

Model B73 & Series 75

Installation and Operating Manual



Sealed
External
Cage
Liquid
Level
Switches

Read this Manual Before Installing

This manual provides information on the B73 and Series 75 Liquid Level Switches. 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.

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Performance specifications are effective with date of issue and are subject to change without notice. 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 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 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 products.

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The quality assurance system in place at MAGNETROL guarantees the highest level of quality throughout the company. MAGNETROL 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.





Model B73 & Series 75 Liquid Level Switches

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1.0 Installation

Caution: If equipment is used in a manner not specified by manufacturer, protection provided by equipment may be impaired.

1.1 Unpacking

Unpack the instrument carefully. Inspect all units for damage. Report any concealed damage to carrier within 24 hours. Check the contents of the packing slip and purchase order. Check and record the serial number for future reference when ordering parts.

1.2 Critical Alarm Function

It is recommended that for critical alarm functions, an additional level switch be installed as a high-high or low-low level alarm for maximum protection.

1.3 Piping

Figure 3 shows a typical piping installation of a MAGNETROL B73 and Series 75 control to a pressure vessel. Level decals on control identify the actuation levels for a unit with a single switch at minimum specific gravity. See **Section 5.2, Physical** on page 16 for the actuation levels.

Use pipe of sufficient strength to support the control. If necessary, provide a stand or hanger to help support its weight. All piping should be straight and free of low spots or pockets so that lower liquid line will drain towards the vessel and upper vapor line will drain toward the control. Shut-off valves are recommended for installation between the vessel and the control. If control is to be used with a low temperature liquid (one which will boil in the float chamber if outside heat is absorbed), the chamber and piping should be insulated. Such boiling in the chamber will cause false level indications.

Caution: Do not insulate switch mechanism housing.

On controls equipped with pneumatic switch assemblies, consult bulletin on mechanism furnished for air (or gas) piping instructions. See **Section 6.1.2, Switch and Housing Reference** on page 20 for bulletin numbers for pneumatic switches.

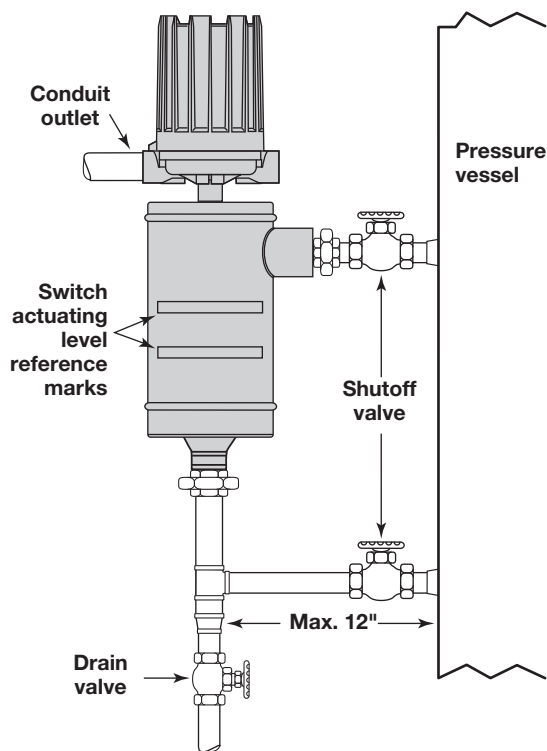


Figure 1
Piping Configuration

1.4 Mounting

Caution: This instrument is intended for use in Installation Category II, Pollution Degree 2.

Adjust piping as required to bring control to a vertical position. MAGNETROL controls must be mounted within 3° of vertical in all directions. A three degree slant is noticeable by eye, but installation should be checked with a spirit level on top and/or sides of float chamber.

Controls should be mounted as close to the vessel as possible. This will result in a more responsive and accurate level change in the control. Liquid in a long line may be cooler and more dense than liquid in the vessel causing lower level indication in the control than actual level in the vessel.

Caution: Never insulate the switch housing of the level control.

Installation and maintenance of tandem float models are accomplished in much the same manner as described for standard models. Additional consideration must be given to the piping arrangement to allow for alignment of the two switch actuating level marks on the float chamber with the desired levels in the vessel.

Caution: Operation of all buoyancy type level devices should be done in such a way as to minimize the action of dynamic forces on the float or displacer sensing element. Good practice for reducing the likelihood of damage to the control is to equalize pressure across the device slowly.

1.5 Wiring

Caution: Level controls are shipped from the factory with the enclosing tube tightened and the middle set screw, on the housing base, locked to the enclosing tube. Failure to loosen the set screw prior to repositioning the conduit connection may cause the enclosing tube to loosen, resulting in the possible leakage of the process liquid or vapor.

B73 and Series 75 controls are shipped with the conduit entry of the switch housing placed 180° opposite to the tank configurations to simplify installation in most cases. If this configuration is appropriate to the installation, proceed to Step 4 to begin wiring the unit. If another configuration is desired, the switch housing can be easily rotated by first following Steps 1, 2, and 3.

NOTE: A switch or circuit breaker shall be installed in close proximity to equipment and within easy reach of operator. It shall be marked as the disconnecting equipment.

1. Loosen set screw(s) at base of switch housing. Refer to Figure 2.
2. Switch housing may be rotated 360° to allow correct positioning of conduit outlet.

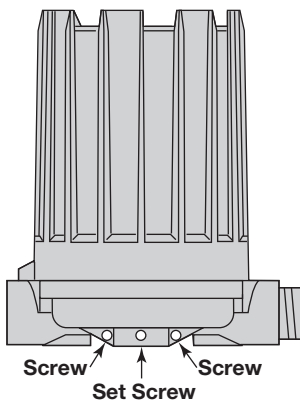


Figure 2
Switch Housing

3. Tighten set screw(s) at base of switch housing.
4. Unscrew and remove switch housing cover. The threads have been lubricated to facilitate removal.

NOTE: For supply connections, use wire with a minimum rating of +167 °F (+75 °C) as required by process conditions. Use a minimum of 14 AWG wire for power and ground field wires.

NOTE: Housing must be grounded via protective ground screw in the base of the housing.

NOTE: On high temperature applications (above +250° F [+121° C] in float chamber), high temperature wire should be used between control and first junction box located in a cooler area. On non-hazardous applications, flexible conduit may be used between the control and the first junction box.

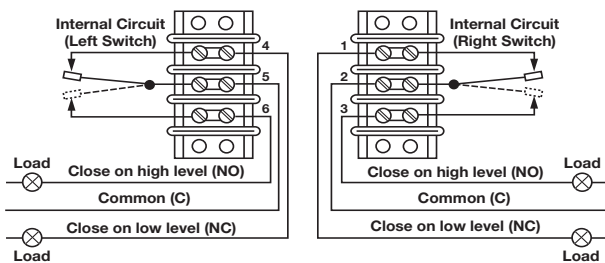


Figure 3
Wiring Diagram for all switches
except Series HS

5. The switch terminals are located next to the conduit outlet to facilitate wiring. Bring supply wires through conduit outlet. Route extra wire around enclosing tube under the baffle plate, and connect them to the proper terminals. Refer to the wiring diagram, **Figure 3**, or your switch bulletin for this information.

NOTE: For models with a Series HS switch with high temperature lead wire, the leads are routed out through the conduit opening by the factory. A suitable conduit box should be provided for the connection of the leads to the control wiring.

6. Dress wiring to ensure no interference or contact with movement of mechanism or replacement of switch housing cover.

Caution: Observe all applicable electrical codes and proper wiring procedures.

Caution: In hazardous areas, do not power the unit until the conduit is sealed and the enclosure cover is screwed down securely.

7. Replace housing cover.
8. If control has been furnished with an explosion proof or moisture proof (gasketed) switch housing, it must be sealed at the conduit outlet with a suitable compound or non-hardening sealant to prevent entrance of air.
9. Test switch action by varying liquid level in float chamber.

NOTE: If switch mechanism fails to function properly, check vertical alignment of control housing and consult installation bulletin for additional wiring information on switch mechanism furnished. See **Section 6.1.2, Switch and Housing Reference** on page 20.

10. Check cover to base fit to be certain gasketed joint is tight. A positive seal is necessary to prevent infiltration of moisture laden air or corrosive gasses into switch housings.

2.0 Reference Information

2.1 Description

MAGNETROL B73 and Series 75 level switches are float operated units suitable for use on clean liquid applications for level alarm, pump control and safety shutdown functions. Series 75 units are available with tandem floats for applications where widely spaced high and low switching are required by a single control.

2.2 Theory of Operation

The design of float operated level switches is based upon the principle that a magnetic field will not be affected by non-magnetic materials such as 316 stainless steel. In this case, the float moves a magnetic attraction sleeve within a non-magnetic enclosing tube and actuates a magnetic switch mechanism. The enclosing tube provides a pressure seal to the chamber and therefore to the process.

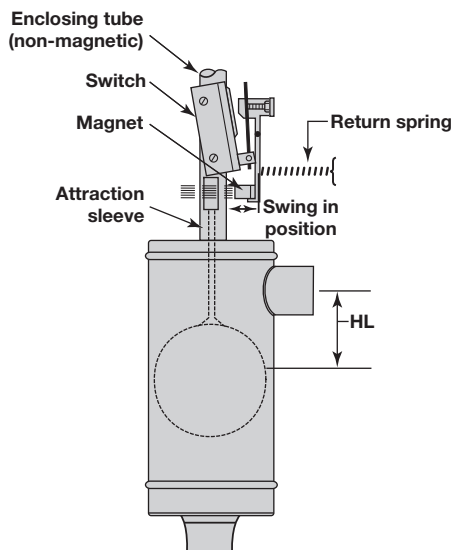


Figure 4
Switch Tripped

2.3 Operating Cycle

As the liquid level rises in the chamber the float moves the magnetic attraction sleeve up within the enclosing tube and into the field of the switch mechanism magnet. Refer to **Figure 4**. As a result, the magnet is drawn in tightly to the enclosing tube causing the switch to trip, making or breaking an electrical circuit. As the liquid level falls, the float drops and moves the attraction sleeve out of the magnetic field, releasing the switch at a predetermined low level. Refer to **Figure 5**. The tension spring ensures the return of the switch in a snap action.

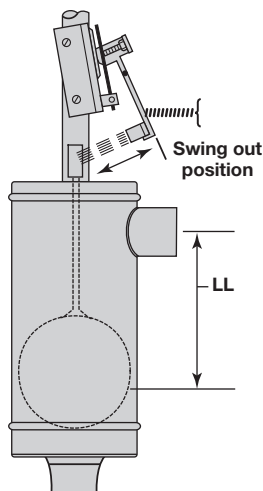


Figure 5
Switch Released

2.4 Switch Differential Adjustment

The standard differential of Series 75 float models with one switch may be field adjusted. Adjustment may be necessary if a wider differential needs to be set to overcome switch chatter caused by the process.

NOTE: This procedure may be applied to single switch models only.

The differential, or the amount of level travel between switch-on and switch-off, may be adjusted by repositioning the lower jam nuts on the float stem. This adjustment is different for high level and low level controls. Refer to the appropriate section below for adjustment instructions.

NOTE: Maximum differential adjustment is 1 inch.

Caution: Differential adjustments should NOT be made in the field on tandem float models. Switch actuation levels have been set at the factory to meet customer specifications. Variations in actual conditions from design conditions, usually require special control modifications. Consult the factory or your local representative for assistance.

2.4.1 Low Level Controls

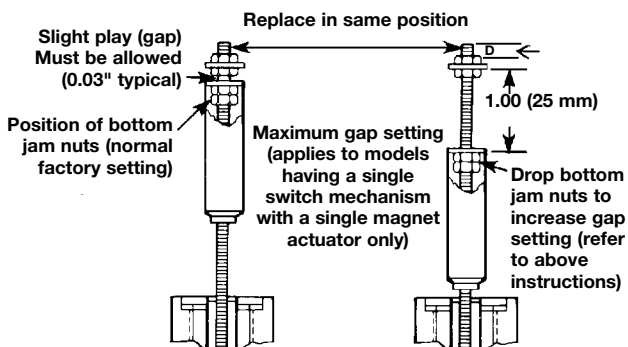


Figure 6

Figure 7

On low level controls the switch trips on the lower actuation point and resets on the higher actuation point. Widening the differential will allow the switch to trip on the original actuation point and reset at a later or higher point.

The differential on low level controls may be adjusted by repositioning the lower jam nuts on the float stem. The standard factory setting is for a minimum amount of play (gap) between the top jam nuts and the attraction sleeve. Refer to **Figure 6**.

1. Determine what change in differential is necessary.

NOTE: To widen the differential by one inch, the lower jam nuts must be set proportionately lower on the stem (i.e., in this example by 1 inch).

2. Make sure power source is turned off.
3. Unscrew and remove switch housing cover.
4. Disconnect power supply wires from switch mechanism. Pull wires out of conduit connection opening in housing base. Refer to **Figure 8**.
- 5a. Perform system shut-down procedures as required to relieve pressure from float chamber of control. Allow unit to cool.

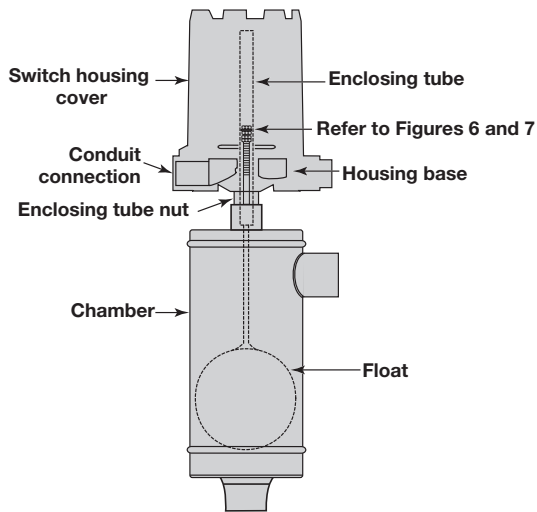


Figure 8

- 5b. Close shut-off valves (if so equipped) to isolate control from tank. Drain off liquid in float chamber.
- 5c. On installations without shut-off valves, relieve pressure from the tank. Drain liquid in tank to a level below the connections of the float chamber.

NOTE: Level control, connections and pipe lines need not be removed from the tank.

6. Loosen enclosing tube nut with a $\frac{1}{8}$ " wrench. Unscrew enclosing tube counterclockwise (switch and housing base will rotate also), until it is free. Refer to **Figure 8**.
7. Lift enclosing tube, switch, and base off float chamber. Jam nuts and attraction sleeve are now accessible.
8. Measure the distance "D" from the top edge of the upper jam nuts to the top of the float stem. Refer to **Figure 7**. Record this measurement.
9. Loosen and remove upper jam nuts, guide washer and attraction sleeve.
10. Loosen and adjust lower jam nuts to the desired position. Tighten lower jam nuts securely. Refer to **Figure 7**.
11. Replace attraction sleeve on stem.
12. Replace upper jam nuts and guide washer on the stem in the position previously noted. Tighten upper jam nuts securely. Refer to **Figure 7**.

NOTE: Use a new enclosing tube gasket when reassembling enclosing tube to the chamber. Make certain that all gasket surfaces are thoroughly cleaned to allow proper gasket seating. Coat enclosing tube threads with anti-seizing compound.

13. Replace enclosing tube, switch, and base on chamber. Screw tube clockwise until tightened to 75–100 foot-pounds of torque for a fiber gasket or 200–225 foot-pounds of torque for a spiral wound gasket.
14. Loosen the set screws at the base of the switch housing. Rotate switch housing to correct position and tighten set screws. Refer to **Figure 2** on page 5.
15. Bring supply wires through conduit outlet. Follow steps 5 through 10 in **Section 1.5, Wiring** on page 5.
16. Test switch action by varying liquid level in float chamber.

NOTE: If switch mechanism fails to function properly, check vertical alignment of control housing and consult installation bulletin on switch mechanism. If the unit still fails to function properly, consult the factory.

2.4.2 High Level Controls

On high level controls, the switch trips on the higher actuation point and resets on the lower actuation point.

Caution: On high level controls, widening the differential requires raising the trip point a proportional amount. The reset point will remain the same.

To widen the differential by raising the trip point, follow steps 1 through 16 in **Section 2.4.1, Low Level Controls** on pages 8–9.

2.5 Tandem Float Models

Models with tandem floats are used on applications where it is advantageous to have two widely spaced high and low switching functions using a single control.

The units incorporate two floats which operate independently, and are arranged so that the lower float actuates the upper switch mechanism, and the upper float actuates the lower switch mechanism. The upper float is attached to the lower attraction sleeve by means of a hollow stem. The lower float attaches to the upper attraction sleeve with a solid stem that extends upward through the upper float and stem assembly.

2.5.1 Installation, Preventive Maintenance and Troubleshooting

Installation and maintenance of tandem float models is accomplished in much the same manner as for standard models previously described. Some additional consideration must be given to the piping arrangement to allow for alignment of the two switch actuating level marks on the float chamber with the desired levels in the vessel. When troubleshooting the level sensing portion of the control, additional checks may be made of the following:

1. Inspect for binding of solid (lower) float stem within hollow (upper) float stem due to corrosion or possible damage incurred during shipment or previous maintenance.
2. Make certain that retaining (snap) rings, used to locate lower attraction sleeve, are locked in place. An extreme shock or hammer, such as during blow-down on a water column boiler control, may damage a ring causing it to snap out of its retaining groove in the hollow (upper) float stem.

2.5.2 Differential Adjustment

Caution: No differential adjustment should be made on tandem float models in the field. Switch actuation levels have been set at the factory to meet customer specifications. Variations in actual conditions, from design conditions, usually require special control modifications.

3.0 Troubleshooting

Usually the first indication of improper operation is failure of the controlled equipment to function, i.e., pump will not start (or stop), signal lamps fail to light, etc. When these symptoms occur, whether at time of installation or during routine service thereafter, check the following potential external causes first:

- a. Fuses may be blown
- b. Reset button(s) may need resetting
- c. Power switch may be open
- d. Controlled equipment may be faulty
- e. Wiring leading to control may be defective

If a thorough inspection of these possible conditions fails to locate the trouble, proceed next to a check of the control's switch mechanism.

3.1 Check Switch Mechanism

1. Pull disconnect switch or otherwise disconnect power to the control.
2. Remove switch housing cover.
3. Disconnect power wiring from switch assembly.
4. Swing magnet assembly in and out by hand to check carefully for any sign of binding. Assembly should require minimal force to move it through its full swing.
5. If binding exists, magnet may be rubbing enclosing tube. If magnet is rubbing, loosen magnet clamp screw and shift magnet position. Retighten magnet clamp screw.
6. If switch magnet assembly swings freely and mechanism still fails to actuate, check installation of control to be certain it is within the specified 3° of vertical.
7. Check the continuity of microswitch with ohmmeter. Replace immediately if defective.
8. If switch mechanism is operating satisfactorily, proceed to check sensing unit.

NOTE: As a matter of good practice, spare switches should be kept on hand at all times.

3.2 Check Sensing Unit

1. Reconnect power supply. Being careful to avoid electrical shock, manually actuate switch mechanism (use a non-conductive tool on electrical switch mechanisms) to determine whether controlled equipment will operate.

Caution: With electrical power on, care should be taken to avoid contact with switch leads and connections at terminal block.

2. If controlled equipment responds to manual actuation test, trouble may be located in the level sensing portion of the control, float(s), stem(s), and magnetic attraction sleeve(s).
3. Check to be certain liquid is entering float chamber. A valve may be closed or piping plugged.

Caution: Be certain to pull disconnect switch or otherwise ensure that electrical circuit(s) through control is deactivated. Close operating medium supply valve on controls equipped with pneumatic switch mechanisms.

4. With liquid in chamber, proceed to check level sensing action by removing switch housing assembly and enclosing tube.
5. Disconnect wiring from supply side of switch mechanism(s) and remove electrical conduit or operating medium line connections to switch housing.
6. Perform system shutdown to relieve pressure from float chamber of control and allow unit to cool.
7. Close shutoff valves (if equipped) to isolate control from vessel. Drain off liquid in chamber if necessary
8. On installations without shutoff valves, relieve pressure from vessel and drain off liquid head above control mounting level.

NOTE: Control chamber, connections, and pipe lines need not be removed from vessel or boiler.

9. Remove switch housing assembly by loosening hex nut, which is located immediately below housing base.
10. With switch housing assembly removed, inspect attraction sleeve(s) and inside of enclosing tube for excessive corrosion or solids buildup which could restrict movement, preventing sleeve(s) from reaching field of switch magnet(s).
11. If differential has been changed in the field by repositioning the lower jam nuts on the float stem, check tightness and position of the jam nuts. Refer to **Figure 7** on page 8.

NOTE: Differential adjustment affects a change in the amount of level travel between switch-on and switch-off actuations. **Do not attempt** adjustment without first consulting factory for assistance in computing level differential change for your control.

-
12. Check float to be certain it is buoyant in the liquid (float chamber or vessel must have adequate liquid level). If float is determined to be filled with liquid, or it is collapsed, it must be replaced immediately. ***Do not attempt to repair a float.*** See **Section 2.5, Tandem Float Models** on page 10.

If all components in the control are in operating condition, the trouble must be located external to the control. Repeat inspection of external conditions previously described.

NOTE: If difficulties are encountered which cannot be identified, consult the factory or your local representative for assistance. A complete description of the trouble should be provided along with information concerning your piping and mounting arrangement, plus a description of your operating sequence. Sketches or photographs showing the installation are also beneficial.

When communicating about your control, be certain to always specify the complete Model and Serial numbers.

4.0 Preventive Maintenance

Periodic inspections are a necessary means to keep your MAGNETROL level control in good working order. This control is a safety device to protect the valuable equipment it serves. A systematic program of preventive maintenance must be implemented when the control is placed into service. If the following is observed, your control will provide reliable protection of your capital equipment for many years.

4.1 Recommended Practice

4.1.1 Keep Control Clean

Be sure the switch housing cover is always in place on the control. This cover is designed to keep dust and dirt from interfering with switch mechanism operation. In addition, it protects against damaging moisture and acts as a safety feature by keeping bare wires and terminals from being exposed. Should the housing cover or any seals become damaged or misplaced, obtain a replacement immediately.

4.1.2 Inspect Switch Mechanisms, Terminals, and Connections Monthly

1. Switches should be inspected for excessive wear on actuating lever or misalignment of adjustment screw at point of contact between screw and lever. Such wear can cause false switch actuating levels. See Section 6.1.2, Switch and Housing Reference on page 20 for bulletin supplied with control should switch adjustment or replacement be necessary.

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2. DO NOT operate your control with defective or mal-adjusted switch mechanisms. See **Section 6.1.2, Switch and Housing Reference** on page 20 for bulletin on switch mechanisms furnished for service instructions.
 3. Level controls may sometimes be exposed to excessive heat or moisture. Under such conditions, insulation on electrical wiring may become brittle, eventually breaking or peeling away. The resulting exposed wires can cause short circuits.

NOTE: Check wiring carefully and replace at the first sign of brittle insulation.

4. Vibration may sometimes cause terminal screws to work loose. Check all terminal connections to be certain that screws are tight.
5. On units with pneumatic switches, air (or gas) lines subjected to vibration, may eventually crack or become loose at connections causing leakage. Check lines and connections carefully and repair or replace if necessary.

NOTE: As a matter of good practice, spare switches should be kept on hand at all times.

4.1.3 Proof Test Procedure --- **(To be performed annually at a minimum)**

1. Bypass the logic controller or take other action to avoid a false trip.
2. Perform a detailed inspection of the unit inside and out for physical damage that may impact the structural integrity, and for evidence of environmental or process leaks. Repair or replace the unit if needed.
3. Using a calibrated multimeter set to measure electrical resistance (ohms), at the field connections measure and record the resistances across the Common (C) and the Normally Closed (NC) contacts, and the Common (C) and the Normally Open (NO) contacts.
4. Change the process level to cause the switch mechanism to change states.
5. Again, measure and record the resistances across the Common (C) and the Normally Closed (NC) contacts, and the Common (C) and the Normally Open (NO) contacts.
6. Ensure with the multimeter readings that the switch mechanism did in-fact change states. A closed switch contact should measure less than 1 ohm, and an open contact should measure greater than 5 megaohms.
7. Repeat steps 3 through 6 for all other sets of switch contacts (if any).
8. Restore the installation to normal operation.





4.2 What To Avoid

Caution: Operation of all buoyancy type level devices should be done in such a way as to minimize the action of dynamic forces on the float or displacer sensing element. Good practice for reducing the likelihood of damage to the control is to equalize pressure across the device very slowly.

1. Never leave switch housing cover off the control longer than necessary to make routine inspections.
2. Never place a jumper wire across terminals to “cut-out” the control. If a “jumper” is necessary for test purposes, be certain it is removed before placing control into service.
3. Never attempt to make adjustments or replace switches without reading instructions carefully. Certain adjustments provided for in level controls should not be attempted in the field. When in doubt, consult the factory or your local representative.
4. Never use lubricants on pivots of switch mechanisms. A sufficient amount of lubricant has been applied at the factory to ensure a lifetime of service. Further oiling is unnecessary and will only tend to attract dust and dirt which can interfere with mechanism operation.

5.0 Specifications

5.1 Agency Approvals

Agency	Approved Model	Area Classification
FM  APPROVED	All with an electric switch mechanism and a housing listed as TYPE 4X/7/9	Class I, Div 1, Groups C & D Class II, Div 1, Groups E, F & G
	All with an electric switch mechanism and a housing listed as TYPE 4X/7/9 Class I, Div 1, Group B	Class I, Div 1, Groups B, C & D Class II, Div 1, Groups E, F & G
CSA 	All with a Series HS, F, 8 or 9 electric switch mechanism and a housing listed as CSA TYPE 4X	Class I, Div 2, Groups A, B, C & D
	All with an electric switch mechanism and a housing listed as TYPE 4X/7/9	Class I, Div 1, Groups C & D Class II, Div 1, Groups E, F & G
	All with an electric switch mechanism and a housing listed as TYPE 4X/7/9 Class I, Div 1, Group B	Class I, Div 1, Groups B, C & D Class II, Div 1, Groups E, F & G
ATEX / IEC Ex ** 	All with an electric switch mechanism and an ATEX housing *	ATEX II 2 G EEx D IIC T6 94/9/EC IEC ExEx d IIC T6 IP66
CE 	Low voltage directives 2006/95/EC Per Harmonized Standard EN 61010-1/1993 & Amendment No. 1	Installation Category II Pollution Degree 2

continued on next page

5.1 Agency Approvals (continued)

* Models with two HS switches are not ATEX approved.

** IEC Installation Instructions:

The cable entry and closing devices shall be Ex d certified suitable for the conditions of use and correctly installed.

For ambient temperatures above +55 °C or for process temperatures above +150 °C, suitable heat resistant cables shall be used.

Heat extensions (between process connection and housing) shall never be insulated.

Special conditions for safe use:

When the equipment is installed in process temperatures higher than +85 °C the temperature classification must be reduced according to the following table as per IEC60079-0.

Maximum Process Temperature	Temperature Classification
< 85 °C	T6
< 100 °C	T5
< 135 °C	T4
< 200 °C	T3
< 300 °C	T2
< 450 °C	T1

These units are in conformity with IECEx KEM 05.0020X Classification Ex d IIC T6

T_{ambient} -40 °C to +70 °C

5.2 Physical

STAINLESS STEEL CHAMBERS WITH 1-INCH CONNECTIONS INCHES

MILLIMETERS

	① Min. SG	NPT & ⑤ Socket Weld			Flanged Upper Side/Btm			Flanged Side/Side			Actuating Levels②		NPT & Socket Weld			Flanged Upper Side/Btm			Flanged Side/Side			Actuating Levels②	
		A	B	C	A	B	C	A	B	C	HL	LL	A	B	C	A	B	C	A	B	C	HL	LL
B73	0.59	6.36	2.83	17.44	9.25	6.25	20.32	9.90	6.25	21.00	1.22	2.10	151	72	442	235	159	515	251	159	532	30	53
C75	0.60	8.50	3.61	22.06	11.56	6.68	25.12	12.21	6.68	25.75	2.75	3.62	216	92	560	294	170	638	310	170	654	70	92
J75	0.57	9.25	3.61	23.06	12.31	6.68	26.12	12.96	6.68	26.75	2.93	3.78	235	92	586	313	170	663	329	170	679	74	96
O75③	0.85	8.50	2.71	21.87	11.56	5.68	24.93	12.21	5.68	25.62	2.44	3.50	216	69	555	294	144	633	310	144	651	62	89
O75④	0.85	8.50	2.59	21.56	11.56	5.56	24.62	12.21	5.56	25.43	2.44	3.50	216	66	548	294	141	625	310	141	646	62	89
P75	0.75	8.50	3.09	21.93	11.56	6.12	25.00	12.21	6.12	25.68	2.56	3.50	216	78	557	294	155	635	310	155	652	65	89

Levels ±0.25" (6 mm)

STAINLESS STEEL CHAMBERS WITH 1½-INCH CONNECTIONS INCHES

MILLIMETERS

	① Min. SG	NPT & ⑤ Socket Weld			Flanged Upper Side/Btm			Flanged Side/Side			Actuating Levels②		NPT & Socket Weld			Flanged Upper Side/Btm			Flanged Side/Side			Actuating Levels②	
		A	B	C	A	B	C	A	B	C	HL	LL	A	B	C	A	B	C	A	B	C	HL	LL
C75	0.60	8.50	4.22	12.56	12.56	7.68	16.63	13.21	7.68	17.31	2.13	3.00	215	107	319	319	195	422	335	195	439	54	76
J75	0.57	9.25	4.22	13.56	13.31	7.68	17.63	13.96	7.68	18.25	2.75	3.50	234	107	344	338	195	448	354	195	464	70	89

Levels ±0.25" (6 mm)

STAINLESS STEEL CHAMBERS WITH 2-INCH CONNECTIONS INCHES

MILLIMETERS

	① Min. SG	NPT & ⑤ Socket Weld			Flanged Upper Side/Btm			Flanged Side/Side			Actuating Levels②		NPT & Socket Weld			Flanged Upper Side/Btm			Flanged Side/Side			Actuating Levels②	
		A	B	C	A	B	C	A	B	C	HL	LL	A	B	C	A	B	C	A	B	C	HL	LL
C75	0.60	8.25	4.37	12.69	12.56	7.68	17.00	13.21	7.68	17.69	1.75	2.63	209	110	322	319	195	431	335	195	449	44	69
J75	0.57	9.00	4.34	13.69	13.31	7.68	18.00	13.96	7.68	18.69	2.98	3.13	228	110	348	338	195	457	354	195	475	60	80

Levels ±0.25" (6 mm)

① Minimum SG given is for single switch units with -1 materials of construction. Consult factory for other configurations.

② Switch actuating levels (HL & LL) are given for minimum specific gravity materials of construction -1 and single switch units. Consult factory for other configurations.

③ 304 Stainless steel only

④ 316 Stainless steel only

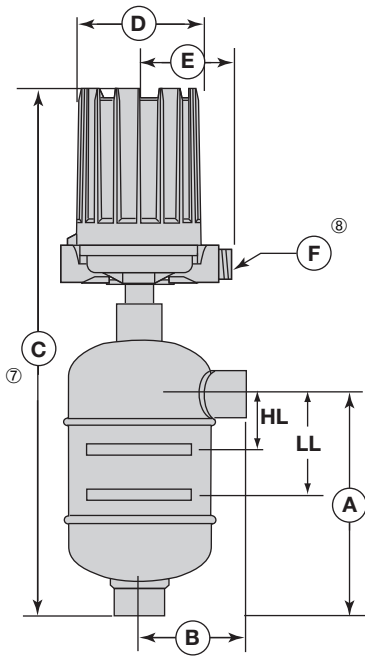
⑤ Standard process connections are a combination of 1" NPT and 1" socket weld coupling.

⑥ These dimensions increase by 2.19 (55) with Series HS switches with terminal blocks.

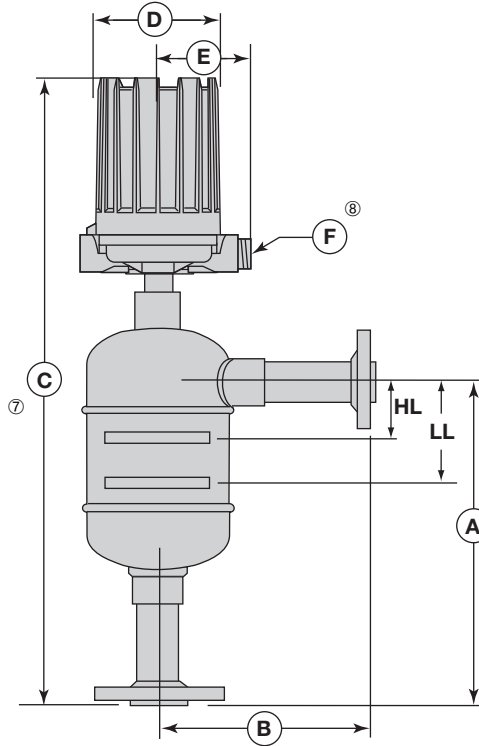
⑦ Allow overhead clearance of 10.00 (254) for cover removal.

⑧ All housings rotatable 360°.

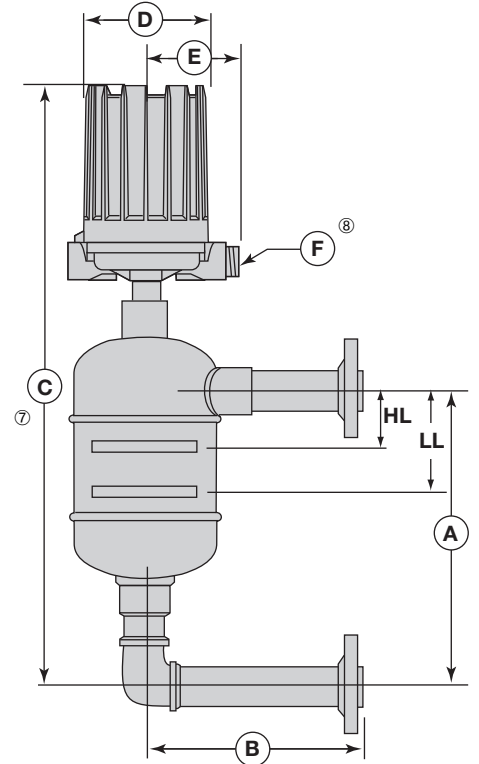
Inches (mm)



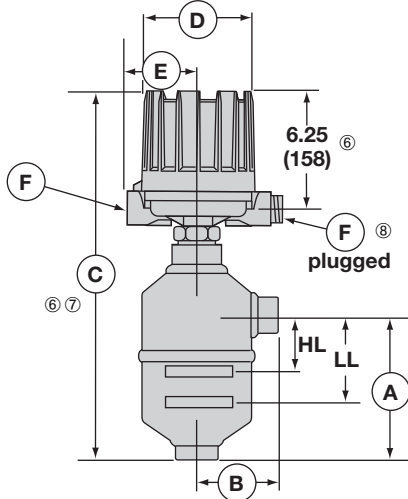
Series 75
Threaded and Socket Weld [Ⓢ]
Upper Side/Bottom



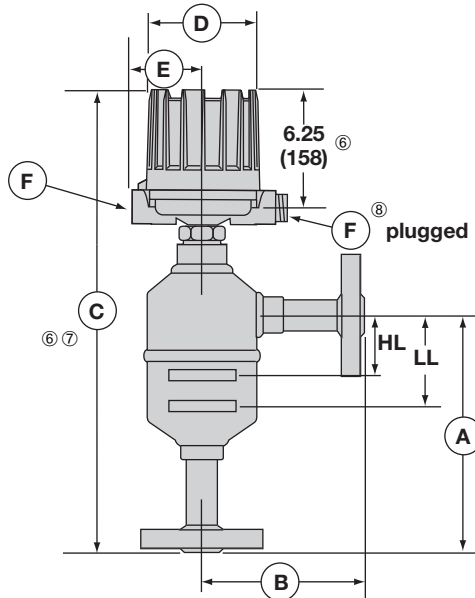
Series 75
Flanged Upper Side/Bottom



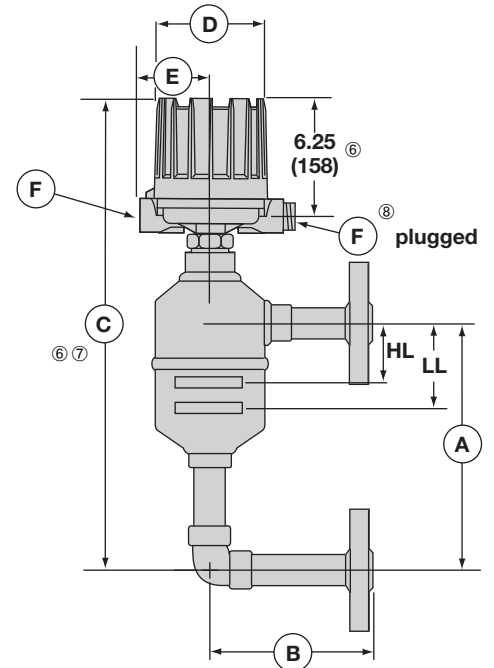
Series 75
Flanged Side/Side



Model B73
Threaded and Socket Weld [Ⓢ]
Upper Side/Bottom



Model B73
Upper Side/Bottom Flanged



Model B73
Side/Side Flanged

Housing	D	E
NEMA 1	4.70 (119)	5.00 (127)
TYPE 4X/7/9 Group B	5.93 (151)	3.87 (98)

Conduit Connections F	
Electrical Switches	
TYPE 4X/7/9:	1" NPT
Group B:	1" NPT
Pneumatic Switches	
NEMA 1:	¼" NPT

5.2 Physical

CARBON STEEL CHAMBERS WITH 1-INCH CONNECTIONS INCHES

MILLIMETERS

	Min. ^① SG	NPT & ③ Socket Weld			Flanged Upper Side/Btm			Flanged Side/Side			Actuating Levels ^②		NPT & Socket Weld			Flanged Upper Side/Btm			Flanged Side/Side			Actuating Levels ^②	
		A	B	C	A	B	C	A	B	C	HL	LL	A	B	C	A	B	C	A	B	C	HL	LL
B73	0.59	6.36	3.34	17.44	9.25	6.25	20.32	9.90	6.25	21.00	1.22	2.10	151	84	442	235	159	515	251	159	532	30	53
B75	0.67	8.69	3.80	22.69	11.56	6.69	25.56	12.21	6.69	26.21	2.56	3.24	221	97	576	294	170	649	310	170	666	65	82
C75	0.55										2.72	3.44										69	87
F75	0.55	10.91	5.33	24.91	13.78	8.19	27.78	14.39	8.19	28.39	1.76	2.35	277	135	633	350	208	706	366	208	721	44	59
G75	0.53	9.44	4.33	23.44	12.31	7.19	26.31	12.96	7.19	26.96	2.25	2.92	240	110	595	313	183	668	329	183	685	57	74
J75	0.48										2.90	3.62										73	91
K75	0.39	11.69	5.33	25.69	14.56	8.19	28.56	15.21	8.19	29.21	2.15	2.77	297	135	653	370	208	754	386	208	742	54	70
L75	0.40	9.44	4.33	23.44	12.31	7.19	26.31	12.96	7.19	26.96	2.45	3.19	240	110	595	313	183	668	329	183	685	62	81
N75	0.32	11.69	5.33	25.69	14.56	8.19	28.56	15.21	8.19	29.21	2.17	2.86	297	135	653	370	208	754	386	208	742	55	72
S75	0.60	11.16	5.33	27.06	Consult Factory						2.13	2.78	283	135	687	Consult Factory						54	70
V75	0.74	9.02	4.15	23.27	11.56	6.68	25.81	12.21	6.68	26.46	2.63	3.38	229	105	591	294	170	656	313	170	672	69	86
Z75	0.68	9.77	4.68	24.16	12.31	7.18	26.70	12.96	7.18	27.35	2.38	3.19	248	119	614	313	182	678	329	182	695	60	81

Levels ±0.25" (6 mm)

CARBON STEEL CHAMBERS WITH 1½-INCH CONNECTIONS INCHES

MILLIMETERS

	Min. ^① SG	NPT & ③ Socket Weld			Flanged Upper Side/Btm			Flanged Side/Side			Actuating Levels ^②		NPT & Socket Weld			Flanged Upper Side/Btm			Flanged Side/Side			Actuating Levels ^②	
		A	B	C	A	B	C	A	B	C	HL	LL	A	B	C	A	B	C	A	B	C	HL	LL
B75	0.67	8.94	4.22	23.06	12.56	7.69	26.69	13.21	7.69	27.34	1.93	2.61	227	107	586	319	195	678	336	195	694	49	66
C75	0.55										1.93	2.61										49	66
F75	0.55	11.06	5.75	26.19	14.78	9.19	29.92	15.39	9.19	30.53	1.08	1.66	281	146	665	375	233	760	391	233	775	27	42
G75	0.53	9.62	4.75	24.09	13.31	8.19	27.75	13.96	8.19	28.42	1.59	2.25	244	121	612	338	208	705	355	208	722	40	57
J75	0.48										2.23	2.95										56	74
K75	0.39	12.06	5.75	27.14	15.56	9.19	30.64	16.21	9.19	31.29	1.77	2.39	306	146	689	395	233	778	412	233	795	44	60
L75	0.40	9.62	4.75	24.09	13.31	8.19	27.75	13.96	8.19	28.42	1.78	2.52	244	121	612	338	208	705	355	208	722	44	64
N75	0.32	12.06	5.75	27.14	15.56	9.19	30.64	16.21	9.19	31.29	1.81	2.49	306	146	689	395	233	778	412	233	806	45	63
S75	0.60	Consult Factory						—		—		Consult Factory						—					
V75	0.74	8.82	4.22	23.20	12.56	7.68	26.94	13.21	7.68	27.79	1.94	2.69	224	107	589	319	195	684	336	195	706	49	68
Z75	0.68	9.51	4.75	24.09	13.31	8.18	27.89	13.96	8.18	28.54	1.69	2.59	242	121	612	338	208	708	355	208	725	43	66

Levels ±0.25" (6 mm)

CARBON STEEL CHAMBERS WITH 2-INCH CONNECTIONS INCHES

MILLIMETERS

	Min. ^① SG	NPT & ③ Socket Weld			Flanged Upper Side/Btm			Flanged Side/Side			Actuating Levels ^②		NPT & Socket Weld			Flanged Upper Side/Btm			Flanged Side/Side			Actuating Levels ^②	
		A	B	C	A	B	C	A	B	C	HL	LL	A	B	C	A	B	C	A	B	C	HL	LL
B75	0.67	8.69	4.34	23.20	12.56	7.69	26.07	13.21	7.69	27.72	1.48	2.16	221	110	589	319	195	662	336	195	704	37	54
C75	0.55										1.64	2.36										41	59
F75	0.55	10.94	5.88	26.32	14.78	9.19	30.16	15.39	9.19	30.77	0.78	1.36	278	149	669	375	233	766	391	233	782	19	34
G75	0.53	9.50	4.88	24.21	13.31	8.19	28.02	13.96	8.19	28.67	1.31	1.97	241	124	615	338	208	712	355	208	728	33	50
J75	0.48										1.95	2.67										49	67
K75	0.39	11.94	5.88	27.32	15.56	9.19	30.94	16.21	9.19	31.59	1.59	2.21	303	149	694	395	233	786	412	233	802	40	56
L75	0.40	9.50	4.88	24.21	13.31	8.19	28.02	13.96	8.19	28.67	1.50	2.24	241	124	615	338	208	712	355	208	728	38	56
N75	0.32	11.94	5.88	27.32	15.56	9.19	30.94	16.21	9.19	31.59	1.63	2.31	303	149	694	395	233	786	412	233	802	40	58
S75	0.60	Consult Factory						—		—		Consult Factory						—					
V75	0.74	8.49	4.34	23.27	12.56	7.68	27.34	13.21	7.68	27.99	1.88	2.63	216	110	591	319	195	694	336	195	711	48	67
Z75	0.68	9.31	4.87	24.16	13.31	8.18	28.16	13.96	8.18	28.81	1.44	2.25	236	124	614	338	208	715	355	208	732	37	57

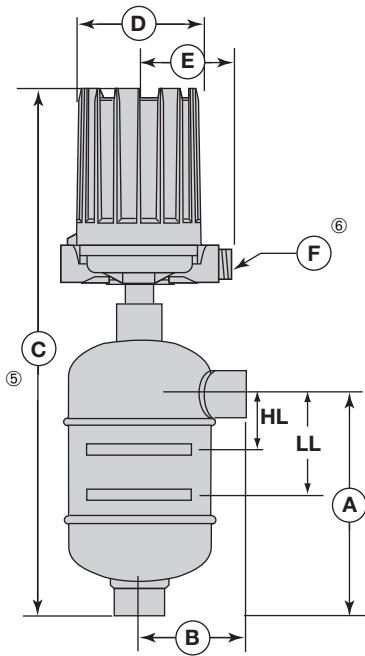
Levels ±0.25" (6 mm)

① Minimum SG given is for single switch units with -1 materials of construction. Consult factory for other configurations.

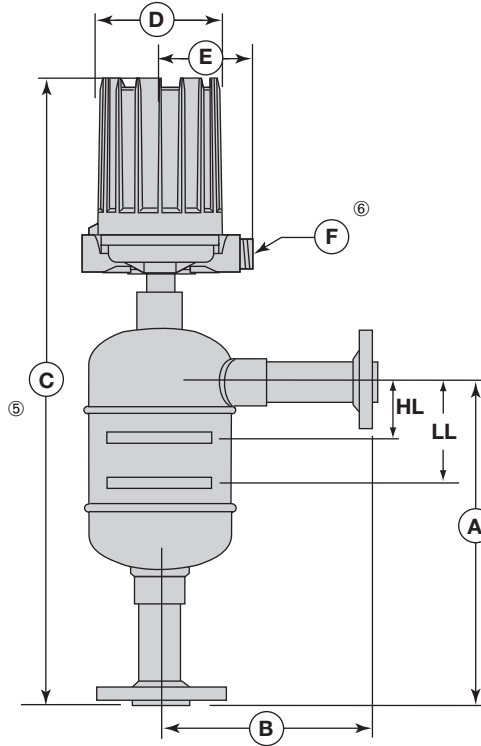
② Switch actuating levels (HL & LL) are given for minimum specific gravity materials of construction -1 and single switch units. Consult factory for other configurations.

③ Standard process connections are a combination of 1" NPT and 1" socket weld coupling.

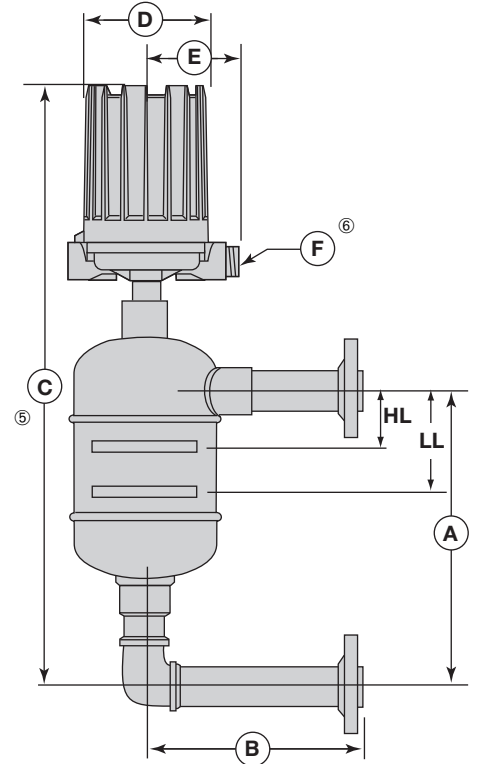
Inches (mm)



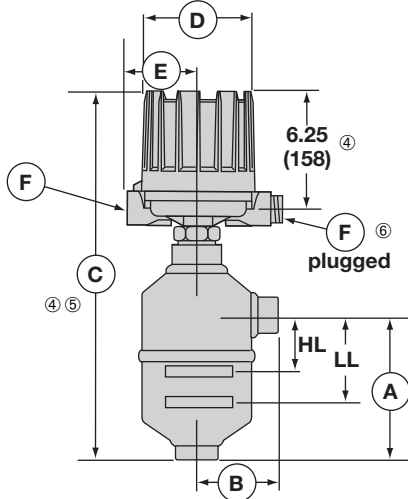
Series 75
Threaded and Socket Weld ^③
Upper Side/Bottom



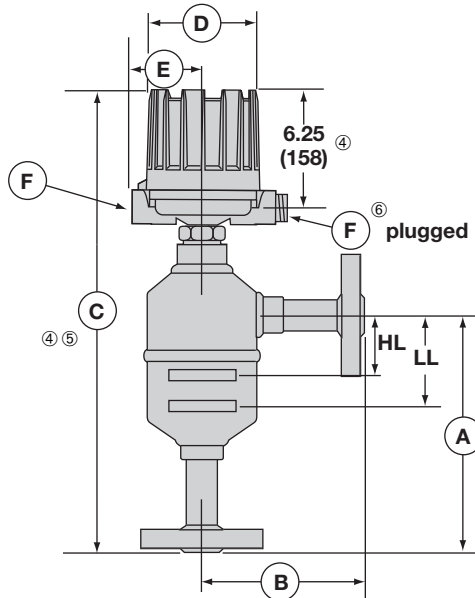
Series 75
Flanged Upper Side/Bottom



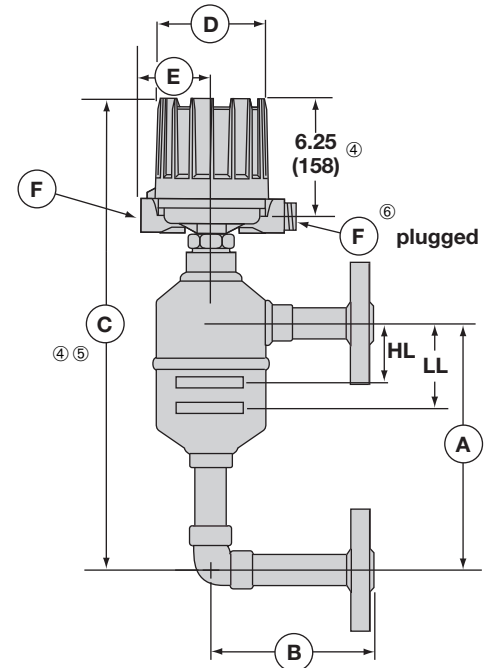
Series 75
Flanged Side/Side



Model B73
Threaded and Socket Weld ^③
Upper Side/Bottom



Model B73
Upper Side/Bottom Flanged



Model B73
Side/Side Flanged

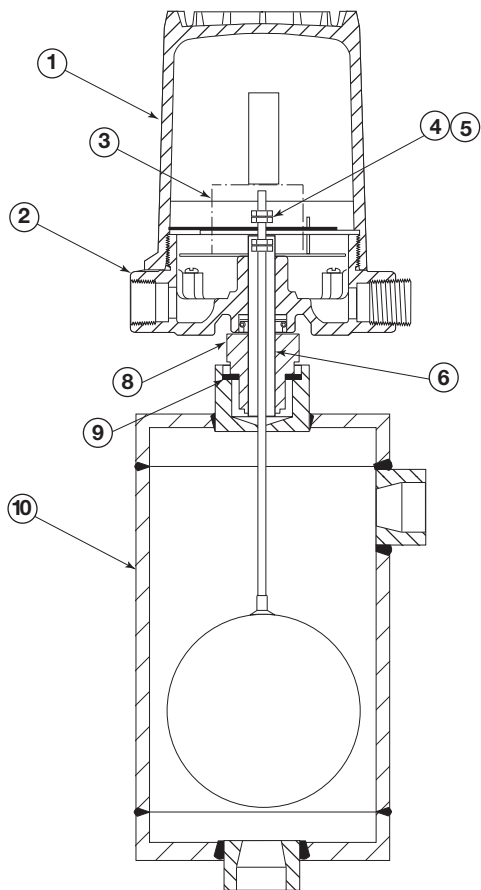
- ④ These dimensions increase by 2.19 (55) with Series HS switches with terminal blocks.
- ⑤ Allow overhead clearance of 10.00 (254) for cover removal.
- ⑥ All housings rotatable 360°.

Housing	D	E
NEMA 1	4.70 (119)	5.00 (127)
TYPE 4X/7/9 Group B	5.93 (151)	3.87 (98)

Conduit Connections F	
Electrical Switches	
TYPE 4X/7/9:	1" NPT
Group B:	1" NPT
Pneumatic Switches	
NEMA 1:	¼" NPT

6.0 Replacement Parts

6.1 Series 75



6.1.1 Parts Identification

Item	Description
1	Housing cover
2	Housing base
3	Switch mechanism
4	Jam nuts
5	Lock washer
6	Attraction sleeve
7	Stop tube (not shown)
8	Enclosing tube
9	E-tube gasket
10	Chamber assembly

IMPORTANT:

When ordering, please specify:

- A. Model and serial numbers or control.
- B. Name and/or number of replacement assembly.

Many Model 75 controls are specially tailored to meet customer specifications and, therefore, may contain special parts. When ordering, always provide serial number of control.

6.1.2 Switch and Housing Reference

	Series Type	Bulletin #
Dry contact	B, C, D	42-683
Hermetically sealed	HS	42-694
Bleed type pneumatic	J	42-685
Non-bleed type pneumatic	K	42-486
High temperature dry contact	F, R, 8, 9	42-799

6.1.3 Series 75 with Material Code 1

	All Models except S75, V75 & Z75	S75, V75 & Z75 Only
Housing cover	See Section 6.1.2, Switch and Housing Reference on previous page for switch and housing bulletin furnished.	
Housing base		
Switch mechanism		
Attraction sleeve kit:		
includes items 4, 5, 6 & 7	089-3409-009	089-3409-002
Enclosing tube - models w/electric switches*	Z32-6325-004	Z32-6325-006
Enclosing tube - models w/J or K switches	Z32-6325-001	Z32-6325-003
E-tube gasket - Models B, E, F, G, H, K	012-1204-001	012-1204-001
E-tube gasket - Models C, J, L, M, N	012-1204-001	012-1204-001
Chamber assembly	Available as complete sensing units only with all parts listed under items 4 through 10 assembled. When ordering, specify model and serial number of control.	

*Consult factory for Series G, H & I switches

6.1.4 Series 75 with Material Code 2

	All Models except S75, V75 & Z75	S75, V75 & Z75 Only
Housing cover	See Section 6.1.2, Switch and Housing Reference on previous page for switch and housing bulletin furnished.	
Housing base		
Switch mechanism		
Attraction sleeve kit:		
includes items 4, 5, 6 & 7	089-3410-012	089-3410-002
Enclosing tube - models w/electric switches*	Z32-6325-005	Z32-6325-006
Enclosing tube - models w/J or K switches	Z32-6325-002	Z32-6325-003
E-tube gasket - Models B, E, F, G, H, K	012-1204-001	012-1204-001
E-tube gasket - Models C, J, L, M, N	012-1204-001	012-1204-001
Chamber assembly	Available as complete sensing units only with all parts listed under items 4 through 10 assembled. When ordering, specify	

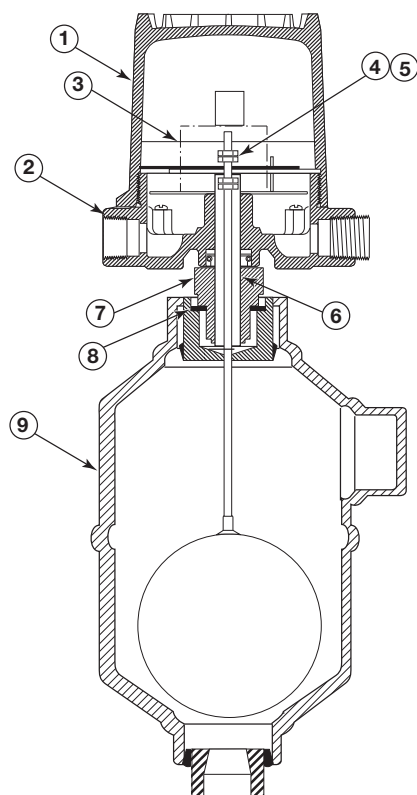
model and serial number of control.

*Consult factory for Series G, H & I switches

6.1.5 Series 75 with Material Code 3 or 4

	All Models w/Material Code 3	All Models w/Material Code 4
Housing cover	See Section 6.1.2, Switch and Housing Reference on previous page for switch and housing bulletin furnished.	
Housing base		
Switch mechanism		
Attraction sleeve kit:		
includes items 4, 5, 6 & 7	089-3410-010	089-3410-001
Enclosing tube - models w/electric switches	Z32-6325-005	Z32-6325-005
Enclosing tube - models w/J or K switches	Z32-6325-002	Z32-6325-002
Enclosing tube gasket	012-1204-001	012-1204-001
Chamber assembly	Available as complete sensing units only with all parts listed under items 4 through 10 assembled. When ordering, specify model and serial number of control.	

6.2 Model B73



6.2.1 Parts Identification

Item	Description
1	Housing cover
2	Housing base
3	Switch mechanism
4	Jam nuts
5	Lock washer
6	Attraction sleeve
7	Enclosing tube
8	E-tube gasket
9	Chamber assembly

IMPORTANT:

When ordering, please specify:

- A. Model and serial numbers or control.
- B. Name and/or number of replacement assembly.

Many Model 75 controls are specially tailored to meet customer specifications and, therefore, may contain special parts. When ordering, always provide serial number of control.

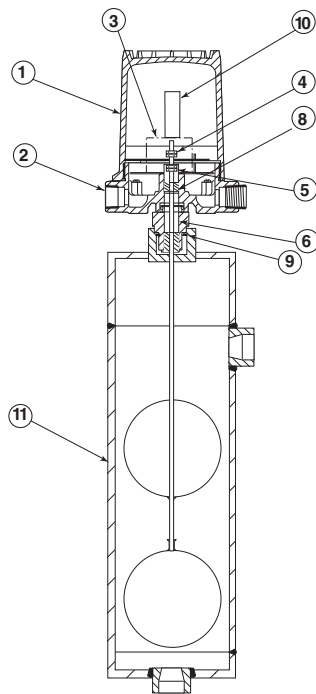
6.2.2 Switch and Housing Reference

	Series Type	Bulletin #
Dry contact	B, C, D	42-683
Hermetically sealed	F	42-799
Hermetically sealed	HS	42-694
Bleed type pneumatic	J	42-685
Non-bleed type pneumatic	K	42-486

6.2.3 Model B73

	Model B73-1	Model B73-2 or B73-4	Model B73-3
Housing cover	See Section 6.2.2, Switch and Housing Reference above for switch and housing bulletin furnished.		
Housing base			
Switch mechanism			
Attraction sleeve kit			
includes items 4, 5, & 6	089-3409-012	089-3410-009	089-3410-011
Enclosing tube	Z32-6325-001	Z32-6325-002	Z32-6325-002
E-tube gasket	012-1301-002	012-1301-002	012-1301-002
Chamber assembly	Available as complete sensing units only with all parts listed under items 4 through 10 assembled. When ordering, specify model and serial number of control.		

6.3 Series 75 Tandem Float Units



6.3.1 Parts Identification

Item	Description
1	Housing cover
2	Housing base
3	Switch mechanism
4	Jam nuts
5	Upper attraction sleeve
6	Lower attraction sleeve
7	Spacer washer (not shown)
8	Retaining ring
9	E-tube gasket
10	Enclosing tube
11	Chamber assembly

6.3.2 Series 75 Tandem Float Units

	Models B, C, G, J, L, & M	Models F, K, & N
Housing cover		
Housing base	See Section 6.3.3, Switch and Housing Reference below for switch and housing bulletin furnished.	
Switch mechanism		
Attraction sleeve kit:		
includes items 4, 5, 6, 7 & 8	089-3411-001 (Mat'l Code 1)	089-3413-001 (Mat'l Code 1)
	089-3412-001 (Mat'l Code 2, 3, & 4)	089-3414-001 (Mat'l Code 2, 3, & 4)
E-tube gasket	012-1204-001	012-1204-001
Enclosing tube	Z32-6325-004 (Mat'l Code 1) / Z32-6325-005 (Mat'l Code 2)	Z32-6325-004 (Mat'l Code 1) / Z32-6325-005 (Mat'l Code 2)
Chamber assembly	Available as complete sensing units only with all parts listed under items 4 through 10 assembled. When ordering, specify model and serial number of control.	

6.3.3 Switch and Housing Reference

	Series Type	Bulletin#
Dry contact	B, C, D	42-683
Hermetically sealed	HS	42-694
Bleed type pneumatic	J	42-685
Non-bleed type pneumatic	K	42-486
High temperature dry contact	F, R, 8, 9	42-799

7.0 Model Numbers

7.1 Model B73

MODEL NUMBER CODE

Model No.	Min. SG	Materials of Construction	Pressure Rating			
			psig @ °F		bar @ °C	
			100	450 ^①	38	232 ^①
B73-1	0.59	Carbon steel chamber, 316 stainless steel float, 400 stainless steel trim	400	275	28	20
B73-2	0.59	Carbon steel chamber, 316 stainless steel float, 316 stainless steel trim				
B73-3	0.59	304 stainless steel chamber, 316 stainless steel float, 304 stainless steel trim				
B73-4	0.59	316 stainless steel chamber, 316 stainless steel float, 316 stainless steel trim				

TANK CONNECTION TYPE AND SIZE

B20	1" NPT threaded side/bottom
B30	1" socket weld side/bottom
N30	1" 150 lb. flanged upper side/bottom
N40	1" 300 lb. flanged upper side/bottom
S30	1" 150 lb. flanged side/side
S40	1" 300 lb. flanged side/side

- ① Models are limited to maximum temperature rating of selected switch mechanism. See Switch Mechanism chart on page 27.
- ② Consult factory for TYPE 4X/7/9 cast iron housings.
- ③ Process temperature based on +100 °F (+38 °C) ambient.
- ④ Drain or uncontrolled housing heater available in TYPE 4X/7/9 enclosures. Consult factory for standard part number.
- ⑤ On steam & other condensing applications, temperature down-rated to +400 °F (+204 °C) process @ +100 °F (+38 °C) ambient.

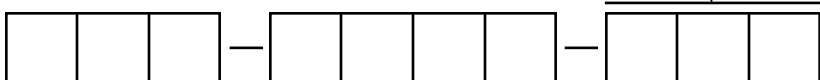


ELECTRIC SWITCH MECHANISM AND ENCLOSURE^②

Switch Description	③ Process Temperature Range °F (°C)	One Set Point Contacts	Model B73-1 Only			Models B73-2, B73-3, B74-4		
			TYPE 4X/7/9 Aluminum Enclosure ^④					
			Class I, Div 1 Groups C & D	Class I, Div 1 Groups B, C & D	ATEX	Class I, Div 1 Groups C & D	Class I, Div 1 Groups B, C & D	ATEX
Series B Snap	-40 to +250 (-40 to +121)	SPDT	BKP	BKT	BAC	BKQ	BKS	BA9
		DPDT	BNP	BNT	BBC	BNQ	BNS	BB9
Series C Snap	-40 to +450 (-40 to +232)	SPDT	CKP	CKT	CAC	CKQ	CKS	CA9
		DPDT	CNP	CNT	CBC	CNQ	CNS	CB9
Series D Snap	-40 to +250 (-40 to +121)	SPDT	—			DKQ	DKS	DA9
		DPDT	—			DNQ	DNS	DB9
Series F Hermetically Sealed Snap	-50 to +450 (-46 to +232)	SPDT	FKP	FKT	FAC	FKQ	FKS	FA9
		DPDT	FNP	FNT	FBC	FNQ	FNS	FB9
Series HS Hermetically Sealed 5 amp Snap with wiring leads	⑤ -50 to +450 (-46 to +232)	SPDT	—			HMC	HEK	—
		DPDT	—			HMF	HET	—
Series HS Hermetically Sealed 5 amp Snap with terminal block	⑤ -50 to +450 (-46 to +232)	SPDT	—			HM3	HM4	HA9
		DPDT	—			HM7	HM8	HB9

PNEUMATIC SWITCH MECHANISM AND ENCLOSURE

Switch Description	Maximum Supply Pressure		Maximum Process Temperature		Bleed Orifice Diameter		Models with Material of Construction Code 1 Code 2, 3 or 4	
	psig	bar	°F	°C	inches	mm	NEMA 1	NEMA 1
Series J Bleed Type	100	7	400	204	.063	1.6	JDG	JDE
	60	4	400	204	.094	2.3	JEG	JEE
	60	4	450	232	.055	1.4	JFG	JFE
Series K Non-Bleed	100	7	400	204	—	—	—	KOE
	40	3	400	204	—	—	KOG	—



7.2 Series 75

MODEL NUMBER CODE

Model Code	Min. S.G. for models with ① Material of Construction Code			Pressure Rating									
				psig @ °F ②					bar @ °C ②				
	1	2	3 & 4	100	550	750	900 ③	1000 ③ ④	38	288	399	482 ③	538 ③ ④
CARBON STEEL CHAMBER													
B75	0.67	0.71	—	1000	870	716	357	138	69	60	49	25	10
C75	0.55	0.59	—	500	435	400	357	138	34	30	28	25	10
F75	0.55	0.56	—	1000	870	800	523	200	69	60	55	36	14
G75	0.53	0.56	—	750	653	600	338	130	52	45	41	23	9
J75	0.48	0.51	—	400	—	250	—	—	28	—	17	—	—
K75	0.39	0.40	—	600	—	375	—	—	41	—	26	—	—
L75	0.40	0.42	—	300	—	185	—	—	21	—	13	—	—
N75	0.32	0.33	—	450	—	280	—	—	31	—	19	—	—
S75④	0.60	—	—	1500	1275	1045	523	—	103	88	72	36	—
V75④	0.74	0.81	—	2240	1913	1455	728	—	154	132	100	50	—
Z75④	0.68	0.71	—	2193	1913	1425	713	—	151	132	98	49	—
STAINLESS STEEL CHAMBER													
C75	—	—	0.60	500	435	400	385	380	34	30	28	26	26
J75	—	—	0.57	400	—	225	—	—	28	—	16	—	—
O75	—	—	0.85	500	435	400	385	380	34	30	28	26	26
P75	—	—	0.75	400	—	225	—	—	28	—	16	—	—

MATERIALS OF CONSTRUCTION

1	Carbon steel chamber, 316 stainless steel float, 400 stainless steel trim
2	Carbon steel chamber, 316 stainless steel float, 316 stainless steel trim
3	304 Stainless steel chamber, 316 stainless steel float, 316 stainless steel trim
4	316 Stainless steel chamber, 316 stainless steel float, 316 stainless steel trim

TANK CONNECTION TYPE AND SIZE

Type	Material	Size											
		1"				1½" ⑤				2" ⑤			
Threaded Side/Bottom	CS	B20				C20				D20			
	SS	B20				C20				D20			
Socket Weld Side/Bottom	CS	B30				C30				D30			
	SS	B30				C30				D30			
		Cage Mounting Flange Rating (lbs.)											
		150	300	600	900 ⑥	150	300	600	900 ⑥	150	300	600	900 ⑥
Flanged Upper Side/Bottom	CS	N30	N40	N50	N60	P30	P40	P50	P60	Q30	Q40	Q50	Q60
	SS	N30	N40	Consult Factory									
Flanged Side/Side	CS	S30	S40	S50	S60	T30	T40	T50	T60	V30	V40	V50	V60
	SS	S30	S40	Consult Factory									

PNEUMATIC SWITCH MECHANISM AND ENCLOSURE

Switch Description	Maximum Supply Pressure		Maximum Process Temperature		Bleed Orifice Diameter		Excluding S75, V75 & Z75		S75, V75 & Z75	
	psig	bar	°F	°C	inches	mm	NEMA 1	NEMA 1	NEMA 1	NEMA 1
Series J Bleed Type	100	7	400	204	.063	1.6	JDE	JKE	JDE	JKE
	60	4	400	204	.094	2.3	JEE	JLE	JEE	JLE
	60	4	700	371	.055	1.3	JFE	JME	JFE	JME
Series K Non-Bleed	100	7	400	204	—	—	KOE	KPE	KOE	KPE

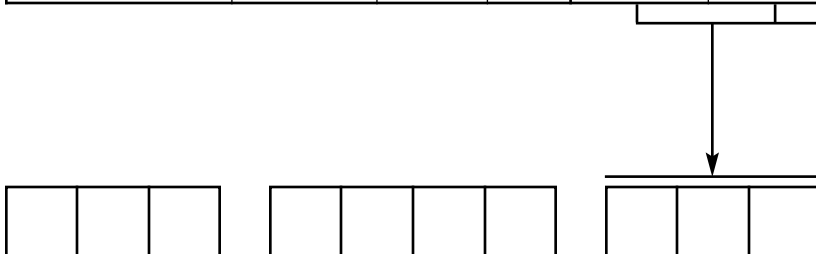


Electric switch mechanism and enclosure codes on the following page.

See Notes on back cover.

ELECTRIC SWITCH MECHANISM AND ENCLOSURE ⑦

Switch Description	Process ⑥ Temperature Range °F (°C)	Contacts	Set Points	All Models with Material of Construction Code 1 except Models S75, V75 & Z75			All models with Material of Construction Codes 2 and all Models S75, V75 & Z75		
				TYPE 4X/7/9 Aluminum Enclosure					
				Class I, Div 1 Groups C&D	Class I, Div 1 Group B	ATEX Ex II 2 G EEx d IIC T6	Class I, Div 1 Groups C&D	Class I, Div 1 Group B	ATEX Ex II 2 G EEx d IIC T6
Series B Snap Switch	-40 to +250 (-40 to +121)	SPDT	1	BJA	BKJ	BCC	BKB	BKK	BC9
			2	BLA	BLJ	BDC	BLB	BLK	BD9
			3	BMA	BMJ	BEC	BMB	BMK	BE9
		DPDT	1	BNA	BNJ	BFC	BNB	BNK	BF9
2	BOA		BOJ	BGC	BOB	BOK	BG9		
Series C Snap Switch	-40 to +450 (-40 to +232)	SPDT	1	CKA	CKJ	CCC	CKB	CKK	CC9
			2	CLA	CLJ	CDC	CLB	CLK	CD9
			3	CMA	CMJ	CEC	CMB	CMK	CE9
		DPDT	1	CNA	CNJ	CFC	CNB	CNK	CF9
2	COA		COJ	CGC	COB	COK	CG9		
Series D DC Current Snap Switch	-40 to +250 (-40 to +121)	SPDT	1	DKB	DKK	DC9	DKB	DKK	DC9
			2	DLB	DLK	DD9	DLB	DLK	DD9
			3	DMB	DMK	DE9	DMB	DMK	DE9
		DPDT	1	DNB	DNK	DF9	DNB	DNK	DF9
2	DOB		DOK	DG9	DOB	DOK	DG9		
Series F Hermetically Sealed Snap Switch	-50 to +750 (-46 to +399)	SPDT	1	FKA	FKJ	FCC	FKB	FKK	FC9
			2	FLA	FLJ	FDC	FLB	FLK	FD9
		DPDT	1	FNA	FNJ	FFC	FNB	FNK	FF9
			2	FOA	FOJ	FGC	FOB	FOK	FG9
Series HS ⑦ Hermetically Sealed 5-amp Snap Switch with Wiring Leads	-50 to +550 ⑧ (-46 to +288)	SPDT	1	HMJ	HMK	—	HMJ	HMK	—
			2	HMN	HMP		HMN	HMP	
		DPDT	1	HMS	HMT		HMS	HMT	
			2	HMY	HMZ		HMY	HMZ	
Series HS ⑦ Hermetically Sealed 5-amp Snap Switch with Terminal Block	-50 to +550 ⑧ (-46 to +288)	SPDT	1	HM3	HM4	HA9	HM3	HM4	HA9
		DPDT	1	HM7	HM8	HB9	HM7	HM8	HB9
Series R High Temperature Snap Switch	-40 to +750 (-40 to +399)	SPDT	1	RKB	RKK	RC9	RKB	RKK	RC9
			2	RLB	RLK	RD9	RLB	RLK	RD9
		DPDT	1	RNB	RNK	RF9	RNB	RNK	RF9
			2	ROB	ROK	RG9	ROB	ROK	RG9
Series 8 Hermetically Sealed Snap Switch	-50 to +750 (-46 to +399)	SPDT	1	8KA	8KJ	8CC	8KB	8KK	8C9
			2	8LA	8LJ	8DC	8LB	8LK	8D9
			3	8MA	8MJ	8EC	8MB	8MK	8E9
		DPDT	1	8NA	8NJ	8FC	8NB	8NK	8F9
2	8OA		8OJ	8GC	8OB	8OK	8G9		
Series 9 High Temperature Hermetically Sealed Snap Switch	-50 to +750 (-46 to +399)	SPDT	1	9KA	9KJ	9CC	9KB	9KK	9C9
			2	9LA	9LJ	9DC	9LB	9LK	9D9
			3	9MA	9MJ	9EC	9MB	9MK	9E9
		DPDT	1	9NA	9NJ	9FC	9NB	9NK	9F9
2	9OA		9OJ	9GC	9OB	9OK	9G9		
Switch Description	Process ⑥ Temp. Range °F (°C)	Contacts	Set Points	CS/Aluminum	Cast Iron		CS/Aluminum	Cast Iron	
				NEMA 4X	Class I, Div 1 Groups C&D	Class I, Div 1 Group B	NEMA 4X	Class I, Div 1 Groups C&D	Class I, Div 1 Group B
Series R High Temperature Snap Switch	-40 to +1000 (-40 to +538)	SPDT	1	R1M	RKM	RKW	R1M	RKM	RKW
			2	R3M	RLM	RLW	R3M	RLM	RLW
		DPDT	1	RDM	RNM	RNW	RDM	RNM	RNW
			2	REM	ROM	ROW	REM	ROM	ROW
Series 9 High Temperature Hermetically Sealed Snap Switch	-50 to +1000 (-46 to +538)	SPDT	1	9AD	9KD	9KV	9AM	9KM	9KW
			2	9BD	9LD	9LV	9BM	9LM	9LW
			3	9CD	9MD	9MV	9CM	9MM	9MW
		DPDT	1	9DD	9ND	9NV	9DM	9NM	9NW
2	9ED		9OD	9OV	9EM	9OM	9OW		



See Notes on back cover.

NOTES (FOR SECTION 7.2)

- ① Minimum specific gravity ratings apply only to single stage units. Consult factory for two or three stage units.
- ② Models are limited to maximum temperature rating of selected switch mechanism. See Switch Mechanism charts on pages 26 and 27.
- ③ Use caution when specifying carbon steel and stainless steel for temperatures greater than +800 °F (+427 °C), as they become sensitized.
- ④ S75, V75 & Z75 contain 17-7 ph float.
- ⑤ The O75 and P75 are not available with 1½" and 2" process connections.
- ⑥ Valid for Models V75 & Z75 only.
- ⑦ Consult factory for TYPE 4X/7/9 cast iron housings.
- ⑧ Process temperature based on +100 °F (+38 °C) ambient.
- ⑨ Drain or uncontrolled housing heater available in TYPE 4X/7/9 enclosures. Consult factory for standard part number.
- ⑩ HS switches can be used with materials of construction code 1 only on models S75, V75 & Z75.
- ⑪ On steam and other condensing applications, temperature down-rated to +400 °F (+204 °C) process at +100 °F (+38 °C) ambient.
- ⑫ R series switch supplied in cast iron switch enclosure.
- ⑬ Consult factory for process temperatures up to +1200 °F (+650 °C).

ASSURED QUALITY & SERVICE COST LESS

Service Policy

Owners of MAGNETROL 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 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 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.



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