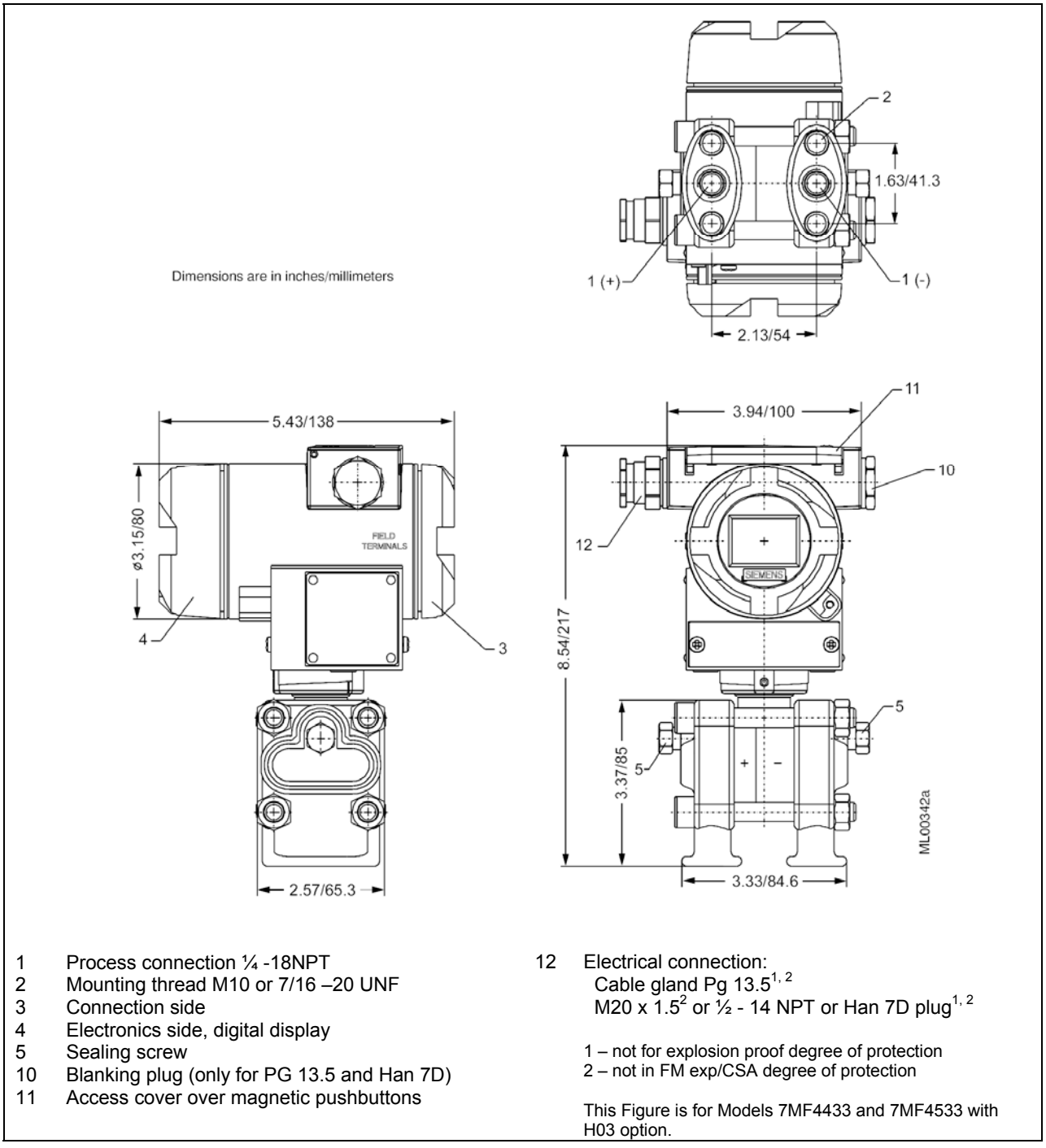
MODELS 7MF4433 AND 7MF4533, DIFFERENTIAL PRESSURE AND FLOW

This section contains a dimension drawing of the transmitter (with the H03 option). A dimension drawing of the standard model is found in Figure 9-3. This section also contains a model designation table and performance specifications.



1 Process connection ¼ -18NPT
2 Mounting thread M10 or 7/16 –20 UNF
3 Connection side
4 Electronics side, digital display
5 Sealing screw
10 Blanking plug (only for PG 13.5 and Han 7D)
11 Access cover over magnetic pushbuttons

12 Electrical connection:
Cable gland Pg 13.5[1, 2]
M20 x 1.5[2] or ½ - 14 NPT or Han 7D plug[1, 2]

1 – not for explosion proof degree of protection
2 – not in FM exp/CSA degree of protection

This Figure is for Models 7MF4433 and 7MF4533 with H03 option.

FIGURE 9-4 Models 7MF4433 and 7MF4533, Dimensions, With H03 Option

TABLE 9-7 Model 7MF4433, Model Designation

Differential pressure and flow transmitters, two-wire, series DSIII, PN 470/2325, 7MF4433-							-				
Measuring cell filling	Measuring cell cleaning										
Silicone oil	Standard	**1**									
Inert liquid	Grease-free	**3**									
Span											
PN 32 (MWP 464 psi)	1 to 20 mbar (0.4015 to 8.03 inH_2O)		**B**								
PN 160 (MWP 2320 psi)	1 to 60 mbar (0.4015 to 24.09 inH_2O)		**C**								
	2.5 to 250 mbar (1.004 to 100.4 inH_2O)		**D**								
	6 to 600 mbar (2.409 to 240.9 inH_2O)		**E**								
	16 to 1600 mbar (6.424 to 642.4 inH_2O)		**F**								
	50 to 5000 mbar (20.08 to 2008 inH_2O)		**G**								
	0.3 to 30 bar (4.35 to 435 psi)		**H**								
Wetted parts materials											
Seal diaphragm	Parts of measuring cell										
Stainless steel	Stainless steel			**A**							
Hastelloy	Stainless steel			**B**							
Hastelloy	Hastelloy			**C**							
Tantalum	Tantalum			**E**							
Monel	Monel			**H**							
Gold	Gold			**L**							
Version for diaphragm remote seal				**Y**							
Process connection											
Female thread 1/4-18 NPT with flange connection to DIN 19213											
• Sealing screw opposite process connection:											
- Mounting thread M10 to DIN 19213					**0**						
- Mounting thread 7/16-20 UNF to EN 61518					**2**						
• Vent on side of process flange:											
- Mounting thread M10 to DIN 19213					**4**						
- Mounting thread 7/16-20 UNF to EN 61518					**6**						
Non-wetted parts materials											
Process flange screws	Electronics housing										
Stainless steel	Die-cast aluminum					**2**					
Stainless steel	Stainless steel precision casting					**3**					
Version											
• Standard version								**1**			
• International version, English label inscriptions and documentation in 5 languages on CD								**2**			
Explosion protection											
• Without									**A**		
• With ATEX, type of protection:											
- Intrinsic safety (EEx ia)									**B**		
- Explosion proof (EEx d)									**D**		
- Intrinsic safety and explosion-proof enclosure (EEx ia + EEx d)									**P**		
- Ex nA/nL (Zone 2)									**E**		
- Intrinsic safety, explosion-proof enclosure and dust explosion protection EExia + EEx d +Zone 1D/2D)									**R**		
• With FM + CSA, type of protection intrinsic safety and explosion proof (is + xp)									**N**	**C**	
Electrical connection / cable entry											
• Screwed gland PG 13.5; Adapter										**A**	
• Screwed gland M20 x 1.5										**B**	
• Screwed gland 1/2-14 NPT										**C**	
• Han 7D plug (plastic housing) incl. mating connector										**D**	
• M12 connectors (metal)											
Display											
• Without (digital indicator hidden, setting: mA)											**1**
• With visible digital indicator											**6**
• With customer specified digital indicator and setting, order code Y21 or Y22 required											**7**

Additional selections and data on next page.

Additional Model 7MF4433 Selections and Data*	**Order code**
Transmitter with mounting bracket of:	
- Steel	**A01**
- Stainless steel	**A02**
Process flange O-ring (instead of FPM (Viton®)) of:	
- 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**
Plug: Han 8U (instead of Han 7D)	**A31**
Sealing screws (1/4-18 NPT) with valve in same material as process flanges	**A40**
Cable sockets for M12 connectors (metal)	**A50**
Inscribing of rating plate (instead of German):	
- English	**B11**
- French	**B12**
- Spanish	**B13**
- Italian	**B14**
- English, pressure units in inH_2O or psi	**B21**
Manufacturer test/calibration certificate M to DIN 55350, Part 18, and ISO 8402	**C11**
Acceptance test certificate to EN 10204-3.1	**C12**
Factory certificate to EN 10204-2.2	**C14**
“Functional Safety (SIL)” certificate	**C20**
Setting the upper limit of output current to 22.0 mA	**D05**
Manufacturer’s declaration according to NACE	**D07**
Type of protection IP68	**D12**
Digital indicator alongside the input keys	**D27**
Process flange screws made of Monel (normal pressure PN20 maximum)	**D34**
Supplied with oval flange set	**D37**
Use in or on Zone 1D/2D	**E01**
Use on Zone 0	**E02**
TUV approved to AD/TRD (only with EEx ia)	**E06**
Overfilling safety device for flammable and non-flammable liquids, PN32 (MVWP 464 psi) maximum	**E08**
Oxygen cleaning application, 160 bar (2325 psi) maximum, for oxygen measurement and inert liquid	**E10**
Explosion proof, intrinsic safety to INMETRO (Brazil)	**E25**
Explosion proof, intrinsic safety to NEPSI (China)	**E55**
Explosion protection, explosion proof to NEPSI (China)	**E56**
Explosion proof, Zone 2 to NEPSI (China)	**E57**
Interchanging of process connection sides	**H01**
Vent on side for gas measurement	**H02**
Stainless steel process flanges for vertical differential pressure lines	**H03**
Process flanges:	
- Hastelloy	**K01**
- Monel	**K02**
- Stainless steel with PVDF insert, PN 10 (MWP 145 psi) maximum, temperature of medium 90°C (194°F) maximum	**K04**
Measuring range to be set, specify in plain text,	
For linear characteristic: ... to ... mbar, psi, kPa, MPa, ... (5 characters maximum)	**Y01**
For square root characteristic: ... to ... mbar, psi, kPa, MPa, ... (5 characters maximum)	**Y02**
Tag number / descriptor, 16 characters maximum, specify in plain text:	**Y15**
Tag message, 27 characters maximum, specify in plain text:	**Y16**
Entry of HART address (Tag), 8 characters maximum	**Y17**
Setting of pressure indicator in pressure units, specify in plain text: mbar, psi, kPa, MPa …	**Y21**
Setting of pressure indicator in non-pressure units, specify in plain text: l/min, m^3/h, m, USgpm ...	**Y22+Y01 or Y02**
Only Y01, Y21, Y22, Y25 and D05 can be factory preset	

* Add “-Z” to model number and specify Order Code(s).

TABLE 9-8 Model 7MF4533, Model Designation

Differential pressure and flow transmitter, two-wire, series DSIII, Model 7MF4533-						-				
Measuring cell filling	Measuring cell cleaning									
Silicon oil	Standard	**1**								
Span										
2.5 to 250 mbar	(1.004 to 100.4 InH_2O)		**D**							
6 to 600 mbar	(2.409 to 240.9 InH_2O)		**E**							
16 to 1600 mbar	(6.424 to 642.4 InH_2O)		**F**							
50 to 5000 mbar	(20.08 to 2008 InH_2O)		**G**							
0.3 to 30 bar	(4.35 to 435 psi)		**H**							
Wetted parts materials (stainless steel process flanges)										
Seal diaphragm	Parts of the measuring cell									
Stainless steel	Stainless steel			**A**						
Hastelloy	Stainless steel			**B**						
Gold	Gold			**L**						
Process connection										
Female thread 1/4-18 NPT with flange connection										
• Sealing screw opposite process connection:										
- Mounting thread M12 to DIN 19213					**1**					
- Mounting thread 7/16-20 UNF to EN 61518					**3**					
• Venting on side of process flanges.										
- Mounting thread M12 to DIN 19213					**5**					
- Mounting thread 7/16-20 UNF to EN 61518					**7**					
Non-wetted parts materials										
Process flange screws	Electronics housing									
Stainless steel	Die-cast aluminum					**2**				
Stainless steel	Stainless steel precision casting					**3**				
Version										
• Standard version							**1**			
• International version, English label inscriptions and documentation in 5 languages on CD							**2**			
Explosion protection										
• Without								**A**		
• With ATEX, type of protection:										
Intrinsic safety (EEx ia)								**B**		
Explosion proof (EEx d)								**D**		
Intrinsic safety and explosion-proof enclosure (EEx ia + EEx d)								**P**		
Ex nA/nL (Zone 2)								**E**		
Intrinsic safety, explosion-proof enclosure and dust explosion protection (EEx ia + EEx d + Zone 1D/2D)								**R**		
• With FM + CSA, type of protection: Intrinsic safety and explosion proof (is + xp) PN 360 maximum								**N**	**C**	
Electrical connection / cable entry										
• Screwed gland PG 13.5; Adapter									**A**	
• Screwed gland M20 x 1.5									**B**	
• Screwed gland 1/2-14 NPT									**C**	
• Han 7D plug (plastic housing) includes mating connector									**D**	
• M12 connector (metal)									**F**	
Display										
• Without (digital indicator hidden, setting: mA)										**1**
• With visible digital indicator										**6**
• With customer specific digital indicator and setting; Order code Y21 or Y22 required.										**7**

Additional selections and data on next page.

Additional Model 7MF4533 Selections and Data*	**Order Code**
Transmitter with mounting bracket of:	
- Steel	**A01**
- Stainless steel	**A02**
O-rings for process flanges (instead of FPM (Viton)) of:	
- 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**
Plug: Han 8U (instead of Han 7D)	**A31**
Sealing screws: 1/4-18 NPT, with valve in material of process flanges	**A40**
Cable sockets for M12 connectors metal	**A50**
Inscribing of the rating plate (instead of German):	
- English	**B11**
- French	**B12**
- Spanish	**B13**
- Italian	**B14**
- English, pressure units in inH_2O or psi	**B21**
Manufacturer's test/calibration certificate M according to DIN 55350, Part 18 and ISO 8402	**C11**
Acceptance test certificate according to EN 10204-3.1	**C12**
Factory certificate according to EN 10204-2.2	**C14**
"Functional Safety (SIL)" certificate	**C20**
Setting the upper limit of output signal to 22.0 mA	**D05**
Manufacturer's declaration according to NACE	**D07**
Type of protection IP 68	**D12**
Digital indicator alongside the input keys	**D27**
Use in or on Zone 1D/2D	**E01**
Use on Zone 0	**E02**
Explosion-proof, intrinsic safety to INMETRO (Brazil)	**E25**
Explosion-proof, intrinsic safety to NEPSI (China)	**E55**
Explosion protection, explosion proof to NEPSI (China)	**E56**
Explosion proof, Zone 2 to NEPSI (China)	**E57**
Interchanging of process connection side	**H01**
Stainless steel process flanges for vertical differential pressure lines	**H03**
Measuring range to be set, specify in plain text:	
With linear characteristic: ... to ... mbar, psi, kPa, MPa ... (5 characters maximum)	**Y01**
With square root characteristic: 0 to ... mbar, psi, kPa, MPa... (5 characters maximum)	**Y02**
Tag number/descriptor,16 characters maximum, specify in plain text	**Y15**
Tag message, 27 characters maximum, specify in plain text:	**Y16**
Entry of HART address (Tag)	**Y17**
Setting of pressure indication in pressure units, specify in plain text: mbar, psi, kPa, MPa...	**Y21**
Setting of pressure indication in non-pressure units, specify in plain text: l/min, m^3/h, m, USgpm...	**Y22+Y01 or Y02**
Only Y01, Y21, Y22, Y25 and D05 can be factory preset.	

* Add "-Z" to model number and specify Order Code(s).

TABLE 9-9 Models 7MF4433 and 7MF4533, Specifications

Input		
Measured variable	Differential pressure and flow	
Span (infinitely adjustable)	Span	Max. permissible text pressure
	1 to 20 mbar (0.4 to 8 inH_2O)	32 bar a (464 psi)
	1 to 60 mbar (0.4 to 24 inH_2O) 2.5 to 250 mbar (1 to 100 inH_2O) 6 to 600 mbar (2.4 to 240 inH_2O) 16 to 1600 mbar (6.4 to 642 inH_2O) 50 to 5000 mbar (20 to 2000 inH_2O) 0.3 to 30 bar (4.35 to 435 psi)	160 bar a (2320 psi)
	2.5 to 250 mbar (1 to 100 inH_2O) 6 to 600 mbar (2.4 to 240 inH_2O) 16 to 1600 mbar (6.4 to 642 inH_2O) 50 to 5000 mbar (20 to 2000 inH_2O) 0.3 to 30 bar (4.35 to 435 psi)	420 bar (6091 psi)
Lower measuring limit		
• Measuring cell, silicone oil filling	-100% of span; -33% with 30 bar (435 psi) measuring cell or 30 mbar a (0.44 psi)	
Upper measuring limit	100% of maximum span (for oxygen version and inert filling liquid; max. 160 bar g (2320 psi g))	
Output		
Output signal	4 to 20 mA	
• Lower limit (infinitely adjustable)	3.55 mA, factory preset to 3.84 mA	
• Upper limit (infinitely adjustable)	23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA	
Load		
• Without HART communication	$R_B \leq (U_H - 10.5\ V)/0.023\ A$; R_B in Ω U_H: power supply in V	
• With Hart communication	R_B = 230 to 500 Ω (SIMATIC PDM) or R_B = 230 to 1100 Ω (HART Communicator)	
Accuracy	To EN 60770-1	
Reference Conditions	Increasing characteristic, start of scale value 0 bar, stainless steel seal diaphragm, silicon oil filling, 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	≤ (0.0029 * r + 0.071)%	
- 10 < r ≤ 30	≤ (0.0045 * r + 0.071)%	
- 30 < r ≤ 100	≤ (0.005 * r + 0.05)%	
• Square-root characteristic (flow > 50%)		
- r ≤ 10	≤ 0.1%	
- 10 < r ≤ 30	≤ 0.2%	
• Square-root characteristic (flow 25 to 50%)		
- r ≤ 10	≤ 0.2%	
- 10 < r ≤ 30	≤ 0.4%	
Long-term drift (temperature change +/-30°C (+/-54°F))	≤ (0.25 * r)% every 5 years static pressure max. 70 bar g (1015 psi g)	
• 20 mbar (0.29 psi)-measuring cell	≤ (0.2 * r) per year	
Influence of ambient temperature		
• at -10 to +60°C (14 to +140°F)	≤ (0.08 * r + 0.1)%	
• at -40 to -10°C and +60 to +85°C (-40 to +14°F and 140 to +185°F)	≤ (0.1 * r + 0.15)%/10K (Twice the value with 20-mbar (0.29 psi) measuring cell)	

Influence of static pressure	
• on the zero point	≤ (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	≤ 0.2% je 100 bar (1450 psi)
- 20 mbar (0.29 psi)-measuring cell	≤ 0.2% je 32 bar (464 psi)
Rated operating conditions	
Degree of protection (to EN 60529)	IP65
Process temperature	
• Measuring cell, silicon oil filling	-40 to +100°C (-40 to +212°F)
• Measuring cell, inert filling liquid	-20 to +100°C (-4 to +212°F)
• In conjunction with dust explosion protection	-20 to +60°C (-4 to +140°F)
Ambient conditions	
• Ambient temperature, digital indicators	-30 to +85°C (-22 to +185°F)
• Storage temperature	-50 to +85°C (-58 to +185°F)
• Climatic class, condensation	Permissible
• Electromagnet compatibility	To EN 61326 and NAMUR NE 21
Design	
Weight, approximate, without options	4.5 kg (9.9 lb)
Housing material	Low copper die-cast aluminum, GD-AISi 12 or stainless steel precision casing, mat. No. 1.4408
Wetted parts materials	
• Seal diaphragm	Stainless steel, mat. No. 1.4404/316L or Hastelloy C276, mat. No. 2.4819, Monel, mat. No. 2.4360, tantalum or gold
Measuring cell filling	Silicone oil or inert filling liquid; max. 160 bar g (2320 psi g) with oxygen measurement
Process connection	Female thread 1/4-18 NPT and flange connection with mounting thread M10 to DIN 19213 or 7/16-20 UNF to EN 61518
Power Supply U_H	
Terminal voltage at transmitter	10.5 to 45 Vdc 10.5 to 30 Vdc in intrinsically-safe mode
Certificate and approvals	See Table 9-20
HART communication	
HART communication	230 to 1100 Ω
Protocol	HART Version 5.x
Software for computer	SIMATIC PDM