

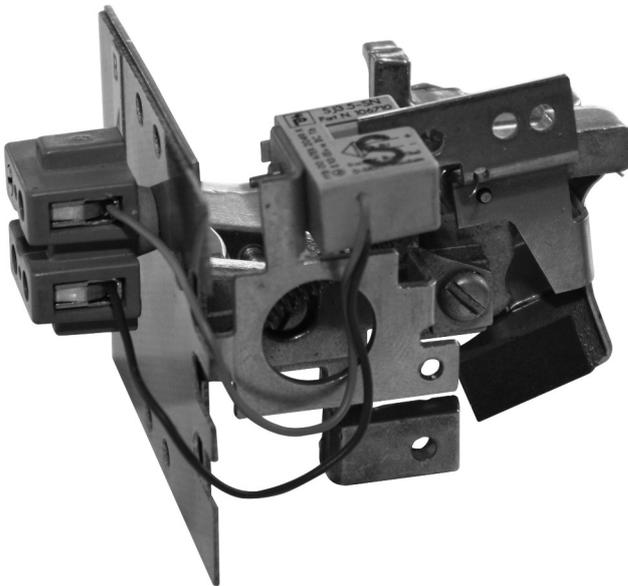
Series V

Installation and Operating Manual

Electric

switch mechanisms

and housings



UNPACKING

Unpack the instrument carefully. Make sure all components have been removed from the foam protection. Inspect all components for damage. Report any concealed damage to the carrier within 24 hours. Check the contents of the carton/crates against the packing slip and report any discrepancies to Magnetrol. Check the nameplate model number to be sure it agrees with the packing slip and purchase order. Check and record the serial number for future reference when ordering parts.

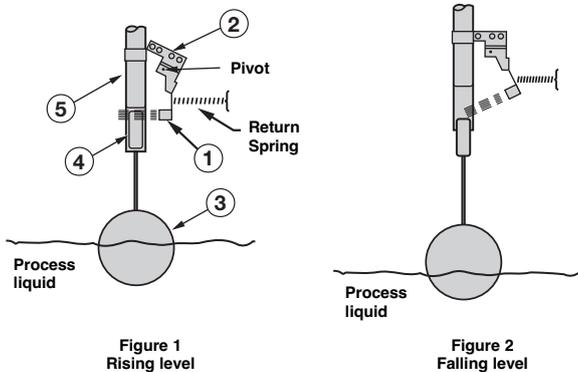


These units are in conformity with the provisions of:

1. Directive 2014/34/EU for equipment or protective system intended for use in potentially explosive atmospheres. EC-type examination certificate number PTB 00 ATEX 2049X, see certificate for applied standards and certification details.
2. The PED directive 97/23/EC (pressure equipment directive). Safety accessories per category IV module H1.

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 sep-



arated 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.

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 moving the measuring plate out of the slot of the proximity switch. 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 allows the measuring plate to move into the slot, thus reversing switch action.

DESCRIPTION

Series V switches are inductive proximity switches type SJ3,5-SN with a maximum liquid temperature rating of +100 °C (+210 °F), see figure 3.

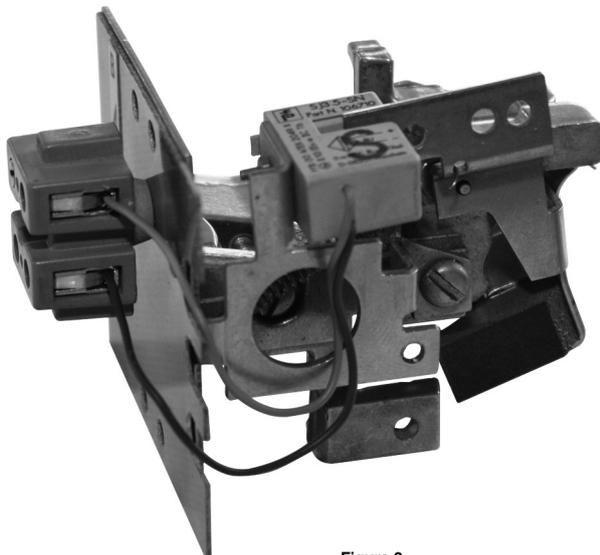


Figure 3
Series V

Replacing the complete switch mechanisms

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.

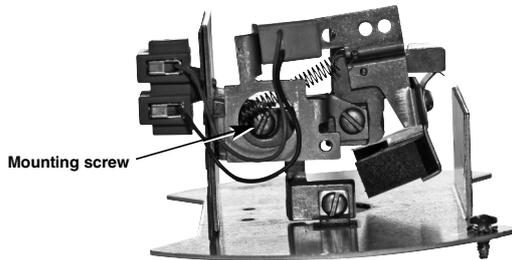


Figure 4
Mounting screw

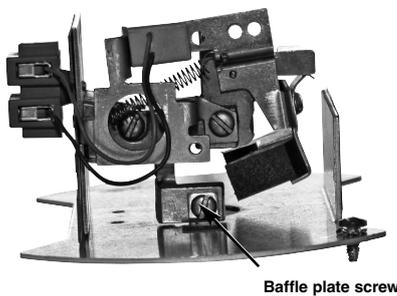


Figure 5
Baffle plate screw

1. Remove the switch housing cover (see page 7).
2. Disconnect wiring from supply side of terminal block on switch mechanism. Note and record lead wire terminal locations.
3. Loosen screw in split mounting clamp until mechanism slides freely on enclosing tube, refer to Figure 4.
4. Remove small round head screw securing lower switch mechanism to baffle plate, refer to Figure 5.
5. 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.
6. 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.
7. 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.
8. Swing magnet assembly in and out by hand, checking carefully for any signs of binding.
9. Reattached supply-side wiring to the terminal block.
10. Reinstall the switch housing cover (see page 7).
11. Reconnect power supply and test switch action under operating conditions.

Replacing the switches only

1. Disconnect control from power supply.
2. Remove the switch housing cover (see page 7).
3. Disconnect switch leads from terminal block. Note and record terminal connections of switch to be replaced.
4. Remove the mounting screw holding existing switch, refer to Figure 6.
5. Remove existing switch and install replacement switch in the same position, tightening mounting screw securely.
6. Reinstall the switch housing cover (see page 7).
7. Reconnect power supply and test switch action by varying liquid level in the vessel or by “gently blowing down” float chamber.

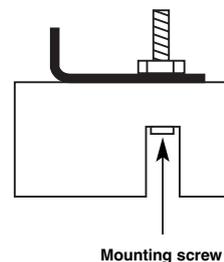


Figure 6

Vibration service adjustment

Level controls are frequently used in applications where vibration is encountered, such as on scrubbers or compressors. Switch mechanisms may require repositioning to prevent unwanted magnet movement. 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 7, illustration is shown as looking at a control from above), to a correct position as follows:

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. Remove the switch housing cover (see page 7).
3. Loosen screw in split mounting clamp until mechanism turns freely on enclosing tube, refer to Figure 4 on page 3.
4. 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.

5. Check action of switch magnet at new position. When magnet vibrates from side to side, instead of front to back, correct position has been attained.
6. Tighten clamp screw on switch mechanism.
7. Reinstall the switch housing cover (see page 7).
8. Reconnect power supply and test switch action under operating conditions.

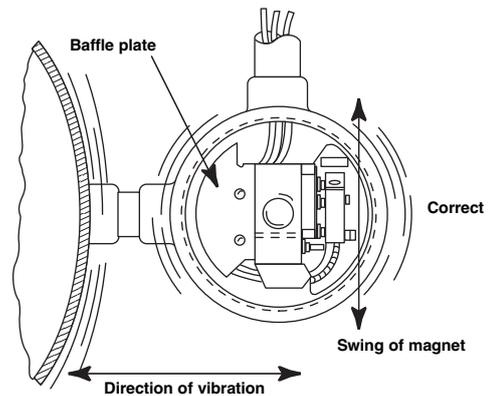
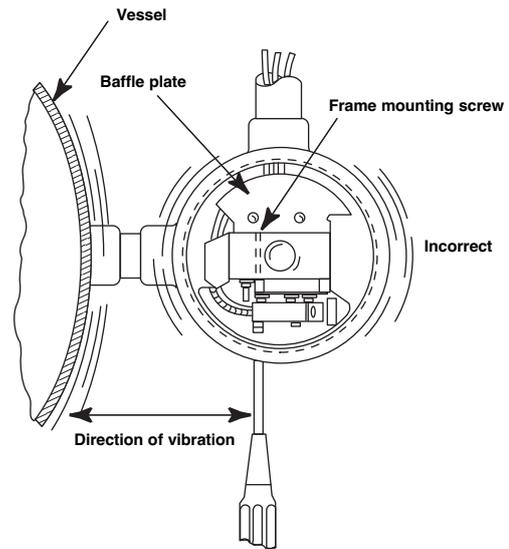


Figure 7
Rotation of switch mechanism in vibration

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.

Terminal connections

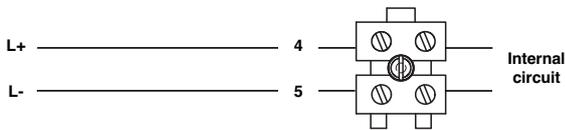


Figure 8

PREVENTIVE MAINTENANCE

Inspect switch mechanisms, terminals and connections regularly. Proof test interval to be determined by application requirements (required reliability, operating conditions, site requirements, etc).

Inspect switch mechanisms, terminals and connections

1. DO NOT operate your control with defective or maladjusted switch mechanisms.
2. 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 “bare” wires can cause short circuits.

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

3. Vibration may sometimes cause terminal screws to loosen. Check all terminal connections to be certain that screws are tight.

NOTE: Spare switches should be kept on hand at all times.

SWITCHES

Switch ratings

| SWITCH SERIES | SWITCH TYPE | Process ^① Temperature range °C (°F) | LOAD | RATING |
|---------------|-------------|--|--------------|---|
| V | Proximity | -40 to +100 (-40 to +210) | NAMUR output | As per NAMUR standard EN 60947-5-6:2000 |

^① Max. Process Temperature based on +40 °C (+100 °F) ambient temperature.

REPLACEMENT SWITCH MECHANISMS

Magnet strength

Switch mechanisms are provided with different strength magnets as determined by the characteristics of the level switch. A red or yellow 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 last 3 digits of the model number identify the switch and magnet used on the control. The correct magnet dot color may be chosen by finding those 3 digits of your model number in the chart. Any model numbers preceded with an "X" are specially modified controls. Contact the factory for replacement part numbers.

Partn°: - -

Serial n°: - -

Digit in partn°: X 1 2 3 - 4 5 6 7 - 8 9 10

See nameplate, always provide complete partn° and serial n° when ordering spares.

↳ X = product with a specific customer requirement

EXPEDITE SHIP PLAN (ESP)

Several parts are available for quick shipment, within max. 1 week after factory receipt of purchase order, through the Expedite Ship Plan (ESP). Parts covered by ESP service are conveniently grey coded in the selection tables.

Yellow dot magnet replacement mechanisms

| Switch Series | 8th, 9th & 10th Digit | Set points | Switch & mechanism | Switch only |
|---------------|-----------------------|------------|--------------------|--------------|
| V | VBS, VCS, VES, V5S | 1 | 047-9108-001 | 009-3989-002 |

Red dot magnet replacement mechanisms

| Switch Series | 8th, 9th & 10th Digit | Set points | Switch & mechanism | Switch only |
|---------------|-----------------------|------------|--------------------|--------------|
| V | VFS, VHS, VJS, VLS | 1 | 047-9108-002 | 009-3989-002 |

REPLACEMENT SWITCH HOUSINGS

Switch housing replacement assemblies

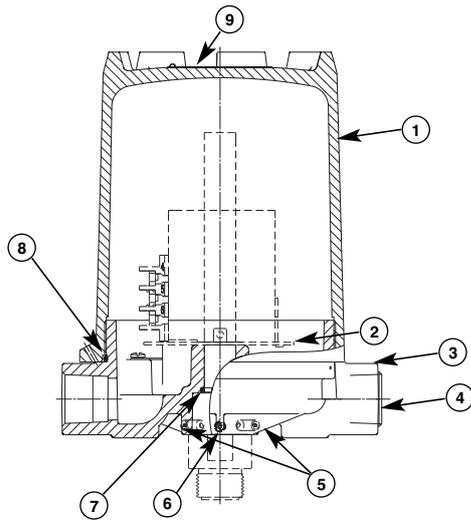
When ordering replacement parts for an existing Magnetrol instrument, please specify:

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.

Cast aluminum housings (short and tall)

Die cast aluminum TYPE 4X housing replacements are available for general purpose or weatherproof installations. Die cast aluminum housings are finished with a baked-on polyester powder coat paint.



- | | |
|--------------------|--------------------|
| 1. Housing cover | 6. Base lock screw |
| 2. Baffle plate | 7. Base O-ring |
| 3. Housing base | 8. Cover O-ring |
| 4. Stopping plug | 9. Caution tag |
| 5. Base lock screw | |

Figure 9
Standard cast aluminium housing (short and tall)

Replacement housing kits

Table with switch & housing model codes:

| Switch & housing code | e.g. V5S, VBS, VFS, VHS, ... | |
|------------------------------------|------------------------------|------------------|
| Description | Kit contains part(s) | Replacement part |
| Cover kit for short housing | 1, 8, 9 | 089-6582-036 |
| Cover kit for tall housing | 1, 8, 9 | 089-6582-038 |
| Base kit for M20 x 1,5 cable entry | 3, 4, 5, 6, 7, 8 | 089-6582-042 |
| Base kit for 1" NPT-F cable entry | 3, 4, 5, 6, 7, 8 | 089-6582-043 |
| Cover 'O'-ring | 8 | 012-2201-253 |
| Base 'O'-ring | 7 | 012-2201-116 |
| Baffle plate | 2 | 005-6657-001 |

Assemble / Disassemble instructions

1. Disconnect control from power supply before opening.
2. Unscrew the cover (1) counterclockwise. Lift housing cover straight upwards to avoid damaging the inside switch mechanism.
3. Replacement of housing base (3) and/or base O-ring (7).
 - 3.1 First remove housing cover (1) - see 1-2.
 - 3.2 Remove entire switch mechanism (see page 3).
 - 3.3 Loosen base lock screws (5) & (6).
 - 3.4 Slide housing base (3) of enclosing tube.
 - 3.5 O-ring (7) can be accessed/replaced.
4. Replace part and mount in opposite order.
5. Close housing cover (1) clockwise.

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.

| ATEX - IP 66 II 1G EEx ia IIC T6 Cast aluminium | | Magnet dot color | Set points | Switch contacts | Housing height | Switch type |
|---|--------|------------------|------------|-----------------|----------------|-------------|
| M20x1.5 | 1" NPT | | | | | |
| V5S | VBS | Yellow | 1 | NAMUR | Short | Proximity |
| VFS | VHS | Red | | | | |
| VCS | VES | Yellow | 1 | NAMUR | Tall | |
| VJS | VLS | Red | | | | |

IMPORTANT

SERVICE POLICY

Owners of Magnetrol products 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. Magnetrol International will repair or replace the control, at no cost to the purchaser, (or owner) **other than transportation cost** if:

- a. Returned within the warranty period; and,
- b. The factory inspection finds the cause of the malfunction to be defective material or workmanship.

If the trouble is the result of conditions beyond our control; or, is **NOT** covered by the warranty, there will be charges for labour 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, labour, direct or consequential damage will be allowed.

RETURNED MATERIAL PROCEDURE

So that we may efficiently process any materials that are returned, it is essential that a "Return Material Authorisation" (RMA) form will be obtained from the factory. It is mandatory that this form will be attached to each material returned. This form is available through Magnetrol's local representative or by contacting the factory. Please supply the following information:

1. Purchaser Name
2. Description of Material
3. Serial Number and Ref Number
4. Desired Action
5. Reason for Return
6. Process details

Any unit that was used in a process must be properly cleaned in accordance with the proper health and safety standards applicable by the owner, before it is returned to the factory.

A material Safety Data Sheet (MSDS) must be attached at the outside of the transport crate or box.

All shipments returned to the factory must be by prepaid transportation. Magnetrol **will not accept** collect shipments.

All replacements will be shipped Ex Works.

BULLETIN N°: BE 42-798.0
EFFECTIVE: DECEMBER 2014
SUPERSEDES: New

UNDER RESERVE OF MODIFICATIONS



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