Series VTP60 Hydrogen pressure sensor

Piezoresistive I Thin-film-on-steel.

Product Introduction

VORTORQ VTPS60 pressure sensors are specifically designed for the challenges of hydrogen applications, utilizing two well-established technologies: piezoresistive and thin-film-on-steel. Piezoresistive sensors are built with hydrogen-compatible AISI 316L stainless steel and feature a gold-coated membrane that acts as a barrier against hydrogen permeation. This design minimizes the risk of hydrogen embrittlement, making it ideal for low-pressure environments.

For high-pressure conditions, thin-film-on-steel sensors offer excellent long-term stability and low signal drift. Manufactured with hydrogen-compatible steel, they ensure reliable and accurate performance even under demanding conditions.

Both sensor types have been extensively tested and field-proven, delivering safety, durability, and precision across a wide range of hydrogen applications.

Specification

- High precision, good long-term stability.
- Micro amplification circuits, it can output various current and voltage signals.
- One body stainless steel integrated welding structure
- Customization
- Diversified electrical connectors
- Anti vibration, anti shock impact, anti lightning, and anti radio frequency interference
- Integrated digital display meter (optional)

Applications

- PEM fuel cells
- Hydrogen refueling station, hydrogen storage
- Hydrogen fuel vehicles
- Backup power
- Test bench
- Train brakes
- Hydrogen Drone

Accuracy
±0,25 %FS
Total error band
±0.5%FS @ -20…85 °C
Pressure ranges
0…10 to 0…1500 bar

Series VTH53 Pressure Transducer

Standard pressure ranges

Measurement method	Range (psi)	Range (bar)	Range(Mpa)	Gauge pressure	Absolute pressure	Mixed pressure (Unless otherwise specified, the lower limit is -1 bar)
Piezoresistive sensors and Thin-film-on -steel sensors		0 to 0.1	0 to 0.01	●		
		0 to 0.2	0 to 0.02	●		
		0 to 0.5	0 to 0.05	●		
		0 to 0.7	0 to 0.07	●		
		-0.5 to +0.5	-0.05 to +0.05	●		●
		-1 to +1	-0.1 to +0.1			●
		-1 to +2	-0.1 to +0.2	●		●
		-1 to +10	-0.1 to +1	●		●
		0 to 2	0 to 0.2	●	●	●
	0 to 100	0 to 7	0 tov0.7	●	●	●
	0 to 150	0 to 10	0 to 1	●	●	●
	0 to 250	0 to 16	0 to 1.6	●	●	●
	0 to 500	0 to 35	0 to 3.5	●	●	●
	0 to 1000	0 to 70	0 to 7	●	●	●
	0 to 1500	0 to 100	0 to 10	●	●	●
	0 to 2250	0 to 150	0 to 15	●	●	●
	0 to 3000	0 to 200	0 to 20	●	●	●
	0 to 5000	0 to 350	0 to 35	●	●	●
	0 to 7500	0 to 500	0 to 50	●	●	●
	0 to 10000	0 to 700	0 to 70	●	●	●
	0 to 15000	0 to 1000	0 to 100	●	●	●
	0 to 22000	0 to 1500	0 to 150	●	●	●

Performance

Pressure

Parameters	Min	Typical	Maximum value	unit	Remarks
Comprehensive accuracy (RSS for linearity, hysteresis, and repeatability)	±0.1	±0.25	0.5	%F.S.BFSL	@ 25℃
Isolation (body to any wire)	100			MΩ	@250VDC
Dielectric strength			2	mA	@500VAC, 1min
Pressure cycling	1X106			0~FS cycle	
Overload pressure	2 times full scale or 300MPa (whichever is smaller)				According to demand, it can reach 4X
Medium temperature [°C]	-30 ~ 80				
Environmental temperature [°C]	-20 ~ 80				
Explosive pressure	>5X				
Long term stability (1 year)	0.1		0.25	%F.S	
Temperature drift	≤ ± 0.05% FS/℃ (temperature range -20～85 ℃, including temperature effects of zero and range)				
Temperature compensation range	0～70℃				
Working temperature	-30		85	℃	
Wetted parts material, process connection	AISI 316L(1.4404)				
Wetted parts material,membrane	AISI 316L(1.4404) Gold plated 15 um				
Diaphragm material	SST3316L				
Shock	50g, 11msec Half Sine Shock per MIL-STD-202G, Method 213B, Condition A				
Vibration	±20g, MIL-STD-810C, Procedure 514.2-2, Curve L				
ATEX I M1 Ex ia I Ma					
Note	For applications in Ex zones, please refer to and comply with the conditions specified in the CE-ATEX Type Examination Certificate. For more information, contact our customer service team.				
Detection range	0~0.01Mpa to 0~250Mpa (Gauge pressure of absolute pressure)				
Overload pressure	2x full scale or 300Mpa (Take the smaller value)				
Output Signal	4~20mADC, 0~5 VDC, 0~5VDC, 0~10VDC, 0.5~4.5VDC, RS485 Modbus-RTU, IIC, Hart				
Excitation Voltage	13~30VDC or 5V				
Medium temperature	-30~+85℃				
Ambient temperature	-20~+85℃				
Accuracy	0.5%F.S., 0.25%F.S., 0.1%F.S.,				
Measurement medium	Various liquids, gases, or vapors compatible with 316 or 304 stainless steel				
Process connection	M20x1.5, M12x1, G1/4, G1/2 etc.				

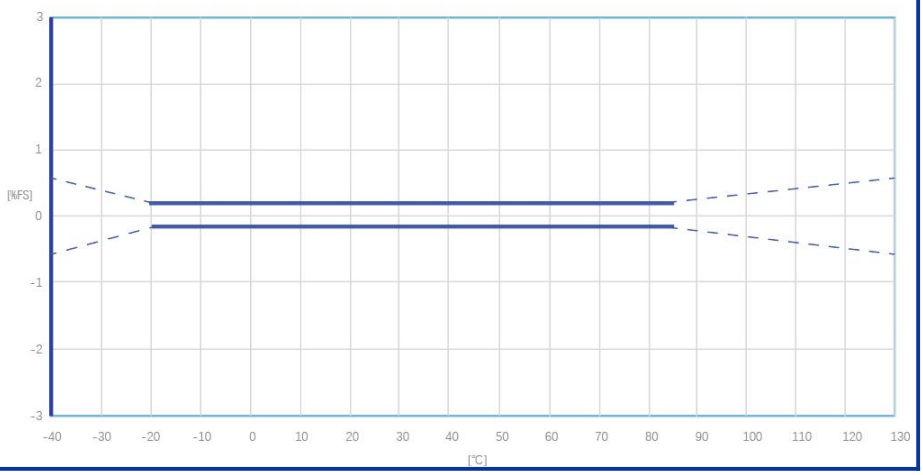
For custom configurations, consult factory.
Notes
Compensated Temperature: The temperature range over which the product will produce an output proportional to pressure within the specified performance limits.
Operating Temperature: The temperature range over which the product will produce an output proportional to pressure but may not remainwithin the specified performance limits.
Storage Temperature: The temperature range over which the product can be stored safely in occasions without pressure applied or power nput and remains rated performance.
Beyond this temperature range may cause permanent damage to the product.
All configurations are built with supply voltage reverse and output short-circuit protections.

CE Compliance (For reference only)
EN 55022 Emissions Class A & B
IEC 61000-4-2 Electrostatic Discharge Immunity (8kV contact/15kV air)
IEC 61000-4-3 Radiated, Radio-Frequency Electromagnetic Field Immunity (10V/m, 80M-1GHz)
IEC 61000-4-4 Electrical Fast Transient Immunity (1kV)
IEC 61000-4-5 Surge Immunity (V+ to V-: ±2KV/42Ω; L to Case: ±1KV/12Ω; V- to V0: ±1KV/42Ω)
IEC 61000-4-6 Immunity to Conducted Disturbances Induced by Radio Frequency
Fields (150K~80MHz, 10V level for voltage output models, 3V level for current output model)
IEC 61000-4-9 Pulse Magnetic Field Immunity (100A/m peak) . For all CE coFPliance tests, max allowed output deviation ±1.5 %F.S.

The graph opposite shows the maximum deviation across the entire medium temperature range (-20 …125 °C, optional: -40…125 °C).

Within the compensated pressure and temperature range, the total error has a maximum value of 0.25 %FS (-20…85 °C)

Experience shows that outside the compensated temperature range, total error increases linearly by 0,04 %FS/K.



CODE	OUTPUT SIGNAL	SUPPLYVOLTAGE
1	0.5-4.5V Ratiometric	5±0.25V Protected to 16V
2	1-5V	8-36V
3	4-20mA	9-36V
4	0-5V	8-36V
5	0-10V	13-36V
6	1-6V	8-36V
7	0.5-4.5V	7.5-36V

CODE	CONNECTION TYPE	DIM C (MAX)
1	Cable	1.97 [50.0]
2	Packard A	2.10 [53.5]
3	Packard B	2.10 [53.5]
4	M12	1.71 [43,5]
5	FORMA	1.93 [49.0]
6	FORM C	1.97 [50.0]
7	AMP	2.52 [64.0]

CODE	PRESSURE PORT TYPE		
	PORT	DIMA	DIM B
1	G1/4 JIS B2351	0.472[12.00]	0.3 [8.0]
2	M20x1.5 mm ISO 6149-2	0.661[16.8]	0.3[8.0]
3	1/4-18 NPT	0.600[15.24]	0.3 [8.0]
4	7/16-20UNFFEMALE SAE J513 STRAIGHT THREAD WITH INTEGRAL VALVE DEPRESSOR	0.687[17.5]	0.3 [8.0]
5	M14x1.5 mm ISO 6149-2	0.433[11.0]	0.3 [8.0]
6	1/8-27 NPT	0.390 [9.91]	0.3[8.0]
7	M12×1.5 mm ISO 6149-2	0.433[11.0]	0.3[8.0]
8	M10x1.0 mm ISO 6149-2	0.374 [9.5]	0.3[8.0]
9	G1/4 DIN 3852 FORME GASKETDIN3869-14 NBR	0.512[13.00]	0.3[8.0]

Series VTPS60 – Specifications

The following wiring definition is commonly used in Mainland China and will need to be determined individually with the European, the UK and the US cusotmers.

CURRENT OUTPUT WIRING					
CONNECTION	+SUPPLY	-SUPPLY	NC. PINS		P REF VENT
Packard, A	A	B	C		
Packard, B	B	A	C		
FORM A	1	2	3,4		
M12	1	2	3,4		Hole Through Connector
CABLE	RED	BLK			Pipe In Cable
VOLTAGE OUTPUT WIRING					
CONNECTION	+SUPPLY	+OUTPOT	COMMON	NC. PINS	P REF VENT
Packard, A	A	C	B		
Packard, B	B	C	A		
FORM A	1	3	2	4	
M12	1	3	2	4	Hole Through Connector
CABLE	RED	WHT	BLK		Pipe In Cable

Weather-Proof Rating

Connection	P Code
Packard A / B	IP66
Cable	IP67
M12	IP67
Form A	IP65
Form C	IP66
AMP	IP66

Mechanical data

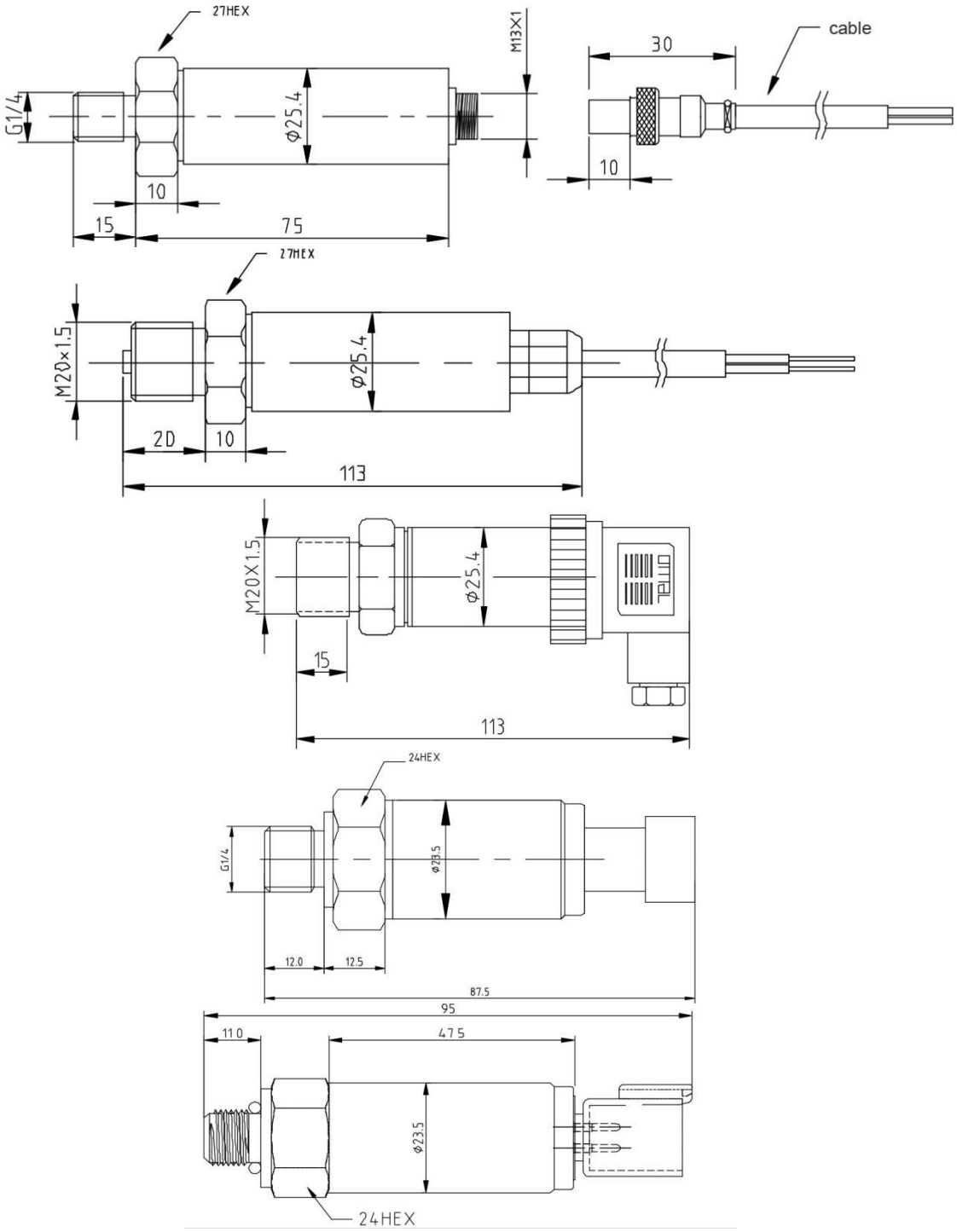
Materials in contact with media

Pressure connection	Stainless steel 17-4 PH
Pressure transducer diaphragm	Stainless steel SUS 316L
Pressure transducer seal (internal)	None
Pressure connection seal (external)	None, metallically sealed

Electrical connections

Round plug	2-wire		3-wire		**Valve plug**	2-wire		3-wire	
M12 × 1	4…20 mA		0…10 V		Form A	4…20 mA		0…10 V	
	2	n.c.	2	n.c.		2	OUT/GND	2	+OUT
	3	OUT/GND	3	+OUT		3	+Vs	3	+Vs
	4	n.c.	4	GND		⏚	Case	⏚	Case

Series VTPS60



Series VTPS60 – Ordering Information

Example	VTPS60 341015500PG	VTPS60	3	4	1	0	1	5	500P	G
Model Code VTPS60 Pressure Transducer										
Output	1	0.5-4.5V RATIOMETRIC								
	2	1-5V								
	3	4-20mA								
	4	0-5V								
	5	0-10V								
	6	1-6V								
	7	0.5-4.5V								
	x	Customization								
Connection	1	Cable								
	2	Packard A								
	3	Packard B								
	4	M12								
	5	FORM A								
	6	FORM C								
	7	AMP								
	8	Customization								
Port Material	1	304Screw+ 17-4 Diaphgram								
	2	17-4 Integral Screw								
	X	Customization								
Snubber	0	No Snubber								
	1	With Snubber								
Label	0	No Label (OEM)								
	1	AdhesiveLabel								
	2	Laser Marking								
Pressure Port	1	G1/4 JIS B2351								
	2	M20 x 1.5								
	3	1/4-18 NPT								
	4	7/16-20UNF FEMALE SAE								
	5	M14 x 1.5								
	6	1/8-27 NPT								
	7	M12 x 1.5								
	8	M10 x 1.0								
	9	G1/4 DIN 3852								
	A	G3/8 JIS B2351								
	X	Customer Specia								
Pressure Range	B	Bar								
	M	Mpa								
	P	PSI								
	K	Kpa								
Pressure Type	G	Gauge								
	S	Sealed (>500PSI)								
	C	Compound								