Mitutoyo

Interface Unit EtherNet/IP for EJ Counter

User's Manual
- Instructions for use -

● For the related User's Manuals, see "■ Positioning of this document, document map" on page 1.

■ Product names and model numbers covered in this document

● Product name

Product name	Interface Unit EtherNet/IP for EJ Counter

■ Notice regarding this document

- Mitutoyo Corporation assumes no responsibilities for any damage to the product, caused by its use not conforming to the procedure described in this document.

- In the event of loss or damage to this document, immediately contact a Mitutoyo sales office or your dealer.

- Read this document thoroughly before operating the product. In particular, be sure to fully understand "Safety Precautions" and "Precautions for Use" in the preface.

- The contents of this document are based on information current as of January 2024.

- No part or whole of this document may be transmitted or reproduced by any means without prior written permission of Mitutoyo Corporation.

- Some screen displays in this document may be highlighted, simplified or partially omitted for convenience of explanation. In addition, some of them may differ from actual ones to the extent that no user will misunderstand the functions and operations.

- The corporation, organization and product names that appear in this document are their trademarks or registered trademarks.

Contents

About This Document

■ Positioning of this document, document map

The position of this document and its relationship to other product documentation are as follows.

● Interface unit manual

| Interface Unit Quick Start Guide |

Explains setup, specifications and troubleshooting. This document is included in the product package together with the Interface Unit. (Common to all interface unit models)

| Interface Unit EtherNet/IP User's Manual (This Document) |

This is the User's Manual that explains the Interface Unit EtherNet/IP in detail.

● Counter manual

| EJ Counter Quick Start Guide |

Explains handling precautions, operating procedures, specifications, troubleshooting for EJ Counters to which the Interface Unit EtherNet/IP is connected for use. For details, see EJ Counter User's Manual. This document is included in the product package together with the EJ Counter.

| EJ Counter User's Manual |

This is the User's Manual that provides a detailed explanation of the EJ Counter that is connected to the Interface Unit EtherNet/IP.
Not included with product. Please download the manual from Mitutoyo's web site (https://manual.mitutoyo.co.jp).

● Linear Gage manual

| LG100 User's Manual |

| LG200 User's Manual |

| LGB User's Manual |

Explains installation procedures, specifications, maintenance and so forth for Linear Gages that can be connected to EJ Counters.

Select and purchase Linear Gages according to your application.

■ Intended readers and purpose of this document

● Intended readers

This manual is intended for customers who are installing or using the Interface Unit EtherNet/IP for EJ Counter for the first time.

● Purpose

The purpose of this document is to help you understand the product overview, functions of each part, procedures for use and care of the product.

Conventions Used in This Document

■ Safety reminder conventions warning against potential hazards

⚠ **CAUTION**	Indicates a hazard with a low level of risk which, if not avoided, **could result in minor or moderate injury**.
NOTICE	Indicates a potentially hazardous situation which, if not avoided, **may result in property damage**.

■ Conventions indicating prohibited and mandatory actions

🚫	Indicates concrete information about prohibited actions.
❗	Indicates concrete information about mandatory actions.
⏚	Indicates that grounding needs to be implemented.

■ Conventions indicating referential information or reference location

IMPORTANT	Indicates information that must be known when using the product.
Tips	Indicates further information and details relevant for the operating methods and procedures that are explained in that section.
📖	Indicates reference location if there is information that should be referred to in this document or an extraneous User's Manual. Example: For details about XX, see 📖 "1.3 Names of Parts" on page 3 in "1 Overview".

■ Other conventions

( ): Round brackets	Represent a paraphrase of an immediately preceding phrase or a supplementary explanation.
" ": Double quotation marks	Represent a highlighted phrase. They also indicate an index where information to be referenced is described.
[ ]: Square brackets	Indicates the name of an operation key.
1, 2, 3, ...	Indicates the order and the contents of tasks.
»	Indicates the action resulted from some operation(s).

4

■ Example of conventions use

2.1.2   Linking to EJ Counters

Link this product to EJ Counters.
Up to eight EJ Counters can be linked to this product.

Tips
The interface unit is intended for use with the EJ-102N (Code No. 542-080) and EJ-102NE (Code No. 542-081) EJ Counters. These two types of EJ Counters can be used in mixed configurations.

1 Remove the protective covers from the counter linkage connectors of this product and the EJ Counter.

2 Attach this product to the DIN rail on the side facing the EJ Counter's counter linkage connector (male).

Tips
For details, see 📖 "2.1.1 DIN Rail Attachment / Removal" on page 20.

3 Link the product to the EJ Counter.
Slide the product or EJ Counter along the DIN rail to fully mate the counter linkage connector on the product (female) with the counter linkage connector (male) on the EJ Counter.

NOTICE
Do not link more than eight EJ Counters together. Failure to observe this precaution may result in damage.

IMPORTANT
When sliding this product or EJ Counters along the DIN rail, move them slowly.

Indicates an operating procedure to be performed or its outline.

Indicates reference to some other document or section.

Indicates safety information.

Indicates important information that must be known when using the product.

Safety Precautions

Read these "Safety Precautions" thoroughly before operating the product to use it properly.

These safety precautions include such information as to prevent injury to the operator and other persons, damage to property and product defects. Be sure to observe these precautions carefully.

■ Precautions for this product

> **⚠ CAUTION**
>
> 🚫 Do not disassemble or modify this product. Otherwise you may be subject to electric shock, and there is a risk of fire due to a short circuit caused by metallic powders that have gotten inside the product.

Precautions for Use

■ Use and handling of the product

● Use this product only by connecting to measuring instruments which supports this product.

Do not use this product for measuring instruments which does not support this product.
For measuring instruments supported by this product, contact the agent where you purchased the product or a Mitutoyo sales office.

● This product is a measuring instrument.

Do not use it for any purposes other than measuring.

● This product is for industrial usage.

Do not use this product for purposes other than for industrial usage.

● The product is a precision instrument.

Handle this product with care. Do not apply excessive shock or force to any of the parts during operation.

■ Environment for placement

This product is designed for indoor use. To ensure that the product is used in a suitable environment, take the following conditions into account when installing it.

- Vibration
  Install this product in an environment where it will be subject to minimal vibration. Using this product in a place with significant vibration for an extended period of time may result in malfunction of the precision components.
- Dust
  Dust in the installation site negatively affects the electrical components. Install this product in an environment where it will be subject to minimal dust.
- Sunlight
  If this product is exposed to direct sunlight, the heat will cause deformations in the main unit, negatively affecting its operation. If installing this product in an environment that is exposed to direct sunlight, such as near a window, is unavoidable, protect it from the sunlight by curtaining it off, etc.
- Ambient temperature and humidity
  Avoid using the product in any place that is subject to sudden changes in temperature or humidity.

When using this product in the following environments, take necessary shielding measures.

- Where noise is generated due to static electricity, etc.
- Where there is strong electrical field intensity
- Where power wires and motor lines pass nearby
- Where there is risk of direct contact with materials such as chips, cutting fluids or water
- Where there is risk of exposure to radiation
- Where there is the risk of exposure to corrosive gas

■ Maintenance

Do not use organic solvents such as thinner or benzine. Gently wipe dirt off of the product with a soft, tightly woven cloth.

■ Power supply

- Be sure to connect this product to ground.
- Provide a power supply with capacity sufficient to accommodate switch-on surge current.

Tips

This product is supplied with power by the connected EJ Counter.

Electromagnetic Compatibility (EMC)

This product complies with the EMC Directive and the UK Electromagnetic Compatibility Regulations; however, if this receives electromagnetic interference that exceeds these requirements, it will be out of warranty and require appropriate measures.

This product is an industrial product, and is not intended to be used in residential environment. If this product is used in residential environment, this product may cause electromagnetic interference with other instruments. In such a case, it is required to take appropriate measures for preventing such electromagnetic interference.

Export Control Compliance

This product falls into the Catch-All-Controlled Goods and/or Catch-All-Controlled Technologies (including Programs) under Category 16 of Appended Table 1 of Export Trade Control Order or under Category 16 of Appended Table of Foreign Exchange Control Order, based on Foreign Exchange and Foreign Trade Act of Japan.

If you intend re-export of the product from a country other than Japan, re-sale of the product in a country other than Japan, or re-providing of the technology (including Programs), you shall observe the regulations of your country.

Also, if an option is added or modified to add a function to this product, this product may fall under the category of List-Control Goods, List-Control Technology (including Programs) under Category 1 - 15 of Appended Table 1 of Export Trade Control Order or under Category 1 - 15 of Appended Table of Foreign Exchange Control Order, based on Foreign Exchange and Foreign Trade Act of Japan. In that case, if you intend re-export of the product from a country other than Japan, re-sale of the product in a country other than Japan, or re-providing of the technology (including Programs), you shall observe the regulations of your country. Please contact Mitutoyo in advance.

Notes on Export to European Countries

When you intend exporting of this product to any of the European countries, it may be required to provide User's Manual(s) in English and Declaration of Conformity in English (in some cases, the official language of the country to be exported).For detailed information, please contact Mitutoyo in advance.

Disposal of Products outside the European Countries

Please follow the official instruction in each community and country.

Disposal of Old Electrical & Electronic Equipment (Applicable in the European Countries with Separate Collection Systems)

This symbol on the product or on its packaging is based on WEEE Directive (Directive on Waste Electrical and Electronic Equipment), and this symbol indicates that this product shall not be treated as household waste.

To reduce the environmental impact and minimize the volume of landfills, please cooperate in reuse and recycle.

For how to dispose of the product, please contact the agent where you purchased the product or a Mitutoyo sales office.

China RoHS Compliance Information

This product meets China RoHS requirements. See the table below.

产品中有害物质的名称及含量

部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
本体	×	○	○	○	○	○
配件	○	○	○	○	○	○

本表格依据 SJ/T 11364 的规定编制。

○: 表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。

×: 表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。

环保使用期限标识是根据《电器电子产品有害物质限制使用管理办法》以及《电子电气产品有害物质限制使用标识要求(SJ/T11364−2014)》制定的,适用于中国境内销售的电子电气产品的标识。

电器电子产品只要按照安全及使用说明内容在正常使用情况下,从生产日期算起,在此期限内产品中含有的有毒有害物质不致发生外泄或突变,不致对环境造成严重污染或对其人身、财产造成严重损害。

产品使用后,要废弃在环保使用年限内或者刚到年限的产品,请根据国家标准采取适当的方法进行处置。

另外,此期限不同于质量/功能的保证期限。

Warranty

This product has been manufactured under strict quality management, but should it develop problems within one year of the date of purchase in normal use, repair shall be performed free of charge. Please contact the agent where you purchased the product or Mitutoyo sales representative ("SERVICE NETWORK" on page App-1). This warranty, however, shall not affect any provisions of the Mitutoyo Software End User License Agreement.

If this product fails or is damaged for any of the following reasons, it will be subject to a repair charge, even if it is still under warranty.

- Failure or damage owing to fair wear and tear
- Failure or damage owing to inappropriate handling, maintenance or repair, or to unauthorized modification
- Failure or damage owing to transport, dropping, or relocation of the product after purchase
- Failure or damage owing to fire, salt, gas, abnormal voltage, lightning surge, or natural disaster
- Failure or damage owing to use in combination with hardware or software other than those designated or permitted by Mitutoyo
- Failure or damage owing to use in ultra-hazardous activities

This warranty is effective only where the product is properly installed and operated in conformance with the instructions in this document within the original country of the installation.

EXCEPT AS SPECIFIED IN THIS WARRANTY, ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS, AND WARRANTIES OF ANY NATURE WHATSOEVER INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NONINFRINGEMENT OR WARRANTY ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE, ARE HEREBY EXCLUDED TO THE MAXIMUM EXTENT ALLOWED BY APPLICABLE LAW.

You assume responsibility for all results due to the selection of this product to achieve your intended results.

Disclaimer

IN NO EVENT WILL MITUTOYO, ITS AFFILIATED AND RELATED COMPANIES AND SUPPLIERS BE LIABLE FOR ANY LOST REVENUE, PROFIT, OR DATA, OR FOR SPECIAL, DIRECT, INDIRECT, CONSEQUENTIAL, INCIDENTAL, OR PUNITIVE DAMAGES HOWEVER CAUSED AND REGARDLESS OF THE THEORY OF LIABILITY ARISING OUT OF THE USE OF OR INABILITY TO USE THIS PRODUCT EVEN IF MITUTOYO OR ITS AFFILIATED AND RELATED COMPANIES AND/OR SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

If, notwithstanding the foregoing, Mitutoyo is found to be liable to you for any damage or loss which arises out of or is in any way connected with use of this product by you, in no event shall Mitutoyo's and/or its affiliated and related companies' and suppliers' liability to you, whether in contract, tort (including negligence), or otherwise, exceed the price paid by you for the product only.

The foregoing limitations shall apply even if the above-stated warranty fails of its essential purpose. BECAUSE SOME COUNTRIES, STATES OR JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR THE LIMITATION OF LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES, IN SUCH COUNTRIES, STATES OR JURISDICTIONS, MITUTOYO'S LIABILITY SHALL BE LIMITED TO THE EXTENT PERMITTED BY LAW.

1 Overview

This chapter describes the Interface Unit EtherNet/IP for EJ Counter product overview, name and functions of each part.

1

Overview

1.1 About EtherNet/IP

EtherNet/IP is a public industrial Ethernet standard that is managed by ODVA (Open DeviceNet Vendor Association, Inc.).

The EtherNet/IP protocol is an implementation of the Common Industrial Protocol (CIP) on a standard Ethernet (using Ethernet cable and the TCP/IP protocol suite). Because EtherNet/IP makes use of standard Ethernet networking, it can share standard Ethernet networking and communication functions (such as FTP).

EtherNet/IP conducts data communication upon establishment of connection between communicating devices. A connection is established when one device requests the other device to open a connection and the other device responds to the request.

Under EtherNet/IP, the device that requests opening of a connection is referred to as the "originator", and the device responding to the request is referred to as the "target".

Further, a device that is equipped with originator functionality is referred to as a "scanner" and a device with only target functionality is referred to as an "adapter", with this product falling into the "adapter" category.

1.2 Main Functions and Features

This product is an interface unit for use with the EJ Counter.

- This is a compact and space-saving interface unit, which is attached to a DIN rail to be used.
- It supports both USB communication and EtherNet/IP communication.
- Linear Gage measurements read by the EJ Counter can be output to external devices such as a PC and or PLC (programmable logic controller). Also, tolerance judgment results obtained by EJ Counters can be output.
- This product can be coupled to up to eight EJ Counters, allowing data output from up to 16 Linear Gages.
- EJ Counter parameter settings can be made via PC or PLC (programmable logic controller).
- The LG QuickSetupTool application software (freeware) is used to make EJ Counter settings and display measurements using USB communication.

Tips

Please download the LG QuickSetupTool application from Mitutoyo's web site (https://www.mitutoyo.co.jp).

The LG QuickSetupTool is compatible with the Windows 10 operating system. No assurance is provided of full operability in any given operating environment. While use of this application is free of charge, the customer must bear communication charges incurred during download of the software.

1.3   System Configuration
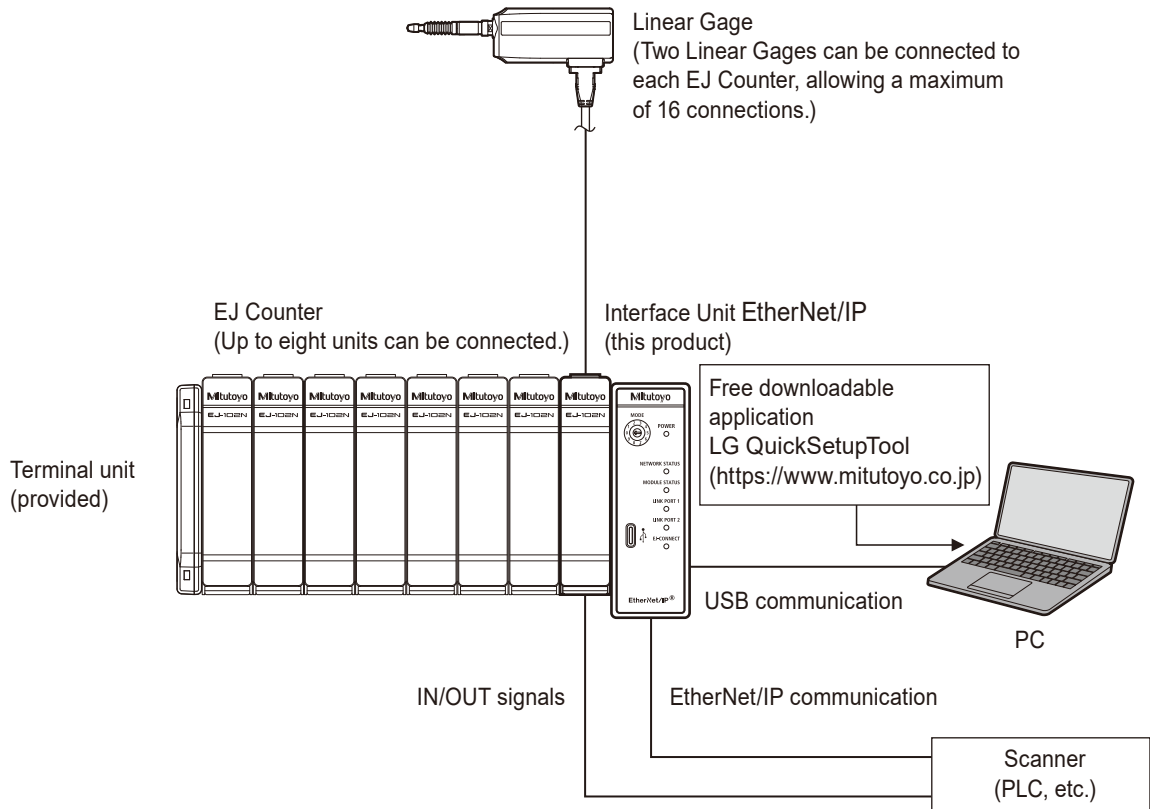
Linear Gage
(Two Linear Gages can be connected to each EJ Counter, allowing a maximum of 16 connections.)

EJ Counter
(Up to eight units can be connected.)

Interface Unit EtherNet/IP
(this product)

Free downloadable application
LG QuickSetupTool
(https://www.mitutoyo.co.jp)

Terminal unit
(provided)

USB communication

PC

IN/OUT signals

EtherNet/IP communication

Scanner
(PLC, etc.)

IMPORTANT

Be sure to install the terminal unit.

Normal communication between this product and EJ Counters requires installation of the terminal unit.

Tips

- This product must be connected to an EJ Counter for use. It cannot be used by itself.
- For details on the EJ Counter, see 📖 the separate "Compact Display Unit for Linear Gage EJ Counter User's Manual".
- Select and purchase Linear Gages according to your application.
- A PC and scanner (PLC, etc.) must be provided by the customer.

1.4 Part Names

1.4.1 Main Unit

Port assignment label

Serial label

Front panel (see 1.4.2)

No.	Name	Description
①	Connector for linking counter	Connect to an EJ Counter.
②	EtherNet/IP communication connector (RJ45 connector)	Connect to an EtherNet/IP network using a commercially-available LAN cable (compatible with the EtherNet/IP communication standard).
		The port on the DIN rail side (at the bottom of the illustration) is PORT 1, and the one on the front side (at the top of the illustration) is PORT 2.
		Tips
		Use STP communication cables of type Cat.5e or higher, or EtherNet/IP-compatible cables that conform with TCP/IP requirements.

No.	Name	Description
③	Grounding terminal	Connect to ground using the provided ground wire.
		Tips • The provided ground wire is to be used only for connecting the ground terminal on the interface unit to the ground terminal on the EJ Counter. • Overall grounding of coupled units is to be made using the ground wire provided with the EJ Counter. For details, see 📖 the separate "Compact Display Unit for Linear Gage EJ Counter User's Manual".
④	DIN rail attachment point	Used for attaching this product to a DIN rail.
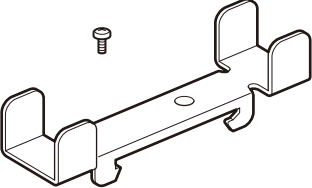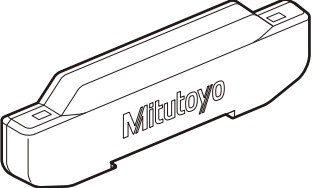
1.4.2   Front Panel

No.	Name	Description
①	[POWER] indicator	Lights when power is supplied to the unit.
②	[NETWORK STATUS] indicator	When lit green Lights green when connection to the scanner has been normally established. When flashing green Flashes green when an IP address has been allocated, but connection to the scanner has not been established. When lit red Lights red when IP address duplication is detected. When flashing red Flashes red when a scanner connection timeout occurs. When flashing alternately green and red Flashes green and red alternately during performance to the product's power-on self-diagnostic test.

15

No.	Name	Description
③	[MODULE STATUS] indicator	**When lit green** Lights green when connection to the scanner has been established and a program has been executed on the scanner. **When flashing green** Flashes green when connection to the scanner has not been established, or connection to the scanner has been established but a program has not been executed on the scanner yet. **When lit red or flashing red** Lights red or flashes red when an error occurs on the product. If the red light remains on and the operation is not restored after verifying EJ Counter and power supply connection, the product may be defective. **When flashing alternately green and red** Flashes green and red alternately during performance to the product's power-on self-diagnostic test. **Tips** For details about lit red/flashing red indication (when an error occurs), see 📖 "6 Troubleshooting" on page 75.
④	[LINK PORT 1] indicator	**When lit green/flashing green** Lights or flashes during 100 Mbps communication through LINK PORT 1 of the EtherNet/IP communication connector. **When lit orange/flashing orange** Lights or flashes during 10 Mbps communication through LINK PORT 1 of the EtherNet/IP communication connector.
⑤	[LINK PORT 2] indicator	**When lit green/flashing green** Lights or flashes during 100 Mbps communication through LINK PORT 2 of the EtherNet/IP communication connector. **When lit orange/flashing orange** Lights or flashes during 10 Mbps communication through LINK PORT 2 of the EtherNet/IP communication connector.
⑥	[EJ-CONNECT] indicator	Lights during communication between the unit and an EJ Counter. Lights off or flashes to indicate an error during communication with an EJ Counter. **Tips** For details about when the indicator is out or flashing (when an error occurs), see 📖 "6 Troubleshooting" on page 75.
⑦	USB connector (Type-C)	Allows USB connection to a PC.
⑧	[MODE] switch	Sets the IP address mode. 0: Fixed IP mode Non-0: USB setting mode **Tips** For details about setting contents, see 📖 "● IP address mode setting" on page 25.

1.5   Standard Accessories

Name	Quantity	Description
DIN rail fixing bracket	2	Used to fasten the unit and EJ Counter(s) to a DIN rail. Fasten the bracket to the DIN rail using an M4 screw. **Tips** The screw provided with the bracket is suitable for fastening to a TH35-7.5 rail. For details, see 📖 "2.1.3 Attaching the DIN Rail Fixing Bracket" on page 22.
Terminal unit	1	The terminal unit is required for communication between this unit and EJ Counters. Attach it to the EJ Counter furthest from the interface unit. **IMPORTANT** Be sure to install the terminal unit. Normal communication between this product and EJ Counters requires installation of the terminal unit. **Tips** For details, see 📖 "2.1.2 Linking to EJ Counters" on page 21.
Ground wire	1	Use this wire to connect the ground terminal on the interface unit to the ground terminal on the EJ Counter. **Tips** For details, see 📖 "2.3.1 Ground Connection" on page 26.
Quick Start Guide	1	99MBC146B
WEEE User's Manual	1	
Warranty	1	

1.6 Operation Flow

The basic flow of operation is explained below.

Be sure to perform operations enclosed by solid lines. Perform operations enclosed by dashed lines as necessary.

Preparation

Scanner (PLC, etc.) Settings	See the manual for the applicable scanner.
Attachment	📖 "2.1 Mounting" on page 20
Wiring and Settings	📖 "2.2 Connection of External Devices" on page 24
Linear Gage Connection	📖 Separate "EJ Counter User's Manual"
Power Supply Connection	📖 "2.3 Power Supply Connection" on page 26
Scanner Start-up (EtherNet/IP only)	See the manual for the applicable scanner.
Communication Settings (EtherNet/IP only)	📖 "4.2 EtherNet/IP Communication Settings" on page 45

Communication

Communication Start	📖 "3.2 USB Communication Format" on page 31
	📖 "4.3 EtherNet/IP Communication Format" on page 51

2   Setup

2

Setup

2.1 Mounting

2.1.1 DIN Rail Attachment / Removal

This product is attached to a DIN rail for use.

IMPORTANT

Attach this product to or remove it from the DIN rail a single unit at a time after first disconnecting USB cables and connector plugs.

Tips

A DIN rail must be provided by the customer.

Suitable DIN rail type names (IEC 60715): TH35-7.5Al, TH35-7.5Fe, TH35-15Fe

■ Attachment

Press the clip (gray) on the rear side of this product onto the DIN rail, and then hook the clip on the opposite side onto the DIN rail.

DIN rail
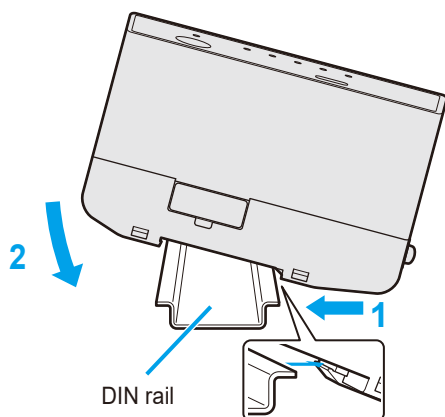
■ Removal

Pressing this product in the direction indicated by arrow 1, raise the clip on the opposite side so that it comes clear of the rail.

2.1.2   Linking to EJ Counters

Link this product to EJ Counters.

Up to eight EJ Counters can be linked to this product.

Tips

The interface unit is intended for use with the EJ-102N (Code No. 542-080) and EJ-102NE (Code No. 542-081) EJ Counters. These two types of EJ Counters can be used in mixed configurations.

1 **Remove the protective covers from the counter linkage connectors of this product and the EJ Counter.**

2 **Attach this product to the DIN rail on the side facing the EJ Counter's counter linkage connector (male).**

Tips

For details, see 📖 "2.1.1 DIN Rail Attachment / Removal" on page 20.

3 **Link the product to the EJ Counter.**

Slide the product or EJ Counter along the DIN rail to fully mate the counter linkage connector on the product (female) with the counter linkage connector (male) on the EJ Counter.

NOTICE

Do not link more than eight EJ Counters together. Failure to observe this precaution may result in damage.

IMPORTANT

When sliding this product or EJ Counters along the DIN rail, move them slowly.

4 **Attach the provided terminal unit to the counter linkage connector (female) on the EJ Counter.**

Attach the terminal unit to the EJ Counter furthest from this product.

IMPORTANT

Be sure to install the terminal unit. Normal communication between this product and EJ Counters requires installation of the terminal unit.

Terminal unit
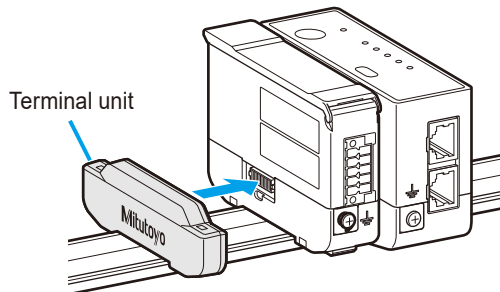
2.1.3 Attaching the DIN Rail Fixing Bracket

This product and EJ Counters are fastened to the DIN rail using the provided DIN rail fixing brackets.

1 **Hook the clip that is closer to the screw hole in the fixing bracket onto the DIN rail, then press toward the opposite side and hook the other clip onto the rail.**

Screw hole

DIN rail fixing bracket
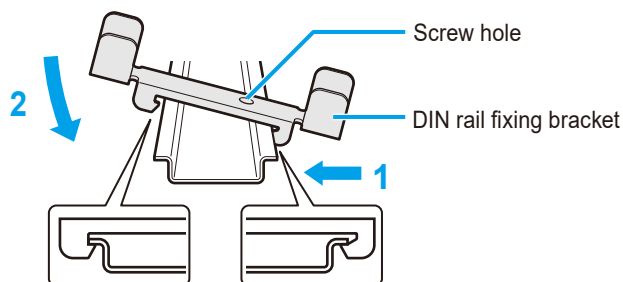
2 **Slide the fixing bracket along the DIN rail to where it comes in contact with this product.**

DIN rail fixing bracket
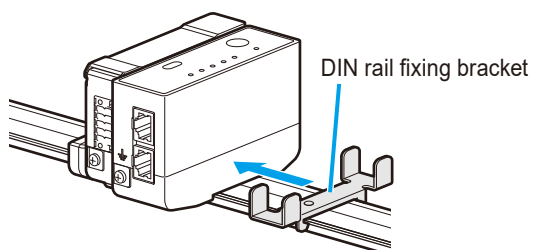
3 Fasten the fixing bracket in place by threading the screw provided with the fixing bracket into the screw hole in the bracket, and then tightening the screw so that it presses against the DIN rail, immobilizing the fixing bracket.

Tips
The screw provided with the bracket is suitable for fastening to a TH35-7.5 rail.
A different screw (M4) must be used for fastening to a TH35-15 rail.
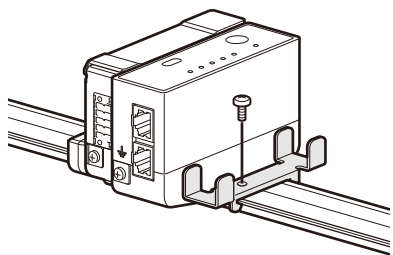
4 Repeat step **1** through **3** to attach the other fixing bracket also to the side with the terminal unit.

2.2 Connection of External Devices

Connection between this product and external devices such as a PC or PLC (programmable logic controller) is made by USB or EtherNet/IP communication.

2.2.1 USB Connection

Use a USB cable to connect the USB connector (Type-C) on the front panel of this product to a USB connector on the PC.

IMPORTANT

For permanent USB cable connection, fasten the cable so that it does not place any strain on the USB connectors.

> **NOTICE**
>
> This product requires a Type-C USB connector.
>
> Note that connectors other than Type-C (such as miniB and microB) cannot be used.
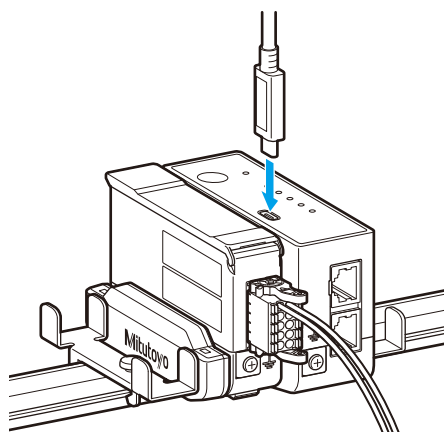
2.2.2　EtherNet/IP Connection

Connect the cable to the EtherNet/IP communication connector (LINK PORT 1 or LINK PORT 2) on this product.

When expanding the network, you can connect another device to the connector that remains open.

Tips

- Use STP communication cables of type Cat.5e or higher, or EtherNet/IP-compatible cables that conform with TCP/IP requirements. This product supports use of both straight cables and cross cables.
- This product does not support optical communication or single-pair Ethernet.
- Make sure that communication cable length does not exceed 30 m.
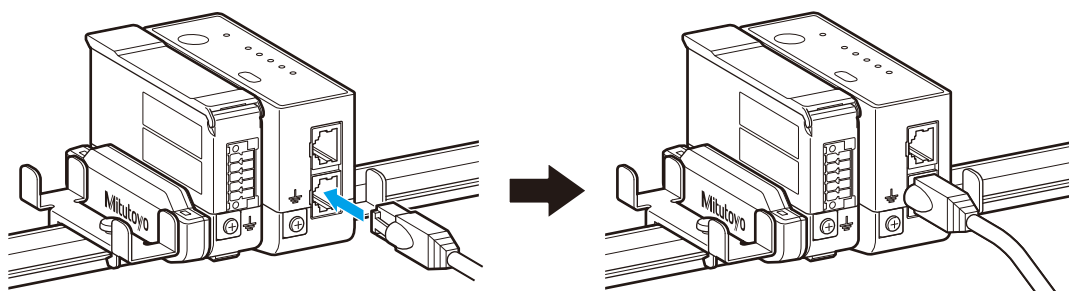
● IP address mode setting

Set the IP address mode to be used for EtherNet/IP communication.

Tips

The IP address mode setting becomes effective when the power is turned ON. When the mode setting is changed with the power ON, the change does not become effective until the power has been turned OFF and then ON again.

[MODE] switch setting	Mode	Description
0	Fixed IP mode	The setting is fixed as follows. IP address: 192.168.14.1 Subnet mask: 255.255.255.0 Default gateway: 0.0.0.0
Non-0	USB setting mode	The setting can be specified with USB command. The default setting is the same as the fixed IP mode. **Tips** For details on USB commands, see 📖 "3.2.3 List of Commands" on page 34.

2.3 Power Supply Connection

This section describes the power supply connection procedure.

IMPORTANT

Provide a power supply with capacity sufficient to accommodate switch-on surge current.

Tips

- Prepare for EtherNet/IP communication by making EtherNet/IP communication connections and settings. For details, see 📖 "4.2 EtherNet/IP Communication Settings" on page 45.
- This product is supplied with power by the connected EJ Counter.

2.3.1 Ground Connection

This product is grounded through the connected EJ Counter. Use the provided ground wire for connecting this product to the EJ Counter.

Be sure to connect this product to ground before connecting it to the power supply. Failure to ground the product will make it susceptible to electrical noise.

1 **Remove the ground terminal screw.**
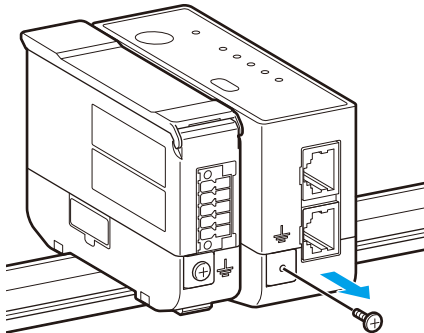
2 **Pass the removed terminal screw through the hole in the ground wire's ring lug, and then loosely fasten the lug to the ground terminal.**
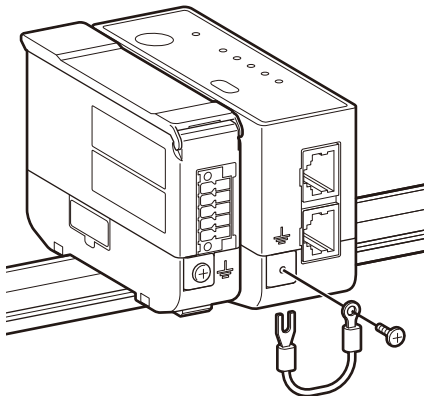
3 **Loosen the ground terminal screw on the adjacent EJ Counter, and then slip the ground wire's fork lug under the head of the screw.**
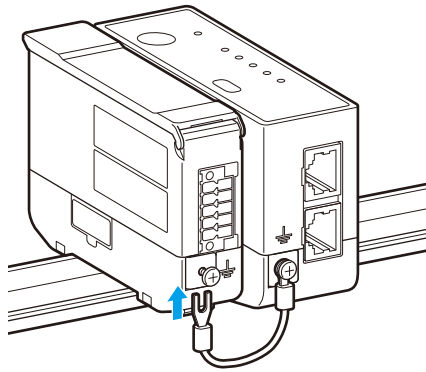
4 **Firmly tighten the ground terminal screws on this product and the EJ Counter.**

5 **Connect the EJ Counter's ground wire.**

> **Tips**
>
> For details on the EJ Counter's ground wire, see 📖 the separate "Compact Display Unit for Linear Gage EJ Counter User's Manual".

2.3.2 Power ON/OFF

This product is not equipped with a power switch. It is supplied with power by the connected EJ Counter.

To power the product ON/OFF, either switch the EJ Counter ON/OFF, or connect/disconnect the power cable.

When the power is turned on, an ID number is automatically assigned to the EJ Counter, and then it becomes ready for communication with this product.

> **Tips**
>
> • When using EtherNet/IP connection, turn on the power of the scanner only after supplying power to this product.
> • The ID number assigned to the EJ Counter differs for USB communication and EtherNet/IP communication. For details, see 📖 "3.2.1 ID Number Assignment During USB Communication" on page 31 and "4.3.1 ID Number Assignment During EtherNet/IP Communication" on page 51.

MEMO

3   USB Communication

3

USB Communication

3.1 USB Specifications

The USB interface provided with this product conforms to the USB 2.0 standard (with Full-speed communication).

It communicates using a virtual COM port on a PC.

Tips

- For details on the content of USB communication, see 📖 "3.2.2 Send and Receive Data Format" on page 32 and 📖 "3.2.3 List of Commands" on page 34.

- This product cannot output data directly to a printer.

- USB communication can be performed when power is supplied to this product. Power cannot be supplied through the USB terminal.

- The LG QuickSetupTool application software (freeware) is provided to allow EJ Counter settings and display of measurement values to be done by USB communication.
  Please download the software from Mitutoyo's web site (https://www.mitutoyo.co.jp).
  Note that the software may not be usable in all environments. Further, Mitutoyo makes no assurance or representation of any kind regarding the fitness or usability of the software. While use of this application is free of charge, the customer must bear communication charges incurred during download of the software.

■ Compatible connector

Type-C connector

■ Compatible cable

Cable compatible with Type-C connector

Tips

- No USB cable is provided with this product. Use a commercially available cable.

- The software works with Windows 10 standard device drivers.

3.2 USB Communication Format

3.2.1 ID Number Assignment During USB Communication

During USB communication, ID numbers from 01 to 08 are automatically assigned to EJ Counters in sequence, starting with the device that is adjacent to this product. However, if arbitrary ID numbers (50 to 99) were set for Parameter Number 19 when the product was last powered on, those values are assigned instead.

Tips

For details about setting parameters, see 📖 "5 EJ Counter Parameter Settings" on page 69.
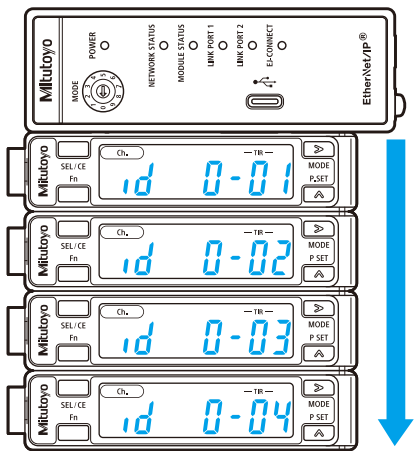
ID numbers are assigned sequentially (figure shows automatic ID number assignments).

3.2.2　Send and Receive Data Format

■ Send data format (from PC to this product)

> **Tips**
> Send data consists of ASCII codes.

● Commands

Commands are made up of three alphanumeric characters.

Example: The command for reading the current value is "GCJ".

● Counter ID and channel (Ch.) numbers

Counter ID and channel numbers are made up of four numeric characters.

The uppermost digit is always 0, followed by two digits indicating the EJ Counter ID, and then a single digit indicating the channel (Ch.).

Example: For an EJ Counter whose ID is 02 on Ch.1, specify "0021".

> **Tips**
> • Commands that do not specify an EJ Counter channel (Ch.) should always have "1" as the last digit.
> • Use "0011" for commands that do not specify an EJ Counter.
>   For details, see 📖 "3.2.3 List of Commands" on page 34.
> • The content of individual channels are specified by parameter settings.
>   For details about setting parameters, see 📖 "5 EJ Counter Parameter Settings" on page 69.

● Numeric values (only for commands requiring such values)

When setting preset and tolerance values, use the + or - sign together with 10-digit numbers. The least significant digit corresponds to a resolution of 10 nm (0.0000001 in).

Example 1: To set +10.5 mm, specify "+0001050000".

Example 2: To set -0.001 in, specify "-0000010000".

> **Tips**
> • Unit, without decimal point.
> • Numeric values must be specified as 10 digits. Pad empty parts with zero (0).
> • When setting the resolution of an EJ Counter, any fractional value below the set resolution is discarded.

● Delimiter

Commands are delimited by the 2-byte sequence CRLF ("0x0D 0x0A").

■ Receive data format (to PC from this product)

> **Tips**
>
> Receive data consists of ASCII codes.

● Commands

Commands are made up of three alphanumeric characters.

These are the same as for send commands (except for commands that are undefined).

● Counter ID and channel (Ch.) numbers

Counter ID and channel numbers are made up of four numeric characters.

ID and channel (Ch.) numbers are specified in the same manner as for send data.

However, "0000" is received for commands that do not specify an EJ Counter.

For details, see 📖 "3.2.3 List of Commands" on page 34.

● Numeric values (only for commands requiring such values)

When outputting preset and tolerance values, use the + or - sign together with 10-digit numbers. The least significant digit corresponds to a resolution of 10 nm (0.0000001 in). Values are rounded according to the EJ Counter's resolution setting.

Example 1: To set +10.5 mm, specify "+0001050000".

Example 2: To set -0.001 in, specify "-0000010000".

> **Tips**
>
> - Unit, without decimal point.
> - Numeric values must be specified as 10 digits. Pad empty parts with zero (0).
> - When setting the resolution of an EJ Counter, any fractional value below the set resolution is discarded.

● Delimiter

Commands are delimited by the 2-byte sequence CRLF ("0x0D 0x0A").

3.2.3　List of Commands

Commands sent from the PC and corresponding content output from this product are explained below.

■ View commands

These commands are used to verify the settings of EJ Counters. They do not affect the EJ Counter settings or display.

> **IMPORTANT**
> Do not send these commands during communication with a scanner. Doing so might result in incorrect measurement.

Command format[1]	Corresponding output[1][2]	Description
GCJ,****(CRLF)	GCJ,****,(Err-1),+0123456789, (TJ-2),(DataER-2)(CRLF)	Read current values and tolerance judgments[3][4]
GPR,****(CRLF)	GPR,****,(Err-1),+0123456789, (DataER-2)(CRLF)	Read preset values[4]
GS1,****(CRLF)	GS1,****,(Err-1),+0123456789, (DataER-2)(CRLF)	Read tolerance value S1[4]
GS2,****(CRLF)	GS2,****,(Err-1),+0123456789, (DataER-2)(CRLF)	Read tolerance value S2[4]
GS3,****(CRLF)	GS3,****,(Err-1),+0123456789, (DataER-2)(CRLF)	Read tolerance value S3[4]
GS4,****(CRLF)	GS4,****,(Err-1),+0123456789, (DataER-2)(CRLF)	Read tolerance value S4[4]
GST,****(CRLF)	GST,****,(Err-1),(D-1)(D-2)(D-3) (D-4),(DataER-2)(CRLF)	Read the EJ Counter display state[5]
GER,****(CRLF)	GER,****,(Err-1),(DataC-8), (DataER-2)(CRLF)	Read EJ Counter error flag details[6]
GEH,****(CRLF)	GEH,****,(Err-1),(DataC-8), (DataER-2)(CRLF)	Read the EJ Counter error flag details history[7]
GPM,****,(PMNum-2)(CRLF)	GPM,****,(Err-1),(PMNum-2), (PMData-2),(DataER-2)(CRLF)	Read EJ Counter parameter settings[8]
FNM,0011(CRLF)	FNM,0000,(Err-1),(Data-1) (CRLF)	Read the number of connected EJ Counters[9]
FCI,0011(CRLF)	FCI,0000,(Err-1),(Data-16) (CRLF)	Read EJ Counter IDs[10]
FIP,0011(CRLF)	FIP,0000,(Err-1),(Data-8)(CRLF)	Read the IP address[11]
FNK,0011(CRLF)	FNK,0000,(Err-1),(Data-8) (CRLF)	Read the subnet mask[11]
FGW,0011(CRLF)	FGW,0000,(Err-1),(Data-8) (CRLF)	Read the default gateway[11]
FDM,0011(CRLF)	FDM,0000,(Err-1),(Data-1) (CRLF)	Read the DHCP enable/disable setting[12]

[1] "****" indicates the counter ID and channel (Ch.) numbers.
For details, see 📖 "3.2.2 Send and Receive Data Format" on page 32.

[2] "Err-1" is the interface unit's communication error flag.
For details, see 📖 "3.3 List of USB Communication Errors" on page 38.

*3   "TJ-2" is the result of tolerance judgment.
     When tolerance judgment is enabled, the result of tolerance judgment is output as a value from L1 to
     L5.
     When tolerance judgment is disabled (when the EJ Counter produces as error), L0 is output.
     For details on tolerance judgment result, see 📖 "3.4 Tolerance Judgment Result" on page 42.

*4   Output of data conforming to the settings of EJ Counter Parameter Numbers 03 (display mode se-
     lection) and 22 (unit setting).
     For details on numeric data output, see 📖 "■ Receive data format (to PC from this product)" on
     page 33.

*5   "D-1" indicates the display state. "00" indicates standby, "01" indicates count display, and "02" indi-
     cates that a parameter preset or tolerance value is being set.
     "D-2" indicates peak mode. "00" indicates the current value, "01" indicates MAX (the maximum val-
     ue), "02" indicates MIN (the minimum value) and "03" indicates TIR (the value of MAX-MIN).
     "D-3" indicates the HOLD state. "00" indicates no HOLD, and any other value indicates HOLD.
     "D-4" indicates the unit. "00" indicates mm, and "01" indicates inch.

*6   For details, see 📖 "3.3.2 EJ Counter Error Flags" on page 39.

*7   The EJ Counter error history contains up to the last four errors, and errors are read out starting with
     the oldest. Note that the error history is deleted even if the error data is not received by the PC.
     For details, see 📖 "3.3.2 EJ Counter Error Flags" on page 39.

*8   For the command's "PMNum-2" parameter, specify the Parameter Number. In the corresponding
     output, the setting of the specified Parameter Number is output for "PMData-2". For details about
     parameters, see 📖 "5 EJ Counter Parameter Settings" on page 69.

*9   "Data-1" is the number of connected EJ Counters (1 to 8).

*10 ID numbers of connected EJ Counters are output for "Data-16". "FF" is output if no EJ Counter is
     connected.
     For example, if eight EJ Counters with ID numbers 1 to 8 are connected, "0102030405060708" is
     output, and if three EJ Counters with ID numbers 1, 2 and 51 are connected, "010251FFFFFFFFFF"
     is output.

*11 The IP address, subnet mask and default gateway of this product are output for "Data-8" according
     to the command.
     The IP address, subnet mask, and default gateway are represented as 8-digit hexadecimal numbers.
     For example, the IP address 192.168.14.1 is represented as C0 A8 0E 01.

*12 The DHCP enable/disable setting is output for "Data-1".
     "0" indicates DHCP is disabled, and "1" indicates DHCP is enabled.

■ Setting and control commands

These commands are used to change EJ Counter settings and control operation of EJ Counters.

> **IMPORTANT**
>
> Do not send these commands during communication with a scanner. Doing so might result in incorrect measurement.

Command format[*1]	Corresponding output[*1][*2]	Description
SPR,****,+0123456789 (CRLF)	SPR,****,(Err-1),+0123456789, (DataER-2)(CRLF)	Write preset values[*3]
SS1,****,+0123456789 (CRLF)	SS1,****,(Err-1),+0123456789, (DataER-2)(CRLF)	Write tolerance value S1[*3][*4]
SS2,****,+0123456789 (CRLF)	SS2,****,(Err-1),+0123456789, (DataER-2)(CRLF)	Write tolerance value S2[*3][*4]
SS3,****,+0123456789 (CRLF)	SS3,****,(Err-1),+0123456789, (DataER-2)(CRLF)	Write tolerance value S3[*3][*4]
SS4,****,+0123456789 (CRLF)	SS4,****,(Err-1),+0123456789, (DataER-2)(CRLF)	Write tolerance value S4[*3][*4]
SSU,****(CRLF)	SSU,****,(Err-1),(DataER-2)(CRLF)	Cancel the start-up standby state ("--------" display)
SPK,****,(D-2)(CRLF)	SPK,****,(Err-1),(DataC-8), (DataER-2)(CRLF)	Switch the peak mode[*5]
SEC,****(CRLF)	SEC,****,(Err-1),(DataER-2)(CRLF)	Clear the EJ Counter error history
PST,****(CRLF)	PST,****,(Err-1),(DataER-2)(CRLF)	Perform presets (set preset values set with the SPR command)
PZS,****(CRLF)	PZS,****,(Err-1),(DataER-2)(CRLF)	Zero current values
PCL,****(CRLF)	PCL,****,(Err-1),(DataER-2)(CRLF)	Clear preset values
PKC,****(CRLF)	PKC,****,(Err-1),(DataER-2)(CRLF)	Clear peak data (MAX and MIN data)
PEC,****(CRLF)	PEC,****,(Err-1),(DataER-2)(CRLF)	Clear errors[*6]
PSH,****(CRLF)	PSH,****,(Err-1),(DataER-2)(CRLF)	Hold current value[*7]
PCH,****(CRLF)	PCH,****,(Err-1),(DataER-2)(CRLF)	Cancel current value hold[*8]
PDA,****(CRLF)	PDA,****,(Err-1),(DataER-2)(CRLF)	Display EJ Counter ID (displays an EJ Counter's ID number for a preset interval)
PDB,****(CRLF)	PDB,****,(Err-1),(DataER-2)(CRLF)	Specify EJ Counter display axis (switches display axes of the current value on an EJ Counter)
PPM,****,(PMNum-2), (PMData-2)(CRLF)	PPM,****,(Err-1),(PMNum-2), (PMData-2),(DataER-2)(CRLF)	Write parameter settings[*9]
RST,0011,SRST (CRLF)	RST,0000,(Err-1)(CRLF)	System reset[*10]
WIP,0011,(D-8)(CRLF)	WIP,0000,(Err-1)(CRLF)	Write the IP address[*11]
WNK,0011,(D-8)(CRLF)	WNK,0000,(Err-1)(CRLF)	Write the subnet mask[*11]
WGW,0011,(D-8)(CRLF)	WGW,0000,(Err-1)(CRLF)	Write the default gateway[*11]
WDM,0011,(D-1)(CRLF)	WDM,0000,(Err-1)(CRLF)	Write the DHCP enable/disable setting[*12]

*1 "****" indicates the counter ID and channel (Ch.) numbers.
     For details, see 📖 "3.2.2 Send and Receive Data Format" on page 32.

*2 "Err-1" is the interface unit's communication error flag.
     For details, see 📖 "3.3 List of USB Communication Errors" on page 38.

*3   Use the + or - sign and specify 10-digit numbers with no decimal point.
For details about specification of numeric data, see 📖 "▪ Send data format (from PC to this product)" on page 32.

*4   For 3-step tolerance, set tolerance values S1 and S4. Setting of S2 and S3 and read-out are not possible. Attempting to set S2/S3 or perform read-out will result in setting of an error flag (bit 0 of DataER-2) and transmission of error output "+2147483647".
For 5-step tolerance, set tolerance values S1 through S4.
Set the tolerance values in sequence from S1 to S4 or from S4 to S1.

*5   For "D-2", specify the peak mode.
Specify "00" for the current value, "01" for MAX (the maximum value), "02" for MIN (the minimum value), or "03" for TIR (the value of MAX-MIN).
When the peak mode is set properly, "00000000" is output for "DataC-8".

*6   Clear the error state after first eliminating the cause of the error.

*7   The HOLD signal is shared by all linked EJ Counters, and all linked EJ Counters enter the HOLD state.
When canceling HOLD with the PCH command, cancellation is required for EJ Counters on which HOLD is set. Set HOLD against the ID number of the linked EJ Counter that is adjacent to the interface unit.

*8   The HOLD signal is shared by all linked EJ Counters, and HOLD is canceled for all linked EJ Counters.
Cancel HOLD on EJ Counters for which HOLD was set with the PSH command.

*9   Specify the Parameter Number for "PMNum-2" and the setting value for "PMData-2". For details about parameters, see 📖 "5 EJ Counter Parameter Settings" on page 69.

*10   A software reset is performed on this product and linked EJ Counters. Do not execute this command while measurement is in progress.

*11   Specify one of the IP address, subnet mask, or default gateway of this product for "D-8" according to the command.
The IP address, subnet mask, and default gateway are set as 8-digit hexadecimal numbers.
For example, the IP address 192.168.14.1 is represented as C0 A8 0E 01.
Default values are as follows:
    IP address: 192.168.14.1
    Subnet mask: 255.255.255.0
    Default gateway: 0.0.0.0

*12   Set the DHCP enable/disable setting for "D-1".
"0" (the default value) indicates DHCP is disabled, and "1" indicates DHCP is enabled.

3.3   List of USB Communication Errors

3.3.1   Interface Unit Communication Error Flags

When a communication error is detected by this product, it outputs the communication error flag (Err-1).

■ Communication error flags (Err-1)

Err-1	Description
5	Commands cannot be executed in this state. EJ Counters are in the standby or error state.
4	This indicates an undefined command. The command sent is undefined or its format is incorrect (missing a comma).
3	The data length of the command is incorrect. The command is missing data or includes unneeded data.
2	The command content is incorrect. The command includes an incorrect ID number or channel specification (contains a character other than a numeral).
1	There was an error in communication between the interface unit and EJ Counters. The ID number specified in a command does not belong to a connected EJ Counter.
0	No error

In the event of a command abnormality (undefined command), the response takes the following format.

CER,****,(Err-1)(CRLF)

For example, if the undefined command "GGG" is sent, the response is as follows.

Send command: GGG,0000(CRLF)

Output data: CER,0000,4(CRLF)

3.3.2   EJ Counter Error Flags

These error flags are output when an EJ Counter detects an error.

■ Error flags (DataER-2)

This error flag (DataER-2) is made up of data in hexadecimal notation. Bits that are set to "1" indicate the location of the alarm or error.

Data ER-2	Judgment	Description
bit 0	0: Normal 1: Alarm or error state	Indicates an error in communication between the interface unit and EJ Counters. Whether or not the command was normally executed cannot be determined. Check the command and execute it again.
bit 1		The EJ Counter is in the Busy state. EJ Counter settings are being made by key operation. Commands cannot be executed. Execute the command after putting the EJ Counter in the counting state.
bit 2		The origin of the requested channel has not been detected. Commands cannot be executed. Execute the command again after performing gage origin detection or disabling origin detection.
bit 3		An alarm occurred on the requested channel or both channels. Commands cannot be executed. The flag is set if the EJ Counter is in the Busy state (DataER-2 bit1), its origin has not been detected (DataER-2 bit 2), or it is in the counter stand-by state.
bit 4		A hardware error occurred on the requested channel or both channels.
bit 5		An alarm or hardware error occurred on one of the channels. The flag is set even if the alarm or hardware error occurred on the channel that was not requested. The command is executed if there is no abnormality the requested channel.
bit 6		Fixed to 0
bit 7		Fixed to 0

■ Error flag details (DataC-8)

Error flag details (DataC-8) are made up of data in hexadecimal notation. Bits that are set to "1" indicate the location of the alarm or error.

Data C-8	Judgment		Description	
bit 0	0: Normal 1: Alarm or error state	Alarm	EJ Counter Busy state (EJ Counter settings are being made by key operation). Put the EJ Counter in the counting state.	
bit 1			A-axis origin not detected. Go through A-axis origin detection.	
bit 2			B-axis origin not detected. Go through B-axis origin detection.	
bit 3			Counter stand-by state Cancel the counter standby state, putting the EJ Counter in the counting state.	
bits 4 to 7			Fixed to 0	
bit 8		Hardware error	A-axis peak detection error (with peak mode only). If this error occurs continuously, verify measurement conditions (such as plunger movement speed).	
bit 9			B-axis peak detection error (with peak mode only). If this error occurs continuously, verify measurement conditions (such as plunger movement speed).	
bit 10			Ch.1 counter value overflow. Verify preset values.	
bit 11			Ch.2 counter value overflow. Verify preset values.	
bit 12			A-axis excess speed error. Verify measurement conditions (such as plunger movement speed).	
bit 13			B-axis excess speed error. Verify measurement conditions (such as plunger movement speed).	
bit 14			No gage head on the A-axis or discontinuity detection error. Verify gage head connection.	
bit 15			No gage head on the B-axis or discontinuity detection error. Verify gage head connection.	
bit 16			Internal memory abnormality. If operation is not restored upon clearing the error, there may be an internal malfunction.	
bit 17			Power supply voltage abnormality. Clear the error after verifying supply of correct voltage.	
bit 18			A-axis counter IC reset error. Occurred because a Linear Gage was connected or removed during operation.	
bit 19			B-axis counter IC reset error. Occurred because a Linear Gage was connected or removed during operation.	
bit 20			A-axis counter IC overflow. Electrical noise could be a problem.	
bit 21			B-axis counter IC overflow. Electrical noise could be a problem.	

Data C-8	Judgment		Description
bit 22	0: Normal 1: Alarm or error state	Hardware error	No A-axis origin signal. When using a Linear Gage with origin, check whether the origin signal is disconnected. When using a Linear Gage without origin, set Parameter Number 05 to 0.
bit 23			No B-axis origin signal. When using a Linear Gage with origin, check whether the origin signal is disconnected. When using a Linear Gage without origin, set Parameter Number 05 to 0.
bit 24			Internal memory access error. If operation is not restored upon clearing the error, there may be an internal malfunction.
bit 25			Wrong number of EJ Counters connected (nine or more devices). Turn the power on after reducing the number of connected EJ Counters to no more than eight.
bits 26 to 31			Fixed to 0

■ EJ Counter error history

If a hardware error occurs, error flag details are stored in the error history in the EJ Counter. Error details are not stored when alarms occur.

The EJ Counter error history holds up to the last four errors, and errors are read out starting with the oldest.

If a hardware error occurs when the error history already contains four errors, the oldest error is discarded.

If the error history is read when there are no errors in the EJ Counter error history, the value 0(0x00000000) is output.

3.4   Tolerance Judgment Result

■ Tolerance judgment output

● 3-step tolerance

S4

S1

Counter data

Max. 10 ms   Max. 10 ms

Tolerance judgment output
(L1 through L5)

L1   L3   L5

* With 3-step tolerance, L2 and L4 are not output.

● 5-step tolerance

S4
S3
S2
S1
Counter data

Max.   Max.
10 ms   10 ms   Max. 10 ms   Max. 10 ms

Tolerance judgment output
(L1 through L5)

L1   L2   L3   L4   L5

4 EtherNet/IP Communication

4
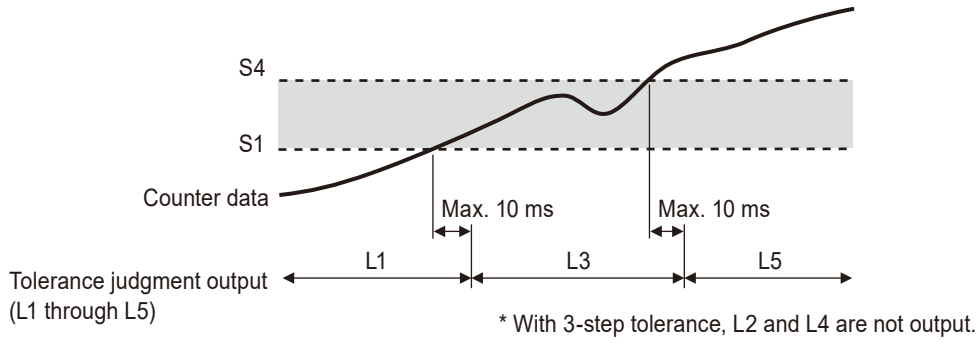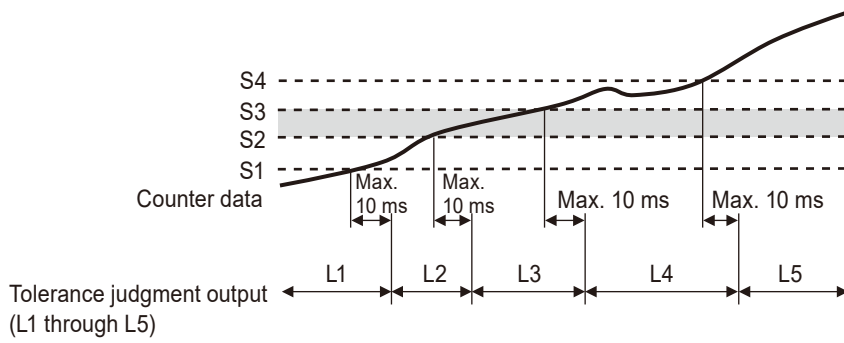
EtherNet/IP Communication

4.1　Outline of EtherNet/IP Communication

This product functions as an EtherNet/IP adapter device. When connected to a scanner (PLC, etc.), this product outputs the tolerance judgments and current value data of the connected EJ Counter(s) to the scanner.

Item		Specifications
EtherNet/IP communica-tion	Communication port	RJ45×2 ports (IP20)
	Communication cable	STP communication cables of type Cat.5e or higher, or EtherNet/IP-compatible cables that conform with TCP/IP requirements
		*Compatible with both straight cables and cross cables
	Baud rate	Automatic switching by auto-negotiation
		10 Mbps / 100 Mbps
		Full duplex / half duplex
	RPI	1–3200 ms (during cyclic communication)
	DLR [1]	Enabled
		(Ethernet ring topology)
	ACD [2]	Enabled
		(Duplicate IP addresses detected)

*1　Device Level Ring

*2　Address Conflict Detections

4.2   EtherNet/IP Communication Settings

4.2.1   Communication Settings

This section explains the settings that are required before this product can communicate with a scanner (PLC, etc.). Make sure that the scanner being used and engineering tool (Rockwell Automation PLC and engineering tool Studio 5000®) are ready before making settings.

Tips

- For details on engineering tool operation, see the manual and other documentation provided by the distributor.
- This product's settings file (the EDS file) for import to the engineering tool can be downloaded from Mitutoyo's website (https://www.mitutoyo.co.jp).

1 **Set the IP address of this product.**

● **When using the USB setting mode**

1   With the product's power turned OFF, set the [MODE] switch to a setting other than [0].

2   Power ON the product.

3   Set the IP address by USB command (WIP command) or using the LG QuickSetupTool.

Tips

- For details on USB commands, see 📖 "3.2.3 List of Commands" on page 34.
- Please download the LG QuickSetupTool application from Mitutoyo's web site (https://www.mitutoyo.co.jp).
- For details on using the LG QuickSetupTool to set IP addresses, see 📖 "4.2.2 Using the LG QuickSetupTool to Set IP Addresses" on page 47.
- For details on the LG QuickSetupTool, see 📖 the separate "LG QuickSetupTool User's Manual" bundled with the software download.

● **When using the fixed IP mode**

1   With the product's power turned OFF, set the [MODE] switch to [0].

2   Power ON the product.

   »   The IP address is set to 192.168.14.1.

2 **Make connections between this product, the scanner, and the PC on which the engineering tool is installed, and then supply the power source.**

Tips

- For details on powering on this product, see 📖 "2.3.2 Power ON/OFF" on page 27.
- For connection between this product and the scanner, use STP communication cables of type Cat.5e or higher, or EtherNet/IP-compatible cables that conform with TCP/IP requirements.
- Before making the settings for this product, select the scanner in the engineering tool and set the IP address.

3 **Install the EDS file for this product in the engineering tool and select this product.**

4 **Allocate space for send/receive data to the scanner.**

Tips

For details, see 📖 "4.3.2 EtherNet/IP Cyclic Communication" on page 52.

4.2.2   Using the LG QuickSetupTool to Set IP Addresses

Tips

The IP address setting feature described in this section is available from LG QuickSetupTool Ver.1.0.3. If you are using an earlier version, please download the latest software from Mitutoyo's web site (https://www.mitutoyo.co.jp).

You can determine the version from the software's Help.

1 **Make connection between this product and the PC on which the LG QuickSetupTool is installed using a USB cable.**

2 **Start the LG QuickSetupTool.**

3 **In the [I/F Unit] tab on the left side of the screen, move the cursor to the green area of the interface unit for which you want to set the IP address and right-click.**

4 **Click [I/F Unit Setting].**
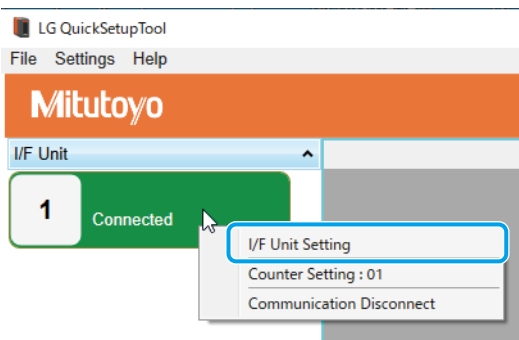
»   The [I/F Unit Setting] screen is displayed.

5 **Click the [Set] button for [Network Setting].**
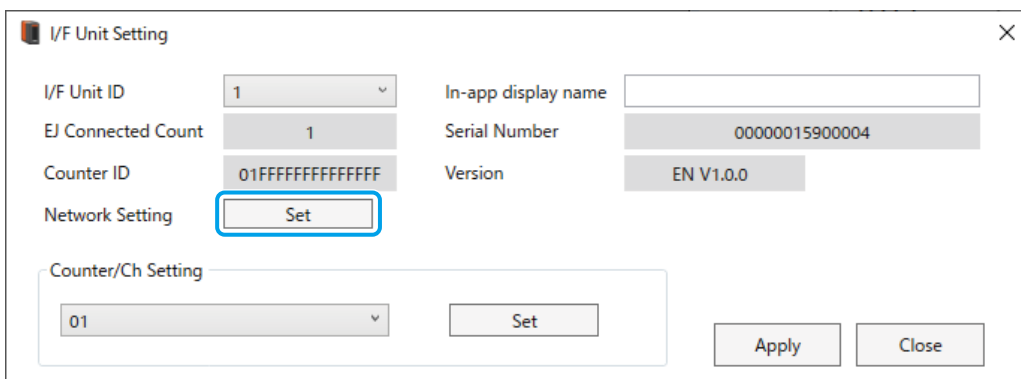
»   The [Network Setting] screen is displayed.

6 **Change the setting values according to the network environment.**

Current setting values are displayed on the [Network Setting] screen. Please change the settings according to your environment.
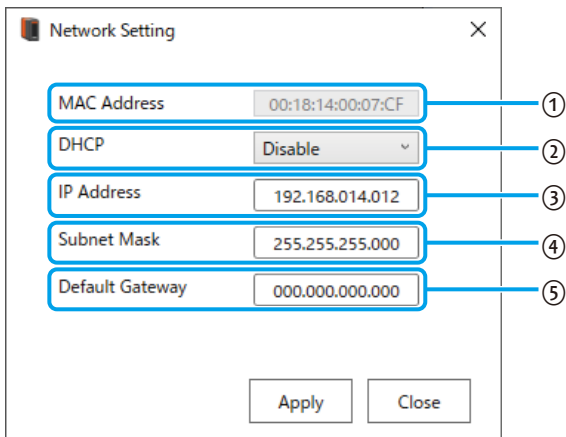
No.	Item	Description
①	MAC Address	Indicates the MAC address of this product. MAC addresses are assigned to devices automatically and cannot be changed.
②	DHCP	Select [Enable] if you want the IP address to be assigned automatically from the DHCP server. When [DHCP] is set to [Enable], the [IP Address], [Subnet Mask], and [Default Gateway] settings cannot be changed.
③	IP Address	Sets the IP address.
④	Subnet Mask	Sets the subnet mask.
⑤	Default Gateway	Sets the default gateway.
		Do not change the default gateway setting if you are not using a default gateway.

Tips

Enter the [IP Address], [Subnet Mask], and [Default Gateway] values from the PC's keyboard. Referring to the example below, enter four groups of 3-digit values from 0–255.
Example: To set "192.168.14.5", enter "192.168.014.005".

7 **After completing the settings, click the [Apply] button.**

» The product is automatically restarted in order to reflect the setting values.
» The LG QuickSetupTool displays the following message.
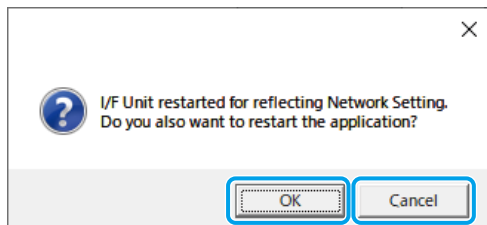
8 **Respond to the LG QuickSetupTool message by clicking the [OK] button or the [Cancel] button.**

Click the [OK] button if you don't need to make network settings for other interface units.

If you need to make network settings for other interface units, click the [Cancel] button and repeat steps **3** to **8**.

9 **Exit the LG QuickSetupTool.**

Either select [Exit] from the [File] menu, or click the [×] button in the upper right corner of the main screen.
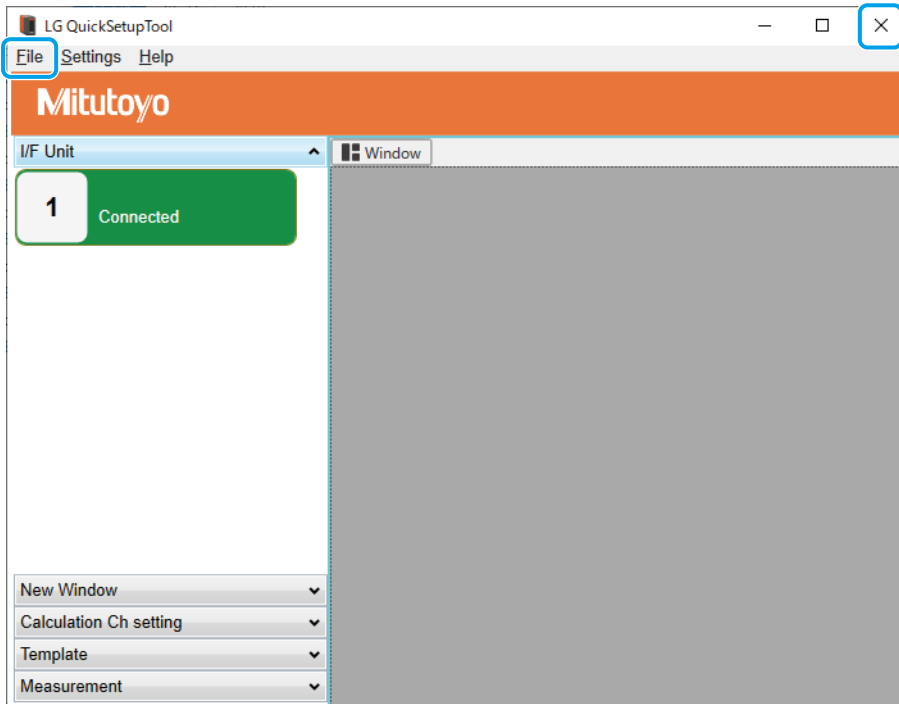
4.2.3   Verifying Communication

Verify that all devices are properly connected and configured, and that I/O data can be properly read and written.

■ Verifying device status

With the scanner connected, verify that indicators on the front panel of the product appear as follows.

Name	Status
[POWER] indicator	Lit green
[NETWORK STATUS] indicator	Lit green
[MODULE STATUS] indicator	Flashing green or lit green
[EJ-CONNECT] indicator	Lit green

Also verify the status of the scanner.

Tips

For details on the scanner, see the manual for the device being used.

■ Verifying data

Verify that I/O data is read and written properly by reading IN data and OUT data on the scanner.

4.3 EtherNet/IP Communication Format

4.3.1 ID Number Assignment During EtherNet/IP Communication

ID numbers used during EtherNet/IP communication are assigned according to the combination of axes connected to each of the EJ Counters being used.

ID numbers are assigned in sequence from COUNTER_1 to COUNTER_8, starting with the EJ Counter that is adjacent to this product. For the Linear Gage, channel number "A" is assigned to the A-axis, and "B" is assigned to the B-axis of each EJ Counter.

The ID number for the axes is formed of combinations of the above in the format "COUNTER_xx".

Example:

The ID number assigned to the B-axis of the second EJ Counter from this product will be "COUNTER_2B".

IMPORTANT

Do not change ID numbers by setting EJ Counter parameters during EtherNet/IP communication (while the [MODULE STATUS] indicator is lit). Changing the ID numbers will prevent normal communication with the EJ Counters.

Tips

Arbitrary ID numbers (50 to 99) set with EJ Counter Parameter Number 19 apply to USB communication.

EtherNet/IP communication ID numbers are automatically assigned in sequence beginning with the EJ Counter that is adjacent to this product.
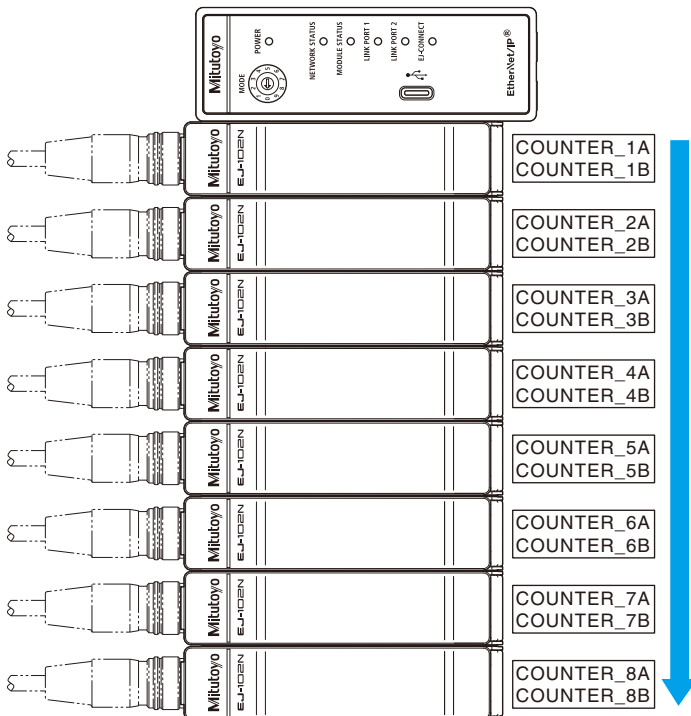
4.3.2 EtherNet/IP Cyclic Communication

This section describes the data makeup of cyclic communication.

Data defined in the EDS file used with this product is indicated in the tables below.

■ IN data (from this product to the scanner)

Instance ID (data identification number): 100 (0x64)

Data size: 196 bytes (bytes 0 through 195)

The size of data acquired from the start of data can be changed by setting on the scanner side.

For example, in order for the scanner to acquire data for the first two EJ Counters in order from this product, the data size to be acquired by the scanner should be specified as 52 bytes (bytes 0 through 51).

Offset bytes	Data type	Item	Description
0	1 Byte	ALL_GO	Tolerance judgment for all axes "1" results if tolerance judgment is OK for all axes (if each axis is available and its tolerance judgment is OK); if any result fails, "0" results.
1	1 Byte	HOLD_COMPLETE	HOLD update complete flag Becomes "1" following data update. These bits are restored to "0" when HOLD clear is returned from "1" to "0" (by external input or OUT data).
2	2 Byte	Reserve	Not used.
4	12 Byte	COUNTER_1A	
16	12 Byte	COUNTER_1B	**Tips** For details about data content of the counters, see 📖 "● COUNTER_xx data details (from this product to the scanner)" on page 53.
28	12 Byte	COUNTER_2A	
40	12 Byte	COUNTER_2B	
…	…	…	
172	12 Byte	COUNTER_8A	
184	12 Byte	COUNTER_8B	

● COUNTER_xx data details (from this product to the scanner)

Item	Bit	Description	
CONNECT	7:1	Reserved (fixed to "0")	
	0	Connection status flag	
		1: Axis enabled	
		0: Counter not connected, or axis not available	
Reserve	7:0	Not used.	
RANGE_L	7:5	Reserved (fixed to "0")	
	4	L5	Tolerance judgment L1 through L5
	3	L4	1: In range
	2	L3	0: Out of range
	1	L2	
	0	L1	**Tips** For details on tolerance judgment (L1 through L5), see 📖 "4.5 Tolerance Judgment Result" on page 66.
RANGE_LT	7:3	Reserved (fixed to "0")	
	2	LT3	Tolerance judgment LT1 through LT3
	1	LT2	1: H
			0: L
	0	LT1	**Tips** For details on tolerance judgment (LT1 through LT3), see 📖 "4.5 Tolerance Judgment Result" on page 66.
SENSOR_ERROR	7:1	Reserved (fixed to "0")	
	0	Tolerance judgment/current value output flag	
		1: Output not possible	
		0: Output possible	
Reserve	23:0	Not used.	
CURRENT_DATA	31:0	Current value data **Tips** • Output of data conforming to the setting of EJ Counter Parameter Numbers 03 (display mode selection) and 22 (unit setting). • Current value data is stored with the lowest order byte in the lower address. (Little endian) • Data is output in the following format as a sign (1 bit) and a numeric value (31 bits). – Minimum resolution: Fixed to 0.00001 mm (0.0000001 in with display in inches) – Unit/ decimal point: None – Sign: "0" when positive, "1" when negative (complement of 2)	

■ OUT data (from the scanner to this product)

Instance ID (data identification number): 150 (0x96)

Data size: 2 bytes (bytes 0 and 1)

Make data settings on the scanner side.

Offset bytes	Data type	Item	Description
0	1 Byte	HOLD_REQUEST	Current value data internal HOLD* 1: Internal HOLD set 0: Internal HOLD cleared
1	1 Byte	Reserve	Not used.

*   When setting internal HOLD, verify the HOLD update complete flag before acquiring current value data.

4.3.3   Asynchronous Data Transfer

Settings and status of this product and connected EJ Counters can be read or written using the messaging (CIP Explicit communication) function.

The messaging function is a function for issuing messages composed of the following formats and communicating at any timing.

This product supports both Unconnected Message Manager (UCMM) and Class 3 messaging.

Item	Description
Service Code	Operation requested of the CIP object
	(*) Service codes that can be used vary according to CIP object.
Class ID	ID that specifies a CIP object
Instance ID	ID that specifies an instance within a CIP object
Attribute ID	An item that is allocated to an instance ID
Service Data	Send data such as setting values

CIP objects that can be specified by messaging include common objects meeting the standard and objects unique to this product. To read/write the settings and status of this product and connected EJ Counters, specify the message as follows.

Tips

For details on procedures for messaging setting, see the manual provided with the engineering tool.

Item	Description
Service Code	0x10: Set_Attribute_Single (write)
	0x0E: Get_Attribute_Single (read)
Class ID	0xA2 (fixed)
Instance ID	Sets the instance number.
Attribute ID	0x05 (fixed)
Service Data	Specifies the setting value for writing.
	Not used with Get_Attribute_Single (read).

■ Acquisition of EJ Counter connection information

Instance No.	Item	Transfer direction*	Response data size	Description
22	Number of counters connected	Get	USINT (1 byte)	Reading the number of connected EJ Counters detected at power-on (zero to eight counters)
29	EJ Counter ID numbers	Get	USINT × 8 (1 byte × 8)	Reading the counter IDs of EJ Counters detected at power-on (up to eight EJ Counters, with "0xFF" returned if no EJ Counters are connected) Example: With EJ Counter IDs of ID=01 and ID=02 (two counters connected) in order of proximity to this product Value read: 0102FFFFFFFFFFFF (Read in sequence starting with the counter closest to this product.)

* For the Get command (Service Code: 0x0E), bring measurement results and setting data from this product to the scanner.
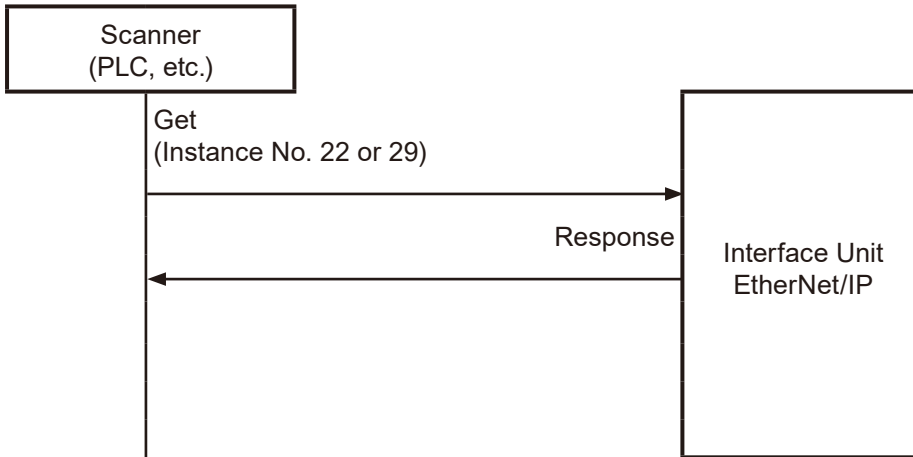
■ System reset

Instance No.	Item	Transfer direction*	Send data size	Description
39	System reset	Set	UINT (2 bytes)	Initiates system reset of this product and EJ Counters. System reset is performed upon setting "0xAAAA" (enable reset), followed by setting "0x0000" (execute reset). **Tips** If any other asynchronous data transfer is performed after setting enable reset, the enable reset state is canceled.

* For the Set command (Service Code: 0x10), set data from the scanner to this product.
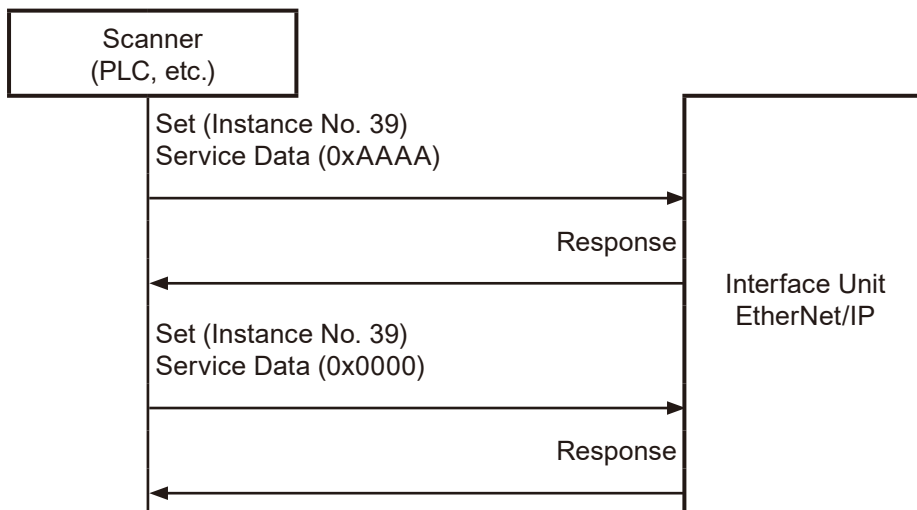
■ Read/Write various parameters

Data is transferred by executing the messaging Set command (Service code: 0x10), and then executing the Get command (Service Code: 0x0E). Parameters are read/written using the following procedure.
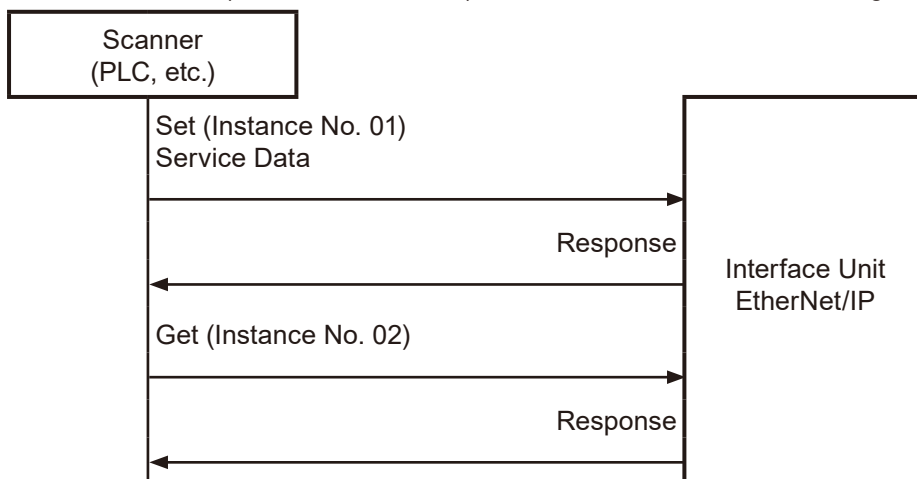
1   Transfer Set command
2   Set command response verification
3   Transfer Get command

● Transfer Set command

Set the Instance No. 01 data, and then execute the Set command (Service Code: 0x10).

This product is notified of the parameter read/write request.

Instance No.	Send data size	Send data			
		Byte	Data type	Item	Description
01	9 Byte	0	USINT (1 byte)	Command code	For details, see 📖 "■ EJ Counter command code" on page 59.
		1	USINT (1 byte)	EJ Counter number	Specify a value from 0x01 through 0x08. ID numbers from 0x01 to 0x08 are assigned to EJ Counters in sequence, starting with the device adjacent to this product.
		2	USINT (1 byte)	Ch. specification	Specify a Linear Gage (Ch.) connected to the EJ Counter. (Data than bit 0 are invalid.) 0: Ch.1 1: Ch.2
		3	USINT (1 byte)	Reserve	Fixed to 0x00.
		Bits 4 to 8	USINT × 5 (5 bytes)	Data	Set data according to command code.

● Verify Set command response

Verify that messaging has taken place properly in response to the Set command from the scanner.

Tips

If an error occurred, check for abnormalities in the command code and data and then sent the command again. For details about error message contents, see 📖 "4.4.1 Asynchronous Data Transfer Errors" on page 64.

● Transfer Get command

Executes the Instance No. 02 Get command (Service Code: 0x0E).

The receive data contains the read results when parameters are read, and write success/failure when parameters are written.

The receive data format is as shown here.

Instance No.	Receive data size	Receive data			
		Byte	Data type	Item	Description
02	9 Byte	0	USINT (1 byte)	Command code	Returns the specified command code.
		1	USINT (1 byte)	EJ Counter number	Returns the specified EJ Counter number.
		2	USINT (1 byte)	Ch. specification	Returns the specified Linear Gage (Ch.). 0: Ch.1 1: Ch.2
		3	USINT (1 byte)	Reserve	N/A
		Bits 4 to 8	USINT × 5 (5 bytes)	Data	Returns response data according to command code.

Tips

Data read out by the Get command is held until the next time the Set command is executed.

■ EJ Counter command code

● Read command parameters

Commands	Command code	Data set to send data (4 to 8)				
		Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
		Data read out by receive data (4 to 8)[1]				
		Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Current value	0x10	0x00	0x00	0x00	0x00	0x00
		Current value (31:0)[2]				Error flag[7]
Preset value	0x20	0x00	0x00	0x00	0x00	0x00
		Preset value (31:0)[2]				Error flag[7]
Tolerance value S1	0x21	0x00	0x00	0x00	0x00	0x00
		Tolerance value S1 (31:0)[2]				Error flag[7]
Tolerance value S2	0x22	0x00	0x00	0x00	0x00	0x00
		Tolerance value S2 (31:0)[2]				Error flag[7]
Tolerance value S3	0x23	0x00	0x00	0x00	0x00	0x00
		Tolerance value S3 (31:0)[2]				Error flag[7]
Tolerance value S4	0x24	0x00	0x00	0x00	0x00	0x00
		Tolerance value S4 (31:0)[2]				Error flag[7]
EJ Counter display status	0x30	0x00	0x00	0x00	0x00	0x00
		Display status[3]	Peak mode[4]	HOLD status[5]	Unit[6]	Error flag[7]

Commands	Com-mand code	Data set to send data (4 to 8)				
		Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
		Data read out by receive data (4 to 8)[1]				
		Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Read EJ Counter pa-rameter set-tings	0x40	0x00	Parameter number	0x00	0x00	0x00
		0x00	Parameter number	0x00	Parameter value	Error flag[7]

*1 If the command cannot be executed, "0x7FFFFFFF" is output for bytes 4 to 7 of the receive data.

*2 The current value, preset value and tolerance data are output from the highest order data. (Big endi-an)
The output data format consists of a sign (1 bit) + numeric value (31 bits).

– Minimum resolution: Fixed to 0.00001 mm (0.0000001 in with display in inches)

– Decimal point: None

– Sign: "0" when positive, "1" when negative (complement of 2)

> **Tips**
>
> The data sequence (endianness) is different than with cyclic communication.

*3 "0x00" indicates the standby state, "0x01" indicates counter display, and "0x02" indicates parameter display.

*4 "0x00" indicates current value display, "0x01" indicates MAX value display, "0x02" indicates MIN value display and "0x03" indicates TIR value display

*5 Bit 0 indicates the external HOLD state, bit 1 indicates the internal HOLD state, and bit 2 indicates the internal HOLD output state. Each is "1" when ON or during output. Bits 3 to 7 are fixed to "0".

*6 "0x00" indicates mm display, and "0x01" indicates inch display.

*7 For details about error flags, see 📖 "4.4.2 EJ Counter Error Flags" on page 65.

● Write command parameters (settings data)

Commands	Com-mand code	Data set to send data (4 to 8)				
		Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
		Data read out by receive data (4 to 8)[1]				
		Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Write preset values	0x60	Preset value (31:0)[2]				0x00
		Set preset value (31:0)[2]				Error flag[4]
Write toler-ance value S1	0x61	Tolerance value S1 (31:0)[2]				0x00
		Set tolerance value S1 (31:0)[2]				Error flag[4]
Write toler-ance value S2	0x62	Tolerance value S2 (31:0)[2]				0x00
		Set tolerance value S2 (31:0)[2]				Error flag[4]
Write toler-ance value S3	0x63	Tolerance value S3 (31:0)[2]				0x00
		Set tolerance value S3 (31:0)[2]				Error flag[4]
Write toler-ance value S4	0x64	Tolerance value S4 (31:0)[2]				0x00
		Set tolerance value S4 (31:0)[2]				Error flag[4]
Cancel the start-up standby state (cancel "--------" display)	0x70	0x00	0x00	0x00	0x00	0x00
		0x00	0x00	0x00	0x00	Error flag[4]
Switch peak mode	0x71	0x00	0x00	0x00	0x00	Peak mode[3]
		0x00	0x00	0x00	Peak mode[3]	Error flag[4]

Commands	Com-mand code	Data set to send data (4 to 8)				
		Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
		Data read out by receive data (4 to 8)[*1]				
		Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Current value preset	0x72	0x00	0x00	0x00	0x00	0x00
		0x00	0x00	0x00	0x00	Error flag[*4]
Zero current values	0x73	0x00	0x00	0x00	0x00	0x00
		0x00	0x00	0x00	0x00	Error flag[*4]
Preset/zero set clear	0x74	0x00	0x00	0x00	0x00	0x00
		0x00	0x00	0x00	0x00	Error flag[*4]
Clear peak data (MAX and MIN data)	0x75	0x00	0x00	0x00	0x00	0x00
		0x00	0x00	0x00	0x00	Error flag[*4]
Clear the EJ Counter error state	0x76	0x00	0x00	0x00	0x00	0x00
		0x00	0x00	0x00	0x00	Error flag[*4]
Write EJ Counter pa-rameter set-tings	0x80	0x00	Parameter number	0x00	Parameter value	0x00
		0x00	Parameter number	0x00	Parameter value	Error flag[*4]

*1 If the command cannot be executed, "0x7FFFFFFF" is output for bytes 4 to 7 of the receive data.

*2 The preset value and tolerance data are set or output from the highest order data. (Big endian)
The output data format consists of a sign (1 bit) + numeric value (31 bits).

 – Minimum resolution: Fixed to 0.00001 mm (0.0000001 in with display in inches)

 – Decimal point: None

 – Sign: "0" when positive, "1" when negative (complement of 2)

Tips

The data sequence (endianness) is different than with cyclic communication.

*3 Specify "0x00" to switch peak mode to current value, "0x01" to switch to MAX value, "0x02" to switch to MIN value and "0x03" to switch to TIR value.

*4 For details about error flags, see 📖 "4.4.2 EJ Counter Error Flags" on page 65.

● Read/Write parameter examples

This example illustrates the procedure for setting the resolution of the Ch.2 Linear Gage (COUNTER_1B) connected to the first EJ Counter to 0.0001 mm.

1 **Write the parameters.**

1 Transfer Set command

Set the following data to Service Data, and then execute the Instance No. 01 Set command.

Send data			
Byte	**Item**	**Data**	**Description**
0	Command code	0x80	Write EJ Counter parameter settings
1	EJ Counter number	0x01	Specify the 1st EJ Counter
2	Ch. specification	0x01	Specify Ch.2
3	N/A	0x00	
4	N/A	0x00	
5	Parameter number	0x04	Linear Gage resolution setting
6	N/A	0x00	
7	Parameter value	0x03	Set to 0.0001 mm
8	N/A	0x00	

2 Verify Set command response

Verify that communication has taken place properly in response to the Set command from the scanner.

3 Transfer Get command

Executes the Instance No. 02 Get command.

4 Verify result

Verify the response to writing of parameters executed by Transfer Set command to make sure that all data matches the content of the data sent, and check to make sure that the EJ Counter hasn't raised an error flag.

Receive data			
Byte	**Item**	**Data**	**Description**
0	Command code	0x80	Write EJ Counter parameter settings
1	EJ Counter number	0x01	Specify the 1st EJ Counter
2	Ch. specification	0x01	Specify Ch.2
3	N/A	0x00	
4	N/A	0x00	
5	Parameter number	0x04	Linear Gage resolution setting
6	N/A	0x00	
7	Parameter value	0x03	Set to 0.0001 mm
8	Error flag	0x00	(When there is no error or alarm)

2 Read the parameters.

Verify the parameters written by reading the parameters.

1 Transfer Set command

Set the following data to Service Data, and then execute the Instance No. 01 Set command.

Send data			
Byte	**Item**	**Data**	**Description**
0	Command code	0x40	Read EJ Counter parameter settings
1	EJ Counter number	0x01	Specify the 1st EJ Counter
2	Ch. specification	0x01	Specify Ch.2
3	N/A	0x00	
4	N/A	0x00	
5	Parameter number	0x04	Linear Gage resolution setting
6	N/A	0x00	
7	N/A	0x00	
8	N/A	0x00	

2 Verify Set command response

Verify that communication has taken place properly in response to the Set command from the scanner.

3 Transfer Get command

Executes the Instance No. 02 Get command.

» The parameters are read and stored in data.

4 Verify result

Verify that all data match the contents of send data, that the value of parameter settings read is 0x03 (0.0001 mm resolution), and that the EJ Counter hasn't raised an abnormal error flag.

Receive data			
Byte	**Item**	**Data**	**Description**
0	Command code	0x40	Read EJ Counter parameter settings
1	EJ Counter number	0x01	Specify the 1st EJ Counter
2	Ch. specification	0x01	Specify Ch.2
3	N/A	0x00	
4	N/A	0x00	
5	Parameter number	0x04	Linear Gage resolution setting
6	N/A	0x00	
7	Parameter value	0x03	Set to 0.0001 mm
8	Error flag	0x00	(When there is no error or alarm)

4.4 EtherNet/IP Communication Errors

4.4.1 Asynchronous Data Transfer Errors

Errors that can occur when the Set command or Get command is not successful during messaging are as follows.

Tips

- Depending on the scanner being used, errors other than those indicated below may be issued, or error codes may not be displayed at all.
- For the error verification procedure, see the manual provided with the engineering tool.

Error code	Description
0x0005 (Path destination unknown)	Class ID or Instance ID is not correct.
0x000C (Object State conflict)	EJ Counter number is not correct.
0x0013 (Not Enough Data)	The set Service Data size is too small.
0x0015 (Too Much Data)	The set Service Data size is too large.
0x001e (Embedded Service Error)	The Service Data set with the system reset command (Instance No. 39) is not correct. • Send data other than 0xAAAA or 0x0000. • Set 0x0000 (execute reset) without setting 0xAAAA (enable reset).

4.4.2   EJ Counter Error Flags

Error flags are made up of data in hexadecimal notation. Bits that are set to "1" indicate the location of the alarm or error.

bit	Judgment	Description
bit 0	0: Normal 1: Alarm or error state	Indicates an error in communication between the interface unit and EJ Counters. Whether or not the command was normally executed cannot be determined. Check the command and execute it again.
bit 1		The EJ Counter is in the Busy state. EJ Counter settings are being made by key operation. Commands cannot be executed. Execute the command after putting the EJ Counter in the counting state.
bit 2		The origin of the requested channel has not been detected. Commands cannot be executed. Execute the command again after performing gage origin detection or disabling origin detection.
bit 3		An alarm occurred on the requested channel or both channels. Commands cannot be executed. The flag is set if the EJ Counter is in the Busy state (DataER-2 bit1), its origin has not been detected (DataER-2 bit 2), or it is in the counter stand-by state.
bit 4		A hardware error occurred on the requested channel or both channels.
bit 5		An alarm or hardware error occurred on one of the channels. The flag is set even if the alarm or hardware error occurred on the channel that was not requested. The command is executed if there is no abnormality the requested channel.
bit 6		Fixed to 0
bit 7		Fixed to 0

4.5 Tolerance Judgment Result

■ Tolerance judgment output

● 3-step tolerance

	x < S1 (L1)	S1 ≦ x ≦ S4 (L3)	S4 < x (L5)
LT1	L	H	H
LT2	H	L	H
LT3	H	H	L
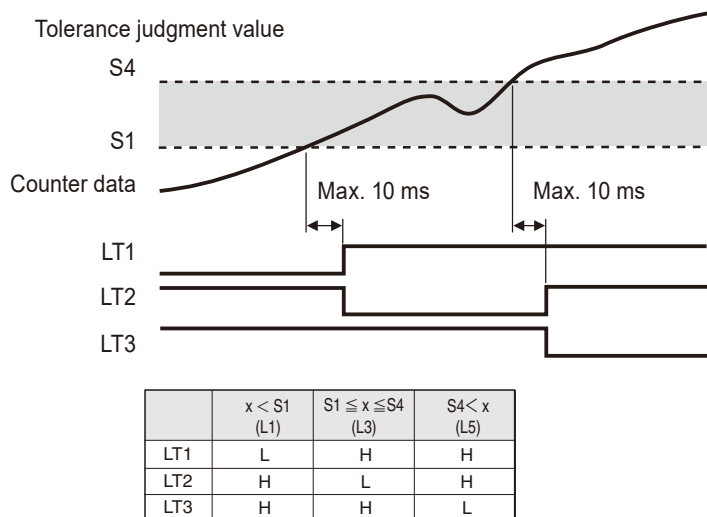
* With 3-step tolerance judgment, L2 and L4 are not used. (Fixed to 0)

● 5-step tolerance

	x < S1 (L1)	S1 ≦ x < S2 (L2)	S2 ≦ x ≦ S3 (L3)	S3 < x ≦ S4 (L4)	S4 < x (L5)
LT1	L	L	H	H	H
LT2	H	L	L	L	H
LT3	H	H	H	L	L
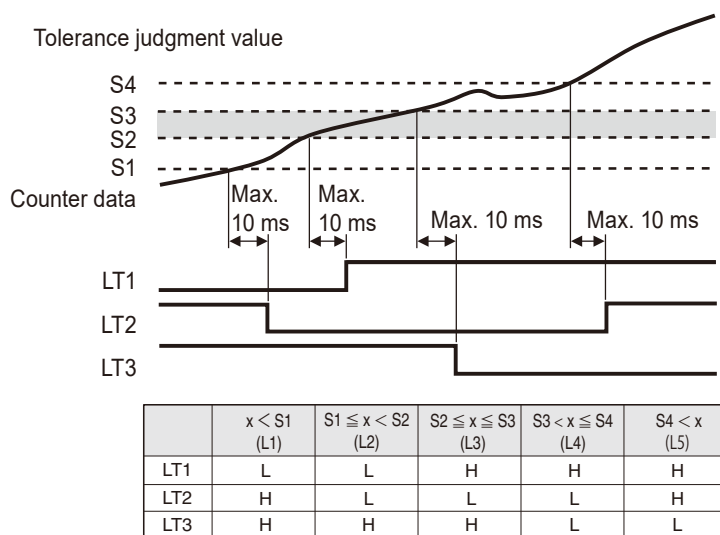
4.6   Communication Response Time

The current value data of EJ Counter(s) connected to this product are sent to the scanner by EtherNet/IP cyclic communication. The time required to update data at the scanner is as follows.

Tips

The update times indicated below are for reference. The time fluctuates depending on the system used by the customer.

■ Conditions

Baud rate: 100 Mbps

Scanner: Compac Logix 5380 (Rockwell Automation)

EtherNet/IP communication cyclic communication period: 1 ms

Number of EJ Counters	Update time (reference)
1 unit	Approx. 6 ms
8 units	Approx. 16 ms

• The update time is the same regardless of whether the number of Linear Gages connected to the EJ Counters is one or two.

MEMO

5 EJ Counter Parameter Settings

No.	Set value	Per-axis setting	Set value: Operation			Default value	Description
01	Key protect	N/A	00: No key protect 01: Key protect			00	Operation of keys other than those used for setting parameters can be disabled to prevent operation errors. **Tips** Operation by external input cannot be disabled.
02	Origin initialization (Origin clear)	N/A	00: Do not initialize. 01: Initialize.			00	When a Linear Gage with origin mark is connected, the origin can be initialized without cycling on the power.
03	Display mode selection	N/A	**Set value**	**Ch. 1**	**Ch. 2**	00	Selects the values to be displayed on Ch.1 and Ch.2. **Tips** • When using only the A-axis or the B-axis, set 06 or 07. • If the displayed content is the same both before and after changing the setting, the tolerance value, preset value and preset state settings are maintained. • In order to set the speed display, set the speed sampling cycle with Parameter Number 17. • The speed display unit is mm/s (or in/s). Display of lower digits may be fixed depending on the speed sampling time. • When the minimum value (MIN) is selected for Peak mode, the speed display indicates the maximum speed in the reverse direction. • Because speed display is simplified, it is not suitable for feedback control.
			00	A-axis counter	B-axis counter		
			01	Sum (A+B)	B-axis counter		
			02	Difference (A-B)	B-axis counter		
			03	A-axis counter	Sum (A+B)		
			04	A-axis counter	Difference (A-B)		
			05	A-axis speed	B-axis speed		
			06	A-axis counter	A-axis speed		
			07	B-axis counter	B-axis speed		

5

EJ Counter Parameter Settings

No.	Set value	Per-axis setting	Set value: Operation	Default value	Description
04	Linear Gage resolution (minimum reading)	✓	00: 0.005 mm (5 µm), 0.0002 in 01: 0.001 mm (1 µm), 0.00005 in 02: 0.0005 mm (0.5 µm), 0.00002 in 03: 0.0001 mm (0.1 µm), 0.000005 in	01	Sets the minimum reading according to the resolution of the connected Linear Gage. Make settings individually for the A-axis and B-axis. **Tips** • Correct values will not be displayed if the settings do not match the resolution of the connected Linear Gage. • The unit for minimum reading is "in" when Parameter Number 22 is set to "1".
05	Origin detection function	N/A	00: Disabled 01: Enabled	00	Selects whether the origin function is enabled or disabled when a Linear Gage with an origin point mark is connected.
06	Counter direction	✓	00: + direction 01: - direction	00	Sets the relationship between the direction in which the numeric value changes and the direction of movement of the Linear Gage plunger. When 00 is set, the numeric value increases as the plunger moves toward top dead center. When 01 is set, the numeric value increases as the plunger moves toward bottom dead center. Make settings individually for the A-axis and B-axis.
07	Origin detection direction	✓	00: + direction 01: - direction	00	When a Linear Gage with an origin mark is connected, selects the direction of the plunger of the Linear Gage for origin detection. Make settings individually for the A-axis and B-axis.

No.	Set value	Per-axis setting	Set value: Operation	Default value	Description
08	Tolerance judgment setting	N/A	00: 3-step tolerance judgment 01: 5-step tolerance judgment 02: No tolerance judgment	00	Selects whether or not the tolerance judgment function is used. When the tolerance judgment is used, selects the number of steps of tolerance judgment. **Tips** Changing the settings does not clear tolerance values S1 to S4, which are maintained. However, the following adjustments may be made in the event that the following inconsistencies occur. When the setting is changed from "3-step tolerance" or "No tolerance" to "5-step tolerance": When S2 < S1 or S4 < S2, S2 is replaced with the value of S1. When S3 < S1 or S4 < S3, S3 is replaced with the value of S4.
09	Display at startup	N/A	00: Counter stand-by 01: Counter displayed	00	Selects whether to display the standby state or the counter display at startup. **Tips** For details about screen display in the counter stand-by state, see 📖 the separate "Compact Display Unit for Linear Gage EJ Counter User's Manual".
10	ERR/ALLGO selection (I/O input/output setting)	N/A	00: Used as ERR 01: Used as ALLGO	00	Selects whether to use the ERR or ALLGO signal as the external output function. **Tips** When multiple EJ Counters are linked together, all of them must have the same setting. Correct output will not be obtained if any of the EJ Counters has a different setting.
11	Channel coupling selection (I/O input/output setting)	N/A	00: Do not couple channels 01: Couple channels	00	Selects whether to couple the 1 or 2 SEL external input signal to the EJ Counter's display channel. **Tips** The EJ Counter's [SEL/CE] key also works to couple the signal.

No.	Set value	Per-axis setting	Set value: Operation	Default value	Description
12	Origin re-detection (I/O input/output setting)	N/A	00: Disabled 01: Only effective for the axis that is dependent on the channel selected by 1/2 SEL. 02: Axis dependent on Ch.1 and axis dependent on Ch.2.	00	When setting is enabled, origin re-detection goes on stand-by when the HOLD signal (I/O input) rises. If the HOLD signal rises again while original detection is on stand-by, origin re-detection is canceled. **Tips** This setting affects all axes related to the specified channel. However, this does not include the axis whose channel is displaying speed. Example: • If the channel displaying the sum (A+B) and difference (A-B) is selected, the A-axis and B-axis are affected. • If the channel displaying the B-axis coordinates is selected, the B-axis is affected.
13	Preset by I/O input (I/O input setting)	N/A	00: Executed only for the channel selected by 1/2 SEL. 01: Executed for both channels.	00	Selects whether preset processing by external input is to be applied to just one channel or both channels.
14	Ch affected by the CLEAR signal (I/O input/output setting)	N/A	00: Executed only for the channel selected by 1/2 SEL. 01: Executed for both channels.	00	Selects whether peak clear and error clear are to be applied to just the specified channel or to both channels.
15	Peak value preset	N/A	00: Disabled 01: Enabled	00	Sets whether the peak value is to be set as the standard during peak mode maximum value display or minimum value display. **Tips** Peak value preset cannot be set during run-out display.
16	Smoothing	N/A	00: No smoothing (update at 5 ms intervals). 01: The average of 16 measurements is displayed (update at 80 ms intervals). 02: The average of 32 measurements is displayed (update at 160 ms intervals).	00	Counter values are averaged to minimize flicker of the lowest-order digit.

No.	Set value	Per-axis setting	Set value: Operation	Default value	Description
17	Speed sampling cycle	N/A	00: 10 ms 01: 50 ms 02: 100 ms	00	Selects the sampling interval for speed calculation.
18	Hide the lowest-order digit.	N/A	00: Display all digits. 01: Hide the lowest-order digit.	00	Hides the lowest-order digit. However, data output to the optional interface unit includes the lowest-order digit.
19	Arbitrary ID specification	N/A	00 to 49: ID numbers assigned automatically. 50 to 99: Arbitrary ID numbers assigned (ID numbers specified).	01	Set the ID number required when an optional interface unit is connected. When arbitrary ID numbers are set in the range 50 to 99, the ID numbers set are assigned the next time the power is turned on. **Tips** • After setting IDs, be sure to cycle the power off and on or perform a system reset. • When 00 to 49 is set, ID numbers 01 to 08 are automatically reassigned when the power is cycled off and on or after the system is reset. • If the same ID number is arbitrarily assigned to more than one EJ Counter, [EJ-CONNECT] will flash following power-on or system reset and the interface unit will not function properly. This will require checking ID settings at the EJ Counters themselves.
20	Power saving function	N/A	00: Display always lit 01 to 99: Display goes out after the specified interval passes (specify the interval length in minutes).	00	Turning off display minimizes power consumption. Specify the time that elapses between when the last key is pressed until the display goes out (01 to 99 minutes). When display is turned off, press any key to turn it on again. **Tips** Counter operation for the axes, I/O input and output, and data communication through the optional interface unit continue even when the display is off.

73

No.	Set value	Per-axis setting	Set value: Operation	Default value	Description
21	Parameter initialization	N/A	00: Do not initialize. 01: Initialize.	00	When this parameter is set to 01, the settings for all parameters other than number 19 (the arbitrary ID) and number 22 (the unit setting) are reset to their default values. Further, the tolerance and preset values are cleared.
22	Unit selection (EJ-102NE only)	N/A	00: mm (mm/s) 01: in (in/s)	00	The unit for displayed values can be set to "mm" or "in". **Tips** • Changing this setting clears the preset and tolerance values. • The default value is not restored even if the parameters are re-initialized. • The resolution of the Linear Gage is fixed to "in".

6   Troubleshooting

When this product does not operate as expected, refer to the cause of the trouble and the solutions shown below:

■ Overall

Problem	Cause	Solution
Power does not go on.	The interface unit is not connected to an EJ Counter.	The interface unit draws power from an EJ Counter. Connect it to an EJ Counter. **Tips** For details, see 📖 "2.1.2 Linking to EJ Counters" on page 21 and "2.3 Power Supply Connection" on page 26.
	Power is not supplied to the EJ Counter.	The interface unit draws power from an EJ Counter. Supply power to the EJ Counter.
	Power is not properly connected to the EJ Counter's connection plug.	Properly connect the power to the EJ Counter's connection plug. **Tips** For details, see 📖 the separate "Compact Display Unit for Linear Gage EJ Counter User's Manual".
	Power supply capacity is insufficient.	Connect a noise-free power supply with a capacity of 10 V DC–27 V DC (30 W).
	You are attempting to supply power via USB.	This product is not designed to receive power via USB bus. Power must be supplied by an EJ Counter. Supply power to the EJ Counter.
	The linkage connector of the counter or interface unit is defective.	Replace the defective counter or interface unit with a good one.
Unit from the middle of daisy chain does not power on.	One of the daisy chain is not properly connected.	Disconnect the first unit that won't power on from the last unit that does power on, and then reconnect the units.
	The linkage connector is defective on either the unit that will power on, the unit that won't power on, or both.	Replace the defective unit with a good one.
Only one unit in the daisy chain does not power on.	The unit in question is defective.	Replace the defective unit with a good one.

Troubleshooting

6

Problem	Cause	Solution
The [EJ-CON-NECT] indicator does not light. (No communication with the EJ Counter.)	The interface unit is not connected to an EJ Counter.	Connect it to an EJ Counter. **Tips** For details, see 📖 "2.1.2 Linking to EJ Counters" on page 21 and "2.3 Power Supply Connection" on page 26.
	The terminal unit is not connected.	Normal communication requires connection of the terminal unit. Connect the terminal unit. **Tips** For details, see 📖 "2.1.2 Linking to EJ Counters" on page 21.
	The interface unit was connected to the EJ Counter while the EJ Counter's power was on.	The interface unit detects the EJ Counter when its power is turned on. Turn off the power, and then turn it back on again.
	Nine or more EJ Counters are linked together.	Turn off the power and then turn it back on after reducing the number of linked EJ Counters to no more than eight.
	The counter or interface unit linkage connector is defective.	Replace the defective counter or interface unit with a good one.
The [EJ-CON-NECT] indicator flashes.	When setting arbitrary IDs , the same ID was assigned to more than one EJ Counter.	Make parameter settings by key operation, taking care to assign a unique ID to each EJ Counter.
The [MODULE STATUS] indicator lights red.	Supplied power is outside of the specified range or the product is defective.	Verify EJ Counter connections and supplied power (10 V DC–27 V DC, 30 W). If operation is not restored after verification, the product may be defective and require replacement.
The [MODULE STATUS] indicator flashes red.	A momentary communication error occurred inside the product.	The power supply or communication cable may be carrying electrical noise. Verify that the power supply is not carrying noise and that the product is grounded.
Connection lost between units.	DIN rail fixing bracket not installed.	Immobilize the interface unit and EJ Counter(s) using the DIN rail fixing bracket. **Tips** For details, see 📖 "2.1.3 Attaching the DIN Rail Fixing Bracket" on page 22.

■ USB communication

Problem	Cause	Solution
Unable to connect USB connector.	The USB connector is of the wrong type.	The interface unit uses a Type-C connector. Use a Type-C compatible cable. **Tips** For details, see 📖 "2.2.1 USB Connection" on page 24.
Unable to use USB communication.	Your device uses the wrong communication standard.	This product uses the USB 2.0 Full Speed communication standard and works with Windows 10 standard device drivers. Please verify that your device supports the USB 2.0 Full Speed standard.
	Your device has the wrong port setting.	With this interface unit, USB communication uses a virtual COM port. When making port settings on your device, check to make sure the settings work with the application use for communication.
Cannot retrieve current value data.	The EJ Counter has thrown an error, and is not counting.	Clear the error on the EJ Counter. **Tips** For details, see 📖 the separate "Compact Display Unit for Linear Gage EJ Counter User's Manual".

■ EtherNet/IP communication

Problem	Cause	Solution
The cable cannot be connected.	You are attempting connection with optical communication or a single-pair Ethernet (SPE).	This product does not support optical communication and SPE. Use a copper-wire cable that meets TCP/IP requirements.
	You are attempting to use other than an RJ45 connector.	The EtherNet/IP communication connector must conform to the RJ45 standard. Obtain a cable and plug connector that supports RJ45 connection.
Communication speed is slow. Communication doesn't work.	The cable used is the wrong category.	Use STP communication cables of type Cat.5e or higher, or EtherNet/IP-compatible cables that conform with TCP/IP requirements.
The current value is not as expected.	You may be applying the wrong unit (mm/in).	This product transfers only numeric data, which does not include the unit of measurement. Check the unit setting on the EJ Counter. **Tips** For details, see 📖 the separate "Compact Display Unit for Linear Gage EJ Counter User's Manual".
	The number of digits is wrong.	This product uses a fixed minimum resolution for data transfer. (0.00001 mm or 0.0000001 in) No decimal point is included in send data. Take the above into consideration and convert data as needed.
	Negative numbers not properly converted.	This product handles negative numbers as the complement of 2. Use a suitable method for converting data.
Communication not working.	IP Address not appropriate.	Verify the value of the [Model] switch. If "0" (Fixed IP mode) is selected, the IP address cannot be set by USB command or using the LG QuickSetupTool.

Tips

For details on handling output errors, see 📖 "3.3 List of USB Communication Errors" on page 38.

7 Specifications

Specifications

7

No. 99MBC144A

7.1 Basic Specifications

Part No.		21HZA188
Product name		Interface Unit EtherNet/IP
Supported interfaces		EtherNet/IP
User interface	Display	POWER (green), NETWORK STATUS (green/red), MODULE STATUS (green/red), LINK PORT 1 (green/orange), LINK PORT 2 (green/orange), EJ-CONNECT (green)
	Switch	Rotary switch × 1 (for mode setting)
Functions		Common protocol for USB and EtherNet/IP
		Current value read-out, current value hold (software hold), EJ Counter parameter setting, tolerance evaluation setting, preset value setting, preset/zero set clear, peak clear, error clear
Power supply specifications	Input voltage	10 V–27 V DC (supplied from EJ Counter) Power cannot be supplied by USB.
	Maximum power consumption	Interface unit by itself: 3 W or less
		With maximum number of linked EJ Counters: 30 W or less (including 8 EJ Counters and 16 Linear Gages)
Operating temperature (humidity) range		0 °C–50 °C (20% RH–80% RH, without condensation)
Storage temperature (humidity) range		-10 °C–60 °C (20% RH–80% RH, without condensation)
CE marking/ UKCA marking		EMC Directive/Electromagnetic Compatibility Regulations : EN IEC 61326-1
		Immunity test requirement: Clause 6.2 Table 2
		Emission limit: Class A
		RoHS Directive/The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations : EN IEC 63000

7.2 Communication Specification

7.2.1 USB Communication

Item		Specifications
USB 2.0	Baud rate	Full Speed (12 Mbps)[*1]
	Port used	Virtual COM port
	Connector type	Type-C

*1 Communication time is 5 to 10 ms when acquiring current values, and 20 to 30 ms when setting EJ Counter parameters (reference values).
Actual times will vary depending on the computer operating environment and conditions of use.

7.2.2 EtherNet/IP Communication

Item		Specifications
EtherNet/IP communica-tion	Communication port	RJ45×2 ports (IP20)
	Communication cable	STP communication cables of type Cat.5e or higher, or EtherNet/IP-compatible cables that conform with TCP/IP requirements *Compatible with both straight cables and cross cables *Make sure that communication cable length does not exceed 30 m.
	Baud rate	Automatic switching by auto-negotiation 10 Mbps / 100 Mbps Full duplex / half duplex
	RPI	1–3200 ms (during cyclic communication)
	DLR[*1]	Enabled (Ethernet ring topology)
	ACD[*2]	Enabled (Duplicate IP addresses detected)

*1 Device Level Ring

*2 Address Conflict Detection

7.3   Outline Dimensional Drawing

■ Main unit dimensions

Unit: mm

POWER
NETWORK STATUS
MODULE STATUS
LINK PORT 1
LINK PORT 2
E-CONNECT

Mitutoyo

MODE

EtherNet/IP®

31.7

(97.6)

56.2

59.25

2.5

69.7

0.2

95

2.6
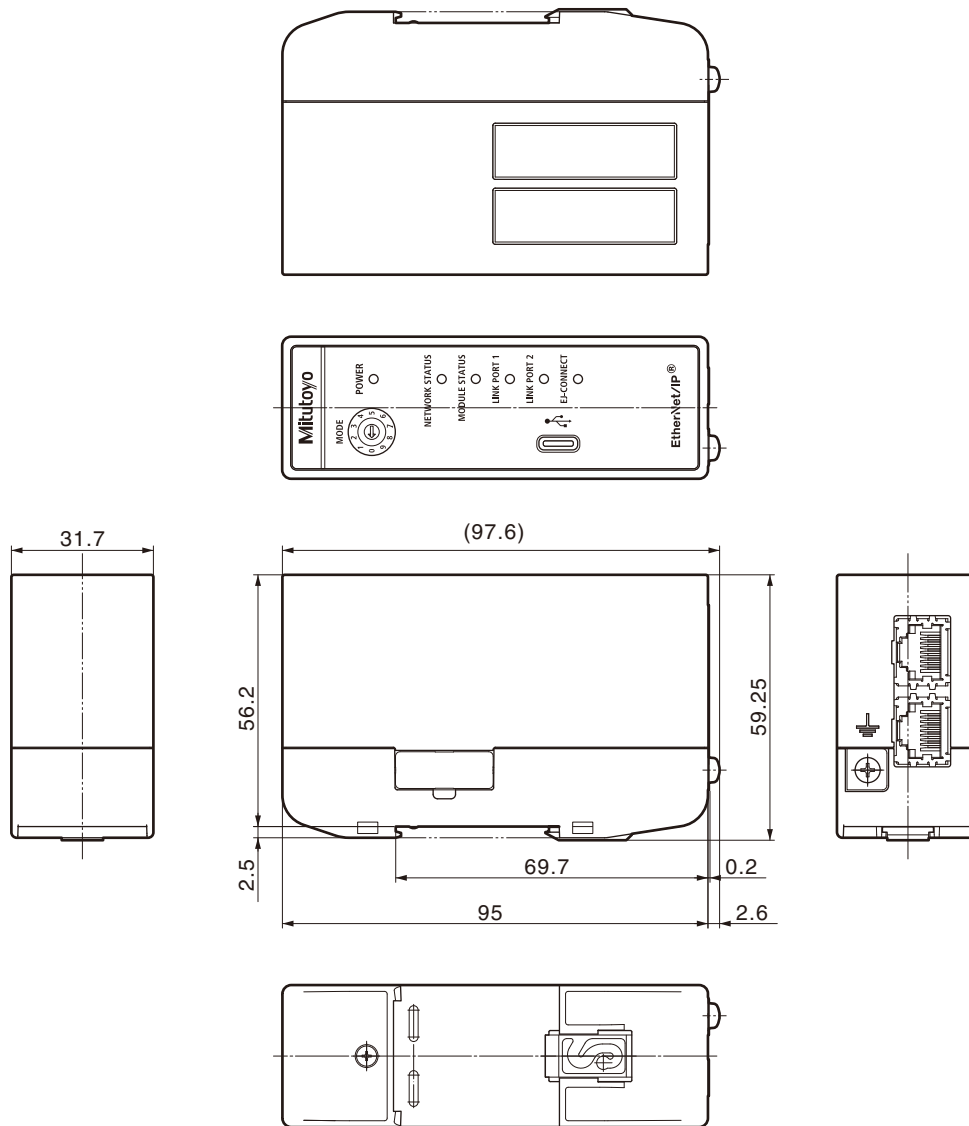
■ DIN rail and connector installation dimensional drawing

Unit: mm

RJ45 compliant connector plug × 2
(any manufacturer)

63.7
(56.2)

7.5

35

69.7

95

DIN rail
(35 mm Top Hat)
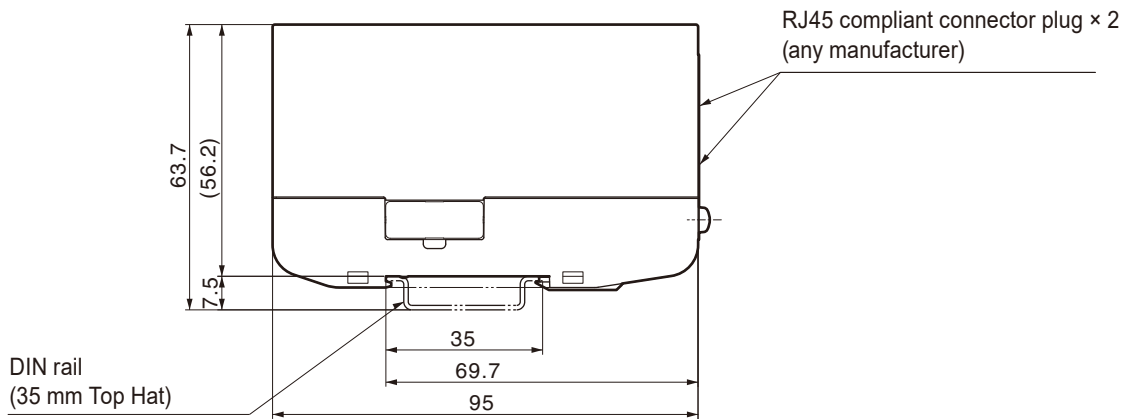
■ Maximum configuration dimensional drawing

Unit: mm

EJ Counter
(sold separately)

Terminal unit (provided)

DIN rail fixing
bracket (provided)

Mitutoyo EJ-102N

Interface
Unit
EtherNet/IP

Mitutoyo
MODE
POWER
NETWORK STATUS
MODULE STATUS
LINK PORT 1
LINK PORT 2
EJ-CONNECT
EtherNet/IP®

DIN rail fixing
bracket (provided)

20.9(unit pitch)

10.2   167(=20.9x8-0.2)   31.9

20   (209.1)   20

(249.1)
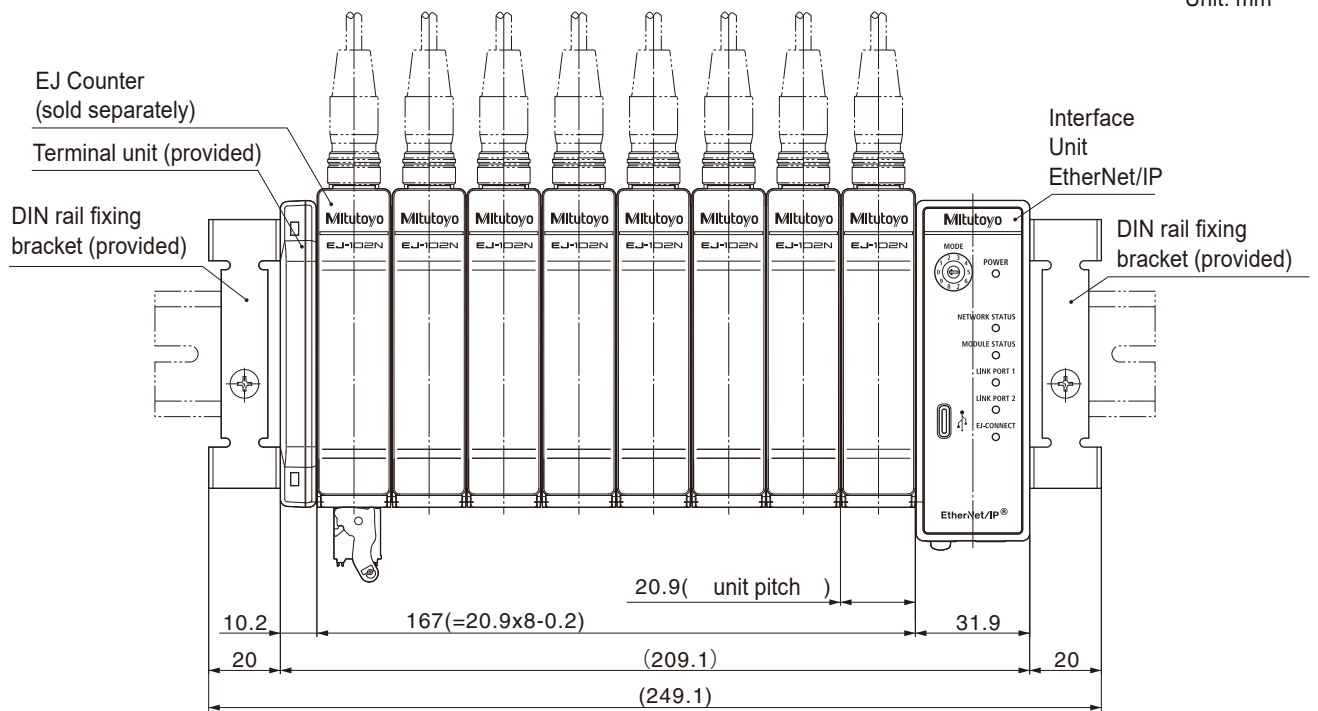
SERVICE NETWORK

Europe

Mitutoyo Europe GmbH
Borsigstrasse 8-10, 41469 Neuss, GERMANY
TEL: 49 (0)2137 102-0 FAX: 49 (0)2137 102-351

Mitutoyo CTL Germany GmbH
Von-Gunzert-Strasse 17, 78727 Oberndorf, GERMANY
TEL: 49 (0)7423 8776-0 FAX: 49 (0)7423 8776-99

KOMEG Industrielle Messtechnik GmbH
Zum Wasserwerk 3, 66333 Völklingen, GERMANY
TEL: 49 (0)6898 91110 FAX: 49 (0)6898 9111100

Germany

Mitutoyo Deutschland GmbH
Borsigstrasse 8-10, 41469 Neuss, GERMANY
TEL: 49 (0)2137 102-0 FAX: 49 (0)2137 86 85

M³ Solution Center Hamburg
Tempowerkring 9·im HIT-Technologiepark 21079 Hamburg, GERMANY
TEL: 49 (0)40 791894-0 FAX: 49 (0)40 791894-50

M³ Solution Center Berlin
Ernst-Lau-Straße 6, 12489 Berlin, GERMANY
TEL:49(0)30 2611 267 FAX: 49 30 67988729

M³ Solution Center Eisenach
Neue Wiese 4, 99817 Eisenach,GERMANY
TEL: 49 (0)3691 88909-0 FAX: 49 (0)3691 88909-9

M³ Solution Center Ingolstadt
Marie-Curie-Strasse 1A, 85055 Ingolstadt, GERMANY
TEL: 49 (0)841 954920 FAX: 49 (0)841 9549250

M³ Solution Center Leonberg
Am Längenbühl 3, 71229 Leonberg, GERMANY
TEL: 49 (0)7152 6080-0 FAX: 49 (0)7152 608060

Mitutoyo Deutschland GmbH - Small Tool Sales Division
Heidenheimer Strasse 14, 71229 Leonberg, GERMANY
TEL: 49 (0)7152 9237-0 FAX: 49 (0)7152 9237-29

U.K.

Mitutoyo (UK) Ltd. HQ
Joule Road, West Point Business Park, Andover, Hampshire SP10 3UX, UNITED KINGDOM
TEL: 44 (0)1264 353123 FAX: 44 (0)1264 354883

Coventry M³ Solution Centre
Unit6, Banner Park, Wickmans Drive, Coventry, West Midlands CV4 9XA, UNITED KINGDOM
TEL: 44 (0)2476 426300

Halifax M³ Solution Centre
Lowfields Business Park, Navigation Close, Elland, West Yorkshire HX5 9HB, UNITED KINGDOM
TEL: 44 (0)1422 375566

East Kilbride M³ Solution Centre
The Bairds Building, Rankine Avenue, Scottish Enterprise Technology Park, East Kilbride G75 0QF, UNITED KINGDOM
TEL: 44 (0)1355 581170

France

Mitutoyo France
Paris Nord 2-123 rue de la Belle Etoile, BP 59267 ROISSY EN FRANCE 95957 ROISSY CDG CEDEX, FRANCE
TEL: 33 (0)149 38 35 00

M³ Solution Center LYON
Parc Mail 523, cours du 3ème millénaire, 69791 Saint-Priest, FRANCE
TEL: 33 (0)149 38 35 70

M³ Solution Center STRASBOURG
Parc de la porte Sud, Rue du pont du péage, 67118 Geispolsheim, FRANCE
TEL: 33 (0)149 38 35 80

M³ Solution Center CLUSES
290 Avenue des Lacs, 74950 Scionzier, FRANCE
TEL: 33 (0)1 49 38 35 90

M³ Solution Center TOULOUSE
Aeroparc Saint Martin Cellule B08 ZAC de Saint Martin du Touch 12 rue de Caulet 31300 Toulouse, FRANCE
TEL: 33 (0)1 49 38 42 90

M³ Solution Center RENNES
2, rue Claude Chappe, PA le Vallon - ZAC Mivoie, 35230 Noyal-Châtillon-sur-Seiche, FRANCE
TEL: 33 (0)1 49 38 42 10

Italy

Mitutoyo Italiana S.r.l.
Corso Europa, 7 - 20045 Lainate (MI), ITALY
TEL: 39 02 935781 FAX: 39 02 93578255

M³ Solution Center BOLOGNA
Via dei Carpini1/A - 40011 Anzola Emilia (BO), ITALY
TEL: 39 02 93578215 FAX: 39 02 93578255

M³ Solution Center CHIETI
Contrada Santa Calcagna - 66020 Rocca S. Giovanni (CH), ITALY
TEL: 39 02 93578280 FAX: 39 02 93578255

M³ Solution Center PADOVA
Via G. Galilei 21/F - 35035 Mestrino (PD), ITALY
TEL: 39 02 93578268 FAX: 39 02 93578255

Netherlands

Mitutoyo Nederland B.V.
Storkstraat 30, 3905 KX Veenendaal,
THE NETHERLANDS
TEL: 31(0)318-534911

Mitutoyo Nederland B.V. / M³ Solution Center Enschede
Institutenweg 50, 7521 PK Enschede,
THE NETHERLANDS
TEL: 31(0)318-534911

Mitutoyo Nederland B.V. / M³ Solution Center Eindhoven
De Run 1115, 5503 LB Veldhoven,
THE NETHERLANDS
TEL: 31(0)318-534911

Mitutoyo Research Center Europe B.V.
De Rijn 18, 5684 PJ Best, THE NETHERLANDS
TEL:31(0)499-320200 FAX:31(0)499-320299

Belgium

Mitutoyo Belgium N.V. / M³ Solution Center Melsele
Schaarbeekstraat 20, B-9120 Melsele, BELGIUM
TEL: 32 (0)3-2540444

Sweden

Mitutoyo Scandinavia AB
Släntvägen 6, 194 61 Upplands Väsby, SWEDEN
TEL: 46 (0)8 594 109 50

Mitutoyo Scandinavia AB / M³ Solution Center Alingsås
Ängsvaktaregatan 3A, 441 38 Alingsås, SWEDEN
TEL: 46 (0)8 594 109 50

Mitutoyo Scandinavia AB / M³ Solution Center Värnamo
Kalkstensvägen 7, 331 44 Värnamo, SWEDEN
TEL: 46 (0)8 594 109 50

Switzerland

Mitutoyo (Schweiz) AG
Steinackerstrasse 35, 8902 Urdorf, SWITZERLAND
TEL: 41 (0)447361150

Mitutoyo (Suisse) SA
Rue Galilée 4, 1400 Yverdon-les Bains, SWITZERLAND
TEL: 41 (0)244259422

Poland

Mitutoyo Polska Sp.z o.o.
Ul.Graniczna 8A, 54-610 Wroclaw, POLAND
TEL: 48 (0)71354 83 50 FAX: 48 (0)71354 83 55

Czech Republic

Mitutoyo Česko s.r.o.
Dubská 1626, 415 01 Teplice, CZECH REPUBLIC
TEL: 420 417-514-011 Email: info@mitutoyo.cz

Mitutoyo Česko s.r.o. M³ Solution Center Ivančice
Ke Karlovu 62/10, 664 91 Ivančice, CZECH REPUBLIC
TEL: 420 417-514-011 Email: info@mitutoyo.cz

Mitutoyo Česko s.r.o. M³ Solution Center Ostrava Mošnov
Mošnov 314, 742 51 Mošnov, CZECH REPUBLIC
TEL: 420 417-514-050 Email: info@mitutoyo.cz

Mitutoyo Česko s.r.o. Slovakia Branch
Hviezdoslavova 124, 017 01 Považská Bystrica, SLOVAKIA
TEL: 421 948-595-590 Email: info@mitutoyo.sk

Hungary

Mitutoyo Hungária Kft.
Galamb József utca 9, 2000 Szentendre, HUNGARY
TEL: 36 (30) 6410210

Romania

Mitutoyo Romania SRL
1A Drumul Garii Odai Street, showroom, Ground Floor, 075100 OTOPENI-ILFOV, ROMANIA
TEL: 40 (0)311012088 FAX: +40 (0)311012089

Showroom in Brasov
Strada Ionescu Crum Nr.1, Brasov Business Park Turnul 1, Mezanin, 500446 Brasov-Judetul Brasov, ROMANIA
TEL/FAX: 40 (0)371020017

Finland

Mitutoyo Scandinavia AB Finnish Branch

Viherkiitäjä 2A, 33960, Pirkkala, FINLAND

TEL: 358 (0)40 355 8498

Austria

Mitutoyo Austria GmbH

Salzburger Straße 260 / 3 A-4600 Wels, AUSTRIA

TEL: 43 (0)7242 219 998

Mitutoyo Austria GmbH Goetzis Regional showroom

Lastenstrasse 48a, 6840 Götzis, AUSTRIA

Singapore

Mitutoyo Asia Pacific Pte. Ltd.

Head office / M³ Solution Center

24 Kallang Avenue, Mitutoyo Building, SINGAPORE 339415

TEL:(65)62942211 FAX:(65)62996666

Malaysia

Mitutoyo (Malaysia) Sdn. Bhd.

Kuala Lumpur Head Office / M³ Solution Center

Mah Sing Integrated Industrial Park, 4, Jalan Utarid U5/14, Section U5, 40150 Shah Alam, Selangor, MALAYSIA

TEL:(60)3-78459318 FAX:(60)3-78459346

Penang Branch office / M³ Solution Center

30, Persiaran Mahsuri 1/2, Sunway Tunas, 11900 Bayan Lepas, Penang, MALAYSIA

TEL:(60)4-6411998 FAX:(60)4-6412998

Johor Branch office / M³ Solution Center

70 (Ground Floor), Jalan Molek 1/28, Taman Molek, 81100 Johor Bahru, Johor, MALAYSIA

TEL:(60)7-3521626 FAX:(60)7-3521628

Thailand

Mitutoyo (Thailand) Co., Ltd.

Bangkok Head Office / M³ Solution Center

76/3-5, Chaengwattana Road, Kwaeng Anusaowaree, Khet Bangkaen, Bangkok 10220, THAILAND

TEL:(66)2080 3500 FAX:(66)2521 6136

Chonburi Branch / M³ Solution Center

7/1, Moo 3, Tambon Bowin, Amphur Sriracha, Chonburi 20230, THAILAND

TEL:(66)2080 3563 FAX:(66)3834 5788

ACC Branch / M³ Solution Center

122/8, 122/9, Moo 6, Tambon Donhuaroh, Amphur Muangchonburi, Chonburi 20000, THAILAND

TEL:(66)2080 3565

Indonesia

PT. Mitutoyo Indonesia

Head Office / M³ Solution Center

Jalan Sriwijaya No.26 Desa cibatu Kec. Cikarang Selatan Kab. Bekasi 17530, INDONESIA

TEL: (62)21-2962 8600 FAX: (62)21-2962 8604

Batam Branch Office

Business Center Adhya Building 3rd Floor Kompleks Permata Niaga Blok A No. 1, Jalan jendral Sudirman Kelurahan Sukajadi, Kecamatan Batam Kota, Kepulauan Riau 29444, INDONESIA

TEL: (62)-778-4888000

Vietnam

Mitutoyo Vietnam Co., Ltd

Hanoi Head Office / M³ Solution Center

1st & 2nd floor, MHDI Building, No. 60 Hoang Quoc Viet Road, Nghia Do Ward, Cau Giay District, Hanoi, VIETNAM

TEL:(84)24-3768-8963 FAX:(84)24-3768-8960

Ho Chi Minh City Branch Office / M³ Solution Center

Unit No. B-00.07, Ground Floor, C1 Building, No. 6, Street D9, An Loi Dong Ward, Thu Duc City, Ho Chi Minh City, VIETNAM

TEL:(84)28-3840-3489 FAX:(84)28-3840-3498

Hai Phong City Branch Office

Room 511, 5th Floor, Thanh Dat 3 Building, No. 4 Le Thanh Tong Street, May To Ward, Ngo Quyen District, Hai Phong City, VIETNAM

TEL:(84)22-5398-9909

Philippines

Mitutoyo Philippines, Inc.

Head Office / M³ Solution Center

Unit 1B & 2B LTI, Administration Building 1, Annex 1, North Main Avenue, Laguna Technopark, Binan Laguna 4024, PHILIPPINES

TEL/FAX:(63) 49 544 0272

India

Mitutoyo South Asia Pvt. Ltd. Head Office

C-122, Okhla Industrial Area, Phase-I, New Delhi-110 020, INDIA

TEL: (91) 11-40578485/86

MSA Technical Center

Plot no. 65, Ground Floor, Udyog Vihar, Phase-4 Gurgaon, Haryana - 122016, INDIA

TEL : (91) 124–2340286/287

Mumbai Region Head office

303, Sentinel Hiranandani Business Park Powai,
Mumbai-400 076, INDIA
TEL: (91) 22-25700684/685/837/839

Pune Office / M³ Solution Center

G4/G5, Pride Kumar Senate, Off. Senapati Bapat
Road, Pune-411 016, INDIA
TEL:(91) 20-25660043/44/45

Ahmedabad Office / M³ Solution Center

A-104 & A-105, First Floor, Solitaire Corporate
Park, Near Divya Bhaskar Press, S.G. Road,
Ahmedabad - 380 015, INDIA
TEL: (91) 079 - 29704902/903

Bengaluru Region Head office / M³ Solution Center

116/117-2, Ground Floor, Sy. No. 93 & 94, 3rd
Phase, Peenya Industrial Area, Bengaluru-560
058, INDIA
TEL: (91) 80-25630946/47/48/49

Coimbatore Office

Regus, Srivari Srimath, 3rd Floor, Door No:1045,
Avinashi Road, Coimbatore - 641 018,INDIA
TEL: (91) 9345005663

Chennai Office / M³ Solution Center

No. 624, Anna Salai Teynampet, Chennai-600 018, INDIA
TEL: (91) 44-24328823/24/25

Kolkata Office

Unit No. 1208,Om Tower, 32,J.L.Nehru Road,
Kolkata-700 071, INDIA
TEL: (91) 33-22267088/40060635/22266817

Taiwan

Mitutoyo Taiwan Co., Ltd. / M³ Solution Center Taipei

4F., No.71, Zhouzi St., Neihu Dist.,Taipei City 114,
TAIWAN
TEL:886(2)5573-5900 FAX:886(2)8752-3267

Taichung Branch / M³ Solution Center Taichung

1F., No. 299, Gaotie 1st Rd., Wuri Dist., Taichung
City 414, TAIWAN
TEL:886(4)2338-6822 FAX:886(4)2338-6722

Kaohsiung Branch / M³ Solution Center Kaohsiung

1F., No.31-1, Haibian Rd., Lingya Dist.,
Kaohsiung City 802, TAIWAN
TEL:886(7)334-6168 FAX:886(7)334-6160

South Korea

Mitutoyo Korea Corporation
Head Office / M³ Solution Center

(Sanbon-Dong, Geumjeong High View Build.), 6F, 153-8,
Ls-Ro, Gunpo-Si, Gyeonggi-Do, 15808 KOREA
TEL:82(31)361-4200 FAX:82(31)361-4201

Busan Office / M³ Solution Center

(3150-3, Daejeo 2-dong) 8,Yutongdanji 1-ro
49beon-gil, Gangseo-gu, Busan, 46721 KOREA
TEL:82(51)324-0103 FAX:82(51)324-0104

Daegu Office / M³ Solution Center

(Galsan-dong, Daegu Business Center), 301-Ho, 217,
Seongseogongdan-ro, Dalseo-gu, Daegu 42704 KOREA
TEL:82(53)593-5602 FAX:82(53)593-5603

China

Mitutoyo Measuring Instruments (Shanghai) Co., Ltd.

8th Floor, Tower 1 Lujiazui Jinkong Square
No.1788/1800 Century Ave., Pudong New District, Shanghai 200122, CHINA
TEL:86(21)5836-0718 FAX:86(21)5836-0717

Suzhou Office / M³ Solution Center China (Suzhou)

1/2 Floor, Building 4, No.175 Songbei Road,
Suzhou Free Trade Zone, Suzhou City, Jiangsu
215000, CHINA
TEL:86(512)6522-1790 FAX:86(512)6251-3420

Wuhan Office / M³ Solution Corner

Room 1701, Wuhan Wanda Center, No. 96,
Linjiang Road, Wuchang District, Wuhan
Hubei 430060, CHINA
TEL:86(27)8544-8631 FAX:86(27)8544-6227

Chengdu Office

Room 1-102, 1st Floor, Unit 1, Building 1, No. 24,
Wannian Road (Wanniancang Cool), Chenghua
District, Chengdu City, Sichuan 610056, CHINA
TEL:86(28)8671-8936 FAX:86(28)8671-9086

Hangzhou Office

Room 804, Eastern International Business Center Building 1, No.600 Jinsha Road of

Hangzhou Economic and Technological
Development Zone, 310018, CHINA
TEL: 86(571)8288-0319 FAX: 86(571)8288-0320

Tianjin Office / M³ Solution Center China (Tianjin)

Room D 12/F, TEDA Building, No.256 Jie-fang
Nan Road Hexi District,Tianjin 300042, CHINA
TEL:86(22)5888-1700 FAX:86(22)5888-1701

Changchun Office

Room 815, 8F, Building A1, Upper East
International No.3000 Dongsheng Street,
Erdao District, Changchun, Jilin, 130031, CHINA
TEL:86(431)8192-6998 FAX:86(431)8192-6998

Chongqing Office

Room 1312, Building 3, Zhongyu Plaza, No.86,
Hongjin Avenue,Longxi Street, Yubei District,
Chongqing, 400000, CHINA
TEL:86(23)6595-9950 FAX:86(23)6595-9950

Qingdao Office

Room 638, 6F, No.192 Zhengyang Road, Chengyang District, Qingdao, Shandong, 266109, CHINA
TEL:86(532)8096-1936 FAX:86(532)8096-1937

Xi'an Office

Room 805, Xi'an International Trade Center, No. 196 Xiaozhai East Road, Xi'an, 710061, CHINA
TEL:86(29)8538-1380 FAX:86(29)8538-1381

Dalian Office / M³ Solution Center China (Dalian)

Room A-106 Shuijing SOHO, No.16 Harbin Road,Economic Development Zone,Dalian, 116600 CHINA
TEL:86(411)8718 1212 FAX:86(411)8754-7587

Zhengzhou Office

Room1801,18/F,Unit1,Building No.23, Shangwu Inner Ring Road, Zhengdong New District,Zhengzhou City, Henan 450018, CHINA
TEL:86(371)6097-6436 FAX:86(371)6097-6981

Dongguan Office / M³ Solution Center China (Dongguan)

Room 801, No 65, Chang'an Section Guanchang Road, Chang'an Town, Dongguan City, Guangdong 523841, CHINA
TEL:86(769)8541 7715 FAX:86(769)-8541 7745

Fuzhou Office

Unit 03, 7th floor of East Tower, Sansheng International Center, No.118 Wusi Road, Gulou Distrit, Fuzhou City, Fujian 350001, CHINA
TEL: 86 (591) 8761 8095
FAX: 86 (591) 8761 8096

Changsha Office

Room 2207, Building 1, Shiner International Plaza, No. 88, Kaiyuan Middle Road, Changsha City, Hunan 410100, CHINA
TEL: 86 (731) 8401 9276
FAX: 86 (731) 8401 9376

Changzhou Office

Room 1502, Joint Financial Tower, No.255, Tongjiang North Road, Tianning District, Changzhou City, Jiangsu 2130002, CHINA
TEL:86(519)8815 8319 FAX:86(519)8815 8319

Wenzhou Office

Room 512, Building 4, Xinjingdujiayuan, Sanyang Street, Ouhai District, Wenzhou City, Zhejiang 325014, CHINA
TEL:86(577)8641 5280

Shunde Office

Room 1603, Buliding 26, Vanke Golden Riverside Plaza Phase II, No.13 Mid DeSheng Road, ShunDe District, Foshan City, Guangdong 528300, CHINA
TEL/FAX: 86(757)2228 8621

Mitutoyo Measuring Technology (Suzhou) Co., Ltd.

1/2 Floor, Building 4, No.175 Songbei Road, Suzhou Free Trade Zone, Suzhou City, Jiangsu 215000, CHINA
TEL:86(512)6252-2660 FAX:86(512)6252-2580

USA

Mitutoyo America Corporation

965 Corporate Blvd., Aurora, IL 60502, U.S.A.
TEL:1-(630)820-9666 Toll Free No. 1-888-648-8869
FAX:1-(630)978-3501

Headquarters (Aurora) / M³ Solution Center

965 Corporate Blvd., Aurora, IL 60502, U.S.A.

Seattle (Renton) Office / M³ Solution Center

1000 SW 34th St. Suite G, Renton, WA 98057 U.S.A.
TEL:1-(888)-648-8869

Houston Office / M³ Solution Center

4560 Kendrick Plaza Drive Suite 120 Houston, TX 77032, U.S.A.
TEL:1-(888)-648-8869 FAX:1-(281)227-0937

Cincinnati (Mason) Office / M³ Solution Center

6220 Hi-Tek Ct., Mason, OH 45040, U.S.A.
TEL:1-(888)-648-8869 FAX:1-(513)754-0718

Detroit (Novi) Office / M³ Solution Center

46850 Magellan Drive, Suite 100 Novi, MI 48377, U.S.A.
TEL:1-(888)-648-8869 FAX: 1-(248)-926-0928

Los Angeles (City of Industry) Office / M³ Solution Center

16925 E. Gale Ave., City of Industry, CA 91745, U.S.A.
TEL:1-(888)-648-8869 FAX:1-(626)369-3352

Charlotte (Huntersville) Office / M³ Solution Center

11515 Vanstory Dr., Suite 140, Huntersville, NC 28078, U.S.A.
TEL:1-(888)-648-8869 FAX:1-(704)875-9273

Boston (Marlborough) Office / M³ Solution Center

753 Forest Street, Suite 110, Marlborough, MA 01752, U.S.A.
TEL:1-(888)648-8869 FAX:1-(508)485-0782

Mitutoyo America Corporation Calibration Lab

965 Corporate Blvd., Aurora, IL 60502, U.S.A.
TEL:1-(888)-648-8869 FAX:1-(630)978-6477

Mituotyo America Corporation CT-Lab Chicago

965 Corporate Blvd., Aurora, IL 60502, U.S.A.
TEL: 1-(888)-648-8869 FAX: 1-(630)-820-3418

Mitutoyo Research & Development America, Inc.

11533 NE 118th St., Kirkland,
WA 98034-7111, U.S.A.
TEL:1-(425)821-3906 FAX:1-(425)821-32280

Mitutoyo Research & Development America, Inc. - California Office

16925 Gale Ave. City of Industry,
CA 91745-1806 U.S.A.
TEL: 1-(425)821-3906 FAX: 1-(425)821-3228

Canada

Mitutoyo Canada Inc.

2121 Meadowvale Blvd., Mississauga,
Ont. L5N 5N1., CANADA
TEL:1-(905)821-1261 FAX:1-(905)821-4968

Montreal Office

7075 Place Robert-Joncas Suite 129, Montreal,
Quebec H4M 2Z2, CANADA
TEL:1-(514)337-5994 FAX:1-(514)337-4498

Brazil

Mitutoyo Sul Americana Ltda.
Head office / M³ Solution Center

Avenida Mimes nº 25 – Loteamento Multivias II,
Jardim Ermida I, CEP 13212-216 Jundiaí - SP,
BRASIL
TEL: 55 (11) 5643-0004/0041

Filial Curitiba / M³ Solution Center

Rua Sergipe, nº 101, Sala A, Bairro Boneca
do Iguaçu, São José dos Pinhais – Paraná –
BRASIL CEP 83040120
TEL: 55 (41) 3534-1728

Argentina

Mitutoyo Sul Americana Ltda.
Argentina Branch / M³ Solution Center

Av. B. Mitre 891/899 – C.P. (B1603CQI)
Vicente López –Pcia. Buenos Aires – ARGENTINA
TEL:54 (11) 4730-1433 FAX:54 (11) 4730-1411

Sucursal Cordoba / M³ Solution Center

Av. Ricchieri 2872 L.4 – Bº Jardin – CP X5014O-
PJ Cordoba, ARGENTINA
TEL:54 (351) 464-4125

Mexico

Mitutoyo Mexicana, S.A. de C.V.

Industria Elēctrica No.15, Parque Industrial, Nau-
calpan de Juārez, Estado de Mēxico C.P.53370,
MÉXICO
TEL: 52 (01-55) 5312-5612
FAX: 52 (01-55) 5312-3380

Monterrey Office / M³ Solution Center

Blv. Interamericana No. 103, Parque Industrial
FINSA, C.P. 66636 Apodaca, N.L., MÉXICO
TEL: 52(01-81) 8398-8227/8228/8242/8244
FAX: 52(01-81) 8398-8226

Tijuana Office / M³ Solution Center

Calle José María Velazco 10501-C, Col. Cd. Industrial
Nueva Tijuana, C.P. 22500 Tijuana, B.C., MÉXICO
TEL: 52 (01-664) 647-5024

Querétaro Office / M³ Solution Center

Av. Cerro Blanco No.500-1, Colonia Centro Sur,
Querétaro, Querétaro, C.P. 76090, MÉXICO
TEL: 52 (01-442) 340-8018, 340-8019 and 340-8020
FAX: 52 (01-442) 340-8017

Mitutoyo Mexicana, S.A. de C.V. Querétaro Calibration Laboratory

Av. Cerro Blanco 500 30 Centro Sur,
Querétaro, Querétaro, C.P. 76090, MÉXICO
TEL: 52 (01-442) 340-8018, 340-8019 and 340-8020
FAX: 52 (01-442) 340-8017

Aguascalientes Office / M³ Solution Center

Av. Aguascalientes No. 622, Local 15 Centro Comer-
cial El Cilindro Fracc. Pulgas Pandas Norte, C.P.
20138, Aguascalientes, Ags. MÉXICO
TEL: 52 (01-449) 174-4140 and 174-4143

Irapuato Office / M³ Solution Center

Boulevard a Villas de Irapuato No. 1460 L.1 Col. Ejido
Irapuato C.P. 36643
Irapuato, Gto., MÉXICO
TEL: 52 (01-462) 144-1200 and 144-1400

Revision Record

Date of publication	Revision status	Details of revision
August 1, 2021	First edition	Publication
December 1, 2021	Revised first edition	Changes in orthography and expressions
January 1, 2024	Revised second edition	Revision due to changes of the harmonized European standards, etc.