Electric Switch Mechanisms

Installation and Operating Manual

Series A, B, C, D, E, F, L, M, N, O, Q, S, T, 2, and 3 with Aluminum, Carbon Steel, or Cast Iron Housings

Magnetrol®

STI®

Read this Manual Before Installing

This manual provides information on Electric Switch Mechanisms. It is important that all instructions are read carefully and followed in sequence. Detailed instructions are included in the Installation section of this manual.

Conventions Used in this Manual

Certain conventions are used in this manual to convey specific types of information. General technical material, support data, and safety information are presented in narrative form. The following styles are used for notes, cautions, and warnings.

Notes

Notes contain information that augments or clarifies an operating step. Notes do not normally contain actions. They follow the procedural steps to which they refer.

Cautions

Cautions alert the technician to special conditions that could injure personnel, damage equipment, or reduce a component's mechanical integrity. Cautions are also used to alert the technician to unsafe practices or the need for special protective equipment or specific materials. In this manual, a caution indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Warnings

Warnings identify potentially dangerous situations or serious hazards. In this manual, a warning indicates an imminently hazardous situation which, if not avoided, could result in serious injury or death.

WARNING! Explosion hazard. Do not connect or disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

Low Voltage Directive

For use in Installation Category II, Pollution Degree 2. If equipment is used in a manner not specified by manufacturer, protection provided by equipment may be impaired.

Notice of Copyright and Limitations

Magnetrol reserves the right to make changes to the products described in this manual at any time without notice. Magnetrol makes no warranty with respect to the accuracy of the information in this manual.

Warranty

All Magnetrol/STI mechanical level and flow controls are warranted free of defects in materials or workmanship for five full years from the date of original factory shipment.

If returned within the warranty period; and, upon factory inspection of the control, the cause of the claim is determined to be covered under the warranty; then, Magnetrol will repair or replace the control at no cost to the purchaser (or owner) other than transportation.

Magnetrol/STI shall not be liable for misapplication, labor claims, direct or consequential damage or expense arising from the installation or use of equipment. There are no other warranties expressed or implied, except special written warranties covering some Magnetrol/STI products.

Quality Assurance

The quality assurance system in place at Magnetrol/STI guarantees the highest level of quality throughout the company. Magnetrol/STI is committed to providing full customer satisfaction both in quality products and quality service.

Magnetrol's quality assurance system is registered to ISO 9001 affirming its commitment to known international quality standards providing the strongest assurance of product/service quality available.

Electric Switch Mechanisms

Table of Contents

1.0 Reference Information

1.1 Principle of Operation

Figures 1 & 2 illustrate the simple, reliable operating principle of a float level switch. Switching action is obtained through the use of a magnetic sleeve (4) and a float (3), displacer or flow sensing element and a switching mechanism (2). These two basic component assemblies are separated by a non-magnetic, pressure tight enclosing tube (5). The switch (2) and magnet (1) are assembled to a mechanism with a swinging arm which operates on precision stainless steel pivots.

1.2 Operating Cycle

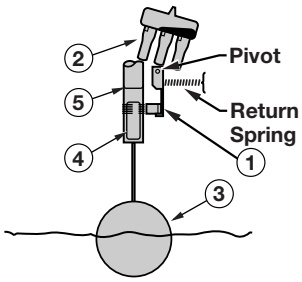


Figure 1
Rising Level

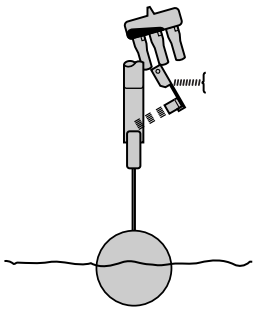


Figure 2
Falling Level

As level of a liquid in a vessel rises (Figure 1), the float rides on the liquid surface moving the magnetic sleeve upward in the enclosing tube and into the field of the switch mechanism magnet. As a result, the magnet is drawn in tightly to the enclosing tube causing the switch to tilt, making or breaking the electrical circuit. As the liquid level recedes (Figure 2), the float and magnetic sleeve moves downward until the switch magnet releases and is drawn outward, away from the enclosing tube by a tension spring. This in turn tilts the switch in an opposite direction, thus reversing switch action.

Switch mechanisms may include a single switch or multiple switches, depending on operational requirements and switching action desired.

Rather than tilting, dry contact switches are actuated by the movement of the swinging arm against the actuation arm of the switch.

1.3 Description

Magnetrol level controls are available with a range of different switch mechanisms—each designed for specific service conditions. A brief description of the individual switch mechanisms and their applications are given below.

1.3.1 Mercury Switches A, E, N, and T

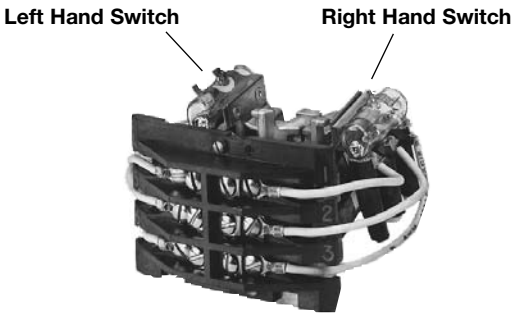


Figure 3
Series A, and N
Mercury Switches

Mercury switches offer the advantage of quick visual inspection of contact conditions and have a maximum liquid temperature rating of +550° F (+288° C).

- **Series A** switches are heavy duty with high load carrying capability, see Figure 3.
- **Series E** switches are specially designed to provide vibration resistance.
- **Series N** switches are heavy duty with high load carrying capability, used only in model C10 and C15 units, see Figure 3.
- **Series T** switches are specially designed to provide vibration resistance, used only in model C10 and C15 units.

1.3.2 Mercury Switches L, M, 2, and 3

Figure 4
Series L
Vibration Resistant
Mercury Switch

These high temperature switches offer the advantage of quick visual inspection of contact conditions. They feature nickel/copper bare wire and ceramic beaded insulation allowing use in applications with process temperatures up to +750° F (+399° C) or for the Model B40 only, up to +1000° F (+538° C).

- **Series L** switches are heavy duty with high load carrying capability and are specially designed to provide vibration resistance. They are used only in model B40 units with process temperatures up to +1000° F (+538° C), see Figure 4.
- **Series M** Switches are heavy duty with high load carrying capability, used only on units requiring manual reset, see Figure 5.
- **Series 2** switches are specially designed to provide greater vibration resistance.
- **Series 3** switches are heavy duty with high load carrying capability, see Figure 5.

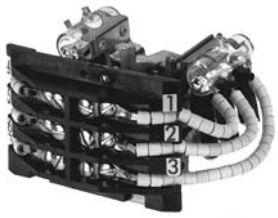


Figure 5
Series M and 3
High Temperature
Mercury Switches

1.3.3 Dry Contact Switches B, C, D, O, Q, and S

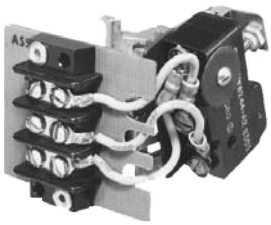


Figure 6
Series B, C, D, O and Q Dry Contact Switches

Dry contact switches are specified in applications where mercury must be avoided.

- **Series B** switches are general purpose with a maximum liquid temperature rating of +250° F (+121° C), see Figure 6.
- **Series C** switches are general purpose with a maximum liquid temperature rating of +450° F (+232° C), see Figure 6.
- **Series D** switches are designed for DC current applications with a maximum liquid temperature rating of +250° F (+121° C), see Figure 6.
- **Series O** switches are general purpose with a maximum liquid temperature rating of +300° F (+149° C), used only in model C10 and C15 units, see Figure 6.
- **Series Q** switches are general purpose with a maximum liquid temperature rating of +250° F (+121° C), used only in model C10 and C15 units, see Figure 6.
- **Series S** switches are general purpose with a maximum liquid temperature rating of +550° F (+288° C), or designed for DC current applications with a maximum liquid temperature of +250° F (+121° C), used only in model B40 units, see Figure 7.

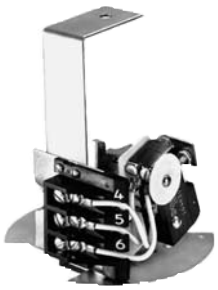


Figure 7
Series S
Snap Switch

1.3.4 Hermetically Sealed Switch

Figure 8
Series F
Hermetically Sealed Switch

Hermetically sealed switches are for use in special applications where hermetically sealed contacts are required.

- **Series F** switches are well suited for use in process temperatures up to +750° F (+399° C), see Figure 8.

NOTE: See bulletin 42-694 for series HS & H1 hermetically sealed switches

2.0 Installation

2.1 Replacing Switch Mechanism

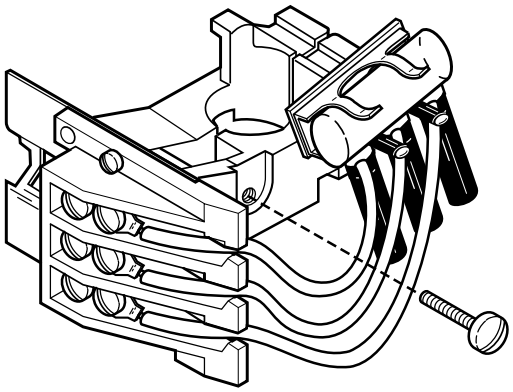


Figure 9
Mounting Screw

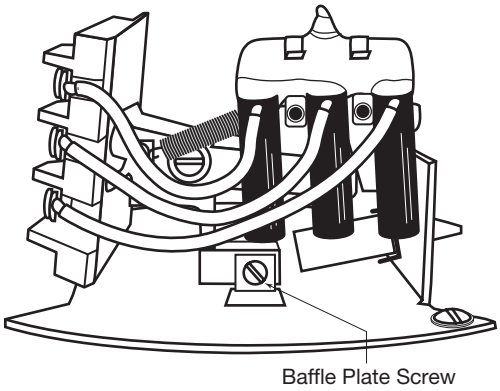


Figure 10
Baffle Plate Screw

Caution: Before attempting to remove a switch mechanism, be certain to pull disconnect switch or otherwise assure that electrical circuit through control is de-energized.

1. Disconnect wiring from supply side of terminal block on switch mechanism. Note and record lead wire terminal locations.
2. Loosen screw in split mounting clamp until mechanism slides freely on enclosing tube, refer to Figure 9.
3. Remove small round head screw securing lower switch mechanism to baffle plate, refer to Figure 10.
4. Slide switch mechanism off of enclosing tube. If mechanism is to be reused, ensure that it is placed on a clean surface, free of metallic particles that may be attracted to the switch magnet.
5. Loosen mounting screw so that switch frame will fit over e-tube. Install switch mechanism by sliding it over the enclosing tube. Slide mechanism down until the bottom of the frame and terminal block are resting on the baffle plate. The baffle plate should be resting on the hub of the housing base.
6. Install and tighten baffle plate screw so that the switch mechanism may not be separated from the baffle plate. Tighten the mechanism mounting screw so that the mechanism is firmly clamped to the enclosing tube.
7. Swing magnet assembly in and out by hand, checking carefully for any signs of binding.
8. Reattached supply-side wiring to the terminal block and check switch function by varying liquid level in the vessel.

2.2 Replacing Mercury Switches

2.2.1 Series A, L, M, N and 3

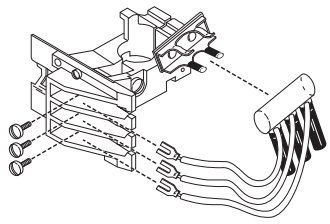


Figure 11
Replacing Mercury Bulb

1. Disconnect the control from power supply.
2. Disconnect switch leads from terminal block, noting terminal post numbers marked on switch mechanism.

NOTE: Before removing existing mercury switch, loosen cement holding switch by gently prying between switch clips and glass tube.

3. Remove mercury switch from clips, Figure 11.
4. Place new mercury switch into clips, making certain that switch legs are positioned to help prevent fouling of leads.

5. Glue switch to clips, using a cement such as DuPont Duco, Goodyear Pliobond®, shellac or equivalent, refer to Figure 11.
6. Connect switch leads to terminal block on identical post positions as those in the original assembly.
7. Check to be certain that the switch leads do NOT cross over or under one another.
8. Swing magnet assembly in and out by hand, checking carefully for any sign of binding. Assembly should require minimum force to move through its full swing. Contact factory if binding is observed.

NOTE: DPDT mechanisms have “left hand” and “right hand” switches, as viewed facing terminal block of mechanism. Refer to Figure 3. Follow all steps for switch replacement and adjustment described above. Reconnect power supply, and test switch action by varying liquid level in the vessel or by “blowing down” float chamber.

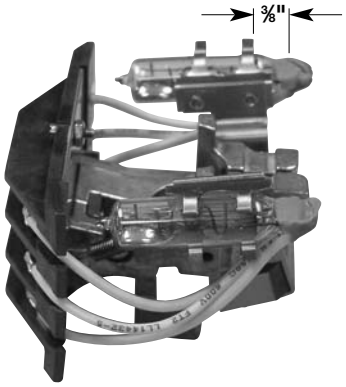


Figure 12
Vibration Resistant Mercury Switch

2.2.2 Series E, T and 2

Follow instructions for Series A except:

1. Replace new mercury switch into clips making certain that a space of ⅜" exists from edge of clip to point where lead wires attach to glass tube. Refer to Figure 12. Lead wires should project downward at 90% angle from horizontal plane.
2. Glue switch to clips using a cement such as DuPont Duco, Goodyear Pliobond®, Shellac or equivalent.

NOTE Some vibration resistant switch bulbs may be held in place with retaining springs. Simply slide replacement switch under spring and position as required.

3. Connect switch leads to terminal block on identical post positions as used in the original assembly.

NOTE: Check to be certain that switch glass tube is not resting on the upper switch lead, and that switch leads drape loosely when switch magnet is in the “swing out” position. Glass tube may be slid forward in clips toward terminal block to correct such conditions.

4. Check new mercury switch carefully to see that it makes and breaks circuit properly.
   a. Slowly swing switch magnet through its operating angle. Mercury must make and break contact between electrodes before magnet comes to its IN stop or OUT stop.
   b. If action is incorrect, contact factory for replacement.

NOTE: A properly adjusted mercury switch will have equal overtravel tilt in both directions after switch actuation.

5. DPDT switch mechanisms have two mercury switches carried by the pivoted magnet. Follow all steps 1 through 4.

   Reconnect power supply and test switch action by varying liquid level in the vessel or by "blowing down" float chamber.

2.3 Replacing dry contact switches

2.3.1 Series B, C, D, F, O, Q and S

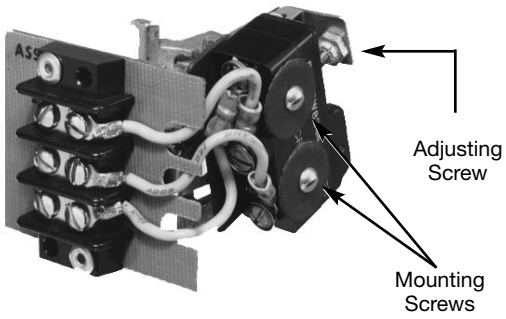


Figure 13
Dry Contact Switch Mechanism

1. Disconnect control from power supply.
2. Disconnect switch leads from terminal block. Note and record terminal connections of switch to be replaced.
3. Remove two mounting screws holding existing switch, refer to Figure 13.
4. Remove existing switch and install replacement switch in the same position, tightening mounting screws securely.

NOTE: For proper operation of the replacement switch, it must actuate in the middle portion of the pivoted magnet's swing.

5. Check switch action and adjust as follows:
   a. Slowly rotate the pivoted magnet by hand, back and forth through its angle of swing, listening closely for the actuating click of the switch in each direction.
   b. Check to see if there is equal overtravel of magnet in its swing after the switch click in either direction.
   c. If switch actuation is not correct, change adjustment of actuating screw using a 1/16" hexagon key wrench, refer to Figure 13.

NOTE: If a single switch is being replaced on a DPDT mechanism, lever of second switch must be depressed and held to allow for the audible adjustment of new switch, as described above.

   d. With new switch in adjustment, release lever of second switch and perform fine-tuning of both switches to provide simultaneous actuation (clicks).
6. Reconnect power supply and test switch action by varying liquid level in the vessel or by "blowing down" float chamber.

2.4 Vibration Service Adjustment

2.4.1 Series E, T and 2

Level controls are frequently used on applications where vibration is encountered, such as on scrubbers in oil field installations. Switch mechanisms may require repositioning to prevent sloshing of mercury in switches. This position is usually best at right angles to the direction of vibration. The direction of vibration may be determined by the arrangement of connections to the vessel or the vessels mounting method. Accordingly, the vibration will tend to be in one direction only.

Upon determining the vibration direction, switch mechanism(s) may be rotated from an incorrect position (as shown in Figure 14, illustration is shown as looking at a control from above), to a correct position as follows:

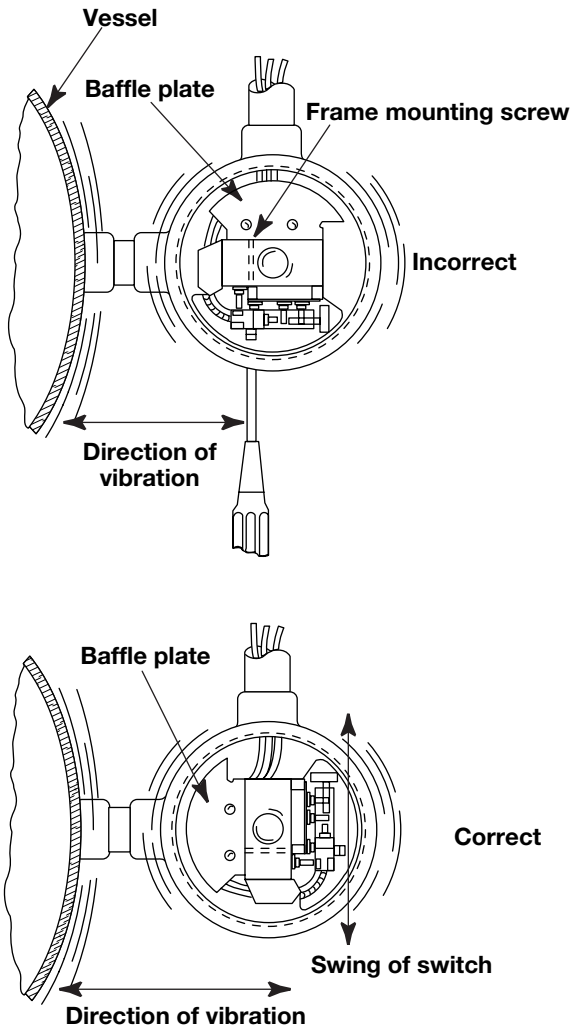


Figure 14
Rotation of Switch Mechanism in Vibration

Caution: Before attempting to remove a switch mechanism, be certain to pull disconnect switch or otherwise assure that electrical circuit through control is de-energized.

1. Disconnect control from power supply.
2. Loosen screw in split mounting clamp until mechanism turns freely on enclosing tube, refer to Figure 9 on page 4.
3. Rotate entire mechanism and bottom baffle plate together to the correct position.

Caution: Be certain power supply wires retain some slack at new position. Do not pull wires taut.

NOTE: Amount of rotation required will vary with each installation and may not be as much as shown in illustration.

4. Check action of mercury in switch at new position. When mercury sloshes from side to side in glass tube, instead of end to end, correct position has been attained.
5. Tighten clamp screw on switch mechanism.
6. Reconnect power supply, and test switch action under operating conditions.

3.0 Wiring

Circuits shown are for direct acting level switches and are reversed in side mounting float-in-tank models, which utilize a reversing float pivot.

NOTE: See bulletin 42-694 for wiring diagrams for "HS" Series hermetically sealed switches.

3.1 SPDT Terminal Connections

3.1.1 Single float with one switch or single stage displacer

1. Rising level closes contacts 5 & 6, see Figure 15.
2. Falling level closes contacts 4 & 5.
3. Wiring Diagram is reversed (high level actuation becomes low level actuation, etc.) when this switch mechanism is used on side mounted float switches employing a reversing pivot (Models B40, T52, T62, T63, etc.).

3.1.2 Single float with two switches or dual stage displacer

1. Rising level closes contacts 5 & 6 and 2 & 3, see Figure 16.
2. Falling level closes contacts 4 & 5 and 1 & 2.
3. Wiring diagram is reversed (high level actuation becomes low level actuation, etc.) when this switch mechanism is used on side mounted float switches employing a reversing pivot (Models B40, T52, T62, T63, etc.).
4. On units with tandem floats, the top float operates the bottom mechanism while the bottom float actuates the top mechanism.

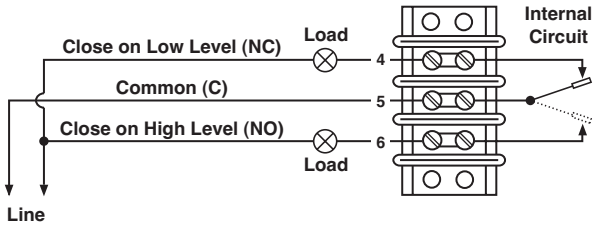


Figure 15

Single Float with One Switch or Single Stage Displacer

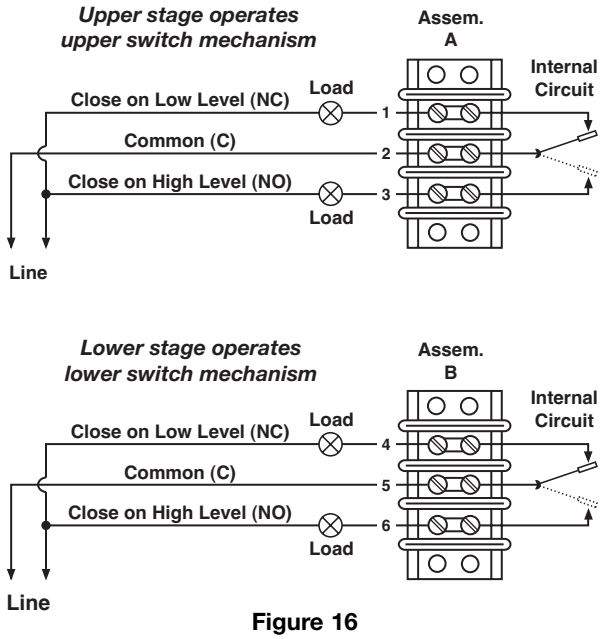


Figure 16

Single Float with Two Switches or Dual Stage Displacer

3.1.3 Single float with three switches or three stage displacer:

1. Rising level closes contacts 5 & 6 and 2 & 3, see Figure 17.
2. Falling level closes contacts 4 & 5 and 1 & 2.
3. Unit is shipped with switches positioned for proper function. Do not change switch spacing.

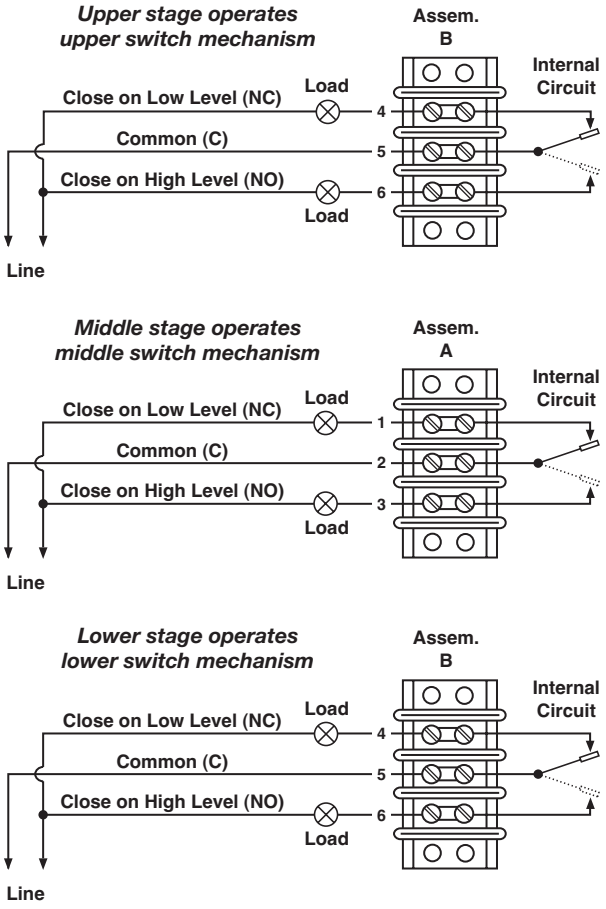


Figure 17

Single Float with Three Switches or Three Stage Displacer

3.2 DPDT Terminal Connections

3.2.1 Single float with one switch or single stage displacer

1. Rising level closes contacts 5 & 6 and 2 & 3, see Figure18.
2. Falling level closes contacts 4 & 5 and 1 & 2.
3. Double pole action is obtained by simultaneous operation of the right and left side single pole double throw switches.
4. Wiring diagram is reversed (close on high becomes close on low, etc.) when this switch mechanism is used on side mounted float switches employing a reversing pivot. (Models B40, T52, T62, T63, etc.)

3.2.2 Single float with two switches or dual stage displacer

1. Rising level closes contacts 5 & 6 and 2 & 3, see Figure 19.
2. Falling level closes contacts 4 & 5 and 1 & 2.
3. Double pole action is obtained by simultaneous operation of the right and left side single pole switches.
4. Wiring diagram is reversed (close on high becomes close on low, etc.) when this switch mechanism is used on side mounted float switches employing a reversing pivot. (Models B40, T52, T62, T63, etc.)
5. On units with tandem floats, the top float operates the bottom mechanism while the bottom float actuates the top mechanism.

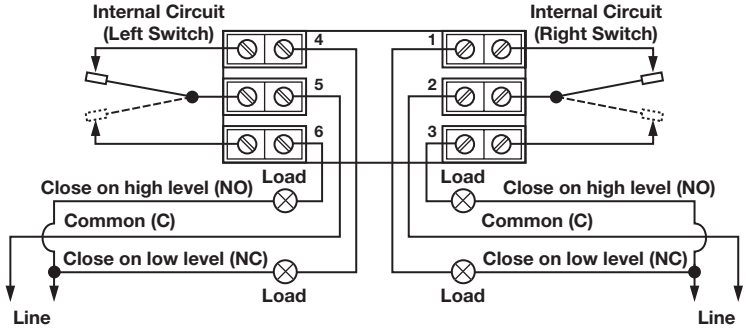
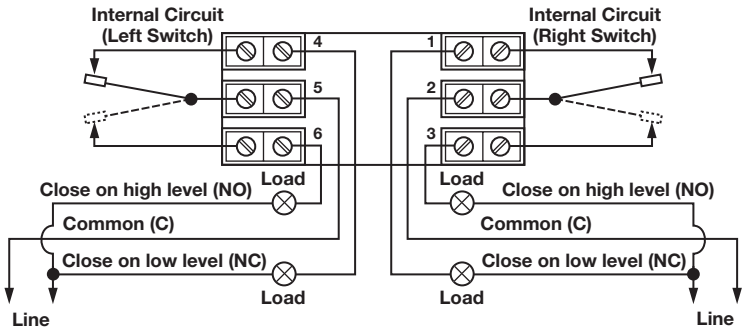


Figure 18

Single Float with One Switch or Single Stage Displacer

Lower stage operates lower switch mechanism



Upper stage operates upper switch mechanism

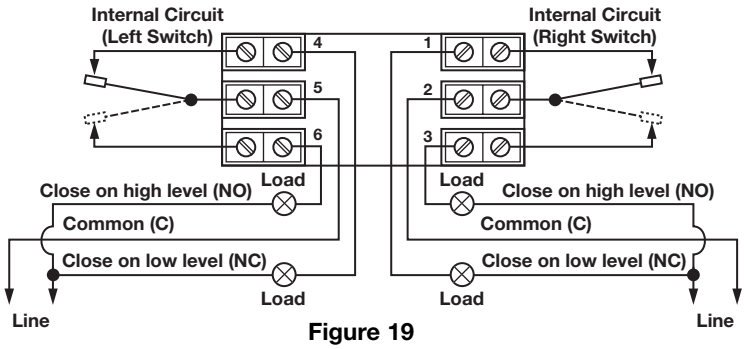


Figure 19

Single Float with Two Switches or Dual Stage Displacer

3.2.3 Three Stage Displacer

1. Rising level closes contacts 5 & 6 and 2 & 3, see Figure 20.
2. Falling level closes contacts 4 & 5 and 1 & 2.
3. Double pole action is obtained by simultaneous operation of the right and left side single pole switches.

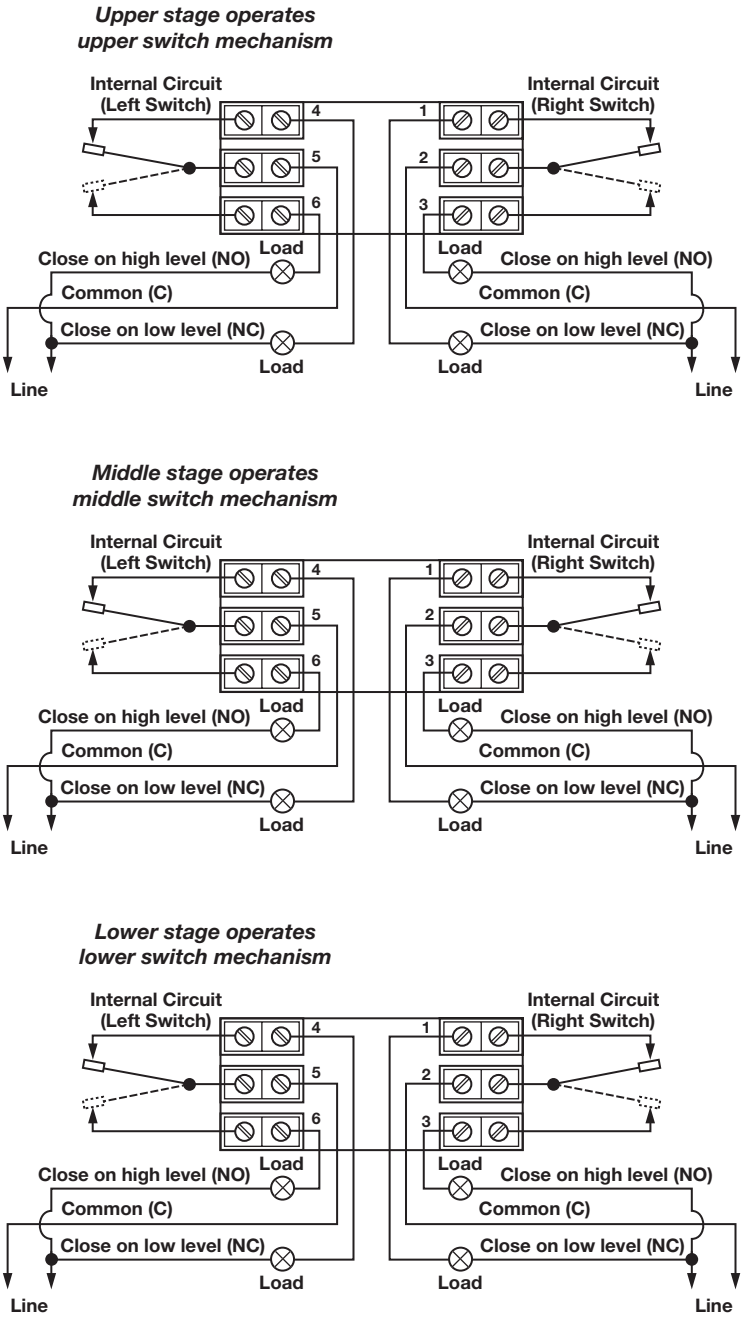


Figure 20
Three Stage Displacer

4.0 Switch Specifications

SWITCH SERIES	SWITCH TYPE	PROCESS TEMP. RANGE① ° F (° C)	LOAD	RATING					
				Volts AC			Volts DC		
				120	240	480	24	120	240
A	Mercury	-20 to +550 (-29 to +288) ②	Non-Inductive Amp	13.00	6.50	3.70	10.00	10.00	5.00
			Inductive Amp	9.80	4.90	2.50	—	5.20	2.60
3		-20 to +750 (-29 to +399)	Horsepower	½	½	½	—	½	½
B	Snap	-40 to +250 (-40 to +121)	Non-Inductive Amp	15.00	15.00	15.00	6.00	0.50	0.25
			Inductive Amp	15.00	15.00	15.00	5.00	0.05	0.03
			Horsepower	⅛	¼	—	—	—	—
C	Snap	-40 to +450 (-40 to +232)	Non-Inductive Amp	15.00	15.00	15.00	10.00	1.00	0.50
			Inductive Amp	15.00	15.00	15.00	5.00	0.50	—
			Horsepower	1/10	⅛	—	—	—	—
D	Snap	-40 to +250 (-40 to +121)	Non-Inductive Amp	10.00	—	—	10.00	10.00	1.50 min. 3.00 max.
			Inductive Amp	3.80	—	—	—	2.20	—
			Horsepower	⅛	—	—	—	⅛	—
E	Vibration Resistant Mercury	-20 to +550 (-29 to +288) ②	Non-Inductive Amp	4.00	2.00	1.00	—	4.00	2.00
			Inductive Amp	3.80	1.90	—	—	2.40	1.20
2		-20 to +750 (-29 to +399)	Horsepower	⅛	⅛	—	—	⅛	⅛
F (followed by letter)	Hermetic	-50 to +750 (-46 to +399)	Resistive Amp	2.50	—	—	4.00 ③	0.30	—
			Inductive Amp	2.50	—	—	2.00 ③	0.10	—
F (followed by number)	Hermetic	-50 to +250 (-46 to +121)	Resistive Amp	1.00	—	—	15.00 ③	—	—
			Inductive Amp	1.00	—	—	10.00 ③	—	—
LA LD LK LN	Mercury	-20 to +1000 (-29 to +538)	Non-Inductive Amp	13.00	6.50	3.70	—	10.00	5.00
			Inductive Amp	9.80	4.90	2.50	—	5.20	2.60
			Horsepower	½	½	½	—	½	½
LB LE LL LO	Mercury Vibration Resistant	-20 to +1000 (-29 to +538)	Non-Inductive Amp	4.00	2.00	1.00	—	4.00	2.00
			Inductive Amp	3.80	1.90	—	—	2.40	1.20
			Horsepower	⅛	⅛	—	—	⅛	⅛
M	Mercury Manual Reset	-20 to +750 (-29 to +399)	Same ratings as **Series 3** switch — Limited to a NEMA 1 enclosure If multiple switches, only bottom mechanism will be manual reset.						
N	Mercury	-20 to +550 (-29 to +288)	Non-Inductive Amp	13.00	6.50	3.70	—	10.00	5.00
			Inductive Amp	9.80	4.90	2.50	—	5.20	2.60
			Horsepower	½	½	½	—	½	½
O	Snap	-40 to +450 (-40 to +232)	Non-Inductive Amp	15.00	15.00	15.00	—	1.00	0.50
			Inductive Amp	15.00	15.00	15.00	—	—	—
			Horsepower	1/10	⅛	—	—	—	—
Q	Snap	-40 to +250 (-40 to +121)	Non-Inductive Amp	15.00	15.00	15.00	6.00	0.50	0.25
			Inductive Amp	15.00	15.00	15.00	5.00	0.05	0.30
			Horsepower	⅛	¼	—	—	—	—
SA SD SK SN	Snap	-40 to +550 (-40 to +288)	Non-Inductive Amp	15.00	15.00	15.00	—	1.00	0.50
			Inductive Amp	15.00	15.00	15.00	—	0.50	—
			Horsepower	1/10	⅛	—	—	—	—
SB SE SL SO	Snap	-40 to +250 (-40 to +121)	Non-Inductive Amp	10.00	—	—	10.00	10.00	1.50 min. 3.00 max.
			Inductive Amp	3.80	—	—	—	2.20	—
			Horsepower	⅛	—	—	—	⅛	—
T	Mercury	-20 to +500 (-29 to +260)	Non-Inductive Amp	4.00	2.00	1.00	—	4.00	2.00
			Inductive Amp	3.80	1.90	—	—	2.40	1.20
			Horsepower	⅛	⅛	—	—	⅛	⅛

① Process temperatures based on +100° F (+38° C) ambient temperature.

② On steam applications, use beaded lead mercury switches, Series 3 & 2.

③ 28 VDC

Continued on next page

SWITCH SERIES	SWITCH TYPE	PROCESS TEMP. RANGE °F (°C)	LOAD	RATING (amps)					
				VOLTS AC			VOLTS DC		
				120	240	480	24	120	240
(X) B (x=gold contacts)	Snap Gold Contacts	-40 to +250 (-40 to +121)	Non-inductive Inductive	1.00 1.00	— —	— —	— —	— —	— —
(X) F (x=gold contacts)	Hermetic Snap Gold Contacts	-50 to +750 (-46 to +399)	Non-inductive Inductive	— —	— —	— —	1.00 0.25	— —	— —
(X) HS (x=gold contacts)	Hermetic Snap Gold Contacts	-50 to +550 (-46 to +288) ④	Non-inductive Inductive	1.00 —	— —	— —	2.00 1.00	— —	— —

④ On steam applications, temperature down-rated to +400° F (+204° C) at +100° F (+38° C) ambient.

5.0 Replacement Switch Mechanisms

5.0.1 Switch Selection

When replacing a switch only, determine whether the switch is the left or right hand switch by orienting the switch mechanism with the terminal block toward you.

5.0.2 Magnet strength

Switch mechanisms are provided with different strength magnets as determined by the characteristics of the level switch. A red, red/yellow or yellow, black or blue dot is visible on each magnet. When ordering replacement switch mechanisms, be certain to determine the color dot on the magnet. For these types of switches, the tenth digit of the model number identifies the magnet used on the control. The correct magnet dot color may be chosen by finding the tenth digit of your model number at the top of the chart. Any model numbers preceded with an 'X' are specially modified controls. Contact the factory for replacement part numbers.

5.1 Yellow Dot Magnet Replacement Mechanisms

5.1.1 Series A, B, C, D, E, F, L, N, O, S & T – Yellow

Switch Series	Contacts	Quantity	8th & 9th Digit	10th Digit E, F, Y, M, W, Q, B, S, K Bottom Mech	10th Digit E, F, Y, M, W, Q, B, S, K Middle Mech	10th Digit E, F, Y, M, W, Q, B, S, K Top Mech	Switch Only Right Hand	Switch Only Left Hand
A	SPDT	1	**AA, AK**	89-7401-012	N/A	N/A	89-7101-013	N/A
		2	**AB, AL**		89-7401-009			
		3	**AC, AM**			89-7401-012		
	DPDT	1	**AD, AN**	89-7401-055	N/A	N/A		89-7101-014
		2	**AE, AO**			89-7401-055		
B	SPDT	1	**BA, BK**	89-7401-104	N/A	N/A	89-7101-020	N/A
		2	**BB, BL**		89-7401-103			
		3	**BC, BM**			89-7401-104		
	DPDT	1	**BD, BN**	89-7401-122	N/A	N/A		89-7101-020
		2	**BE, BO**			89-7401-122		
C	SPDT	1	**CA, CK**	89-7401-110	N/A	N/A	89-7101-022	N/A
		2	**CB, CL**		89-7401-109			
		3	**CC, CM**			89-7401-110		
	DPDT	1	**CD, CN**	89-7401-125	N/A			89-7101-022
		2	**CE, CO**			89-7401-125		
D	SPDT	1	**DA, DK**	89-7401-106	N/A	N/A	89-7101-024	N/A
		2	**DB, DL**		89-7401-105			
		3	**DC, DM**			89-7401-106		
	DPDT	1	**DD, DM**	89-7401-123	N/A	N/A		89-7101-024
		2	**DE, DO**			89-7401-123		
E	SPDT	1	**EA, EK**	89-7401-068	N/A	N/A	89-7101-015	N/A
		2	**EB, EL**		89-7401-063			
		3	**EC, EM**			89-7401-068		
	DPDT	1	**ED, EN**	89-7401-052	N/A	N/A		89-7101-015
		2	**EE, EO**			89-7401-052		
F	SPDT	1	**FA, FK**	89-7401-095	N/A	N/A	89-7101-041	N/A
		2	**FB, FL**			89-7401-096		
	DPDT	1	**FD, FN**	89-7401-098	N/A	N/A		89-7101-041
		2	**FE, FO**			89-7401-098		
L	SPDT	1	**LA, LK**	89-7401-015	N/A		89-7101-042	N/A
	DPDT	1	**LD, LN**	89-7401-024				89-7101-043
L (vibr res)	SPDT	1	**LB, LL**	89-7401-155	N/A		89-7101-033	N/A
	DPDT	1	**LE, LO**	89-7401-156				89-7101-044
N	SPDT	3	**NC, NM**	89-7401-012	89-7401-009	89-7401-012	89-7101-013	N/A
	DPDT	3	**NE, NK**	89-7401-055	89-7401-055	89-7401-055		89-7101-014
O	SPDT	3	**OC, OM**	89-7401-110	89-7401-109	89-7401-110	89-7101-022	N/A
	DPDT	3	**OE, OK**	89-7401-125	89-7401-125	89-7401-125		89-7101-022
Q	SPDT	3	**QC, QM**	89-7401-104	89-7401-103	89-7401-104	89-7101-020	N/A
	DPDT	3	**QE, QK**	89-7401-122	89-7401-122	89-7401-122		89-7101-020
S	SPDT	1	**SA, SK**	89-7401-126	N/A		89-7101-022	N/A
	DPDT	1	**SD, SN**	89-7401-128				89-7101-022
S (DC volt)	SPDT	1	**SB, SL**	89-7401-129	N/A		89-7101-024	N/A
	DPDT	1	**SE, SO**	89-7401-127				89-7101-024
T	SPDT	3	**TC, TM**	89-7401-068	89-7401-063	89-7401-068	89-7101-015	N/A
	DPDT	3	**TE, TK**	89-7401-052	89-7401-052	89-7401-052		89-7101-015

5.1.2 Series 2, 3 & M – Yellow

Switch Series	Contacts	Quantity	8th & 9th Digit	10th Digit				Switch Only	
				E, Y, Q, S	F, M, W, B, K				
				Single Mech	Bottom Mech	Middle Mech	Top Mech	Right Hand	Left Hand
2	SPDT	1	**2A, 2K**	89-7401-150	89-7401-150	N/A	N/A	89-7101-033	N/A
		2	**2B, 2L**	N/A		89-7401-149			
		3	**2C, 2M**				89-7401-150		
	DPDT	1	**2D, 2N**	89-7401-154	89-7401-154	N/A	N/A		89-7101-044
		2	**2E, 2O**	N/A			89-7401-154		
3	SPDT	1	**3A, 3K**	89-7401-147	89-7401-147	N/A	N/A	89-7101-042	N/A
		2	**3B, 3L**	N/A		89-7401-146			
		3	**3C, 3M**				89-7401-147		
	DPDT	1	**3D, 3N**	89-7401-148	89-7401-148	N/A	N/A		89-7101-043
		2	**3E, 3O**	N/A			89-7401-148		
M	SPDT	1	**MA**	89-7401-147	89-7401-147	N/A	N/A	89-7101-042	N/A
		2	**MB**	N/A		89-7401-146			
		3	**MC**				89-7401-147		
	DPDT	1	**MD**	89-7401-148	89-7401-148	N/A	N/A		89-7101-043
		2	**ME**	N/A			89-7401-148		

5.2 Red, Black and Blue Dot Magnet Replacement Mechanisms

5.2.1 Series A, B, C & E – Red, Red/Yellow

Switch Series	Contacts	Quantity	8th & 9th Digit	10th Digit			Switch Only	
				G, H, R, D, V, P, A, T, J				
				Bottom Mech	Middle Mech	Top Mech	Right Hand	Left Hand
A	SPDT	1	**AA, AK**	89-7401-006	N/A	N/A	89-7101-013	N/A
		2	**AB, AL**		89-7401-003			
		3	**AC, AM**	89-7401-173				
	DPDT	1	**AD, AN**	89-7401-018	N/A	N/A		89-7101-014
		2	**AE, AO**			89-7401-018		
B	SPDT	1	**BA, BK**	89-7401-102	N/A	N/A	89-7101-020	N/A
		2	**BB, BL**		89-7401-101			
		3	**BC, BM**			89-7401-102		
	DPDT	1	**BD, BN**	89-7401-121	N/A	N/A		89-7101-020
		2	**BE, BO**			89-7401-121		
C	SPDT	1	**CA, CK**	89-7401-108	N/A	N/A	89-7101-022	N/A
		2	**CB, CL**		89-7401-107			
		3	**CC, CM**			89-7401-108		
	DPDT	1	**CD, CN**	89-7401-124	N/A	N/A		89-7101-022
		2	**CE, CO**			89-7401-124		
E	SPDT	1	**EA, EK**	89-7401-078	N/A	N/A	89-7101-015	N/A
		2	**EB, EL**		89-7401-073			
		3	**EC, EM**	89-7401-177				
	DPDT	1	**ED, EN**	89-7401-046	N/A	N/A		89-7101-015
		2	**EE, EO**			89-7401-046		
F	SPDT	1	**FA, FK**	89-7401-093	N/A	N/A	89-7101-041	N/A
		2	**FB, FL**			89-7401-094		
	DPDT	1	**FD, FN**	89-7401-097		N/A		89-7101-041
		2	**FE, FO**			89-7401-097		

5.2.2 Series 2, 3 and M – Red, Red/Yellow

Switch Series	Contacts	Quantity	8th & 9th Digit	10th Digit				Switch Only	
				G, R, P, T	H, D, V, A, J				
				Single Mech	Bottom Mech	Middle Mech	Top Mech	Right Hand	Left Hand
2	SPDT	1	**2A, 2K**	89-7401-152	89-7401-152	N/A	N/A	89-7101-033	N/A
		2	**2B, 2L**	N/A		89-7401-174			
		3	**2C, 2M**		89-7401-177				
	DPDT	1	**2D, 2N**	89-7401-153	89-7401-153	N/A	N/A		89-7101-044
		2	**2E, 2O**	N/A			89-7401-153		
3	SPDT	1	**3A, 3K**	89-7401-158	89-7401-158	N/A	N/A	89-7101-042	N/A
		2	**3B, 3L**	N/A		89-7401-170			
		3	**3C, 3M**		89-7401-173				
	DPDT	1	**3D, 3N**	89-7401-159	89-7401-159	N/A	N/A		89-7101-043
		2	**3E, 3O**	N/A			89-7401-159		
M	SPDT	1	**MA**	89-7401-158	89-7401-158	N/A	N/A	89-7101-042	N/A
		2	**MB**	N/A		89-7401-170			
		3	**MC**		89-7401-173				
	DPDT	1	**MD**	89-7401-159	89-7401-159	N/A	N/A		89-7101-043
		2	**ME**	N/A			89-7401-159		

5.2.3 Series 2, 3 and M – Red/Black/Blue

Switch Series	Contacts	Quantity	8th & 9th Digit	10th Digit			Switch Only	
				E, G				
				Bottom Mech	Middle Mech	Top Mech	Right Hand	Left Hand
2	SPDT	1	**2A, 2K**	N/A			89-7101-033	N/A
		2	**2B, 2L**	89-7401-152	89-7401-174	N/A		
		3	**2C, 2M**	89-7401-152	89-7401-174	89-7401-175		
	DPDT	1	**2D, 2N**	N/A				89-7101-044
		2	**2E, 2O**					
3	SPDT	1	**3A, 3K**	N/A			89-7101-042	N/A
		2	**3B, 3L**	89-7401-158	89-7401-170	N/A		
		3	**3C, 3M**	89-7401-158	89-7401-170	89-7401-171		
	DPDT	1	**3D, 3N**	N/A				89-7101-043
		2	**3E, 3O**					
M	SPDT	1	**MA**	N/A			89-7101-042	N/A
		2	**MB**	89-7401-158	89-7401-170	N/A		
		3	**MC**	89-7401-158	89-7401-170	89-7401-171		
	DPDT	1	**MD**	N/A				89-7101-043
		2	**ME**					

6.0 Switch Housing Replacement Assemblies

When ordering replacement parts for an existing Magnetrol instrument, please specify:

1. Model and serial numbers of control.
2. Description and part number of replacement kit.

The proper replacement switch housing kit and parts can be determined by the last three characters of the model number. In section 6.1.1 on page 19, locate the eighth and ninth digits of your model number at the left side of the chart. Follow the appropriate row across the page while locating the tenth digit of your model number at the top of the chart. In section 6.1.2 on page 19, the chart lists the replacement housing kits according to description.

6.0.1 Aluminum Housings

Die cast aluminum NEMA 4X housing replacements are available for general purpose or weather proof installations. Explosion proof NEMA 4X/7/9 and Class I, Div 1, Group B housing replacements are available for hazardous atmosphere locations. Die cast aluminum housings are finished with a baked-on polyester powder coat paint.

NOTE: Consult your local representative on applications to meet NEMA and other codes not covered in this bulletin.

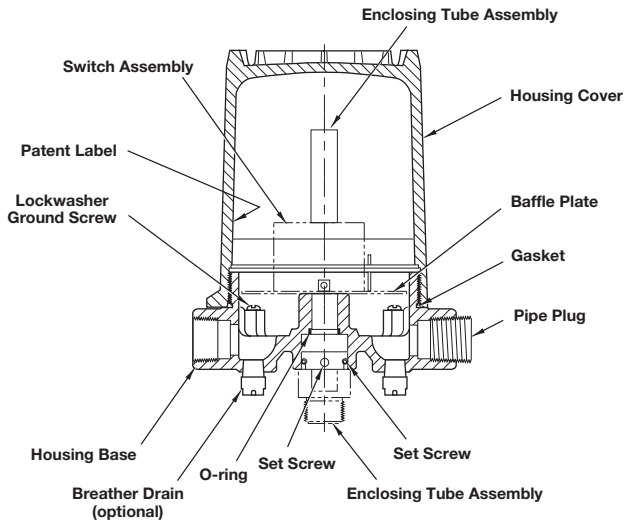


Figure 21
Aluminum Housing Assembly

6.0.2 Cast Iron Housings

Cast Iron NEMA 7/9 housing replacements are available for hazardous atmosphere locations. Both Class I, Div. 1, Groups C & D and Group B versions are available. The grey iron cover and base are finished with a baked-on polyester powder coat paint.

NOTE: Consult your local representative on applications to meet NEMA and other codes not covered in this bulletin.

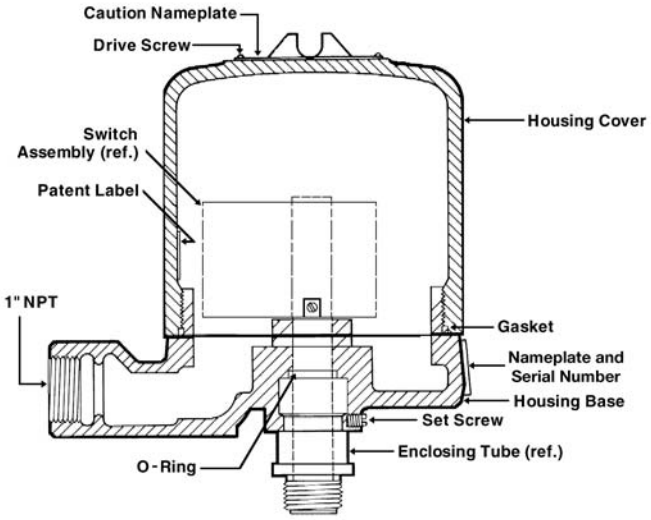


Figure 22
Cast Iron Housing Assembly

6.0.3 Carbon Steel Housings

Carbon steel NEMA 4X switch housings are available for general purpose and weather proof installations. The housing base is cast from aluminum while the cover is made from cold rolled steel. The housings are finished with a baked-on polyester powder coat paint.

NOTE: Consult your local representative on applications to meet NEMA and other codes not covered in this bulletin.

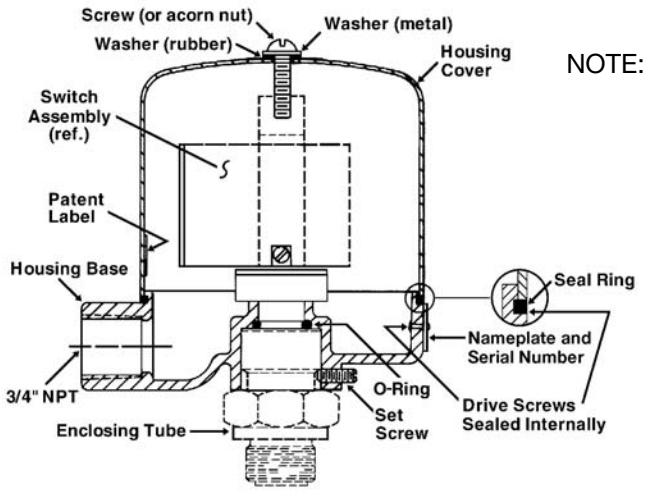


Figure 23
Carbon Steel Housing Assembly

6.1 Replacement Housing Kits

6.1.1 Referenced by eighth, ninth and tenth digit

Eighth Digit	Ninth Digit	Tenth Digit						
		E, G, Y, R	P, Q	S, T	F, H, D, M	A, B	J, K, G	V, W
2, 3, A, B, C, D, E, F, G, H, I, L, S	A, B, C, D, E	89-6509-003*	89-6582-023	N/A	89-6510-003*	89-6582-024	N/A	N/A
	K, L, M, N, O	89-6582-002	89-6582-023	89-6582-032	89-6582-005	89-6582-024	89-6582-033	89-6582-008
	U, V, W, X, Y	89-6582-003	89-6582-028	N/A	89-6582-006	89-6582-029	N/A	N/A
M	A, B, C, D, E	89-6511-003*	N/A		89-6512-003*	N/A		
N, O, Q, T	A, B, C, D, E	N/A			89-6528-003	89-6582-025		
	K, L, M, N, O				89-6578-001	89-6582-025		

* Cover kit only. Housing base must be ordered separately by P/N 89-6505-003.

6.1.2 Referenced by description

Cover Height	Housing Material	NEMA 1	NEMA 4X	NEMA 4X/7/9	NEMA 7/9	Group B	NEMA 4X/7/9 with drain	NEMA 7/9 with drain
Short	CS cover, aluminum base	89-6511-003*	89-6509-003*	N/A	N/A	N/A		N/A
	Cast aluminum	N/A	89-6582-023	89-6582-023		89-6582-032	89-6582-028	
	Cast Iron		N/A		89-6582-002	N/A		89-6582-003
Tall	CS cover, aluminum base	89-6512-003*	89-6510-003*	N/A	N/A	N/A		N/A
	Cast aluminum	N/A	89-6582-024	89-6582-024		89-6582-033	89-6582-029	
	Cast Iron		N/A		89-6582-005	89-6582-008	N/A	89-6582-006
X-Tall	CS cover, aluminum base	N/A	89-6528-003	N/A	N/A	N/A	N/A	N/A
	Cast aluminum		89-6582-025	89-6582-025				
	Cast Iron		N/A		89-6578-001			

* Cover kit only. Housing base must be ordered separately by P/N 89-6505-003.

Lexan Cover Kit	89-6522-001*

6.2 Replacement Gaskets and Hardware

Housing Material	Enclosure Type	Ninth Digit	Tenth Digit	Gasket	O-ring	Baffle Plate*	Cover Hardware
CS cover, aluminum base	NEMA 4X	A, B, C, D, E	D, E, F, G, H, M, R, Y	N/A	N/A	36-5303-001	89-6508-001
Cast aluminum	NEMA 4X	All	A, B, P, Q	12-2201-253	12-2201-116	05-6657-001	N/A
	NEMA 4X/7/9	All	A, B, E, P, Q				
	Group B	All	G, J, K, S, T				
Cast iron	NEMA 7/9	K, L, M, N, O	D, M, R, Y	12-2201-249			
	7/9 w/drain	U, V, W, X, Y	D, M, R, Y				
	All	All	V, W				

* For models with manual reset options, see page 20 for parts

7.0 Manual Reset Option

7.1 Parts Breakdown and Identification

Part No. 89-6507-001, on Boiler Controls Equipped with Series M Switch Mechanism (*denotes included in kit)

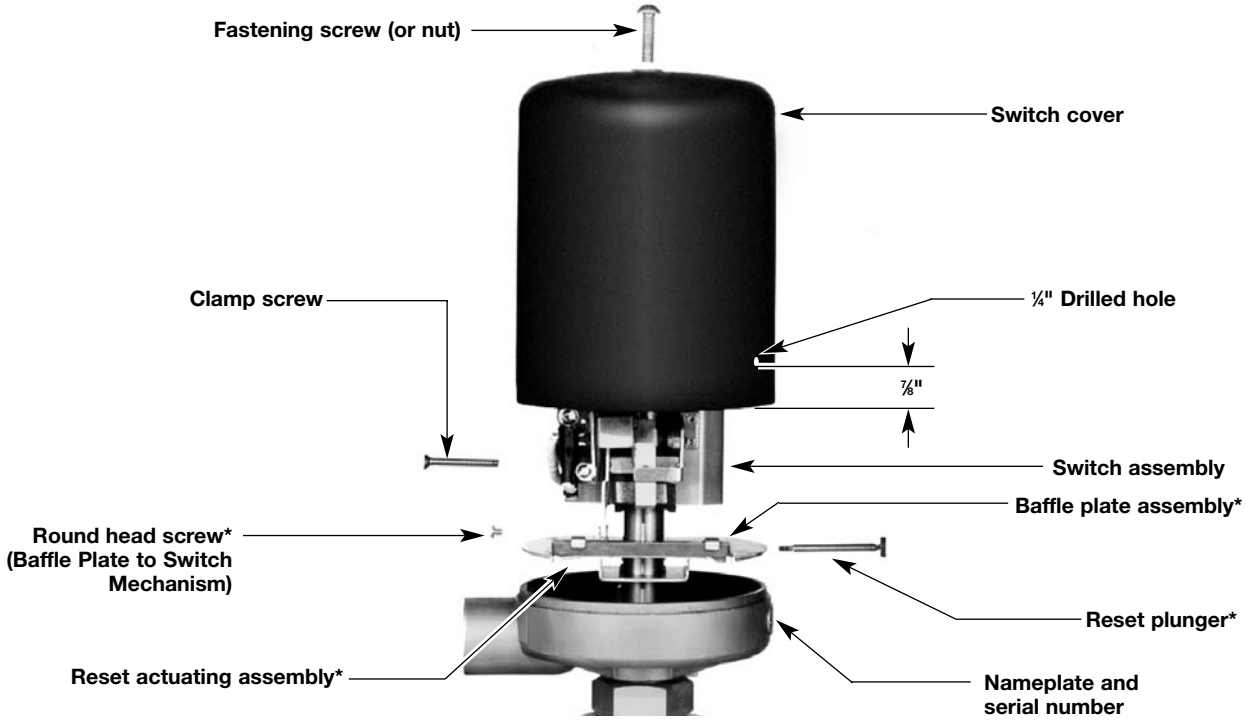


Figure 24

7.2 Field Installation Instructions

Caution: Before attempting work on any level control, be certain to pull disconnect switch or otherwise assure that electrical circuit through control is de-energized.

1. Remove switch cover by loosening fastening screw (or nut).
2. Drill a ¼" diameter hole in cover at ⅞" up from bottom edge, as shown.
3. Disconnect wiring from supply side of terminal strip on switch mechanisms.

NOTE: Measure location of switch mechanism(s) on enclosing tube and record for reference use during reassembly. (Measure from top of enclosing tube to top of mounting clamp on switch mechanism[s]).

4. Loosen screw in split mounting clamp of switch mechanism(s) until assembly moves freely on enclosing tube.
5. Remove small round head screw securing baffle plate to switch mechanism.
6. Carefully lift off switch mechanism(s) and baffle plate. Place on a clean surface, free of any metal particles that may be attracted onto the magnet(s).
7. Install a new baffle plate assembly, with manual reset mechanism, and carefully replace switch mechanism(s) in reverse of steps 3 through 6 above.
8. Replace switch cover, lining up drilled hole with hole in reset actuating mechanism. Do not tighten cover fastening screw (or nut) at this point.
9. Thread reset plunger into actuating mechanism through drilled hole in switch cover and thumb tighten securely. Reposition switch cover as necessary to be certain it does not bind reset plunger.
10. Tighten fastening screw (or nut) on switch cover and check action of plunger to see that it moves freely.
11. Blow down float chamber to test operation of manual reset mechanism.

NOTE: Boiler level controls should not start firing equipment when boiler water level has returned to normal (safe point) until reset plunger has been manually depressed. If control starts firing equipment, magnet stop arm on switch mechanism must be bent out on switch frame 1/32" allowing magnet to swing further from enclosing tube arm and into the field of the reset magnet.

Caution: If it is necessary to reposition manual reset plunger, entire switch mechanism(s) must be loosened and rotated on enclosing tube to desired position (refer to step 4). **Do not** attempt to position plunger by twisting switch cover or damage to switch mechanism(s) will result.

8.0 Switch and Housing Model Codes

The following charts identify the switch and housing model codes used with the buoyancy products. The eighth, ninth and tenth digit combinations may be used to identify the type and number of switches, number of contacts, switch magnet strength as well as housing type, size and options. The switch and housing codes in bold are currently valid and available in combination with various buoyancy products. The unbolded codes are no longer valid and should be replaced by the appropriate valid code.

example model number:

□□□-□□□□-A A E

NEMA 4 Carbon Steel	NEMA 4X Carbon Steel	NEMA 7/9 Cast Iron	NEMA 4X Cast Alum.	NEMA 4X/7/9 Cast Alum.	Group B Cast Iron	ATEX Cast Iron 3/4" NPT	NEMA 4X/7/9 Group B Cast Alum	ATEX Cast Alum 1" NPT	Magnet Dot Color	Set Points	Switch Contacts	Housing Height and Options	Switch Type
AAE	**AAY**	**AKY**	AAQ	**AKQ**	—	—	**AKS**	**AA9**	Yellow	1	SPDT	Short	Mercury
AAG	**AAR**	**AKR**	AAP	**AKP**	—	—	**AKT**	**AAC**	Red				
AAF	**AAM**	**AKM**	AAB	**AKB**	**AKW**	**AU5**	**AKK**	**AC9**	Yellow			Tall	
AAH	**AAD**	**AKD**	AAA	**AKA**	**AKV**	**AU7**	**AKJ**	**ACC**	Red				
ABF	**ABM**	**ALM**	ABB	**ALB**	**ALW**	**AV5**	**ALK**	**AD9**	Yellow	2			
ABH	**ABD**	**ALD**	ABA	**ALA**	**ALV**	**AV7**	**ALJ**	**ADC**	Red				
ACF	**ACM**	**AMM**	ACB	**AMB**	**AMW**	**A75**	**AMK**	**AE9**	Yellow	3			
ACH	ACD	AMD	ACA	AMA	AMV	A77	AMJ	AEC	Red				
ADE	**ADY**	**ANY**	ADQ	**ANQ**	—	—	**ANS**	**AB9**	Yellow	1	DPDT	Short	
ADG	**ADR**	**ANR**	ADP	**ANP**	—	—	**ANT**	**ABC**	Red				
ADF	**ADM**	**ANM**	ADB	**ANB**	**ANW**	**AW5**	**ANK**	**AF9**	Yellow			Tall	
ADH	**ADD**	**AND**	ADA	**ANA**	**ANV**	**AW7**	**ANJ**	**AFC**	Red				
AEF	**AEM**	**AOM**	AEB	**AOB**	**AOW**	**AY5**	**AOK**	**AG9**	Yellow	2			
AEH	**AED**	**AOD**	AEA	**AOA**	**AOV**	**AY7**	**AOJ**	**AGC**	Red				
—	—	**AUY**	—	**AUQ**	—	—	—	—	Yellow	1	SPDT	Short w/Drain	
—	—	**AUR**	—	**AUP**	—	—	—	—	Red				
—	—	**AUM**	—	**AUB**	—	—	—	—	Yellow			Tall w/Drain	
—	—	**AUD**	—	**AUA**	—	—	—	—	Red				
—	—	**AVM**	—	**AVB**	—	—	—	—	Yellow	2			
—	—	**AVD**	—	**AVA**	—	—	—	—	Red				
—	—	**AWM**	—	**AWB**	—	—	—	—	Yellow	3			
—	—	AWD	—	AWA	—	—	—	—	Red				
—	—	**AXY**	—	**AXQ**	—	—	—	—	Yellow	1	DPDT	Short w/Drain	
—	—	**AXR**	—	**AXP**	—	—	—	—	Red				
—	—	**AXM**	—	**AXB**	—	—	—	—	Yellow			Tall w/Drain	
—	—	**AXD**	—	**AXA**	—	—	—	—	Red				
—	—	**AYM**	—	**AYB**	—	—	—	—	Yellow	2			
—	—	**AYD**	—	**AYA**	—	—	—	—	Red				
AFE	**AFY**	**APY**	AFQ	**APQ**	—	—	—	—	Yellow	1	SPDT	Short w/Heater	
AFG	**AFR**	**APR**	AFP	**APP**	—	—	—	—	Red				
AFF	**AFM**	**APM**	AFB	**APB**	—	—	—	—	Yellow			Tall w/Heater	
AFH	**AFD**	**APD**	AFA	**APA**	—	—	—	—	Red				
AGF	**AGM**	**AQM**	AGB	**AQB**	—	—	—	—	Yellow	2			
AGH	**AGD**	**AQD**	AGA	**AQA**	—	—	—	—	Red				
AHF	**AHM**	**ARM**	AHB	**ARB**	—	—	—	—	Yellow	3			
AHH	AHD	ARD	AHA	ARA	—	—	—	—	Red				
AIE	**AIY**	**ASY**	AIQ	**ASQ**	—	—	—	—	Yellow	1	DPDT	Short w/Heater	
AIG	**AIR**	**ASR**	AIP	**ASP**	—	—	—	—	Red				
AIF	**AIM**	**ASM**	AIB	**ASB**	—	—	—	—	Yellow			Tall w/Heater	
AIH	**AID**	**ASD**	AIA	**ASA**	—	—	—	—	Red				
AJF	**AJM**	**ATM**	AJB	**ATB**	—	—	—	—	Yellow	2			
AJH	**AJD**	**ATD**	AJA	**ATA**	—	—	—	—	Red				
BAE	**BAY**	**BKY**	BAQ	**BKQ**	—	—	**BKS**	**BA9**	Yellow	1	SPDT	Short	Dry Contact
BAG	**BAR**	**BKR**	BAP	**BKP**	—	—	**BKT**	**BAC**	Red				
BAF	BAM	**BKM**	BAB	**BKB**	**BKW**	**BU5**	**BKK**	**BC9**	Yellow			Tall	
BAH	**BAD**	**BKD**	BAA	**BKA**	**BKV**	**BU7**	**BKJ**	**BCC**	Red				
BBF	**BBM**	**BLM**	BBB	**BLB**	**BLW**	**BV5**	**BLK**	**BD9**	Yellow	2			
BBH	**BBD**	**BLD**	BBA	**BLA**	**BLV**	**BV7**	**BLJ**	**BDC**	Red				
BCF	**BCM**	**BMM**	BCB	**BMB**	**BMW**	**B75**	**BMK**	**BE9**	Yellow	3			
BCH	**BCD**	**BMD**	BCA	**BMA**	**BMV**	**B77**	**BMJ**	**BEC**	Red				

8.0 Switch and Housing Model Codes

NEMA 4 Carbon Steel	NEMA 4X Carbon Steel	NEMA 7/9 Cast Iron	NEMA 4X Cast Alum.	NEMA 4X/7/9 Cast Alum.	Group B Cast Iron	ATEX Cast Iron 3/4" NPT	NEMA 4X/7/9 Group B Cast Alum	ATEX Cast Alum 1" NPT	Magnet Dot Color	Set Points	Switch Contacts	Housing Height and Options	Switch Type
BDE	**BDY**	**BNY**	BDQ	**BNQ**	—	—	**BNS**	**BB9**	Yellow	1	DPDT	Short	Dry Contact
BDG	**BDR**	**BNR**	BDP	**BNP**	—	—	**BNT**	**BBC**	Red				
BDF	**BDM**	**BNM**	BDB	**BNB**	**BNW**	**BW5**	**BNK**	**BF9**	Yellow			Tall	
BDH	**BDD**	**BND**	BDA	**BNA**	**BNV**	**BW7**	**BNJ**	**BFC**	Red				
BEF	**BEM**	**BOM**	BEB	**BOB**	**BOW**	**BY5**	**BOK**	**BG9**	Yellow	2			
BEH	**BED**	**BOD**	BEA	**BOA**	**BOV**	**BY7**	**BOJ**	**BGC**	Red				
—	—	**BUY**	—	**BUQ**	—	—	—	—	Yellow	1		Short w/Drain	
—	—	**BUR**	—	**BUP**	—	—	—	—	Red				
—	—	**BUM**	—	**BUB**	—	—	—	—	Yellow			Tall w/Drain	
—	—	**BUD**	—	**BUA**	—	—	—	—	Red		SPDT		
—	—	**BVM**	—	**BVB**	—	—	—	—	Yellow	2			
—	—	**BVD**	—	**BVA**	—	—	—	—	Red				
—	—	**BWM**	—	**BWB**	—	—	—	—	Yellow	3			
—	—	**BWD**	—	**BWA**	—	—	—	—	Red				
—	—	**BXY**	—	**BXQ**	—	—	—	—	Yellow	1	DPDT	Short w/Drain	
—	—	**BXR**	—	**BXP**	—	—	—	—	Red				
—	—	**BXM**	—	**BXB**	—	—	—	—	Yellow			Tall w/Drain	
—	—	**BXD**	—	**BXA**	—	—	—	—	Red				
—	—	**BYM**	—	**BYB**	—	—	—	—	Yellow	2			
—	—	**BYD**	—	**BYA**	—	—	—	—	Red				
BFE	**BFY**	**BPY**	BFQ	**BPQ**	—	—	—	—	Yellow	1	SPDT	Short w/Heater	
BFG	**BFR**	**BPR**	BFP	**BPP**	—	—	—	—	Red				
BFF	**BFM**	**BPM**	BFB	**BPB**	—	—	—	—	Yellow			Tall w/Heater	
BFH	**BFD**	**BPD**	BFA	**BPA**	—	—	—	—	Red				
BGF	**BGM**	**BQM**	BGB	**BQB**	—	—	—	—	Yellow	2			
BGH	**BGD**	**BQD**	BGA	**BQA**	—	—	—	—	Red				
BHF	**BHM**	**BRM**	BHB	**BRB**	—	—	—	—	Yellow	3			
BHH	**BHD**	**BRD**	BHA	**BRA**	—	—	—	—	Red				
BIE	**BIY**	**BSY**	BIQ	**BSQ**	—	—	—	—	Yellow	1	DPDT	Short w/Heater	
BIG	**BIR**	**BSR**	BIP	**BSP**	—	—	—	—	Red				
BIF	**BIM**	**BSM**	BIB	**BSB**	—	—	—	—	Yellow			Tall w/Heater	
BIH	**BID**	**BSD**	BIA	**BSA**	—	—	—	—	Red				
BJF	**BJM**	**BTM**	BJB	**BTB**	—	—	—	—	Yellow	2			
BJH	**BJD**	**BTD**	BJA	**BTA**	—	—	—	—	Red				
CAE	**CAY**	**CKY**	CAQ	**CKQ**	—	—	**CKS**	**CA9**	Yellow	1	SPDT	Short	Dry Contact
CAG	**CAR**	**CKR**	CAP	**CKP**	—	—	**CKT**	**CAC**	Red				
CAF	**CAM**	**CKM**	CAB	**CKB**	**CKW**	**CU5**	**CKK**	**CC9**	Yellow			Tall	
CAH	**CAD**	**CKD**	CAA	**CKA**	**CKV**	**CU7**	**CKJ**	**CCC**	Red				
CBF	**CBM**	**CLM**	CBB	**CLB**	**CLW**	**CV5**	**CLK**	**CD9**	Yellow	2			
CBH	**CBD**	**CLD**	CBA	**CLA**	**CLV**	**CV7**	**CLJ**	**CDC**	Red				
CCF	**CCM**	**CMM**	CCB	**CMB**	**CMW**	**C75**	**CMK**	**CE9**	Yellow	3			
CCH	**CCD**	**CMD**	CCA	**CMA**	**CMV**	**C77**	**CMJ**	**CEC**	Red				
CDE	**CDY**	**CNY**	CDQ	**CNQ**	—	—	**CNS**	**CB9**	Yellow	1	DPDT	Short	
CDG	**CDR**	**CNR**	CDP	**CNP**	—	—	**CNT**	**CBC**	Red				
CDF	**CDM**	**CNM**	CDB	**CNB**	**CNW**	**CW5**	**CNK**	**CF9**	Yellow			Tall	
CDH	**CDD**	**CND**	CDA	**CNA**	**CNV**	**CW7**	**CNJ**	**CFC**	Red				
CEF	**CEM**	**COM**	CEB	**COB**	**COW**	**CY5**	**COK**	**CG9**	Yellow	2			
CEH	**CED**	**COD**	CEA	**COA**	**COV**	**CY7**	**COJ**	**CGC**	Red				
—	—	**CUY**	—	**CUQ**	—	—	—	—	Yellow	1	SPDT	Short w/Drain	
—	—	**CUR**	—	**CUP**	—	—	—	—	Red				
—	—	**CUM**	—	**CUB**	—	—	—	—	Yellow			Tall w/Drain	
—	—	**CUD**	—	**CUA**	—	—	—	—	Red				
—	—	**CVM**	—	**CVB**	—	—	—	—	Yellow	2			
—	—	**CVD**	—	**CVA**	—	—	—	—	Red				
—	—	**CWM**	—	**CWB**	—	—	—	—	Yellow	3			
—	—	**CWD**	—	**CWA**	—	—	—	—	Red				
—	—	**CXY**	—	**CXQ**	—	—	—	—	Yellow	1	DPDT	Short w/Drain	
—	—	**CXR**	—	**CXP**	—	—	—	—	Red				
—	—	**CXM**	—	**CXB**	—	—	—	—	Yellow			Tall w/Drain	
—	—	**CXD**	—	**CXA**	—	—	—	—	Red				
—	—	**CYM**	—	**CYB**	—	—	—	—	Yellow	2			
—	—	**CYD**	—	**CYA**	—	—	—	—	Red				

8.0 Switch and Housing Model Codes

NEMA 4 Carbon Steel	NEMA 4X Carbon Steel	NEMA 7/9 Cast Iron	NEMA 4X Cast Alum.	NEMA 4X/7/9 Cast Alum.	Group B Cast Iron	ATEX Cast Iron 3/4" NPT	NEMA 4X/7/9 Group B Cast Alum	ATEX Cast Alum 1" NPT	Magnet Dot Color	Set Points	Switch Contacts	Housing Height and Options	Switch Type
CFE	**CFY**	**CPY**	CFQ	**CPQ**	—	—	—	—	Yellow	1	SPDT	Short w/Heater	Dry Contact
CFG	**CFR**	**CPR**	CFP	**CPP**	—	—	—	—	Red				
CFF	**CFM**	**CPM**	CFB	**CPB**	—	—	—	—	Yellow				
CFH	**CFD**	**CPD**	CFA	**CPA**	—	—	—	—	Red			Tall w/Heater	
CGF	**CGM**	**CQM**	CGB	**CQB**	—	—	—	—	Yellow	2			
CGH	**CGD**	**CQD**	CGA	**CQA**	—	—	—	—	Red				
CHF	**CHM**	**CRM**	CHB	**CRB**	—	—	—	—	Yellow	3			
CHH	**CHD**	**CRD**	CHA	**CRA**	—	—	—	—	Red				
CIE	**CIY**	**CSY**	CIQ	**CSQ**	—	—	—	—	Yellow	1	DPDT	Short w/Heater	
CIG	**CIR**	**CSR**	CIP	**CSP**	—	—	—	—	Red				
CIF	**CIM**	**CSM**	CIB	**CSB**	—	—	—	—	Yellow			Tall w/Heater	
CIH	**CID**	**CSD**	CIA	**CSA**	—	—	—	—	Red				
CJF	**CJM**	**CTM**	CJB	**CTB**	—	—	—	—	Yellow	2			
CJH	**CJD**	**CTD**	CJA	**CTA**	—	—	—	—	Red				
DAE	**DAY**	**DKY**	DAQ	**DKQ**	—	—	**DKS**	**DA9**		1	SPDT	Short	DC Voltage Dry Contact
DAF	**DAM**	**DKM**	DAB	**DKB**	**DKW**	**DU5**	**DKK**	**DC9**				Tall	
DBF	**DBM**	**DLM**	DBB	**DLB**	**DLW**	**DV5**	**DLK**	**DD9**		2			
DCF	**DCM**	**DMM**	DCB	**DMB**	**DMW**	**D75**	**DMK**	**DE9**		3			
DDE	**DDY**	**DNY**	DDQ	**DNQ**	—	—	**DNS**	**DB9**		1	DPDT	Short	
DDF	**DDM**	**DNM**	DDB	**DNB**	**DNW**	**DW5**	**DNK**	**DF9**				Tall	
DEF	**DEM**	**DOM**	DEB	**DOB**	**DOW**	**DY5**	**DOK**	**DG9**		2			
—	—	**DUY**	—	**DUQ**	—	—	—	—		1	SPDT	Shrt w/Drn	
—	—	**DUM**	—	**DUB**	—	—	—	—				Tall w/Drain	
—	—	**DVM**	—	**DVB**	—	—	—	—		2			
—	—	**DWM**	—	**DWB**	—	—	—	—	Yellow	3			
—	—	**DXY**	—	**DXQ**	—	—	—	—		1	DPDT	Shrt w/Drn	
—	—	**DXM**	—	**DXB**	—	—	—	—				Tall w/Drain	
—	—	**DYM**	—	**DYB**	—	—	—	—		2			
DFE	**DFY**	**DPY**	DFQ	**DPQ**	—	—	—	—		1	SPDT	Shrt w/Htr	
DFF	**DFM**	**DPM**	DFB	**DPB**	—	—	—	—				Tall w/Heater	
DGF	**DGM**	**DQM**	DGB	**DQB**	—	—	—	—		2			
DHF	**DHM**	**DRM**	DHB	**DRB**	—	—	—	—		3			
DIE	**DIY**	**DSY**	DIQ	**DSQ**	—	—	—	—		1	DPDT	Shrt w/Htr	
DIF	**DIM**	**DSM**	DIB	**DSB**	—	—	—	—				Tall w/Heater	
DJF	**DJM**	**DTM**	DJB	**DTB**	—	—	—	—		2			
EAE	**EAY**	**EKY**	EAQ	**EKQ**	—	—	**EKS**	**EA9**	Yellow	1	SPDT	Short	Vibration Resistant Mercury
EAG	**EAR**	**EKR**	EAP	**EKP**	—	—	**EKT**	**EAC**	Red				
EAF	**EAM**	**EKM**	EAB	**EKB**	**EKW**	**EU5**	**EKK**	**EC9**	Yellow			Tall	
EAH	**EAD**	**EKD**	EAA	**EKA**	**EKV**	**EU7**	**EKJ**	**ECC**	Red				
EBF	**EBM**	**ELM**	EBB	**ELB**	**ELW**	**EV5**	**ELK**	**ED9**	Yellow	2			
EBH	**EBD**	**ELD**	EBA	**ELA**	**ELV**	**EV7**	**ELJ**	**EDC**	Red				
ECF	**ECM**	**EMM**	ECB	**EMB**	**EMW**	**E75**	**EMK**	**EE9**	Yellow	3			
ECH	ECD	EMD	ECA	EMA	EMV	E77	EMJ	EEC	Red				
EDE	**EDY**	**ENY**	EDQ	**ENQ**	—	—	**ENS**	**EB9**	Yellow	1	DPDT	Short	
EDG	**EDR**	**ENR**	EDP	**ENP**	—	—	**ENT**	**EBC**	Red				
EDF	**EDM**	**ENM**	EDB	**ENB**	**ENW**	**EW5**	**ENK**	**EF9**	Yellow			Tall	
EDH	**EDD**	**END**	EDA	**ENA**	**ENV**	**EW7**	**ENJ**	**EFC**	Red				
EEF	**EEM**	**EOM**	EEB	**EOB**	**EOW**	**EY5**	**EOK**	**EG9**	Yellow	2			
EEH	**EED**	**EOD**	EEA	**EOA**	**EOV**	**EY7**	**EOJ**	**EGC**	Red				
—	—	**EUY**	—	**EUQ**	—	—	—	—	Yellow	1	SPDT	Short w/Drain	
—	—	**EUR**	—	**EUP**	—	—	—	—	Red				
—	—	**EUM**	—	**EUB**	—	—	—	—	Yellow			Tall w/Drain	
—	—	**EUD**	—	**EUA**	—	—	—	—	Red				
—	—	**EVM**	—	**EVB**	—	—	—	—	Yellow	2			
—	—	**EVD**	—	**EVA**	—	—	—	—	Red				
—	—	**EWM**	—	**EWB**	—	—	—	—	Yellow	3			
—	—	EWD	—	EWA	—	—	—	—	Red				
—	—	**EXY**	—	**EXQ**	—	—	—	—	Yellow	1	DPDT	Short w/Drain	
—	—	**EXR**	—	**EXP**	—		—		Red				

8.0 Switch and Housing Model Codes

NEMA 4 Carbon Steel	NEMA 4X Carbon Steel	NEMA 7/9 Cast Iron	NEMA 4X Cast Alum.	NEMA 4X/7/9 Cast Alum.	Group B Cast Iron	ATEX Cast Iron 3/4" NPT	NEMA 4X/7/9 Group B Cast Alum	ATEX Cast Alum 1" NPT	Magnet Dot Color	Set Points	Switch Contacts	Housing Height and Options	Switch Type
—	—	**EXM**	—	**EXB**	—	—	—	—	Yellow	1	DPDT	Tall w/Drain	Dry Contact
—	—	**EXD**	—	**EXA**	—	—	—	—	Red				
—	—	**EYM**	—	**EYB**	—	—	—	—	Yellow	2			
—	—	**EYD**	—	**EYA**	—	—	—	—	Red				
EFE	**EFY**	**EPY**	EFQ	**EPQ**	—	—	—	—	Yellow	1	SPDT	Short w/Heater	
EFG	**EFR**	**EPR**	EFP	**EPP**	—	—	—	—	Red				
EFF	**EFM**	**EPM**	EFB	**EPB**	—	—	—	—	Yellow			Tall w/Heater	
EFH	**EFD**	**EPD**	EFA	**EPA**	—	—	—	—	Red				
EGF	**EGM**	**EQM**	EGB	**EQB**	—	—	—	—	Yellow	2			
EGH	**EGD**	**EQD**	EGA	**EQA**	—	—	—	—	Red				
EHF	**EHM**	**ERM**	EHB	**ERB**	—	—	—	—	Yellow	3			
EHH	EHD	ERD	EHA	ERA	—	—	—	—	Red				
EIE	**EIY**	**ESY**	EIQ	**ESQ**	—	—	—	—	Yellow	1	DPDT	Short w/Heater	
EIG	**EIR**	**ESR**	EIP	**ESP**	—	—	—	—	Red				
EIF	**EIM**	**ESM**	EIB	**ESB**	—	—	—	—	Yellow			Tall w/Heater	
EIH	**EID**	**ESD**	EIA	**ESA**	—	—	—	—	Red				
EJF	**EJM**	**ETM**	EJB	**ETB**	—	—	—	—	Yellow	2			
EJH	**EJD**	**ETD**	EJA	**ETA**	—	—	—	—	Red				
FAE	**FAY**	**FKY**	FAQ	**FKQ**	—	—	**FKS**	**FA9**	Yellow	1	SPDT	Short	
FAG	**FAR**	**FKR**	FAP	**FKP**	—	—	**FKT**	**FAC**	Red				
FAF	**FAM**	**FKM**	FAB	**FKB**	**FKW**	**FU5**	**FKK**	**FC9**	Yellow			Tall	
FAH	**FAD**	**FKD**	FAA	**FKA**	**FKV**	**FU7**	**FKJ**	**FCC**	Red				
FBF	**FBM**	**FLM**	FBB	**FLB**	**FLW**	**FV5**	**FLK**	**FD9**	Yellow	2			
FBH	**FBD**	**FLD**	FBA	**FLA**	**FLV**	**FV7**	**FLJ**	**FDC**	Red				
FDE	**FDY**	**FNY**	FDQ	**FNQ**	—	—	**FNS**	**FB9**	Yellow	1	DPDT	Short	
FDG	**FDR**	**FNR**	FDP	**FNP**	—	—	**FNT**	**FBC**	Red				
FDF	**FDM**	**FNM**	FDB	**FNB**	**FNW**	**FW5**	**FNK**	**FF9**	Yellow			Tall	
FDH	**FDD**	**FND**	FDA	**FNA**	**FNV**	**FW7**	**FNJ**	**FFC**	Red				
FEF	**FEM**	**FOM**	FEB	**FOB**	**FOW**	**FY5**	**FOK**	**FG9**	Yellow	2			
FEH	**FED**	**FOD**	FEA	**FOA**	**FOV**	**FY7**	**FOJ**	**FGC**	Red				
GAF	**GAM**	**GKM**	—	—	**GKW**	**GU5**	—	—	Yellow	1	SPDT	Tall	Dual Magnet Dry Contact
GAH	**GAD**	**GKD**	—	—	**GKV**	**GU7**	—	—	Red				
GDF	**GDM**	**GNM**	—	—	**GNW**	**GW5**	—	—	Yellow		DPDT		
GDH	**GDD**	**GND**	—	—	**GNV**	**GW7**	—	—	Red				
—	—	**GUM**	—	—	—	—	—	—	Yellow		SPDT	Tall w/Drain	
—	—	**GUD**	—	—	—	—	—	—	Red				
—	—	**GXM**	—	—	—	—	—	—	Yellow		DPDT		
—	—	**GXD**	—	—	—	—	—	—	Red				
HAF	**HAM**	**HKM**	—	—	**HKW**	**HU5**	—	—	Yellow	1	SPDT	Tall	Dual Magnet Dry Contact
HAH	**HAD**	**HKD**	—	—	**HKV**	**HU7**	—	—	Red				
HDF	**HDM**	**HNM**	—	—	**HNW**	**HW5**	—	—	Yellow		DPDT		
HDH	**HDD**	**HND**	—	—	**HNV**	**HW7**	—	—	Red				
—	—	**HUM**	—	—	—	—	—	—	Yellow		SPDT	Tall w/Drain	
—	—	**HUD**	—	—	—	—	—	—	Red				
—	—	**HXM**	—	—	—	—	—	—	Yellow		DPDT		
—	—	**HXD**	—	—	—	—	—	—	Red				
IAF	**IAM**	**IKM**	—	—	**IKW**	**IU5**	—	—	Yellow	1	SPDT	Tall	DC Dual Magnet Dry Contact
IAH	**IAD**	**IKD**	—	—	**IKV**	**IU7**	—	—	Red				
IDF	**IDM**	**INM**	—	—	**INW**	**IW5**	—	—	Yellow		DPDT		
IDH	**IDD**	**IND**	—	—	**INV**	**IW7**	—	—	Red				
—	—	**IUM**	—	—	—	—	—	—	Yellow		SPDT	Tall w/Drain	
—	—	**IUD**	—	—	—	—	—	—	Red				
—	—	**IXM**	—	—	—	—	—	—	Yellow		DPDT		
—	—	**IXD**	—	—	—	—	—	—	Red				

8.0 Switch and Housing Model Codes

NEMA 4 Carbon Steel	NEMA 4X Carbon Steel	NEMA 7/9 Cast Iron	NEMA 4X Cast Alum.	NEMA 4X/7/9 Cast Alum.	Group B Cast Iron	ATEX Cast Iron 3/4" NPT	NEMA 4X/7/9 Group B Cast Alum	ATEX Cast Alum 1" NPT	Magnet Dot Color	Set Points	Switch Contacts	Housing Height and Options	Switch Type
LAF	**LAM**	**LKM**	—	—	**LKW**	—	—	—	Yellow	1	SPDT	Tall	High temp Merc For B40
LDF	**LDM**	**LNM**	—	—	**LNW**	—	—	—			DPDT		
LBF	**LBM**	**LLM**	—	—	**LLW**	—	—	—			SPDT		
LEF	**LEM**	**LOM**	—	—	**LOW**	—	—	—			DPDT		
MAE	**MAY**	—	—	—	—	—	—	—	Yellow	1	SPDT	Short	High Temp mercury with Manual Reset
MAG	**MAR**	—	—	—	—	—	—	—	Red				
MAF	**MAM**	—	—	—	—	—	—	—	Yellow			Tall	
MAH	**MAD**	—	—	—	—	—	—	—	Red				
MBF	**MBM**	—	—	—	—	—	—	—	Yellow	2			
MBH	MBD	—	—	—	—	—	—	—	Red				
—	**MBE**	—	—	—	—	—	—	—	R/B/B				
MCF	**MCM**	—	—	—	—	—	—	—	Yellow	3			
MCH	MCD	—	—	—	—	—	—	—	Red				
—	**MCE**	—	—	—	—	—	—	—	R/B/B				
MDE	**MDY**	—	—	—	—	—	—	—	Yellow	1	DPDT	Short	
MDG	**MDR**	—	—	—	—	—	—	—	Red				
MDF	**MDM**	—	—	—	—	—	—	—	Yellow			Tall	
MDH	**MDD**	—	—	—	—	—	—	—	Red				
MEF	**MEM**	—	—	—	—	—	—	—	Yellow	2			
MEH	**MED**	—	—	—	—	—	—	—	Red				
NCF	**NCM**	**NMM**	NCB	**NMB**	**NMI**	—	**NMN**	—	Yellow	3	SPDT	X-Tall	Mercury for C10/C15
NEF	**NEM**	**NKM**	NEB	**NKB**	**NKI**	—	**NKN**	—			DPDT		
NHF	**NHM**	**NRM**	NHB	**NRB**	—	—	—	—			SPDT	X-Tall w/Heater	
NJF	**NJM**	**NLM**	NJB	**NLB**	—	—	—	—			DPDT		
—	—	**NWM**	—	**NWB**	—	—	—	—			SPDT	X-Tall w/Drain	
—	—	**NNM**	—	**NNB**	—	—	—	—			DPDT		
OCF	**OCM**	**OMM**	OCB	**OMB**	**OMI**	—	**OMN**	—	Yellow	3	SPDT	X-Tall	Dry Contact for C10/C15
OEF	**OEM**	**OKM**	OEB	**OKB**	**OKI**	—	**OKN**	—			DPDT		
OHF	**OHM**	**ORM**	OHB	**ORB**	—	—	—	—			SPDT	X-Tall w/Heater	
OJF	**OJM**	**OLM**	OJB	**OLB**	—	—	—	—			DPDT		
—	—	**OWM**	—	**OWB**	—	—	—	—			SPDT	X-Tall w/Drain	
—	—	**ONM**	—	**ONB**	—	—	—	—			DPDT		
QCF	**QCM**	**QMM**	QCB	**QMB**	**QMI**	—	**QMN**	—	Yellow	3	SPDT	X-Tall	Dry Contact for C10/C15
QEF	**QEM**	**QKM**	QEB	**QKB**	**QKI**	—	**QKN**	—			DPDT		
QHF	**QHM**	**QRM**	QHB	**QRB**	—	—	—	—			SPDT	X-Tall w/Heater	
QJF	**QJM**	**QLM**	QJB	**QLB**	—	—	—	—			DPDT		
—	—	**QWM**	—	**QWB**	—	—	—	—			SPDT	X-Tall w/Drain	
—	—	**QNM**	—	**QNB**	—	—	—	—			DPDT		
SAF	**SAM**	**SKM**	SAB	**SKB**	**SKW**	—	**SKK**	—	Yellow	1	SPDT	Tall	Dry Contact for B40
SDF	**SDM**	**SNM**	SDB	**SNB**	**SNW**	—	**SNK**	—			DPDT		
SBF	**SBM**	**SLM**	SBB	**SLB**	**SLW**	—	**SLK**	—			SPDT		DC Dry Contact for B40
SEF	**SEM**	**SOM**	SEB	**SOB**	**SOW**	—	**SOK**	—			DPDT		
TCF	**TCM**	**TMM**	TCB	**TMB**	**TMI**	—	**TMN**	—	Yellow	3	SPDT	X-Tall	Vibration Resistant Mercury for C10/C15
TEF	**TEM**	**TKM**	TEB	**TKB**	**TKI**	—	**TKN**	—			DPDT		
THF	**THM**	**TRM**	THB	**TRB**	—	—	—	—			SPDT	X-Tall w/Heater	
TJF	**TJM**	**TLM**	TJB	**TLB**	—	—	—	—			DPDT		
—	—	**TWM**	—	**TWB**	—	—	—	—			SPDT	X-Tall w/Drain	
—	—	**TNM**	—	**TNB**	—	—	—	—			DPDT		

8.0 Switch and Housing Model Codes

NEMA 4 Carbon Steel	NEMA 4X Carbon Steel	NEMA 7/9 Cast Iron	NEMA 4X Cast Alum.	NEMA 4X/7/9 Cast Alum.	Group B Cast Iron	ATEX Cast Iron 3/4" NPT	NEMA 4X/7/9 Group B Cast Alum	ATEX Cast Alum 1" NPT	Magnet Dot Color	Set Points	Switch Contacts	Housing Height and Options	Switch Type
2AE	**2AY**	**2KY**	2AQ	**2KQ**	—	—	**2KS**	**2A9**	Yellow	1	SPDT	Short	High Temp Vibration Resistant Mercury
2AG	**2AR**	**2KR**	2AP	**2KP**	—	—	**2KT**	**2AC**	Red				
2AF	**2AM**	**2KM**	2AB	**2KB**	**2KW**	**2U5**	**2KK**	**2C9**	Yellow			Tall	
2AH	**2AD**	**2KD**	2AA	**2KA**	**2KV**	**2U7**	**2KJ**	**2CC**	Red				
2BF	**2BM**	**2LM**	2BB	**2LB**	**2LW**	**2V5**	**2LK**	**2D9**	Yellow	2			
2BH	2BD	2LD	2BA	2LA	2LV	2V7	2LJ	2DC	Red				
—	—	—	—	**2LE**	—	—	**2LG**	—	R/B/B				
2CF	**2CM**	**2MM**	2CB	**2MB**	**2MW**	**275**	**2MK**	**2E9**	Yellow	3			
2CH	**2CD**	**2MD**	2CA	2MA	2MV	277	2MJ	2EC	Red				
—	—	—	—	**2ME**	—	—	**2MG**	—	R/B/B				
2DE	**2DY**	**2NY**	2DQ	**2NQ**	—	—	**2NS**	**2B9**	Yellow	1	DPDT	Short	
2DG	**2DR**	**2NR**	2DP	**2NP**	—	—	**2NT**	**2BC**	Red				
2DF	**2DM**	**2NM**	2DB	**2NB**	**2NW**	**2W5**	**2NK**	**2F9**	Yellow			Tall	
2DH	**2DD**	**2ND**	2DA	**2NA**	**2NV**	**2W7**	**2NJ**	**2FC**	Red				
2EF	**2EM**	**2OM**	2EB	**2OB**	**2OW**	**2Y5**	**2OK**	**2G9**	Yellow	2			
2EH	**2ED**	**2OD**	2EA	**2OA**	**2OV**	**2Y7**	**2OJ**	**2GC**	Red				
—	—	**2UY**	—	**2UQ**	—	—	—	—	Yellow	1	SPDT	Short w/Drain	
—	—	**2UR**	—	**2UP**	—	—	—	—	Red				
—	—	**2UM**	—	**2UB**	—	—	—	—	Yellow			Tall w/Drain	
—	—	**2UD**	—	**2UA**	—	—	—	—	Red				
—	—	**2VM**	—	**2VB**	—	—	—	—	Yellow	2			
—	—	2VD	—	2VA	—	—	—	—	Red				
—	—	**2WM**	—	**2WB**	—	—	—	—	Yellow	3			
—	—	2WD	—	2WA	—	—	—	—	Red				
—	—	**2XY**	—	**2XQ**	—	—	—	—	Yellow	1	DPDT	Short w/Drain	
—	—	**2XR**	—	**2XP**	—	—	—	—	Red				
—	—	**2XM**	—	**2XB**	—	—	—	—	Yellow			Tall w/Drain	
—	—	**2XD**	—	**2XA**	—	—	—	—	Red				
—	—	**2YM**	—	**2YB**	—	—	—	—	Yellow	2			
—	—	**2YD**	—	**2YA**	—	—	—	—	Red				
2FE	**2FY**	**2PY**	2FQ	**2PQ**	—	—	—	—	Yellow	1	SPDT	Short w/Heater	
2FG	**2FR**	**2PR**	2FP	**2PP**	—	—	—	—	Red				
2FF	**2FM**	**2PM**	2FB	**2PB**	—	—	—	—	Yellow			Tall w/Heater	
2FH	**2FD**	**2PD**	2FA	**2PA**	—	—	—	—	Red				
2GF	**2GM**	**2QM**	2GB	**2QB**	—	—	—	—	Yellow	2			
2GH	2GD	2QD	2GA	2QA	—	—	—	—	Red				
2HF	**2HM**	**2RM**	2HB	**2RB**	—	—	—	—	Yellow	3			
2HH	2HD	2RD	2HA	2RA	—	—	—	—	Red				
2IE	**2IY**	**2SY**	2IQ	**2SQ**	—	—	—	—	Yellow	1	DPDT	Short w/Heater	
2IG	**2IR**	**2SR**	2IP	**2SP**	—	—	—	—	Red				
2IF	**2IM**	**2SM**	2IB	**2SB**	—	—	—	—	Yellow			Tall w/Heater	
2IH	**2ID**	**2SD**	2IA	**2SA**	—	—	—	—	Red				
2JF	**2JM**	**2TM**	2JB	**2TB**	—	—	—	—	Yellow	2			
2JH	**2JD**	**2TD**	2JA	**2TA**	—	—	—	—	Red				

8.0 Switch and Housing Model Codes

NEMA 4 Carbon Steel	NEMA 4X Carbon Steel	NEMA 7/9 Cast Iron	NEMA 4X Cast Alum.	NEMA 4X/7/9 Cast Alum.	Group B Cast Iron	ATEX Cast Iron 3/4" NPT	NEMA 4X/7/9 Group B Cast Alum	ATEX Cast Alum 1" NPT	Magnet Dot Color	Set Points	Switch Contacts	Housing Height and Options	Switch Type
3AE	**3AY**	**3KY**	3AQ	**3KQ**	—	—	**3KS**	**3A9**	Yellow	1	SPDT	Short	High Temp Mercury
3AG	**3AR**	**3KR**	3AP	**3KP**	—	—	**3KT**	**3AC**	Red				
3AF	**3AM**	**3KM**	3AB	**3KB**	**3KW**	**3U5**	**3KK**	**3C9**	Yellow			Tall	
3AH	**3AD**	**3KD**	3AA	**3KA**	**3KV**	**3U7**	**3KJ**	**3CC**	Red				
3BF	**3BM**	**3LM**	3BB	**3LB**	**3LW**	**3V5**	**3LK**	**3D9**	Yellow	2			
3BH	3BD	3LD	3BA	3LA	3LV	3V7	3LJ	3DC	Red				
—	—	—	—	**3LE**	—	—	**3LG**	—	R/B/B				
3CF	**3CM**	**3MM**	3CB	**3MB**	**3MW**	**375**	**3MK**	**3E9**	Yellow	3			
3CH	3CD	3MD	3CA	3MA	3MV	377	3MJ	3EC	Red				
—	—	—	—	**3ME**	—	—	**3MG**	—	R/B/B				
3DE	**3DY**	**3NY**	3DQ	**3NQ**	—	—	**3NS**	**3B9**	Yellow	1	DPDT	Short	
3DG	**3DR**	**3NR**	3DP	**3NP**	—	—	**3NT**	**3BC**	Red				
3DF	**3DM**	**3NM**	3DB	**3NB**	**3NW**	**3W5**	**3NK**	**3F9**	Yellow			Tall	
3DH	**3DD**	**3ND**	3DA	**3NA**	**3NV**	**3W7**	**3NJ**	**3FC**	Red				
3EF	**3EM**	**3OM**	3EB	**3OB**	**3OW**	**3Y5**	**3OK**	**3G9**	Yellow	2			
3EH	**3ED**	**3OD**	3EA	**3OA**	**3OV**	**3Y7**	**3OJ**	**3GC**	Red				
—	—	**3UY**	—	**3UQ**	—	—	—	—	Yellow	1	SPDT	Short w/Drain	
—	—	**3UR**	—	**3UP**	—	—	—	—	Red				
—	—	**3UM**	—	**3UB**	—	—	—	—	Yellow			Tall w/Drain	
—	—	**3UD**	—	**3UA**	—	—	—	—	Red				
—	—	**3VM**	—	**3VB**	—	—	—	—	Yellow	2			
—	—	3VD	—	3VA	—	—	—	—	Red				
—	—	**3WM**	—	**3WB**	—	—	—	—	Yellow	3			
—	—	3WD	—	3WA	—	—	—	—	Red				
—	—	**3XY**	—	**3XQ**	—	—	—	—	Yellow	1	DPDT	Short w/Drain	
—	—	**3XR**	—	**3XP**	—	—	—	—	Red				
—	—	**3XM**	—	**3XB**	—	—	—	—	Yellow			Tall w/Drain	
—	—	**3XD**	—	**3XA**	—	—	—	—	Red				
—	—	**3YM**	—	**3YB**	—	—	—	—	Yellow	2			
—	—	**3YD**	—	**3YA**	—	—	—	—	Red				
3FE	**3FY**	**3PY**	3FQ	**3PQ**	—	—	—	—	Yellow	1	SPDT	Short w/Heater	
3FG	**3FR**	**3PR**	3FP	**3PP**	—	—	—	—	Red				
3FF	**3FM**	**3PM**	3FB	**3PB**	—	—	—	—	Yellow			Tall w/Heater	
3FH	**3FD**	**3PD**	3FA	**3PA**	—	—	—	—	Red				
3GF	**3GM**	**3QM**	3GB	**3QB**	—	—	—	—	Yellow	2			
3GH	3GD	3QD	3GA	3QA	—	—	—	—	Red				
3HF	**3HM**	**3RM**	3HB	**3RB**	—	—	—	—	Yellow	3			
3HH	3HD	3RD	3HA	3RA	—	—	—	—	Red				
3IE	**3IY**	**3SY**	3IQ	**3SQ**	—	—	—	—	Yellow	1	DPDT	Short w/Heater	
3IG	**3IR**	**3SR**	3IP	**3SP**	—	—	—	—	Red				
3IF	**3IM**	**3SM**	3IB	**3SB**	—	—	—	—	Yellow			Tall w/Heater	
3IH	**3ID**	**3SD**	3IA	**3SA**	—	—	—	—	Red				
3JF	**3JM**	**3TM**	3JB	**3TB**	—	—	—	—	Yellow	2			
3JH	**3JD**	**3TD**	3JA	**3TA**	—	—	—	—	Red				

Service Policy

Owners of Magnetrol/STI controls may request the return of a control or any part of a control for complete rebuilding or replacement. They will be rebuilt or replaced promptly. Controls returned under our service policy must be returned by Prepaid transportation. Magnetrol/STI will repair or replace the control at no cost to the purchaser (or owner) other than transportation if:

1. Returned within the warranty period; and
2. The factory inspection finds the cause of the claim to be covered under the warranty.

If the trouble is the result of conditions beyond our control; or, is NOT covered by the warranty, there will be charges for labor and the parts required to rebuild or replace the equipment.

In some cases it may be expedient to ship replacement parts; or, in extreme cases a complete new control, to replace the original equipment before it is returned. If this is desired, notify the factory of both the model and serial numbers of the control to be replaced. In such cases, credit for the materials returned will be determined on the basis of the applicability of our warranty.

No claims for misapplication, labor, direct or consequential damage will be allowed.

Return Material Procedure

So that we may efficiently process any materials that are returned, it is essential that a "Return Material Authorization" (RMA) number be obtained from the factory, prior to the material's return. This is available through Magnetrol's/STI's local representative or by contacting the factory. Please supply the following information:

1. Company Name
2. Description of Material
3. Serial Number
4. Reason for Return
5. Application

Any unit that was used in a process must be properly cleaned in accordance with OSHA standards, before it is returned to the factory.

A Material Safety Data Sheet (MSDS) must accompany material that was used in any media.

All shipments returned to the factory must be by prepaid transportation.

All replacements will be shipped F.O.B. factory.

Magnetrol

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