

## STANDALONE PRESSURE DISPLAY SYSTEM OPERATIONS AND MAINTENANCE MANUAL

p/n ALS5A100



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## 1.0 GENERAL DESCRIPTION



This system is designed to display wellhead pressure inside of a wireline unit. The system consists of the pressure display panel, pressure transducers, and cables.

The standalone display panel can display two different pressures (ie. tubing and casing pressure) simultaneously. The panel has four connectors, one for pressure-1 transducer, one for pressure-2 transducer, one for the RS232 serial data port/analog signal and one for power.

The two pressures can be displayed and recorded simultaneously. This allows the operator to monitor both tubing and casing pressure real time while inside the logging unit. When work is performed on a well such as pulling a plug, the operator can instantly see the pressure change to help confirm the operation.

If only one transducer is connected, the unused display can be switched off.

The pressure transducers are intrinsically safe for use on or near the well head or pressure lubricator. An I.S. barrier is installed inside the panel to limit the power to the transducer.

The panel is powered by providing 12vdc to pin A and ground to pin B on the panel connector.

## 2.0 OPERATING PROCEDURES

### 2.1 GENERAL OPERATING INSTRUCTIONS

- 2.1.1 Apply 12vdc power to the power in connector. A +, B -.
- 2.1.2 Turn on panel using power switch. This switch is a locking switch and needs to be pulled before it can be switched.
- 2.1.3 Use the SELECT switch to select which pressure is to be displayed, Pressure 1, Pressure 2, or Both.

If Both is not selected then the display not displaying pressure will display the pressure units (PSI, BAR, or KPA).

- 2.1.4 Connect the pressure transducer and let it stabilize with not pressure applied. After it stabilizes press the ZERO button to eliminate any offset. The maximum amount of offset that can be eliminated is 250 PSI (17.23 BAR or 1723 KPA)

### 2.2 SELECTING PRESSURE UNITS AND SCALES

- 2.2.1 The panel can be set to display pressures in PSI, KPA, or BAR.
- 2.2.2 The panel can also be set to operate with 10K PSI (689 BAR, 68,948 KPA) or 15K PSI (1034 BAR, 10,3421 KPA)
- 2.2.3 The default settings are 10K and PSI. To change these settings, use the ZERO 1, ZERO 2, and SELECT (1, 2, BOTH) switches along with the power on/off switch.
- 2.2.4 To set the PRESSURE UNITS, turn the power off and set the SELECT switch to the center position.

To set to PSI, turn power on while depressing the Pressure 1 Zero button.

To set to KPA, turn power on while depressing the Pressure 2 Zero button.

To set to BAR, turn power on while depressing both the Pressure 1 buttons and the Pressure 2 Zero buttons.

2.2.5 To set the PRESSURE SCALE, turn the power off and set the SELECT switch to the UP or DOWN position.

To set the top display PRESSURE SCALE press the SELECT switch to the UP position

To set the bottom display PRESSURE SCALE press the SELECT switch to the DOWN position

To set to 15K PSI press and hold the Pressure 1 Zero when turning on power.

To set to 10K PSI press and hold the Pressure 2 Zero when turning on power.

Examples:

If the SELECT switch is set to DOWN and the Pressure 1 Zero button is pressed while power is turned on, the Pressure 2 display will be set to 15K PSI.

If the SELECT switch is set to UP and the Pressure 2 Zero button is pressed while power is turned on, the Pressure 1 display will be set to 10K PSI.

2.2.6 This only needs to be done one time. The panel will remember the previous setting the next time the unit is powered up.

## 2.3 INTERNAL DATA RECORDER OPERATION

This device records depth and tension data along with other job parameters onto a compact flash card.

### 2.3.1 DATA FORMAT

Data is stored in comma delimited ASCII TEXT format (CSV). Each line terminates with CR and LF characters.

DATE (mm/dd/yy)  
 TIME  
 PRESSURE 1 (or units if not selected)  
 PRESSURE 2 (or units if not selected)

<CR> - CARRIAGE RETURN, <LF> - LINEFEED

FOLLOWING IS AN EXAMPLE RECORD

4/3/2007	15:35:19	unit kpa	
4/3/2007	15:35:19	-336	155
4/3/2007	15:35:20	-336	65
4/3/2007	15:35:21	-337	-176
4/3/2007	15:35:22	-337	-138
4/3/2007	15:35:23	kpa	234
4/3/2007	15:35:24	kpa	936
4/3/2007	15:35:25	kpa	-26
4/3/2007	15:35:26	kpa	-176
4/3/2007	15:35:28	kpa	616
4/3/2007	15:35:29	kpa	935
4/3/2007	15:35:30	kpa	-115
4/3/2007	15:35:31	-337	-177
4/3/2007	15:35:36	-337	-126
4/3/2007	15:35:37	kpa	-14
4/3/2007	15:35:38	kpa	-176
4/3/2007	15:35:39	kpa	-36

### 2.3.2 DATA RECORD

Data is written to the board once every second. To minimize the amount of data written to the board, a write only occurs when tension changes by more than 5 pounds. Interpolation can be used to fill in non written records since a DATE and TIME stamp is recorded as a part of each data record,

The RECORD LED on the front of the DATA RECORDER board indicates that it is in RECORD mode.

The DATA LED flashes each time a data record is written.

Before removing the CompactFlash card, turn the panel power off. There is a delay when turning off the power while the data files are being closed. After a short delay, the panel will power itself off.

To continue recording on a new flash card, insert the card then turn the panel off then on. This will put the panel into record mode and write a new header file on the CompactFlash card.

### 2.3.3 MEDIA CARD

The CompactFlash media device used in the data recorder may be ordered using part number AMS4P232. Additionally it may be acquired from any number of other retail sources. 1 GB is the minimum recommended size.

### 2.3.4 DATA EXPORT

The memory board can be removed and data moved onto a PC using a standard CompactFlash Media Reader. The data can be imported into programs such as MS Excel or MS Access.

To remove the compact flash card, press the small STOP button located on the front of the DATA RECORDER to cease recording and close the data file. Press the release button to eject the card.

### 2.3.5 DB9 RS232 SERIAL INTERFACE

This connector provides an RS232 interface from the panel to an external computer. This serial port is used to set the real time clock time and date on the data recorder and also send the analog tension signal to an external recording device or acquisition system.

### 2.3.6 ANALOG DATA OUT

Analog data is available at J4 pins 8 and 9.

Pin 8 = pressure 1 and pin 9 = pressure 2.

This data is a 0 – 4vdc signal where 0v = 0 lbs/BAR/Kg

4VDC = Full Scale (10,000 PSI, or 15,000 PSI)

### 2.3.7 SERIAL PORT SETUP

To set the parameters, connect a serial cable to the DB9 port on the right side of the panel. The wiring is as follows:

DB9 PIN OUT: 2 = TRANSMIT, 3 = RECEIVE, 5 = GROUND

Run a program such as MS Windows HyperTerm using the following parameters

BAUD	19,200
BITS	8
PARITY	N
STOP	1
HANDSHAKING	NONE

## 2.3.8 SETTING TIME AND DATE

Connect a serial cable between a PC and the Pressure Recorder panel. Setup the PC as described in section 2.2.5. Turn the panel power off then back on. At this time you will be given the opportunity to set the parameters by pressing any key. If no key stroke is detected during the panel bootup process the data recorder will enter the record mode.

If a keystroke is detected, you will be prompted to enter prompted Enter < rtn > to keep the current time or 's' to set time.

If s is pressed:

Enter the day: 1 – 7 where 1 = Sun and 7 = Sat

To set the year, first enter the tens digit then enter the ones digit (i.e. for 2006 first enter 0 then 6).

To set the month, first enter the tens digit then enter the ones digit (i.e. for Dec. first enter 1 then 2, for Jan. first enter 0 then 1).

To set the day, first enter the tens digit then enter the ones digit (i.e. for the 15<sup>th</sup> first enter 1 then 5, for the 5<sup>th</sup> first enter 0 then 5).

To set the hours (24 hour format), enter 0 for 12:00AM to 9:00, 1 for 10:00 to 19:00, 2 for 20:00 to 23:00. Next enter actual hour (i.e. to set the hour to 17:00 first enter 1 then next enter 7, to set the hour to 09:00 first enter 0 then next enter 9).

To set the minutes, first enter the tens digit then enter the ones digit (i.e. for 21 minutes past the hour first enter 2 then 1, for 9 minutes past the hour first enter 0 then 9).

Seconds is set in the same manner.

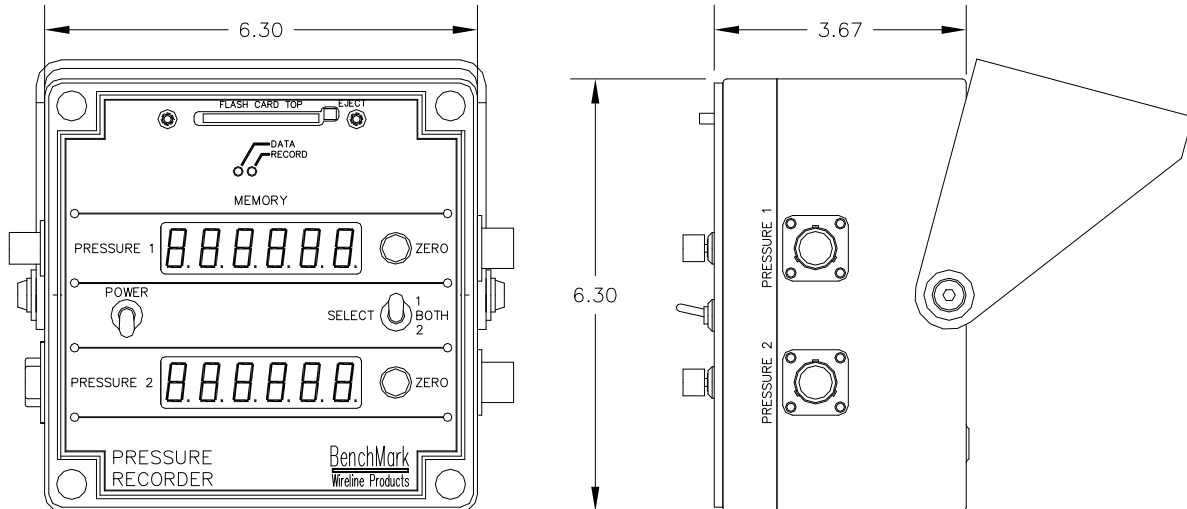
At this time the system is ready to record data.

### 3.0 DRAWINGS, PARTS LISTS AND WIRING DIAGRAMS

#### 3.1 ALS5K101 KIT REMOTE PRESSURE DISPLAY

Part Number	Description	Qty
ALS5A100	PANEL REMOTE PRESS DEPTH TEN	1
ALS5A029-20	CABLE ASSY PRESSURE X-DUCER IN	1
ALS5A028-100	CABLE ASSY PRESSURE X-DUCER IN	1
C276P204	REEL HAND REWIND	1
ALS5P011	I.S. PRESSURE XDUCER 10KPSI I.S. ½ NPT	OPT
ALS5P013	I.S. PRESSURE XDUCER 10KPSI I.S. ¼ NPT	OPT
ALS5P016	I.S. PRESSURE XDUCER 15KPSI I.S. ¼ NPT	OPT
AM5KA036	CABLE ASSY 12V IN	1

#### 3.2 ALS5A100 PANEL REMOTE PRESSURE PHYSICAL SPECIFICATIONS



HEIGHT: 6.30" 16 CM  
 WIDTH: 6.30" 16 CM  
 DEPTH: 3.67" 9.3 CM  
 WEIGHT: 4.75 POUNDS 2.15 KG

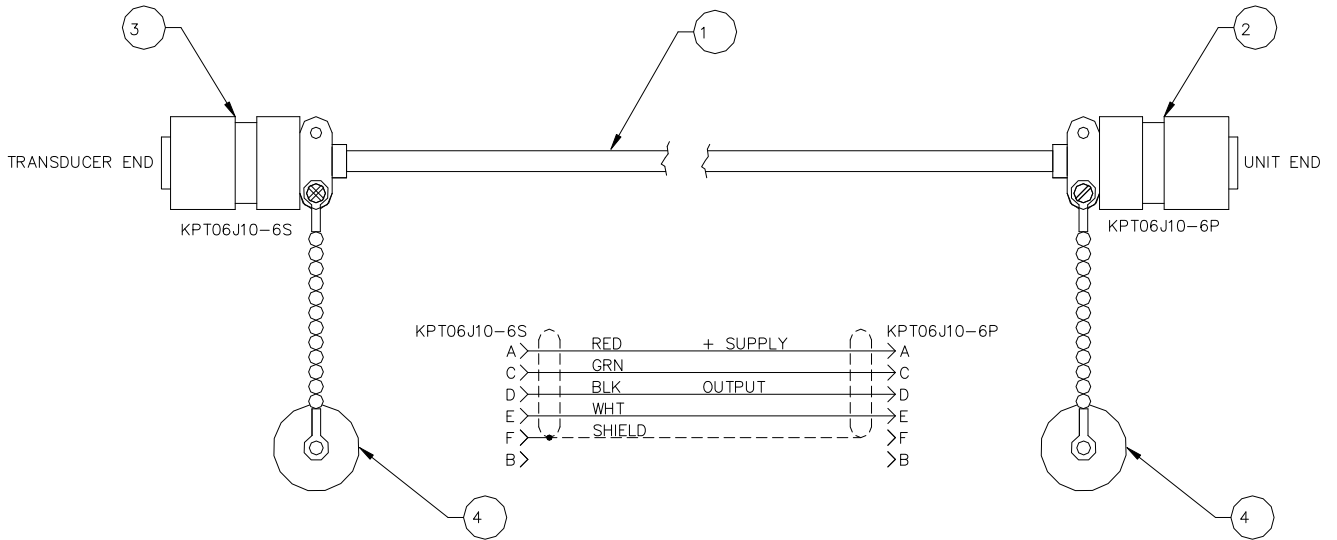
### 3.3 ALS5A100 PRESSURE DISPLAY PANEL PARTS LIST

Part Number	Description	Qty
SW-ALS5A100A	SOFTWARE FOR ALS5A100 PRESS	1
ALS5A021	PCB ASSY TERN FCB PWR SUP 4-20	1
AMS4M076	WINDOW LED RECESSED SERIAL	2
AMS4P128	DISPLAY LED RED 0.5" 14 SEGMNT	2
C276P620	BARRIER LOOP ISOLATOR 4-20mA	1
AMS4P232	MEMORY COMPACTFLASH 256MB	1
AMS4P164	CONN DB9S CRIMP AMP USED WITH	1
AMS4P168	SOCKET AMP M39029/63-368 USED	3
AMS4P257	CONN KPT02E8-33P RECEPTACLE	1
AM5KP056	CONN KPT02E10-6S RECEPTACLE	2
C276P607	STOP END 35MM DIN RAIL TERM	2
ALS5M006	RAIL DIN REMOTE PRES DISP PNL	1
ALS5M021	PANEL FRONT REMOTE PRESS DISPL	1
ALS5M022	ENCLOSURE MOD REMOTE PRES DISP	1
AMS4M167	MOUNT PCB COMPACT FLASH TERN	1
ALS5M020	MOUNT ANGLE REMOTE PRESS DISP	1
AMS4P631	NUT 1/4-40 DRESS BRIGHT NICKEL	4
AMS7P068	SCREW JACK D-CONNECTOR KEYSTON	2
ALS5P012	SCREW M6-1.0P X 12MM BTN HD SS	4
ALS6P006	SCREW 1/4-20 X 1/2 BTN HD SST	2
AMS4P198	SPACER UNTHREADED RND NYLON #4	8
ALS4P009	STANDOFF 4-40 X 15/32 M/F HEX	2
ALS4P011	STANDOFF 4-40 X 13/32 M/F HEX	3
AMS7P030	CONN 102398-8 AMP 20 POS PCB	1
AMS7P035	CONN 102681-5 AMP 20 POS FRONT	1
AMS7P058	CONN 102536-8 AMP 20 POS BACK	1
AMS4P020	SWITCH SPDT TOGGLE LOCKING	1
AMS4P810	SWITCH DPDT ON OFF ON PNL MNT	1
AMS4P018	SWITCH SPDT PUSH MOM MPA-106F	2
AMS4P021	SWITCH CAP ALCO C-22 BLACK	2
C276P165	FERRULE 18 AWG WHITE ALTECH	8
ALS4P007	SCREW 4-40 X 3/4 PHIL PAN SST	2
AMS4P286	PCB ASSY TERN FLASHCORE-B	1

### 3.4 PANEL CONNECTOR PINOUT

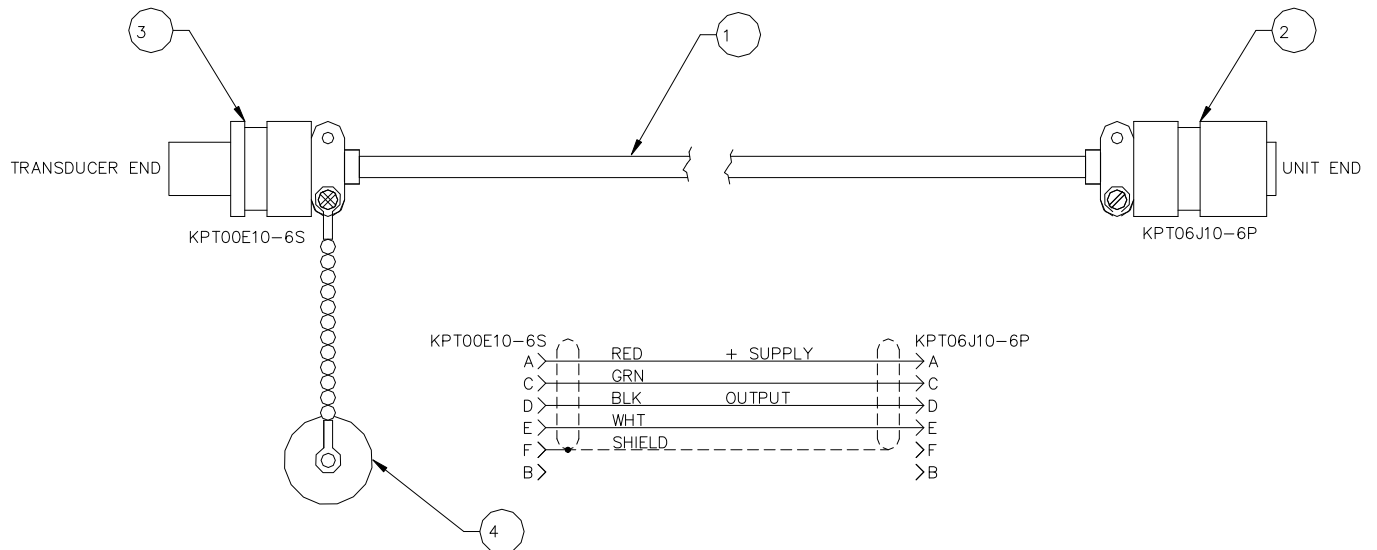
<b>J1</b>	<b>KPT02E8-33P</b>	DC POWER IN
J1-A	12-24VDC	
J1-B	BATT GND	
<b>J2</b>	<b>KTP02E10-6S</b>	PRESSURE SENSOR # 1
J2-A	+SUPPLY	
J2-B	NC	
J2-C	NC	
J2-D	OUTPUT	
J2-E	NC	
J2-F	NC	
<b>J3</b>	<b>KTP02E10-6S</b>	PRESSURE SENSOR # 2
J3-A	+SUPPLY	
J3-B	NC	
J3-C	NC	
J3-D	OUTPUT	
J3-E	NC	
J3-F	NC	
<b>J4</b>	<b>DB9F</b>	SERIAL COMMUNICATION
J4-2	RX	TXD
J4-3	TX	RXD
J4-5	GND	GND
J4-8	PRESS 1 OUT	CH1 DAC OUT
J4-9	PRESS 2 OUT	CH2 DAC OUT

### 3.5 ALS5A028 CABLE ASSY PRESSURE TRANSDUCER TO REMOTE DISPLAY (100' REEL)



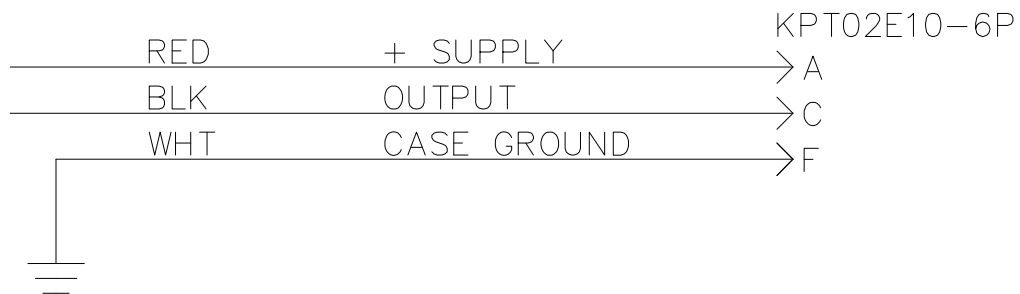
Part Number	Description	Qty
AMS4P222	CABLE 20/4C ALPHA 25154 BLACK	100
AM5KP057	CONN KPT06F10-6P STR PLUG	1
AM5KP064	CONN KPT06J10-6S STR PLUG	1
AM5KP059	DUST CAP KPT8010C CANNON	2
ACMU1P88	TUBING SHRINK 1.00 ADH LINED	1

### 3.6 ALS5A029 CABLE ASSY PRESSURE DISPLAY TO SPOOL (OPTIONAL 20' PIGTAIL)



Part Number	Description	Qty
AMS4P222	CABLE 20/4C ALPHA 25154 BLACK	20
AM5KP057	CONN KPT06F10-6P STR PLUG	1
AM5KP056	CONN KPT00E10-6S RECEPTACLE	1
AM5KP059	DUST CAP KPT8010C CANNON	2
ACMU1P88	TUBING SHRINK 1.00 ADH LINED	1

- 3.7 ALS5P011 10K PSI PRESSURE TRANSDUCER – ½” NPT  
 ALS5P013 10K PSI PRESSURE TRANSDUCER – ¼” NPT  
 ALS5P016 15K PSI PRESSURE TRANSDUCER – ¼” NPT



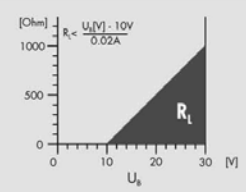
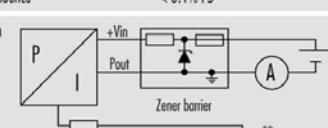
### 3.8 ALS5P011, 13, 16 PRESSURE TRANSDUCERS SPECIFICATIONS

#### Specifications

Pressure range	[bar]	0.1 ... 0.5	> 0.5 ... 2	> 2 ... 25	> 25 ... 600	> 600 ... 1000
<b>Overpressure</b>		3bar	3 x FS (min. 3 bar)	3 x FS	3 x FS (max. 850bar, optional 1500bar)	1500 bar
<b>Burst pressure</b>	[bar]	> 200	> 200	> 200	> 850 (optional 1500bar)	1500
<b>Accuracy<sup>1)</sup></b>	[± % FS]	≤ 0.5 (optional ≤ 0.25)	≤ 0.5 (optional ≤ 0.25/≤ 0.1)	≤ 0.5 (optional ≤ 0.25/≤ 0.1)	≤ 0.5 (optional ≤ 0.25/≤ 0.1)	≤ 1 (optional ≤ 0.5/≤ 0.25)
<b>Thermal shift</b>	[± % FS/°C]					
Zero	0...70°C	≤ 0.06	≤ 0.03	≤ 0.015	≤ 0.015	≤ 0.015
	-25...85°C	≤ 0.08	≤ 0.04	≤ 0.02	≤ 0.02	≤ 0.02
Span	0...70°C	≤ 0.015	≤ 0.015	≤ 0.015	≤ 0.015	≤ 0.015
	-25...85°C	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02
<b>Response time</b>		< 1 ms/10...90% FS				
<b>Long term stability</b> (1 year) - (typ./max.)		<0.5% FS/< 4mbar	<0.2% FS/< 4mbar	<0.1% FS/< 0.2% FS	<0.1% FS/< 0.2% FS	<0.1% FS/< 0.2% FS

<sup>1)</sup> Zero based non-conformity according to DIN 16086, including hysteresis and repeatability

#### Electrical connection

<b>Type</b>	4...20mA Two wire current transmitter	<b>Load resistance</b> 
<b>Supply voltage</b> Supply voltage influence	10...30V DC < 0.1% FS	
<b>Circuit diagram</b>		<b>Load resistance influence</b> < 0.1% FS

#### Ex-Approval

<b>Type of protection</b>	Certificate SEE 99 ATEX 2640	I/II M1/1G Ex IIC T3...T6 II 1D T90°C IP68	Ex-Approval for gas and mines Ex-Approval for dust special requirements in mines general requirements intrinsic safety "i" special requirements zone 0 zener barrier
<b>Standards</b>		EN 50303 EN 50 014 EN 50 020 EN 50 284	
<b>Max. values for supply/output circuit</b>		30V / 100mA / 1W	
<b>Temperature class</b>		<b>T6</b>	<b>T4</b>
Ambient temperature T <sub>a</sub>	[°C]	-25...55	-25...85
Process temperature	[°C]	-25...55	-25...100
			<b>T3</b>
			-25...85

Without any information about temperature class the transmitter will be delivered for gas.

<sup>2)</sup> Only use DIN-Connector in gas group IIB, In Zone 0 only cable output permitted

#### Materials

<b>Process connection, diaphragm, housing</b>	Stainless steel 1.4435 (316L), other materials (e.g. titanium) on request
<b>Seals (standard)</b>	Viton (other materials see ordering information)

#### Electromagnetic compability

Standard	Level	Typical interferences	
<b>Emission:</b>			
EN 61000-6-3	Generic emission standard		
EN 55022	Emission, class B		
<b>Immunity:</b>			
EN 61000-6-2	Generic immunity		
EN 61000-4-2	Electrostatic discharge	4kV contact, 8kV air	
EN 61000-4-3	Radiated electro-magnetic field	10V/m, 80-1000MHz, 80% AM 1kHz	Cellular phones, radio sets
EN 61000-4-3	Radiated electro-magnetic field (GSM)	10V/m, 950MHz, 200Hz on/off	Digital portable phones
EN 61000-4-4	Fast transients (burst)	2kV	Motors, valves
EN 61000-4-6	Conducted radio-frequency	10V, 0.15-80MHz, 80% AM 1kHz	Cellular phones, radio sets
EN 61000-4-5	Surge	10kA (8/20µs) <sup>2)</sup>	Lightning strikes

<sup>2)</sup> Only with optional surge (lightning) protection

