ZEF006261500

ezABSO®

CC-Link IE TSN

EZA-MACTS-02C

Specifications & Instruction Manual

CE

CONTENTS

INTRODUCTION

Thank you very much for purchasing our product. Before operating this product, be sure to carefully read this manual so that you may fully understand the product, safety instructions and precautions.

- Please submit this manual to the operators actually involved in operation.
- Please keep this manual in a handy place.

RELATED MANUALS

The following instruction manuals are available for this product.
Referring to the table below, get an applicable instruction manual as required.

Manual name	Document No.
EZA-MACTS-02C Reference Manual for SLMP	ZEF0062616**
EZA-MACTS-02C Network Configuration Setting Manual (For RJ71GN11-T2)	ZEF0062617**
ezSCOPE Specifications & Instruction Manual	ZEF0058901**

**: Revision number

TERMS

This manual uses the following terms.

Term	Description
EZA-MACTS	Abbreviation for EZA-MACTS-02C
Engineering tool	It is an engineering software "GX Works3" from Mitsubishi Electric Corporation.
Network synchronous communication	It is CC-Link IE TSN network synchronous communication.

Depending on the version of the engineering tool, the term used in this manual may be different from the term on the screen.

Term on screen	Term after change
Slave station	Device station
Configuration tool	Engineering tool

For other terms described in the manuals provided by Mitsubishi Electric Corporation, refer to those manuals.

TRADEMARKS

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- Other companies' and products' names are either trademarks or registered trademarks of each company.
- In some cases, trademark symbols (TM, ®) are not specified in this manual.

GENERAL SAFETY RULES

● Application Limitation

This product is not designed to be used under any situation affecting human life. When you are considering using this product for special purposes such as medical equipment, aerospace equipment, nuclear power control systems, traffic systems, and etc., please consult with NSD.

This product is designed to be used under the industrial environments categorized in Class A device. The supplier and user may be required to take appropriate measures.

● Signal Words

Safety precautions in this manual are classified into WARNING and CAUTION.

Symbol	Meaning
⚠ WARNING	Incorrect handling may cause a hazardous situation that will result in death or serious injury.
⚠ CAUTION	Incorrect handling may cause a hazardous situation that will result in moderate injury or physical damage.

Instructions accompanied by a symbol ⚠ CAUTION may also result in serious damage or injury. Be sure to follow the all instructions accompanied by the symbol.

● Graphic Symbols

Symbol	Meaning
⃠	Indicates prohibited items.
❗	Indicates items that must be performed to.

1. Handling Precautions

⚠ WARNING	
⚡	- Do not touch components inside of ezABSO; otherwise, it may cause electric shock.
⃠	- Do not touch to ezABSO during operation; otherwise, it may cause injury. - Do not damage the cable by applying excessive load, placing heavy objects on it, or clamping; otherwise, it may cause electric shock or fire.
❗	- Turn the power supply OFF before wiring, transporting, and inspecting ezABSO; otherwise, it may cause electric shock. - Provide an external safety circuit so that the entire system functions safely even when ezABSO is faulty.

⚠ CAUTION	
⃠	- Do not use ezABSO in the following places; the atmosphere of the corrosion, the atmosphere of the flammable vapor, and the side of the combustibility. Doing so may result in fire or ezABSO may become faulty. -Do not use in areas where strong magnetic fields exist; otherwise, it may cause injury or malfunction.
❗	- Be sure to use ezABSO in the environment designated by the general specifications in the manual. Failure to do so may result in electric shock, fire, malfunction or ezABSO failure. - Be sure to use the specified combination of ezABSO and cable; otherwise, it may cause fire or ezABSO failure.

2. Transport

⚠ CAUTION	
⃠	- Do not hold the cable or shaft of ezABSO during transport; otherwise, it may cause injury or failure.

3. Storage

⚠ CAUTION	
⃠	- Do not store ezABSO in a place exposed to water, or toxic gas and liquid. - Do not to store in areas where strong magnetic fields exist.
❗	- Be sure to store ezABSO in locations not exposed to direct sunlight or within the specified temperature and humidity. - Be sure to consult with NSD when ezABSO is stored for long periods.

4. Installation

⚠ CAUTION	
⃠	- Do not step on ezABSO or place heavy objects on ezABSO; otherwise, it may cause injury or malfunction. - Do not subject ezABSO to strong impact shocks; otherwise, it may cause ezABSO failure.
❗	- Be sure that ezABSO mounting adequately supports its weight. Failure to do so may result in ezABSO falling and possibly causing injury. -Mount ezABSO in the prescribed manner. Failure to do so may cause ezABSO to fall or malfunction, possible resulting in injury. -Be sure to use a coupling device to link shafts; otherwise, it may cause injury, malfunction, or ezABSO failure.

5. Wiring

⚠ CAUTION	
❗	- Be sure to keep the cable at least 300 mm away from the power line; otherwise, it may malfunction. - Be sure to connect all cables correctly; otherwise, it may cause malfunction or ezABSO failure.

6. Operation

⚠ CAUTION	
⃠	- Do not change the ezABSO's function switch settings during the operation; otherwise, it may cause injury. - Do not approach the machine after instantaneous power failure has been recovered. Doing so may result in injury if the machine starts abruptly.
❗	- Be sure to check that the power supply specifications are correct; otherwise, it may cause ezABSO failure. - Be sure to provide an external emergency stop circuit so that operation can be stopped with power supply terminated immediately. - Be sure to conduct independent trial runs for ezABSO before mounting ezABSO to the machine; otherwise, it may cause injury. - When an error occurs, be sure to eliminate the cause, ensure safety, and reset the error before restarting operation; otherwise, it may cause injury.

7. Maintenance and Inspection

⚠ CAUTION	
⃠	- Do not disassemble, remodel, or repair ezABSO; otherwise, it may cause electric shock, fire, and ezABSO failure.

8. Disposal

⚠ CAUTION	
⃠	- Be sure to handle ezABSO as industrial waste while disposing of it.

REVISION HISTORY

The Document No. appears at the upper right of this manual's cover page.

Document No.	Date	Revision Description
ZEF006261500	14, Apr., 2025	1st Edition Japanese document: ZEF006261001

- MEMO -

1. OVERVIEW

EZA-MACTS is a multi-turn type rotary encoder which adopts the electromagnetic induction method.
A converter is incorporated in the sensor, and the machine positions can be detected by only a sensor unit.
The CC-Link IE TSN network is used for communicating with the host controller.

1-1. Features

(1) Long-life

No electrolytic capacitor, light-emitting element, light-receiving element, and variable resistor are used.

(2) Superior durability

Withstands vibrations and impact shocks because the EZA-MACTS does not have a glass slit plate.

(3) Position data

Detects maximum 8,778 turns of the position data.
The maximum divisions per turn are 262,144 divisions. (The value can be changed by the parameter.)

(4) Connection with the CC-Link IE TSN

The following data can be transmitted via CC-Link IE TSN.

- Position data
- Speed data
- Error and alarm
- Preset data
- Parameter data

Also, the CC-Link IE TSN network synchronous communication function enables highly accurate synchronous operation with other devices connected to the same network.

(5) Error and alarm detection function

The errors and alarms of EZA-MACTS can be checked by "master station of CC-Link IE TSN" or "ezSCOPE".

(6) Current position preset function

The position data can be changed to any desired value from the master station of CC-Link IE TSN.

(7) Parameter

The parameters of EZA-MACTS can be set by using the engineering tool or the web server function.
Also, EZA-MACTS can be easily replaced by using the parameter automatic setting function of the engineering tool.

(8) ezSCOPE

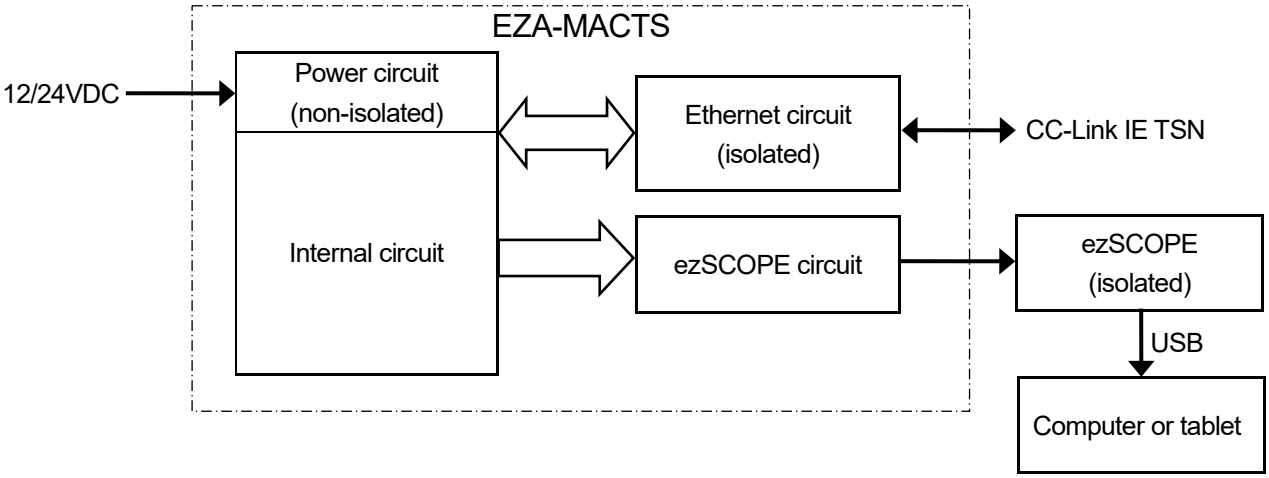
With using the device (ezSCOPE) for monitoring, the EZA-MACTS status can be checked by software for ezSCOPE of the computer or tablet.

(9) Web server function

EZA-MACTS can do the followings by using the Web server function;

- Setting parameters
- Checking the status
- Checking the event log

1-2. Internal Block Diagram

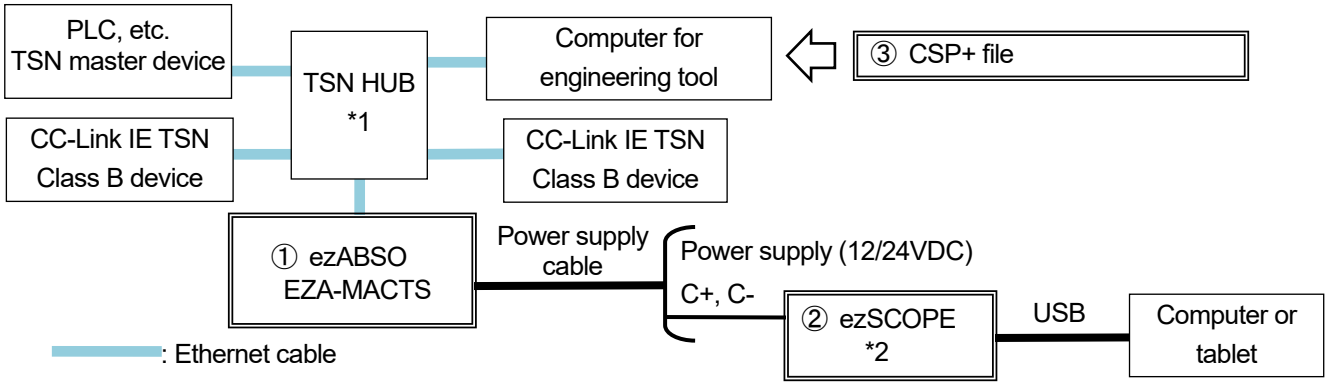


2. MODEL SELECTION WHEN ORDERING

The following figure indicates the connection configuration of EZA-MACTS. Before ordering, refer to the connection configuration and model list.

Please prepare by customer except (1) to (3) in the connection configuration.

2-1. Connection Configuration Example



*1: Use a Class B (CC-Link IE TSN Class B) switching hub certified by the CC-Link Partner Association.

*2: ezSCOPE is not needed for the normal operation.

ezSCOPE is a monitoring device for EZA-MACTS. Use it for monitoring the sensor system normality and operation status.

ezSCOPE is connected to EZA-MACTS with two signals (C+ and C-) of a power supply cable and is connected to a computer or tablet with a USB cable. EZA-MACTS data is sent to the computer or tablet by the software for ezSCOPE.

The signal line between EZA-MACTS and ezSCOPE is isolated, thus the sensor operation is not affected from the disturbance.

2-2. Model List

◆ ezABSO

No.	Model	Description
①	EZA-MACTS-02C	- Multi-turn type - CC-Link IE TSN-supported - Cable connection method: M12 connector

◆ ezSCOPE (option)

No.	Model	Description
②	EZSCP-01	Monitoring device for EZA-MACTS
	EZSCP-TXMDL-01	Infrared transmission module

◆ CSP+ File

No.	Model	Description
③	0x0264_EZA-MACTS_1_ja.CSPP.zip	For EZA-MACTS In the model, "ja" means the Japanese version, and "en" means the English version. Download it from the NSD website.
	0x0264_EZA-MACTS_1_en.CSPP.zip	

3. SPECIFICATIONS

3-1. EZA-MACTS Specifications

3-1-1. General specification

Item	Specification
Power supply voltage	10.8 to 28.8VDC (including ripple)
Current consumption	340mA or less (at 12VDC) 170mA or less (at 24VDC)
Insulation resistance	10 M-Ohms or more between DC power terminals and case (by 500VDC insulation resistance tester)
Withstand voltage	500VAC, 60Hz for 1 minute between DC power terminals and case
Vibration resistance *1	200m/s^2 55 to 2,000Hz (JIS C 60068-2-6)
Shock resistance *1	2,000m/s^2 (6ms, JIS C 60068-2-27)
Ambient operating temperature *2	-20 to +75°C (no condensation)
Grounding	Must be securely grounded (ground resistance of 100 ohm or less)
Ambient storage temperature	-20 to +90°C (no condensation)
Outside dimension (mm)	Refer to dimensions for details.
Mass	Approx. 0.6kg

*1: The vibration and shock resistances are numeric values when EZA-MACTS is tested alone.

*2: The ambient operation temperature indicates the surface temperature of EZA-MACTS's case side.
Pay attention to EZA-MACTS mounting part because it might be high temperature even if the ambient temperature is low.

3-1-2. Mechanical specification

Item	Specification
Position detection method	Electromagnetic induction method
Shaft diameter	10mm
Protection rating	IP66 Shaft seal part: IP64 (during the shaft rotation)
Permissible shaft load	Radial: 40N Thrust: 20N
Permissible mechanical speed	6,000r/min (continuous operation)
Linearity error	0.03° (±0.015°)
Moment of inertia	1×10^{-6} kg·m^2
Starting torque	0.02N·m

3-1-3. Function specification

Item	Specification
Total number of turns	8,778
Total number of divisions *1	Max. 2,301,100,032 divisions (8,778 turns x 262,144 per turn) Factory setting: 575,275,008 divisions (8,778 turns x 65,536 per turn)
Output code	Binary code
Internal updating cycle *2	Position data, speed data: approx. 250μs *3
	Power supply voltage, internal temperature: 4ms Operating time: 7.5 minutes
Error detection	CPU error, Sensor error, Memory error, Hardware error, Switch error, Power supply voltage alarm, Internal temperature alarm, Rotation speed alarm, Preset data setting alarm, IP address setting change alarm, IP address setting alarm, IP address duplicate alarm, Cyclic transmission size alarm
Device operation	Preset Error clear
Event log	64 events can be recorded. (Events can be viewed with the Web server function.)
Monitor function	EZA-MACTS can be connected to ezSCOPE.
Monitor LED	RUN / ERR: EZA-MACTS status D LINK: Cyclic transmission status LINK P1: PORT1 sending/receiving status LINK P2: PORT2 sending/receiving status
IP address setting	IP / STATION switch: x 16, x 1
Function, parameter setting	Position data increase direction Current position preset function selection Scaling function selection Scaling data Sensor low-pass filter Sensor median filter
Parameter setting method	Auto-setting (parameter setting to the master station by the engineering tool) Parameter write by the engineering tool Parameter setting by the Web server

*1: The number of divisions can be changed by the parameter setting (scaling data).
262,144 and 65,536 are number of divisions per turn.

*2: Updating cycle of EZA-MACTS internal data.

*3: This is the cycle when the network synchronous communication is not used.
When using the network synchronous communication, the internal updating cycle depends on the network updating cycle of the master station.

3-1-4. Communication specification

Item	Specification
Station type	Remote station
Number of communication ports	2 (connector: M12)
Communication speed *1	1Gbps (1000BASE-T, full-duplex)
Communication protocol	CC-Link IE TSN
CC-Link IE TSN Class	Class B
CC-Link IE TSN protocol version	2.0
Network topology *2	Line topology, star topology, ring topology, mixture of line and star topologies, mixture of ring and star topologies
Communication cycle interval	Min. 125μs (Min. 250μs when using the network synchronous communication)
Device type	Sensor (type code: 0x0030)
Recommended cable	Cat.5e or higher, shielded (STP) straight cable
Cable length *3	Between nodes: Max. 100m
IP / STATION address	1 to 254
IP version	IPv4
IP address setting	- Setting by the switch - Setting by the storage memory
Multicast filter	Supported
Cyclic transmission	RX/RY points: 32 points RWr/RWw points: 16 points
Monitor function	By the Web server function.

*1: 100Mbps is not supported.

*2: A mesh topology is not supported.

*3: Depending on the cable type (for movable parts, etc.) and ambient temperature, it may not be possible to extend up to 100m.

For more details, refer to the following document.

- 3. 2. Checking Wiring in CC-Link IE TSN Installation Manual
  (Download it from the CC-Link Partner Association web site.)

> ⚠ NOTE
>
> EZA-MACTS cannot communicate with some MELSEC iQ-F series products such as FX5-SSC-G and FX5-CCLGN-MS by using the network synchronous communication.

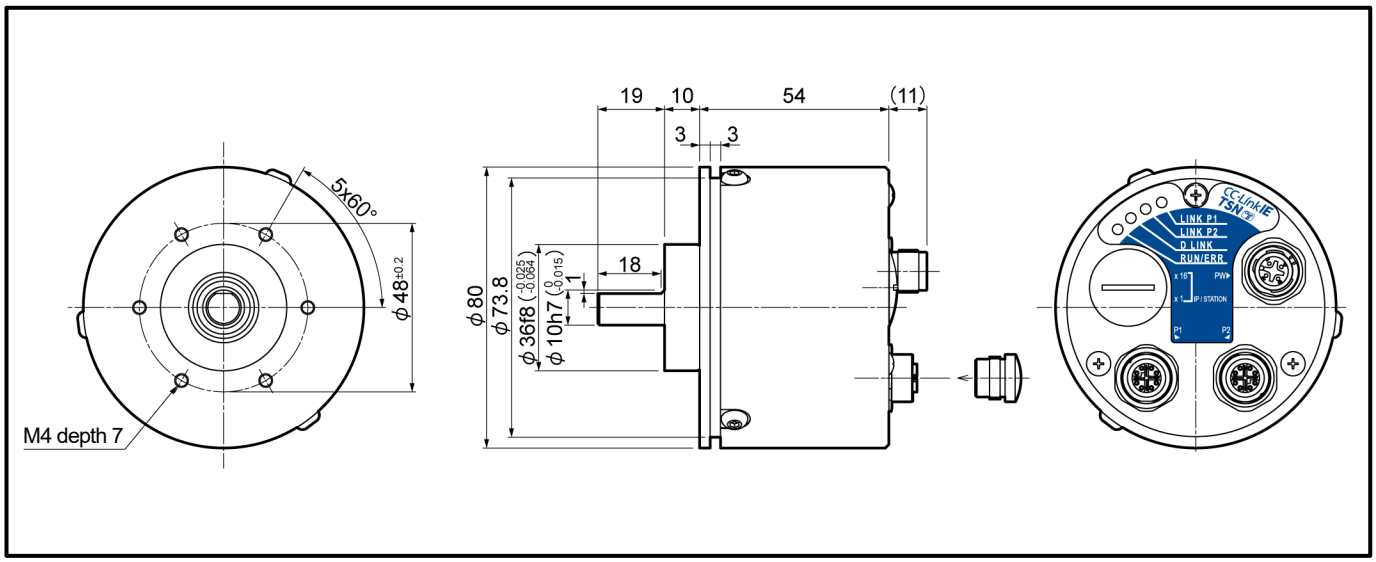
3-1-5. Connector specification

The connector specifications on the EZA-MACTS side are shown below. Select a cable with compatible connectors.

Item	Specification	Remark
Ethernet connector (P1, P2)	M12 8pin X-Coding	Housing: Socket Contact: Male
Power supply connector (PW)	M12 4pin A-Coding	Housing: Plug Contact: Male

4. DIMENSIONS

Units: mm

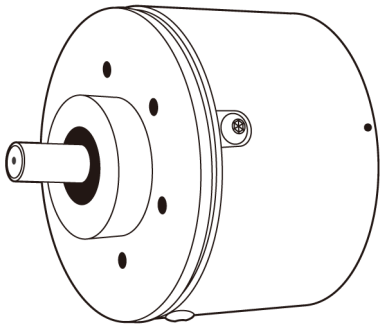


5. PACKING LIST

Unpack the packing case and check that the following items are included.

Packing condition when shipped from factory

① (EZA-MACTS) is shipped with ② (sealing cap) attached.

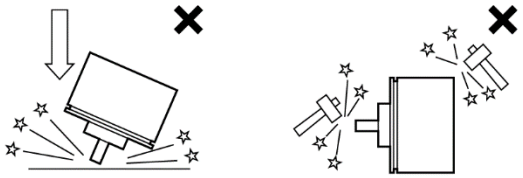
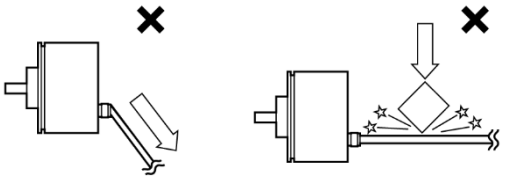
No.	①	②
Appearance		 * Attach this cap to the connector that is not connected to the cable.
Model	EZA-MACTS-02C	Sealing cap
Quantity	1 unit	1 piece

6. INSTALLATION

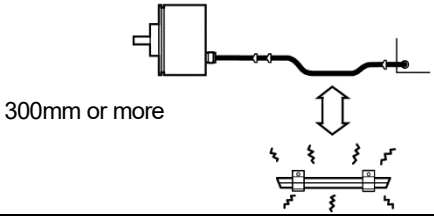
6-1. EZA-MACTS Installation Condition and Precaution

This section describes the installation conditions and precautions for EZA-MACTS.

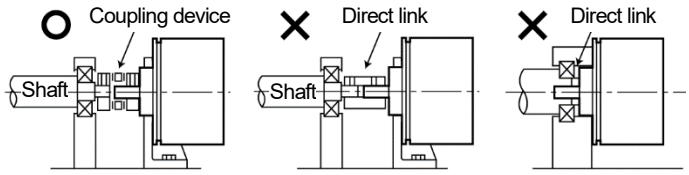
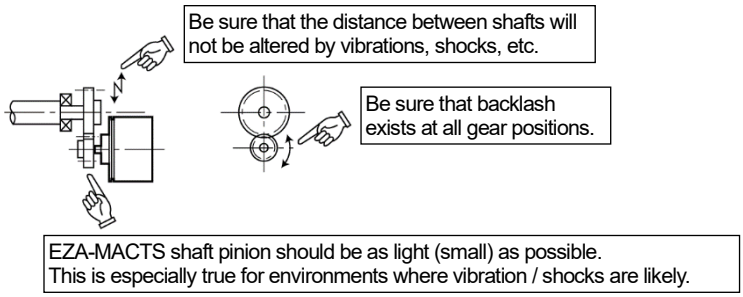
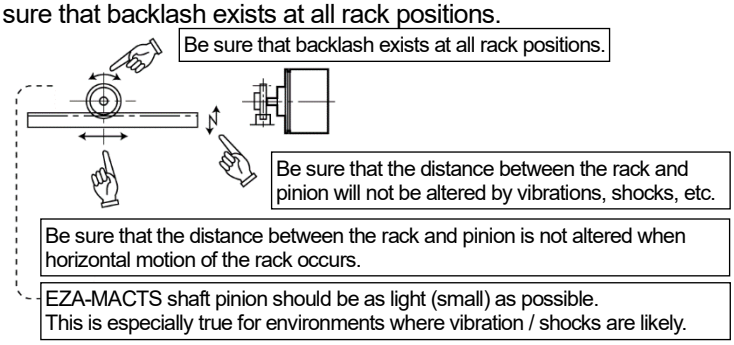
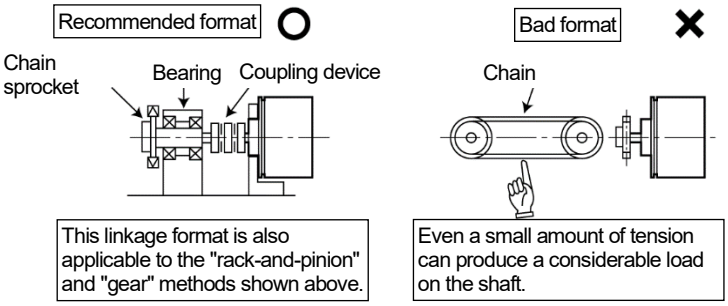
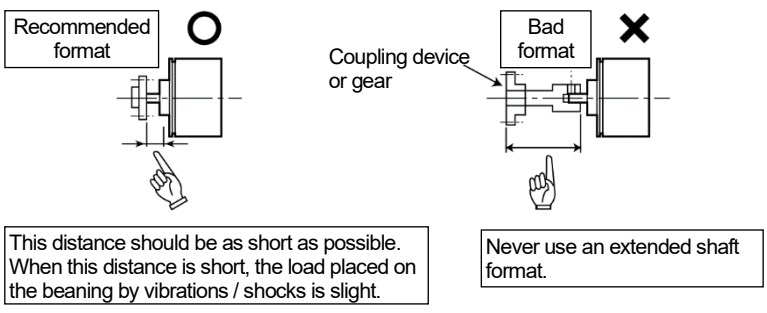
● Handling of EZA-MACTS

Item	Explanation	Precaution
(1) Main unit	Do not loosen any screws or nuts except the window's lid for changing the switch setting. Do not disassemble or remodel EZA-MACTS. Secure tightly with screws on the window's lid for changing the switch setting before the operation.	—
(2) Main unit	Never drop EZA-MACTS, or subject it to excessive forces or shocks. 	—
(3) Main unit	Do not allow any foreign object (e.g. cutting chips, wire strips) to get into EZA-MACTS.	—
(4) Main unit	Never directly touch this EZA-MACTS's conductive areas.	—
(5) Cable	Avoid stepping on, or applying excessive stress to the cable. 	—

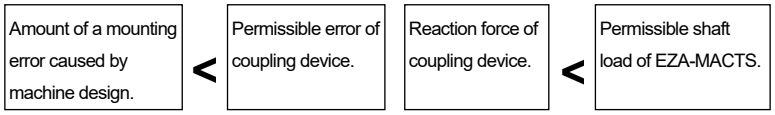
● Mounting of EZA-MACTS

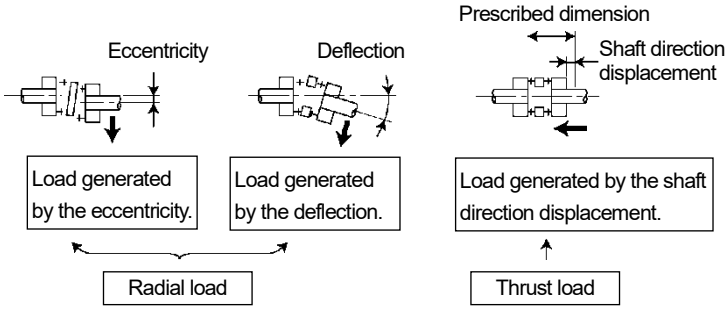
Item	Explanation	Precaution
(1) Mounting	Install EZA-MACTS by following the dimensions shown in section 4.	—
(2) Cable	Use a flexible cable if a cable moves.	—
(3) Wiring	The cable should be located at least 300mm away from power lines and other lines which generate a high level of electrical noise. 	—
(4) Wiring	EZA-MACTS has electrical parts inside. Never subject it to excessive shocks by tools.	It may cause failure of EZA-MACTS.
(5) Wiring	Be sure to shut off all power before executing wiring, installing, or uninstalling.	—

● Mounting of EZA-MACTS

Item	Explanation	Precaution
(1) Coupling of machine shaft and EZA-MACTS shaft	Be sure to use a coupling device to link the 2 shafts. 	A "direct-link" installation will result in shaft fatigue and / or breakage after using long periods.
(2) For gear-type linkage	If a gear linkage is used, be sure that some backlash exists. 	Incorrect gear mounting can result in shaft bending or breakage.
(3) For rack and pinion type linkage	Be sure that backlash exists at all rack positions. 	Incorrect rack and pinion mounting can result in shaft bending or breakage.
(4) Chain or timing belt linkage	When a chain or timing belt linkage format is used, there is an inherent risk of the shaft's load being increased by the resulting tension. Therefore, a bearing should be used, with the shafts being linked by a coupling device immediately behind the bearing. 	–
(5) Shaft mounting position	The coupling device or gear should be attached to the shaft at a point which is as near to the EZA-MACTS body as possible. 	–

● Coupling for EZA-MACTS

<table>
<tr><th>Item</th><th>Explanation</th><th>Precaution</th></tr>
<tr><td rowspan="2">(1) Coupling device selection precaution</td><td>1. Selection of the coupling device should be based on the following factors;
- Amount of a mounting error caused by machine design.
- Permissible error of coupling device.
- Reaction force of coupling device.
- Permissible shaft load of EZA-MACTS.
 

Mounting error
 
</td><td rowspan="2">If the selected coupling device is larger than necessary (when used in high vibration/shock environments), the load which is applied to the shaft by the vibrations/shocks will be increased by the weight of the coupling device.

Excessive force applied to the shaft might deform the coupling and reduce durability.</td></tr>
<tr><td>2. Be sure to select a coupling device with an adequate transmission torque surplus relative to the EZA-MACTS shaft's torque.</td></tr>
<tr><td>(2) Coupling device installation precaution</td><td>Avoid bending or damaging the coupling.
  </td></tr>
<tr><td>(3) Recommended coupling</td><td>Micro-coupling (manufactured by Daido Precision Industries Ltd.)

If there is a possibility of electric corrosion on the bearing, an insulated micro coupling is recommended.</td><td>–</td></tr>
</table>

6-2. Grounding

EZA-MACTS case must be securely grounded (ground resistance of 100 ohm or less) to prevent electrical shocks and noises.

6-3. External Connecting Devices

6-3-1. Power supply

(1) The power supply capacity should be more than twice the current consumption of EZA-MACTS.
Refer to section 3-1-1 for the current consumption of EZA-MACTS.
Consider the voltage drop of the cable.

(2) The power supply must have an over current protector.

(3) Use the power supply which should be isolated from the commercial one.

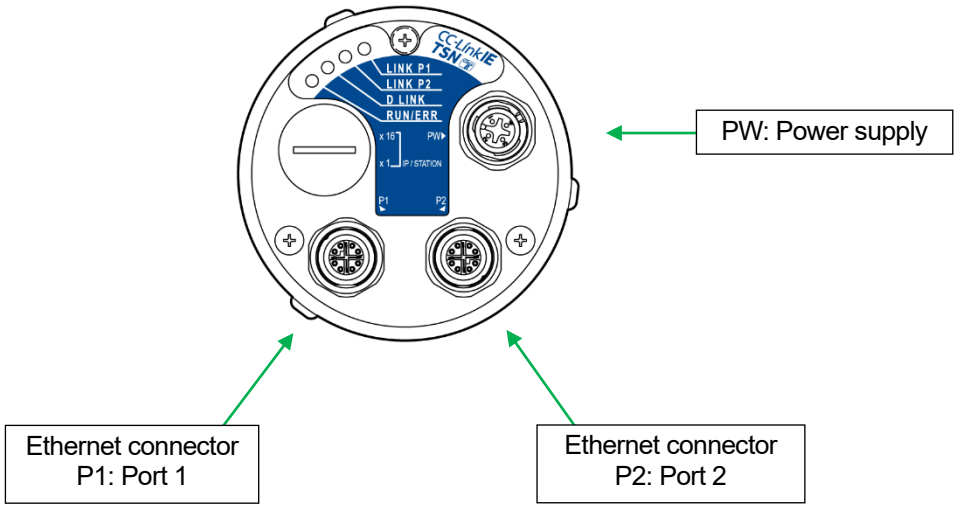
6-3-2. ezSCOPE

(1) Refer to "ezSCOPE specifications and instruction manual" for maximum cable lengths between EZA-MACTS and ezSCOPE.

(2) The following cables are recommended to extend the length.
① KPEV-SB (instrumentation cable with the shield), 0.5mm^2 or more
② LAN cable (with the shield) * No category specified

(3) Do not wire to the terminal for ezSCOPE of the power supply connector when not using ezSCOPE.

6-4. Cable Connection



Ethernet connector

The operation does not change even if a cable is connected to either P1 (Port 1) or P2 (Port 2).
Attach the sealing cap if a cable is not connected.

6-4-1. Wiring precautions for the cables

(1) Do not bind or close the cable which is connected to EZA-MACTS with the main circuit cable and the power supply cable.
Use the cable ducts or the wiring conduits to separate wiring if a location near the above cables is unavoidable.

(2) When wiring conduits are used, they should be securely grounded.

(3) Use a connector or connector with a cable which is complied with the following IEC standards.
- Ethernet connector side: IEC61076-2-109
- Power supply connector side: IEC61076-2-101

(4) Securely tighten the connector ring when connecting the power supply and Ethernet cables to EZA-MACTS. If not, it may cause a connection failure, communication failure, and deterioration of waterproof.

(5) Be sure to attach the sealing cap to the connector not connected to the Ethernet cable.
If not, it may cause a connection failure and deterioration of waterproof.
Tightening torque of the sealing cap: 0.4N·m

(6) Use a cable with a finished outer diameter matching the connector.
If not, it may cause a connection failure, deterioration of waterproof, and damage of the internal board.

(7) Use the robotic cable for movable parts.

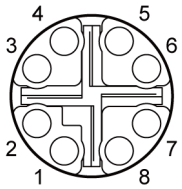
(8) The shield wire should be grounded at the spacious area to prevent noises.

(9) Secure the cable near EZA-MACTS by using a cable clamp etc. to prevent vibration.
If not, it may cause damage of the connector or deterioration of waterproof.

6-4-2. Wiring precautions for Ethernet cables

Pin No.	Signal name	Remark
1	TRD0+	Sending/receiving0+
2	TRD0-	Sending/receiving0-
3	TRD1+	Sending/receiving1+
4	TRD1-	Sending/receiving1-
5	TRD3+	Sending/receiving3+
6	TRD3-	Sending/receiving3-
7	TRD2-	Sending/receiving2-
8	TRD2+	Sending/receiving2+

Pin layout of EZA-MACTS side



(1) Cable specification
It is recommended to use a straight cable with a shield (STP) of Cat.5e or higher.

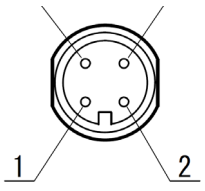
(2) Max. cable length
Depending on the cable type (for movable parts, etc.) and ambient temperature, it may not be possible to extend up to 100m.
For more details, refer to the following document.
- 3. 2. Checking Wiring in CC-Link IE TSN Installation Manual
(Download it from the CC-Link Partner Association web site.)

(3) For wiring when the following devices are mixed, refer to "SYSTEM CONFIGURATION" in the manual for the master station provided by Mitsubishi Electric Corporation.
- CC-Link IE TSN Class B device with a communication speed of 100Mbps
- CC-Link IE TSN Class A device
- Ethernet device

6-4-3. Wiring precautions for power supply

Pin No.	Signal name	Remark
1	24V	
2	C+	For ezSCOPE
3	0V	
4	C-	For ezSCOPE

Pin layout of EZA-MACTS side



(1) Be sure to use a shielded twisted pair cable for the power cable.

(2) Twist the wires for the power supply (24VDC and 0V) and ezSCOPE (C+ and C-) individually in order to prevent noises, and use combinations of the twist.

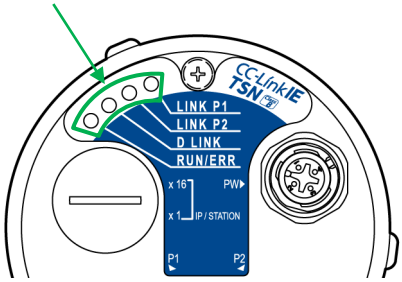
(3) The cable length should be decided with considering the voltage drops.

- MEMO -

7. PART NAMES AND FUNCTIONS

7-1. Monitor LEDs

It has the monitor LED on the opposite side of the shaft.



Display Monitor LED	Description	
LINK P1 (Green)	Indicates the data sending/receiving status of the Ethernet connector P1.	
	OFF	Data not sent nor received
	ON	Data being sent or received
LINK P2 (Green)	Indicates the data sending/receiving status of the Ethernet connector P2.	
	OFF	Data not sent nor received
	ON	Data being sent or received
D LINK (Green)	Indicates the cyclic transmission status.	
	OFF	Disconnected
	ON	Cyclic transmission being performed
	Flashing	Cyclic transmission stopped or reserved station being set
RUN / ERR (Green/Red)	Indicates the EZA-MACTS status. (For more details, refer to section 11.)	
	OFF	No power or major error
	ON (Green)	Normal operation (Ready=1, Error=0, Alarm=0)
	ON (Red)	Major error
	Flashing (Red)	Moderate error
	Flashing (Green)	Minor error
	Flashing alternately (Green/Red)	"Indicator display" by SLMP being performed (checking LED lighting)

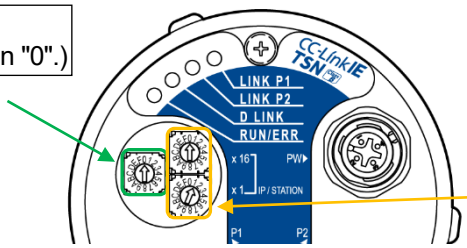
For more details, refer to section 11.

7-2. Rotary Switches

The IP address can be set with the rotary switches under the window's lid for changing the switch setting.
For more details on the IP address setting, refer to section 8-1.

- Factory Setting
  IP / STATION: 00
  MODE: 0

MODE: Not used
(Do not set to anything other than "0".)



IP / STATION ×16, ×1
Station No. (IP address)

8. CC-Link IE TSN COMMUNICATION

This section describes CC-Link IE TSN communication for EZA-MACTS.

8-1. IP Address Setting

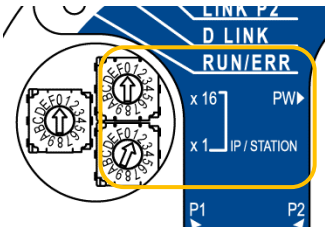
The fourth octet of the IP address is set by using the IP/STATION switch (x16, x1).
The first to third octets of the IP address operate with the first to third octets of the IP address of the master station.
The subnet mask operates with the subnet mask of the master station.

● Setting Method

The IP/STATION switch setting is performed when the power supply of EZA-MACTS is OFF.
After the setting, turn ON the power supply. When a data link has established with the master station, the IP address is stored in the storage memory of EZA-MACTS.

● Setting Range

1 to 254 (01 to FE)



POINT

If the IP address is set to a value outside the setting range, the following occurs.
- 0: Operates with the IP address stored in the storage memory (factory setting: 192.168.3.100) and the subnet mask of the master station.
- 255: The IP address setting alarm occurs.

When setting the IP address by using the engineering tool, set the IP/STATION switch to 0.

Set the IP address not to be duplicated. If it is duplicated, the data link will not be established.

⚠ NOTE

1. The following IP addresses are not available for EZA-MACTS.
   - The host address is all 0 or all 255.
   - The values of the third and fourth octets are all 255.
   - The values outside the range of 0.0.0.1 to 223.255.255.254

2. After the switch setting has been completed, securely tighten the window's lid for changing the switch setting.

3. Electrical components are used inside of EZA-MACTS.
   Do not give impact shocks to them by tools. It may cause failure.

4. Do not allow any cutting chips and wire strips to get into EZA-MACTS.

8-2. Registration of CSP+ File

CSP+ file is a profile that describes information required for the startup, operation, and maintenance of CC-Link family compatible devices.

The device configuration and parameter setting can be easily set by registering the CSP+ file in the engineering tool.

Download the CSP+ file for EZA-MACTS from the NSD website.

URL: www.nsdcorp.com

Japanese version : 0x0264_EZA-MACTS_1_ja.CSPP.zip

English version : 0x0264_EZA-MACTS_1_en.CSPP.zip

For more details, refer to Network Configuration Setting Manual (For RJ71GN11-T2).

8-3. Link Device Assignment

Remote I/O signals and remote registers used between EZA-MACTS and the master station are as follows.
In this manual, an example of the remote I/O signals and remote registers assigned as shown below is described.

Signal name	Address	Description
Remote input (RX)	RX00 to RX1F	Input signal from EZA-MACTS to the master station
Remote output (RY)	RY00 to RY1F	Output signal from the master station to EZA-MACTS
Remote register (RWr)	RWr0 to RWrF	Input information from EZA-MACTS to the master station
Remote register (RWw)	RWw0 to RWwF	Output information from the master station to EZA-MACTS

8-4. Input Signal (Device Station to Master Station)

8-4-1. Remote input (RX)

	bit							
	7/F	6/E	5/D	4/C	3/B	2/A	1/9	0/8
RX00 to 07								
RX08 to 0F							Configuration parameter data	Preset answer
RX10 to 17	IP address setting change alarm	Preset data setting alarm	Rotation speed alarm	Internal temperature alarm	Power supply voltage alarm	Hardware error	Memory error	Sensor error
RX18 to 1F					Ready	Error	Alarm	

Signal name	Description	
Preset answer	This is an operation checking signal of preset.	
Configuration parameter data	This is a signal to check whether "Parameter auto-setting" or "Parameter write" for EZA-MACTS are "Valid" or "Invalid" in the engineering tool.	
	0 (Invalid)	The parameter auto-setting or write is not available. ("Configuration Parameter Data" is set to "Invalid" on the web server.)
	1 (Valid)	The parameter auto-setting or write is available. (Factory setting)
Sensor error	EZA-MACTS has failed.	
Memory error	An error has occurred in the storage memory inside EZA - MACTS.	
Hardware error	EZA-MACTS has failed.	
Power supply voltage alarm	The power voltage supplied to EZA-MACTS is outside of the range between 10.8 and 28.8V.	
Internal temperature alarm	The EZA-MACTS's ambient temperature is outside of the range between -20 and +75°C.	
Rotation speed alarm	The EZA-MACTS's rotation speed is over 6,100r/min.	
Preset data setting alarm	The preset data (RWw0, 1) is outside of the range.	
IP address setting change alarm	The IP / STATION switch has been changed while the power supply is still ON.	
Alarm *1	0	EZA-MACTS operates normally.
	1	The minor error has occurred.
Error *1	0	EZA-MACTS operates normally.
	1	The moderate error has occurred.
Ready	This is an operation checking signal for EZA-MACTS.	
	0	- The moderate error has occurred. - The parameter is being changed.
	1	EZA-MACTS operates normally.

*1: For more details on errors and alarms, refer to section 11.

8-4-2. Remote register (RWr)

	word
RWr0	Position data
RWr1	
RWr2	Speed data
RWr3	
RWr4	Power supply voltage data
RWr5	Internal temperature data
RWr6	Operating time data
RWr7	
RWr8 to E	Reserved
RWrF	Reserved (Watchdog counter for communication monitoring)

Signal name	Description
Position data	The position data can be read out by a binary code.
Speed data	The speed data can be read out by a binary code. (Unit: 0.1r/min) - Positive numerical value: H 0000 to H 0001 5F90 (0 to 90,000) The shaft of EZA-MACTS turns in clockwise (CW) direction. - Negative numerical value: H FFFF FFFF to H FFFE A070 (-1 to -90,000) The shaft of EZA-MACTS turns in counterclockwise (CCW) direction. The positive and negative of the speed data does not invert even if the position data increase direction of parameter is changed. When the shaft rotates in 9,000r/min or more, the speed data might be unstable.
Power supply voltage data	The power supply voltage which is supplied to EZA-MACTS is read out. (Unit: 0.1V) Ex.) 24.0V: 240 (H 00F0)
Internal temperature data	The internal temperature of EZA-MACTS is read out. (Unit: 0.1°C) Ex.) 25°C: 25 (H 0019) -10°C: -10 (H FFF6) The internal temperature is approximately 18 to 25°C higher than the surface (sides of the case) temperature of EZA-MACTS.
Operating time data	Operating time of EZA-MACTS (power supply ON time) is read out. (Unit: 1 hour) Ex.) 80,000 hours: 80,000 (H 0001 3880) The operation time is measured at internal EZA-MACTS every 1/8 hour (7.5 minutes). However, the data of less than 1 hour is rounded down and read out. The operating time is not increased when the power supply turns ON less than 7.5 minutes. When the operating time area in the storage memory is corrupted, "Memory error" will not occur. If this area is read out, it will become "-1" (FFFF FFFF H).
Reserved	The data in this area is unstable.
Reserved (Watchdog counter for communication monitoring)	This is an area used by the CC-Link IE TSN communication system. Not available.

8-5. Output Signal (Master Station to Device Station)

8-5-1. Remote output (RY)

	bit							
	7/F	6/E	5/D	4/C	3/B	2/A	1/9	0/8
RY00 to 07								
RY08 to 0F								Preset
RY10 to 17								
RY18 to 1F						Error clear		

Signal name	Description
Preset	The position data can be changed to the desired value (preset data) by setting this signal to "1". For more details, refer to section 8-5-3.
Error clear	"Error" can be cleared by setting this signal to "1". For more details, refer to section 8-5-4.

8-5-2. Remote register (RWw)

	word
RWw0	Preset data
RWw1	
RWw2 to E	Reserved
RWwF	Reserved (Watchdog counter for communication monitoring)

Signal name	Description
Preset data	This is the writing data for the current position preset. For more details on the setting range, refer to section 8-5-3.
Reserved	Do not write any value except "0" in this area.
Reserved (Watchdog counter for communication monitoring)	This is an area used by the CC-Link IE TSN communication system. Not available.

8-5-3. Current position preset

The position data is changed by writing the preset data and the preset signal from the PLC or other devices.
The position data is changed when the preset signal is changed from "0" to "1".

(1) Setting range of preset data

When the parameter "Scaling Function Selection" is valid
Setting range: 0 ≦ Preset data ≦ (Scaling data - 1)
(The scaling data differs depending on the parameter settings.)

When the parameter "Scaling Function Selection" is invalid
Setting range: 0 ≦ Preset data ≦ 2,301,100,031

(2) "Preset data setting alarm" and "Alarm"

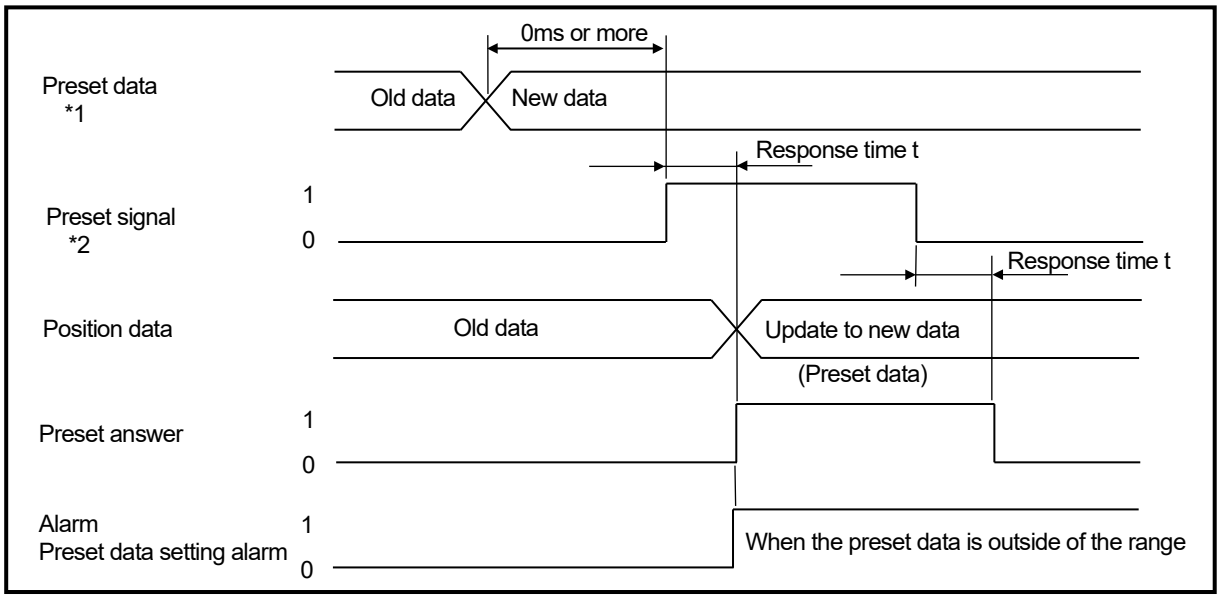
"Preset data setting alarm" and "Alarm" of the remote input (RX) will become "1" if the preset data outside of the setting range is written and then preset is performed.

To clear the alarm, write the preset data within the setting range, and then perform preset again. "Preset data setting alarm" and "Alarm" of the remote input (RX) will return to "0".

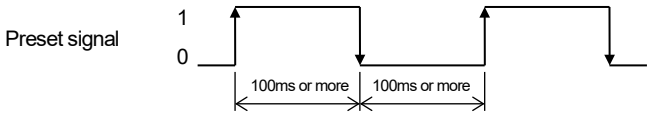
(3) Preset timing

The processing timing after changing the preset signal from "0" to "1" is shown below.
The response time until preset is completed can be calculated with the following formula.

Response time t = PLC scan time + Master station's communication cycle interval + EZA-MACTS internal processing time (Max. 10ms)



*1: After writing the preset data, the preset signal should be changed from "0" to "1". (0ms or more)
*2: EZA-MACTS needs an interval of 100ms or more until accepting the preset signal change from "0 to 1" or "1 to 0".
(The preset signal cycle should be 200ms or more.)



⚠ NOTE

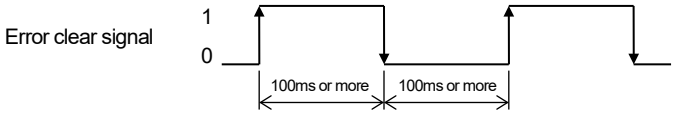
In the following cases, preset cannot be done. ("Preset Answer" does not change to "1".)
- "Current Position Preset Function" of the parameter is set to "Invalid".
- "Ready" of the remote input (RX) is "0" ("Error" is "1").

8-5-4. Error clear

To clear the error, the error clear signal should be changed from "0" to "1".

After clearing the error, turn the error clear signal back to "0". If the cause of the error has been eliminated, "Error" of the remote input (RX) will become "0" and "Ready" will become "1".

EZA-MACTS needs an interval of 100ms or more until accepting the error clear signal change from "0 to 1" or "1 to 0". (The error clear signal cycle should be 200ms or more.)



For more details on errors, refer to section 11.

8-6. Parameter

8-6-1. Parameter setting method

The parameter setting methods of EZA-MACTS are shown below.

The set parameter data is not deleted even if the power supply is turned OFF since it is stored in the storage memory of EZA-MACTS.

Method	Storage location for parameter data
"Parameter auto-setting" by the engineering tool *1	The setting data is stored in the master station. When a data link has established between EZA-MACTS and the master station, the setting data is automatically written from the master station to the storage memory of EZA-MACTS.
"Parameter write" by the engineering tool *1	The setting data is written to the storage memory of EZA-MACTS.
Parameter setting by the Web server *2	The setting data is written to the storage memory of EZA-MACTS.
If the parameter is not set.	EZA-MACTS operates with an initial value of the factory setting.

*1: When setting parameters from the engineering tool, the functional parameter "Configuration Parameter Data" should be set to "Valid" on the Web server in advance.
For more details on settings, refer to section 10-4-3.
For more details on the engineering tool, refer to the manual for the master station provided by Mitsubishi Electric Corporation.

*2: For more details on the parameter setting method by using the Web server function, refer to section 10-4-3.

POINT

- If the parameter setting is performed several times, the parameter data which was set last becomes effective, regardless of the setting method.

- When setting parameters by "Parameter auto-setting", the parameter is automatically written to the new EZA-MACTS even if the old EZA-MACTS is replaced due to failure or other reasons.

⚠ NOTE

When changing the parameter, the input/output signal is unstable for a maximum of 1s.
The system should be stopped in advance when changing the EZA-MACTS's parameter in order to avoid affecting the system from the data change.

When "Ready" of the remote input (RX) is "0" ("Error" is "1"), the parameter setting is not available.

8-6-2. Parameter list

The parameter list for EZA-MACTS is shown below.

byte	Parameter name	Setting range	Factory setting
0	Current position preset function	0, 1	1
1	Position data increase direction	0, 1	0
2	Scaling function selection	0, 1	1
3	Sensor low-pass filter	0 to 4	2
4	Sensor median filter	0, 1	0
5	Scaling data	2 to 2,301,100,032 (H 2 to H 8928_0000)	575,275,008 (H 224A_0000)

8-6-3. Parameter setting contents

(1) Current position preset function

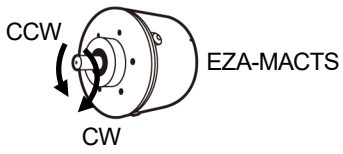
Select whether "Valid" or "Invalid" to the current position preset function.

byte	Setting value	Selection content	Description
0	0	Invalid	The position data cannot be changed by preset.
	1	Valid **(Factory setting)**	The position data can be changed by preset.

(2) Position data increase direction

This setting determines the rotation direction in which the position data value increases.

byte	Setting value	Selection content	Description
1	0	CW **(Factory setting)**	The position data value will increase when the shaft of EZA-MACTS turns in the clockwise direction as viewed from the shaft end.
	1	CCW	The position data value will increase when the shaft of EZA-MACTS turns in the counterclockwise direction as viewed from the shaft end.



⚠ NOTE

The positive and negative of the speed data does not change even if the position data increase direction is changed.

(3) Scaling function selection and scaling data

The scaling setting can be changed the division number of the position data per turn.
Set the total number of divisions when changing it.

Scaling function selection

byte	Setting value	Selection content	Description
2	0	Invalid	The scaling is invalid. The total division number of the position data is [8,778 turns x 262,144 / turn = 2,301,100,032].
	1	Valid **(Factory setting)**	The scaling is valid.

Scaling data

byte	Setting range	Description
5	2 to 2,301,100,032 **(Factory setting = 575,275,008)**	The total division number of the position data is set. Total number of divisions = "Total number of turns (8,778 turns)" x "Division number of data per turn"

For more details on the scaling data, refer to the next page.

(4) Sensor low-pass filter

Sets the low-pass filter's cutoff frequency on the internal sensor circuit of EZA-MACTS.
When the cutoff frequency is set low, the position data's flicker can be inhibited, but the response will be poor.
When the cutoff frequency is set high, the response improves, but the position data's flicker is more likely to occur.

This function should be set when you need to reduce influences such as random noises (white noise) or mechanical oscillations.

byte	Setting value	Selection content	Description
3	0	1kHz	Cutoff frequency = 1kHz
	1	500Hz	Cutoff frequency = 500Hz
	2	250Hz **(Factory setting)**	Cutoff frequency = 250Hz
	3	125Hz	Cutoff frequency = 125Hz
	4	62Hz	Cutoff frequency = 62Hz

(5) Sensor median filter

Sets "Valid" or "Invalid" for the sensor median filter on the internal sensor circuit of EZA-MACTS.
The position data will become a median value of data which is extracted within a certain amount of time if this filter is valid.
This filter is effective when using an inverter that generates cyclic instantaneous noises.
With using the sensor median filter, the data might have a certain period delay.
This filter can be used together with the sensor low-pass filter above.

byte	Setting value	Selection content	Description
4	0	Invalid **(Factory setting)**	The median filter is invalid.
	1	Valid	The median filter is valid.

(6) Details of scaling data setting

The scaling data is set by "8,778 turns (total number of turns) x division number of data per turn".

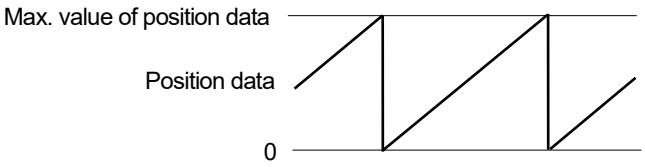
For the following example ① and ②, the scaling data setting value is set to "8,778 x 2^n (2^n = division number of data per turn)". In this case, a specific bit range can be read out separately as the single-turn data and multi-turn data.

For the following example ③, the scaling data setting value is set to a value except "8,778 x 2^n (2^n = division number of data per turn)". In this case, a specific bit range cannot be read out separately as the single-turn data and multi-turn data.

<table>
<tr><th rowspan="2">Ex.</th><th rowspan="2">Scaling data
setting value</th><th colspan="12">Position data (32bit)</th></tr>
<tr><td>D31</td><td>D30</td><td>D29</td><td>・・・・・・・・</td><td>D18</td><td>D17</td><td>D16</td><td>D15</td><td>・・・・・・・・</td><td>D0</td></tr>
<tr><td rowspan="2">①</td><td rowspan="2">(Factory setting)
575,275,008
= 8,778 turns x 65,536 / turn</td><td rowspan="2">0</td><td rowspan="2">0</td><td colspan="6">Multi-turn data
H 0 to H 2249: 0 to 8,777</td><td colspan="6">Single-turn data: 16bit
H 0 to H FFFF: 0 to 65,535</td></tr>
<tr><td colspan="12">Position data range : H 0 to H 2249 FFFF : 0 to 575,275,007</td></tr>
<tr><td rowspan="2">②</td><td rowspan="2">(Maximum value of total division number)
When the scaling is invalid,
2,301,100,032
= 8,778 turns x 262,144 / turn</td><td colspan="6">Multi-turn data
H 0 to H 2249: 0 to 8,777</td><td colspan="6">Single-turn data: 18bit
H 0 to H 3 FFFF: 0 to 262,143</td></tr>
<tr><td colspan="12">Position data range : H 0 to H 8927 FFFF : 0 to 2,301,100,031</td></tr>
<tr><td rowspan="2">③</td><td rowspan="2">2^n setting example
2,147,483,648 (= 2^{31})</td><td rowspan="2">0</td><td colspan="11">"Multi-turn data (8,778)" x "Single-turn data (244,643.8423 divisions)"</td></tr>
<tr><td colspan="11">Position data range : H 0 to H 7FFF FFFF : 0 to 2,147,483,647</td></tr>
</table>

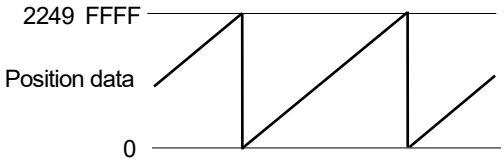
⚠ NOTE

If the position data exceeds the maximum value, the data will return to "0". (If the data exceeds "0", it will become the maximum value.)
In the factory setting, if the multi-turn data exceeds 8,777 (maximum value), it will return to "0".

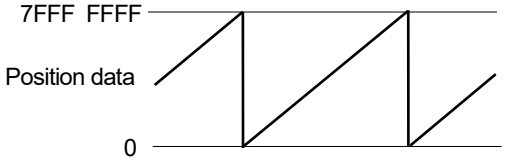


When the position data exceeds maximum value and return to "0", it might be difficult to calculate correct position data if positions of the device which rotates continuously like a roll are detected.
In this case, it is recommended to set the scaling data to "2^n (example ③ above)".

(Example ① above)



(Example ③ above)



H 7FFF FFFF (maximum value data) is easier to calculate than H 2249 FFFF when calculating the position changing amount which is across "0".

8-7. Cyclic Transmission

8-7-1. Overview

The cyclic transmission is a function that periodically communicates data among stations on the same network.
For more details on the cyclic transmission, refer to the manual for the master station provided by Mitsubishi Electric Corporation.

8-7-2. Remote output (RY) operation of EZA-MACTS

When the following operation statuses occur on the master station side, the remote output (RY) of EZA-MACTS holds the previous value.

- The CPU module on the master station side has changed to the STOP state.
- An error has occurred in the CPU module on the master station side.
- Communication with the master station has been lost.

8-8. CC-Link IE TSN Network Synchronous Communication

8-8-1. Overview

EZA-MACTS supports the CC-Link IE TSN network synchronous communication function.

The input and output operations are performed in the synchronization cycle of the master station which supports the CC-Link IE TSN network synchronous communication function.

This function enables to synchronize the operation timing with other device stations connecting to the same network.

For more details on the network synchronous communication, refer to the manual for the master station provided by Mitsubishi Electric Corporation.

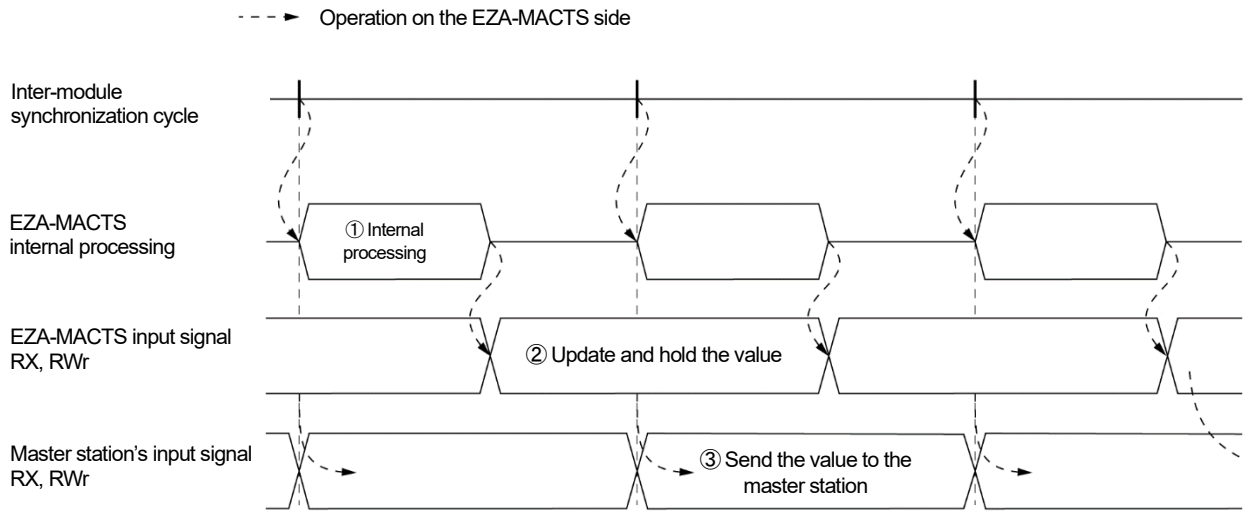
> ⚠ NOTE
>
> EZA-MACTS cannot communicate with some MELSEC iQ-F series products such as FX5-SSC-G and FX5-CCLGN-MS by using the network synchronous communication.

8-8-2. Synchronization cycle timing

8-8-2-1. Input signal (RX, RWr)

By using the network synchronous communication function, the timing can be synchronized when the master station reads the input signal from the device station.

The synchronization cycle timing of the input signal of EZA-MACTS is shown below.



① The EZA-MACTS internal processing is performed at the inter-module synchronization cycle start timing.
② The value of EZA-MACTS input signal is updated to the value processed in ①, and then held.
③ During the next inter-module synchronization cycle, EZA-MACTS sends the input signal to the master station.

⚠ NOTE

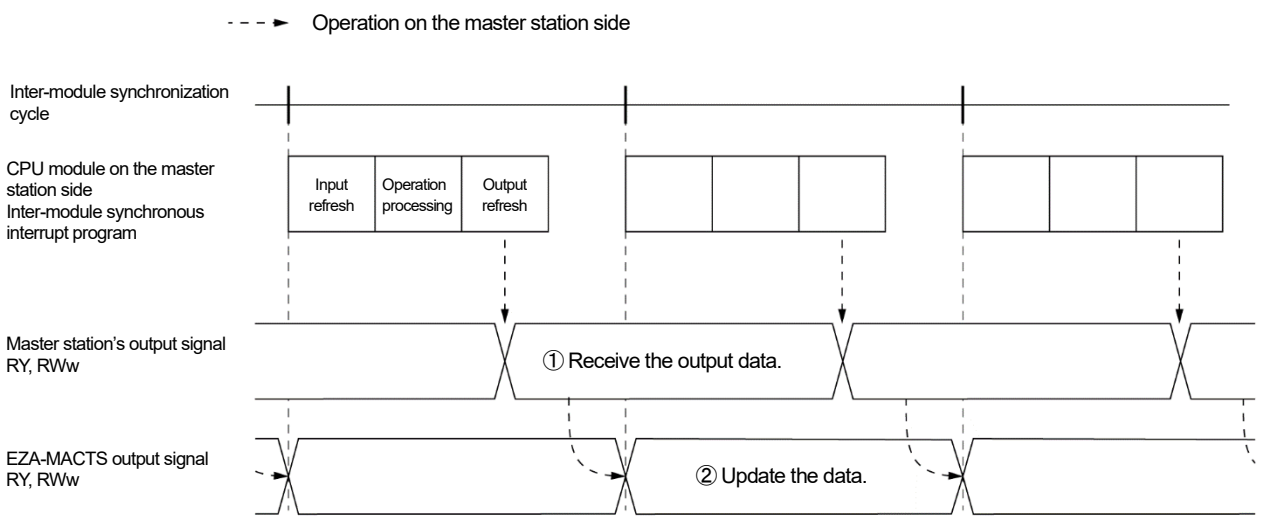
The position and speed data while using the network synchronous communication will have the following errors against the actual position and speed.

- Time synchronization accuracy of CC-Link IE TSN network (±1μs)
- Internal processing time of EZA-MACTS (0.5μs)
- Linearity error of EZA-MACTS (0.03°)

8-8-2-2. Output signal (RY, RWw)

By using the network synchronous communication function, the timing can be synchronized when the master station updates the output signal of the device station.

The synchronization cycle timing of the output signal of EZA-MACTS is shown below.



① The master station receives the output signal data from the CPU module on the master station side at each timing of the inter-module synchronization cycle.

② At the start timing of the next inter-module synchronization cycle, the master station updates the output signal data of EZA-MACTS.

8-8-2-3. Simultaneous preset for multiple units

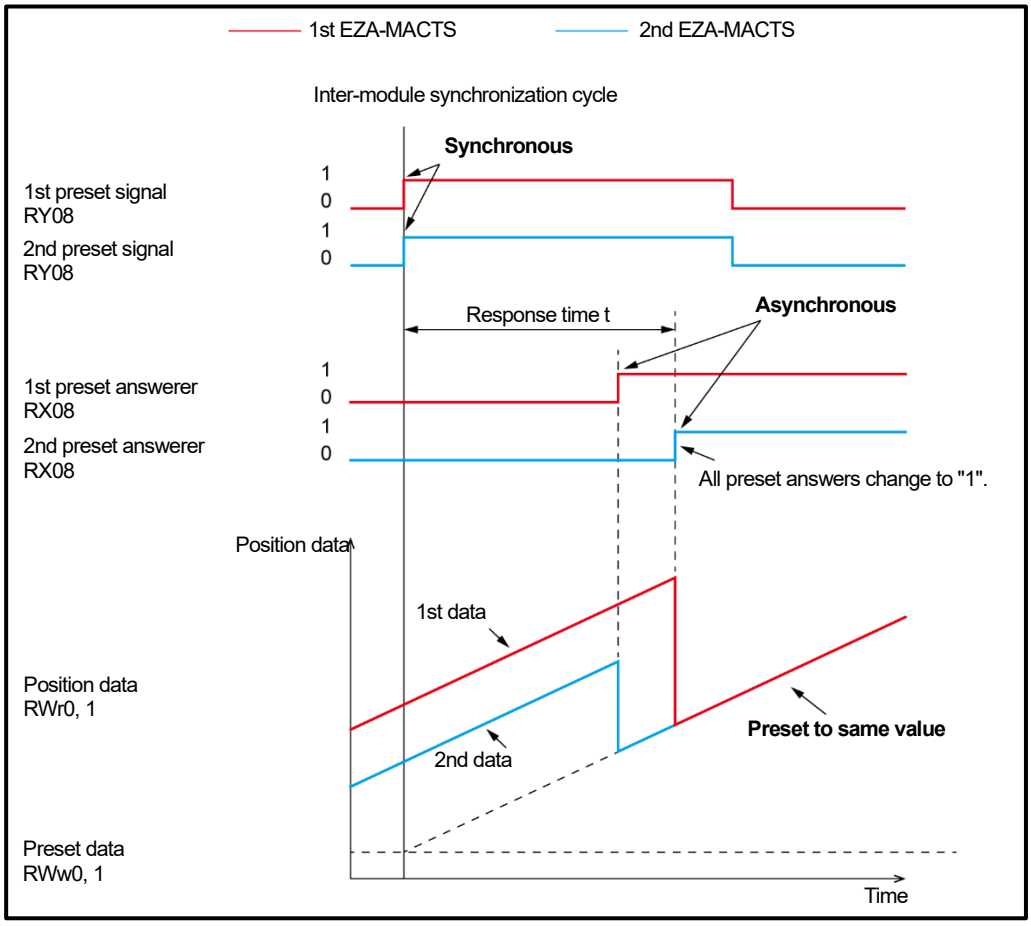
Multiple units of EZA-MACTS can be preset at the same time by using the network synchronous communication.

When reading the position data after preset in the master station, read it after the preset answers of all EZA-MACTS units have changed from "0" to "1".

The timing of two EZA-MACTS units simultaneously preset is shown below.

If the preset is performed under the following conditions, the position data after preset will become the same value. (See below)

- Operating at the same speed.
- The same preset data (RWw0, 1) is set.



> ⚠ NOTE
>
> The position data after preset will have an error against the actual position.
> For more details, refer to section 8-8-2-1.

9. SAMPLE PROGRAM

A program example using the CC-Link IE TSN master module (RJ71GN11-T2) of MELSEC iQ-R is shown below.
For more details on programs and settings, refer to Network Configuration Setting Manual (For RJ71GN11-T2).

For more details on the RJ71GN11-T2 module, refer to the manuals provided by Mitsubishi Electric Corporation.

9-1. Cyclic Transmission Program Example

Cyclic transmission's program example performs following.

- Read the EZA-MACTS position data by the master station.
- To preset and error clear EZA-MACTS by the master station.

9-1-1. Precaution for program

For the cyclic transmission program, interlock with the following special relay, special register, and signal.

- Data link error status of own station (SB0049) *1
- Data link status of each station (SW00B0 to SW00B7) *2
- EZA-MACTS ready signal (RX1B)

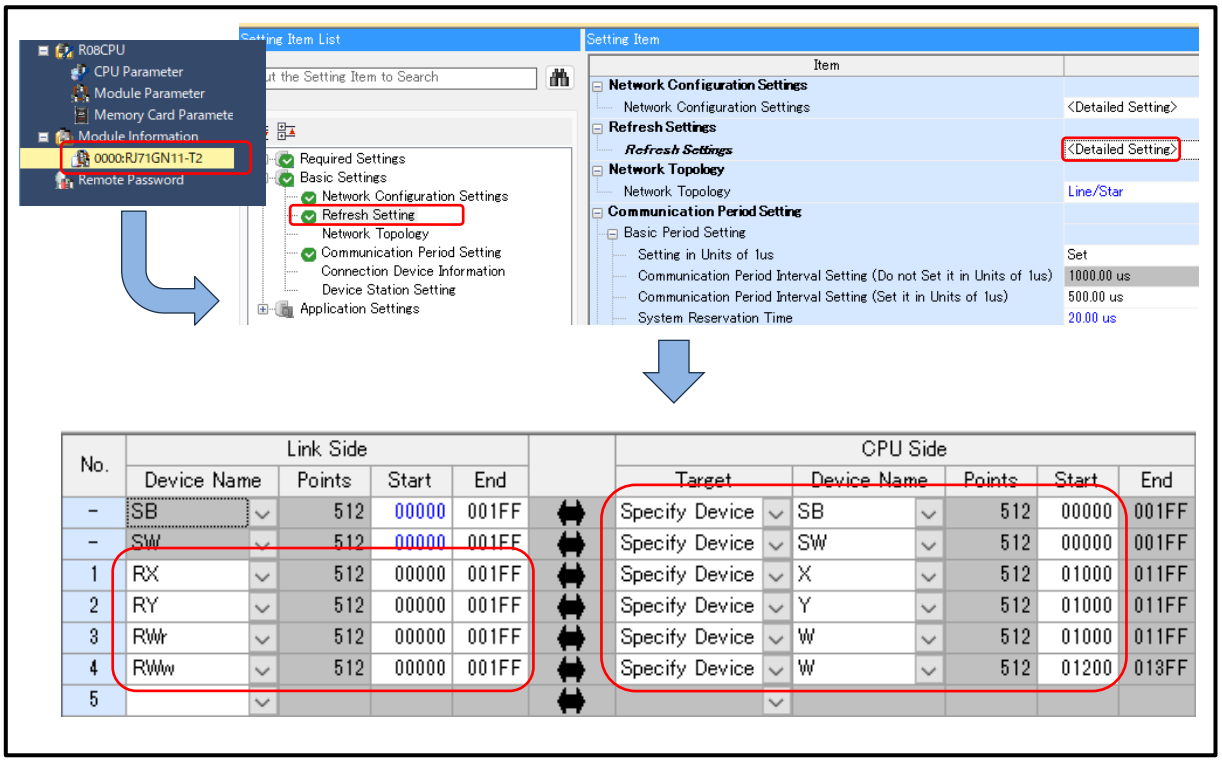
*1 : "Own station" is the master station.
*2 : "Each station" is the device station(EZA-MACTS).

9-1-2. Program example

(1) Configuration setting

EZA-MACTS: station No. = 1 (IP/STATION = 01)

Refresh setting:

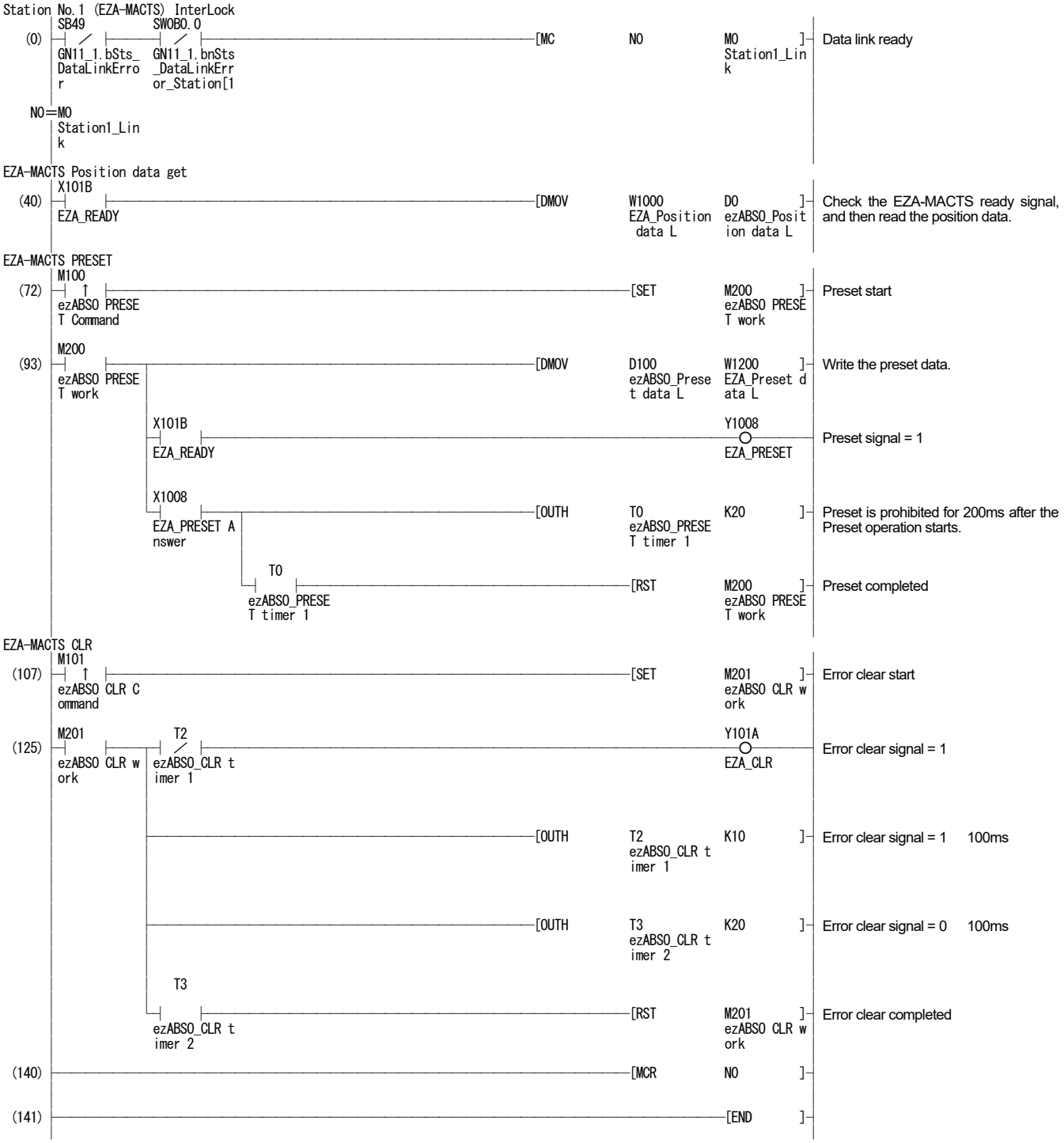


No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	512	00000	001FF		Specify Device	SB	512	00000	001FF
-	SW	512	00000	001FF		Specify Device	SW	512	00000	001FF
1	RX	512	00000	001FF		Specify Device	X	512	01000	011FF
2	RY	512	00000	001FF		Specify Device	Y	512	01000	011FF
3	RWr	512	00000	001FF		Specify Device	W	512	01000	011FF
4	RWw	512	00000	001FF		Specify Device	W	512	01200	013FF
5										

(2) Devices used

Device	Description	
N0	Nesting	
M0	Data link ready	
M100	Preset command	
M101	Error clear command	
M200	Preset in progress	
M201	Error clear in progress	
T0	Preset complete timer	
T2	Error clear ON timer	
T3	Error clear OFF timer	
D0	Read register for EZA-MACTS position data	
D100	Specified value of preset data	
SB49	The master station's data link error status	RJ71GN11-T2
SW0B0.0	EZA-MACTS data link status (device station No.: 1)	
X1008	EZA-MACTS preset answer	Remote input (RX)
X101B	EZA-MACTS ready	
Y1008	EZA-MACTS preset	Remote output (RY)
Y101A	EZA-MACTS error clear	
W1000	EZA-MACTS position data	Remote register (RWr)
W1200	EZA-MACTS preset data	Remote register (RWw)

(3) Ladder program



9-2. CC-Link IE TSN Network Synchronous Communication Program Example

CC-Link IE TSN Network Synchronous Communication's program example performs following.

- Read the both EZA-MACTS position data and speed data by the master station.

9-2-1. Precaution for program

For the CC-Link IE TSN Network synchronous communication program, interlock with the following register and signal.

- Synchronous/asynchronous operating status information of each station (SW01C8 to SW01CF) *1
- EZA-MACTS ready signal (RX1B)

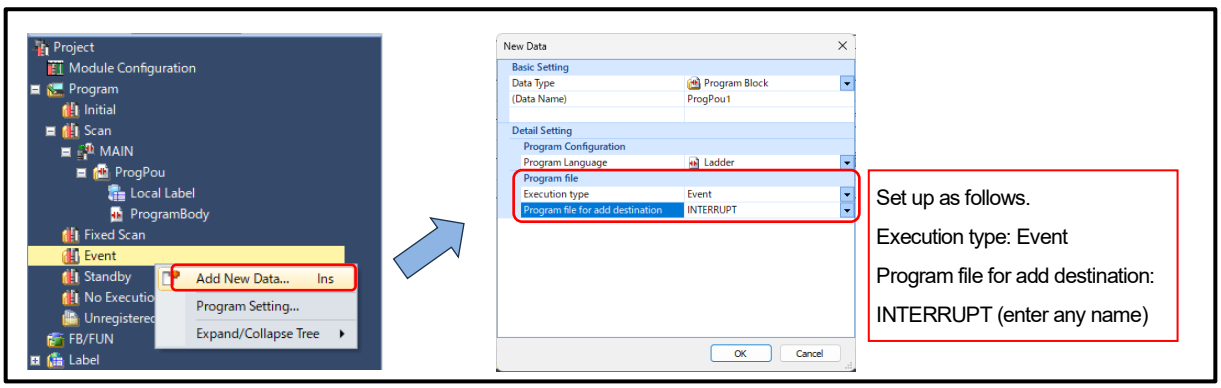
*1 : "Each station" is the device station(EZA-MACTS).

It can be checked that EZA-MACTS is normally synchronized.

Also, if synchronization has failed due to an error or other cause, unintended operation can be prevented by stopping the I/O control.

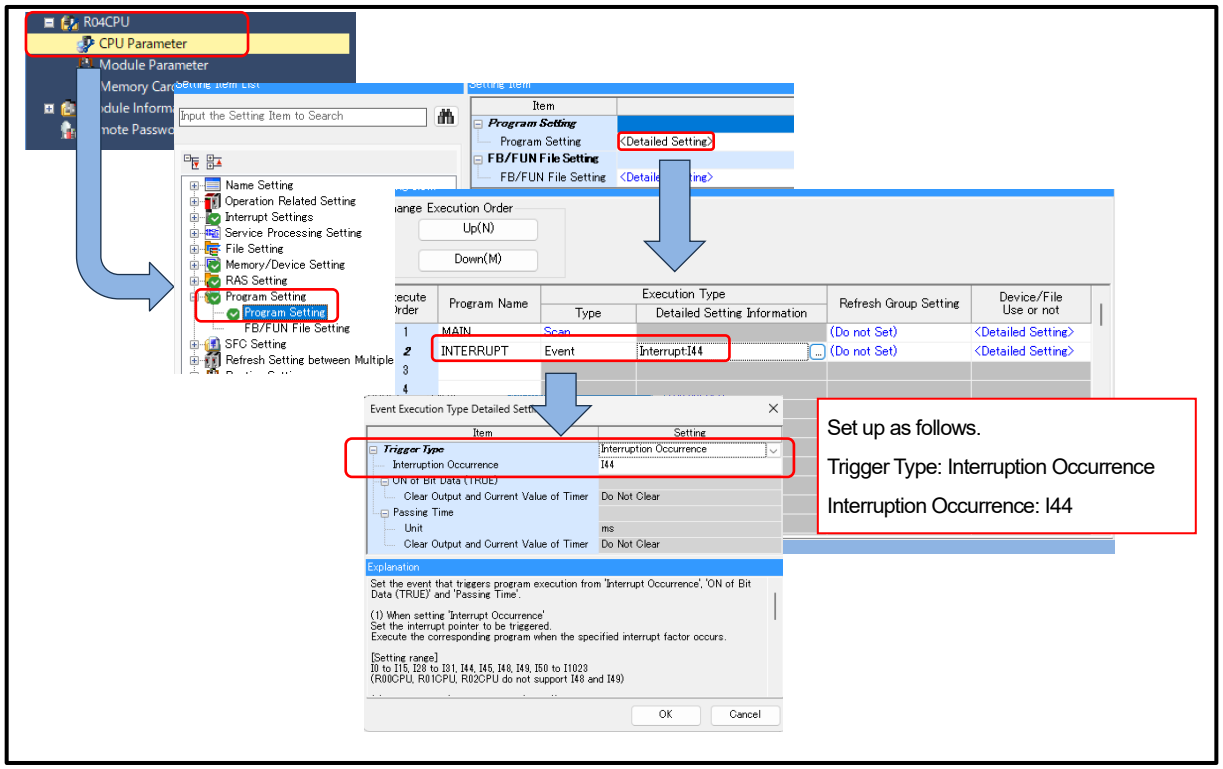
9-2-2. Program example

(1) Event program addition (program name: "INTERRUPT")



For more details, refer to Network Configuration Setting Manual (For RJ71GN11-T2).

(2) CPU parameter setting

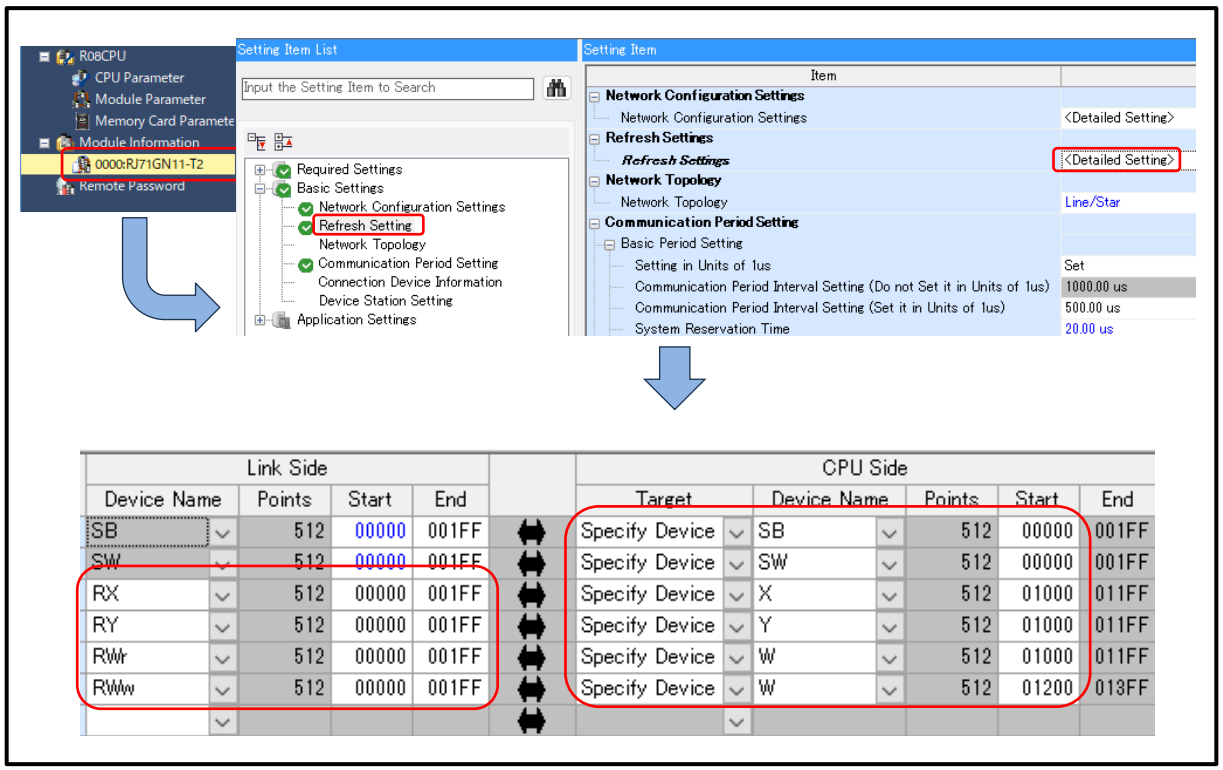


For more details, refer to Network Configuration Setting Manual (For RJ71GN11-T2).

(3) Configuration setting

EZA-MACTS: station No. = 1 (IP/STATION = 01)

Refresh setting:

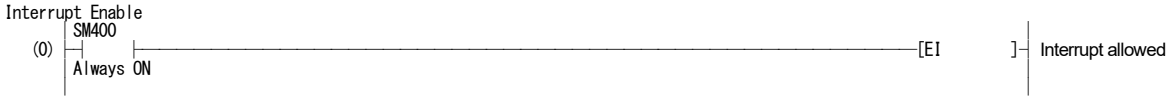


(4) Devices used

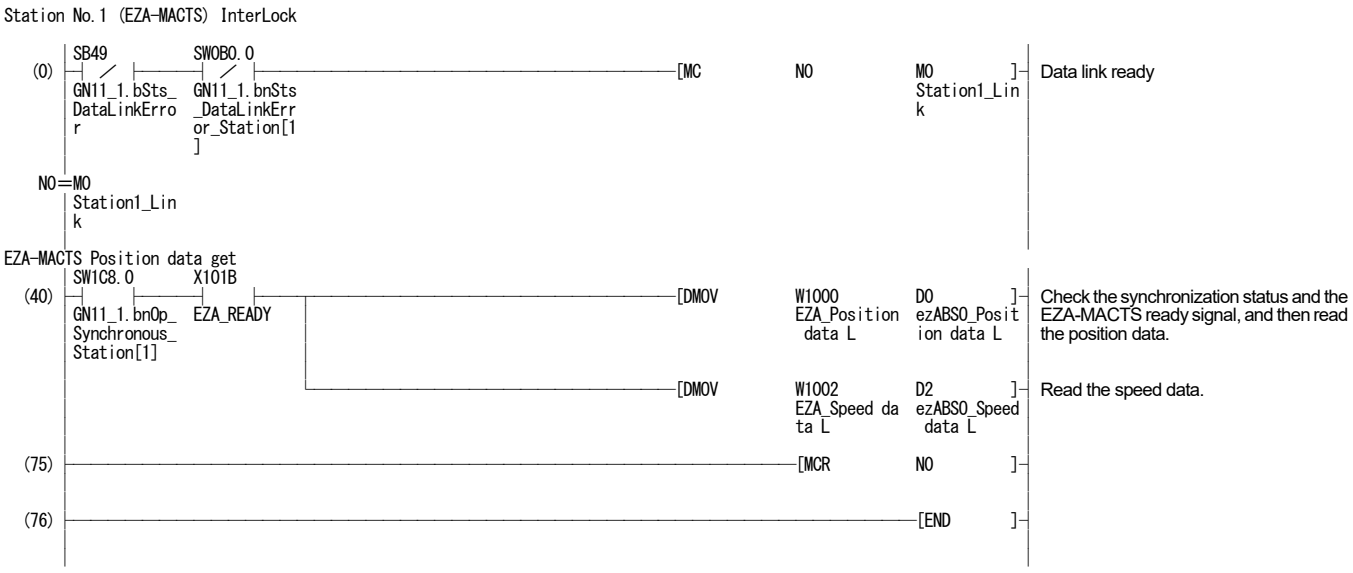
Device	Description	
N0	Nesting	
M0	Data link ready	
D0	Read register for EZA-MACTS position data	
D2	Read register for EZA-MACTS speed data	
SB49	The master station's data link error status	RJ71GN11-T2
SW0B0.0	Data link status of EZA-MACTS (device station No.: 1)	
SW01C8.0	Synchronization state of EZA-MACTS (device station No.: 1)	
X101B	EZA-MACTS ready	Remote input (RX)
W1000	EZA-MACTS position data	Remote register (RWr)
W1002	EZA-MACTS speed data	

(5) Ladder program (MAIN)

Execute the EI command in the MAIN program to set I44 to the interrupt-enabled state.



(6) Ladder program (I44)



10. WEB SERVER FUNCTION

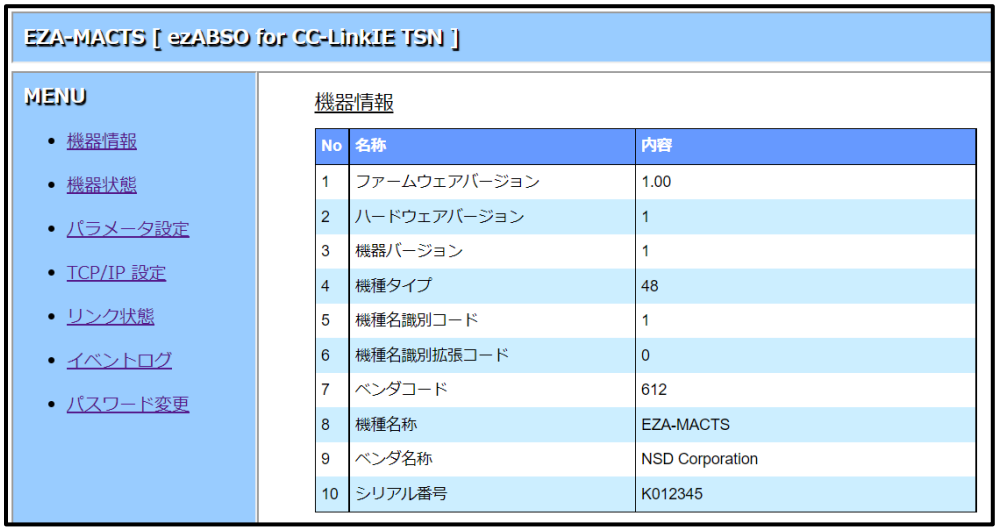
10-1. Overview

With the Web server function, EZA-MACTS information can be checked and parameters can be set by using a Web browser on a computer connected to the CC-Link IE TSN network.

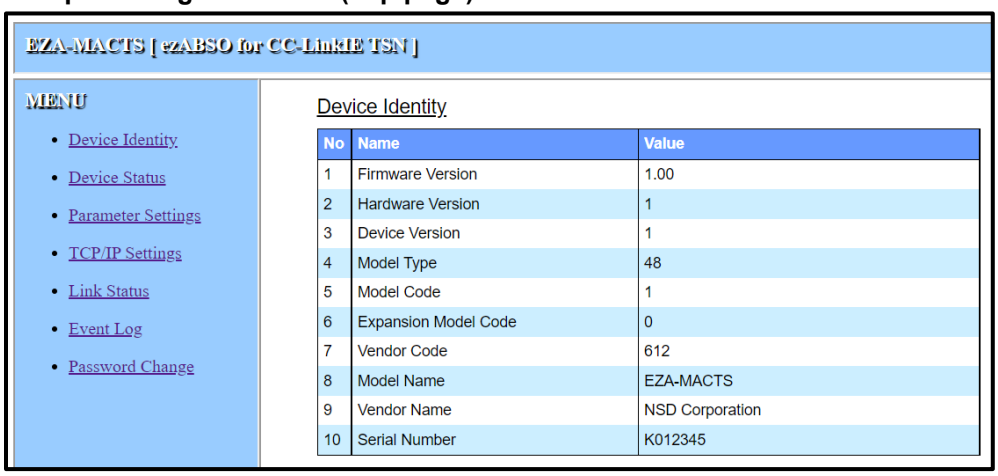
When the language setting of the Web browser is set to "Japanese," the screen will be displayed in Japanese.
If set to other languages, the screen will be displayed in English.

No.	MENU	Description
1	Device Identity	The EZA-MACTS device identity can be checked.
2	Device Status	The EZA-MACTS operational status can be checked.
3	Parameter Settings	The EZA-MACTS parameters can be set and checked.
4	TCP/IP Settings	The TCP/IP settings can be checked.
5	Link Status	The CC-Link IE TSN communication status can be checked.
6	Event Log	The event history of EZA-MACTS can be checked.
7	Password Change	The password for setting parameters can be changed.

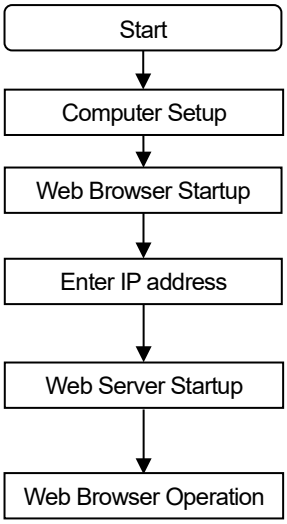
(1) Example of Japanese screen (Top page)



(2) Example of English screen (Top page)



10-2. Operation Procedure of Web Server



- Connect the computer to the CC-Link IE TSN network with an Ethernet cable.
- Set the IP address of the computer. (Set up without duplication).

- Start the Web browser (Microsoft Edge, Google Chrome, etc.) on the computer.

- Enter the EZA-MACTS's IP address to the address bar of the Web browser.

- The Web server of EZA-MACTS operates, and then the device identity is displayed in the Web browser.
  Check the IP address and security of the computer if the Web server does not operate. *1

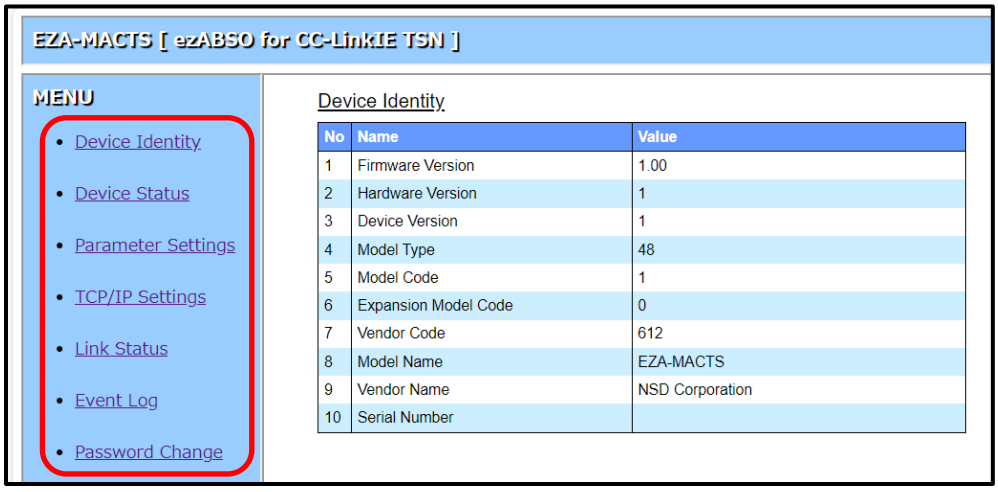
- Operate the Web browser to check the status and set the parameters.

*1: "Security" is firewalls, security software, etc.

> ⚠ NOTE
>
> If the power is turned ON again for EZA-MACTS while using the web browser in Japanese, some of the displays may change to English.
> Update (reload) the Web browser when the power is turned ON again for EZA-MACTS.

10-3. Basic Operation

Click "MENU" to display the corresponding contents.



POINT

In the following screens, the displayed contents are not automatically updated.
To update, click again.

- Device Identity
- Parameter Settings
- TCP/IP Settings
- Password Change

10-4. Details of each Screen

Details of each screen are shown below.

10-4-1. Device Identity

The EZA-MACTS device identity can be checked.

Device Identity

No	Name	Value
1	Firmware Version	1.00
2	Hardware Version	1
3	Device Version	1
4	Model Type	48
5	Model Code	1
6	Expansion Model Code	0
7	Vendor Code	612
8	Model Name	EZA-MACTS
9	Vendor Name	NSD Corporation
10	Serial Number	

10-4-2. Device Status

The EZA-MACTS operational status can be checked.

This screen is automatically updated every approximately 1s.

Sensor Data

No	Name	Value
1	Position Data	77086
2	Speed Data	0.0 r/min

Device Diagnosis

No	Name	Value
1	Device Diagnosis	☐ Error ☐ Alarm ☑ Ready ☐ Preset Answer ☑ Configuration Parameter Data
2	Error information	☐ Sensor Error ☐ Memory Error ☐ Hardware Error ☐ Power Supply Voltage Alarm ☐ Internal Temperature Alarm ☐ Rotation Speed Alarm ☐ Preset Data Setting Alarm ☐ IP Address Setting Change Alarm ☐ Cyclic Transmission Size Alarm
3	Power Supply Voltage	23.6 V
4	Internal Temperature	58 deg C
5	Operating Time	105 h

10-4-3. Parameter Settings

The functional parameters and sensor parameters of EZA-MACTS can be set and checked.

● **Functional parameter (configuration parameter data) setting**

Sets whether the EZA-MACTS parameter setting by the engineering tool is "Valid" or "Invalid".

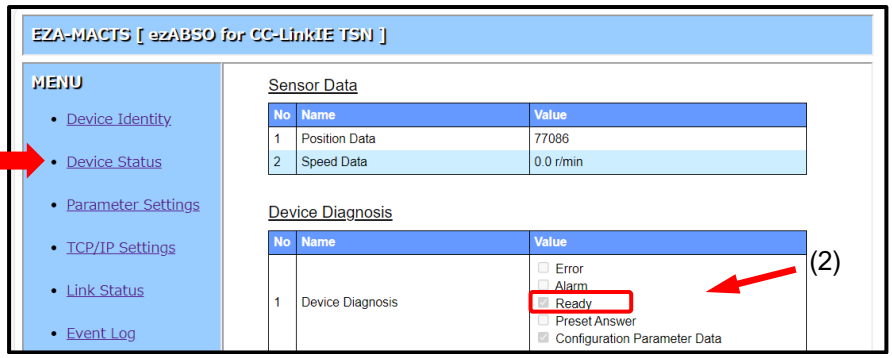
- Invalid: The parameters cannot be set by the engineering tool.
- Valid: The parameters can be set by the engineering tool.

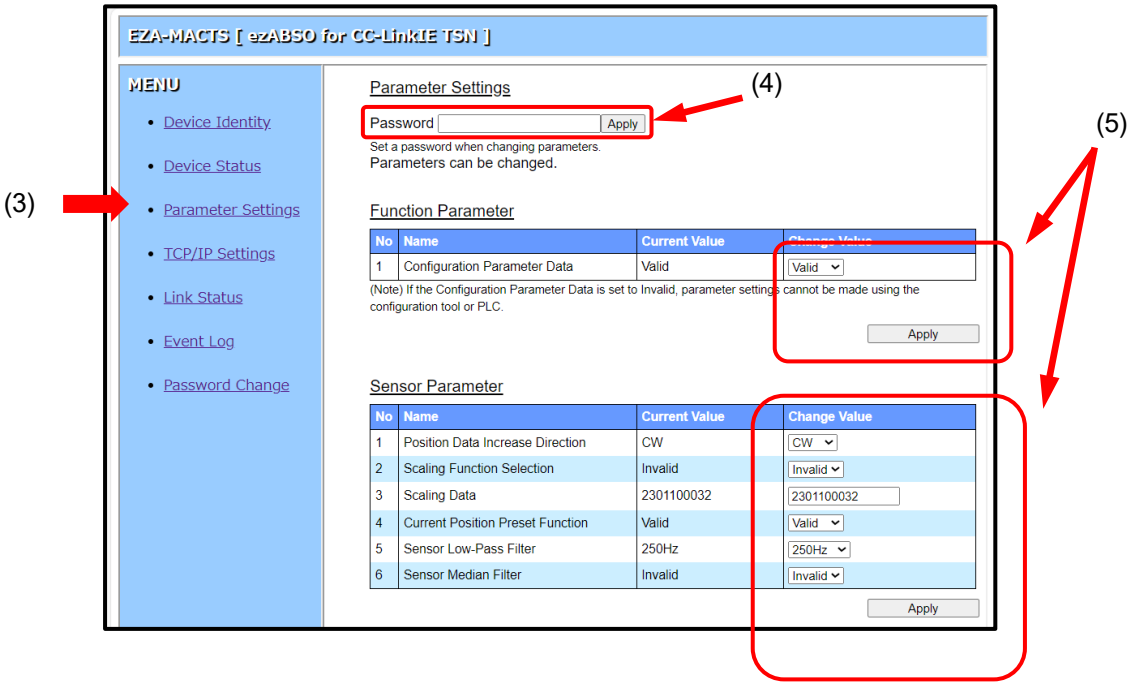
● **Sensor parameter setting**

Sets the parameters of EZA-MACTS. For more details on parameters, refer to section 8-6-2.

● **Setting procedure**

(1) Click "Device Status" in MENU.
(2) Check that "Ready" is marked in "Device Diagnosis".
(3) Click "Parameter Settings" in MENU.
(4) Enter the password, and then click "Apply". (The initial password is "admin".)
(5) Set each parameter, and then click "Apply".





10-4-4. TCP/IP Settings

The TCP/IP settings can be checked.

TCP/IP Settings

No	Name	Value
1	IP Address	192.168. 3. 1
2	Subnet Mask	255.255.255. 0
3	Default Gateway	0. 0. 0. 0
4	Host Name	EZA-MACTS
5	IP Parameter Update *1 *2	Not Updated
6	Station Node Address Settings	1 : Node Switch Configuration Value

*1: "IP Parameter" is a generic term for IP address, subnet mask, default gateway, and host name.

*2: When the IP parameter has been changed from the engineering tool, "Updated" will be displayed.

10-4-5. Link Status

The CC-Link IE TSN communication status of EZA-MACTS can be checked.

This screen is automatically updated every approximately 5s.

CC-LinkIE TSN Cyclic Transmission Status

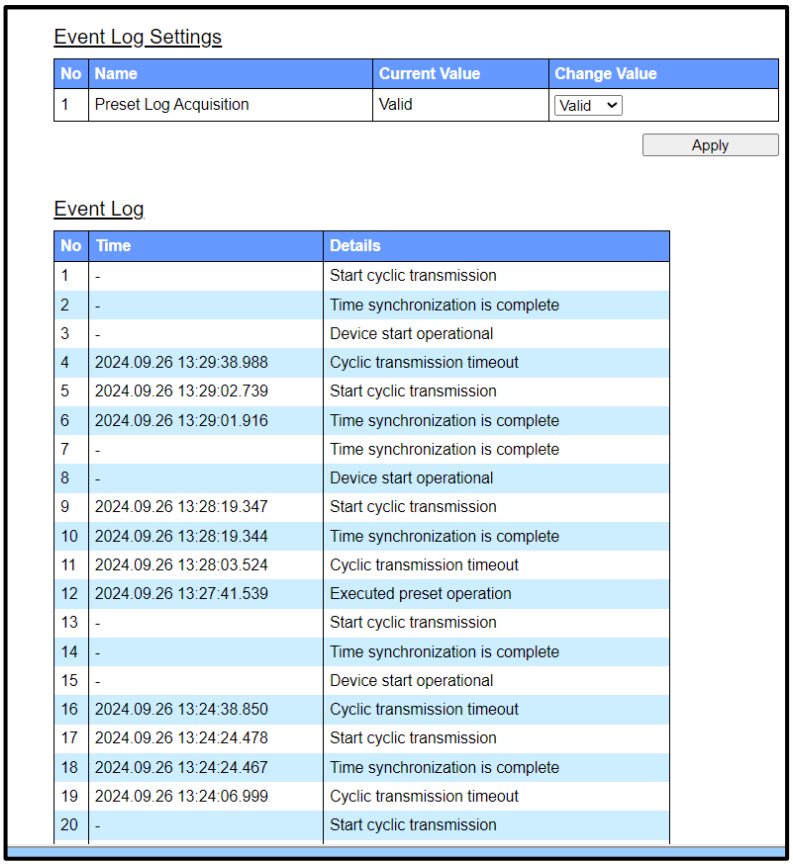
No	Name	Value
1	Cyclic Transmission Status	At Normal Communication or Power-On
2	Data Link Status	Cyclic Run
3	Network Synchronous Communication	Invalid
4	Hold/Clear Status	Not Occurred
5	Master CPU Operating Status	Run
6	Master CPU Error Status	No Error
7	Cyclic Transmission Size Set by the Master Station	RX : 32 bit RY : 32 bit RWr : 16 Word RWw : 16 Word

PHY Port Status

No	Name	Value	
		Port1	Port2
1	Link Status	Link Up	Link Up
2	Communication Speed	1Gbps	1Gbps
3	Duplex	Full	Full
4	MAC Address	E8-8E-60-00-00-01	

10-4-6. Event Log

The event history of EZA-MACTS can be checked.
It stores up to 64 data in storage memory.
The time of the master station (network) is saved in "Time" (YYYY.MM.DD HH:MM:SS.ms).
If the time synchronization has not been completed between the master station and EZA-MACTS, "-" is displayed in "Time".
This screen is automatically updated every approximately 5s.



Event Log Settings

No	Name	Current Value	Change Value
1	Preset Log Acquisition	Valid	Valid

Apply

Event Log

No	Time	Details
1	-	Start cyclic transmission
2	-	Time synchronization is complete
3	-	Device start operational
4	2024.09.26 13:29:38.988	Cyclic transmission timeout
5	2024.09.26 13:29:02.739	Start cyclic transmission
6	2024.09.26 13:29:01.916	Time synchronization is complete
7	-	Time synchronization is complete
8	-	Device start operational
9	2024.09.26 13:28:19.347	Start cyclic transmission
10	2024.09.26 13:28:19.344	Time synchronization is complete
11	2024.09.26 13:28:03.524	Cyclic transmission timeout
12	2024.09.26 13:27:41.539	Executed preset operation
13	-	Start cyclic transmission
14	-	Time synchronization is complete
15	-	Device start operational
16	2024.09.26 13:24:38.850	Cyclic transmission timeout
17	2024.09.26 13:24:24.478	Start cyclic transmission
18	2024.09.26 13:24:24.467	Time synchronization is complete
19	2024.09.26 13:24:06.999	Cyclic transmission timeout
20	-	Start cyclic transmission

<Event List>

Event message	Content
Device start operational	EZA-MACTS is starting to operate.
Device forced stop operational	EZA-MACTS stopped its operation.
Time synchronization is complete	The time synchronization is completed between the master station and EZA-MACTS.
Start cyclic transmission	The cyclic transmission is starting between the master station and EZA-MACTS.
Executed preset operation	Executed preset.
Executed error clear operation	Executed error clear.
Executed remote reset operation	Executed the remote reset operation from the engineering tool.
Changed position data increase direction	Changed the position data increase direction.
Changed current position preset function	Changed "Valid" or "Invalid" of the current position preset function.
Changed scaling function	Changed "Valid" or "Invalid" of the scaling function.
Changed scaling data	Changed the scaling data.
Changed sensor low-pass filter	Changed the sensor low-pass filter.
Changed sensor median filter	Changed the sensor median filter.
Changed logging config	Changed the logging configuration.
Changed password for parameter setting	Changed the password for setting parameters.
Initialized password for parameter setting	Initialized the password for setting parameters.
Sensor error	A sensor error has occurred.
Memory error	A memory error has occurred.
Switch error	A switch error has occurred.
Hardware error	A hardware error has occurred.
Power supply voltage alarm	The power supply voltage is outside of the specification range (10.8 to 28.8V).
Internal temperature alarm	The ambient temperature is outside of the specification range (-20 to +75°C).
Rotation speed alarm	The rotation speed is outside of the specification range (6,100 r/min or more).
Preset data setting alarm	The preset data (RWw0, 1) is outside of the scaling range.
IP address duplicate alarm	The IP address is duplicated with other devices'.
IP address setting alarm	The IP/STATION switch is set to "FF".
IP address setting change alarm	The IP address was intentionally changed.
	The IP address was accidentally changed.
Cyclic transmission size alarm	The cyclic transmission size alarm has occurred.
Cyclic transmission timeout	The cyclic transmission monitoring timer has timed out.
Reserved station setting	Set as the reserved station.
Changed network synchronous communication setting	Changed the network synchronous communication setting.

10-4-7. Password Change

The password for setting parameters can be changed.

● **Change procedure**

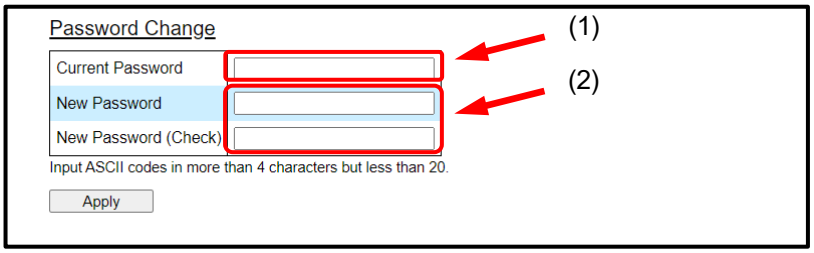
(1) Enter the currently set password. (The initial password is "admin".)

(2) Enter the new password, and then click "Apply".

Password requirements:

- 4 to 20 single-byte characters.
- Characters that can be used are numbers 0 to 9, alphabets A to Z, and a to z.
- Passwords are case-sensitive.

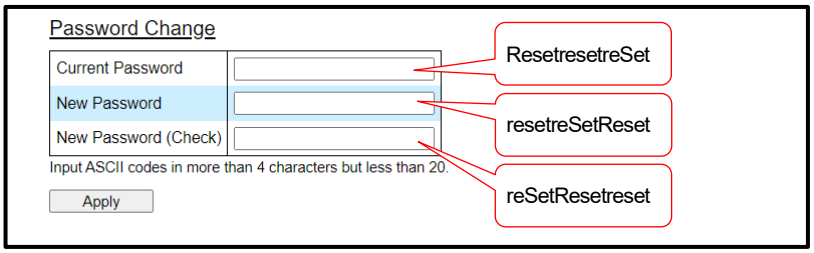
If successful, the password is confirmed and stored in the storage memory of EZA-MACTS.



> ⚠ NOTE
>
> Write down the changed password for preventing to forget.

10-4-8. Password initialization

The password for setting parameters can be reset to the initial password "admin".
Enter the following information on the screen, and then click "Apply".



11. ERROR AND ALARM CONTENTS

11-1. List of Errors and Alarms

Name	Monitor LED	Remote input (RX)			Web server	ezSCOPE *1	Classification
	RUN / ERR	Ready	Error	Alarm	Device diagnosis	Network error	
CPU error	Unstable	Unstable	Unstable	Unstable	Communication failure	Hardware error	Major
	Red	0	1	0			
Sensor error	Flashing Red	0	1	0	Sensor error	Sensor error	Moderate
Memory error	Flashing Red	0	1	0	Memory error / Communication failure	Memory error	Moderate
Hardware error	Flashing Red	0	1	0	Hardware error	LINK OFF or Hardware error	Moderate
Switch error	Flashing Red	Unstable	Unstable	Unstable	Communication failure	Switch error	Moderate
Power supply voltage alarm	Flashing Green	1	0	1	Power supply voltage alarm	Power supply voltage alarm (overvoltage, undervoltage)	Minor
Internal temperature alarm	Flashing Green	1	0	1	Internal temperature alarm	Internal temperature alarm (high, low)	Minor
Rotation speed alarm	Flashing Green	1	0	1	Rotation speed alarm	Rotation speed alarm	Minor
Preset data setting alarm	Flashing Green	1	0	1	Preset data setting alarm	Preset data setting alarm	Minor
IP address setting change alarm	Flashing Green	1	0	1	IP address setting change alarm	IP address change alarm	Minor
IP address setting alarm	Flashing Green	Unstable	Unstable	Unstable	Communication failure	IP address setting alarm	Minor
IP address duplicate alarm	Flashing Green	Unstable	Unstable	Unstable	Communication failure	IP address overlap alarm	Minor
Cyclic transmission size alarm	Flashing Green	Unstable	Unstable	Unstable	Cyclic transmission size alarm	Transmission size alarm	Minor

*1: For more details, refer to "ezSCOPE specifications and instruction manual".

11-2. Cause and Clear Method

After removing the cause, follow the clear method to clear the error or alarm.

Name	Probable cause	When detected	Status	Clear method *3 *4
CPU error	- The internal CPU of EZA-MACTS had a runaway.	Always	The operation does not work.	Restart
Sensor error	- The sensor circuit inside EZA-MACTS has an error.	Always	The position and speed data are unstable.	Error clear or Restart
Memory error	- The storage memory inside EZA-MACTS has an error.	At power ON	It operates under the factory setting.	Error clear
Hardware error	- The circuit inside EZA-MACTS has an error.	Always	The position and speed data are unstable.	Error clear or Restart
Switch error	- The IP/STATION switch has an error.	At power ON	CC-link IE TSN communication is not available.	Restart
Power supply voltage alarm	- The power voltage supplied to EZA-MACTS is outside of the range between 10.8 and 28.8V.	Always	The position and speed data output normally.	Automatic recovery
Internal temperature alarm	- The EZA-MACTS's ambient temperature is outside of the range between 20 and 75°C.	Always	The position and speed data are output normally, but its accuracy cannot be assured.	Automatic recovery
Rotation speed alarm	- The EZA-MACTS's rotation speed is more than 6,100r/min. *2	Always	The position and speed data output normally. *2	Automatic recovery
Preset data setting alarm	- The preset data (RWw0, 1) is outside of the range.	When preset (RY) changes from 0 to 1	It operates with the position data before the preset operation.	Set the preset data correctly, and then perform the preset again.
IP address setting change alarm	- The IP address was intentionally changed.	Always	It operates with the IP address before the change.	Restart
	- The IP address was accidentally changed.			Return the IP address to the setting at power ON, and then perform error clear.
IP address setting alarm	- The IP/STATION switch has been set to "FF".	At power ON	CC-link IE TSN communication is not available.	Set the IP/STATION switch correctly, and then restart the power supply.
IP address duplicate alarm	- The IP address is duplicated with other devices'.	Always	CC-Link IE TSN communication becomes unstable.	Set the IP address correctly, and then restart the power supply.
Cyclic transmission size alarm	- The specification of EZA-MACTS differs from the transmission size set in the PLC.	Always	The cyclic transmission is not available.	Correct the PLC's transmission size setting, and then restart the power supply.

*2 When the shaft rotates in 9,000r/min or more, the speed data and the rotation speed alarm might be unstable.
*3 The items listed as "Restart" in the clearing method can also be cleared by the remote reset operation of the engineering tool.
*4 If the error cannot be cleared by performing the clear method, EZA-MACTS has failed. Contact your NSD representative.

⚠ NOTE

- EZA-MACTS might be damaged when "Internal Temperature Alarm" occurs.
  Lower the ambient temperature quickly. Or, the installation location should move to a location which is within a permissible temperature range.

- If "Switch Error" occurs, CC-Link IE TSN communication is not available. Check the state by the monitor LED or ezSCOPE because it cannot be checked by the PLC or the Web server function.

- If "Memory Error" occurs, the parameter setting value and preset data are returned to the factory settings. Set the parameter and preset data again.

  Also, the IP address will return to the factory setting (192.168.3.100).
  If the IP/STATION switch is set to "0", set the IP address again.

- When the operating time area in the storage memory is corrupted, "Memory error" will not occur.
  If this area is read out, it will become "-1" (FFFF FFFF H).

- When the event log area in the storage memory is corrupted, "Memory error" will not occur.
  If this area is read out, it will become unstable.

12. INSPECTION

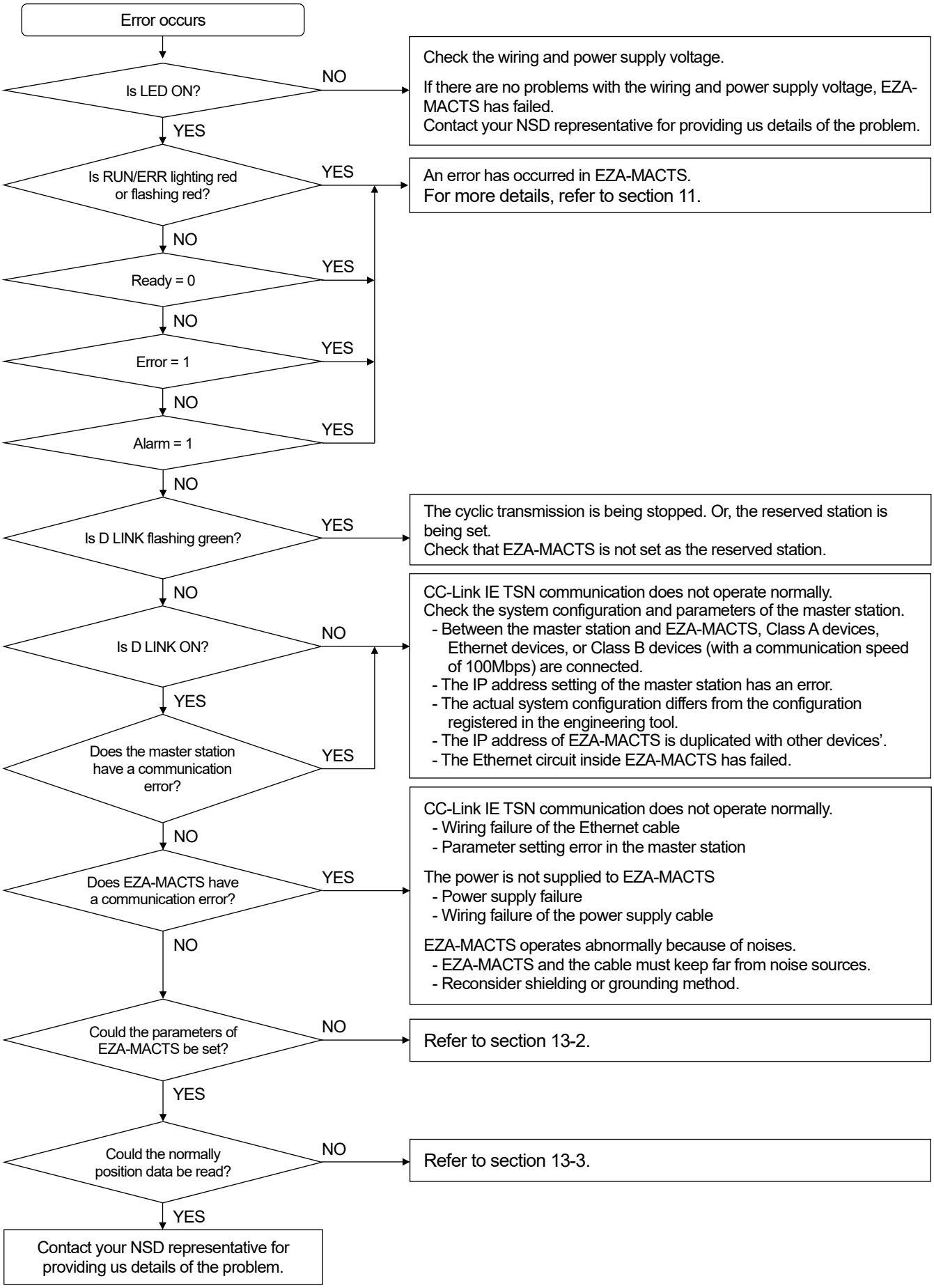
The inspection should be conducted once every 6 months to a year.

Any inspected items which do not satisfy the criteria shown below should be corrected.

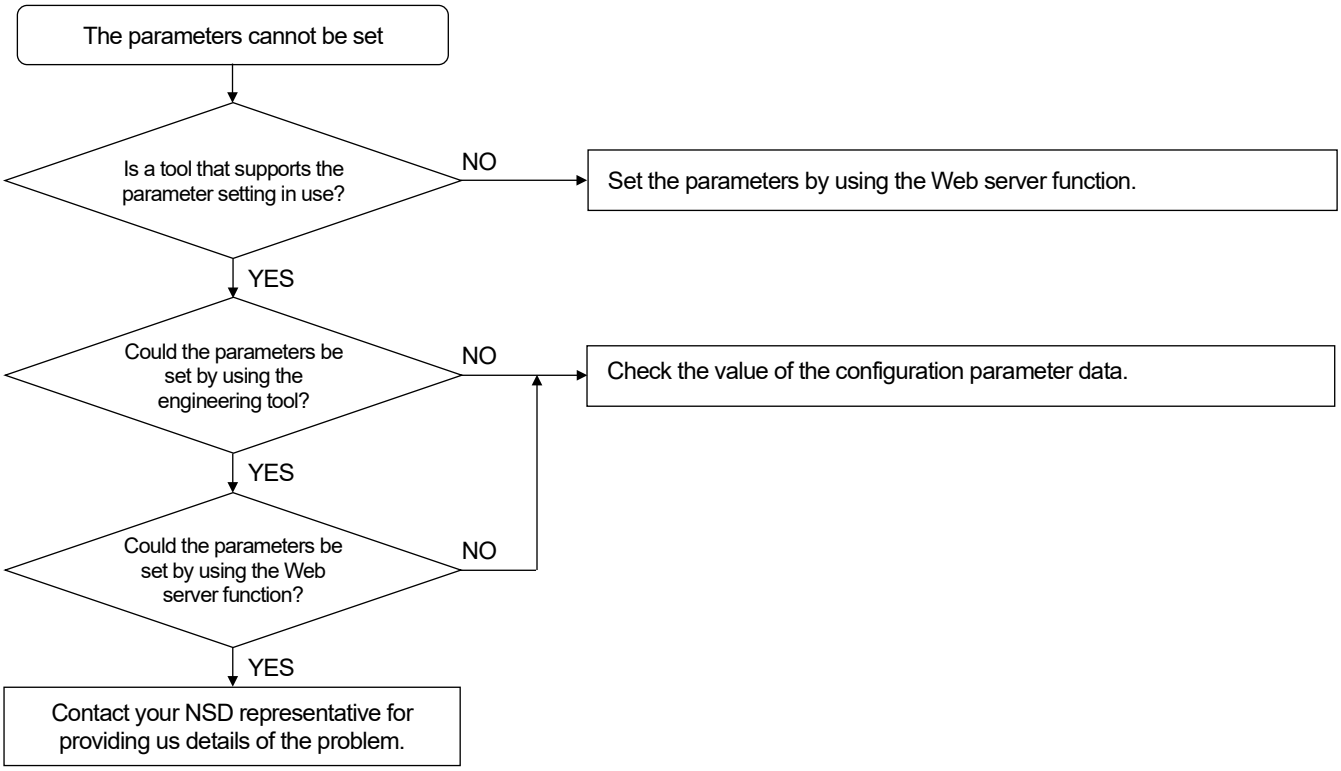
Inspection item	Description	Criteria	Remark
Power supply	Measure the voltage fluctuation on the terminal block of the power supply.	Within 10.8 to 28.8 VDC range	Tester
Ambient conditions	Check the ambient temperature.	-20 to +75°C	Thermometer
	Check the accumulation of dust.	None	Visual inspection
Mount conditions	Check that EZA-MACTS is securely mounted.	There should be no looseness.	
	Check that the shaft of EZA-MACTS is securely coupled to the machine shaft.	There should be no looseness.	
	Check for severed cables.	Cable should appear normal.	
	Check that the screws of the relay terminal for cable are securely tightened.	There should be no looseness.	
	Check that the connector is securely connected.	There should be no looseness.	

13. TROUBLE SHOOTING

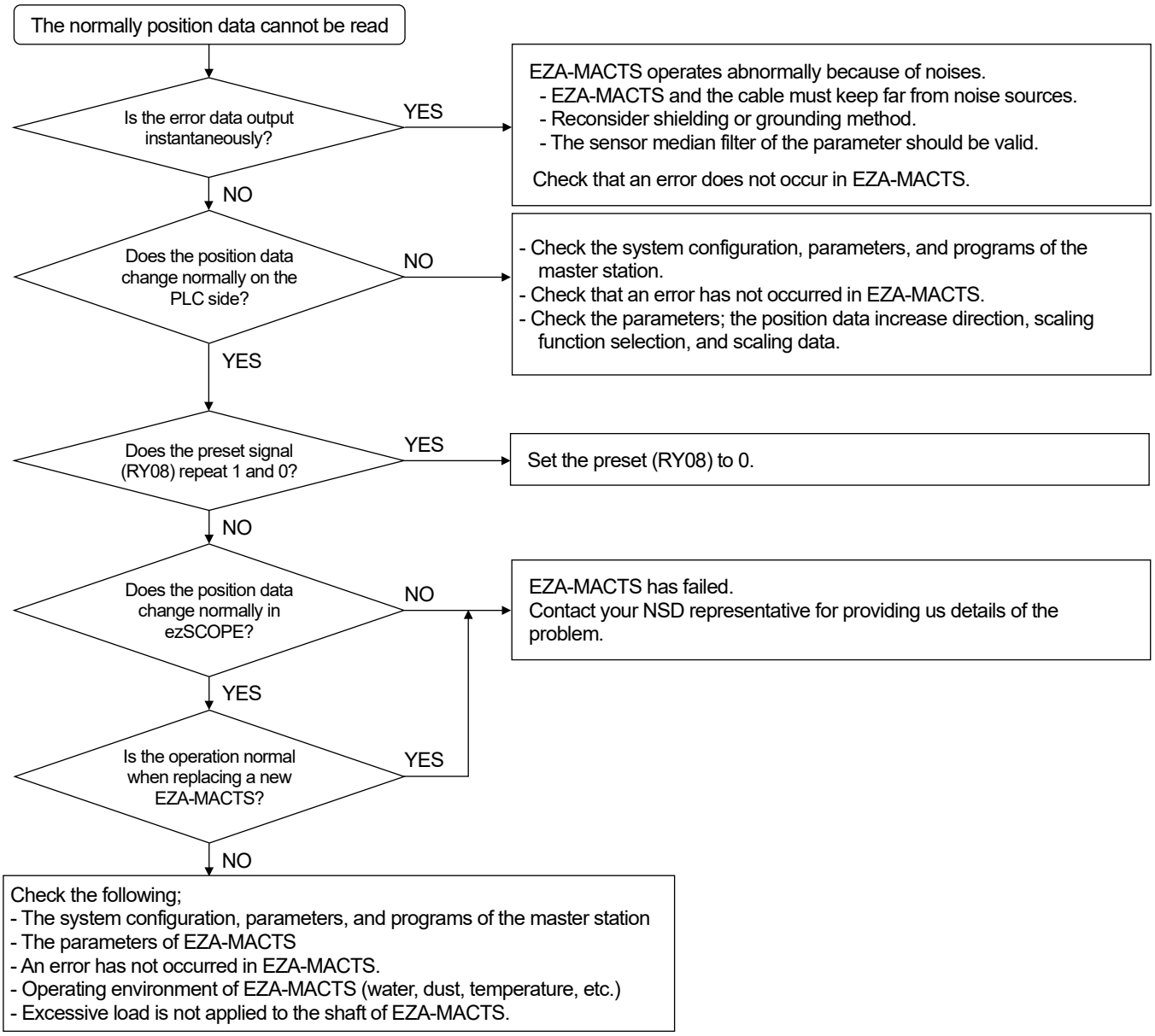
13-1. Trouble Shooting Flowchart



13-2. Flowchart when Parameter cannot be Set



13-3. Flowchart when Normally Position Data cannot be Read



13-4. Information Required when Reporting Problem

Should a problem occur with this product, please contact your NSD representative as soon as possible.

(1) Contact information

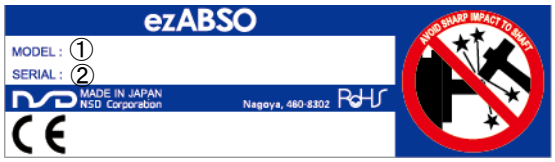
Please refer to the back cover.

(2) Information to report

● Nameplate information ① and ② below

① MODEL (Model code)

② SERIAL (Serial number)



● Error details

1. Date and time of occurrence
2. When did the error occur
   a. At initial power on
   b. During test operation
   c. During continuous operation (approx. __ months)
3. Error occurrence conditions — a. At startup b. During operation
4. Error occurrence frequency
5. Error description (details)
6. Operation conditions
   Machine name used
   Wiring
   Operating environment (water, oil, dust, etc.)
   Ambient temperature
   Vibration
   Noise

13-5. Warranty Period and Scope

(1) Warranty Period

The warranty period is 1 year from the delivery date.

(2) Scope of Warranty

In the event that the unit fails during the above warranty period due to a cause for which NSD is responsible, NSD will replace the failed parts and will perform necessary repairs. The following problem causes, however, are outside the scope of this warranty.

1. Problems caused by mishandling.
2. Problems originating outside this unit.
3. Problems caused by unauthorized modifications or repairs.
4. Problems caused by natural disasters, catastrophes, etc.

This warranty extends only to the delivered product, and does not cover any collateral damage which a malfunction in this product may cause.

13-6. Scope of Service

The purchase price of this product does not include service fees for dispatching engineers, etc.
Separate service fees will therefore be imposed for the following types of service.

(1) Installation guidance and presence at test operation
(2) Maintenance, inspection, adjustment, and repair
(3) Technical guidance

APPENDIX 1. CE MARKING

EZA-MACTS conforms to EMC directive.

The low voltage directive is out of the range because EZA-MACTS is activated by 24VDC power supply.

Appendix 1-1. EMC Directives

It is necessary to do CE marking in the customer's responsibility in the state of a final product.

Confirm EMC compliance of the machine and the entire device by the customer because EMC changes configuration of the control panel, wiring, and layout.

Appendix 1-2. EMC Directive and Standards

EMC Directive consists of immunity and emission items.

EMC standards and testing items are indicated in the following table.

EMC Standard and Testing

Class	Standard No.	Name
EMI (Emission)	EN61000-6-4	Generic standards. Emission standard for industrial environments
EMS (Immunity)	EN61000-6-2	Generic standards. Immunity standard for industrial environments
	EN61000-4-2	Electrostatic Discharge
	EN61000-4-3	Radiated, Radio Frequency, Electromagnetic Field
	EN61000-4-4	Electrical Fast Transient / Burst
	EN61000-4-5	Surge Immunity
	EN61000-4-6	Conducted Disturbances, Induced by Radio-Frequency Fields
	EN61000-4-8	Power Frequency Magnetic Field

Appendix 1-3. Restriction

When using the Ethernet cable length longer than 30m, the Ethernet cable should be passed through a metal duct, or covered with a shielded zipper tube and grounded (ground resistance of 100 ohm or less) the shield of the zipper tube.

Recommended zipper tube

Model	Manufacturer
MLBFSX 20ϕ	ZIPPERTUBING(JAPAN), LTD.

Reference

It might be improved when the clamp filter is installed to the power supply cable or the Ethernet cable when it operates faultily by the influence from the peripheral devices.

Recommended clamp filter

Mounting location	Model	Manufacturer
- Power supply cable - Ethernet cable	ZCAT2032-0930 (Inner dimensions: ϕ9)	TDK Corporation

NSD Group

Manufacturer
NSD Corporation 3-31-28, OSU, NAKA-KU, NAGOYA, JAPAN 460-8302

Distributor
NSD Trading Corporation 3-31-23, OSU, NAKA-KU, NAGOYA, JAPAN 460-8302
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