Rev. 2

Power Monitoring of Existing Equipment Compact module can be squeezed into a tight space inside existing distribution boards

# **Multi Power Transducer**

As calls for becoming carbon neutral increase, visualization of CO<sub>2</sub> emissions intensity has become essential.

Multi Power Transducers, thanks to their compact package, can fit into a tight space
of both new and existing panels or manufacturing equipment.

They realize easily a detailed energy consumption monitoring via Modbus communication.



NEW C €

CO<sub>2</sub> emissions (energy conversion value) can be calculated.

Modbus communication

Modbus plus two energy count pulse outputs

Max. 480 V AC direct input

Max. 4-circuit inputs for single-phase/ 2-wire system, max. 2-circuit inputs fo single- or three-phase/3-wire system

Supporting three-phase/4-wire system connection

Equipped with OEL display

See Page 5 for detailed information



Model: M50XWTU

Modbus communication

CO<sub>2</sub> emissions (energy conversion value) can be calculated.

Modbus plus two energy count pulse outputs

Max. 480 V AC direct input

Max. 4-circuit inputs for single-phase/ 2-wire system, max. 2-circuit inputs for single- or three-phase/3-wire system

Supporting three-phase/4-wire system connection

See Page 5 for detailed information



**Model: M5XWTU** 

Modbus communication

You can choose one of the following output options: Modbus communication, analog output, or energy count pulse/alarm output.

Max. 240 V AC direct input

290 measured variables (three-phase/3-wire system)



**Model: M5XWT** 

Modbus communication

Modbus communication output

Max. 240 V AC direct input

104 measured variables except harmonic contents (three-phase/3-wire system)

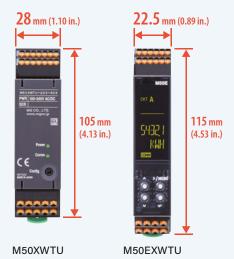
MG CO., LTD. (formerly M-System Co., Ltd.) www.mgco.jp

## Compact size

**Multi Power Transducers**, featuring the 41 mm (1.61 in.) deep (55 mm or 2.17 in. for M50EXWTU), terminal block style housing, are suitable for installation in a tight space of breaker boxes or wall-mounted panels.







## Easy installation with clamp-on current sensors

The current inputs are connected in one touch by using **Clamp-on Current Sensors** (Model: **CLSE**), needing no live cable modification.

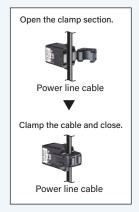
Furthermore, the M5XWTU and M5XWT use the voltage input to drive their internal circuits, needing no auxiliary power supply connection.



Easy Retrofitting Clamp-on Current Sensor CLSE Series

Power line cable

#### Clamp-on current sensors can be retrofitted with no power line modification

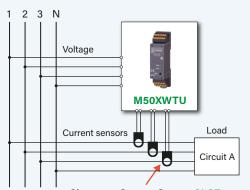


Installation



The current sensors can be installed without modifying existing power lines.

#### ■ Three-phase/4-wire connection for M50XWTU



Clamp-on Current Sensor **CLSE** 

#### **CLAMP-ON CURRENT SENSOR**

The one-touch clamp-type sensor, incorporating a nylon spring, can be easily installed on existing equipment, such as distribution boards.

5 A, 50 A, 100 A, 200 A, 400 A, and 600 A types are available.



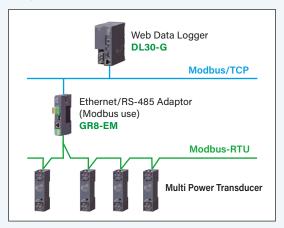
Model	CLSE-R5	CLSE-05	CLSE-10	CLSE-20	CLSE-40	CLSE-60
Applicable wire diameter	10 dia. max.	10 dia. max.	16 dia. max.	24 dia. max.	36 dia. max.	36 dia. max.
Operational range	5 A max.	50 A max.	100 A max.	200 A max.	400 A max.	600 A max.

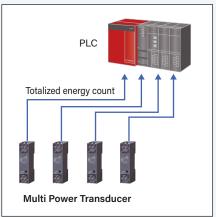
### **Settings and Connection**

## Modbus communication

Modbus communication, convenient for remote energy monitoring by PLC or data loggers, is selectable as standard. Monitoring points can be easily added by daisy-chain wiring of twisted-pair cables.

Other output options such as analog signal, energy count pulse and alarm contact<sup>(+)</sup> are also available for direct input to PLC/DCS.







The built-in CPU calculates the AC power variables instantaneously

The built-in CPU calculates instantaneously up to 290(\*2) variables for three-phase/3-wire system, including momentary values such as current, voltage, power, average values, maximum and minimum values, total harmonic distortion, and the 2nd to 31st harmonic contents, before updating the measured data in the memory every 500 milliseconds (approximate cycle).

- (\*1) Options for M5XWTU. Modbus only for M5XWT. Modbus plus energy count pulse signals are available for M50XWTU and M50EXWTU.
- (\*2) 104 variables for M5XWT (three-phase/3-wire), excluding harmonic contents.

#### **Settings and Connection**

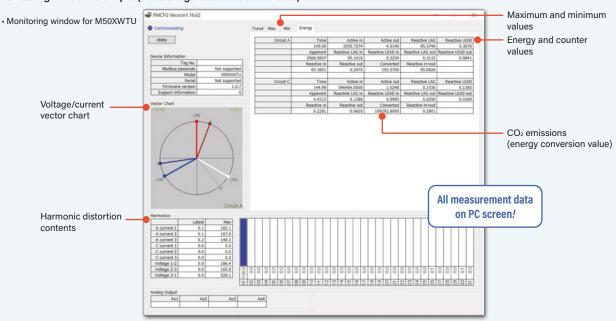
## Free setup software tool with convenient functions

The PC Configurator Software is used to set up various parameters of the **Multi Power Transducer**. It has a convenient monitoring window showing all measurement values in real time.

The loop test output mode, in which any output value can be simulated without actually connecting to active input circuits, is useful for system comissioning.



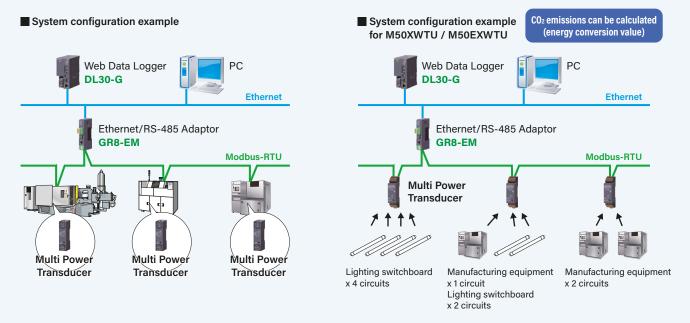
#### ■ Monitoring window example (PC Configurator Model: PMCFG)



## You can start a single- or multi-point power monitoring system with the Modbus.

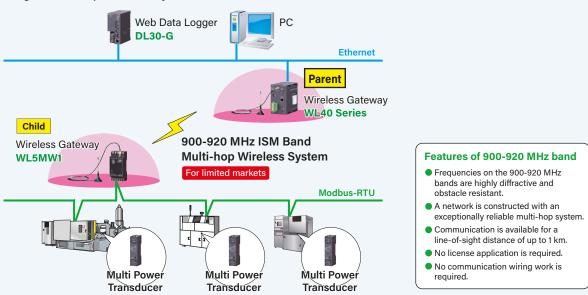
Precise power management is essential to achieving carbon neutrality. You can install the **Multi Power Transducers** in a small space, even on existing equipment.

You can start with a small budget and gradually increase the number of measurement points, extending to overall management. For example, using **Web Data Logger** (Model: **DL30-G**) may be ideal as it enables Modbus communication at a reasonable cost.



The Wireless Gateway allows the wireless transmission of the Modbus communication of the Multi Power Transducers.

System configuration example, wireless system





- · Modbus-RTU transparent, 920 MHz band wireless gateway
- The gateway connects to Modbus remote I/Os and transfers Modbus-RTU protocol onto a wireless communication network
- The compact terminal block style module can be installed in shallow panels such as breaker boxes and control panels on machines.

W45 x H97 x D41 mm (1.77" x 3.82" x 1.61")

## M50XWTU / M50EXWTU with Universally Adaptable Features

Universally adaptable features including CE marking, 480 V AC input, and three-phase/4-wire configuration.

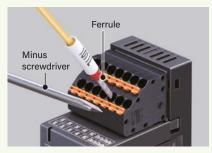
Multi-circuit measurement by single unit thanks to the tension-clamp terminal block with a large number of terminals.



#### **FEATURES**

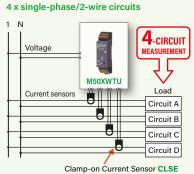
- CO<sub>2</sub> emissions (energy conversion value) can be calculated.
- Max. 480 V AC direct input
- Three-phase/4-wire system input connection
- Max. 4-circuit inputs for single-phase/2-wire system, max. 2-circuit inputs for single- or three-phase/3-wire system by single module
- Two energy count pulse outputs
- High-contrast OEL display equipped on the M50EXWTU

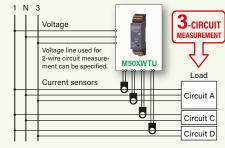
#### ■ Tension-clamp terminal block



Wiring to the tension-clamp terminal block is quick and easy. Ferrules, solid or stranded wires of up to 1.5 mm<sup>2</sup> can be used.

#### ■ Single module can measure up to 4 circuits! Space-saving and economical.





1 x single-phase/3-wire + 2 x single-phase 2-wire circuits

• Please see data sheet for more connection/application examples.

### M50EXWTU: OEL display clearly displays information

The OEL display allows you to check the measured values of voltage, current, power, energy, CO<sub>2</sub> emissions (energy conversion value), and relative harmonic content of each element, as well as various setting values.

The display turns off if a set time elapses without any button operation. Just press any button while the display is off to return to the state before the display was turned off. You can also set the display to always be on.

■ Switching measured value display Pressing ∨ ∧ button switches the measured value display in order.



Flashes according to the ON/OFF state of totalized pulse

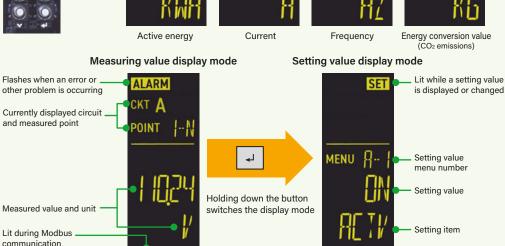
Display examples





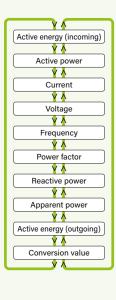






Display example for 1-N line voltage of circuit A

Example of enabling display of circuit A



## **Specifications**





 $\epsilon$ W28 x H105 x D41 mm (1.10" x 4.13" x 1.61")

		(0.89" x 4.53" x 2.17")	(1.10" x 4.13" x 1.61")		
Product name		Multi Power Transduce	er (PC programmable)		
Model		M50EXWTU M50XWTU			
Configuration		Single phase / 2 wire and 2 wi	iro 2 phone / 2 wire and 4 wire		
Configuration	Construction	Single phase / 2-wire and 3-wire, 3-phase / 3-wire and 4-wire  Terminal block			
	Connection	Tension clamp terminal			
	Screw terminal				
	Applicable wire size	Lower connector (voltage input, power, Modbus) 0.2 - 1.5 mm², stripped length 8 - 9 mm			
	Housing material	Upper connector (current sensor input, pulse output) 0.2 - 1.5 mm², stripped length 10 - 11 mm  Flame-resistant resin (black)			
	Isolation		to pulse output 1 to pulse output 2 to power		
General Specifications	Measured variables	Voltage: 1-N, 2-N, 3-N, 1-2, 2-3, 3-1 Current: 1, 2, 3, N Active power Reactive power Apparent power Power factor Frequency  Active energy: Incoming / outgoing Reactive energy: Incoming / outgoing / lag (inductive) / lead (capacitive) Harmonic distortion: Overall distortion ratio, content rate (2nd to 31st) Max. and min. values CO <sub>2</sub> emissions (energy conversion value)			
	Simplified measurement mode	Calculates power from current values w	vith fixed voltage values and power factor.		
	Power indicator LED		Green LED; Blinking patterns indicate different operating status of the transducer.		
	Communication Standard		nronous, no procedure TIA/EIA-485-A		
	Transmission distance		eters max.		
	Baud rate		, 38400 bps (default: 38400 bps)		
	Protocol	Modb	ous-RTU		
Modbus	Node address		(default: 1)		
Communication	Parity Stop hit		odd (default: odd)		
	Stop bit Max. number of nodes		default: 1) ding master)		
	Transmission media		Shielded twisted-pair cable (CPEV-S 0.9 dia.)		
	Internal terminating resistor	110	0 Ω		
	Communication indicator LED Frequency		Green LED turns ON while Modbus communication		
Input/Output Specifications		• Voltage Input Rated voltage for each wiring Single-phase/2-wire: rated voltage 240 V AC Single-phase/3-wire: line voltage 240 V AC / line voltage 480 V AC Three-phase/3-wire: line voltage 240 V AC / line voltage 480 V AC (480 V AC when voltage to ground for each line is ≤ 277 V) Three-phase/4-wire: phase voltage 277 V / line voltage 480 V AC Input range: 1-N, 2-N, 3-N: 50 to 277 V AC 1-2, 2-3, 3-1: 50 to 480 V AC Consumption VA: Voltage circuit ≤ ULN² / 250 kΩ / ph Selectable primary voltage range: 50 - 400 000 V • Current Input CLSE-R5: 0 - 5 A AC CLSE-10: 0 - 100 A AC CLSE-60: 0 - 600 A AC CLSE-40: 0 - 400 A AC CLSE-60: 0 - 600 A AC Input range: 0 - 120% of the rating Low-end cutout (current): 0 - 99.9% (default setting: 1%) Selectable primary current range: 1 - 20 000 A (only with CLSE-R5, refer to 15 plays function: Displays measured values and status of the unit Display size: Approx. 14 x 40 mm (0.55" x 1.57") Character color: Yellow Brightness: Standard or low brightness (default: standard) Display life: Approx. 120,000 hours (Expected time for the display brightness to be reduced to 50 % when the display is used continuously with low brightness in 25°C) Operating mode: Automatically turn off after no operation, or always on (default: automatically turn off after no operation, or always on is play by proper of the control of	Pulse output Outputs assignable to pulse: various energy Output type: Photo MOSFET relay Rated load: 30 V 200 mA AC/DC at peak ON resistance: 1 Ω max. Leakage current during opening: 2 μA max.  to the configurator settings)		
	Operating temperature	-20 to +65°C	C (-4 to +149°F)		
In the Heat	Operating humidity	30 to 90 %RH (non-condensing)			
Installation	Atmosphere Mounting	No corrosive gas or heavy dust  DIN rail			
	Weight	90 g (2.8 oz)	70 g (2.5 oz)		
	Power consumption		C: ≤ 1.5 W (100 - 240 V DC) [universal]		
Performance		Accuracy (*3)  Accuracy (*3)  Voltage: ±0.5 % (*4)  Current: ±0.5 % (*4)  Power: ±0.5 % (*4)  Power factor: ±1.5 %  Frequency: ±0.1 Hz	75 %/°C (0.004 %/°F) sec. 100 MΩ with 500 V DC 0 V AC @1 minute e input to Modbus to pulse output 1 to pulse output 2 to power) (M50XWTU)		
		(current input of voltage	e input to Modbus to pulse output 1 or pulse output 2 to power) ulse output 1 to pulse output 2) (M50EXWTU)		

- (\*3) Sensor error margin not included. Add sensor error margin when using with the combination of the sensor.

  (\*4) An accuracy for rated input. The described accuracy levels are ensured at the input 1% or more for neutral current in a single-phase/3-wire circuit, phase-2 current in a 3-phase/4-wire circuit.



W25 x H97 x D41 mm



W25 x H97 x D41 mm

	(0.96" x 3.82" x 1.61")	_	(0.96" x 3.82" x 1.61")
	Multi Power Transducer (PC programma	ble, self-powered)	
M5XWTU		М	5XWT
	Single phase / 2-wire and 3-wire, 3-p	phase / 3-wire	
	Terminal block		
	M3.5 screw terminals (torque 0 Nickel-plated steel (standard) or st	,	
		-1-)	
Current input or voltage input to analog output or pul	Flame-resistant resin (bla se output or Modbus	Current input or voltage input to Mo	dbus
Voltage: R-S, S-T, T-R Current: R, S, T Active energy: Incoming Reactive power Reactive power Apparent power Apower factor Active energy: Incoming Reactive energy: Incoming Active energy: Incoming Apparent energy: Incoming Active energy: Incoming Apparent energy Apparent power Apparent power Apparent power Average active power (d	ng / outgoing / Overall distortion ratio, content rate (2nd to 31st) Voltage: R-S, S-T, T-R emand) Current: R, S, T	Voltage: R-S, S-T, T-R Current: R, S, T Active power Reactive power Apparent power Power factor	Reactive energy: Incoming / outgoing / lag (inductive) / lead (capacitive) Apparent energy Average active power (demand) Average reactive power (demand) Average apparent power (demand)
Frequency Average apparent power	(demand)	Frequency	Average (demand) current: R, S, T
Average (demand) curre	Calculates power from current values with fixed volt	Active energy: Incoming / outgoing	Max. and min. values
	Green LED; Blinking patterns indicate different opera		
	Half-duplex, asynchronous, no p		
	Conforms to TIA/EIA-485 500 meters max.	-A	
	1200, 2400, 4800, 9600, 19200, 38400 bps (	default: 38400 bps)	
	Modbus-RTU	· ·	
	1 to 247 (default: 1) None, even or odd (default:	add)	
	1 or 2 (default: 1)	ouuj	
	31 (excluding master)		
	Shielded twisted-pair cable (CPE)	/-S 0.9 dia.)	
	110 Ω 		
	50 / 60 Hz (45 - 66 Hz)		
• Voltage Input Rated voltage: 240 V AC Input range: 80 - 260 V AC (Phase voltage range is 80 - 130 V for single-phase/3-wire) Consumption VA: P1 - P2: ≤ 3 VA (power consumption of internal circuit) P2 - P3: voltage²/≤ 1.5MΩ VA  Selectable primary voltage range: 50 - 400 000 V • Current Input CLSE-R5: 0 - 5 A AC CLSE-05: 0 - 50 A AC CLSE-10: 0 - 100 A AC CLSE-20: 0 - 200 A AC CLSE-40: 0 - 400 A AC CLSE-60: 0 - 600 A AC Input range: 0 - 120% of the rating Low-end cutout (current): 0 - 99.9% (default setting: 1%) Selectable primary current range: 1 - 20 000 A (only with CLSE-R5, refer to the configurator settings  ■ Analog output Default setting is DC current output 4 - 20 mA Types DC current output: 0 - 20 mA DC DC voltage output: -10 - +10 V DC Ottputs: Voltage, current, various powers, power factor, frequency, harmonic current and harmonic voltage • DC current output range: 0 - 20 mA DC Output available range: 0 - 23 mA DC Minimum span: 1 mA Load resistance: 550 Ω • DC voltage output range -10 - +10 V DC Output available range: -11.5 - +11.5 V DC Minimum span: 1 W Load resistance: 0utput drive 1 mA max. (e.g. When 0 - 10 V DC, 10 V÷1 mA = 10kΩ)		Consumption VA: P1 - P2: ≤ 3 VA ( P2 - P3: voltage* Selectable primary voltage range:  • Current Input CLSE-R5: 0 - 5 A AC CLSE-CLSE-10: 0 - 100 A AC CLSE-CLSE-40: 0 - 400 A AC CLSE-Input range: 0 - 120% of the rating Low-end cutout (current): 0 - 99.9% Selectable primary current range: 1	50 – 400 000 V <b>05</b> : 0 – 50 A AC <b>20</b> : 0 – 200 A AC <b>60</b> : 0 – 600 A AC <b>6</b> (default setting: 1%)
	-20 to +65°C (-4 to +149° 30 to 90 %RH (non-conden:		
	No corrosive gas or heavy		
	DIN rail		
	80 g (2.8 oz)		
Voltage: ±0.5 % (*5) Temp. coeffic	it accuracy (*6) cient: ±0.0075 %/°C (0.004 %/°F) er < 500 msec	Accuracy (*3) Voltage: ±0.5 % (*5) Current: ±0.5 % (*5)	Temp. coefficient: ±0.0075 %/°C (0.004 %/°F) Sampling time: < 500 msec.

Current: ±0.5 % (\*5)

Power: ±0.5 % (\*5)

Power factor: ±1.5 % Frequency: ±0.5 Hz

(power factor  $\geq$  0.5, input  $\geq$  10%)

Energy: ±2 %

Sampling time: ≤ 500 msec.

input to Modbus to ground)

≥ 100 MΩ with 500 V DC

Dielectric strength: 2000 V AC

@ 1 minute (current input or voltage

Insulation resistance:

Sampling time: ≤ 500 msec.

Analog output response time: ≤ 1.5 sec. (0 to 99%)

Insulation resistance:  $\geq$  100 M $\Omega$  with 500 V DC Dielectric strength: 2000 V AC @ 1 minute (current input or voltage input to analog output or pulse output or Modbus to ground)

Current: ±0.5 % (\*5)

Power: ±0.5 % (\*5)

Power factor: ±1.5 % Frequency: ±0.5 Hz

(power factor  $\geq$  0.5, input  $\geq$  10%)

Energy: ±2 %

(\*5) An accuracy for rated input. The described accuracy levels are ensured at the input 1% or more for neutral current in a single-phase/3-wire circuit and phase-S current in a 3-phase/3-wire circuit.

(\*6) Output accuracy for the setting value span is shown as following formula.

Output accuracy = (output range ÷ output setting value span) × 0.02% For current output: Output accuracy = (output range ÷ output setting value span) × 0.04%

[Ex1] DC current output 4 - 20 mA: Output accuracy = (20 mA ÷ 16A) × 0.04% = 0.05% Input accuracy and sensor error are added to total accuracy.

## **M5-UNIT Series Terminal Block Signal Conditioners**

#### ■ ISOLATORS & SENSOR INPUTS

Product name	Model
Isolator	M5YV
Input Loop Powered Isolator	M5SN
Universal Transmitter (PC programmable)	M5XU
Signal Transmitter (PC programmable)	M5XV
Signal Transmitter	M5VS
Signal Transmitter (narrow span input)	M5MV
Signal Transmitter (high speed response)	M5VF
Signal Transmitter (high speed response 30 µsec.)	M5VF2
Signal Transmitter (high dielectric strength)	M5VSH
Voltage Divider	M5VV
Thermocouple Transmitter	M5TS
TC/RTD Transmitter (PC programmable)	M5XTR
RTD Transmitter	M5RS
Potentiometer Transmitter	M5MS
Current Loop Supply	M5D
Current Loop Supply	M5DY
Current Loop Supply (applicable to HART signal, opencircuit detection selectable)	M5DYH2
Tachogenerator Transmitter	M5TG
AC Transmitter Scheduled release date: Sept. 2024	M5AC

#### FREQUENCY I/O

Product name	Model
Pulse Isolator	M5PP
Pulse Isolator Under development	M5YPD
Frequency Transmitter	M5PA
Frequency Transmitter (PC programmable)	M5XPA
Encoder Speed Transmitter (PC programmable)	M5XRP
DC/Frequency Transmitter Scheduled release date: March 2025	M5AP
Pulse Scaler Under development	M5PRU

#### **DC ALARMS**

	Product name	Model
DC Alarm	Under development	M5AVS
DC Alarm	Under development	M5SED

#### **FUNCTION MODULES**

Product name	Model
Adder (PC programmable)	M5XADS
Subtractor (PC programmable)	M5XSBS
Multiplier (PC programmable)	M5XMLS
Divider (PC programmable)	M5XDIS
Ratio/Bias Transmitter (PC programmable)	M5XREB
Ratio/Bias Transmitter (PC programmable)	M5XRTS
Linearizer (PC programmable)	M5XF
Square Root Extractor (PC programmable)	M5XFLS
Inverted Output Transmitter (PC programmable)	M5XUDS
Ramp Buffer (PC programmable)	M5XCRS
Track/Hold (PC programmable)	M5XAMS
Peak Hold (PC programmable)	M5XPHS
High/Low Selector (PC programmable)	M5XSES
Parameter Generator (PC programmable)	M5XMST

#### **■ POWER TRANSDUCERS**

Product name	Model
Multi Power Transducer (PC programmable, self-powered)	M5XWTU
Multi Power Transducer (PC programmable, self-powered)	M5XWT
PT Transmitter (RMS sensing)	M5PT
CT Transmitter (RMS sensing)	M5CT
CT Transmitter (clamp-on current sensor)	М5СТС

#### Universal power supply

Supporting 100 to 240 V AC and 24 V DC

#### Reliable 3-port isolation

3-port isolation between input, output, and power supply

#### Loop test output

Simulated signals are output for operation testing without input signals. (PC programmable type only)

• Specifications may vary depending on the model. For details, check the specification sheet.





Request Info

MG CO., LTD. (formerly M-System Co., Ltd.) www.mgco.jp Your local representative: