

Panasonic®

Technical reference AC Servo Motor & Driver MINAS E-series



- Thank you very much for your purchase of Panasonic AC Servo Motor & Driver, MINAS E-series.
- Before use, refer this manual and safety instructions to ensure proper use. Keep this manual and read when necessary.
- Make sure to forward this manual for safety to the final user.

If you are the first user of this product, please be sure to purchase and read the optional Engineering Material (DV0P3700), or downloaded instruction Manual from our Web Site.

[Web address of Motor Company, Matsushita Electric Industrial Co., Ltd.]
http://industrial.panasonic.com/ww/i_e/25000/motor_fa_e/motor_fa_e.html

<Contents>

| | page | | page |
|---------------------------------|-----------|---|------------|
| 1.Introduction | B2 | 3.Parameter | B10 |
| After Opening the Package | B2 | Parameter | B10 |
| Check the Model of Driver | B2 | 4.Protective Functions | B15 |
| Check the Model of Motor | B3 | Protective Functions | |
| 2.System Configuration | | (What is alarm code?) | B15 |
| and Wiring | B4 | 5.Conformance to EC Directives | |
| General Wiring Diagram | B4 | and UL standards | B17 |
| Wiring of Connectors CN X1, X3 | | Peripheral Equipment | B18 |
| (Wiring of Main Circuits) | B6 | Conformance to EC Directives and | |
| Wiring to Connector CN X4 | | UL Standards | B20 |
| (Connection with Encoder) | B7 | After-Sale Service (Repair) | B21 |
| Circuit Available for Typical | | | |
| Control Modes | B8 | | |

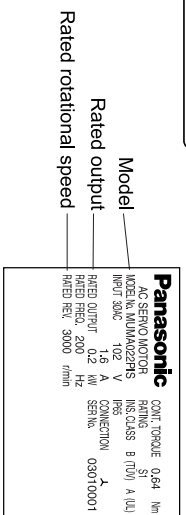
during transportation.
The received package.

contact dealer or sales agent.

1. Introduction

Check the Model of Motor

Name plate



Model ——— Rated output ——— Rated rotational speed ——— Serial Number
 Ex.: 03010001
 Consecutive No.
 Month of production
 Year of production
 (Lower 2 digits of AD year)

Model Designation

M U M A 0 2 2 P 1 S **
 1-4 5-6 7 8 9 10 11~12
 Symbol Type
 M U M A Super low inertia
 0 2 2 Rated output
 P 1 Motor structure
 S ** Custom specifications (Non critical)
 Design order
 1: Standard

Table 1a: Motor rated output

| Symbol | Rated output |
|--------|--------------|
| 5A | 50 W |
| 01 | 100 W |
| 02 | 200 W |
| 04 | 400 W |

Power supply
 1: 100 V
 2: 200 V
 Z: 100/200 V common-used
 (Limited to 50W only)

Table 1b: Rotary encoder

| Symbol | Specifications | | |
|--------|----------------|---------------|------------|
| | Type | No. of pulses | Resolution |
| P | Incremental | 2500 P/r | 10000 |
| | | | Lead wire |
| | | | 5-wire |

Table 1c: Motor structure

| | Shaft | | Holding brake | Oil seal |
|---|-----------------------------------|---------|---------------|----------|
| | Center tap on key-wayed shaft end | Without | | |
| S | ● | ● | ● | ● |
| T | ● | ● | ● | ● |

The product with oil seal is a special order product.

Serial Number
 Ex.: 03010001
 Consecutive No.
 Month of production
 Year of production
 (Lower 2 digits of AD year)
 Rated output current

Special specifications (Non critical)
 11~12

Control Mode
 P: Pulse row
 Rating of current detector

| Symbol | Current rating of current detector |
|--------|------------------------------------|
| 05 | 5A |
| 10 | 10A |

3-phase 200 V
 power module
 Current rating of
 module

Wiring

Circuits

Wiring, to prevent electric shock.

Instruction manual (DV0P3700) for

perfect color matching between the colors of the motor lead-out cable and the motor output terminal (U, V, W) (pin), V (4 pins), W (6 pins) and E (3 pins) respectively.
Preventing the power supply with CN X3.

Check the circuit as the brake control circuit so it even with emergency stop signal from the motor.
The brake has no polarity.
If capacity and operation detail of the brake, refer to the Technical Instruction Manual (DV0P3700).
The motor absorber (C-5A2 or Z15D151 made electronic). For the detail thereof refer to the Instruction Manual (DV0P3700).

Check the power nameplate to check the power of the breaker or leakage breaker without fail. Use a leakage breaker to which the motor is applied for high frequency is applied for the motor.
Provide noise filter.
Magnetic contactor coil with surge absorber.
Preventing the motor by magnetic contactor.

Motor

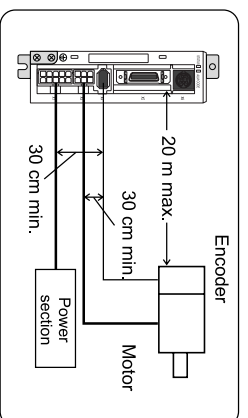
Case 200V, connect L1 (10 pins), L2 (8 pins)

the **grounding system of the facility**.
The driver protective earth terminal (⊕) and the earth (earth plate) of the control panel for electric shock. In this case, don't co-clamp the protective earth terminal (⊕). Two earth terminals are provided.

2. System Configuration and Wiring

Wiring to Connector CN X4 (Connection with Encoder)

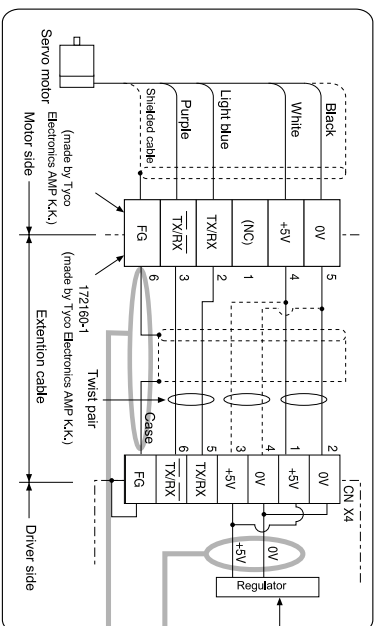
Points in Wiring



- o Cable length between the driver and the motor – 20 m max. If this cable length exceeds 20m, consult with the dealer/distributor from which you have purchased the driver.
- o Keep 30 cm or more spacing from the main circuit wiring. Neither guide this wiring through the same duct, together with the main circuit nor bundle these two together.

Wiring Diagram

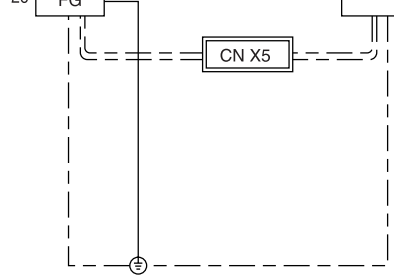
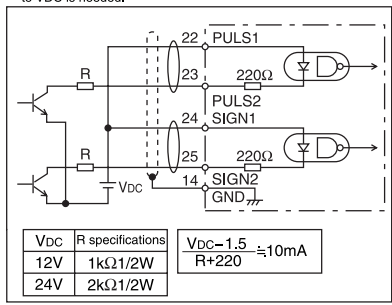
- Requests, where extension cable for the encoder is self-manufactured (For the connector detail, refer to “Technical Instruction Manual” (DV0P3700) for sale at option)
- [1] Refer to the wiring diagram below.
- [2] Cable used: Shielded twist pair cable of 0.18 mm² (AWG 24) minimum in conductor diameter that is excellent in bending resistance.
- [3] For signal/power wiring in pair, use twist pair cable.



- [4] Shielding treatment
- Driver-side shield sheath: Connect to CNX4 connector case (FG).
- Motor-side shield sheath: Connect to 6 pin. Where the cable length exceeds 10m, do double-wiring for the encoder power (+5V, 0V), as illustrated left.
- [6] Connect nothing to the empty terminal (NC) of the connector.

- [7] Don't use a cable pair composed of the motor cable and encoder cable which were shielded in batch.

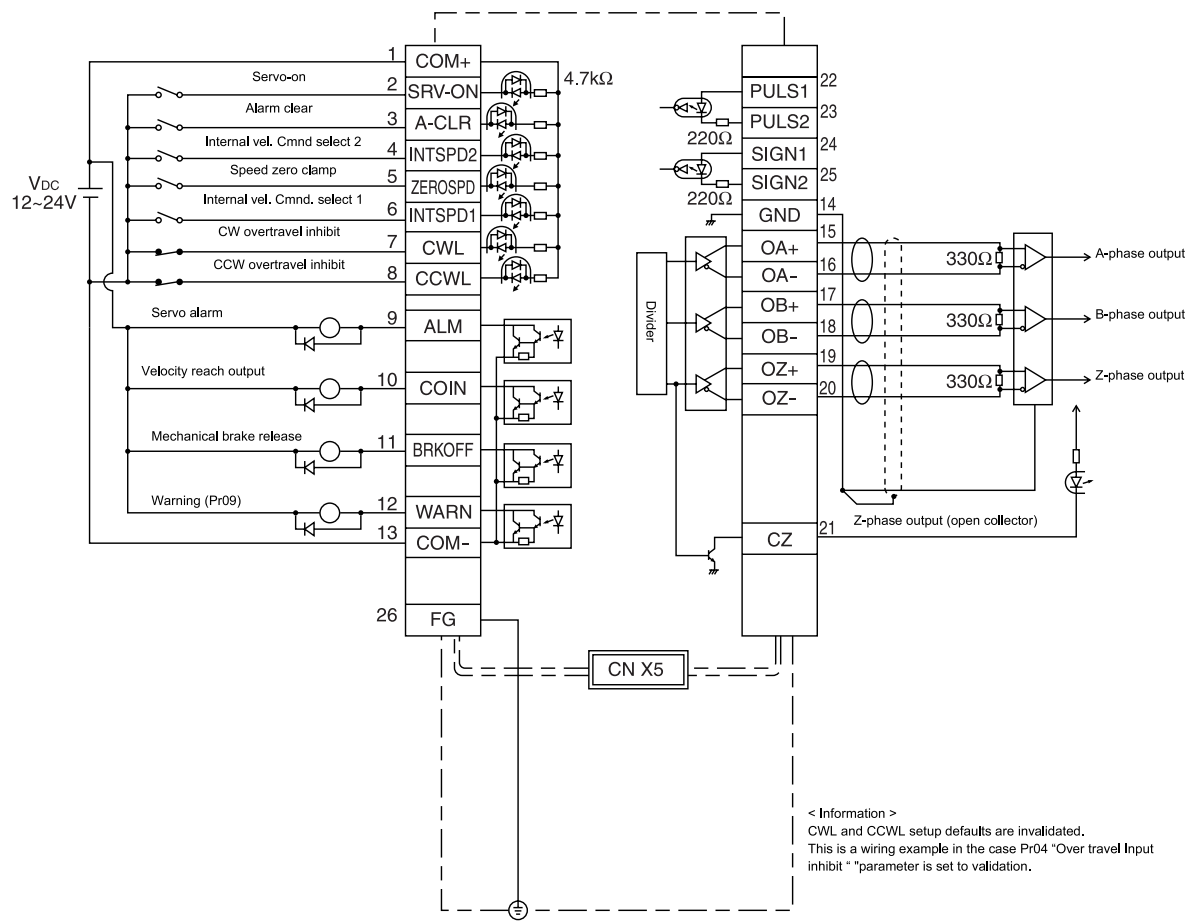
- external parts.
- In this case, the resistor(R) for current limitation corresponding to VDC is needed.



- < Information >
- When using CW pulse row + CCW pulse row system as the pulse input form, **reversing the connection method would cause pulse counting failure and motor running failure.** Connect the pulse inputs so that the driver internal photo-coupler at pulse non-inputted side turns OFF.
 - CWL and CCWL setup defaults are invalidated. This is a wiring example in the case Pr04 "Over travel input inhibit" parameter is set to validation.

2. System Configuration and Wiring

Example of CN X5 Internal Velocity Control Mode in Wiring



- < Information >
- CWL and CCWL setup defaults are invalidated. This is a wiring example in the case Pr04 "Over travel Input inhibit" parameter is set to validation.

| Default | Unit | Related control mode |
|---------|----------------------|----------------------|
| <1> | - | P-P2 |
| <10> | - | P-P2 |
| <33> | 166 μs | P-P2 |
| <50> | - | P-P2 |
| <30> | - | P-P2 |
| <20> | Setup value x 166 μs | P-P2 |
| 0 | - | - |
| 0 | - | - |
| 0 | - | - |
| 0 | - | - |
| 0 | - | - |
| 0 | - | - |

with < > vary automatically with adjusting in MANUAL mode, set Pr21

using symbols.

3. Parameter

Parameters for Positioning control

| Parameter No. (Pr□□□) | Parameter description | Range | Default | Unit | Related control mode |
|--------------------------|--|-----------|---------|--------------------------|----------------------|
| *40 | Command pulse multiplier set-up | 1 - 4 | 4 | - | P-P2 |
| *41 | Command pulse rotational direction set-up | 0 - 3 | 0 | - | P-P2 |
| *42 | Command pulse input mode set-up | 0 - 3 | 1 | - | P-P2 |
| 43 | (For manufacturer use) | - | 0 | - | - |
| *44 | Output pulses per single turn. | 1 - 16384 | 2500 | P/r | All control modes |
| *45 | Pulse output logic inversion | 0 - 1 | 0 | - | All control modes |
| 46 | Numerator of 1st command pulse ratio | 1 - 10000 | 10000 | - | P-P2 |
| 47 | Numerator of 2nd command pulse ratio | 1 - 10000 | 10000 | - | P-P2 |
| 48 | (For manufacturer use) | - | 0 | - | - |
| 49 | (For manufacturer use) | - | 0 | - | - |
| 4A | Multiplier of numerator of command pulse ratio | 0 - 17 | 0 | 2° | P-P2 |
| 4B | Denominator of command pulse ratio | 1 - 10000 | 10000 | - | P-P2 |
| 4C | Smoothing filter set-up | 0 - 7 | 1 | - | P-P2 |
| 4D | (For manufacturer use) | - | 0 | - | - |
| 4E | FIR filter set-up | 0 - 31 | 0 | (Setup value + 1) cycles | P-P2 |
| *4F | (For manufacturer use) | - | 0 | - | - |

● *-marked parameter No. in the above table is validated by writing the parameter No. in EEPROM after set up and re-switching ON the power after once switched OFF.

Parameters for Internal Velocity Control and Torque Limit

| Parameter No. (Pr□□□) | Parameter description | Range | Default | Unit | Related control mode |
|--------------------------|---------------------------|----------------|--------------|------------------|----------------------|
| 50 | (For manufacturer use) | - | 0 | - | - |
| 51 | (For manufacturer use) | - | 0 | - | - |
| 52 | (For manufacturer use) | - | 0 | - | - |
| 53 | 1st internal speed set-up | -20000 - 20000 | 0 | r/ | S |
| 54 | 2nd internal speed set-up | -20000 - 20000 | 0 | r/ | S |
| 55 | 3rd internal speed set-up | -20000 - 20000 | 0 | r/ | S |
| 56 | 4th internal speed set-up | -20000 - 20000 | 0 | r/ | S |
| 57 | JOG speed set-up | 0 - 500 | 300 | r/min | All control modes |
| 58 | Acceleration time set-up | 0 - 5000 | 0 | 2 ms (1000r/min) | S |
| 59 | Deceleration time set-up | 0 - 5000 | 0 | 2 ms (1000r/min) | S |
| 5A | (For manufacturer use) | - | 0 | - | - |
| 5B | (For manufacturer use) | - | 0 | - | - |
| 5C | (For manufacturer use) | - | 0 | - | - |
| 5D | (For manufacturer use) | - | 0 | - | - |
| 5E*1 | 1st torque limit set-up | 0 - 500 | See DV0P3700 | % | All control modes |
| 5F | (For manufacturer use) | - | 0 | - | - |

*1: Each default setup value in Pr5E differs depending on combination of driver and motor. For details please refer to the Technical Instruction Manual (DV0P3700) for sale at option.

| Default | Unit | Related control mode |
|---------|-----------|----------------------|
| 10 | Pulse | P-P2 |
| 50 | r/min | All control modes |
| 1000 | r/min | S |
| 1875 | 256 Pulse | P-P2 |
| 0 | - | P-P2 |
| 0 | - | - |
| 0 | - | All control modes |
| 0 | - | All control modes |
| 0 | - | All control modes |
| 0 | - | All control modes |
| 0 | - | All control modes |
| 0 | 2 ms | All control modes |
| 0 | 2 ms | All control modes |
| 0 | 2 ms | All control modes |
| 3 | - | All control modes |
| 0 | - | - |
| 0 | - | - |

on detection value of “setup value x
would result in position over-deviation

| Default | Unit | Related control mode |
|---------|-----------|----------------------|
| 0 | r/min | All control modes |
| 0 | % | All control modes |
| 1875 | 256 Pulse | P-P2 |
| 0 | r/min | All control modes |

4. Protective Functions

Protective Functions (What is alarm code?)

- The driver has various protective functions. If any of these functions acts, the motor stops immediately, being then put in trip condition, and simultaneously “Servo Alarm Output” (ALM) is turned OFF.
- Counteractions against motor trip
 - If the motor is in tripping, STATUS display on the front panel of the servo driver discolors into red display and Alarm Code LED (ALM Code) blinks simultaneously, then disabling “Servo ON”.
- In addition, when the console is in use Alarm code No. is displayed on the LED display unit of the console, then disabling “Servo ON”.
- Motor trip condition can be reset (released) by keeping “Alarm Clear Input (A-CLR)” ON for 120 ms or more.
- If the overload protective function acts, the alarm can be cleared according to Alarm Clear (A-CLR) signal after elapse of 10 sec or more since alarm output. If the driver power is switched OFF, the overload time limit characteristic (OVERLOAD) is cleared.
- The above alarms can be cleared even by operation of “PANATERM®”.
- Furthermore, the above alarms can be cleared even by operation of the console.
- If any of *-marked functions in “Table of Protective Functions” acts, Alarm Clear Input (A-CLR)” is unable to be reset (cleared). In such a case, after switching OFF the driver power, search and remove the cause and thereafter re-switch ON the same power for resetting the alarm.

Check LED Status

| Status LED color | Content |
|---|---|
| <input type="checkbox"/> Green | Power ON. The driver power is switched ON. |
| <input type="checkbox"/> Orange | This LED blinks (1 sec) against warning conditions. (LED in blinking indicates overload/over-regeneration/abnormal revolutions of cooling fan.) This is not displayed on the LED display unit of the console. |
| <input checked="" type="checkbox"/> Red | Alarm output |

Alarm code LED is not in blinking? (Normally OFF)



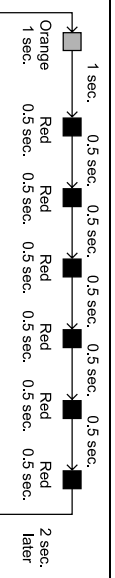
This LED blinks against alarm output.
Alarm code No. is expressed by blinking frequency in orange and red.

For the detail refer to the Technical Instruction Manual (DV0P3700) for sale at option or the Instruction Manual downloaded from our web site.

Orange: 10 digit, Red: 1 digit

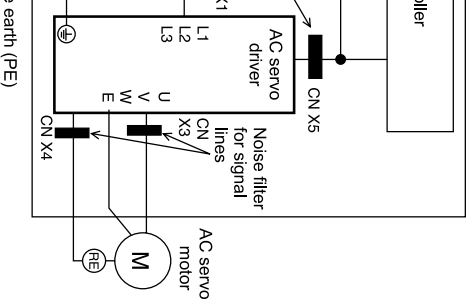
(Ex.) In the case Overload Alarm (Alarm code No.16) was output and the driver stopped

Orange LED blinks once and red one blinks 6 times.



Standards and UL Standards

Level 2 or 1 specified by IEC60664-1



5%, 50/60 Hz
5%, 50/60 Hz
5%, 50/60 Hz

Category II specified by IEC60664-1.
If the equipment is in Category II, use the insulated
type for source input.
Use the appropriate EN Standard type

Use a surge filter. The circuit breaker should

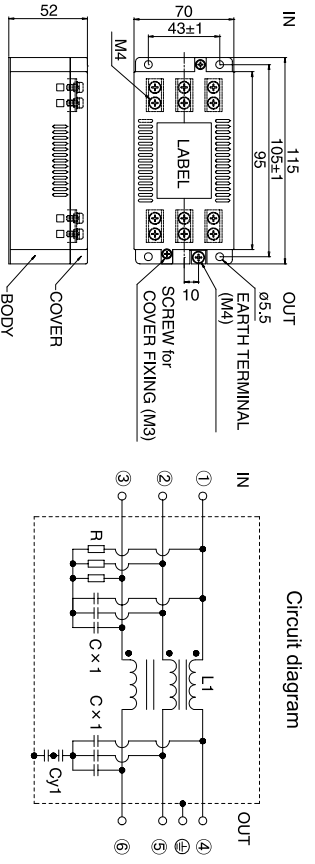
5. Conformance to EC Directives and UL Standards

Noise Filter

Install the noise filter on the primary line as shown in previous page.

Where two or more drivers are used and, in addition, one set of noise filters is installed in the power unit for all the drivers, feel free to consult with the noise filter manufacturer.

| | | |
|-----------------------------|---|---|
| Option Part No. DV0P4160 | Manufacturer's part No. 3SUP-HU10-ER-6 | Manufacturer Okaya Electric Industries Co., Ltd. |
|-----------------------------|---|---|



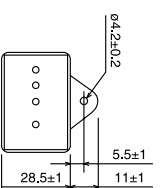
Surge Absorber

Install the surge absorber on the primary line of the noise filter.

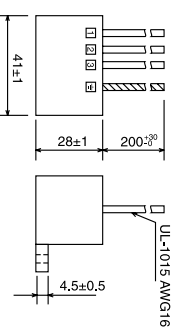
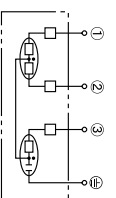
< Request >

When performing voltage-resistant test on the machine/equipment, remove the surge absorber. Otherwise the absorber may be damaged.

| | | |
|-----------------------------|---|---|
| Option Part No. DV0P1450 | Manufacturer's part No. R·A·V-781BXZ-4 | Manufacturer Okaya Electric Industries Co., Ltd. |
|-----------------------------|---|---|



Circuit diagram



Standards and UL Standards

Encoder cable, interface cable) with

| |
|---------------|
| Manufacturer |
| TDK Co., Ltd. |

Weight: 62.8 g



Two driver protective earth terminal together.
(), avoid co-clamping.

Power supply of the servo driver.

DET) conforms to UL508C
in Level 2 or 1 specified by
(xx),
supply and noise filter. The circuit
be. The current rating of the circuit
"Action Manual" (DV0P3700)

After-Sale Service (Repair)

Repair

Consult to a dealer from whom you have purchased the product for details of repair.
When the product is incorporated to the machine or equipment you have purchased, consult to the manufacturer or the dealer of the machine or equipment.

Cautions for Proper Use

- This product is intended to be used with a general industrial product, but not designed or manufactured to be used in a machine or system that may cause personal death when it is failed.
- Install a safety equipments or apparatus in your application, when a serious accident or loss of property is expected due to the failure of this product.
- Consult us if the application of this product is under such special conditions and environments as nuclear energy control, aerospace, transportation, medical equipment, various safety equipments or equipments which require a lesser air contamination.
- We have been making the best effort to ensure the highest quality of the products, however, application of exceptionally larger external noise disturbance and static electricity, or failure in input power, wiring and components may result in unexpected action. It is highly recommended that you make a fail-safe design and secure the safety in the operative range.
- If the motor shaft is not electrically grounded, it may cause an electrolytic corrosion to the bearing, depending on the condition of the machine and its mounting environment, and may result in the bearing noise. Checking and verification by customer is required.
- Failure of this product depending on its content, may generate smoke of about one cigarette. Take this into consideration when the application of the machine is clean room related.
- Please be careful when using in an environment with high concentrations of sulphur or sulphuric gases, as sulphuration can lead to disconnection from the chip resistor or a poor contact connection.
- Take care to avoid inputting a supply voltage which significantly exceeds the rated range to the power supply of this product. Failure to heed this caution may result in damage to the internal parts, causing smoking and/or a fire and other trouble.

Electric Data

Electric data of this product (Instruction Manual, CAD data) can be downloaded from the following web site.
http://industrial.panasonic.com/ww/i_e/25000/motor_fa_e/motor_fa_e.html

MEMO (Fill in the blanks for reference in case of inquiry or repair.)

| Date of purchase | Model No. | M <input type="checkbox"/> DE | M <input type="checkbox"/> MA |
|---------------------------|-----------|-------------------------------|-------------------------------|
| | | | |
| Dealer | | | |
| Tel : () - - | | | |



Motor Company

Matsushita Electric Industrial Co., Ltd.







7-1-1 Morofuku, Daito, Osaka, 574-0044, Japan Tel : (81)-72-871-1212

Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

-  [View MLDET2110P on WIN SOURCE](#)
-  [Panasonic Information](#)

Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management