INSTRUCTION MANUAL Panasonic

Head Separated Digital Pressure Sensor Controller DPC-100 Series

MJE-DPC100 No.0102-94\

Thank you very much for purchasing Panasonic products. Read this Instruction Manual carefully and thoroughly for the correct and optimum use of this product. Kindly keep this manual in a convenient place for quick reference.

- Never use this product in a device for personnel protection
- In case of using devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.
- A product intended for use in Japan confor ms to the Japanese Measurement Act. Do not use a product intended for use overseas in Japan.

1 PART DESCRIPTION



Notes: 1) Attach the unit switch plate corresponds to the set pressure u The product for use inside Japan can be set only to "MPa" or "kPa.

2 MOUNTING

• The sensor mounting bracket MS-DP1-6 is available as an option. When mounting the sensor onto the sensor mounting bracket, etc., the tightening torque should be 0.5N·m or less.



- The panel mounting bracket MS-DP1-2 (optional), as well as the front cover MS-**DP1-3** (optional) are also available.
- For mounting of the panel mounting bracket, refer to the Instruction Manual enclosed with MS-DP1-2

3 CONNECTION OF PRESSURE SENSOR HEAD

- This product can automatically recognize the connected pressure sensor head.
- When replacing the pressure sensor head, the threshold value may be changed. Therefore, confirm the threshold value.

Connection method

 Insert the pressure sensor head cable into the product's connector area for the pressure sensor head as shown in the right figure.

Disconnection method

• Pressing the release lever of the pressure sensor head cable, pull out the connector.

Connector area of the pressure sensor head cable e-con: 1473562-4 Tvco Electronics AMP G.K.

Release lever

ressure sensor

head cable

Note: Do not pull by holding the cable without pressing the release lever, as this can cause cable break or connector

<Connection connector pin arrangement>

	Connector pin No.	Terminal name
	1	Sensor head supply voltage
	2	Analogue input
	3	0 V
	4	Model discrimination signal

4 WIRING

Connection method

• Insert the cable with connector CN-66A-C into the product's connector area for a power supply / I-O cable as shown in the right figure.

Disconnection method

• Pressing the release lever of the cable with connector, pull out the connector.

Note: Do not pull by holding the cable without pressing the release lever, as this can cause cable break or connecto

<Connection connector pin arrangement>



5 I/O CIRCUIT DIAGRAMS

When using the analogue voltage output, take care to the input impedance of the connected device.

Furthermore, note that if the cable is extended, the cable resistance will cause the voltage to drop.

NPN output type



PNP output type



	"Z
on-voltage contact, NPN open-collector transistor or C 2-wire output	Non-voltage contact, PNP open-collector transistor or DC 2-wire output
or +	or +
gh (5 V DC to 30 V DC or Open): Invalid w (0.4V DC or less): Valid	High (5 V DC to +V DC): Valid Low (0.6V DC or less or Open): Invalid

Notes: 1) When the analogue current is output, the output load resistance should be 250 Ω max 2) Take care that when the analogue current is output, 5 V or more voltage generates 3) When using the analogue voltage output, be careful to the input impedance of the connected devic Furthermore, note that if the cable is extended, the cable resistance will cause the voltage to drop. tance of the connected device

6 OUTPUT MODE AND OUTPUT OPERATION

• The EASY mode. hysteresis mode or window comparator mode can be selected as the output mode for comparative output 1 and comparative output 2. Refer to <Comparative output 1 / 2 output mode setting> in " MENU SET-TING MODE" for details.

EASY mode

• ON / OFF of the comparative output is controlled in this mode.



Notes: 1) Hysteresis can be fixed in 8 steps. Refer to <Hysteresis fixed value selection> in " ROMODE" for setting. 2) "P-1" is displayed for comparative output 1 and "P-2" for comparative output 2 on the sub-displayed

Cable with connector

lever

Release

Cable with con

• The comparative output ON / OFF state can be controlled with randomly set hysteresis in this mode.



Notes: 1) " $H_1 - I$ " or " $L_0 - I$ " is displayed for comparative output 1 and " $H_1 - 2$ " or " $L_0 - 2$ " for comparative output 2 on the

2) When the pressure sensor head is compound pressure type or positive pressure type, high pressure indicates That has presente solution indicates " L_0 ." while in case of vacuum pressure type, high vacuum indicates " H_1 and low vacuum indicates " L_0 ."

Window comparator mode

 In this mode, the ON or OFF state of the comparative output is controlled with a pressure in the set range.



2) " H, - !" or " Lo-!" is displayed for comparative output 1 and " H, -?" or " Lo-?" for comparative output 2 on the

- sub-display. 3) When the pressure sensor head is compound pressure type or positive pressure type, high pressure indicates "*H*₁" and low pressure indicates "*L*₀," while in case of vacuum pressure type, high vacuum indicates "*H*₁" and low vacuum indicates "*L*₀," 4) Set the interval between the Lo side and Hi side to hysteresis fixed value or more.

7 RUN MODE

- Setting the threshold value
- Refer to <Comparative output 1 / 2 output mode setting> in "8 MENU SET-TING MODE" for setting conditions.
- The Sub display conducts the threshold value. Main display does not changed. MODE Display is changed by pressing down. Comparative output 2 is OFF <u>.cuu</u> EASY mode { output 1 Press When the pressure sensor head is compound pressure type or positive pressure type Hysteresis mode The threshold value increases to the higher pressure side LO" When the pressure sensor head is vacuum pressure type mode · Lo side i<u>korď</u>, threshold value decreases to the higher vacuum side D Press Hysteresis mode / When the pressure sensor head is compound pressure type or positive pressure mode · Hi side When the pressure sensor head is vacuum pressure type The threshold value increases to the lower vacuum side MODE

Blinks alternately

- Notes: 1) If the set pressure range is exceeded, " UP " (exceeds the upper limit) or " BOHN " (exceeds the lower limit) will appear on the sub display. " BUHN " will also appear if the Hi side threshold value exceeds the Lo side threshold
- value when setting the "hysteresis mode / window comparator mode" threshold value. mote zero-adjustment value are For details, refer to " AUTO-REFERENCE FUNCTION" and " M REMOTE ZERO-ADJUSTMENT FUNCTION."
- n the dash line box is not displayed when not setting " ##EF " or " #E#[]" in ext nethod, refer to <External input selection> in " I MENU SETTING MODE."

Zero-adjustment function

• The zero-adjustment function forcibly sets the pressure value to "zero" when the pressure port is opened

.003	▲ 🖾 Hold down		Automatic	
200		200		200

Note: Even if the zero-adjustment is conducted, the analogue voltage / current output is not influence

Key lock function

 The key lock function prevents key operations so that the conditions set in each setting mode are not inadvertently changed.

<Kev lock set

<Kev lock released



Peak / bottom hold function

- The peak / bottom hold functions display the peak value and bottom value of the fluctuating pressure
- The peak value is displayed on the main display and the bottom value is displayed on the sub-display.
- When the pressure sensor head is compound pressure type or positive pressure type, the higher pressure side indicates the peak value, while the lower pressure side indicates the bottom value. When the pressure sensor head is vacuum pressure type, the higher vacuum side indicates the peak value, while the lower vacuum side indicates the bottom value. <Peak / bottom hold set>





8 MENU SETTING MODE

• The mode will change to RUN mode when the mode selection key is held down during this setting process. In doing so, changed ite ms before holding down the mode selection key have been set.



- RUN mode
- Notes: 1) When positive pressure type of the pressure sensor head is connected to the controller for use inside Japa you can only set to "MPa" or "kPa." When compound pressure type or vacuum pressure type is connected, the unit selection is not displayed.
- 2) When compound pressure type or vacuum pressure type of the pressure sensor head is connected to the controller for use outside Japan, " MPR " is not displayed. 3) When positive pressure type of the pressure sensor head is connected to the controller for use outside Japan
- this is not displayed.

Setting item	Factory setting	Description	
Comparative output 1 output mode setting	ERSY	Sets the output operation of comparative output 1.	
Comparative output 2 output mode setting	UFF	Sets the output operation of comparative output 2.	
N.O. / N.C. selection	No	Normal open (N.O.) or normal close (N.C.) can be selected. The initial state when the comparative output 2 output mode setting is set to other than OFF shows " $l_{\Omega}2_{\Omega}$."	
Analogue voltage / cur- rent output selection	l'out	Selects analogue voltage output or analogue current output.	
External input selection	<u>OFF</u>	Selects auto-reference input, or remote zero-adjustment input.	
Response time setting		Sets the response time. The response time can be selected from 0.5 ms, 1 ms, 2.5 ms, 5 ms, 10 ms, 25 ms, 50 ms, 100 ms, 250 ms, 500 ms, 1,000 ms or 5,000 ms.	
Displayed color of the main display selection	R-ON	Displayed color of the main indicator can be changed.	
Unit selection	MPA	Pressure unit can be changed. When compound pressure type or vacuum type of the pressure sensor head is connected to the controller for use outside Japan, the initial state shows " KPR ."	

9 PRO MODE

Setting check code

<u>IIFF</u>

Setting copy mod

Reset setting

• The mode will change to RUN mode when the mode selection key is held down during this setting process. However, changed ite ms before holding down the mode selection key have been set.



Current setting contents can be checked. For codes. refer to "Code table"

The setting of the master side sensor can be copied to the slave side sensors For details, refer to " III SETTING COPY FUNCTION."

By pressing dowun mode key when " []N " mode, becomes default settings

into key-lock state

eturns to default settings (factory settings

The setting contents are copied. The setting contents are copied, and the slave side sensor goes

Main display (1st digit form left)

	1st	digit	2nd digit 3rd digit		4th	digit		
Code	Comparative output 1 output mode	N.O. / N.C. selection	Comparative output 2 output mode	N.O. / N.C. selection	Analogue output	Threshold display	Extern	al input
0	FACY	N.O.	OFF	-		Threshold value 1	OFF	-
1	EAST	N.C.	EASY	N.O.	Analogue	Threshold value 2		Comparative output 1
2	Lhustanaia	N.O.	EAST	N.C.	output	Threshold value 3 Auto-reference	Comparative output 2	
3	nysteresis	N.C.	Lhustanaia	N.O.		Threshold value 4		Comparative output 1 / 2
Ч	Window	N.O.	Hysteresis	N.C.		Threshold value 1		Comparative output 1
5	comparator	N.C.	Window	N.O.	Analogue	Threshold value 2	Remote zero- adjustment	Comparative output 2
Б	-	-	comparator	N.C.	output	Threshold value 3		Comparative output 1 / 2
7	-	-	-	-		Threshold value 4	-	-

• Sub-display (5th digit from left)

е	5th digit		6th digit	7th digit	8th digit	
Cod	Displayed color of the main display	Displayed color relation	Response time	Unit selection (Note)	Display speed	Eco mode
0	Ded when ON	Comparative output 1	0.5 ms	MPa		OFF
1	Red when ON	Comparative output 2	1 ms	kPa	250 ms	Std
2	Concernition ON	Comparative output 1	2.5 ms	kgf/cm ²		Full
3	Green when ON	Comparative output 2	5 ms	bar		OFF
Ч		Comparative output 1	10 ms	psi	500 ms	Std
5	Always red	Comparative output 2	25 ms	mmHg		Full
Б	A.L	Comparative output 1	50 ms	inchHg		OFF
7	Always green	Comparative output 2	100 ms	-	1,000 ms	Std
8	-	-	250 ms	-		Full
9	_	-	500 ms	-	-	-
Я	-	-	1,000 ms	-	-	-
B	-	-	5,000 ms	-	-	-

Note: When positive pressure type of the pressure sensor head is connected to the controller for use inside Japan, " (MPa) or " /" (kPa) is displayed. When compound pressure type or vacuum pressure type is connected, only (kPa) is displayed

10 SETTING COPY FUNCTION

- This can copy the settings of the master side sensor to the slave side sensor.
- Be sure to use the setting copy function between the identical models.
- This function cannot be used between different models.
- Only one sensor can be connected on slave side with a master side sensor for the
- setting copy function. • Do not use the setting copy function other than the following wiring, as pulsed out-
- put generates when turning the power ON after setting the master side sensor to the copy ready state.

Setting procedure

- 1. Set the setting copy function of the master side sensor to "Copy sending ON" or "Copy sending ON-L" with the pressure sensor head connected, and then press the mode selection key so that the sensor is in copy ready state. For details, refer to <Setting copy mode> in " PRO MODE."
- 2. Turn OFF the master side sensor.
- 3. Remove the pressure sensor head and connect the master side sensor with the slave side sensor as shown below.



- 4. Turn ON the master side sensor and the slave side sensor at the same time. (Note)
- 5. Set contents (16-bit coded) are shown in orange on the main display of the master side sensor and the copying starts.
- 6. The same code explained above is shown in green on the the main display of the slave side sensor, and " []; " is shown on the sub-display (When copying is com-
- 7. Turn OFF the power of the master side sensor and the slave side sensor and disconnect the wire
- * If copying the setting to another sensor repeatedly, follow steps **3** to **7**.
- Note: Take care that if the power is not turned on at the same time, the setting contents may not be copied.

To cancel the setting copy mode of master side sensor

- 1. Whilst the slave side sensor is disconnected, turn on the power of the master side
- 2. Press the mode selection key for approx. 2 seconds.

11 AUTO-REFERENCE FUNCTION

- The auto-reference function corrects the set value using the detected pressure value during auto-reference input as the reference pressure.
- Using the detected pressure value at auto-reference input P(a) as a reference, the set value $\mathbf{1}'$ is automatically corrected to "set value 1 + P(a)".



Settable range and set pressure range after correction

• The set pressure range is wider than the rating pressure range so that the autoreference function can be handled.

If the corrected set value exceeds the set pressure range when auto-reference input is carried out, the set value will be automatically corrected to within the set pressure range. Thus, take care not to exceed the set pressure range.

Operation chart



Note: The set values are corrected in the same manner during the EASY mode or the window comparator mode.

- The detected pressure value at auto-reference input becomes "zero" when the set ting of the external input selection function is changed or the power is turned ON
- The auto-reference input value can be checked when setting the threshold value in RUN mode. Refer to the threshold value setting in " RUN MODE" for details.

12 REMOTE ZERO-ADJUSTMENT FUNCTION

• The remote zero-adjustment function forcibly sets the pressure value to "zero" when the external signal is inputted.

The set value is not corrected when remote zero-adjustment is input. Make sure that the pressure and set value during remote zero-adjustment do not exceed the set pressure range.

Operation chart



- The remote zero-adjustment value is cleared when the setting of the external input selection function is changed or the power is turned ON again, and normal operation based on the atmospheric pressure is resumed.
- The remote zero-adjustment value can be confirmed when setting the threshold value in RUN mode. Refer to the threshold value setting in "**7** RUN MODE".

IB ERROR INDICATION

Error message Cause		Corrective action	
E-0	The controller and the pressure sensor head are not correctly connected. The pressure sensor head is damaged.	Connect the controller and the pressure sensor head cor- rectly. Replace the pressure sensor head.	
E-1	The load is short-circuited causing an overcurrent to flow.	Turn the power OFF and check the load.	
E - 3	When the zero-adjustment function is implemented, pressure is applied.	Reset the voltage applied to the pressure port to the atmo- spheric pressure and implement the zero-adjustment function again.	
E-4	External input is carried out outside the rated pressure range.	Applied pressure range should be brought within the rated pressure range.	
E-5	Communication error (Disconnection, faulty connection, etc.)	Check the wiring when using the copy function.	
E-8	Communication error (Incorrect model.)	Make sure that the system is configured of the same models when using the copy function.	
* * *	The applied pressure exceeds the upper limit of the display pressure range.	Applied pressure range should be brought within the rated	
* * *	The applied pressure exceeds the lower limit (reverse pressure) of the display pressure range.	pressure range.	

When other error massage is displayed, contact us

14 SPECIFICATIONS

Tran		NPN output type		PNP output type		
13he		For use inside Japan	For use outside Japan	For use inside Japan	For use outside Japan	
Мо	del No. (Note 1)	DPC-101Z	DPC-101	DPC-101Z-P	DPC-101-P	
Sup	oply voltage	12 \	/ DC to 24 V DC ±10 9	% Ripple P-P 10 % or	less	
Normal operation: 960 mW or less (current consumption 40 mA or less at 24 V supply Power consumption (Note 2) ECO mode (STD): 720 mW or less (current consumption 30 mA or less at 24 V supply ECO mode (FULL): 600 mW or less (current consumption 25 mA or less at 24 V supply					at 24 V supply voltage) at 24 V supply voltage) at 24 V supply voltage)	
Ser	nsor head supply voltage		Same as su	pply voltage		
	Pressure sensor head input	Input voltage	range: 1 V DC to 5 V I	DC (within the rated pr	essure range)	
Input	External input	ON voltage: 0.4 OFF voltage: 5 V Input impedanc Input time: 1 ms	ON voltage: 0.4V DC or less OFF voltage: 0.4V DC or open Input impedance: Approx. 10 kΩ Input impedance: Approx. 10 kΩ Input impedance: Approx. 10 kΩ		DC to +V DC V DC or less or open Approx. 10 k Ω or more	
Comparative output (Comparative output 1 / 2)		NPN open-collector t Maximum sink cur Applied voltage: 3 (between compar Residual voltage: (at	NPN open-collector transistor PNP open-collector transistor Maximum sink current: 100 mA Maximum source curre Applied voltage: 30 V DC r less (between comparative output and 0 V) Maximum source curre Residual voltage: 1 V or less (at 100 mA sink current) Residual voltage: 1 V ci		ransistor current: 100 mA 0 V DC or less rative output and +V) 1 V or less 0 mA source current)	
	Output operation	Selectable either N.O. or N.C., with key operation				
	Hysteresis	Min. 1 digit (however, 2 digits when using psi units for use outside Japan)				
Repeatability		With positive / vacuum pressure type connected: Within ±0.2 % F.S. digit (±2 digits) With compound pressure type connected: Within ±0.2 % F.S. digits (±4 digits)				
	Response time	0.5 ms, 1 ms, 2.5 ms, 5 ms, 10 ms, 25 ms, 50 ms, 100 ms, 250 ms, 500 ms, 1,000 ms or 5,000 ms selectable with key operations				
Analogue output		<analogue voltage<br="">• Output voltage: 1 Zero point: Within 1 V ±0.5 vacuum pressure) Within 3 V ±0.5 pressure) • Span: Within 4 V = Linearity: Within 4 V • Output impedance</analogue>	output> V to 5 V % F.S. (positive / % F.S. (compound ±0.5 % F.S. 0.1 % F.S. 2: Approx, 1 kΩ	<analogue currer<br="">Output current: Zero point: Within 4 mA ± vacuum pressur Within 12 mA ±1 pressure) Span: Within 16 Linearity: Within Load resistance</analogue>	t output> 4 mA to 20 mA 1 % F.S. (positive / e) .5 % F.S. (compound mA ±1.5 % F.S. ±0.1 % F.S. ±0.1 % F.S. ±0.20 (MAX.)	
Ove	ervoltage category					
Am	bient temperature	-10 °C to +50 °C (No dew condensation or icing allowed), Storage: -10 °C to +60 °C				
Ambient humidity		35 % RH to 85 % RH, Storage: 35 % RH to 85 % RH				
Pol	lution degree	2				
Ten	nperature characteristics		Within ±0.5 % F.S. (at +20 °C reference)		
Ma	terial	Enclosure: PBT (with glass fiber), LCD display: Acrylic Mounting screw section: Brass (nickel-plated), Key part: Silicon rubber				
We	ight	Approx. 25 g (Main body only)				
Accessories CN-66A-C2 (Cable with a connector, 2 m long)			, 2 m long) (optional fo	r J type): 1 pc.		

Notes: 1) The cable with connector is not enclosed with models that have "-J" at the end of the model names. 2) Excluding the current consumption of analogue current output and applying pressure sensor hear 3) The values specified above are applied only to the controller. Regarding the specifications for the applied pres-

sure sensor head, refer to the instruction manual enclosed with the pressure sensor head

Pressure range of the pressure sensor head

Туре	Compound pressure type	Positive pressure type	Vacuum pressure type
Applicable pressure sensor head	DPH-101	DPH-102	DPH-103
Rated pressure range	-100.0 kPa to +100.0 kPa	0 MPa to 1.000 MPa	0 kPa to -101.0 kPa
Set pressure range	-199.9 kPa to +199.9 kPa	-1.050 MPa to +1.050 MPa	+101.3 kPa to -101.3 kPa

15 CAUTIONS

- This product has been developed / produced for industrial use only.
- This product is suitable for indoor use only.
- The operating altitude of this product is 2000 m or less.
- Make sure that the power supply is OFF while wiring.
- Take care that if a voltage exceeding the rated range is applied, or if an AC power supply is directly connected, the product may get burnt or damaged.
- Take care that wrong wiring will damage the sensor.
- If power is supplied from a commercial switching regulator, ensure that the frame ground (F.G.) terminal of the power supply is connected to an actual ground.
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of this sensor, connect the frame ground (F.G.) terminal of the equipment to an actual ground.
- Do not use during the initial transient time (0.5 sec.) after the power supply is switched on
- Do not run the wires together with high-voltage lines or power lines or put them in the same raceway. This can cause malfunction due to induction.
- The specification may not be satisfied in a strong magnetic field.
- Extension up to total 100 m (emitter and receiver each for thru-beam type), or less. is possible with 0.3 mm², or more of conductor cross-section area cable. However, to reduce noise, make the wiring as short as possible. If using this product as complaint model with CE Marking / UKCA Marking, the power supply line must be 30 m or less.
- Make sure that stress by forcible bend or pulling is not applied directly to the sensor cable ioint
- Avoid dust. dirt. and steam.
- Take care that the product does not come in contact with water, oil, grease, or organic solvents, such as, thinner, etc.
- Do not operate the keys with pointed or sharp objects.
- Do not use this sensor in places having excessive vapor, dust, etc., or where it may come in contact with corrosive gas, etc
- Never disassemble or modify the senso
- This product use EEPROM. The EEPROM has lifetime and cannot set more then 1 million times of setting
- Do not drop the product or otherwise subject to strong Front surface shock. Otherwise, the product may be damaged. of the product i
- Do not apply an excessive load to the front surface or corners of the product. Otherwise, the product may be damaged.



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