

ZT11

Pressure Sensor

for the Semiconductor Industry

Outline

This is a pressure sensor with a thin-film semiconductor strain gauge.
We have added an increased-safety construction type to our lineup, further enhancing safety when using equipment.

Features

- A zero adjustment mechanism is provided on the side of the case to improve workability.
- Lineup includes UHP-grade models equivalent to Hastelloy® C-22.
- Added increased safety (Ex ec) models to our line up.



Product appearance			
	Type	Standard (Gauge pressure)	Increased safety (Gauge pressure)
	Model number	ZT11-2	ZT11-F, H
	Label color	Green	Black



List of grade

Cleanliness These pressure sensors have been assembled, adjusted, inspected and packaged in a clean room, paying special attention for maintaining cleanliness.

Grade		UHP (Ultra-High Purity)	EP (Electro Polishing)	GP (General Purpose)
Surface roughness of gas contact		0.13 μ m Ra Avg.	0.18 μ m Ra Avg.	0.5 μ m Ra Avg.
Wetted parts	Pressure sensor	Hastelloy®C-22 equivalent	SUS316L	
	Fitting	SUS316L		
Maximum allowable pressure *1		200% of rated pressure	150% of rated pressure	
Leakage (Helium leak rate)		5×10 ⁻¹² Pa・m ³ /s or under		
Particle		Zero count for size 0.1 μ m or greater (In our inspection standard)		No regulation
Cleaning		Ultra clearance (Cleaning)		Degreasing
Operating media *2 (Recommended)		High-purity gas, semiconductor material gas, etc.		Purge gas, exhaust gas, etc.

*1 The maximum allowable pressure is the highest pressure at which the product safely returns to normal operation once the pressure is reduced back within the rated range after temporary overpressure. It can withstand several static overpressure events of about 10 minutes each without performance degradation, but repeated overpressure exposure is not guaranteed.

*2 Please confirm if the gas contact part material is suitable for the gas to be measured.

* UHP and EP grade products are double-packed (N2 sealed).

Specification

Item	Descriptions			
Measurement fluid	Various kinds of process gases for semiconductor			
Fitting shape	Type T integral structure (forged), Type S, Surface-mount fitting			
Connection	Integral structure compatible with 1/4 VCR®, 1/2 (3/8) VCR®, 1/4 UJR™, 1.125 C-Seal			
Internal volume	Approx. 0.9 cm³ (For Type S and 1/4UJR™, it depends on the fitting shape.)			
Pressure sensor seal method	Welding type			
Pressure range*1	Gauge Pressure	0 to 0.3, 0.5, 1, 2, 3.5, 5, 10, 20 MPa -0.1 to 0.3, 0.5, 1, 2, 3.5, 5, 10, 20 MPa		
Power supply voltage	Standard	10 to 30V DC (4 to 20mA DC) 13 to 32V DC (0 to 10V DC)		
	Increased safety "ec"	12 to 24V DC (4 to 20mA DC)		
Load resistance	4 to 20mA DC: R max. (Ω) =50E—500 [E: Power supply voltage] , 0 to 10V DC: 10kΩ min.			
Output	4 to 20mA DC or 0 to 10V DC			
Transmission system	2-wire system (4 to 20mA DC) or 3-wire system (0 to 10V DC)			
Accuracy	±0.25% F.S. (at 23°C) (Including linearity, hysteresis and repeatability)			
Temperature coefficient (ZERO, SPAN)	±0.02% F.S./°C			
Operating temperature	Standard	-20 to 70°C (No freezing or condensation)		
	Increased safety "ec"	Temperature class	T4	-20 to 70°C (No freezing or condensation)
			T5	
			T6	-20 to 30°C (No freezing or condensation)
Strage temperature	-30 to 80°C (No freezing or condensation)			
Insulation resistance	100MΩ or over (joint to I/O terminal package: 50VDC)			
Electrical connections	M12 connector connection (4-pin) or Bayonet connector connection (4-pin)			
Case material	SUS305, PBT			
Protection class*2	Standard	IP67 (IEC60529)		
	Increased safety "ec"	IP65 (IEC60529)		
Zero adjustment mechanism	External adjustment method (Side of case)			
Weight	Approx. 70 g (for M12 connector, Type S; excluding cable; varies depending on fitting shape)			

*1 For Surface-mount C-seal fittings, the maximum available pressure rating is 1MPa.

*2 Mated state with connector cable

Increased safety type pressure sensor (Type of protection: "ec")

Features

- Acquired certifications for increased safety type construction ("ec") from IECEx, ATEX, JAPAN, TS, KCs, and NEPSI.
EX ec II C T4/T5/T6 Gc
- This pressure sensor can be used without a safety barrier in Zone 2 (Category 3G) areas.

* For the increased safety (Ex ec) type, only M12 connector with 4 to 20mA DC output is available

Attention

Please be sure to use the M12 connector cable specified by us.



(Gauge pressure)

Increased Safety specification

	Specifications					
Intrinsically safe standard	IECEX (International)	ATEX (Europe)	TS (Taiwan)	KCs (Korea)	JAPAN	NEPSI (China)
Certificate number	IECEX CML 21.0001X	CML 20ATEX3232X	TD10003L (Identification No.)	21-AV4B0-0262X	CML 23JPN3070X	GYJ23.1080X
Hazardous area classifications	Zone 2	Category 3G	Zone 2			
Applicable standards	IEC 60079-0: 2017 IEC 60079-7: 2017	EN 60079-0: 2018 EN 60079-7: 2015+A1: 2018	CNS3376-0 CNS3376-7	IEC 60079-0: 2017 IEC 60079-7: 2017 (Notice 2021-22)	JNIO SH-TR-46-1:2020 JNIO SH-TR-46-5:2018	GB/T 3836.1-2021 GB/T 3836.3-2021
Applicable directive		2014/34/EU (ATEX Directive)				
Ex marking	<div><div>Ex ec</div><div>IIC</div><div>T4/T5/T6</div><div>Gc</div><div>Equipment protection level</div><div>Temperature class</div><div>Group of gases</div><div>Increased safety "ec"</div></div>					
Container protection class	IP65 (Cable with M12 connector fitted.)					
Withstand voltage	500V AC for 1 minute					
Operating temperature	Temperature class		T4	-20 to 70℃ (No freezing or condensation)		
			T5			
			T6	-20 to 30℃ (No freezing or condensation)		
Power supply voltage	12 to 24V DC					

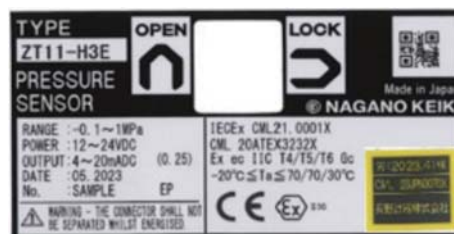
* For the increased safety (Ex ec) type, only M12 connector with 4 to 20mA DC output is available.

Label

Increased safety "ec" for overseas



Increased safety "ec" for JAPAN




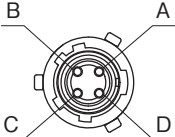
* The label is an example of Increased safety "ec", gauge pressure, label color: black.

* For overseas and for JAPAN are printed differently on the label.



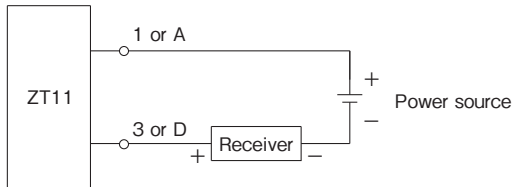
Electrical connection

M12 Connector terminal array	Terminal number	2-wire system	3-wire system	Cable color
	1	Power source (+)	Power source (+)	Brown
	2	—	—	White
	3	Power source (-)	Common	Blue
	4	—	Output (+)	Black

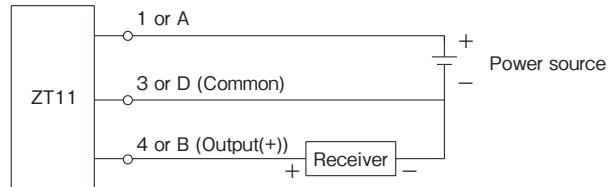
Bayonet Connector terminal array	Terminal number	2-wire system	3-wire system	Cable color
	A	Power source (+)	Power source (+)	Red
	B	—	Output (+)	Green
	C	—	—	Blue
	D	Power source (-)	Common	White

Wiring

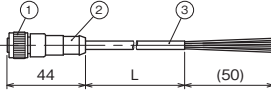
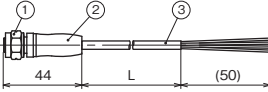
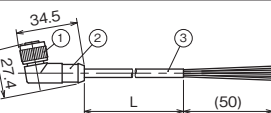
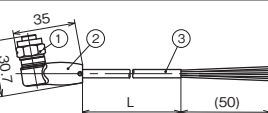
2-wire system



3-wire system



M12 cable with connector (Optional)

	PUR cable (Oilproof)	PVC cable (Stainless nut)
Straight		
Type L		
Material	① Zinc die casting (Nickel plating) ② TPU (Green) ③ PUR (Black)	① Stainless ② PP (White) ③ PVC (Gray)
Cable length (L)	3m or 5m	3m or 5m
Cross-section area of conductor	0.34mm ² (22AWG)	0.34mm ² (22AWG)
Core diameter including insulation	1.27mm	1.26mm
External cable diameter	4.7mm	4.7mm

Caution

Please be sure to use the M12 connector cable specified in the left column when using the "ec" increased safety type.

* The degree of protection is ensured only when the M12 connector cable is in the mated state.

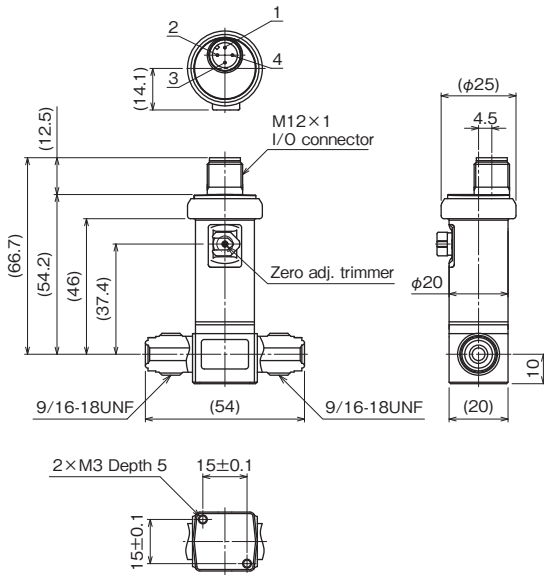
* Please contact us regarding the Bayonet connector cable.

Dimensions 1

ZT11-1, 5 (gauge pressure),
ZT11-E, G (type“ec” gauge)

Unit: mm

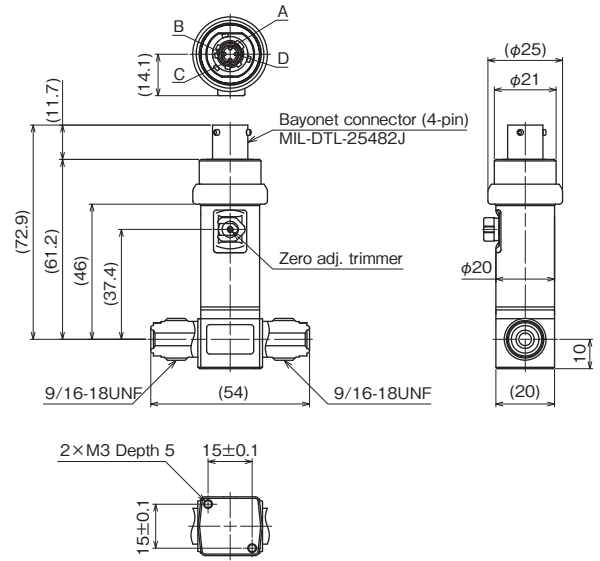
Type T (M12 connector)



1/4 Compatible with VCR®

ZT11-13 ☐
ZT11-E3 ☐
ZT11-G3 ☐

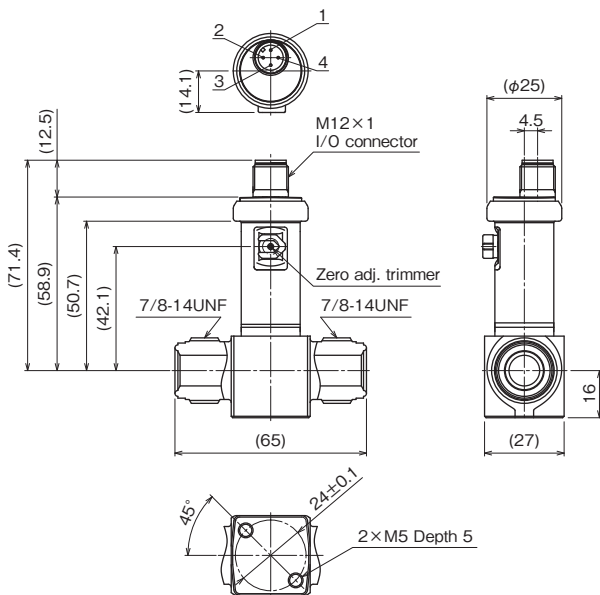
Type T (Bayonet connector)



1/4 Compatible with VCR®

ZT11-53 ☐

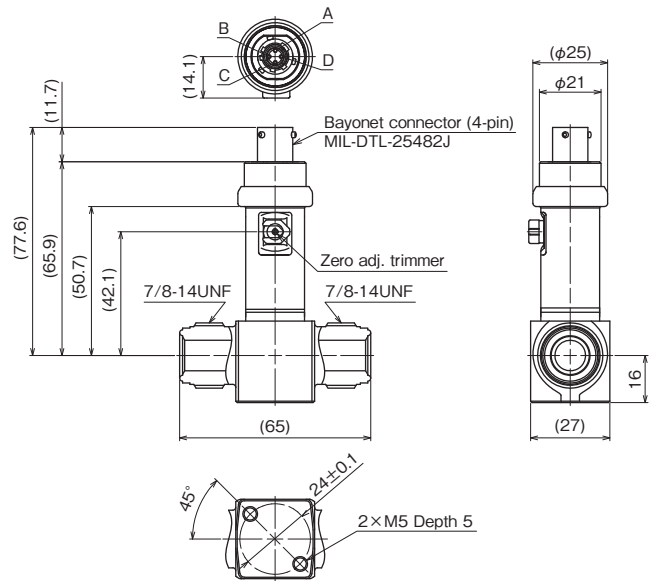
Type T (M12 connector)



1/2 (3/8) Compatible with VCR®

ZT11-14 ☐
ZT11-E4 ☐
ZT11-G4 ☐

Type T (Bayonet connector)



1/2 (3/8) Compatible with VCR®

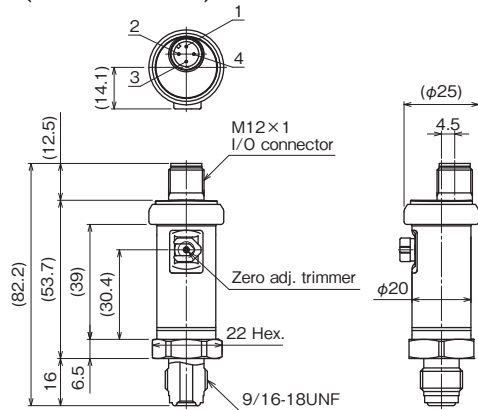
ZT11-54 ☐

Dimensions 2

ZT11-2, 6 (gauge pressure),
ZT11-F, H (type "ec" gauge),

Unit: mm

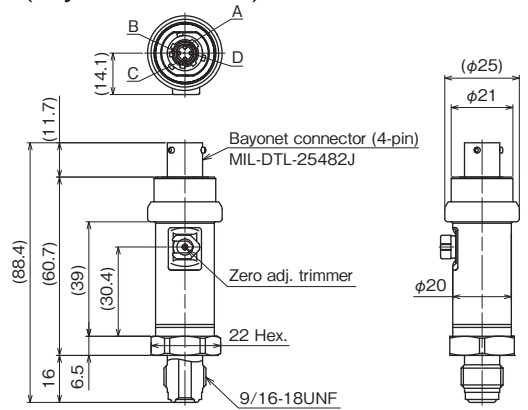
Type S (M12 connector)



1/4 Compatible with VCR®

ZT11-23
ZT11-F3
ZT11-H3

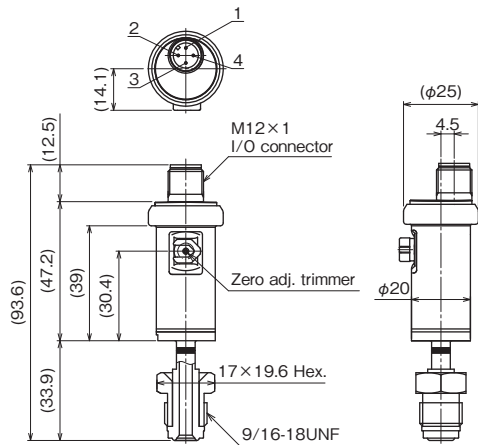
Type S (Bayonet connector)



1/4 Compatible with VCR®

ZT11-63

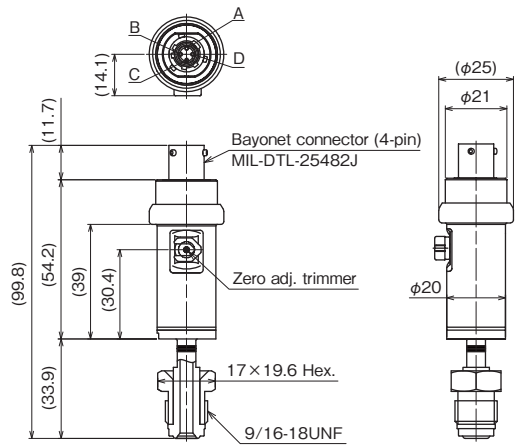
Type S (M12 connector)



1/4 UJR™

ZT11-2NE, 2NG
ZT11-FNE, FNG
ZT11-HNE, HNG

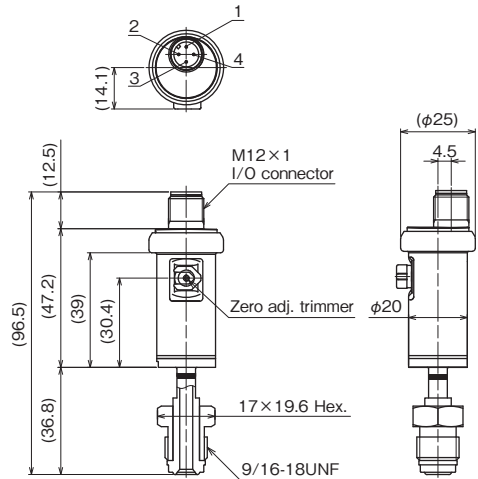
Type S (Bayonet connector)



1/4 UJR™

ZT11-6NE, 6NG

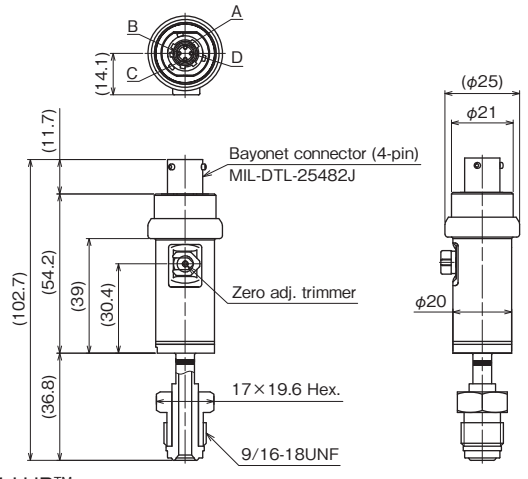
Type S (M12 connector)



1/4 UJR™

ZT11-2NC
ZT11-FNC
ZT11-HNC

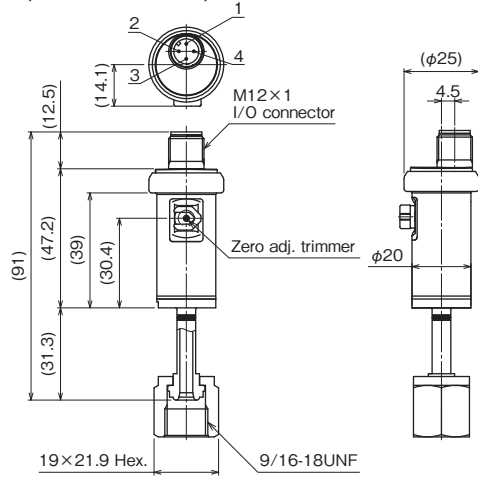
Type S (Bayonet connector)



1/4 UJR™

ZT11-6NC

Type S (M12 connector)

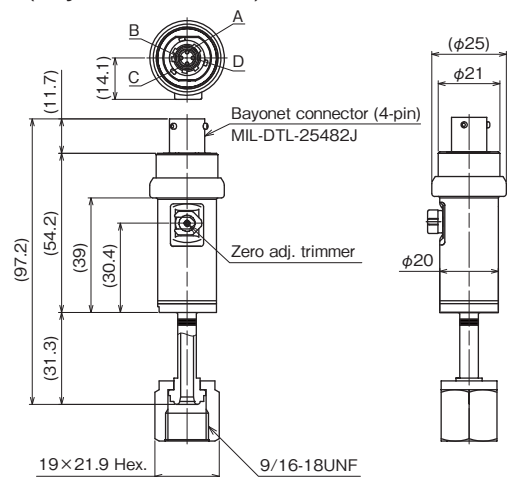


1/4 UJR™

ZT11-2QE, 2QG
ZT11-FQE, FQG
ZT11-HQE, HQG

Type S (Bayonet connector)

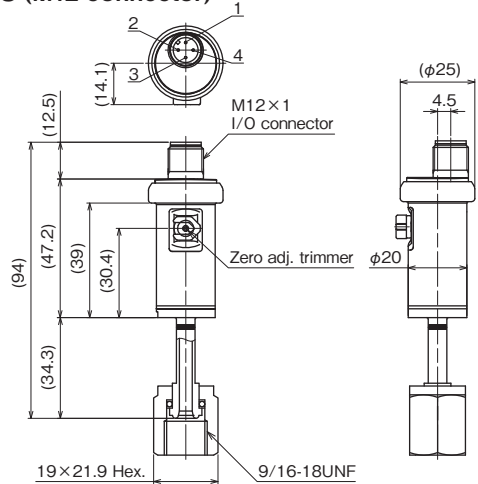
Unit: mm



1/4 UJR™

ZT11-6QE, 6QG

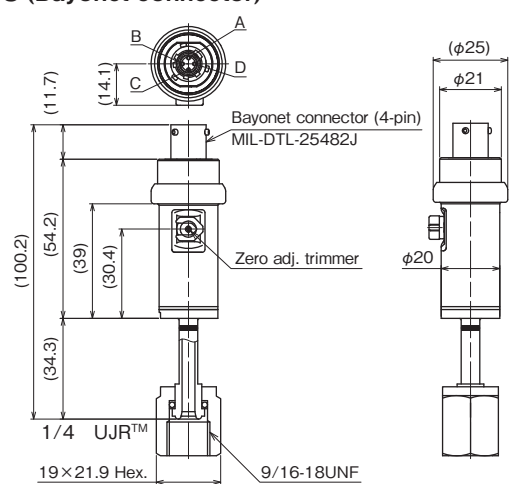
Type S (M12 connector)



1/4 UJR™

ZT11-2QG
ZT11-FQG
ZT11-HQG

Type S (Bayonet connector)



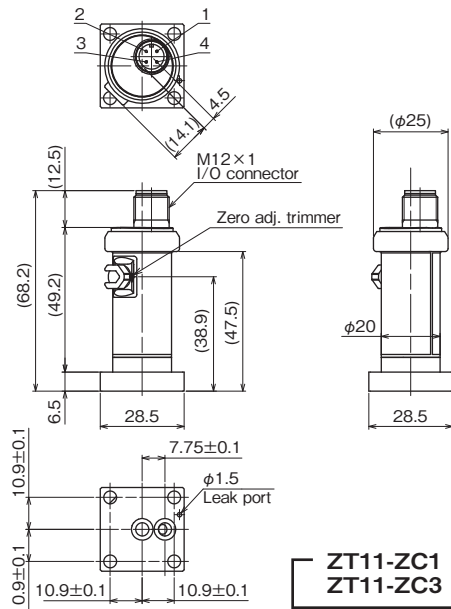
1/4 UJR™

ZT11-6QC

Dimensions 3

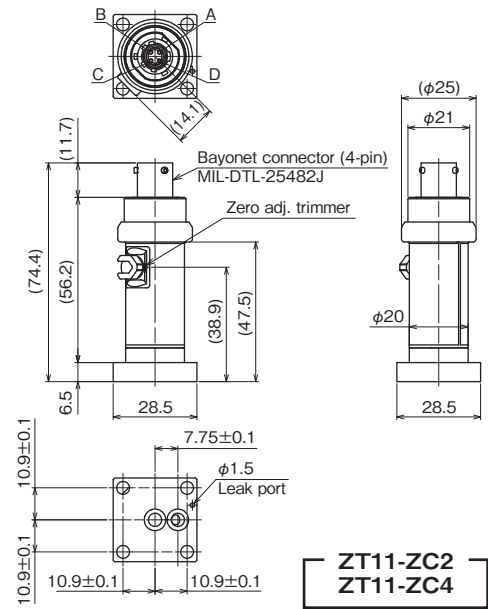
ZT11-Z (gauge pressure),

Surface-mount fitting (M12 connector)



ZT11-ZC1
ZT11-ZC3

Surface-mount fitting (Bayonet connector)



ZT11-ZC2
ZT11-ZC4

Gauge pressure range product

Model number configuration

Please specify the model number, each specs and the range for ordering.

Model

Z T 1 1

V

×

×

×

×

×

×

×

Pressure Sensor (gauge pressure)
for Semiconductor Industry

①

②

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⑭

⑮

Model number

Selective spec.

Additional spec. (Option)

①

Mounting (Attention)

1

Type T

M12 connector connection

Construction: IP67

2

Type S

M12 connector connection

Construction: IP67

5

Type T

Bayonet connector connection

Construction: IP67

6

Type S

Bayonet connector connection

Construction: IP67

E

Type T Increased safety "ec" for overseas

M12 connector connection

Construction: IP65

F

Type S Increased safety "ec" for overseas

M12 connector connection

Construction: IP65

G

Type T Increased safety "ec" for JAPAN

M12 connector connection

Construction: IP65

H

Type S Increased safety "ec" for JAPAN

M12 connector connection

Construction: IP65

②

Connection
of fitting

3

1/4

Compatible with VCR® Male integrated

Type S

Type T

○

○

4

1/2
(3/8)

Compatible with VCR® Male integrated

×

○

N

1/4

UJR™ Male nut

○

×

Q

1/4

UJR™ Female nut (Without pure ring)*1

○

×

③

Wetted parts
by grade

C

UHP Grade • Pressure sensor : Hastelloy®C-22 equivalent (All welding) • Fitting : SUS316L

E

EP Grade • Pressure sensor: SUS316L (All welding) • Fitting: SUS316L

G

GP Grade • Pressure sensor: SUS316L (All welding) • Fitting: SUS316L

④

Pressure range*2

C

-0.1 to 0.3MPa

1

0 to 0.3MPa

D

-0.1 to 0.5MPa

2

0 to 0.5MPa

E

-0.1 to 1MPa

3

0 to 1MPa

F

-0.1 to 2MPa

4

0 to 2MPa

G

-0.1 to 3.5MPa

5

0 to 3.5MPa

H

-0.1 to 5MPa

- VCR® is the registered trademark of SWAGELOK.
- UJR™ is the trademark of Fujikin Incorporated.

Gauge pressure range product

Model number configuration

Please specify the model number, each specs and the range for ordering.

Model

Z T 1 1 — **Z C** — **V** × × × × × × × ×

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮

Pressure Sensor (gauge pressure)
for Semiconductor Industry

Model number

Selective spec. Additional spec. (Option)

① Mounting **Z** Surface-mount fitting

② Connection of fitting **C** 1.125 C-Seal (Without bolt)

③ Wetted parts by grade/
Electrical connections

1	UHP Grade · Pressure sensor : Hastelloy® C-22 equivalent (All welding) · Fitting : SUS316L / M12 connector connection (4-pin)
2	UHP Grade · Pressure sensor : Hastelloy® C-22 equivalent (All welding) · Fitting : SUS316L / Bayonet connector connection (4pin)
3	EP Grade · Pressure sensor: SUS316L (All welding) · Fitting: SUS316L / M12 connector connection (4-pin)
4	EP Grade · Pressure sensor: SUS316L (All welding) · Fitting: SUS316L / Bayonet connector connection (4pin)

④ Pressure range*1

C	-0.1 to 0.3MPa
D	-0.1 to 0.5MPa
E	-0.1 to 1MPa
1	0 to 0.3MPa
2	0 to 0.5MPa
3	0 to 1MPa

Please specify the pressure range and units separately besides selection of range code.

⑤ Accuracy **V** ±0.25%F.S. (Temperature coefficient ±0.02%F.S./°C)

⑥ Power source

⑦ Output

⑥	⑦	⑥ Power source	⑦ Output
M	1	10 to 30V DC	4 to 20mA DC (2-wire system)
9	7	13 to 32V DC	0 to 10V DC (3-wire system)

⑨ Connector cable

0	Nil
1	M12 connector
2	PUR cable (Oilproof)
3	M12 connector PVC cable (Stainless nut)
4	
5	M12 connector
6	PUR cable (Oilproof)
7	PVC cable (Stainless nut)
8	
J	Bayonet connector cable
K	Bayonet connector cable

⑮ Documents

0	Nil
1	Required (Please specify the desired documents separately.) Submission drawings, instruction manual, inspection procedure, mill sheet, test report (1 pc 1 copy), inspection / traceability certificate, strength calculation, attended inspection

* 1 : ③ UHP Grade, please select from 0~0.5, 1MPa, -0.1~0.5, 1MPa.

* Specify "X" if there is no applicable specification.