





Safety Precautions

Power supply transformer

Please read through the following precautions before installation, operation, maintenance or inspection, and use the unit correctly.

-  **Warning** In case the product is used erroneously, it may cause serious accidents and death.
-  **Caution** In case the product is used erroneously, it may cause dangerous states and may be harmful to operators or physical properties can be damaged.

Warning

- Do not touch any terminal part when electric power is ON.
This may cause electric shock.

Cautions

- It may cause electric shock, inflammation or burning may be caused.
- Use the unit after complete installation on the special protective circuits on the primary and secondary sides of the power supply transformer.
- Conduct any of the wiring, maintenance or inspection only after breaking the breaker of the input side and only after confirming that no electricity is supplied.
- Do not touch the unit while the power supply is being energized or immediately after the power supply is being disconnected.
- Do not use the unit in any abnormal circumstances, e.g. in high temperature, high humidity, corrosive gas, vibrations or shocks etc.
- Use the product with connecting appropriate size of wires fitted for the rated specifications of the product, and apply crimping terminal insulation cap to each terminal.
- Be sure to apply terminal cover after the end of wiring process.
- For tightening the screws, please follow the following tightening torque :

M4 1.8N·m (18Kgf·cm)

M5 3.0N·m (30Kgf·cm)

M8 9.0N·m (92Kgf·cm)

- In the installation process, do not hold the terminal block to take the unit.
- Please check the terminal screws periodically
- Do not loosen or touch any bolts or nuts which are not concerned with the required working in the wiring process.
- Users should not modify, disassemble or repair the unit in their plant.

Protective Circuit and Important Notes.

To avoid trouble to the power supply transformer

As cause of trouble of the power supply transformer, the defective of the power supply transformer itself, abnormality of the power load, erroneous wiring etc. shall be considered. They may cause heat generation, electric leakage, electric shock, burning, fire and the other accidents.

Therefore, in using the power supply transformer, it is required to install appropriate protective circuits on the primary and the secondary sides.

As the method to install the protective circuits, it is appropriate to insert a current fuse and circuit protector on the primary side.

However, when the power supply voltage is turned ON, a rush of current, at the level of several times or about 20 times of the rated current, will flow in for a while (1/2-1 cycles). In this connection, the protective circuits for the safety purpose should react (break the circuits) immediately and correctly. A time-lag blown fuse or time delay circuit protector should be selected in consideration of the characteristics of the power supply transformer

If other fusing are used other than the above mentioned products, inappropriate products may not work when any trouble happens, causing more affective troubles.

Pay particular attention to such troubles.

For the calculation of the rated value of the current fuse or circuit protector, please refer to the following formula:

$$\text{Rated value(A)} = \frac{\text{Capacity of the transformer (VA)}}{\text{Primary voltage}} \times 2.0$$

Note:

Special protective circuits shall be installed for each power supply transformer independently.

Such circuits should not be branched not used commonly for the other power supply transformer(S).

Environment for Installation

Altitude

Use the protective circuit in locations 1,000meters or below above sea level.

Ambient temperature

Select a location where the ambient temperature does not rise above 40°C, the yearly average temperature is about 20°C, and the daily average is below 35°C

※ When you use your equipment under special environment that does not satisfy the above conditions (as specified in JEC-204), you are required to specify your use conditions when placing an order with us.

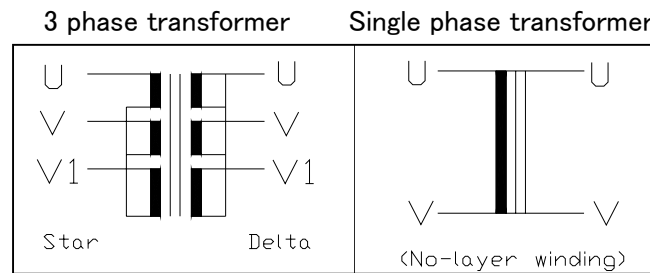
Even under such special conditions, however, you must observe the following notes on connection.

Compound Transformer & Auto Transformer

Applications of compound transformer

- The compound transformer is used where there must be insulation between the input side (power supply side) and the output side (load side).
- It transforms the power-supply voltage into a specified voltage.
- It converts the phases of power supply and load.

Connection Diagram of Compound Transformer



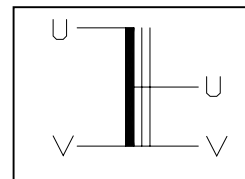
Application of auto-transformer

- The auto-transformer is used where no insulation is required between the input side and the load side.
- It transforms the input-side voltage into a specified voltage

CAUTION

With an auto-transformer, which has the primary and the secondary winding interconnected, the same voltage to ground as in the primary can occur in the secondary as well.

Connection Diagram of Compound Transformer



Single phase transformer

Notes on Connection

Circuit Voltage waveform

- The voltage waveform of the circuit to which the transformer is connected must be a substantially sinusoidal waveform.

Voltage balance of polyphase circuit

- The voltage of the polyphase circuit to which the polyphase transformer is connected must be nearly balanced.

Type of Insulation and Permissible Maximum Temperatures

Type of insulation	Permissible maximum temperature (°C)
A	105
E	120
B	130
F	155
H	180

Check Items before Ordering

- (1) Power source : Single phase or Three phase
 (2) Primary voltage : () V
 (3) Secondary voltage : () V
 (4) Secondary current : () A
 (5) Capacity : () VA or () KVA
 (6) Winding : Auto or Compound
 (7) Frequency : 60Hz or 50Hz
 (Our standard products are usable with both 50Hz and 60Hz)
 (8) Shield (electrostatic shield) : With or Without
 (9) Casing : With or Without casing
 (Indoor or outdoor)

Calculation of capacity

- Calculate the capacity of transformer as follows

Single phase : Capacity(VA)= Secondary voltage(V) × Secondary current(A)

Three phase : Capacity(VA)= $\sqrt{3}$ × Secondary voltage(V) × Secondary Current'(A)

Standard and Customized Products

- The models marked with "Standard Products" in the catalog are always in stock at our head office, so that they will be supplied to you right away.
- Custom-made products are also manufactured in short lead time to your order.
- For a custom-made transformer, please provide us with detailed specifications. If detailed specifications are not provided, we will design and manufacture it according to our standards (See below standards)

Standard specification

Without customer specifications, the following items will comply with our company standards. Test are performed as specified in JIC-C5311

Withstand voltage

Rated voltage	Test voltage
60V or below	1,000V
300V or below	2,000V
600V or below	2,500V

Rate of voltage variation

Rated power	Maximal value rate of voltage variation(%)
50VA or below	15
500VA or below to 50VA	10
500VA or above	5

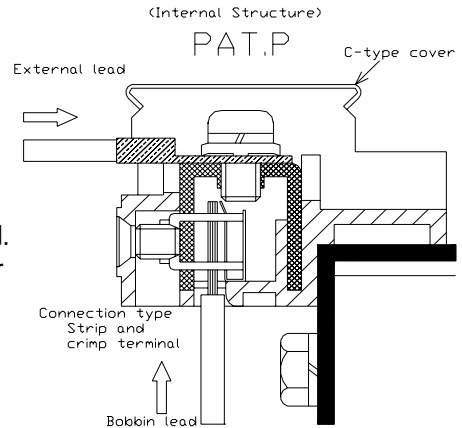
Temperature rise

Point of measurement	Measuring method	Class of insulation	Limit of temperature rise
Winding	Resistance method	A	65°C
		E	80°C
		B	90°C
		F	115°C
		H	135°C

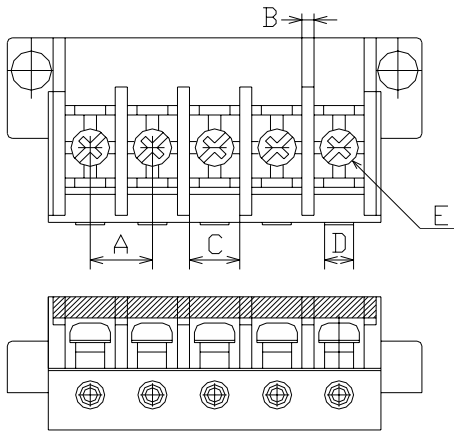
TR,TRA, and TRT Series with Safe Terminal Block Answering the Needs of the Times.

Our original design maximizing safety also contributes to enhanced durability and reliability.

- Safety is assured by higher partitions between terminals
- The insulator used is reinforced PBT resin (UL94-V0) featuring high resistance to oil, heat and chemicals.
- Special design ensures reliable connection of the bobbin lead.
- The C-type cover never fails off even when the transformer exposed to strong vibration.



Full view of M4/M5 terminal block



The number of Pole varies with models.

Specification of M4/M5 terminal block

Parts	Material	Dimension	Treatment	Remark
Body	PBT	-	-	UL94-V0
Conductor	C2680R	t=1.5	NI	-
Screw	SWRM	See else	ZMC	Free terminal screw
Cover	PC(clear)	-	-	UL94-V0

Standard tightening torque

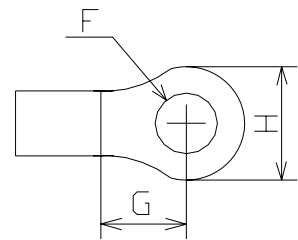
M4 terminal blocks = 18Kgf·cm(1.8N·m)

M5 terminal blocks = 30Kgf·cm(3N·m)

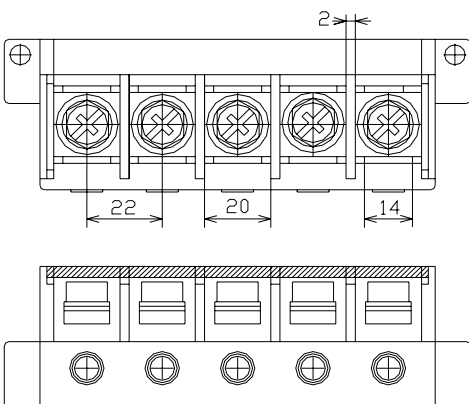
Dimension table

Code	M4/B	M5 T/B
A	11.5mm	14.5mm
B	2mm	2mm
C	9.5mm	12.5mm
D	6mm	7.4mm
E	M4 × 8L	M5 × 10L
F	MIN φ4	MIN φ5
G	MIN 6.7mm	MIN 7.8mm
H	MAX 9.4mm	MAX 12.4mm

Applicable crimp terminal



Full view of M8 terminal block



The number of Pole varies with models.

Specification of M4/M5 terminal block

Parts	Material	Dimension	Treatment	Remark
Body	PBT	-	-	UL94-V0
Conductor	C2680R	t=1.5	NI	-
Screw	SWRM	M8 × 14L	ZMC	Free terminal screw
Cover	PC(clear)	-	-	UL94-V0

Standard tightening torque : 92Kgf·cm(9N·m)

Applicable crimp terminal

