

MT3809G Series

Variable Area

Metal Tube Variable Area Flowmeters



MT3809G General Purpose
Housing

Overview

Brooks® MT3809 meter operation is based on the variable area principle. The all metal meter is ideal for a variety of gas, liquid and steam applications. These meters are indispensable where high pressure and/or high temperature operating conditions exist.

The primary meter is available in 316/316L stainless steel as well as with a PTFE liner. But a wide range of corrosion resistant materials of construction are available which makes it a perfect fit for metering of aggressive applications.

A broad range of connection sizes and types such as ASME, DIN and JIS flange choices along with several threaded options provide for flexible installations.

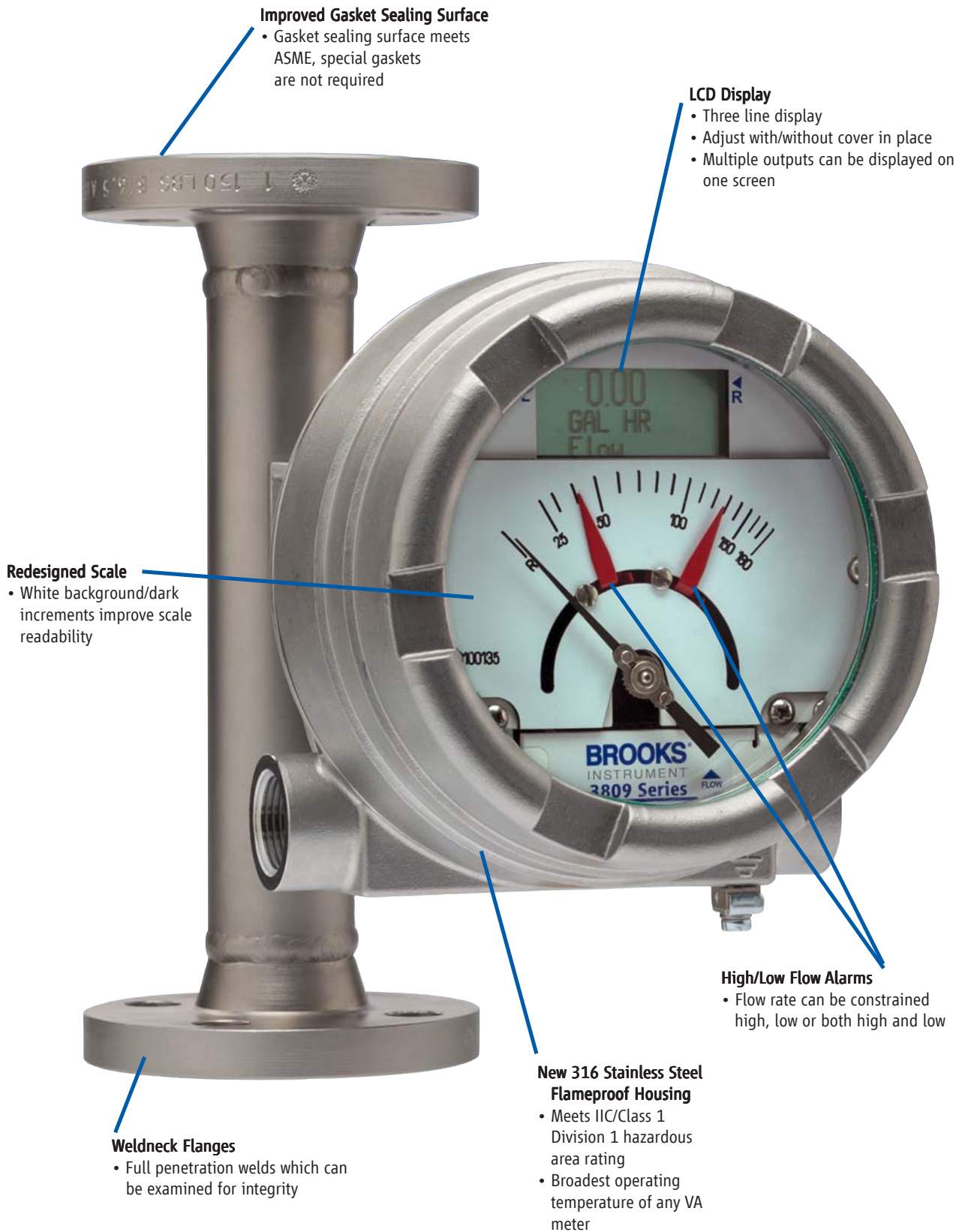
The very popular mechanical indicator option does not require power which reduces installation costs and is a cost-effective solution for flow measurement in hazardous areas. Certified transmitters and alarms both flameproof and intrinsically safe are available for hazardous installations anywhere in the world.

Product Description

The Brooks Model MT3809 has been the “go to” meter for several years and the choice of Engineering & Procurement Contractors (EPC) and major industrial customers. Brooks is proud to raise the performance of the standard meter by adding these new features and options:

- Alarm function that meets SIL 2 requirements, the perfect product for safety applications
- LCD display with local operator interface without removing the cover which means changes can be made even in hazardous areas
- 316SS flameproof housing that meets IIC/Class 1 Div 1 to handle the toughest hazardous applications
- The broadest range of operating temperatures in the industry, the perfect meter for difficult applications
- Lower flow rates with the current lay lengths which means one meter style can be used for very low to high flow rates
- The new meter is designed to ASME B31.3 and the gasket sealing surface is per ASME, a rugged design that does not require special gaskets at installation
- Weldneck flanges are standard for MT3809 and MT3810 which means full penetration welds that can easily be tested for integrity

Features and Benefits



Product Description

316 SS Flameproof Housing

The 3809 flameproof housing has been redesigned and improved. The option is made of 316 stainless steel. This includes housing, cover, bracket and hardware. The new option now meets ATEX gas group IIC/NA class 1 Division 1. This is the highest gas protection rating available. Now this option can be used in more hazardous area applications. This option also has the broadest operating temperature range of any Variable Area meter. The new 3809 can be used in applications from -198°C to +420°C (-325°F to +788°F).

LCD Display

The 4-20 mA output transmitter is still available with remote analog output but now a LCD display is a new option. The LCD display supplies additional information locally such as totalization, alarm signals and the ability to make parameter changes. The changes can be made by removing the housing cover which is possible in a non-hazardous area. But in a hazardous area the display can be accessed with the cover in place using a supplied magnet.

Improved Transmitter and Alarm Option

The transmitter and alarm options can be used in applications from -198°C to +420°C (-325°F to +788°F). Every transmitter has HART Revision 7 capability. The transmitter and alarm options will have worldwide approvals including CSA (North America), ATEX (Europe), KOSHA (Korea), NEPSI (China) and TR CU (Custom Union including Russia). The alarm function has a safety certification of SIL 2. This option can be used in the toughest applications including safety systems.

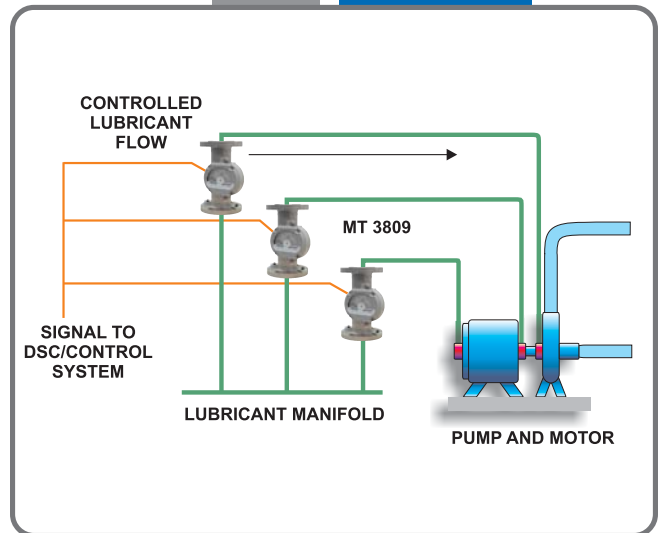


Product Applications

Rotating Equipment

Large rotating equipment requires effective and reliable flow monitoring on a number of fluid supplies – like lubrication fluids, coolants, and dry gas seal gasses – to ensure efficient and safe operation.

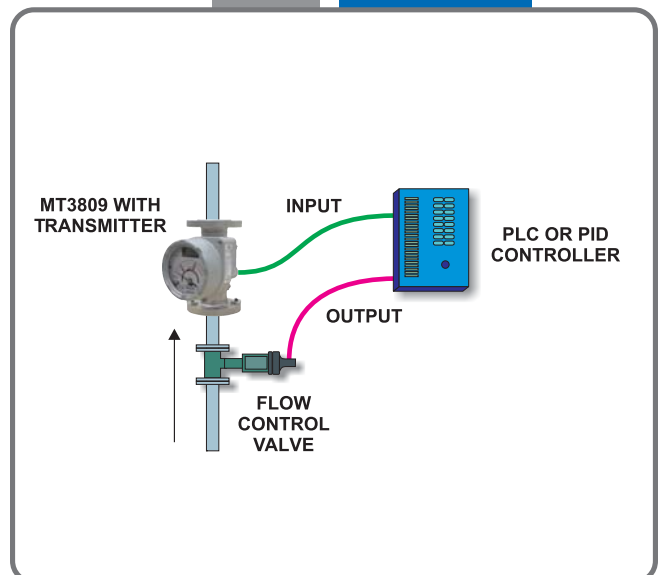
Brooks variable area meters – such as the MT3809 shown – are commonly used to monitor lube oil and coolant flows. The optimum solution is using a 4-20 mA transmitting variable area meter so that flow can be continuously monitored.



Basic Flow Control

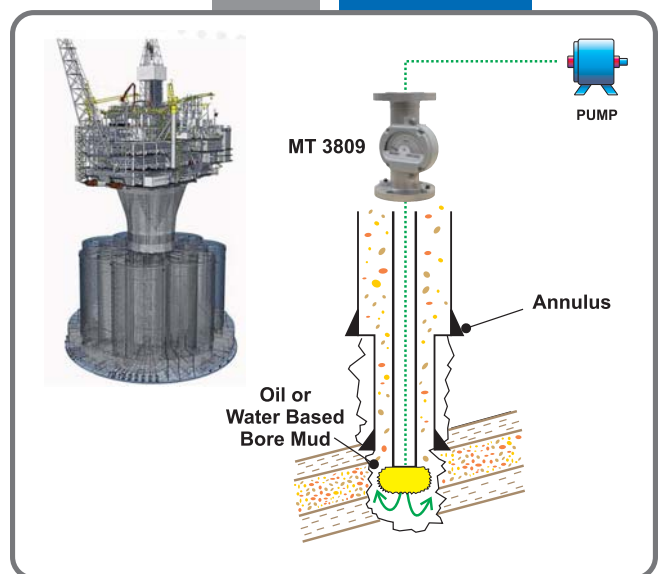
Many industrial processes require reliable, accurate, and repeatable gas and liquid flow measurement and control. Brooks variable area meters are exceptionally versatile, and are ideal for monitoring process flow, instrument impulse lines, purge gas flows, flows of flushing or cooling media, make-up flows, and reactor gas and liquid feeds.

Many Brooks variable area meters offer flow switches, alarms, or continuous electronic output to allow flow conditions to be monitored and controlled remotely. A variety of valves is also available for setting a flow set-point, and electronic pressure controllers are offered to provide constant flow under varying pressure conditions.



Offshore/High Pressure

Operators of offshore platforms require reliable products that operate under extreme conditions such as high pressure and difficult environmental conditions. Common offshore applications involve injecting a fluid (many times a proprietary fluid) into the high pressure extraction fluid to either prevent corrosion, freezing of the extraction fluid or adding lubrication. In all cases the goal is to provide local monitoring of the extraction process which improves the overall process yield. The Model 3809 variable area meter is an excellent choice because it is simple, proven, reliable (only one moving part) and is available for operating pressures to 20,000 PSIG/ 1350 bar.



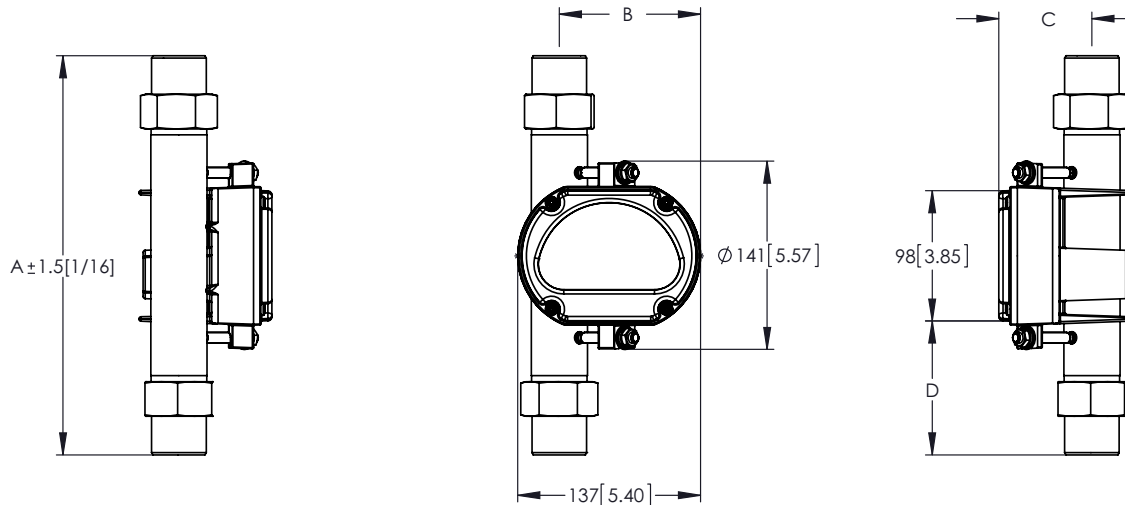
Product Specifications - Meter

Specifications	MT3809	MT3809 ELF	TFE Lined	MT3810
Measuring Range	See Capacity Tables on page 11			
Rangeability	10:1 (most sizes)			
Metering Tube	316/316L (dual certified stainless steel) Alloy 625, Hastelloy® C, Titanium Gr. II	Monel® K-500, Hastelloy® C	316/316L (dual certified stainless steel) w/Tefzel® Lining	316/316L (dual certified stainless steel)
Flanges and End Fittings	316/316L (dual certified stainless steel) Alloy 625, Hastelloy® C, Titanium Gr. II		316/316L (dual certified stainless steel) w/Tefzel® Lining	316/316L (dual certified stainless steel)
Accuracy	2%, 1%, VDI/VDE class 1.6	5%, 3%, VDI/VDE class 4, 2.5	2%, VDI/VDE class 1.6	5%, VDI/VDE class 6
Repeatability	0.25% Full Scale	1% Full Scale	0.25% Full Scale	0.25% Full Scale
Scale	Dark increments with white background - Aluminum Material			
Connections	Weldneck flanges to ANSI B16.5, DIN 2527/2635		Flanges to ANSI B16.5, DIN 2527/2635	Weldneck flanges to ANSI B16.5, DIN 2527/2635
	1/2" to 2" NPT/Rc-Female	1/2" NPT/Rc-Female		1/2" to 2" NPT-Female
	1" to 2-1/2" NPT-Male	1" NPT-Male		
Flange Rating	ANSI 1/2" to 4" 150# RF to 600# RF	ANSI 1/2" to 1" 150# RF to 600# RF	ANSI 1/2" to 2" 150# RF to 300# RF	ANSI 1/2" to 2" 150# RF to 300# RF
	DIN PN 40		DIN PN40	
Standard Flange Finish	3.2 - 6.3 Ra			
Floats	316L stainless steel Alloy 625, Hastelloy C Titanium Gr. II	316L stainless steel/Titanium Monel K-500, Hastelloy C	Hastelloy C-276 (sizes 7,8) PVDF (sizes 10-13)	316L stainless steel
O-rings	Viton® Teflon®	Kalrez® 4079 Kalrez® 3018	None None	Viton® Teflon®
Protection Category	IP64, IP66/67, NEMA 4X - Refer to housing description and/or Approvals pages for details			
Indicator Housing & Cover	Die cast Aluminum (Alloy 380), epoxy paint, glass window (general purpose) - IP66/67 & NEMA 4X *Die cast Aluminum (Alloy 380), epoxy paint, glass window (Intrinsic Safe) - IP64 Cast 316 stainless steel, glass window (general purpose) - IP66/67 & NEMA 4X Cast 316 stainless steel, 316 stainless steel hardware, glass window (flameproof) - IP66/67 & NEMA 4X			
Pressure/Temperature	See Pressure/Temperature Tables on pages 9 and 10			
Maximum Fluid Temperature	420°C/788°F (refer to page 9, 10)		150°C/270°F	300°C/570°F
Meter Dimensions	Refer to figures on pages 6, 7 and 8			
Model Code	Refer to pages 15, 16, 17 and 18			
Pressure Equipment Directive (PED) 97/23/EC	Flowmeter complies under Sound Engineering Practices (SEP) or categories I, II, III			
Needle Control Valves	Sizes 7-12	Sizes 0-5	None	Sizes 7-12
Flow Controllers	Sizes 7-8	Sizes 0-5	None	Sizes 7 & 8
Inductive Alarm Switches*	1 or 2 inductive switches (Relay power supply recommended)			
Transmitter	4-20 mA output with HART® Rev. 7 communications			
Transmitter and Inductive Alarm Switches*	4-20 mA output with HART® Rev. 7 communications and 1 or 2 inductive switches (Relay power supply recommended)			
Transmitter, LCD Display and Inductive Switches*	4-20 mA output with HART® Rev. 7 communications with digital display plus 1 or 2 inductive switches (Relay power supply recommended)			
Transmitter LCD Display Pulse Output	4-20 mA output with HART® Rev. 7 communications and pulse output plus digital display			
General Purpose & Intrinsically Safe Power Supplies for Transmitter	24 Vdc, 110 Vac, 220 Vac			
Intrinsically Safe Power Supply/Relay for Alarms - Recommended*	24 Vdc, 110 Vac, 220 Vac			
Agency Approvals	Refer to Page 14			
Other Approvals*	SIL 2 Alarms			
EMC Protection	The device complies with EU Directive 2004/108/EC, FCC Part 15, subpart B, Industry Canada, 1 CES-003 Recommendations NE21/NE43			

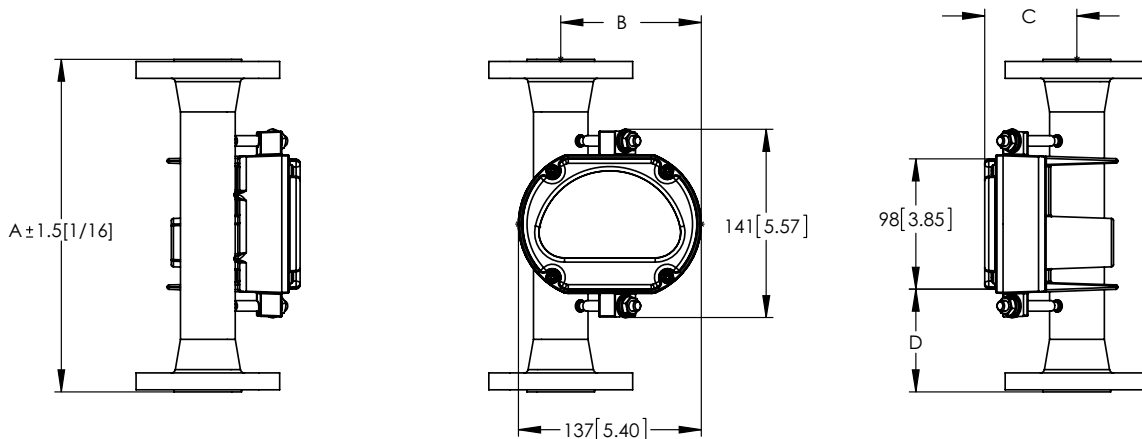
* Inductive Alarm or IS Housing does not apply to MT3809 ELF

Product Dimensions - General Purpose Housing

Model 3809 & 3810 General Purpose Indicator Housing with Threaded Female St'd Connections mm [inches]



Model 3809 & 3810 General Purpose Indicator Housing with Flanged Connections mm [inches]



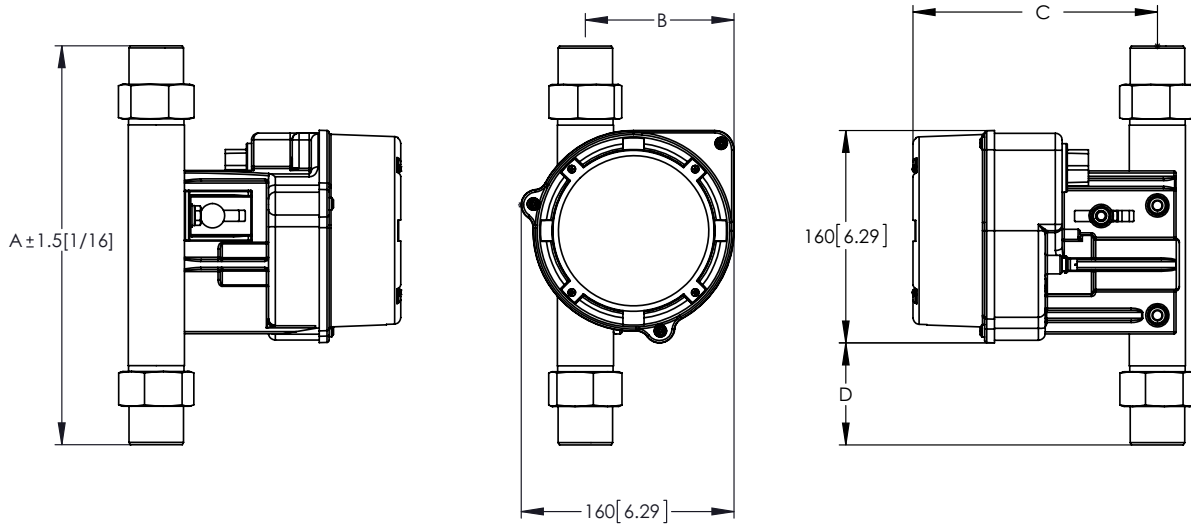
Meter Size	Connection	A	B	C	D	Weight (Approx.)**
0-5	1/2" Threaded Female St'd	225 [8.85]*	99 [3.90]	63 [2.48]	76 [2.98]	2.7 kg [6 lbs.]
7 & 8	1/2" Threaded Female St'd	225 [8.85]*	99 [3.90]	63 [2.48]	76 [2.98]	2.7 kg [6 lbs.]
10	1" Threaded Female St'd	300 [11.81]*	107 [4.21]	71 [2.80]	76 [2.98]	4.5 kg [10 lbs.]
12	1-1/2" Threaded Female St'd	300 [11.81]*	116 [4.57]	80 [3.15]	76 [2.98]	6.8 kg [15 lbs.]
13	2" Threaded Female St'd	300 [11.81]*	122 [4.78]	86 [3.39]	76 [2.98]	7.7 kg [17 lbs.]
0-5	1/2" Flange	250 [9.84]	99 [3.90]	63 [2.48]	76 [2.98]	4.1 kg [9 lbs.]
7 & 8	1/2" Flange	250 [9.84]	99 [3.90]	63 [2.48]	76 [2.98]	4.1 kg [9 lbs.]
10	1" Flange	250 [9.84]	106 [4.18]	70 [2.76]	76 [2.98]	7.7 kg [17 lbs.]
12	1-1/2" Flange	250 [9.84]	115 [4.54]	79 [3.12]	76 [2.98]	12.2 kg [27 lbs.]
13	2" Flange	250 [9.84]	121 [4.63]	85 [3.36]	76 [2.98]	14.1 kg [31 lbs.]
15	3" Flange	250 [9.84]	139 [5.46]	103 [4.05]	76 [2.98]	20.0 kg [44 lbs.]
16	4" Flange	350 [13.78]	152 [5.98]	118 [4.65]	126 [4.95]	37.6 kg [83 lbs.]

* Dimensions apply to threaded female standard connections only.

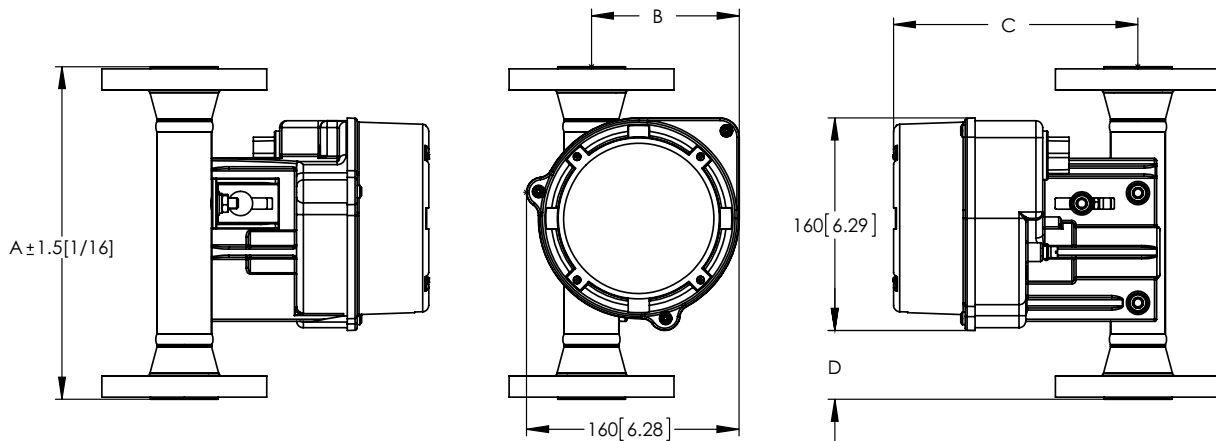
** Weights shown for aluminum indicator. Add 1.8 kg [4 lbs.] for steel indicator housing.

Product Dimensions - Intrinsically Safe Housing

Model 3809 Intrinsically Safe Indicator Housing with Threaded Female St'd Connections mm [inches]



Model 3809 Intrinsically Safe Indicator Housing with Flanged Connections mm [inches]

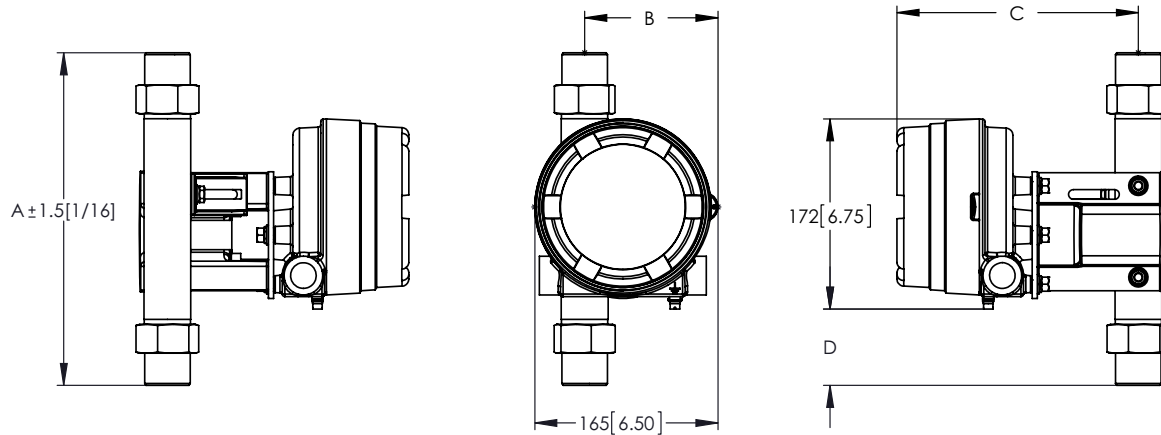


Meter Size	Connection	A	B	C	D	Weight (Approx.)
0-5	1/2" Threaded Female St'd	225 [8.85]*	104 [4.09]	182 [7.17]	52 [2.04]	5.4 kg [12 lbs.]
7 & 8	1/2" Threaded Female St'd	225 [8.85]*	104 [4.09]	182 [7.17]	52 [2.04]	5.4 kg [12 lbs.]
10	1" Threaded Female St'd	300 [11.81]*	112 [4.41]	182 [7.17]	52 [2.04]	7.3 kg [16 lbs.]
12	1-1/2" Threaded Female St'd	300 [11.81]*	121 [4.76]	182 [7.17]	52 [2.04]	9.5 kg [21 lbs.]
13	2" Threaded Female St'd	300 [11.81]*	127 [5.00]	182 [7.17]	52 [2.04]	10.4 kg [23 lbs.]
0-5	1/2" Flange	250 [9.84]	104 [4.09]	182 [7.17]	52 [2.04]	6.8 kg [15 lbs.]
7 & 8	1/2" Flange	250 [9.84]	104 [4.09]	182 [7.17]	52 [2.04]	6.8 kg [15 lbs.]
10	1" Flange	250 [9.84]	111 [4.37]	182 [7.17]	52 [2.04]	10.4 kg [23 lbs.]
12	1-1/2" Flange	250 [9.84]	120 [4.73]	182 [7.17]	52 [2.04]	15.0 kg [33 lbs.]
13	2" Flange	250 [9.84]	126 [4.97]	182 [7.17]	52 [2.04]	16.8 kg [37 lbs.]
15	3" Flange	250 [9.84]	144 [5.67]	182 [7.17]	52 [2.04]	22.7 kg [50 lbs.]
16	4" Flange	350 [13.78]	159 [6.26]	182 [7.17]	102 [4.00]	40.4 kg [89 lbs.]

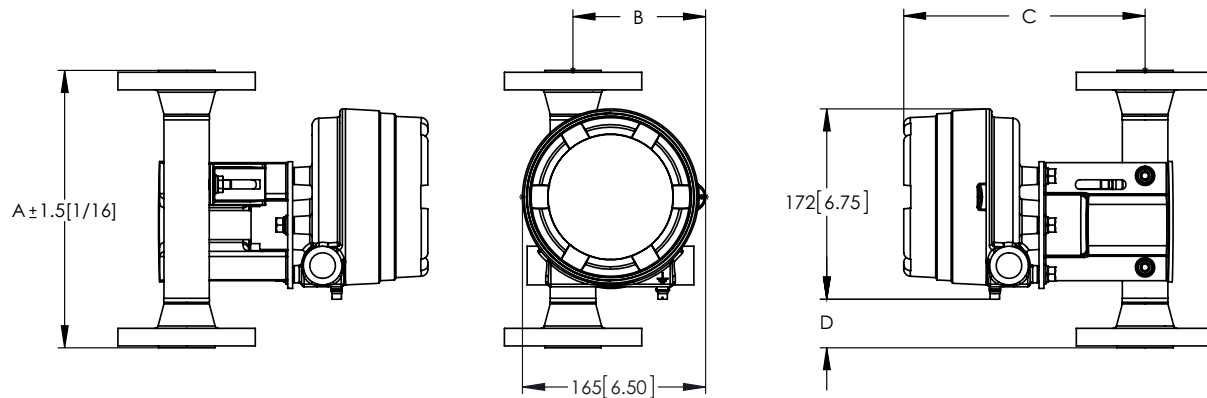
* Dimensions apply to threaded female standard connections only.

Product Dimensions - Explosion Proof Housing

Model 3809 Explosion Proof Indicator Housing with Threaded Female St'd Connections mm [inches]



Model 3809 Explosion Proof Indicator Housing with Flanged Connections mm [inches]



Meter Size	Connection	A	B	C	D	Weight (Approx.)
0-5	1/2" Threaded Female St'd	225 [8.85]*	112 [4.41]	218 [8.57]	44 [1.72]	11.8 kg [26 lbs.]
7 & 8	1/2" Threaded Female St'd	225 [8.85]*	112 [4.41]	218 [8.57]	44 [1.72]	11.8 kg [26 lbs.]
10	1" Threaded Female St'd	300 [11.81]*	120 [4.73]	218 [8.57]	44 [1.72]	13.6 kg [30 lbs.]
12	1-1/2" Threaded Female St'd	300 [11.81]*	129 [5.08]	218 [8.57]	44 [1.72]	15.9 kg [35 lbs.]
13	2" Threaded Female St'd	300 [11.81]*	135 [5.31]	218 [8.57]	44 [1.72]	16.8 kg [37 lbs.]
0-5	1/2" Flange	250 [9.84]	113 [4.45]	218 [8.57]	44 [1.72]	13.2 kg [29 lbs.]
7 & 8	1/2" Flange	250 [9.84]	113 [4.45]	218 [8.57]	44 [1.72]	13.2 kg [29 lbs.]
10	1" Flange	250 [9.84]	120 [4.73]	218 [8.57]	44 [1.72]	16.8 kg [37 lbs.]
12	1-1/2" Flange	250 [9.84]	129 [5.08]	218 [8.57]	44 [1.72]	21.3 kg [47 lbs.]
13	2" Flange	250 [9.84]	135 [5.31]	218 [8.57]	44 [1.72]	23.1 kg [51 lbs.]
15	3" Flange	250 [9.84]	153 [6.02]	218 [8.57]	44 [1.72]	29.0 kg [64 lbs.]
16	4" Flange	350 [13.78]	168 [6.61]	218 [8.57]	94 [3.69]	46.7 kg [103 lbs.]

* Dimensions apply to threaded female standard connections only.

Product Specifications - Pressure/Temperature Ratings Tables (continued)

NPT - Male - Standard Design							
316/316L							
Temperature		#7/8		#10		#12	
°F	°C	psi	Bar	psi	Bar	psi	Bar
-325	-198	4699	324	3785	261	3684	254
100	38	4699	324	3785	261	3684	254
212	100	4018	277	3234	223	3147	217
392	200	3379	233	2712	187	2654	183
572	300	3002	207	2408	166	2350	162
752	400	2785	192	2248	155	2190	151

NPT - Male - Standard Design							
Hastelloy Alloy C-276							
Temperature		#7/8		#10		#12	
°F	°C	psi	Bar	psi	Bar	psi	Bar
-325	-198	4989	344	5163	356	5033	347
100	38	4989	344	5163	356	5033	347
212	100	4511	311	4670	322	4540	313
392	200	3931	271	4061	280	3960	273
572	300	3466	239	3597	248	3495	241
752	400	3176	219	3292	227	3205	221

NPT - Male - Standard Design							
Titanium Gr. 2							
Temperature		#7/8		#10		#12	
°F	°C	psi	Bar	psi	Bar	psi	Bar
-75	-59	3046	210	3147	217	3075	212
100	38	3046	210	3147	217	3075	212
212	100	2596	179	2683	185	2611	180
392	200	1900	131	1973	136	1914	132
572	300	1450	100	1494	103	1450	100
617	325	1349	93	1407	97	1363	94

NPT - Male - Standard Design							
Inconel Alloy 625							
Temperature		#7/8		#10		#12	
°F	°C	psi	Bar	psi	Bar	psi	Bar
-325	-198	5758	397	5961	411	5802	400
100	38	5758	397	5961	411	5802	400
212	100	5758	397	5961	411	5802	400
392	200	5540	382	5729	395	5584	385
572	300	5279	364	5453	376	5323	367
752	400	5062	349	5236	361	5105	352

NPT - Male - ELF - 2500LBS Design*			
316/316L			
Temperature		ELF	
°F	°C	psi	Bar
-58 to 122	-50 to 50	6000	414
212	100	5100	351.6
392	200	4311	297.2
572	300	3822	263.5

NPT - Male - ELF - 2500LBS Design*			
Titanium Gr. 2			
Temperature		ELF	
°F	°C	psi	Bar
-58 to 122	-50 to 50	5100	352
212	100	4335	298.9
392	200	3017	208.0
572	300	2293	158.1

NPT - Male - ELF - 2500LBS Design*			
Alloy C-276/ Alloy 625			
Temperature		ELF	
°F	°C	psi	Bar
-58 to 122	-50 to 50	6250	431
212	100	6228	429.4
392	200	5842	402.8
572	300	5179	357.1

* ELF 2500# Design (Kalrez 4079)

Product Specifications - Temperature Cut-off Tables

Meter with 316 SS Mechanical Indicator

Connection type	Process Temperature		Ambient Temperature	
	°C	°F	°C	°F
Flanged / MNPT	-198 to 420	-325 to 788	-55 to 75	-67 to 167
Threaded female	-50 to 300*	-58 to 572*	-55 to 75	-67 to 167
ETFE lined	-30 to 150	-22 to 302	-30 to 40	-22 to 104

Meter with Aluminum Mechanical Indicator

Connection type	Process Temperature		Ambient Temperature	
	°C	°F	°C	°F
Flanged / MNPT	-198 to 300	-325 to 572	-55 to 75	-67 to 167
Threaded female	-50 to 300*	-58 to 572*	-55 to 75	-67 to 167
ETFE lined	-30 to 150	-22 to 302	-30 to 40	-22 to 104

Ambient Temperatures with Electrical Components

Option	°C	°F
Transmitter	-40 to 70	-40 to 158
Transmitter w/display	-20 to 70	-4 to 158
Inductive switches	-40 to 70	-40 to 158

Insulation required when process temperatures are greater than 300°C/572°F.
Refer to Instruction Manual for details

Meter with Electrical Components - Ambient Temperature 30°C / 86°F

Connection type	Process Temperature	
	°C	°F
Transmitter	-198 to 420	-325 to 788
Transmitter w/display	-198 to 420	-325 to 788
Inductive switches	-198 to 420	-325 to 788

Meter with Electrical Components - Ambient Temperature 60°C / 140°F

Connection type	Process Temperature	
	°C	°F
Transmitter	-198 to 200	-325 to 392
Transmitter w/display	-198 to 175	-325 to 350
Inductive switches	-198 to 200	-325 to 392

Elastomer Materials	Minimum Temperature		Maximum Temperature	
	°F	°C	°F	°C
Kalrez 4079	-58	-50	572	300
Kalrez 3018	-31	-35	550	288
Teflon PTFE	-58	-50	482	250
Viton A	5	-15	400	204
Teflex (Viton core, FEP jacket)	5	-15	400	204

Product Specifications - Capacity Tables, 3809/3810

METER SIZE	CONNECTION SIZE		FLOAT CODE	FLOAT MATERIAL STAINLESS STEEL 316L, TITANIUM FLOAT METER SIZE 0								PED Category
	DIN	ANSI		WATER ³		AIR ^{1,2}		Press Drop mbar	Press Drop inches WC	VIC (cSt)	Max. Visc (cSt)	
	DN mm	inches		l/h	gph	scfh	nl/h					
0	15	1/2"	0	0.96	0.25	1.6	44	12	5	1	5	SEP
1			0	1.3	0.34	2.1	59	12	5	1	10	SEP
2			0	3.6	0.96	4.9	130	12	5	1	20	SEP
3			0	10	2.8	12	350	12	5	1	35	SEP
4			0	21	5.5	23	650	32	13	1	70	SEP
5			0	42	11	53	1400	38	15	1	100	SEP

1. Air flows in scfh are given at 70°F and 14.7 psia 2. Air flows in nl/h are given at 0°C and 1.013 bar (a) 3. Water flows in l/h & gpm are given at 70°F

METER SIZE	CONNECTION SIZE		FLOAT CODE	FLOAT MATERIAL STAINLESS STEEL 316L								PED Category
	DIN	ANSI		WATER ⁴		AIR ^{1,2}		Press Drop mbar	Press Drop inches WC	VIC (cSt)	Max. Visc (cSt)	
	DN mm	inches		l/h	gpm	scfm	nm ³ /h					
7	15	1/2"	A	25	0.11	0.49	0.8	30	13	1	40	SEP
			B*	65	0.28	1.2	2.1	30	13	1	20	SEP
			C	130	0.59	2.4	3.9	30	13	1	120	SEP
			D*	200	0.88	3.7	6.1	35	15	1	20	SEP
8	15	1/2"	A	250	1.1	5.2	8.5	45	19	2	250	SEP
			B	400	1.7	7.7	12	55	23	1	180	SEP
			C	650	2.8	11	19	60	25	2	475	SEP
			D	1000	4.4	21	35	130	53	1.5	250	SEP
10	25	1"	A	1200	5.2	19	31	60	25	5	300	CAT I, II or III
			B	1500	6.6	31	51	70	29	1.5	300	CAT I, II or III
			C	2400	10	41	68	85	35	7	300	CAT I, II or III
			D	3500	15	65	100	155	63	4	300	CAT I, II or III
12	40	1 1/2"	A	4000	17	67	100	50	21	50	300	CAT I, II or III
			B	6000	26	95	150	60	25	30	300	CAT I, II or III
			C	8000	35	150	240	150	61	2	300	CAT I, II or III
			D	10000	46	210	340	300	121	2	300	CAT I, II or III
13	50	2"	A	6500	28	100	160	50	21	50	300	CAT I, II or III
			B	9500	41	160	260	60	25	50	300	CAT I, II or III
			C	12000	55	200	330	100	41	2.5	300	CAT I, II or III
			D	20000	88	390	650	300	121	1	-	CAT I, II or III
15	80	3"	A	20000	88	390	640	110	45	8	-	CAT I, II or III
			B	30000	130	550	900	140	57	7	-	CAT I, II or III
			C	40000	170	750	1200	280	113	5	-	CAT I, II or III
16	100	4"	A	49000	210	NA	NA	160	65	15	-	CAT I, II or III
			B	70000	300	NA	NA	210	85	10	-	CAT I, II or III
			C	100000	440	NA	NA	300	121	5	-	CAT I, II or III

1. Air flows in scfm are given at 70°F and 14.7 psia 2. Air flows in nm³/h are given at 0°C and 1.013 bar (a)
3. *Minimum operating pressure required 7 psig / 0.48 bar 4. Water flows in l/h & gpm are given at 70°F

Product Specifications - Capacity Tables, ETFE Lined

METER SIZE	CONNECTION SIZE		TUBE FLOAT CODE	STANDARD FLOAT MATERIAL CAPACITIES (See Note 3)						PED Category
	DIN	ANSI		WATER ⁵		AIR ^{1,2,4}		Press Drop mbar	Press Drop inches WC	
	DN mm	inches		l/h	gpm	scfm	nm ³ /h			
7	15	1/2"	GA	110	0.48	2.2	3.7	25	11	SEP
			GB	170	0.75	3.5	5.8	50	21	SEP
8	15	1/2"	A	250	1.1	5.1	8.3	30	13	SEP
			B	420	1.8	8.5	13	45	19	SEP
			C	500	2.2	9.9	16	40	17	SEP
			D	850	3.7	18	30	130	53	SEP
10	25	1"	A	1400	6.2	27	45	45	19	CAT I, II or III
			B	2000	8.8	39	63	106	43	CAT I, II or III
			C	2400	10	47	77	90	37	CAT I, II or III
			D	3000	13	58	95	130	53	CAT I, II or III
12	40	1 1/2"	A	3000	13	58	95	50	21	CAT I, II or III
			B	4000	18	73	120	75	31	CAT I, II or III
			C	5000	22	94	150	85	35	CAT I, II or III
			D	6000	26	110	180	120	49	CAT I, II or III
13	50	2"	A	6000	26	110	180	95	39	CAT I, II or III
			B	8000	35	150	250	125	51	CAT I, II or III
			C	12000	53	220	370	200	81	CAT I, II or III
			D	15000	66	280	470	225	91	CAT I, II or III

1. Air flows in scfm are given at 70°F and 14.7 psia 2. Air flows in nm³/h are given at 0°C and 1.013 bar (a)
3. Sizes 7 & 8 floats are Hastelloy C-276 (Density = 8.94 kg/dm³), Sizes 10, 12 & 13 are PVDF (Density = 4.22 kg/dm³)
4. For gas applications operating pressure must be greater than 29 PSIA / 2 bar (a)
5. Water flows in l/h & gpm are given at 70°F

Product Specifications - Transmitter



Design Features

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

Description

The transmitter (with or without the alarms, display and pulse output) is a compact microprocessor device designed to interface directly with the Model MT 3809.

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. 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 flow rate information may be viewed locally at the meter scale, LCD display or displayed remotely.

Power Supply Transmitter	21 to 30 Vdc: (2-wire current loop transmitter) 4-20 mA analog output with HART data. Update rate: 4 times per sec. Range: 3.8 to 22.0 mA.
Two Alarm Outputs (open collector)	Optically isolated outputs assignable to alarms. • Max. off-state voltage: 30 Vdc • Max. off-state current: 0,05 mA • Max. on-state voltage: 1.2 Vdc • Max. 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 • Max. off-state voltage: 30 Vdc • Max. off-state current: 0.05 mA • Max. on-state voltage: 1.2 Vdc • Max. on-state current: 20 mA
Temperature Specification	See Temperature Cut-off Table on page 10
Electrical Connector	M20 x 1.5 according to ISO, 1/2" NPT (F), 3/4" NPT (F)
Linearity	Less than 1% at max. current.
Temperature Influence	Less than 0.04% per °C.
Voltage Influence	Less than 0.002% / Vdc.
Load Resistance Influence	± 0.1% full scale.

Product Specifications - Inductive Alarm Switches



Design Features

- 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

Relay Power Supply - recommended



Description

One or two 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 front cover.

Power Supply	5 - 25 Vdc: (8 Vdc nominal)
Impedance	- Approximately 1 kohm with cam absent - Approximately 8 kohm with cam present
Ambient and Operating Temperature	See Temperature Cut-off Table on page 10
Electrical Connector	M20 x 1.5 according to ISO 1/2" NPT (F) or cable gland 8-11 mm

Approval Certificates for Meters, Transmitters and Alarms






Approval Certificates

Declarations	Model Type	Applicable Standards/ Directives	Certificate/Status
EC Declaration 	All	EMC Directive (2004/108/EC)	Approved
		RoHS Directive (2011/65/EU)	Approved
		Pressure Equipment Directive (97/23/EC)	Approved
SIL Declaration	Meters with Inductive Alarm	IEC 61508-2: 2010	Approved
SIL Declaration	Meters with Transmitter	IEC 61508-2: 2010	PENDING
NAMUR Declaration	Electrical Meters	NAMUR NE21, NE43	Approved
IP66/67	Indicator Only Meter	IEC 60529	Approved
NEMA 4X - Watertight	Indicator Only Meter	NEMA 250	Approved
CRN	All	ASME 31.3	Approved
Surge Immunity Declaration	Meters with Transmitter	IEC 61000-4-5	Approved
EAC 	All	Customs Union – Russia: TR CU 032/2013 "On safety of the equipment operating under excessive pressure"	TC N RU Д- U.AY04.B.05988

Hazardous Location Certification: Flame Proof (Exd)

Model Type : Flame Proof (Exd)

Ambient -40°C to 70°C, IP66/67, NEMA 4X

Mark	Approvals	Approval Marking	Certificate/Status
	CSA	Ex d IIC T6 Gb / Class I, Div.1 Group A, B, C and D Ex tb IIIC T85 Db / Class II, Div.1, Groups E, F, and G Class I, Zone 1, AEx d IIC T6 Gb / Zone 21, AEx tb IIIC T85 Db	14.2628516
	ATEX	II 2 G Exd IIC T6..T1 Gb II 2 D Ex tb IIIC T85°C...T400°C Db EN 60079-0:2012, EN 60079-1:2007, EN 60079-31:2009	DEKRA 13ATEX0086X
	IECEX	Exd IIC T6..T1 Gb : Ex tb IIIC T85°C...T400°C Db IEC 60079-0:2011, IEC 60079-1: 2007-04, IEC 60079-31:2008	IECEX DEK13.0027X
	Customs Union – Russia	TR CU 012/2011 1 Ex d IIC «T6...T1» GbX : Ex tb IIIC «T85°C...T400°C» Db X	RU C- HU.Г508.B.00741
	NEPSI	Exd IIC T6..T1 Gb : Ex tb IIIC T85°C...T400°C Db	GYJ14.1304X
	CCOE	Exd IIC T6..T1 Gb : Ex tb IIIC T85°C...T400°C Db	CCEs P349406/1
	KOSHA	Exd IIC T6..T1 Gb : Ex tb IIIC T85°C...T400°C Db	15-AV4BO-0353

Special conditions for safe use (ATEX/IECEX)

For information regarding the dimension of the flameproof joints the manufacturer shall be contacted.

Process and Ambient Temperature Limits: Flame Proof (Exd)

Process and Ambient Temperature limits

Temperature Class	T6	T5	T4	T3	T2	T1
Maximum Ambient Temperature	≤ 70	≤ 70	≤ 65	≤ 58	≤ 47	≤ 32.5
Maximum Process Temperature (°C)	85	100	135	200	300*	420*

* For application with process temperature equal to or greater than 300°C heat shield and customer supplier installation required. Please refer to installation manual for details

Additional limitations by model type:

Model	Maximum Process Temperature (°C)
Meters with Flanges or Male Threads	420°C
Meters with Female Threads	300°C
ELF Meters	300°C
ETFE Lined Meters	150°C





Approval Certificates for Meters, Transmitters and Alarms (continued)

Hazardous Location Certification: Intrinsic Safety (ia) / Non-sparking (nA)

Model Type : Intrinsic safety (ia) / non-sparking (nA) / Enclosure dust (tc)

Ambient -40°C to 70°C,

Aluminum Housing – IP64, Stainless Steel Housing – IP66/67

	ATEX IECEX	M1	M2	M1 = Apparatus with Transmitter M2 = Apparatus with Inductive Alarm	
		✓	✓	Units without Digital Display Aluminum housing II 2 G Ex ia IIC T6...T4 Gb : II 2 D Ex ia IIIC T 85°C...T135°C Db II 3 G Ex nA IIC T6...T4 Gc : II 3 D Ex ic IIIC T 85°C...T135°C Dc II 3 G Ex ic IIC T6...T4 Gc : II 3 D Ex ic IIIC T 85°C...T135°C Dc Stainless Steel housing II 2 G Ex ia IIC T6...T3 Gb : II 2 D Ex ia IIIC T 85°C...T200°C Db II 3 G Ex nA IIC T6...T3 Gc : II 3 D Ex ic IIIC T 85°C...T200°C Dc II 3 G Ex ic IIC T6...T3 Gc : II 3 D Ex ic IIIC T 85°C...T200°C Dc Stainless Steel High Temp housing II 2 G Ex ia IIC T6...T2 Gb : II 2 D Ex ia IIIC T 85°C...T300°C Db II 3 G Ex nA IIC T6...T2 Gc : II 3 D Ex ic IIIC T 85°C...T300°C Dc II 3 G Ex ic IIC T6...T2 Gc : II 3 D Ex ic IIIC T 85°C...T300°C Dc	DEKRA 13ATEX0106 X DEKRA 13ATEX0107 X
		✓	✓		IECEX DEK13.0045 X
		✓	✓	Units with Digital Display Aluminum housing II 2 G Ex ia IIC T4 Gb : II 2 D Ex ia IIIC T135°C Db II 3 G Ex nA IIC T4 Gc : II 3 D Ex ic IIIC T135°C Dc II 3 G Ex ic IIC T4 Gc : II 3 D Ex ic IIIC T135°C Dc Stainless Steel housing II 2 G Ex ia IIC T4...T3 Gb : II 2 D Ex ia IIIC T 135°C...T200°C Db II 3 G Ex nA IIC T4...T3 Gc : II 3 D Ex ic IIIC T 135°C...T200°C Dc II 3 G Ex ic IIC T4...T3 Gc : II 3 D Ex ic IIIC T 135°C...T200°C Dc Stainless Steel High Temp housing II 2 G Ex ia IIC T4...T2 Gb : II 2 D Ex ia IIIC T 135°C...T300°C Db II 3 G Ex nA IIC T4...T2 Gc : II 3 D Ex ic IIIC T 135°C...T300°C Dc II 3 G Ex ic IIC T4...T2 Gc : II 3 D Ex ic IIIC T 135°C...T300°C Dc	
		✓	✓	EN 60079-0:2012+ A11, EN 60079-11:2012, EN 60079-15:2010 IEC 60079-0:2011, IEC 60079-11:2011, IEC 60079-15:2010	
	UL USL, CNL			Class I, Division 1, Groups A, B, C, and D; Class II, Division 1, Groups E, F, and G; Class III Hazardous Locations Class I, Division 2, Groups A, B, C, and D; Class II, Division 2, Groups F and G; Class III Hazardous Locations Class I, Zone 1, AEx ia IIC T2/T3/T4/T5/T6 Gb Zone 21, AEx ia IIIC T85°C/T100°C/T135°C/T200°C/T300°C Db Class I, Zone 2, AEx nA IIC T2/T3/T4/T5/T6 Gc Zone 22, AEx tc IIIC T85°C/T100°C/T135°C/T200°C/T300°C Dc	E73889
	Customs Union – Russia			TR CU 012/2011 "On safety of the equipment for work in explosive environments" Zone 1 / Zone2 - Intrinsic safety ia/ic, Zone 2 non-sparking (nA)	RU C- HU.ГБ08.B.00741
	NEPSI			Zone 1 - Intrinsic safety (ia), Zone 2 non-sparking (nA/ic)	GYJ15.1039X GYJ15.1040X
	CCOE			Zone 1 - Intrinsic safety (ia), Zone 2 non-sparking (nA)	PENDING
	KOSHA			Zone 1 - Intrinsic safety (ia), Zone 2 non-sparking (nA)	PENDING

Model Code

Code Pos.	Applicable for	
	3809	3810
I-IV	x	x
V	x	x
VI	x x x x x x x x x x x x x x x x x x x	x x x x x x x x x x x x x x x x x x x
VII	x x x x x x	x x
VIII & IX	x x x x x x x x x x x x	x x x x

BASE MODEL

	<u>Inlet</u>	<u>Outlet</u>	<u>Std Accuracy</u>
3809	Vertical	Vertical	2% F.S. or 2.5 VDI
3810	Vertical	Vertical	5% F.S. or 6 VDI

ORIENTATION

MODEL REVISION

G Redesigned

MATERIAL & MATERIAL CERTIFICATION

- A** 316L SS Dual Cert
- B** 316L SS Dual Cert w/Material Certificate 3.1
- C** 316L SS Dual Cert w/Material Certificate 3.1 - CODE 5*
- D** 316L SS Dual Cert - E/TFE lined
- E** 316L SS Dual Cert - E/TFE lined w/Material Certificate 3.1
- F** 316L SS Dual Cert - E/TFE lined w/Material Certificate 3.1 - CODE 5*
- G** 316L SS Dual Cert - CRN
- H** 316L SS Dual Cert w/Material Certificate 3.1 - CRN
- J** 316L SS Dual Cert w/Material Certificate 3.1 - CODE 5* - CRN
- K** Hastelloy C-276 w/Material Certificate 3.1
- L** Hastelloy C-276 w/Material Certificate 3.1 - CRN
- M** Inconel 625 w/Material Certificate 3.1
- N** Inconel 625 w/Material Certificate 3.1 - CRN
- P** Titanium Grade II w/Material Certificate 3.1
- Q** Titanium Grade II w/Material Certificate 3.1 - CRN

* Pressure bound material from Western Europe, Japan, Canada or USA.

CONSTRUCTION

- A** Flange RF with Std Connection Size
- B** Flange RF with Oversized Connection
- C** Flange RF with Connection twice the Std Size
- D** Threaded Female St'd
- E** Threaded Female High Pressure 2500LBS Design
- F** Threaded Male

METER and CONNECTION SIZES

		CONNECTION SIZES							
		3809G						3809G & 3810G	3810G
CODE	METER SIZE	Std Conn Sz NECK FLANGED	Oversized Conn NECK FLANGED	Connection 2x Std Size WELD NECK FLANGED	Lined Meter SLIP-ON FLANGED	THREADED FEMALE NPT HI PRESSURE	THREADED MALE NPT	THREADED FEMALE - ST'D PRESSURE	WELD NECK FLANGE D
00	0	1/2"	3/4"	1"		1/2"	1"		
01	1	1/2"	3/4"	1"		1/2"	1"		
02	2	1/2"	3/4"	1"		1/2"	1"		
03	3	1/2"	3/4"	1"		1/2"	1"		
04	4	1/2"	3/4"	1"		1/2"	1"		
05	5	1/2"	3/4"	1"		1/2"	1"		
07	7	1/2"	3/4"	1"	1/2"	1/2"	1"	1/2"	1/2"
08	8	1/2"	3/4"	1"	1/2"	1/2"	1"	1/2"	1/2"
10	10	1"	1.5"		1"	1"	1.5"	1"	1"
12	12	1.5"	2"		1.5"	1.5"	2.5"	1.5"	1.5"
13	13	2"	3"		2"			2"	2"
15	15	3"	4"						
16	16	4"							

Sample Standard Model Code

I-IV	V	VI	VII	VIII & IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX
3809	G	A	B	02										

Model Code (continued)

Code Pos.	Applicable for	
	3809	3810
X		
	x	
	x	
	x	
	x	
	x	
	x	
	x	
XI	x	x
	x	x
	x	x
	x	x
	x	x
	x	
	x	x
	x	
	x	x
	x	
XII	x	x
	x	x
	x	x
	x	
	x	
	x	

MAXIMUM FLOW (Based On Water At Standard Conditions for 316SS Meter)

3809G Unlined Meters							
CODE	for Low Flow ELF Meter						
	Size 0	Size 1	Size 2	Size 3	Size 4	Size 5	
0	0.96 l/h	1.3 l/h	3.6 l/h	10 l/h	21 l/h	42 l/h	
for larger Meter Sizes							
	Size 7	Size 8	Size 10	Size 12	Size 13	Size 15	Size 16
A	25 l/h	250 l/h	1200 l/h	4000 l/h	6500 l/h	20,000 l/h	49,000 l/h
B	65 l/h	400 l/h	1500 l/h	6000 l/h	9500 l/h	30,000 l/h	70,000 l/h
C	130 l/h	650 l/h	2400 l/h	8000 l/h	12,000 l/h	40,000 l/h	100,000 l/h
D	200 l/h	1000 l/h	3500 l/h	10,000 l/h	20,000 l/h		

3809G - E/TFE Lined Meters					
CODE	Size 7	Size 8	Size 10	Size 12	Size 13
A	110 l/h	250 l/h	1400 l/h	3000 l/h	6000 l/h
B	170 l/h	420 l/h	2000 l/h	4000 l/h	8000 l/h
C	500 l/h	500 l/h	2400 l/h	5000 l/h	12,000 l/h
D	850 l/h	850 l/h	3000 l/h	6000 l/h	15,000 l/h

3810G					
CODE	Size 7	Size 8	Size 10	Size 12	Size 13
A	25 l/h	250 l/h	1200 l/h	4000 l/h	6500 l/h
B	65 l/h	400 l/h	1500 l/h	6000 l/h	9500 l/h
C	130 l/h	650 l/h	2400 l/h	8000 l/h	12,000 l/h
D	200 l/h	1000 l/h	3500 l/h	10,500 l/h	20,000 l/h

CONNECTION TYPE

- A NPT-Female w/Viton O-Rings (High pressure 2500# design has Viton/Teflon O-rings)
- B NPT-Female w/Teflon O-Rings (High pressure 2500# design has Kalrez 3018/Teflon O-rings)
- C Rc-Female w/Viton O-Rings (High pressure 2500# design has Viton/Teflon O-rings)
- D Rc-Female w/Teflon O-Rings (High pressure 2500# design has Kalrez 3018/Teflon O-rings)
- E NPT-Male
- F ANSI 150LBS RF
- G ANSI 300LBS RF
- H ANSI 600LBS RF
- J DIN PN40 RF
- K JIS B2220 DIN 10K
- L JIS B2220 DIN 20K
- M ANSI 150LBS RF - Elbow Outlet
- N ANSI 300LBS RF - Elbow Outlet
- P ANSI 600LBS RF - Elbow Outlet

SCALE INSCRIPTION/FLUID

CODE	SCALE	FLUID
A	Single - % Scale / Direct	Liquid
B	Single - % Scale / Direct	Gas
C	Single - % Scale / Direct	Liquid , Hi Viscosity
D	Dual - %and/or Direct	Liquid
E	Dual - %and/or Direct	Gas
F	Dual - %and/or Direct	Liquid , Hi Viscosity

Sample Standard Model Code

I-IV	V	VI	VII	VIII & IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX
3809	G	A	B	02	B	F	C							

Model Code (continued)

Code Pos.	Applicable for	
	3809	3810
XIII	x x x x x x x	x x
XIV	x x x x x x x x x	x x
XV	x x x x x x x x x x x	x
XVI	x x x x x	x
XVII	x x x x x x x x x x x x x x x x x x x	x

METER ACCURACY

- A** 5% Full Scale
- B** 2% Full Scale
- C** 1% Full Scale
- D** 6 VDI
- E** 2.5 VDI
- F** 1.6 VDI
- G** 4 VDI
- H** 3% Full Scale

INDICATOR CONFIGURATION

- 1** Aluminum Housing
- 2** 316SS Housing
- 3** X-proof SS Housing
- 4** Aluminum Housing, High Temperature Design
- 5** 316SS Housing, High Temperature Design
- 6** X-Proof SS Housing, High Temperature Design
- 7** X-Proof SS Housing, Low Ambient Temperature Design(-50°C)
- 8** AI - Housing - Shatterproof Window
- 9** SS - Housing - Shatterproof Window

ELECTRONICS CONFIGURATION

- A** Indicator only
- B** Inductive Alarm, 1 Switch*
- C** Inductive Alarm, 2 Switches*
- D** Transmitter, 4 - 20 mA / HART compatible
- E** Transmitter, 4 - 20 mA / HART compatible w/Pulse Output & Alarm Contacts
- F** Transmitter, 4 - 20 mA / HART compatible w/ Inductive Alarm 1 Sw*
- G** Transmitter, 4 - 20 mA / HART compatible w/ Inductive Alarm 2 Sw*
- H** Transmitter, 4 - 20 mA / HART compatible + LOI (DIGITAL DISPLAY)
- J** Transmitter, 4 - 20 mA / HART compatible w/Pulse Output & Alarm Contacts + LOI (Digital Display)
- K** Transmitter, 4 - 20 mA / HART compatible w/ Inductive Alarm 1 Sw + LOI (Digital Display)*
- L** Transmitter, 4 - 20 mA / HART compatible w/ Inductive Alarm 2 Sw +LOI (Digital Display)*

*Relay Power Supply Recommended

ELECTRICAL CONNECTION

- 0** None
- 1** Cord Connector 8-11 mm
- 2** M20x1.5
- 3** 1/2" NPT-F
- 4** 3/4" NPT-F (X-Proof Housing Only)

CERTS (APPROVAL TYPE)

- 0** None

	ATEX / IECEx	North American Approvals
A	Zone 2, Non-incendive/non-sparking	
B	Zone 1, Intrinsically Safe	
C	Zone 1, Flame-proof XP - IIC	Div 1 / Zone 1, Flame-proof XP

- D** Nepsi - Zone 2, Non-incendive/non-sparking
- E** Nepsi - Zone 1, Intrinsically Safe
- F** Nepsi - Zone 1, Flame-proof XP - IIC
- G** KOSHA - Zone 2, Non-incendive/non-sparking
- H** KOSHA - Zone 1, Intrinsically Safe
- J** KOSHA - Zone 1, Flame-proof XP - IIC
- K** CCOE - Zone 2, Non-incendive/non-sparking
- L** CCOE - Zone 1, Intrinsically Safe
- M** CCOE - Zone 1, Flame-proof XP - IIC
- N** TR CU Ex Zone 2, Non-incendive/non-sparking (Custom Union including Russia)
- P** TR CU Ex Zone 1, Intrinsically Safe (Custom Union including Russia)
- Q** TR CU Ex Zone 1, Flameproof XP - IIC (Custom Union including Russia)
- R** TR CU Indicator only (Custom Union including Russia)
- S** UL - Div 1 / Zone 1, Intrinsically Safe (4-20 mA transmitter options)
- T** UL - Div 2 / Zone 2, Non-Incendive / Non-Sparking (all electronic options)
- U** FM - Div 1 / Zone 1, Intrinsically Safe (inductive alarms)
- V** ATEX - Zone 1 / Zone 2, Non-Electrical

Sample Standard Model Code

I-IV	V	VI	VII	VIII & IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX	XX
3809	G	A	B	02	B	F	C	C	3	E	4	C			

Model Code (continued)

Code Pos.	Applicable for	
	3809	3810
XVIII	x	x
	x	x
	x	x
	x	x
	x	x
	x	x
	x	x
	x	x
	x	x
	x	x
	x	x
XIX	x	x
	x	
	x	
	x	
	x	
	x	
XX	x	x
	x	
	x	
	x	
	x	

VALVE / FLOW CONTROLLER

- 0** None
- A** Valve on Inlet - Viton Seals
- B** Valve on Inlet - Teflon(Low flow valve Kalrez/Teflon)
- C** Valve on Outlet - Viton Seals
- D** Valve on Outlet - Teflon(Low flow valve Kalrez/Teflon)
- E** Std Press FLOW CONTROLLER on Inlet - Viton Seals
- F** Std Press FLOW CONTROLLER on Inlet - Teflon/Kalrez Seals
- G** High Press FLOW CONTROLLER on Inlet - Teflon/Kalrez Seals
- H** Std Press FLOW CONTROLLER on Outlet - Viton Seals
- J** Std Press FLOW CONTROLLER on Outlet - Teflon/Kalrez Seals
- K** High Press FLOW CONTROLLER on Outlet - Teflon/Kalrez Seals

PROCESSES with CERTIFICATES (Group 1)

- 0** None
- A** Declaration of Compliance 2.1 Positive Material Identification
- B** Declaration of Compliance 2.1 Positive Alloy Material Identification
- C** Material Certificate-3.1 & NACE MR0175 & MR0103 Certificate - 2.1
- D** Material Certificate-3.1 & NACE MR0175 & MR0103 Certificate - 2.1 & DoC 2.1 PMI
- E** Material Certificate-3.1 & NACE MR0175 & MR0103 Certificate - 2.1 & DoC 2.1 PAMI

PROCESSES with CERTIFICATES (Group 2)

- 0** None
- A** Radiographic Examination Report 2.1
- B** Liquid Dye-Penetrant Test Report 2.1
- C** Radiographic Exam 2.1 & Liquid Dye-Penetrant Test 2.1

Additional Services

- 1 Clean for Oxygen Service 2.1
- 2 Hazardous Location Certificate
- 3 Certificate of Conformance 2.1
- 4 International Calibration Certificate 3.1
- 5 Pressure Test Certificate 2.2
- 6 Commercial Clean

Notes: The CRN approved meters are designed per ASME 31.3, constructed using materials compliant with ASTM/ASME specification and welding according to ASME IX standard.

The CRN approvals are valid for standard model code option and special model code options based on approval granted to the pressure vessel design and no changes to the pressure vessel design.

Sample Standard Model Code

I-IV	V	VI	VII	VIII & IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX	XX
3809	G	A	B	02	B	F	C	C	3	E	4	C	0	A	B

Brooks Service and Support

Brooks is committed to assuring all of our customers receive the ideal flow solution for their application, along with outstanding service and support to back it up. We operate first class repair facilities located around the world to provide rapid response and support. Each location utilizes primary standard calibration equipment to ensure accuracy and reliability for repairs and recalibration and is certified by our local Weights and Measures Authorities and traceable to the relevant International Standards.

Visit www.BrooksInstrument.com to locate the service location nearest to you.

START-UP SERVICE AND IN-SITU CALIBRATION

Brooks Instrument can provide start-up service prior to operation when required. For some process applications, where ISO-9001 Quality Certification is important, it is mandatory to verify and/or (re)calibrate the products periodically. In many cases this service can be provided under in-situ conditions, and the results will be traceable to the relevant international quality standards.

SEMINARS AND TRAINING

Brooks Instrument can provide seminars and dedicated training to engineers, end users, and maintenance persons.

Please contact your nearest sales representative for more details.

Due to Brooks Instrument's commitment to continuous improvement of our products, all specifications are subject to change without notice.

TRADEMARKS

Brooks Brooks Instrument, LLC

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