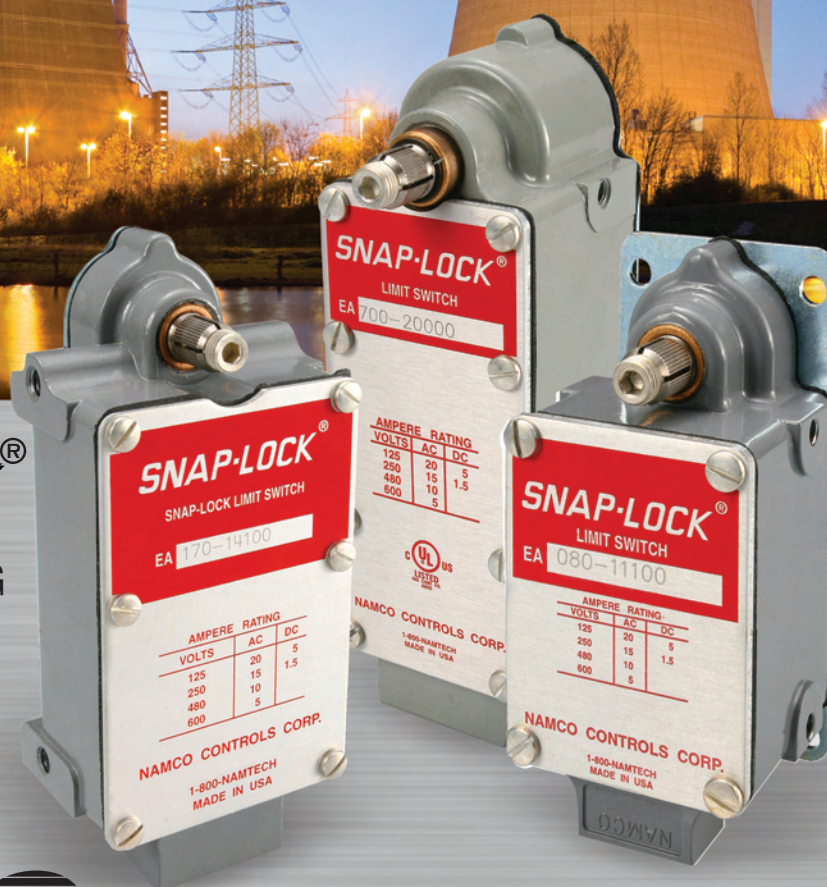


# NAMCO

## SNAP-LOCK<sup>®</sup>

LIMIT SWITCH CATALOG



# NAMCO

*Because nothing else works better!*

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# LET'S TALK ABOUT RELIABILITY



Namco Controls grew from the heavy duty side of the industrial world. For decades, Snap Lock® limit switches have been the benchmark in reliability for steel mills, auto factories, foundries, power plants and machine shops.

In 1938, the need for a limit switch of high quality, repeatability, and reliability was pressing – but one didn't exist. Namco Controls was therefore created to design and manufacture limit switches for our own needs. Innovative and reliable from the beginning, they were eagerly sought after by other companies and we branched out into supplying the demand.

Everything that made Namco Snap-Lock Limit Switches the preference of the heavy and machine tool industries of the past is still applicable today. Times may have changed, but our reputation for reliability hasn't.

Today, Snap-Lock still provides unparalleled reliability in the toughest environments and in heavy-duty applications. This superior limit switch provides a huge range of operation, construction, and practical flexibility. You can choose a model, size, and type that will meet and exceed the demands you place on it. In every respect, Snap-Lock has the features and benefits you insist on in a limit switch.

In addition to easily covering all your functional requirements, Snap-Lock Limit Switches will meet practically every application. They have the ruggedness to operate under the most severe conditions and have the durability needed for a long, trouble-free lifespan.

## SNAP-LOCK FEATURES FOR YOUR NEEDS:

- Heavy duty butt contacts.
- Wide selection of levers.
- Contact arrangements and choice of materials allows application versatility.
- Available pre-wired to save down-time.
- Totally sealed construction for almost all environmental conditions.
- High and low temperature models, range of operating torques and choice of housing types increase application capabilities.
- Optional sliding contact feature results in self-cleaning benefits.

**JUST SOME OF THE REASONS WHY NAMCO/ SNAP-LOCK LIMIT SWITCHES ARE STILL THE PREFERRED CHOICE AFTER SEVENTY YEARS.**

## SEVERAL PRODUCTS FOR SPECIAL VARIATIONS



### Series EA800

This series of hazardous location Snap-Lock Limit Switches utilizes the internal mechanism of the EA700 series, with a significant advantage. The mechanisms are enclosed in UL-listed, NEMA-rated housing available in aluminum or bronze and are perfect for use in environments with excessive vibration, dirt and heat. Applications include coal conveyors, mining equipment and machinery, valves located in explosive environments such as oil and gas fields and refineries, grain elevators and storage areas, Navy and Marine deck equipment.

# WE CAN BE YOUR ONE SOURCE SENSOR SUPPLIER



## Series EA880

These hazardous location Snap-lock switches can have any of the internal mechanism of the EA080, EA060, or EA040 switches. They are enclosed in UL-listed NEMA-rated aluminum housings. Single-pole contacts and end uses similar to the EA800 series.

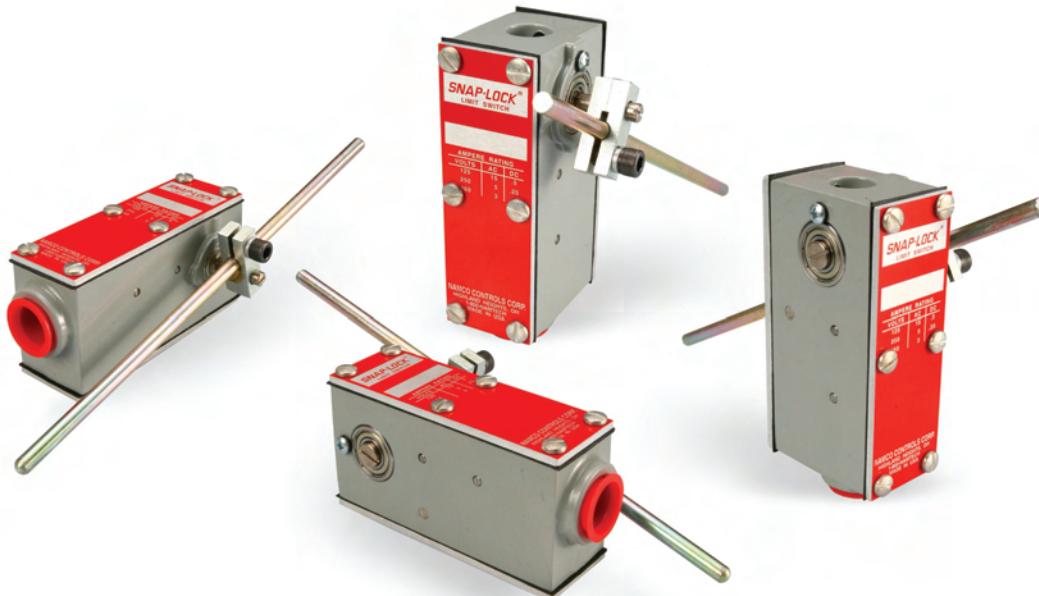
“A limit switch may not be the best solution to your sensing problem.”

Our reputation is as durable as our limit switches. Because we have decades of experience in diverse applications, we are able to give you the best advice on whether your particular situation requires one of our switches. If it doesn't, we won't try to sell you something that you don't need.

You can depend on the Namco name for outstanding RELIABILITY, maximized PRODUCTIVITY and UPTIME.

## EA150

EA150 has dust-tight zinc housing with LED light option. It's ultra-sensitive and has a gravity or spring return for small-part and other light-touch requirements.



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If you have any questions, please do call us at 1-800-NAMTECH (626-8324) There are always qualified application engineers available to give you expert advice, before and after the sale.



## Certifications of Namco Switches

The product has been evaluated to the applicable CSA and ANSI/UL standards for use in Canada and U.S. respectively.

### CSA International

- Certificate: 1269954 (LR38127)
- Class 3211-07 Industrial Control Equipment, Miscellaneous Apparatus
- Class 3211-87 Industrial Control Equipment, Miscellaneous Apparatus - Certified to U.S. Standards

### Series EA170, and EA180 enclosed limit switches, form Z double pole, double-break, double throw rated:

**Electrical:** 5A, 125V dc, 1.5A, 250V dc, 5A, 600V ac, 10A, 480V ac, 15A, 250V ac, 20A, 125V ac; heavy pilot duty, 20A, 600V ac; AC make/break: 120 to 600V, 10800/1080va; dc: N600

**Environmental rating:** 90°C max., Type 1, 3, 4, 12, 13

### Series EA700 and EA740 special-use switch, single pole, single or multiple circuit, double throw, double break, rated:

**Electrical:** 5A, 125V, dc, 1.5A, 250V dc, 5A, 600V ac, 10A, 480V ac, 15A, 250V ac, 20A, 125V ac; heavy pilot duty, 20A, 600V ac; AC make/break: 120 to 600V, 10800/1080va; dc: N600

**Environmental:** 55°C max.

### Series EA040, EA060, and EA080 machine-operated switches, single pole, double throw, double throw, double break, rated:

**Electrical:** 5A, 125V dc, 1.5A, 250V dc, 5A, 600V ac, 10A, 480V ac, 15A, 250V ac, 20A, 125V ac; heavy pilot duty, 20A, 600V ac; AC make/break: 120 to 600V, 10800/1080va; dc: N600

**Environmental rating:** Type 1 or 13

### Series EA880 SPDT machine operated switches rated:

**Electrical:** 5A, 125V dc, 1.5A, 250V dc, 5A, 600V ac, 10A, 480V ac, 15A, 250V ac, 20A, 125V ac; Heavy pilot duty, 600V ac max.

**Environmental rating:** Type 1, 4, 4X

**Series EA800 snap switch, single pole, 1 N.O./N.C. contact rated:** 5A, 125V dc, 1.5A, 250V dc, 5A, 600V ac, 10A, 480V ac, 15A, 250V ac, 20A, 125V ac

**Environmental rating:** Type 1, 4

*Note: These switches are for ordinary location use only.*

### Applicable Requirements

- CSA C22.2 No. 14-95 — Industrial Control Equipment
- CSA C22.2 No. 94-M91 — Special Purpose Enclosures
- UL 508 — Industrial Control Equipment
- UL 50 — Enclosures for Electrical Equipment

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*All Specifications and Dimensions are subject to change without notice – Please Consult Factory for Latest Data.*



## Information

**PRICE LISTS**

All price lists are covered in separate publications and are subject to change without notice.

Not all products manufactured by NAMCO are covered on standard price lists. To supplement standard price lists, NAMCO publishes an ANPL catalog (Alpha-Numeric Price Lists), listing a broad selection of available products including many vintage products. Cross-references are provided to identify older part numbering.

**APPLICATION ASSISTANCE**

NAMCO sales representatives are available to assist with the specification and selection of NAMCO products. If additional assistance is needed, please contact the Customer Service Department in Elizabethtown, NC. For more detailed technical information, questions on specially manufactured units or any questions concerning non-standard items, your requests should be sent to the appropriate application engineers.

**HOT LINE 1-800-NAMTECH**

Hotline calls go directly to the Application Help Department and cannot be transferred to Customer Service or other departments.

**RETURNED GOODS**

Returned goods are governed by provisions as stated in the "Conditions of Sale." No products may be returned without first obtaining Seller's written permission and a Return Material Authorization (RMA) number.

Only standard stock items qualify for normal return. Any non-stock or made to order merchandise is non-returnable. Not all items listed in currently published catalogs are stock items. (See ANPL)

Returns due to NAMCO error will generally be returnable. This would include shipping discrepancies, order write-up discrepancies or material for replacement under warranty.

All requests for return must be made within 30 days of original shipment. Once return authorization has been granted, material must be returned within 30 days or that authorization will be considered null and void. All authorized returns due to NAMCO error will be credited at the actual purchase price plus the actual cost of return motor freight less any handling charges necessary due to abuse or improper packing. All other requests for return, if authorized, must be returned with freight prepaid.

With the exception of items qualifying for return under warranty, any product which has been installed and used does not qualify for return under any circumstances. All returns under warranty are subject to engineering inspection.

**DIMENSIONS**

Each product sheet has approximate outline dimensions (where appropriate). For certified construction drawings, please request as a separate item when ordering or contact Customer Service department.

**CUSTOMER SERVICE**

Customer Service deals with day-to-day order requirements including standard pricing and product availability. Customer Service is available from 8:00 a.m. until 5:00 p.m., Eastern Standard Time.

NAMCO Customer Service  
2100 West Broad Street  
Elizabethtown, NC 28337

(800) 390-6405  
FAX (910) 879-5486

**WARNING:**

A SWITCH IN A PROTECTIVE INTERLOCKING CIRCUIT SHOULD BE USED WITH AT LEAST ONE OTHER DEVICE THAT WILL PROVIDE A REDUNDANT PROTECTIVE FUNCTION, AND THE CIRCUIT SHOULD BE SO ARRANGED THAT EITHER DEVICE WILL INTERRUPT THE INTENDED OPERATION OF THE CONTROLLED EQUIPMENT. (PROPOSED NEMA ICS 2-225.95 St'd.)

SERVICING ENERGIZED INDUSTRIAL CONTROL EQUIPMENT CAN BE HAZARDOUS. SEVERE INJURY OR DEATH CAN RESULT FROM ELECTRICAL SHOCK, BURN OR UNINTENDED ACTUATION OF CONTROLLED EQUIPMENT.

RECOMMENDED PRACTICE IS TO DISCONNECT AND LOCK OUT CONTROL EQUIPMENT FROM POWER SOURCES, AND DISCHARGE STORED ENERGY TO CAPACITORS, IF PRESENT. IF IT IS NECESSARY TO WORK IN THE VICINITY OF ENERGIZED EQUIPMENT, ONLY QUALIFIED PERSONNEL SHOULD BE PERMITTED TO PERFORM SUCH WORK, USING ALL APPLICABLE SAFETY PRACTICES AND PROTECTIVE EQUIPMENT.

The user should refer to NFPA 70B, RECOMMENDED PRACTICE FOR ELECTRICAL EQUIPMENT MAINTENANCE, published by the National Fire Protection Association, for additional information.

**Notes**



## WHAT IS A LIMIT SWITCH?

Limit switches are used to convert a mechanical motion into an electrical control signal. The mechanical motion is usually in the form of a cam, a machine component or an object moving toward a pre-determined position. The cam engages the limit switch lever or plunger which makes or breaks an electrical contact inside the switch. This electrical control signal is then used to limit position or reverse the machine travel or to initiate another operating sequence. It can also be used for counting, sorting or as a safety device.

Typical limit switch applications are in the control circuits of solenoids, control relays and motor starters which control the motion of machine tools, conveyors, hoists, elevators and practically every type of motor driven machine. Experience has shown that most limit switch failures are caused by faulty installation. In some cases a perfect installation is not possible, but in the majority of cases, proper application of the limit switch would have prevented failure.

## Definition of Limit Switch Terms

**Actuator** – Mechanism of the switch or switch enclosure which operates the contacts, i.e. lever arm, plunger, wobble stick.

**Break** – To open an electrical circuit.

**Cam** – Machine part or component that applies force to switch actuator causing actuator to move as intended. See also “Dog”.

**Cam Track** – Distance from switch mounting surface to a specified point on actuator.

**Differential Travel** – Distance or angle from the operating position to the reset position.

**Direct-Acting Contacts** – Contacts are moved directly by the operating shaft. In general should only be used where movement of actuator must break welded contacts, as in a crane safety limit switch.

**Dog** – Machine part or component that applies force to switch actuator causing actuator to move as intended. See also “Cam”.

**Double Break** – Contacts open circuit at two points.

**Double Pole Double Throw (DPDT)** – Switches which make and break two separate circuits. This circuit provides a normally open and normally closed contact for each pole.

**Free Position** – Position of actuator when no external force (other than gravity) is applied on the actuator. See also “Initial Position” and “Normal Position”.

**Initial Position** – Position of switch actuator when no external force (other than gravity) is applied on the actuator. See also “Free Position” and “Normal Position”.

**Maintained Contact Switch** – Designed for applications requiring sustained contact after actuator has been released, but with provision for resetting.

**Make** – To close or establish an electrical circuit.

**Momentary Contact Switch** – A switch which returns from the operated condition to normal condition when actuating force is removed. See also “Spring Return”.

**Neutral Position limit Switch** – Lever arm type switch with two sets of contacts, one of which operates when the shaft is rotated clockwise and the other of which operates when the shaft is rotated counter-clockwise.

## Definition of Limit Switch Terms

**Normal Position** – Position of switch actuator when no external force (other than gravity) is applied to actuator. See also “Free Position” and “Initial Position”.

**Normally Closed Contact (N.C.)** – Contacts that move to the closed position when no external force is on the actuator.

**Normally Open Contacts (N.O.)** – Contacts that move to the open position when no external force is on the actuator.

**Operating Force** – Amount of force applied to the actuator to cause contact operation.

**Operating Position** – Position of the actuator at which the contacts move to the operated position. See also “Trip Position”.

**Overtravel** – Movement of the actuator beyond the operating position.

**Pilot Duty Rating** – Rating of contacts when making and breaking inductive loads such as coils and solenoids.

**Pole** – Parts necessary to control one conductor of a circuit.

**Precision Snap Acting Switch** – An electromechanical switch having predetermined and accurately controlled characteristics and having a spring loaded quick make and break contact action.

**Pretravel** – Distance or angle through which the actuator moves from the normal position to the operating position.

**Reset Position** – Position of actuator at which contacts return to the normal position. See also “Releasing Position”.

**Releasing Position** – Position of actuator at which contacts return to the normal position. See also “Reset Position”.

**Repeat Accuracy** – Ability of a switch to repeat its characteristics precisely from one operation to the next operation. See also “Repeatability”.

**Repeatability** – Ability of a switch to repeat its characteristics precisely from one operation to the next operation. See also “Repeat Accuracy”.

**Single Pole Double Throw (SPDT)** – Switches which make and break one circuit. Circuit provides one normally open and one normally closed contact.

**Slow Make and Break Contacts** – The speed of contact transfer is direct dependent on the speed of the operating shaft.

**Snap Action** – Rapid motion of the contacts from one position to another position or their return. This action is relatively independent of the rate of travel of the actuator.

**Snap Back** – Sudden return of actuator to normal position.

**Spring Return Switch** – A switch which returns from operated condition to normal condition when actuating force is removed. See also “Momentary Contact Switch”.

**Trip Position** – Position of the actuator at which the contacts move to the operated position. See also “Operating Position”.

**Total Travel** – Distance from actuator free position to over-travel limit position.

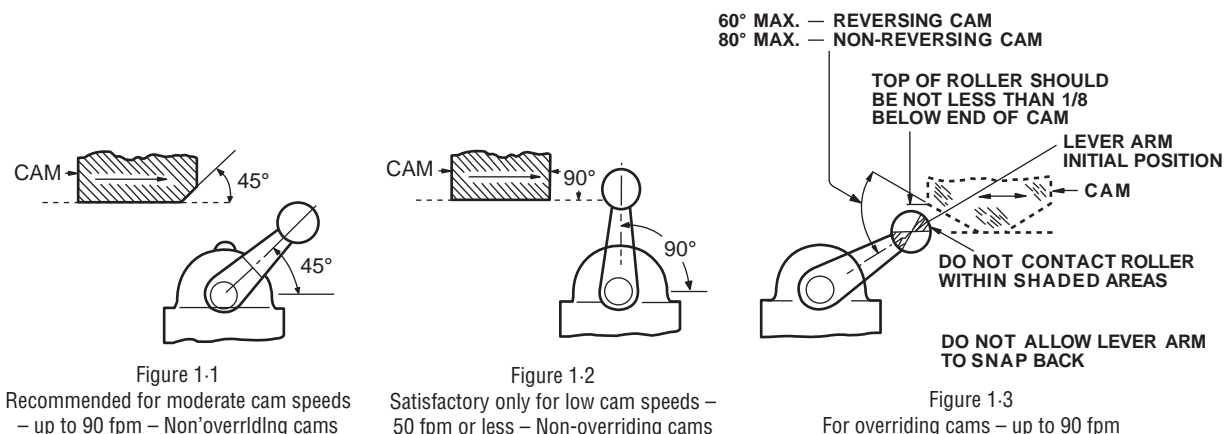


For maximum limit switch life, the force applied to the lever arm by a cam should be perpendicular to the lever arm. This means that the cam angle and lever arm angle should be the same.

A good recommended cam angle and lever arm angle at moderate cam speeds (up to 90 fpm) is 45°, see Figure 1-1. Here lever acceleration is less and deceleration is also less at the lower cam edge.

The arrangement shown in Figure 1-2 is satisfactory only at cam speeds below 50 fpm. At higher speeds, the impact due to high lever acceleration causes excess roller bounce. Rapid deceleration occurs at the lower cam edge.

The cam trailing edge on overriding cams must also be considered for maximum switch life, see Figure 1-3. Lever arm snap back causes shock loads which reduce switch life. Also, with reversing cams the trailing edge becomes a leading edge on the return stroke.



## Electrical Ratings

**RATINGS**- Most control applications today involve highly inductive loads such as starter, contactor and relay coils; solenoids and clutches. In order to apply a control device correctly, the inductive rating must be known. Ratings are generally listed in three ways:

1. **Resistive or non-inductive.**
2. **Inductive (pilot duty).**
3. **Continuous.**

**RESISTIVE OR NON-INDUCTIVE RATINGS** – This rating indicates the resistive load only that the contacts make or break. Resistive ratings are generally based on a 75% minimum power factor for AC.

**INDUCTIVE (PILOT DUTY) RATINGS** – The inductive rating indicates the non-motor inductive load, such as the contactors, relays and other remotely controlled devices that the contacts can make or break. These ratings usually are based on a 35% power factor for AC.

**CONTINUOUS RATING** – Continuous rating indicates the load that the contacts can carry continuously without making or breaking the circuit.

The inductive rating is always less than the resistive or continuous rating. When contacts break an inductive circuit, the inductance in the load tends to keep the current flowing in the same direction. The result is an arc across the contacts which causes heating and burning of the contacts. Because of the extra heat generated, the allowable inductive current must be less than the resistive current for equal contact life.

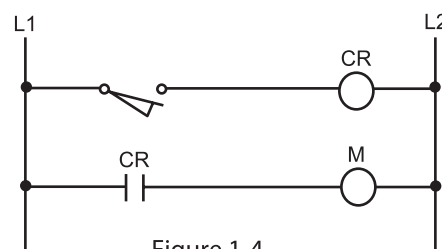
Quick make and quick break (snap-action) contacts reduce the arcing time and allow higher inductive ratings than with slow make or break contacts. A.C. inductive coil loads have a momentary inrush current of approximately 10 times the sealed current. Contacts must be able to break or interrupt the inrush current in an emergency.

**EXCESSIVE LOAD** – If the load exceeds the ratings of the limit switch being used, a control relay (CR) or contactor with proper ratings can be used as in Figure 1-4.

The DC current ratings of a device can be increased by placing contacts in series. This effectively increases the contact gap allowing a higher current rating. In general, the following ratings can be applied:

- 2 contacts in series – DC rating x 2.5
- 3 contacts in series – DC rating x 5

Current should never exceed the maximum continuous current rating of the device.



## Contact Resistance

### RESISTANCE OF SNAP SWITCHES

Snap switch resistance is the total electrical resistance that a snap switch adds to the circuit and consists of:

**CONDUCTING PATH:** Includes all terminals, inserts, stationary contact material resistance, movable contact material resistance, movable blade assembly, and any other parts in the conducting circuit.

**CONstriction RESISTANCE** of all joints, discontinuities, or interfaces. This is the resistance caused by limited mating surfaces through which the load must pass. If the movable and stationary contact tips are viewed through a microscope, it can be seen that they only touch at a very few points. Accordingly, increased resistance is presented to the current. If the current is high enough, the points of constriction are softened and enlarged through thermal effects and the resistance decreases.

**FILM RESISTANCE:** It is well known that silver accumulates a surface resistance due to chemical reaction with its environment. The most common reaction is with sulfur and oxygen which creates a sulfide and an oxide of silver. Such a surface is known to have some resistance which can be read with a low voltage instrument such as an ohmmeter. These surfaces, however, have the characteristic of being self-clearing. When current is passed through such a surface, it creates heat which, in turn, reduces the compound to pure silver again and restores the contact to a low ohmic value. This has long been the characteristic which has made silver such a good selection for contact materials.

**STANDARD CONTACTS** can be gold plated to reduce switch resistance, but may not provide sufficient increase in reliability to warrant the added cost. For example, if the contact material underneath is exposed at any point due to excessive current or normal mechanical wear, a contaminating film may develop and will eventually creep over the plated portion. Long term reliability is then no better than with standard contacts.

**PARTICLE RESISTANCE:** Contamination in the form of foreign material can also produce resistance. Carefully controlled production processes are used to prevent contamination during assembly of snap switches.

**NAMCO LIMIT SWITCHES** are specifically designed for use with industrial control equipment where voltages are relatively high, normally 120 volts or higher, and current levels are high, normally .25 amperes or higher. An increase in switch resistance may appear to be more critical in high energy circuits because it represents a greater percentage of total circuit impedance, however, the arcing produced breaks down or burns away the contaminants reducing the actual resistance seen by the load.

**SWITCH RESISTANCE** in dry circuit (low voltage, low current) applications can be more of a problem, but the resistance has to be quite high to significantly affect operation. For example, a solid state circuit operating at 20 volts and 1 ma has a circuit resistance of  $20 \div (1 \times 10^{-3})$  or 20,000 ohms.

A Snap-Lock switch with 10 ohms resistance would have little effect. The problem arises with film or particle resistance which can be quite high or even present an open circuit. Use of snap switches with dry circuits is not recommended because these voltages and currents are not high enough to reduce the silver sulfide or silver oxide to pure silver or to burn away other contaminants present.

An ohmmeter test on Snap-Lock switch is unreliable because the most common voltage source in an ohmmeter is a 1.5 volt battery and, to snap switch contacts being tested, this is just another dry circuit load. Several ohmmeter readings of the same contacts may vary from a few hundredths of an ohm to several ohms yet the contacts will work perfectly with a nominal coil load.

Recommendations for Application and Testing of Limit Switch Contacts

**STANDARD NAMCO LIMIT SWITCHES** are normally recommended for use with industrial control devices, not dry circuits. If lower voltages are present, the current drawn through the contacts should be on order of .25 amperes in order to maintain proper continuity.

To test continuity in the field, a six volt, .25 ampere pilot light is recommended.

***Do not use an ohmmeter to test continuity.***

An ohmmeter is a reliable test only if the snap switch is to be used with a dry circuit and, as stated above, this is normally not recommended.

## Wiring and Mounting

- Unless specifically designed for such service limit switches **SHOULD NOT BE** submerged in or splashed with oils, coolants or other liquids. **PLEASE CONSULT THE FACTORY.**
- Limit switches **MUST NOT BE** used in locations where temperature or atmospheric conditions are beyond those for which they have been specifically designed.
- Power from different sources **MUST NOT BE** connected to the contact of one limit switch unless specifically designed for such service.
- Limit switches **MUST BE** used within their contact ratings. Please refer to switch label on cover for electrical ratings and the appropriate limit switch bulletin for acceptable environmental conditions in which the switch has been designed to function properly.
- Limit switches **SHOULD BE** mounted rigidly and in readily accessible locations, with suitable clearances to permit easy service and replacement when necessary. Cover plates **SHOULD** face the maintenance access point.
- Limit switches **SHOULD BE** placed in locations where machining chips do not accumulate under normal operating conditions to avoid chip interference with the lever operation.
- Opposite polarities **MUST NOT BE** connected to the contacts of one limit switch unless the limit switch is specifically designed for such service.

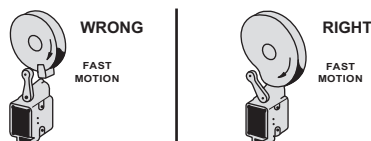
## Limit Switch Selection

There are several general categories or classifications of limit switches on the market, the most common are electro-mechanical switches, non-contact proximity switches and photoelectric switches. Because electro-mechanical switches are suitable for the vast majority of applications and are generally the most economic to use, the electro-mechanical limit switch should be the first choice. This application section will deal predominantly with the proper application of electro-mechanical limit switches.

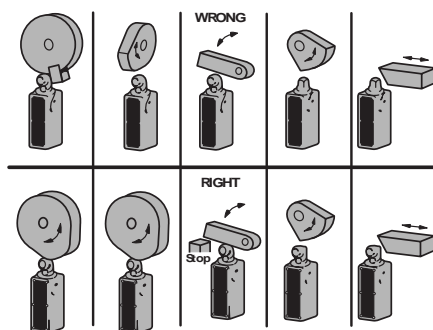
Selection of the proper electro-mechanical limit switch for an application generally breaks down into two major decisions, choosing the proper actuator (lever) and choosing the proper enclosure. There are other considerations, such as what operating sequences are available, temperature rating and electrical rating. These vary from switch type to switch type. Selection of Limit Switch Actuator – Selection of a suitable actuator depends on the shape, speed, direction and total travel of the cam or part being used to trip the limit switch and the accuracy desired. See pages 68 through 75 for levers that fit Namco limit switches.

## Actuator Consideration

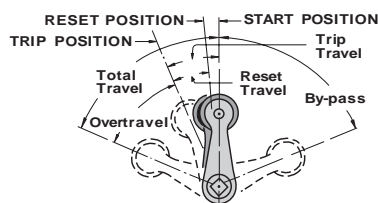
- Where relatively slow motions operate the limit switch, a snap-acting or snap-lock design **SHOULD BE** used.
- Where relatively fast motions are involved, the cam arrangement **SHOULD BE** set so the actuator does not receive a severe impact.
- Where relatively fast motions are involved, cams **MUST BE** designed so the limit switch will be held operated long enough to operate relays, valves, etc.



- For limit switches with pushrod actuators, the actuating force **SHOULD BE** applied as accurately as possible in line with the pushrod axis.

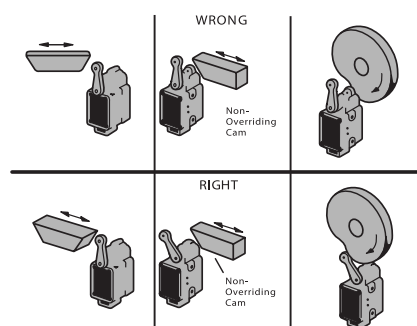


- Limit switches **MUST NOT BE** operated beyond the manufacturers recommended travel. Operating positions and lever travel terminology are illustrated in the drawing below. For specifications of a specific switch, refer to the appropriate catalog page.



*PLEASE NOTE: When loosening or tightening the pipe plug or set screw used to clamp the actuating lever in the desired position, be careful not to restrain the shaft/lever assembly so as not to transmit the applied torque to the switch itself.*

- Cam or dog arrangements **SHOULD BE** such that the actuator is not suddenly released to snap back freely unless specifically designed for such service.
- For limit switches with lever actuators, the actuating force **SHOULD BE** applied as nearly perpendicular to the lever as practical and perpendicular to the shaft axis in which the lever rotates.

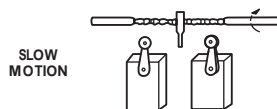


- A limit switch actuator **MUST BE** allowed to move far enough for positive operation of the contacts.
- Limit switches **MUST BE** mounted in locations which will prevent false operation by normal movements of operator or machine components.
- Limit switches are designed for proper performance with the actuators with which they are supplied.
- Supplementary actuators **SHOULD NOT BE** used unless the limit switches are specifically designed for them.
- Operating mechanisms for limit switches **MUST BE** so designed that, under any operating or emergency conditions, the limit switch is not operated beyond its overtravel limit position. A limit switch **MUST NOT BE** used as a mechanical stop.

The most important consideration in the proper application of limit switches is external cam design, as the majority of limit switch failures can be traced back to poor cam design. Excessive over-travel and/or excessive snap back of the operating lever arm are the most common abuses. A good cam design will greatly increase the life of your limit switch.

Listed below are general rules for the proper design and application of limit switch cams published by NEMA in Standards Publication ICS2-225.

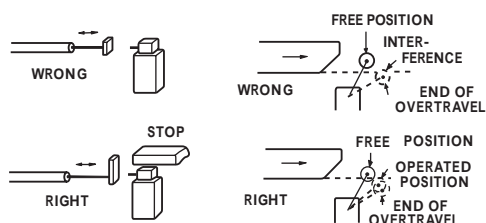
**ICS2-225.83** – Where relatively slow motions operate the limit switch, it should generally be snap acting.



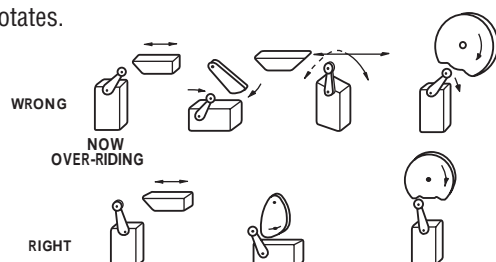
**ICS2-225.84** – Where relatively fast motions are involved, cam arrangements should be such that the actuator does not receive a severe impact.



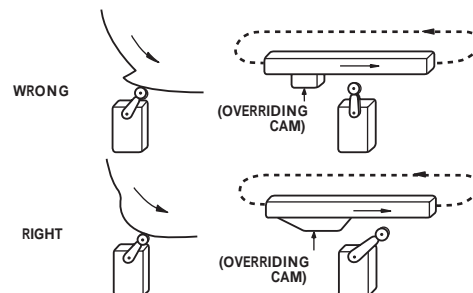
**ICS2-225.88** – Operating mechanisms for limit switches should be so designed that under any operating or emergency conditions, the limit switch is not operated beyond its overtravel limit position. A limit switch should not be used as a mechanical stop.



**ICS2-225.90** – For limit switches with lever actuators, the actuating force should be applied as nearly perpendicular to the lever as practical, and perpendicular to the shaft axis about which the lever rotates.



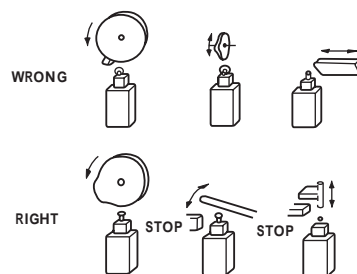
**ICS2-225.85** – Cam or dog arrangements should be such that the actuator is not suddenly released to snap back freely.



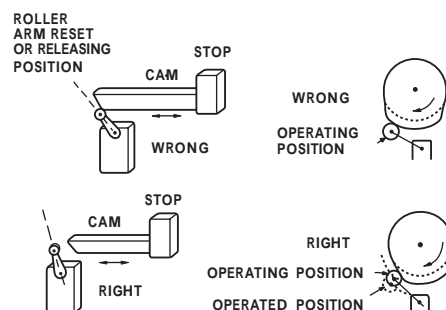
**ICS2-225.86** – Where relatively fast motions are involved, cams should be designed such that the limit switch will be held operated long enough to operate relays, valves, etc.



**ICS2-225.89** – For limit switches with pushrod actuators, the actuating force should be applied as nearly as possible in line with the push rod axis.

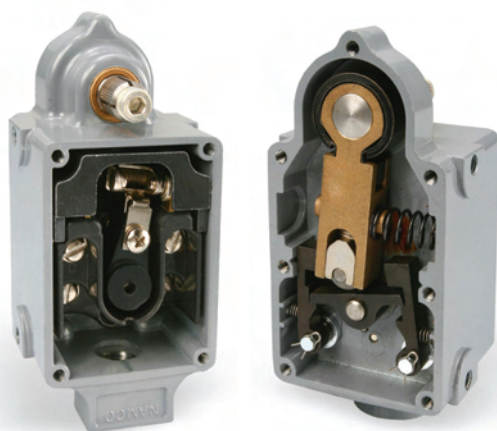


**ICS2-225.91** – A limit switch actuator must be allowed to move far enough for positive operation of the contacts.





## ROCKER-LEVER TYPE EA080 Series



**ELECTRICAL SIDE      MECHANICAL SIDE**

## CAM-OPERATED TYPE EA700 Series



**ELECTRICAL SIDE      MECHANICAL SIDE**

- Housings have separate compartment enclosures for mechanical and electrical components.
- Ample space inside switch for wiring up to No. 12 AWG conductors.

For Quick Accurate Reference

## Comparison Chart

### Chart Guide

Temp. Range St. Temp.: -20°C- +90°C (For All Switches).

(Note: FOR EA700, 780, 790, 800 and 880 Special High and Low Temp. Versions Available)

- Consult Factory for UL Listing.
- Meet MIL-C-2212 and IEEE 45 Spec. and High Shock.

Δ Hazardous Location Switches.

† Maintained Contacts/Neutral Position.

\*\* 2 N.O./2 N.C., 4 N.O./4 N.C., 1 N.O./1 N.C., 2 N.O./2 N.C.

ROCKER TYPE						
	EA040 NEUTRAL POSITION	EA060 SHORT TRAVEL	EA080 STANDARD	EA170 STANDARD	EA170 SHORT TRAVEL	EA170 REVERSE SHAFT
<b>SNAP LOCK</b>	•	•	•	•	•	•
<b>CONTACT</b>	FORM Z 2 N.O.	FORM Z 1 N.O. 1 N.C.	FORM Z 1 N.O. 1 N.C.	FORM Z 2 N.O. 2 N.C.	FORM Z 2 N.O. 2 N.C.	FORM Z 2 N.O. 2 N.C.
<b>PRE-TRAVEL</b>	7°	6°30'	10°	10°	6°30'	10°
<b>DIFF. TRAVEL</b>	6°	4°	8°	8°	4°	8°
<b>REC. TRAVEL</b>	7°30'	7°	13°	13°	7°	13°
<b>TOTAL TRAVEL</b>	33°	35°	38°	37°	36°	37°
<b>MAX TORQUE</b>	22 IN. - LB.	24 IN. - LB.	14 IN. - LB.	23 IN. - LB.	32 IN.-LB.	30 IN.-LB.
<b>MAX TORQUE</b> (AT TOTAL TRAVEL)	50 IN. - LB.	45 IN. - LB.	38 IN. - LB.	33 IN. - LB.	45 IN.-LB.	33 IN.-LB.
<b>WT (LB)</b>	2.3	2.3	2.3	3.5	3.5	3.5
<b>UL/CSA</b>	•	•	•	—	—	—
<b>NEMA RATING</b>	1,4,13	1,4,13	1,4,13	1,4,13	1,4,13	1,4,13
<b>ENCLOSURE</b>	ZINC	ZINC	ZINC	AL/ZINC	AL/ZINC	AL/ZINC

### The standard Snap-Lock, 1 N.O.-1 N.C

(Series EA080 standard, EA060 short travel, EA040 neutral position.)

This series was designed by the Electrical Manufacturing Division of National Acme to fill a need for limit switches offering a high degree of repeatability, life and reliability for use on machine tools. This series of single pole limit switches remains one of Namco's most popular lines. It has numerous applications on machine controls, conveyors, material-handling systems and valve controls.

*The quick make and break, positive latching mechanism coined the trade name, "Snap-Lock".*

### THE SAME SNAP-LOCK BUT 2 N.O.-2 N.C

(Series EA170, same standard and short travel as others but also comes with reverse shaft.)

This series was developed to provide two-pole (2 N.O., 2 N.C.) switches while retaining repeatability, reliability, and durable long life. Applications include machine and valve controls, conveyor and material handling systems. An important derivative is Namco's EA180: one of Namco's two limit switches qualified for use inside containment areas of nuclear power plants.

### THE SAME SNAP-LOCK BUT CAM-OPERATED

(Series EA700, available in 1 N.O. - 1 N.C., 2 N.O. - 2 N.C., and 3 N.O. - 3 N.C.)

This series is Namco's most versatile line of Snap-Lock Limit Switches. It has many significant derivatives, all exhibiting ruggedness, high reliability, and repeatability. This important series was developed as a result of the need for lower trip torque and greater total actuating lever travel. The important derivative switches include Namco's EA740 nuclear switches, EA770 sealed switch and the EA730, 780, and 790 Navy and Marine switches.



**EA700  
CAM OPERATED TYPE**



**EA080  
ROCKER-LEVER TYPE**

CAM OPERATED							
EA880Δ	EA700 STANDARD	EA700 (M.C./N.P†)	EA770 (SLT)	EA780*	EA790*	EA800Δ	
•	•	•	•	•	•	•	
FORM Z SAME AS EA040, 080 OR 060	FORM Z 1 N.O. 1N.C. 2 N.O. 2 N.C. 3 N.O. 3 N.C.	FORM Z **	FORM Z 1 N.O. 1 N.C. 2 N.O. 2 N.C.	FORM Z 1 N.O. 1 N.C. 2 N.O. 2 N.C.	FORM Z 1 N.O. 1 N.C. 2 N.O. 2 N.C.	FORM Z 1 N.O. 1 N.C. 2 N.O. 2 N.C.	
	18°	SEE CAT.	18°	18°	18°	18	
	14°		14°	14°	14°	14	
SAME AS EA040, 060, OR 080	30°	DEPENDS ON CW OR CCW ROTATION	30°	30°	30°	30	
	90°		90°	90°	90°	90	
	15-33 IN.-LB.		15-33 IN.-LB.	15-27 IN.-LB.	15-27 IN.-LB.	15-33 IN.-LB.	
	DEPENDS ON # OF CONTACTS		DEPENDS ON # OF CONTACTS	DEPENDS ON # OF CONTACTS	DEPENDS ON # OF CONTACTS	DEPENDS ON # OF CONTACTS	
•	•	—	—	—	—	•	
1,4,7,9,13	1,4,13	1,4,13	1,4,6,13	1,4,4X,6,6P,13	1,4,4X,6,6P,13	4X,6,6P,7,9	
AL	ZINC	ZINC	ZINC	BRONZE	BRONZE	AL, BRONZE	



# ROCKER TYPE REFERENCE PAGES

<b>Design Features — Rocker Type</b> 1 N.O. - 1 N.C. -- (EA040/EA060/EA080)	18-19
<b>Standard</b> Butt Contacts -- (EA080)	20-21
<b>Short Travel</b> Butt Contacts -- (EA060)	22-23
<b>Neutral Position</b> Butt Contacts -- (EA040)	24-25
<b>Design Features — Rocker Type</b> 2 N.O. - 2 N.C. -- (EA170)	26-27
<b>Standard</b> Butt Contacts -- (EA170)	28-29
<b>Short Travel</b> Butt Contacts -- (EA170)	30-31
<b>Reverse Shaft</b> Butt Contacts -- (EA170)	32-33

# NOTES





## ROCKER TYPE SWITCHES

This series was designed by the Electrical Manufacturing Division of National Acme (Now NAMCO) to fill a need for limit switches offering a high degree of repeatability, life and reliability for use on machine tools. This series of limit switches still remains one of Namco's most popular lines. It has numerous applications on machine controls, conveyors, material-handling systems and valve controls.

*The quick make and break, positive latching mechanism coined the trade name, "Snap-Lock".*



**PAGE 42**



**PAGE 46**



## Design Features & Performance

Snap-Lock limit switches have separate enclosures within a single housing for the electrical contacts and terminals on one side and latch bars, rockers and other parts of the operating mechanism on the other side.

The snap-lock action ensures a quick-make and quick-break of contacts together with locking in either open or closed position.

These switches are heavy duty, machine tool type with isolated poles, double throw, butt type contacts. Enclosures are water, oil and dust tight and meet NEMA Type 1, 4, and 13 requirements.

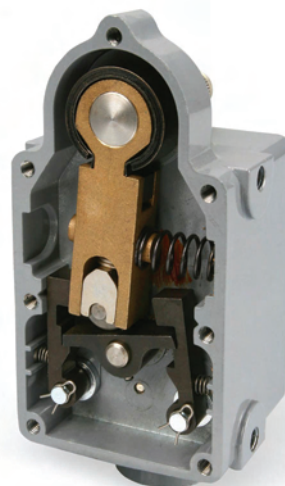
### Provide Separate Enclosures for Mechanical and Electrical Sides

#### Electrical Side



The electrical side, completely separated from the mechanical side, provides ample wiring space and readily accessible terminal screws in the molded contact blocks. The contact lever carries self-wiping silver-alloy contacts and is connected directly by a shaft to the latch bar on the mechanical side. Water and oil tight enclosures are assured by the use of proper gasket materials.

#### Mechanical Side



The contacts are positively maintained until the latch bar is disengaged by the return travel of the lever to reset the switch. The return spring serves to reset the switch automatically to its original position when the force on the operating lever is removed, but with spring removed the operating lever will remain in either position as actuated.



**Series EA080  
Standard**



**Series EA060  
Short Travel**



**Series EA040  
Neutral Position**

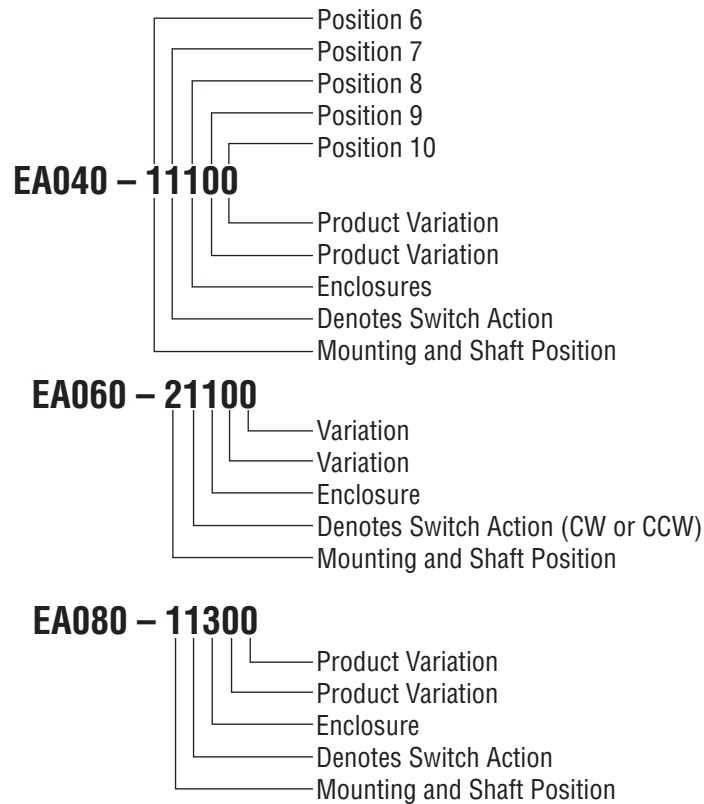
## Catalog Numbering System

### How to Read Part Numbers

Always order Switch and Operating Lever as SEPARATE ITEMS and use the Ordering Number listed. Refer to Series EL for Operating Levers.

EXAMPLE: To order a Standard Snap-Lock Switch and the operating lever considered as standard, use the catalog numbers as follows:

- 1 No. EA080-11100 Snap-Lock Switch
- 1 No. EL010-53420 Operating Lever Assembly



### Position 6

- |                          |                                  |
|--------------------------|----------------------------------|
| 1 Standard Front Shaft   | 7 Standard Front and Back Shafts |
| 2 Wide Front Shaft       | 8 Wide Front and Back Shafts     |
| 4 Standard Reverse Shaft | 0 Special                        |
| 5 Wide Reverse Shaft     |                                  |

### Position 7

- |       |                  |
|-------|------------------|
| 1 CW  | 3 Without Spring |
| 2 CCW | 9 Special        |

### Position 8

- |                                  |                                   |
|----------------------------------|-----------------------------------|
| 1 Standard Enclosure             | 5 Standard Housing, Plastic Cover |
| 2 Epoxy Sealed Switch with Cable | 6 Sealed Switch with Connector    |
| 3 Extreme Environment            | 9 Special                         |
| 4 Tandem                         |                                   |

### Position 9 & 10

Denotes Product Variation

*Note: The above chart is designed to help identify an existing model number. It is not intended to be used to select a model number.*

**ROCKER TYPE SWITCHES**  
**EA040/060/080**

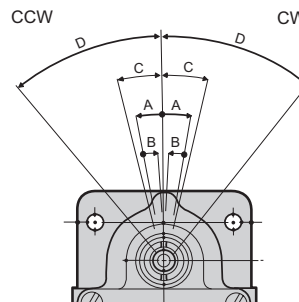
**SNAP-LOCK®**  
1 N.O. - 1 N.C.  
1-800-NAMTECH



Single pole, double break, double throw, heavy duty limit switch having mechanical travel of 10° to trip and with one normally open and one normally closed circuit.

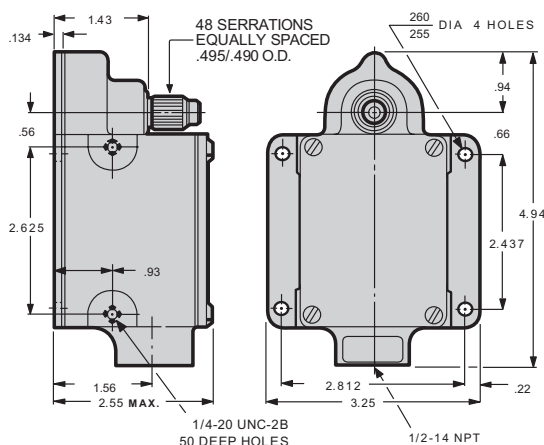
Can be furnished with standard and style 1 mountings.

## Operational Data

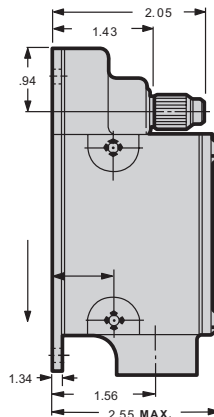


- A. Pre-Travel ..... 10°
- B. Differential Travel ..... 8°
- C. Recommended Travel ..... 13°
- D. Total Travel ..... 38°
- E. Max. Torque During Pre-Travel 14 Lb-In
- F. Max. Torque at Total Travel .... 38 Lb-In
- G. Weight: ..... Approx. 2.3 Lbs.

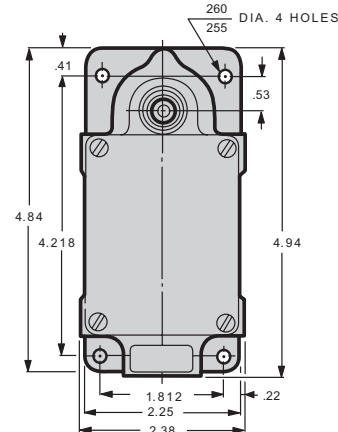
## Dimensions and Mounting



Wide Mounting Plate



Long Mounting Plate



ORDERING INFO		ORDERING NUMBERS	
TYPE MOUNTING	ROTATION CW	ROTATION CCW	MAINTAINED (WITHOUT RETURN SPRING)
LONG MOUNTING	EA080-11100	EA080-12100	EA080-13100
WIDE MOUNTING	EA080-21100	EA080-22100	EA080-23100

## Contact Configurations

FOR  
CCW  
SWITCH



FOR  
CW  
SWITCH



### Specifications

Heavy Duty, Machine Tool Type, Single Pole, Double Throw, Quick Make, Quick Break, Butt Type, NEMA Form "Z" Contacts.

Enclosure is Water, Oil and Dust Tight. Meets (NEMA) 1, 4, & 13 Requirements.

Torque Necessary for Operation of Switch 14 in. lb. (Without Return Spring, Item 25, 5 in. lb.)  
Ambient Temperature: -20°C to + 90°C

Continuous Current Rating - Amperes

Volts	AC	DC
125	20	5
250	15	1.5
480	10	
600	5	

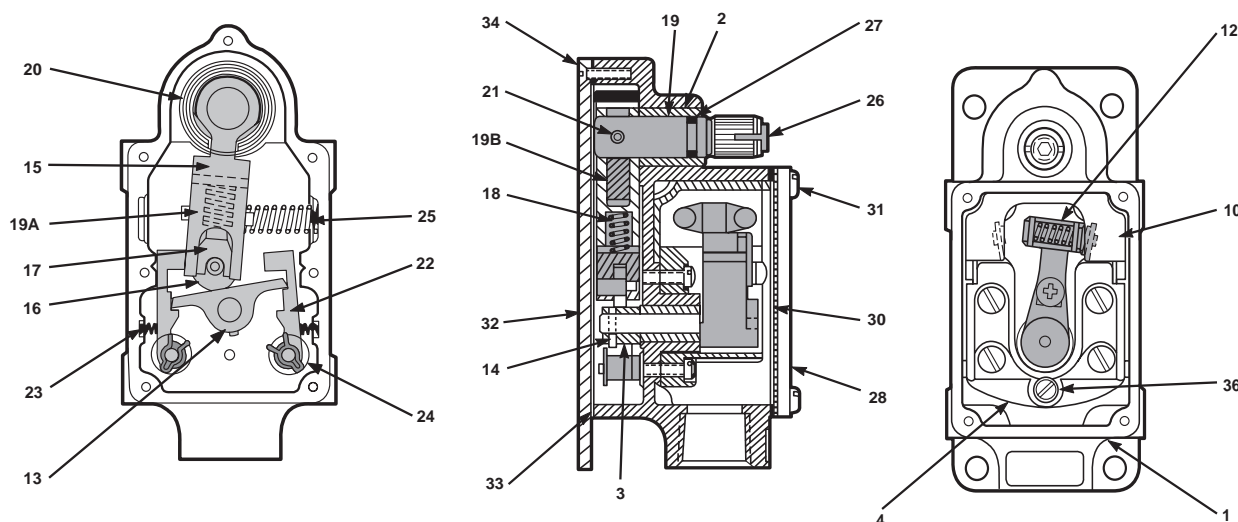
75-100% Power Factor

External Lever is Adjustable by 7°30' Increments thru 167°

FORM Z - A Form Z contact arrangement is one which has single-pole double-throw contacts with four terminals - two for normally open and two for normally closed. The function of this arrangement is to open one circuit and close the other. (NEMA Standard 11-12-1970).

For Hazardous Location Requirements, see EA880 Series.

### Parts List



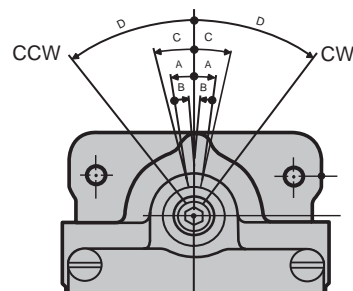
ITEM NO.	DESCRIPTION	QTY.	ITEM NO.	DESCRIPTION	QTY.
1	HOUSING ASSY.	1	21	ROLL PIN	1
2	BUSHING	1	22	LATCH	2
3	BUSHING	1	23	LATCH SPRING	2
4	CONTACT BLOCK	1	24	LATCH RETAINING RING	2
10	END INSULATOR	1	25	RETURN SPRING	1
12	CONTACT LEVER ASSY.	1	26	PIPE PLUG	1
13	ROCKER	1	27	"O" - RING	1
14	ROLL PIN	1	28	TOP COVER	1
15	LEVER SHAFT ASSY. (INCLUDES ITEMS 19, 19A, 19B, 20 & 21)	1	30	TOP COVER GASKET	1
16	ROLLER	1	31	TOP COVER SCREW	4
17	ROLLER SLIDE	1	32	BOTTOM COVER	1
18	ROLLER SLIDE SPRING	1	33	BOTTOM COVER GASKET	1
19	LEVER SHAFT	1	34	BOTTOM COVER SCREW	7
19A	LEVER	1	36	SCREW	2
19B	SPRING LEVER	1			
20	TORSION SPRING	1			





With mechanical travel of less than  $6\frac{1}{2}^{\circ}$  required to trip, this heavy duty limit switch operates with one normally open and one normally closed circuit.

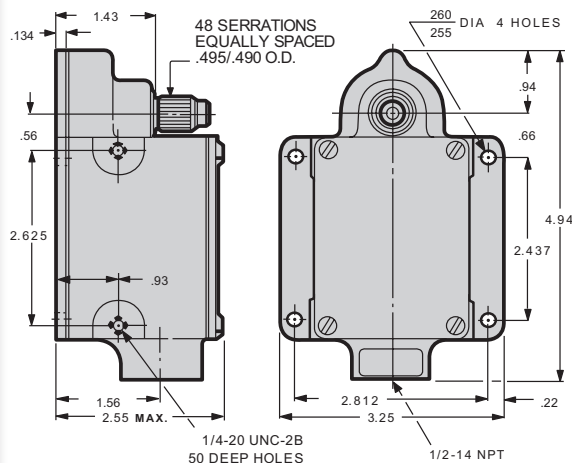
Can be furnished with standard and style 1 mountings.



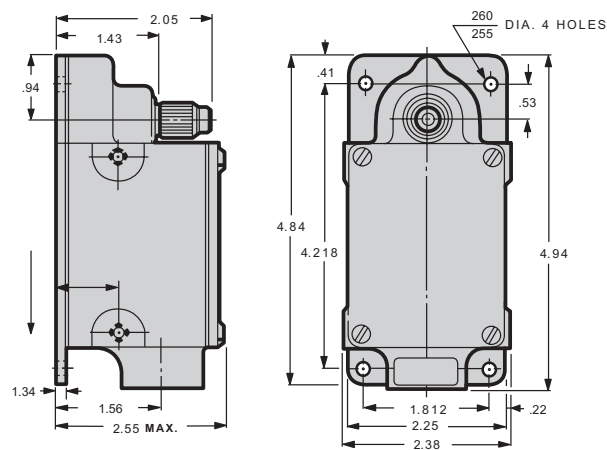
### Direction of Rotation

- A. Pre-Travel .....  $6^{\circ}30'$
- B. Differential Travel .....  $4^{\circ}$
- C. Recommended Travel .....  $7^{\circ}$
- D. Total Travel .....  $35^{\circ}$
- E. Max. Torque During Pre-Travel 24 Lb-In
- F. Max. Torque at Total Travel ..... 45 Lb-In
- G. Weight: Approx. .... 2.3 Lbs.

### Dimensions and Mounting



Wide Mounting Plate



Long Mounting Plate

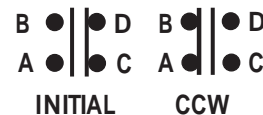
ORDERING INFO		ORDERING NUMBERS	
TYPE MOUNTING	ROTATION CW	ROTATION CCW	MAINTAINED (WITHOUT RETURN SPRING)
LONG MOUNTING	EA060-11100	EA060-12100	EA060-13100
WIDE MOUNTING	EA060-21100	EA060-22100	EA060-23100

### Contact Configurations

FOR  
CW  
SWITCH



FOR  
CCW  
SWITCH



### Specifications

Heavy Duty, Machine Tool Type, Single Pole, Double Throw, Quick Make, Quick Break, Butt Type, NEMA Form "Z" Contacts.

Enclosure is Water, Oil and Dust Tight. Meets (NEMA) 1, 4, & 13 Requirements.

Torque Necessary for Operation of Switch 24 in. lb. (Without Return Spring, Item 25, 12 in. lb.)

Ambient Temperature: -20°C to + 90°C

For Hazardous Location Requirements, see EA880 Series.

Continuous Current Rating - Amperes

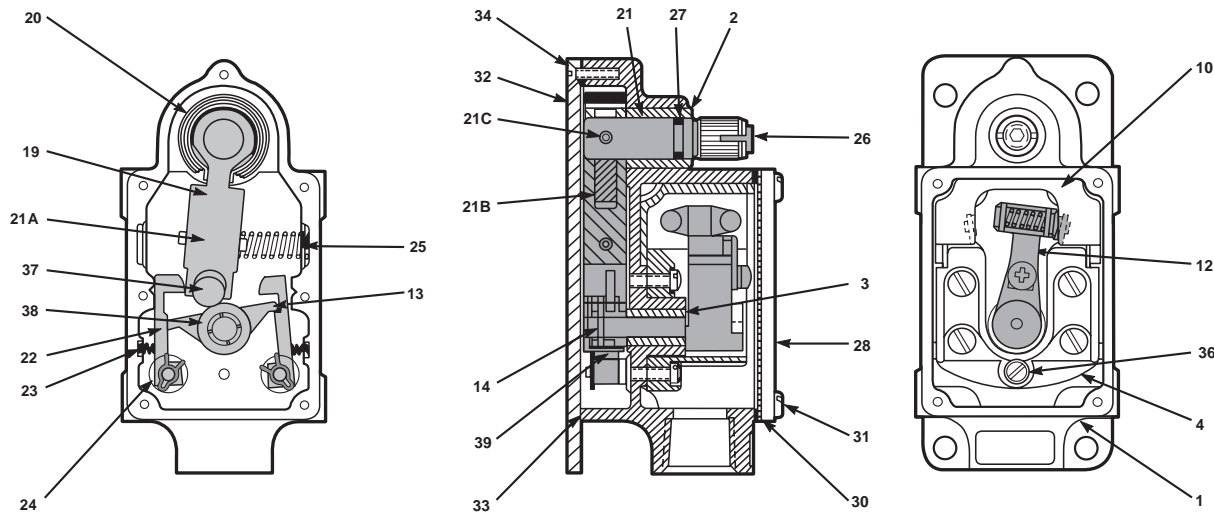
Volts	AC	DC
125	20	5
250	15	1.5
480	10	
600	5	

75-100% Power Factor

External Lever is Adjustable by 7°30' Increments thru 167°

FORM Z - A Form Z contact arrangement is one which has single-pole double-throw contacts with four terminals - two for normally open and two for normally closed. The function of this arrangement is to open one circuit and close the other. (NEMA Standard 11-12-1970).

### Parts List



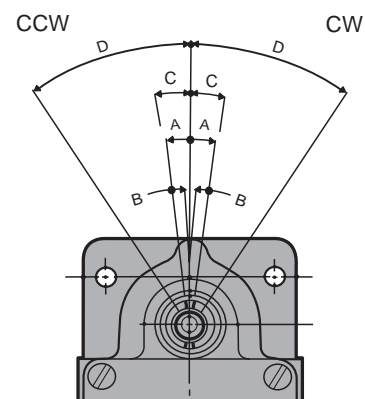
ITEM NO.	DESCRIPTION	QTY.	ITEM NO.	DESCRIPTION	QTY.
1	HOUSING ASSY.	1	24	LATCH RETAINING RING	2
2	BUSHING	1	25	RETURN SPRING	1
3	BUSHING	1	26	PIPE PLUG	1
4	CONTACT BLOCK	1	27	"O"-RING	1
10	END INSULATOR	1	28	TOP COVER	1
12	CONTACT LEVE ASSY.	1	30	TOP COVER GASKET	1
13	ROCKER ASSY.	1	31	TOP COVER SCREW	4
14	TAPER PIN	1	32	BOTTOM COVER	1
19	LEVER SHAFT ASSY. (INCLUDES ITEMS 20, 21, 21A, 21B & 21C)	1	33	BOTTOM COVER GASKET	1
20	TORSION SPRING	1	34	BOTTOM COVER SCREW	7
21	LEVER SHAFT	1	36	SCREW	2
21A	LEVER	1	37	FLOATING LEVER	1
21B	SPRING LEVER	1	38	WASHER	1
21C	ROLL PIN	1	39	TORSION SPRING	1
22	LATCH	2			
23	LATCH SPRING	2			



Designed for applications where a neutral position is essential in operation. This series provides the same snap locking action of the other series of SNAP-LOCK Switches.

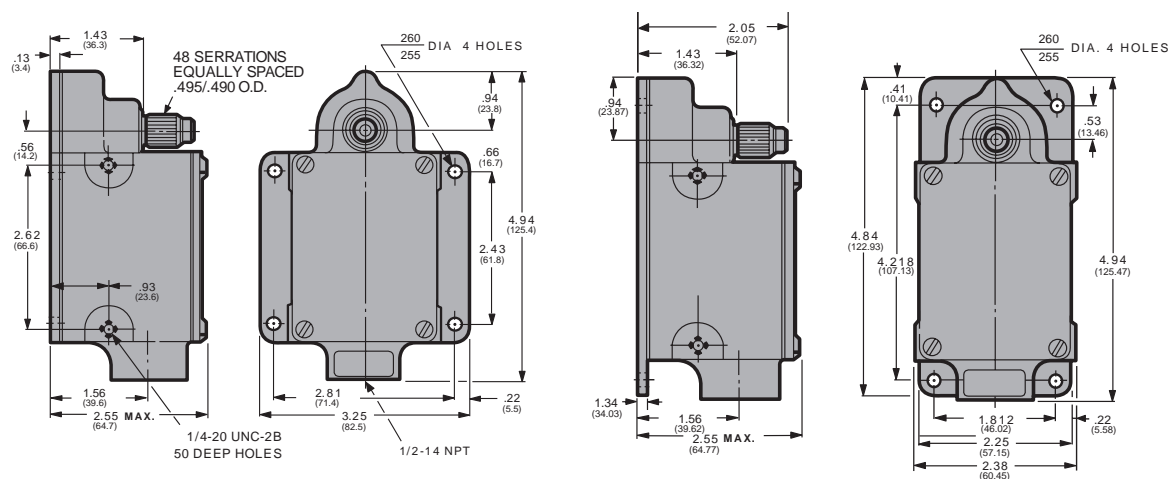
Can be furnished with standard and style 1 mountings.

## Operational Data



- A. Pre-Travel..... 7°
- B. Differential Travel ..... 6°
- C. Recommended Travel ..... 7°30'
- D. Total Travel ..... 33°
- E. Max. Torque During Pre-Travel 22 Lb-In
- F. Max. Torque at Total Travel ..... Lb-In
- G. Weight:..... Approx. 2.3 Lbs.

## Dimensions and Mounting



## Specifications

Heavy Duty, Machine Tool Type, Quick Make, Quick Break, Butt Type, Contacts (2 Normally Open)

Enclosure is Water, Oil and Dust Tight. Meets (NEMA) 1, 4, & 13 Requirements.

Torque Necessary for Operation of Switch  
22 in. lb.

Ambient Temperature: -20°C to + 90°C

For Hazardous Location Requirements, see EA880 Series.

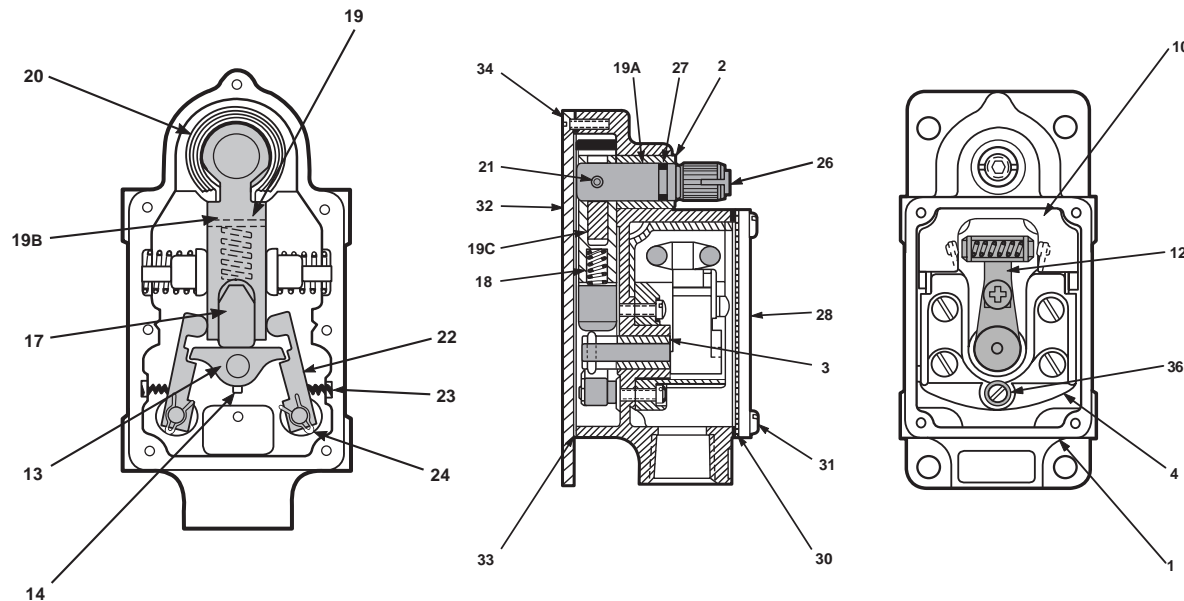
Continuous Current Rating - Amperes

Volts	AC	DC
125	20	5
250	15	1.5
480	10	
600	5	

75-100% Power Factor

External Lever is Adjustable by 7°-30°  
Increments thru 167°

## Parts List



ITEM NO.	DESCRIPTION	QTY.	ITEM NO.	DESCRIPTION	QTY.
1	HOUSING ASSY.	1	21	ROLL PIN	1
2	BUSHING	1	22	LATCH	2
3	BUSHING	1	23	LATCH SPRING	2
4	CONTACT BLOCK	1	24	LATCH RETAINING RING	2
10	END INSULATOR	1	26	PIPE PLUG	1
11	CONTACT LEVER ASSY.	1	27	"O"-RING	1
13	ROCKER	1	28	TOP COVER	1
14	ROLL PIN	1			
17	ROLL SLIDE	1			
18	ROLLER SLIDE SPRING	1	30	TOP COVER GASKET	1
19	LEVER SHAFT ASSY. (INCLUDES ITEMS 19A. 19B. 19C. 20 & 21)	1	31	TOP COVER SCREW	4
19A	LEVER SHAFT	1	32	BOTTOM COVER	1
19B	LEVER	1			
19C	SPRING LEVER	1	33	BOTTOM COVER GASKET	1
20	TORSION SPRING	1	34	BOTTOM COVER SCREW	7
			36	SCREW	2



## Design Features & Performance

Snap-Lock switches have separate enclosures within a single housing for the electrical contacts and terminals on one side and latches, rockers and other parts of the operating mechanism on the other.

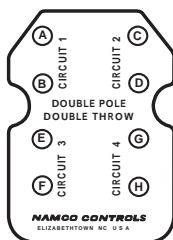
The patented snap-lock action guarantees a quick-make and quick-break of contacts together with locking in either open or closed position.

These tough switches are heavy duty, machine tool type with double pole, double throw, butt type contacts.

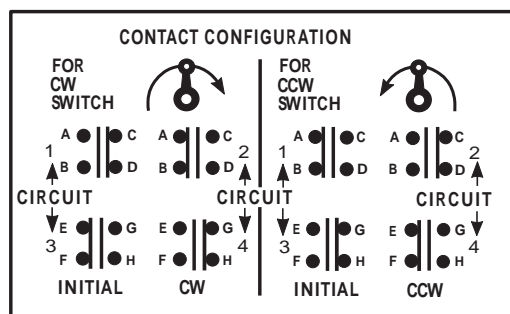
Enclosures are water, oil and dust tight and meet all NEMA Type 1, 4, and 13 requirements.

### Provide Separate Enclosures for Mechanical and Electrical Sides

#### Electrical side



#### Mechanical Side



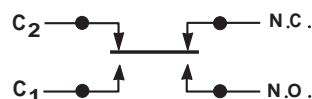
The electrical side, completely separated from the mechanical side, provides ample wiring space and readily accessible terminal screws in the molded contact blocks. The contact lever carries self-wiping silver-alloy contacts and is connected directly by a shaft to the latch bar on the mechanical side. Water, oil and dust-tight enclosures are guaranteed by the use of appropriate gasket materials.

The contacts are positively maintained until the latch is disengaged by the return travel of the lever to reset the switch. The return spring serves to reset the switch automatically to its original position when the force on the operating lever is removed, but with the spring removed the operating lever will remain in either position as actuated.

### FORM Z

A Form Z contact arrangement is one which has single-pole double-throw contacts with four terminals, two for normally open and two for normally closed. The function of this arrangement is to open one circuit and close the other as needed.

### NEMA Standard 11-12-1970





**Series EA170-11100**  
**Standard**



**Series EA170-14100**  
**Short Travel**



**Series EA170-41100**  
**Reverse Shaft**

## Catalog Numbering System

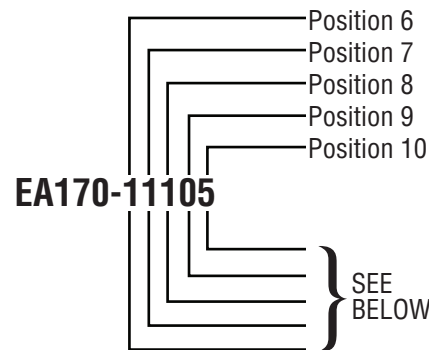
### How to Read Part Numbers

Please order Switch and Operating Lever as SEPARATE ITEMS ONLY and use the Ordering Number listed. Refer to Series EL for Operating Levers.

EXAMPLE: To order a Standard Snap-Lock Switch and the operating lever considered as standard, use the catalog numbers as follows:

- 1 No. EA080-11100 Snap-Lock Switch
- 1 No. EL010-53420 Operating Lever Assembly

### EA170 Series Basic Switch



#### Position 6

- 1 Standard Mounting, Front Shaft
- 2 Wide Mounting, Front Shaft
- 3 Long Mounting, Front Shaft
- 4 Standard Mounting, Reverse Shaft
- 5 Wide Mounting, Reverse Shaft
- 6 Long Mounting, Reverse Shaft
- 7 Standard Mounting, Front and Back Shafts
- 8 Wide Mounting, Front and Back Shafts
- 9 Long Mounting, Front and Back Shaft
- 0 Special

#### Position 7

- |                              |                               |
|------------------------------|-------------------------------|
| 1 CW, Standard Travel        | 5 CCW Spring and Short Travel |
| 2 CCW, Standard Travel       | 6 w/o Spring – Short Travel   |
| 3 w/o Spring Standard Travel | 7 Neutral Position            |
| 4 CW Spring and Short Travel | 9 Special                     |

#### Position 8

- |                       |                                   |
|-----------------------|-----------------------------------|
| 1 Standard            | 4 Tandem                          |
| 2 Epoxy Sealed Switch | 5 Standard Housing, Plastic cover |
| 3 Extreme Environment | 9 Special                         |

#### Position 9 & 10

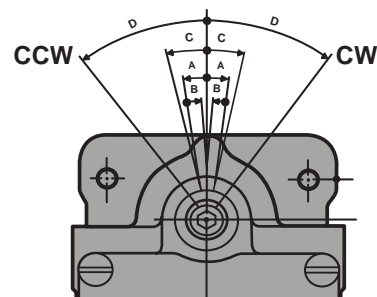
Denotes Product Variation

*Note: The above chart is designed to help identify an existing model number. It is not intended to be used to select a model number.*



Double pole, double break, double throw, heavy duty limit switch having mechanical travel of 10° to trip and with two normally open and two normally closed circuit.

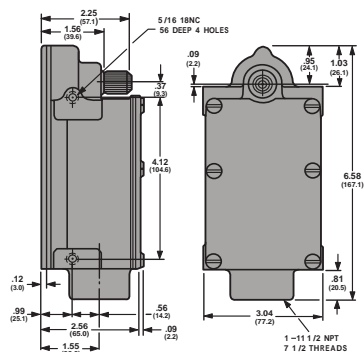
*Can be supplied with standard, wide or long mounting.*



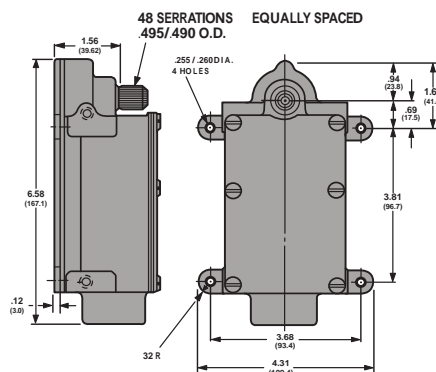
### Direction of Rotation

- A. Trip Travel ..... 10°
- B. Reset Travel ..... 8°
- C. Recommended Travel ..... 13°
- D. Total Travel ..... 37°
- E. Torque to Trip (Inch Lbs.) ..... 23°
- F. Weight: Approx. .... 3.5 Lbs.

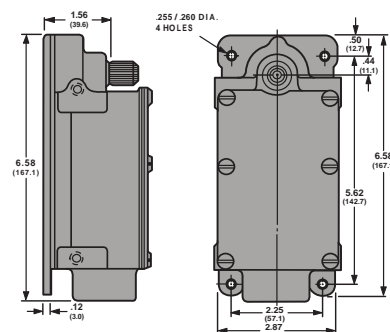
### Dimensions and Mounting



**Standard Mounting**



**Wide Mounting**

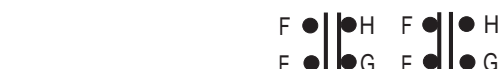


**Long Mounting**

*All dimensions given in US & Metric: Inches (mm)*

ORDERING INFO	ORDERING NUMBERS		
TYPE MOUNTING	ROTATION CW	ROTATION CCW	MAINTAINED (WITHOUT RETURN SPRING)
STANDARD MOUNTING	EA170-11100	EA170-12100	EA170-13100
WIDE MOUNTING	EA170-21100	EA170-22100	EA170-23100
LONG MOUNTING	EA170-31100	EA170-32100	EA170-33100

### Contact Configurations



FOR  
CW  
SWITCH



FOR  
CCW  
SWITCH



### Specifications

Heavy Duty, Machine Tool Type, Double Pole, Double Throw, Quick Make, Quick Break, Butt Type, NEMA Form "Z" Contacts.

Enclosure is Water, Oil and Dust Tight. Meets (NEMA) 1, 4, & 13 Requirements.

Torque Necessary for Operation of Switch 23 in. lb. (Without Return Spring, Item 23, 10 in. lb.)

Ambient Temperature: -20°C to + 90°C

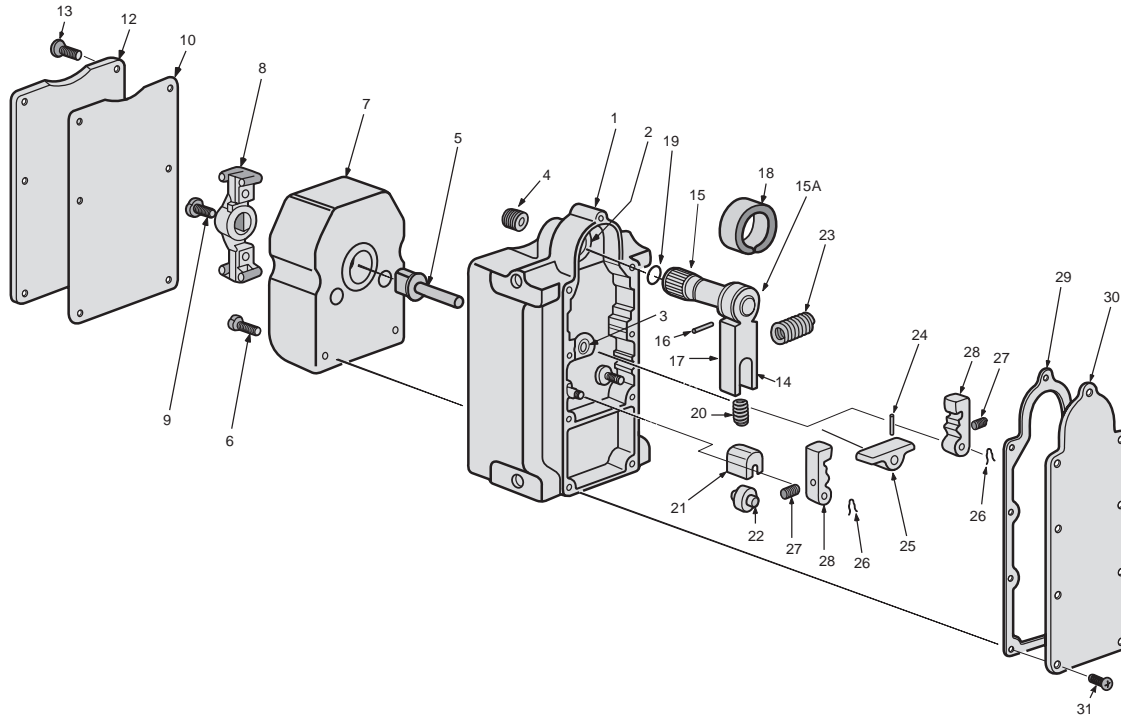
Continuous Current Rating - Amperes

75-100% Power Factor

External Lever is Adjustable by 7°30' Increments thru 167°

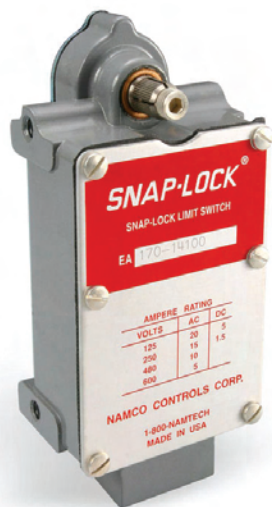
Volts	AC	DC
125	20	5
250	15	1.5
480	10	
600	5	

### Parts List



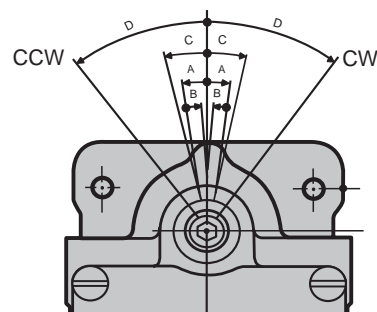
ITEM NO.	DESCRIPTION	QTY.	ITEM NO.	DESCRIPTION	QTY.
1	HOUSING ASSY.	1	17	LEVER (ONLY)	1
2	BUSHING	1	18	TORSION SPRING	1
3	BUSHING	1	19	"O"-RING	1
4	PIPE PLUG	1	20	SPRING	1
5	CONTACT LEVER SHAFT	1	21	ROLLER SLIDE	1
6	CONTACT BLOCK SCREW	4	22	ROLLER	1
7	CONTACT BLOCK ASSEMBLY	1	23	RETURN SPRING	1
8	LEVER	1	24	ROLL PIN	1
9	SEMS SCREW	1	25	ROCKER	1
10	TOP COVER GASKET	1	26	RETAINING CLIP	2
12	TOP COVER	1	27	LATCH SPRING	2
13	TOP COVER SCREW	6	28	LATCH	2
14	LEVER SHAFT ASSY. (INCLUDES ITEMS 15, 15A, 16, 17 & 18)	1	29	BOTTOM COVER GASKET	1
15	SHAFT	1	30	BOTTOM COVER	1
15A	SPRING LEVER	1			
16	ROLL PIN	1	31	BOTTOM COVER SCREW	9





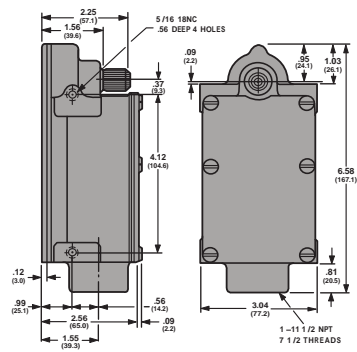
This heavy duty limit switch operates with two normally open and two normally closed circuits, with mechanical travel of less than 6½° required to trip.

Can be supplied with with standard, wide or long mounting as required.

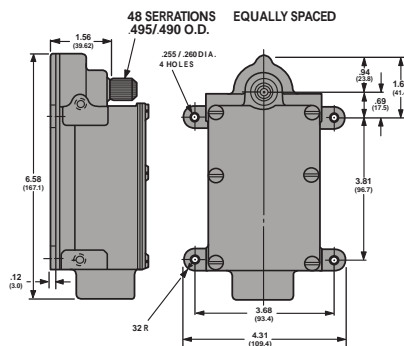


- A. Pre-Travel ..... 6°30"  
B. Differential Travel ..... 4°  
C. Recommended Travel ..... 7°  
D. Total Travel ..... 36°  
E. Max. Torque During Pre-Travel 32 Lb-In  
F. Max. Torque at Total Travel .... 45 Lb-In  
G. Weight: Approx. .... 3.5 Lbs.

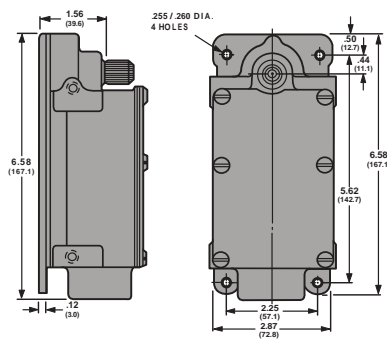
## Dimensions and Mounting



## Standard Mounting



## Wide Mounting



## Long Mounting

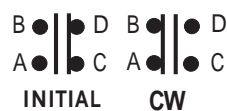
*All dimensions given in US & Metric: Inches (mm)*

ORDERING INFO	ORDERING NUMBERS		
TYPE MOUNTING	ROTATION CW	ROTATION CCW	MAINTAINED (WITHOUT RETURN SPRING)
STANDARD MOUNTING	EA170-14100	EA170-15100	EA170-16100
WIDE MOUNTING	EA170-24100	EA170-25100	EA170-26100
LONG MOUNTING	EA170-34100	EA170-35100	EA170-36100

## Contact Configurations



FOR  
CW  
SWITCH



FOR  
CCW  
SWITCH



### Specifications

Heavy Duty, Machine Tool Type, Double Pole, Double Throw, Quick Make, Quick Break, Butt Type, NEMA Form "Z" Contacts.

Enclosure is Water, Oil and Dust Tight. Meets (NEMA) 1, 4, & 13 Requirements.

Torque Necessary for Operation of Switch 32 in. lb. (Without Return Spring, Item 23, 10.5 in lb.)

Ambient Temperature: -20°C to + 90°C

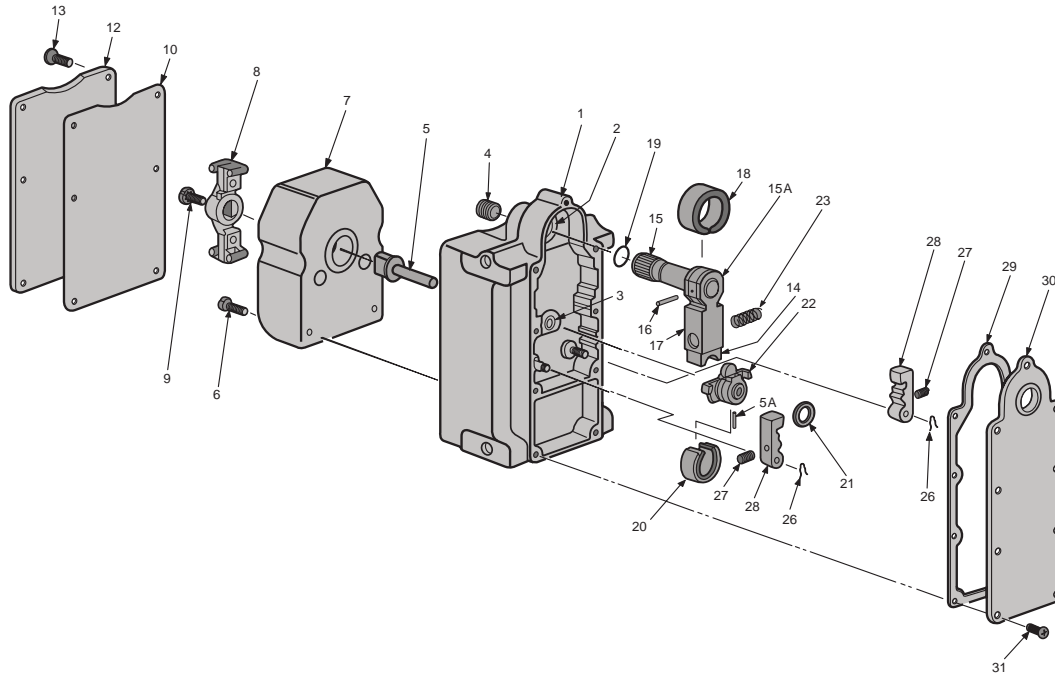
Continuous Current Rating - Amperes

75-100% Power Factor

External Lever is Adjustable by 7°30' Increments thru 167°

Volts	AC	DC
125	20	5
250	15	1.5
480	10	
600	5	

### Parts List

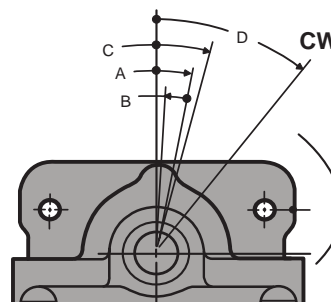


ITEM NO.	DESCRIPTION	QTY.	ITEM NO.	DESCRIPTION	QTY.
1	HOUSING ASSY.	1	16	ROLL PIN	1
2	BUSHING	1	17	LEVER	1
3	BUSHING	1	18	TORSION SPRING	1
4	PIPE PLUG	1	19	"O"-RING	1
5	CONTACT LEVER SHAFT	1	20	TORSION SPRING	1
5A	ROLL PIN	1	21	WASHER	1
6	CONTACT BLOCK SCREW	4	22	ROCKER & FLOATING LEVER ASSEMBLY	1
7	CONTACT BLOCK ASSEMBLY	1	23	RETURN SPRING	1
8	LEVER ASSEMBLY	1	26	REATAINING CLIP	2
9	SEMS SCREW	1	27	LATCH SPRING	2
10	TOP COVER GASKET	1	28	LATCH	2
12	TOP COVER	1	29	BOTTOM COVER GASKET	1
13	TOP COVER SCREW	6	30	BOTTOM COVER	1
14	LEVER SHAFT ASSY.	1			
15	LEVER SHAFT	1			
15A	SPRING LEVER	1	31	BOTTOM COVER SCREW	



Designed for applications where a reverse shaft is essential in operation. This series provides the same snap locking action of the other series of SNAP-LOCK Switches.

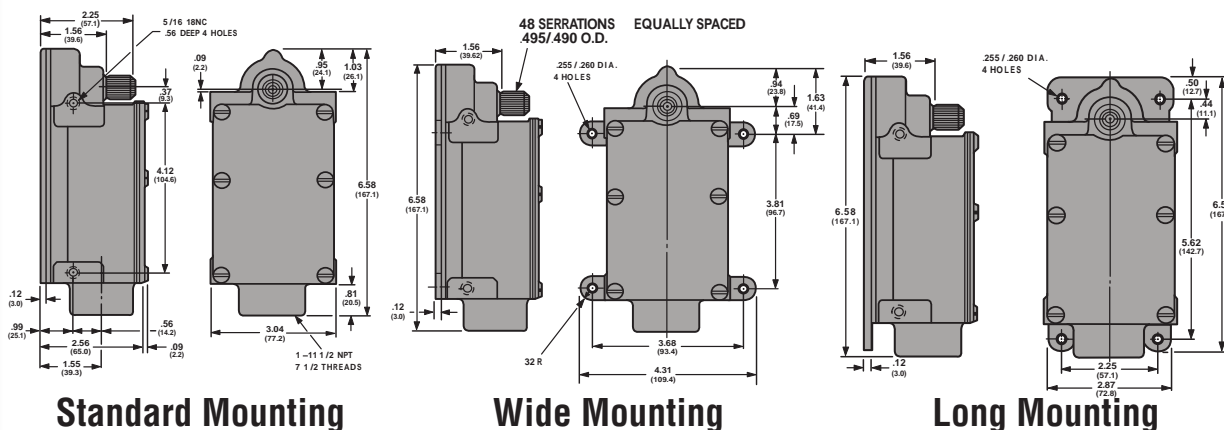
Can be supplied with standard, wide or long mounting.



(CW Operation Shown)  
Viewed From Top Cover  
Direction of Rotation

- A. Trip Travel ..... 10°
- B. Reset Travel ..... 8°
- C. Recommended Travel ..... 13°
- D. Total Travel ..... 37°
- E. Weight:..... Approx. 3.5 Lbs.

## Dimensions and Mounting



All dimensions given in US & Metric: Inches (mm)

ORDERING INFO	ORDERING NUMBERS		
TYPE MOUNTING	ROTATION CW	ROTATION CCW	MAINTAINED (WITHOUT RETURN SPRING)
STANDARD MOUNTING	EA170-41100	EA170-42100	EA170-43100
WIDE MOUNTING	EA170-51100	EA170-52100	EA170-53100
LONG MOUNTING	EA170-61100	EA170-62100	EA17063100

## Contact Configurations



FOR  
CW  
SWITCH



FOR  
CCW  
SWITCH



### Specifications

Heavy Duty, Machine Tool Type, Double Pole, Double Throw, Quick Make, Quick Break, Butt Type, NEMA Form "Z" Contacts.

Enclosure is Water, Oil and Dust Tight. Meets (NEMA) 1, 4, & 13 Requirements.

Torque Necessary for Operation of Switch 30 in. lb. (Without Return Spring, Item 23, 10 in lb.)

Ambient Temperature: -20°C to + 90°C

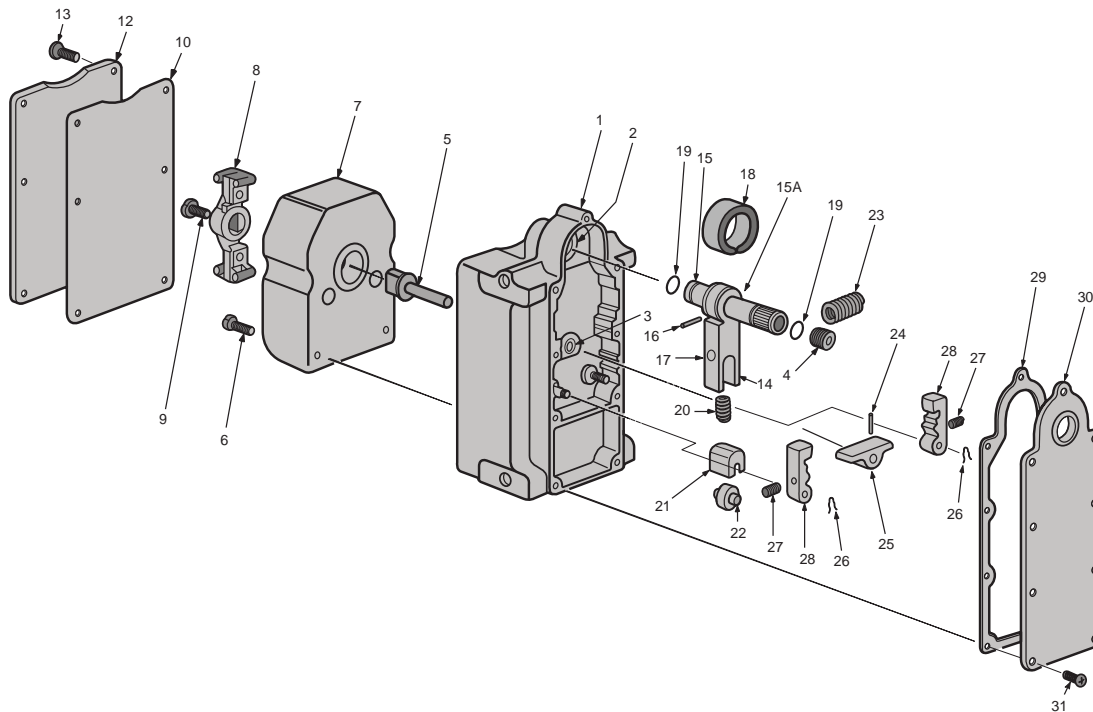
Continuous Current Rating - Amperes

75-100% Power Factor

External Lever is Adjustable by 7°30' Increments thru 360°

Volts	AC	DC
125	20	5
250	15	1.5
480	10	
600	5	

### Parts List



ITEM NO.	DESCRIPTION	QTY.	ITEM NO.	DESCRIPTION	QTY.
1	HOUSING ASSY.	1	17	LEVER (ONLY)	1
2	BUSHING	1	18	TORSION SPRING	1
3	BUSHING	1	19	"O"-RING	1
4	PIPE PLUG	1	20	SPRING	1
5	CONTACT LEVER SHAFT	1	21	ROLLER SLIDE	1
6	CONTACT BLOCK SCREW	4	22	ROLLER	1
7	CONTACT BLOCK ASSEMBLY	1	23	RETURN SPRING	1
8	LEVER	1	24	ROLL PIN	1
9	SEMS SCREW	1	25	ROCKER	1
10	TOP COVER GASKET	1	26	RETAINING CLIP	2
12	TOP COVER	1	27	LATCH SPRING	2
13	TOP COVER SCREW	6	28	LATCH	2
14	LEVER SHAFT ASSY. (INCLUDES ITEMS 15, 15A, 16, 17 & 18)	1	29	BOTTOM COVER GASKET	1
15	SHAFT	1	30	BOTTOM COVER	1
15A	SPRING LEVER	1			
16	ROLL PIN	1	31	BOTTOM COVER SCREW	9



## CAM OPERATED REFERENCE PAGES

<b>Design Features — Cam Type</b>	36-37
1 N.O. - 1 N.C. -- (EA700/EA800)	
2 N.O. - 2 N.C.	
3 N.O. - 3 N.C.	
<b>Specifications/Mountings/Dimensions/Cams</b> (EA700)	38-39
<b>Standard</b>	40-41
1 N.O. - 1 N.C.	
Butt Contacts -- (EA700)	
<b>Maintained</b>	42
1 N.O. - 1 N.C.	
Butt Contacts -- (EA700)	
<b>Neutral</b>	43
1 N.O. - 1 N.C.	
Butt Contacts -- (EA700)	
<b>Standard</b>	44-45
2 N.O. - 2 N.C.	
Butt Contacts -- (EA700)	
<b>Maintained</b>	46
2 N.O. - 2 N.C.	
Butt Contacts -- (EA700)	
<b>Neutral</b>	47
2 N.O. - 2 N.C.	
Butt Contacts -- (EA700)	
<b>Standard</b>	48-49
3 N.O. - 3 N.C.	
Butt Contacts -- (EA700)	
<b>Multi-Station -- 2/4 Unit</b>	50-51
2 N.O. - 2 N.C.	
Butt Contacts -- (EA760)	

## NOTES





## CAM OPERATED SWITCHES

Snap-Lock Limit Switches have long set the standard in the industry. Whatever the required size or type, we have what you need. With decades of industry experience behind us, Snap-Lock Switches have been designed to meet virtually every conceivable condition of installation. Our switches provide enduring, dependable "machine-life" service even while operating under the most demanding conditions and will still deliver millions of consistently fast, accurate contacts.



**PAGE 40**



**PAGE 44**



## Design Features &amp; Performance

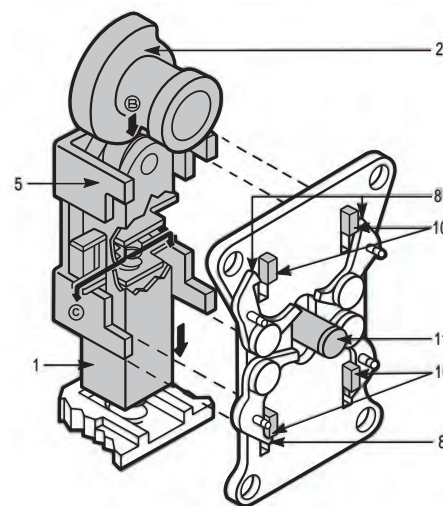


3 N.O. - 3 N.C.

2 N.O. - 2 N.C.

1 N.O. - 1 N.C.

**WIDE RANGE OF OPERATION**  
**MODULAR CONSTRUCTION**  
**PRACTICAL FLEXIBILITY**

**Snap-Lock Mechanism**

- |                       |                         |
|-----------------------|-------------------------|
| 1. Cam Follower       | 8. Latches              |
| 2. Cam                | 9. Latch Plate          |
| 3. Return Spring      | 10. Ears, Shuttle       |
| 4. Fixed Base         | 11. Operating Pin       |
| 5. Shuttle            | 12. Movable Contacts    |
| 6. Floating Arms      | 13. Stationary Contacts |
| 7. Compression Spring | 14. Contact Block       |
|                       | 15. Contact Spring      |

Snap-Lock Limit Switches set the bar in the industry and are the best choice when it comes to today's tough requirements; regardless of size of type, we have the ideal Model to fit your need.

Snap-Lock Switches have been designed to meet virtually every conceivable condition of installation. These switches provide enduring, dependable "machine-life" service even while operating under the most harsh and demanding conditions while still delivering millions of consistently fast, accurate contacts.

**Here are just few of the exceptional features built into each switch for maximum performance:**

- Generous overtravel and by-pass.
- Flexibility of motion; clockwise and counter-clockwise
- Light operating torque.
- Fast contact action.
- Form Z contact arrangement.

**Options Available**

- Precious metal contacts for optimal performance.
- High temperature (20°C to +180°C) components and lubricants with aluminum housing.
- Low temperature (-40°C to +90°C) components and lubricants.

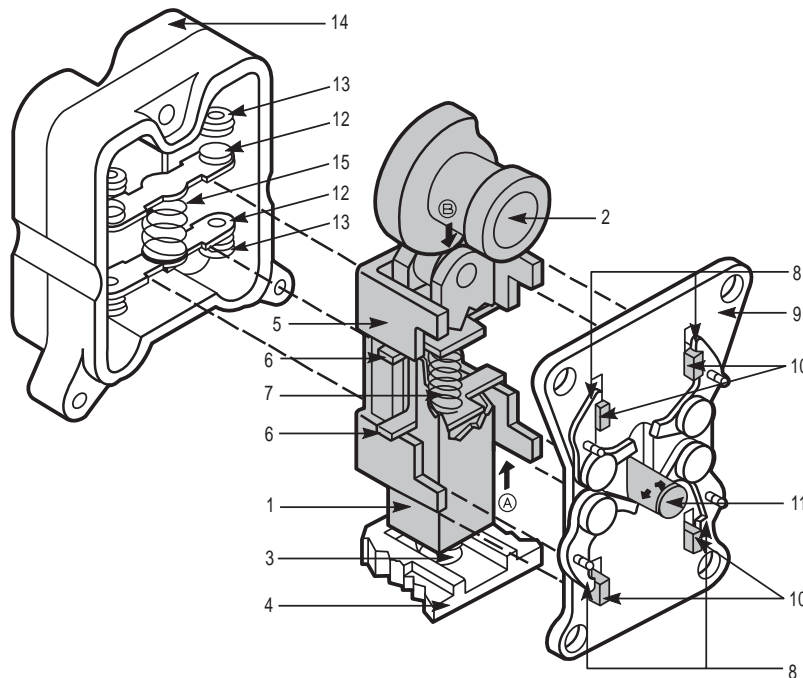
The Snap-Lock Mechanism is responsible for quickly and positively snapping the contacts open and closed and then locking them in either position. Here's how it works:

As the lever arm is moved the Cam (2) starts to rotate, this causes the cam follower to move in direction B. The Shuttle (5) is locked in place by Latches (8) which are engaged with the lower fingers (10) of the shuttle. This in turn causes the Floating Arm (6) to compress Spring (7) with resultant force in direction C. Operating Pin (11), an integral part of Cam Follower (1), moves downward as the cam continues to rotate; first releasing the upper Latches (8), they remain open and resting against the shuttle fingers, secondly the Operating Pin engages the lower latches. At a predetermined point the latches are forced open and disengage the shuttle fingers. At this point force C goes into action and snaps Shuttle (5) to the down position, contact transfer now takes place.

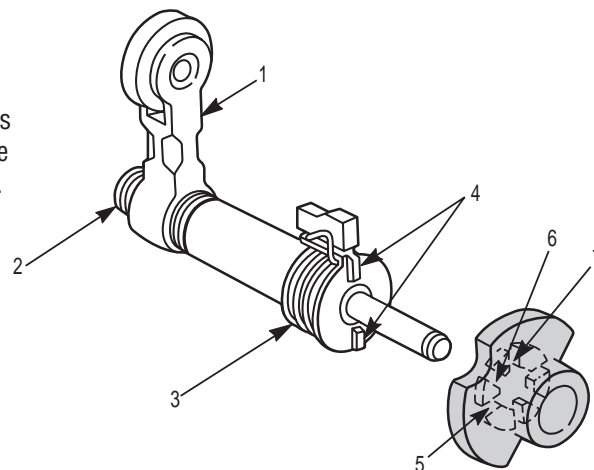
The Cam Follower is at the extreme end of its travel, Return Spring (3) has been compressed with resulting force in direction A. The Cam Follower is held in this position by the cam rise. Shuttle (5) is locked into position by the upper Latches (8).

To put the positive Snap-Lock mechanism into use in our switch, we added a pair of movable contact carriers (12) and two pairs of Stationary Contacts (13). The movable contact carriers are connected to the Shuttle (5) by means of a molded plastic carrier (not shown here). As a result, the movable contact carriers are moved from one set of stationary contacts to the other as the shuttle moves. The movable contact carriers are free to "float" and "self-align" with the Stationary Contacts for positive wiping action. The Stationary Contacts (13) are an integral part of the molded plastic Contact Block (14).

In the sketch the lower contacts are closed a little before the Shuttle (5) reaches the locked position and are held firmly together by the Contact Spring (15). When the lever arm allows the cam to return to its original position force A takes over and the process is simply reversed with the lower contacts being snapped "open" and the upper contacts then snapped "closed" and positively locked.



In most cases these switches are operated by some type of auxiliary lever (1). Namco Controls supplies a series of these (please see Product Information Sheets Series EL). Most Namco Controls supplied levers have serrated holes that match the switch operating shafts. The levers are locked in place by simply turning in the screw (2) in the end of the switch operating shaft with an Allen wrench. (3/16") When the switch is operated by a force against the lever, clockwise or counterclockwise return torque is supplied by the self-contained torsion spring (3). This motion is transmitted to the cam by two clutch projections (4) that engage the cam slots (either 5, 6 or 7).



1 N.O. - 1 N.C./2 N.O. - 2 N.C./3 N.O. - 3 N.C.

**SNAP-LOCK®**

1-800-NAMTECH

## Specifications

1. Enclosure is water, oil and dust tight.
2. Enclosure meets NEMA Type 1, 4 and 13 requirements.
3. Contacts made of silver alloy. Contact shifting mechanism is locked in position by the latches until switch lever is actuated.
4. Standard Temperature Range: -20°C to +90°C
5. Operating lever is adjustable to any required position.
6. Operating Lever Angles (travel either clockwise or counterclockwise) maximum degrees of trip travel, reset travel, as well as total lever travel, are determined by the cam selected.
7. Operating Torques - Trip Torque varies from 15 to 33 in. lbs. depending on switch size and cam
8. Underwriters' Laboratories, Inc. Recognized. File No. E12967. (Except neutral position module)
9. Current Ratings:

## Voltage

125V-A.C.	20.0 Amps*
250V-A.C.	15.0 Amps*
480V-A.C.	10.0 Amps*
600V-A.C.	5.0 Amps*
125V-D.C.	5.0 Amps*
250V-D.C.	1.5 Amps*

## For Neutral Position Only

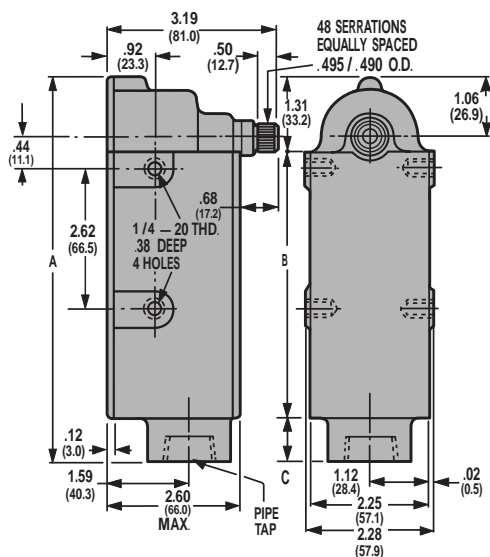
10.0 Amps*
7.5 Amps*
5.0 Amps*
2.5 Amps*
2.5 Amps*
.75 Amps*

\*75-100% Power Factor

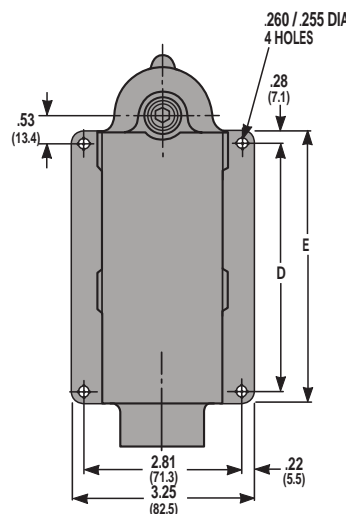
For Marine or Off-Shore Requirements, See EA780, EA790 Series, Pages 56 through 59.  
For Hazardous Location Requirements, See EA800 Series, Pages 60 through 61.

## Dimensions and Mounting

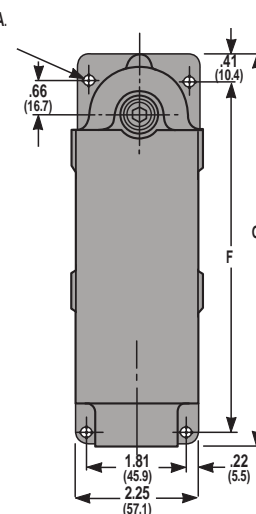
Series EA700 Snap-Lock Limit Switches are carefully designed for flexibility in mounting arrangements. Basic design permits mounting for either side or back. Shown here are the (1) STANDARD for side mounting; (2) WIDE for back mounting; (3) LONG for back mounting.



Standard Mounting



Wide Mounting



Long Mounting

All dimensions given in US &amp; Metric: Inches (mm)

CONTACT SEQUENCE	STANDARD SWITCH				MOUNTING STYLE			
	PIPE TAP SIZE	A	B	C	WIDE		LONG	
					D	E	F	G
1 N.O. - 1 N.C.	1/2-14 NPT	4.94	3	0.62	2.44	3	4.22	4.84
2 N.O. - 2 N.C.	1-11 1/2 NPT	7.06	4.94	0.81	4.38	4.94	6.41	7.06
3 N.O. - 3 N.C.	1-11 1/2 NPT	9.62	7.5	0.81	6.94	7.5	8.97	9.62

## Cams Unlimited...Operating Sequence Unlimited

The versatility of the Snap-Lock mechanism is achieved with the use of a series of uniquely designed cams. A standard EA700 series switch, supplied with a combination B1/B2 cam.

Namco Controls offers a wide variety of cams which can be used in all EA700 series switches.

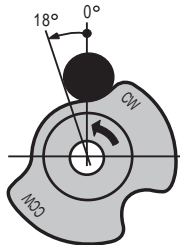
### Typical Cams

#### Combination B1/B2 CAM

The following three operating sequences are built into the combination cam used in the standard EA700 switches; B1 Single Action CW, B1 Single Action CCW and B2 Double Action CW & CCW.

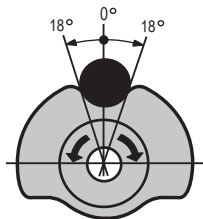
1. The contacts function when the lever is operated clockwise. The lever can be operated counterclockwise but the contacts will not operate.
2. The contacts function when the lever is operated counterclockwise. The lever can be operated clockwise but the contacts will not operate.
3. The contacts function when the lever is operated clockwise or counterclockwise.

#### B1 Single Action



Normally open to make (normally closed to break) IN ONE DIRECTION ONLY. Lever and cam are spring returned to starting position. Used on Single Action Switches only.

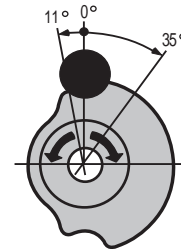
#### B2 Double Action



Normally open to make (normally closed to break) IN EITHER DIRECTION. Lever and cam are spring returned to starting position.

#### Neutral Position N Cam

The neutral position cam is designed for applications requiring a neutral position in the contact arrangement. Both the operating lever and cam are spring returned to starting position. The maximum lever travel in either direction is 90°.



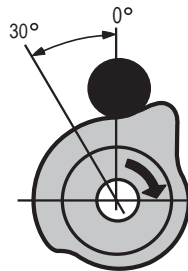
This is the contact action of neutral switches:

- As the lever is moved clockwise the lower contact transfers. As the lever is spring returned to starting position the lower contact is returned to its original position.
- As the lever is moved counterclockwise from starting position the upper contact transfers. As the lever is spring returned to starting position the upper contact returns.

#### Maintained Position Cam

Maintained Switches are available for applications that require maintained contacts and are available with two contact operations:

1. When the lever is moved clockwise the normally open contacts close and the normally closed contacts open. The lever is maintained in tripped position. As the lever is activated counterclockwise to starting position, normally open contacts open and normally closed contacts close.
2. When the lever is moved clockwise the normally open contacts close and the normally closed contacts open. This contact arrangement is maintained as the lever is spring returned to starting position and until the lever is moved counterclockwise when the normally open contacts open and the normally closed contacts close.







1 N.O. - 1 N.C.

## Specifications

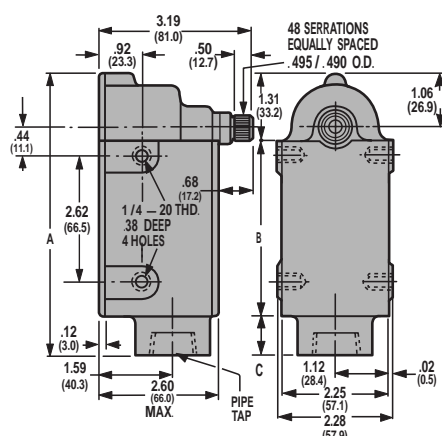
1. Enclosure is water, oil and dust tight.
2. Enclosure meets NEMA Type 1, 4 and 13 requirements.
3. Contacts made of silver alloy. Contact shifting mechanism is locked in position by the latches until switch lever is actuated.
4. Standard Temperature Range:  $-20^{\circ}\text{C}$  to  $+90^{\circ}\text{C}$
5. Operating lever is adjustable to any required position.
6. Operating Lever Angles (travel either clockwise or counterclockwise) maximum degrees of trip travel, reset travel, as well as total lever travel, are determined by the cam selected.
7. Operating Torques - Trip Torque varies from 15 to 33 in. lbs. depending on switch size and cam selected.
8. Current Ratings:

Voltage	For Neutral Position Only	
125V-A.C.	20.0 Amps*	10.0 Amps*
250V-A.C.	15.0 Amps*	7.5 Amps*
480V-A.C.	10.0 Amps*	5.0 Amps*
600V-A.C.	5.0 Amps*	2.5 Amps*
125V-D.C.	5.0 Amps*	2.5 Amps*
250V-D.C.	1.5 Amps*	.75 Amps*

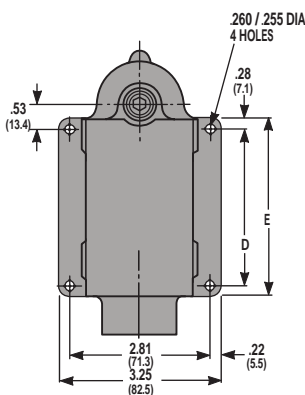
\*75-100% Power Factor

## Dimensions and Mounting

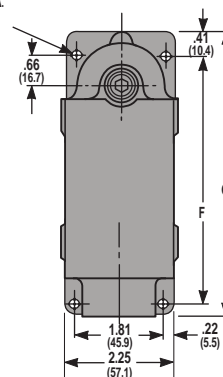
Series EA700 Snap-Lock Limit Switches are specifically designed for flexibility in mounting arrangements. Basic design permits mounting for either side or back. Shown here are the (1) STANDARD for side mounting; (2) WIDE for back mounting; (3) LONG for back mounting.



Standard Mounting



Wide Mounting



Long Mounting

All dimensions given in US &amp; Metric: Inches (mm)

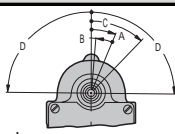

CONTACT SEQUENCE	STANDARD SWITCH				MOUNTING STYLE			
	PIPE TAP SIZE	A	B	C	WIDE		LONG	
					D	E	F	G
1 N.O. - 1 N.C.	1/2-14 NPT	4.94	3	0.62	2.44	3	4.22	4.84

## Standard Switches

## ORDERING INFORMATION

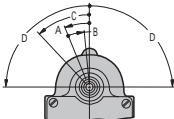



**CW OPERATION ONLY (Combination B-1/B-2 Cam)**

Contacts transfer when lever is operated CW. Lever can be operated CCW but contacts will not transfer.

CATALOG NUMBERS			OPERATIONAL DATA		
MOUNTING (see opposite page)					
STANDARD	WIDE	LONG			
EA700-10000	EA700-40000	EA700-70000			
CONTACTS		CIRCUITS		A. Trip Travel ..... 18° B. Reset Travel ..... 14° C. Recommended Travel ..... 30° D. Total Travel Available..... 90° Torque (Inch Lbs.) 1 N.O. - 1 N.C. .... 15	
1 N.O. 1 N.C.					

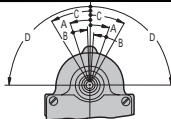

**CCW OPERATION ONLY (Combination B-1/B-2 Cam)**

Contacts transfer when lever is operated CCW. Lever can be operated CW but contacts will not transfer.

CATALOG NUMBERS			OPERATIONAL DATA		
MOUNTING (see opposite page)					
STANDARD	WIDE	LONG			
EA700-10001	EA700-40001	EA700-70001			
CONTACTS		CIRCUITS		A. Trip Travel ..... 18° B. Reset Travel ..... 14° C. Recommended Travel ..... 30° D. Total Travel Available..... 90° Torque (Inch Lbs.) 1 N.O. - 1 N.C. .... 15	
1 N.O. 1 N.C.		<div><div><div>CW</div><div></div></div><div><div>INITIAL</div><div></div></div><div><div>CCW</div><div></div></div></div>			

**CW & CCW OPERATION ONLY (Combination B-1/B-2 Cam)**

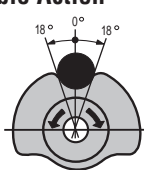
Contacts transfer when lever is operated CW or CCW.

CATALOG NUMBERS			OPERATIONAL DATA		
MOUNTING (see opposite page)					
STANDARD	WIDE	LONG			
EA700-10100	EA700-40100	EA700-70100			
CONTACTS		CIRCUITS		A. Trip Travel ..... 18° B. Reset Travel ..... 14° C. Recommended Travel ..... 30° D. Total Travel Available..... 90° Torque (Inch Lbs.) 1 N.O. - 1 N.C. .... 15	
1 N.O. 1 N.C.					

## Typical Cams

**B1 Single Action**

Normally open to make (normally closed to break) IN ONE DIRECTION ONLY. Lever and cam are spring returned to starting position. Used on Single Action Switches only.

**B2 Double Action**

Normally open to make (normally closed to break) IN EITHER DIRECTION. Lever and cam are spring returned to starting position.

**Combination B1/B2 CAM**

The following three operating sequences are built into the combination cam used in the standard EA700 switches: B1 Single Action CW, B1 Single Action CCW and B2 Double Action CW & CCW.

1. The contacts function when the lever is operated clockwise. The lever can be operated counterclockwise but the contacts will not operate.
2. The contacts function when the lever is operated counterclockwise. The lever can be operated clockwise but the contacts will not operate.
3. The contacts function when the lever is operated clockwise or counterclockwise.

## ORDERING INFORMATION

## Maintained Switches

**M CAM – MAINTAINED CONTACTS & LEVER POSITION**

Lever and contacts are maintained in tripped position. When lever is moved CCW the N.C. contacts open and the N.O. contacts close. Starting at this position rotating the lever CW the N.O. contacts open and the N.C. close.

CATALOG NUMBERS		
MOUNTING (see page 40)		
STANDARD	Wide	Long
EA700-16000	EA700-46000	EA700-76000
CONTACTS	CIRCUITS	
	POSITION 1	POSITION 2
1 N.O.	CW INITIAL CCW	CW INITIAL CCW
1 N.C.		

## OPERATIONAL DATA

	POSITION 1 CCW	POSITION 2 CW
Position	1(CCW)	2(CW)
A. Trip Travel	25°	55°
B. Reset Travel	25°	22°
C. Min. Travel to Maintain	54°	55°
D. Recommended Travel	60°	60°
E. Total Travel	124°	116°
F. Overall Travel	56°	64°
Torque	(inch Lbs.)	
M CAM	1 N.O. 1 N.C.	CW CCW
		6 9

To change Switch Operation from Cam Position 1 to Position 2, Operate Switch thru Angle C. Remove Lever and Reset at Initial Position.

**M7 CAM – MAINTAINED CONTACTS – LEVER RETURNED**

Contacts are maintained in tripped position, torsion spring will return lever to initial position when released. When lever is moved CCW the N.C. contacts open and the N.O. contacts close. The lever must then be returned to the initial position and be operated in the CW direction to reset the contacts.

CATALOG NUMBERS		
MOUNTING (see page 44)		
STANDARD	Wide	Long
EA700-16700	EA700-46700	EA700-76700
CONTACTS	CIRCUITS	
	POSITION 1	POSITION 2
1 N.O.	CW INITIAL CCW	CW INITIAL CCW
1 N.C.		

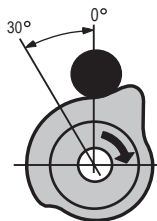
## OPERATIONAL DATA

	POSITION 1 CCW	POSITION 2 CW
Position	1(CCW)	2(CW)
A. Trip Travel	16°	30°
B. Reset Travel	30°	26°
C. Min. Travel to Maintain	26°	30°
D. Recommended Travel	45°	45°
E. Total Travel	90°	90°
Torque	(inch Lbs.)	
M7 CAM	1 N.O. 1 N.C.	CW CCW
		12 13.5

To change Switch Operation from Cam Position 1 to Position 2, Operate Switch thru Angle B. Remove Lever and Reset at Initial Position.

## Maintained Position Cam

The maintained cam is designed for those applications requiring maintained contacts.



Maintained Switches are available with two contact operations:

1. When the lever is moved clockwise the normally open contacts close and the normally closed contacts open. The lever is maintained in tripped position. As the lever is activated counterclockwise to starting position, normally open contacts open and normally closed contacts close.
2. When the lever is moved clockwise the normally open contacts close and the normally closed contacts open. This contact arrangement is maintained as the lever is spring returned to the starting position and until the lever is moved counterclockwise when the normally open contacts open and the normally closed contacts close.

## Neutral Position Switches

## ORDERING INFORMATION

**N CAM – NEUTRAL POSITION – ALL CONTACTS OPEN**

As lever is moved CW upper contacts close. As lever is spring returned to starting position upper contacts open. As lever is moved CCW from starting position lower contacts close. As lever is spring returned to starting position lower contacts open.

CATALOG NUMBERS		
MOUNTING (see page 40)		
STANDARD	Wide	Long
EA700-15000	EA700-45000	EA700-75000
CONTACTS		
2 N.O.	CIRCUI TS 	

**N CAM – NEUTRAL POSITION – ALL CONTACTS CLOSED**

As lever is moved CW lower contacts open. As lever is spring returned to starting position lower contacts close. As lever is moved CCW from starting position upper contacts open. As lever is spring returned to starting position upper contacts close.

CATALOG NUMBERS		
MOUNTING (see page 40)		
STANDARD	Wide	Long
EA700-15100	EA700-45100	EA700-75100
CONTACTS		
2 N.C.	CIRCUI TS 	

OPERATIONAL DATA			
Direction of Rotation	CW	CCW	
A. Trip Travel	11°	35°	
B. Reset Travel	9°	13°	
C. Recommended Travel	45°	45°	
D. Total Travel	90°	90°	
Torque			(Inch Lbs.)
N CAM	2 N.O.	CW	18
	2 N.O.	CCW	13.5
	4 N.O.	CW	9.5
	4 N.O.	CCW	15
	2 N.C.	CW	8
	2 N.C.	CCW	13.5

\*Available in short travel version with 13° trip – Consult Factory.

**N1 – NEUTRAL POSITION – ALL CONTACTS OPEN**

As lever is moved CW lower contacts close. As lever is spring returned to starting position lower contacts open. As lever is moved C W from starting position upper contacts close. As lever is spring returned to starting position upper contacts open.

CATALOG NUMBERS		
MOUNTING (see page 40)		
STANDARD	Wide	Long
EA700-15700	EA700-45700	EA700-75700
CONTACTS		
2 N.O.	CIRCUI TS 	

**N1 CAM – NEUTRAL POSITION – ALL CONTACTS CLOSED**

As lever is moved CW upper contacts open. As lever is spring returned to starting position upper contacts close. As lever is moved CCW from starting position lower contacts open. As lever is spring returned to starting position lower contacts close.

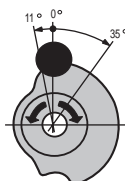
CATALOG NUMBERS		
MOUNTING (see page 40)		
STANDARD	Wide	Long
EA700-15800	EA700-45800	EA700-75800
CONTACTS		
2 N.C.	CIRCUI TS 	

OPERATIONAL DATA			
Direction of Rotation	CW	CCW	
A. Trip Travel	31°	31°	
B. Reset Travel	22°	12°	
C. Recommended Travel	45°	45°	
D. Total Travel	90°	90°	
Torque			(Inch Lbs.)
N1 CAM	2 N.O.	CW	15
	2 N.O.	CCW	19.5
	4 N.O.	CW	16.5
	4 N.O.	CCW	20.5
N1 CAM	2 N.C.	CW	15
	2 N.C.	CCW	19.5
	4 N.C.	CW	16.5
	4 N.C.	CCW	20.5

## Neutral Position Cam

The neutral position cam is designed for applications requiring a neutral position in the contact arrangement. Both the operating lever and the cam are spring returned to starting position. The maximum lever travel in either direction is 90°.

See Page 40 for Mounting Dimensions



This is the contact action of neutral switches:

- As the lever is moved clockwise the lower contact transfers. As the lever is spring returned to starting position the lower contact is returned to its original position.
- As the lever is moved counterclockwise from starting position the upper contact transfers. As the lever is spring returned to starting position the upper contact returns.

Neutral Position 2 N.O. or 2 N.C.

SNAP-LOCK®

1-800-NAMTECH





**2 N.O. - 2 N.C.**

## Specifications

1. Enclosure is water, oil and dust tight.
2. Enclosure meets NEMA Type 1, 4 and 13 requirements.
3. Contacts made of silver alloy. Contact shifting mechanism is locked in position by the latches until switch lever is actuated.
4. Standard Temperature Range: -20°C to +90°C
5. Operating lever is adjustable to any required position.
6. Operating Lever Angles (travel either clockwise or counterclockwise) maximum degrees of trip travel, reset travel, as well as total lever travel, are determined by the cam selected.
7. Operating Torques - Trip Torque varies from 15 to 33 in. lbs. depending on switch size and cam selected.
8. Current Ratings:

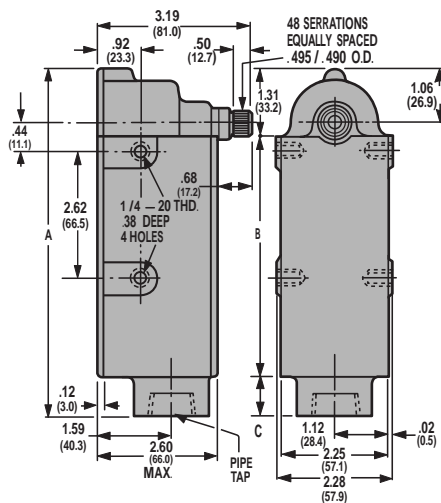
### Voltage

125V-A.C.	20.0 Amps*	10.0 Amps*
250V-A.C.	15.0 Amps*	7.5 Amps*
480V-A.C.	10.0 Amps*	5.0 Amps*
600V-A.C.	5.0 Amps*	2.5 Amps*
125V-D.C.	5.0 Amps*	2.5 Amps*
250V-D.C.	1.5 Amps*	.75 Amps*

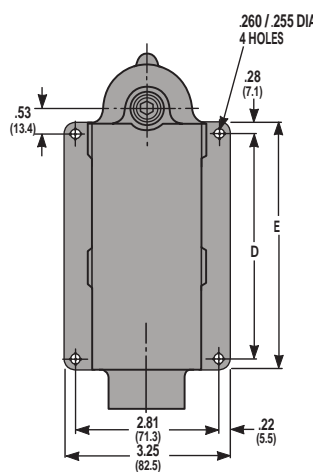
\*75-100% Power Factor

## Dimensions and Mounting

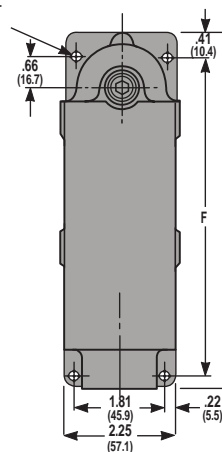
Series EA700 Snap-Lock Limit Switches are specifically designed for flexibility in mounting arrangements. Basic design permits mounting for either side or back. Shown here are the (1) STANDARD for side mounting; (2) WIDE for back mounting; (3) LONG for back mounting.



## Standard Mounting



## Wide Mounting



## Long Mounting

*All dimensions given in US & Metric: Inches (mm)*

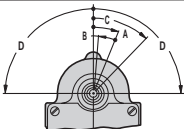






CONTACT SEQUENCE	STANDARD SWITCH				MOUNTING STYLE			
	PIPE TAP SIZE	A	B	C	WIDE		LONG	
					D	E	F	G
2 N.O. - 2 N.C.	1-11 1/2 NPT	7.06	4.94	0.81	4.38	4.94	6.41	7.06

## Standard Switches

## ORDERING INFORMATION

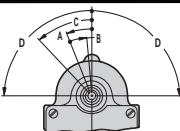
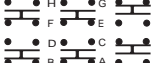
**CW OPERATION ONLY (Combination B-1/B-2 Cam)**

Contacts transfer when lever is operated CW. Lever can be operated CCW but contacts will not transfer.

CATALOG NUMBERS			
MOUNTING (see opposite page)			
STANDARD	Wide	Long	
EA700-20000	EA700-50000	EA700-80000	
CONTACTS	CIRCUITS		A. Trip Travel ..... 18° B. Reset Travel ..... 14° C. Recommended Travel ..... 30° D. Total Travel Available..... 90° Torque (Inch Lbs.) 2 N.O. - 2 N.C. .... 27
2 N.O. 2 N.C.	<div>CW   INITIAL   CCW</div> <div>  </div> <div>  </div>		

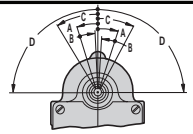
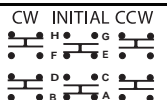
**CCW OPERATION ONLY (Combination B-1/B-2 Cam)**

Contacts transfer when lever is operated CCW. Lever can be operated CW but contacts will not transfer.

CATALOG NUMBERS			OPERATIONAL DATA
MOUNTING (see opposite page)			
STANDARD	Wide	Long	
EA700-20001	EA700-50001	EA700-80001	
CONTACTS	CIRCUITS		
2 N.O.	CW INITIAL CCW		A. Trip Travel ..... 18°
2 N.C.			B. Reset Travel ..... 14°
			C. Recommended Travel ..... 30°
			D. Total Travel Available..... 90°
			Torque (Inch Lbs.) 2 N.O. - 2 N.C. .... 27

**CW & CCW OPERATION (Combination B-1/B-2 Cam)**

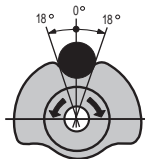
Contacts transfer when lever is operated CW or CCW.

CATALOG NUMBERS			
MOUNTING (see opposite page)			
STANDARD	Wide	Long	
EA700-20100	EA700-50100	EA700-80100	
CONTACTS	CIRCUITS		A. Trip Travel ..... 18°
2 N.O.	<div>CW INITIAL CCW</div> <div></div>		B. Reset Travel ..... 14°
2 N.C.			C. Recommended Travel ..... 30°
			D. Total Travel Available..... 90°
			Torque (Inch Lbs.) 2 N.O. - 2 N.C. .... 27

## Typical Cams

**B1 Single Action**

Normally open to make (normally closed to break) IN ONE DIRECTION ONLY. Lever and cam are spring returned to starting position. Used on Single Action Switches only.

**B2 Double Action**

Normally open to make (normally closed to break) IN EITHER DIRECTION. Lever and cam are spring returned to starting position.

**Combination B1/B2 CAM**

The following three operating sequences are built into the combination cam used in the standard EA700 switches: B1 Single Action CW, B1 Single Action CCW and B2 Double Action CW & CCW.

1. The contacts function when the lever is operated clockwise. The lever can be operated counterclockwise but the contacts will not operate.
2. The contacts function when the lever is operated counterclockwise. The lever can be operated clockwise but the contacts will not operate.
3. The contacts function when the lever is operated clockwise or counterclockwise.

## ORDERING INFORMATION

### M CAM – MAINTAINED CONTACTS & LEVER POSITION

Lever and contacts are maintained in tripped position. When lever is moved CCW the N.C. contacts open and the N.O. contacts close. Starting at this position rotating the lever CW the N.O. contacts open and the N.C. close.

CATALOG NUMBERS		
MOUNTING (see page 44)		
STANDARD	Wide	Long
EA700-26000	EA700-56000	EA700-86000
CONTACTS		
CONTACTS	CIRCUITS	
	POSITION 1	POSITION 2
2 N.O.		
2 N.C.		

## Maintained Switches

### OPERATIONAL DATA

POSITION 1 CCW	POSITION 2 CW
Position	1(CCW) 2(CW)
A. Trip Travel	25° 55°
B. Reset Travel	25° 22°
C. Min. Travel to Maintain	54° 55°
D. Recommended Travel	60° 60°
E. Total Travel	124° 116°
F. Overall Travel	56° 64°
Torque	(inch Lbs.)
M CAM	1 N.O. CW 6
	1 N.C. CCW 9

To change Switch Operation from Cam Position 1 to Position 2, Operate Switch thru Angle C. Remove Lever and Reset at Initial Position.

### M7 CAM – MAINTAINED CONTACTS – LEVER RETURNED

Contacts are maintained in tripped position, torsion spring will return lever to initial position when released. When lever is moved CCW the N.C. contacts open and the N.O. contacts close. The lever must then be returned to the initial position and be operated in the CW direction to reset the contacts.

CATALOG NUMBERS		
MOUNTING (see page 44)		
STANDARD	Wide	Long
EA700-26700	EA700-56700	EA700-86700
CONTACTS		
CONTACTS	CIRCUITS	
	POSITION 1	POSITION 2
2 N.O.		
2 N.C.		

### OPERATIONAL DATA

POSITION 1 CCW	POSITION 2 CW
Position	1(CCW) 2(CW)
A. Trip Travel	16° 30°
B. Reset Travel	30° 26°
C. Min. Travel to Maintain	26° 30°
D. Recommended Travel	45° 45°
E. Total Travel	90° 90°
Torque	(inch Lbs.)
M7 CAM	1 N.O. CW 12
	1 N.C. CCW 13.5

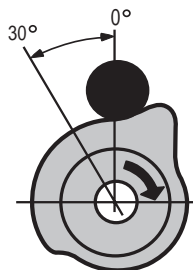
To change Switch Operation from Cam Position 1 to Position 2, Operate Switch thru Angle B. Remove Lever and Reset at Initial Position.

## Maintained Position Cam

Maintained Switches are available with two contact operations:

1. When the lever is moved clockwise the normally open contacts close and the normally closed contacts open. The lever is maintained in tripped position. As the lever is activated counterclockwise to starting position, normally open contacts open and normally closed contacts close.
2. When the lever is moved clockwise the normally open contacts close and the normally closed contacts open. This contact arrangement is maintained as the lever is spring returned to the starting position and until the lever is moved counterclockwise when the normally open contacts open and the normally closed contacts close.

The maintained cam is designed for those applications requiring maintained contacts.



## Neutral Position Switches

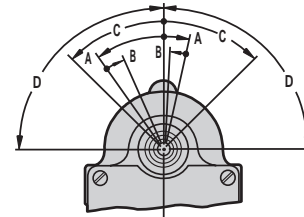
## ORDERING INFORMATION

**N CAM – NEUTRAL POSITION – ALL CONTACTS OPEN**

As lever is moved CW upper contacts close. As lever is spring returned to starting position upper contacts open. As lever is moved CCW from starting position lower contacts close. As lever is spring returned to starting position lower contacts open.

CATALOG NUMBERS		
MOUNTING (see page 44)		
STANDARD	Wide	Long
EA700-25000	EA700-55000	EA700-85000
CONTACTS	CIRCUITS	
4 N.O.		

## OPERATIONAL DATA



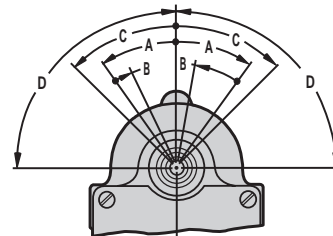
Direction of Rotation	CW	CCW
A. Trip Travel	11°	35°
B. Reset Travel	9°	13°
C. Recommended Travel	45°	45°
D. Total Travel	90°	90°
Torque	(Inch Lbs.)	
N CAM	2 N.O. CW	18
	2 N.O. CCW	13.5
	4 N.O. CW	9.5
	4 N.O. CCW	15
	2 N.C. CW	18
	2 N.C. CCW	13.5

**N1 – NEUTRAL POSITION – ALL CONTACTS OPEN**

As lever is moved CW lower contacts close. As lever is spring returned to starting position lower contacts open. As lever is moved CCW from starting position upper contacts close. As lever is spring returned to starting position upper contacts open.

CATALOG NUMBERS		
MOUNTING (see page 44)		
STANDARD	Wide	Long
EA700-25102	EA700-55102	EA700-85102
CONTACTS	CIRCUITS	
4 N.O.		

## OPERATIONAL DATA



Direction of Rotation	CW	CCW
A. Trip Travel	31°	31°
B. Reset Travel	22°	12°
C. Recommended Travel	45°	45°
D. Total Travel	90°	90°
Torque	(Inch Lbs.)	
N1 CAM	2 N.O. CW	15
	2 N.O. CCW	19.5
	4 N.O. CW	16.5
	4 N.O. CCW	20.5
N1 CAM	2 N.C. CW	15
	2 N.C. CCW	19.5
	4 N.C. CW	16.5
	4 N.C. CCW	20.5

**N1 CAM – NEUTRAL POSITION – ALL CONTACTS CLOSED**

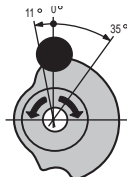
As lever is moved CW upper contacts open. As lever is spring returned to starting position upper contacts close. As lever is moved CCW from starting position lower contacts open. As lever is spring returned to starting position lower contacts close.

CATALOG NUMBERS		
MOUNTING (see page 44)		
STANDARD	Wide	Long
EA700-25108	EA700-55108	EA700-85108
CONTACTS	CIRCUITS	
4 N.C.		

## Neutral Position Cam

The neutral position cam is designed for applications requiring a neutral position in the contact arrangement. Both the operating lever and the cam are spring returned to starting position. The maximum lever travel in either direction is 90°.

See Page 44 for Mounting Dimensions



This is the contact action of neutral switches:

- As the lever is moved clockwise the lower contact transfers. As the lever is spring returned to starting position the lower contact is returned to its original position.
- As the lever is moved counterclockwise from starting position the upper contact transfers. As the lever is spring returned to starting position the upper contact returns.

Neutral Position 4 N.O. or 4 N.C.

SNAP-LOCK®

1-800-NAMTECH



**3 N.O. - 3 N.C.****Specifications**

1. Enclosure is water, oil and dust tight.
2. Enclosure meets NEMA Type 1, 4 and 13 requirements.
3. Contacts made of silver alloy. Contact shifting mechanism is locked in position by the latches until switch lever is actuated.
4. Standard Temperature Range: -20°C to +90°C
5. Operating lever is adjustable to any required position.
6. Operating Lever Angles (travel either clockwise or counterclockwise) maximum degrees of trip travel, reset travel, as well as total lever travel, are determined by the cam selected.
7. Operating Torques - Trip Torque varies from 15 to 33 in. lbs. depending on switch size and cam selected.
8. Current Ratings:

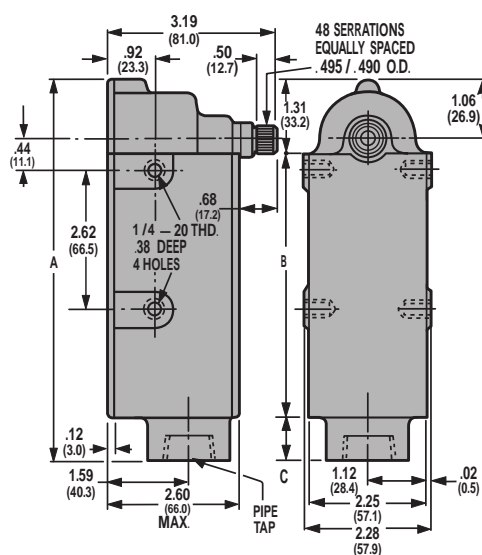
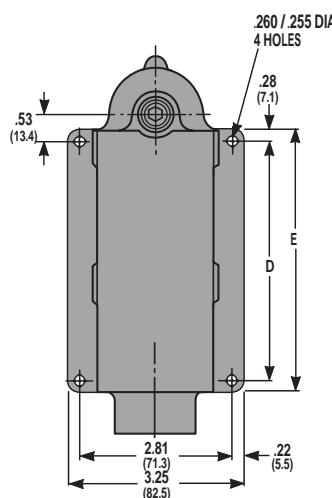
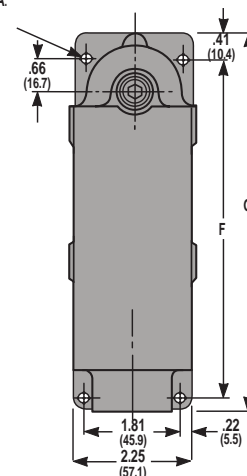
**Voltage****For Neutral Position Only**

125V-A.C.	20.0 Amps*	10.0 Amps*
250V-A.C.	15.0 Amps*	7.5 Amps*
480V-A.C.	10.0 Amps*	5.0 Amps*
600V-A.C.	5.0 Amps*	2.5 Amps*
125V-D.C.	5.0 Amps*	2.5 Amps*
250V-D.C.	1.5 Amps*	.75 Amps*

\*75-100% Power Factor

**Dimensions and Mounting**

Series EA700 Snap-Lock Limit Switches are specifically designed for flexibility in mounting arrangements. Basic design permits mounting for either side or back. Shown here are the (1) STANDARD for side mounting; (2) WIDE for back mounting; (3) LONG for back mounting.

**Standard Mounting****Wide Mounting****Long Mounting**

All dimensions given in US &amp; Metric: Inches (mm)

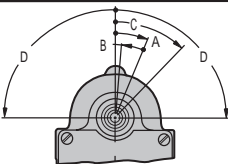
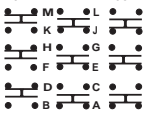
CONTACT SEQUENCE	STANDARD SWITCH				MOUNTING STYLE			
	PIPE TAP SIZE	A	B	C	WIDE		LONG	
					D	E	F	G
3 N.O. - 3 N.C.	1-11 1/2 NPT	9.62	7.5	0.81	6.94	7.5	8.97	9.62

### Standard Switches

### ORDERING INFORMATION

#### CW OPERATION ONLY (Combination B-1/B-2 Cam)

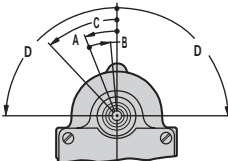
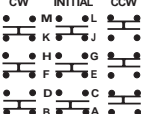
Contacts transfer when lever is operated CW. Lever can be operated CCW but contacts will not transfer.

CATALOG NUMBERS			OPERATIONAL DATA
MOUNTING (see opposite page)			
STANDARD	Wide	Long	
EA700-30000	EA700-60000	EA700-90000	
CIRCUITS			
CONTACTS	<div>CW    INITIAL    CCW</div> <div></div>		
3 N.O.			
3 N.C.			
			A. Trip Travel .....18
			B. Reset Travel .....14
			C. Recommendation Travel.....30
			D. Total Travel Available .....90
			Torque (inch Lbs.) 3 N.O. - 3 N.C. ....33

A. Trip Travel .....	18
B. Reset Travel .....	14
C. Recommendation Travel.....	30
D. Total Travel Available .....	90
Torque (inch Lbs.) 3 N.O. - 3 N.C. ....	33

#### CCW OPERATION ONLY (Combination B-1/B-2 Cam)

Contacts transfer when lever is operated CCW. Lever can be operated CW but contacts will not transfer.

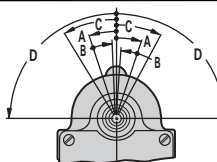
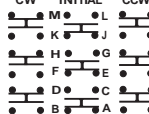
CATALOG NUMBERS			<div></div>
MOUNTING (see opposite page)			
STANDARD	Wide	Long	
EA700-30001	EA700-60001	EA700-90001	
CIRCUITS			
CONTACTS	<div><div><div>CW</div><div>INITIAL</div><div>CCW</div></div><div></div></div>		
3 N.O.			
3 N.C.			

A. Trip Travel .....	18
B. Reset Travel .....	14
C. Recommendation Travel.....	30
D. Total Travel Available .....	90
Torque (inch Lbs.) 3 N.O. - 3 N.C. ....	33

A. Trip Travel .....	18
B. Reset Travel .....	14
C. Recommendation Travel.....	30
D. Total Travel Available .....	90
Torque (inch Lbs.) 3 N.O. - 3 N.C. ....	33

#### CW & CCW OPERATION ONLY (Combination B-1/B-2 Cam)

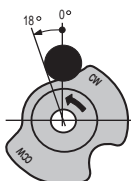
Contacts transfer when lever is operated CW or CCW.

CATALOG NUMBERS			OPERATIONAL DATA
MOUNTING (see opposite page)			
STANDARD	Wide	Long	
EA700-30100	EA700-60100	EA700-90100	
CIRCUITS			
CONTACTS	<div>CW      INITIAL      CCW</div> <div></div>		
3 N.O.			
3 N.C.			
			A. Trip Travel .....18
			B. Reset Travel .....14
			C. Recommendation Travel.....30
			D. Total Travel Available .....90
			Torque (inch Lbs.) 3 N.O. - 3 N.C. ....33

A. Trip Travel .....	18
B. Reset Travel .....	14
C. Recommendation Travel.....	30
D. Total Travel Available .....	90
Torque (inch Lbs.) 3 N.O. - 3 N.C. ....	33

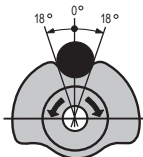
### Typical Cams

#### B1 Single Action



Normally open to make (normally closed to break) IN ONE DIRECTION ONLY. Lever and cam are spring returned to starting position. Used on Single Action Switches only.

#### B2 Double Action



Normally open to make (normally closed to break) IN EITHER DIRECTION. Lever and cam are spring returned to starting position.

#### Combination B1/B2 CAM

The following three operating sequences are built into the combination cam used in the standard EA700 switches: B1 Single Action CW, B1 Single Action CCW and B2 Double Action CW & CCW.

1. The contacts function when the lever is operated clockwise. The lever can be operated counterclockwise but the contacts will not operate.
2. The contacts function when the lever is operated counterclockwise. The lever can be operated clockwise but the contacts will not operate.
3. The contacts function when the lever is operated clockwise or counterclockwise.



The Multiple Station Switch makes it possible to incorporate from two to four EA700 Namco Series Snap-Lock Limit Switches into a single assembly. This unit can be adapted to almost any application where individual limit switches are mounted side by side. This single assembly reduces installation time, cuts wiring costs and has a more compact appearance than individually mounted switches.

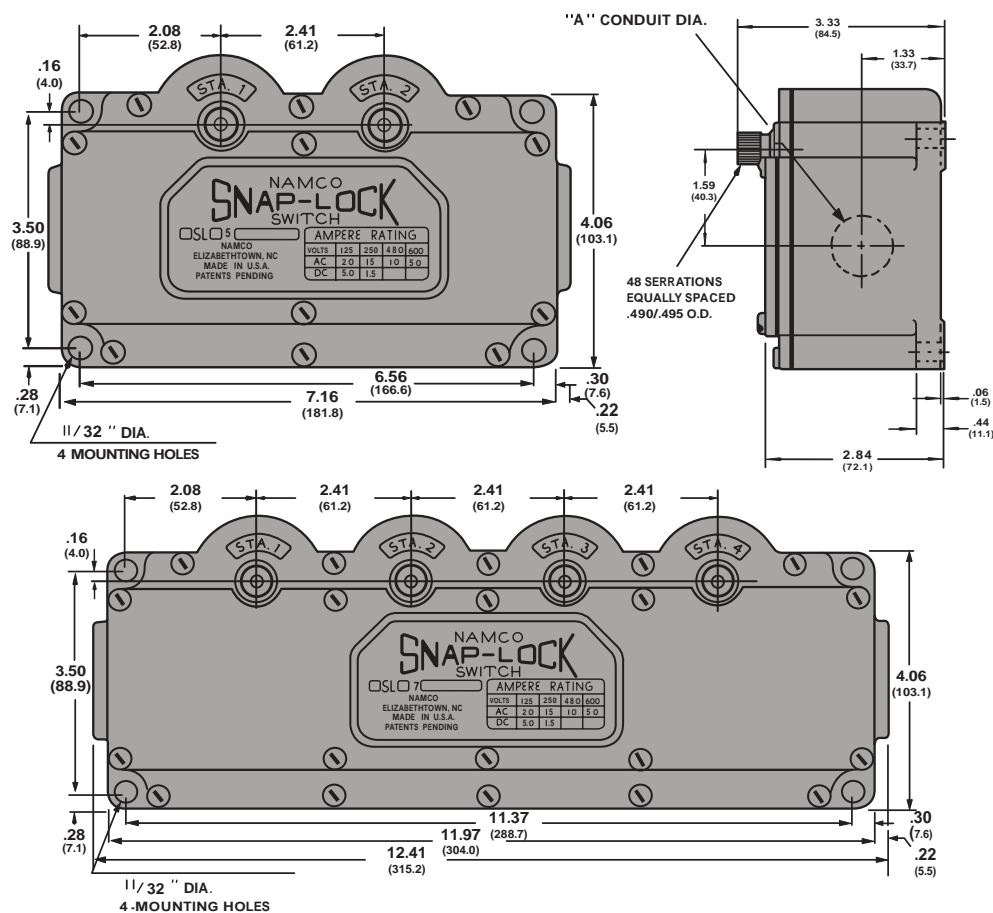
## Specifications

1. Heavy duty contact black arrangement for each station is NEMA form "Z"; single pole, double throw, butt contacts; quick-make, quick break with four terminals; 2 for N.O. and 2 N.C.
2. Enclosure meets NEMA Type 1.
3. Operating levers (not shown) are adjustable in  $7^{\circ}30'$  @ increments thru  $360^{\circ}$ .
4. Each station had adequate wiring space for four No. 12 awg. Conductors.
5. Operating Temperature:  $-20^{\circ}\text{C}$  to  $+90^{\circ}\text{C}$ .
6. Continuous Current Ratings -- Amps:

Current Ratings

125 VAC	20.0 Amps.
250 VAC	15.0 Amps.
480 VAC	10.0 Amps.
600 VAC	5.0 Amps.
125 VDC	5.0 Amps.
250 VDC	1.5 Amps.

## Dimensions and Mounting



All dimensions given in US & Metric: Inches (mm)

## Ordering Information

## 2-STATION

PART NO.	CIRCUITS		DIM. A	OPERATIONAL DATA	
	STA 1	STA 2			
EA760-10005			.75 DIA. (Left Side Only)	PRE-TRAVEL (A) .....13° DIF. TRAVEL (B) .....10° RECOMMENDED TRAVEL .....30° TOTAL TRAVEL .....90° TORQUE TO PRE-TRAVEL .....16.55 LB/in	

## 4-STATION

PART NO.	CIRCUITS				DIM. A	OPERATIONAL DATA	
	STA 1	STA 2	STA 3	STA 4			
EA760-00265					1" DIA.	PRE-TRAVEL (A) .....18° DIF. TRAVEL (B) .....14° OVER-TRAVEL .....72° TOTAL TRAVEL .....90°	
EA760-00445					1" - 11.50" NPT	PRE-TRAVEL (A) .....13° DIF. TRAVEL (B) .....10° RECOMMENDED TRAVEL .....30° TOTAL TRAVEL .....90° TORQUE TO TRIP ...16.5 LB/in	
EA760-00455					1" - 11.50" NPT	PRE-TRAVEL (A) .....13° DIF. TRAVEL (B) .....10° RECOMMENDED TRAVEL .....30° TOTAL TRAVEL .....90° TORQUE TO TRIP ...16.5 LB/in	
EA760-30001					NO HOLE	PRE-TRAVEL (A) .....18° DIF. TRAVEL (B) .....14° OVER-TRAVEL .....72° TOTAL TRAVEL .....90°	
EA760-30003 L.H. CONDUIT					1.38" DIA.	PRE-TRAVEL (A) .....18° DIF. TRAVEL (B) .....14° OVER-TRAVEL .....72° TOTAL TRAVEL .....90°	
EA760-30004 R.H. CONDUIT					1.38" DIA.	PRE-TRAVEL (A) .....18° DIF. TRAVEL (B) .....14° OVER-TRAVEL .....72° TOTAL TRAVEL .....90°	
EA760-30006					1"-11.5" NPT	PRE-TRAVEL (A) .....13° DIF. TRAVEL (B) .....10° RECOMMENDED TRAVEL .....30° TOTAL TRAVEL .....90° TORQUE TO TRIP ...16.5 LB/in	

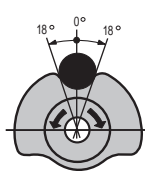
## Typical Cams

## B1 Single Action



Normally open to make (normally closed to break) IN ONE DIRECTION ONLY. Lever and cam are spring returned to starting position. Used on Single Action Switches only.

## B2 Double Action



Normally open to make (normally closed to break) IN EITHER DIRECTION. Lever and cam are spring returned to starting position.

## Combination B1/B2 CAM

The following three operating sequences are built into the combination cam used in the standard EA760 switches: B1 Single Action CW, B1 Single Action CCW and B2 Double Action CW & CCW.

1. The contacts function when the lever is operated clockwise. The lever can be operated counterclockwise but the contacts will not operate.
2. The contacts function when the lever is operated counterclockwise. The lever can be operated clockwise but the contacts will not operate.
3. The contacts function when the lever is operated clockwise or counterclockwise.



## SPECIAL FUNCTION REFERENCE PAGES

**Super Sensitive-Snap Action** 54-55  
1N.O. - 1N.C./ -- (EA150)  
Oscillating/Rotary -- 2N.O. - 2N.C.

**Navy-Marine** 56-59  
1 N.O. - 1 N.C.  
Sliding Contacts -- (EA780)

**Standard/Maintained**  
2 N.O. - 2 N.C.

**Navy-Marine** 56-59  
1 N.O. - 1 N.C.  
Butt Contacts -- (EA790)

**Standard/Maintained**  
2 N.O. - 2 N.C.  
**Short Travel/Neutral**  
1 N.O. - 1 N.C., 2 N.O. - 2 N.C.

**Hazardous Location** 60-61  
1 N.O. - 1 N.C.  
Butt Contacts -- (EA800)

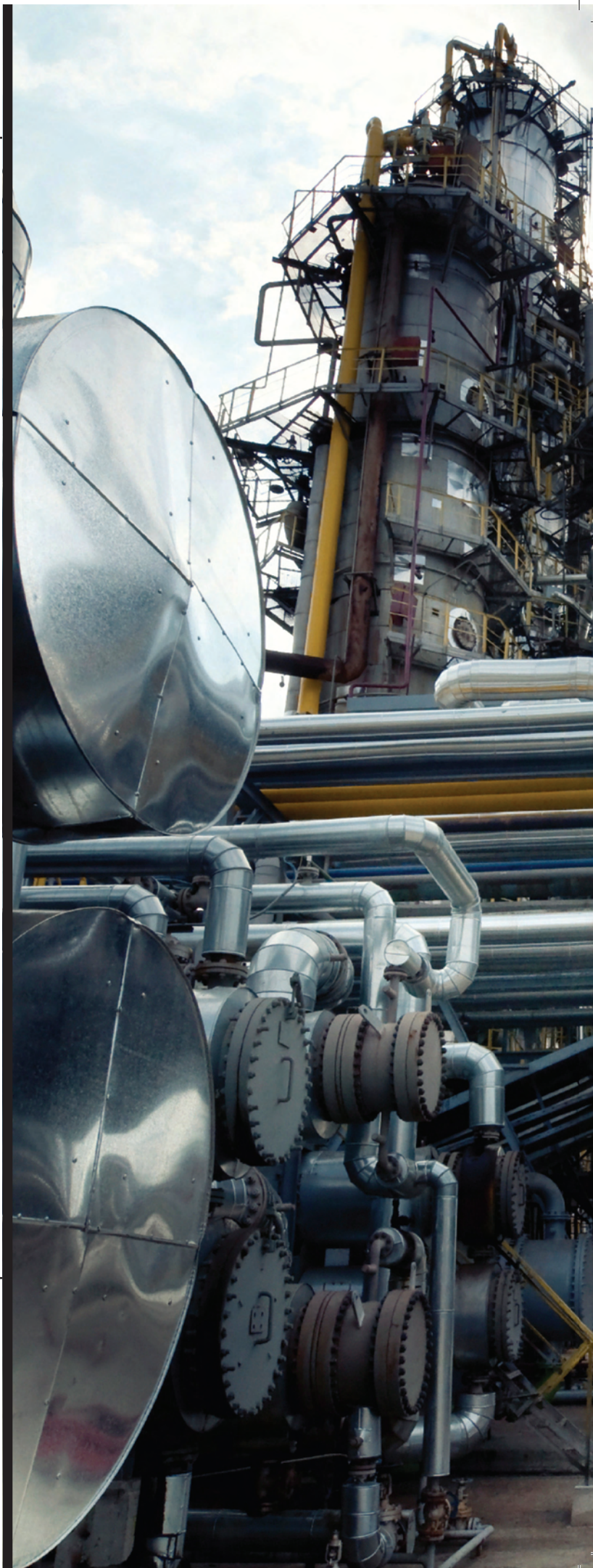
**Cam Type - Standard**  
2 N.O. - 2 N.C.  
3 N.O. - 3 N.C.

**Rocker Type** 62-63  
1 N.O. - 1 N.C.  
Standard, Neutral -- (EA880)

**Belt Mis-Alignment** 64-65  
Butt Contacts -- (EA780)

**Cam Type** 64-65  
1 N.O. - 1 N.C.  
Maintained -- (EA800)

## NOTES







**SPECIAL FUNCTION SWITCHES**

**1-800-NAMTECH**



## SUPER SENSITIVE LIMIT SWITCHES

Oscillating/Rotary

EA150



## Design Features &amp; Performance

### NAMCO EA150 Super-Sensitive Limit Switches Can Be Tripped By Forces As Low as 0.15 Ounces!

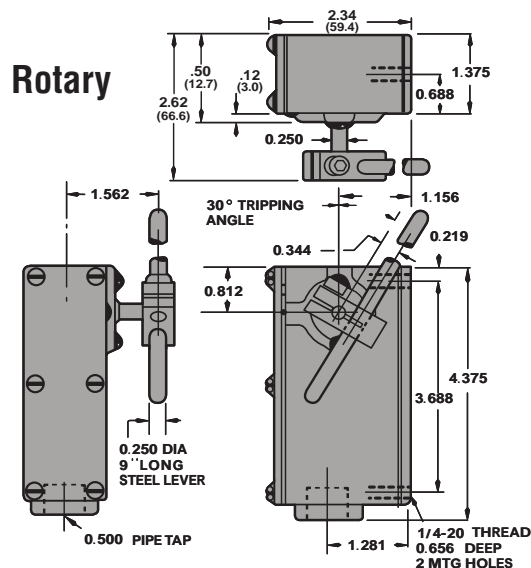
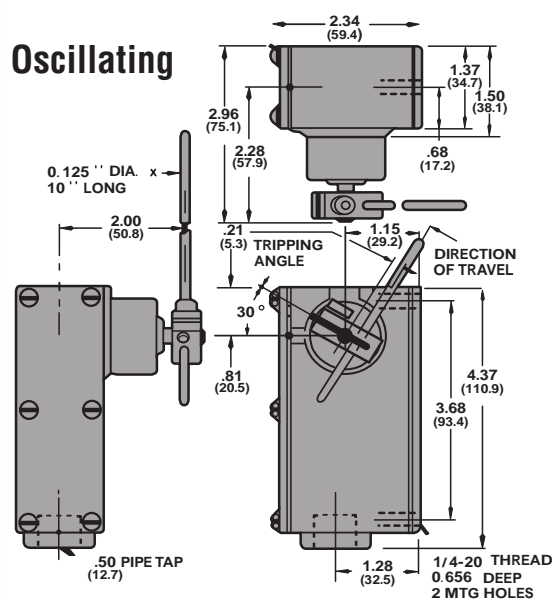
For many years the EA150 Series has been the only choice of Switch for designers and operating personnel when it comes to sensing small, lightweight objects. Consistently reliable, our switches come in a broad variety for any application you may need.

Rotary units are gravity return to the set position and have 360° of total travel either clockwise or counterclockwise. Trip torques range from 1.5 to 7 inch-ounces based on output selected. Oscillating units are spring return with 15 inch-ounce trip torque.

Outputs include SPDT (1 N.O. and 1 N.C.) and DPDT (2 N.O. and 2 N.C.) contacts, or a special electronic version with 10-30 VDC, PNP or NPN output. Output indicator lights are optional if required.

EA150 Super-Sensitive Limit Switches have been extensively used for fill detection on vibratory bowl feeders, small part sensing or counting, gauging devices, time delay mechanisms, safety interlock switch applications, liquid level controls, governors and a wide variety of other industrial applications that require accuracy and dependability.

## Dimensions and Mounting



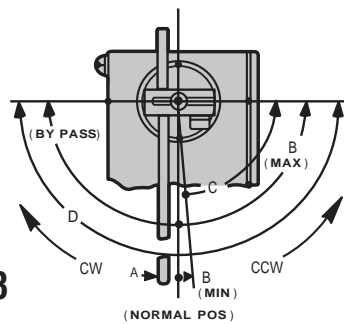
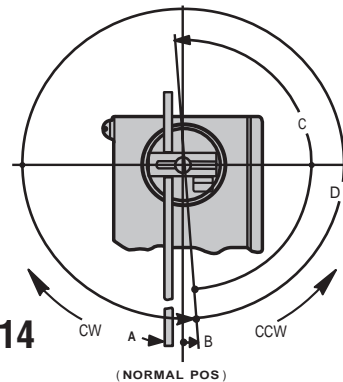
OPERATING RODS	GRAVITY RETURN (ROTARY)	SPRING RETURN (OSCILLATING)
STEEL ROD (1/8" X 10") EL140-18901	OPTIONAL	STANDARD
STEEL ROD (1/4" X 9") EA140-18900	STANDARD	OPTIONAL
FIBER ROD (1/8" X 10") EA140-18903	—	OPTIONAL
FIBER ROD (1/4" X 12") EA140-18902	OPTIONAL	—

## Ordering Information

OSCILLATING TYPE		ROTARY TYPE	
PART NUMBER	DESCRIPTION	PART NUMBER	DESCRIPTION
EA150-10013	STANDARD UNIT 1 N.O. - 1 N.C.	EA150-30014	STANDARD UNIT 1 N.O. - 1 N.C.
EA150-10313	STANDARD UNIT WITH L.E.D. TOP COVER	EA150-30303	STANDARD UNIT WITH L.E.D. TOP COVER
EA150-10173	STANDARD UNIT WITH 1/8" X 10" FIBER ROD	EA150-30283	STANDARD UNIT WITH 1/4" X 12" FIBER ROD
EA150-10083	STANDARD UNIT WITH 1/4" X 9" STEEL ROD	EA150-30223	STANDARD UNIT WITH 1/8" X 10" STEEL ROD
EA150-10093	STANDARD UNIT WITH 1/4" X 9" STEEL ROD AND NEON LIGHT TOP COVER	EA150-30233	STANDARD UNIT WITH 1/8" X 10" STEEL ROD AND NEON LIGHT TOP COVER
—	—	EA150-30396	STANDARD UNIT WITH LEFT HAND SHAFT EXTENSION
EA150-10143	STANDARD UNIT 2 N.O. - 2 N.C.	EA150-30143	STANDARD UNIT 2 N.O. - 2 N.C.
EA150-10343	STANDARD UNIT 2 N.O. - 2 N.C. WITH NEON LIGHT TOP COVER	EA150-30145	STANDARD UNIT 2 N.O. - 2 N.C. WITH NEON LIGHT TOP COVER
SPARE LEVER CLAMP KITS (FOR STANDARD)*			
EL140-18901	1/8" X 10" STEEL ROD	EL140-18900	1/4" X 9" STEEL ROD

\*Contains Steel Rod, Lever Clamp, Lockwasher, Set Screw and Cap Screw.

## Operational Data

Oscillating  
EA150-10013Rotary  
EA150-30014

DIRECTION OF OPERATION	CW OR CCW (1)
(A) OPERATING TORQUE	15 INCH-OUNCES
(B) TRAVEL TO MAKE OR BREAK CONTACTS	ADJUSTABLE FROM 4° MIN. TO 90° MAX.
(C) OVERTRAVEL	ADJUSTABLE TO 86°
(D) TOTAL LEVER TRAVEL	180°
APPROXIMATE WEIGHT OF SWITCH	1 LB. 12 OZ.
OPERATING MECHANISM	1/8" STEEL ROD 10" IN LENGTH

DIRECTION OF OPERATION	CW OR CCW (1)
(A) OPERATING TORQUE	5 INCH-OUNCES*
(B) TRAVEL TO MAKE OR BREAK CONTACTS	4°
(C) OVERTRAVEL	TRAVEL TO RESET = 180°
(D) TOTAL LEVER TRAVEL	360°
APPROXIMATE WEIGHT OF SWITCH	1 LB. 11 OZ.
OPERATING MECHANISM	1/4" STEEL ROD 9" IN LENGTH

(1) Mechanism can be positioned to trip switch, in one direction only, either clockwise or counter-clockwise.





## Design Features & Performance

**CONSTRUCTION** – Completely fabricated from non-corrosive materials, its bronze housing and high quality stainless steel shaft completely protect against external damage to the switch from salt spray or other corrosive elements. Sealing against leakage is achieved through the use of high quality gaskets on machined surfaces and “O” Ring protection, plus close tolerance between the shaft and bushing.

**DURABILITY** – All internal components are of high grade stainless steel or copper alloy (chrome plated when required), to protect against bearing surface wear and to provide millions of operations. Both the EA780 and EA790 series switches have heavy duty electrical contacts. The EA780 switches have sliding, double break type contacts built to meet the high shock requirements outlined in MIL-S-901. EA790 switches have heavy duty, double break butt type contacts.

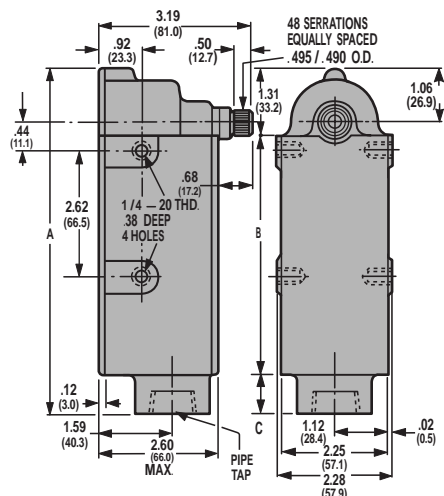
**CONTACTS** – The EA780 switches are available in two contact arrangements 1 N.O. - 1 N.C. & 2 N.O. - 2 N.C.

The Standard B1 cam provides for clockwise or counter-clockwise operations; B2 cam for operation in both directions (clockwise & counter-clockwise) or Maintained is also available. Contacts wipe clean with each operation. The EA790 switch is available in two contact arrangements, 1 N.O. - 1 N.C. & 2 N.O. - 2 N.C. with B1, B2, Neutral, Maintained & Short Travel Cam Operations.

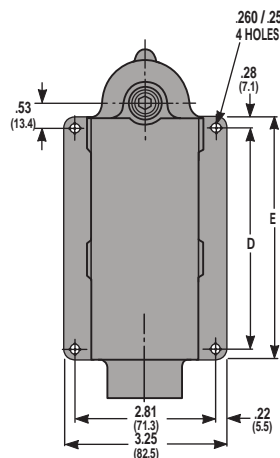
**LEVERS** – A variety of corrosion resistant levers are available to meet specific actuating requirements.

**NOTE:** Levers must be ordered as separate items. Please see “EL” series operating lever brochure.

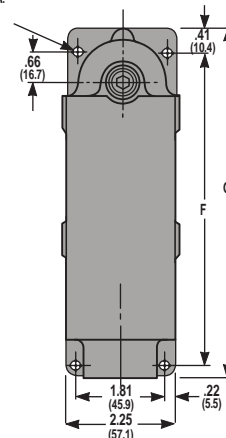
## Dimensions and Mounting



Standard Mounting



Wide Mounting



Long Mounting

All dimensions given in US & Metric: Inches (mm)

CONTACT SEQUENCE	PIPE TAP SIZE	STANDARD SWITCH			MOUNTING STYLE			
		A	B	C	WIDE		LONG	
					D	E	F	G
1 N.O.-1 N.C.	1/2" - 14 NPT	4.94	3.00	.62	2.44	3.00	4.22	4.84
2 N.O.-2 N.C.	1-11 1/2 NPT	7.06	4.94	.81	4.38	4.94	6.41	7.06

## Specifications

1. Conforms to MIL-C-2212F.
2. Enclosure meets NEMA Type 1, 4, 4X, 6, 6P and 13.
3. Watertight (3 ft. for 60 minutes) and submersible (15 ft. for 30 minutes) per MIL-STD-108E.
4. Meets vibration requirements of MIL-STD-167B, type I.
5. Meets Hi Shock requirements of MIL-S-901, Grade A, Class I, type A.
6. Contacts made of silver alloy. Contact shifting mechanism is locked in position by the latches until switch lever is actuated.
7. TEMPERATURE RANGE: -20°C to +90°C. Modifications available for temperatures to +150°C and -40°C continuous.
8. Operating lever is adjustable by 7°30' increments thru 360°.
9. Operating Torques -- Trip Torque varies from 6 to 33 in. lbs. depending on switch size and cam selected.
10. Current Ratings:

Switch Series

Voltage	EA790	EA780
125V-A.C.	20.0 Amps*	10.0 Amps*
250V-A.C.	15.0 Amps*	7.5 Amps*
480V-A.C.	10.0 Amps*	5.0 Amps*
600V-A.C.	5.0 Amps*	2.5 Amps*
125V-D.C.	5.0 Amps*	2.5 Amps*
250V-D.C.	1.5 Amps*	.75 Amps*

\*75-100% Power Factor

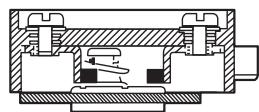
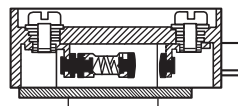
11. Form Z Contact.

## Ordering Information

## EA780-Sliding Contacts

CONTACT CONFIGURATION	CAM & OPERATION	MOUNTING		
		STANDARD	WIDE	LONG
1 N.O. 1 N.C.	B-1 CW	EA780-10000	EA780-40000	EA780-70000
	B-1 CCW	EA780-10001	EA780-40001	EA780-70001
	B-2 CW & CCW	EA780-10100	EA780-40100	EA780-70100
2 N.O. 2 N.C.	B-1 CW	EA780-20000	EA780-50000	EA780-80000
	B-1 CCW	EA780-20001	EA780-50001	EA780-80001
	B-2 CW & CCW	EA780-20100	EA780-50100	EA780-80100
1 N.O./1 N.C.	MAINTAINED*	EA780-16000	EA780-46000	EA780-76000
2 N.O./2 N.C.	M CAM	EA780-26000	EA780-56000	EA780-86000

1 N.O./1 N.C.	MAINTAINED*	EA780-16700	EA780-46700	EA780-76700
2 N.O./2 N.C.	M-7 CAM	EA780-26700	EA780-56700	EA780-86700

Series EA780  
Sliding TypeSeries EA790  
Butt Type

## EA-790-Butt Contacts

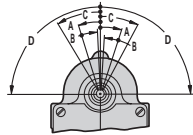
CONTACT CONFIGURATION	CAM & OPERATION	MOUNTING		
		STANDARD	WIDE	LONG
1 N.O.* 1 N.C.	B-1 CW	EA790-10000	EA790-40000	EA790-70000
	B-1 CCW	EA790-10001	EA790-40001	EA790-70001
	B-2 CW & CCW	EA790-10100	EA790-40100	EA790-70100
2 N.O.* 2 N.C.	B-1 CW	EA790-20000	EA790-50000	EA790-80000
	B-1 CCW	EA790-20001	EA790-50001	EA790-80001
	B-2 CW & CCW	EA790-20100	EA790-50100	EA790-80100
1 N.O./1 N.C.	MAINTAINED**	EA790-16000	EA790-46000	EA790-76000
2 N.O./2 N.C.	M CAM	EA790-26000	EA790-56000	EA790-86000
1 N.O./1 N.C.	MAINTAINED**	EA790-16700	EA790-46700	EA790-76700
2 N.O./2 N.C.	M-7 CAM	EA790-26700	EA790-56700	EA790-86700
1 N.O./1 N.C.	SHORT TRAVEL B-9 CAM	EA790-10900	EA790-40900	EA790-70900
2 N.O./2 N.C.	CW & CCW	EA790-20900	EA790-50900	EA790-80900
2 N.O.	NEUTRAL	EA790-15700	EA790-54700	EA790-75700
4 N.O.	N-1 CAM	EA790-25102	EA790-55102	EA790-85102
2 N.C.	NEUTRAL	EA790-15800	EA790-45800	EA790-75800
4 N.C.	N-1 CAM	EA790-25104	EA790-55104	EA790-85104

\*During High Shock: N.C. contacts opened for more than 20 ms.  
N.O. contacts did not close.

\*\*Contacts may transfer during High Shock.

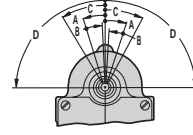
## Operational Data

### B1 CAM



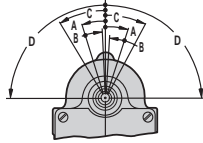
A. Trip Travel.....	18°
B. Reset Travel.....	14°
C. Recommended Travel.....	30°
D. Maximum Travel Available.....	90°
Torque (Inch Lbs.)	
1 N.O. - 1 N.C. ....	15
2 N.O. - 2 N.C. ....	27

### B2 CAM



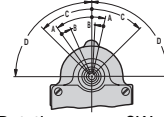
A. Trip Travel.....	18°
B. Reset Travel.....	14°
C. Recommended Travel.....	30°
D. Maximum Travel Available.....	90°
Torque (Inch Lbs.)	
1 N.O. - 1 N.C. ....	15
2 N.O. - 2 N.C. ....	27

### Short Travel B9 CAM



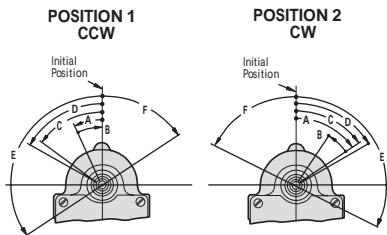
A. Trip Travel.....	13°
B. Reset Travel.....	10°
C. Recommended Travel.....	30°
D. Maximum Travel Available.....	90°
Torque (Inch Lbs.)	
1 N.O. - 1 N.C. ....	15
2 N.O. - 2 N.C. ....	27

### Neutral N-1 CAM



Direction of Rotation		CW	CCW
A. Trip Travel.....	18°	31°	
B. Reset Travel.....	14°	22°	
C. Recommended Travel.....	30°	45°	
D. Total Travel.....	90°	90°	
Torque			(inch Lbs.)
N1 CAM	2 N.O.	CW	15
	2 N.O.	CCW	19.5
	4 N.O.	CW	16.5
	4 N.O.	CCW	16.5
N1 CAM	2 N.C.	CW	15
	2 N.C.	CCW	15
	4 N.C.	CW	16.5
	4 N.C.	CCW	16.5

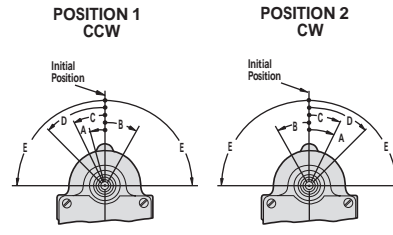
### Maintained M-CAM



Position	1(CCW)	2(CW)	
A. Trip Travel .....	25°	55°	
B. Reset Travel .....	25°	22°	
C. Min. Travel to Maintain .....	54°	55°	
D. Recommended Travel .....	60°	60°	
E. Maximum Travel Available.....	124°	116°	
F. Overall Travel .....	56°	64°	
Torque		(inch Lbs.)	
M CAM	1 N.O.	CW	6
	1 N.C.	CCW	9
	2 N.O.	CW	6
	2 N.C.	CCW	9

To change Switch Operation from Cam Position 1 to Position 2,

### Maintained M7-CAM

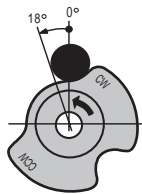


Position	1(CCW)	2(CW)	
A. Trip Travel .....	16°	30°	
B. Reset Travel .....	30°	26°	
C. Min. Travel to Maintain .....	26°	30°	
D. Recommended Travel .....	45°	45°	
E. Maximum Travel Available.....	90°	90°	
Torque		(inch Lbs.)	
M7 CAM	1 N.O.	CW	12
	1 N.C.	CCW	13.5
	2 N.O.	CW	15
	2 N.C.	CCW	16.5

To change Switch Operation from Cam Position 1 to Position 2, Operate Switch thru Angle C. Remove Lever and Reset at Initial Position.

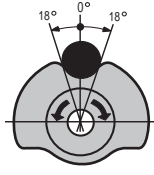
## Typical Cams

### B1 Single Action



Normally open to make (normally closed to break) IN ONE DIRECTION ONLY. Lever and cam are spring returned to starting position. Used on Single Action Switches only.

### B2 Double Action



Normally open to make (normally closed to break) IN EITHER DIRECTION. Lever and cam are spring returned to starting position.

### Combination B1/B2 CAM

The following three operating sequences are built into the combination cam used in the standard EA780/EA790 switches: B1 Single Action CW, B1 Single Action CCW and B2 Double Action CW & CCW.

1. The contacts function when the lever is operated clockwise. The lever can be operated counterclockwise but the contacts will not operate.
2. The contacts function when the lever is operated counterclockwise. The lever can be operated clockwise but the contacts will not operate.
3. The contacts function when the lever is operated clockwise or counterclockwise.





1 N.O. - 1 N.C.  
2 N.O. - 2 N.C.  
3 N.O. - 3 N.C.

- NEMA RATED FOR HAZARDOUS LOCATION
- 1 N.O. - 1 N.C., 2 N.O. - 2 N.C., 3 N.O. - 3 N.C.
- BRONZE, OR ALUMINUM HOUSING
- GENEROUS OVERTRAVEL
- HEAVY DUTY CAM OPERATED
- FLEXIBILITY OF MOTION, CW AND CCW
- AMPLE WIRING SPACE

**SERVICE CONDITIONS** – The Series EA-800 hazardous location limit switches operate reliably where gases, vapors, and dust are potential explosion hazards. The switch bodies are carefully engineered to resist corrosion.

**RUGGED CONSTRUCTION** – Approved spark-proof bronze, or aluminum housings can withstand internal and external gas explosions. Silver alloy butt contact arrangement is standard. Wiring space is ample for up to size 12 wire.

**PROVEN PERFORMANCE** – Cycle life is in the millions, when operated at the rated current, voltage, and temperature. Standard switches have maximum ambient temperature ratings of 90°C continuous. Switches can also be specially ordered with either -40°C or +150°C capabilities.

**LEVERS AVAILABLE** – A variety of levers for hazardous locations limit switches can be ordered from Namco Controls Series EL.

**PLEASE NOTE:** Only non-sparking levers should be used in hazardous locations. See Pages 68-75.

*Not all models are UL approved.*

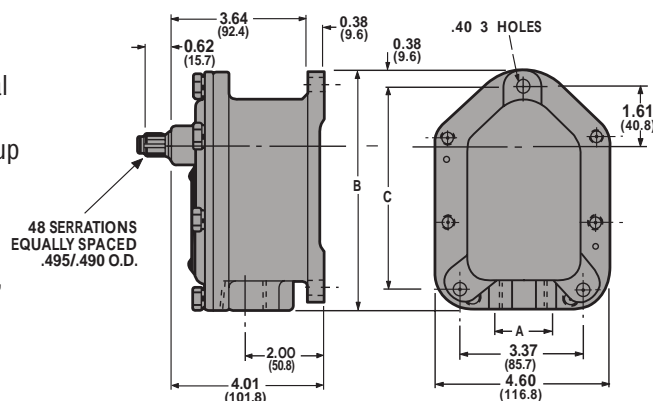
## Specifications

1. Enclosure meets NEMA Types 4, 4X, 6, 6P, 7, Class I, Groups C and D; and Type 9, Class II, Groups E, F, and G.
2. Contacts made of silver alloy. Contact shifting mechanism is locked in position by the latches until switch lever is actuated.
3. Standard Temperature Range: -20°C to +90°C.
4. Operating lever is adjustable to any required position.
5. Operating Lever Angles (travel either clockwise or counterclockwise) maximum degrees of trip travel, reset travel, as well as total lever travel, are determined by the cam selected.
6. Operating Torques -- Trip Torque varies from 15 to 35 lb. in.
7. Continuous Current Ratings -- Amperes

Volts	AC	DC
125	20	5
250	15	1.5
480	10	
600	5	

- 75-100% Power Factor  
8. Form Z contact arrangement.

TYPE CONTACT	DIMENSIONS (in.)		
	CONDUIT OPENING NPT	TOTAL HEIGHT (in.)	MOUNT HEIGHT (in.)
	A	B	C
1 N.O. - 1 N.C.	3/4" 14	6.47	5.422
2 N.O. - 2 N.C.	1" 11 1/2	8.5	7.578
3 N.O. - 3 N.C.	1 1/4" 11 1/2	10.56	9.672

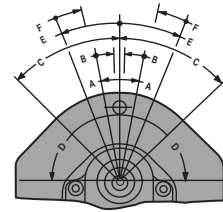


## OPTIONS AVAILABLE:

- Maintained and neutral position.
- High temperature (0° to + 150°C) components and lubricants.
- Low temperature (-40° to +90°C) components and lubricants.
- Belt mis-alignment.

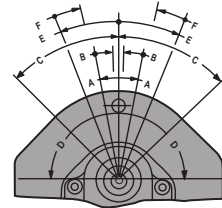
### Ordering Information

CW OPERATION ONLY (Combinations B-1/B-2 Cam) Contacts transfer when lever is operated CW. Lever can be operated CCW but contacts will not transfer.	CONTACTS	CIRCUITS	HOUSING	
			BRONZE	ALUMINUM
	1 N.O. 1 N.C.		EA800-10040 WGT. 12 LB.	EA800-10050 6 LB.
	2 N.O. 2 N.C.		EA800-20040 WGT. 16 LB.	EA800-20050 7 LB.
	3 N.O. 3 N.C.		EA800-30040 EGT. 19 LB.	EA800-30050 8 LB.



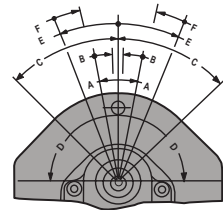
A. Trip Travel.....	18°
B. Reset Travel.....	14°
C. Recommended Travel.....	30°
D. Maximum Travel Available.....	90°
Torque	1 N.O. - 1 N.C. .... 15
(Inch Lbs.)	2 N.O. - 2 N.C. .... 27
	3 N.O. - 3 N.C. .... 33

CCW OPERATION (Combination B-1/B-2 Cam) Contacts transfer when lever is operated CCW. Lever can be operated CW but contacts will not transfer.	CONTACTS	CIRCUITS	HOUSING	
			BRONZE	ALUMINUM
	1 N.O. 1 N.C.		EA800-10041 WGT. 12 LB.	EA800-10051 6 LB.
	2 N.O. 2 N.C.		EA800-20041 WGT. 16 LB.	EA800-20051 7 LB.
	3 N.O. 3 N.C.		EA800-30041 WGT. 19 LB.	EA800-30051 8 LB.



A. Trip Travel.....	18°
B. Reset Travel.....	14°
C. Recommended Travel.....	30°
D. Maximum Travel Available.....	90°
Torque	1 N.O. - 1 N.C. .... 15
(Inch Lbs.)	2 N.O. - 2 N.C. .... 27
	3 N.O. - 3 N.C. .... 33

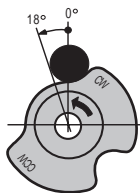
CW & CCW OPERATION (Combination B-1/B-2 Cam) Contacts transfer when lever is operated CW or CCW.	CONTACTS	CIRCUITS	HOUSING	
			BRONZE	ALUMINUM
	1 N.O. 1 N.C.		EA800-10140 WGT. 12 LB.	EA800-10150 6 LB.
	2 N.O. 2 N.C.		EA800-20140 WGT. 16 LB.	EA800-20450 7 LB.
	3 N.O. 3 N.C.		EA800-30140 WGT. 19 LB.	EA800-30150 8 LB.



A. Trip Travel.....	18°
B. Reset Travel.....	14°
C. Recommended Travel.....	30°
D. Maximum Travel Available.....	90°
Torque	1 N.O. - 1 N.C. .... 15
(Inch Lbs.)	2 N.O. - 2 N.C. .... 27
	3 N.O. - 3 N.C. .... 33

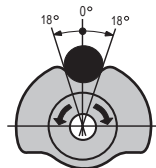
### Typical Cams

#### B1 Single Action



Normally open to make (normally closed to break) IN ONE DIRECTION ONLY. Lever and cam are spring returned to starting position. Used on Single Action Switches only.

#### B2 Double Action



Normally open to make (normally closed to break) IN EITHER DIRECTION. Lever and cam are spring returned to starting position.

#### Combination B1/B2 CAM

The following three operating sequences are built into the combination cam used in the standard EA800 switches: B1 Single Action CW, B1 Single Action CCW and B2 Double Action CW & CCW.

1. The contacts function when the lever is operated clockwise. The lever can be operated counterclockwise but the contacts will not operate.
2. The contacts function when the lever is operated counterclockwise. The lever can be operated clockwise but the contacts will not operate.
3. The contacts function when the lever is operated clockwise or counterclockwise.



**1 N.O. - 1 N.C. & Neutral Position**

1. Heavy duty contact arrangements is NEMA Form Z, single pole, double throw, butt contacts, quick make-quick break with four terminals.
2. Operating Lever (not shown) is adjustable in 7°30' increments thru 360°.
3. Adequate wiring space for four no. 12 AWG conductors.
4. NEMA Type 7, Class I, Groups C and D; Type 9, Class II, Groups E, F, and G.
5. Meets Continuous current rating - AMPS

75-100% Power Factor  
Heavy pilot duty 600 VAC max.

125 VAC	20 Amps	600 VAC	5 Amps
250 VAC	15 Amps	125 VDC	5 Amps
480 VAC	10 Amps	250 VDC	1.5 Amps

**General Description:** Namco Controls now offers the EA080, EA060 and EA040 switches in an enclosure suitable for use in hazardous locations designated Series EA880. All the

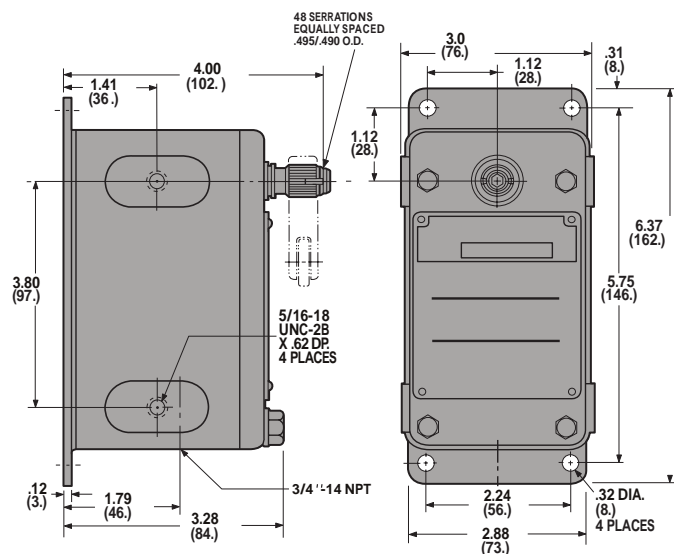
operational features of these tough heavy duty limit switches are now available in a hazardous location enclosure, or hazardous location plus watertight when required.

**Service Conditions:** The Series EA880 hazardous location switches operate reliably where gases, vapors and dust are potential explosion hazards. The cast aluminum switch housings resist corrosion.

**Rugged Construction:** Spark proof aluminum NEMA type enclosure listed by the Underwriters Laboratories can withstand internal and external gas explosions. Wiring space is ample for up to size 12 wire. Meets NEMA types 1, 4, 13 water, oil, dust-tight and Type 7, Class I, Groups C & D and Type 9, Class II, Groups E, F and G, – hazardous locations.

**Proven Performance:** Cycle life in the millions, when operated properly at the rated current, voltage, and temperature. Standard switches have maximum ambient temperature rating of -20°C to +90°C continuous. Switches can be specially ordered for LOW temperature -40°C to +90°C or HIGH temperature + 10°C to + 180°C requirements.

## Dimensions and Mounting

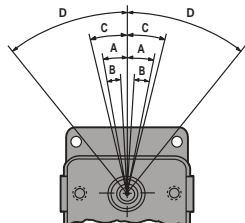
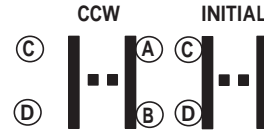
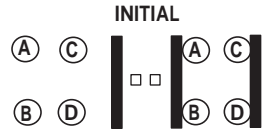
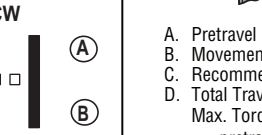


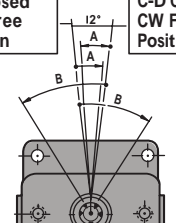
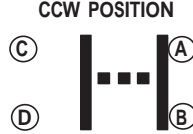

All dimensions given in US & Metric: Inches (mm)

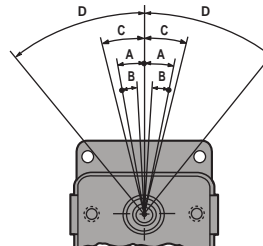
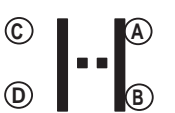

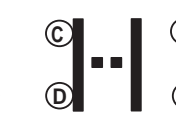
**Levers Available.** A variety of levers for hazardous location limit switches can be ordered. See Pages 68-75.

**NOTE:** Levers must be ordered as separate item. ONLY non-sparking levers should be used in hazardous locations.

## Ordering Information

CAT. NO.	REMARKS	DESCRIPTION	TEMP. RANGE	ROTATION	U.L.	OPERATIONAL DATA
EA880-11100	ALUM	STD.	—20° C TO +90° C	CW	YES	 <p> A. Pretravel ..... 10°  B. Movement Differential ..... 8°  C. Recommended Travel ..... 13°  D. Total Travel ..... 38°  Max. Torque during pretravel ..... 13 Lb. In.  Max. Torque at total travel ..... 35 Lb. In. </p>
EA880-11500	ALUM (NEMA type 4)	WATERTIGHT	—20° C TO +90° C	CW	YES	
EA880-11700	ALUM (NEMA type 4)	WATERTIGHT	—40° C TO +90° C	CW	NO	
EA880-12100	ALUM	STD.	—20° C TO +90° C	CCW	YES	
EA880-12500	ALUM (NEMA type 4)	WATERTIGHT	—20° C TO +90° C	CCW	YES	
EA880-12700	ALUM (NEMA type 4)	WATERTIGHT	—40° C TO +90° C	CCW	NO	
<b>CONTACT CONFIGURATION</b> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <b>CCW</b>   </div> <div style="text-align: center;"> <b>INITIAL</b>   </div> <div style="text-align: center;"> <b>CW</b>   </div> </div>						

CAT. NO.	REMARKS	DESCRIPTION	TEMP. RANGE	ROTATION	U.L.	OPERATIONAL DATA
EA880-13100	ALUM	STD.	—20° C TO +90° C	NO RETURN SPRING	YES	 <p> A. Pretravel CW or CCW ..... 10°  B. Total Travel CW or CCW ..... 8°  C. Max. Torque during pretravel ..... 5 Lb. In.  Max. Torque at total travel ..... 25 Lb. In. </p>
EA880-13200	BRONZE	STD.	—20° C TO +90° C	NO RETURN SPRING	YES	
EA880-13500	ALUM (NEMA type 4)	WATERTIGHT	—20° C TO +90° C	NO RETURN SPRING	YES	
EA880-13600	BRONZE (NEMA type 4)	WATERTIGHT	—20° C TO +90° C	NO RETURN SPRING	YES	
EA880-13700	ALUM (NEMA type 4)	WATERTIGHT	—40° C TO +90° C	NO RETURN SPRING	NO	
<b>CONTACT CONFIGURATION</b> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <b>CCW POSITION</b>   </div> <div style="text-align: center;"> <b>CW POSITION</b>   </div> </div>						

CAT. NO.	REMARKS	DESCRIPTION	TEMP. RANGE	ROTATION	U.L.	OPERATIONAL DATA
EA880-17100	ALUMINUM	STD.	—20° C TO +90° C	NEUTRAL POSITION	YES	 <p> A. Pretravel CW or CCW ..... 7°  B. Movement Differential CW or CCW ..... 6°  C. Recommended Travel CW or CCW ..... 7°30'  D. Total Travel CW or CCW ..... 33°  Max. Torque during pretravel ..... 22 Lb. In.  Max. Torque at total travel ..... 35 Lb. In. </p>
EA880-17500	ALUMINUM	WATERTIGHT	—20° C TO +90° C	NEUTRAL POSITION	YES	
EA880-17700	ALUMINUM	WATERTIGHT	—40° C TO +90° C	NEUTRAL POSITION	NO	
<b>CONTACT CONFIGURATION</b> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <b>CCW</b>   </div> <div style="text-align: center;"> <b>INITIAL</b>   </div> <div style="text-align: center;"> <b>CW</b>   </div> </div>						



## EA700



## EA800



## Dimensions and Mounting

- HEAVY DUTY CAM OPERATED
- MULTIPLE TRIP SEQUENCE'S
- ADJUSTABLE AND FIXED BELT
- ROLLER LEVERS
- AVAILABLE FOR INDUSTRIAL OR
- HAZARDOUS LOCATIONS

NAMCO has adapted the EA700/800 Series switches for use as belt-misalignment on conveyor systems. The EA700 Series is rated NEMA type 1, 4 & 13. The hazardous location EA800 Series is rated for NEMA type 4, type 7 Class I, Groups C & D, and type 9 Class II, Groups E, F, G. The scope of models is carefully engineered to meet any requirements for conveyor systems. All models have Namco's standard feature of generous over-travel, fast contact action and Form Z contact arrangement.

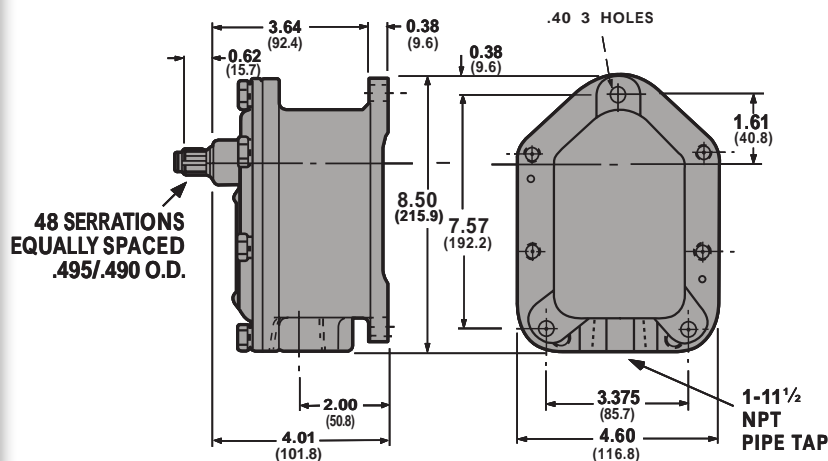
Switches are available with the

- One-step sequence switch with maintained lever and contact position.
- One-step operation.
- Trip travel is 18° in both clockwise & counter-clockwise. Contacts and lever are maintained in tripped position.
- Two-step sequence switch. Two-step operation with first trip at 12°, second trip at 22° in both clockwise and counter-clockwise. **LEVER IS SPRING RETURNED.**
- Two-step sequence switch with maintained lever and contact position. Two-step operation with first trip at 12°, second trip at 22° in both clockwise and counter-clockwise. **LEVER AND CONTACTS ARE MAINTAINED IN TRIPPED POSITION.**

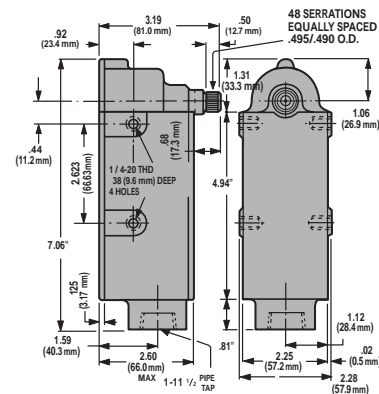
## OPTIONS AVAILABLE:

- High Temperature (0°C to + 150°C)  
Components and Lubricants
- Low Temperature (-40°C to +90°C)  
Components and Lubricants
- Enclosure to meet NEMA 4X, 6, & 6P

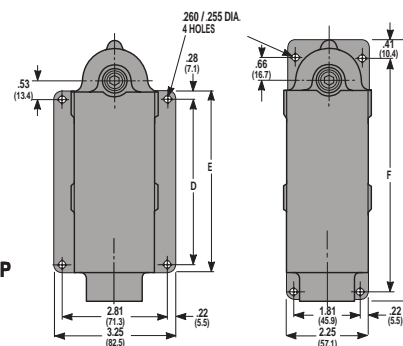
## EA800



## EA700



## Standard Mounting



## Wide mounting

## Long Mounting

## Specifications

- Enclosure: EA700: NEMA 1, 4, & 13  
EA800: NEMA 4, 7, Class I,  
Groups C & D, Class II  
Groups E, F, & G
- Contacts made of silver alloy.
- Standard Temperature Range: -20°C to +90°C
- Operating lever is adjustable to any required position.
- Operating Torques -- Trip Torque varies. See Operational Data Chart.

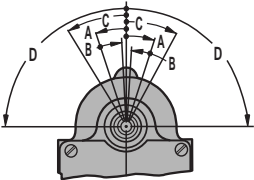

### 6. Continuous Current Rating -- Amperes

125 V-A.C.	20.0 Amps.*
250 V-A.C.	15.0 Amps.*
480 V-A.C.	10.0 Amps.*
600 V-A.C.	5.0 Amps.*
125 V-D.C.	5.0 Amps
250 V-D.C.	1.5 Amps

\*75-100% Power Factor.

### 7. Form Z contact arrangement.

## Ordering Information

ORDERING INFORMATION					OPERATIONAL DATA	
ONE-STEP — MAINTAINED LEVER & CONTACTS					 <p>A. Trip Travel ..... 12° B. Reset Travel ..... 10° C. Recommended Travel ..... 45° D. Total Travel Available ..... 90° Torque (Inch Lbs.): 2 N.O. - 2 N.C. ..22°</p>	
EA700						
NEMA TYPE	SERIES	MOUNTING				
		STANDARD	WIDE	LONG		
1, 4, 13	EA700	20137	50137	80137		
EA800						
NEMA TYPE	SERIES	HOUSING				
		BRONZE	ALUMINUM			
4, 7, 9	EA800		20157			
<div>2 N.O. 2 N.C.</div> <div></div>						

ORDERING INFORMATION					OPERATIONAL DATA	
TWO-STEP — MAINTAINED LEVER & CONTACTS						
EA700						
NEMA TYPE	SERIES	MOUNTING				
1, 4, 13	EA700	STANDARD	WIDE	LONG		
		28437	58437	88437		
CONTACT CONFIGURATION						
CW & CCW						
TWO-STEP — SPRING RETURN					<p>Direction of Rotation CW CCW</p> <p>A. Trip Travel 1st ..... 12° 12°</p> <p>B. Reset Travel 1st ..... 10° 10°</p> <p>C. Recommended Travel ..... 45° 45°</p> <p>D. Total Travel ..... 90° 90°</p> <p>E. 2nd Trip Travel ..... 22° 22°</p> <p>F. 2nd Reset Travel ..... 10° 10°</p>	
EA700						
NEMA TYPE	SERIES	MOUNTING				
1, 4, 13	EA700	STANDARD	WIDE	LONG		
		20176	50176	80176		
EA800						
NEMA TYPE	SERIES	HOUSING				
4, 7, 9	EA800	BRONZE	ALUMINUM			
		28440	28450			

**OPERATING LEVER REFERENCE PAGES**

**Operating Levers**  
(EL Series)

68-75

**NOTES**







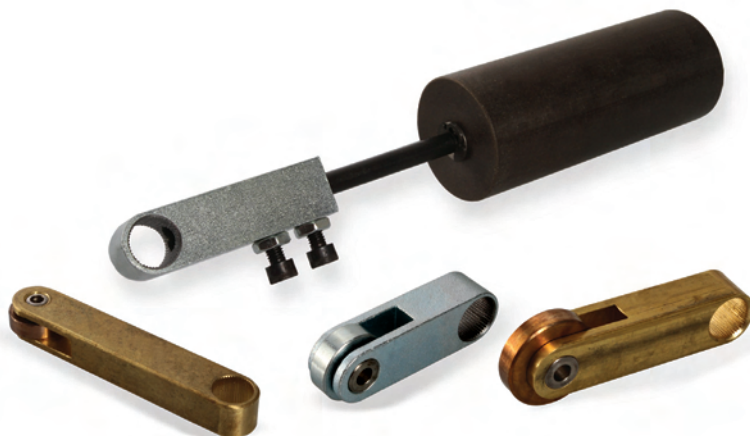
**OPERATING LEVERS**

**1-800-NAMTECH**



### FOR SERIES:

EA040 (D200G-NPB),  
EA060 (D200G-ST),  
EA080 (D1200G),  
EA170 (D2400X),  
EA700 (SL2C, 3C, 4C),  
EA770, EA780, EA790,  
EA800 (SL2XC/3XC/4XC),  
EA880

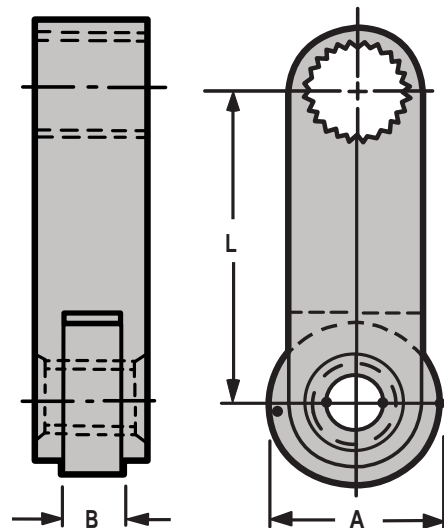


Please select the operating lever for your application with regards to dimensions and materials required.

Requests for operating levers not shown should include lever style and all specific information as to limit switch number, dimensions, materials, etc.

Depending upon your application, levers are available in cold rolled steel, stainless steel, or bronze. Rollers are available in steel, nylon, beryllium copper stainless steel or steel ball bearings. Please consult materials column of the lever of your choice.

This style and size operating lever is considered standard for the majority of snap-lock switch installations. The EL010-53420 (D1260) lever is steel with a nylon roller and a stainless steel roller pin. Like all Snap-Lock levers, the serrated mounting hole matches the serrated lever shaft of the switches to provide fixed adjustment of the lever in 7.5° increments.



# EL SERIES

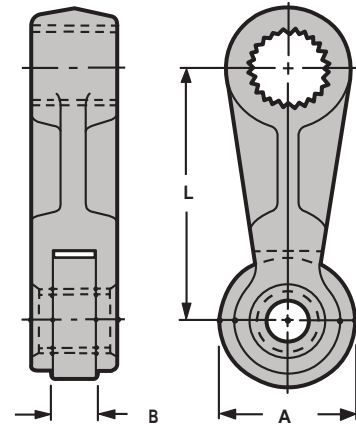
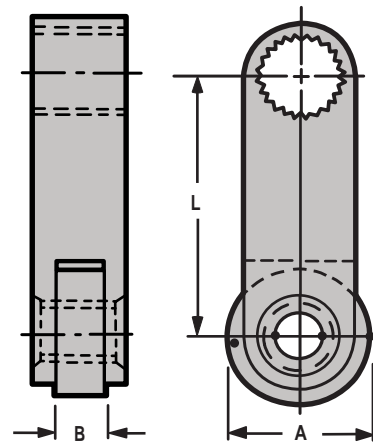
ORDERING NUMBERS		L	A	B	MATERIAL	
PART NUMBER	REFERENCE				LEVER	ROLLER
EL060-50320	D1260BA	3/4	3/4	1/4	C.R.S	C.R.S
EL060-51319	—	1	3/4	1/4	C.R.S	Brvl. Cop.
EL060-52321	D1260GQ	1-1/4	3/4	1/4	C.R.S	C.R.S
EL060-53923	D1260BH	1-1/2	1-1/4	1/4	C.R.S	C.R.S
EL010-53338	DS1260	1-1/2	3/4	1/4	STEEL	C.R.S
EL060-53300	—	1-1/2	3/4	1/4	BRASS	Brvl. Cop.
EL010-53336	—	1-1/2	3/4	1/4	STEEL	S.S.
EL010-53337	—	1-1/2	3/4	1/4	STEEL	Brvl. Cop.
EL060-53401	D1260RF	1-1/2	9/32	9/32	BRASS	NYLON
EL060-53402	—	1-1/2	7/8	9/32	BRASS	Brvl. Cop.
EL010-53420	D1260	1-1/2	7/8	9/32	STEEL	NYLON
EL010-53429	D1260Y	1-1/2	7/8	9/32	STEEL	B.B.
EL060-53536	D1260Z	1-1/2	1	1/4	C.R.S	C.R.S
EL060-53926	D1260CL	1-1/2	1-3/8	1/4	C.R.S	C.R.S
EL060-55327	D1260E	2	3/4	1/4	C.R.S	C.R.S
EL060-55300	—	2	3/4	1/4	C.R.S	Brvl. Cop.
EL060-55520	D1260AC	2	1	1/4	C.R.S	C.R.S
EL060-55601	—	2	1	1/4	C.R.S	Brvl. Cop.
EL060-55530	D1260RT	2	1	1/4	BRASS	Brvl. Cop.
EL060-55927	D1260GT	2	1-1/2	1/4	C.R.S	C.R.S
EL060-50321	D1260BC	2-1/8	3/4	1/4	C.R.S	C.R.S
EL060-50501	D1260B	2-1/8	1	1/4	C.R.S	C.R.S
EL060-50334	D1260M	2-1/4	3/4	1/4	C.R.S	C.R.S
EL060-59300	D1260KC	2-3/8	3/4	1/4	C.R.S	C.R.S
EL010-56427	D1260KC	2-1/2	7/8	9/32	STEEL	NYLON
EL010-56334	DS1260K	2-1/2	3/4	1/4	STEEL	C.R.S
EL010-55421	D1260DF	2-1/2	1	1/4	C.R.S	C.R.S
EL060-56500	D1260RR	2-1/2	1	1/4	BRASS	Brvl. Cop.
EL060-56920	D1260CP	2-1/2	1-1/2	1/4	C.R.S	C.R.S
EL060-50322	D1260BD	2-3/4	3/4	1/4	C.R.S	C.R.S
EL060-57300	—	2-3/4	3/4	1/4	C.R.S	Brvl. Cop.
EL010-58300	—	3	3/4	1/4	STEEL	Brvl. Cop.
EL010-58337	DS1260L	3	3/4	1/4	STEEL	C.R.S
EL060-58305	—	3	3/4	1/4	BRASS	Brvl. Cop.
EL010-58400	—	3	7/8	9/32	STEEL	Brvl. Cop.
EL010-58423	D1260L	3	7/8	9/32	STEEL	NYLON
EL010-58451	—	3	7/8	9/32	STEEL	C.R.S
EL060-58401	—	3	7/8	9/32	BRASS	NYLON
EL060-58403	D1260VQ	3	7/8	9/32	S.S.	Brvl. Cop.
EL010-58521	D1260CJ	3	1	1/4	STEEL	C.R.S
EL010-58522	—	3	1	1/4	C.R.S	Brvl. Cop.
EL010-58923	D1260CN	3	1-1/4	1/4	STEEL	C.R.S
EL060-58923	—	3	1-1/4	1/4	BRASS	STEEL
EL010-58900	D1260VR	3	1-1/2	1/4	STEEL	NYLON
EL010-58920	D1260AE	3	1-1/2	1/4	STEEL	C.R.S
EL060-58320	D1260BB	3-1/2	3/4	1/4	C.R.S	C.R.S
EL060-58431	D1260AP	3-1/2	1	1/4	C.R.S	C.R.S
EL060-58932	—	3-1/2	3/4	1/4	BRASS	Brvl. Cop.
EL060-58930	—	3-1/2	1-1/2	1/4	BRASS	Brvl. Cop.
EL060-58326	D1260C	4	3/4	1/4	C.R.S	C.R.S
EL060-58304	D1260WD	4	3/4	1/4	C.R.S	Brvl. Cop.
EL060-50523	D1260BL	4	1	1/4	C.R.S	C.R.S
EL060-58925	—	4	1-1/4	1/4	BRASS	Brvl. Cop.
EL060-58920	D1260AB	4	1-1/2	1/4	C.R.S	C.R.S
EL060-58901	—	4	1-1/2	9/32	C.R.S	NYLON
EL060-50335	D1260N	5	3/4	1/4	C.R.S	C.R.S
EL060-50925	D1260BW	5	1-1/2	1/4	C.R.S	C.R.S
EL060-50305	D1260CQ	6	3/4	1/4	C.R.S	C.R.S
EL060-50338	—	6	3/4	1/4	C.R.S	Brvl. Cop.
EL060-50930	D1260JE	6	1-1/4	1/4	C.R.S	C.R.S
EL060-50703	D1260KD	6	3	1/4	C.R.S	C.R.S

All dimensions are in inches.

## Style R

Regular Straight Type

For series: EA040, 060, 080, 170, 700, 710, 730, 760, 770, 780, 790, 800, 880, 990



OPERATING LEVERS

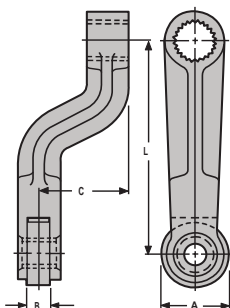
OPERATING LEVERS

1-800-NAMTECH

## Regular Lever Offset Type

## Style RLO

For series: EA040, 060, 080, 170, 700, 710, 730, 760, 770, 780, 790, 800, 880, 990 only.



ORDERING NUMBERS		L	A	B	C	MATERIAL	
PART	REFERENCE					LEVER	ROLLER
* EL020-53326	D1260GX	1-1/2	3/4	1/4	1-1/4	Mang. Br.	STEEL
* EL020-53325	D1260GU	1-1/2	3/4	1/4	1-3/16	Mang. Br.	STEEL
EL020-55327	D1260HZ	2	3/4	1/4	1-1/8	Mang. Br.	STEEL
EL020-55300	D1260JD	2	3/4	1/4	1-1/2	Mang. Br.	STEEL
* EL020-56321	D1260DW	2-1/2	3/4	1/4	2-1/4	Mang. Br.	STEEL
EL020-56421	D1260DG	2-1/2	1	1/4	1	Mang. Br.	STEEL
EL020-58922	D1260FT	3	1-1/4	1/4	1-1/4	Mang. Br.	STEEL
EL020-58923		3	1-1/4	1/4	1-1/4	Mang. Br.	S.S.
EL020-59900	D1260AY	5-1/2	1-1/2	1/4	1-3/4	C.R.S.	STEEL

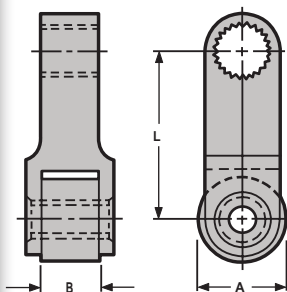
Offset lever with straddle-supported roller.

\*On Series EA040/060/080/170, Lever will not clear top of switch when mounted with Roller facing rear.

## Wide Roller Regular Type

## Style RW

For series: EA040, 060, 080, 170, 700, 710, 730, 760, 770, 780, 790, 800, 880, 990 only.



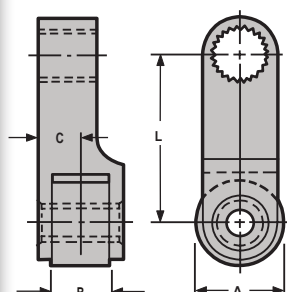
ORDERING NUMBERS		L	A	B	MATERIAL	
PART	REFERENCE				LEVER	ROLLER
EL070-53501	D1260AJ	1-1/2	1	1/2	C.R.S.	Bryl. Cop.
EL070-50507	D1260CY	1-5/8	1	1/2	C.R.S.	Bryl. Cop.
EL070-56921	D1260DY	2-1/2	1-1/4	1/2	C.R.S.	STEEL
EL060-00024	D1260AL	3	1-1/2	1/2	C.R.S.	STEEL
EL060-50921	D1260BE	4	1-1/4	1/2	C.R.S.	STEEL

Machined lever with wide roller straddle-supported directly in line with the serrated mounting hole.

## Wide Roller Offset Type

## Style RWO

For series: EA040, 060, 080, 170, 700, 710, 730, 760, 770, 780, 790, 800, 880, 990 only.



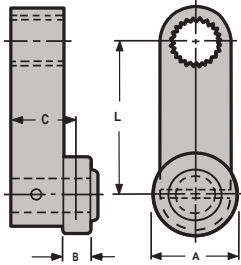
ORDERING NUMBERS		L	A	B	C	MATERIAL	
PART	REFERENCE					LEVER	ROLLER
EL080-53329	D1260R	1-1/2	3/4	1/2	3/8	Mang. Br.	STEEL
EL080-53321	D1260CS	1-1/2	3/4	1-1/8	3/4	Mang. Br.	STEEL
EL080-53932	D1260P	1-1/2	1-1/2	1/2	3/8	C.R.S.	STEEL
EL080-55323	D1260FR	2	3/4	1/2	3/8	C.R.S.	STEEL
EL080-54905	D1260DD	2	1-1/2	1/2	3/8	C.R.S.	C.R.S.
EL080-56301	D1260AH	2-1/2	3/4	1/2	3/8	C.R.S.	STEEL
EL080-56305		2-1/2	3/4	1/2	3/8	C.R.S.	Bryl. Cop.
EL080-58322	D1260GN	3	3/4	1/2	3/8	C.R.S.	STEEL
EL080-58901	D1260DE	3	1-1/2	1/2	3/8	C.R.S.	STEEL
EL080-58906	D1260DZ	3-1/2	1-1/2	1/2	3/8	C.R.S.	STEEL
EL080-58909	D1260HA	4	1-1/2	1/2	3/8	C.R.S.	STEEL
EL080-50924	D1260BS	6	1-1/2	1/2	3/8	C.R.S.	STEEL

Lever provides straddle-type support for wide roller, which is offset from serrated lever hub. Side toward switch is machined straight.

## Style S

Side Roller Type

For series: EA040, 060, 080, 170, 700, 710, 730, 760, 770, 780, 790, 800, 880, 990 only.



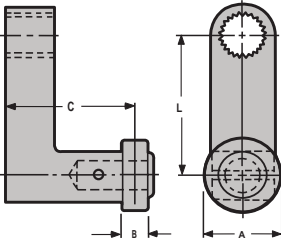
ORDERING NUMBERS		L	A	B	C	MATERIAL	
PART	REFERENCE					LEVER	ROLLER
EL150-53303	—	1-1/2	3/4	3/4	7/8	C.R.S.	Bryl. Cop.
EL150-53301	D1260A	1-1/2	3/4	1/4	5/8	C.R.S.	STEEL
EL150-53300	D1260DU	1-1/2	3/4	3/4	7/8	C.R.S.	STEEL
EL150-53901	D1260HV	1-1/2	1-1/4	1/4	5/8	C.R.S.	STEEL
EL150-55300	—	2	3/4	1/2	3/4	C.R.S.	Bryl. Cop.
EL150-55303	D1260DT	2	3/4	1/4	5/8	C.R.S.	STEEL
EL150-55301	D1260JJ	2	3/4	1/2	3/4	C.R.S.	C.R.S.
EL150-56300	D1260DX	2-1/2	3/4	1/4	5/8	C.R.S.	C.R.S.
EL150-56500	—	2-1/2	1	1/2	3/4	C.R.S.	S.S.
EL150-57300	D1260DO	2-3/4	3/4	1/4	5/8	C.R.S.	C.R.S.
EL150-58901	—	4	1-1/4	1/4	5/8	BRONZE	NYLON
EL150-58902	—	4	1-1/4	1/4	5/8	BRONZE	STEEL

Side supported roller offset on front side of lever machined with straight side.

## Style SLO

Wide Roller Regular Type

For series: EA040, 060, 080, 170, 700, 710, 730, 760, 770, 780, 790, 800, 880, 990 only.



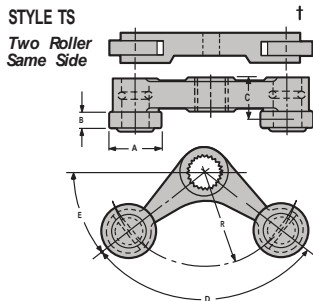
ORDERING NUMBERS		L	A	B	C	MATERIAL	
PART	REFERENCE					LEVER	ROLLER
EL090-53324	D1260GZ	1-1/2	3/4	1/4	1	BRONZE	STEEL
EL090-53336	—	1-1/2	3/4	1/4	1-3/8	BRONZE	NYLON
EL090-53321	D1260CT	1-1/2	3/4	1/4	1-3/8	BRONZE	STEEL
EL090-53322	—	1-1/2	3/4	1/4	1-3/8	BRONZE	Bryl. Cop.
EL090-53328	D1260GV	1-1/2	3/4	1/4	2	BRONZE	STEEL

Right angle offset lever has side-supported roller mounted on end.

## Style TS

Two Roller Same Side

For series: EA040, 060, 080, 170, 700, 710, 730, 760, 770, 780, 790, 800, 880, 990 only.



ORDERING NUMBERS		R	A	B	C	D	E	MATERIAL	
PART	REFERENCE							LEVER	ROLLER
EL040-50327	D1260CM	1-3/8	3/4	1/4	5/8	107°34'	36°	BRONZE	STEEL
EL040-50328	D1260JQ	1-3/8	3/4	1/2	3/4	107°34'	36°	BRONZE	STEEL
EL040-58904	D1260JH	3	1-1/2	1/2	3/4	150°	15°	BRONZE	STEEL
EL040-58905	—	3	1-1/2	1/2	3/4	150°	15°	BRONZE	Bryl. Cop.

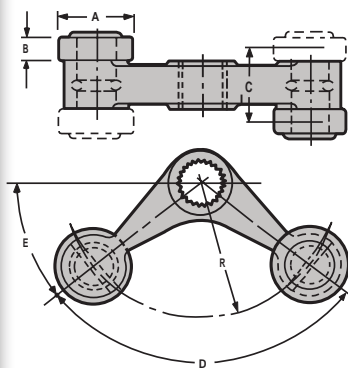
Angle type rocker arm has both side-supported rollers mounted on same side.



## Two Roller Opposite Side

## Style TSO

For series: EA040, 060, 080, 170, 700, 710, 730, 760, 770, 780, 790, 800, 880, 990 only.



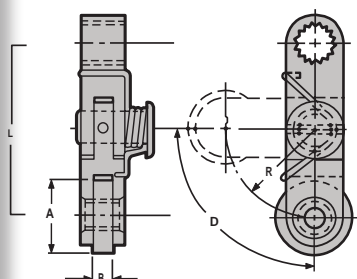
ORDERING NUMBERS		R	A	B	C	D	E	MATERIAL	
PART	REFERENCE							LEVER	ROLLER
EL030-50301	D1260AA	1-3/8	3/4	1/4	3/4	107°34'	36°13'	BRONZE	STEEL
EL030-50302	D1260DH	1-3/8	3/4	1/2	1	107°34'	36°13'	BRONZE	STEEL
EL030-52322	D1260DQ	1-1/2	3/4	3/4	1 1/4	90°	45°	BRONZE	STEEL

Angle type rocker lever has side-supported rollers mounted on opposite sides.

## Knee Action Straight Type

## Style KR

For series: EA040, 060, 080, 170, 700, 710, 730, 760, 770, 780, 790, 800, 880, 990 only.



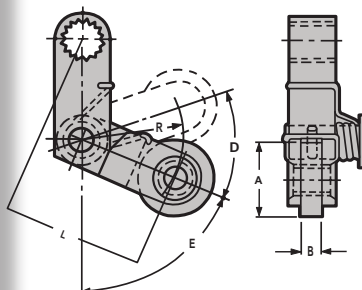
ORDERING NUMBERS		R	A	B	D	L	MATERIAL	
PART	REFERENCE						LEVER	ROLLER
EL100-55401	D1260JM	1	7/8	1/4	90°	2	STEEL	STEEL
EL100-55402	—	1	7/8	1/4	90°	2	STEEL	Bryl. Cop.
EL100-55403	—	1	7/8	1/4	90°	2	STEEL	S.S.

Single-loaded lever with straddle-supported roller. Used where switch action is required in one direction only – return movement of actuating mechanism does not operate the switch.

## Knee Action Offset Type

## Style KRO

For series: EA040, 060, 080, 170, 700, 710, 730, 760, 770, 780, 790, 800, 880, 990 only.



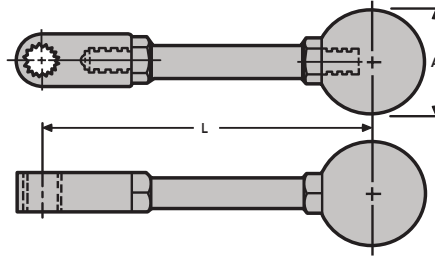
ORDERING NUMBERS		R	A	B	D	E	L	MATERIAL	
PART	REFERENCE							LEVER	ROLLER
EL110-50401	D1260JV	1-1/8	7/8	1/4	41°30'	67°30'	1-7/8	STEEL	STEEL

Spring-loaded offset lever with straddle-supported roller. Used where switch action is required in one direction only – return movement of actuating mechanism does not operate switch.

## Style M

Manual Type

For series: EA040, 060, 080, 170, 700, 710, 730, 760, 770, 780, 790, 800, 880, 990 only.

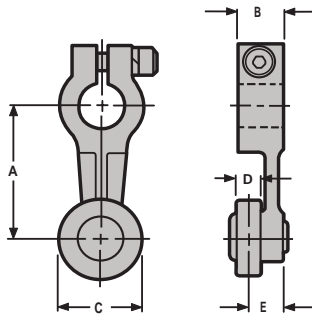


ORDERING NUMBERS		L	A	MATERIAL	
PART NUMBER	REFERENCE			LEVER	KNOB
EL050-58900	D1260EP-3	3	1-3/8	STEEL	BAKELITE
EL050-59901	D1260EP-1	4	1-3/8	STEEL	BAKELITE
EL050-59900	D1260EP-1	6-1/3	1-3/8	STEEL	BAKELITE

Steel shaft with bakelite knob.

## STRAIGHT

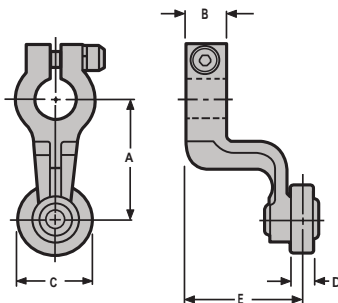
For series: EA700, 710, 730, 760, 770, 780, 790, 800, 880, 990 only.



ORDERING NUMBERS		A	B	C	D	E	MATERIAL	
PART	REFERENCE						LEVER	ROLLER
EL010-62401	SL-160	1-1/2	1/2	7/8	9/32	25/64	ZINC	STEEL
EL010-63414	SL-160K	1-1/2	1/2	7/8	9/32	25/64	ZINC	S.S.
EL010-63415	SL-160N	1-1/2	1/2	7/8	9/32	25/64	ZINC	NYLON

## OFFSET

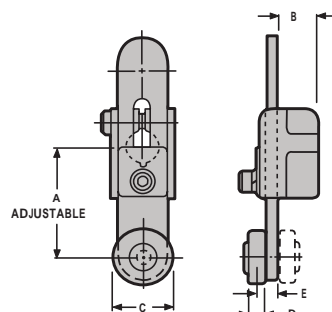
For Series: EA700, EA770, EA780, EA790, EA800, EA880 Switches with .500 dia. Lever Shaft.



ORDERING NUMBERS		A	B	C	D	E	MATERIAL	
PART	REFERENCE						LEVER	ROLLER
EL020-63412	SL-160C	1-1/2	1/2	7/8	9/32	1-7/16	ZINC	STEEL
EL020-63414	2L-160L	1-1/2	1/2	7/8	9/32	1-7/16	ZINC	NYLON
EL020-63415	SL-160S	1-1/2	1/2	7/8	9/32	1-7/16	ZINC	S.S.

## Adjustable Straight

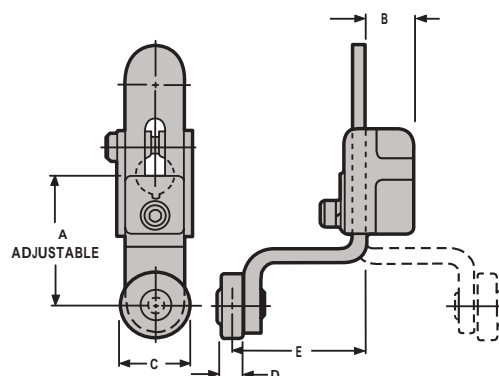
For series: EA700, 710, 730, 760, 770, 780, 790, 800, 880, 990 only.



ORDERING NUMBERS		A	B	C	D	E	MATERIAL	
PART	REFERENCE						LEVER	ROLLER
EL120-60400	SL-170A	1-3/4-3	21/32	7/8	9/32	11/32	STEEL	STEEL
EL120-60600	SL-170C	1-7/8-3	21/32	2	9/32	11/32	STEEL	STEEL
EL120-69415	SL-170K	1-3/4-3	21/32	7/8	9/32	11/32	STEEL	NYLON
EL120-69421	SL-170R	3-3/4-5	21/32	7/8	9/32	11/32	STEEL	STEEL
EL120-60601	—	3-3/4-5	21/32	2	9/32	11/32	STEEL	STEEL

## Adjustable Offset

For series: EA700, 710, 730, 760, 770, 780, 790, 800, 880, 990 only.

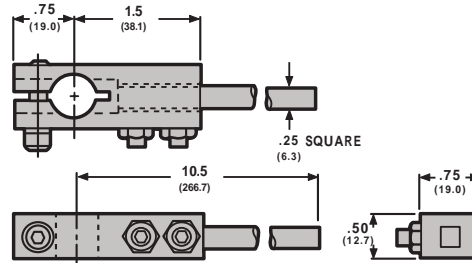


ORDERING NUMBERS		A	B	C	D	E	MATERIAL	
PART	REFERENCE						LEVER	ROLLER
EL130-64410	SL-170	1-3/4-3	21/32	7/8	9/32	1-25/32	STEEL	STEEL
EL130-69410	SL-170D	1-3/4-3	21/32	7/8	9/32	1-25/32	STEEL	NYLON
EL130-69412	SL-170F	1-3/4-3	21/32	7/8	9/32	2-3/8	STEEL	STEEL
EL130-69413	SL-170G	1-3/4-3	21/32	7/8	9/32	3-1/2	STEEL	STEEL
EL130-69414	SL-170J	1-3/4-3	21/32	7/8	9/32	15/16	STEEL	STEEL
* EL130-69411	SL-170E	1-3/4-3	21/32	7/8	9/32	1-9/32	STEEL	STEEL
EL130-20401	—	1-3/4-3	21/32	7/8	17/64	3-1/2	STEEL	NYLON

\*Roller mounted on opposite side.

## Rod Lever

For series: EA700, 710, 730, 760, 770, 780, 790, 800, 880, 990 only.

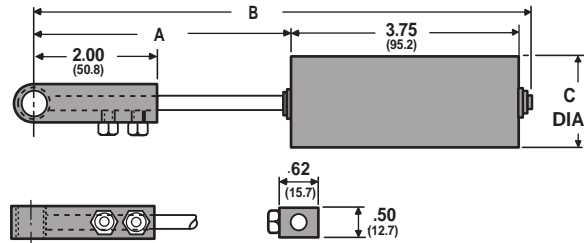


ORDERING NUMBERS		A	B	C	D	E	MATERIAL
PART	REFERENCE						
EL140-69917	SL170 M-1	OTHER ROD LENGTHS AVAILABLE TO SUIT REQUIREMENTS					STEEL ROD

## Style VR

Belt Mis-Alignment Lever – Adjustable

For series: EA040, 060, 080, 170, 700, 710, 730, 760, 770, 780, 790, 800, 880, 990 only.

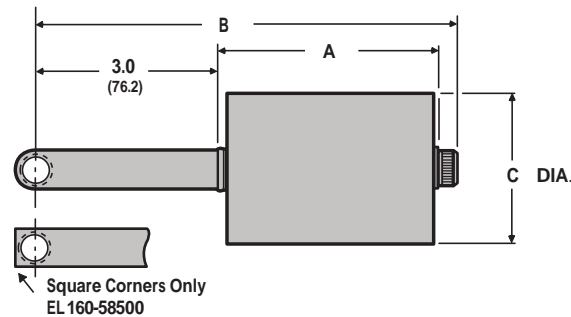


ORDERING NUMBERS	"A" (Adjustable)	"B" Max.	"C" Dia.	MATERIAL	
				LEVER	ROLLER
EL140-58500	4.33/3.75"	8.38"	1.50"	STEEL	DELRIN
EL140-58600	4.38/3.75"	8.38"	2.50"	STEEL	DELRIN

## Style YR

Belt Mis-Alignment Lever

For series: EA040, 060, 080, 170, 700, 710, 730, 760, 770, 780, 790, 800, 880, 990 only.



ORDERING NUMBERS	"A"	"B" Max.	"C" Dia.	MATERIAL	
				LEVER	ROLLER
EL160-58500	2.24"	5.64"	1.25"	STEEL	NYLON
EL160-58600	3.50"	6.90"	2.50"	STEEL	NYLON



## ICS 6-110.01 Definitions

### Acid-resistant

Constructed so that its less likely to be damaged by exposure to acid fumes.

*NEMA Standard 12-8-1972.*

### Drip-proof

Constructed or protected so that falling dirt or drops of liquid will not hinder the successful operation of the apparatus under specified test conditions. See ICS 6-110.52, *NEMA Standard 7-16-1969.*

### Drip-tight

Constructed or protected to exclude falling dirt or drops of liquid under specified test conditions. See ICS 6-110.52, *NEMA Standard 7-16-1969.*

### Dust-tight

Constructed to meet the requirements of a specified dust-tightness test. See ICS 6-110-.54, *NEMA Standard 7-16-1969.*

### External Mounting

Enclosure mounting provisions external to the apparatus cavity.

*NEMA Standard 7-16-1969.*

### Flush Mounting

Designed to have a minimal front projection when set into and secured to a flat surface.

*NEMA Standard 7-16-1969.*

### Knockout

A portion of the wall of a box or cabinet created so that it can be removed easily by a hammer, screwdriver, and pliers at the time of installation in order to provide a hole for the attachment of a raceway cable or fitting.

*NEMA Standard 7-16-1969.*

### Hazardous Locations

Those areas which may contain hazardous materials in enough quantity to create an explosion. See Article 500 of the National Electrical Code.

*NEMA Standard 7-16-1969.*

### Non-ventilated

Constructed provides no intentional circulation of external air through the enclosure.

*NEMA Standard 7-16-1969.*

### Outdoor

Suitable for installation where its exposed to the weather.

*NEMA Standard 7-16-1969.*

### Proof (Used as a Suffix)

Constructed, protected or treated that successful operation of the apparatus is not interfered with when subjected to the specified material or condition.

*NEMA Standard 7-16-1969.*

### Rainproof

Constructed, protected or treated to prevent rain under specified test conditions from interfering with successful operation of the apparatus. See ICS 6-110.53.

*NEMA Standard 5-17-1971.*

### Rain-tight

Constructed or protected to exclude rain under specified test conditions. See ICS 6-110.53,

*NEMA Standard 7-16-1969.*

### Resistant (Used as a Suffix)

Constructed, protected, or treated that the apparatus will not be damaged when subjected to the specified material or conditions for a specified time.

*NEMA Standard 7-16-1969.*

### Rust-resistant

Constructed, protected or treated so that rust will not exceed a specified limit when subjected to a specified rust-resistance test. See ICS 6-110.57,

*NEMA Standard 7-16-1969.*

### Sleetproof

Constructed or protected that the accumulation of sleet (ice) under specified test conditions will not interfere with the successful operation of the apparatus including external operating mechanism(s). See ICS 6-110.55,

*NEMA Standard 7-16-1969.*

### Sleet-resistant

Constructed so that the accumulation and/or melting of sleet (ice) under specified test conditions will not damage the apparatus, See ICS 6-110.55,

*NEMA Standard 7-16-1969.*

### Submersible

Constructed to exclude water when submerged in water under specified test conditions of pressure and time.

*NEMA Standard 7-16-1969.*

### Tight (Used as a Suffix)

Constructed so that the enclosure will exclude the specified material under specified conditions.

*NEMA Standard 7-16-1969.*

### Watertight

Constructed to exclude water applied in the form of a hose stream under specified test conditions. See ICS 6-110.56,

*NEMA Standard 7-16-1969.*

**ICS 6-110.23 General**

The term “explosion-proof” has been so loosely applied that NEMA deprecates its use. As defined by the National Electrical Code, the term “explosion-proof” applies only to Type 7 and 10 enclosures which, when properly installed and maintained, are designed to contain an internal explosion without causing external hazard. The term should not be applied to Type 8 enclosures which are designed to prevent an explosion through the use of oil-immersed equipment or to Type 9 enclosures which are designed to exclude explosive amounts of easily ignitable hazardous dust.

Type 4, 4X, 12 (nonventilated only), and 13 enclosures are suitable for use in Class III hazardous locations,\* when they are applied within the surface temperature limitations given in Article 503 of the National Electrical Code and when they are marked as being suitable for Class III locations. These enclosures are designed to exclude explosive amounts of easily ignitable fibers and flyings.

\* For the definition of Class III locations, see the National Electrical Code.

*Authorized Engineering Information 3-17-1976.*

**ICS 6-110.24 Type 7, Class I, Division I Group A, B, C or D – Indoor Hazardous Locations Airbreak Equipment****.01 Nonventilated Enclosures**

Type 7 enclosures are intended for use indoors, in the atmospheres and locations defined as Class I, Division I, and Group A, B, C or D in the National Electrical Code. The letter or letters A, B, C or D which indicate the gas or vapor atmospheres in the hazardous location shall appear as a suffix to the designation “Type 7” to give the complete NEMA designation and correspond to Class I, Division I, Group A, B, C or D, respectively, as defined in the National Electrical Code. These enclosures shall be designed in accordance with the requirements of Underwriters Laboratories Inc., Industrial Control Equipment for Use in Hazardous Locations, UL 698, and shall be marked to show the Class and Group letter designations.

**.02 Design Test**

The enclosure with its enclosed equipment shall be evaluated in accordance with Underwriters Laboratories Inc., Publication No. UL 698, in effect at time of manufacture and the rust-resistance test described in ICS 6-110.57.

*NEMA Standard 3-17-1976.*

**ICS 6-110.26 Type 9, Class II; Division I Group E, F or G – Indoor Hazardous Locations Airbreak Equipment****.01 Nonventilated Enclosures**

Type 9 enclosures are intended for use indoors in the atmospheres and locations defined as Class II, Division I, and Group E, F or G in the National Electrical Code. The letter or letters E, F or G which indicate the dust atmospheres in the hazardous location shall appear as a suffix to the designation “Type 9” to give the complete NEMA designation and correspond to Class II, Division I, Group E, F or G, respectively as defined in the National Electrical Code. These enclosures shall prevent the ingress of explosive amounts of hazardous dust. If gaskets are used, they shall be mechanically attached and of a noncombustible, nondeteriorating, verminproof material. These enclosures shall be designed in accordance with the requirements of Underwriters Laboratories Inc., Publication No. UL 698, and shall be marked to show the class and group letter designations.

**.02 Ventilated Enclosures**

Ventilated enclosures are the same as nonventilated enclosures, except that ventilation shall be provided by forced air from a source outside the hazardous area to produce positive pressure within the enclosure. See ICS6-110.07.

**.03 Design Test**

The enclosure with its enclosed equipment shall be evaluated in accordance with Underwriters Laboratories Inc., Publication No. UL 698, in effect at time of manufacture and the rust-resistance test described in ICS 6-110.57.

*NEMA Standard 3-17-1976.*

**ICS 6-110.27 TYPE 10 – MESA****.01 Nonventilated Enclosures**

Type 10 enclosures shall be designed to meet the requirements of schedule 2G (1968) of the Mining Enforcement Safety Administration, U.S. Department of the Interior, for equipment to be used in mines with atmospheres containing methane or natural gas, with or without coal dust. Additional information may be found in Bulletin 541 and Information Circular 8227.

**.02 Design Test**

The design test for this type of enclosure shall be that described in Schedule 2G (1968) of the Mining Enforcement Safety Administration, U.S. Department of the Interior, Washington, D.C.

*NEMA Standard 3-17-1976.*

## ALPHA-NUMERIC LISTING

CATALOG NO.	PG.	CATALOG NO.	PG.	CATALOG NO.	PG.	CATALOG NO.	PG.
EA040	11100 24	EA170	52100 32	EA700	75000 43	EA780	80000 59
	21100 24		53100 32		75100 43		80001 59
			61100 32		75700 43		80100 59
EA060	11100 22		62100 32		75800 43		86000 59
	12100 22		63100 32		76000 42		86700 59
	13100 22				76700 42		
	21100 22	EA700	10000 41		80000 45	EA790	10000 59
	22100 22		10001 41		80001 45		10001 59
	23100 22		10100 41		80100 45		10100 59
			15000 37		80137 65		10900 59
EA080	11100 20		15100 43		80176 65		15700 59
	12100 20		15700 43		85000 47		15800 59
	13100 20		15800 43		85102 47		16000 59
	21100 20		16000 42		85108 47		16700 59
	22100 20		16700 42		86000 46		20000 59
	23100 20		20000 45		86700 46		20001 59
			20001 45		88437 65		20100 59
EA150	10013 54		20100 45		90000 49		20900 59
	10083 54		20137 65		90001 49		25102 59
	10093 54		20176 65		90100 49		25104 59
	10143 54		25000 47				26000 59
	10173 54		25102 47	EA760	00265 51	EA760	26700 59
	10313 54		25108 47		00445 51		40000 59
	10343 54		26000 46		00455 51		40001 59
	30014 54		26700 46		10005 51		40100 59
	30143 54		28437 65		30001 51		40900 59
	30145 54		30000 49		30003 51		45700 59
	30223 54		30001 49		30004 51		45800 59
	30233 54		30100 49		30006 51		46000 59
	30283 54		40000 41				46700 59
	30303 54		40001 41	EA780	10000 59	EA780	50000 59
	30396 54		40100 41		10001 59		50001 59
			45000 43		10100 59		50100 59
EA170	11100 28		45100 43		16000 59		50900 59
	12100 28		45700 43		16700 59		55102 59
	13100 28		45800 43		20000 59		55104 59
	14100 30		46000 42		20001 59		56000 59
	15100 30		46700 42		20100 59		56700 59
	16100 30		50000 45		26000 59		70000 59
	21100 28		50001 45		26700 59		70001 59
	22100 28		50100 45		40000 59		70100 59
	23100 28		50137 65		40001 59		70900 59
	24100 30		50176 65		40100 59		75700 59
	25100 30		55000 47		46000 59		75800 59
	26100 30		55102 47		46700 59		76000 59
	31100 28		55108 47		50000 59		76700 59
	32100 28		56000 46		50001 59		80000 59
	33100 28		56700 46		50100 59		80001 59
	34100 30		58437 65		56000 59		80100 59
	35100 30		60000 49		56700 59		80900 59
	36100 30		60001 49		70000 59		85102 59
	41100 32		60100 49		70001 59		85104 59
	42100 32		70000 41		70100 59		86000 59
	43100 32		70001 41		76000 59		86700 59
	51100 32		70100 41		76700 59	EA800	10400 61

CATALOG NO.	PG.	CATALOG NO.	PG.	CATALOG NO.	PG.	CATALOG NO.	PG.
EA800	10041 61	EA880	63414 73	EL060	55927 69	EL130	69412 74
	10050 61		63415 73		56500 69		69413 74
	10051 61				56920 69		69414 74
	10140 61	EL020	53325 70		57300 69		
	10150 61		53326 70		58304 69	EL140	18900 21
	20040 61		55300 70		58305 69		18901 21
	20041 61		55327 70		58320 69		58500 75
	20050 61		56321 70		58326 69		58600 75
	20051 61		56421 70		58401 69		69917 75
	20140 61		58922 70		58403 69		
	20150 61		58923 70		58431 69	EL150	53300 71
	20157 65		59900 70		58901 69		53301 71
	28440 65		63412 73		58920 69		53303 71
	28450 65		63414 73		58923 69		53901 71
	30040 61		63415 73		58925 69		55300 71
	30041 61				58930 69		55301 71
	30050 61		50301 72		58932 69		55303 71
	30051 61		50302 72		59300 69		56300 71
	30140 61		52322 72				56500 71
	30150 61			EL070	50507 70		57300 71
		EL040	50327 71		50921 70		58901 71
			50328 71		53501 70		58902 71
			58904 71		56921 70		
			58905 71			EL160	58500 75
EA880	11100 63			EL080	50924 70		58600 75
	11500 63				53321 70		
	11700 63				53329 70		
	12100 63				53932 70		
	12500 63	EL050	58900 73		54905 70		
	12700 63		59900 73		55323 70		
	13100 63		59901 73		56301 70		
	13200 63				56305 70		
	13500 63	EL060	00024 70		58322 70		
	13600 63		50305 69		58901 70		
	13700 63		50320 69		58906 70		
	17100 63		50321 69		58909 70		
	17500 63		50322 69	EL090	53321 71		
	17700 63		50334 69		53322 71		
			50335 69		53324 71		
EL010	53336 69		50338 69		53328 71		
	53337 69		50501 69		53336 71		
	53338 69		50523 69	EL100	55401 72		
	53420 69		50703 69		55402 72		
	53429 69		50925 69		55403 72		
	55421 69		50930 69	EL110	50401 72		
	56334 69		51319 69				
	56427 69		52321 69	EL120	60400 74		
	58300 69		53300 69		60600 74		
	58337 69		53401 69		60601 74		
	58400 69		53402 69		69415 74		
	58423 69		53536 69		69421 74		
	58451 69		53923 69	EL130	20401 74		
	58521 69		53926 69		64410 74		
	58522 69		55300 69		69410 74		
	58900 69		55327 69		69411 74		
	58920 69		55520 69				
	58923 69		55530 69				
	62401 73		55601 69				



**NOTE:** The following Conditions of Sale are subject to change. All Sales Transactions are subject to the latest published Conditions of Sale of NAMCO and to any Special Conditions of Sale which may be contained in applicable NAMCO quotations and acknowledgements.

**1. ACCEPTANCE, GOVERNING PROVISIONS, AND CANCELLATIONS.** No order for Seller's products or services shall be binding upon Seller until accepted in writing by an authorized official of Seller or by shipment or other performance of such order. Any such order shall be subject to these conditions of Sale, and acceptance shall be expressly conditioned on assent to such Conditions, which assent shall be deemed given unless Purchaser shall expressly notify Seller to the contrary prior to any shipment or other performance of an order by Seller and, in any event, within five (5) days after receipt of any acknowledgement or confirmation of such order.

No order accepted by Seller may be altered or modified by Purchaser unless agreed to in writing signed by an authorized official of Seller, and no such order may be cancelled or terminated except upon payment of Seller's loss, damage and expense arising from such cancellation or termination.

No modified or other conditions will be recognized by Seller unless specifically agreed to in writing, and failure of Seller to object to provisions contained in any purchase order or other communication for a Purchaser (including, without limitation, penalty clauses of any kind) shall not be construed as a waiver of these Conditions nor an acceptance of any such provisions.

Any contract for sale and these Conditions shall be governed by and construed according to the Laws of the State of New York.

**2. QUOTATIONS AND PRICES.** Written quotations are conditioned upon acceptance by Purchaser within thirty (30) days from date issued and shall be considered as offers by Seller to sell during such thirty (30) day period unless sooner terminated by notice. Other Seller publications are maintained as sources of general information and are not quotations or offers to sell.

All prices are subject to change without notice. In the event of a new price change, the price of products on order but unshipped will be adjusted to the price in effect at the time of shipment. Downward adjustment of prices shall apply only to unshipped portions of outstanding orders.

All clerical errors are subject to correction.

**3. PAYMENT TERMS.** Except as may otherwise be stated in quotations, discount schedules, catalogs, or other Seller publications, terms of payment to Purchaser of satisfactory credit are 30 days net.

Seller reserves the right at any time to demand full or portion payment before proceeding with a contract of sale if, in its judgement, the financial condition of Purchaser shall not justify the terms of payment specified. If delivery is delayed or deferred by Purchaser beyond the scheduled date, payment shall be due in full when Seller is prepared to ship and the products may be stored at the risk and expense of the Purchaser. If Purchaser defaults when any payment is due, then the whole contract price shall become due and payable upon demand, or Seller, at its option, without prejudice to other lawful remedies, may defer delivery or cancel the contract for sale.

**4. TAXES AND OTHER CHARGES.** Any manufacturer's tax, retailer's occupation tax, use tax, sales tax, excise tax, (except the Federal excise tax on vehicles), duty, custom, inspection or testing fee, or other tax, fee or charge of any nature whatsoever, imposed by any governmental authority, on or measured by any transaction between Seller and Purchaser, shall be paid by Purchaser in addition to the prices quoted or invoiced.

**5. DELIVERY.** Delivery of product to a carrier at any of Seller's plants or other shipping point shall constitute delivery to Purchaser; and, regardless of freight payment, title and all risk of loss or damage in transit shall pass to Purchaser at that time.

Great care is taken in packing Seller's product. Seller cannot be held responsible for breakage after having received "in good order" receipts from the transportation company. All claims for loss and damage must be made by Purchaser to the carrier.

Claims for shortages or other errors must be made in writing to Seller within 30 days after receipt of shipment, and failure to give such notice shall constitute unqualified acceptance and a waiver of all such claims by Purchaser.

Except as may otherwise be stated in quotations, discount schedules, catalogs, or other Seller publications, freight is not allowed.

No allowance will be made in lieu of transportation in Purchaser accepts shipment at factory, warehouse, freight station, or otherwise supplies its own transportation.

Method and route of shipment will be at the discretion of Seller unless Purchaser shall specify otherwise, and any additional expense of the method or route of shipment specified by Purchaser shall be borne by Purchaser.

Seller reserves the right to make delivery in installments, unless otherwise expressly stipulated in the contract for sale; and all such installments when separately invoiced shall be paid for when due per invoice, without regard to subsequent deliveries. Delay in delivery of any installment shall not relieve Purchaser of its obligations to accept remaining deliveries. Seller shall not be liable for any damage as a result of any delay due to any cause beyond Seller's reasonable control, including, without limitation, an act of God, an act of Purchaser or Seller's supplier, embargo or other governmental act, regulation or request; fire, accident, strike, slowdown, war, riot, delay in transportation, and inability to obtain necessary labor, materials or manufacturing facilities. In the event of any such delay, the date of delivery shall be extended for a period equal to the time lost by reason of the delay.

**6. SUBSTITUTES.** Seller may furnish suitable substitutes for materials unobtainable because of priorities or regulations established by governmental authority or nonavailability of materials from suppliers, and assumes no liability for deviation from published dimensions and descriptive information not essential to proper performance of the product.

**7. WARRANTY.** Seller warrants products manufactured by it to be free from defects in materials and workmanship for a period of one (1) year from date of shipment to Purchaser. If within this period any such products shall be proven to Sellers reasonable satisfaction to be so defective, they shall be repaired or replaced at Seller's option. This warranty shall not apply to (a) products not manufactured by Seller, (b) products which shall have been repaired or altered by others than Seller so as, in its judgement, to affect same adversely, (c) products which shall have been subjected to negligence, accident or damage by circumstances beyond sellers control, or to improper operation, maintenance or storage, or to other than normal use or service. With respect to products not manufactured by Seller, the warranty obligations of Seller shall conform to the warranty actually extended to Seller by its supplier, subject to the limitations and exclusions hereafter stated. The foregoing warranties do not cover reimbursement for transportation, removal, installation, or other expenses which may be incurred in connection with repair or replacement.

Except as may be expressly provided in the authorized writing by Seller, Seller shall not be subject to any other obligations or liabilities whatsoever with respect to products manufactured by Seller or services rendered by Seller.

**THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES EXCEPT WARRANTIES OF TITLE, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

**8. LIMITATIONS OF LIABILITY AND REMEDIES.** SELLER SHALL NOT BE LIABLE, AND PURCHASER WAIVES ALL CLAIMS AGAINST SELLER, FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, WHETHER OR NOT BASED UPON SELLER'S NEGLIGENCE OR BREACH OF WARRANTY OR STRICT LIABILITY IN TORT OF ANY OTHER CAUSE OF ACTION. Buyers exclusive remedy for any cause of action under this contract is a claim for damages and in no event will damages or any other recovery of any kind against Seller exceed the price of the specific products as to which the claim is made. Seller will not be liable to Purchaser for any loss, damage or injury to persons or property resulting from the handling, storage, transportation, resale or use of the products in manufacturing processes, or otherwise.

**9. RETURN OF PRODUCTS.** No products may be returned without first obtaining Seller's written permission and a Returned Material Authorization (RMA) number.

Products accepted for credit, not involving an error on Seller's part, shall be subject to a minimum service charge of 25% of the invoice price and all transportation charges shall be prepaid by purchaser.

Returned products must be securely packed to reach Seller without damage; any cost incurred by Seller to put equipment in first class condition will be charged to Purchaser.

**10. PATENTS.** As to products proposed and furnished by Seller, Seller shall defend any suit or proceeding brought against Purchaser so far as based on a claim that said equipment constitutes an infringement of any patent of the United States, if notified promptly in writing and given authority, information and assistance at Seller's expense for the defense of the same. In even of a final award of costs and damages, Seller shall pay such award. In event the use of said product by Purchaser is enjoined in such a suit, Seller shall, at its own expense, either (a) procure for Purchaser the right to continue using said equipment, (b) modify said equipment to render it noninfringing, (c) replace said equipments with noninfringing equipment, or (d) refund the purchase price (less depreciation) and the transportation and installation costs of said equipment. Seller will not be responsible for any compromise or settlement made without its written consent. The foregoing states the entire liability of Seller for patent infringement, and in no event shall seller be liable if the infringement charge is based on the use of Sellers products for a purpose other than that for which sold by Seller. As to any products furnished by Seller to Purchaser and manufactured in accordance with designs proposed by Purchaser, Purchaser shall indemnify Seller against any award made against Seller for patent, trademark, or copyright infringements.

**11. NUCLEAR IDEMNITY BY PURCHASER.** If the products furnished by Seller are to be used in any nuclear installation or activity, then Purchaser shall, or cause the ultimate user to (a) secure and maintain the maximum nuclear property damage and liability insurance protections available, (b) enter into and maintain a Government Indemnity Agreement and (c) waive and require its insurers to waive all rights of recovery or subrogation against Seller and its suppliers and subcontractors or every tier for, and indemnify and hold Seller harmless from and against, any claims, losses or damages whatsoever (including contractual or special damages of any kind) arising out of a Nuclear Incident as that term is defined in the Atomic Energy Act of 1954, as amended.



## Eagle Signal Controls

For over 70 years, Eagle Signal has supplied mechanical, electromechanical and electronic timer device solutions to customers the world over. Product series provide rugged and reliable control of run time, production and process time applications. Excellent performance value, renowned quality and fast delivery make Eagle Signal brand products the #1 choice of design engineers.



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For over a century, Veeder-Root has supplied mechanical, electromechanical and electronic event timers and counters to satisfy a full range of popular applications involving winding / spooling / rotation count, position display and flow rate. Recognized for innovative designs, quality, durability and accuracy.

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If it pivots or reciprocates, it will work better with low cost, high performance Thompson Nyliner anti-friction polymer bushings, bearings and custom engineered products. When product assembly must be fast and simple, Nyliner products are a designer's first choice. Products will move smoother, quicker, last longer and fit better.



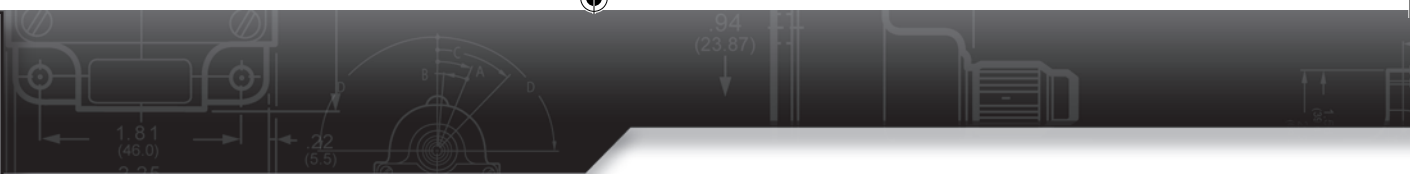
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NOTES







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