

Autonics PANEL METER MT4W SERIES



Thank you very much for selecting Autonics products. For your safety, please read the following before using.

Caution for your safety

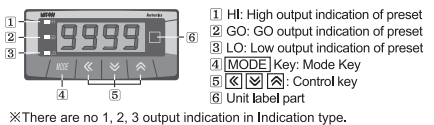
- Please keep these instructions and review them before using this unit.
- Please observe the cautions that follow;
 - Warning** Serious injury may result if instructions are not followed.
 - Caution** Product may be damaged, or injury may result if instructions are not followed.
- The following is an explanation of the symbols used in the operation manual.
 - Warning**: Injury or danger may occur under special conditions.

- In case of using this unit with machinery(Ex: nuclear power control, medical equipment, ship, vehicle, train, airplane, combustion apparatus, safety device, crime/disaster prevention equipment, etc) which may cause damages to human life or property, it is required to install fail-safe device. It may cause a fire, human injury or damage to property.
- It must be mounted on the Panel. It may cause electric shock.
- Do not connect terminals when it is power on. It may cause electric shock.
- Do not disassemble and modify this unit. Please contact us if it is required. It may cause electric shock or a fire.
- Please check the number of terminal when connect power line or measured input. It may cause a fire.

Caution

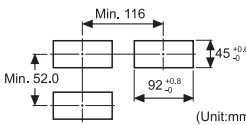
- This unit shall not be used outdoors. It might shorten the life cycle of the product or cause electric shock. It may cause insulation failure, contact melt, contact failure, relay broken, fire etc.
- When connecting wire, AWG 20(0.50mm²) should be used and screw bolt on terminal block with 0.74N-m to 0.90N-m strength. It may cause malfunction or a fire due to contact failure.
- Please observe the rated specification. It might shorten the life cycle of the product and cause a fire.
- Do not use the load beyond the rated switching capacity of Relay contact. It may cause insulation failure, contact melt, contact failure, relay broken, fire etc.
- In cleaning the unit, do not use water or organic solvent. And use dry cloth. It might cause an electric shock or fire that will result in damage to the product.
- Do not use this unit at place where there are flammable or explosive gas, humidity, direct ray the sun, radiant heat, vibration, impact etc. It may cause explosion.
- Do not inflow dust or wire drogs into inside of this unit. It may cause a fire or mechanical trouble.
- Please connect properly after checking the polarity of measurement terminals. It may cause a fire or explosion.

Front panel identification

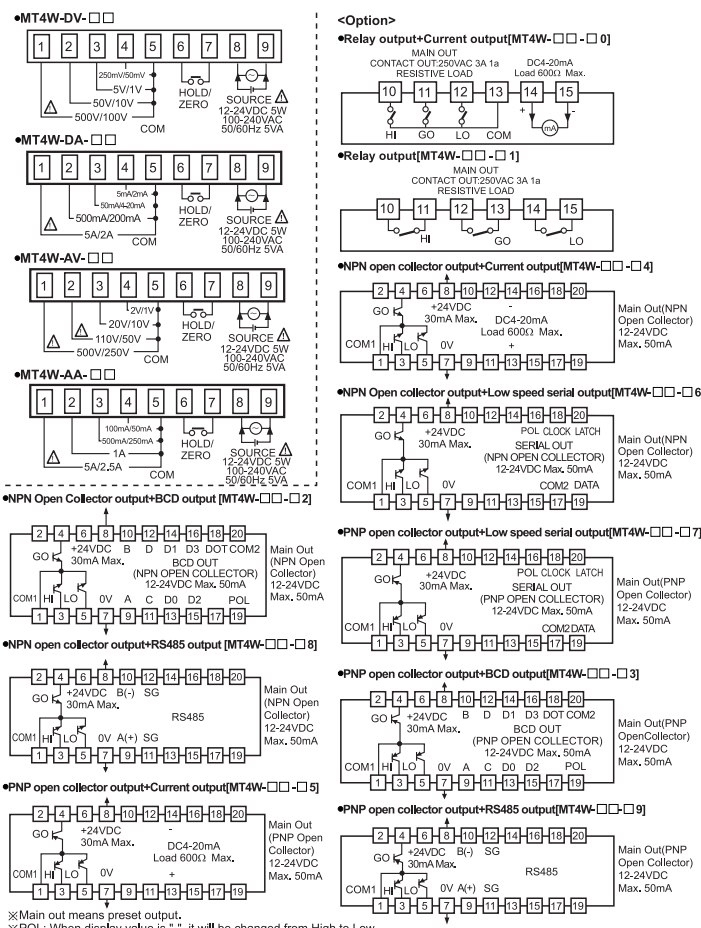


There are no 1, 2, 3 output indication in Indication type.

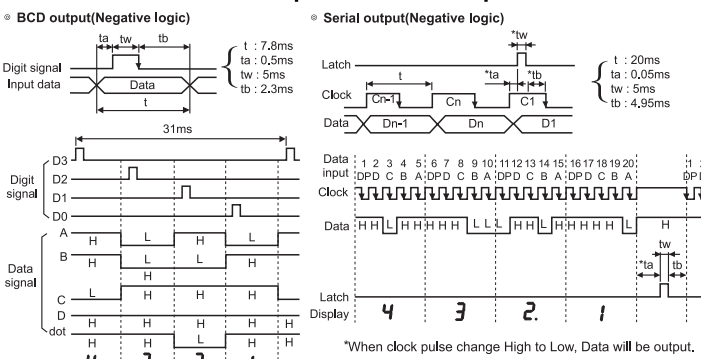
Panel cut-out



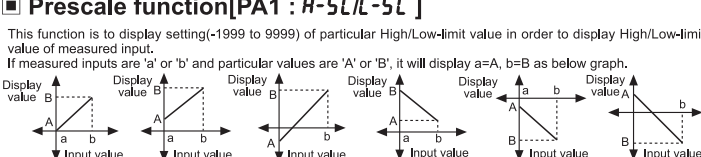
Terminal connection



Time chart of serial output and BCD output



Prescale function [PA1: H-SC/L-SC]



Error display function

Display	Description
HHHH	Flashes when measurement input is exceeded the maximum allowable input (110%)
LLLL	Flashes when measurement input is exceeded the minimum allowable input (-10%)
F-HH	Flashes when display input is exceeded H-SC set value
F-L	Flashes when display input is exceeded L-SC set value
F-HH	Flashes when input frequency is exceeded the max. display value of measured range
0.00	Flashes when it exceeds zero range (±99)

The above specifications are subject to change and some models may be discontinued without notice.

Specifications

Model	MT4W-□□-□□	MT4W-□□-1□
Power supply	100-240VAC 50/60Hz(90 to 110% of rated voltage)	12-24VDC(90 to 110% of rated voltage)
Power consumption	5VA	5W
Display method	7Segment LED Display(Red)	
Display accuracy	23°C±5°C DC Type: F.S.±0.1% rdg±2digit / AC Type: F.S.±0.3% rdg±3digit Frequency: F.S.±0.1% rdg±2digit F.S.±0.3% rdg ±3digit max. only for 5A terminal	
Input	-10°C to 50°C DC/AC Type: F.S.±0.5% rdg±3digit DC Voltage/Current, AC Voltage/Current, AC Frequency	
Max. allowable input	110% for each measured input range	
A/D conversion method	Practical over sampling using successive approximation ADC.	
Sampling cycle	50ms(DC), 16.6ms(AC 60Hz)	
Max. indication range	-1999 to 9999(4Digit)	
Preset output	Relay output ⇒ Contact capacity: 250VAC 3A, 30VDC 3A/Contact composition: N.O.(1a) NPN/PNP Open Collector output ⇒ 12-24VDC ± 2V 50mA Max.(Load resistance)	
Sub output (Transmission output)	RS485 communication output ⇒ Baud rate: 1200/2400/4800/9600, Communication method: 2-wire half duplex, Synchronous: Asynchronous method, Protocol: Modbus type, Serial/BCD output ⇒ NPN Open collector output, 12-24VDC Max. 50mA(Resistive load), 4-20mA output ⇒ Resolution: 12,000 division(Load resistance max. 600Ω), Response time: Max. 450ms	
AC measurement function	Selectable RMS or AVG	
Frequency measurement function	Measured range: 0.100 to 9999Hz(Variable by decimal point position)	
Hold function	Includes(External hold function)	
Environment	Ambient temperature: -10 to 50°C, Storage: -20 to 60°C Ambient humidity: 35 to 85%RH, Storage: 35 to 85%RH	
Insulation type	Double insulation or reinforced insulation (Dielectric strength between the measuring input part and the power parts: 1kV)	
Approval	CE, CE	
Weight	Approx. 211g	

Environment resistance is rated at no freezing or condensation.

Specification of measured input and range [PA1: In-r]

Type	Measured input and range	Input impedance	Display range [5ndt]	Prescale Display range [SCAL]
DC Volt	0-500V [500u]	4,33315MΩ	0.0 to 500.0(Fixed)	
	0-100V [100u]	4,33315MΩ	0.0 to 100.0(Fixed)	
	0-50V [50u]	433,15kΩ	0.0 to 50.00(Fixed)	
	0-10V [10u]	43,315kΩ	0.0 to 10.00(Fixed)	
	0-5V [5u]	4,3315kΩ	0.0 to 5.000(Fixed)	
	0-250mV [0.25u]	2,15kΩ	0.0 to 250.0(Fixed)	
	0-50mV [50m]	2,15kΩ	0.0 to 50.00(Fixed)	
	0-5A [5A]	0.01Ω	0.00 to 5.000(Fixed)	
	0-2A [2A]	0.01Ω	0.00 to 2.000(Fixed)	
	0-500mA [0.5A]	0.1Ω	0.0 to 500.0(Fixed)	
DC Ampere	0-200mA [0.2A]	0.1Ω	0.00 to 200.0(Fixed)	
	0-50mA [0.05A]	1.0Ω	0.00 to 50.00(Fixed)	
	4-20mA [4-20]	1.0Ω	0.00 to 20.00(Fixed)	
	0-5mA [5mA]	10,0Ω	0.00 to 5.000(Fixed)	
	0-2mA [2mA]	10,0Ω	0.00 to 2.000(Fixed)	
	0-500V [500u]	4,987MΩ	0.0 to 500.0(Fixed)	
	0-250V [250u]	4,987MΩ	0.0 to 250.0(Fixed)	
	0-110V [110P]	1,087MΩ	0.0 to 440.0(Fixed)	
	0-50V [50u]	1,087MΩ	0.00 to 50.00(Fixed)	
	0-20V [20u]	200kΩ	0.00 to 20.00(Fixed)	
AC Volt	0-10V [10u]	200kΩ	0.00 to 10.00(Fixed)	
	0-2V [2u]	20kΩ	0.00 to 2.000(Fixed)	
	0-1V [1u]	20kΩ	0.00 to 1.000(Fixed)	
	0-5A [5A]	0.01Ω	0.00 to 5.000(Fixed)	
	0-2.5A [2.5A]	0.01Ω	0.00 to 2.500(Fixed)	
	0-1A [1A]	0.05Ω	0.00 to 1.000(Fixed)	
	0-500mA [0.5A]	0.1Ω	0.0 to 500.0(Fixed)	
	0-250mA [0.25A]	0.1Ω	0.00 to 250.0(Fixed)	
	0-100mA [0.1A]	0.5Ω	0.00 to 100.0(Fixed)	
	0-50mA [0.05A]	0.5Ω	0.00 to 50.0(Fixed)	

110P is standard specification 440V/110VAC P.T.

Display cycle delay function [PA2: d15t]

In some applications the measured input may fluctuate which in turn causes the display to fluctuate. By adjusting the display cycle delay function time at d15t of parameter 2, the operator can adjust the display time within a range of 0.1 sec to 5 sec. For example, if the operator sets the display cycle time to 4.0 sec, the display value displayed will be the average input value over 4-sec, and also will show any changes if any every 4 sec.

Monitoring max./min. display value function [PA0: HPEEL/PEEL, PA2: PELL]

It monitors Max./Min. display value based on the current displays value and then displays the data at HPEEL/PEEL of parameter 0. Set the delay time (0 to 30sec), at PELL of parameter 2 in order to prevent malfunction caused by initial over current or over voltage, when monitoring the peak value. Delay time is 0 to 30sec, and it starts to monitor the peak value after the set time. When pressing any one of [H] [L] keys at HPEEL/PEEL of parameter 0, the monitored data is initialized.

Monitoring function is not displayed when the delay time is set as "0.5" at PELL of parameter 2.

Current output(DC4-20mA) Scale adjustment function [PA2: F5-H / F5-L]

It set current output for the display value at the current output DC4-20mA. It sets display value for 4mA at F5-L and 20mA at F5-H and the range between F5-H and F5-L should be 10% F.S. (When it sets as under 10% F.S. automatically). Preset display value is fixed to output as 4mA at F5-L and 20mA at F5-H.

AC frequency measurement function [PA1: d15P]

It measures input signal frequency when it is AC input. It uses fixed decimal point (PA1: dot), measured range can be changed by setting and measured range of decimal point position is as below chart.

It is available to adjust the upper gradient at (PA1: nbH) and (PA1: nbL). In order to measure frequency normally, input signal, over 10% F.S. of measured range should be supplied. Please select the proper point of measurement terminal.

Measured range

Decimal point position	0.000	0.00	0.0	0
Measurement range	0.100 to 9,999Hz	0.10 to 999.9Hz	0.1 to 99.99Hz	1 to 9,999.9Hz

Accuracy of frequency measurement: Below 1kHz, F.S. ± 0.1rdg ± 2digit. From 1kHz to 10kHz, F.S. ± 0.3rdg ± 2digit.

nbH: 0.100 to 9,999(Gradient adjustment of high value)

nbL: 10⁻², 10⁻¹, 10⁰, 10¹ [Index adjustment of nbH]

Refer to description [Error correction function], [Error display function] and [Parameter 2] for function and error.

Error correction function [PA1: nbH / nbL]

It corrects display value error of measured input. nbL: ±99(Adjustment of low value)

nbH: 0.00 to 0.100(Correction gradient(%)) of high value

Display value=(Measured value × nbH) + nbL

When the measured range is 0 to 500V, and the display range is 0 to 500.0, if the low display value is "1.2" to 0V input, set "+12" as the nbL value to display "0.0" by adjusting the offset of the low value.

The display value to the 500V measured input varies by adjusting the offset of the low value. If this display value is "50.0", calculate 500.0/501.0 (the desired display value / the display value), and set the 0.998 correction value as the nbH to display "500.0" by adjusting the gradient of the high value.

The offset correction range of nbL is within -99 to for D⁺, D⁻ digit regardless of decimal point.

Gradient correction function [PA1: nbH]

It corrects the gradient of prescale value and display value. (Picture 1) Display value Y can be used as a, β times against X input value by correction function [nbH] and used as correction function of max. display value (H-SC).

Adjustment range is 0.100 to 5.000 and multiply current gradient.

Ex) Input: 200mVDC, Display: 3.000 for MT4W-DV type

Select 0.1VDC(1V) for measured input in Parameter 1.

Standard specification in input: 0-1VDC and 1,000 therefore it has to be 15,000(H-SC) for 1VDC(Input) in order to display 3.000 for DC200mV(Input).

But it is unable due to setting range is 9,999

In this case, please check below chart.

Please set as 1 nbH-H-SC=15,000

Preset output mode [PA2: outE]

Mode	Output operation	Operation
HSEt	H: Hysteresis	
off	No output	
LSt	If it is equal or lower than Low setting value, LO output is ON. If it is higher than Low setting value, GO output is ON.	
HSt	If it is equal or higher than High setting value, HI output is ON. If it is equal or lower than High setting value, GO output is ON.	
LHSt	LO output is ON when it is equal or lower than Low setting value. HI output is ON when it is equal or higher than High setting value. GO output is ON when it is higher than Low setting value, and lower than High setting value.	
HHSt	LO output is ON when it is equal or higher than Low setting value. HI output is ON when it is equal or higher than High setting value. GO output is ON when it is lower than Low/High setting value.	
LLSt	LO output is ON when it is lower than Low setting value. HI output is ON when it is equal or lower than High setting value. GO output is ON when it is higher than Low/High setting value.	
LdSt	It is operated same with LSt but LO output does not operated under initial Low setting value, and it is ON from under next Low setting value. If this is higher than Low setting value, GO output is ON.	

HSEt is displayed according to the setting of output operation mode, when user sets "OFF", HSEt/LLSt is not displayed.

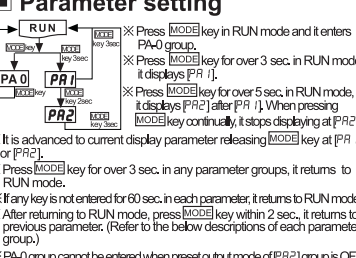
Startup compensation timer function [PA2: 5tA.t.]

This time function limits the operation of an output until the measured input(overvoltage or inrush current) is stable at moment of power on. All outputs are off during startup compensation time setting after power is supplied. Setting range: 0.0 to 99.9 (Unit: sec.), Factory default: 00.0

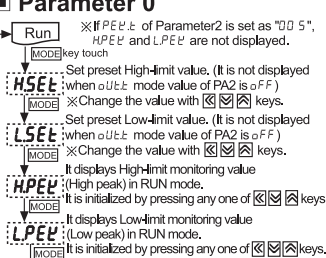
Parameter

Parameter	Display	Function	Note
PA 1 (Parameter 1)	In-r	Selectable RMS/AVG in AC type	Available AC type only.
	In-r	Selection of input range	-
	d15P	Selection of display type	Selectable 5ndt / SCAL / FrE9
	5ndt	Standard scale range	Display Max. display value of 5ndt
	FrE9	Frequency display	Available AC type only.
	SCAL	Scale range	These are displayed at SCAL
	H-SC	Set max. value of display range	It sets max. display value / min. display value (-1999 to 9999)
	L-SC	Set min. value of display range	
	dot	Set decimal point position	It is displayed at SCAL, FrE9 only and set the decimal point position
	InbH	Correct High-limit value of display value	5ndt/SCAL Correction range 0.100 to 5,000 FrE9 Correction range 0.100 to 9,999
PA 2 (Parameter 2)	InbL	Correct Low-limit value of display value	Set range: -99 to +99
	InbE	Set display index of frequency mode	Set range: 10 ² / 10 ¹ / 10 ⁰ / 10 ⁻¹
	outE	Set operation mode of preset output	Selectable oFF / L5t / H5t / LH5t / HH5t / LL5t / Ld5t
	HYS	Set hysteresis value	Set range: 1 to 10% F.S.
	5tA.t.	Startup compensation time	Set range: 00 to 99.9sec.
	PELL	Set monitoring delay time for peak value(sec)	Set range: 00sec to 30sec
	d15t	Set sampling time(sec.)	0.1 to 5.0 sec.(Variable by 0.1sec.)
	Ero	Set usage of front side zero adjustment key	no: Not use front side zero adjustment key 5E: Use front side zero adjustment key
	EuIn	Set external terminal(6, 7) function	HoLd: Use external terminal as Hold terminal 5Ero: Use external terminal as zero point adjustment terminal
	F5-H	Set the upper value output point or PV output	Min. set range: Min. 10% F.S.
PA 0 (Parameter 0)	F5-L	Set the lower value output point or PV output	Max. set range: Max. F5-H 10%
	AdS	Set communication address	Set range: 01 to 99
	bPS	Set baudrate(bps)	Selectable 1200/2400/4800/9600
	LoC	Set lock function	Selectable oFF / LoC1 / LoC2 / LoC3
	HSEt	Set High setting value	Setting range: Same as the display range of 5ndt/SCAL
	LSEt	Set Low setting value	
	HPEL	Max. value by data monitoring	Initializes the monitored data value by pressing any one of [H] [L] keys.
	LEPEL	Min. value by data monitoring	It is initialized by pressing any one of [H] [L] keys.

Parameter setting



Parameter 0

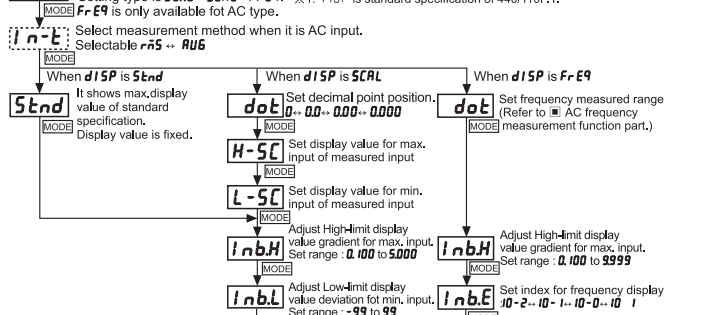


Parameter 1

Item	Range of measured input
MT4W-DV	500u ⇒ 100u ⇒ 50u ⇒ 10u ⇒ 5u ⇒ 1u ⇒ 0.25u ⇒ 50m ⇒ 500u
MT4W-DA	5A ⇒ 2A ⇒ 0.5A ⇒ 0.2A ⇒ 50mA ⇒ 4-20
MT4W-AA	500u ⇒ 250u ⇒ 10P ⇒ 50u ⇒ 20u ⇒ 10u ⇒ 2u ⇒ 1u ⇒ 500u
MT4W-AA	5A ⇒ 2.5A ⇒ 1A ⇒ 0.5A ⇒ 0.25A ⇒ 0.1A ⇒ 50mA ⇒ 5A

110P is standard specification of 440/110V.P.T.

Change the parameter setting value



Parameter 2

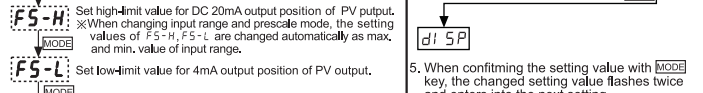
Item	Range of measured input
MT4W-DV	500u ⇒ 100u ⇒ 50u ⇒ 10u ⇒ 5u ⇒ 1u ⇒ 0.25u ⇒ 50m ⇒ 500u
MT4W-DA	5A ⇒ 2A ⇒ 0.5A ⇒ 0.2A ⇒ 50mA ⇒ 4-20
MT4W-AA	500u ⇒ 250u ⇒ 10P ⇒ 50u ⇒ 20u ⇒ 10u ⇒ 2u ⇒ 1u ⇒ 500u
MT4W-AA	5A ⇒ 2.5A ⇒ 1A ⇒ 0.5A ⇒ 0.25A ⇒ 0.1A ⇒ 50mA ⇒ 5A

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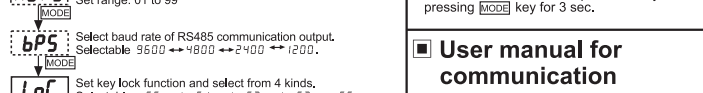
Caution for using

- Allowable installation environment
 - If shall be used indoor
 - Altitude Max. 2000m
 - Pollution Degree 2
 - Installation Category I.
- Use the terminal(M3.5, Max.7.2mm) when connecting the AC power supply.
- Use separate line from high voltage line or power line in order to avoid inductive noise.
- Protecting noise between lines at primary side of power transformer, but it is very difficult to install protection components at small size product like D.P.M. Therefore, please use noise absorber circuit such as line filter, varistor in external lines when voltage failure occurs by power relay, magnet SMV and high frequency equipment are opened in same line or surge occurs by spark of high voltage or thunder etc.
- Input line: Shield wire must be used when the measured input line is getting longer in the place occurring lots of noise.
- When input applied, if "HHHH" or "LLLL" are displayed, it has some trouble with measuring input, please check the line after power off.
- Noise inflowing from power line can cause serious problem for D.P.M.(Digital Panel Meter) driving by AC power supply. Even though there is condenser for protecting noise between lines at primary side of power transformer, but it is very difficult to install protection components at small size product like D.P.M. Therefore, please use noise absorber circuit such as line filter, varistor in external lines when voltage failure occurs by power relay, magnet SMV and high frequency equipment are opened in same line or surge occurs by spark of high voltage or thunder etc.
- Input line: Shield wire must be used when the measured input line is getting longer in the place occurring lots of noise.

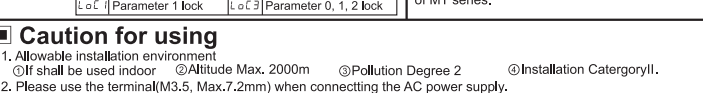
Using line filter



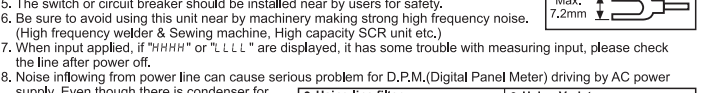
Using Varistor



Using Double shield wire



Using Single shield wire



Major products

- Photoelectric sensors
- Fiber optic sensors
- Door sensors
- Counters
- Area sensors
- Proximity sensors
- Control switches/Lamps/Buzzers
- I/O Terminal Blocks & Cables
- Stepper motors/drivers/motion controllers
- Graphic Logic panels
- Field network devices
- Laser marking system(Fiber, CO₂, Nd:YAG)
- Laser welding/soldering system
- Temperature controllers
- Temperature/Humidity transducers
- SSR/Power controllers
- Rotary encoders
- Panel meters
- Pressure sensors/Flow/Rate/meters
- Display units
- Connector/Sockets
- Switching mode power supplies
- Control switches/Lamps/Buzzers
- Stepper motors/drivers/motion controllers
- Graphic Logic panels
- Field network devices
- Laser marking system(Fiber, CO₂, Nd:YAG)
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