9700 MK2 transmitter
submersible hydrostatic level transmitter

9700 transmitter
- Factory sealed and tested for submersed duty
- Good long-term stability

Features
- 2 wire 24V DC loop powered
- 4 to 20mA, remote zero and span option
- Accuracy +/- 0.1% of calibrated span
- Ranges from 0.2 to 100m H_2O
- 10:1 rangeability
- Ceramic capacitive sensor
- Low maintenance
- Fully submersible IP68
- Reverse polarity protection
- Intrinsically safe option

Description
The 9700 series electronic pressure/level transmitter is designed to perform in the arduous conditions of today's level measurement applications.

Using temperature compensated, surface mount electronics and a ceramic capacitive sensor, the 9700 provides an accuracy of better than +/-0.1% of calibrated span and excellent long term stability. Mounting options enable simple installation in situations from service tanks to remote reservoirs.

All versions can be mounted in areas subject to flooding and are rated IP68 (except 9795 type rated IP67).

Operation
At the heart of the 9700 is the Ceramic Capacitive pressure Sensor (CCS). The CCS provides a "flush" diaphragm, avoiding the risks of sensor clogging and ensures extremely low hysteresis, minimal output drift and high repeatability. With traditional sensors, process build up on the diaphragm face can result in an unreliable measurement, requiring regular servicing of the sensor.

The CCS used in the 9700 series is virtually immune to the effects of process build up due to a maximum sensor deflection of only 0.025mm, compared with up to 1.5mm for convental sensors.

The ceramic sensor provides outstanding corrosion resistance. The 9700 provides reliable and low maintenance measurement year after year.

For measurements up to 300 bar, the series 9000 pressure transmitter offers a cost effective solution for most pressure measurement applications. The series 9000 also features a CCS and 0.1% accuracy. For further information, ask for data sheet number 0077.

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Specification

Functional

	9710, 9720, 9780, 9790 & 9797 Submersible	9795 External
Output signal:	Two-wire, 4-20mA	Two-wire, 4-20mA
Power supply:	10 to 30 Vdc	10 to 30V dc
Load resistance:	R=50 x (supply voltage-10V) Ω	R=50 x (supply voltage-10V) Ω
Measuring range:	0.2 to 100m H_2O (See note)	0.2 to 100m H_2O (See Note)
Overrange limit:	5 x range up to a max 120m H_2O	5 x range up to a max 120m H_2O
Zero adjustment:	-20 to + 40% Span	-20 to + 40% Span
Span adjustment:	+10 to + 100% URL*	+10 to + 100% URL*
Process temp. limits:†	-20 to + 90°C (80°C EEx ia)	-20 to +125°C (FPM/FKM seal rings)
		-30 to +110°C (Buna N seal rings)
		-30 to +110°C (Chemraz® seal rings) #
Ambient temp. limits:	-20 to + 90°C (80°C EEx ia)	-20 to + 90°C (80°C EEx ia)
Humidity limits:	0 to 100% RH***	0 to 100% RH
Hazardous area certification:	ATEX II 1 G and ATEX II 1 D EEx ia IIB T4	ATEX II 1 G and ATEX II 1 D EEx ia IIB T4

Note *** : When terminated using the 9710/077 vented terminal box

Performance

	9710, 9720, 9780, 9790 & 9797 Submersible	9795 External
Accuracy:	+/- 0.1% ** of calibrated span	+/- 0.1% ** of calibrated span
Stability:	+/- 0.1% URL* per 6 months	+/- 0.1% URL* per 6 months
Temperature effect: (over ambient temp. range)	+/-0.015% URL per °C	+/-0.015% URL per °C

Physical

	9710, 9720, 9780, 9790 & 9797 Submersible	9795 External
Cable entry:	Glanding system supplied with required length of vented cable	M20/PG13.5 cable gland for cable 5 to 9mm (cable not supplied)
Wetted Parts:		
Sensor:	Ceramic	Ceramic
Sensor housing:	316 Stainless Steel, Aluminium Bronze or Titanium	316 Stainless Steel, Aluminium Bronze or Titanium
Seal rings:	Fluorocarbon (FPM/FKM), Buna N or Chemraz® #	Fluorocarbon (FPM/FKM), Buna N or Chemraz® #
Cable:	Polyurethane Flourinated Ethylyene Polypropylene coated	Not supplied
Ingress protection:	IP68 (120m H_2O)	IP67
Approximate weight:	0.7Kg (sensor only)	0.7Kg
Meantime between failure:	Integral electronics : 40 years Remote electronics : 37 years	

* URL = Upper range limit   ** includes effects of linearity, hysteresis and repeatability

† For process temperatures above 90°C, temperature barrier must be specified.

Chemraz® is a registered trademark of Green Tweed. Chemraz® only available on Industrial models, not marine version.

Product Overview

Simple installation, low maintenance

The 9700 is available in both submersible versions and externally mounted (floodable) versions. The housing contains the capacitive ceramic sensor and the electronics circuit board, all the components needed to produce an accurate and reliable measurement of the process. The glanding system used with the submersible versions ensures absolute integrity of the IP68 rating. IP68 units are generally factory fitted with the required length of vented cable fitted.

9780 - Pole mounted

Protected from aggressive environments and processes

The transmitter is designed to withstand the harshest of environments.
Its rugged, flush ceramic sensor is inherently capable of withstanding attack from most chemicals.

Temperature limits for the CCS are -30°C to +125°C. The process temperature is limited to -20°C to + 90°C for submersible versions (+80°C for EEx ia versions).
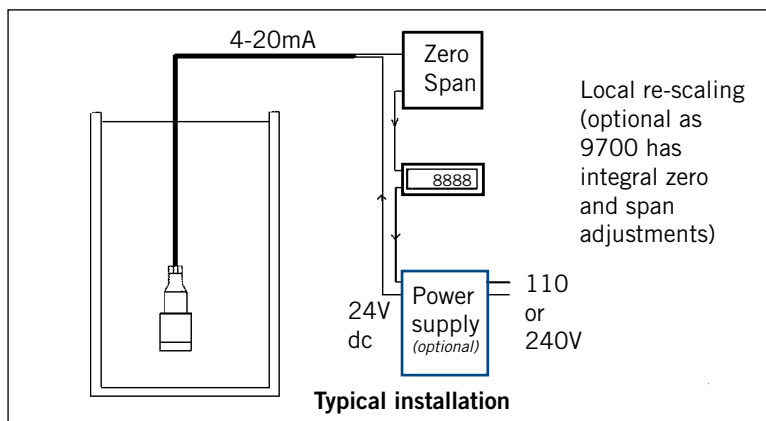
Mounting options

The 9700 is available in various mounting configurations, all are rated IP68 with the exception of the 9795 which is IP67.

- **9710** - Cable suspended
- **9720** - Clamped
- **9780** - Pole mounted
- **9790** - Flanged
- **9797** - Threaded 1½" BSPP male

Typical installation

In order to simplify installation, all 9700 series transmitters are available with integral or remote zero and span. Remote zero and span allows zero and full scale output to be set without removing sensor from process, this option includes an IP67 junction box. Integral zero and span versions require a vented terminal box for cable termination* (not required with 9795).

*Available as option (part no. 9710/077). Essential when venting into areas of high humidty.

9790 - Flanged

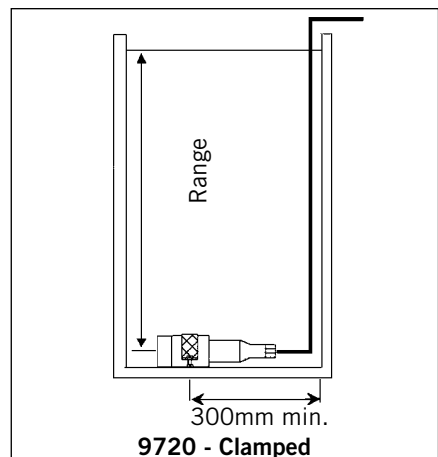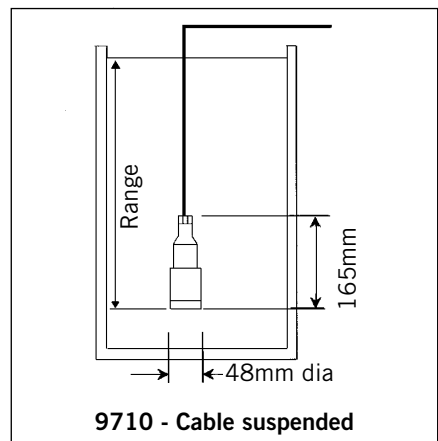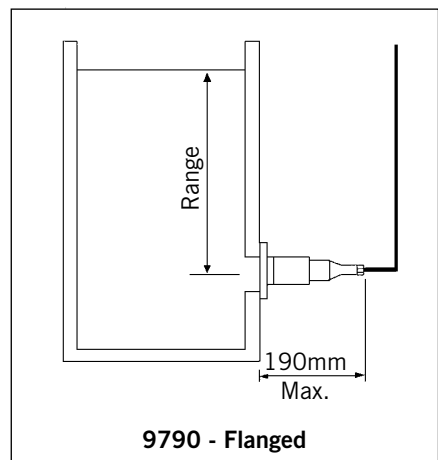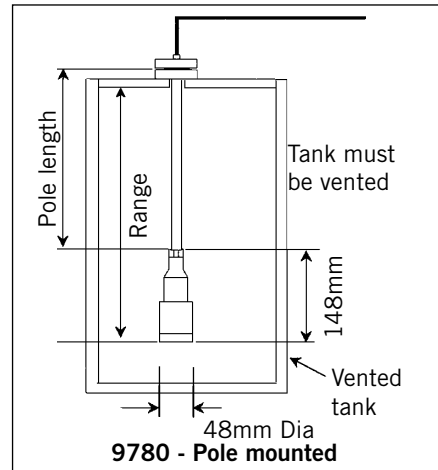**9710 - Cable suspended**

Typical installation

9720 - Clamped

APPROVALS

Hazardous area certification :
ATEX II 1 G
ATEX II 1 D (90°c)
EExi a IIB T4 Intrinsically Safe

Marine approvals :
Lloyds Register
Bureau veritas
American Bureau of Shipping
Korean Register

Ordering Information : Industrial Version

97	9700 Series, electronic hydrostatic level transmitter - Industrial version										
	Code	**Sensor type**									
	10	Cable suspended, submersible	IP68								
	20	Clamped, submersible	IP68								
	80	Pole mount, submersible	IP68								
	90	Flanged, submersible	IP68								
	95	Mobrey 'Thames' fitting (¾" BSPP running nut)	IP68								
	97	1½" BSPP male, submersible	IP68								
		Code	**Electronics enclosure and process connection material**								
		S	Stainless steel 316 S31								
		A	Aluminium bronze								
		T	Titanium (Note: non-wetted parts in 316 st. st.								
			Code	**'O' ring material**							
			1	HPS - Fluorocarbon (FPM/FKM)							
			2	HPS - Buna N							
			3	Chemraz® - available only on 9780, 9790 slip on flange, 9795 & 9797 (non-wetted seals in Fluorocarbon (FPM/FKM)							
				Code	**Nominal range**	**Overrange limit**					
				A	0 to 2m H_2O (0 to 0.2 Bar g)	10m H_2O					
				B	0 to 5m H_2O (0 to 0.5 Bar g)	25m H_2O					
				C	0 to 10m H_2O (0 to 1.0 Bar g)	50m H_2O					
				D	0 to 20m H_2O (0 to 2.0 Bar g)	100m H_2O					
				E	0 to 50m H_2O (0 to 5.0 Bar g)	120m H_2O					
				F	0 to 100m H_2O (0 to 10 Bar g)	120m H_2O					
					Code	**Zero and span**					
					1	Integral (note 1)					
					2	Remote					
					3	Local *9780 Non-IS only*					
						Code	**Cable material**				
						X	None 9795 supplied without cable				
						P	Polyurethane Specify cable length with order				
						F	FEP Specify cable length with order				
							Code	**Approval**			
							0	Non certified - Safe area use only			
							1	ATEX II 1 G , EEx ia IIB T4, ATEX II 1 D (+90°C)			
								Code	**Process connection**		
								A	Slip-on flange DN25 PN40 (DIN 2635) †*not 9780*		
								B	Fixed flange DN40 PN40 (DIN 2635)		
								C	Fixed flange DN50 PN40 (DIN 2635)		
								D	Fixed flange DN80 PN40 (DIN 2635)		
								E	Slip-on flange 1" # 150 ANSI B16.5 *not 9780*		
								F	Fixed flange 2" # 150 ANSI B16.5		
								G	Fixed flange 3" # 150 ANSI B16.5		
								V	¾" BSPP running nut *9795 only*		
								W	G 1½" A (1½" BSPP) *9797 only*		
								X	None *9710 & 9720*		
									Code	**Pole material Note 2**	
									0	None	
									1	Stainless steel 316 S31	
									2	Mild steel	
									3	Copper Nickel	
										Code	**Temperature barrier Note 3**
										0	No
										1	Yes *9795 only*
	97	**10**	**S**	**1**	**A**	**1**	**P**	**1**	**E**	**1**	**0** **Typical ordering code**

Note 1: Calibrated to user requirements during manufacture, not field adjustable. (9795 *is* field adjustable)
Note 2: Specify number of equally spaced joints required. The pole is supplied in 6' lengths up to the required length
Note 3: Used to reduce risk of condensation forming on electronics housing when combination of low process and high ambient temperature is possible. Also required when process temperature may exceed 194°F

† Fixed flange on Aluminium Bronze option.
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Order information : Marine version

97	9700M Series, electronic hydrostatic level transmitter - Marine version										
	Code	**Electronics enclosure and process connection material**									
	10M	Cable suspended, submersible				IP68					
	20M	Clamped, submersible				IP68					
	80M	Pole mount, submersible				IP68					
	90M	Flanged, submersible				IP68					
	95M	Mobrey 'Thames' fitting (¾" BSPP running nut)				IP67					
	97M	1½" BSPP male, submersible				IP68					
		Code	**Electronics enclosure and process connection material**								
		S	Stainless steel 316 S31								
		A	Aluminium bronze								
		T	Titanium								
			Code	**'O' ring material**							
			1	HPS - Fluorocarbon (FPM/FKM)							
			2	HPS - Buna N							
				Code	**Nominal range**		**Overrange limit**				
				A	0 to 2m H_2O	(0 to 0.2 Bar g)	10m H_2O				
				B	0 to 5m H_2O	(0 to 0.5 Bar g)	25m H_2O				
				C	0 to 10m H_2O	(0 to 1.0 Bar g)	50m H_2O				
				D	0 to 20m H_2O	(0 to 2.0 Bar g)	100m H_2O				
				E	0 to 50m H_2O	(0 to 5.0 Bar g)	120m H_2O				
				F	0 to100m H_2O	(0 to 10 Bar g)	120m H_2O				
				G	0 to 1m H_2O	(0 to 0.1 Bar g)	5m H_2O				
				H	0 to 3.5m H_2O	(0 to 0.35 Bar g)	17.5m H_2O				
				J	0 to 20 Bar g		60 Bar g	}			
				K	0 to 70 Bar g		105 Bar g	} Note 3			
				L	0 to 300 Bar g		400 Bar g	}			
					Code	**Zero and span**					
					1	Integral (note 1)					
					2	Remote					
						Code	**Cable material**				
						X	None				
						P	Polyurethane (Specify cable length with order)				
						F	FEP (Specify cable length with order)				
							Code	**Electrical approval**			
							0	Non certified - safe area use only			
							1	ATEX II 1G, EEx ia IIB T4 , ATEX II 1D (+90°C)			
								Code	**Process connection**		
								A	Slip-on flange DN25 PN40 (DIN 2635)†	*not 9780*	
								B	Fixed flange DN40 PN40 (DIN 2635)		
								C	Fixed flange DN50 PN40 (DIN 2635)		
								D	Fixed flange DN80 PN40 (DIN 2635)		
								E	Slip-on flange ANSI B16.5 1" # 150	*not 9780*	
								F	Fixed flange ANSI B16.5 2" # 150		
								G	Fixed flange ANSI B16.5 3" # 150		
								V	¾" BSPP running nut	*9795 only*	
								W	G 1½" A (1½" BSPP)	*9797 only*	
								X	None	*9710 & 9720*	
									Code	**Pole material Note 2**	
									0	None	
									1	Stainless steel 316 S31	
									3	Copper Nickel	
										Code	**Temperature barrier**
										0	No

97	10M	S	1	A	1	P	1	B	1	0	**Typical ordering code**

Note 1: Calibrated to user requirements during manufacture, not field adjustable. (9795 is field adjustable)
Note 2: Specify number of equally spaced joints required. The pole is supplied in 6' lengths up to the required length.
Note 3: Check relevant flange tables if temperature is greater than 50°C.
† Fixed flange on Aluminum Bronze option.