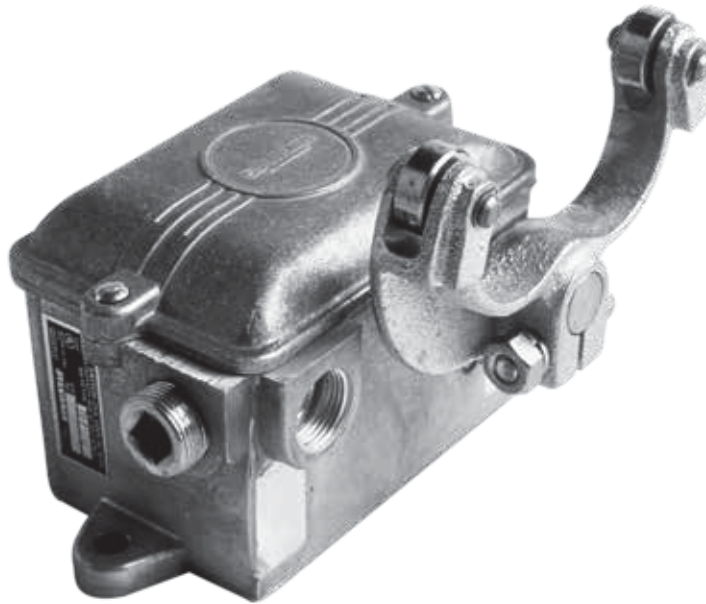


# MILL DUTY PRODUCTS

Index



| Description                 | Page Number         |
|-----------------------------|---------------------|
| Limit Switches - Type ..... | 102HL ..... E2, E3  |
|                             | 102TL..... E4, E5   |
|                             | 102RS ..... E6      |
|                             | 102CHL..... E7      |
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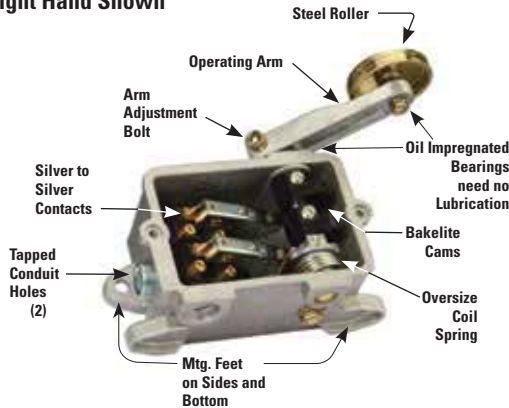


# MILL DUTY PRODUCTS

## Limit Switch



Right Hand Shown



### Application

Type 102HL and HLD Hatchway Limit Switches are designed as pilot circuit devices for all heavy duty applications to limit travel or set up function at predetermined positions. On Type HL single acting switches, the lever operates in one direction only; while on Type HLD double acting switches, it operates in two directions with a variety of contact sequences.

### Features:

- Double Break removable Silver-to-Silver Contacts.
- Each contact may be independently changed from normally open to normally closed and vice versa without disassembly.
- Operating Arm on most models may be field changed to the other side by reversing the shaft.
- Oil impregnated bearings at contact finger pivot points.
- Oil impregnated shaft bearings need no lubrications.

Lever Travel is 50°  
Each Direction

Type HL Single Acting Hatchway - Limit Switch

### Right Hand<sup>2</sup>

| Type                         | Contacts                             | Poles | Standard Enclosures      | Dust-tight Enclosure     | Watertight Enclosure     |
|------------------------------|--------------------------------------|-------|--------------------------|--------------------------|--------------------------|
|                              |                                      |       | Catalog No. <sup>1</sup> | Catalog No. <sup>1</sup> | Catalog No. <sup>1</sup> |
| HLA-1                        | NO or NC                             | 1     | A102-41252A-1            | A102-231414A-1           | A102-54634A-1            |
| HLA-2                        | 2 NO or 2 NC                         | 2     | A102-41251A-1            | A102-231413A-1           | A102-54635A-1            |
| HLA-3                        | 1 NO & 1 NC                          | 2     | A102-41251A-3            | A102-231413A-3           | A102-54635A-3            |
| HLA-30                       | 1 NO & 1 NC overlapping <sup>4</sup> | 2     | A102-54268A-1            | A102-273562A-1           | A102-68866A-1            |
| <b>Left Hand<sup>2</sup></b> |                                      |       |                          |                          |                          |
| HLLA-1                       | NO or NC                             | 1     | A102-41252A-3            | A102-231414A-3           | A102-54634A-3            |
| HLLA-2                       | 2 NO or 2 NC                         | 2     | A102-41251A-4            | A102-231413A-4           | A102-54635A-4            |
| HLLA-3                       | 1 NO & 1 NC                          | 2     | A102-41251A-6            | A102-231413A-6           | A102-54635A-6            |
| HLLA-30                      | 1 NO & 1 NC overlapping <sup>4</sup> | 2     | A102-54268A-2            | A102-273562A-2           | A102-68866A-2            |

Any 1 or 2 pole switch may be converted from right to left hand and vice versa using a screwdriver.

### Note:

1. Includes operating lever and standard steel roller.
2. Type HLA-1, 2 & 44, HLLA-1 & 2 contacts are normally closed when shipped from the factory. To change to normally open, loosen cam and rotate 180°.
3. Any 1 or 2 pole switch may be converted from right to left hand and vice versa using a screwdriver.
4. Overlapping contacts are not convertible.

### Limit Switch Electrical Ratings

| 25 Amp - 600V AC Maximum                             |                   |       |              |
|--|-------------------|-------|--------------|
| Heavy Pilot Duty 600V AC A600, 250V DC Maximum N300. |                   |       |              |
| Volts  | Current - Amperes |       |              |
|  | Carry             | Break | Inrush/ Make |
| 110-120V AC  | 25                | 6.0   | 6.0          |
| 220-240V AC  | 25                | 3.0   | 3.0          |
| 440-480V AC  | 25                | 1.5   | 1.5          |
| 550-600V AC  | 25                | 1.2   | 1.2          |
| 115-125V DC  | 10                | 2.2   | 2.2          |
| 230-250V DC  | 10                | 1.1   | 1.1          |

### Ordering Information

- Use complete catalog number when ordering. If modification is required, state in full detail on the order.

#### Modifications:

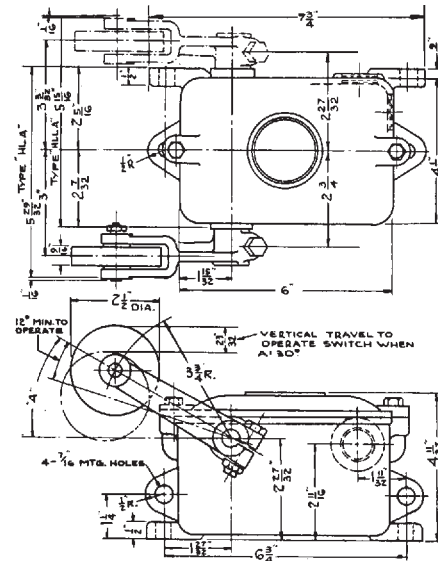
- Omit standard lever and roller.
- Phenolic composition roller, 2 1/2" dia., on standard lever in place of standard steel roller, A102-426105A
- Five-inch lever with standard steel roller, in place of standard lever and roller, A102-248096A
- Seven-inch dia., composition roller on 5" lever, in place of standard lever and roller, A102-75993A

### Type HLD - Double Acting Hatchway - Limit Switch

| Poles | Contacts Sequence <sup>3</sup> |    | Standard Enclosure Catalog No.   | Dust-tight Enclosure Catalog No. | Ship. Weight |
|-------|--------------------------------|----|----------------------------------|----------------------------------|--------------|
|       | CCW                            | CW |                                  |                                  |              |
| 1     |                                |    | HLD-1                            | HLD-5                            | 11 lbs.      |
| 2     |                                |    | HLD-2                            | HLD-6                            |              |
| 2     |                                |    | HLD-3                            | HLD-7                            |              |
| 2     | as specified                   |    | HLD-4                            | HLD-8                            |              |
| Poles | Contacts Sequence              |    | Watertight Enclosure Catalog No. | Ship. Weight                     | 12 lbs.      |
|       | CCW                            | CW |                                  |                                  |              |
| 1     |                                |    | HLD-9                            |                                  |              |
| 2     |                                |    | HLD-10                           |                                  |              |
| 2     |                                |    | HLD-11                           |                                  |              |
| 2     | as specified                   |    | HLD-12                           |                                  |              |

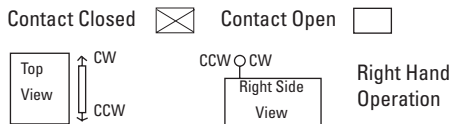
Cams are included under JC80

HLA-1, 2, 3 & 30, HLLA-1, 2, 3 & 30,  
Standard and Dust-tight Enclosures  
12<sup>0</sup> min. to operate std. 1 & 2 pole switches.  
Switches with overlapping contacts require 22<sup>0</sup> min.



### Contact Sequence

| Cam No.     | As Supplied |    | Converted To: |    |
|-------------|-------------|----|---------------|----|
|             | CCW         | CW | CCW           | CW |
| A102-277623 |             |    |               |    |
| A102-277624 |             |    |               |    |
| A102-277625 |             |    |               |    |



### Limit Switch Electrical Ratings

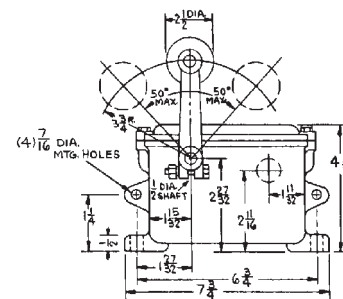
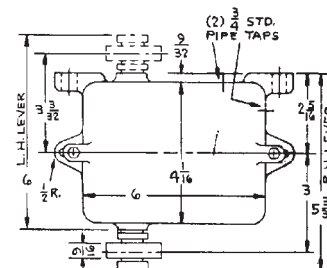
| 25 Amp - 600V AC Maximum                             |       |       |              |
|--|-------|-------|--------------|
| Heavy Pilot Duty 600V AC A600, 250V DC Maximum N300. |       |       |              |
| Current - Amperes                                    |       |       |              |
| Volts  | Carry | Break | Inrush/ Make |
| 110-120V AC  | 25    | 6.0   | 6.0          |
| 220-240V AC  | 25    | 3.0   | 3.0          |
| 440-480V AC  | 25    | 1.5   | 1.5          |
| 550-600V AC  | 25    | 1.2   | 1.2          |
| 115-125V DC  | 10    | 2.2   | 2.2          |
| 230-250V DC  | 10    | 1.1   | 1.1          |

### Ordering Information

- Use complete catalog number when ordering.
- Modifications on page G2. If modifications are required, state in full detail on the order.

### HLD-1, 2, 3 & 4 in Standard Enclosure HLD-5, 6, 7 & 8 in Dust-tight Enclosure

| Spare Parts                              | JC 80        |
|--|--------------|
| Movable Contact                          | A101-028965  |
| Torsen Spring                            | A101-062988  |
| 1 Pole Base                              | A102-041256A |
| 2 Pole Base                              | A102-041255A |
| Std. Arm & Roller                        | A102-302350A |
| JC32                                     |              |
| 5" Lever with Steel Roller               | A102-248096A |
| 5" Lever with 7" Dia. Composition Roller | A102-075993A |



### Notes:

1. Includes operating lever and standard steel roller.
2. All contacts are NC when shipped from the factory. To change to NO, loosen cam and rotate 180°.
3. Any 1 or 2 pole switches may be converted from right to left hand and vice versa, using a screwdriver.

# MILL DUTY PRODUCTS

## Limit Switch



### Application

Type 102TL Track Type Limit Switches are designed as pilot circuit devices for all heavy duty applications to limit travel or set up functions at predetermined positions.

### Operation

The contacts of these switches make and break very quickly due to the snap action of the toggle type operating mechanism. The operating arm is secured to a hollow outer shaft that fits over the camshaft. When the arm is tripped, it turns the outer shaft which actuates the toggle mechanism. The toggle mechanism does not change position until the operating lever is past the midpoint of its travel; then it snaps over and turns the camshaft quickly. Since the cams are fastened rigidly to the camshaft, they in turn impart snap action opening and closing to the contacts. Force to operate switch is approximately 25 inch-pounds.

### Angular Travel

Total angular travel of the arm from one tripped position to the other is 90°. However, the contacts are actuated when the arm moves 60°, the balance of the travel is to clear the arm so that the linear operator may pass over.



### TLSF-11 or 22 with Straight Fork Lever

#### Features:

- Double Break removable Silver-to-Silver Contacts.
- Each contact may be independently changed from normally open to normally closed and vice versa without disassembly.
- Operating Arm adjustable on shaft.
- Oil impregnated bearings at contact finger pivot points.
- Cast weatherproof enclosure standard. Dust-tight and watertight enclosures are also available for all types.
- Contact wearing parts completely interchangeable with same parts in Type 101SD Master Switch, 101FS Foot Switch, and 102HL & CHL Limit Switch.

### Available Levers:



Part # A102-054262  
TLSF Straight  
Fork Lever



Part # A102-054261  
TLS Rod or  
Chain Type Lever

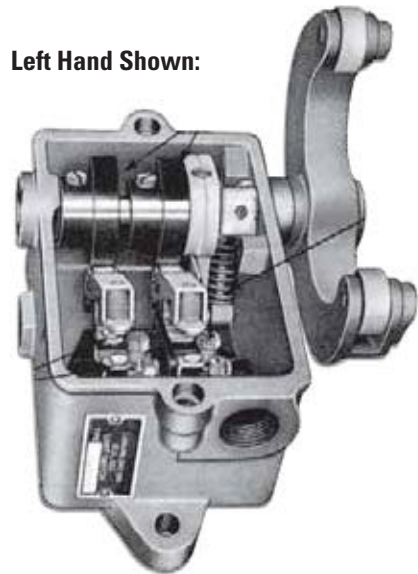


A102-460805A-1  
TLRS Straight Roller Lever



Part # 102-54260A  
TLF Roller Fork  
Lever

### Left Hand Shown:



TLF-22, 2 Contacts, Cover Removed

### Type TL Snap Action - Limit Switch

| Type    | Operating Lever    | Contacts <sup>2</sup> | Standard Enclosure Catalog No. | Dust-tight Enclosure Catalog No. | Watertight Enclosure Catalog No. |
|---------|--------------------|-----------------------|--------------------------------|----------------------------------|----------------------------------|
| TLS-11  | Rod or Chain       | 1                     | A102-80579A-1                  | A102-80579A-2                    | A102-80580A                      |
| TLS-22  | Rod or Chain       | 2                     | A102-80581A-1                  | A102-80581A-2                    | A102-80582A                      |
| TLSR-11 | Straight or Roller | 1                     | A102-80591A-1                  | A102-80591A-2                    | A102-80592A                      |
| TLSR-22 | Straight or Roller | 2                     | A102-80593A-1                  | A102-80593A-2                    | A102-80594A                      |
| TLF-11  | Roller Fork        | 1                     | A102-80575A-1                  | A102-80575A-2                    | A102-80576A                      |
| TLF-22  | Roller Fork        | 2                     | A102-80577A-1                  | A102-80577A-2                    | A102-80578A                      |
| TLSF-11 | Straight Fork      | 1                     | A102-80583A-1                  | A102-80583A-2                    | A102-80584A                      |
| TLSF-22 | Straight Fork      | 2                     | A102-80585A-1                  | A102-80585A-2                    | A102-80586A                      |

#### Note:

1. Includes limit switch complete with operating lever.
2. Contacts can be changed from open to close by rotating cam 180°.

#### Limit Switch Electrical Ratings

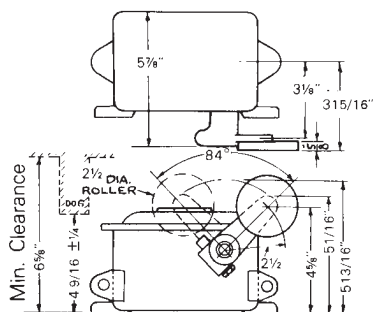
| 25 Amp - 600V AC Maximum<br>Heavy Pilot Duty 600V AC A600, 250V DC Maximum N300. |                   |       |              |
|--|-------------------|-------|--------------|
| Volts  | Current - Amperes |       |              |
|  | Carry             | Break | Inrush/ Make |
| 110-120V AC  | 25                | 6.0   | 6.0          |
| 220-240V AC  | 25                | 3.0   | 3.0          |
| 440-480V AC  | 25                | 1.5   | 1.5          |
| 550-600V AC  | 25                | 1.2   | 1.2          |
| 115-125V DC  | 10                | 2.2   | 2.2          |
| 230-250V DC  | 10                | 1.1   | 1.1          |

#### Ordering Information:

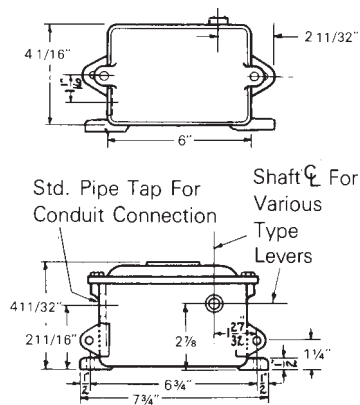
- Use complete catalog number when ordering.

#### Approximate Outline Dimensions

##### TLSR Straight Roller Lever

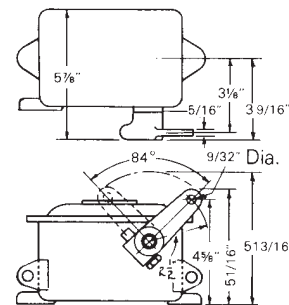


##### Enclosure Dimensions Only (Same for all types)

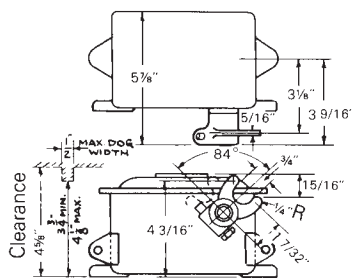


Std. Pipe Tap For Conduit Connection  
Shaft  $\varnothing$  For Various Type Levers

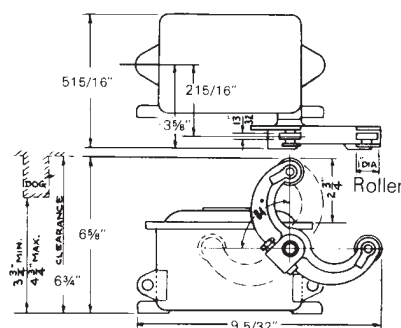
##### TLS Rod or Chain Type Lever



##### TLSF Straight Fork Lever

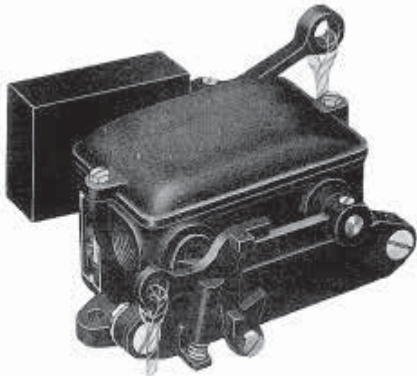


##### TLF Roller Fork Lever



# MILL DUTY PRODUCTS

## Safety Switches



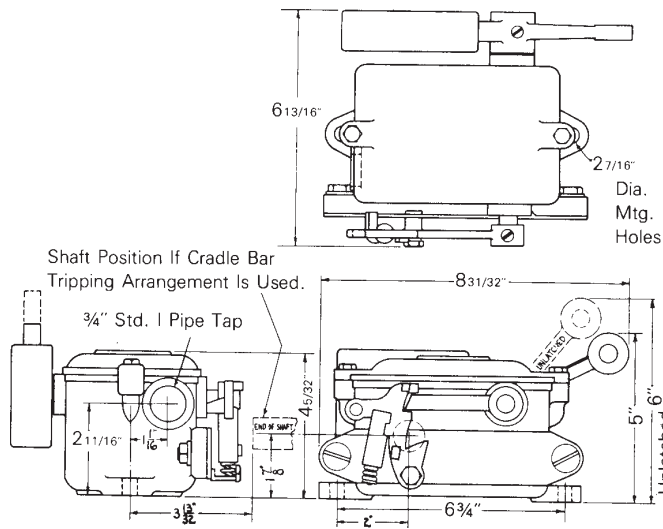
### Application

Type 102RS Rubber Calender Safety Switch is a pilot circuit device used chiefly in the Rubber Industry as an emergency stop arrangement on Calenders, and similar motor driven machinery.

### Features:

- Gravity Operated.
- Double break removable silver-to-silver contacts.
- Can be mounted horizontally or vertically.
- Oil impregnated shaft bearings need no lubrication.
- Contact wearing parts completely interchangeable with same parts in type 101SD Master Switches, type 101FS Foot Switches and type 102HL, CHL, TL Limit Switches.
- Dust-tight enclosure is standard.

### Approximate Dimensions



### Limit Switch Electrical Ratings

| 25 Amp - 600V AC Maximum<br>Heavy Pilot Duty 600V AC A600, 250V DC Maximum N300. |       |       |              |
|--|-------|-------|--------------|
| Current - Amperes  |       |       |              |
| Volts  | Carry | Break | Inrush/ Make |
| 110-120V AC  | 25    | 6.0   | 6.0          |
| 220-240V AC  | 25    | 3.0   | 3.0          |
| 440-480V AC  | 25    | 1.5   | 1.5          |
| 550-600V AC  | 25    | 1.2   | 1.2          |
| 115-125V DC  | 10    | 2.2   | 2.2          |
| 230-250V DC  | 10    | 1.1   | 1.1          |

### Rubber Calender

| Type | Contacts | Poles | Dust-tight Enclosure<br>Catalog No. |
|------|----------|-------|-------------------------------------|
| RS22 | 2 NC     | 2     | A102-66750A                         |

### Note:

1. Includes limit switch complete with cable, cable weight and counterweight.

### Ordering Information

- Use complete catalog number when ordering. If modification is required, state in full detail on the order.  
Modifications:
- If cradle bar tripping arrangement is desired, add the following to the catalog number, "including part number A102-66747A tripping bar"





# MILL DUTY PRODUCTS

## General Information



### Application

Type 101 FS Foot Operated Master Switches are used on applications requiring a rugged foot operated pilot circuit device.

**Weatherproof** enclosures are standard on all types.

**Dust tight** enclosures can be furnished at an additional charge for the dust seal gasket.

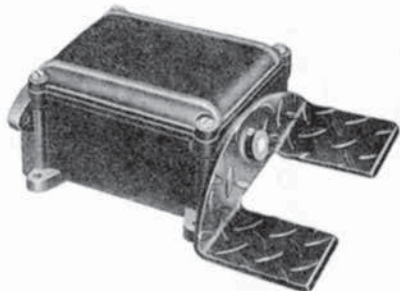
### Enclosures

Two pole foot switches have cast aluminum enclosures.

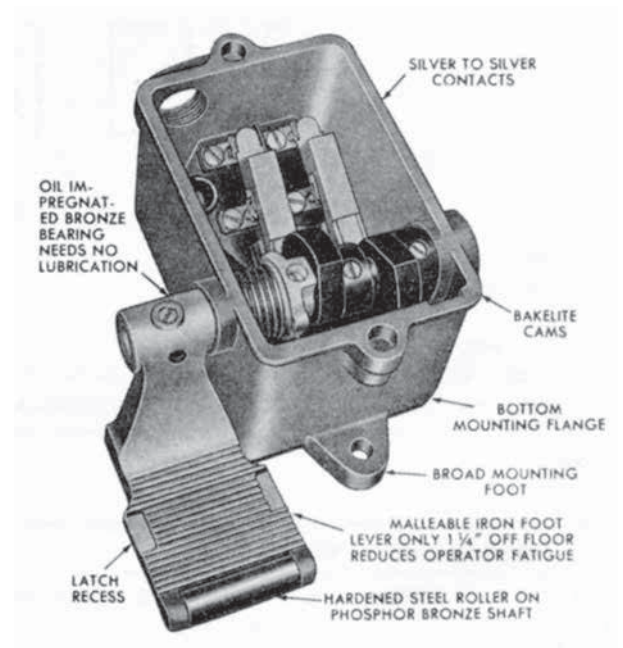
**Watertight** enclosures are available for all types except Type FWLSA-22. The same heavy case is specially fitted with watertight bushings and seals to meet NEMA watertight tests.

### Features

- Double Break removable Silver-to-Silver Contacts.
- Contact wearing parts completely interchangeable with the same parts in Type 101SD Master Switch, and Type 102HL, TL and CHL Limit Switch.
- Each contact may be independently changed from NO to NC and vice versa without disassembly.
- Oil impregnated bearings at contact finger pivot points.
- Oil impregnated shaft bearings need no lubrications
- Malleable iron operating pedal.
- Spring return standard.
- Cast Weatherproof enclosure standard.



**FRSA-22, 2 Pole 3 Position**



**FSA-22, 2 Pole  
Horizontal Mounting, Left Hand, Open View**



### Type 101FS - Foot Operated

### Standard NEMA 1 Enclosure

| Type    | Poles | Contact Arrangement                   | Contact Symbol | Special Features                                | Mounting Arrangement | Pedal Arrangement | Catalog No.   | Dim. Ref & Ship Weight |
|---------|-------|---------------------------------------|----------------|---|----------------------|-------------------|---------------|------------------------|
| FSA-11  | 1     | NO or NC                              | A or B         | -----   | Horizontal Only      | R.H. or L.H.      | A101-55171A-2 | 1 & 2                  |
| FSA-22  | 2     | Both NO or NC                         | C or D         | -----   |                      |                   | A101-55172A-2 |                        |
| FSA-33  | 2     | 1 NO & 1 NC                           | E              | -----   |                      |                   | A101-55172A-2 |                        |
| FRSA-22 | 2     | 1 forward, 1 reverse and an off point | ---            | Double treadle foot pedal for reverse operating |                      |                   | A101-62266A   | 3                      |

### Type 101FS - Foot Operated

### NEMA 4 Enclosure

| Type    | Poles | Contact Arrangement                   | Contact Symbol | Special Features                                | Mounting Arrangement   | Pedal Arrangement | Catalog No. | Dim. Ref & Ship Weight |
|---------|-------|---------------------------------------|----------------|---|------------------------|-------------------|-------------|------------------------|
| FSA-11  | 1     | NO or NC                              | A or B         | -----   | Horizontal or Vertical | R.H. only         | A101-60224A | 1 & 2                  |
| FSA-22  | 2     | Both NO or NC                         | C or D         | -----   |                        |                   | A101-60225A |                        |
| FSA-33  | 2     | 1 NO & 1 NC                           | E              | -----   |                        |                   | A101-60225A |                        |
| FRSA-22 | 2     | 1 forward, 1 reverse and an off point | ---            | Double treadle foot pedal for reverse operating | Horizontal Only        | R.H. or L.H.      | A101-62267A | 3                      |

### Contact Symbols



A



B



C



D



E



F

#### Note:

- Includes switch complete with operating pedal.
- Page G12 for Dimension reference and shipping weight.
- Overlapping Contacts:  
Standard switches provide for only one contact closed at a time. If overlapping is required, one contact must close before the other contact opens.  
Type FSA-330 switches have overlapping contacts. If the degree and/or point of overlap is not specified.

#### Ordering Information

- Use complete catalog number when ordering. If modifications are required, state in full detail on the order.

#### Note:

- Type 101FS does not meet the safety standards for press applications.

#### Modifications

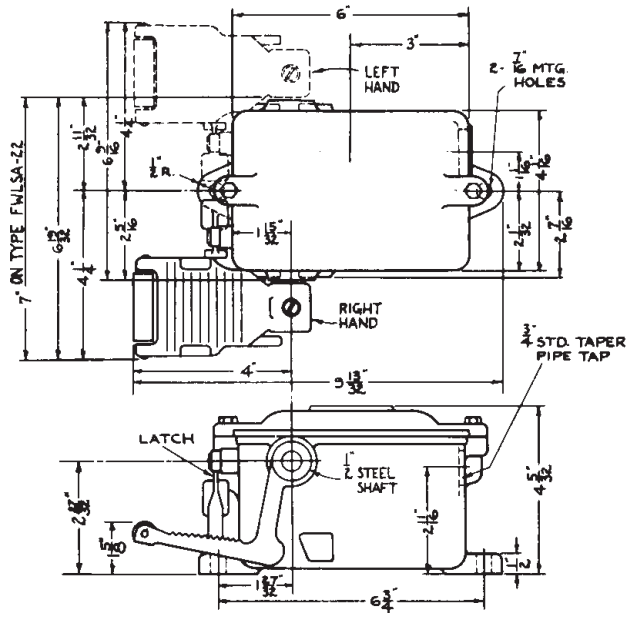
For Dust tight use same catalog number as for a standard enclosure and specify "Dust tight" on order.  
Floor plate.

# MILL DUTY PRODUCTS

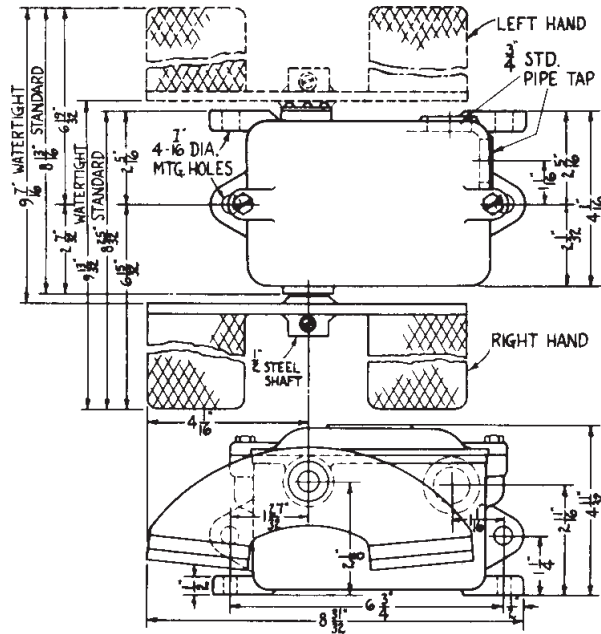
## Master Switch

### Dimensional Information

#### Reference No. 1 - Horizontal

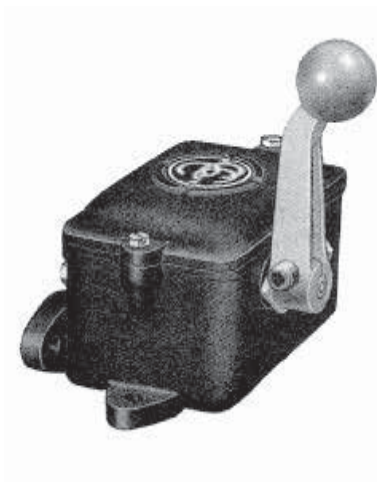


#### Reference No. 3- Double Treadle



Shipping Weight (approx.)

| Reference | Weight  |
|-----------|---------|
| No. 1     | 12 lbs. |
| No. 2     | 12 lbs. |
| No. 3     | 15 lbs. |



Type 101SD Master Switches are designed as pilot circuit devices for frequent operation with minimum maintenance on heavy duty application in all industries. The type SD units are sturdy devices constructed for heavy duty service where few control circuits are required. Type SD Switches are made in two frame sizes:

Type SD-2 is a single point device, one point either side of the off point, and there are two isolated contacts which can be opened or closed in various combinations.

For the usual circuit arrangements refer to page G14.

Type SD Master Switches are supplied in watertight enclosures; panel mounted units have angle brackets for back of panel mounting. Spring return to the off point is available.

Master Switch, Enclosed Type SD-2 Two Circuit

### Mill Master Jr. - Master Switch

#### Spring Return Operation

| Type   | Number of Operating Points | No. of Circuits | Reversing | Surface Mounting Catalog No. | Dim. Ref. |
|--------|----------------------------|-----------------|-----------|------------------------------|-----------|
| SD-2-S | 1 (each direction)         | 2               | yes       | A101-88361A                  | A         |
|        | 1 (one direction only)     |                 | no        | A101-88365A                  |           |

#### Notes:

1. Includes master switch in watertight enclosure complete with operating handle.
  2. Includes master switch in watertight enclosure complete with metal pistol grip handle, steel mounting plate and standard anular name plate. Specify nameplate markings; standard nameplate provides one marking for each point of the switch.
- Advise detailed cam development for each switch. Refer to page G14 for diagram of standard cam development.

#### Ordering Information:

- Use complete catalog number when ordering.
- Dimensional reference on page G14

# MILL DUTY PRODUCTS

## 100 Series



### Mill Type Push Buttons (Heavy Duty) Type H Assembled



Type H Form RN  
Unprotected



Type H Form RNG  
With Guard Ring for  
Palm Operation

#### Features:

- Heavy cast enclosure and mushroom operating head.
- Oil impregnated bushing.
- Heavy duty Type H push button element with double break silver-to-silver wipe action contacts.
- Large electrical clearance.
- Push button stop independent of contacts. All shock absorbed by the cast case.
- All parts removable and replaceable with a screwdriver.

E

### Type H - Momentary Contact

|                                    |                       |                   | Form RN - Without Guard Ring | Form RNG - With Guard Ring |
|------------------------------------|-----------------------|-------------------|------------------------------|----------------------------|
| Name Plate <sup>2</sup><br>Marking | Contacts<br>Available | Contact<br>Symbol | Catalog<br>Number            | Catalog<br>Number          |
| None                               | 1 N.O. and 1 N.C.     | 1                 | 1RN-1                        | 1RNG-1                     |
| None                               | 2 N.O. and 2 N.C.     | 4                 | 1RN-2                        | 1RNG-2                     |

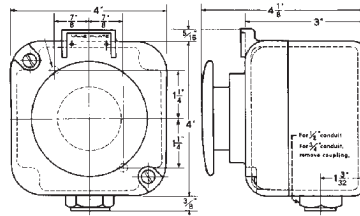
#### Note:

1. Includes assembled push button station complete with element.
2. With Name Plate at top, case may be turned so that Conduit Opening is at top or bottom.

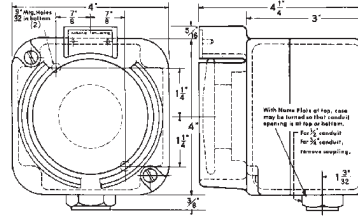
#### Contact Blocks

|           |    |                     |
|-----------|----|---------------------|
| INO & INC | BA | JC80                |
| 2NO & 2NC | BB | Discount<br>Scheule |

### Dimensions



Form RN  
Unprotected



Form RNG  
With Guard Ring for  
Palm Operation

| Volts   | AC (50 or 60 Hz) |        | DC (Inductive) |
|---------|------------------|--------|----------------|
|         | Normal           | Inrush | Normal         |
| 110-120 | 6.0              | 60     | 2.2            |
| 220-240 | 3.0              | 30     | 1.1            |
| 440-480 | 1.5              | 15     | ----           |
| 550-600 | 1.2              | 12     | 0.4            |

### Contact Symbols

