

R88M-1A□, R88D-1SAN□□□-ECT

# 1S Servo System with Motion Safety

## Safe & Running – 1S Servo System with Motion Safety Functionality

- All safety functions conform to maximum safety performance level PL<sub>e</sub> (SIL-3)
- Hardwired and FSoE STO (Safe Torque Off)
- FSoE functions: SS1 (Safe Stop 1), SS2 (Safe Stop 2), SOS (Safe Operating Stop), SLS (Safely-Limited Speed), SLP (Safely-Limited Position), SDI (Safe Direction), SBC (Safe Brake Control)
- Battery-free absolute multi-turn encoder
- One cable connection: power, encoder and brake in a pre-assembled cable with IP67 connector
- Fast and secure screw-less push-in in all connectors
- 20-bit high resolution encoder
- Up to 350% momentary maximum torque



## Ratings

- 230 VAC from 200 W to 1.5 kW  
(rated torque from 0.637 to 9.55 Nm)
- 400 VAC from 750 W to 3 kW  
(rated torque from 2.39 to 19.1 Nm)

## Type designation

### 1S servo drive with Motion Safety

R 8 8 D - 1 S A N 0 2 H - E C T

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

| No  | Item                  | Symbol | Specifications                    |
|-----|-----------------------|--------|-----------------------------------|
| (1) | 1S Series servo drive |        |                                   |
| (2) | Drive type            | A      | Motion Safety type                |
|     |                       | N      | Communication (Network) interface |
| (3) | Capacity              | 02     | 200 W                             |
|     |                       | 04     | 400 W                             |
|     |                       | 08     | 750 W                             |
|     |                       | 10     | 1 kW                              |
|     |                       | 15     | 1.5 kW                            |
|     |                       | 20     | 2 kW                              |
|     |                       | 30     | 3 kW                              |
| (4) | Voltage               | H      | 230 VAC                           |
|     |                       | F      | 400 VAC                           |
| (5) | Network type          | ECT    | EtherCAT communications           |

### 1S servo motor with Motion Safety

R 8 8 M - 1 A M 2 0 0 3 0 T - B O S 2

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

| No  | Item                               | Symbol | Specifications                    |
|-----|------------------------------------|--------|-----------------------------------|
| (1) | 1S Series servo motor              |        |                                   |
| (2) | Servo motor type                   | AL     | Motion Safety/Low-inertia type    |
|     |                                    | AM     | Motion Safety/Middle-inertia type |
| (3) | Capacity                           | 200    | 200 W                             |
|     |                                    | 400    | 400 W                             |
|     |                                    | 750    | 750 W                             |
|     |                                    | 1K0    | 1 kW                              |
|     |                                    | 1K5    | 1.5 kW                            |
|     |                                    | 2K0    | 2 kW                              |
|     |                                    | 3K0    | 3 kW                              |
| (4) | Rated speed                        | 15     | 1500 rpm                          |
|     |                                    | 30     | 3000 rpm                          |
| (5) | Voltage and encoder specifications | T      | 230 V, absolute encoder           |
|     |                                    | C      | 400 V, absolute encoder           |
| (6) | Options                            |        |                                   |
|     | Brake                              | Blank  | No brake                          |
|     |                                    | B      | Brake                             |
|     | Oil seal                           | Blank  | No oil seal                       |
|     |                                    | O      | Oil seal                          |
|     | Shaft end                          | Blank  | Straight shaft, no key            |
|     |                                    | S2     | Straight, key, tapped (standard)  |

## Specifications

### 1S servo drive with Motion Safety

#### Single-phase, 230 V

| Servo drive model                |                      |                                    | R88D-1SAN02H-ECT                           | R88D-1SAN04H-ECT | R88D-1SAN08H-ECT       | R88D-1SAN15H-ECT |
|----------------------------------|----------------------|------------------------------------|--------------------------------------------|------------------|------------------------|------------------|
| Applicable servo motor<br>R88M-□ | 3000 r/min           | 1AM20030T                          | 1AM40030T                                  | 1AM75030T        | 1AL1K030T<br>1AL1K530T |                  |
|                                  | 1500 r/min           | —                                  |                                            |                  |                        | 1AM1K515T        |
| Max. applicable motor capacity   |                      |                                    | 200 W                                      | 400 W            | 750 W                  | 1.5 kW           |
| Input                            | Main circuit         | Power supply voltage               | Single-phase 200 to 240 VAC (170 to 252 V) |                  |                        |                  |
|                                  |                      | Frequency                          | 50/60 Hz (47.5 to 63 Hz)                   |                  |                        |                  |
|                                  |                      | Rated input current (Single-phase) | 2.7 Arms                                   | 4.6 Arms         | 7.3 Arms               | 15.7 Arms        |
|                                  | Control circuit      | Power supply voltage               | 24 VDC (21.6 to 26.4 V)                    |                  |                        |                  |
|                                  |                      | Current consumption                | 700 mA                                     |                  |                        |                  |
| Output                           | Rated output current |                                    | 1.5 Arms                                   | 2.5 Arms         | 4.6 Arms               | 9.7 Arms         |
|                                  | Max. current         |                                    | 5.6 Arms                                   | 9.1 Arms         | 16.9 Arms              | 28.4 Arms        |
| Heating value                    |                      | Main circuit                       | 17.0 W                                     | 25.0 W           | 42.0 W                 | 88.0 W           |
|                                  |                      | Control circuit                    | 11.9 W                                     |                  | 14.5 W                 | 22.4 W           |
| Weight                           |                      |                                    | 2.6 kg                                     |                  |                        | 4.2 kg           |

#### Three-phase, 400 V

| Servo drive model                |                 | R88D-1SAN10F-ECT                     | R88D-1SAN15F-ECT                          | R88D-1SAN20F-ECT | R88D-1SAN30F-ECT |          |
|----------------------------------|-----------------|--------------------------------------|-------------------------------------------|------------------|------------------|----------|
| Applicable servo motor<br>R88M-□ | 3000 r/min      | 1AL75030C<br>1AL1K030C               | 1AL1K530C                                 | 1AL2K030C        | 1AL3K030C        |          |
|                                  | 1500 r/min      | —                                    | 1AM1K515C                                 | —                | 1AM3K015C        |          |
| Max. applicable motor capacity   |                 | 1 kW                                 | 1.5 kW                                    | 2 kW             | 3 kW             |          |
| Input                            | Main circuit    | Power supply voltage                 | Three-phase 380 to 480 VAC (323 to 504 V) |                  |                  |          |
|                                  |                 | Frequency                            | 50/60 Hz (47.5 to 63 Hz)                  |                  |                  |          |
|                                  |                 | Rated input current<br>(Three-phase) | 3.1 Arms                                  | 4.3 Arms         | 6.5 Arms         | 8.4 Arms |
|                                  | Control circuit | Power supply voltage                 | 24 VDC (21.6 to 26.4 V)                   |                  |                  |          |
|                                  |                 | Current consumption                  | 1 A                                       |                  |                  |          |
|                                  | Output          | Rated output current                 |                                           | 4.1 Arms         | 4.7 Arms         | 7.8 Arms |
| Max. current                     |                 | 9.6 Arms                             | 14.1 Arms                                 | 19.8 Arms        | 28.3 Arms        |          |
| Heating value                    |                 | Main circuit                         | 56.0 W                                    | 81.0 W           | 120.0 W          | 150.0 W  |
|                                  |                 | Control circuit                      | 22.4 W                                    |                  |                  |          |
| Weight                           |                 | 4.2 kg                               |                                           |                  |                  |          |

### Safety functions

| Function                      | Description                                                                                                                                                                                                  |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safe torque off (STO)         | The function is used to cut off a motor current and stop the motor.                                                                                                                                          |
| Safe stop 1 (SS1)             | This function is used to stop a motor by activating STO function at any timing after receiving a command from a safety controller.                                                                           |
| Safes stop 2 (SS2)            | This function is used to monitor a motor's stop by activating SOS function at any timing after receiving a command from a safety controller.                                                                 |
| Safe operating stop (SOS)     | This function is used to monitor that a motor stops at any positions. Both a position and velocity are monitored. Excessive limit value error occurs when the motor operates from a position where it stops. |
| Safely-limited speed (SLS)    | This function is used to monitor a safety present motor velocity. When the safety present motor velocity exceeds the velocity limit for monitoring, excessive limit value error occurs.                      |
| Safely-limited position (SLP) | This function is used to monitor current positions. Excessive limit value error occurs when the positions surpass a range for monitoring.                                                                    |
| Safe direction (SDI)          | This function is used to monitor motor's rotating direction. Excessive limit value error occurs when a motor rotates toward the banned rotating direction.                                                   |
| Safe brake control (SBC)      | This function is used to provide safety output for a holding brake. The function can be used with STO, SS1 functions and the brake operation.                                                                |

**Note:** Safety Servo Drives have two type STO functions. Use either or both functions according to configuration of safety devices.

- STO function by safety input signals
- STO function via EtherCAT communications

**Note:** When you use just STO function by safety input signals, you do not need a setting related EtherCAT network.

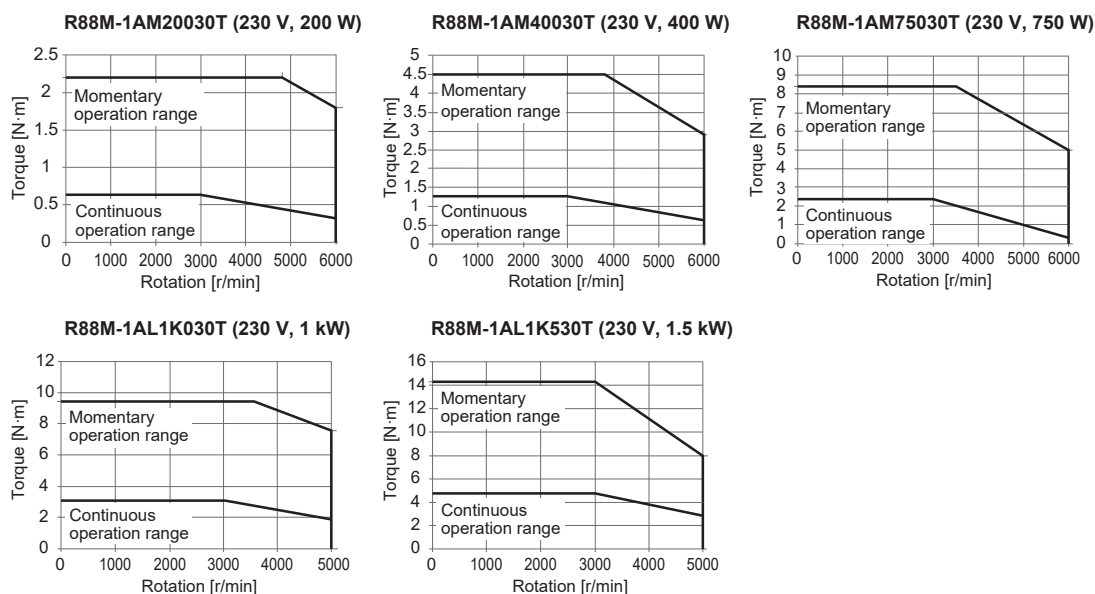
# 1S servo motor with Motion Safety

## 3000 r/min servo motors, 230 V

| Voltage                              |                                       |                                     | 230 V                                                              |                           |           |           |           |                            |
|--------------------------------------|---------------------------------------|-------------------------------------|--------------------------------------------------------------------|---------------------------|-----------|-----------|-----------|----------------------------|
| Servo motor model: R88M-□            |                                       |                                     | 20-bit absolute encoder                                            | 1AM20030T                 | 1AM40030T | 1AM75030T | 1AL1K030T | 1AL1K530T                  |
| Rated output                         |                                       |                                     | W                                                                  | 200                       | 400       | 750       | 1,000     | 1,500                      |
| Rated torque                         |                                       |                                     | N·m                                                                | 0.637                     | 1.27      | 2.39      | 3.18      | 4.77                       |
| Instantaneous peak torque            |                                       |                                     | N·m                                                                | 2.2                       | 4.5       | 8.4       | 9.55      | 14.3                       |
| Rated speed                          |                                       |                                     | r/min                                                              | 3,000                     |           |           |           |                            |
| Max. speed                           |                                       |                                     | r/min                                                              | 6,000                     |           |           |           | 5,000                      |
| Rated current                        |                                       |                                     | A(rms)                                                             | 1.5                       | 2.5       | 4.6       | 5.2       | 8.8                        |
| Instantaneous max. current           |                                       |                                     | A(rms)                                                             | 5.6                       | 9.1       | 16.9      | 28.4      |                            |
| Rotor moment of inertia              | Without brake                         | ×10 <sup>-4</sup> kg·m <sup>2</sup> | 0.224                                                              | 0.446                     | 1.825     | 2.105     |           |                            |
|                                      | With brake                            | ×10 <sup>-4</sup> kg·m <sup>2</sup> | 0.284                                                              | 0.506                     | 2.075     | 2.555     |           |                            |
| Applicable load inertia              |                                       |                                     | ×10 <sup>-4</sup> kg·m <sup>2</sup>                                | 4.80                      | 8.40      | 19.4      | 35.3      | 47.6                       |
| Torque constant                      |                                       |                                     | N·m/A(rms)                                                         | 0.48                      | 0.56      | 0.59      | 0.67      | 0.58                       |
| Power rate                           |                                       |                                     | kW/s                                                               | 18.1                      | 36.2      | 31.3      | 48        | 108                        |
| Mechanical time constant             |                                       |                                     | ms                                                                 | 0.79                      | 0.58      | 0.66      | 0.58      |                            |
| Electrical time constant             |                                       |                                     | ms                                                                 | 2.4                       | 2.6       | 3.3       | 5.9       | 6.1                        |
| Allowable radial load                |                                       |                                     | N                                                                  | 245                       |           | 490       |           |                            |
| Allowable thrust load                |                                       |                                     | N                                                                  | 88                        |           | 196       |           |                            |
| Weight                               | Without brake                         | kg                                  | 1.3                                                                | 1.8                       | 3.2       | 5.8       |           |                            |
|                                      | With brake                            | kg                                  | 1.7                                                                | 2.2                       | 4.1       | 7.5       |           |                            |
| Radiator plate dimensions (material) |                                       |                                     | mm                                                                 | 250 × 250 × t6 (aluminum) |           |           |           | 400 × 400 × t20 (aluminum) |
| Brake specifications                 | Excitation voltage <sup>*1</sup>      | V                                   | 24 DC±10%                                                          |                           |           |           |           |                            |
|                                      | Current consumption (at 20°C)         | A                                   | 0.32                                                               |                           |           | 0.37      | 0.70      |                            |
|                                      | Static friction torque                | N·m                                 | 1.37 min.                                                          |                           |           | 2.55 min. | 9.3 min.  |                            |
| Basic specifications                 | Insulation class                      |                                     | Class F                                                            |                           |           |           |           |                            |
|                                      | Ambient operating/storage temperature |                                     | 0 to 40°C/-20 to 65°C                                              |                           |           |           |           |                            |
|                                      | Ambient operating/storage humidity    |                                     | 20 to 90% (non-condensing)                                         |                           |           |           |           |                            |
|                                      | Atmosphere                            |                                     | No corrosive gases                                                 |                           |           |           |           |                            |
|                                      | Insulation resistance                 |                                     | 10 MΩ min. at 500 VDC between the power terminals and FG terminal  |                           |           |           |           |                            |
|                                      | Vibration resistance                  |                                     | Vibration acceleration of 49 m/s²                                  |                           |           |           |           |                            |
|                                      | Impact resistance                     |                                     | Acceleration of 98 m/s² max. 3 times each in X, Y and Z directions |                           |           |           |           |                            |
| Enclosure                            |                                       |                                     | IP67 (except for the through-shaft parts and connector pins)       |                           |           |           |           |                            |

<sup>\*1</sup> This is a non-excitation brake. It is released when excitation voltage is applied.

## Torque-speed characteristics

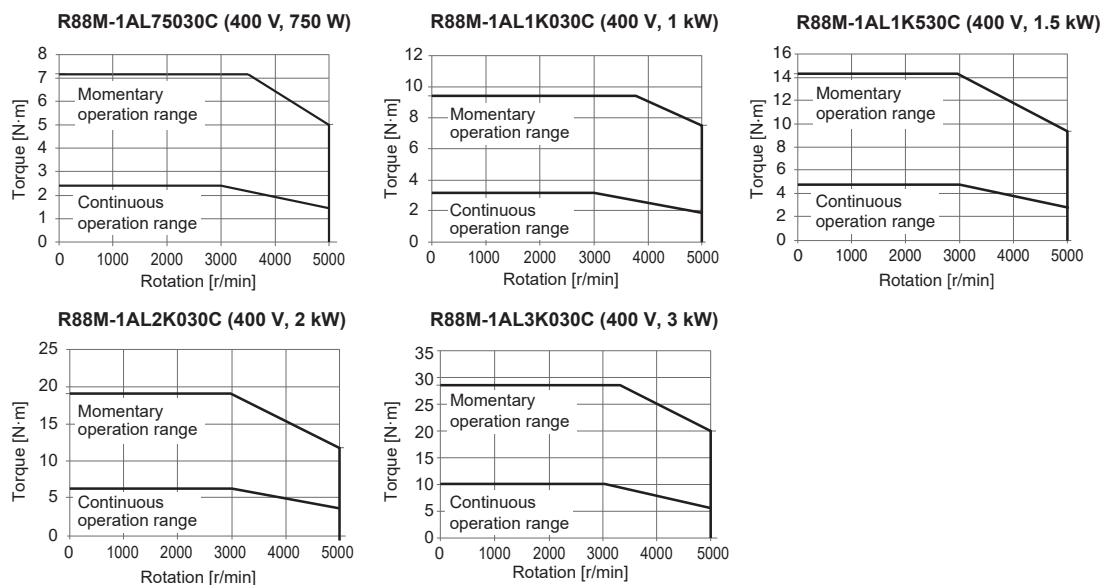


## 3000 r/min servo motors, 400 V

| Voltage                              |                                       |                                     | 400 V                                                              |                            |                            |           |                            |           |         |
|--------------------------------------|---------------------------------------|-------------------------------------|--------------------------------------------------------------------|----------------------------|----------------------------|-----------|----------------------------|-----------|---------|
| Servo motor model: R88M-□            |                                       |                                     | 20-bit absolute encoder                                            | 1AL75030C                  | 1AL1K030C                  | 1AL1K530C | 1AL2K030C                  | 1AL3K030C |         |
| Rated output                         |                                       |                                     | W                                                                  | 750                        | 1,000                      | 1,500     | 2,000                      | 3,000     |         |
| Rated torque                         |                                       |                                     | N·m                                                                | 2.39                       | 3.18                       | 4.77      | 6.37                       | 9.55      |         |
| Instantaneous peak torque            |                                       |                                     | N·m                                                                | 7.16                       | 9.55                       | 14.3      | 19.1                       | 28.7      |         |
| Rated speed                          |                                       |                                     | r/min                                                              | 3,000                      |                            |           |                            |           |         |
| Max. speed                           |                                       |                                     | r/min                                                              | 5,000                      |                            |           |                            |           |         |
| Rated current                        |                                       |                                     | A(rms)                                                             | 3.0                        |                            | 4.5       | 6.3                        | 8.7       |         |
| Instantaneous max current            |                                       |                                     | A(rms)                                                             | 9.6                        |                            | 14.1      | 19.8                       | 27.7      |         |
| Rotor moment of inertia              | Without brake                         | ×10 <sup>-4</sup> kg·m <sup>2</sup> | 1.305                                                              | 2.105                      |                            | 2.405     |                            | 6.813     |         |
|                                      | With brake                            | ×10 <sup>-4</sup> kg·m <sup>2</sup> | 1.755                                                              | 2.555                      |                            | 2.855     |                            | 7.313     |         |
| Applicable load inertia              |                                       |                                     | ×10 <sup>-4</sup> kg·m <sup>2</sup>                                | 38.6                       | 35.3                       | 47.6      | 60.2                       | 118       |         |
| Torque constant                      |                                       |                                     | N·m/A(rms)                                                         | 0.91                       | 1.17                       |           | 1.15                       | 1.23      |         |
| Power rate                           |                                       |                                     | kW/s                                                               | 44                         | 48                         | 108       | 169                        | 134       |         |
| Mechanical time constant             |                                       |                                     | ms                                                                 | 1.1                        | 0.58                       |           | 0.52                       | 0.49      |         |
| Electrical time constant             |                                       |                                     | ms                                                                 | 4.3                        | 5.9                        |           | 6.3                        | 11        |         |
| Allowable radial load                |                                       |                                     | N                                                                  | 490                        |                            |           |                            |           |         |
| Allowable thrust load                |                                       |                                     | N                                                                  | 196                        |                            |           |                            |           |         |
| Weight                               | Without brake                         | kg                                  | 4.2                                                                | 5.8                        |                            | 6.5       |                            | 11.5      |         |
|                                      | With brake                            | kg                                  | 5.9                                                                | 7.5                        |                            | 8.2       |                            | 13.5      |         |
| Radiator plate dimensions (material) |                                       |                                     | mm                                                                 | 305 × 305 × t20 (aluminum) | 400 × 400 × t20 (aluminum) |           | 470 × 470 × t20 (aluminum) |           |         |
| Brake specifications                 | Excitation voltage <sup>*1</sup>      | V                                   | 24 VDC±10%                                                         |                            |                            |           |                            |           |         |
|                                      | Current consumption (at 20°C)         | A                                   | 0.70                                                               |                            |                            |           |                            |           | 0.66    |
|                                      | Static friction torque                | N·m                                 | 9.3 min.                                                           |                            |                            |           |                            |           | 12 min. |
| Basic specifications                 | Insulation class                      |                                     | Class F                                                            |                            |                            |           |                            |           |         |
|                                      | Ambient operating/storage temperature |                                     | 0 to 40°C/-20 to 65°C                                              |                            |                            |           |                            |           |         |
|                                      | Ambient operating/storage humidity    |                                     | 20 to 90% (non-condensing)                                         |                            |                            |           |                            |           |         |
|                                      | Atmosphere                            |                                     | No corrosive gases                                                 |                            |                            |           |                            |           |         |
|                                      | Insulation resistance                 |                                     | 10 MΩ min. at 500 VDC between the power terminals and FG terminal  |                            |                            |           |                            |           |         |
|                                      | Vibration resistance                  |                                     | Vibration acceleration of 49 m/s²                                  |                            |                            |           |                            |           |         |
|                                      | Impact resistance                     |                                     | Acceleration of 98 m/s² max. 3 times each in X, Y and Z directions |                            |                            |           |                            |           |         |
| Enclosure                            |                                       |                                     | IP67 (except for the through-shaft parts and connector pins)       |                            |                            |           |                            |           |         |

<sup>\*1</sup> This is a non-excitation brake. It is released when excitation voltage is applied.

## Torque-speed characteristics

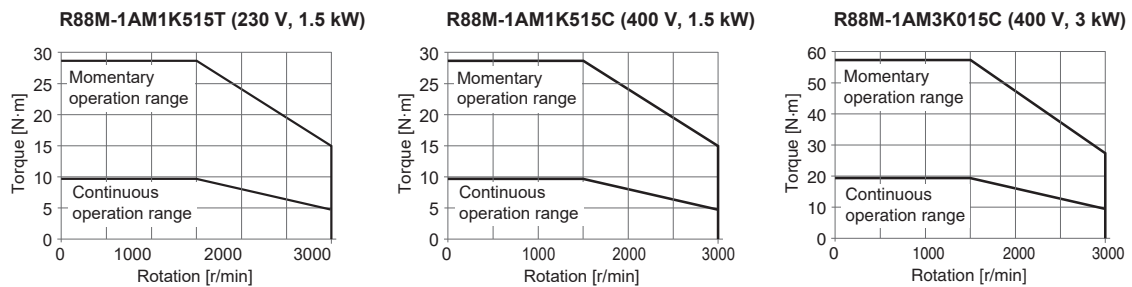


## 1500 r/min servo motors, 230 V/400 V

| Voltage                              |                                       |                                    | 230 V                                                                          | 400 V               |
|--------------------------------------|---------------------------------------|------------------------------------|--------------------------------------------------------------------------------|---------------------|
| Servo motor model: R88M-□            |                                       | 20-bit absolute encoder            | 1AM1K515T                                                                      | 1AM1K515C 1AM3K015C |
| Rated output                         |                                       | W                                  | 1,500                                                                          | 3,000               |
| Rated torque                         |                                       | N·m                                | 9.55                                                                           | 19.1                |
| Instantaneous peak torque            |                                       | N·m                                | 28.7                                                                           | 57.3                |
| Rated speed                          |                                       | r/min                              | 1,500                                                                          |                     |
| Max. speed                           |                                       | r/min                              | 3,000                                                                          |                     |
| Rated current                        |                                       | A(rms)                             | 8.6                                                                            | 4.4 8.5             |
| Instantaneous max. current           |                                       | A(rms)                             | 28.4                                                                           | 14.1 28.3           |
| Rotor moment of inertia              | Without brake                         | $\times 10^{-4}$ kg·m <sup>2</sup> | 12.413                                                                         | 12.413 40.013       |
|                                      | With brake                            | $\times 10^{-4}$ kg·m <sup>2</sup> | 13.013                                                                         | 45.113              |
| Applicable load inertia              |                                       | $\times 10^{-4}$ kg·m <sup>2</sup> | 127.05                                                                         | 270.63              |
| Torque constant                      |                                       | N·m/A(rms)                         | 1.11                                                                           | 2.21 2.46           |
| Power rate                           |                                       | kW/s                               | 73                                                                             | 91                  |
| Mechanical time constant             |                                       | ms                                 | 0.75                                                                           | 1.2                 |
| Electrical time constant             |                                       | ms                                 | 17                                                                             | 16                  |
| Allowable radial load                |                                       | N                                  | 490                                                                            | 1176                |
| Allowable thrust load                |                                       | N                                  | 196                                                                            | 490                 |
| Weight                               | Without brake                         | kg                                 | 11                                                                             | 18                  |
|                                      | With brake                            | kg                                 | 13                                                                             | 22                  |
| Radiator plate dimensions (material) |                                       | mm                                 | 470 × 470 × t20 (aluminum)                                                     |                     |
| Brake specifications                 | Excitation voltage <sup>**1</sup>     | V                                  | 24 VDC±10%                                                                     |                     |
|                                      | Current consumption (at 20°C)         | A                                  | 0.66                                                                           | 1.20                |
|                                      | Static friction torque                | N·m                                | 12 min.                                                                        | 22 min.             |
| Basic specifications                 | Insulation class                      |                                    | Class F                                                                        |                     |
|                                      | Ambient operating/storage temperature |                                    | 0 to 40°C/-20 to 65°C                                                          |                     |
|                                      | Ambient operating/storage humidity    |                                    | 20 to 90% (non-condensing)                                                     |                     |
|                                      | Atmosphere                            |                                    | No corrosive gases                                                             |                     |
|                                      | Insulation resistance                 |                                    | 10 MΩ min. at 500 VDC between the power terminals and FG terminal              |                     |
|                                      | Vibration resistance                  |                                    | Vibration acceleration of 49 m/s <sup>2</sup>                                  |                     |
|                                      | Impact resistance                     |                                    | Acceleration of 98 m/s <sup>2</sup> max. 3 times each in X, Y and Z directions |                     |
| Enclosure                            |                                       |                                    | IP67 (except for the through-shaft parts and connector pins)                   |                     |

<sup>\*\*1</sup> This is a non-excitation brake. It is released when excitation voltage is applied.

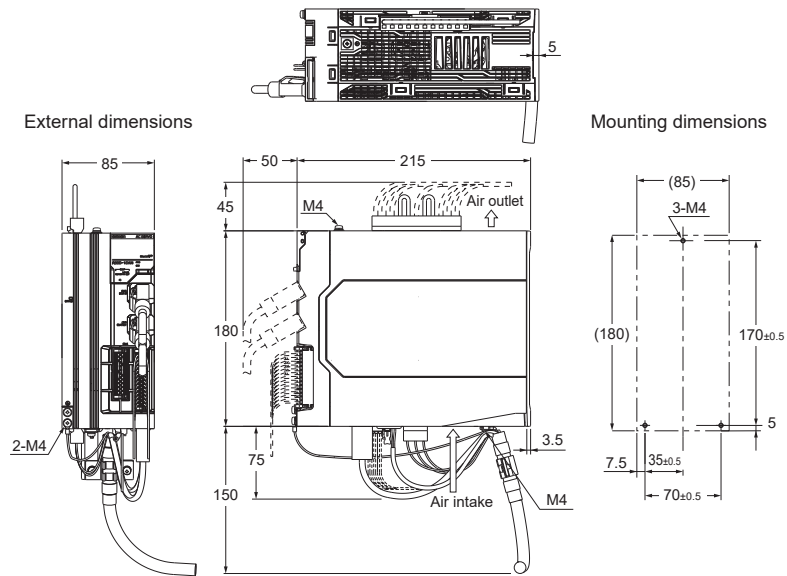
### Torque-speed characteristics



## Dimensions

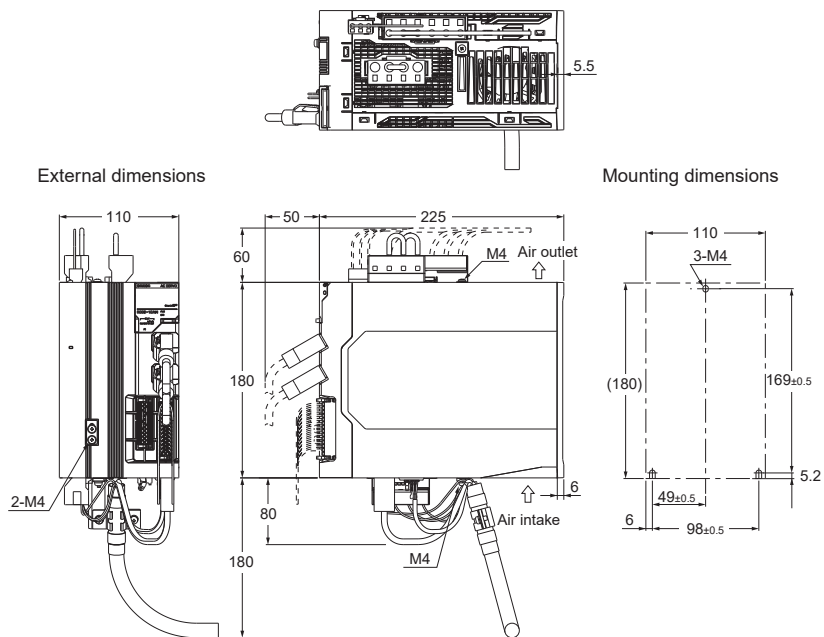
### 1S servo drive with Motion Safety

#### R88D-1SAN02H-ECT/04H-ECT/08H-ECT (230 V, 200 W to 750 W)

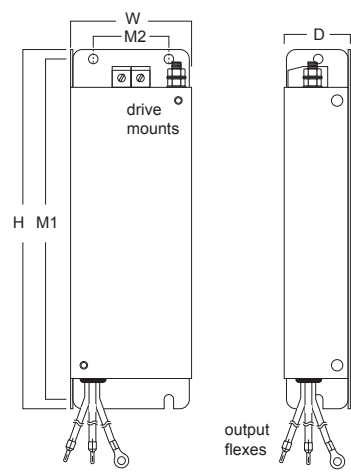


#### R88D-1SAN15H-ECT (230 V, 1.5 kW)

#### R88D-1SAN10F-ECT/15F-ECT/20F-ECT/30F-ECT (400 V, 1 kW to 3 kW)



Filters

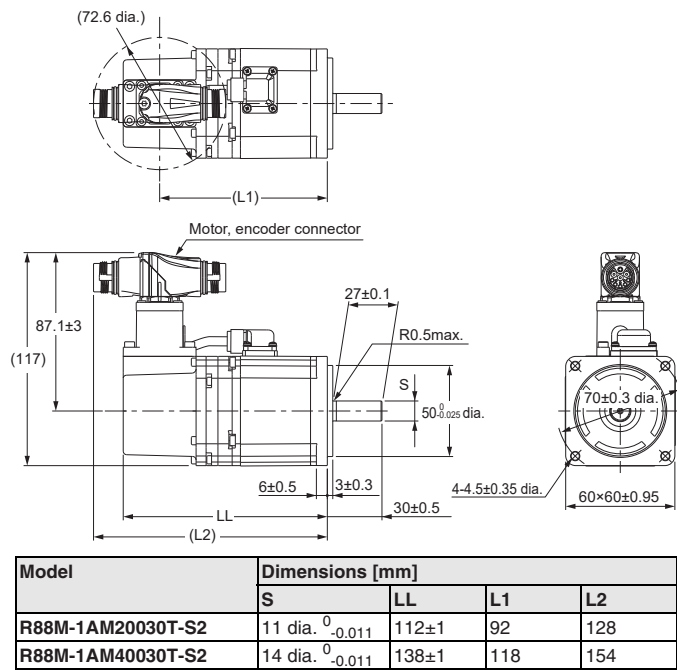


| Filter model     | External dimensions (mm) |       |    | Mount dimensions (mm) |    | Weight (kg) |
|------------------|--------------------------|-------|----|-----------------------|----|-------------|
|                  | H                        | W     | D  | M1                    | M2 |             |
| R88A-FI1SA108-SE | 210                      | 85    | 35 | 200                   | 65 | 0.98        |
| R88A-FI1SA116-SE |                          | 114.6 | 45 |                       | 80 | 1.4         |
| R88A-FI1SA309-SE |                          |       |    |                       |    |             |

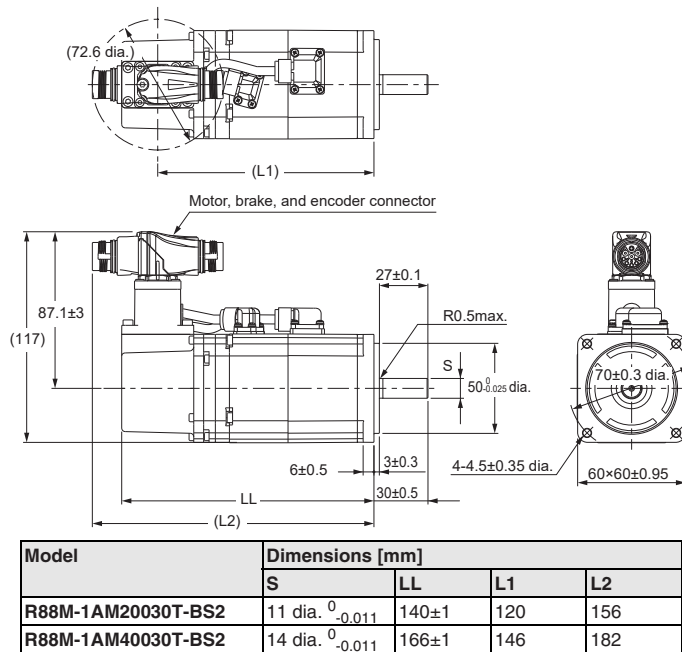
1S servo motor with Motion Safety

Type 3000 r/min motors (230 V, 200 W to 400 W)

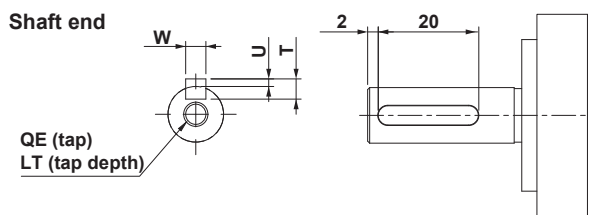
R88M-1AM20030T-S2, R88M-1AM40030T-S2



R88M-1AM20030T-BS2, R88M-1AM40030T-BS2



Common dimensions for models with and without brake

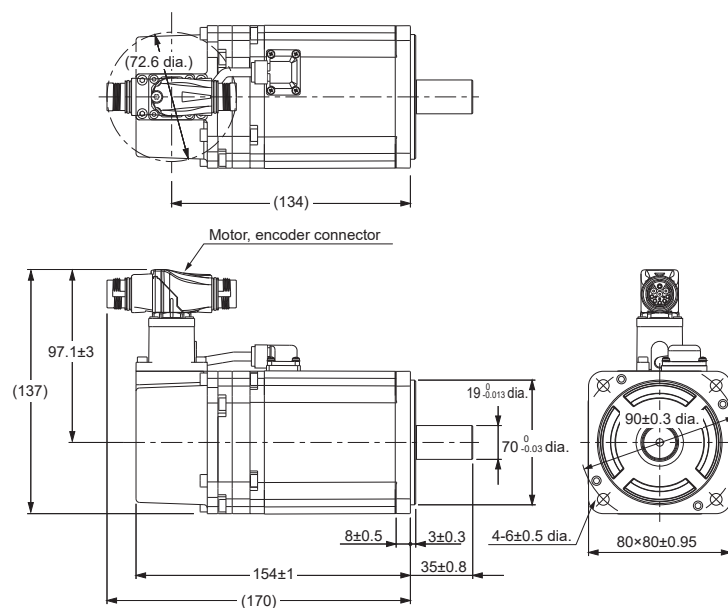


| Model              | Dimensions [mm]                 |   |                                  |    |    |
|--------------------|---------------------------------|---|----------------------------------|----|----|
|                    | W                               | T | U                                | QE | LT |
| R88M-1AM20030T-□S2 | 4 <sup>0</sup> <sub>-0.03</sub> | 4 | 1.5 <sup>0</sup> <sub>-0.2</sub> | M4 | 10 |
| R88M-1AM40030T-□S2 | 5 <sup>0</sup> <sub>-0.03</sub> | 5 | 2 <sup>0</sup> <sub>-0.2</sub>   | M5 | 12 |

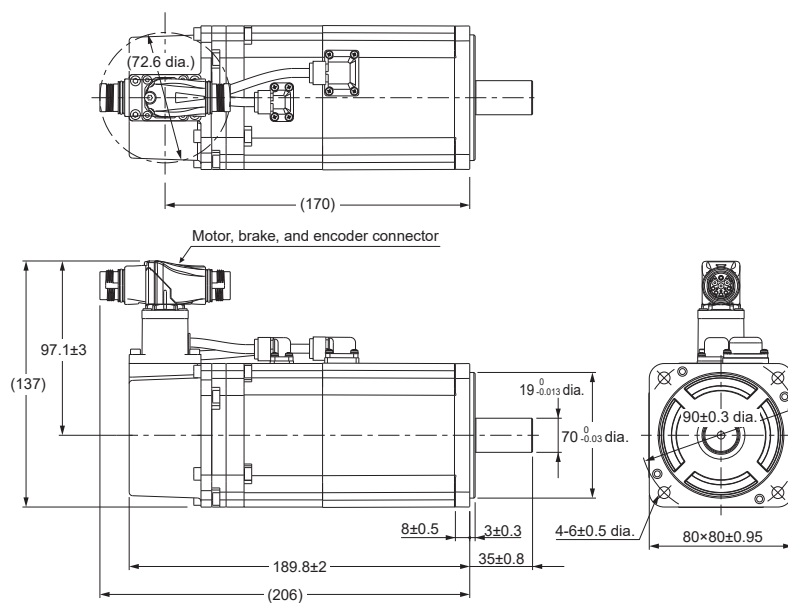


# Type 3000 r/min motors (230 V, 750 W)

R88M-1AM75030T-S2

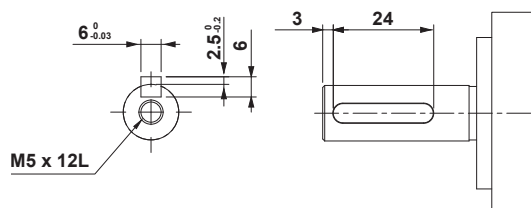


R88M-1AM75030T-BS2



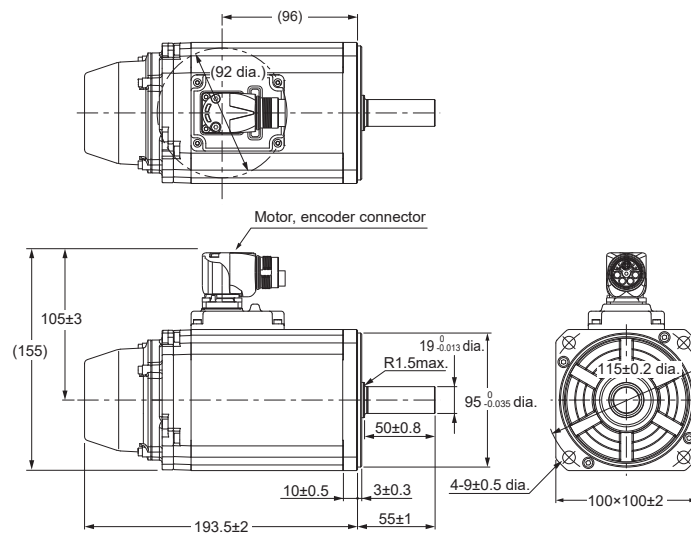
Common dimensions for models with and without brake

## Shaft end

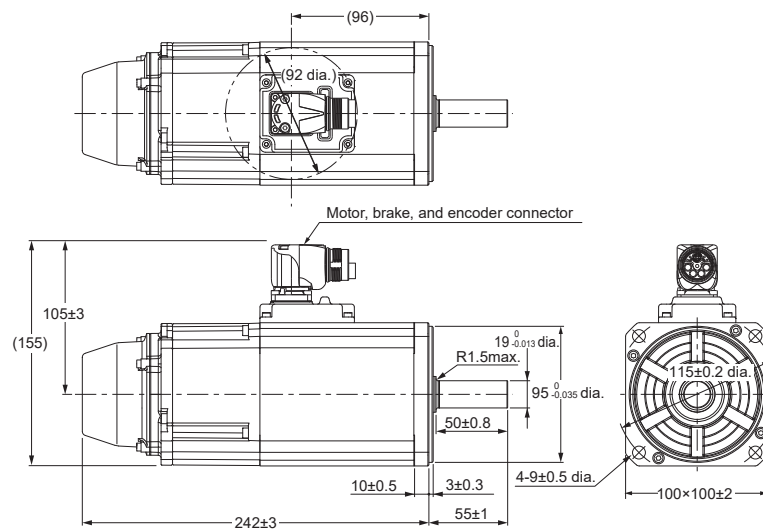


## Type 3000 r/min motors (230 V, 1 kW to 1.5 kW)

R88M-1AL1K030T-S2, R88M-1AL1K530T-S2

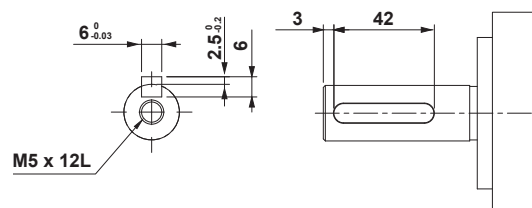


R88M-1AL1K030T-BS2, R88M-1AL1K530T-BS2



Common dimensions for models with and without brake

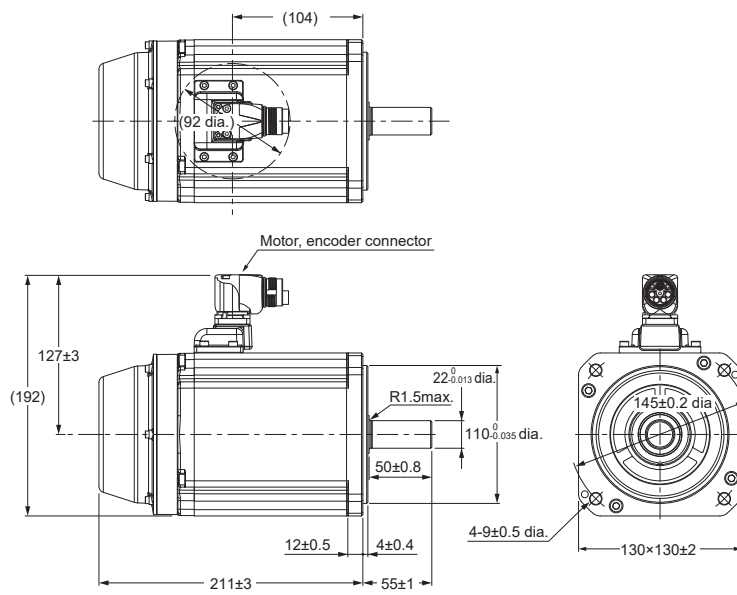
### Shaft end



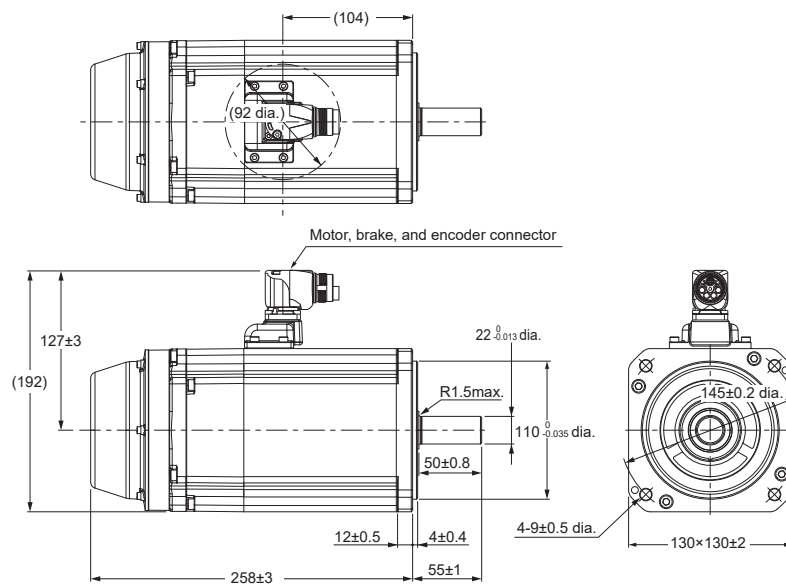


## Type 3000 r/min motors (400 V, 3 kW)

R88M-1AL3K030C-S2

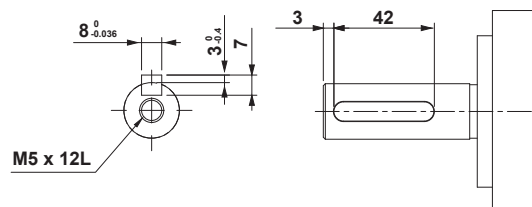


R88M-1AL3K030C-BS2



Common dimensions for models with and without brake

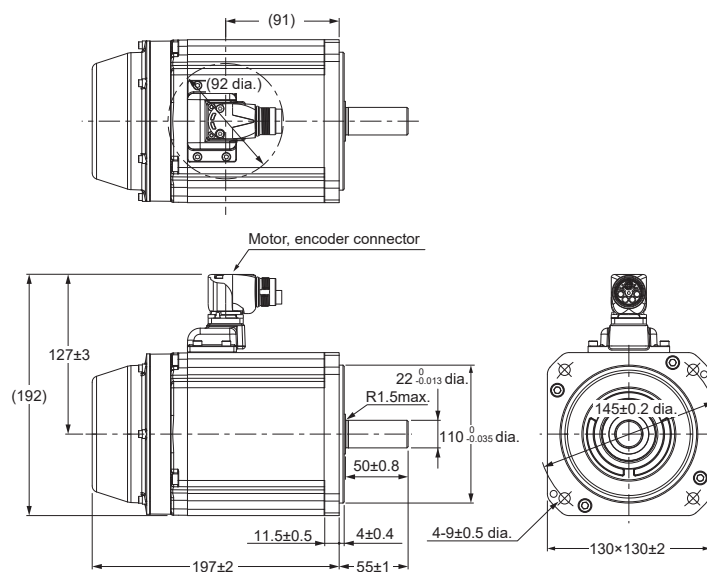
### Shaft end



# Type 1500 r/min motors (230 V/400 V, 1.5 kW)

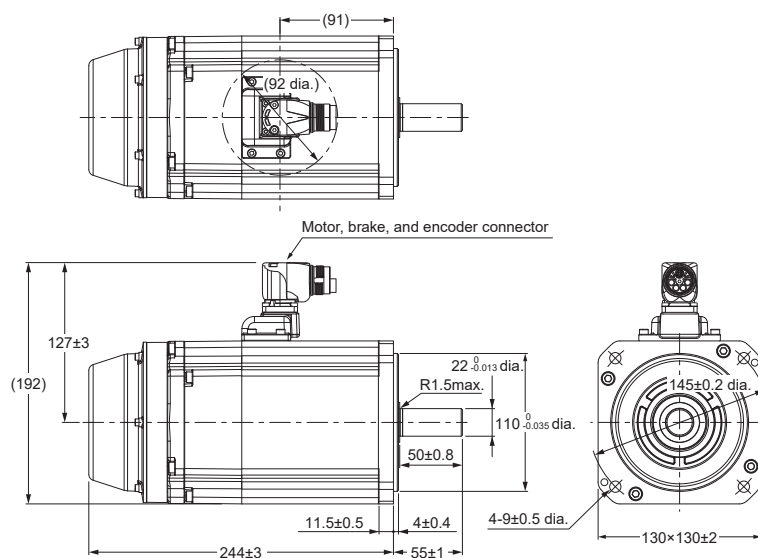
R88M-1AM1K515T-S2

R88M-1AM1K515C-S2



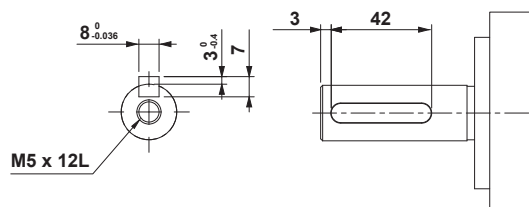
R88M-1AM1K515T-BS2

R88M-1AM1K515C-BS2



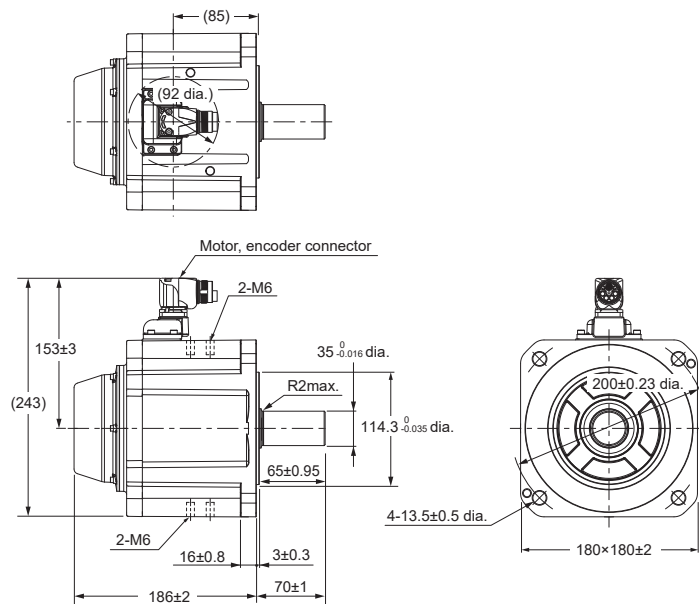
Common dimensions for models with and without brake

## Shaft end

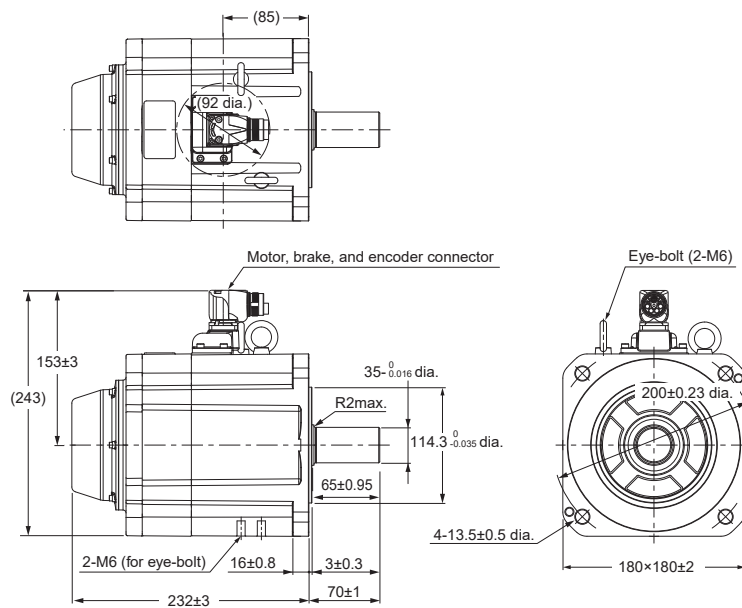


## Type 1500 r/min motors (400 V, 3 kW)

R88M-1AM3K015C-S2

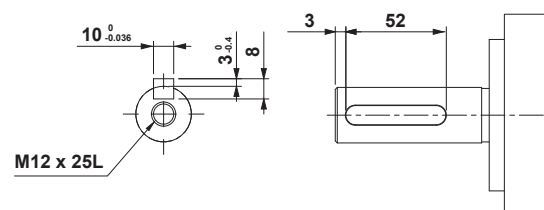


R88M-1AM3K015C-BS2



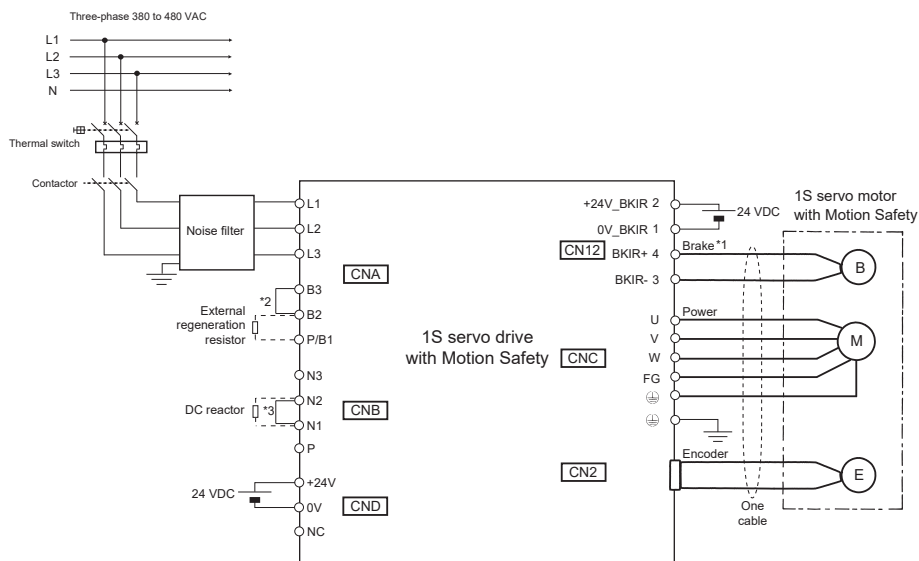
Common dimensions for models with and without brake

### Shaft end





### Three-phase, 400 VAC (1 kW to 3 kW models)

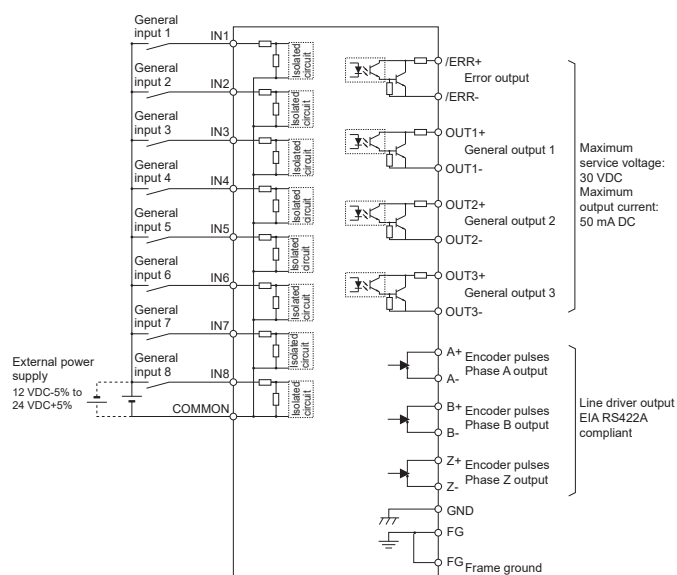


\*1 There is no polarity on the brake.

\*2 B2 and B3 are short-circuited. If the internal regenerative resistor is insufficient, remove the wire between B2 and B3 and connect an external regenerative resistor between B1 and B2.

<sup>\*3</sup> To use a DC reactor, remove the short-circuit wire and connect the DC reactor between N1 and N2.

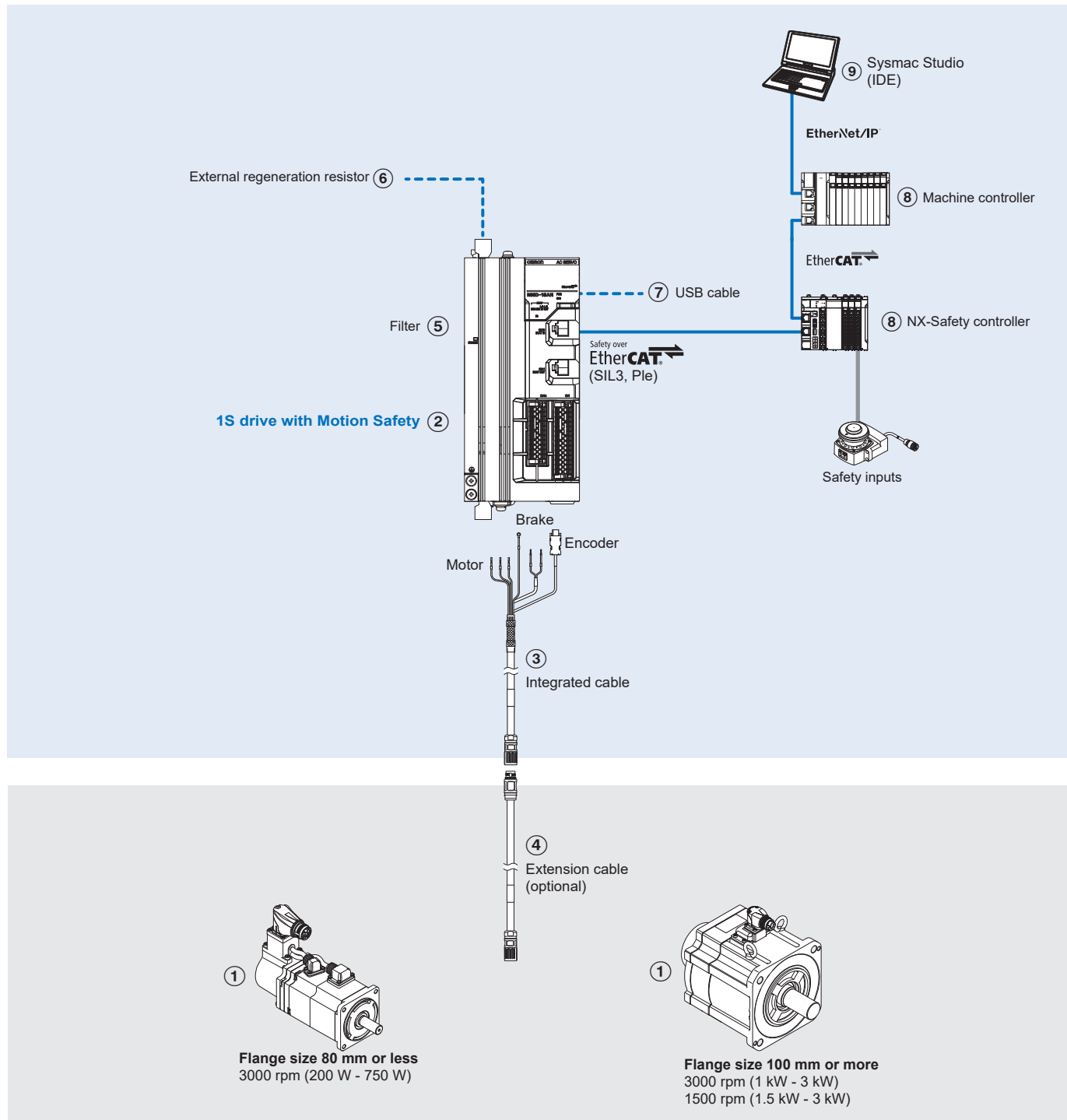
### Standard I/O connector (CN1)







## Ordering information



### Servo motors

① Select motor from R88M-1A□ family using motor tables in next pages.

### Servo drives

② Select drive from R88D-1SAN□ family according to the selected motor.

# Motor and drive combinations

## Servo motors 3000 r/min (200 W to 3 kW)

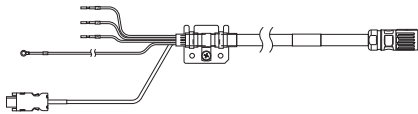
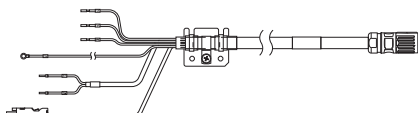
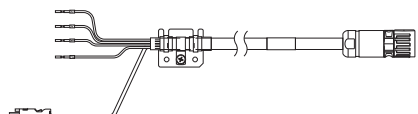
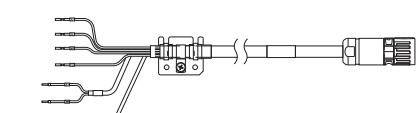
| Voltage | Brake option  | Rated torque | Capacity | ① Servo motor model | ② Compatible servo drive |
|---------|---------------|--------------|----------|---------------------|--------------------------|
| 230 V   | Without brake | 0.637 N·m    | 200 W    | R88M-1AM20030T-S2   | R88D-1SAN02H-ECT         |
|         |               | 1.27 N·m     | 400 W    | R88M-1AM40030T-S2   | R88D-1SAN04H-ECT         |
|         |               | 2.39 N·m     | 750 W    | R88M-1AM75030T-S2   | R88D-1SAN08H-ECT         |
|         |               | 3.18 N·m     | 1 kW     | R88M-1AL1K030T-S2   | R88D-1SAN15H-ECT         |
|         |               | 4.77 N·m     | 1.5 kW   | R88M-1AL1K530T-S2   | R88D-1SAN15H-ECT         |
|         | With brake    | 0.637 N·m    | 200 W    | R88M-1AM20030T-BS2  | R88D-1SAN02H-ECT         |
|         |               | 1.27 N·m     | 400 W    | R88M-1AM40030T-BS2  | R88D-1SAN04H-ECT         |
|         |               | 2.39 N·m     | 750 W    | R88M-1AM75030T-BS2  | R88D-1SAN08H-ECT         |
|         |               | 3.18 N·m     | 1 kW     | R88M-1AL1K030T-BS2  | R88D-1SAN15H-ECT         |
|         |               | 4.77 N·m     | 1.5 kW   | R88M-1AL1K530T-BS2  | R88D-1SAN15H-ECT         |
| 400 V   | Without brake | 2.39 N·m     | 750 W    | R88M-1AL75030C-S2   | R88D-1SAN10F-ECT         |
|         |               | 3.18 N·m     | 1 kW     | R88M-1AL1K030C-S2   | R88D-1SAN10F-ECT         |
|         |               | 4.77 N·m     | 1.5 kW   | R88M-1AL1K530C-S2   | R88D-1SAN15F-ECT         |
|         |               | 6.37 N·m     | 2 kW     | R88M-1AL2K030C-S2   | R88D-1SAN20F-ECT         |
|         |               | 9.55 N·m     | 3 kW     | R88M-1AL3K030C-S2   | R88D-1SAN30F-ECT         |
|         | With brake    | 2.39 N·m     | 750 W    | R88M-1AL75030C-BS2  | R88D-1SAN10F-ECT         |
|         |               | 3.18 N·m     | 1 kW     | R88M-1AL1K030C-BS2  | R88D-1SAN10F-ECT         |
|         |               | 4.77 N·m     | 1.5 kW   | R88M-1AL1K530C-BS2  | R88D-1SAN15F-ECT         |
|         |               | 6.37 N·m     | 2 kW     | R88M-1AL2K030C-BS2  | R88D-1SAN20F-ECT         |
|         |               | 9.55 N·m     | 3 kW     | R88M-1AL3K030C-BS2  | R88D-1SAN30F-ECT         |

## Servo motors 1500 r/min (1.5 kW to 3 kW)

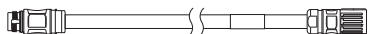
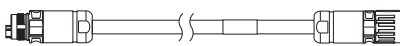
| Voltage | Brake option  | Rated torque | Capacity | ① Servo motor model | ② Compatible servo drive |
|---------|---------------|--------------|----------|---------------------|--------------------------|
| 230 V   | Without brake | 9.55 N·m     | 1.5 kW   | R88M-1AM1K515T-S2   | R88D-1SAN15H-ECT         |
|         | With brake    |              |          | R88M-1AM1K515T-BS2  | R88D-1SAN15H-ECT         |
| 400 V   | Without brake | 9.55 N·m     | 1.5 kW   | R88M-1AM1K515C-S2   | R88D-1SAN15F-ECT         |
|         |               | 19.1 N·m     | 3 kW     | R88M-1AM3K015C-S2   | R88D-1SAN30F-ECT         |
|         | With brake    | 9.55 N·m     | 1.5 kW   | R88M-1AM1K515C-BS2  | R88D-1SAN15F-ECT         |
|         |               | 19.1 N·m     | 3 kW     | R88M-1AM3K015C-BS2  | R88D-1SAN30F-ECT         |

## Cables

### ③ Integrated cable

| Applicable servo motor                                                                                     |               |      | Model          | Appearance                                                                           |
|------------------------------------------------------------------------------------------------------------|---------------|------|----------------|--------------------------------------------------------------------------------------|
| R88M-1AM(200/400/750)30T-□                                                                                 | Without brake | 3 m  | R88A-CX1A003SF |   |
|                                                                                                            |               | 5 m  | R88A-CX1A005SF |                                                                                      |
|                                                                                                            |               | 10 m | R88A-CX1A010SF |                                                                                      |
|                                                                                                            |               | 15 m | R88A-CX1A015SF |                                                                                      |
|                                                                                                            |               | 20 m | R88A-CX1A020SF |                                                                                      |
|                                                                                                            | With brake    | 3 m  | R88A-CX1A003BF |   |
|                                                                                                            |               | 5 m  | R88A-CX1A005BF |                                                                                      |
|                                                                                                            |               | 10 m | R88A-CX1A010BF |                                                                                      |
|                                                                                                            |               | 15 m | R88A-CX1A015BF |                                                                                      |
|                                                                                                            |               | 20 m | R88A-CX1A020BF |                                                                                      |
| R88M-1AL(1K0/1K5)30T-□<br>R88M-1AM1K515T-□<br>R88M-1AL(750/1K0/1K5/2K0/3K0)30C-□<br>R88M-1AM(1K5/3K0)15C-□ | Without brake | 3 m  | R88A-CX1C003SF |   |
|                                                                                                            |               | 5 m  | R88A-CX1C005SF |                                                                                      |
|                                                                                                            |               | 10 m | R88A-CX1C010SF |                                                                                      |
|                                                                                                            |               | 15 m | R88A-CX1C015SF |                                                                                      |
|                                                                                                            |               | 20 m | R88A-CX1C020SF |                                                                                      |
|                                                                                                            | With brake    | 3 m  | R88A-CX1C003BF |  |
|                                                                                                            |               | 5 m  | R88A-CX1C005BF |                                                                                      |
|                                                                                                            |               | 10 m | R88A-CX1C010BF |                                                                                      |
|                                                                                                            |               | 15 m | R88A-CX1C015BF |                                                                                      |
|                                                                                                            |               | 20 m | R88A-CX1C020BF |                                                                                      |

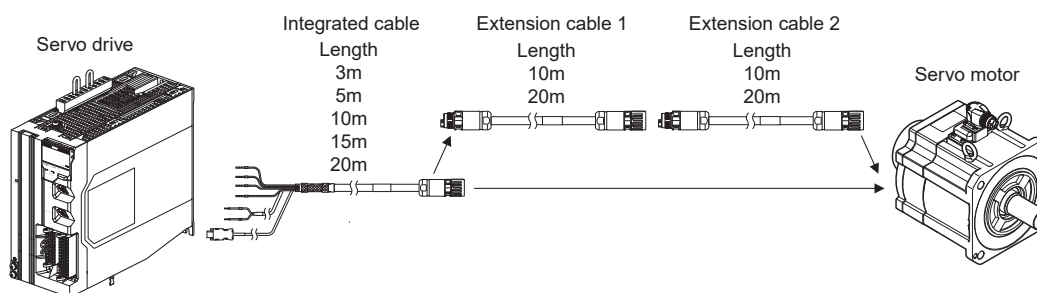
### ④ Extension cable (optional)

| Applicable servo motor                                                                                     |      | Model                        | Appearance                                                                            |
|------------------------------------------------------------------------------------------------------------|------|------------------------------|---------------------------------------------------------------------------------------|
| R88M-1AM(200/400/750)30T-□                                                                                 | 10 m | R88A-CX1AE10BF               |  |
|                                                                                                            | 20 m | R88A-CX1AE20BF               |                                                                                       |
| R88M-1AL(1K0/1K5)30T-□<br>R88M-1AM1K515T-□<br>R88M-1AL(750/1K0/1K5/2K0/3K0)30C-□<br>R88M-1AM(1K5/3K0)15C-□ | 10 m | R88A-CX1BE10BF <sup>*1</sup> |  |
|                                                                                                            | 20 m | R88A-CX1BE20BF <sup>*1</sup> |                                                                                       |

<sup>\*1</sup> Use R88A-CX1BE□□BF as an extension cable for R88A-CX1C□□BF.

## Combinations of integrated cables and extension cables

The table below lists the combinations of cables that can be used to extend the integrated cable to more than 20 m.



| Length (m) |                  |                   |                   | Combination                                                            |
|------------|------------------|-------------------|-------------------|------------------------------------------------------------------------|
| Total      | Integrated cable | Extension cable 1 | Extension cable 2 |                                                                        |
| 3          | 3                | —                 | —                 | Integrated cable only                                                  |
| 5          | 5                | —                 | —                 | Integrated cable only                                                  |
| 10         | 10               | —                 | —                 | Integrated cable only                                                  |
| 15         | 15               | —                 | —                 | Integrated cable only                                                  |
| 20         | 20               | —                 | —                 | Integrated cable only                                                  |
| 30         | 20               | 10                | —                 | Integrated cable + extension cable 1                                   |
| 40         | 20               | 20                | —                 | Integrated cable + extension cable 1                                   |
| 50         | 20               | 10                | 20                | Integrated cable + extension cable 1 + extension cable 2 <sup>*1</sup> |

<sup>\*1</sup> A 20 m extension cable 1 and a 10 m extension cable 2 can also be used.

### ⑤ Filters

| Applicable servo drive         | Rated current | Leakage current | Rated voltage | Model            |
|--------------------------------|---------------|-----------------|---------------|------------------|
| R88D-1SAN(02H/04H/08H)-ECT     | 8 A           | 7.9 mA          | 250 VAC       | R88A-FI1SA108-SE |
| R88D-1SAN15H-ECT               | 16 A          | 7.4 mA          |               | R88A-FI1SA116-SE |
| R88D-1SAN(10F/15F/20F/30F)-ECT | 9 A           | 2.3 mA          | 400 VAC       | R88A-FI1SA309-SE |

### ⑥ External regeneration resistor

| Applicable servo drive                      | Regeneration process capacity | Model        |
|---------------------------------------------|-------------------------------|--------------|
| R88D-1SAN02H-ECT                            | 24 W, 25 Ω                    | R88A-RR12025 |
| R88D-1SAN15H-ECT                            | 60 W, 14 Ω                    | R88A-RR30014 |
| R88D-1SAN08H-ECT/-1SAN20F-ECT <sup>*1</sup> | 60 W, 20 Ω                    | R88A-RR30020 |
| R88D-1SAN02H-ECT/-1SAN04H-ECT               | 60 W, 25 Ω                    | R88A-RR30025 |
| R88D-1SAN30F-ECT                            | 60 W, 32 Ω                    | R88A-RR30032 |
| R88D-1SAN10F-ECT <sup>*1</sup>              | 60 W, 33 Ω                    | R88A-RR30033 |
| R88D-1SAN15F-ECT                            | 60 W, 54 Ω                    | R88A-RR30054 |

<sup>\*1</sup> Use two series-connected external regeneration resistors for this model.

### ⑦ USB cable

Use a commercially available USB that is double-shielded, gold-plated and supports USB 2.0. The Micro B type USB cable can be used.

### ⑧ Machine and Safety controller

| Type               | Name                          | Model                                                  |
|--------------------|-------------------------------|--------------------------------------------------------|
| Machine controller | Industrial PC                 | Box PC type                                            |
|                    |                               | Panel PC type (Box PC + Monitor integrated)            |
|                    | Modular controller            | NX7 series                                             |
|                    |                               | NJ series                                              |
|                    |                               | NX1 series                                             |
| Safety controller  | Compact controller            | NX1P series                                            |
|                    | CIP-Safety and FSoE protocols | NX1P2-□                                                |
|                    |                               | 254 Safety master connections, 2,032 Safety I/O points |
|                    | FSoE protocol                 | 128 Safety master connections, 1,024 Safety I/O points |
|                    |                               | 32 Safety master connections, 256 Safety I/O points    |

## Servo drive connectors (spare parts)

| Applicable servo drive                             | Name                                         | Model                     |
|----------------------------------------------------|----------------------------------------------|---------------------------|
| R88D-1SAN(02H/04H/08H)-ECT                         | Main circuit connector (CNA) <sup>*1</sup>   | R88A-CN102P <sup>*2</sup> |
|                                                    | Motor connector (CNC)                        | R88A-CN101A <sup>*2</sup> |
| R88D-1SAN15H-ECT<br>R88D-1SAN(10F/15F/20F/30F)-ECT | Main circuit connector A (CNA) <sup>*3</sup> | R88A-CN103P <sup>*2</sup> |
|                                                    | Main circuit connector B (CNB) <sup>*3</sup> | R88A-CN104P <sup>*2</sup> |
|                                                    | Motor connector (CNC)                        | R88A-CN102A <sup>*2</sup> |
|                                                    | Control power supply connector (CND)         | R88A-CN101P <sup>*2</sup> |
| Common to all models                               | Control I/O connector (CN1)                  | R88A-CN102C               |
|                                                    | Encoder connector (CN2)                      | R88A-CN101R               |
|                                                    | Brake interlock connector (CN12)             | R88A-CN101B               |
|                                                    | Safety signal connector (CN14) <sup>*4</sup> | R88A-CN101S               |
|                                                    | Safe brake control connector (CN15)          | R88A-CN102S               |

<sup>\*1</sup> Two short-circuit wires are connected to the connector.

<sup>\*2</sup> One opener is included.

<sup>\*3</sup> One short-circuit wire is connected to the connector.

<sup>\*4</sup> Four short-circuit wires are connected to the connector. One pin to prevent improper wiring are included

## Cable shield clamp (spare parts)

| Description                                                                                                                   | Model          |
|-------------------------------------------------------------------------------------------------------------------------------|----------------|
| A shield clamp is used to fix the integrated cable and to connect the shield of the integrated cable to FG of the servo drive | R88A-SC10CX-PE |

## ⑨ Computer software

| Specifications                       | Model         |
|--------------------------------------|---------------|
| Sysmac Studio version 1.27 or higher | SYSMAC-SE2□□□ |
| Sysmac Studio Drive Edition          | SYSMAC-DE001L |

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. I220E-EN-01D In the interest of product improvement, specifications are subject to change without notice.