

INSTRUCTION MANUAL AND REPLACEMENT PARTS

DESCRIPTION

Magnetrol side mounting controls mount horizontally to any tank or vessel through a threaded or flanged pipe connection. Standard models are normally equipped with a single switch mechanism for high or low level alarm or control applications. Tandem models with two switch mechanisms are available for two level stage applications, providing the operating functions of two separate instruments such as high and low level alarm.

OPERATING PRINCIPLE

Side mounting units employ permanent magnetic force as the only link between the float and the switching element. As the pivoted float follows, liquid level changes, it moves a magnetic sleeve ① into or out the field of a switch actuating magnet ② causing switch operation. A non-magnetic barrier tube ③ effectively isolates the switch mechanism from the controlled liquid.

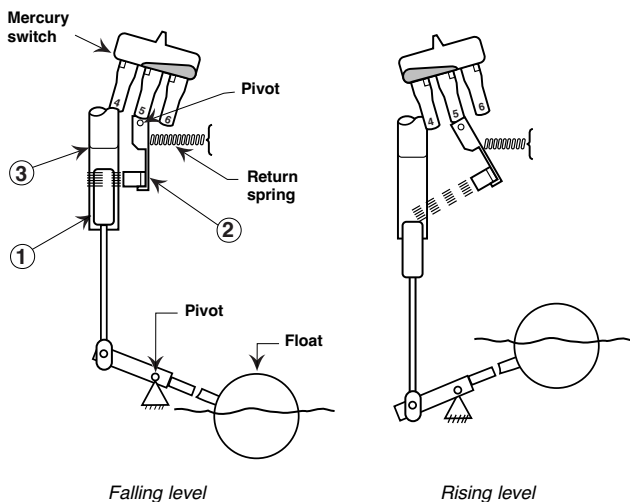


Figure 1

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.

AGENCY APPROVALS

| Agency | Approval |
|---|---|
| ATEX | II 2G EEx d II C T6, explosion proof II 1G EEx ia II C T6, intrinsically safe |
| CCE ① | Explosion proof & intrinsically safe |
| FM | Class I, Div. 1, Groups C & D Class II, Div. 1, Groups E, F & G, Type NEMA 7/9 |
| FM/CSA ② | Non-Hazardous area Explosion proof area – Groups B, C, D, E, F & G Type NEMA 4X/7/9 |
| SAA ② | Explosion proof area |
| LRS | Lloyds Register of Shipment (marine applications) |
| GOST/ GOSGORTECHNADZOR ② | Russian Authorisation Standards |
| Other approvals are available, consult factory for more details | |

① For CCE approved units, use the ATEX model numbers.
② Consult factory for proper model numbers.

MODEL IDENTIFICATION

A complete measuring system consists of:

- Code for **side mounted** models (each unit can be factory calibrated when specific level differentials are specified separately).
- Code for **modified** models or adders: put an "X" in front of the closest matching order code and specify the modifications/adders separately
eg. XT62-AG3A-AAP X = with material certification EN 10204 / DIN 50049-3.1.B
- OPTION: External cage: consult factory for model description.

- Code for T62/T67 side mounted float level switch

BASIC MODEL NUMBER

– Single switch model

| | | |
|-------|-------------------|--------------------------|
| T 6 2 | down to S.G. 0,50 | up to 34,5 bar (500 psi) |
|-------|-------------------|--------------------------|

– Dual switch model

| | | |
|-------|-------------------|--------------------------|
| T 6 7 | down to S.G. 0,50 | up to 34,5 bar (500 psi) |
|-------|-------------------|--------------------------|

MATERIALS OF CONSTRUCTION

| Code | Cage & process connection material | Float and trim | Magnetic sleeve |
|------|------------------------------------|------------------|------------------|
| A | Carbon steel | 316 SST (1.4401) | 400 series SST |
| B | | | 316 SST (1.4401) |
| D | 316/316L (1.4401/1.4404) | | |

PROCESS CONNECTION

– threaded

| | |
|-----|--------|
| F 2 | 3" NPT |
|-----|--------|

– ANSI flanges

| | |
|-----|--------------------|
| G 3 | 3" 150 lbs ANSI RF |
| G 4 | 3" 300 lbs ANSI RF |
| H 3 | 4" 150 lbs ANSI RF |
| H 4 | 4" 300 lbs ANSI RF |

– DIN flanges

| | |
|-----|----------------------------------|
| 7 F | DN 80, PN 16 DIN 2527 form C |
| 7 G | DN 80, PN 25/40 DIN 2527 form C |
| 8 F | DN 100, PN 16 DIN 2527 form C |
| 8 G | DN 100, PN 25/40 DIN 2527 form C |

FLOAT AND STEM LENGTH

| Stem length versus min S.G. | | | | | | Float size mm (inches) ^① | Max pressure bar (psi) | |
|-----------------------------|--------------|--------------|--------------|--|--------------------------|-------------------------------------|------------------------|--|
| 203 mm (8") | 305 mm (12") | 457 mm (18") | 660 mm (26") | | @ 40 °C (100 °F) | | @ 400 °C (750 °F) | |
| A 0,80 | B 0,80 | C 0,90 | D 0,90 | | ø 64 (2.50) | 24,1 (350) | 13,8 (200) | |
| E 0,52 | F 0,55 | G 0,60 | H 0,66 | | ø 64 x 102 (2.50 x 4.00) | 6,9 (100) | 4,1 (60) | |
| J 0,55 | K 0,55 | L 0,60 | M 0,60 | | ø 76 (3.00) | 17,2 (250) | 10,3 (150) | |
| N 0,50 | P 0,50 | Q 0,55 | R 0,55 | | ø 89 (3.50) | 27,6 (400) | 15,5 (225) | |
| S 0,65 | T 0,65 | V 0,70 | W 0,70 | | ø 76 x 127 (3.00 x 5.00) | 34,5 (500) | 20,7 (300) | |

^① All floats can be screwed to float stem from inside of vessel in case the float cannot pass through the nozzle.

SWITCH MECHANISM & ENCLOSURE

- for T62 units (see page 3)
- for T67 units (see page 4)
- for pneumatic switch mechanisms (see table below)

| | | | | | | | |
|---|---|--|--|--|--|--|--|
| T | 6 | | | | | | |
|---|---|--|--|--|--|--|--|

complete code for T62/T67 side mounted float level switch

Select pneumatic switch mechanism & enclosure - for T62/T64 models

| Pneumatic switch type | Max supply pressure bar (psi) | Max liquid temperature °C (°F) | Bleed orifice Ø mm (inches) | NEMA 3R (IP 53) | |
|---------------------------|-------------------------------|--------------------------------|-----------------------------|-----------------|----------------------|
| | | | | material code A | material codes B & D |
| Series J (open air) | 6,9 (100) | 200 (400) | 1,60 (0.063) | JDE | JDE |
| | 4,1 (60) | 200 (400) | 2,39 (0.094) | JEE | JEE |
| | 4,1 (60) | 370 (700) | 1,40 (0.055) | JFE | JFE |
| Series K (closed circuit) | 6,9 (100) | 200 (400) | – | – | KOE |
| | 2,8 (40) | 200 (400) | – | KOG | – |

1. Code for T64 side mounted float level switch

BASIC MODEL NUMBER

- Single switch model

| | | | | |
|---|---|---|-------------------|---------------------------|
| T | 6 | 4 | down to S.G. 0,40 | up to 82,7 bar (1200 psi) |
|---|---|---|-------------------|---------------------------|

MATERIALS OF CONSTRUCTION

| Code | Cage & process connection material | Float and trim | Magnetic sleeve |
|------|------------------------------------|-------------------------------------|-----------------|
| A | Carbon steel | 304 SST (1.4301) / 316 SST (1.4401) | 400 series SST |

PROCESS CONNECTION

- ANSI flanges

| | |
|-----|--------------------|
| H 3 | 4" 150 lbs ANSI RF |
| H 4 | 4" 300 lbs ANSI RF |
| H 5 | 4" 600 lbs ANSI RF |

- DIN flanges

| | |
|-----|----------------------------------|
| 8 F | DN 100, PN 16 DIN 2527 form C |
| 8 G | DN 100, PN 25/40 DIN 2527 form C |
| 8 H | DN 100, PN 64 DIN 2527 form E |
| 8 J | DN 100, PN 100 DIN 2527 form E |

FLOAT AND STEM LENGTH

| | |
|---|---|
| N | Fixed stem length: 203 mm (8") Min. S.G: 0,40 Float size: ø 89 mm (3.50") Float rating: 82,7 bar (1200 psi) @ 40 °C (100 °F) 400 °C (750 °F) @ 51,7 bar (750 psi) |
|---|---|

SWITCH MECHANISM & ENCLOSURE - for electric switch mechanisms (see table below)
- for pneumatic switch mechanisms (see page 2)

| | | | | | | | |
|---|---|---|---|--|---|--|--|
| T | 6 | 4 | A | | N | | |
|---|---|---|---|--|---|--|--|

complete code for T64 side mounted float level switch

Select electric switch mechanism & enclosure for T62 and T64 models (see page 3 for switch ratings)

| qty and switch type | All models with material code A | | | | | | | | | | All models with material codes B and D | | | | | | | | | |
|---------------------|---------------------------------|----------------|--------------------|----------------|----------------------|-----------|--------------------|----------------|----------------|--------------------|--|----------------|----------------------|----------------|--------------------|-----------|----------|-----|------------|--|
| | Weather proof (IP 66) | | ATEX (IP 66) | | | | | | FM (IP 66) | | Weather proof (IP 66) | | ATEX (IP 66) | | | | | | FM (IP 66) | |
| | | | II 2G EEx d IIC T6 | | II 1G EEx ia II C T6 | | II 2G EEx d IIC T6 | | NEMA 7/9 | II 2G EEx d IIC T6 | | | II 1G EEx ia II C T6 | | II 2G EEx d IIC T6 | | NEMA 7/9 | | | |
| | cast Aluminium | cast Aluminium | cast Aluminium | cast Aluminium | cast Iron | cast Alu. | cast Aluminium | cast Aluminium | cast Aluminium | cast Iron | cast Alu. | cast Aluminium | cast Aluminium | cast Aluminium | cast Iron | cast Alu. | | | | |
| M20 x 1,5 | 1" NPT | M20 x 1,5 | 1" NPT | M20 x 1,5 | 1" NPT | M20 x 1,5 | 3/4" NPT | 1" NPT | M20 x 1,5 | 1" NPT | M20 x 1,5 | 1" NPT | M20 x 1,5 | 1" NPT | M20 x 1,5 | 3/4" NPT | 1" NPT | | | |
| A | 1 x SPDT | A2P | AAP | AHC | AAC | - | - | AK7 | AU7 | AKP | A2Q | AAQ | AH9 | AA9 | - | - | AK5 | AU5 | AKQ | |
| | 1 x DPDT | A8P | ADP | AJC | ABC | - | - | AD7 | AW7 | ANP | A8Q | ADQ | AJ9 | AB9 | - | - | AD5 | AW5 | ANQ | |
| 3 | 1 x SPDT | 32P | 3AP | 3HC | 3AC | - | - | 3K7 | 3U7 | 3KP | 32Q | 3AQ | 3H9 | 3A9 | - | - | 3K5 | 3U5 | 3KQ | |
| | 1 x DPDT | 38P | 3DP | 3JC | 3BC | - | - | 3D7 | 3W7 | 3NP | 38Q | 3DQ | 3J9 | 3B9 | - | - | 3D5 | 3W5 | 3NQ | |
| B | 1 x SPDT | B2P | BAP | BHC | BAC | - | - | BK7 | BU7 | BKP | B2Q | BAQ | BH9 | BA9 | - | - | BK5 | BU5 | BKQ | |
| | 1 x DPDT | B8P | BDP | BJC | BBC | - | - | BD7 | BW7 | BNP | B8Q | BDQ | BJ9 | BB9 | - | - | BD5 | BW5 | BNQ | |
| C | 1 x SPDT | C2P | CAP | CHC | CAC | C2L | CAL | CK7 | CU7 | CKP | C2Q | CAQ | CH9 | CA9 | C2S | CAS | CK5 | CU5 | CKQ | |
| | 1 x DPDT | C8P | CDP | CJC | CBC | C8L | CDL | CD7 | CW7 | CNP | C8Q | CDQ | CJ9 | CB9 | C8S | CDS | CD5 | CW5 | CNQ | |
| D | 1 x SPDT | - | - | - | - | - | - | - | - | - | D2Q | DAQ | DH9 | DA9 | - | - | DK5 | DU5 | DKQ | |
| | 1 x DPDT | - | - | - | - | - | - | - | - | - | D8Q | DDQ | DJ9 | DB9 | - | - | DD5 | DW5 | DNQ | |
| F | 1 x SPDT | F2P | FAP | FHC | FAC | - | - | FK7 | FU7 | FKP | F2Q | FAQ | FH9 | FA9 | - | - | FK5 | FU5 | FKQ | |
| | 1 x DPDT | F8P | FDP | FJC | FBC | - | - | FD7 | FW7 | FNP | F8Q | Fdq | FJ9 | FB9 | - | - | FD5 | FW5 | FNQ | |
| HS | 1 x SPDT | - | - | - | - | - | - | - | - | - | H7A | HM2 | HFC | HA9 | - | - | HB3 | HB4 | HM3 | |
| | 1 x DPDT | - | - | - | - | - | - | - | - | - | H7C | HM6 | HGC | HB9 | - | - | HB7 | HB8 | HM7 | |
| U | 1 x SPDT | U2P | UAP | UHC | UAC | U2L | UAL | UK7 | UU7 | UKP | U2Q | UAQ | UH9 | UA9 | U2S | UAS | UK5 | UU5 | UKQ | |
| | 1 x DPDT | U8P | UDP | UJC | UBC | U8L | UDL | UD7 | UW7 | UNP | U8Q | UDQ | UJ9 | UB9 | U8S | UDS | UD5 | UW5 | UNQ | |
| V | - | - | - | - | - | VFS | VHS | - | - | - | - | - | - | - | - | V5S | VBS | - | - | |
| W | 1 x SPDT | W2P | WAP | WHC | WAC | W2L | WAL | WK7 | WU7 | WKP | W2Q | WAQ | WH9 | WA9 | W2S | WAS | WK5 | WU5 | WKQ | |
| | 1 x DPDT | - | - | - | - | - | - | - | - | - | W8Q | WDQ | WJ9 | WB9 | W8S | WDS | WD5 | WW5 | WNQ | |
| X | 1 x SPDT | X2P | XAP | XHC | XAC | X2L | XAL | XK7 | XU7 | XKP | X2Q | XAQ | XH9 | XA9 | X2S | XAS | XK5 | XU5 | XKQ | |
| | 1 x DPDT | - | - | - | - | - | - | - | - | - | X8Q | XDQ | XJ9 | XB9 | X8S | XDS | XD5 | XW5 | XNQ | |

Select electric switch mechanism & enclosure for **T67 models** (see page 3 for switch ratings)

| qty and switch type | All models with material code A | | | | | | | | | | All models with material codes B and D | | | | | | | | | |
|---------------------|---------------------------------|-----------|---------------------|-----------|----------------------|-----------|---------------------|--------|------------|---------------------|--|----------------|----------------------|----------------|---------------------|-----------|----------|-----------|------------|--|
| | Weather proof (IP 66) | | ATEX (IP 66) | | | | | | FM (IP 66) | | Weather proof (IP 66) | | ATEX (IP 66) | | | | | | FM (IP 66) | |
| | | | II 2G EEx d II C T6 | | II 1G EEx ia II C T6 | | II 2G EEx d II C T6 | | NEMA 7/9 | II 2G EEx d II C T6 | | | II 1G EEx ia II C T6 | | II 2G EEx d II C T6 | | NEMA 7/9 | | | |
| | cast Aluminium | | cast Aluminium | | cast Aluminium | | cast Iron | | cast Alu. | cast Aluminium | | cast Aluminium | | cast Aluminium | | cast Iron | | cast Alu. | | |
| M20 x 1,5 | 1" NPT | M20 x 1,5 | 1" NPT | M20 x 1,5 | 1" NPT | M20 x 1,5 | 3/4" NPT | 1" NPT | | M20 x 1,5 | 1" NPT | M20 x 1,5 | 1" NPT | M20 x 1,5 | 1" NPT | M20 x 1,5 | 3/4" NPT | 1" NPT | | |
| A | 2 x SPDT | A4A | ABA | ALC | ADC | - | - | AL7 | AV7 | ALA | A4B | ABB | AL9 | AD9 | - | - | AL5 | AV5 | ALB | |
| | 2 x DPDT | A1A | AEA | APC | AGC | - | - | A07 | AY7 | AOA | A1B | AEB | AP9 | AG9 | - | - | A05 | AY5 | AOB | |
| 3 | 2 x SPDT | 34E | 3BE | 39E | 3DE | - | - | 3L7 | 3V7 | 3LE | 34B | 3BB | 3L9 | 3D9 | - | - | 3L5 | 3V5 | 3LB | |
| | 2 x DPDT | 31A | 3EA | 3PC | 3GC | - | - | 307 | 3Y7 | 30A | 31B | 3EB | 3P9 | 3G9 | - | - | 305 | 3Y5 | 30B | |
| B | 2 x SPDT | B4A | BBA | BLC | BDC | - | - | BL7 | BV7 | BLA | B4B | BBB | BL9 | BD9 | - | - | BL5 | BV5 | BLB | |
| | 2 x DPDT | B1A | BEA | BPC | BGC | - | - | B07 | BY7 | BOA | B1B | BEB | BP9 | BG9 | - | - | B05 | BY5 | BOB | |
| C | 2 x SPDT | C4A | CBA | CLC | CDC | C4X | CBX | CL7 | CV7 | CLA | C4B | CBB | CL9 | CD9 | C4T | CBT | CL5 | CV5 | CLB | |
| | 2 x DPDT | C1A | CEA | CPC | CGC | C1X | CEX | C07 | CY7 | COA | C1B | CEB | CP9 | CG9 | C1T | CET | C05 | CY5 | COB | |
| D | 2 x SPDT | D4B | DBB | DL9 | DD9 | - | - | DL5 | DV5 | DLB | D4B | DBB | DL9 | DD9 | - | - | DL5 | DV5 | DLB | |
| | 2 x DPDT | D1B | DEB | DP9 | DG9 | - | - | D05 | DY5 | DOB | D1B | DEB | DP9 | DG9 | - | - | D05 | DY5 | DOB | |
| F | 2 x SPDT | FFA | FBA | FLC | FDC | - | - | FL7 | FV7 | FLA | FFB | FBB | FL9 | FD9 | - | - | FL5 | FV5 | FLB | |
| | 2 x DPDT | FHA | FEA | FPC | FGC | - | - | F07 | FY7 | FOA | FHB | FEB | FP9 | FG9 | - | - | F05 | FY5 | F0B | |
| U | 2 x SPDT | U4A | UBA | ULC | UDC | U4X | UBX | UL7 | UV7 | ULA | U4B | UBB | UL9 | UD9 | U4T | UBT | UL5 | UV5 | ULB | |
| | 2 x DPDT | U1A | UEA | UPC | UGC | U1X | UEX | U07 | UY7 | UOA | U1B | UEB | UP9 | UG9 | U1T | UET | U05 | UY5 | U0B | |
| W | 2 x SPDT | W4A | WBA | WLC | WDC | W4X | WBX | WL7 | WV7 | WLA | W4B | WBB | WL9 | WD9 | W4T | WBT | WL5 | WV5 | WLB | |
| | 2 x DPDT | W1B | WEB | WP9 | WG9 | W1T | WET | W05 | WY5 | WOB | W1B | WEB | WP9 | WG9 | W1T | WET | W05 | WY5 | WOB | |
| X | 2 x SPDT | X4A | XBA | XLC | XDC | X4X | XBX | XL7 | XV7 | XLA | X4B | XBB | XL9 | XD9 | X4T | XBT | XL5 | XV5 | XLB | |
| | 2 x DPDT | X1B | XEB | XP9 | XG9 | X1T | XET | X05 | XY5 | X0B | X1B | XEB | XP9 | XG9 | X1T | XET | X05 | XY5 | X0B | |

INSTALLATION

MOUNTING

Before assembling control to tank or vessel, check threaded or flanged mounting nozzle for the following:

- Nozzle length and inside diameter must be sized correctly to allow for switch actuation at design levels within the maximum differential available (see table on page 4).
- Nozzle should be checked for horizontal alignment. Finished mounting must allow control switch housing to be within 3° degrees of vertical for proper operation. A three degree slant is noticeable by eye, but installation should be checked with a spirit level.

WIRING

Most mechanical control switch housings are designed to allow 360° positioning of the cable entries by loosening the set screw(s). See **figure 2**. On high temperature applications (above 120° C [250° F]), high temperature wire should be used between control and first junction box located in a cooler area.

1. To gain access to switch mechanism(s) remove switch housing cover.
2. Pull in supply wires (conductors), wrap them around enclosing tube under the baffle plate and connect to proper terminals. Be certain that excess wire does not interfere with "tilt" of switch and that adequate clearance exists for replacement of switch housing cover.

NOTE: See bulletin on switch mechanism furnished with your control (as listed below) for proper connections.

3. Connect power supply to control and test switch action by varying liquid level in tank or vessel.

NOTE: If switch mechanism fails to function properly, check vertical alignment of control housing and consult installation instructions in switch mechanism bulletin.

4. Replace switch housing cover and place control into service.

NOTE: If control has been furnished with an explosion proof (cast) or moisture proof (gasketed) switch housing, check the following:

- After wiring connections have been completed, housings must be sealed via the correct cable gland to prevent entrance of air.
- 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 gases into switch housing.

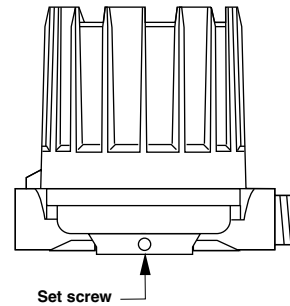
CAUTION:

In hazardous area, do not power the unit until the cable gland is sealed and the enclosure cover is screwed down securely.

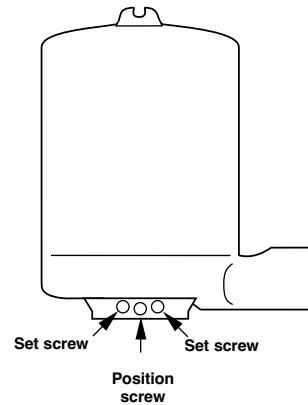
| Switch mechanism | Bulletin | Reference series |
|-------------------------------------|----------|------------------|
| Mercury switches | 42-783 | A |
| Dry contact switches | 42-683 | B, C, D, U, W, X |
| Anti-vibration mercury switches | | E |
| Anti-vibration dry contact switches | 42-684 | G, H, I |
| Bleed type pneumatic valve | 42-685 | J |
| Non-bleed type pneumatic valve | 42-686 | K |

OBSERVE ALL APPLICABLE ELECTRICAL CODES AND PROPER WIRING PROCEDURES

NEMA 4x



NEMA 7/9



ATEX

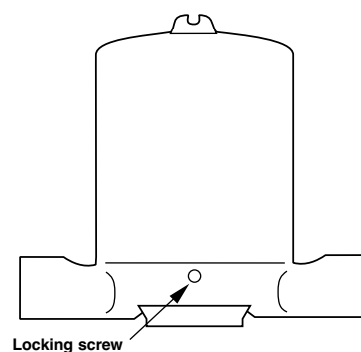


Figure 2

CAUTION:

- DO NOT attempt to reposition NEMA 4 / NEMA 7/9 housings without loosening the set screws; ATEX housings MAY NOT BE REPOSITIONNED. ALWAYS retighten set screw(s) after repositioning.
- DO NOT attempt to unscrew cover of ATEX housings before loosening locking screw in base of housing. ALWAYS retighten locking screw after replacing cover.

LEVEL DIFFERENTIAL ADJUSTMENT

The level differential setting of the side mounting controls can be field adjusted within limits specified in the table at right by repositioning the jam nuts on the magnetic sleeve stem.

NOTE: The control need not be removed from tank or vessel to make differential adjustment.

CAUTION: Before attempting any work on the control, be certain to pull disconnect switch or otherwise assure that electrical circuit(s) through control is deactivated. Close operating medium supply valve on controls equipped with pneumatic switch mechanisms.

1. Disconnect wiring from supply side of switch mechanism and electrical conduit or operating medium line connections to switch housing.
2. Perform system shut-down as required to relieve pressure from tank or vessel and drain off liquid "head" above control mounting position. Allow unit to cool.
3. Remove switch housing assembly by loosening hex nut located immediately below housing base.

With switch housing removed, jam nuts and magnetic sleeve are now accessible, as in **Figure 3**. Raising the lower jam nuts or lowering the upper jam nuts will reduce the differential. Jam nut adjustments in opposite directions will, of course, increase the differential. As the first step in any adjustment procedure, the position of the lower jam nuts (dimension A) should be established.

4. Loosen and remove upper jam nuts, guide washer and magnetic sleeve. Dimension "A", as measured from top of stem to top of lower jam nuts, may now be increased or decreased as desired.

Tandem model units have two switch mechanisms actuated by two independent magnetic sleeves. For adjustment purposes, each sleeve and jam nut set is considered as an individual unit in conjunction with the switch mechanism it operates.

NOTE: Be certain to tighten jam nuts securely after adjustment.

5. Replace magnetic sleeve on stem and position upper jam nuts to desired "B" dimension by measuring from top of sleeve to bottom of upper jam nuts. Lock upper jam nuts to guide washer.
6. Reassemble control in reverse of steps 1 through 3, previously described.
7. Test switch actuation by varying liquid level in tank or vessel.

CAUTION: After increasing differential adjustment, be certain to check carefully for proper operation of switch mechanism. Magnet must "snap" cleanly with additional float movement available after magnet snaps.

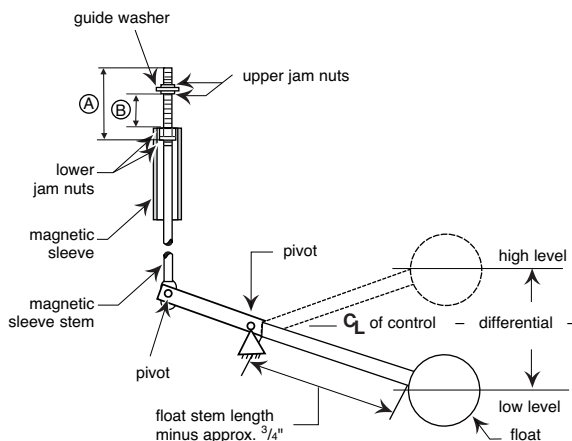


Figure 3

Millimeters

| Model ① | | Differentials Obtainable ② ④ | | | | Approx. Jam Nut Setting ③ | |
|-------------------|------|------------------------------|-----|-----|-----|---------------------------|-----|
| | | Float Stem Length | | | | A | B |
| | | 203 | 305 | 457 | 660 | | |
| T62 (Threaded) | Min. | 32 | 51 | 73 | 102 | 21 | 0.8 |
| | Max. | 148 | 206 | 294 | 409 | 33 | 27 |
| T62 (Flanged) | Min. | 32 | 41 | 67 | 95 | 16 | 0.8 |
| | Max. | 89 | 130 | 191 | 273 | 28 | 18 |

Inches

| Model ① | | Differentials Obtainable ② ④ | | | | Approx. Jam Nut Setting ③ | |
|-------------------|------|------------------------------|-------|-------|-------|---------------------------|------|
| | | Float Stem Length | | | | A | B |
| | | 8.00 | 12.00 | 18.00 | 26.00 | | |
| T62 (Threaded) | Min. | 1.25 | 2.00 | 2.88 | 4.00 | 0.81 | 0.03 |
| | Max. | 5.81 | 8.12 | 11.56 | 16.12 | 1.31 | 1.06 |
| T62 (Flanged) | Min. | 1.25 | 1.62 | 2.62 | 3.75 | 0.62 | 0.03 |
| | Max. | 3.50 | 5.12 | 7.50 | 10.75 | 1.12 | 0.69 |

Notes:

- ① All models are factory set at minimum differential unless otherwise specified.
- ② To maintain maximum differential, nozzle length "L" (**Fig. 2**) must not exceed: 64 mm (2.50") model T62 threaded; or 89 mm (3.50") model T62 flanged.
- ③ Dimensions given are approximate and will vary slightly with each unit.
- ④ Consult factory for differentials of models not shown.

LEVEL DIFFERENTIAL ADJUSTMENT (cont.)

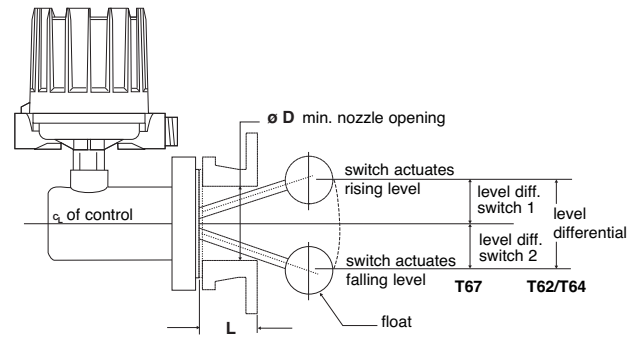
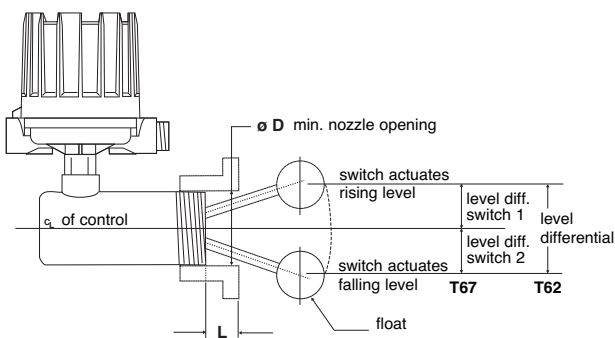
LEVEL DIFFERENTIAL VS. MOUNTING NOZZLE LENGTH

The tables below may be used to determine the maximum level travel (differential) available between "Switch on" and "Switch off" actuations with mounting nozzles of different lengths. The differentials given occur with the minimum tank opening diameter listed for each model and are applicable to standard controls.

Level differential in mm (inches)

| Models | dim. "D" | Differential | dim. "L" | Float stem length versus level differential | | | |
|--------------|---------------------------------|--------------|----------------------|---|----------------|----------------|----------------|
| | | | | 203 mm (8") | 305 mm (12") | 457 mm (18") | 660 mm (26") |
| T62 threaded | 77,9 mm (3.07") 3" – Sch 40 | min | Not applicable | 32 (1.26) | 51 (2.01) | 73 (2.87) | 102 (4.02) |
| | | max | 50 mm (2") | 148 (5.83) | 206 (8.11) | 294 (11.58) | 409 (16.10) |
| | | | 100 mm (4") | 111 (4.37) | 155 (6.10) | 221 (8.70) | 310 (12.20) |
| | | | 150 mm (6") | 38 (1.50) | 119 (4.69) | 170 (6.69) | 236 (9.29) |
| | | | 200 mm (8") | - | 97 (3.82) | 138 (5.43) | 192 (7.56) |
| | | | 250 mm (10") | - | 81 (3.19) | 116 (4.57) | 162 (6.38) |
| 305 mm (12") | - | - | 100 (3.94) | 138 (5.43) | | | |
| T62 flanged | 73,7 mm (2.90") 3" – Sch 80 | min | Not applicable | 32 (1.26) | 41 (1.61) | 67 (2.64) | 95 (3.74) |
| | | max | 50 mm (2") | 89 (3.50) | 130 (5.12) | 191 (7.52) | 273 (10.75) |
| | | | 100 mm (4") | 83 (3.27) | 121 (4.76) | 178 (7.01) | 254 (10.00) |
| | | | 150 mm (6") | - | 95 (3.74) | 137 (5.39) | 197 (7.76) |
| | | | 200 mm (8") | - | 76 (2.99) | 114 (4.49) | 159 (6.26) |
| | | | 250 mm (10") | - | 64 (2.52) | 95 (3.74) | 137 (5.39) |
| 305 mm (12") | - | - | 83 (3.27) | 117 (4.61) | | | |
| T64 flanged | 102,3 mm (4.03") 4" – Sch 40 | fixed | max 178 mm (7") | 32 (1.26) | Not applicable | Not applicable | Not applicable |
| T67 threaded | 77,9 mm (3.07") 3" – Sch 40 | min | max 57 mm (2.25") | 25 (1.00) | 38 (1.50) | 54 (2.12) | 76 (3.00) |
| | | max | | 64 (2.50) | 95 (3.75) | 140 (5.50) | 197 (7.75) |
| T67 flanged | 73,7 mm (2.90") 3" – Sch 80 | min | max 89 mm (3.50") | 25 (1.00) | 38 (1.50) | 54 (2.12) | 76 (3.00) |
| | | max | | 48 (1.88) | 68 (2.69) | 99 (3.88) | 140 (5.50) |

All units are factory set at minimum differential unless otherwise specified. Consult factory for differentials not shown.



PREVENTIVE MAINTENANCE

Periodic inspections are a necessary means to keep your Magnetrol level control in good working order. This control is, in reality, a safety device to protect the valuable equipment it serves. Therefore, a systematic program of "preventive maintenance" should be implemented when control is placed into service. If the following sections on "what to do" and "what to avoid" are observed, your control will provide reliable protection of your capital equipment for many years.

WHAT TO DO

1. Keep control clean

NEVER leave switch housing cover off 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 become damaged or misplaced, order a replacement immediately.

2. Inspect switch mechanisms, terminals and connections monthly.

- Mercury switches may be visually inspected for short circuit damage. Check for small cracks in the glass tube containing the mercury. Such cracks can allow entrance of air into the tube causing the mercury to "oxidize". This is noticeable as the mercury will appear dirty and have a tendency to "string out" like water, instead of breaking into round pools. If these conditions exist, replace the mercury switch immediately.
- Dry contact switches should be inspected for excessive wear on actuating lever or misalignment of adjusting screw at point of contact between screw and lever. Such wear can cause false switch actuating levels. Adjust switch mechanism to compensate (if possible) or replace switch.

Do **NOT** operate your control with defective or maladjusted switch mechanisms (refer to bulletin on switch mechanism furnished for service instructions).

- Magnetrol controls may sometimes be exposed to excessive heat or moisture. Under such conditions, insulation on electrical wires may become brittle, eventually breaking or peeling away. The resulting "bare" wires can cause short circuits.

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

- Vibration may sometimes cause terminal screws to work loose. Check all terminal connections to be certain that screws are tight. Air (or gas) operating medium 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.
- On units with pneumatic switches, air (or gas) operating medium lines subjected to vibration, may eventually crack or become loose at 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.

3. Inspect entire unit periodically

Isolate control from vessel. Raise and lower liquid level to check for switch contact and reset.

WHAT TO AVOID

1. **NEVER** leave switch housing cover off the control longer than necessary to make routine inspections.
2. **NEVER** use lubricants on pivots of switch mechanisms. A sufficient amount of lubricant has been applied at the factory to insure a lifetime of service. Further oiling is unnecessary and will only tend to attract dust and dirt which can interfere with mechanism operation.
3. **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.
4. **NEVER** attempt to make adjustments or replace switches without reading instructions carefully. Certain adjustments provided for in Magnetrol controls should not be attempted in the field. When in doubt, consult the factory or your local Magnetrol representative.

TROUBLE SHOOTING

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.

- Fuses may be blown.
- Reset button(s) may need resetting.
- Power switch may be open.
- Controlled equipment may be faulty.
- 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.

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 three (3°) degrees of vertical (Use spirit level on side of enclosing tube in two place, 90° apart).
7. If mechanism is equipped with a mercury switch, examine glass mercury tube closely as previously described in "Preventive Maintenance" section. If switch is damaged, replace it immediately.
8. If switch mechanism is operating satisfactorily, proceed to check sensing unit.

CHECK SENSING UNIT

1. Re-connect power supply and carefully actuate switch mechanism manually (using a non-conductive tool) 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, stem and magnetic attraction sleeve[s]).

NOTE: Check first to be certain liquid is entering storage tank or vessel. A valve may be closed or pipe line plugged.

3. With liquid in tank or vessel, proceed to check level sensing action by removing switch housing assembly.
4. Inspect magnetic attraction sleeve(s) and inside of enclosing tube for excessive corrosion or solids build-up which could restrict movement, preventing sleeve(s) from reaching field of magnet(s).
5. If differential has been changed in the field, check tightness and position of the jam nuts.

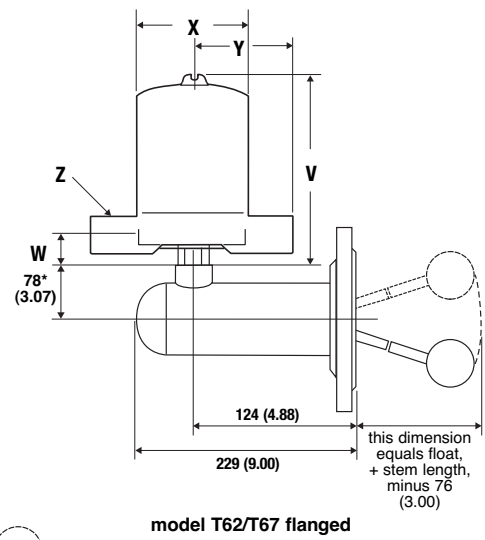
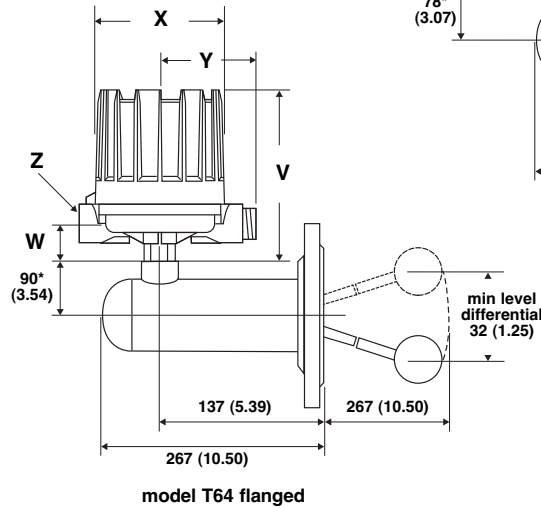
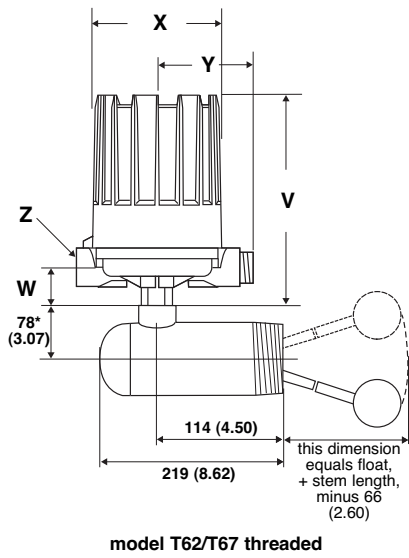
NOTE: Differential adjustment affects a change in the amount of level travel between "switch on" and "switch off" actuations. Do **NOT** attempt adjustment without first consulting factory for assistance in computing level differential change for your control.

6. Check float to be certain it is buoyant in the liquid (tank or vessel must have adequate liquid level). If float is determined to be filled with liquid or collapsed, it must be replaced immediately. Do NOT attempt to repair a float.

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

NOTE: When in doubt about the condition or performance of a Magnetrol control, return it to the factory. See "Our Service Policy" on back page.

DIMENSIONAL SPECIFICATIONS in mm (inches)

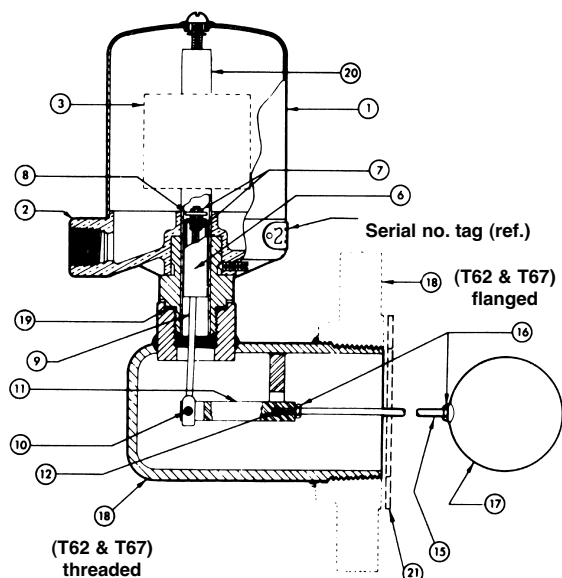
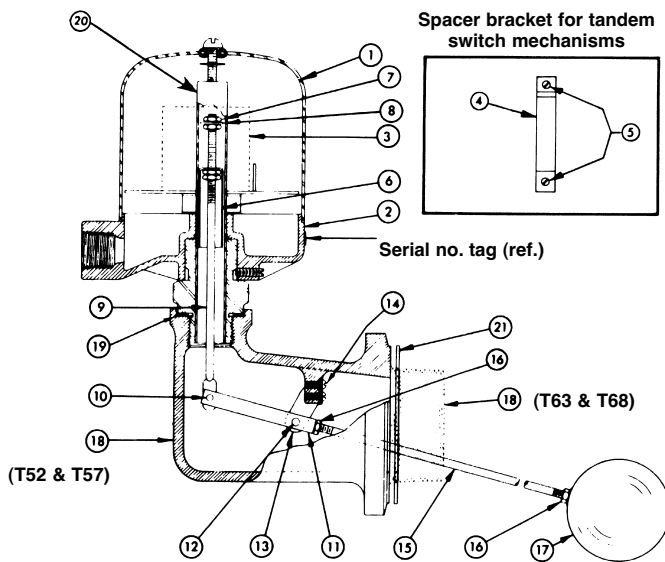


* Dimensions for all housings, except for cast iron housing, add for these 76 mm (3")

| Housing type | Models | V | | W | | ø X | | Y | | Z |
|--|--------------------------------|-----|--------|----|--------|-----|--------|-----|--------|---|
| | | mm | inches | mm | inches | mm | inches | mm | inches | |
| Weatherproof-FM (NEMA 7/9) - ATEX (Cast Alu) | T62/T64 with HS-switch and T67 | 257 | 10.12 | 42 | 1.66 | 151 | 5.93 | 109 | 4.29 | M20 x 1,5 (*) or 1" NPT (2 entries - 1 plugged) (*) not for FM (NEMA 7/9) |
| | T62/T64 excl. HS-switch | 202 | 7.94 | | | | | | | |
| ATEX (Cast Iron) | All | 249 | 9.80 | 45 | 1.77 | 143 | 5.63 | 110 | 4.33 | M20 x 1,5 or 3/4" NPT (single entry - 2 entries at request) |
| Pneumatics Switch Module J | T62/T64 | 165 | 6.50 | 39 | 1.54 | 118 | 4.65 | 110 | 4.33 | 1/4" NPT |
| Pneumatics Switch Module K | | | | | | | | 130 | 5.12 | |

Allow 200 mm (7.87") overhead clearance / All housings are 360 ° rotatable

REPLACEMENT PARTS



REPLACEMENT PARTS

| Item | Description | | Replacement assemblies ① | | | | | |
|------|-------------------------|--|--|-------------------------------------|-----|--------------------------------|--------------------------------|-------------|
| | | | Model | | | | | |
| | | | T62 threaded | T62 flanged | T64 | T67 threaded | T67 flanged | |
| 1 | Switch housing cover | Housing kits | See bulletin BE 42-680/BE 42-780 ref. A, B, C, D & E switch housings replacement assemblies. Consult factory on series G, H, I, J & K. | | | | | |
| 2 | Switch housing base | | | | | | | |
| 3 | Switch mechanism(s) | — | See bulletin on switch mechanism(s) furnished, as listed below. | | | | | |
| 4 | Spacer bracket | — | N/R | | — | 05-7542-121 | | |
| 5 | Round head screws (2) | — | | | | 10-1409-006 | | |
| 6 | Attraction sleeve(s) | Stem kits ② Kits shown contain 203 mm (8.08") stem lengths. Consult factory for longer stem lengths. | 89-5510-001 Standard sleeve | 89-5514-001 Sheathed sleeve ④ | — | 89-5512-001 Standard sleeve | 89-5511-001 Standard sleeve | |
| 7 | Jam nuts | | | | | | | |
| 8 | Guide washer | | | | | | | |
| 9 | Sleeve stem | | | | | | | |
| 10 | Connecting pin | | | | | | | |
| 11 | Fulcrum | | | | | | | |
| 12 | Fulcrum pin | | | | | | | |
| 13 | Pivot bracket | | | | | | | |
| 14 | Round head mach. screws | | | | | | | |
| 15 | Float stem | | | | | | | |
| 16 | Stem lock nuts | | | | | | | |
| 17 | Float ⑥ | ø 64 (2,5") | 89-5546-001 | — | | 89-5546-001 | | |
| | | ø 64 x 102 (2,5" x 4") | 89-5553-001 | — | | 89-5553-001 | | |
| | | ø 76 (3") | 89-5551-001 | — | | 89-5551-001 | | |
| | | ø 89 (3,5") | 89-5552-001 | 07-1101-012 | — | | 89-5552-001 | |
| | | ø 76 x 127 (3" x 5") | 89-5554-001 | — | | 89-5554-001 | | |
| | | ø 76 x 152 (3" x 6") | 89-5555-001 | — | | 89-5555-001 | | |
| 18 | Body | — | 33-6120-001 | 33-6124-001 | — | | 33-6120-001 | 33-6124-001 |
| 19 | E-tube gasket | — | 12-1301-002 ⑤ | | | | | |
| 20 | Enclosing tube | Materiel code 1,2 | NEMA 4 NEMA 7/9 Pneumatic housing | 32-6302-031 | | 32-6302-033 | | |
| | | | ATEX | 32-6344-002 | | | | |
| | | Materiel code 4 | NEMA 4 NEMA 7/9 Pneumatic housing | 32-6302-036 | | 32-6302-037 | | |
| | | | ATEX | 32-6344-001 | | | | |
| 21 | Flange gasket | — | N/R | N/A ③ | | N/R | N/A ③ | |

N/R = not required – **N/A** = not available

- ① All replacement assemblies listed are for standard base models which use Ref. series A, B, C, D, E and J switch mechanisms only. Consult local representative for ordering assistance on all special model replacement parts not included in the above listing.
- ② Sheathed attraction sleeves are used on models specified for corrosive service. Standard sleeve is type 400 series stainless steel.
- ③ Flange gasket used on T62, T64 and T67 units is standard ANSI type, readily available at local supply houses.
- ④ Sheathed sleeve stem kits are used on models with Material of Construction Codes 2 through 9.
- ⑤ Above 300 Lb. rating, use 12-1204-001.
- ⑥ Dimensions in millimeters (inches).

IMPORTANT:

When ordering, please specify:

A. Model and serial number of control.

B. Name and number of replacement assembly.

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
4. Desired Action
5. Reason for Return
6. Process details

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

All replacements will be shipped FOB factory.

BULLETIN N°: BE 44-602.12
EFFECTIVE: JANUARY 2005
SUPERSEDES: December 1996

UNDER RESERVE OF MODIFICATIONS



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