

SmartLine® Non-Contact Radar Level Meter Technical Datasheet

34-VF-03-19
October 14th 2008

Specification

The Universal Radar Solution

The SmartLine Non-Contact Radar Level Meter (FMCW) is for level measurement of liquids and can be used to calculate for volume assessment. SmartLine Non-Contact Radar Level Meters provide a more stable measurement than pulse radar and they are well suited for agitated process conditions.

Highlights

- ± 3 mm / ± 0.04 " standard accuracy
- Reliable measurement in difficult process conditions
- Operates up to a flange temperature of 200°C / (390°F) and 40 barg (580 psig)
- Measuring range up to 80 m (260 ft)
- Long antenna versions can be extended to suit nozzle length
- Configuration software and Hart DTMs included as standard
- Optional second current output
- Direct-accessible graphic touchscreen/wizard (option)
- Converter rotates 360°
- Triple barrier gas-tight protection available for working with dangerous gases (using pre-stressed fused glass)

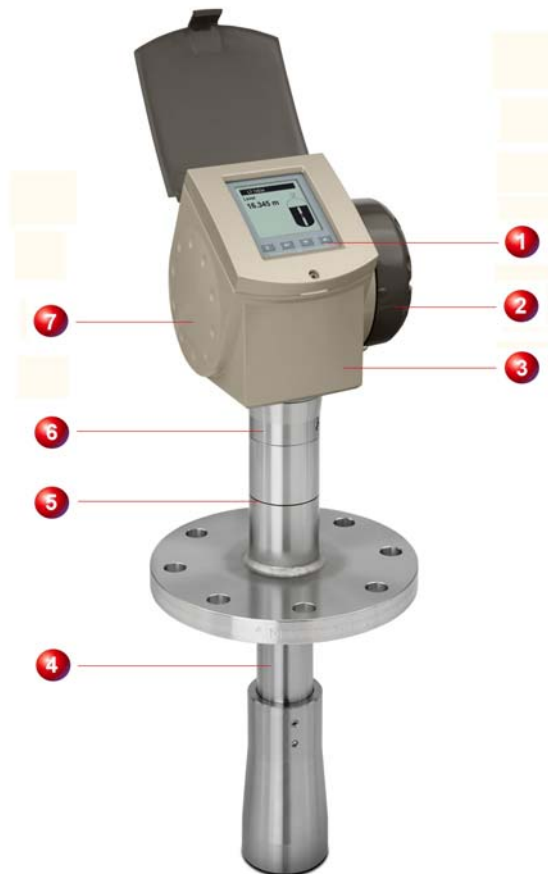
Industries

- Chemicals
- Food & Beverage
- Iron, Steel & Metals
- Minerals & Mining
- Oil & Gas
- Petrochemicals
- Pulp & Paper
- Water & Wastewater

Applications

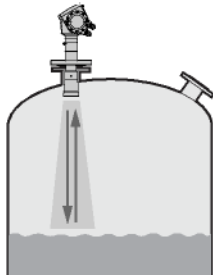
- Tanks with agitators
- Process tanks
- Storage tanks

Figure 1 – SmartLine Non-Contact Radar Level Meter



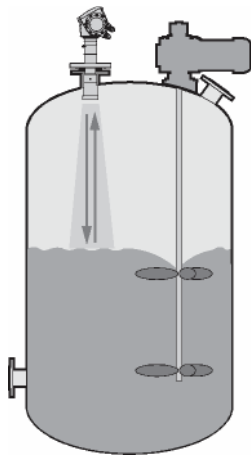
1. Optional touch screen with 4-button operation
2. 2-wire level meter
3. One converter for all applications
4. Antenna extension (for long nozzles)
5. Optional Metaglas barrier
6. Rotatable housing
7. Same housing for Ex d and Non-Ex

Applications



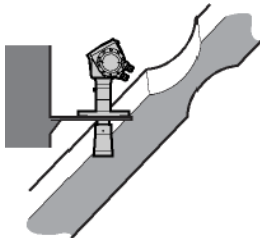
1. Level measurement of liquids in storage tanks

SmartLine Non-Contact Radar can measure the level of a wide range of liquid products on a large variety of installations, including LPG and LNG tanks. It does not require calibration or commissioning when installed. It can measure any liquid within the stated pressure and temperature range, and distances up to 80 m / 260 ft



2. Level measurement of liquids in process tanks

SmartLine Non-Contact Radar can measure level accurately in agitated conditions, such as near to vortices caused by agitators, and also where foam is present.



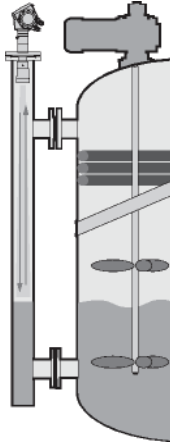
3. Open channel metering or flow

SmartLine Non-Contact Radar can measure level in an open channel and convert this measurement into flow values if the characteristics of the channel are known. This solution is the high end alternative to ultrasonic and hydrostatic pressure transmitters.

For installation requirements and application needs please refer to the User manual.

Please refer to the User manual for details of how and where to use these products.

4. Measurement of liquids in a bypass chamber



If the tank is full of obstructions such as agitators and reinforcements, Honeywell recommends installing the SmartLine Non-Contact Radar in a bypass chamber or a stilling well.

For installation requirements and application needs please refer to the User manual.

Please refer to the User manual for details of how and where to use these products.

Technical Data

Input

Measurement principle	K-band FMCW radar
Parameter	Level, distance, volume and reflectivity
Min. tank dimension: height	0.2 m (8")
Max. measuring range	80 m (260 ft)
Blocking distance	Antenna extension length + antenna length + 0.1 m / 4"

Outputs

Output signal (Output 1)	4...20 mA HART® or 3.8...20.5 mA acc. to NAMUR NE 43
Output signal (Output 2)	4...20 mA (no HART® signal) or 3.8...20.5 mA acc. to NAMUR NE 43
Resolution	±3 µA
Temperature drift	Typically 50 ppm/K
Error signal	High: 22 mA; Low: 3.6 mA acc. to NAMUR NE 43

Reference conditions acc. to EN 60770

Temperature	+20°C ±5°C (+70°F ±10°F)
Pressure	1013 mbar abs. ±20 mbar (14.69 psig ±0.29 psig)
Relative air humidity	60% ±15%
Reference target	Metal plate in an anechoic chamber

Accuracy (under reference conditions)

Resolution	1 mm (0.04")
Repeatability	±1 mm (±0.04")
Accuracy	±3 mm (±0.12"), when distance ≤ 10 m (33 ft); ±0.03% of measured distance, when distance > 10 m (33 ft)
Beam angle - DN40 antenna	20°
Beam angle - DN50 antenna	15°
Beam angle - DN80 antenna	10°

Process conditions

Ambient temperature	-40...+80°C (-40...+175°F) (EEx i: see supplementary operating instructions or approval certificates)
Storage temperature	-40...+85°C (-40...+185°F)
Flange temperature	-40...+200°C (-40...+390°F) (EEx i: see supplementary operating instructions or approval certificates)
Thermal shock resistance	100°C/min
Operating pressure	-1...40 barg(-14.5...580 psig); subject to process connection used and flange temperature
Dielectric constant (ϵ_r)	≥ 1.5
Vibration resistance	IEC 68-2-6 and EN 50178 (10...57 Hz: 0.075 mm (57...150 Hz:1 g)
Protection category	IP 66/67 equivalent to NEMA 6-6X

Material

Housing	Aluminium, Stainless steel
Wetted parts	Stainless steel 1.4404 (316L); Hastelloy ® C-22 (2.4602)
Process fitting	Stainless steel 1.4404 (316L); Hastelloy ® C-22 (2.4602)
Gaskets	FKM/FPM -40...+200°C (-40...+390°F); Kalrez® 6375 -20...+200°C (-5...+390°F)
Feedthrough	PEI/standard -40...+200°C (-40...+390°F); Metaglas® -30...+200°C (-20...+390°F)
Weather protection (Option)	Stainless steel 1.4301 (304)

Process Connections

Thread	G 1½"; NPT 1½"
Flange	DN40...150 (PN40 / PN16); 1½"...8" (150 lb / 300 lb); 10K (40...100A)

Electrical Connections

Instrument terminal 1 - Non-Ex / EEx i versions	14...30 VDC (1)
Instrument terminal 1 - EEx d version	20...36 VDC (1)
Instrument terminal 2 - Non-Ex/ EEx i/ EEx d versions	10...30 VDC (2)
Cable entry (x2)	M20x1.5; (NPT ½"; G ½") (FM and CSA approval pending).
Cable tightening capacity	0.5...1.5 mm ² (0.02... 0.06")

Human Machine Interface

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

Approvals

ATEX (approval pending)	ATEX II 1, 1/2, 2 G/D EEx ia IIC T6...T3 IP 6x; ATEX II 1/2, 2 G/D EEx d [ia] IIC T6...T3 IP 6x; ATEX II 3 G EEx nA IIC T6...T3
IECEX (approval pending)	Ex iaD 21 T 65...T 90 IP 6X; Ex ia IIC T6...T4 IP 66
FM or CSA (approvals pending)	
NEC 500/ CEC	Cl. I, Div . 1, Gr. ABCD (IS);
	Cl. I, Div . 1, Gr. ABCD (FM only) (XP); (FM approval pending)
	Cl. I, Div . 2, Gr. ABCD (XP/NI);
	Cl. II, Div . 1, Gr. EFG; Cl. III (FM only) (XP); (FM approval pending)
	Cl. II Div . 1, Gr. EFG; Cl. III (IS);
	Cl. II/III, Div . 2, Gr. FG (XP/NI)
NEC 505/ CEC	Cl. I, Zone 0 AEx ia Gr. IIC (CSA: Ex ia) (IS); (CSA approval pending)
	Cl. I, Zone 1 AEx d [ia] Gr. IIC (XP);
	Cl. I, Zone 2, AEx nA [ia], Gr. IIC (CSA: Ex nA [ia]) (IS) (CSA approval pending)
NEPSI (approval pending)	Ex dia IIC T3...T6; Ex ia IIC T3...T6
Other approvals	Gosstandard; PESO (India) (approvals pending)

Options and Accessories

Options	Integrated LCD display with sun cover; 2nd current output; Antenna purging system (3)
Accessories	Weather protection; Antenna extensions (4)

1 min./max. value for an output of 22 mA at the terminal

2 min./max. value for an output of 22 mA at the terminal (additional power supply needed – output relay)

3 supplied with NPTF ¼ connection

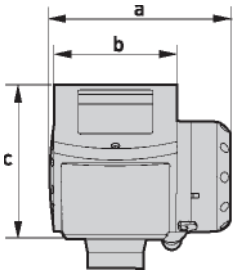
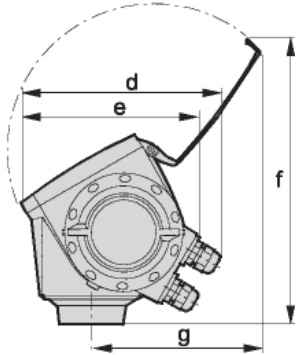
4 for long antenna versions only

Dimensions and Weight

Note:


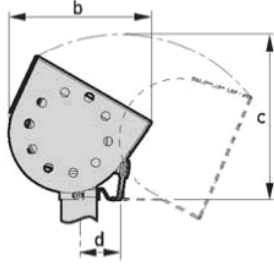
- Cable glands are delivered on demand with non-Ex.
- A weather protection cover is delivered on demand with all devices

Dimensions in mm (inches) and kg (lbs)

 <p>Housing front view</p>	 <p>Housing front view</p>							
Dimensions mm (inches)								
	a	b	c	d	e	f	g	Weight kg (lbs)
Housing	180 (7.1)	122 (4.8)	158.5 (6.2)	182 (1) (7.2) (1)	167 (6.7)	277 (10.9)	155 (6.10)	3.3 (7.3)

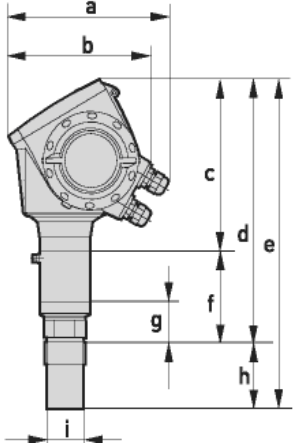
¹ if fitted with cable glands

Dimensions and Weight in mm (inches) and kg (lbs)

					
Weather protection back view		Weather protection left side			
Dimensions mm (inches)					
	a	b	c	d	Weight kg (lbs)
Weather protection	208 (8.2)	231.5 (9.1)	268 (1) (10.6) (1)	66 (2.6)	2.9 (6.4)

1 radius

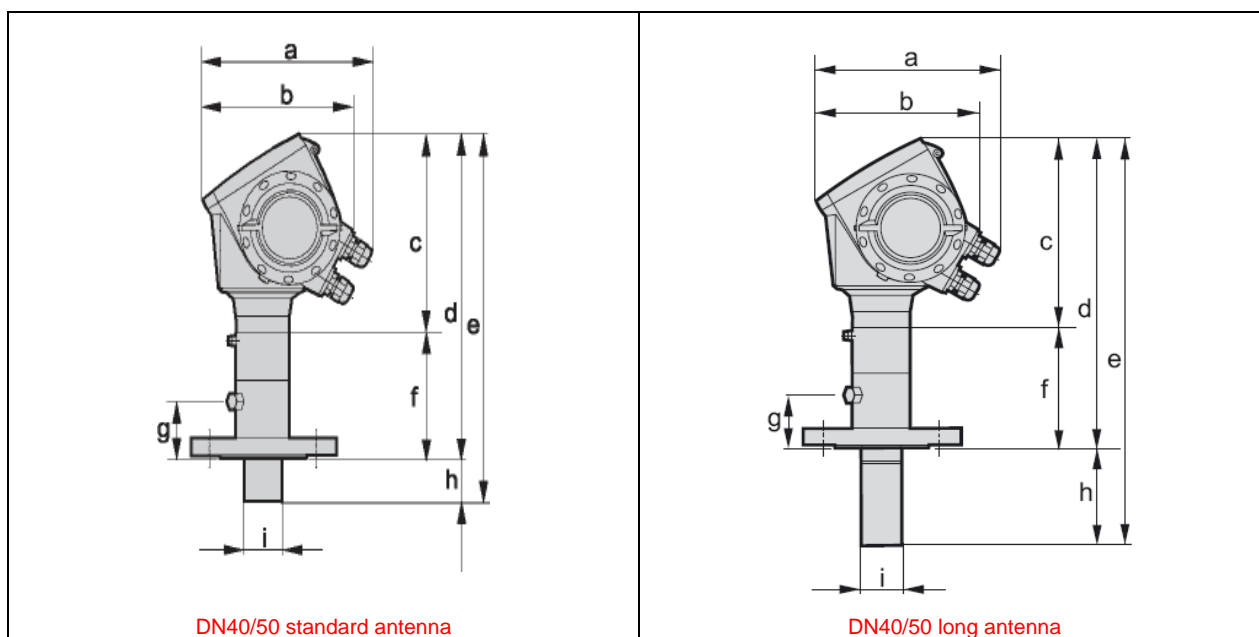
Dimensions and Weight in mm (inches) and kg (lbs)

										
Antenna with thread connection										
Dimensions mm (inches)										Weight kg (lbs)
	a	b	c	d	e	f	g	h	i	
DN50 Standard	182 (1) (7.2) (1)	167 (6.5)	190 (7.5)	278 (11.0)	355 (14.0)	88 (3.5)	44.5 (1.8)	77 (3.0)	43 (2) (1.7) (2)	6 (13.2)

1 if fitted with standard cable glands

2 1½" NPT or G process connections available

Dimensions and Weight in mm (inches) and kg (lbs)



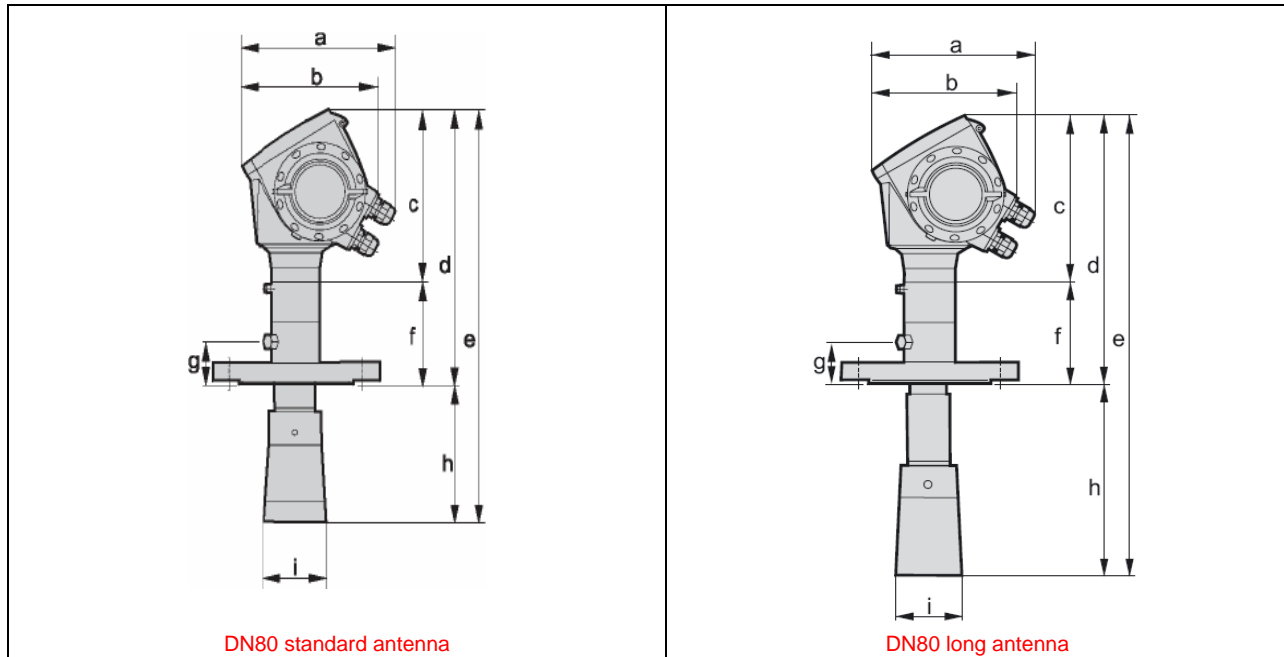
	Dimensions mm (inches)									Weight kg (lbs)
	A	b	c	d	e	f	g	h	i	
DN40 standard	182 (1) (7.2) (1)	167 (6.5)	190 (7.5)	305 (12.0)	344 (13.5)	115 (4.5)	50 (2) (2.0) (2)	39 (1.5)	39 (1.5)	6 (17.6)
DN40 long	182 (1) (7.2) (1)	167 (6.5)	190 (7.5)	305 (12.0)	590 (23.2)	115 (4.5)	50 (2) (2.0) (2)	95 (3) (3.7) (3)	39 (1.5)	9 (19.8)
DN50 standard	182 (1) (7.2) (1)	167 (6.5)	190 (7.5)	305 (12.0)	355.5 (14.0)	115 (4.5)	50 (2) (2.0) (2)	50.5 (2.0)	43 (1.7)	6 (17.6)
DN50 long	182 (1) (7.2) (1)	167 (6.5)	190 (7.5)	305 (12.0)	411 (16.2)	115 (4.5)	50 (2) (2.0) (2)	106 (3) (4.2) (3)	43 (1.7)	9 (17.8)

1 if fitted with standard cable glands

2 antenna flushing system delivered on demand (NPTF ¼ connection)

3 additional antenna extensions of 105 mm (4.1") length are available

Dimensions and Weight in mm (inches) and kg (lbs)



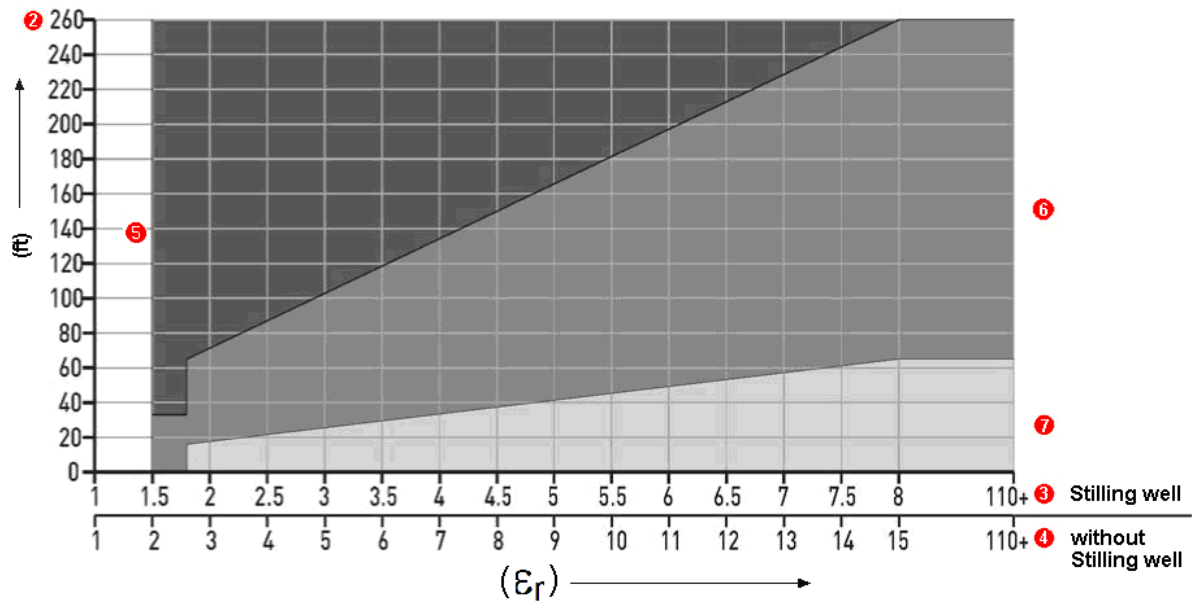
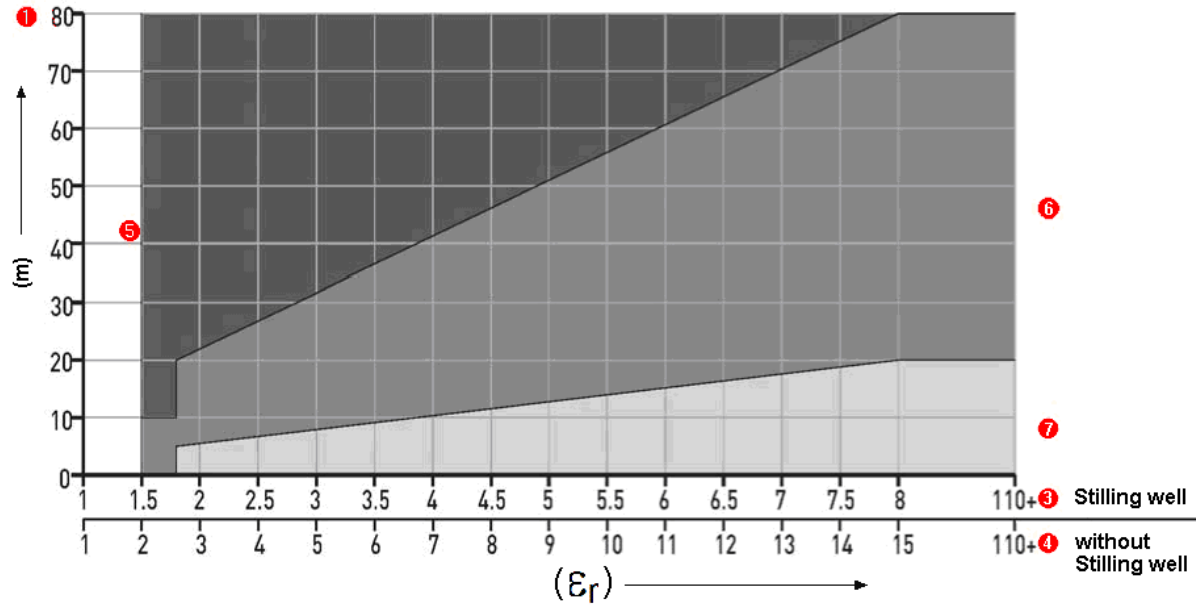
	Dimensions mm (inches)									Weight kg (lbs)
	a	b	c	d	e	f	g	h	i	
DN80 standard	182 (1) (7.2) (1)	167 (6.5)	190 (7.5)	305 (12.0)	465 (18.3)	115 (4.5)	50 (2) (2.0) (2)	160.5 (6.3)	75 (3.0)	11 (24.3)
DN80 long	182 (1) (7.2) (1)	167 (6.5)	190 (7.5)	305 (12.0)	523 (20.5)	115 (4.5)	50 (2) (2.0) (2)	216 (3) (8.5) (3)	75 (3.0)	12 (26.5)

- 1 if fitted with standard cable glands
- 2 antenna flushing system delivered on demand (NPTF ¼ connection)
- 3 additional antenna extensions of 105 mm (4.1") length are available

Antenna selection: liquid applications

The graphs below show which antenna to select for the application based on:

- D, the measuring range,
- ϵ_r is the dielectric constant of the product being measured and
- the application.



- 1 Distance, D [m]
- 2 Distance, D [ft]
- 3 Dielectric constant (ϵ_r) range for storage/stillwell applications
- 4 Dielectric constant (ϵ_r) range for process/agitator applications
- 5 DN 80 antenna in a still well
- 6 DN 80 antenna with or without a still well
- 7 DN40, DN 50, DN 80 antenna with or without a still well

Ordering Information

Contact your nearest Honeywell sales office, or

In the U.S.:

Honeywell Process Solutions
Honeywell International Inc
2500 West Union Hills Drive
Phoenix, AZ 85027 1-800-343-0228

In Europe and Africa:

Honeywell S. A.
Avenue du Bourget 1
1140 Brussels, Belgium

In Asia:

Honeywell Asia Pacific Inc.
Honeywell Building,
17 Changi Business Park Central 1
Singapore 486073
Republic of Singapore

In Canada:

The Honeywell Centre
155 Gordon Baker Rd.
North York, Ontario M2H 3N7
1-800-461-0013

In Eastern Europe:

Honeywell Praha,
s.r.o. Budejovicka 1
140 21 Prague 4,
Czech Republic

In the Pacific:

Honeywell Pty Ltd.
5 Thomas Holt Drive
North Ryde NSW Australia 2113
(61 2) 9353 7000

In Latin America:

Honeywell Inc.
480 Sawgrass Corporate Parkway,
Suite 200 Sunrise, FL 33325
(954) 845-2600

In the Middle East:

Honeywell Middle East Ltd.
Khalifa Street,
Sheikh Faisal Building
Abu Dhabi, U. A. E.

In Japan:

Honeywell K.K.
14-6 Shibaura 1-chrome
Minato-ku, Tokyo, Japan 105-0023

Or, visit Honeywell on the World Wide Web at: <http://www.honeywell.com/ps>
Specifications are subject to change without notice.