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OMRON

XD-□, XD-□-E

# XtraDrive



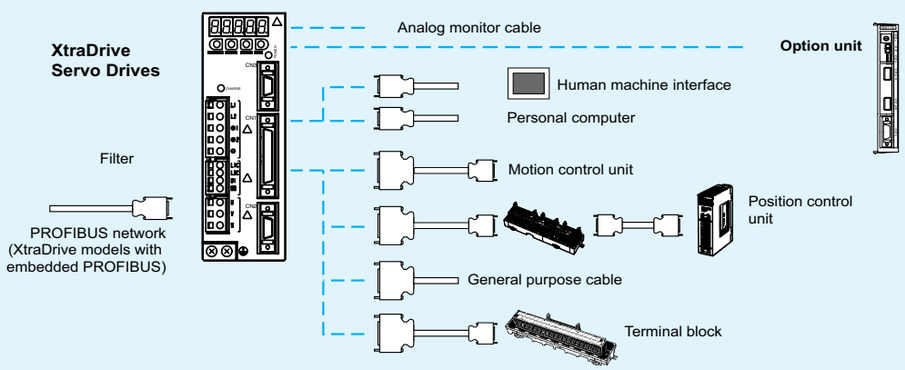
**Intelligent servo drive. Integrated controller and network connectivity.**

- NCT. Patented non-linear algorithm for tight control
- Very low tracking error with no overshoot and zero settling time
- Supports different servo motor encoder types
- PROFIBUS embedded in the drive available
- XtraDive model available with electronic CAM
- The ideal drive for linear motor control
- Fast hardware registration input
- Intuitive text programming language
- Automatic tuning of servo parameters for optimal settling time
- Oscilloscope available via XtraWare software tool
- CompoWay/F is supported, it allows remote access to the drives through the PLC

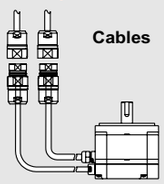
**Ratings**

- 230 VAC single-phase 30 W to 1.5 kW (4.77 Nm)
- 400 VAC three-phase 0.5 kW to 5.0 kW (28.4 Nm)

## System configuration

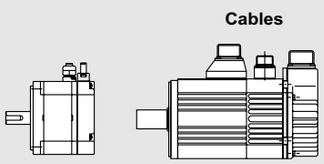



(Refer to chapter SmartStep servo motors)




R7M Servo Motor

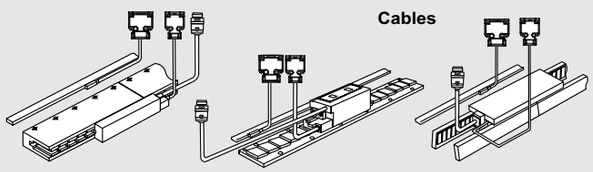
(Refer to chapter Sigma-II rotary motors)




SGMAH, SGMPH Servo Motor

SGMGH, SGMUH, SGMSH, SGMBH Servo Motor

(Refer to chapter Sigma-II linear motors)




SGLG_ linear Servo Motor

SGLF_ linear Servo Motor

SGLT_ linear Servo Motor



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## Servo motor / servo drive combination

| Servo motor | | | | Servo drive | | | |
|---|---|---|---|---|---|---|---|
| | Voltage | Rated torque | Capacity | 230 V (1-phase) | 230 V (1-phase) w PROFIBUS | 400 V (3-phase) | 400 V (3-phase) w PROFIBUS |
| **Sigma-II series motors (refer to the Sigma-II rotary motors chapter for details)** | | | | | | | |
| SGMAH (3000 min$^{-1}$)  | 230 V | 0.0955 N.m | 30 W | XD-P3-MN01-□ | XD-P3-MSD0-□ | - | - |
| | | 0.159 N.m | 50 W | XD-P5-MN01-□ | XD-P5-MSD0-□ | - | - |
| | | 0.318 N.m | 100 W | XD-01-MN01-□ | XD-01-MSD0-□ | - | - |
| | | 0.637 N.m | 200 W | XD-02-MN01-□ | XD-02-MSD0-□ | - | - |
| | | 1.27 N.m | 400 W | XD-04-MN01-□ | XD-04-MSD0-□ | - | - |
| | | 2.39 N.m | 750 W | XD-08-MN□ | XD-08-MSD0-□ | - | - |
| | 400 V | 0.955 N.m | 300 W | - | - | XD-05-TN□ | XD-05-TSD0-□ |
| | | 2.07 N.m | 650 W | - | - | XD-10-TN□ | XD-10-TSD0-□ |
| SGMPH (3000 min$^{-1}$)  | 230 V | 0.318 N.m | 100 W | XD-01-MN01-□ | XD-01-MSD0-□ | - | - |
| | | 0.637 N.m | 200 W | XD-02-MN01-□ | XD-02-MSD0-□ | - | - |
| | | 1.27 N.m | 400 W | XD-04-MN01-□ | XD-04-MSD0-□ | - | - |
| | | 2.39 N.m | 750 W | XD-08-MN□-□ | XD-08-MSD0-□ | - | - |
| | | 4.77 N.m | 1500 W | XD-15-MN□-□ | - | - | - |
| | 400 V | 0.637 N.m | 200 W | - | - | XD-05-TN□ | XD-05-TSD0-□ |
| | | 1.27 N.m | 400 W | - | - | XD-05-TN□ | XD-05-TSD0-□ |
| | | 2.39 N.m | 750 W | - | - | XD-10-TN□ | XD-10-TSD0-□ |
| | | 4.77 N.m | 1500 W | - | - | XD-15-TN□ | XD-15-TSD0-□ |
| SGMGH (1500 min$^{-1}$)  | 400 V | 2.84 N.m | 0.45 kW | - | - | XD-05-TN□ | XD-05-TSD0-□ |
| | | 5.39 N.m | 0.85 kW | - | - | XD-10-TN□ | XD-10-TSD0-□ |
| | | 8.34 N.m | 1.3 kW | - | - | XD-15-TN□ | XD-15-TSD0-□ |
| | | 11.5 N.m | 1.8 kW | - | - | XD-20-TN□ | XD-20-TSD0-□ |
| | | 18.6 N.m | 2.9 kW | - | - | XD-30-TN□ | XD-30-TSD0-□ |
| | | 28.4 N.m | 4.4 kW | - | - | XD-50-TN□ | - |
| SGMSH (3000 min$^{-1}$)  | 400 V | 3.18 N.m | 1.0 kW | - | - | XD-10-TN□ | XD-10-TSD0-□ |
| | | 4.90 N.m | 1.5 kW | - | - | XD-15-TN□ | XD-15-TSD0-□ |
| | | 6.36 N.m | 2.0 kW | - | - | XD-20-TN□ | XD-20-TSD0-□ |
| | | 9.80 N.m | 3.0 kW | - | - | XD-30-TN□ | XD-30-TSD0-□ |
| | | 12.6 N.m | 4.0 kW | - | - | XD-50-TN□ | - |
| | | 15.8 N.m | 5.0 kW | - | - | XD-50-TN□ | - |
| SGMUH (6000 min$^{-1}$)  | 400 V | 1.59 N.m | 1.0 kW | - | - | XD-10-TN□ | XD-10-TSD0-□ |
| | | 2.45 N.m | 1.5 kW | - | - | XD-15-TN□ | XD-15-TSD0-□ |
| | | 4.9 N.m | 3.0 kW | - | - | XD-30-TN□ | XD-30-TSD0-□ |
| | | 6.3 N.m | 4.0 kW | - | - | XD-50-TN□ | - |
| **SmartStep series motors (refer to the SmartStep servo motors chapter for details)** | | | | | | | |
| R7M-A (3000 min$^{-1}$)  | 230 V | 0.0955 N.m | 30 W | XD-P3-MN01-□ | - | - | - |
| | | 0.159 N.m | 50 W | XD-P5-MN01-□ | - | - | - |
| | | 0.318 N.m | 100 W | XD-01-MN01-□ | XD-01-MSD0-□ | - | - |
| | | 0.637 N.m | 200 W | XD-02-MN01-□ | XD-02-MSD0-□ | - | - |
| | | 1.27 N.m | 400 W | XD-04-MN01-□ | XD-04-MSD0-□ | - | - |
| | | 2.39 N.m | 750 W | XD-08-MN□ | XD-08-MSD0-□ | - | - |
| R7M-AP (3000 min$^{-1}$)  | 230 V | 0.318 N.m | 100 W | XD-01-MN01-□ | XD-01-MSD0-□ | - | - |
| | | 0.637 N.m | 200 W | XD-02-MN01-□ | XD-02-MSD0-□ | - | - |
| | | 1.27 N.m | 400 W | XD-04-MN01-□ | XD-04-MSD0-□ | - | - |
| | | 2.39 N.m | 750 W | XD-08-MN□ | XD-08-MSD0-□ | - | - |
| **Sigma linear motors (refer to the Sigma linear motors chapter for details)** | | | | | | | |
| SGLGW Linear motors  | 230 V | Refer to the linear motors chapter for details | | | | | |
| SGLFW Linear motors  | 230 V, 400 V | Refer to the linear motors chapter for details | | | | | |
| SGLTW Linear motors  | 400 V | Refer to the linear motors chapter for details | | | | | |

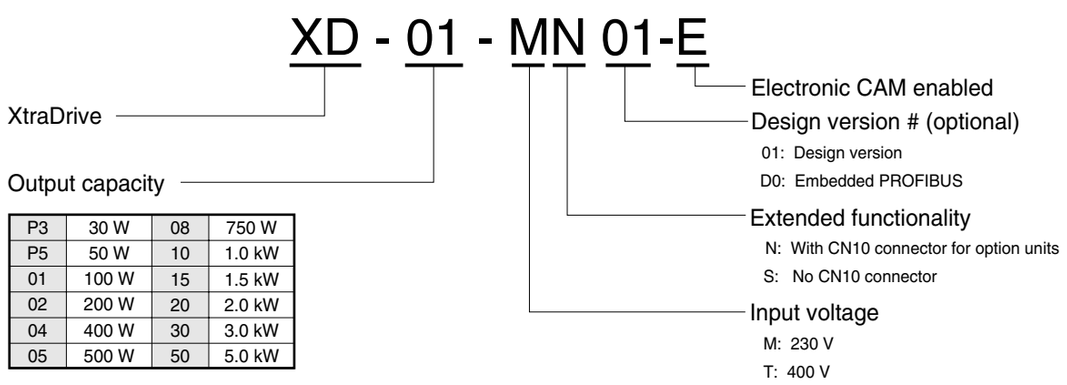


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## Type designation

### Drive




| | | | |
|---|---|---|---|
| P3 | 30 W | 08 | 750 W |
| P5 | 50 W | 10 | 1.0 kW |
| 01 | 100 W | 15 | 1.5 kW |
| 02 | 200 W | 20 | 2.0 kW |
| 04 | 400 W | 30 | 3.0 kW |
| 05 | 500 W | 50 | 5.0 kW |

## Servo drive specifications

### Single-phase, 230 V

| Servo drive type | | | XD-P3-M□ | XD-P5-M□ | XD-01-M□ | XD-02-M□ | XD-04-M□ | XD-08-M□ | XD-15-M□ |
|---|---|---|---|---|---|---|---|---|---|
| Applicable servo motor | | SGMAH-□ | A3A□ | A5A□ | 01A□ | 02A□ | 04A□ | 08A□ | 15A□ |
| | | SGMPH-□ | - | - | 01A□ | 02A□ | 04A□ | 08A□ | - |
| | | R7M-□ | A03030-□ | A05030-□ | A10030-□ | A20030-□ | A40030-□ | A75030-□ | - |
| | | R7M-□ | - | - | AP10030-□ | AP20030-□ | AP40030-□ | AP75030-□ | - |
| Basic specifications | Max. applicable motor capacity W | | 30 | 50 | 100 | 200 | 400 | 750 | 1500 |
| | Continuous output current Arms | | 0.44 | 0.64 | 0.91 | 2.1 | 2.8 | 5.7 | 11.6 |
| | Max. output current Arms | | 1.3 | 2.0 | 2.8 | 6.5 | 8.5 | 13.9 | 28 |
| | Input power | Main circuit | For single-phase, 200 to 230 VAC + 10 to -15% | | | | | | |
| | Supply | Control circuit | For single-phase, 200 to 230 VAC + 10 to -15% | | | | | | |
| | Control method | | Single phase full-wave rectification / IGBT / PWM / sine-wave current drive method | | | | | | |
| | Feedback | | Serial encoder (incremental/absolute value) | | | | | | |
| | Conditions: Usage/storage temperature | | 0 to +55 °C / -20 to 85 °C | | | | | | |
| | Conditions: Usage/storage humidity | | 90%RH or less (non-condensing) | | | | | | |
| | Conditions: Altitude | | 1000 m or less above sea level | | | | | | |
| | Conditions: Vibration/shock resistance | | 4.9 $m/s^2$ / 19.6 $m/s^2$ | | | | | | |
| | Configuration | | Base mounted | | | | | | |
| | Approx. weight Kg | | 0.8 | | | | 1.1 | 1.7 | 3.8 |

### Three-phase, 400 V

| Servo drive type | | | XD-05-T□ | XD-10-T□ | XD-15-T□ | XD-20-T□ | XD-30-T□ | XD-50-T□ |
|---|---|---|---|---|---|---|---|---|
| Applicable servo motor | | SGMAH-□ | 03D□ | 07D□ | - | - | - | - |
| | | SGMPH-□ | 02D□, 04D□ | 08D□ | 15D□ | - | - | - |
| | | SGMGH-□ | 05D□ | 09D□ | 13D□ | 20D□ | 30D□ | 44D□ |
| | | SGMSH-□ | - | 10D□ | 15D□ | 20D□ | 30D□ | 40D□/50D□ |
| | | SGMUH-□ | - | 10D□ | 15D□ | - | 30D□ | 40D□ |
| Basic specifications | Max. applicable motor capacity kW | | 0.45 | 1.0 | 1.5 | 2.0 | 3.0 | 5.0 |
| | Continuous output current Arms | | 1.9 | 3.5 | 5.4 | 8.4 | 11.9 | 16.5 |
| | Max. output current Arms | | 5.5 | 8.5 | 14 | 20 | 28 | 40.5 |
| | Input power | Main circuit | For three-phase, 380 to 480 VAC + 10 to -15% (50/60 Hz) | | | | | |
| | Supply | Control circuit | 24 VDC+15% | | | | | |
| | Control method | | Three phase full-wave rectification / IGBT / PWM / sine-wave current drive method | | | | | |
| | Feedback | | Serial encoder (incremental/absolute value) | | | | | |
| | Conditions: Usage/storage temperature | | 0 to +55 °C / -20 to +85 °C | | | | | |
| | Conditions: Usage/storage humidity | | 90%RH or less (non condensing) | | | | | |
| | Conditions: Altitude | | 1000 m or less above sea level | | | | | |
| | Conditions: Vibration/shock resistance | | 4.9 $m/s^2$ / 19.6 $m/s^2$ | | | | | |
| | Configuration | | Base mounted | | | | | |
| | Approx. weight Kg | | 2.8 | | | 3.8 | | 5.5 |



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## General specifications

| | | | | |
|---|---|---|---|---|
| Speed/torque control mode | Performance | Speed control range | | 1:5000 |
| | | Speed variance | Load variance | During 0 to 100% load ±0.01% max. (at rated speed) |
| | | | Voltage variance | Rated voltage ±10%: 0% (at rated speed) |
| | | | Temperature variance | 25 ±25 °C: ±0.1 % max (at rated speed) |
| | | Frequency characteristics | | 400Hz (at $J_L = J_M$) |
| | | Torque control accuracy (reproducibility) | | ±2% |
| | | Soft start time setting | | 0 to 10s (acceleration, deceleration can each be set.) |
| | Input signal | Speed reference input | Reference voltage | ±6VDC (forward motor rotation if positive reference) at rated speed: Set at delivery<br>Variable setting range: ±2 to ±10 VDC at rated speed/ max. input voltage: ±12 V |
| | | | Input empedance | Approx. 14 kΩ |
| | | | Circuit time constant | - |
| | | Torque reference input | Reference voltage | ±3 VDC (forward rotation if positive reference) at rated speed: Set at delivery<br>Variable setting range ±1 to ±10 VDC at rated torque reference |
| | | | Imput impedance | Approx. 14 KΩ |
| | | | Circuit time constant | Approx. 47 µs |
| | | Contact speed reference | Rotation direction selection | With P control signal |
| | | | Speed selection | With forward/reverse current limit signal (speed 1 to 3 selection), servo motor stops or another control method is used when both are OFF. |
| Position control mode | Performance | Bias Setting | | 0 to 450 $min^{-1}$ (setting resolution: 1 $min^{-1}$) |
| | | Feed forward compensation | | 0 to 100 % (setting resolution: 1%) |
| | | Position completed width setting | | 0 to 250 command units (setting resolution: 1 command unit) |
| | Input signal | Command pulse | Input pulse type | Sign + pulse train, 90° phase displacement 2-phase pulse (A-phase+ B-phase) or CCW/CW pulse train |
| | | | Input pulse form | Line driver (+5 V level) , open collector (+5 V or +12 level) |
| | | | Input pulse frequency | 0 to 500 Kpps (200 Kpps max. at open collector) |
| | | Control signal | | Clear signal (input pulse is same as reference pulse) |
| I/O signal | | Position signal output | | A-phase, B.phase, C-phase, (S-phase): line driver output S-phase is for absolute encoder only. |
| | | Sequence input signal | | Servo ON, P control (or control mode switching, zero clamp, command pulse inhibit), forward/reverse run prohibit, alarm reset, forward/ reverse current limit (or internal speed switching) |
| | | Sequence output signal | | Servo alarm, alarm codes (3-bit output): CN1 output terminal is fixed |
| | | | | It is possible to output three types of signals form among: positioning complete (speed agree), motor rotation, servo ready, current limit, speed limit, brake release, warning, NEAR, and zero point pulse signal |
| Integrated functions | | Communications | Interface | Digital operator (hand- held type), RS-422 port for PCs, etc. (RS-232C ports under some conditions) |
| | | | 1:N communications | N may equal up to 14 when an RS-422A port is used.<br>CompoWay/F protocol is supported on firmware version "3.20C" and higher |
| | | | Axis address setting | Set by user setting |
| | | | Functions | Status display, user constant setting monitor display, alarm traceback display, JOG run /autotuning operations, and graphing functions for speed/torque command signal, etc |
| | | | PROFIBUS | (Only models with PROFIBUS) PROFIBUS DP slave, node address 0-125 set by rotary switches, baud rate from 9.6 kbps to 12 Mbps. LED Indicators: Bus failure and system failure |
| | | Auto tuning function | | Position speed loop gain and integral time constant can be automatically set. |
| | | Dynamic brake (DB) | | Operates during main power OFF, servo alarm, servo OFF or overtravel |
| | | Regenerative processing | | Regenerative resistor externally mounted (option) |
| | | Overtravel (OT) prevention function | | DB stop, deceleration stop or coast to stop during P-OT, N-OT operation |
| | | Encoder divider function | | Optional division possible |
| | | Electronic gearing | | 0,01< A/B<100 |
| | | Internal speed setting function | | 3 speeds may be set internally |
| | | Protective functions | | Overcurrent, overvoltage, insufficient voltage, overload, main circuit sensor error, heatsink overheat, power phase loss, overflow, overspeed, encoder error, runaway, CPU error, parameter error, etc. |
| | | Analog monitor functions for supervision | | Integrates analog monitor connectors for supervision of the speed and torque reference signals, etc. |
| | | Display functions | | CHARGE, POWER, 7-segments LEDx5<br>(Integrated digital operator function, not available in models with PROFIBUS) |
| | | Others | | Reverse connection, zero search, automatic motor discrimination function, and DC reactor connection terminal for high frequency power suppression function (except: 6 to 15 kW) |

## I/O specifications

### Terminal specifications

| Symbol | Name | Function | |
|---|---|---|---|
| L1, L2 or L1, L2, L3 | Main circuit AC input terminal | AC power input terminals for the main circuit | |
| U | Servo motor connection terminal | Red | Terminals for outputs to the servo motor. |
| V | | White | |
| W | | Blue | |
| L1C, L2C | Control power input terminal | AC power input terminals for the control circuit. | |
| ⏚ | Frame ground | Ground terminal. Ground to a maximum of 100 Ω. (class 3) | |
| B1, B2 or B1, B2, B3 | Main circuit DC output terminal | 5 kW or less: Connect an external regenerative resistor if regenerative energy is high.<br>5.5 kW: There is no internal regenerative resistor. Be sure to connect an external regenerative resistor unit. | |
| ⊕1, ⊕2 | DC reactor connection terminal for suppressing power supply harmonic waves | Normally, short ⊕1 and ⊕2. If a countermeasure against power supply harmonic waves is needed, connect a DC reactor between ⊕1 and ⊕2. | |
| ⊕ | Main circuit DC output terminal (+) | Normally, not connected.<br>This terminal exists on the servo drives with a capacity opf 6.0 kW or higher only. | |
| ⊖ | Main circuit DC output terminal (n-) | Normally, not connected. | |



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## Encoder connector (CN2)

| Pin | Symbol | Function |
|---|---|---|
| 1, 2, 3 | PPG0V | Encoder power supply GND |
| 4, 5, 6 | PPG5V | Encoder power supply +5 V |
| 7 | - | - |
| 8 | PS+ | Encoder serial signal input |
| 9 | PS– | Encoder serial signal input |
| 10 | SePG5V | Serial encoder power supply +5 V (Sigma-II) |
| 11 | SePG0V | Serial encoder power supply GND (Sigma-II) |
| 12 | BAT+ | Battery + (used only with absolute encoder) |
| 13 | BAT- | Battery - (used only with absolute encoder) |
| 14 | PC+ | Encoder + C-phase input |
| 15 | PC– | Encoder – C-phase input |
| 16 | A+ | Encoder + A-phase input |
| 17 | A– | Encoder – A-phase input |
| 18 | B+ | Encoder + B-phase input |
| 19 | B– | Encoder – B-phase input |
| 20 | - | - |
| Shell | FG | Cable shield ground |

## I/O signals (CN1) - input signals

| Pin No. | Signal Name | | Function | |
|---|---|---|---|---|
| 40 | Common | /S-ON | Servo ON: Turns ON the servo motor when the gate block in the inverter is released. | |
| 41 | | /P-CON | Function selected by parameter. | |
| | | | Proportional control reference | Switches the speed control loop from PI (proportional/ integral) to P (proportional) control when ON. |
| | | | Direction reference | With the internal set speed selected: switch the rotation direction. |
| | | | Control mode switching | Position ↔ speed<br>Position ↔ torque<br>Torque ↔ speed<br>} Enables control mode switching. |
| | | | Zero-clamp reference | Speed control with zero-clamp function: referencevspeed is zero when ON. |
| | | | Reference pulse block | Position control with reference pulse stop: stops reference pulse input when ON. |
| 42<br>43 | | P-OT<br>N-OT | Forward run prohibited<br>Reverse run prohibited | Overtravel prohibited: stops servo motor when movable part travels beyond the allowable range of motion. |
| 45<br>46 | | /P-CL<br>/N-CL | Function selected by parameter. | |
| | | | Forward external torque limit ON<br>Reverse external torque limit ON | Current limit function enabled when ON. |
| | | | Internal speed switching | With the internal set speed selected: switches the internal speed settings. |
| 44 | | /ALM-RST | Alarm reset: releases the servo alarm state. | |
| 47 | | +24VIN | Control power supply input for sequence signals: users must provide the +24 V power supply.<br>Allowable voltage fluctuation range: 11 to 25 V | |
| 4 (2) | | SEN | Initial data request signal when using an absolute encoder. | |
| 21<br>22 | | BAT (+)<br>BAT (-) | Connecting pin for the absolute encoder backup battery.<br>Do not connect when a battery is connected to the host controller. | |
| 5 (6) | Speed | V-REF | Speed reference speed input: ±2 to ±10 V/rated motor speed (input gain can be modified using a parameter.) | |
| 9 (10) | Torque | T-REF | Torque reference input: ±1 to ±10 V/rated motor torque (input gain can be modified using a parameter.) | |
| 7<br>8<br>11<br>12 | Position | PULS<br>/PULS<br>SIGN<br>/SIGN | Reference pulse input<br>for line driver only | Input mode is set from the following pulses.<br>Sign + pulse string<br>CCW/CW pulse<br>Two-phase pulse (90° phase differential) |
| 15<br>14 | | CLR<br>/CLR | Positional error pulse clear input: clears the positional error pulse during position control. | |
| 3<br>13<br>18 | | PL1<br>PL2<br>PL3 | +12 V pull-up power is supplied when PULS, SIGN, and CLR reference signals are open-collector outputs<br>(+12 V power supply is built into the SERVOPACK). | |

**Note: 1.** Pin numbers in parentheses () indicate signal grounds.

**2.** The functions allocated to /S-ON, /P-CON. P-OT, N-OT, /ALM-RST, /P-CL, and /N-CL input signals can be changed by using the parameters.

**3.** The voltage input range for speed and torque references is a maximum of ±12 V.



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## I/O signals (CN1) - output signals

| Pin No. | Signal name | | Function | |
|---|---|---|---|---|
| 31<br>32 | Common | ALM+<br>ALM- | Servo alarm: Turns OFF when an error is detected. | |
| 27<br>28 | | /TGON+<br>/TGON- | Detection during servo motor rotation: detects when the servo motor is rotating at a speed higher than the motor speed setting. Detection speed can be set by using the parameters. | |
| 29<br>30 | | /S-RDY+<br>/S-RDY- | Servo ready: ON if there is no servo alarm when the control/main circuit power supply is turned ON. | |
| 33 (1)<br>34 | | PAO<br>/PAO | Phase-A signal | Converted two-phase pulse (phases A and B) encoder output signal and zero-point pulse (phase C) signal: RS-422 or the equivalent (proper line receiver is SN75175 manufactured by Texas Instruments or the equivalent corresponding to MC3486.) |
| 35<br>36 | | PBO<br>/PBO | Phase-B signal | |
| 19<br>20 | | PCO<br>/PCO | Phase-C signal | |
| 48<br>49 | | PSO<br>/PSO | Phase-S signal | With an absolute encoder: Outputs serial data corresponding to the number of revolutions (RS-422 or the equivalent) |
| 37<br>38<br>39 (1) | | ALO1<br>ALO2<br>ALO3 | Alarm code output: Outputs 3-bit alarm codes.<br>Open-collector: 30 V and 20 mA rating maximum | |
| 16 | | TMON | Analog monitor signal | |
| 17 | | VTG | Analog monitor signal | |
| Shell | | FG | Connected to frame ground if the shield wire of the I/O signal cable is connected to the connector shell. | |
| 25<br>26 | Speed | /V-CMP+<br>/V-CMP- | Speed coincidence (output in speed control mode): Detects whether the motor speed is within the setting range and if it matches the reference speed value. | |
| 25<br>26 | Position | /COIN+<br>/COIN- | Positioning completed (output in position control mode): Turns ON when the number of positional error pulses reaches the value set. The setting is the number of positional error pulses set in reference units (input pulse units defined by the electronic gear). | |
| - | Reserved | /CLT<br>/VLT<br>/BK<br>/WARN<br>/NEAR | Reserved terminals<br>The functions allocated to /TGON, /S-RDY, and /V-CMP (/COIN) can be changed by using the parameters. /CLT, /VLT, /BK, /WARN, and /NEAR signals can also be changed. | |
| 23<br>24<br>50 | | - | Terminals not used<br>Do not connect relays to these terminals. | |

**Note: 1.** Pin numbers in parentheses () indicate signal grounds.

**2.** The functions allocated to /TGON, /S-RDY, and /V-CMP (/COIN) can be changed by using the parameters. /CLT, /VLT, /BK, /WARN, and /NEAR signals can also be changed.



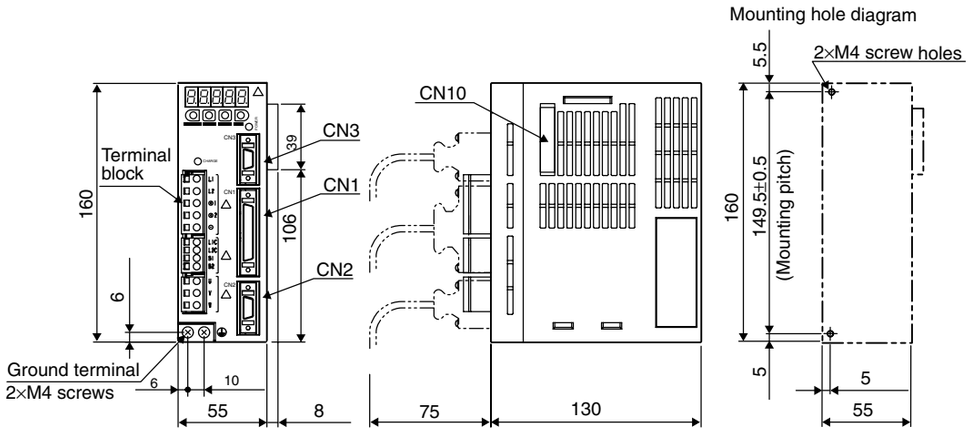
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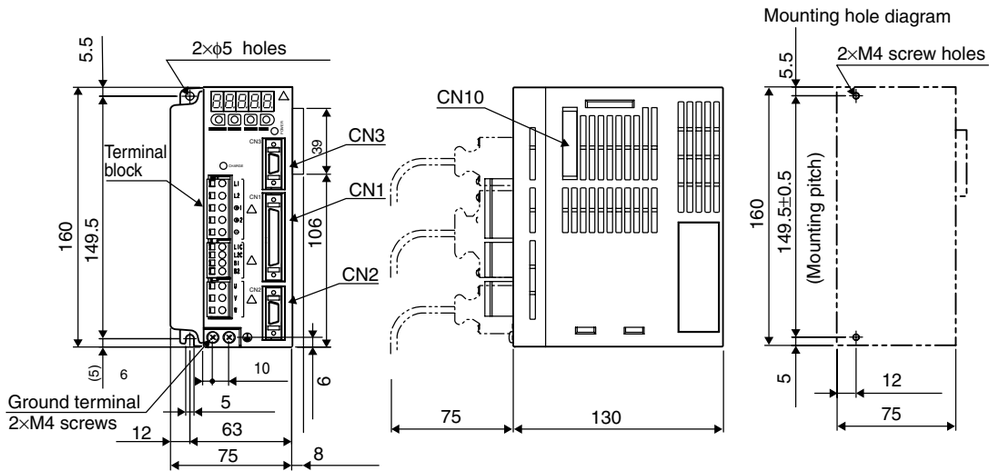
## Dimensions

### Servo drives

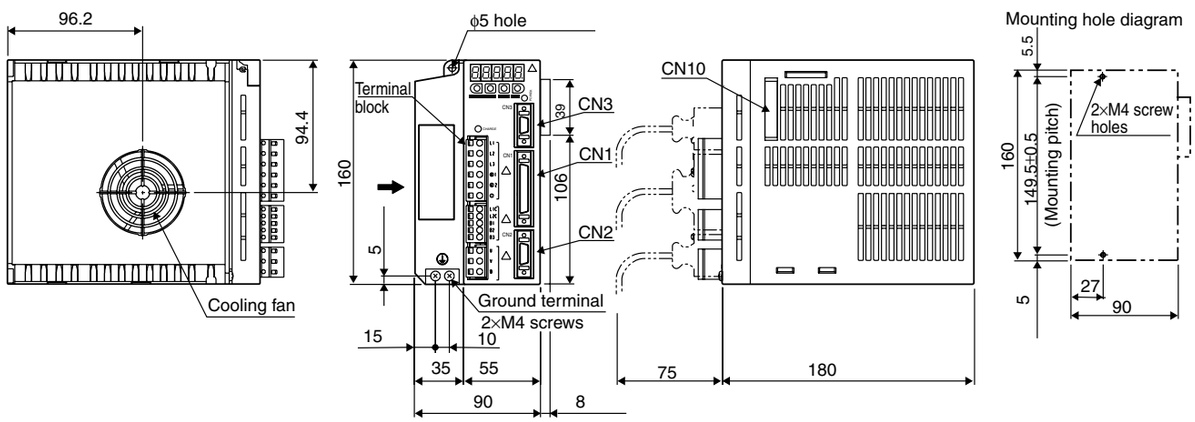
#### XD-P3-M□ to XD-02-M□ (230V, 30 to 200W)




#### XD-04-M□ (230V, 400W)




#### XD-08-M□ (230V, 750W)

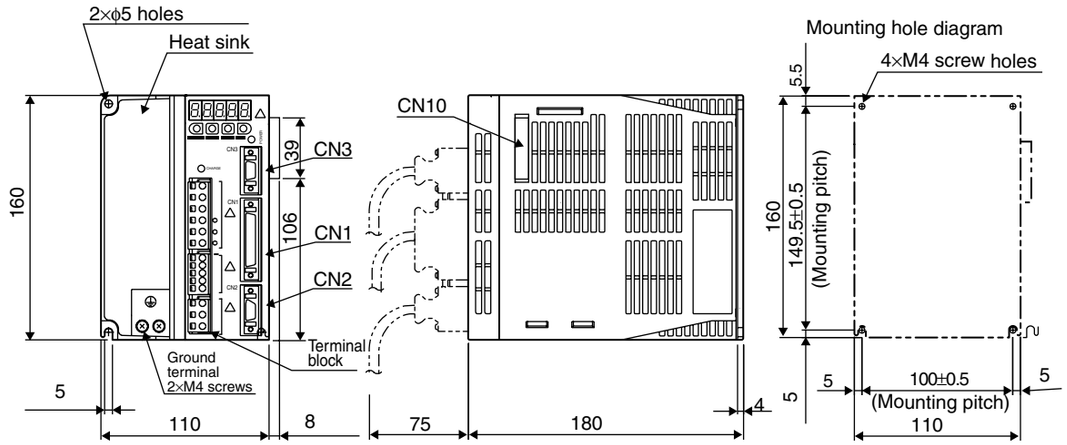





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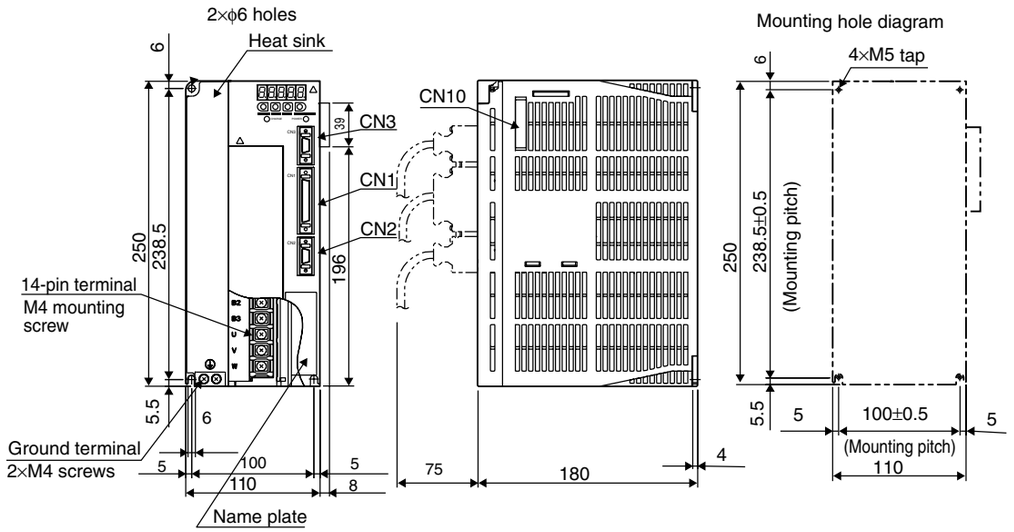
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### XD-05-T□ to -15-T□ (400V, 0.5 to 1.5kW)

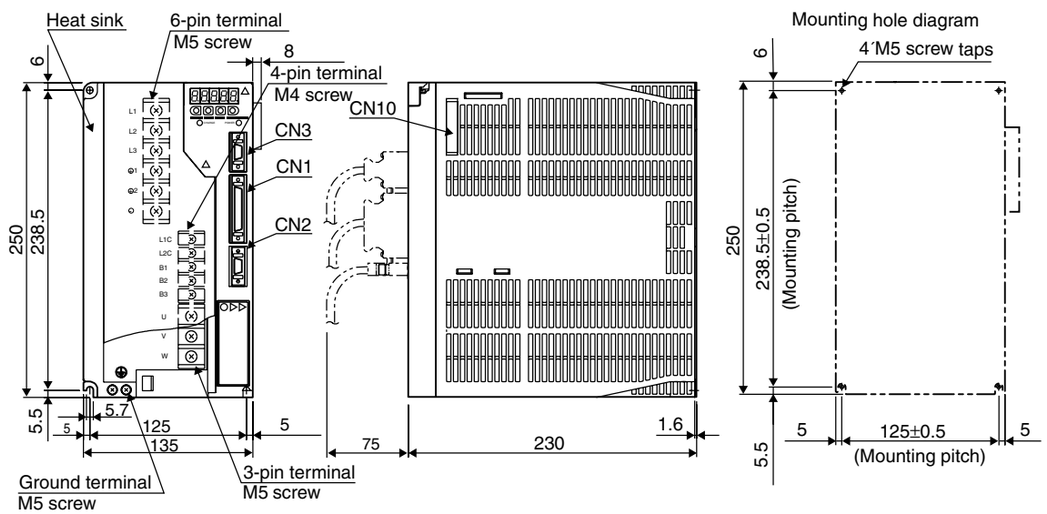



### XD-15-M□ (230V, 1.5kW)

### XD-20-T□, XD-30-T□ (400V, 2/3kW)




### XD-50-T□ (400V, 5kW)



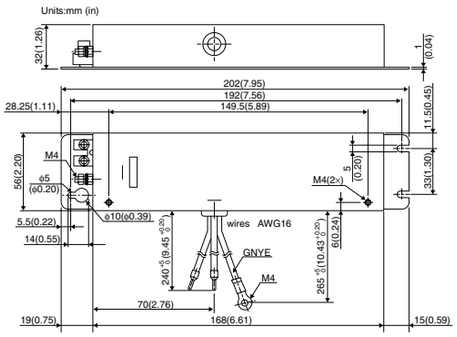



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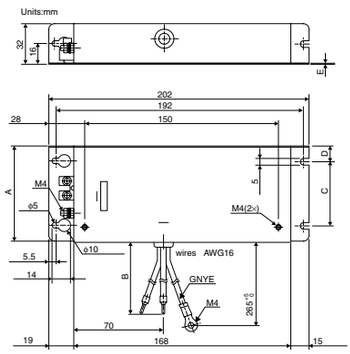
## Filters

### R88A-FIW104-SE

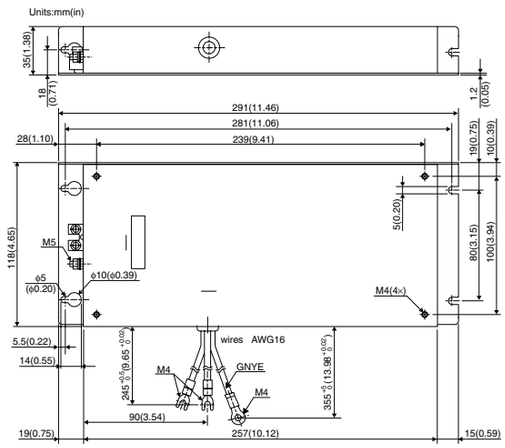



### R88A-FIW107-SE, R88A-FIW115-SE

| Model | | R88A-FIW107-SE | R88A-FIW115-SE |
|---|---|---|---|
| Dimensions in mm | A | 75 | 90 |
| | B | $240^{+5}$ | $300^{+5}$ |
| | C | 50 | 60 |
| | D | 12 | 15 |
| | E | 1 | 1.2 |

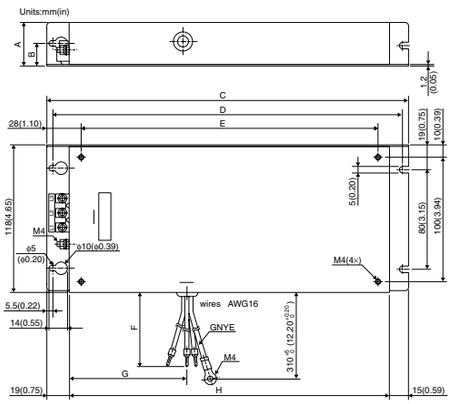



### R88A-FIW125-SE

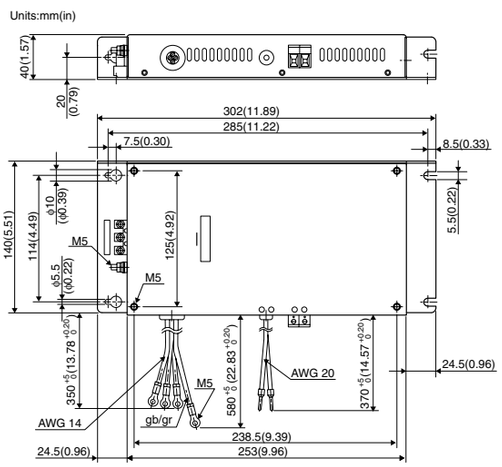



### R88A-FIW4006-SE, R88A-FIW4010-SE

| Model | | R88A-FIW4006-SE | R88A-FIW4010-SE |
|---|---|---|---|
| Dimensions in mm (in) | A | 32 (1.26) | 35 (1.38) |
| | B | 16 (0.63) | 18 (0.71) |
| | C | 202 (7.95) | 291 (11.46) |
| | D | 192 (7.56) | 281 (11.06) |
| | E | 150 (5.91) | 239 (9.41) |
| | F | 300 (11.81) | 270 (10.63) |
| | G | 70 (2.76) | 90 (3.54) |
| | H | 168 (6.61) | 257 (10.12) |




### R88A-FIW4020-SE



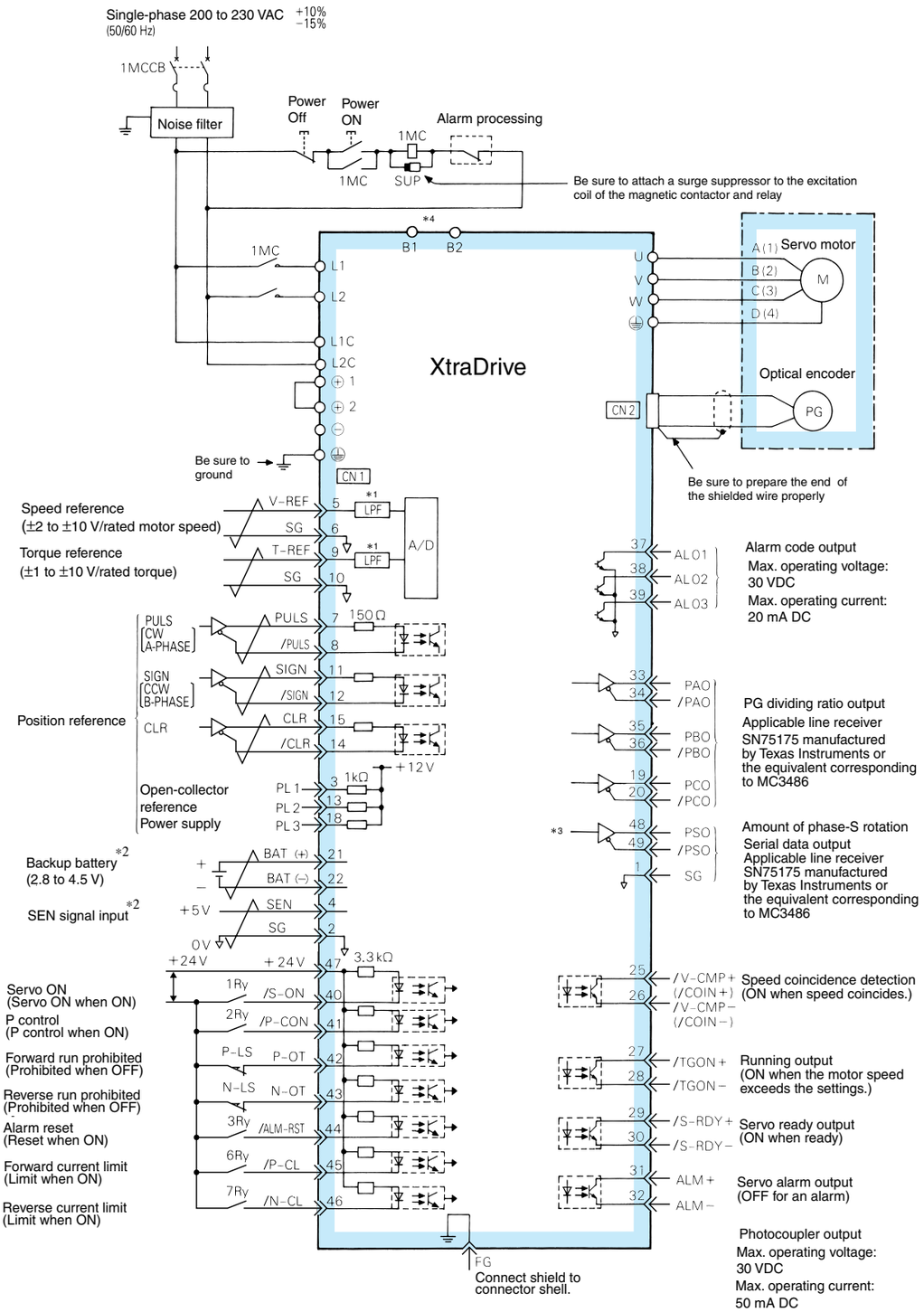



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## Installation

### Single-phase, 230 VAC




*1 The time constant for the primary filter is 47 µs.
*2 Connect when using an absolute encoder.
*3 Used only with an absolute encoder.
*4 Regenerative resistor can be connected between B1 and B2.
*6 TI stands for Texas Instruments Inc.

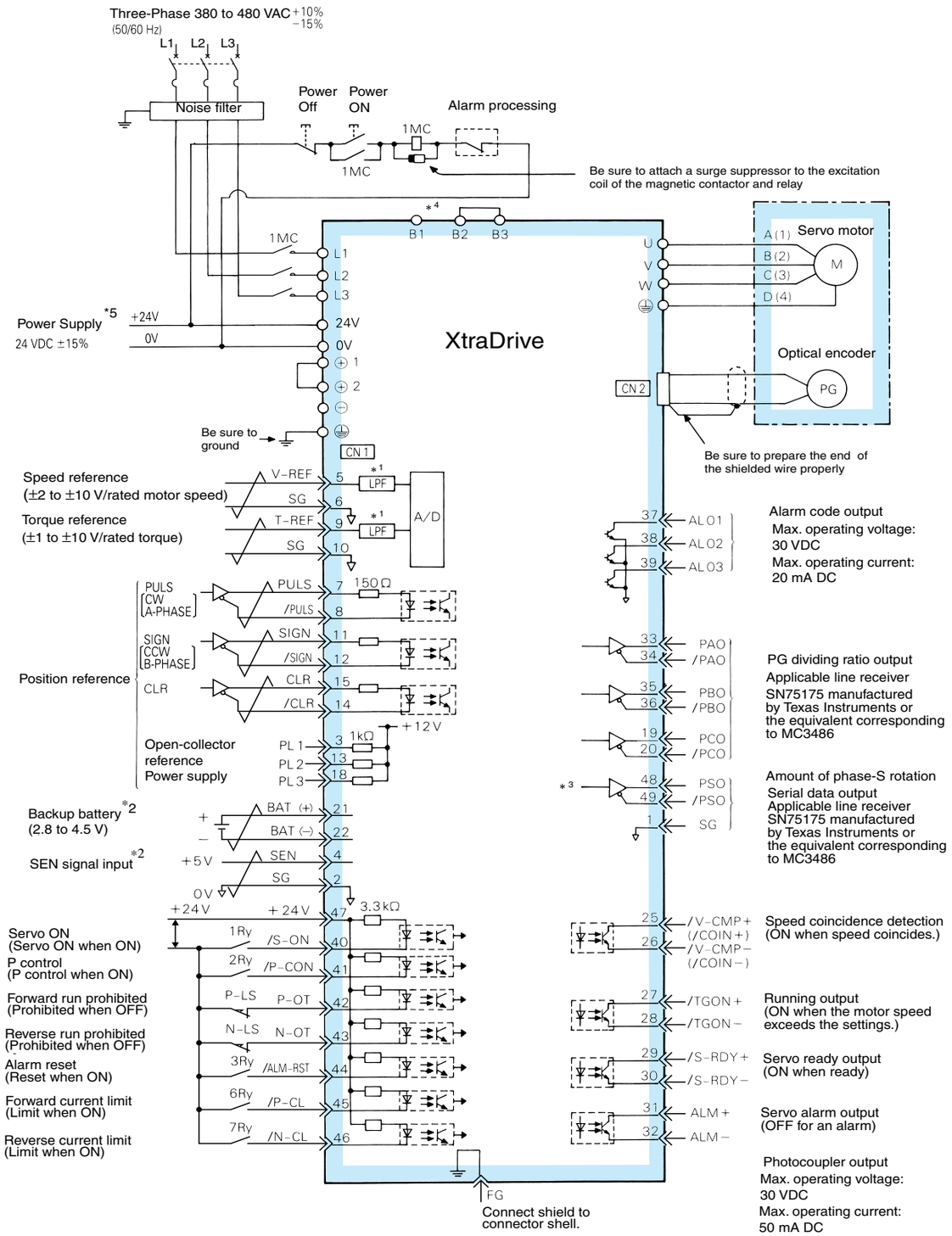


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### Three-phase, 400 VAC



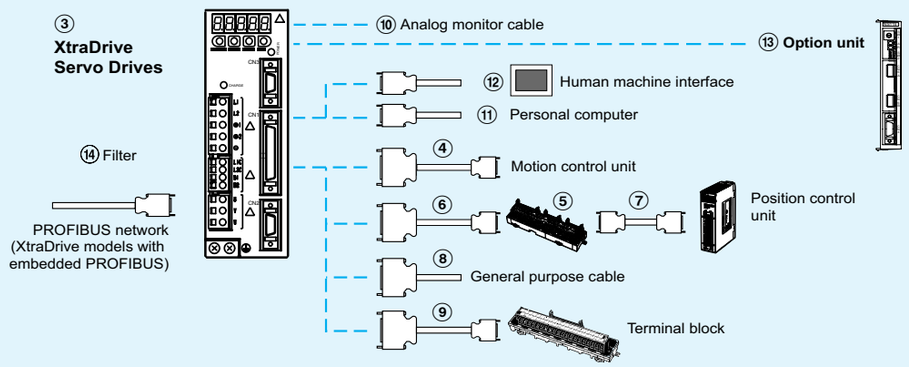

*1 The time constant for the primary filter is 47 µs.
*2 Connect when using an absolute encoder.
*3 Used only with an absolute encoder.
*4 For using an external regenerative resistor, connect it between B1 and B2.
*5 The 24VDC power is supplyed by the user.
*6 TI stands for Texas Instruments Inc.



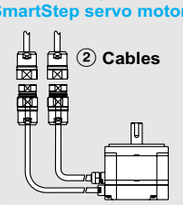
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## Ordering information

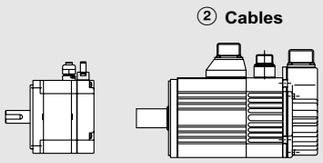



(Refer to chapter SmartStep servo motors)




① R7M Servo Motor

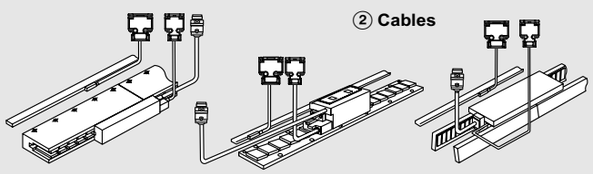
(Refer to chapter Sigma-II rotary motors)




① SGMAH, SGMPH Servo Motor

① SGMGH, SGMUH, SGMSH, SGMBH Servo Motor

(Refer to chapter Sigma-II linear motors)




① SGLG_ linear Servo Motor

① SGLF_ linear Servo Motor

① SGLT_ linear Servo Motor

**Note:** The symbols ①②③④⑤... show the recommended sequence to select the components for a servo system

### Servo motors, power & encoder cables

**Note:** ①② Refer to the servo motors chapter for detailed motor specifications and selection

### Servo Drives

| Symol | Specifications | | XtraDrive | XtraDrive-E with electronic CAM | XtraDrive-DP with PROFIBUS | XtraDrive-DP-E with PROFIBUS and electronic CAM | Compatible servo motors ① | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Sigma-II rotary | SmartStep | Sigma linear motors |
| ③ | 1 phase 200 VAC | 30 W | XD-P3-MN01 | XD-P3-MN01-E | XD-P3-MSD0 | XD-P3-MSD0-E | SGMAH-A3A□ | R7M-A03030-□ | - |
| | | 50 W | XD-P5-MN01 | XD-P5-MN01-E | XD-P5-MSD0 | XD-P5-MSD0-E | SGMAH-A5D□ | R7M-A05030-□ | SGLGW-30A050□ |
| | | 100 W | XD-01-MN01 | XD-01-MN01-E | XD-01-MSD0 | XD-01-MSD0-E | SGMAH-01A□, SGMPH-01A□ | R7M-A10030-□, R7M-AP10030-□ | SGLGW-30A080□, SGLGW-40A140□ |
| | | 200 W | XD-02-MN01 | XD-02-MN01-E | XD-02-MSD0 | XD-02-MSD0-E | SGMAH-02A□, SGMPH-02A□ | R7M-A20030-□, R7M-AP20030-□ | SGLFW-20A□, SGLFW-35A120□, SGLGW-40A253A□, SGLGW-60A140□ |
| | | 400 W | XD-04-MN01 | XD-04-MN01-E | XD-04-MSD0 | XD-04-MSD0-E | SGMAH-04A□, SGMPH-04A□ | R7M-A40030-□, R7M-AP40030-□ | SGLGW-40A365A□, SGLGW-60A253A□ |
| | | 750 W | XD-08-MN | XD-08-MN00-E | XD-08-MSD0 | XD-08-MSD0-E | SGMAH-08A□, SGMPH-08A□ | R7M-A75030-□, R7M-AP75030-□ | SGLFW-35A230□, SGLFW-50A200□, SGLGW-60A365A□ |
| | | 1.5 kW | XD-15-MN | XD-15-MN00-E | - | - | SGMPH-15A□ | - | SGLFW-50A380□, SGLFW-1ZA200□, SGLGW-90A200A□ |
| | 3 Phase 400 VAC | 0.5 kW | XD-05-TN | XD-05-TN00-E | XD-05-TSD0 | XD-05-TSD0-E | SGMGH-05D□, SGMAH-03D□, SGMPH-02D□/04D□ | - | SGLFW-35D□ |
| | | 1.0 kW | XD-10-TN | XD-10-TN00-E | XD-10-TSD0 | XD-10-TSD0-E | SGMGH-09D□, SGMSH/UH-10D□, SGMAH-07D□, SGMPH-08D□ | - | SGLFW-50D200□, SGLTW-35D170□, SGLTW-50D170□ |
| | | 1.5 kW | XD-15-TN | XD-15-TN00-E | XD-15-TSD0 | XD-15-TSD0-E | SGMGH-13D□, SGMSH/UH-15D□, SGMPH-15D□ | - | SGLFW-50D380□, SGLFW-1ZD200□ |
| | | 2.0 kW | XD-20-TN | XD-20-TN00-E | XD-20-TSD0 | XD-20-TSD0-E | SGMGH-20D□, SGMSH-20D□ | - | SGLFW-1ED380□, SGLTW-35D320□, SGLTW-50D320□ |
| | | 3.0 kW | XD-30-TN | XD-30-TN00-E | XD-30-TSD0 | XD-30-TSD0-E | SGMGH-30D□, SGMSH/UH-30D□ | - | SGLFW-1ZD380□, SGLFW-1ED560□, SGLTW-40D400□ |
| | | 5.0 kW | XD-50-TN | XD-50-TN00-E | - | - | SGMGH-44D□, SGMSH/UH-40D□, SGMSH-50D□ | - | SGLTW-40D600□, SGLTW-80D400□ |

**Note:** SGLGW-□ linear motor combination is made considering the use of standard magnets. Refer to the linear motors chapter for details



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### Control cables (for CN1)

| Symbol | Description | Connect to | Len | Model |
|---|---|---|---|---|
| ④ | Control cable (1 axis) | Motion control units CS1W-MC221 CS1W-MC421 C200H-MC221 | 1 m | R88A-CPW001M1 |
| | | | 2 m | R88A-CPW002M1 |
| | | | 3 m | R88A-CPW003M1 |
| | | | 5 m | R88A-CPW005M1 |
| | Control cable (2 axis) | Motion control units CS1W-MC221 CS1W-MC421 C200H-MC221 | 1 m | R88A-CPW001M2 |
| | | | 2 m | R88A-CPW002M2 |
| | | | 3 m | R88A-CPW003M2 |
| | | | 5 m | R88A-CPW005M2 |
| | Terminal block (4 axes) | Motion control unit C200HW-MC402-E | - | R88A-TC04-E |
| | Servo drive connecting cable (1 axis) | | 1 m | R88A-CMUK001J3-E2 |
| | PLC unit control cables (4 axes) | | 1 m | R88A-CMX001S-E |
| | | | 1 m | R88A-CMX001J1-E |
| ⑤ | Servo relay unit | CS1W-NC1□3, CJ1W-NC1□3, or C200HW-NC113 Position control unit | | XW2B-20J6-1B (1 axis) |
| | | CS1W-NC2□3/4□3, CJ1W-NC2□3/4□3, or C200HW-NC213/413 Position control unit | | XW2B-40J6-2B (2 axes) |
| | | CQM1H-PLB21 CQM1-CPU43 | | XW2B-20J6-3B (1 axis) |
| | | CJ1M-CPU22/23 | | XW2B-20J6-8A (1 axis) XW2B-40J6-9A (2 axes) |
| ⑥ | Cable to servo drive | Servo relay units XW2B-□0J6-□B | 1 m | XW2Z-100J-B4 |
| | | | 2 m | XW2Z-200J-B4 |
| ⑦ | Position control unit connecting cable | C200H-NC112 | 0.5 m | XW2Z-050J-A1 |
| | | | 1 m | XW2Z-100J-A1 |
| | | C200H-NC211 | 0.5 m | XW2Z-050J-A2 |
| | | | 1 m | XW2Z-100J-A2 |
| | | CQM1-CPU43-V1 and CQM1H-PLB21 | 0.5 m | XW2Z-050J-A3 |
| | | | 1 m | XW2Z-100J-A3 |
| | | CS1W-NC113 and C200HW-NC113 | 0.5 m | XW2Z-050J-A6 |
| | | | 1 m | XW2Z-100J-A6 |
| | | CS1W-NC213/413 and C200HW-NC213/413 | 0.5 m | XW2Z-050J-A7 |
| | | | 1 m | XW2Z-100J-A7 |
| | | CS1W-NC133 | 0.5 m | XW2Z-050J-A10 |
| | | | 1 m | XW2Z-100J-A10 |
| | | CS1W-NC233/433 | 0.5 m | XW2Z-050J-A11 |
| | | | 1 m | XW2Z-100J-A11 |
| | | CJ1W-NC113 | 0.5 m | XW2Z-050J-A14 |
| | | | 1 m | XW2Z-100J-A14 |
| | | CJ1W-NC213/413 | 0.5 m | XW2Z-050J-A15 |
| | | | 1 m | XW2Z-100J-A15 |
| | | CJ1W-NC133 | 0.5 m | XW2Z-050J-A18 |
| | | | 1 m | XW2Z-100J-A18 |
| | | CJ1W-NC233/433 | 0.5 m | XW2Z-050J-A19 |
| | | | 1 m | XW2Z-100J-A19 |
| | | CJ1M-CPU22/23 | 0.5 m | XW2Z-050J-A27 |
| | | | 1 m | XW2Z-100J-A27 |
| ⑧ | Control cable | For general purpose controllers | 1 m | R88A-CPW001S or JZSP-CKI01-1 |
| | | | 2 m | R88A-CPW002S or JZSP-CKI01-2 |
| ⑨ | Relay terminal block cable | General purpose controller | 1 m | R88A-CTW001N |
| | | | 2 m | R88A-CTW002N |
| | Relay terminal block | | - | XW2B-50G5 |

### Cable (for CN5)

| Symbol | Name | Model |
|---|---|---|
| ⑩ | Analog monitor cable | R88A-CMW001S or DE9404559 |

### Options (for CN3)

| Symbol | Name | Model |
|---|---|---|
| ⑪ | Computer connecting cable | R88A-CCW002P2 or JZSP-CMS02 |

### Human machine interface

| Symbol | Name | Model |
|---|---|---|
| ⑫ | 4.1“ HMI monochrome | NT3S-ST126B-E |

### Option units (for CN10)

| Symbol | Name | Model |
|---|---|---|
| ⑬ | IO card, 8 inputs / 8 outputs | XDIO-08 |

### Filters

| Symbol | Applicable servo drive | Filter model | Rated current | Rated voltage |
|---|---|---|---|---|
| ⑭ | XD-P3-M□, XD-P5-M□, XD-01-M□, XD-02-M□ | R88A-FIW104-SE | 4 A | 250 VAC single-phase |
| | XD-04-M□ | R88A-FIW107-SE | 7A | |
| | XD-08-M□ | R88A-FIW115-SE | 15 A | |
| | XD-15-M□ | R88A-FIW125-SE | 25 A | |
| | XD-05-T□, XD-10-T□, XD-15-T□ | R88A-FIW4006-SE | 6 A | 400 VAC three-phase |
| | XD-20-T□, XD-30-T□ | R88A-FIW4010-SE | 10 A | |
| | XD-50-T□ | R88A-FIW4020-SE | 20 A | |

### Battery backup for absolute encoder

| Name | Model |
|---|---|
| Battery (required for servo motors with absolute encoder) | JZSP-BA01 ER6VC3 (3.6V) |

### Connectors

| Specification | | Model |
|---|---|---|
| Control I/O connector (for CN1) | | R88A-CNU11C or JZSP-CKI9 |
| XtraDrive 200 V connector kit (for 200 V motors SGMAH/PH-□□A□□□D-OY and R7M-A□-D) | Connectors included | XD-CN200K-DE |
| | DE9406973 SPOC-17H-FRON169 SPOC-06K-FSDN169 | |
| XtraDrive 400 V connector kit. (for 400 V motors SGMAH/PH-□□D□□□D-OY) | Connectors included | XD-CN400K-DE |
| | DE9406973 SPOC-17H-FRON169 LPRA-06B-FRBN170 | |
| Sigma-II drive encoder connector (For CN2) | | DE9406973 or R88A-CNU01R |
| Hypertac encoder connector IP67 (for motors SGMAH/PH-□□□□□□□D-OY and R7M-A□-D) | | SPOC-17H-FRON169 |
| Hypertac power connector IP67, 200 V. (for 200 V motors SGMAH/PH-□□A□□□□D-OY and R7M-A□-D) | | SPOC-06K-FSDN169 |
| Hypertac power connector IP67, 400 V. (for 400 V Motors SGMAH/PH-□□D□□□□D-OY) | | LPRA-06B-FRBN170 |
| Military encoder connector IP67 (for Motors SGMGH-□, SGMSH-□, SGMUH-□) | | MS3108E20-29S |
| Military power connector IP67 (for 400 V motors SGMGH-(05/10/13)D□, SGMSH-(10/15/20)D□ , SGMUH-(10/15)D□) | | MS3108E18-10S |
| Military power connector IP67 (for 400 V motors SGMGH-(20/30/44)D□, SGMSH-(30/40/50)D□, SGMUH-(30/40)D□) | | MS3108E22-22S |
| Military brake connector IP67 (for 400 V servo motors SGMGH-□, SGMSH-□, SGMUH-□) | | MS3108E10SL-3S |

### Computer software

| Specifications | Model |
|---|---|
| XtraWare | MOTION TOOLS |



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

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