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

Servo amplifier
MR-J4-A-RJ

Main/control circuit power supply connection
The connection differs according to the power voltage.
Refer to "Main/Control Circuit Power Supply Connection Example" on pp. 1-17 and 1-18 in this catalog.

Main circuit power supply
Control circuit power supply

L1
L2
L3
L11
L21

Servo motor connection
The connection differs according to each servo motor. Refer to "Servo Motor Connection Example" on pp. 1-32 to 1-36 in this catalog.

U
V
W

Power cable

CN2

Encoder cable

Servo motor

CN1

OPC	12
DICOM	20
DOCOM	46
LZ	8
LZR	9
LA	4
LAR	5
LB	6
LBR	7
LG	34
OP	33
SD	Plate

24 V DC power supply for interface

Encoder Z-phase pulse (differential line driver)
Encoder A-phase pulse (differential line driver)
Encoder B-phase pulse (differential line driver)
Control common
Control common
Encoder Z-phase pulse (Open collector)

2 m or shorter
10 m or shorter

Main circuit (Note 4) power supply

(Note 2)

CN2L CN2L connector connection
Refer to pp. 1-31 to 1-36 in this catalog for the connection.

CN8 (Note 3) CN8 connector connection
Refer to "STO I/O Signal Connector (CN8) Connection Example" on p. 1-16 in this catalog.

EM2	42
SON	15
MD0	16
ST1	17
ST2	18
DOG	45
LSP	43
LSN	44
DI0	19
DI1	41
DI2 (Note 6)	10
DI3 (Note 6)	35
DOCOM	47

Forced stop 2
Servo-on
Operation mode selection 1
Forward rotation start
Reverse rotation start
Proximity dog
Forward rotation stroke end
Reverse rotation stroke end
Point table No. selection 1
Point table No. selection 2
Point table No. selection 3
Point table No. selection 4

10 m or shorter

CN3 RS-422/RS-485 (Note 1)

5	SDP	RDP	
4	SDN	RDN	
3	RDP	SDP	
6	RDN	SDN	
1	LG	GND	
7	LG	GND	
2	P5D	+5V	
8	TRE		

30 m or shorter

Parameter unit MR-PRU03 (Note 7)

GOT

DICOM	21
ALM	48
CPO	22
ZP	23
MEND	25
INP	24
RD	49
(Note 5)	13
(Note 5)	14

Malfunction
Rough match
(Note 8) Home position return
Travel completion
In-position
Ready
Preliminary DO

10 m or shorter

CN4

1	BAT
2	LG

Mount an option battery (MR-BAT6V1SET), or a battery case (MR-BT6VCASE) and batteries (MR-BAT6V1) for absolute position detection system.

Personal computer

CN5

USB cable MR-J3USBCBL3M

Setup software MR Configurator2

P15R	1
VC	2
LG	28
TLA	27
SD	Plate

Upper limit setting
Analog override ±10 V/0% to 200%
Upper limit setting
Analog torque limit +10 V/maximum torque

2 m or shorter

CN6

3	MO1
1	LG
2	MO2

Analog monitor output
Output voltage: ±10 V, Maximum output current: 1 mA
Output voltage: ±10 V, Maximum output current: 1 mA

2 m or shorter

Notes: 1. It is also possible to connect a personal computer to CN3 connector with an RS-422/RS-232C conversion cable. However, USB (CN5 connector) and RS-422/RS-485 (CN3 connector) communication functions are mutually exclusive. Do not use them at the same time. Refer to "Products on the Market for Servo Amplifiers" in this catalog 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 MR-J4-03A6-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. When using MR-PRU03 parameter unit, use a commercial LAN cable (EIA568 compliant), and keep the wire length to a maximum of 10 m.
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.
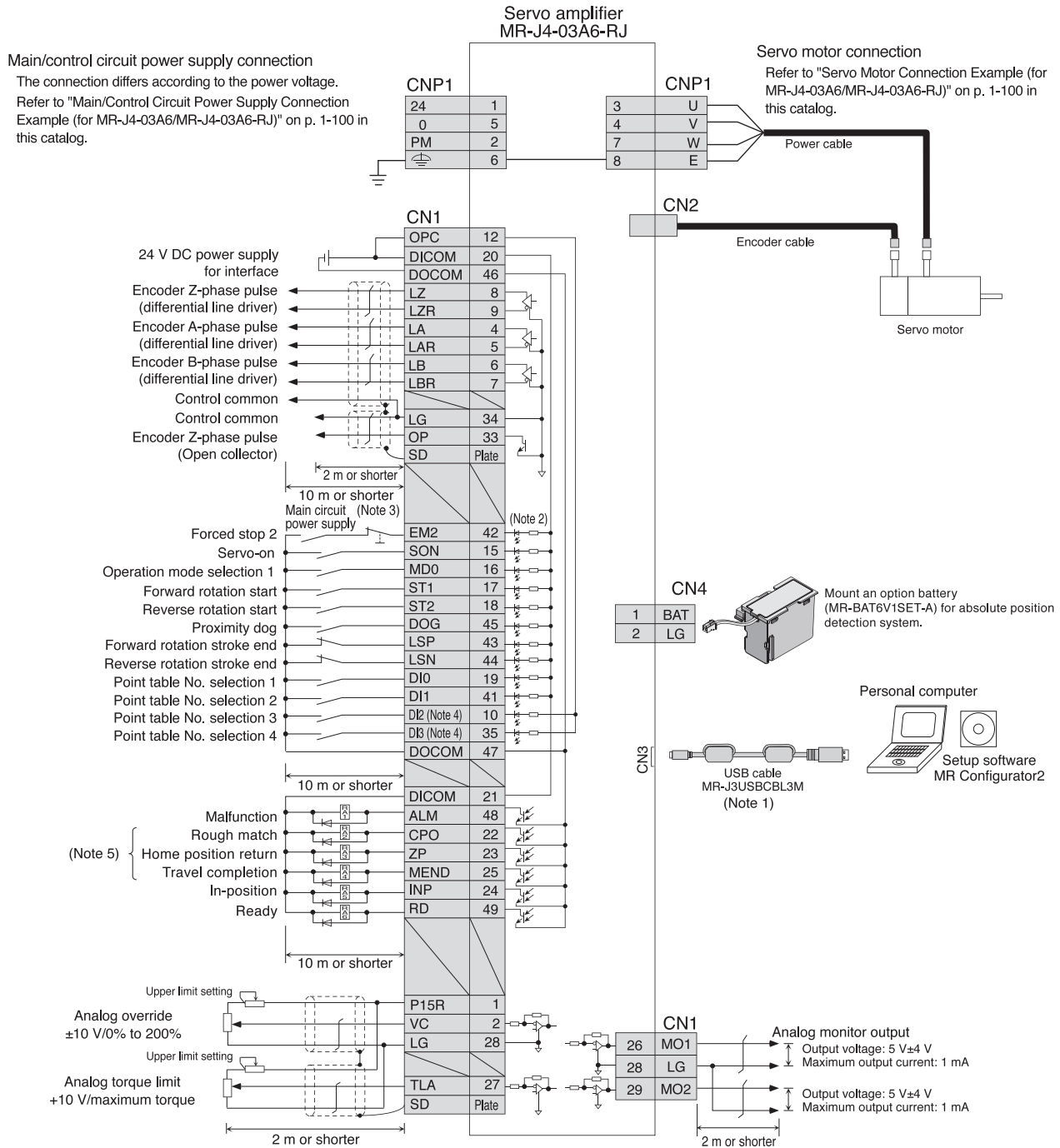
Servo Amplifiers

MR-J4-03A6-RJ Standard Wiring Diagram Example: Point Table Method A-RJ

Notes: 1. USB and RS-422 communication functions are mutually exclusive. Do not use them at the same time.
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 MR-J4-03A6-RJ Servo Amplifier Instruction Manual (Positioning Mode)" for details.
3. 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.
4. 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.
5. 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.

1-112

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

Create a program including the position data, the servo motor speed, and the acceleration/deceleration time constants, and select the program No. with the command interface signals to start the positioning operation. The program based method enables more complex positioning operation than the point table method. MR Configurator2 is required to create programs.

Item			Description
Command method	Command interface	MR-J4-_A_-RJ	DI/O (Input: 11 points excluding EM2 (Forced stop 2), output: 8 points) RS-422/RS-485 communication (Note 2)
		MR-J4-03A6-RJ	DI/O (Input: 11 points excluding EM2 (Forced stop 2), output: 6 points) RS-422 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 [×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 with program language. Setting range of feed length: -999999 to 999999 [×10^{STM} µm], -99.9999 to 99.9999 [×10^{STM} 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 2) based on speed commands 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, Count type, Data set type, Stopper type, Home position ignorance (servo-on position as home position), Dog type rear end reference, Count type front end reference, Dog cradle type, Dog type adjacent Z-phase reference, Dog type front end reference, Dogless Z-phase reference
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, 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. Compatible with RS-422 communication (Mitsubishi Electric general-purpose AC servo protocol) and RS-485 communication (MODBUS® RTU protocol).
3. Compatible with RS-422 communication (Mitsubishi Electric general-purpose AC servo protocol).

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

A-RJ

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 based on the value set as an absolute value.
MOVA(setting value) (Note 4, 5)	Absolute value continuous travel command		Travels continuously based on 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 based on the value set as an incremental value.
MOVIA(setting value) (Note 4, 5)	Incremental value continuous travel command		Travels continuously based on 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].

Servo Amplifiers

Rotary Servo Motors

Linear Servo Motors

Direct Drive Motors

Options/Peripheral Equipment

LVS/Wires

Product List

Cautions

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

<div style="float:right">A-RJ</div>

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.

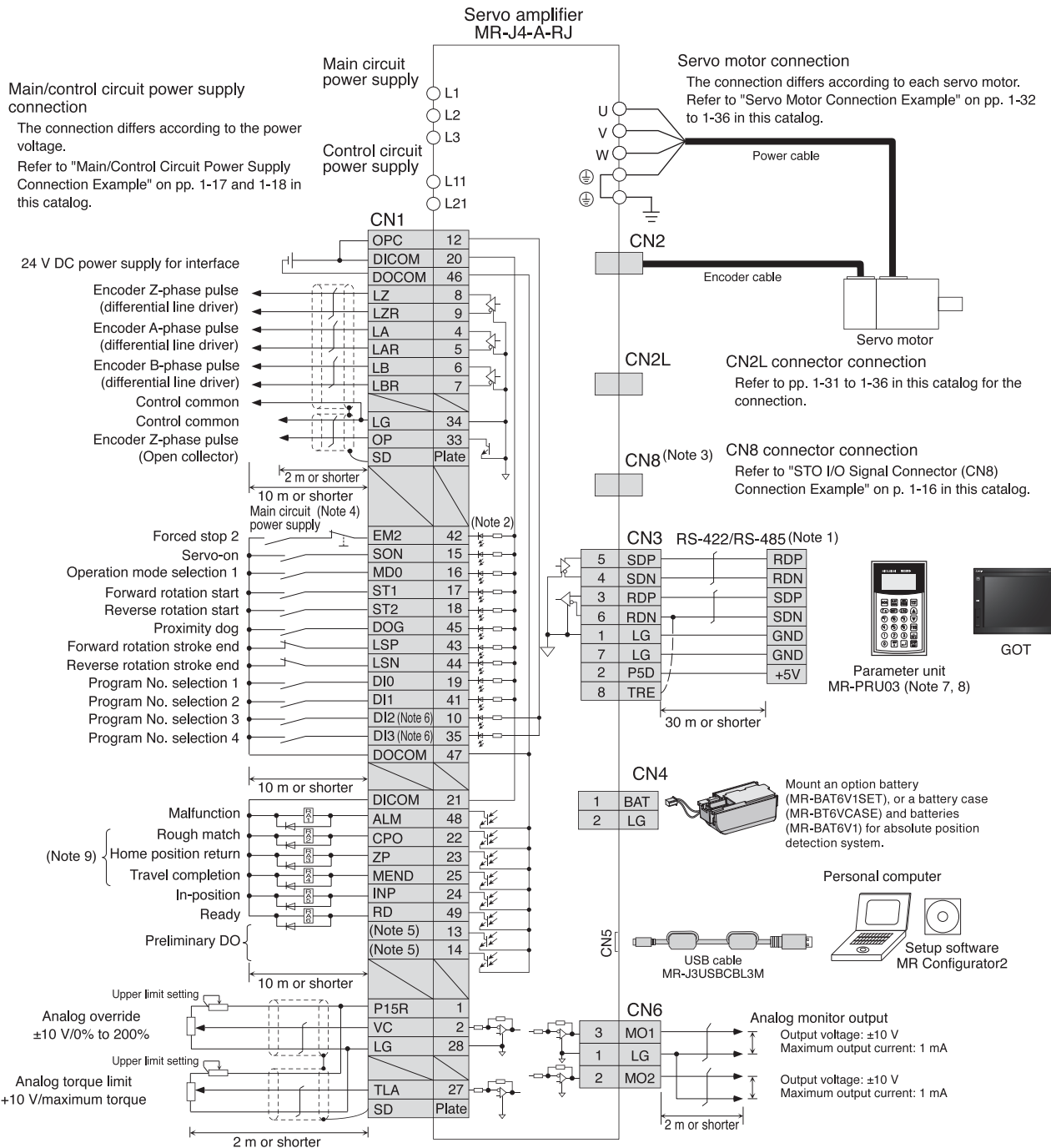| Step	Program (Note 1)	Description
(1)	SPN(3000)	Servo motor speed: 3000 [r/min]
(2)	STA(200)	Acceleration time constant: 200 [ms]
(3)	STB(300)	Deceleration time constant: 300 [ms]
(4)	MOV(1000)	Absolute value travel command: 1000 [×10^{STM} µm]
(5)	TIM(100)	Dwell: 100 [ms]
(6)	MOV(2500)	Absolute value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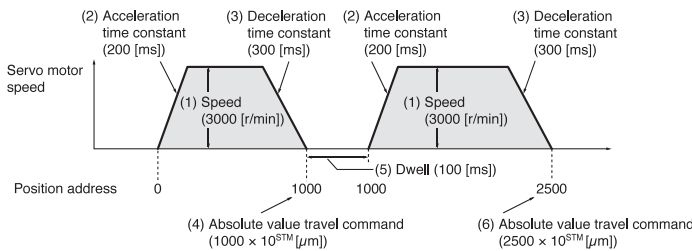
Program example 2

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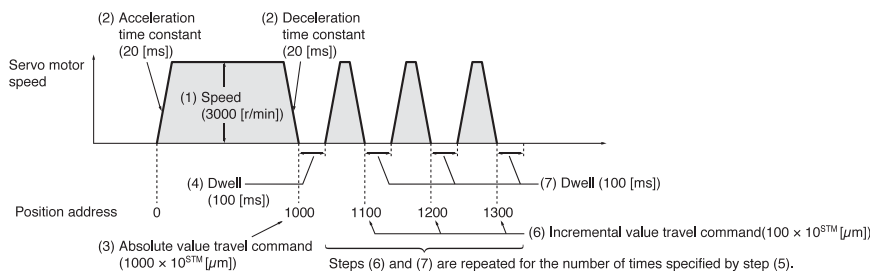
Notes: 1. The values in [SPN], [STA], [STB], and [STC] commands remains valid until they are reset. The values will not be initialized at the start of the program. The settings are also valid in other programs.

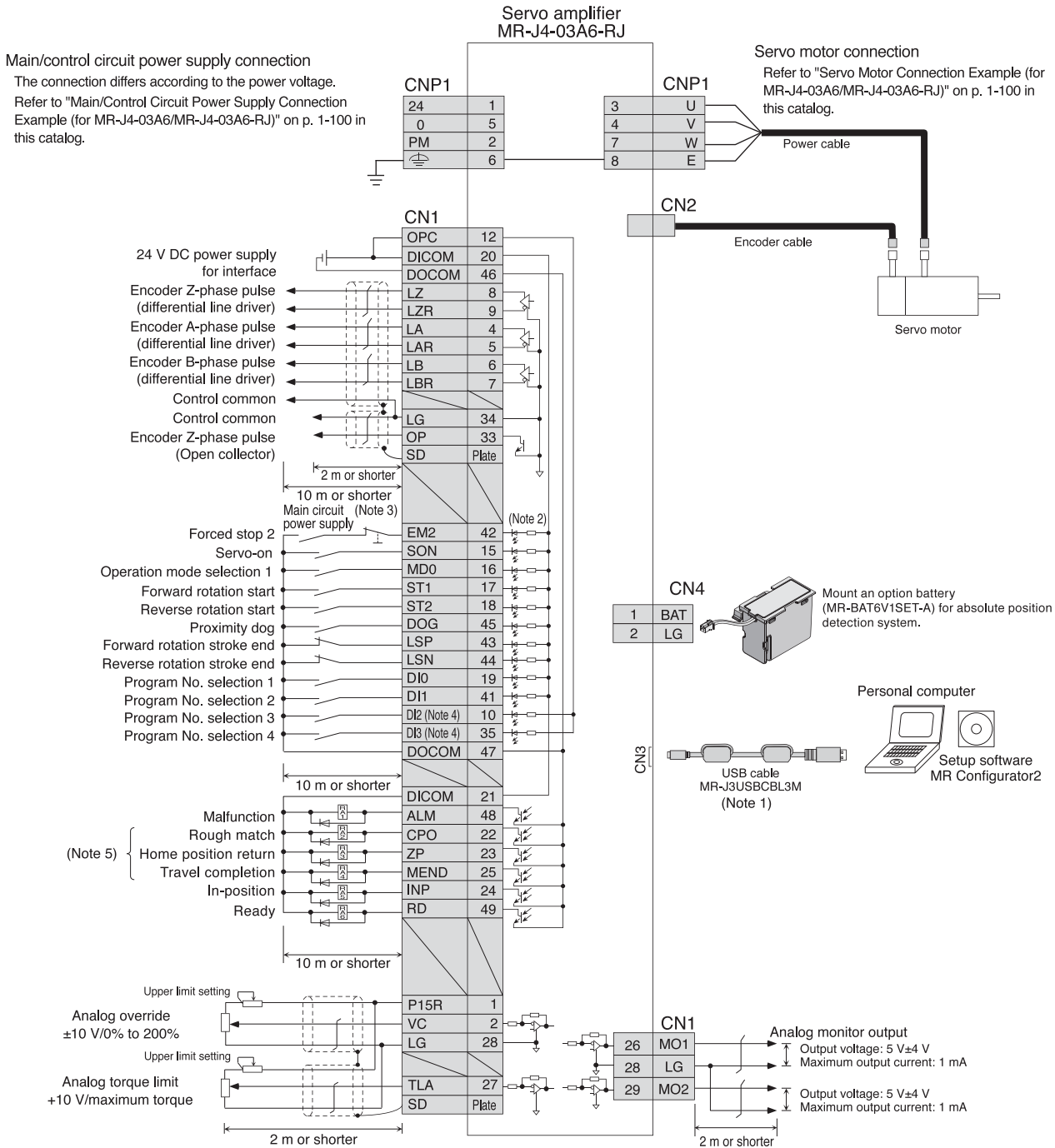# MR-J4-A-RJ Standard Wiring Diagram Example: Program Method A-RJ

Notes: 1. It is also possible to connect a personal computer to CN3 connector with an RS-422/RS-232C conversion cable. However, USB (CN5 connector) and RS-422/RS-485 (CN3 connector) communication functions are mutually exclusive. Do not use them at the same time. Refer to "Products on the Market for Servo Amplifiers" in this catalog 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 MR-J4-03A6-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. When using MR-PRU03 parameter unit, use a commercial LAN cable (EIA568 compliant), and keep the wire length to a maximum of 10 m.
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.

Servo Amplifiers
Rotary Servo Motors
Linear Servo Motors
Direct Drive Motors
Options/Peripheral Equipment
LVS/Wires
Product List
Cautions

MR-J4-03A6-RJ Standard Wiring Diagram Example: Program Method `A-RJ`

Servo amplifier MR-J4-03A6-RJ

Main/control circuit power supply connection
The connection differs according to the power voltage.
Refer to "Main/Control Circuit Power Supply Connection Example (for MR-J4-03A6/MR-J4-03A6-RJ)" on p. 1-100 in this catalog.

Servo motor connection
Refer to "Servo Motor Connection Example (for MR-J4-03A6/MR-J4-03A6-RJ)" on p. 1-100 in this catalog.

Notes: 1. USB and RS-422 communication functions are mutually exclusive. Do not use them at the same time.
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 MR-J4-03A6-RJ Servo Amplifier Instruction Manual (Positioning Mode)" for details.
3. 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.
4. 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.
5. 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.