

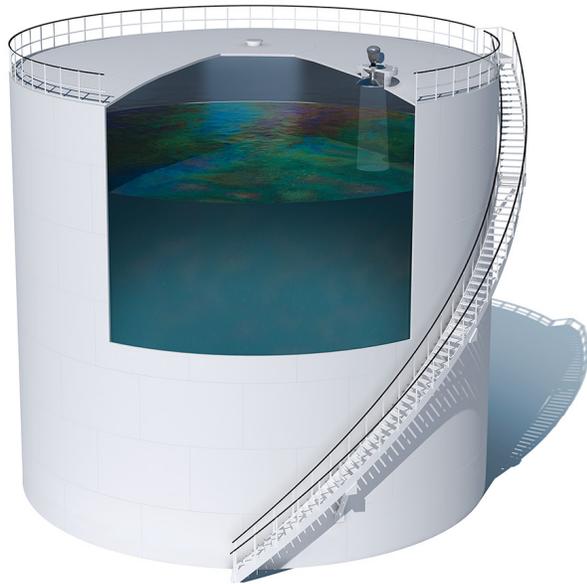
Rosemount 5900C Radar Level Gauge

Reliable non-contact measurement
for tank gauging systems



- Get highest reliability for monitoring of bulk liquid assets
- Certified IEC 61508 SIL 2 capable
- Measures level with ± 3 mm (0.12 in.) instrument accuracy
- Bus powered for convenient and safe 2-wire installation
- Full functionality, wired or wireless
- No need to take non-pressurized tanks out of service during installation

Improve plant efficiency and safety



Highest reliability for your bulk liquid storage tanks

The 5900C level gauge with its non-contact radar measurement method ensures state of the art reliability:

- No moving parts
- Less maintenance
- Reliable loss control data

The 5900C is normally combined with multiple spot temperature sensors for API standard net volume calculations. It measures level in all bulk storage tank types and products, ranging from liquefied gases, light products, heavy fuel oil and bitumen.

Make operations more efficient

- Less interruptions and slow-downs
- Most 5900C antenna types are installed with the tanks in operation
- Emerson Smart Wireless can drastically reduce installation cost and give you access to remote tanks
- The 5900C is an integrated part of complete tank gauging solutions from Emerson who has supplied tank gauging for more than 100 000 bulk liquid storage tanks



Taking overfill safety to a higher level

- Certified SIL 2 capable safety according to IEC 61508-2 and 61508-3
- Enables API 2350 compliant solutions

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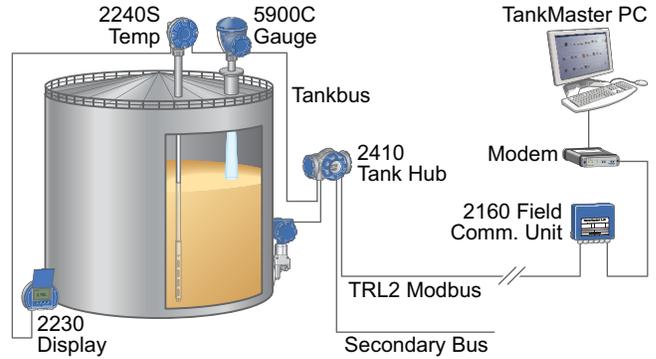
Get complete level and inventory information

The Rosemount 5900C level gauge is normally integrated into a complete tank gauging system including average temperature measurement for net volume calculation. Data can be displayed remotely, on a host computer or the TankMaster inventory software package. In most cases measurement data is transmitted to the control room via TRL2 Modbus communication from the Tank Hub. As an alternative, data can be transmitted via Foundation fieldbus communication directly from the gauge to the control room without using the Tank Hub.

The 5900C is optimized for medium accuracy applications. For highest precision, we recommend the 5900S Radar Level Gauge.

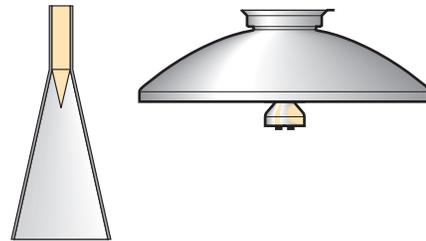
Through proprietary emulation technology, Rosemount Tank Gauging devices can be cost effectively added to an existing system using the previous vendor's communication protocol.

Using an Emerson Smart Wireless solution is an alternative that saves installation cost and enables full tank gauging functionality for remote tanks and where long distance field wiring is obsolete.



Drip-off means no condensation

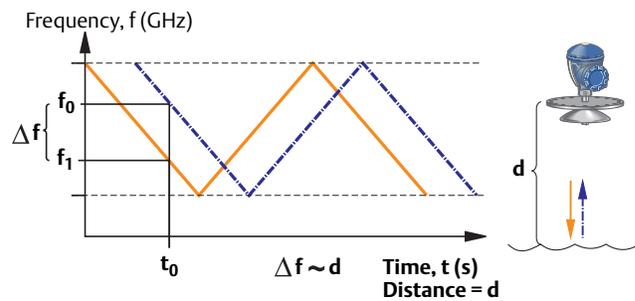
Since the antenna has an inclined polished PTFE surface where microwaves are emitted, it will be less susceptible to condensed water or product. Condensation drops will not coat the active antenna part, so the radar signal remains strong, resulting in higher accuracy and better reliability.



The FMCW method

The FMCW-method (Frequency Modulated Continuous Wave) means that the transmitted radar signal has a linear frequency variation. The reflection from the liquid surface has a slightly different frequency compared with the signal transmitted from the antenna when the reflection is received.

The difference in frequency is directly proportional to the distance to the liquid surface and to the liquid level. This technology enables a very accurate and stable measured value.



The FMCW-method is based on a radar sweep with varying frequency.

Ordering Information

Rosemount 5900C Radar Level Gauge with parabolic antenna



Rosemount 5900C with parabolic antenna is a non-contact radar level gauge. The parabolic antenna is the preferred antenna type for installation on tanks with fixed roofs without a still-pipe. It can be installed on existing manhole covers and close to the tank wall due to the narrow radar beam and the high signal to noise ratio. In certain cases, it can be used on tanks with floating roofs to measure the distance down to a target plate on the floating roof.

- Measures all products ranging from light products to heavy fuel oil and asphalt
- Tolerant to product build-up and condensation
- Certified SIL 2 capable according to IEC 61508-2 and 61508-3
- Communicates via a 2-wire, intrinsically safe Tankbus for easy and safe installation
- Installation normally with tank in service

Table 1. 5900C Radar Level Gauge with parabolic antenna ordering information

Model	Product Description
5900C	Radar Level Gauge
Performance Class	
3	±3 mm (0.12 in.) instrument accuracy
Safety Certification (SIS)	
2 ⁽¹⁾	Certified IEC 61508 SIL 2 capable
F	None. Ready for upgrade of safety certification (SIS)
0	None
Redundancy	
1	None. Single radar level gauge electronics
Tankbus: Power and Communication	
F	Bus powered 2-wire FOUNDATION™ fieldbus (IEC 61158)

Table 1. 5900C Radar Level Gauge with parabolic antenna ordering information

Hazardous Location Certification	
I1	ATEX Intrinsic Safety
I5	FM-US Intrinsic Safety
I6	FM-Canada Intrinsic Safety
I7	IECEx Intrinsic Safety
KA	ATEX Intrinsic Safety+FM-US Intrinsic Safety
KC	ATEX Intrinsic Safety+IECEx Intrinsic Safety
KD	FM-US Intrinsic Safety+FM-Canada Intrinsic Safety
NA	None
Custody Transfer Type Approval	
0	None
Radar Measurement Method	
1	10 GHz FMCW radar technology
2	10 GHz FMCW radar technology for the US market
Housing	
A	Standard enclosure, polyurethane-coated aluminum. IP 66/67
Cable/Conduit Connections	
1	½ - 14 NPT, female thread. 1 plug included
2	M20 x 1.5 adapters, female thread. 2 adapters and 1 plug included
G	Metal cable glands (½ - 14 NPT). Min. temperature -20 °C (-4 °F). ATEX/IECEx Exe approved. 2 glands and 1 plug included
E	Eurofast male connector, 1 plug included
M	Minifast male connector, 1 plug included
Antenna	
1P	Parabolic antenna
Antenna Size	
F	20 in./DN 500, Ø=440 mm (17.3 in.)
Antenna Material	
S	Stainless steel AISI 316L/EN 1.4436
Tank Seal	
PF	PTFE with FEP fluoropolymer o-ring
Tank Connection	
WE ⁽²⁾	Welded installation
CL ⁽²⁾	Clamped/threaded installation

Table 1. 5900C Radar Level Gauge with parabolic antenna ordering information

Special	
0	None
V ⁽³⁾	Proof test reflector kit
Options (Include with selected model number)	
WR3	Extended Product Warranty: 3-year limited warranty
WR5	Extended Product Warranty: 5-year limited warranty
QT ⁽⁴⁾	IEC 61508 certificate and FMEDA-data
Q4	Calibration certificate
Q8 ⁽⁵⁾	Antenna material traceability certification per EN 10204 3.1
ST	Engraved SST tag plate
U1 ⁽⁶⁾	TÜV/DIBt WHG approval for overfill protection
Typical Model Number: 5900C 3 2 1 F I5 0 2 A 1 1P F S PF WE 0 Q4	

(1) Requires 2410 Tank Hub with Relay Output (SIS/SIL) code 2.

(2) Flange not included.

(3) Not available with Options code U1.

(4) Requires Safety Certification (SIS) code 2.

(5) Certificate includes all pressure retaining wetted parts.

(6) Requires one or more relay outputs in the 2410 Tank Hub. If the connected 2410 Tank Hub's Relay Output (SIS/SIL) code is 2, Safety Certification (SIS) code 2 is required.

Rosemount 5900C Radar Level Gauge with cone antenna



Rosemount 5900C with cone antenna is a non-contact radar level gauge. It is designed for easy installation on fixed roofs tanks, with smaller nozzles.

- Communicates via a 2-wire, intrinsically safe Tankbus for easy and safe installation
- Installation normally with tank in service
- Measures on a variety of products except asphalt or similar for which the parabolic antenna is recommended

Table 2. 5900C Radar Level Gauge with cone antenna ordering information

Model	Product Description
5900C	Radar Level Gauge
Performance Class	
3	±3 mm (0.12 in.) instrument accuracy
Safety Certification (SIS)	
0	None
Redundancy	
1	None. Single radar level gauge electronics
Tankbus: Power and Communication	
F	Bus powered 2-wire FOUNDATION™ fieldbus (IEC 61158)
Hazardous Location Certification	
I1	ATEX Intrinsic Safety
I5	FM-US Intrinsic Safety
I6	FM-Canada Intrinsic Safety
I7	IECEX Intrinsic Safety
KA	ATEX Intrinsic Safety+FM-US Intrinsic Safety
KC	ATEX Intrinsic Safety+IECEX Intrinsic Safety
KD	FM-US Intrinsic Safety+FM-Canada Intrinsic Safety
NA	None

Table 2. 5900C Radar Level Gauge with cone antenna ordering information

Custody Transfer Type Approval	
0	None
Radar Measurement Method	
1	10 GHz FMCW radar technology
2	10 GHz FMCW radar technology for the US market
Housing	
A	Standard enclosure, polyurethane-covered aluminum. IP 66/67
Cable/Conduit Connections	
1	½ - 14 NPT, female thread. 1 plug included
2	M20 x 1.5 adapters, female thread. 2 adapters and 1 plug included
G	Metal cable glands (½ - 14 NPT). Min. temperature -20 °C (-4 °F). ATEX/IECEx Exe approved. 2 glands and 1 plug included
E	Eurofast male connector, 1 plug included
M	Minifast male connector, 1 plug included
Antenna	
1C	Cone antenna
Antenna Size	
4	4 in. /DN100 Ø 93 mm (3.7 in.)
6	6 in. /DN150 Ø 141 mm (5.6 in.)
8	8 in. /DN 200, Ø=189 mm (7.4 in.)
X	Customer specific, consult factory
Antenna Material	
S	Stainless steel AISI 316L/EN 1.4436
X	Customer specific, consult factory
Tank Seal	
PV	PTFE with Viton® fluoroelastomer O-rings
PK	PTFE with Kalrez® perfluoroelastomer O-rings
QV	Quartz with Viton® fluoroelastomer O-rings
QK	Quartz with Kalrez® perfluoroelastomer O-rings
Tank Connection	
ANSI Hole Pattern (SST AISI 316L) - Flat Face - Thin flange for non-pressurized applications. Max pressure 0,2 bar (2.9 psi)	
6T	6 in. Class 150
8T	8 in. Class 150
EN Hole Pattern (SST EN 1.4404) - Flat Face - Thin flange for non-pressurized applications. Max pressure 0,2 bar (2.9 psi)	
KT	6 in. Class 150
MT	8 in. Class 150

Table 2. 5900C Radar Level Gauge with cone antenna ordering information

ANSI Flanges (SST AISI 316 L) - Flat Face	
4A	4 in. Class 150
4B	4 in. Class 300
6A	6 in. Class 150
8A	8 in. Class 150
EN Flanges (SST EN 1.4404) - Flat Face	
JA	DN100 PN16
JB	DN100 PN40
KA	DN150 PN16
LA	DN200 PN16
Other	
00	None
XX	Customer specific, consult factory
Special	
0	None
1 ⁽¹⁾	Extended Cone Antenna, total length 20 in. (500 mm)
X	Customer specific, consult factory
Options (Include with selected model number)	
WR3	Extended Product Warranty: 3-year limited warranty
WR5	Extended Product Warranty: 5-year limited warranty
Q4	Calibration certificate
Q8 ⁽²⁾	Antenna material traceability certification per EN 10204 3.1
ST	Engraved SST tag plate
U1 ⁽³⁾	TÜV/DIBt WHG approval for overfill protection
Typical Model Number: 5900C 3 0 1 F I5 0 2 A G 1C 8 S PV 8A 0 ST	

(1) Requires Antenna Size code 4 or 6.

(2) Certificate includes all pressure retaining wetted parts.

(3) Requires one or more relay outputs in the 2410 Tank Hub.

Rosemount 5900C Radar Level Gauge with still-pipe array antenna



The Rosemount 5900C with array antenna is a non-contact radar level gauge for still-pipe measurement. It is available in two versions, Fixed and Hinged Hatch. Typical applications are crude oil tanks with floating roofs and gasoline/product tanks with or without inner floating roofs.

- Suitable for crude oil, gasoline or similar products
- Certified SIL 2 capable according to IEC 61508-2 and 61508-3
- Tolerant against rust and product deposits inside the pipe
- Communicates via a 2-wire, intrinsically safe Tankbus for easy and safe installation
- Installation normally with tank in service
- Hinged hatch version enables easier product sampling and hand-dips

Table 3. 5900C Radar Level Gauge with still-pipe array antenna ordering information

Model	Product Description
5900C	Radar Level Gauge
Performance Class	
3	±3 mm (0.12 in.) instrument accuracy
Safety Certification (SIS)	
2 ⁽¹⁾	Certified IEC 61508 SIL 2 capable
F	None. Ready for upgrade of safety certification (SIS)
0	None
Redundancy	
1	None. Single radar level gauge electronics
Tankbus: Power and Communication	
F	Bus powered 2-wire FOUNDATION™ fieldbus (IEC 61158)
Hazardous Location Certification	
I1	ATEX Intrinsic Safety
I5	FM-US Intrinsic Safety
I6	FM-Canada Intrinsic Safety
I7	IECEX Intrinsic Safety
KA	ATEX Intrinsic Safety+FM-US Intrinsic Safety
KC	ATEX Intrinsic Safety+IECEX Intrinsic Safety
KD	FM-US Intrinsic Safety+FM-Canada Intrinsic Safety
NA	None

Table 3. 5900C Radar Level Gauge with still-pipe array antenna ordering information

Custody Transfer Type Approval	
0	None
Radar Measurement Method	
1	10 GHz FMCW radar technology
2	10 GHz FMCW radar technology for the US market
Housing	
A	Standard enclosure, polyurethane-covered aluminum. IP 66/67
Cable/Conduit Connections	
1	½ - 14 NPT, female thread. 1 plug included
2	M20 x 1.5 adapters, female thread. 2 adapters and 1 plug included
G	Metal cable glands (½ - 14 NPT). Min. temperature -20 °C (-4 °F). ATEX/IECEx Exe approved. 2 glands and 1 plug included
E	Eurofast male connector, 1 plug included
M	Minifast male connector, 1 plug included
Antenna	
1A	Still-pipe array antenna
Antenna Size	
5	5 in. /DN 125, Ø=120 mm (4.7 in.)
6	6 in. /DN 150, Ø=145 mm (5.7 in.)
8	8 in. /DN 200, Ø=189 mm (7.4 in.)
A	10 in. /DN 250, Ø=243 mm (9.6 in.)
B	12 in. /DN 300, Ø=293 mm (11.5 in.)
Antenna Material	
S	Stainless steel (AISI 316L/EN 1.4404) and PPS (Polyphenylene sulfide)
Tank Seal	
FF	Fixed flange installation with fluorosilicone o-ring
HH	Integrated hatch installation with fluorosilicone o-ring
Tank Connection	
ANSI Hole Pattern (SST AISI 316 L) - Flat Face	
5A	5 in. Class 150
6A	6 in. Class 150
8A	8 in. Class 150
AA	10 in. Class 150
BA	12 in. Class 150

Table 3. 5900C Radar Level Gauge with still-pipe array antenna ordering information

EN Hole Pattern (SST EN 1.4404) - Flat Face	
KA	DN 150 PN 16
LA	DN 200 PN 10
MB	DN 250 PN 16
Special	
0	None
C	Clamp flange in galvanized steel (for still-pipes without a flange). Same size as tank connection
V ⁽²⁾	Proof test reflector kit, size equal to tank connection
Options (Include with selected model number)	
WR3	Extended Product Warranty: 3-year limited warranty
WR5	Extended Product Warranty: 5-year limited warranty
QT ⁽³⁾	IEC 61508 certificate and FMEDA-data
Q4	Calibration certificate
Q8 ⁽⁴⁾	Antenna material traceability certification per EN 10204 3.1
ST	Engraved SST tag plate
U1 ⁽⁵⁾	TÜV/DIBt WHG approval for overfill protection
Typical Model Number: 5900C 3 F 1 F I5 0 2 A 1 1A 5 S FF AA C Q4	

(1) Requires 2410 Tank Hub with Relay Output (SIS/SIL) code 2.

(2) Requires Antenna Size code 6 or 8. Not available with Options code U1.

(3) Requires Safety Certification (SIS) code 2.

(4) Certificate includes all pressure retaining wetted parts.

(5) Requires one or more relay outputs in the 2410 Tank Hub. If the connected 2410 Tank Hub's Relay Output (SIS/SIL) code is 2, Safety Certification (SIS) code 2 is required.

Rosemount 5900C Radar Level Gauge with LPG/LNG antenna



The Rosemount 5900C with LPG/LNG antenna is a non-contact radar level gauge for measurement on pressurized or cryogenic liquefied gas. Radar signals are transmitted inside the still-pipe which enables the gauge to have a sufficiently strong echo even under surface boiling conditions.

- Certified SIL 2 capable according to IEC 61508-2 and 61508-3
- Reference device function enables measurement verification with the tank in service
- Communicates via a 2-wire, intrinsically safe Tankbus for easy and safe installation
- Built-in pressure sensor for vapor compensation for best performance in pressurized applications
- Integrated ball valve

Table 4. 5900C Radar Level Gauge with LPG/LNG antenna ordering information

Model	Product Description
5900C	Radar Level Gauge
Performance Class	
3	±3 mm (0.12 in.) instrument accuracy
Safety Certification (SIS)	
2 ⁽¹⁾	Certified IEC 61508 SIL 2 capable
F	None. Ready for upgrade of safety certification (SIS)
0	None
Redundancy	
1	None. Single radar level gauge electronics
Tankbus: Power and Communication	
F	Bus powered 2-wire FOUNDATION™ fieldbus (IEC 61158)

Table 4. 5900C Radar Level Gauge with LPG/LNG antenna ordering information

Hazardous Location Certification	
I1	ATEX Intrinsic Safety
I5	FM-US Intrinsic Safety
I6	FM-Canada Intrinsic Safety
I7	IECEx Intrinsic Safety
KA	ATEX Intrinsic Safety+FM-US Intrinsic Safety
KC	ATEX Intrinsic Safety+IECEx Intrinsic Safety
KD	FM-US Intrinsic Safety+FM-Canada Intrinsic Safety
NA	None
Custody Transfer Type Approval	
0	None
Radar Measurement Method	
1	10 GHz FMCW radar technology
2	10 GHz FMCW radar technology for the US market
Housing	
A	Standard enclosure, polyurethane-covered aluminum. IP 66/67
Cable/Conduit Connections	
1	½ - 14 NPT, female thread. 1 plug included
2	M20 x 1.5 adapters, female thread. 2 adapters and 1 plug included
G	Metal cable glands (½ - 14 NPT). Min. temperature -20 °C (-4 °F). ATEX/IECEx Exe approved. 2 glands and 1 plug included
E	Eurofast male connector, 1 plug included
M	Minifast male connector, 1 plug included
Antenna	
G1 ⁽²⁾	LNG still-pipe antenna
G2 ⁽³⁾	LPG still-pipe antenna
Antenna Size	
A	4 in. Schedule 10, Ø=107 mm (4.2 in.)
B	4 in. Schedule 40, Ø=101 mm (4.0 in.)
D	DN 100, Ø=99 mm (3.9 in.)
Antenna Material	
S	Stainless steel AISI 316/316L corresponding to EN 1.4401/1.4404
Tank Seal	
QA	Quartz sealing

Table 4. 5900C Radar Level Gauge with LPG/LNG antenna ordering information

Tank Connection	
ANSI Flanges (SST AISI 316 L) - Raised Face	
4A	4 in. Class 150
4B	4 in. Class 300
6A	6 in. Class 150
6B	6 in. Class 300
8A	8 in. Class 150
8B	8 in. Class 300
Special	
V	Measurement verification kit with 1 verification pin and 1 pipe end deflector kit
Options (Include with selected model number)	
WR3	Extended Product Warranty: 3-year limited warranty
WR5	Extended Product Warranty: 5-year limited warranty
QT ⁽⁴⁾	IEC 61508 certificate and FMEDA-data
Q4	Calibration certificate
Q8 ⁽⁵⁾	Antenna material traceability certification per EN 10204 3.1
ST	Engraved SST tag plate
P1	Antenna hydrostatic pressure testing
U1 ⁽⁶⁾	TÜV/DIBt WHG approval for overfill protection
Typical Model Number: 5900C 3 F 1 F I1 0 1 A 2 G1 B S QA 4A V Q4	

(1) Requires 2410 Tank Hub with Relay Output (SIS/SIL) code 2.

(2) Including integrated ball valve.

(3) Including integrated ball valve and pressure transmitter.

(4) Requires Safety Certification (SIS) code 2.

(5) Certificate includes all pressure retaining wetted parts.

(6) Requires one or more relay outputs in the 2410 Tank Hub. If the connected 2410 Tank Hub's Relay Output (SIS/SIL) code is 2, Safety Certification (SIS) code 2 is required.

Specifications

Measurement principle

FMCW (Frequency Modulated Continuous Wave)

Instrument accuracy⁽¹⁾

± 3 mm (0.12 in.)

Temperature stability

Typically <± 0.5 mm (0.020 in.) in -40 to +70 °C (-40 to +158 °F)

Fieldbus (standard)

FOUNDATION™ fieldbus FISCO (Tankbus)

Update time

New measurement every 0.3 s

Repeatability

0.2 mm (0.008 in.)

Maximum level rate

Up to 200 mm/s

Metrology sealing possibility

Yes

Installation considerations

See Rosemount 5900C Reference Manual (document number 00809-0100-5901)

Communication / Display / Configuration

Output variables and units

- Level, and ullage: meter, centimeter, millimeter, feet, or inch
- Level rate: meter/second, meter/hour, feet/second, feet/hour, inch/minute
- Signal strength: mV

Configuration tools

Rosemount TankMaster WinSetup, Field Communicator

FOUNDATION™ fieldbus characteristics

Polarity sensitive

No

Quiescent current draw

51 mA

Lift-off minimum voltage

9.0 VDC

Device capacitance / inductance

See “Product Certifications” on page 20

Class (Basic or Link Master)

Link Master (LAS)

Number of available VCRs

Maximum 20, including one fixed

Links

Maximum 40

Minimum slot time / maximum response delay / minimum intermessage delay

8/5/8

Blocks and Execution time

1 Resource block.
 5 Transducer blocks (Level, Register, Adv_Config, Volume, and LPG).
 6 Analog Input (AI) blocks: 10 ms, 2 Analog Output (AO) blocks: 10 ms.
 1 Proportional/Integral/Derivate (PID) block: 15 ms
 1 Signal Characterizer (SGCR) block: 10 ms, 1 Integrator (INT) block: 10 ms,
 1 Arithmetic (ARTH) block: 10 ms, 1 Input Selector (ISEL) block: 10 ms.
 1 Control Selector (CS) block: 10 ms, 1 Output Splitter (OS) block: 10 ms.
 For more information, see the FOUNDATION™ fieldbus Blocks manual (document number 00809-0100-4783).

Instantiation

Yes

Conforming FOUNDATION™ fieldbus

ITK 5.2

PlantWeb alert support

Yes

Action support wizards

Restart measurement, write protect device, factory reset - measurement configuration, start/stop device simulation, set as surface, reset statistics, change all modes, register/remove false echo, refresh echo peaks, pin verification, change vapor pressure, change vapor temperature.

(1) Instrument accuracy is under reference conditions. Reference conditions are: Measurement in test bench at Rosemount Tank Radar AB in Göteborg Sweden. Test bench is calibrated minimum yearly by an accredited laboratory (SP Technical Research Institute of Sweden). Measuring range is up to 30 m (98 ft). Ambient temperature and humidity is close to constant during tests. Total uncertainty in test bench is below 0.15 mm (0.006 in.).

Advanced diagnostics

Software, memory/database, electronics, internal communication, simulation, level correction, level measurement, ambient temperature, vapor pressure/temperature correction, LPG verification pin, and manual measurement values.

Electric

Tankbus cabling

0.5-1.5 mm² (AWG 22-16), twisted shielded pairs

Power supply

FISCO: 9.0 - 17.5 VDC polarity insensitive (for example from 2410 Tank Hub)

Entity: 9.0 - 30.0 VDC polarity insensitive

Bus current draw

50 mA

Microwave output power

< 1 mW

Mechanical

Housing material & surface treatment

Polyurethane-coated die-cast aluminum

Cable entry (connection/glands)

Two ½ - 14 NPT entries for cable glands or conduits. One metal plug to seal any unused port is enclosed in the transmitter delivery.

Optional:

- M20 x 1.5 conduit / cable adapter
- Cable glands in metal (½ - 14 NPT)
- 4-pin male Eurofast connector or A size Mini 4-pin male Minifast connector

Total weight

- 5900C transmitter head: 5.1 kg (11.2 lbs)
- 5900C with cone antenna: Appr. 12 kg (26 lbs)
- 5900C with parabolic antenna: Appr. 17 kg (37 lbs)
- 5900C with still-pipe array antenna: Appr. 13.5-24 kg (30-53 lbs)
- 5900C with LPG/LNG antenna: Appr. 30 kg (66 lbs) for 6-in. 150 psi, and 40 kg (88 lbs) for 6-in. 300 psi

Antennas

The 5900C antennas have a drip-off design which for some versions also include inclined polished PTFE surfaces. Condensation on the antenna is minimized, and the radar signal remains strong. This results in maintenance free operation, high accuracy and reliability. There is always a suitable antenna for every tank type, tank opening and application:

- Parabolic
- Cone
- Still-pipe Array
- LPG/LNG

Transmitter head

The same transmitter head is used for all 5900C antenna types, minimizing spare part requirements:

- The dual compartment transmitter housing, with electronics and cabling separated, can be replaced without opening the tank
- It is protected against lightning, moisture/rain, and has a surface protection against sulphur and salt spray atmospheres
- Electronics consists of one encapsulated unit
- No need for re-calibration

Environment

Ambient operating temperature

-40 to +70 °C (-40 to +158 °F). Minimum start-up temperature is -50 °C (-58 °F)

Storage temperature

-50 to +85 °C (-58 to +185 °F)

Humidity

0-100% relative humidity

Ingress protection

IP 66/67 and Nema 4X

Vibration resistance

IEC 60770-1 level 1 and IACS UR E10 test 7.

Telecommunication

Compliance with:

- FCC 15B Class A, and 15C
- R&TTE (EU directive 99/5/EC) ETSI EN 302372; EN 50371
- IC (RSS210-5)

Electromagnetic compatibility

EMC (EU directive 2004/108/EC) EN 61326-1;

EN 61326-3-1

Transient / built-in lightning protection

According to IEC 61000-4-5, level 2 kV line to ground. Complies with IEEE 587 Category B transient protection and IEEE 472 surge protection.

Pressure Equipment Directive (PED)

97/23/EC

Low Voltage Directive (LVD)

LVD (EU directive 2006/95/EC) EN/IEC 61010-1

5900C standard version**Built-in Tankbus terminator**

Yes (to be connected if required)

Daisy chain possibility

Yes

5900C SIL version**Built-in Tankbus terminator**

No

Daisy chain possibility

Yes

Electric properties for intrinsically safe alarm signal

12.5 VDC, 1-2 mA for normal condition (no alarm)

Wiring

- Additional separate 2-wire cable for alarm or
- A single cable incorporating two 2-wire cables (alarm and level)

For cable see Tankbus cabling on [page 17](#) for cable specification.**5900C with parabolic antenna****Operating temperature in tank**

Max. +230 °C (+445 °F)

Measuring range

0.8 to 30 m (2.6 to 100 ft) below flange.
 (Possibility to measure 0.5 to 50 m (1.6 to 164 ft). Accuracy may be reduced. For longer measuring range, please consult your local representative.)

Pressure range

Clamped/threaded: -0.2 to 0.2 bar (-2.9 to 2.9 psig)

Welded: -0.2 to 10 bar (-2.9 to 145 psig)

Material exposed to tank atmosphere

Antenna: material corresponds to AISI 316/316L and EN 1.4401 /1.4404.

Sealing: PTFE

O-ring: FEP fluoropolymer

Antenna dimension

440 mm (17 in.)

Manway size and installation

500 mm (20-in.) opening.

The parabolic antenna is installed on the manway cover by using the flange ball. It is designed for easy adjustment of the antenna inclination and orientation within the specified limits.

The flexible flange ball can be installed on both horizontal or inclined manways without any special arrangements.

Tank connection

The gauge is clamped in a 96 mm (3.78 in.) diameter hole, or welded in a 117 mm (4.61 in.) diameter hole.

5900C with cone antenna**Measuring range, accuracy and cone dimensions**

When selecting cone antenna dimension, it is generally recommended to use as large antenna diameter as possible. Standard cone antennas are available for 4-, 6- and 8-in. tank openings. The 4- and 6-in. cones can be extended to fit long tank nozzles.

Level accuracy is up to ±3 mm (0.12 in.) for 8-in. cone antennas. For 4- and 6-in. cone antennas accuracy depends on installation conditions.

Measuring range:

8-in. cone: 0.8 to 20 m (2.6 to 65 ft) below flange.
 (Possibility to measure 0.4 to 30 m (1.3 to 100 ft).
 Accuracy may be reduced.)

6-in. cone: 0.8 to 20 m (2.6 to 65 ft) below flange.
 (Possibility to measure 0.3 to 25 m (1 to 80 ft).
 Accuracy may be reduced.)

4-in. cone: 0.8 to 15 m (2.6 to 50 ft) below flange.
 (Possibility to measure 0.2 to 20 m (0.7 to 65 ft).
 Accuracy may be reduced.)

See Ordering Information on [page 7](#), for standard flange options and Dimensional Drawing on [page 24](#) for sizes.

Material exposed to tank atmosphere

Antenna: SST AISI 316L/EN 1.4436

Tank seal alternatives:

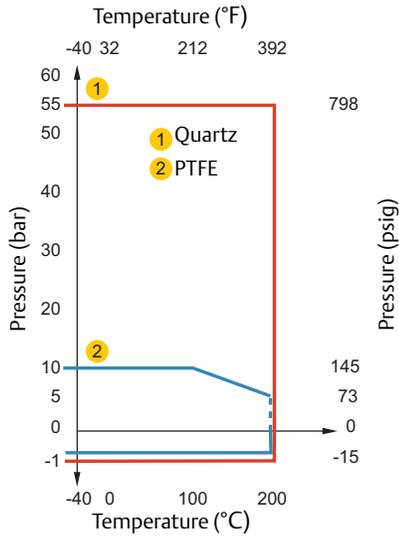
PTFE with Viton® fluoroelastomer O-rings

PTFE with Kalrez® perfluoroelastomer O-rings

Quartz with Viton® fluoroelastomer O-rings

Quartz with Kalrez® perfluoroelastomer O-rings

Pressure/temperature rating



The relation between temperature and maximum pressure for cone antennas.

5900C with still-pipe array antenna

Operating temperature in tank

-40 to 120 °C (-40 to 248 °F)

Measuring range

0.8 to 30 m (2.6 to 100 ft) below flange.
(Possibility to measure 0.5 to 40 m (1.6 to 130 ft). Accuracy may be reduced. For longer measuring range, please consult your local representative.)

Pressure range

Fixed version: -0.2 to 2 bar (-2.9 to 29 psig) at 20 °C (68 °F).
Hinged hatch version: -0.2 to 0.5 bar (-2.9 to 7.2 psig) for 5 to 8-in. pipes.
-0.2 to 0.25 bar (-2.9 to 3.6 psig) for 10 and 12-in. pipes.

Material exposed to tank atmosphere

Antenna: Polyphenylenesulphide (PPS)
Sealing: PTFE
O-ring: Fluorosilicone
Flange: material corresponds to AISI 316/316L and EN 1.4401/1.4404.

Still-pipe dimensions

5, 6, 8, 10 or 12-in.

5900C with LPG/LNG antenna

Operating temperature at ball valve

-55 to 90 °C (-67 to 194 °F)

Operating temperature in tank

-170 to 90 °C (-274 to 194 °F)

Measuring range

1.2 to 30 m (3.9 to 100 ft) below flange.
(Possibility to measure 0.8 to 60 m (2.6 to 200 ft). Accuracy may be reduced. For longer measuring range, please consult your local representative.)

Pressure range

-1 to 25 bar (-14.5 to 365 psig).
Note! Flanges may have higher pressure rating than 25 bar, but maximum tank pressure is still 25 bar.

Pressure sensor (option)

Rosemount 2051. It is available with various hazardous location certifications, see [page 22](#).

For more information see the 2051 Product Data Sheet (document number 00813-0100-4101).

Material exposed to tank atmosphere

Antenna and flange: material corresponds to AISI 316/316L and EN 1.4401/1.4404.
Sealing: Quartz and PTFE.

Still-pipe dimension compatibility

Antenna choices for 4-in. sch. 10, 4-in. sch 40, or 100 mm (99 mm inner diameter) still-pipe dimensions.

Flange size & rating

4-in. class 150/300
6-in. class 150/300
8-in. class 150/300

Verification possibility

A patented reference device function enables measurement verification with the tank in service. A verification pin mounted in a still-pipe hole, and a deflection plate with a verification ring at the lower still-pipe end provide reference echoes at fixed pre-defined distances.

Product Certifications

SIL Certification

The SIL safety certificate, issued by Exida in Switzerland, includes the SIL alarm channel within the 5900C radar level gauge and the 2410 Tank Hub. Both units are SIL 2 capable according to IEC 61508, parts 1-7.

Certificate number is Rosemount 091243 P0017 C001.



German WHG Certification

The certificate for the 5900C radar level gauge and the 2410 Tank Hub is issued by DIBt (Deutsches Institut für Bautechnik) according to the German WHG regulations for overfill prevention. It is based on technical evaluation and testing conducted by TÜV NORD CERT GmbH.

Certificate number is Z-65.16-500.



CE-mark

93/68/EEC: complies with applicable EU directives (EMC, ATEX, LVD, and R&TTE). Based on the low emitted effects from the gauges (below 0.1 mW) compared to limits given by the Rec. 1999/519/EC, no additional measures are needed.

Ordinary Location Certification

Complies with FM 3810:2005 and CSA: C22.2 No. 1010.1

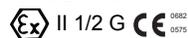
Hazardous Location Certificates

European ATEX Directive Information

EC-Type Examination Certificate Number: FM09ATEX0057X
Control Drawing: 9240 040-917

I1⁽¹⁾ Intrinsically Safe:

FISCO Field Device:



Ex ia IIC T4 (-50 °C < T_a < +80 °C)

For each channel: U_i=17.5 VDC, I_i=380 mA, P_i=5.32 W,

C_i=1.1 nF, L_i=1.5 μH

Entity:



Ex ia IIC T4 (-50 °C < T_a < +80 °C)

For each channel: U_i=30 VDC, I_i=300 mA, P_i=1.3 W,

C_i=1.1 nF, L_i=1.5 μH

SPECIAL CONDITIONS FOR SAFE USE (X)

1. The enclosure contains aluminum and is considered to present a potential risk of ignition by impact or friction. Care must be taken during installation and use to prevent impact or friction.
2. Parabolic and Array antennas with plastic surfaces and the painted surface of the enclosure may, under certain extreme conditions, generate an ignition-capable level of electrostatic charge for IIC applications. Therefore, when these antennas are used in Category 1G, Group IIC, appropriate measures must be taken to prevent electrostatic discharge.
3. Category 1/2 notation: The Rosemount 5900 Radar Level Gauge was evaluated so that an [ib] associated apparatus can connect to it restricting the installation of the electronics to a Zone 1 location while still allowing the antenna to enter a Zone 0 location.

US Factory Mutual (FM-US) Certification



Certificate of Compliance: 3035466

Control Drawing: 9240 040-917

I5⁽¹⁾ Intrinsically Safe

FISCO Field Device:

Intrinsically Safe for Class I, II, III, Division 1, Groups A, B, C, D, E, F, and G

Class I, Zone 0/1 AEx ia IIC

For each channel: U_i=17.5 VDC, I_i=380 mA, P_i=5.32 W,

C_i=1.1 nF, L_i=1.5 μH

Entity:

Intrinsically Safe for Class I, II, III, Division 1, Groups A, B, C, D, E, F, and G

Class I, Zone 0/1 AEx ia IIC

For each channel: U_i=30 VDC, I_i=300 mA, P_i=1.3 W,

C_i=1.1 nF, L_i=1.5 μH

Dust ignition proof for Class II/III, Division 1, Groups E, F, and G

Temperature Code T4

Ambient Temperature Limits: -50 to +80 °C

(1) Ordering Information code for Hazardous Location Certification.

SPECIAL CONDITIONS OF USE

1. Parabolic and Array antennas with plastic surfaces and the surface of the painted housing may, under certain extreme conditions, generate an ignition-capable level of electrostatic charge. Appropriate measures must be taken to prevent electrostatic discharge.
2. Class I, Zone 0/1 notation: For installation in Zone classified locations, the Rosemount 5900 Radar Level Gauge was evaluated so that an [ib] associated apparatus can connect to it restricting the installation of the electronics to a Zone 1 location while still allowing the antenna to enter a Zone 0 location.

Canadian Factory Mutual (FM-C) Certification

Certificate of Compliance: 3035466C

Control Drawing: 9240 040-917

I6⁽¹⁾ Intrinsically Safe

FISCO Field Device:

Intrinsically Safe for Class I, II, III, Division 1, Groups A, B, C, D, E, F, and G.

Ex ia IIC

For each channel: $U_i=17.5$ VDC, $I_i=380$ mA, $P_i=5.32$ W, $C_i=1.1$ nF, $L_i=1.5$ μ H

Entity:

Intrinsically Safe for Class I, II, III, Division 1, Groups A, B, C, D, E, F, and G.

Ex ia IIC

For each channel: $U_i=30$ VDC, $I_i=300$ mA, $P_i=1.3$ W, $C_i=1.1$ nF, $L_i=1.5$ μ H

Dust ignition proof for Class II/III, Division 1, Groups E, F, and G

Temperature Code T4

Ambient Temperature Limits: -50 to +80 °C

SPECIAL CONDITIONS OF USE

1. Parabolic and Array antennas with plastic surfaces and the surface of the painted housing may, under certain extreme conditions, generate an ignition-capable level of electrostatic. Appropriate measures must be taken to prevent electrostatic discharge.

IECEx Certification

Certificate of Conformity Number: IECEx FMG 09.0009X

Control Drawing: 9240 040-917

I7⁽¹⁾ Intrinsically Safe

FISCO Field Device:

Ex ia IIC T4 Ga/Gb (-50 °C < T_a < +80 °C)For each channel: $U_i=17.5$ VDC, $I_i=380$ mA, $P_i=5.32$ W, $C_i=1.1$ nF, $L_i=1.5$ μ H

Entity:

Ex ia IIC T4 Ga/Gb (-50 °C < T_a < +80 °C)For each channel: $U_i=30$ VDC, $I_i=300$ mA, $P_i=1.3$ W, $C_i=1.1$ nF, $L_i=1.5$ μ H**SPECIAL CONDITIONS OF CERTIFICATION (X):**

1. The enclosure contains aluminum and is considered to present a potential risk of ignition by impact or friction. Care must be taken during installation and use to prevent impact or friction.
2. Parabolic and Array antennas with plastic surfaces and the painted surface of the enclosure may, under certain extreme conditions, generate an ignition-capable level of electrostatic charge for IIC applications. Therefore, when these antennas are used in Category EPL Ga, Group IIC, appropriate measures must be taken to prevent electrostatic discharge.
3. Ga/Gb notation: The Rosemount 5900 Radar Level Gauge was evaluated so that an [ib] associated apparatus can connect to it restricting the installation of the electronics to a Zone 1 location while still allowing the antenna to enter a Zone 0 location.

Combination Approvals

The radar level gauge can be ordered with dual certifications (indicated at the main label). The following combinations are possible:

KA=I1+I5 (ATEX + FM-US)

KC=I1+I7 (ATEX + IECEx)

KD=I5+I6 (FM-US+FM-C)

(1) Ordering Information code for Hazardous Location Certification.

Product Certifications Rosemount 2051

European ATEX Directive Information

IA⁽¹⁾ FISCO Intrinsic Safety

Certification No. Baseefa08ATEX0129X  II 1 G

Ex ia IIC T4 (T_{amb} = -60 to +60 °C)

IP66

CE 1180

Input Parameters: U_i=17.5 VDC, I_i=380 mA, P_i=5.32 W,

C_i ≤ 5 μF, L_i = 10 μH.

SPECIAL CONDITIONS FOR SAFE USE (X):

The device is not capable of withstanding the 500V insulation test required by Clause 6.3.12 of EN60079-11.

This must be taken into account when installing the apparatus.

SPECIAL CONDITIONS FOR SAFE USE (X):

The device is not capable of withstanding the 500V insulation test required by Clause 6.3.12 of EN60079-11.

This must be taken into account when installing the apparatus.

US Factory Mutual (FM-US) Certification

IE⁽¹⁾ Intrinsically Safe for use in Class I, Division 1, Groups A, B, C, and D; Class II, Division 1, Groups E, F, and G; Class III, Division 1 when connected per Rosemount drawing 02051-1009; Non-incendive for Class I, Division 2, Groups A, B, C, and D.

Temperature Code: T4 (T_a = 40 °C), T3 (T_a = 85 °C)

Enclosure Type 4X

For input parameters see control drawing 02051-1009.

Canadian Factory Mutual (FM-C) Certification

IF⁽¹⁾ Intrinsically safe approval. Intrinsically safe for Class I, Division 1, Groups A, B, C, and D when connected in accordance with Rosemount drawings 02051-1008.

Temperature Code T3C.

Dust-Ignition-Proof for Class II and Class III, Division 1, Groups E, F, and G. Suitable for Class I, Division 2 Groups A, B, C, and D hazardous locations. Enclosure type 4X, factory sealed

For input parameters see control drawing 02051-1008.

IECEx Certification

IA⁽¹⁾ FISCO Intrinsic Safety

Certification No. IECExBAS08.0045X  II 1 G

Ex ia IIC T4 (T_{amb} = -60 to +60 °C)

IP66

CE 1180

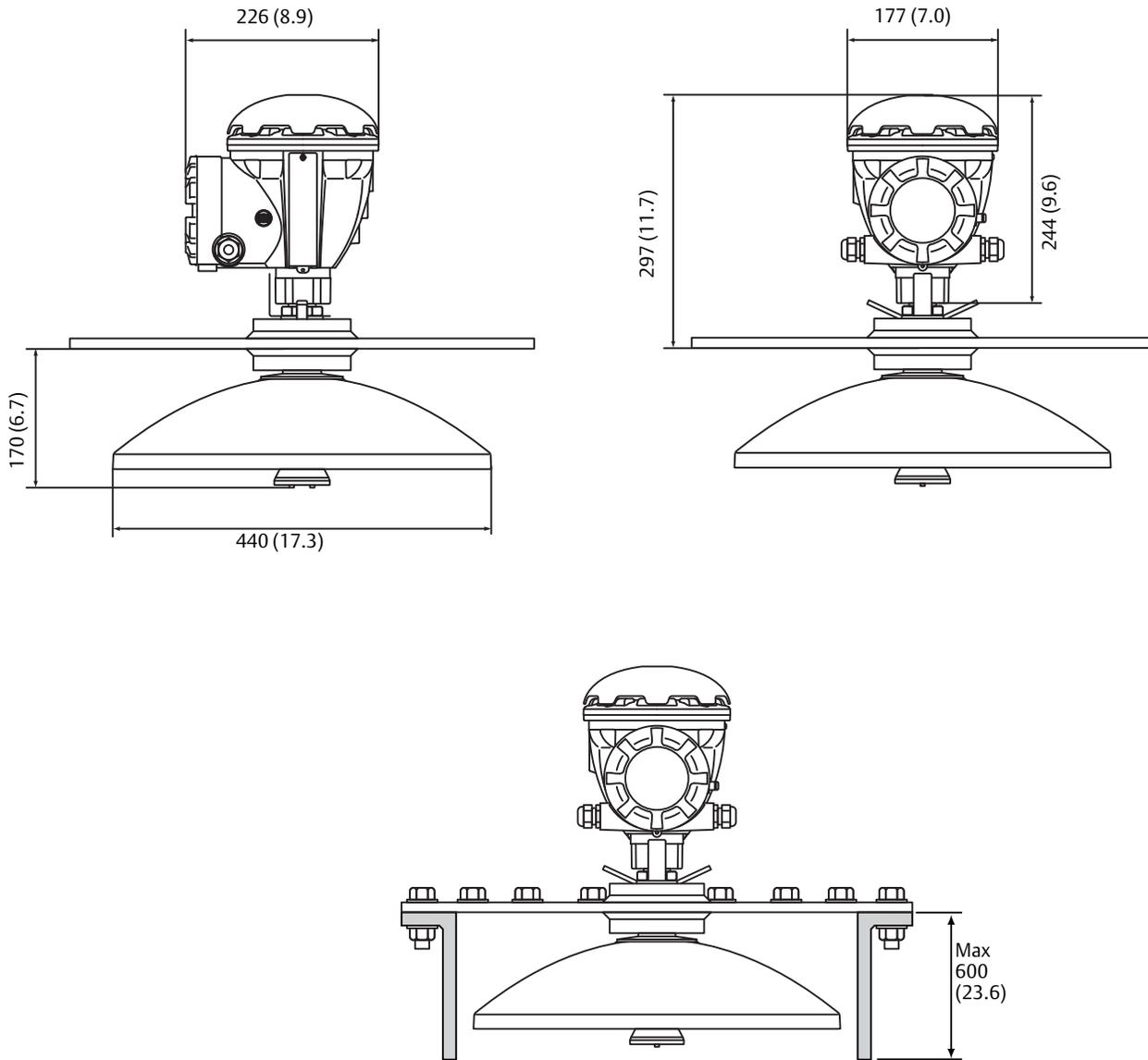
Input Parameters: U_i=17.5 VDC, I_i=380 mA, P_i=5.32 W,

C_i ≤ 5 μF, L_i = 10 μH.

(1) Ordering Information code for Hazardous Location Certification.

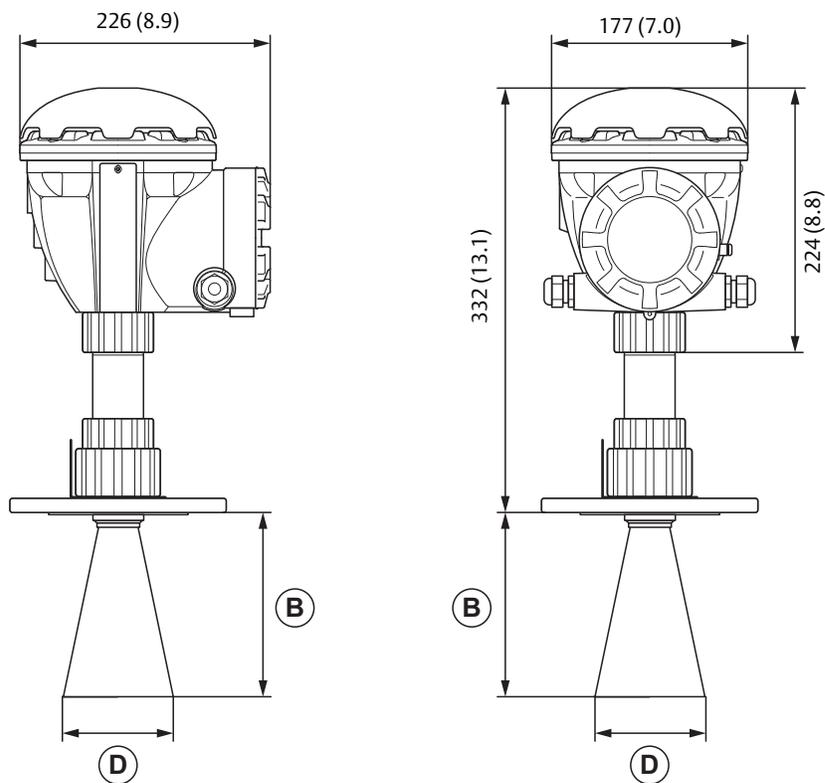
Dimensional Drawings

Figure 1. Rosemount 5900C with parabolic antenna dimensions



Note
Dimensions are in millimeters (inches).

Figure 2. Rosemount 5900C with cone antenna dimensions

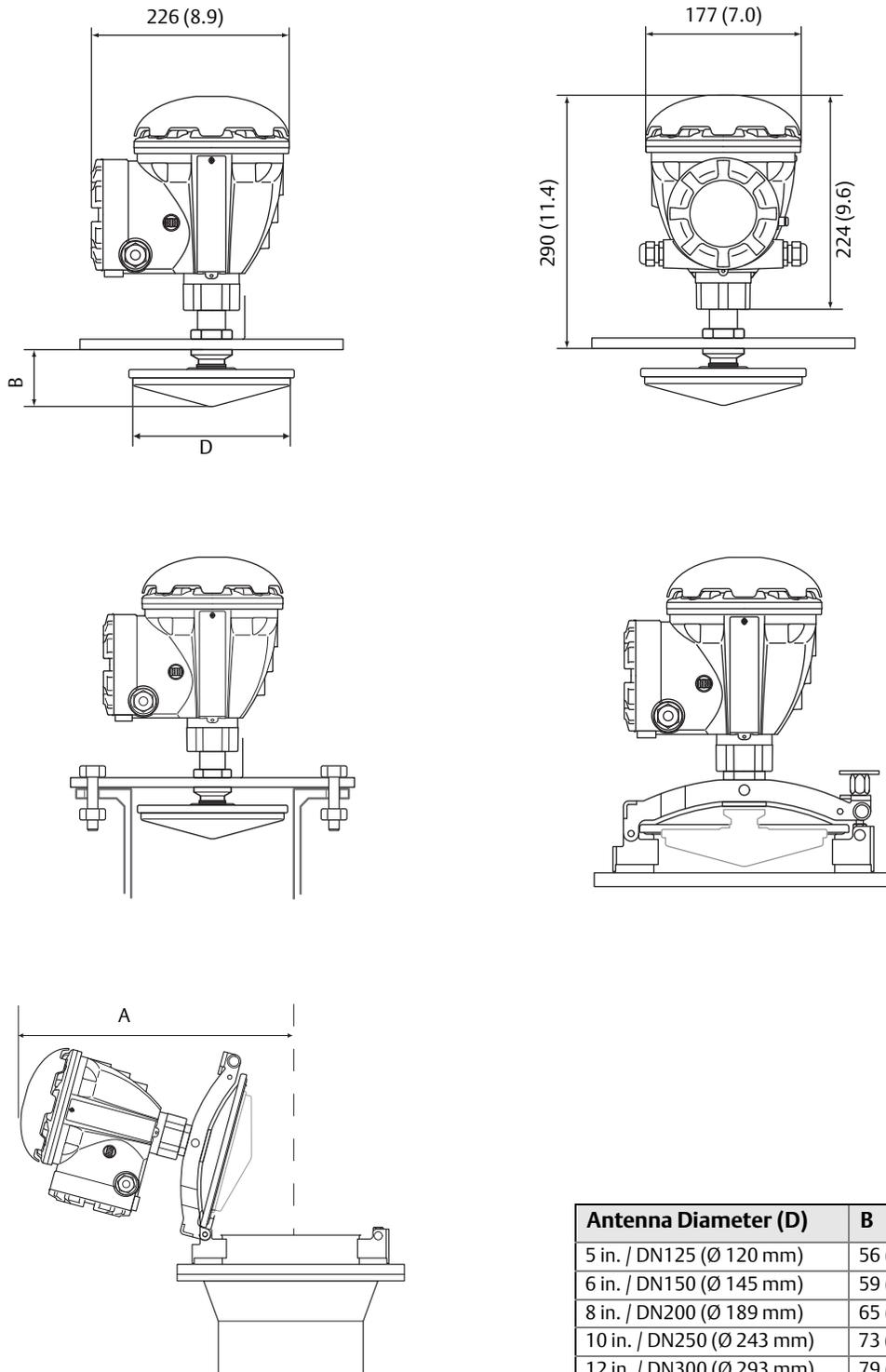


Antenna Diameter (D)	B
4 in. /DN100 Ø 93 mm (3.7 in.)	150 (5.91)
6 in. /DN150 Ø 141 mm (5.6 in.)	260 (10.24)
8 in. /DN 200, Ø=189 mm (7.4 in.)	370 (14.57)

Note

Dimensions are in millimeters (inches).

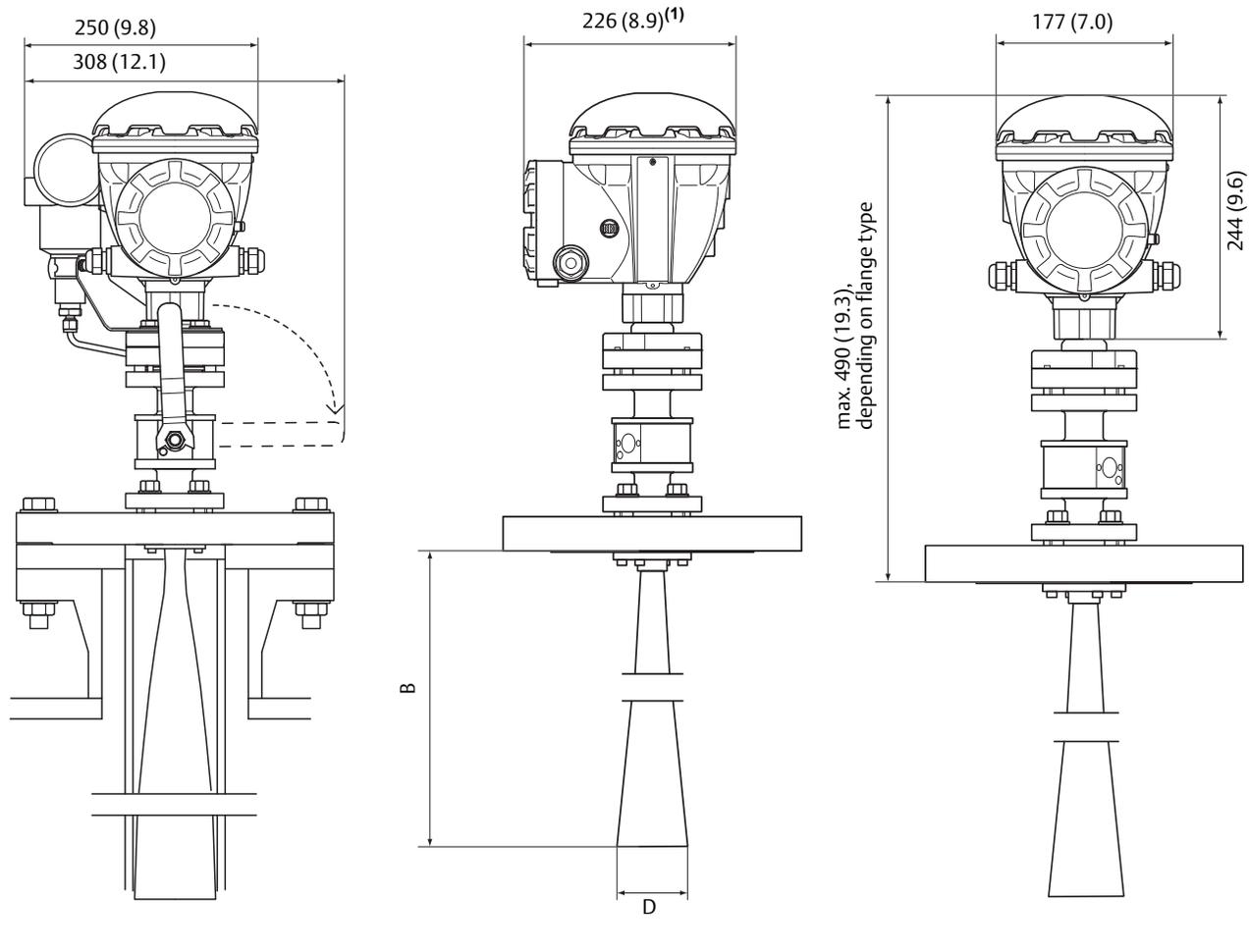
Figure 3. Rosemount 5900C with still-pipe array antenna dimensions



Antenna Diameter (D)	B	A
5 in. / DN125 (Ø 120 mm)	56 (2.2)	470 (18.5)
6 in. / DN150 (Ø 145 mm)	59 (2.3)	470 (18.5)
8 in. / DN200 (Ø 189 mm)	65 (2.6)	480 (18.9)
10 in. / DN250 (Ø 243 mm)	73 (2.9)	490 (19.3)
12 in. / DN300 (Ø 293 mm)	79 (3.1)	490 (19.3)

Note
Dimensions are in millimeters (inches).

Figure 4. Rosemount 5900C with LPG/LNG antenna dimensions



(1) 302 (11.9) with pressure transmitter option

Antenna Diameter (D)	B
4 in. Sch10 (Ø 107 mm)	752 (29.6)
4 in. Sch40 (Ø 101 mm)	534 (21.0)
DN100 (Ø 99 mm)	502 (19.8)

Note
Dimensions are in millimeters (inches).

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