Level I Radar

Area of application

Radar sensors in the VEGAPULS series are used for non-contact level measurement of liquids and bulk solids. They measure all kinds of liquids, even under high pressure and extreme temperatures, in solvents as well as aggressive liquids, they are also suitable for use in applications with stringent hygiene requirements. VEGAPULS sensors can also measure the lightest to the heaviest of bulk solids with absolute reliability, even in the presence of dust and noise, without being affected by buildup or condensation.

Measuring principle

The measuring instrument sends out short microwave signals toward the medium via the antenna system. The product surface reflects the signal waves, which are then received back by the antenna system. The instrument calculates the level from the running time of the microwave signals and the entered tank height.

Advantages

Non-contact radar technology is characterized by a particularly high measurement accuracy. The measurement is not affected by changing medium properties or by changing process conditions such as temperature, pressure or intense dust generation. User-friendly adjustment without vessel filling and emptying saves time and the sensors are maintenance free.

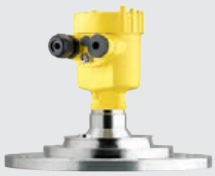
	VEGAPULS C 11	VEGAPULS C 21/22	VEGAPULS C 23
			
Application	Liquids and bulk solids in simple process conditions	Liquids and bulk solids in simple process conditions	Liquids and bulk solids in simple process conditions
Measuring range	8 m	15 m	30 m
Antenna	Integrated plastic horn antenna made of PVDF	Integrated plastic horn antenna made of PVDF	Integrated plastic horn antenna made of PVDF
Process fitting	Threads G1½, 1½ NPT	Threads G1½, 1½ NPT	–
Mounting connection	Threads G1, 1 NPT	VEGAPULS C 21: Threads G1, 1 NPT VEGAPULS C 22: Adapter for ceiling mounting	Threads G1, 1 NPT
Process temperature	-40 … +60 °C	-40 … +80 °C	-40 … +80 °C
Process pressure	-1 … +3 bar (-100 … +300 kPa)	-1 … +3 bar (-100 … +300 kPa)	-1 … +3 bar (-100 … +300 kPa)
Accuracy	±5 mm	±2 mm	±2 mm
Frequency range	W-band, 80 GHz	W-band, 80 GHz	W-band, 80 GHz
Signal output	4 ... 20 mA	4 ... 20 mA/HART, SDI 12, Modbus	4 ... 20 mA/HART, SDI 12, Modbus
Display/adjustment	VEGA Tools app	VEGA Tools app	VEGA Tools app
Approvals	–	ATEX, IEC, cCSAus, FM us, NEPSI, EAC, INMETRO, KOSHA/KTL, CCOE, EG 1935/2004, FDA, NSF, KTW, WHG, VLAREM, Ship	ATEX, IEC, cCSAus, FM us, NEPSI, EAC, INMETRO, KOSHA/KTL, CCOE, EG 1935/2004, FDA, NSF, KTW, WHG, VLAREM, Ship
Benefit	▪ Maintenance-free operation through non-contact 80 GHz radar technology ▪ Low-cost sensor for simple measuring tasks ▪ User-friendly, wireless setup and diagnosis via Bluetooth with mobile devices or PC	▪ Maintenance-free operation through non-contact 80 GHz radar technology ▪ Low-cost sensor for simple measuring tasks ▪ User-friendly, wireless setup and diagnosis via Bluetooth with mobile devices or PC	▪ Maintenance-free operation through non-contact 80 GHz radar technology ▪ Unaffected by vessel internals thanks to very good signal focusing ▪ User-friendly, wireless setup and diagnosis via Bluetooth with mobile devices or PC

Level I Radar

	VEGAPULS 11	VEGAPULS 21/31
		
Application	Liquids and bulk solids in simple process conditions	Liquids and bulk solids in simple process conditions
Measuring range	8 m	15 m
Antenna	Integrated plastic horn antenna made of PVDF	Integrated plastic horn antenna made of PVDF
Process fitting	Threads G1½, 1½ NPT	Threads G1½, 1½ NPT
Process temperature	-40 … +60 °C	-40 … +80 °C
Process pressure	-1 … +3 bar (-100 … +300 kPa)	-1 … +3 bar (-100 … +300 kPa)
Accuracy	±5 mm	±2 mm
Frequency range	W-band, 80 GHz	W-band, 80 GHz
Signal output	4 … 20 mA	4 ... 20 mA/HART
Display/adjustment	VEGA Tools app	VEGAPULS 21: VEGA Tools app VEGAPULS 31: Integrated on-site display and 3-key operation, VEGA Tools app
Approvals	–	ATEX, IEC, cCSAus, FM us, NEPSI, EAC, INMETRO, KOSHA/KTL, CCOE, EG 1935/2004, FDA, NSF, KTW, WHG, VLAREM, Ship
Benefit	▪ Maintenance-free operation through non-contact 80 GHz radar technology ▪ Low-cost sensor for simple measuring tasks ▪ User-friendly, wireless setup and diagnosis via Bluetooth with mobile devices or PC	▪ Maintenance-free operation through non-contact 80 GHz radar technology ▪ Low-cost sensor for simple measuring tasks ▪ User-friendly, wireless setup and diagnosis via Bluetooth with mobile devices or PC

VEGAPULS 61	VEGAPULS 62	VEGAPULS 63
		
Liquids under simple process conditions	Storage containers, reactors and process vessels with various process conditions	Aggressive liquids or with hygienic requirements
up to 35 m	up to 35 m	up to 35 m
Plastic horn antenna of PP or encapsulated horn antenna of PVDF	Horn antenna, parabolic antenna or standpipe antenna ½" of 316L	Hygienically encapsulated horn antenna of PTFE or PFA
Thread G1½, 1½ NPT Mounting strap, compression Flanges from DN 80, 3" Adapter flanges from DN 100, 4"	Thread from G1½, 1½ NPT Flanges from DN 50, 2"	Flanges from DN 50, 2" Slotted nut Hygienic fittings
-40 … +80 °C	-196 … +450 °C	-196 … +200 °C
-1 … +3 bar (-100 … +300 kPa)	-1 … +160 bar (-100 … +16000 kPa)	-1 … +16 bar (-100 … +1600 kPa)
±2 mm	±2 mm	±2 mm
K-band, 26 GHz	K-band, 26 GHz	K-band, 26 GHz
4 ... 20 mA/HART, Profibus PA, Foundation Fieldbus	4 ... 20 mA/HART, Profibus PA, Foundation Fieldbus	4 ... 20 mA/HART, Profibus PA, Foundation Fieldbus
PLICSCOM, PACTware, VEGADIS 81, VEGADIS 82	PLICSCOM, PACTware, VEGADIS 81, VEGADIS 82	PLICSCOM, PACTware, VEGADIS 81, VEGADIS 82
ATEX, IEC, FM, CSA, EAC (GOST), UKR Sepro, Overfill protection, Ship, SIL2	ATEX, IEC, FM, CSA, EAC (GOST), UKR Sepro, Overfill protection, Ship, SIL2	ATEX, IEC, FM, CSA, EAC (GOST), UKR Sepro, Overfill protection, Ship, SIL2
▪ Economical solution through wide variety of mounting options ▪ Maintenance-free operation with encapsulated antenna system	▪ Optimal solution for nearly all applications through different antenna versions ▪ Simple planning and engineering thanks to large temperature and pressure range	▪ Continuous maintenance-free operation through high chemical resistance ▪ Optimal cleaning to meet strict hygienic requirements thanks to front-flush mounting

	VEGAPULS 64	VEGAPULS 66	VEGAPULS 67
			
Application	Liquids under various process conditions or with hygienic requirements	Liquids under difficult process conditions	Bulk solids in vessels of average height
Measuring range	up to 30 m	up to 35 m	up to 15 m
Antenna	Plastic horn antenna of PP, thread with integrated horn antenna, flange with encapsulated antenna system	Horn antenna of 316L or enamel or standpipe 2" of 316L	Completely encapsulated plastic horn antenna of PP
Process fitting	Mounting strap, thread from G¾, ¾ NPT, flanges from DN 50, 2", compression flanges from DN 80, 3", hygienic fittings	Flanges from DN 50, 2"	Mounting Compression Compression flanges from DN 80, 3"
Process temperature	-196 … +200 °C	-60 … +400 °C	-40 … +80 °C
Process pressure	-1 … +25 bar (-100 … +2500 kPa)	-1 … +160 bar (-100 … +16000 kPa)	-1 … +2 bar (-100 … +200 kPa)
Accuracy	±1 mm	±8 mm	±2 mm
Frequency range	W-band, 80 GHz	C-band, 26 GHz	K-band, 26 GHz
Signal output	4 ... 20 mA/HART	4 ... 20 mA/HART, Profibus PA, Foundation Fieldbus	4 ... 20 mA/HART, Profibus PA, Foundation Fieldbus
Display/adjustment	PLICSCOM, PACTware, VEGADIS 81, VEGADIS 82	PLICSCOM, PACTware, VEGADIS 81, VEGADIS 82	PLICSCOM, PACTware, VEGADIS 81, VEGADIS 82
Approvals	ATEX, IEC, FM, CSA, EAC (GOST), UKR Sepro, Overfill protection, Ship	ATEX, IEC, FM, CSA, EAC (GOST), UKR Sepro, Overfill protection, Ship, SIL2	ATEX, IEC, FM, CSA, SIL2, EAC (GOST), UKR Sepro
Benefit	▪ Ideal solution for very small and narrow vessels through extreme signal focusing ▪ High plant availability, hence insensitive to buildup and contamination	▪ Universal use through different antenna versions	▪ Economical solution through wide variety of mounting options ▪ Maintenance-free operation with encapsulated antenna system

	VEGAPULS 68 (SR 68)	VEGAPULS 69
		
	Bulk solids for average to large vessels	Bulk solids for smaller or very large vessels
	up to 75 m, SR 68: up to 30 m	up to 120 m
	Horn or parabolic antenna of 316L	Plastic horn antenna of PP, metal jacketed lens antenna with rinsing air connection of PEEK, thread with integrated horn antenna
	Thread from G1½, 1½ NPT, flanges from DN 50, 2"	Mounting strap, compression flanges from DN 80, 3"; flanges from DN 80, 3", thread G1½, 1½ NPT
	-196 … +450 °C SR 68: -40 … +250 °C	-40 … +200 °C
	-1 … +160 bar (-100 … +16000 kPa) SR 68: -1 … +100 bar (-100 … +10000 kPa)	-1 … +20 bar (-100 … +2000 kPa)
	±2 mm	±5 mm
	K-band, 26 GHz	W-band, 80 GHz
	4 ... 20 mA/HART, Profibus PA, Foundation Fieldbus	4 … 20 mA/HART, Profibus PA, Foundation Fieldbus
	PLICSCOM, PACTware, VEGADIS 81, VEGADIS 82	PLICSCOM, PACTware, VEGADIS 81, VEGADIS 82
	ATEX, IEC, FM, CSA, EAC (GOST), UKR Sepro, only VEGAPULS 68: Ship, SIL2	ATEX, IEC, FM, CSA, EAC (GOST), UKR Sepro
	▪ Optimal solution for almost all applications due to different antenna versions and materials ▪ Simple planning and engineering thanks to large temperature and pressure range	▪ Ideal solution for very narrow or very large containers through extreme signal focusing ▪ Maintenance-free operation with encapsulated antenna system