

**CS1 Series, C200HX/HG/HE, C200HS, C200H
C200H-MC221**

Motion Control Unit

Specification Sheets

OMRON

CS1 Series, C200HX/HG/HE, C200HS, C200H Motion Control Unit

C200H-MC221

2-axis Motion Control with Multitasking G Language

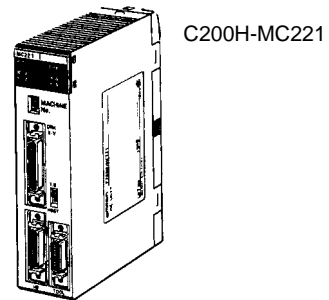
■ The C200H-MC221 is a 2-axis Motion Control Unit for the CS1-series, C200HX/HG/HE, C200HS, and C200H PCs. With its built-in G-language programming, it can be used for advanced motion control, and its multitasking capability allows operations to be performed independently for each axis. The following two modes can be used for motion control:

1. Motion control by G language programming in the MC Unit (Automatic Mode)
2. Motion control by instructions from the PC interface area in the CPU Unit or by manual commands from the Teaching Box (Manual Mode)

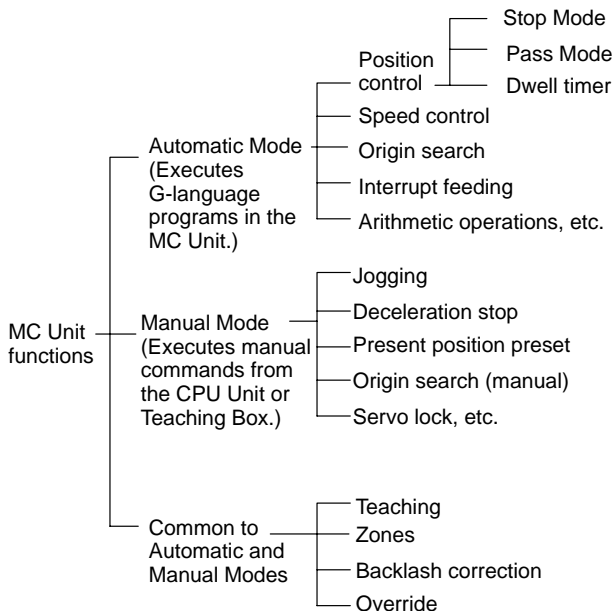
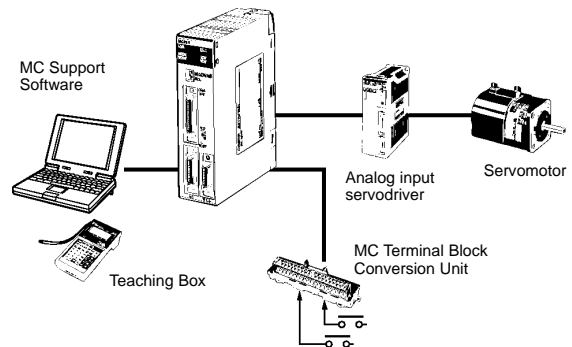
The MC Unit has been developed for use in simple positioning applications using servomotors. Applicable machines are as follows:

- Conveyor Systems: X/Y tables, palletizers/depalletizers, loaders/unloaders, etc.
- Assembling Systems: Simple robots (including orthogonal robots), simple automated assembling machines (such as coil winding, polishing, hole punching), etc.

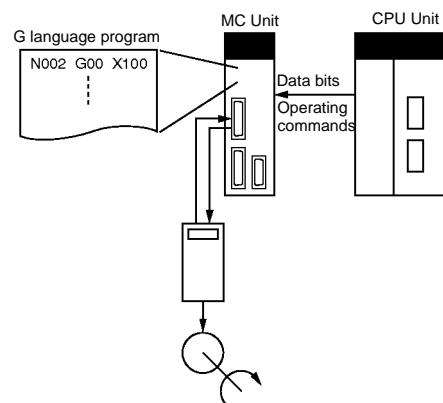
Note: The MC Unit is not designed to perform linear interpolation, circular interpolation, or helical circular interpolation with horizontal articulated robots or cylindrical robots, because it does not support coordinate conversions. The MC Unit can, however, perform PTP control with these robots.



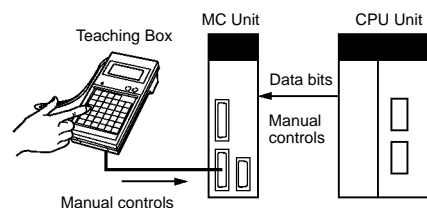
■ System Configuration



Automatic Mode



Manual Mode



“Programmable Controller” is abbreviated as “PC” in these *Specification Sheets*.

■ Features

Multitasking G Language to Reduce CPU Unit Programming

The MC Unit is provided with a multitasking G language, an ideal language for motion control. Up to 100 programs can be registered.

- Multiaxis control programs can be easily created.
- Position control can be performed by specifying program numbers using the PC interface area and executing operation commands, reducing the workload on the CPU Unit's ladder program.
- Axis configuration can be set, such as controlling X-Y robot operations or controlling operations separately for each axis.

Up to 16 Axes Can be Controlled for Each CPU Unit

Up to 8 MC Units can be mounted to a CPU Unit, so up to 16 axes can be controlled.

High-speed Response to Start Commands from CPU Unit

The response time from when a start command is received from the CPU Unit until the command voltage is output from the MC Unit is 12 ms.

Operation Can be Started or Stopped by General-purpose Inputs

The MC Unit is provided with general-purpose inputs, so operation can be started or stopped without needing intervention by the CPU Unit.

- General-purpose inputs can be used as jog start signals, external device interlock signals, restart signals, and other signals.

- The MC Unit can perform high-speed-response positioning by itself.

Interrupt Feeding Function Provided as Standard

The MC Unit can perform high-speed positioning for feeding operations (such as for feeders) by external sensors.

Compatible with Absolute Encoders

This MC Unit is compatible with OMNUC U-series and other Servomotors with absolute encoders. It no longer requires origin searches, and allows quick start and reset at system start-up or power-down. The MC Unit can also handle a mixture of absolute and incremental encoders.

250-kp/s Encoder Response Frequency

The maximum feedback encoder response frequency is 250 kp/s, so the MC Unit can be used with high-speed and high-precision servomotors.

Data Creation Using Teaching Box

In addition to entering numbers in the Position Data Edit Window of the MC Support Software, it is possible to create position data by using the Teaching Box to teach positions while actually moving the machinery.

Operate with MPG

Positioning and simple sync operations can be performed using an MPG (manual pulse generator).

Special Cable for Connecting Servodrivers

■ Models

| Applicable PCs | Unit classification | Number of controlled axes | Controlled servodriver | Model |
|------------------------------------|------------------------|---------------------------|--------------------------|-------------|
| CS1, C200HX/HG/HE C200HS, C200H | C200H Special I/O Unit | 2 axes | Analog input servodriver | C200H-MC221 |

MC Unit Support Software (Sold Separately)

| Name | Computer | Specifications | Model |
|---|-------------------------|--|---|
| MC Support Software | IBM PC/AT or compatible | Editing system parameters, editing position data, creating MC programs (G language), transferring data to MC Unit, monitoring MC Unit, saving data in flash memory, and printing | CV500-ZN3AT1-E |
| RS-422 Cable (connects to peripheral connector on Unit front panel) | IBM PC/AT or compatible | Cable: 3.3 m (connector on MC Unit end: half-pitch 20-pin, connector on computer end: D-sub 25-pin) 25-to-9-pin conversion connector manufactured by Sanwa Supply | CV500-CIF01 D09-9F25F (Sanwa Supply) |

■ Specifications

| Item | Specifications |
|--|--|
| Model number | C200H-MC221 |
| Applicable PC | CS1-series, C200HX/HG/HE, C200HS, C200H |
| Unit classification | C200H Special I/O Unit |
| Racks on which MC Unit can be mounted | CPU Rack, C200H Expansion I/O Rack, CS1 Expansion Rack, SYSMAC BUS Remote I/O Slave Rack |
| Maximum number of MC Units that can be mounted | 8 Units (16 axes) or 5 Units (10 axes) depending on the PC model. (For details, refer to <i>Connectable CPU Unit Models</i> .) |
| Unit numbers | 0 to 8 and A to E, or 0 to 8 depending on the PC model. (For details, refer to <i>Connectable CPU Unit Models</i> .) |

| Model number | | C200H-MC221 |
|--|--|---|
| Method for data transfer with CPU Unit | Words allocated to Special I/O Units in CIO Area | 20 words/Unit (uses 2 unit numbers.) CPU Unit to MC Unit: Program numbers, cycle start (MC program operation command), origin search command, automatic/manual mode switching, etc. MC Unit to CPU Unit: Status: Positioning completed, zones, busy flag, etc. Monitor data: Present position, error codes, M codes, etc. |
| | Words allocated to Special I/O Units in DM Area | 2 words used out of 100 words allocated Expansion Data words are specified in initial settings. |
| | Words in Expansion Data Area (DM or EM Area) | 23 words per Unit CPU Unit to MC Unit: Data transfer area specifications, present position preset values, etc. MC Unit to CPU Unit: System error codes, task error codes, effective program numbers, etc. |
| Controlled servodrivers | | Analog input servodrivers (Example: OMRON OMNUC H, M, or U Series) |
| Encoder interface | | Line receiver input; maximum response frequency: 250 kp/s (before multiplication) Pulse ratio: 4 (fixed) Note: The applicable absolute encoder is the OMRON OMNUC U Series. |
| Built-in program language | | G language (Started by receiving a start command from the CPU Unit ladder diagram program.) |
| Control | Control method | Speed reference voltage output-type semi-closed loop system, using incremental and absolute encoder inputs (automatic trapezoidal or S-curve acceleration/deceleration method) |
| | Number of controlled axes | 2 axes max. |
| | Number of simultaneously controlled axes | 2 axes max. |
| | PTP (independent) control | Multitasking can be used to execute independent operating modes and programs for each axis. |
| Automatic/Manual Mode (for each task) | | Automatic Mode: Mode for executing MC program created in G language. Manual Mode: Mode for executing manual commands from CPU Unit (PC interface area) or Teaching Box. Note: The Automatic and Manual Modes are switched according to the PC interface area of the CPU Unit. There are a total of 10 Manual Mode commands, including origin search, reference origin return, jogging, and present position preset. The operation command (cycle start) is started in Automatic Mode using the PC interface area of the CPU Unit. |
| Positioning operations | Independent | Independent operations for a maximum of two axes |
| | Linear interpolation | Linear interpolation for a maximum of two axes |
| | Circular interpolation | Circular interpolation for a maximum of two axes on a plane. |
| | Interrupt feeding | Operations for each axis |
| Position specification method | | Operating positions can be specified in MC programs by using one of the following three methods. Direct Specification of Coordinate Values Example: When G00 X100 is specified with absolute specification, the X axis moves to a position of 100. Address Specification of Position Data Example: When G00 XA0000 is specified, the axis moves to the position set as position data address 0000. Indirect Register Specification Example: When G00 X(E00) is specified, the X axis moves to the position set as the position data address in the E00 indirect register. |
| Control unit | Minimum setting unit | 1, 0.1, 0.01, 0.001, 0.0001 |
| | Units | mm, inch, degree, pulse (There is no unit conversion function.) |
| Maximum command value | | -39,999,999 to +39,999,999 |
| Acceleration/deceleration curve | | Trapezoidal or S-curve (Can be selected for each axis.) |
| Acceleration/deceleration time | | Individual acceleration/deceleration settings possible: 0 to 9,998 ms (2-ms increments) |
| Speed reference | | Speed control for a maximum of two axes. When the unit is pulses, the setting range is from 1 p/s to 1,000 kp/s (after multiplication by 4). |
| Feed rate (PTP operation) specification method | | Can be set for each axis. Feed rate = High speed × Override value/100 Real-time speed can be changed by altering the override value. |

| Model number | | C200H-MC221 | |
|---------------------------|---------------------------------|---|--|
| External I/O | Input | Individual axis control | The following signals are each provided for two axes: CCW limit inputs CW limit inputs Origin proximity inputs Emergency stop inputs |
| | | Servodriver relationships | The following signal is provided for two axes: Driver alarm signal |
| | | Encoder | Line receiver inputs For two axes 250 kp/s max. before multiplication Fixed at $\times 4$ Note: When using a manual pulse generator (MPG), connect it to the Y-axis encoder input terminal. (X-axis + MPG) |
| | | General-purpose inputs | 2 points (for external start commands, etc.) |
| | Output | Servodriver relationships | The following signals are each provided for two axes: Speed command voltage output (± 10 V) Operation command output SEN signal (for absolute encoder) Driver alarm reset signal |
| | Peripheral device | 1 serial channel for Teaching Box or MC Support Software (switchable using the slide switch on the front panel) Teaching Box: 9,600 bits/s for RS-422 MS Support Software: 9,600 bits/s for RS-422 and RS-232C | |
| Feed operations | Maximum rapid feed rate | Maximum feed rate for PTP operation 36.86 m/min under the following conditions: Encoder resolution: 2,048 p/r Motor speed: 4,500 r/m Control unit: 0.001 mm/pulse | |
| | Maximum interpolation feed rate | Maximum feed rate for interpolation operations 36.86 m/min under the same conditions as above | |
| | Rapid feed override | 0% to 100.0% (Setting unit: 0.1%) | |
| | Interpolation feed override | 0% to 199.9% (Setting unit: 0.1%) | |
| | Jog feed override | 0% to 100.0% (Setting unit: 0.1%) | |
| Axis control | Zone settings | Up to 8 zones/axis can be set. | |
| | Backlash correction | Backlash for mechanical system Can be set from 0 to 999 pulses. | |
| | In-position zone | Number of accumulated pulses for determining the positioning completed status Can be set from 0 to 999 pulses. | |
| | Position loop gain | Servo system response adjustment gain 5 to 250 (1/s) | |
| | Position loop feed-forward gain | Servo system response adjustment gain 0% to 100% | |
| Task program management | Number of tasks | 2 max. (program execution units) | |
| | Number of programs | When 1 task is used: 100 max. When 2 tasks are used: 50 max./task | |
| | Program capacity | When 1 task is used: 800 blocks max. When 2 tasks are used: 400 blocks max./task | |
| | Position data capacity | 2,000 positions max. (when only one axis is used) (A0000 to A1999) | |
| | Number of registers | 32 (Mainly used for specifying position data numbers.) (E00 to E31) | |
| | Subroutine nesting | 5 levels max. | |
| Auxiliary function | M code | 000 to 999 | |
| Saving program data | MC Unit | MC programs, system parameters, and position data can be stored in the flash memory in the MC Unit. | |
| | External peripheral devices | MC Support Software can be used to save data to a floppy disk or the hard disk at the personal computer. | |
| Self-diagnostic function | | Memory corruption is detected. | |
| Error detection functions | | Error counter warning, error counter over, absolute encoder error detection, CPU errors, communications errors (Teaching Box), flash memory error, EEPROM error, software limit over error, phase-Z error, overtravel, emergency stop, unit number error, driver alarm detection, driver reverse wiring detection, CPU Unit error detection | |

| Model number | C200H-MC221 |
|--|---|
| Settings | The following switches are located on the front panel. Rotary switch: Unit number setting (0 to 8, A to E) Slide switch: Peripheral selection switch (used for determining whether to connect the peripheral connector to Teaching Box or MC Support Software) The following switch is located on the rear panel. DIP switch: Absolute encoder default setting function, software switch enabled/disabled, Teaching Box Japanese/English mode switching |
| Indicators | 6 LED indicators: Running, error, motor rotation direction (CCW/CW) |
| Connectors on front panel | Servodriver connector, I/O connector, peripheral connector (one each) |
| Internal current consumption (supplied from Power Supply Unit) | 650 mA or less at 5 VDC (with Teaching Box connected: 850 mA or less) 200 mA or less at 24 VDC |
| Dimensions | 130.0 × 34.5 × 100.5 mm (H × W × D) Single-slot size Note: The height including the Backplane is 200 to 240 mm when the attached connector and the recommended cable are used. |
| Weight (Connectors excluded) | 500 g max. |
| Safety standards | Conforms to UL (Class 2), CSA (Class 2), and EC directives (EMC directive, low-voltage directive). |
| Standard accessories | 10126-3000VE snap-on connector for Servodrivers and 10326-42F0-008 connector cover (manufactured by Sumitomo 3M): 1 set Peripheral connector (10120-3000VE 20-pin connector and 10320-42F0-008 connector cover manufactured by Sumitomo 3M): 1 set |
| Cat No. | Introduction: W314, Details: W315 (suffixes omitted) |

■ Options (Sold Separately)

| Name | Specifications | Model | |
|---|---|---|------------------------------|
| MC Terminal Block Conversion Unit | For easier wiring of I/O connectors | XW2B-20J6-6 | |
| MC Terminal Block Conversion Unit Cable | For connecting the I/O connectors on the front panel of the Unit | XW2Z-100J-F1 | |
| Snap-on connector for Servodriver connector on Unit front panel (1 set provided as standard on this Unit) | Soldered connector | 10126-3000VE (Sumitomo 3M) | |
| | Connector cover | 10326-42F0-008 (Sumitomo 3M) | |
| RS-232C cable and connector for MC Support Software | Recommended cable | CO-DS-IREVV-SX-10P × 0.18 mm ² (Hitachi Cable) | |
| | Peripheral connector on Unit front panel (1 set provided as standard on this Unit) | Soldered connector | 10120-3000VE (Sumitomo 3M) |
| | | Connector cover | 10320-42F0-008 (Sumitomo 3M) |
| Teaching Box | Jogging, origin search, present value monitoring, and other operations by means of manual commands Teaching (taking present values into position data) | CVM1-PRO01-E | |
| Teaching Box Connecting Cable | Cable length: 2 m | CV500-CN224 | |
| | Cable length: 4 m | CV500-CN424 | |
| | Cable length: 6 m | CV500-CN624 | |
| ROM Cassette | --- | CVM1-MP702 | |

■ Applicable CPU Units

| PC | CPU Unit model | Total number of MCUs that can be mounted on CPU Units, Expansion I/O Racks, and SYSMAC BUS Remote I/O Slave Racks (see note) | Unit location restrictions |
|--------------|--|--|---|
| CS1-series | CS1H-CPU□□ CS1G-CPU□□ | 8 (unit numbers 0 to 8 and A to E) | None |
| C200HX/HG/HE | C200HE-CPU11/32/42 (-ZE) C200HG-CPU33/43 (-ZE) C200HX-CPU34/44 (-ZE) | 5 (unit numbers 0 to 8) | None |
| | C200HG-CPU53/63 (-ZE) C200HX-CPU54/64 (-ZE) C200HX-CPU65-ZE/85-ZE | 8 (unit numbers 0 to 8 and A to E) | None |
| C200HS | C200HS-CPU01(-□)/21(-□)/31/03/23/33 | 5 (unit numbers 0 to 8) | None |
| C200H | C200H-CPU01/02/03/11/21/22/23/31 | 5 (unit numbers 0 to 8) | Cannot be mounted to two rightmost slots on CPU Rack. |

Note: Restrictions on SYSMAC BUS Remote I/O Slave Racks

The maximum number of C200H Special I/O Units that can be mounted on a SYSMAC BUS Remote I/O Slave Unit differs according to

the Unit type as shown below. C200H Special I/O Units can be divided into the following four groups according to the maximum number of Units that can be mounted.

| Group | A | B | C | D |
|--|---|--|-------------------------------------|--|
| Units | ASCII Unit, High-speed Counter Unit, Position Control Unit (NC111/112/113/213), Analog I/O Unit, ID Sensor Unit, Fuzzy Logic Unit | Multipoint I/O Unit, Temperature Control Unit, PID Control Unit, Heating/Cooling Control Unit, Cam Positioner Unit | Temperature Sensor Unit, Voice Unit | Position Control Unit (NC211/413), Motion Control Unit |
| Maximum number of Units that can be mounted in each group under one Master | 4 Units | 8 Units | 6 Units | 2 Units |
| Maximum number of Units that can be mounted in all groups | $3A + B + 2C + 6D \leq 12$, and $A + B + C + D \leq 8$ | | | |

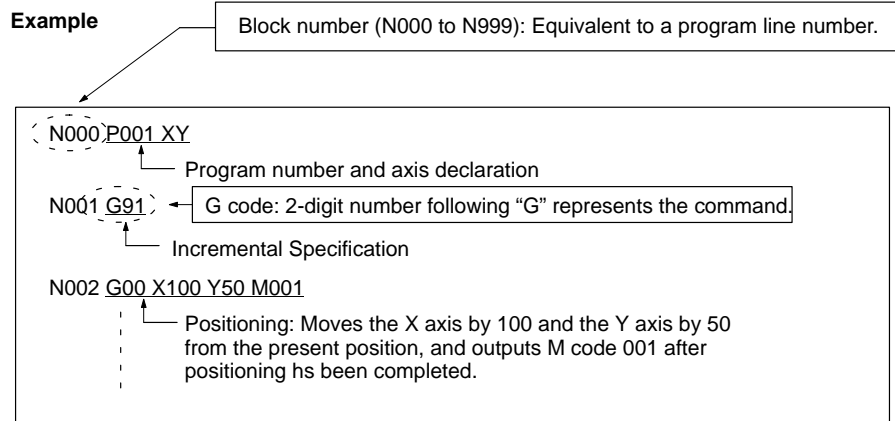
■ MC Unit Functions and Execution Methods

The MC Unit functions can be executed using either of the following three methods.

1. Using MC programs (G language)
2. Specifying functions from the CPU Unit to the MC Unit through the PC interface area
3. Specifying system parameters by using MC Support Software, IOWR instructions, or I/O transfer bits

| Function | Execution methods (Modes in parentheses: Valid modes) | | |
|---|--|-------------------------|-------------------------|
| | MC program (G language) | PC interface area | System parameters |
| Positioning with linear interpolation | (G01) (Automatic Mode) | --- | --- |
| Positioning with circular interpolation | (G02/03) (Automatic Mode) | --- | --- |
| Speed control | (G30) (Automatic Mode) | --- | --- |
| Interrupt feeding | (G31) (Automatic Mode) | --- | --- |
| Switching to Pass Mode | (G10) (Automatic Mode) | --- | --- |
| Switching to Stop Mode | (G11) (Automatic Mode) | --- | --- |
| Dwell timer setting/execution | (G04) (Automatic Mode) | --- | --- |
| In-position setting | --- | --- | (Automatic/Manual Mode) |
| Workpiece origin return | (G27) (Automatic Mode) | --- | --- |
| Position loop gain setting | --- | --- | (Automatic/Manual Mode) |
| Cycle start | --- | (Automatic Mode) | --- |
| Single block | --- | (Automatic Mode) | --- |
| Pause | --- | (Automatic Mode) | --- |
| Forced block end | --- | (Automatic Mode) | --- |
| Origin search | (G28) (Automatic Mode) | (Manual Mode) | --- |
| Reference origin return | (G26) (Automatic Mode) | (Manual Mode) | --- |
| Override setting | --- | (Automatic/Manual Mode) | --- |
| Error counter reset | --- | (Automatic/Manual Mode) | --- |
| Driver alarm reset | --- | (Automatic/Manual Mode) | --- |
| M code reset | --- | (Automatic Mode) | --- |
| Teaching | --- | (Automatic/Manual Mode) | --- |
| Jogging | --- | (Manual Mode) | --- |
| Deceleration stop | --- | (Manual Mode) | --- |
| Forced origin | --- | (Manual Mode) | --- |
| Absolute encoder origin setting | --- | (Manual Mode) | --- |
| Servo-lock | --- | (Manual Mode) | --- |
| Servo-unlock | --- | (Manual Mode) | --- |
| Trapezoidal/S-curve specification | --- | --- | (Automatic/Manual Mode) |
| Zone settings | --- | --- | (Automatic/Manual Mode) |
| Backlash correction setting | --- | --- | (Automatic/Manual Mode) |
| Origin deceleration method | --- | --- | (Automatic/Manual Mode) |

■ G Language



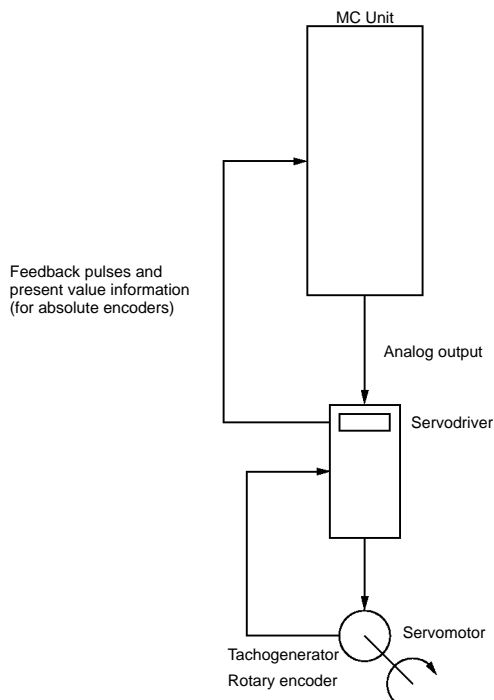
| Code | Name | Function |
|------|---|--|
| G00 | Positioning | Performs positioning according to maximum rapid feed rate × override (%). (PTP control) |
| G01 | Linear Interpolation | Performs linear interpolation on 1, 2, 3, or 4 axes (1 or 2 axes for MC221). The specified axes move simultaneously. The feed rate can be specified. |
| G02 | Circular Interpolation (Clockwise) | Performs 2-axis circular interpolation in the clockwise direction at the specified interpolation feed rate. |
| G03 | Circular Interpolation (Counterclockwise) | Performs 2-axis circular interpolation in the counterclockwise direction at the specified interpolation feed rate. |
| G04 | Dwell Timer | Waits for the specified length of time. |
| G10 | Pass Mode | Performs operations one-by-one in sequence without waiting for deceleration to stop. |
| G11 | Stop Mode | Performs the next operation after completing positioning. |
| G17 | Circular Plane Specification (X-Y) | Sets the X-Y plane as the plane for circular interpolation. |
| G26 | Reference Origin Return | Moves to the reference origin. |
| G27 | Workpiece Origin Return | Moves to the workpiece origin. |
| G28 | Origin Search | Performs an origin search on the specified axis. |
| G29 | Origin UNDEFINED | Sets the origin to an undefined state. |
| G30 | SPEED CONTROL | Feeds up to 2 axes simultaneously at the controlled feed rate. |
| G31 | INTERRUPT FEEDING | Performs an interrupt feeding operation. |
| G50 | Select Reference Coordinate System | Specifies the reference coordinate system. |
| G51 | Select Workpiece Coordinate System | Specifies the workpiece coordinate system. |
| G53 | Change Workpiece Origin Offset | Changes the origin of the workpiece coordinate system. |
| G54 | Change Reference Coordinate System PV | Changes the present value in the reference coordinate system. |
| G60 | Arithmetic Operations | Performs arithmetic operations on numerical values, position data, and registers. |
| G63 | Substitution | Substitutes numerical values, position data, or registers into other position data or registers. |
| G69 | Change Parameter | Changes the acceleration/deceleration time. |
| G70 | Unconditional Jump | Unconditionally jumps to the specified block. |
| G71 | Conditional Jump | Jumps to the specified block when the condition is met. |
| G72 | Subroutine Jump | Calls the specified subroutine. |
| G73 | Subroutine End | Ends the subroutine. |
| G74 | Optional End | Ends the block currently being executed when the specified optional input is ON. |
| G75 | Optional Skip | Skips the block after this command when the specified optional input is ON. |
| G76 | Optional Program Stop | Pauses the program when the specified optional input is ON. |
| G79 | Program End | Ends the main program. |
| G90 | Absolute Specification | Positions with absolute coordinates when performing axis operations. |
| G91 | Incremental Specification | Positions with relative coordinates when performing axis operations. |

■ Auxiliary Codes

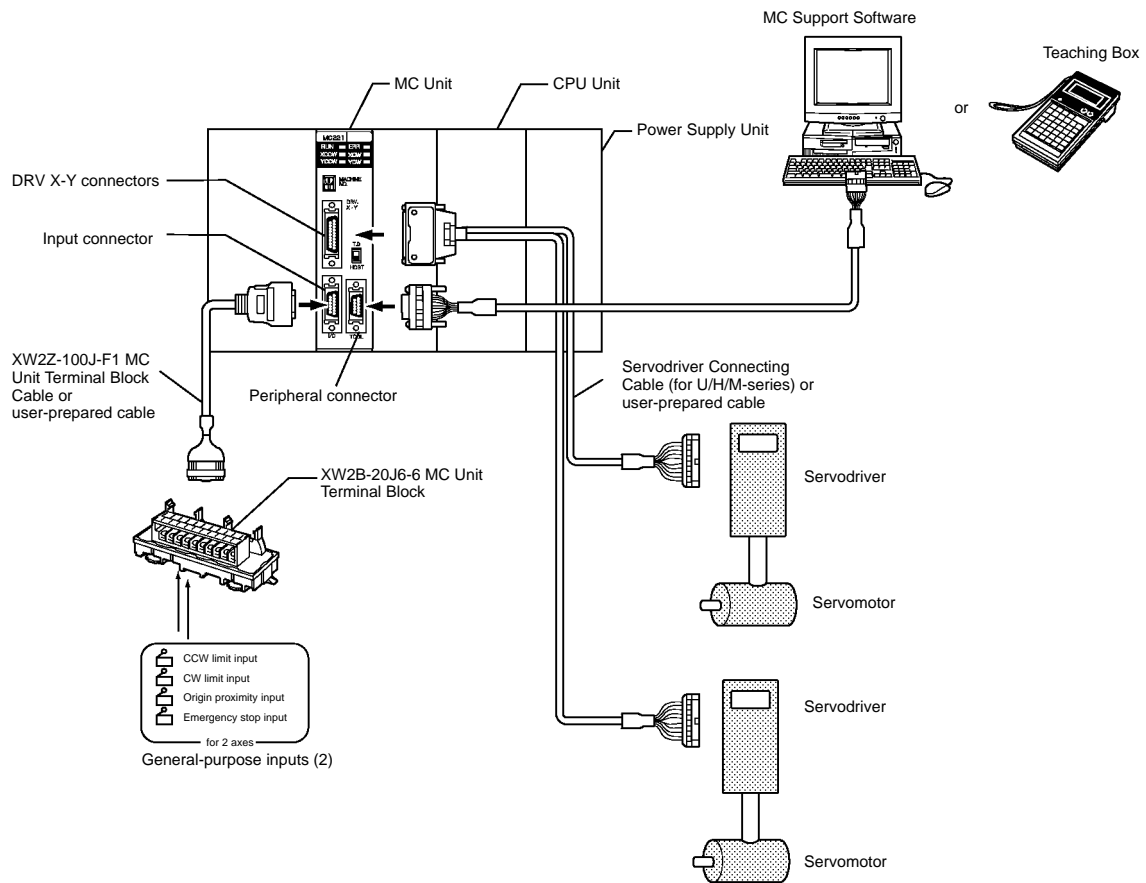
| Code | Name | Function |
|------|--------|--------------------|
| M | M code | Outputs an M code. |

■ System Configuration
Control System

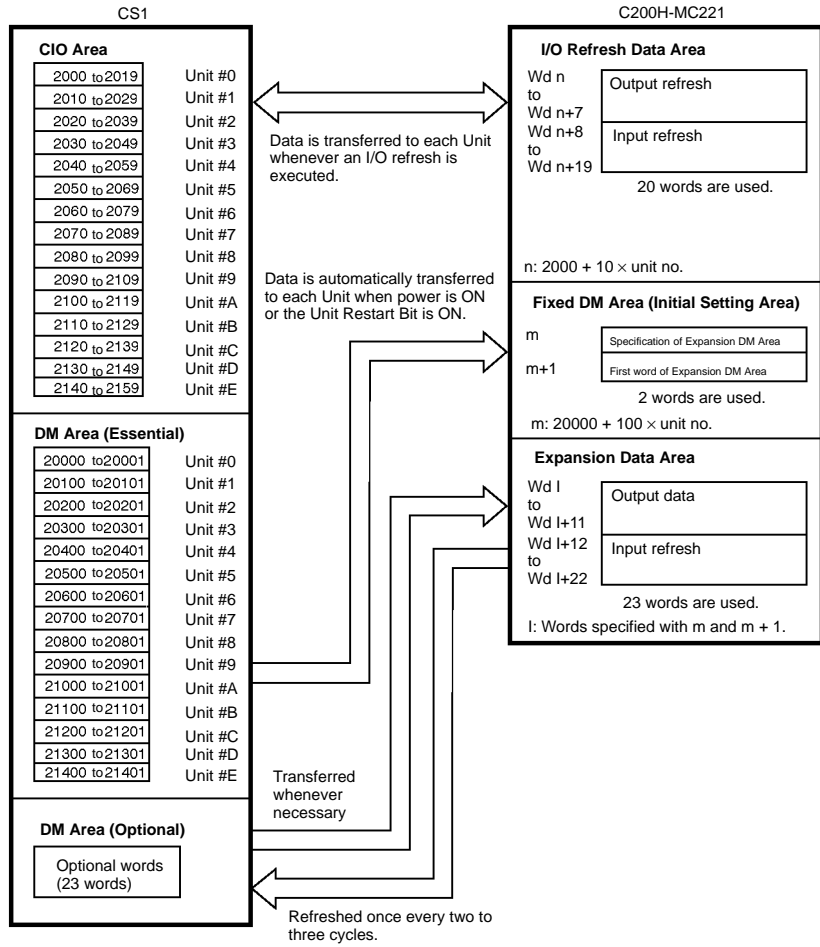
Semi-closed Loop System



Connected Configuration

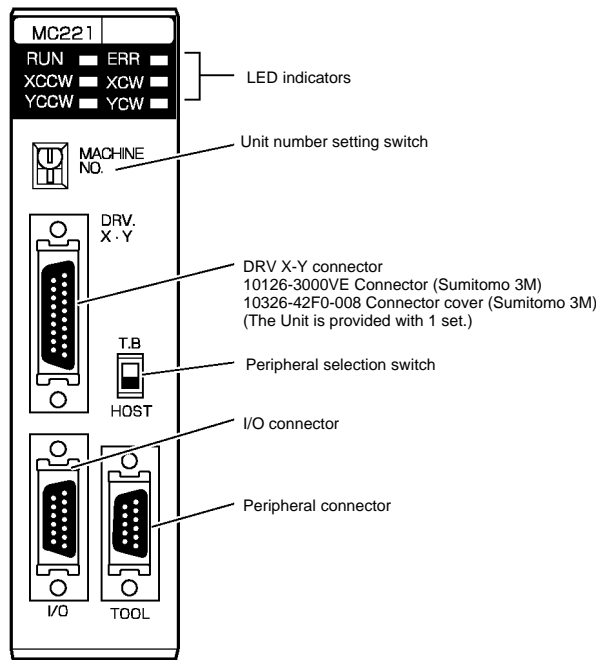


■ Exchanging Data



| | Word | Description | X-axis control bit | |
|----------|------|------------------------------|--------------------|-----------------------------|
| PC to MC | n | Task 1 program no. | Bit | Bit name |
| | n+1 | Task 1 system control bit | 00 | Deceleration stop |
| | n+2 | Task 2 program no. | 01 | Origin search |
| | n+3 | Task 2 system control bit | 02 | Reference origin return |
| | n+4 | X-axis override | 03 | Jogging |
| | n+5 | X-axis control bit | 04 | Not used |
| | n+6 | Y-axis override | 05 | Present position preset |
| MC to PC | n+7 | Y-axis control bit | 06 | Reserved |
| | n+8 | Error data and system status | 07 | Reserved |
| | n+9 | Error code | 08 | MPG enabled |
| | n+10 | Task 1 M code | 09 | Servo lock |
| | n+11 | Task 1 status | 10 | Servo free |
| | n+12 | Task 2 M code | 11 | Driver alarm reset |
| | n+13 | Task 2 status | 12 | Override set |
| | n+14 | X-axis present position | 13 | Jogging direction |
| | n+15 | | 14 | MPG multiplication factor 1 |
| | n+16 | X-axis status (zone, etc.) | 15 | MPG multiplication factor 2 |
| | n+17 | Y-axis present position | | |
| | n+18 | | | |
| | n+19 | Y-axis status (zone, etc.) | | |

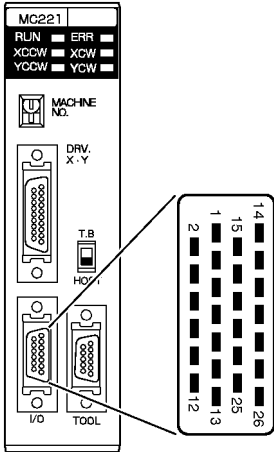
■ Component Names



Indicators

| Indicator | Color | Status | Meaning |
|--------------|--------|--------|---|
| RUN | Green | ON | Initialization has been completed normally. (Connected to the CPU Unit normally.) |
| | | OFF | An error has occurred in the MC Unit or the CPU Unit. |
| ERR | Red | ON | An error has occurred in the MC Unit. |
| | | OFF | The MC Unit is operating normally. |
| XCCW YCCW | Orange | ON | The motor is rotating counterclockwise. |
| | | OFF | The motor is rotating clockwise or stopped. |
| XCW YCW | Orange | ON | The motor is rotating clockwise. |
| | | OFF | The motor is rotating counterclockwise or stopped. |

■ External I/O Connections: Input Connector

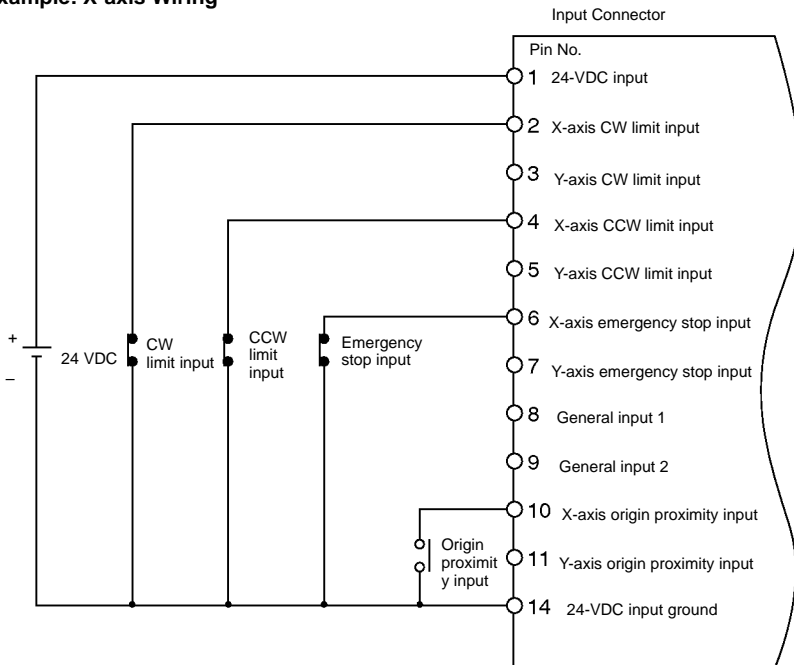


| Pin | Symbol | Terminal on MC Unit terminal block | Name | Function |
|-----|---------------|------------------------------------|-------------------------------|---|
| 1 | +24 V | 10 | 24-VDC input | Connects to the + terminal of the 24-VDC external power supply. |
| 2 | XCWL (NC) | 11 | X-axis CW limit input | Limits movement of the X axis in the CW direction. |
| 3 | YCWL (NC) | 16 | Y-axis CW limit input | Limits movement of the Y axis in the CW direction. |
| 4 | XCCWL (NC) | 12 | X-axis CCW limit input | Limits movement of the X axis in the CCW direction. |
| 5 | YCCWL (NC) | 17 | Y-axis CCW limit input | Limits movement of the Y axis in the CCW direction. |
| 6 | XSTOP (NC) | 14 | X-axis emergency stop input | Disables the X-axis run output and stops it. |
| 7 | YSTOP (NC) | 8 | Y-axis emergency stop input | Disables the Y-axis run output and stops it. |
| 8 | IN1 (NO) | 4 | General input 1 | General input 1 |
| 9 | IN2 (NO) | 9 | General input 2 | General input 2 |
| 10 | XORG (NC, NO) | 13 | X-axis origin proximity input | Used for the X-axis origin search. |
| 11 | YORG (NC, NO) | 18 | Y-axis origin proximity input | Used for the Y-axis origin search. |
| 14 | DC GND | 0 | 24-VDC input ground | Connects to the – terminal (0 V) of the 24-VDC external power supply. |

“NC” stands for normally closed and “NO” stands for normally open.

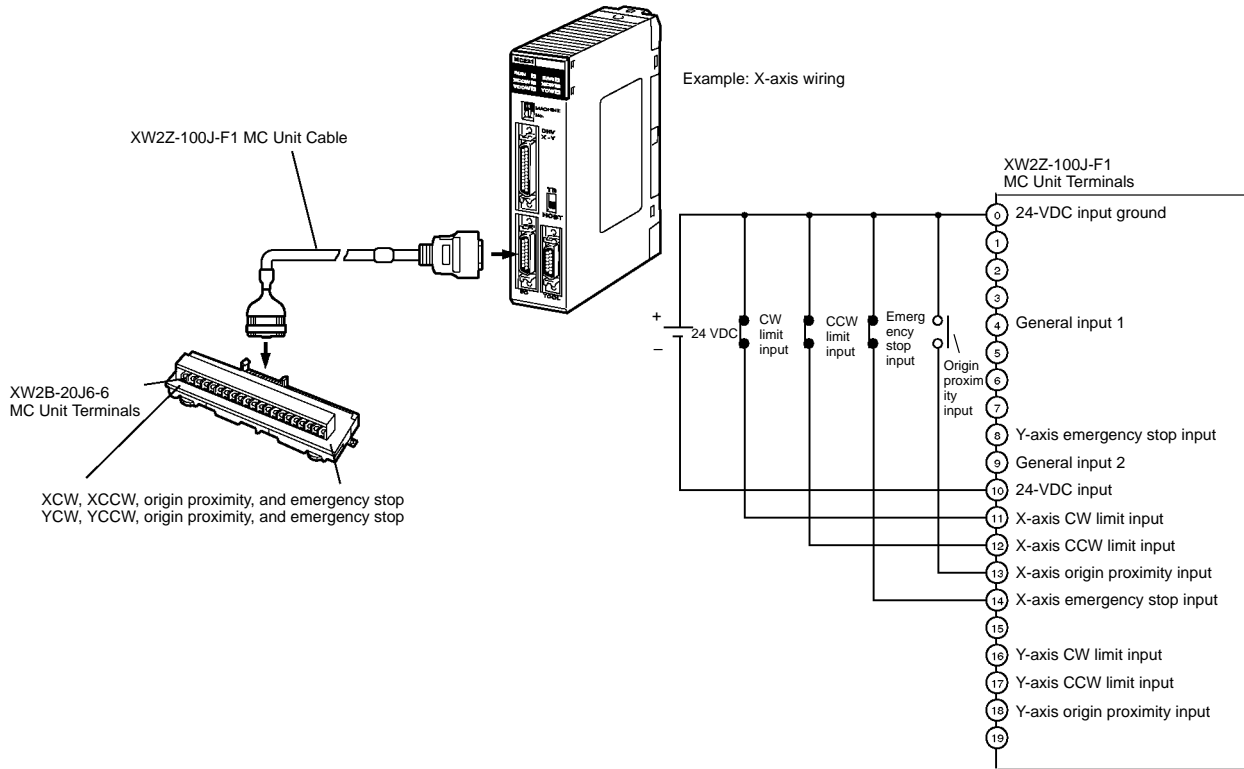
■ External Connection Diagram Using the MC Unit Input Connector

Example: X-axis Wiring

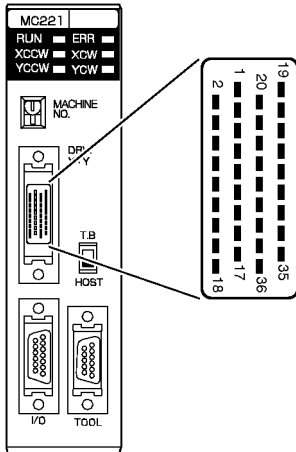


Connector:
Wire and assemble the connector by using the connector case provided with the Unit or by using the XW2Z-100J-F1 MC Unit Terminal Block Connecting Cable.

Using the MC Unit Terminal Block



DRV X-Y Connector: Servodriver Connection

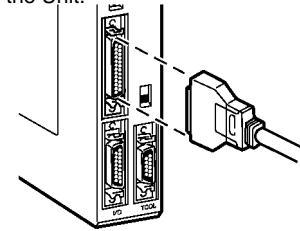


| Pin | Symbol | Name | Function |
|-----|--------------|------------------------------|--|
| 1 | +24 V | 24 VDC input | External power supply's 24-VDC input (for the X-Y axes) |
| 2 | DC GND | 24 VDC input ground | External power supply's 24-VDC ground (for the X-Y axes) |
| 3 | XALM | X-axis alarm input | Driver alarm input for the X-axis |
| 4 | XRUN | X-axis run output | Driver run output for the X-axis |
| 5 | XALMRS | X-axis alarm reset output | Reset output for the X-axis's driver alarm. |
| 8 | XSGND | X-axis SEN signal ground | SEN signal ground for the X-axis |
| 9 | XSOUT | X-axis SEN signal output | SEN signal output for the X-axis (absolute encoder driver) |
| 10 | X-GND | X-axis feedback ground | Feedback ground for the X-axis |
| 11 | X-A | X-axis phase A input | Phase A feedback input for the X-axis |
| 12 | X- \bar{A} | X-axis phase \bar{A} input | Phase \bar{A} feedback input for the X-axis |
| 13 | X-B | X-axis phase B input | Phase B feedback input for the X-axis |
| 14 | X- \bar{B} | X-axis phase \bar{B} input | Phase \bar{B} feedback input for the X-axis |
| 15 | X-Z | X-axis phase Z input | Phase Z feedback input for the X-axis |
| 16 | X- \bar{Z} | X-axis phase \bar{Z} input | Phase \bar{Z} feedback input for the X-axis |
| 17 | XOUT | X-axis speed control | Speed control voltage to the X-axis driver |
| 18 | XAGND | X-axis speed control ground | Ground for the X-axis's speed control voltage |
| 19 | +F24V | 24 VDC output | 24-VDC input to the driver (for the X-Y axes) |
| 20 | FDC GND | 24 VDC output ground | Ground for 24-VDC outputs (for the X-Y axes) |
| 21 | YALM | Y-axis alarm input | Driver alarm input for the Y-axis |
| 22 | YRUN | Y-axis run output | Driver run output for the Y-axis |
| 23 | YALMRS | Y-axis alarm reset output | Reset output for the Y-axis's driver alarm. |
| 26 | YSGND | Y-axis SEN signal ground | SEN signal ground for the Y-axis |
| 27 | YSOUT | Y-axis SEN signal output | SEN signal output for the Y-axis (absolute encoder driver) |
| 28 | Y-GND | Y-axis feedback ground | Feedback ground for the Y-axis |
| 29 | Y-A | Y-axis phase A input | Phase A feedback input for the Y-axis |
| 30 | Y- \bar{A} | Y-axis phase \bar{A} input | Phase \bar{A} feedback input for the Y-axis |
| 31 | Y-B | Y-axis phase B input | Phase B feedback input for the Y-axis |
| 32 | Y- \bar{B} | Y-axis phase \bar{B} input | Phase \bar{B} feedback input for the Y-axis |
| 33 | Y-Z | Y-axis phase Z input | Phase Z feedback input for the Y-axis |
| 34 | Y- \bar{Z} | Y-axis phase \bar{Z} input | Phase \bar{Z} feedback input for the Y-axis |
| 35 | YOUT | Y-axis speed control | Speed control voltage to the Y-axis driver |
| 36 | YAGND | Y-axis speed control ground | Ground for the Y-axis's speed control voltage |

■ Servodriver Cables (Optional)

When using OMRON's U-, H-, or M-series Servodrivers, use Special Servodriver Cables that are available as options to connect the MC Unit to Servodrivers.

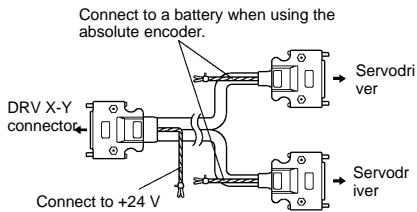
Connector:
When the Special Cables shown on the left are not to be used, wire and assemble the connector by using the connector case provided with the Unit.



| Series | | Cable model number | | Length (m) |
|----------|---------------------------------------|--------------------|-----------------|------------|
| | | For two axes | For single axis | |
| U-series | R88D-U for 30-W to 750-W Servodrivers | R88A-CPU001M2 | R88A-CPU001M1 | 1.0 |
| | | R88A-CPU002M2 | R88A-CPU002M1 | 2.0 |
| | R88D-U for 1-W to 5-kW Servodrivers | R88A-CPUB001M2 | R88A-CPUB001M1 | 1.0 |
| | | R88A-CPUB002M2 | R88A-CPUB002M1 | 2.0 |
| H-series | R88D-H | R88A-CPH001M2 | R88A-CPH001M1 | 1.0 |
| | | R88A-CPH002M2 | R88A-CPH002M1 | 2.0 |
| M-series | R88D-M | R88A-CPM001M2 | R88A-CPM001M1 | 1.0 |
| | | R88A-CPM002M2 | R88A-CPM002M1 | 2.0 |

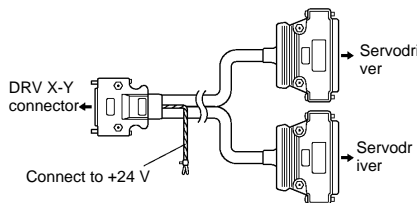
U-series Servodrivers:

R88A-CPU001M2/002M2 (30 to 750 W)
R88A-CPUB001M2/002M2 (1 to 5 kW)



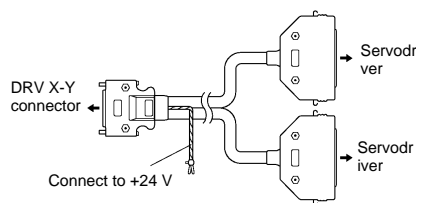
H-series Servodrivers:

R88A-CPH001M2/002M2



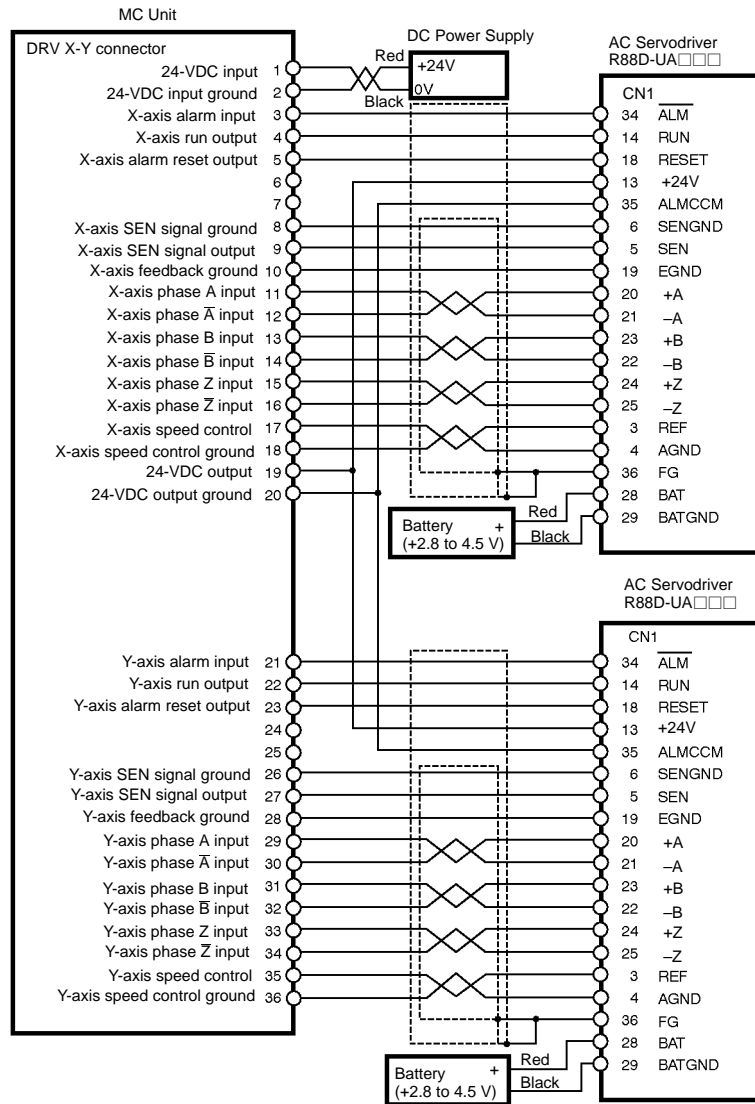
M-series Servodrivers:

R88A-CPM001M2/002M2



■ Connection Examples

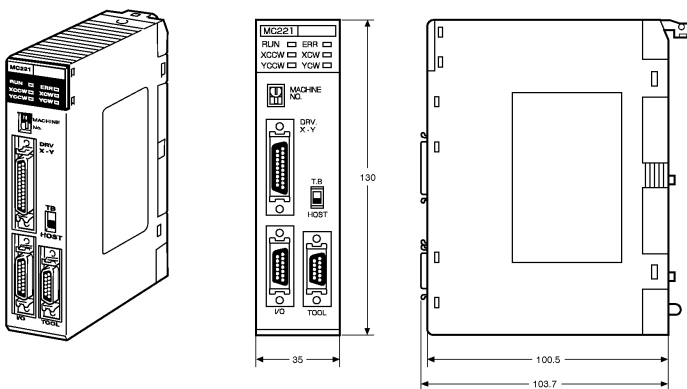
Connection to U-series 30-W to 750-W Models (Using an Absolute Encoder)
 Special Servodriver Cable: R88A-CPU00□M2



■ Dimensions

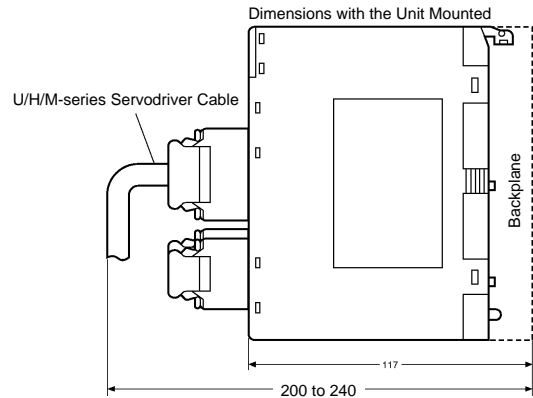
Note: All units are in millimeters unless otherwise indicated.

C200H-MC221



Dimensions with the Unit Mounted

Unit: mm



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

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Authorized Distributor:

Note: Specifications subject to change without notice.

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