CKD

SMF-2009-A

INSTRUCTION MANUAL

ABSODEX Driver

AX Series

TS Type

TH Type

XS Type

[DeviceNet Specification]

- Read this Instruction Manual carefully and thoroughly before using this product.
- Pay extra attention to the instructions concerning safety.
- After reading this Instruction Manual, keep it in a safe and convenient place.

4th Edition

CKD Corporation

Introduction

Thank you for choosing ABSODEX.

ABSODEX is a direct-drive index unit developed to drive intermittently operated turntables or the likes of general industrial assembling machines and inspection machines flexibly and with precision.

This Instruction Manual is for DeviceNet specification TS type, TH type, and XS type ABSODEX drivers.

It is not for drivers of other types.

For the operation method, precautions on operation, maintenance and inspection items and so on, refer to "Instruction Manual for AX Series TS, TH, XS Types" (SMF-2006).

The descriptions, specifications, and appearances in this Instruction Manual are subject to change without notice.

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Contents

ABSODEX

AX series [TS type, TH type, and XS type DeviceNet specification]

Instruction Manual No. SMF-2009-A

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2026/6/30 Discontinued

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1. Specifications

1.1 Product Configuration

Table 1.1 Product structure

Name			Quantity
1	Driver unit		1
2	Accessories	CN5 motor power connector: PC4/3-ST-7.62 (Phoenix Contact)	1
		CN4 power supply connector: PC4/5-ST-7.62 (Phoenix Contact)	1
		CN3 communication connector (DeviceNet): MSTB2.5/5-STF-5.08AUM (Phoenix Contact)	1

1.2 General Specifications of Drivers

Table 1.2 General specifications of TS type and TH type drivers

Item			Description
1. Power supply voltage	Main	TS	1-phase or 3-phase 200 VAC ± 10% to 230 VAC ± 10%[*1)] 1-phase 100 VAC ± 10% to 115 VAC ± 10%[*2)] (-J1 option)
		TH	1-phase or 3-phase 200 VAC ± 10% to 230 VAC ± 10% [*1)]
	Control	TS	1-phase 200 VAC ± 10% to 230 VAC ± 10% 1-phase 100 VAC ± 10% to 115 VAC ± 10% (-J1 option)
		TH	1-phase 200 VAC ± 10% to 230 VAC ± 10%
2. Power supply frequency			50/60 Hz
3. Rated input current		TS	1.8 A
		TH	5.0 A
4. Input phase			1-phase or 3-phase[*1)]
5. Output voltage			0 to 230 V
6. Output frequency			0 to 50 Hz
7. Rated output current		TS	1.9 A
		TH	5.0 A
8. Output phase			3-phase
9. Power system			TN, TT, IT
10. Mass		TS	About 1.6 kg
		TH	About 2.1 kg
11. Outside dimensions		TS	W75 × H220 × D160
		TH	W95 × H220 × D160
12. Configuration			Driver and controller integrated type (open type)
13. Operating ambient temperature			0 to 50ºC
14. Operating ambient humidity			20 to 90%RH (no condensation allowed)
15. Storage ambient temperature			-20 to 65ºC
16. Storage ambient humidity			20 to 90%RH (no condensation allowed)
17. Atmosphere			No corrosive gases and no dust
18. Noise resistance			1,000 V (P-P), 1 µsec pulse width, 1 nsec rise time
19. Vibration resistance			4.9 m/s^2
20. Altitude			1000 m or less
21. Protection			IP2X (excludes CN4 and CN5)

*1) Only models with a maximum torque of 45 N·m or less can be used with 1-phase 100 VAC power.

For models with a maximum torque of 75 N·m or more, the torque limit area is calculated differently when used with 1-phase 200 VAC. Please contact CKD to determine if it can be used.

*2) Supply the main power and control power from the same power source. Do not supply them from power sources of different voltages or phases. Otherwise, it may cause a malfunction or damage.

Use 1-phase 100 to 115 VAC power for the control power. If 1-phase 200 to 230 VAC power is connected by mistake, the internal circuits of the driver will be damaged.

Table 1.3 General specifications of XS type driver

Item		Description
Power supply voltage	Main	1-phase or 3-phase: 200 VAC ± 10% to 230 VAC ± 10% (standard) 1-phase 100 VAC ± 10% to 115 VAC ± 10% (-J1 option)
	Control	1-phase 200 VAC ± 10% to 230 VAC ± 10% (standard) 1-phase 100 VAC ± 10% to 115 VAC ± 10% (-J1 option)
Power supply frequency		50/60 Hz
Rated input current		1.8 A
Input phase		1-phase or 3-phase
Output voltage		0 to 230 V
Output frequency		0 to 50 Hz
Rated output current		1.9 A
Output phase		3-phase
Power system		TN, TT, IT
Mass		About 1.6 kg
Outside dimensions		W75 × H220 × D160
Configuration		Open modular type (integrated driver and controller)
Operating ambient temperature		0 to 50ºC
Operating ambient humidity		20 to 90%RH (no condensation allowed)
Storage ambient temperature		-20 to 65ºC
Storage ambient humidity		20 to 90%RH (no condensation allowed)
Atmosphere		No corrosive gases and no dust
Noise resistance		1,000 V (P-P), 1 µsec pulse width, 1 nsec rise time
Vibration proof		4.9 m/s^2
Altitude		1,000 m or less
Protection		IP2X (excludes CN4 and CN5)

1.3 Performance Specifications of Drivers

Table 1.4 Performance specifications of TS type and TH type drivers

Item	Description
Number of controlled axes	1 axis; 540,672 pulses/rotation
Angle setting units	° (degree), pulse, and number of indexes
Minimum angle setting units	0.001°, 1 pulse (= about 2.4 sec [0.00067 deg.])
Speed setting units	sec, rpm
Speed setting range	0.01 to 100 sec/0.11 to 300 rpm
Number of equal segments	1 to 255
Maximum instruction value	7-digit input ±9,999,999
Timer	0.01 to 99.99 sec
Programming language	NC language
Programming method	Data is set via RS-232C port using PC
Operation modes	Automatic, single block, MDI, jog, servo OFF, pulse string input, network operation mode
Coordinates	Absolute and incremental
Acceleration curve	<5 types> Modified sine (MS), Modified constant velocity (MC, MC2) Modified trapezoid (MT), Trapecloid (TR)
Status display	LED power status indicator
Motion display	7-segment LED (2 digits)
Communication interface	RS-232C compliant
DeviceNet communication function	<Input> Home positioning instruction, reset, start, stop, continuous rotation stop, emergency stop, answer, position deviation counter reset, program number selection, jog, brake release, servo ON, program number setting, ready return
	<Output> Alarm 1 and 2, positioning completion, in-position, standby for start input, M code 8 points, output during indexing 1 and 2, home position output, M code strobe, segment position strobe, servo status, ready output
Program capacity	<NC program> About 6,000 characters (256 pcs.)
	<Point table> 64 points
Electronic thermal	Actuator overheat protection

Table 1.5 Product specifications of XS type driver

Item	Description
Number of controlled axes	1 axis; 4,194,304 pulses/rotation
Angle setting units	° (degree), pulse, and number of indexes
Minimum angle setting units	0.001°, 1 pulse (= about 0.31 sec [0.000086 deg.])
Speed setting units	sec, rpm
Speed setting range	0.01 to 100 sec/0.11 to 240 rpm
Number of equal segments	1 to 255
Maximum instruction value	8-digit input ±99,999,999
Timer	0.01 to 99.99 sec
Programming language	NC language
Programming method	Data is set via RS-232C port using PC
Operation modes	Automatic, single block, MDI, jog, servo OFF, pulse string input, network operation mode
Coordinates	Absolute and incremental
Acceleration curve	<5 types> Modified sine (MS), Modified constant velocity (MC, MC2) Modified trapezoid (MT), Trapecloid (TR)
Status display	LED power status indicator
Motion display	7-segment LED (2 digits)
Communication interface	RS-232C compliant
DeviceNet communication function	<Input> Home positioning instruction, reset, start, stop, continuous rotation stop, emergency stop, answer, position deviation counter reset, program number selection, jog, brake release, servo ON, program number setting, ready return
	<Output> Alarm 1 and 2, positioning completion, in-position, standby for start input, M code 8 points, output during indexing 1 and 2, home position output, M code strobe, segment position strobe, servo status, ready output
Program capacity	<NC program> About 6,000 characters (256 pcs.)
	<Point table> 64 points
Electronic thermal	Actuator overheat protection

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2. Wiring

2.1 Panel Description

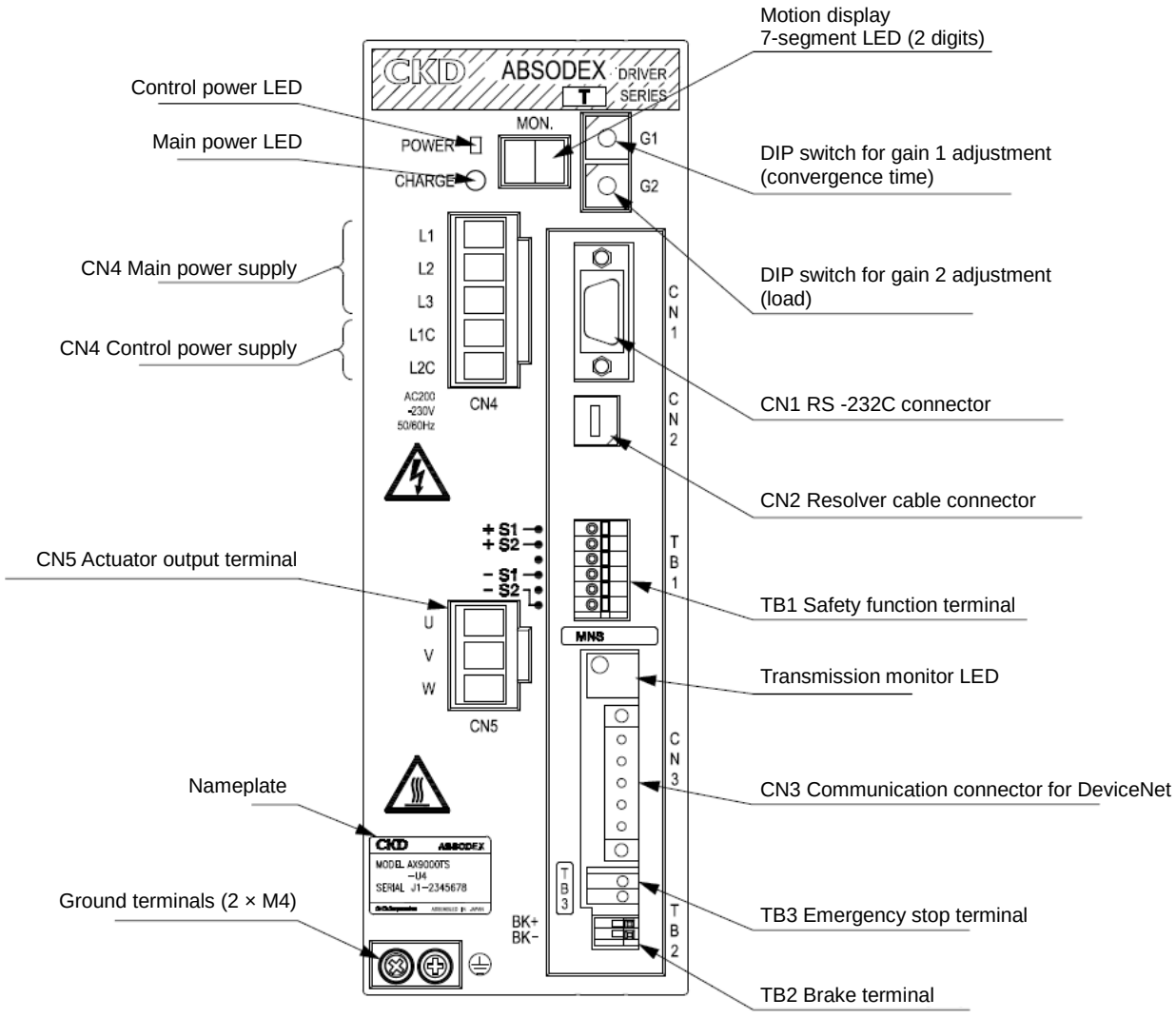


Fig. 2.1 TS type and TH type DeviceNet specifications driver panel

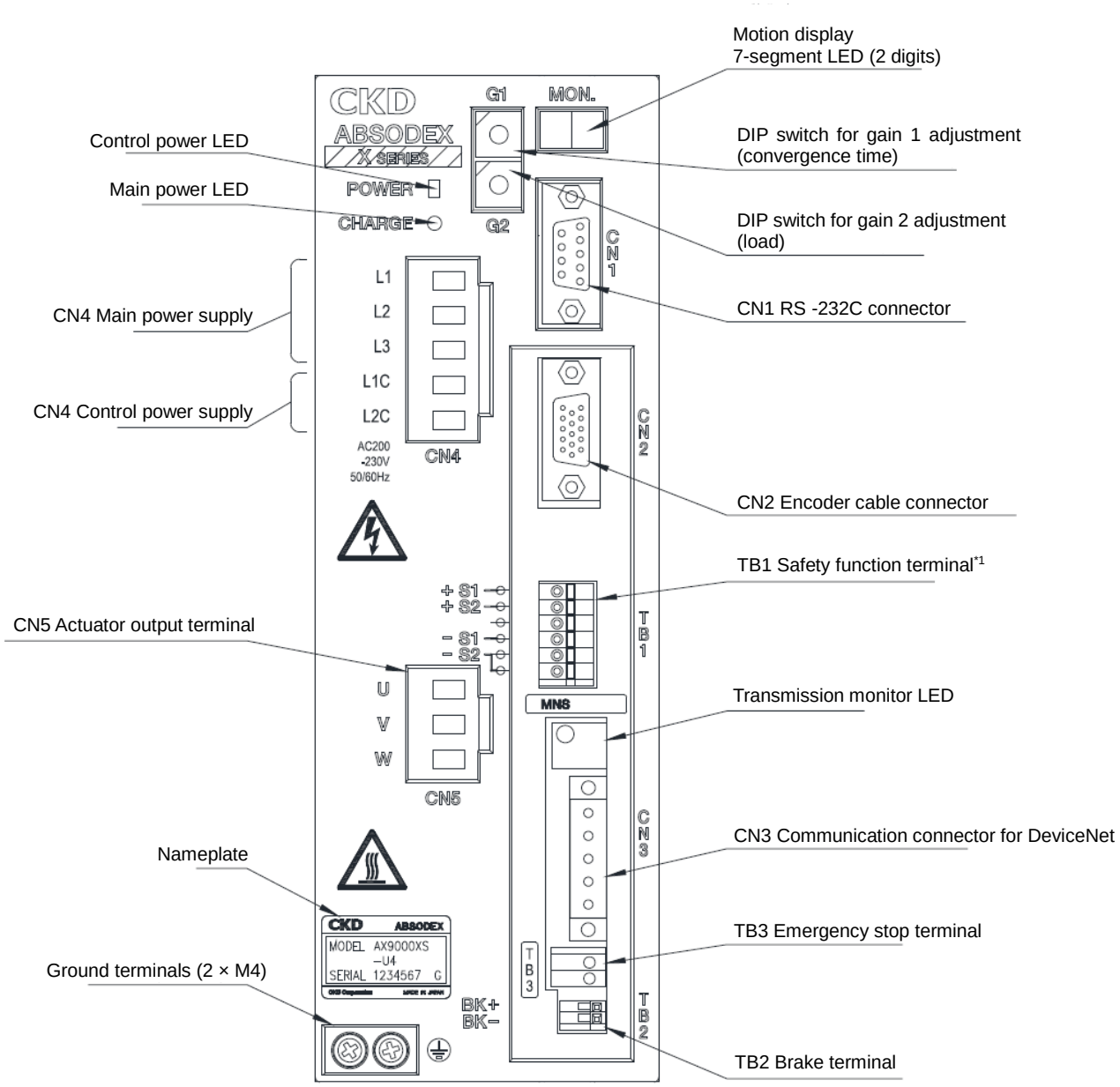


Fig. 2.2 XS type DeviceNet specifications driver panel

Note *1: The safety function (TB1) of this product does not comply with the safety standards.

2.2 Communication Connector

The pin layout of DeviceNet communication connector CN3 is shown below.

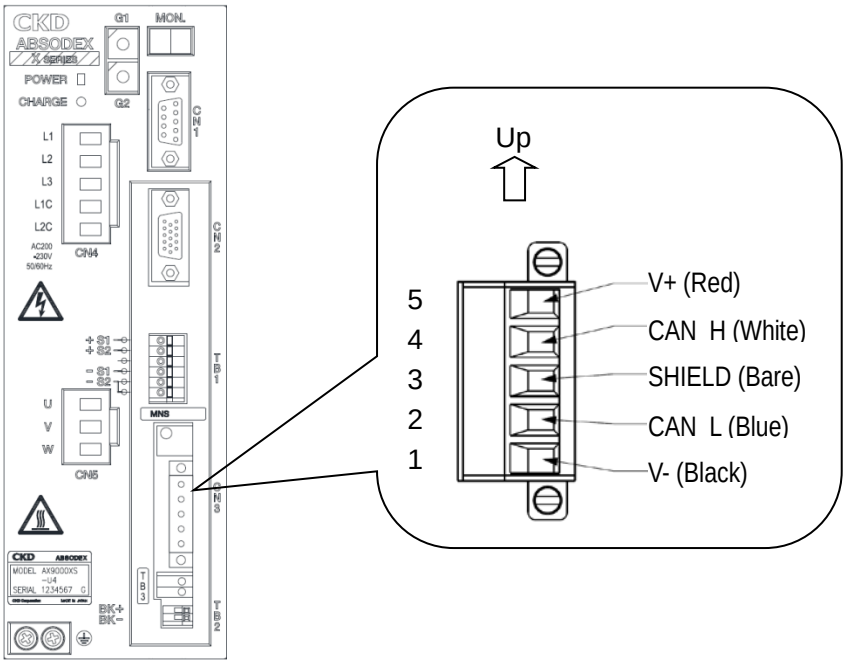


Fig. 2.3 Pin layout of communication connector

Table 2.1 Pin layout of CN3

Pin	Signal name	Function	Description
1	V-	Communication power (-)	Power supply (11 to 25 VDC) with less noise is used.
2	CAN_L	Communication terminal (L)	This terminal is connected to the communication line "CAN_L" of the master station or other slave station.
3	Drain	Shield terminal	The shield line of the cable is connected to this terminal.
4	CAN_H	Communication terminal (H)	This terminal is connected to the communication line "CAN_H" of the master station or other slave station.
5	V+	Communication power (+)	Power supply (11 to 25 VDC) with less noise is used.

- It is not connected with the drain (shield terminal) and ground terminal (heat sink section) of the driver.
- We recommend the use of cables and connectors dedicated for DeviceNet.

If this product is the termination of the network, connect a terminating connector between "CAN_L" and "CAN_H".

2.3 Connecting the Communication Cable

Follow the procedure below to connect the special DeviceNet cable to the module.

[1] Peel the sheath of the cable off without causing a broken wire (length of peeled cable sheath: 7 mm).
Do not solder the bare cable. Otherwise poor continuity may be caused. The solderless terminals specified below are recommended.
Select a solderless terminal that matches the size of the cable.
Note that the peeling dimension of the cable sheath varies according to the type of the solderless terminal.

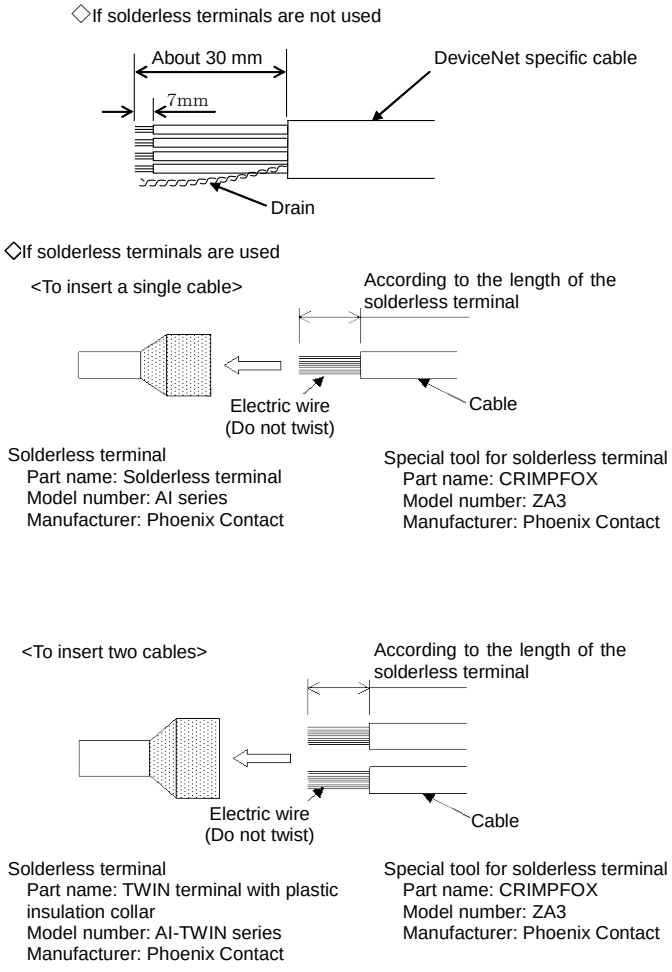


Fig. 2.4 Peeling dimension of communication cable

[2] Insert the CAN_H (white), CAN_L (blue), V+ (red), V- (black), and Drain (bare) lines of the DeviceNet cable into relevant holes (CAN_H, CAN_L, V+, V-, Drain) while referring to the orientation of the connection connector (MSTB2.5/5-STF-5.08AUM). (For details, see the following Figure.)
The recommended connector is MSTB2.5/5-STF-5.08AUM manufactured by Phoenix Contact.

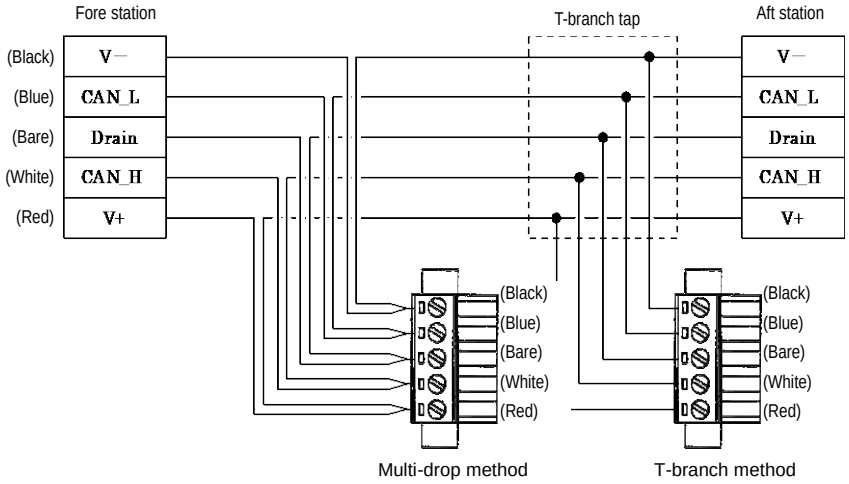


Fig. 2.5 Connection example of communication cable

[3] Secure each line firmly using the cable fixing screws of the connection connector.
(Proper tightening torque: 0.5 N•m)

[4] Make sure that the cable colors are matched with those shown on the connector. Insert the connection connectors into the slave station and secure them using the connector fixing screws.
(Proper tightening torque: 0.3 N•m)

CAUTION

- Be sure to use special signal cables complying with the DeviceNet specifications.
- For those provided with a connector fixing screw, securely tighten the connector fixing screw when inserting the connector. Otherwise the connector may be dislocated and cause malfunction.
  For those not provided with a connector fixing screw, check that the catch of the connector snaps in position.
- Before disconnecting the connector, loosen the fixing screws (2 places) sufficiently.
  For those not provided with a connector fixing screw (2 places), check that the catch of the connector snaps in position. Loosen the fixing screws before removing the connector. The connector may be damaged if excess force is applied to the connector without the screws loosened.
- Remove the connector vertically to avoid excess force from being applied to the connector.
- Do not bend the communication cable forcibly. Assure a sufficient bending radius.
- Reserve a sufficient distance between the communication cable and power cable (motor cable).
- If the communication cable is routed near the power cable or if they are tied, noise will enter to make communication unstable, possibly causing frequent communication errors and/or communication retries.
- Use in the RUN mode to output signals from the PLC and drive ABSODEX.
  Before switching, check that other devices do not malfunction unexpectedly.

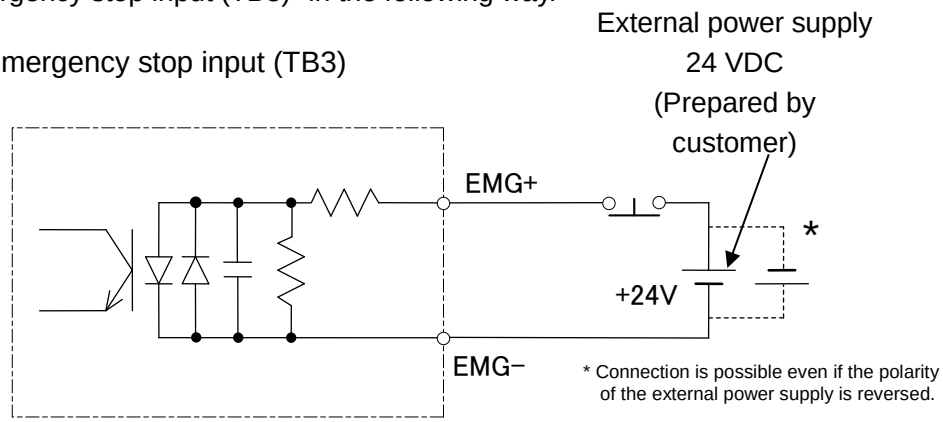
- Only one section of the drain (shielding wire) of the DeviceNet cable must be grounded to avoid ground loop problems. Also, ground the wire as close to the center of the network as possible.
- Primary AC power supply for the communication power supply must not be used among components such as motors and inverters. Those components must be driven by control power supply instead. Always insert a noise filter to the AC power supply input section as well.

For details of the laying of the communication cable, refer to the DeviceNet Laying Manual, etc.

2.4 IO Interface

Connect "emergency stop input (TB3)" in the following way.

2.4.1 Wiring of emergency stop input (TB3)



Rated voltage 24 V ±10%, rated current within 5 mA

Fig. 2.6 Connection example of emergency stop input (TB3)

- The emergency stop input will be effective as default setting. Refer to the "Instruction Manual for AX Series TS, TH, XS Types" (SMF-2006) for setting instructions.
- Emergency stop is a "b" contact input. Thus it will take effect when emergency stop input (TB3) becomes open.
  Emergency stop using DeviceNet communication will be effective when the input data is OFF.

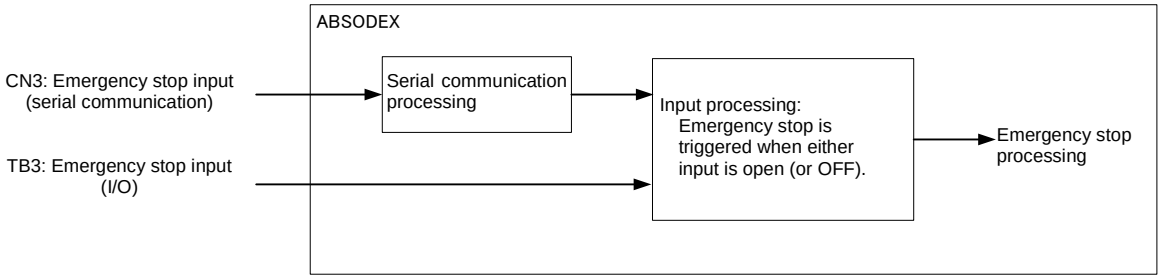


Fig. 2.7 Specification of emergency stop input

- Tow inputs, input terminal TB3 and DeviceNet communication CN3, are provided for the emergency stop inputs, and if one of the inputs becomes open (or OFF), it will be recognized as emergency stop.
  Input to TB3 is necessary to release the emergency stop.

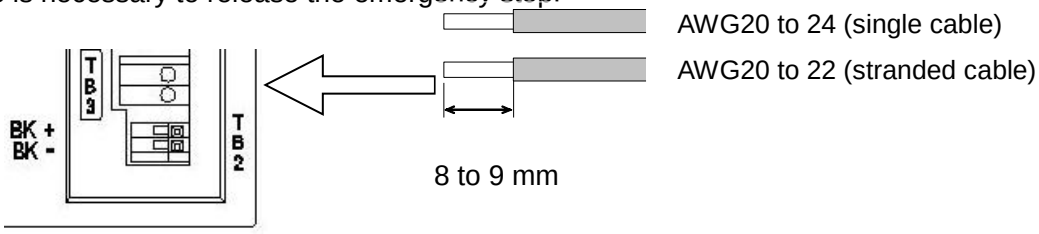


Fig. 2.8 Applicable cable to TB3 and peeling size

- The cable sheath peeling length should be 8 to 9 mm.
- The applicable cable is AWG20 to 24 (single cable) or AWG20 to 22 (stranded cable).

3. DeviceNet Communication Function

3.1 Communication Specifications

Table 3.1 Communication specifications

Item	Specifications
Power voltage (communication power)	11 to 25 VDC
Consumption current (communication power)	50 mA or less
Communication Protocol	DeviceNet conformed (remote I/O)
Number of occupied nodes	Input 8 bytes / output 8 bytes
Communication speed	500 k / 250 k / 125 kbps (select by parameter setting)
Connection cable	DeviceNet compatible cable (shielded 5-wire cable: 2 signal lines, 2 power lines, 1 shield)
Node address	0 to 63 (configured with parameter)
Number of connected modules	Max. 64 stations (including master)

3.2 Remote I/O

3.2.1 Basic format

The table below shows the basic format of command data sent from the host component (such as PLC) to a DeviceNet unit (ABSODEX) and response data sent from an ABSODEX to a host component.

Command data, response data are both 8-byte data.
With 3 bytes occupation, 0 to 2 bytes will be used and others will not be available.

Table 3.2 Format of command data (8 bytes)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	0.7	0.6	0.5	0.4	0.3	0.2	0.1	0.0
1	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.0
2	2.7	2.6	-	-	2.3	2.2	2.1	2.0
3	3.7	3.6	3.5	3.4	3.3	3.2	3.1	3.0
4	Monitor code							
5	Written data, lower 8 bits							
6	Command code							
7	Written data, upper 8 bits							

Table 3.3 Format of response data (8 bytes)

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	0.7	0.6	0.5	0.4	0.3	0.2	0.1	0.0
1	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.0
2	2.7	2.6	-	-	-	-	2.1	2.0
3	Response code							
4	Monitor data, lower 8 bits							
5	Monitor data, upper 8 bits							
6	Loaded data, lower 8 bits							
7	Loaded data, upper 8 bits							

3.2.2 8 bytes occupied (Input 8 bytes / output 8 bytes)

Table 3.4 Memory layout list (8 bytes occupied)

PLC → AX (command)

Byte No.	Signal name	Logic	Judgment
0.0	Program number selection input (bit 0)	Positive	Level
0.1	Program number selection input (bit 1)	Positive	Level
0.2	Program number selection input (bit 2)	Positive	Level
0.3	Program number selection input (bit 3)	Positive	Level
0.4	Program number selection input (bit 4) / Program number setting input, second digit	Positive	Edge Level
0.5	Program number setting input, first digit / Program number selection input (bit 5)	Positive	Edge Level
0.6	Reset input	Positive	Edge
0.7	Home return command input	Positive	Edge
1.0	Start input	Positive	Edge
1.1	Servo-on input / Program stop input	Positive	Level Edge
1.2	Ready return input / Continuous rotation stop input	Positive	Edge
1.3	Answer input / Position deviation counter reset	Positive	Edge
1.4	Emergency stop input	Negative	Level
1.5	Brake release input	Positive	Level
1.6	Jog operation input (CW direction) *1	Positive	Level
1.7	Jog operation input (CCW direction) *1	Positive	Level
2.0	Parameter number (bit 8) *2 /Movement unit selection input (bit 0) *3	Positive	Level
2.1	Parameter number (bit 9) *2 / Movement unit selection input (bit 1) *3	Positive	Level
2.2	Parameter number (bit 10) *2 / Movement speed unit selection input *3	Positive	Level
2.3	Table operation, data input operation Switching input	Positive	Level
2.4 2.5	Reserved	-	-
2.6	Monitor output execution request	Positive	Level
2.7	Command code execution request	Positive	Edge
3.0	Parameter number (bit 0) *2 / Reserved *3	Positive	Level
3.1	Parameter number (bit 1) *2 / Reserved *3	Positive	Level
3.2	Parameter number (bit 2) *2 / Reserved *3	Positive	Level
3.3	Parameter number (bit 3) *2 / Reserved *3	Positive	Level
3.4	Parameter number (bit 4) *2 / Reserved *3	Positive	Level
3.5	Parameter number (bit 5) *2 / Reserved *3	Positive	Level
3.6	Parameter number (bit 6) *2 / Reserved *3	Positive	Level
3.7	Parameter number (bit 7) *2 / Reserved *3	Positive	Level

AX → PLC (response)

Byte No.	Signal name	Logic
0.0	M code output (bit 0)	Positive
0.1	M code output (bit 1)	Positive
0.2	M code output (bit 2)	Positive
0.3	M code output (bit 3)	Positive
0.4	M code output (bit 4)	Positive
0.5	M code output (bit 5)	Positive
0.6	M code output (bit 6)	Positive
0.7	M code output (bit 7)	Positive
1.0	In-position output	Positive
1.1	Positioning completion output	Positive
1.2	Start input wait output	Positive
1.3	Alarm output 1	Negative
1.4	Alarm output 2	Negative
1.5	Indexing-in-progress output 1 / Home position output	Positive
1.6	Indexing-in-progress output 2 / Servo state output	Positive
1.7	Ready state output	Positive
2.0	Segment position strobe output	Positive
2.1	M code strobe output	Positive
2.2 to 2.5	Reserved	-
2.6	Monitoring	Positive
2.7	Command code execution complete	Positive

Note *1: Only the network operation mode can be used.
*2: Selected in the case of a table operation (command 2.3 = OFF).
*3: Selected in the case of a data input operation (command 2.3 = ON).

Table 3.5 Monitor code (command byte 4) list

Code No.	Monitored item	Data length	Unit	Range
01h	Current position in full rotation (deg.)	16 bits	× 10 [deg.]	0 to 3,599
03h	Current position in full rotation (pulse) TS TH	16 bits	1/32 [pulse]	0 to 16,895
	XS		1/128 [pulse]	0 to 32,767
05h	Position deviation amount	16 bits	[pulse]	-32,768 to 32,767
07h	Program number	16 bits	[No.]	0 to 999
08h	Electronic thermal	16 bits	× 100 [°C]	0 to 65,535
09h	Rotation speed	16 bits	[rpm]	-32,768 to 32,767
0Ah	Point table number	16 bits	[No.]	0 to 63
0Bh	Torque load factor *1	16 bits	[%]	0 to 110
0Ch	Angular acceleration *1	16 bits	[rad/s²]	-32,768 to 32,767

Note *1: Can be used only for TS type and TH type.

Table 3.6 Response code (response: byte 3) list *2

Code No.	Description	Details
0	Normal	The command code is executed normally.
1	Code error	A code not listed is executed.
2	Parameter selection error	A parameter number which cannot be loaded or set is specified.
3	Error in writing range	An excessive value is executed.
4	Timing error	The writing command code is executed during processing of the CN1 communication function.

Note *2: The response code is shared in the monitor, load command and writing command.

Table 3.7 Load command code (command byte 6) list

Code No.	Item/Function	Loaded data	
		Response: Byte 6	Response: Byte 7
10h	Current alarm loading	Alarm loading 1	Alarm loading 2
20h	Operation mode loading	Current operation mode No.	0 (fixed)
22h	Reading parameter (upper 16 bits) (RAM data)	Parameter set value [bit 23-16]	Parameter set value [bit 31-24]
23h	Reading parameter (lower 16 bits) (RAM data)	Parameter set value [bit 7-0]	Parameter set value [bit 15-8]
24h	Parameter loading (upper 16 bits)	Parameter set value [bit 23-16]	Parameter set value [bit 31-24]
25h	Parameter loading (lower 16 bits)	Parameter set value [bit 7-0]	Parameter set value [bit 15-8]

Load current alarm (10h)

Currently occurring alarm No. is loaded.
It is set as loaded data. Each byte indicates the type, and up to two alarms are specified.
Alarm indication is consistent to the 7-segment LED indication. The first digit indicates details of the alarm and the second digit indicates the alarm number. Alarms not expressed in 0 to F

Alarm H → "d"
Alarm L → "b"
Alarm P, U and others → "8"

Alarms are set in the order from "F" to "0."
In case of "no alarm," "00" is set.

Operation mode loading (20h)

The current operation mode is loaded.
The number of the operation mode is set in the loaded data.

Table 3.8 Loadable operation mode list

Operation mode	Loaded data Set value
Automatic operation mode	1
Single block mode	2
MDI (manual data input) mode	3
Jog mode	4
Servo OFF mode	5
Pulse string input mode	6
Network operation mode	7

Parameter loading (22h, 23h, 24h, 25h)

The set value of the parameter designated with the parameter number (command 3.7-3.0, 2.2-2.0) is loaded using an integer value. A parameter with a decimal value is loaded using a value multiplied by 100 or 10,000.
For details, refer to the "Parameter list" on page 3-7.

Table 3.9 Writing command code (command byte 6) list

Code No.	Item/Function	Written data	
		Command: Byte 5	Command: Byte 7
21h	Operation mode switching	Automatic operation number	0 (fixed)
26h	Parameter settings (top 16 bits) (RAM data only)	Parameter set value [bit 23-16]	Parameter set value [bit 31-24]
27h	Parameter settings (lower 16 bits) (RAM data only)	Parameter set value [bit 7-0]	Parameter set value [bit 15-8]
28h	Parameter setting (upper 16 bits)	Parameter set value [bit 23-16]	Parameter set value [bit 31-24]
29h	Parameter setting (lower 16 bits)	Parameter set value [bit 7-0]	Parameter set value [bit 15-8]
30h	Point table initialization	Table number initialized	0 (fixed)
31h	Parameter initialization	999 (lower 8 bits) = E7h	999 (upper 8 bits) = 03h

Operation mode switching (21h)

The mode is switched to the operation mode designated with written data.
The switchable modes and set values are as shown in the following.

Table 3.10 Switchable operation mode list

Operation mode	Written data set value
Automatic operation mode	1
Single block mode	2
Servo OFF mode	5
Network operation mode	7

Parameter settings (26h, 27h, 28h, 29h)

The set value of the parameter designated with the parameter number (command 3.7-3.0, 2.2-2.0) is rewritten to the value of written data. Written data are integer values only.
As for a parameter with a decimal value, set a value multiplied by 100 or 10,000.
For details, refer to the "Parameter list" on page 3-7.
Parameters are written when the command code is executed in the order of the upper 16 bits and the lower 16 bits.
The command code for parameter setting (RAM data only) rewrites only the data in RAM.

Point table initialization (30h)

Point tables designated with written data are initialized.
When the written data are 999, all point tables including shared tables are initialized.
The value after initialization is as shown in the following.

Table 3.11 Point tables after initialization

Type	Instruction	Movement unit	Movement speed unit	A code/P code	F code
Shared table	Absolute	× 1,000 [deg.]	× 1,000 [rpm]	-	-
Table number 0 to 63	Shared table	Shared table	Shared table	0	2,000

Parameter initialization (31h)

The set values of all parameters are initialized.
Parameter 61 (station number and baud rate setting) is not targeted.

● The program and parameters can be rewritten 100,000 times.

Table 3.12 Parameter list (1/2) *1

PRM No.	Name		Set range	Initial value	Unit
1	Cam curve		1 to 5	1	-
2	Acceleration/Deceleration time of MC2 curve		1 to 5,000	100	× 100 [sec]
3	Home position offset amount	TS TH	-540,672 to 540,672	0	[pulse]
		XS	-2,097,152 to 2,097,151		
4	Home positioning direction		1 to 3	1	-
5	Home positioning speed		100 to 2,000	200	× 100 [rpm]
6	Acceleration/Deceleration time of home positioning		10 to 200	100	× 100 [sec]
7	Home positioning stop		1, 2	2	-
8	Soft limit, Coordinate A (+ direction)	TS TH	-9,999,998 to 9,999,999	9,999,999	[pulse]
		XS	-99,999,998 to 99,999,999	99,999,999	
9	Soft limit, Coordinate B (− direction)	TS TH	-9,999,999 to 9,999,998	-9,999,999	[pulse]
		XS	-99,999,999 to 99,999,998	-99,999,999	
10	Effective/Ineffective of soft limit		1, 2	2	-
11	No answer time		1 to 100, 999	999	[sec]
12	Necessity/Unnecessity of M answer		1, 2	2	-
13	Answer input at time of positioning and home positioning completion		1, 2	2	-
14	Jog speed		1 to 10,000	200	× 100 [rpm]
15	Jog acceleration/deceleration time		10 to 200	100	× 100 [sec]
16	In-position range	TS TH	1 to 10,000	2,000	[pulse]
		XS	1 to 80,000	15,000	
17	Number of times of in-position sampling		1 to 2,000	1	[time]
18	Position deviation amount		Cannot be set	-	[pulse]
19	Upper limit value of position deviation amount	TS TH	1 to 540,672	4,000	[pulse]
		XS	1 to 4,194,304	30,000	
20	Speed over limit	AX2006TS AX2012TS AX2018TS	1 to 5,947	5,947	[rpm]
		AX1022TS AX1045TS AX4009TS AX4022TS AX4045TS	1 to 4,866	4,866	
		AX1075TS AX4075TS	1 to 2,883	2,883	
		AX1150TH AX1210TH	1 to 2,522	2,522	
		AX4150TH AX4300TH	1 to 1,982	1,982	
		AX4500TH	1 to 1,441	1,441	
		AX410WTH	1 to 630	630	
		AX7022XS AX7045XS	1 to 37,749	37,749	
21	Deceleration rate during emergency stop	TS TH	1 to 180, 999	999	[pulse/2 msec^2]
		XS	1 to 1,396, 9,999	9,999	
22	Delay time of emergency stop servo OFF		0 to 2,000	1,000	[msec]
23	Emergency stop input		1 to 3	3	-
24	Actuator temperature increase		Cannot be set	-	× 100 [°C]
25	Upper limit value of actuator temperature		Cannot be set	7,000	× 100 [°C]
27	Delay time after brake output	TS TH	0 to 1,000	100	[msec]
		XS		250	
28	Initial state of brake		1, 2	2	-
29	Mode when power is turned ON		1, 2, 6, 7	1	-
33	Indexing-in-progress output 1		0 to 99	0	[%]
34	Indexing-in-progress output 2		0 to 99	0	[%]
36	Switching of I/O program number selection method		1 to 5	1	-
37	Segment position range width of designation of indexes	TS TH	1 to 270,336	1,500	[pulse]
		XS	1 to 2,097,152	10,000	
38	Rotation direction at time of designation of indexes		1 to 4	3	-
39	Torque limitation		1 to 100	100	[%]

Note *1: Refer to the "Instruction Manual for AX Series TS, TH, XS Types" (SMF-2006) for the function of each parameter.

Table 3.12 Parameter list (2/2) *1

PRM No.	Name		Set range	Initial value	Unit
45	Coordinate recognition range when power is turned ON	TS TH	0 to 540,671	270,335	[pulse]
		XS	0 to 4,194,303	2,097,151	
46	Home position output range	TS TH	0 to 10,000	2,000	[pulse]
		XS	0 to 80,000	15,000	
47	Positioning completion output time		0 to 1,000	100	[msec]
48	Alarm deceleration stop		1, 2	2	-
51	In-position signal output mode		0, 1	0	-
52	I/O input signal, Function selection of CN3-14 (bit 9)		0, 1	0	-
53	I/O input signal, Function selection of CN3-15 (bit 10)		0, 1	0	-
54	I/O input signal, Function selection of CN3-16 (bit 11)		0, 1	0	-
56	I/O output signal, Function selection of CN3-46 (bit 13)		0, 1	0	-
57	I/O output signal, Function selection of CN3-47 (bit 14)		0, 1	0	-
62	Cut OFF frequency of low-pass filter 1	AX1000T series AX2000T series AX4009T AX4022T AX4045T AX7022X AX7045X	1,000 to 100,000	20,000	× 100 [Hz]
		AX4075T AX4150T AX4300T AX4500T AX410WT		10,000	
63	Cut OFF frequency of low-pass filter 2		1,000 to 100,000	50,000	× 100 [Hz]
64	Cut OFF frequency of notch filter 1		1,000 to 100,000	50,000	× 100 [Hz]
65	Cut OFF frequency of notch filter 2		1,000 to 100,000	50,000	× 100 [Hz]
66	Filter switch		0 to 15	1	-
67	Integration limiter	TS TH	1 to 540,672	100,000	[pulse]
		XS	1 to 4,194,304	770,000	
70	Value Q for notch filter 1		10 to 990	100	× 100 [-]
71	Value Q for notch filter 2		10 to 990	100	× 100 [-]
72	Integration gain magnification	AX1000T series AX2000T series AX4009T AX4022T AX4045T AX7022X AX7045X	10 to 1,000	100	× 100 [-]
		AX4075T AX4150T AX4300T AX4500T AX410WT	10 to 1,000	30	× 100 [-]
75	Delay Time When Turning On Power		0,3000	0	[msec]
80	Integration gain		0 to 320,000	0	× 10,000 [-]
81	Proportion gain		0 to 5,120,000	0	× 10,000 [-]
82	Differentiation gain		0 to 20,480,000	0	× 10,000 [-]
83	Auto tuning command		1 to 32	0	-
87	Auto tuning torque	AX1022T AX1045T AX2000T series	0 to 8,192	500	-
		AX1075T AX1150T AX1210T AX4000T series AX7022X AX7045X		1,000	
88	Auto tuning measurement start speed	TS	0 to 1,000	100	[pulse/msec]
		XS	0 to 8,000	800	
89	Auto tuning measurement completion speed	TS	0 to 1,000	700	[pulse/msec]
		XS	0 to 8,000	5,500	

Note *1: Refer to the "Instruction Manual for AX Series TS, TH, XS Types" (SMF-2006) for the function of each parameter.

3.2.3 3 bytes occupied (Input 3 bytes / output 3 bytes)

Table 3.13 Memory layout list (3 bytes occupied)

PLC → AX (command)

Byte No.	Signal name	Logic	Judgment
0.0	Program number selection input (bit 0)	Positive	Level
0.1	Program number selection input (bit 1)	Positive	Level
0.2	Program number selection input (bit 2)	Positive	Level
0.3	Program number selection input (bit 3)	Positive	Level
0.4	Program number setting input, second digit / Program number selection input (bit 4)	Positive	Edge Level
0.5	Program number setting input, first digit / Program number selection input (bit 5)	Positive	Edge Level
0.6	Reset input	Positive	Edge
0.7	Home return command input	Positive	Edge
1.0	Start input	Positive	Edge
1.1	Servo-on input / Program stop input	Positive	Level Edge
1.2	Ready return input / Continuous rotation stop input	Positive	Edge
1.3	Answer input / Position deviation counter reset	Positive	Edge
1.4	Emergency stop input	Negative	Level
1.5	Brake release input	Positive	Level
1.6	Jog operation input (CW direction) *1	Positive	Level
1.7	Jog operation input (CCW direction) *1	Positive	Level
2.0 to 2.7	Reserved *2	-	-

AX → PLC (response)

Byte No.	Signal name	Logic
0.0	M code output (bit 0)	Positive
0.1	M code output (bit 1)	Positive
0.2	M code output (bit 2)	Positive
0.3	M code output (bit 3)	Positive
0.4	M code output (bit 4)	Positive
0.5	M code output (bit 5)	Positive
0.6	M code output (bit 6)	Positive
0.7	M code output (bit 7)	Positive
1.0	In-position output	Positive
1.1	Positioning completion output	Positive
1.2	Start input wait output	Positive
1.3	Alarm output 1	Negative
1.4	Alarm output 2	Negative
1.5	Indexing-in-progress output 1 / Home position output	Positive
1.6	Indexing-in-progress output 2 / Servo state output	Positive
1.7	Ready state output	Positive
2.0	Segment position strobe output	Positive
2.1	M code strobe output	Positive
2.2 to 2.7	Reserved	-

Note *1: Can be used only for the network operation.
*2: Monitor function cannot be used with 3 bytes occupied.

3.3 Data Communication Timing Chart

3.3.1 Monitor code

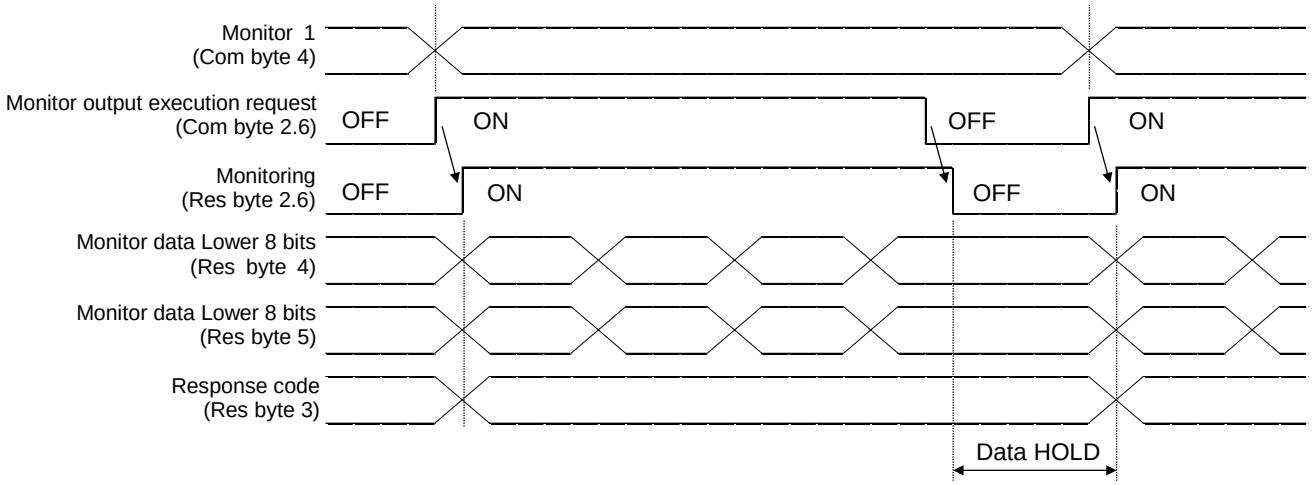


Fig. 3.1 Timing chart for monitor code execution

Entering monitor (command byte 4) as monitor codes and turning the monitor output execution request (command byte 2.6) will set the following data.
All 16-bit data pieces will be divided into the upper 8 bits and lower 8 bits and stored in the memory.
All data is in hexadecimals. At this time, the monitoring signal (response byte 2.6) is turned ON simultaneously.

Monitor data, lower 8 bits (response byte 4): Lower 8 bits of data requested with monitor (command byte 4)
Monitor data, upper 8 bits (response byte 5): Upper 8 bits of data requested with monitor (command byte 4)

If there is no data at "response byte 5", the sign is acquired.
The sign is "00" in case of "+" while it is "FF" in case of "-."
The monitor data acquired in remote registers are always updated while the monitoring signal (response byte 2.6) remains turned ON.
If the monitoring signal (response byte 2.6) is turned OFF, monitor data (response byte 4 and 5) will be held.
If a monitor code not included in specifications is set on monitor (command byte 4), an error code (□1) will be set in the response code.

3.3.2 Command code

i) Load command code

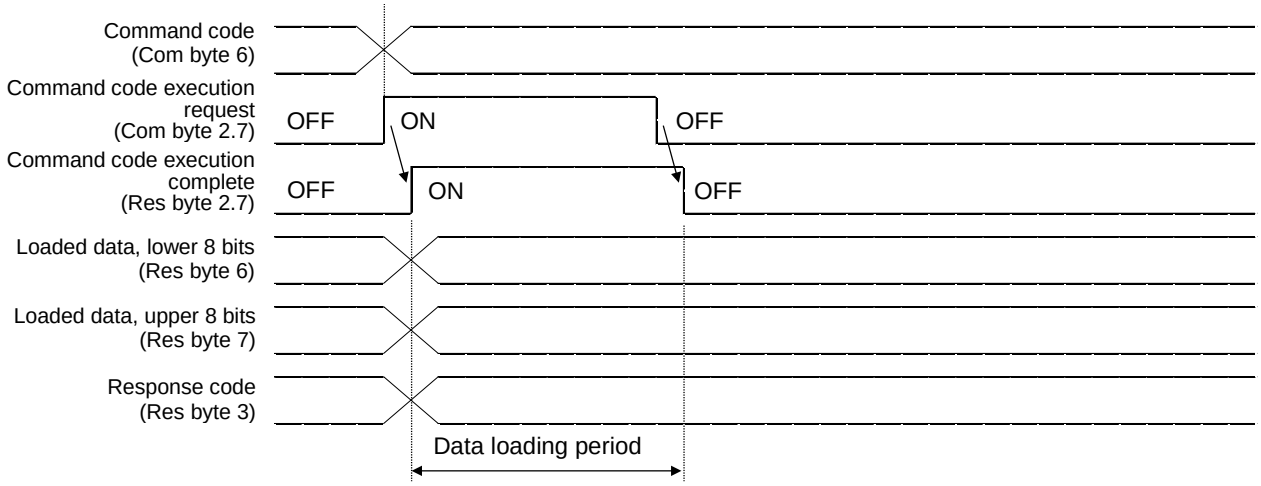


Fig. 3.2 Timing chart for load command code execution

Enter the load command code as command code (command byte 6), enter the parameter number as necessary and turn the command code execution request (command byte 2.7) ON to acquire the data corresponding to the specified loading code in load data (response byte 6, 7).
All 16-bit data pieces will be divided into the upper 8 bits and lower 8 bits and stored in the memory. All data is in hexadecimals.
At this time, the command code execution completion (response byte 2.7) is turned on simultaneously.
Load data from (response byte 6, 7) while the command code execution request (command byte 2.7) remains turned ON.
The data is held until the next load command code is entered and the command code execution request (command byte 2.7) is turned ON.
If a command code not included in specifications is set as a command code (command byte 6), an error code (1□) is set in the response code. If a parameter that cannot be used is loaded, an error (2□) is set.
Turn the command code execution request (command byte 2.7) off after data loading is finished.

ii) Writing command code

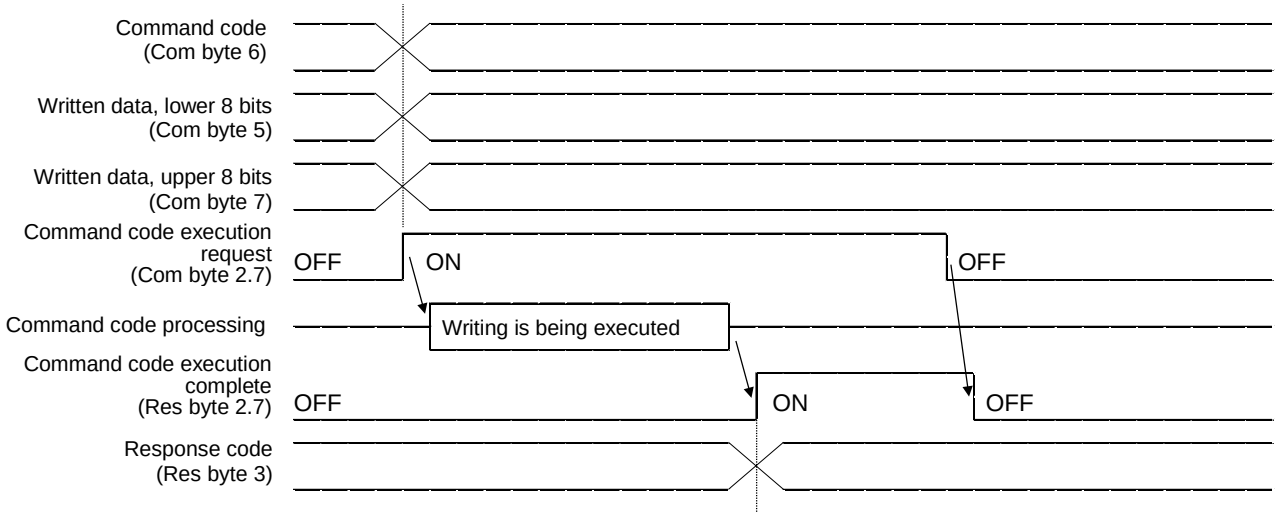


Fig. 3.3 Timing chart for writing command code execution

Set the writing command code as a command code (command byte 6) and set the written data as written data (command byte 5, 7) and, as necessary, a parameter number.
Turn on the command code execution request (command byte 2.7) and write into data designated with the command code. Written 16-bit data pieces will be divided into the upper 8 bits and lower 8 bits and stored in the memory.
All data is in hexadecimals. After writing, the command code execution completion (response byte 2.7) is turned ON. If a command code not included in specifications is set as a command code (command byte 6), an error code (1□) is set in the response code.
If a user tries to write into a parameter that cannot be set by parameter setting, an error code (2□) is set.
If a user tries to write an excessive value, an error code (3□) is set.
If the writing command code is executed during the processing of the communication command input into CN1, an error code (4□) is set.
Turn the command code execution request (command byte 2.7) off after the command code execution completion (response byte 2.7) is turned ON.

3.3.3 Response code

If the monitor code or command code specified in the memory is out of the allowable setting range, an error code is specified as a response code (response byte 3). If they are normal, "00" is set.

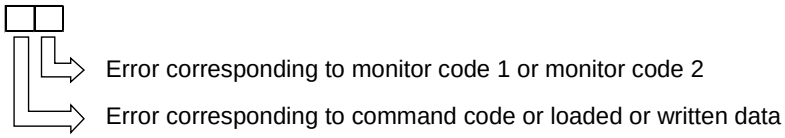


Fig. 3.4 Description of error of response code

3.4 Defining the DeviceNet Register

Set the station number and baud rate using AX Tools Ver 2.12 or later.
The default station number is 63, the default baud rate is 2 (500 kbps) and the default I/O size is 0 (8 byte).

i) DeviceNet setting screen

Select "Setting" > "Communication field selection" > "DeviceNet" from the menu of the AX Tools to open the "DeviceNet Setting Register" screen.

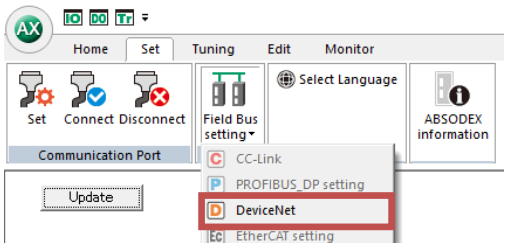


Fig. 3.5 Setting menu of AX Tools

ii) DeviceNet register

Check that a value is displayed on the DeviceNet register setting and select "Setting (ABSODEX)".

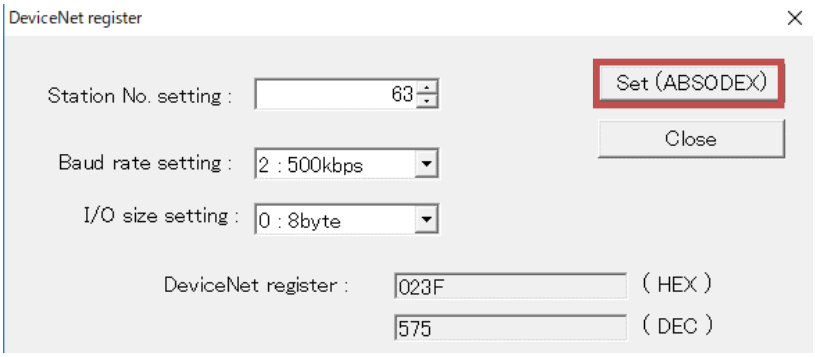


Fig. 3.6 Setting screen of DeviceNet register

<Station No. setting>
The current station number setting is displayed. Enter the new station number in the range from 0 to 63.
<Baud rate setting>
The current baud rate setting is displayed. Select the desired one among 0 (125 kbps), 1 (250 kbps), 2 (500 kbps).
<I/O size setting>
The current I/O size setting is displayed. Select the desired one among 0 (8 bytes), 1 (3 bytes).
* The default setting of the EDS file is 8 bytes. Change the setting of the host (PLC) manually when using with 3 bytes.
<DeviceNet register>
The specified values of the station number, baud rate and I/O registers are displayed.
<Set (ABSODEX)>
Click on this button to transfer new data to the register of ABSODEX.
<Close>
Click on this button to close the screen.

iii) End of setting

After the settings are normally entered, a completion screen is displayed.
Shutdown and restart the power after finishing configuration.
Settings for station No. and baud rate will take effect after the power has been restarted.

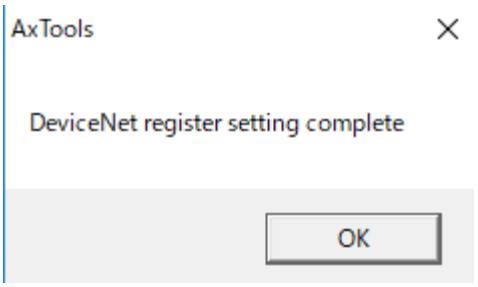


Fig. 3.7 Screen for end of setting

iv) Error in setting

The following screen is displayed if there is an error in the station number setting.

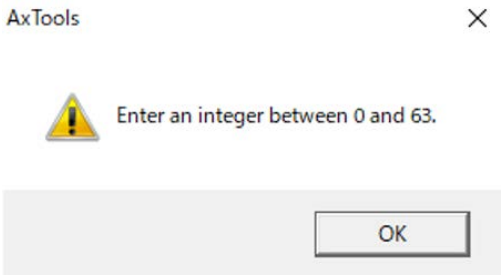


Fig. 3.8 Warning screen at time of error setting of station number

If the system is initialized, DeviceNet register settings will return to default settings.
Set the DeviceNet register setting again after initializing the system.

3.5 Monitoring the DeviceNet Communication State

The communication state can be monitored using AX Tools Ver. 2.10 or later.

i) I/O view

From the AX Tools menu, select "Monitor" > "Display I/O signal status".
Display the "I/O display" screen.

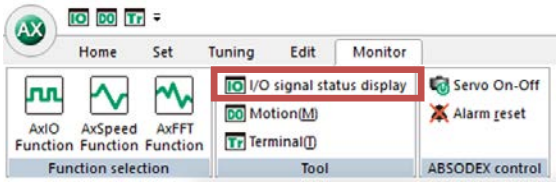


Fig. 3.9 AX Tools monitor menu

ii) I/O check

The I/O state by DeviceNet communication can be monitored.
"*" shows negative logic, thus, the I/O indication will indicate ON when it is open.

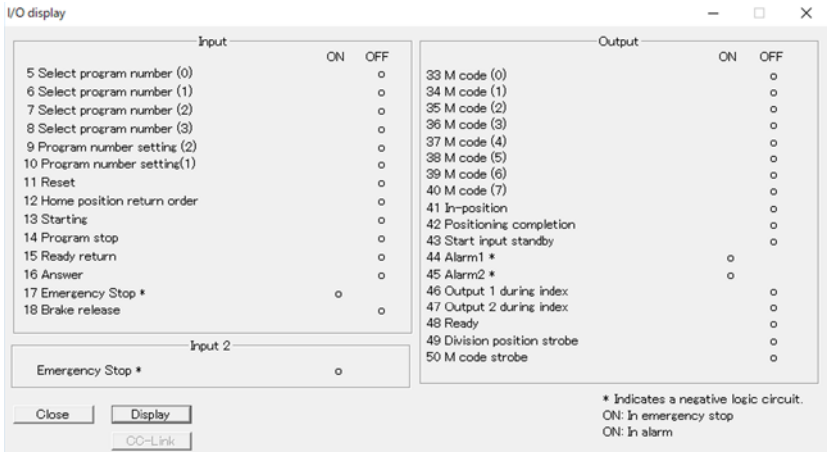


Fig. 3.10 Screen example of I/O indication

3.6 LED Indication

The state of the module and that of the network can be displayed. See the description in the following table for the LED indication.

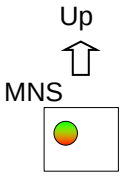


Fig. 3.11 Name of LED

Table 3.14 LED specification list

LED	Color	Description of indication
MNS	Green /Red	The Module/Network status is indicated with a combination of the green and red LEDs. The error status is indicated.

Table 3.15 LED state list

MNS	Contents	Remarks
●	Device Not Powered/Not On–line -> The device may not be powered.	• Check the wiring and turn on the control power. • Check the wiring and turn on the communication power.
○ Green	This shows the correct status.	-
⊙ Green	Waiting for establishment of the connection from the master	-
⊙ Red	Any one or more of the following conditions	After checking the following items, restart the slave.
○ Red	The device has an unrecoverable fault -> Bus-off (communication stop status due to frequent occurrence of data error)	• Check whether the communication speed of the master is the same as that of the slave (slave station). • Check whether the cable length (main line and branch line) is appropriate. • Check whether the cable has no wire breakage and looseness. • Check whether the terminating resistors are connected only to both ends of the trunk line. • Check whether large noise is generated frequently.
○ Red	The device has an unrecoverable fault -> Duplicate node address	After correcting the settings so that the node address is not duplicated, turn ON the control power.
⊙Red/ Green	Network access error	After checking that the status of master, turn ON the communication power.

○: Lit, ●: Unlit, ⊙: Blink

3.7 7-segment LED Indication

A station number is indicated on the 7-segment LED. The flow after the power is turned ON is as shown in the following.

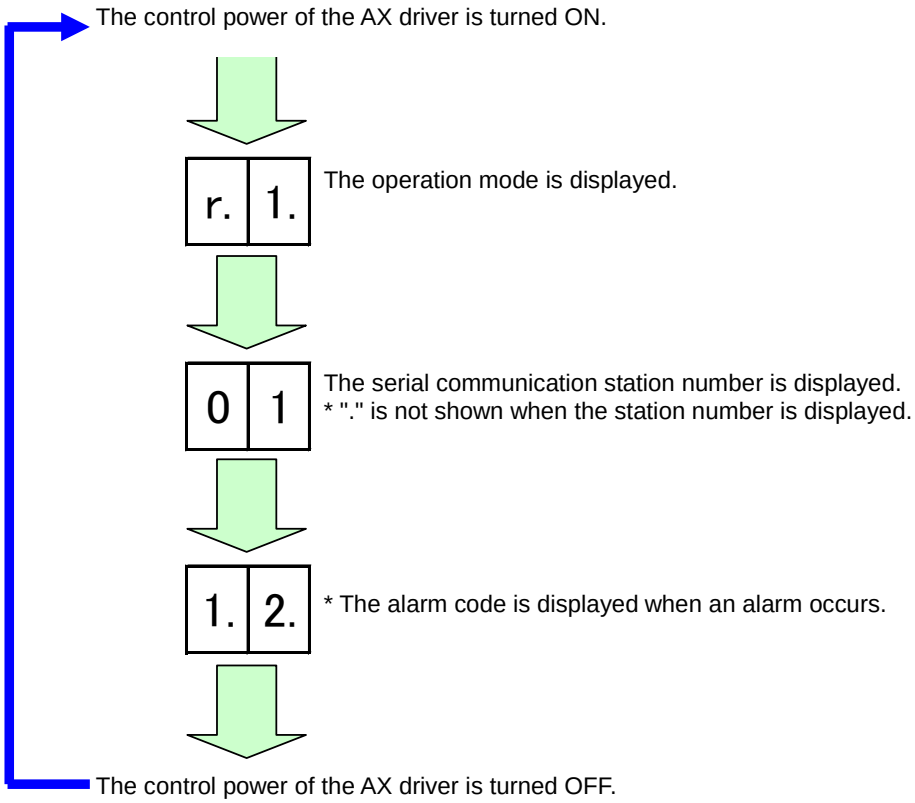


Fig. 3.12 7-segment LED indication specifications

4. Network Operation Mode

The network operation mode is an operation mode which can be used for wiring saving specification-U4 (DeviceNet).
However, TS type and TH type can be used with software version 4.02.00GS3 or later.

4.1 Point Table Operation

The point table operation use point table data in the ABSODEX driver to operate.
As for point table data, point table data can be referred to and set from the PLC.

4.1.1 Operation method

i) Set a point table.
Set it using AX Tools Ver. 2.12 or later or a command code.
A command code can be used only in the network operation mode.

ii) Operation mode switching
Switch the operation mode to the "network operation mode".
The switching method can be performed by any of the following.
- Send communication command "M7".
- Set PRM29 (mode when power is turned ON) = 7 and restart the control power.
- Switch using a command code (21h).

iii) Switch to a table operation.
Turn OFF the table operation and data input operation switching input (command byte 2.3).
OFF : Table operation
ON : Data input operation

iv) Selection of point table
For selection, use a program number selection input (command byte 0.0 to 0.5).
The selection method is a method set in PRM36 (switching of I/O program number selection method). The selection range of a point table is 0 to 63.

v) Start of point table
Execute the point table being selected by turning ON the start input.

4.1.2 Point table data

In the point tables, there are data of shared tables and tables 0 to 63.
Respective data can load and write values with communication codes and command codes from the PLC as with parameters.

Table 4.1 Point table data list (1/2)

Table No.	Corresponding PRM No.	Description	Set range	Initial value
-	197	Instruction of shared table	1 to 6	1
		1: Absolute dimension (G90) 2: Full rotation absolute dimension (G90.1) 3: CW direction rotation absolute dimension (G90.2) 4: CCW direction rotation absolute dimension (G90.3) 5: Incremental dimension (G91) 6: Full rotation incremental dimension (G91.1)		
-	198	Movement unit of shared table	1 to 3	1
		1: Angle unit (G105) 2: Pulse unit (G104) 3: Index unit (G106)		
-	199	Movement speed unit of shared table	1 to 2	1
		1: Rotation speed (G10) 2: Time (G11)		
0	200	Instruction	0 to 11	0
		0: Instruction set to shared table 1: Absolute dimension (G90) 2: Full rotation absolute dimension (G90.1) 3: CW direction rotation absolute dimension (G90.2) 4: CCW direction rotation absolute dimension (G90.3) 5: Incremental dimension (G91) 6: Full rotation incremental dimension (G91.1) 7: Home positioning (G28) 8: Designation of number of segments (G101) 9: Change of magnification of gain (G12) 10: Brake activation (M68) 11: Brake release (M69)		
	201	Movement unit	0 to 3	0
		0: Movement unit set to shared table 1: Angle unit (G105) 2: Pulse unit (G104) 3: Index unit (G106)		
	202	Movement speed unit	0 to 2	0
		0: Movement speed unit set to shared table 1: Rotation speed (G10) 2: Time (G11)		

Table 4.1 Point table data list (2/2)

Table No.	Corresponding PRM No.	Description		Set range	Initial value
0	203	A code/P code	TS TH	-540,672 to 540,672	0
			XS	-4,194,302 to 4,194,304	0
		Set the set values (values equivalent to A code and P code of NC program) within the following range according to the instruction and movement unit within the following range. Angle : -360,000 to 360,000 × 1,000 [deg.] Pulse TS TH : -540,672 to 540,672 [pulse] XS : -4,194,304 to 4,194,304 [pulse] Number of indexes and segments : 1 to 255 [Number of indexes and segments] Gain magnification : 0, 50 to 200 [%]			
	204	F code *1	TS TH	10 to 300,000	2,000
			XS	10 to 240,000	2,000
		Set the set values (values equivalent to F code of NC program) within the following range according to the instruction and movement speed unit. Rotation speed TS TH : 110 to 300,000 × 1,000 [rpm] XS : 110 to 240,000 × 1,000 [rpm] Time : 10 to 100,000 × 1,000 [sec]			
n (1 to 63)	200 + 5 × n	Instruction		0 to 11	0
		Refer to the explanation of the instruction of table 0.			
	201 + 5 × n	Movement unit		0 to 3	0
		Refer to the explanation of the movement unit of table 0.			
	202 + 5 × n	Movement speed unit		0 to 2	0
		Refer to the explanation of the movement speed unit of table 0.			
	203 + 5 × n	A code/P code	TS TH	-540,672 to 540,672	0
			XS	-4,194,304 to 4,194,304	0
		Refer to the explanation of the A code/P code of table 0.			
	204 + 5 × n	F code	TS TH	10 to 300,000	2,000
			XS	10 to 240,000	2,000
		Refer to the explanation of the F code of table 0.			

Note *1: In the NC program, the initial value of the movement speed unit is the movement time [sec]. In the point table, the initial value is the rotation speed [rpm].

One table consists of five items, "Instruction", "Movement unit", "Movement speed unit", "A code/P code" and "F code". Required items vary depending on the description of the instruction.

Table 4.2 Network operation mode instruction combination list

Instruction	Movement unit	Movement speed unit	A code/P code	F code
Absolute (G90)	○	○	○	○
Full rotation absolute (G90.1)	○	○	○	○
CW direction absolute (G90.2)	○	○	○	○
CCW direction absolute (G90.3)	○	○	○	○
Incremental (G91)	○	○	○	○
Full rotation incremental (G91.1)	○	○	○	○
Home positioning (G28)	×	×	×	×
Designation of number of segments (G101)	×	×	○	×
Change of magnification of gain (G12)	×	×	○	×
Brake activation (M68)	×	×	×	×
Brake release (M69)	×	×	×	×

4.1.3 Point table setting example

- Turning operation using shared table

Table 4.3 NC program, Operation instruction equivalent to G90G105G11A90F3

Table	Description	Set value	Contents
Shared table	Instruction	1	Absolute dimension
	Movement unit	1	Angle unit
	Movement speed unit	2	Time
n	Instruction	0	Move to 90 degrees in absolute coordinates in 3 seconds (Absolute, angular, and velocity units set in the common table are used.)
	Movement unit	0	
	Movement speed unit	0	
	A code /P code	90,000	
	F code	3,000	

When the set values of the instruction, movement unit and movement speed unit of tables 0 to 63 are 0 (initial value), the setting set to the shared table is used. In this case, the operation descriptions of tables 0 to 63 can be changed only by changing the set values of the shared table.
If you want to execute an operation different from the shared table, set the set values of the instruction, movement unit and movement speed unit of tables 0 to 63 to values other than 0.

- Operation not using shared table

Table 4.4 NC program, Operation instruction equivalent to G91G104G11A-50,000F1

Table	Description	Set value	Contents
Shared table	Instruction	1	Absolute dimension
	Movement unit	1	Angle unit
	Movement speed unit	1	Rotation speed
n	Instruction	5	Move from current position to -50,000 pulse position in 1 second (Commands, moving units, and speed units different from the common table are used.)
	Movement unit	2	
	Movement speed unit	2	
	A code/P code	-50,000	
	F code	1,000	

- Home positioning

Table 4.5 NC program, Operation instruction equivalent to G28

Table	Description	Set value	Contents
n	Instruction	7	Home positioning
	Movement unit	-	Set values are ignored. Hereinafter written as "–"
	Movement speed unit	-	
	A code/P code	-	
	F code	-	

- Designation of number of segments

Table 4.6 NC program, Operation instruction equivalent to G101A4

Table	Description	Set value	Contents
n	Instruction	8	Designation of number of segments
	Movement unit	-	-
	Movement speed unit	-	
	A code/P code	4	Number of segments 4
	F code	-	-

- Change of magnification of gain

Table 4.7 NC program, Operation instruction equivalent to G12P0

Table	Description	Set value	Contents
n	Instruction	9	Change of magnification of gain
	Movement unit	-	-
	Movement speed unit	-	
	A code/P code	0	0%
	F code	-	-

- Brake activation

Table 4.8 NC program, Operation instruction equivalent to M68

Table	Description	Set value	Contents
n	Instruction	10	Brake activation
	Movement unit	-	-
	Movement speed unit	-	
	A code/P code	-	
	F code	-	

- Brake release

Table 4.9 NC program, Operation instruction equivalent to M69

Table	Description	Set value	Contents
n	Instruction	11	Brake release
	Movement unit	-	-
	Movement speed unit	-	
	A code/P code	-	
	F code	-	

4.2 Data Input Operation

In a data input operation, ABSODEX is operated using reception data from the PLC. Consequently, the operation description of ABSODEX can be changed only by changing the communication data from the PLC.

4.2.1 Operation method

i) Switch the operation mode.
Switch the operation mode to the "network operation mode".
The switching method can be performed by any of the following.
- Send communication command "M7".
- Set PRM29 (mode when power is turned on) = 7 and restart the control power.
- Switch using a command code (21h).

ii) Switch to a table operation.
Turn ON the table operation and data input operation switching input (command byte 2.3).
OFF : Table operation
ON : Data input operation

iii) Setting of operation description
Set the instruction, movement unit and movement speed unit.
Then send values equivalent to the A code/P code and F code.

iv) Start by data input operation
The operation set in iii) is executed by changing the status of start input to ON.

4.2.2 Input data

Table 4.10 Instruction list

Set value (command)				Description
0.3	0.2	0.1	0.0	
0	0	0	0	Absolute dimension (G90)
0	0	0	1	Full rotation absolute dimension (G90.1)
0	0	1	0	CW direction rotation absolute dimension (G90.2)
0	0	1	1	CCW direction rotation absolute dimension (G90.3)
0	1	0	0	Incremental dimension (G91)
0	1	0	1	Full rotation incremental dimension (G91.1)
0	1	1	0	Home positioning (G28)
0	1	1	1	Designation of number of segments (G101)
1	0	0	0	Change of magnification of gain (G12)
1	0	0	1	Brake activation (M68)
1	0	1	0	Brake release (M69)

Table 4.11 Movement unit list

Set value (command)		Description
2.1	2.0	
0	0	Angle unit (G105)
0	1	Pulse unit (G104)
1	0	Index unit (G106)

Table 4.12 Movement speed unit

Set value (command)	Description
2.2	
0	Rotation speed (G10)
1	Time (G11)

Table 4.13 A code/P code list

Set value (command)		Description		
Byte 6	Byte 7			
Lower 8 bits	Upper 8 bits	Angle	: -3,600 to 3,600	× 10 [deg.]
		Pulse	: -32,768 to 32,767	[pulse]
		Number of indexes and segments: 1 to 255 [Number of indexes and segments]		
		Gain magnification: 0, 50 to 200		[%]

Table 4.14 F code list

Set value		Description		
Byte 3	Byte 5			
Lower 8 bits	Upper 8 bits	Rotation speed	TS TH : 11 to 30,000	× 100 [rpm]
			XS : 11 to 24,000	× 100 [rpm]
		Time	: 10 to 30,000	× 1,000 [sec]

In input data used for a data input operation, there are five items, "Instruction", "Movement unit", "Movement speed unit", "A code/P code" and "F code".
Required input data items vary depending on the description of the instruction. For details, refer to "Network Operation Mode, Instruction Combination List" on page 4-4.

4.2.3 Input data setting examples

- Moves 90 degrees from the current position in the CW direction in 1 sec.

Table 4.15 NC program, Operation instruction equivalent to G91.1G105G11A90F1

Command	Set value	Description
0.0	1	Full rotation incremental dimension (G91.1)
0.1	0	
0.2	1	
0.3	0	
2.0	0	Angle unit (G105)
2.1	0	
2.2	1	Time (G11)
Byte 6	84h	0384h = 900 (unit: × 10 [deg.]) = 90 degrees
Byte 7	03h	
Byte 3	E8h	03E8h = 1,000 (unit: × 1,000 [sec]) = 1 sec
Byte 5	03h	

- Change the gain magnification to 100.

Table 4.16 NC program, Operation instruction equivalent to G12P100

Command	Set value	Description
0.0	0	Change of magnification of gain (G12)
0.1	0	
0.2	0	
0.3	1	
0.4	-	-
0.5	-	
0.6	-	
0.7	0064h	0000 0064h = 100%
0.8	0000h	
0.9	-	-

--- MEMO ---