

Technical Data Sheet - Type VF7
Input

Function		Time Domain Reflectometry (TDR)
Parameter		Level, distance, volume and/or interface
Max. measuring range	Double rod Ø8 mm / 0.3"	4 m / 13 ft
	Single rod Ø8 mm / 0.3"	4 m / 13 ft
	Coaxial Ø22 mm / 0.9"	6 m / 20 ft
	Double cable Ø4 mm / 0.15"	35 m / 115 ft
	Single cable Ø4 mm / 0.15"	35 m / 115 ft
	Single cable Ø8 mm / 0.3"	35 m / 115 ft

Output

Output signal	Output 1	4 ... 20 mA HART® or 3.8 ... 20.5 mA acc. to NAMUR NE 43
	Output 2 (option)	4 ... 20 mA (no HART® signal) or 3.8 ... 20.5 mA acc. to NAMUR NE 43
Accuracy		0.05% (rel. 20 mA; 20°C / 70°F)
Resolution		±2 µA
Temperature drift		Typically 50 ppm/K
Error signal		High: 22 mA; Low: 3.6 mA acc. to NAMUR NE 43
Max. Load		350 ohm

Measuring accuracy

Reference conditions acc. to IEC770	Temperature	+20°C ±5°C / +68°F ± 9°F
	Pressure	1013 mbar abs. ±20 mbar / 14.69 psig ±0.29 psig
	Relative air humidity	60% ±15%
Resolution		±1 mm / ±0.04"
Accuracy (in direct mode)	Liquids	±3 mm / 0.12", when L < 10 m / 33 ft; ±0.03% of measured distance, when L > 10 m / 33 ft
	Powders	±20 mm / ±0.8"
	Interface	±10 mm (εr constant)

Application conditions

Temperature	Ambient temperature	-40...+80°C / -40...+175°F; EExi: -40...+60°C / -40...+140°F
	Storage temperature	-40...+85°C / -40...+185°F
	Flange temperature	-40...+200°C / -40...+300°F (Ex: refer to relevant device's approval and temperature class)
Thermal shock resistance		100°C / min
Process conditions	Operating pressure	-1...40 bar / -14.5...580 psig; subject to process connection used and flange temperature
	Dielectric constant	≥1.4 for coaxial probe; ≥1.6 for single and double probes
Vibration resistance		IEC 68-2-6 and prEN 50178 (10...57Hz: 0.075 mm / 57...150 Hz: 1 g)
Protection category		IP 66/67 equiv. to NEMA 6-6X

Mechanical data

Material	Housing	Aluminium
	Single rod	Stainless steel (1.4404 / 316 L); Hastelloy C-22 (2.4602)
	Double rod	Stainless steel (1.4404 / 316 L); Hastelloy C-22 (2.4602)
	Coaxial	Stainless steel (1.4404 / 316 L); Hastelloy C-22 (2.4602)
	Single cable	Stainless steel (1.4401 / 316); Hastelloy C-22 (2.4602) (only cable Ø4 mm / 0.15")
	Double cable	Stainless steel (1.4401 / 316)
	Process fitting	Stainless steel (1.4404 / 316 L); Hastelloy C-22 (2.4602)
Process connection	Gaskets	Viton (-40...+150°C / -40...+300°F); Kalrez 6375 (-20...+150°C / -5 ...+300°F)
	Thread	G 3/4"...1 1/2"; NPT 3/4"...1 1/2"
	Flange	DN 25...DN 150 (PN 40 / PN 16); 1"...8" (150 lb / 300 lb); 10 K (40...100A)

Electrical connection

2-wire power supply	Terminals output 1	
	Non-Ex/ EEx i	24 V DC (14...30 V DC)
	EEx d	24 V DC (20...36 V DC)
	Terminals output 2	
	Non-Ex/ EEx i/ EEx d	24 V DC (10...30 V DC)
Cable entry		M20x1.5; NPT 1/2"; G 1/2"
Terminals		0.5...1.5 mm²

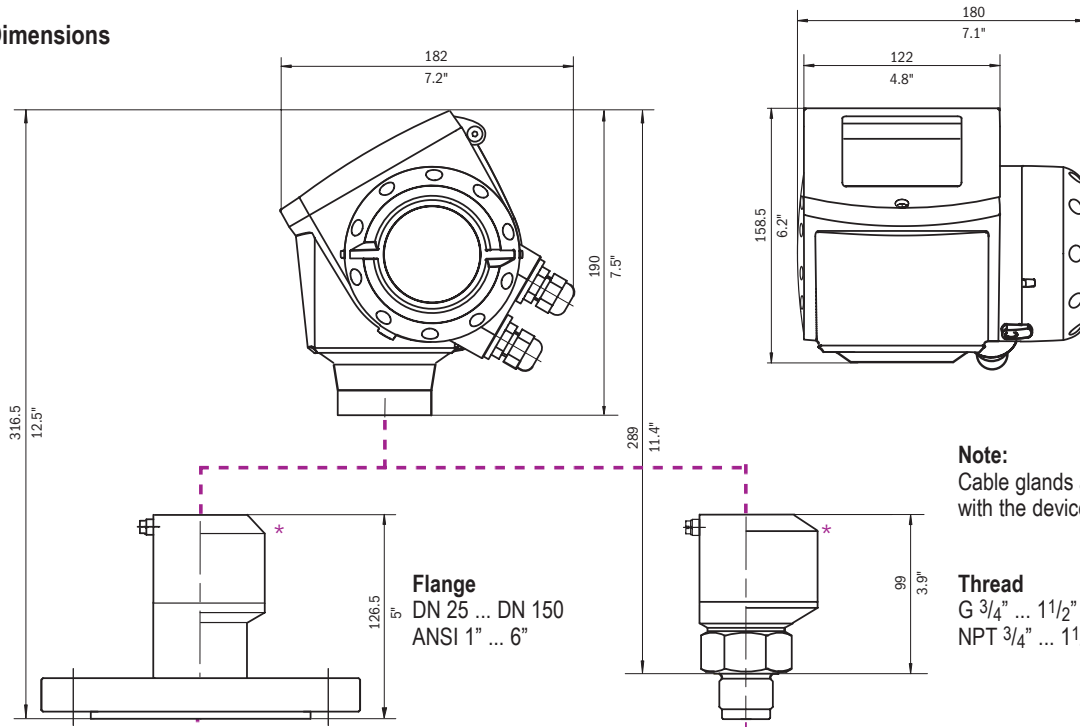
Human machine interface

Display		9 lines, 160x160 pixels in 8-step greyscale with 4-button keypad
Operating languages		English (UK), German, French, Italian, Spanish, Portuguese, Japanese, Chinese (Mandarin), Russian

Approvals

Overfill protection	WHG
ATEX	ATEX II G/D 1, 1/2, 2 EEx ia IIC T6; ATEX II G/D 1/2, 2 EEx d ia IIC T6
FM	IS class I Div. 1 Gr. A...G; XP class I Div. 1 Gr. A...G
CSA	IS class I Div. 1 Gr. A...G; XP class I Div. 1 Gr. A...G

Dimensions



Note:
Cable glands are not delivered with the device.

Thread
G 3/4" ... 1 1/2"
NPT 3/4" ... 1 1/2"

Flange
DN 25 ... DN 150
ANSI 1" ... 6"

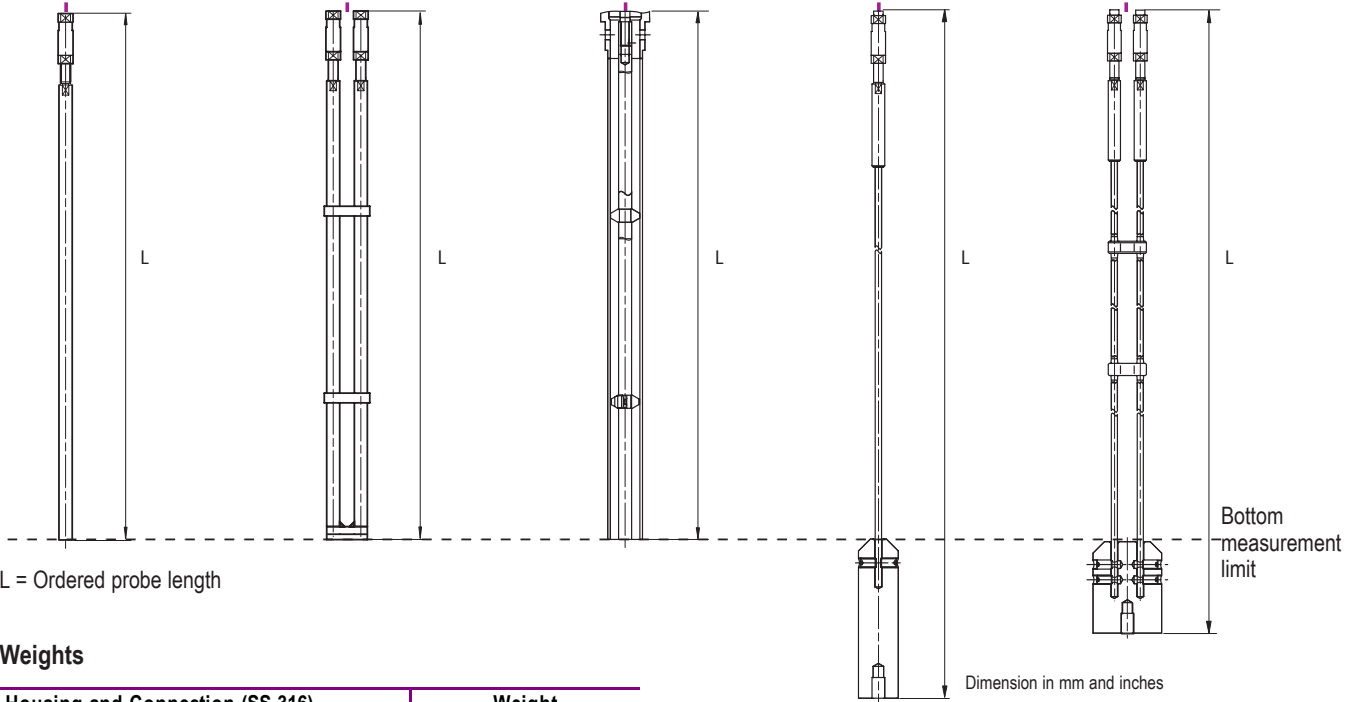
Single rod
Ø 8 mm / Ø 0.3"

Double rod
Ø 8 mm / Ø 0.3"

Coaxial
Ø 22 mm / Ø 0.9"

Single cable
Ø 4 mm / Ø 0.15"
Ø 8 mm / Ø 0.3"

Double cable
Ø 4 mm / Ø 0.15"



L = Ordered probe length

Dimension in mm and inches

Weights

Housing and Connection (SS 316)	Weight	
	[kg]	[lb]
Housing	3.3	7.3
Flange connection DN 25...80 / ANSI 1"...3"	4...7	8.8...15.4
Flange connection DN 100...150 / ANSI 4"...6"	7...12	15.4...26.5
Thread connection	3	6.6
Probes	[kg / m]	[lb / ft]
Single cable Ø4 mm / 0.15"	0.12	0.08
Single cable Ø8 mm / 0.3"	0.41	0.28
Double cable Ø4 mm / 0.15"	0.24	0.16
Single rod Ø8 mm / 0.3"	0.41	0.28
Double rod Ø8 mm / 0.3"	0.82	0.56
Coaxial Ø22 mm / 0.9"	0.79	0.53

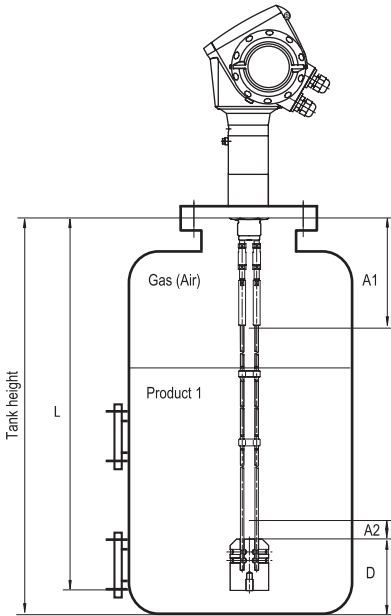
Note:
Wide range of counterweights and anchoring solutions available.
Contact HYCONTROL for further information.

* Only single cable Ø 8 mm / Ø 0.3"
(solids application)

Measurement limits

Probes	Top dead zone $\epsilon r = 80^*$ [mm / inch]	Bottom dead zone $\epsilon r = 80^*$ [mm / inch]	Top dead zone $\epsilon r = 2.3^*$ [mm / inch]	Bottom dead zone $\epsilon r = 2.3^*$ [mm / inch]
Double rod	125 / 4.9	10 / 0.4	165 / 6.5	50 / 1.95
Single rod	200 / 7.9	10 / 0.4	250 / 9.9	50 / 1.95
Coaxial	10 / 0.4	10 / 0.4	10 / 0.4	50 / 1.95
Double cable	125 / 4.9	10 / 0.4	165 / 6.5	50 / 1.95
Single cable $\varnothing 8 \text{ mm} / \varnothing 0.3''$	200 / 7.9	10 / 0.4	250 / 9.9	50 / 1.95
Single cable $\varnothing 4 \text{ mm} / \varnothing 0.15''$	200 / 7.9	10 / 0.4	250 / 9.9	50 / 1.95

* 80 is ϵr of water; 2.3 is ϵr of oil



A1, Top dead zone

Min. distance from flange to top limit of measuring range.

A2, Bottom dead zone

Length at end of probe, where measurement is not possible.

D, non measurement zone

Zone where measurement cannot be taken.

L, Probe length

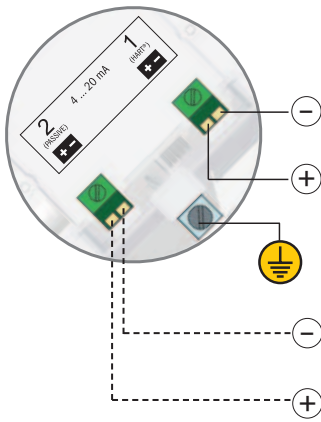
Length specified by customer in the order.

Probe selection

	Double rod	Single rod	Coaxial	Double cable	Single cable $\varnothing 8 \text{ mm} / \varnothing 0.3''$	Single cable $\varnothing 4 \text{ mm} / \varnothing 0.15''$
Maximum tank height						
4 m / 13 ft	◆	◆				
6 m / 20 ft			◆			
35 m / 115 ft				◆	◆	◆
Liquids						
Liquid application	◆	◆	◆	◆	◆	◆
LPG, LNG	◆		◆	◆		
Highly viscous liquids		◆				◆
Highly crystallising liquids		◆				◆
Highly corrosive liquids	◆	◆	◆			◆
Foam		◆	◆			◆
Agitated liquids	◆		◆	◆*		◆*
Spray in tank			◆			
Storage tanks	◆	◆	◆	◆		◆
Installation in bypass chamber	◆	◆	◆	◆		◆
Small diameter nozzles	◆		◆	◆		
Long nozzles	◆		◆	◆		
Stilling wells	◆	◆	◆	◆		◆
Interface measurement	◆		◆	◆		

* with anchor fitting

Electrical connection



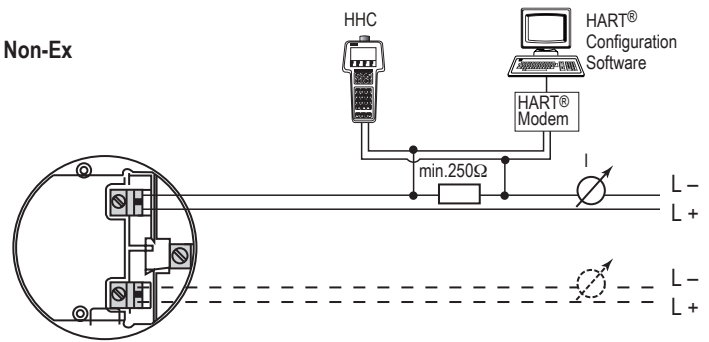
Output 1

4 ... 20 mA/HART
or
3.8 ... 20.5 mA/HART
acc. to NAMUR NE 43

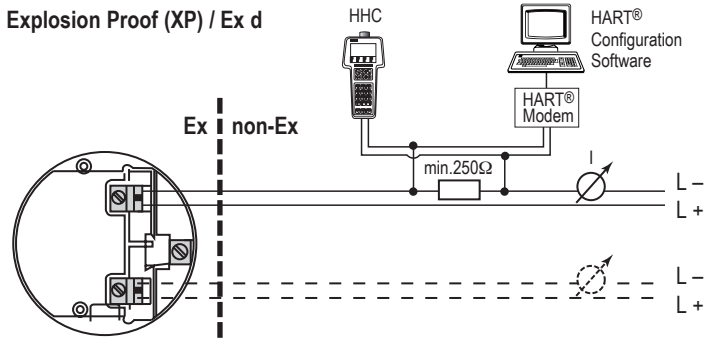
Output 2 (Option)

4 ... 20 mA
or
3.8 ... 20.5 mA
acc. to NAMUR NE 43

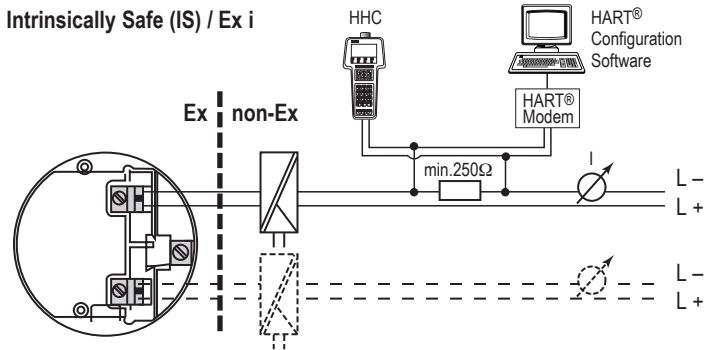
Non-Ex



Explosion Proof (XP) / Ex d



Intrinsically Safe (IS) / Ex i



Note: Other options how to connect the HHC (Hand Held Communicator) and modem to the HART® loop are available.

State-of-the-art with PACTware

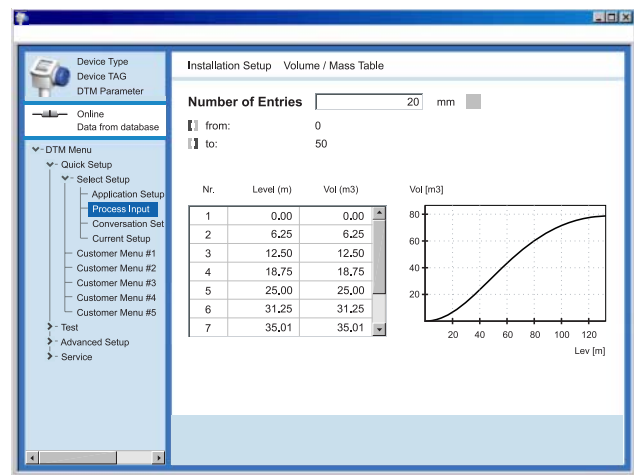
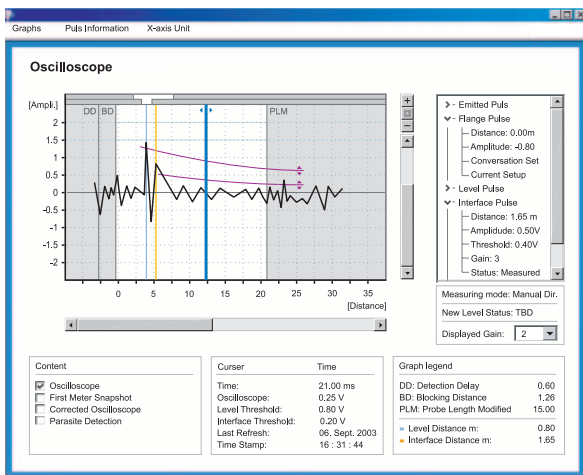
The VF7 is PACTware-ready. Each device is supplied ex-factory with the appropriate DTM.

A DTM (Device Type Manager) is a device driver making available the device functionality independent from the FIELDBUS protocol and providing a graphical user interface optimized for device operation and configuration.

Simple on-screen and intuitive setup procedure for devices without a display, or for set up from the Central Control Room. Summarized setup provides perfect control of initial input, and a guarantees perfect results.

All features of PACTware are fully supported:

- Online device setup
- Displays measured values
- Records measured information during operation
- Shows status of device
- Gives stepwise setup with on-screen progress check
- Displays summary of setup selection for final supervision



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