

# Analog Voltage/Pulse Train Reference Type SERVOPACKs

## SGDV-□□□□01

(For Rotary Servomotors)

## SGDV-□□□□05

(For Linear Servomotors)



### Model Designations

SGDV - R70 A 01 B 002000

$\Sigma$ -V Series  
SGDV SERVOPACK

Current

Options

| Code   | Specifications   |
|--------|--|
| 002000 | Base-mounted, varnish(standard)                          |
| 008000 | Single-phase, 200VAC Input<br>(model: SGD-120A01A008000) |

Design Revision

| Code | Specification |
|------|---------------|
| B    | Standard      |

Voltage

| Code | Specifications |
|------|----------------|
| F    | 100 VAC        |
| A    | 200 VAC        |
| D    | 400 VAC        |

Interface

| Code | Specifications  |
|------|---|
| 01   | Analog voltage/pulse train reference type<br>(for rotary servomotors) |
| 05   | Analog voltage/pulse train reference type<br>(for linear servomotors) |

| Code | 100 V (Single Phase)                   |  | Code  | 200 V (Three Phase)                    |  | Code | 400 V (Three Phase)                    |  |
|------|--|--|-------|--|--|------|--|--|
|      | Applicable Servomotor Max. Capacity kW |  |       | Applicable Servomotor Max. Capacity kW |  |      | Applicable Servomotor Max. Capacity kW |  |
| R70  | 0.05                                   |  | R70*  | 0.05                                   |  | 1R9  | 0.5                                    |  |
| R90  | 0.1                                    |  | R90*  | 0.1                                    |  | 3R5  | 1.0                                    |  |
| 2R1  | 0.2                                    |  | 1R6*  | 0.2                                    |  | 5R4  | 1.5                                    |  |
| 2R8  | 0.4                                    |  | 2R8*  | 0.4                                    |  | 8R4  | 2.0                                    |  |
|      |  |  | 3R8   | 0.5                                    |  | 120  | 3.0                                    |  |
|      |  |  | 5R5*  | 0.75                                   |  | 170  | 5.0                                    |  |
|      |  |  | 7R6   | 1.0                                    |  | 210  | 6.0                                    |  |
|      |  |  | 120** | 1.5                                    |  | 260  | 7.5                                    |  |
|      |  |  | 180   | 2.0                                    |  | 280  | 11                                     |  |
|      |  |  | 200   | 3.0                                    |  | 370  | 15                                     |  |
|      |  |  | 330   | 5.0                                    |  |      |  |  |
|      |  |  | 470   | 6.0                                    |  |      |  |  |
|      |  |  | 550   | 7.5                                    |  |      |  |  |
|      |  |  | 590   | 11                                     |  |      |  |  |
|      |  |  | 780   | 15                                     |  |      |  |  |

NOTE: Shaded items are non-stock.

\* These amplifiers can be powered with single or three-phase.

\*\* SGD-120A□1A008000, a special version of the 1.5kW amplifier can be used for single-phase operation.

# Features

- Unprecedented ease-of-use through cutting-edge technology
  - New tuning-less function means no adjustment needed.
  - Impressive load regulation with strengthened vibration suppression function.
- Slashed setup time
  - Setup wizard function and wiring conformation function of engineering tool SigmaWin+ allows easy setup just by watching the monitor.
- High response characteristics at 1 kHz min.
  - New advanced autotuning.
  - Reduced positioning time through model following control, and smooth machine control enabled by vibration suppression function.

## Ratings

### Single-phase 100 V

| SERVOPACK Model                     | SGDV-□□□□ | R70F                                | R90F | 2R1F | 2R8F |
|-------------------------------------|-----------|-------------------------------------|------|------|------|
| Applicable Servomotor Max. Capacity | kW        | 0.05                                | 0.1  | 0.2  | 0.4  |
| Continuous Output Current           | $A_{rms}$ | 0.66                                | 0.91 | 2.1  | 2.8  |
| Max. Output Current                 | $A_{rms}$ | 2.1                                 | 2.9  | 6.5  | 9.3  |
| Main Circuit (Single Phase)         |           | 100 to 115 VAC+10% to -15% 50/60 Hz |      |      |      |
| Control Circuit (Single Phase)      |           | 100 to 115 VAC+10% to -15% 50/60 Hz |      |      |      |

### Single-phase 200 V

| SERVOPACK Model                     | SGDV-□□□□ | R70A                                 | R90A | 1R6A | 2R8A | 5R5A | 120  |
|-------------------------------------|-----------|--------------------------------------|------|------|------|------|------|
| Applicable Servomotor Max. Capacity | kW        | 0.05                                 | 0.1  | 0.2  | 0.4  | 0.75 | 1.5  |
| Continuous Output Current           | $A_{rms}$ | 0.66                                 | 0.91 | 1.6  | 2.8  | 5.5  | 11.6 |
| Max. Output Current                 | $A_{rms}$ | 2.1                                  | 2.9  | 6.5  | 9.3  | 16.9 | 28   |
| Main Circuit (Single Phase)         |           | 220 to 230 VAC +10% to -15% 50/60 Hz |      |      |      |      |      |
| Control Circuit (Single Phase)      |           | 220 to 230 VAC +10% to -15% 50/60 Hz |      |      |      |      |      |

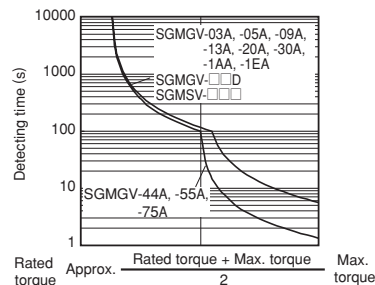
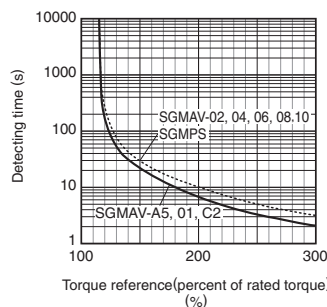
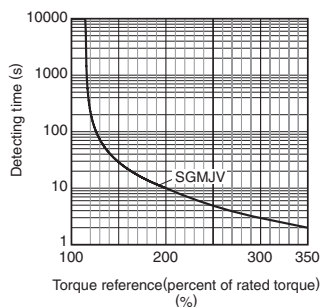
### Three-phase 200 V

| SERVOPACK Model                     | SGDV-□□□□ | R70A   | R90A | 1R6A | 2R8A | 3R8A | 5R5A | 7R6A | 120A | 180A | 200A | 330A | 470A | 550A | 590A | 780A |
|-------------------------------------|-----------|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Applicable Servomotor Max. Capacity | kW        | 0.05   | 0.1  | 0.2  | 0.4  | 0.5  | 0.75 | 1.0  | 1.5  | 2.0  | 3.0  | 5.0  | 6    | 7.5  | 11   | 15   |
| Continuous Output Current           | $A_{rms}$ | 0.66   | 0.91 | 1.6  | 2.8  | 3.8  | 5.5  | 7.6  | 11.6 | 18.5 | 19.6 | 32.9 | 46.9 | 54.7 | 58.6 | 78   |
| Max. Output Current                 | $A_{rms}$ | 2.1  | 2.9  | 6.5  | 9.3  | 11   | 16.9 | 17   | 28   | 42   | 56   | 84   | 110  | 130  | 140  | 170  |
| Main Circuit                        |           | Three-phase 200 to 230 VAC+10% to -15% 50/60 Hz  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Control Circuit                     |           | Single-phase 200 to 230 VAC+10% to -15% 50/60 Hz |      |      |      |      |      |      |      |      |      |      |      |      |      |      |

### Three-phase 400 V

| SERVOPACK Model                     | SGDV-□□□□ | 1R9D  | 3R5D | 5R4D | 8R4D | 120D | 170D | 210D | 260D | 280D | 370D |
|-------------------------------------|-----------|---|------|------|------|------|------|------|------|------|------|
| Applicable Servomotor Max. Capacity | kW        | 0.5   | 1.0  | 1.5  | 2.0  | 3.0  | 5.0  | 6    | 7.5  | 11   | 15   |
| Continuous Output Current           | $A_{rms}$ | 1.9   | 3.5  | 5.4  | 8.4  | 11.9 | 16.5 | 20.8 | 25.4 | 28.1 | 37.2 |
| Max. Output Current                 | $A_{rms}$ | 5.5   | 8.5  | 14   | 20   | 28   | 42   | 55   | 65   | 70   | 85   |
| Main Circuit                        |           | Three-phase 380 to 480 VAC+10% to -15% 50/60 Hz |      |      |      |      |      |      |      |      |      |
| Control Circuit                     |           | 24 VDC ±15%                                     |      |      |      |      |      |      |      |      |      |

### ●SERVOPACK Overload Characteristics



Note: Overload characteristics shown above do not guarantee continuous duty of 100% or more output. Use a servomotor with effective torque within the continuous duty zone of Torque-Motor Speed Characteristics.

# Specifications

| Items                   |  | Specifications  |   |
|-------------------------|--|---|---|
| Input Power Supply      | Main Circuit   | 100 V   | Single-phase 100 to 115 VAC + 10% to - 15% 50/60 Hz   |
|                         |  | 200 V   | Three-phase 200 to 230 VAC + 10% to - 15% 50/60 Hz  |
|                         |  | 400 V   | Three-phase 380 to 480 VAC + 10% to - 15% 50/60 Hz  |
|                         | Control Circuit  | 100 V   | Single-phase 100 to 115 VAC + 10% to - 15% 50/60 Hz   |
|                         |  | 200 V   | Single-phase 200 to 230 VAC + 10% to - 15% 50/60 Hz   |
| 400 V                   |  | 24 VDC ± 15%  |   |
| Control Method          |  | For 100 V, for 200 V, for 400 V, single-phase or three-phase full-wave rectification IGBT PWM control, sine-wave driven   |   |
| Feedback                | Rotary Servomotors   | Serial encoder: 13-bit (incremental encoder)<br>: 17-bit (incremental/absolute encoder)<br>: 20-bit (incremental/absolute encoder)  |   |
|                         | Linear Servomotors   | Serial converter or serial data   |   |
| Operating Conditions    | Surrounding/Storage Temperature  | Surrounding temperature: 0 to +55°C, storage temperature: -20 to +85°C  |   |
|                         | Ambient/Storage Humidity   | 90%RH or less (no condensation)   |   |
|                         | Vibration/Shock Resistance   | Vibration resistance: 4.9 m/s <sup>2</sup> , Shock resistance: 19.6 m/s <sup>2</sup>  |   |
|                         | Protection class/Pollution degree                                      | Protection class: IP 1X, pollution degree: 2<br>Do not use SERVOPACKs in the following locations:<br>· Locations subject to corrosive or flammable gasses<br>· Locations subject to exposure to water, oil, or chemicals<br>· Locations subject to dust, including iron dust, and salts   |   |
|                         | Others   | Do not use SERVOPACKs in the following locations:<br>· Locations subject to static electricity noise, strong electromagnetic/magnetic fields, radioactivity   |   |
| Elevation               |  | 1000 m or less  |   |
| Compliant Standards     |  | UL 508C<br>EN50178, EN55011 class A group 1, EN61800-3, EN61800-5-1   |   |
| Configuration           |  | Base-mounted (Rack-mounting available as an option for some models. 6 kW or more models are duct-ventilated.)   |   |
| Performance             | Speed Control Range  | 1:5000 (The lowest speed of the speed control range is the speed at which the servomotor will not stop with a rated torque load.)   |   |
|                         | Speed Regulation*  | Load Regulation   | 0% to 100% load: ±0.01% max. (at rated speed)   |
|                         |  | Voltage Regulation  | Rated voltage: ±10% : 0% (at rated speed)   |
|                         |  | Temperature Regulation  | 25 ± 25°C : ±0.1% max. (at rated speed)   |
|                         | Torque Control Tolerance (Repeatability)                               | ±1%   |   |
| Soft Start Time Setting | 0 to 10 s (can be set individually for acceleration and deceleration.) |   |   |
| I/O Signals             | Encoder Output Pulses  | Phase A, phase B, phase C: line driver output<br>The number of dividing pulse: Any setting ratio is available.  |   |
| Communications          | RS-422A Communications   | Interface   | Digital operator, RS-422A port of personal computers etc.   |
|                         |  | 1:N communications  | RS-422A port: N= 15 max. available  |
|                         |  | Axis address setting  | Set by parameters   |
|                         | USB Communications   | Function  | Status display, parameter settings, adjustment functions, utility functions, parameter copy functions |
|                         |  | Interface   | Personal computers (application: engineering tool SigmaWin+)  |
| USB Communications      | 1:N communications   | Compliant with USB1.1 standard  |   |
|                         | Function   | Status display, parameter settings, adjustment functions, utility functions, parameter copy functions, waveform trace   |   |
| Display                 | Power Charge   | CHARGE for main circuit power supply input confirmation One LED (orange)  |   |
| Analog Monitor          |  | Analog monitor connector built in for monitoring speed, torque and other reference signals.<br>Number of points: 2  |   |
| Protective Functions    |  | Overcurrent, Overvoltage, low voltage, overload, regeneration error   |   |
| Utility Functions       |  | Alarm history, JOG operation, origin search, etc.   |   |
| Regenerative Processing |  | 100 VAC model: External regenerative resistor (optional)<br>200 VAC SGDV-R70A, -R90A, -1R6A, -2R8A: External regenerative resistor (optional)<br>200 VAC SGDV-470A, -550A, -590A, -780A: External regenerative resistor unit (optional)<br>200 VAC models other than shown above: Built-in regenerative resistor<br>400 VAC SGDV-210D, -260D, -280D, -370D: External regenerative resistor unit (optional)<br>400 VAC models other than shown above: Built-in regenerative resistor |   |
| Safety Functions        | Input  | /HWBB1, /HWBB2: Hard wire base block signal   |   |
|                         | Output   | EDM1: Status monitor (fixed output) of built-in safety circuit  |   |
|                         | Compliant Standards  | EN954 category 3 Stop category 0, IEC61508 SIL 2  |   |
| Option Card Function    | Feedback   | Serial encoder communications input for fully-closed loop control   |   |

\*: Speed regulation is defined as follows:

$$\text{Speed regulation} = \frac{\text{No-load motor speed} - \text{Total load motor speed}}{\text{Rated motor speed}} \times 100\%$$

The motor speed may change due to voltage variations or temperature variation. The ratio of speed changes to the rated speed represent speed regulation due to voltage and temperature variations.

## Specifications

## ● Rotary Servomotors

| Items            |                                    | Specifications   |  |  |
|------------------|------------------------------------|--|--|--|
| I/O Signal       | Encoder Output Pulses              |  | Phase A, phase B, phase C: line driver output<br>The number of dividing pulse: Any setting ratio is available.   |  |
|                  | Sequence Input                     | Fixed Input  | SEN signal   |  |
|                  |                                    | Input Signals which can be allocated                                   | Number of Channels   | 7 channels   |
|                  |                                    |  | Functions  | The signal allocation and positive/negative logic can be modified.<br>Servo On (/S-ON), proportional control (/P-CON),<br>alarm reset (/ALM-RST), forward run prohibited (P-OT),<br>reverse run prohibited (/N-OT), forward torque limit (/P-CL),<br>reverse torque limit(/N-CL),<br>internal set speed selection (/SPD-D, /SPD-A, /SPD-B), control selection (/C-SEL), zero clamping (/ZCLAMP), reference pulse inhibit (/INHIBIT), gain selection (/G-SEL) |
|                  | Sequence Output                    | Fixed Output   | Servo alarm (ALM), alarm code (ALO1, ALO2, ALO3) outputs   |  |
|                  |                                    | Output Signals which can be allocated                                  | Number of Channels   | 3 channels   |
|                  | Functions                          |  | The signal allocation and positive/negative logic can be modified.<br>Positioning completion (/COIN), speed coincidence detection (/V-CMP), servomotor rotation detection (/TGON), servo ready (/S-RDY), torque limit detection (/CLT), speed limit detection (/VLT), brake interlock (/BK), warning (/WRAN), near (/NEAR) |  |
| Panel Operator   |                                    | Display  | 7-segment 5-digit LED (Red)  |  |
|                  |                                    | Switch   | Push switch: 4 channels  |  |
| Torque Control   | Analog Input                       | Reference Voltage  | $\pm 3$ VDC (Variable setting range: $\pm 1$ to 10 VDC) at rated torque,<br>max. input voltage: $\pm 12$ V   |  |
|                  |                                    | Input Impedance  | About 14 k $\Omega$ min.   |  |
|                  |                                    | Circuit Time Constant  | 16 $\mu$ s   |  |
| Speed Control    | Analog Input                       | Reference Voltage  | $\pm 6$ VDC (variable setting range: $\pm 2$ to 10 VDC) at rated speed,<br>max. input voltage: $\pm 12$ V  |  |
|                  |                                    | Input Impedance  | About 14 k $\Omega$ min.   |  |
|                  |                                    | Circuit Time Constant  | 30 $\mu$ s   |  |
|                  | Internal Set Speed Control         | Rotation Direction Selection   | Switches the direction by /P-CON (/SPD-D)  |  |
|                  |                                    | Speed Selection  | Speed 1 to 3 selection   |  |
| Function         | Soft Start Setting                 | 0 to 10 s (can be set individually for acceleration and deceleration.) |  |  |
| Position Control | Reference Pulse                    | Type   | Sign + pulse train, 90° phase difference 2-phase pulse (phase A + phase B), or CCW + CW pulse train  |  |
|                  |                                    | Form   | Non-insulated line driver (+5 V level), open collector   |  |
|                  |                                    | Max. Input Pulse Frequency*  | Sign+ Pulse train  | : 4 Mpps   |
|                  |                                    |  | CW+ CCW pulse train  | : 4 Mpps   |
|                  | 90° phase difference 2-phase pulse |  | $\times 1$ multiplier : 1 Mpps (before multiplier)<br>$\times 2$ multiplier : 1 Mpps (before multiplier)<br>$\times 4$ multiplier : 1 Mpps (before multiplier)   |  |
|                  | Open collector                     | : 200 kpps   |  |  |
| Clear Signal     | Function                           | Clears error pulse by external signals.                                |  |  |
|                  | Form                               | Applicable to line driver, open collector                              |  |  |

\*: If the maximum reference frequency exceeds 1 Mpps, use a shielded cable for I/O signals and ground both ends of the shield. Connect the shield at the SERVOPACK to the connector shell.

# Specifications

## ● Linear Servomotors

| Items            |                                    | Specifications   |  |   |
|------------------|------------------------------------|--|--|---|
| I/O Signal       | Encoder Output Pulses              | Phase A, phase B, phase C: line driver output<br>The number of dividing pulse: Any setting ratio is available. |  |   |
|                  | Sequence Input                     | Input Signals which can be allocated   | Number of Channels   | 7 channels  |
|                  |                                    |  | Functions  | The signal allocation and positive/negative logic can be modified. Servo ON (/S-ON), proportional control (/P-CON), alarm reset (/ALM-RST), forward run prohibited (P-OT), reverse run prohibited (N-OT), forward external force limit (/P-CL), reverse external force limit (/N-CL), internal set speed selection (/SPD-D, /SPD-A, /SPD-B), control selection (/C-SEL), zero clamping (/ZCLAMP), reference pulse inhibit (/INHIBIT), gain selection (/G-SEL), polarity detection (P-DET) |
|                  | Sequence Output                    | Fixed Output   | Servo alarm (ALM), alarm code (ALO1, ALO2, ALO3) outputs   |   |
|                  |                                    | Output Signals which can be allocated  | Number of Channels   | 3 channels  |
|                  | Functions                          |  | The signal allocation and positive / negative logic can be modified. Positioning completion (/COIN), speed coincidence detection (/V/CMP), servomotor movement detection (/TGON), servo ready (/S-RDY), force limit detection (/CLT), speed limit detection (/VLT), brake interlock (/BK), warning (/WARN), near (/NEAR) |   |
| Panel Operator   |                                    | Display  | 7-segment 5-digit LED (Red)  |   |
|                  |                                    | Switch   | Push switch: 4 channels  |   |
| Force Control    | Analog Input                       | Reference Voltage  | $\pm 3$ VDC (variable setting range: $\pm 1$ to 10 VDC), max. input voltage: $\pm 12$ V  |   |
|                  |                                    | Input Impedance  | About 14 k $\Omega$ min.   |   |
|                  |                                    | Circuit Time Constant  | 16 $\mu$ s   |   |
| Speed Control    | Analog Input                       | Reference Voltage  | $\pm 6$ VDC (variable setting range: $\pm 2$ to 10 VDC) at rated speed, max. input voltage: $\pm 12$ V   |   |
|                  |                                    | Input Impedance  | About 14 k $\Omega$ min.   |   |
|                  |                                    | Circuit Time Constant  | 30 $\mu$ s   |   |
|                  | Internal Set Speed Control         | Movement Direction Selection   | /P-CON (/SPD-D) signal   |   |
|                  |                                    | Speed Selection  | Speed 1 to 3 selection   |   |
| Function         | Soft Start Setting                 | 0 to 10 s (can be set individually for acceleration and deceleration.)   |  |   |
| Position Control | Reference Pulse                    | Type   | Sign+ pulse train, 90° phase difference 2-phase pulse (phase A+phase B), or CCW+ CW pulse train  |   |
|                  |                                    | Form   | Non-insulated line driver (+5 V level), open collector   |   |
|                  |                                    | Max. Input Pulse Frequency*  | Sign+ Pulse train  | : 4 Mpps  |
|                  |                                    |  | CW+ CCW pulse train  | : 4 Mpps  |
|                  | 90° phase difference 2-phase pulse |  |  |   |
|                  | Clear Signal                       | Function   | Clears error pulse by external signals.  |   |
| Form             |                                    | Applicable to line driver, open collector  |  |   |

\*: If the maximum reference frequency exceeds 1 Mpps, use a shielded cable for I/O signals and ground both ends of the shield. Connect the shield at the SERVOPACK to the connector shell.

## Power Supply Capacities and Power Losses

The following table shows SERVOPACK's power supply capacities and power losses at the rated output.

| Main Circuit Power Supply | Applicable Servomotor Max. Capacity kW | SERVOPACK Model SGD V- | Power Supply Capacity kVA | Output Current A | Main Circuit Power Loss W | Regenerative Resistor Power Loss W | Control Circuit Power Loss W | Total Power Loss W |
|---------------------------|--|------------------------|---------------------------|------------------|---------------------------|------------------------------------|------------------------------|--------------------|
| Signal-phase<br>100 V     | 0.05                                   | R70F                   | 0.2                       | 0.66             | 5.4                       | —                                  | 17                           | 22.4               |
|                           | 0.1                                    | R90F                   | 0.3                       | 0.91             | 7.8                       |                                    |                              | 24.8               |
|                           | 0.2                                    | 2R1F                   | 0.7                       | 2.1              | 14.4                      |                                    |                              | 31.4               |
|                           | 0.4                                    | 2R8F                   | 1.4                       | 2.8              | 25.6                      |                                    |                              | 42.6               |
| Single-phase<br>200 V     | 0.05                                   | R70A                   | 0.2                       | 0.66             | 5.2                       | —                                  | 17                           | 22.2               |
|                           | 0.1                                    | R90A                   | 0.3                       | 0.91             | 7.4                       |                                    |                              | 24.4               |
|                           | 0.2                                    | 1R6A                   | 0.7                       | 1.6              | 13.7                      |                                    |                              | 30.7               |
|                           | 0.4                                    | 2R8A                   | 1.2                       | 2.8              | 24.9                      |                                    |                              | 41.9               |
|                           | 0.75                                   | 5R5A                   | 1.9                       | 5.5              | 52.7                      | 8                                  | 77.7                         |                    |
|                           | 1.5                                    | 120A                   | 4                         | 11.6             | 68.2                      | 10                                 | 22                           | 100.2              |
| Three-phase<br>200 V      | 0.05                                   | R70A                   | 0.2                       | 0.66             | 5.1                       | —                                  | 17                           | 22.1               |
|                           | 0.1                                    | R90A                   | 0.3                       | 0.91             | 7.3                       |                                    |                              | 24.3               |
|                           | 0.2                                    | 1R6A                   | 0.6                       | 1.6              | 13.5                      |                                    |                              | 30.5               |
|                           | 0.4                                    | 2R8A                   | 1                         | 2.8              | 24.0                      |                                    |                              | 41.0               |
|                           | 0.5                                    | 3R8A                   | 1.4                       | 3.8              | 20.1                      | 8                                  | 45.1                         |                    |
|                           | 0.75                                   | 5R5A                   | 1.6                       | 5.5              | 43.8                      |                                    | 68.8                         |                    |
|                           | 1.0                                    | 7R6A                   | 2.3                       | 7.6              | 53.6                      | 10                                 | 78.6                         |                    |
|                           | 1.5                                    | 120A                   | 3.2                       | 11.6             | 65.8                      |                                    | 97.8                         |                    |
|                           | 2.0                                    | 180A                   | 4                         | 18.5             | 111.9                     | 16                                 | 22                           | 149.9              |
|                           | 3.0                                    | 200A                   | 5.9                       | 19.6             | 113.8                     |                                    | 161.4                        |                    |
|                           | 5.0                                    | 330A                   | 7.5                       | 32.9             | 263.7                     | 36                                 | 27                           | 326.7              |
|                           | 6.0                                    | 470A                   | 10.7                      | 46.9             | 279.4                     | (180) <sup>1</sup>                 | 33                           | 312.4              |
|                           | 7.5                                    | 550A                   | 14.6                      | 54.7             | 357.8                     | (350) <sup>2</sup>                 |                              | 390.8              |
|                           | 11                                     | 590A                   | 21.7                      | 58.6             | 431.7                     |                                    | 479.7                        |                    |
| 15                        | 780A                                   | 29.6                   | 78                        | 599.0            | 48                        |                                    | 647.0                        |                    |
| Three-phase<br>400 V      | 0.5                                    | 1R9D                   | 1.1                       | 1.9              | 24.6                      | 14                                 | 21                           | 59.6               |
|                           | 1.0                                    | 3R5D                   | 2.3                       | 3.5              | 46.1                      |                                    |                              | 81.1               |
|                           | 1.5                                    | 5R4D                   | 3.5                       | 5.4              | 71.3                      |                                    |                              | 106.3              |
|                           | 2.0                                    | 8R4D                   | 4.5                       | 8.4              | 77.9                      | 28                                 | 25                           | 130.9              |
|                           | 3.0                                    | 120D                   | 7.1                       | 11.9             | 108.7                     |                                    |                              | 161.7              |
|                           | 5.0                                    | 170D                   | 11.7                      | 16.5             | 161.1                     | 36                                 | 24                           | 221.1              |
|                           | 6.0                                    | 210D                   | 12.4                      | 20.8             | 172.7                     | (180) <sup>3</sup>                 | 27                           | 199.7              |
|                           | 7.5                                    | 260D                   | 14.4                      | 25.7             | 218.6                     |                                    |                              | 245.6              |
|                           | 11                                     | 280D                   | 21.9                      | 28.1             | 294.6                     | (350) <sup>4</sup>                 | 30                           | 324.6              |
| 15                        | 370D                                   | 30.6                   | 37.2                      | 403.8            | 433.8                     |                                    |                              |                    |

\*1: For the optional JUSP-RA04-E regenerative resistor unit.

\*2: For the optional JUSP-RA05-E regenerative resistor unit.

\*3: For the optional JUSP-RA18-E regenerative resistor unit.

\*4: For the optional JUSP-RA19-E regenerative resistor unit.

Notes: 1 SGD V-R70F, -R90F, -2R1F, -2R8F, -R70A, -R90A, -1R6A, and -2R8A SERVOPACKS do not have built-in regenerative resistors.

If the regenerative energy exceeds the specified value, connect an external regenerative resistor (optional).

2 SGD V-470A, -550A, -590A, -780A, -210D, -260D, -280D, -370D SERVOPACKS do not have built-in regenerative resistors.

Be sure to connect a regenerative resistor unit (optional) or an external regenerative resistor (optional).

3 Regenerative resistor power losses are allowable losses. Take the following action if this value is exceeded.

· Remove the lead or short bar that is short-circuiting the SERVOPACK main circuit terminal B2 and B3.

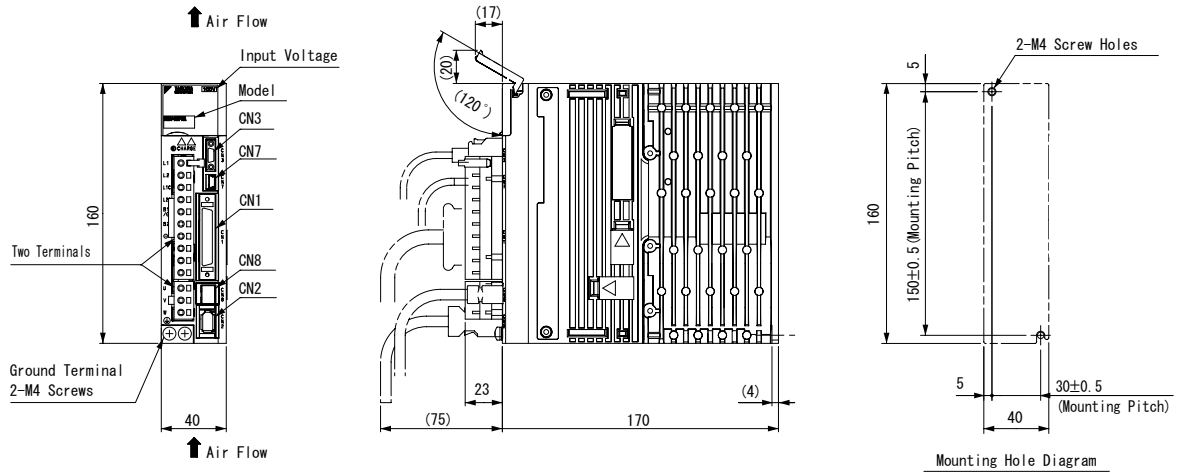
(SGD V-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, or 400-V class SERVOPACKS.)

· Install an external regenerative resistor (optional).

## External Dimensions Units: mm

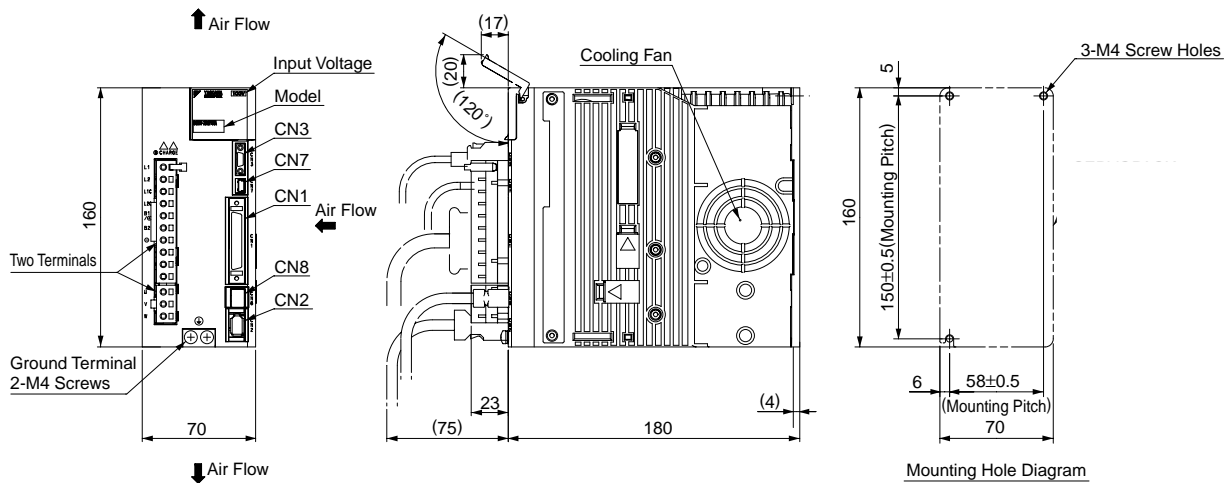
### ● Base-mounted SERVOPACKS

(1) Single-phase 100 VAC, Model: SGD V-R70F0□A, -R90F0□A, and -2R1F0□A



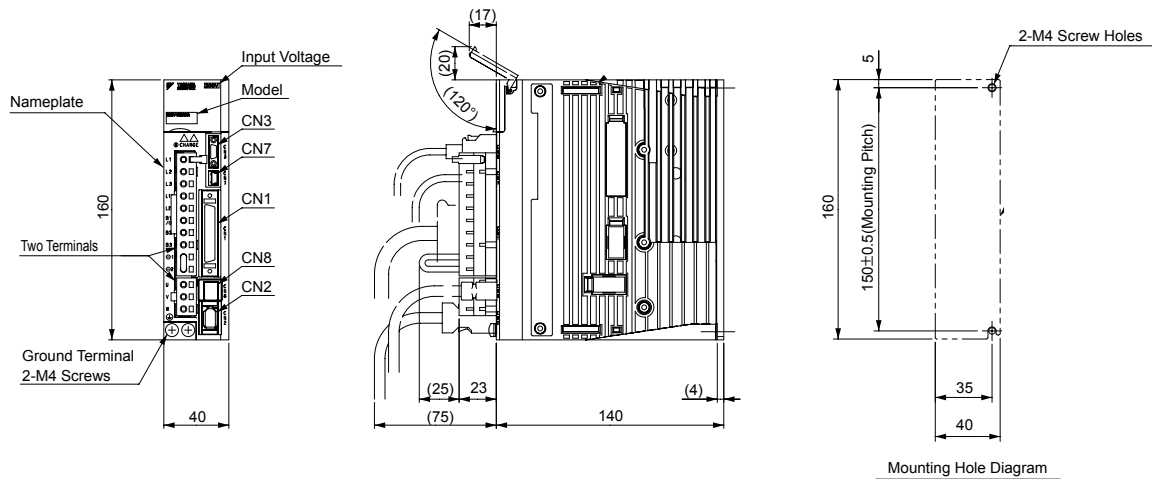
Approx. Mass: 1.1 kg

(2) Single-phase 100 VAC, Model: SGD V-2R8F0□A



Approx. Mass: 1.5 kg

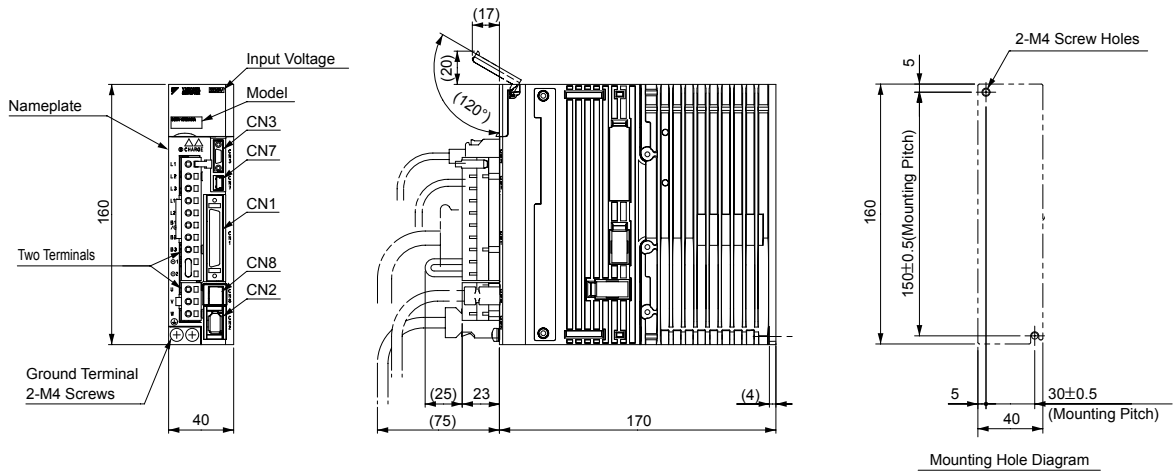
(3) Three-phase 200 VAC, Model: SGD V-R70A0□B, -R90A0□B, and -1R6A0□B



Approx. Mass: 0.9 kg

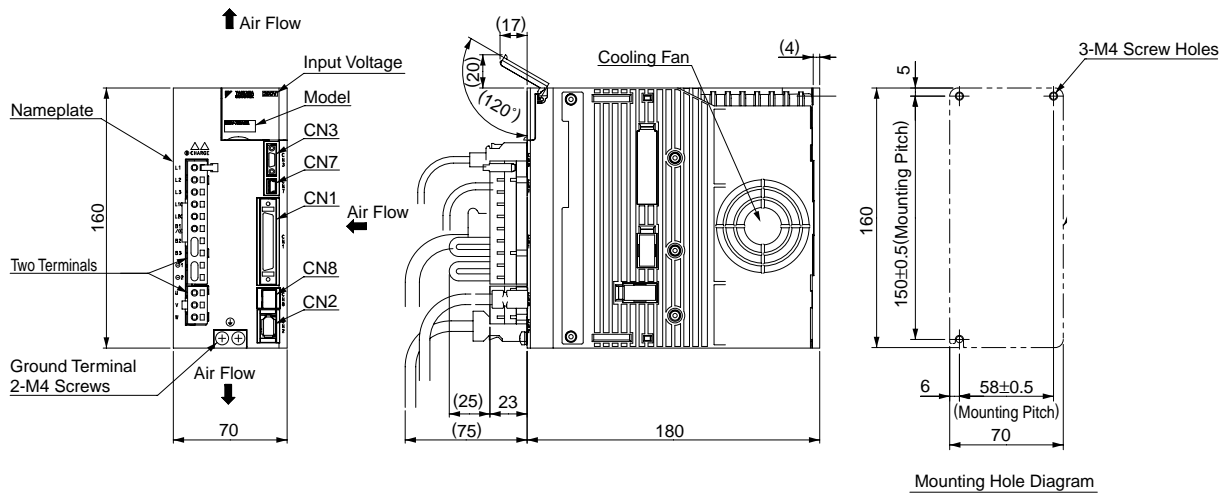
**External Dimensions** Units: mm

(4) Three-phase 200 VAC, Model: SGDV-2R8A0□B



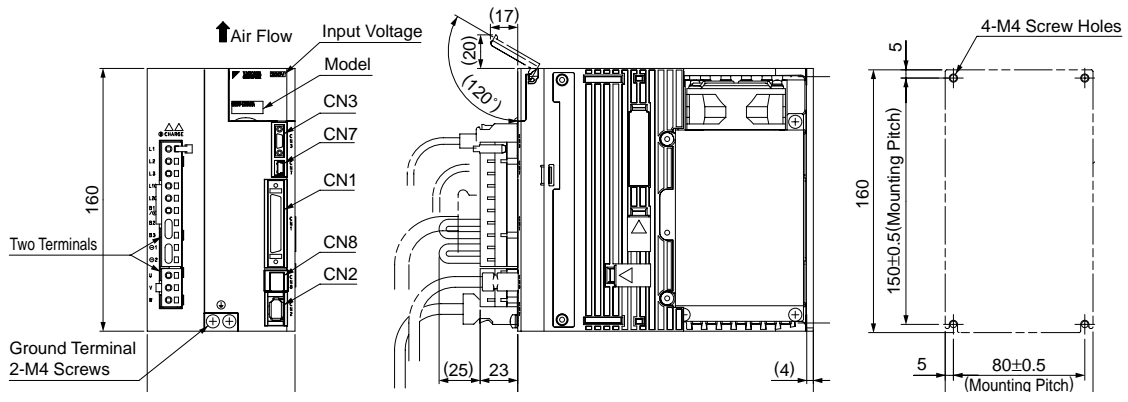
Approx. Mass: 1.0 kg

(5) Three-phase 200 VAC, Model: SGDV-3R8A0□A, -5R5A0□A, and 7R6A0□A



Approx. Mass: 1.5 kg

(6) Three-phase 200 VAC, Model: SGDV-120A0□A



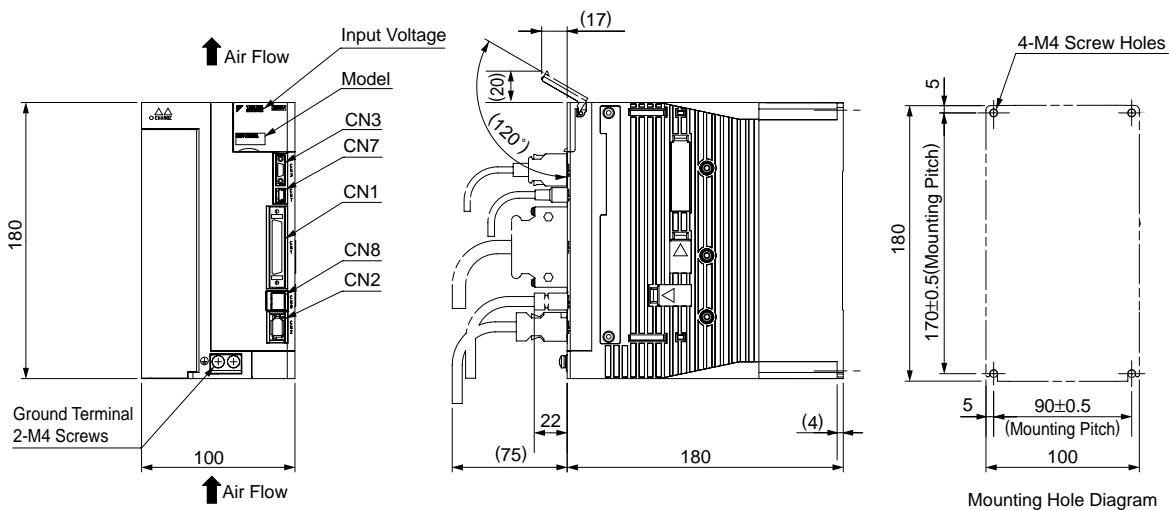
Approx. Mass: 2.4 kg

Analog/Pulse Type SERVOPACKS



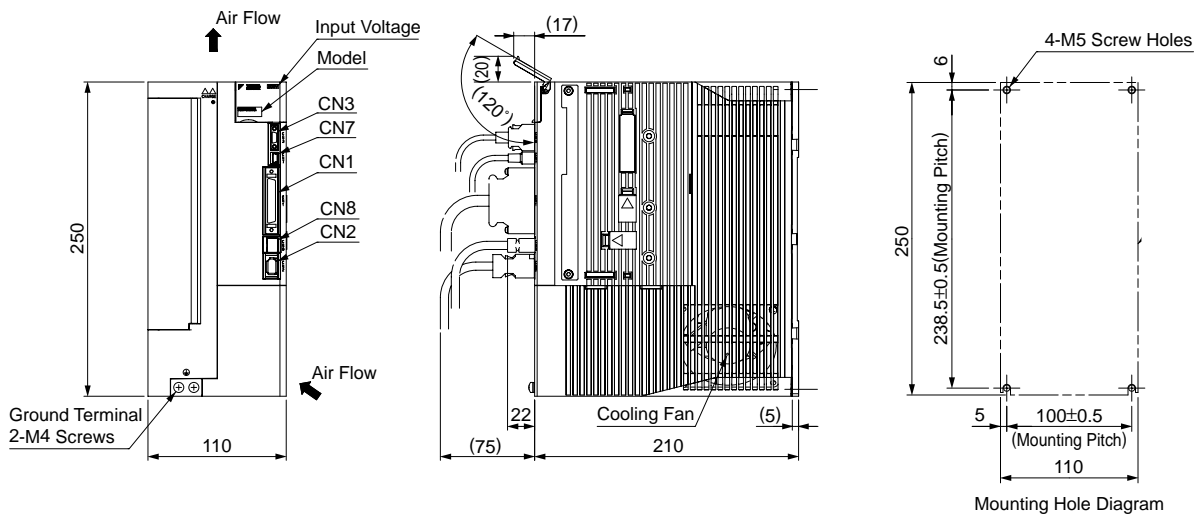
**External Dimensions** Units: mm

(7) Single-phase 200 VAC, Model: SGDV-120A0□A008000 (1.5 kW, single-phase input type)  
 Three-phase 200 VAC, Model: SGDV-180A0□A and -200A0□A



Approx. Mass: 2.8 kg

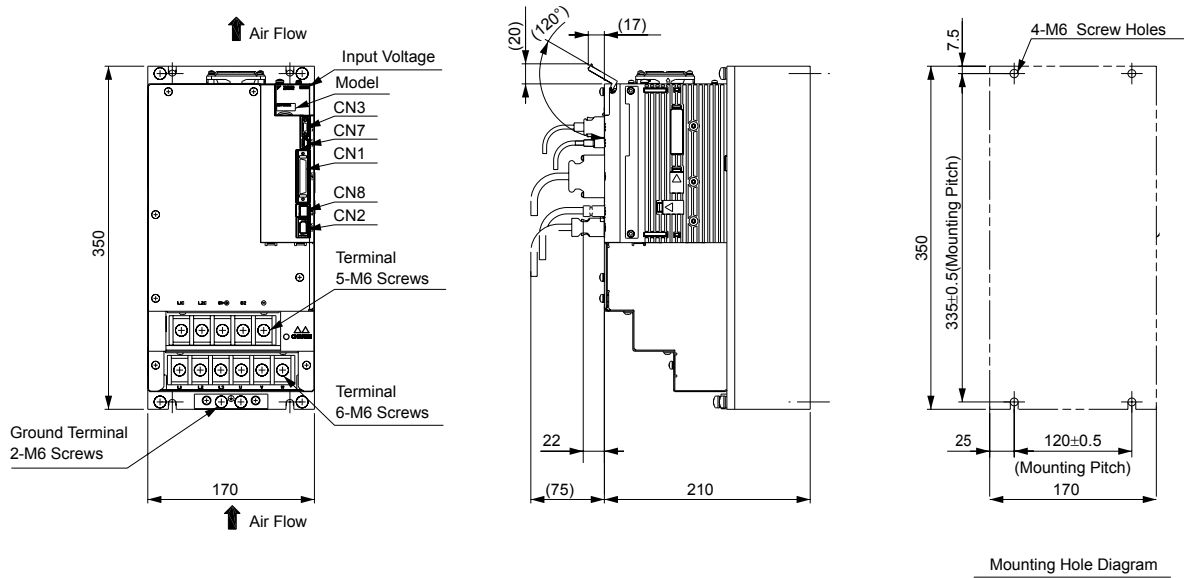
(8) Three-phase 200 VAC, Model: SGDV-330A0□A



Approx. Mass: 4.6 kg

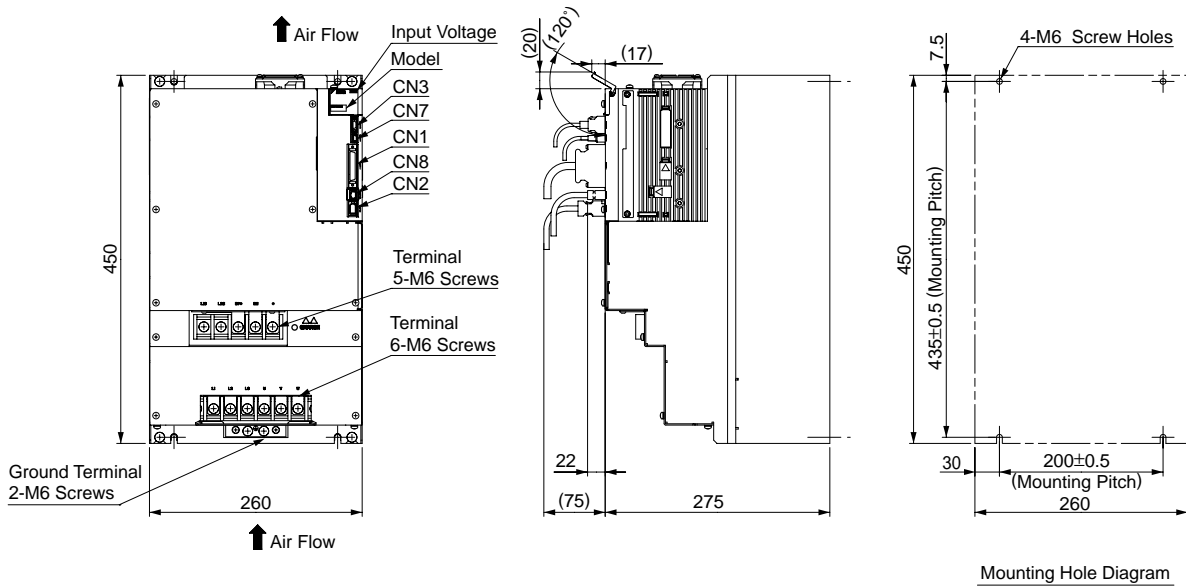
**External Dimensions** Units: mm

(9) Three-phase 200 VAC, Model: SGDV-470A0□A and -550A0□A



Approx. Mass: 10.2 kg

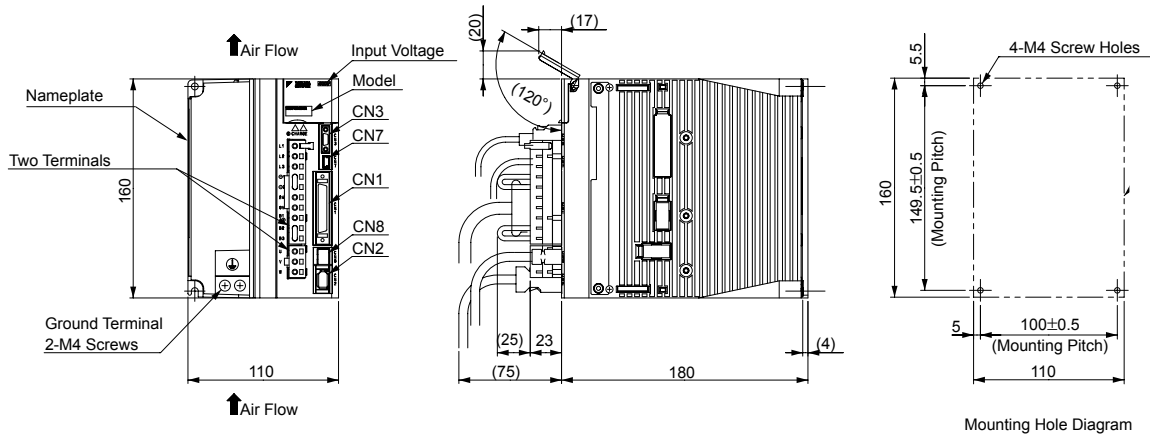
(10) Three-phase 200 VAC, Model: SGDV-590A0□A and -780A0□A



Approx. Mass: 21.0 kg

**External Dimensions** Units: mm

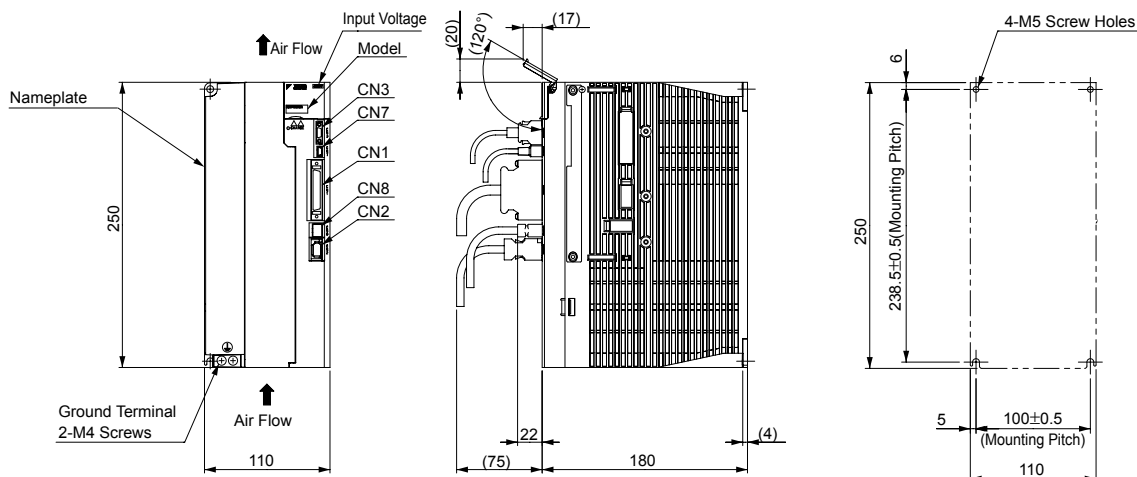
(11) Three-phase 400 VAC, Model: SGDV-1R9D0□A, -3R5D0□A, and -5R4D0□A



Mounting Hole Diagram

Approx. Mass: 2.7 kg

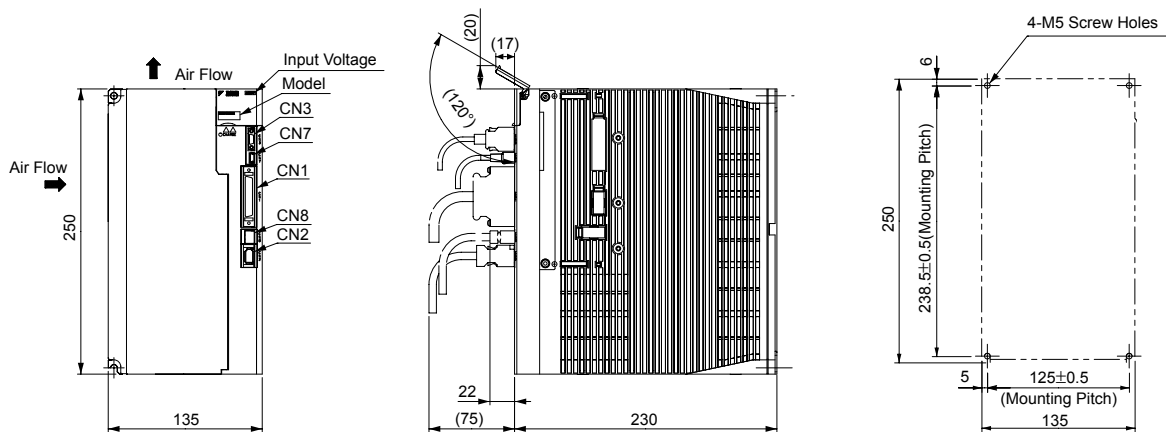
(12) Three-phase 400 VAC, Model: SGDV-8R4D0□A and -120D0□A



Mounting Hole Diagram

Approx. Mass: 3.7 kg

(13) Three-phase 400 VAC, Model: SGDV-170D0□A

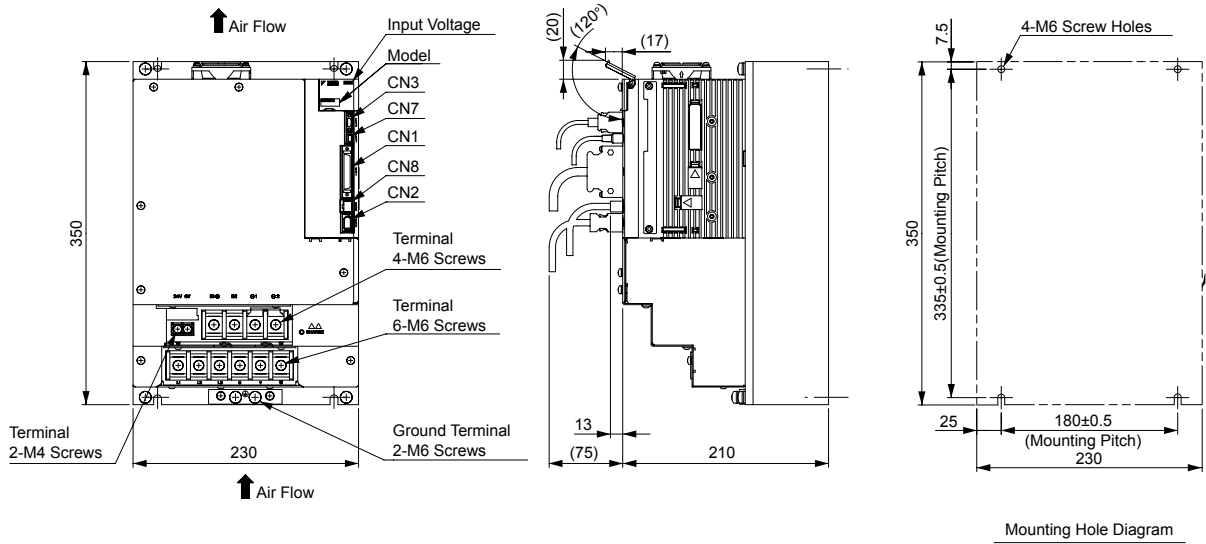


Mounting Hole Diagram

Approx. Mass: 5.6 kg

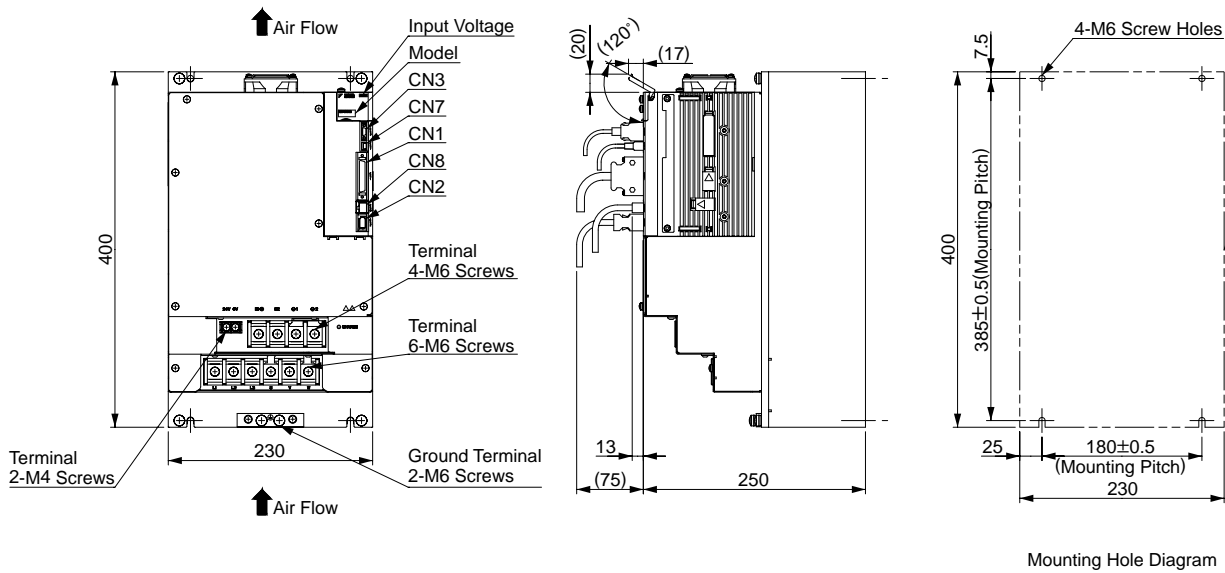
**External Dimensions** Units: mm

(14) Three-phase 400 VAC, Model: SGDV-210D0□A and -260D0□A



Approx. Mass: 11.3 kg

(15) Three-phase 400 VAC, Model: SGDV-280D0□A and -370D0□A



Approx. Mass: 16.2 kg

**Connectors for Base-mounted SERVOPACKS**

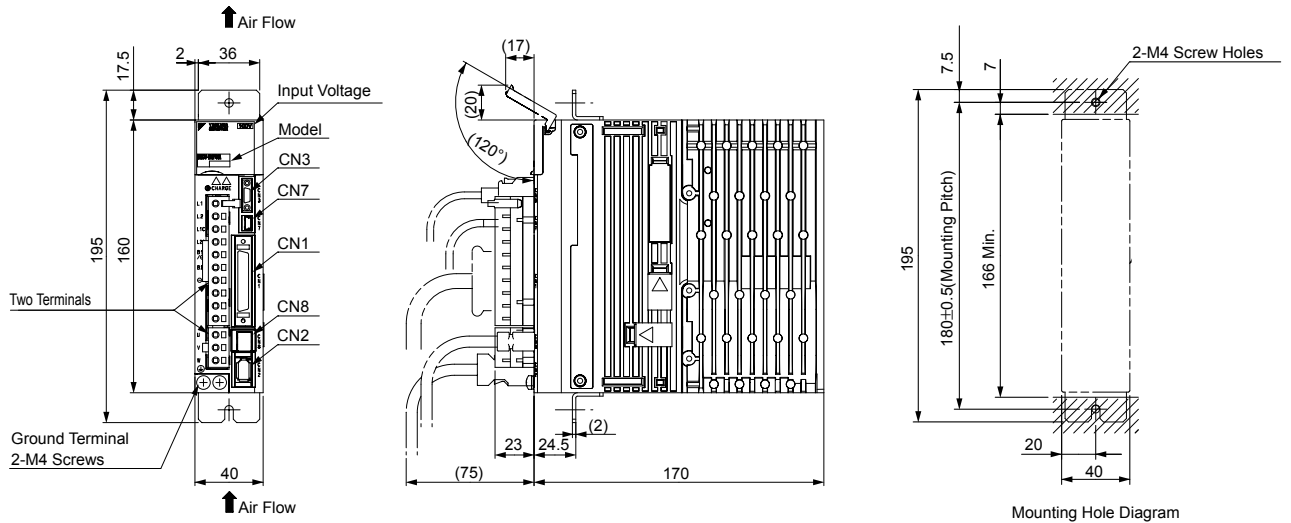
| Port | Model                  | Pin | Manufacturer                  |
|------|------------------------|-----|-------------------------------|
| CN1  | 10250-52A2PL           | 50  | Sumitomo 3M Ltd.              |
| CN2  | 53984-0671             | 6   | Molex Japan Co., Ltd.         |
| CN3  | HDR-EC14LFDTN-SLE-PLUS | 14  | Honda Tsushin Kogyo Co., Ltd. |
| CN7  | MNC23-5K5H00           | 5   | ADVANCED-CONNECTEK INC.       |
| CN8  | 1981080-1              | 8   | Tyco Electronics AMP K.K.     |

Note: The connectors above or their equivalents are used for SERVOPACKS.

## External Dimensions Units: mm

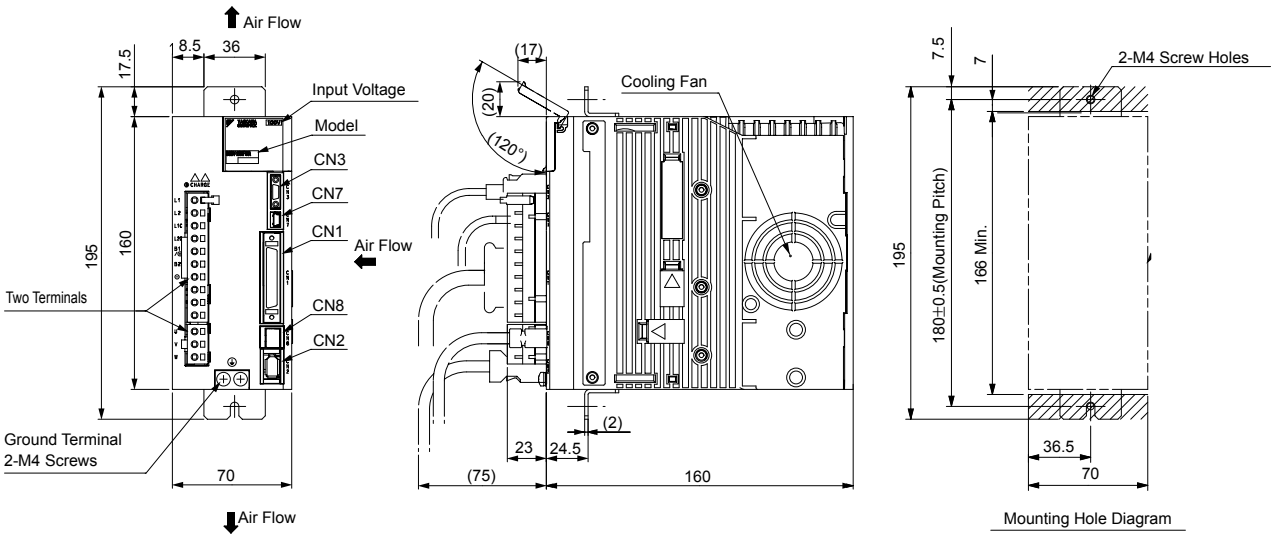
### ● Rack-mounted SERVOPACKs (6 kW or more models: duct-ventilated)

(1) Single-phase 100 VAC, Model: SGDV-R70F0□A001, -R90F0□A001, and -2R1F0□A001



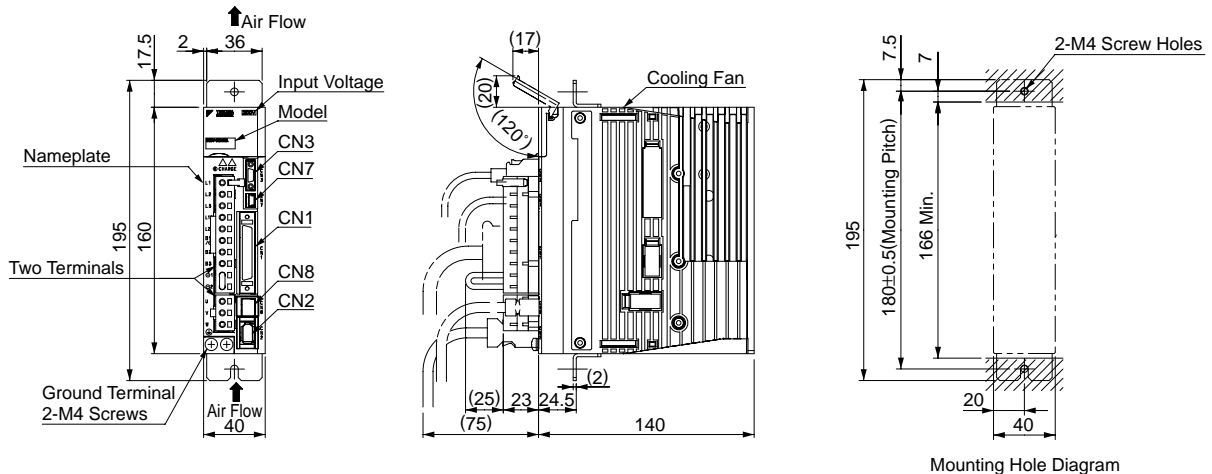
Approx. Mass: 1.1 kg

(2) Single-phase 100 VAC, Model: SGDV-2R8F0□A001



Approx. Mass: 1.5 kg

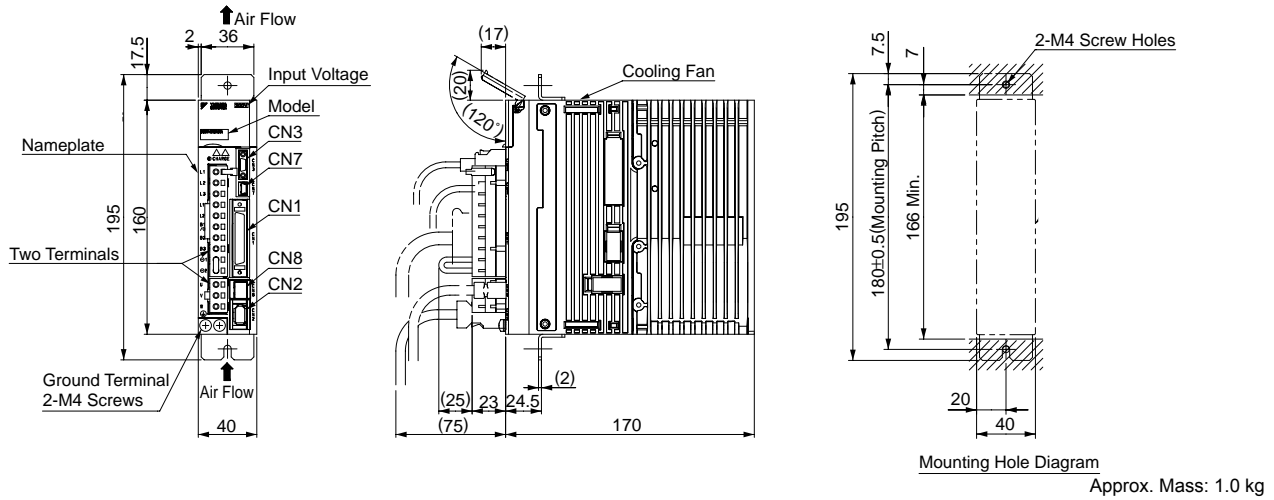
(3) Three-phase 200 VAC, Model: SGDV-R70A0□A001, -R90A0□A001, and -1R6A0□A001



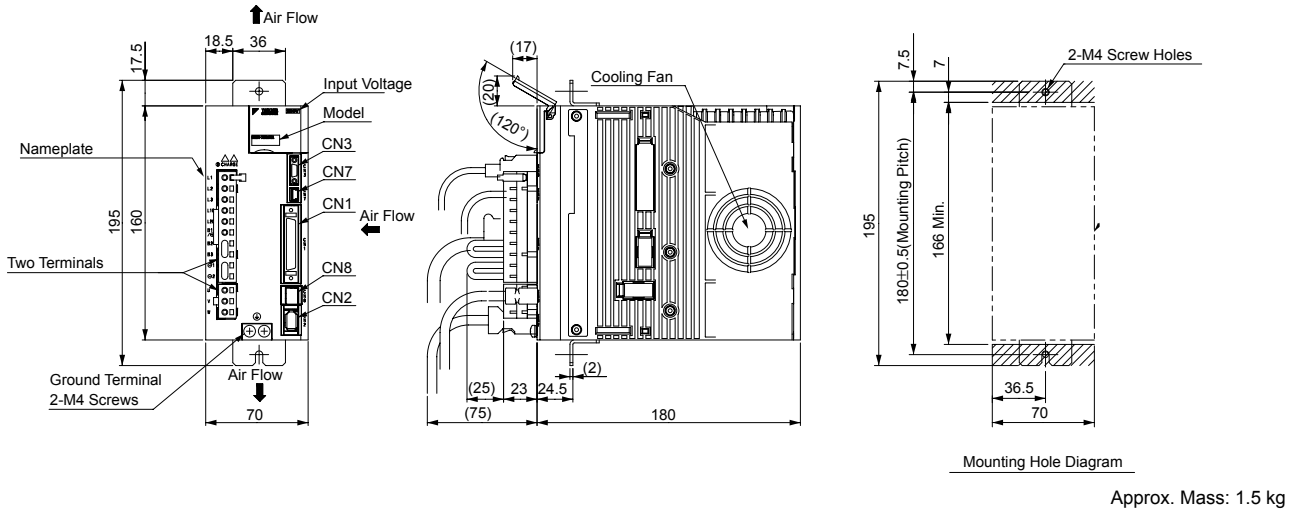
Approx. Mass: 0.9 kg

**External Dimensions** Units: mm

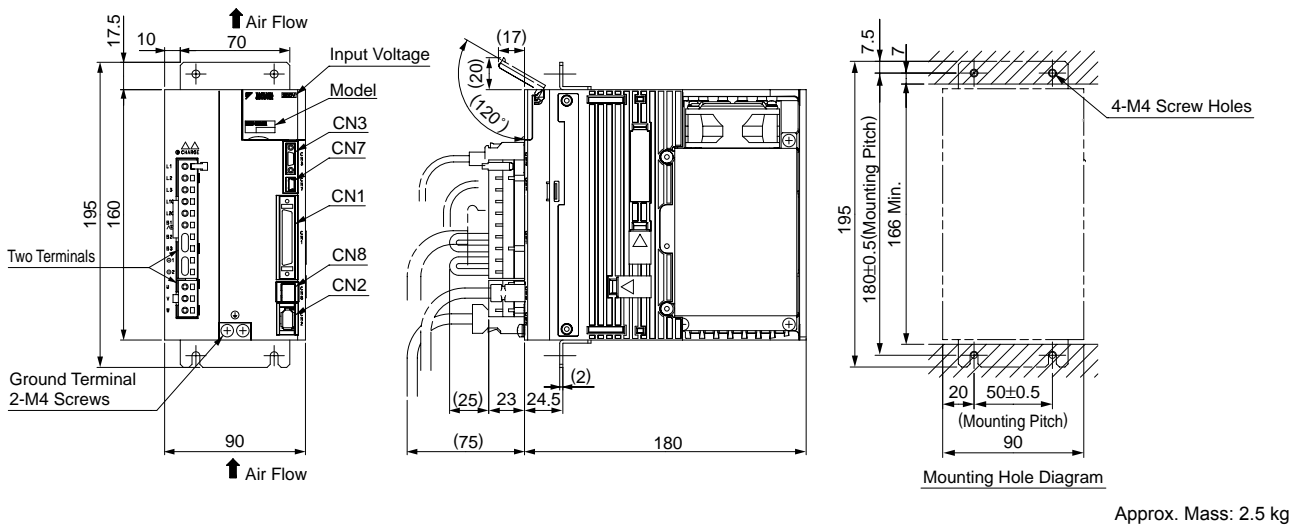
(4) Three-phase 200 VAC, Model: SGDV-2R8A0□A001



(5) Three-phase 200 VAC, Model: SGDV-3R8A0□A001, -5R5A0□A001, and -7R6A□0A001

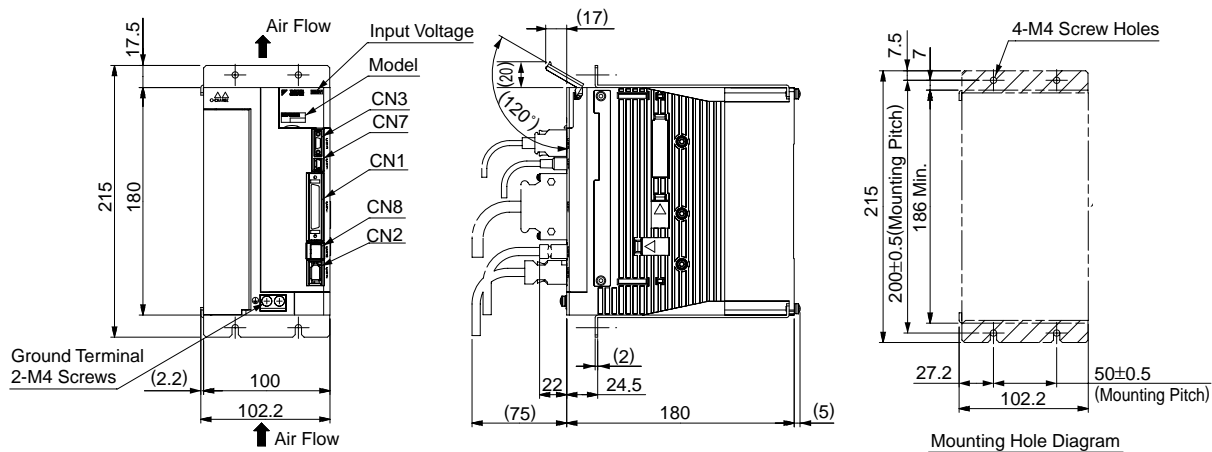


(6) Three-phase 200 VAC, Model: SGDV-120A0□A001



**External Dimensions** Units: mm

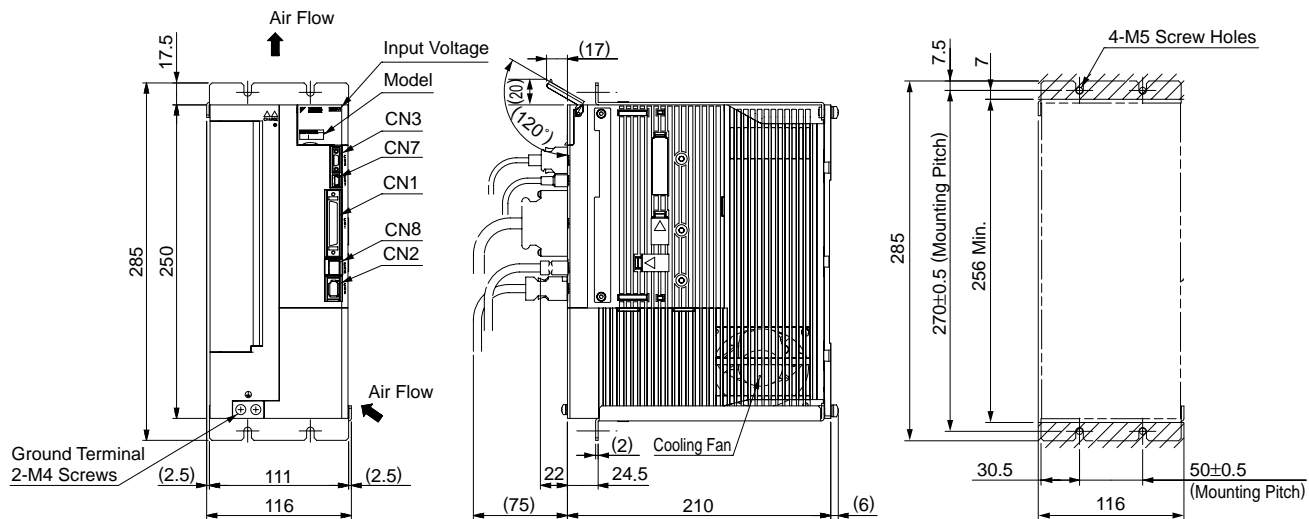
(7) Single-phase 200 VAC, Model: SGDV-120A0□A008000 (1.5 kW, single-phase input type)  
 Three-phase 200 VAC, Model: SGDV-180A0□A001 and -200A0□A001



Mounting Hole Diagram

Approx. Mass: 3.1 kg

(8) Three-phase 200 VAC, Model: SGDV-330A0□A001

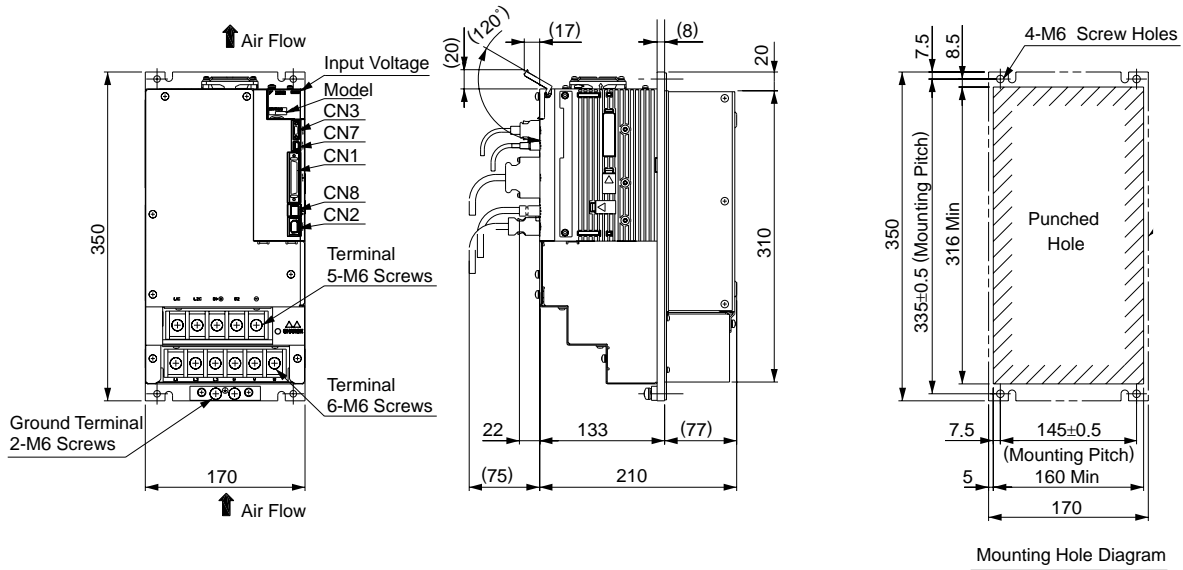


Mounting Hole Diagram

Approx. Mass: 6.0 kg

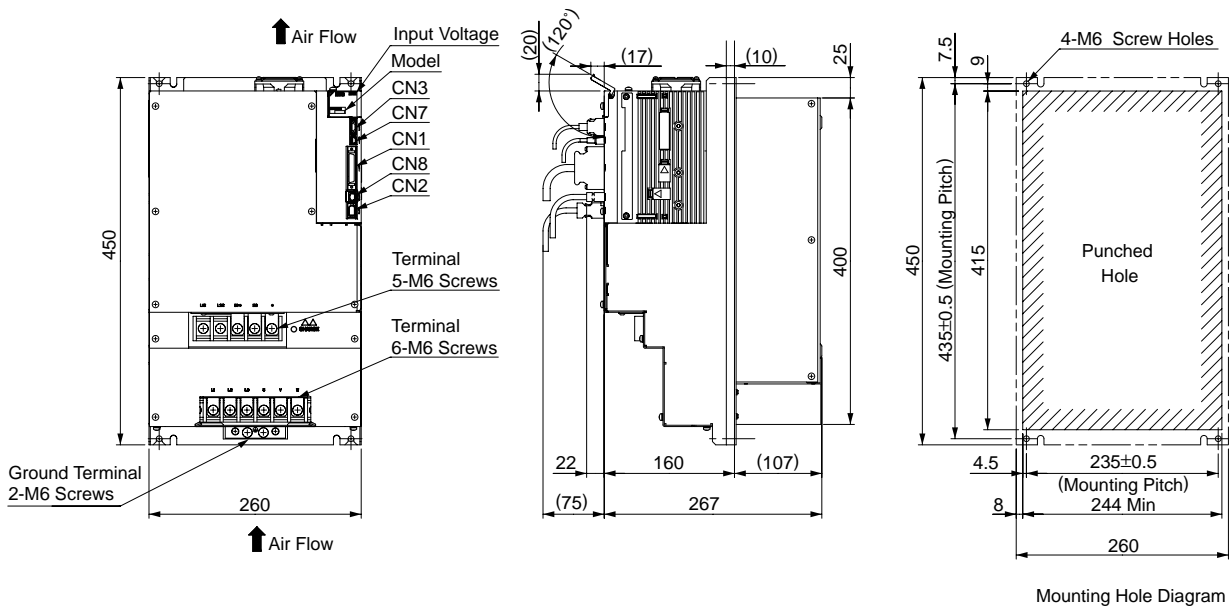
External Dimensions Units: mm

(9) Three-phase 200 VAC, SGDV-470A0□A001 and -550A□A001 (Duct-ventilated type)



Approx. Mass: 8.5 kg

(10) Three-phase 200 VAC, SGDV-590A0□A001 and -780A□A001 (Duct-ventilated type)

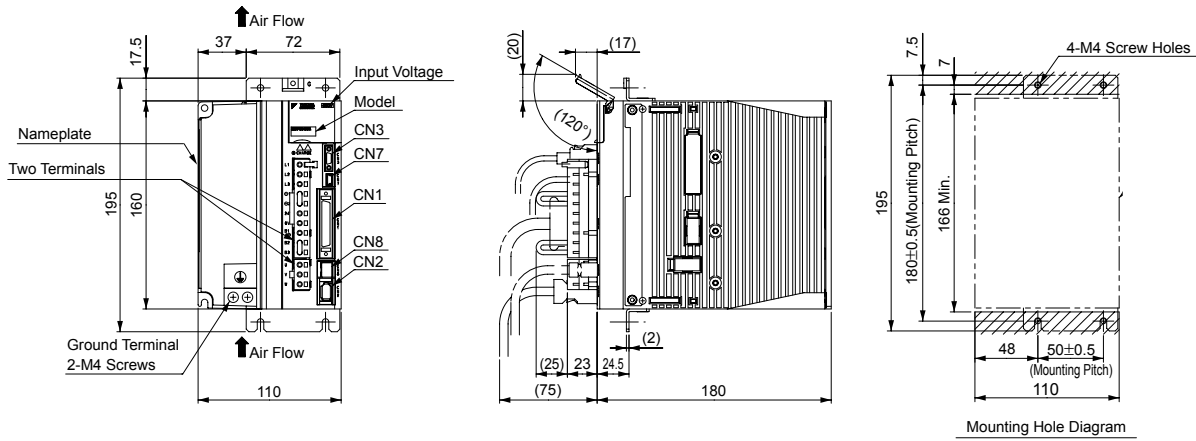


Approx. Mass: 16.0 kg



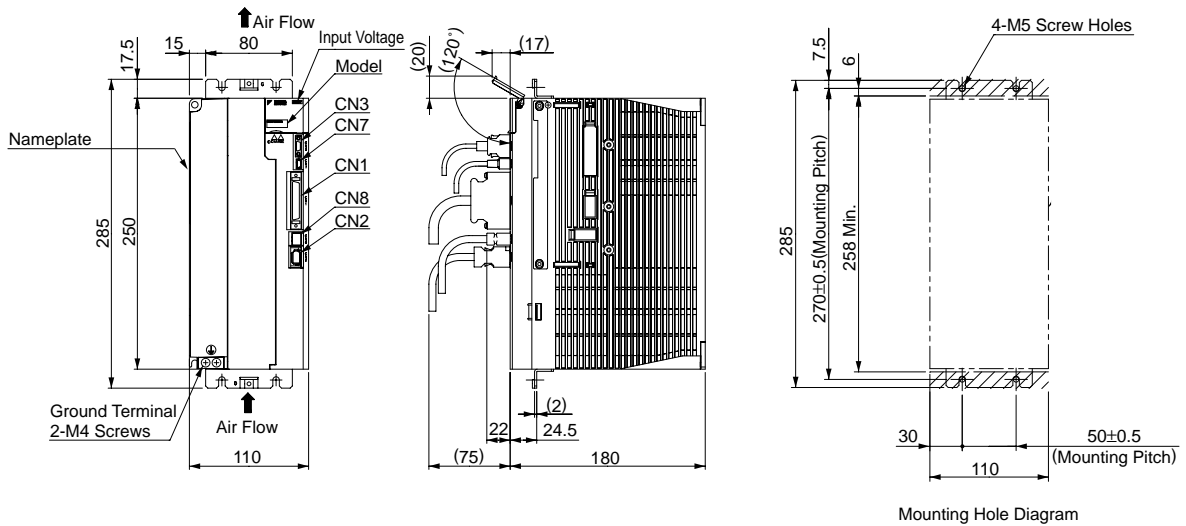
**External Dimensions** Units: mm

(11) Three-phase 400 VAC, Model: SGDV-1R9D0□A001, -3R5D0□A001, and -5R4D0□A001



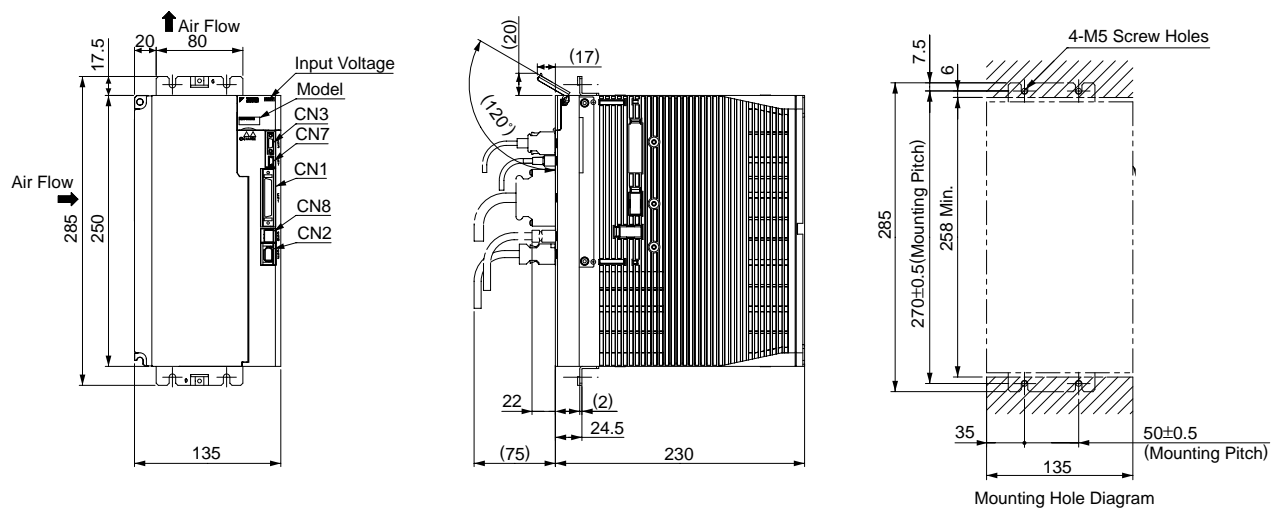
Approx. Mass: 2.7 kg

(12) Three-phase 400 VAC, Model: SGDV-8R4D0□A001 and -120D0□A001



Approx. Mass: 3.8 kg

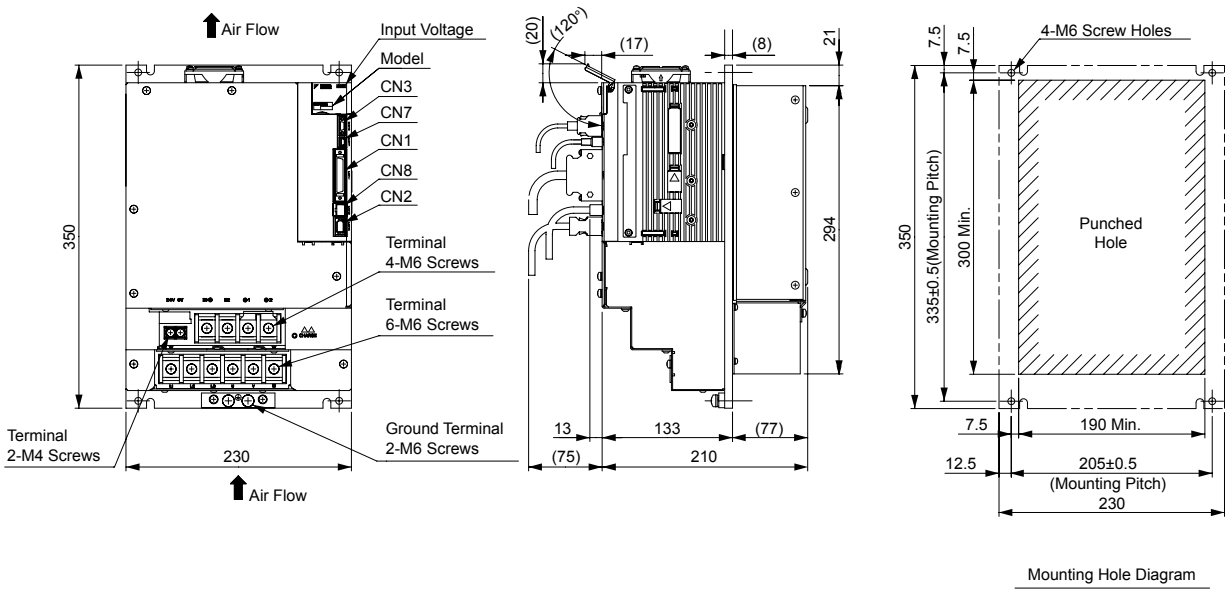
(13) Three-phase 400 VAC, Model: SGDV-170D0□A001



Approx. Mass: 5.7 kg

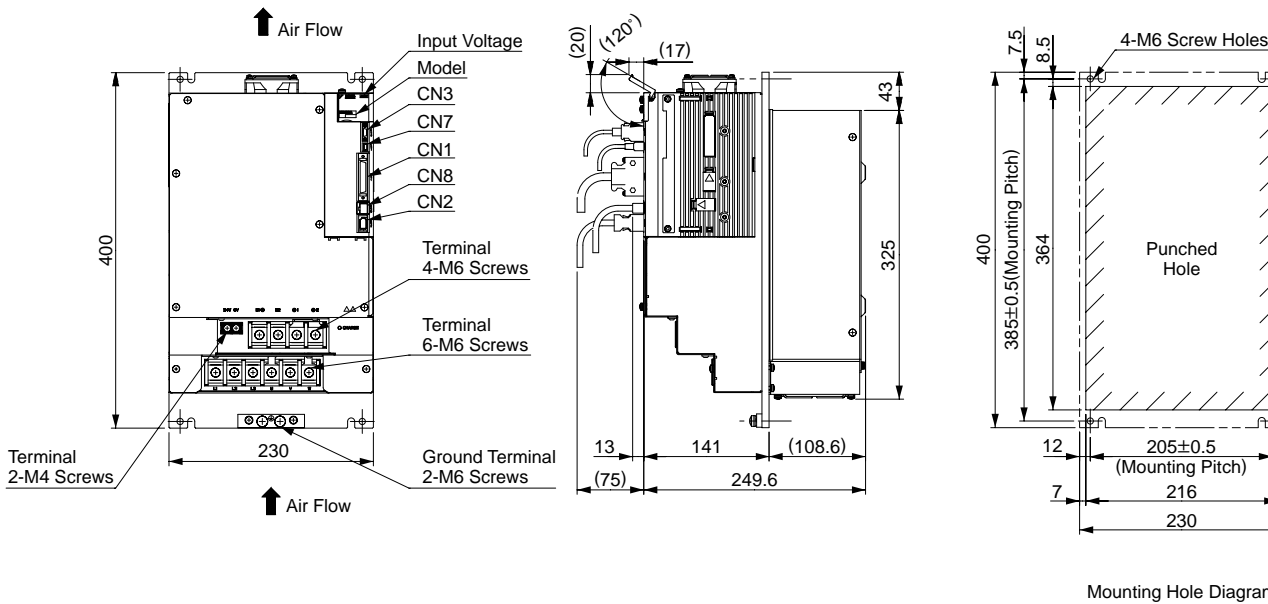
**External Dimensions** Units: mm

(14) Three-phase 400 VAC, Model: SGDV-210D0□A001 and -260D0□A001 (Duct-ventilated type)



Approx. Mass: 8.1 kg

(15) Three-phase 400 VAC, Model: SGDV-280D0□A001 and -370D0□A001 (Duct-ventilated type)



Approx. Mass: 13.6 kg

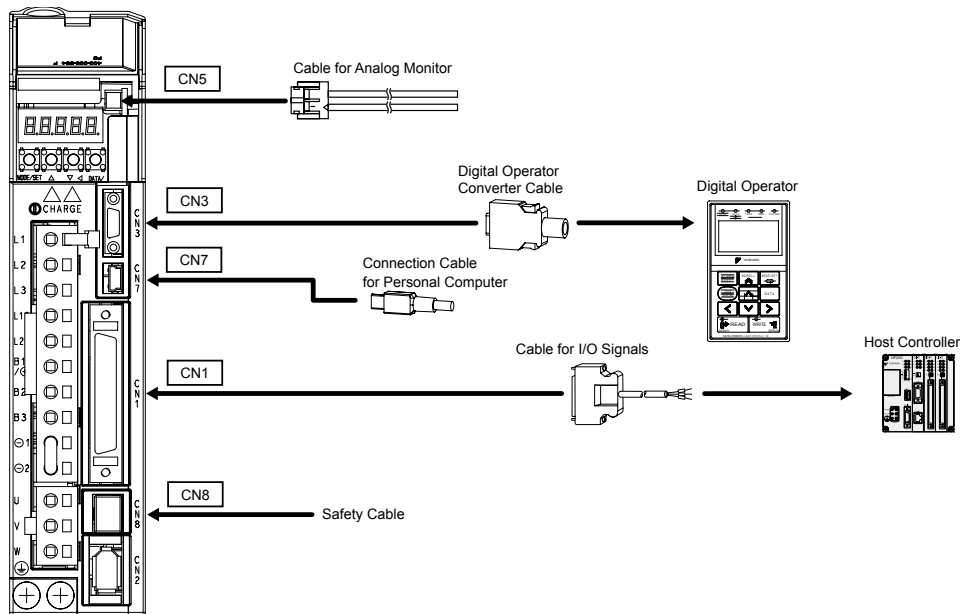
**Connectors for Rack-mounted SERVOPACKS**




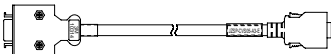

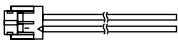
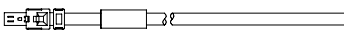
| Port | Model                  | Pin | Manufacturer                  |
|------|------------------------|-----|-------------------------------|
| CN1  | 10250-52A2PL           | 50  | Sumitomo 3M Ltd.              |
| CN2  | 53984-0671             | 6   | Molex Japan Co., Ltd.         |
| CN3  | HDR-EC14LFDTN-SLE-PLUS | 14  | Honda Tsushin Kogyo Co., Ltd. |
| CN7  | MNC23-5K5H00           | 5   | ADVANCED-CONNECTEK INC.       |
| CN8  | 1981080-1              | 8   | Tyco Electronics AMP K.K.     |

Note: The connectors above or their equivalents are used for SERVOPACKS.

## Selecting Cables

### ● Cables for **CN1** **CN3** **CN5** **CN7** **CN8** (Analog Voltage/Pulse Train Reference Type SERVOPACKs)



| Name  | Length  | Order No.  | Specifications  | Details   |     |
|---|---|--|---|---|-----|
| <b>CN1</b><br>Cables for I/O Signals                  | Connector Terminal Converter Unit             | JUSP-TA50PG-E  | Terminal Block and 0.5 m Connection Cable<br>            | (1)   |     |
|   | Cables with Loose Wires at One End            | 1 m  | JZSP-CSI01-1-E  | Cable with Loose Wires at Peripheral Devices<br> | (2) |
|   |   | 2 m  | JZSP-CSI01-2-E  |   |     |
|   | 3 m   | JZSP-CSI01-3-E   |   |   |     |
| <b>CN3</b>  | Digital Operator                              | JUSP-OP05A-1-E   | With Connection Cable (1 m)<br>                          | (3)   |     |
|   | Digital Operator Converter Cable <sup>1</sup> | 0.3 m  | JZSP-CVS05-A3-E<br>Cable with Connectors at Both Ends<br> | (4)   |     |
| <b>CN7</b><br>Connection Cables for Personal Computer | 2.5 m   | JZSP-CVS06-02-E  | Cable with Connectors at Both Ends<br>                    | (5)   |     |
| <b>CN5</b><br>Cables for Analog Monitor               | 1 m   | JZSP-CA01-E  | SERVOPACK End<br>  | (6)   |     |
| <b>CN8</b><br>Cables for Safety Functions             | Cables with Connector <sup>2</sup>            | 3 m  | JZSP-CVH03-03-E<br>                                       | (7)   |     |
|   | Connector Kit <sup>3</sup>                    | Contact Tyco Electronics AMP K.K.<br>Product name: Industrial Mini I/O D-shape Type1<br>Plug Connector Kit<br>Model: 2013595-1 |   |   |     |

<sup>1</sup> : A converter cable is required to use  $\Sigma$ -III series digital operators (model: JUSP-OP05A) for  $\Sigma$ -V series SERVOPACKs.

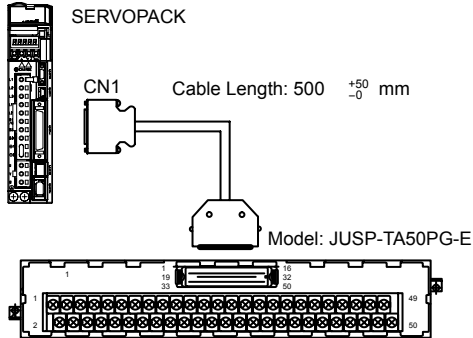
<sup>2</sup> : When using the safety function, connect this cable to the safety devices. Even when not using the safety function, use SERVOPACKs with the Safe Jumper Connector (model: JZSP-CVH05-E) connected.

<sup>3</sup> : Use the connector kit when you make cables yourself.

## Selecting Cables

### (1) Connector Terminal Converter Unit for CN1

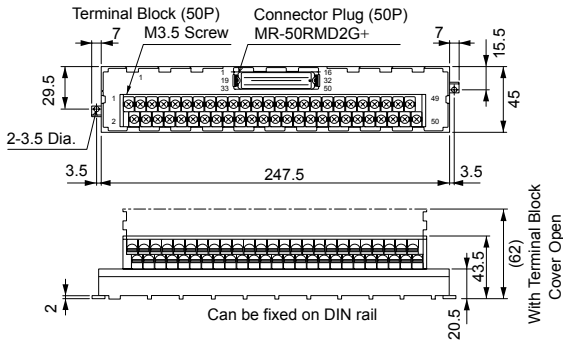
#### · Configurations



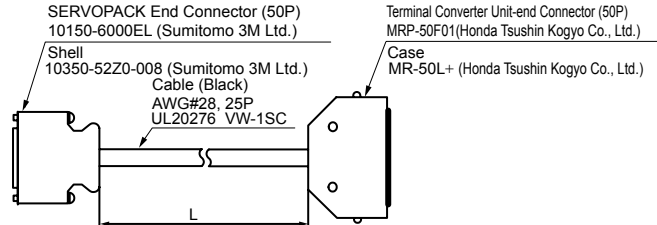
| Model           | Cable Length (L) |
|-----------------|------------------|
| JUSP-TA50PG-E   | 0.5 m            |
| JUSP-TA50PG-1-E | 1 m              |
| JUSP-TA50PG-2-E | 2 m              |

Note: Shaded items are non-stock.

#### · Dimensional Drawings of Terminal Block (Units: mm)

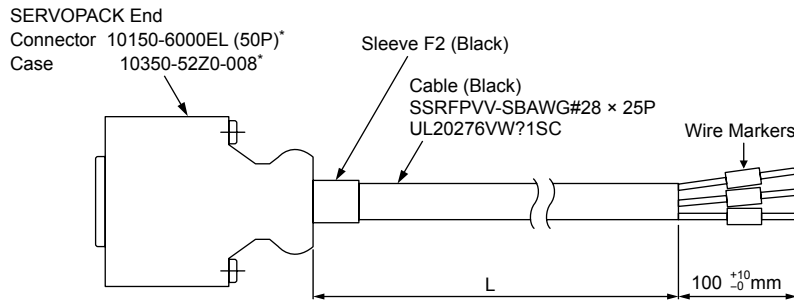


#### · Dimensional Drawings of Cable



### (2) Cable with Loose Wires at One End for CN1

#### · Dimensional Drawings of Cable



\* : Manufactured by Sumitomo 3M Ltd.

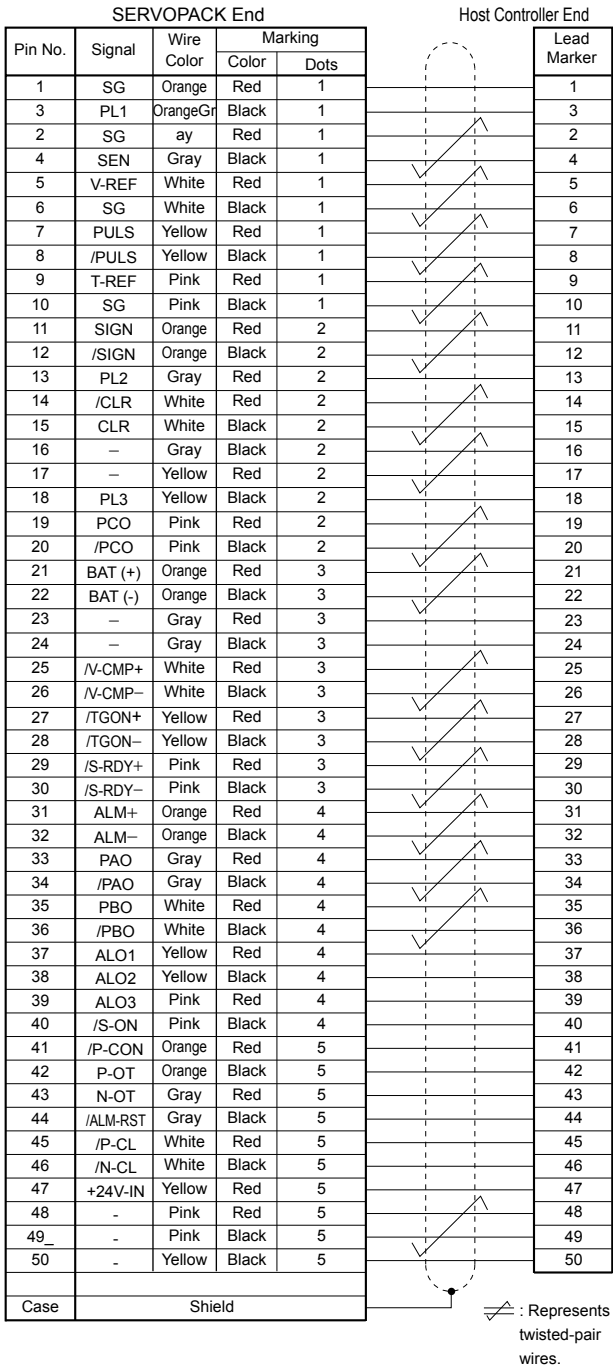
Note : See the next page for the connection diagram.

| Model          | Cable Length (L) |
|----------------|------------------|
| JZSP-CSI01-1-E | 1 m              |
| JZSP-CSI01-2-E | 2 m              |
| JZSP-CSI01-3-E | 3 m              |

## Selecting Cables Units: mm

### ● Cable with Loose Wires at One End for CN1

Connection Diagram of JZSP-CSI01-□-E Cable



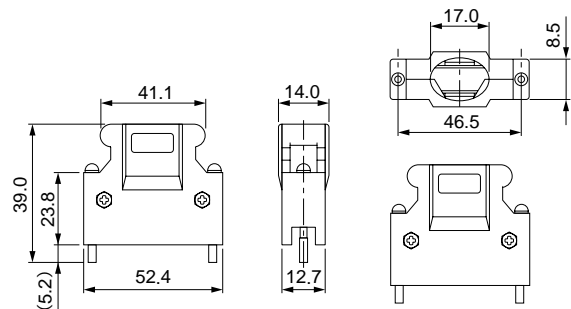
### ● Connector Kit for CN1

Use the following connector and cable to assemble the cable. The CN1 connector kit includes one case and one connector.

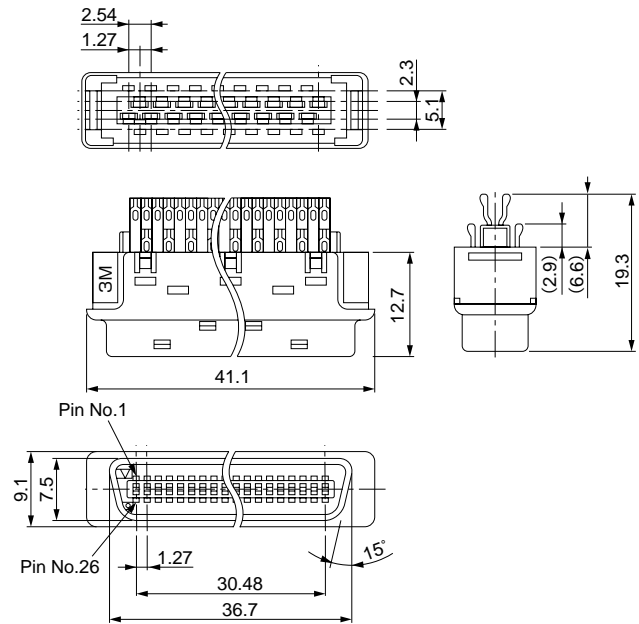
| Connector Kit Model | Case            |       | Connector                |     |
|---------------------|-----------------|-------|--------------------------|-----|
|                     | Model           | Qty   | Model                    | Qty |
| JZSP-CSI9-1-E       | 10350-52Z0-008* | 1 set | 10150-3000PE* (Soldered) | 1   |

\* : Manufactured by Sumitomo 3M Ltd.

#### · Dimensional Drawings of Case



#### · Dimensional Drawings of Connector

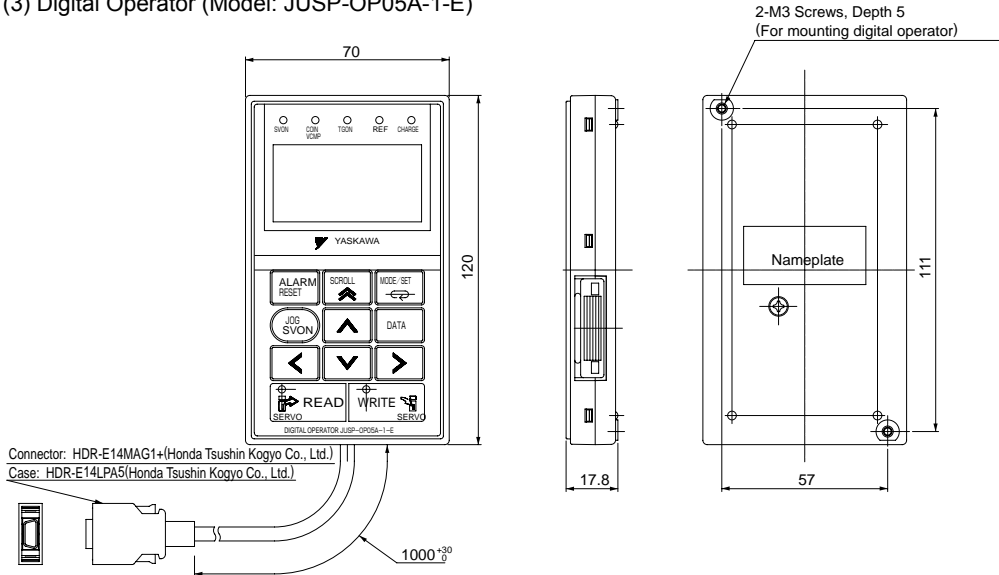


#### · Cable Size

| Item                    | Specifications                                  |
|-------------------------|---|
| Cable                   | Use twisted-pair or twisted-pair shielded wire. |
| Applicable Wires        | AWG 24, 26, 28, 30                              |
| Cable Finished Diameter | 16 dia. max.                                    |

Selecting Cables Units: mm

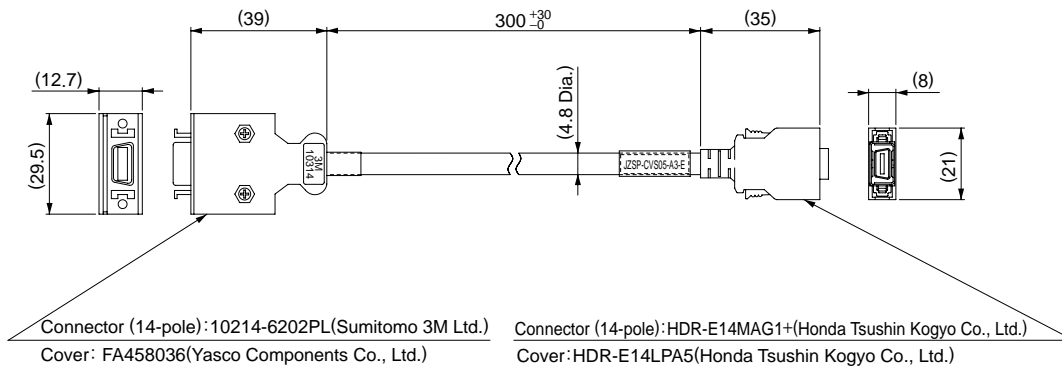
(3) Digital Operator (Model: JUSP-OP05A-1-E)



(4) Digital Operator Converter Cable for CN3  
 (Model: JZSP-CVS05-A3-E)

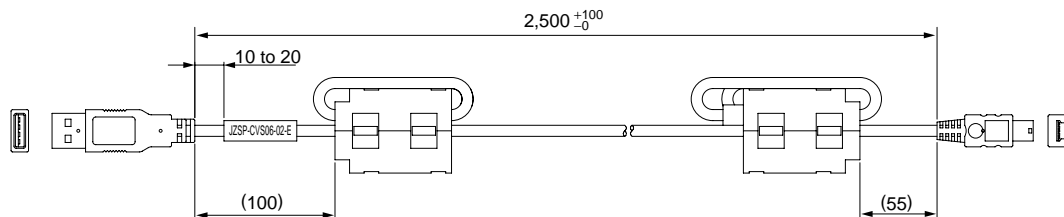
A converter cable is required to use  $\Sigma$ -III series digital operators (model: JUSP-OP05A) for  $\Sigma$ -V series SERVOPACKS.

· Dimensional Drawings



(5) Connection Cable for Personal Computer for CN7  
 (Model: JZSP-CVS06-02-E)

· Dimensional Drawings

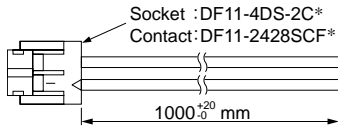


**IMPORTANT** Use a cable specified by Yaskawa.  
 When using other cables, operation cannot be guaranteed.

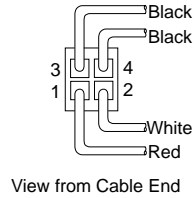
## Selecting Cables Units: mm

### (6) Cable for Analog Monitor for CN5 (Model: JZSP-CA01-E)

#### · Dimensional Drawings



\* : Manufactured by Hirose Electric Corporation.



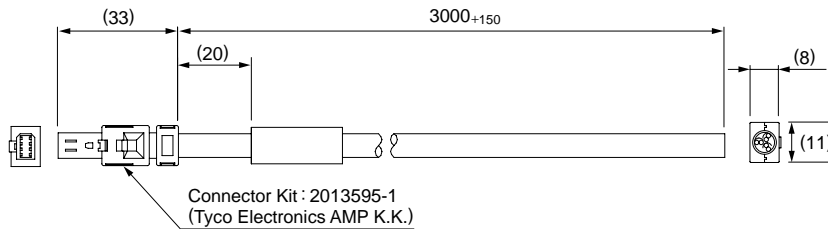
#### · Specifications

| Pin No. | Cable Color      | Signal           | Standard Settings                       |
|---------|------------------|------------------|---|
| 1       | Red              | Analog Monitor 2 | Motor speed : 1V/1000 min <sup>-1</sup> |
| 2       | White            | Analog Monitor 1 | Torque reference : 1V/100% rated torque |
| 3, 4    | Black (2 cables) | GND(0V)          | -                                       |

Note : The specifications above are factory settings. Monitor specifications can be changed by changing parameters Pn006 and Pn007.

### (7) Cable with Connector for CN8 (Model: JZSP-CVH03-03-E)

#### · Dimensional Drawings



#### · Specifications

| Pin No. | Signal   | Lead Color | Marking Color |
|---------|----------|------------|---------------|
| 1       | Not used | -          | -             |
| 2       | Not used | -          | -             |
| 3       | /HWBB1-  | White      | Black         |
| 4       | /HWBB1□  | White      | Red           |
| 5       | /HWBB2-  | Gray       | Black         |
| 6       | /HWBB2□  | Gray       | Red           |
| 7       | EDM1-    | Orange     | Black         |
| 8       | EDM1□    | Orange     | Red           |

