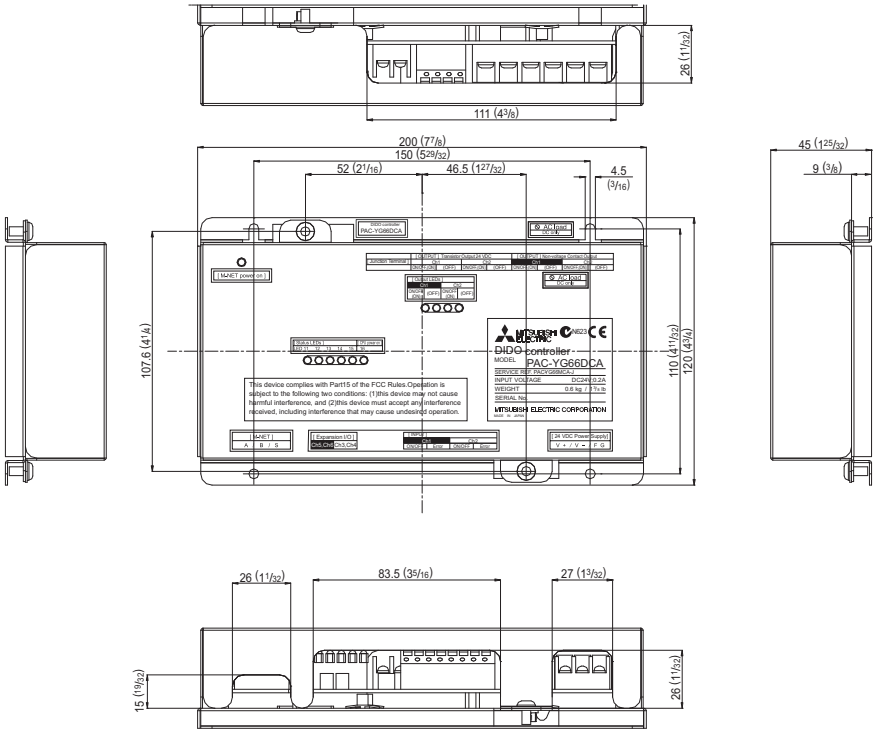
3-10. DIDO controller [PAC-YG66DCA]

The DIDO controller is used in combination with a AE-C400E/EW-C50E to operate general-purpose equipment, as well as to monitor operating and error status. It is equipped with two sets of standard terminals (Channels 1 and 2), and four sets of expansion connectors for the input/output terminals. Expansion cable is optional.
Operation can be monitored or performed from the AE-C400E LCD.
In addition, this device includes a function that interlocks M-NET devices such as indoor units, general equipment, etc.

External Dimensions

Unit: mm (in)



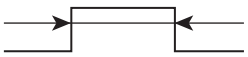
⚠CAUTION

Usage Restrictions

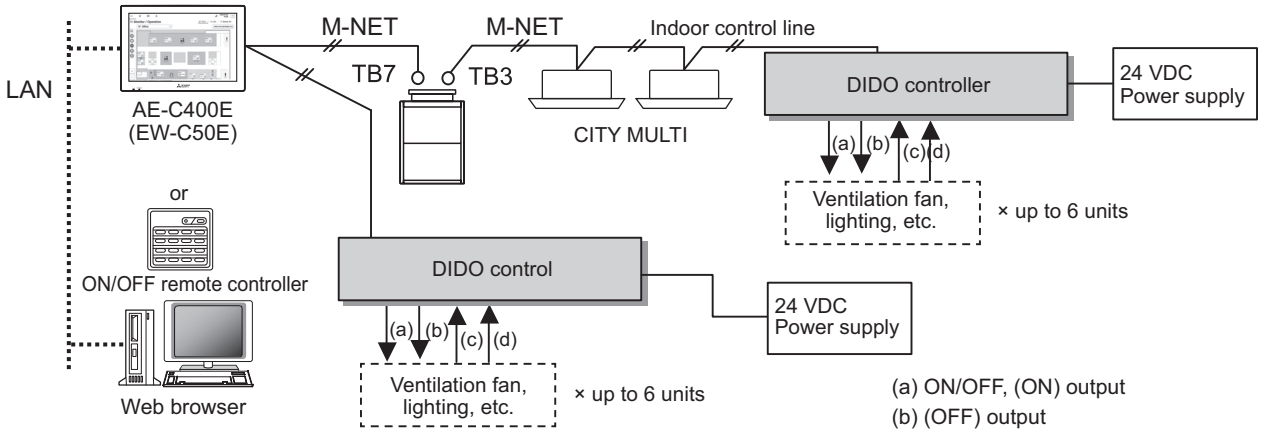
- Mitsubishi Electric does not take financial responsibility for damages caused by issues beyond our control or special circumstances (predicable or unpredictable); and secondary or accidental damages, and damages to other objects. We also do not take financial responsibility for opportunities lost as a result of device failure, or electrical power failure at the end-user site.
  Mitsubishi Electric does not take financial responsibility caused by end-users' requests including, but not limited to, device testing, startup, readjustment, and replacement.
- Do not use this device in disaster prevention, security, or "critical to life" applications.
- It is recommended to provide an external switch for general-purpose equipment in case of a failure of the DIDO controller or a peripheral part.

1. Specifications

(1). Device Specifications

<table>
<tr><th>Item</th><th colspan="6">Rating and Specification</th></tr>
<tr><td>Power Supply</td><td colspan="5">24 VDC ±10%: 5 W (*1)</td><td>Screw terminal block (M3) (*8)</td></tr>
<tr><td rowspan="8">Interface</td><td colspan="3">M-NET communication</td><td colspan="2">17 to 30 VDC (*2)</td><td>Screw terminal block (M3) (*8)</td></tr>
<tr><td rowspan="6">Standard</td><td rowspan="3">Output (*3)</td><td>ON/OFF, (ON) (*4)</td><td>Non-voltage Relay contact (2)</td><td>Applied load
MAX: 24 VDC, 5 W
MIN: 5 VDC, 2 mW
* AC loads cannot be connected.</td><td>Screw terminal block (M3.5) (*8)</td></tr>
<tr><td>Transistor (2)</td><td>24 VDC 40 mA or less (*5)</td><td>Screwless terminal block</td></tr>
<tr><td>(OFF) (*4)</td><td>Non-voltage Relay contact (2)</td><td>Applied load
MAX: 24 VDC, 5 W
MIN: 5 VDC, 2 mW
* AC loads cannot be connected.</td><td>Screw terminal block (M3.5) (*8)</td></tr>
<tr><td>Transistor (2)</td><td>24 VDC 40 mA or less (*5)</td><td>Screwless terminal block</td></tr>
<tr><td rowspan="2">Input</td><td>ON/OFF</td><td rowspan="2">Non-voltage a contact (2 each)</td><td rowspan="2">24 VDC 1 mA or less (*6)</td><td rowspan="2">Screwless terminal block</td></tr>
<tr><td>Error/Normal</td></tr>
<tr><td rowspan="4">Expansion</td><td rowspan="2">Output</td><td>ON/OFF, (ON) (*4)</td><td rowspan="2">Transistor (4 each)</td><td rowspan="2">24 VDC 40 mA or less (*5)</td><td rowspan="2">9 pin connector</td></tr>
<tr><td>(OFF) (*4)</td></tr>
<tr><td rowspan="2">Input</td><td>ON/OFF</td><td rowspan="2">24 VDC input (4 each)</td><td rowspan="2">24 VDC 1 mA or less (*7)</td><td rowspan="2">9 pin connector</td></tr>
<tr><td>Error/Normal</td></tr>
<tr><td colspan="3">Output Pulse Width</td><td>1s ± 30 ms</td><td colspan="2">1s ±30 ms  </td></tr>
<tr><td>Interlock Function</td><td colspan="6">Interlock M-NET devices and output contacts according to status of input contacts. (*8)</td></tr>
<tr><td rowspan="3">Environment Conditions</td><td colspan="2" rowspan="2">Temperature</td><td>Operating temperature range</td><td colspan="2">0 to 40°C[32°F to 104°F]</td></tr>
<tr><td>Storage temperature range</td><td colspan="2">-20 to 60°C[-4°F to 140°F]</td></tr>
<tr><td colspan="2">Humidity</td><td colspan="3">30 to 90%RH (no condensation)</td></tr>
<tr><td>Dimensions</td><td colspan="6">200 (W) × 120 (H) × 45 (D) mm / 7 7/8 (W) × 4 3/4 (H) × 1 25/32 (D) in</td></tr>
<tr><td>Weight</td><td colspan="6">0.6 kg / 1 3/8 lbs</td></tr>
<tr><td>Time Backup During Power Failure</td><td colspan="6">In the event of power failure or shut-off, the internal capacitor will continue to track time for approximately one week. (The internal capacitor takes about 24 hours to fully charge; a replacement battery is not necessary.)</td></tr>
<tr><td>Installation Environment</td><td colspan="6">Inside the metal control board (indoors)
* Use this product in a hotel, a business office environment or similar environment.</td></tr>
</table>

*1: For details, refer to "1-(2). Parts Purchased Separately".
*2: Supply electric power from a power unit for the transmission line or an outdoor unit.
Furthermore, the power consumption factor of the M-NET circuitry of this device is "1/4".
*3: Non-voltage Relay contact or transistor is available for output. Only one can be used at a time.
*4: ( ) is in the case of a pulse.
*5: The output is open collector type. Power must be supplied from an external power source to the output circuit of this device.
*6: Power is supplied from this device to the external contacts.
*7: Power must be supplied from an external power source.
*8: M3 and M3.5 are sizes of the screw on the terminal block (ISO metric screw thread).
The number indicates the screw diameter (mm).



*This figure omits the power supply line and only shows the transmission line.

(a) ON/OFF, (ON) output
(b) (OFF) output
(c) ON/OFF input
(d) Error/Normal input
Standard: Terminal block (for 2 units)
Expansion: Connectors (for 4 units)
Total: 6 units

<Restrictions>
Maximum of 50 units (50 channels) per AE-C400E/EW-C50E
However, the number of units that can be connected to a AE-C400E/EW-C50E is up to 50 including the number of contacts used on this device, an indoor unit, LOSSNAY unit, etc.
Up to 6 contacts can be connected to the DIDO controller (1 M-NET address). One contact connected to this device is calculated as the equivalent of one indoor unit connected to AE-C400E/EW-C50E.
For example, 5 contacts connected to the DIDO controller are calculated as the equivalent of 5 indoor units connected to AE-C400E/EW-C50E.

NOTE

- For the shield ground of the M-NET centralized control line, use single-point grounding at the power unit for the transmission line.
  However, when supplying electric power to the M-NET centralized control line from the R410A-Series outdoor unit*1 without using a power supply unit for the transmission line, use single-point grounding at the TB7 of that outdoor unit. *1: Except PUMY model.
  Furthermore, when connecting this device to the M-NET indoor control line, use grounding at the TB3 for each outdoor unit system.
- If the M-NET transmission line of this device is connected to the M-NET indoor control line and the outdoor unit is down because, for example, the power supply is interrupted for servicing or there is a failure, the DIDO controller cannot be controlled from the system controller.
- Controlling the ON/OFF remote controller is only possible with channel 1 of a standard terminal block.
- When AE-C400E/EW-C50E is connected, monitoring control can only be performed from AE-C400E/EW-C50E Web. Monitoring control cannot be performed from the ON/OFF remote controller.

(2). Parts Purchased Separately

Prepare the following parts to install this device.

Required Part	Specification
Unit fixing screws	M4 screw × 4 (*M4: ISO metric screw thread)
Power supply for this device	Commercially available power source: 24 VDC±10% 0.2 A (Minimum loading), SELV circuit, power line with grounding terminal Ripple noise: Lower than 200 mVp-p Compatible specification Authorized or CE marked products Subject to regulations: - IEC60950 (or EN60950) - CISPR22/24 (or EN55022/24) - IEC61000-3-2/3-3 (or EN61000-3-2/3-3) When using transistor output (including extension output) for the 24 VDC output of this device, increase the capacity to match the number used. • 1 set used: 0.3 ADC (Minimum) • 2 sets used: 0.4 ADC (Minimum) • 3 sets used: 0.5 ADC (Minimum) • 4 sets used: 0.6 ADC (Minimum) • 5 sets used: 0.7 ADC (Minimum) • 6 sets used: 0.8 ADC (Minimum) * The increase of the power supply capacity is 0.1 ADC for every set.
Power line	Use a sheathed vinyl cord or cable. At least 0.75 mm^2 (AWG18)
M-NET transmission line	Type of the cable: Sheathed vinyl cords or cable which comply with the following specifications or equivalent. • CPEV ø1.2 mm to ø1.6 mm • CVVS 1.25 mm^2 to 2 mm^2 (AWG 16 to 14) * CPEV: PE insulated PVC sheathed shielded communication cable * CVVS: PVC insulated PVC sheathed shielded control cable PE: Polyethylene PVC: Polyvinyl choloride Power needs to be supplied to the M-NET circuitry of this device. Use an outdoor unit or a separately purchased power supply unit for the transmission line.
Signal lines	Use electric wire of an appropriate size for the terminal block of this device. Electric wire size ···· (1) Solid wire: ø0.65 mm (AWG21) - ø1.2 mm (AWG16) (2) Stranded wire: 0.75 mm^2 (AWG18) - 1.25 mm^2 (AWG16) Single strand: At least ø0.18 mm To use an expansion input/output, use a separa tely purchased external input/output adapter.

[Parts to be Purchased Separately]

Name	Model	Application	Remark
Power supply unit	PAC-SC51KUA	Power supply to the M-NET transmission line	This is not required when power is to be supplied from an outdoor unit.
External I/O adapter	PAC-YG10HA-E	Connection adapter for using an expansion input/output	This is required when an expansion input/output is used.

[Commercially available parts]

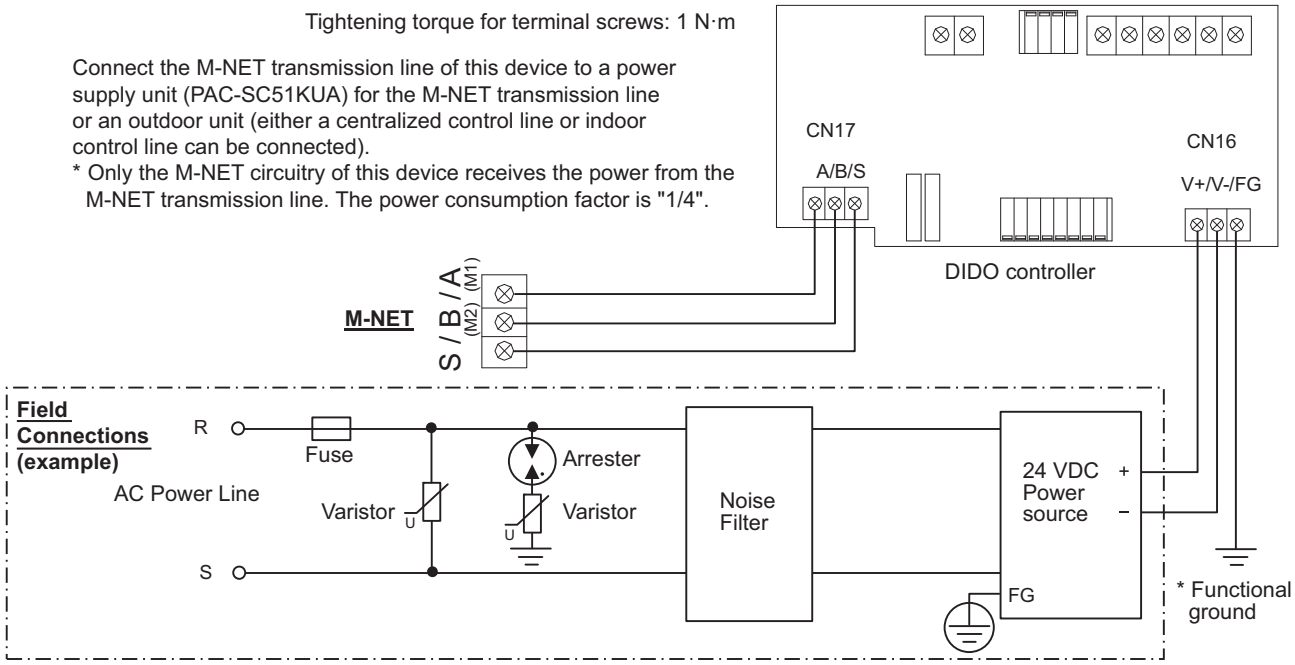
Name	Application	Remark
External 24 VDC power source	Supplies power when to use the DIDO controller or transistor output.	Refer to "Power supply for this device" in "Required Part" above for the power supply capacity.
Relay device	Requires commercially available relay device depending on the electric specifications with an external device.	

2. Wiring Instructions

(1). Connecting the Power and M-NET Transmission Lines

Tightening torque for terminal screws: 1 N·m

Connect the M-NET transmission line of this device to a power supply unit (PAC-SC51KUA) for the M-NET transmission line or an outdoor unit (either a centralized control line or indoor control line can be connected).
* Only the M-NET circuitry of this device receives the power from the M-NET transmission line. The power consumption factor is "1/4".



⚠CAUTION

- Use a power line and M-NET transmission line that satisfy the specifications described in "1-(2). Parts Purchased Separately".
- Attach a circuit comprising the following components to the supply primary side of the 24 VDC power supply.
  (1) Varistor, (2) Arrester, (3) Noise filter, (4) Fuse
- It is important to pay attention to the polarity when connecting to the 24 VDC power supply terminal block. Connecting the positive and negative in the reverse order will cause a failure.
- Fix the power line and M-NET transmission line in place on the outside to ensure that the terminal block is not affected by any external force.
  Not securely connecting and fixing the wires in place may cause heat generation and fire.
- Make sure that the copper wiring is not short-circuiting the plates (cover, lower case) or neighboring wires. Cover the shielded line of the M-NET transmission line with materials such as vinyl tape and prevent short-circuiting with the plates.

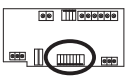
(2). Connecting the Signal Lines

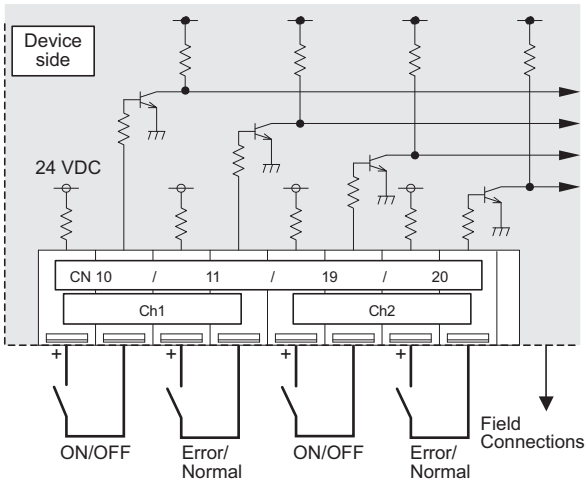
- Separately procure the relay, power supply for the relay, terminal block, and cable locally.
- The maximum wire length is 100 m (328 ft). However, since the use of long wires makes the device susceptible to noise, using wires shorter than 10 m (32.8 ft) is recommended.
- Connect another relay within 10 m (32.8 ft) from DIDO controller to extend the input line.

1) Standard Terminals (Channels 1 and 2)

(1-1) Input

(a) Non-voltage a-contact Inputs





Contacts closed :
Operating (ON); detected an error
Contacts closed :
Operating (ON); detected an error
*Error/normal detection becomes inverted from contact open/closed logic for a b-contact setting.

NOTE

- Connect the operate/stop (ON/OFF) inputs so that closing the contact operates (ON) the device and opening the contact stops (OFF) the device.
- The error/normal inputs of channels 1 and 2 can be switched between a-contact and b-contact.

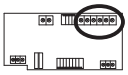
⚠CAUTION

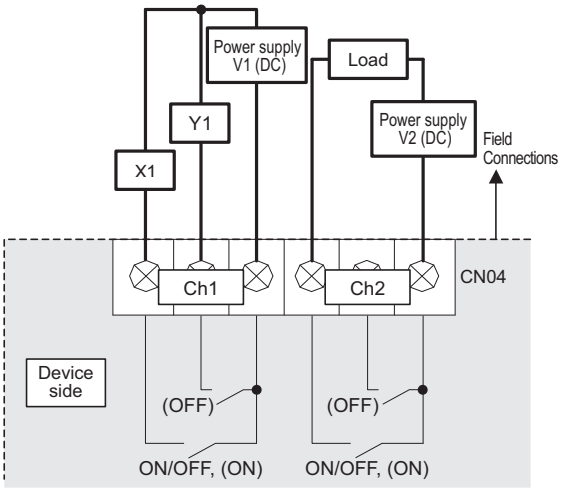
- The polarity of the input terminals is important, so be sure to match the polarity when using contacts that have polarity.
- Select a contact with a minimum applicable load of 1 mADC or less.
- Supply 24 VDC 1 mA from the positive terminal to the external contacts.
- Do not install alongside or in contact with other wires.
- Strip 12 ±1 mm (15/32 ± 1/32 in) of the wire coating and insert firmly into the terminal.
- Make sure that the copper wiring is not short-circuiting the plates (cover, lower case) or neighboring wires.
- Perform wiring so that the terminal block is not strained.
  If strained, use a wire guide or junction terminal to alleviate the stress on the terminal block.

(1-2) Output

Non-voltage Relay contact or transistor is available for output. Only one can be used at a time.

(a) Non-voltage Relay Contact Outputs





Operate (ON) output :
Contacts closed
Stop (OFF) output :
Contacts open
*Upon pulse output, the (ON), (OFF) contacts close according to the output content. ((ON) and (OFF) refer to the junctions in the diagram.)

( ) is in the case of a pulse.

Tightening torque for terminal screws: 1 N·m

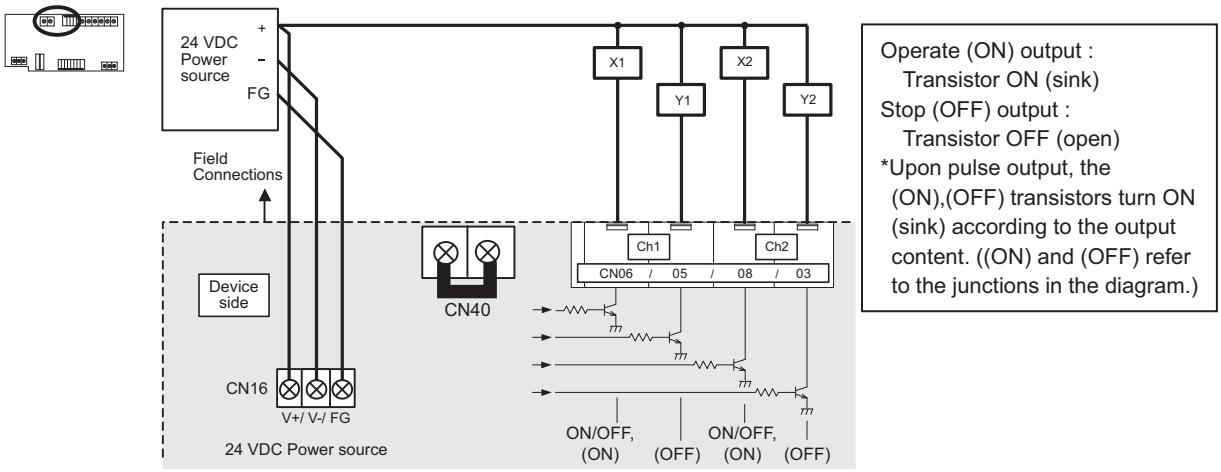
⚠CAUTION

- To use X1 and Y1 relay, obtain one that satisfies the following specifications.
  Operating coil
  [Applied load]
  MAX: 24 VDC, 5 W (Built-in diode)
  MIN: 5 VDC, 2 mW (Built-in diode)
  *1 AC loads cannot be connected.
  *2 Provide a power supply (V1, V2) that matches the load and relay to be used.
- To drive a direct load, use ones within the following.
  [Applied load]
  MAX: 24 VDC, 5 W
  MIN: 5 VDC, 2 mW

* AC loads cannot be connected.

- Make sure that the copper wiring is not short-circuiting the plates (cover, lower case) or neighboring wires.
- Perform wiring so that the terminal block is not strained.
  If strained, use a wire guide or junction terminal to alleviate the stress on the terminal block.
- Do not connect the wires directly from the top of the control panel to the terminal block.
  Moisture may enter this device along the wiring and cause electric shock or fire.

(b) Transistor Outputs (Open Collector)



Operate (ON) output :
Transistor ON (sink)
Stop (OFF) output :
Transistor OFF (open)
*Upon pulse output, the (ON),(OFF) transistors turn ON (sink) according to the output content. ((ON) and (OFF) refer to the junctions in the diagram.)

( ) is in the case of a pulse.

Tightening torque for terminal screws: 1 N·m

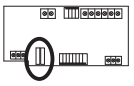
NOTE	The junction terminal block CN40 (for 24 VDC) is provided. Use them as relay terminals if necessary.

⚠CAUTION	• When X1, X2, Y1 and Y2 relays are used, select ones that satisfy the following specifications. Operating coil Rated voltage: 24 VDC (Built-in diode) Power consumption: 0.9 W or less (*1) Be sure to use the ones with the voltages rated above. Exceeding the rated voltage may affect the ON/OFF of other outputs. (*2) When using a separate power supply for this device, connect GND of the power supply to V- of CN16 of the terminal block of this device. (*3) Use a relay with a withstanding voltage of at least 2000 VAC between the coil and contact. Otherwise, there is the likelihood of an electric shock or fire. • Strip 12 ±1 mm (15/32 ±1/32 in) of the wire coating and insert firmly into the terminal. • Make sure that the copper wiring is not short-circuiting the plates (cover, lower case) or neighboring wires. • Perform wiring so that the terminal block is not strained. If strained, use a wire guide or junction terminal to alleviate the stress on the terminal block. • Do not connect the wires directly from the top of the control panel to the terminal block. Moisture may enter this device along the wiring and cause electric shock or fire.

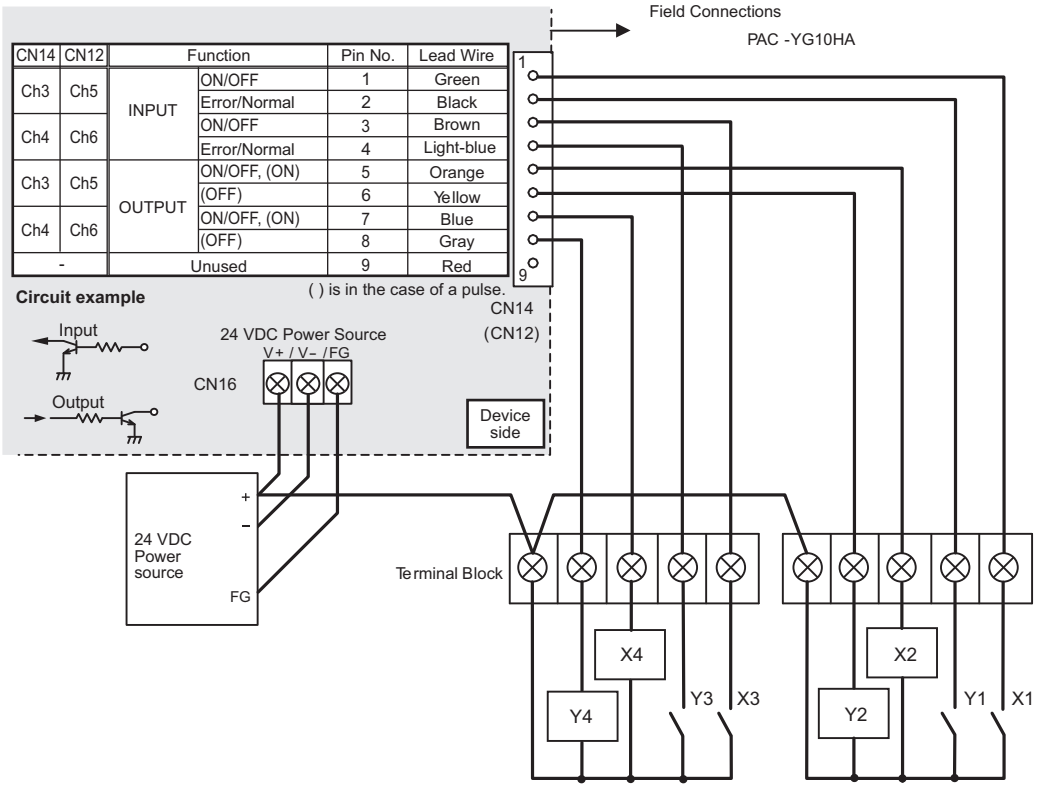
2) Expansion Connectors (Channels 3 to 6)

(2-1) Expansion Inputs/Outputs

Purchase an optional external input/output adapter (model: PAC-YG10HA-E) when using expansion inputs/outputs.
PAC-YG66DCA has two expansion connectors, and up to two external input/output devices can be connected to each connector.
An optional external input/output adapter is required for each connector used.



CN14	CN12	Function		Pin No.	Lead Wire
Ch3	Ch5	INPUT	ON/OFF	1	Green
			Error/Normal	2	Black
Ch4	Ch6		ON/OFF	3	Brown
			Error/Normal	4	Light-blue
Ch3	Ch5	OUTPUT	ON/OFF, (ON)	5	Orange
			(OFF)	6	Yellow
Ch4	Ch6		ON/OFF, (ON)	7	Blue
			(OFF)	8	Gray
-		Unused		9	Red



[Input]
Contacts closed (24 VDC applied): Operating (ON); detected an error
Contacts open : Stopped (OFF); detected as normal
* Error/normal detection becomes inverted from contact open/closed logic for a b-contact setting.
[Output]
Operate (ON) output : Transistor ON (sink)
Stop (OFF) output : Transistor OFF(open)
* Upon pulse output, the (ON), (OFF) transistors turn ON (sink) according to the output content. ((ON) and (OFF) refer to the junctions in the diagram.)

⚠CAUTION

- When using X1, X2, X3, X4, Y1, Y2, Y3 and Y4 relays, select ones that satisfy the following specifications.
  Operating coil Rated voltage: 24 VDC (Built-in diode)
  Power consumption: 0.9 W or less
  (*1) Be sure to use the ones with the voltages rated above. Exceeding the rated voltage may affect the ON/OFF of other outputs.
  (*2) When using a separate power supply for this device, connect GND of the power supply to V– of CN16 of the terminal block of this device.
  (*3) Use a relay with a withstanding voltage of at least 2000 VAC between the coil and contact. Otherwise, there is the likelihood of an electric shock or fire.
- Select a contact with a minimum applicable load of 1 mADC or less for the input contact.
- Do not install alongside or in contact with other wires.

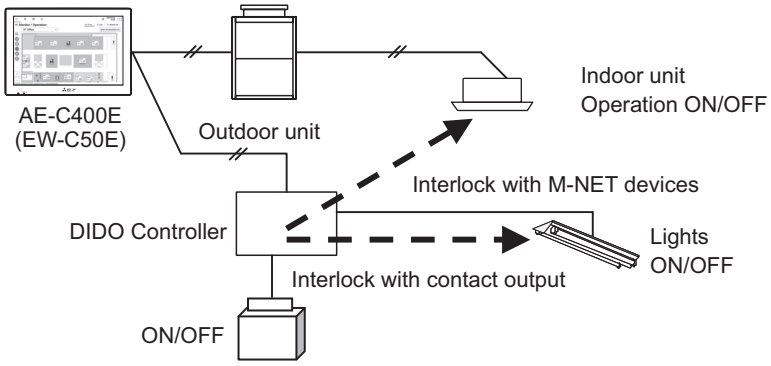
3. Interlock control

The DIDO controller (PAC-YG66DCA) has an interlock control function, which enables operation or set temperature change on the M-NET devices such as indoor units and also enables signal output to the contacts on the DIDO controller.
Interlock control covers the units connected to the DIDO controller with M-NET system.
AE-C400E/EW-C50E must be connected to use the function.
Ask your dealer for interlock control setting. The setting requires special tool support.

⚠CAUTION

Before using the interlock control, you must agree to the following.
1.This feature must not be used for disaster prevention or security purpose.
(Not designed to be used in situations that are life-threatening)
2.No functions must be added that allow the malfunctioning unit to run by defeating the safety features, such as an external ON/OFF switch or a short-circuit.
3.Those settings for the function that are not supported by the interlocked units must not be made. All the settings must be made within the specified range.
(Failure to observe these precautions may result in malfunctions and failures.)
4.Perform a test run for interlock control, and confirm the correct settings and normal operation.
5.The system must be configured in the way that integrates the operation of the interlocked fire and emergency control systems.

Item	Content	Remarks
Number of events	24 events	1 event interlock with 1 unit
Determinant condition for interlock control	At input contact change	• Operation input ON/OFF • Error input Error/Normal
Interlock control contents (to be output)	1 action for 1 condition • ON/OFF operation of indoor units • Operation mode change of indoor units • Temperature setting of indoor units (*1) • Contact output to DIDO controller (*2)	Interlock control covers the units connected to DIDO controllers with M-NET system. (*1) Temperature setting range: 19-28ºC (Standard setting) (*2) DIDO controller itself or other DIDO controllers in the same M-NET system.
Other	Interlock control prohibition function is enabled at emergency stop from AE-C400E/EW-C50E	



Interlock control of DIDO controller (example)

Note: Do not use Interlock control function on both AE-C400E/EW-C50E and DIDO controller at the same time.