



Kotron® Sentinel Models 822, 832 and 842 RF Point Level Switches

DESCRIPTION

The Sentinel is a powerful multi-point level switch. The microprocessor-based circuitry has non-volatile memory, to protect against data loss. Powerful diagnostics check all major aspects of the system while MagneCal™ offers the user the advantage that one small level change is needed to calibrate.

FEATURES

- Optional intrinsically safe probe circuitry (with on-board barriers) allows safe use, even with bare probes in hazardous media
- Intrinsically safe remote mount models up to 800 feet (240 meters) of cable
- Integral or standard remote mount up to 2500 feet (760 meters) for application flexibility
- Two to four DPDT relays yield wide application flexibility for most alarm and control operation
- Relays 2 and 3, Series 832/842 models, may be used for lead/lag pump sequencing
- Time delay eliminates relay chatter due to turbulence.
- Usable with all Kotron probes for excellent application flexibility
- 3-button/4-digit LED data entry of all parameters
- One small level change (2% of span) needed for initial calibration in most cases
- Powerful self-diagnostics check the system, minimizing the need for routine maintenance checks
- Diagnostics check the integrity of the probe
- One relay may be dedicated as a diagnostic alarm



APPLICATIONS

- Hydrocarbons and solvents
- Corrosives
- High temperature/pressure liquids
- Multi-point alarm/control
- Pump control
- Lead/Lag pump control
- Process temperatures up to +1000° F
- Process pressures up to 5000 psig

TECHNOLOGY

The amount of capacitance developed in any vessel is determined by the size (surface area) of the probe, the distance from the probe to its ground reference, and the dielectric constant of the medium being measured.

Considering that the probe's mounting position is fixed and the dielectric of the medium is constant, then the amount of capacitance developed in any vessel becomes dependent upon the amount of the probe which is covered by the media.

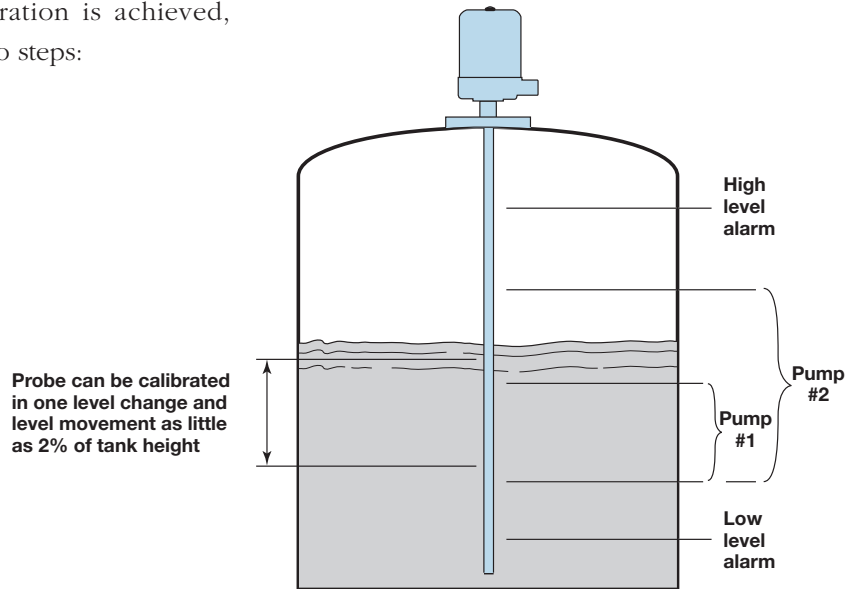
As the media rises and falls in the tank, the amount of capacitance developed between the probe and the ground reference also changes. The capacitance signal is converted to a frequency proportional to the change in level. The amplifier then converts this digital signal into an isolated 4–20 mA analog output signal.

SPECIFICATIONS

Supply voltage	120 VAC, 50/60 Hz (+10/-15%) 240 VAC, 50/60 Hz (+10/-15%) 24 VDC (±10%)
Power consumption	15 VA nominal
Humidity	99% non-condensing (electronics)
Electrostatic discharge protection	Per IEC specification 801-2
Response time	70 ms to approximately 2 seconds, depending upon probe capacitance and averaging value
Ambient temperature	-40° to +160° F (-40° to +70° C)
Temperature coefficient of set point	±0.01%/degree F (±0.018%/degree C)
Maximum remote mount distance:	
	Standard 2500 feet (760 meters)
	Intrinsically safe 800 feet (240 meters)
Data:	
	Entry 3-button keypad
	Indication 4-digit LED, 1 overflow LED for +10,000
Relays 2 to 4 DPDT:	
	AC 10 amp @ 120/240 VAC resistive
	DC 10 amp @ 30 VDC resistive, 0.5 amp @ 125 VDC resistive
Set point range	0–50,000 pF
Differential range	0.50 pF minimum / 50,000 pF maximum
Time delay	0–90 seconds level rising, falling, both

TYPICAL APPLICATION

The following sump application displays the extraordinary power and simplified calibration of the Kotron Sentinel with MagneCal. To better understand how this calibration is achieved, consider the approach in two steps:



Step 1 Probe calibration

All RF Capacitance devices must be calibrated in the process vessel. To calibrate, the process level must be varied to achieve a capacitance change.

With MagneCal, the probe is calibrated by establishing only two reference points and storing the data in the microprocessor, via the 4-digit LED and 3-button keypad. With conventional electronics, the level would need to be varied multiple times.

Step 2 Relay configuration



The relays are now configured with no further level change required.

The Sentinel draws upon the reference data stored during the probe calibration.


The relay control points are easily entered via the same 4-digit LED and 3-button keypad. All relays can be calibrated and recalibrated without further level change.

Relays can be set up for lead/lag operation to enable even pump wear.

AGENCY APPROVALS

Agency	Approved Model	Protection Method	Area Classification
FM 	8X2-1X02-G0X 8X2-1X03-G0X with rigid insulated probe	Explosion proof	Class I Div. 1, Groups C & D Class II Div. 1, Groups E, F & G NEMA 4X, IP65
	8X2-1X05-G0X 8X2-1X06-G0X	Explosion proof with intrinsically safe probe circuit	Electronics: Class I Div. 1, Groups C & D Class II Div. 1, Groups E, F & G NEMA 4X, IP65 Probe: Class I, II, III, Div. 1, Groups A, B, C, D, E, F & G NEMA 4X, IP65
	8X2-1X02-R0X 8X2-1X03-R0X 8X2-1X03-Y0X with rigid insulated probe	Explosion proof	Class I Div. 1, Groups B, C & D Class II Div. 1, Groups E, F & G NEMA 4X, IP65
	8X2-1X05-R0X 8X2-1X06-R0X 8X2-1X06-Y0X	Explosion proof with intrinsically safe probe circuit	Electronics: Class I, Div. 1, Groups B, C & D Class II, Div. 1, Groups E, F & G NEMA 4X, IP65 Probe: Class I, II, III, Div. 1, Groups A, B, C, D, E, F & G NEMA 4X, IP65
CSA 	8X2-1X00-C00 8X2-1X01-C00	Non-hazardous	TYPE 4X
	8X2-1X02-G0X 8X2-1X03-G0X with rigid insulated probe	Explosion proof	Class I Div. 1, Groups C & D Class II Div. 1, Groups E, F & G TYPE 4X
	8X2-1X05-G0X 8X2-1X06-G0X	Explosion proof with intrinsically safe probe circuit	Electronics: Class I Div. 1, Groups C & D Class II Div. 1, Groups E, F, G TYPE 4X Probe: Class I, II, III, Div. 1, Groups A, B, C, D, E, F & G TYPE 4X
	8X2-1X02-R0X 8X2-1X03-R0X 8X2-1X03-Y0X with rigid insulated probe	Explosion proof	Class I Div. 1, Groups B, C & D Class II Div. 1, Groups E, F & G TYPE 4X
	8X2-1XX5-R0X 8X2-1XX6-R0X 8X2-1XX6-Y0X	Explosion proof with intrinsically safe probe circuit	Electronics: Class I Div. 1, Groups B, C & D Class II Div. 1, Groups E, F, G TYPE 4X Probe: Class I, II, III, Div. 1, Groups A, B, C, D, E, F & G TYPE 4X

MODEL NUMBER

 Models available for quick shipment, usually within one week after factory receipt of a complete purchase order, through the Expedite Ship Plan (ESP).

Note: Delivery is ESP only if the Model 822, 832, or 842 and probe selected are both ESP.
Refer to bulletin 50-125 for probe selections.

RELAYS

2	Relays
3	3 Relays (lead/lag)
4	4 Relays (lead/lag)

INPUT POWER

0	120 VAC
1	240 VAC
2	24 VDC

MOUNTING

0	Integral NEMA 4X
1	Remote NEMA 4X
2	Integral NEMA 4X/7/9
3	Remote NEMA 4X/7/9
5	Integral NEMA 4X/7/9 with intrinsically safe probe circuit
6	Remote NEMA 4X/7/9 with intrinsically safe probe circuit

HOUSINGS

C	NEMA 4X, aluminum base with carbon steel cover, 3/4" NPT single conduit
G	NEMA 4X/7/9, cast iron, 1" NPT single conduit
R	NEMA 4X/7/9, aluminum, 1" NPT dual conduit
Y	NEMA 4X/7/9, aluminum, 1" NPT dual conduit with 316 SS 3/4" NPT single conduit (remote mount only)

PROBE SELECTION

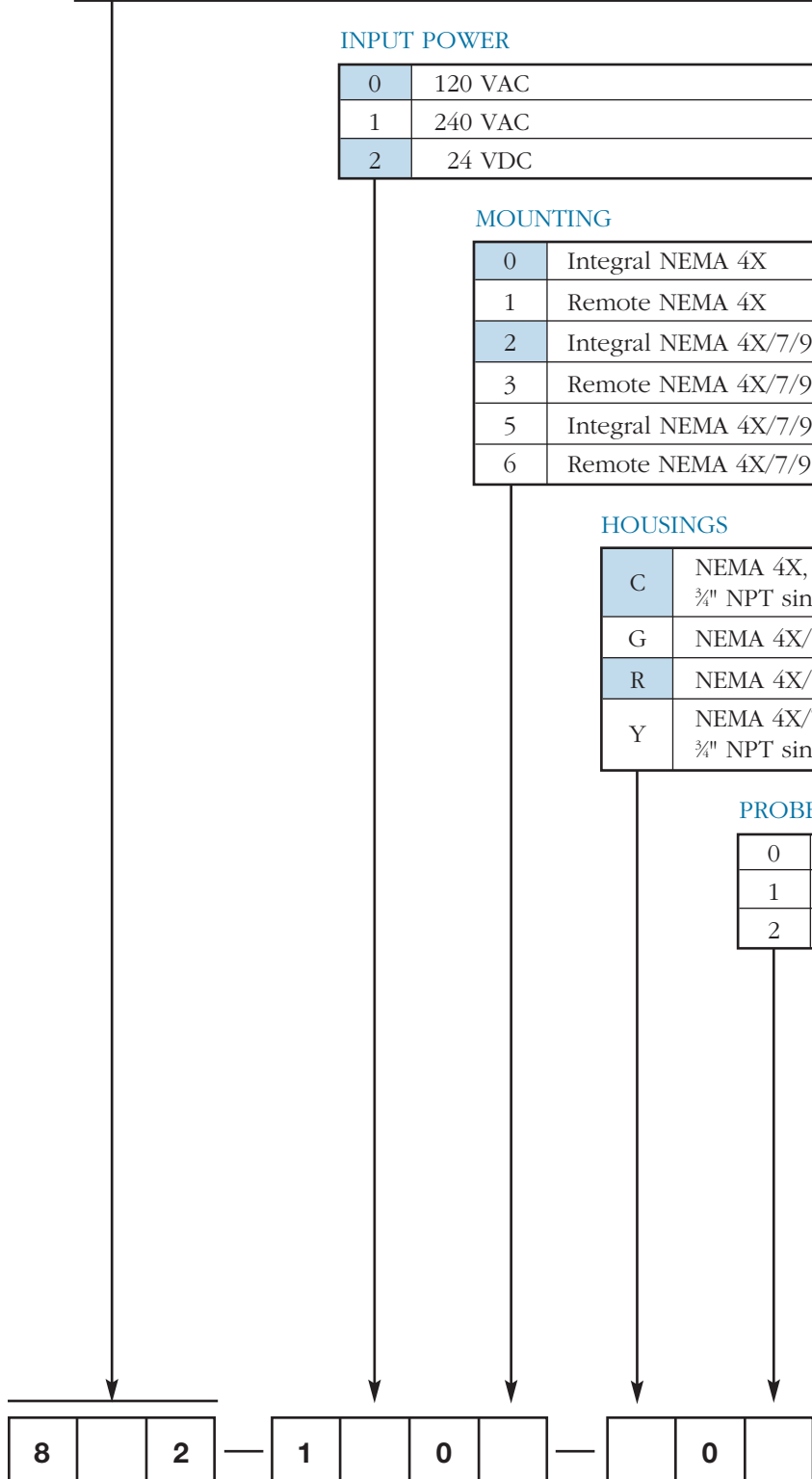
0	Probe ordered separately
1	18" (457 mm) guarded probe
2	36" (914 mm) guarded probe

PROBES

A full range of rigid and flexible probes for conductive and non-conductive process media is available in various lengths and materials of construction. For further information on probe assemblies, refer to bulletin 50-125.

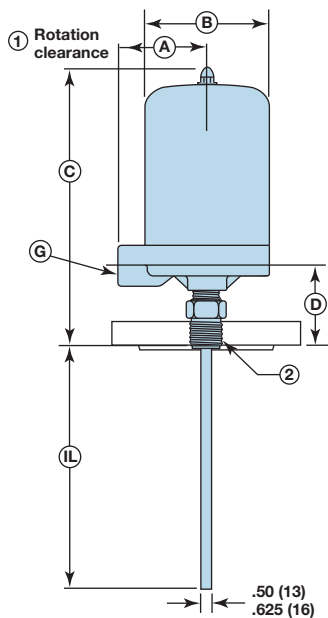
REMOTE CABLE

Remote cable should be shielded, twisted pair, 22-gauge stranded conductors and may be ordered using Magnetrol® part number 009-7146-001. Cable length in feet must be specified at time of order; 2500 feet (760 m) maximum; 800 feet (240 m) maximum for intrinsically safe models.

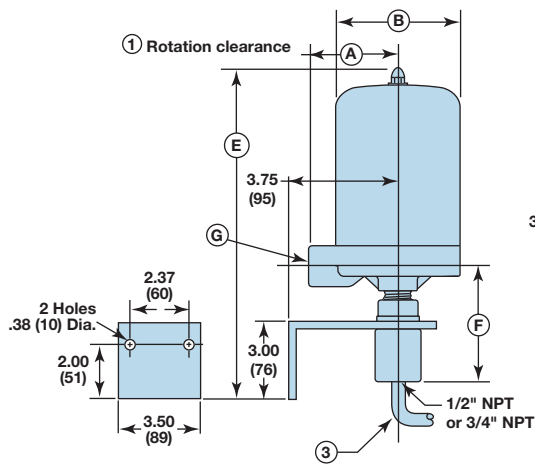


DIMENSIONAL SPECIFICATIONS

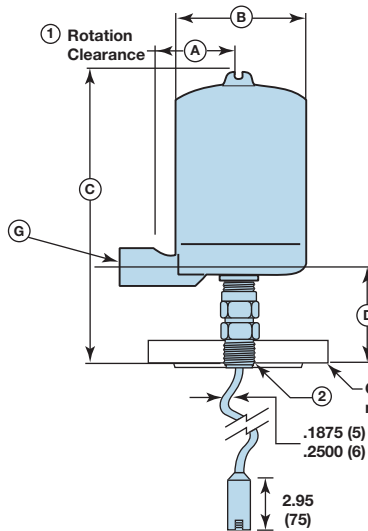
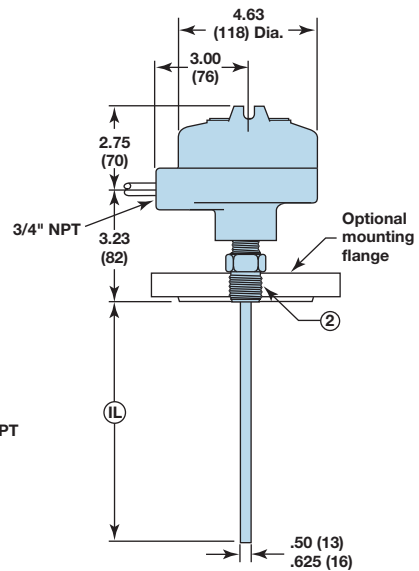
INCHES (mm)



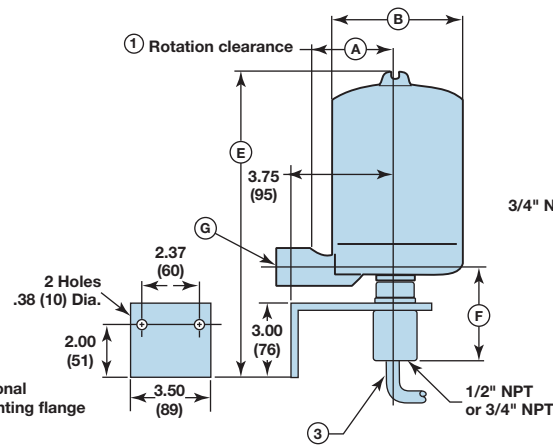
Integral Mount with Standard Rigid Probe
(shown with carbon steel housing)



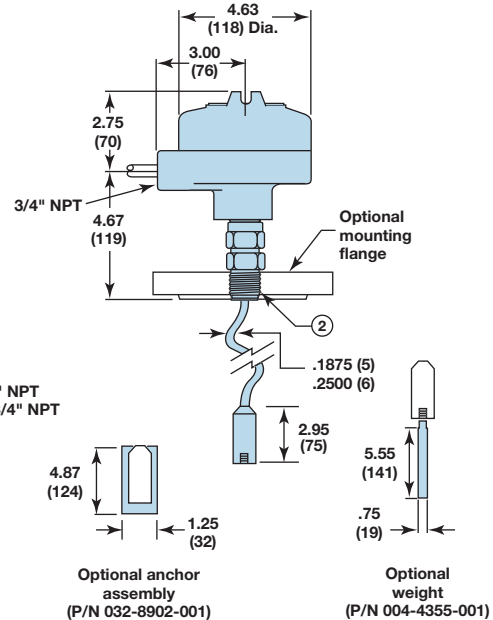
Remote Mount with Standard Rigid Probe
(shown with carbon steel housing)



Integral Mount with Flexible Probe
(shown with cast iron housing)

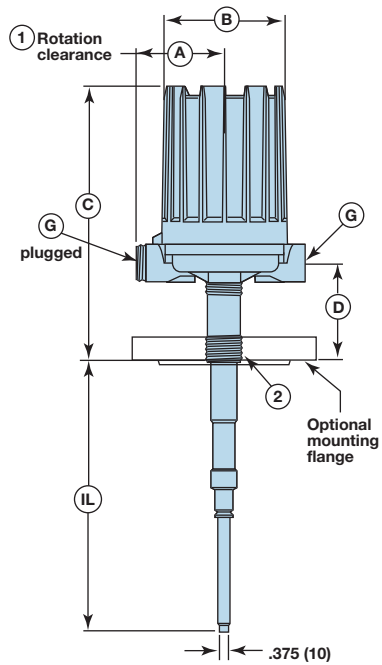


Remote Mount with Flexible Probe
(shown with cast iron housing)

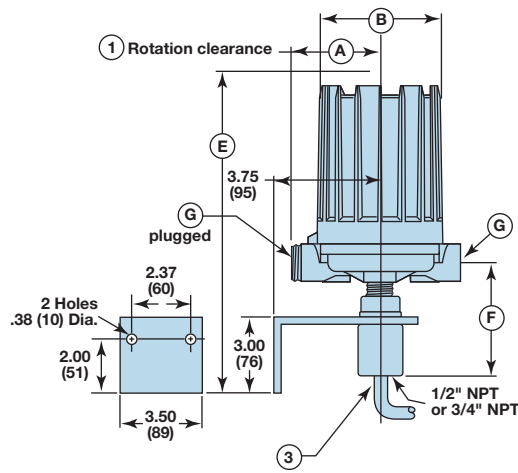


DIMENSIONAL SPECIFICATIONS

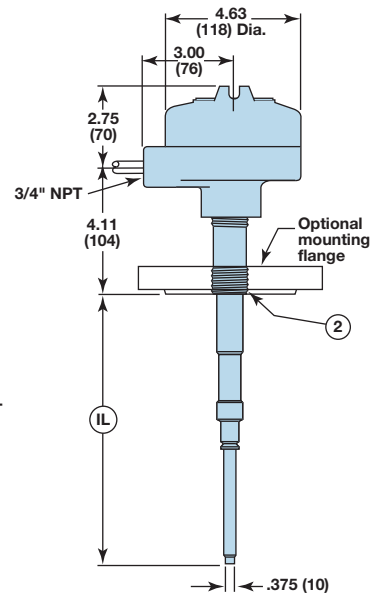
INCHES (mm)



Integral Mount with Guarded Probe
(shown with aluminum housing)



Remote Mount with Guarded Probe
(shown with aluminum housing)



Outline Dimensions														
Housing	A	B	Standard Rigid Probe				Flexible Probe				Guarded Probe			
			C	D	E	F	C	D	E	F	C	D	E	F
NEMA 4X Carbon steel	3.25 (82)	4.69 (119)	9.04 (230)	2.29 (58)	11.67 (296)	4.04 (103)	10.48 (266)	3.73 (95)	11.67 (296)	4.04 (103)	9.84 (250)	3.17 (80)	11.67 (296)	4.04 (103)
NEMA 4X/7/9 Cast iron	5.25 (133)	5.81 (148)	11.26 (286)	2.40 (61)	13.81 (351)	4.15 (105)	12.70 (323)	4.67 (119)	13.81 (351)	4.15 (105)	12.06 (306)	3.28 (83)	13.81 (351)	4.15 (105)
NEMA 4X/7/9 Aluminum	3.87 (98)	5.93 (151)	10.89 (276)	2.44 (61)	13.44 (341)	4.11 (104)	12.33 (313)	4.71 (119)	13.44 (341)	4.11 (104)	11.69 (296)	3.32 (84)	13.44 (341)	4.11 (104)

Conduit Connections (G)	
NEMA 4X Single conduit	3/4" NPT
NEMA 4X/7/9 Single conduit	1" NPT
NEMA 4X/7/9 Dual conduit	1" NPT

NOTES:

- ① Allow 8 inch (203 mm) overhead clearance for cover removal.
- ② Standard process connection is 3/4" NPT. Consult probe bulletin (50-125) for flange and other probe connections.
- ③ Probe/amplifier connecting cable to be shielded twisted pair 22-gauge stranded conductors. Magnetrol P/N 009-7146-XXX, where XXX = length in feet; 2500 feet (760 m) maximum; 800 feet (240 m) maximum for intrinsically safe models. For lengths over 999 feet, use X009-7146-999 and X = total length in feet.

QUALITY



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

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

ESP

Expedite Ship Plan

Several Kotron Model 822/832/842 RF Point Switches are available for quick shipment, usually within one week after factory receipt of a complete purchase order, through the Expedite Ship Plan (ESP).

To take advantage of ESP, simply match the

color coded model number codes (standard dimensions apply).

ESP service may not apply to orders of ten units or more. Contact your local representative for lead times on larger volume orders, as well as other products and options.

WARRANTY



All Magnetrol electronic level and flow controls are warranted free of defects in materials or workmanship for one full year from the date of original factory shipment.

If returned within the warranty period; and, upon factory inspection of the control, the cause of the claim is determined to be covered under the warranty; then, Magnetrol will repair or replace the control at no cost

to the purchaser (or owner) other than transportation.

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

For additional information, see Instruction Manual 50-621.



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