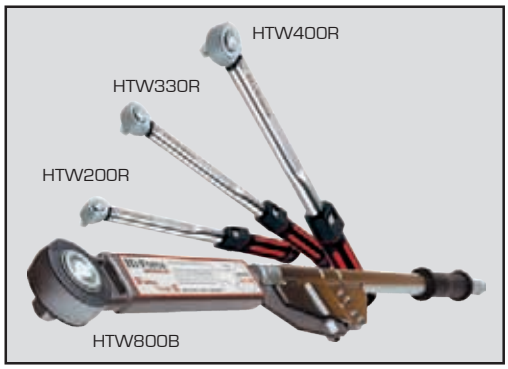
HTW - MANUAL TORQUE WRENCHES



Torque capacities up to 1500 Nm

Repeatable accuracy

Dual scale Nm & lbf. ft.

The HTW range of industrial manual torque wrenches offers 10 models with torque capacities from 8 to 1500 Nm (5 to 1000 lbf. ft) with square drive sizes from 3/8" to 1". All models are designed and manufactured to meet or exceed the highest demands of industry and are marked with a unique serial number and supplied with a calibration certificate. All models are ideally suited for applications requiring repeatable, accurate torquing of bolts and nuts. The push-through square drive allows the wrench to be used for torque control in both clockwise and anti-clockwise directions.
The HTW-R models incorporate a soft feel grip and integrated locking mechanism to prevent accidental alteration of the torque setting during operation. The click system is activated immediately the required torque is achieved. The HTW-B break-back type models provide a large break angle, to prevent the possibility of over torquing. The cam control of the internal mechanism will ensure a controlled "break" which will reduce the risk of the operator losing balance. All wrenches automatically reset when the hand pressure is released.

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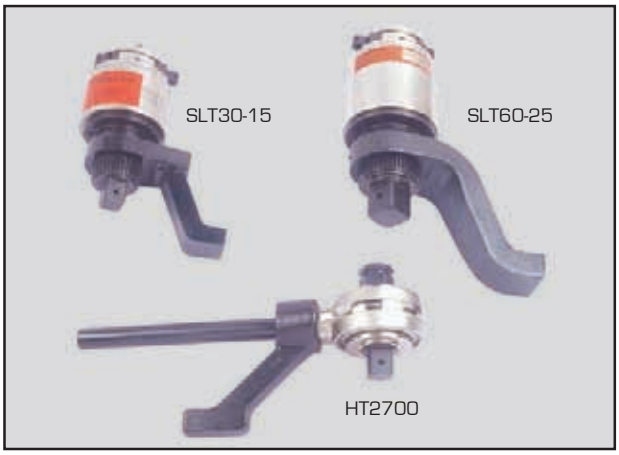
- Heavy duty ratchet head
- Accuracy +/- 3% (HTW-R models)
- Accuracy +/- 4% (HTW-B models)
- Push-through square drive
- Supplied with calibration certificate
- Complete with carrying & storage case

Need a higher torque capacity .....

Please check our manual torque multipliers on pages 65 & 66. Alternatively see our pneumatic torque multipliers and hydraulic torque wrenches, as featured on pages 67 to 78.

Model number	Square drive	Torque range Nm	Torque range lbf. ft	Length mm	Ratchet head dia mm	Weight kg
HTW60R	3/8"	8 - 60	5 - 45	312	35	0.6
HTW100R	1/2"	20 - 100	15 - 80	359	40	0.8
HTW200R	1/2"	40 - 200	30 - 150	442	42	1.0
HTW330R	1/2"	60 - 330	45 - 220	683	49	1.5
HTW400R	3/4"	80 - 400	60 - 300	683	49	2.1
HTW500B	3/4"	100 - 500	70 - 350	910	70	5.2
HTW800B	3/4"	200 - 800	150 - 600	1250	70	6.4
HTW1000B	3/4"	300 - 1000	200 - 750	1475	70	7.3
HTW1500B	3/4"	700 - 1500	500 - 1000	1475	70	10.4
HTW1800B	1"	700 - 1500	500 - 1000	1475	70	10.4

HT & SLT - MANUAL TORQUE MULTIPLIERS



Torque capacities up to 6000 Nm

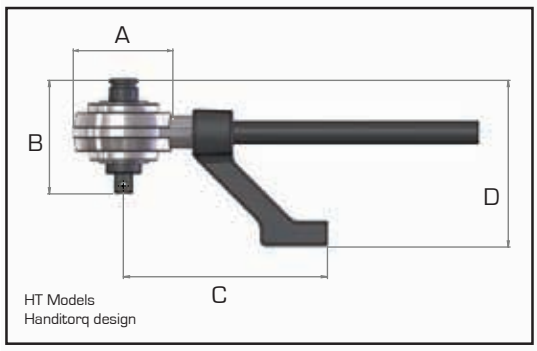
Choice of two different designs

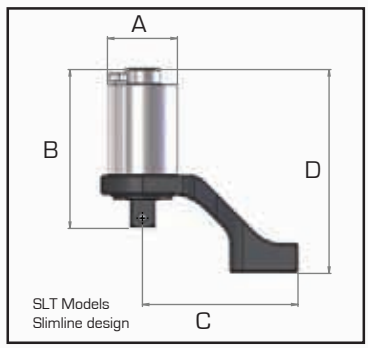
Supplied complete with reaction foot

Hi-Force Handitorq (HT range) manual torque multipliers provide a true 5:1 torque multiplication with repeatable accuracy of +/- 4%. A choice of two models, with output torque capacities of 1300 Nm and 2700 Nm are available, each supplied with two different reaction bar designs for maximum versatility. Supplied in a handy plastic storage case the Handitorq series multiplier is ideal for inclusion in the heavy vehicle tool kit.

Hi-Force Slimline (SLT range) manual torque multipliers offer comparable output torque capacities to standard diameter torque multipliers but with the added advantage of a slimline body design, particularly suited for bolt tightening applications on pipeline flanges. The range offers 5 models all with an adjustable spline type reaction foot which allows for various lengths of sockets to be used. All models have an anti-wind up ratchet fitted as standard, which retains all of the wind-up forces as they are created, providing a greater level of safety and ease of operation. Output torque capacities range from 2000 Nm to 6000 Nm with multiplication ratios of 15:1, 25:1 and 75:1 available. Recommended Hi-Force manual torque wrenches for use with Hi-Force manual torque multipliers are detailed on page 64 of this catalogue.

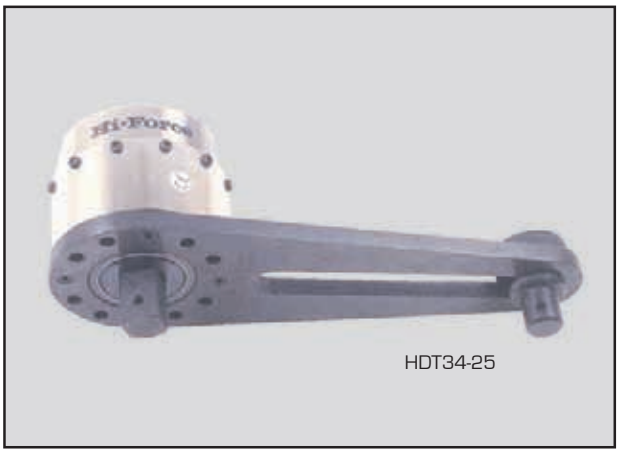
- Compact with true torque multiplication
- Output square drives from ¾" to 1½"
- Anti-wind up ratchet on all SLT models





Model Number	Maximum torque capacity Nm	lbf.ft	Multi-plication ratio	Input square drive	Output square drive	Recom. torque wrench	Weight kg	Dimensions in mm A	B	C	D
HT1300	1300	960	5:1	½"	¾"	**HTW330R**	7.1	108	126	210	180
HT2700	2700	2000	5:1	¾"	1"	**HTW800B**	7.1	108	129	210	186
SLT20-25	2000	1450	25:1	½"	1"	**HTW200R**	4.5	72	166	143	197
SLT30-15	3000	2200	15:1	½"	1"	**HTW200R**	9.0	108	224	141	256-285
SLT30-25	3000	2200	25:1	½"	1"	**HTW200R**	9.0	108	224	141	256-285
SLT60-25	6000	4400	25:1	½"	1½"	**HTW330R**	15.0	119	271	154	320-351
SLT60-75	6000	4400	75:1	½"	1½"	**HTW200R**	16.5	119	301	154	350-380

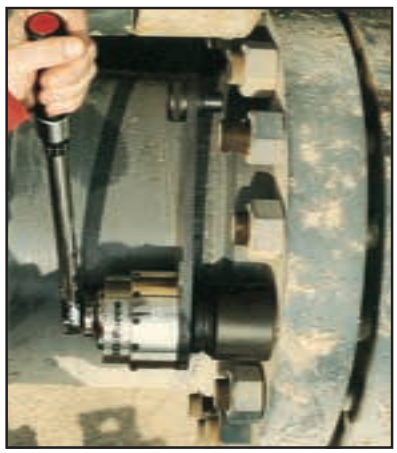
HDT - HEAVY DUTY MANUAL TORQUE MULTIPLIERS



HDT34-25

- Torque capacities up to 9500 Nm
- Heavy duty design
- Supplied complete with reaction foot

The Hi-Force HDT range of heavy duty manual torque multipliers is available in a choice of 6 models with output capacities from 1700 to 9500 Nm and multiplication ratios of 25:1 and 125:1. All models are fitted with an anti-wind up ratchet, retaining all of the wind-up forces as they are created, providing a greater level of safety and ease of operation. Models HDT17-25 and HDT34-25 are fitted as standard with a flat type reaction foot as pictured above, all other models feature a box type reaction foot with special reaction plates available up on request.



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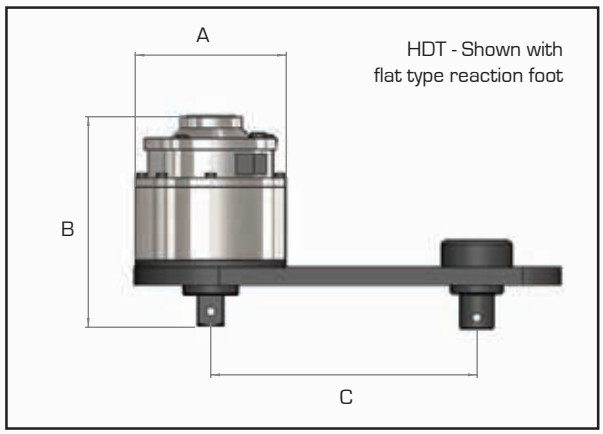
See page 64 for detailed specifications of the recommended Hi-Force manual torque wrenches for use with HDT multipliers.



HDT - Shown with flat type reaction foot

- Compact with true torque multiplication
- Output square drives 1" and 1½"
- Anti-wind up ratchet on all models

Model number	Maximum torque capacity Nm	lbf.ft	Multiplication ratio	Input square drive	Output square drive	Recom. torque wrench	Weight kg
HDT17-25	1700	1250	25:1	½"	1"	HTW200R	7.8
HDT34-25	3400	2500	25:1	½"	1"	HTW200R	10.1
HDT60-25	6000	4400	25:1	½"	1½"	HTW330R	17.0
HDT60-125	6000	4400	125:1	½"	1½"	HTW200R	18.5
HDT95-25	9500	7000	25:1	¾"	1½"	HTW400R	25.7
HDT95-125	9500	7000	125:1	½"	1½"	HTW200R	27.2

Dimensions in mm A	B	C
108	156	83-217
119	187	86-264
144	226	146-333
144	240	146-333
184	209	171-351
184	234	171-351

PG - PISTOL GRIP PNEUMATIC TORQUE MULTIPLIERS

Torque capacities up to 2000 Nm

Repeatable accuracy of +/- 5%

Choice of 5 models

The PG pistol grip pneumatic torque multiplier range is designed to provide smooth bolt tightening without impacting or pulsing. Offering a repeatable torque accuracy of +/- 5%, these low noise level tools reduce operator fatigue, increase safety and ensure fast, accurate tightening of bolted components. Incorporating a powerful, reversible air motor suitable for tightening and loosening operations, the non-impacting design of the planetary gears ensures minimum wear to sockets and bolted components. All models are supplied complete with an airline pressure and lubrication control unit in a handy carrying frame and a 3 metre length connecting hose. Accurate preset torque can easily be achieved by adjusting the airline input pressure in conjunction with the calibration graph supplied with each tool. Air consumption is 11 litres per second from a standard airline pressure of 5 Bar (23 cubic feet per minute @ 70 PSI).

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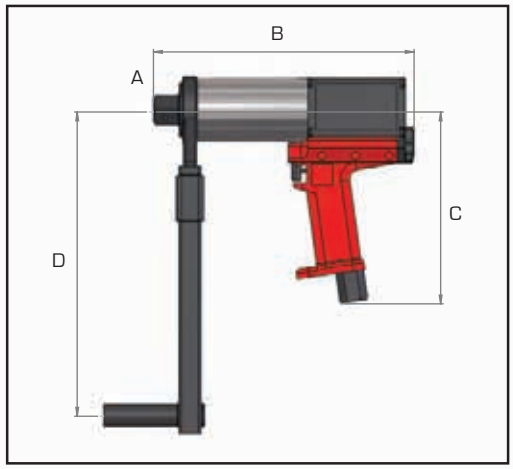
- Slim 72mm diameter gear box allows excellent access
- Sensitive trigger control allows for easy reaction plate positioning
- Smooth, quiet, non-impacting design with reversible air motor
- Wide range of attachments and accessories available
- Two speed models available on request



Model number	Torque capacity Nm	Torque capacity lbf.ft	Square drive size	R.P.M. at max pressure	Weight kg
PG500	90-500	66-370	¾"	35	8.1
PG1075	190-1000	140-740	¾"	15	8.1
PG1000	190-1000	140-740	1"	15	8.1
PG1500	300-1500	220-1100	1"	9	8.1
PG2000	400-2000	300-1450	1"	6	8.1

Dimensions in mm			
A	B	C	D
72	301	223	334
72	301	223	334
72	301	223	334
72	301	223	334
72	301	223	334

SP & PT - PNEUMATIC TORQUE MULTIPLIERS


SP2700

Torque capacities up to 9500 Nm

Smooth, quiet, non-impacting design

Repeatable accuracy of +/- 5%

The SP & PT pneumatic torque multiplier range offers a choice of 9 models, suitable for almost every bolting application and all models are supplied with an airline pressure and lubrication control unit. Maximum torque output capacities range from 680 to 9500 Nm with a choice of square drives from ¾" to 1½". As with all Hi-Force pneumatic torque multipliers a repeatable, accurate torque of +/- 5% can be easily achieved using the calibration graph supplied with each tool. Both SP models are designed with a reduced body diameter, particularly suited where a limitation of space exists and are fitted with an adjustable spline type reaction foot which allows for use with various length sockets. The PT models are supplied with a flat type reaction plate, with the exception of the PT6000 and PT9500 which incorporate a box type reaction foot. Optional specially designed reaction plates can be supplied on request. The smooth and continuous torque output of Hi-Force pneumatic torque multipliers make them suitable for a wide range of bolting applications including wheel nuts on trucks and large machinery, structural steelwork, high pressure joints e.g. pipelines, boiler feed pumps and pressure vessels, heat exchangers and many other applications.

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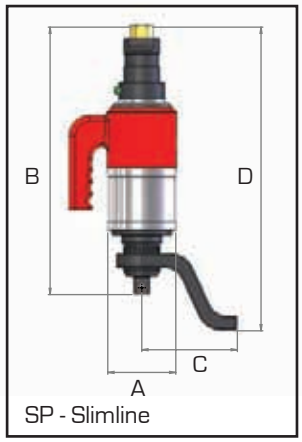
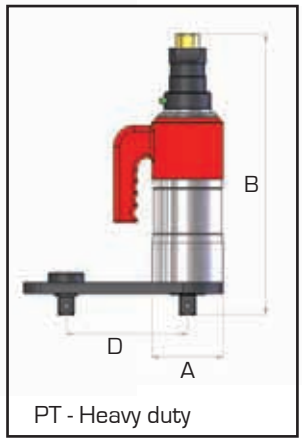
- Powerful reversible air motor with safety trigger
- Adjustable spline type reaction foot (SP models only)
- Wide range of attachments and accessories available
- Two speed models available on request



SP - Slimline



PT - Heavy duty

Model number	Torque capacity Nm	Torque capacity lbf.ft	Square drive size	R.P.M. at max pressure	Weight kg
SP2700	880-2700	650-2000	1"	5.0	16.5
SP5500	1200-5500	885-4060	1½"	2.5	21.9
PT680 - ¾	160-680	120-500	¾"	30.0	12.8
PT680 - 1	160-680	120-500	1"	30.0	12.8
PT1200	270-1200	200-900	1"	15.0	13.3
PT1700	515-1700	380-1250	1"	9.0	13.3
PT3400	880-3400	650-2500	1"	5.0	16.5
PT6000	1762-6000	1300-4500	1½"	2.5	26.0
PT9500	2710-9500	2000-7000	1½"	1.8	32.7

Dimensions in mm A	B	C	D min	D max
108	437	140	469	498
119	512	154	566	592
108	378	-	83	217
108	368	-	83	217
108	373	-	83	217
108	373	-	83	217
119	424	-	86	264
144	457	-	146	333
184	452	-	169	351

TWS-N - HYDRAULIC TORQUE WRENCHES - SQUARE DRIVE

TWS45N

Working pressure 700 Bar

Compact, lightweight, aluminium construction

Fitted with 360° Uni-Swivel quick release couplings

Hi-Force TWS-N series lightweight aluminium hydraulic torque wrenches are designed to handle the toughest bolting jobs accurately and quickly. All models provide a torque accuracy of +/- 3%. The internal reaction arm spline allows the operator to easily position the tool and, if necessary, react directly off the tool body in very confined access applications. All models incorporate an easily reversible high grade alloy steel square drive enabling the operator to quickly switch from tightening to loosening applications. Uni-Swivel quick release couplers are fitted as standard to all models enabling easy positioning of the hydraulic hoses away from any possible "pinch points". Optional allen hex drives are available (see page 71) along with a comprehensive range of high quality torque wrench sockets. (See pages 72 & 73).

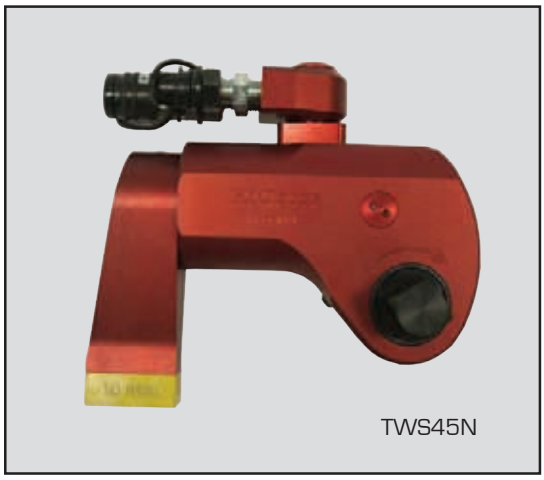
- Accurate to +/- 3% with calibration chart supplied
- Multi-position reaction foot with safety lock feature
- Reversible square drive for tightening and loosening applications
- Suitable for continuous operation at maximum pressure

Allen hex drive adaptors
(see page 71)

Did you know.....

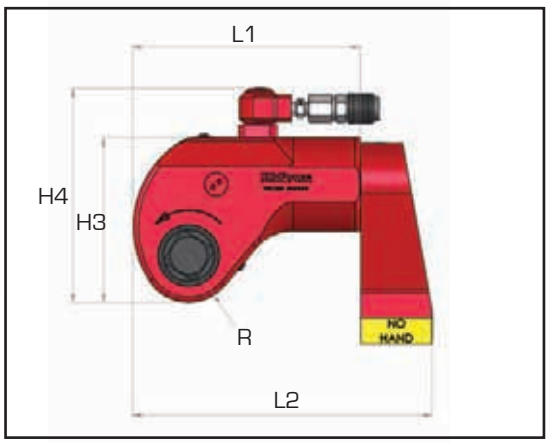
that Hi-Force hydraulic torque tools are manufactured on the latest "State of the art" CNC machining centres, guaranteed to manufacture components to the highest quality standards available.

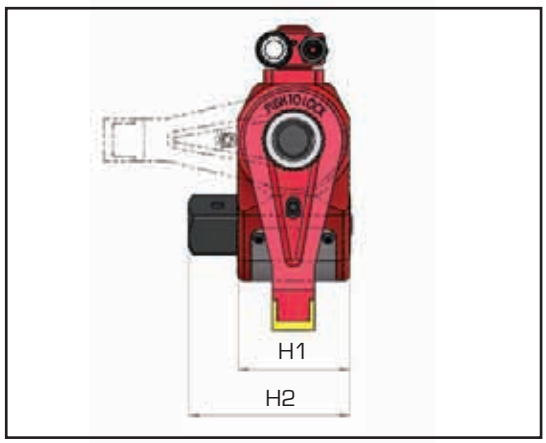
TWS-N - HYDRAULIC TORQUE WRENCHES - SQUARE DRIVE



TWS45N

- Designed for tightening and loosening
- Internal reaction arm spline
- Accurate to +/- 3%





Model number	Torque capacity Nm at 700 Bar	Torque capacity lbf.ft at 10,000 PSI	Square drive size	Weight incl. reaction foot kg
TWS17N	1727	1254	¾"	1.9
TWS45N	4529	3289	1"	4.8
TWS100N	10064	7308	1 ½"	9.0
TWS150N	14974	10873	1 ½"	14.8
TWS370N	36992	26860	2 ½"	32.5

Dimensions in mm						
L1	L2	H1	H2	H3	H4	R
129	167	51	73	90	131	25
167	218	68	98	121	170	34
223	293	92	135	163	211	46
246	323	100	141	177	225	50
329	432	137	204	240	288	66

TWS-N - ALLEN HEXAGON DRIVE ADAPTORS

TWS17N with hexagon drive fitted

Sizes available for all TWS-N wrenches

Limitations on applied torque (check before use)

Suitable for tightening & loosening applications

Hexagon drive adaptor

Imperial:

TWS17N		TWS45N		TWS100N		TWS150N		TWS370N	
Hex Size	Model Number	Hex Size	Model Number	Hex Size	Model Number	Hex Size	Model Number	Hex Size	Model Number
½"	IH17N-008	⅝"	IH45N-010	⅞"	IH100N-014	1¼"	IH150N-104	1½"	IH370N-108
⅝"	IH17N-010	¾"	IH45N-012	1"	IH100N-100	1⅜"	IH150N-106	1⅝"	IH370N-110
¾"	IH17N-012	⅞"	IH45N-014	1⅛"	IH100N-102	1½"	IH150N-108	1¾"	IH370N-112
⅞"	IH17N-014	1"	IH45N-100	1¼	IH100N-104	1⅝"	IH150N-110	1⅞"	IH370N-114
1"	IH17N-100	1⅛"	IH45N-102	1⅜"	IH100N-106	1¾"	IH150N-112	2"	IH370N-200
		1¼"	IH45N-104	1½"	IH100N-108			2¼"	IH370N-204

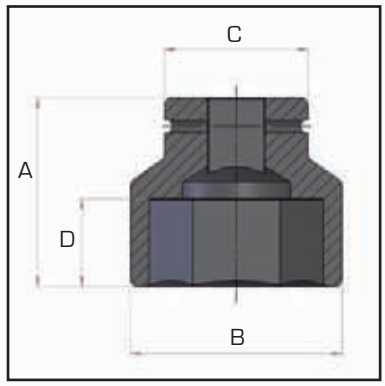
Metric:

TWS17N		TWS45N		TWS100N		TWS150N		TWS370N	
Hex Size	Model Number	Hex Size	Model Number	Hex Size	Model Number	Hex Size	Model Number	Hex Size	Model Number
14mm	MH17N-14	17mm	MH45N-17	22mm	MH100N-22	30mm	MH150N-30	36mm	MH370N-36
17mm	MH17N-17	19mm	MH45N-19	24mm	MH100N-24	32mm	MH150N-32	41mm	MH370N-41
19mm	MH17N-19	22mm	MH45N-22	27mm	MH100N-27	36mm	MH150N-36	46mm	MH370N-46
22mm	MH17N-22	24mm	MH45N-24	30mm	MH100N-30	41mm	MH150N-41	50mm	MH370N-50
24mm	MH17N-24	27mm	MH45N-27	32mm	MH100N-32	46mm	MH150N-46	55mm	MH370N-55
		32mm	MH45N-32	36mm	MH100N-36			60mm	MH370N-60

Note: Due to the hexagon AF size some models are not suitable for use at maximum output torque of the selected TWS-N hydraulic wrench. Always check permissible maximum torque before use..

IS - IMPERIAL HEXAGON AF SIZE HEAVY DUTY SOCKETS

- Square drives from ¾" to 2½"
- Across flat sizes up to 6⅞"
- Supplied complete with retaining ring and pin



Hi-Force high quality imperial size heavy duty sockets are designed and manufactured for use with all Hi-Force bolting products, including hydraulic torque wrenches and impact wrenches. The IS range of imperial impact sockets offers 47 models, with square drives from ¾" to 2½" and across flat sizes up to 6⅞". Long length, bi-hexagonal and special sockets are available on request.

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Model number	Square drive	Nut AF inches	Dimensions in mm A	B	C	D
IS2-101	¾"	1 1/16"	52	40	38	16
IS2-104	¾"	1 1/4"	52	44	44	20
IS2-107	¾"	1 7/16"	56	51	44	23
IS2-110	¾"	1 5/8"	62	58	44	27
IS2-113	¾"	1 13/16"	68	67	44	32
IS2-200	¾"	2"	72	71	54	35
IS2-203	¾"	2 3/16"	74	77	54	35
IS2-206	¾"	2 3/8"	75	84	54	35
IS9-101	1"	1 1/16"	58	44	51	17
IS9-104	1"	1 1/4"	60	51	51	21
IS9-107	1"	1 7/16"	62	56	52	26
IS9-110	1"	1 5/8"	62	62	52	26
IS9-113	1"	1 13/16"	64	68	58	27
IS9-200	1"	2"	70	74	58	31
IS9-203	1"	2 3/16"	72	80	62	32
IS9-206	1"	2 3/8"	78	87	62	35
IS9-209	1"	2 9/16"	80	93	62	36
IS9-212	1"	2 3/4"	85	98	62	40
IS9-215	1"	2 15/16"	95	104	86	48
IS9-302	1"	3 1/8"	100	109	86	52
IS9-308	1"	3 1/2"	105	125	86	52
IS9-314	1"	3 7/8"	105	136	95	52
IS5-113	1 1/2"	1 13/16"	84	76	86	27
IS5-200	1 1/2"	2"	87	82	86	29

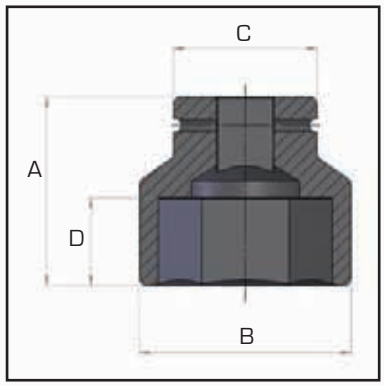
Model number	Square drive	Nut AF inches	Dimensions in mm A	B	C	D
IS5-203	1 1/2"	2 3/16"	90	86	86	36
IS5-206	1 1/2"	2 3/8"	92	93	86	38
IS5-209	1 1/2"	2 9/16"	95	97	86	40
IS5-212	1 1/2"	2 3/4"	100	105	86	43
IS5-215	1 1/2"	2 15/16"	103	110	86	45
IS5-302	1 1/2"	3 1/8"	110	116	86	50
IS5-308	1 1/2"	3 1/2"	118	130	86	55
IS5-314	1 1/2"	3 7/8"	125	140	95	58
IS5-404	1 1/2"	4 1/4"	125	150	95	58
IS5-410	1 1/2"	4 5/8"	135	165	95	65
IS5-500	1 1/2"	5"	140	179	127	70
IS5-506	1 1/2"	5 3/8"	150	195	127	75
IS6-302	2 1/2"	3 1/8"	140	124	127	51
IS6-308	2 1/2"	3 1/2"	140	135	127	51
IS6-314	2 1/2"	3 7/8"	150	147	127	57
IS6-404	2 1/2"	4 1/4"	160	159	127	64
IS6-410	2 1/2"	4 5/8"	170	172	127	71
IS6-500	2 1/2"	5"	175	185	127	75
IS6-506	2 1/2"	5 3/8"	180	197	127	79
IS6-512	2 1/2"	5 3/4"	185	210	127	83
IS6-602	2 1/2"	6 1/8"	190	223	127	91
IS6-608	2 1/2"	6 1/2"	195	235	127	95
IS6-614	2 1/2"	6 7/8"	200	248	127	105

MS - METRIC HEXAGON AF SIZE HEAVY DUTY SOCKETS

Square drives from ¾" to 2½"

Across flat sizes up to 145mm

Supplied complete with retaining ring and pin

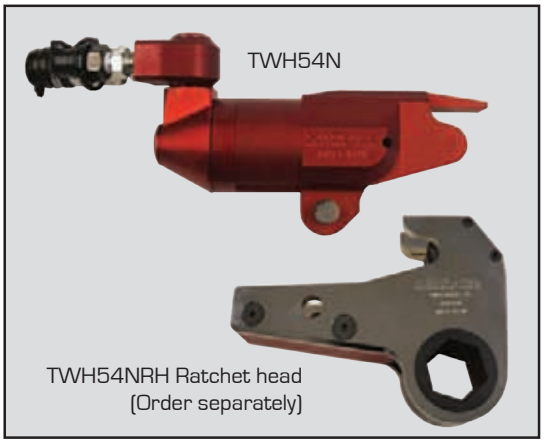


Hi-Force high quality metric size heavy duty sockets are designed and manufactured for use with all Hi-Force bolting products, including hydraulic torque wrenches and impact wrenches. The MS range of metric impact sockets offers 56 models, with square drives from ¾" to 2½" and across flat sizes up to 145mm. Long length, bi-hexagonal and special sockets are available on request.

Model number	Square drive	Nut AF mm	Dimensions in mm A	B	C	D
MS2-24	¾"	24	50	39	44	16
MS2-27	¾"	27	54	43	44	16
MS2-30	¾"	30	54	47	44	23
MS2-32	¾"	32	56	49	44	23
MS2-36	¾"	36	56	54	44	23
MS2-41	¾"	41	58	60	44	24
MS2-46	¾"	46	63	67	44	30
MS2-50	¾"	50	72	71	54	32
MS2-55	¾"	55	74	78	54	35
MS2-60	¾"	60	75	84	54	37
MS9-24	1"	24	58	42	54	17
MS9-27	1"	27	58	46	54	17
MS9-30	1"	30	60	50	54	21
MS9-32	1"	32	60	51	54	21
MS9-36	1"	36	65	56	54	30
MS9-41	1"	41	67	63	54	31
MS9-46	1"	46	74	69	54	36
MS9-50	1"	50	80	74	54	42
MS9-55	1"	55	84	80	54	44
MS9-60	1"	60	87	86	54	44
MS9-65	1"	65	90	92	54	46
MS9-70	1"	70	96	99	54	51
MS9-75	1"	75	98	106	86	45
MS9-80	1"	80	100	112	86	48
MS9-85	1"	85	105	118	86	52
MS9-90	1"	90	105	125	86	52
MS9-95	1"	95	115	131	86	52
MS9-100	1"	100	115	137	95	58

Model number	Square drive	Nut AF mm	Dimensions in mm A	B	C	D
MS5-36	1 ½"	36	78	64	86	23
MS5-41	1 ½"	41	80	70	86	26
MS5-46	1 ½"	46	84	76	86	27
MS5-50	1 ½"	50	87	81	86	29
MS5-55	1 ½"	55	90	86	86	36
MS5-60	1 ½"	60	92	93	86	38
MS5-65	1 ½"	65	95	97	86	40
MS5-70	1 ½"	70	100	105	86	43
MS5-75	1 ½"	75	103	110	86	45
MS5-80	1 ½"	80	110	116	86	50
MS5-85	1 ½"	85	118	125	86	55
MS5-90	1 ½"	90	118	130	86	55
MS5-95	1 ½"	95	118	137	95	55
MS5-100	1 ½"	100	125	140	95	58
MS5-105	1 ½"	105	125	150	95	58
MS5-110	1 ½"	110	125	156	95	58
MS5-115	1 ½"	115	135	160	95	65
MS5-130	1 ½"	130	140	185	127	70
MS6-80	2 ½"	80	140	124	127	51
MS6-85	2 ½"	85	140	130	127	51
MS6-90	2 ½"	90	145	136	127	54
MS6-95	2 ½"	95	145	143	127	54
MS6-100	2 ½"	100	150	149	127	57
MS6-105	2 ½"	105	155	155	127	61
MS6-110	2 ½"	110	160	161	127	64
MS6-115	2 ½"	115	165	167	127	67
MS6-130	2 ½"	130	175	188	127	75
MS6-145	2 ½"	145	185	208	127	83

TWH-N - HYDRAULIC TORQUE WRENCH - DRIVE CYLINDERS



Working pressure 700 Bar

Powerful with low clearance design

Fitted with 360° x 360° Uni-Swivel couplings

Hi-Force TWH-N series female hexagon cassette head hydraulic torque wrenches offer a choice of 5 models with output torque capacities from 2625 Nm to 48181 Nm (1906 to 34985 lbf.ft). Manufactured from high grade aluminium (except TWH430N), all models provide direct in-line reaction and a minimal radius clearance for easy fitment in confined spaces. The user friendly design of the tool simply requires the operator to withdraw/insert a single pin to change the ratchet head. Ratchet heads are available in all standard metric and imperial AF sizes from 24 to 175mm (1 1/16" to 6 7/8") with low cost hexagon reducer bushes also available (see pages 79 - 80). Uni-Swivel quick release couplers are fitted as standard to all models, enabling easy positioning of the hydraulic hoses.

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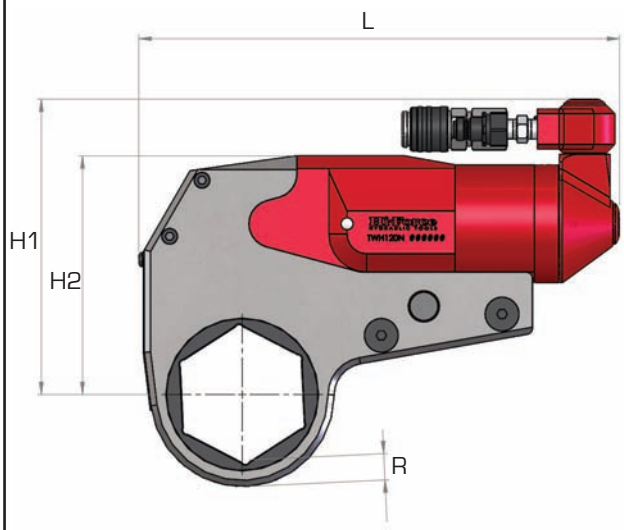
- Compact, lightweight, aluminium drive unit (except TWH430N)
- Accurate to +/- 3% with standard torque chart supplied
- Low profile design for limited access applications
- Minimum radius cassette head for fitment in confined spaces
- Suitable for continuous operation at maximum pressure

Note: Model TWH430N manufactured from high grade alloy steel

TWH-N - HYDRAULIC TORQUE WRENCH - DRIVE CYLINDERS

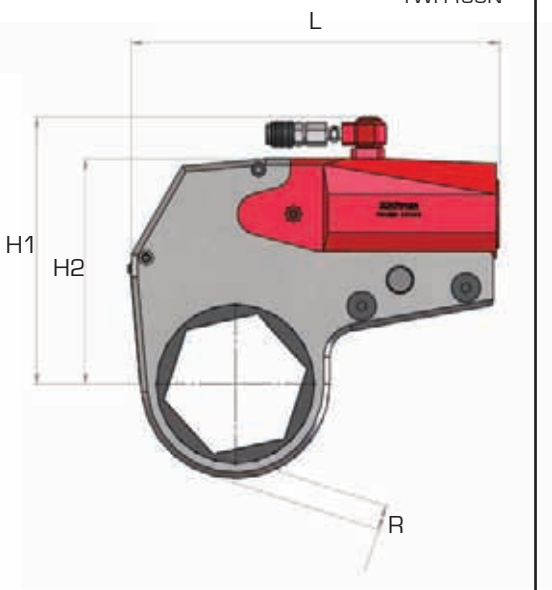
- Designed for tightening and loosening applications
- Easily assembled to selected ratchet head
- Minimal nose radius for fitment in confined spaces

TWH27N, TWH54N,
TWH120N, TWH210N



All Models

TWH430N



Note: Drawing shows drive cylinder, including ratchet head as detailed on pages 76-77.
Drive cylinder and ratchet head are seperate items and must be ordered seperately

Model number (drive cyl.)	Torque capacity Nm at 700 Bar	Torque capacity lbf. ft at 10,000PSI	Hexagon AF size Metric min	Metric max	Imperial min	Imperial max	Weight kg
TWH27N	2625	1906	24	46	1 1/16"	1 13/16"	1.4
	3068	2228	50	60	2"	2 3/8"	1.4
TWH54N	5372	3901	36	65	1 7/16"	2 9/16"	2.3
	6037	4384	70	80	2 3/4"	3 1/8"	2.3
TWH120N	11737	8522	50	80	2 3/16"	3 1/8"	3.8
	14349	10419	85	100	3 1/2"	3 7/8"	3.8
TWH210N	21216	15405	70	100	2 3/4"	3 7/8"	6.4
	23124	16791	105	115	4 1/4"	4 5/8"	6.4
TWH430N	43792	31798	80	115	3 1/8"	4 5/8"	16.1
	48181	34985	130	175	5"	6 7/8"	16.1

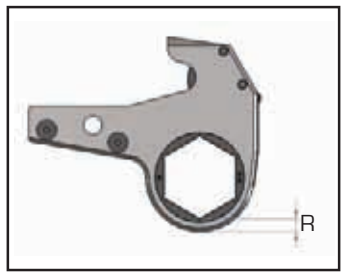
Dimensions in mm L max	H1 max	H2 max	W1	W2	R min - max
193	125	97	32	51	9.5 - 12.2
193	136	108	32	51	10 .1 - 10.5
250	158	125	41	64	10.7 - 13.8
250	169	136	41	64	11.7 - 14.6
310	189	157	52	78	14.7 - 15.2
310	214	182	52	78	15.9 - 18.7
378	223	191	64	97	18.1 - 18.6
378	236	204	64	97	18.3 - 20.7
405	291	242	83	93	25.6 - 31.3
425	309	260	83	93	24.8 - 27.3

Note: Above selection table is for drive unit only. Ratchet head(s) to be ordered separately - see pages 76-77.
Weight as stated is drive cylinder only, exact radius size (R) varies according to ratchet AF size selected.

TWH-NRH - IMPERIAL SIZE RATCHET HEADS


TWH120NRH3.1/2

- Choice of standard imperial sizes
- Easily fitted to TWH-N drive units
- Strong steel construction
- Non standard and special design ratchet heads can be made to order



The TWH-NRH range of imperial hexagon ratchet heads, suitable for use with TWH-N series low profile hydraulic torque wrenches (see pages 74-75), provide exceptional flexibility with across flats (AF) sizes from 1 1/16" to 6 7/8" available as standard. All models feature extremely low profile design combined with a minimum nose radius (R) that enables fitment in very confined limited access places. For even greater versatility a comprehensive range of imperial hexagon reducer bushes (see page 79) and square drive conversion kits (see page 78) to suit TWH-NRH imperial ratchet heads are also available.

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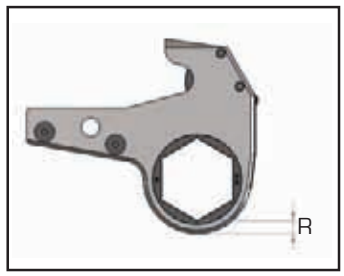
IMPERIAL RATCHET HEAD SELECTION TABLE:

Bolt size	Nut AF size	For TWH27N			For TWH54N			For TWH120N			For TWH210N			For TWH430N		
		Model number	R mm	Wt kg	Model number	R mm	Wt kg	Model number	R mm	Wt kg	Model number	R mm	Wt kg	Model number	R mm	Wt kg
5/8"	1 1/16"	TWH27NRH1.1/16	10.4	1.5												
3/4"	1 1/4"	TWH27NRH1.1/4	9.7	1.6												
7/8"	1 7/16"	TWH27NRH1.7/16	9.8	1.6	TWH54NRH1.7/16	13.5	2.9									
1"	1 5/8"	TWH27NRH1.5/8	10.0	1.6	TWH54NRH1.5/8	10.8	2.8									
1 1/8"	1 13/16"	TWH27NRH1.13/16	10.5	1.7	TWH54NRH1.13/16	10.7	2.9									
1 1/4"	2"	TWH27NRH2	10.5	1.7	TWH54NRH2	11.7	3.0									
1 3/8"	2 3/16"	TWH27NRH2.3/16	10.3	1.8	TWH54NRH2.3/16	11.8	3.1	TWH120NRH2.3/16	14.7	6.1						
1 1/2"	2 3/8"	TWH27NRH2.3/8	10.5	1.8	TWH54NRH2.3/8	11.8	3.2	TWH120NRH2.3/8	14.8	6.4						
1 5/8"	2 9/16"				TWH54NRH2.9/16	11.6	3.3	TWH120NRH2.9/16	14.8	6.4						
1 3/4"	2 3/4"				TWH54NRH2.3/4	11.8	3.4	TWH120NRH2.3/4	14.9	6.5	TWH210NRH2.3/4	18.3	12.1			
1 7/8"	2 15/16"				TWH54NRH2.15/16	14.8	3.5	TWH120NRH2.15/16	14.9	6.5	TWH210NRH2.15/16	18.3	12.2			
2"	3 1/8"				TWH54NRH3.1/8	12.1	3.5	TWH120NRH3.1/8	15.1	6.5	TWH210NRH3.1/8	18.5	12.3	TWH430NRH3.1/8	26.0	23.2
2 1/4"	3 1/2"							TWH120NRH3.1/2	16.9	7.9	TWH210NRH3.1/2	19.3	12.4	TWH430NRH3.1/2	26.8	23.9
2 1/2"	3 7/8"							TWH120NRH3.7/8	19.6	8.5	TWH210NRH3.7/8	19.5	12.5	TWH430NRH3.7/8	26.5	25.7
2 3/4"	4 1/4"										TWH210NRH4.1/4	19.5	13.3	TWH430NRH4.1/4	26.9	26.1
3"	4 5/8"										TWH210NRH4.5/8	19.3	13.8	TWH430NRH4.5/8	25.9	26.3
3 1/4"	5"													TWH430NRH5	27.4	27.9
3 1/2"	5 3/8"													TWH430NRH5.3/8	25.8	28.3
3 3/4"	5 3/4"													TWH430NRH5.3/4	24.8	29.3
4"	6 1/8"													TWH430NRH6.1/8	25.0	30.1
4 1/4"	6 1/2"													TWH430NRH6.1/2	25.0	31.0
4 1/2"	6 7/8"													TWH430NRH6.7/8	27.3	31.8

TWH-NRH - METRIC SIZE RATCHET HEADS


TWH120NRH-65

- Choice of standard metric sizes
- Easily fitted to TWH-N drive units
- Strong steel construction
- Non standard and special design ratchet heads can be made to order



The TWH-NRH range of metric hexagon ratchet heads, suitable for use with TWH-N series low profile hydraulic torque wrenches (see pages 74-75), provide exceptional flexibility with across flats (AF) sizes from 24mm to 175mm available as standard. All models feature extremely low profile design combined with a minimum nose radius (R) that enables fitment in very confined limited access places. For even greater versatility a comprehensive range of metric hexagon reducer bushes (see page 80) and square drive conversion kits (see page 78) to suit TWH-NRH metric ratchet heads are also available.

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METRIC RATCHET HEAD SELECTION TABLE:

Bolt size	Nut AF size	For TWH27N			For TWH54N			For TWH120N			For TWH210N			For TWH430N		
		Model number	R mm	Wt kg	Model number	R mm	Wt kg	Model number	R mm	Wt kg	Model number	R mm	Wt kg	Model number	R mm	Wt kg
16	24	TWH27NRH-24	12.1	1.5												
18	27	TWH27NRH-27	10.4	1.5												
20	30	TWH27NRH-30	10.7	1.6												
22	32	TWH27NRH-32	9.5	1.6												
24	36	TWH27NRH-36	10.1	1.6	TWH54NRH-36	13.8	2.9									
27	41	TWH27NRH-41	10.1	1.6	TWH54NRH-41	10.9	2.8									
30	46	TWH27NRH-46	10.5	1.7	TWH54NRH-46	10.7	2.9									
33	50	TWH27NRH-50	10.4	1.7	TWH54NRH-50	12.1	3.0	TWH120NRH-50	15.2	5.8						
36	55	TWH27NRH-55	10.1	1.8	TWH54NRH-55	12.1	3.1	TWH120NRH-55	15.0	6.1						
39	60	TWH27NRH-60	10.5	1.8	TWH54NRH-60	12.0	3.2	TWH120NRH-60	15.0	6.4						
42	65				TWH54NRH-65	11.7	3.3	TWH120NRH-65	14.9	6.4						
45	70				TWH54NRH-70	11.7	3.4	TWH120NRH-70	14.8	6.5	TWH210NRH-70	18.2	12.1			
48	75				TWH54NRH-75	14.6	3.5	TWH120NRH-75	14.7	6.5	TWH210NRH-75	18.1	12.2			
52	80				TWH54NRH-80	11.7	3.5	TWH120NRH-80	14.7	6.5	TWH210NRH-80	18.1	12.3	TWH430NRH-80	25.6	23.2
56	85							TWH120NRH-85	16.4	7.8	TWH210NRH-85	18.2	12.4	TWH430NRH-85	29.0	24.0
60	90							TWH120NRH-90	16.2	7.9	TWH210NRH-90	18.6	12.4	TWH430NRH-90	31.3	26.0
64	95							TWH120NRH-95	15.9	7.9	TWH210NRH-95	18.6	12.5	TWH430NRH-95	28.5	25.8
68	100							TWH120NRH-100	18.7	8.5	TWH210NRH-100	18.6	12.5	TWH430NRH-100	25.6	25.6
72	105										TWH210NRH-105	18.4	12.9	TWH430NRH-105	28.6	26.5
76	110										TWH210NRH-110	18.3	13.3	TWH430NRH-110	25.7	26.2
80	115										TWH210NRH-115	20.7	13.8	TWH430NRH-115	27.3	26.4
90	130													TWH430NRH-130	25.6	27.3
100	145													TWH430NRH-145	25.4	29.4
110	155													TWH430NRH-155	25.0	30.1
115	165													TWH430NRH-165	25.0	31.0
n/a	175													TWH430NRH-175	27.3	31.8

TWH-N - SQUARE DRIVE CONVERSION KITS

Suitable for TWH-N range up to 23124 Nm

Square drive sizes from 1" to 2½"

Easily fitted, no special tools required

Hi-Force SDC square drive conversion kits, suitable for Hi-Force TWH-N hexagon drive hydraulic torque wrenches (see pages 74-77) are available for all models, excluding TWH430N. All models are supplied complete with an easily attachable reaction foot and a standard hexagon AF size adaptor, suitable for fitment to a commonly used size of imperial or metric ratchet head, per tool type (see table for more details). These SDC square drive conversion kits provide the most flexible and cost effective method of converting a female hexagon drive hydraulic torque wrench into a square drive wrench.

- Supplied complete with reaction foot
- Makes your hexagon drive torque wrench even more versatile
- Full range of heavy duty sockets available
- (see pages 72 & 73)

Flexibility ...

The combination of a Hi-Force drive cylinder, standard ratchet head and square drive conversion kit gives the user maximum flexibility. Whether a low height or square drive wrench is required, this combination provides it all !

Model number	Square drive	Hexagon AF Size	Maximum torque Nm	Maximum torque lbf.ft	Suitable for drive cylinder incl. ratchet head		Weight kg
SDC27-I	1"	1 13/16"	3068	2263	TWH27N	TWH27NRH-1 13/16"	1.1
SDC27-M	1"	46mm	3068	2263	TWH27N	TWH27NRH-46	1.1
SDC54-I	1½"	2 9/16"	6037	4453	TWH54N	TWH54NRH-2 9/16"	3.0
SDC54-M	1½"	65mm	6037	4453	TWH54N	TWH54NRH-65	3.0
SDC120-I	1½"	3 1/8"	14349	10583	TWH120N	TWH120NRH-3 1/8"	4.4
SDC120-M	1½"	80mm	14349	10583	TWH120N	TWH120NRH-80	4.4
SDC210-I	2½"	3 7/8"	23124	17055	TWH210N	TWH210NRH-3 7/8"	9.1
SDC210-M	2½"	100mm	23124	17055	TWH210N	TWH210NRH-100	9.1

IB - IMPERIAL HEXAGON REDUCER BUSHES

To reduce the female hexagon AF size of the TWH-NRH imperial ratchet heads (see page 76), these Hi-Force hexagon reducer bushes offer an easy and economical solution. Just select your outside AF size (i.e ratchet head AF size) and the required inside AF size to determine the model number. Please note that wall thickness (specified below as 'W' dimension) must be added to the minimum radius dimension of your ratchet head when using a reducer bush.

Outside AF size	Inside AF size	For TWH27NRH		For TWH54NRH		For TWH120NRH		For TWH210NRH		For TWH430NRH	
		Model number	W mm	Model number	W mm	Model number	W mm	Model number	W mm	Model number	W mm
1 1/4"	1 1/16"	IB27-104-101	2.4								
1 7/16"	1 1/16"	IB27-107-101	4.8								
1 7/16"	1 1/4"	IB27-107-104	2.4								
1 5/8"	1 1/4"	IB27-110-104	4.8	IB54-110-104	4.8						
1 5/8"	1 7/16"	IB27-110-107	2.4	IB54-110-107	2.4						
1 13/16"	1 7/16"	IB27-113-107	4.8	IB54-113-107	4.8						
1 13/16"	1 5/8"	IB27-113-110	2.4	IB54-113-110	2.4						
2"	1 5/8"	IB27-200-110	4.8	IB54-200-110	4.8						
2"	1 13/16"	IB27-200-113	2.4	IB54-200-113	2.4						
2 3/16"	1 5/8"	IB27-203-110	7.2	IB54-203-110	7.2						
2 3/16"	1 13/16"	IB27-203-113	4.8	IB54-203-113	4.8						
2 3/16"	2"	IB27-203-200	2.4	IB54-203-200	2.4						
2 3/8"	1 13/16"	IB27-206-113	7.2	IB54-206-113	7.2						
2 3/8"	2"	IB27-206-200	4.8	IB54-206-200	4.8						
2 3/8"	2 3/16"	IB27-206-203	2.4	IB54-206-203	2.4	IB120-206-203	2.4				
2 9/16"	2"			IB54-209-200	7.2	not available	-				
2 9/16"	2 3/16"			IB54-209-203	4.8	IB120-209-203	4.8				
2 9/16"	2 3/8"			IB54-209-206	2.4	IB120-209-206	2.4				
2 3/4"	2 3/16"			IB54-212-203	7.2	IB120-212-203	7.2				
2 3/4"	2 3/8"			IB54-212-206	4.8	IB120-212-206	4.8				
2 3/4"	2 9/16"			IB54-212-209	2.4	IB120-212-209	2.4				
2 15/16"	2 3/8"			IB54-215-206	7.2	IB120-215-206	7.2				
2 15/16"	2 9/16"			IB54-215-209	4.8	IB120-215-209	4.8				
2 15/16"	2 3/4"			IB54-215-212	2.4	IB120-215-212	2.4	IB210-215-212	2.4		
3 1/8"	2 9/16"			IB54-302-209	7.2	IB120-302-209	7.2	not available	-		
3 1/8"	2 3/4"			IB54-302-212	4.8	IB120-302-212	4.8	IB210-302-212	4.8		
3 1/8"	2 15/16"			IB54-302-215	2.4	IB120-302-215	2.4	IB210-302-215	2.4		
3 1/2"	2 15/16"					IB120-308-215	7.2	IB210-308-215	7.2		
3 1/2"	3 1/8"					IB120-308-302	4.8	IB210-308-302	4.8	IB430-308-302	4.8
3 7/8"	3 1/8"					IB120-314-302	9.5	IB210-314-302	9.5	IB430-314-302	9.5
3 7/8"	3 1/2"					IB120-314-308	4.8	IB210-314-308	4.8	IB430-314-308	4.8
4 1/4"	3 1/2"							IB210-404-308	9.5	IB430-404-308	9.5
4 1/4"	3 7/8"							IB210-404-314	4.8	IB430-404-314	4.8
4 5/8"	3 7/8"							IB210-410-314	9.5	IB430-410-314	9.5
4 5/8"	4 1/4"							IB210-410-404	4.8	IB430-410-404	4.8
5"	4 1/4"									IB430-500-404	9.5
5"	4 5/8"									IB430-500-410	4.8
5 3/8"	4 5/8"									IB430-506-410	9.5
5 3/8"	5"									IB430-506-500	4.8
5 3/4"	5"									IB430-512-500	9.5
5 3/4"	5 3/8"									IB430-512-506	4.8
6 1/8"	5 3/8"									IB430-602-506	9.5
6 1/8"	5 3/4"									IB430-602-512	4.8
6 1/2"	5 3/4"									IB430-608-512	9.5
6 1/2"	6 1/8"									IB430-608-602	4.8
6 7/8"	6 1/8"									IB430-614-602	9.5
6 7/8"	6 1/2"									IB430-614-608	4.8

MB - METRIC HEXAGON REDUCER BUSHES

To reduce the female hexagon AF size of the TWH-NRH metric ratchet heads (see page 77), these Hi-Force hexagon reducer bushes offer an easy and economical solution. Just select your outside AF size (i.e ratchet head AF size) and the required inside AF size to determine the model number. Please note that wall thickness (specified below as 'W' dimension) must be added to the minimum radius dimension of your ratchet head when using a reducer bush.

Outside AF size	Inside AF size	For TWH27NRH		For TWH54NRH		For TWH120NRH		For TWH210NRH		For TWH430NRH	
		Model number	W mm	Model number	W mm	Model number	W mm	Model number	W mm	Model number	W mm
30	24	MB27-30-24	3.0								
32	24	MB27-32-24	3.0								
32	27	MB27-32-27	3.0								
36	30	MB27-36-30	3.0	MB54-36-30	3.0						
41	36	MB27-41-36	2.5	MB54-41-36	2.5						
46	36	MB27-46-36	5.0	MB54-46-36	5.0						
46	41	MB27-46-41	2.5	MB54-46-41	2.5						
50	41	MB27-50-41	4.5	MB54-50-41	4.5						
50	46	MB27-50-46	2.0	MB54-50-46	2.0						
55	41	MB27-55-41	7.0	MB54-55-41	7.0						
55	46	MB27-55-46	4.5	MB54-55-46	4.5						
55	50	MB27-55-50	2.5	MB54-55-50	2.5	MB120-55-50	2.5				
60	46	MB27-60-46	7.0	MB54-60-46	7.0	not available					
60	50	MB27-60-50	5.0	MB54-60-50	5.0	MB120-60-50	5.0				
60	55	MB27-60-55	2.5	MB54-60-55	2.5	MB120-60-55	2.5				
65	50			MB54-65-50	7.5	MB120-65-50	7.5				
65	55			MB54-65-55	5.0	MB120-65-55	5.0				
65	60			MB54-65-60	2.5	MB120-65-60	2.5				
70	55			MB54-70-55	7.5	MB120-70-55	7.5				
70	60			MB54-70-60	5.0	MB120-70-60	5.0				
70	65			MB54-70-65	2.5	MB120-70-65	2.5				
75	60			MB54-75-60	7.5	MB120-75-60	7.5				
75	65			MB54-75-65	5.0	MB120-75-65	5.0				
75	70			MB54-75-70	2.5	MB120-75-70	2.5	MB210-75-70	2.5		
80	65			MB54-80-65	7.5	MB120-80-65	7.5	not available	-		
80	70			MB54-80-70	5.0	MB120-80-70	5.0	MB210-80-70	5.0		
80	75			MB54-80-75	2.5	MB120-80-75	2.5	MB210-80-75	2.5		
85	70					MB120-85-70	7.5	MB210-85-70	7.5		
85	75					MB120-85-75	5.0	MB210-85-75	5.0		
85	80					MB120-85-80	2.5	MB210-85-80	2.5	MB430-85-80	2.5
90	75					MB120-90-75	7.5	MB210-90-75	7.5	not available	-
90	80					MB120-90-80	5.0	MB210-90-80	5.0	MB430-90-80	5.0
90	85					MB120-90-85	2.5	MB210-90-85	2.5	MB430-90-85	2.5
95	80					MB120-95-80	7.5	MB210-95-80	7.5	MB430-95-80	7.5
95	85					MB120-95-85	5.0	MB210-95-85	5.0	MB430-95-85	5.0
95	90					MB120-95-90	2.5	MB210-95-90	2.5	MB430-95-90	2.5
100	85					MB120-100-85	7.5	MB210-100-85	7.5	MB430-100-85	7.5
100	90					MB120-100-90	5.0	MB210-100-90	5.0	MB430-100-90	5.0
100	95					MB120-100-95	2.5	MB210-100-95	2.5	MB430-100-95	2.5
105	90							MB210-105-90	7.5	MB430-105-90	7.5
105	95							MB210-105-95	5.0	MB430-105-95	5.0
105	100							MB210-105-100	2.5	MB430-105-100	2.5
110	95							MB210-110-95	7.5	MB430-110-95	7.5
110	100							MB210-110-100	5.0	MB430-110-100	5.0
110	105							MB210-110-105	2.5	MB430-110-105	2.5
115	100							MB210-115-100	7.5	MB430-115-100	7.5
115	105							MB210-115-105	5.0	MB430-115-105	5.0
115	110							MB210-115-110	2.5	MB430-115-110	2.5
130	105									MB430-130-105	12.5
130	110									MB430-130-110	10.0
130	115									MB430-130-115	7.5
145	110									MB430-145-110	17.5
145	115									MB430-145-115	15.0
145	130									MB430-145-130	7.5

BW - BACKUP WRENCHES

BW3 with BW3-90

- Suitable for use with TWS-N & TWH-N Wrenches
- Interchangeable hexagon links
- Positive release mechanism

The Hi-Force BW series of back up wrenches provide an easily fitted and easily removable back nut reaction arm to prevent both nuts rotating during tightening applications. The 'T-Bar' design adjustable reaction point prevents lock up once tightening is completed.

Model Number	Description	Suitable for hexagon link sizes (see below)			
		From		To	
		Imperial	Metric	Imperial	Metric
BW1	Backup Wrench holder	15/16"	24 mm	3 1/8"	80 mm
BW2	Backup Wrench holder	2 3/16"	55 mm	3 7/8"	100 mm
BW3	Backup Wrench holder	3 1/2"	85 mm	4 5/8"	115 mm
BW4	Backup Wrench holder	3 1/2"	85 mm	6 7/8"	145 mm

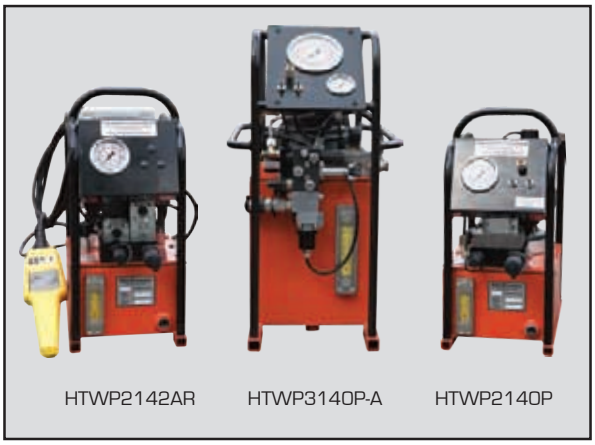
Imperial links for Backup Wrench

Link Part Number	Backup Wrench holder	Hexagon AF Size
BW1-015	BW1	15/16"
BW1-101	BW1	1 1/16"
BW1-104	BW1	1 1/4"
BW1-107	BW1	1 7/16"
BW1-110	BW1	1 5/8"
BW1-113	BW1	1 13/16"
BW1-200	BW1	2"
BW1-203	BW1 - BW2	2 3/16"
BW1-206	BW1 - BW2	2 3/8"
BW1-209	BW1 - BW2	2 9/16"
BW1-212	BW1 - BW2	2 3/4"
BW1-215	BW1 - BW2	2 15/16"
BW1-302	BW1 - BW2	3 1/8"
BW2-308	BW2 - BW3 - BW4	3 1/2"
BW2-314	BW2 - BW3 - BW4	3 7/8"
BW3-404	BW3 - BW4	4 1/4"
BW3-410	BW3 - BW4	4 5/8"
BW4-500	BW4	5"
BW4-506	BW4	5 3/8"
BW4-512	BW4	5 3/4"
BW4-602	BW4	6 1/8"
BW4-608	BW4	6 1/2"
BW4-614	BW4	6 7/8"

Metric links for Backup Wrench

Link Part Number	Backup Wrench holder	Hexagon AF Size
BW1-24	BW1	24 mm
BW1-27	BW1	27 mm
BW1-30	BW1	30 mm
BW1-32	BW1	32 mm
BW1-36	BW1	36 mm
BW1-41	BW1	41 mm
BW1-46	BW1	46 mm
BW1-50	BW1	50 mm
BW1-55	BW1 - BW2	55 mm
BW1-60	BW1 - BW2	60 mm
BW1-65	BW1 - BW2	65 mm
BW1-70	BW1 - BW2	70 mm
BW1-75	BW1 - BW2	75 mm
BW1-80	BW1 - BW2	80 mm
BW2-85	BW2 - BW3 - BW4	85 mm
BW2-90	BW2 - BW3 - BW4	90 mm
BW2-95	BW2 - BW3 - BW4	95 mm
BW2-100	BW2 - BW3 - BW4	100 mm
BW3-105	BW3 - BW4	105 mm
BW3-110	BW3 - BW4	110 mm
BW3-115	BW3 - BW4	115 mm
BW4-130	BW4	130 mm
BW4-145	BW4	145 mm

HTWP - TORQUE WRENCH PUMPS



Working pressure 700 Bar

Choice of air or electric power options

Supplied complete with hand pendant controller

Hi-Force hydraulic torque wrench pumps are compatible for use with all Hi-Force hydraulic torque wrenches. All models are 700 Bar maximum working pressure, fitted with an easily accessible and adjustable torque setting pressure relief valve, and are available as air driven or electric driven pump units. All pumps are supplied with a remote operation, push button hand pendant controller with three metres of control line cable. Glycerine filled, easy to read, dual scale (0-700 Bar/0-10,000 PSI) hydraulic pressure gauges are fitted as standard to all models. Air driven versions also include an integral inline filter, regulator, lubricator system with airline pressure gauge and an exhaust air cooling system.

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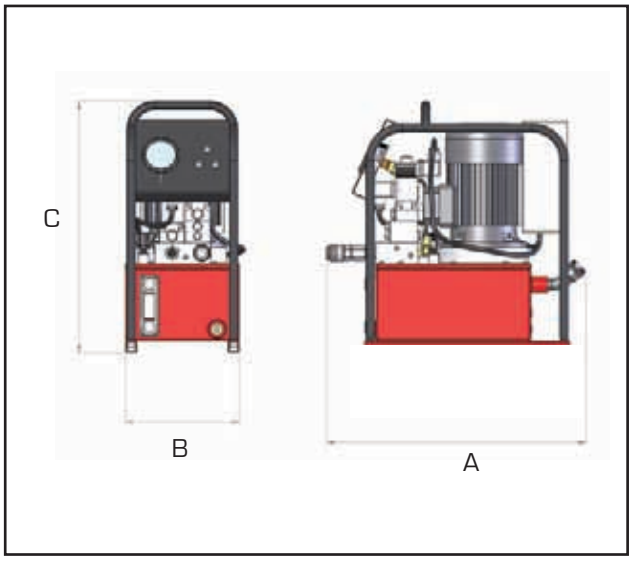
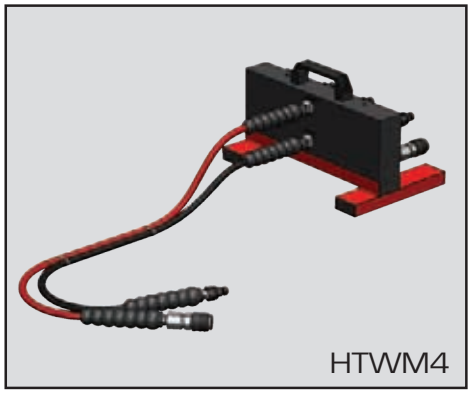
- Dual scale glycerine filled pressure gauge fitted as standard
- Two speed operation with choice of standard length hoses available
- Externally adjustable torque setting pressure relief valve fitted as standard
- Protective carrying frame and oil sight level gauge
- Air pressure gauge and filter-regulator-lubricator unit (air powered pumps only)
- Integral oil cooling system (air powered pumps only)
- HTWP2141/2AR are fitted with auto retract function as standard.



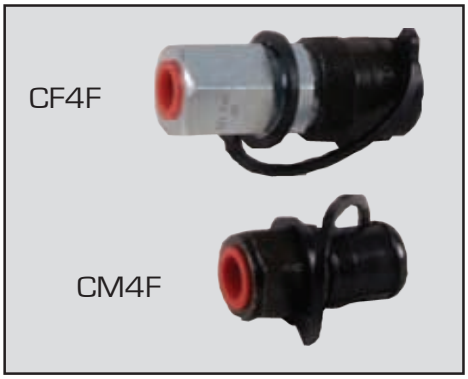
Model number	Max pressure bar	Power supply	Motor rating kW	Displacement l/min low pressure	high pressure	Changeover pressure bar	Weight kg	Dimensions in mm A	B	C
HTWP2140P	700	7 Bar	1.5	6.1	0.51	60	28.0	468	205	445
HTWP2141AR	700	110 volt	1.1	5.6	0.48	60	34.0	468	205	445
HTWP2142AR	700	240 volt	1.1	5.6	0.48	60	34.0	468	205	445
HTWP3140P-A	700	7 Bar	3.7	13.5	1.90	100	60.0	547	246	589
HTWP3141P-A	700	110 volt	1.5	6.3	0.90	100	72.0	547	246	653
HTWP3142P-A	700	240 volt	1.5	6.3	0.90	100	72.0	547	246	653

HTWP - TORQUE WRENCH PUMP ACCESSORIES



4-WAY MULTI SPLIT BLOCK

Model number	Description
HTWM4	Multi-split block complete with quick connect couplers. Suitable for use with up to 4 hydraulic wrenches from one pump unit



QUICK CONNECT COUPLINGS

Model number	Thread type	Description
CF4F	1/4" NPT Female	Female half coupler
CM4F	1/4" NPT Female	Male half coupler

Note: Always check for the required thread size when ordering spare or replacement couplings. If different thread size is required, please check available reducers and adaptors on page 54 of this catalogue.

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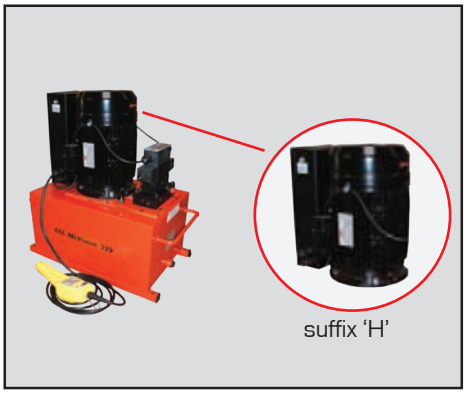
HYDRAULIC HOSES

Model number	Length metres	Description
HTWH4	4	Twin hose set with hose clips and quick connect couplers on both ends.
HTWH5	5	
HTWH6	6	
HTWH8	8	
HTWH10	10	

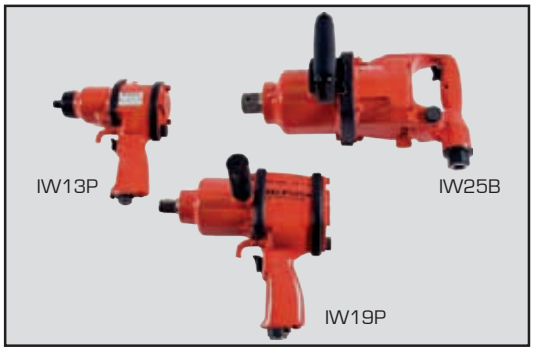
Note: Alternative length hoses available on request.



60 HZ ELECTRIC MOTOR

Suffix	
H	Please suffix your pump model with 'H' for 60Hz version

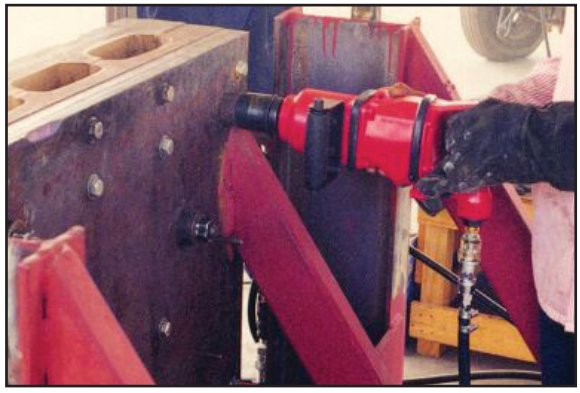
IW - PNEUMATIC IMPACT WRENCHES



- Industrial heavy duty design
- Square drive sizes from ½" to 1½"
- Excellent power to weight ratio

The IW range of heavy duty pneumatic impact wrenches is designed for high volume production, heavy maintenance and construction work. A choice of four models in square drive sizes ½", ¾", 1" or 1½" is available all offering an excellent power to weight ratio, compact design and low vibration. Available with pistol grip (models IW13P and IW19P) and back handle grip (models IW25B and IW38B) these high quality tools offer increased durability, low noise level and reduced operator fatigue. All models can be used for tightening and loosening applications and incorporate a four position adjustable power output device.

- Choice of four models
- Minimal noise and vibration features
- Operates from standard 6 Bar air pressure



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A full range of impact quality sockets, in both imperial and metric sizes, for use with Hi-Force impact wrenches is detailed on pages 72 and 73.

Model number	Square drive size	Bolt capacity mm	Bolt capacity inch	Free speed R.P.M.	Free speed I.P.M.	Max. torque Nm	Max. torque lbf.ft	Recommended torque Nm	Recommended torque lbf.ft	Air Consumption m^3/min	Air Consumption cfm	Weight kg
Pistol grip versions												
IW13P	½"	16	⅝"	6300	1200	500	369	90-400	65-295	0.35	12.5	2.8
IW19P	¾"	22	⅞"	3800	1100	1100	812	250-870	180-630	0.60	21.4	6.2
Back handle grip versions												
IW25B	1"	45	1¾"	3700	700	2340	1727	700-2000	517-1476	0.75	26.7	10.7
IW38B	1½"	50	2"	3000	600	3200	2361	800-2800	590-2066	0.82	29.2	16.0

FRL - FILTER/REGULATOR/LUBRICATOR UNIT

Model No	Description
FRL11	Air inlet filter, regulator and lubricator unit complete with airline pressure gauge, fitted in a strong steel carrying and protection frame. 3 metre air hose with end fittings included.

Hi-Force®

STUD BOLT TENSIONERS

STS - TOPSIDE STUD BOLT TENSIONERS - IMPERIAL RANGE

Capacities from 234 to 2649 kN

Working pressure 1500 Bar

Single acting design

- Nitrocarburised piston
- Maximum piston stroke indicator
- Suitable for single or multi-tensioning applications
- Specially designed tensioners available on request (see page 96)
- User friendly operating and maintenance procedure
- Choice of manually operated or air powered pumps available (see page 101)

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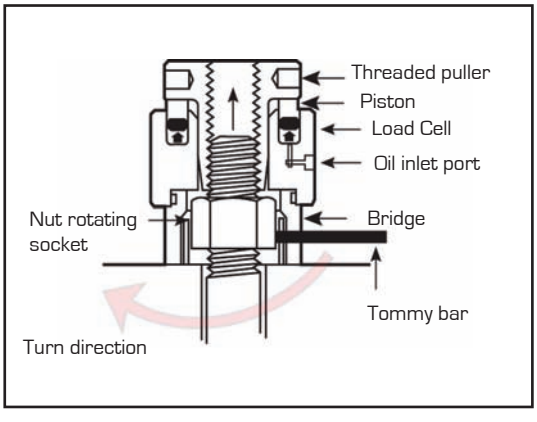
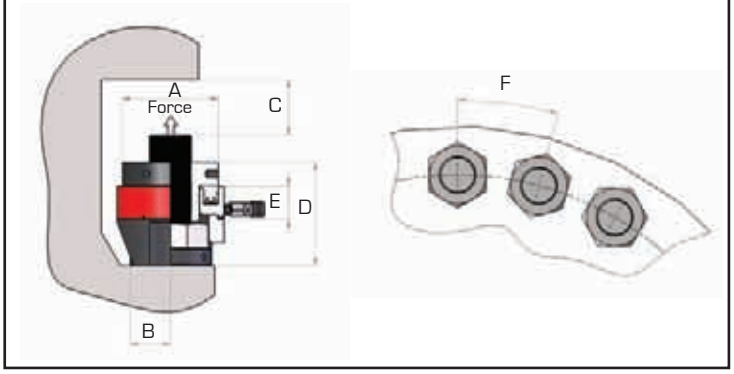
The STS imperial stud bolt tensioner range is designed for topside operation in a wide variety of applications including pipeline flanges, heat exchangers, pressure vessels, compressor covers, boiler feed pumps, anchor bolts and many others. The range comprises of 23 imperial size options ranging from ¾" to 4" thread size and all models are suitable for working pressures up to 1500 Bar. Each of the 6 models of hydraulic tensioning cylinder can be operated with a variety of threaded pullers and nut rotating sockets ensuring that the maximum possible range of bolt sizes can be accommodated using the minimum number of hydraulic cylinders. Threaded pullers and nut rotating sockets are available as individual components or as convenient thread size conversion kits (see pages 88 & 89 for detailed information). All Hi-Force hydraulic stud bolt tensioners are designed and manufactured to include a wear coated piston, maximum piston stroke indicator, self-energising high pressure seals, dual quick connect couplings for easy multiple tensioner connection and a user friendly operation and maintenance procedure. Suitable manual and air driven hydraulic pumps, high pressure hoses and couplings for use with Hi-Force stud bolt tensioners are detailed on pages 101 & 102.



STS - TOPSIDE STUD BOLT TENSIONERS - IMPERIAL RANGE

- Bolt sizes from ¾" to 4"
- Modular design for optimum versatility
- Dual quick connect couplings for easy connection

*Dimension D may vary, depending on bridge size used



Model number	Stud bolt thread size	Threads per inch	Capacity kN	Capacity tonnes	Effective area cm²	Stroke mm	Weight kg
STS1-075	¾"	10	234	23.9	15.6	10	1.7
STS1-087	⅞"	9	234	23.9	15.6	10	1.7
STS1-100	1"	8	234	23.9	15.6	10	1.7
STS1-112	1 ⅛"	8	234	23.9	15.6	10	1.7
STS2-125	1 ¼"	8	457	46.6	30.5	15	3.5
STS2-137	1 ⅜"	8	457	46.6	30.5	15	3.5
STS2-150	1 ½"	8	457	46.6	30.5	15	3.5
STS3-162	1 ⅝"	8	822	83.8	54.8	15	6.1
STS3-175	1 ¾"	8	822	83.8	54.8	15	6.1
STS3-187	1 ⅞"	8	822	83.8	54.8	15	6.1
STS3-200	2"	8	822	83.8	54.8	15	6.1
STS4-187	1 ⅞"	8	1264	128.9	84.3	15	10.6
STS4-200	2"	8	1264	128.9	84.3	15	10.6
STS4-225	2 ¼"	8	1264	128.9	84.3	15	10.6
STS4-250	2 ½"	8	1264	128.9	84.3	15	10.6
STS5-250	2 ½"	8	1833	186.9	122.2	15	16.0
STS5-275	2 ¾"	8	1833	186.9	122.2	15	16.0
STS5-300	3"	8	1833	186.9	122.2	15	16.0
STS6-300	3"	8	2649	270.0	176.6	15	23.5
STS6-325	3 ¼"	8	2649	270.0	176.6	15	23.5
STS6-350	3 ½"	8	2649	270.0	176.6	15	23.5
STS6-375	3 ¾"	8	2649	270.0	176.6	15	23.5
STS6-400	4"	8	2649	270.0	176.6	15	23.5

Dimensions in mm					
A	B	C min	D	E	F
74	28	74	90	45	51
74	28	74	90	45	54
74	30	80	98	45	61
74	30	80	98	45	64
102	39	103	128	54	74
102	39	103	128	54	77
102	39	103	128	54	80
133	47	115	150	56	92
133	47	115	150	56	93
133	47	115	150	56	97
133	50	117	155	56	104
163	50	119	149	57	104
163	62	119	149	57	106
163	62	135	165	57	121
163	62	135	165	57	127
193	73	145	187	60	134
193	73	145	187	60	140
193	73	145	187	60	147
233	84	178	216	64	161
233	84	178	216	64	167
233	84	178	216	64	172
233	105	205	257	64	191
233	105	205	257	64	196

Note: Weight is for load cell and bridge only. Total weight of complete assembly depends on size of puller and nut rotating socket selected.

STS-CK - STUD BOLT TENSIONER CONVERSION KITS - IMPERIAL

Typical Conversion Kit

Nut rotating socket

Threaded puller

For use with STS Imperial Tensioners

23 different kits available

Offers greater versatility

The modular design of Hi-Force STS series topside hydraulic stud bolt tensioners enables the user to adapt an existing STS tensioner assembly to another thread size, within the tensioner range, by purchasing a simple conversion kit. Comprising of a threaded puller and compatible nut rotating socket, Hi-Force STS-CK conversion kits offer the user even greater versatility at an economical cost.

Important note: Tensioner models STS1, STS3, STS4 & STS6 are available with two different bridge sizes, hence always check that the correct bridge is available on your existing STS tensioner prior to ordering a conversion kit. Bridges are available as individual components if required, see table below.

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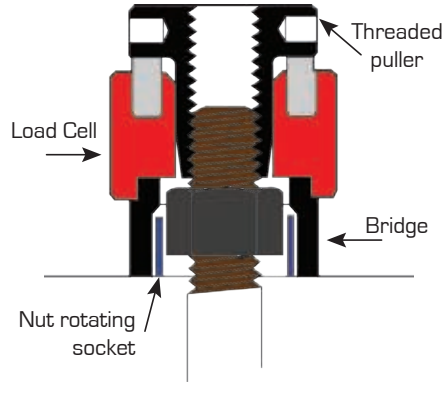
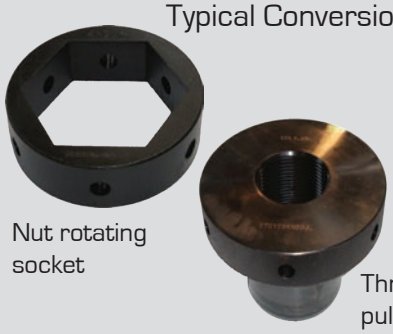
Bridge identification table :

Tensioner model	Bridge number	Compatible stud bolt size			Tensioner model	Bridge number	Compatible stud bolt size		
STS1 series	**STS1-B1**	3/4"	7/8"		STS4 series	**STS4-B1**	1 7/8"	2"	
	STS1-B2	1"	1 1/8"			**STS4-B2**	2"	2 1/4"	2 1/2"
STS2 series	**STS2-B1**	1 1/4"	1 3/8"	1 1/2"	STS5 series	**STS5-B1**	2 1/2"	2 3/4"	3"
STS3 series	**STS3-B1**	1 5/8"	1 3/4"	1 7/8"	STS6 series	**STS6-B1**	3"	3 1/4"	3 1/2"
	STS3-B2	1 3/4"	1 7/8"	2"		**STS6-B3**	3 3/4"	4"	

Note: Imperial models STS3-175, STS3-187 & STS4-200 are supplied with the smaller size bridge (B1), so that fitment in confined spaces is assured. Should these models be required to be supplied with the larger size bridge (B2), please add suffix 'B2' to the model number of the tensioner, e.g. STS3-175B2.



STS-CK - STUD BOLT CONVERSION KITS - IMPERIAL



- Cost saving option
- Easily fitted to existing tensioner assembly
- Supplied as a kit or as individual components

Conversion kit selection table :

From Tensioner	To convert tensioner model in left hand column to another size within its applicable range, select from the below table of conversion kits				
	¾" bolt size	⅞" bolt size	1" bolt size	1 ⅛" bolt size	
STS1-075	not applicable	**STS1-CK087**	**STS1-CK100**	**STS1-CK112**	
STS1-087	**STS1-CK075**	not applicable	**STS1-CK100**	**STS1-CK112**	
STS1-100	**STS1-CK075**	**STS1-CK087**	not applicable	**STS1-CK112**	
STS1-112	**STS1-CK075**	**STS1-CK087**	**STS1-CK100**	not applicable	
	1 ¼" bolt size	1 ⅜" bolt size	1 ½" bolt size		
STS2-125	not applicable	**STS2-CK137**	**STS2-CK150**		
STS2-137	**STS2-CK125**	not applicable	**STS2-CK150**		
STS2-150	**STS2-CK125**	**STS2-CK137**	not applicable		
	1 ⅝" bolt size	1 ¾" bolt size	1 ⅞" bolt size	2" bolt size	
STS3-162	not applicable	**STS3-CK175**	**STS3-CK187**	**STS3-CK200**	
STS3-175	**STS3-CK162**	not applicable	**STS3-CK187**	**STS3-CK200**	
STS3-187	**STS3-CK162**	**STS3-CK175**	not applicable	**STS3-CK200**	
STS3-200	**STS3-CK162**	**STS3-CK175**	**STS3-CK187**	not applicable	
	1 ⅞" bolt size	2" bolt size	2 ¼" bolt size	2 ½" bolt size	
STS4-187	not applicable	**STS4-CK200**	**STS4-CK225**	**STS4-CK250**	
STS4-200	**STS4-CK187**	not applicable	**STS4-CK225**	**STS4-CK250**	
STS4-225	**STS4-CK187**	**STS4-CK200**	not applicable	**STS4-CK250**	
STS4-250	**STS4-CK187**	**STS4-CK200**	**STS4-CK225**	not applicable	
	2 ½" bolt size	2 ¾" bolt size	3" bolt size		
STS5-250	not applicable	**STS5-CK275**	**STS5-CK300**		
STS5-275	**STS5-CK250**	not applicable	**STS5-CK300**		
STS5-300	**STS5-CK250**	**STS5-CK275**	not applicable		
	3" bolt size	3 ¼" bolt size	3 ½" bolt size	3 ¾" bolt size	4" bolt size
STS6-300	not applicable	**STS6-CK325**	**STS6-CK350**	**STS6-CK375**	**STS6-CK400**
STS6-325	**STS6-CK300**	not applicable	**STS6-CK350**	**STS6-CK375**	**STS6-CK400**
STS6-350	**STS6-CK300**	**STS6-CK325**	not applicable	**STS6-CK375**	**STS6-CK400**
STS6-375	**STS6-CK300**	**STS6-CK325**	**STS6-CK350**	not applicable	**STS6-CK400**
STS6-400	**STS6-CK300**	**STS6-CK325**	**STS6-CK350**	**STS6-CK375**	not applicable

Note: Remember to check bridge compatibility for STS1, STS3, STS4 and STS6 models when ordering conversion kits.

STS - TOPSIDE STUD BOLT TENSIONERS - METRIC RANGE

STS3-M52

Capacities from 234 to 2649 kN

Working pressure 1500 Bar

Single acting design

- Nitrocarburised piston
- Maximum piston stroke indicator
- Suitable for single or multi-tensioning applications
- Specially designed tensioners available on request (see page 96)
- User friendly operating and maintenance procedure
- Choice of manually operated or air powered pumps available (see page 101)

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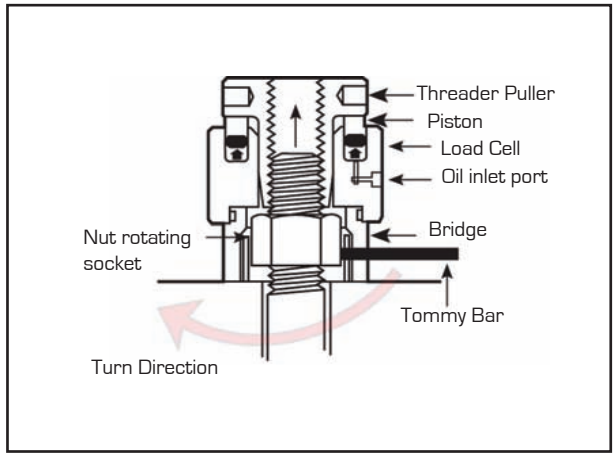
The STS metric stud bolt tensioner range is designed for topside operation in a wide variety of applications including pipeline flanges, heat exchangers, pressure vessels, compressor covers, boiler feed pumps, anchor bolts and many others. The range comprises of 23 metric size options ranging from M16 to M100 thread size and all models are suitable for working pressures up to 1500 Bar. Each of the 6 models of hydraulic tensioning cylinder can be operated with a variety of threaded pullers and nut rotating sockets ensuring that the maximum possible range of bolt sizes can be accommodated using the minimum number of hydraulic cylinders. Threaded pullers and nut rotating sockets are available as individual components or as convenient thread size conversion kits (see pages 92 to 93 for detailed information).

All Hi-Force hydraulic stud bolt tensioners are designed and manufactured to include a wear coated piston, maximum piston stroke indicator, self-energising high pressure seals, dual quick connect couplings for easy multiple tensioner connection and a user friendly operation and maintenance procedure. Suitable manual and air driven hydraulic pumps, high pressure hoses and couplings for use with Hi-Force stud bolt tensioners are detailed on pages 101 & 102.

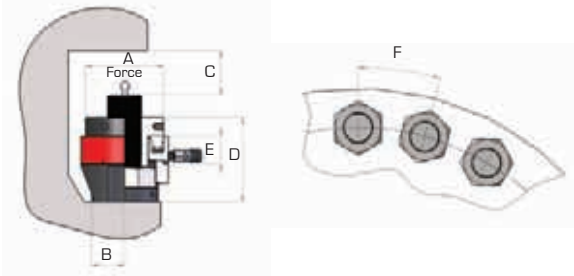


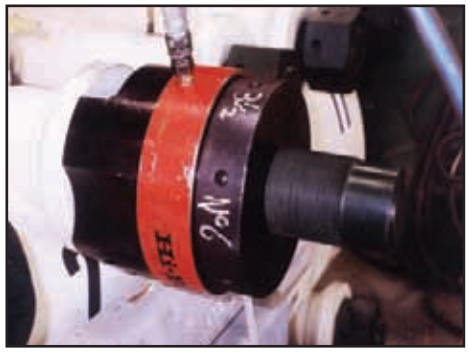
STS - TOPSIDE STUDBOLT TENSIONERS - METRIC RANGE

STS3-M52

- Bolt sizes from M16 to M100
- Modular design for optimum versatility
- Dual quick couplings for easy connection

*Dimension D may vary, depending on bridge size used





Model number	Stud bolt thread size	Thread pitch	Capacity kN	Capacity tonnes	Effective area cm²	Stroke mm	Weight kg	Dimensions in mm A	B	C	D	E	F
STS1-M16	M16	2	234	23.9	15.6	10	1.7	74	28	74	90	45	47
STS1-M18	M18	2.5	234	23.9	15.6	10	1.7	74	28	74	90	45	49
STS1-M20	M20	2.5	234	23.9	15.6	10	1.7	74	28	74	90	45	51
STS1-M22	M22	2.5	234	23.9	15.6	10	1.7	74	30	80	98	45	56
STS1-M24	M24	3	234	23.9	15.6	10	1.7	74	30	80	98	45	59
STS1-M27	M27	3	234	23.9	15.6	10	1.7	74	30	80	98	45	61
STS2-M30	M30	3.5	457	46.6	30.5	15	3.5	102	39	103	128	54	71
STS2-M33	M33	3.5	457	46.6	30.5	15	3.5	102	39	103	128	54	74
STS2-M36	M36	4	457	46.6	30.5	15	3.5	102	39	103	128	54	77
STS2-M39	M39	4	457	46.6	30.5	15	3.5	102	39	103	128	54	80
STS3-M42	M42	4.5	822	83.8	54.8	15	6.1	133	47	115	150	56	91
STS3-M45	M45	4.5	822	83.8	54.8	15	6.1	133	47	115	150	56	94
STS3-M48	M48	5	822	83.8	54.8	15	6.1	133	47	115	150	56	97
STS3-M52	M52	5	822	83.8	54.8	15	6.1	133	50	117	155	56	105
STS4-M48	M48	5	1264	128.9	84.3	15	10.6	163	50	119	149	57	105
STS4-M52	M52	5	1264	128.9	84.3	15	10.6	163	50	119	149	57	108
STS4-M56	M56	5.5	1264	128.9	84.3	15	10.6	163	62	135	165	57	120
STS4-M60	M60	5.5	1264	128.9	84.3	15	10.6	163	62	135	165	57	124
STS4-M64	M64	6	1264	128.9	84.3	15	10.6	163	62	135	165	57	126
STS5-M64	M64	6	1833	186.9	122.2	15	16.0	193	73	145	187	60	134
STS5-M68	M68	6	1833	186.9	122.2	15	16.0	193	73	145	187	60	136
STS5-M72	M72	6	1833	186.9	122.2	15	16.0	193	73	145	187	60	139
STS5-M76	M76	6	1833	186.9	122.2	15	16.0	193	73	145	187	60	142
STS6-M76	M76	6	2649	270.0	176.6	15	23.5	233	84	178	216	64	158
STS6-M80	M80	6	2649	270.0	176.6	15	23.5	233	84	178	216	64	160
STS6-M85	M85	6	2649	270.0	176.6	15	23.5	233	84	178	216	64	162
STS6-M90	M90	6	2649	270.0	176.6	15	23.5	233	84	178	216	64	170
STS6-M95	M95	6	2649	270.0	176.6	15	23.5	233	105	205	257	64	184
STS6-M100	M100	6	2649	270.0	176.6	15	23.5	233	105	205	257	64	190

Note: Weight is for load cell and bridge only. Total weight of complete assembly depends on size of puller and nut rotating socket selected.

STS-CK - STUD BOLT TENSIONER CONVERSION KITS - METRIC

Typical Conversion Kit

Nut rotating socket

Threaded puller

- Cost saving option
- Easily fitted to existing tensioner assembly
- Offers greater versitility

Similar to the imperial thread conversion kits (pages 88 & 89), the Hi-Force metric topside hydraulic stud bolt tensioners are also modular in design and can be adapted to another thread size, within the tensioner range, by purchasing a simple conversion kit. Comprising of a threaded puller and nut rotating socket, Hi-Force STS-CK conversion kits offer the user even greater versatility at an economical cost.

Important note: Tensioner models STS1, STS3, STS4 & STS6 are available with two different bridge sizes, hence always check that the correct bridge is available on your existing STS tensioner prior to ordering a conversion kit. Bridges are available as individual components if required, see table below.

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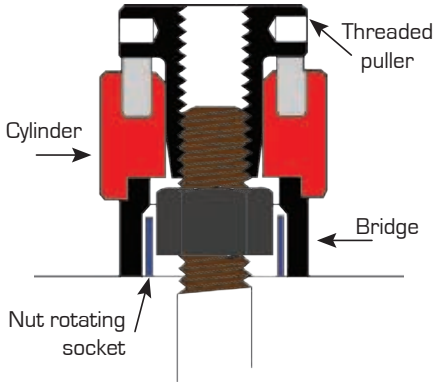
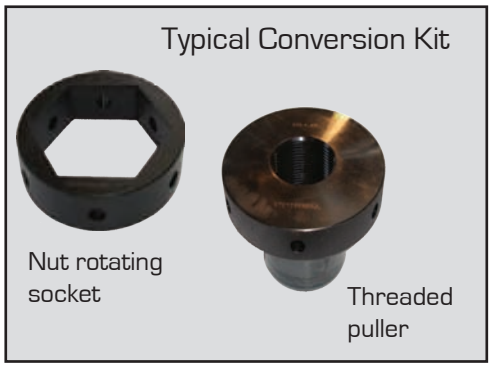
Bridge identification table :

Tensioner model	Bridge number	Compatible stud bolt size				Tensioner model	Bridge number	Compatible stud bolt size			
STS1 series	**STS1-B1**	M16	M18	M20		STS4 series	**STS4-B1**	M48	M52		
	STS1-B2	M22	M24	M27			**STS4-B2**	M52	M56	M60	M64
STS2 series	**STS2-B1**	M30	M33	M36	M39	STS5 series	**STS5-B1**	M64	M68	M72	M76
STS3 series	**STS3-B1**	M42	M45	M48		STS6 series	**STS6-B1**	M76	M80	M85	M90
	STS3-B2	M45	M48	M52			**STS6-B3**	M95	M100		

Note: Metric models STS3-M45, STS3-M48 & STS4-M52 are all supplied with the smaller size bridge (B1), so that fitment in confined spaces is assured. Should these models be required to be supplied with the larger size bridge (B2), please add suffix 'B2' to the model number of the tensioner, e.g. STS3-M48B2.



STS-CK - STUD BOLT TENSIONER CONVERSION KITS- METRIC



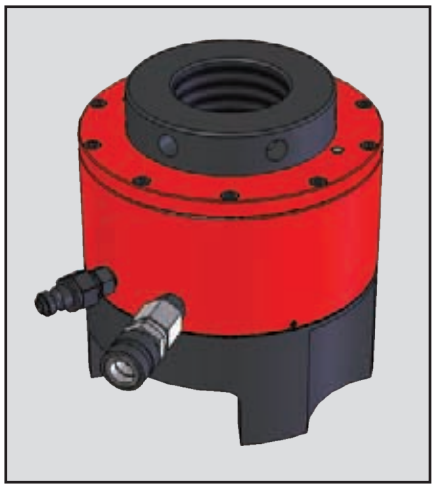
- Cost saving option
- Easily fitted to existing tensioner assembly
- Supplied as a kit or as individual components

Conversion kit selection table :

From Tensioner	To convert tensioner model in left hand column to another size within its applicable range, select from table of conversion kits below					
	M16 bolt size	M18 bolt size	M20 bolt size	M22 bolt size	M24 bolt size	M27 bolt size
STS1-M16	not applicable	STS1-CKM18	STS1-CKM20	STS1-CKM22	STS1-CKM24	STS1-CKM27
STS1-M18	STS1-CKM16	not applicable	STS1-CKM20	STS1-CKM22	STS1-CKM24	STS1-CKM27
STS1-M20	STS1-CKM16	STS1-CKM18	not applicable	STS1-CKM22	STS1-CKM24	STS1-CKM27
STS1-M22	STS1-CKM16	STS1-CKM18	STS1-CKM20	not applicable	STS1-CKM24	STS1-CKM27
STS1-M24	STS1-CKM16	STS1-CKM18	STS1-CKM20	STS1-CKM22	not applicable	STS1-CKM27
STS1-M27	STS1-CKM16	STS1-CKM18	STS1-CKM20	STS1-CKM22	STS1-CKM24	not applicable
	M30 bolt size	M33 bolt size	M36 bolt size	M39 bolt size		
STS2-M30	not applicable	STS2-CKM33	STS2-CKM36	STS2-CKM39		
STS2-M33	STS2-CKM30	not applicable	STS2-CKM36	STS2-CKM39		
STS2-M36	STS2-CKM30	STS2-CKM33	not applicable	STS2-CKM39		
STS2-M39	STS2-CKM30	STS2-CKM33	STS2-CKM36	not applicable		
	M42 bolt size	M45 bolt size	M48 bolt size	M52 bolt size		
STS3-M42	not applicable	STS3-CKM45	STS3-CKM48	STS3-CKM52		
STS3-M45	STS3-CKM42	not applicable	STS3-CKM48	STS3-CKM52		
STS3-M48	STS3-CKM42	STS3-CKM45	not applicable	STS3-CKM52		
STS3-M52	STS3-CKM42	STS3-CKM45	STS3-CKM48	not applicable		
	M48 bolt size	M52 bolt size	M56 bolt size	M60 bolt size	M64 bolt size	
STS4-M48	not applicable	STS4-CKM52	STS4-CKM56	STS4-CKM60	STS4-CKM64	
STS4-M52	STS4-CKM48	not applicable	STS4-CKM56	STS4-CKM60	STS4-CKM64	
STS4-M56	STS4-CKM48	STS4-CKM52	not applicable	STS4-CKM60	STS4-CKM64	
STS4-M60	STS4-CKM48	STS4-CKM52	STS4-CKM56	not applicable	STS4-CKM64	
STS4-M64	STS4-CKM48	STS4-CKM52	STS4-CKM56	STS4-CKM60	not applicable	
	M64 bolt size	M68 bolt size	M72 bolt size	M76 bolt size		
STS5-M64	not applicable	STS5-CKM68	STS5-CKM72	STS5-CKM76		
STS5-M68	STS5-CKM64	not applicable	STS5-CKM72	STS5-CKM76		
STS5-M72	STS5-CKM64	STS5-CKM68	not applicable	STS5-CKM76		
STS5-M76	STS5-CKM64	STS5-CKM68	STS5-CKM72	not applicable		
	M76 bolt size	M80 bolt size	M85 bolt size	M90 bolt size	M95 bolt size	M100 bolt size
STS6-M76	not applicable	STS6-CKM80	STS6-CKM85	STS6-CKM90	STS6-CKM95	STS6-CKM100
STS6-M80	STS6-CKM76	not applicable	STS6-CKM85	STS6-CKM90	STS6-CKM95	STS6-CKM100
STS6-M85	STS6-CKM76	STS6-CKM80	not applicable	STS6-CKM90	STS6-CKM95	STS6-CKM100
STS6-M90	STS6-CKM76	STS6-CKM80	STS6-CKM85	not applicable	STS6-CKM95	STS6-CKM100
STS6-M95	STS6-CKM76	STS6-CKM80	STS6-CKM85	STS6-CKM90	not applicable	STS6-CKM100
STS6-M100	STS6-CKM76	STS6-CKM80	STS6-CKM85	STS6-CKM90	STS6-CKM95	not applicable

Note: Remember to check bridge compatibility for STS1, STS3, STS4 and STS6 models when ordering conversion kits.

STS-SR - SPRING RETURN STUD BOLT TENSIONERS - IMPERIAL



Imperial bolt size range from 2 ½" to 4"

Maximum working pressure 1500 Bar

Spring assisted piston retraction

The STS-SR imperial range of hydraulic stud bolt tensioners, offers all of the features and benefits of our standard STS range (see pages 86-87), but with the added feature of spring assisted return hydraulic pistons. Designed primarily for topside operation, this additional spring return piston feature will reduce bolt tensioning cycle times considerably, as the tensioner piston will automatically retract immediately after the hydraulic pressure is released. The range currently comprises of 8 models, suitable for standard size stud bolts from 2 ½ " to 4" diameter. For bolt sizes less than 2 ½" diameter, where manually retracting the tensioner piston is much easier and faster, please refer to our standard STS range on pages 86-87. We can, if necessary, design and manufacture spring return piston versions, for bolt sizes less than 2 ½" diameter, to special order.

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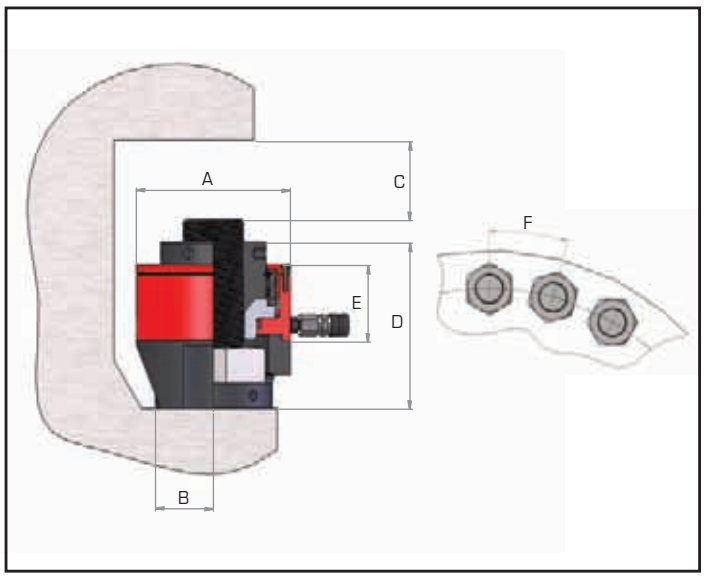
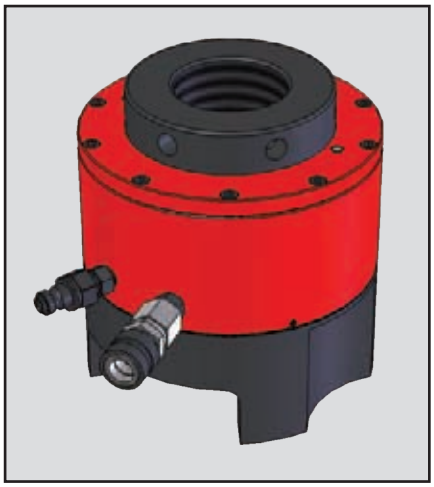
The versatility of the STS-SR stud bolt tensioner range, is identical to our standard STS range, with a variety of interchangeable threaded pullers and nut rotating sockets available, either as bolt size conversion kits or individual parts. Further details on STS-SR conversion kits are available on request. All STS-SR stud bolt tensioners are designed and manufactured with a wear coated piston, maximum stroke indicator, self energising high pressure seals, dual quick connect couplers, for easy multiple tensioner hook up and operate at pressures up to 1500 Bar maximum.

Suitable hydraulic pumps and high pressure hydraulic hose assemblies for use with STS-SR tensioners are detailed on pages 101 & 102.



Model number	Stud bolt thread size	Thread Pitch	Capacity Kn	Capacity Tonnes	Effective Area cm^2	Stroke	Weight	Dimensions in mm A	B	C	D	E	F
STS5-250SR	2 ½"	8	1846	188.2	123.1	15	23.2	193	73	96	208	96	134
STS5-275SR	2 ¾"	8	1846	188.2	123.1	15	23.2	193	73	96	208	96	140
STS5-300SR	3"	8	1846	188.2	123.1	15	23.2	193	73	96	208	96	147
STS6-300SR	3"	8	2657	270.8	177.1	15	35.9	233	84	97	229	97	161
STS6-325SR	3 ¼"	8	2657	270.8	177.1	15	35.9	233	84	97	229	97	167
STS6-350SR	3 ½"	8	2657	270.8	177.1	15	35.9	233	84	97	229	97	172
STS6-375SR	3 ¾"	8	2657	270.8	177.1	15	41.1	233	105	97	270	97	191
STS6-400SR	4"	8	2657	270.8	177.1	15	41.1	233	105	97	270	97	196

STS-SR - SPRING RETURN STUD BOLT TENSIONERS - METRIC



Metric bolt size range from M64 to M100

Maximum working pressure 1500 Bar

Spring assisted piston retraction

The STS-SR metric range of hydraulic stud bolt tensioners offers all of the features and benefits of our standard STS range (see pages 88-89), but with the added feature of spring assisted return hydraulic pistons. Designed primarily for topside operation, this additional spring return piston feature, will reduce bolt tensioning cycle times considerably, as the tensioner piston will automatically retract, immediately after the hydraulic pressure is released. The range currently comprises of 10 models, suitable for standard size stud bolts from M64 to M100 diameter. For bolt sizes below M64 diameter, where manually retracting the tensioner piston is much faster, please refer to our standard STS range on pages 88-89. We can, if necessary, design and manufacture spring return piston versions for bolt sizes less than M64 diameter, to special order.

The versatility of the STS-SR stud bolt tensioner range, is identical to our standard STS range, with a variety of interchangeable threaded pullers and nut rotating sockets available, either as bolt size conversion kits or individual parts. All STS-SR stud bolt tensioners are designed and manufactured with a wear coated piston, maximum stroke indicator, self energising high pressure seals, dual quick connect couplers, for easy multiple tensioner hook up and operate at pressures up to 1500 Bar maximum. Suitable hydraulic pumps and high pressure hydraulic hose assemblies for use with SRS-SR tensioners are detailed on pages 101-102.

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Note ...

Standard STS conversion kits are NOT compatible for use with STS-SR tensioners. STS-SR conversion kits are available to special order.

Model number	Stud bolt thread size	Thread Pitch	Capacity Kn	Capacity Tonnes	Effective Area cm^2	Stroke	Weight	Dimensions in mm A	B	C	D	E	F
STS5-M64SR	M64	6	1846	188.2	123.1	15	23.2	193	73	96	208	96	134
STS5-M68SR	M68	6	1846	188.2	123.1	15	23.2	193	73	96	208	96	136
STS5-M72SR	M72	6	1846	188.2	123.1	15	23.2	193	73	96	208	96	139
STS5-M76SR	M76	6	1846	188.2	123.1	15	23.2	193	73	96	208	96	142
STS6-M76SR	M76	6	2657	270.8	177.1	15	35.9	233	84	107	229	97	158
STS6-M80SR	M80	6	2657	270.8	177.1	15	35.9	233	84	107	229	97	160
STS6-M85SR	M85	6	2657	270.8	177.1	15	35.9	233	84	107	229	97	162
STS6-M90SR	M90	6	2657	270.8	177.1	15	35.9	233	84	107	229	97	170
STS6-M95SR	M95	6	2657	270.8	177.1	15	41.1	233	105	107	270	97	184
STS6-M100SR	M100	6	2657	270.8	177.1	15	41.1	233	105	107	270	97	190

Note: For dimensional drawing, please see page 94.

STS - SPECIAL DESIGN TOPSIDE STUD BOLT TENSIONERS

Custom built to your requirements

Working pressure up to 1500 Bar

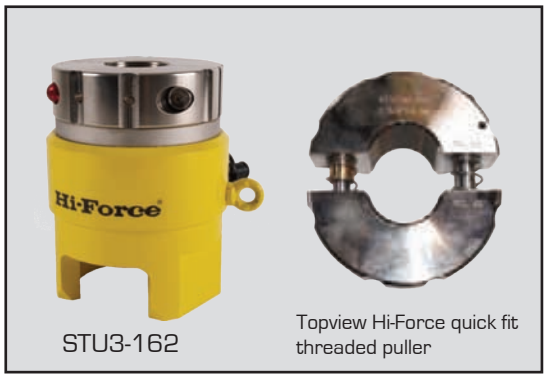
Short delivery lead time

In addition to the large range of standard topside stud bolt tensioners available, Hi-Force has the capability to manufacture tensioners to suit special requirements. Our product designs incorporate the latest Solid Works computer technology and together with our 'state of the art' CNC production machinery, we have the capability to offer a solution to meet your needs.

Example of situations where Hi-Force have been able to offer bespoke solutions include:

- Non standard sizes and shapes of nut requiring special bridges
- Nuts recessed into holes requiring special sockets
- Studs with two different thread sizes
- Larger sizes of stud
- Applications with restricted space requirements
- Systems with different operating pressures
- Bridges with increased load bearing area

STU - SUB SEA STUD BOLT TENSIONERS - IMPERIAL

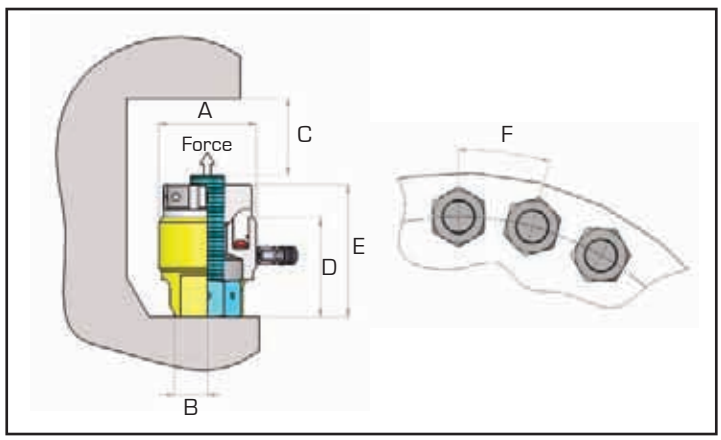


STU3-162

Topview Hi-Force quick fit threaded puller

- Working pressure 1500 Bar
- Interchangeable quickfit/release pullers
- Load cell with integral bridge

Hi-Force STU series sub-sea stud bolt tensioners are designed and manufactured to suit the demanding requirements of divers operating in harsh sub-sea environments. With an easy to operate two piece design comprising of a quick fit/release threaded puller and a hydraulic load cell with integral bridge and an extra long 30mm piston stroke to reduce re-setting operations. Hi-Force STU series sub-sea bolt tensioners offer a consistent, reliable and cost effective method of tensioning sub-sea bolted joints. All hydraulic load cells are suitable for different thread sizes (see table below and on page 98) and interchangeable quick fit/release pullers can be ordered separately, as required, resulting in even greater flexibility and cost savings.



H

Model number	Stud bolt thread size	Capacity kN	Capacity Tonnes	Effective area cm²	Stroke mm	Weight kg
STU1-100	1" - 8UN	256.04	26.10	17.07	30	3.2
STU1-112	1 1/8" - 8UN	256.04	26.10	17.07	30	3.2
STU2-125	1 1/4" - 8UN	430.36	43.87	28.69	30	4.8
STU2-137	1 3/8" - 8UN	430.36	43.87	28.69	30	4.8
STU3-150	1 1/2" - 8UN	533.39	56.41	36.89	30	6.2
STU3-162	1 5/8" - 8UN	533.39	56.41	36.89	30	6.2
STU4-175	1 3/4" - 8UN	756.30	77.09	50.42	30	8.5
STU4-187	1 7/8" - 8UN	756.30	77.09	50.42	30	8.5
STU5-200	2" - 8UN	1168.19	119.08	77.88	30	12.2
STU5-225	2 1/4" - 8UN	1168.19	119.08	77.88	30	12.2
STU6-250	2 1/2" - 8UN	1649.12	168.11	109.94	30	19.2
STU6-275	2 3/4" - 8UN	1649.12	168.11	109.94	30	19.2
STU7-300	3" - 8UN	2483.44	253.15	165.56	30	29.0
STU7-325	3 1/4" - 8UN	2483.44	253.15	165.56	30	29.0
STU7-350	3 1/2" - 8UN	2483.44	253.15	165.56	30	29.0

Dimensions in mm					
A	B	C	D	E	F
82	22	129	129	150	61
82	22	129	129	150	64
102	30	140	140	164	73
102	30	140	140	164	75
114	35	142	142	169	82
114	35	142	142	169	85
128	41	151	151	181	94
128	41	151	151	181	98
148	48	164	164	202	112
148	48	164	164	202	116
176	60	183	183	231	136
176	60	183	183	231	141
215	89	215	215	260	162
215	89	215	215	260	173
215	89	215	215	260	175

STU - SUB-SEA STUD BOLT TENSIONERS - METRIC

STU3-42

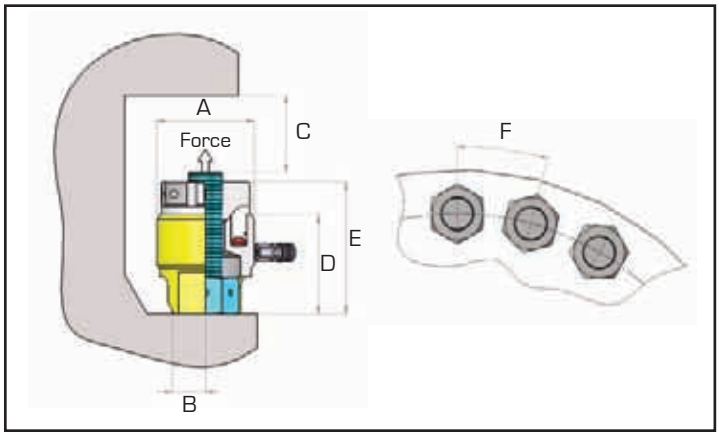
Topview Hi-Force quick fit threaded puller

Working pressure 1500 Bar

Interchangeable quickfit/release pullers

Load cell with integral bridge

- Dual hose connection for easy hook up
- Extra long 30mm piston stroke to reduce re-setting time
- Maximum piston stroke indicator
- Corrosion protected for operation in harsh sub-sea environments



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Model number	Stud bolt thread size	Capacity kN	Capacity Tonnes	Effective area cm²	Stroke mm	Weight kg
STU1-24	M24 x 2	256.04	26.10	17.07	30	3.2
STU1-27	M27 x 3	256.04	26.10	17.07	30	3.2
STU2-30	M30 x 3.5	430.36	43.87	28.69	30	4.8
STU2-33	M33 x 3.5	430.36	43.87	28.69	30	4.8
STU2-36	M36 x 4	430.36	43.87	28.69	30	4.8
STU3-39	M39 x 4	553.39	56.41	36.89	30	6.2
STU3-42	M42 x 4.5	553.39	56.41	36.89	30	6.2
STU4-45	M45 x 4.5	756.30	77.09	50.42	30	8.5
STU4-48	M48 x 5	756.30	77.09	50.42	30	8.5
STU5-52	M52 x 5	1168.19	119.08	77.88	30	12.2
STU5-56	M56 x 5.5	1168.19	119.08	77.88	30	12.2
STU6-60	M60 x 5.5	1649.12	168.11	109.94	30	19.2
STU6-64	M64 x 6	1649.12	168.11	109.94	30	19.2
STU6-68	M68 x 6	1649.12	168.11	109.94	30	19.2
STU6-72	M72 x 6	1649.12	168.11	109.94	30	19.2
STU7-76	M76 x 6	2483.44	253.15	165.56	30	29.0
STU7-80	M80 x 6	2483.44	253.15	165.56	30	29.0
STU7-85	M85 x 6	2483.44	253.15	165.56	30	29.0
STU7-90	M90 x 6	2483.44	253.15	165.56	30	29.0

Dimensions in mm					
A	B	C	D	E	F
82	22	129	129	150	61
82	22	129	129	150	64
102	30	140	140	164	73
102	30	140	140	164	75
102	30	140	140	164	78
114	35	142	142	169	82
114	35	142	142	169	85
128	41	151	151	181	94
128	41	151	151	181	98
148	48	164	164	202	112
148	48	164	164	202	116
176	60	183	183	231	136
176	60	183	183	231	136
176	60	183	183	231	136
176	60	183	183	231	141
215	94	215	215	260	164
215	94	215	215	260	164
215	94	215	215	260	175
215	94	215	215	260	175

HTN - HYDRAULIC TENSIONER NUTS - IMPERIAL

- Integral mechanical load retaining collar
- Working pressure 1500 Bar
- Imperial thread sizes from 1" to 4"

The Hi-Force HTN range of imperial top collar hydraulic nuts is specifically designed and manufactured for applications where regular, periodic opening of the joint, for inspection and maintenance purposes is required. Unlike conventional hydraulic stud bolt tensioners, Hi-Force HTN series hydraulic nuts are designed to permanently replace standard hexagon nuts, on one side of the bolted joint. Initially the bolt tension/elongation is applied hydraulically and once achieved, it is permanently retained via the integral mechanical load retaining collar.

Whilst initial investment in Hi-Force HTN series hydraulic nuts is significantly higher than the cost of standard hexagon nuts, this investment is quickly and easily recovered, when the user considers the huge time savings achieved, during joint opening and closing, when compared to using conventional hydraulic stud bolt tensioners or hydraulic torque wrenches. Standard range models are available for imperial stud bolt sizes from 1" to 4", with other sizes available to special order.

All models are 1500 Bar maximum working pressure and supplied with quick connect hydraulic couplings, compatible for use with Hi-Force air or manually operated hydraulic stud bolt tensioner pumps (see page 101).

Model No	Stud Bolt Size	Capacity kN	Capacity tonnes	Effective area cm^2	Stroke mm	Diameter mm	Height mm	Weight kg
HTN1-100	1"- 8 UN	198.27	20.21	13.22	5	72	55	1.9
HTN2-112	1 ⅛" - 8 UN	216.30	22.05	14.42	5	75	55	2.0
HTN3-125	1 ¼" - 8 UN	252.94	25.78	16.86	5	82	57	2.4
HTN4-137	1 ⅜" - 8 UN	305.83	31.18	20.39	5	88	57	2.7
HTN5-150	1 ½" - 8 UN	344.12	35.08	22.94	6	93	58	2.9
HTN6-162	1 ⅝" - 8 UN	397.61	40.53	26.51	6	100	62	3.5
HTN7-175	1 ¾" - 8 UN	475.01	48.42	31.67	6	106	64	4.0
HTN8-187	1 ⅞" - 8 UN	501.40	51.11	33.43	6	110	64	4.2
HTN9-200	2" - 8 UN	563.72	57.46	37.58	6	117	67	4.9
HTN10-225	2 ¼" - 8 UN	746.44	76.09	49.76	8	128	74	6.4
HTN11-250	2 ½" - 8 UN	905.13	92.27	60.34	8	141	77	8.0
HTN12-275	2 ¾" - 8 UN	999.85	101.92	66.66	8	150	78	8.8
HTN13-300	3"- 8 UN	1203.43	122.67	80.23	8	162	81	10.6
HTN14-325	3 ¼" - 8 UN	1413.72	144.11	94.25	10	174	87	12.9
HTN15-350	3 ½" - 8 UN	1605.04	163.61	107.00	10	187	95	16.2
HTN16-375	3 ¾" - 8 UN	1704.59	173.76	113.64	10	194	102	18.3
HTN17-400	4"- 8 UN	1911.46	194.85	127.43	10	205	110	21.9

HTN - HYDRAULIC TENSIONER NUTS - METRIC

HTN8-M48

- Integral mechanical load retaining collar
- Working pressure 1500 Bar
- Metric thread sizes from M24 to M100

The Hi-Force HTN range of metric top collar hydraulic nuts is specifically designed and manufactured for applications where regular, periodic opening of the joint for inspection and maintenance purposes is required. Unlike conventional hydraulic stud bolt tensioners, Hi-Force HTN series hydraulic nuts are designed to permanently replace standard hexagon nuts on one side of the bolted joint. Initially the bolt tension/elongation is applied hydraulically and once achieved, it is permanently retained via the integral mechanical load retaining collar. Whilst initial investment in Hi-Force HTN series hydraulic nuts is significantly higher than the cost of standard hexagon nuts, this investment is quickly and easily recovered, when the user considers the huge time savings achieved, during joint opening and closing, when compared to using conventional hydraulic stud bolt tensioners or hydraulic torque wrenches. Standard range models are available for stud bolt sizes from M24 to M100, with other sizes available to special order.

All models are 1500 Bar maximum working pressure and supplied with quick connect hydraulic couplings, compatible for use with Hi-Force air or manually operated hydraulic stud bolt tensioner pumps (see page 101).

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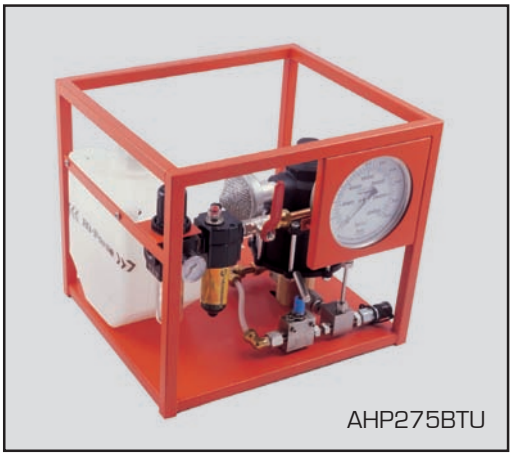
Model number	Stud bolt size	Capacity kN	Capacity tonnes	Effective area cm^2	Stroke mm	Diameter mm	Height mm	Weight kg
HTN1-M24	M24 x 2	198.27	20.21	13.22	5	72	55	1.9
HTN2-M27	M27 x 3	216.30	22.05	14.42	5	75	55	2.0
HTN3-M30	M30 x 3.5	252.94	25.78	16.86	5	82	57	2.4
HTN3-M33	M33 x 3.5	252.94	25.78	16.86	5	82	57	2.4
HTN4-M36	M36 x 4	305.83	31.18	20.39	5	88	57	2.7
HTN5-M39	M39 x 4	344.12	35.08	22.94	6	93	58	2.9
HTN6-M42	M42 x 4.5	397.61	40.53	26.51	6	100	62	3.5
HTN7-M45	M45 x 4.5	475.01	48.42	31.67	6	106	64	4.0
HTN8-M48	M48 x 5	501.40	51.11	33.43	6	110	64	4.2
HTN9-M52	M52 x 5	563.72	57.46	37.58	6	117	67	4.9
HTN10-M56	M56 x 5.5	746.44	76.09	49.76	8	128	74	6.4
HTN11-M60	M60 x 5.5	905.13	92.27	60.34	8	141	77	8.0
HTN11-M64	M64 x 6	905.13	92.27	60.34	8	141	77	8.0
HTN12-M68	M68 x 6	999.85	101.92	66.66	8	150	78	8.8
HTN13-M72	M72 x 6	1203.43	122.67	80.23	8	162	81	10.6
HTN13-M76	M76 x 6	1203.43	122.67	80.23	8	162	81	10.6
HTN14-M80	M80 x 6	1413.72	144.11	94.25	10	174	87	12.9
HTN14-M85	M85 x 6	1413.72	144.11	94.25	10	174	87	12.9
HTN15-M90	M90 x 6	1605.04	163.61	107.00	10	187	95	16.2
HTN16-M95	M95 x 6	1704.59	173.76	113.64	10	194	102	18.3
HTN17-M100	M100 x 6	1911.46	194.85	127.43	10	205	110	21.9

AHP-BTU - AIR DRIVEN PUMP FOR BOLT TENSIONERS


AHP275BTU

- Operates from standard 7 Bar air supply
- Air consumption 28 scfm (0.79 m^3/minute)
- Working pressure 1500 Bar

The Hi-Force AHP275BTU air driven hydraulic pump is compatible for use with Hi-Force STS, STS-SR and STU stud bolt tensioners as well as HTN hydraulic nuts. The pump unit is easy to operate and is supplied complete with a glycerine filled vibra-gauge and quick release outlet coupling. The complete system, including an air inlet filter, regulator and lubricator unit is fitted in a robust stainless steel frame.

Model number	Working pressure Bar	Usable oil capacity litres	Outlet coupler	Weight kg	Dimensions in mm Length	Width	Height
AHP275BTU	1500	7	STFC4	22	450	395	395

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XHP - MANUALLY OPERATED PUMP FOR BOLT TENSIONERS


XHP1500BTU

- Compact & lightweight design
- Complete with pressure gauge
- Working pressure 1500 Bar

Hi-Force XHP1500BTU manually operated high pressure hydraulic pump is compatible for use with Hi-Force STS, STS-SR and STU stud bolt tensioners as well as HTN hydraulic nuts. Lightweight, compact and independent from any required power source, it is suitable for all tensioning applications on-site requiring reliable hydraulic power. The pump is easy to operate and supplied complete with a pressure gauge and quick release outlet coupling.

Model number	Working pressure Bar	Usable oil capacity litres	Displacement per stroke (cm^3) 1st stage	2nd stage	Outlet coupler	Weight kg	Dimensions in mm Length	Width	Height
XHP1500BTU	1500	0.7	12.5	0.75	STFC4	7.0	610	170	180

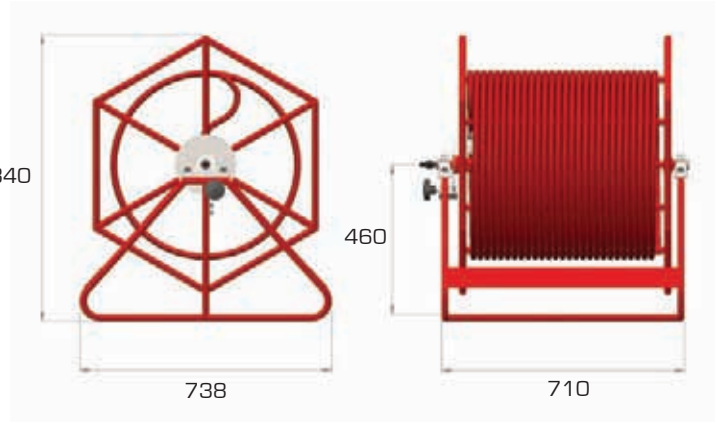
BOLT TENSIONER HOSES, COUPLERS & HOSE REELS

Safety factor 3 : 1

Working pressure up to 1500 Bar

Supplied with quick connect couplings

Hi-Force ultra-high pressure hoses are compatible for use with all Hi-Force bolt tensioning products up to a maximum of 1500 Bar working pressure. Each hose is supplied complete with quick connect couplings on each end (male/female) and has a safety factor of 3:1 on maximum working pressure. Four standard lengths are available with special lengths available on request. Extra long lengths can also be supplied complete with an easy to use hose reel. Further information available on request.



Designed for sub-sea main line hose connection between the pump and the first tensioner, the reel above is suitable for off-shore use and can accommodate up to 250 meters of Hi-Force XHC hydraulic hose. The reel comes complete with quick connect couplings, fully sealed stainless steel bearings and an adjustable stainless steel drag brake.

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Spare couplings and nipples are also available (see below).

Model number	Maximum pressure Bar	Description
Ultra high pressure hoses		
XHC1.5B	1500	Link hose complete with quick connect couplings, length 1.5 metres
XHC3B	1500	Link hose complete with quick connect couplings, length 3.0 metres
XHC5B	1500	Mainline hose complete with quick connect couplings, length 5.0 metres
XHC10B	1500	Mainline hose complete with quick connect couplings, length 10.0 metres
Couplings and nipples		
STFC4	1500	Female coupling
STMC4	1500	Male coupling
STN1P4	1500	¼" BSP nipple c/w bonded sealing washer (old design)
STN1P4-C	1500	¼" BSP nipple with cone seat seal (current design)

BOLTRIGHT SOFTWARE - THE EASY ANSWER !

Available as download only

Multi-Language Interface

Easy to use, minimal computer knowledge required

Designed for : Windows

The Hi-Force BoltRight software programme is designed to assist engineers in the Oil & Gas, Petrochemical, Power Generation and a wide variety of other Engineering Industries where accurate and consistent "bolt up" of components is required. The programme allows the user to input key joint data related to flange size and class, for all ANSI/ASME, API and ISO type flanges along with the applicable bolt material, gasket material and type, operating temperature, preferred or specified method of bolt tightening (torque or direct tension), friction reducing lubricant to be applied, or the applicable value of friction coefficient necessary for torque tightening applications. Based on the information entered, the BoltRight programme will analyse all of the data and produce a comprehensive calculation sheet along with the required torque or tension figures to ensure an accurate and correctly bolted joint is achieved.

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BoltRight will also create an individual tightening procedure for each bolted joint, which can include specific information such as plant owner name, bolting contractor company name, joint tag reference number and any special remarks all of which can be easily entered into the procedure by the user. These individually produced tightening procedures can also be added to a master joint register, allowing the contractor and/or plant operator to implement a comprehensive on-site Flange Management System. Both the individual tightening procedures and the master joint register can be either printed or stored electronically to ensure full traceability.

Whilst calculating the applicable torque or direct tension figures the BoltRight programme will also calculate the required pump pressure settings for the selected Hi-Force hydraulic wrench or bolt tensioner to be used. In most cases the programme will offer a multiple choice of suitable Hi-Force tools based on the applicable torque or tension figures and the design output capacity of the tools recommended. For ease of use BoltRight also includes detailed technical information on all of the Hi-Force tools that it recommends for the respective application.

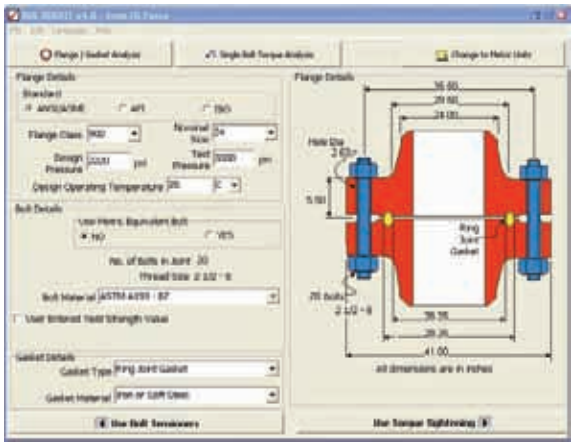
For bolt tensioning applications BoltRight also offers the user a choice of 25%, 33%, 50% and 100% simultaneous bolt tensioning options along with the applicable A and B pump pressure settings for all options, excluding 100% simultaneous tensioning, where only one pump pressure setting is required. For torque wrench applications the BoltRight programme will calculate the required pump pressure settings for a 25%, 50% and 100% applied output torque figure, which is the recommended three stage procedure when using a single hydraulic torque wrench to tighten a multiple bolt flange in a diametrically opposed manner. The tightening procedure will also provide the necessary bolt numbering sequence to ensure that the bolts are tightened in the correct numerical order.

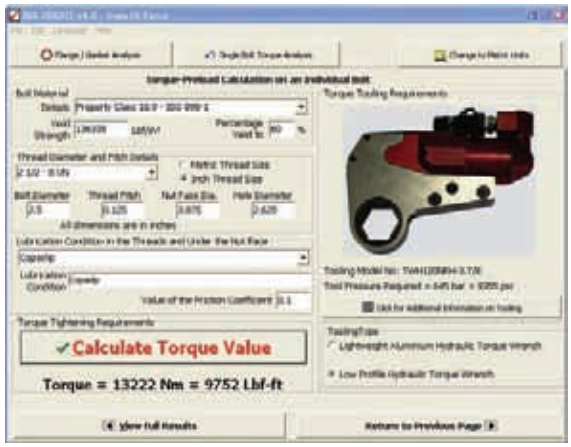
BOLTRIGHT SOFTWARE - THE EASY ANSWER !

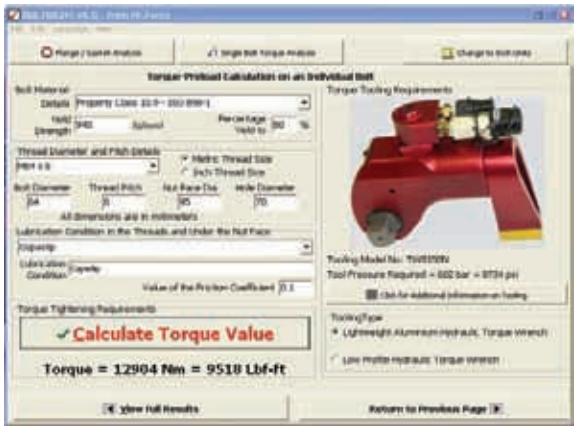
Currently the BoltRight programme is available in English, Dutch, Portuguese, French, Chinese, Russian and Italian with the addition of further languages an ongoing process. The BoltRight programme is Windows compatible and only available by download from www.hi-force.com and www.boltright.com using an authorised password issued by Hi-Force. Applications for the password can be made via the website.

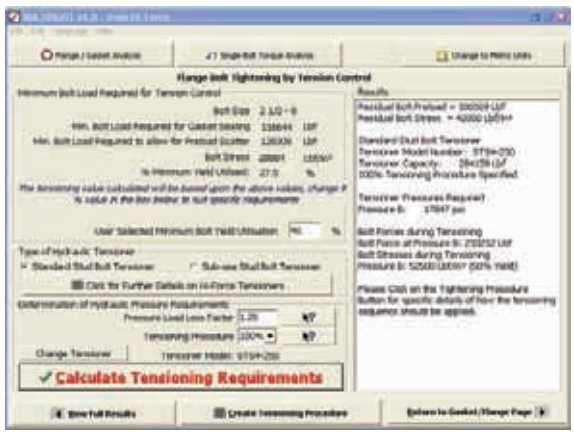
Since the introduction of the Hi-Force BoltRight software programme in early 2005, the programme has continued to evolve and develop into what we believe is the best and most user friendly bolting programme available in the world today. As further development of the programme is an ongoing process, mainly driven by customer requests for additional features and benefits, we have designed the website download in such a way that the programme expires every 90 days, to allow for ongoing programme upgrades to be made. Authorised users can easily obtain an upgraded version by requesting a new password via the Hi-Force or Boltright website.

Model number	Description
BR-M	BoltRight Multi-language - Including joint register system



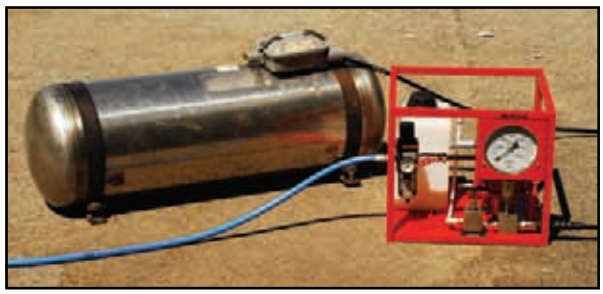






Hi-Force®

HYDROTEST PUMPS



HTP - MANUALLY OPERATED HYDROTEST PUMPS


HTP700

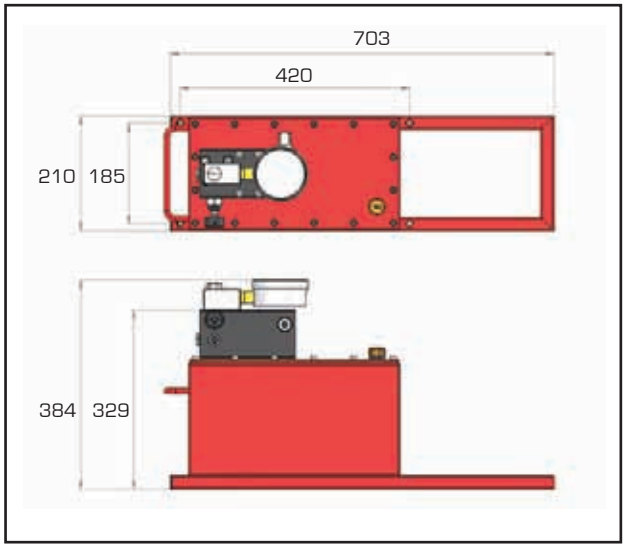
Up to 1000 Bar working pressure

Suitable for use with a wide variety of fluids

Two stage with semi automatic pressure changeover

The Hi-Force HTP series of manually operated two speed hydraulic pumps is suitable for use with a wide variety of fluids including water. Manufactured predominantly from high quality aluminium alloy, the HTP series are lightweight and extremely versatile. The pump's two stage piston design offers a superb 49 cm^3 delivery per stroke at low pressure (up to 20 Bar) with an semi automatic changeover valve for operating the high pressure piston. The pump unit is available with a choice of 5 high pressure capacities ranging from 100 to 1000 Bar with all models incorperating a factory set pressure relief valve and a 610mm long operating lever. Major applications for Hi-Force HTP series pumps include hydrotesting of piping, pressure vessels, valves and many other items of pressure retaining equipment, prior to commissioning.

- Lightweight aluminium design with stainless steel pistons
- Needle type design release valve for precise pressure control
- Low cost replaceable valve seats
- Standard 15 litre capacity stainless steel fluid reservoir
- Optional pressure gauges available (see page 108)



Model number	Working pressure Bar	Valve type	Displacement per stroke cm^3 1st stage	2nd stage	Changeover pressure Bar	Outlet port	Suction port	Weight kg
HTP100	100	2-way	49	20	20	3/8" NPT	3/8" BSP	20
HTP300	300	2-way	49	7	20	3/8" NPT	3/8" BSP	20
HTP500	500	2-way	49	4	20	3/8" NPT	3/8" BSP	20
HTP700	700	2-way	49	3	20	3/8" NPT	3/8" BSP	20
HTP1000	1000	2-way	49	2	20	3/8" NPT	3/8" BSP	20

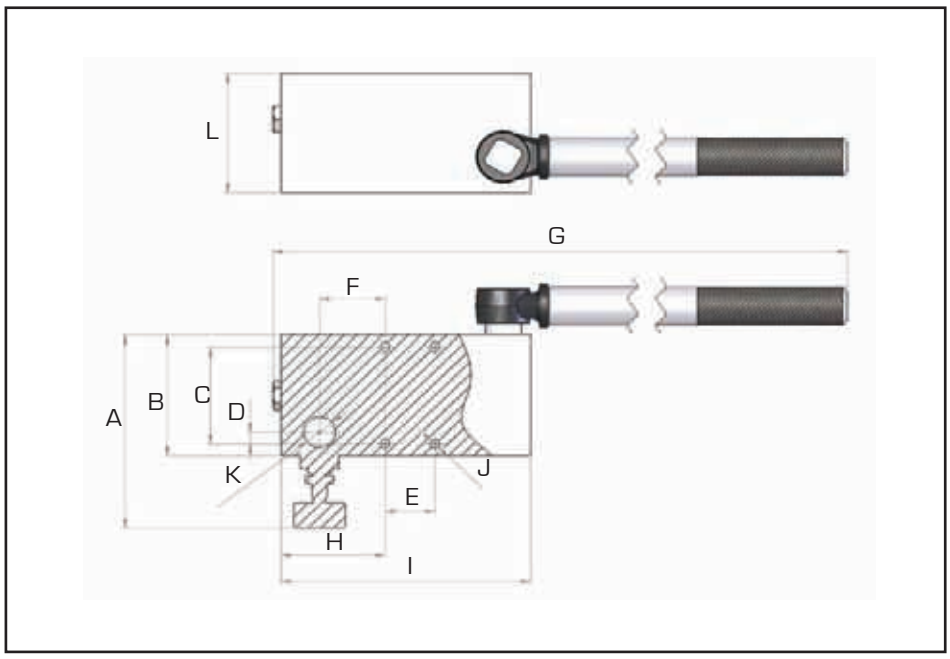
HTP-PU - MANUALLY OPERATED HYDROTEST PUMPS


HTP300PU

- Choice of 5 different models
- Supplied complete with fixing kit
- Compact, lightweight and easy to operate

The Hi-Force HTP-PU series offers the same features as the HTP range on page 106 however these are supplied as a pump unit only without a fluid reservoir. The pump unit is supplied complete with a mounting kit for easy attachment to any specially designed fluid reservoir and an operating lever.

Model number	Working pressure Bar	Valve type	Displacement per stroke cm^3 1st stage	2nd stage	Changeover pressure Bar	Outlet port(s)	Suction port(s)	Weight kg
HTP100PU	100	2-way	49	20	20	3/8" NPT	3/8" BSP	5.9
HTP300PU	300	2-way	49	7	20	3/8" NPT	3/8" BSP	5.9
HTP500PU	500	2-way	49	4	20	3/8" NPT	3/8" BSP	5.9
HTP700PU	700	2-way	49	3	20	3/8" NPT	3/8" BSP	5.9
HTP1000PU	1000	2-way	49	2	20	3/8" BSP	3/8" BSP	5.9



Dimensions in mm (all models)											
A	B	C	D	E	F	G	H	I	J	K	L
143.0	88.9	71.4	8.7	34.9	46.0	772.5	73.0	175.0	4 X M8	23.0	88.5

HTP - OPTIONAL EXTRAS

RESERVOIRS

Standard 15 litre stainless steel, powder coated reservoir.
Alternative capacity reservoirs available on request.

Model number	Description
HRS15	15 litre standard reservoir

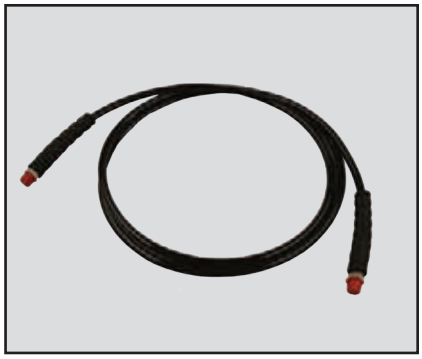
PRESSURE GAUGES

Complete range of 100 mm diameter pressure gauges manufactured to EN837-1 and compatible for use with HTP series pumps. Supplied complete with gauge mounting kit.

Model number	Pressure range Bar
HTP100GK	110
HTP300GK	310
HTP500GK	552
HTP700GK	700
HTP1000GK	1000

HOSES

Standard 3 metre length hose assembly to suit HTP series pumps. All hoses have a female swivel end fitting with a male-male nipple.



Note: Do not interchange hoses with different capacity pumps!

Model Number	Max W.P Bar	Length (metres)	End Fitting	For model number
HH3-6NMS-1	100	3	3/8" NPT Male Swivel	HTP100
HH3-6NMS-1	300	3	3/8" NPT Male Swivel	HTP300
HH3-6NMS-2	500	3	3/8" NPT Male Swivel	HTP500
HH3-6NMS-2	700	3	3/8" NPT Male Swivel	HTP700
HH3-6NMS-3	1000	3	3/8" NPT Male Swivel	HTP1000

AHP - AIR DRIVEN HYDROTEST PUMPS - STANDARD FLOW

AHP58

Output pressures up to 2931 Bar

Suitable for use with various fluids.

150mm dual scale vibra pressure gauge

- Air consumption 28 scfm (0.79m³/minute)
- Infinitely variable output pressure and flow
- 7 litre reservoir capacity

The Hi-Force AHP series of air driven hydrostatic pressure testing pumps offers a choice of eight models with output pressure capacities ranging from 6 Bar (87 PSI) to 2931 Bar (42500 PSI). All models are suitable for use with various fluids, including water and are supplied with a 150mm diameter glycerine filled hydraulic pressure gauge (calibrated on request), inlet airline filter, lubricator and pressure regulator unit, lightweight fluid reservoir, pump start/stop valve and a robust stainless steel skid mounted framework. Optional extras include stainless steel reservoir, stroke counter system and pressure isolation valve. All units are of compact design with a maximum weight of 23 kg.

Model number	Max. output pressure (bar) at airline input pressure 10 PSI 0.69 Bar	50 PSI 3.45 Bar	100 PSI 6.9 Bar	Fluid volume displacement per stroke (cm³)	Outlet port thread	Weight kg	Dimensions in mm Length	Width	Height
AHP10	6	34	69	42.3	½" NPT	23	450	395	395
AHP26	14	90	181	16.0	½" NPT	21	450	395	395
AHP36	17	122	250	12.3	½" NPT	20	450	395	395
AHP58	28	200	400	7.6	½" NPT	20	450	395	395
AHP107	62	373	738	4.0	½" NPT	20	450	395	395
AHP187	97	638	1293	2.2	9/16"-18UNF	20	450	395	395
AHP275	155	931	1897	1.6	9/16"-18UNF	20	450	395	395
AHP425	345	1448	2931	1.0	9/16"-18UNF	20	450	395	395

Hydraulic pressure PSI	Bar	Approximate rate of discharge (litres/min) at air input pressure 100 PSI (7 Bar) AHP10	AHP26	AHP36	AHP58	AHP107	AHP187	AHP275	AHP425
0	0	23.10	8.80	6.00	3.56	1.97	1.15	0.72	0.43
500	35	12.00	5.85	4.39	3.05	1.50	1.05	0.68	0.40
1000	69	*	4.72	3.80	2.51	1.28	1.00	0.65	0.38
1500	104	*	3.90	3.34	2.38	1.25	0.90	0.60	0.36
2000	138	*	3.00	3.00	2.25	1.21	0.78	0.55	0.34
2500	173	*	1.21	2.56	2.05	1.18	0.75	0.50	0.33
3000	207	*	*	1.95	1.85	1.16	0.73	0.48	0.31
4000	276	*	*	*	1.56	1.02	0.70	0.45	0.29
5000	345	*	*	*	1.02	0.95	0.67	0.42	0.26
7500	517	*	*	*	*	0.76	0.60	0.40	0.25
10000	690	*	*	*	*	0.44	0.52	0.37	0.24
15000	1034	*	*	*	*	*	0.39	0.33	0.21
20000	1379	*	*	*	*	*	*	0.30	0.20
25000	1724	*	*	*	*	*	*	0.21	0.16
30000	2069	*	*	*	*	*	*	*	0.13
40000	2760	*	*	*	*	*	*	*	0.05

* Pressure exceeds pump capacity.

AHP-CR AIR DRIVEN HYDROTEST PUMPS - WITH CHART RECORDER


AHP187-CR

Output pressures up to 2931 Bar

Suitable for use with various fluids.

150mm dual scale vibra pressure gauge

- Air consumption 28 scfm (0.79m³/minute)
- Infinitely variable output pressure and flow
- 7 litre reservoir capacity
- Supplied with 50 recorder charts and one black chart pen, for additional charts and pens, please see page 114.

The Hi-Force AHP-CR series of air driven hydrostatic pressure testing pumps offers a choice of 8 models with output pressure capacities ranging from 6 Bar (87 PSI) to 2931 Bar (42500 PSI) all fitted with on board, 4 hour, single pen chart recorder as standard. All models are suitable for use with various fluids including water and are supplied with a 150mm diameter glycerine filled hydraulic pressure gauge (calibrated on request), inlet airline filter, lubricator and pressure regulator unit, lightweight fluid reservoir, pump start/stop valve and a robust stainless steel skid mounted framework. Recorder isolation valve and pressure release valve are fitted as standard. Optional extras include stainless steel reservoir, pressure isolation valve, stroke counter system, gauge calibration certificate and varying recorder clock speeds. All units are of compact design with a maximum weight of 31 kg.

Model number	Max. output pressure (bar) at airline input pressure 10 PSI 0.69 Bar	50 PSI 3.45 Bar	100 PSI 6.9 Bar	Fluid volume displacement per stroke (cm³)	Outlet port thread	Weight kg	Dimensions in mm Length	Width	Height
AHP10-CR	6	34	69	42.3	½" NPT	31	530	390	390
AHP26-CR	14	90	181	16.0	½" NPT	29	530	390	390
AHP36-CR	17	122	250	12.3	½" NPT	28	530	390	390
AHP58-CR	28	200	400	7.6	½" NPT	28	530	390	390
AHP107-CR	62	373	738	4.0	½" NPT	28	530	390	390
AHP187-CR	97	638	1293	2.2	9/16"-18UNF	28	530	390	390
AHP275-CR	155	931	1897	1.6	9/16"-18UNF	28	530	390	390
AHP425-CR	345	1448	2931	1.0	9/16"-18UNF	28	530	390	390

Hydraulic pressure PSI	Bar	Approximate rate of discharge (litres/min) at air input pressure 100 PSI (7 Bar) AHP10-CR	AHP26-CR	AHP36-CR	AHP58-CR	AHP107-CR	AHP187-CR	AHP275-CR	AHP425-CR
0	0	23.10	8.80	6.00	3.56	1.97	1.15	0.72	0.43
500	35	12.00	5.85	4.39	3.05	1.50	1.05	0.68	0.40
1000	69	*	4.72	3.80	2.51	1.28	1.00	0.65	0.38
1500	104	*	3.90	3.34	2.38	1.25	0.90	0.60	0.36
2000	138	*	3.00	3.00	2.25	1.21	0.78	0.55	0.34
2500	173	*	1.21	2.56	2.05	1.18	0.75	0.50	0.33
3000	207	*	*	1.95	1.85	1.16	0.73	0.48	0.31
4000	276	*	*	*	1.56	1.02	0.70	0.45	0.29
5000	345	*	*	*	1.02	0.95	0.67	0.42	0.26
7500	517	*	*	*	*	0.76	0.60	0.40	0.25
10000	690	*	*	*	*	0.44	0.52	0.37	0.24
15000	1034	*	*	*	*	*	0.39	0.33	0.21
20000	1379	*	*	*	*	*	*	0.30	0.20
25000	1724	*	*	*	*	*	*	0.21	0.16
30000	2069	*	*	*	*	*	*	*	0.13
40000	2760	*	*	*	*	*	*	*	0.05

* Pressure exceeds pump capacity.

AHP2 - AIR DRIVEN HYDROTEST PUMPS - HIGH FLOW

AHP2-036

Output pressures up to 1634 Bar

Suitable for use with various fluids.

150mm dual scale vibra pressure gauge

- Air consumption 56 scfm (1.59m³/minute)
- Infinitely variable output pressure and flow
- 7 litre reservoir capacity

The Hi-Force AHP2 series of air driven hydrostatic pressure testing pumps offers a choice of 5 models with output pressure capacities ranging from 17 Bar (246 PSI) to 1634 Bar (23700 PSI). All models are compact design and suitable for use with various fluids including water and are supplied with a 150mm diameter glycerine filled hydraulic pressure gauge (calibrated on request), inlet airline filter, lubricator and pressure regulator unit, lightweight fluid reservoir, pump start/stop valve and a robust stainless steel skid mounted framework. Optional extras include stainless steel reservoir, stroke counter system and pressure isolation valve.

Model number	Max. output pressure (bar) at airline input pressure 10 PSI 0.69 Bar	50 PSI 3.45 Bar	100 PSI 6.9 Bar	Fluid volume displacement per stroke (cm³)	Outlet port thread	Weight kg
AHP2-036	17.2	124.1	248.2	40.8	½" NPT	24
AHP2-060	31.0	199.9	413.7	24.6	½" NPT	24
AHP2-097	51.7	327.5	668.8	15.2	½" NPT	24
AHP2-144	75.8	489.5	992.8	10.2	½" NPT	24
AHP2-237	131.0	799.8	1634.1	6.1	9/16"-18UNF	24

Dimensions in mm Length	Width	Height
450	390	465
450	390	465
450	390	465
450	390	465
450	390	465

Hydraulic pressure PSI	Bar	Approximate rate of discharge (litres/min) at air input pressure 100 PSI (7 Bar) AHP2-036	AHP2-060	AHP2-097	AHP2-144	AHP2-237
0	0	10.20	6.20	3.90	2.70	1.57
500	35	8.60	5.50	3.55	2.50	1.52
1000	69	7.25	4.80	3.19	2.35	1.47
1500	104	6.15	4.50	3.00	2.16	1.42
2000	138	5.40	4.20	2.87	2.15	1.38
3000	207	3.05	3.50	2.55	1.88	1.29
4000	276	*	2.75	2.28	1.75	1.22
5000	345	*	2.16	2.10	1.64	1.20
7500	517	*	*	1.45	1.35	1.10
10000	690	*	*	*	1.15	0.98
15000	1034	*	*	*	*	0.78
20000	1379	*	*	*	*	0.51
23700	1634	*	*	*	*	0.34

* Pressure exceeds pump capacity.

AHP2-CR AIR DRIVEN HYDROTEST PUMPS - WITH CHART RECORDER

AHP2-237CR

Output pressures up to 1634 Bar

Suitable for use with various fluids.

150mm dual scale vibra pressure gauge

- Air consumption 56 scfm (1.59m³/minute)
- Infinitely variable output pressure and flow
- 7 litre reservoir capacity
- Supplied with 50 recorder charts and one black chart pen, for additional charts and pens, please see page 114.

The Hi-Force AHP2-CR series of air driven hydrostatic pressure testing pumps offers a choice of 5 models with output pressure capacities ranging from 17 Bar (246 PSI) to 1634 Bar (23700 PSI) all fitted with on board, 4 hour, single pen chart recorder as standard. All models are compact design and suitable for use with various fluids including water and are supplied with a 150mm diameter glycerine filled hydraulic pressure gauge (calibrated on request), inlet airline filter, lubricator and pressure regulator unit, lightweight fluid reservoir, pump start/stop valve and a robust stainless steel skid mounted framework. Recorder isolation valve and pressure release valve are fitted as standard. Optional extras include stainless steel reservoir, pressure isolation valve, stroke counter system, gauge calibration certificate and varying recorder clock speeds.

Model number	Max. output pressure (bar) at airline input pressure 10 PSI 0.69 Bar	50 PSI 3.45 Bar	100 PSI 6.9 Bar	Fluid volume displacement per stroke (cm³)	Outlet port thread	Weight kg	Dimensions in mm Length	Width	Height
AHP2-036CR	17.2	124.1	248.2	40.8	½" NPT	32	555	390	465
AHP2-060CR	31.0	199.9	413.7	24.6	½" NPT	32	555	390	465
AHP2-097CR	51.7	327.5	668.8	15.2	½" NPT	32	555	390	465
AHP2-144CR	75.8	489.5	992.8	10.2	½" NPT	32	555	390	465
AHP2-237CR	131.0	799.8	1634.1	6.1	9/16"-18UNF	32	555	390	465

Hydraulic pressure PSI	Bar	Approximate rate of discharge (litres/min) at air input pressure 100 PSI (7 Bar) AHP2-036CR	AHP2-060CR	AHP2-097CR	AHP2-144CR	AHP2-237CR
0	0	10.20	6.20	3.90	2.70	1.57
500	35	8.60	5.50	3.55	2.50	1.52
1000	69	7.25	4.80	3.19	2.35	1.47
1500	104	6.15	4.50	3.00	2.16	1.42
2000	138	5.40	4.20	2.87	2.15	1.38
3000	207	3.05	3.50	2.55	1.88	1.29
4000	276	*	2.75	2.28	1.75	1.22
5000	345	*	2.16	2.10	1.64	1.20
7500	517	*	*	1.45	1.35	1.10
10000	690	*	*	*	1.15	0.98
15000	1034	*	*	*	*	0.78
20000	1379	*	*	*	*	0.51
23700	1634	*	*	*	*	0.34

* Pressure exceeds pump capacity.

ATDP - AIR DRIVEN TWIN DOUBLE ACTING HYDROTEST PUMPS


ATDP125

Output pressures up to 1489 Bar

Suitable for use with various fluids.

Twin double acting design offering high volume flow

The Hi-Force ATDP series of twin double acting air driven hydrostatic pressure testing pumps offers a choice of 3 models with output pressure capacities ranging from 87 Bar (1260 PSI) to 1489 Bar (21600 PSI). The twin double acting design offers a much higher displacement volume per stroke than the smaller AHP & AHP2 series, making it ideal for prefill as well as pressure testing. All models are supplied with a 150mm diameter glycerine filled vibra-gauge, inlet airline filter, lubricator and regulator unit, pump start/stop valve and fluid strainer. Viton and ethylene propylene seals for handling special fluids or chemicals can be factory fitted prior to delivery if required. Other seal materials are available on request.

- Air consumption 212 scfm (6m^3/minute)
- Suitable for use with various fluids including water
- 150mm dual scale glycerine filled gauge
- Infinitely variable output pressure and flow
- Fitted with inlet air filter, regulator & lubricator
- Optional extras include stainless steel frame work, pneumatic or LCD stroke counter system, onboard chart recorder, pressure isolation valve and wheel mounting.

Model number	Max. output pressure (bar) at airline input pressure 20 PSI 1.38 Bar	60 PSI 4.14 Bar	100 PSI 6.9 Bar	Fluid volume displacement per stroke (cm^3)	Outlet port thread	Weight kg
ATDP63	87	260	434	275	½" NPT	96
ATDP125	172	517	862	140	½" NPT	96
ATDP216	298	894	1489	79	1⅛"-12UNF	96

Dimensions in mm Length	Width	Height
765	570	700
765	570	700
765	570	700

Hydraulic pressure PSI	Bar	Approximate rate of discharge (litres/min) at air input pressure 100 PSI (7 Bar) ATDP63	ATDP125	ATDP216
0	0	32.2	16.9	9.5
1000	69	25.7	14.0	8.8
2000	138	20.5	12.3	8.0
3000	207	16.2	10.6	7.4
4000	276	12.5	9.4	6.9
5000	345	8.0	8.3	6.4
6000	414	2.8	7.3	6.1
8000	552	*	4.8	5.5
10000	690	*	3.0	4.9
12000	828	*	0.4	4.3
16000	1103	*	*	3.2
20000	1379	*	*	1.6

* Pressure exceeds pump capacity

HYDROTEST PUMP ACCESSORIES AND APPLICATIONS

Pack of 100 spare charts, diameter 163mm, 4 hour time scale

Model No	Chart Reading PSI	Suitable for Hydrotest Pump unit
AHP-C01	0 - 1.500	AHP10-CR
AHP-C03	0 - 3.000	AHP26-CR
AHP-C05	0 - 5.000	AHP36-CR - AHP2-036CR
AHP-C10	0 - 10.000	AHP58-CR - AHP2-060CR
AHP-C15	0 - 15.000	AHP107-CR - AHP2-097CR
AHP-C20	0 - 20.000	AHP187-CR - AHP2-144CR
AHP-C30	0 - 30.000	AHP275-CR - AHP2-237CR
AHP-C45	0 - 45.000	AHP425-CR

Replacement pen for chart recorder

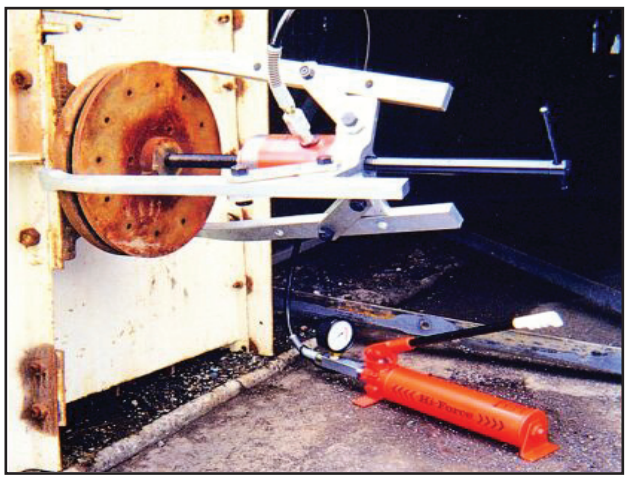
Model No	Colour	Description
AHP-PB	Black	Suitable for pressure reading on all Hi-Force AHP pumps with chart recorder

Did you know .....

Hi-Force can also supply chart recorders with multiple reading functions

Hi-Force®

PULLER KITS



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SCP - SELF-CONTAINED HYDRAULIC PULLERS

Capacities from 10 to 30 tonnes

Sealed hydraulic system

Operates in any position

The SCP range of self-contained hydraulic pullers offers a choice of 3 models, each with integral manually operated hydraulic pump and multi-position operating handle. The completely sealed hydraulic system of the SCP pullers enables use of the tool in any position and all models are easy to operate and provide an efficient solution for many pulling applications.

Model number	Capacity tonnes	Type of puller	Hydraulic stroke mm	Piston Ext. mm	Weight kg
SCP103	10	3-way jaw	82	50	11.6
SCP203	20	3-way jaw	82	100	23.7
SCP303	30	3-way jaw	110	150	50.0

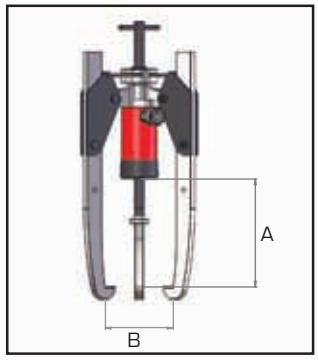
Dimensions in mm				
Reach	Dia min.	Dia max.	Tip depth	Tip height
195	30	250	22	6
275	50	360	29	10
405	100	410	38	36

ACP - AUTO-CENTRE HYDRAULIC PULLER KITS

Capacities from 10 to 50 tonnes

Quick set-up time, easy to use

High quality, drop forged steel components



The ACP heavy duty, auto-centering hydraulic puller kit range offers a choice of 4 models, with capacities from 10 to 50 tonnes. All models are supplied complete with a detachable hollow ram cylinder, manually operated pump, hydraulic hose and a 100mm diameter pressure gauge. All models are easy to set up and are the ideal tool for all pulling, pushing, installing and removing applications required for press fitted or heat fitted parts, including wheels, sprockets, flywheels, gears and bearings.

Model number	Capacity tonnes	Type of puller	Cylinder model no.	Pump model no.	Weight kg
ACP10	10	2 & 3 jaw	HHS102	HP110	24.5
ACP20	20	3 jaw	HHS202	HP110	44.0
ACP30	30	3 jaw	HHS302	HP110	76.5
ACP50	50	3 jaw	HHS603	HP227	181.0

Dimensions in mm		
A	B (Min)	B (Max)
296	50	350
320	70	480
407	90	580
727	120	920

PKS - HYDRAULIC 2 & 3 WAY PULLER KITS

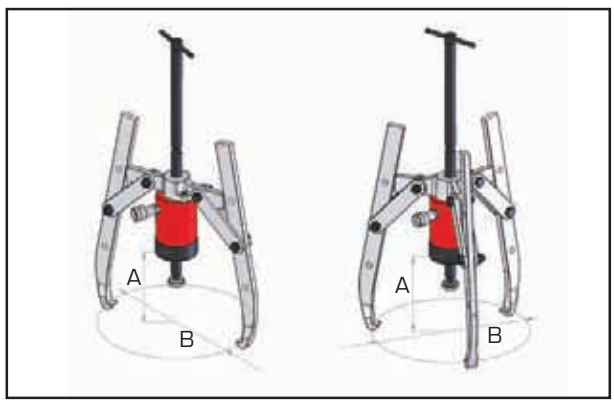
Capacities from 4.5 to 50 tonnes

Quick set-up time, easy to use

High quality, drop forged steel components

The PKS heavy duty hydraulic puller range is designed for removing stubborn parts such as wheels, gears, sprockets, sleeves, pulleys and other similar items. The range offers a selection of 8 models with pulling capacities up to 50 tonnes. All models are supplied complete with a full set of versatile detachable hydraulic components. All models are safe and easy to operate and avoid the need for heating and hammering.

- Working pressure 700 Bar
- Multi-purpose hollow piston cylinder (excl. PKS5-2-3)
- Complete with all hydraulic components (pump, cylinder, hose, gauge, etc.)
- Supplied complete with carrying case



Model number	Capacity tonnes	Type of puller	Cylinder model no.	Pump model no.	Weight kg	Dimensions in mm A	Dimensions in mm B
PKS5-2-3	4.5	2 & 3 jaw	HSS53	HP145	24	225	240
PKS10-2-3	10	2 & 3 jaw	HHS102	HP110	34	296	350
PKS20-2	20	2 jaw	HHS202	HP110	29	320	480
PKS20-3	20	3 jaw	HHS202	HP110	37	320	480
PKS30-2	30	2 jaw	HHS302	HP110	49	407	580
PKS30-3	30	3 jaw	HHS302	HP110	58	407	580
PKS50-2	50	2 jaw	HHS603	HP227	105	727	920
PKS50-3	50	3 jaw	HHS603	HP227	130	727	920
PK202	20	2 jaw beam	*	*	3	*	*
PK302	30	2 jaw beam	*	*	4	*	*
PK502	50	2 jaw beam	*	*	7	*	*

Note: PK202, PK302 & PK502 are 2-jaw beam only (not complete kit). Dimensions calculated with 15° outward angled puller legs.

PKC - COMPREHENSIVE HYDRAULIC PULLER KITS

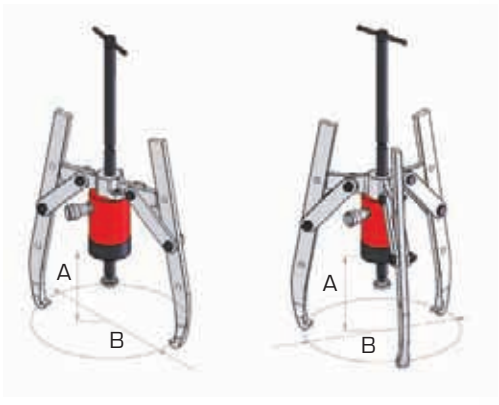
Capacities from 10 to 50 tonnes

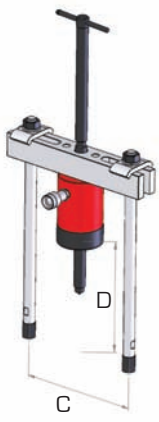
Combination of 4 different pullers in one set

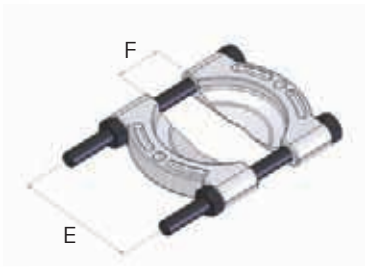
Quick set-up time, easy to use

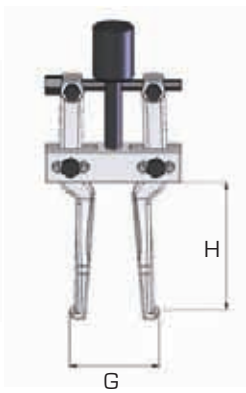
The PKC heavy duty, multi-purpose hydraulic puller kit range is extremely versatile and includes 2-way and 3-way grip pullers (as detailed on page 117), bearing pullers, bearing cup pullers and cross head pullers. All models are designed for pulling, pushing, installing and removing all press fitted or heat fitted parts such as gears, bearings, sleeves, cogs, internal bearings, wheels, sprockets, flywheels, etc. The range offers a selection of 4 models with pulling capacities up to 50 tonnes, all supplied complete with a full set of versatile, detachable hydraulic components.

- Working pressure 700 Bar
- Complete hydraulic system supplied, including gauge
- High quality, drop-forged steel components
- Supplied complete with carrying case









Model number	Capacity tonnes	Cylinder model no.	Pump model no.	Weight kg
PKC10	10	HHS102	HP110	25
PKC20	20	HHS202	HP110	60
PKC30	30	HHS302	HP110	116
PKC50	50	HHS603	HP227	268

Dimensions in mm										
A	B	C Min	C Max	D	E	F Min	F Max	G Min	G Max	H
296	480	115	260	300	110	10	110	40	145	115
320	480	135	345	265	152	11	134	40	145	115
407	580	180	440	284	260	15	250	60	240	150
727	920	230	580	447	260	15	250	60	240	150

Dimensions A, B, C & D calculated with 15° outward angled puller legs.

Hi-Force®

CRIMPING TOOLS AND CUTTERS

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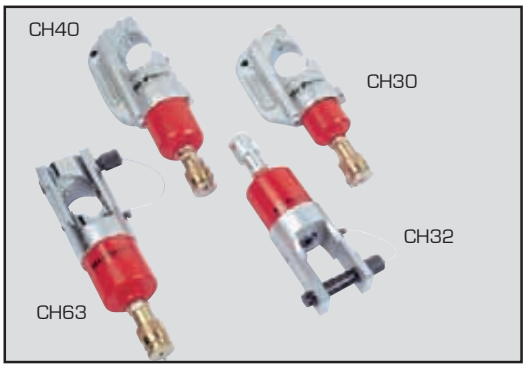
CRIMPING TOOLS - GENERAL INFORMATION

Hi-Force hydraulic cable crimping tools are designed and manufactured for crimping un-insulated compression and mechanical connectors, in copper and aluminium, to a wide range of electrical power cables including distribution and transmission lines. Offering a choice of either self-contained operation, with inbuilt manually operated hydraulic pump mechanism, or separate remote operation, crimping head for use with a separate hydraulic pump and hose assembly, the Hi-Force hydraulic crimping tools range offers the most optimum choice to suit the widest range of electrical cable crimping applications.

Brand new to our crimper range in 2010 are our recently introduced battery operated hydraulic crimping tools, offering all the versatility of our self contained, manually operated tools but with the added speed and ease of use associated with a battery powered tool.

All models are designed and manufactured for use at 700 Bar maximum working pressure, supplied complete with all applicable die sets, compatible for use with the selected tool and include a handy carrying and storage case. Self contained manually operated and battery powered crimper tools are fitted with an automatic pump pressure relief valve, which activates and releases the hydraulic pressure immediately the compression (crimping) process has been successfully achieved. All remote operation crimper heads must be operated with a compatible Hi-Force 700 Bar hydraulic pump unit, fitted with an inbuilt pump safety overload, pressure relief valve, 700 Bar pressure gauge and 700 Bar rated hydraulic hose assembly.

CH - CABLE CRIMPING HEADS



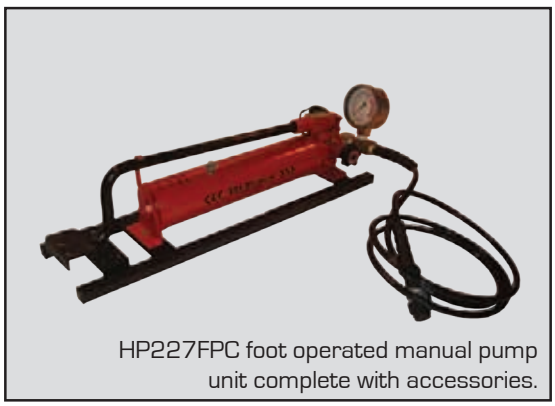
Choice of 7 models available

Supplied complete with die sets

Working pressure 700 Bar

The CH hydraulic cable crimping tool range offers 7 models with a choice of open "C" jaw or parallel guide design. All models are supplied complete with standard die sets and a carrying case. Models with 180° rotating head are designed for easy access into confined spaces. Suitable pump units include HP227FPC foot operated pump set which includes elbow fitting, gauge, gauge block, 3 metre hose and male coupler, as shown below. Standard hand operated pumps suitable for use with CH crimper heads can be found on pages 27-29. All models, excluding CH1000, are available as a complete kit, comprising of HP227FPC, MSB1 metal storage case and selected crimping tool with die sets.

- Model CH21 is suitable for crimping non-insulated terminals up to 240mm²
- Models CH30, CH32 & CH40 are suitable for crimping connectors up to 400mm²
- Models CH63 & CH80 are suitable for crimping connectors up to 630mm²
- Model CH1000 is suitable for crimping distribution and transmission lines up to 1000mm²



HP227FPC foot operated manual pump unit complete with accessories.

For pump specifications, please see page 126.

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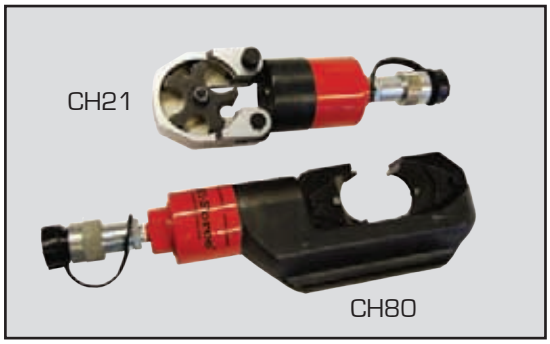
CH - CABLE CRIMPING HEADS



All fitted with standard quick connect coupler

Choice of 'C' jaw or parallel guide design

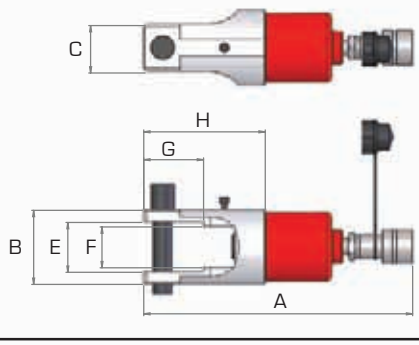
Designed for easy access in confined spaces

Model number	Output tonnes	C-Jaw opening	Applicable range DIN mm²	Standard dies mm²		Length mm	Weight kg
CH21	10	not applicable	16-240	With die Female die	(4pcs) 16-25, 35-70, 70-185, 240 (1pc) 25-35, 50-70, 95-120, 150-185, 240	210	3.0
CH30	12	30 mm	35-400	With die	35, 50, 70, 95, 120, 150, 185 240, 300, 400	220	4.0
CH32	18	not applicable	16-400	With die Female die	(4pcs) 16, 25-35, 50-120, 150-400 (8pcs) 16-25, 35-70, 95-120, 150 185, 240, 300, 400	210	3.6
CH40	12	38 mm	35-400	With die	35, 50, 70, 95, 120, 150, 185 240, 300, 400	245	4.8
CH63	18	not applicable	35-630	With die	35, 50, 70, 95, 120, 150, 185 240, 300, 400, 500, 630	240	4.8
CH80	15	50 mm	35-630	With die	35, 50, 70, 95, 120, 150, 185 240, 300, 400, 500, 630	300	7.0
CH1000	50	not applicable	500-1000	With die	500, 630, 800, 1000	420	38.0

Note : Models CH21 & CH32 supplied with single indent dies, all other models supplied with hexagon dies.

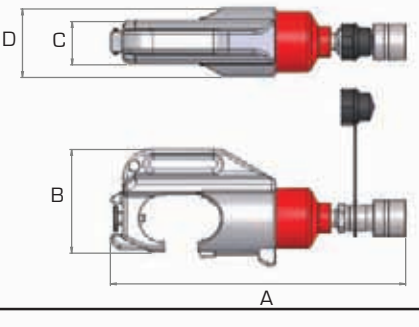
Model Number	Dimensions in mm A	B	C	D
CH21	278	88	28	-
CH30	294	105	43	68
CH32	284	78	50	-
CH40	326	113	43	74
CH63	319	78	50	-
CH80	370	106	63	-
CH1000	455	210	60	-

CH32/CH63



Model Number	Dimensions in mm E	F	G	H
CH21	-	-	-	-
CH30	-	-	-	-
CH32	53	43	63	96
CH40	-	-	-	-
CH63	49	-	163	-
CH80	-	-	-	-
CH1000	100	-	285	-

CH30/CH40/CH80



Note : CH21 and CH1000 dimensional drawings are not shown.

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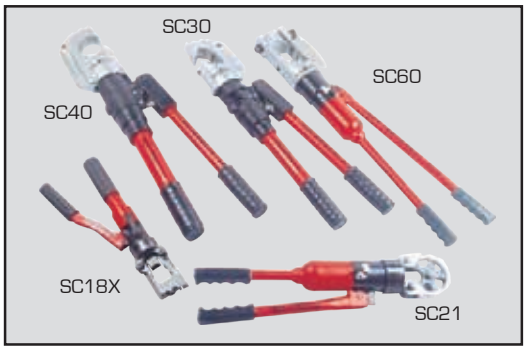
SC - SELF-CONTAINED CABLE CRIMPING TOOLS



Choice of 6 models available

Supplied complete with die sets

Automatic pressure release valve

The SC self-contained hydraulic cable crimping tool range offers 6 models with a choice of open "C" jaw or parallel guide design. All models are fitted with an automatic pressure release valve and are supplied complete with standard die sets and a carrying case. Models with 180° rotating head are designed for easy access into confined spaces.

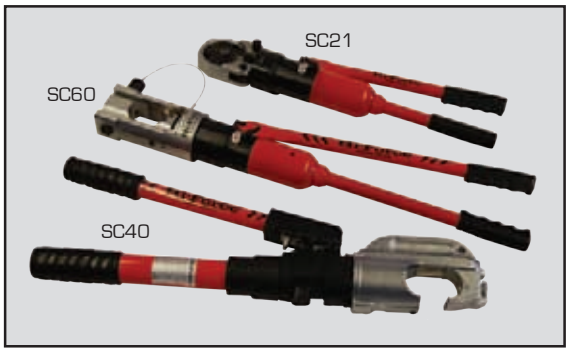
- Model SC21 is suitable for crimping connectors up to 240mm²
- Models SC30, SC32 & SC40 are suitable for crimping connectors up to 400mm²
- Model SC60 is suitable for crimping non-insulated terminals up to 630mm²
- Model SC18X is suitable for crimping non-insulated terminals up to 185mm²

Model number	Output tonnes	C - Jaw opening	Applicable range DIN mm²	Standard dies mm²	Length mm	Weight kg
SC21	10	not applicable	25-240	With die (4pcs) 25, 35-50, 70-185, 240 Female die (1pc) 25-35, 50-70, 95-120, 150-185, 240	528	5.2
SC30	12	30 mm	35-400	With die 35, 50, 70, 95, 120, 150, 185, 240, 300, 400	610	6.3
SC32	18	not applicable	16-400	With die (4pcs) 16, 25-35, 50-120, 150-400 Female die (8pcs) 16-25, 35-70, 95-120, 150, 185, 240, 300, 400	650	6.2
SC40	12	38 mm	35-400	With die 35, 50, 70, 95, 120, 150, 185, 240, 300, 400	636	7.7
SC60	18	not applicable	35-630	With die 35, 50, 70, 95, 120, 150, 185, 240, 300, 400, 500, 630	650	6.5
SC18X	6	not applicable	10-185	With die 10-16, 25-35, 50-70, 95-120, 150, 185	370	2.0

Note : Models SC21 & SC32 are supplied with single indent dies, all other models are supplied with hexagonal dies.

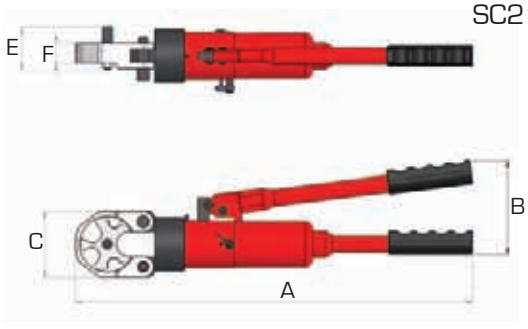
Hi-Force®

SC - SELF-CONTAINED CABLE CRIMPING TOOLS

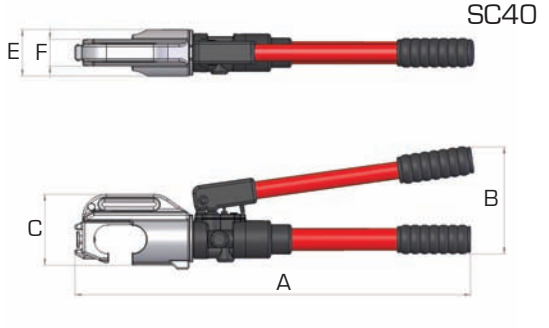


- Supplied in handy carrying & storage case
- Easy to operate, self-contained design
- Choice of open 'C' jaw or parallel guide design

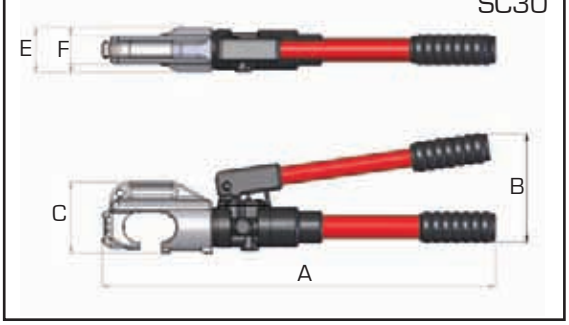
SC21



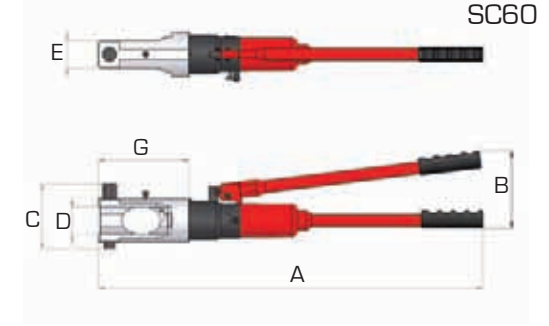
SC40



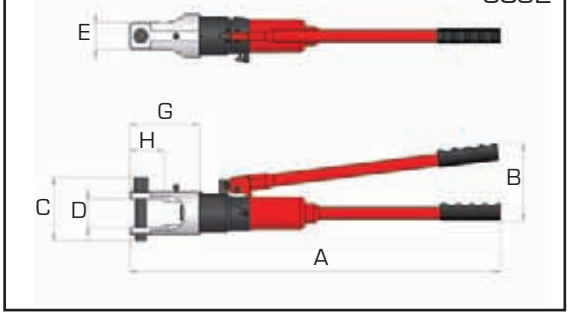
SC30



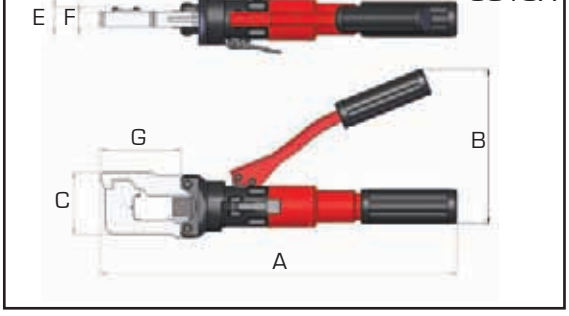
SC60



SC32



SC18X



Model Number	Dimensions in mm A	B	C	D	E	F	G	H
SC21	520	122	86	-	57	27	-	-
SC30	602	166	116	-	68	43	-	-
SC32	680	137	116	52	50	-	128	63
SC40	630	166	113	-	74	48	-	-
SC60	690	140	116	52	50	-	163	-
SC18X	380	142	70	-	21	16	86	-

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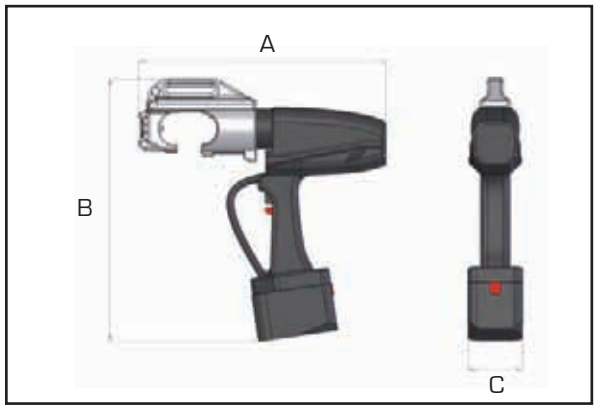
BC - BATTERY OPERATED CABLE CRIMPING TOOLS


BC30

- Supplied complete with standard set of dies
- Battery power warning light
- Efficient and quick battery recharger

The BC range of battery powered crimping tools consists of 4 models with a choice of 'C' jaw or parallel guide design.

The range offers all the versatility of the manually operated CH and SC range but with the added speed and ease of use associated with a battery powered tool. All models are supplied with battery, battery charger, shoulder strap and tool box storage case.



Model number	Output tonnes	C - Jaw opening	Applicable range DIN mm²	Standard dies mm²		Dimensions in mm A	B	C	Weight kg
BC18X	6	not applicable	10-185	With die	10-16, 25-35, 50-70, 95-120, 150, 185	320	310	75	3.0
BC30	12	30 mm	35-400	With die	35, 50, 70, 95, 120, 150, 185 240, 300, 400	350	300	78	7.0
BC40	12	38 mm	35-400	With die	35, 50, 70, 95, 120, 150, 185 240, 300, 400	380	300	78	8.0
BC63	18	not applicable	35-630	With die	35, 50, 70, 95, 120, 150, 185 240, 300, 400, 500, 630	420	300	78	7.0

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ACCESSORIES

Model number	Description
CU110	Charger 110V
CU220	Charger 220/230V
MP220	Power supply 220/230V to operate unit directly from mains
CCU144	Car cigarette lighter charger unit
BP144	Battery Pack 14.4V

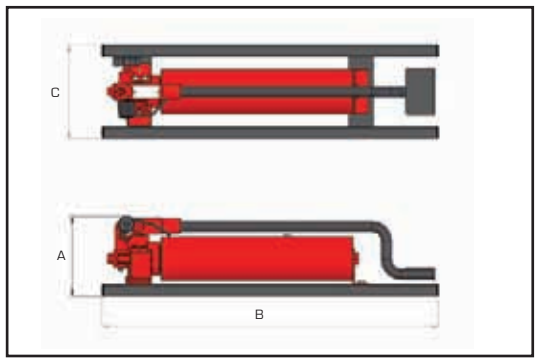

BP144

CU220

HP227FPC - FOOT OPERATED PUMP ASSEMBLY

- Working pressure 700 Bar
- Two stage operation
- Complete with accessories

The HP227FPC manually operated foot pump is supplied complete with 100mm diameter pressure gauge, gauge mounting block and 3 metre length hydraulic hose with CM1 quick connect male coupler. Ideally suited for use with Hi-Force CH series crimper heads (see pages 121 & 122) and all other Hi-Force 700 bar maximum working pressure, hydraulic tools that require a remote pump operation, the HP227FPC has a superb two speed low pressure displacement (12.9 cm^3 per stroke) with automatic changeover to high pressure displacement (2.3 cm^3 per stroke) up to 700 Bar. Supplied with a pre-filled oil reservoir offering a usable oil capacity of 2.3 litres, the HP227FPC is supplied ready for immediate use.



Model number	Valve type	Displacement per stroke cm^3 1st stage	2nd stage	Usable oil cap. litres	Handle effort kg	Material	Weight kg
HP227FPC	2-way	12.9	2.3	2.3	39	Steel	14.5

Dimensions in mm A	B	C
160	720	200

BPP - BATTERY POWERED HYDRAULIC PUMP

Model number	Max working pressure	Oil Cap litres	Oil Flow lit/min 1st stage	2nd stage	Weight kg
BPP107	700 bar	0.7	0.5	0.15	6.6

Dimensions	Length	Width	Height
in mm	355	160	260

The Hi-Force BPP107 battery powered hydraulic pump is designed for operator convenience in terms of handling and power supply. Driven by a powerful 14.4V long life battery the unit takes away the physical effort required by a manually operated hand or foot pump, whilst at the same time eliminating the need for an external power source. The pumps ergonomic lightweight design (6.6 kg) also makes the unit very portable and user friendly for the operator with a handy shoulder strap supplied with the pump. The pump incorporates an automatic pressure relief and release valve meaning that the pressure automatically relieves once the pump reaches its maximum pressure of 700 bar, making the pump ideal for use with Hi-Force CH series crimping tools, NS series Nut Splitters, HCH Cutters and HKP series knockout punchers.

ACCESSORIES

Model	Description	Model	Description
CU110	Charger 110V	CCU144	Car cigarette lighter charger unit
CU220	Charger 220/230V	BP144	Battery Pack 14.4V
MP220	Power supply 220/230V to operate unit directly from mains		

HCH - HYDRAULIC CUTTER HEADS

HCH40

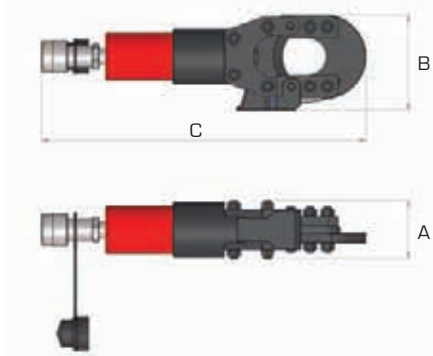
- Cutting capacity up to 125mm diameter
- Working pressure 700 Bar
- Compact and lightweight

The HCH cutter head range cuts a wide range of materials and offers 2 models, suitable for cutting a wide range of materials. Suitable manually operated and powered hydraulic pumps suitable for use with Hi-Force HCH cutters are detailed on pages 25 to 44 and 126.

Model number	Cutting force tonnes	Weight kg	Dimensions in mm A	B	C
HCH40	6	2.8	62	101	247
HCH120	15	14.5	76	250	600

Did you know .....

HCH cutters can be operated with battery powered pumps, see facing page.



Material	Description	Maximum diameter cutting capacity in mm : HCH40	HCH120
Steel Wire Rope	6x7 Hempcore	20	-
	6x12 Hempcore	25	-
	6x19 Hempcore	25	-
Round Bar	Soft copper bar	25	-
	Soft aluminum bar	22	-
	Soft steel bar	16	-
	Reinforcing bar	13	-
Wire Strands	Bare copper strands	32	-
	Bare aluminum strands	32	-
	1x7 Guy steel wire strands	20	-
	1x19 Guy steel wire strands	25	-
Cable	Telephone cable CCP	40	125
	Lead sheathed telephone cable	40	125
	Underground cable	40	75

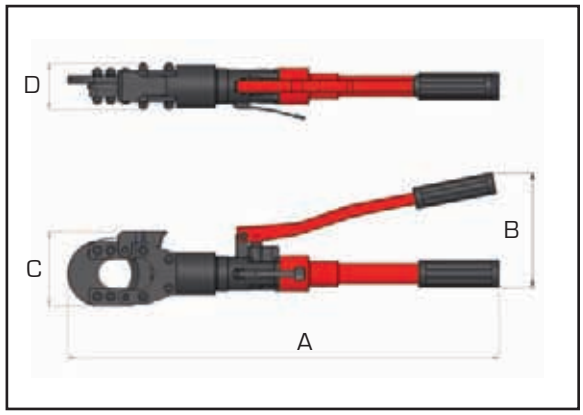
CT - SELF-CONTAINED HYDRAULIC CUTTERS

CT40

- Cutting capacity up to 40mm diameter
- Cuts a wide variety of materials
- Self-contained operation

The CT self-contained hydraulic cutter range offers a choice of 2 models with cutting capacities up to 25mm steel wire rope and 40mm cable. These versatile cutters are suitable for cutting wire rope, round bar, wire strands and electrical cable.

Model number	Cutting force tonnes	Weight kg	Dimensions in mm			
			A	B	C	D
CT20	6	2.8	390	145	76	40
CT40	6	6.0	630	155	103	65

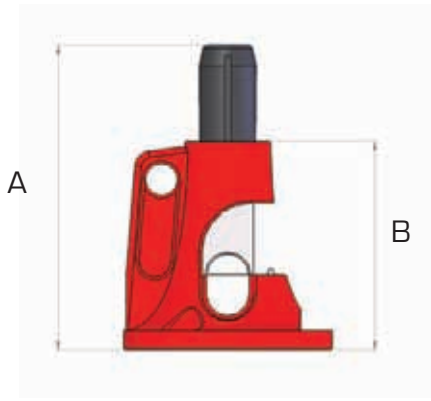


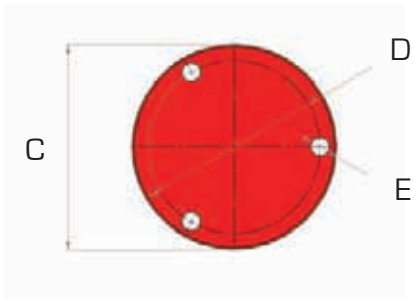
Material	Description	Maximum diameter cutting capacity in mm	
		CT20	CT40
Steel Wire Rope	6x7 Hempcore	20	22
	6x12 Hempcore	20	25
	6x19 Hempcore	20	25
Round Bar	Soft copper bar	20	25
	Soft aluminum bar	20	22
	Soft steel bar	16	16
	Reinforcing bar	13	13
Wire Strands	Bare copper strands	20	32
	Bare aluminum strands	20	32
	ACSR	20	-
	1x7 Guy steel wire strands	15	20
	1x19 Guy steel wire strands	16	25
Cable	Telephone cable CCP	20	40
	Lead sheathed telephone cable	20	40
	Underground cable	20	40

HWC - HAMMER BLOW WIRE ROPE AND CABLE CUTTERS

- Highly cost efficient impact design
- Cutting capacity up to 38mm diameter wire rope
- Portable and lightweight

The Hi-Force HWC range of highly cost effective hammer blow cutters are manufactured from high quality, shock resistant, ductile iron and are fitted with replaceable cutting blades made from tool steel. The cutting blades are retained in the housing at the moment of impact, ensuring absolute safety. These cutters offer a considerable time saving over conventional axe, chisel and hacksaw methods.





Model number	Cutting capacity Wire rope Ø mm	Electric cable mcm*	Electric cable mm²	Weight kg
HWC90	19	250	127	3.2
HWC91	27	300	152	7.0
HWC92	38	750	380	13.0

*mcm = 1,000 circular mils

Dimensions in mm A	B	C	D	E
225	140	88	N/A	N/A
245	154	160	148	14
285	195	195	164	18

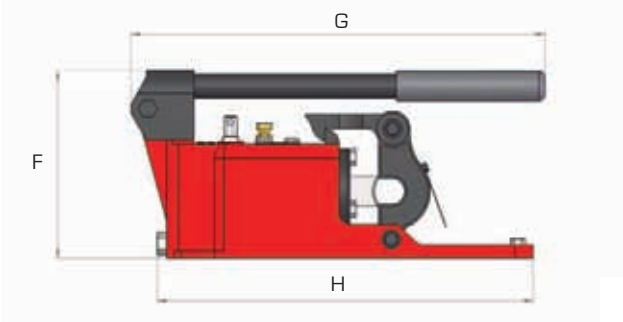
HSWC - SELF-CONTAINED HYDRAULIC WIRE ROPE CUTTERS

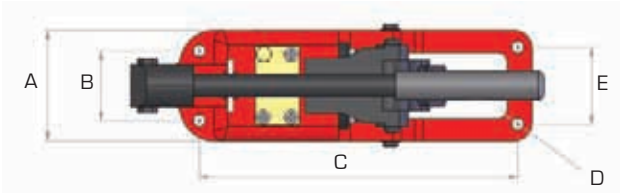
HSWC44

- Cutting capacities up to 44mm diameter
- Strong rigid steel construction
- Easy to use with minimum operator effort

The Hi-Force range of self-contained portable hydraulic wire rope and cable cutters comprises of 3 models with cutting capacities up to 44mm diameter. Approved and specified by many major industries throughout the world, these high quality cutters are precision engineered to give a good, clean cut with minimum effort, time after time. The self-contained design of the cutter enables easy transportation to the job site with minimum of fuss.

The shear blades are manufactured using high quality tool steel, which is heat treated and ground to very tight tolerances, ensuring superior performance and long-life. Users include wire rope manufacturers, earthmoving and construction contractors, rigging shops, elevator manufacturers and repairers and many others.





Model number	Cutting capacity wire rope mm Ø	Weight kg
HSWC19	19	9.5
HSWC28	28	15.5
HSWC44	44	30.0

Dimensions in mm							
A	B	C	D	E	F	G	H
93	58	265	10.2	64	154	345	315
105	64	294	10.2	67	174	374	357
125	70	393	10.2	84	203	490	460

HWRC - DOUBLE ACTING WIRE ROPE CUTTERS

Working pressure 700 Bar

Double acting design

Smooth guillotine cutting action

Hand and powered pumps suitable for these cutters are detailed on pages 25 to 44.

- Cuts high tensile locked coil wire rope and steel bar
- Cutting capacities up to 114mm diameter wire rope
- Cutting capacities up to 40mm diameter steel bar

The HWRC range of hydraulic cutters is specifically designed and manufactured for cutting high tensile locked coil wire rope and solid steel bar. Maximum cutting capacities up to 114mm diameter wire rope and up to 40mm diameter 28 tonnes tensile solid steel bar. All models incorporate a double acting hydraulic cylinder, suitable for working pressures up to 700 Bar and an open jaw design cutting head (see pictures below) for easy access to the material to be cut. Cutting blades and jaws are manufactured from specially toughened high tensile steel and the smooth guillotine action of the cutter greatly reduces the risk of blade jamming.

Step 1:

To open the cutter, swivel cutting head forward.

Step 2:

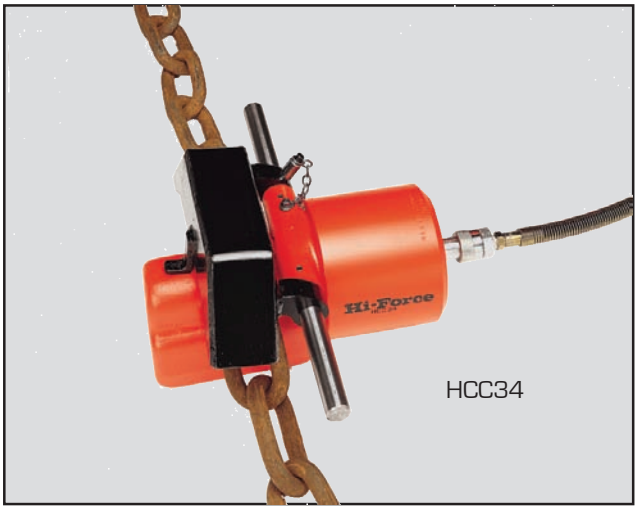
Position material to be cut in the cutting head slot.

Step 3:

Close the cutting head by swivelling it back to its original postion and secure behind the latch.

Model number	Output tonnes	Cutting capacity in mm: Wire rope mm Ø	Cutting capacity in mm: Cable	Cutting capacity in mm: Reinforcing Bar	Oil capacity Litres	Weight kg	Dimensions in mm: Length	Dimensions in mm: Width	Dimensions in mm: Height
HWRC1115	36	38	38	20	0.35	30	400	155	270
HWRC1125	80	63	63	32	0.90	60	450	200	390
HWRC1136	80	90	90	32	1.20	70	515	200	390
HWRC1145	120	114	114	40	2.40	95	570	280	445

HCC - CHAIN CUTTERS



HCC34

Working pressure 700 Bar

Single acting design

Fitted with locking guard

- Standard blades suitable for high tensile grade 80 chain and reinforcing bar
- Special blades, suitable for cutting Grade 100 chain available on request
- Cutting capacities up to46mm diameter

The HCC range of hydraulic cutters is specifically designed and manufactured for cutting high tensile chain and reinforcing bar. The easily replaceable cutter blades are manufactured from specially toughened high tensile steel and the choice of models available offer maximum cutting capacities up to 46mm diameter. All models are suitable for working pressures up to 700 Bar and incorporate a single acting cylinder fitted with a powerful piston retraction spring. The swivel action design of the locking safety guard (see pictures below) allows easy access for the material to be cut.

Picture 1:

HCC26 cutter shown with swivel action safety guard opened.

Picture 2:

HCC26 cutter shown with swivel action safety guard closed.

Hand and powered pumps suitable for these cutters are detailed on pages 25 to 44.

K

Model number	Cutting capacity mm Ø	Cutting force tonnes	Oil capacity cm^3	Weight kg	Dimensions in mm Length	Width	Height
HCC26	26	70	276	23	440	180	180
HCC34	34	100	492	40	410	460	250
HCC46	46	140	980	72	565	635	345

Hi-Force®

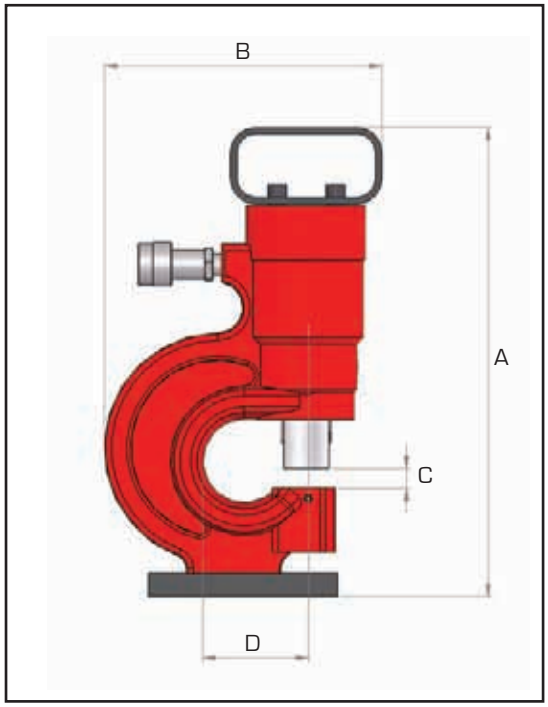
HYDRAULIC TOOLS

L

HHP - HOLE PUNCHERS

- Punching force up to 50 tonnes
- Throat depth 70mm
- Working pressure 700 Bar

The Hi-Force HHP series hydraulic hole puncher range offers a choice of two models comprising of the HHP30, 30 tonnes capacity single acting version, and the HHP50, 50 tonnes capacity double acting version. Both models are suitable for punching holes in steel plate as per the respective capacity of each model and are supplied complete with standard punch and die sets and an integral positioning and carrying handle. See pages 25-44 for detailed information and suitable pumps for use with HHP series punchers.



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Model number	Maximum force tonnes	Throat depth mm	Punch capacity (mm) Steel plate	Punch capacity (mm) Hole punch diameter	Standard punch/die sets included mm	Recommended pump & hose Manually operated	Recommended pump & hose Pneumatically operated	Weight excl. pump kg
HHP30	30	70	10.0	up to 20.5	10.5, 13.5 17.5, 20.5	HP232 complete with HC3 3m hose	AHP1120 complete with HC3 3m hose	19.8
HHP50	50	70	15.0	up to 25.0	10.5, 13.5 17.5, 20.5, 25.0	HP232D c/w 2 x HC3	AHP1141 c/w 2 x HC3	42.0

Note: pump supplied separately

Model number	Dimensions in mm A	B	C	D
HHP30	372	216	15	78
HHP50	412	281	15	71

The HHP30 is single acting operation, the HHP50 is double acting operation.

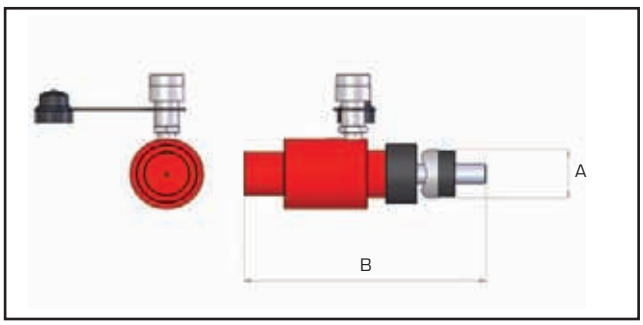
HKP & SKP - KNOCK OUT PUNCHERS


HKP10-4

- Capacity up to 10 tonnes
- Spring return hydraulic cylinder
- Working pressure 700 Bar

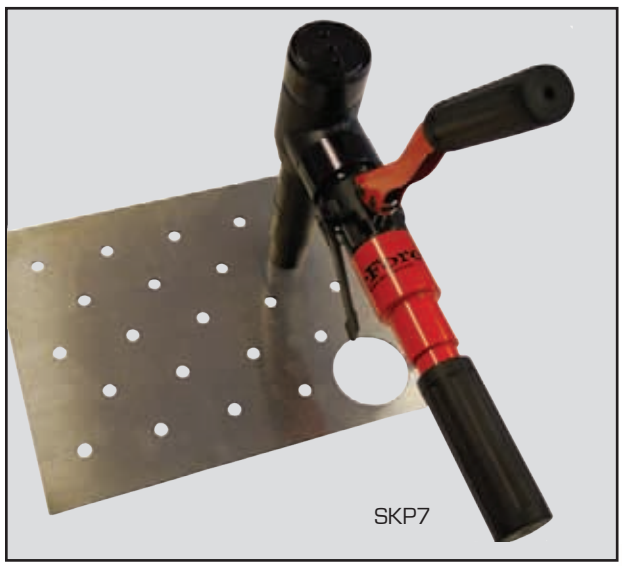
The Hi–Force HKP and SKP knock out puncher range is supplied as a complete set, including all standard sizes of punches/dies as specified below. Ideal for on-site hole punching in electric control panels and metal plates.

Model number	Maximum force tonnes	Plate capacity (mm) Stainless steel	Mild steel	Pump Included	Hose Included	Complete set weight kg
HKP10-2	10	1.6	3.2	HP110	HC2	14.6
HKP10-4	10	1.6	3.2	HP110	HC2	26.1
HKP10-2H	10	1.6	3.2	Not included	Not included	7.0
HKP10-4H	10	1.6	3.2	Not included	Not included	18.5
SKP7	7	1.6	3.2	Self contained unit with integral pump		9.0



Did you know.....

Hi-Force knock-out punchers are supplied complete with a carrying case


SKP7

Model number	Description	Punches/dies included									
HKP10-2	Std. punch/die A	21.8	27.6	34.1	42.7	48.7	60.5				
	Conduit Size	½"	¾"	1"	1¼"	1½"	2"				
	Length B	306	240	240	240	240	240				
HKP10-4	Std. punch/die A	21.8	27.6	34.1	42.7	48.7	60.5	76.1	88.9	102.8	115.5
	Conduit Size	½"	¾"	1"	1¼"	1½"	2"	2½"	3"	3½"	4"
	Length B	306	240	240	240	240	240	253	253	253	253
SKP7	Std. punch/die A	21.8	27.6	34.1	42.7	48.7	60.5				
	Conduit Size	½"	¾"	1"	1¼"	1½"	2"				
	Length B	306	240	240	240	240	240				

NS - HYDRAULIC NUT SPLITTERS


NS110

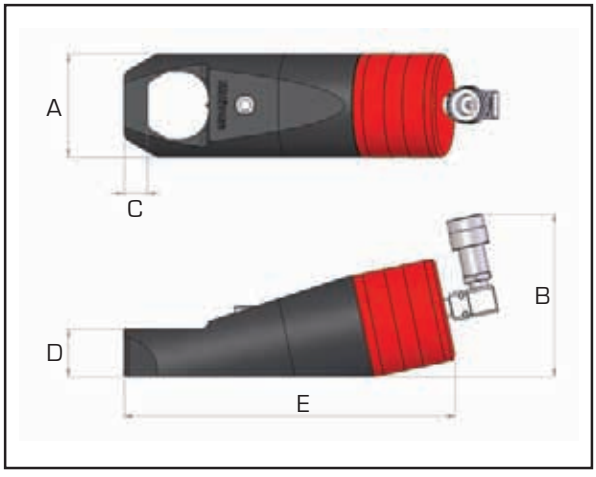
Capacities from 17 to 75mm AF

Working pressure 700 Bar

Compact & easy to use

The improved NS range of hydraulic nut splitters offers a choice of 5 models suitable for hexagon nut AF sizes from 17 to 75mm (M10 to M48 bolt sizes). The revolutionary design incorporates a hardened steel linkage that ensures the blade cutting edge is kept parallel to the nut throughout the splitting process which improves operational efficiency and more importantly, blade life. Designed to easily split corroded nuts up to RC44 hardness, Hi-Force nut splitters offer the ideal 'cold cut' solution for removing worn or corroded fasteners, especially in applications where 'hot work' permits are not allowed. All NS models are supplied fitted with a unique 360° positional swivel coupling for easy adjustment and fitment in confined spaces. Suitable pumps are detailed on pages 25 to 44.

- Angled body design on all models
- Provides necessary clearance on flanges and flat surfaces
- Manufactured from high quality steel



Model number	Hexagon AF sizes mm	Bolt sizes mm	Weight kg
NS104	17 - 32	M10 - M22	4.0
NS110	32 - 41	M22 - M27	7.4
NS200	41 - 50	M27 - M33	10.6
NS206	50 - 60	M33 - M39	15.8
NS215	60 - 75	M39 - M48	39.3

Dimensions in mm				
A	B	C	D	E
64	132	12.5	30.0	210
78	140	20.0	37.0	270
94	175	21.0	43.0	302
105	161	24.0	52.0	334
156	185	27.0	75.0	418

HMNS - SELF CONTAINED HYDRAULIC NUT SPLITTERS

Capacities from 17 to 50mm AF

Choice of 3 models

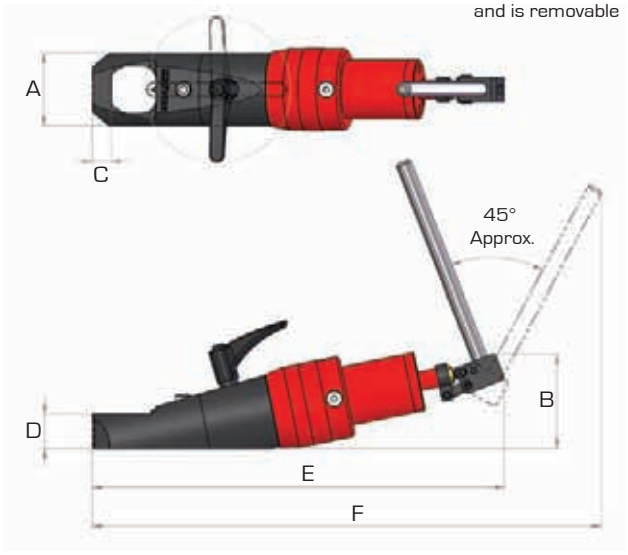
Compact & easy to use

The HMNS range of hydraulic nut splitters offers a choice of 3 models suitable for hexagon nut AF sizes from 17 to 50mm (M10 to M33 bolt sizes). All models have an angled body design to provide the neccessary clearance on flanges and flat surfaces. The revolutionary design incorporates a hardened steel linkage that ensures the blades cutting edge is kept parallel to the nut throughout the splitting process which improves operational efficiency and more importantly, blade life. Designed to easily split corroded nuts up to RC44 hardness, Hi-Force nut splitters offer the ideal 'cold cut' solution for removing worn or corroded fasteners, especially in applications where 'hot work' permits are not allowed. All models incorporate an integral hydraulic pump with multi-positional lever for even greater versatility.

- Angled body design on all models
- Provides necessary clearance on flanges and flat surfaces
- Manufactured from high quality steel

HMNS Models

Handle rotates freely through 360° and is removable

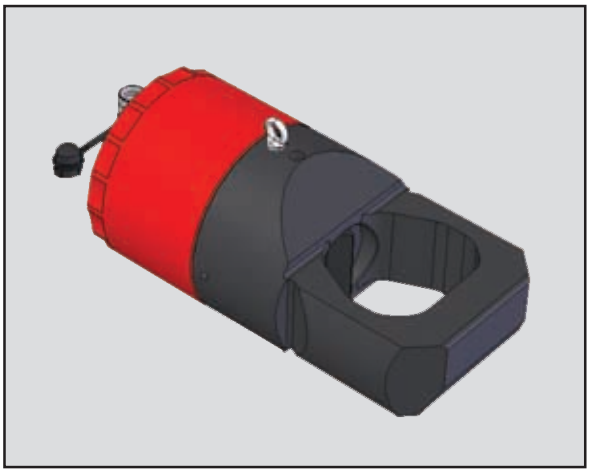


Model number	Hexagon AF sizes mm	Bolt sizes mm	Weight kg
HMNS104	17 - 32	M10 - M22	5.8
HMNS110	32 - 41	M22 - M27	7.9
HMNS200	41 - 50	M27 - M33	13.6

Dimensions in mm					
A	B	C	D	E	F
64	88	12.5	30.0	380	455
78	101	20.0	37.0	440	540
94	112	21.0	43.0	471	566

L

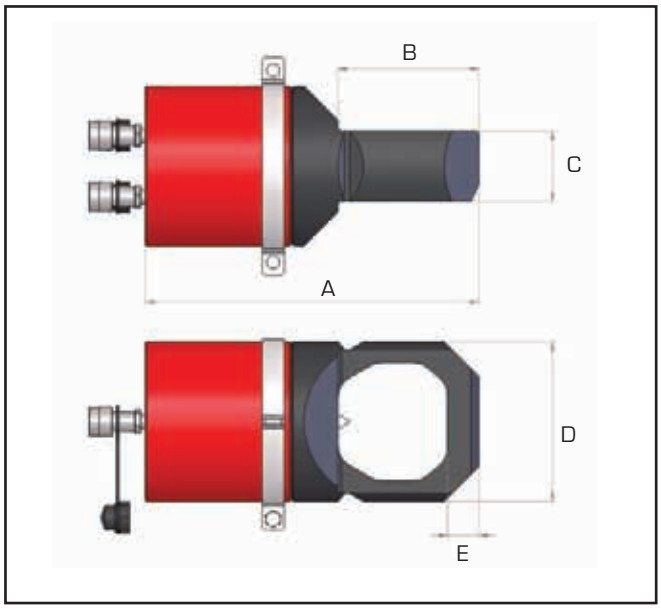
DNS - DOUBLE ACTING HYDRAULIC NUT SPLITTERS



- Choice of 2 models
- Working pressure 700 Bar
- Double acting design

The Hi-Force DNS range of double acting, hydraulic nut splitters offers a choice of 2 models suitable for splitting nuts of across flats (AF) sizes from 2.15/16" to 5.3/8" (74mm to 136mm). Both models are 700 bar maximum working pressure and feature a double acting hydraulic piston for easy extension and retraction of the toughened steel splitting blade. Suitable manual and powered pumps for use with DNS range nut splitters can be found on pages 25-44 of this catalogue. Hi-Force DNS range hydraulic nut splitters are easy to set up and capable of safely splitting nuts quickly without any sparks, flames or flying debris usually associated with cutting torches. The DNS range nut splitter heads are designed to fit on all API and ANSI flanges and capable of splitting the hardest nuts with minimal damage to the stud bolt threads.

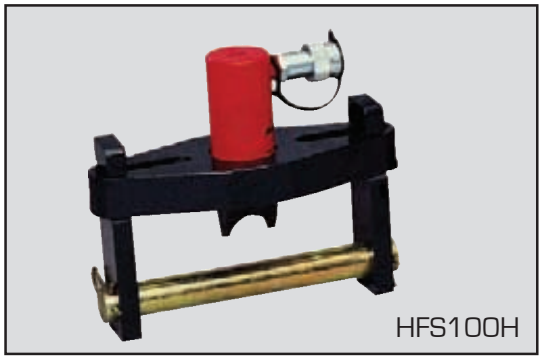
Splitting blades are easy to remove and re-install after re-sharpening or when a replacement blade is required.



Pictures (left and below) show a typical nut splitting operation taking place. In most cases it is neccessary to split the nut on two opposite faces.

Model number	Hexagon AF sizes inch	Hexagon AF sizes mm	Stud bolt thread sizes imperial	Stud bolt thread sizes metric	Weight kg	Dimensions in mm A	B	C	D	E
DNS404	2 15/16" - 4 1/4"	74 - 105	1 7/8" - 2 3/4"	M48 - M70	47	382	161	80.5	183	36
DNS506	4 1/4" - 5 3/8"	108 - 136	2 3/4" - 3 1/2"	M70 - M90	95	463	198	100	243	52

HFS-H - HYDRAULIC FLANGE SPREADERS


HFS100H

Capacities from 4.5 to 10 tonnes

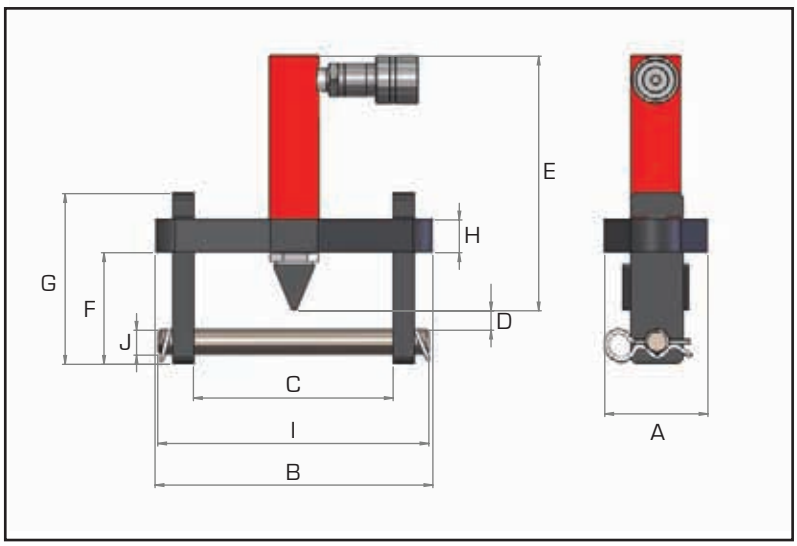
Working pressure 700 Bar

Quick and easy to assemble on flange

HFS-H hydraulic flange spreaders provide the ideal solution for safely opening pipe flanges in the marine and oil & gas industry. Available in capacities from 0 - 4.5 tonnes and 0 - 10 tonnes, these models offer the user the capability of opening flanges up to 2 x 57mm or 2 x 92mm thick respectively. Hi-Force flange spreaders can be operated individually, or as a pair when opening large flanges using a standard pump (see pages 27 to 29) and connecting hose (see page 50). With Hi-Force flange spreaders you are only minutes away from safely opening the toughest flanges without the risk of sparks caused by hammer blows, chisels and flying wedges.

›› Suitable for fitment onto flanges with a maximum stud bolt size of 1⅝" (41 mm)

Pump and hose not included!
See page 140 for complete kits.

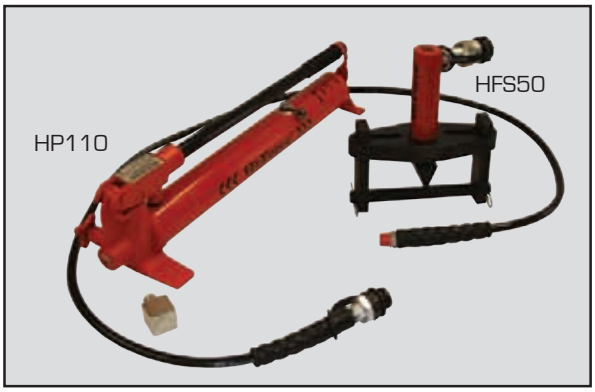


Model number	Capacity tonnes	Stroke mm	Oil capacity cm^3	Max. flange thickness mm	Stud size mm	Standard wedge mm	Weight kg
HFS50H	4.5	75	48	2 x 57	19 - 29	3 - 29	5.0
HFS100H	10	56	81	2 x 92	32 - 41	3 - 29	11.6

	Dimensions in mm :										
Model number	A	B	C min	C max	D	E	F	G	H	I	J
HFS50H	76	210	61	155	10	192	69	129	25	206	18
HFS100H	108	290	61	224	30	165	89	178	38	273	31

L

HFS & HFS-TK - HYDRAULIC FLANGE SPREADERS



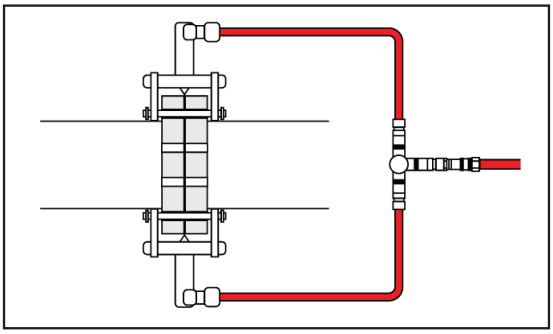
Capacities from 4.5 to 10 tonnes

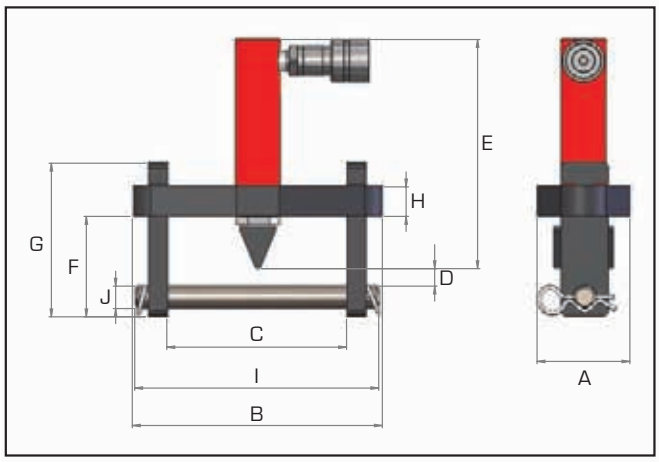
Working pressure 700 Bar

Supplied in a steel storage & carrying case

HFS and HFS-TK hydraulic flange spreader kits offer a choice of either single spreader complete with pump and accessories (HFS) or a twin spreader arrangement incorporating two flange spreaders operated from a single pump with a T-piece and twin hose connection (HFS-TK). For flange seperation in applications where long lengths of heavy pipework are involved, the HFS-TK twin spreader kit enables the operator to achieve parallel flange seperation all around the joint. Hi-Force HP110 hand pump is supplied as standard to HFS & HFS-TK flange spreader kits and details can be found on page 27 of this catalogue.

- Supplied complete with manually operated pump and hose assembly
- Suitable for fitment onto flanges with a maximum stud bolt size of 1 5/8" (41 mm)





Specifications :

Model number	Capacity tonnes	Stroke mm	Oil capacity cm^3	Max. flange thickness mm	Stud size mm	Standard wedge mm	Weight kg
HFS50	4.5	75	48	2 x 57	19 - 29	3 - 29	22.5
HFS100	10	56	81	2 x 92	32 - 41	3 - 29	29.1
HFS50-TK	2 x 4.5	75	2 x 48	2 x 57	19 - 29	3 - 29	27.5
HFS100-TK	2 x 10	56	2 x 81	2 x 92	32 - 41	3 - 29	35.7

Dimensions in mm :

Model number	A	B	C min	C max	D	E	F	G	H	I	J
HFS-50	76	210	61	155	10	192	69	129	25	206	18
HFS-100	108	290	61	224	30	165	89	178	38	273	31
HFS50-TK	76	210	61	155	10	192	69	129	25	206	18
HFS100-TK	108	290	61	224	30	165	89	178	38	273	31

MFS - MECHANICAL FLANGE SPREADERS

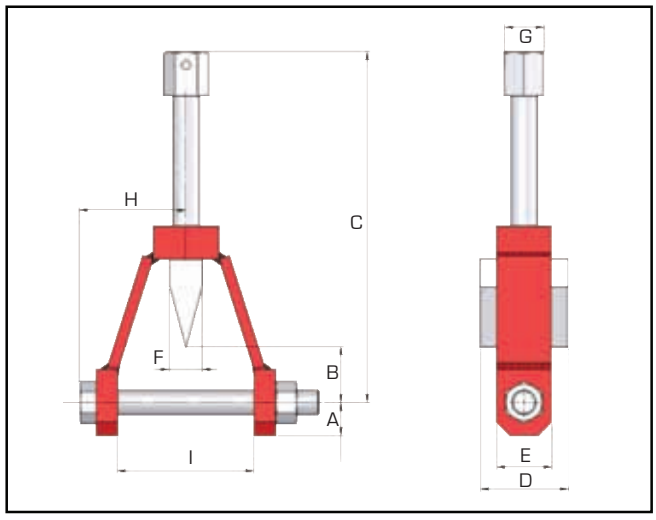
Suitable for bolt diameters up to 31mm

Maximum spread 231mm

No external power source required

The MFS range of mechanical flange spreaders comprises of 6 models, each offering a safe and economical way to open flanges without the risk of sparks. The threaded spindle can be operated using a standard spanner, allowing the user to apply a controlled force without damaging the flange. Due to the mechanical design of these flange spreaders, no external power source is needed and therefore, they can be used anywhere on-site.

- Choice of six models available
- High grade steel construction with high tensile cross bolt
- Case hardened spreading wedge



Model number	Dimensions in mm A	B max.	C min.	C max.	D	E	F	G	H	I
MFS16	25	28	185	232	65	40	25	30	66	70
MFS19	30	50	185	254	65	50	25	30	81	95
MFS22	30	50	247	318	80	50	30	36	97	124
MFS25	30	85	247	353	80	50	30	36	113	155
MFS28	30	80	275	382	90	60	40	46	130	181
MFS31	32	84	275	385	90	60	40	46	157	231

Model number	Pin diameter mm	inch	Min flange bolt hole diameter	Maximum flange thickness mm	inch	Weight kg
MFS16	16	5/8"	17	2 x 22	2 x 7/8"	2.2
MFS19	19	3/4"	20	2 x 35	2 x 1 3/8"	2.7
MFS22	22	7/8"	23	2 x 47	2 x 1 13/16"	4.1
MFS25	25	1	26	2 x 62	2 x 2 7/16"	6.4
MFS28	28	1 1/8"	29	2 x 70	2 x 2 3/4"	8.2
MFS31	31	1 1/4"	32	2 x 95	2 x 3 3/4"	9.6

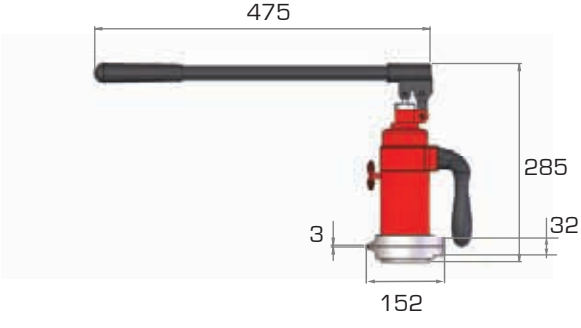
SFS - STEPPED FLANGE SPREADERS


SFS15

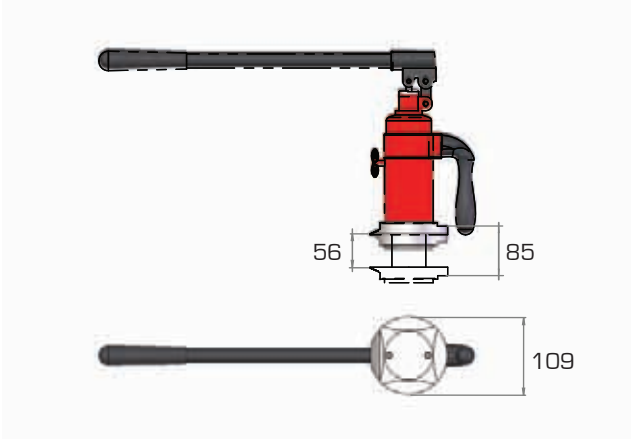
- Capacities up to 15 tonnes
- Stroke 53mm
- Minimum gap required only 3mm

The Hi-Force range of SFS stepped flange spreaders offers a choice of either self-contained design, with in built pump mechanism, or a flange spreader head designed for use with a separate hand or powered pump. Unlike the majority of flange spreaders that utilise a two jaw mechanism, the Hi-Force SFS range has a unique four position, twin, stepped plate arrangement which greatly reduces the risk of jaw slippage during operation. The SFS12-H offers a maximum spreading capacity of 12 tonnes at 700 Bar maximum working pressure and is ideally suited for multiple position flange spreading operations, using a single pump unit with a manifold and multiple hose set up. Model SFS15 is completely self-contained with in built manually operated hydraulic hand pump and provides a superb 15 tonnes of spreading force. Both models are capable of operation within a flange gap of 3mm to 32mm and provide a spreading stroke length of 53mm.

Retracted



Extended



Note: Drawing shows SFS15 only.
SFS12-H does not have internal pump but features quick connect coupling for use with external pump.

Model number	Capacity tonnes	Stroke mm	Access gap in mm Min	Max	Recommended pump/hose not included!	Weight kg
SFS12-H	12	53	3	32	HP110 HC2	5.9
SFS15	15	53	3	32	Integral pump design	6.5

SJS - HYDRAULIC STEPPED JAW SPREADER


SJS10

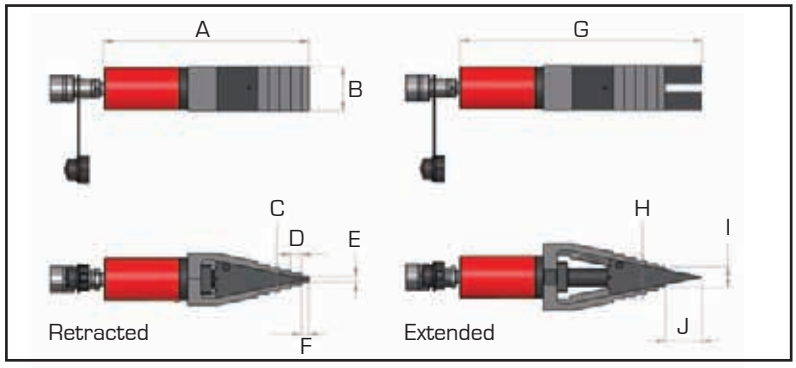
Capacity up to 13 tonnes

Supplied with safety block & stepped blocks

Maximum spread 60mm

- Single acting, spring assisted return
- Compact & lightweight design

The SJS10 hydraulic spreader offers the ideal solution for spreading, wedging and prising operations in a wide variety of industrial applications. The compact, low weight, spring assisted, piston retract design of the SJS10 offers the user a powerful 13 tonnes of spreading capacity. Manufactured from high strength steel, the low height jaw tips can easily fit within an 8mm gap and can provide a total spreading distance of 60mm in 5 operations, using the step blocks provided with the tool. Suitable for operation up to 700 Bar maximum working pressure, and supplied complete with a female half quick connect coupler for easy attachment to a Hi-Force manually operated or powered hydraulic pump.



Model number	Capacity tonnes	Oil capacity cm^3	Weight kg
SJS10	13	74	5.5

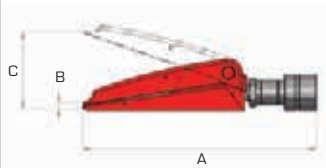
Dimensions in mm									
A	B	C	D	E	F	G	H	I	J
279	60	40	15	8	10	328	60	28	49

JS - HYDRAULIC JAW SPREADER


JS4

The JS4 hydraulic spreader is the ideal solution for spreading, wedging and prising operations in a wide variety of industrial applications. The compact, low weight, spring assisted return design enables the tool to fit into a gap of 9.7mm and offers a maximum spread of 94mm. Manufactured from high strength steel, with a maximum pressure of 700 Bar, the JS4 is supplied fitted with a quick connect female half coupler.

JS4



Model number	Capacity tonnes	Oil capacity cm^3	Weight kg
JS4	0.9	10.0	2.2

Dimensions in mm		
A	B	C
223	9.7	94

Hi-Force®

HPB & HPF - WORKSHOP PRESSES


HPF10042

Capacities from 10 to 200 tonnes

Stroke lengths from 150 to 330mm

Working pressure 700 Bar

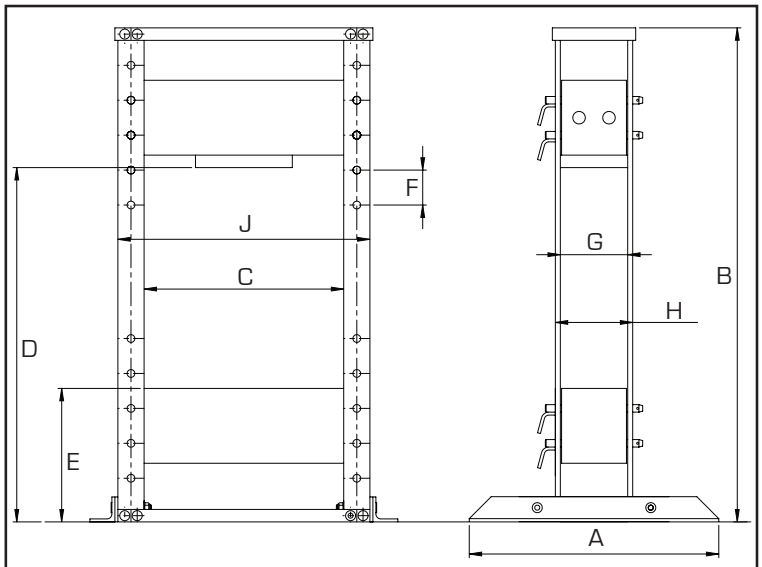
- Choice of manual, air or electric powered pumps
- Supplied complete with pressure gauge
- Other configurations available on request

Model number	Capacity tonnes	Stroke mm	Cylinder model no. [1]	Cylinder principle	Pump model no. [2]	Pump operation	Weight kg
HPB1020	10	250	HSS1010	single acting	HP110	hand operated	78
HPB1020F	10	250	HSS1010	single acting	HP227FP	foot operated	83
HPB1026	10	150	HSS106	single acting	HP110	hand operated	77
HPB1026F	10	150	HSS106	single acting	HP227FP	foot operated	82
HPB1030	10	250	HSS1010	single acting	AHP1120	air powered	78
HPB1036	10	150	HSS106	single acting	AHP1120	air powered	77
HPF1020	10	250	HSS1010	single acting	HP110	hand operated	95
HPF1030	10	250	HSS1010	single acting	AHP1120	air powered	85
HPF2520	25	250	HSS2510	single acting	HP227	hand operated	145
HPF2530	25	250	HSS2510	single acting	AHP1120	air powered	138
HPF2541	25	250	HSS2510	single acting	HEP103341	electric driven 110 V	160
HPF2542	25	250	HSS2510	single acting	HEP103342	electric driven 240 V	160
HPF2544	25	250	HSS2510	single acting	HEP207314	electric driven 415 V	160
HPF5020S	50	330	HSS5013	single acting	HP257	hand operated	470
HPF5020D	50	330	HDA5013	double acting	HP257D	hand operated	500
HPF5030S	50	330	HSS5013	single acting	AHP1121	air powered	505
HPF5030D	50	330	HDA5013	double acting	AHP1141	air powered	505
HPF5041S	50	330	HSS5013	single acting	HEP207311	electric driven 110 V	505
HPF5041D	50	330	HDA5013	double acting	HEP207411	electric driven 110 V	481
HPF5042S	50	330	HSS5013	single acting	HEP207312	electric driven 240 V	512
HPF5042D	50	330	HDA5013	double acting	HEP207412	electric driven 240 V	518
HPF5044S	50	330	HSS5013	single acting	HEP207314	electric driven 415 V	518
HPF5044D	50	330	HDA5013	double acting	HEP207414	electric driven 415 V	518
HPF10020	100	330	HDA10013	double acting	HP245D	hand operated	1011
HPF10030	100	330	HDA10013	double acting	HAP21042	air powered	1029
HPF10041	100	330	HDA10013	double acting	HEP207421	electric driven 110 V	1043
HPF10042	100	330	HDA10013	double acting	HEP207422	electric driven 240 V	1043
HPF10044	100	330	HDA10013	double acting	HEP207424	electric driven 415 V	1043
HPF20041	200	305	HDA20012	double acting	HEP310421	electric driven 110 V	3250
HPF20042	200	305	HDA20012	double acting	HEP310422	electric driven 240 V	3250
HPF20044	200	305	HDA20012	double acting	HEP310424	electric driven 415 V	3250

Notes: [1]) For detailed specification on applicable cylinders, see pages 14 & 15 for HSS range and page 19 for HDA range. [2]) For detailed specification on applicable pumps, see pages 27 & 29 for HP range, page 33-36 for HEP range, page 41-42 for AHP range and page 43 for HAP range.

HPB & HPF - WORKSHOP PRESSES

The HPB and HPF range of workshop presses offers a choice of 31 models with either single acting or double acting cylinders and manually operated, air powered or electric powered pumps. Floor presses incorporate an adjustable work table and dual scale pressure gauge. Factory mounted optional accessories include a mechanical bed winch for easy adjustment of the work table and multi-position V-blocks. All presses are supplied completely assembled, ready for use. Hi-Force workshop presses are manufactured to the highest quality standards, and are suitable for the most demanding jobs.



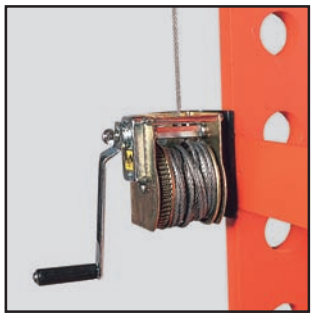
Note: Press bed and press head are adjustable in steps of 'F',
50 tonne has 4 positions, 100 tonne has 3 positions, 200 tonne has 7 positions.
10 and 25 tonne press frame has fixed press head and adjustable press bed.

In order to fully comply with CE regulations, some presses must be equipped with specific safety components, such as spring centered valves, two-hand control devices or others.

Press Range	Capacity tonnes
HPB1000	10
HPF1000	10
HPF2500	25
HPF5000	50
HPF10000	100
HPF20000	200

Frame dimensions in mm										
A	B	C	D (min)	D (max)	E (min)	E (max)	F	G	H	J
280	675	394	573		95		-	-	-	545
742	1448	508	1258		260	1010	150	-	152	660
742	1448	508	1258		260	1010	150	-	152	660
1000	2055	800	1140	1560	395	815	140	258	298	1000
1000	1980	1000	1090	1370	550	830	140	338	388	1240
1200	2500	1250	2115	1815	610	1510	150	330	410	1750

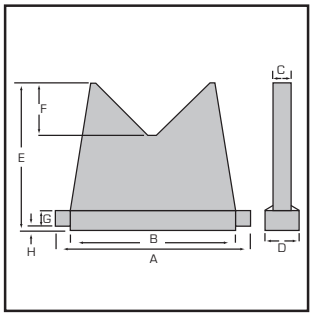
OPTIONAL EXTRAS



Multi-position V-blocks

- Factory fitted option
- Lifts and lowers work table
- Available for 50 and 100 tonne presses

Model number	Applicable for
HBW50	All Hi-Force 50 tonnes workshop presses, HPF range
HBW100	All Hi-Force 100 tonnes workshop presses, HPF range



- With flat bed and V-shape press surfaces
- Available for 10, 25, 50 and 100 tonne presses

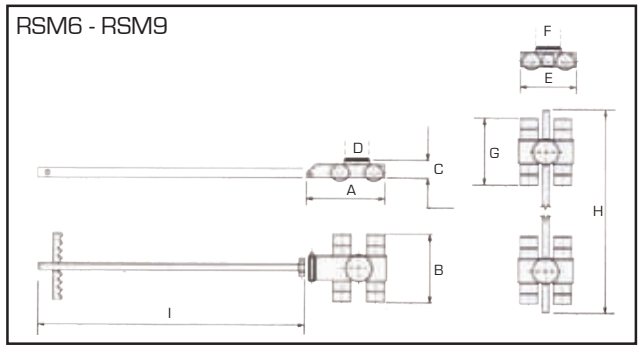
Model number	Cap. per set tonnes	Dimensions in mm A	B	C	D	E	F	G	H
HVB2500	10 - 25	204	154	20	45	155	45	20	8
HVB5000	50	365	265	25	50	190	60	25	10
HVB10000	100	425	325	35	60	265	85	35	10

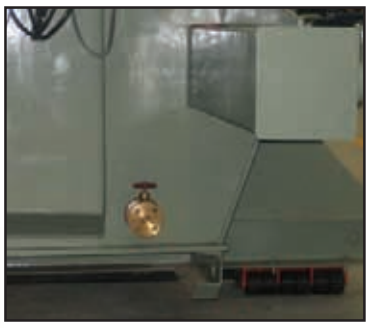
L

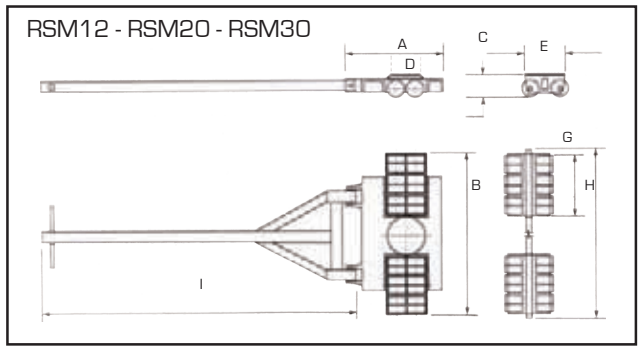
RSM - NYLON MULTI-ROLLER STEERABLE SKATES

- Capacities from 6 to 30 tonnes
- Steerable front skate for total control
- Low weight, compact size

The RSM nylon multi-roller steerable skate range is ideal for use on tiled floors and is available with capacities from 6 to 30 tonnes. These skates consist of 3 major parts: 1 steerable turntable front skate and 2 adjustable rear skates. This modular design allows the system to be easily assembled and dismantled without the use of tools. All models are fitted with low rolling resistance wheels with ball bearings and non-slip Neoprene pads on each load surface.







Model number	Capacity per skate set tonnes	No. of wheels front steerable	No. of wheels twin rear skate	Weight incl. box kg
RSM6	6	4 no. 82 mm x 48 mm	8 no. 82 mm x 48 mm	51
RSM9	9	8 no. 82 mm x 48 mm	16 no. 82 mm x 48 mm	64
RSM12	12	8 no. 82 mm x 48 mm	8 no. 82 mm x 48 mm	95
RSM20	20	16 no. 82 mm x 48 mm	16 no. 82 mm x 48 mm	118
RSM30	30	24 no. 82 mm x 48 mm	24 no. 82 mm x 48 mm	135

Dimensions in mm								
A	B	C	D	E	F	G	H max	I
330	210	109	110	240	110	210	1500	1150
330	310	109	160	240	160	310	1500	1150
413	614	110	190	180	-	130	1500	1500
413	673	110	190	180	-	242	1500	1500
413	990	110	190	188	-	354	1500	1500

RSC & RSS - MULTI-PURPOSE SKATES

Capacities from 5 to 37.5 tonnes

Available as complete kit or as individual skates

Endless hardened roller chain

The RSC and RSS range of industrial, low profile skates offer the safest, fastest and most economical method of moving heavy equipment. The range comprises of 4 models available with capacities of up to 37.5 tonnes per skate. Designed with an endless hardened roller chain which revolves around the skate, at least 5 rollers remain in contact with the floor at any one time, ensuring smooth travel even over cracked concrete floors. With a range of turntables, stabilisers, spacer bars and steering handles available, Hi-Force skates can move and position heavy and irregular shaped loads easily and more economically than other lifting devices. Hi-Force skates are also ideal for use in confined spaces and typical applications include bridge building, transformers, generators, turbines, heavy machinery and many others.

Complete kits :

Model number	Cap. per set tonnes	Skates Qty: 4	Turntables Qty: 2	Stabilisers Qty: 2	Spacer bars Qty: 4	Handles Qty: 2	Wooden box Qty: 1	Weight kg
RSC20	20	**RSS20**	**RT20**	**RS20**	**RB20**	**RH20**	**WB1**	41
RSC50	50	**RSS50**	**RT50**	**RS50**	**RB50**	**RH50**	**WB2**	94

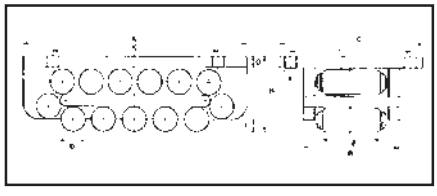
Individual skate selection chart :

Model number	Cap. per skate tonnes	Weight kg	Dimensions in mm Length	Width	Height less t/table	Height incl. t/table	Roller width	Roller dia
RSS20	5.0	4	210	102	59	94	51	18
RSS50	12.5	11	271	125	95	143	87	30
RSS100	25.0	27	370	175	130	179	90	42
RSS150	37.5	42	502	186	152	206	90	42

Note : Turntables for RSS100 (RT100) and RSS150 (RT150) are available on request.

RSH - HEAVY DUTY SKATES

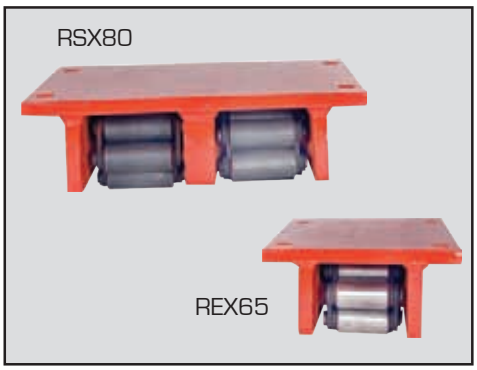
The RSH heavy duty range of moving skates are ideal for movement of heavy loads such as transformers, generators, turbines and machinery. Available with capacities ranging from 15 to 100 tonnes each skate.



Model number	Capacity tonnes	Rollers in contact	Rollers total	Weight kg
RSH15	15	5	15	9
RSH20	20	4	13	12
RSH40	40	4	13	19
RSH50	50	6	17	29
RSH65	65	4	13	51
RSH100	100	6	17	92

Dimensions in mm A	B	C	D	E	F	G	H	I	J	K
210	100	175	18	51	6	13	76	14	140	150
220	113	190	24	60	10	14	87	14	155	150
270	130	210	30	68	10	14	104	18	175	190
320	140	220	30	68	10	18	115	18	180	240
380	168	270	42	76	19	19	145	22	220	280
530	182	300	50	86	19	19	165	22	240	410

REX & RSX - HEAVY DUTY SKATES WITH GROOVED GUIDE



Capacities from 40 to 400 tonnes

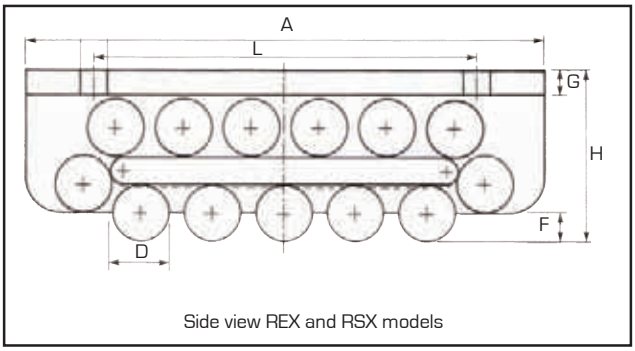
Heat treated load bearing centre plate

Heat treated, special chrome alloy chains

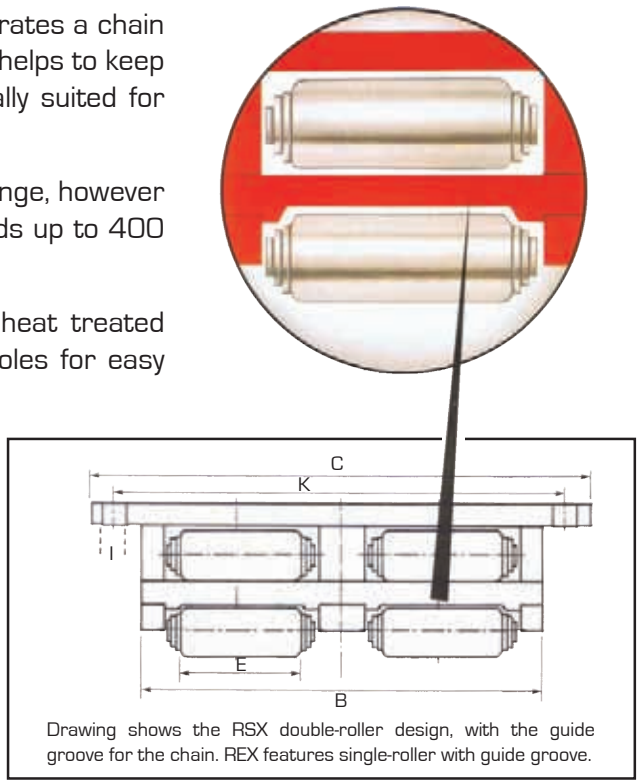
Available with capacities up to 200 tonnes each skate, the REX heavy duty range of single roller moving skates incorporates a chain groove cut into the centre member of the skate, which helps to keep the chain running parallel with the body and is specially suited for moving loads over long distances.

The RSX range offers the same features as the REX range, however has a double roller design, capable of transporting loads up to 400 tonnes per skate.

Both the REX and RSX models feature high quality, heat treated components and are supplied with 4 mounting bolt holes for easy attachment to the load.



Side view REX and RSX models



Drawing shows the RSX double-roller design, with the guide groove for the chain. REX features single-roller with guide groove.

Model number	Capacity tonnes	Rollers in contact	Rollers total	Weight kg	Dimensions in mm A	B	C	D	E	F	G	H	I	K	L
REX Range - Single-roller design															
REX40	40	4	13	20	270	130	210	30	68	10	14	104	18	175	190
REX50	50	6	17	29	320	140	220	30	68	10	18	115	18	180	240
REX65	65	4	13	52	380	168	270	42	76	19	19	145	22	220	280
REX100	100	6	17	93	530	182	300	50	86	19	19	165	22	240	410
REX150	150	9	23	162	600	205	350	50	100	20	28	190	26	280	480
REX200	200	13	31	266	900	205	380	50	100	20	38	200	33	300	720
RSX Range - Double-roller design															
RSX80	80	2 x 4	2 x 13	36	270	260	340	30	68	10	14	104	18	305	190
RSX100	100	2 x 6	2 x 17	57	320	280	360	30	68	10	18	115	18	325	240
RSX130	130	2 x 4	2 x 13	96	380	336	440	42	76	19	19	145	22	390	300
RSX200	200	2 x 6	2 x 17	175	530	364	480	50	86	19	19	165	22	430	420
RSX300	300	2 x 9	2 x 23	305	600	410	560	50	100	20	28	190	26	490	480
RSX400	400	2 x 13	2 x 31	485	900	410	590	50	100	20	38	200	33	500	720

L

TL - TOUGHLIFT JACKING SYSTEMS

The Hi-Force ToughLift jacking system offers users the easiest and safest method of lifting material haulers in the mining and construction industry and locomotives in the railway industry, when critical maintenance and breakdown repair work requires completion.

Suitable for lifting even the largest earth haulers in the world, the Hi-Force ToughLift is available in 50, 100, 150 and 200 tonnes lifting capacities. All models are available with either a 110 volt or 240 volt single phase electric driven pump unit or a 7 Bar compressed air driven pump version. All models are operated via a remote, push button hand pendant controller with a 6 metre length control cable to ensure the operator has precise control over the lifting operation from a safe distance away from the load.

Hi-Force ToughLift jacking systems are supplied fitted as standard with a hardened steel lifting saddle, patented "snap latch" handle assembly for easy positioning and transportation and a patented jacking system design for increased safety, enabling them to be easily positioned, in the tightest of spaces, to ensure location into the correct and exact lifting and jacking position.

Fitted with large diameter wheels and heavy duty tyres as standard, all ToughLift models are narrow in width and have the smallest footprint area in the industry.

A wide variety of optional extras are also available which include load holding blocks, swivel load caps, locking and non locking load block extensions, slip lock extensions and accessory storage baskets. Further details can be found on pages 152 to 154.

With the Hi-Force ToughLift, plant operators in mining, construction and railway industries are assured of minimal maintenance and repair downtime, of their capital intensive equipment, from the strongest and most versatile lifting jack in the world!

TL - TOUGHLIFT JACKING SYSTEMS

TL50A255 TL100A405

Working pressure 700 Bar

Choice of 12 models with a range of accessories

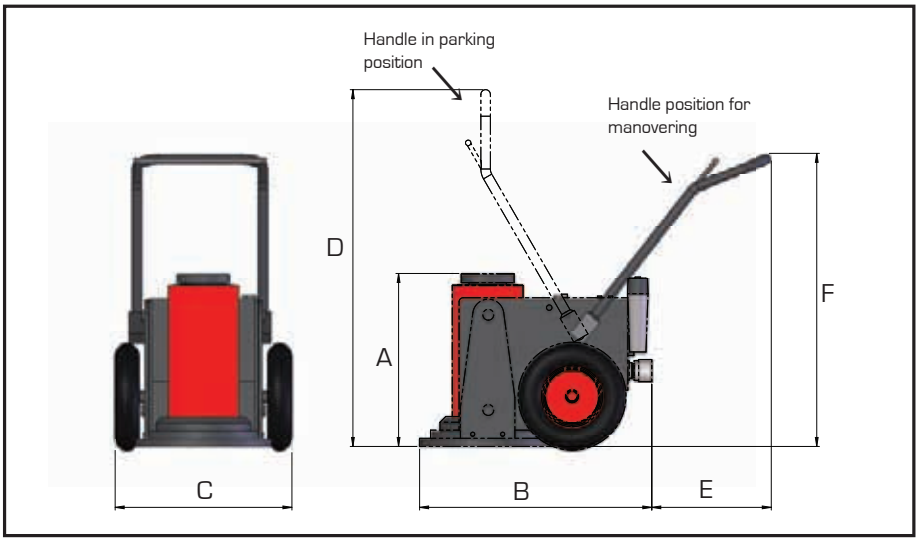
Used in mining, construction & railway industries

- Choice of 50, 100, 150 or 200 tonne lifting capacities
- Patented multi-positional lifting handle for easy transportation and positioning
- Available with choice of electric or air driven hydraulic pump unit
- Push button remote hand pendant controller with 6 metre control cable
- Patented jacking system for safe and correct positioning prior to load lift
- Wide range of accessories available for even greater versatility (see pages 152 to 154)
- Narrow width, with small footprint for easy access into confined spaces
- Integral airline filter, lubricator and pressure regulator unit (air driven models only)
- User friendly design with easily accessible maintenance features
- Large diameter, heavy duty wheels for easy positioning underneath the load

Model number	Capacity tonnes	Power Supply	Stroke mm	Weight kg	Max additional stack in mm
TL050A255	50	6-Bar air driven	254	160	680
TL050E255	50	240V electric	254	170	680
TL100A405	100	6-Bar air driven	405	307	480
TL100A530	100	6-Bar air driven	530	340	180
TL100E405	100	240V electric	405	317	480
TL100E530	100	240V electric	530	350	180
TL150A390	150	6-Bar air driven	390	348	485
TL150A520	150	6-Bar air driven	520	394	180
TL150E390	150	240V electric	390	358	485
TL150E520	150	240V electric	520	404	180
TL200A380	200	6-Bar air driven	381	395	500
TL200E380	200	240V electric	381	405	500

Note: All electric driven ToughLift jacking systems are available in 110V and 240V single phase, power supply options. For 110V version, please suffix model number with 110, i.e TL050E255-110 for 110V version.

TL - TOUGHLIFT JACKING SYSTEMS



Model Number	Dimensions in mm A	B	C	D	E	F
TL050A255	435	775	507	1310	390	1110
TL050E255	435	701	507	1310	464	1110
TL100A405	635	850	600	1500	630	1150
TL100A530	813	850	600	1500	630	1150
TL100E405	635	780	600	1500	630	1150
TL100E530	813	780	600	1500	630	1150
TL150A390	635	850	600	1500	665	1185
TL150A520	813	850	600	1500	665	1185
TL150E390	635	780	600	1500	665	1185
TL150E520	813	780	600	1500	665	1185
TL200A380	635	850	600	1600	700	1220
TL200E380	635	780	600	1600	700	1220

SADDLES

Flat saddles are supplied fitted as standard to all ToughLift jacks, however tilting swivel saddles can also be supplied as an optional extra. Both types of saddle (flat or tilting swivel) can be easily fitted to all slip lock, non locking and load locking extensions.

EXTENSIONS

Hi-Force also offers a range of extensions for use with ToughLift jacking systems. Non-locking extensions can be used in multiples up to the maximum indicated on page 150 for each specific capacity jack. Similarly, slip lock extensions can also be used in multiples up to the maximum height specified on page 150. Load lock extensions can only be used one at a time, however, they can be used in conjuction with slip lock and non-locking extensions.

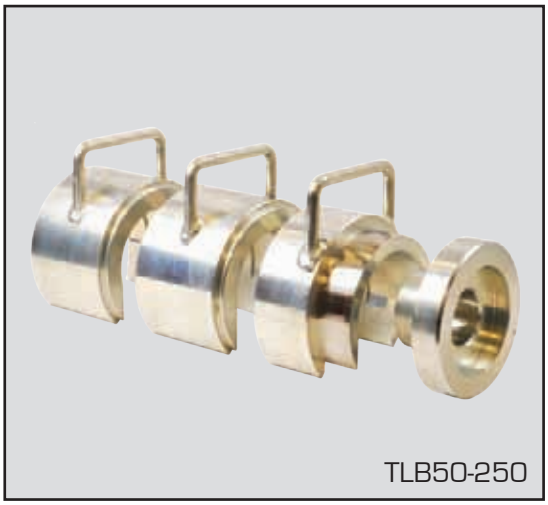
All extension options must terminate with a flat or swivel tilting saddle on the top of the extension stack.

LOAD BLOCK SETS

Sets comprise of the following:
(see table to the right)

Load block sets Model Number	Load Blocks	Adaptor
TLB50-250	3	1
TLB100-405	5	1
TLB100-530	7	1
TLB150-390	5	1
TLB150-520	7	1
TLB200-380	5	1

Load block sets



TLB50-250

Load block sets Model number	Capacity tonnes	Lock out Height (mm)	To Suit Jack Model
TLB50-250	50	250	TL050A255
TLB50-250	50	250	TL050E255
TLB100-405	100	400	TL100A405
TLB100-530	100	525	TL100A530
TLB100-405	100	400	TL100E405
TLB100-530	100	525	TL100E530
TLB150-390	150	385	TL150A390
TLB150-520	150	515	TL150A520
TLB150-390	150	385	TL150E390
TLB150-520	150	515	TL150E520
TLB200-380	200	375	TL200A380
TLB200-380	200	375	TL200E380

Swivel load caps

TLS100

Swivel load caps Model number	Capacity tonnes	To Suit Jack Model
TLS50	50	TL050A255
TLS50	50	TL050E255
TLS100	100	TL100A405
TLS100	100	TL100A530
TLS100	100	TL100E405
TLS100	100	TL100E530
TLS150	150	TL150A390
TLS150	150	TL150A520
TLS150	150	TL150E390
TLS150	150	TL150E520
TLS200	200	TL200A380
TLS200	200	TL200E380

Tool boxes

SBS50E SBL100A

Small Tool box	Dimensions mm (H x L x W)	Large Tool box	Dimensions mm (H x L x W)	To Suit Jack Model
TB50S	180 x 265 x150	TB50L	210 x 380 x 265	TL050A255
TB50S	180 x 265 x150	TB50L	210 x 380 x 265	TL050E255
TB100S	185 x 345 x185	TB100L	215 x 340 x 345	TL100A405
TB100S	185 x 345 x185	TB100L	215 x 340 x 345	TL100A530
TB100S	185 x 345 x185	TB100L	215 x 340 x 345	TL100E405
TB100S	185 x 345 x185	TB100L	215 x 340 x 345	TL100E530
TB100S	185 x 345 x185	TB100L	215 x 340 x 345	TL150A390
TB100S	185 x 345 x185	TB100L	215 x 340 x 345	TL150A520
TB100S	185 x 345 x185	TB100L	215 x 340 x 345	TL150E390
TB100S	185 x 345 x185	TB100L	215 x 340 x 345	TL150E520
TB200S	185 x 345 x 260	TB200L	250 x 340 x 345	TL200A380
TB200S	185 x 345 x 260	TB200L	250 x 340 x 345	TL200E380

Note: All accessories on this page can be seen fitted to a Tuff Lift on page 154

Non locking extensions

Length 175mm	Length 200mm	Length 300mm	Length 400mm	Length 500mm	To suit jack model	Recommended max. extension height in mm
NLE-175-50	NLE200-50	NLE300-50	NLE400-50	NLE500-50	TL050A255	680
NLE175-50	NLE200-50	NLE300-50	NLE400-50	NLE500-50	TL050E255	680
NLE175-100	NLE200-100	NLE300-100	NLE400-100	*	TL100A405	480
NLE175-100	*	*	*	*	TL100A530	180
NLE175-100	NLE200-100	NLE300-100	NLE400-100	*	TL100E405	480
NLE175-100	*	*	*	*	TL100E530	180
NLE175-150	NLE200-150	NLE300-150	NLE400-150	*	TL150A390	485
NLE175-150	*	*	*	*	TL150A520	180
NLE175-150	NLE200-150	NLE300-150	NLE400-150	*	TL150E390	485
NLE175-150	*	*	*	*	TL150E520	180
NLE175-200	NLE200-200	NLE300-200	NLE400-200	NLE500-200	TL200A380	500
NLE175-200	NLE200-200	NLE300-200	NLE400-200	NLE500-200	TL200E380	500

* = Exceeds recommended maximum extension height

Slip lock extensions

Length 175mm	Length 200mm	Length 300mm	Length 400mm	Length 500mm	To suit jack model	Recommended max. extension height in mm
SLE-175-50	SLE200-50	SLE300-50	SLE400-50	SLE500-50	TL050A255	680
SLE175-50	SLE200-50	SLE300-50	SLE400-50	SLE500-50	TL050E255	680
SLE175-100	SLE200-100	SLE300-100	SLE400-100	*	TL100A405	480
SLE175-100	*	*	*	*	TL100A530	180
SLE175-100	SLE200-100	SLE300-100	SLE400-100	*	TL100E405	480
SLE175-100	*	*	*	*	TL100E530	180
SLE175-150	SLE200-150	SLE300-150	SLE400-150	*	TL150A390	485
SLE175-150	*	*	*	*	TL150A520	180
SLE175-150	SLE200-150	SLE300-150	SLE400-150	*	TL150E390	485
SLE175-150	*	*	*	*	TL150E520	180
SLE175-200	SLE200-200	SLE300-200	SLE400-200	SLE500-200	TL200A380	500
SLE175-200	SLE200-200	SLE300-200	SLE400-200	SLE500-200	TL200E380	500

* = Exceeds recommended maximum extension height

Load lock extensions

Length 175mm	Length 200mm	Length 300mm	Length 400mm	Length 500mm	To suit jack model	Recommended max. extension height in mm
LLE-175-50	LLE200-50	LLE300-50	LLE400-50	LLE500-50	TL050A255	680
LLE175-50	LLE200-50	LLE300-50	LLE400-50	LLE500-50	TL050E255	680
LLE175-100	LLE200-100	LLE300-100	LLE400-100	*	TL100A405	480
LLE175-100	*	*	*	*	TL100A530	180
LLE175-100	LLE200-100	LLE300-100	LLE400-100	*	TL100E405	480
LLE175-100	*	*	*	*	TL100E530	180
LLE175-150	LLE200-150	LLE300-150	LLE400-150	*	TL150A390	485
LLE175-150	*	*	*	*	TL150A520	180
LLE175-150	LLE200-150	LLE300-150	LLE400-150	*	TL150E390	485
LLE175-150	*	*	*	*	TL150E520	180
LLE175-200	LLE200-200	LLE300-200	LLE400-200	LLE500-200	TL200A380	500
LLE175-200	LLE200-200	LLE300-200	LLE400-200	LLE500-200	TL200E380	500

* = Exceeds recommended maximum extension height

Note: All accessories on this page can be seen fitted to a ToughLift on page 154

TL - TOUGHLIFT JACKING SYSTEMS

ToughLift TL50A255 fitted with load block set and swivel load cap.

ToughLift TL100A530 fitted with swivel load cap.

ToughLift TL50A255 fitted with large and small toolbox.

ToughLift TL100A530 fitted with non locking extension.

ToughLift TL100A530 fitted with slip lock extension.

ToughLift TL50A255 fitted with load block set, load lock extension and swivel load cap.

Hi-Force®

SERVICES

M

RENTAL SERVICES

The Hi-Force philosophy of offering a complete service package to support our valued customers needs and requirements also extends to tool rental services. With such an extensive array of products available within the Hi-Force range, it is sometimes difficult for our customers to decide on the most suitable tool in which to invest their money. Additionally, with our higher value products like high tonnage cylinders, powered pumps, hydraulic wrenches, stud bolt tensioners and hydrotest pumps, many clients simply cannot justify the high capital outlay to purchase, especially in cases where their needs for the product are relatively short term or even simply for a one off job. In some cases annual budget restraints also make it difficult to get purchase expenditure approval even though there is a definite requirement for the tools.

Hi-Force actively encourages and promotes its tool rental services package, both at Regional Offices and at participating distributors worldwide. Unlike our competitors who believe that tool rental business reduces product sales, we at Hi-Force believe it actually increases them !

Many of our customers worldwide who have purchased Hi-Force products, initially took the opportunity to "try out" both our product quality and our level of service support via tool rental. Once satisfied, these same customers became, brand loyal purchasers of Hi-Force products on a regular basis.

An additional benefit of maintaining a comprehensive fleet of rental tools at our Regional Offices and participating distributors is that users can easily request on-site demonstrations, using rental tools at short notice, or even utilise our rental services whilst having their own equipment serviced or repaired. In most industries the biggest drain on profits is the cost to the company of maintenance and shutdown activities. Hi-Force tool rental is available at very short notice and helps ensure that production recommences as quickly as possible without any unnecessary delays.

All Hi-Force rental equipment is proof-tested prior to release for rental. All tests are documented and all equipment is supplied with a test certificate.

Additionally, torque equipment is calibrated, using the latest technology. Test & calibration results are automatically transferred to purpose-written software for producing unique and traceable certificates.

Hi-Force tool rental is available on both short and long term basis and all equipment provided is guaranteed, tested and certified prior to mobilisation to site.

Hi-Force tool rental offers an economical alternative to purchasing capital intensive specialised equipment at short notice. Give it a try, you will be pleasantly surprised !

ON-SITE SERVICES

In addition to the tool rental services offered by Hi-Force and detailed on page 156, we also offer a first class on-site services package. Utilising Hi-Force tools drawn from our extensive global rental tool inventory, Hi-Force is also able to offer a first class on-site bolting and jacking service. Available globally via Hi-Force Regional Offices and participating distributors, the Hi-Force on-site services package combines the expertise of our highly trained and experienced crews with the high quality reputation of Hi-Force products.

For on-site bolting services we are able to carry out jobs ranging from a simple bolt up of a single flange joint to major construction and maintenance shut down projects. Our record and past experience of working with many major multi-national companies is second to none and our crews have established an excellent reputation for meeting and beating critical time deadlines, even in the most demanding conditions. Major customer industries include oil & gas, power generation, cement plants, civil and mechanical construction and maintenance.

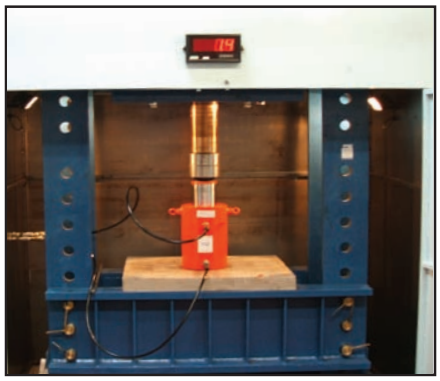
We also offer on-site lifting and jacking services usually related to heavy lift applications involving multiple numbers of Hi-Force high tonnage cylinders, pumps, hoses and accessories. Past jobs undertaken and successfully completed include bridge lifting, cantilever and steel structure weighing and a variety of lift and shift applications.

Our crews have received many verbal and written testimonials for their excellent performance and copies of these are available on request.

Hi-Force is very proud of its excellent reputation for carrying out efficient, safe, competitively priced on-site jobs, within client specified time periods. Please do not hesitate to contact us if you have a requirement for Hi-Force on-site services.

REPAIR SERVICES

Every year huge amounts of money are lost to industries worldwide due to the breakdown of capital intensive hydraulic and pneumatic tools. This extensive loss of revenue could be drastically reduced if users and owners were always in a position to call upon specialist repairers, at short notice, to identify the faults and carry out fast, reliable, guaranteed repairs.

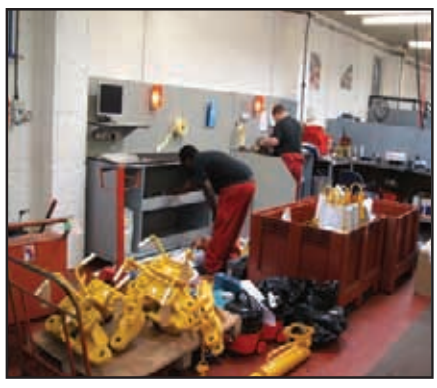


Hi-Force is at your service!! We have built our success on our "service first philosophy" and a long history of providing customers with a comprehensive repair service for a wide range of hydraulic and pneumatic tools.

All Hi-Force offices worldwide, along with participating Hi-Force Distributors operate a fully equipped workshop repair facility, using the latest "state of the art" repair and testing equipment and techniques, carried out by trained and qualified workshop technicians. Our global network of Hi-Force service centres is modelled on our highly successful and wholly owned UK Distributor company, H.E.S. Sales Limited, who have been offering repair services, along with the other services detailed in this section of the catalogue, from two strategically placed locations in England, since the early 1970's.

All Hi-Force service centres carry good stocks of commonly used spare parts and are able to offer a first class guaranteed repair service for all Hi-Force products as well as most international competitor brands. All items repaired carry a 90 day warranty against faulty materials or workmanship and each item is returned to the customer with an individual test/calibration certificate.

Make the most of your investment in tools through regular servicing and repair, at an economical cost, through the Hi-Force service network.



CALIBRATION SERVICES

As part of our ever improving after sales and service support facilities, Hi-Force has recently added a comprehensive calibration service for all makes of hand, pneumatic and hydraulic torque tools to our services portfolio. Available from selected Hi-Force Regional Offices and distributors worldwide, this fast expanding activity is currently receiving considerable attention from our customer base.

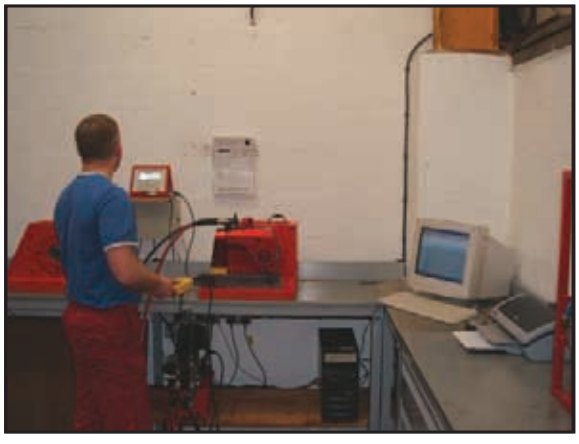
All of our in house calibration equipment has valid, independently approved "NAMAS" calibration certificates which are renewed annually. All items calibrated are returned with an individual test and calibration certificate traceable to our "NAMAS" certification.

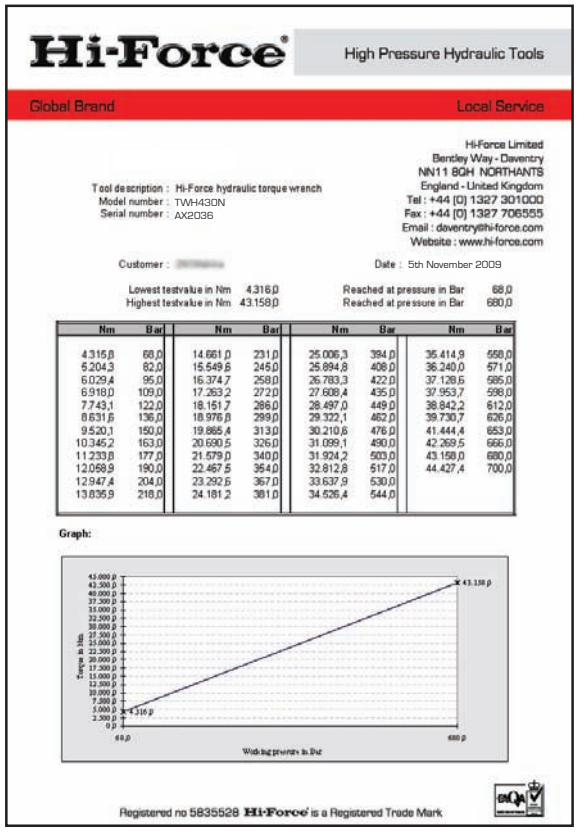
This service is particularly focused on tools used for accurate bolt tightening, which according to industry standards, recommends that they are calibrated, at least once per year and in some cases more often if used extensively. When did you last have your critical bolt tightening tools calibrated? Check and contact Hi-Force for a first class calibration service at a competitive price.

Hi-Force is also able to offer a limited calibration service for other hydraulic and pneumatic tools. Contact your local Hi-Force Regional Office or distributor for more information.

Calibration of a hand torque wrench

Hydraulic torque wrench calibration




Hi-Force® High Pressure Hydraulic Tools

Global Brand Local Service

Hi-Force Limited
Bentley Way - Daventry
NN11 8QH NORTHANTS
England - United Kingdom
Tel : +44 (0) 1327 301000
Fax : +44 (0) 1327 706555
Email : daventry@hi-force.com
Website : www.hi-force.com

Tool description : Hi-Force hydraulic torque wrench
Model number : TWH430N
Serial number : AX2036

Customer :

Date : 5th November 2009

Lowest testvalue in Nm 4.316,0
Highest testvalue in Nm 43.158,0
Reached at pressure in Bar 68,0
Reached at pressure in Bar 680,0

Nm	Bar	Nm	Bar	Nm	Bar	Nm	Bar
4.316,0	68,0	14.661,0	231,0	25.006,3	394,0	35.414,9	558,0
5.204,3	82,0	15.549,6	245,0	25.894,8	408,0	36.240,0	571,0
6.029,4	95,0	16.374,7	258,0	26.783,3	422,0	37.128,5	585,0
6.918,0	109,0	17.263,2	272,0	27.608,4	435,0	37.953,7	598,0
7.743,1	122,0	18.151,7	286,0	28.497,0	449,0	38.842,2	612,0
8.631,6	136,0	18.976,8	299,0	29.322,1	462,0	39.730,7	626,0
9.520,1	150,0	19.865,4	313,0	30.210,6	476,0	41.444,4	653,0
10.345,2	163,0	20.690,5	326,0	31.099,1	490,0	42.269,5	666,0
11.233,8	177,0	21.579,0	340,0	31.924,2	503,0	43.158,0	680,0
12.058,9	190,0	22.467,5	354,0	32.812,8	517,0	44.427,4	700,0
12.947,4	204,0	23.292,6	367,0	33.637,9	530,0		
13.835,9	218,0	24.181,2	381,0	34.526,4	544,0		

Graph:

Registered no 5835528 Hi-Force® is a Registered Trade Mark

Sample calibration certificate

M

TESTING & SERVICE CONTRACTS

Targeted at companies with a wide variety or a considerable number of hydraulic and pneumatic tools, Hi-Force is able to negotiate and offer a regular on-site testing and service facility to customers, which ensures that their tool inventory is kept in first class working condition, fully tested and certified. This is particularly beneficial to tool users that are required to carry out planned plant maintenance shutdowns at their facilities, as this unique service, from Hi-Force, can be planned to coincide within a reasonable time period, prior to an upcoming shutdown.

Hi-Force workshop

Within the UK, Hi-Force testing and service contracts are managed by our wholly owned distributor, H.E.S Sales Limited, who operate a fleet of dedicated, fully equipped, on-site mobile test vehicles ably supported by two strategically placed workshop service centres. All test vehicles are managed by a trained and qualified test engineer, who is fully conversant with all of the latest safety regulations related to hydraulic and pneumatic tools. Site visits are planned and pre-booked for mutually agreed date(s) so that clients can arrange to gather all of their tools, requiring test and inspection, to a central point, at their facilities, for our test inspector to carry out the testing.

Hi-Force Daventry test facilities

A comprehensive test report is prepared by our test engineer, detailing all of the tools examined and tested, along with a report on all tools that fail the test. A copy of the report is handed over by our test engineer, prior to leaving site, for the client to assess and give any necessary authorisation for the tools to be removed from site for detailed examination and estimate for repair. Subject to client approval, our test engineer will deliver the tools to the nearest H.E.S. Sales Limited service centre, from where a comprehensive strip down, inspection, report and repair quotation will be promptly prepared and sent to the client in writing. Subject to approval of the repair costs, the client's tools will then receive the "first class" repair service, as detailed on page 158.

Hi-Force test & service vehicle

Alongside the testing service many of our clients also negotiate a period contract covering both the on-site testing and repair service which usually results in more advantageous and competitive rates. For further information on our global testing and service capabilities please contact Hi-Force UK or one of our Regional Offices and Service Centres.

Interior of Hi-Force test & service vehicle

Hi-Force
HYDRAULIC TOOLS

Training Certificate

This certificate is awarded to: *Rajesh Menon*

Company name: International Heavy Equipment

For successfully completing a training course on:

Hi-Force Hydraulic Tools - Level 1

Achieved scores per training session :
1) Principles of hydraulics: 15/21
2) Hydraulic Tools: 17/25
3) Bolting Equipment: 49/55

Date of Course: 09-11-2009
Overall result: 81/101

Course leader comments:

Power... Precisely!

Course Leader: Craig Brown
Signature: _____ Date: 12-11-2009

With our ever expanding network of Hi-Force regional offices and authorised distributors worldwide (today we are active in over 100 countries), Hi-Force has identified technical product and application training, as an essential core competency, for us to maintain our continued growth in the global market for hydraulic tools.

Hi-Force is totally committed to ensuring that all of our own sales personnel, as well as those of our distributors, are fully trained and totally competent to offer end users, of our products, the correct and proper technical advice, whilst discussing individual customer specific applications and requirements for hydraulic tools.

In April 2008, Hi-Force embarked on an ambitious project to design and produce a modular training programme covering all aspects of technical sales, industry specific application selling, special product design, practical and theoretical operation and maintenance, and service and repair of our entire product range. We believe that our training programme is now, along with our extensive product range, at the leading edge of the hydraulic tools industry world wide.

Hi-Force
HYDRAULIC TOOLS

Training Certificate

This certificate is awarded to: *James Smith*

Company name: Hydraulics & Trading Ltd

For successfully completing a training course on:

Hi-Force Hydraulic Tools - Level 1

Achieved scores per training session :
1) Principles of hydraulics: 14/21
2) Hydraulic Tools: 18/25
3) Bolting Equipment: 40/55

Date of Course: 08-12-2009
Overall result: 72/101

Course leader comments:

Power... Precisely!

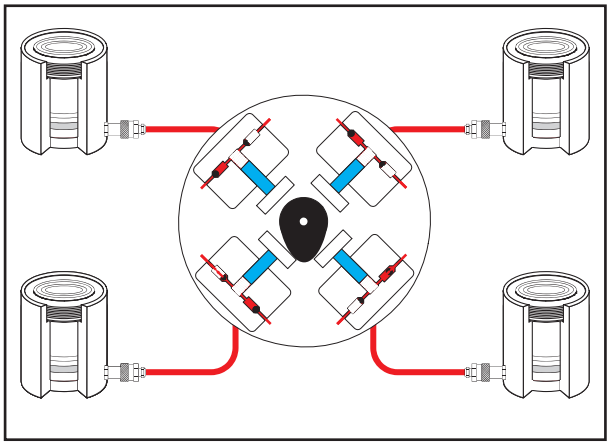
Course Leader: Steve Wakelin
Signature: _____ Date: 11-12-2009

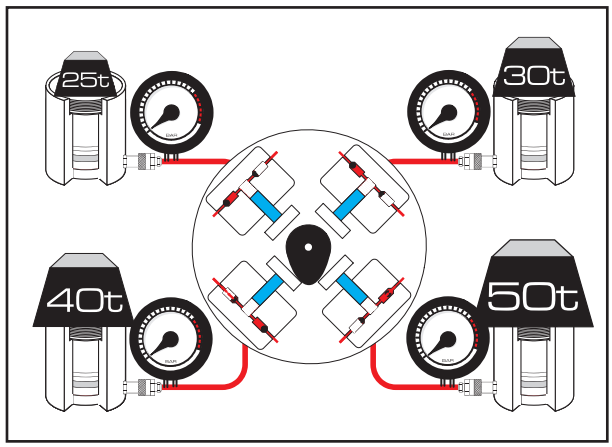
PRODUCT TRAINING

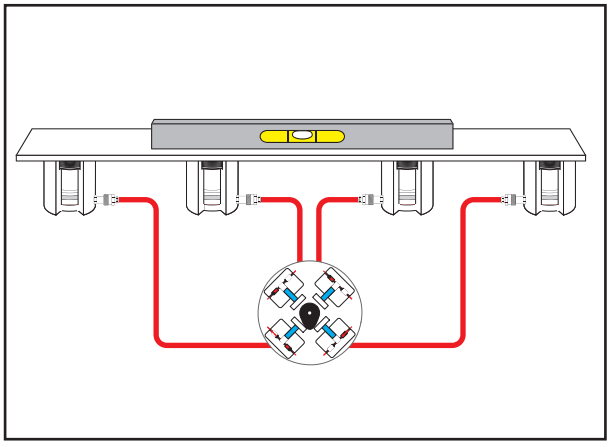
To cater for the large number of different countries in which our products are now distributed and sold, we have designed and produced our training programme in such a way that moving graphics and pictorial examples are used wherever possible, thus minimising the need for sometimes difficult to understand written words. This enables us to easily translate the various modules of our training into different languages to suit local market requirements.

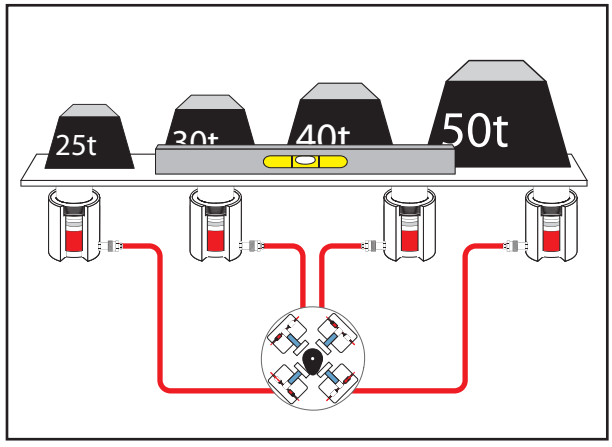
From basic moving graphics of a simple hand pump and cylinder through to complex multiple lifting applications using split flow pumps, hydraulic torque wrenches and hydraulic stud bolt tensioners, our easy to understand moving graphics easily demonstrate how our products operate and show the many benefits that they bring to Hi-Force product users. The training also covers key areas like industry specific applications of our products in Power Stations, Cement Plants, Refineries, Oil Platforms, Mines, Railways etc. all of which are of great assistance to our global sales teams as they search the market place for new customers and applications for our products.

Example images below show typical set-up of split-flow lifting system:-









BOLTING TRAINING

Above: Practical training in use of Hi-Force hydraulic torque wrench system held at Hi-Force Dubai

Above: Practical training in use of Hi-Force hydraulic bolt tensioning system at the Hi-Force UK office.

Right and below: Classroom training in support of the practical 'hands on' training held at Hi-Force Dubai

BOLTING TRAINING

Hi-Force is also able to offer training to users of our products in selected, specific areas of the training programme. For example the use of Hi-Force bolting tools and the application of our unique Hi-Force BoltRight software programme (see pages 103 & 104) designed to accurately calculate bolt tension requirements in a wide range of bolted joint applications. Hi-Force is committed to investment in the training of people and further information on the best available training courses in the hydraulic tools industry today, can be obtained from your nearest Hi-Force regional office, or your local Hi-Force distributor.

Practical training in Malaysia

Classroom training in Thailand

All Hi-Force training courses can be held at Hi-Force UK head office, overseas regional offices or at distributor and end user locations.

Practical training in U.K

Practical training in Dubai, U.A.E

Hi-Force®

THE INFORMATION PAGES

Introduction

The basic principles of hydraulics are not difficult to understand, knowing how and why hydraulic tools work will help the user to select the most suitable Hi-Force tools for the job, ensuring maximum performance at the most economical cost.

If the "Basic Principles of Hydraulics" detailed in this section of the catalogue are of assistance to the reader, then its purpose of helping with the selection of the correct Hi-Force tool for the job has been achieved.

Using hydraulic fluid pressure to generate a force

a) Hydraulic Pressure

Hydraulic power provides one of the simplest and most powerful forms of producing considerable amounts of force within a confined space using hydraulic fluid pressure to generate a force. Since the early inventions of low pressure, heavy hydraulic lifting jacks through to the latest state of the art high pressure hydraulic systems of today, hydraulic power remains an extensively used and widely respected assistant to mankind's drive for even greater power and knowledge.

Pascal's law states that pressure applied at any point upon a confined fluid (liquid) is transmitted undiminished in all directions within the fluid (see figure 1 & 2). This means that by using hydraulic pressure as a medium a small force can be converted into an appreciable multiple of itself.

The actual fluid pressure involved plays a very important role in this "Multiplication of Force" and in this context there are two features of hydraulic pressure which are important to remember.

1. Hydraulic pressure is measured as a force per unit of area e.g. Bar (kg/cm²) or PSI (Pounds per Square Inch).
2. The hydraulic pressure at any point within the fluid is the same in all directions provided of course that the fluid is static (non moving) - see figure 1 & 2.

Figure 1

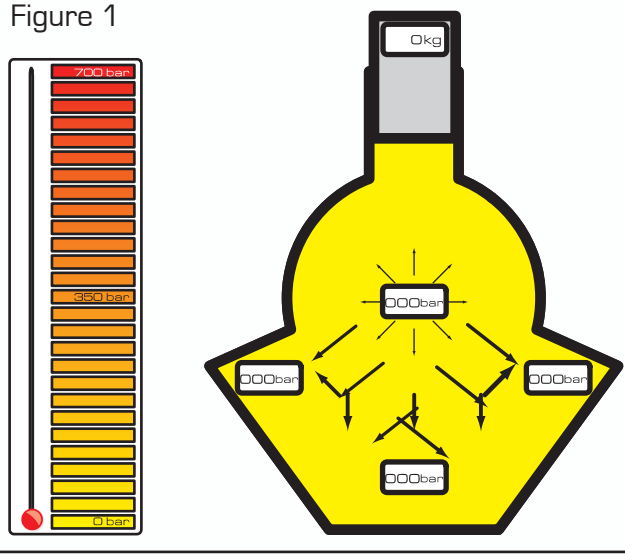
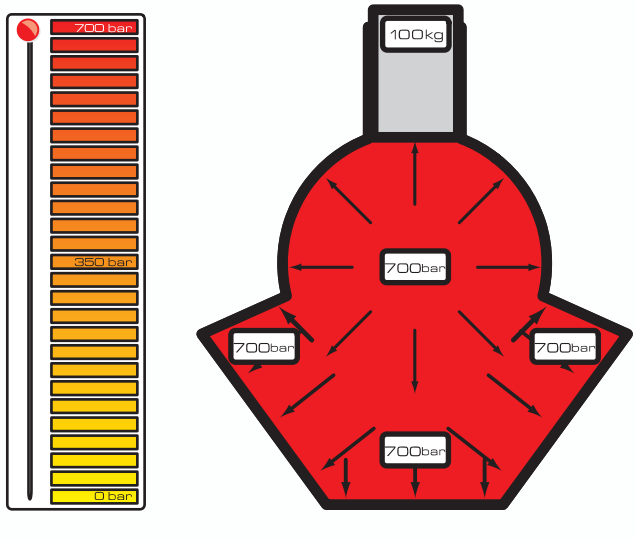


Figure 2



b) The Industry Standard

The accepted International Standard for maximum working pressure in the high pressure hydraulic tools industry is 700 Bar (10,000 PSI) and the majority of the products detailed in this catalogue have a maximum working pressure of 700 Bar (10,000 PSI). Therefore where a particular cylinder is specified in this catalogue as having a 10 tonnes maximum capacity, it must be noted that the maximum capacity is calculated at the maximum working pressure.

c) Pressure and Force

The criteria for establishing the maximum output force of a hydraulic cylinder at 700 Bar pressure is the size of the effective area of the cylinder bore, i.e. the area to which the hydraulic fluid at a pressure of 700 Bar is being applied. Because of this simple criteria it is possible to manufacture cylinders in the Hi-Force range from 4.5 tonnes up to in excess of 500 tonnes capacity.

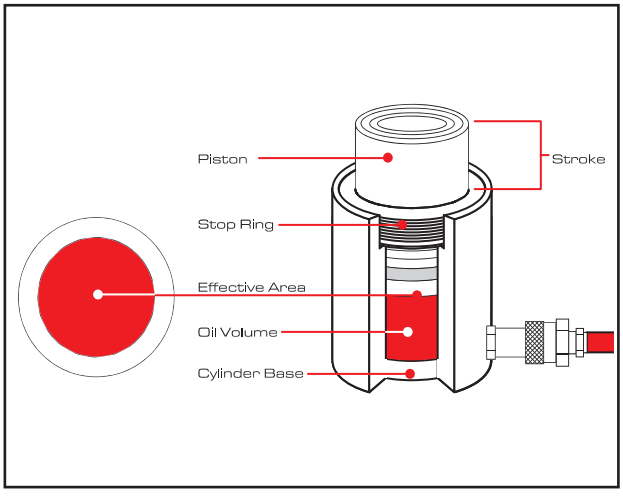
The equation for calculating the output force of a hydraulic cylinder, given that the effective area and design maximum working pressure are known, is simply : -

$$\frac{\text{Effective area (cm}^2\text{) x Pressure (Bar)}}{981} = \text{Output Force (Tonnes)}$$

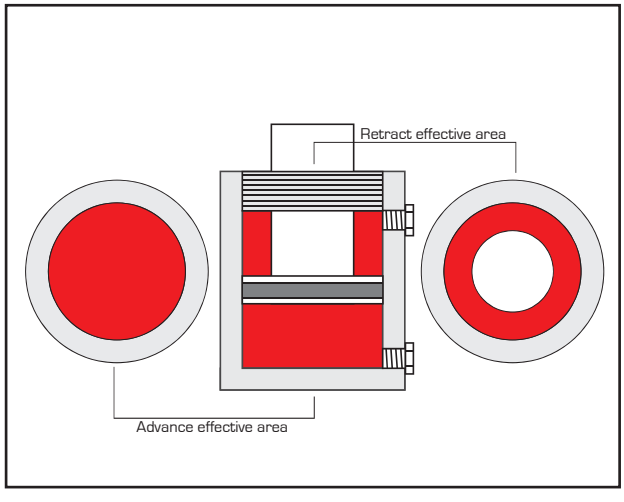
For example Hi-Force model reference HLS502 (page 13) has an effective area of 71.3 cm^2 and therefore a maximum working pressure of 700 Bar : -

$$\frac{71.3\ (\text{cm}^2) \times 700\ (\text{Bar})}{981} = 50.88\ \text{Tonnes}$$

Single acting cylinder



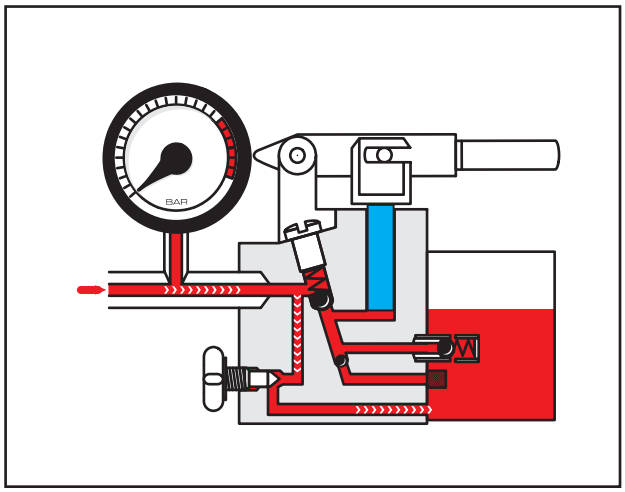
Double acting cylinder



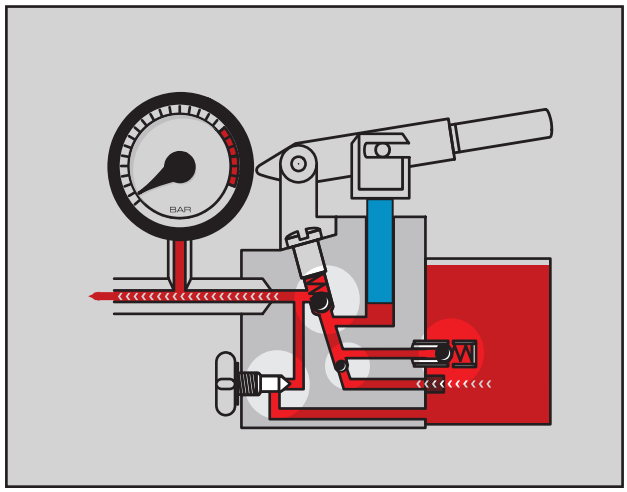
d) The Pump

Hydraulic pressure is provided by a hydraulic pump (manual or powered operation) that pumps the hydraulic fluid into the cylinder bore via a flexible hydraulic hose connected to the cylinder quick connect inlet coupling.

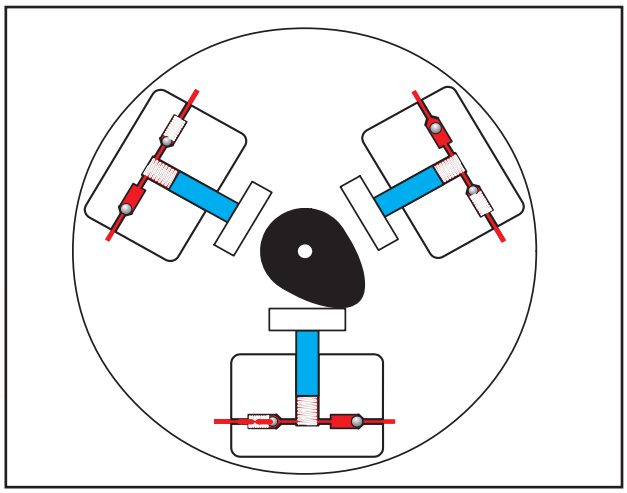
Hand operated pumps are the simplest form of pump and consist of a pumping piston, release valve, and suction and delivery check valves. The pump is operated by closing the valve and then raising and lowering the handle to pump fluid from the reservoir to the pump outlet connection. This action produces a steadily increasing fluid pressure generated by the downward leverage of the pump handle in conjunction with the opening and closing of the suction and delivery check valves. Power pumps replace hand leverage with a motive driven rotational force, i.e., electric, air or petrol engine driven motor.

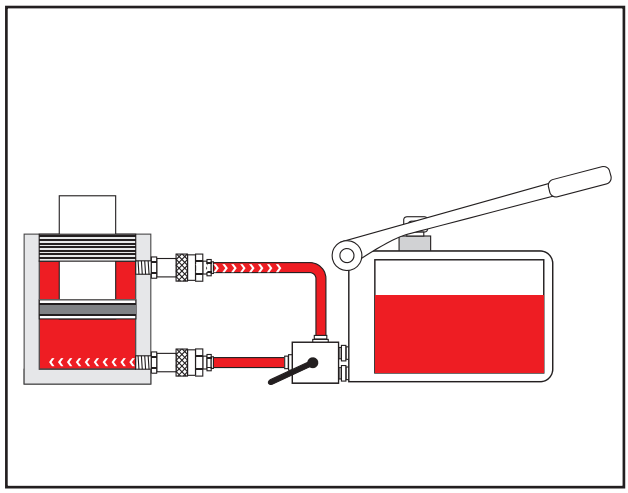


Single speed hand pump



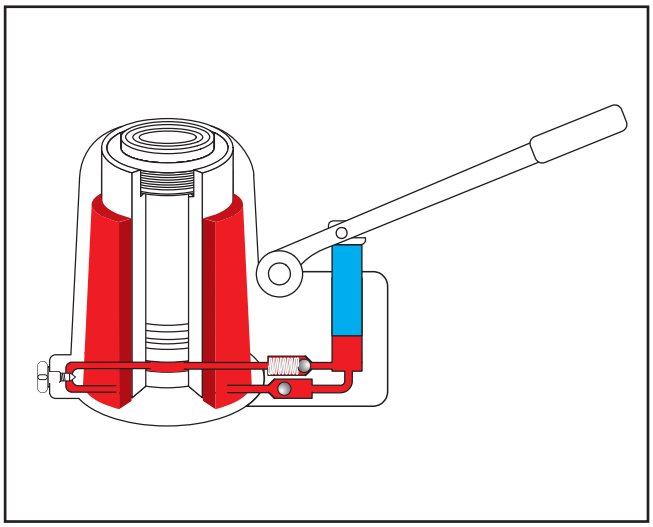
Suction, delivery & release valve highlighted


Multiple piston block powered pump

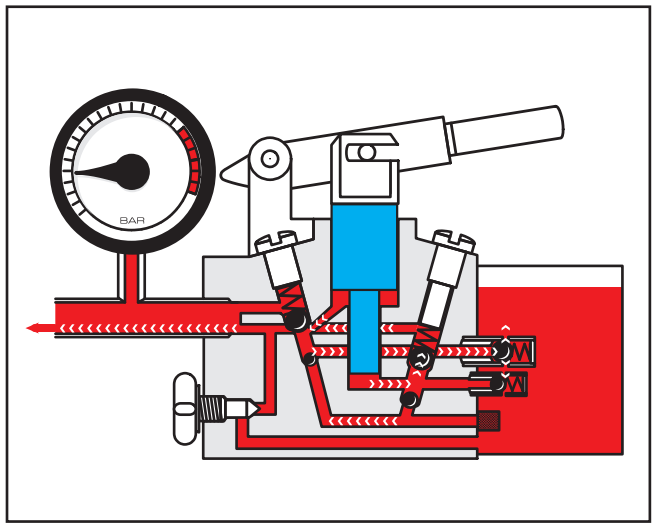

Double acting cylinder & hand pump combination

BASIC PRINCIPLES OF HYDRAULICS

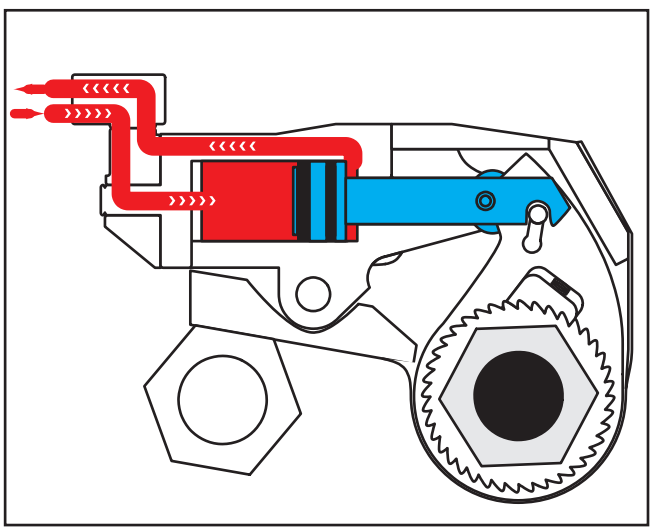
As the hydraulic fluid enters into the bore of the cylinder it forces the cylinder piston to move upwards. Any resistance to the upward movement of the piston, e.g. a load, will result in the fluid pressure increasing as the operator continues to actuate the pump lever up and down. The fluid pressure will continue to increase either until the piston overcomes the resistance (load) and moves upwards until it reaches the end of its designed stroke length or the fluid pressure reaches the maximum permissible pressure of 700 Bar and the pump safety pressure relief valve is activated preventing over pressurisation above 700 Bar.



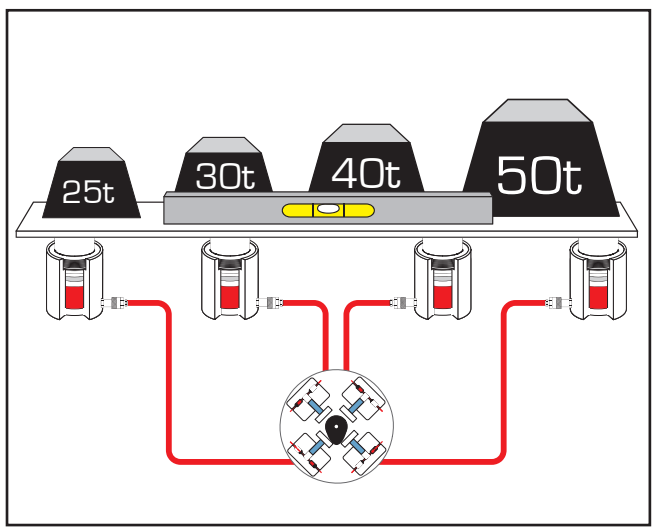
The internal workings of a hydraulic jack



A two speed hand pump circuit



The internal workings of a TWH-N hydraulic wrench



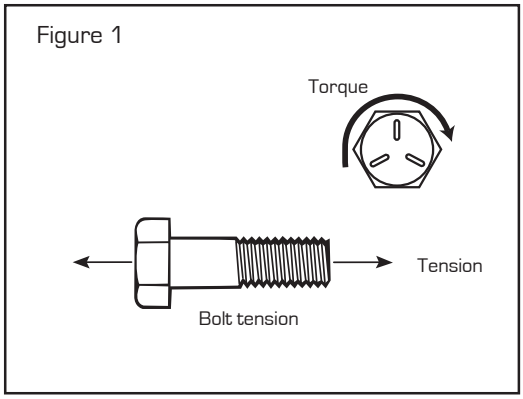
A split flow synchronised lift schematic

BASIC PRINCIPLES OF BOLTING TOOLS AND EQUIPMENT

Since the invention of using threaded bolts and nuts to join various components together was introduced centuries ago, the methods of bolt tensioning and the tool design technology have improved tremendously to the extent that Hi-Force offers the most comprehensive range of bolting products available from a single source anywhere in the world !

From basic high quality, calibrated hand torque wrenches to the latest "State of the Art" hydraulic torque wrenches and stud bolt tensioners, Hi-Force can deliver the right tool for the job on time, every time !

Figure 1



This section of the catalogue provides basic information about the methods of applying tension to a bolted connection. There are three possible methods to tighten threaded fasteners, by torque which is rotation of the nut or bolt head, by direct tension to stretch the fastener, or by heat to expand the fastener.

Torque and tensioning (see figure 1) probably covers 99% of bolting applications, and it is these two methods that are detailed in this catalogue.

What is tension and how does it affect a bolted fastener ?

As with most materials, steel which is predominantly used in the manufacture of bolts and nuts, has an inherent "elasticity" i.e. it can be stretched between two points. The tension that is imparted into the bolt acts as a clamping force to hold the bolted components together. Care must always be taken when stretching the bolt to ensure that its "yield point" is not exceeded which will cause the bolt to lose its physical properties of elasticity.

Hooke's law states that the amount of distortion (lengthening, shortening, bending or twisting) applied will be directly proportional to the applied force, provided the applied force is kept within the material's elastic limits. For most industrial applications, a fastener should be tightened until it has a retained tension of 40 to 60 percent of its elastic limit.

For a threaded fastener to correctly hold (clamp) components together it must be "stretched" (tensioned) to a known accurate amount. A threaded fastener that is under-tightened could work loose and come apart, resulting in a "shearing force" developing between the mating parts which could cut the bolt in two. A loose fastener may also lead to further mechanical looseness of surrounding machinery parts causing unnecessary vibration and wear. Fluid and gas leaks could also occur due to incorrect sealing in pressure joints, which could be extremely dangerous if any of the materials to be sealed are toxic, flammable or explosive.

An over-tightened fastener could cause damage to the bolted components, excessive over-tightening will cause the bolt and/or nut to deform causing loss of tension in the fastener as it exceeds its elastic limit (yield point).

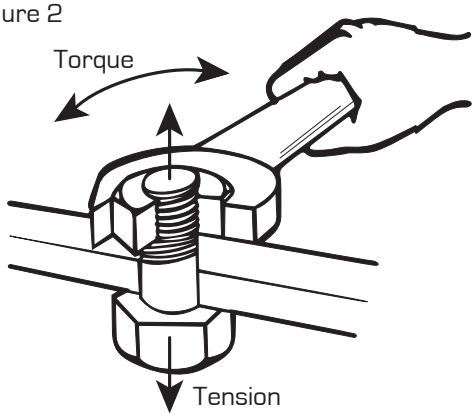
For most industrial applications, the equipment manufacturers, as well as structural and piping component designers, will provide the torque or tension specifications for the relevant fastener(s) to be used to connect the component parts. It is vitally important to adhere to these specifications to ensure a correctly tensioned joint is achieved.

How do we generate tension in the bolt ?

As mentioned earlier the two most common methods to impart tension into a threaded fastener are by torque (see figure 2) or by direct tension (see figure 3).

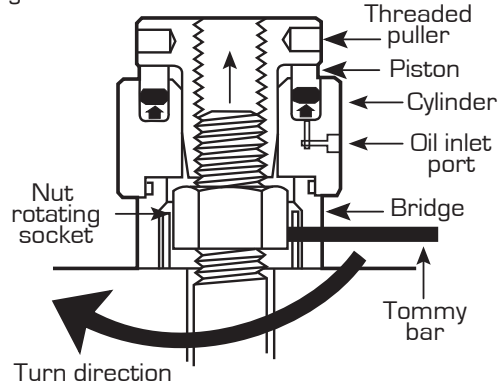
Torque is defined as the turning or twisting force exerted on a nut or bolt head and it is the product of two measurements i.e. force and distance (see figure 4). Force is measured in units of Pounds or Newtons and is quite simply the amount of force applied at a given distance from the centre of the item being turned or twisted. Distance is measured in units of length i.e. inches, feet, centimetres or metres. Torque is expressed as a combination of the relevant units of force and distance i.e. pounds feet (lbf.ft) in the imperial measurement system or Newton metres (Nm) in the metric system. Torque is applied to a threaded fastener by a variety of manual and power driven types of torque wrenches.

Figure 2



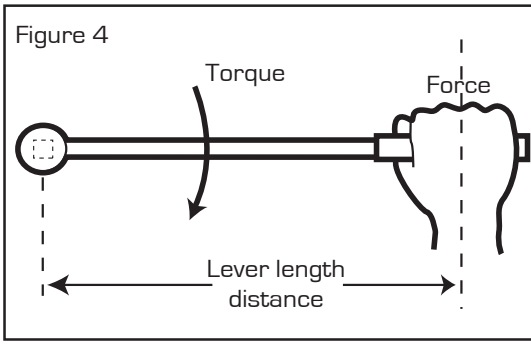
Newton's law states that for every applied force there is an equal and opposite reactive force. Therefore as the torque is applied to the nut, by turning it increases, it will create a tension in the stud bolt which will act as a "clamping force" within the effective thread length. Initially this clamping force will pull the two bolted components together and subsequently it will build up and retain a known tension (load) within the fastener to maintain the joint integrity.

Figure 3



The amount of torque to be applied to a threaded fastener will depend on several factors including the design application, type of joint, size, length and quantity of fasteners to be used and the type of thread lubricant. Ordinarily the torque applied should not be outside of the 40-60% of minimum yield range. Hi-Force BoltRight software programme (see pages 103-104) assists the user to accurately calculate the required torque/tension to achieve a successful joint bolt up.

Figure 4



Direct tension is applied to the fastener using a hydraulic tensioning device commonly known as a hydraulic stud bolt tensioner (see figure 3). This is a high pressure hydraulic cylinder, with accessories, designed to seat against the joint, grip the fastener thread using a compatible threaded puller, and via applied hydraulic pressure extend the cylinder piston against the puller, to pull (stretch) the bolt or stud to a known tension in tonnes or kN. When the pull force equals the desired bolt preload, plus an additional amount to compensate for bolt relaxation, the nut is run down the thread using a short tommy bar until it is tight against the joint face. The hydraulic pressure is then released and the threaded fastener is prevented from returning to it's original length, by the tightened nut, subsequently leaving the required tension retained in the fastener.

BASIC PRINCIPLES OF BOLTING TOOLS AND EQUIPMENT

Hydraulic stud bolt tensioners are commonly used in multiples linked to a single hydraulic pump unit particularly in applications where reliable leak free joints are required. By using a number of tensioners simultaneously the operator is able to ensure an even pull down of the joint components, resulting in uniformity of gasket compression and consistent leak free joints. As with torque, the actual amount of tension to be directly applied to the threaded fastener by the hydraulic stud bolt tensioner, should be confirmed by the equipment manufacturer or designer. The majority of hydraulic stud bolt tensioners operate at a maximum hydraulic pressure of 1500 Bar and certainly this maximum pressure/tension load should never be exceeded.

Correct Tool Selection

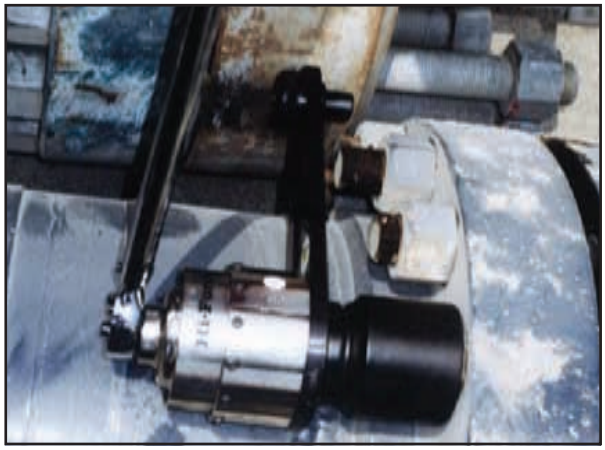
Having now understood the two most common methods of applying tension to the fastener (torque or direct tension) let us now look at the various types of tools available to accurately and successfully complete the given task, along with other bolting products available from Hi-Force.

Hand Torque Wrenches

Probably the most commonly used tool, for accurately tightening threaded fasteners in the world!! Hand torque wrenches are designed and manufactured on the basis of Hooke's Law i.e. force x distance. Hi-Force hand torque wrenches incorporate a reversible ratchet design drive head and a clear, easily adjustable torque setting scale. All Hi-Force hand torque wrenches are designed and manufactured to International Standard ISO 6789:2003. Each model is supplied marked with a unique serial number, traceable to an individual test and calibration certificate, and provides a repeatable accuracy of +/- 3% for HTW-R models and +/- 4% for the HTW-B models. Full technical specification on the Hi-Force range of hand torque wrenches can be found on page 64 of this catalogue.

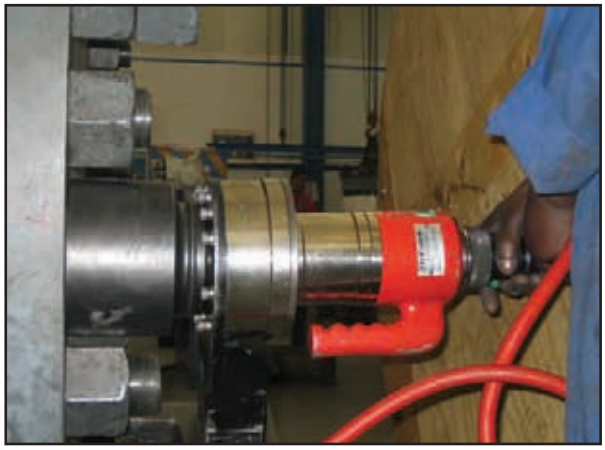
Hand Torque Multipliers

A hand torque multiplier is a mechanical device that multiplies the preset amount of input torque applied by the operator using a calibrated hand torque wrench. Hi-Force hand torque multipliers incorporate a "planetary" gear train which has one or more stages, each of which increases the input torque applied by a factor of 5. The greater the number of stages within the planetary gear train, the higher the output torque achieved, relative to the input torque applied. Due to the greater output torque produced using hand torque multipliers, it is necessary to incorporate an integral reaction foot to absorb the opposing reactive force generated (Hooke's Law). Great care must be taken to ensure that the reaction foot is correctly located against a suitably strong reaction point prior to operating the tool. Because the power output cannot exceed the power input, the number of output rotations will be lower than the number of input rotations. Hi-Force hand torque multipliers are available with multiplication ratios of 5:1, 25:1, 75:1 and 125:1 and full technical details can be found on pages 65-66 of this catalogue.



Pneumatic Torque Multipliers

A pneumatic torque multiplier operates in the same way as a hand torque multiplier except that the input motive force is provided by a pneumatically driven air motor instead of a manually operated hand torque wrench, making the tool both faster and easier to operate. Torque output is preset and adjusted by regulating the input air pressure, supplied to the pneumatic motor, which will control the amount of input torque applied to the planetary gear train. As the torque output increases the air motor will gradually slow down, until it eventually stalls i.e. the opposite reactive force generated becomes equivalent to the input torque of the air motor. Each tool is supplied with an airline filter, regulator, lubricator unit in a handy carrying frame with integral air line pressure gauge and 3 metre connecting hose. Repeatable accuracy of +/- 5% can easily be achieved in conjunction with the individual torque calibration chart supplied with each tool. Full technical details can be found on pages 67 - 68 of this catalogue.



Hydraulic Torque Wrenches

Hydraulic torque wrenches are specifically designed for applications where limitation of space and/or particularly high output torque is required. The design of a hydraulic torque wrench utilises the far higher leverage forces generated from a hydraulic piston, using high pressure hydraulic power supplied from an air or electric driven pump. The hydraulic piston is connected to a ratchet via a reaction pawl assembly which allows it to engage the ratchet teeth in the advance mode to rotate the nut or bolt head, and subsequently release during piston retraction to re-engage in the next forward push position. All Hi-Force hydraulic torque wrenches operate at 700 Bar maximum hydraulic pressure, incorporate a double acting heavy duty hydraulic piston for fast and easy operation, and can be used for accurately tightening or loosening nuts/bolts. A choice of standard square drive tools, suitable for use with a variety of sizes of torque wrench sockets, or hexagon drive cassette head tools that locate directly on to the nut/bolt are available. Full technical specifications can be found on pages 69 to 80 of this catalogue.

Hydraulic Stud Bolt Tensioners

Hydraulic stud bolt tensioners provide the most consistent and accurate method of applying tension to bolted connections. Comprising of four component parts, i.e. bridge, nut rotating socket, threaded puller and loadcell, hydraulic stud bolt tensioners offer a safe, accurate method of ensuring consistent joint integrity. Sub sea tensioners consists of only two parts, i.e a bridge mounted loadcell and a quick fit threaded puller. Designed to directly stretch the bolt by applying a known load to the fastener using a hydraulic loadcell and threaded puller, the securing nut is rotated using a short tommy bar, whilst the thread is being stretched, until it is firmly tightened against the joint face. Immediately after the hydraulic pressure (load) is released, the bolt tension is retained because the threaded fastener is prevented from returning to its original length by the tightened nut. Hydraulic stud bolt tensioners can be linked together in multiples to ensure an even "pull down" or tension is applied to all bolts simultaneously. This is particularly critical in applications where a sealing gasket is used and consistent leak free connections are required. Full technical specification can be found on pages 86 to 102 of this catalogue.

Nut splitters

Hydraulic nut splitters provide the perfect answer for removal of worn, damaged or corroded fasteners that cannot be opened using torque or tensioning tools. The nut splitter design incorporates a powerful hydraulic piston to drive a precision engineered, angled splitting wedge into the flat face of the nut. The splitting wedge is manufactured from high grade tool steel for maximum life and can be easily removed for re-sharpening or replacement. The angled design of the splitting wedge allows the nut to be split with minimal damage to the threads on the bolt or stud. Full details can be found on pages 136 - 138 of this catalogue.

Impact Wrenches

Air driven (pneumatic) impact wrenches are probably one of the most commonly used tools in the bolting industry today. Ideally suited for run down or fast removal of bolted connections, all models operate using a standard 6 Bar air line pressure. Hi-Force industrial quality impact wrenches have a 4 position adjustable power output device, however torque accuracy cannot be measured or guaranteed due to the impact design of these tools. Full technical details can be found on page 84 of this catalogue.

Flange Spreaders

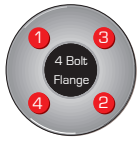
Flange spreaders provide the perfect answer for separating flange joints for maintenance etc..... after bolt removal. Hi-Force flange spreaders are available in both mechanical and hydraulic options. Full technical details can be found on pages 139 to 143 of this catalogue.

Sockets and Accessories

Most of the bolting products detailed in this catalogue will also require a selection of accessories to assist with the relevant bolting application. Hi-Force offers an extensive range of sockets, hexagon drives, hexagon reducer bushes and backup wrenches suitable for use with Hi-Force bolting tools. Full specifications and available options in both imperial and metric standard sizes are detailed on pages 71, 72, 73, 79, 80 and 81 of this catalogue.

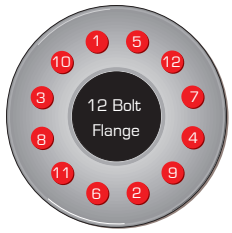
TIGHTENING SEQUENCE & BOLTING PROCEDURE FOR FLANGE BOLTS

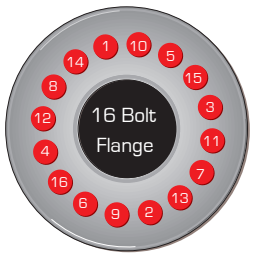
As explained on page 171, the two most common methods for tightening of bolted flange joints are either by torque using torque wrenches or by direct tension using hydraulic stud bolt tensioners. Regardless of the method selected a pre-bolting inspection is essential if an accurate and leak free joint is to be achieved first time, every time. The inspection must include checking for any damage to the gasket and sealing surfaces, ensuring that the stud bolts and nuts are the correct size and material, are not damaged in any way and that the correct lubricant is to be used. In addition, it is vitally important that the two flanges are correctly aligned to each other and that the stud bolts can be easily fitted through the bolt holes. If any of the above checks are not satisfactory immediate remedial action must take place before starting to bolt up the joint.



Tightening using torque wrenches

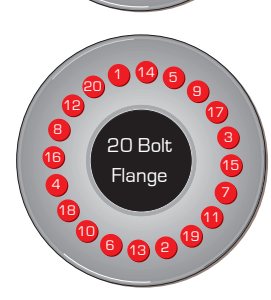
Insert the stud bolts through both flanges and hand tighten the nuts on both sides ensuring that there is full thread engagement on both nuts of every stud bolt. Square up the joint and ensure that all stud bolts are freely moving through the bolt holes and that the nuts are hand tightened against the outer flange faces. Number all bolts sequentially in a diametrically opposed fashion as shown in the illustrations on the right. Commence tightening of the bolts sequentially starting with a first pass at 25% of the final specified and required torque figure, a second pass at 50% and then a third pass at 100%. Finally a check pass should be carried out in either a clockwise or anti-clockwise direction at 100% of the required torque to ensure all bolts are uniformly tightened.

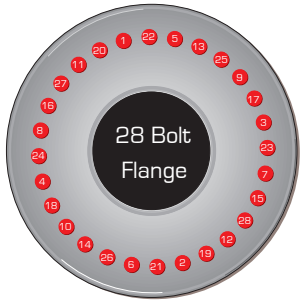




Tensioning procedure using hydraulic stud bolt tensioners

Insert the stud bolts through both flanges and hand tighten the nuts on both sides ensuring that there is full thread engagement on both sides. Take care to ensure that on the selected flange face, to which the tensioners are to be affixed, that there is at least 1 x diameter (*) of the stud bolt thread protruding above the nut face. This is required for the tensioner puller to attach correctly and if insufficient thread is exposed then the tensioning procedure must not proceed. The exact number and positioning of the hydraulic stud bolt tensioners must then be ascertained i.e. 25%, 33%, 50% or 100% simultaneous tensioning of all the bolts in the respective joint. After deciding the number of stud bolt tensioners to be used simultaneously, affix them to the exposed thread end of the stud bolts, equally spaced around the flange for 25%, 33% or 50% simultaneous tensioning, or on every stud bolt in the case of 100% simultaneous tensioning. Please refer to page 179 and to the comprehensive Hi-Force operating manual for stud bolt tensioners for more detailed instructions. After correctly assembling all of the stud bolt tensioners on to the flange, hook up the interconnecting hydraulic hoses and the mainline hose to the air driven pump unit and apply the applicable hydraulic pressure, as specified by either the joint equipment manufacturer or the BoltRight software (see pages 103 & 104). In cases other than 100% simultaneous tensioning there will be two different hydraulic pump pressures to be applied to the bolt tensioners and these should be strictly adhered to. Once all of the stud bolts have been tensioned using the Hi-Force stud bolt tensioners the joint is ready for testing. Take note that it is normal to have to make 2 or 3 passes around the stud bolts when tensioning at 50% or less and usually the lower the number of tensioners being used simultaneously, the more passes that will need to be done and hence it will take more time to complete the joint tightening.





Whether tightening the bolts using a torque wrench or stud bolt tensioners it is a good idea to carry out a final check for tightness of all the bolts by simply tapping each nut with a hammer and listen to see if a high pitched ringing sound is achieved. A dull sound indicates that the respective bolt is still loose.

(*) For sub-sea tensioners, please see note on page 179.

TIGHTENING SEQUENCE & BOLTING PROCEDURE FOR FLANGE BOLTS

Hi-Force hydraulic stud bolt tensioners offer the quickest, safest and most accurate means of applying a specific residual load to stud bolts. Stud bolt tensioners can be used to easily achieve an accurate and pre-determined bolt loading in a single, simultaneous operation, providing the uniform gasket compression, essential for the integrity of critical bolted connections. Ideally all bolts in the joint should be tensioned simultaneously (100%), however 50%, 33% or even 25% simultaneous tensioning can be carried out, which then requires the operator to make two, three or four tensioning operations by moving around the bolts in diametrically opposed fashion. Whilst partial tensioning will take longer to complete the task, it enables the user to optimise between the cost of the equipment and the available time.

Hi-Force hydraulic stud bolt tensioners are designed to directly stretch the bolt by applying a known load to the fastener using a hydraulic cylinder and threaded puller. The securing nut is then rotated using a short tommy bar, whilst the thread is being stretched, until it is firmly tightened against the joint face. Immediately the hydraulic pressure (load) is released the bolt tension (residual load) is retained, within the clamp length of the stud bolt, because it is prevented from returning to its original length by the tightened nut.

To operate hydraulic stud bolt tensioners on bolted connections safely, an extra length of threaded stud above the nut, of at least 1x bolt diameter (*), is required to facilitate easy fitment of the equipment (see figure 1).
Assembly of the tensioners to the stud bolt is quick and easy, provided of course that the stud bolts and nuts are clean, lubricated and in good condition (see figures 2 -5).

Hi-Force has considerable experience in providing precise calculations of the correct bolt load to be applied to ensure an accurate residual load is imparted into the bolts, whether they be tightened using a 100%, 50%, 33% or 25% simultaneous tensioning procedure (see figures 6-9).

Please refer to page 103 - 104 for further details on the Hi-Force BoltRight software programme.

(*) Depending on the stud bolt size, sub-sea tensioners (STU Range) may require an extra length of threaded stud above the nut, up to 4.8 x the diameter.

Figure 1

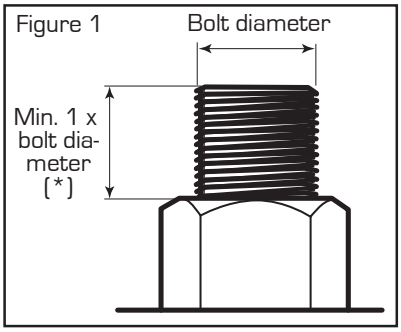


Figure 2

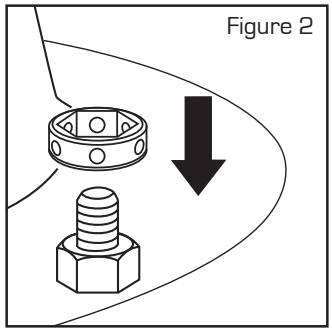


Figure 3

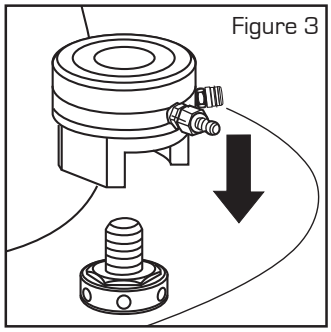


Figure 4

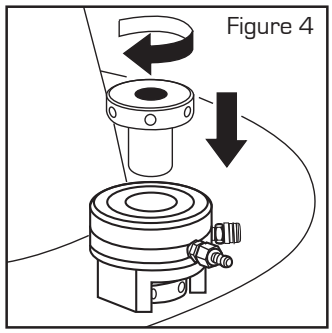


Figure 5

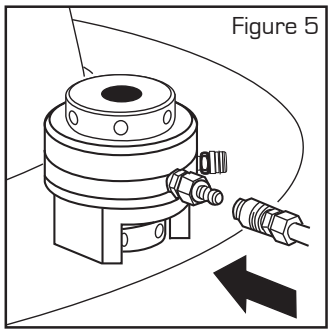


Figure 6

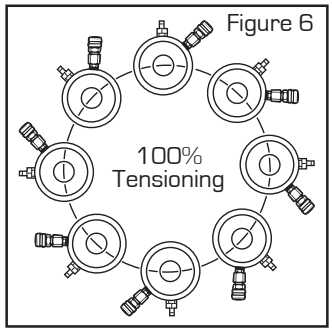


Figure 7

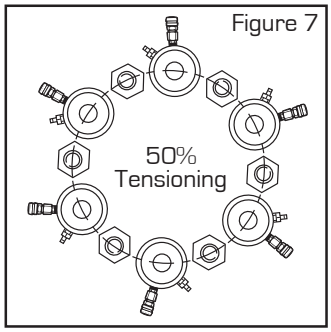


Figure 8

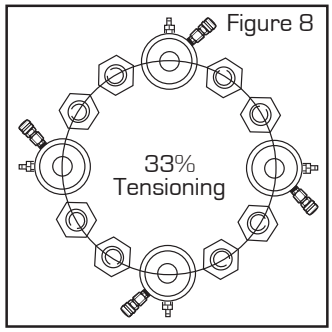
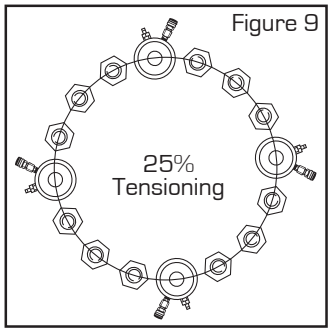


Figure 9



Note: If 100% tensioning cannot be achieved by attaching all bolt tensioners to one side of the flange, due to a lack of space, then alternate the tensioners on opposite sides of the flange.

METRIC TO IMPERIAL CONVERSION CHART

SI Unit System International	Conversion Factor	Imperial Equivalent	Conversion Factor	SI Unit System International
Pressure				
Bar	x 14.5	PSI	x 0.069	Bar
Bar	x 14.5	lbf.in²	x 0.069	Bar
kPA	x 0.145	PSI	x 6.89	kPa
mPA	x 145	PSI	x .00689	mPa
Volume				
cm³	x 0.061	inch³	x 16.4	cm³
litre	x 61	inch³	x 0.016	litre
litre	x 0.22	gallon	x 4.54	litre
m³	x 1.3	yard³	x 0.76	m³
Area				
mm²	x 0.00155	inch²	x 645	mm²
cm²	x 0.155	inch²	x 6.45	cm²
m²	x 10.8	foot²	x 0.0929	m²
Length				
mm	x 0.03937	inch	x 25.4	mm
cm	x 0.3937	inch	x 2.54	cm
m	x 3.28	foot	x 0.305	m
Force				
N	x 0.225	pound	x 4.45	N
kN	x 225	pound	x 0.00445	kN
Torque				
Nm	x 0.738	lbf.ft	x 1.356	Nm
Nm	x 8.9	lbf.in	x 0.113	Nm
kgf.m	x 7.2345	lbf.ft	x 0.1382	kgf.m
Mass				
g	x 0.035	ounce	x 28.3	g
kg	x 2.2046	pound	x 0.4536	kg
t	x 1.1	ton (short)	x 0.907	t
Flow				
cm³/min	x 0.61	inch³/min	x 16.4	cm³/min
litres/min	x .2642	gallon/min	x 3.785	litres/min
Power				
kw	x 1.34	hp	x 0.746	kw
kw	x 0.948	Btu/s	x 1.055	kw
w	x 0.74	ft lb/s	x 1.36	w

N

Temperature

To calculate Celsius to Fahrenheit :	[°F - 32] / 1.8 = °C
To calculate Fahrenheit to Celsius :	[°C x 1.8] + 32 = °F

CALCULATION WORKSHEET

REPLACEMENT PARTS

Hi-Force supplies comprehensive service kits, containing all of the "wear and tear" parts necessary to guarantee the correct performance and integrity of your Hi-Force equipment. Always specify and order genuine Hi-Force service kits and spare parts. Please provide product serial number when ordering to ensure correct parts are supplied.
Complete spare parts information including exploded view part sheets can be found on our website : www.hi-force.com

FOR CYLINDERS		
Range	Capacity t.	Repair kit part no.
HVL	10	HVL10TP1-K
HVL	20	HVL20TP1-K
HVL	32	HVL30TP1-K
HVL	50	HVL50TP1-K
HVL	100	HVL100TP1-K
HPS	4.5	HPS5TP1-K
HPS	10	HPS10TP2-K
HPS	20	HPS20TP2-K
HPS	32	HPS30TP2-K
HPS	50	HPS50TP2-K
HPS	73	HPS75TP2-K
HPS	109	HPS100TP2-K
HPS	147	HPS150TP2-K
HLS	10	HLS10TP2-K
HLS	20	HLS20TP2-K
HLS	32	HLS30TP2-K
HLS	50	HLS50TP2-K
HLS	109	HLS100TP2-K
HLS	147	HLS150TP2-K
HSS	4.5	HSS5TP1-K
HSS	10	HSS10TP2-K
HSS	14.5	HSS15TP2-K
HSS	25	HSS25TP2-K
HSS	29	HSS30TP2-K
HSS	50	HSS50TP2-K
HSS	73	HSS75TP2-K
HSS	109	HSS100TP2-K
HAS	31	HAS30TP1-K
HAS	51	HAS50TP1-K
HAS	109	HAS100TP1-K
HHS	11	HHS10TP2-K
HHS	23	HHS20TP2-K
HHS	33	HHS30TP2-K
HHS	61	HHS50TP2-K
HHS	102	HHS100TP2-K
HHR	33	HHR30TP1-K
HHR	61	HHR60TP1-K
HHR	102	HHR100TP1-K
HHR	156	HHR150TP1-K
HHR	247	HHR250TP1-K

FOR CYLINDERS		
Range	Capacity t.	Repair kit part no.
HDA	25	HDA25TP1-K
HDA	50	HDA50TP1-K
HDA	109	HDA100TP1-K
HDA	152	HDA150TP1-K
HDA	203	HDA200TP1-K
HDA	326	HDA300TP1-K
HDA	398	HDA400TP1-K
HDA	520	HDA500TP1-K
HFL	50	HFL50TP1-K
HFL	109	HFL100TP1-K
HFL	152	HFL150TP1-K
HFL	260	HFL250TP1-K
HFL	520	HFL500TP1-K
HFG	50	HFG50TP1-K
HFG	109	HFG100TP1-K
HFG	152	HFG150TP1-K
HFG	203	HFG200TP1-K
HFG	326	HFG300TP1-K
HFG	398	HFG400TP1-K
HFG	520	HFG500TP1-K
HPC	10	HPC10TP1-K
HPC	30	HPC30TP1-K
HPC	50	HPC50TP1-K

FOR MANUAL PUMPS		
Range	Model no.	Repair kit part no.
HP	HP110	HP110TP2-K
HP	HP145	HP110TP2-K
HP	HP212	HP212TP1-K
HP	HP227	HP227TP2-K
HP	HP232	HP232TP1-K
HP	HP245	HP245TP1-K
HP	HP252	HP252TP1-K
HP	HP257	HP227TP2-K
HP-D	HP232D	HP232DTP1-K
HP-D	HP245D	HP245DTP1-K
HP-D	HP252D	HP252DTP1-K
HP-FP	HP227FP	HP227FPTP2-K
XHP	XHP1500	XHP1500TP1-K
XHP	XHP2800	XHP2800TP1-K

FOR POWERED PUMPS		
Range	Model no.	Repair kit part no.
AHP	AHP112*	AHP112TP1-K
AHP	AHP114*	AHP114TP1-K
HAP	HAP210	HAP210TP1-K
HEP1	HEP121*S	HEP121TP1-K
HEP1	HEP103	HEP103TP1-K
HEP2	HEP207	HEP207TP1-K
HEP3	HEP310	HEP310TP1-K
HEP5	HEP517	HEP517TP1-K
HPP	HPP210	HPP210TP1-K

VALVES FOR POWERED PUMPS		
Range	Model no.	Repair kit part no.
PMV	PMV2	PMV2TP1-K
PMV	PMV3	PMV4TP1-K
PMV	PMV4	PMV4TP1-K

FOR JACKS		
Range	Capacity t.	Repair kit part no.
JAS	10	JAS10TP1-K
JAH	20	122059
JAH	30	123059
JAH	60	126059
JCS	10	JCS10TP1-K
JCS	20	JCS20TP1-K
JCS	30	JCS30TP1-K
JCH	10	JCH10TP1-K
JCH	20	JCH20TP1-K
JSS	3	JSS35TP1-K
JSS	5	JSS55TP1-K
JSS	10	JSS106TP1-K
JSS	16	JSS166TP1-K
JSS	20	JSS207TP1-K
JSS	37	JSS327TP1-K
JSS	50	JSS507TP1-K
JSS	100	JSS1007TP1-K
HCJ	5	HCJ5TP1-K
HMJ	10	HMJ10TP1-K
HMJ	20	HMJ20TP1-K

Note: all service kits and spare parts detailed on pages 186 and 187 are latest model versions. Always check serial number of your product when ordering parts to ensure correct Hi-Force part supply.

REPLACEMENT PARTS

FOR TORQUE WRENCHES		
Range	Model no.	Repair kit part no.
TWS	17N	TWS17NTP2-K
TWS	45N	TWS45NTP2-K
TWS	100N	TWS100NTP2-K
TWS	150N	TWS150NTP2-K
TWS	370N	TWS370NTP2-K
TWH	27N	TWH27NTP2-K
TWH	54N	TWH54NTP2-K
TWH	120N	TWH120NTP2-K
TWH	210N	TWH210NTP2-K
TWH	430N	TWH430NTP1-K

FOR TORQUE WRENCH PUMPS		
Range	Model no.	Repair kit part no.
HTWP	2140P	HTWP2140P-K
HTWP	2141P	HTPW2141/2-K
HTWP	2142P	HTWP2141/2-K
HTWP	3140P	HTWP3140TP2-K
HTWP	3141P	HTWP3141/2TP2-K
HTWP	3142P	HTWP3141/2TP2-K

FOR STUD BOLT TENSIONERS		
Range	Size	Repair kit part no.
STS	1	STS1LCTP1-K
STS	2	STS2LCTP1-K
STS	3	STS3LCTP1-K
STS	4	STS4LCTP1-K
STS	5	STS5LCTP1-K
STS	6	STS6LCTP1-K
STU	1	STU1LCTP1-K
STU	2	STU2LCTP1-K
STU	3	STU3LCTP1-K
STU	4	STU4LCTP1-K
STU	5	STU5LCTP1-K
STU	6	STU6LCTP1-K
STU	7	STU7LCTP1-K

FOR TENSIONER PUMPS		
Range	Model no.	Repair kit part no.
AHP	275BTU	AHP275TP1-K

FOR HYDROTEST PUMPS		
Range	Model no.	Repair kit part no.
AHP	10	AHP10TP1-K
AHP	26	AHP26TP1-K
AHP	36	AHP36TP1-K
AHP	58	AHP58TP1-K

FOR HYDROTEST PUMPS		
Range	Model no.	Repair kit part no.
AHP	107	AHP107TP1-K
AHP	187	AHP187TP1-K
AHP	275	AHP275TP1-K
AHP	425	AHP425TP1-K
AHP2	036	AHP2-036TP1-K
AHP2	060	AHP2-060TP1-K
AHP2	097	AHP2-097TP1-K
AHP2	144	AHP2-144TP1-K
AHP2	237	AHP2-237TP1-K
ATDP	63	ATDP63TP1-K
ATDP	125	ATDP125TP1-K
ATDP	216	ATDP216TP1-K

FOR IMPACT WRENCHES		
Range	Model no.	Repair kit part no.
IW	13P	IW13PTP1-K
IW	19P	IW19PTP1-K
IW	25B	IW25BTP1-K
IW	38B	IW38BTP1-K

FOR SELF CONTAINED PULLERS		
Range	Model no.	Repair kit part no.
SCP	103	SCP103TP1-K
SCP	203	SCP203TP1-K
SCP	303	SCP303TP1-K

FOR HYDRAULIC CUTTERS		
Range	Model no.	Repair kit part no.
CT	20	CT20TP1-K
CT	40	CT40TP1-K
HCH	40	HCH40TP1-K
HCH	120	HCH120TP1-K
HWRC	1115	HWRC1115TP1-K
HWRC	1125	HWRC1136TP1-K
HWRC	1136	HWRC1136TP1-K
HWRC	1145	HWRC1145TP1-K
HSWC	19	HSWC19TP1-K
HSWC	28	HSWC28TP1-K
HSWC	44	HSWC44TP1-K
HCC	26	HCC26TP1-K
HCC	34	HCC34TP1-K
HCC	46	HCC46TP1-K

FOR CRIMPING TOOLS		
Range	Model no.	Repair kit part no.
CH	21	CH21TP1-K
CH	30	CH30TP1-K
CH	32	CH32TP1-K
CH	40	CH40TP1-K
CH	63	CH63TP1-K
CH	80	CH80TP1-K
CH	1000	CH1000TP1-K
SC	18X	SC18TP1-K
SC	21	SC21TP1-K
SC	30	SC30TP1-K
SC	32	SC32TP1-K
SC	40	SC40TP1-K
SC	60	SC60TP1-K
BC	18X	BC18TP1-K
BC	21	BC21TP1-K
BC	30	BC30TP1-K
BC	32	BC32TP1-K
BC	40	BC40TP1-K
BC	63	BC63TP1-K

FOR NUT SPLITTERS		
Range	Model no.	Repair kit part no.
DNS	404	DNS404TP1-K
DNS	506	DNS506TP1-K
NS	104	NS104TP1-K
NS	110	NS110TP1-K
NS	200	NS200TP1-K
NS	206	NS206TP1-K
NS	215	NS215TP1-K
HMNS	126	HMNS126TP1-K
HMNS	161	HMNS161TP1-K
HMNS	197	HMNS197TP1-K

FOR OTHER TOOLS		
Range	Model no.	Repair kit part no.
HHP	30	HHP30TP1-K
HHP	50	HHP50TP1-K
JS	4	JS4TP1-K
HKP	10	HKP10HTP1-K
SFS	12H	SFS12TP1-K
SFS	15	SFS15TP1-K
SJS	10	SJS10TP1-K
SKP	7	SKP7TP1-K

Replacement blades for nut splitters, chain cutters, cable cutters and wire rope cutters

Tool Model no.	Replacement blades
CT20	CT20-4
CT40	CT40-76
HCH40	HCH40-2
HCH120	HCH120-19
HWRC1115	HWRC1115-B
HWRC1125	HWRC1125-B
HWRC1136	HWRC1136-B
HWRC1145	HWRC1145-B

Tool Model no.	Replacement blades
HSWC19	HSWC19-4
HSWC28	HSWC28-4
HSWC44	HSWC44-4
HCC26 (static blade)	HCC26-4S
HCC26 (moving blade)	HCC26-4M
HCC34 (static blade)	HCC34-5S
HCC34 (moving blade)	HCC34-5M
HCC46 (static blade)	HCC46-11S
HCC46 (moving blade)	HCC46-11M

Tool Model no.	Replacement blades
DNS404	DNS404-B
DNS506	DNS506-B
NS104	NS104-B
NS110	NS110-B
NS200	NS200-B
NS206	NS206-B
NS215	NS215-B
HMNS104	NS104-B
HMNS110	NS110-B
HMNS200	NS200-B

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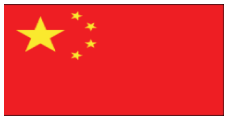

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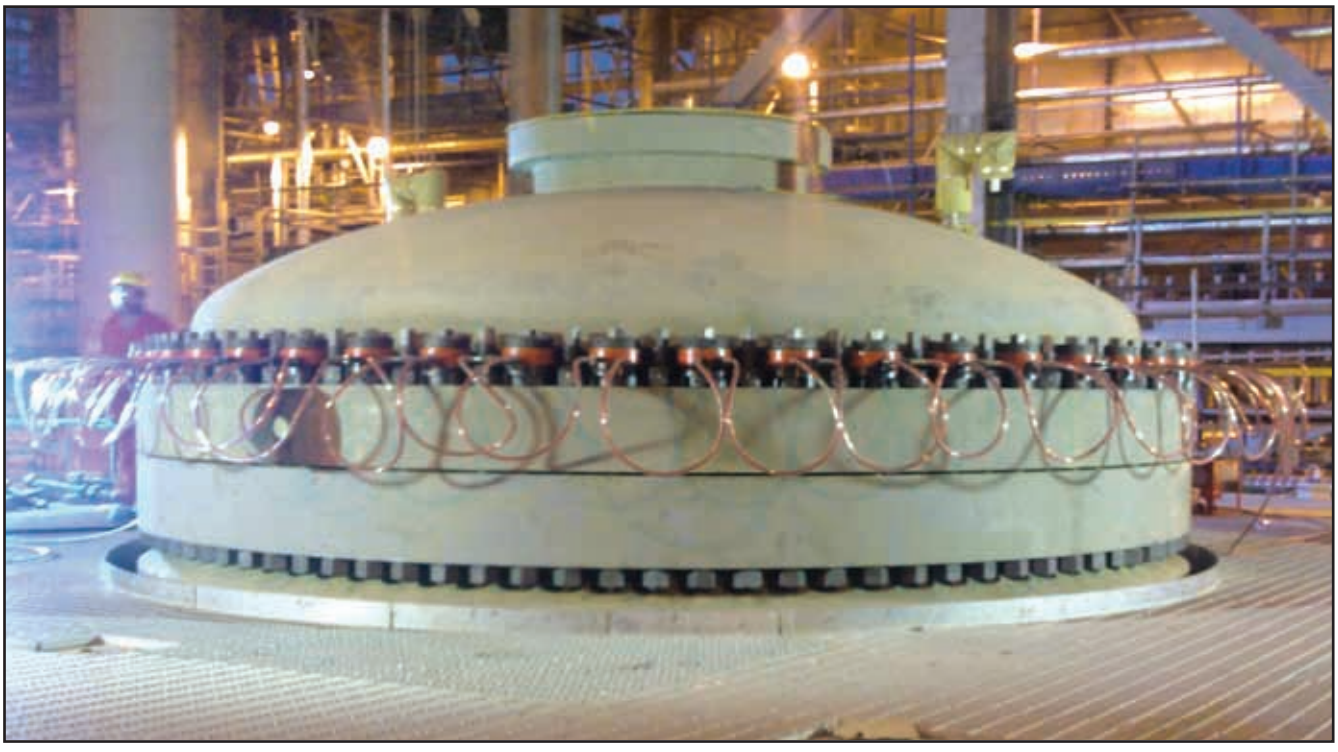

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