



# APT3200L

# SMART PRESSURE TRANSMITTER

# WITH DIAPHRAGM SEAL



# **Application Areas:**

- Nuclear
- Water & Wastewater
- **Chemicals**
- Petrochemical
- Oil & Gas
- Pulp & Paper
- Food & Beverage,
- Pharmaceutical
- Power
- Renewable Energy
- Alternate Fuel

#### **Autrol America Inc,**

10 N. Martingale Rd, Suite 400. Schaumburg, IL 60173. United States T: 847-779-5000

F: 847-655-6062

Email: info@autroltransmitters.com























"Autrol America Inc. (AAI) range of transmitters includes a complete range of "intelligent" high performance transmitters for Temperature, Gauge, Absolute, Vacuum & Differential pressure measurements for standalone monitoring and/or closed loop control applications. These "intelligent" microprocessor-based "Smart" transmitters features a two-wire loop powered 4 to 20mA current outputs with "Digital" HART as standard (Foundation Fieldbus optional) communication(s) for seamless integration with a host control system such as DCS, PLC, SCADA, AMS, PDM and/or a local Hand Held Communicator(HHC)."

#### **Description of Product**

The APT3200 series of smart transmitters have excellent stability, high accuracy and include features that facilitate easy installation, start up and minimum maintenance thereby lowering process downtime and overall cost of ownership in the long run.

Autrol transmitters are equipments with analog (4/20mA- 2 wire) and digital (HART or Foundation Fieldbus) communication protocols for seamless integration with a host Control System such as DCS, PLC, SCADA, AMS, PDM and/or Hand Held Communicator (HHC). Through Digital HART Protocol one can easily acquire process measured variable, configure and modify its various Parameters (Range, Tag Name and Damping, Transfer Function, Trimming).

These transmitters are equipped with an automatic temperature compensation function integrated into its advanced signal processing circuitry to ensure high reliability and performance corresponding to change of ambient temperature.

#### **Features**

- Superior Performance
- High Reference Accuracy :+/-0.075% of Calibrated Span(without seal)
- Long-Term Stability
- Flexibility
- Data Configuration with HART Configurator
- Zero Point Adjustment
- Reliability
- Continuous Self-Diagnostic Function
- Automatic Ambient Temperature Compensation
- Fail-mode Process Function
- EEPROM Write Protection
- CE EMC Conformity Standards(EN5081-2, EN50082-2)



#### **Function**

- Flexible Sensor Input : GP, AP, Vacuum
- Various Output : 4 ~20mA , Digital Signals
- Setting Various Parameters : Zero/Span,
- Trim, Unit, Fail-mode, etc
- Self Diagnostic Function : Sensor, Memory
- A/D Converter, Power, etc
- Digital Communication with HART protocol
- Explosion-proof Approval & Intrinsic Safety Approval: KOSHA, KTL





#### TRUE SMART

The heart of Autrol smart transmitter is a microprocessor-based high performance module. In addition, each transmitter is ambient temperature characterized using state-of-art technologies to ensure maximum transmitter accuracy and minimized drift over a wide range of operating temperatures.

On integrated sensor models such as in APT3200 series transmitters the characteristics data of its sensor are stored in internal non-volatile EEPROM to minimize measuring error. On non sensor transmitter models such as ATT2100 temperature transmitters, it has a linearization table built in wherein user can modify the various necessary values in field per the added temperature sensor (RTD or T/C) characteristics to get better accuracy from the overall measurement system. Its integral microprocessor module then automatically converts the required value referring to the customized linearization table.

All transmitters include advanced self diagnostic functions for detecting any malfunctions of sensor and/or fault of A/D converter, internal memory and microprocessor. All diagnostic/error status is transmitted to a connected Master by analog current signal (fail mode current 3.75mA or 22mA) or digital HART (or FF) communication.

The transmitters have Last Value Status (L V S) function for safety of instrumentation. When the sensor input occurs in abnormal status, output is fixed to the previous value and when the recovery to normal status, output is updated to the current value. If abnormal status of sensor continues during the defined interval, the fault is recognized as a sensor failure & reported accordingly for corrective action.

#### **OPEN ARCHITECTURE**

Using a Device Master (AMS, PMD etc) or a hand-held terminal, PC configuration program or HART Compatible DCS, PLC or SCADA the user can change, modify and review parameters of smart transmitter through HART communication. There functions provide convenience for your calibration and maintenance practice.





#### FIELD PROGRAMMABLE

All Autrol transmitter have a fully programmable front panel from which users can directly input values (e.g. range, zero/span, sensor type, thermocouples, RTD and mV and automatic temperature compensation) to reduce cost of installation and commissioning eliminating need of a additional configuration tools.

# **S**table $\underline{\mathbf{M}}$ easurable $\underline{\mathbf{A}}$ ccurate $\underline{\mathbf{R}}$ eliable $\underline{\mathbf{T}}$ ransmitters



#### **Electronics Module**

The Electronics module consists of a circuit board sealed in an enclosure. There is a MCU module, a power module, an analog module, a LCD module and a terminal module included within the transmitter.

The MCU modules acquire the digital value from the analog module and apply correction coefficients selected from EEPROM. The output section of the power module converts the digital signal to a 4~20 mA output. The MCU module communicates with the HART-based Configurator or Control Systems such as DCS. The Power modules have a DC-to-DC Power conversion circuit and an Input/output isolation circuit. An optional LCD module plugs into the MCU module and displays the digital output in user-configured unit.

#### **Sensor Inputs**

The model APT3200 is available in an absolute pressure sensor of a piezo-resistive type and measures absolute pressure.

The sensor module converts the capacitance or the resistance to the digital value. The MCU module calculates the process pressure based on the digital value.

The sensor modules include the following features

- +/-0.075%accuracy, the most accurate sensor in the industry.
- The software of the transmitter compensates for the thermal effects, improving performance.
- Precise Input Compensation during operation is achieved with temperature and pressure correction coefficients that are characterized over the range the transmitter and stored in the sensor module EEPROM memory.

 EEPROM stores sensor information and correction coefficients separately from MCU module, allowing for easy repair, reconfiguration and replacement

#### **Basic Setup**

ATP3200 Pressure transmitter can be easily configured from any host that supports the HART protocol.

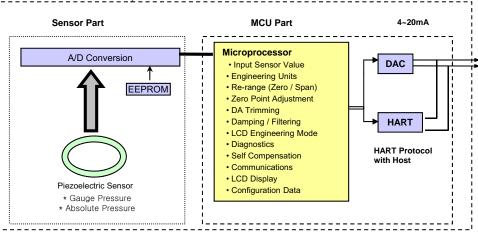
- · Operational Parameters
- Operational Parameters.
- 4~20mA Points (Zero/Span)
- Engineering Units
- Damping Time: 0.25 ~ 60 sec
- Tag: 8 alphanumeric characters
- Descriptor: 16 characters
- Message: 32 characters.
- Date: day/month/year

#### **Calibration and Trimming**

- Lower/Upper Range (zero/span)
- Sensor Zero Trimming
- Zero Point Adjustment
- DAC Output Trimming
- Transfer Function
- Self-Compensation

#### **Self-Diagnosis and Others**

- CPU & Analog Module Fault Detection
- Communication Error
- Fail-mode Handling
- LCD Indication
- Temperature Measurement of Sensor Module





#### **General Specifications**

#### 1) Diaphragm Sealed Sensor Range (Rangeability: 20: 1)

Range	Code	kPa
Low	4	-100 ~ 1000
Medium	5	0 ~ 5000
High	6	0 ~ 20000

2) Electrical Specifications

Power Supply	11.9 ~ 45 V dc	Output Signal	4 ~ 20 mA dc/HART
HART loop resistance	250 ~ 550 ohm	Isolation	500 Vrms (707V DC)

3) Performance Specifications (without seal)

Terrormance opecinications (without scar)								
Reference	±0.075% of Span(0.2URL≤Span ≤URL)	Operating Temp.	-40~ +85°C					
Accuracy	±[0.05+0.005x(URL/Span)]% of Span (0.05URL≤Span<0.2 URL)	LCD Meter Operating Temp.	-30~ +80°C					
	(**************************************	Humidity Limit	5% ~ 98% RH					
Ambient Temp. Effect	±[0.025%URL+0.125%Span]/28°C	Process Temp. Limit	-40 ∼ +205°C					
Stability	±0.1% URL for 12 Months	Power Supply Effects	±0.005% of Span per Volt					
Static	±0.1% of URL per 7Mpa (Zero Error)	Manustina Davitina Effects	∙Zero Shift up to 350Pa					
Pressure Effects	±0.2% of Reading per 7Mpa (Span Error)	Mounting Position Effects	· No Span Effect					

4) Physical Specifications

Isolating Diaphragm	316L SST	Process Connection Size	1/2"- 14 NPT
Electronic Housing	Aluminum	Diaphragm Seal (Flush/Extended)	2" or 3"/3" or4"
Weight(Only Transmitter)	1.7Kg	Electrical Connections	1/2" – 14 NPT with M4
		2" Pipe Stanchion Type bracket	Angel or Flat type

5) Hazardous Location Certifications - Option

/		
	International Approval	Flameproof approval: Ex d IIC T6 (KOSHA)
		Intrinsic Safety Approval: Ex ia IIC T5 (KTL)
		CSA Explosion proof Approval
		FM Explosion proof Approval
		ATEX Flame proof Approval









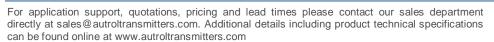






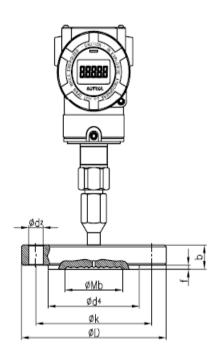


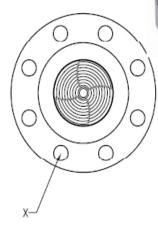




# APT3200LFD

Flush Diaphragm Seal and Direct Mount Type Transmitter







#### Flange Size: 80mm (3 inch)

Flange Rating	Mb	D	b	d2	k	f	d4	Х	
ANSI Class 150	89	190	24	20	152.5	2	127	4	
ANSI Class 300	09	210	29	22	168.5	_	127	8	
JIS 10 K	89	185	18	19	150	2	126	Q	
JIS 20 K	09	200	22	23	160	_	132	0	
DIN PN 10/6	00	000	20	40	400	0	400	0	
DIN PN 25/40	89	89	200	24	18	160	2	138	8

## Flange Size: 50mm (2 inch)

Flange Rating	Mb	D	b	d2	k	f	d4	Х
ANSI Class 150	59	150	20	20	120.5	2	92	4
ANSI Class 300	59	165	22.5	20	127	2	92	8
JIS 10 K	59	155	16	19	120	2	96	4
JIS 20 K	39	155	18	19	120	2	90	8
DIN PN 10/6	59	165	20	18	125	2	102	1
DIN PN 25/40	39	100	20	10	120		102	4

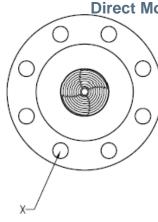


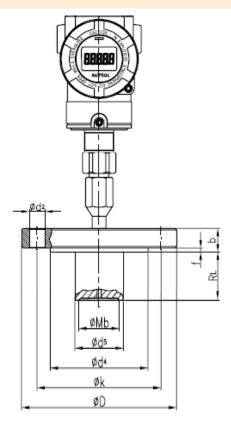
MODEL NO.	Code	Description					
APT3200	-LFD	Flush Diaphragm Seal and Direct Mount type Transmitter					
	4	-100 to 1500kPa					
Pangas	5	0 to 5000kPa					
Ranges	6	0 to 25	5000kPa				
	X	Sp	ecial				
	S2	2-inch (50mm)	SST				
Mounting Flange Size/Material	S3	3-inch (80mm)	SST				
O120/Matorial	XX	Sp	ecial				
	A1	ANSI C	Class 150				
	A2	ANSI C	Class 300				
	J1	JIS	10K				
Mounting Flange Rating	J2	JIS	20K				
rating	D1	DIN P	N 10/16				
	D2	DIN P	N 25/40				
	XX	Sp	ecial				
		DIAPHRAGM	OTHERS				
	S	316L SST	316L SST				
Wetted Parts	PT	PTFE + 316L SST	316L SST				
Material Diaphragm/Others	Н	Hastelloy C-276	316L SST				
4 3	Т	Tantalum	316L SST				
	X	Special	Special				
	2	D.C.Silicon 200	-40 to 205 °C (-40 to 400 °F)				
Fill Fluid	7	D.C.Silicon 704	15 to 205 °C (60 to 400 °F)				
	X	Sp	ecial				
Materials of		FLANGE	VENT/DRAIN VALVE				
Construction	SS	316L SST	316L SST				
		ELECTRICAL CONNECTION	MATERIAL				
Electrical	1	½-14 NPT	Epoxy Coated – Aluminum				
Connection	2	G½	Epoxy Coated - Aluminum				
	X	Sp	ecial				
	K0	Maker Standard	(Waterproof : IP67)				
	K1	KOSHA Flameproof	Approval : Ex d IIC T6				
	K2	KTL Intrinsic Safet	y Approval : Ex ia IIC				
	*E1	ATEX(KEM/	A )Flameproof				
Hazardous	*E2	ATEX(KEMA)	Intrinsic Safety				
Locations	*F1	FM/FMC Explosion pro	oof (for USA & Canada)				
Certifications	*F2	FM Intrir	sic Safety				
	M1	LCD I	ndicator				
	K	Oil Fre	e Finish				
	LP	Lighting Protect	or (Internal Type)				
	X	Specia	al Order				



# APT3200LED

For Extended Diaphragm Seal and Direct Mount Type Transmitter





# Flange Size: 80mm (3 inch)

Flange Rating	Mb	D	b	d2	k	f	d4	d5	Х
ANSI Class 150	72	190	24	20	152.5	1.6	127	76	4
ANSI Class 300	/2	210	29	22	168.5	1.0	127	70	8
JIS 10K	72	185	18	19	150	2	126	76	0
JIS 20K	/2	200	22	23	160		132	70	8
DIN PN 10/16	70	200	20	18	160	2	138	76	8
DIN PN 25/40	72	200	14	10	100		130	70	0

## Flange Size: 50mm (2 inch)

Flange Rating	Mb	D	b	d2	k	f	d4	d5	Х		
ANSI Class 150	47	150	20	20	120.5	2	92	48.3	4		
ANSI Class 300	47	165	22.5	20	127		92	40.3	8		
JIS 10K	47	155	16	19	120	2	96	48.3	4		
JIS 20K	47	7 155	18	19	120	2	90	40.3	8		
DIN PN 10/16	47	165	20	10	125	2	102	48.3	4		
DIN PN 25/40	47	47	47	17 165	20	18	125	2	102	46.3	4

Diaphragm Extension Length Code	$R_L$
5	50 mm (2 inch)
10	100 mm (4 inch)
15	150 mm (6 inch)





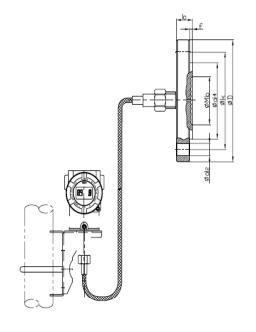
Model No.	Code	De	escription				
APT3200	-LED	Extended Diaphragm Seal	and Direct Mount type Transmitter				
	4	-100	to 1500kPa				
Ranges	5	0 t	o 5000kPa				
Ranges	6	0 to 25000kPa					
	X		Special				
	S2	2-inch (50mm)	SST				
Mounting Flange Size/Material	S3	3-inch (80mm)	SST				
GI20/Waterial	XX		Special				
	A1	ANS	SI Class 150				
	A2	ANS	SI Class 300				
	J1		JIS 10K				
Mounting Flange Rating	J2		JIS 20K				
ramg	D1	DIN	N PN 10/16				
	D2	DIN	N PN 25/40				
	XX		Special				
	05	50	) mm(2in.)				
Extension Length	10	100mm(4in.)					
Extension Length	15	150mm(6in.)					
	XX	Special					
		DIAPHRAGM	OTHERS				
	S	316L SST	316L SST				
Wetted Parts Material	PT	PTFE + 316L SST	316L SST				
Diaphragm/Others	Н	Hastelloy C-276	316L SST				
	Т	Tantalum	316L SST				
	X	Special	Special				
		FILL FLUID	TEMPERATURE LIMITS				
Fill Fluid	2	D.C.Silicon 200	-40 to 205 °C (-40 to 400 °F)				
I III I IUIU	7	D.C.Silicon 704	15 to 205 °C (60 to 400 °F)				
	X		Special				
Materials of		FLANGE	VENT/DRAIN VALVE				
Construction	SS	316L SST	316L SST				
	W	without Process Adapter	(1/4-18 NPT on the cover flange)				
Low Side	N	with 1/2 -14 NPT Process Adapter(316SST)					
	X		Special				
		ELECTRICAL CONNECTION	MATERIAL				
Electrical	1	½-14 NPT	Epoxy Coated – Aluminum				
Connection	2	G1⁄2	Epoxy Coated - Aluminum				
	Χ		Special				

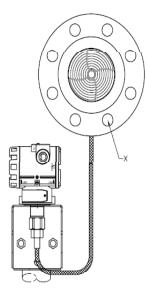


Hazardous	K0	Maker Standard (Waterproof : IP67)	
Locations Certifications	K1	KOSHA Flameproof Approval : Ex d IIC T6	
Certifications	K2	KTL Intrinsic Safety Approval : Ex ia IIC	
	*E1	ATEX(KEMA )Flameproof	
	*E2	ATEX(KEMA) Intrinsic Safety	
	*F1	FM/FMC Explosion proof (for USA & Canada)	
	*F2 FM Intrinsic proof		
	M1	LCD Indicator	
	LP	Lighting Protector (Internal Type)	
	K	Oil Free Finish	
	X	Special Order	

# APT3200LFS

Flush Diaphragm Seal and Capillary
Type Transmitter







### Flange Size: 80mm (3 inch)

•	-							
Flange Rating	Mb	D	b	d2	k	f	d4	Х
ANSI Class 150	89	190	24	20	152.5	2	127	4
ANSI Class 300	89	210	29	22	168.5		127	8
JIS 10 K	90	185	18	19	150	2	126	8
JIS 20 K	89	200	22	23	160		132	
DIN PN 10/6	90		20	18	160	2	138	8
DIN PN 25/40	89	200	24	10	160	2	130	0

# Flange Size: 50mm (2 inch)

Flange Rating	Mb	D	b	d2	k	f	d4	Х
ANSI Class 150	59	150	20	20	120.5		02	4
ANSI Class 300	59	165	22.5	20	127	2	92	8
JIS 10 K			16		400			4
JIS 20 K	59	155	18	19	120	2	96	8
DIN PN 10/6	59	165	20	18	125	2	102	1
DIN PN 25/40	39	100	20	10	125	2	102	4



MODEL NO.	Code	Des	cription				
APT3200	-LFS	Flush Diaphragm Seal ar	nd Capillary Type Transmitter				
	4	-100 to 1500kPa					
5	5	0 to 5000kPa					
Ranges	6	0 to 25000kPa					
	X	Sp	pecial				
	S2	2-inch (50mm)	SST				
Mounting Flange Size/Material	S3	3-inch (80mm)	SST				
Size/ivialerial	XX	Sr	pecial				
	A1	ANSI	Class 150				
	A2	ANSI	Class 300				
	J1	JI	S 10K				
Mounting Flange Rating	J2	JIS 20K					
Nating	D1	DIN PN 10/16					
	D2	DIN PN 25/40					
	XX	Special					
		DIAPHRAGM	OTHERS				
	S	316L SST	316L SST				
Wetted Parts	PT	PTFE + 316L SST	316L SST				
Material Diaphragm/Others	Н	Hastelloy C-276	316L SST				
	Т	Tantalum	316L SST				
X		Special	Special				
		FILL FLUID	TEMPERATURE LIMITS				
Fill Fluid	2	D.C.Silicon 200	-40 to 205 °C (-40 to 400 °F)				
i ili i idid	7	D.C.Silicon 704	15 to 205 °C (60 to 400 °F)				
	X	Sp	pecial				
Capillary Length(m)		Capillary Length fi	rom 1to 12m (3m: 03)				
Materials of		FLANGE	VENT/DRAIN VALVE				
Construction	SS	316L SST	316L SST				
		ELECTRICAL CONNECTION	MATERIAL				
Electrical	1	½-14 NPT	Epoxy Coated – Aluminum				
Connection	2	G½	Epoxy Coated - Aluminum				
	X	Special					

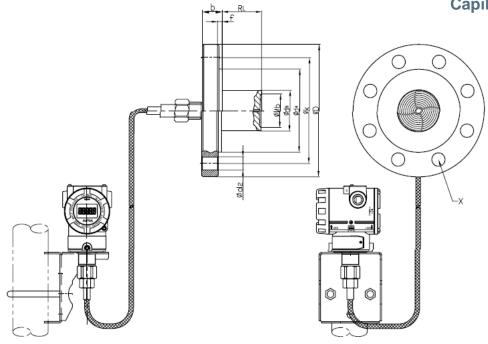


Hazardous	K0	Maker Standard (Waterproof : IP67)
Locations Certifications	K1	KOSHA Flameproof Approval : Ex d IIC T6
Certifications	K2	KTL Intrinsic Safety Approval : Ex ia IIC
	*E1	ATEX(KEMA)Flameproof
	*E2	ATEX(KEMA) Intrinsic Safety
	*F1	FM Explosion proof
	*F2	FM/FMC Intrinsic proof (for USA & Canada)
	M1	LCD Indicator
	LP	Lighting Protector (Internal Type)
	K	Oil Free Finish
	BA	Stainless Steel Bracket(Angle Type) with SST Bolts
	BF	Stainless Steel Bracket(Flat Type) with SST Bolts
	X	Special Order

Note 1: Specify Draft Range, Absolute (small pressure and vacuum) and Items marked "\*" before order.

# APT3200LES

Extended Diaphragm Seal and Capillary Type Transmitter



## Flange Size: 80mm (3 inch)

Flange Rating	Mb	D	b	d2	k	f	d4	d5	Х
ANSI Class 150		190	24	20	152.5	1.6	127	76	4
ANSI Class 300	72	210	29	22	168.5	1.0	127	70	8
JIS 10K		185	18	19	150	2	126	76	0
JIS 20K	72	200	22	23	160		132	70	8
DIN PN 10/16		200	20	18	160	2	138	76	8
DIN PN 25/40	72	200	14	10	700		130	70	0

# Flange Size: 50mm (2 inch)

Flange Rating	Mb	D	b	d2	k	f	d4	d5	Х
ANSI Class 150	47	150	20	20	120.5	2	92	48.3	4
ANSI Class 300	47	165	22.5	20	127		92	40.3	8
JIS 10K	47	155	16		120	2	96	48.3	4
JIS 20K	47	155	18	19	120		90	40.3	8
DIN PN 10/16	47	165	20	18	125	2	102	48.3	4
DIN PN 25/40	47	100	20	10	120		102	40.3	4

Diaphragm Extension Length Code	RL
5	50 mm (2 inch)
10	100 mm (4 inch)
15	150 mm (6 inch)



MODEL NO.	Code	Des	scription					
APT3200	LES	Extended Diaphragm Seal	and Capillary Type Transmitter					
	4	-100 to 1500kPa						
Dongoo	5	0 to	5000kPa					
Ranges	6	0 to 25000kPa						
	Χ	S	Special					
	S2	2-inch (50mm) SST						
Mounting Flange Size/Material	S3	3-inch (80mm)	SST					
O120/Matorial	XX	S	special					
	A1	ANSI	Class 150					
	A2	ANSI	Class 300					
	J1	JI	S 10K					
Mounting Flange Rating	J2	JI	S 20K					
raang	D1	DIN	PN 10/16					
	D2	DIN PN 25/40						
	XX	Special						
	05	50 mm(2in.)						
Extension Length	10	100mm(4in.)						
Extension Length	15	150mm(6in.)						
	XX	Special						
		DIAPHRAGM	OTHERS					
	S	316L SST	316L SST					
Wetted Parts Material	PT	PTFE	316L SST					
Diaphragm/Others	Н	Hastelloy C-276	316L SST					
	Т	Tantalum	316L SST					
	Χ	Special	Special					
		FILL FLUID	TEMPERATURE LIMITS					
Fill Fluid	2	D.C.Silicon 200	-40 to 205 °C (-40 to 400 °F)					
T III T IGIG	7	D.C.Silicon 704	15 to 205 °C (60 to 400 °F)					
	Χ	Special						
Capillary Length (m)		Capillary Length from 1to 12m (3m: 03)						
Materials of		FLANGE	VENT/DRAIN VALVE					
Construction	SS	316L SST	316L SST					
		ELECTRICAL CONNECTION	MATERIAL					
Electrical	1	½-14 NPT	Epoxy Coated – Aluminum					
Connection	2	G1/2	Epoxy Coated - Aluminum					
	Χ	Special						



Hazardous	K0	Maker Standard (Waterproof : IP67)
Locations Certifications	K1	KOSHA Flameproof Approval : Ex d IIC T6
Certifications	K2	KTL Intrinsic Safety Approval : Ex ia IIC
	*E1	ATEX(KEMA) Flameproof
	*E2	ATEX(KEMA) Intrinsic Safety
	*F1	FM/FMC Explosion proof (for USA & Canada)
	*F2	FM Intrinsic proof
	M1	LCD Indicator
	LP	Lighting Protector (Internal Type)
	K	Oil Free Finish
	BA	Stainless Steel Bracket(Angle Type) with SST Bolts
	BF	Stainless Steel Bracket(Flat Type) with SST Bolts
	X	Special Order

Note 1: Specify Draft Range, Absolute (small pressure and vacuum) and Items marked "\*" before order.

# **Autrol America Inc,**

10 N. Martingale Rd, Suite 400. Schaumburg, IL 60173. United States T: 847-779-5000 | F: 847-655-6062 | website: www.autroltransmitters.com

Email: info@autroltransmitters.com

