

ZT60

Digital Pressure Gauge for Semiconductor Industry

Outline

This Digital Pressure Gauge for the semiconductor industry uses a semiconductor strain gauge sensor which has track records of durability and stability in its pressure-sensitive portions. It is equipped with a variety of intelligent functions like comparator output, analog output, and loop checking function, and takes high reliability on measurements.

Features

- The high corrosion resistant pressure sensor made of Co-Ni alloy or SUS316L is directly welded to the 316Lst.st. coupling portion, demonstrating excellent corrosion resistance, hermetic properties, stability and reliability.
*Please confirm that material in contact with gas is suitable for it.
- The gauge uses a large 4-digit LED display that is bright and easy to see. Users can choose either vertical or horizontal mounting type.
- The loop checking function is designed to cut down on inspection labor. Additionally, the scaling function (Display, output) and zero adjustment function make bothersome adjustments unnecessary.
- Also offers a wide variety of coupling options.



RoHS



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		UC (Ultra Clean)	BA (Bright Annealing)	EP (Electro Polishing)	GP (General Purpose)
Surface roughness of gas contact		0.18 μ m Ra Avg. 0.7 μ m Rz Max.	Approx. Rz 2.5 μ m	0.18 μ m Ra Avg.	0.5 μ m Ra Avg.
Wetted parts	Pressure sensor	Co-Ni alloy		SUS316L	
	Fitting *1	SUS316L		SUS316L	
Maximum allowable pressure *2		200% of rated pressure		150% of rated pressure	
Leakage (Helium leak rate)		5 x 10 ⁻¹² Pa·m ³ /s and under		5 x 10 ⁻¹² Pa·m ³ /s and under	
Particle		Zero count for size 0.1 μ m or greater (In our inspection standard)	—————	Zero count for size 0.1 μ m or greater (In our inspection standard)	—————
Cleaning		Ultra clearance (Cleaning)	Degreasing	Ultra clearance (Cleaning)	Degreasing
Operating media *3 (Recommended)		High-purity gas, semiconductor material gas, etc.	Purge gas, exhaust gas, etc.	High-purity gas, semiconductor material gas, etc.	Purge gas, exhaust gas, etc.




*1 For UC Grade, the pressure transmitter can be manufactured in DOUBLE MELT material by request. Please contact us.

*2 Allowable maximum 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 pressure range with a couple of times overpressurization for about 10 minutes. Effects of continuous overpressure are not guaranteed.

*3 Ensure that pressure media is compatible with wetted parts.

*UC / EP Grade rises with double packing (Filled with N₂).

Specification

Item		Description
Fluid		Process gasses for semiconductor industry
Pressure range		0 to 200, 300kPa, 0 to 0.5, 1, 2, 3.5, 5, 10, 20MPa -100 to 100, 200, 300kPa, -0.1 to 0.5, 1, 2MPa
Fitting shape		Horizontal mounting type T  Horizontal mounting type S  Vertical mounting type S 
Connection		1/4, 3/8 UJR, VCR, CVC, etc.
Power source		12 to 24V DC $\pm 10\%$ (When analog output 4 to 20 mA DC is used ... 15 to 24V DC $\pm 10\%$)
Display accuracy*1		$\pm(1.0\%F.S.+1\text{digit})$ at 23°C (Standard) or $\pm(0.5\%F.S.+1\text{digit})$ at 23°C (Option). However, 0.5MPa range or greater can be specified.
Output	Comparator output	NPN or PNP open collector x 2 independent outputs (Select at the time of order) [Hysteresis mode, Window comparator mode] Load current: 80 mA DC and under Applied voltage: 30V DC and under (NPN output) Residual voltage: 1V DC and under (At 80 mA DC of Load current) Protection circuit: Short-circuit (Over-current) protection Response time: 5 ms and under (No filter) Repeatability: $\pm(0.2\%F.S.+1\text{digit})$ at 23°C Deadband: Hysteresis mode (Variable) Window comparator mode (1% F.S. fixed) Delay: 0 to 2.00s Variable (For both ON and OFF) Comparator operation display LED: Red LED (OUT1, 2), Lights when turning on the power.
	Analog output (Option/selection)	4 to 20 mA DC or 1 to 5V DC Output accuracy*1: $\pm 1.0\%F.S.$ at 23°C [Display accuracy for $\pm(1.0\%F.S.+1\text{digit})$] $\pm 0.5\%F.S.$ at 23°C [Display accuracy for $\pm(0.5\%F.S.+1\text{digit})$] Load current: For current output (4 to 20 mA DC): 400Q maximum For voltage output (1 to 5V DC): 10kQ minimum
Consumption current		NPN: 30 mA and under (4 to 20 mA: 50 mA and under) PNP: 40 mA and under (4 to 20 mA: 60 mA and under) *Except comparator output current
Operating temperature and humidity range		-10 to 50°C, 35 to 80%RH (No freezing or condensation)
Storage temperature		-20 to 60°C (No freezing or condensation)
Temperature coefficient		$\pm 0.1\%F.S./^{\circ}C$ [Display accuracy for $\pm(1.0\%F.S.+1\text{digit})$] (Zero, Span) or $\pm 0.05\%F.S./^{\circ}C$ [Display accuracy for $\pm(0.5\%F.S.+1\text{digit})$] (Zero, Span)
Pressure display		4-digit LED (Digit size: 8mm)
Cable length		2 m only
CE compliance		Applicable Standards: EN61326-1: 2013; EN61326-2-3: 2013 *Please use it to connect to the indoor power distribution network which is not affected by the lightning surge voltage and power supply system switching transients.
Function	Display switch	MPa (kPa), etc.
	Display scaling	-1999 to 6000 digits with respect to the ratings range
	Analog scaling	-100 to +200%F.S. with respect to the ratings range
	Loop check	Displayed in manually without application of pressure. The comparator and analog pressures are output simulatively.
	Filter	Selectable among No filter, 25ms, 250ms, 2.5s, 5s or 10s
	Hold display	Both the maximum value and the minimum value can be indicated, reset
	One-touch zero adjustment	Press the ADJ key for more than 3 seconds and then release the key. The zero adjustment is started after one second.
	Key lock	Operation PB lock
Error display		Comparator over-current, over-pressure, out of pressure range for zero adjustment
Protection function		Reverse connection protection, load short protection (Comparator output)
Case material		PC (Polycarbonate)/ABS (UL94V-0)
Enclosure		Indoor use
Weight		Approx. 200 to 250 g (Varies depending on the fitting shape)

*1 Display and analog output accuracies include the effects of Linearity, Hysteresis and Repeatability.

Cable

	Environmental temperature	Conductor		Cable outer diameter (mm)	Minimum bending radius (mm)
		Cross-sectional area (mm ²)	Twisted conductors (pcs./mm)		
PVC cable	-60 to 90°C	0.18	7/0.18	φ4.0	17

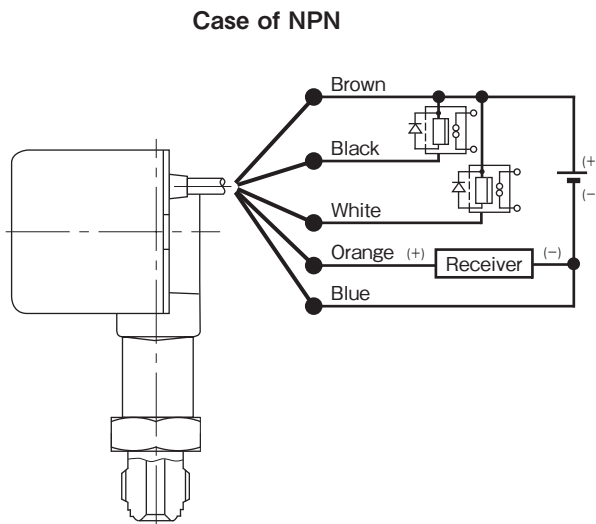
*Cable length: 2 m only

Pressure range and display maximum value by unit

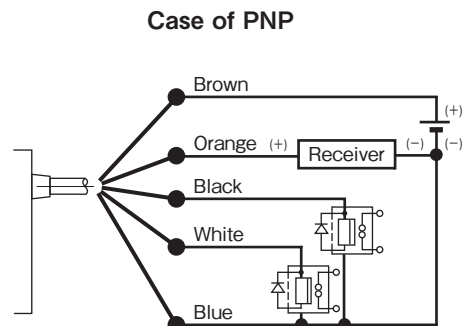
Pressure range			Display max. value by unit	
Minimum	Maximum		Pascal (Unit)	
			MPa	kPa
0	to	200 kPa	—	200.0
0	to	300 kPa	—	300
0	to	0.5 MPa	0.500	—
0	to	1 MPa	1.000	—
0	to	2 MPa	2.000	—
0	to	3.5 MPa	3.50	—
0	to	5 MPa	5.00	—
0	to	10 MPa	10.00	—
0	to	20 MPa	20.00	—
-100	to	100 kPa	—	100.0
-100	to	200 kPa	—	200.0
-100	to	300 kPa	—	300
-0.1	to	0.5 MPa	0.500	—
-0.1	to	1 MPa	1.000	—
-0.1	to	2 MPa	2.000	—

Wiring

Put the transistor protective diodes in relay in case of relay input.



Cable core
Nominal cross-sectional area: 0.18mm²
(AWG25)



Cable wiring color
Brown Power source (+) 24V DC
Black Open collector (OUT1)
White Open collector (OUT2)
Orange ... Analog output (+)
(4 to 20 mA or 1 to 5V DC) (Option)
Blue Power source (-) Common

Caution

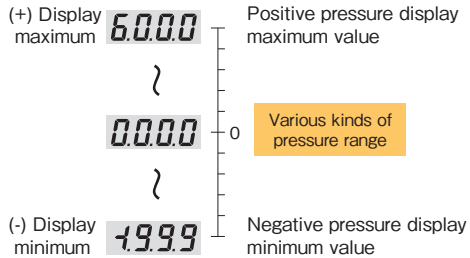
Avoid installing in location where apparatus or atmosphere (excluding process media) could be cause of initiation of ignition or explosion under normal operating condition.

Seven points related to function

1 Flexible range application by the high accuracy of display and output scaling.

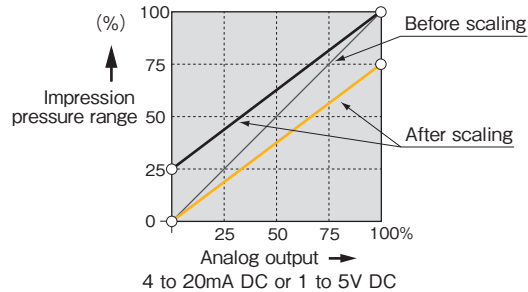
●Display scaling function

Digital display can be set at given values within the limit of a 4 figure display.

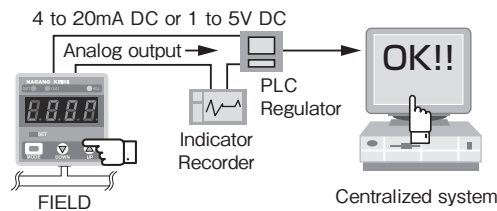


●Analog output scaling function *1

Scaling of the analog output can be arbitrarily carried out to a full-scale display within the limit of a maximum display and rated pressure range.



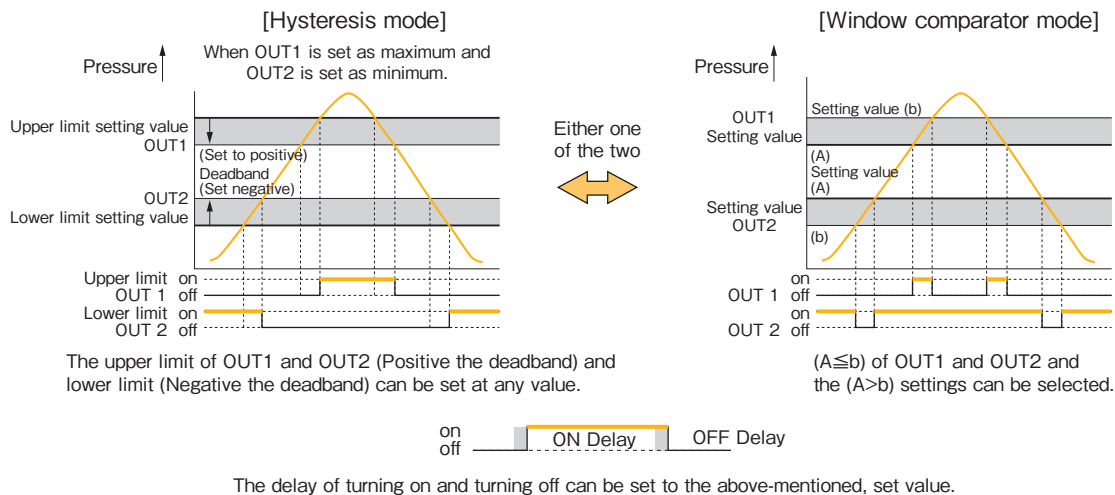
2 By the loop checking, display, analog output*1 and comparator output can be manually tested with up and down keys operation without applying actual pressure. It is suitable for the simulation operation of a wiring check etc.



Comparator output can also be tested of operation.

*1 With analog output (Option) only

3 The operation mode of comparator output can be selected.



4 The digital filter is built in. It is useful, when pressure change is hard and a display is hard to see. (Either Nil, 25ms, 250ms, 2.5s, 5s or 10s is selected.)

5 Easy zero adjust by setting inlet port to atmospheric pressure and pushing ADJ key for over 3 sec.

6 The peak and bottom value of measured are memorized. It displays, while pushing up and down keys.

7 An error message is displayed when outside of the zero adjustment and excessive pressure is applied. Key lock function for avoiding incorrect operation is prepared.

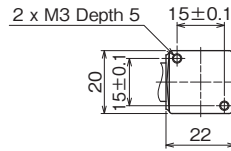
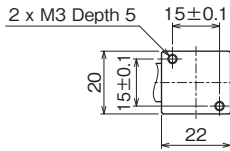
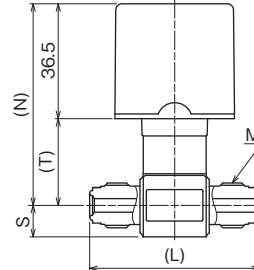
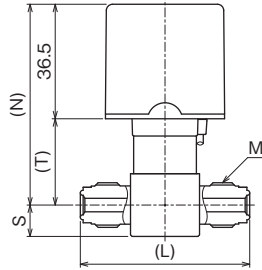
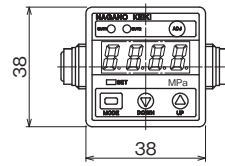
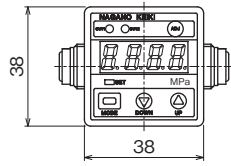
Dimensions 1

Horizontal Mounting
Type T
Male Integrated

UC/BA Grade

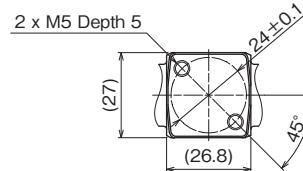
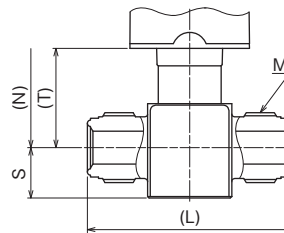
EP/GP Grade

Unit: mm



Compatible with 1/4 VCR

Compatible with 1/4 VCR



Compatible with 1/2 (3/8) VCR

Grade	Connection	Piping DIA.	Screw size M	Dimensions				Model number
				N	T	S	L	
UC	Compatible with VCR Male integrated	1/4	9/16-18UNF	64	27.5	10	54	ZT60-136

Grade	Connection	Piping DIA.	Screw size M	Dimensions				Model number
				N	T	S	L	
BA	Compatible with VCR Male integrated	1/4	9/16-18UNF	64	27.5	10	54	ZT60-13N

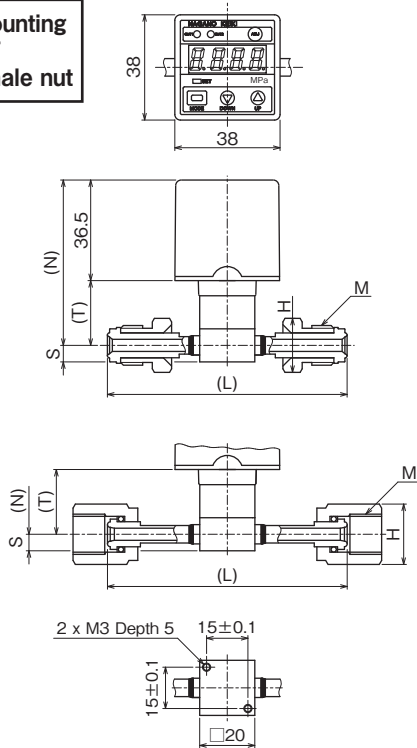
Grade	Connection	Piping DIA.	Screw size M	Dimensions				Model number
				N	T	S	L	
EP	Compatible with VCR Male integrated	1/4	9/16-18UNF	64	27.5	10	54	ZT60-13E
		1/2 (3/8)	7/8-14UNF	68	31.5	16	65	ZT60-14E

Grade	Connection	Piping DIA.	Screw size M	Dimensions				Model number
				N	T	S	L	
GP	Compatible with VCR Male integrated	1/4	9/16-18UNF	64	27.5	10	54	ZT60-13G

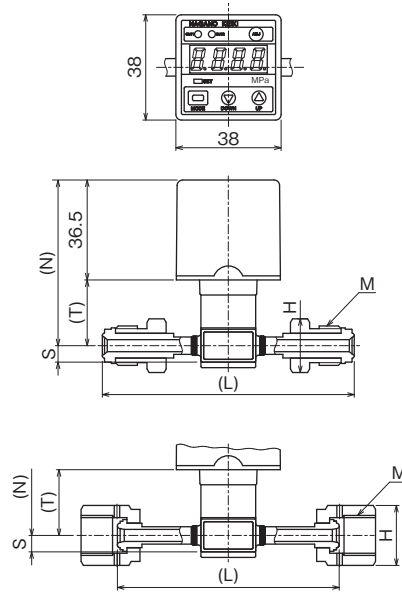
Dimensions 2

Horizontal Mounting
Type T
Male nut/Female nut

UC Grade



BA Grade



Unit: mm

BA Grade doesn't have screw.

Grade	Connection	Piping DIA.	Screw size M	Dimensions					Model number
				N	T	S	H	L	
UC	VCR Male nut	1/4	9/16-18UNF	60	23.5	6	16 x 18.5 Hex.	86	ZT60-1J6
		3/8	7/8-14UNF	65.5	29	7	24 x 27.7 Hex.	90.5	ZT60-1K6
	VCR Female nut (Bearings are not included)	1/4	9/16-18UNF	60	23.5	6	19 x 21.9 Hex.	80.8	ZT60-1L6
		3/8	7/8-14UNF	65.5	29	7	27 x 31.2 Hex.	81.8	ZT60-1M6
	UJR Male nut	1/4	9/16-18UNF	60	23.5	6	17 x 19.6 Hex.	87	ZT60-1N6
		3/8	7/8-14UNF	65.5	29	7	23 x 26.6 Hex.	100	ZT60-1P6
	UJR Female nut (With pure ring)	1/4	9/16-18UNF	60	23.5	6	19 x 21.9 Hex.	87	ZT60-1Q6
		3/8	7/8-14UNF	65.5	29	7	26 x 30 Hex.	100	ZT60-1R6
	CVC Male nut	1/4	9/16-18UNF	60	23.5	6	15.8 x 18.2 Hex.	86	ZT60-1W6
		3/8	7/8-14UNF	65.5	29	7	23.8 x 27.5 Hex.	90.6	ZT60-1X6
	CVC Female nut (Bearings are not included)	1/4	9/16-18UNF	60	23.5	6	19 x 21.9 Hex.	80.8	ZT60-1Y6
		3/8	7/8-14UNF	65.5	29	7	27 x 31.2 Hex.	82	ZT60-1Z6

Grade	Connection	Piping DIA.	Screw size M	Dimensions					Model number
				N	T	S	H	L	
BA	VCR Male nut	1/4	9/16-18UNF	60.5	24	6	16 x 18.5 Hex.	86	ZT60-1JN
	VCR Female nut (Bearings are not included)						19 x 21.9 Hex.	80.8	ZT60-1LN
	UJR Male nut						17 x 19.6 Hex.	92	ZT60-1NN
	UJR Female nut (Without pure ring)						19 x 21.9 Hex.	81	ZT60-1QN
	CVC Male nut						15.8 x 18.2 Hex.	86	ZT60-1WN
	CVC Female nut (Bearings are not included)						19 x 21.9 Hex.	80.8	ZT60-1YN

ZT60

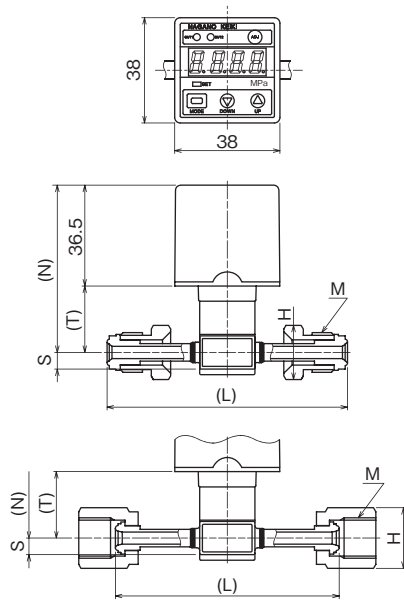
Digital Pressure Gauge

Dimensions 3

Unit: mm

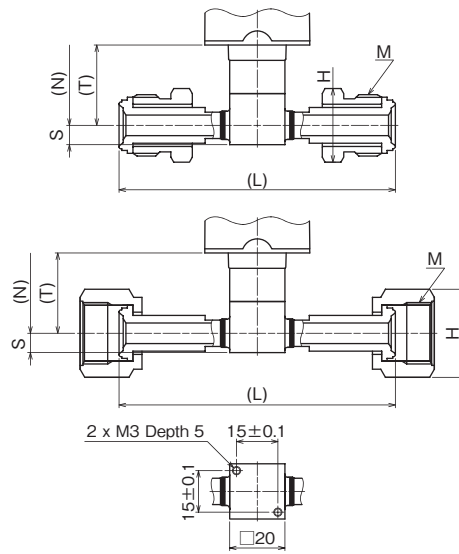
Horizontal Mounting
Type T
Male nut/Female nut

EP/GP Grade



* There is no M3 screw on the piping diameter 1/4.

1/4UJR



3/8UJR

Grade	Connection	Piping DIA.	Screw size M	Dimensions					Model number
				N	T	S	H	L	
EP	UJR Male nut	1/4	9/16-18UNF	60.5	24	6	17 x 19.6 Hex.	87	ZT60-1NE
		3/8	7/8-14UNF	65.5	29	7	23 x 26.6 Hex.	100	ZT60-1PE
	UJR Female nut (Without pure ring)	1/4	9/16-18UNF	60.5	24	6	19 x 21.9 Hex.	81	ZT60-1QE
		3/8	7/8-14UNF	65.5	29	7	26 x 30 Hex.	100	ZT60-1RE

Grade	Connection	Piping DIA.	Screw size M	Dimensions					Model number
				N	T	S	H	L	
GP	UJR Male nut	1/4	9/16-18UNF	60.5	24	6	17 x 19.6 Hex.	87	ZT60-1NG
	UJR Female nut (Without pure ring)						19 x 21.9 Hex.	81	ZT60-1QG

ZT60

Digital Pressure Gauge

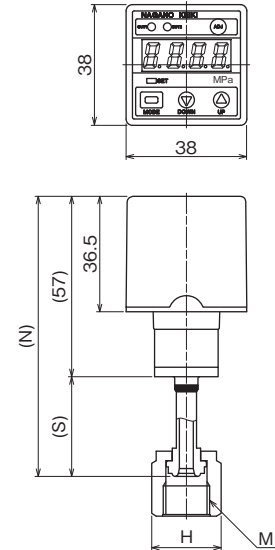
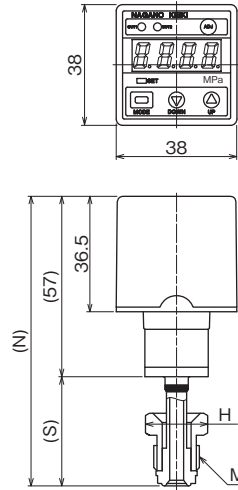
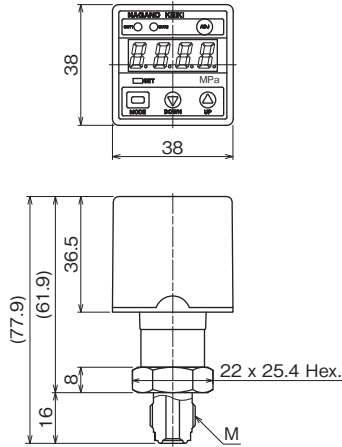
Dimensions 4

UC/BA/EP/GP Grade

Unit: mm

Horizontal Mounting
Type S
Male Integrated

Horizontal Mounting
Type S
Male nut/Female nut



Compatible with 1/4 VCR

Grade	Connection	Piping DIA.	Screw size M	Model number
UC	Compatible with VCR Male integrated	1/4	9/16-18UNF	ZT60-236

Grade	Connection	Piping DIA.	Screw size M	Dimensions			Model number
				N	S	H	
UC	VCR Male nut	1/4	9/16-18UNF	91	34	16 x 18.5 Hex.	ZT60-2J6
	VCR Female nut (Bearings are not included)			88.4	31.4	19 x 21.9 Hex.	ZT60-2L6
	UJR Male nut			94	37	17 x 19.6 Hex.	ZT60-2N6
	UJR Female nut (With pure ring)			91.5	34.5	19 x 21.9 Hex.	ZT60-2Q6
	CVC Male nut			93	36	15.8 x 18.2 Hex.	ZT60-2W6
	CVC Female nut (Bearings are not included)			88.4	31.4	19 x 21.9 Hex.	ZT60-2Y6

Grade	Connection	Piping DIA.	Screw size M	Model number
BA	Compatible with VCR Male integrated	1/4	9/16-18UNF	ZT60-23N

Grade	Connection	Piping DIA.	Screw size M	Dimensions			Model number
				N	S	H	
BA	VCR Male nut	1/4	9/16-18UNF	91	34	16 x 18.5 Hex.	ZT60-2JN
	VCR Female nut (Bearings are not included)			78.8	21.8	19 x 21.9 Hex.	ZT60-2LN
	UJR Male nut			94	37	17 x 19.6 Hex.	ZT60-2NN
	UJR Female nut (Without pure ring)			78.7	21.7	19 x 21.9 Hex.	ZT60-2QN
	CVC Male nut			93	36	15.8 x 18.2 Hex.	ZT60-2WN
	CVC Female nut (Bearings are not included)			88.4	31.4	19 x 21.9 Hex.	ZT60-2YN

Grade	Connection	Piping DIA.	Screw size M	Model number
EP	Compatible with VCR Male integrated	1/4	9/16-18UNF	ZT60-23E

Grade	Connection	Piping DIA.	Screw size M	Dimensions			Model number
				N	S	H	
EP	UJR Male nut	1/4	9/16-18UNF	91.5	34.5	17 x 19.6 Hex.	ZT60-2NE
	UJR Female nut (Without pure ring)			88.5	31.5	19 x 21.9 Hex.	ZT60-2QE

Grade	Connection	Piping DIA.	Screw size M	Model number
GP	Compatible with VCR Male integrated	1/4	9/16-18UNF	ZT60-23G

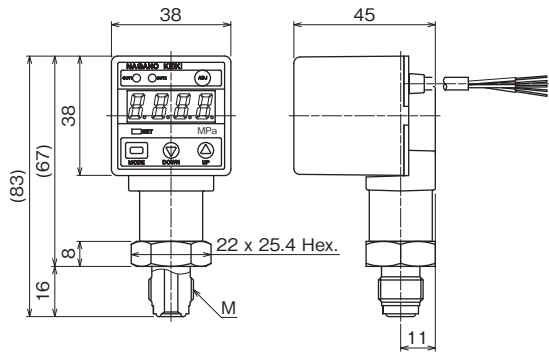
Grade	Connection	Piping DIA.	Screw size M	Dimensions			Model number
				N	S	H	
GP	UJR Male nut	1/4	9/16-18UNF	91.5	34.5	17 x 19.6 Hex.	ZT60-2NG
	UJR Female nut (Without pure ring)			88.5	31.5	19 x 21.9 Hex.	ZT60-2QG

Dimensions 5

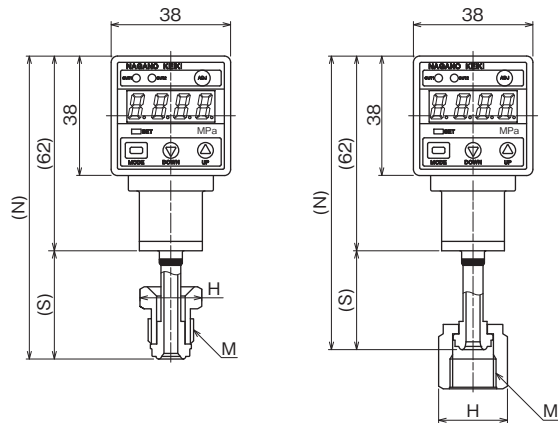
UC/BA/EP/GP Grade

Unit: mm

Vertical Mounting
Type S
Male Integrated



Vertical Mounting
Type S
Male nut/Female nut



Compatible with 1/4 VCR

Grade	Connection	Piping DIA.	Screw size M	Model number
UC	Compatible with VCR Male integrated	1/4	9/16-18UNF	ZT60-A36

Grade	Connection	Piping DIA.	Screw size M	Dimensions			Model number
				N	S	H	
UC	VCR Male nut	1/4	9/16-18UNF	96	34	16 x 18.5 Hex.	ZT60-AJ6
	VCR Female nut (Bearings are not included)			93.4	31.4	19 x 21.9 Hex.	ZT60-AL6
	UJR Male nut			99	37	17 x 19.6 Hex.	ZT60-AN6
	UJR Female nut (With pure ring)			96.5	34.5	19 x 21.9 Hex.	ZT60-AQ6
	CVC Male nut			98	36	15.8 x 18.2 Hex.	ZT60-AW6
	CVC Female nut (Bearings are not included)			93.4	31.4	19 x 21.9 Hex.	ZT60-AY6

Grade	Connection	Piping DIA.	Screw size M	Model number
BA	Compatible with VCR Male Integrated	1/4	9/16-18UNF	ZT60-A3N

Grade	Connection	Piping DIA.	Screw size M	Dimensions			Model number
				N	S	H	
BA	VCR Male nut	1/4	9/16-18UNF	96	34	16 x 18.5 Hex.	ZT60-AJN
	VCR Female nut (Bearings are not included)			83.8	21.8	19 x 21.9 Hex.	ZT60-ALN
	UJR Male nut			99	37	17 x 19.6 Hex.	ZT60-ANN
	UJR Female nut (Without pure ring)			83.7	21.7	19 x 21.9 Hex.	ZT60-AQN
	CVC Male nut			98	36	15.8 x 18.2 Hex.	ZT60-AWN
	CVC Female nut (Bearings are not included)			93.4	31.4	19 x 21.9 Hex.	ZT60-AYN

Grade	Connection	Piping DIA.	Screw size M	Model number
EP	Compatible with VCR Male Integrated	1/4	9/16-18UNF	ZT60-A3E

Grade	Connection	Piping DIA.	Screw size M	Dimensions			Model number
				N	S	H	
EP	UJR Male nut	1/4	9/16-18UNF	96.5	34.5	17 x 19.6 Hex.	ZT60-ANE
	UJR Female nut (Without pure ring)			93.5	31.5	19 x 21.9 Hex.	ZT60-AQE

Grade	Connection	Piping DIA.	Screw size M	Model number
GP	Compatible with VCR Male Integrated	1/4	9/16-18UNF	ZT60-A3G

Grade	Connection	Piping DIA.	Screw size M	Dimensions			Model number
				N	S	H	
GP	UJR Male nut	1/4	9/16-18UNF	96.5	34.5	17 x 19.6 Hex.	ZT60-ANG
	UJR Female nut (Without pure ring)			93.5	31.5	19 x 21.9 Hex.	ZT60-AQG

ZT60

Digital Pressure Gauge

BA Grade

Model number configuration

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

Model
Z T 6 0 — **N** —

Digital Pressure Gauge
BA Grade

Model number		Selective spec.		Additional spec. (Option)	
① Mounting	1	Horizontal mounting, Type T			
	2	Horizontal mounting, Type S			
	A	Vertical mounting, Type S			
② Connection	3	1/4	Compatible with VCR Male integrated		
	J	1/4	VCR Male nut		
	L	1/4	VCR Female nut (Bearings are not included)		
	N	1/4	UJR Male nut		
	Q	1/4	UJR Female nut (Without pure ring)		
	W	1/4	CVC Male nut		
	Y	1/4	CVC Female nut (Bearings are not included)		
③ Wetted parts by grade	N	BA Grade ·Pressure sensor: Co-Ni alloy (All welding) ·Fitting: SUS316L			
	④ Pressure range	A	-100 to 100kPa (Number of digit indication: 100.0)		
	B	-100 to 200kPa (Number of digit indication: 200.0)			
	C	-100 to 300kPa (Number of digit indication: 300)			
	D	-0.1 to 0.5MPa (Number of digit indication: 0.500)			
	E	-0.1 to 1MPa (Number of digit indication: 1.000)			
	F	-0.1 to 2MPa (Number of digit indication: 2.000)			
	Z	0 to 200kPa (Number of digit indication: 200.0)			
	1	0 to 300kPa (Number of digit indication: 300)			
	2	0 to 0.5MPa (Number of digit indication: 0.500)			
	3	0 to 1MPa (Number of digit indication: 1.000)			
	4	0 to 2MPa (Number of digit indication: 2.000)			
	5	0 to 3.5MPa (Number of digit indication: 3.50)			
	6	0 to 5MPa (Number of digit indication: 5.00)			
	7	0 to 10MPa (Number of digit indication: 10.00)			
	8	0 to 20MPa (Number of digit indication: 20.00)			
⑤ Display accuracy	5	± (0.5%F.S.+1digit) (0.5MPa range or greater can be specified)			
	7	± (1.0%F.S.+1digit)			
⑥ Power source	N	12 to 24V DC±10%			
	P	15 to 24V DC±10% (When 4 to 20 mA DC is output)			
⑦ Comparator output	1	PNP open collector x 2 outputs (80 mA max.)			
	3	NPN open collector x 2 outputs (30V DC, 80 mA max.)			
⑧ Analog output	0	Nil			
	1	4 to 20 mA DC			
	8	1 to 5V DC			
⑮ Documents	0	Nil			
	1	Required (Please specify the desired documents separately.) Submission drawings, instruction manual, inspection procedure, mill test report, 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.

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

