

# ZT11 Pressure Sensor for Semiconductor Industry

## Outline

This instrument is a pressure sensor that uses thin film deposition type semiconductor strain gauge. We added the increased safety construction type to our portfolio that improves safety still farther when using equipment and facilities.

## Features

- Improved temperature characteristics ( $\pm 0.02\% \text{F.S./}^\circ\text{C}$ )
- Zero adjustment mechanism is provided on the side of the case to improve workability.
- In addition to gauge pressure (positive pressure /compound) range, absolute pressure range is also available.
- Added the increased safety construction type to our portfolio.



Identification by label color					
	Type	Standard (Gauge pressure)	Increased safety (Gauge pressure)	Standard (Absolute pressure)	Increased safety (Absolute pressure)
	Model number	ZT11-2	ZT11-F, H	ZT11-4	ZT11-Q, U
	Label color	Green	Black	Yellow-green	brown



## List of grade

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

Grade		EP (Electro Polishing)	GP (General Purpose)
Surface roughness of gas contact		0.18 $\mu\text{m}$ Ra Avg.	0.5 $\mu\text{m}$ Ra Avg.
Wetted parts	Pressure sensor	SUS316L	
	Fitting	SUS316L	
Maximum allowable pressure *1		150% of rated pressure	
Leakage (Helium leak rate)		$5 \times 10^{-12} \text{ Pa} \cdot \text{m}^3/\text{s}$ or under	
Particle		Zero count for size 0.1 $\mu\text{m}$ 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 upper limit of pressure value which may safely be applied to the product and remain in specification once pressure is returned to the rated range which a couple of times over pressurization for about 10 minutes. Effects of continuous over pressure are not guaranteed.

\*2 Please confirm if the gas contact part material is suitable for the gas to be measured. For UC grade (pressure sensor material: Co-Ni alloy), please contact us.

### Specification

Item	Descriptions			
Measurement fluid	Various kinds of process gases for semiconductor			
Fitting shape	Type T integral structure (forged), Type S			
Connection	Integral structure compatible with 1/4 VCR®, 1/2 (3/8) VCR®, 1/4 UJR™			
Internal volume	Approx. 0.9 cm <sup>3</sup> (For Type S and 1/4UJR™, it depends on the fitting shape.)			
Pressure sensor seal method	Welding type			
Pressure range	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		
	Absolute Pressure	0 to 0.3, 0.5, 1, 2, 3.5, 5, 10, 20 MPa abs.		
Power supply voltage	Standard	10 to 30V DC		
	Increased safety "ec"	12 to 24V DC		
Load resistance	R max. (Ω) =50E-500 [E: Power supply voltage]			
Output	4 to 20mA DC			
Transmission system	2-wire system			
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)	
Storage 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)			
Case material	SUS305, PBT			
Protection class*	Standard	IP67 (IEC60529)		
	Increased safety "ec"	IP65 (IEC60529)		
Zero adjustment mechanism	External adjustment method (Side of case)			
Weight	Approx. 70 g (For Type S, it depends on the joint shape, excluding the cable.)			

\*Mated state with M12 connector cable

## Increased safety Pressure Sensor Type of protection "ec"

### Features

- Acquired: the increased safety type construction of IECEx, ATEX, JAPAN, TS, KCs, and NEPSI. Ex ec II C T4/T5/T6 Gc
- This pressure sensor can be used without the safety barrier in the places (Zone 2 / Category 3G).

**Attention**  
Please make sure to use with the M12 connector cable specified by us.



(Gauge pressure)



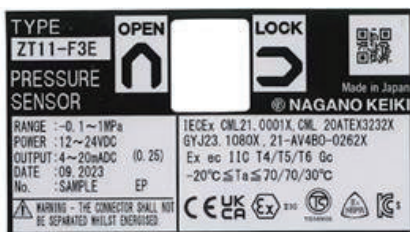
(Absolute pressure)

### Intrinsically safe specification

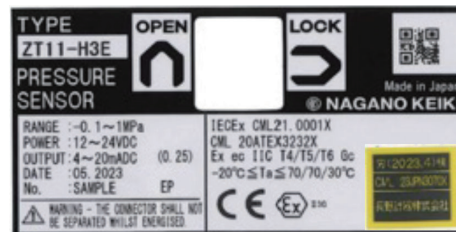
Intrinsically safe standard	Specifications					
	IECEX (International)	ATEX (Europe)	TS (Taiwan)	KCs (Korea)	JAPAN	NEPSI (China)
Certificate number	IECEX CML 21.0001X	CML 20ATEX3232X	TD10003L (Identification No.)	21-AV4B0-0262X	CML 23JPN3070X	GYJ23.1080X
Hazardous area classifications	Zone 2	Category 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 style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>Ex ec</p> <p>└─ Increased safety "ec"</p> </div> <div style="text-align: center;"> <p>IIC</p> <p>└─ Group of gases</p> </div> <div style="text-align: center;"> <p>T4/T5/T6</p> <p>└─ Temperature class</p> </div> <div style="text-align: center;"> <p>Gc</p> <p>└─ Equipment protection level</p> </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°C (No freezing or condensation)		
			T5			
			T6	-20 to 30°C (No freezing or condensation)		
Power supply voltage	12 to 24V DC					

### Label

Increased safety "ec" for overseas



Increased safety "ec" for domestic



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

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

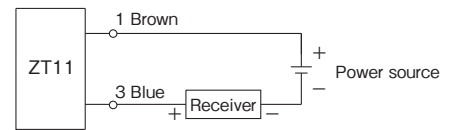


### Electrical connection

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

### Wiring

#### 2-wire system



#### 2-wire system Terminal array

- 1 - Brown: Power source (+)
- 3 - Blue: Power source (-)

### M12 cable with connector (Optional)

	PUR cable (Oilproof)	PVC cable (Stainless nut)
Straight		
Type L		
Material	<ul style="list-style-type: none"> <li>① Zinc die casting (Nickel plating)</li> <li>② TPU (Green)</li> <li>③ PUR (Black)</li> </ul>	<ul style="list-style-type: none"> <li>① Stainless</li> <li>② PP (White)</li> <li>③ PVC (Gray)</li> </ul>
Cable length (L)	3m or 5m	3m or 5m
Cross-section area of conductor	0.34mm <sup>2</sup> (22AWG)	0.34mm <sup>2</sup> (22AWG)
Core diameter including insulation	1.27mm	1.26mm
External cable diameter	4.7mm	4.7mm

\* The protection structure of the cable with the M12 connector is protection class in a mating state.

### Caution

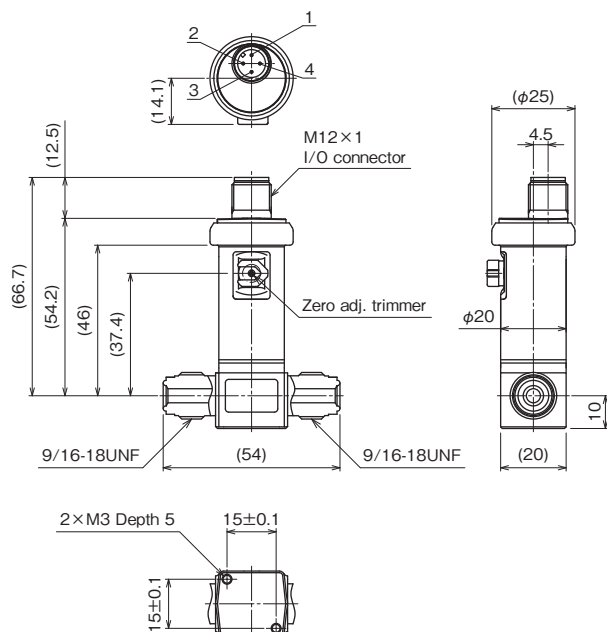
Please make sure to use the M12 connector cable shown in the left column when you specified "ec" increased safety type.

### Dimensions 1

ZT11-1 (gauge pressure), ZT11-3 (absolute pressure),  
ZT11-E, G (type "ec" gauge), ZT11-P, T (type "ec" absolute)

Unit: mm

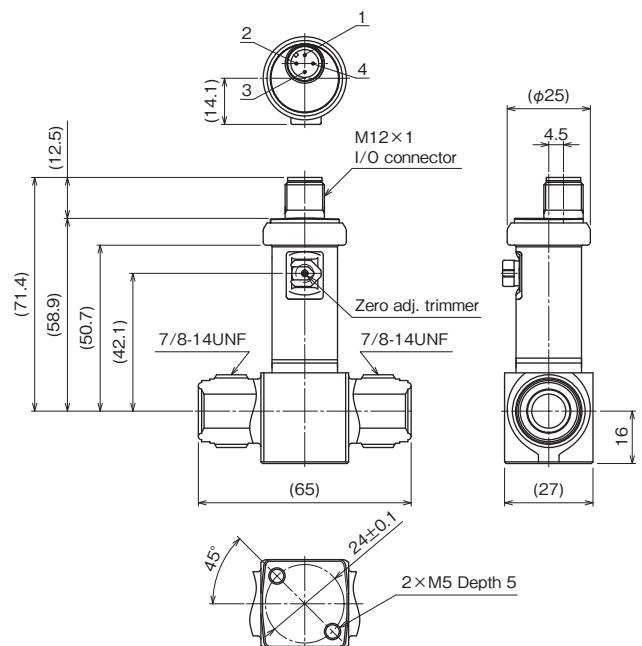
#### Type T



1/4 Compatible with VCR®

ZT11-13	<input type="checkbox"/>
ZT11-33	<input type="checkbox"/>
ZT11-E3	<input type="checkbox"/>
ZT11-G3	<input type="checkbox"/>
ZT11-P3	<input type="checkbox"/>
ZT11-T3	<input type="checkbox"/>

#### Type T



1/2 (3/8) Compatible with VCR®

ZT11-14	<input type="checkbox"/>
ZT11-34	<input type="checkbox"/>
ZT11-E4	<input type="checkbox"/>
ZT11-G4	<input type="checkbox"/>
ZT11-P4	<input type="checkbox"/>
ZT11-T4	<input type="checkbox"/>

# ZT11

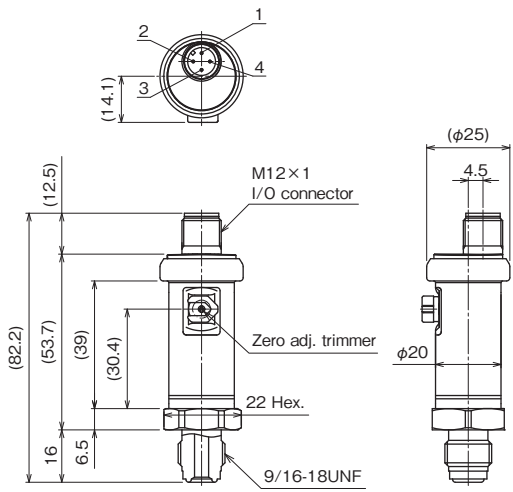
## Pressure Sensor

### Dimensions 2

ZT11-2 (gauge pressure), ZT11-4 (absolute pressure),  
ZT11-F, H (type "ec" gauge), ZT11-Q, U (type "ec" absolute)

Unit: mm

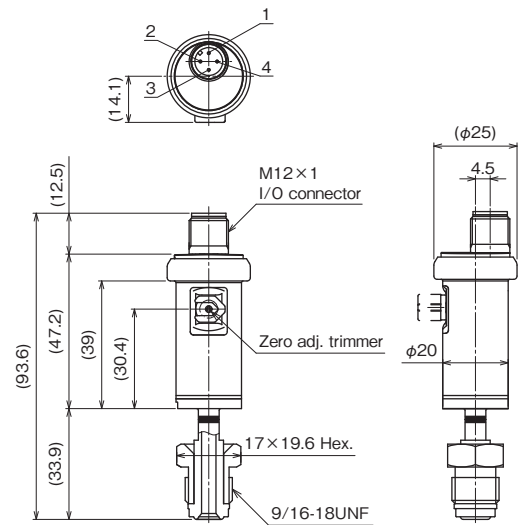
#### Type S



1/4 Compatible with VCR®

- ZT11-23
- ZT11-43
- ZT11-F3
- ZT11-H3
- ZT11-Q3
- ZT11-U3

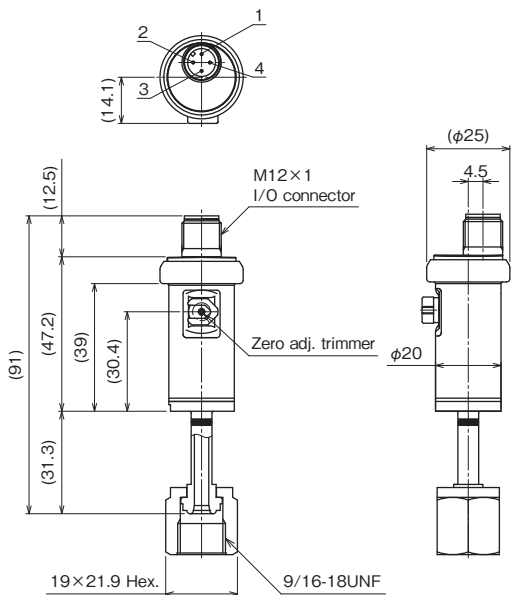
#### Type S



1/4 UJR™

- ZT11-2N
- ZT11-4N
- ZT11-FN
- ZT11-HN
- ZT11-QN
- ZT11-UN

#### Type S



1/4 UJR™

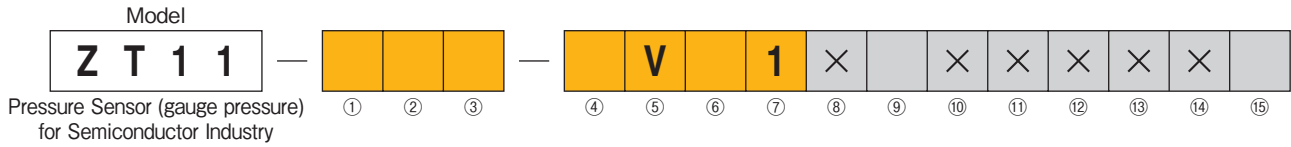
- ZT11-2Q
- ZT11-4Q
- ZT11-FQ
- ZT11-HQ
- ZT11-QQ
- ZT11-UQ

**Zero adjustment trimmer:**  
Upward (placed next to the input/output connector) If you require a Zero adjustment trimmer, we have another model, Please contact us.

### Gauge pressure range product

#### Model number configuration

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



Model number		Selective spec.	Additional spec. (Option)	
① Mounting (Attention)	1	Type T	Construction: IP67	
	2	Type S	Construction: IP67	
	E	Type T Increased safety "ec" for overseas	Construction: IP65	
	F	Type S Increased safety "ec" for overseas	Construction: IP65	
	G	Type T Increased safety "ec" for domestic	Construction: IP65	
	H	Type S Increased safety "ec" for domestic	Construction: IP65	
	② Connection of fitting	3	1/4	Compatible with VCR <sup>®</sup> Male integrated
4		1/2 (3/8)	Compatible with VCR <sup>®</sup> Male integrated	Type S <input checked="" type="radio"/> Type T <input type="radio"/>
N		1/4	UJR <sup>™</sup> Male nut	Type S <input type="radio"/> Type T <input checked="" type="radio"/>
Q		1/4	UJR <sup>™</sup> Female nut (Without pure ring)	Type S <input type="radio"/> Type T <input checked="" type="radio"/>
③ Wetted parts by grade		E	EP Grade · Pressure sensor: SUS316L (All welding) · Fitting: SUS316L	
	G	GP Grade · Pressure sensor: SUS316L (All welding) · Fitting: SUS316L		
④ Pressure range	C	-0.1 to 0.3MPa		
	D	-0.1 to 0.5MPa		
	E	-0.1 to 1MPa		
	F	-0.1 to 2MPa		
	G	-0.1 to 3.5MPa		
	H	-0.1 to 5MPa		
	J	-0.1 to 10MPa		
	K	-0.1 to 20MPa		
	1	0 to 0.3MPa		
	2	0 to 0.5MPa		
	3	0 to 1MPa		
4	0 to 2MPa			
5	0 to 3.5MPa			
6	0 to 5MPa			
7	0 to 10MPa			
8	0 to 20MPa			
⑤ Accuracy	V	±0.25%F.S. (Temperature coefficient ±0.02%F.S./°C)		
⑥ Power source	M	10 to 30V DC (Standard)		
	N	12 to 24V DC (Increased safety "ec")		
⑦ Output	1	4 to 20mA DC (2-wire system)		
⑨ M12 connector cable	0	Nil		
	1	PUR cable (Oilproof)	Straight	Cable length 3m
	2		L type	
	3	PVC cable (Stainless nut)	Straight	
	4		L type	
	5	PUR cable (Oilproof)	Straight	Cable length 5m
	6		L type	
	7	PVC cable (Stainless nut)	Straight	
8	L type			
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		

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

**Attention**  
Please make sure to use with the M12 connector cable specified by us.

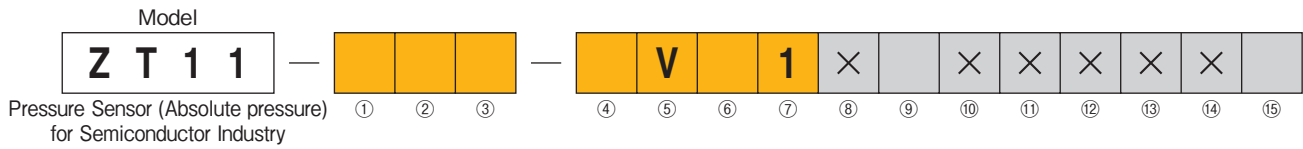
\* Specify "X" if there is no applicable specification.

· VCR<sup>®</sup> is the registered trademark of SWAGELOK.  
· UJR<sup>™</sup> is the trademark of Fujikin Incorporated.

### Absolute pressure range products

#### Model number configuration

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



Model number		Selective spec.		Additional spec. (Option)		
① Mounting (Attention)	3	Type T	Construction: IP67			
	4	Type S	Construction: IP67			
	P	Type T Increased safety "ec" for overseas	Construction: IP65			
	Q	Type S Increased safety "ec" for overseas	Construction: IP65			
	T	Type T Increased safety "ec" for domestic	Construction: IP65			
	U	Type S Increased safety "ec" for domestic	Construction: IP65			
② Connection of fitting	3	1/4	Compatible with VCR <sup>®</sup> Male integrated		Type S	Type T
	4	1/2 (3/8)	Compatible with VCR <sup>®</sup> Male integrated		×	○
	N	1/4	UJR <sup>™</sup> Male nut		○	×
	Q	1/4	UJR <sup>™</sup> Female nut (Without pure ring)		○	×
③ Wetted parts by grade	E	EP Grade · Pressure sensor: SUS316L (All welding) · Fitting: SUS316L				
	G	GP Grade · Pressure sensor: SUS316L (All welding) · Fitting: SUS316L				
④ Pressure range	R	0 to 0.3MPa abs.				
	S	0 to 0.5MPa abs.				
	T	0 to 1MPa abs.				
	U	0 to 2MPa abs.				
	V	0 to 3.5MPa abs.				
	W	0 to 5MPa abs.				
	X	0 to 10MPa abs.				
	Y	0 to 20MPa abs.				
⑤ Accuracy	V	±0.25%F.S. (Temperature coefficient ±0.02%F.S./°C)				
⑥ Power source	M	10 to 30V DC (Standard)				
	N	12 to 24V DC (Increased safety "ec")				
⑦ Output	1	4 to 20mA DC (2-wire system)				
⑨ M12 connector cable	0	Nil				
	1	PUR cable (Oilproof)	Straight	Cable length 3m		
	2		L type			
	3	PVC cable (Stainless nut)	Straight			
	4		L type			
	5	PUR cable (Oilproof)	Straight	Cable length 5m		
	6		L type			
	7	PVC cable (Stainless nut)	Straight			
8	L type					
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				

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

**Attention**  
Please make sure to use with the M12 connector cable specified by us.

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

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