

# COMPO ARM

## RS232C Communication Specifications

### **BA** SERIES

**CONTROLLER MODEL :  
CA10-M00/M01-CC**

### **BA-II** SERIES

**CONTROLLER MODEL :  
CA10-M00B/M01B-CC  
CA20-M00/M01**

### **BA-III** SERIES

**CONTROLLER MODEL :  
CA25-M10/M40/M80**

**TOSHIBA MACHINE CO., LTD.**



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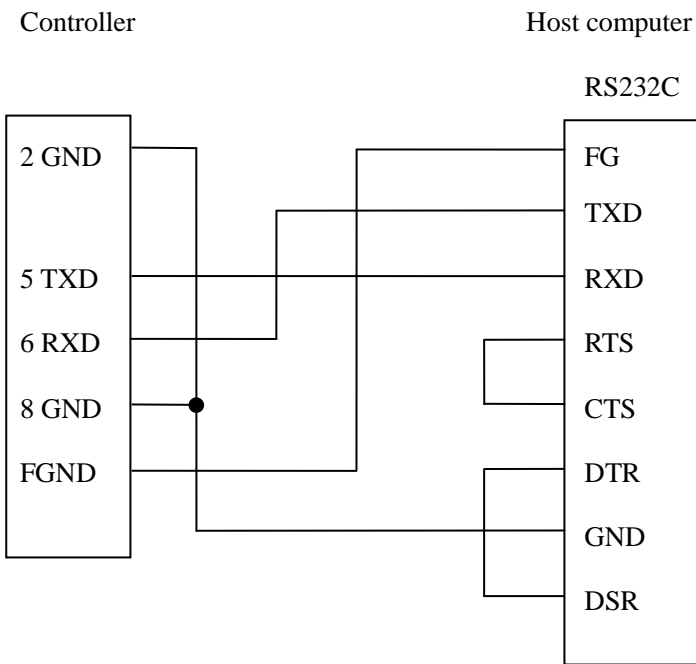
# 1. Communication Specifications

This chapter stipulates the specifications for communication between the host computer and controller.

## 1-1 Communication cable connector pin layout

Controller side pin numbers

Pin No.	Signal name	Signal details
2	GND	Signal ground
5	TXD	Transmission data (output)
6	RXD	Reception data (input)
8	GND	Signal ground
FG	FGND	Frame ground



Connection of controller and host computer



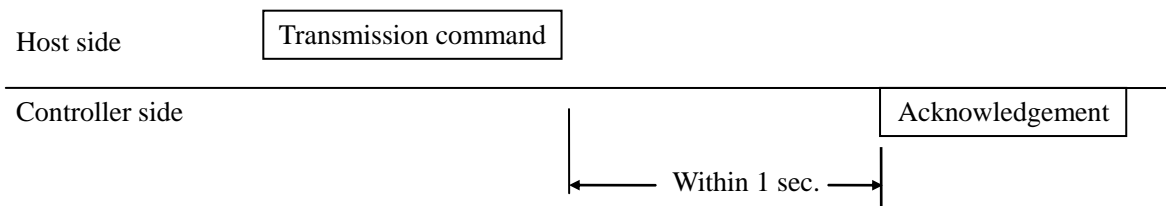
## 1-2 Transmission specifications

The electrical specifications follow RS232-C standards.

- Synchronization method: Asynchronous communication method
- Transmission speed: 9600bps
- Data length: 8-bit
- Parity: Even
- Stop bit: 1-bit

## 1-3 Communication method

1. The relation of the host and controller is set so that the host is always the master and the controller is the slave. The half-duplex communication method in which the host issues a command and the controller replies is used.
2. The data used for communication is ASCII codes (20H or more) and CR LF (0DH0AH).
3. When the controller receives a command that it can process, it transmits an acknowledgement or the required data.  
If the controller is busy and cannot process the command, it will issue a negative acknowledgement.  
There will be no acknowledgement if a communication error is detected.



In this specifications manual, the host side transmission and controller side transmission is indicated in the following manner.

- Host side transmission (controller side reception):      command  
Controller side transmission (host side reception):      acknowledgement

#### 1-4 Basic block format

Communication is carried out in the following block units.

Block example 1.

@	CMD	CR	LF
---	-----	----	----

Block example 2.

@	CMD	△	DATA	CR	LF
---	-----	---	------	----	----

Block example 3.

@	CMD	△	DATA	△	...	DATA	CR	LF
---	-----	---	------	---	-----	------	----	----

Block example 4.

@	OK	CR	LF
---	----	----	----

Block example 5.

@	NG	CR	LF
---	----	----	----

Up to 128 bytes of characters can be used in one communication block.

#### Character definition

@	40H	Start of transmission block
CMD		Communication command (4-byte)
CR LF	0DH 0AH	End of transmission block (2-byte) Use of only CR(0DH) is possible for the block from the host.
DATA		Data section using ASCII codes (20H or more). There are cases when there is DATA, when there is no DATA, and when there is multiple DATA as shown in example 3 above. One piece of data can have up to 15 bytes.
△	20H	Identifier when there is multiple data.
OK NG	4FH 4BH 4EH 47H	Acknowledgement or negative acknowledgement (2-bytes) This is used only in the cases such as examples 4 and 5 above. @OK CR LF is a acknowledgement from the controller to the host. @NG CR LF is a negative acknowledgement from the controller to the host.

## 2. Communication Commands

The following commands will be described.

### 2-1 Command list and legend

Function type	Command	Description	Enabled at host ON <sup>Note 1</sup>	Write to EEPROM <sup>Note 2</sup>
◆ Mode settings	SYSP	Request system parameter		
	HSO <sup>Note 3</sup>	Host ON		
	HOF	Host OFF		
	MPRO	Program mode	○	
	MSTP	Step mode	○	
	MAUT	Automatic mode	○	
	MSEQ	Sequential mode	○	
	MPL	Palletizing mode	○	
	STAS	Request status		
	CVER	Controller version		
TYPE	Robot type			
◆ Parameter settings	WPAR	Write parameter	○	○
	RPAR	Read parameter		
◆ Text editing	MINT	Initialize memory	○	○
	CPSS	Copy sequential step	○	○
	ISTX	Insert sequential text line	○	○
	DSTX	Delete sequential text line	○	○
	SSTG	Search sequential text TAG No.	○	
	DSTL	Delete sequential text block	○	○
	CPPL	Copy palletizing program	○	○
	CESY	Copy easy program		○
	WMCA	Write to memory card		
	RMCA	Read memory card		
	WESY	Write easy text		○
	RESY	Read easy text		
	WSTX	Write sequential test	○	○
	RSTX	Read sequential text		
	WPLT	Write palletizing text	○	○
RPLT	Read palletizing text			
◆ Execution control	HOME	Return to origin	○	
	SPST	Start sequential	○	
	SPLN	Set palletizing program No.	○	
	PPST	Start palletizing	○	
	SESY	Easy start		
	RPLD	Request palletizing execution data		
	STOP	Stop		
	JGST	JOG operation	○	

	DOUT	Direct port output	○	
	WOVR	Write override	○	○
	ROVR	Read override		
	REST	Reset		
	CERR	Cancel error		
	EXTP	Start external point designation	○	
	SVON	Servo ON	○	
	SVOF	Servo OFF	○	
	SESN	Set easy program No.		
	RESD	Request easy execution data		
	HTSK	Change task No.		
	SORG	Synchronized origin search	○	
◆ Monitor	MINP	Request input data		
	MOUT	Request output data		
	MNIN	Internal port monitor		
	MPST	Request present position		
	MOFF	Request present offset value		
	MRSS	RS232C coordinate input		
	MCNT	Request counter value		
	MTMR	Request timer value		
	MCST	Counter direct set		
	MERP	Request error point No.		
	MTSK	Read task No.		
	RSTX	Read current step		
	MBUS	Read CC-Link status		
	EHTR	Error history request		

Note 1) These commands are valid when the host is ON. If the command is transmitted to a controller where the host is OFF, acknowledgement is denied (@NG is returned).

Note 2) These commands write data to the EEPROM in the controller. Due to EEPROM characteristics, the number of rewrites is limited to approximately 1 million times. If the number of rewrites is exceeded, data can no longer be written in the EEPROM even if an @OK reply is sent.

Minimize the number of transmissions for enabling a long service life.

\*KCA-25-M10/M40/M80, CA20-M00/M01 does not use an EEPROM, and so there is no limit on the number of rewrites.

Note 3) The host ON command cannot be received when the teach pendant (T/P) is ON. If the command is transmitted, acknowledgement is denied (@NG is returned). Also, if the teach pendant is turned ON while the host is ON, the host is automatically turned OFF.

◆ Legend

◆ Request system parameter

Transmission: "@SYSP"

Reception: "@SYSP RTYP=000000 VER=00.00 J ARM1=X ARM2=Y ARM3=Z ARM4=R N" ←Received by host

Details

←Command details

←Transmitted from host

- \* RTYP=000000 to 999999 : Robot type
- VER=00.00 to 99.99 : Controller version
- J or E : T/P display Japanese or English
- ARM1=X or Y or Z or R : Axis 1 display
- ARM2=X or Y or Z or R : Axis 2 display
- ARM3=X or Y or Z or R : Axis 3 display
- ARM4=X or Y or Z or R : Axis 4 display

←Parameter range or explanation

## 2-2 System request and mode setting commands

### ◆ Request system parameter

Transmission: "@SYSP"

Reception: "@SYSP RTYP=000000 VER=00.00 J ARM1=X ARM2=Y ARM3=Z ARM4=R N"

- \* RTYP=000000 to 999999 : Robot type
- VER=00.00 to 99.99 : Controller version
- J or E : T/P display Japanese or English
- ARM1=X or Y or Z or R : Axis 1 display
- ARM2=X or Y or Z or R : Axis 2 display
- ARM3=X or Y or Z or R : Axis 3 display
- ARM4=X or Y or Z or R : Axis 4 display

### ◆ Host ON

Transmission: "@HSON"

Reception: "@OK" or "@NG"

- \* When the host turns ON, the commands from the host computer will be valid and the start input in the system will be invalidated. A negative acknowledgement will be made if the teach pendant is ON.

### ◆ Host OFF

Transmission: "@HSOF"

Reception: "@OK" or "@NG"

- \* When the host turns OFF, the commands from the host computer will be invalid and the start input in the system will be validated.

### ◆ Program mode

Transmission: "@MPRO"

Reception: "@OK" or "@NG"

### ◆ Step mode

Transmission: "@MSTP"

Reception: "@OK" or "@NG"

### ◆ Automatic mode

Transmission: "@MAUT"

Reception: "@OK" or "@NG"

### ◆ Sequential mode

Transmission: "@MSEQ"

Reception: "@OK" or "@NG"

### ◆ Palletizing mode

Transmission: "@MPLE"

Reception: "@OK" or "@NG"

◆ Controller version

Transmission: "@CVER NO=0"

Reception: "@CVER NO=0 VER=00.00"

- \* NO=0 to 4 : Station No.
- VER=00.00 to 99.99 : Controller version

◆ Robot type

Transmission: "@TYPE AX1 RTYP=000000"

Reception: "@TYPE AX1 RTYP=000000"

- \* AX1 to AX4 : Unit (axis) No.
- RTYP=000000 to 999999 : Robot type

If the transmitted robot type is correctly set, the robot type will be replied.

If an incorrect robot type is transmitted, the currently set robot type will be replied.

◆ Request status

Transmission: "@STAS SNO=0"

Reception: "@STAS SNO=0 ST1=00 ST2=00"

- \* SNO=0 to 4 : Status No.
- ST1=00 to FF : Status
- ST2=00 : Normally 00

ST1 replies using bit data expressed in hexadecimal ASCII format.

ST2 is normally 00, but if an error code (SNO=1) is requested, and ST1 is a BS servo amplifier alarm (ST1=25, 35, 45, 55), then a BS alarm code (see 4-2) is inserted for ST2.

Example: When the controller is executing a command and positioning completion is ON, if the status is requested with SNO=0, the reply is 00100010b(22H)→"ST1=22 ST2=00". (ST2 is normally 00.)

Status (ST1) details

Status SNO=0	
BitBit	Details
0	1: Error found
1	1: In execution
2	1: Paused
3	1: In return to origin
4	1: Return to origin complete
5	1: Positioning complete
6	
7	1: Parameter 2 changed

Status SNO=1	
bitbit	Details
0	Error code (00~FF)  (Refer to section 4. Error codes for details on the error codes.)
1	
2	
3	
4	
5	
6	
7	

Status SNO=2

Bit	Details
0	00: Sequential mode 01: Palletizing mode
1	10: Point mode 11: Easy mode
2	00: Automatic mode 01: Step mode
3	10: Program mode
4	1: Single movement mode
5	
6	1: Teach pendant ON
7	1: Host computer ON

Status SNO=3

Bit	Details
0	1: Servo ON
1	Reserve
2	
3	
4	0: Slave not ready
5	1: Card inserted
6	1: Reading card
7	1: Writing to card

Status SNO=4

Bit	Details
0	1: Escape input ON
1	1: Continuous input ON
2	1: INPUT wait
3	1: Pause input ON
4	1: Ready output
5	
6	
7	



## 2.3 Text change commands

### ◆ Memory initialize, program clear

Transmission: "@MINT PR=0"

Reception: "@OK" or "@NG"

* PR=0	:Memory all clear
1	:Sequential all clear
2	:Palletizing all clear
3	:Sequential/palletizing all clear
4	:Easy/point table clear
5	: Reserve
6	:Point table clear

Sequential clear and point table clear will clear the currently-set tasks only.

### ◆ Write parameter (Refer to 2-4)

Transmission: "@WPAR M01 0/01/1"

Reception: "@OK" or "@NG"

### ◆ Read parameter (Refer to 2-4)

Transmission: "@RPAR M01"

Reception: "@RPAR M01 0/01/1"

### ◆ Copy sequential step

Transmission: "@CPSS TASK=00 STA=0001 END=0001 TASK=01 TOP=0001"

Reception: "@OK" or "@NG"

* TASK=01 to 04	: TASK No.
STA=0001 to 5000	: Copy start stop No.
END=0001 to 5000	: Copy end step No.
TOP=0001 to 5000	: Copy designation step No.

### ◆ Insert sequential text line

Transmission: "@ISTX 0001"

Reception: "@OK" or "@NG"

* 0001 to 5000	: Insertion designation step No.
----------------	----------------------------------

### ◆ Delete sequential text line

Transmission: "@DSTX 0001"

Reception: "@OK" or "@NG"

* 0001 to 5000	: Step No. to be deleted
----------------	--------------------------

### ◆ Search sequential text TAG No.

Transmission: "@SSTG TAG=001"

Reception: "@OK" or "@NG"

* TAG=001 to 999	: TAG NO.
------------------	-----------

◆ Delete sequential text block

Transmission: "@DSTL STA=0001 END=0001"

Reception: "@OK" or "@NG"

\* STA=0001 to 5000 : Deletion start step No.  
END=0001 to 5000 : Deletion end step No.

◆ Copy palletizing program

Transmission: "@CPPL STA=01 TOP=01"

Reception: "@OK" or "@NG"

\* STA=01 to 16 : Copy program No.  
TOP=01 to 16 : Copy designation program No.

◆ Copy easy program

Transmission: "@CESY STA=01 TOP=01"

Reception: "@OK" or "@NG"

\* STA=01 to 08 : Copy program No.  
TOP=01 to 08 : Copy designation program No.

◆ Write to memory card

Transmission: "@WMCA"

Reception: "@OK" or "@NG"

◆ Read memory card

Transmission: "@RMCA"

Reception: "@OK" or "@NG"

◆ Write easy text

Transmission: "@WESY PNO=01 ST=000 START=000 LOOP=0000 END=000"

Reception: "@OK" or "@NG"

\* PNO=01 to 08 : Program No.  
ST=000 : 000 only  
START=000 to 999 : Start TAG No.  
LOOP=0000 to 9999 : No. of loops  
END=000 to 999 : End TAG No.

◆ Read easy text

Transmission: "@RESY PNO=01 ST=000"

Reception: "@RESY PNO=01 ST=000 START=000 LOOP=0000 END=000"

\* PNO=01 to 08 : Program No.  
ST=000 : 000 only  
START=000 to 999 : Start TAG No.  
LOOP=0000 to 9999 : No. of loops  
END=000 to 999 : End TAG No.

◆ Write sequential test (Refer to 2-5)

Transmission: "@WSTX 0001 NOP"

Reception: "@OK" or "@NG"

◆ Read sequential text (Refer to 2-5)

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 NOP"

◆ Write palletizing text (Refer to 2-6)

Transmission: "@WPLT 99 SNO=01 TAG=001 MOD=M-M"

Reception: "@OK" or "@NG"

◆ Read palletizing text (Refer to 2-6)

Transmission: "@RPLT 99 SNO=01"

Reception: "@RPLT 99 SNO=01 TAG=001 MOD=M-M"

## 2-4 Parameters (Write and read commands)

### ◆ Mode parameter settings

#### ● Designation of single operation mode input bit

[Write]

Transmission: "@WPAR M01 0/01/0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR M01"

Reception: "@RPAR M01 0/01/0"

\* 0 to 4 : Station No.  
/01 to 99 : Port No.  
/0 to 8 : Bit designation

#### ● Designation of continuous start input bit

[Write]

Transmission: "@WPAR M02 0/01/0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR M02"

Reception: "@RPAR M02 0/01/0"

\* 0 : Station No.  
/01 to 99 : Port No.  
/0 to 8 : Bit designation

#### ● Designation of escape input bit

[Write]

Transmission: "@WPAR M03 0/01/0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR M03"

Reception: "@RPAR M03 0/01/0"

\* 0 to 4 : Station No.  
/01 to 99 : Port No.  
/0 to 8 : Bit designation

● Designation of pause input bit

[Write]

Transmission: "@WPAR M04 0/01/0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR M04"

Reception: "@RPAR M04 0/01/0"

\* 0 to 4 : Station No.  
/01 to 99 : Port No.  
/0 to 8 : Bit designation

● Designation of program selection input bit

[Write]

Transmission: "@WPAR M05 0/01/0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR M05"

Reception: "@RPAR M05 0/01/0"

\* 0 to 4 : Station No.  
/01 to 99 : Port No.  
/0 to 8 : Bit designation

● Designation of palletizing input bit

[Write]

Transmission: "@WPAR M06 0/01/0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR M06"

Reception: "@RPAR M06 0/01/0"

\* 0 to 4 : Station No.  
/01 to 99 : Port No.  
/0 to 8 : Bit designation

● Designation of output during pause bit

[Write]

Transmission: "@WPAR M07 0/01/0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR M07"

Reception: "@RPAR M07 0/01/0"

\* 0 to 4 : Station No.  
/01 to 99 : Port No.  
/0 to 8 : Bit designation

● Designation of input wait output bit

[Write]

Transmission: “@WPAR M08 0/01/0”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RPAR M08”

Reception: “@RPAR M08 0/01/0”

\* 0 to 4 : Station No.  
/01 to 99 : Port No.  
/0 to 8 : Bit designation

● Change T/P language

[Write]

Transmission: “@WPAR M09 J”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RPAR M09”

Reception: “@RPAR M09 J”

\* J or E : Japanese or English

● Easy/external point designation

[Write]

Transmission: “@WPAR M10 I”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RPAR M10”

Reception: “@RPAR M10 I”

\* I or E or P : Invalid or easy/external point designation

● Clear at general-purpose output reset

[Write]

Transmission: “@WPAR M11 I”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RPAR M11”

Reception: “@RPAR M11 I”

\* I or E : Invalid or valid

● Setting of direct output bit

[Write]

Transmission: “@WPAR M12 PN1=0/01/0 PN2=0/01/0 PN3=0/01/0 PN4=0/01/0”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RPAR M12”

Reception: “@RPAR M12 PN1=0/01/0 PN2=0/01/0 PN3=0/01/0 PN4=0/01/0”

\* PN1=0 to 4 : Station No. Same for PN2, PN3 and PN4  
/01 to 13 : Port No. Same for PN2, PN3 and PN4  
/0 to 8 : Bit designation

● Designation of READY output bit

[Write]

Transmission: “@WPAR M13 0/01/0”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RPAR M13”

Reception: “@RPAR M13 0/01/0”

\* 0 to 4 : Station No.  
/01 to 99 : Port No.  
/0 to 8 : Bit designation

● Bit designation of task positioning complete output

[Write]

Transmission: “@WPAR M14 TA1=0/01/0 TA2=0/01/0 TA3=0/01/0 TA4=0/01/0”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RPAR M14”

Reception: “@RPAR M14 TA1=0/01/0 TA2=0/01/0 TA3=0/01/0 TA4=0/01/0”

\* 0 to 4 : Station No.  
/01 to 99 : Port No.  
/0 to 8 : Bit designation

● Bit designation of task return to origin complete output

[Write]

Transmission: “@WPAR M15 TA1=0/01/0 TA2=0/01/0 TA3=0/01/0 TA4=0/01/0”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RPAR M15”

Reception: “@RPAR M15 TA1=0/01/0 TA2=0/01/0 TA3=0/01/0 TA4=0/01/0”

\* 0 to 4 : Station No.  
/01 to 99 : Port No.  
/0 to 8 : Bit designation

● Designation of BS amplifier send fiber-optic cable length (\*Compatible with CA20-M00/M01)

[Write]

Transmission: "@WPAR M16 01"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR M16"

Reception: "@RPAR M16 01"

\* 01 to 20 : Cable length [m]

● Setting of CC-Link (\* Compatible with CA20-M00/M01,CA25-M10/M40/M80)

[Write]

Transmission: "@WPAR M17 STN=01 BRT=156K OPT=0000"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR M17"

Reception: "@RPAR M17 STN=01 BRT=156K OPT=0000"

\* STN=00 to 99 : CC-Link station number (station 0 and stations 62 and after are invalid)  
BRT=156K, 625K, 2.5M, 5M, 10M : Baud rate  
OPT=0000 to 9999 : Option flag

● Setting of DeviceNet (\* Compatible with CA20-M00/M01,CA25-M10/M40/M80)

[Write]

Transmission: "@WPAR M18 STN=01 BRT=156K OPT=0000"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR M18"

Reception: "@RPAR M18 STN=01 BRT=156K OPT=0000"

\* STN=00 to 99 : DeviceNet station number  
(station 0 and stations 64 and after are invalid)  
BRT=125K,250K,500K : Baud rate  
OPT=000 to 9999 : Option flag

● Designation of battery alarm output bit (\* Compatible with CA20-M00/M01,CA25-M10/M40/M80)

[Write]

Transmission: "@WPAR M19 0/01/0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR M19"

Reception: "@RPAR M19 0/01/0"

\* 0 to 4 : Station No.  
/01 to 99 : Port No.  
/0 to 8 : Bit designation



● Moving coordinate table number output in external point designation mode (\*Compatible with CA20-M00/M01,CA25-M10/M40/M80)

[Write]

Transmission: "@WPAR M20 I"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR M20"

Reception: "@RPAR M20 I"

\* I or E : Invalid or valid

● Servo on input bit designation (\* Compatible with CA20-M00/M01,CA25-M10/M40/M80)

[Write]

Transmission: "@WPAR M21 0/01/0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR M21"

Reception: "@RPAR M21 0/01/0"

\* 0 to 4 : Station No.  
/01 to 99 : Port No.  
/0 to 8 : Bit designation

● Torque limit input bit designation (\* Compatible with CA25-M10/M40/M80)

[Write]

Transmission: "@WPAR M22 0/01/0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR M22"

Reception: "@RPAR M22 0/01/0"

\* 0 to 4 : Station No.  
/01 to 99 : Port No.  
/0 to 8 : Bit designation

● Designation of Coordinate table base in external point designation mode  
(\* Compatible with CA25-M10/M40/M80)

[Write]

Transmission: "@WPAR M23 0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR M23"

Reception: "@RPAR M23 0"

\* 0 to 4 : Coordinate table base

● Bit designation of task load output (\* Compatible with CA25-M10/M40/M80)

[Write]

Transmission: "@WPAR M24 TA1=0/01/0 TA2=0/01/0 TA3=0/01/0 TA4=0/01/0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR M24"

Reception: "@RPAR M24 TA1=0/01/0 TA2=0/01/0 TA3=0/01/0 TA4=0/01/0"

\* 0 to 4 : Station No.  
/01 to 99 : Port No.  
/0 to 8 : Bit designation

● Bit designation of task limit output (\* Compatible with CA25-M10/M40/M80)

[Write]

Transmission: "@WPAR M25 TA1=0/01/0 TA2=0/01/0 TA3=0/01/0 TA4=0/01/0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR M25"

Reception: "@RPAR M25 TA1=0/01/0 TA2=0/01/0 TA3=0/01/0 TA4=0/01/0"

\* 0 to 4 : Station No.  
/01 to 99 : Port No.  
/0 to 8 : Bit designation

● Bit designation of task lock output (\* Compatible with CA25-M10/M40/M80)

[Write]

Transmission: "@WPAR M26 TA1=0/01/0 TA2=0/01/0 TA3=0/01/0 TA4=0/01/0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR M26"

Reception: "@RPAR M26 TA1=0/01/0 TA2=0/01/0 TA3=0/01/0 TA4=0/01/0"

\* 0 to 4 : Station No.  
/01 to 99 : Port No.  
/0 to 8 : Bit designation

## ◆ Parameter 1

### ● Soft limit value (+)

[Write]

Transmission: "@WPAR P01 AX1=+0000.00 AX2=+0000.00 AX3=+0000.00 AX4=+0000.00"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR P01"

Reception: "@RPAR P01 AX1=+0000.00 AX2=+0000.00 AX3=+0000.00 AX4=+0000.00"

\* =-8000.00 to +8000.00 : Coordinate value

### ● Soft limit value (-)

[Write]

Transmission: "@WPAR P02 AX1=+0000.00 AX2=+0000.00 AX3=+0000.00 AX4=+0000.00"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR P02"

Reception: "@RPAR P02 AX1=+0000.00 AX2=+0000.00 AX3=+0000.00 AX4=+0000.00"

\* =-8000.00 to +8000.00 : Coordinate value

### ● Servo gain (Position)

[Write]

Transmission: "@WPAR P03 AX1=07 AX2=07 AX3=07 AX4=07"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR P03"

Reception: "@RPAR P03 AX1=07 AX2=07 AX3=07 AX4=07"

\* =00 to 15 : Position gain

### ● Servo gain (Speed)

[Write]

Transmission: "@WPAR P04 AX1=07 AX2=07 AX3=07 AX4=07"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR P04"

Reception: "@RPAR P04 AX1=07 AX2=07 AX3=07 AX4=07"

\*=00 to 15 : Speed gain

### ● Pass area data value

[Write]

Transmission: "@WPAR P05 AX1=0000 AX2=0000 AX3=0000 AX4=0000"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR P05"

Reception: "@RPAR P05 AX1=0000 AX2=0000 AX3=0000 AX4=0000"

● Origin offset

[Write]

Transmission: “@WPAR P06 AX1=+0000.00 AX2=+0000.0 AX3=+0000.000 AX4=+0000.00”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RPAR P06”

Reception: “@RPAR P06 AX1=+0000.00 AX2=+0000.0 AX3=+0000.000 AX4=+0000.00”

\* =-8000.00 to +8000.00 : Offset value (mm)

● Sequence of return to origin

[Write]

Transmission: “@WPAR P07 AX1=1 AX2=1 AX3=1 AX4=1”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RPAR P07”

Reception: “@RPAR P07 AX1=1 AX2=1 AX3=1 AX4=1”

\* =1 to 4 : Sequence of return to origin

● JOG speed (A1)

[Write]

Transmission: “@WPAR P08 L=010.0 H=050.0”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RPAR P08”

Reception: “@RPAR P08 L=010.0 H=050.0”

L=000.1 to 999.9 : Low-speed JOG speed

H=000.1 to 999.9 : High-speed JOG speed

● JOG speed (A2)

[Write]

Transmission: “@WPAR P09 L=010.0 H=050.0”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RPAR P09”

Reception: “@RPAR P09 L=010.0 H=050.0”

L=000.1 to 999.9 : Low-speed JOG speed

H=000.1 to 999.9 : High-speed JOG speed

● JOG speed (A3)

[Write]

Transmission: "@WPAR P10 L=010.0 H=050.0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR P10"

Reception: "@RPAR P10 L=010.0 H=050.0"

L=000.1 to 999.9 : Low-speed JOG speed

H=000.1 to 999.9 : High-speed JOG speed

● JOG speed (A4)

[Write]

Transmission: "@WPAR P11 L=010.0 H=050.0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR P11"

Reception: "@RPAR P11 L=010.0 H=050.0"

L=000.1 to 999.9 : Low-speed JOG speed

H=000.1 to 999.9 : High-speed JOG speed

● JOG inching movement

[Write]

Transmission: "@WPAR P12 AX1=00.01 AX2=00.01 AX3=00.01 AX4=00.01"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR P12"

Reception: "@RPAR P12 AX1=00.01 AX2=00.01 AX3=00.01 AX4=00.01"

\* =00.00 to 65.00 : Movement amount mm

● Area output bit (A1)

[Write]

Transmission: "@WPAR P13 AX1>=+0000.00 0/01/0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR P13"

Reception: "@RPAR P13 AX1>=+0000.00 0/01/0"

\* <= or >= : Comparison operator

-8000.00 to +8000.00 : Coordinate value

0 to 4 : Station No.

/01 to 99 : Port No.

/0 to 8 : Bit designation

● Area output bit (A2)

[Write]

Transmission: "@WPAR P14 AX2>=+0000.00 0/01/0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR P14"

Reception: "@RPAR P14 AX2>=+0000.00 0/01/0"

\* <= or >= : Comparison operator  
-8000.00 to +8000.00 : Coordinate value  
0 to 4 : Station No.  
/01 to 99 : Port No.  
/0 to 8 : Bit designation

● Area output bit (A3)

[Write]

Transmission: "@WPAR P15 AX3>=+0000.00 0/01/0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR P15"

Reception: "@RPAR P15 AX3>=+0000.00 0/01/0"

\* <= or >= : Comparison operator  
-8000.00 to +8000.00 : Coordinate value  
0 to 4 : Station No.  
/01 to 99 : Port No.  
/0 to 8 : Bit designation

● Area output bit (A4)

[Write]

Transmission: "@WPAR P16 AX4>=+0000.00 0/01/0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR P16"

Reception: "@RPAR P16 AX4>=+0000.00 0/01/0"

\* <= or >= : Comparison operator  
-8000.00 to +8000.00 : Coordinate value  
0 to 4 : Station No.  
/01 to 99 : Port No.  
/0 to 8 : Bit designation

● Synchronized offset (\* Compatible with CA20-M00/M01)

[Write]

Transmission: "@WPAR P17 AX1=+000.00 AX2=+000.00 AX3=+000.00 AX4=+000.00"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR P17"

Reception: "@RPAR P17 AX1=+000.00 AX2=+000.00 AX3=+000.00 AX4=+000.00"

\* =-99.999 to +99.999 : Offset value (mm)

● Synchronized error allowable value parameter (\*Compatible with CA20-M00/M01)

[Write]

Transmission: "@WPAR P18 AX1=20.00 AX2=20.00 AX3=20.00 AX4=20.00"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR P18"

Reception: "@RPAR P18 AX1=20.00 AX2=20.00 AX3=20.00 AX4=20.00"

\* =01.00 to 99.99 : Synchronized error allowable value parameter [mm]

## ◆ Parameter 2

Note 1) Parameter 2 includes parameters provided for use with future developed products. Malfunctions could occur if these parameters are changed, so do not change the initial values (set with the robot type input).

Note 2) When parameter 2 is changed, the controller side will be valid only for communication, and execution or canceling of errors will not be possible.

Turn the controller power ON again for execution or to cancel an error.

The parameters that were set are not enabled unless the power is turned off and then on again.

### ● T/P axis display setting

[Write]

Transmission: "@WPAR E01 AX1=X AX2=Y AX3=Z AX4=R"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E01"

Reception: "@RPAR E01 AX1=X AX2=Y AX3=Z AX4=R"

\* X or Y or Z or R : Axis display

### ● In-position data value

[Write]

Transmission: "@WPAR E02 AX1=00.05 AX2=00.05 AX3=00.05 AX4=00.05"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E02"

Reception: "@RPAR E02 AX1=00.05 AX2=00.05 AX3=00.05 AX4=00.05"

\* =00.01 to 65.00 : In-position data value mm

### ● Overflow data value

[Write]

Transmission: "@WPAR E03 AX1=20000 AX2=20000 AX3=20000 AX4=20000"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E03"

Reception: "@RPAR E03 AX1=20000 AX2=20000 AX3=20000 AX4=20000"

\* =00001 to 65535 : Overflow data value pulse

### ● Feed forward data value

[Write]

Transmission: "@WPAR E04 AX1=02000 AX2=02000 AX3=02000 AX4=02000"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E04"

Reception: "@RPAR E04 AX1=02000 AX2=02000 AX3=02000 AX4=02000"

\* =00001 to 65535 : Feed forward data value pulse



● Direction of motor revolution

[Write]

Transmission: "@WPAR E05 AX1=1 AX2=1 AX3=1 AX4=1"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E05"

Reception: "@RPAR E05 AX1=1 AX2=1 AX3=1 AX4=1"

\* =0 or 1 : CW or CCW

● Max. axis speed setting

[Write]

Transmission: "@WPAR E06 AX1=1000 AX2=1000 AX3=1000 AX4=1000"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E06"

Reception: "@RPAR E06 AX1=1000 AX2=1000 AX3=1000 AX4=1000"

\* =0001 to 1000 : Speed mm/s

● Return to origin speed (A1)

[Write]

Transmission: "@WPAR E07 L=002.0 M=020.0 H=100.0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E07"

Reception: "@RPAR E07 L=002.0 M=020.0 H=100.0"

L=000.1 to 999.9 : Speed mm/s

M=000.1 to 999.9 : Speed mm/s

H=000.1 to 999.9 : Speed mm/s

● Return to origin speed (A2)

[Write]

Transmission: "@WPAR E08 L=002.0 M=020.0 H=100.0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E08"

Reception: "@RPAR E08 L=002.0 M=020.0 H=100.0"

L=000.1 to 999.9 : Speed mm/s

M=000.1 to 999.9 : Speed mm/s

H=000.1 to 999.9 : Speed mm/s

● Return to origin speed (A3)

[Write]

Transmission: "@WPAR E09 L=002.0 M=020.0 H=100.0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E09"

Reception: "@RPAR E09 L=002.0 M=020.0 H=100.0"

L=000.1 to 999.9 : Speed mm/s

M=000.1 to 999.9 : Speed mm/s

H=000.1 to 999.9 : Speed mm/s

● Return to origin speed (A4)

[Write]

Transmission: "@WPAR E10 L=002.0 M=020.0 H=100.0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E10"

Reception: "@RPAR E10 L=002.0 M=020.0 H=100.0"

L=000.1 to 999.9 : Speed mm/s

M=000.1 to 999.9 : Speed mm/s

H=000.1 to 999.9 : Speed mm/s

● Return to origin method

[Write]

Transmission: "@WPAR E11 AX1=1 AX2=1 AX3=1 AX4=1"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E11"

Reception: "@RPAR E11 AX1=1 AX2=1 AX3=1 AX4=1"

\* =0 or 1 : Z-phase detection or origin sensor detection

● Origin sensor logic

[Write]

Transmission: "@WPAR E12 AX1=1 AX2=1 AX3=1 AX4=1"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E12"

Reception: "@RPAR E12 AX1=1 AX2=1 AX3=1 AX4=1"

\* =0 or 1 : ON when detected, or OFF when detected

● High speed return to origin position

[Write]

Transmission: "@WPAR E13 AX1=+0000.00 AX2=+0000.00 AX3=+0000.00 AX4=+0000.00"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E13"

Reception: "@RPAR E13 AX1=+0000.00 AX2=+0000.00 AX3=+0000.00 AX4=+0000.00"

\* =-8000.00 to +8000.00 : Coordinate value mm

● Pulse rate (lead)

[Write]

Transmission: "@WPAR E14 AX1=20.000 AX2=20.000 AX3=20.000 AX4=20.000"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E14"

Reception: "@RPAR E14 AX1=20.000 AX2=20.000 AX3=20.000 AX4=20.000"

\* =01.000 to 99.999 : Lead mm

● Pulse rate (divided)

[Write]

Transmission: "@WPAR E15 AX1=2000 AX2=2000 AX3=2000 AX4=2000"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E15"

Reception: "@RPAR E15 AX1=2000 AX2=2000 AX3=2000 AX4=2000"

\* =0001 to 9999 : No. of division pulse/rotation

● Pluse multiplier

[Write]

Transmission: "@WPAR E16 AX1=4 AX2=4 AX3=4 AX4=4"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E16"

Reception: "@RPAR E16 AX1=4 AX2=4 AX3=4 AX4=4"

\* =1 to 4 : Multiplier

● Encoder type

[Write]

Transmission: "@WPAR E17 E=i"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E17"

Reception: "@RPAR E17 E=i"

\* = i or a : incremental a: absolute

● ACC T2 ratio

[Write]

Transmission: “@WPAR E18 TW=090”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RPAR E18”

Reception: “@RPAR E18 TW=090”

\* =090

: ACC T2 ratio

● Task and axis combination

[Write]

Transmission: “@WPAR E19 1000”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RPAR E19”

Reception: “@RPAR E19 1000”

\*

Setting value	Task 1	Task 2	Task 3	Task 4
1000	1-axis specifications	Axisless task	Axisless task	Axisless task
1100	1-axis specifications	1-axis specifications	Axisless task	Axisless task
1110	1-axis specifications	1-axis specifications	1-axis specifications	Axisless task
1111	1-axis specifications	1-axis specifications	1-axis specifications	1-axis specifications
1120	1-axis specifications	1-axis specifications	2-axis specifications	Axisless task
1200	1-axis specifications	2-axis specifications	Axisless task	Axisless task
1210	1-axis specifications	2-axis specifications	1-axis specifications	Axisless task
1300	1-axis specifications	3-axis (2D) specifications	Axisless task	Axisless task
1400	1-axis specifications	3-axis (3D) specifications	Axisless task	Axisless task
2000	2-axis specifications	Axisless task	Axisless task	Axisless task
2100	2-axis specifications	1-axis specifications	Axisless task	Axisless task
2110	2-axis specifications	1-axis specifications	1-axis specifications	Axisless task
2200	2-axis specifications	2-axis specifications	Axisless task	Axisless task
3000	3-axis (2D) specifications	Axisless task	Axisless task	Axisless task
3100	3-axis (2D) specifications	1-axis specifications	Axisless task	Axisless task
4000	3-axis (3D) specifications	Axisless task	Axisless task	Axisless task
4100	3-axis (3D) specifications	1-axis specifications	Axisless task	Axisless task
5000	4-axis specifications	Axisless task	Axisless task	Axisless task

An axisless task enables command-only execution by excluding axis-related commands (movement-type commands). When the setting value is set to "1210", task 1 is set to the 1-axis (AX1) setting, task 2 is set to the 2-axis (AX2, AX3) setting, and task 3 is set to the 1-axis (AX4) setting, and task 4 is set as an axisless task.

● Multi-task order of priority

[Write]

Transmission: "@WPAR E20 TASK01=1 TASK02=1 TASK03=1 TASK04=1"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E20"

Reception: "@RPAR E20 TASK01=1 TASK02=1 TASK03=1 TASK04=1"

\* 0 to 4 : Order of priority

● Setting of No. of task coordinates

[Write]

Transmission: "@WPAR E21 TASK01=999 TASK02=999 TASK03=999 TASK04=999"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E21"

Reception: "@RPAR E21 TASK01=999 TASK02=999 TASK03=999 TASK04=999"

\* TASK01=999 TASK02=999 TASK03=999 TASK04=999 : This setting is always fixed at 999 regardless of the setting for each task.

● Setting of No. of task steps

[Write]

Transmission: "@WPAR E22 TASK01=2000 TASK02=0000 TASK03=0000 TASK04=0000"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E22"

Reception: "@RPAR E22 TASK01=1000 TASK02=0000 TASK03=0000 TASK04=0000"

\* 0000 to 5000 : No. of steps

If the total from TASK01 to 04 is a setting of 5001 or higher, @NG is received.

If the total from TASK01 to 04 is a setting of 2001 or higher, the easy program text is erased.

If the value is reset to a value smaller than the setting value for the number of task steps, and this is sent, the programs that were input in between are erased.

(Example: If the setting is changed from 1000 to 50, the commands from steps 501 to 1000 become NOP commands.)

● Setting of BA I/O compatibility mode (\* Compatible with ver. 3.36 or later)

[Write]

Transmission: "@WPAR E23 I"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E23"

Reception: "@RPAR E23 I"

\* I or E : Invalid or valid

● Setting of return to origin direction (\* Compatible with CA20-M00/M01, CA25-M10/M40/M80)

[Write]

Transmission: "@WPAR E24 AX1=0 AX2=0 AX3=0 AX4=0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E24"

Reception: "@RPAR E24 AX1=0 AX2=0 AX3=0 AX4=0"

\* =0 or 1 : - direction or + direction

● Setting of dynamic brake (\* Compatible with CA20-M00/M01)

[Write]

Transmission: "@WPAR E25 AX1=0 AX2=0 AX3=0 AX4=0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E25"

Reception: "@RPAR E25 AX1=0 AX2=0 AX3=0 AX4=0"

\* =0 or 1 : Invalid or valid  
Use this setting unchanged at 0 (invalid).

● Setting of synchronized axes (\*Compatible with CA20-M00/M01)

[Write]

Transmission: "@WPAR E26 AX1=M AX2=S AX3=0 AX4=0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E26"

Reception: "@RPAR E26 AX1=M AX2=S AX3=0 AX4=0"

\* = M or S or 0 : Drive axis or coupled-drive axis or invalid (normal axis)  
Set the coupled-drive axis (S) to the next axis following the one that was set as the drive axis (M).

● Setting of return to origin torque limit (\*Compatible with CA25-M10/M40/M80)

[Write]

Transmission: "@WPAR E27 AX1=00 AX2=00 AX3=00 AX4=00"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR E27"

Reception: "@RPAR E27 AX1=00 AX2=00 AX3=00 AX4=00"

\* = 00 to 08 : Torque limit table No.

◆ Parameter 3 (\*Compatible with CA20-M00/M01)

Parameter 3 edits the user parameters for the BS servo amplifier.

Note 1) When parameter 3 is changed, the controller side will be valid only for communication, and execution or canceling of errors will not be possible.

Turn the controller power ON again for execution or to cancel an error.

The parameters that were set are not enabled unless the power is turned off and then on again.

● Setting of resolver cable length

[Write]

Transmission: "@WPAR U03 AX1=005 AX2=005 AX3=005 AX4=005"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR U03"

Reception: "@RPAR U03 AX1=005 AX2=005 AX3=005 AX4=005"

\* =001 to 120 : Cable length [m]

● Setting of external reverse-current absorption resistance value

[Write]

Transmission: "@WPAR U21 AX1=000.0 AX2=000.0 AX3=000.0 AX4=000.0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR U21"

Reception: "@RPAR U21 AX1=000.0 AX2=000.0 AX3=000.0 AX4=000.0"

\* =000.0 to 100.0 : Resistance value [ $\Omega$ ]

● Setting of external reverse-current absorption resistor allowable value

[Write]

Transmission: "@WPAR U22 AX1=000.00 AX2=000.00 AX3=000.00 AX4=000.00"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RPAR U22"

Reception: "@RPAR U22 AX1=000.00 AX2=000.00 AX3=000.00 AX4=000.00"

\* =000.00 to 327.67 : Resistance capacity [kW]

## ◆ Tables

### ● Coordinate table

[Write]

Transmission: “@WPAR T1 PT=001 X=+0000.00 Y=+0000.00 Z=+0000.00 R=+0000.00”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RPAR T1 PT=001”

Reception: “@RPAR T1 PT=001 X=+0000.00 Y=+0000.00 Z=+0000.00 R=+0000.00”

\* PT=001 to 999 : Coordinate table No.  
X=-8000.00 to +8000.00 : X coordinates  
Y=-8000.00 to +8000.00 : Y coordinates  
Z=-8000.00 to +8000.00 : Z coordinates  
R=-8000.00 to +8000.00 : R coordinates

Writing is performed to the table of the currently-set task number. The task number can be changed by the Change Task No. command.

### ● Speed table

[Write]

Transmission: “@WPAR T2 V01=0001.0”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RPAR T2 V01”

Reception: “@RPAR T2 V01=0001.0”

\* V01 to 20 : Speed table No.  
=0001.0 to 9999.9 : Speed mm/s

### ● Acceleration/deceleration table

[Write]

Transmission: “@WPAR T3 A01=0.01”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RPAR T3 A01”

Reception: “@RPAR T3 A01=0.01”

\* A01 to 20 : Acceleration/deceleration table No.  
=0.01 to 9.99 : Acceleration/deceleration speed sec.



● MVM table

[Write] (S1: Coordinate table designation)

Transmission: "@WPAR T4 S1 GRP=01 ORG=001 P1=000 P2=000 P3=000"

Reception: "@OK" or "@NG"

[Read] (S1: Coordinate table designation)

Transmission: "@RPAR T4 S1 GRP=01"

Reception: "@RPAR T4 S1 GRP=01 ORG=001 P1=000 P2=000 P3=000"

- \* GRP=01 to 32 : MVM group No.
- ORG=001 to 999 : ORG (P0) coordinate table No.
- P1=000 to 999 : P1 coordinate table No.
- P2=000 to 999 : P2 coordinate table No.
- P3=000 to 999 : P3 coordinate table No.

[Write] (S2: Number of pieces designation)

Transmission: "@WPAR T4 S2 GRP=01 P1=0000 P2=0000 P3=0000"

Reception: "@OK" or "@NG"

[Read] (S2: Number of pieces designation)

Transmission: "@RPAR T4 S2 GRP=01"

Reception: "@RPAR T4 S2 GRP=01 P1=0000 P2=0000 P3=0000"

- \* GRP=01 to 32 : MVM group No.
- P1=0000 to 9999 : No. of pieces in P1 direction
- P2=0000 to 9999 : No. of pieces in P2 direction
- P3=0000 to 9999 : No. of pieces in P3 direction

[Write] (S3: Counter number designation)

Transmission: "@WPAR T4 S3 GRP=01 P1=01 P2=01"

Reception: "@OK" or "@NG"

[Read] (S3: Counter number designation)

Transmission: "@RPAR T4 S3 GRP=01"

Reception: "@RPAR T4 S3 GRP=01 P1=01 P2=01 P3=01"

- \* GRP=01 to 32 : MVM group No.
- P1=01 to 99 : P1 direction counter No.
- P2=01 to 99 : P2 direction counter No.
- P3=01 to 99 : P3 direction counter No.

[Write] (S4: Approach point designation)

Transmission: "@WPAR T4 S4 GRP=01 a Z=+0000.00 R=+0000.00"

Reception: "@OK" or "@NG"

[Read] (S4: Approach point designation)

Transmission: "@RPAR T4 S4 GRP=01"

Reception: "@RPAR T4 S4 GRP=01 a Z=+0000.00 R=+0000.00"

- \* a or i : Absolute coordinates or incremental coordinates
- Z=-8000.00 to +8000.00 : Z coordinates
- R=-8000.00 to +8000.00 : R coordinates

[Write] (S5: Destination point designation)

Transmission: "@WPAR T4 S5 GRP=01 R=+0000.00"

Reception: “@OK” or “@NG”

[Read] (S5: Destination point designation)

Transmission: “@RPAR T4 S5 GRP=01”

Reception: “@RPAR T4 S5 GRP=01 R=+0000.00”

\* R=-8000.00 to +8000.00 : R coordinates

● Torque limit table (\* Compatible with CA25-M10/M40/M80)

[Write]

Transmission: “@WPAR T5 LIM01 T=3.00 L=3.00”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RPAR T5 LIM01”

Reception: “@RPAR T5 LIM01 T=3.00 L=3.00”

\* LIM01 to 08 : Torque limit table No.  
T=0.01 to 9.99 : Torque limit value  
L=0.01 to 9.99 : Load Output Standard value

## 2-5 Sequential text (Write and read commands)

### ◆ ACC

[Write]

Transmission: "@WSTX 0001 ACC A=01"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 ACC A=01"

\* 0001 to 5000 : Step No. (Common for all following commands.)

A=01 to 20 : Acceleration/deceleration table No.

### ◆ BRAC

[Write]

Transmission: "@WSTX 0001 BRAC CN=01 OFS=000"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 BRAC CN=01 OFS=000"

\* CN=00 to 99 : Counter No.

OFS=000 to 999 : TAG No. offset value

### ◆ CAL

[Write]

Transmission: "@WSTX 0001 CAL TAG=001"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 CAL TAG=001"

\* TAG=001 to 999 : TAG No.

### ◆ CALC

[Write]

Transmission: "@WSTX 0001 CALC TAG=001 CN01= 0000"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 CALC TAG=001 CN01= 0000"

\* TAG=001 to 999 : TAG No.

CN01 to 99 : Counter No.

= or < or > or <= or >= : Comparison operator Note) Not "=", "<", ">" but "=", "< ", "> "

0000 to 9999 : Count value

◆ CALI

[Write]

Transmission: "@WSTX 0001 CALI TAG=001 STN=0 PN01=10. 10. 10"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 CALI TAG=001 STN=0 PN01=10. 10. 10"

- \* TAG=001 to 999 : TAG No.
- STN=00 to 4 : Station No.
- PN01 to 99 : Port No.
- =..... or 0 or 1 : Port input conditions

◆ CALT

[Write]

Transmission: "@WSTX 0001 CALT TAG=001 TN1= 000.0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 CALT TAG=001 TN1= 000.0"

- \* TAG=001 to 999 : TAG No.
- TN1 to 9 : Timer No.
- = or < or > or <= or >= : Comparison operator Note) Not "=", "<", ">" but "=", "< ", "> "
- 000.0 to 999.9 : Timer value

◆ CANS

[Write]

Transmission: "@WSTX 0001 CANS TA=0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 CANS TA=0"

- \* TAG=0 to 4 : TASK No.

◆ CNT

[Write]

Transmission: "@WSTX 0001 CNT CN01=0000"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 CNT CN01=0000"

- \* CN01 to 99 : Counter No.
- =0000 to 9999 : Count value

◆ CNT+

[Write]

Transmission: "@WSTX 0001 CNT+ CN01=0000"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 CNT+ CN01=0000"

\* CN01 to 99 : Counter No.  
=0000 to 9999 : Count value

◆ CNT-

[Write]

Transmission: "@WSTX 0001 CNT- CN01=0000"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 CNT- CN01=0000"

\* CN01 to 99 : Counter No.  
=0000 to 9999 : Count value

◆ CNTC

[Write]

Transmission: "@WSTX 0001 CNTC"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 CNTC"

◆ CWIT

[Write]

Transmission: "@WSTX 0001 CWIT CN01= 0000"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 CWIT CN01= 0000"

\* CN01 to 99 : Counter No.  
= or < or > or <= or >= : Comparison operator Note) Not "=", "<", ">" but "=", "< ", "> "  
0000 to 9999 : Count value

◆ DEC (\* Compatible with CA25-M10/M40/M80)

[Write]

Transmission: "@WSTX 0001 DEC D=01"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 DEC D=01"

\* D=01 to 20 : Acceleration/deceleration table No.

◆ END

[Write]

Transmission: "@WSTX 0001 END"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 END"

◆ HOME

[Write]

Transmission: "@WSTX 0001 HOME"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 HOME"

◆ IN

[Write]

Transmission: "@WSTX 0001 IN STN=0 PN01=. . . . . AND"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 IN STN=0 PN01=. . . . . AND"

\* STN=00 to 4 : Station No.  
PN01 to 99 : Port No.  
=. . . . . or 0 or 1 : Port input conditions  
AND or OR : Logic

◆ INPC

[Write]

Transmission: "@WSTX 0001 INPC STN=0 PN=01 CN=01"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 INPC STN=0 PN=01 CN=01"

\* STN=00 to 4 : Station No. (internal)  
PN=01 to 99 : Station No., port No.  
CN=01 to 99 : Counter No.

◆ IOUT

[Write]

Transmission: “@WSTX 0001 IOUT PN1=. . . . .”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RSTX 0001”

Reception: “@RSTX 0001 IOUT PN1=. . . . .”

- \* PN1 to 9 : Port No.
- =. . . . . or 0 or 1 : Port input conditions

◆ INSP

[Write]

Transmission: “@WSTX 0001 INSP PN1=. . . . . AND ”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RSTX 0001”

Reception: “@RSTX 0001 INSP PN1=. . . . . AND ”

- \* PN1 to 9 : Port No. (internal)
- =. . . . . or 0 or 1 : Port input conditions
- AND or OR : Logic

◆ JMP

[Write]

Transmission: “@WSTX 0001 JMP TAG=001”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RSTX 0001”

Reception: “@RSTX 0001 JMP TAG=001”

- \* TAG=001 to 999 : TAG No.

◆ JMPC

[Write]

Transmission: “@WSTX 0001 JMPC TAG=001 CN01= 0000”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RSTX 0001”

Reception: “@RSTX 0001 JMPC TAG=001 CN01= 0000”

- \* TAG=001 to 999 : TAG No.
- CN01 to 99 : Counter No.
- = or < or > or <= or >= : Comparison operator Note) Not “=”, “<”, “>” but “= ”, “< ”, “> ”
- 0000 to 9999 : Count value



## ◆ JMPI

[Write]

Transmission: "@WSTX 0001 JMPI TAG=001 STN=0 PN01=. . . . ."

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 JMPI TAG=001 STN=0 PN01=. . . . ."

\* TAG=001 to 999 : TAG No.  
STN=00 to 4 : Station No.  
PN01 to 99 : Station No., port No.  
=. . . . . or 0 or 1 : Port input conditions

## ◆ JMPT

[Write]

Transmission: "@WSTX 0001 JMPT TAG=001 TN1= 000.0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 JMPT TAG=001 TN1= 000.0"

\* TAG=001 to 999 : TAG No.  
TN1 to 9 : Timer No.  
= or < or > or <= or >= : Comparison operator Note) Not "=", "<", ">" but "=", "< ", "> "  
000.0 to 999.9 : Timer value

## ◆ LOOP

[Write]

Transmission: "@WSTX 0001 LOOP GRP=01 THEN=001 ELSE=001"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 LOOP GRP=01 THEN=001 ELSE=001"

\* GRP=01 to 32 : Group No.  
THEN=001 to 999 : TAG No.  
ELSE=001 to 999 : TAG No.

## ◆ MINI

[Write]

Transmission: "@WSTX 0001 MINI GRP=01"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 MINI GRP=01"

\* GRP=01 to 32 : Group No.

## ◆ MOV

[Write]

Transmission: "@WSTX 0001 MOV a X=+0000.00 Y=+0000.00 Z=+0000.00 R=+0000.00 S V=00 POST"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 MOV a X=+0000.00 Y=+0000.00 Z=+0000.00 R=+0000.00 S V=00 POST"

* a or i	: Absolute coordinates or incremental coordinates
X=-8000.00 to +8000.00	: X coordinates
Y=-8000.00 to +8000.00	: Y coordinates
Z=-8000.00 to +8000.00	: Z coordinates
R=-8000.00 to +8000.00	: R coordinates
S or T	: Axis speed constant or line speed constant
V=00 to 10	: Speed table No.
POST or PASS	: Position or pass point

## ◆ MOVP

[Write]

Transmission: "@WSTX 0001 MOVP a PT=001 CN=00 S V=00 POST"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 MOVP a PT=001 CN=00 S V=00 POST"

* a or i	: Absolute coordinates or incremental coordinates
PT=000 to 999	: Coordinate table No.
CN=00 to 99	: Counter No.
S or T	: Axis speed constant or line speed constant
V=00 to 10	: Speed table No.
POST or PASS	: Position or pass point

## ◆ MVB

[Write]

Transmission: "@WSTX 0001 MVB S V=00 POST"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 MVB S V=00 POST"

* S or T	: Axis speed constant or line speed constant
V=00 to 10	: Speed table No.
POST or PASS	: Position or pass point

## ◆ MVC

[Write]

Transmission: "@WSTX 0001 MVC a X=+0000.00 Y=+0000.00 Z=+0000.00 R=+0000.00 V=00 POST"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 MVC a X=+0000.00 Y=+0000.00 Z=+0000.00 R=+0000.00 V=00 POST"

* a or i	: Absolute coordinates or incremental coordinates
X=-8000.00 to +8000.00	: X coordinates
Y=-8000.00 to +8000.00	: Y coordinates
Z=-8000.00 to +8000.00	: Z coordinates
R=-8000.00 to +8000.00	: R coordinates
V=00 to 10	: Speed table No.
POST or PASS	: Position or pass point

## ◆ MVCP

[Write]

Transmission: "@WSTX 0001 MVCP a PT=001 CN=00 V=00 POST"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 MVCP a PT=001 CN=00 V=00 POST"

* a or i	: Absolute coordinates or incremental coordinates
PT=000 to 999	: Coordinate table No.
CN=00 to 99	: Counter No.
V=00 to 10	: Speed table No.
POST or PASS	: Position or pass point

## ◆ MVE

[Write]

Transmission: "@WSTX 0001 MVE a PT=000 CN=00 S V=00"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 MVE a PT=000 CN=00 S V=00"

* a or i	: Absolute coordinates or incremental coordinates
PT=000 to 999	: Coordinate table No.
CN=00 to 99	: Counter No.
S or T	: Axis speed constant or line speed constant
V=00 to 10	: Speed table No.

◆ MVM

[Write]

Transmission: "@WSTX 0001 MVM S GRP=01 V=00 POST DIST"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 MVM S GRP=01 V=00 POST DIST"

\* S or T : Axis speed constant or line speed constant  
GRP=01 to 32 : Group No.  
V=00 to 10 : Speed table No.  
POST or PASS : Position or pass point  
DIST or APPR : Destination or approach

◆ NOP

[Write]

Transmission: "@WSTX 0001 NOP"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 NOP"

◆ OFS

[Write]

Transmission: "@WSTX 0001 OFS X=+0000.00 Y=+0000.00 Z=+0000.00 R=+0000.00"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 OFS X=+0000.00 Y=+0000.00 Z=+0000.00 R=+0000.00"

\* X=-8000.00 to +8000.00 : X coordinates  
Y=-8000.00 to +8000.00 : Y coordinates  
Z=-8000.00 to +8000.00 : Z coordinates  
R=-8000.00 to +8000.00 : R coordinates

◆ OFSP (\* Compatible with CA25-M10/M40/M80)

[Write]

Transmission: "@WSTX 0001 OFSP PT=001 CN=00"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 OFSP PT=001 CN=00"

\* PT=000 to 999 : Coordinate table No.  
CN=00 to 99 : Counter No.

◆ OUT

[Write]

Transmission: "@WSTX 0001 OUT STN=0 PN01=....."

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 OUT STN=0 PN01=....."

- \* STN=00 to 4 : Station No.
- PN01 to 99 : Port No.
- =..... or 0 or 1 : Port output conditions

◆ OUTC

[Write]

Transmission: "@WSTX 0001 OUTC STN=0 PN=01 CN=01"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 OUTC STN=0 PN=01 CN=01"

- \* STN=00 to 4 : Station No.
- PN01 to 99 : Port No.
- CN=01 to 99 : Counter No.

◆ OUTP

[Write]

Transmission: "@WSTX 0001 OUTP STN=0 PN01=..... TM=00.0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 OUTP STN=0 PN01=..... TM=00.0"

- \* STN=00 to 4 : Station No.
- PN01 to 99 : Port No.
- =..... or 0 or 1 : Port output conditions
- TM=00.0 to 99.9 : Output time

◆ OUTS

[Write]

Transmission: "@WSTX 0001 OUTS TA=0 STN=0 PN01=..... X<=+0000.00"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 OUTS TA=0 STN=0 PN01=..... X<=+0000.00"

- \* TAG=0 to 4 : TASK No.
- STN=00 to 4 : Station No.
- PN01 to 99 : Port No.
- =..... or 0 or 1 : Port output conditions

X or Y or Z or R

<= or >=

: Comparison operator

-8000.00 to +8000.00

: Coordinate value

◆ PASS (\* Compatible with CA25-M10/M40/M80)

[Write]

Transmission: "@WSTX 0001 PASS PASS=100.0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 PASS PASS=100.0"

\* PASS=000.1 to 100.0

: Pass percentage

◆ PSEL

[Write]

Transmission: "@WSTX 0001 PSEL"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 PSEL"

◆ RET

[Write]

Transmission: "@WSTX 0001 RET"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 RET"

◆ RSMV

[Write]

Transmission: "@WSTX 0001 RSMV a X=+0000.00 Y=+0000.00 Z=+0000.00 R=+0000.00 S V=00 POST"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 RSMV a X=+0000.00 Y=+0000.00 Z=+0000.00 R=+0000.00 S V=00 POST"

\* a or i : Absolute coordinates or incremental coordinates  
X=-8000.00 to +8000.00 : X coordinates  
Y=-8000.00 to +8000.00 : Y coordinates  
Z=-8000.00 to +8000.00 : Z coordinates  
R=-8000.00 to +8000.00 : R coordinates  
S or T : Axis speed constant or line speed constant  
V=00 to 10 : Speed table No.  
PASS : Pass point fixed

◆ SPD

[Write]

Transmission: "@WSTX 0001 SPD V=01"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 SPD V=01"

\* V=01 to 10 : Speed table No.

◆ STOP

[Write]

Transmission: "@WSTX 0001 STOP"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 STOP"

◆ SVON

[Write]

Transmission: "@WSTX 0001 SVON ALL"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 SVON ALL"

\* All or X or Y or Z or R : Axis designation

◆ SVOF

[Write]

Transmission: "@WSTX 0001 SVOF ALL"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 SVOF ALL "

\* All or X or Y or Z or R : Axis designation

◆ TAG

[Write]

Transmission: "@WSTX 0001 TAG TAG=001"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 TAG TAG=001"

\* TAG=001 to 999 : TAG NO.

◆ TCAN

[Write]

Transmission: "@WSTX 0001 TCAN TASK=00"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 TCAN TASK=00"

\* TASK=02 to 04 : TASK No.



◆ TIM

[Write]

Transmission: "@WSTX 0001 TIM TM=000.0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 TIM TM=000.0"

\* TM=000.0 to 999.9 : Output time

◆ TIMP

[Write]

Transmission: "@WSTX 0001 TIMP TN1=000.0"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 TIMP TN1=000.0"

\* TN1 to 9 : Timer No.  
=000.0 to 999.9 : Timer value

◆ TLMV (\* Compatible with CA25-M10/M40/M80)

[Write]

Transmission: "@WSTX 0001 TLMV X TT=08 TM=000.0 TE=OFF LE=OFF AE=OFF DD=ON"

Reception: "@OK" or "@NG"

[Read]

Transmission: "@RSTX 0001"

Reception: "@RSTX 0001 TLMV X TT=08 TM=000.0 TE=OFF LE=OFF AE=OFF DD=ON"

\* X, Y, Z, R : Axis to do torque limit move  
TT=01~08 : Torque limit table No.  
TM=000.0~999.9 : Torque limit judgement time  
TE=ON or OFF : Torque limit end  
LE=ON or OFF : Lock end  
AE=ON or OFF : Arrival end  
DD=ON or OFF : Overflow detection

◆ TRSA

[Write]

Transmission: “@WSTX 0001 TRSA TASK=01”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RSTX 0001”

Reception: “@RSTX 0001 TRSA TASK=01”

\* TASK=01 to 04 : TASK No.

◆ TSTO

[Write]

Transmission: “@WSTX 0001 TSTO TASK=01”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RSTX 0001”

Reception: “@RSTX 0001 TSTO TASK=01”

\* TASK=01 to 04 : TASK No.

◆ TSTR

[Write]

Transmission: “@WSTX 0001 TSTR TASK=02”

Reception: “@OK” or “@NG”

[Read]

Transmission: “@RSTX 0001”

Reception: “@RSTX 0001 TSTR TASK=02”

\* TASK=02 to 04 : TASK No.

## 2-6 Palletizing text (Write and read commands)

[Write] (SNO=01: Start program tag No.)

Transmission: "@WPLT 01 SNO=01 TAG=000 MOD=M-1"

Reception: "@OK" or "@NG"

[Read] (SNO=01: Start program tag No.)

Transmission: "@RPLT 01 SNO=01"

Reception: "@RPLT 01 SNO=01 TAG=000 MOD=M-1"

\* 01 to 16 : Program No.  
TAG=000 to 999 : TAG No.  
MOD=M-1 or 1-M or M-M : Palletizing mode

[Write] (SNO=02: S side matrix P0 coordinates)

Transmission: "@WPLT 01 SNO=02 X=+0000.00 Y=+0000.00 Z=+0000.00"

Reception: "@OK" or "@NG"

[Read] (SNO=02: S side matrix P0 coordinates)

Transmission: "@RPLT 01 SNO=02"

Reception: "@RPLT 01 SNO=02 X=+0000.00 Y=+0000.00 Z=+0000.00"

\* X=-8000.00 to +8000.00 : S side P0 X coordinates  
Y=-8000.00 to +8000.00 : S side P0 Y coordinates  
Z=-8000.00 to +8000.00 : S side P0 Z coordinates

[Write] (SNO=03: S side matrix P1 coordinates)

Transmission: "@WPLT 01 SNO=03 X=+0000.00 Y=+0000.00 Z=+0000.00"

Reception: "@OK" or "@NG"

[Read] (SNO=03: S side matrix P1 coordinates)

Transmission: "@RPLT 01 SNO=03"

Reception: "@RPLT 01 SNO=03 X=+0000.00 Y=+0000.00 Z=+0000.00"

\* X=-8000.00 to +8000.00 : S side P1 X coordinates  
Y=-8000.00 to +8000.00 : S side P1 Y coordinates  
Z=-8000.00 to +8000.00 : S side P1 Z coordinates

[Write] (SNO=04: S side matrix P2 coordinates)

Transmission: "@WPLT 01 SNO=04 X=+0000.00 Y=+0000.00 Z=+0000.00"

Reception: "@OK" or "@NG"

[Read] (SNO=04: S side matrix P2 coordinates)

Transmission: "@RPLT 01 SNO=04"

Reception: "@RPLT 01 SNO=04 X=+0000.00 Y=+0000.00 Z=+0000.00"

\* X=-8000.00 to +8000.00 : S side P2 X coordinates  
Y=-8000.00 to +8000.00 : S side P2 Y coordinates  
Z=-8000.00 to +8000.00 : S side P2 Z coordinates

[Write] (SNO=05: S side matrix P1 coordinates)

Transmission: "@WPLT 01 SNO=05 X=+0000.00 Y=+0000.00 Z=+0000.00"

Reception: "@OK" or "@NG"

[Read] (SNO=05: S side matrix P2 coordinates)

Transmission: "@RPLT 01 SNO=05"

Reception: "@RPLT 01 SNO=05 X=+0000.00 Y=+0000.00 Z=+0000.00"

\* X=-8000.00 to +8000.00 : S side P3 X coordinates  
Y=-8000.00 to +8000.00 : S side P3 Y coordinates  
Z=-8000.00 to +8000.00 : S side P3 Z coordinates

[Write] (SNO=06: S side matrix No. of pieces)

Transmission: "@WPLT 01 SNO=06 P1=0000 P2=0000 P3=0000"

Reception: "@OK" or "@NG"

[Read] (SNO=06: S side matrix No. of pieces)

Transmission: "@RPLT 01 SNO=06"

Reception: "@RPLT 01 SNO=06 P1=0000 P2=0000 P3=0000"

\* P1=0000 to 9999 : S side P1 No. of pieces  
P2=0000 to 9999 : S side P2 No. of pieces  
P3=0000 to 9999 : S side P3 No. of pieces

[Write] (SNO=07: S side approach coordinates)

Transmission: "@WPLT 01 SNO=07 a S APR=+0000.00 V=00 POST R=+0000.00"

Reception: "@OK" or "@NG"

[Read] (SNO=07: S side approach coordinates)

Transmission: "@RPLT 01 SNO=07"

Reception: "@RPLT 01 SNO=07 a S APR=+0000.00 V=00 POST R=+0000.00"

\* a or i : Absolute coordinates or incremental coordinates  
S or T : Axis speed constant or line speed constant  
APR=-8000.00 to +8000.00 : Approach point coordinates  
V=00 to 10 : Speed table No.  
POST or PASS : Position or pass point  
R=-8000.00 to +8000.00 : Approach point R axis coordinates

[Write] (SNO=08: S side hand program tag No.)

Transmission: "@WPLT 01 SNO=08 R=+0000.00 TAG=000"

Reception: "@OK" or "@NG"

[Read] (SNO=08: S side hand program tag No.)

Transmission: "@RPLT 01 SNO=08"

Reception: "@RPLT 01 SNO=08 R=+0000.00 TAG=000"

\* R=-8000.00 to +8000.00 : R axis coordinates  
TAG=000 to 999 : TAG No.

[Write] (SNO=09: D side matrix P0 coordinates)

Transmission: "@WPLT 01 SNO=09 X=+0000.00 Y=+0000.00 Z=+0000.00"

Reception: "@OK" or "@NG"

[Read] (SNO=09: D side matrix P0 coordinates)

Transmission: "@RPLT 01 SNO=09"

Reception: "@RPLT 01 SNO=09 X=+0000.00 Y=+0000.00 Z=+0000.00"

\* X=-8000.00 to +8000.00 : D side P0 X coordinates  
Y=-8000.00 to +8000.00 : D side P0 Y coordinates  
Z=-8000.00 to +8000.00 : D side P0 Z coordinates

[Write] (SNO=10: D side matrix P1 coordinates)

Transmission: "@WPLT 01 SNO=10 X=+0000.00 Y=+0000.00 Z=+0000.00"

Reception: "@OK" or "@NG"

[Read] (SNO=10: D side matrix P1 coordinates)

Transmission: "@RPLT 01 SNO=10"

Reception: "@RPLT 01 SNO=10 X=+0000.00 Y=+0000.00 Z=+0000.00"

\* X=-8000.00 to +8000.00 : D side P1 X coordinates  
Y=-8000.00 to +8000.00 : D side P1 Y coordinates  
Z=-8000.00 to +8000.00 : D side P1 Z coordinates

[Write] (SNO=11: D side matrix P2 coordinates)

Transmission: "@WPLT 01 SNO=11 X=+0000.00 Y=+0000.00 Z=+0000.00"

Reception: "@OK" or "@NG"

[Read] (SNO=11: D side matrix P2 coordinates)

Transmission: "@RPLT 01 SNO=11"

Reception: "@RPLT 01 SNO=11 X=+0000.00 Y=+0000.00 Z=+0000.00"

\* X=-8000.00 to +8000.00 : D side P2 X coordinates  
Y=-8000.00 to +8000.00 : D side P2 Y coordinates  
Z=-8000.00 to +8000.00 : D side P2 Z coordinates

[Write] (SNO=12: D side matrix P3 coordinates)

Transmission: "@WPLT 01 SNO=12 X=+0000.00 Y=+0000.00 Z=+0000.00"

Reception: "@OK" or "@NG"

[Read] (SNO=12: D side matrix P3 coordinates)

Transmission: "@RPLT 01 SNO=12"

Reception: "@RPLT 01 SNO=12 X=+0000.00 Y=+0000.00 Z=+0000.00"

\* X=-8000.00 to +8000.00 : D side P3 X coordinates  
Y=-8000.00 to +8000.00 : D side P3 Y coordinates  
Z=-8000.00 to +8000.00 : D side P3 Z coordinates

[Write] (SNO=13: D side matrix No. of pieces)

Transmission: "@WPLT 01 SNO=13 P1=0000 P2=0000 P3=0000"

Reception: "@OK" or "@NG"

[Read] (SNO=13: D side matrix No. of pieces)

Transmission: "@RPLT 01 SNO=13"

Reception: "@RPLT 01 SNO=13 P1=0000 P2=0000 P3=0000"

- \* P1=0000 to 9999 : D side P1 No. of pieces
- P2=0000 to 9999 : D side P2 No. of pieces
- P3=0000 to 9999 : D side P3 No. of pieces

[Write] (SNO=14: D side approach coordinates)

Transmission: "@WPLT 01 SNO=14 a S APR=+0000.00 V=00 POST R=+0000.00"

Reception: "@OK" or "@NG"

[Read] (SNO=14: D side approach coordinates)

Transmission: "@RPLT 01 SNO=14"

Reception: "@RPLT 01 SNO=14 a S APR=+0000.00 V=00 POST R=+0000.00"

- \* a or i : Absolute coordinates or incremental coordinates
- S or T : Axis speed constant or line speed constant
- APR=-8000.00 to +8000.00 : Approach point coordinates
- V=00 to 10 : Speed table No.
- POST or PASS : Position or pass point
- R=-8000.00 to +8000.00 : Approach point R axis coordinates

[Write] (SNO=15: D side hand program tag No.)

Transmission: "@WPLT 01 SNO=15 R=+0000.00 TAG=000"

Reception: "@OK" or "@NG"

[Read] (SNO=15: D side hand program tag No.)

Transmission: "@RPLT 01 SNO=15"

Reception: "@RPLT 01 SNO=15 R=+0000.00 TAG=000"

- \* R=-8000.00 to +8000.00 : R axis coordinates
- TAG=000 to 999 : TAG No.

[Write] (SNO=16: End program tag No.)

Transmission: "@WPLT 01 SNO=16 TAG=000"

Reception: "@OK" or "@NG"

[Read] (SNO=16: End program tag No.)

Transmission: "@RPLT 01 SNO=16"

Reception: "@RPLT 01 SNO=16 TAG=000"

- \* TAG=000 to 999 : TAG No.

## 2-7 Execution commands

### ◆ Return to origin

Transmission: "@HOME"  
 Reception: "@OK" or "@NG"

### ◆ Start sequential

Transmission: "@SPST 0001"  
 Reception: "@OK" or "@NG"

\* 0000 to 5000 : Step No.

If 0000 is designated, the program is started from the current step.

### ◆ Set palletizing program No.

Transmission: "@SPLN PR=01"  
 Reception: "@OK" or "@NG"

\* 01 to 16 : Program No.

### ◆ Start palletizing

Transmission: "@PPST"  
 Reception: "@OK" or "@NG"

### ◆ Easy start

Transmission: "@SESY"  
 Reception: "@OK" or "@NG"

### ◆ Request palletizing execution data

Transmission: "@RPLD"  
 Reception: "@RPLD M-1 START PR=01 PC1=0000 PN1=0000 PC2=0000 PN2=0000 PC3=0000 PN3=0000  
 TAG=000 STP=0000"

\* M-1 or 1-M or M-M : Palletizing mode  
 START or SOURCE or DESTI or END : Execution state: start program or feed side or reception side or end program  
 PR=01 to 08 : Program No.  
 PC1=0000 to 9999 : No. of pieces being executed for axis 1  
 PN1=0000 to 9999 : No. of pieces set for axis 1  
 PC2=0000 to 9999 : No. of pieces being executed for axis 2  
 PN2=0000 to 9999 : No. of pieces set for axis 2  
 PC3=0000 to 9999 : No. of pieces being executed for axis 3  
 PN3=0000 to 9999 : No. of pieces set for axis 3  
 TAG=000 to 999 : Hand program TAG No.  
 STP=0000 to 1000 : No. of sequential step being executed

◆ Stop (sequential, palletizing, easy, external point designation)

Transmission: "@STOP"  
Reception: "@OK" or "@NG"

◆ JOG operation

Transmission: "@JGST X=RS Y=RS Z=RS R=RS"  
Reception: "@OK" or "@NG"

* X= RS	: Axis 1 reset
SP	Stop
-C	- direction inching
+C	+ direction inching
-L	- direction low-speed JOG
+L	+ direction low-speed JOG
-H	- direction high-speed JOG
+H	+ direction high-speed JOG
Y=	: Same as above for axis 2
Z=	: Same as above for axis 3
R=	: Same as above for 4nd axis

\* In JOG operation, operation is performed for one axis at a time. Multiple axes cannot be moved at the same time.  
Set "SP" for axes that will not be moved.  
For the operating procedure, refer to the transmission samples in section 3-2. JOG operation.

◆ Direct port output

Transmission: "@DOUT STN=0 PN01=. . . . ."  
Reception: "@OK" or "@NG"

* STN=00 to 4	: Station No.
PN01 to 99	: Port No.
=. . . . . or 0 or 1	: Port output designation

Transmission: "@DOUT 1"  
Reception: "@OK" or "@NG"

\* 1 to 4 : Direct output designation F1 ~ F4

◆ Write override

Transmission: "@WOVR OV=001"  
Reception: "@OK" or "@NG"

\* OV=001 to 100 : Override value %  
The settings are valid only when the program is stopped.

◆ Read override

Transmission: "@ROVR"  
Reception: "@ROVR OV=001"

\* OV=001 to 100 : Override value %



◆ Reset

Transmission: "@REST"  
Reception: "@OK" or "@NG"

◆ Cancel error

Transmission: "@CERR"  
Reception: "@OK" or "@NG"

◆ Start external point designation

Transmission: "@EXTP PT=001"  
Reception: "@OK" or "@NG"

\* PT=001 to 999 : Coordinate table No.

◆ Servo ON

Transmission: "@SVON"  
Reception: "@OK" or "@NG"

◆ Servo OFF

Transmission: "@SVOF"  
Reception: "@OK" or "@NG"

◆ Set easy program No.

Transmission: "@SESN PR=01"  
Reception: "@OK" or "@NG"

\* PR=01 to 08 : Easy program No.

◆ Request easy execution data

Transmission: "@RESD"  
Reception: "@RESD PR=01 ST=000 SQS=0000 SUB=000 LOOP=0000"

\* PR=01 to 08 : Easy program No.  
ST=000 to 999 : No. of step being executed  
SQS=0000 to 9999 : Step No. of sequential program being executed  
SUB=000 to 999 : Tag No. of hand program being executed  
LOOP=0000 to 9999 : No. of repetitions

◆ Change task No.

Transmission: "@CTSK TASK=00"  
Reception: "@OK" or "@NG"

\* TASK=01 to 04 : TASK No.

◆ Synchronized origin search (\*Compatible with CA20-M00/M01)

Transmission: "@SORG 1"  
Reception: "@OK" or "@NG"

\* 1 to 3 : Axis number of drive axis performing origin search

## 2-8 Monitor commands

### ◆ Request input data

Transmission: "@MINP SNO=0 GN=1"

Reception: "@MINP SNO=0 GN=1 SY01=00000000 PN01=00000000 PN02=00000000 PN03=00000000"

\* SNO=0 to 4 : Station No.  
GN=1 to 7 : Screen No. (SNO1 to 4 is fixed at GN=1)  
PN01 to 23 : General-purpose input port No.  
=00000000 0 or 1 : Port data

Transmission: "@MINP SNO=0 GN=2"

Reception: "@MINP SNO=0 GN=2 PN04=00000000 PN05=00000000 PN06=00000000 PN07=00000000"

\* SNO=0 to 4 : Station No.  
GN=1 to 7 : Screen No. (SNO1 to 4 is fixed at GN=1)  
PN01 to 23 : General-purpose input port No.  
=00000000 0 or 1 : Port data

Transmission: "@MINP SNO=1 GN=1"

Reception: "@MINP SNO=1 PN01=00000000 PN02=00000000 PN03=00000000"

Transmission: "@MINP SNO=2 GN=1"

Reception: "@MINP SNO=2 PN01=00000000 PN02=00000000 PN03=00000000"

Transmission: "@MINP SNO=3 GN=1"

Reception: "@MINP SNO=3 PN01=00000000 PN02=00000000 PN03=00000000"

Transmission: "@MINP SNO=4 GN=1"

Reception: "@MINP SNO=4 PN01=00000000 PN02=00000000 PN03=00000000"

### ◆ Request output data

Transmission: "@MOUT SNO=0 GN=1"

Reception: "@MOUT SNO=0 GN=1 SY01=00000000 PN01=00000000 PN02=00000000 PN02=00000000"

\* SNO=0 to 4 : Station No.  
GN=1 to 5 : Screen No. (SNO1 to 4 is fixed at GN=1)  
PN01 to 18 : General-purpose output port No.  
=00000000 0 or 1 : Port data

Transmission: "@MOUT SNO=0 GN=2"

Reception: "@MOUT SNO=0 GN=2 PN04=00000000 PN05=00000000 PN06=00000000 PN07=00000000"

\* SNO=0 to 4 : Station No.  
GN=1 to 5 : Screen No. (SNO1 to 4 is fixed at GN=1)  
PN01 to 18 : General-purpose output port No.  
=00000000 0 or 1 : Port data

Transmission: "@MOUT SNO=1 GN=1"

Reception: "@MOUT SNO=1 PN01=00000000 PN02=00000000"

Transmission: "@MOUT SNO=2 GN=1"  
Reception: "@MOUT SNO=2 PN01=00000000 PN02=00000000"

Transmission: "@MOUT SNO=3 GN=1"  
Reception: "@MOUT SNO=3 PN01=00000000 PN02=00000000"

Transmission: "@MOUT SNO=4 GN=1"  
Reception: "@MOUT SNO=4 PN01=00000000 PN02=00000000"

◆ Internal port data request

Transmission: "@MNIN SNO=0 GN=1"  
Reception: "@MNIN SNO=0 GN=1 PN01=00000000 PN02=00000000 PN03=00000000 PN04=00000000"

\* SNO=0 : Station No. (Fixed at 0)  
GN=1 : Screen No. (Fixed at 1)  
PN01 to 04 : Port No.  
=00000000 0 or 1 : Port data

◆ Request present position

Transmission: "@MPST"  
Reception: "@MPST X=+0000.00 Y=+0000.00 Z=+0000.00 R=+0000.00"

\* X=-8000.00 to +8000.00 : X coordinates  
Y=-8000.00 to +8000.00 : Y coordinates  
Z=-8000.00 to +8000.00 : Z coordinates  
R=-8000.00 to +8000.00 : R coordinates

◆ Request present offset value

Transmission: "@MOFF"  
Reception: "@MOFF X=+0000.00 Y=+0000.00 Z=+0000.00 R=+0000.00"

\* X=-8000.00 to +8000.00 : X offset  
Y=-8000.00 to +8000.00 : Y offset  
Z=-8000.00 to +8000.00 : Z offset  
R=-8000.00 to +8000.00 : R offset

◆ RS232C coordinate data settings

Transmission: "@MRSS TASK=01 X=+0000.00 Y=+0000.00 Z=+0000.00 R=+0000.00 V=00"  
Reception: "@OK" or "@NG"

\* TASK=01 to 04 : TASK No.  
X=-8000.00 to +8000.00 : X coordinates  
Y=-8000.00 to +8000.00 : Y coordinates  
Z=-8000.00 to +8000.00 : Z coordinates  
R=-8000.00 to +8000.00 : R coordinates  
V=00 to 10 : Speed table No.

◆ Request counter value

Transmission: "@MCNT CN=01"

Reception: "@MCNT CN01=0000"

\* CN=01 to 99 : Counter No.  
CN01 to 99 : Counter No.  
=0000 to 9999 : Count value

◆ Request timer value

Transmission: "@MTMR TN=1"

Reception: "@MTMR TN1=000.0"

\* TN=1 to 9 : Timer No.  
TN1 to 9 : Timer No.  
=000.0 to 999.9 : Timer value

◆ Counter direct set

Transmission: "@MCST CN01=0001"

Reception: "@OK" or "@NG"

\* CN01 to 99 : Counter No.  
=0000 to 9999 : Count value

◆ Request error point No.

Transmission: "@MERP"

Reception: "@MERP "

◆ Read task No.

Transmission: "@MTSK"

Reception: "@MTSK TASK=01"

\* TASK=01 to 04 : TASK No.

◆ Read current step

Transmission: "@RSTX 0000"

Reception: "@RSTX ???? \*\*\*\*"

\* ????(0001 to 5000) : Current step No.  
\*\*\*\* : The format is identical to sequential text (read).

◆ Read CC-Link status (1/2) (\*Compatible with CA20-M00/M01)

Transmission: "@MBUS C1"

Reception: "@MBUS C1 STN=01 BRT=156K VER=00"

\* STN=00 to 99 : CC-Link station number  
BRT=156K, 625K, 2.5M, 5M, 10M : Baud rate  
VER=00 to 99 : CC-Link hardware version

◆ Read the CC-Link status (2/2) (\*Compatible with CA20-M00/M01)

Transmission: "@MBUS C2"

Reception: "@MBUS C2 ER1=00 ER2=00 ER3=00 MS1=00 MS2=00"

* ER1=00 to 99	: Error 1
ER2=00 to 99	: Error 2
ER3=00 to 99	: Error 3
MS1=00 to 99	: Main status 1
MS2=00 to 99	: Main status 2

◆ Error history request (\*Compatible with CA20-M00/M01)

Transmission: "@EHTR NO=01"

Reception: "@EHTR NO=01 ER=00 AL=00 H=999 M=59 S=59"

* NO=01 to 99	: Error history number
ER=00 to FF,**	: Error code
AL=00 to 3F,**	: BS error code
H=000 to 999,***	: Time (hour)
M=00 to 59,**	: Time (minute)
S=00 to 59,**	: Time (second)

If the power supply is cut off, histories marked by "\*" will record the values for all of ER, AL, H, M, and S once.

### 3. Transmission Samples

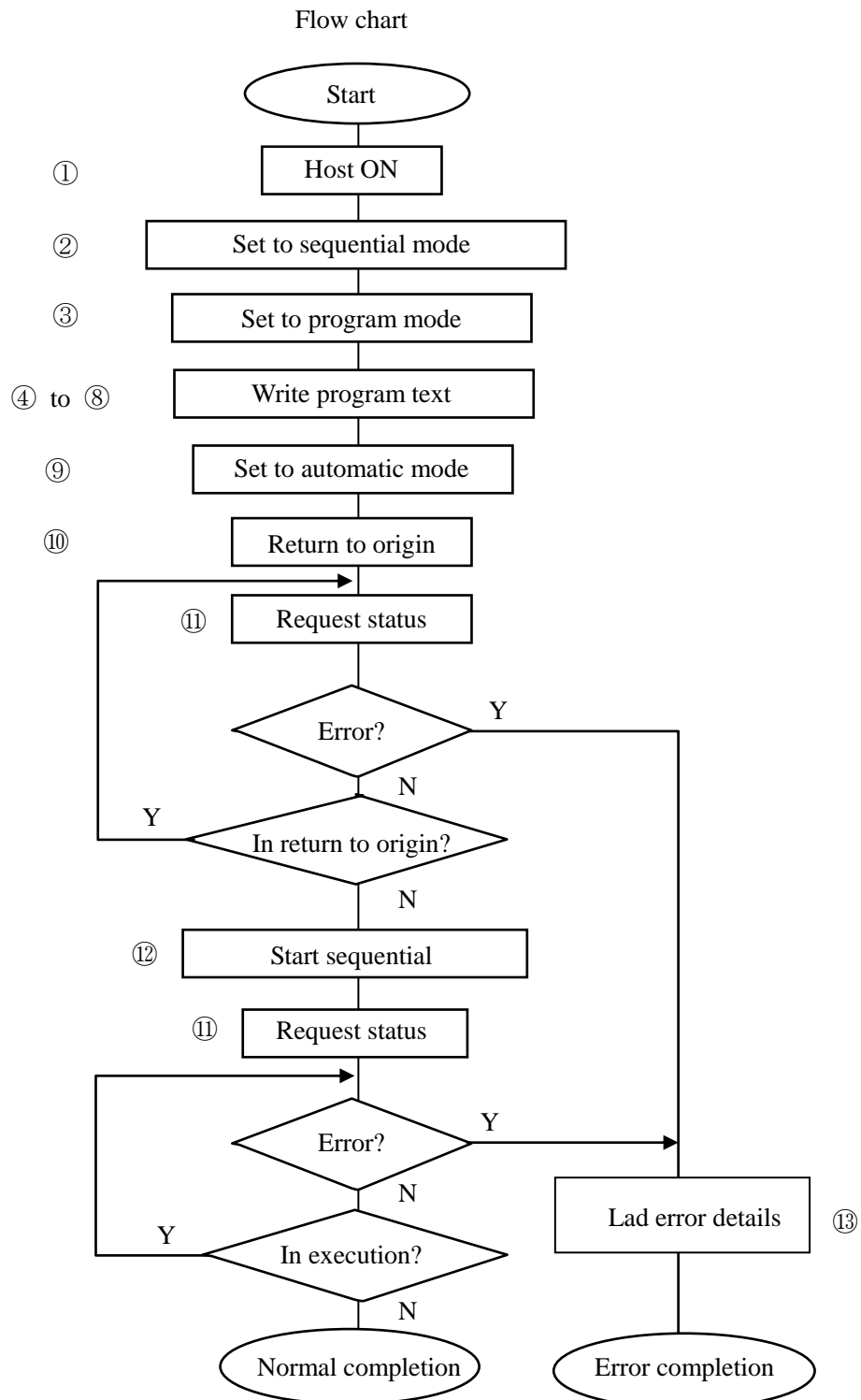
#### 3-1 Power ON sequential program execution

This is a sample of transmission when the sequential program text is written in and the program is executed in the automatic mode after the controller power is turned ON.

It is assumed that the servo gain and soft limit have been set already, and that there is no problem in executing the program using the teach pendant.

<Details of sequential program>

Move the slider to the coordinate table No. 1 coordinates (X = 100 mm, Y = 20 mm) at speed 5, and turn the general-purpose output bit 1 ON.



- ① **Host ON**  
Transmission: "@HSON"  
Reception: "@OK"
  
- ② **Set to sequential mode**  
Transmission: "@MSEQ"  
Reception: "@OK"
  
- ③ **Set to program mode**  
Transmission: "@MPRO"  
Reception: "@OK"
  
- ④ **Write SPD=5 into sequential step No. 1**  
Transmission: "@WSTX 0001 SPD V=05"  
Reception: "@OK"
  
- ⑤ **Write MOVP a PT=1 CN=0 S V=0 POST into sequential step No. 2.**  
Transmission: "@WSTX 0002 MOVP a PT=001 CN=00 S V=00 POST"  
Reception: "@OK"
  
- ⑥ **Write OUT STN=0 PN01=.....1 into sequential step No. 3**  
Transmission: "@WSTX 0003 OUT STN=0 PN01=. . . . . 1"  
Reception: "@OK"
  
- ⑦ **Write END into sequential step No. 4.**  
Transmission: "@WSTX 0004 END"  
Reception: "@OK"
  
- ⑧ **Write X=100 Y=20 Z=0 R=0 into coordinate table No. 1**  
Transmission: "@WPAR T1 PT=001 X=+0100.00 Y=+0020.00 Z=+0000.00 R=+0000.00"  
Reception: "@OK"
  
- ⑨ **Set to automatic mode**  
Transmission: "@MAUT"  
Reception: "@OK"
  
- ⑩ **Execute return to origin**  
Transmission: "@HOME"  
Reception: "@OK"
  
- ⑪ **Status request (check that return to origin is completed)**  
Transmission: "@STAS SNO=0"  
Reception: "@STAS SNO=0 ST1=30 ST2=00"
  
- ⑫ **Execute sequential start**  
Transmission: "@SPST 0001"  
Reception: "@OK"
  
- ⑬ **Request error details (request status)**  
Transmission: "@STAS SNO=1"  
Reception: "@STAS SNO=1 ST1=00 ST2=00"

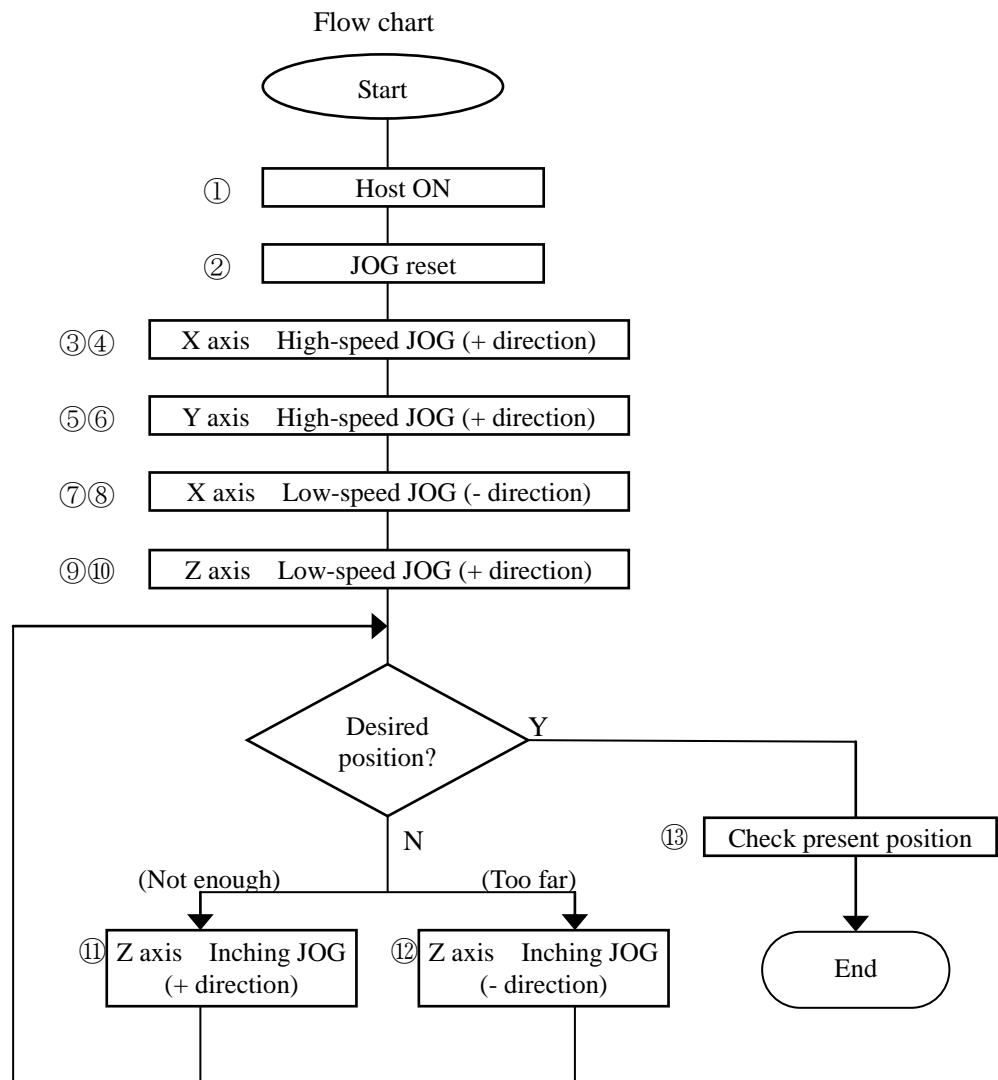
### 3-2 JOG operation

This is a sample transmission for performing JOG operation using the JOG execution commands. It is assumed that the servo gain and soft limit have been set already, and that there is no problem in executing the program using the teach pendant. It is also assumed that the return to origin operation has been completed.

<JOG operation>

Use JOG operation to control the X-Y-Z 3-axis robot to move to the desired position.

First, use high-speed JOG to move the X axis and Y axis to the approximate desired position, and then use low-speed JOG to adjust the X axis in the return direction. Finally, move the Z axis at low speed, and then perform fine adjustment by inching. After the operation is completed, check the current position coordinates.



\* The JOG operation is performed for one axis at a time. Multiple axes cannot be moved at the same time. Set "SP" for axes that will not be moved.



- ① **Host ON**  
 Transmission: "@HSON"  
 Reception: "@OK"
- ② **JOG reset**  
 Transmission: "@JGST X=RS Y=RS Z=RS R=RS"  
 Reception: "@OK"
- ③ **X axis + direction high-speed JOG**  
 Transmission: "@JGST X=+H Y=SP Z=SP R=SP"  
 Reception: "@OK"
- ④ **JOG stop**  
 Transmission: "@JGST X=SP Y=SP Z=SP R=SP"  
 Reception: "@OK"
- ③ **Y axis + direction high-speed JOG**  
 Transmission: "@JGST X=SP Y=+H Z=SP R=SP"  
 Reception: "@OK"
- ⑥ **JOG stop**  
 Transmission: "@JGST X=SP Y=SP Z=SP R=SP"  
 Reception: "@OK"
- ⑦ **X axis - direction low-speed JOG**  
 Transmission: "@JGST X=-L Y=SP Z=SP R=SP"  
 Reception: "@OK"
- ⑧ **JOG stop**  
 Transmission: "@JGST X=SP Y=SP Z=SP R=SP"  
 Reception: "@OK"
- ⑨ **Z axis + direction low-speed JOG**  
 Transmission: "@JGST X=SP Y=SP Z=+L R=SP"  
 Reception: "@OK"
- ⑩ **JOG stop**  
 Transmission: "@JGST X=SP Y=SP Z=SP R=SP"  
 Reception: "@OK"
- ⑪ **Z axis + direction inching**  
 Transmission: "@JGST X=SP Y=SP Z=+C R=SP"  
 Reception: "@OK"
- ⑫ **Z axis - direction inching**  
 Transmission: "@JGST X=SP Y=SP Z=-C R=SP"  
 Reception: "@OK"
- ⑬ **Current position check (current position request)**  
 Transmission: "@MPST"  
 Reception: "@MPST X=+0000.00 Y=+0000.00 Z=+0000.00 R=+0000.00"

## 4. Error Codes

The error codes and details are shown below.

Refer to Error Messages in the Controller Instruction Manual (Basic Section) for details on each error.

### 4-1 Error codes

Error code	Error details
12	Watchdog timer error
13	Emergency stop
20	Axis 1 communication error
21	Axis 1 overspeed error
22	Axis 1 overcurrent error
23	Axis 1 overload error
24	Axis 1 overflow
25	Axis 1 BS servo amplifier alarm (→ 4-2. BS alarm codes)
26	Axis 1 encoder error
27	Axis 1 Home Positioning Error
28	Axis 1 + soft limit exceeded (during execution)
29	Axis 1 - soft limit exceeded (during execution)
2A	Axis 1 overvoltage error
2B	Axis 1 motor overheat error
2C	Axis 1 encoder backup error
2D	Axis 1 encoder switching error
2F	Axis 1 driver error
30	Axis 2 communication error
31	Axis 2 overspeed error
32	Axis 2 overcurrent error
33	Axis 2 overload error
34	Axis 2 overflow
35	Axis 2 BS servo amplifier alarm (→ 4-2. BS alarm codes)
36	Axis 2 encoder error
37	Axis 2 Home Positioning Error
38	Axis 2 + soft limit exceeded (during execution)
39	Axis 2 - soft limit exceeded (during execution)
3A	Axis 2 overvoltage error
3B	Axis 2 motor overheat error
3C	Axis 2 encoder backup error
3D	Axis 2 encoder switching error
3F	Axis 2 driver error
40	Axis 3 communication error
41	Axis 3 overspeed error
42	Axis 3 overcurrent error
43	Axis 3 overload error
44	Axis 3 overflow
45	Axis 3 BS servo amplifier alarm (→ 4-2. BS alarm codes)
46	Axis 3 encoder error
47	Axis 3 Home Positioning Error
48	Axis 3 + soft limit exceeded (during execution)
49	Axis 3 - soft limit exceeded (during execution)
4A	Axis 3 overvoltage error
4B	Axis 3 motor overheat error
4C	Axis 3 encoder backup error
4D	Axis 3 encoder switching error
4F	Axis 3 driver error
50	Axis 4 communication error
51	Axis 4 overspeed error
52	Axis 4 overcurrent error
53	Axis 4 overload error

54	Axis 4 overflow
55	Axis 4 BS servo amplifier alarm
56	Axis 4 encoder error
57	Axis 4 Home Positioning Error
58	Axis 4 + soft limit exceeded (during execution)
59	Axis 4 - soft limit exceeded (during execution)
5A	Axis 4 overvoltage error
5B	Axis 4 motor overheat error
5C	Axis 4 encoder backup error
5D	Axis 4 encoder switching error
5F	Axis 4 driver error
60	Continuous execution failure
61	Return to origin incomplete
62	Unexecutable
63	Task starting disabled
64	Synchronized axes origin search incomplete
65	Excessive synchronization error
66	Synchronized axes parameter error
67	Synchronized axes origin search error
90	ID error
91	Sequential program memory error
92	Palletizing program memory error
93	Parameter memory error
94	Coordinate table memory error
95	Speed table memory error
96	Acceleration/deceleration table memory error
97	MVM table memory error
98	Easy program memory error
99	Slave ID error
A0	Command error (impossible command)
A1	Tag undefined
A2	Tag duplicate definition
A3	Stack overflow
A4	Stack underflow
A5	Not enough circular interpolation data
A6	Circular interpolation radius oversize
A7	Calculation error
A8	Parameter error
B0	Step number error
B1	Tag number error
B2	Palletizing program No. error
B3	Counter No. error
B4	Timer No. error
B5	Port No. error
B6	Table No. error
B7	Group No. error
B9	Easy program No. error
BA	Task No. error
C0	Axis 1 + soft limit exceeded
C1	Axis 1 - soft limit exceeded
C2	Axis 2 + soft limit exceeded
C3	Axis 2 - soft limit exceeded
C4	Axis 3 + soft limit exceeded
C5	Axis 3 - soft limit exceeded
C6	Axis 4 + soft limit exceeded
C7	Axis 4 - soft limit exceeded
E0	Other errors

#### 4-2 BS alarm codes

Alarm code	Error details
01	Overcurrent (OC)
02	Overvoltage (OV)
03	PN voltage drop (PNLV)
04	Main power supply input error (ACINF)
05	Charging resistor overheat (CROH)
06	Disconnected resolver wire (RELV)
07	Power status error (POWFAIL)
08	Servo amplifier overheat (SOH)
09	Reverse-current absorption resistor overheat (RGOH)
0A	Reverse-current absorption error (RGST)
0B	
0C	DSP error (DSPERR)
0D	ABS battery voltage drop (BLV)
0E	Brake error (BERR)
0F	Overcurrent detection (OCS)
10	Speed amplifier saturation (VAS)
11	Motor overload (MOL)
12	Instant thermal (POL)
13	Resolver phase error (RESERR)
14	Overspeed (OSPD)
15	Deviation counter exceeded (FULL)
16	Resolver ABS phase error (ABSE)
17	Resolver ABS disconnected wire (ACN)
18	ABS battery alarm (BAL)
19	Option alarm (OPALM)
1A	Parameter setting error (CERR)
1B	Resolver ABS error (AEERR)
1C	Link error (LINKERR)
1D	Command value exceeded (CON.OV)
1E	Current value exceeded (ACT.OV)
1F	
20	Origin not stored error (MZE)
21	ABS origin invalid (CLD)
22	+ soft limit exceeded (SOTP)
23	- soft limit exceeded (SOTM)
24	ABS battery cable disconnected wire (ABT)
25	
26	Overrun (OVTR)
27	
28	Encoder disconnected wire (EREE)
29	Encoder communication error (ETER)
2A	Encoder backup error (EBACK)
2B	Encoder checksum error (ECKER)
2C	Encoder battery alarm (EBAL)
2D	Encoder ABS phase error (EABSE)
2E	Encoder overspeed (EOSPD)
2F	Encoder communication error (EWER)
30	Encoder initialization error (EINIT)
31	Encoder sensor phase error (PHSERR)
36	Magnetic pole detection error (MPERR)
FB	PON error (PONERR)
FC	Control power supply input error (CACINF)