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XD-□

# XtraDrive



**Intelligent Servo Drive. Integrated controller and network connectivity.**

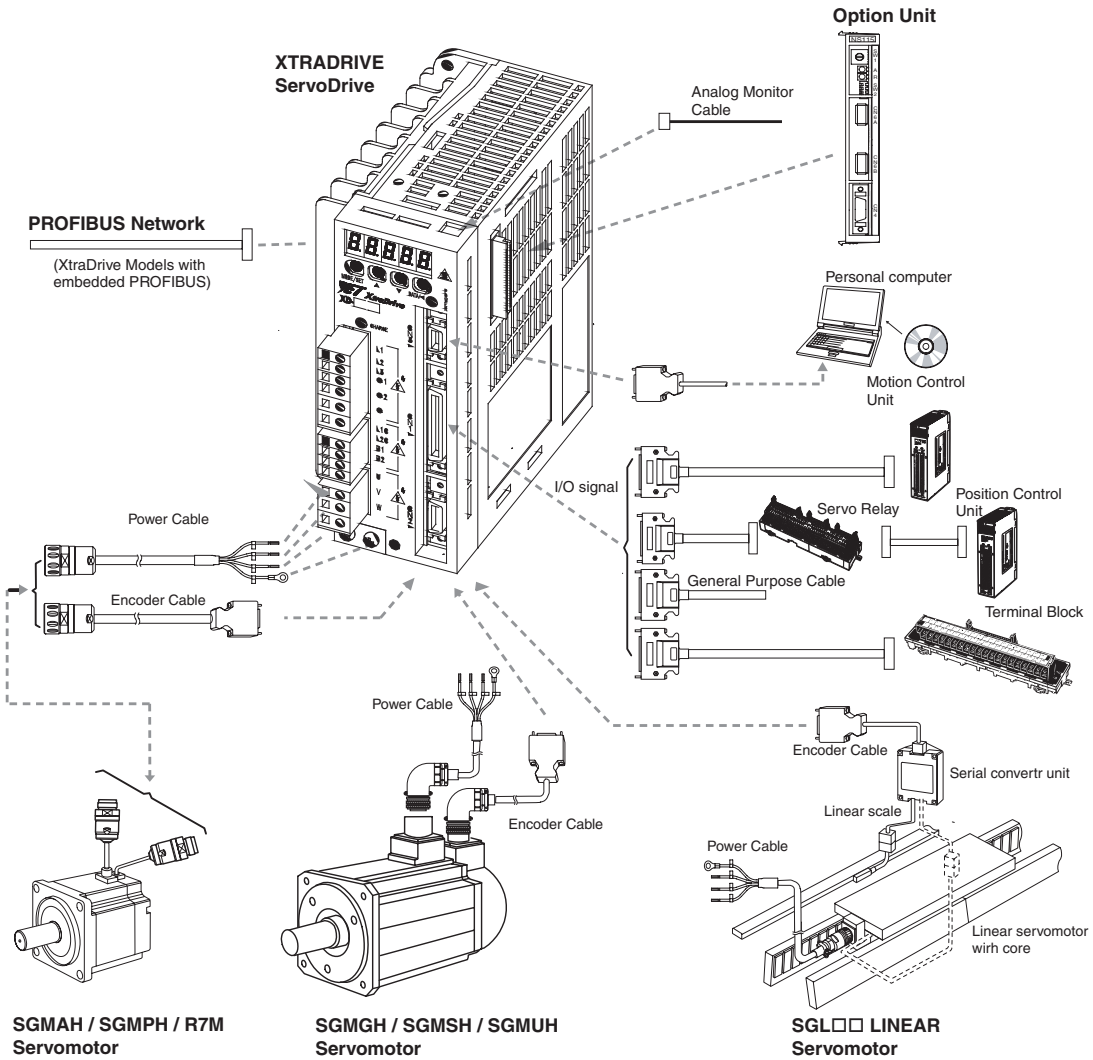
- NCT. Patented non-linear technique for tight control
- Very low tracking error with no overshoot and zero settling time
- Automatic tuning of servo parameters for optimal settling time
- OCA. Oscillation Cancelling Algorithm
- Profibus Embedded in the drive available
- Ideal drive for linear motors control
- Automatic motor recognition of Sigma-II motors
- Analogue control for speed and torque
- Pulse train control for positioning
- Oscilloscope available via XtraWare software tool

**Ratings**

- 230VAC Single-phase 30 W to 800W
- 400VAC Three-phase 0.5 KW to 3.0 kW



## System Configuration






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## Servomotor / Servo Drive Combination

| Servomotor | | | | Servo Drive | | | |
|---|---|---|---|---|---|---|---|
| | Voltage | Rated Torque | Capacity | 230 V (1-phase) | 230 V (1-phase) w PROFIBUS | 400 V (3-phase) | 400V (3-phase) w PROFIBUS |
| **Sigma-II Series Motors (Refer to the Sigma-II chapter for Motor 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 | - | - |
| | 400 V | 0.637 N.m | 200 W | - | - | XD-05-TN | XD-05-TSD0 |
| | | 1.27 N.m | 400 W | - | - | XD-10-TN | XD-10-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 |
| 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 |
| 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 |
| **SmartStep Series Motors (Refer to the SmartStep chapter for Motor 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 Motor 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

XD - 01 - MN 01

- XD — XtraDrive
- 01 — Output Capacity

| | | | |
|---|---|---|---|
| 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 | | |

- MN — Input Voltage
  - M: 230V
  - T: 400V
- MN — Extended Functionality
  - N: With CN10 connector for Option Units
  - S: No CN10 Connector
- 01 — Design Version # (optional)
  - 01: Design Version
  - D0: Embedded Profibus

## Servo Drive Specifications

### Single-Phase, 230 V

| Servo Drive Type | | | XD-P3-M□ | XD-P3-M□ | XD-01-M□ | XD-02-M□ | XD-04-M□ | XD-08-M□ |
|---|---|---|---|---|---|---|---|---|
| Applicable Servomotor | | SGMAH-□ | A3A□ | A5A□ | 01A□ | 02A□ | 04A□ | 08A□ |
| | | 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 |
| | Continuous Output Current Arms | | 0.44 | 0.64 | 0.91 | 2.1 | 2.8 | 5.7 |
| | Max. Output Current Arms | | 1.3 | 2.0 | 2.8 | 6.5 | 8.5 | 13.9 |
| | Input Power Supply | Main Circuit | For single-phase, 200 to 230 VAC + 10 to -15% | | | | | |
| | | 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 Humidit | | 90%RH or less (non-condensing) | | | | | |
| | Conditions: Altitude | | 1000m or less above sea level | | | | | |
| | Conditions: Vibration/Shock Resistance | | 4.9m/s$^2$ / 19.6m/s$^2$ | | | | | |
| | Configuration | | Base mounted | | | | | |
| | Approx. Mass Kg | | 0.8 | | | | 1.1 | 1.7 |

### Three-Phase, 400 V

| Servo Drive Type | | | XD-05-T□ | XD-10-T□ | XD-15-T□ | XD-20-T□ | XD-30-T□ |
|---|---|---|---|---|---|---|---|
| **Applicable Servomotor** | | **SGMAH-□** | **03D□** | **07D□** | **-** | **-** | **-** |
| | | **SGMAH-□** | **02D□, 04D□** | **08D□** | **15D□** | **-** | **-** |
| | | **SGMGH-□** | **05D□** | **09D□** | **13D□** | **20D□** | **30D□** |
| | | **SGMSH-□** | **-** | **10D□** | **15D□** | **20D□** | **30D□** |
| | | **SGMUH-□** | **-** | **10D□** | **15D□** | **-** | **30D□** |
| Basic Specifications | Max. Applicable Motor capacity kW | | 0.45 | 1.0 | 1.5 | 2.0 | 3.0 |
| | Continuous Output Current Arms | | 1.9 | 3.5 | 5.4 | 8.4 | 11.9 |
| | Max. Output Current Arms | | 5.5 | 8.5 | 14 | 20 | 28 |
| | Input Power Supply | Main Circuit | For three-phase, 380 to 480 VAC + 10 to -15% (50/60Hz) | | | | |
| | | Control Circuit | 24VDC+ 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 Humidit | | 90%RH or less (non-condensing) | | | | |
| | Conditions: Altitude | | 1000m or less above sea level | | | | |
| | Conditions: Vibration/Shock Resistance | | 4.9m/s$^2$ / 19.6m/s$^2$ | | | | |
| | Configuration | | Base mounted | | | | |
| | Approx. Mass Kg | | 2.8 | | | 3.8 | |





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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 Controll 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: ±12V |
| | | | 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. 47μ s |
| | | Contact Speed Reference | Rotation Direction Sellection | With P control signal |
| | | | Speed sellection | With forward/reverse current limit signal (speed 1 to 3 selection), servomotor stops or another control metoth 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<br>CCW/CW pulse train |
| | | | Input Pulse Form | Line driver (+5V level) , open collector (+5V or +12 level) |
| | | | Input Pulse Frequency | 0 to 500 Kpps (200Kpps 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 |
| | | | 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 9.6kbps 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 (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 15kW) |

## 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 | Servomotor connection terminal | Red | Terminals for outputs to the Servomotor. |
| 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 100Ω. (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+ | Batery + (used only with absolute encoder) |
| 13 | BAT- | Batery - (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 servomotor 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: Reference speed 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 servomotor 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 for only line driver | 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 (+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 servomotor rotation: Detects when the servomotor 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<br>(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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## Parameters

| Parameter No. | Name | | | Setting Range | Units | Factory Setting | Setting Validation |
|---|---|---|---|---|---|---|---|
| Pn000 | Function Selection Basic Switches | | | - | - | 00D0 | After restart |
| | **Digit** | **Function name** | **Setting** | **Description** | | | |
| | 0 | Direction Selection | 0 | Sets CCW as forward direction | | | |
| | | | 1 | Sets CW as forward direction (Reserve Rotation Mode) | | | |
| | | | 2 and 3 | Reserved ( Do not change.) | | | |
| | 1 | Control Method Selection | 0 | Speed control (analog reference) | | | |
| | | | 1 | Yaskawa OB | | | |
| | | | 2 | Torque control (analog reference) | | | |
| | | | 3 | Internal set speed control (contact reference) | | | |
| | | | 4 | Internal set speed control (contact reference) <> Speed control (analog reference) | | | |
| | | | 5 | Internal set speed control reference <> Position control (pulse train reference) | | | |
| | | | 6 | Internal set speed control (contact reference) <> Torque control (analog reference) | | | |
| | | | 7 | Position control (pulse train reference) <> Speed control (analog reference) | | | |
| | | | 8 | Position control (pulse train reference) <> Torque control (analog reference) | | | |
| | | | 9 | Torque control (analog reference) <> Speed control (analog reference) | | | |
| | | | A | Speed control (analog reference) <> Zero clamp | | | |
| | | | B | Position control (pulse train reference) <> Position control (Inhibit) | | | |
| | | | C | Position control (pulse train) | | | |
| | | | D | Serial communication command | | | |
| | 2 | Axis Address | 0 to F | Sets servo amplifier axis adrdress. | | | |
| | 3 | Reserved | | - | | | |
| Pn001 | Function Selection Application Switches 1 | | | - | - | 0000 | After restart |
| | **Digit** | **Function name** | **Setting** | **Explanation** | | | |
| | 0 | Servo OFF or Alarm Stop Mode | 0 | Stops the motor by applying dynamic brake (DB) | | | |
| | | | 1 | Stops the motor by applying dynamic brake (DB) and then realeases DB | | | |
| | | | 2 | Makes the motor coast to a stop state without using the dynamic brake (DB) | | | |
| | 1 | Overtravel (OT) Stop Mode | 0 | Same setting as Pn001.0 (Stops the motor by applying DB or by coasting) | | | |
| | | | 1 | Sets the torque of Pn406 to the maximum value, decelerate the motor to a stop, and then set it to servolock state | | | |
| | | | 2 | Sets the torque of Pn406 to the maximum value. decelerates the motor to a stop, and then sets it to coasting state | | | |
| | 2 | AC/DC Power Input Selection | 0 | Not applicable to DC power input: Input AC power supply through L1, L2 (,and L3) terminals | | | |
| | | | 1 | Applicable to DC power input: Input DC power supply through (+)1 and (-) terminals. | | | |
| | 3 | Warning Code Output Selection | 0 | ALO1, ALO2, and ALO3 output only alarm codes. | | | |
| | | | 1 | ALO1, ALO2, and ALO3 output both alarms codes and warning codes. While warning codes are output, ALM signal output remains ON (normal state). | | | |
| | | | 2 | Uses absolute encoder as an absolute encoder. Uses multi-turn limit. | | | |
| Pn002 | Function Selection Application Switches 2 | | | - | - | 0000 | After restart |
| | **Digit** | **Function name** | **Setting** | **Explanation** | | | |
| | 0 | Speed Control Option | 0 | None | | | |
| | | | 1 | Uses T-REF as an external torque limit input | | | |
| | | | 2 | Uses T-REF as a torque feed-forward input | | | |
| | | | 3 | Uses T-REF when P-CL and N-CL are ON | | | |
| | 1 | Torque Control Option | 0 | None | | | |
| | | | 1 | Uses V-REF as an external speed limit input. | | | |
| | 2 | Absolute Encoder Usage | 0 | Uses absolute encoder as an absolute encoder | | | |
| | | | 1 | Uses absolute encoder as an incremental encoder | | | |
| | | | 2 | Uses aboslute encoder aa an absolute encoder.<br>Uses multi-turn limit. | | | |
| | 3 | Not used. | - | | | | |
| Pn003 | Function Selection Application Switches 3 | | | - | - | 0002 | Immediately |
| | **Digit** | **Function name** | **Setting** | **Explanation** | | | |
| | 0 | Analog Monitor 1 Torque Reference Monitor | 0 | Motor speed: 1V/1000 $min^{-1}$ | | | |
| | | | 1 | Speed reference: 1V/1000 $min^{-1}$ | | | |
| | | | 2 | Torque reference: 1 V/100% | | | |
| | | | 3 | Position error: 0,05 V/1 reference unit | | | |
| | | | 4 | Position error:0,05 V/100 reference units | | | |
| | | | 5 | Reference pulse frequency (converted to $min^{-1}$): 1V/1000 $min^{-1}$ | | | |
| | | | 6 | Motor Speed x 4: 1V/250 $min^{-1}$ | | | |
| | | | 7 | Motor Speed x 8: 1V/250 $min^{-1}$ | | | |
| | 1 | Analog Monitor 2 Speed Reference Monitor | 0 to 7 | Same as Pn003.0 (see above) | | | |
| | 2 | Not used | - | | | | |
| | 3 | Not used | - | | | | |
| Pn004 | Reserved (Do not change) | | | - | - | 0000 | - |
| Pn005 | | | | - | - | 0000 | - |





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| Parameter No. | Name | | | Setting Range | Units | Factory Setting | Setting Validation |
|---|---|---|---|---|---|---|---|
| Pn006 | Gain Application Switches | | | - | - | 0000 | Immediately |
| | **Digit** | **Function name** | **Setting** | **Explanation** | | | |
| | 0 | Analog Monitor 1. | 0 | Servo position error: 1V/10 encoder counts | | | |
| | | | 1 | Servo position error: 1V/5 user units | | | |
| | | | 2 | Target speed 1V/500 rpm. | | | |
| | | | 3 | Target speed after appliying command smoothing 1V/500 rpm | | | |
| | | | 4 | Torque reference: 10V/Max Torque | | | |
| | | | 5 | Motor speed:1V/500 rpm | | | |
| | | | 6 | Target acceleration after appliying command smoothing: 10V/ max acceleration allowed. | | | |
| | 1 | Analog monitor 1-selection of source parameter | 0 | Pn003.0 used for analog monitor 1. | | | |
| | | | 1 | Pn006.0 used for analog monitor 1. | | | |
| | 2 | Analog monitor 1-selection of source | 0-4 | 0:x1, 1:x10, 2:x100, 3:x1/10, 4:x1/100 | | | |
| | 3 | Not used | 0 | - | | | |
| Pn007 | Gain Application Switches | | | - | - | 0000 | Immediately |
| | **Digit** | **Function name** | **Setting** | **Explanation** | | | |
| | 0 | Analog Monitor 2 | 0 | Servo position error: 1V/10 encoder counts | | | |
| | | | 1 | Servo position error: 1V/5 user units | | | |
| | | | 2 | Target speed 1V/500 rpm. | | | |
| | | | 3 | Target speed after appliying command smoothing 1V/500 rpm | | | |
| | | | 4 | Torque reference: 10V/Max Torque | | | |
| | | | 5 | Motor speed:1V/500 rpm | | | |
| | | | 6 | Target acceleration after appliying command smoothing: 10V/ max acceleration allowed. | | | |
| | 1 | Analog monitor 2-selection of source parameter | 0 | Pn003.0 used for analog monitor 2. | | | |
| | | | 1 | Pn007.0 used for analog monitor 2. | | | |
| | 2 | Analog monitor 2 | 0-4 | 0:x1, 1:x10, 2:x100, 3:x1/10, 4:x1/100 | | | |
| | 3 | Not used | 0 | - | | | |
| Pn080 (Linear Motors Only) | Lineal Motor Commutation Switch | | | - | - | 0011 | After restart |
| | **Digit** | **Function name** | **Setting** | **Explanation** | | | |
| | 0 | Communication sensor switch | 0 | With commutation sensors | | | |
| | | | 1 | Without commutation sensors | | | |
| | 1 | Communication sensor order | 0 | UVW | | | |
| | | | 1 | UWV | | | |
| | 2 | Reserved | - | - | | | |
| | 3 | Reserved | - | - | | | |
| Pn100 | Speed Loop Gain | | | 1 to 2000 Hz | 1 Hz | 40 Hz | Immediately |
| Pn101 | Speed Loop Integral Time Constant | | | 0.15 to 512.00 ms | 0.01 ms | 20.00 ms | Immediately |
| Pn102 | Position Loop Gain | | | 1 to 2000/s | 1/s | 40/s | Immediately |
| Pn103 | Moment of Inertia Ratio | | | 0 to 10000% | 1% | 0% | Immediately |
| Pn104 | 2nd Speed Looop Gain | | | 1 to 2000 Hz | 1 Hz | 40 | Immediately |
| Pn105 | 2nd Speed Loop Integral Time Constant | | | 0.15 to 512.00 ms | 0.01 ms | 20.00 ms | Immediately |
| Pn106 | 2nd Position Loop Gain | | | 1 to 2000/s | 1/s | 40/s | Immediately |
| Pn107 | Bias | | | 0 to 450 $min^{-1}$ | 1 $min^{-1}$ | 0 $min^{-1}$ | Immediately |
| Pn108 | Bias Width Addition | | | 0 to 250 reference unit | Reference unit | 7 reference unit | Immediately |
| Pn109 | Feed-forward | | | 0 to 100% | 1% | 0% | Immediately |
| Pn110 | Online Autotuning Switches | | | - | - | 0010 | After restart |
| | **Digit** | **Function name** | **Setting** | **Explanation** | | | |
| | 0 | Online Autotuning Method | 0 | Tunes only at the beginning of operation | | | |
| | | | 1 | Always tunes. | | | |
| | | | 2 | Does not perform autotuning. | | | |
| | 1 | Speed feedback Compensation Selection | 0 | Enabled | | | |
| | | | 1 | Disabled | | | |
| | 2 | Friction Compensation Selection | 0 | Friction compensation: Disabled | | | |
| | | | 1 | Friction compensation: Small | | | |
| | | | 2 | Friction compensation: Large | | | |
| | 3 | Reserved | 0 - 3 | Reserved parameter (Do not change) | | | |
| Pn10A | Feed-forward Filter Time Constant | | | 0.00 to 64.00 ms | 0.01 ms | 0.00 ms | Immediately |
| Pn10B | Pending!!!!! | | | - | - | 0000 | - |
| Pn10C | Mode Switch Torque Reference | | | 0 to 800% | 1% | 200% | Immediately |
| Pn10D | Mode Swtich Speed Reference | | | 0 to 10000 $min^{-1}$ | 1 $min^{-1}$ | 0 $min^{-1}$ | Immediately |
| Pn10E | Mode Switch Acceleration | | | 0 to 3000 $min^{-1}$/s | 1 $min^{-1}$/s | 0 $min^{-1}$/s | Immediately |
| Pn10F | Mode Switch Error Pulse | | | 0 to 10000 reference units | 1 reference unit | 0 reference unit | Immediately |
| Pn111 | Speed Feedback Compensation | | | 1 to 500% | 1% | 100% | Immediately |


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| Parameter No. | Name | Setting Range | Units | Factory Setting | Setting Validation |
|---|---|---|---|---|---|
| Pn112 | Reserved (Do not set) | - | - | 100 | - |
| Pn113 | | | | 1000 | |
| Pn114 | | | | 200 | |
| Pn115 | | | | 32 | |
| Pn116 | | | | 16 | |
| Pn117 | | | | 100 | |
| Pn118 | | | | 100 | |
| Pn119 | | | | 50 | |
| Pn11A | | | | 1000 | |
| Pn11B | | | | 50 | |
| Pn11C | | | | 70 | |
| Pn11D | Reserved (Do not change) | - | - | 100 | - |
| Pn11E | | | | 100 | |
| Pn11F | | | | 0 | |
| Pn120 | | | | 0 | |
| Pn121 | | | | 50 | |
| Pn122 | | | | 0 | |
| Pn123 | | | | 0 | |
| Pn124 | | | | 0 | |
| Pn125 | | | | 100 | |
| Pn131 | | | | 0 | |
| Pn132 | | | | 0 | |
| Pn133 | | | | 0 | |
| Pn134 | | | | 0 | |
| Pn135 | | | | 0 | |
| Pn136 | | | | 0 | |
| Pn137 | | | | 0 | |
| Pn138 | | | | 0 | |
| Pn139 | | | | 0 | |
| Pn13A | | | | 0 | |
| Pn140 | | | | 200 | |
| Pn141 | | | | 800 | |
| Pn142 | | | | 0 | |
| Pn143 | | | | 0 | |
| Pn144 | | | | 1000 | |
| Pn145 | | | | 0 | |
| Pn190 | Motor selection Switches | - | - | 0000 | After restart |

| Digit | Function Name | Setting | Explanation |
|---|---|---|---|
| 0 | Motor model | 0 | Yaskawa A quad B model SGM |
| | | 1 | Yaskawa A quad B model SGMP |
| | | 2 | Non Yaskawa rotary motor |
| | | 3 | Non Yaskawa lineal motor |
| 1 | Encoder type | 0 | Incremental A quad B encoder |
| | | 1 | Yaskawa absolute A quad B encoder |
| 2 | Encoder selection | 0 | Yaskawa serial encoder |
| | | 1 | A quad B encoder |
| | | 2 | A quad B encoder with commutation sensors (U,V,W) |
| | | 3 | A quad B encoder with commutation sensors (/U,/V,/W) |
| 3 | C-phase mask | 0 | C phase signal used |
| | | 1 | C phase signal mask |

| | | | | | |
|---|---|---|---|---|---|
| Pn191 | Motor selection Switches | - | - | 1000 | After restart |

| Digit | Function Name | Setting | Explanation |
|---|---|---|---|
| 0 | Motor phase order | 0 | Not defined |
| | | 1 | UVW |
| | | 2 | UWV |
| 1-3 | Not used | 0 | - |

| | | | | | |
|---|---|---|---|---|---|
| Pn192 | Pulses number of A quad B encoder (Low) | 0-999 Pulses/rev | Pulses/rev | 2048 | After restart |
| Pn193 | Pulses number of A quad B encoder (High) | 0-419 Pulse*10000/Rev | Pulse*10000/Rev | 0 | After restart |
| Pn194 | Reserved (Do not change) | - | - | 2 | - |
| Pn195 | | | | 20 | |
| Pn196 | | | | 20 | |
| Pn197 | | | | 88 | |
| Pn198 | | | | 0 | |
| Pn199 | Encoder counts per Scale Pitch of linear motor | 1-256 Counts/Scale pitch | Counts/Scale pitch | 1 | After restart |
| Pn1A0 | Reserved (Do not change) | - | - | 60 | - |
| Pn1A1 | | | | 60 | |
| Pn1A2 | | | | 40 | |
| Pn1A3 | | | | 40 | |
| Pn1A4 | | | | 20 | |
| Pn1A5 | | | | 0 | |
| Pn1A6 | | | | 40 | |





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| Parameter No. | Name | | | Setting Range | Units | Factory Setting | Setting Validation |
|---|---|---|---|---|---|---|---|
| Pn1A7 | Motor selecetion Switches | | | - | - | 0001 | Immediately |
| | **Digit** | **Function Name** | **Setting** | **Explanation** | | | |
| | 0 | Integral Mode | 0 | Disable clear integral function | | | |
| | | | 1 | Enable clear integral function | | | |
| | 1-3 | Not used | 0 | Not used | | | |
| Pn1A8 | Reserved (Do not change) | | | - | - | 0 | - |
| Pn1A9 | | | | | | 40 | |
| Pn1AA | | | | | | 40 | |
| Pn1AB | | | | | | 30 | |
| Pn1AC | | | | | | 80 | |
| Pn1AD | | | | | | 0 | |
| Pn1AE | | | | | | 300 | |
| Pn1AF | | | | | | 0 | |
| Pn1B0 | Reserved (Do not change) | | | - | - | 40 | - |
| Pn1B1 | | | | | | 40 | |
| Pn1B2 | | | | | | 40 | |
| Pn1B3 | | | | | | 2000 | |
| Pn1B4 | | | | | | 0 | |
| Pn1B5 | | | | | | 160 | |
| Pn1B6 | | | | | | 150 | |
| Pn1B7 | | | | | | 20 | |
| Pn1B8 | | | | | | 100 | |
| Pn1B9 | | | | | | 600 | |
| Pn1BA | | | | | | 0 | |
| Pn1BB | | | | | | 2000 | |
| Pn1BC | | | | | | 300 | |
| Pn1BD | | | | | | 2000 | |
| Pn1BE | | | | | | 0 | |
| Pn1BF | | | | | | 3 | |
| Pn1C0 | | | | | | 0 | |
| Pn1C1 | | | | | | 3 | |
| Pn1C2 | | | | | | 0 | |
| Pn200 | Position Control References Selection Switches | | | - | - | 0000 | After restart |
| | **Digit** | **Function Name** | **Setting** | **Explanation** | | | |
| | 0 | Reference Pulse Form | 0 | Sign + Pulse, positive logic | | | |
| | | | 1 | CW + CCW, positive logic | | | |
| | | | 2 | Phase A + Phase B (x 1), positive logic | | | |
| | | | 3 | Phase A + Phase B (x 2), positive logic | | | |
| | | | 4 | Phase A + Phase B (x 4), positive logic | | | |
| | | | 5 | Sign + Pulse, negative logic | | | |
| | | | 6 | CW + CWW, negative logic | | | |
| | | | 7 | Phase A + Phase B (x 1), negative logic | | | |
| | | | 8 | Phase A + Phase B (x 2), negative logic | | | |
| | | | 9 | Phase A + Phase B (x 4), negative logic | | | |
| | 1 | Error Counter Clear Signal Form | 0 | Clears error counter when the signal is at H level | | | |
| | | | 1 | Clears error counter at the rising edge of the signal | | | |
| | | | 2 | Clears error counter when the signal is at L level. | | | |
| | | | 3 | Clears error counter at the falling edge of the signal | | | |
| | 2 | Clear Operation | 0 | Clear error counter at the baseblock | | | |
| | | | 1 | Does not clear error counter (Possible to clear error counter only with CLR signal) | | | |
| | | | 2 | Clears error counter when an alarm occurs. | | | |
| | | | 3 | Clear signal ignore | | | |
| | 3 | Filter Selection | 0 | Reference input filter for line driver signals | | | |
| | | | 1 | Reference input filter for open collector signals | | | |
| Pn201 | PG Dividing Pulse (16bit or less) | | | 0,17 to 65535 P/rev | 1 P/rev | 2048 P/rev | After restart |
| Pn202 | Electronic Gear Ratio (Numerator) | | | 1 to 65535 | - | 4 | After restart |
| Pn203 | Electronic Gear Ratio (Denominator) | | | 1 to 65535 | - | 1 | After restart |
| Pn204 | Position Reference Accel/Decel Time Constant | | | 0.00 to 64.00 ms | 0.01 ms | 0.00 ms | Immediately |
| Pn205 | Multiturn Limit Setting | | | 0 to 65535 rev | rev | 65535 rev | After restart |
| Pn206 | Reserved (Do not change) | | | - | - | 16384 | - |
| Pn207 | Pending!!!!!!!!!!!!!!!! | | | - | | 0 | - |
| Pn208 | Position Reference Movement Averaging Time | | | 0.00 to 64.00 ms | 0.01 ms | 0.00 ms | After restart |
| Pn209 | Reserved (Do not change) | | | - | - | 0 | - |
| Pn216 | Command smoothing | | | 1 to 65535 ms | 0.1 ms | 0 | Immediately |
| Pn281 | Reserved (Linear Motors) | | | - | - | - | - |


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| Parameter No. | Name | | | Setting Range | Units | Factory Setting | Setting Validation |
|---|---|---|---|---|---|---|---|
| Pn2A0 | Reserved (Do not change) | | | - | - | 16 | - |
| Pn2A1 | | | | | | 0 | |
| Pn2A2 | | | | | | 0 | |
| Pn2A3 | | | | | | 0 | |
| Pn2A4 | | | | | | 0 | |
| Pn2A5 | | | | | | 0 | |
| Pn2A6 | | | | | | 0 | |
| Pn2A7 | | | | | | 0 | |
| Pn2A8 | | | | | | 65535 | |
| Pn2A9 | | | | | | 256 | |
| Pn2B0 | | | | | | 1 | |
| Pn2B1 | | | | | | 0 | |
| Pn2B2 | | | | | | 1 | |
| Pn2B3 | | | | | | 0 | |
| Pn2B4 | | | | | | 1 | |
| Pn2B5 | | | | | | 0 | |
| Pn2B6 | | | | | | 1 | |
| Pn2B7 | | | | | | 0 | |
| Pn2B8 | | | | | | 1 | |
| Pn2B9 | | | | | | 0 | |
| Pn2BA | | | | | | 1 | |
| Pn2BB | | | | | | 0 | |
| Pn2C0 | Reserved (Do not change) | | | - | - | 7 | - |
| Pn2C1 | | | | | | 24000 | |
| Pn2C2 | | | | | | 0 | |
| Pn2C3 | | | | | | 0 | |
| Pn2C4 | | | | | | 0 | |
| Pn2C5 | | | | | | 2 | |
| Pn2C6 | Communication Switch | | | - | - | 0200 | Immediately |
| | **Digit** | **Function Name** | **Setting** | **Explanation** | | | |
| | 0 | Check Sum | 0 | Doesn´t use check sum | | | |
| | | | 1 | Use check sum | | | |
| | 1 | Not used. | - | | | | |
| | 2 | | | | | | |
| | 3 | | | | | | |
| Pn2C7 | Home Switches | | | - | - | 0008 | After restart |
| | **Digit** | **Function Name** | **Setting** | **Explanation** | | | |
| | 0 | Home switch input | 0 | Inputs from the SI0 (CN1-40). Input terminal | | | |
| | | | 1 | Inputs from the SI1 (CN1-41). Input terminal | | | |
| | | | 2 | Inputs from the SI2 (CN1-42). Input terminal | | | |
| | | | 3 | Inputs from the SI3 (CN1-43). Input terminal | | | |
| | | | 4 | Inputs from the SI4 (CN1-44). Input terminal | | | |
| | | | 5 | Inputs from the SI5 (CN1-45). Input terminal | | | |
| | | | 6 | Inputs from the SI6 (CN1-46). Input terminal | | | |
| | | | 7 | Sets signal ON | | | |
| | | | 8 | Sets signal OFF | | | |
| | | | 9 | Inputs the reverse signal from SI0 (CN1-40) input terminal | | | |
| | | | A | Inputs the reverse signal from SI1 (CN1-41) input terminal | | | |
| | | | B | Inputs the reverse signal from SI2 (CN1-42) input terminal | | | |
| | | | C | Inputs the reverse signal from SI3 (CN1-43) input terminal | | | |
| | | | D | Inputs the reverse signal from SI4 (CN1-44) input terminal | | | |
| | | | E | Inputs the reverse signal from SI5 (CN1-45) input terminal | | | |
| | | | F | Inputs the reverse signal from SI6 (CN1-46) input terminal | | | |
| | 1 | Reserved | - | | | | |
| | 2 | Reserved | - | | | | |
| | 3 | Reserved | - | | | | |
| Pn2C8 | Reserved (Do not change) | | | - | - | 400 | - |
| Pn2C9 | | | | | | 50 | |
| Pn2CA | | | | | | 50 | |
| Pn2CB | | | | | | 50 | |
| Pn2CC | | | | | | 0 | |
| Pn2CC | | | | | | 0 | |
| Pn2CD | | | | | | 0 | |
| Pn2CE | | | | | | 60 | |
| Pn2CF | | | | | | 0 | |
| Pn2D0 | | | | | | 8888 | |
| Pn2D1 | Extended input signal selection | | | - | - | 0078 | After restart |
| | **Digit** | **Function Name** | **Setting** | **Explanation** | | | |
| | 0 | Emergency input | 0-F | Same as Pn2C7.0 | | | |
| | 1 | New Mode Enable | 0-F | Same as Pn2C7.0 | | | |
| | 2 | Reserved | -- | - | | | |
| | 3 | Reserved | -- | -- | | | |





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| Parameter No. | Name | | | Setting Range | Units | Factory Setting | Setting Validation |
|---|---|---|---|---|---|---|---|
| Pn2D2 | Extended Output Signal Selection | | | - | - | 0000 | After restart |
| | **Digit** | **Function Name** | **Setting** | **Explanation** | | | |
| | 0 | /COIN Signal Mapping | 0 | Disabled | | | |
| | | | 1 | Outputs from the SO1 (CN1-25, 26) output terminal | | | |
| | | | 2 | Outputs from the SO2 (CN1-27, 28) output terminal | | | |
| | | | 3 | Outputs from the SO3 (CN1-29, 30) output terminal | | | |
| | 1 | Not used | - | | | | |
| | 2 | | | | | | |
| | 3 | | | | | | |
| Pn2D3 | Reserved (Do not change) | | | - | - | 2000 | - |
| Pn2D4 | Oscillation Cancelling Mode Switch | | | - | - | 0001 | Immediately |
| | **Digit** | **Function Name** | **Setting** | **Explanation** | | | |
| | 0 | Oscillation Cancelling Mode | 0 | OCA is not active | | | |
| | | | 1 | OCA is active | | | |
| | 1 | Not used | - | | | | |
| | 2 | | | | | | |
| | 3 | | | | | | |
| Pn300 | Speed Reference Input Gain | | | 1.50 to 30.00 V/ rated speed | 0.01V/ rated speed | 6.00 V/ rated speed | Immediately |
| Pn301 | Speed 1 (rotary motor) | | | 0 to 10000 $min^{-1}$ | 1 $min^{-1}$ | 100 $min^{-1}$ | Immediately |
| Pn302 | Speed 2 | | | 0 to 10000 $min^{-1}$ | 1 $min^{-1}$ | 200 $min^{-1}$ | Immediately |
| Pn303 | Speed 3 | | | 0 to 10000 $min^{-1}$ | 1 $min^{-1}$ | 300 $min^{-1}$ | Immediately |
| Pn304 | JOG Speed | | | 0 to 10000 $min^{-1}$ | 1 $min^{-1}$ | 500 $min^{-1}$ | Immediately |
| Pn305 | Soft Start Acceleration Time | | | 0 to 10000 ms | 1 ms | 0 ms | Immediately |
| Pn306 | Soft Start Deceleration Time | | | 0 to 10000 ms | 1 ms | 0 ms | Immediately |
| Pn307 | Speed Reference Filter Time Constant | | | 0.00 to 655.35 ms | 0.01 ms | 0.40 ms | Immediately |
| Pn308 | Speed Feedback Filter Time Constant | | | 0.00 to 655.35 ms | 0.01 ms | 0.00 ms | Immediately |
| Pn380 | Linear Motor Speed 1 (Only for linear motors) | | | 0-5000 mm/s | mm/s | 10 | Immediately |
| Pn381 | Linear Motor Speed 2 (Only for linear motors) | | | 0-5000 mm/s | mm/s | 20 | Immediately |
| Pn382 | Linear Motor Speed 3 (Only for linear motors) | | | 0-5000 mm/s | mm/s | 30 | Immediately |
| Pn383 | Linear Motor JOG Speed (Only for linear motors) | | | 0-5000 mm/s | mm/s | 40 | Immediately |
| Pn400 | Torque Reference Input Gain | | | 1.0 to10.0 V/rated torque | 0.1 V/rated torque | 3.0 V/ rated torque | Immediately |
| Pn401 | Torque Reference Filter Time Constant | | | 0.00 to 655.35 ms | 0.01 ms | 1.00 ms | Immediately |
| Pn402 | Forward Torque Limit | | | 0 to 800% | 1% | 800% | Immediately |
| Pn403 | Reverse Torque Limit | | | 0 to 800% | 1% | 800% | Immediately |
| Pn404 | Forward External Torque Limit | | | 0 to 800% | 1% | 100% | Immediately |
| Pn405 | Reverse External Torque Limit | | | 0 to 800% | 1% | 100% | Immediately |
| Pn406 | Emergency Stop Torque | | | 0 to 800% | 1% | 800% | Immediately |
| Pn407 | Speed Limit during Torque Control | | | 0 to 10000 $min^{-1}$ | 1 $min^{-1}$ | 10000 $min^{-1}$ | Immediately |
| Pn408 | Torque Control Function Switches | | | - | - | 0000 | Immediately |
| | **Digit** | **Function Name** | **Setting** | **Explanation** | | | |
| | 0 | Notch Filter Selection | 0 | Disabled | | | |
| | | | 1 | Uses a notch filter for torque reference | | | |
| | 1 | Not used | - | - | | | |
| | 2 | | | | | | |
| | 3 | | | | | | |
| Pn409 | Notch Filter Frequency | | | 50 to 2000 Hz | 1 Hz | 2000 Hz | Immediately |
| Pn40A | Notch Filter width | | | 70 to 1000 Hz | 1 Hz | 70(0.70) | Immediately |
| Pn40B | Reserved (Do not change) | | | - | - | 1000 | - |
| Pn40C | | | | | | 2000 | |
| Pn40D | | | | | | 70 | |
| Pn40E | | | | | | 1000 | |
| Pn480 | Reserved (Do not change) only available for linear motors | | | - | - | - | - |
| Pn483 | | | | | | | |
| Pn484 | | | | | | | |
| Pn500 | Positioning Completed Width | | | 0 to 250 reference units | 1 reference unit | 7 reference units | Immediately |
| Pn501 | Zero Clamp Level | | | 0 to 10000 $min^{-1}$ | 1 $min^{-1}$ | 10 $min^{-1}$ | Immediately |
| Pn502 | Rotation Detection Level | | | 1 to 10000 $min^{-1}$ | 1 $min^{-1}$ | 20 $min^{-1}$ | Immediately |
| Pn503 | Speed Coincidence Signal Output Width | | | 0 to 100 $min^{-1}$ | 1 $min^{-1}$ | 10 $min^{-1}$ | Immediately |
| Pn504 | NEAR Signal Width | | | 1 to 250 reference units | 1 reference unit | 7 reference units | Immediately |
| Pn505 | Overflow Level | | | 1 to 32767reference units | 256 reference unit | 1024 reference u | Immediately |
| Pn506 | Brake Reference - Servo OFF Delay Time | | | 0 to 50 (0 to 500 ms) | 10 ms | 0 ms | Immediately |
| Pn507 | Brake Reference Output Speed Level | | | 0 to 10000 $min^{-1}$ | 1 $min^{-1}$ | 100 $min^{-1}$ | Immediately |
| Pn508 | Timing for Brake Reference Output during Motor Operation | | | 10 to 100 (100 to 1000 ms) | 10 ms | 500 ms | Immediately |
| Pn509 | Momentary Hold time | | | 20 to 1000 ms | 1 ms | 20 ms | Immediately |


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| Parameter No. | Name | | | Setting Range | Units | Factory Setting | Setting Validation |
|---|---|---|---|---|---|---|---|
| Pn50A | Input Signal Selections 1 | | | - | - | 2100 | After restart |
| | **Digit** | **Function Name** | **Setting** | **Explanation** | | | |
| | 0 | Input Signal Allocation Mode | 0 | Sets the input signal allocation for the sequence to the same one as for the Yaskawa special servo amplifier | | | |
| | | | 1 | Possible to freely allocate the input signals | | | |
| | 1 | /S-ON Signal Mapping (Servo ON when low) | 0 | Inputs from the SI0 (CN1-40). Input terminal | | | |
| | | | 1 | Inputs from the SI1 (CN1-41). Input terminal | | | |
| | | | 2 | Inputs from the SI2 (CN1-42). Input terminal | | | |
| | | | 3 | Inputs from the SI3 (CN1-43). Input terminal | | | |
| | | | 4 | Inputs from the SI4 (CN1-44). Input terminal | | | |
| | | | 5 | Inputs from the SI5 (CN1-45). Input terminal | | | |
| | | | 6 | Inputs from the SI6 (CN1-46). Input terminal | | | |
| | | | 7 | Sets signal ON | | | |
| | | | 8 | Sets signal OFF | | | |
| | | | 9 | Inputs the reverse signal from SI0 (CN1-40) input terminal | | | |
| | | | A | Inputs the reverse signal from SI1 (CN1-41) input terminal | | | |
| | | | B | Inputs the reverse signal from SI2 (CN1-42) input terminal | | | |
| | | | C | Inputs the reverse signal from SI3 (CN1-43) input terminal | | | |
| | | | D | Inputs the reverse signal from SI4 (CN1-44) input terminal | | | |
| | | | E | Inputs the reverse signal from SI5 (CN1-45) input terminal | | | |
| | | | F | Inputs the reverse signal from SI6 (CN1-46) input terminal | | | |
| | 2 | /P-CON Signal Mapping (P control when low) | 0 to F | Same as above | | | |
| | 3 | /P-OT Signal Mapping (Overtravel when high) | 0 to F | Same as above | | | |
| Pn50B | Input Signal Selections 2 | | | - | - | 6543 | After restart |
| | **Digit** | **Function Name** | **Setting** | **Explanation** | | | |
| | 0 | N-OT Signal Mapping (Overtravel when high) | 0 to F | Same as Pn50A.1 | | | |
| | 1 | /ALM-RST Signal Mapping (Alarm Reset when low.) | 0 to F | Same as Pn50A.1 | | | |
| | 2 | /P-CL Signal Mapping(Torque control when low.) | 0 to F | Same as Pn50A.1 | | | |
| | 3 | /N-CL Signal Mapping(Torque control when low.) | 0 to 8 | Same as Pn50A.1 | | | |
| Pn50C | Input Signal Selections 3 | | | - | - | 8888 | After restart |
| | **Digit** | **Function Name** | **Setting** | **Explanation** | | | |
| | 0 | /SPD-D Signal Mapping (Internal Set Speed Selection) | 0 to F | Same as Pn50A.1 | | | |
| | 1 | /SPD-A Signal Mapping (Internal Set Speed Selection) | 0 to F | Same as Pn50A.1 | | | |
| | 2 | /SPD-D Signal Mapping (Internal Set Speed Selection) | 0 to F | Same as Pn50A.1 | | | |
| | 3 | /C-SEL Signal Mapping (Control Mode Switching) | 0 to F | Same as Pn50A.1 | | | |
| Pn50D | Input Signal Selections 4 | | | -- | | 8888 | After restart |
| | **Digit** | **Function Name** | **Setting** | **Explanation** | | | |
| | 0 | /ZCLAMP Signal Mapping (Zero clamping) | 0 to F | Same as Pn50A.1 | | | |
| | 1 | /INHIBIT Signal Mapping (Disabling Reference Pulse) | 0 to F | Same as Pn50A.1 | | | |
| | 2 | /G-SEL Signal Mapping (Gain Switching) | 0 to F | Same as Pn50A.1 | | | |
| | 3 | (Reserved) | 0 to F | Same as Pn50A.1 | | | |
| Pn50E | Output Signal Selections 1 | | | - | - | 3211 | After restart |
| | **Digit** | **Function Name** | **Setting** | **Explanation** | | | |
| | 0 | /COIN Signal Mapping | 0 | Disabled | | | |
| | | | 1 | Outputs from the SO1 (CN1-25, 26) output terminal | | | |
| | | | 2 | Outputs from the SO2 (CN1-27, 28) output terminal | | | |
| | | | 3 | Outputs from the SO3 (CN1-29, 30) output terminal | | | |
| | 1 | /V-CMP Signal Mapping | 0 to 3 | Same as above | | | |
| | 2 | /TGON Signal Mapping | 0 to 3 | Same as above | | | |
| | 3 | /S-RDY Signal Mapping | 0 to 3 | Same as above | | | |
| Pn50F | Output Signal Selections 2 | | | -- | | 0000 | After restart |
| | **Digit** | **Function Name** | **Setting** | **Explanation** | | | |
| | 0 | /CLT Signal Mapping | 0 to 3 | Same as Pn50E.0 | | | |
| | 1 | Speed Limit Detection Signal Mapping (/VLT) | 0 to 3 | Same as Pn50E.0 | | | |
| | 2 | Brake Interlock Signal Mapping (/BK) | 0 to 3 | Same as Pn50E.0 | | | |
| | 3 | Warning Signal Mapping (/WARN) | 0 to 3 | Same as Pn50E.0 | | | |
| Pn510 | Output Signal Selections 3 | | | - | - | 0000 | After restart |
| | **Digit** | **Function Name** | **Setting** | **Explanation** | | | |
| | 0 | Near Signal Mapping (/NEAR) | 0 to 3 | Same as Pn50E.0 | | | |
| | 1 | Reserved (Do not Change) | 0 to 3 | Same as Pn50E.0 | | | |
| | 2 | Not Used | 0 | | | | |
| | 3 | Not Used | 0 | | | | |





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| Parameter No. | Name | Setting Range | Units | Factory Setting | Setting Validation |
|---|---|---|---|---|---|
| Pn511 | Reserved (Do not change) | - | - | 8888 | - |
| Pn512 | | | | 0000 | |
| Pn51A | | | | 10 | |
| Pn550 | | | | 100 | |
| Pn551 | | | | 100 | |
| Pn580 | Reserved (Do not change) only available for linear motors | - | - | 10 | - |
| Pn581 | | | | 20 | |
| Pn582 | | | | 10 | |
| Pn583 | | | | 100 | |
| Pn600 | Regenerative Resistor Capacity | Depends on SERVOPACK Capacity *2 | 10 W | 0 W | Immediately |
| Pn601 | Reserved (Do not change) | Depends on SERVOPACK Capacity *2 | - | 0 W | Immediately |

### Monitor Mode Details

| Monitor No. | Monitor item | Unit | Explanation |
|---|---|---|---|
| Un000 | Speed Feedback | $min^{-1}$ | Displays the actual motor speed. |
| Un001 | Speed Command | $min^{-1}$ | Displays the speed command value or internally set speed value during speed control. 0 is displayed during pulse-train input control. |
| Un002 | Torque Command | % | Displays the command value for a current loop that is expressed by treating the rated torque as 100%. |
| Un003 | Number of Pulses from Z-Phase | Pulses | Displays the number of pulses from Z-Phase in encoder resolution units (times 4). |
| Un004 | Electrical Angle | degrees | Displays the motor electrical angle. |
| Un005 | Input Signal Monitor | --- | Displays driver I/O signal status by turning ON or OFF each signal bit. |
| Un006 | Output Signal Monitor | --- | |
| Un007 | Command Pulse Speed Display | r/min | Displays command pulse frequency converted in r/min. |
| Un008 | Position Deviation (Error Counter) | Reference units | Displays the number of pulses accumulated in the error counter (Position Deviation) that are converted in reference units (input pulse references). |
| Un009 | Motor Load Rate | % | Displays effective torque at intervals of 10 s that is expressed by treating the rated torque as 100%. |
| Un00A | Regeneration Load Rate | % | Displays the amount of regeneration energy absorbed at intervals of 10 s that is expressed by treating the Pn600 setting (Regenerative Resistor Capacity) as 100%. |
| Un00B | Dynamic Brake Resistance Load Rate | % | Displays the resistance load factor at intervals of 10 s that is expressed by treating the rated load factor as 100%. |
| Un00C | Input Pulse Counter | Reference units | Displays the number of counted input pulses in hexadecimal notation. |
| Un00D | Feedback Pulse Counter | Pulses | Displays the number of counted encoder feedback pulses in hexadecimal notation (multiplied by 4). |

### List of Function Modes

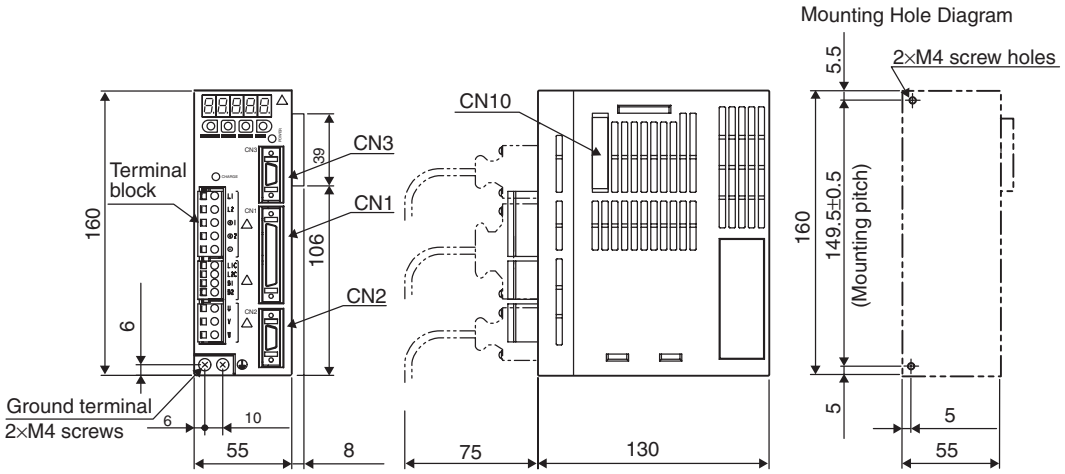
| Parameter No. | Function |
|---|---|
| Fn000 | Alarm traceback data display |
| Fn001 | Rigidity setting during online autotuning |
| Fn002 | JOG mode operation |
| Fn003 | Zero-point search mode |
| Fn004 | Fixed parameter |
| Fn005 | Parameter setting initialization |
| Fn006 | Alarm traceback data clear |
| Fn007 | Writing to EEPROM moment of inertia ratio data obtained from online autotuning |
| Fn008 | Absolute encoder multiturn reset and encoder alarm reset |
| Fn009 | Automatic tuning of analog (speed, torque) reference offset |
| Fn00A | Manual adjustment of speed reference offset |
| Fn00B | Manual adjustment of torque reference offset |
| Fn00C | Manual zero-adjustment of analog monitor output |
| Fn00D | Manual gain-adjustment of analog monitor output |
| Fn00E | Automatic offset-adjustment of motor current detection signal |
| Fn00F | Manual offset-adjustment of motor current detection signal |
| Fn010 | Password setting (protects parameters from being changed) |
| Fn011 | Motor models display |
| Fn012 | Software version display |
| Fn013 | Multiturn limit setting change when a Multiturn Limit Disagreement Alarm (A.CC) occurs |
| Fn014 | Application module detection results clear |


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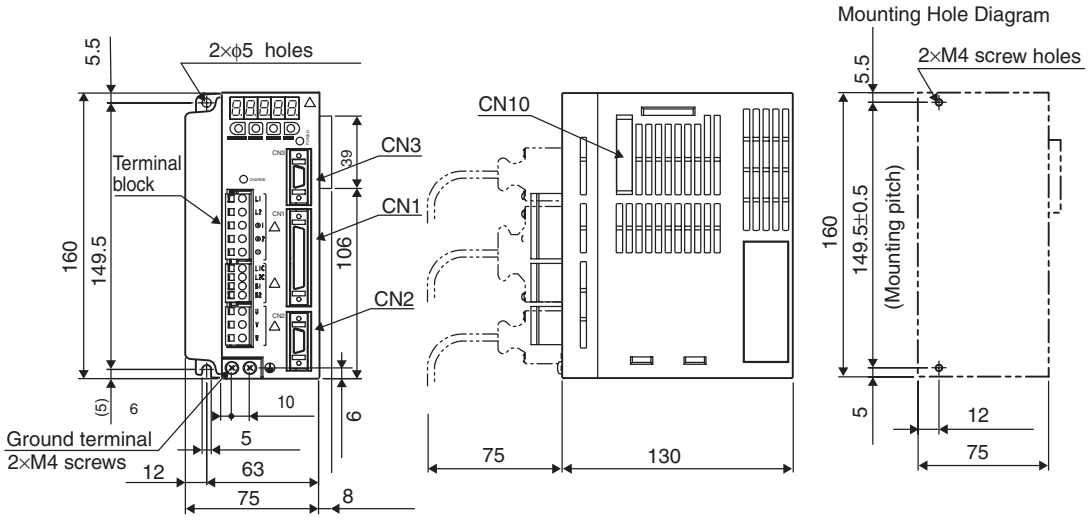
# Dimensions

## Servodrives

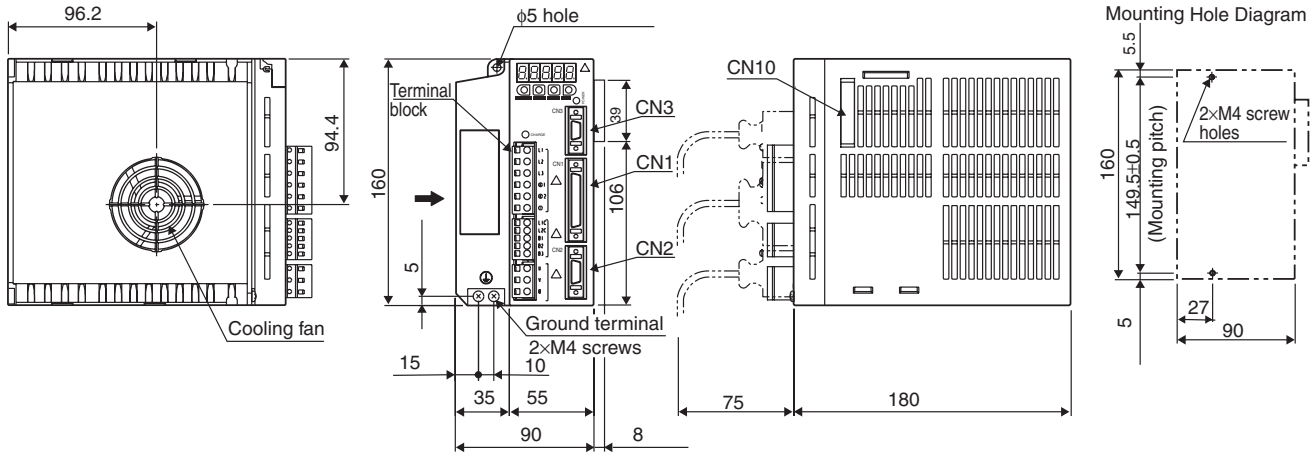
### XD-P3-M□ to XD-02-M□ (230V, 30 to 200W)




### XD-04-M□ (230V, 400W)



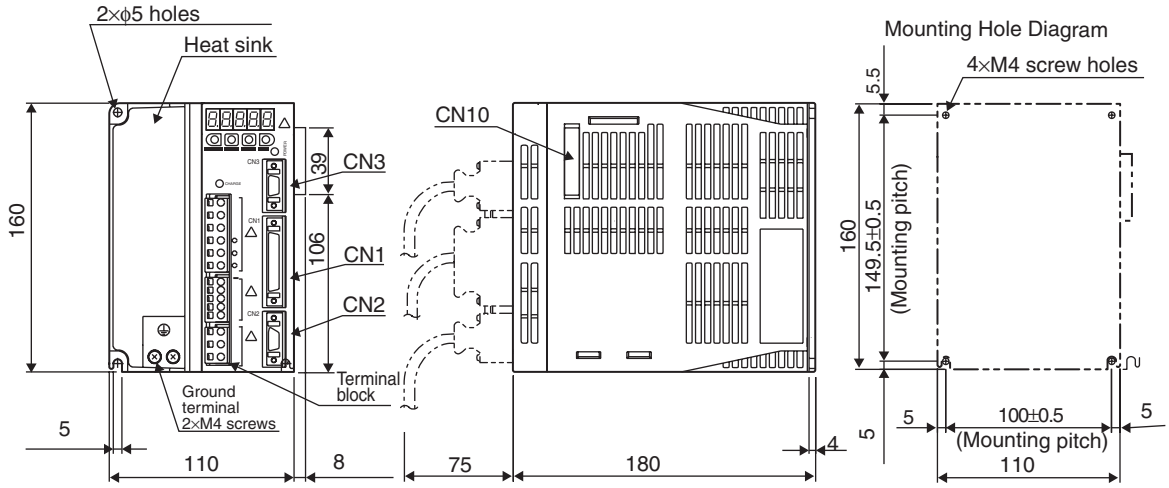

### XD-08-M□ (230V, 750W)



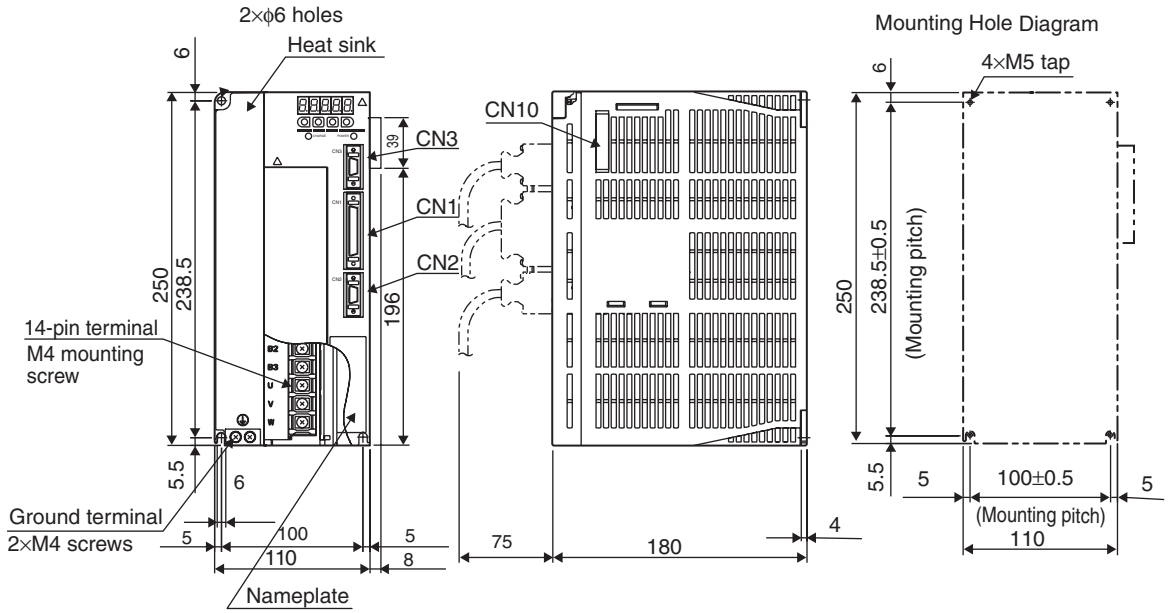



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## XD-05-T□ to -15-T□ (400V, 0.5 to 1.5kW)




## XD-20-T□, XD-30-T□ (400V, 2/3kW)

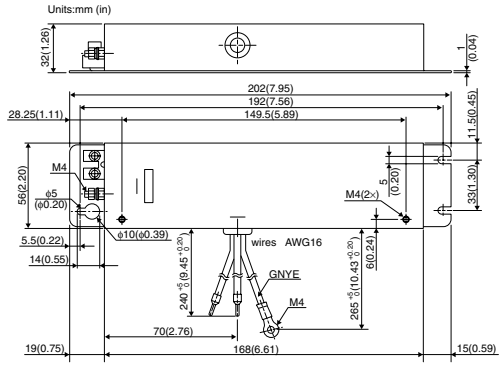




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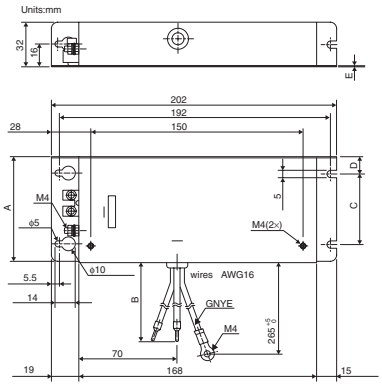
## Filters

### R88A-FIW104-SE



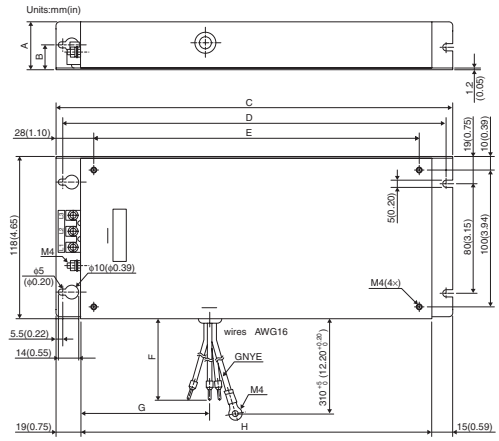

### R88A-FIW107-SE, R88A-FIW115-SE

| 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-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) |

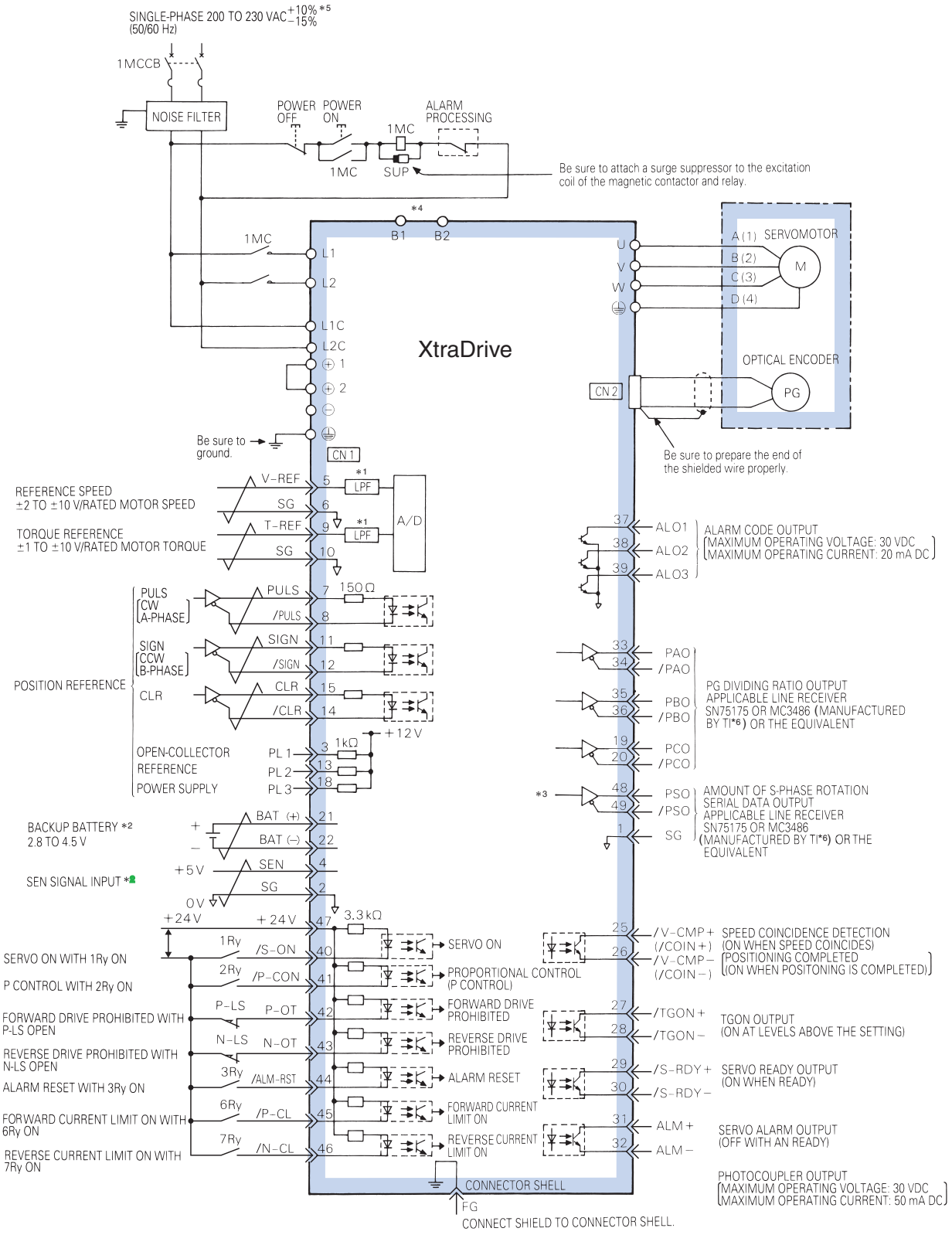





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## Installation

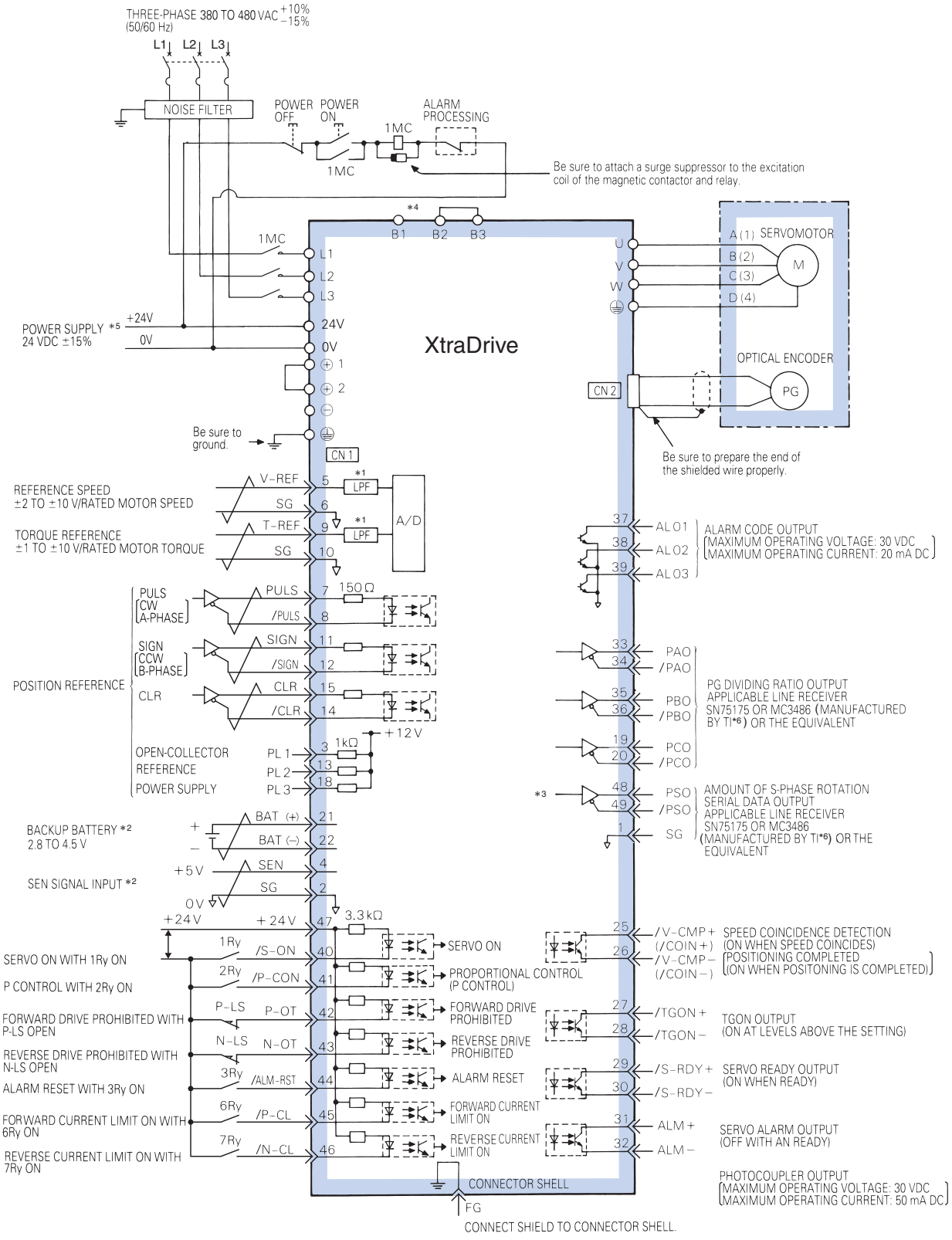
### Single-phase, 230VAC




*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.
*5 For types XD-08-M□, voltage is 220 to 230 VAC (+10% -15%).
*6 TI stands for Texas Instruments Inc.


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### Three-phase, 400VAC



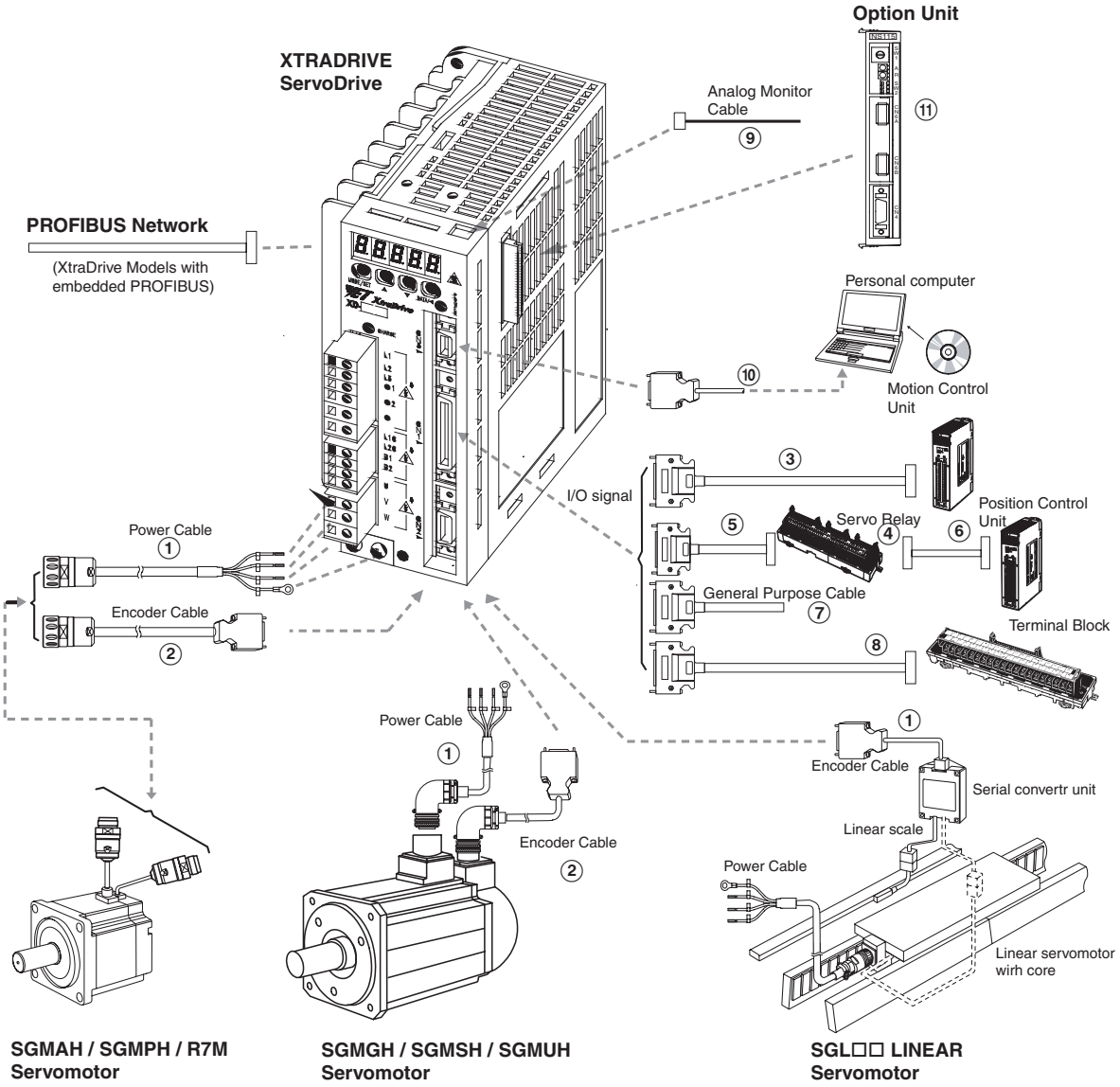

*1 The time constant for the primary filter is 47 μs.
*2 Connect when using an absolute encoder.
*3 Used only with an absolute encoder.
*4 For using an external regenerative resistor, connect it between B1 and B2.
*5 The 24VDC power is supplyed by the user.
*6 TI stands for Texas Instruments Inc.



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## Ordering Information

### System Configuration




### Servo Drives

| Specifications | | XtraDrive | XtraDrive-DP With PROFIBUS | Compatible Servomotors | | |
|---|---|---|---|---|---|---|
| | | | | Sigma-II | SmartStep | Sigma Linear Motors |
| 1 Phase 200 V AC | 30 W | XD-P3-MN01 | XD-P3-MSD0 | SGMAH-A3A□ | R7M-A03030-□ | - |
| | 50 W | XD-P5-MN01 | XD-P5-MSD0 | SGMAH-A5D□ | R7M-A05030-□ | SGLGW-30A050□ |
| | 100 W | XD-01-MN01 | XD-01-MSD0 | SGMAH-01A□, SGMPH-01A□ | R7M-A10030-□, R7M-AP10030-□ | SGLGW-30A080□, SGLGW-40A140□ |
| | 200 W | XD-02-MN01 | XD-02-MSD0 | SGMAH-02A□, SGMPH-02A□ | R7M-A20030-□, R7M-AP20030-□ | SGLFW-20A□, SGLFW-35A120□, SGLGW-40A253A□,SGLGW-60A140□ |
| | 400 W | XD-04-MN01 | XD-04-MSD0 | SGMAH-04A□, SGMPH-04A□ | R7M-A40030-□, R7M-AP40030-□ | SGLGW-40A365A□, SGLGW-60A253A□ |
| | 750 W | XD-08-MN | XD-08-MSD0 | SGMAH-08A□, SGMPH-08A□ | R7M-A75030-□, R7M-AP75030-□ | SGLFW-35A230□, SGLFW-50A200□, SGLGW-60A365A□ |
| 3 Phase 400 V AC | 0.5 kW | XD-05-TN | XD-05-TSD0 | SGMGH-05D□, SGMAH-03D□, SGMPH-02D□/04D□ | - | SGLFW-35D□ |
| | 1.0 kW | XD-10-TN | XD-10-TSD0 | SGMGH-09D□, SGMSH/UH-10D□, SGMAH-07D□, SGMPH-08D□ | - | SGLFW-50D200□, SGLTW-35D170□, SGLTW-50D170□ |
| | 1.5 kW | XD-15-TN | XD-15-TSD0 | SGMGH-13D□, SGMSH/UH-15D□, SGMPH-15D□ | - | SGLFW-50D380□, SGLFW-1ZD200□ |
| | 2.0 kW | XD-20-TN | XD-20-TSD0 | SGMGH-20D□, SGMSH-20D□ | - | SGLTW-35D320□, SGLTW-50D320□ |
| | 3.0 kW | XD-30-TN | XD-30-TSD0 | SGMGH-30D□, SGMSH/UH-30D□ | - | SGLFW-1ZD380□, SGLTW-40D400□ |

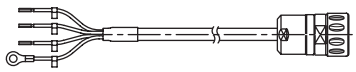
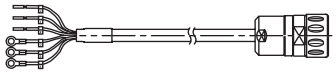
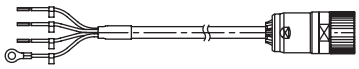
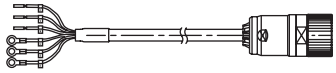
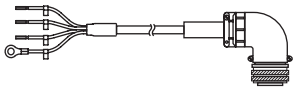
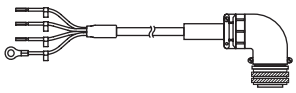
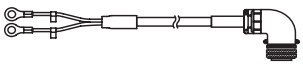
**Note:** SGLGW-□ Linear motor combination is made considering the use of Standard Magnets. Reffer to the Linear motors chapter for details

### Servomotors

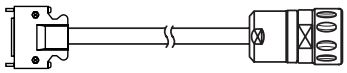
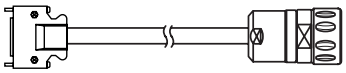
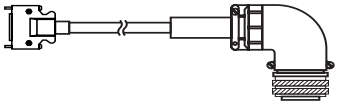
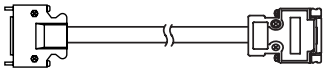
**Note:** Reffer to the Servo System chapter for motor details.


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## Power Cables

| Symbol | Specifications | | Model | Appearance |
|---|---|---|---|---|
| A | For 200V Servomotors without brake<br>SGMAH-□□A□□□1D-OY<br>SGMPH-(01/02/04/08)A□□□1D-OY<br>R7M-A(P)□□□30-S1-D | 3 m | R88A-CAWA003S-DE |  |
| | | 5 m | R88A-CAWA005S-DE | |
| | | 10 m | R88A-CAWA010S-DE | |
| | | 15 m | R88A-CAWA015S-DE | |
| | | 20 m | R88A-CAWA020S-DE | |
| | For 200V Servomotors with brake<br>SGMAH-□□A□□□CD-OY<br>SGMPH-(01/02/04/08)A□□□CD-OY<br>R7M-A(P)□□□30-BS1-D | 3 m | R88A-CAWA003B-DE |  |
| | | 5 m | R88A-CAWA005B-DE | |
| | | 10 m | R88A-CAWA010B-DE | |
| | | 15 m | R88A-CAWA015B-DE | |
| | | 20 m | R88A-CAWA020B-DE | |
| | For 400V Servomotors without brake<br>SGMAH-□□D□□□1D-OY<br>SGMPH-□□D□□□1D-OY | 3 m | R88A-CAWK003S-DE |  |
| | | 5 m | R88A-CAWK005S-DE | |
| | | 10 m | R88A-CAWK010S-DE | |
| | | 15 m | R88A-CAWK015S-DE | |
| | | 20 m | R88A-CAWK020S-DE | |
| | For 400V Servomotors with brake<br>SGMAH-□□D□□□CD-OY<br>SGMPH-□□D□□□CD-OY | 3 m | R88A-CAWK003B-DE |  |
| | | 5 m | R88A-CAWK005B-DE | |
| | | 10 m | R88A-CAWK010B-DE | |
| | | 15 m | R88A-CAWK015B-DE | |
| | | 20 m | R88A-CAWK020B-DE | |
| | For 400V Servomotors<br>SGMGH-(05/09/13)D□<br>SGMSH-(10/15/20)D□<br>SGMUH-(10/15)D□<br>For servomortors with Brake a separate cable (R88A-CAWC0□□B-E) is needed | 3 m | R88A-CAWC003S-E |  |
| | | 5 m | R88A-CAWC005S-E | |
| | | 10 m | R88A-CAWC010S-E | |
| | | 15 m | R88A-CAWC015S-E | |
| | | 20 m | R88A-CAWC020S-E | |
| | For 400V Servomotors<br>SGMGH-(20/30)D□<br>SGMSH-30D□<br>SGMUH-30D□<br>For servomortors with Brake a separate cable (R88A-CAWC0□□B-E) is needed | 3 m | R88A-CAWD003S-E |  |
| | | 5 m | R88A-CAWD005S-E | |
| | | 10 m | R88A-CAWD010S-E | |
| | | 15 m | R88A-CAWD015S-E | |
| | | 20 m | R88A-CAWD020S-E | |
| | Brake Cable only.<br>For 400V Servomotors with Brake<br>SGMGH-□□D□<br>SGMSH-□□D□<br>SGMUH-□□D□ | 3 m | R88A-CAWC003B-E |  |
| | | 5 m | R88A-CAWC005B-E | |
| | | 10 m | R88A-CAWC010B-E | |
| | | 15 m | R88A-CAWC015B-E | |
| | | 20 m | R88A-CAWC020B-E | |

## Encoder Cables (for CN2)

| Symbol | Specifications | | Model | Appearance |
|---|---|---|---|---|
| B | Encoder cable for Sigma-II (SGMAH/PH) Servomotors<br>SGMAH-□□□□□□□D-OY<br>SGMPH-□□□□□□□D-OY | 3 m | XD-CRWA003-DE |  |
| | | 5 m | XD-CRWA005-DE | |
| | | 10 m | XD-CRWA010-DE | |
| | | 15 m | XD-CRWA015-DE | |
| | | 20 m | XD-CRWA020-DE | |
| | Encoder cable for SmartStep Servomotors<br>R7M-A(P)□□□30-S1-D | 3 m | XD-CRA003-DE |  |
| | | 5 m | XD-CRA005-DE | |
| | | 10 m | XD-CRA010-DE | |
| | | 15 m | XD-CRA015-DE | |
| | | 20 m | XD-CRA020-DE | |
| | Encoder cable for Sigma-II (SGMGH/SH/UH/BH) Servomotors<br>SGMGH-□<br>SGMSH-□<br>SGMUH-□ | 3 m | XD-CRWB003N-E |  |
| | | 5 m | XD-CRWB005N-E | |
| | | 10 m | XD-CRWB010N-E | |
| | | 15 m | XD-CRWB015N-E | |
| | | 20 m | XD-CRWB020N-E | |
| | Encoder cable to the serial converter of Sigma Linear Motors<br><br>(Reffer to the Linear motors chapter for more details) | 3 m | XD-CLP70-03-E |  |
| | | 5 m | XD-CLP70-05-E | |
| | | 10 m | XD-CLP70-10-E | |
| | | 15 m | XD-CLP70-15-E | |
| | | 20 m | XD-CLP70-20-E | |



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## Control Cables (for CN1)

| Symbol | Description | Connect to | | Model |
|---|---|---|---|---|
| ③ | 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 |
| | Servodrive 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 |
| ④ | 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) |
| ⑤ | Cable to Servo drive | Servo Relay Units XW2B-□0J6-□B | 1 m | XW2Z-100J-B4 |
| | | | 2 m | XW2Z-200J-B4 |
| ⑥ | 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 |
| ⑦ | Control Cable | For General purpose Controllers | 1 m | R88A-CPW001S or JZSP-CKI01-1 |
| | | | 2 m | R88A-CPW002S or JZSP-CKI01-1 |
| ⑧ | 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 |
|---|---|---|
| ⑨ | Analog Monitor Cable | R88A-CMW001S or DE9404559 |

## Options (for CN3)

| Symbol | Name | Model |
|---|---|---|
| ⑩ | Computer Connecting Cable | R88A-CCW002P2 or JZSP-CMS02 |

## Option Units (for CN10)

| Symbol | Name | Model |
|---|---|---|
| ⑪ | DeviceNet Interface unit with Positioning Fuctionality | JUSP-NS300 |

## Battery Backup for absolute encoder

| Name | Model |
|---|---|
| Battery (Required forservomotors with absolute encoder) | JZSP-BA01 ER6VC3 (3.6V) |

## Connectors

| Specification | | Model |
|---|---|---|
| Control I/O connector (For CN1) | | R88A-CNU11C or JZSP-CKI9 |
| XtraDrive 200V Connector Kit. (For 200V Motors SGMAH/PH-□□A□□□D-OY and R7M-A□-D) | Connectors included DE9406973 SPOC-17H-FRON169 SPOC-06K-FSDN169 | XD-CN200K-DE |
| XtraDrive 400V Connector Kit. (For 400V Motors SGMAH/PH-□□D□□□D-OY) | Connectors included DE9406973 SPOC-17H-FRON169 LPRA-06B-FRBN170 | XD-CN400K-DE |
| 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, 200V. (For 200V Motors SGMAH/PH-□□A□□□□D-OY and R7M-A□-D) | | SPOC-06K-FSDN169 |
| Hypertac Power Connector IP67, 400V. (For 400V 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 400V Motors SGMGH-(05/10/13)D□, SGMSH-(10/15/20)D□ , SGMUH-(10/15)D□) | | MS3108E18-10S |
| Military Power connector IP67 (For 400V Motors SGMGH-(20/30)D□, SGMSH-30D□, SGMUH-30D□) | | MS3108E22-22S |
| Military Brake connector IP67 (For 400V ServoMotors SGMGH-□, SGMSH-□, SGMUH-□) | | MS3108E10SL-3S |

## Filters

| Specifications (applicable Servo Drive) | Model | Rated Current | Rated Voltage |
|---|---|---|---|
| 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-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 | |

## Computer Software

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

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. I18E-EN-01

In the interest of product improvement, specifications are subject to change without notice.



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