Design Specifications
DS-3810
May,1997
(Supersedes issue dated April, 1997)

Metal Tube Variable Area Flowmeter with Optional Electronics based on Smart Meter Manager™ Technology

- Broad range of flow capacities
- 5% Full scale accuracy
- Versatile construction for all gas and liquid applications
- No back pressure required for operation
- Flanged or female NPT connections
- Optional 4-20 mA and HART® programmable microprocessor transmitter with or without alarms and pulse output for totalization
- Electronics designed with either intrinsically safe or explosion proof construction to meet UL,cUL, CENELEC and TIIS certifications and CE requirements

Model MT 3810

DESCRIPTION

The Brooks® Model MT 3810 Variable Area Flowmeter is a rugged, all metal flowmeter offering 5% full scale accuracy. The MT 3810 is constructed with stainless steel components for measuring a variety of liquid and gas applications.

Flow rate indication is provided by means of magnetic coupling where a magnet, encapsulated in the float, is coupled to a rotatable magnet located in the rear of the indicator, thus turning the dial indicator mounted on the meter.

Optional accessories available include 4-20 mA output with HART microprocessor transmitter with or without configurable alarms and pulse output for totalization. The microprocessor electronics are based on the proprietary Smart Meter Manager technology utilized as the basis for an array of Brooks products. Also available are front adjustable inductive alarms.

SPECIFICATIONS - METER

⚠ WARNING

Do not operate this instrument in excess of the specifications below. Failure to heed this warning can result in serious personal injury and/or damage to the equipment.

Capacities, Pressure Drop and Viscosity Immunity Ceilings
Refer to Table 1

Accuracy
Standard Flow Accuracy: ± 5% Full Scale from 100% to 10% of scale reading

Repeatability
0.25% Full Scale

Pressure Ratings
Refer to Table 2 for maximum non-shock pressure

Scales
Standard: Detachable aluminum plate single or dual scales
Graduations: Choice of direct reading units, percentage of maximum flow

Operating Fluid Temperature Limits/Meter only
Minimum: -20°F (-39°C)
Maximum: 420°F (215°C)
Refer to Table 3 for temperature limitations for meters with electronics.

Materials of Construction:

Metering Tube
316L stainless steel

Flanges and End Fittings
316/316L dual certified stainless steel

Connections
150 lbs or 300 lbs RF ANSI B 16.5 flanges or PN 40 DIN 2527/2635 or Female NPT
125/175 Ra flange finish
Vertical inlet and outlet

Floats
Standard: 316L stainless steel

O-rings (NPT only)
Standard: Viton®
Optional: Teflon®

Indicator Housing and Cover
Enclosure NEMA 4X construction
Die cast aluminum, polyurethane paint with glass window

Meter Dimensions
Refer to Figure 1, Sizes 7-13

Ordering Information and Model Code
Refer to Table 4

OPTIONAL ACCESSORIES

Needle Valves and Sight Flow Indicators
For flowrate control, needle valves may be externally piped into the inlet or outlet side of the instrument. Needle valves can be supplied up to size 10 (1") maximum 6.6 gpm (1,500 l/hr) water equivalent. Sight flow indicators are available for all flanged meters and to size 13 (2") NPT meters.

OPTIONAL ELECTRONIC EQUIPMENT

Electronic equipment available with the Model MT 3810 includes the Microprocessor Transmitter, Microprocessor Transmitter/Alarm/Pulse Output for totalization, Inductive Alarms, and Transmitter with Inductive Alarms, refer to pages 5 through 11 for additional information. All models are designed to be either Intrinsically Safe or Explosion Proof.

Table 1 Model MT 3810 Capacities, Pressure Drop and Viscosity Immunity Ceiling

SIZE	CONNECTION SIZE	FLOAT MATERIAL STAINLESS STEEL 316 SS								
		WATER		AIR (See Notes 1& 2)					Press. Drop Inches W.C.	Viscosity Immunity Ceiling (Centistokes)
		gpm	l/h	scfm	m^3/h	nm^3/h	ln/h	slpm		
7	1/2"	0.11	25	0.49	0.84	0.78	780	13.97	12.1	5
		0.29	65	1.30	2.20	2.05	2,050	36.71	12.1	1
		0.59	135	2.40	4.09	3.80	3,800	68.04	12.1	5
		0.88	200	3.73	6.34	5.90	5,900	105.64	14.1	1
8	1/2"	1.10	250	5.25	8.92	8.30	8,300	149	18.1	9
		1.76	400	7.71	13.12	12.20	12,200	218	22.1	6
		2.86	650	11.76	20.00	18.60	18,600	333	24.1	9
		4.40	1,000	21.37	36.34	33.80	33,800	605	52.3	6
10	1"	5.28	1,200	19.35	32.90	30.60	30,600	548	24.1	20
		6.60	1,500	25.61	43.55	40.50	40,500	725	28.1	6
		10.56	2,400	41.73	70.97	66.00	66,000	1,182	34.2	20
		15.40	3,500	65.44	111.29	103.50	103,500	1,853	62.3	6
12	1-1/2"	17.60	4,000	67.02	113.97	106	106,000	1,898	20.1	25
		26.40	6,000	95	161.28	150	150,000	2,686	24.1	25
		35.20	8,000	151	256.98	239	239,000	4,279	60.3	2
		46.20	10,500	212	360.20	335	335,000	5,998	120.6	2
13	2"	28.60	6,500	102	174.19	162	162,000	2,901	20.1	40
		41.80	9,500	161	274.18	255	255,000	4,566	24.1	40
		55.00	12,500	202	343.00	319	319,000	5,712	40.2	6
		88.00	20,000	392	666.64	620	620,000	11,101	120.6	6

Notes: 1) Air flows for scfm and slpm are given at 14.7 psia and 70°F
2) Air flows for nm^3/h are given at 14.7 psia and 0°C
3) All meters have a 10:1 turndown

Table 2 Model MT 3810 Pressure Ratings

Flange Rating*	316/316L Stainless Steel (psig at indicated temperature)						
	-20°F to 100°F	200°F	300°F	400°F	500°F	600°F	617°F
150 lb.	275	240	215	195	170	140	134
300 lb.	720	620	560	515	480	450	448

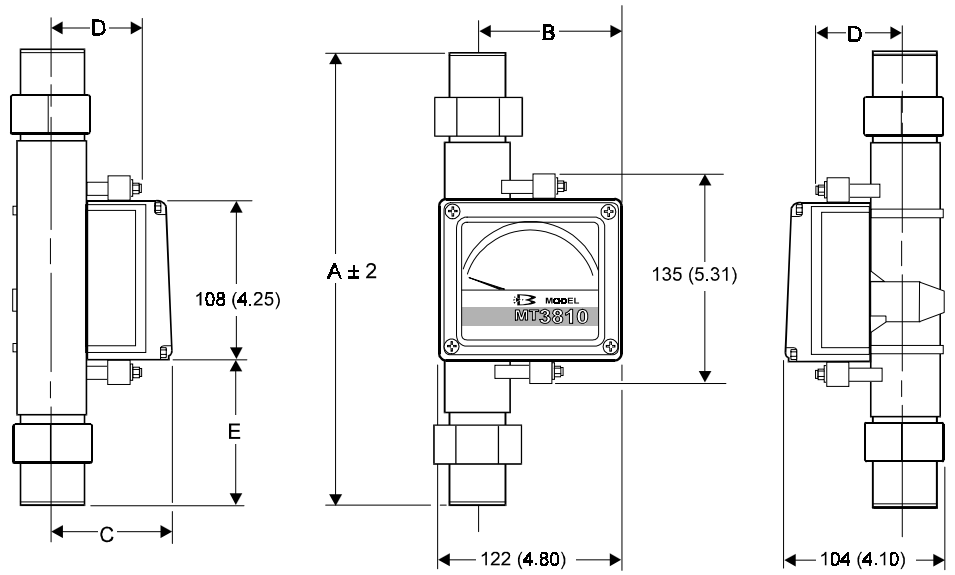
Threaded NPT	316L Stainless Steel (psig at indicated temperature)						
	-20°F to 100°F	200°F	300°F	400°F	500°F	600°F	617°F
7 & 8	1500	1500	1400	1400	1300	1200	1200
10	1500	1500	1400	1400	1300	1200	1200
12	1500	1500	1400	1400	1300	1200	1200
13	1300	1300	1200	1200	1100	1000	1000

*Flanges are dual certified 316/316L Stainless Steel

Table 3 Maximum Fluid Temperature at 104°F (40°C) Ambient

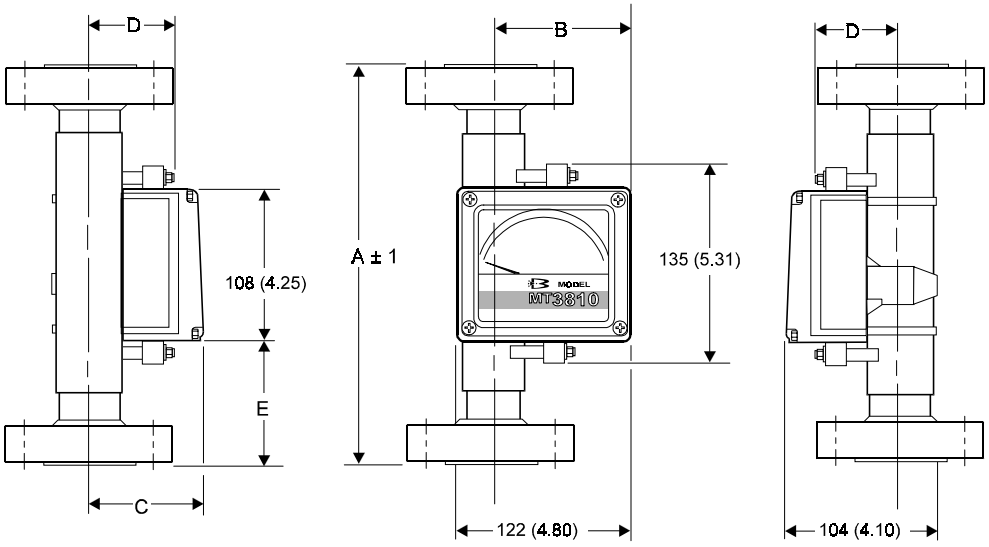
Indicator Only	Microprocessor Transmitter with or without Alarms & Pulse Output	Inductive Limit Switch Alarms	Microprocessor Transmitter withInductive Limit Switch Alarms
Standard	Standard	Standard	Standard
420°F (215°C)	195°F (90°C)	320°F (160°C)	195°F (90°C)

Model MT 3810 NPT-F Connection mm (inches)*



Meter Size	Connection	A	B	C	D	E	WEIGHT (Approx.)
7 & 8	1/2" NPT-F	225 (8.85)	88 (3.46)	72 (2.83)	53 (2.09)	59 (2.32)	1.3 kg (3 lbs.)
10	1" NPT-F	300 (11.81)	95 (3.78)	80 (3.15)	59 (2.32)	96 (3.78)	2.8 kg (7 lbs.)
12	1-1/2" NPT-F	300 (11.81)	105 (4.13)	89 (3.50)	65 (2.56)	96 (3.78)	5 kg. (12 lbs.)
13	2" NPT-F	300 (11.81)	111 (4.37)	95 (3.74)	77 (3.63)	96 (3.78)	6.3 kg (14 lbs.)

Model MT 3810 Flanged Connections mm (inches)*



Meter Size	Connection	A	B	C	D	E	WEIGHT (Approx.)
7 & 8	1/2" Flange	250 (9.84)	88 (3.46)	72 (2.83)	53 (2.09)	71 (2.78)	2.5 kg (6 lbs.)
10	1" Flange	250 (9.84)	96 (3.78)	80 (3.15)	59 (2.32)	71 (2.78)	4.2 kg (10 lbs.)
12	1-1/2" Flange	250 (9.84)	105 (4.13)	89 (3.50)	65 (2.56)	71 (2.78)	6.8 kg (15 lbs.)
13	2" Flange	250 (9.84)	111 (4.37)	95 (3.74)	77 (3.03)	71 (2.78)	8.7 kg (20 lbs.)

*Dimensions shown are for standard indicator units as well as units with the Smart Meter Manager transmitter or stand-alone inductive alarms.
Consult factory for dimensions of units with transmitters plus alarms or transmitters with inductive alarms.

Figure 1 Model MT 3810 Meter Dimensions

Microprocessor Transmitter With or Without Alarms and Pulse Output Based on Brooks Smart Meter Manager Technology

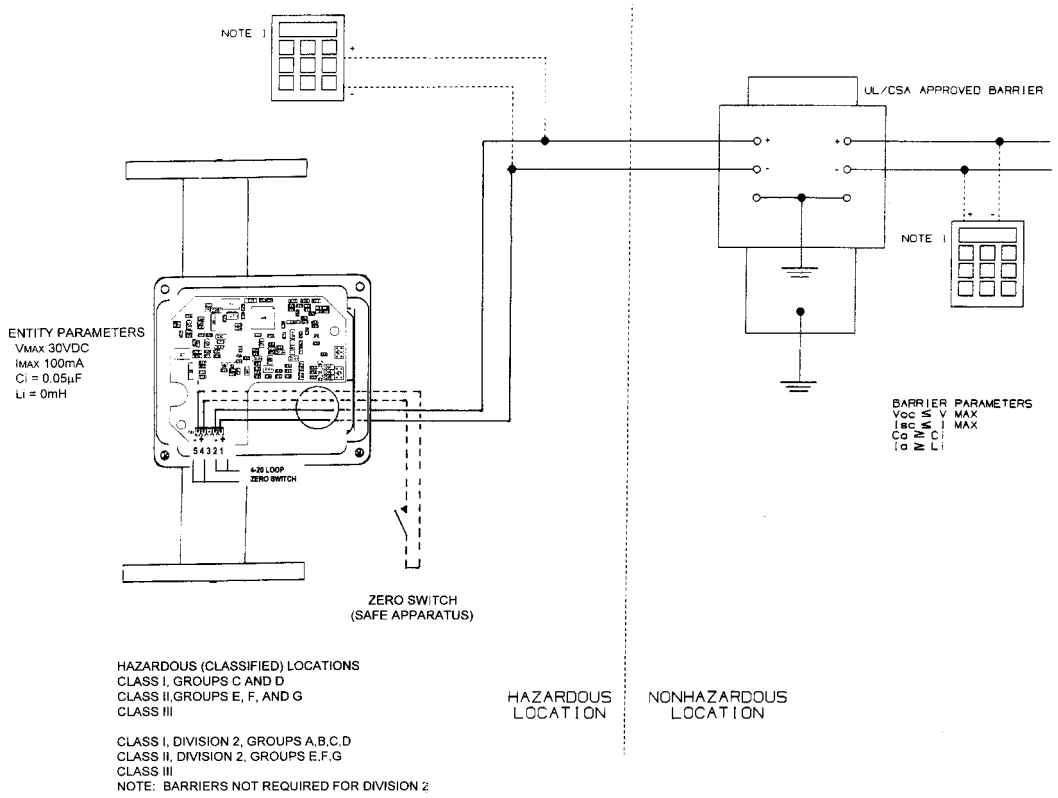
- A 2-wire, loop-powered device for ease of wiring and installation
- 4-20 mA analog output for flowrate, with Bell-202 modulated HART communication channel
- User selectable 0% and 100% analog output ranges with optional smoothing
- Flexible (mix & match) units of measure for flowrates, totals, temperatures, densities, etc.
- Two flow totalizers: Resettable and inventory totalization
- User configurable, scaleable pulse output for various engineering units
- Comprehensive alarms for both process flow and internal diagnostic checks
- Easily configured and compatible with other plant equipment
- Patented magnetic sensor which is resistant to external magnetic fields

"Smart Inside" best defines the Brooks transmitter with optional alarms and pulse output for totalization. The transmitter (with or without the alarms and pulse output) is a compact microprocessor device designed to interface directly with the Model MT 3810 flowmeter. The microprocessor electronics are based on the Brooks Smart Meter Manager (SMM™) technology common to other Brooks flowmeters.

The transmitter is HART-programmable for numerous variables such as flow rate, totalization, calibration factors, and high-low alarm parameters. It is programmable with easy-to-use hand held configurators such as the Fisher-Rosemount™ HART 275 Communicator. Prior to shipment, commonly used default values are programmed by Brooks to ensure ease of operation and quick startup. However, parameters may be reprogrammed by the user if needed. The 2-wire electronics system is easy to install and inface with other existing equipment such as process management systems or maintenance control packages.

In operation the microprocessor transmitter converts the measured process flow into a 4-20 mA output with HART protocol. The signal originates when the float magnet inside the metering tube passes a magnetic sensor mounted on the transmitter. Flow rate information may be viewed locally at the meter scale or displayed remotely (along with other flow data) as a function of external support systems through analog/pulse outputs or multiple digital communications.

In addition to transmitter features, this unit can also be ordered with optional alarms and pulse output provided by open collector switches. One or two alarms may be programmed prior to shipment of the unit or at the customer site with a hand-held communicator.



Refer to Figure 8 for Wiring Diagram Notes

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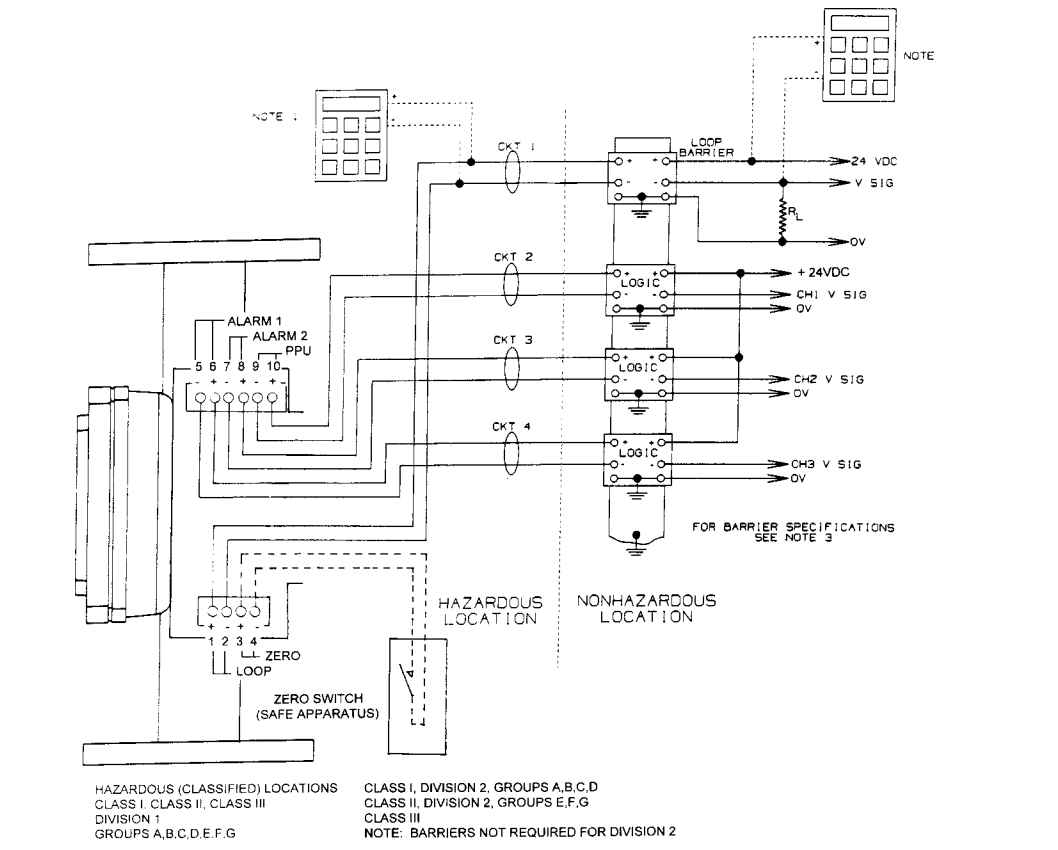
Figure 2 Transmitter Only Wiring Diagram



Refer to Figure 8 for Wiring Diagram Notes

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Figure 3 Transmitter with Alarm and Pulse Outputs Wiring Diagram

SPECIFICATIONS - SMM MICROPROCESSOR TRANSMITTER WITH OR WITHOUT ALARM AND PULSE OUTPUT

⚠ WARNING

Do not operate this instrument in excess of the specifications below. Failure to heed this warning can result in serious personal injury and/or damage to the equipment.

Electrical Classification
UL/cUL listed - Intrinsically Safe
Division 1, Class I, II and III, Groups A, B, C, D,E, F, G for all enclosure options
Enclosure 4X

UL/cUL listed - Non-incendive for Division 2, Class I, II, III, Groups A, B, C, D, E, F, G for all enclosure options
Enclosure 4X

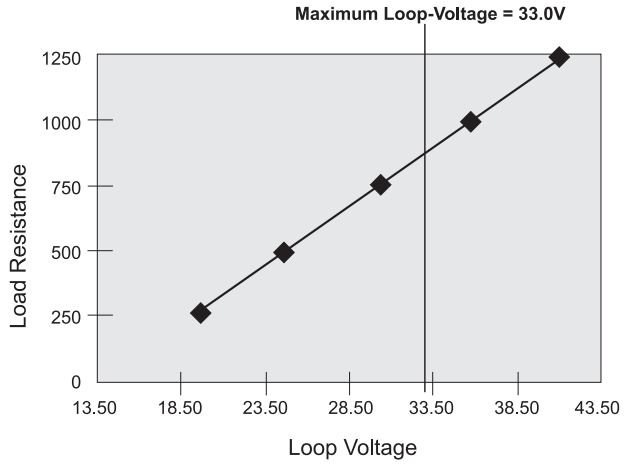
UL/cUL listed - Hazardous locations, Explosion Proof Class I, Division 1, Groups C, D, Class II, Division 1, Groups E, F, G; Class III Enclosure 4X, for optional explosion proof housing

CENELEC listed - Intrinsically Safe
EEX ia IIC T4 IP 65. Certified to EN50020, for all enclosure options

Flameproof, EEX d II B T4, IP 65 certified to EN 50014, for explosion proof housing.

Certified - CE Mark; EMC Directive

Power Supply and Maximum Load Resistance
21.0 to 33.5 Vdc Power Supply, refer to Figure 4 below.
Input Power: Derived from Analog Output (2-wire current loop transmitter)



Note: Load resistance should also include I.S. barrier resistance. When using Model 275 HART Communicator the minimum load resistance is 250 ohms.

Figure 4 Power Supply vs. Maximum Load Resistance

Output Signals
Transmitter: 4-20 mA analog output with HART
Update Rate: 4 times per sec.
Range: 3.8 to 22.0 mA

Two Alarm Outputs (open collector)
Optically isolated outputs assignable to alarms, reverse flow indicator, or manual valve.
Maximum off-state voltage: 30 Vdc
Maximum off-state current: 0.05 mA
Maximum on-state voltage: 1.2 Vdc
Maximum on-state current: 20 mA

One Pulse Output (open collector)
Optically isolated. Scaleable to a variety of engineering unit systems (pulses per liter, gallons, etc.)
Range: 1 Hz to 1 kHz
Maximum off-state voltage: 30 Vdc
Maximum off-state current: 0.05 mA
Maximum on-state voltage: 1.2 Vdc
Maximum on-state current: 20 mA

Ambient Temperature Limit
-20°F to 104°F (-39°C to 40°C)
For conditions outside of range consult factory.

Linearity
Less than 1% at I maximum

Temperature Influence
Less than 0.04% per °C

Voltage Influence
Less than 0.002%/Vdc

Load Resistance Influence
± 0.1% full scale

Transmitter, Alarm and Pulse Output Wiring Diagrams
Refer to Figures 2, 3, 5 and 8

For Division 1 explosion proof installations, the optional explosion proof enclosure must be used. This enclosure does not use the auxiliary terminal box, as shown on some of the installation diagrams. All connections are made directly within the housing.

For Division 2 non-incendive installations, either the standard enclosure or the explosion proof enclosure may be used.

For both Division 1 explosion proof and Division 2 non-incendive installations, the barriers shown in the installation drawings are unnecessary.

Wiring must be done in accordance with the applicable electrical codes, i.e., NEC Chapter 5 and CEC Section 18 and any local codes.

TRANSMITTER ACCESSORIES

General purpose and intrinsically safe HART compatible power supplies are available in 110V and 220V.

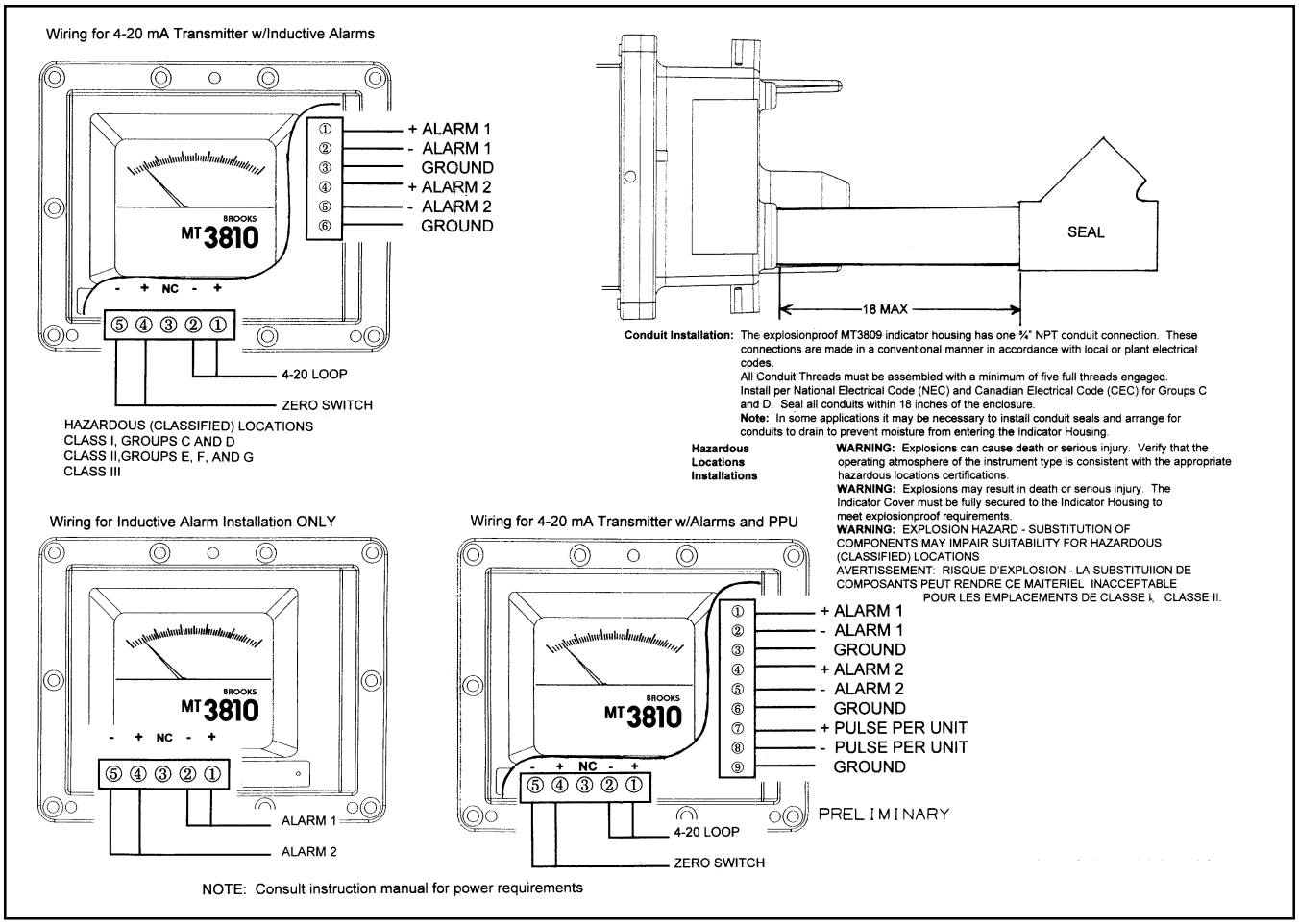


Figure 5 MT 3810 Explosion-proof Housing Wiring Diagram

Microprocessor Transmitter with Inductive Alarms

This combined system provides both the sophistication of the microprocessor along with the simplicity of one or two switch inductive alarms. Specifications for the transmitter are as stated previously and specifications for the front adjustable inductive alarms are as follows.

Wiring Diagrams
Refer to Figures 6 and 8

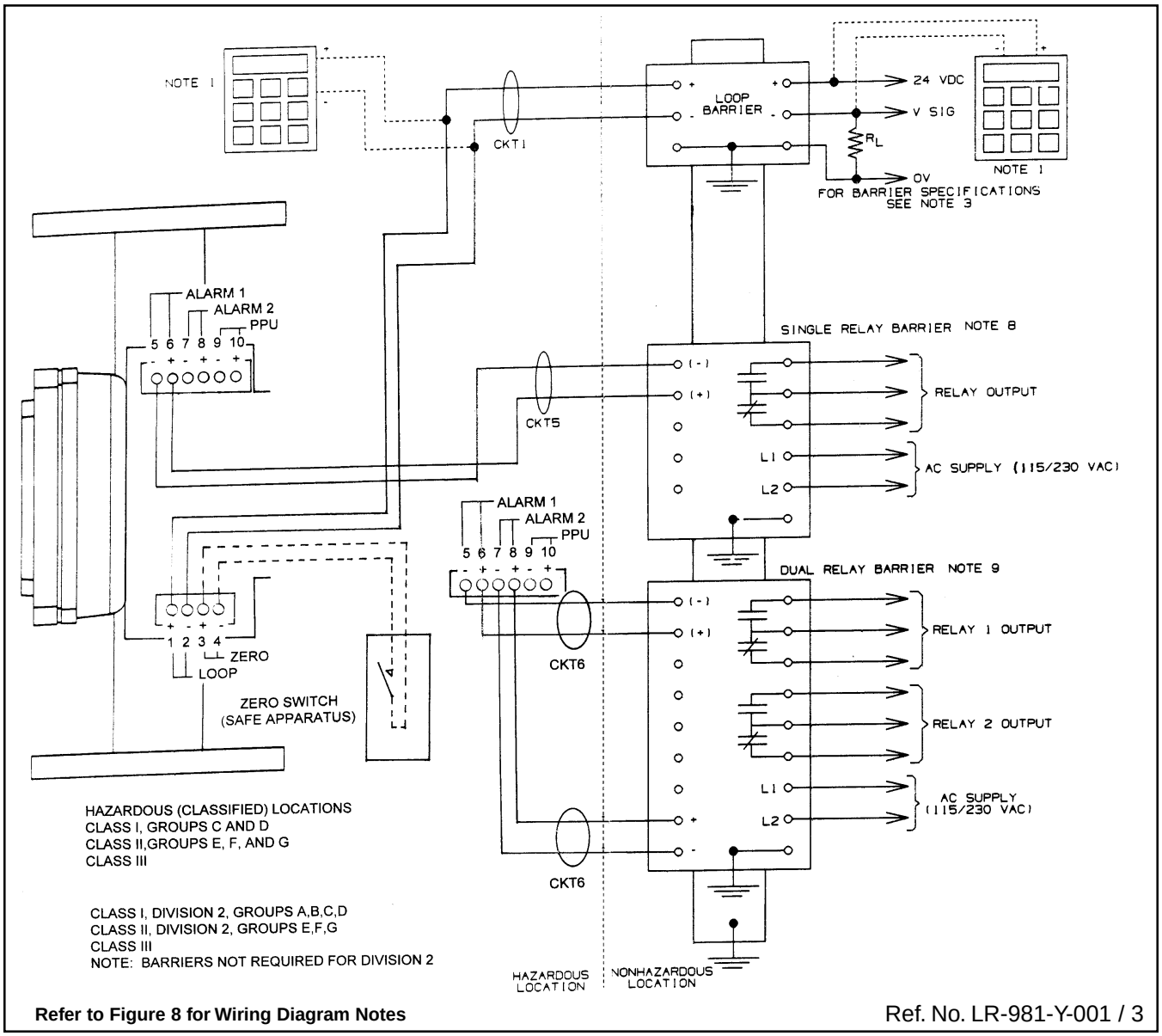


Figure 6 Transmitter with Inductive Alarm Wiring Diagram

Inductive Alarm Switches

- 1 or 2 normally open inductive limit switches
- Optional intrinsically safe power supply/amplifier/ relay unit
- For low or high limit signaling/switching
- Front adjustable

One or 2 electronic limit switches can be installed in the indicator housing to allow initiation of signaling or switching functions on a preset flow value. The limit switch operates as a slot initiator that is inductively actuated by a disc mounted on the pointer shaft. Any flow value can be used for setting the limit value by sliding the initiator along the indicator scale. Minimum setting distance between two limit switches is approximately 40% full scale. The position of the initiator also serves to visually indicate the set value. Settings can be adjusted by removing the indicator cover, loosening, moving and retightening of the alarm indication needle, and replacement of the indicator cover.

SPECIFICATIONS

⚠ WARNING

Do not operate this instrument in excess of the specifications below. Failure to heed this warning can result in serious personal injury and/or damage to the equipment.

Electrical Classification
UL/cUL listed - Intrinsically Safe
Division 1, Class I, II and III, Groups A, B, C, D,E, F, G for all enclosure options
Enclosure 4X

UL/cUL listed - Non-incendive for Division 2, Class I, II, III, Groups A, B, C, D, E, F, G for all enclosure options
Enclosure 4X

UL/cUL listed - Hazardous locations, Explosion Proof Class I, Division 1, Groups C, D, Class II, Division 1, Groups E, F, G; Class III Enclosure 4X, for optional explosion proof housing

CENELEC listed - Intrinsically Safe
EEX ia IIC T4 IP 65. Certified to EN50020, for all enclosure options

Flameproof, EEX d II B T4, IP 65 certified to EN 50014, for explosion proof housing.

Certified - CE Mark; EMC Directive

Power Supply
5-25 Vdc

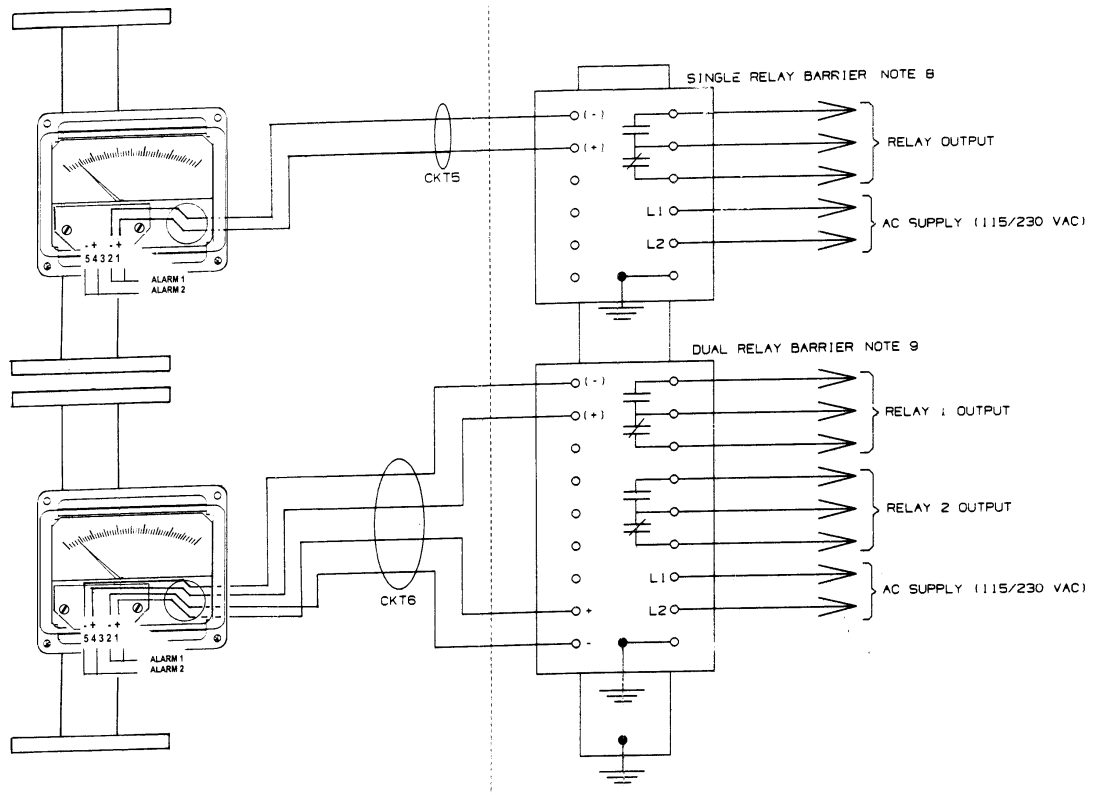
Impedance
Approximately 1 kohm with cam absent
Approximately 8 kohm with cam present

Ambient Operating Temperature
-20°F to 104°F (-39°C to 40°C)
For conditions outside range consult factory.

Maximum Operating Temperature
Refer to Table 3

Alarm Wiring Diagrams
Refer to Figures 7 and 8

Alarm Accessories
Amplifier Power Supply (approved isolated barrier) 1 or 2 channel approved for intrinsically safe application, remotely mounted, 110 or 220 Vac power. Single pole with double throw (SPDT) relay standard. For other configurations, consult factory.



Refer to Figure 8 for Wiring Diagram Notes

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Figure 7 Inductive Alarms Only Wiring Diagram

NOTES:

1- THIS DEVICE IS A ROSEMOUNT MODEL 275 HAND HELD COMMUNICATOR.

2- CHT1, CKT2, CKT3, CKT4, CKT5, AND CKT6 MUST RUN IN SEPARATE CABLES OR IN ONE CABLE WHICH HAS SUITABLE ISULATION. REFER TO INSTRUMENT SOCIETY OF AMERICA (ISA) RECOMMENDED PRACTICE RP12.6 FOR INSTALLING INTRINSICALLY SAFE LOOPS AND THE NATIONAL ELECTRICAL CODE, NFPA 70, ARTICLE 504. FOR CANADA, INSTALLATIONS MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE, PART 1.

3- LOOP BARRIER: R. STAHL INC. PART NO. 9002/13-280-110-00
LOGIC BARRIER: R. STAHL INC. PART NO. 9002/13-280-110-00

4- THE LENGTH OF THE CABLES WILL BE RESTRICTED TO THE FOLLOWING VALUES:

CIRCUIT	GROUP	C(uF)	L(mH)	CABLE LENGTH
CKT1	A,B	0.11uF	2.9mH	1,833 FT MAX
CKT1	C,E	0.33uF	11.6mH	5,500 FT MAX
CKT1	D,F,G	0.88uF	23.6mH	14,667 FT MAX
CKT2,3,4	A,B	0.10uF	4.4mH	1,667 FT MAX
CKT2,3,4	C,E	0.80uF	17.2mH	13,333 FT MAX
CKT2,3,4	D,F,G	1.10uF	35.7mH	18,333 FT MAX

FOR INTRINSIC SAFETY PURPOSES, THE MAXIMUM CABLE LENGTH WAS CALCULATED USING A CAPACITANCE OF 60 pF/FT AND AN INDUCTANCE OF 0.20uH/FT PER UL913.

5- WARNING: EXPLOSION HAZARD, SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR USE IN HAZARDOUS LOCATIONS.
AVERTISSEMENT: LA SUBSTITION DE COMPOSANTS PEUT COMPROMETTRE LA SECURITE INTRINSEQUE.

6- THE BARRIERS MUST NOT BE CONNECTED TO ANY DEVICE WHICH USES OR GENERATES IN EXCESS OF 250 VOLTS RMS OR DC INLESS IT HAS BEEN DETERMINED THAT THE VOLTAGE HAS BEEN ADEQUATELY ISOLATED FROM THE BARRIERS.

7- LOOP SUPPLY VOLTAGE: 24 VDC MAX., LOGIC SUPPLY VOLTAGE: 12 VDC MAX.

8- SINGLE RELAY BARRIER:
PEPPERL & FUCHS (WE77/EX1)-115 VAC, 45-60 HZ
(WE77/EX1-220)-230 VAC, 45-60 HZ
(KFA5-SR2-EX1.W 115 VAC, 45-65 HZ)
(KFA6-SR2-EX1.W 230 V, 45-65 HZ)

RELAY RATINGS (PEPPERL & FUCHS WE77/EX1)
AC V MAX ≤ 250 VAC
I MAX ≤ 4 AMP
P MAX ≤ 500 VA/Cos 0=0.7
DC 110 VDC/0.2 AMP
60 VDC/0.6 AMP
24 VDC/4.0 AMP

RELAY RATINGS (PEPPERL & FUCHS KFA5/KFA6)
AC V MAX ≤ 250 VAC
I MAX ≤ 2 AMP
P MAX 253V/2A Cos0 ≥ 0.7
DC 40V/2A RESISTIVE LOAD

9- DUAL RELAY BARRIER:
PEPPERL & FUCHS (WE77/EX2)-115 VAC, 45-60 HZ
(WE77/EX2-220)-230 VAC, 45-60 HZ
(KFA5-SR2-EX2.W 115 VAC, 45-65 HZ)
(KFA6-SR2-EX2.W 230 V, 45-65 HZ)

DC POWERED BARRIER
MTL 4016 - 20-35 VDC
45-80 mA
REED RELAY CONTACT RATINGS
10 WATTS, 0.5 A, 35 VDC
RESPONSE TIME 2MSEC MAX
NOTE: REACTIVE LOADS MUST BE ADEQUATELY SUPPRESSED.

PEPPERL & FUCHS
KFD2-SR2-EX2.W
POWER SUPPLY 20-30 VDC, 50 MA MAX
Voc=8V, I_{sc}=8 MA
SWITCH POINT/SWITCHING HYSTERESIS 1.2 MA-2.1 MA/≈ 0.2 MA
INPUT PULSE LENGTH/INPUT PULSE PAUSE ≥ 20 MSEC/≥ 20 MSEC
OUTPUT: AC 250V/2A/Cos0 > 0.7
DC 40V/2A RESISTIVE
RESPONSE TIME ≈ 20 MSEC

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Figure 8 Wiring Diagram Notes

Table 4 Ordering Information and Model Code

MODEL	BASIC MODEL TYPE
3810A	THRU-FLOW METER, THREADED & FLANGED CONNECTIONS

CODE	MATERIALS OF CONSTRUCTION (Body, Float and Fittings/Flanges)
1	316/316L SS

METER AND CONNECTION SIZE

CODE	METER SIZE	STANDARD CONNECTION SIZE		METER LAY LENGTH	
		FLANGED	NPT (F)	FLANGED	NPT (F)
1	7	1/2"	1/2"	250mm	225mm
2	8	1/2"	1/2"	250mm	225mm
3	10	1"	1"	250mm	300mm
4	12	1.5"	1.5"	250mm	300mm
5	13	2"	2"	250mm	300mm

MAXIMUM FLOW

NOTE: LIQUID FLOW BASED ON WATER Sp.Gr. 1.0, Visc 1.0 CP

AIR FLOWS FOR SCFM ARE @ 14.7 PSIA AND 70oF(21oC); NM3/H @ 14.7 PSIA AND 32oF(0oC)

CODE	SIZE 7	SIZE 8	SIZE 10	SIZE 12	SIZE 13
A	0.11 GPM	1.10 GPM	5.28 GPM	17.60 GPM	28.6 GPM
A	25 L/H	250 L/H	1200 L/H	4000 L/H	6500 L/H
A	0.49 SCFM	5.25 SCFM	19.35 SCFM	67.02 SCFM	102 SCFM
A	0.78 NM3/H	8.30 NM3/H	30.60 NM3/H	106 NM3/H	162 NM3/H
B	0.29 GPM	1.76 GPM	6.60 GPM	26.40 GPM	41.8 GPM
B	65 L/H	400 L/H	1500 L/H	6000 L/H	9500 L/H
B	1.30 SCFM	7.71 SCFM	25.61 SCFM	95 SCFM	161 SCFM
B	2.05 NM3/H	12.20 NM3/H	40.50 NM3/H	150 NM3/H	255 NM3/H
C	0.59 GPM	2.86 GPM	10.56 GPM	35.2 GPM	55.00 GPM
C	135 L/H	650 L/H	2400 L/H	8000 L/H	12500 L/H
C	2.40 SCFM	11.76 SCFM	41.73 SCFM	151 SCFM	202 SCFM
C	3.80 NM3/H	18.60 NM3/H	66.00 NM3/H	239 NM3/H	319 NM3/H
D	0.88 GPM	4.40 GPM	15.40 GPM	46.2 GPM	88 GPM
D	200 L/H	1000 L/H	3500 L/H	10500 L/H	20000 L/H
D	3.73 SCFM	21.37 SCFM	65.44 SCFM	212 SCFM	392 SCFM
D	6.34 NM3/H	33.80 NM3/H	103.5 NM3/H	335 NM3/H	620 NM3/H

CODE	CONNECTION TYPE
1	NPT (F) with Viton O'Ring (Sizes 7-13 only; up to 350 oF (177 oC))
2	NPT (F) with Teflon O'Ring (Sizes 7-13 only; up to 450 oF (232 oC))
A	ANSI 150# RF
B	ANSI 300# RF
D	DIN PN40

	METER ACCURACY/SCALE INSCRIPTION/FLUID		
CODE	METER ACCURACY	SCALE INSCRIPTION	FLUID
N	5% FULL SCALE	% SCALE	LIQUID
P	5% FULL SCALE	DIRECT	LIQUID
Q	5% FULL SCALE	% SCALE	GAS
R	5% FULL SCALE	DIRECT	GAS
S	5% FULL SCALE	% SCALE (SEE CAPACITY TABLE FOR LIMITS)	LIQUID HIGH VISCOSITY
T	5% FULL SCALE	DIRECT (SEE CAPACITY TABLE FOR LIMITS)	LIQUID HIGH VISCOSITY
7	5% FULL SCALE	Dual Scales % and/or Direct*	LIQUID
8	5% FULL SCALE	Dual Scales % and/or Direct*	GAS
9	5% FULL SCALE	Dual Scales % and/or Direct* (SEE CAPACITY TABLE FOR LIMITS)	LIQUID HIGH VISCOSITY

*Dual inscription scales are not available with any 4-20 mA transmitter options

3810A	1	2	A	1

Table 4 Ordering Information and Model Code Continued

	INDICATION CONFIGURATION			
CODE	HOUSING	MATERIAL	FINISH	INDICATOR FUNCTION
A	Standard	Aluminum	Polyurethane	Indictor only
B	Standard	Aluminum	Polyurethane	Inductive Alarm only, 1 Switch
C	Standard	Aluminum	Polyurethane	Inductive Alarm only, 2 Switches
D	Standard	Aluminum	Polyurethane	4-20 mA uP Transmitter only
E	Standard	Aluminum	Polyurethane	4-20mA uP Xmtr & Inductive Alarm 1 Sw
F	Standard	Aluminum	Polyurethane	4-20mA uP Xmtr & Inductive Alarm 2 Sw
G	Standard	Aluminum	Polyurethane	4-20mA uP Xmtr w/Pulse Output & Alarm Contacts
1	Ex. Proof	Aluminum	Epoxy	Inductive Alarm only, 1 Switch
2	Ex. Proof	Aluminum	Epoxy	Inductive Alarm only, 2 Switch
3	Ex. Proof	Aluminum	Epoxy	4-20 mA uP Transmitter only
4	Ex. Proof	Aluminum	Epoxy	4-20mA uP Xmtr & Inductive Alarm 1 Sw
5	Ex. Proof	Aluminum	Epoxy	4-20mA uP Xmtr & Inductive Alarm 2 Sw
6	Ex. Proof	Aluminum	Epoxy	4-20mA uP Xmtr W/Pulse Output & Alarm Contacts

CODE	RELAY/POWER SUPPLY OPTIONS (NOTE 2)
A	None
B	Power Supply Relay Unit - 220VAC - 1 Channel (For use with inductive alarms only)
C	Power Supply Relay Unit - 220VAC - 2 Channel (For use with inductive alarms only)
D	Power Supply Relay Unit - 110VAC - 1 Channel (For use with inductive alarms only)
E	Power Supply Relay Unit - 110VAC - 2 Channel (For use with inductive alarms only)
F	General Purpose Power Supply, 24 VDC (For use with 4-20mA transmitter only)
G	General Purpose Power Supply, 110VAC Input (For use with 4-20mA transmitter only)
H	General Purpose Power Supply, 220VAC Input (For use with 4-20mA transmitter only)
J	Intrinsically Safe Power Supply, 24Vdc Input (For use with 4-20mA transmitter only)
K	Intrinsically Safe Power Supply, 110Vdc Input (For use with 4-20mA transmitter only)
L	Intrinsically Safe Power Supply, 220Vdc Input (For use with 4-20mA transmitter only)

CODE	CERTIFICATIONS
1	None
A	Certificate for NIST Traceability
B	Certificate acc. N.A.C.E. MR-01-75
G	Certificate for NIST Traceability & N.A.C.E. MR-01-75

CODE	ACCESSORIES (NOTE 3 & 4)	METER LIMITATIONS
A	None	
N	1/4" Valve on Inlet (1/4" in with 1/2" out)	Size 7, float codes A, B, & C only
P	1/4" Valve on Outlet (1/2" in with 1/4" out)	Size 7, float codes A, B, & C only
Q	1/2" Valve on Inlet	Size 7, float code D; Size 8, float codes A, B & C only
R	1/2" Valve on Outlet	Size 7, float code D; Size 8, float codes A, B & C only
S	1" Valve on Inlet	Size 8, float code D; Size 10, float codes A & B only
T	1" Valve on Outlet	Size 8, float code D; Size 10, float codes A & B only
U	Sight Flow Indicator Mounting Hardware	Flanged units all sizes; NPT up to size 13 (2")
V	Sight Flow Indicator Mounting Hardware	Flanged units all sizes; NPT up to size 13 (2") Flanged units all sizes; NPT up to size 13 (2")

CODE	SOFTWARE REVISION LEVEL (for uP Transmitter)
1	Not Applicable - uP Transmitter not part of meter
A	Initial Release

3810A12A1 A A B A

NOTE ALARMS AND TRANSMITTER ARE DESIGNED IN ACCORDANCE WITH UL, cUL AND CENELEC STANDARDS AND CE MARK FOR INTRINSICALLY SAFE OR EXPLOSION PROOF APPLICATIONS.

NOTE 2: FOR INDUCTIVE ALARM POWER SUPPLY WITH 1 RELAY DPDT ADD $320 AND FOR 2 RELAYS DPDT ADD $620. ORDER AS SEPARATE LINE ITEM.

NOTE 3: ACTUAL SIGHT FLOW INDICATOR UNITS MUST BE ORDERED AS SEPARATE LINE ITEMS.

NOTE 4: VALVES AVAILABLE WITH NPT CONNECTIONS ONLY

Table 4 Ordering Information and Model Code Continued

Approximate Shipping Weight (lbs):	METER SIZE			
	7-8	10	12	13
WEIGHT 150# R.F. flange w/ indicator only	6	10	15	20
WEIGHT 150# R. F. flange w/transmitter	7	11	16	21
WEIGHT 150# R. F. flange w/inductive alarms	7	11	16	21
WEIGHT NPT (F) w/ indicator only	3	7	12	14
WEIGHT NPT (F) flange w/transmitter	4	8	13	15
WEIGHT NPT (F) flange w/inductive alarms	4	8	13	15

TRADEMARKS
Brooks ..... Brooks Instrument Division, Emerson Electric Co.
HART ..... HART Communications Foundation
Fisher-Rosemount ..... Fisher-Rosemount Grp. of Companies
Managing The Process Better ..... Fisher-Rosemount Grp. of Companies
Smart Meter Manager ..... Brooks Instrument Div., Emerson Electric Co.
SMM ..... Brooks Instrument Division, Emerson Electric Co.
Teflon ..... E.I. DuPont de Nemours & Co.
Viton ..... E.I. DuPont de Nemours & Co.

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