

Panasonic INSTRUCTION MANUAL

ON / OFF Input NPS Series

MJE-NPS No.0034-68V

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.

WARNING

- Never use this product with 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.

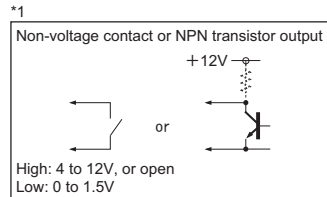
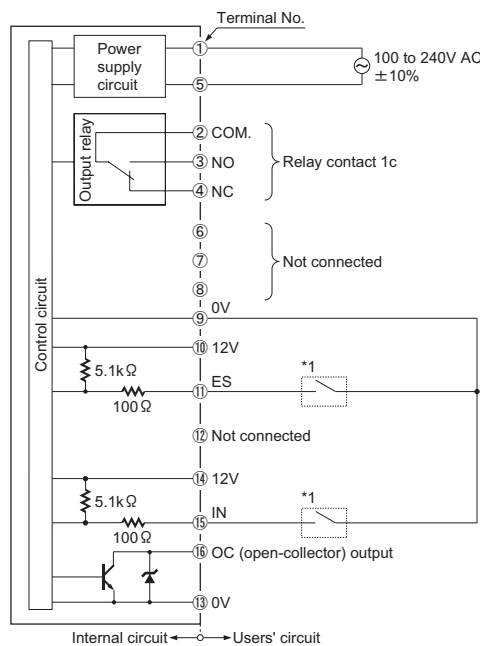
1 SPECIFICATIONS

Item	Type	General use	High-performance	Two sensor connection
Model No.		NPS-C7	NPS-CT7	NPS-C7W
Applicable sensors		Photoelectric sensor, inductive proximity sensor, etc., with NPN transistor output or relay output		
Supply voltage		100 to 240V AC ±10%		
Power consumption		6VA or less		
Power supply Voltage for sensor		12V DC ±10% (incorporated with short-circuit protection)		
Current		150mA	130mA	120mA
Output		Relay contact 1c • Switching capacity: 250V 3A AC (resistive load) • Electrical life: 100,000 switching operations or more (rated load) (at 1,800 operations/hour) • Mechanical life: 10 million switching operations or more (at 36,000 operations/hour)	NPN open-collector transistor • Maximum sink current: 100mA • Applied voltage: 30V DC or less (between output and 0V) • Residual voltage: 1V or less (at 100mA sink current) 0.4V or less (at 16mA sink current)	Relay contact 1c × 2 • Switching capacity: 250V 3A AC (resistive load) • Electrical life: 100,000 switching operations or more (rated load) (at 1,800 operations/hour) • Mechanical life: 10 million switching operations or more (at 36,000 operations/hour)
Output operation		Switchable normal operation or inverse operation		
Response time		Relay contact: 10ms approx., NPN open-collector transistor: 5 μs or less		10ms approx.
Power		Red LED (lights up when the power is ON)		
Output (Note)		Red LED (lights up when the output is ON)		
Sensor signal input		—	Red LED (lights up when the sensor signal input is effective)	—
External synchronization input		—	Red LED (lights up when the external synchronization input is effective)	—
External synchronization function		Gate trigger	Gate trigger and edge trigger	—
Timer function		—	Three function selectable timer (Delay timer: switchable either 40ms to 1 sec. or 0.4 sec. to 10sec.)	—
Ambient temperature		-10 to +50°C (No dew condensation or icing allowed), Storage: -30 to +70°C		
Ambient humidity		35 to 85% RH, Storage: 35 to 85% RH		
Material		Enclosure: ABS, Terminal block: PBT (Glass fiber reinforced)		
Connecting method		Terminal block		
Weight		160g approx.		
Accessories		Short bar: 1 pc., NPS-CV (Protection cover): 1 pc., Short-circuit protection plate: 1 pc. Adjusting screwdriver: 1 pc. (NPS-CT7 only)		

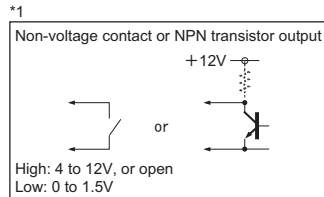
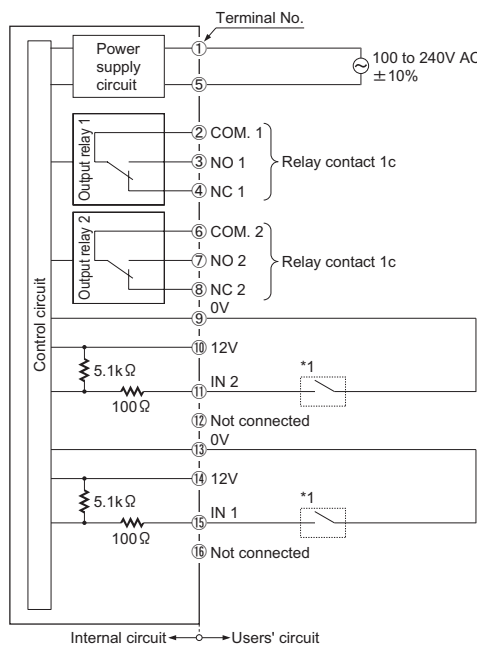
Note: In NPS-C7W, two output indicators, Sensor 1 output indicator and Sensor 2 output indicator, have been incorporated.

2 I/O CIRCUIT DIAGRAMS

● NPS-C7, NPS-CT7



● NPS-C7W



3 CAUTIONS

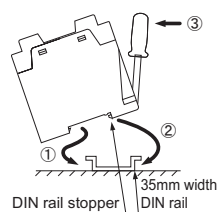
- Make sure that the power supply is off while mounting / removing this product.
- Take care that wrong wiring will damage the sensor.
- Due to heat radiation from the control element, the enclosure may be heated. When this product is mounted, provide for enough heat radiation / ventilation.
- Verify that the supply voltage variation is within the rating.
- Do not use during the initial transient time (0.5 sec.) after the power supply is switched on.
- Avoid dust, dirt, and steam.
- Take care that the controller does not come in direct contact with water, oil, grease, organic solvents, such as, thinner etc., strong acid or alkaline.
- NPS-C7 and NPS-CT7 do not incorporate a short-circuit protection at the NPN open-collector transistor output. Do not connect them directly to a power supply or a capacitive load.
- The response time of the NPN open-collector transistor output of NPS-C7 or NPS-CT7 is 5 μs. If a relay or a micro-switch (mechanical contact) is connected, take care since its bounce may result in output chattering.
- 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.

4 MOUNTING

<Mounting on DIN rail>

Mounting method

- The front section is fitted on a 35mm width DIN rail.
- Then the rear section (the side towards the DIN rail stopper) is fitted by pressing it.

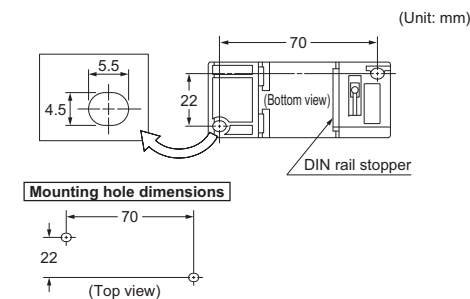


Dismantling method

- Dismantling can be done by pulling out the DIN rail stopper with the help of a screw-driver, etc.

<Mounting with screws>

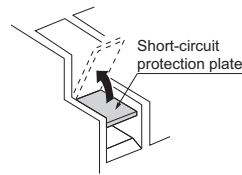
- Use two commercially available M4 screws. The tightening torque should be 0.78N·m or less.



5 WIRING

● Short-circuit protection plate

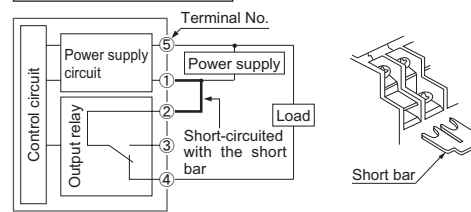
- The short-circuit protection plate is attached to terminal No. 1 to prevent AC short-circuit. Flip the plate up, connect the wire to terminal No. 1, and then flip it down.



● Short bar

- The short bar saves wiring when a common power supply is used for the AC supply terminal and the load supply of the relay contact output. (The short bar is attached between the terminal Nos. 1 and 2 at the time of shipment from our factory. To use a separate power supply for the output relay, make sure to remove it.)

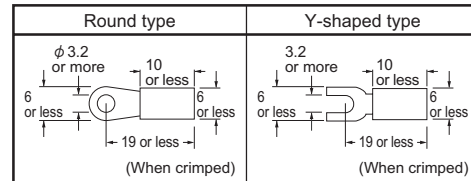
Typical wiring diagram



- All the terminals of NPS series use M3 terminal screws. If crimped terminals are used, they should be of the following dimensions.

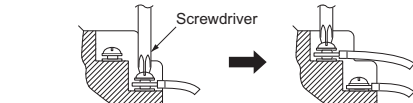
● Dimensions of suitable crimp terminals

(Unit: mm)

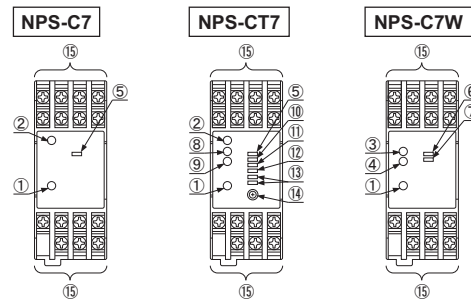


Note: Use crimp terminals having insulation sleeves. Recommended crimp terminal: Nominal size 1.25-3

- The tightening torque should be 0.25 to 0.49 N·m.
- Since the terminal block is divided into upper and lower levels, please make connection at the lower level first.



6 FUNCTIONAL DESCRIPTION

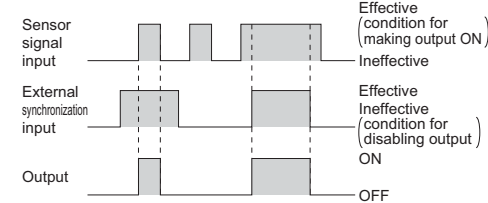


Description	Function
1 Power indicator (Red)	Lights up when the power is ON.
2 Output indicator (Red)	Lights up when the output is ON.
3 Sensor 1 output indicator (Red)	Lights up when the output is ON.
4 Sensor 2 output indicator (Red)	Lights up when the output is ON.
5 Sensor signal input selection switch	Selects the output operation. INV.: The output is ON when the sensor signal input is High. NORM.: The output is ON when the sensor signal input is Low.
6 Sensor 1 output operation mode switch	Selects the output operation. INV.: The output is ON when the sensor signal input is High. NORM.: The output is ON when the sensor signal input is Low.
7 Sensor 2 output operation mode switch	Selects the output operation. INV.: The output is ON when the sensor signal input is High. NORM.: The output is ON when the sensor signal input is Low.
8 Sensor signal input indicator (Red)	Indicates the state of the sensor signal input. The operation differs according to the mode set with 5 Sensor signal input selection switch. INV.: Lights up when the sensor signal input is High. NORM.: Lights up when the sensor signal input is Low.
9 External synchronization input indicator (Red)	Indicates the state of the external synchronization input. Lights up when the external synchronization input does not disable the output.
10 External synchronization operation mode switch	Selects the operation of external synchronization. INV.: The output is neglected when the external synchronization input is High. NORM.: The output is neglected when the external synchronization input is Low.
11 Gate / Edge trigger operation mode switch	Selects Gate trigger or Edge trigger. √: Effective at the instant the external synchronization input is applied. ∟: Effective over the period for which the external synchronization input is applied.
12 Delay time selection switch	Selects the delay time. 1sec: Variable from 40ms approx. to 1 sec. approx. 10sec: Variable from 0.4 sec. approx. to 10 sec. approx.
13 Timer operation mode switch	Selects the timer operation. Refer to 8 TIMER FUNCTIONS (NPS-CT7 only).
14 Timer adjuster	Set the delay time.
15 Terminal block	—

7 EXTERNAL SYNCHRONIZATION FUNCTION (NPS-C7, NPS-CT7 only)

● Gate trigger

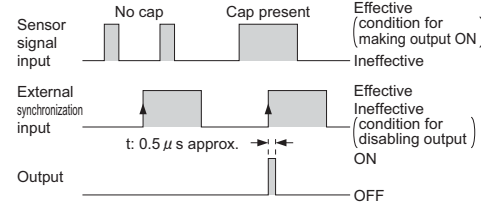
- The output is disabled when the external synchronization input is Low [mode selection switch on NORM. (Note)] or is High [mode selection switch on INV. (Note)].



Note: Since NPS-C7 is not incorporated with the selection switch, the output is disabled only when the external synchronization input is Low.

● Edge trigger (NPS-CT7 only)

- The sensor signal is judged at the instant the external synchronization input rises up or falls down. This sensor is ideal for cap presence detection that would have required two controllers in the past.



Note: As the output time 't' is only 5 μs approx., extend it by using the OFF-delay timer or the ONE SHOT timer.

8 TIMER FUNCTIONS (NPS-CT7 only)

- NPS-CT7 has three types of convenient built-in timer functions.

ON-delay (OND)

Function : Neglects short output signals.

Application: As only long signals are extracted, this function is useful for detecting if a line is choked or for sensing only objects taking a long time to travel.

OFF-delay (OFD)

Function : Extends the output signal for a fixed period of time.

Application: This function is useful if the output signal is so short that the connected device cannot respond.

ONE SHOT (OSD)

Function : Outputs a fixed width signal upon sensing.

Application: This function is useful when the input specifications of the connected device require a signal of fixed width. Of course, it is also useful for extending a short width signal to a desired width.

Selection switch and timer operation

Switch setting	Sensor signal input	Output operation
INV. NORM.	High	ON
INV. NORM.	Low	OFF
INV. NORM.	High	ON (with delay T)
INV. NORM.	Low	OFF (with delay T)
INV. NORM.	High	ON (with delay T)
INV. NORM.	Low	OFF (with delay T)
INV. NORM.	High	ON (with delay T)
INV. NORM.	Low	OFF (with delay T)
INV. NORM.	High	ON (with delay T)
INV. NORM.	Low	OFF (with delay T)
INV. NORM.	High	ON (with delay T)
INV. NORM.	Low	OFF (with delay T)
INV. NORM.	High	ON (with delay T)
INV. NORM.	Low	OFF (with delay T)

Timer period: T = Switchable, either 40ms approx. to 1 sec. approx., or 0.4 sec. approx. to 10 sec. approx.

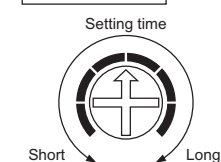
9 TIMER PERIOD SETTING (NPS-CT7 only)

- In order to set the timer period, use the delay time selection switch and the timer adjuster.

Delay time selection switch

Delay time selection switch	Setting range
1sec (ON) 10sec (OFF)	40ms approx. to 1 sec. approx.
1sec (OFF) 10sec (ON)	0.4 sec. approx. to 10 sec. approx.

Timer adjuster



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