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SERVO AMPLIFIERS & MOTORS

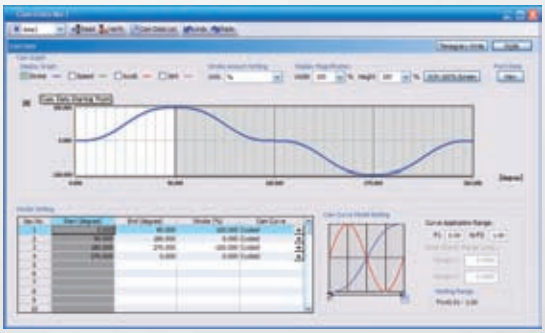
April 2015

Function Expanded

MELSERVO-J4 Series with Built-in Positioning Function

MR-J4-A-RJ

MR-J4-A-RJ with built-in positioning function enables positioning system without command pulses (Positioning module). Point table, program based, and indexer methods are available for positioning. Now that new functions such as simple cam, mark sensor input compensation, and MODBUS® RTU communication are added to the positioning function, making positioning easier than ever.

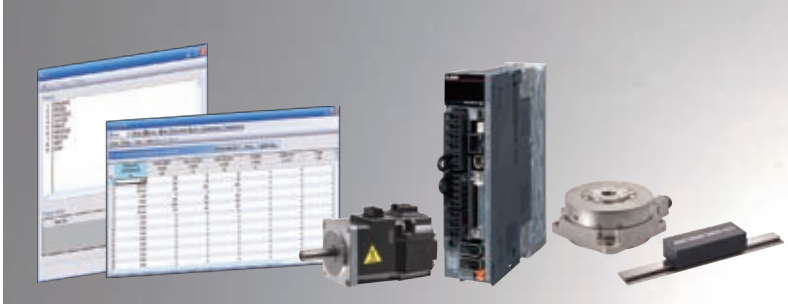


MR Configurator2 Simple cam setting window

Various functions are added to the positioning function.

- Simple cam function: Enables smooth conveyance and reduces tact time.
- Encoder following/command pulse input through function: Makes the system synchronized with synchronous encoder.
- Mark sensor input compensation function: Enables accurate positioning by calculating a compensation amount of current value based on sensor input.
- Communication function: Expands control/observation range of external equipment by complying with MODBUS® RTU protocol.
- Rewriting point table by communication function allows flexible positioning.
- Compatible with MR-D01 extension IO unit for increasing digital/analog inputs and outputs.

Extended functions are available with the servo amplifiers with software version B7 or later.

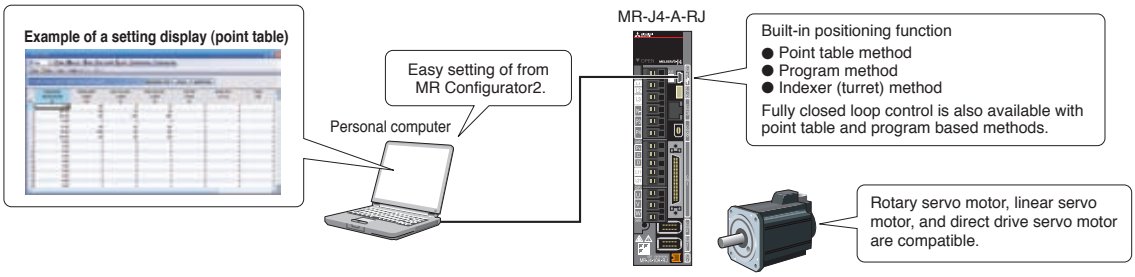


MITSUBISHI SERVO AMPLIFIERS & MOTORS

MELSERVO-J4

Built-in Positioning Function

Positioning operation with point table, program based, and indexer (turret) methods became capable by built-in positioning function in MR-J4-A-RJ*1, allowing to configure positioning system without command pulses (Positioning module). Positioning command is executed by input/output signals or RS-422/RS-485 communication (up to 32 axis). The positioning data can be set from MR Configurator2*2 easily.



*1. Use MR-J4-A-RJ servo amplifiers with software version B3 or later when using the positioning function.
*2. Be sure to update your MR Configurator2 to the latest version.

Point table method*

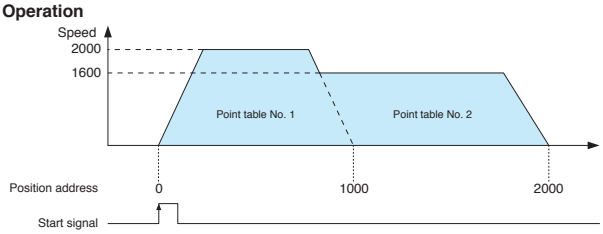
Setting position data (target position), servo motor speed, and acceleration/deceleration time constants in point table is as easy as setting a parameter. Up to 255 points are settable for the point table. The positioning operation is performed with a start signal after selecting the point table No.

Point table example

Point table No.	Position data	Servo motor speed	Acceleration time constant	Deceleration time constant	Dwell	Sub function	M code
1	1000	2000	200	200	0	1	1
2	2000	1600	100	100	0	0	2
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
255	3000	3000	100	100	0	2	99

* Point table can be set with push buttons on the servo amplifier or MR-PRU03 parameter unit along with MR Configurator2.

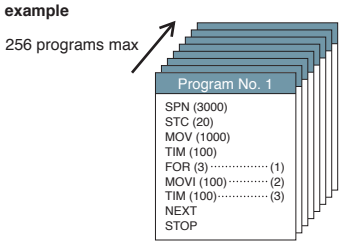
Operation



Program method*

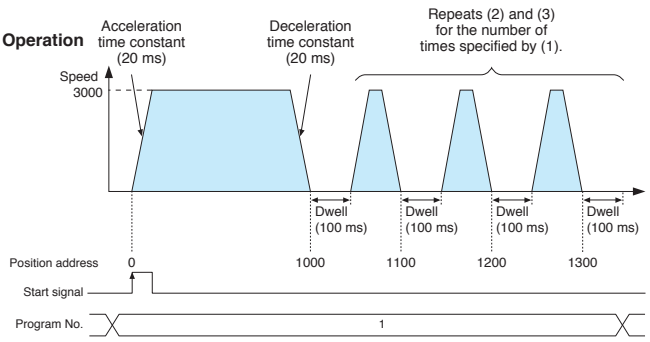
Create positioning programs with dedicated commands. The positioning operation is performed with a start signal after selecting the program No. The program method enables more complex positioning operation than the point table method. Maximum of 256 programs are registerable. (The total number of steps of each program: 640)

Program example



* MR Configurator2 is required to create programs.

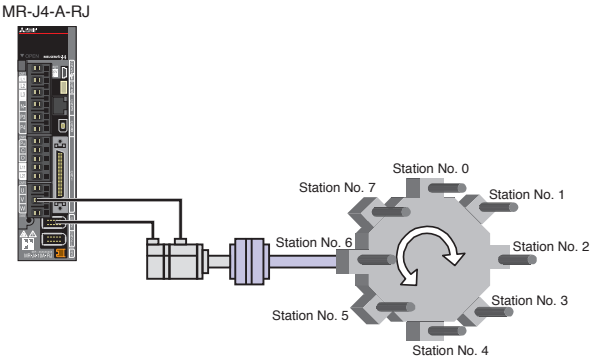
Operation



Indexer (turret) method*

Positioning operation is performed by specifying equally divided stations (up to 255 stations). By setting the number of equally divided stations, the travel distance will be calculated automatically. The positioning operation is performed with a start signal after selecting the station position No.
In addition to rotation direction specifying indexer and shortest rotating indexer, backlash compensation and digital override function are also available.

* Fully closed loop control mode and linear servo motor control mode are not available with the indexer (turret) method.

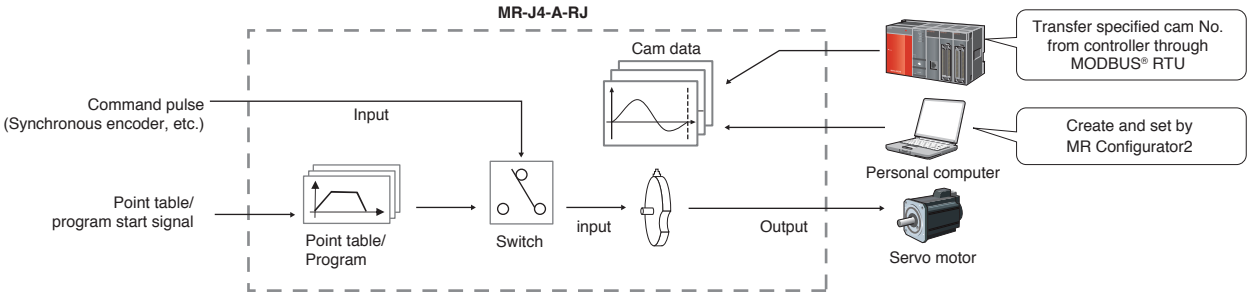


Convenient functions

New useful functions are added to the positioning function: simple cam function, encoder following function, command pulse input through function, mark sensor input compensation function, and communication functions (MODBUS® RTU, Point to Point positioning, current position latch function).
Apply these useful functions to a wide variety of applications to configure positioning system easily. (Use MR-J4-A-RJ servo amplifier with software version B7 or later.)

Simple cam function

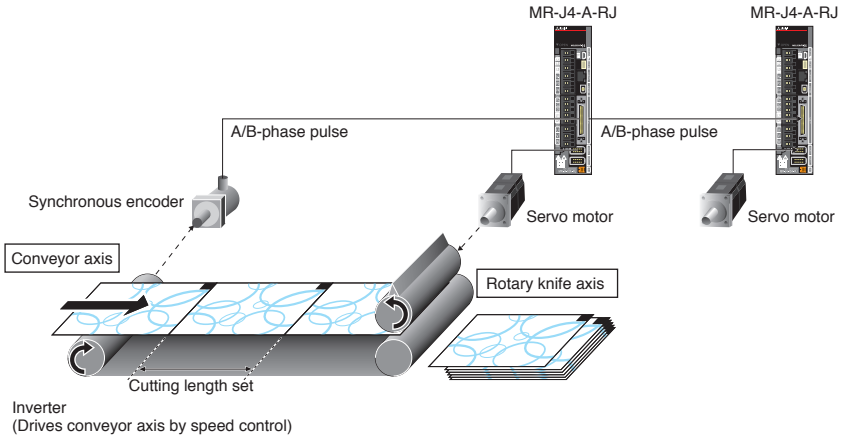
Various patterns of cam data* can be created easily by using MR Configurator2. Command pulse or point table/program start signal can be used as input to the simple cam. The input command will be outputted to the servo motor according to the cam data.



* Cam curve can be selected from 12 types (constant speed/constant acceleration/5th curve/single hypotenuse/cycloid/distorted trapezoid/distorted sine/distorted constant speed/trapecloid/reverse trapecloid/double hypotenuse/reverse double hypotenuse). For details of simple cam function, refer to p.18 in this catalog.

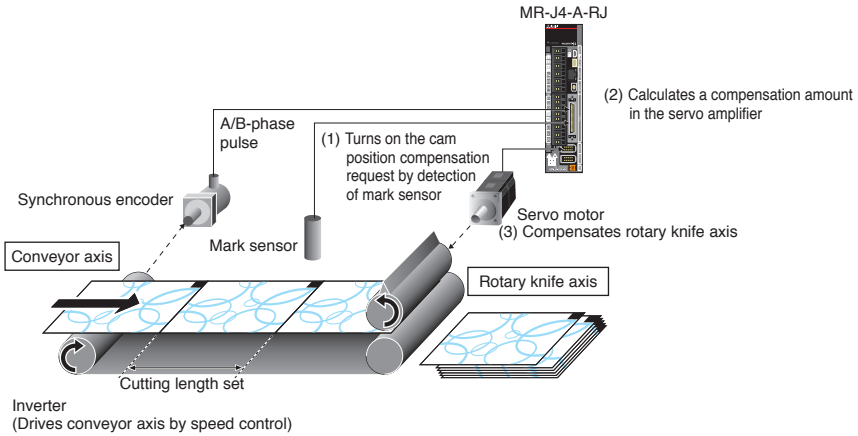
Encoder following function/Command pulse input through function

With the encoder following function, the servo amplifier receives A/B-phase output signal from the synchronous encoder as command pulse, and the input command will be outputted to the servo motor according to the cam data. By setting cam data that matches with sheet length, a diameter of the rotary knife axis, and synchronous section of the sheet; a system in which the conveyor axis and the rotary knife axis are synchronized can be configured. Up to 4 Mpulses/s of input from synchronous encoder is compatible with the servo amplifier.
The command pulse input through function allows the first axis to output A/B-phase pulses which are received from the synchronous encoder to the next axis, enabling a system the second and later axes are synchronized with the synchronous encoder.



Mark sensor input compensation function

The actual position of the servo motor can be obtained based on the inputs from the sensor that detects the registration marks printed on the high-speed moving film. The servo amplifier calculates compensation amounts and corrects position errors of the rotary knife axis based on those inputs from the sensor so that the film can be cut at the set position.



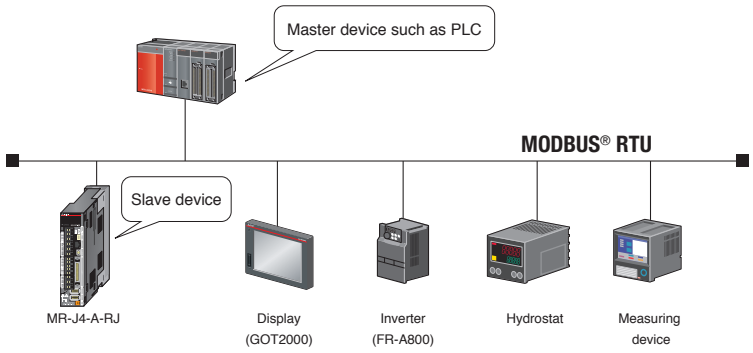
Communication function (MODBUS® RTU)

In addition to RS-422 communication (Mitsubishi general-purpose AC servo protocol), RS-485 communication (MODBUS® RTU protocol) is supported.

MODBUS® RTU protocol is compatible with function code 03h (Read holding registers), etc. Controlling and monitoring the servo amplifier by external devices is possible.

Compatible function code

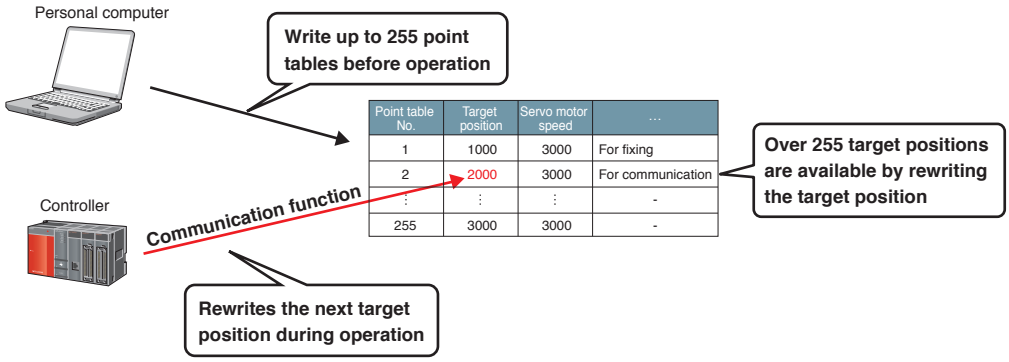
03h	Read holding registers
08h	Diagnostics
10h	Preset multiple registers



* RJ-45 junction connector terminal block and RJ-45 compatible cable designed for MR-J4-A-RJ are required. Refer to "Products on the Market" in this catalog.

Communication function (Point to Point positioning)

By setting target position of point table in advance, up to 255 points of Point to Point positioning are possible.
Flexible positioning is possible by rewriting the next target position of point table during operation by using this communication function.

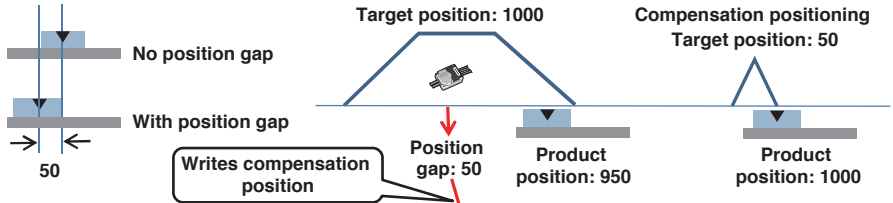


Communication function (current position latch)

Target position can be compensated by writing point table (target position) based on the data latched by a mark detection function (current position latch*).

* When the mark detection signal turns on, a current position will be latched. The latched data can be read by the communication function.

Example: Executing positioning compensation when a product is mispositioned by 50 on a handling pallet.
Start an operation by specifying point table No.1 (target position: 1000).
Communication function (current latch) measures a position gap with the mark detection function and writes the position gap of 50 to the target position in point table No.2 for compensation during operation.
After the operation is complete, the product stops with the position gap of 50. When an operation is started, by specifying point table No.2, the product moves by 50, and it will be set to the right position.



Point table No.	Target position	Servo motor speed	…
1	1000	3000	-
2	0	3000	For compensation

Point table No.	Target position	Servo motor speed	…
1	1000	3000	-
2	50	3000	For compensation

MR-J4-A-RJ Positioning Function: Point Table Method

Positioning operation is executed by selecting the point table No. with a command interface signal according to the position and speed data set in the point table.

Item				Description
Command method		Command interface		Input: 11 points excluding EM2 (Forced stop 2), output: 8 points RS-422 communication/RS-485 communication (Note 3)
		Operating specification		Positioning by specifying the point table No. (255 points)
		Position command input (Note 1)	Absolute value command method	Set in the point table. Setting range of feed length per point: -999999 to 999999 [×10^{STM} µm], -99.9999 to 99.9999 [×10^{STM} inch], -999999 to 999999 [pulse], Setting range of rotation angle: -360.000 to 360.000 [degree]
			Incremental value command method	Set in the point table. Setting range of feed length per point: 0 to 999999 [×10^{STM} µm], 0 to 99.9999 [×10^{STM} inch], 0 to 999999 [pulse], Setting range of rotation angle: 0 to 999.999 [degree]
		Speed command input		Set the acceleration/deceleration time constants in the point table. Set the S-pattern acceleration/deceleration time constants with [Pr. PC03].
		System		Signed absolute value command method, incremental value command method
		Analog override		0 V DC to ±10 V DC/0% to 200%
		Torque limit		Set by parameters or external analog input (0 V DC to +10 V DC/maximum torque)
Operation mode	Automatic operation mode	Each positioning operation		Point table No. input, position data input method Each positioning operation is executed based on the position/speed commands.
		Automatic continuous positioning operation		Varying-speed operation (2 to 255 speeds), automatic continuous positioning operation (2 to 255 points)
	Manual operation mode	JOG operation		Inching operation is executed with input signal or serial communication function (Note 3) according to the speed command set with a parameter.
		Manual pulse generator operation		Manual feeding is executed with a manual pulse generator. Command pulse multiplication: select from ×1, ×10, and ×100 with a parameter.
	Home position return mode	Dog type		Returns to home position upon Z-phase pulse after passing through proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Count type		Returns to home position upon the encoder pulse count after touching proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Data set type		Returns to home position without dog. Any position settable as a home position using manual operation, etc. Home position address settable
		Stopper type		Returns to home position upon hitting the stroke end. Home position return direction selectable, home position address settable
		Home position ignorance (servo-on position as home position)		Sets a home position where SON (Servo-on) signal turns on. Home position address settable
		Dog type rear end reference		Returns to home position with reference to the rear end of proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Count type front end reference		Returns to home position with reference to the front end of proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Dog cradle type		Returns to home position upon the first Z-phase pulse with reference to the front end of proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Dog type adjacent Z-phase reference (Note 2)		Returns to home position upon the last Z-phase pulse with reference to the front end of proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Dog type front end reference		Returns to home position to the front end of dog with reference to the front end of proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Dogless Z-phase reference (Note 2)		Returns to home position to Z-phase pulse with reference to the first Z-phase pulse. Home position return direction settable, home position shift distance settable, home position address settable
	Automatic positioning to home position function			High-speed automatic positioning to a defined home position
Other functions				Absolute position detection, backlash compensation, overtravel prevention with external limit switches (LSP/LSN), teaching function, roll feed display function, software stroke limit, mark detection (current position latch/interrupt positioning/mark sensor input compensation), simple cam function, encoder following function, command pulse input through function, infinite feed function (setting degree), analog override function

Notes: 1. STM is the ratio to the setting value of the position data. STM can be changed with [Pr. PT03].
2. Home position return modes of dog type adjacent Z-phase reference and dogless Z-phase reference are not available when the direct drive motor or incremental type linear encoder is used.
3. Compatible with Mitsubishi general-purpose AC servo protocol (RS-422/RS-485 communication) and MODBUS® RTU protocol (RS-485 communication).

MR-J4-A-RJ Positioning Function: Point Table Method

Absolute value command method: travels to a specified address (absolute value) with reference to the home position

Item	Setting range	Description
Point table No.	1 to 255	Specify a point table in which a target position, servo motor speed, acceleration/deceleration time constants, dwell, and sub function will be set.
Target position (Note 1, 3) (position data)	-999999 to 999999 [×10STM μm] -99.9999 to 99.9999 [×10STM inch] -360.000 to 360.000 [degree] -999999 to 999999 [pulse]	Set a travel distance. (1) When using as absolute value command method Set a target address (absolute value). (2) When using as incremental value command method Set a travel distance. Reverse rotation command is applied with a minus sign.
Servo motor speed (Note 2)	0 to permissible speed [r/min] [mm/s]	Set a command speed for the servo motor in positioning.
Acceleration time constant	0 to 20000 [ms]	Set a time period for the servo motor to reach the rated speed.
Deceleration time constant	0 to 20000 [ms]	Set a time period for the servo motor to decelerate from the rated speed to a stop.
Dwell	0 to 20000 [ms]	Set dwell. When the dwell is set, the position command for the next point table will be started after the position command for the selected point table is completed and the set dwell is passed. The dwell is disabled when 0 or 2 is set for the sub function. Varying-speed operation is enabled when 1, 3, 8, 9, 10, or 11 is set for the sub function and when 0 is set for the dwell.
Sub function	0 to 3, and 8 to 11	Set sub function. (1) When using as absolute value command method 0: Executes automatic operation for a selected point table. 1: Executes automatic continuous operation without stopping for the next point table. 8: Executes automatic continuous operation without stopping for the point table selected at the start. 9: Executes automatic continuous operation without stopping for the point table No. 1. (2) When using as incremental value command method 2: Executes automatic operation for a selected point table. 3: Executes automatic continuous operation without stopping for the next point table. 10: Executes automatic continuous operation without stopping for the point table selected at the start. 11: Executes automatic continuous operation without stopping for the point table No. 1.
M code	0 to 99	Set a code to be outputted when the positioning completes.

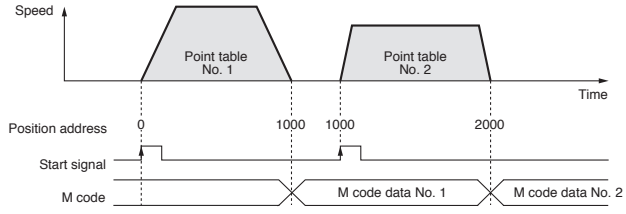
Notes: 1. Change the unit to μm/inch/degree/pulse with [Pr. PT01].
2. The speed unit is r/min for the rotary servo motors and the direct drive motors, and mm/s for the linear servo motors.
3. STM is the ratio to the setting value of the position data. STM can be changed with [Pr. PT03].

Example of setting point table data

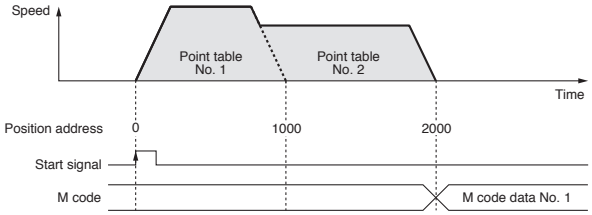
Point table No.	Target position (position data) [× 10STM μm] (Note 1)	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Sub function	M code
1	1000	2000	200	200	0	✻	1
2	2000	1600	100	100	0	0	2
:	:	:	:	:	:	:	:
255	3000	3000	100	100	0	2	99

✻ The operation of the next point table is set with the sub function.

● **When the sub function is set to 0:**
Start signal is required for each point table.



● **When the sub function is set to 1:**
Automatic continuous operation is executed based on the point table.



Notes: 1. STM is the ratio to the setting value of the position data. STM can be changed with [Pr. PT03].

MR-J4-A-RJ Positioning Function: Point Table Method

Incremental value command method: travels from a current position according to the set position data

Item	Setting range	Description
Point table No.	1 to 255	Specify a point table in which a target position, servo motor speed, acceleration/deceleration time constants, dwell, and sub function will be set.
Target position (Note 1, 3) (position data)	0 to 999999 [×10^{STM} µm] 0 to 99.9999 [×10^{STM} inch] 0 to 999.999 [degree] 0 to 999999 [pulse]	Set a travel distance. Operation starts with ST1 (Forward rotation start) or ST2 (Reverse rotation start).
Servo motor speed (Note 2)	0 to permissible speed [r/min] [mm/s]	Set a command speed for the servo motor in positioning.
Acceleration time constant	0 to 20000 [ms]	Set a time period for the servo motor to reach the rated speed.
Deceleration time constant	0 to 20000 [ms]	Set a time period for the servo motor to decelerate from the rated speed to a stop.
Dwell	0 to 20000 [ms]	Set a dwell. When the dwell is set, the position command for the next point table will be started after the position command for the selected point table is completed and the set dwell is passed. The dwell is disabled when 0 is set for the sub function. Varying-speed operation is enabled when 1, 8, or 9 is set for the sub function and when 0 is set for the dwell.
Sub function	0, 1, 8, and 9	Set sub function. 0: Executes automatic operation for the selected point table. 1: Executes automatic continuous operation without stopping for the next point table. 8: Executes automatic continuous operation without stopping for the point table selected at the start. 9: Executes automatic continuous operation without stopping for the point table No. 1.
M code	0 to 99	Set a code to be outputted when the positioning completes.

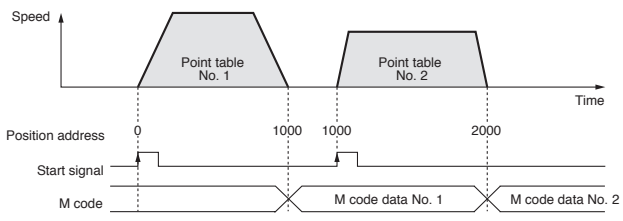
Notes: 1. Change the unit to µm/inch/degree/pulse with [Pr. PT01].
2. The speed unit is r/min for the rotary servo motors and the direct drive motors, and mm/s for the linear servo motors.
3. STM is the ratio to the setting value of the position data. STM can be changed with [Pr. PT03].

Example of setting point table data

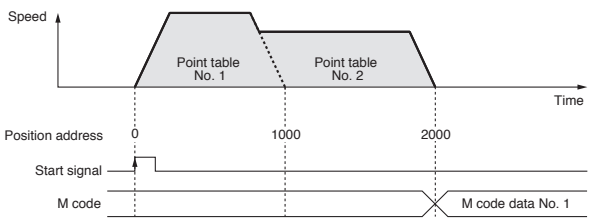
Point table No.	Target position (position data) [× 10^{STM} µm] (Note 1)	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Sub function	M code
1	1000	2000	200	200	0	✻	1
2	1000	1600	100	100	0	0	2
:	:	:	:	:	:	:	:
255	3000	3000	100	100	0	0	99

✻ The operation of the next point table is set with the sub function.

● **When the sub function is set to 0:**
Start signal is required for each point table.

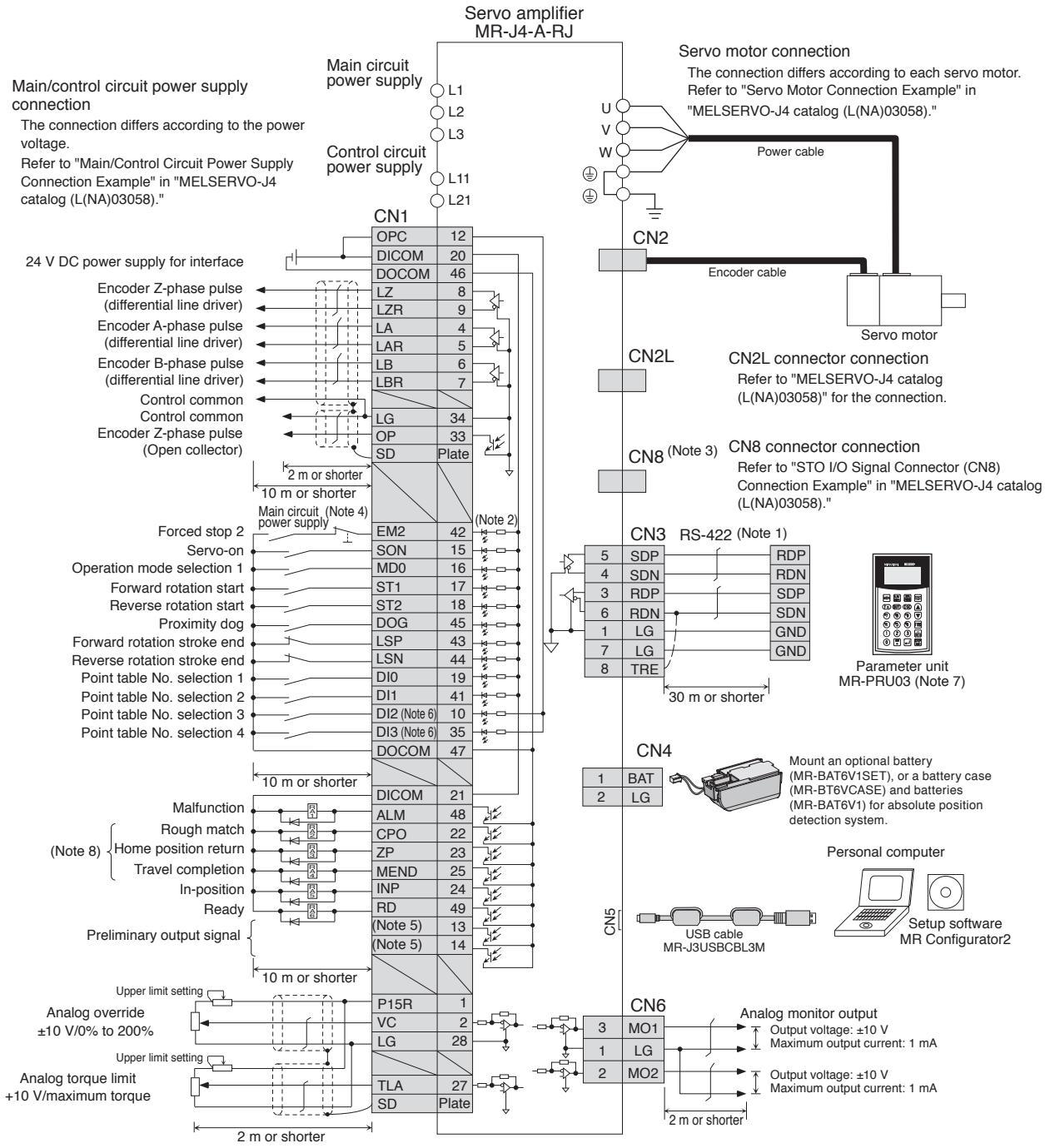


● **When the sub function is set to 1:**
Automatic continuous operation is executed based on the point table.



Notes: 1. STM is the ratio to the setting value of the position data. STM can be changed with [Pr. PT03].

MR-J4-A-RJ Standard Wiring Diagram Example: Point Table Method



Notes: 1. It is also possible to connect a personal computer to CN3 connector with an RS-422/RS-232C conversion cable. However, USB interface (CN5 connector) and RS-422 interface (CN3 connector) are mutually exclusive. Do not use them at the same time. Refer to "Products on the Market for Servo Amplifiers" in "MELSERVO-J4 catalog (L(NA)03058)" for the RS-422/RS-232C conversion cable. Refer to "MR-J4-_A_-RJ Servo Amplifier Instruction Manual (Modbus-RTU communication)" for RS-485 communication cable connection diagram.

2. This is for sink wiring. Source wiring is also possible. However, when input devices are assigned to CN1-10 pin and CN1-35 pin, be sure to use sink wiring. Source wiring is not possible in this case. In the positioning mode, input devices are assigned in the initial setting. Refer to "MR-J4-_A_-RJ Servo Amplifier Instruction Manual (Positioning Mode)" for details.
3. Be sure to attach a short-circuit connector supplied with the servo amplifier when the STO function is not used.
4. To prevent an unexpected restart of the servo amplifier, create a circuit to turn off EM2 (Forced stop 2) when the main circuit power is turned off.
5. No output device is assigned in the initial setting. Assign an output device with [Pr. PD47] as necessary.
6. DI2 and DI3 are assigned to CN1-10 pin and CN1-35 pin respectively in the initial setting. Change them with [Pr. PD44] and [Pr. PD46] when using a manual pulse generator.
7. Use a commercial LAN cable (EIA568 compliant), and keep the wiring distance within 10 m when using MR-PRU03 parameter unit.
8. Assign the output devices mentioned to CN1-22 pin, CN1-23 pin, and CN1-25 pin with [Pr. PD23], [Pr. PD24] and [Pr. PD26].

⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

MR-J4-A-RJ Positioning Function: Program Method

Positioning operation is executed by selecting programs with command signals. The programs including position data, servo motor speed, acceleration/deceleration time constants and others need to be created beforehand. The program method enables more complex positioning operation than the point table method. MR Configurator2 is required to create programs.

Item				Description
Command method		Command interface		Input: 11 points excluding EM2 (Forced stop 2), output: 8 points RS-422 communication/RS-485 communication (Note 3)
		Operating specification		Program language (program with MR Configurator2) Program capacity: 640 steps (256 programs)
		Position command input (Note 1)	Absolute value command method	Set with program language. Setting range of feed length: -999999 to 999999 [×10STM μm], -99.9999 to 99.9999 [×10STM inch], -999999 to 999999 [pulse], Setting range of rotation angle: -360.000 to 360.000 [degree]
			Incremental value command method	Set with program language. Setting range of feed length: -999999 to 999999 [×10STM μm], -99.9999 to 99.9999 [×10STM inch], -999999 to 999999 [pulse], Setting range of rotation angle: -999.999 to 999.999 [degree]
		Speed command input		Set servo motor speed, acceleration/deceleration time constants, S-pattern acceleration/deceleration time constants with program language. S-pattern acceleration/deceleration time constants are also settable with [Pr. PC03].
		System		Signed absolute value command method/signed incremental value command method
		Analog override		0 V DC to ±10 V DC/0% to 200%
		Torque limit		Set by parameters or external analog input (0 V DC to +10 V DC/maximum torque)
Operation mode	Automatic operation mode	Program		Depends on the setting of the program language
	Manual operation mode	JOG operation		Inching operation is executed with input signal or serial communication function (Note 3) according to the speed command set with a parameter.
		Manual pulse generator operation		Manual feeding is executed with a manual pulse generator. Command pulse multiplication: select from ×1, ×10, and ×100 with a parameter.
	Home position return mode	Dog type		Returns to home position upon Z-phase pulse after passing through proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Count type		Returns to home position upon the encoder pulse count after touching proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Data set type		Returns to home position without dog. Any position settable as a home position using manual operation, etc. Home position address settable
		Stopper type		Returns to home position upon hitting the stroke end. Home position return direction selectable, home position address settable
		Home position ignorance (servo-on position as home position)		Sets a home position where SON (Servo-on) signal turns on. Home position address settable
		Dog type rear end reference		Returns to home position with reference to the rear end of proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Count type front end reference		Returns to home position with reference to the front end of proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Dog cradle type		Returns to home position upon the first Z-phase pulse with reference to the front end of proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Dog type adjacent Z-phase reference (Note 2)		Returns to home position upon the last Z-phase pulse with reference to the front end of proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Dog type front end reference		Returns to home position to the front end of dog with reference to the front end of proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Dogless Z-phase reference (Note 2)		Returns to home position to Z-phase pulse with reference to the first Z-phase pulse. Home position return direction settable, home position shift distance settable, home position address settable
	Automatic positioning to home position function			High-speed automatic positioning to a defined home position
Other functions				Absolute position detection, backlash compensation, overtravel prevention with external limit switches (LSP/LSN), roll feed display function, software stroke limit, mark detection (current position latch/interrupt positioning/mark sensor input compensation), simple cam function, encoder following function, command pulse input through function, infinite feed function (setting degree), analog override function

Notes: 1. STM is the ratio to the setting value of the position data. STM can be changed with [Pr. PT03].
2. Home position return modes of dog type adjacent Z-phase reference and dogless Z-phase reference are not available when the direct drive motor or incremental type linear encoder is used.
3. Compatible with Mitsubishi general-purpose AC servo protocol (RS-422/RS-485 communication) and MODBUS® RTU protocol (RS-485 communication).

MR-J4-A-RJ Positioning Function: Program Method

Command List

Command	Name	Setting range	Description
SPN(setting value) (Note 2)	Servo motor speed	0 to instantaneous permissible speed [r/min] [mm/s]	Set a command speed for the servo motor in positioning. Do not set a value exceeding the instantaneous permissible speed of the servo motor.
STA(setting value) (Note 2)	Acceleration time constant	0 to 20000 [ms]	Set acceleration time constant. The setting value is a time period that the servo motor reaches the rated speed from a stop.
STB(setting value) (Note 2)	Deceleration time constant	0 to 20000 [ms]	Set deceleration time constant. The setting value is a time period that the servo motor stops from the rated speed.
STC(setting value) (Note 2)	Acceleration/ deceleration time constants	0 to 20000 [ms]	Set acceleration and deceleration time constants. The setting value is a time period that the servo motor reaches the rated speed from a stop and stops from the rated speed.
STD(setting value) (Note 2)	S-pattern acceleration/ deceleration time constants	0 to 1000 [ms]	Set S-pattern acceleration/deceleration time constants.
MOV(setting value) (Note 4, 5)	Absolute value travel command	-999999 to 999999 [×10^{STM} µm] -99.9999 to 99.9999 [×10^{STM} inch] -360.000 to 360.000 [degree] -999999 to 999999 [pulse]	Travels according to the value set as an absolute value.
MOVA(setting value) (Note 4, 5)	Absolute value continuous travel command		Travels continuously according to the value set as an absolute value. Be sure to write this command after [MOV] command.
MOVI(setting value) (Note 4, 5)	Incremental value travel command	-999999 to 999999 [×10^{STM} µm] -99.9999 to 99.9999 [×10^{STM} inch] -999.999 to 999.999 [degree] -999999 to 999999 [pulse]	Travels according to the value set as an incremental value.
MOVIA(setting value) (Note 4, 5)	Incremental value continuous travel command		Travels continuously according to the value set as an incremental value. Be sure to write this command after [MOVI] command.
SYNC(setting value) (Note 1)	Waiting for external signal to switch on	1 to 3	Stops the next step until PI1 (Program input 1) to PI3 (Program input 3) turn on after SOUT (SYNC synchronous output) is outputted.
OUTON(setting value) (Note 1)	External signal on output	1 to 3	Turns on OUT1 (Program output 1) to OUT3 (Program output 3).
OUTOF(setting value) (Note 1)	External signal off output	1 to 3	Turns off OUT1 (Program output 1) to OUT3 (Program output 3) which were turned on with [OUTON] command.
TRIP(setting value) (Note 1, 4, 5)	Absolute value trip point specification	-999999 to 999999 [×10^{STM} µm] -99.9999 to 99.9999 [×10^{STM} inch] -360.000 to 360.000 [degree] -999999 to 999999 [pulse]	Executes the next step after [MOV] or [MOVA] commands are started and then the servo motor moves for the travel amount set in [TRIP] command. Be sure to write this command after [MOV] or [MOVA] command.
TRIPI(setting value) (Note 1, 4, 5)	Incremental value trip point specification	-999999 to 999999 [×10^{STM} µm] -99.9999 to 99.9999 [×10^{STM} inch] -999.999 to 999.999 [degree] -999999 to 999999 [pulse]	Executes the next step after [MOVI] or [MOVIA] commands are started and then the servo motor moves for the travel amount set in [TRIPI] command. Be sure to write this command after [MOVI] or [MOVIA] command.
ITP(setting value) (Note 1, 3, 4, 5)	Interrupt positioning		Stops the operation after the servo motor moves for the travel amount set when the interrupt signal is inputted. Be sure to write this command after [SYNC] command.
COUNT(setting value) (Note 1)	External pulse count	-999999 to 999999 [pulse]	Executes the next step when the value of the pulse counter exceeds the count value set in [COUNT] command. [COUNT (0)] clears the pulse counter to zero.
FOR(setting value) NEXT	Step repeat command	0, and 1 to 10000 [number of times]	Repeats the steps between [FOR (setting value)] and [NEXT] commands for the number of times set. Repeats endlessly with [FOR (0) NEXT].
LPOS (Note 1)	Current position latch	-	Latches the current position with the rising edge of the LPS signal. The latched current position data can be read with the communication command.
TIM(setting value)	Dwell	1 to 20000 [ms]	Waits for the next step until the set time passes.
ZRT	Home position return	-	Executes a manual home position return.
TIMES(setting value)	Program count command	0, and 1 to 10000 [number of times]	Set the number of program execution by writing [TIMES (setting value)] command in the first line of the program. The setting is not required for executing once. Repeats endlessly with [TIMES (0)].
STOP	Program stop	-	Stops the program in execution. Be sure to write this command in the final line.

Notes: 1. [SYNC], [OUTON], [OUTOF], [TRIP], [TRIPI], [ITP], [COUNT], and [LPOS] commands are valid while the commands are outputted.
2. [SPN] command is valid while [MOV], [MOVA], [MOVI], or [MOVIA] command is in execution. [STA], [STB], [STC], and [STD] commands are valid while [MOV] or [MOVI] command is in execution.
3. [ITP] command will be skipped to the next step when the remaining distance equals to or less than the setting value, when the servo motor is not running, or when the servo motor is decelerating.
4. Change the unit to µm/inch/degree/pulse with [Pr. PT01].
5. STM is the ratio to the setting value of the position data. STM can be changed with [Pr. PT03].

MR-J4-A-RJ Positioning Function: Program Method

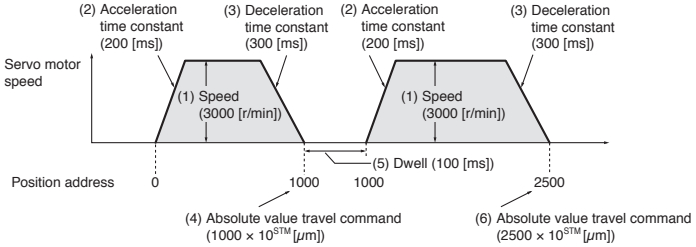
Command list

Command	Name	Setting range	Description
TLP(setting value)	Forward rotation torque limit	0, and 1 to 1000 [0.1%]	Limits the torque generated by the servo motor driving in CCW and regenerating in CW, as the maximum torque is 100%. The setting remains valid until the program is stopped. [TLP (0)] enables the setting of [Pr. PA11].
TLN(setting value)	Reverse rotation torque limit	0, and 1 to 1000 [0.1%]	Limits the torque generated by the servo motor driving in CW and regenerating in CCW, as the maximum torque is 100%. The setting remains valid until the program is stopped. [TLN (0)] enables the setting of [Pr. PA12].
TQL(setting value)	Torque limit	0, and 1 to 1000 [0.1%]	Limits the torque generated by the servo motor, as the maximum torque is 100%. The setting remains valid until the program is stopped. [TQL (0)] enables the settings of [Pr. PA11] and [Pr. PA12].

Program example 1

The following is an example of executing two types of operations with the same servo motor speed and acceleration/deceleration time constants but the different travel commands.

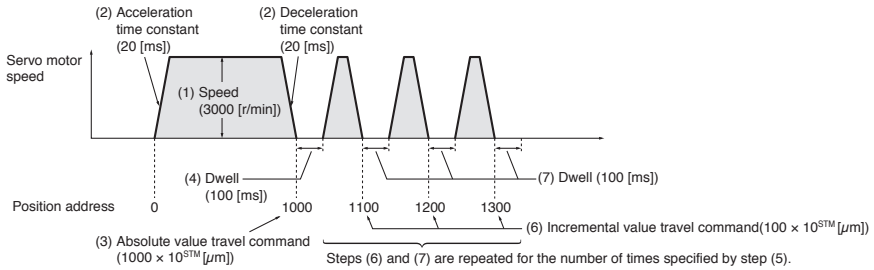
Step	Program (Note 1)	Description
(1)	SPN(3000)	Servo motor speed: 3000 [r/min]
(2)	STA(200)	Acceleration time constant: 200 [ms]
(3)	STB(300)	Deceleration time constant: 300 [ms]
(4)	MOV(1000)	Absolute value travel command: 1000 [×10^{STM} µm]
(5)	TIM(100)	Dwell: 100 [ms]
(6)	MOV(2500)	Absolute value travel command: 2500 [×10^{STM} µm]
(7)	STOP	Program stop



Program example 2

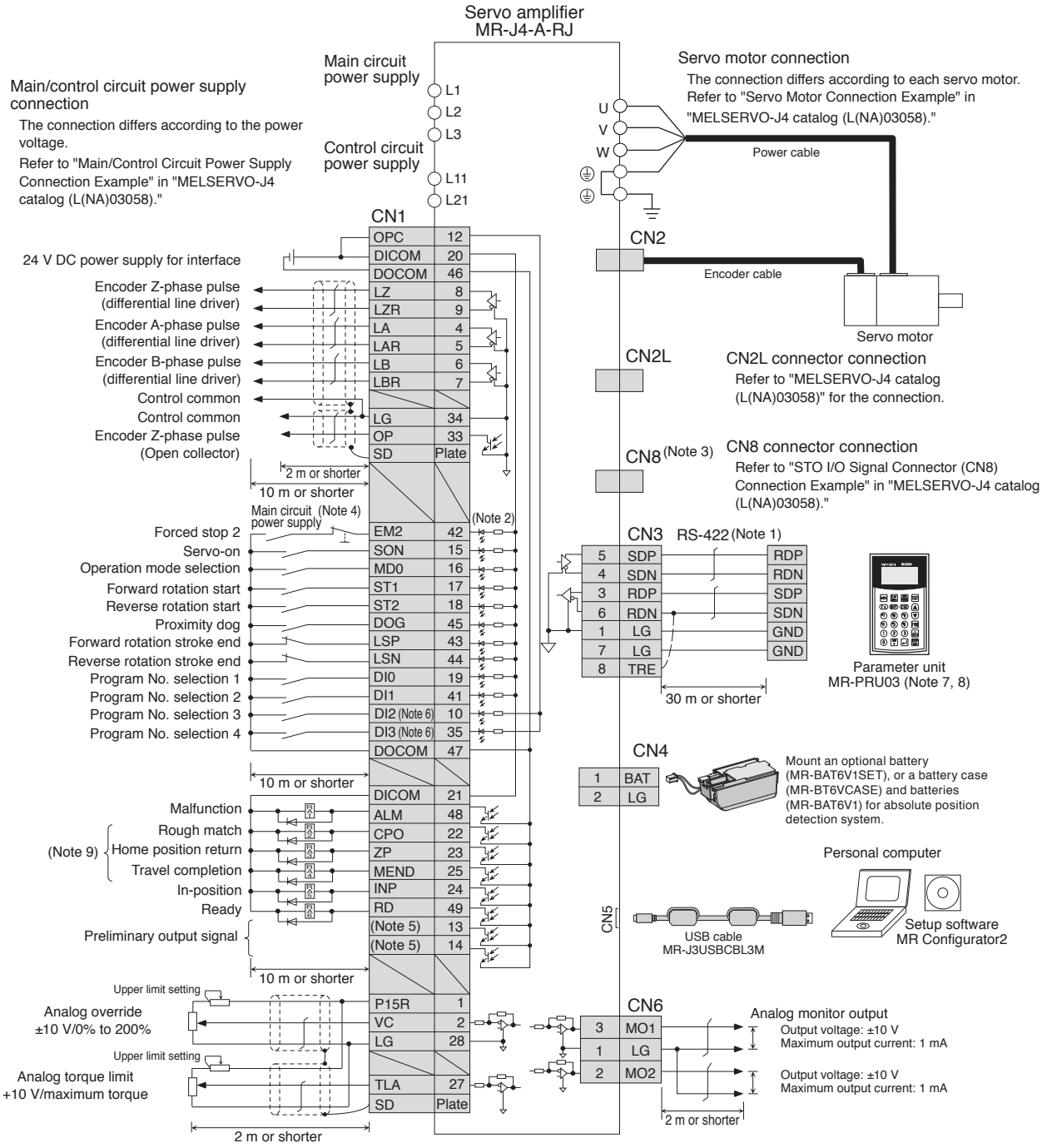
The following is an example of repeating the steps between [FOR (setting value)] and [NEXT] commands for the number of times set.

Step	Program (Note 1)	Description
(1)	SPN(3000)	Servo motor speed: 3000 [r/min]
(2)	STC(20)	Acceleration/deceleration time constants: 20 [ms]
(3)	MOV(1000)	Absolute value travel command: 1000 [×10^{STM} µm]
(4)	TIM(100)	Dwell: 100 [ms]
(5)	FOR(3)	Starting the step repeat command: 3 [number of times]
(6)	MOVI(100)	Incremental value travel command: 100 [×10^{STM} µm]
(7)	TIM(100)	Dwell: 100 [ms]
(8)	NEXT	Ending the step repeat command
(9)	STOP	Program stop



Notes: 1. The values in [SPN], [STA], [STB], and [STC] commands remains valid until they are reset. The values will not be initialized at the start of the program. The settings are also valid in other programs.

MR-J4-A-RJ Standard Wiring Diagram Example: Program Method



Notes: 1. It is also possible to connect a personal computer to CN3 connector with an RS-422/RS-232C conversion cable. However, USB interface (CN5 connector) and RS-422 interface (CN3 connector) are mutually exclusive. Do not use them at the same time. Refer to "Products on the Market for Servo Amplifiers" in "MELSERVO-J4 catalog (L(NA)03058)" for the RS-422/RS-232C conversion cable. Refer to "MR-J4-_A_-RJ Servo Amplifier Instruction Manual (Modbus-RTU communication)" for RS-485 communication cable connection diagram.

2. This is for sink wiring. Source wiring is also possible. However, when input devices are assigned to CN1-10 pin and CN1-35 pin, be sure to use sink wiring. Source wiring is not possible in this case. In the positioning mode, input devices are assigned in the initial setting. Refer to "MR-J4-_A_-RJ Servo Amplifier Instruction Manual (Positioning Mode)" for details.
3. Be sure to attach a short-circuit connector supplied with the servo amplifier when the STO function is not used.
4. To prevent an unexpected restart of the servo amplifier, create a circuit to turn off EM2 (Forced stop 2) when the main circuit power is turned off.
5. No output device is assigned in the initial setting. Assign an output device with [Pr. PD47] as necessary.
6. DI2 and DI3 are assigned to CN1-10 pin and CN1-35 pin respectively in the initial setting. Change them with [Pr. PD44] and [Pr. PD46] when using a manual pulse generator.
7. Use a commercial LAN cable (EIA568 compliant), and keep the wiring distance within 10 m when using MR-PRU03 parameter unit.
8. Programs cannot be edited with the parameter unit.
9. Assign the output devices mentioned to CN1-22 pin, CN1-23 pin, and CN1-25 pin with [Pr. PD23], [Pr. PD24] and [Pr. PD26].

⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

MR-J4-A-RJ Positioning Function: Indexer (Turret) Method

Positioning is executed by specifying stations (maximum of 255 stations).
Travel distance is automatically calculated with parameters by setting the numbers of stations.

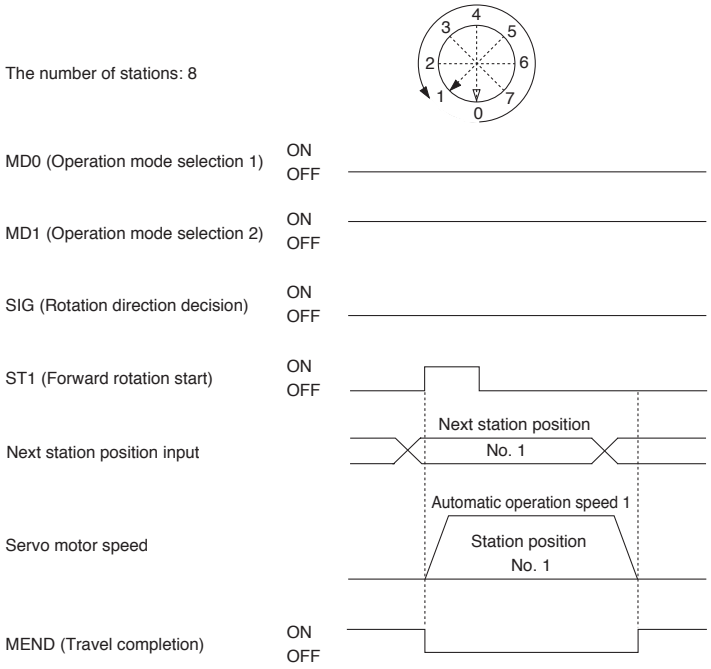
Item			Description
Command method		Command interface	Input: 11 points excluding EM2 (Forced stop 2), output: 8 points RS-422 communication/RS-485 communication (Note 1)
		Operating specification	Positioning by specifying the station position The maximum number of divisions: 255
		Speed command input	Selects the rotation speed and acceleration/deceleration time by input signal
		System	Rotation direction specifying indexer, shortest rotating indexer
		Digital override	Selects the override multiplying factor by input signal
		Torque limit	Set by parameters or external analog input (0 V DC to +10 V DC/maximum torque)
Operation mode	Automatic operation mode	Rotation direction specifying indexer	Positions to the specified station. Rotation direction settable
		Shortest rotating indexer	Positions to the specified station. Rotates in the shorter direction from the current position.
	Manual operation mode	JOG operation	Decelerates to a stop regardless of the station
		Station JOG operation	Rotates in a direction specified by the rotation direction decision when the start signal turns on. Positions to the nearest station where the servo motor can decelerate to a stop when the start signal turns off.
	Home position return mode	Torque limit changing dog type	Returns to home position upon Z-phase pulse after passing through the front end of proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, torque limit automatic switching function
		Torque limit changing data set type	Returns to home position without dog. Any position settable as home position, home position address settable, torque limit automatic switching function
Other functions			Absolute position detection system, backlash compensation, overtravel prevention with external limit switches (LSP/LSN), digital override function

Notes: 1. Compatible with Mitsubishi general-purpose AC servo protocol (RS-422/RS-485 communication) and MODBUS® RTU protocol (RS-485 communication).

MR-J4-A-RJ Positioning Function: Indexer (Turret) Method

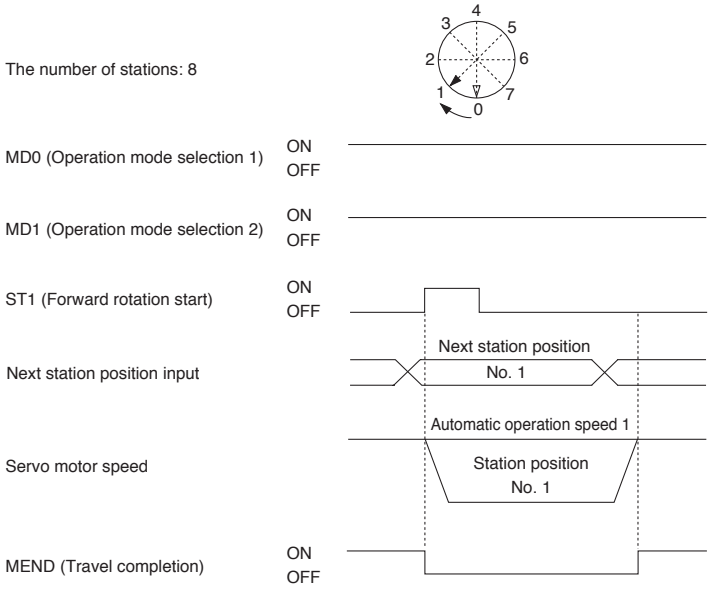
Rotation direction specifying indexer

In the rotation direction specifying indexer, the servo motor always rotates in a definite direction.
Turn off MD0 (Operation mode selection 1), and turn on MD1 (Operation mode selection 2). The servo motor moves in the station No. decreasing direction with SIG (Rotation direction decision) off, and in the increasing direction with SIG on. When ST1 (Forward rotation direction) turns on, the travel amount will be calculated from the current position and the next station position, and then the positioning will be executed to the direction specified by the rotation direction decision.
The following timing chart is an example of the operation executed from the station No. 0 where the servo motor is stopped at servo-on.

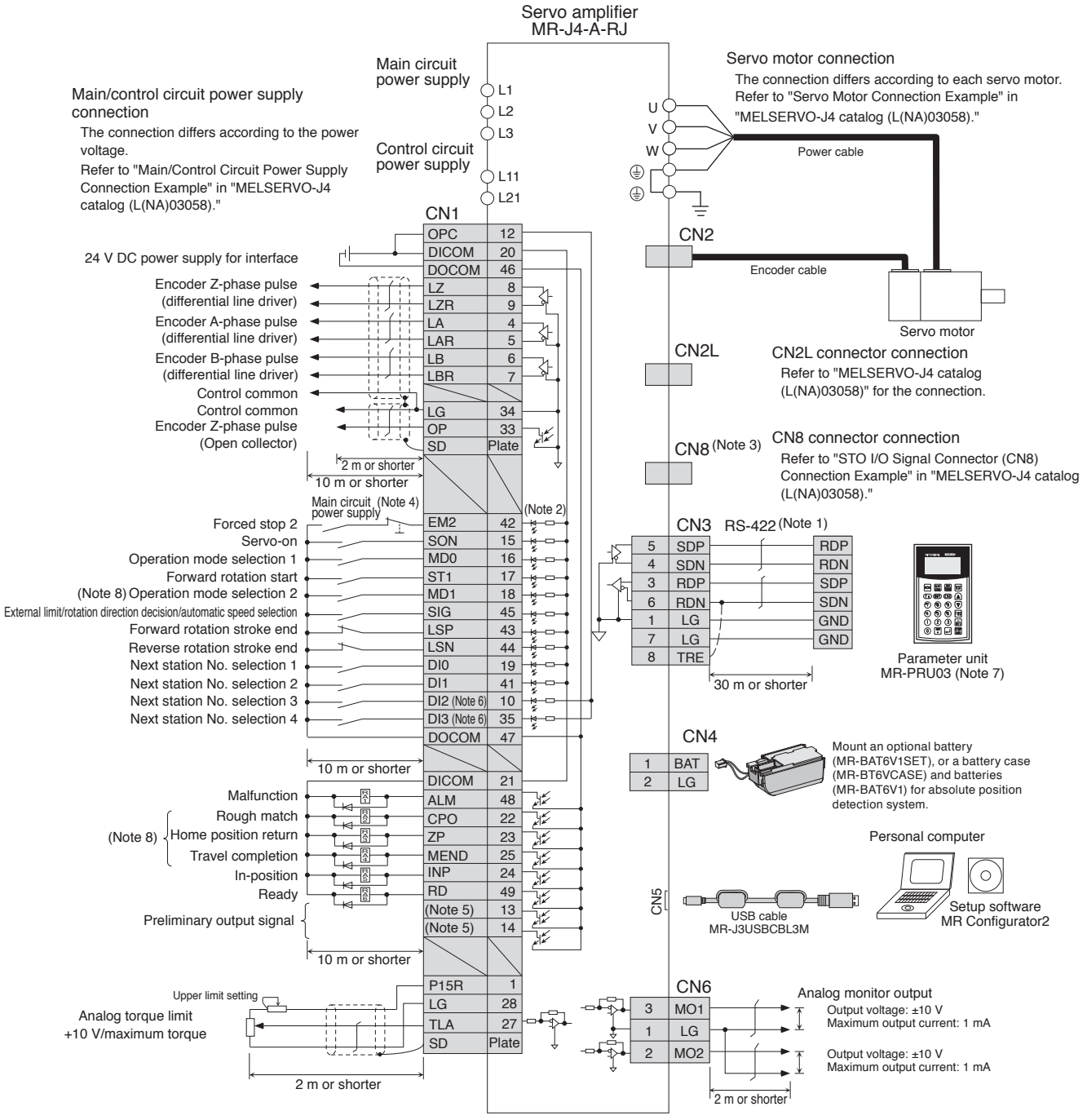


Shortest rotating indexer

In the shortest rotating indexer, the servo motor automatically rotates in the shorter direction.
Turn on both MD0 (Operation mode selection 1) and MD1 (Operation mode selection 2). When ST1 (Forward rotation direction) turns on, the travel amount will be calculated from the current position and the next station position, and then the positioning will be executed in the shorter direction.
The following timing chart is an example of the operation executed from the station No. 0 where the servo motor is stopped at servo-on.



MR-J4-A-RJ Standard Wiring Diagram Example: Indexer (Turret) Method



Notes: 1. It is also possible to connect a personal computer to CN3 connector with an RS-422/RS-232C conversion cable. However, USB interface (CN5 connector) and RS-422 interface (CN3 connector) are mutually exclusive. Do not use them at the same time. Refer to "Products on the Market for Servo Amplifiers" in "MELSERVO-J4 catalog (L(NA)03058)" for the RS-422/RS-232C conversion cable. Refer to "MR-J4-_A_-RJ Servo Amplifier Instruction Manual (Modbus-RTU communication)" for RS-485 communication cable connection diagram.

2. This is for sink wiring. Source wiring is also possible. However, when input devices are assigned to CN1-10 pin and CN1-35 pin, be sure to use sink wiring. Source wiring is not possible in this case. In the positioning mode, input devices are assigned in the initial setting. Refer to "MR-J4-_A_-RJ Servo Amplifier Instruction Manual (Positioning Mode)" for details.
3. Be sure to attach a short-circuit connector supplied with the servo amplifier when the STO function is not used.
4. To prevent an unexpected restart of the servo amplifier, create a circuit to turn off EM2 (Forced stop 2) when the main circuit power is turned off.
5. No output device is assigned in the initial setting. Assign an output device with [Pr. PD47] as necessary.
6. DI2 and DI3 are assigned to CN1-10 pin and CN1-35 pin respectively in the initial setting. Change them with [Pr. PD44] and [Pr. PD46] when using a manual pulse generator.
7. Use a commercial LAN cable (EIA568 compliant), and keep the wiring distance within 10 m when using MR-PRU03 parameter unit.
8. Assign the output devices mentioned to CN1-18, CN1-22 pin, CN1-23 pin, and CN1-25 pin with [Pr. PD10], [Pr. PD23], [Pr. PD24] and [Pr. PD26].

⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

Model Configuration

M R - J 4 - 1 0 A _ - R J

Mitsubishi general-purpose AC servo amplifier MELSERVO-J4 Series

Symbol	Interface
A	General-purpose

Symbol	Rated output [kW]
10	0.1
20	0.2
40	0.4
60	0.6
70	0.75
100	1
200	2
350	3.5
500	5
700	7
11K	11
15K	15
22K	22

Symbol	Power supply
None	3-phase 200 V AC or 1-phase 200 V AC (Note 2)
1	1-phase 100 V AC (Note 5)
4	3-phase 400 V AC (Note 3)

Symbol	Special specification
RJ	Fully closed loop control four-wire type/load-side encoder A/B/Z-phase input compatible/ functional safety unit compatible (Note 8)/ positioning mode compatible (Note 7)
RU	MR-J4-A-RJ without a dynamic brake (Note 1)
RZ	MR-J4-A-RJ without an enclosed regenerative resistor (Note 4)
KJ	MR-J4-A-RJ with DC power input type (Note 6)

Notes: 1. Dynamic brake which is built in 7 kW or smaller servo amplifiers is removed. When using the servo amplifier without a dynamic brake, the servo motor does not stop immediately at alarm occurrence or power failure. Take measures to ensure safety on the entire system.
When the following servo motors are used, an electronic dynamic brake may operate at alarm occurrence.
HG-KR053, HG-KR13, HG-KR23, HG-KR43, HG-MR053, HG-MR13, HG-MR23, HG-MR43, HG-SR51, and HG-SR52
Disable the electronic dynamic brake by setting [Pr. PF09] to "_ _ _ 2."
In addition, when [Pr. PA04] is set to "2 _ _ _" (initial value), the servo motor may be decelerated to a stop forcibly at alarm occurrence. The forced stop deceleration function will be disabled by setting [Pr. PA04] to "0 _ _ _."
2. Servo amplifiers of 0.75 kW or smaller are available for 1-phase 200 V AC.
3. Servo amplifiers of 0.6 kW, and 1 kW or larger are available.
4. Available in 11 kW to 22 kW servo amplifier. A regenerative resistor (standard accessory) is not enclosed.
5. Servo amplifiers of 0.4 kW or smaller are available.
6. Contact your local sales office for the DC power input type servo amplifier.
7. Use MR-J4-A-RJ servo amplifier with software version B3 or later when using the positioning mode, and B7 or later when using the extended function such as simple cam.
8. Achievable safety observation function depends on the software versions of MR-D30 and the servo amplifier. Refer to "New Product Release SV1404-2E-A" for details.

Drive Unit Model Designation (Note 3)

MR-J4-DU30KA__-RJ

Mitsubishi general-purpose AC servo amplifier MELSERVO-J4 Series

Symbol	Special specification
RJ (Note 2)	Fully closed loop control four-wire type/load-side encoder A/B/Z-phase input compatible/ Positioning mode compatible

Symbol	Power supply
None	3-phase 200 V AC (Note 1)
4	3-phase 400 V AC

Symbol	Interface
A	General-purpose

Symbol	Rated output [kW]
30K	30
37K	37
45K	45
55K	55

Converter Unit Model Designation (Note 3)

MR-CR55K_

Symbol	Power supply
None	3-phase 200 V AC
4	3-phase 400 V AC

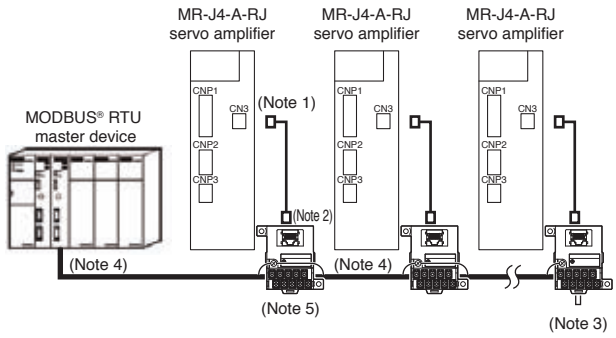
Symbol	Rated output [kW]
55K	55

Notes: 1. Drive units of 37 kW or smaller are available in 3-phase 200 V AC.
2. MR-D01 extension IO unit is not compatible with the drive unit.
3. One unit of converter unit is required for each drive unit.

MODBUS® RTU Specifications

Item		Specifications
Communication protocol		MODBUS® RTU protocol
Compliance to standards		EIA-485 (RS-485)
Numbers connected		1: n (Maximum 32) Set stations 1 to 247 by a parameter. (Station 0 is for broadcast communication)
Communication baud rate [bps]		4800/9600/19200/38400/57600/115200 (set by a parameter)
Control process		Asynchronous system
Communication method		Half-duplex method
Maximum overall extension distance [m]		30
Communication specifications	Character method	Binary (8-bit fixed)
	Start bit	1-bit
	Stop bit length	Select from the following by a parameter. • Even parity, stop bit length 1-bit (initial value) • Odd parity, stop bit length 1-bit • No parity, stop bit length 2-bit
	Parity check	
	Error check	CRC-16 method
	Terminator	None
Waiting time setting		None
Master/Slave classification		Slave

MODBUS® RTU Wiring (For Multi-drop (Note 6))



Notes: 1. Use RJ-45 compatible cable (DSV-CABMD06) designed for MR-J4-A-RJ.
2. Use RJ-45 compatible junction connector terminal block (PX7D-10V4-RJ45).
3. For the final axis, connect 6-pin and 8-pin of RJ-45 compatible junction connector terminal block (PX7D-10V4-RJ45).
4. Use a shielded twisted pair cable between a master device and RJ-45 compatible junction connector terminal block (PX7D-10V4-RJ45) and between each of RJ-45 compatible junction connector terminal blocks (PX7D-10V4-RJ45).
5. Connect the shield of the shielded twisted pair cable mentioned in Note 4 to E terminal of RJ-45 compatible junction connector terminal block (PX7D-10V4-RJ45).
6. RJ-45 junction connector terminal block (PX7D-10V4-RJ45) and RJ-45 compatible cable (DSV-CABMD06) designed for MR-J4-A-RJ are required even for connecting single axis.

MODBUS® RTU Compatible Function Codes

MR-J4-A-RJ servo amplifier is compatible with following function code.

Code	Function name	Description
03h	Read holding registers	Reading holding registers Reads data stored in holding registers from a master.
08h	Diagnostics	Functional diagnostics When this function code is sent from a master to slaves, the slaves return the data as it is. This function can be used for checking the communication status.
10h	Preset multiple registers	Writing to multiple registers Writes a series of data to multiple holding registers from a master.

MODBUS® RTU Functions

The functions of MODBUS® RTU are as follows. MODBUS® RTU can operate and maintain the servo amplifier by remote control.

Function	Description
Status monitor	Reads the items of "Display All" in monitor function of MR Configurator 2 such as servo motor speed and droop pulse.
Parameter setting	Reads and writes parameters.
Point table setting	Reads and writes point table data.
Cam data setting	Reads and writes cam data.
Current alarm reading	Reads an alarm No. currently generated.
Alarm history reading	Reads all 16 alarm histories.
Parameter error No. reading/point table error No. reading	Reads corresponding parameter No. for parameter error and corresponding point table No. for point table error.
Input/output monitor	Reads on/off status of input/output signal and monitor situation of input/output device.
Motor driving	Drives servo motors.
Servo amplifier information reading	Reads servo amplifier model, software version, and cumulative power time.

Simple Cam Specifications (Note 1)

Items			Specifications
Memory capacity	Storage area for cam data		8 Kbytes (FLASH-ROM)
	Working area for cam data		8 Kbytes (RAM)
Number of registration			Up to 8 (depending on memory capacity, cam resolution, and the number of coordinates)
Comment			Up to 32 single-byte characters for each cam data
Cam data	Stroke ratio data type	Cam resolution (Max. number of registration)	256 (8), 512 (4), 1024 (2), 2048 (1)
		Stroke ratio	-100.000% to 100.000%
	Coordinate data type	The number of coordinates (Max. number of registration)	2 to 1024 Example: 128 (8), 256 (4), 512 (2), 1024 (1)
		Coordinate data	Input value: 0 to 999999 Output value: -999999 to 999999
Cam curve			12 types (constant speed/constant acceleration/5th curve/single hypotenuse/ cycloid/distorted trapezoid/distorted sine/distorted constant speed/trapecloid/reverse trapecloid/double hypotenuse/reverse double hypotenuse)

Notes: 1. MR-D30 functional safety unit cannot be used.

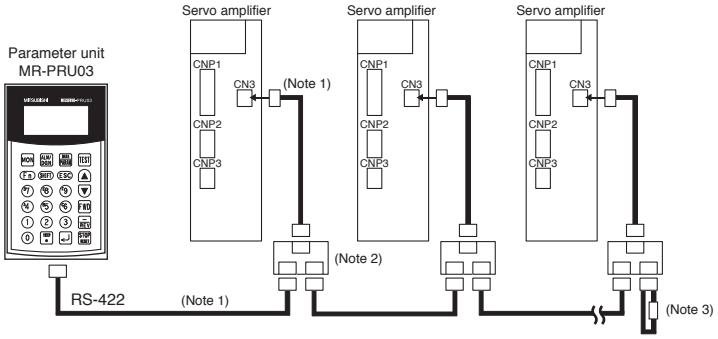
Parameter Unit (MR-PRU03) (Note 1)

Parameter unit with a 16 characters × 4 lines display, is available as an option. The parameter unit connected with MR-J4-A-RJ servo amplifiers enables setting of point table data (Note 2) and parameters, and test operation without MR Configurator2.

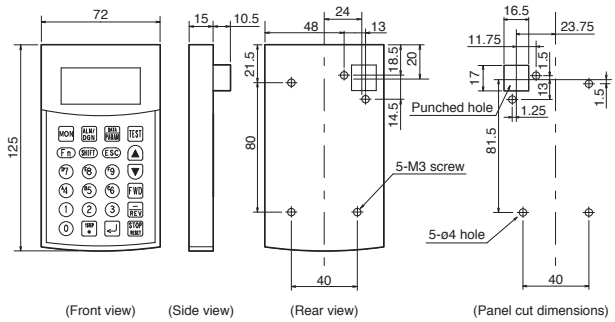
Notes: 1. Use MR-PRU03 with software version B0 or later. Parameter unit can be used by setting [Pr. PF34] to "1_ _ _".
2. Programs cannot be edited with the parameter unit.

Wiring and communication method

- RS-422 communication method
- Connectable with one unit of the servo amplifier with the commercial LAN cable
- Connectable up to 32 axes with multi-drop system



Dimensions



Notes: 1. Use 10BASE-T cable (EIA568 compliant), etc. Keep the distance between the branch connector and servo amplifier as short as possible.
2. Branch connector, BMJ-8 (HACHIKO ELECTRIC CO., LTD) is recommended. Refer to "Products on the Market for Servo Amplifiers" in "MELSERVO-J4 catalog (L(NA)03058)."
3. For the final axis, terminate RDP (3-pin) and RDN (6-pin) of the receiving side (servo amplifier) with 150 Ω resistor.

Specifications

Parameter unit model		MR-PRU03
Power supply		Receives power from the servo amplifier
Functions	Parameter mode	Basic setting parameters, gain/filter parameters, extension setting parameters, I/O setting parameters, extension setting 2 parameters, extension setting 3 parameters, option setting parameters, linear/DD motor setting parameters, positioning control parameters
	Monitor mode	Cumulative feedback pulses, servo motor speed, droop pulses, cumulative command pulses, command pulse frequency, regenerative load ratio, effective load ratio, peak load ratio, load to motor inertia ratio, bus voltage, point table No./program No./station position No., step No., override voltage, cam axis current value per cycle, cam reference position, cam axis current feed value, execute cam No., execute cam stroke amount, main shaft current value, main shaft current value per cycle, etc.
	Diagnosis mode	External I/O (DIDO) display, software version, Automatic VC offset, servo motor information, cumulative power-on
	Alarm mode	Current alarm, alarm history
	Test operation mode	JOG operation, positioning operation, forced digital output (DO), single-step feed
	Point table mode	Position data, servo motor speed, acceleration/deceleration time constants, dwell, sub function, M code
Display		LCD (16 characters × 4 lines)
Environment	Ambient temperature	Operation: -10 °C to 55 °C (non-freezing), storage -20°C to 65°C(non-freezing)
	Ambient humidity	Operation/storage: 90 %RH maximum (non-condensing)
	Ambience	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust
Mass [g]		130

Extension IO Unit (MR-D01) (Note 4)

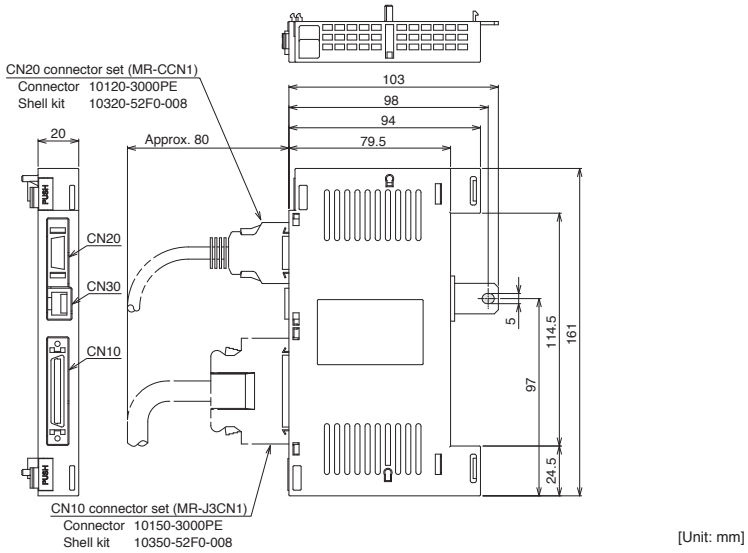
Digital/analog inputs and outputs can be increased by combining extension IO unit (MR-D01).

Specification

Extension IO unit model		MR-D01
Interface power supply		24 V DC ±10% (required current capacity: 0.8 A (Note 1, 2))
Digital input		30 points, photocoupler insulation, sink/source compatible
Digital output		16 points, photocoupler insulation, sink/source compatible
Analog input		2 channels, 0 V DC to ±10 V DC (input impedance: 10 kΩ to 12 kΩ)
Analog output		2 channels, 0 V DC to ±12 V DC
Power supply for analog input signal		P15R: +15 V DC, permissible current: 30 mA (Note 3) N12R: -12 V DC, permissible current: 30 mA (Note 3)
Structure (IP rating)		Natural cooling, open (IP00)
Environment	Ambient temperature	Operation: 0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)
	Ambient humidity	Operation/storage: 90 %RH maximum (non-condensing)
	Ambience	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust
	Altitude	1000 m or less above sea level
	Vibration resistance	5.9 m/s^2 at 10 Hz to 55 Hz (directions of X, Y and Z axes)
Mass [g]		140

Notes: 1. 0.8A is the value when all of the input/output points are used. The current capacity can be stepped down according to the number of input/output points in use. Refer to "MR-J4-_A_-RJ Servo Amplifier Instruction Manual (Positioning Mode)" for details.
2. A 24 V DC power supply for input/output signals can be shared by the servo amplifier and MR-D01. In this case, secure the power supply capacity corresponding to the points of the input/output signals to be used.
3. P15R can be used as a power supply for TLA and VC. N12R can be used as a power supply for VC. Note that the power voltage varies between -12 V to -15 V.
4. MR-D01 extension IO unit is not compatible with the drive unit.

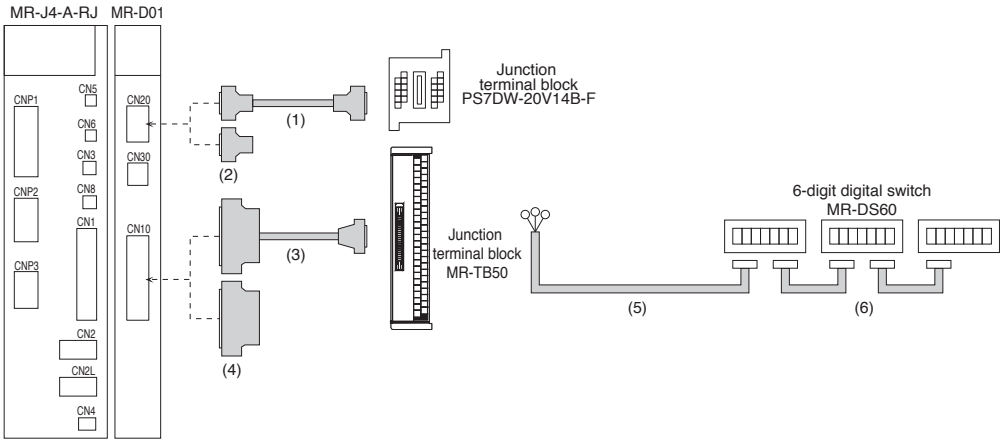
Dimensions



[Unit: mm]

Using Extension IO Unit (MR-D01)

Connectors and cables for the servo amplifier are the same as those required when the extension IO unit is not used.

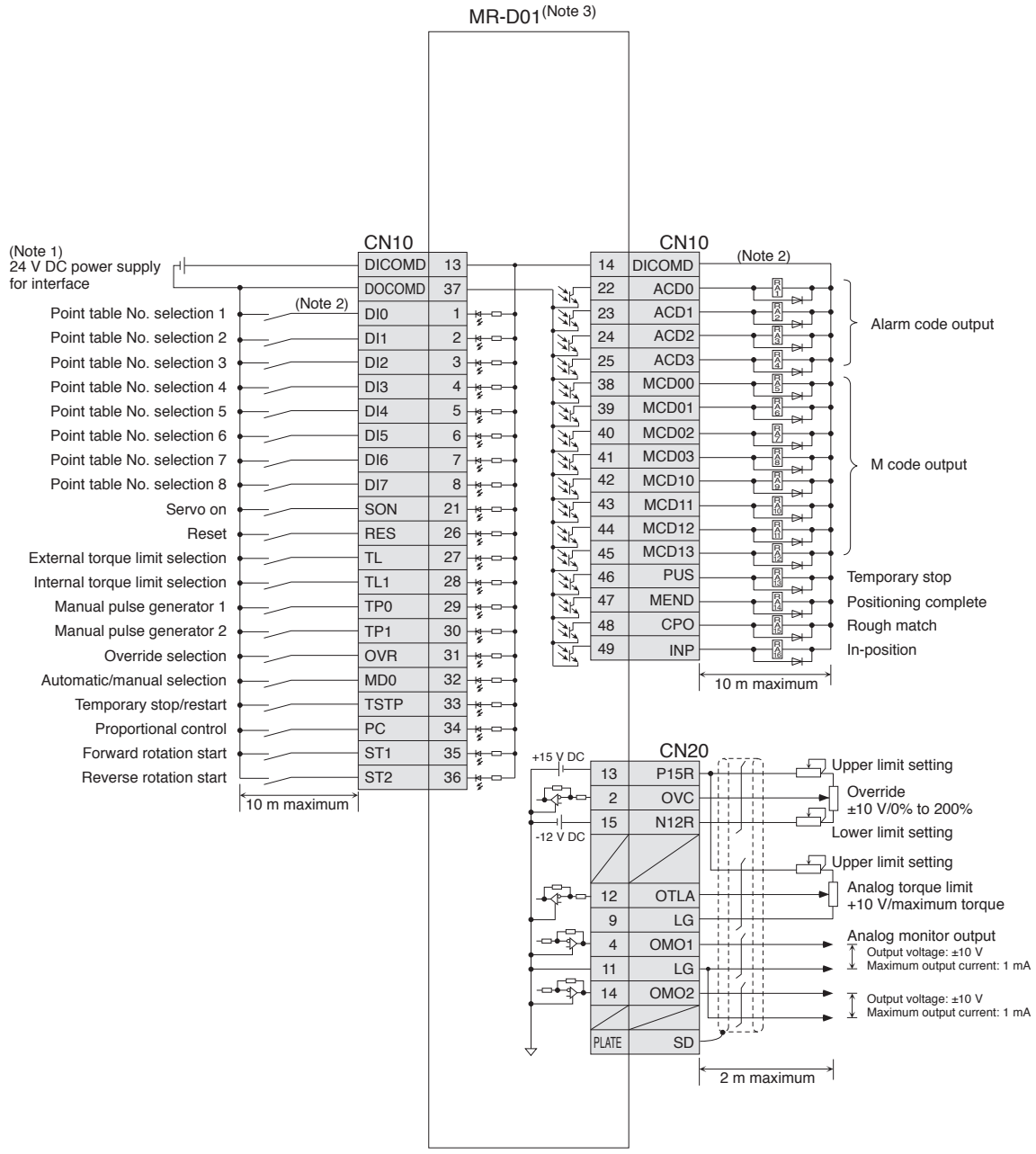


Cables and Connectors for MR-D01

Item			Model	Cable length	IP rating	Description
For CN20	(1)	Junction terminal block cable	MR-J2HBUS05M	0.5 m	-	Servo amplifier connector / Junction terminal block connector
			MR-J2HBUS1M	1 m		
			MR-J2HBUS5M	5 m		
	(2)	Connector set	MR-CCN1	-	-	Servo amplifier connector
For CN10	(3)	Junction terminal block cable	MR-J2M-CN1TBL05M	0.5 m	-	MR-D01 connector / Junction terminal block connector
			MR-J2M-CN1TBL1M	1 m		
	(4)	Connector set	MR-J3CN1	-	-	MR-D01 connector
	(5)	Digital switch cable (for between MR-DS60 and MR-D01)	MR-DSCBL3M-G	3 m	-	
			MR-DSCBL5M-G	5 m	-	
			MR-DSCBL10M-G	10 m	-	
	(6)	Digital switch cable (for between MR-DS60 and MR-DS60)	MR-DSCBL25	25 cm	-	
			MR-DSCBL100	1 m	-	

* Refer to "MELSERVO-J4 catalog (L(NA)03058)" for details of each connector.

Extension IO Unit (MR-D01): Connection Example (Point Table Positioning Operation)

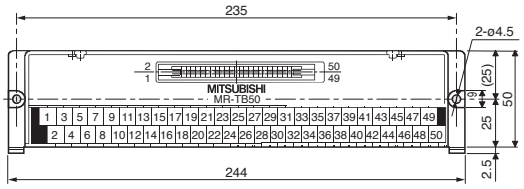


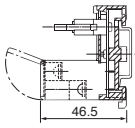
Notes: 1. A 24 V DC power supply for input/output signals can be shared by the servo amplifier and MR-D01. In this case, secure the power supply capacity corresponding to the points of the input/output signals to be used.
2. This is for sink wiring. Source wiring is also possible. Refer to "MR-J4-_A_-RJ Servo Amplifier Instruction Manual (Positioning Mode)" for details.
3. MR-D01 connects directly to CN7 connector of MR-J4-_A-RJ.

Junction Terminal Block (MR-TB50)

Connect all signals via the junction terminal block.

Dimensions [Unit: mm]



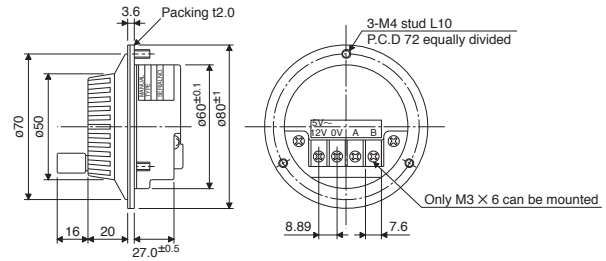


Terminal screw size: M3.5
Applicable wire: 2 mm² maximum
Crimping terminal width: 7.2 mm or shorter
Mounting screw size: M4

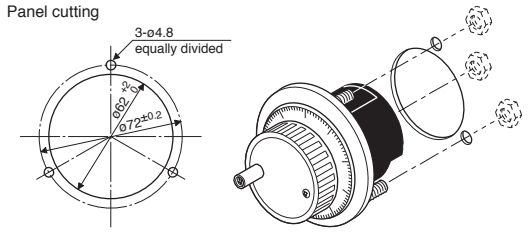
Manual Pulse Generator (MR-HDP01)

Servo motors can be operated by using MR-HDP01 manual pulse generator.

Dimensions [Unit: mm]



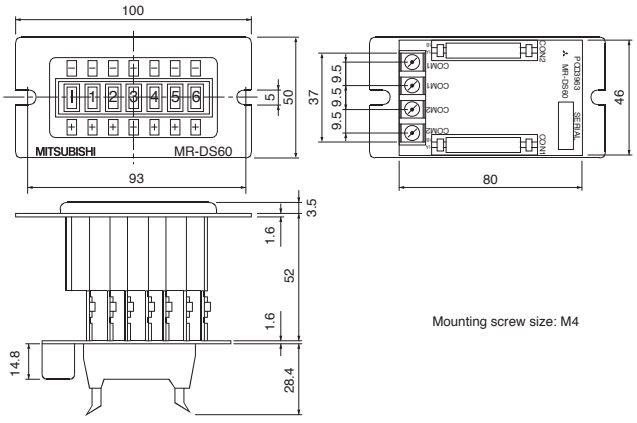
Mounting [Unit: mm]



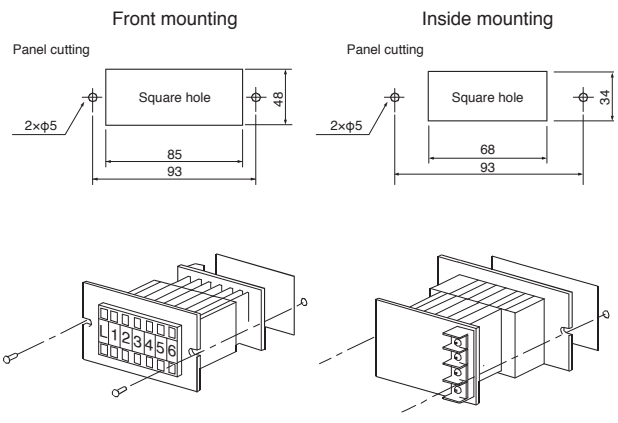
6-digit Digital Switch (MR-DS60): For MR-D01

By using the 6-digit digital switch (MR-DS60), position data can be sent to the servo amplifier with BCD signal.

Dimensions [Unit: mm]



Mounting [Unit: mm]



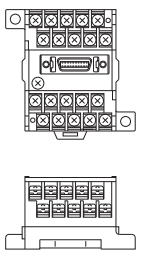
[Products on the Market]

Contact the relevant manufacturers directly.

Junction terminal block (PS7DW-20V14B-F)

Connect all signals via the junction terminal block.

Description



Toho Technology Corp.
Yoshida Terminal Block Division
Applicable wire: 1.25 mm² maximum

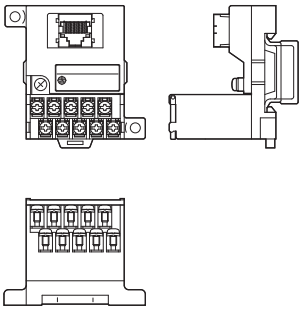
[Products on the Market]

Contact the relevant manufacturers directly.

Cable for MODBUS® RTU

Application	Model	Cable length	Description
RJ-45 compatible cable designed for MR-J4-A-RJ	DSV-CABMD06	0.6 m	 Diatrend Corp.

RJ-45 compatible junction connector terminal block for MODBUS® RTU

Application	Model	Description
RJ-45 compatible junction connector terminal block	PX7D-10V4-RJ45 (spring-up screw)	 Toho Technology Corp. Yoshida Terminal Block Division PS7D-10V4-RJ45 (self-up screw) is also usable.

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE: TOKYO BUILDING, 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS: 1-14, YADA-MINAMI 5, HIGASHI-KU, NAGOYA, JAPAN

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