Magnetrol®

Kotron® series 811

R.F. point level sensor

INSTRUCTION MANUAL AND PARTS LIST

TABLE OF CONTENTS

MODEL IDENTIFICATION

8 1 1 – 1 ☐ 0 ☐ – ☐ 0 ☐

INPUT POWER
1 – 240 V AC
2 – 24 V DC
0 – 120 V AC
3 – 12 V DC

MOUNTING (with intrinsically safe probe circuit)
5 or 8 – Integral, NEMA 4X/7/9 (Standard or CENELEC)
6 or 9 – Remote, NEMA 4X/7/9 (Standard or CENELEC)

HOUSING
E or V – Double 3/4" NPT cable entry - aluminium (Standard or CENELEC)
W – Double M 20 x 1.5 cable entry - aluminium (CENELEC)
U – Double PG 13.5 cable entry - aluminium (CENELEC)
S – Double PG 16 cable entry - aluminium (CENELEC)
Y or 6 – Single 3/4" NPT cable entry - stainless steel (Standard or CENELEC)

PROBE
0 – Prove ordered separately, see probe bulletin BE 50-125.
1 or A – 455 mm (18") guarded probe (Standard or CENELEC).
2 or B – 915 mm (36") guarded probe (Standard or CENELEC).

DESCRIPTION

The Kotron® series 811 R.F. point level sensor can be utilized in liquid or bulk material applications. There are no moving parts in contact with the medium.

PRINCIPLE OF OPERATION

As the medium covers the sensing probe, a pulse waveform generated by the electronics is altered, changing the relay contact position. As the medium drains from the sensing probe, the relay reverses.

NOTE: The unit is designed for maximum safety (intrinsically safe probe circuit). Jumper (J4) must be intact under normal operating conditions. The jumper must not be removed by anyone unless there is a specific need for intrinsically safe grounding separate from the standard earth ground. Consult factory before considering special grounding which would require removal of the jumper. Violation of this requirement will VOID warranty and release Magnetrol® of any responsibility.

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 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.

PRELIMINARY OPERATIONAL CHECK

(if supplied with factory assembled guarded probe)

After unpacking and before installation, perform the following operational check on the unit in a non-hazardous area.

1. Fill a suitable grounded container with water.
2. In a non-hazardous area, power the unit with a properly grounded voltage source.
3. Dip the probe in the water. The relay should activate.
4. Withdraw the probe from the water. The relay should deactivate.

If the unit performs as described above, it is operating properly. In case of malfunction, consult Calibration procedure on p. 9-12 or Troubleshooting section on p. 8.

INSTALLATION LOCATION

Kotron® point sensors should be located to allow for easy access for service, calibration and monitoring. Units should not be exposed to ambient temperatures above +70°C (+160°F) or below -40°C (-40°F).
Special precautions should be taken to prevent exposure to corrosive atmosphere, excessive vibration, shock or physical damage.

Sensing probes should be located close to the tank wall for greatest sensitivity in non-conductive media. Probes should be isolated from severe motion in the tank, because surface turbulence may cause signal deviation.

***CAUTION:** This unit contains CMOS electronics which may be damaged by static electricity. Do not touch any semi-conductor devices unless you are properly grounded.*

INSTALLATION cont.

INSTALLATION LOCATION cont.

Metal Walled Tanks

In water based liquids, no problem should be encountered with sensitivity or linearity. With non-conductive, low dielectric media, sensitivity can be enhanced by locating the probe close to and parallel with the tank wall. If this is not practical, a concentric ground tube (sometimes called a stilling well) surrounding the probe may be a solution.

NOTE: These comments also apply to glass-lined metal walled tanks.

Tanks or silos with non-conductive materials of construction

With plastic, concrete, wood or any other non-conductive walled vessels, the reference electrode mentioned above needs clarification. Most commonly, this electrode will be in the form of a concentric ground tube (i.e. stilling well). In questionable circumstances, consult the factory. In all cases, a good electrical connection must be made between the ground surface and the probe housing.

CAUTION: *When an insulated probe is used in abrasive medium, the probe should be inspected periodically for nicks, cuts or abrasions which may ruin the integrity of the insulation. In the event that wear is found, replace the probe or consult the factory for further instructions.*

HORIZONTAL MOUNTING

Alarm (narrow differential) applications only

Horizontally mounted probes provide a high degree of sensitivity for use with non-conductive liquids as only approximately 10 mm (0.38") of level change is required to completely cover (or uncover) the probe.

Horizontally mounted probes should be installed so the probe is parallel to and at the level at which control point is desired. Refer to **Figure 1**.

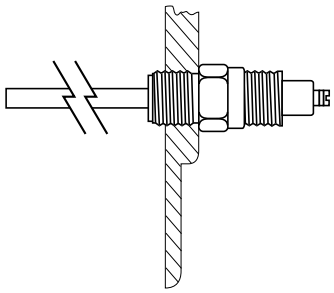


Figure 1 — Recommended horizontal mounting

Avoid any installation method in which the material may become trapped in the mounting nozzle, thus preventing probe signaling when level recedes. Refer to **Figures 2** & **3**.

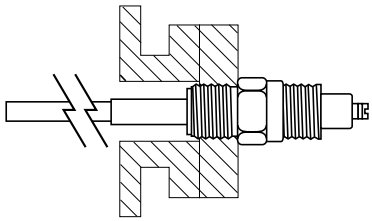


Figure 2 — Recommended mounting with nozzle

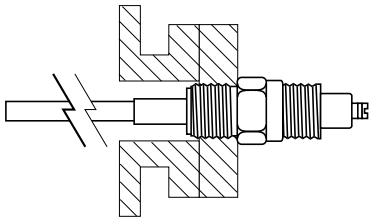


Figure 3 — Not recommended

NOTE: If a nozzle mounting is unavoidable, the probe must be installed with an inactive metal sheath having a length at least 25 mm (1") greater than the length of the nozzle. The sheath is required to render the length of the probe within the nozzle insensitive to capacitance change. Refer to Figure 2.

Guarded probe

Unit will signal at probe level. Refer to **Figures 4** and **5**.

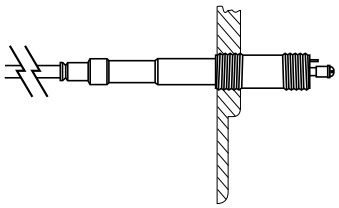


Figure 4 — Recommended horizontal mounting

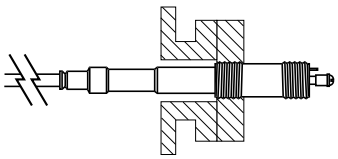


Figure 5 — Recommended mounting with nozzle

NOTE: Guard element MUST be located outside of the nozzle. Do NOT horizontally mount the unit in a nozzle deeper than 75 mm (3"). Refer to **Figure 5**. The medium may build up in the nozzle and cause false activation.

Alternate horizontal mounting

On applications involving viscous liquids or materials which tend to cling or build-up, horizontal mounting probes should be installed at a slight downward angle to allow material to drain from probe rod. With this type of installation, packing gland face of probe assembly should extend into the tank (or vessel). Refer to **Figure 6**.

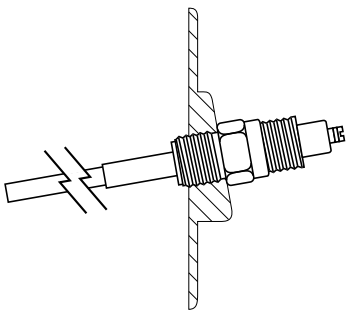


Figure 6 — Alternate mounting

VERTICAL MOUNTING

Vertically mounted probes provide the capability to adjust the set point and differential up or down a section of the probe rod by means of calibration adjustments within the unit's amplifier.

Vertically mounted probes should be installed so the end of the probe rod is at the desired level control point with bare, uninsulated probes in conductive materials; a minimum of 50 mm (2") below the desired level control point with insulated probes in conductive materials; or a minimum of 100 mm (4") below desired level control point with non-conductive materials. Refer to **Figure 7**.

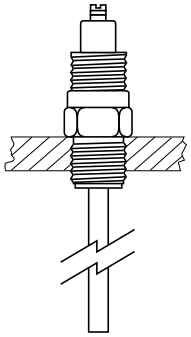


Figure 7 — Vertical mounting

MOUNTING PROCEDURE

Kotron® series 811 point level sensors with standard probes up to 3048 mm (120") in length and guarded probes up to and including 915 mm (36") in length are shipped pre-assembled. Units with standard probes over 305 mm (12") in length are shipped unassembled to avoid damage during transit. They must be assembled before mounting. Follow the mounting procedure for your particular case.

NOTE: Before beginning mounting procedures, make sure the power source to the unit is turned off.

> ***CAUTION:*** *The protective cover on the amplifier board is not shown in the figures. However, it is critical this cover be mounted and secured to retain maximum safety. Elimination of this cover voids all agency approvals.*

Integral mount with GUARDED probe

1. Thread electronics/probe assembly into mounting bushing on tank.
2. Tighten securely, being certain that wrench is applied only to the mounting gland. Refer to **Figure 8**.

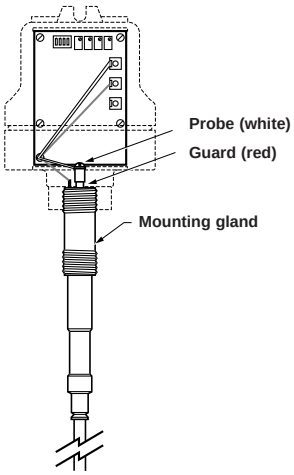


Figure 8

3. Proceed to **Wiring Procedure** on page 7.

Integral mount with STANDARD probe

1. Thread probe into mounting bushing on tank.
2. Tighten securely, being certain that the wrench is applied ONLY to the mounting gland. Refer to **Figure 9**.
3. Screw the amplifier housing onto the probe. Refer to **Figure 9**.

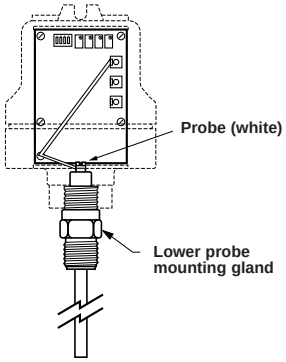


Figure 9

4. Screw housing on probe until hand tight. Housing can be wrench tightened to align cable entry.
5. Remove housing cover.
6. Remove electronic assembly by loosening three screws in base. Refer to **Figure 9**.
7. Loosen securing screws and open electronic assembly protective cover.
8. Attach white PROBE wire (shipped in plastic bag) from probe terminal on circuit board to probe screw on the top of the probe. Be sure wiring is passed through opening on the bottom, left of the circuit board; and the bottom, center of the mounting bracket. Refer to **Figure 9**.

NOTE: The remaining two wires (red GUARD and green GROUND) can be discarded.

9. Close and secure protective cover.
10. Slowly lower electronic assembly into housing base while pushing slack wire up into bottom opening of mounting bracket.
11. Tighten the three screws to the housing base.

> ***CAUTION:*** *Check probe terminal connection carefully to be certain lug will not short to packing gland or interfere with assembly of amplifier housing to probe.*

12. Proceed to Wiring Procedure on page 7-8.

INSTALLATION cont.

MOUNTING PROCEDURE cont.

Integral mount with FLEXIBLE probe

CAUTION: *Flexible probes are shipped with the cable clamp and the probe nut hand tightened. The end of a flexible probe MUST be secured to the bottom of the tank by either attachment to a bracket or to a heavy weight in order to keep the probe taut. Follow the mounting instructions listed below.*

1. Unscrew probe from probe housing. Remove mylar housing insulator located over the clamp. Refer to **Figure 10**.

CAUTION: *Do not discard mylar housing insulator.*

2. Attach weight (if used) to probe end. Refer to **Figure 10**.

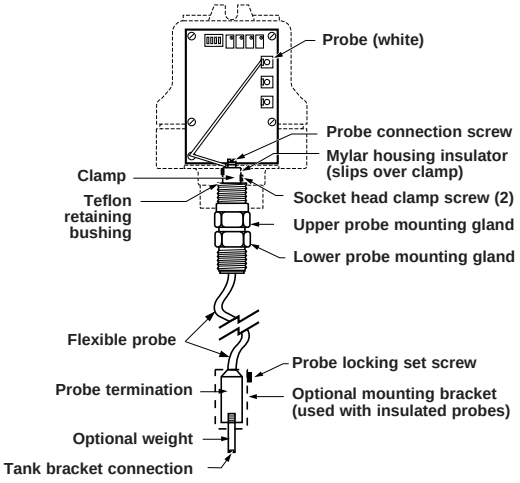


Figure 10

3. Insert probe end through tank mounting bushing and feed cable into tank. Do not allow probe insulation to be damaged by scraping against the bushing threads.

CAUTION: *Probe cable must not be in contact with anything metallic in its final installation position.*

4. Secure lower end of probe (or optional weight) to tank bracket if one is used.
5. Apply thread sealant to mounting nut.
6. Screw mounting nut into tank bushing until tight.

CAUTION: *Apply wrench to lower probe nut only.*

NOTE: Do not allow the probe to fall in the tank while following steps 7 through 24. Steps 7 through 24 do not apply to the flexible probe 41-5105.

7. Loosen both socket clamp screws.
8. Pull clamp and teflon retaining bushing off probe.
9. While holding probe cable, loosen upper probe nut.
10. Pull excess cable up through probe nuts until cable is taut.
11. Tighten the probe nuts.
12. Cut off cable 35 mm (1.35 inches) above top of upper probe nut and strip off 30 mm (1.25 inches) of insulation.
13. Slide teflon retaining bushing onto cable and seat it into the upper probe nut.
14. Slide clamp onto cable and seat it in the teflon retaining bushing.
15. Tighten both socket head clamp screws to approx. 3.96 Nm (35 in./lbs) torque.
16. Slip mylar housing insulator over clamp.
17. Screw housing onto probe and tighten. Make sure cable entry is properly aligned for wire entry.
18. Remove electronic assembly by loosening three screws in base. Refer to Figure 10.
19. Loosen securing screws and open electronic assembly protective cover.
20. Attach white PROBE wire (shipped in plastic bag) from probe terminal on circuit board to probe screw on the top of the probe. Be sure wiring is passed through opening on the bottom, left of the circuit board; and the bottom, center of the mounting bracket. Refer to Figure 10.

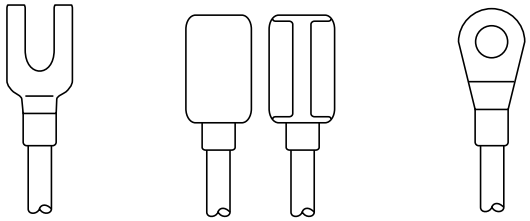
NOTE: The remaining two wires (red GUARD and green GROUND) can be discarded.

21. Close and secure protective cover.
22. Slowly lower electronic assembly into housing base while pushing slack wire up into bottom opening of mounting bracket.
23. Tighten the three screws to the housing base.

CAUTION: Check probe terminal connection carefully to be certain lug will not short to packing gland or interfere with assembly of amplifier housing to probe.

24. Proceed to Wiring Procedure on page 7.

PROBE WIRE CONNECTIONS



PROBE (white) **GUARD (red)** **GROUND (green)**

MOUNTING PROCEDURE cont.

NOTE: All remote mount units use triaxial cable that is shipped in a length specified at the time of order. This cable must always make all 3 connections at the main amplifier. At the probe head, the cable will always make at least 2 connections (PROBE and GROUND). The third connection (GUARD) is only used with the guarded probe. Cut the guard wire back to the cable end and dress with tape when NOT in use.

Remote mount with GUARDED probe

Electronic housing

Remote electronic housings are normally shipped from the factory assembled into an L mounting bracket. To install the electronic housing, proceed as follows. Refer to **Figure 11**.

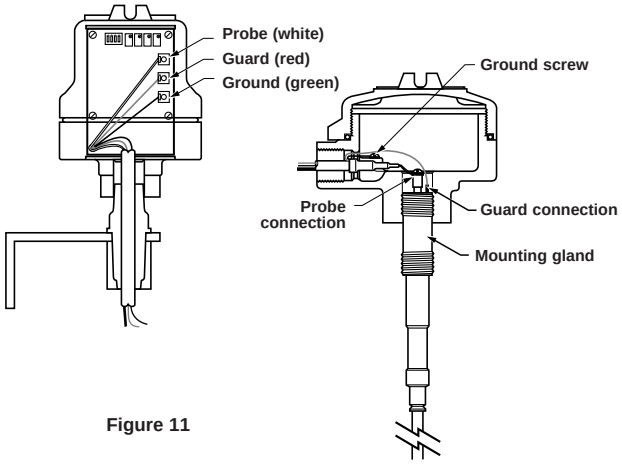


Figure 11

1. Remove electronic housing from mounting bracket.
2. Install bracket in a location which will isolate unit from temperatures below -40°C (-40°F) and over +70°C (+160°F) or vibration/mechanical damage. Unit can be mounted up to 45 m (150 ft) from probe assembly. Location should also offer easy access for wiring, calibration and maintenance.
3. Re-install onto mounting bracket. Screw electronic housing onto the probe.
4. Screw housing on mounting bracket until hand tight. Housing can be wrench tightened to align cable entry.

Probe housing connections

1. Thread probe into mounting bushing on tank.
2. Tighten securely being certain that the wrench is applied ONLY to the mounting gland. Refer to **Figure 11**.
3. Screw probe housing onto the probe. Refer to **Figure 11**.
4. Screw housing on probe until hand tight. Housing can be wrench tightened to align cable entry.
5. Attach the red guard wire to the slip-on guard connection on probe. Refer to Probe wire wonnections.
6. Attach the white probe wire to the probe screw on top of the probe. Refer to Probe Wire Connections.
7. Attach the green ground wire to the green ground screw in the housing base. Refer to Probe wire connections.
8. Proceed to Wiring procedure on page 7-8.

Remote mount with STANDARD RIGID probe

Electronic housing

Remote electronic housings are normally shipped from the factory assembled into an L mounting bracket. To install the electronic housing, proceed as follows. Refer to **Figure 12**.

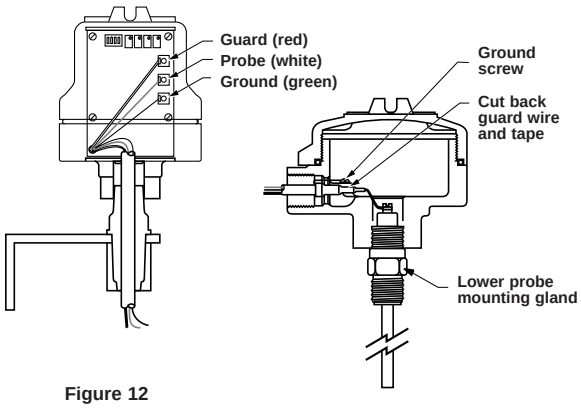


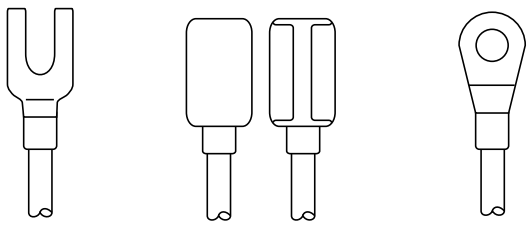
Figure 12

1. Remove electronic housing from mounting bracket.
2. Install bracket in a location which will isolate unit from temperatures below -40°C (-40°F) and over +70°C (+160°F) or vibration/mechanical damage. Unit can be mounted up to 45 m (150 ft) from probe assembly. Location should also offer easy access for wiring, calibration and maintenance.
3. Re-install onto mounting bracket. Screw electronic housing onto the probe.
4. Screw housing on mounting bracket until hand tight. Housing can be wrench tightened to align cable entry.

Probe housing connections

1. Thread probe into mounting bushing on tank.
2. Tighten securely being certain that the wrench is applied ONLY to the mounting gland. Refer to **Figure 12**.
3. Screw probe housing onto the probe. Refer to **Figure 12**.
4. Screw housing on probe until hand tight. Housing can be wrench tightened to align cable entry. Proceed to Wiring procedure on page 7-8.
5. Trim red guard wire back to cable end. Insulate with electrical tape.
6. Attach the white probe wire to the probe screw on top of the probe. Refer to Probe wire connections.
7. Attach the green ground wire to the green ground screw in the housing base. Refer to Probe wire connections.

PROBE WIRE CONNECTIONS



PROBE (white) **GUARD (red)** **GROUND (green)**

MOUNTING PROCEDURE cont.

Remote mount with FLEXIBLE probe

Electronic housing

Remote electronic housings are normally shipped from the factory assembled into an L mounting bracket. To install the electronic housing, proceed as follows. Refer to **Figure 13**.

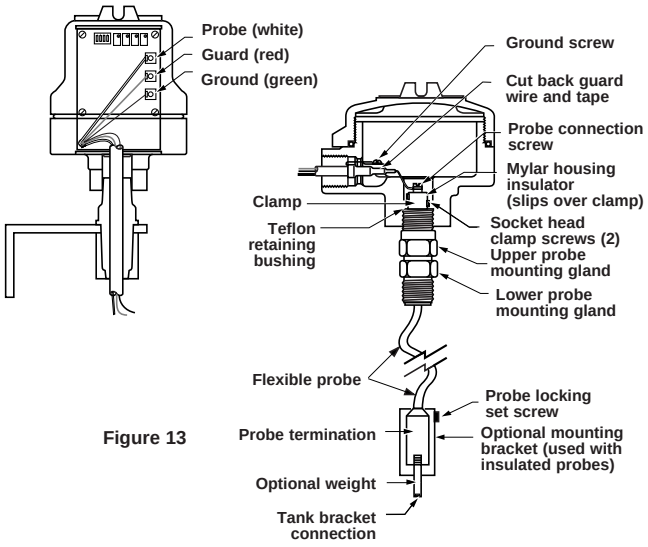


Figure 13

1. Remove electronic housing from mounting bracket.
2. Install bracket in a location which will isolate unit from temperatures below -40°C (-40°F) and over +70°C (+160°F) or vibration/mechanical damage. Unit can be mounted up to 45 m (150 feet) from probe assembly. Location should also offer easy access for wiring, calibration and maintenance.
3. Re-install electronic housing onto mounting bracket.
4. Screw housing on mounting bracket until hand tight. Housing can be wrench tightened to align cable entry.

Probe Housing Connections

> ***CAUTION:*** *Flexible probes are shipped with the cable clamp and the probe nut hand tightened. The end of a flexible probe MUST be secured to the bottom of the tank by either attachment to a bracket or to a heavy weight in order to keep the probe taut. Follow the mounting instructions listed below.*

1. Unscrew probe from probe housing. Remove mylar housing insulator located over the clamp. Refer to **Figure 13**.

> ***CAUTION:*** *Do not discard mylar housing insulator.*

2. Attach weight (if used) to probe end.
3. Insert probe end through tank mounting bushing and feed cable into tank. Do not allow probe insulation to be damaged by scraping against the bushing threads.

> ***CAUTION:*** *Probe cable must not be in contact with anything metallic in its final installation position.*

4. Secure lower end of probe (or optional weight) to tank bracket if one is used.
5. Apply thread sealant to mounting nut.
6. Screw mounting nut into tank bushing until tight.

> ***CAUTION:*** *Apply wrench to lower probe nut only.*

NOTE: Do not allow the probe to fall in the tank while following steps 7 through 21.

7. Loosen both socket clamp screws.
8. Pull clamp and teflon retaining bushing off probe.
9. While holding probe cable, loosen upper probe nut.
10. Pull excess cable up through probe nuts until cable is taut.
11. Tighten the probe nuts.
12. Cut off cable 35 mm (1.35") above top of upper probe nut and strip off 30 mm (1.25") of insulation.
13. Slide teflon retaining bushing onto cable and seat it into the upper probe nut.
14. Slide clamp onto cable and seat it in the teflon retaining bushing.
15. Tighten both socket head clamp screws to approximately 3.96 Nm (35 in./lbs) torque.
16. Slip mylar housing insulator over clamp.
17. Screw housing onto probe and tighten. Make sure cable entry is properly aligned for wire entry.
18. Trim the red guard wire back to cable end. Insulate with electrical tape.
19. Attach the white probe wire to the probe screw on top of the probe. Refer to Probe wire connections on page 7.
20. Attach the green ground wire to the green ground screw in the housing base. Refer to Probe wire connections on page 7.

> ***CAUTION:*** *Check probe terminal connection carefully to be certain lug will not short to packing gland or interfere with assembly of electronic housing to probe.*

21. Proceed to Wiring procedure.

WIRING

INTEGRAL MOUNT MODELS

All power and control connections are made at the terminal strip within the amplifier enclosure, EXCEPT GROUNDING. Power grounding must be made at green ground screw on the housing base. 16 AWG wire is recommended for power and control circuits.

NOTE: There are special wiring exceptions for intrinsic safety. Observe all local electrical codes and proper wiring procedures.

1. Make sure the power source is turned off.
2. Unscrew and remove housing cover.
3. Pull power supply and control wires through cable entry.
4. Connect green ground wire to green ground screw located in the base of the housing. DO NOT PROCEED UNTIL GROUND CONNECTION IS MADE.
5. After grounding is complete, connect power leads to applicable AC or DC terminals as marked. Refer to **Figure 14**.
6. a. Connect control circuit leads to relay terminals. Refer to **Figure 14**. Make sure the load to be controlled is within the relay's rated capacity.
   b. Dress wiring to guard against interference or contact with cover or circuit board components.
7. Prevent moisture seepage into housing by installing an approved cable gland(s).
8. Select operating mode. (Refer to Operating Mode Selection on page 8 for detailed information.) Make sure that the failsafe switch is in the correct position for your selection. Refer to **Figure 15** in the Calibration section on page 9.

> ***CAUTION:*** *In hazardous areas, do not power the unit until the cable gland is sealed and enclosure cover is screwed down securely.*

9. Installation is complete. Replace housing cover.
10. Proceed to Calibration section on page 9.

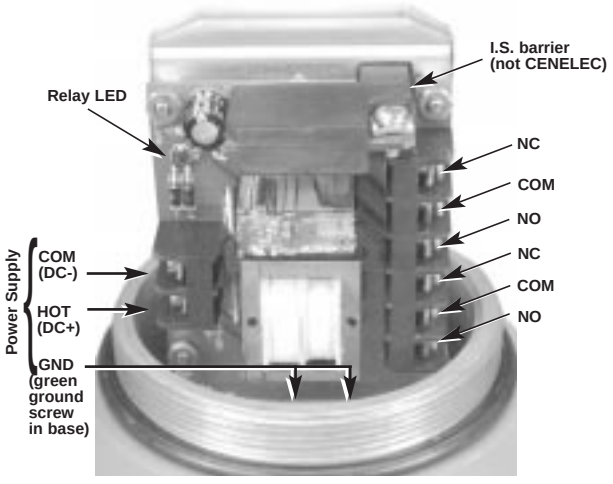


Figure 14

REMOTE MOUNT MODELS

All power and control connections are made at the terminal strip within the amplifier enclosure, EXCEPT GROUNDING. Power grounding must be made at green ground screw on the housing base. 16 AWG wire is recommended for power and control circuits.

1. Make sure the power source is turned off.
2. Unscrew and remove housing cover.
3. Remove electronic assembly by loosening three screws in base.
4. Pull power supply and control wires through cable entry.
5. Pull triaxial probe cable through bottom base connection.
6. Loosen securing screw and open the protective cover on the amplifier board.
7. Thread cable through bottom of electronic assembly bracket and probe wire hole at bottom, left of circuit board.
8. Attach white PROBE wire to probe terminal.
9. Attach red GUARD wire to guard terminal.
10. Attach green GROUND wire to I.S. Ground terminal.
11. Close and secure protective cover.
12. Slowly lower electronic assembly into housing base while pushing slack into conduit.
13. Tighten three screws to housing base.
14. Connect green ground wire to green ground screw located in the base of the housing. DO NOT PROCEED UNTIL GROUND CONNECTION IS MADE.
15. After grounding is complete, connect power leads to applicable AC or DC terminals as marked. Refer to **Figure 14**.
16. a. Connect control circuit leads to relay terminals. Refer to **Figure 14**. Make sure the load to be controlled is within the relay's rated capacity.
    b. Dress wiring to guard against interference or contact with cover or circuit board components.
17. Prevent moisture seepage into housing by installing an approved cable gland.
18. Select operating mode. (Refer to Operating Mode Selection below for detailed information.) Make sure the failsafe switch is in the correct position for your selection.

> ***CAUTION:*** *In hazardous areas, do not power the unit until the cable gland is sealed and enclosure cover is screwed down securely.*

19. Installation is complete. Replace housing cover.
20. Proceed to Calibration section on page 9-10.

WIRING cont.

ALL MODELS

Operating mode selection

The chart below is provided to aid in the proper choice of relay wiring and calibration. Please note:

1. Equipment controlled by the Kotron relays is assumed to be powered from one source, while the Kotron unit itself is assumed to be powered from a different source.
2. There is a failsafe switch on the Kotron unit which may be set in either a High or Low position. Refer to **Figure 15** on page 9.
3. Fail means a loss of power to the Kotron unit.
4. HL (High Level) means a material level in the tank which is equal to or above the set point.
5. LL (Low Level) means a material level in the tank which is equal to or below the set point.
6. a. When the relay coil is de-energized, (LED will be off) a connection is made between the common (CM) and normally closed (NC) terminals, and there is no connection between CM and normally open (NO) terminals .
   b. When the relay coil is energized, (LED will be on) a connection is made between the CM and NO terminals, and there is no connection between CM and NC terminals. Refer to the Relay wiring chart below.

Kotron power	*Material level*	*Failsafe position*	*Relays coil*	*Relay terminal*		*Kotron power*	*Material level*	*Failsafe position*	*Relays coil*	*Relay terminal*	
				CM to NC	*CM to NO*					*CM to NC*	*CM to NO*
On	High	HL	de-energised	closed	open	**Off**	High	HL	de-energised	closed	open
		LL	energised	open	closed			LL	de-energised	closed	open
	Low	Hl	energised	open	closed		Low	Hl	de-energised	closed	open
		LL	de-energised	closed	open			LL	de-energised	closed	open

TROUBLESHOOTING

NO SIGNAL WITH LEVEL CHANGE

1. Check power and control circuit wiring.
2. Check DIP switch positions.
3. Check Calibration.
4. Check for proper ground reference particularly in non-metal tanks.

SWITCH CHATTER

1. Check for turbulence. If turbulence is present, increase time delay until appropriate.
2. Check for proper power supply voltage.
3. Check for proper ground reference.

PROBE

> ***CAUTION:*** *When an insulated probe is used in an abrasive medium, the probe should be inspected periodically for nicks, cuts or abrasions which may ruin the integrity of the insulation. In the event that wear is found, replace the probe or consult the factory for further instructions.*

To check for a malfunctioning sensing probe:

1. Remove the white probe lead from the sensing probe and isolate it from the ground.
2. Connect an ohmmeter between the sensing probe terminal and ground. (i.e. stainless steel probe nut or housing base)
3. Measure the resistance between the probe and ground using the highest resistance scale available. If the resistance measures 10 Megohm to infinity and is stable, the probe is operating correctly. If the resistance measures less than 10 MegΩ and/or is unstable, there may be a problem with the probe.

NOTE: If the application is an insulated probe in a conductive medium, it is helpful to have the medium at its highest possible level. This aids in the detection of cuts or nicks in the insulation.

4. Inspect the malfunctioning probe for a cut in the insulating sheath or looseness in the seal at the probe mounting nut.
5. Inspect the probe for a coating or build-up of conductive medium.
6. If probe test is working properly, check for insufficient ground, loose or broken wiring, including the white probe wire. Also check continuity between probe mounting nut and metal tank. There should be continuity (zero resistance). If there is resistance, check for excessive teflon tape used on the probe threads.

NOTE: If the above suggestions prove unsuccessful, consult factory.

CALIBRATION

— Alarm (narrow differential) only —

CAUTION: *In hazardous areas do not remove housing cover until power is disconnected and atmosphere is determined to be safe. Hazardous environments must be declared safe by the local safety authority.*

1. Turn on power to the instrument.
2. Remove housing cover.
3. Set point location:
   a. Conductive media: The set point is located at the tip of the probe (with guarded or other uninsulated probes). Calibration is not required for most conductive liquids. If the unit does not switch on alarm test, then proceed to Step 4.
   b. Non-conductive media: The set point is located on the probe at a point determined by the set point adjustment. Minimum probe coverage is 100 mm (4"). Calibration is required. Proceed to Step 4.
4. Adjustments: (see **Figure 15**)

4.1 Dip switch

a. Failsafe: ON = high level
OFF = low level

b. Time delay direction: ON = delay on rising level
OFF = delay on falling level

c. Short time delay (0.5 to 7 sec.): 3 ON
4 OFF

d. Long time selay (2 to 120 sec.): 3 OFF
4 ON

NOTE: Switch positions 3 and 4 cannot be both ON or both OFF. One must be ON the other OFF or the LED and relay will remain ON.

4.2 25 turn potentiometer: (see **Figure 15**)

a. Timer:
– Allows continuous adjustment of time delay within limits of DIP switch range chosen
– Clockwise rotation increases delay.

b. Differential:
– Allows continuous adjustment of pump or valve control ON to OFF.
– Clockwise rotation increases differential. Full counter-clockwise rotation is the narrowest differential and is used for alarm applications.

c. Coarse:
– Allows continuous adjustment of setpoint over the entire range of the electronics (0 to 1000 pF).
– Clockwise rotation raises SETPOINT on probe.

d. Fine:
– Allows precision adjustment of SETPOINT within the limits of the COARSE SETPOINT adjusted initially.
– Clockwise rotation raises SETPOINT on probe.
– This is an extremely fine adjustment. Sometimes it is necessary to go 1 to 2 turns past the final SETPOINT to stop relay chatter. A small amount of time delay (2 turns) can also be used.

5. The LED shows the status of the relay coil:
   LED on: relay energized
   LED off: relay de-energized
6. Initial Settings:
   a. Turn the COARSE, FINE, DIFFERENTIAL and TIME controls fully counter-clockwise 25 full turns or until a clicking sound is detected.
   b. Turn FINE control approximately 12 turns clockwise to the midpoint.
   c. Set the DIP switch positions 3 ON, 4 OFF. (Note that if DIP switch positions 3 and 4 are both ON the LED and relay will remain on.)

LOW LEVEL ALARM

Failsafe low – with no media on the probe:

1. Set DIP switch positions 1 OFF, 2 OFF, 3 ON and position 4 OFF. LED will be ON.
2. Turn the COARSE control clockwise until the LED turns off.
3. ***Slowly*** turn the COARSE control counter-clockwise until the LED is on.
4. Turn the FINE control clockwise until the LED stays OFF.

Failsafe low – with media on the probe:

1. Set DIP switch positions 1 OFF, 2 OFF, 3 ON and position 4 OFF. LED will be ON.
2. Turn the COARSE control clockwise until the LED turns off.
3. ***Slowly*** turn the COARSE control counter-clockwise until the LED is on.
4. Turn the FINE control clockwise until the LED goes OFF, then counter-clockwise until the LED stays ON.

HIGH LEVEL ALARM

Failsafe high – with no media on the probe:

1. Set DIP switch positions 1 ON, 2 ON, 3 ON and position 4 OFF. LED will be OFF.
2. Turn the COARSE control clockwise until the LED turns on.
3. ***Slowly*** turn the COARSE control counter-clockwise until the LED is off.
4. Turn the FINE control clockwise until the LED stays ON.

Failsafe high – with media on the probe:

1. Set DIP switch positions 1 ON, 2 ON, 3 ON and position 4 OFF. LED will be OFF.
2. Turn the COARSE control clockwise until the LED turns on.
3. ***Slowly*** turn the COARSE control counter-clockwise until the LED is OFF.
4. Turn the FINE control clockwise until the LED turns ON, then counter-clockwise until the LED stays OFF.

TIME DELAY

If time delay is required (i.e. surface waves causing relay chatter), the following choices must be made:

Delay function:

– delay on FILL (rising level) is DIP switch 2 ON.
– delay on EMPTY (falling level) is DIP switch 2 OFF.

Delay duration:

– 0.5 to 7 sec. delay – DIP switch 3 ON, 4 OFF.
– 2 to 120 sec. delay – DIP switch 3 OFF, 4 ON.
– Clockwise rotation increases duration.

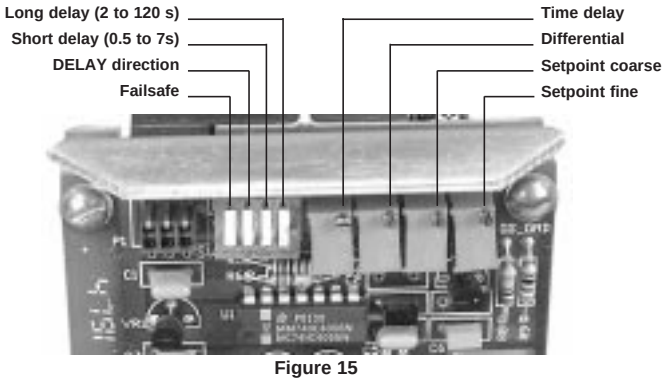


Figure 15

CALIBRATION cont.

— Control (wide differential) —

CAUTION: *In hazardous areas do not remove housing cover until power is disconnected and atmosphere is determined to be safe. Hazardous environments must be declared safe by the local safety authority.*

LOW LEVEL FAILSAFE

(relay de-energizes below low control point)

1. Turn on power to the instrument.
2. Remove housing cover.
3. Adjustments

   3.1 Dip switch

   a. Failsafe ON = high level
   OFF = low level

   b. Time delay direction: ON = delay on rising level
   OFF = delay on falling level

   c. Short time delay (0.5 to 7 sec.): 3 ON
   4 OFF

   d. Long time delay (2 to 120 sec.): 3 OFF
   4 ON

NOTE: Switch positions 3 and 4 cannot be both ON or both OFF. One must be ON the other OFF or the LED and relay will remain ON.

3.2 25 Turn potentiometer

a. Timer:

– Allows continuous adjustment of time delay within limits of DIP switch range chosen.
– Clockwise rotation increases delay.

b. Differential:

– Allows continuous adjustment of pump or valve control ON to OFF.
– Clockwise rotation increases differential. Full counter-clockwise rotation is the narrowest differential and is used for alarm applications.

c. Coarse:

– Allows continuous adjustment of setpoint over entire range of the electronics (0 to 1000 pF).
– Clockwise rotation raises SETPOINT on probe.

d. Fine:

– Allows precision adjustment of SETPOINT within the limits of the COARSE SETPOINT adjusted initially.
– Clockwise rotation raises SETPOINT on probe.
– This is an extremely fine adjustment. Sometimes it is necessary to go 1 to 2 turns past the final SETPOINT to stop relay chatter. A small amount of time delay (2 turns) can also be used.

4. The LED shows the status of the relay coil:
   LED on: relay energized
   LED off: relay de-energized
5. Be sure Failsafe mode selection has been set correctly.
   a. In low level failsafe (LLFS) mode, the relay is de-energised on rising level and remains de-energised until upper differential point is reached.
   b. In high level failsafe (HLFS) mode, the relay is de-energized on falling level and remains de-energised until the lower setpoint is reached.
6. Set DIP switch positions 1 OFF, 2 OFF, 3 ON and position 4 OFF. LED will be ON.
7. Verify process level is at desired low control point.
8. Turn COARSE control clockwise until LED turns OFF. Turn coarse control counter-clockwise until the LED is ON.
9. Slowly turn coarse control clockwise until LED is OFF. Low control point is now calibrated.

NOTE: FINE control can be used during wide differential calibration, but is usually not needed.

10. Prior to raising level to desired high control point, turn Differential control 25 turns clockwise or until clicking sound is heard.
11. Raise level to desired high control point.
12. Slowly turn Differential control counter-clockwise until the LED turns ON. The wide differential relay is calibrated.

TIME DELAY

If time delay is required (i.e. surface waves causing relay chatter), the following choices must be made:

Delay Function:

– Delay on FILL (rising level) is DIP switch 2 ON.
– Delay on EMPTY (falling level) is DIP switch 2 OFF.

Delay Duration:

– 0.5 to 7 sec. delay – DIP switch 3 ON, 4 OFF.
– 2 to 120 sec. delay – DIP switch 3 OFF, 4 ON.
– Clockwise rotation increases duration.

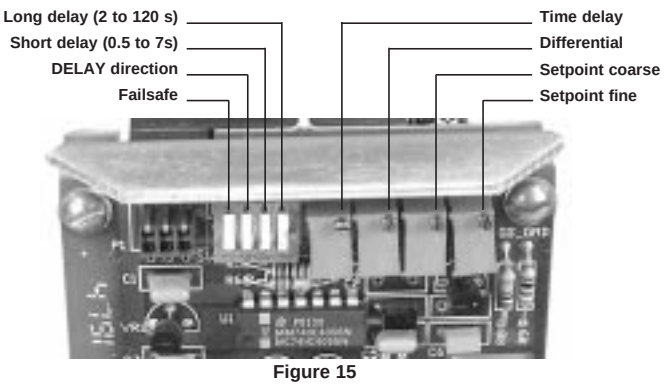


Figure 15

CALIBRATION cont.

— Control (wide differential) —

CAUTION: *In hazardous areas do not remove housing cover until power is disconnected and atmosphere is determined to be safe. Hazardous environments must be declared safe by the local safety authority.*

HIGH LEVEL FAILSAFE

(relay de-energized above high control point)

1. Turn on power to the instrument.
2. Remove housing cover.
3. Adjustments

3.1 Dip switch

a. Failsafe: ON = high level
OFF = low level

b. Time delay direction: ON = delay on rising level
OFF = delay on falling level

c. Short time delay (0.5 to 7 sec.): 3 ON
4 OFF

d. Long time delay (2 to 120 sec.): 3 OFF
4 ON

NOTE: Switch positions 3 and 4 cannot be both ON or both OFF. One must be ON the other OFF or the LED and relay will remain ON.

3.2 25 turn potentiometer

a. Timer:

– Allows continuous adjustment of time delay within limits of DIP switch range chosen.
– Clockwise rotation increases delay.

b. Differential:

– Allows continuous adjustment of pump or valve control ON to OFF.
– Clockwise rotation increases differential. Full counter-clockwise rotation is the narrowest differential and is used for alarm applications.

c. Coarse:

– Allows continuous adjustment of setpoint over entire range of the electronics (0 to 1000 pF).
– Clockwise rotation raises SETPOINT on probe.

d. Fine:

– Allows precision adjustment of SETPOINT within the limits of the coarse adjusted initially.
– Clockwise rotation raises SETPOINT on probe.
– This is an extremely fine adjustment. Sometimes it is necessary to go 1 to 2 turns past the final SETPOINT to stop relay chatter. A small amount of time delay (2 turns) can also be used.

4. The LED shows the status of the relay coil:
LED on: relay energized
LED off: relay de-energized
5. Be sure Failsafe Mode Selection has been set correctly.
   a. In low level failsafe (LLFS) mode, the relay is de-energised on rising level and remains de-energised until upper differential point is reached.
   b. In high level failsafe (HLFS) mode, the relay is de-energised on falling level and remains de-energised until the lower setpoint is reached.
6. Set DIP switch positions 1 ON, 2 ON, 3 ON and position 4 OFF. LED will be OFF.
7. Verify process level is at desired low control point.
8. Turn COARSE control clockwise until LED turns ON. Turn coarse control counter-clockwise until the LED is off.
9. Slowly turn COARSE control clockwise until LED is ON. Low control point is now calibrated.

NOTE: FINE control can be used during wide differential calibration, but is usually not needed.

10. Prior to raising level to desired high control point, turn the differential control 25 turns clockwise or until clicking sound is heard.
11. Raise level to desired high control point.
12. Slowly turn the differential control counter-clockwise until the LED turns OFF. The wide differential relay is calibrated.

TIME DELAY

If Time Delay is needed for any reason (eg; surface waves causing relay chatter), the following two choices must be made:

Delay Function

– Delay on FILL (rising level) is DIP switch 2 ON.
– Delay on EMPTY (falling level) is DIP switch 2 OFF.

Delay Duration

– 0.5 to 7 sec.delay – DIP switch 3 ON, 4 OFF.
– 2 to 120 sec. delay – DIP switch 3 OFF, 4 ON.
– Clockwise rotation increases duration.

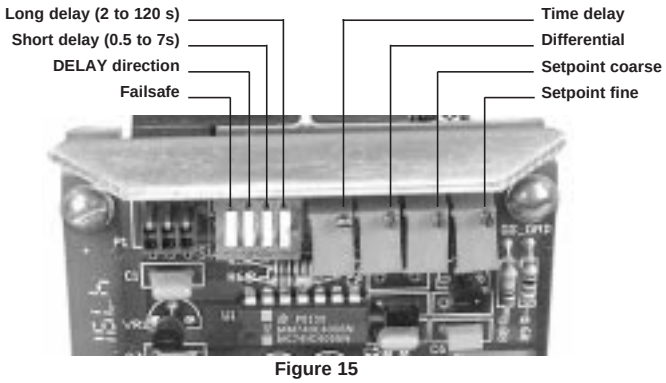


Figure 15

CALIBRATION cont.

KOTRON SERIES 811 APPLICATION

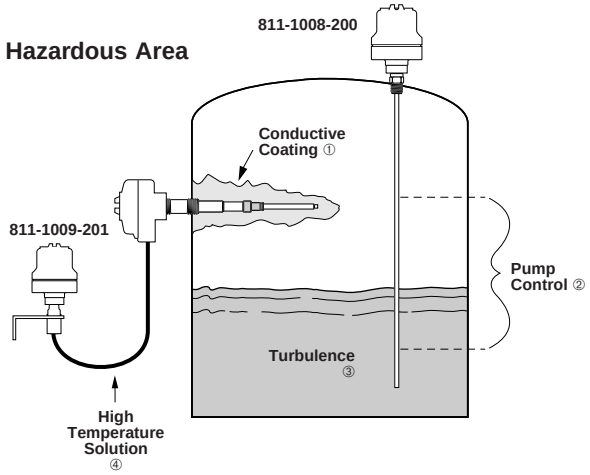
The Kotron series 811 incorporates as standard features what are optional features on many competitors devices:

① Rejection of conductive build-up by guarded probe and circuit.

② Ability to handle alarm (narrow differential) and pump/valve control (wide differential) in one unit.

③ Time delay eliminates the effect of relay chatter due to surface turbulence.

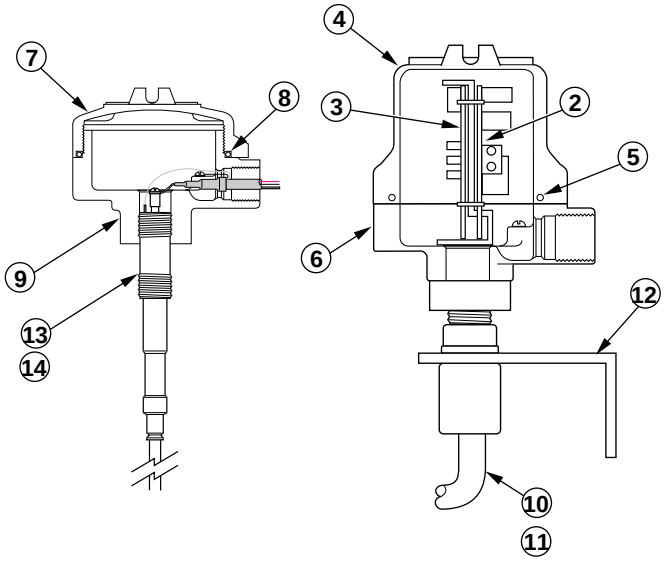
④ The unit does not require a preamplifier on the probe for elevated temperature.



REPLACEMENT PARTS

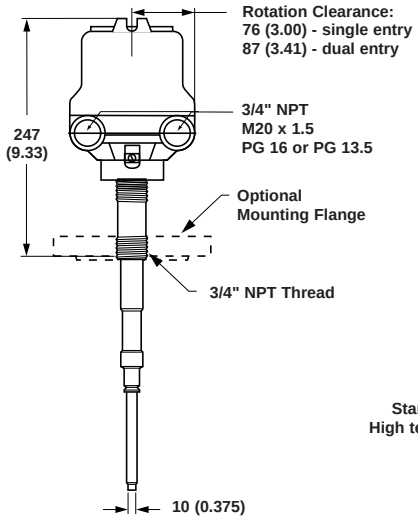
No.	Description		Part Number
1	Complete electronic assembly consist of items 2 and 3 and mounting bracket	120 VAC	30-9102-001
		240 VAC	30-9102-002
		24 VDC	30-9102-003
		12 VDC	30-9102-004
2	Power Supply Board (Integral or Remote)	120 VAC	30-4502-001
		240 VAC	30-4502-002
		24 VDC	30-4502-004
		12 VDC	30-4502-003
3	I.S. Amplifier Board (Integral or Remote)		30-4506-001
4	Electronics Cover (Integral or Remote)		02-6204-607
5	Electronics O-Ring (Integral or Remote)		12-2101-345
6	Electronics Base (Integral or Remote)		C/F
7	Remote Probe Cover		04-9105-005
8	Remote Probe O-Ring		12-2101-345
9	Remote Probe Base		C/F
10	Remote Triax Cable (Standard)①		37-3180-XXX
11	Remote Triax Cable (High Temp.)①		37-3184-XXX
12	Remote mounting bracket		C/F
13	Probe 18" (455 mm) (Integral or Remote)		41-5096-018
14	Probe 36" (915 mm) (Integral or Remote)		41-5096-036

① Specify remote cable by exact length, 10 to 150 feet (3 to 45 M).
Standard (+176°F/+80°C) 37-3180-XXX (length in feet).
High Temp. (+392°F/+200°C) 37-3184-XXX (length in feet).

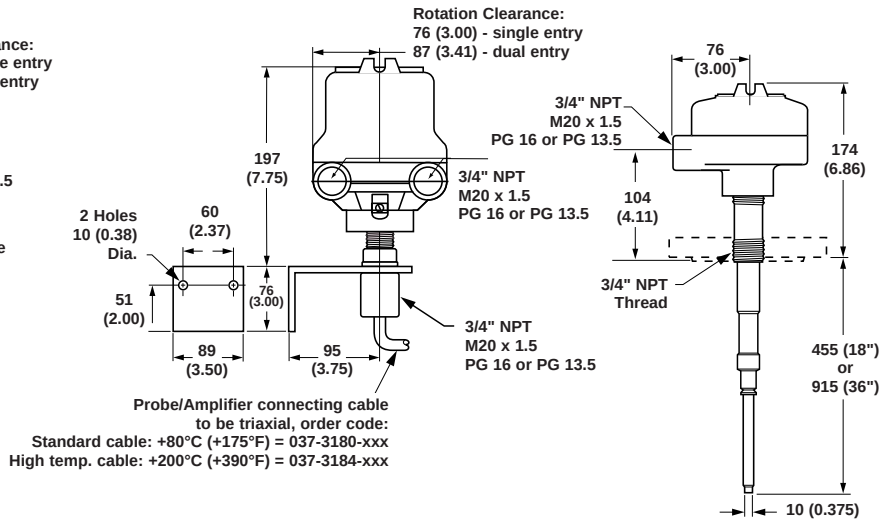


DIMENSIONS IN MM (INCHES)

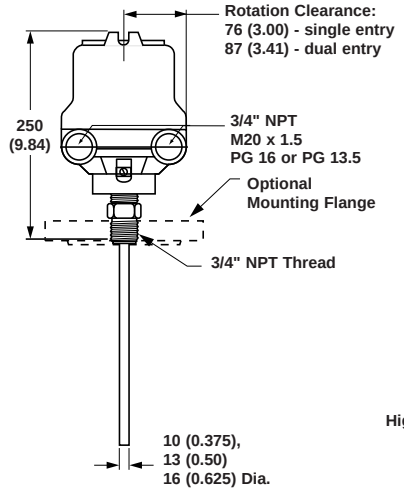
Integral mount with guarded probe



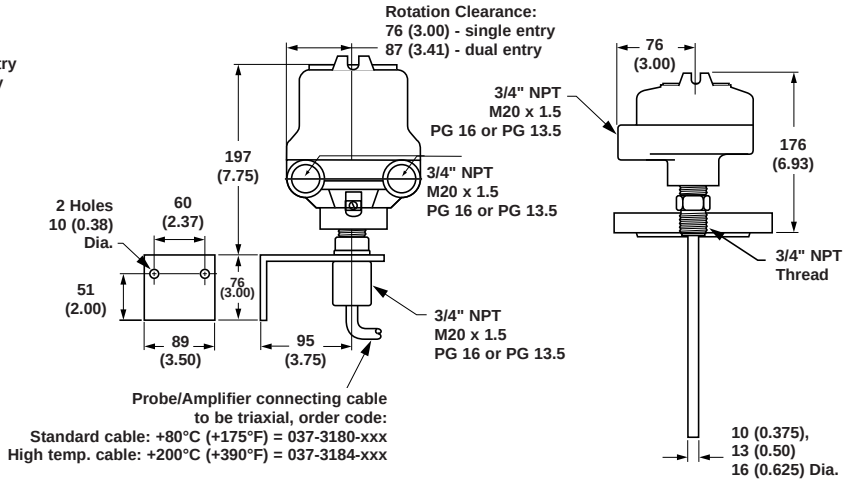
Remote mount with guarded probe



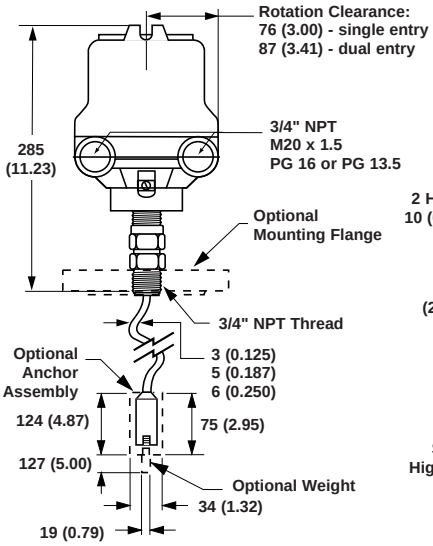
Integral mount with standard rigid probe



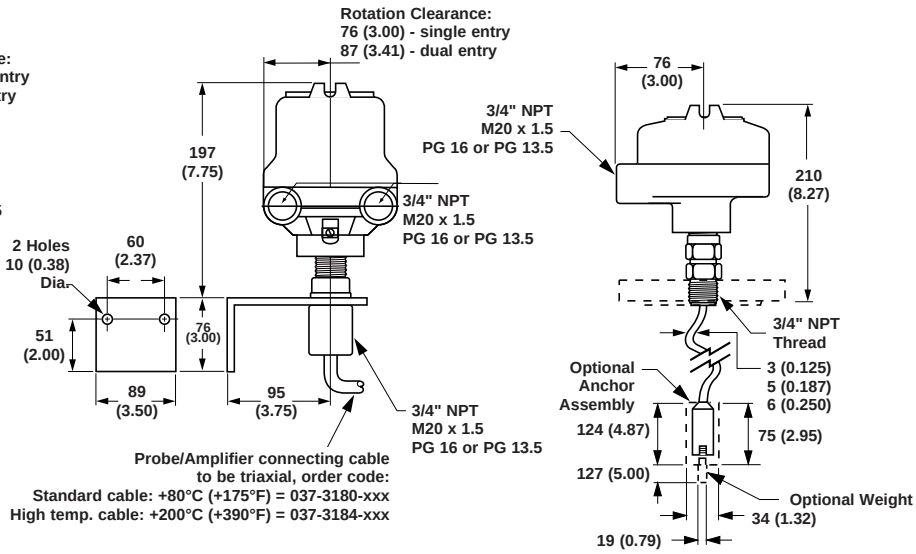
Remote mount with standard rigid probe



Integral mount with flexible probe



Remote mount with flexible probe



SPECIFICATIONS

Description		*Specification*
Supply voltage		240/120 V AC, 50-60 Hz 24/12 V DC
Power consumption		240/120 V AC, less than 5 V A 24/12 V DC, 1 W max.
Zero range		0 pF (Min.) to 1000 pF (Max.)
Adjustable differential		0.5 pF to 700 pF
Output relays	AC	Reversible DPDT, 240/120 V AC 10A Resistive
	DC	Reversible DPDT, 30 V DC 10A Resistive
Response time		100 milliseconds
Repeatability		Better than 1.0%
Ambient temperature at electronics		-40°C to + 70°C (-40°F to + 160°F)
Operating process pressure/temperature		Dependant upon probe selection, see probe bulletin 50-125
		Guarded probe: 041-5092 240 bar @ 20°C (3500 PSIG @ 70°F) 17 bar @ 205°C (250 PSIG @ 400°F)
Temperature coefficient of setpoint -40°C to +70°C (-40°F to +160°F)		± 0.018 pF/°C of setpoint (± 0.01 pF/°F of setpoint)
Electrostatic discharge protection		per IEC spec. 801-2

AGENCY APPROVALS

Agency	*Approval*
CENELEC	EEx d II C T6, explosion proof EEx d ia II C T6, with intrinsically safe probe (pending)
FM/CSA	Explosion proof with intrinsically safe circuitry Intrinsically safe (on remote mounted units only)

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: Returned within the warranty period; and, 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 50-608.0
EFFECTIVE: APRIL 1996
SUPERSEDES: New

UNDER RESERVE OF MODIFICATIONS

Magnetrol®

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