KOMPETENTE MESSTECHNIK

AccuMU

Transmitter for pressure, absolute pressure and differential pressure

Technical description

TÜVRheinland® CERT ISO 9001

ACCUMU pressure transmitters are digital pressure transmitters featuring extensive user-friendliness and high accuracy. The parameterization is performed using control keys or via HART communication.

Extensive functionality enables the pressure transmitter to be precisely adapted to the plant's requirements. Operation is very simple in spite of the numerous setting options

Pressure transmitter for gauge pressure

Measured variable: Gauge pressure of aggressive and non-aggressive gases, vapors and liquids.

Span (infinitely adjustable)
for DS III HART: 0.01 bar to 700 bar (0.15 psi to 10153 psi)

Pressure transmitters for differential pressure and flow

Measured variables:
• Differential pressure
• Small positive or negative pressure
• Flow $q \sim \sqrt{\Delta p}$ (together with a primary differential pressure device (see chapter "Flow Meters"))

Span (infinitely adjustable)
for DS III HART: 1 mbar ... 30 bar (0.0145 ... 435 psi)

Pressure Transmitter for gauge pressure

	HART		
Input			
Measured variable gauge pressure	Gauge pressure		
Spans (infinitely adjustable) or nominal measuring range and	Span	Max. perm. test pressure	
	0,01...1 bar g (0,15...14.5 psi g	6 bar g (87 psi g)	
	0,04...4 bar g (0.58...58 psi g)	10 bar g (145 psi g)	
	0,16...16 bar g (2.32....232 psi g)	32 bar g (464 psi g)	(464 psi g)
	0,6...63 bar g (9.14....914 psi g)	100 bar g (1450 psi g)	
	1,6....160 bar g (23,2.....2320 psi g)	250 bar g (3626 psi g)	
	4,0...400 bar g (58....5802 psi g)	600 bar g g) (8700 psi g)	(8700 psi
	7,0.....700 bar g (102...10153 psi g)	800 bar g (11603 psi g)	
Output			
Output signal	4...20 mA		

Measuring accuracy	Acc. To EN 60770-1
Reference conditions (All error data always refer to the set span)	Increasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm, silicone oil filling Ing, room temperature 25°C (77°F) r: Span ratio (r=max span / set span),
Error in measurement and fixed-point setting (including hysteresis and repeatability)	

• Linear characteristic r ≤ 10 10 < r ≤ 30 30 < r ≤ 100	 ≤ (0,0029 · r + 0,071) % ≤ (0,0045 · r + 0,071) % ≤ (0,005 · r + 0,05) %
Long-term drift (temperature change ±30 °C (±54 °F)	≤ (0,25 · r) % per 5 years
Influence of ambient temperature • at -10 ….+60°C (14…. 140 °F)	 ≤(0,08 · r + 0,1) % (at 700 bar: ≤ (0,1 · r + 0,2) %
• at -40….-10°C und +60….+85°C (-40…+14°F und 140….185 °F	≤ (0,1 · r + 0,15) %/10 K
Measured Value Resolution	
Rated conditions Degree of protection (to EN 60529)	IP65
Design	
Weight (without options)	≈ 1,5 kg (≈ 3.3 lb)
Power supply U_H Terminal voltage on transmitter	DC 10,5….45V

For gauge pressure

Selection and Ordering data		Order code					
Pressure transmitter for gauge pressure		Var-ACCU			0	3	3
Measuring cell filling	*Measuring cell cleaning*						
Silicone oil	normal	1					
Inert liquid [1]	Grease-free	3					
Nominal measuring range							
0,01…1 bar g	(0.15…14.5 psi g)		B				
0,04…4 bar g	(0.58…58 psi g)		C				
0,16…16 bar g	(2.32…232 psi g)		D				
0,63…63 bar g	(9.14…814 psi g)		E				
1,6…160 bar g	(23.2…2320 psi g)		F				
4,0…400 bar g	(58.0…5802 psi g)		G				
7,0…700 bar g	(102.0….10153 psi g)		J				

Wetted parts materials								
Seal diaphragm	Process connection							
Stainless steel	Stainless steel			A				
Hastelloy	Stainless steel			B				
Hastelloy	Hastelloy			C				
Version as diaphragm seal[2) 3)]				Y				
Process connection								
• Connection shank G1/2B to EN 837-1					0			
• Female thread 1/2 -14 NPT					1			
• Stainless steel oval flange								
Mounting thread 6/16-20UNF to EN 61518					2			
Mounting thread M10 to Din 19213					3			
Mounting thread M12 to Din 19213					4			
• Male thread M20 x 1,5					5			
• Male thread 1/2 - 14NPT					6			
Process connection								
• Housing made of die-cast aluminum						0		
• Housing stainless steel precision casting						3		
Version								
• Standard Version							1	
• International version, English label inscriptions, documentation in 5 languages on CD							2	
Selection and Ordering data	Order No. Var-ACCU			0	3	3		
Pressure transmitter for gauge pressure								
• Screwed gland M20x1.5								B
•Screwed gland ½-14NPT								C
• M12 connectors (metal) [8)]								F
Display								
• Without display								0
• Without visible digital indicator (digital indicator concealed, setting: bar)								1
• With visible digital indicator								6
• With customer-specific digital indicator (setting as specified, Order Code “Y21” required)								7

1) For oxygen application, add Order code E10.
2) When the manufacturer’s certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
3) If the acceptance test certificate 3.1. is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

4) Without cable gland, with blanking plug.
5) With enclosed cable gland EEx ia and blanking plug.
6) M12 delivered without cable socket

Further designs Add-**„Z“** to order No. and specify Order Code	
Pressure transmitter with mounting bracket made of	
• steel	A01
• stainless steel	A02
plug	
• Han 7D (metal, gray)	A30
• Han 8U (instead Han 7D)	A31
Cable sockets for M12 connectors (metal)	A50
Rating plate inscription (instead of German)	
• English	B11
• French	B12
• Spanish	B13
• Italian	B14
English rating plate Pressure units in H_20 and/or psi	B21
Quality inspection certificate (factoring calibration) to IEC 60770-02 [1]	C11
Inspection certificate [2] Acc. to EN 10204-3.1	C12
Factoring certificate Acc. to EN 10204-2.2	C14
Setting of upper limit of output signal to 22.0mA Add-**„Z“** to order No. and specify Order Code	D05
Degree of protection IP68 (only for M20x1,5 and 1/2-14 NPT	D12
Digital indicator alongside the input keys (only together with the devices 7MF4033-....0-.A.6 or -.A.7-Z, Y21 or Y22 + Y01)	D27
Supplied with oval flange (1 item), PTFE-packing und screws in thread of oval flange	D37

Oxygen application (In the case of oxygen measurement and inert liquid max 120 bar G (1740 psi G) at 60° (140°F))	E10
Measuring range to be set Specify in plain text (max. 5 characters): Y01: … up to … mbar, bar, kPa, MPa, psi	Y01
Stainless steel tag plate (measuring point description) max. 16 characters specify in plain text: Y15.....	Y15

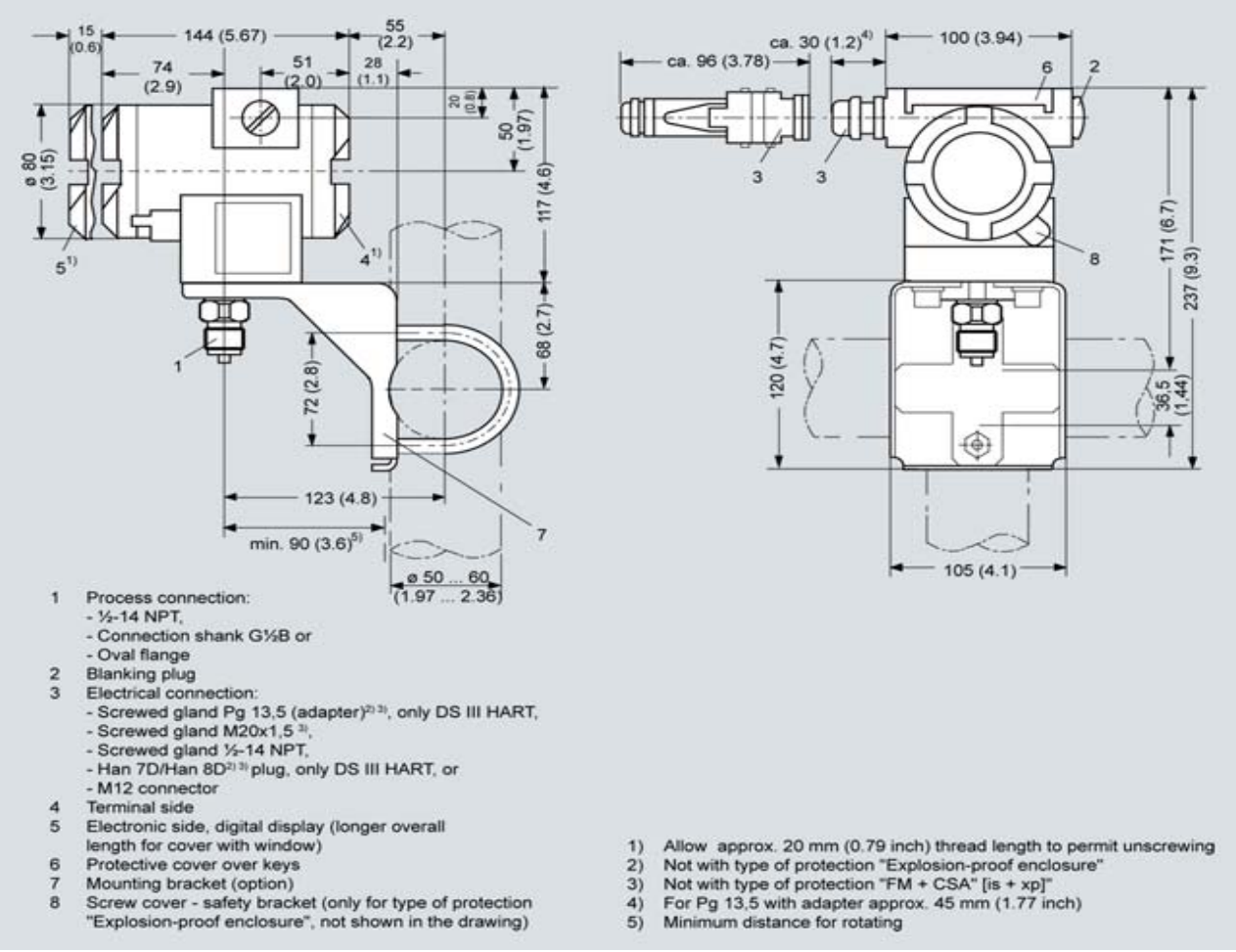
Additional data Please add „-Z“ to Order No. and specify Order code(s) and plain text	
Measuring point text (max. 27 characters) specify in plain text: Y16: …….	Y16
Entry of HART address (TAG) max. 8 characters specify in plain text: Y17……	Y17
Setting of pressure indication in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, … Note: The following pressure units can be selected: bar, mbar, mm H_2O*), in H_2O*), ftH_2O*), mmHG, In HG, psi, Pa, kPa, MPa, g/cm², kg/cm², Torr, ATM or % *) ref. temperature 20 °C	Y21
Setting of pressure indication in ***Non-pressure units*** [3)] Specify in plain text: Y22:… up to … l/min, m³/h, m, USgpm, … (Specification of measuring range in pressure units „Y01“ is essential, unit with max 5 characters)	Y22 + Y01

Only "Y01", "Y21", "Y22“ and "D05" can be factory preset.

Ordering example
Item line: 7MF4033-1EA00-1AA7-Z
B line: A01 + Y01 + Y21
C line: Y01: 10 ... 20 bar (145 ... 290 psi)
C line: Y21: bar (psi)

1) When the manufacturer's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
2) If the acceptance test certificate 3.1. is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
3) Preset values can only be changed over SIMATIC PDM.

Dimensional drawings



1 Process connection:
- ½-14 NPT,
- Connection shank G½B or
- Oval flange

2 Blanking plug

3 Electrical connection:
- Screwed gland Pg 13,5 (adapter)[2) 3)], only DS III HART,
- Screwed gland M20x1,5 [3)],
- Screwed gland ½-14 NPT,
- Han 7D/Han 8D[2) 3)] plug, only DS III HART, or
- M12 connector

4 Terminal side

5 Electronic side, digital display (longer overall length for cover with window)

6 Protective cover over keys

7 Mounting bracket (option)

8 Screw cover - safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)

1) Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
2) Not with type of protection "Explosion-proof enclosure"
3) Not with type of protection "FM + CSA" [is + xp]"
4) For Pg 13,5 with adapter approx. 45 mm (1.77 inch)
5) Minimum distance for rotating

AccuMU pressure transmitters for gauge pressure, dimensions in mm (inch)

Transmitter for differential pressure and flow

Input		
Measured variable	Differential pressure and flow	
Spans (infinitely adjustable) or Nominal measuring range and max. permissible operating pressure	Span	Maximum operating pressure
	1 … 20 mbar 0.4 … 8 in H_2O)	32 bar (464 psi)
	1…60 mbar (0.4….24 inH_2O) 2.5 … 250 mär (1 … 100 inH_2O) 6 … 600 mbar (2.4 … 240 inH_2O) 16 … 1600 mbar (6.4 … 642 inH_2O) 50 … 5000 mbar (20 … 2000 inH_2O) 0,3 … 30 bar (4.35 … 435 psi)	160 bar (2320 psi)
	2.5 … 250 mbar (1 … 100 inH_2O) 6 … 600 mbar (2.4 … 240 inH_2O) 16 … 1600 mbar (6.4 … 642 inH_2O) 50 … 5000 mbar (20 … 2000 inH_2O) 0,3 … 30 bar (4.35 … 435 psi)	420 bar (6091 psi)
Output Output signal	4…20 mA	

Measuring accuracy	Acc. to EN 60770-1
Reference conditions (All error data always refers to the set span)	Increasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm, silicone oil filling, room temperature 25 (77°F)) r: Span ratio (r= max. span/set span)
Error in measurement and fixed-point setting (including hysteresis and repeatability)	
• Linear characteristic	
- r ≤ 10	≤ (0,0029 · r + 0,071) %
- 10 < r ≤ 30	≤ (0,0045 · r + 0,071) %
- 30 < r ≤ 100	≤ (0,005 · r + 0,05) %

• Square-rooted characteristic (flow > 50%)	
- r ≤ 10	≤ 0,1 %
- 10 < r ≤ 30	≤ 0,2 %
• Square-rooted characteristic (flow 25…50 %)	
- r ≤ 10	≤ 0,2 %
- 10 < r ≤ 30	≤ 0,4 %
Long-term drift (temperature change ± 30°C (± 54 °F)	≤ (0,025 · r) % per static pressure max. 70 bar g (1015 psi g)
• 20-mbar (0.29 psi)-measuring cell	≤ (0,2 · r) % per year
Influence of static pressure	
• at -10…+60 °C (14… 140 °F)	≤ (0,008 · r + 0,1) %
• at -40…-10 °C and +60…+85°C (-40…+ 14°F and 140…185 °F)	≤ (0,1 · r + 0,15) %/10 K (Twice the value with 20-mbar (0.29 psi) (measuring cell)
Influence of static pressure	
• on the zero point (PKN)	≤ (0,15 · r) % per 100 bar (1450 psi)
- 20-mbar (0.29 psi)-measuring cell	≤ (0,15 · r) % per 32 bar (464 psi)
• on the span (PKS)	≤ 0,2 % per 100bar (1450 psi)
- 20-mbar (0.29 psi)-measuring	≤ 0,2 % per 32 bar (464 psi)
Measured Value Resolution	
Rated conditions	
Degree of protection (to EN 60529)	IP65
Weight (without options)	= 4,5 kg (≈ 9.9 Ib)
Power supply U_H	
Terminal voltage on transmitter	DC 10,5 … 45 V

Selection and Ordering data			Order-No.					
Pressure transmitter for gauge and absolute pressure, front flush diaphragm AccuMU			Var-ACCU			4	3	3
Measuring cell filling	**Measuring cell cleaning**							
Silicone oil	normal	>	1					
Inert liquid[1)]	Grease-free		3					
Measuring span								
PN32 (MWP 464 psi)								
1 … 20 mbar [2)]	(0.4015 … 24.09 in H_2O)	>		B				
PN 160 (MWP 2320 psi)								
1 … 60 mbar	(0.4015 … 24.09 inH_2O)	>		C				
2,5 … 250 mbar	(1.004 … 100.4 inH_2O)	>		D				
6 … 600 mbar	(2.409 … 240.9 inH_2O)	>		E				
16 …1600 mbar	(6.424 … 642.4 inH_2O)	>		F				
50 …5000 mbar	(20.08 … 2008 inH_2O)	>		G				

0,3 …30 mbar	(4.35 … 435 psi)	>	H					
Wetted parts materials								
(stainless steel process flanges)								
Seal diaphragm	Parts of measuring cell							
Stainless steel	Stainless steel	>		A				
Hastelloy	Stainless steel			B				
Hastelloy	Hastelloy			C				
Tantalum [3]	Tantalum			E				
Monel [3]	Monel			H				
Gold [3]	Gold			L				
Version for diaphragm seal [4] [5]				Y				
Process connection								
Female 1/4- 18 NPT with flange connection								
• Sealing screw opposite process connection								
- Mounting thread 7/16-20 UNF to EN 61518					2			
- Mounting thread M10 to DIN 19213 (only for replacement requirement)					0			
• Vent on side of process flange [2]								
- Mounting thread 7/16-20 UNF to EN 61518					6			
- Mounting thread M10 to DIN 19213 (only for replacement requirement)					4			

Selection and Ordering data		Order No.					
pressure AccuMU for differential pressure and flow,		Var-ACCU		4	3	3	
Non-wetted parts materials							
Process flange screws	Electronics housing						
Stainless steel	Die-cast aluminum		2				
Stainless steel	Stainless steel precision casting[6]		3				
Version							
• Standard versions				1			
• International versions, English label inscriptions, documentation in 5 languages on CD				2			
Electrical connection /cable entry							
• Screwed gland Pg 13,5 [9]					A		
• Screwed gland M20x1,5					B		
• Screwed gland 1/2 -14 NPT					C		
• Han 7D plug (plastic housing) incl. mating connector [9][10]					D		
• M12 connectors (metal) [11]					F		
Display							
• without indicator						0	
• without visible digital indicator (digital indicator concealed, setting: mA						1	
• with visible digital indication, setting: mA						6	
• with customer-specific digital indication (setting as specified, Order Code „Y21“ or „Y22“ required)						7	

1) Not with temperature decouple P00 and P10, not for process connections

R01, R02, R04, R10 and R11, and can only be ordered in conjunction with silicone oil.
2) Only possible for flange with M.., N.. and Q.. option.
3) Without cable gland, with blanking plug
4) With enclosed cable gland Ex ia and blanking plug
5) Not in conjunction with types of protection "Explosion-proof" and "Ex nA",
"Intrinsic safety" and "Explosion-proof".
6) M12 delivered without cable socket
F) Subject to export regulations AL: 9I999, ECCN: N.

Further designs Add „-Z" to Order No. and specify Order Code	
Pressure transmitter with mounting bracket (2 shackles, 4 nuts, 4 U-plates, 1 angle made) of:	
• Steel	A01
• Stainless steel	A02
O-rings for process flanges (instead of FPM (Viton))	
• PTFE (Teflon)	A20
• FEP (with silicone core, approved for food)	A21
• FFPM (Kalrez, Compound 4079)	A22
• NBR (Buna N)	A23
Plug	
• Han 7D (metal, gray)	A30
• Han 8U (instead of Han 7D)	A31
Sealing screws ¼-18 NPT, with valve in mat. of process	A40
Cable sockets for M12 connectors (metal)	A50
Rating plate inscription (instead of German)	
• English	B11
• French	B12
•Spanish	B13
• Italian	B14
English rating plate Pressure units in H_2O and/or psi	B21
Quality inspection certificate (factory calibration) to IEC 60770-02	C11
Inspection certificate Acc. to EN 10204-3.1	C12
Factory certificate Acc. to EN 10204-2.2	C14
Degree of protection IP68 (only for M20x1,5 and ½-¼ NPT)	D12

Digital indicator alongside the input keys (onlytogether with the devices 7MF4033-....0-.A.6 or -.A.7-Z, Y21 or Y22 + Y01)	D27
Process flange screws made of Monel (max. nominal pressure PN20)	D34
Supplied with oval flange set (2 items), PTFE packing and screws in thread of oval flange	D37
Further designs Add „-Z" to Order No. and specify Order Code	
Oxygen application (In the case of oxygen measurement and inert liquid max. 120 bar a (1740 psi) at 60°C (140°F))	E10
Interchanging of process connection side	H01
Vent on side for gas measurements	H02
Stainless steel process flanges for vertical differential pressure lines (not together with K01, K02 und K04) [3]	H03
Process flange	
• Hastelloy	K01
• Monel	K02
• Stainless steel with PVDF insert max. PN10 (MWP 145 psi max. temperature of medium 90°C (194 °F))	K04
For ½-14 NPT inner process connection on the side in the middle of the process flanges, vent valve not possible	

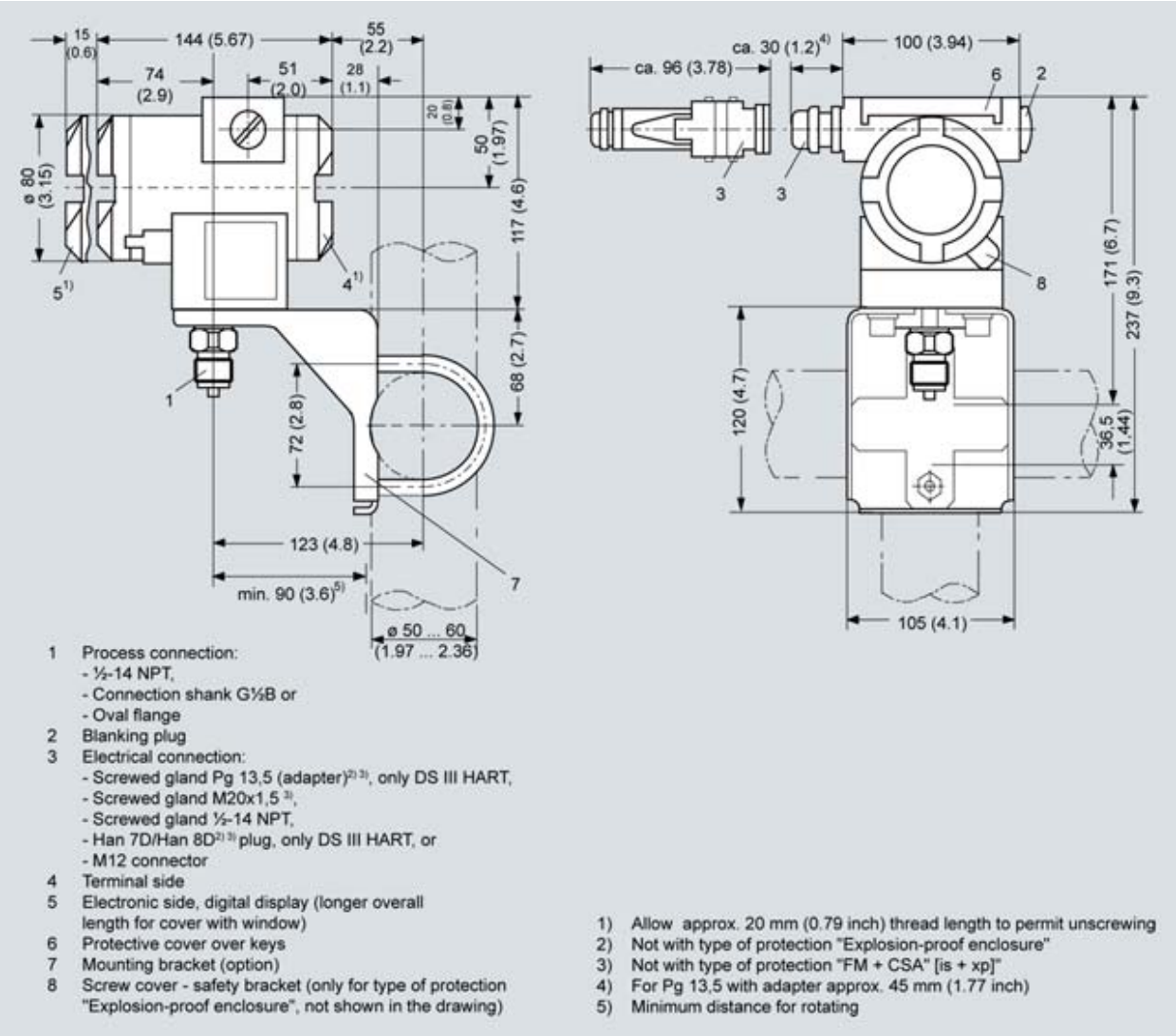
1) When the manufacturer's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
2) If the acceptance test certificate 3.1. is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
3) Not suitable for connection of remote seal

Additional data Please add„-Z" to Order No. and specify Order code(s) and plain text.	
Measuring range to be set Specify in plain text	
• In the case of linear characteristic curve	Y01

(max. 5 characters): Y01: … up to … mbar, bar, kPa, MPa, psi	
• in the case of square rooted characteristic curve (max. 5 characters): Y02: … up to … mbar, Bar, kPa, MPa, psi	Y02
Stainless steel tag plate (measuring point description) max. 16 characters, specify in plain text.: Y15: ...	Y15
Measuring point text max. 27 characters, specify in plain text: Y16: ..	Y16
Entry of HART address (TAG) max. 8 characters, specify in plain text.: Y17	Y17
Setting of pressure indicator in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, … Note: the following pressure units can be selected: bar, mbar, mm H_2O*), in H_2O*), H_2O*), mHG, in HG, psi, Pa, kPa, MPa, g/cm², kg/cm², Torr, ATM or %, *) ref. temperature 20°C	Y21
Setting of pressure indicator in non-pressure units [1)] Specify in plain text: Y22: … up to …l/min, m³/h, m, Usgpm, … (specification of measuring range in pressure units “Y01" or "Y02" is essential, until with max. 5 characters)	Y22[2)] + Y01 or Y02

Only "Y01", "Y21", "Y22", "Y25" and "D05" can be factory preset

[1)] Preset values can only be changed over SIMATIC PDM.
[2)] Not in conjunction with over-filling safety device for flammable and non flammable liquids (Order Code “E08”)



1 Process connection:
- ½-14 NPT,
- Connection shank G½B or
- Oval flange

2 Blanking plug

3 Electrical connection:
- Screwed gland Pg 13,5 (adapter)[2) 3)], only DS III HART,
- Screwed gland M20x1,5 [3)],
- Screwed gland ½-14 NPT,
- Han 7D/Han 8D[2) 3)] plug, only DS III HART, or
- M12 connector

4 Terminal side

5 Electronic side, digital display (longer overall length for cover with window)

6 Protective cover over keys

7 Mounting bracket (option)

8 Screw cover - safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)

1) Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
2) Not with type of protection "Explosion-proof enclosure"
3) Not with type of protection "FM + CSA" [is + xp]"
4) For Pg 13,5 with adapter approx. 45 mm (1.77 inch)
5) Minimum distance for rotating

AccuMU pressure transmitters for differential pressure and flow, dimensions in mm (inch)