

Rosemount 9901

Safety Instructions



Safety Instructions

These safety instructions are to be read and used in conjunction with the instrument manual.

NOTICE

Read this manual before working with the product. For personal and system safety, and for optimum product performance, make sure you thoroughly understand the contents before installing or maintaining this product.

⚠ WARNING

Failure to follow these installation guidelines could result in death or serious injury.
Process leaks could result in death or serious injury.

A. DEFINITIONS

NOTES:

- Ps = Maximum allowable chamber pressure (in psi and bar) at stated temperature
Pt = Chamber test pressure (in psi and bar)
Ts_{max} = Maximum allowable chamber temperature (in °F and °C)
Ts_{min} = Minimum allowable chamber temperature (in °F and °C)

B. PRESSURE EQUIPMENT DIRECTIVE (PED)

The *PED-approved 9901* (model codes 9901*1 and 9901*5) is designed and manufactured to comply with Module “H” of the Pressure Equipment Directive 97/23/EC. It carries a “CE” mark and has a Declaration of Conformity to show compliance with the Directive. Under the Pressure Equipment Directive, the *PED-approved 9901* is classified as **Category III Piping**. The *PED-approved 9901* is designed for use with **unstable gases and liquids within Groups 1 and 2**.

C. INSTRUCTIONS

It is the responsibility of the installer/user of this equipment to ensure:

1. The product is installed and used by suitably trained personnel in accordance with all relevant Local and National regulations and codes.
2. Safe working practices for the media and process concerned are followed during installation and maintenance.
3. The materials of construction are suitable for the application. See Table 1-1 on page 1-2.
4. The pressure and temperature limits for this equipment are not exceeded, if necessary by the use of suitable safety accessories. See Table 1-5 on page 1-3, and Table 1-6 on page 1-4.
5. All Rosemount supplied installation fixing bolts are used where applicable, and are only replaced by exact equivalents. On all other flanges, the correct quantity, size and strength of bolts (clamp type) are used. All fasteners are evenly tightened to the correct torque. See Table 1-2 on page 1-2.
6. Correct gaskets/seals are fitted and are compatible with the media and process.
7. The product is protected from fire.
8. The product is protected from impact.
9. This product is not used as a support for other equipment or personnel.
10. Regular inspection for corrosion and wear are carried out, both internal and external.
11. This product is adequately supported.

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D. MATERIALS

Table 1-1. Vessel Pressure Materials

Component	Carbon Steel	Stainless Steel
Instrument Mounting Flange	ASTM A105	ASTM A182 F316/F316L
Chamber Body Tube	ASTM A106 Grade B	ASTM A312 TP316/TP316L
Chamber End Cap	ASTM A105	ASTM A182 F316/F316L
Process Flange / Fitting	ASTM A105	ASTM A182 F316/F316L
T-Pieces and Reducers	ASTM A234 WPB	ASTM A403 WP316/WP316L-S
Standard Alloy Steel Studbolts	ASTM A193 B7	ASTM A320 L7
Standard Alloy Steel Nuts	ASTM A194 2H	ASTM A194 Grade 7 + S3
Stainless Studbolts (maximum PN40/Class 300)	ASTM A193 B8M CI 1	ASTM A193 B8M CI 1
Stainless Nuts (maximum PN40/Class 300)	ASTM A194 Grade 8M	ASTM A194 Grade 8M
Stainless Studbolts (maximum PN100/Class 600 and 200°C)	ASTM A193 B8M CI 2	ASTM A193 B8M CI 2
Stainless Nuts (maximum PN100/Class 600 and 200°C)	ASTM A194 Grade 8M	ASTM A194 Grade 8M

E. BOLTING AND TIGHTENING TORQUE

Table 1-2. Bolt Torques (Instrument Mounting Flange)

Flange Rating (Chamber Size)	Bolting	Compressed Fibre Gasket	Torque (in Nm) ⁽¹⁾		Spiral Wound
			RTJ		
			Iron	Stainless Steel	
Class 150 (3 in.)	5/8-in. UNC	230	124	124	122
Class 150 (4 in.)	5/8-in. UNC	190	112	112	122
Class 300 (3 in.)	3/4-in. UNC	125	174	174	203
Class 300 (4 in.)	3/4-in. UNC	220	196	196	203
Class 600 (3 in.)	3/4-in. UNC	(2)	218	218	203
Class 600 (4 in.)	7/8-in. UNC	(2)	313	313	325
Class 900 (3 in.)	7/8-in. UNC	(2)	348	348	325
Class 900 (4 in.)	1 1/8-in. UNC	(2)	677	677	722
Class 1500 (3 in.)	1 1/8-in. -8 UN	(2)	752	752	722
Class 1500 (4 in.)	1 1/4-in. -8 UN	(2)	1040	1040	1016
PN16 (DN80)	M16	125	(3)	(3)	124
PN16 (DN100)	M16	125	(3)	(3)	115
PN25 (DN80)	M16	95	(3)	(3)	122
PN25 (DN100)	M20	150	(3)	(3)	203
PN40 (DN80)	M16	95	(3)	(3)	122
PN40 (DN100)	M20	150	(3)	(3)	203
PN63 DN80)	M20	(2)	(3)	(3)	203
PN63 (DN100)	M24	(2)	(3)	(3)	325
PN100 (DN80)	M24	(2)	(3)	(3)	428
PN100 (DN100)	M27	(2)	(3)	(3)	565
PN160 (DN80)	M24	(2)	(3)	(3)	428
PN160 (DN100)	M27	(2)	(3)	(3)	565
PN250 (DN80)	M27	(2)	(3)	(3)	565
PN250 (DN100)	M30	(2)	(3)	(3)	852

- (1) This is provisional data – to be approved by gasket suppliers and chamber pressure tests.
(2) Not recommended.
(3) Not applicable.

F. NAMEPLATE STAMPING EXPLANATION

Table 1-3. Nameplate Stamping Explanation (Imperial)

Ps max @ 68 °F	Ts _{min}	284	14
Ps max @	Ts _{max}	94	752
Pt		435	

Table 1-4. Nameplate Stamping Explanation (Metric)

Ps max @ 20 °C	Ts _{min}	19.6	-10
Ps max @	Ts _{max}	6.5	400
Pt		30	

NOTE:

- $T_{s_{min}}$ for carbon steel chambers is always:
"14 °F" (fourteen degrees Fahrenheit) / "-10 °C" (minus ten degrees Celsius)
- $T_{s_{min}}$ for 316/316L stainless steel chambers is always:
"-148 °F" (minus one hundred and forty eight degrees Fahrenheit) / "-100 °C" (minus 100 degrees Celsius)
- $T_{s_{max}}$ for carbon and stainless steel chambers with standard alloy steel bolting is always:
"752 °F" (seven hundred and fifty two degrees Fahrenheit) / "400 °C" (four hundred degrees Celsius)
- $T_{s_{max}}$ for chambers with stainless 316 bolting and rated PN63, PN100, or Class 600 is always:
"392 F" (three hundred and ninety two degrees Fahrenheit) / "200 °C" (two hundred degrees Celsius)

Table 1-5. Chamber Pressure and Temperature Ratings (Standard Alloy Steel Bolting)

Class / Rating		Working Pressure (Psi and Bar) For The 9901 Chambers with Standard Alloy Steel Bolting			
		Carbon Steel ⁽¹⁾		Stainless Steel ⁽²⁾	
		Psi	Bar	Psi	Bar
ASME B16.5 Class 150	Ps max (RT) ⁽³⁾	285	19.6	275	19.0
	Ps max (752 °F) / (400 °C)	95	6.5	95	6.5
	Pt	428	30	413	29
ASME B16.5 Class 300	Ps max (RT)	740	51.1	720	49.6
	Ps max (752 °F) / (400 °C)	505	34.7	425	29.4
	Pt	1110	77	1080	75
ASME B16.5 Class 600	Ps max (RT)	1480	102.1	1440	99.3
	Ps max (752 °F) / (400 °C)	1015	69.4	855	58.9
	Pt	2220	154	2160	149
ASME B16.5 Class 900	Ps max (RT)	2220	153.2	2160	148.9
	Ps max (752 °F) / (400 °C)	1520	104.2	1280	88.3
	Pt	3330	230	3240	224
ASME B16.5 Class 1500	Ps max (RT)	3705	255.3	3600	248.2
	Ps max (752 °F) / (400 °C)	2535	173.6	2135	147.2
	Pt	5558	383	5400	373
EN1092 PN16	Ps max (RT)	232	16	227	15.7
	Ps max (752 °F) / (400 °C)	137	9.5	134	9.3
	Pt	348	24	348	24
EN1092 PN25	Ps max (RT)	362	25	356	24.6
	Ps max (752 °F) / (400 °C)	214	14.8	211	14.6
	Pt	543	37.5	536	37
EN1092 PN40	Ps max (RT)	580	40	569	39.3
	Ps max (752 °F) / (400 °C)	345	23.8	339	23.4
	Pt	870	60	855	59
EN1092 PN63	Ps max (RT)	913	63	899	62
	Ps max (752 °F) / (400 °C)	543	37.5	536	37
	Pt	1377	95	1348	93
EN1092 PN100	Ps max (RT)	1450	100	1427	98.4
	Ps max (752 °F) / (400 °C)	862	59.5	851	58.7
	Pt	2175	150	2146	148
EN1092 PN160	Ps max (RT)	2320	160	2291	158
	Ps max (752 °F) / (400 °C)	1380	95.2	1361	93.9
	Pt	3480	240	3437	237
EN1092 PN250	Ps max (RT)	3625	250	3567	246
	Ps max (752 °F) / (400 °C)	2158	148.8	2132	147
	Pt	5438	375	5351	369

(1) $T_{s_{min}}$ is 14 °F (-10 °C)

(2) $T_{s_{min}}$ is -148 °F (-100 °C)

(3) RT is Room Temperature of 68 °F (20 °C)

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Table 1-6. Chamber Pressure and Temperature Ratings (Stainless Steel 316 Bolting)

Class / Rating		Working Pressure (Psi and Bar) For The 9901 Chambers with Stainless 316 Bolting			
		Carbon Steel ⁽¹⁾		Stainless Steel ⁽²⁾	
		Psi	Bar	Psi	Bar
ASME B16.5 Class 150	Ps max (RT) ⁽³⁾	285	19.6	275	19.0
	Ps max (752 °F) / (400 °C)	95	6.5	95	6.5
	Pt	428	30	413	29
ASME B16.5 Class 300	Ps max (RT)	740	51.1	720	49.6
	Ps max (752 °F) / (400 °C)	505	34.7	425	29.4
	Pt	1110	77	1080	75
ASME B16.5 Class 600 ⁽⁴⁾	Ps max (RT)	1480	102.1	1440	99.3
	Ps max (392 °F) / (200 °C)	1268	87.6	1032	71.3
	Pt	2220	154	2160	149
EN1092 PN16	Ps max (RT)	232	16	227	15.7
	Ps max (752 °F) / (400 °C)	137	9.5	134	9.3
	Pt	348	24	348	24
EN1092 PN25	Ps max (RT)	362	25	356	24.6
	Ps max (752 °F) / (400 °C)	214	14.8	211	14.6
	Pt	543	37.5	536	37
EN1092 PN40	Ps max (RT)	580	40	569	39.3
	Ps max (752 °F) / (400 °C)	345	23.8	339	23.4
	Pt	870	60	855	59
EN1092 PN63 ⁽⁴⁾	Ps max (RT)	913	63	899	62
	Ps max (392 °F) / (200 °C)	761	52.5	645	44.5
	Pt	1377	95	1348	93
EN1092 PN100 ⁽⁴⁾	Ps max (RT)	1450	100	1427	98.4
	Ps max (392 °F) / (200 °C)	1208	83.3	1025	70.7
	Pt	2175	150	2146	148

(1) *Ts min is 14 °F (-10 °C)*

(2) *Ts min is -148 °F (-100 °C)*

(3) *RT = Room Temperature of 68 °F (20 °C)*

(4) *Limited to 392 °F (200 °C)*

G. MANUFACTURER

Mobrey Limited, 158 Edinburgh Avenue, Slough, Berkshire, SL1 4UE, United Kingdom

H. PRODUCT RECYCLING/DISPOSAL

Recycling of equipment and packaging should be taken into consideration. The product and packaging should be disposed of in accordance with local and national legislation.

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Rosemount Level Solutions

Emerson provides a complete range of Rosemount products for level measurement applications.

Pressure – Level or Interface Measurement

Emerson has a complete line of Rosemount pressure transmitters and remote seals for measuring level or interfaces in liquid applications. Optimize performance with direct mount, Tuned Seal systems:

- Rosemount 3051S_L, 3051L, and 1151LT Liquid Level Transmitters
- Rosemount 1199 Remote Diaphragm Seals with direct mount or capillary connections

Vibrating Fork Switches – Point Level Detection

The Rosemount 2100 Series is developed for reliable point level detection of liquids and consists of:

- Rosemount 2110 Compact Vibrating Fork Liquid Level Switch
- Rosemount 2120 Full-featured Vibrating Fork Liquid Level Switch

Guided Wave Radar – Level and Interface Measurement

Multivariable, loop-powered Guided Wave Radar transmitters with a wide range of probe styles to fit different liquids and solids applications. The product line consists of:

- Rosemount 3300 Series – Versatile and easy-to-use transmitter with proven reliability
- Rosemount 5300 Series – Accurate, high performance transmitter with FOUNDATION™ fieldbus support

Non-contacting Radar – Level Measurement

The Rosemount non-contacting radar family consists of:

- Rosemount 5400 Series Transmitters – Loop-powered transmitter with a wide range of antennas, for liquid level measurement in most applications and process conditions
- Rosemount 5600 Series Transmitters – Transmitters with ultra-high sensitivity for measurement of level in liquids and solids, even for the most challenging applications

Non-contacting Ultrasonic – Level Measurement

The Rosemount 3100 Series ultrasonic level transmitters provide continuous non-contacting level measurement of liquids. The range consists of:

- Rosemount 3101 for simple continuous level measurement
- Rosemount 3102 for continuous measurement with two integral relays for local control functionality
- Rosemount 3105 Intrinsically safe certified version for hazardous areas

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