MITSUBISHI ELECTRIC

Changes for the Better

for a greener tomorrow eco Changes

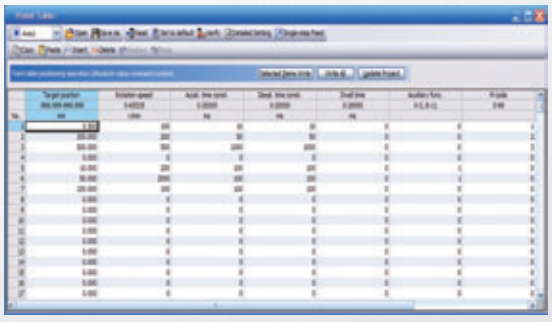
SERVO AMPLIFIERS & MOTORS

MELSERVO-J4 Series with Built-in Positioning Function

MR-J4-A-RJ

MR-J4-A-RJ is now available with built-in positioning function, allowing positioning operation with point table, program, and indexer (turret) methods.

MR Configurator2 offers easy setting of positioning data.



[Point table] window on MR Configurator2

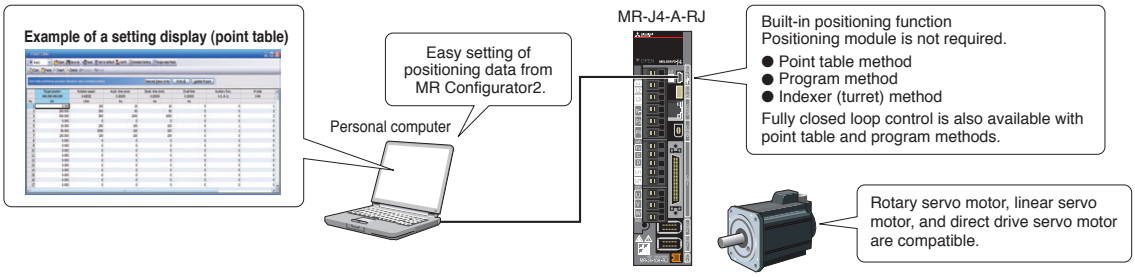
- Point table method: Positioning according to the position and speed data set in the point table.
- Program method: Positioning by following pre-created programs.
- Indexer (turret) method: Positioning by specifying station positions.
- Command interface is compatible with DI/O or RS-422 serial communication (maximum of 32 axes).
- Easy setting of positioning data with MR Configurator2.

MITSUBISHI SERVO AMPLIFIERS & MOTORS

MELSERVO-J4

Built-in Positioning Function

Positioning operation with point table, program, and indexer (turret) methods became capable by built-in positioning function in MR-J4-A-RJ*1, allowing to configure positioning system without controller such as Positioning module. Command interface is selectable from DI/O and RS-422 serial communication (maximum 32 axes). 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. Use MR Configurator2 with software version 1.25B or later when using the positioning function. Be sure to update your MR Configurator2 to the latest version.

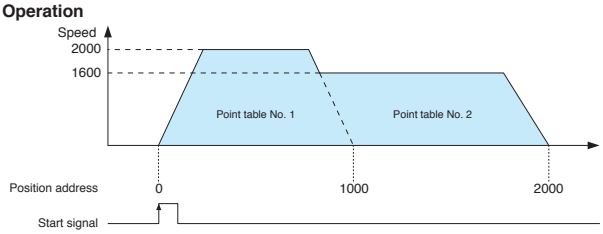
Point table method

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

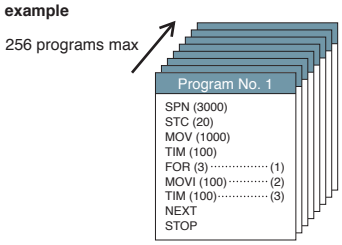
Operation



Program method*

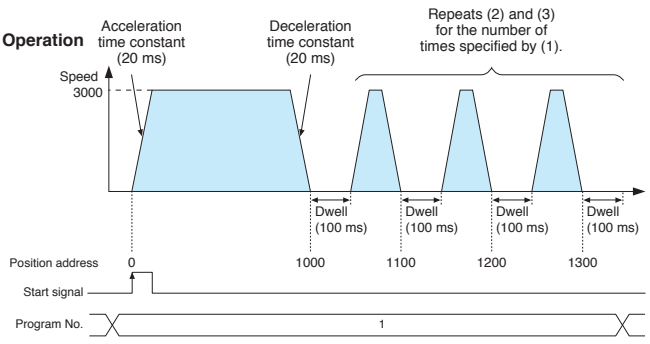
Create positioning programs with dedicated commands. The positioning operation is performed with a start signal after selecting the program No. The program method enables more complex positioning operation than the point table method. Maximum of 256 programs are registerable. (The total number of steps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

Program example



* MR Configurator2 is required to create programs.

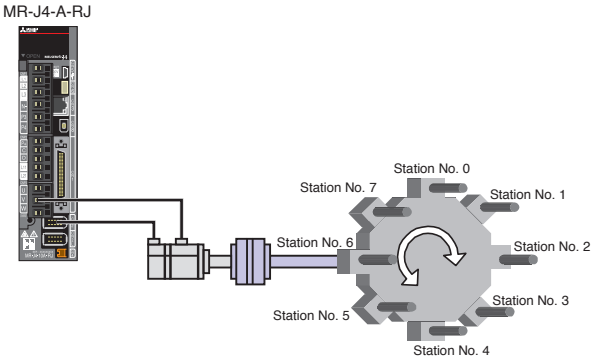
Operation



Indexer (turret) method*

Positioning operation is performed by specifying equally divided stations (up to 255 stations). By setting the number of teeth on load and motor sides and 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 override function are also available.



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

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		DIO (input: 11 points (excluding forced stop input (EM2)), and output: 8 points), RS-422
		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 DI or RS-422 communication function 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 system, backlash compensation, overtravel prevention with external limit switches (LSP/LSN), teaching function, roll feed function, software stroke limit, mark detection (current position latch) function, 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.

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 [×10^{STM} µm] -99.9999 to 99.9999 [×10^{STM} 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.

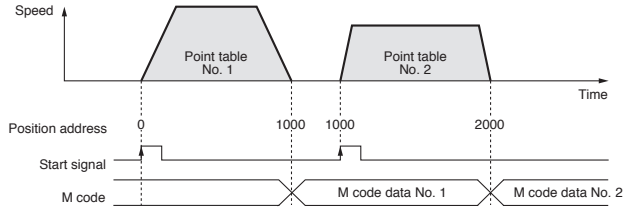
Notes: 1. Change the unit to µm/Inch/Degree/Pulse with [Pr. PT01].
2. The speed unit is r/min for the rotary servo motors and the direct drive motors, and mm/s for the linear servo motors.
3. STM is the ratio to the setting value of the position data. STM can be changed with [Pr. PT03].

Example of setting point table data

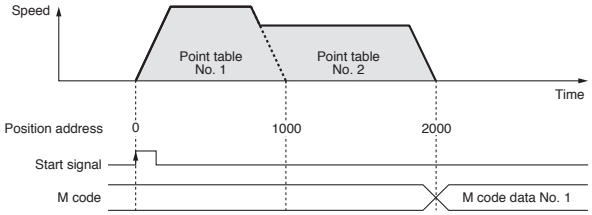
Point table No.	Target position (position data) [× 10^{STM} µm] (Note 1)	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Sub function	M code
1	1000	2000	200	200	0	✻	1
2	2000	1600	100	100	0	0	2
:	:	:	:	:	:	:	:
255	3000	3000	100	100	0	2	99

✻ 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.

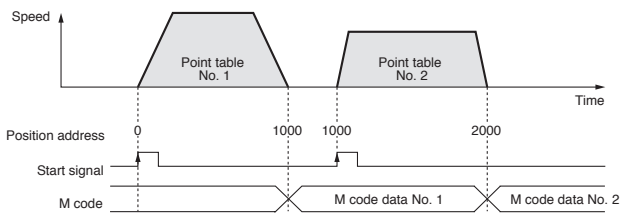
Notes: 1. Change the unit to µm/Inch/Degree/Pulse with [Pr. PT01].
2. The speed unit is r/min for the rotary servo motors and the direct drive motors, and mm/s for the linear servo motors.
3. STM is the ratio to the setting value of the position data. STM can be changed with [Pr. PT03].

Example of setting point table data

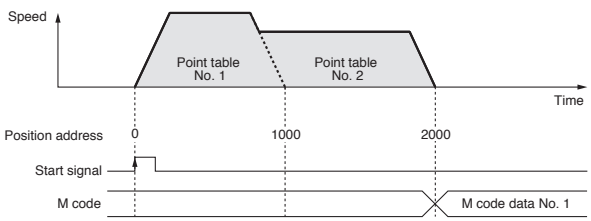
Point table No.	Target position (position data) [× 10^{STM} µm] (Note 1)	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Sub function	M code
1	1000	2000	200	200	0	✻	1
2	1000	1600	100	100	0	0	2
:	:	:	:	:	:	:	:
255	3000	3000	100	100	0	2	99

✻ 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.

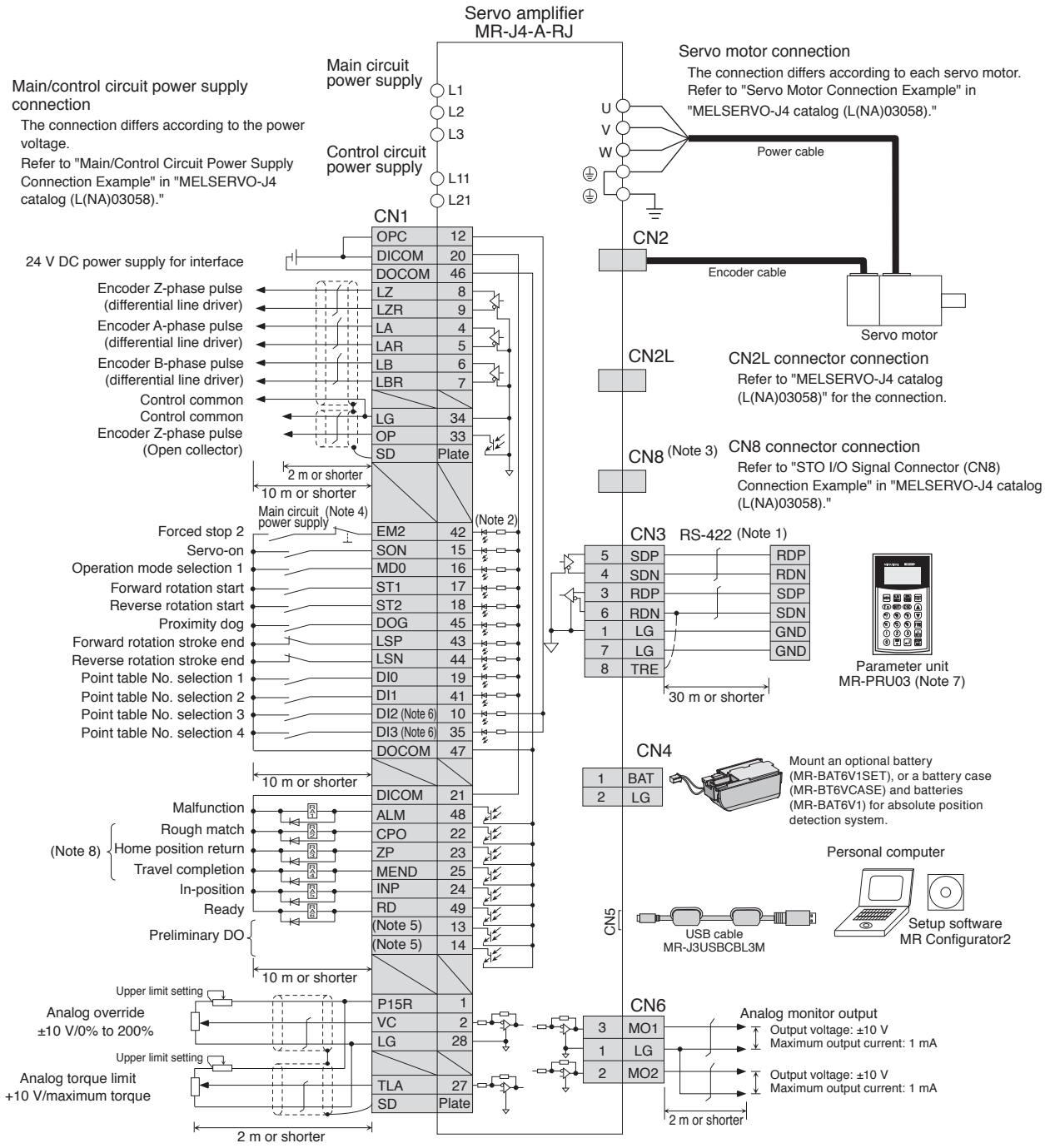


● **When the sub function is set to 1:**
Automatic continuous operation is executed based on the point table.



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 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.

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. Create a circuit to turn off EM2 (Forced stop 2) when the main circuit power is turned off to prevent an unexpected restart of the servo amplifier.
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		DIO (input: 11 points (excluding forced stop input (EM2)), and output: 8 points), RS-422
		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 DI or RS-422 communication function 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 system, backlash compensation, overtravel prevention with external limit switches (LSP/LSN), roll feed function, software stroke limit, mark detection (current position latch) function, 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.

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] -999999 to 999999 [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] -999999 to 999999 [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

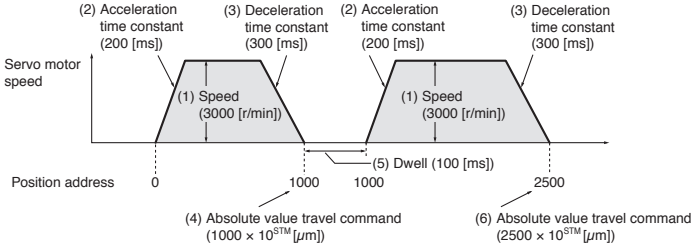
Command list

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.

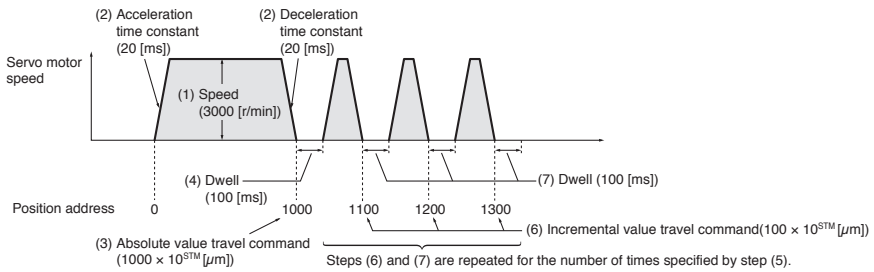
Step	Program	Description
(1)	SPN (3000) (Note 1)	Servo motor speed: 3000 [r/min]
(2)	STA (200) (Note 1)	Acceleration time constant: 200 [ms]
(3)	STB (300) (Note 1)	Deceleration time constant: 300 [ms]
(4)	MOV (1000)	Absolute value travel command: 1000 [×10^{STM} µm]
(5)	TIM (100)	Dwell: 100 [ms]
(6)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



Program example 2

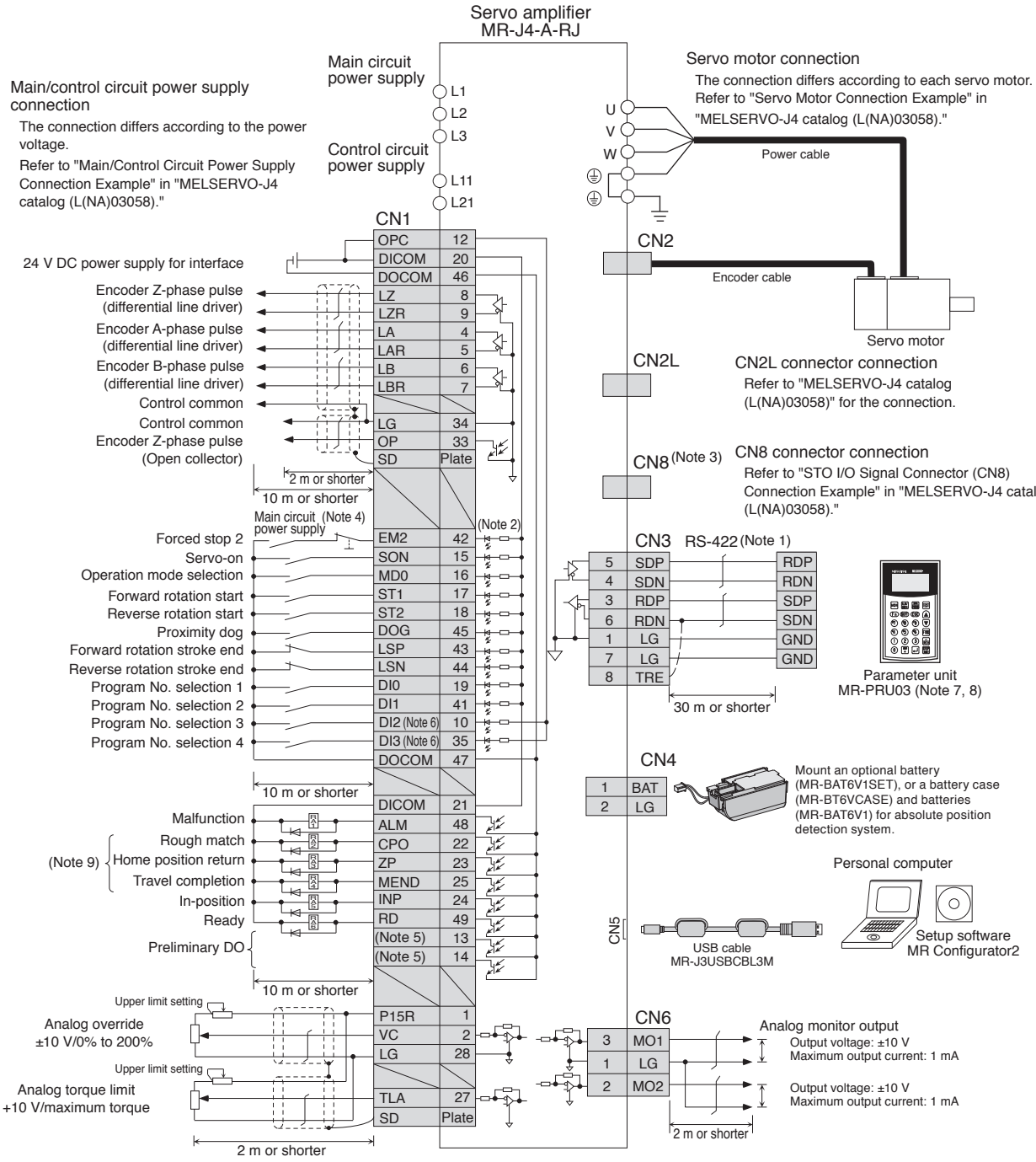
The following is an example of repeating the steps between [FOR (setting value)] and [NEXT] commands for the number of times set.

Step	Program	Description
(1)	SPN (3000) (Note 1)	Servo motor speed: 3000 [r/min]
(2)	STC (20) (Note 1)	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.

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. Create a circuit to turn off EM2 (Forced stop 2) when the main circuit power is turned off to prevent an unexpected restart of the servo amplifier.
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

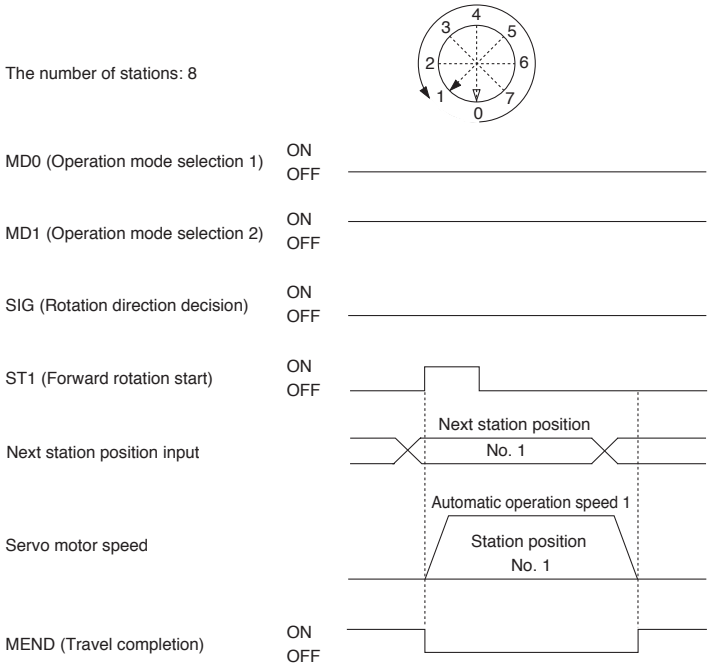
Positioning is executed by specifying stations (maximum of 255 stations).
Travel distance is automatically calculated with parameters by setting the numbers of stations and gears on machine-side and motor-side.

Item			Description
Command method		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
		System	Rotation direction specifying indexer, shortest rotating indexer
		Digital override	Selects the override multiplying factor by DI
		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), override function

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

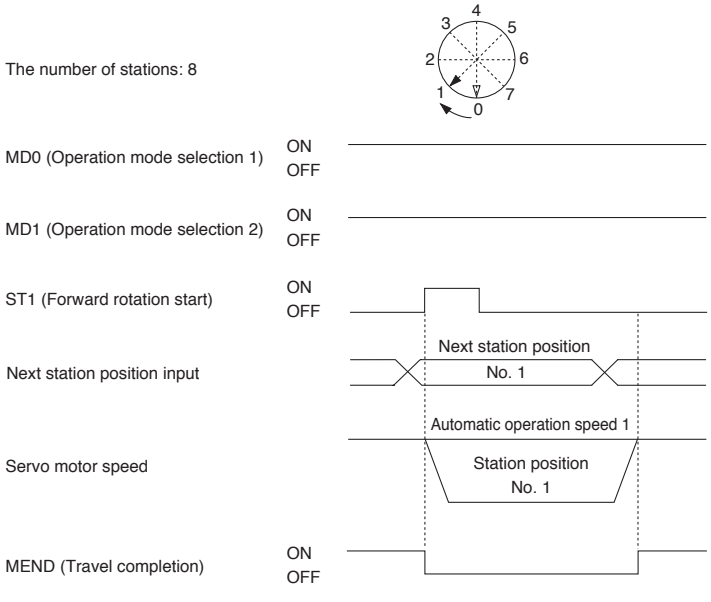
Rotation direction specifying indexer

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.

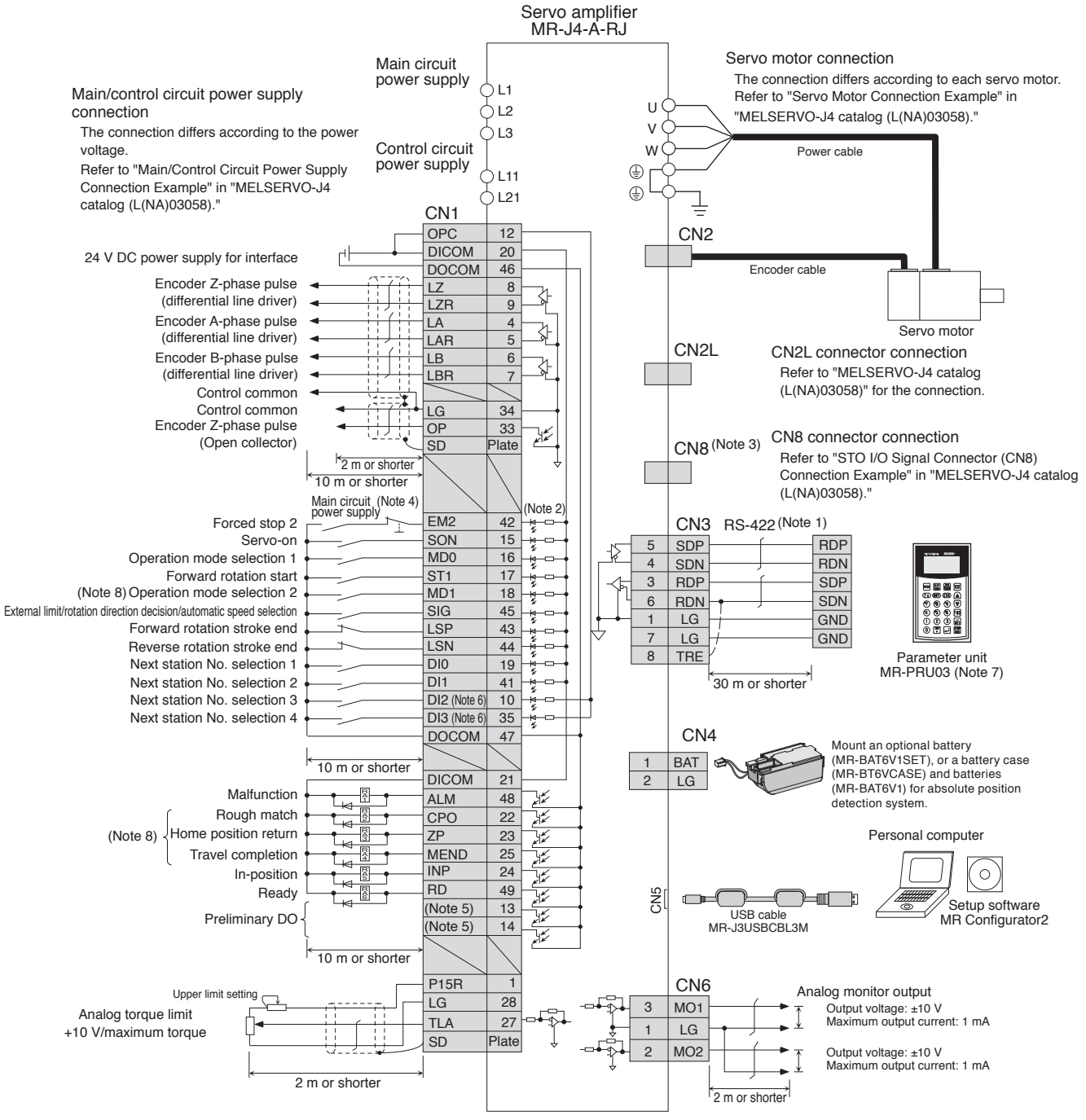


Shortest rotating indexer

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.
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. Create a circuit to turn off EM2 (Forced stop 2) when the main circuit power is turned off to prevent an unexpected restart of the servo amplifier.
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

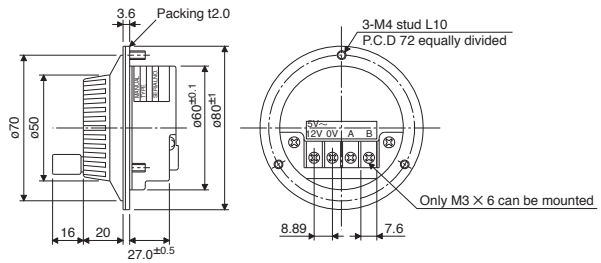
Symbol	Power supply
None	3-phase 200 V AC or 1-phase 200 V AC (Note 2)
1	1-phase 100 V AC (Note 5)
4	3-phase 400 V AC (Note 3)

Symbol	Special specification
RJ	Fully closed loop control four-wire type/load-side encoder A/B/Z-phase input compatible/ 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 6)
KJ	Fully closed loop control four-wire type/load-side encoder A/B/Z-phase input compatible/ DC power input type (Note 6)

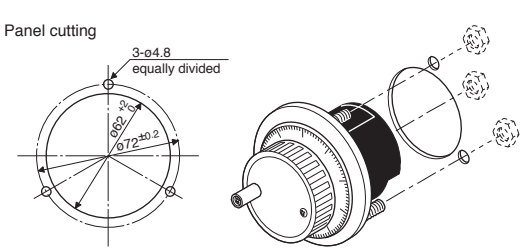
Notes: 1. Dynamic brake which is built in 7 kW or smaller servo amplifiers is removed. When using the servo amplifier without a dynamic brake, the servo motor does not stop immediately at alarm occurrence or power failure. Take measures to ensure safety on the entire system.
When the following servo 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. 0.75 kW or smaller servo amplifiers are available for 1-phase 200 V AC.
3. 0.6 kW, and 1 kW or larger servo amplifiers are available.
4. Available in 11 kW to 22 kW servo amplifier. A regenerative resistor (standard accessory) is not enclosed.
5. 0.4 kW or smaller servo amplifiers 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 function.

Manual Pulse Generator (MR-HDP01)

Dimensions [Unit: mm]



Mounting [Unit: mm]



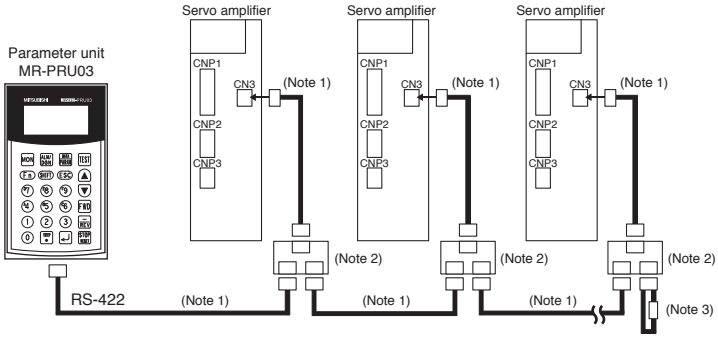
Parameter unit (MR-PRU03)

Parameter unit with a 16 characters × 4 lines display, is available as an option.
The parameter unit (Note 1) connected with MR-J4-A-RJ servo amplifiers enables setting of point table data (Note 2) and parameters, and test operation without MR Configurator2.

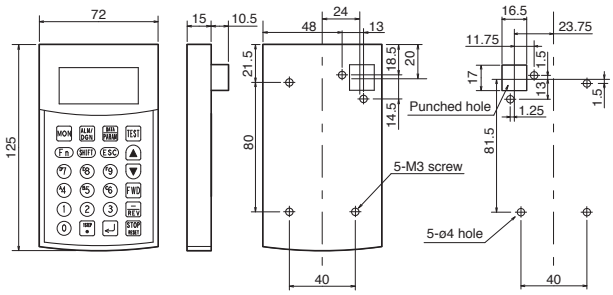
Notes: 1. Use MR-PRU03 with software version B0 or later.
2. Programs cannot be edited with the parameter unit.

Wiring and communication method

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



Dimensions



[Unit: mm]

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 "Ordering Information for Customers" in "MELSERVO-J4 catalog (L(NA)03058)."
3. Connect a 150 Ω termination resistor.

Specifications

Item		Description
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, special setting parameters, linear/DD motor setting parameters, positioning control parameters
	Monitor mode	Cumulative feedback pulses, rotary servo motor/linear servo motor speed, droop pulses, cumulative command pulses, command pulse frequency, analog speed command voltage/analog speed limit voltage, analog torque limit voltage/analog torque command voltage, regenerative load ratio, effective load ratio, peak load ratio, instantaneous torque, position within one-revolution, ABS counter, load to motor inertia ratio, bus voltage, load-side encoder cumulative feedback pulses, load-side encoder droop pulses, load-side encoder information 1, load-side encoder information 2, servo motor thermistor temperature, cumulative feedback pulses (unit of motor side), electrical angle, motor-side/load-side position deviation, motor-side/load-side speed deviation, encoder inside temperature, settling time, oscillation detection frequency, the number of tough drive operations, unit power consumption, unit total power consumption, current position, command position, command remaining distance, point table No./program No./station position No., step No., override voltage, override level
	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 system (16 characters × 4 lines)
Environment	Ambient temperature in operation	-10 °C to 55 °C (non freezing)
	Ambient humidity in operation	90 %RH maximum (non condensing)
	Storage temperature	-20 °C to 65 °C (non freezing)
	Storage humidity	90 %RH maximum (non condensing)
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust
Mass [g]		130

⚠ Safety Warning

To ensure proper use of the products listed in this catalog, please be sure to read the instruction manual prior to use.

Country/Region	Sales office	Tel/Fax
USA	MITSUBISHI ELECTRIC AUTOMATION, INC. 500 Corporate Woods Parkway, Vernon Hills, IL 60061, U.S.A.	Tel : +1-847-478-2100 Fax : +1-847-478-2253
Mexico	MITSUBISHI ELECTRIC AUTOMATION, INC. Mexico Branch Mariano Escobedo #69, Col. Zona Industrial, Tlalnepantla Edo, C.P.54030, Mexico	Tel : +52-55-3067-7500 Fax : –
Brazil	MITSUBISHI ELECTRIC DO BRASIL COMÉRCIO E SERVIÇOS LTDA. Rua Jussara, 1750- Bloco B Anexo, Jardim Santa Cecilia, CEP 06465-070, Barueri - SP, Brasil	Tel : +55-11-4689-3000 Fax : +55-11-4689-3016
Germany	MITSUBISHI ELECTRIC EUROPE B.V. German Branch Gothaer Strasse 8, D-40880 Ratingen, Germany	Tel : +49-2102-486-0 Fax : +49-2102-486-1120
UK	MITSUBISHI ELECTRIC EUROPE B.V. UK Branch Travellers Lane, Hatfield, Hertfordshire, AL10 8XB, U.K.	Tel : +44-1707-28-8780 Fax : +44-1707-27-8695
Italy	MITSUBISHI ELECTRIC EUROPE B.V. Italian Branch Centro Direzionale Colleoni - Palazzo Sirio Viale Colleoni 7, 20864 Agrate Brianza(Milano) Italy	Tel : +39-039-60531 Fax : +39-039-6053-312
Spain	MITSUBISHI ELECTRIC EUROPE, B.V. Spanish Branch Carretera de Rubí, 76-80-Apdo. 420, 08173 Sant Cugat del Vallés (Barcelona), Spain	Tel : +34-935-65-3131 Fax : +34-935-89-1579
France	MITSUBISHI ELECTRIC EUROPE B.V. French Branch 25, Boulevard des Bouvets, F-92741 Nanterre Cedex, France	Tel : +33-1-55-68-55-68 Fax : +33-1-55-68-57-57
Czech Republic	MITSUBISHI ELECTRIC EUROPE B.V. Czech Branch Avenir Business Park, Radlicka 751/113e, 158 00 Praha5, Czech Republic	Tel : +420-251-551-470 Fax : +420-251-551-471
Poland	MITSUBISHI ELECTRIC EUROPE B.V. Polish Branch ul. Krakowska 50, 32-083 Balice, Poland	Tel : +48-12-630-47-00 Fax : +48-12-630-47-01
Russia	MITSUBISHI ELECTRIC EUROPE B.V. Russian Branch St. Petersburg office Piskarevsky pr. 2, bld 2, lit "Sch", BC "Benua", office 720; RU-195027 St. Petersburg, Russia	Tel : +7-812-633-3497 Fax : +7-812-633-3499
Sweden	MITSUBISHI ELECTRIC EUROPE B.V. (Scandinavia) Fjelievägen 8, SE-22736 Lund, Sweden	Tel : +46-8-625-10-00 Fax : +46-46-39-70-18
Turkey	MITSUBISHI ELECTRIC TURKEY A.Ş Ümraniye Branch Şerifali Mahallesi Nutuk Sokak No:5, TR-34775 Ümraniye, İstanbul, Türkey	Tel : +90-216-526-3990 Fax : +90-216-526-3995
UAE	MITSUBISHI ELECTRIC EUROPE B.V. Dubai Branch Dubai Silicon Oasis, P.O.BOX 341241, Dubai, U.A.E.	Tel : +971-4-3724716 Fax : +971-4-3724721
South Africa	ADROIT TECHNOLOGIES 20 Waterford Office Park, 189 Witkoppen Road, ZA-Fourways, South Africa	Tel : +27-11-658-8100 Fax : +27-11-658-8101
China	MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD. No.1386 Hongqiao Road, Mitsubishi Electric Automation Center, Shanghai, China	Tel : +86-21-2322-3030 Fax : +86-21-2322-3000
Taiwan	SETSUYO ENTERPRISE CO., LTD. 6F, No.105, Wugong 3rd Road, Wugu District, New Taipei City 24889, Taiwan, R.O.C.	Tel : +886-2-2299-2499 Fax : +886-2-2299-2509
Korea	MITSUBISHI ELECTRIC AUTOMATION KOREA CO., LTD. 10-10, Yangcheon-Ro 57-Gil, Gangseo-Gu, Seoul 157-200, Korea	Tel : +82-2-3660-9510 Fax : +82-2-3664-8372/8335
Singapore	MITSUBISHI ELECTRIC ASIA PTE. LTD. 307, Alexandra Road, Mitsubishi Electric Building, Singapore 159943	Tel : +65-6473-2308 Fax : +65-6476-7439
Thailand	MITSUBISHI ELECTRIC FACTORY AUTOMATION (THAILAND) CO., LTD. 12th Floor, SV.City Building, Office Tower 1, No. 896/19 and 20 Rama 3 Road, Kwaeng Bangpongpang, Khet Yannawa, Bangkok 10120, Thailand	Tel : +66-2682-6522 to 6531 Fax : +66-2682-6020
Indonesia	PT. MITSUBISHI ELECTRIC INDONESIA Gedung Jaya 11th Floor, JL. MH. Thamrin No.12, Jakarta Pusat 10340, Indonesia	Tel : +62-21-3192-6461 Fax : +62-21-3192-3942
Vietnam	MITSUBISHI ELECTRIC VIETNAM COMPANY LIMITED Unit 01-04, 10th Floor, Vincom Center, 72 Le Thanh Ton Street, District 1, Ho Chi Minh City, Vietnam	Tel : +84-8-3910-5945 Fax : +84-8-3910-5947
India	MITSUBISHI ELECTRIC INDIA PVT. LTD. Pune Branch Emerald House, EL -3, J Block, M.I.D.C Bhosari, Pune - 411026, Maharashtra, India	Tel : +91-20-2710-2000 Fax : +91-20-2710-2100
Australia	MITSUBISHI ELECTRIC AUSTRALIA PTY. LTD. 348 Victoria Road, P.O. Box 11, Rydalmere, N.S.W 2116, Australia	Tel : +61-2-9684-7777 Fax : +61-2-9684-7245

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

L(NA)03101ENG-A 1404 Printed in Japan 〈IP〉

New publication, effective April 2014.
Specifications are subject to change without notice.