



## Kotron® Sentinel Model 804 RF Level Transmitter

### DESCRIPTION

---

The Sentinel is a unique, powerful level transmitter. The leading edge microprocessor-based circuitry has non-volatile memory. The display and keypad simplify calibration and setup of the instrument. Powerful diagnostics not only check all functions of the system, simplifying troubleshooting. MagneCal™ offers the user the greatest improvement in RF Capacitance—one small level change is needed to calibrate.

### FEATURES

---

- Two or four SPDT relays with gold flash contacts for alarm and control operation.
- Optional intrinsically safe probe circuitry (with on-board barriers).
- 16-button keypad and 2 by 16 LCD display.
- Isolated 4–20 mA output includes an active/passive mode.
- Relays can be configured for sequential or lead/lag pump control.
- One small level change (2% of span) needed for initial probe calibration.
- 4–20 mA and up to eight control points can be programmed with no level change.
- Powerful self-diagnostics check the system, including probe.
- Relay #1 can be dedicated as a diagnostics relay.



### APPLICATIONS

---

- Continuous level measurement
- Interface measurement
- Hydrocarbons and solvents
- Slurries
- Acids
- High temperature/pressure liquids

# 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 with 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 Pulsatel™ circuit mounted on the probe changes the capacitance signal 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
Ambient temperature range	-40° to +160° F (-40° to +70° C)
Humidity	99% non-condensing (electronics)
Accuracy	Better than ±1.0%
Repeatability	±0.1%
Linearity	±0.5%
Temperature effect	±0.01%/° F (±0.018/° C)
Operator interface:	
Data entry	16-button keypad
Display	2 line × 16 character LCD display
Continuous Output:	
Active signal	4-20 mA (isolated), reversible, 1000 ohms max. loop resistance
Passive signal	4-20 mA (isolated), reversible, loop resistance dependent on power supply
Range	5 pF minimum; 50,000 pF maximum
Damping	0-90 seconds
Discrete output (SPDT) with gold flash contacts:	
Set point range	0-50,000 pF
Adjustable differential range	0.5 pF minimum; 50,000 pF maximum
Time delay	0-90 seconds level rising, level falling, both
Relay output:	
AC	10 amp @ 120/240 Vac resistive
DC	10 amp @ 30 Vdc resistive 0.5 amp @ 125 Vdc resistive
Maximum remote cable length:	
Standard	2500 feet (760 meters)
Intrinsically safe	800 feet (240 meters)

# AGENCY APPROVALS

Agency	Approved Model	Protection Method	Area Classification
<b>FM</b>  APPROVED	804-XXXX-23X 804-XXXX-33X Insulated rigid probes only	Explosion proof	Class I Div. 1, Groups B, C & D Class II, Div. 1, Groups E, F, & G Class III NEMA 4X, IP65
	804-XXXX-53X 804-XXXX-63X	Explosion proof with intrinsically safe probe circuit	Integral units Class I Div. 1, Groups B, C & D Class II, Div. 1, Groups E, F, & G Class III NEMA 4X, IP65  Electronics Class I Div. 1, Groups B, C & D Class II, Div. 1, Groups E, F, & G Class III NEMA 4X, IP65  Remote probe Class I Div. 1, Groups A, B, C & D Class II, Div. 1, Groups E, F, & G Class III, NEMA 4X, IP65
<b>CSA</b> 	804-XXXX-23X 804-XXXX-33X Insulated rigid probes only	Explosion proof	Class I Div. 1, Groups C & D Class II, Div. 1, Groups E, F, & G Class III TYPE 4X
	804-XXXX-53X 804-XXXX-63X	Explosion proof ① with intrinsically safe probe circuit	Integral units with IS probe circuit Class I Div. 1, Groups B, C & D Class II, Div. 1, Groups E, F, & G ① Class III TYPE 4X  Electronics Class I Div. 1, Groups B, C & D Class II, Div. 1, Groups E, F, & G ① Class III TYPE 4X  Remote probe Class I Div. 1, Groups A, B, C & D Class II, Div. 1, Groups E, F, & G ① Class III TYPE 4X

① For Class II, Groups E & F insulated probes must be used



These units have been tested to EN 50081-2 and EN 50082-2 and are in compliance with the EMC Directive 89/336/EEC.

# MODEL NUMBER

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

## BASIC MODEL

804	Sentinel RF Level Transmitter
-----	-------------------------------

### ELECTRONIC HOUSING

R	NEMA 4X/7/9 aluminum, 1" NPT
Y	NEMA 4X/7/9 aluminum, 1" NPT with 316 SS, remote housing

### INPUT POWER

0	120 Vac
1	240 Vac
2	24 Vdc

### ANALOG OUTPUT/COMMUNICATIONS

1	4-20 mA
5	4-20 mA with RS-485 (Modbus)

### ALARM/CONTROL OUTPUT

0	No relays
C	(2) 10 amp SPDT relays with gold flash contacts
D	(4) 10 amp SPDT relays with gold flash contacts

### MOUNTING

2	Integral explosion proof
3	Remote explosion proof
5	Integral explosion proof w/IS safe probe circuit
6	Remote explosion proof w/IS safe probe circuit ①

① Not available with Electronic housing code Y



## PROBES

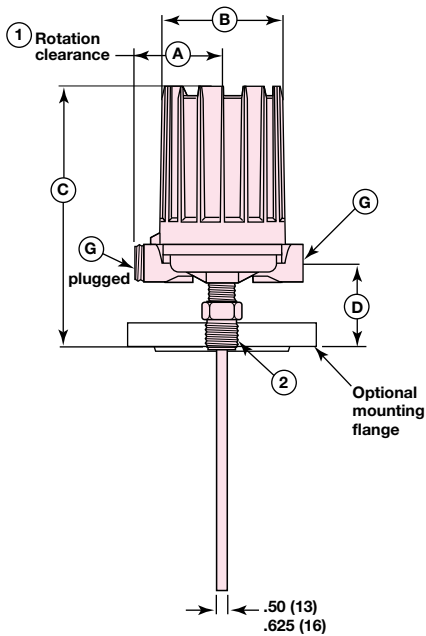
A full range of rigid and flexible probes, for conductive and non-conductive process media, is available in various lengths and materials of construction. For further information on probe assemblies, refer to bulletin 50-125.

## REMOTE CABLE

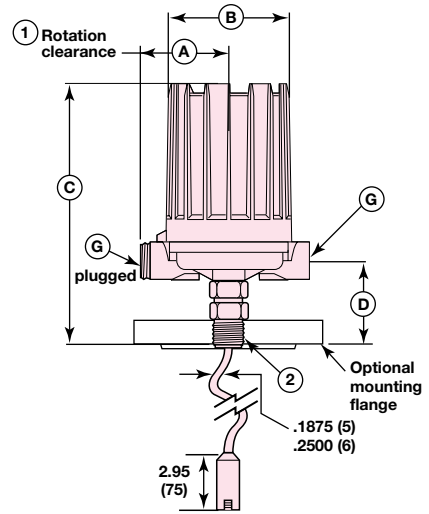
Remote cable should be shielded, twisted pair, 22-gauge stranded conductors and may be ordered using Magnetrol part number 009-7146-001. Cable length in feet must be specified at time of order; 2500 feet (760m) maximum; 800 feet (240 m) maximum for intrinsically safe models.

# DIMENSIONAL SPECIFICATIONS

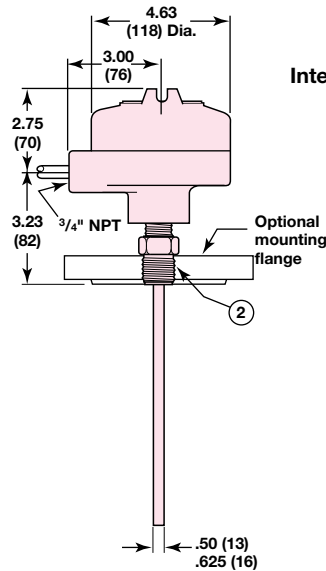
INCHES (mm)



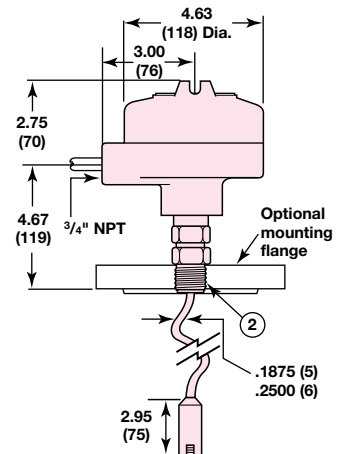
**Integral Mount with Standard Rigid Probe**



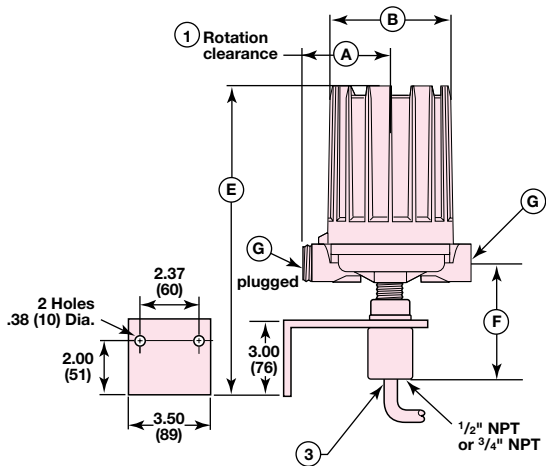
**Integral Mount with Flexible Probe**



**Rigid Probe**



**Flexible Probe**



**Remote Mount**

Outline Dimensions										
Housing	A	B	Standard Rigid Probe				Flexible Probe			
			C	D	E	F	C	D	E	F
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)

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

**NOTES:**

- ① Allow 8.00 (200) 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 part number 009-7146-001; 2500 feet (760 m) maximum; 800 feet (240 m) maximum for intrinsically safe models.

## 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.

Magnetrol's 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 804 RF transmitters are available for quick shipment, usually within one week after factory receipt of a 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 50-604.



5300 Belmont Road • Downers Grove, Illinois 60515-4499 • 630-969-4000 • Fax 630-969-9489 • [www.magnetrol.com](http://www.magnetrol.com)  
6291 Dorman Road • Mississauga, Ontario L4V-1H2 • 905-678-2720 • Fax 905-678-7407  
Heikenstraat 6 • B 9240 Zele, Belgium • 052 45.11.11 • Telex 25944 • Fax 052 45.09.93  
Regent Business Ctr., Jubilee Rd. • Burgess Hill, Sussex RH15 9TL U.K. • 01444-871313 • Fax 01444-871317

©2001 Magnetrol International, Incorporated. All rights reserved. Printed in the USA.  
Magnetrol and Magnetrol logotype are registered trademarks of Magnetrol International.

Performance specifications are effective with date of issue and are subject to change without notice.  
The brand and product names contained within this document are trademarks or registered trademarks of their respective holders.

**BULLETIN: 50-118.3**  
**EFFECTIVE: February 2001**  
**SUPERSEDES: September 2000**