Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!


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OMRON

AC Servomotors / Linear Motors / Servo Drives

# G5 Series

## The Preeminent Servo That Revolutionizes Motion Control


» EtherCAT

» High Speed and High Precision

» International Safety Standards

SYSMAC
always in control

# Higher Throughput and Shorter Tact Time, Plus Improved Machine Safety


**High Speed and High Precision**

Fastest speed response frequency in industry at 2 kHz

**Safety**

Conforms to the latest international safety standards

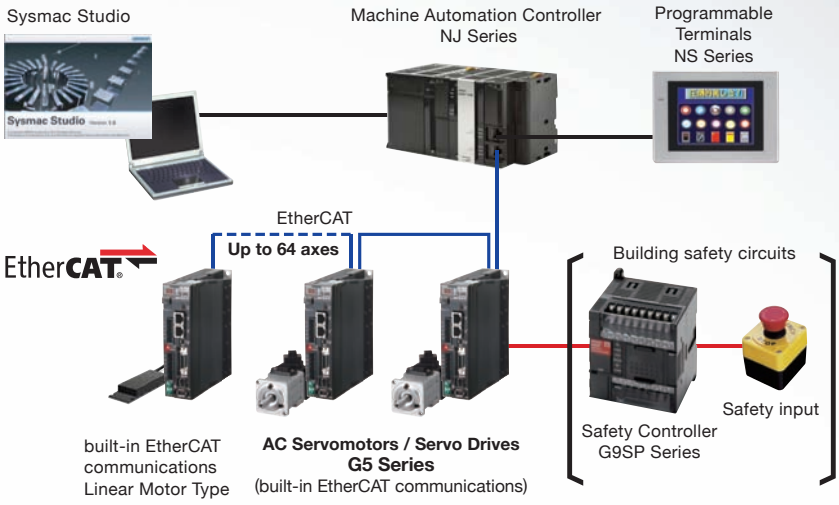
**Reduced TCO**

Advanced autotuning

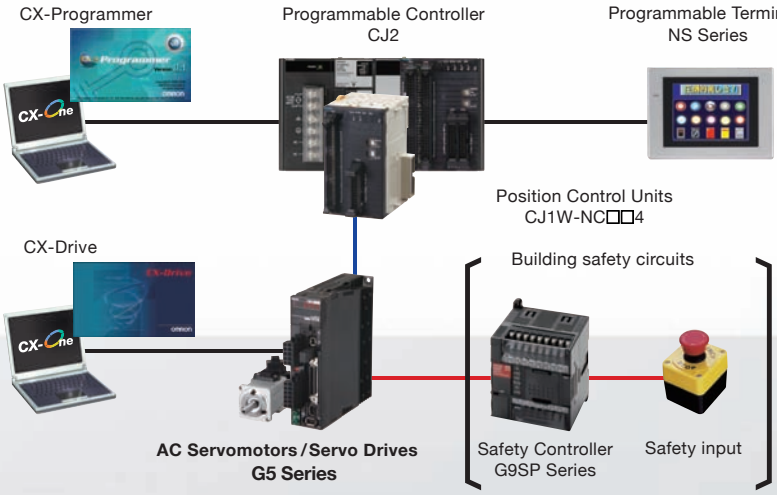
# Achieve the fastest position control in the industry by combining the G5 with an OMRON Controller.

## System Configuration Example

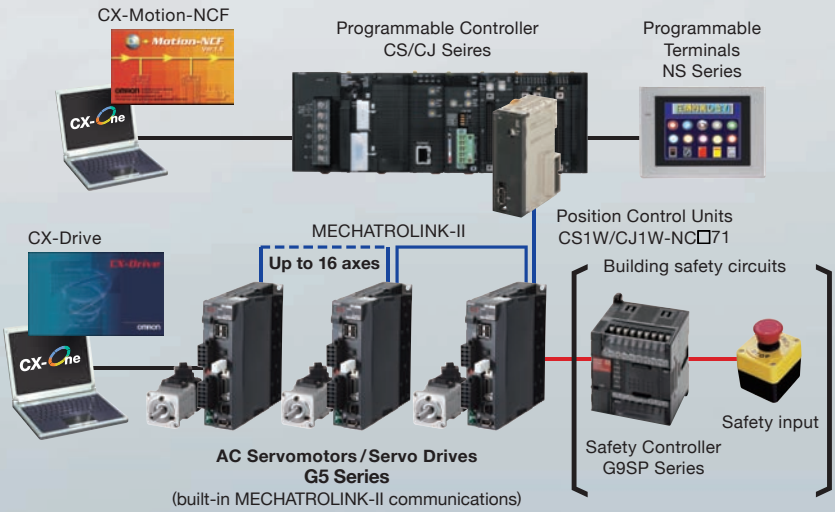
### EtherCAT Communications




### General-purpose Inputs




### MECHATROLINK-II Communications

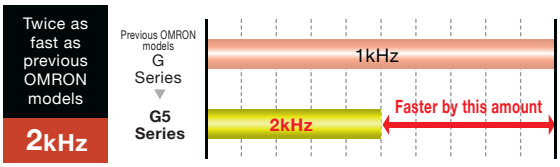


# Provide Tact Time Improvement and Hig

## Industry Top-class Tracking Performance

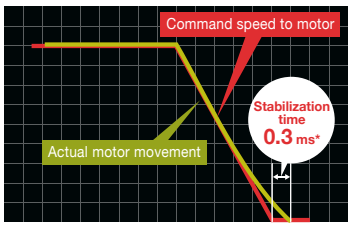
### Speed Response Frequency of 2 kHz

Speed response is representative of servo system characteristics. In the G5, the industry's fastest response has been achieved at 2 kHz. By improving the speed response by twice compared to previous OMRON models, the stabilization time has been shortened and this contributes to tact time reduction.




Motion control accurately follows commands.Effective for simultaneous control as well as improving tact time.

* Combination of R88D-KT01L Servo Drive and R88M-K10030L Servomotor. Example of actual measurements taken with gain adjusted by CX-Drive, with inertia ratio of x3 on ball screw mechanical system.

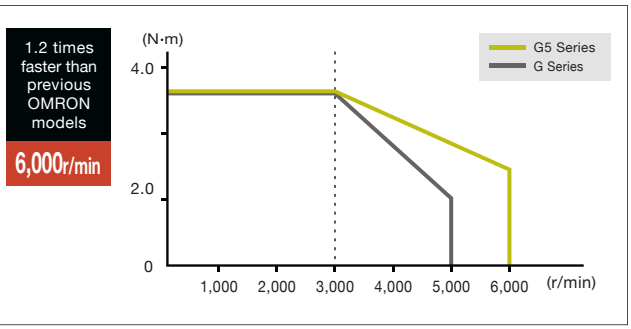



## Reduced Tact Time with Higher Speed

### Maximum rotation speed : 6,000 r/min*

The maximum rotation speed of R88M-series Servomotors has increased to 6,000 r/min, resulting in high-speed positioning that can reduce tact time.

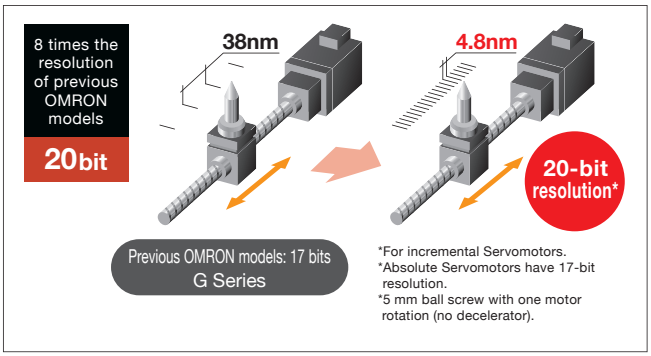
*Applicable to 100 V/200 V models with 750 W or less.




## Best Positioning Accuracy

### Featuring a 20-bit high-resolution incremental encoder

High-precision positioning can be achieved with the built-in encoder, 8 times the resolution of previous OMRON models at 20 bits.

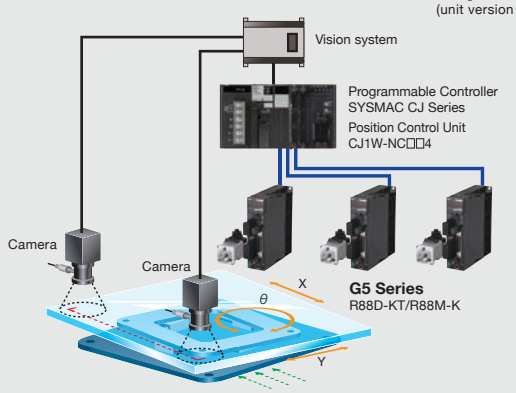



*For incremental Servomotors.
*Absolute Servomotors have 17-bit resolution.
*5 mm ball screw with one motor rotation (no decelerator).

### Example of High-speed/High-precision Application

- High-Speed and, High-Precision Position Control Using Camera Compensation
- The pulse output startup time of 0.1 ms enables High-Speed camera compensation.

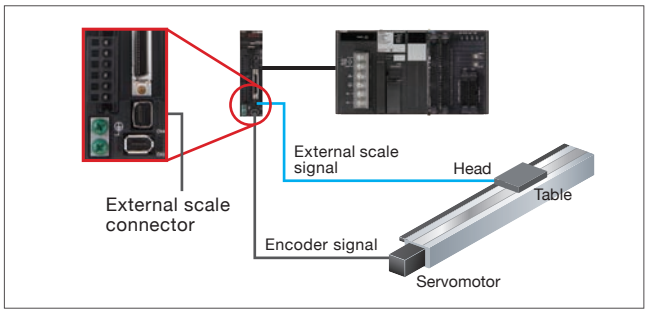
Note: Using a CJ2 CPU Unit (unit version 1.1 or later).




## High-precision Positioning

### Fully Closed Loop Control Is a Standard Feature

High-precision and high-response positioning can be realized without being affected by temperature changes by determining the position using direct feedback of the control position from the external scale, to enable using fully closed loop control without options.
(The external scale connector terminal is a standard feature.)

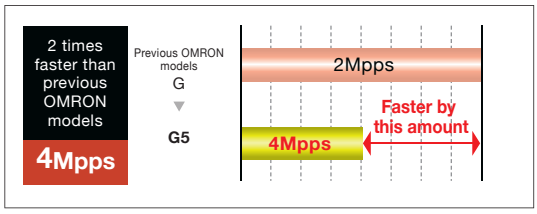


# Safety Motion Control That Provides Safety and Reliability

## High-speed and High-precision Positioning

### Pulse input response frequency: 4 Mpps

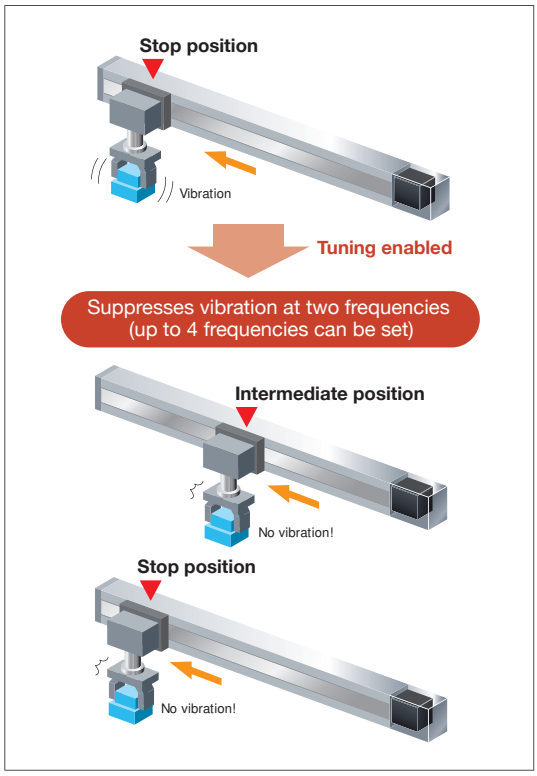
The Servo Drive response to command pulses is 4 Mpps, twice that of previous OMRON models. Response delays are thus reduced enabling high-speed and high-precision positioning.




## Ideal for Applications That Require High Accuracy

### Improved vibration control function

With the vibration control function, if the tip of the device is vibrating, the vibration frequency can be set to remove the vibration. It can also be used to suppress vibration resulting from starting and stopping the device, allowing precise movement.

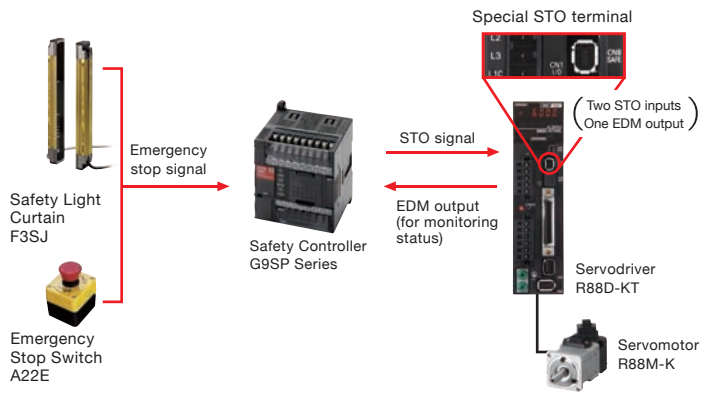



## Conforms to the Latest International Standards

### Safety and Productivity

The G5 was the first to acquire international standard IEC 61800-5-2 (STO) for motion control in the industry within Japan. It also conforms to the European Directives ISO 13849-1(PLc,d) * and EN 61508 (SIL2). Safety control circuits can be constructed with the Servo Drive, delivering both safety and productivity.

**Example of the structure of safety motion control**

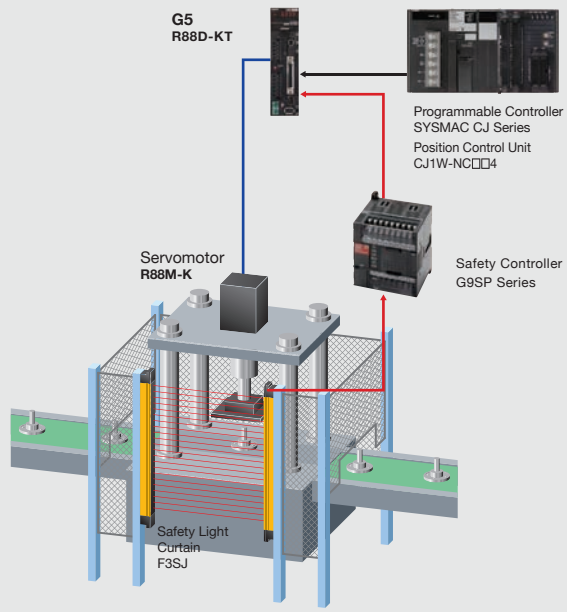



Note: STO = Safe Torque Off. When there is an STO input, power supply to the motor is turned OFF and kept OFF.

* Refer to General Specification of Servo Drive for the compliance of international standards.

**Safety Motion Application Example**

- Safety interlocks can be controlled by combining a Safety Light Curtain and Safety Motion Control.



# Easy Adjustment and Reduce works to

## Complete Support from Setup to Maintenance

### Software

**How to Select Required Support Software for Your Controller**

The required Support Software depends on the Controller to connect. Please check the following table when purchasing the Support Software.

| Item | Omron Machine Automation Controller System | Omron PLC System |
|---|---|---|
| **Controller** | NJ-series | CS, CJ, CP, and other series |
| **AC Servomotor/Drives** | G5-series<br>• EtherCAT Communications (Unit version 2.1 or later reccomended)<br>• EtherCAT Communications Linear Motor | G5-series<br>• EtherCAT Communications<br>• EtherCAT Communications Linear Motor<br>• General-purpose input type(PulseTrain or Analog inputs)<br>• MECHATROLINK-II Communications |
| **Software** | **Automation Software Sysmac Studio**<br>The Sysmac Studio provides an integrated development environment to set up, program, debug, and maintain NJ-series Controllers and other Machine Automation Controllers, as well as EtherCAT slaves.<br>Setting, adjustment, monitoring/tracing with the Servo Drive can be done via an EtherCAT network.<br><Connecting method with the Servo Drive><br>- Connection via the NJ | **FA Integrated Tool Package CX-One**<br>The CX-Drive software allows you to set, transfer, and compare Servo Drive parameters, to perform trial operation and adjustments,and to monitor and trace operation.<br>CX-Drive is bundled in CX-One.<br><Connecting method with the Servo Drive><br>- Direct connection with the Servo Drive.<br>- Connection via a PLC (possible with the Servo Drive with built-in EtherCAT communications function) |

### Simple Gain Adjustment

**Quickly adjust the gain using a wizard.**

The autotuning feature provided with the CX-Drive makes it easy to adjust the Servo Drive gain. You can use a wizard to complete gain adjustment in approximately five minutes or less per axis simply by selecting the machine configuration and entering the target set time.

4 steps for gain adjusted (5 minutes per axis)

**Autotuning**

**1. Machine Configuration**

Although previously the machine configuration was set using parameters, it can now be selected from ball screws, turntables, belts, and other devices.

**2. Automatic Adjustment**

Setting for automatic adjustment and conditions after completing automatic adjustment.

**3. Autotuning**

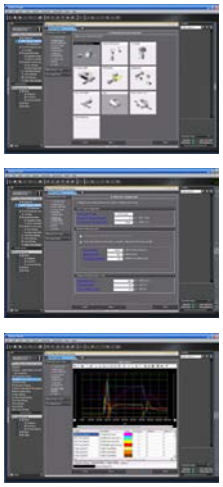
Implement auto-tuning until reaching to a target value. Stabilization time, overshooting amount and efective load rate can be monitored.

**4. Autotuning Completed**

After completing autotuning, the results can be checked using the data tracing.

**Setting screen image**

Sysmac Studio



CX-Drive

### Editing Parameters

- Operation is as easy as with a digital operator.
- Easily set parameters for Inverters and Servo Drives.

Sysmac Studio

CX-Drive

### Simple FFT

- Device frequency characteristics can be easily measured to analyze resonant frequencies.
- Use notch filters for resonance frequencies to improve response.

Sysmac Studio

CX-Drive

# System Start-up

## Automatic damping control setting

### Settings for damping control for the axis at the tip of the machine in a short time

Automatic damping control setting function is useful to execute damping control for Servo Drives. Manual settings will not be necessary. JOG operation, measuring vibration and parameter settings can be made on one screen.

2 steps for damping filter settings (5 minutes per axis).

**Starting automatic damping control setting**

↓

**1. Measuring machine vibration**

Automatically measures vibration frequency by starting JOG operation from the software or operation executed by the Controller.

↓

**2. Damping filter setting**

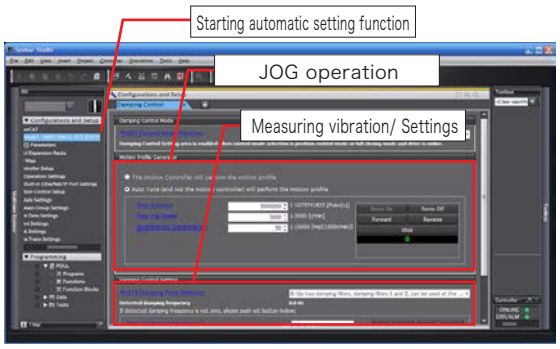
Apply the damping filter 1 to 4 for the measured vibration frequency. Vibration can be suppressed by setting the filters.

↓

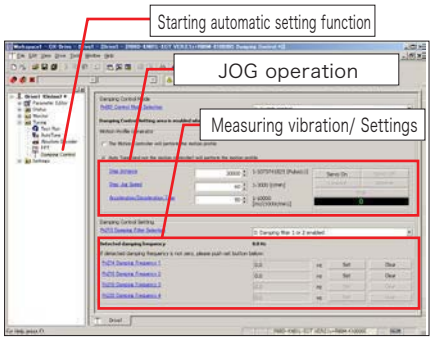
**Damping control filter setting completed**

**Setting screen image**

Sysmac Studio




CX-Drive




**Machine Automation Controller NJ-series and AC Servomotor/Drives G5-series with built-in EtherCAT Communications**

Reduced TCO

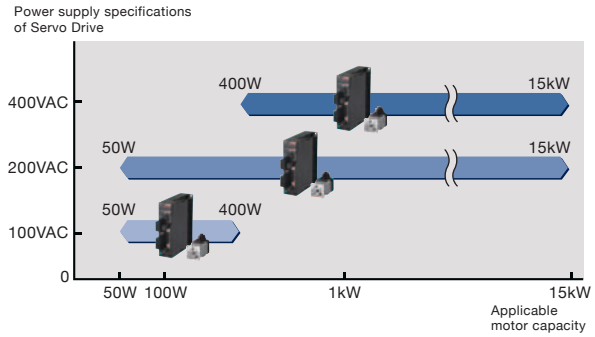
# Easy Adjustment and Reduce works to System Start-up

## Globalization

### Lineup of 400VAC Servomotors

Servomotors are available for 100VAC, 200VAC, and 400VAC. And they conform to international safety standards for easy application anywhere worldwide.

**Variations**

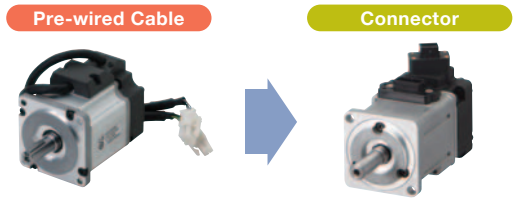



**Certified Standards**

## Flexible cable pull-out direction

### Direct conenctors for power cable, encoder cable, and brake cable connection.

In case that user creates motor cables, cable pull-out direction can be changed by 180 degree. (Refer to G5 Series User's manual (Cat,No. I571/I572) for the information about applicable motor capacity and connection method).
If you use cables provided by Omron, cable pull-out direction is limited to only one direction.




Cable is pulled out in only one direction.

Connector hood installation direction can be changed by 180 degree, which allows the cables to be pulled out in two directions.

## Side by side installation to save space

### Possible to install multiple drivers side by side.

*Drivers with 750W or less capacity only
There are usage limitations including ambient temperature and load rate.
Refer to G5 Series User's manual (Cat.No. I571/I572) for detailed information.

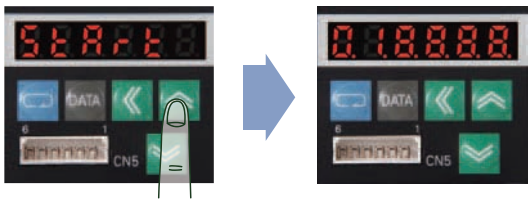
## Reduced Work with Increased Monitor Functions

### Monitoring for preventive maintenance have been improved.

**Example of easier operation with improved monitoring.**

**Monitoring the Total Run Time When the Main Circuit Is ON**

Total Run Time Monitor




**Monitoring the Causes of why the servo motor does not rotate***

A function has been provided that monitors the causes of why the Servo motor does not move even though a rotation command has been sent.

* Supported by the Servo Drive Analog/Pulse train type only.

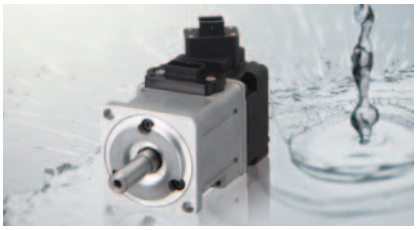
## Servomotors Conform to IP67

(Excluding through-shaft parts, connector pins of Servomotor Connector and connector pins of Encoder Connector)

### The power cable and encoder cable also conform to IP67

*Applicable to 3 to 20m cables of 100V/200V models with 750W or less.

The Servomotor provides IP67 protection, enhancing resistance to the environment.



## Reduced Stabilization Time by Suppressing Vibration

### 60% cogging torque reduction

(compared to previous G models)

Motor torque variation is reduced due to a 60% reduction in the cogging torque, resulting in high-precision positioning. This enables smooth operation at low speeds.

# Lineup of Linear Motors to Achieve Higher Speed and Higher Precision

## Inherited functions and performance of G5 series with EtherCAT communications

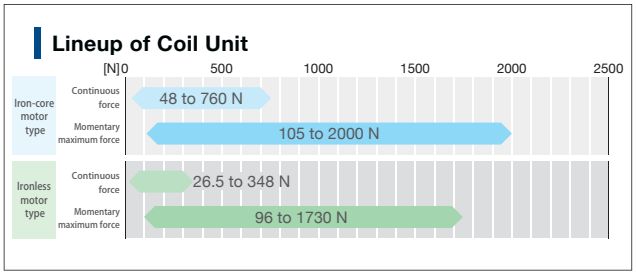
### EtherCAT

Linear motors joined the lineup and the following functions of G5 series achieve higher speed and higher precision.
* High-speed communication via EtherCAT communications at 100 Mbps
* Autotuning for simple adjustment
* Useful damping control function to improve device quality
* Safety function STO (Safe Torque Off)


## Selectable motors suitable for device

### Iron-core motor type and ironless motor type

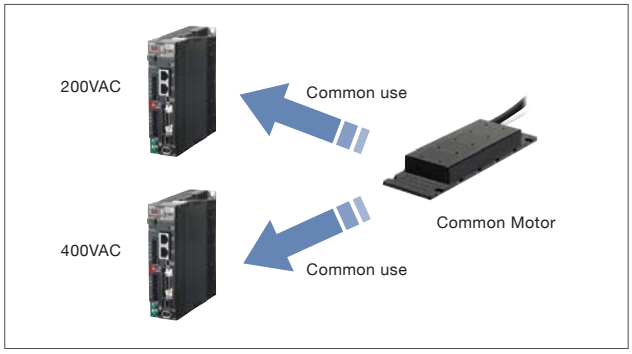
You can choose between compact and high-thrust iron-core motor type and cogging-free ironless motor type with excellent speed stability




## Power supply voltage sharing iron-core motor

### Using the same Iron-core motor for 200VAC/400VAC

Iron-core motor type The same motor can be used for 200VAC and 400VAC. The same maintenance parts for motors can be used regardless of device and user.




## Reduced tact time with higher speed

### Higher speed by direct drive

Significantly higher speed than ball screws contributes to make G5 series suitable for faster device application and reduce tact time.
Maximum speed 16 m/s*
* This value is for R88L-EC-GW0309 200VAC motor. It is limited by power supply voltage, model, linear guide, linear scale, and load.

## High-precision positioning

### Available with various linear scales

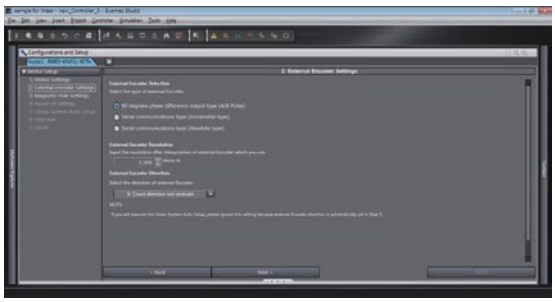
High-precision and high-speed positioning Maximum speed at 0.01 μm of scale resolution for serial communications: 4 m/s*
* This value is for Servo Drive. It is limited by the scale specifications.
Available linear scale
Serial communications (incremental/absolute), phase A/B/Z pulse type

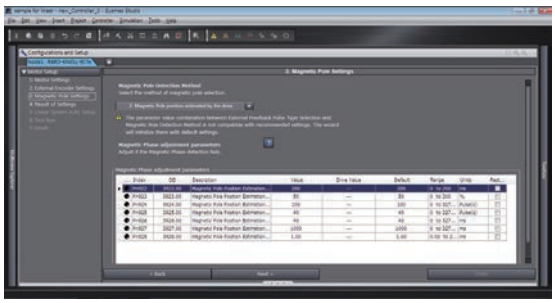
## Quick setup

### Automatic setup

Automatic setup for motor parameters by selecting the motor.
A wizard helps set the scale direction, magnetic pole, or current gain automatically.

<Sysmac Studio> Setting screen image





# The optimum combination can be found from a v
# model variations to handle various applications.

## Servo Drive Variations

| | | | G5 Series | | | |
|---|---|---|---|---|---|---|
| | | | EtherCAT Compatible Servo Drives | EtherCAT Compatible Servo Drives Linear Motor Type | Servo Drives Pulse/analog inputs | MECHATROLINK-II Compatible Servo Drives |
| | | | R88D-KN□-ECT  | R88D-KN□-ECT-L  | R88D-KT  | R88D-KN□-ML2  |
| Power supply | 100VAC | | Single-phase | Single-phase | Single-phase | Single-phase |
| Power supply | 200VAC | | Single/Three-phase, Three-phase | Single/Three-phase, Three-phase | Single/Three-phase, Three-phase | Single/Three-phase, Three-phase |
| Power supply | 400VAC | | Three-phase | Three-phase | Three-phase | Three-phase |
| Motor Capacity/Force | 100VAC | | 50 W, 100 W, 200 W, 400 W | 26.5 N, 48 N, 53 N, 58 N, 96 N, 117 N, 160 N, 175 N, 232 N | 50 W, 100 W, 200 W, 400 W | 50 W, 100 W, 200 W, 400 W |
| Motor Capacity/Force | 200VAC | Single-phase | — | 26.5 N, 48 N, 53 N | — | — |
| Motor Capacity/Force | 200VAC | Single/Three-phase | 50 W, 100 W, 200 W, 400 W, 750 W, 900 W, 1 kW, 1.5 kW | 58 N, 80 N, 96 N, 117 N, 160 N, 175 N | 50 W, 100 W, 200 W, 400 W, 750 W, 900 W, 1 kW, 1.5 kW | 50 W, 100 W, 200 W, 400 W, 750 W, 900 W, 1 kW, 1.5 kW |
| Motor Capacity/Force | 200VAC | Three-phase | 2 kW, 3 kW, 4 kW, 4.5 kW, 5 kW, 6 kW, 7.5 kW, 11 kW, 15 kW | 232 N, 240 N, 320 N, 348 N, 608 N, 760 N | 2 kW, 3 kW, 4 kW, 4.5 kW, 5 kW, 6 kW, 7.5 kW, 11 kW, 15 kW | 2 kW, 3 kW, 4 kW, 5 kW |
| Motor Capacity/Force | 400VAC | Three-phase | 400 W, 600 W, 750 W, 900 W, 1 kW, 1.5 kW; 2 kW, 3 kW, 4 kW, 4.5 kW, 5 kW, 6 kW, 7.5 kW, 11 kW, 15 kW | 48 N, 96 N, 160 N, 240 N, 320 N, 608 N, 760 N | 400 W, 600 W, 750 W, 900 W, 1 kW, 1.5 kW; 2 kW, 3 kW, 4 kW, 4.5 kW, 5 kW, 6 kW, 7.5 kW, 11 kW, 15 kW | 400 W, 600 W, 750 W, 900 W, 1 kW; 1.5 kW, 2 kW, 3 kW, 4 kW, 5 kW |
| Interface | Command type | | ECT | ECT | Pulse train, Analog | ML2 |
| Control modes | Control modes | | Position control, Speed control, Torque control | Position control, Speed control, Torque control | Position control, Speed control, Torque control | Position control, Speed control, Torque control |
| Control modes | Control mode switching | | Mode switching | Mode switching | Mode switching | Mode switching |
| Tuning functions | Vibration control | | Vibration control *1 | Vibration control *1 | Vibration control *1 | Vibration control *1 |
| Tuning functions | Autotuning | | AUTO 32 | AUTO 32 | AUTO 32 | AUTO 32 |
| Tuning functions | Realtime autotuning | | Adaptive filter *2 | Adaptive filter *2 | Adaptive filter *2 | Adaptive filter *2 |
| Safety | Conforms to international safety standards | | Safety | Safety | Safety | Safety |
| Servo Drive functions | Fully closed | | Fully closed | Fully closed | Fully closed | Fully closed |
| Servo Drive functions | Torque limits | | Torque limit *1 | Torque limit *1 | Torque limit *1 | Torque limit *1 |
| Servo Drive functions | Encoder output | | ABS, INC 20 | — | ABS, INC 20 | ABS, INC 20 |
| Servo Drive functions | Internal set speeds | | — | — | 8 speeds | — |

◎ Refer to Ordering Information for details on combining Drives and Servomotors. *1. Two limits. *2. Two adaptive filters and two notch filters.

## Functions

**ECT:** EtherCAT high-speed Servo communications motion network.

**Position control:** Control is applied to move to the target position and then stop at the target position.

**Vibration control function:** Vibration is suppressed by automatically setting a filter for the vibration frequency.

**Adaptive filter:** The machine load inertia is calculated in realtime and the result is used to automatically set the optimum gain.

**Internal set speeds:** Speed control according to the internal set speed that is set for the parameter. Up to 8 internal set speeds can be selected.

**Pulse train:** The speed and travel distance are input to the Servo as pulse trains.

**Speed control:** Control is applied to change the linear or rotational speed. For example, speed control is used for applications such as turning grindstones, controlling welding speeds, and controlling feeding speeds.

**Autotuning:** This function automatically sets an appropriate gain based on the rigidity setting of the machine load; 32 levels of rigidity settings are possible.

**Safety function:** Conforms to IEC 61800-5-2 (STO), EN ISO 13849-1: 2008 (PLc,d), ISO13849-1: 2006(PLc,d) and EN 61508 (SIL2).

**Analog:** The speed and torque are input to the Servo as analog signals.

**Torque control:** Control is applied to adjust the rotational force. Torque control is suitable for applications such as parts insertion, pressing, and screw tightening.

**Absolute output:** When the Controller power supply is turned ON, the Controller reads the Servo absolute position data to restore the absolute position.

**Fully closed (fully closed loop control):** Positioning using direct feedback of the current position from the external scale.

**ML2:** MECHATROLINK-II high-speed Servo communications motion network. (See note.)

**Command control mode switching:** Switching is possible between any two of the three control modes: position control, speed control, and torque control.

**Incremental output:** When the controller power supply is turned ON, operation is always started from the origin. A 20-bit resolution is provided on models with incremental outputs.

**Torque limit:** Switching is possible between the first torque limit and the second torque limit to limit the Servomotor output torque.

# ariety of functions and

## Motor Variations

### G5 Series AC Servomotor

Servomotors with EtherCAT Compatible, General-purpose inputs and MECHATROLINK-II Compatible Servomotors

R88M-K

| Servomotor capacity | Motor type | Cylinder type | | |
|---|---|---|---|---|
| | Rated speed | 1000r/min | 2000r/min | 3000r/min |
| | 50W | | | ABS/INC, INC 20 |
| | 100W | | | ABS/INC, INC 20 |
| | 200W | | | ABS/INC, INC 20 |
| | 400W | | ABS/INC, INC 20 | ABS/INC, INC 20 |
| | 600W | | ABS/INC, INC 20 | |
| | 750W | | | ABS/INC, INC 20 |
| | 900W | ABS/INC, INC 20 | | |
| | 1kW | | ABS/INC, INC 20 | ABS/INC, INC 20 |
| | 1.5kW | | ABS/INC, INC 20 | ABS/INC, INC 20 |
| | 2kW | ABS/INC, INC 20 | ABS/INC, INC 20 | ABS/INC, INC 20 |
| | 3kW | ABS/INC, INC 20 | ABS/INC, INC 20 | ABS/INC, INC 20 |
| | 4kW | | ABS/INC, INC 20 | ABS/INC, INC 20 |
| | 4.5kW | ABS/INC | | |
| | 5kW | | ABS/INC, INC 20 | ABS/INC, INC 20 |
| | 6kW | ABS/INC | | |
| | 7.5kW | | ABS/INC * | |
| | 11kW | | ABS/INC * | |
| | 15kW | | ABS/INC * | |

* The rated speed is 1,500 r/min

### G5 Series Linear Motor

Servomotors with EtherCAT Compatible Linear motor Type

R88L-EC-FW-□

R88L-EC-GW-□

| Linear Motor Force | Motor type | Iron-core | Ironless |
|---|---|---|---|
| | 26.5N | | Iron less |
| | 48N | Iron core | |
| | 53N | | Iron less |
| | 58N | | Iron less |
| | 80N | | Iron less |
| | 96N | Iron core | |
| | 117N | | Iron less |
| | 160N | Iron core | |
| | 175N | | Iron less |
| | 232N | | Iron less |
| | 240N | Iron core | |
| | 320N | Iron core | |
| | 348N | | Iron less |
| | 608N | Iron core | |
| | 760N | Iron core | |

## Functions

ABS/INC **absolute/Incremental output:** The Servomotor can be switched between an absolute output and an Incremental output. When an absolute output is selected and the Controller power supply is turned ON, the Controller reads the Servo absolute position data to restore the absolute position. A-17bit resolution is provided on model with an absolute output and an incremental output.

INC 20 **Incremental output:** When the controller power supply is turned ON, operation is always started from the origin. A 20-bit resolution is provided on models with incremental outputs.

Iron core **Iron-core:** Coil units consist of cores and coils. Compact and high-thrust type.

Iron less **Ironless:** Coil units do not include a core. Cogging-free type with excellent speed stability.

## System Configuration

### Controllers

- Machine Automation Controller
  NJ/NX-series
- Industrial PC Platform
  NY-series IPC Machine Controller

### Automation Software

- Sysmac Studio

- Industrial PC Platform
  NY-series IPC RTOS Controller
- Programmable Multi Axis Controller (PMAC)
  CK3E/NY51□-A

### EtherCAT Cables

Use a category 5 or higher cable with double, aluminium tape and braided shielding.

Programmable Controller
CJ2/CJ1

Position Control Unit with
EtherCAT interface
CJ1W-NC□81/NC□82

### Support Software

- CX-One FA Integrated
  Tool Package
  (Including CX-Programmer)

### Support Software

- CX-One FA Integrated
  Tool Package
  (Including CX-Drive)

Note: PMAC is an abbreviation for Programmable Multi Axis Controller.

# High-Speed and High-Precision G5 Series EtherCAT Communications with the Controller

- High-accuracy positioning with fully-closed control.
- Servo Drives for 400VAC globally widens applicable systems and environment, including large-scale equipment.
- Safe design and Safe Torque Off (STO) function.
- Vibration can be suppressed in acceleration/deceleration even in low-rigidity mechanical systems.

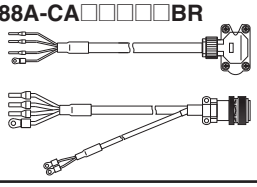
## Servo Drive

- G5 Series
  Drives with Built-in EtherCAT Communications
  R88D-KN□□-ECT

## I/O signals

### Power Cables

- Non-Flexible Cables
  - Without Brake
    R88A-CA□□□□□S
  - With Brake
    R88A-CA□□□□□B
- Flexible Cables
  - Without Brake
    R88A-CA□□□□□SR
  - With Brake
    R88A-CA□□□□□BR



### Brake Cables (50 to 750 W or less)

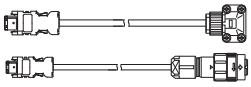
- Non-Flexible Cables
  R88A-CAKA□□□B
- Flexible Cables
  R88A-CAKA□□□BR

## Motor power signals

## Feedback Signals

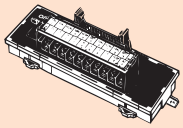
### Encoder Cables

- Non-Flexible Cables
  - 750W or less
    R88A-CRK□□□□C
  - 1.0kW or more
    R88A-CRKC□□□N
- Flexible Cables
  - 750W or less
    R88A-CRK□□□□CR
  - 1.0kW or more
    R88A-CRK□□□NR



## Connector-Terminal Block Conversion Units and Cable

- Connector-Terminal Block Conversion Unit
  XW2□-20G□



- Cable
  XW2Z-□□□J-B34

## AC Servomotors

- G5 Series motor
  R88M-K

3000r/min
2000r/min
1500r/min
1000r/min

INC | ABS INC

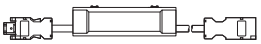
## External scale

## Peripheral Devices

- Reactors
  3G3AX-DL
  3G3AX-AL
- External Regeneration Resistors
  R88A-RR

## Absolute Encoder Battery Cable

**R88A-CRGD0R3C (-BS)**
(One Battery is included with model numbers ending in"BS")



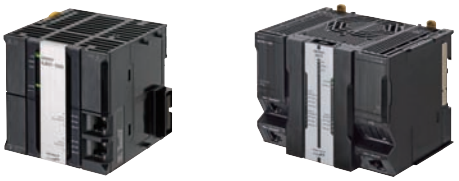
Note: Not required if a battery is connected to the control connector (CN1).

## Decelerators

- Backlash: 3 Arcminutes max.
  R88G-HPG
- Backlash: 15 Arcminutes Max.
  R88G-VRXF

## System Configuration

### Controllers



- Machine Automation Controller
  NJ/NX-series
- Industrial PC Platform
  NY-series IPC Machine Controller

### Automation Software

- Sysmac Studio

- Industrial PC Platform
  NY-series IPC RTOS Controller
- Programmable Multi Axis Controller (PMAC)
  CK3E/NY51□-A

### EtherCAT Cables

Use a category 5 or higher cable with double, aluminium tape and braided shielding.

Programmable Controller
CJ2/CJ1

+

Position Control Unit with
EtherCAT interface
CJ1W-NC□81/NC□82

### Support Software

CX-One FA Integrated
Tool Package
(Including CX-Programmer)

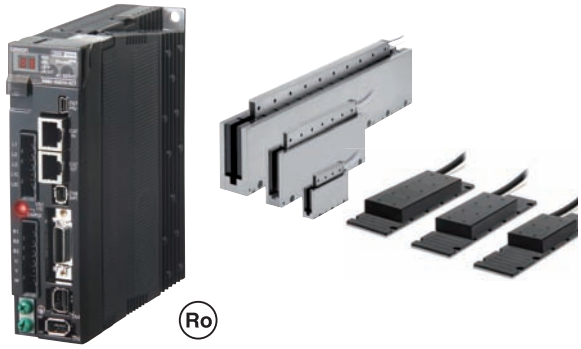
### Support Software

- CX-One FA Integrated
  Tool Package
  (Including CX-Drive)

Note: PMAC is an abbreviation for Programmable Multi Axis Controller.

# Linear Motor for Higher-speed and Higher-precision

- Inherited functions and performance of G5 series and EtherCAT communications achieve high-speed and high-precision positioning.
- Lineup of compact and high-thrust iron-core motor type and cogging-free ironless motor type with excellent speed stability.
- Same Iron-core motor type for 200V AC and 400V AC.
- Quick setup by automatic setup function.



## Servo Drive

- **G5 Series Drives with Built-in EtherCAT Communications Linear Motor type R88D-KN□□-ECT-L**

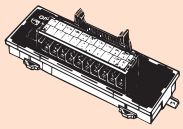
EtherCAT Communications

USB Communications

**I/O signals**

## Connector-Terminal Block Conversion Units and Cable

- **Connector-Terminal Block Conversion Unit XW2□-20G□**



- **Cable XW2Z-□□□J-B34**

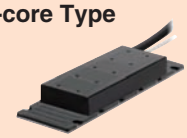
**Motor power signals**

### Power Cables

- **Power Cable**
  Supplied by the user.

## Linear Motor

- **Iron-core Type**



Motor Coil Unit : R88L-EC-FW-□
Magnet Trac : R88L-EC-FM-□

- **Ironless Type**

Motor Coil Unit : R88L-EC-GW-□
Magnet Trac : R88L-EC-GM-□

**Feedback Signals**

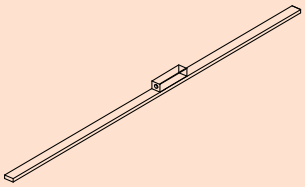
### External encoder Cables

- **Serial Communications Cable R88A-CRKE010SR**

- **90° Phase Difference Input Cable**
  Supplied by the user

## External encoder

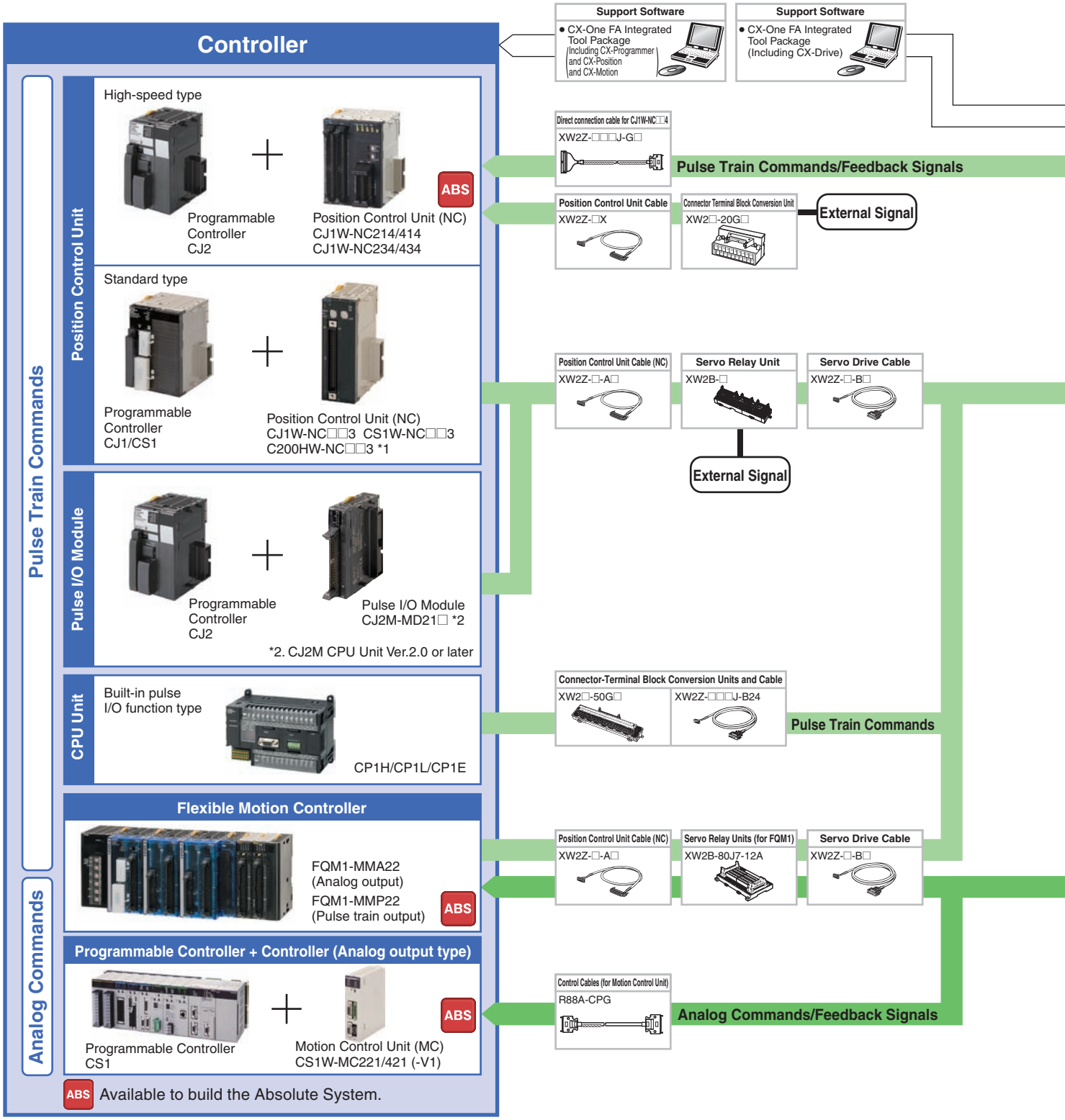
- **Commercial Product**
  Supplied by the user.



### Peripheral Devices

- Reactors
  3G3AX-DL
  3G3AX-AL
- External Regeneration Resistors
  R88A-RR

## System Configuration




*1. C200HW-NC was discontinued.

# The Preeminent Servo That Revolutionizes Motion Controll

- Industry Top-class Tracking Performance.
  Speed Response Frequency of 2 kHz.
- Best Positioning Accuracy*.
  Featuring a 20-bit high-resolution incremental encoder.
  ✻8 times the resolution of previous OMRON models
- High-precision Positioning.
  Fully Closed Loop Control Is a Standard Feature.
- Conforms to the Latest International Standards.
  Safety and Productivity.
- Globalization. Lineup of 400 VAC Servomotors.

USB communications

## Servo Drive

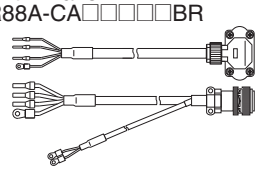
- G5 Series driver
  R88D-KT

100 VAC
200 VAC
400 VAC

## Motor power signals

### Power Cables

- Non-flexible Cables
  - Without Brake
    R88A-CA□□□□□S
  - With Brake
    R88A-CA□□□□□B
- Flexible Cables
  - Without Brake
    R88A-CA□□□□□SR
  - With Brake
    R88A-CA□□□□□BR



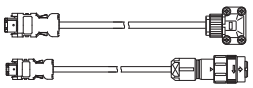
### Brake Cables (50 to 750 W or less)

- Non-flexible Cables
  R88A-CAKA□□□B
- Flexible Cables
  R88A-CAKA□□□BR

## Feedback Signals

### Encoder Cables

- Non-Flexible Cables
  - 750W or less
    R88A-CRK□□□□C
  - 1.0kW or more
    R88A-CRKC□□□N
- Flexible Cables
  - 750W or less
    R88A-CRK□□□□CR
  - 1.0kW or more
    R88A-CRK□□□NR



## AC Servomotors

- G5 Series motor
  R88M-K

3,000 r/min
2,000 r/min
1,500 r/min
1,000 r/min

INC ABS INC

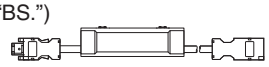
## Peripheral Devices

External scale

- Reactors
  3G3AX-DL
  3G3AX-AL
- External Regeneration Resistors
  R88A-RR

## Absolute Encoder Battery Cable

R88A-CRGD0R3C (-BS)
(One Battery is included with Servo Drivers with model numbers ending in "BS.")



* Not required if a battery is connected to the control connector (CN1).

## Decelerators

- Backlash: 3 Arcminutes max.
  R88G-HPG
- Backlash: 15 Arcminutes Max.
  R88G-VRXF

# R88M-K/R88D-KN□-ML2

## System Configuration

### Controllers (MECHATROLINK-II type)

**Support Software**

- CX-One FA Integrated Tool Package (Including CX-Programmer and CX-Position and CX-Motion)

**Support Software**

- CX-One FA Integrated Tool Package (Including CX-Drive)

Programmable Controller
CJ1

+

Position Control Unit
CJ1W-NC□71

**MECHATROLINK-II**

Programmable Controller
CS1

+

Position Control Unit
CS1W-NC□71

### MECHATROLINK-II Cables

**(With ring core and USB connector on both ends)**
**FNY-W6003-□□ (OMRON model number)**
**(Without ring core USB connector on both ends)**
**FNY-W6002-□□ (OMRON model number)**

### MECHATROLINK-II Repeater

| | | Maximum transmission distance | |
|---|---|---|---|
| | | 0 to 30 m | 30 to 50 m |
| Number of connected devices | 1 to 15 | Repeater not required. | Repeater not required. |
| | 16 | Repeater not required. | Repeater required. |

# High-Speed and High-Precision G5 Series MECHATROLINK-II Communications with the Controller

- Data transfer using MECHATROLINK-II Communications:
  All control data that can be interfaced between the Servo Driver and the Controller is transmitted using data communications. This enables maximizing the Servomotor performance without restricting the transmission performance of the control signals.
- Having a communications module built into the Servo Driver significantly saves space in the control panel.

USB communi-cations

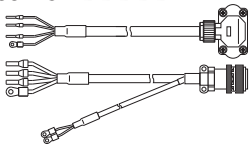
## Servo Drive

- **G5 Series driver**
  **R88D-KN□□-ML2**

## I/O signals

### Power Cables

- Non-flexible Cables
  - Without Brake
    R88A-CA□□□□□S
  - With Brake
    R88A-CA□□□□□B
- Flexible Cables
  - Without Brake
    R88A-CA□□□□□SR
  - With Brake
    R88A-CA□□□□□BR

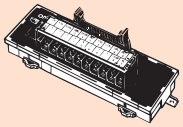


### Brake Cables (50 to 750 W or less)

- Non-flexible Cables
  R88A-CAKA□□□B
- Flexible Cables
  R88A-CAKA□□□BR

## Connector-Terminal Block Conversion Units and Cable

- **Connector-Terminal Block Conversion Unit**
  **XW2□-20G□**



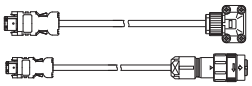
- **Cable**
  **XW2Z-□□□J-B34**

## Motor power signals

## Feedback Signals

### Encoder Cables

- Non-Flexible Cables
  - 750W or less
    R88A-CRK□□□□C
  - 1.0kW or more
    R88A-CRKC□□□N
- Flexible Cables
  - 750W or less
    R88A-CRK□□□□CR
  - 1.0kW or more
    R88A-CRK□□□NR



## AC Servomotors

- **G5 Series motor**
  **R88M-K**

**3000r/min**
**2000r/min**
**1000r/min**

INC ABS INC

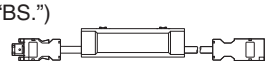
External scale

### Peripheral Devices

- Reactors
  3G3AX-DL
  3G3AX-AL
- External Regeneration Resistors
  R88A-RR

### Absolute Encoder Battery Cable

R88A-CRGD0R3C (-BS)
(One Battery is included with Servo Drivers with model numbers ending in "BS.")



* Not required if a battery is connected to the control connector (CN1).

### Decelerators

- Backlash: 3 Arcminutes max.
  R88G-HPG
- Backlash: 15 Arcminutes Max.
  R88G-VRXF

## MEMO

# Ordering Information

**Product name** AC Servomotors / Linear Motors / Servo Drives
**G5-series**



As a Sysmac Device, the G5-series AC Servomotor/Servo Drive with Built-in EtherCAT Communications is designed to provide optimal functionality and enhanced operability when used in conjunction with a Machine Automation Controller such as NJ series and the automation software Sysmac Studio.
Sysmac Device is a generic term for OMRON control devices such as an EtherCAT Slave, designed with unified communications specifications and user interface specifications.

When connecting a Servo Drive to the NJ5 series Machine Automation Controller, it is recommended that you use the Servo Drive with Built-in EtherCAT Communications, R88D-KN□□□-ECT, with unit version 2.1 or later.

# Interpreting Model Numbers

## AC Servo Drive Rotary Motor Type Model Numbers

**R88D-K N 01 H -ECT**

(1) (2) (3) (4) (5)

| No | Item | Symbol | Specifications |
|---|---|---|---|
| (1) | G5-series Servo Drive | | |
| (2) | Drive Type | T | Analog input/Pulse train input type |
| | | N | Communication type |
| (3) | Maximum Applicable Servomotor Capacity | A5 | 50 W |
| | | 01 | 100 W |
| | | 02 | 200 W |
| | | 04 | 400 W |
| | | 06 | 600 W |
| | | 08 | 750 W |
| | | 10 | 1 kW |
| | | 15 | 1.5 kW |
| | | 20 | 2 kW |
| | | 30 | 3 kW |
| | | 40 | 4 kW |
| | | 50 | 5 kW |
| | | 75 | 7.5 kW |
| | | 150 | 15 kW |
| (4) | Power Supply Voltage | L | 100 VAC |
| | | H | 200 VAC |
| | | F | 400 VAC |
| (5) | Network type | Blank | General-purpose Inputs |
| | | -ML2 | MECHATROLINK-II Communications |
| | | -ECT | EtherCAT Communications |

## AC Servo Drive Linear Motor Type Model Numbers

**R88D-K N 01 H -ECT -L**

(1) (2) (3) (4) (5) (6)

| No | Item | Symbol | Specifications |
|---|---|---|---|
| (1) | G5-series Servo Drive | | |
| (2) | Drive Type | N | Communication type |
| (3) | Maximum Applicable Linear Motor Capacity | 01 | 100 W |
| | | 02 | 200 W |
| | | 04 | 400 W |
| | | 06 | 600 W |
| | | 08 | 750 W |
| | | 10 | 1 kW |
| | | 15 | 1.5 kW |
| | | 20 | 2 kW |
| | | 30 | 3 kW |
| (4) | Power Supply Voltage | L | 100 VAC |
| | | H | 200 VAC |
| | | F | 400 VAC |
| (5) | Network type | -ECT | EtherCAT Communications |
| (6) | Motor type | -L | Linear Motor |

## AC Servomotor Model Numbers

**R88M-K □ 750 30 H -BO S2**

(1) (2) (3) (4) (5) (6)

| No | Item | Symbol | Specifications |
|---|---|---|---|
| (1) | G5-series Servomotor | | |
| (2) | Motor Type | Blank | Cylinder type |
| (3) | Servomotor Capacity | 050 | 50 W |
| | | 100 | 100 W |
| | | 200 | 200 W |
| | | 400 | 400 W |
| | | 600 | 600 W |
| | | 750 | 750 W |
| | | 900 | 900 W |
| | | 1K0 | 1 kW |
| | | 1K5 | 1.5 kW |
| | | 2K0 | 2 kW |
| | | 3K0 | 3 kW |
| | | 4K0 | 4 kW |
| | | 4K5 | 4.5 kW |
| | | 5K0 | 5 kW |
| | | 6K0 | 6 kW |
| | | 7K5 | 7.5 kW |
| | | 11K0 | 11 kW |
| | | 15K0 | 15 kW |
| (4) | Rated Rotation Speed | 10 | 1,000 r/min |
| | | 15 | 1,500 r/min |
| | | 20 | 2,000 r/min |
| | | 30 | 3,000 r/min |
| (5) | Applied Voltage | F | 400 VAC (with incremental encoder specifications) INC |
| | | H | 200 VAC (with incremental encoder specifications) INC |
| | | L | 100 VAC (with incremental encoder specifications) INC |
| | | C | 400 VAC (with absolute encoder specifications) ABS/INC |
| | | T | 200VAC (with absolute encoder specifications) ABS/INC |
| | | S | 100 VAC (with absolute encoder specifications) ABS/INC |
| (6) | Option | Blank | Straight shaft |
| | | B | With brake |
| | | O | With oil seal |
| | | S2 | With key and tap |

**Note:** INC incremental encoder: 20bit
ABS/INC incremental encoder: 17bit, absolute encoder: 17bit

## Linear Motor

### ● Iron-core linear motor

**Motor Coil Unit**

**R88L-EC -FW -03 03 -A NP C**

(1) (2) (3) (4) (5) (6) (7)

| No | Item | Symbol | Specifications |
|---|---|---|---|
| (1) | G5-series Linear Motor | | |
| (2) | Part Type | FW | Iron-core type Motor Coil Unit |
| (3) | Effective Magnet Width | 03 | 30mm |
| | | 06 | 60mm |
| | | 11 | 110mm |
| (4) | Coil Model | 03 | 3-coil |
| | | 06 | 6-coil |
| | | 09 | 9-coil |
| | | 12 | 12-coil |
| | | 15 | 15-coil |
| (5) | Version | A | Ver.A |
| (6) | Connector | NP | Not Provided |
| (7) | Type | C | Compact type |

**Magnet Trac**

**R88L-EC -FM -03 096 -A**

(1) (2) (3) (4) (5)

| No | Item | Symbol | Specifications |
|---|---|---|---|
| (1) | G5-series Linear Motor | | |
| (2) | Part Type | FM | Iron-core type Magnet Trac |
| (3) | Effective Magnet Width | 03 | 30mm |
| | | 06 | 60mm |
| | | 11 | 110mm |
| (4) | Magnet Trac Unit Length | 096 | 96mm |
| | | 144 | 144mm |
| | | 192 | 192mm |
| | | 288 | 288mm |
| | | 384 | 384mm |
| (5) | Version | A | Ver.A |

### ● Ironless linear motor

**Motor Coil Unit**

**R88L-EC -GW -03 03 -A NP S**

(1) (2) (3) (4) (5) (6) (7)

| No | Item | Symbol | Specifications |
|---|---|---|---|
| (1) | G5-series Linear Motor | | |
| (2) | Part Type | GW | Ironless type Motor Coil Unit |
| (3) | Effective Magnet Width | 03 | 30mm |
| | | 05 | 50mm |
| | | 07 | 70mm |
| (4) | Coil Model | 03 | 3-coil |
| | | 06 | 6-coil |
| | | 09 | 9-coil |
| (5) | Version | A | Ver.A |
| (6) | Connector | NP | Not Provided |
| (7) | Type | S | Standard type |

**Magnet Trac**

**R88L-EC -GM -03 090 -A**

(1) ② ③ ④ ⑤

| No | Item | Symbol | Specifications |
|---|---|---|---|
| (1) | G5-series Linear Motor | | |
| (2) | Part Type | GM | Ironless type Magnet Trac |
| (3) | Effective Magnet Width | 03 | 30mm |
| | | 05 | 50mm |
| | | 07 | 70mm |
| (4) | Magnet Trac Unit Length | 090 | 90mm |
| | | 114 | 114mm |
| | | 120 | 120mm |
| | | 126 | 126mm |
| | | 168 | 168mm |
| | | 171 | 171mm |
| | | 210 | 210mm |
| | | 390 | 390mm |
| | | 456 | 456mm |
| | | 546 | 546mm |
| (5) | Version | A | Ver.A |

## Understanding Decelerator Model Numbers (Backlash = 3' Max./Backlash = 15' Max.)

Refer to the *Decelerators* in *Ordering Information* for motor capacity and decelerator combinations.

**Backlash = 3' Max.**

**R88G-HPG 14A 05 100 S B J**

(1) (2) (3) (4) (5) (6) (7)

| No | Item | Symbol | Specifications |
|---|---|---|---|
| (1) | Decelerator for Servomotors Backlash = 3' Max. | | |
| (2) | Flange Size Number | 11B | □40 |
| | | 14A | □60 |
| | | 20A | □90 |
| | | 32A | □120 |
| | | 50A | □170 |
| | | 65A | □230 |
| (3) | Gear Ratio | 05 | 1/5 |
| | | 09 | 1/9 |
| | | 11 | 1/11 |
| | | 20 | 1/20 |
| | | 21 | 1/21 |
| | | 25 | 1/25 |
| | | 33 | 1/33 |
| | | 45 | 1/45 |
| (4) | Applicable Servomotor Capacity | 050 | 50 W |
| | | 100 | 100 W |
| | | 200 | 200 W |
| | | 400 | 400 W |
| | | 750 | 750 W |
| | | 900 | 900 W |
| | | 1K0 | 1 kW |
| | | 1K5 | 1.5 kW |
| | | 2K0 | 2 kW |
| | | 3K0 | 3 kW |
| | | 4K0 | 4 kW |
| | | 4K5 | 4.5 kW |
| | | 5K0 | 5 kW |
| (5) | Motor Type | Blank | 3,000-r/min cylindrical servomotors |
| | | S | 2,000-r/min cylindrical servomotors |
| | | T | 1,000-r/min cylindrical servomotors |
| (6) | Backlash | B | Backlash = 3' Max |
| (7) | Option | Blank | Straight shaft |
| | | J | With key and tap |

**Backlash = 15' Max.**

**R88G-VRXF 09 B 100 C J**

(1) (2) (3) (4) (5) (6) (7)

| No | Item | Symbol | Specifications |
|---|---|---|---|
| (1) | Decelerator for Servomotor Backlash: 15 Arcminutes max. | | |
| (2) | Gear Ratio | 05 | 1/5 |
| | | 09 | 1/9 |
| | | 15 | 1/15 |
| | | 25 | 1/25 |
| (3) | Flange Size Number | B | □52 |
| | | C | □78 |
| | | D | □98 |
| (4) | Applicable Servomotor Capacity | 100 | 50 W, 100 W |
| | | 200 | 200 W |
| | | 400 | 400 W |
| | | 750 | 750 W |
| (5) | Backlash | C | Backlash = 15' Max |
| (6) | Option | J | With key and tap |

# Table of AC Servomotor Variations

**R88M-K□□□□□□□-□□□□**

(3) (4) (5) (6) (7) (8) (9)

| (3) | (4) | (5) | Model | (6) | | | | | | (7) | | (8) | | (9) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | Applicable Servomotor Capacity | Rotation speed | | Applied Voltage | | | | | | With brake / Without brake | | Models with oil seals | | Shaft type | |
| | | | | INC | INC | INC | ABS | ABS | ABS | | | | | | |
| | | | | 400 | 200 | 100 | 400 | 200 | 100 | – | B | | | | |
| | | | | F | H | L | C | T | S | Blank | With brake | Blank | O | Blank | S2 |
| Cylinder | 50 W | 3,000 r/min | R88M-K05030 ✻1 | | √ | | | √ | | √ | √ | √ | √ | √ | √ |
| | 100 W | | R88M-K10030 | | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ |
| | 200 W | | R88M-K20030 | | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ |
| | 400 W | | R88M-K40030 | | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ |
| | 750 W | | R88M-K75030 | √ | √ | | √ | √ | | √ | √ | √ | √ | √ | √ |
| | 1 kW | | R88M-K1K030 | √ | √ | | √ | √ | | √ | √ | √ | √ | √ | √ |
| | 1.5 kW | | R88M-K1K530 | √ | √ | | √ | √ | | √ | √ | √ | √ | √ | √ |
| | 2 kW | | R88M-K2K030 | √ | √ | | √ | √ | | √ | √ | √ | √ | √ | √ |
| | 3 kW | | R88M-K3K030 | √ | √ | | √ | √ | | √ | √ | √ | √ | √ | √ |
| | 4 kW | | R88M-K4K030 | √ | √ | | √ | √ | | √ | √ | √ | √ | √ | √ |
| | 5 kW | | R88M-K5K030 | √ | √ | | √ | √ | | √ | √ | √ | √ | √ | √ |
| | 400 W | 2,000 r/min | R88M-K40020 | √ | | | √ | | | √ | √ | √ | √ | √ | √ |
| | 600 W | | R88M-K60020 | √ | | | √ | | | √ | √ | √ | √ | √ | √ |
| | 1 kW | | R88M-K1K020 | √ | √ | | √ | √ | | √ | √ | √ | √ | √ | √ |
| | 1.5 kW | | R88M-K1K520 | √ | √ | | √ | √ | | √ | √ | √ | √ | √ | √ |
| | 2 kW | | R88M-K2K020 | √ | √ | | √ | √ | | √ | √ | √ | √ | √ | √ |
| | 3 kW | | R88M-K3K020 | √ | √ | | √ | √ | | √ | √ | √ | √ | √ | √ |
| | 4 kW | | R88M-K4K020 | √ | √ | | √ | √ | | √ | √ | √ | √ | √ | √ |
| | 5 kW | | R88M-K5K020 | √ | √ | | √ | √ | | √ | √ | √ | √ | √ | √ |
| | 7.5 kW | | R88M-K7K515 ✻2 | | | | √ | √ | | √ | √ | √ | √ | √ | √ |
| | 11 kW | | R88M-K11K015 ✻2 | | | | √ | √ | | √ | √ | √ | √ | √ | √ |
| | 15 kW | | R88M-K15K015 ✻2 | | | | √ | √ | | √ | √ | √ | √ | √ | √ |
| | 900 W | 1,000 r/min | R88M-K90010 | √ | √ | | √ | √ | | √ | √ | √ | √ | √ | √ |
| | 2 kW | | R88M-K2K010 | √ | √ | | √ | √ | | √ | √ | √ | √ | √ | √ |
| | 3 kW | | R88M-K3K010 | √ | √ | | √ | √ | | √ | √ | √ | √ | √ | √ |
| | 4.5 kW | | R88M-K4K510 | | | | √ | √ | | √ | √ | √ | √ | √ | √ |
| | 6 kW | | R88M-K6K010 | | | | √ | √ | | √ | √ | √ | √ | √ | √ |
| **Blank:** Cylinder type | example<br>030: 30 W<br>100: 100 W<br>1K0: 1 kW | 10: 1,000 r/min<br>20: 2,000 r/min<br>30: 3,000 r/min | | F: 400 VAC (with incremental encoder) INC<br>H: 200 VAC (with incremental encoder) INC<br>L: 100 VAC (with incremental encoder) INC<br>C: 400 VAC (with absolute encoder) ABS/INC<br>T: 200 VAC (with absolute encoder) ABS/INC<br>S: 100 VAC (with absolute encoder) ABS/INC | | | | | | Blank: Without brake<br>B: 24 VDC With brake | | Blank: Without oil seals<br>O: With oil seals | | Blank: Straight shaft<br>S2: With key and tap | |

✻1. R88M-K05030H-□, R88M-K05030T-□, can be used for Power Supply Voltage of 100/200VAC.
✻2. The rated speed is 1,500 r/min.