

Rosemount™ 5900S Radar Level Gauge

High performance level measurement for tank gauging systems



- Get highest certified custody transfer accuracy of 0,5 mm for precise monitoring of bulk liquid assets
- Increase safety with third party certified IEC 61508 SIL 2 or SIL 3 capability
- Enable independent back-up level measurement and overfill prevention with innovative 2-in-1 functionality
- Benefit from convenient and safe installation with 2-wire IS bus power supply
- Include wired and/or wireless data transmission
- Measure in all bulk storage tank types and products, ranging from liquefied gases, light products, crude oil and bitumen

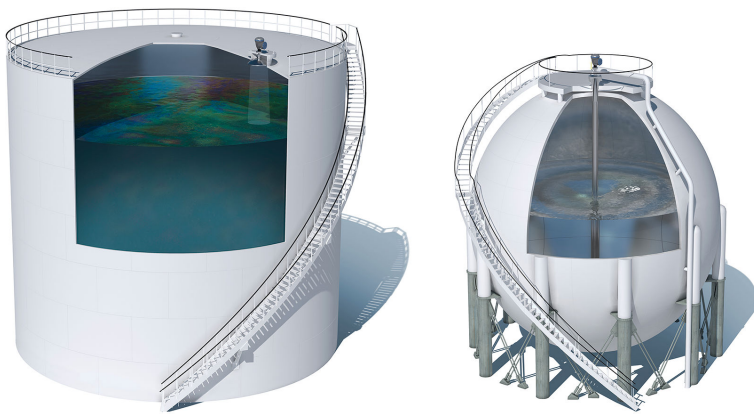
Improve safety and measurement accuracy

Highest level precision for your bulk liquid storage tanks

The Rosemount 5900S radar gauge with its 0.5 mm instrument accuracy reduces level measurement uncertainty to a minimum. It enhances your storage operation by providing:

- Certified custody transfer accuracy according to OIML and other legal metrological authorities
- Better inventory management
- Reliable loss control data

The Rosemount 5900S is normally combined with high precision multi-spot temperature sensors. This enables accurate net volume calculations according to API and other standards.



Make operations more efficient

- No moving parts and no contact with the liquid gives increased reliability and fewer interruptions
- Most Rosemount 5900S antenna types are installed with the tanks in operation
- Emerson wireless solution can drastically reduce installation cost and give you access to remote tanks
- The Rosemount 5900S gauge is available with antennas for all bulk liquid storage applications and tank types

Taking overfill safety to a higher level

- Innovative 2-in-1 feature with two radar gauges in one housing for independent level and overfill measurement
- SIL 2 and SIL 3 certified safety according to IEC 61508
- Enables API 2350 compliant solutions

Contents

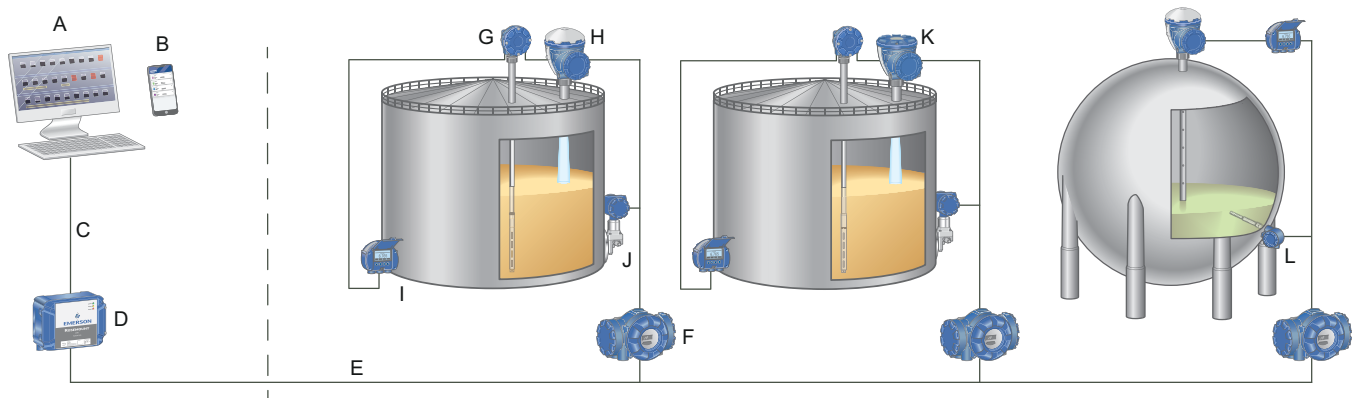
Improve safety and measurement accuracy.....	2
Get complete level and inventory information.....	3
Ordering information.....	6
Specifications.....	28
Product certifications.....	42
Dimensional drawings.....	55

Get complete level and inventory information

The Rosemount 5900S is a premium non-contact radar level gauge, suitable for tank terminals and refineries. It is integrated into a high performance tank gauging system including average temperature measurement, free water level, pressure and API standard net volumes. See also Rosemount Tank Gauging [System Data Sheet \(SDS\)](#).

Data is displayed locally and on a host computer or via the Rosemount TankMaster™ inventory software in the control room.

Figure 1: Tank Gauging System Overview



- A. Rosemount TankMaster Inventory Management
- B. Rosemount TankMaster Mobile Inventory Management
- C. Modbus® RTU/TCP
- D. Rosemount 2460 System Hub
- E. Tankbus
- F. Rosemount 2410 Tank Hub
- G. Rosemount 2240S Multi-input Temperature Transmitter with Rosemount 765 Multiple Spot Temperature and Water Level Sensor
- H. Rosemount 5900S Radar Level Gauge
- I. Rosemount 2230 Graphical Field Display
- J. Rosemount 3051S Pressure Transmitter
- K. Rosemount 5900C Radar Level Gauge
- L. Rosemount 644 Temperature Transmitter with Rosemount 65, 114C, or 214C Single Point Temperature Sensor

SIL safety functions

Rosemount 5900S is certified SIL 2 and SIL 3 capable for use in overfill prevention systems via outputs from the Rosemount 2410 Tank Hub connected to the gauge. The alarm signal can be connected to an Emergency Shut-down System (ESD)/Automatic Overfill Prevention System (AOPS).

SIL 2 is achieved via the 4-20 mA output or via a safety relay. SIL 3 requires a Rosemount 5900S with the 2-in-1 option. The Safety Instrumented System (SIS) functionality activates a separate alarm loop at a preset liquid level and triggers the safety relay or analog output in the tank hub.

2-in-1 gauge for cost-efficient level measurement redundancy

The Rosemount 5900S gauge can be delivered with two independent units in one housing. This unique 2-in-1 solution gives you one primary and one backup level unit, or one level gauge plus an independent radar based High-High level alarm. It means that the single Rosemount 5900S 2-in-1 can serve as a safety certified level device in two independent protection layers (i.e. BPCS and SIS).

Figure 2: Rosemount 5900S with Two Galvanically Separated Gauges within the Same Housing (2-in-1 Solution)



The 2-in-1 solution enables real-time delta verification by configuring the transmitter to compare signals on both units.

The 2-in-1 solution uses only one tank opening, which reduces installation cost.

Innovative antenna technology

The drip-off design with inclined polished PTFE surfaces on the antenna enables highest performance by reducing condensation from product and water.



The still-pipe gauge uses the Low Loss H01 radar transmission mode. This mode focuses the microwave energy into the center of the pipe, ensuring custody transfer accuracy also in old still pipes with rust and product deposits.

Access information when you need it with asset tags

Newly shipped devices include a unique QR code asset tag that enables you to access serialized information directly from the device. With this capability, you can:

- Access device drawings, diagrams, technical documentation, and troubleshooting information in your MyEmerson account
- Improve mean time to repair and maintain efficiency
- Ensure confidence that you have located the correct device
- Eliminate the time-consuming process of locating and transcribing nameplates to view asset information

Rosemount 5900S Radar Level Gauge with parabolic antenna



Rosemount 5900S with parabolic antenna is a premium non-contact radar level gauge. The parabolic antenna is the first choice 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 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, bitumen and asphalt
- Antenna design gives extreme tolerance to product build-up and condensation
- Custody transfer accuracy according to OIML R85:2008
- Certified SIL 2 and SIL 3 capable according to IEC 61508
- 2-in-1 functionality available for redundant level measurement
- Communicates via a 2-wire, low voltage Tankbus for easy and safe installation
- Installation normally with tank in service

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Required model components

Model

Code	Description
5900S	Radar Level Gauge

Performance class

Code	Description
P	Premium: ± 0.5 mm (0.020 in.) instrument accuracy

Safety certification (SIS)

Code	Description
3 ⁽¹⁾	Certified IEC 61508 SIL 3 capable
S ⁽²⁾	Certified IEC 61508 SIL 2 capable
F	None. Ready for upgrade to Safety certification (SIS)
0	None

(1) Requires Redundancy code 2 and Rosemount 2410 with Safety certification (SIS) code 3.

(2) Requires Rosemount 2410 with either Analog output 4-20 mA or Relay output code 1 or 2.

Redundancy

Code	Description
2	2-in-1: Dual independent radar level gauge electronics
F	None. Ready for upgrade to 2-in-1
1	None. Single radar level gauge electronics

Tankbus: Power and communication

Code	Description
F	Bus powered 2-wire FOUNDATION™ Fieldbus (IEC 61158)

Hazardous location certification

Code	Description
I1	ATEX Intrinsic Safety
I7	IECEx Intrinsic Safety
I5	FM-US Intrinsic Safety
I6	FM-Canada Intrinsic Safety
I2	INMETRO Intrinsic Safety (Brazil)
IP ⁽¹⁾	KC Intrinsic Safety (South Korea)
IW	CCOE/PESO Intrinsic Safety (India)
I4 ⁽²⁾	Japan Intrinsic Safety
IM	Technical Regulations Customs Union (EAC) Intrinsic Safety
NA	None

(1) Requires Custody transfer type approval code R or O.

(2) Not available with Cable entry/Conduit connections code E or M.

Custody transfer type approval

Requires the same Custody transfer type approval code for both the Rosemount 2410 and the Rosemount 5900S.

Code	Description
R ⁽¹⁾⁽²⁾	OIML R85 edition 2008
A ⁽¹⁾⁽³⁾	CMI (Czech Republic)
B ⁽¹⁾⁽³⁾	NMI (Australia)
C ⁽³⁾⁽⁴⁾	PTB Eich (Germany)
E ⁽¹⁾⁽³⁾	TJA (Estonia)
G ⁽¹⁾⁽³⁾	GUM (Poland)
I ⁽¹⁾⁽⁵⁾	Ministero (Italy)
K ⁽¹⁾⁽³⁾⁽⁶⁾	GOST (Kazakhstan)
L ⁽⁵⁾⁽⁷⁾	LNE (France)
M ⁽¹⁾⁽⁵⁾	BMS (Belgium)
N ⁽⁸⁾⁽⁹⁾	NMi (The Netherlands)
O ⁽¹⁾⁽³⁾	ONML (Algeria)
Q ⁽¹⁾⁽³⁾	IPQ (Portugal)
S ⁽¹⁾⁽²⁾⁽⁶⁾	GOST (Russia)
T ⁽¹⁾⁽³⁾	ANM (Tunisia)
W ⁽¹⁾⁽³⁾	METAS (Switzerland)

Code	Description
Y ⁽¹⁾⁽³⁾	Justervesenet (Norway)
0	None

- (1) Requires integral display in Rosemount 2410 or Rosemount 2230 or Rosemount TankMaster.
 (2) Requires Calibration certificate options code Q4 or QL.
 (3) Requires Calibration certificate options code Q4.
 (4) Requires integral display in Rosemount 2410 or Rosemount 2230 with Custody transfer approval code C or Rosemount TankMaster.
 (5) Requires Calibration certificate options code S4.
 (6) Requires Hazardous location certification code I1.
 (7) Requires integral display in Rosemount 2410 or Rosemount 2230 with Custody transfer approval code L or Rosemount TankMaster.
 (8) Requires integral display in Rosemount 2410 or Rosemount 2230 with Custody transfer approval code N or Rosemount TankMaster.
 (9) Requires Calibration certificate options code S4 or SL.

Level measurement method

Code	Description
1	10 GHz FMCW radar technology
2	10 GHz FMCW radar technology for US/Russian installation

Housing

Code	Description
A	Standard enclosure, polyurethane-covered aluminum. IP 66/67

Cable entry/Conduit connections

Code	Description
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). Minimum temperature -20 °C (-4 °F). ATEX/IECEx Exe approved. (2 glands and 1 plug included)
E	euromast [®] male connector (1 plug included)
M	minifast [®] male connector (1 plug included)

Antenna

Code	Description
1P	Parabolic antenna

Antenna size

Code	Description
F	20 in./DN 500, Ø=440 mm (17.3 in.)

Antenna material

Code	Description
S	SST AISI 316L/EN 1.4436

Tank seal

Code	Description
PF	PTFE with FEP fluoropolymer O-ring
PK	PTFE with Kalrez® perfluoroelastomer O-ring

Tank connection

Code	Description
WE	Welded installation
CL	Clamped/threaded installation

Antenna options

Code	Description
0	None
V ⁽¹⁾	Proof test verification reflector

(1) Not available with Options code U1.

Additional options**Safety certificate**

Requires Safety certification (SIS) code 3 or S.

Code	Description
QT	IEC 61508 certificate and FMEDA-data (printed copy)

Calibration certificate

Code	Description
Q4	Calibration certificate (tank height up to 30 m (100 ft), printed copy)
QL	Calibration certificate 40 m (tank height up to 40 m (130 ft), printed copy)
S4	Witnessed calibration certificate (tank height up to 30 m (100 ft), witnessed by factory selected accredited third party)
SL	Witnessed calibration certificate 40 m (witnessed by factory selected accredited third party)

Material traceability certificate

Not available for transmitter head sparepart.

Code	Description
Q8	Antenna material traceability certification per EN 10204 3.1

Overfill protection approval

Code	Description
U1 ⁽¹⁾	TÜV/DIBt WHG approval for overfill protection
U2	SVTI approval for overfill protection (Switzerland)

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

Tag plate

Code	Description
ST	Engraved SST tag plate (tag shall be submitted with order)

Extended product warranty

Rosemount extended warranties have a limited warranty of three or five years from date of shipment.

Code	Description
WR3	3-year limited warranty
WR5	5-year limited warranty

Rosemount 5900S Radar Level Gauge with horn antenna



Rosemount 5900S with horn antenna is a non-contact radar level gauge. It is designed for easy installation on fixed roofs tanks, with smaller nozzles, down to 200 mm (8 in.).

- Measures on a variety of products except asphalt or similar for which the parabolic antenna is recommended
- Custody transfer accuracy according to OIML R85:2008
- Certified SIL 2 and SIL 3 capable according to IEC 61508
- 2-in-1 functionality available for redundant level measurement
- Communicates via a 2-wire, low voltage Tankbus for easy and safe installation
- Installation normally with tank in service

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Required model components

Model

Code	Description
5900S	Radar Level Gauge

Performance class

Code	Description
P	Premium: ±0.5 mm (0.020 in.) instrument accuracy

Safety certification (SIS)

Code	Description
3 ⁽¹⁾	Certified IEC 61508 SIL 3 capable
S ⁽²⁾	Certified IEC 61508 SIL 2 capable
F	None. Ready for upgrade to Safety certification (SIS)
0	None

(1) Requires Redundancy code 2 and Rosemount 2410 with Safety certification (SIS) code 3.

(2) Requires Rosemount 2410 with either Analog output 4-20 mA or Relay output code 1 or 2.

Redundancy

Code	Description
2	2-in-1: Dual independent radar level gauge electronics
F	None. Ready for upgrade to 2-in-1
1	None. Single radar level gauge electronics

Tankbus: Power and communication

Code	Description
F	Bus powered 2-wire FOUNDATION™ Fieldbus (IEC 61158)

Hazardous location certification

Code	Description
I1	ATEX Intrinsic Safety
I7	IECEx Intrinsic Safety
I5	FM-US Intrinsic Safety
I6	FM-Canada Intrinsic Safety
I2	INMETRO Intrinsic Safety (Brazil)
IP ⁽¹⁾	KC Intrinsic Safety (South Korea)
IW	CCOE/PESO Intrinsic Safety (India)
I4 ⁽²⁾	Japan Intrinsic Safety
IM	Technical Regulations Customs Union (EAC) Intrinsic Safety
NA	None

(1) Requires Custody transfer type approval code R or O.

(2) Not available with Cable entry/Conduit connections code E or M.

Custody transfer type approval

Requires the same Custody transfer type approval code for both the Rosemount 2410 and the Rosemount 5900S.

Code	Description
R ⁽¹⁾⁽²⁾	OIML R85 edition 2008
A ⁽¹⁾⁽²⁾	CMI (Czech Republic)
B ⁽¹⁾⁽²⁾	NMI (Australia)
C ⁽²⁾⁽³⁾	PTB Eich (Germany)
E ⁽¹⁾⁽²⁾	TJA (Estonia)
G ⁽¹⁾⁽²⁾	GUM (Poland)
I ⁽¹⁾⁽⁴⁾	Ministero (Italy)
K ⁽¹⁾⁽²⁾⁽⁵⁾	GOST (Kazakhstan)
L ⁽⁴⁾⁽⁶⁾	LNE (France)
M ⁽¹⁾⁽⁴⁾	BMS (Belgium)
N ⁽⁴⁾⁽⁷⁾	NMi (The Netherlands)
O ⁽¹⁾⁽²⁾	ONML (Algeria)
Q ⁽¹⁾⁽²⁾	IPQ (Portugal)
S ⁽¹⁾⁽²⁾⁽⁵⁾	GOST (Russia)
T ⁽¹⁾⁽²⁾	ANM (Tunisia)
W ⁽¹⁾⁽²⁾	METAS (Switzerland)

Code	Description
Y ⁽¹⁾⁽²⁾	Justervesenet (Norway)
0	None

- (1) Requires integral display in Rosemount 2410 or Rosemount 2230 or Rosemount TankMaster.
 (2) Requires Calibration certificate options code Q4.
 (3) Requires integral display in Rosemount 2410 or Rosemount 2230 with Custody transfer approval code C or Rosemount TankMaster.
 (4) Requires Calibration certificate options code S4.
 (5) Requires Hazardous location certification code I1.
 (6) Requires integral display in Rosemount 2410 or Rosemount 2230 with Custody transfer approval code L or Rosemount TankMaster.
 (7) Requires integral display in Rosemount 2410 or Rosemount 2230 with Custody transfer approval code N or Rosemount TankMaster.

Level measurement method

Code	Description
1	10 GHz FMCW radar technology
2	10 GHz FMCW radar technology for US/Russian installation

Housing

Code	Description
A	Standard enclosure, polyurethane-covered aluminum. IP 66/67

Cable entry/Conduit connections

Code	Description
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). Minimum temperature -20 °C (-4 °F). ATEX/IECEX Exe approved. (2 glands and 1 plug included)
E	euromast [®] male connector (1 plug included)
M	minifast [®] male connector (1 plug included)

Antenna

Code	Description
1H	Horn antenna

Antenna size

Code	Description
8	8 in. / DN 200, Ø=175 mm (6.9 in.)

Antenna material

Code	Description
S	SST AISI 316/316L and SST EN 1.4401/1.4404

Tank seal

Code	Description
PV	PTFE with Viton® fluoroelastomer O-ring

Tank connection

Code	Description
ANSI Hole Pattern (SST AISI 316/316 L) – Flat Face	
8A	8 in. Class 150
8Z	8 in. Class 150, inclined 4 degrees
EN Hole Pattern (SST EN 1.4401/1.4404) – Flat Face	
LA	DN 200/PN 10
LZ	DN 200/PN 10, inclined 4 degrees

Antenna options

Code	Description
0	None

Additional options**Safety certificate**

Requires Safety certification (SIS) code 3 or S.

Code	Description
QT	IEC 61508 certificate and FMEDA-data (printed copy)

Calibration certificate

Code	Description
Q4	Calibration certificate (printed copy)
S4	Witnessed calibration certificate (witnessed by factory selected accredited third party)

Material traceability certificate

Not available for transmitter head sparepart.

Code	Description
Q8	Antenna material traceability certification per EN 10204 3.1

Overfill protection approval

Code	Description
U1 ⁽¹⁾	TÜV/DIBt WHG approval for overfill protection
U2	SVTI approval for overfill protection (Switzerland)

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

Tag plate

Code	Description
ST	Engraved SST tag plate (tag shall be submitted with order)

Extended product warranty

Rosemount extended warranties have a limited warranty of three or five years from date of shipment.

Code	Description
WR3	3-year limited warranty
WR5	5-year limited warranty

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



The Rosemount 5900S with array antenna is a premium 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. For Methanol please consult factory.
- Custody transfer accuracy according to OIML R85:2008
- Certified SIL 2 and SIL 3 capable according to IEC 61508
- 2-in-1 functionality available for redundant level measurement
- Tolerant against rust and product deposits inside the pipe, using Low Loss mode
- Communicates via a 2-wire, low voltage Tankbus for easy and safe installation
- Hinged hatch version enables easier product sampling and hand-dips
- Installation normally with tank in service

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Required model components

Model

Code	Description
5900S	Radar Level Gauge

Performance class

Code	Description
P	Premium: ±0.5 mm (0.020 in.) instrument accuracy

Safety certification (SIS)

Code	Description
3 ⁽¹⁾	Certified IEC 61508 SIL 3 capable
5 ⁽²⁾	Certified IEC 61508 SIL 2 capable
F	None. Ready for upgrade to Safety certification (SIS)
0	None

(1) Requires Redundancy code 2 and Rosemount 2410 with Safety certification (SIS) code 3.

(2) Requires Rosemount 2410 with either Analog output 4-20 mA or Relay output code 1 or 2.

Redundancy

Code	Description
2	2-in-1: Dual independent radar level gauge electronics
F	None. Ready for upgrade to 2-in-1
1	None. Single radar level gauge electronics

Tankbus: Power and communication

Code	Description
F	Bus powered 2-wire FOUNDATION™ Fieldbus (IEC 61158)

Hazardous location certification

Code	Description
I1	ATEX Intrinsic Safety
I7	IECEx Intrinsic Safety
I5	FM-US Intrinsic Safety
I6	FM-Canada Intrinsic Safety
I2	INMETRO Intrinsic Safety (Brazil)
IP ⁽¹⁾	KC Intrinsic Safety (South Korea)
IW	CCOE/PESO Intrinsic Safety (India)
I4 ⁽²⁾	Japan Intrinsic Safety
IM	Technical Regulations Customs Union (EAC) Intrinsic Safety
NA	None

(1) Requires Custody transfer type approval code R or O.

(2) Not available with Cable entry/Conduit connections code E or M.

Custody transfer type approval

Requires the same Custody transfer type approval code for both the Rosemount 2410 and the Rosemount 5900S.

Code	Description
R ⁽¹⁾⁽²⁾	OIML R85 edition 2008
A ⁽¹⁾⁽³⁾	CMI (Czech Republic)
B ⁽¹⁾⁽³⁾	NMI (Australia)
C ⁽³⁾⁽⁴⁾	PTB Eich (Germany)
E ⁽¹⁾⁽³⁾	TJA (Estonia)
G ⁽¹⁾⁽³⁾	GUM (Poland)
I ⁽¹⁾⁽⁵⁾	Ministero (Italy)
K ⁽¹⁾⁽³⁾⁽⁶⁾	GOST (Kazakhstan)
L ⁽⁵⁾⁽⁷⁾	LNE (France)
M ⁽¹⁾⁽⁵⁾	BMS (Belgium)
N ⁽⁸⁾⁽⁹⁾	NMi (The Netherlands)
O ⁽¹⁾⁽³⁾	ONML (Algeria)
Q ⁽¹⁾⁽³⁾	IPQ (Portugal)
S ⁽¹⁾⁽²⁾⁽⁶⁾	GOST (Russia)
T ⁽¹⁾⁽³⁾	ANM (Tunisia)
W ⁽¹⁾⁽³⁾	METAS (Switzerland)

Code	Description
Y ⁽¹⁾⁽³⁾	Justervesenet (Norway)
0	None

- (1) Requires integral display in Rosemount 2410 or Rosemount 2230 or Rosemount TankMaster.
 (2) Requires Calibration certificate options code Q4 or QL.
 (3) Requires Calibration certificate options code Q4.
 (4) Requires integral display in Rosemount 2410 or Rosemount 2230 with Custody transfer approval code C or Rosemount TankMaster.
 (5) Requires Calibration certificate options code S4.
 (6) Requires Hazardous location certification code I1.
 (7) Requires integral display in Rosemount 2410 or Rosemount 2230 with Custody transfer approval code L or Rosemount TankMaster.
 (8) Requires integral display in Rosemount 2410 or Rosemount 2230 with Custody transfer approval code N or Rosemount TankMaster.
 (9) Requires Calibration certificate options code S4 or SL.

Level measurement method

Code	Description
1	10 GHz FMCW radar technology
2	10 GHz FMCW radar technology for US/Russian installation

Housing

Code	Description
A	Standard enclosure, polyurethane-covered aluminum. IP 66/67

Cable entry/Conduit connections

Code	Description
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). Minimum temperature -20 °C (-4 °F). ATEX/IECEx Exe approved. (2 glands and 1 plug included)
E	euromast [®] male connector (1 plug included)
M	minifast [®] male connector (1 plug included)

Antenna

Code	Description
1A	Still-pipe array antenna

Antenna size

Code	Description
5	5 in./DN 125, Ø=120 mm (4.7 in.)
6	6 in./DN 150, Ø=145 mm (5.7 in.)

Code	Description
8	8 in./DN 200, Ø=189 mm (7.4 in.)
A	10 in./DN 250, Ø=243 mm (9.8 in.)
B	12 in./DN 300, Ø=293 mm (11.8 in.)

Antenna material

Code	Description
S	SST (AISI 316L / EN 1.4404) and PPS (polyphenylene sulfide)

Tank seal

Code	Description
FF	Fixed flange installation with fluorosilicone O-ring
HH	Integrated hatch installation with fluorosilicone O-ring (direct access to pipe with hand gauge)

Tank connection

Code	Description
ANSI Hole Pattern (SST AISI 316/316 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
EN Hole Pattern (SST EN 1.4404) – Flat Face	
KA	DN 150 PN 16
LA	DN 200 PN 10
MB	DN 250 PN 16

Antenna options

Code	Description
0	None
C	Clamp flange in galvanized steel (for still-pipes without a flange). Available for 6, 8, 10, and 12 in. tank connections.
V ⁽¹⁾⁽²⁾⁽³⁾	Proof test verification reflector (size equal to Tank connection)

(1) Requires Antenna size code 6, 8, A, or B.

(2) Not available with Options code U1.

(3) Requires Custody transfer type approval code 0 or R.

Additional options

Safety certificate

Requires Safety certification (SIS) code 3 or S.

Code	Description
QT	IEC 61508 certificate and FMEDA-data (printed copy)

Calibration certificate

Code	Description
Q4	Calibration certificate (tank height up to 30 m (100 ft), printed copy)
QL	Calibration certificate 40 m (tank height up to 40 m (130 ft), printed copy)
S4	Witnessed calibration certificate (tank height up to 30 m (100 ft), witnessed by factory selected accredited third party)
SL	Witnessed calibration certificate 40 m (witnessed by factory selected accredited third party)

Material traceability certificate

Not available for transmitter head sparepart.

Code	Description
Q8	Antenna material traceability certification per EN 10204 3.1

Overfill protection approval

Code	Description
U1 ⁽¹⁾	TÜV/DIBt WHG approval for overfill protection
U2	SVTI approval for overfill protection (Switzerland)

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

Tag plate

Code	Description
ST	Engraved SST tag plate (tag shall be submitted with order)

Extended product warranty

Rosemount extended warranties have a limited warranty of three or five years from date of shipment.

Code	Description
WR3	3-year limited warranty
WR5	5-year limited warranty

Rosemount 5900S Radar Level Gauge with LPG/LNG antenna



The Rosemount 5900S with LPG/LNG antenna is a premium 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 turbulent conditions, such as a boiling surface.

- Custody transfer accuracy according to OIML R85:2008
- Certified SIL 2 and SIL 3 capable according to IEC 61508
- 2-in-1 functionality available for redundant level measurement
- Reference device function enables measurement verification with the tank in service
- Communicates via a 2-wire, low voltage Tankbus for easy and safe installation
- Built-in pressure sensor for vapor compensation gives best measurement performance
- Integrated ball valve

VIEW PRODUCT >

Required model components

Model

Code	Description
5900S	Radar Level Gauge

Performance class

Code	Description
P	Premium: ±0.5 mm (0.020 in.) instrument accuracy

Safety certification (SIS)

Code	Description
3 ⁽¹⁾	Certified IEC 61508 SIL 3 capable
S ⁽²⁾	Certified IEC 61508 SIL 2 capable
F	None. Ready for upgrade to Safety certification (SIS)
0	None

(1) Requires Redundancy code 2 and Rosemount 2410 with Safety certification (SIS) code 3.

(2) Requires Rosemount 2410 with either Analog output 4-20 mA or Relay output code 1 or 2.

Redundancy

Code	Description
2	2-in-1: Dual independent radar level gauge electronics
F	None. Ready for upgrade to 2-in-1
1	None. Single radar level gauge electronics

Tankbus: Power and communication

Code	Description
F	Bus powered 2-wire FOUNDATION™ Fieldbus (IEC 61158)

Hazardous location certification

Code	Description
I1	ATEX Intrinsic Safety
I7	IECEx Intrinsic Safety
I5	FM-US Intrinsic Safety
I6	FM-Canada Intrinsic Safety
I2	INMETRO Intrinsic Safety (Brazil)
IP ⁽¹⁾	KC Intrinsic Safety (South Korea)
IW	CCOE/PESO Intrinsic Safety (India)
I4 ⁽²⁾	Japan Intrinsic Safety
IM	Technical Regulations Customs Union (EAC) Intrinsic Safety
NA	None

(1) Requires Custody transfer type approval code R or O.

(2) Not available with Cable entry/Conduit connections code E or M.

Custody transfer type approval

Requires the same Custody transfer type approval code for both the Rosemount 2410 and the Rosemount 5900S.

Code	Description
R ⁽¹⁾⁽²⁾	OIML R85 edition 2008
A ⁽¹⁾⁽³⁾	CMI (Czech Republic)
B ⁽¹⁾⁽³⁾	NMI (Australia)
C ⁽³⁾⁽⁴⁾	PTB Eich (Germany)
E ⁽¹⁾⁽³⁾	TJA (Estonia)
G ⁽¹⁾⁽³⁾	GUM (Poland)
I ⁽¹⁾⁽⁵⁾	Ministero (Italy)
K ⁽¹⁾⁽³⁾⁽⁶⁾	GOST (Kazakhstan)
L ⁽⁵⁾⁽⁷⁾	LNE (France)
M ⁽¹⁾⁽⁵⁾	BMS (Belgium)

Code	Description
N ⁽⁸⁾⁽⁹⁾	NMi (The Netherlands)
O ⁽¹⁾⁽³⁾	ONML (Algeria)
Q ⁽¹⁾⁽³⁾	IPQ (Portugal)
S ⁽¹⁾⁽²⁾⁽⁶⁾	GOST (Russia)
T ⁽¹⁾⁽³⁾	ANM (Tunisia)
W ⁽¹⁾⁽³⁾	METAS (Switzerland)
Y ⁽¹⁾⁽³⁾	Justervesenet (Norway)
0	None

(1) Requires integral display in Rosemount 2410 or Rosemount 2230 or Rosemount TankMaster.

(2) Requires Calibration certificate options code Q4 or QL.

(3) Requires Calibration certificate options code Q4.

(4) Requires integral display in Rosemount 2410 or Rosemount 2230 with Custody transfer approval code C or Rosemount TankMaster.

(5) Requires Calibration certificate options code S4.

(6) Requires Hazardous location certification code I1.

(7) Requires integral display in Rosemount 2410 or Rosemount 2230 with Custody transfer approval code L or Rosemount TankMaster.

(8) Requires integral display in Rosemount 2410 or Rosemount 2230 with Custody transfer approval code N or Rosemount TankMaster.

(9) Requires Calibration certificate options code S4 or SL.

Level measurement method

Code	Description
1	10 GHz FMCW radar technology
2	10 GHz FMCW radar technology for US/Russian installation

Housing

Code	Description
A	Standard enclosure, polyurethane-covered aluminum. IP 66/67

Cable entry/Conduit connections

Code	Description
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). Minimum 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

Code	Description
G1	LPG/LNG (liquefied gas) still-pipe antenna (with integrated ball-valve, without pressure transmitter)
G2 ⁽¹⁾	LPG/LNG (liquefied gas) still-pipe antenna (with integrated ball-valve and pressure transmitter)
G4 ⁽¹⁾⁽²⁾	LPG/LNG (liquefied gas) still-pipe antenna (with integrated ball-valve and dual pressure transmitters)

(1) Requires Hazardous location certification code I1, I2, I5, I6, I7, IP, I4, or IM.

(2) Requires Redundancy code 2.

Related information

[Rosemount 5900S with LPG/LNG antenna](#)

Antenna size

Code	Description
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

Code	Description
S	SST AISI 316/316L and SST EN1.4401/1.4404

Tank seal

Code	Description
PT	PTFE sealing

Tank connection

Code	Description
ANSI Flanges (SST AISI 316/316 L) – Raised Face	
1B ⁽¹⁾⁽²⁾⁽³⁾	1.5 in. Class 300
2A ⁽¹⁾⁽²⁾⁽³⁾	2 in. Class 150
2B ⁽¹⁾⁽²⁾⁽³⁾	2 in. Class 300
3A ⁽¹⁾⁽²⁾⁽³⁾	3 in. Class 150
3B ⁽¹⁾⁽²⁾⁽³⁾	3 in. Class 300
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

Code	Description
EN Hole Pattern (SST EN 1.4404) – Raised Face B1	
NA	DN 100 PN40
OA	DN 150 PN40
PA	DN 200 PN25
PB	DN 200 PN40

- (1) Requires Antenna size code A.
 (2) Requires Custody transfer type approval code R or O.
 (3) Not available with Safety certification (SIS) code 3.

Antenna options

Code	Description
V	Measurement verification kit with 1 verification pin and 1 pipe end deflector kit

Additional options

Safety certificate

Requires Safety certification (SIS) code 3 or S.

Code	Description
QT	IEC 61508 certificate and FMEDA-data (printed copy)

Calibration certificate

Code	Description
Q4	Calibration certificate (tank height up to 30 m (100 ft), printed copy)
QL	Calibration certificate 40 m (tank height up to 40 m (130 ft), printed copy)
S4	Witnessed calibration certificate (tank height up to 30 m (100 ft), witnessed by factory selected accredited third party)
SL	Witnessed calibration certificate 40 m (witnessed by factory selected accredited third party)

Material traceability certificate

Not available for transmitter head sparepart.

Code	Description
Q8	Antenna material traceability certification per EN 10204 3.1

Overfill protection approval

Code	Description
U1 ⁽¹⁾	TÜV/DIBt WHG approval for overfill protection
U2	SVTI approval for overfill protection (Switzerland)

- (1) Requires one or more relay outputs in the Rosemount 2410 Tank Hub.

Tag plate

Code	Description
ST	Engraved SST tag plate (tag shall be submitted with order)

Hydrostatic pressure test

Code	Description
P1	Antenna hydrostatic pressure testing

Extended product warranty

Rosemount extended warranties have a limited warranty of three or five years from date of shipment.

Code	Description
WR3	3-year limited warranty
WR5	5-year limited warranty

Specifications

General

Instrument accuracy

Rosemount 5900S standard version ± 0.5 mm (0.020 in.)

Rosemount 5900S 2-in-1 version ± 0.5 mm (0.020 in.)⁽¹⁾

Instrument accuracy is under reference conditions. Reference conditions are: Measurement in test bench at Rosemount Tank Radar AB in Mölnlycke Sweden. Test bench is calibrated minimum yearly by an accredited laboratory: RISE Research Institutes of Sweden. Measuring range is up to 40 m (130 ft). Ambient temperature and humidity is close to constant during tests. Total uncertainty in test bench is below 0.15 mm (0.006 in.).

Temperature stability

Typically $< \pm 0.5$ 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

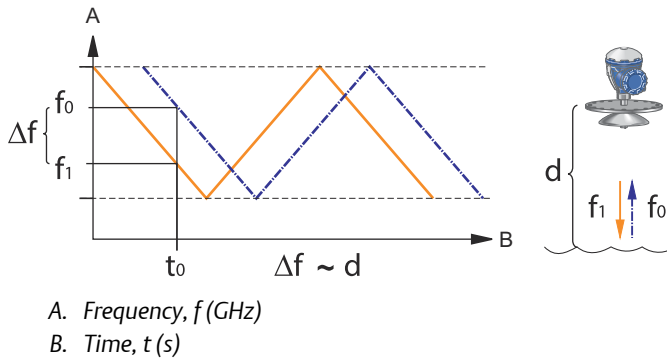
Installation considerations

See Rosemount 5900S [Reference Manual](#)

Measurement principle

The FMCW-method (Frequency Modulated Continuous Wave) means that the transmitted radar signal has a linear frequency variation around 10 GHz. 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 between the antenna and the liquid surface, and thereby also the liquid level. This technology enables a very accurate and stable measured value.

(1) Some level offset may be expected on the secondary unit.

Figure 4: Principle of FMCW Technology

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](#).

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

Table 1: Execution Time

Block	Execution time
1 Resource block	N/A
5 Transducer blocks (Level, Register, Adv_Config, Volume, and LPG)	N/A
6 Analog Input (AI)	10 ms
2 Analog Output (AO)	10 ms
1 Proportional/Integral/Derivate (PID)	15 ms
1 Signal Characterizer (SGCR)	10 ms
1 Integrator (INT)	10 ms
1 Arithmetic (ARTH)	10 ms
1 Input Selector (ISEL)	10 ms
1 Control Selector (CS)	10 ms
1 Output Splitter (OS)	10 ms

For more information, see the FOUNDATION Fieldbus Blocks [Manual](#).

Instantiation

Yes

Conforming FOUNDATION Fieldbus

ITK 6

Field Diagnostics 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.

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 Rosemount 2410 Tank Hub)

Entity: 9.0 - 30.0 VDC polarity insensitive

Bus current draw

50 mA (100 mA for the 2-in-1 version)

Microwave output power

< 1 mW

Built-in Tankbus terminator

Yes (to be connected if required)

Daisy chain possibility

Yes

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

Table 2: Weight of Transmitter Head

Transmitter head	Weight
Rosemount 5900S single version	5.1 kg (11.2 lbs)
Rosemount 5900S 2-in-1 version	5.4 kg (11.9 lbs)

Table 3: Weight With Antenna

Transmitter head with antenna	Weight
Rosemount 5900S with horn antenna	Appr. 12 kg (26 lbs)
Rosemount 5900S with parabolic antenna	Appr. 17 kg (37 lbs)
Rosemount 5900S with still-pipe array antenna	Appr. 13.5-24 kg (30-53 lbs)
Rosemount 5900S with LPG/LNG antenna, 6-in. 150 psi	Appr. 30 kg (66 lbs)
Rosemount 5900S with LPG/LNG antenna, 6-in. 300 psi	Appr. 40 kg (88 lbs)

Antennas

The Rosemount 5900S 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
- Horn
- Still-pipe array
- LPG/LNG

Transmitter head

The same transmitter head is used for all Rosemount 5900S 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 or two encapsulated units. The 2-in-1 solution has duplicate, galvanically isolated electronic units in the same housing
- 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
- RED (EU directive 2014/53/EU) ETSI EN 302372; EN 50371
- IC (RSS210-5)

Electromagnetic compatibility

- EMC (EU directive 2014/30/EU) EN 61326-1; EN 61326-3-1
- OIML R85:2008

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.

Low Voltage Directive (LVD)

LVD (EU directive 2014/35/EU) EN/IEC 61010-1

Rosemount 5900S SIL 2 version (SIS option code S)

Rosemount 5900S 2-in-1 version

Separation

Galvanically separated gauge electronics, and shared antenna for the two units

Wiring

Separated or common

Tank hub connection

- Connection of both units to one hub, or
- Separate connection of units to two different hubs

Built-in Tankbus terminator

Single Tankbus connection: Yes (to be connected if required).

Dual Tankbus connection: Possible to terminate the primary Tankbus.

Daisy chain possibility

Yes

Rosemount 5900S SIL 3 version (SIS option code 3)

Measuring range

1.2 to 30 m (3.9 to 100 ft) below flange.

Separation

Galvanically separated gauge electronics, and shared antenna

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 specification, see [Cable entry \(connection/glands\)](#)

Rosemount 5900S with parabolic antenna

Operating temperature in tank

Maximum +180 °C (+356 °F) with FEP O-ring, or +230 °C (+445 °F) with Kalrez® O-ring

Measuring range

0.8 to 40 m (2.6 to 130 ft) below flange⁽²⁾

Possibility to measure 0.5 to 50 m (1.6 to 164 ft). Accuracy may be reduced. For longer measuring range, 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, or Kalrez®

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.

(2) Local regulations and applicable certificates must be observed.

Rosemount 5900S with horn antenna

Operating temperature in tank

Maximum +180 °C (+356 °F)

Measuring range

0.8 to 20 m (2.6 to 65 ft) below flange.

Possibility to measure 0.5 to 30 m (1.6 to 100 ft). Accuracy may be reduced. For longer measuring range, consult your local representative.

Pressure range

-0.2 to 2 bar (-2.9 to 29 psig)

Material exposed to tank atmosphere

Antenna and flange: Material corresponds to AISI 316/316L and EN 1.4401 /1.4404

Sealing: PTFE

O-ring: Viton®

Antenna dimension

175 mm (7 in.)

Nozzle diameter

Minimum 200 mm (8 in.)

Tank connection

The flange can be horizontal or 4° inclined for installation close to the tank wall.

The horizontal flange is used when highest accuracy and reliability is required. The 4° inclined version can be used to maintain high accuracy when the gauge is installed close to the tank wall.

Rosemount 5900S with still-pipe array antenna

Operating temperature in tank

-40 to 120 °C (-40 to 248 °F)

Measuring range

0.8 to 40 m (2.6 to 130 ft) below flange⁽³⁾

The minimum range can be extended to 0.5 m (1.6 ft) with slightly reduced accuracy. For longer measuring range, 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: FMVQ

Flange: Material corresponds to AISI 316/316L and EN 1.4401 /1.4404

Still-pipe dimensions

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

Tank connection

5 in. hole pattern according to ANSI 5 in. Class 150

6 in. hole pattern according to ANSI 6 in. Class 150 / DN 150 PN 16

8 in. hole pattern according to ANSI 8 in. Class 150 / DN 200 PN 10

10 in. hole pattern according to ANSI 10 in. Class 150 / DN 250 PN 16

12 in. hole pattern according to ANSI 12 in. Class 150

Low Loss Mode

To get the accuracy, required for custody transfer bulk liquid storage applications, the antenna uses Low Loss Mode technology, invented for Rosemount Tank Gauging products, to transmit radar waves in the still-pipe center.

This virtually eliminates signal and accuracy degradation due to rust and product deposits inside the still-pipe.

(3) Local regulations and applicable certificates must be observed.

Rosemount 5900S 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 40 m (3.9 to 130 ft) below flange⁽⁴⁾

Possibility to measure 0.8 to 60 m (2.6 to 200 ft). Accuracy may be reduced. For longer measuring range, 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, pressure sensor range 0-55 bar. For other pressure range contact factory. Rosemount 2051 is available with various hazardous location certifications, see [Product certifications](#).

For more information see the Rosemount 2051 [Product Data Sheet](#).

Material exposed to tank atmosphere

Antenna and flange: Material corresponds to AISI 316/316L and EN 1.4401 /1.4404

Sealing: 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 and rating

1.5 in. Class 300

2 in. Class 150/300

3 in. Class 150/300

4 in. Class 150/300

6 in. Class 150/300

8 in. Class 150/300

DN 100 PN40

DN 150 PN40

DN 200 PN25

DN 200 PN40

Pressure seal

The pressure seal includes a double-block function, consisting of a PTFE seal and a fire-proof ball valve. A pressure sensor enables correction due to vapor for best measurement performance.

(4) Local regulations and applicable certificates must be observed.

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

Rev 7.28

European directive information

The most recent revision of the EU Declaration of Conformity can be found at [Emerson.com/Rosemount](https://emerson.com/Rosemount).

Ordinary Location Certification

As standard, the transmitter has been examined and tested to determine that the design meets the basic electrical, mechanical, and fire protection requirements by a nationally recognized test laboratory (NRTL) as accredited by the Federal Occupational Safety and Health Administration (OSHA). Complies with FM 3810:2005 and CSA: C22.2 No. 1010.1.

Telecommunication compliance

FCC

This device complies with Part 15C of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Certificate: K8C5900

IC

This device complies with RSS210-7.

Certificate: 2827A-5900

Radio Equipment Directive (RED)

This device complies with ETSI EN 302 372 and EN 62479. EU directive 2014/53/EU. The device shall be installed according to requirements ETSI EN 302372.

CE-mark

The product complies with applicable EU directives (EMC, ATEX, LVD, and RED). 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.

Installing Equipment in North America

The US National Electrical Code® (NEC) and the Canadian Electrical Code (CEC) permit the use of Division marked equipment in Zones and Zone marked equipment in Divisions.

The markings must be suitable for the area classification, gas, and temperature class. This information is clearly defined in the respective codes.

North America

I5 USA Intrinsic Safety

Certificate	FM 17US0030X
Standards	FM Class 3600:2018, FM Class 3610:2018, FM Class 3810:2005, ANSI/ISA 61010-1:2004, ANSI/NEMA 250:2003, ANSI/IEC 60529:2004, ANSI/UL 60079-0:2013 Ed 6, ANSI/UL 60079-11:2014 Ed 6.3, ANSI/UL 60079-26:2017 Ed 3
Markings	IS/I,II,III/1/ABCDEFGH/T4 DIP/II,III/1/EFG/T5 CL 1 ZN 0 AEx ia IIC T4 Ga CL 1 ZN 0/1 AEx ib IIC T4 Ga/Gb Ta = -50°C to 80°C - 9240040-917; Type 4X; IP66; IP67

	Ui (Vmax)	Ii (Imax)	Pi	Ci	Li
Entity parameters	30 V	300 mA	1.3 W	1.1 nF	1.5 μH
FISCO parameters	17.5V	380 mA	5.32 W	1.1 nF	1.5 μH

Specific Conditions for Safe Use (X):

1. The enclosure contains aluminum and is considered to present a potential risk of ignition by impact or friction. When installed as EPL Ga, care must be taken during installation and use to prevent impact or friction.
2. Non-metallic 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.
3. Using the box provided on the nameplate, the User shall permanently mark the type of protection chosen for the specific installation. Once the type of protection has been marked it shall not be changed.
4. When installed as Ex ib Ga/Gb, the partition wall materials separating EPL Ga from EPL Gb are constructed of different materials depending on the antenna option. Please refer to Control Drawing D9240040-917 for the material type of each antenna. The material shall not be subject to environmental conditions which might adversely affect the partition wall.
5. Maximum Process Temperatures are as follows:

When option n=Tank Seal	O-ring Type	Min/Max Process Temperature Range
PV or QV	Viton	-15°C to +180°C
PK, FK, HK or QK	Kalrez	-20°C to +230°C
PE or QE	EPDM	-40°C to +110°C
PB or QB	BUNA-N	-35°C to +90°C
PM, FF, HH or QM	FVMQ	-60°C to +155°C
PF or QF	FEP	-60°C to +180°C

I6 Canada Intrinsic Safety

Certificate	FM17CA0016X
Standards	CSA-C22.2 No. 25-2017 CSA-C22.2 No. 94-M91:1991 (R2011) CSA-C22.2 No. 1010-1:2004 (R2009) CSA-C22.2 No. 60529:2016 CSA-C22.2 No. 60079-0:2015 CSA-C22.2 No. 60079-11:2014 CSA-C22.2 No. 60079-26:2016
Markings	IS/I,II,III/1/ABCDEFG/T4 Ex ia IIC T4 Ga Ex ib IIC T4 Ga/Gb DIP/II,III/1/EFG/T5 Ta = -50°C to 80°C 9240040-917 Type 4X; IP66; IP67

	Ui (Vmax)	Ii (Imax)	Pi	Ci	Li
Entity parameters	30 V	300 mA	1.3 W	1.1 nF	1.5 µH
FISCO parameters	17.5V	380 mA	5.32 W	1.1 nF	1.5 µH


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4. When installed as Ex ib Ga/Gb, the partition wall materials separating EPL Ga from EPL Gb are constructed of different materials depending on the antenna option. Please refer to Control Drawing D9240040-917 for the material type of each antenna. The material shall not be subject to environmental conditions which might adversely affect the partition wall.
5. Maximum Process Temperatures are as follows:

When option n= Tank Seal	O-ring Type	Min/Max Process Temperature Range
PV or QV	Viton	-15°C to +180°C
PK, FK, HK or QK	Kalrez	-20°C to +230°C
PE or QE	EPDM	-40°C to +110°C
PB or QB	BUNA-N	-35°C to +90°C
PM, FF, HH or QM	FVMQ	-60°C to +155°C
PF or QF	FEP	-60°C to +180°C

Europe

I1 ATEX Intrinsic Safety

Certificate	FM09ATEX0057X
Standards	EN IEC 60079-0:2018, EN 60079-11:2012, EN 60079-26:2015, EN 60529:1991+A1(2000)+A2(2013)
Markings	 II 1 G Ex ia IIC T4 Ga II 1/2 G Ex ib IIC T4 Ga/Gb Ta = -50°C to 80°C; IP66, IP67

	Ui (Vmax)	Ii (Imax)	Pi	Ci	Li
Entity parameters	30 V	300 mA	1.3 W	1.1 nF	1.5 μH
FISCO parameters	17.5V	380 mA	5.32 W	1.1 nF	1.5 μH

Specific Conditions for Safe Use (X):

1. The enclosure contains aluminum and is considered to present a potential risk of ignition by impact or friction. When installed as EPL Ga, care must be taken during installation and use to prevent impact or friction.
2. Non-metallic 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.
3. Using the box provided on the nameplate, the User shall permanently mark the type of protection chosen for the specific installation. Once the type of protection has been marked it shall not be changed.
4. When installed as Ex ib Ga/Gb, the partition wall materials separating EPL Ga from EPL Gb are constructed of different materials depending on the antenna option. Please refer to Control Drawing D9240040-917 for the material type of each antenna. The material shall not be subject to environmental conditions which might adversely affect the partition wall.
5. Maximum Process Temperatures are as follows:

When option n=Tank Seal	O-ring Type	Min/Max Process Temperature Range
PV or QV	Viton	-15°C to +180°C
PK, FK, HK or QK	Kalrez	-20°C to +230°C
PE or QE	EPDM	-40°C to +110°C
PB or QB	BUNA-N	-35°C to +90°C
PM, FF, HH or QM	FVMQ	-60°C to +155°C
PF or QF	FEP	-60°C to +180°C

International

I7 IECEX Intrinsic Safety

Certificate	IECEX FMG 09.0009X
Standards	IEC 60079-0:2017, IEC 60079-11:2011, IEC 60079-26:2014
Markings	Ex ia IIC T4 Ga Ex ib IIC T4 Ga/Gb Ta = -50°C to +80°C; IP66, IP67

	Ui (Vmax)	Ii (Imax)	Pi	Ci	Li
Entity parameters	30 V	300 mA	1.3 W	1.1 nF	1.5 μH
FISCO parameters	17.5V	380 mA	5.32 W	1.1 nF	1.5 μH

Specific Conditions for Safe Use (X):

1. The enclosure contains aluminum and is considered to present a potential risk of ignition by impact or friction. When installed as EPL Ga, care must be taken during installation and use to prevent impact or friction.
2. Non-metallic 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.
3. Using the box provided on the nameplate, the User shall permanently mark the type of protection chosen for the specific installation. Once the type of protection has been marked it shall not be changed.
4. When installed as Ex ib Ga/Gb, the partition wall materials separating EPL Ga from EPL Gb are constructed of different materials depending on the antenna option. Please refer to Control Drawing D9240040-917 for the material type of each antenna. The material shall not be subject to environmental conditions which might adversely affect the partition wall.
5. Maximum Process Temperatures are as follows:

When option n=Tank Seal	O-ring Type	Min/Max Process Temperature Range
PV or QV	Viton	-15°C to +180°C
PK, FK, HK or QK	Kalrez	-20°C to +230°C
PE or QE	EPDM	-40°C to +110°C
PB or QB	BUNA-N	-35°C to +90°C
PM, FF, HH or QM	FVMQ	-60°C to +155°C
PF or QF	FEP	-60°C to +180°C

Brazil

I2 INMETRO Intrinsic Safety

Certificate	UL-BR 17.0982X
Standards	ABNT NBR IEC 60079-0:2020, 60079-11:2013, 60079-26:2016
Markings	Ex ia IIC T4 Ga Ex ib IIC T4 Ga/Gb Tamb: -50 °C to + 80 °C IP66/IP67

	Ui (Vmax)	Ii (Imax)	Pi	Ci	Li
Entity parameters	30 V	300 mA	1.3 W	1.1 nF	1.5 μH
FISCO parameters	17.5V	380 mA	5.32 W	1.1 nF	1.5 μH

Special Conditions for Safe Use (X):

1. See certificate for special conditions.

China

I3 China Intrinsic Safety

Certificate	GYJ21.1117X
Standards	GB 3836.1 - 2010, GB 3836.4 - 2010, GB 3836.20 - 2010
Markings	Ex ia IIC T4 Ga Ex ib IIC T4 Ga/Gb

	Ui (Vmax)	Ii (Imax)	Pi	Ci	Li
Entity parameters	30 V	300 mA	1.3 W	1.1 nF	1.5 μH
FISCO parameters	17.5V	380 mA	5.32 W	1.1 nF	1.5 μH

Special Conditions for Safe Use (X):

1. See certificate for special conditions.

Technical Regulations Customs Union (EAC)

TR CU 020/2011 “Electromagnetic Compatibility of Technical Products”

TR CU 032/2013 “On safety of equipment and vessels under pressure”

Certificate EAЭC RU C-US.AД07.B.00770/19

IM EAC Intrinsic Safety

Certificate EAЭC RU C-SE.AA87.B.00528/20

Markings 0 Ex ia IIC T4 Ga X
Ga/Gb Ex ib IIC T4 X
Tamb: -50 °C to + 80 °C
IP66/IP67

	Ui (Vmax)	Ii (Imax)	Pi	Ci	Li
Entity parameters	30 V	300 mA	1.3 W	1.1 nF	1.5 μH
FISCO parameters	17.5V	380 mA	5.32 W	1.1 nF	1.5 μH

Special Conditions for Safe Use (X):

1. See certificate for special conditions.

Ex

TR CU 012/2011 “On safety of equipment intended for use in explosive atmospheres”

Japan

I4 Japan Intrinsic Safety

Certificate CML 17JPN2301X

Markings Ex ia IIC T4 Ga
Ex ib IIC T4 Ga/Gb
-50 °C ≤ Ta ≤ +80 °C

	Ui (Vmax)	Ii (Imax)	Pi	Ci	Li
FISCO parameters	17.5V	380 mA	5.32 W	1.1 nF	1.5 μH
Entity parameters	30 V	300 mA	1.3 W	1.1 nF	1.5 μH

Special Conditions for Safe Use (X):

1. See certificate for special conditions.

Republic of Korea

IP Korea Intrinsic Safety

Certificate 14-KB4BO-0573X
Markings Ex ia IIC T4 Ga
 Ex ib IIC T4 Ga/Gb
 (-50 °C ≤ Ta ≤ +80 °C)

	Ui (Vmax)	Ii (Imax)	Pi	Ci	Li
Entity parameters	30 V	300 mA	1.3 W	1.1 nF	1.5 μH
FISCO parameters	17.5V	380 mA	5.32 W	1.1 nF	1.5 μH

Special Conditions for Safe Use (X):

1. See certificate for special conditions.

India

India Ex Certification

Certificate P463068/1

	Ui (Vmax)	Ii (Imax)	Pi	Ci	Li
Entity parameters	30 V	300 mA	1.3 W	1.1 nF	1.5 μH
FISCO parameters	17.5V	380 mA	5.32 W	1.1 nF	1.5 μH

Special Conditions for Safe Use (X):

1. See certificate for special conditions.

United Arab Emirates

Intrinsic Safety

Certificate 20-11-28736/Q20-11-001012
Markings Same as IECEx (I7)

Additional certifications

Functional Safety Certification (SIS)

3 Functional Safety

Certificate	ROS 1312032 C001 SIL 3 2-in-1 (1oo2) option (SIS-relays)
Standards	IEC 61508:2010 Parts 1-7

S Functional Safety

Certificate	ROS 1312032 C004 SIL 2 1-in-1 (1oo1) option, with 4-20mA or K1/K2 relay
Standards	IEC 61508:2010 Parts 1-7
Certificate	ROS 1312032 C005 SIL 2 2-in-1 (1oo1) option, with 4-20mA or K1/K2 relay
Standards	IEC 61508:2010 Parts 1-7

Germany WHG Certification (DIBt)

Certificate	Z-65.16-500
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Belgium Overfill Certification (Vlarem)

Certificate	99/H031/13072201
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Custody Transfer Certifications

Australia Custody Transfer

Certificate No 5/1/7
Standards Regulation 60: National Measurement Regulations 1999

Belgium Custody Transfer

BMS Certificate NR. P6.0.014.02-B-16

Bulgaria Custody Transfer

Bulgaria 18.10.5106.1
**Institute of
Metrology**

China Custody Transfer

CPA Pattern Approval

Certificate 2012-L134

Croatia Custody Transfer

Certificate 558-02-01_01-15-2

Czech Republic Custody Transfer

Certificate 0111-CS-C022-10

Estonia Custody Transfer

Certificate TJA 6.13-3_15.09.11

France Custody Transfer

Certificate No. LNE-24609

Germany Custody Transfer

Certificate PTB-1.5-4058175

India Custody Transfer

Certificate IND/13/12/191

Indonesia Custody Transfer

Certificate DITJEN MIGAS CT approval 26.10.2010

Italy Custody Transfer

Certificate 65234 (Raptor system)

Kazakhstan Custody Transfer

GOST Pattern Approval:

Certificate KZ.02.02.06177-2018 No.14983 (5900)
KZ.02.02.04018-2014 No.10790 (System)

Malaysia Custody Transfer

Certificate ATS 09-11

Netherlands Custody Transfer

NMI Certificate TC8934R1

Norway Custody Transfer

Certificate No. N-11-7146

Poland Custody Transfer

Certificate ZT-7 2013

Portugal Custody Transfer

Certificate P12_101.12_31

Russia Custody Transfer

GOST Pattern Approval:

Certificate SE.C.29.639.A No. 66902 (5900)

Serbia Custody Transfer

Certificate 393-7_0-01-2088

South Africa Custody Transfer

Certificate SAEx S11-065

Switzerland Custody Transfer

Certificate Zulassungszertifikat CH-L-11127-01

OIML Custody Transfer

Certificate R85/2008-A-SE1-2021.01

Product Certifications Rosemount 2051

Extract from Rosemount 2051 Product Certifications Rev: 1.13

North America

IE USA FISCO

Certificate	FM16US0231X
Standards	FM Class 3600 – 2011, FM Class 3610 – 2010, FM Class 3611 – 2004, FM Class 3810 – 2005
Markings	IS CL I, DIV 1, GP A, B, C, D when connected per Rosemount drawing 02051-1009 (-50°C ≤ Ta ≤ +60°C); Type 4x

Special Conditions for Safe Use (X):

1. The Model 2051 transmitter housing contains aluminum and is considered a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact and friction.

IF Canada Intrinsic Safety

Certificate	2041384
Standards	CSA Std. C22.2 No. 142 - M1987, CSA Std. C22.2 No. 213 - M1987, CSA Std. C22.2 No. 157 - 92, ANSI/ISA 12.27.01 – 2003, CAN/CSA-E60079-0:07, CAN/CSA-E60079-11:02
Markings	Intrinsically safe for Class I, Division 1, Groups A, B, C, and D when connected in accordance with Rosemount drawing 02051-1008. Ex ia IIC T3C. Single Seal. Enclosure Type 4X

Europe

IA ATEX FISCO

Certificate	Baseefa08ATEX0129X
Standards	EN60079-0:2012+A11:2013, EN60079-11:2012
Markings	Ⓔ II 1 G Ex ia IIC T4 Ga (-60°C ≤ Ta ≤ +60°C)

	Ui	Ii	Pi	Ci	Li
FISCO parameters	17.5V	380 mA	5.32 W	0 μF	0 mH

Special Conditions for Safe Use (X):

1. If the equipment is fitted with an optional 90V transient suppressor, it is incapable of withstanding the 500V isolation from earth test and this must be taken into account during installation.
2. The enclosure may be made of aluminum alloy and given a protective polyurethane paint finish; however care should be taken to protect it from impact and abrasion when located in Zone 0.

International

IG IECEx FISCO

Certificate IECExBAS08.0045X
Standards IEC60079-0:2011, IEC60079-11:2011
Markings Ex ia IIC T4 Ga (-60°C ≤ Ta ≤ +60°C)

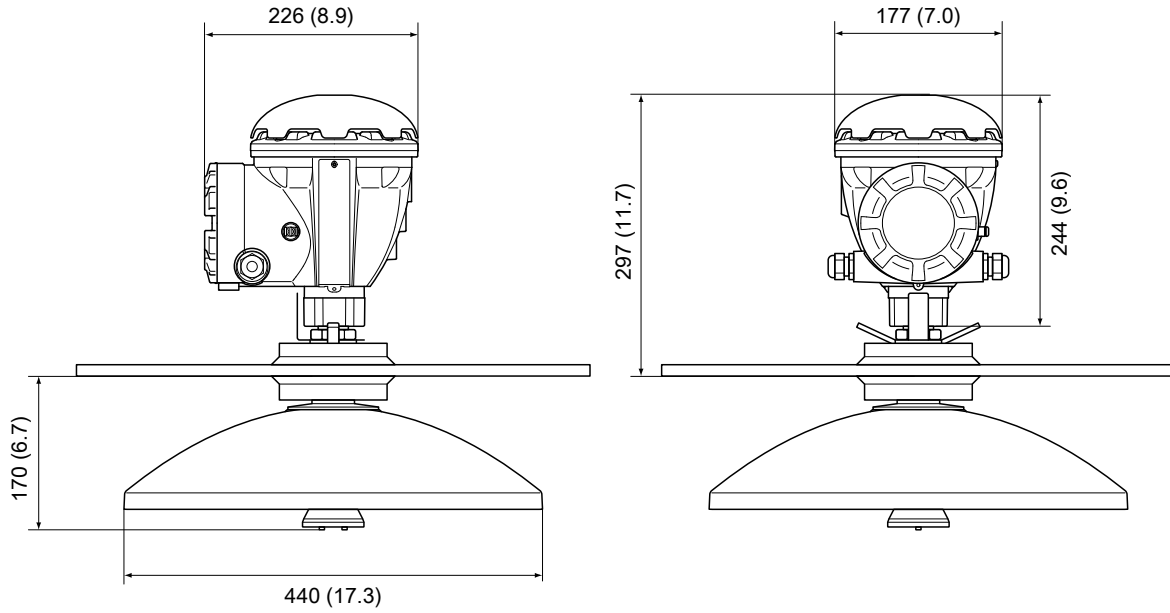
	Ui	Ii	Pi	Ci	Li
FISCO parameters	17.5V	380 mA	5.32 W	0 nF	0 μH

Special Conditions for Safe Use (X):

1. If the equipment is fitted with an optional 90V transient suppressor, it is incapable of withstanding the 500V isolation from earth test and this must be taken into account during installation.
2. The enclosure may be made of aluminum alloy and given a protective polyurethane paint finish; however care should be taken to protect it from impact and abrasion when located in Zone 0.
3. The equipment contains thin wall diaphragms. The installation, maintenance and use shall take into account the environmental conditions to which the diaphragms will be subjected. The manufacturer’s instructions for installation and maintenance shall be followed in detail to assure safety during its expected lifetime.

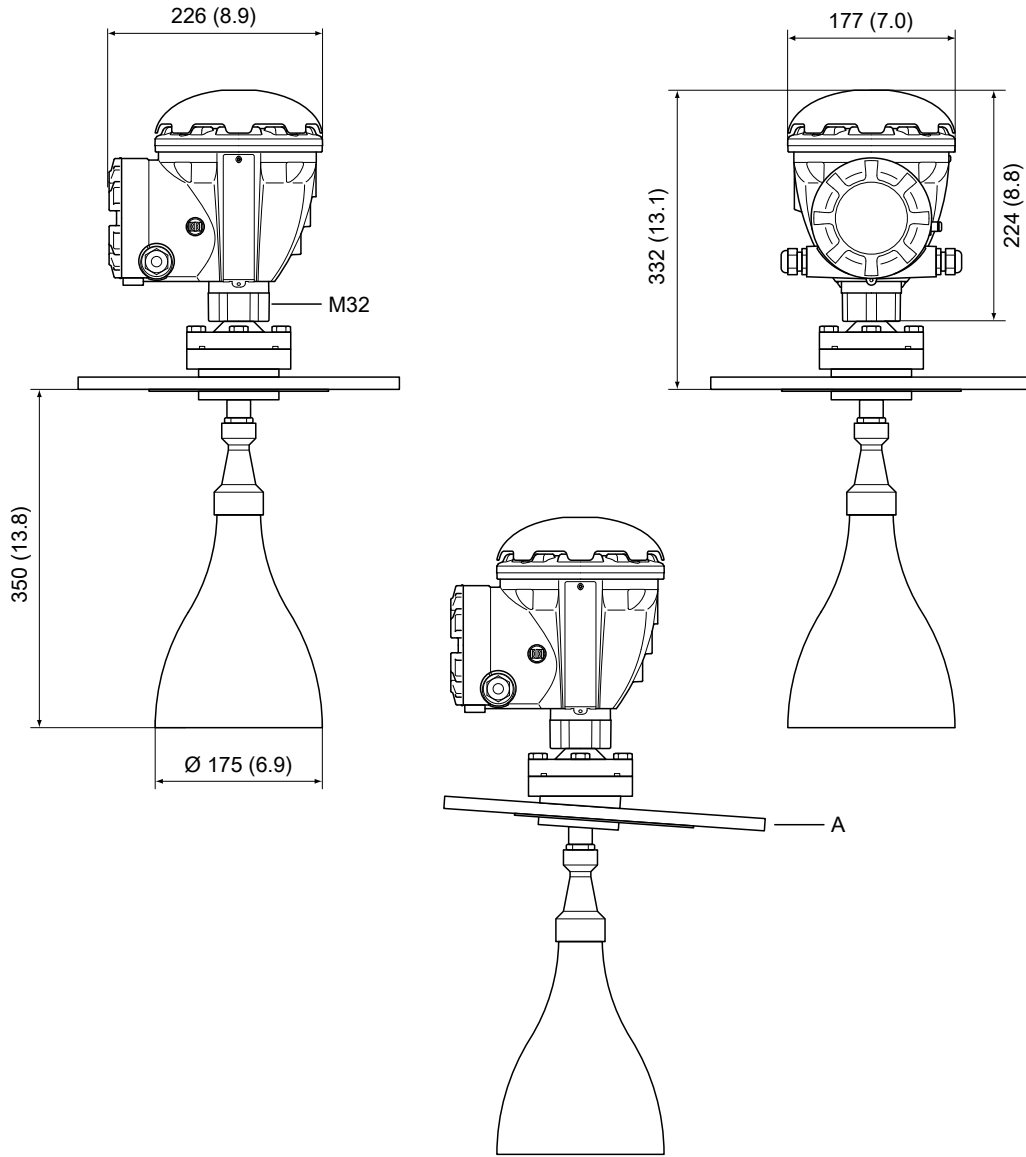
Dimensional drawings

Figure 5: Dimensions of Rosemount 5900S with Parabolic Antenna



Dimensions are in millimeters (inches).

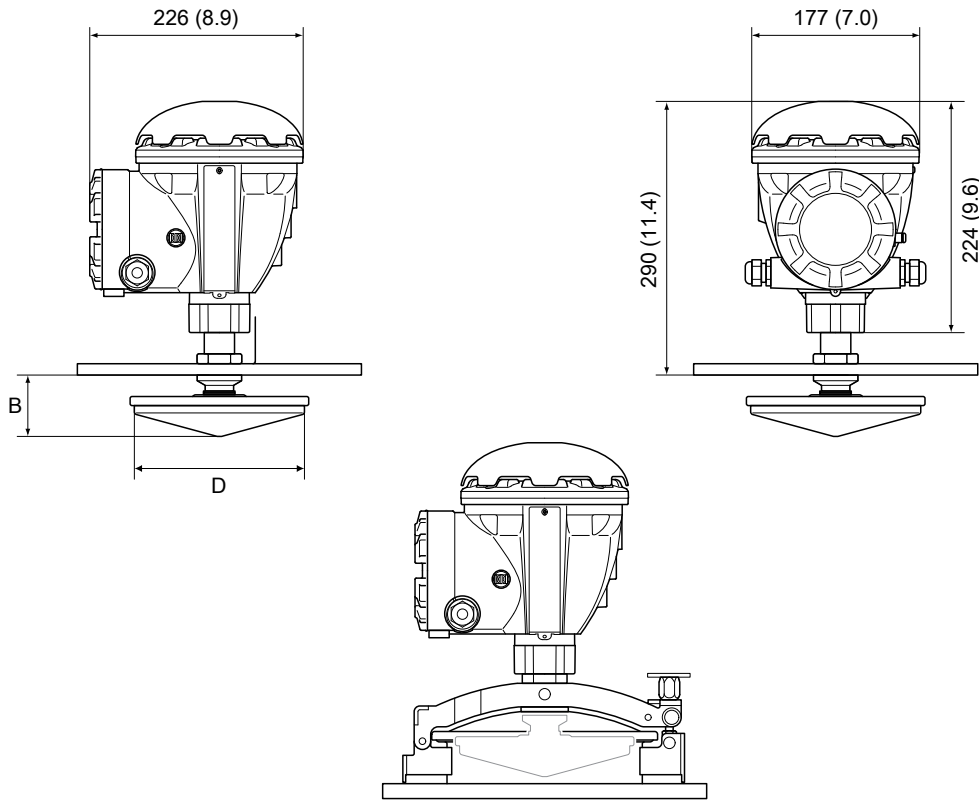
Figure 6: Dimensions of Rosemount 5900S with Horn Antenna



A. Flange Inclined 4°

Dimensions are in millimeters (inches).

Figure 7: Dimensions of Rosemount 5900S with Still-Pipe Array Antenna

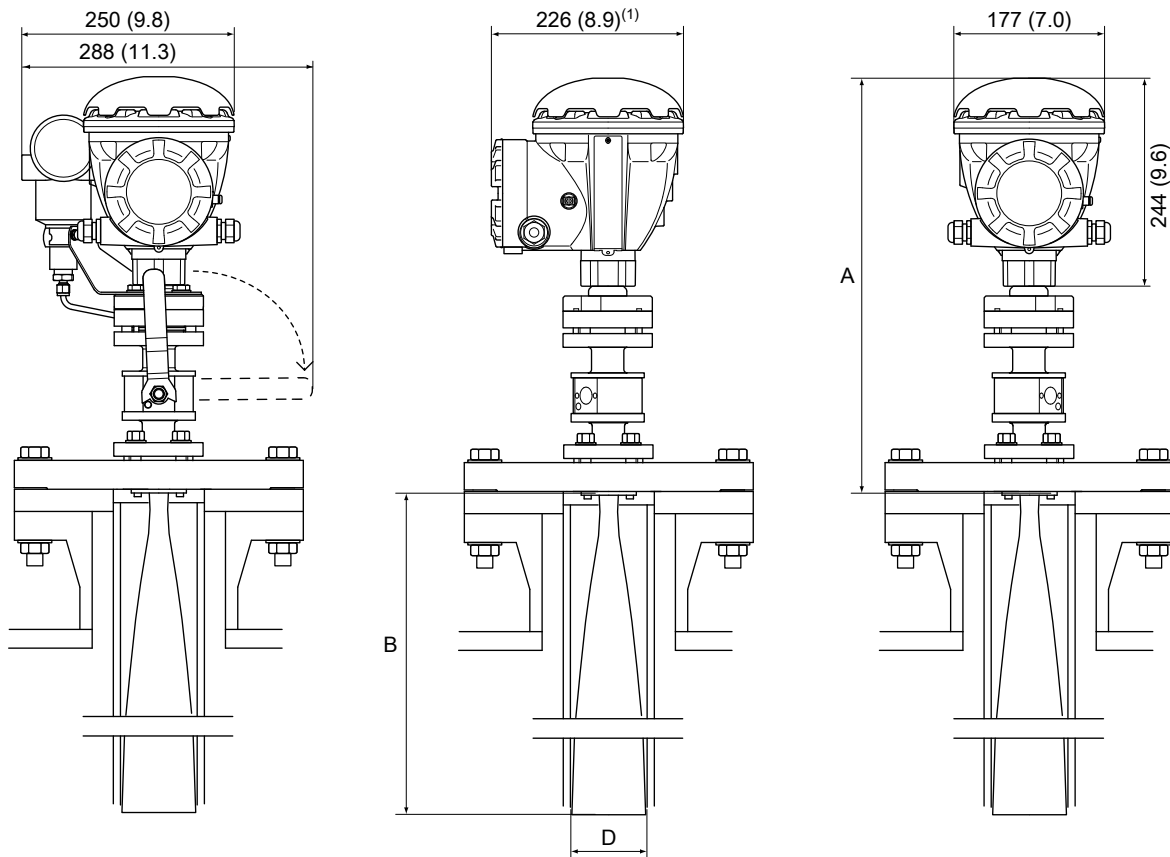


Dimensions are in millimeters (inches).

Table 4: Available sizes for Still-Pipe Array Antenna

Antenna diameter (D)	B (mm)
5 in. / DN125 (Ø 120 mm)	56
6 in. / DN150 (Ø 145 mm)	59
8 in. / DN200 (Ø 189 mm)	65
10 in. / DN250 (Ø 243 mm)	73
12 in. / DN300 (Ø 293 mm)	79

Figure 8: Dimensions of Rosemount 5900S with LPG/LNG Still-Pipe Antenna



A. Approximately 488 (19.2), depending on flange type

1. 302 mm with pressure transmitter

Dimensions are in millimeters (inches).

Table 5: Available sizes for LPG/LNG Still-Pipe antenna

Antenna diameter (D)	B (mm)
4 in. Sch10 (Ø 107 mm)	752
4 in. Sch40 (Ø 101 mm)	534
DN100 (Ø 99 mm)	502

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