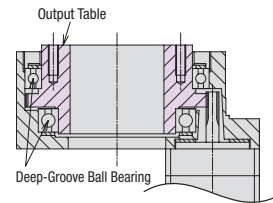
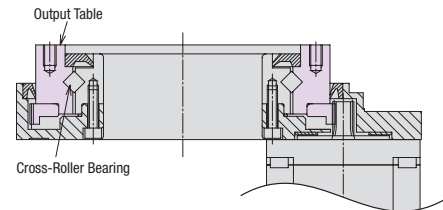


DG60 Structure



DG85, 130, 200 Structure



Actuator with High Strength, Accuracy and Reliability

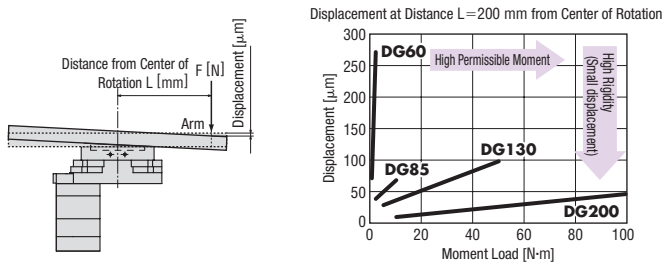
High Power and High Rigidity

The hollow output table is integrated with a high rigidity cross-roller bearing*. This structure improves permissible thrust load and moment load while maintaining high torque.

*Excludes the **DG60**

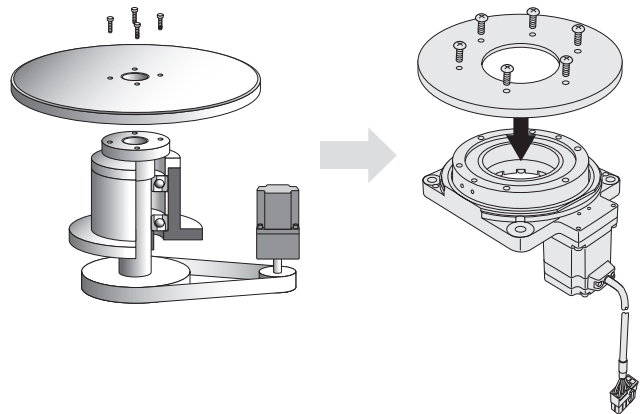
<Rigidity>

The output table uses a cross-roller bearing (85, 130, and 200 mm frame size) or 2 deep-groove ball bearings (60 mm frame size). The permissible moment load increases as the frame size increases, but the displacement caused by the moment load decreases.



Direct Coupling for Higher Reliability

Equipment tables and arms can be installed directly on the output table. This saves you the hassle and cost of designing an installation mechanism, arranging necessary mechanism parts, adjusting the belt tension, etc., when mechanical components such as a belt and pulley are used for installation.



High Positioning Accuracy with Non-Backlash

- Non-Backlash
- Repetitive Positioning Accuracy ± 15 sec
- Lost Motion 2 arc minutes

Note The repetitive positioning accuracy is measured at a constant temperature (normal temperature) under a constant load.

Large-Diameter, Hollow Output Table Makes Simple Wiring and Piping Possible

The large diameter hollow hole (through-hole) helps reduce the complexity of wiring and piping, thus simplifying your equipment design.

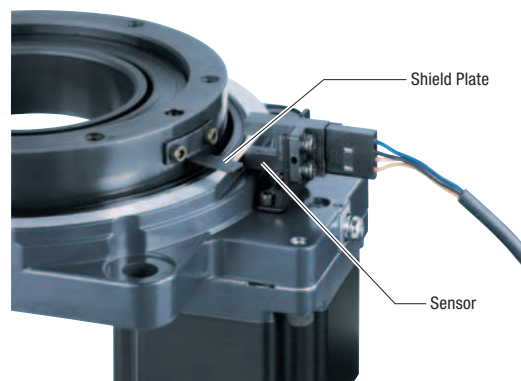
| | Frame Size mm | Diameter of Hollow Section mm |
|--------------|---------------|-------------------------------|
| DG60 | 60 | $\phi 28$ |
| DG85 | 85 | $\phi 33$ |
| DG130 | 130 | $\phi 62$ |
| DG200 | 200 | $\phi 100$ |

Example: **DG200**

"Home Sensor Set" is Available as an Accessory

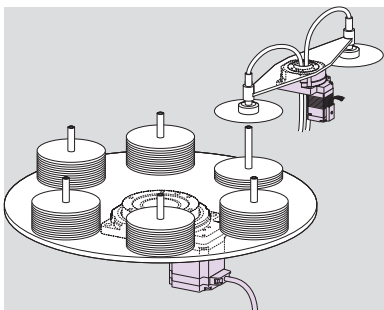
Since the sensor set comes with all the parts required for the return-to-home operation, you will spend less time designing, fabricating and procuring parts related to sensor installation.

DG130 Sensor Installation Example

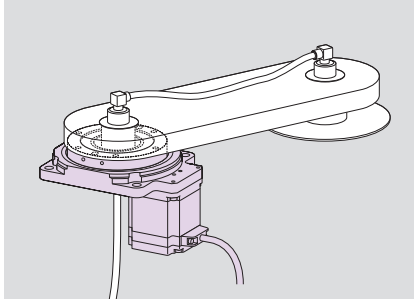


Application

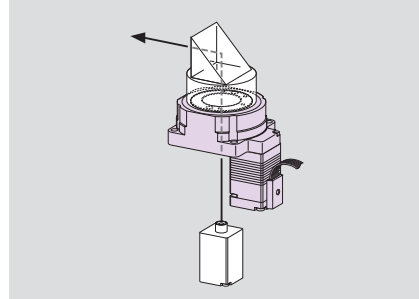
● Applications Subject to Changing Load Inertia



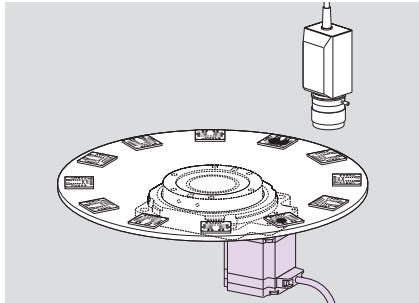
● Applications Where a Moment Load is Applied



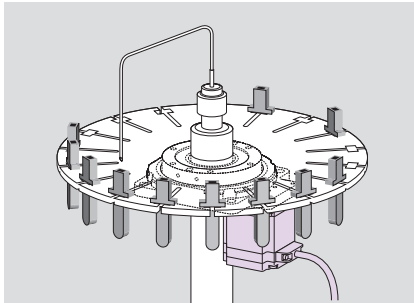
● Optical Applications Using the Hollow Hole



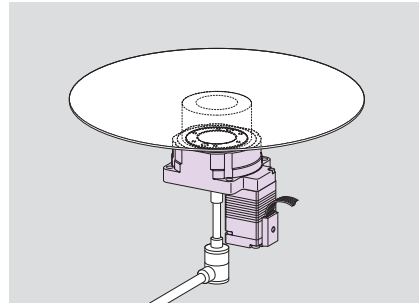
● High Positioning Accuracy Applications



● High Positioning Accuracy Applications Using the Hollow Hole



● Air Adsorption Applications Using the Hollow Hole



Lineup

| Actuator Frame Size | Product | Electro-magnetic Brake | Driver | Power Supply Voltage | Diameter of Hollow Section [mm] | Permissible Torque [N-m] | Permissible Moment Load [N-m] | | | | Permissible Thrust Load [N] | | |
|---------------------|---------|------------------------|---------------------|---|---------------------------------|--------------------------|-------------------------------|----|----|----|-----------------------------|------|------|
| | | | | | | | 20 | 40 | 60 | 80 | 1000 | 2000 | 3000 |
| 60 mm | | - | Built-in Controller | 24 VDC | φ28 | 0.9 | 2 | | | | | | 100 |
| | | | Pulse Input | 24 VDC | | | | | | | | | |
| 85 mm | | - | Built-in Controller | Single-Phase 100-120 VAC Single-Phase 200-240 VAC | φ33 | 2.8 | 10 | | | | | | 500 |
| | | | Pulse Input | Single-Phase 100-115 VAC Single-Phase 200-230 VAC Three-Phase 200-230 VAC | | | | | | | | | |
| 130 mm | | ● | Built-in Controller | Single-Phase 100-120 VAC Single-Phase 200-240 VAC | φ62 | 12 | 50 | | | | | | 2000 |
| | | | Pulse Input | Single-Phase 100-115 VAC Single-Phase 200-230 VAC Three-Phase 200-230 VAC | | | | | | | | | |
| 200 mm | | ● | Built-in Controller | Single-Phase 100-120 VAC Single-Phase 200-240 VAC | φ100 | 50 | 100 | | | | | | 4000 |
| | | | Pulse Input | Single-Phase 100-115 VAC Single-Phase 200-230 VAC Three-Phase 200-230 VAC | | | | | | | | | |

Excellent Characteristics Unique to Stepping Motors

User-Friendly and Easy, Highly Accurate Positioning

Stepping motors provide convenient means to ensure highly accurate positioning because they synchronize themselves with commands without requiring feedback.

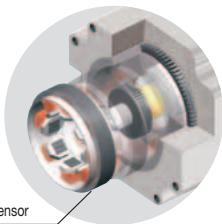
High response

The motor operates synchronously with pulse commands to achieve high response. There's no time lag in operation following a pulse command.

High Reliability Due to Oriental Motor's Unique Closed Loop Control

Adoption of a Rotor Position Detection Sensor (Resolver)

- Because the sensor is compact and slim, the overall length of the motor has been reduced.
- Performance such as heat resistance and vibration resistance is better than with regular optical encoders.
- Because an encoder cable is not necessary, the motor and driver can be connected with just 1 cable.



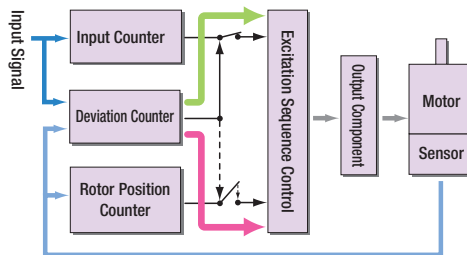
Rotor Position Detection Sensor

Continues Operation Even with Sudden Load Fluctuation and Sudden Acceleration

Operates synchronously with commands using open loop control during normal conditions. In an overload condition, changes immediately to closed loop control to correct the position.

Alarm Signal Output in Case of Abnormality

If an overload is applied continuously, an alarm signal is output. When the positioning is complete, an end signal is output. This ensures the same level of reliability achieved by a servo motor.



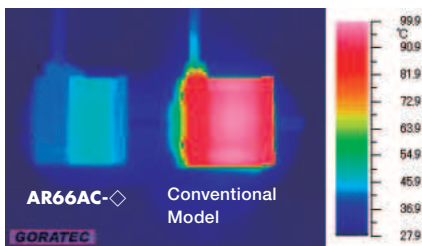
- Normal**
● Motor runs in open loop mode like a stepping motor.
- Overload Condition**
The closed loop mode is engaged to maintain the positioning operation.

Continuous Operation Possible Due to Lower Heat Generation from Higher Efficiency

Lower Heat Generation

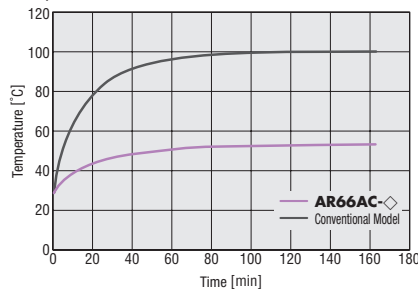
Heat generation by the motor has been significantly reduced through higher efficiency.

- Temperature Distribution by Thermography



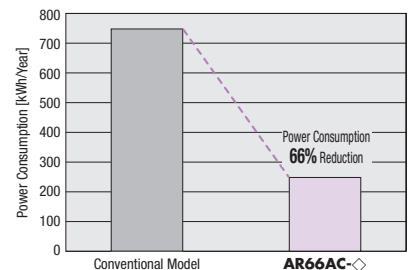
Comparison under same conditions.

- Motor Surface Temperature during Same Operation Conditions



Power Consumption: 66% Less Than Conventional Model due to Energy-Saving Features*

- Power Consumption



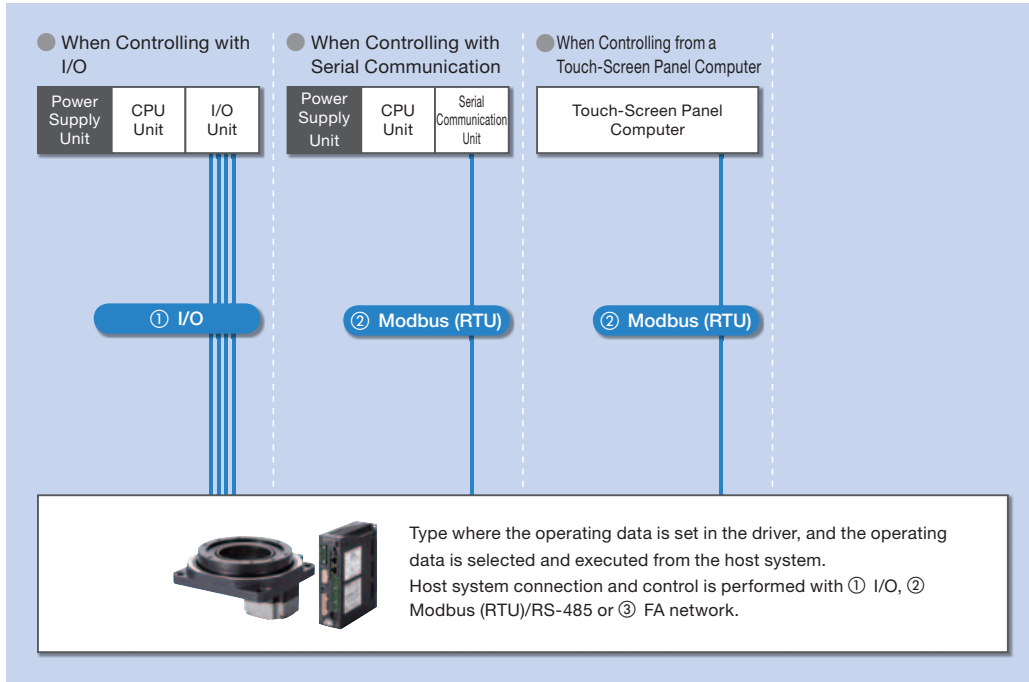
CO₂ Emissions: 66% Less Than Conventional Model* (Oriental Motor comparison)

* Speed: 1000 r/min, Load Factor: 50%
Operating Time: 24 hours of operation (70% operating, 25% standing by, 5% standstill), 365 days/year

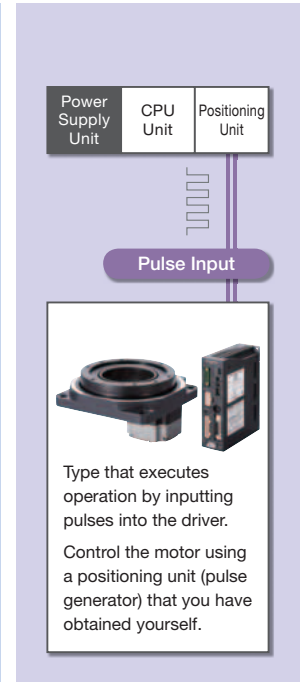
2 Driver Types Selectable by System Configuration

You can select from 2 driver types for the **DGII** Series, depending on your host system.

Built-in Controller Type



Pulse Input Type

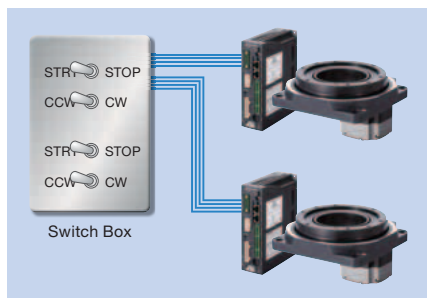


How to Connect a Built-In Controller Type

① I/O

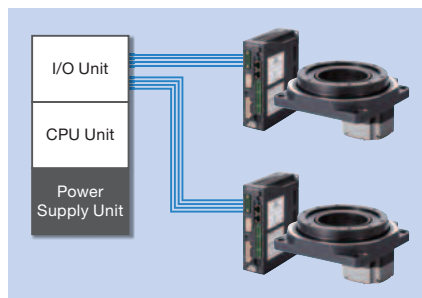
Because the positioning unit (pulse generator) function is built in to the driver, you can build an operation system using I/O by directly connecting to a switch box or PLC. Because a positioning unit is not necessary on the PLC side, space is saved and the system is simplified.

● Example of Using a Switch Box



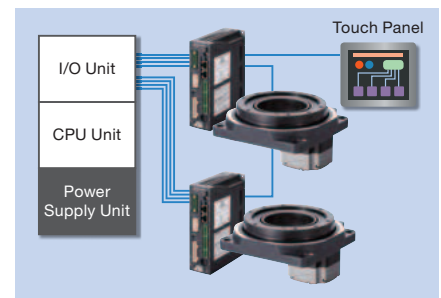
Because operating data is set in the driver, the actuator can be started and stopped simply by connecting a switch you have on hand. Control can be performed easily without using PLC.

● Example of Using PLC



When using PLC, you can build an operation system by connecting directly to an I/O unit. Because a positioning unit is not necessary on the PLC side, space is saved and the system is simplified.

● Example of Using PLC and a Touch Panel



Normally, the actuator is started and stopped with I/O. Changing the operating data settings and displaying the monitors and alarms is performed with the touch panel using Modbus (RTU) communication. When there is a lot of setup work, changes can be easily performed on the touch panel, and the burden of creating ladders is reduced.

② Modbus (RTU)/RS-485

Operating data and parameters can be set and operation commands can be input using RS-485 communication. Up to 31 drivers can be connected to each serial communication unit. Also, there is a function that enables the simultaneous start of multiple axes. The protocol supports Modbus (RTU), enabling connection with devices such as touch-screen panel computers and PCs.

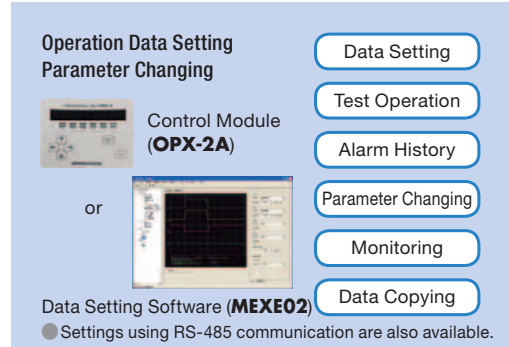
Built-In Controller Type

Because the driver has the information necessary for actuator operation, the burden on the host PLC is reduced. The system configuration when using multi-axis control has been simplified.

Settings are configured using a control module (sold separately), data setting software or RS-485 communication.

Operation Types

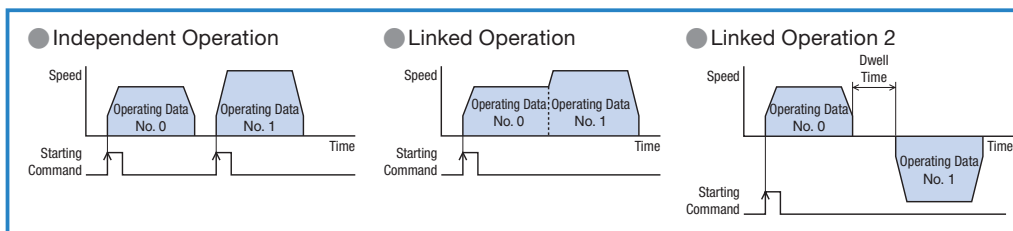
In the built-in controller type, the operating speed and traveling amount of the actuator are set with operating data, and operation is performed according to the selected operating data.



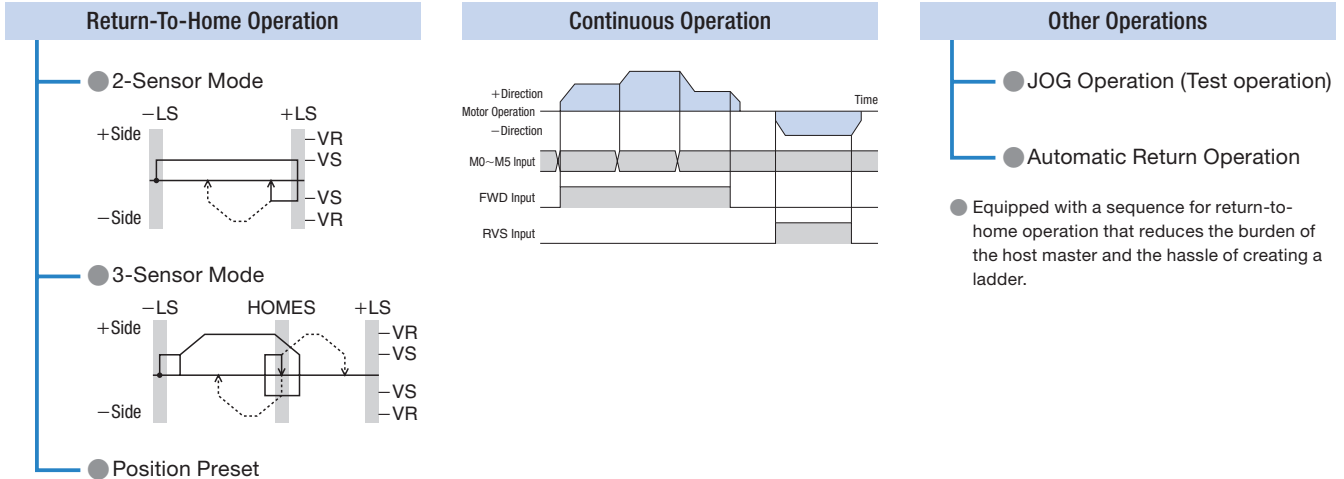
| Item | | Content | |
|--------------------------------------|--|--|---|
| Common | Control Method | I/O Control | |
| | | RS-485 Communication | Network converter connection Modbus RTU protocol connection |
| | Position Command Input | Setting with operating data number | Command range for each point: -8388608 to 8388607 [step] (Setting Unit: 1 [step]) |
| | Speed Command Input | Setting with operating data number | Command Range: 0 to 1000000 [Hz] (Setting Unit: 1 [Hz]) |
| | Acceleration/Deceleration Command Input | Set with the operating data number or parameter. You can select acceleration/deceleration rate [ms/kHz] or acceleration/deceleration time [sec]. Command Range: 0.001 to 1000.000 [ms/kHz] (Setting Unit: 0.001 [ms/kHz]) 0.001 to 1000.000 [sec] (Setting Unit: 0.001 [sec]) | |
| Acceleration/Deceleration Processing | Velocity filter, movement average filter | | |
| Return-To-Home Operation | Return-to-Home Modes | 2-Sensor Mode | A return-to-home operation that uses a limit sensor (+LS, -LS). |
| | | 3-Sensor Mode | A return-to-home operation that uses a limit sensor and home sensor. |
| | | Position Preset | A function where P-preset is input at the desired position to confirm the home position. You can set the home position to the desired value. |
| Positioning Operation | Number of Positioning Points | 64 points (No. 0 to 63) | |
| | | Operating Modes | Incremental mode (Relative positioning) |
| | Operation Functions | | Absolute mode (Absolute positioning) |
| | | Independent Operation | A PTP (Point to Point) positioning operation. |
| | | Linked Operation | A multistep speed-change positioning operation that is linked with operating data. |
| | Start Methods | Linked Operation 2 | A positioning operation with a timer that is linked with operating data. The timer (dwell time) can be set from 0 to 50.000 [sec]. (Setting Unit: 0.001 [sec]) |
| Operating Data Selection Method | | Starts the positioning operation when Start is input after selecting M0 to M5. | |
| Direct Method (Direct positioning) | | Starts the positioning operation with the operating data number set in the parameters when MS0 to MS5 is input. Starts the positioning operation. | |
| Continuous Operation | Number of Speed Points | 64 points (No. 0 to 63) | |
| | | Speed Change Method | Change the operating data number. |
| Other Operations | JOG Operation | Execute regular feed by inputting +JOG or -JOG. | |
| | Automatic Return Operation | When the motor position is moved by an external force while the motor is in a non-excitation state, it automatically returns to the position where it originally stopped. | |
| Absolute Backup | | You can build an absolute system by using a battery (accessory). | |

● Push-motion operation cannot be used with this product.

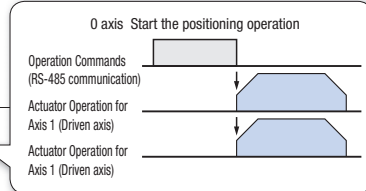
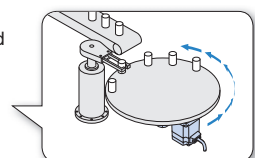
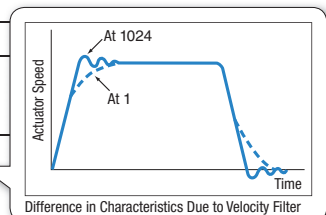
Positioning Operation



- <Start Methods>
- Operating Data Selection Method
 - Direct Positioning
 - Sequential Positioning



Main Function

| Function | Content | |
|--|--|---|
| Motor Resolution Setting Function*1 | <p>The motor resolution can be changed by the driver without the mechanically operated speed reduction mechanism. A desired setting can be made from 100 to 10000 [P/R].</p> <p>How to obtain the resolution on the actuator</p> $1000 \times \frac{\text{Electronic gear B}}{\text{Electronic gear A (Gear ratio)}} \times 18 \quad [\text{P/R}]$ | |
| Group Send Function (RS-485 communication) | <p>You can configure a group of multiple axes connected using RS-485 communication, and send commands by group. You can also perform simultaneous start and simultaneous operation for multiple axes.</p> |  |
| Round Function | <p>When the command position is outside the setting value of the "round setting range" parameter, this function returns the command position and multiple rotation data to 0. Because the multiple rotation data is also returned to 0, you can perform position control even for continuous rotation operations in the same direction that use the absolute backup system.</p> <p>● When building an absolute system, the accessory (sold separately) battery is necessary.</p> |  |
| Hardware Overtravel | This function stops the actuator when exceeding the mechanical limit. | |
| Software Overtravel | This function stops the actuator when exceeding the limit set by the software. Depending on the setting, an alarm can also be output without stopping. | |
| Stop Input (External stop) | This function forcibly stops operation when there is an abnormality or other issue. You can select instantaneous stop, deceleration stop, or all windings off (actuator holding force is off) as the stopping method. | |
| Alarm Code Output | You can output alarm codes that are occurring. | |
| Alarm History | Even if the power is turned off, up to 10 alarms that have occurred can be stored. This can be used for troubleshooting. | |
| Velocity Filter | This is used to make adjustments when a smooth start/stop or smooth motion at low speed operation is required. Even for sudden operation command changes, this function controls the speed changes of the actuator to prevent them from becoming too large. |  |
| Teaching Function*1 | You can perform teaching. Move the load to the target position, and store the position data at this time as the positioning data. | |
| I/O Monitoring*1 | You can check the ON/OFF status of the I/O signals. | |
| Waveform Monitoring*2 | You can check the operating speed and I/O signals as a waveform. | |

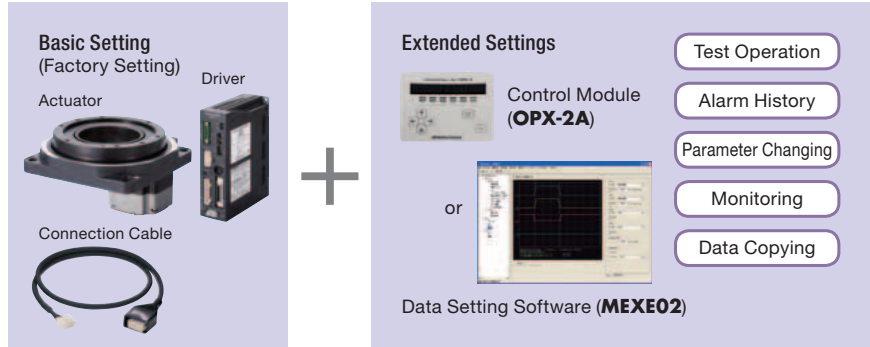
● The **MEXE02** data setting software can be downloaded from the Oriental Motor website. Oriental Motor can also provide a CD-ROM. For details, please contact the nearest Oriental Motor sales office.

*1 Can be performed with the separately-sold control module (**OPX-2A**) or data setting software (**MEXE02**).

*2 Can be performed with the data setting software (**MEXE02**).

Pulse Input Type

You can use the separately-sold control module and data setting software to perform operations according to your needs, such as changing the parameters, displaying the alarm history, and performing various types of monitoring.



Main Additional Functions Available with Extended Settings

| Item | Overview | Basic Setting | Extended Settings |
|---|--|---------------|-------------------|
| Selection of Pulse Input Mode | You can select the 1-pulse input or 2-pulse input (negative logic) mode. | ● | ● |
| | In addition to the normal settings, you can set phase difference input. · 1-pulse input mode (positive logic/negative logic) · 2-pulse input mode (positive logic/negative logic) · Phase difference input (1-multiplication/2-multiplication/4-multiplication) | – | ● |
| Resolution Setting | You can select the resolution with the function switches (D0, D1, CS0, CS1). | ● | ● |
| | You can change the value of the electronic gear corresponding to each function switch (D0, D1, CS0, CS1). | – | ● |
| Running Current Setting | You can change the running current setting with the current setting switch (CURRENT). | ● | ● |
| | You can change the value corresponding to each of 0 to F (16 levels) for the current setting switch (CURRENT). | – | ● |
| Standstill Current Ratio Setting | You can set the ratio of the standstill current relative to the running current. | – | ● |
| Motor Rotational Coordinates Setting | You can set the rotational coordinates for the motor. | – | ● |
| All Windings On Signal (C-ON input) | The input signal for the excitation of the motor. | ● | ● |
| | You can set the C-ON input logic for when the power supply is input. | – | ● |
| Return to Excitation Position Operation during All Windings On Enable/Disable | You can set whether or not to return to the excitation position (deviation 0 position) during all windings on. | – | ● |
| Alarm Code Signal Enable/Disable | Set to output the code when an alarm occurs. | – | ● |
| End Output Signal Range Setting | You can change the End output signal range. | – | ● |
| End Output Signal Offset | You can offset the End output signal value. | – | ● |
| A-/B-Phase Output | You can use for motor position verification. | ● | ● |
| Timing Output Signal | This is output each time the motor rotates 7.2° (0.4° for the output table). | ● | ● |
| Velocity Filter Setting | Applies a filter to the operation command to control the motor action. | ● | ● |
| | You can change the value corresponding to each of 0 to F (16 levels) for the setting switch. | – | ● |
| Vibration Suppression Function for Normal Mode | You can set to suppress resonant vibration during rotation. | – | ● |
| | You can set to suppress vibration during acceleration, deceleration and stopping. | – | ● |
| Gain Adjustment for Current Control Mode* | Adjusts the position and speed loop gain. | – | ● |
| | Adjusts the speed integration time constant. | – | ● |
| | Sets the damping control vibration frequency. | – | ● |
| | Sets whether to enable or disable damping control. | – | ● |
| Selection of Motor Excitation Position at Power On | You can select the motor excitation position for when the power is turned on. | – | ● |
| Control Module Setting | You can select whether to use symbols or an absolute value display for the speed display of the control module. | – | ● |
| | You can set the geared motor gear ratio for the speed monitor. (The gear ratio for the DGII Series is 1:18) | – | ● |

● The **MEXE02** data setting software can be downloaded from the Oriental Motor website. Oriental Motor can also provide a CD-ROM. For details, please contact the nearest Oriental Motor sales office.

*Except when you want to further reduce heat generation or noise, using normal mode is recommended.