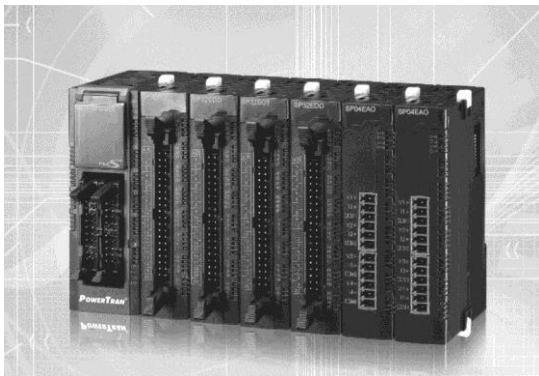


# POWERTRAN - PLC **S**

## PROGRAMMABLE LOGIC CONTROLLER

### PLC-S Digital I/O Module

- CM3-SP32EDO
- CM3-SP32EOT
- CM3-SP32EOC
- CM3-SP16EOR
- CM3-SP32EDT
- CM3-SP16EDR
- CM3-SP32PWM



## Before You Start


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This manual contains important information on the use and operation of this device. Please read all the information carefully for optimal performance and to prevent any damage or misuse of the device.

To keep product safely, all activities including product installation, wiring operation, or maintenance required are to be treated by trained personnel.

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Safety symbols are classified into two categories, "WARNING" and "CAUTION".

 **Warning**-This symbol describes situations that could cause major or fatal injury to the user.

 **Caution**-This symbol describes situations that may cause minor injury or damage to the device.

### SAFETY SYMBOLS USED IN THIS PRODUCT MEANS:

 This symbol warns the user of potential hazards.

 This symbol warns the user of un-insulated voltage within the unit that can cause dangerous electric shock.

Keep this manual nearby the user operating devices so it can be easily checked.

## A-class equipment (Broadcasting communication equipment for business)

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This product has passed the testing for electromagnetic waves for business use, and has not been designed or manufactured to be used as a household item; users are advised as such.

## Design Precautions ( Warning) ---

Please install a safety circuit to protect entire control system in case of an unexpected power shutdown and PLC module malfunction. Such anomalies may severely compromise the integrity of the overall system.

External to the PLC, please install circuits and switches to safeguard the system from mechanical damages (ex. Emergency stop, upper/lower limit switches, forward/reverse direction interlocking circuits, etc)

When the PLC detects either of the following failure conditions, it may stop operation and turn off all outputs.

- The overcurrent protection or overvoltage protection of the power supply module is activated.
- The PLC CPU detected a failure, such as the watchdog timer error or module installation failure, with its self-diagnostic function.

In addition, all outputs may be turned on when there is a failure that the PLC CPU cannot detect, such as in the relay or TR terminal. Build an extra monitoring circuit that will monitor any output signal that could cause serious accidents.

A greater than normal current passed through the PLC for an extended period of time, or a short-circuited load flows in the output module may cause a fire.

Build a circuit that turns on the external power supply after the PLC power supply is turned on. If the external power supply is turned on first, it could result in output failure or malfunction.

In order to ensure that the system operates safely, please configure an interlock circuit in the scan program for the following situations.

- When exchanging data with computer or other devices.
- When operated by a computer or other devices.

Not doing so could result in output failure or malfunction.

### **Precautions for design ( ⚠ Caution)**

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Do not bundle the input/output signal or communications cables with the main circuit and power cables. They should be installed at least more than 100 mm (3.94inches) apart. Not doing so could result in output failure or malfunction.

### **Precautions for mounting ( ⚠ Caution)**

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Use the PLC in the environment that meets the general specifications given in this manual.

Using this PLC in any environment outside the range of the general specifications could result in electric shock, fire, malfunction, or damage to or deterioration of the product.

Please ensure that each module is installed correctly in its place. Loosely or incorrectly installed pieces may result in malfunction, failure, or free-fall.

Power supply in PLC should be turned off before mounting the module. Not doing so could cause an electric shock or damage to the device.

Install I/O devices or extension connectors correctly. If they are installed incorrectly, it may result in an input or output failure.

Do not convey direct vibration into PLC. Doing so could cause electric shock, fire or malfunctions.

After wiring work, please make sure to close the terminal cover before turning on the power for the PLC system.

### **Precautions for wiring ( ⚠ Warning)**

---

Make sure to check the device's rated voltage and circuit arrangement before wiring. Failure to do so may cause electric shock or damage on the device.

Make sure to close the terminal cover before turning on the power of PLC system after wiring work. Failure to do so may cause electric shock.

### **Precautions for wiring ( ⚠ Caution)**

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Make sure to check device's regular voltage and sequence of terminals. Failure to do so may cause fire, electric shock and malfunctions.

Make sure to tighten the screw with standard torque. Loose connections may cause short-circuit, fire or malfunctions.

In grounding the FG ground terminals, be sure to conduct the product at least D type (Class 3) grounding. Not doing so could result in electric shock or malfunctions.

When wiring, make sure that wiring debris do not enter the module. Failure to do so may cause fire, equipment damage or malfunctions.

### **Precautions for test run and repair ( ⚠ Warning)**

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Please do not touch the terminals when the power is ON. Doing so could cause an electric shock or malfunctions.

When cleaning or tightening the screw, turn off the power of PLC and all other systems. Failure to do so could cause an electric shock or malfunctions.

Do not charge, disassemble, heat up, short, or solder the battery. Doing so could cause the battery to heat up, rupture or ignite thereby harming the user.

### **Precautions for test run and repair ( ⚠ Caution)**

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Do not dissociate the PCB from the module's casing or make any modifications to the device. Doing so may cause fire, electric shock or malfunction.

When mounting or separating the module, make sure to turn off power to PLC and all other devices. Failure to do so could cause an electric shock or malfunctions.

Use radio, walkie-talkie or cellphone devices at least 30cm away from the PLC. Not doing so could result in malfunction.

### **Precautions for Disposal ( ⚠ Caution)**

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When the product is disposed of, it should be done so according to your country's regulations for similar types of industrial waste. Not doing so may cause an occurrence of toxic substances or explosion.

# GENERAL SPECIFICATIONS

Items	Specification					Standards
Ambient Temp.	-10°C ~ 65°C					-
Storage Temp.	-25°C ~ 80°C					-
Ambient Humidity	5 ~ 95%RH, Not Condensed					-
Storage Humidity	5 ~ 95%RH, Not Condensed					-
Vibration	For discontinuous vibration					IEC61131-2
	Frequency	Acceleration	Amplitude	Times		
	5 ≤ f < 9Hz	-	1.75mm	X, Y, Z Each direction, 10 times		
	9 ≤ f ≤ 150Hz	9.8 m/s²{1G}	-			
	Continuous vibration					
	Frequency	Acceleration	Amplitude	Times		
	5 ≤ f < 9Hz	-	3.5mm	X, Y, Z Each direction, 10 times		
9 ≤ f ≤ 150Hz	4.9 m/s²{0.5G}	-				
Shock	Max. impact acceleration : 147 m/s² {15G} Authorized time : 11ms Pulse wave : Sign half-wave pulse (3 times each in X, Y, Z)					IEC61131-2
Noise	Square wave Impulse noise	±2kV				POWERTRAN Standard
	Electrostatic Discharge	Voltage : ±4kV(Contact), ±8kV(Air)				IEC61131-2 IEC61000-4-2
	Radiated electromagnetic field noise	80 ~ 1000 MHz, 10V/m				IEC61131-2 IEC61000-4-3
	Fast Transient Burst noise	Unit	Power module	Digital I/O (24V or more)	Digital I/O (less than 24V) Analog I/O Comm. interface	IEC61131-2 IEC61000-4-4
		Voltage	3KV	2KV	1KV	
Ambient conditions	No corrosive gas or dust					
Altitude	2,000m or less					
Pollution	2 or less					
Cooling Type	Natural air cooling					

## TECHNICAL SPECIFICATIONS

Items		DC Input	Relay Output	TR Output
Rated I/O Voltage		DC 24V	AC 220V / DC 24V	DC 12V / 24V
Rated I/O Current		4mA	1 point 2A COM 5A	1 point 1A COM 5A
On Voltage/Current		DC19V / 3mA	-	-
Off Voltage/Current		DC6V / 1mA	-	-
Response Time	Off → On	3ms or less	10ms or less	1ms or less
	On → Off	3ms or less	5ms or less	1ms or less
Operation Indication		LED will be ON when the Input is ON		
Insulation Type		Photo coupler Insulation	Relay Insulation	Photo coupler Insulation
Input Type		Sink/Source	-	-
Output Type		-	Relay	Sink/Source
Diagram				

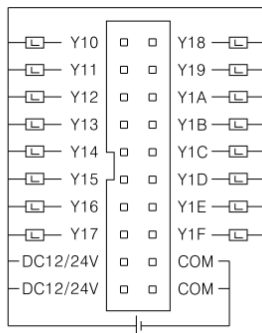
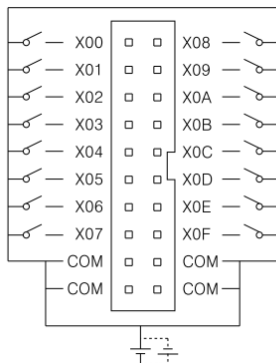
- ※ The Relay output must be less than 64 points in a station.
- ※ Max. Expansion number of CM3-SP16E0R is up to 4 modules(64 points).

## TECHNICAL SPECIFICATIONS – SP32PWM

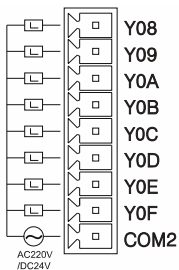
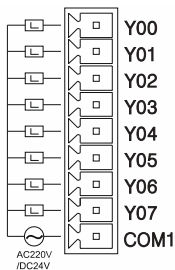
Items	PWM Output(SP32PWM)
Frequency Range (Guarantee DUTY Ratio)	1pps ~ 4000pps
Max Frequency	65Kpps
DUTY Ratio Resolution	0.0~100.0 % (Resolution 1/1000)
RAMP Control	Frequency RAMP, DUTY Ratio RAMP Control

# WIRING

## ● SP32EDT

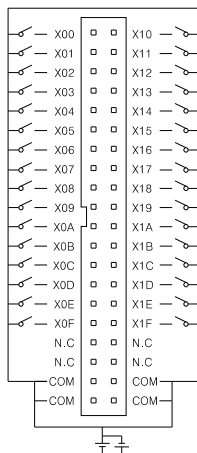


## ● SP16EOR

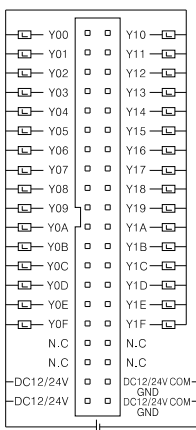


# WIRING

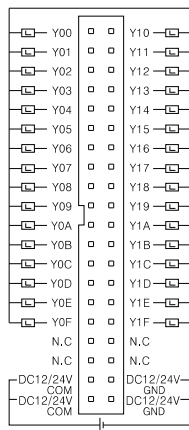
## ● SP32EDO



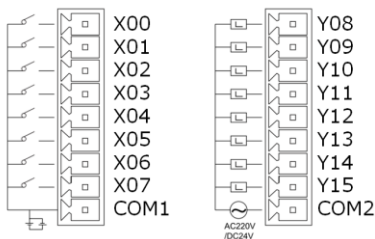
## ● SP32EOT



## ● SP32EOC

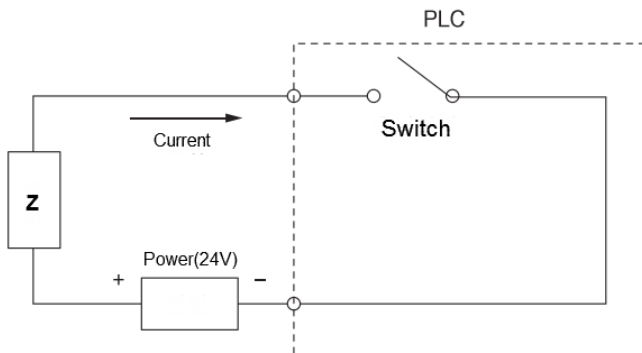


## ● SP16EDR

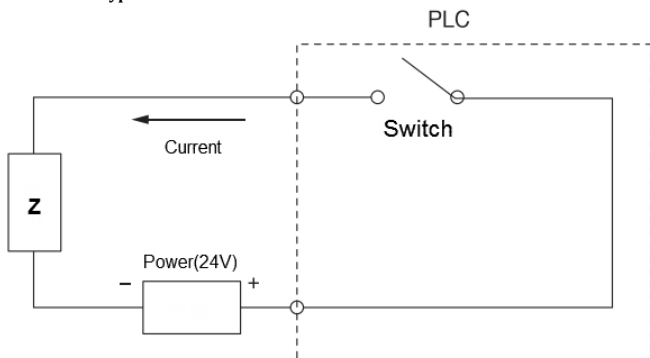


## INPUT / OUTPUT TYPE

### ● Sink Type

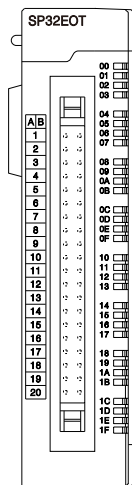


### ● Source Type

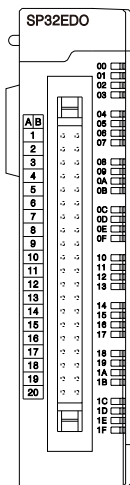


# APPEARANCE

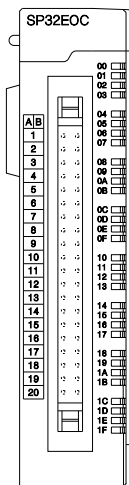
▶ SP32EOT



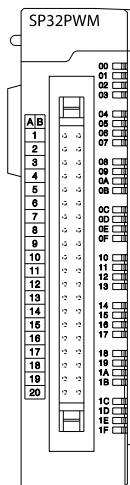
▶ SP32EDO



▶ SP32EOC

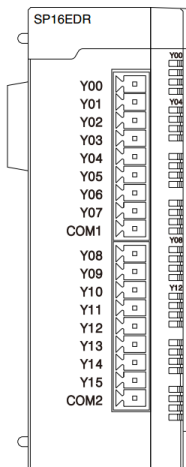


▶ SP32PWM

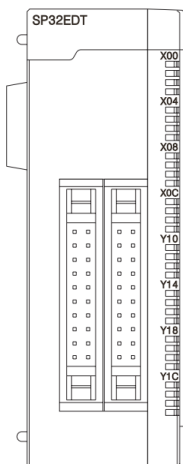


# APPEARANCE

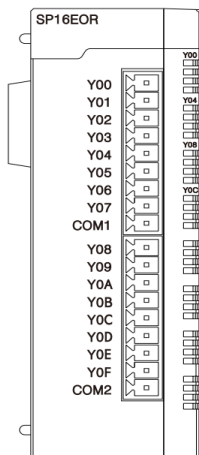
► SP16EDR



► SP32EDT

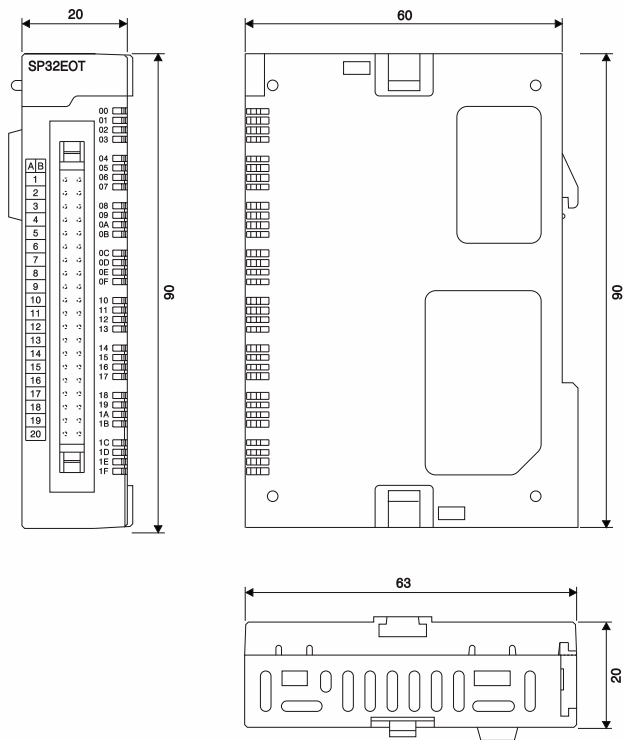


► SP16EOR



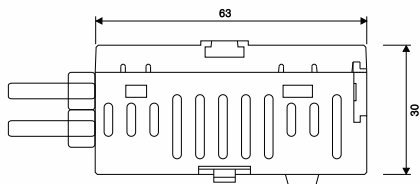
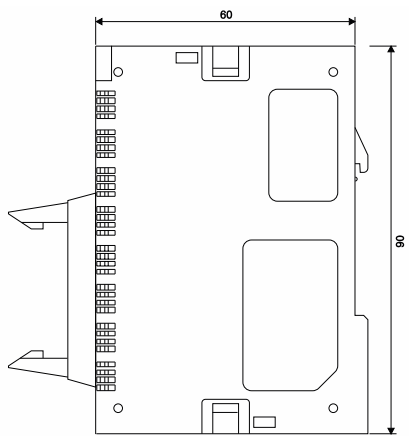
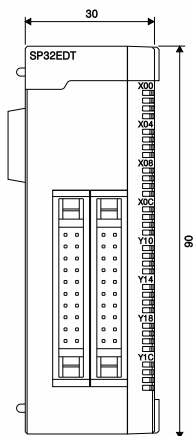
# DIMENSION

(Unit : mm)



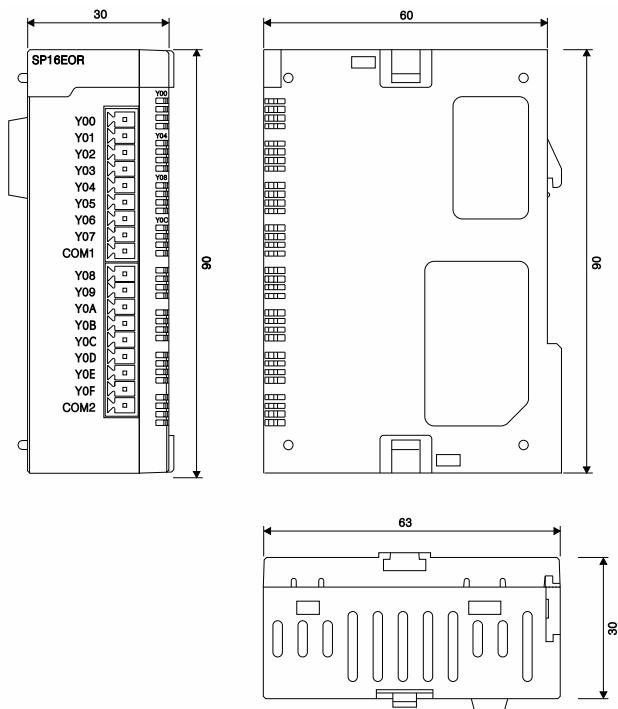
# DIMENSION

(Unit : mm)



# DIMENSION

(Unit : mm)



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JKFIL Industrial automation products including hardware, software, and firmware (collectively called “Products”) carry a **one-year warranty** against defects in materials and workmanship beginning from the date of product receipt from seller or its appointed distributor. If a product proves defective in materials and workmanship within one year from the date of purchase, we will replace or repair it. JKFIL makes no representation or warranty, express or implied, that the operation of the Products will be uninterrupted or error free, or that the functions contained therein will meet or satisfy buyer’s intended use or requirements.

**Repaired or replaced Products provided as a result of this warranty are warranted for a period of six (6) months from the date of replacement.** JKFIL’s standard policy is that all customers are responsible for freight charges to JKFIL when returning products under the warranty return policy.

This warranty will be void if Products date codes or serial numbers are removed or defaced. Warranties do not apply to products that have been subjected to abnormal use, abnormal conditions, improper storage, exposure to moisture or dampness, unauthorized modifications, unauthorized repair, misuse, neglect, accident, alteration, improper installation or other acts which are not the fault of JKFIL, including damage caused in shipping. Our warranty also does not apply to any product that has been damaged by external causes such as fire, flood, sand, dirt, lightning, acts of God, battery leakage, theft, blown fuses, improper use of any electrical source or connection to product not recommended in writing for interconnection by JKFIL.

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## PRODUCT WARRANTY

To minimize the risk of potential safety problems, you should follow all applicable local and national codes that regulate the installation and operation of your equipment. These codes vary from area to area and usually change with time. It is your responsibility to determine which codes should be followed, and to verify that the equipment, installation and operation is in compliance with the latest revision of these codes.

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