

Panasonic INSTRUCTION MANUAL

Head Separated Digital Pressure Sensor Controller DPS-400 Series

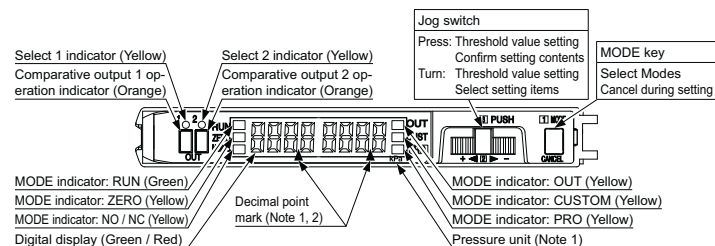
MJE-DPS400 No.0034-13V

Thank you very much for purchasing Panasonic products. Please 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.

WARNING

- 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.

1 PART DESCRIPTION

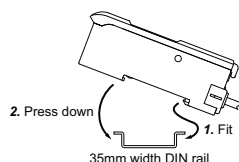


Notes: 1) The above figure shows the compound pressure type or vacuum pressure type **DPS-401**. Positions of the decimal point mark and the pressure unit on the name plate for positive pressure type **DPS-402** differ from the above figure.
2) The decimal point is used in RUN mode, threshold value setting mode, or peak / bottom hold function. It is not used in other modes.

2 MOUNTING

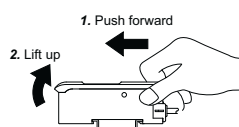
How to mount

- Fit the rear part of the mounting section of the controller on a DIN rail.
- Press down the rear part of the mounting section of the unit on the DIN rail and fit the front part of the mounting section to the DIN rail.



How to remove

- Push the controller forward.
- Lift up the front part of the controller to remove it.



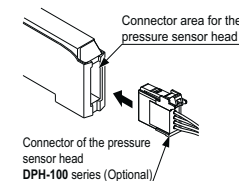
Note: Take care that if the front part is lifted without pushing the controller forward, the hook on the rear portion of the mounting section is likely to break.

3 CONNECTION OF PRESSURE SENSOR HEAD

- Make sure that the power supply is OFF while connecting or removing the pressure sensor head **DPH-100** series (optional).
- This product can automatically recognize the connected pressure sensor head.
- When the pressure sensor head is replaced, the threshold value and the zero-adjustment value change. Therefore, set those values again.

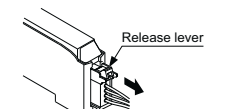
How to connect

- Insert the connector of the pressure sensor head **DPH-100** series (optional) into the connector area for the pressure sensor head of this product.



How to disconnect

- Pressing the release lever attached to the connector of the pressure sensor head, pull out the connector.



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

<Terminal arrangement>

Terminal No.	Terminal name
1	Pressure sensor head power supply
2	Analogue input
3	0V
4	Model discrimination signal

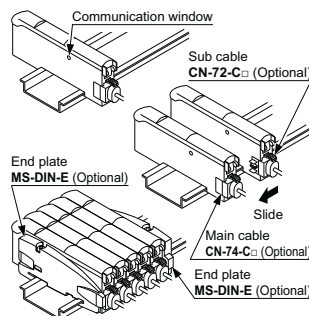
4 CONTROLLER CASCADING

- Make sure that the power supply is OFF while adding or removing the series connection type.
- In case 2 or more the series connection types are connected in cascade, make sure to mount them on a DIN rail.
- The maximum 11 the controllers using sub cables **CN-72-C** (optional) can be added to a controller using a main cable **CN-74-C** (optional).
- When connecting 2 or more in cascade, use the sub cable for the second series connection type onwards.

For mounting and removing the controller, refer to "2 MOUNTING."

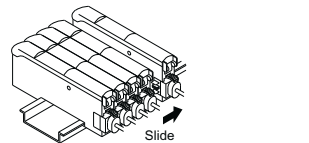
How to cascade

- Mount the controllers, one by one, on the DIN rail.
- Slide the controllers next to each other, and connect the quick-connection cables.
- Mount the end plates **MS-DIN-E** (optional) at both the ends to hold the controllers between their flat sides.
- Tighten the screws to fix the end plates.

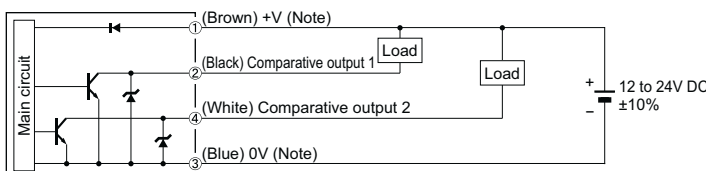


How to remove

- Loosen the screws of the end plates.
- Remove the end plates.
- Slide the controllers and remove them one by one.



5 I/O CIRCUIT DIAGRAM



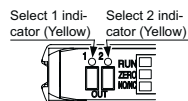
Note: The quick-connection sub cable does not have +V (brown) and 0V (blue). The power is supplied from the connector of the main cable.

<Terminal arrangement>

Terminal No.	Terminal name
1	+V
2	Comparative output 1
3	0V
4	Comparative output 2

6 COMPARATIVE OUTPUT CHANNEL SWITCHING

- Press the MODE key for 2 sec. or more to switch the comparative output 1 / 2.
- Comparative output 1 can be set when the Select 1 indicator (yellow) lights up, and the comparative output 2 can be set when the Select 2 indicator (yellow) lights up.

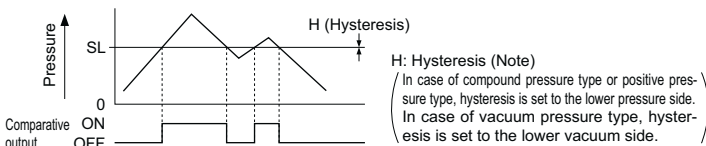


7 OUTPUT MODE AND OUTPUT OPERATION

- The EASY mode, window comparator mode, hysteresis mode, forced ON output mode, or forced OFF output mode can be selected individually as the comparative output mode 1 or the comparative output 2. However, the comparative output 2 cannot be set to the window comparator mode.
- For details, refer to "12 OUTPUT MODE."

EASY mode

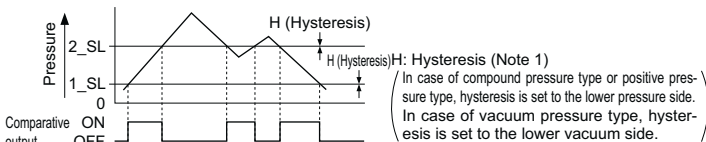
- The comparative output ON / OFF state can be controlled in this mode.



Note: Hysteresis can be set to "H-01" (1% F.S.), "H-02" (2% F.S.) or "H-03" (5% F.S.). For setting method, refer to <PRO 1: Hysteresis setting> in "12 PRO MODE."

Window comparator mode

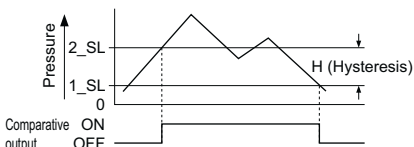
- In this mode, the ON or OFF state of the comparative output is controlled with a pressure in the set range.



Notes: 1) Hysteresis can be set to "H-01" (1% F.S.), "H-02" (2% F.S.) or "H-03" (5% F.S.). For setting method, refer to <PRO 1: Hysteresis setting> in "12 PRO MODE."
2) Window comparator mode cannot be used as the comparative output 2. For details, refer to "12 OUTPUT MODE."

Hysteresis mode

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



Forced ON output mode

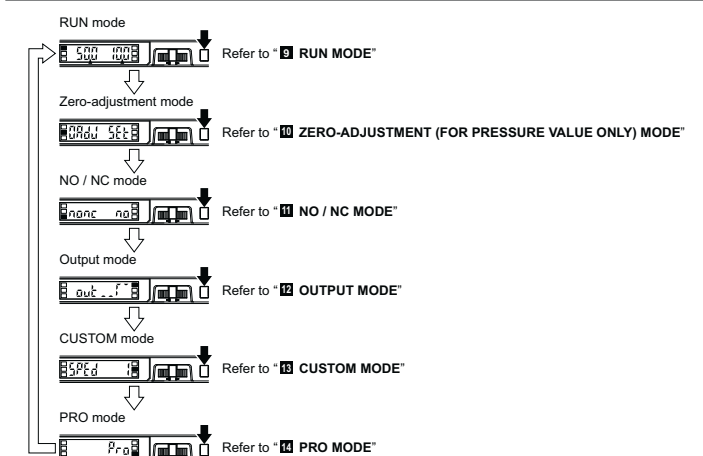
- Sets forcibly the comparative output to ON.

Forced OFF output mode

- Sets forcibly the comparative output to OFF.

8 OPERATION PROCEDURE

- Be sure to set the comparative output 1 or the comparative output 2 before setting each item.
- The items that can be set in the comparative output 1 and the comparative output 2 respectively are only Threshold value, NO / NC and Output mode. The items other than those are common. (However, in case of code setting, a combination of the comparative output 1 / 2 can be set only for output mode. The items other than output mode are valid only for the comparative output 1.)
- The changed contents are not stored if turning the power OFF while setting. Therefore, make sure to confirm the settings by pressing the jog switch before turning the power OFF.



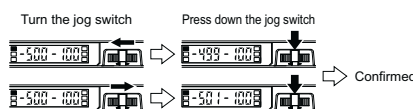
9 RUN MODE

- After the power is turned ON, the mode will be in the RUN mode and the MODE indicator: RUN (green) lights up. The digital display shows the threshold value (green) and the pressure value (red).
- The decimal point mark is used at "RUN mode."

Threshold value setting

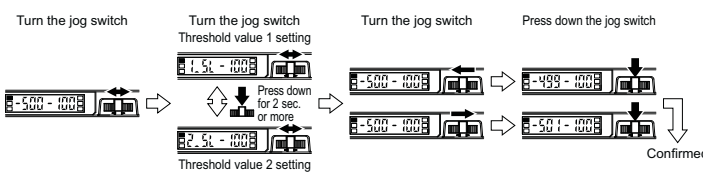
- In case of compound pressure type or positive pressure type, turn the jog switch to "+" side to increase the threshold value. While turn the jog switch to "-" side to decrease the threshold value. In case of vacuum pressure type, turn the jog switch to "-" side to increase the threshold value. While turn the jog switch to "+" side to decrease the threshold value.

<Example> Compound pressure type (In case of EASY mode)



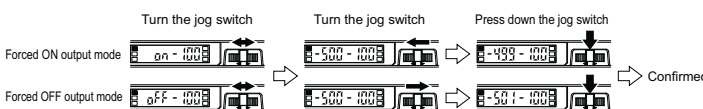
(In case of window comparator mode or hysteresis mode)

- When setting output mode to the window comparator mode or hysteresis mode, turn the jog switch to show "1.5L" or "2.5L". Turn the jog switch again to set the threshold value. Press down the jog switch for 2 sec. or more to show "1.5L" or "2.5L". For the output mode, refer to "12 OUTPUT MODE."



Note: Take care if the pressure sensor head is replaced after setting the threshold value, the set threshold value is changed.

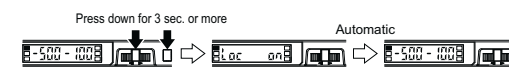
(In case of forced ON output mode or forced OFF output mode)



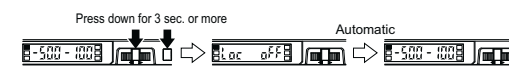
Key lock function

- The key lock function prevents key operations so that the conditions set in each setting mode are not inadvertently changed.
- If operating the jog switch or MODE key after key lock is set, "LOCK ON" is indicated on the digital display.

<Setting of key lock>



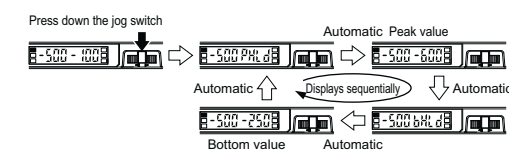
<Release of key lock>



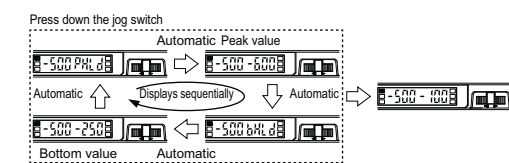
Peak / bottom hold function

- Peak / bottom hold function displays peak value and bottom value of fluctuating pressure.
- Set the digital display to "d-Lc OFF" (lock OFF) while pressure value is indicated on the digital display (red). After setting, press the jog switch to show the peak / bottom value on the digital display (red). When the digital display is set to "d-Lc ON" (lock ON), the peak / bottom value is not indicated on the digital display (red) even if pressing the jog switch. For digital display setting, refer to <PRO 2: Digital display setting> in "12 PRO MODE."
- Sampling of the peak value and the bottom value begins right after pressing the jog switch.
- In case of compound pressure type or positive pressure type, the higher pressure side indicates the peak value, while the lower pressure side indicates the bottom value. In case of vacuum pressure type, the higher vacuum side indicates the peak value, while the lower vacuum side indicates the bottom value.
- Although the displays of the peak value and the bottom value are maintained, the values are not stored to EEPROM.

<Setting of peak / bottom hold function>



<Release of peak / bottom hold function>



Note: When pressing the jog switch at any of the displays within the dashed area, the peak value and the bottom value are cleared and returns to RUN mode.

10 ZERO-ADJUSTMENT (FOR PRESSURE VALUE ONLY) MODE

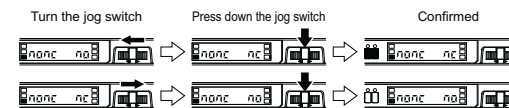
- The zero-adjustment (only for pressure value) mode forcibly sets the pressure value to "zero" when the pressure port is opened.
- When the MODE indicator: ZERO (yellow) lights up, the zero-adjustment can be done only for pressure value.
- The zero-adjustment can be performed for compound pressure type: up to ±5kPa, for vacuum pressure type: up to ±5kPa, and for positive pressure type: up to ±0.05MPa.



Note: Take care if the pressure sensor head is replaced after setting the zero-adjustment (for pressure value only) mode, the set pressure value "zero" is changed.

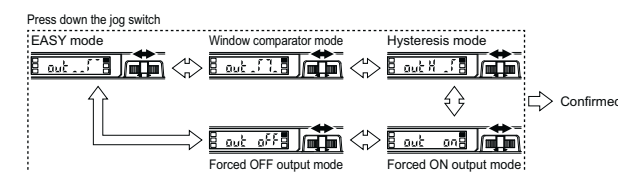
11 NO / NC MODE

- When MODE indicator: NO / NC (yellow) lights up, NO (normally open) / NC (normally closed) can be set.
- The comparative output 1 / 2 operation indicator (orange) lights up when NC (normally closed) is set.



12 OUTPUT MODE

- When MODE indicator: OUT (yellow) lights up, output mode can be set.
- The comparative output 1 / 2 operation indicator (orange) lights up when forced ON output mode is set.

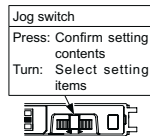


Note: In case of the comparative output 2, the window comparator mode is not displayed.

13 CUSTOM MODE

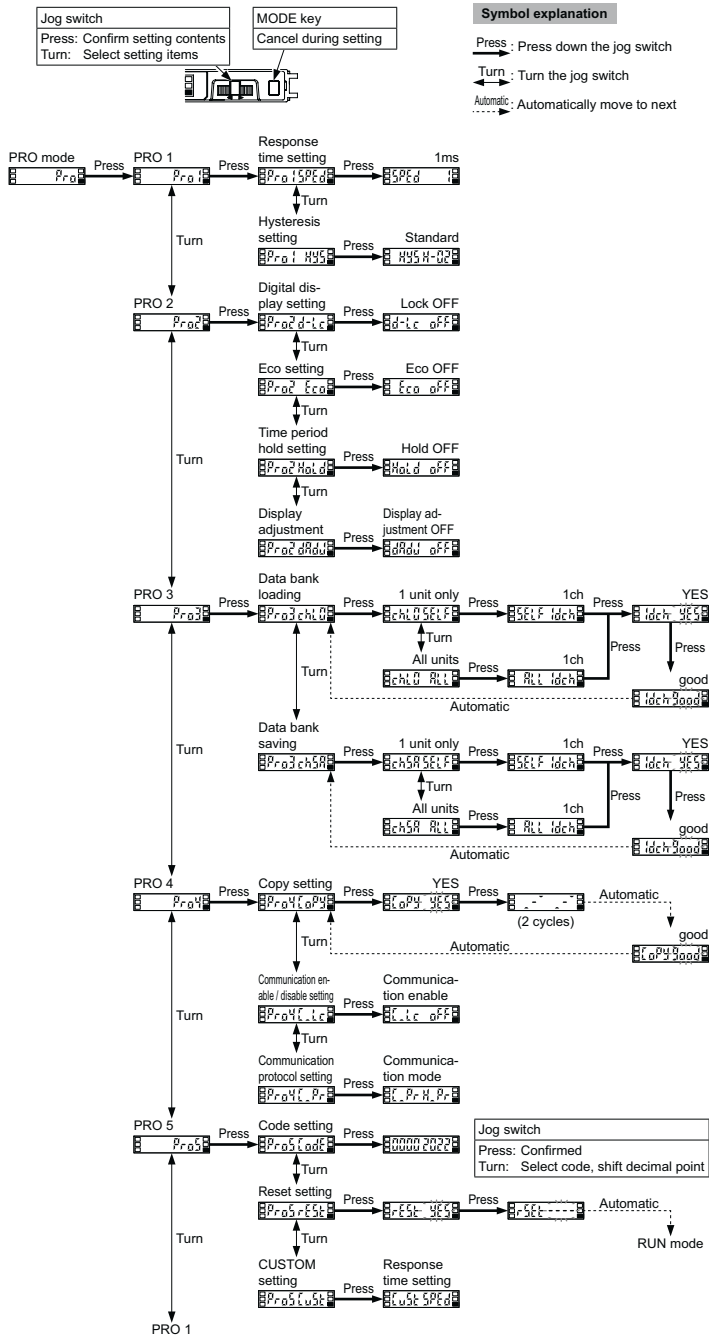
- When MODE indicator: CUST (yellow) lights up, response time setting, data bank loading (only one unit), or code setting can be displayed. Setting contents of the displayed item can be changed. For the setting procedure, refer to <PRO 5: CUSTOM setting> in "14 PRO MODE."
- For setting of each item, refer to the following table.

Item	Display display	Reference item
Response time setting	5PEd	<PRO 1: Response time setting>
Data bank loading (Only one unit)	chl0 ldeh	<PRO 3: Data bank loading>
Code setting	codc	<PRO 5: Code setting>



14 PRO MODE

- When MODE indicator: PRO (yellow) lights up, PRO mode can be set.
- The mode will change to RUN mode when the MODE key is held down during this setting process. However, changed items before holding down the mode selection key have been set.



Item	Default setting	Description
Response time setting	5PEd	Sets response time. * 0.15": 150μs, * 0.5": 500μs, * 1": 1ms, * 5": 5ms * 10": 10ms, * 50": 50ms, * 100": 100ms, * 500": 500ms
Hysteresis setting	HYS H-02	Hysteresis can be set when EASY mode or window comparator mode is set. * H-01: Small * H-02: Standard * H-03: Large
Digital display setting	d-lc OFF	When setting to "d-lc OFF" (lock OFF) and pressing the jog switch in RUN mode, pressure value and peak / bottom value can be switched to show on the digital display (red). * OFF: Lock OFF * ON: Lock ON
Eco setting	ECO OFF	Power consumption can be lowered. * OFF: Eco OFF * ON: Eco ON If any key operation is not carried out for 20 sec. in RUN mode, the digital display turns OFF. * MAN: Manual The digital display turns OFF when setting the key lock function to ON in RUN mode. * FULL: FULL The digital display turns OFF if any key operation is not carried out for 20 sec. or the key lock function is set to ON in RUN mode.
Time period hold setting	Hold OFF	* OFF: Hold OFF Peak / bottom value in the digital display refreshing condition can be displayed. * ON: Hold ON Peak / bottom value in the hold condition can be displayed.
Display adjustment	DRDU OFF	Forcibly sets the pressure value indicated on the digital display to "zero." Threshold value changes in conjunction with the pressure value. * OFF: Display adjustment OFF * ON: Display adjustment ON
Data bank loading	chl0 5ELF	Loads configuration setting from the data bank. * SELF: Select this mode when only one unit to load. * RL: Select this mode when all units to load in a lump by optical communications. For optical communications, refer to "16 OPTICAL COMMUNICATIONS."
Data bank saving	chsR 5ELF	Saves configuration setting from the data bank. * SELF: Select this mode when only one unit to save. * RL: Select this mode when all units to save in a lump by optical communications. For optical communications, refer to "16 OPTICAL COMMUNICATIONS."
Copy setting	-	The set contents can be copied to all sub controllers cascaded to the right side from the connector side of the main controller via optical communication. However, the data bank loading / saving, and zero-adjustment settings are excluded. For optical communications, refer to "16 OPTICAL COMMUNICATIONS."
Communication enable / disable setting	LiLc OFF	When conducting the copy setting or data bank loading / saving from the main controller via optical communications, it is possible that only the sub controller which is set to communication halt "LiLc ON", not to receive the set contents. * OFF: Communication enable * ON: Communication disable
Communication protocol setting	LiPr H-Pr	When conducting the copy setting or data bank loading / saving from the main controller via optical communications, it is possible that only the sub controller which is set to communication halt "LiPr OFF", not to receive the set contents. * H-Pr: Communication mode * OFF: Communication halt
Code setting	nnnn nnnn	Consistent setting can be done by inputting 8-digit code instead of independent setting. In addition, present setting can be confirmed.
Reset setting	-	If setting to "RES", returns to default settings (factory settings).
CUSTOM setting	cu5t 5PEd	Selects an item in CUSTOM mode to display. * 5PEd: Response time setting * chl0: Data bank loading * codc: Code setting

Code setting table

Green digital display (right side is the first digit)

Code	4th digit	3rd digit	2nd digit	1st digit
0	NO / NC mode	Response time setting	Digital display	Digital display setting
1	NO / NO	150μs	Pressure value	Lock OFF
2	NC / NO	500μs	Peak / bottom value	Lock ON
3	NO / NC	1ms	Pressure value	Manual
4	-	5ms	Peak / bottom value	FULL
5	-	10ms	-	-
6	-	50ms	-	-
7	-	100ms	-	-
8	-	500ms	-	-

Red digital display (right side is the first digit)

Code	4th digit	3rd digit	2nd digit	1st digit
0	Communication protocol setting	Communication enable / disable setting	CUSTOM mode	Comparative output 1 mode
1	Communication mode	Communication enable	Response time setting	Hysteresis setting
2	Communication halt	Communication enable	Data bank loading	Comparative output 2 mode
3	Communication mode	Communication disable	Code setting	-
4	-	-	-	Window comparator mode
5	-	-	-	-
6	-	-	-	Hysteresis mode
7	-	-	-	Forced ON output mode
8	-	-	-	Forced OFF output mode

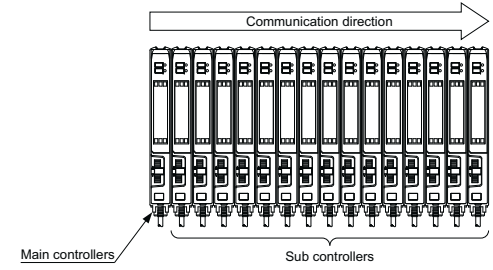
15 ERROR INDICATION

Error indication	Cause	Remedy
Er01	EEPROM is broken or reached the end of its working life.	Please contact our office.
Er02	EEPROM writing error.	
Er11	Load of the comparative output 1 is short-circuited causing an overcurrent to flow.	Turn OFF the power and check the load.
Er12	Load of the comparative output 2 is short-circuited causing an overcurrent to flow.	
Er42	Disconnection error of the pressure sensor head.	Check the connection state of the pressure sensor head.
Er52	Communication error when the controllers are mounted closely.	Verify that there is no loose or clearance between controllers.
Er53	Communication error between the upper communication unit and a controller.	Verify that there is no loose or clearance between the upper communication unit and the controller connected right after the upper communication unit.
FFF	The applied pressure exceeds the upper limit of the displayed pressure range.	Applied pressure range should be brought within the rated pressure range.
-FFF	The applied pressure exceeds the lower limit of the displayed pressure range.	

When other error message is displayed, contact us.

16 OPTICAL COMMUNICATIONS

- When the data bank loading / saving, or copy setting is conducted via optical communications, cascade the sub controllers right side to the main controller as follows.
- If a sub controller is under any of the following conditions, the data bank loading / saving, or copy setting cannot be carried out.
 - In case the digital display is blinking
 - In case PRO mode is being set
 - In case the communication enable / disable setting is set to communication disable "LiLc ON."
- When communication protocol of a sub controller is set to communication halt "LiPr OFF", the data bank loading / saving, or copy setting cannot be carried out to sub controllers subsequent to the mentioned controller.
- The pressure sensing operation stops during optical communication.



17 SPECIFICATIONS

Type	Compound / Vacuum pressure type	Positive pressure type
Model No.	DPS-401	DPS-402
Applicable pressure sensor	Compound pressure type DPH-101□ Vacuum pressure type DPH-103□	Positive pressure type DPH-102□
Pressure type	Gauge pressure	
Rated pressure range	-100.0 to 100.0kPa 0 to -101kPa	0 to 1.000MPa
Display / setting pressure range	-199.9 to 199.9kPa 101.3 to -101.3kPa	-1.050 to 1.050MPa
Supply voltage	12 to 24V DC ±10%	
Power consumption (Note 1)	Normal operation: 650mW or less (current consumption 25mA or less at 24V supply voltage) Eco mode: 500mW or less (current consumption 20mA or less at 24V supply voltage)	
Pressure sensor head supply voltage	Same as the supply voltage	
Pressure sensor head input	Input voltage range: 1 to 5V DC (within the rated pressure range)	
Comparative output (Comparative output 1 / 2)	NPN open-collector transistor • Maximum sink current: 50mA (Note 2) • Applied voltage: 30V DC or less (between comparative output and 0V) • Residual voltage: 1.5V or less (Note 3) [at 50mA (Note 2) sink current]	
Output operation	Selectable either NO or NC, with key operation	
Hysteresis	Min. 0 digit, changeable at hysteresis setting	
Repeatability	Compound pressure type: Within ±0.2% F.S. (digits ±4 digits) Vacuum / positive pressure type: Within ±0.2% F.S. (digit ±2 digits)	
Response time	150μs, 500μs, 1ms, 5ms, 10ms, 50ms, 100ms or 500ms selectable with key operation	
Ambient temperature	-10 to +50°C (If 8 to 16 units are mounted closely: -10 to +45°C) (No dew condensation or icing allowed), Storage: -20 to +70°C	
Ambient humidity	35 to 85% RH, Storage: 35 to 85% RH	
Temperature characteristics	Within ±0.5% F.S. (at +25°C reference)	
Material	Enclosure: Heat-resistant ABS, Protective cover: Polycarbonate Jog switch: ABS, MODE key: Acrylic	
Weight	Approx. 20g (main body only)	

- Notes: 1) Excluding current consumption of the applicable pressure sensor head.
2) 25mA max. if 5, or more controllers are connected together.
3) In case of using the quick-connection cable (cable length 5m) (optional).
4) The cable for controller connection is not supplied as an accessory. Make sure to use the quick-connection cables (optional) given below.
Main cable (4-core):
CN-74-C1 (cable length 1m), CN-74-C2 (cable length 2m), CN-74-C5 (cable length 5m)
Sub cable (2-core):
CN-72-C1 (cable length 1m), CN-72-C2 (cable length 2m), CN-72-C5 (cable length 5m)
5) The values specified above are applied only to the controller. Regarding the specifications for the applied pressure sensor head, refer to the instruction manual enclosed with the pressure sensor head.

18 CAUTIONS

- This product has been developed / produced for industrial use only.
- Make sure that the power supply is OFF while wiring and adding the units.
- 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 short circuit of the load or wrong wiring may burn or damage the product.
- 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.
- Verify that the supply voltage variation is within the rating.
- 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 product, connect the frame ground (F.G.) terminal of the equipment to an actual ground.
- Do not use during the initial transient time (approx. 1 sec.) after the power supply is switched ON.
- Make sure to use the quick-connection cable (optional) for the connection of the controller. Extension up to total 50m (if 9 to 16 units are connected in cascade: 20m) is possible with 0.3mm², or more, cable.
However, in order to reduce noise, make the wiring as short as possible.
- Make sure that stress by forcible bend or pulling is not applied to the sensor cable joint.
- This product is suitable for indoor use only.
- Avoid dust, dirt, and steam.
- Take care that the product does not come in contact with oil, grease, organic solvents, such as thinner, etc., strong acid or alkaline.
- This product cannot be used in an environment containing inflammable or explosive gases.
- Never disassemble or modify the product.
- This product adopts EEPROM. Settings cannot be done 100 thousand times or more, because of the EEPROM's lifetime.

19 INTENDED PRODUCTS FOR CE MARKING

- The models listed under "17 SPECIFICATIONS" come with CE Marking.
As for all other models, please contact our office.



- Contact for CE
<Until June 30 ,2013>
Panasonic Electric Works Europe AG
Rudolf-Diesel-Ring 2, D-83607 Holzkirchen, Germany
<From July 1 ,2013>
Panasonic Marketing Europe GmbH Panasonic Testing Center
Winsbergring 15, 22525 Hamburg, Germany

Panasonic Industrial Devices SUNX Co., Ltd.

http://panasonic.net/id/pidsx/global

Overseas Sales Division (Head Office)

2431-1 Ushiyama-cho, Kasugai-shi, Aichi, 486-0901, Japan
Phone: +81-568-33-7861 FAX: +81-568-33-8591

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