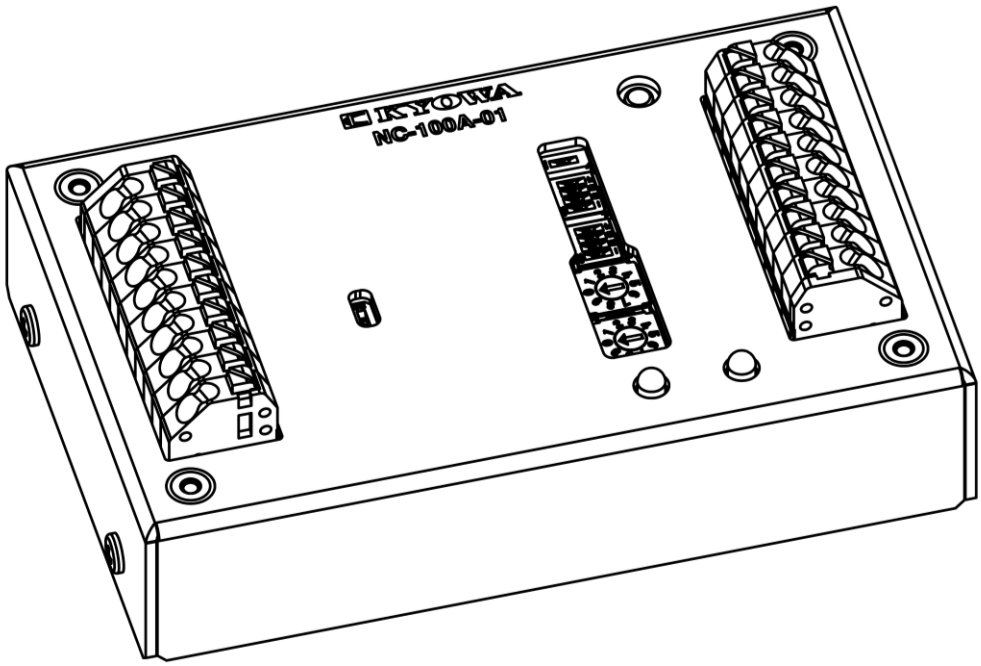
KYOWA

IM-A-1491B May 2026

INSTRUCTION MANUAL
NC-100A Series
DIGITAL CONVERSION UNIT

RS-485, with Control I/O：NC-100A-01

RS-485, with CAN：NC-100A-10



Business use only

Contents

INTRODUCTION (PLEASE READ BEFORE USE)

Instruction Manual

Thank you for purchasing this KYOWA product.
This instruction manual (hereinafter referred to as **This Manual**) describes functions, installation, wiring methods, and operating methods, so that the functions of the NC-100A series (hereinafter referred to as **This Device**) can be used appropriately.
To ensure safe and proper use of this product, be sure to read this manual thoroughly and understand its contents before use.
After reading, keep this manual in a safe place where it can be accessed readily.

Precautions for this document

- Use this device only as described in this document.
- Company names and trade names described in this document are trademarks or registered trademarks of their respective companies.
- This document may not be copied or reproduced, in whole or part, without the consent of KYOWA.
- This document is the work of Kyowa Electronic Instruments Co., Ltd. and is copyright © Kyowa Electronic Instruments Co., Ltd.
- For the latest information, please check the product page on the KYOWA website (https://product.kyowa-ei.com/en).
- Specifications and product appearances contained in this document are subject to change without prior notice.

Related Documents

The documents related to this device are listed below. Please refer to them according to your purpose.

Name	Content
NC-100A Series INSTRUCTION MANUAL （This Manual）	Details this device's functions, installation, wiring, operation methods, and specifications.
NC-100A Series READ BEFORE USING THE PRODUCT	Contains precautions for the safe and correct use of the NC-100A Series and lists its accessories.

Please download each document from the download page on our product homepage.
The link to our web page is as follows:

https://product.kyowa-ei.com/en/products/category/type-nc-100	

About The User

- This device should only be used by someone with experience in using electrical measuring equipment who has understood the contents of this manual and confirmed safety before using it.
- If this device is to be used by someone with no experience in using electrical measuring equipment, they must receive training from a person with experience in electrical measurements, or use it under the supervision of an experienced person who has understood the contents of this manual and confirmed safety before using it.
- If tasks are to be performed by non-native English speakers, the customer is responsible for providing education regarding worker safety and related tasks.

Safety Notations

This instruction manual makes use of certain notations to ensure that the product is used properly, prevent injury to people, and prevent physical damage. The meanings of the notations are described below.

About Precautions Noted in This Instruction Manual

This manual uses the following signal words to explain product precautions. Please be sure to read them.

⚠ **DANGER**	Indicates a situation where incorrect handling poses a high and imminent risk of death or serious injury to the user.
⚠ **WARNING**	Indicates a situation where incorrect handling could potentially result in death or serious injury to the user.
⚠ **CAUTION**	Indicates a situation where incorrect handling could potentially result in minor injury to the user.
NOTE	Indicates a situation where incorrect handling could potentially result in property damage.

About Symbols Noted in This Instruction Manual

In this Instruction manual, the following symbols are used in addition to the warnings **DANGER**, **WARNING**, **CAUTION**, and **NOTE** to make the warnings easier to understand.
The following symbols are mainly used in this Instruction manual.

Symbol	Content
	Indicates prohibited actions.
	Indicates content that requires caution and warnings.
	Indicates actions that must be strictly followed.

Notations Used in This Instruction Manual

Terms used in this manual

This manual uses the following notation for related products.

- The NC-100A series is collectively referred to as **This Device**.
- The Setting Software for NC-100A series is referred to as the **Setting Software**.

In addition, the following terms are defined in this document.

Term	Definition
Original value	The strain gage transducer output received by this device. The unit is mV/V. For example, if 5 N are applied to a load cell with a rated capacity of 10 N and a rated output of 1.0 mV/V, the original value input to this device would be 0.5 mV/V.
Rated capacity value	The setting value used for calibration of this device. The rated load set for the strain gage transducer.
No-load zero value	The setting value used for calibration of this device. This is the original value output by the strain gage transducer when no load is applied.
Rated output value	This is the setting value used to calibrate this device. It is the rated output of the strain gage transducer, calculated by subtracting the no-load zero value from the original value when the rated capacity is applied. For example, if the original value of the transducer at rated load is 1.1 mV/V and the no-load zero value of the transducer is 0.1 mV/V, the rated output value will be 1.0 mV/V.

About other symbols used

The following symbols are used in this manual.

Term	Definition
" "	Double quotation marks are used to indicate links in this document. Example: Refer to "Safety Notations" for information on notations.
< >	Angle brackets indicate control characters used for RS-485 communication. Control characters are represented by a single byte in binary. Example: GOD<CR>

Safety Precautions

Read the following precautions carefully in order to use this device safely.

Precautions Regarding the Surrounding Environment

DANGER	
Do not use this device in locations with flammable gases, flammable vapors, or flammable dust.	
	If this device is used in a flammable environment, it can cause fire or explosion.
Do not use this device on or near combustible materials.	
	If this device is used on or near combustible materials, it can cause a fire due to heat generation.
Do not use this device in a location with corrosive gases.	
	Performance degradation caused by corrosive gases can lead to damage and electric shock. Furthermore, if parts scatter as a result of this degradation, it can cause personal injury (death, injury).

WARNING	
Do not use this device in an environment where it may be splashed with water.	
	This device does not have waterproof or drip-proof functions. If liquid such as water enters this device, it may lead to malfunction or electrical leakage.

NOTE	
When using this device in an environment with rapid changes in ambient temperature and humidity, confirm that there is no condensation before use.	
	Rapid changes in ambient temperature and humidity, such as during transport, can cause condensation. If liquid enters the product, it can lead to performance degradation or malfunction. When using this device in such an environment, confirm that no condensation is present before turning on the power.
When using or storing this device near the sea, take measures to block the outside air.	
	Salt from seawater can cause performance degradation or malfunction. When using or storing near the sea, take measures to block the outside air.

NOTE	
Do not use this device under loads (such as vibration, shock, and centrifugal acceleration) that are outside its specified range.	
	Continuous loads (such as vibration, shock, and centrifugal acceleration) outside the specified range can cause performance degradation or malfunction. Please be particularly cautious when using this device in environments with significant loads. Additionally, when using in an environment with loads, please secure both the housing and the connecting cables.
Do not install or use this device near a welding machine.	
	This can cause this device to operate outside its temperature range, leading to output abnormalities, malfunction, or failure.
Do not use under high or low-pressure environments.	
	This device is designed for use under standard atmospheric pressure. Use outside of standard atmospheric pressure can cause malfunction, performance degradation, or failure. Please use at an altitude of 2000 m or less.
Do not use or store in environments exposed to dust or powder.	
	If dust or powder enters the interior of this device, it may lead to performance degradation or malfunction. If using or storing this device in an environment exposed to dust or powder, take measures to prevent the operating parts from being exposed.

Precautions Regarding Device Handling

⚠WARNING	
Make sure to frame ground this device.	
	Failure to frame ground the GND terminal of this device may result in electric shock, reduced performance, or malfunction. When grounding this device, please read "5 WIRING TO THIS DEVICE" before proceeding.
If abnormalities (such as smoke, strange odors, or unusual sounds) occur, turn off this device's power.	
	Continuing to use this device in an abnormal state can lead to electric shock, fire, performance degradation, or malfunction. After turning off the power due to an abnormality, disconnect all cables connected to this device and discontinue use.

⚠WARNING

When wiring this device, be sure to avoid short circuits and incorrect wiring.

Short-circuiting or incorrect wiring of this device's terminals may result in fire or malfunction. When wiring this device, please read "5 WIRING TO THIS DEVICE."

Do not use this device outside the input power voltage range specified in the product specifications.

Operating this device with a power supply voltage outside the product specification range may result in electric shock, fire, or failure. Before connecting the power supply, be sure to check that the voltage is within the specified range for this device.
In addition, power supply voltages outside the specified range due to momentary power interruptions or noise may result in performance degradation, malfunction, or failure.

Do not disassemble or modify this device.

Disassembling or modifying may cause an electric shock, fire, or failure. It will also void the warranty of this device. If this product requires repair, contact our sales office, the nearest distributor, or our website.

NOTE

When connecting this device to an external system, be sure to thoroughly verify the operation of the system before use.

If an output abnormality occurs in this device, it may cause the external system to behave unexpectedly, leading to accidents or malfunctions of peripheral devices, etc. Please thoroughly verify the operation of the system before use to prevent unexpected system behavior due to a malfunction of this device.

Before touching this device, touch a metal object to discharge static electricity.

Static electricity may cause a malfunction of this device and its peripheral equipment.

If this device gets dirty, clean it with a soft, dry cloth.

Cleaning this device with a wet cloth, benzene, thinner, alcohol, etc. may cause discoloration or deformation of this device, which may lead to malfunction.

Precautions Regarding Installation

⚠ WARNING	
If this device is installed in a high place, take measures to prevent it from falling.	
	If this device or its attached parts fall, it may result in personal injury (death or injury), or malfunction or damage to this device or sensor. If installing this device in a high place, take measures to prevent it from falling. Also, check below the installation location and install it in a safe place.
If operating this device for a long period, periodically check the mounting condition and replace the bolts.	
	During long-term operation, screws may loosen and deteriorate due to aging. This can cause this device to become detached and scatter, leading to personal injury (death, injury), or the damage and destruction of equipment and sensors. If you plan to use this device for a long period of time, be sure to periodically check for loose screws and replace them.
Do not install this device under conditions other than those specified.	
	If installed under non-specified conditions, this device may become detached and scatter, which can lead to personal injury (death, injury), or the damage and destruction of equipment and sensors, especially in environments with strong loads (vibration, shock, centrifugal acceleration, etc.).

NOTE	
Before installing, operating, or removing this device from an external system, be sure to check the following:	
	Incorrect mounting of this device may cause it to fall due to external system operations (such as vibration or shock), resulting in failure or damage to the equipment or sensors. For safety, ensure the following during installation, operation, and removal of this device: Turn off the power of all related equipment, including the installation target, before installing, removing, or repairing this device. Before starting the external system, after replacing parts, after a malfunction, or after a long period of inactivity, verify that this device, strain gages, and associated wiring will not detach due to system operation (such as vibration or shock).

Usage Precautions

To Ensure Proper Usage

This device was designed according to the information in "15 PRODUCT SPECIFICATION." Do not use this device in environments or for purposes outside of specifications.

It is recommended to periodically maintain and calibrate this device to ensure proper use. For details, refer to “Maintenance Inspections.”

Precautions Regarding the Surrounding Environment

- This device is designed to operate within the following temperature and humidity ranges. Please use this device within the following temperature and humidity ranges.

Model	Operating temperature	Operating humidity
NC-100A-01	-20 to 60 ºC	20 to 80 % (non-condensing)
NC-100A-10	-20 to 60 ºC	20 to 80 % (non-condensing)

- Use this device indoors. This device is designed to be used normally and safely indoors.

Precautions Regarding Device Handling

- This device is designed to operate with the following power supply voltage. Please observe the following power supply voltage input range when using this device.

Model	Power supply
NC-100A-01	10 to 30 VDC, 3 W or less (24 VDC, 350 Ω load)
NC-100A-10	10 to 30 VDC, 3 W or less (24 VDC, 350 Ω load)

Symbols On This Device

The following symbols are printed on the top of the power supply and control terminal block on this device. For details, see "2 NAMES OF PARTS.”

Symbol	Content
	This symbol indicates caution when handling. When this symbol is displayed, be sure to refer to the relevant section in this manual before use.
	This symbol indicates direct current (DC).

Maintenance Inspections

Limited-Life Parts

Limited-life parts will deteriorate or become worn depending on factors such as the frequency of use, passage of time, and usage environment (temperature, humidity, etc.). This could cause reduced performance, malfunction, or failure.
For the replacement of limited-life parts, please contact our sales office, your nearest distributor, or our website.

・Replacement of limited-life parts

Item	Service life
Replacement of aluminum electrolytic capacitors	The service life of an aluminum electrolytic capacitor is approximately 10 years, depending on frequency of use and operating temperature. We will collect this device for replacement.
Replacement of spring terminal block	The service life of a spring terminal block depends on the frequency of use and the operating temperature, but can withstand up to 1,000 insertions and removals of each wiring at one location. We will collect this device for replacement.

Maintenance Inspections

We recommend that you perform regular maintenance and inspections of this device.
To ensure stable long-term use of this device, regular maintenance inspections and part replacement are necessary. For information on replacing limited-life parts or calibrating the system, please contact our sales office, nearest distributor, or visit our website.

• System calibration

Item	Inspection frequency
Operation confirmation and calibration	Periodic inspections are recommended once per year to ensure the operation of this device. Devices will be collected by KYOWA for periodic inspection.

Replacement of This Device

Periodic maintenance and part replacement are effective for maintaining the performance of this device and ensuring stable operation. However, the number of replaceable parts is limited, and these measures cannot prevent the overall deterioration of this device caused by aging over long periods of use. The rate of deterioration varies depending on the operating environment and frequency of use.
If any of the following conditions are observed, it indicates that this device is deteriorating due to aging. For safety reasons, we strongly recommend considering replacement of this device.

- The frequency of failures or repairs has increased compared to the past.
- The performance of this device has noticeably declined.
- Abnormal noise or vibration occurs during operation.

Calibration of This Device

If performing actual load calibration, first check the rated output value and rated capacity value. If performing sensitivity registering calibration yourself, refer to the data sheet of the strain gage transducer and input the rated output value and rated capacity value indicated in the data sheet. Refer to "9 CALIBRATION" for information on how to perform calibration.

Software Update of This Device

Devices can be updated using the update software available on the KYOWA website.
Refer to the "Update Software INSTRUCTION MANUAL" included with the update software for details.

Initializing This Device

Settings of this device can be reverted to the factory settings by sending the initialization command using an RS-485 command. This will initialize all settings other than calibration values.
The items that will be initialized and their initial values are listed below.
Be sure to refer to "11-8-2 Measurement Condition Setting Initialization" before performing initialization.

Item	Initial values	
Hold mode settings	Hold mode	: 00 (Normal)
	Output mode	: 0 (Always output)
	Comparison mode	: 0 (Always compare)
	Delay time	: 0.00 (s)
	Detection time	: 0.01 (s)
Smoothing settings	Moving average	: 1200 (times)
	Minimum scale	: 0 (Minimum scale 1)
	IIR low-pass filter	: 0 (No filter)
Additional value	+000000	
Level test	Setting	: 0 (OFF)
	Addition setting	: 0 (OFF)
	Level test value	: +000000
Hysteresis settings	ON hysteresis	: 000000
	OFF hysteresis	: 000000
Comparator settings	Comparator 0	: 0 (High limit), +099999
	Comparator 1	: 0 (High limit), +099999
	Comparator 2	: 0 (High limit), +099999
	Comparator 3	: 0 (High limit), +099999
Automatic zero compensation settings	Zero compensation range	: 000000
	Judging time	: 0.00 (s)
Tare zero settings	Apply zero value	: 0 (OFF)
	Zero value	: +000000
Digital zero settings	Apply zero value	: 0 (OFF)
	Zero value	: +000000
User string setting	ABCDEFGH	
Control I/O settings (NC-100A-01 function)	Control input setting	: 0 (No function)
	Control output setting	: 0 (Always OFF)
CAN communication settings (NC-100A-10 function)	CAN standard ID	: 0x7FF
	CAN extended ID	: 0x1FFFFFFF
	CAN baud rate	: 12 (1000 kbps)
	CAN output interval	: 10 (1000 ms)
	CANID mode	: 0 (Standard format)

• The rated output, rated capacity, and no-load zero value will not be initialized.

Contact Information for Emergencies or Abnormalities

In the unlikely event that an abnormality occurs in this device, please contact the sales office where you purchased the product, your nearest distributor, or our website.

Please visit the following URL:

https://www.kyowa-ei.com/en/corporate/location-information	

1.PRODUCT OUTLINE

1-1.Product Outline

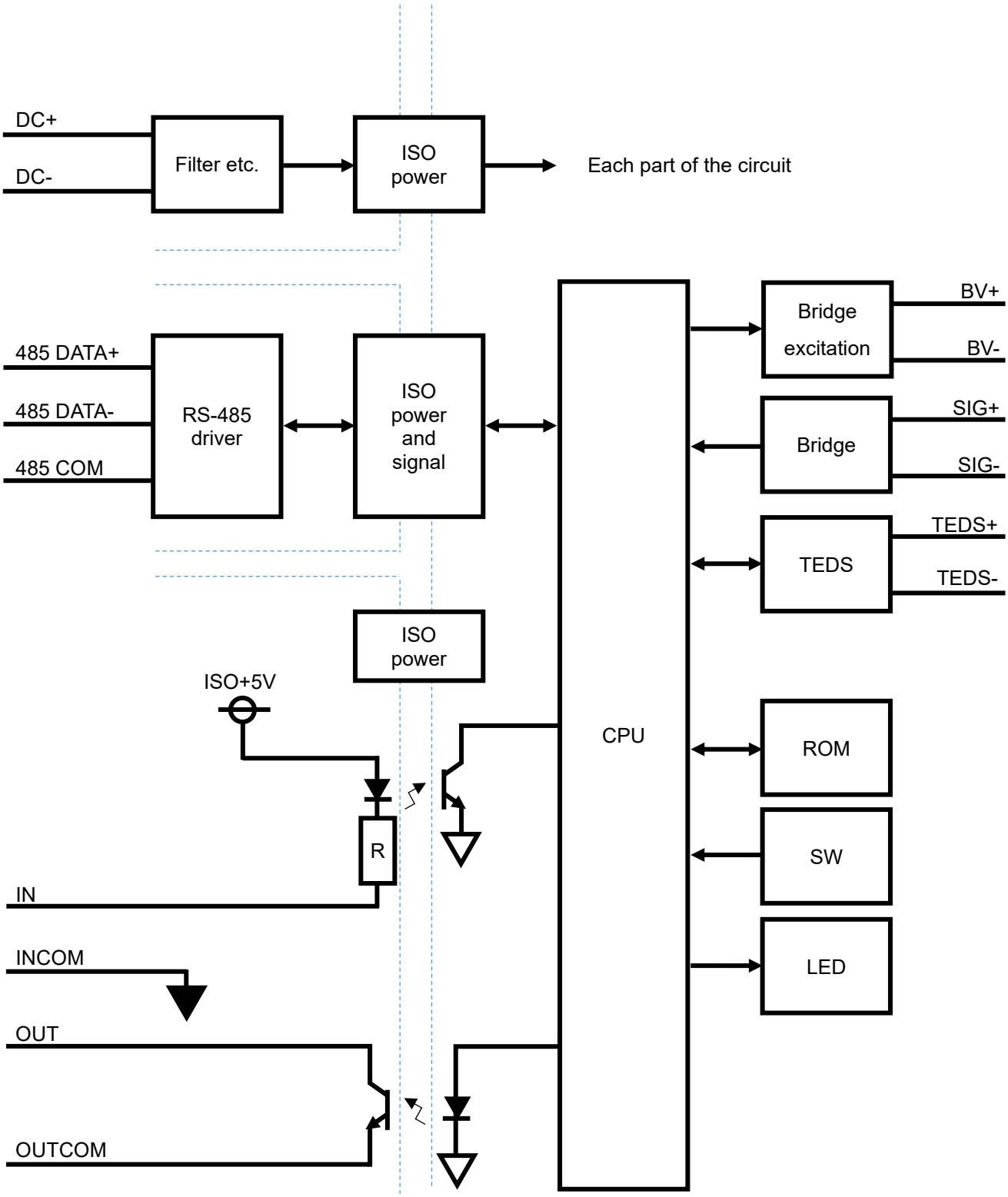
This device is a measuring instrument that converts the analog output from a strain gage transducer into digital signals.
By placing this device near a transducer, the effect of exogenous noise interfering with analog signals can be reduced, while allowing the output data from the transducer to be acquired in a remote location.

NC-100A-01 features an RS-485 communication port and control I/O ports.
NC-100A-10 features an RS-485 communication port and a CAN data output port.

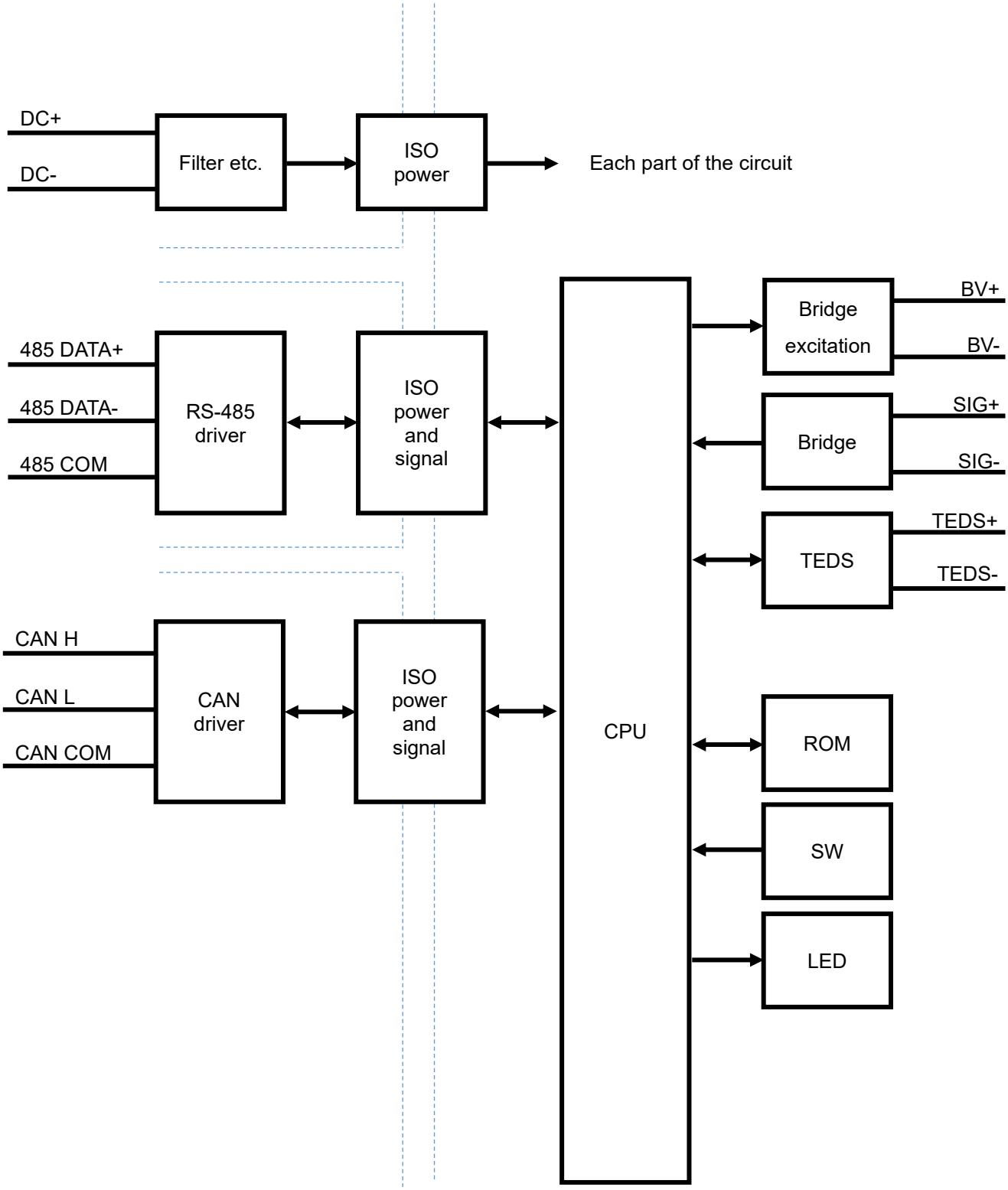
The RS-485 communication port allows you to set measurement conditions such as filters and perform calibration.
The control input port allows you to control functions such as hold and digital zero execution.
The control output port outputs information such as the status of this device and comparison results with threshold values.
Measurement data is output from the CAN data output port.

1-2.Block Diagrams

1-2-1.NC-100A-01



1-2-2.NC-100A-10



1-3.Included in Package

NC-100A-01/NC-100A-10 is packaged with the following standard accessories.
After opening the package, confirm that all standard accessories are present.

Name	Quantity
· **READ BEFORE USING THE PRODUCT**	1
· **Product warranty**	1
· **Device cover**	1
· **Cover fixation screws**	4
· **Rubber feet**	4

1-4.Dedicated Software

The following can be downloaded free of charge from the KYOWA website.

· SETTING SOFTWARE for NC-100A Series

The link to the KYOWA website is as follows:

https://product.kyowa-ei.com/en/products/category/type-nc-100	

When using SETTING SOFTWARE for NC-100A Series, be sure to read the "SETTING SOFTWARE for NC-100A Series INSTRUCTION MANUAL" before use.

1-5.Tools Required for Installation

· Flathead screwdriver (tip width 1.2 mm to 3.0 mm)

Use to press the buttons on the terminal block when connecting wires.

· Phillips screwdriver (for M3 screws)

Use when securing this device using the utility nuts.

1-6.Procedure Prior to Measurement

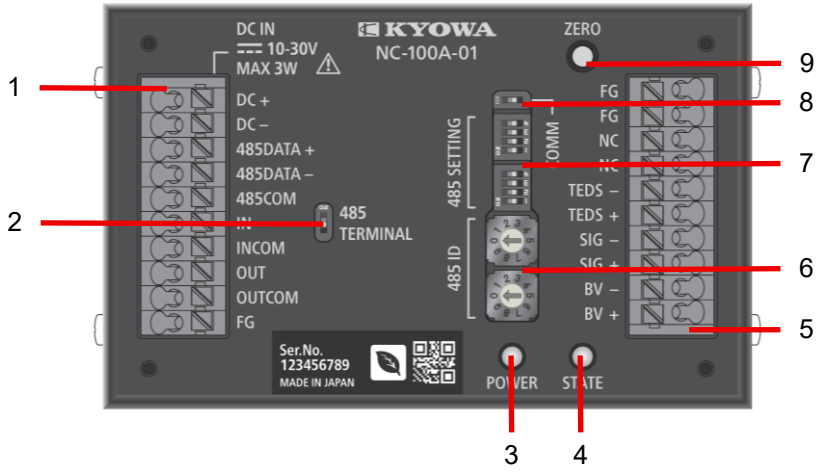
Follow the procedure below.

1. Perform "4 INSTALLATION OF THIS DEVICE.“
2. Perform “5 WIRING TO THIS DEVICE.”
3. Perform "6 SETTING OF MAIN UNIT SWITCHES."
4. Perform "7 TURNING THE POWER SUPPLY OF THIS DEVICE ON."
5. Perform "8 SETTING OF MEASUREMENT CONDITIONS."
6. Perform "9 CALIBRATION."
7. Perform "10 DATA ACQUISITION."

Refer to "13 FUNCTIONS" for details on commands and the control ports.

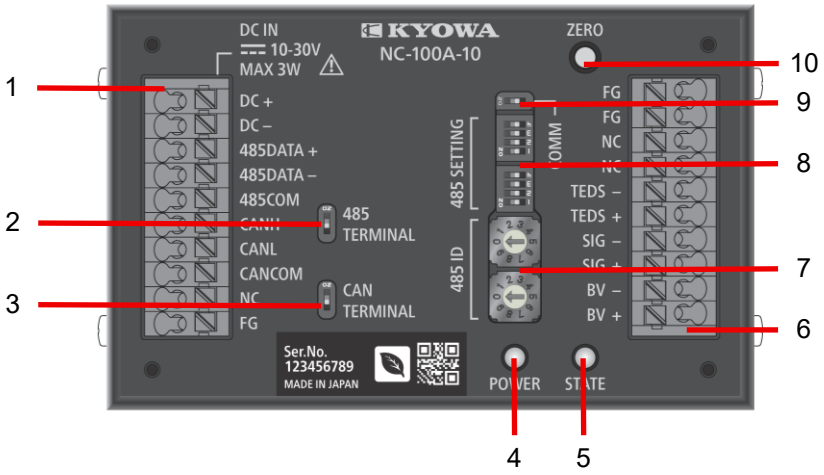
2.NAMES OF PARTS

2-1.NC-100A-01 Control Section



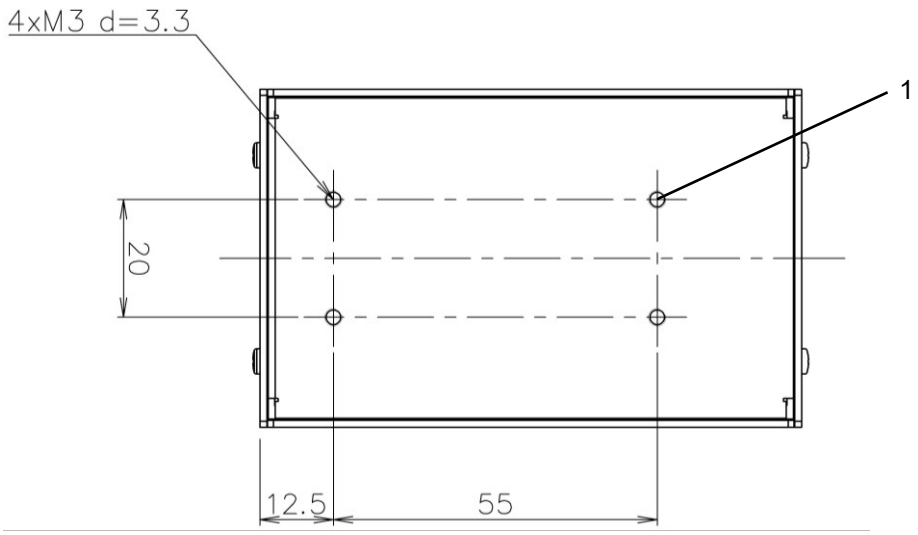
No.	Name	Description
1	Power supply and control terminal block (Left terminal block)	The terminal block for the power supply, RS-485 communication, control I/O signals, and frame grounding. Refer to "5 WIRING TO THIS DEVICE" for details.
2	RS-485 terminator ON/OFF switch	When turned ON, the terminator is inserted into the RS-485 signal line. Refer to "6-3 Terminator ON/OFF Switch" for details.
3	POWER LED	An LED used to indicate the power status. Refer to "3 LEDS" for details.
4	STATUS LED	An LED used to indicate the status of this device. Refer to "3 LEDS" for details.
5	Strain gage transducer terminal block (Right terminal block)	The terminal block used for wiring strain gage transducers. Refer to "5 WIRING TO THIS DEVICE" for details.
6	RS-485 ID setting switches	Used to set the RS-485 device ID. Refer to "6-1 Setting of RS-485 Communication Setting Switches" for details.
7	RS-485 Communication setting switches	Used to configure RS-485 communication settings. Refer to "6-1 Setting of RS-485 Communication Setting Switches" for details.
8	Communication ON/OFF switch	Turns RS-485 communication ON/OFF. Refer to "6-2 Setting of Communication ON/OFF Switch" for details.
9	Digital zero button	Press to perform digital zero. Refer to "6-4 Digital Zero Button" for details.

2-2.NC-100A-10 Control Section



No.	Name	Description
1	Power supply and control terminal block (Left terminal block)	The terminal block for the power supply, RS-485 communication, control I/O signals, and frame grounding. Refer to "5 WIRING TO THIS DEVICE" for details.
2	RS-485 terminator ON/OFF switch	When turned ON, the terminator is inserted into the RS-485 signal line. Refer to "6-3 Terminator ON/OFF Switch" for details.
3	CAN terminator ON/OFF switch	When turned ON, the terminator is inserted into the CAN signal line. Refer to "6-3 Terminator ON/OFF Switch" for details.
4	POWER LED	An LED used to indicate the power status. Refer to "3 LEDS" for details.
5	STATUS LED	An LED used to indicate the status of this device. Refer to "3 LEDS" for details.
6	Strain gage transducer terminal block (Right terminal block)	The terminal block used for wiring strain gage transducers. Refer to "5 WIRING TO THIS DEVICE" for details.
7	RS-485 ID setting switches	Used to set the RS-485 device ID. Refer to "6-1 Setting of RS-485 Communication Setting Switches" for details.
8	RS-485 Communication setting switches	Used to configure RS-485 communication settings. Refer to "6-1 Setting of RS-485 Communication Setting Switches" for details.
9	Communication ON/OFF switch	Turns RS-485 and CAN communication ON/OFF. Refer to "6-2 Setting of Communication ON/OFF Switch" for details.
10	Digital zero button	Press to perform digital zero. Refer to "6-4 Digital Zero Button" for details.

2-3.Back



No.	Name	Description
1	Utility nuts	Utility nuts used to secure this device. Refer to "4 INSTALLATION OF THIS DEVICE" for details.

3.LEDS

The LEDs on this device light up under the conditions described below.

Name	Description	POWER LED	STATUS LED
Initializing	Power supply ON status	**Lit up in red**	**Lit up in red**
Saving settings	Saving settings to this device	**Lit up in red**	**Lit up in red**
Normal	Performing communication/AD normally	**Lit up in green**	**Flashes green**
Hold	Transitioning to the "hold interval" due to the hold function	**Lit up in green**	**Lit up in green**
Overflow	An input overflow or measurement data overflow has occurred	**Lit up in green**	**Flashes red**
Communication OFF	RS-485 or CAN (NC-100A-10 function) communication not possible Refer to "6-2 Setting of Communication ON/OFF Switch" for details.	**Lit up in green**	**Lit up in red**
Updating	The dedicated update software is being used to update this device	**Lit up in orange**	**Lit up in orange**

4.INSTALLATION OF THIS DEVICE

4-1.Outline

NOTE
If using the utility nuts to install, remove the rubber feet from this device.
Leaving the rubber feet between this device and a mounting board could prevent this device from being sufficiently secured, which may result in failure of this device.

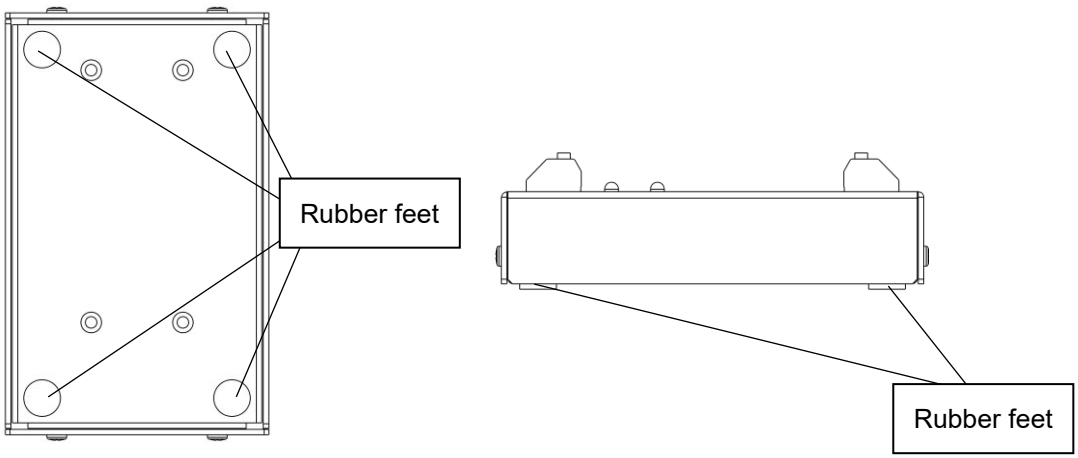
There are two installation methods for this device.

- Installation using the rubber feet
- Installation using the utility nuts

4-2.Installation Using the Rubber Feet

⚠WARNING
When installing this device, ensure that the power supplies of this device and any connected devices are turned OFF before working.
Failure to do so may result in electric shock or failure of this device.

Rubber feet are included with this device as standard accessories.
This device can be installed by attaching the standard accessory rubber feet to its underside.
Shown below is one example.



4-3.Installation Using the Utility Nuts

⚠WARNING

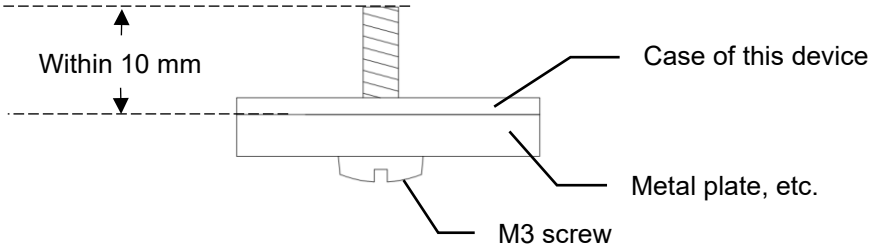
When installing this device, ensure that the power supplies of this device and any connected devices are turned OFF before working.

Failure to do so may result in electric shock or failure of this device.

NOTE

When installing this device, use screws of a length within 10 mm from the mounted surface to the end of the screw.

Using screws of a length different from that shown below could cause a failure due to damage to the electrical parts of this device.



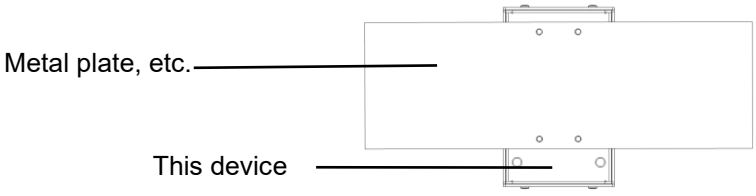
When installing this device, use M3 screws and a tightening torque of 0.7 N·m to secure it.

Confirm the screw precautions before working. Failure to do so could cause damage to the screws or this device.

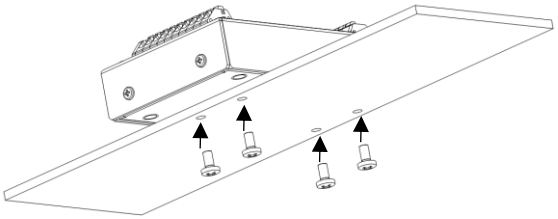
This device can be secured using the utility nuts on its back.
Refer to "16 OUTLINE DRAWINGS" for the dimensions of the utility nuts.

・ Procedure

1. Lay the mounting board over this device.



2. Secure this device using M3 screws.

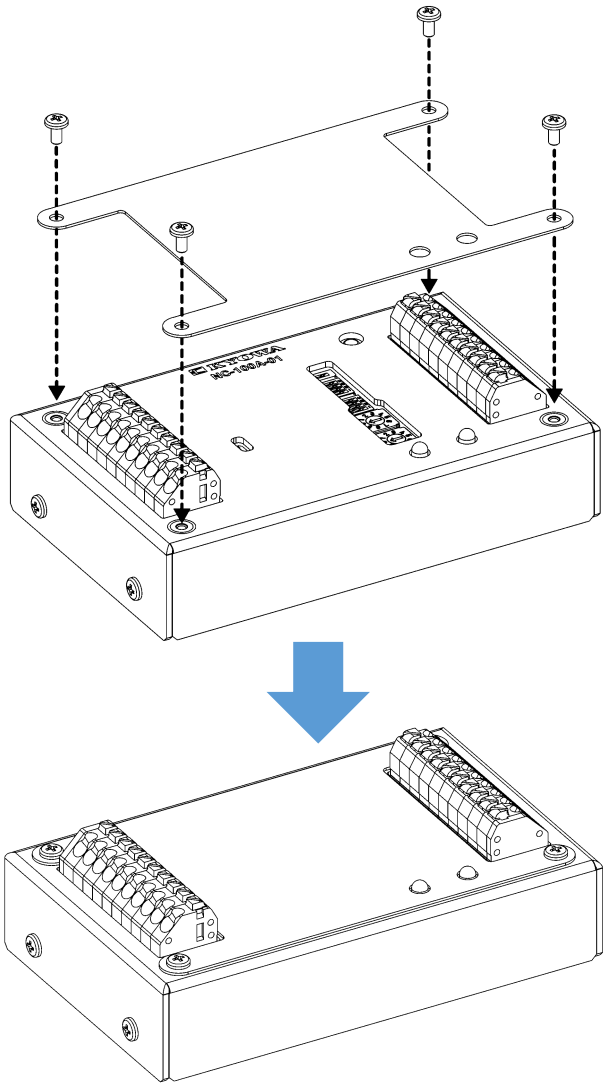


4-4.Installation of the Device Cover

⚠WARNING
When performing the work described in this section, ensure that the power supplies of any connected devices are turned OFF before working.
Failure to do so may result in electric shock or failure of this device.

The supplied device cover can be attached to this device using the cover fixing screws to protect the various switches.

Install the device cover as shown in the figure below.

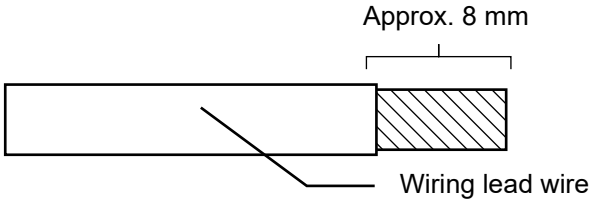


5.WIRING TO THIS DEVICE

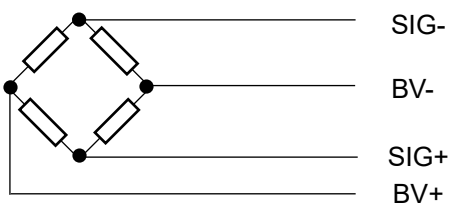
5-1.Strain Gage Transducer Wiring

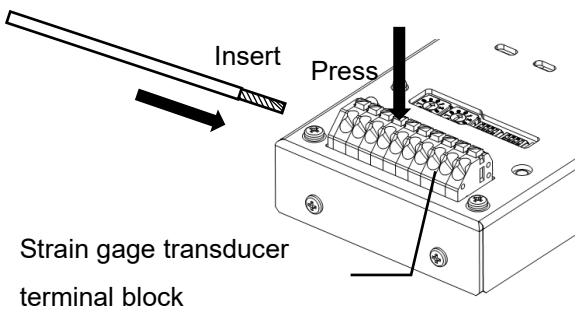
⚠WARNING	
Never insert two or more wires into a single terminal hole.	
	Failure to do so may result in heat generation, fire, or failure caused by poor contact. When branching the wiring, be sure to use an intermediate connector or similar device before connecting to the terminal block.
When performing the work described in this section, ensure that the power supplies of any connected devices are turned OFF before working.	
	Failure to do so may result in electric shock or failure of this device.
Follow the instructions in this section to wire a strain gage transducer to this device.	
	Failure to do so may result in electric shock or failure of this device.

1. Prepare the strain gage transducer
   Strip the covering of the wiring lead wire so that approximately 8 mm of the conductive section is exposed.
   Ensure that the diameter of the conductive section is from 20 to 14 AWG (0.518 to 2.08 mm2).



2. Wire
   Use a flathead screwdriver to press the button part of the power supply and control terminal block on this device down to open the insertion hole, and then insert the electric wire into the insertion hole. The names of signal wires connected to the strain gage transducer are shown below.
   After inserting, lift the flathead screwdriver from the button.





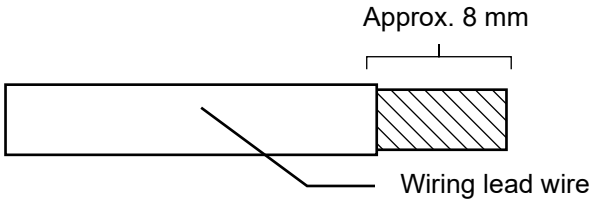
Wire to the corresponding terminal names shown below.

Name	Description
BV+	Connect to excitation voltage (+) on the strain gage transducer. If using a KYOWA sensor, the wiring color is red.
BV-	Connect to excitation voltage (-) on the strain gage transducer. If using a KYOWA sensor, the wiring color is black.
SIG+	Connect to output voltage (+) on the strain gage transducer. If using a KYOWA sensor, the wiring color is green.
SIG-	Connect to output voltage (-) on the strain gage transducer. If using a KYOWA sensor, the wiring color is white.
TEDS+	Connect to TEDS signal (+). If using a KYOWA sensor, the wiring color is yellow.
TEDS-	Connect to TEDS signal (-). If using a KYOWA sensor, the wiring color is blue.
NC	Not connected. Do not connect to anything.
FG	Frame ground. Connected to the housing. Connect the strain gage transducer cable shield, etc.

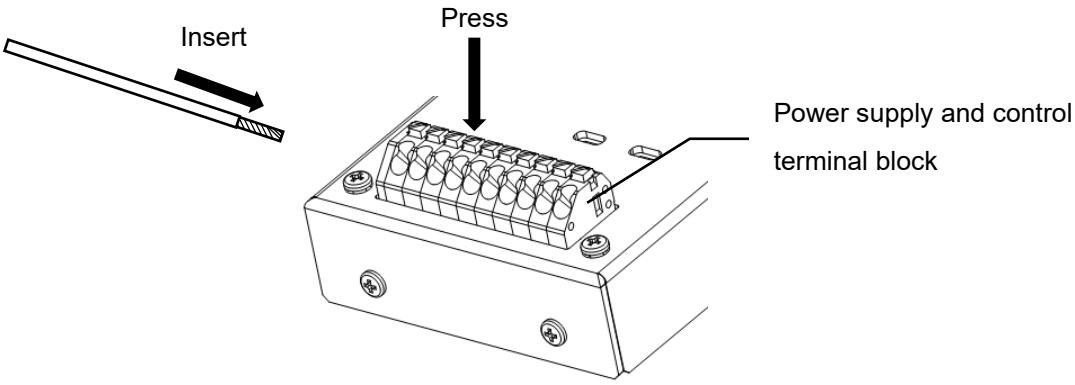
5-2.RS-485 Wiring

⚠WARNING	
Never insert two or more wires into a single terminal hole.	
	Failure to do so may result in heat generation, fire, or failure caused by poor contact. When branching the wiring, be sure to use an intermediate connector or similar device before connecting to the terminal block.
When performing the work described in this section, ensure that the power supplies of any connected devices are turned OFF before working.	
	Failure to do so may result in electric shock or failure of this device.
Follow the instructions in this section for RS-485 wiring.	
	Failure to do so may result in electric shock or failure of this device.

1. Prepare the cable
   Strip the covering of the wiring lead wire from the cable so that approximately 8 mm of the conductive section is exposed.
   Ensure that the diameter of the conductive section is from 20 to 14 AWG (0.518 to 2.08 mm2).



2. Wire
   Use a flathead screwdriver to press the button part of the power supply and control terminal block on this device down to open the insertion hole, and then insert the electric wire into the insertion hole.
   After inserting the electric wire, lift the flathead screwdriver from the button.



Wire to the corresponding terminal names shown below.

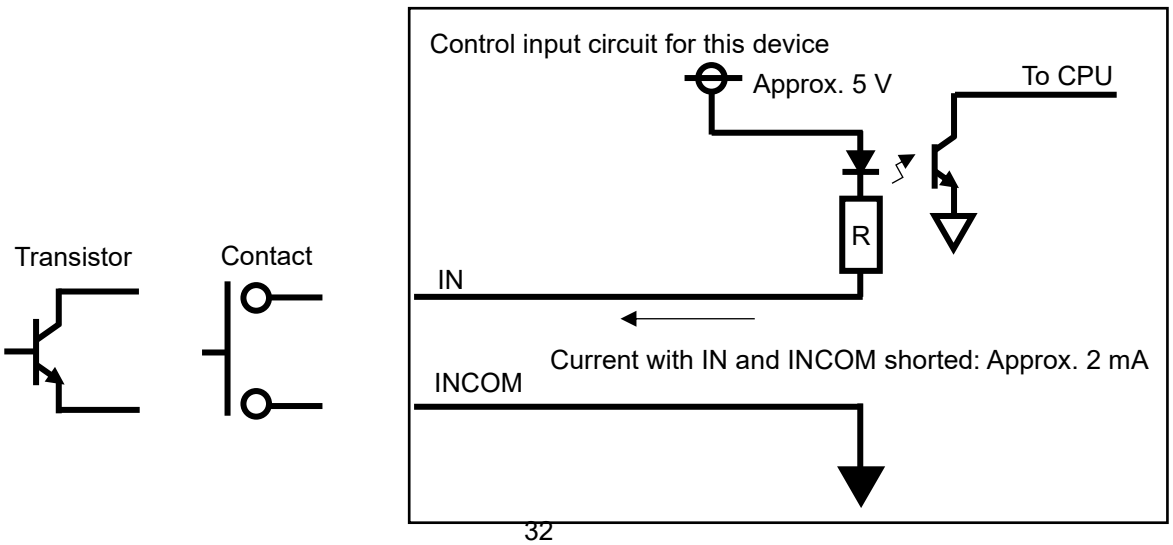
Name	Description
485DATA+	Connect the RS-485 non-inverted signal. The non-inverted signal is the H signal where the signal is idle.
485DATA-	Connect the RS-485 inverted signal. The inverted signal is the L signal where the signal is idle.
485COM	Connect the RS-485 signal ground.

5-3.Control Input Wiring (NC-100A-01 Function)

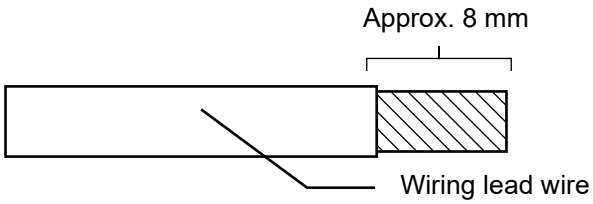
⚠WARNING
Never insert two or more wires into a single terminal hole.
Failure to do so may result in heat generation, fire, or failure caused by poor contact. When branching the wiring, be sure to use an intermediate connector or similar device before connecting to the terminal block.
When performing the work described in this section, ensure that the power supplies of any connected devices are turned OFF before working.
Failure to do so may result in electric shock or failure of this device.
Follow the instructions in this section for control input wiring.
Failure to do so may result in electric shock or failure of this device.
When connecting a contact or transistor to the control input terminal of this device, use a part with sufficient rated capacity, taking into consideration the voltage and current that will be applied when turned ON and OFF.
Using a part with a low rated capacity could cause a failure in the part or this device. Example: Rated voltage of 15 V or more, rated current of 10 mA or more, leakage current of 100 μA or less. A transistor or contact protection circuit must be installed separately, in accordance with the connected device and environment.

NOTE
Do not apply voltage inside this device from an external source.
Doing so could cause failure or failure of the electronic component or other parts of this device.

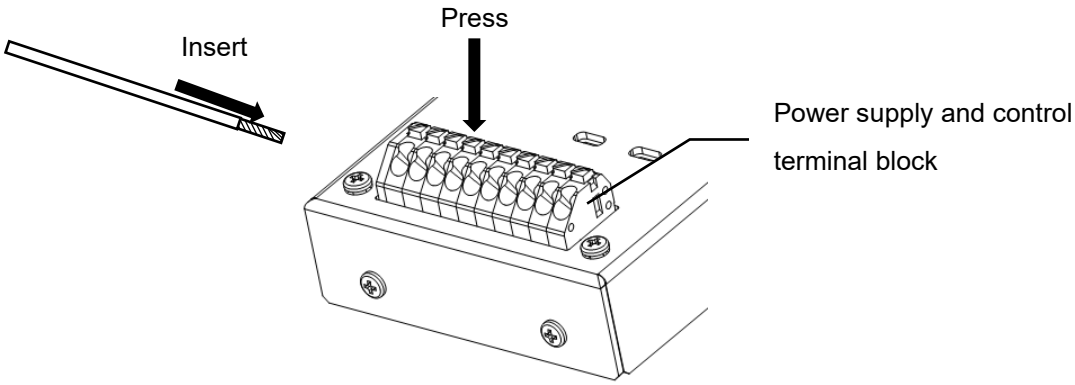
If connecting a part such as a contact or open collector, refer to the following diagram.
Shorting the IN terminal and INCOM terminal will cause an approximately 2 mA current to flow between the terminals, and the control signal will turn ON.



1. Prepare the cable
   Strip the covering of the wiring lead wire from the cable so that approximately 8 mm of the conductive section is exposed.
   Ensure that the diameter of the conductive section is from 20 to 14 AWG (0.518 to 2.08 mm2).



2. Wire
   Use a flathead screwdriver to press the button part of the power supply and control terminal block on this device down to open the insertion hole, and then insert the electric wire into the insertion hole.
   After inserting the electric wire, lift the flathead screwdriver from the button.



Wire to the corresponding terminal names shown below.

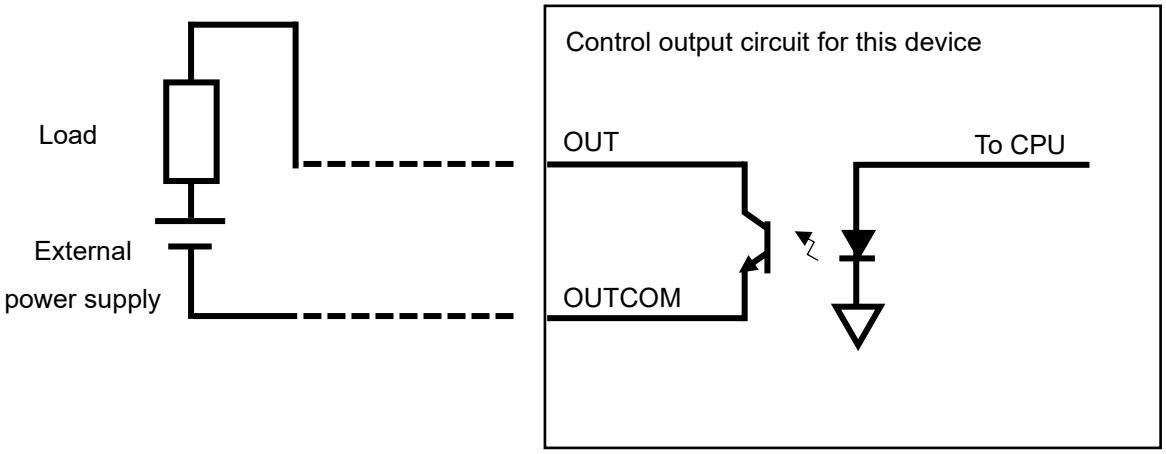
Name	Description
IN	The signal source of the control input terminal. Connect a collector if connecting an NPN transistor.
INCOM	The signal COM of the control input terminal. Connect an emitter if connecting an NPN transistor.

5-4.Control Output Wiring (NC-100A-01 Function)

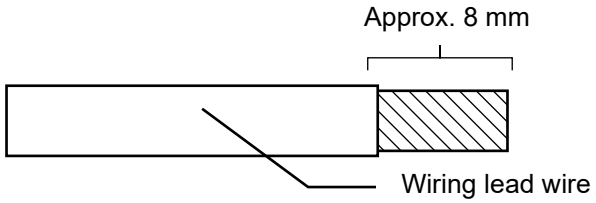
⚠WARNING	
Never insert two or more wires into a single terminal hole.	
	Failure to do so may result in heat generation, fire, or failure caused by poor contact. When branching the wiring, be sure to use an intermediate connector or similar device before connecting to the terminal block.
When performing the work described in this section, ensure that the power supplies of any connected devices are turned OFF before working.	
	Failure to do so may result in electric shock or failure of this device.
Follow the instructions in this section for control output wiring.	
	Failure to do so may result in electric shock or failure of this device.

NOTE	
The rating of the photocoupler used in the control output circuit is DC 30 Vmax, 20 mA.	
	Do not exceed this rating when connecting and operating an external power supply voltage or load to the control output of this device. Exceeding the rating of the photocoupler may result in failure of this device.
A protection circuit for the external load must be installed separately, in accordance with the connected device and environment.	
	Failure to install the appropriate protection circuit for the external load of this device may result in failure of this device.

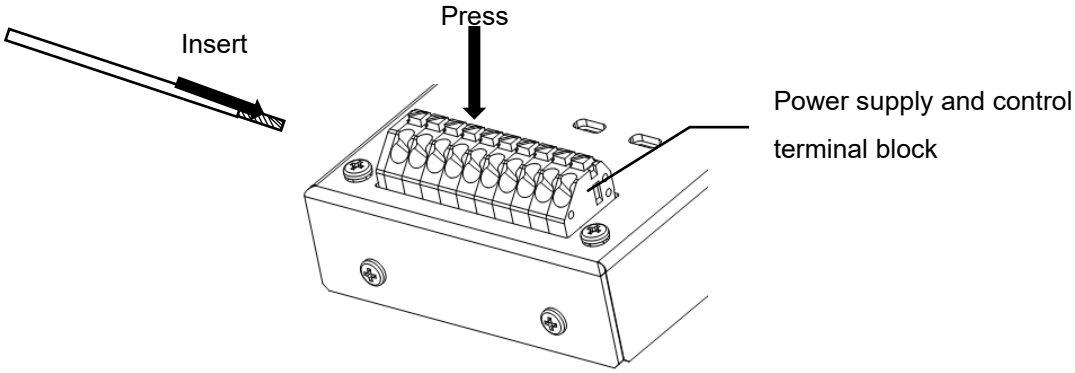
The control output is an open collector. Connect the relay or other load as shown below.



1. Prepare the cable
   Use a shielded cable.
   Strip the covering of the wiring lead wire from the cable so that approximately 8 mm of the conductive section is exposed.
   Ensure that the diameter of the conductive section is from 20 to 14 AWG (0.518 to 2.08 mm2).



2. Wire
   Use a flathead screwdriver to press the button part of the power supply and control terminal block on this device down to open the insertion hole, and then insert the electric wire into the insertion hole.
   After inserting the electric wire, lift the flathead screwdriver from the button.



Wire to the corresponding terminal names shown below.

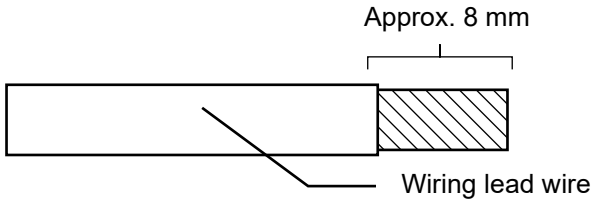
Name	Description
OUT	The open collector output.
OUTCOM	COM for the open collector output.

5-5.CAN Wiring (NC-100A-10 Function)

⚠WARNING	
Never insert two or more wires into a single terminal hole.	
	Failure to do so may result in heat generation, fire, or failure caused by poor contact. When branching the wiring, be sure to use an intermediate connector or similar device before connecting to the terminal block.
When performing the work described in this section, ensure that the power supplies of any connected devices are turned OFF before working.	
	Failure to do so may result in electric shock or failure of this device.
Follow the instructions in this section for CAN wiring.	
	Failure to do so may result in electric shock or failure of this device.

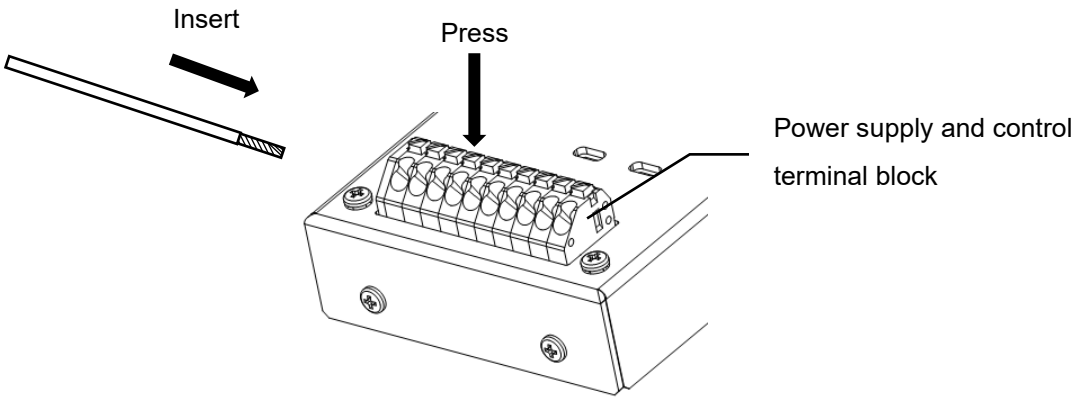
NOTE	
If inserting or removing a live wire, turn the communication ON/OFF switch OFF after turning the power supply ON before inserting or removing the wire.	
	If the above procedure is not followed, a dominant signal of up to 200 microseconds will be output throughout the CAN bus when the power supply of this device is turned ON or OFF, which could impede communication with other devices on the bus.

1. Prepare the cable
   Use a shielded cable.
   Strip the covering of the wiring lead wire from the cable so that approximately 8 mm of the conductive section is exposed.
   Ensure that the diameter of the conductive section is from 20 to 14 AWG (0.518 to 2.08 mm2).



2. Wire

Use a flathead screwdriver to press the button part of the power supply and control terminal block on this device down to open the insertion hole, and then insert the electric wire into the insertion hole.
After inserting the electric wire, lift the flathead screwdriver from the button.



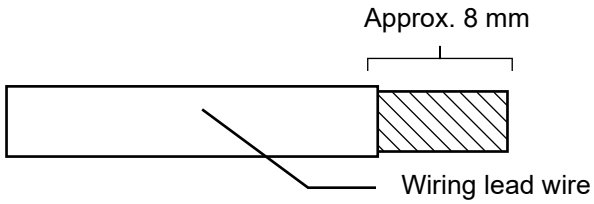
Wire to the corresponding terminal names shown below.

Name	Description
CANH	Connect to H on the CAN bus.
CANL	Connect to L on the CAN bus.
CANCOM	Connect to ground on the CAN bus.

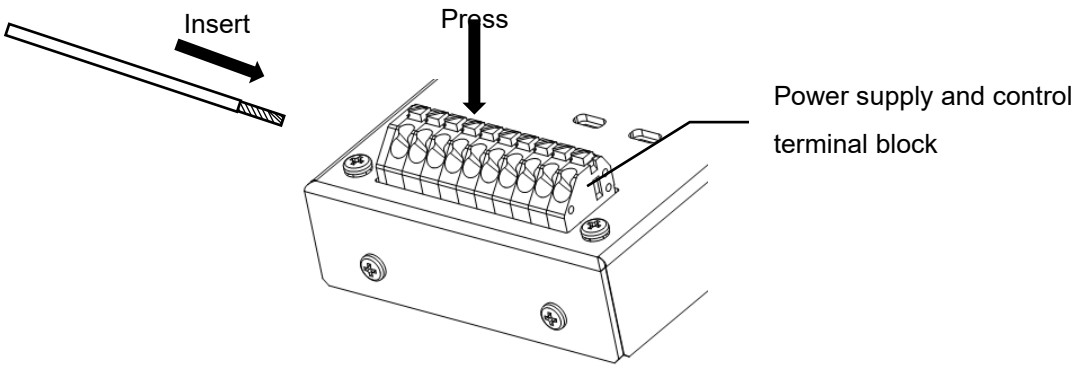
5-6.Power Supply Wiring

⚠WARNING	
Never insert two or more wires into a single terminal hole.	
	Failure to do so may result in heat generation, fire, or failure caused by poor contact. When branching the wiring, be sure to use an intermediate connector or similar device before connecting to the terminal block.
When performing the work described in this section, ensure that the power supplies of any connected devices are turned OFF before working.	
	Failure to do so may result in electric shock or failure of this device.
Follow the instructions in this section for power supply wiring.	
	Failure to do so may result in electric shock or failure of this device.
Wire a power supply that complies with the power supply voltage specification of this device.	
	The power supply voltage range specification for this device is from 10 to 30 V. Turning ON a power supply exceeding the specification of this device could cause a failure or other issue.

1. Prepare the cable
   Strip the covering of the wiring lead wire from the cable so that approximately 8 mm of the conductive section is exposed.
   Ensure that the diameter of the conductive section is from 20 to 14 AWG (0.518 to 2.08 mm2).



2. Wire
   Use a flathead screwdriver to press the button part of the power supply and control terminal block on this device down to open the insertion hole, and then insert the electric wire into the insertion hole.
   After inserting the electric wire, lift the flathead screwdriver from the button.



Wire to the corresponding terminal names shown below.

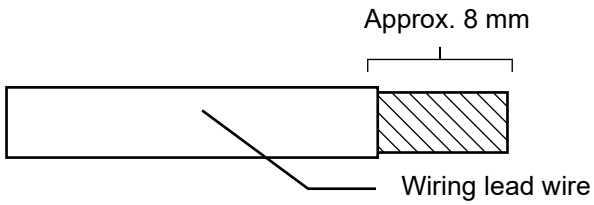
Name	Description
DC+	Connect the positive (+) terminal of the driving power supply.
DC-	Connect the negative (-) terminal of the driving power supply.

5-7.Grounding This Device

⚠WARNING	
Never insert two or more wires into a single terminal hole.	
	Failure to do so may result in heat generation, fire, or failure caused by poor contact. When branching the wiring, be sure to use an intermediate connector or similar device before connecting to the terminal block.
Make sure to ground this device.	
	Failure to ground this device could cause an accident due to electric shock or a failure.
When performing the work described in this section, ensure that the power supplies of any connected devices are turned OFF before working.	
	Failure to do so may result in electric shock or failure of this device.
Follow the instructions in this section for wiring the power supply of this device.	
	Failure to do so may result in electric shock or failure of this device.

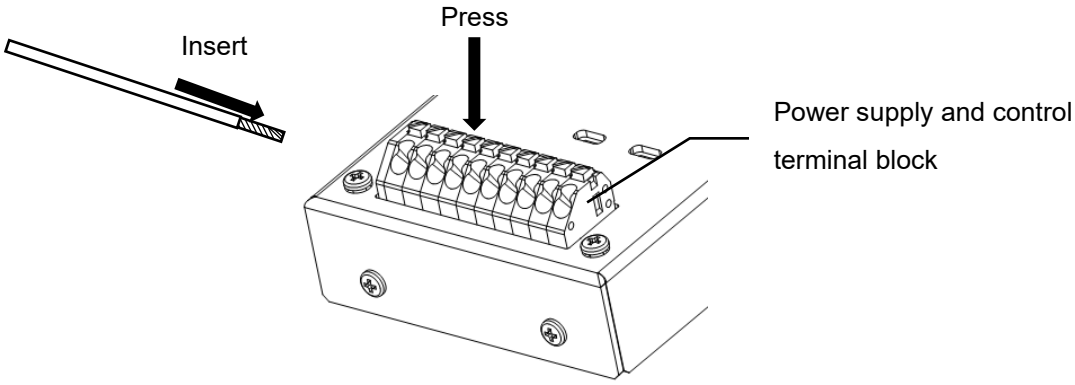
The FG terminal on this device is for connection to the case of this device.
Ground the wiring cable shield through the FG terminal on this device.

1. Prepare the cable
   Strip the covering of the wiring lead wire from the cable so that approximately 8 mm of the conductive section is exposed.
   Ensure that the diameter of the conductive section is from 20 to 14 AWG (0.518 to 2.08 mm2).



2. Wire

Use a flathead screwdriver to press the button part of the power supply and control terminal block on this device down to open the insertion hole, and then insert the electric wire into the insertion hole.
After inserting the electric wire, lift the flathead screwdriver from the button.



6.SETTING OF MAIN UNIT SWITCHES

6-1.Setting of RS-485 Communication Setting Switches

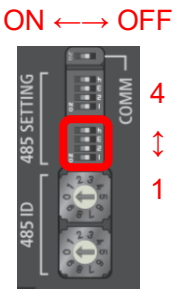
6-1-1.Outline

The RS-485 communication conditions of this device can be set by setting the RS-485 communication setting switches.

The RS-485 communication setting switch and RS-485 ID setting switch settings are applied when the power supply is turned ON or the communication ON/OFF switch is set from OFF to ON.
If the RS-485 communication conditions are modified after this device has started, operate the communication ON/OFF switch.
Refer to "6-2 Setting of Communication ON/OFF Switch" for the operating method of the communication ON/OFF switch.

6-1-2.Setting of RS-485 Baud Rate

Use the switches indicated in red in the diagram to the left to configure.
The relationships between the pins and the communication speeds are shown below. The pins are numbered 1, 2, 3, and 4 from below.
When shipped from the factory, all pins are set to OFF.



Baud rate (bps)	Pin 1	Pin 2	Pin 3	Pin 4
1200	OFF	OFF	OFF	OFF
2400	ON	OFF	OFF	OFF
4800	OFF	ON	OFF	OFF
9600	ON	ON	OFF	OFF
19200	OFF	OFF	ON	OFF
38400	ON	OFF	ON	OFF
57600	OFF	ON	ON	OFF
115200	ON	ON	ON	OFF

Pin 4 operates as if it were in the OFF state even if it is set to ON.

6-1-3.Setting of RS-485 Communication Conditions

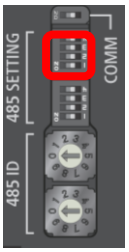
Use the switches indicated in red in the diagram to the left to configure.

The relationships between the pins and the communication conditions are shown below. The pins are numbered 1, 2, 3, and 4 from below.

When shipped from the factory, all pins are set to OFF.

Data length	Pin 1
8	OFF
7	ON

ON ⟷ OFF



Stop bit	Pin 2
1	OFF
2	ON

Parity	Pin 3	Pin 4
None	OFF	OFF
Odd	ON	OFF
Even	OFF	ON

If pins 3 and 4 are both set to ON, the parity bit will be set to none.

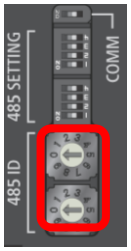
6-1-4.Setting of RS-485 ID

Use the switches indicated in red in the diagram to the left to configure.

The lower switch indicates the ones place, and the upper switch indicates the tens place.

The setting range is from 01 to 99.

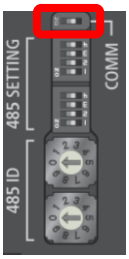
When shipped from the factory, this is set to 00.



6-2.Setting of Communication ON/OFF Switch

RS-485 communication can be controlled (turned ON/OFF) on this device.
For NC-100A-10, this will also affect CAN communication.
Operate as shown below.
The behavior when operating the communication ON/OFF switch will vary between RS-485 and CAN.
When shipped from the factory, this is set to OFF.

ON ←→ OFF



6-2-1.RS-485 Behavior

When the communication ON/OFF switch is OFF, this device will be disconnected from the bus and will not send/receive RS-485 communication.
When the communication ON/OFF switch is turned ON, the state of the RS-485 communication setting switch is applied to the communication conditions.
Refer to "6-1 Setting of RS-485 Communication Setting Switches" for information on the RS-485 communication setting switch.

6-2-2.CAN Behavior (NC-100A-10 function)

When the communication ON/OFF switch is OFF, this device will be disconnected from the bus and will not output CAN transmission data.
When the communication ON/OFF switch is switched from OFF to ON, it will operate in accordance with the CAN output process. Refer to "13-3 CAN (NC-100A-10 Function)" for details.

6-3.Terminator ON/OFF Switch

NOTE	
If turning the terminator OFF with this device set as the end of the bus, ensure that a terminator is inserted, such as another device, to act as the new bus terminator.	
	The terminator of this device is effective only when power is ON. If installing this device at the end of the bus, ensure that other devices do not communicate when this device is powered OFF. If other devices communicate even after this device is powered OFF, ensure that a terminator is inserted, such as another device. Failure to do so could impede communication among other devices and could cause an accident or a failure.

6-3-1.RS-485

Set as shown below.
A resistance of approximately 120 Ω is inserted when ON.
When shipped from the factory, this is set to OFF.

NC-100A-01

NC-100A-10

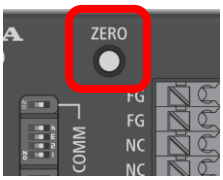
6-3-2.CAN (NC-100A-10 function)

Set as shown below.
A resistance of approximately 120 Ω is inserted when ON.
When shipped from the factory, this is set to OFF.

6-4.Digital Zero Button

Pressing the button shown below for approximately one second will perform digital zero.
This function registers the current measurement data as the digital zero value and subtracts it from the measurement data when the digital zero application state is ON.
When digital zero is performed by pressing the digital zero button, the digital zero application state will always be ON.
The application state setting will be reset when this device is powered OFF.

Refer to "11-1-2 Digital Zero Function" for details on the digital zero function.



7.TURNING THE POWER SUPPLY OF THIS DEVICE ON

Notes vary depending on the model of this device.

7-1.NC-100A-01

NOTE	
Wire a power supply that complies with the power supply voltage specification of this device.	
	The power supply voltage range specification for this device is from 10 to 30 V. Turning ON a power supply exceeding the specification of this device could cause a failure or other issue.

1. Check the power supply
   Confirm that the DC power supply connected to this device is within the specified range.
   Confirm that the polarity of the connected power supply is correct.

2. Turn the power supply ON
   Turn the output from the DC power supply powering this device ON.
   This device starts operating once the power supply is turned ON.

7-2.NC-100A-10

NOTE	
Wire a power supply that complies with the power supply voltage specification of this device.	
	The power supply voltage range specification for this device is from 10 to 30 V. Turning ON a power supply exceeding the specification of this device could cause a failure or other issue.
Do not turn the power supply of this device ON in an environment where other devices are communicating.	
	A dominant signal of up to 200 microseconds will be output throughout the CAN bus when the power supply of this device is turned ON, which could impede communication with other devices on the bus and could cause a failure in other devices. When turning the power supply of this device ON, turn the power supply ON with this device disconnected from the CAN bus, and then connect it to the CAN bus with the communication ON/OFF switch turned OFF.

1. Check the power supply
   Confirm that the DC power supply connected to this device is within the specified range.
   Confirm that the polarity of the connected power supply is correct.

2. Turn the power supply ON
   Turn the output from the DC power supply powering this device ON.
   This device starts operating once the power supply is turned ON.

8.SETTING OF MEASUREMENT CONDITIONS

8-1.Outline

The measurement conditions of this device are set from a PC or control device through RS-485 communication.

1. Set communication conditions
   Set the RS-485 communication conditions of this device based on the communication conditions set by the PC or control device.
   Refer to "6-1 Setting of RS-485 Communication Setting Switches" for information on setting the RS-485 communication conditions of this device.

2. Send the communication establishment command
   Send the "1 <ENQ>: Establish communication" RS-485 command from the PC or other device to connect with this device.
   Refer to "13-1 RS-485 Commands" for the RS-485 command operation flowchart.
   This procedure is unnecessary if RS-485 communication has already been established.

3. Set conditions
   Send RS-485 commands to this device to set the conditions.
   Refer to "13-1 RS-485 Commands" for details on each command.

8-2.List of Measurement Conditions

The measurement conditions that can be set in this device are listed below.
Some functions are available for all models of this device, while other functions are available only for specific models.

8-2-1.Measurement Conditions for All Models of This Device

Setting item		Description
Zero functions	Tare zero function	This function registers the measurement data of this device when performing tare zero execution as the tare zero value, and subtracts this from the measurement data. Refer to "11-1 Zero Functions" for details.
	Digital zero function	This function registers the measurement data of this device when performing digital zero execution as the digital zero value, and subtracts this from the measurement data. Refer to "11-1 Zero Functions" for details.
	Automatic zero compensation function	Automatically performs digital zero when the measurement data of this device is within the zero compensation range for a certain period of time. Refer to "11-1 Zero Functions" for details.
Hold function		Measurement data can be held based on conditions set in this device. Refer to "11-2 Hold Function" for details.
Comparison function		Compares measurement data with the comparison value set in each comparator of this device. The comparison direction can be set to either High limit or Low limit. Refer to "11-3 Comparison Function, Hysteresis Function" for details.
Hysteresis function		Sets ON hysteresis or OFF hysteresis for the comparison value set in this device. Refer to "11-3 Comparison Function, Hysteresis Function" for details.
Smoothing function	Moving average	Applies a simple moving average to the measurement data of this device. Refer to "11-4 Smoothing Function" for details.
	Minimum scale	This function rounds off the measurement data of this device to the specified unit. Refer to "11-4 Smoothing Function" for details.
	Low-pass filter	Applies a low-pass filter to the measurement data of this device. Refer to "11-4 Smoothing Function" for details.
Additional value function		Adds the setting value to the measurement data of this device. Refer to "11-5 Additional Value Function" for details.

Setting item	Description
Level test function	This function temporarily sets the measurement data of this device as the level test value. It can be used to confirm the operation of other functions. Refer to "11-6 Level Test Function" for details.
User string saving function	A user-specified character string up to nine characters long can be saved to this device. Refer to "11-7 User String Saving Function" for details.
Measurement condition management function	Up to 16 measurement conditions can be saved and recalled for this device. Refer to "11-8 Measurement Condition Management Function" for details.

8-2-2.Measurement Conditions Specific to NC-100A-01

Setting item		Description
Control I/O functions	Control input	Sets functionality when this device receives control input. Refer to "13-2 Control I/O (NC-100A-01 Function)" for details.
	Control output	Sets the control output conditions for this device. Refer to "13-2 Control I/O (NC-100A-01 Function)" for details.

8-2-3.Measurement Conditions Specific to NC-100A-10

Setting item		Description
CAN data output functions	CAN ID	Sets the CAN ID for CAN output data for this device. Refer to "13-3 CAN (NC-100A-10 Function)" for details.
	Output baud rate	Sets the baud rate for CAN output data for this device. Refer to "13-3 CAN (NC-100A-10 Function)" for details.
	Output interval	Sets the output interval for CAN output data for this device. Refer to "13-3 CAN (NC-100A-10 Function)" for details.

9.CALIBRATION

9-1.Outline

9-1-1.Purpose of Calibration

NOTE
After sending the calibration command, do not turn the power supply OFF until a response is received from this device.
When the above command is received, this device will save the settings to its internal memory. If the power is cut off while saving is in progress, this may cause damage to this device.

Calibration for this device is performed through RS-485 communication.

The rated capacity value, rated output value, and output during no load (initial value) are set for strain gage transducers connected to this device.
The output of the connected strain gage transducer can be converted into the physical amount and output as measurement data by calibrating this device and registering the rated output value, rated capacity value, and initial value of the strain gage transducer in this device.

9-1-2.Equation Used by This Device

Set the output of the strain gage transducer and the measurement data of this device.
Measurement data is calculated from the following equation.

$$\text{Measurement data} = \frac{\text{Rated capacity value}}{\text{Rated output value (mV/V)}} \times (\text{Original value} - \text{No load zero value})\ (\text{mV/V})$$

$$+ \text{Additional Value} - \text{Tare zero value} - \text{Digital zero value}$$

9-1-3.Output Range of Measurement Data

The output range of measurement data for this device is determined by the decimal point position of the rated capacity value registered during calibration.

Example:

Measurement data output range when rated capacity value is +015000: -099999 to +099999
Measurement data output range when rated capacity value is +1500.0: -9999.9 to +9999.9
Measurement data output range when rated capacity value is +150.00: -999.99 to +999.99
Measurement data output range when rated capacity value is +15.000: -99.999 to +99.999
Measurement data output range when rated capacity value is +1.5000: -9.9999 to +9.9999
Measurement data output range when rated capacity value is +0.1500: -9.9999 to +9.9999

9-2.Calibration Procedure

9-2-1.Types of Calibration

The types of calibration for this device are listed below.

There are three methods of calibrating this device.
Select the appropriate method depending on the environment or the connected strain gage transducer.

Item	Description
Actual load calibration	Registers the original value when the rated load is applied to the strain gage transducer as the rated output, and the rated load as the rated capacity of this device. Refer to "9-2-2 Actual Load Calibration Procedure" for details on the configuration procedure.
Sensitivity registering calibration	Inputs the rated capacity value and rated output value of the strain gage transducer and registers these with this device. Refer to "9-2-3 Sensitivity Registering Calibration Procedure" for details on the configuration procedure.
TEDS calibration	Acquires the rated capacity value and rated output value of the TEDS-compatible strain gage transducer and registers these with this device. Refer to "9-2-4 About TEDS Calibration " for details on the configuration procedure.

9-2-2.Actual Load Calibration Procedure

This section describes the actual load calibration procedure for this device, using an example of connecting an actual load cell to this device.

1. Wire strain gage transducer
   Wire the strain gage transducer to this device.
   Refer to "5-1 Strain Gage Transducer Wiring" for details on wiring.

2. Set communication conditions
   Set the RS-485 communication conditions of this device based on the communication conditions set by the PC or control device.
   Refer to "6-1 Setting of RS-485 Communication Setting Switches" for information on setting the RS-485 communication conditions of this device.

3. Send the communication establishment command
   Send the "1 <ENQ>: Establish communication" RS-485 command from the PC or other device to connect with this device.
   Refer to "13-1 RS-485 Commands" for the operation flowchart for RS-485 commands sent to this device.
   This procedure is unnecessary if communication between the PC and this device has already been established.

4. Perform no-load zero
   An original value can be set for use as the reference point in calibrating this device.
   Ensure that there is no load on the strain gage transducer, and then execute the "4 ZAD: No-load zero" RS-485 command.
   If ensuring a no-load condition is difficult, such as when using a pressure sensor for absolute pressure measurement or when a load is already applied, use the "5 VRC: Numeric value registering calibration" RS-485 command to enter and set the original value that will serve as the calibration reference point.
   Select the appropriate method depending on the environment or the connected strain gage transducer.

5. Apply actual load

   Apply the load to register as the rated capacity value to the load cell connected to this device.

6. Perform actual load calibration

With the system still in the state described in Step 5, send the actual load calibration command via RS-485.
Set the load applied in Step 5 as the argument for the actual load calibration command.
Once the actual load calibration command has been executed, the calibration values of this device will be set as shown below.

Item	Description
Rated output value	Original value when load was applied
Rated capacity value	Rated capacity value set by command

Refer to "6 VCL: Actual load calibration" for details on the actual load calibration command.

9-2-3.Sensitivity Registering Calibration Procedure

This section describes the sensitivity registering calibration procedure for this device, using an example of connecting an actual load cell to this device.

1. Wire strain gage transducer
   Wire the strain gage transducer to this device.
   Refer to "5-1 Strain Gage Transducer Wiring" for details on wiring.

2. Set communication conditions
   Set the RS-485 communication conditions of this device based on the communication conditions set by the PC or control device.
   Refer to "6-1 Setting of RS-485 Communication Setting Switches" for information on setting the RS-485 communication conditions of this device.

3. Send the communication establishment command
   Send the "1 <ENQ>: Establish communication" RS-485 command from the PC or other device to connect with this device.
   Refer to "13-1 RS-485 Commands" for the operation flowchart for RS-485 commands sent to this device.
   This procedure is unnecessary if communication between the PC and this device has already been established.

4. Perform no-load zero
   An original value can be set for use as the reference point in calibrating this device.
   Ensure that there is no load on the strain gage transducer, and then execute the "4 ZAD: No-load zero" RS-485 command.
   If ensuring a no-load condition is difficult, such as when using a pressure sensor for absolute pressure measurement or when a load is already applied, use the "5 VRC: Numeric value registering calibration" RS-485 command to enter and set the original value that will serve as the calibration reference point.
   Select the appropriate method depending on the environment or the connected strain gage transducer.

5. Perform sensitivity registering calibration
   With the system still in the state described in Step 4, send the sensitivity registering calibration command via RS-485.
   For the sensitivity registering calibration command, enter the rated capacity value and rated output value listed on the calibration certificate or other document of the load cell.
   Once the sensitivity registering calibration command has been executed, the calibration values of this device will be set as shown below.

Item	Description
Rated output value	Rated output value set by command
Rated capacity value	Rated capacity value set by command

   Refer to "7 EIC: Sensitivity registering calibration" for details on the sensitivity registering calibration command.

9-2-4.About TEDS Calibration

TEDS calibration characteristics

The rated capacity value and rated output value of up to four connected TEDS-compatible strain gage transducers can be acquired through TEDS calibration.

If this device successfully performs a TEDS scan, the response to the TEDS calibration command will indicate from how many devices TEDS information was loaded.

If TEDS information is loaded from multiple devices, it is assumed that multiple strain gage transducers are connected in parallel, and the combined rated capacity value and rated output value will be set as the calibration values.

Before executing TEDS calibration

- The template for loading is NO.33 (Bridge sensors). TEDS information for other template numbers cannot be registered to this device and will result in an error.
- Physical value and Electrical output in TEDS information are used to execute sensitivity registering calibration.
- This information must be registered as TEDS information.
- Rated capacity values and rated output values loaded during TEDS calibration will overwrite the calibration values of this device.
- If multiple TEDS-compatible sensors are connected in parallel, the rated capacity and rated output will be calculated as follows.

Rated capacity:
The total value of the rated capacity of the strain gage transducers
Rated output:
The average value of the rated output of the strain gage transducers

TEDS calibration procedure

This section describes the TEDS calibration procedure for this device, using an example of connecting an actual load cell to this device.

1. Wire strain gage transducer
   Wire the TEDS-compatible strain gage transducer to this device.
   Refer to "5-1 Strain Gage Transducer Wiring" for details on wiring.

2. Set communication conditions
   Set the RS-485 communication conditions of this device based on the communication conditions set by the PC or control device.
   Refer to "6-1 Setting of RS-485 Communication Setting Switches" for information on setting the RS-485 communication conditions of this device.

3. Send the communication establishment command
   Send the "1 <ENQ>: Establish communication" RS-485 command from the PC or other device to connect with this device.
   Refer to "13-1 RS-485 Commands" for the operation flowchart for RS-485 commands sent to this device.
   This procedure is unnecessary if communication between the PC and this device has already been established.

4. Perform no-load zero
   An original value can be set for use as the reference point in calibrating this device.
   Ensure that there is no load on the strain gage transducer, and then execute the "4 ZAD: No-load zero" RS-485 command.
   If ensuring a no-load condition is difficult, such as when using a pressure sensor for absolute pressure measurement or when a load is already applied, use the "5 VRC: Numeric value registering calibration" RS-485 command to enter and set the original value that will serve as the calibration reference point.
   Select the appropriate method depending on the environment or the connected strain gage transducer.

5. Perform TEDS calibration
   With the system still in the state described in Step 4, send the TEDS calibration command via RS-485.
   Refer to "8 EID: TEDS calibration" for details on the TEDS calibration command.

10.DATA ACQUISITION

10-1.Data Acquisition Commands

Measurement data can be acquired using RS-485 commands (NC-100A-01), or using RS-485 commands or CAN output data (NC-100A-10).

10-1-1.RS-485

Measurement data, original values, and status information can be acquired through RS-485 using the following commands.

Command	Description
"GDT: Measurement data acquisition"	Acquires measurement data with calibration settings and measurement conditions applied.
"GOD: Original value acquisition"	Acquires the signal (original value) from the strain gage transducer.
"GST: Status acquisition"	Acquires the status of this device.

Measurement data acquisition

You can acquire measurement data with the measurement functions of this device applied.

Refer to "32 GDT: Measurement data acquisition" for details on the acquisition command.

The applied measurement functions are listed below.

- Rated capacity value
- Rated output value
- No-load zero value
- Tare zero function
- Digital zero function
- Hold function
- Smoothing function
- Additional value function
- Level test function

Refer to "11 OTHER MEASUREMENT FUNCTIONS" for details on each function.

The following data may be output instead of numbers for measurement data.

- ±OFL_IN
  Displayed when the input from the strain gage transducer to this device is outside the measuring range of this device (±7.5 mV/V).
- ±OFL_DP
  Displayed when the result of applying measurement functions to the measurement data of this device is outside the measurement data range of this device (±099999).

In the above cases, refer to "14 TROUBLESHOOTING" and perform troubleshooting.

Original value acquisition

The original value before applying the measurement functions of this device can be acquired.

Refer to "33 GOD: Original value acquisition" for details on the acquisition command.

The following data may be output instead of numbers for the original value.

- ±OFL_IN
  Displayed when the input from the strain gage transducer to this device is outside the measuring range of this device (±7.5 mV/V).

In the above cases, refer to "14 TROUBLESHOOTING" and perform troubleshooting.

Status acquisition

The status of the measurement functions of this device can be acquired.

Refer to "34 GST: Status acquisition" for details on the acquisition command.

The following status information can be acquired using the status acquisition command.

Status	Description
Comparator 0 status	Outputs the detection status of comparator 0.
Comparator 1 status	Outputs the detection status of comparator 1.
Comparator 2 status	Outputs the detection status of comparator 2.
Comparator 3 status	Outputs the detection status of comparator 3.
All comparators OFF status	Switches ON when all comparators are in the detection OFF status. Switches OFF if any of them are ON.
Normal interval	Switches ON when the hold status is normal interval.
Detecting interval	Switches ON when the hold status is detecting interval.
Hold interval	Switches ON when the hold status is hold interval.
Original value overflow	Turns ON when the original value overflows.
Measurement data overflow	Turns ON when measurement data overflows.
CAN output error	Turns ON when there is a CAN communication abnormality. This is always OFF for models other than NC-100A-10.

• Comparator status 0 to 3, all comparators OFF status

The status of one of these will always be ON due to the comparator status of this device.

• normal interval, detecting interval, hold interval

The status of one of these will always be ON due to the hold status of this device.

• Original value exceeded, measurement data exceeded

The status will be ON when measurement data is OFL_IN or OFL_DP.

10-1-2.CAN (NC-100A-10 function)

For CAN, the measurement data and status of this device can be acquired from the CAN output data that is output according to the measurement conditions set in "8 SETTING OF MEASUREMENT CONDITIONS."

Item	Data type	Description
Measurement data	Floating-point type (4 bytes)	Acquires measurement data applying the calibration settings and measurement conditions.
Status	Integer type (4 bytes)	Acquires the status of this device.

Refer to "13-3 CAN (NC-100A-10 Function)" for details on CAN output data.

10-2.Measurement Data Control

Measurement data can be freely controlled through such means as zero commands, hold commands, and reset commands during measurement.

For NC-100A-01, control is possible through RS-485 and control input.
For NC-100A-10, control is possible through RS-485.

10-2-1.RS-485

The following commands can be used to provide control through RS-485.

Command		Description
"25 ZON: Tare zero function, digital zero"	Tare zero function	This function registers the measurement data of this device when performing tare zero execution as the tare zero value, and subtracts this from the measurement data. Refer to "11-1 Zero Functions" for details.
	Digital zero function	This function registers the measurement data of this device when performing digital zero execution as the digital zero value, and subtracts this from the measurement data. Refer to "11-1 Zero Functions" for details.
"27 HLD: Hold command"		Continues to detect the hold value when sent. The actual operation will vary depending on the hold mode. Refer to "11-2 Hold Function" for details.
"28 RST: Reset command"		Resets the hold value when sent. Refer to "11-2 Hold Function" for details.

Refer to "13-1 RS-485 Commands" for details on the above commands.

10-2-2.Control Input (NC-100A-01 function)

This device can be controlled through the use of control input.
Refer to "13-2-1 Control Input Function Details" for details on control input functions.
Control input can be used to perform the operation set in "8 SETTING OF MEASUREMENT CONDITIONS."

The following items can be set.

Item	Description
No setting	Will not perform operations using control input.
Hold command	Continues to detect the hold value when sent. The actual operation will vary depending on the hold mode. Refer to "11-2 Hold Function" for details.
Reset command	Resets the hold value when sent.
Update tare zero value	Updates the zero value for subtracting tare.
Update digital zero value	Updates the digital zero value.

Refer to "16 SIO: Control I/O function setting (NC-100A-01 function)" for details on the above.

11.OTHER MEASUREMENT FUNCTIONS

This device provides functions to help perform measurement data acquisition.
This section describes these measurement functions.

11-1.Zero Functions

This device provides two functions to set the zero value of measurement data.

11-1-1.Tare Zero Function

The tare zero function is used to subtract tare from the measurement data of this device.
It can be used to register the current measurement data of this device as the tare zero value, and subtract this from measurement data.
The tare zero function setting and the tare zero value are saved using the "/M" command.

If this is set to not apply the tare zero value to measurement data, the tare zero value will be retained, and the measurement data with tare subtraction disabled can be confirmed.
Refer to "25 ZON: Tare zero function, digital zero" for details on the tare zero function setting command using the RS-485 command.

11-1-2.Digital Zero Function

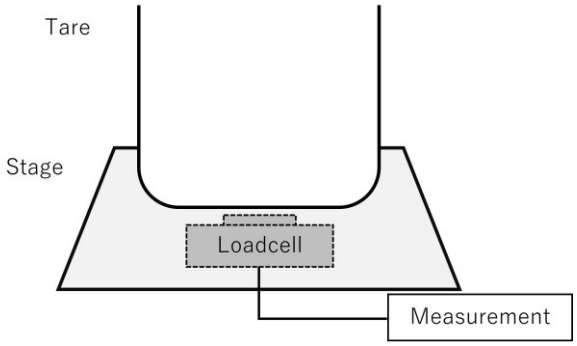
The digital zero function is used to subtract the digital zero value from the measurement data of this device.
It can be used to register the current measurement data of this device as the digital zero value, and subtract this from measurement data.
The digital zero function setting is saved using the "/M" command. However, the acquired digital zero value will not be saved and will be reset when the power supply of this device is turned OFF.

If this is set to not apply the digital zero value to measurement data, the digital zero value will be retained, and the measurement data with the offset disabled can be confirmed.
Refer to "25 ZON: Tare zero function, digital zero" for details on the digital zero function setting command using the RS-485 command.

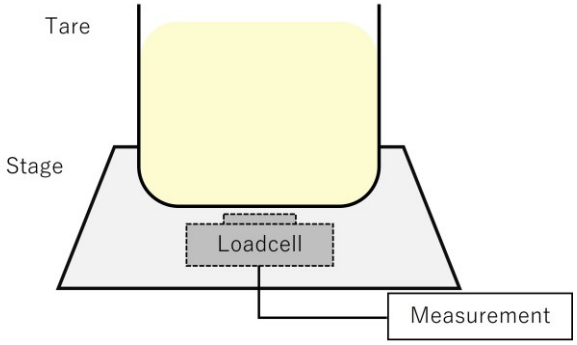
If the automatic zero correction function is enabled, when digital zero is performed using the automatic zero correction function, the digital zero will be automatically applied to the measurement data.
Refer to "11-1-4 Automatic Zero Compensation Function" for details on automatic zero compensation function.

11-1-3.Usage Examples

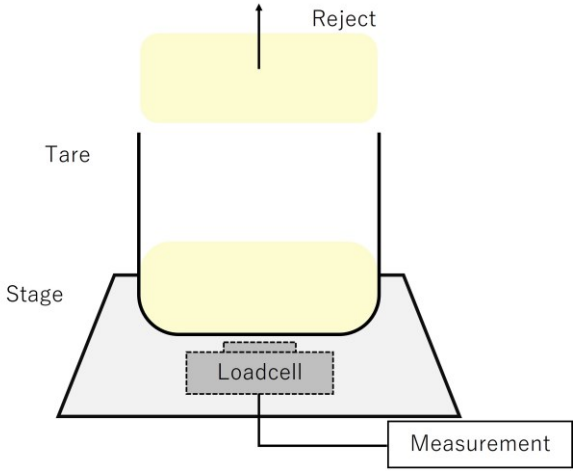
Consider the following measurement system.
Imagine that the container is filled with the measuring object, and then a certain amount is discharged.
The goal is to measure the amount discharged.



The stand on the load cell and the tare have a fixed weight each time, so tare zero is performed and the fixed weight is recorded as the tare zero value.



As shown here, the measuring object is loaded, and then digital zero is performed as the reference and the digital zero value is recorded.



As shown here, the amount discharged can be acquired as measurement data.

11-1-4.Automatic Zero Compensation Function

The automatic zero compensation function of this device automatically performs "11-1-2 Digital Zero Function."
RS-485 commands can be used to set the zero compensation range and judging time for this device, so that it will automatically perform digital zero when measurement data is within the zero compensation range during the judging time.

Example: **Zero compensation range:** 10, **Judging time:** 1.00 second

Performs digital zero when measurement data transitions within the range ±10 for 1.00 second.

If the judging time is set to 0.00 seconds, the automatic zero compensation function of this device will not perform automatic zero compensation.
Set the judging time to 0.00 seconds to disable automatic zero compensation.
Even if the measurement data is set not to apply digital zero, when digital zero is performed by automatic zero compensation, the digital zero will be applied to the measurement data.

Refer to "9 SZT: Automatic zero compensation" for details on RS-485 commands.
Refer to "11-1-2 Digital Zero Function" for details on the digital zero function.

11-1-5.Tare Zero Function Using the Control Input Function of NC-100A-01

NC-100A-01 can use the tare zero function through the control input function.
The process of using the tare zero function using the control input function is described below.

1. Set communication conditions
   Set the RS-485 communication conditions of this device based on the communication conditions set by the PC or control device.
   Refer to "6-1 Setting of RS-485 Communication Setting Switches" for information on setting the RS-485 communication conditions of this device.

2. Send the communication establishment command
   Send the "1 <ENQ>: Establish communication" command from the PC or other device to connect with this device.
   Refer to "13-1 RS-485 Commands" for the command operation flowchart.
   This procedure is unnecessary if communication has already been established.

3. Send the control input function setting command
   Use the RS-485 command to send the control input function setting command from the PC or other device to set the control input function to the tare zero function.
   Refer to "16 SIO: Control I/O function setting (NC-100A-01 function)" for details on RS-485 commands.

4. Provide control input to this device
   If control input to this device changes from OFF to ON and stays ON for 3 seconds, the tare zero function operates, and then the tare zero function is applied to measurement data.
   The setting will not be saved if the power supply of this device turns OFF, even if the setting value of tare zero changes from OFF to ON.
   The setting of the tare zero value registered as tare zero will also not be saved.
   Refer to "13-2-1 Control Input Function Details" for details on the control input function.

11-1-6.Digital Zero Function Using the Control Input Function of NC-100A-01

NC-100A-01 can use the digital zero function through the control input function.
The process of using the digital zero function using the control input function is described below.

1. Set communication conditions
   Set the RS-485 communication conditions of this device based on the communication conditions set by the PC or control device.
   Refer to "6-1 Setting of RS-485 Communication Setting Switches" for information on setting the RS-485 communication conditions of this device.

2. Send the communication establishment command
   Send the "1 <ENQ>: Establish communication" command from the PC or other device to connect with this device.
   Refer to "13-1 RS-485 Commands" for the command operation flowchart.
   This procedure is unnecessary if communication has already been established.

3. Send the control input function setting command
   Use the RS-485 command to send the control input function setting command from the PC or other device to set the control input function to the digital zero function.
   Refer to "16 SIO: Control I/O function setting (NC-100A-01 function)" for details on RS-485 commands.

4. Provide control input to this device
   If control input to this device changes from OFF to ON and stays ON for 3 seconds, the digital zero function operates, and then the digital zero function is applied to measurement data.
   The setting will not be saved if the power supply of this device turns OFF, even if the setting value of digital zero changes from OFF to ON.
   Refer to "13-2-1 Control Input Function Details" for details on the control input function.

11-2.Hold Function

11-2-1.Outline

The hold command can be input to this device using RS-485 commands or control input, which allows the peak value or bottom value detected within the specified detecting interval to be held and output.

The process for using this is described below.

1. Set communication conditions
   Set the RS-485 communication conditions of this device based on the communication conditions set by the PC or control device.
   Refer to "6-1 Setting of RS-485 Communication Setting Switches" for information on setting the RS-485 communication conditions of this device.

2. Send the communication establishment command
   Send the "<ENQ>: Establish communication" command from the PC or other device to connect with this device.
   Refer to "13-1 RS-485 Commands" for the command operation flowchart.
   This procedure is unnecessary if communication has already been established.

3. Set measurement conditions
   Send RS-485 commands to set the hold mode and conditions.
   Refer to "11-2-2 Hold Function Parameters" for details on hold modes and conditions.
   Refer to "10 SMF: Hold mode setting" for details on RS-485 commands.

4. Send hold command or reset command
   Hold control can be performed on measurement data by sending a hold command or a reset command during measurement.
   Refer to "11-2-3 Hold Command, Reset Command" for details on the hold command and reset command.

5. Perform measurement data acquisition
   Acquire the measurement data for which hold control is applied from the RS-485 command.
   For NC-100A-10, this can also be acquired using CAN output data.
   Refer to "10 DATA ACQUISITION" for details.

11-2-2.Hold Function Parameters

The five following parameters are used to set the hold function of this device.

1. Hold modes
   These set the operation of the hold function.
   The hold detection direction can be set to peak value, bottom value, or peak-to-peak value.
   The hold detection method can be set to Arbitrary point hold, interval definition detect, interval definition hold, or time specification hold.
   Refer to "11-2-5 Hold Detection Directions" for details on hold detection directions.
   Refer to "11-2-6 Hold Detection Methods" for details on hold detection methods.

2. Output modes
   These set whether measurement data follows the hold value within the detecting interval.
   Output mode setting is disabled when the hold mode is set to Arbitrary point hold or interval definition detect.
   Refer to "11-2-7 Output Modes" for details on output modes.

3. Comparison modes
   During the detecting interval, these set comparator operation ON/OFF.
   Refer to "11-2-8 Comparison Modes" for details on comparison modes.

4. Delay time
   This is used to set the time until the detecting interval starts after the hold command is input.
   The input range is from 0.00 to 9.99 s.

5. Detection time
   This is used to set the length of the detecting interval.
   It is enabled only when the hold mode is set to time specification hold.
   This setting will be disabled if any other hold mode is set.
   The input range is from 0.01 to 9.99 s.

11-2-3.Hold Command, Reset Command

This device receives hold command and reset command from RS-485 commands.
Refer to "27 HLD: Hold command" and "28 RST: Reset command" for details on commands.
In this document, "HLD command" refers to a hold command using RS-485 commands, while "RST command" refers to a reset command using RS-485 commands.

For NC-100A-01, hold commands and reset commands can be performed from control input.
If using control input, an RS-485 command must be used to set the mode for control input.

If the control input is set to the hold command, a hold command will be applied as control input; and if it is set to the reset command, a reset command will be applied.
There is only a single control input, so they cannot be used together.
Hold commands and reset commands using control input are prioritized over the HLD commands and RST commands, and hold commands and reset commands using RS-485 commands when control input is ON will be disabled.

Example: Control input is set to hold command

If a hold command using control input is ON, RST commands will either be applied for an instant or will not be received at all, depending on the mode.

Refer to "13-2 Control I/O (NC-100A-01 Function)" for details on the control input function.

11-2-4.Hold interval

The hold setting or hold operation will result in one of the following conditions.

1. Normal interval
   The block before the hold command switches ON.
   Measurement data will continue to be updated.
   A Normal interval will be applied continuously if the hold mode is set to Normal.

2. Delay interval
   This is the delay time for transitioning from the Normal interval to the detecting interval, when the hold command is ON.
   It can be set within the range from 0.00 to 9.99 s.
   Detection will not be performed, but measurement data will depend on the output mode setting.

   Example: If set to peak hold, the peak value will be held even in the delay interval. However, the peak value of the delay interval will not be used as the hold value, even if this peak value is larger than the peak value of the detecting interval.

3. Detecting interval
   This block will detect the peak value, etc. after the hold command switches ON.
   If the output mode is set to "always output," measurement data will continue to update the hold value.
   If the output mode is set to "output at hold moment," the measurement data at the moment the hold command switches ON will continue to be retained.

4. Hold interval
   Transitions from the detecting interval following the detection time.
   If set to interval definition hold, transitions when the hold command is input again in the detecting interval.
   The hold value detected in the detecting interval will continue to be output.

11-2-5.Hold Detection Directions

Each detection type is outlined below.

Peak

This mode detects and holds the peak value (maximum value) in the detecting interval.

Example: If the input value fluctuates within the range of -100 to +100 in the detecting interval, measurement data in the hold interval will be **+100**.

Bottom

This mode detects and holds the bottom value (minimum value) in the detecting interval.

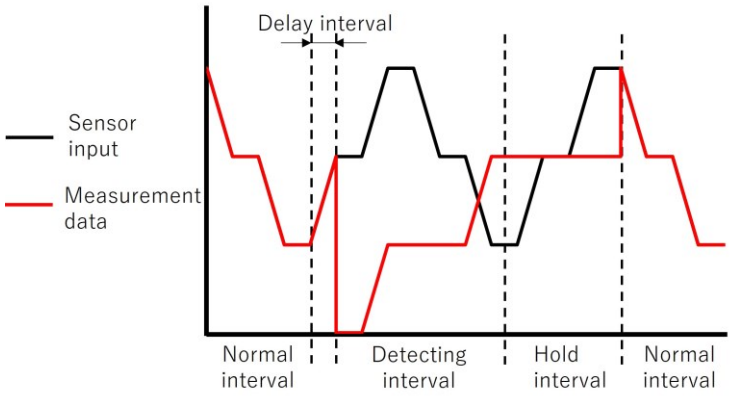
Example: If the input value fluctuates within the range of -100 to +100 in the detecting interval, measurement data in the hold interval will be **-100**.

Peak-to-peak

This mode detects and holds the difference between the peak value and the bottom value in the detecting interval.

Example: If the input value fluctuates within the range of -100 to +100 in the detecting interval, measurement data in the hold interval will be **+200**.

The transition of measurement data when peak-to-peak hold is used is as follows:



At the start of detection, the peak value and bottom value are equal, so the measurement data is 0.

11-2-6.Hold Detection Methods

This section describes the hold detection methods of this device.
As described below, there are five operations depending on factors such as the behavior when the hold command is ON.

Number	Item	Description
1	Normal	Will not receive hold commands.
2	Arbitrary point hold	Retains the measurement data when the hold command switches ON.
3	Interval definition detect	When the hold command switches ON, it transitions through the delay interval to the detecting interval. When the hold command switches ON in the detecting interval, it transitions to the Normal interval.
4	Interval definition hold	When the hold command switches ON, it transitions through the delay interval to the detecting interval. When the hold command switches ON in the detecting interval, it transitions to the hold interval and continues to hold the detection results from the detecting interval. When the hold command switches ON in the hold interval, it transitions to the Normal interval.
5	Time specification hold	When the hold command switches ON, it transitions through the delay interval to the detecting interval. After the set detection time has passed, it transitions to the hold interval and continues to hold the detection results from the detecting interval. When the hold command switches ON in the hold interval, it transitions to the Normal interval.

This device provides two types of hold commands: RS-485 command and control input set to hold command. The operation when held differs, so this section provides detailed descriptions of each item.

1. Normal

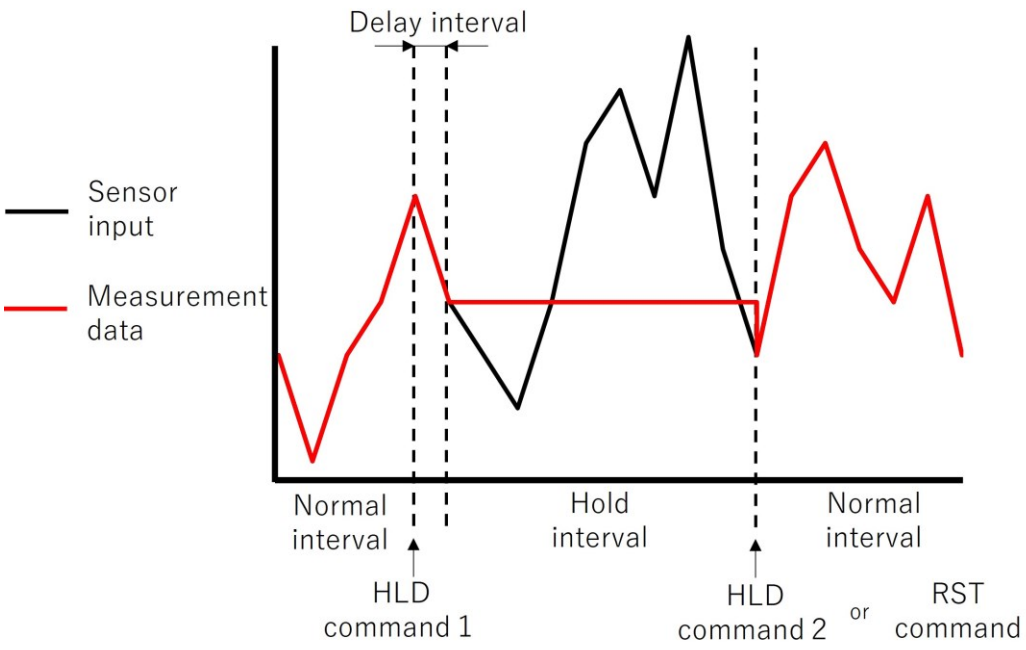
Maintains the Normal interval without receiving hold commands or reset commands.
Set this for measurement without using the hold function.

2. Arbitrary point hold

Retains the measurement data when the hold command switches ON.
Details on each operation are described below.

Operation using RS-485 commands

After receiving a hold command using an RS-485 command, it switches to the hold interval and continues to hold the value after the delay interval as measurement data.
After receiving the HLD command or RST command, it cancels the hold and transitions to the Normal interval.
The following example shows operation when the detection type is set to "peak."

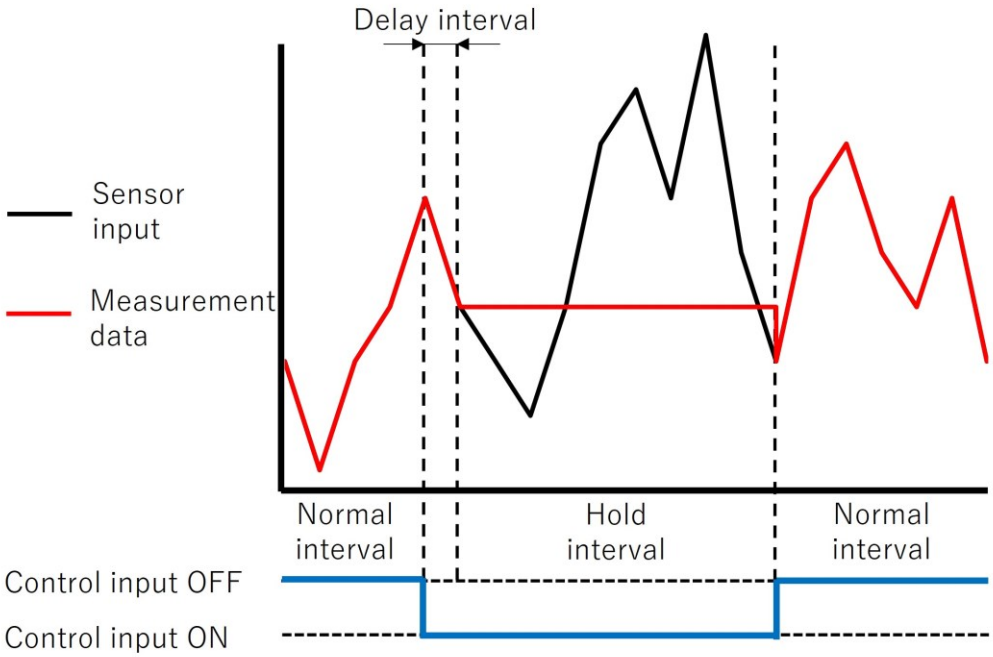


There is no detecting interval for Arbitrary point hold, so setting the output mode or comparison mode has no effect.

Operation when control input is set to hold command (NC-100A-01 only)

While control input is ON, it switches to the hold interval and continues to hold the value after the delay time as measurement data.

When control input switches OFF, it releases the hold and transitions to the Normal interval.



There is no detecting interval for Arbitrary point hold, so setting the output mode or comparison mode has no effect.

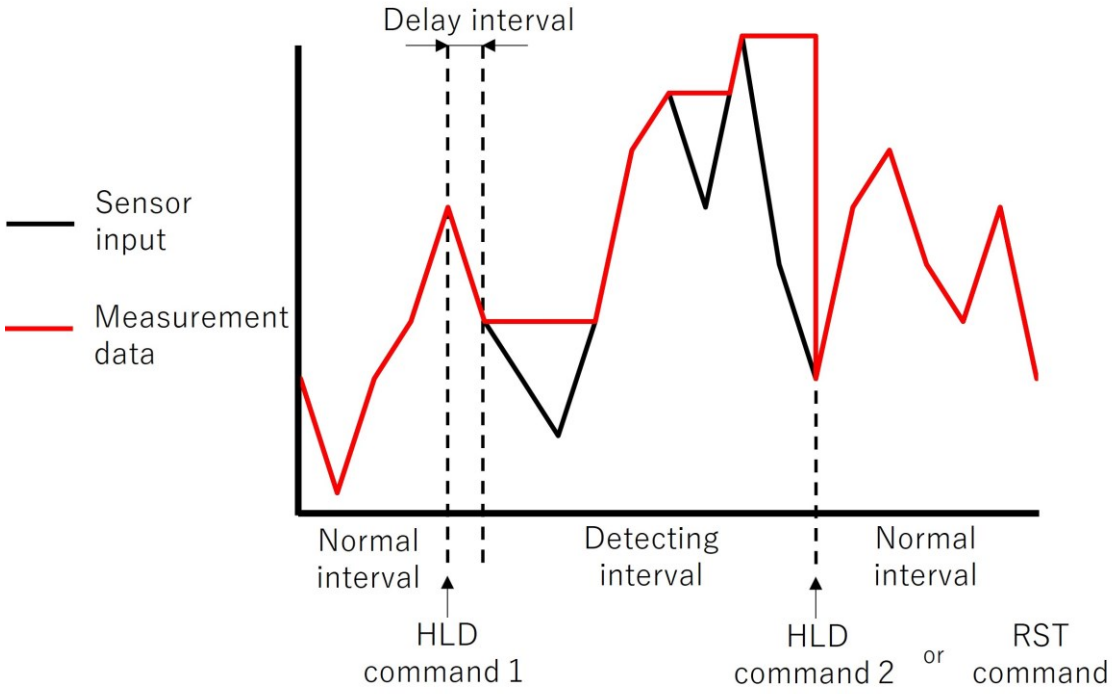
While control input is ON, operation using the HLD command or RST command will be disabled.

3. Interval definition detect

Each time a hold command is received, it waits for the delay time and then retains the measurement data of either "peak," "bottom," or "peak-to-peak."
Details on each operation are described below.

Operation using RS-485 commands

After receiving the HLD command, it continues to detect either "peak," "bottom," or "peak-to-peak" as measurement data.
After receiving the HLD command or RST command, it cancels the hold and transitions to the Normal interval.
In the following example, the detection type is set to "peak" and the output mode is set to "always output."

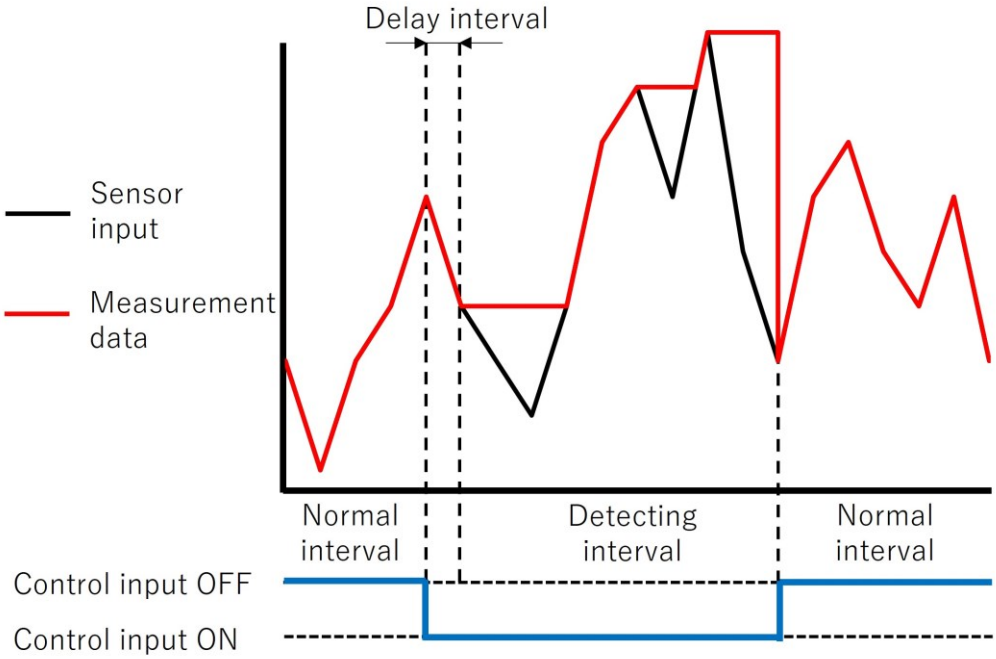


There is no hold interval for interval definition detect, so detection will be performed regardless of the output mode setting.
Comparison will be performed regardless of the comparison mode setting.

Operation when control input is set to hold command (NC-100A-01 only)

While control input is ON, it switches to the detecting interval, and then after the delay time continues to detect either "peak," "bottom," or "peak-to-peak" as measurement data.
When control input switches OFF, it transitions to the Normal interval.

In the following example, the detection type is set to "peak" and the output mode is set to "always output."



There is no hold interval for interval definition detect, so detection will be performed regardless of the output mode setting.
Comparison will be performed regardless of the comparison mode setting.

If control input is set to hold command or reset command, the HLD command and RST command will be disabled while control input is ON.

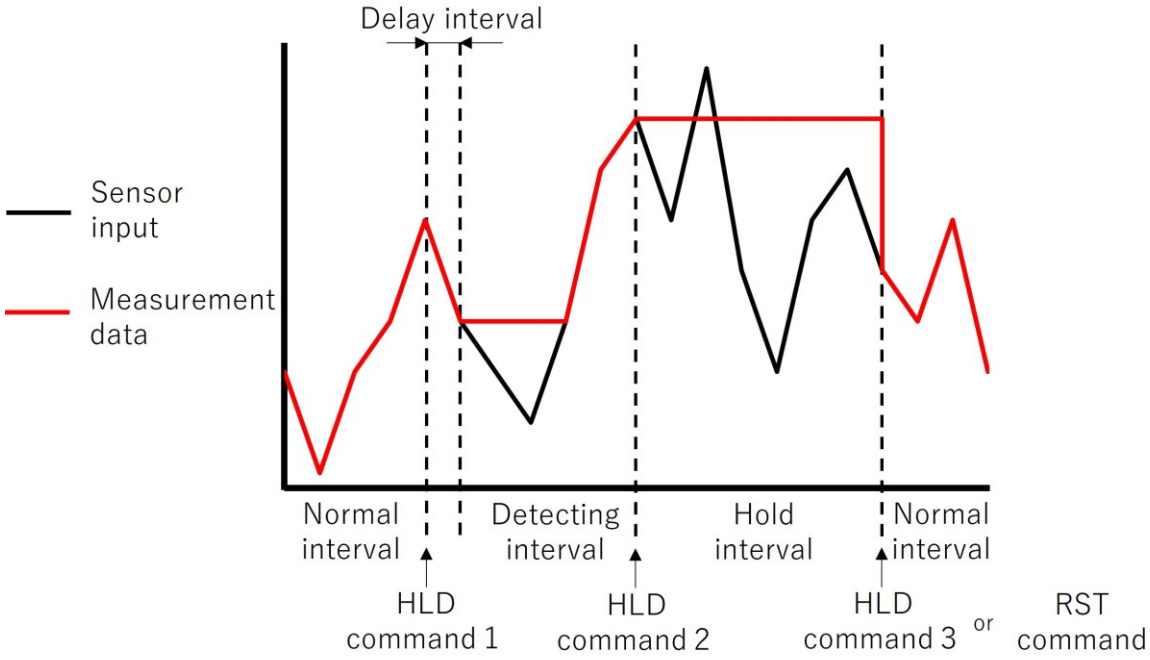
4. Interval definition hold

Continues to detect either the "peak," "bottom," or "peak-to-peak" of the detecting interval as measurement data, and then holds and outputs once the detecting interval has ended.
Details on each operation are described below.

Operation using RS-485 commands

Details on each operation are described below.
When the first HLD command is received, the detecting interval starts once the delay time has elapsed, and then detects and outputs the peak value, etc.
When the second HLD command is received, it transitions to the hold interval and then holds and outputs the peak value, etc.
When the third HLD command or the RST command is received, the hold interval ends, and it transitions to the Normal interval.

In the following example, the detection type is set to "peak" and the output mode is set to "always output."

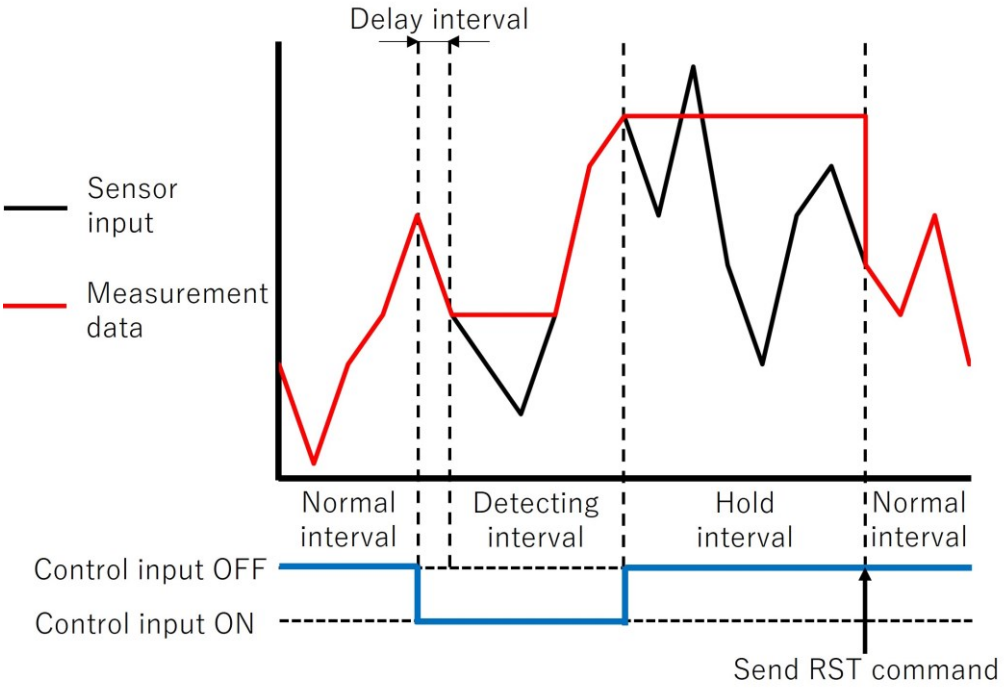


When the RST command is received, it transitions to the Normal interval at any time.
For NC-100A-01, it also transitions to the Normal interval when a reset command is received using control input.

Operation when control input is set to hold command (NC-100A-01 only)

When the hold command switches ON, the peak value, etc. are detected and output for the detecting interval, which is the period from after the delay time has elapsed until the hold command switches OFF.
When the hold command switches OFF, it transitions to the hold interval, and then holds and outputs the peak value, etc.
When the reset command switches ON, the hold interval ends, and it transitions to the Normal interval.

In the following example, the detection type is set to "peak" and the output mode is set to "always output."



While control input is ON, the HLD command and RST command will be disabled.
If the HLD command or RST command is received while control input is OFF, it operates the same as though operating using RS-485 commands.

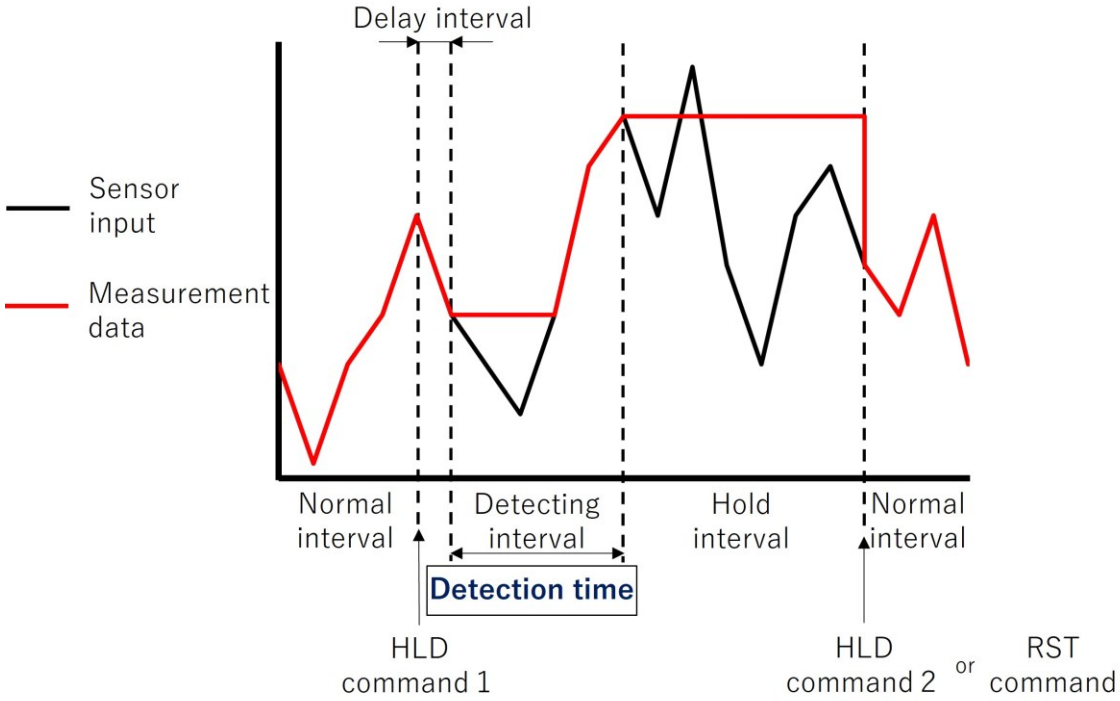
5. Time specification hold

When a hold command is received, it waits for the detection time and then retains the measurement data of either "peak," "bottom," or "peak-to-peak."
Details on each operation are described below.

Operation using RS-485 commands

When the first HLD command is received, the detecting interval starts once the delay time has elapsed, and then detects and outputs the peak value, etc.
It transitions to the hold interval once the detection time has elapsed, and then holds and outputs the peak value, etc.
When the second HLD command or the RST command is received, the hold interval ends, and it transitions to the Normal interval.

In the following example, the detection type is set to "peak" and the output mode is set to "always output."

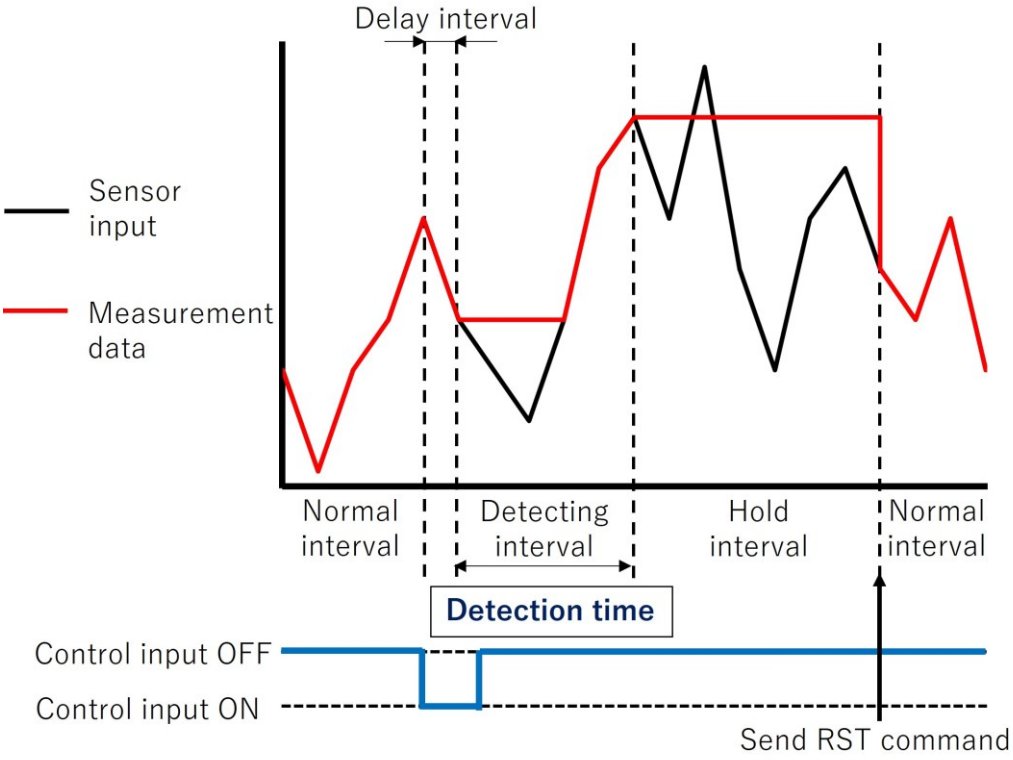


When the RST command is received, it transitions to the Normal interval at any time.
For NC-100A-01, it also transitions to the Normal interval when a reset command is received using control input.

Operation when control input is set to hold command (NC-100A-01 only)

After the hold command switches ON and the delay time has elapsed, the peak value, etc. are detected and output during the detection time (detecting interval).
It transitions to the hold interval once the detection time has elapsed, and then holds and outputs the peak value, etc.
When the reset command switches ON, the hold interval ends, and it transitions to the Normal interval.
If the control input remains ON exceeding the delay time and detection time, it does not transition to the hold interval but repeats the delay time and detection time as if the control input had switched ON.

In the following example, the detection type is set to "peak" and the output mode is set to "always output."



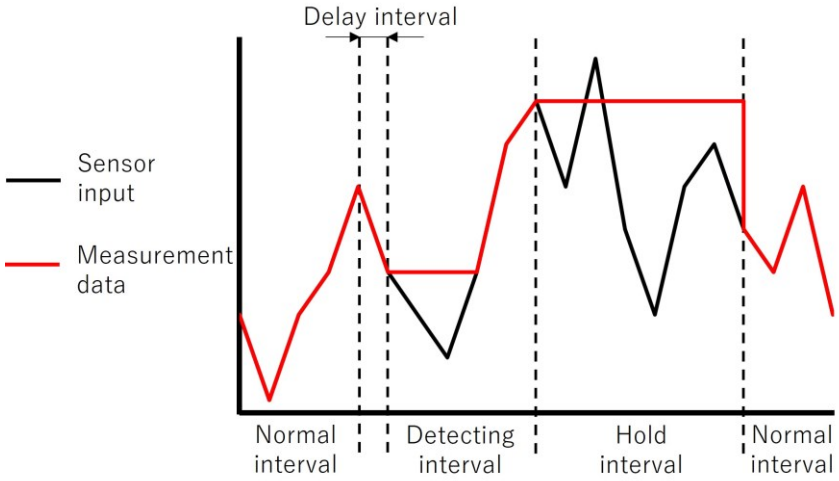
While control input is ON, the HLD command and RST command will be disabled.
If the HLD command or RST command is received while control input is OFF, it operates the same as though operating using RS-485 commands.

11-2-7.Output Modes

These set whether measurement data follows the hold value within the detecting interval.
If the hold mode is set to Arbitrary point hold, which does not have a detecting interval, or to interval definition detect, which does not have a hold interval, the output mode setting is disabled and the "always output" is applied.

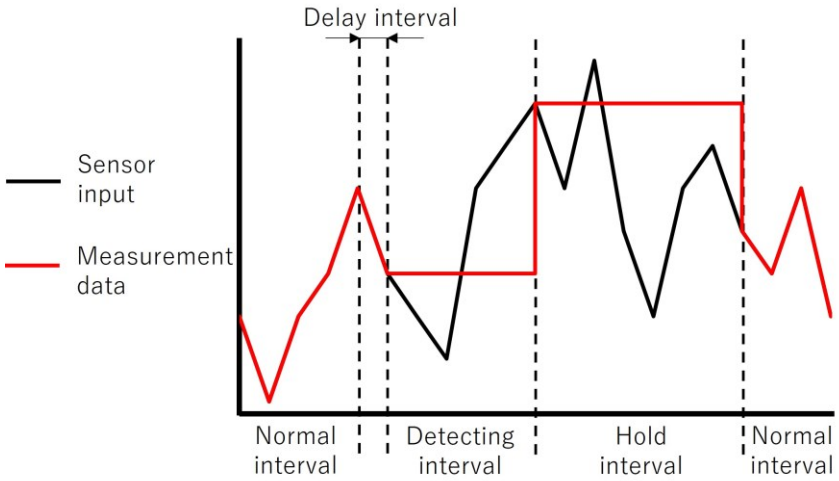
Always output

During the detecting interval, the hold value is output as measurement data.
In the following example, the detection type is set to "peak" and the output mode is set to "always output."



Output at hold moment

During the detecting interval, the measurement data at the start of the detecting interval is retained. The hold value is output as the measurement data upon transition to the hold interval.
In the following example, the detection type is set to "peak" and the output mode is set to "output at hold moment."

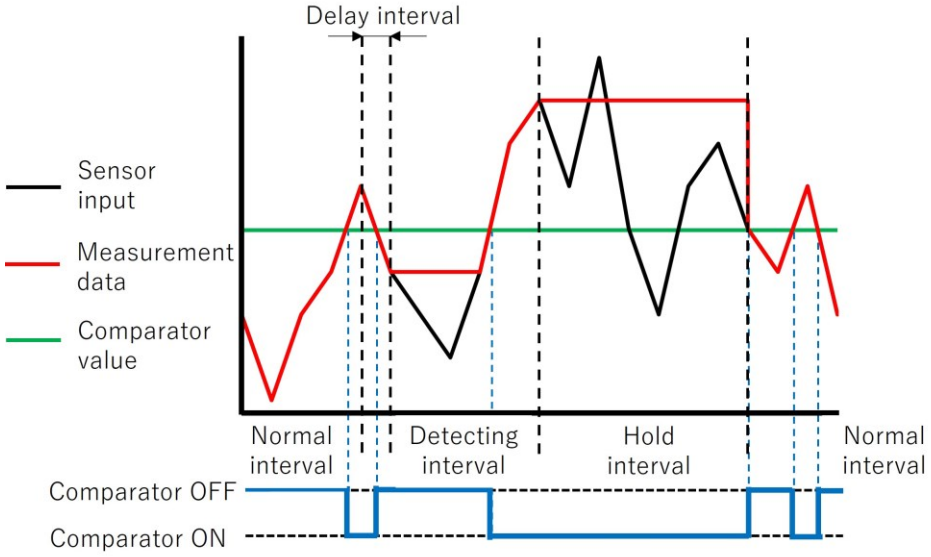


11-2-8.Comparison Modes

During the detecting interval, these set comparator operation ON/OFF.
Refer to "11-3 Comparison Function, Hysteresis Function" for details on comparators.

Always compare

During the detecting interval, the comparator always operates based on measurement data.
In the following example, the detection type is set to "peak" and the comparison mode is set to "always compare."
For the comparator, the detection direction is "High limit" and the comparison value is indicated with the green line below. The operation of only a single comparator is shown in the example.

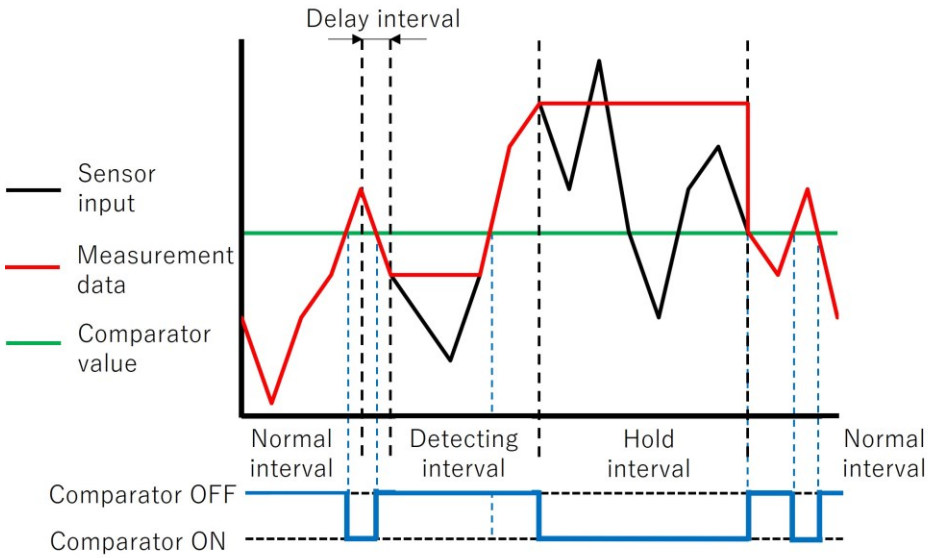


Compare at hold moment

During the detecting interval, all comparators turn OFF, and then comparison is performed after transitioning to the hold interval.

In the following example, the detection type is set to "peak" and the comparison mode is set to "compare at hold moment."

For the comparator, the detection direction is "High limit" and the comparison value is indicated with the green line below. The operation of only a single comparator is shown in the example.



11-3.Comparison Function, Hysteresis Function

This section describes the comparison function and comparison hysteresis of this device.

11-3-1.Comparison Function Outline

This device contains four comparators.
The comparison value and detection direction (High limit, Low limit) of each comparator can be set.
Each comparator operates independently, and detection is performed by each comparator.
If measurement data exceeds the comparison value in the detection direction, the detection result switches to ON.
If measurement data does not exceed the comparison value in the detection direction, the detection result switches to OFF.
The detection result of each comparator can be confirmed by acquiring the status of this device.

The comparators are set through RS-485 commands.
Refer to "11 SCV: Comparison value" for information on the comparison value setting command.
Refer to "12 SCF: Comparator" for information on the comparator detection direction setting command.

Comparator detection results can be acquired through RS-485 commands.
For NC-100A-10, this can also be acquired using CAN output data.
Refer to "34 GST: Status acquisition" for information on acquiring comparator detection results using RS-485 commands.
Refer to "13-3 CAN (NC-100A-10 Function)" for information on acquiring comparator detection results using RS-485 commands.

11-3-2.Comparison Function Example

In this example, +3000.0 g will be measured using a strain gage transducer connected to this device. During measurement, an error of ±300.0 g is within the allowable range, but an error outside ±500.0 g will result in a failure.
Failure can be checked by setting the comparators as shown below.

Comparator	Detection direction	Comparison value
Comparator 0	High limit	+3500.0
Comparator 1	High limit	+3300.0
Comparator 2	Low limit	+2700.0
Comparator 3	Low limit	+2500.0

Measurement data	Comparator 0 detection result	Comparator 1 detection result	Comparator 2 detection result	Comparator 3 detection result
+3400.0	OFF	ON	OFF	OFF
+2900.0	OFF	OFF	OFF	OFF
+2400.0	OFF	OFF	ON	ON

11-3-3.ON/OFF Hysteresis Function

This device can set ON hysteresis or OFF hysteresis during comparator detection.
If ON/OFF hysteresis is set, the comparators will turn ON or OFF under the following conditions.

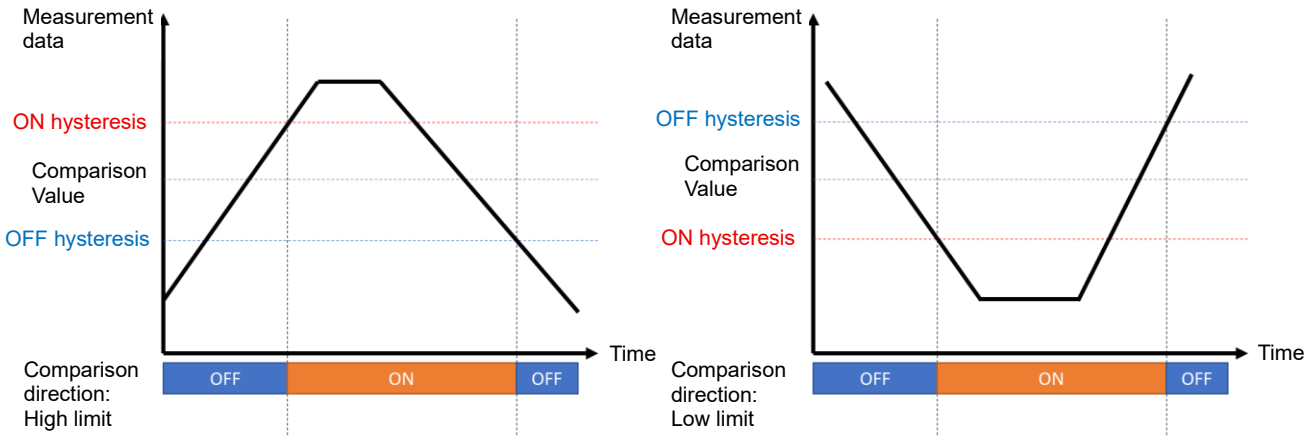
When comparator detection direction is High limit:

ON	Measurement data ≥ Comparison value + ON hysteresis
OFF	Measurement data < Comparison value - OFF hysteresis

When comparator detection direction is Low limit:

ON	Measurement data ≤ Comparison value - ON hysteresis
OFF	Measurement data > Comparison value + OFF hysteresis

An example of the relationship with comparator operation during measurement by this device is shown below.



Refer to "13 SCH: Comparison value ON hysteresis and OFF hysteresis setting" for information on the ON hysteresis and OFF hysteresis setting command.

11-4.Smoothing Function

This section describes the smoothing function that can be set for this device.

Setting item	Description
Moving average	Applies a simple moving average to measurement data.
Minimum scale	Sets the minimum unit for the amount of change in measurement data.
Low-pass filter	Applies a low-pass filter to measurement data.

Refer to "14 SSM: Smoothing function setting" for information on the smoothing function setting RS-485 command.

11-4-1.Moving Average

Applies a simple moving average to the measurement data acquired by this device.

The setting range is from 1 time to 1200 times, and can be set in increments of 1.
If set to 1200 times, the result will be the moving average of measurement data for approximately 0.5 seconds.

11-4-2.Minimum Scale

Rounds the measurement data acquired by this device to the specified minimum scale setting value.

The minimum scale division can be set up to 1000 in the 1-2-5 series.
Examples with a setting value of 20, 50, and 100 are provided below.

Minimum scale 20

Data			Data after rounding
…			…
-50	to	-31	-40
-30	to	-11	-20
-10	to	10	0
11	to	30	20
31	to	50	40
…			…

Minimum scale 50

Data			Data after rounding
	…		…
-125	to	-76	-100
-75	to	-26	-50
-25	to	25	0
26	to	75	50
76	to	125	100
	…		…

Minimum scale 100

Data			Data after rounding
	…		…
-250	to	-151	-200
-150	to	-51	-100
-50	to	50	0
51	to	150	100
151	to	250	200
	…		…

11-4-3.Low-Pass Filter

Applies a digital low-pass filter to the measurement data acquired by this device.

This device uses a 2D IIR low-pass filter.

A cutoff frequency of 30 Hz, 60 Hz, or 120 Hz can be selected.

Refer to "14 SSM: Smoothing function setting" for details on configuration.

11-5.Additional Value Function

This section describes the additional value function of this device.
This device provides a function to add an additional value to measurement data.
When the additional value is set, the additional value will always be added to measurement data.

Functions will treat measurement data with an additional value applied as normal measurement data.
For example, if measurement data with an additional value applied exceeds the comparison value, the detection result of the comparator will switch to ON.

Refer to "15 SZM: Additional value function setting" for information on the additional value setting command.

11-6.Level Test Function

This section describes the level test function of this device.
The level test function of this device can be used to set an arbitrary value as measurement data to confirm the operation of a function.
The level test function can be set to output the level test value as measurement data, or to add the level test value to the measurement data and output it.

The level test function can be set ON/OFF using RS-485 commands.

Refer to "26 LVS: Level test function setting" for information on the level test function setting command.

11-7.User String Saving Function

This section describes the user string saving function of this device.
The user string saving function of this device is used to save a string of 0 to 9 characters to this device using RS-485 commands.
The characters that can be used are uppercase letters (A to Z) and numbers (0 to 9).

Refer to "21 UAS: User string saving function setting" for information on the user string save commands.

11-8.Measurement Condition Management Function

NOTE	
After sending commands related to measurement conditions, do not turn the power supply OFF until a response is received from this device.	
	When the above command is received, this device will save the settings to its internal memory. If the power is cut off while saving is in progress, this may cause damage to this device.

11-8-1.Measurement Condition Numbers

This section describes the measurement condition management function of this device.
This device manages the following functions as measurement conditions.

- Hold function
- Smoothing function
- Additional value function
- Level test function
- Comparison function
- ON/OFF hysteresis function
- Tare zero, digital zero function
- User string function
- Control I/O function (NC-100A-01 function)

This device manages measurement conditions using measurement condition numbers, and 16 of these numbers can be saved (00 to 15).
When starting or saving this device, the measurement conditions set for the measurement condition number are applied as the setting values for this device.
When this device is shipped from the factory, number 00 is set as the default measurement conditions.

The measurement condition selection command is used to change the measurement condition number used as the current measurement conditions. This overwrites the current setting values with the measurement conditions of the selected measurement condition number.

[Example] SOP05: The measurement condition number is changed to 05, and the current measurement conditions of this device are overwritten with the measurement conditions registered to measurement condition number 05.

The measurement condition overwrite command overwrites the specified measurement condition number with the measurement conditions currently used as setting values.

[Example] COP05: Measurement condition number 05 is overwritten with the current measurement conditions of this device.

Refer to "22 SOP: Measurement condition number selection" and "23 COP: Measurement condition overwriting" for information on setting commands related to managing measurement conditions.

11-8-2.Measurement Condition Setting Initialization

This device provides an initialization command using RS-485 to revert measurement conditions to the factory settings.
The changes made by the initialization command are listed below.

- The following settings saved as measurement conditions 00 through 15 will be reverted to the factory settings.
  - Hold mode, delay time, detection time
  - Smoothing settings
  - Additional value
  - Level test settings
  - ON hysteresis, OFF hysteresis
  - Comparator setting values 0 through 3
  - Tare zero, digital zero
  - Control I/O
  - User string
- The following settings unrelated to measurement conditions will be reverted to the factory settings.
  - CAN settings (ID, baud rate, output interval, ID mode)
- The following settings related to calibration and not saved to measurement condition numbers will not be initialized.
  - No-load zero value
  - Rated output value
  - Rated capacity value

Refer to "Initializing This Device" for information on the factory setting values.
Refer to "24 RES: Initialization of setting values except calibration values" for details on the initialization command.

11-9.Self-Check Function

This section describes the self-check function of this device.

This device performs the following self-checks and sends the results when a self-check execution command is sent via RS-485.

- Memory — Checks for abnormalities in the internal memory and returns the result.
- Bridge power supply voltage — Checks for abnormalities in the bridge power supply voltage and returns the result.
- Sensor signal wiring — Checks for abnormalities in the sensor signal wiring and returns the result.

If there are any abnormalities, refer to "14 TROUBLESHOOTING" and perform troubleshooting.

Refer to "30 CHK: Self-check" for details on the self-check execution command.

12.TURNING THE POWER SUPPLY OF THIS DEVICE OFF

Notes vary depending on the model of this device.

12-1.Turning NC-100A-01 Power Supply OFF

NOTE	
If installing this device at the end of the bus, ensure that a terminator is inserted, such as another device.	
	The terminator will no longer function if the power supply of this device is turned OFF. If installing this device at the end of the bus, either ensure that the power supply is not turned OFF, or ensure that a terminator is inserted, such as another device. Failure to do so could impede communication among other devices and could cause an accident or a failure.
If the save command and initialization command are sent to this device, do not turn the power supply OFF until a response is received from this device.	
	When the above command is received, this device will save the settings to its internal memory. If the power is cut off while saving is in progress, this may cause damage to this device.

Stop supplying power to this device.

When sending a save or initialize command, confirm that an RS-485 communication response is received before turning off the power to this device.

12-2.Turning NC-100A-10 Power Supply OFF

NOTE	
If installing this device at the end of the bus, ensure that a terminator is inserted, such as another device.	
	The terminator will no longer function if the power supply of this device is turned OFF. If installing this device at the end of the bus, either ensure that the power supply is not turned OFF, or ensure that a terminator is inserted, such as another device. Failure to do so could impede communication among other devices and could cause an accident or a failure.
If using in an environment where other devices are communicating, turn the power supply of this device OFF only after disconnecting it from the CAN bus.	
	A dominant signal of up to 200 microseconds will be output throughout the CAN bus when the power supply of this device is turned OFF, which could impede communication with other devices on the bus and could cause a failure in other devices. If turning the power supply of this device OFF in an environment where other devices are communicating over the CAN bus, first turn the communication ON/OFF switch of this device OFF, disconnect it from the CAN bus, and then turn the power supply OFF.
If the save command and initialization command are sent to this device, do not turn the power supply OFF until a response is received from this device.	
	When the above command is received, this device will save the settings to its internal memory. If the power is cut off while saving is in progress, this may cause damage to this device.

Stop supplying power to this device.

When sending a save or initialize command, confirm that an RS-485 communication response is received before turning off the power to this device.

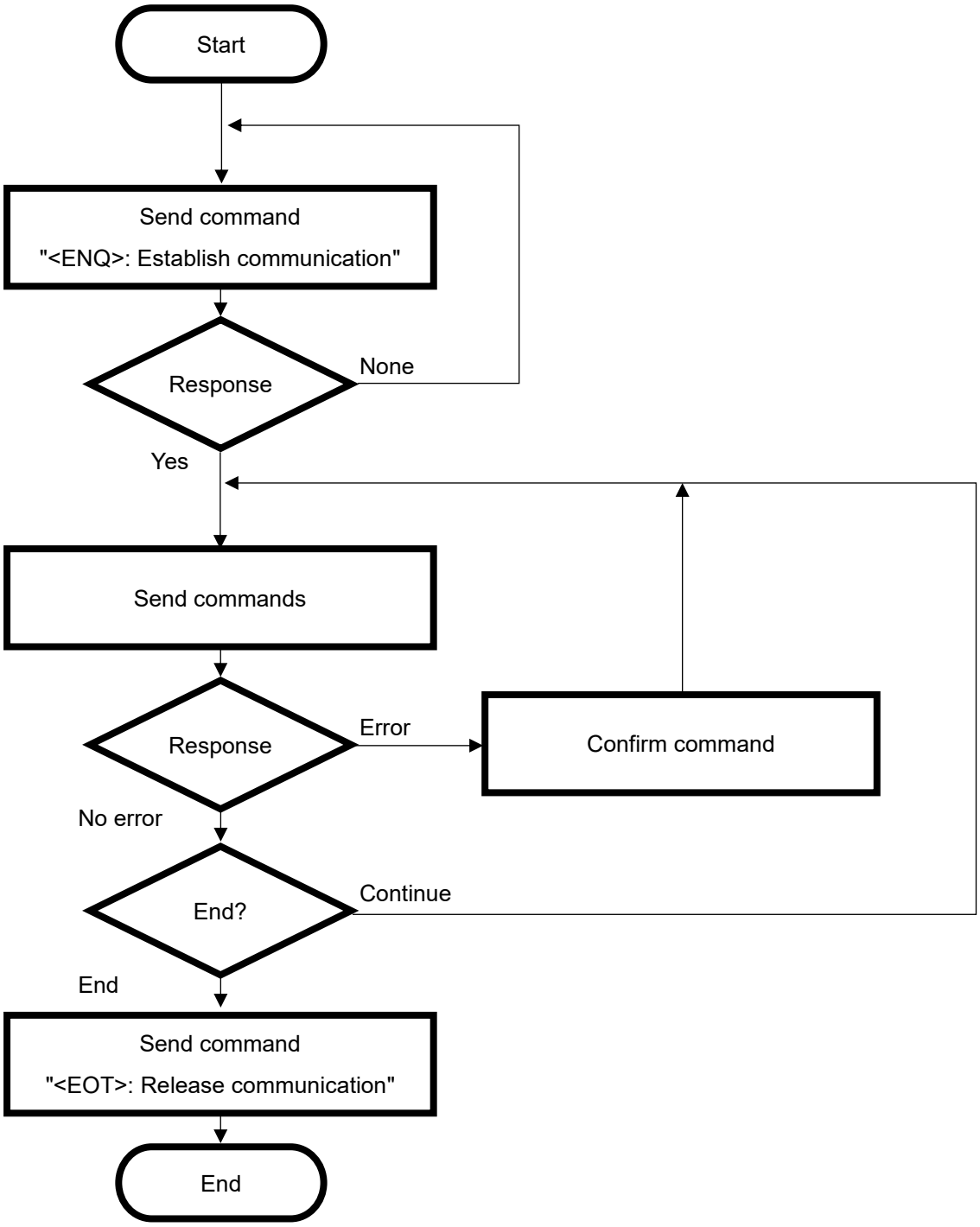
13.FUNCTIONS

13-1.RS-485 Commands

NOTE	
After sending the command to save settings to this device, do not turn off the power until a response is received.	
	When the above command is received, this device will save the settings to its internal memory. If the power is cut off while saving is in progress, this may cause damage to this device.

13-1-1.Outline

Commands can be sent via RS-485 to this device to set measurement conditions, perform calibration, and perform data acquisition.
After performing the procedures up through "7 TURNING THE POWER SUPPLY OF THIS DEVICE ON," use a PC or other control device to send commands.
Refer to the following flowchart for information on control using commands.



1. Sample program

Sample code from the Tera Term, open-source terminal emulator software, is shown below.
Executing this code will perform smoothing and data acquisition for this device with RS-485 ID 01.
Refer to Tera Term official website for information on using Tera Term.

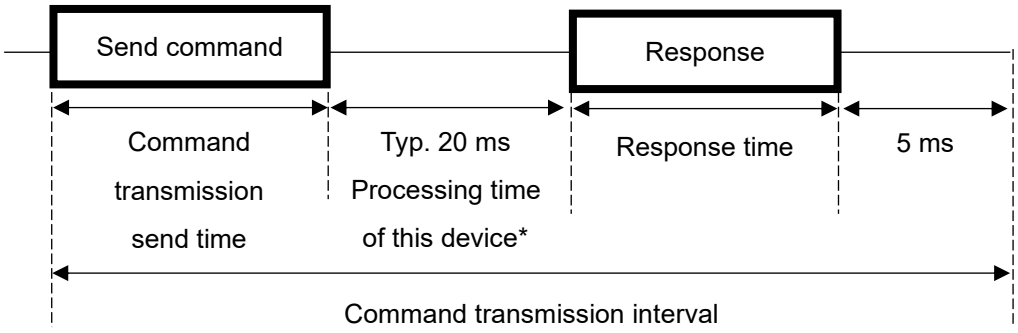
```
; Declaration and definition of variables
cr = $0d
lf = $0a
enq = $05
id = "01"
waittime = 50

;Establishing communication <enq>ID<cr>
send enq id cr
mpause waittime

; Get data after setting smoothing
send "SSM1200,0,1,0" cr
mpause waittime
send "GDT1" cr
mpause waittime
```

2. Command interval

When sending commands from a PC or other device, set the command transmission interval to at least the time calculated as shown below. However, setting some commands such as calibration takes time, so the transmission interval must be set to at least the time listed on the page describing the command.



* When a command to save setting values to this device is sent, a processing time of approximately 500 milliseconds or more is required. Refer to "13-1-2 Command list" for details on whether setting values are saved for each command.

3. Command description pages

Commands are described using the format below in the following pages.
Some information may be omitted for certain command functions.

Settings	
Command	Describes the format of the setting command sent to this device. All commands for this device are standardized to three characters, consisting of binary control characters and ASCII characters. Included parameters are written in lowercase letters.
Command parameters	Describes parameters included in the setting command.
Command byte length	The byte length of the command.
Response	Describes the response sent when this device receives the command. Included parameters are written in lowercase letters.
Response parameters	Describes parameters included in the response.
Response byte length	The byte length of the response.
Loading	
Command	Describes the format of the loading command sent to this device. Included parameters are written in lowercase letters.
Command parameters	Describes parameters included in the loading command.
Command byte length	The byte length of the command.
Response	Describes the response sent when this device receives the command. Included parameters are written in lowercase letters.
Response parameters	Describes parameters included in the response.
Response byte length	The byte length of the response.
Explanation/other information	
Describes command functionality and provides other supplementary information.	

4. Control characters

This device uses the following control characters for RS-485 communication.
Control characters are represented by a single byte in binary.

Control characters	Binary	Usage
<ENQ>	0x05	Used as a prefix when starting communication, as an RS-485 communication convention.
<ACK>	0x06	Used as a prefix when responding to the <ENQ>: Establish communication command.
<EOT>	0x04	Used as a prefix when ending communication, as an RS-485 communication convention.
<CR>	0x0d	Used at the end when sending/receiving.
<LF>	0x0a	Used at the end when sending a response from this device.

13-1-2.Command list

The following commands are received during RS-485 communication with this device.
Refer to the section for each command for details.

Type	NO.	/M support	Save when sent	Description
Communication establishment/end	1			<ENQ>: Establish communication
	2			<EOT>: Release communication
	3			RS-: RS line test
Calibration	4		✓	ZAD: No-load zero calibration
	5		✓	VRC: Numeric value registering calibration
	6		✓	VCL: Actual load calibration
	7		✓	EIC: Sensitivity registering calibration
	8		✓	EID: TEDS calibration
Measurement condition settings	9	✓		SZT: Automatic zero compensation setting
	10	✓		SMF: Hold mode setting
	11	✓		SCV: Comparison value setting
	12	✓		SCF: Comparator detection direction setting
	13	✓		SCH: Comparison value ON hysteresis and OFF hysteresis setting
	14	✓		SSM: Smoothing function setting
	15	✓		SZM: Additional value function setting
	16	✓		SIO: Control I/O function setting (NC-100A-01 function)
	17	✓		CID: CAN ID setting (NC-100A-10 function)
	18	✓		CBR: CAN output baud rate setting (NC-100A-10 function)
	19	✓		COI: CAN data output interval setting (NC-100A-10 function)
	20	✓		CCF: CAN ID mode standard/extended switching (NC-100A-10 function)
	21	✓		UAS: User string saving function setting
	22	✓		SOP: Measurement condition number selection
	23		✓	COP: Measurement condition overwriting
	24		✓	RES: Initialization of setting values except calibration values

Type	NO.	/M support	Save When sent	Description
Control/operation confirmation	25	✓		ZON: Tare zero function, digital zero function setting
	26	✓		LVS: Level test function setting
	27			HLD: Hold command
	28			RST: Reset command
	29			CCT: Control input status confirmation (NC-100A-01 function)
	30			CHK: Self-check execution
	31			SYS: Model, etc. acquisition
Data acquisition	32			GDT: Measurement data acquisition
	33			GOD: Original value acquisition
	34			GST: Status acquisition
Error message	35			ng: Undefined command, response outside setting range

/M: About the setting save command

NOTE	
After sending the save command, do not turn the power supply OFF until a response is received from this device.	
	When a command with "/M" appended is received, this device will save the settings to its internal memory. If the power is cut off while saving is in progress, this may cause damage to this device.

Settings	
Command	・ aaaaaaa/M<CR> Note: "a" represents the command
Command parameters	According to the command input for "a"
Response	According to the command input for "a"
Response parameters	According to the command input for "a"
Explanation/other information	
・ Commands with this suffix character will cause setting values to be saved to the internal memory of this device. ・ A response will be sent once settings have been saved to this device. The processing time for saving settings to this device is approximately 500 ms.	

13-1-3.Communication Establishment/End Commands

1. <ENQ>: Establish communication

Settings	
Command	<ENQ>aa<CR>
Command parameters	・ aa Device ID 01 to 99 Specified as two digits.
Command byte length	4 bytes
Response	<ACK>aa<CR><LF>
Response parameters	・ aa Device ID
Response byte length	5 bytes
Explanation/other information	
・ <ENQ> is a control character, which is represented as 0x05 in a single binary byte. Refer to "4 Control characters". ・ <ACK> is a control character, which is represented as 0x06 in a single binary byte. Refer to "4 Control characters". ・ The device ID is set using the switches. Refer to "6-1-4 Setting of RS-485 ID" for details. ・ No response will be provided if the device ID is different. ・ Execute this command before sending other commands.	

2. <EOT>: Release communication

Settings	
Command	<EOT><CR>
Command parameters	None
Command byte length	2 bytes
Response	None
Explanation/other information	
・ Release communication with this device. ・ <EOT> is a control character, which is represented as 0x04 in a single binary byte. Refer to "4 Control characters". ・ Once communication has been released, this device will not receive any commands other than "1 <ENQ>: Establish communication."	

3. RS-: RS line test

Loading	
Command	RS-<CR>
Command parameters	None
Command byte length	4 bytes
Response	RS-485<CR><LF>
Response parameters	None
Response byte length	8 bytes
Explanation/other information	
・ This command is used to confirm that communication has been established. It always sends the same response regardless of the setting.	

13-1-4.Calibration Commands

4. ZAD: No-load zero calibration

NOTE
After sending the calibration command, do not turn the power supply OFF until a response is received from this device.
 When the above command is received, this device will save the settings to its internal memory. If the power is cut off while saving is in progress, this may cause damage to this device.

Settings	
Command	ZAD<CR>
Command parameters	None
Command byte length	4 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Loading	
Command	PRR011<CR>
Command parameters	None
Command byte length	7 bytes
Response	±a.aaaa<CR><LF>
Response parameters	・ ±a.aaaa No-load zero value (mV/V)
Response byte length	9 bytes
Explanation/other information	
・ Registers the original value input when this command was received, as the no-load zero value. ・ The no-load zero value set using this command is registered (overwritten) to the internal memory of this device. ・ The response is provided approximately 500 milliseconds after the command has been received. The above time may vary depending on the baud rate.	

5. VRC: Numeric value registering calibration

NOTE
After sending the calibration command, do not turn the power supply OFF until a response is received from this device.
 When the above command is received, this device will save the settings to its internal memory. If the power is cut off while saving is in progress, this may cause damage to this device.

Settings	
Command	VRC±a.aaaa<CR>
Command parameters	・ ±a.aaaa No-load zero value (mV/V) -7.5000 to +7.5000
Command byte length	11 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Loading	
Command	PRR011<CR>
Command parameters	None
Command byte length	7 bytes
Response	±a.aaaa<CR><LF>
Response parameters	・ ±a.aaaa No-load zero value (mV/V)
Response byte length	9 bytes
Explanation/other information	
・ Registers the no-load zero value to this device specified as an argument. Use this when ensuring a no-load condition is difficult, such as when using a pressure sensor for absolute pressure measurement or when a load is already applied. ・ The no-load zero value set using this command is registered (overwritten) to the internal memory of this device. ・ The response is provided approximately 500 milliseconds after the command has been received. The above time may vary depending on the baud rate.	

6. VCL: Actual load calibration

NOTE
After sending the calibration command, do not turn the power supply OFF until a response is received from this device.
 When the above command is received, this device will save the settings to its internal memory. If the power is cut off while saving is in progress, this may cause damage to this device.

Settings	
Command	VCL±aaaaaa<CR>
Command parameters	・ ±aaaaaa Rated capacity value -099999 to +099999 Specify 7 characters including the sign (+/-) (1 sign character + 6 digits including the decimal point). If a decimal point is not included (or if the number of digits is insufficient), pad the empty leading digits with zeros.
Command byte length	11 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Loading	
Command	PRR010<CR>
Command parameters	None
Command byte length	7 bytes
Response	±a.aaaa,±bbbbbb<CR><LF>
Response parameters	・ ±a.aaaa Rated output value (mV/V) ・ ±bbbbbb Rated capacity value
Response byte length	17 bytes
Explanation/other information	

・ Calculates the rated output using the following equation from the original value input to this device when this command was received, and registers this to this device.

Rated output value = (Original value when this command was received) - (No-load zero value)

・ The argument of this command is registered to this device as the rated capacity value.

・ The rated capacity value and rated output value set using this command are registered (overwritten) to the internal memory of this device.

・ Follow the instructions in "9-2-2 Actual Load Calibration Procedure" when executing the command.

・ The response is provided approximately 500 milliseconds after the command has been received. The above time may vary depending on the baud rate.

7. EIC: Sensitivity registering calibration

NOTE

After sending the calibration command, do not turn the power supply OFF until a response is received from this device.

When the above command is received, this device will save the settings to its internal memory. If the power is cut off while saving is in progress, this may cause damage to this device.

Settings	
Command	EIC±a.aaaa,±bbbbbb<CR>
Command parameters	・ ±a.aaaa Rated output value (mV/V) -7.5000 to +7.5000 ・ ±bbbbbb Rated capacity value -099999 to +099999 Specify 7 characters including the sign (+/-) (1 sign character + 6 digits including the decimal point). If a decimal point is not included (or if the number of digits is insufficient), pad the empty leading digits with zeros.
Command byte length	19 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Loading	
Command	PRR010<CR>
Command parameters	None
Command byte length	7 bytes
Response	±a.aaaa,±bbbbbb<CR><LF>
Response parameters	・ ±a.aaaa Rated output value (mV/V) ・ ±bbbbbb Rated capacity value
Response byte length	17 bytes
Explanation/other information	
・ The rated capacity value and rated output value set using this command are registered (overwritten) to the internal memory of this device. ・ Outputs an error when the ratio between the rated capacity value and rated output value exceeds 1:10000 or 10000:1. ・ The response is provided approximately 500 milliseconds after the command has been received. The above time may vary depending on the baud rate.	

8. EID: TEDS calibration

NOTE
After sending the calibration command, do not turn the power supply OFF until a response is received from this device.
 When the above command is received, this device will save the settings to its internal memory. If the power is cut off while saving is in progress, this may cause damage to this device.

Settings	
Command	EID<CR>
Command parameters	None
Command byte length	4 bytes
Response	rd-*<CR><LF>
Response parameters	* The number loaded (1 through 4)
Response byte length	6 bytes
Loading	
Command	PRR010<CR>
Command parameters	None
Command byte length	7 bytes
Response	±a.aaaa,±bbbbbb<CR><LF>
Response parameters	・ ±a.aaaa Rated output value (mV/V) ・ ±bbbbbb Rated capacity value
Response byte length	17 bytes
Explanation/other information	
・ The response to this command is provided approximately 2 seconds after the command has been received. If converters are connected in parallel, an additional approximately 2 seconds is required for each additional unit. The above time may vary depending on the baud rate. ・ The template for loading is NO.33 (Bridge sensors). ・ Physical value and Electrical output in TEDS information are used to execute sensitivity registering calibration. ・ The rated capacity value and rated output value set using this command are saved (overwritten) to the internal memory of this device. ・ Returns an error if "Excitation level, max." in TEDS information is less than 5 V. ・ Returns an error if different models of transducers are connected in parallel.	

13-1-5.Measurement Condition Setting Commands

9. SZT: Automatic zero compensation setting

Settings	
Command	SZTaaaaaa,b.bb<CR>
Command parameters	・ aaaaaa Zero compensation range 000000 to 099999 Specify 6 digits including the decimal point. If a decimal point is not included (or if the number of digits is insufficient), pad the empty leading digits with zeros. Set the decimal point position to match the setting value for rated output. ・ b.bb Judging time (s) 0.00 to 9.99
Command byte length	15 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Loading	
Command	PRR090<CR>
Command parameters	None
Command byte length	7 bytes
Response	aaaaaa,b.bb<CR><LF>
Response parameters	・ aaaaaa Zero compensation range ・ b.bb Judging time (s)
Response byte length	13 bytes
Explanation/other information	
・ Compatible with the setting save command ("/M"). ・ Sends an error response ("35 ng: Undefined command, response outside setting range") if a parameter outside the setting range is sent. ・ If the decimal point position of the rated capacity value is changed through calibration, the decimal point position of the zero compensation range will move to the same position. ・ Example: Rated capacity value +015000 SZT001000,1.00<CR> ・ Example: Rated capacity value +1.5000 SZT0.1000,1.00<CR> ・ Refer to "11-1-4 Automatic Zero Compensation Function" for details on the function.	

10. SMF: Hold mode setting

Settings	
Command	SMFaa,b,c,d.dd,e.ee<CR>
Command parameters	・ aa Hold mode 00: Normal, 01: Arbitrary point hold, 02: Interval definition Peak detect, 03: Interval definition peak hold, 04: Time specification peak hold, 05: Interval definition Bottom detect, 06: Interval definition bottom hold, 07: Time specification bottom hold, 08: Interval definition Peak-to-peak detect, 09: Interval definition peak-to-peak hold, 10: Time specification peak-to-peak hold ・ b Output mode 0: Always output, 1: Output at hold moment ・ c Comparison mode 0: Always compare, 1: Compare at hold moment ・ d.dd Delay time (s) 0.00 to 9.99 ・ e.ee Detection time (s) 0.01 to 9.99
Command byte length	20 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Loading	
Command	PRR070<CR>
Command parameters	None
Command byte length	7 bytes
Response	aa,b,c,d.dd,e.ee<CR><LF>
Response parameters	・ aa Hold mode ・ b Output mode ・ c Comparison mode ・ d.dd Delay time (s) ・ e.ee Detection time (s)
Response byte length	18 bytes
Explanation/other information	
・ Compatible with the setting save command ("/M"). ・ Sends an error response ("35 ng: Undefined command, response outside setting range") if a parameter outside the setting range is sent. ・ Refer to "11-2 Hold Function" for details on the function.	

11. SCV: Comparison value setting

Settings	
Command	SCVa,±bbbbbb<CR>
Command parameters	・ a Comparator number 0: Comparator 0, 1: Comparator 1, 2: Comparator 2, 3: Comparator 3 ・ ±bbbbbb Comparison value -099999 to +099999 Specify 7 characters including the sign (+/-) (1 sign character + 6 digits including the decimal point). If a decimal point is not included (or if the number of digits is insufficient), pad the empty leading digits with zeros. Set the decimal point position to match the setting value for rated output.
Command byte length	13 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Loading	
Command	PRR050<CR> Comparator 0 comparison value PRR051<CR> Comparator 1 comparison value PRR052<CR> Comparator 2 comparison value PRR053<CR> Comparator 3 comparison value
Command byte length	7 bytes
Command parameters	None
Response	±aaaaaa<CR><LF>
Response parameters	・ ±aaaaaa Comparison value
Response byte length	9 bytes

Explanation/other information

- Compatible with the setting save command ("/M").
- Sends an error response ("35 ng: Undefined command, response outside setting range") if a parameter outside the setting range is sent.
- Registers the comparison value to a different comparator, based on the value of parameter a.
- Refer to "12 SCF: Comparator" for information on the comparator detection direction setting command.
- If the decimal point position of the rated capacity value is changed through calibration, the decimal point position of the comparison value will move to the same position.
  Example: Rated capacity value +015000
  SCV0,+001000<CR>
  Example: Rated capacity value +1.5000
  SCV0,+0.1000<CR>
- “11-3 Comparison Function, Hysteresis Function" for details on the comparison function.

12. SCF: Comparator detection direction setting

Settings	
Command	SCFa,b,c,d<CR>
Command parameters	・ a Comparator 0 detection direction 0: High limit, 1: Low limit ・ b Comparator 1 detection direction 0: High limit, 1: Low limit ・ c Comparator 2 detection direction 0: High limit, 1: Low limit ・ d Comparator 3 detection direction 0: High limit, 1: Low limit
Command byte length	11 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Loading	
Command	PRR054<CR>
Command parameters	None
Command byte length	7 bytes
Response	a,b,c,d<CR><LF>
Response parameters	・ a Comparator 0 detection direction ・ b Comparator 1 detection direction ・ c Comparator 2 detection direction ・ d Comparator 3 detection direction
Response byte length	9 bytes
Explanation/other information	
・ Compatible with the setting save command ("/M"). ・ Sends an error response ("35 ng: Undefined command, response outside setting range") if a parameter outside the setting range is sent. ・ Refer to "11 SCV: Comparison value setting" for information on the comparator comparison value setting command. ・ Refer to "11-3 Comparison Function, Hysteresis Function" for details.	

13. SCH: Comparison value ON hysteresis and OFF hysteresis setting

Settings	
Command	SCHa,bbbbbb<CR>
Command parameters	・ a ON hysteresis, OFF hysteresis 0: ON hysteresis, 1: OFF hysteresis ・ bbbbbb Hysteresis 000000 to 099999 Specify 6 digits including the decimal point. If a decimal point is not included (or if the number of digits is insufficient), pad the empty leading digits with zeros. Set the decimal point position to match the setting value for rated output.
Command byte length	12 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Loading	
Command	PRR042<CR> ON hysteresis PRR043<CR> OFF hysteresis
Command parameters	None
Command byte length	7 bytes
Response	aaaaaa<CR><LF>
Response parameters	・ aaaaaa Hysteresis
Response byte length	8 bytes

Explanation/other information

- Compatible with the setting save command ("/M").
- Sends an error response ("35 ng: Undefined command, response outside setting range") if a parameter outside the setting range is sent.
- When command parameter a is 0, registers the ON hysteresis setting.
  When command parameter a is 1, registers the OFF hysteresis setting.
- If the decimal point position of the rated capacity value is changed through calibration, the decimal point position of hysteresis will move to the same position.
  Example: Rated capacity value +015000
  SCH0,001000<CR>
  Example: Rated capacity value +1.5000
  SCH0,0.1000<CR>
- Refer to "11-3 Comparison Function, Hysteresis Function" for details on the comparison function and hysteresis function.

14. SSM: Smoothing function setting

Settings	
Command	SSMaaaa,b,c,d<CR>
Command parameters	・ aaaa Moving average count (times) 0001 to 1200 ・ b Minimum scale 0: 1, 1: 2, 2: 5, 3: 10, 4: 20, 5: 50, 6: 100, 7: 200, 8: 500, 9: 1000 ・ c IIR low-pass filter (Hz) 0: None, 1: 30, 2: 60, 3: 120 ・ d Reserved Fixed at 0
Command byte length	14 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Loading	
Command	PRR020<CR>
Command parameters	None
Command byte length	7 bytes
Response	aaaa,b,c,d<CR><LF>
Response parameters	・ aaaa Moving average count (times) ・ b Minimum scale ・ c IIR low-pass filter (Hz) ・ d Reserved
Response byte length	12 bytes
Explanation/other information	
・ Compatible with the setting save command ("/M"). ・ Sends an error response ("35 ng: Undefined command, response outside setting range") if a parameter outside the setting range is sent. ・ d is fixed at 0. Enter "0" when sending the command. Sends an error response if any value other than 0 is entered. ・ Refer to "11-4 Smoothing" for details on the smoothing function.	

15. SZM: Additional value function setting

Settings	
Command	SZM1,±aaaaaa<CR>
Command parameters	・ ±aaaaaa Additional value -099999 to +099999 Specify 7 characters including the sign (+/-) (1 sign character + 6 digits including the decimal point). Set the decimal point position to match the setting value for rated output.
Command byte length	13 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Loading	
Command	PRR030<CR>
Command parameters	None
Command byte length	7 bytes
Response	±aaaaaa<CR><LF>
Response parameters	・ ±aaaaaa Additional value
Response byte length	9 bytes

Explanation/other information

- Compatible with the setting save command ("/M").
- Sends an error response ("35 ng: Undefined command, response outside setting range") if a parameter outside the setting range is sent.
- If the decimal point position of the rated capacity value is changed through calibration, the decimal point position of the additional value will move to the same position.
- Example: Rated capacity value +015000
  SZM1,+001000<CR>
  Example: Rated capacity value +1.5000
  SZM1,+0.1000<CR>
- Refer to "11-5 Additional Value Function" for details on the additional value function.

16. SIO: Control I/O function setting (NC-100A-01 function)

Settings	
Command	SIOa,b<CR>
Command parameters	・ a Control input 0: None, 1: Reset command, 2: Hold command, 3: Tare zero execution & Application to measurement data enabled (Not retained when power supply turned OFF), 4: Digital zero execution & Application to measurement data enabled (not retained when power supply turned OFF) ・ b Control output 0: Always OFF, 1: Healthy, 2: Comparator 0 comparison result, 3: Comparator 1 comparison result, 4: Comparator 2 comparison result, 5: Comparator 3 comparison result, 6: ON when comparison result of all comparators is OFF 7: Input ±OVER, measurement data overflow
Command byte length	7 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Loading	
Command	PRR080<CR>
Command parameters	None
Command byte length	7 bytes
Response	a,b<CR><LF>
Response parameters	・ a Control input ・ b Control output
Response byte length	5 bytes
Explanation/other information	
・ Compatible with the setting save command ("/M"). ・ Sends an error response ("35 ng: Undefined command, response outside setting range") if a parameter outside the setting range is sent. ・ This function is specific to NC-100A-01. ・ Sends an error response ("35 ng: Undefined command, response outside setting range") if this command is sent to a device other than NC-100A-01. ・ Refer to "13-2 Control I/O (NC-100A-01 Function)" for details on the control I/O function.	

17. CID: CAN ID setting (NC-100A-10 function)

Settings	
Command	CID0,aaa<CR> CID1,bbbbbbbb<CR>
Command parameters	・ aaa CAN ID in standard format (for CID0) 000 to 7FF Specified as three hexadecimal digits. ・ bbbbbbbb CAN ID in extended format (for CID1) 00000000 to 1FFFFFFF Specified as eight hexadecimal digits.
Command byte length	CID0:9 bytes CID1:14 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Loading	
Command	PRR120<CR>
Command parameters	None
Command byte length	7 bytes
Response	aaa,bbbbbbbb<CR><LF>
Response parameters	・ aaa CAN ID in standard format ・ bbbbbbbb CAN ID in extended format
Response byte length	14 bytes
Explanation/other information	

・ Compatible with the setting save command ("/M").
・ Sends an error response ("35 ng: Undefined command, response outside setting range") if a parameter outside the setting range is sent.
・ This function is specific to NC-100A-10.
・ Sends an error response ("35 ng: Undefined command, response outside setting range") if this command is sent to a device other than NC-100A-10.
・ Sent command examples
Standard format: CID0,7FF<CR>
Extended format: CID1,1FFFFFFF<CR>

・ Refer to "20 CCF: CAN ID mode standard/extended switching (NC-100A-10 function)" for information on switching the CAN ID format output by this device.
・ Refer to "13-3 CAN (NC-100A-10 Function)" for details on the CAN function.

18. CBR: CAN output baud rate setting (NC-100A-10 function)

Settings	
Command	CBRaa<CR>
Command parameters	・ aa CAN output baud rate (kbps) 00: 10, 01: 20, 02: 25, 03: 33.3, 04: 50, 05: 62.5, 06: 83.3, 07: 100, 08: 125, 09: 250, 10: 500, 11: Reserved, 12: 1000
Command byte length	6 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Loading	
Command	PRR121<CR>
Command parameters	None
Command byte length	7 bytes
Response	aa<CR><LF>
Response parameters	・ aa CAN output baud rate (kbps)
Response byte length	4 bytes
Explanation/other information	

・ Compatible with the setting save command ("/M").
・ Sends an error response ("35 ng: Undefined command, response outside setting range") if a parameter outside the setting range is sent.
・ "11" is reserved and cannot be used. If sent, an error response ("35 ng: Undefined command, response outside setting range") will be sent.
・ This function is specific to NC-100A-10.
・ Sends an error response ("35 ng: Undefined command, response outside setting range") if this command is sent to a device other than NC-100A-10.
・ Refer to "13-3 CAN (NC-100A-10 Function)" for details on the CAN function.

19. COI: CAN data output interval setting (NC-100A-10 function)

Settings	
Command	COIaa<CR>
Command parameters	・ aa CAN data output interval (ms) 00: 0.5, 01: 1, 02: 2, 03: 5, 04: 10, 05: 20, 06: 50, 07: 100, 08: 200, 09: 500, 10: 1000
Command byte length	6 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Loading	
Command	PRR122<CR>
Command parameters	None
Command byte length	7 bytes
Response	aa<CR><LF>
Response parameters	・ aa CAN data output interval (ms)
Response byte length	4 bytes
Explanation/other information	

・ Compatible with the setting save command ("/M").
・ Sends an error response ("35 ng: Undefined command, response outside setting range") if a parameter outside the setting range is sent.
・ This function is specific to NC-100A-10.
・ Sends an error response ("35 ng: Undefined command, response outside setting range") if this command is sent to a device other than NC-100A-10.
・ Refer to "13-3 CAN (NC-100A-10 Function)" for details on the CAN function.

20. CCF: CAN ID mode standard/extended switching (NC-100A-10 function)

Settings	
Command	CCFa<CR>
Command parameters	・ a CAN ID mode 0: Standard format, 1: Extended format
Command byte length	5 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Loading	
Command	PRR123<CR>
Command parameters	None
Command byte length	7 bytes
Response	a<CR><LF>
Response parameters	・ a CAN ID mode
Response byte length	3 bytes

Explanation/other information

- Compatible with the setting save command ("/M").
- Sends an error response ("35 ng: Undefined command, response outside setting range") if a parameter outside the setting range is sent.
- This function is specific to NC-100A-10.
  Sends an error response ("35 ng: Undefined command, response outside setting range") if this command is sent to a device other than NC-100A-10.
- This command sets the CAN ID mode (standard ID or extended ID) for CAN output data.
  Refer to "17 CID: CAN ID setting (NC-100A-10 function)" for information on setting the CAN ID itself.
- Refer to "13-3 CAN (NC-100A-10 Function)" for details on the CAN function.

21. UAS: User string saving function setting

Settings	
Command	UASaaaaaaaaa<CR>
Command parameters	・ aaaaaaaaa Any character string of 0 to 9 characters Uppercase letters (A to Z) and numbers (0 to 9).
Command byte length	4 to 13 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Loading	
Command	PRR110<CR>
Command parameters	None
Command byte length	7 bytes
Response	aaaaaaaaa<CR><LF>
Response parameters	・ aaaaaaaaa Any character string of 0 to 9 characters Returns only <CR><LF> if there are no characters.
Response byte length	2 to 11 bytes
Explanation/other information	

・ Compatible with the setting save command ("/M").
・ Sends an error response ("35 ng: Undefined command, response outside setting range") if a parameter outside the setting range is sent.
・ If the registered string has fewer than nine characters, the response byte length will vary depending on the registered string.
Example: PRR110 response when UAS<CR> is sent
<CR><LF> : 2 bytes
Example: PRR110 response when UAS012345<CR> is sent
012345<CR><LF> : 8 bytes

22. SOP: Measurement condition number selection

NOTE	
After sending commands related to measurement conditions, do not turn the power supply OFF until a response is received from this device.	
	When the above command is received, this device will save the settings to its internal memory. If the power is cut off while saving is in progress, this may cause damage to this device.

Settings	
Command	SOPaa<CR>
Command parameters	・ aa Measurement condition numbers From 00 (measurement condition number 0) to 15 (measurement condition number 15)
Command byte length	6 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Loading	
Command	PRR063<CR>
Command parameters	None
Command byte length	7 bytes
Response	aa<CR><LF>
Response parameters	・ aa Current measurement condition number
Response byte length	4 bytes
Explanation/other information	
・ Compatible with the setting save command ("/M"). ・ Sends an error response ("35 ng: Undefined command, response outside setting range") if a parameter outside the setting range is sent. ・ Refer to "11-8 Measurement Condition Management Function" for details on the measurement condition management function.	

23. COP: Measurement condition overwriting

NOTE
After sending commands related to measurement conditions, do not turn the power supply OFF until a response is received from this device.
 When the above command is received, this device will save the settings to its internal memory. If the power is cut off while saving is in progress, this may cause damage to this device.

Settings	
Command	COPaa<CR>
Command parameters	・ aa Measurement condition numbers From 00 (measurement condition number 0) to 15 (measurement condition number 15)
Command byte length	6 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Loading	
Command	PRR063<CR>
Command parameters	None
Command byte length	7 bytes
Response	aa<CR><LF>
Response parameters	・ aa Current measurement condition number
Response byte length	4 bytes
Explanation/other information	
・ Sends an error response ("35 ng: Undefined command, response outside setting range") if a parameter outside the setting range is sent. ・ The current settings of this device are registered (overwritten) to the measurement condition number specified by this command. ・ Refer to "11-8 Measurement Condition Management Function" for details on the measurement condition management function.	

24. RES: Initialization of setting values except calibration values

NOTE	
After sending the initialization command, do not turn the power supply OFF until a response is received from this device.	
	When the above command is received, this device will save the settings to its internal memory. If the power is cut off while saving is in progress, this may cause damage to this device.

Settings	
Command	RES0628<CR>
Command parameters	None
Command byte length	8 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Loading	
Command	Use the loading command for the command to confirm the setting values.
Explanation/other information	
・ The response is provided approximately 7 second after the command has been received. ・ Sends an error response ("35 ng: Undefined command, response outside setting range") if a parameter outside the setting range is sent. ・ Be sure to refer to "11-8-2 Measurement Condition Setting Initialization" before sending this command. ・ Refer to "Initializing This Device" for information on the setting values applied after initialization.	

13-1-6.Control/Operation Confirmation Commands

25. ZON: Tare zero function, digital zero function setting

Settings	
Command	ZONa,b,c<CR>
Command parameters	・ a Zero value type 0: Tare zero, 1: Digital zero ・ b Zero value application 0: Do not apply, 1: Apply ・ c Zero value acquisition 0: Do not acquire, 1: Acquire
Command byte length	9 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Loading	
Command	PRR100<CR> Tare zero PRR101<CR> Digital zero
Command parameters	None
Command byte length	7 bytes
Response	a,±bbbbbb<CR><LF>
Response parameters	・ a Zero value application status 0: Do not apply, 1: Apply ・ ±bbbbbb Zero value
Response byte length	11 bytes
Explanation/other information	

・ Compatible with the setting save command ("/M").
・ Sends an error response ("35 ng: Undefined command, response outside setting range") if a parameter outside the setting range is sent.
・ When command parameter a is 0, registers the tare zero setting.
When command parameter a is 1, registers the digital zero setting.
・ If the decimal point position of the rated capacity value is changed through calibration, the decimal point position of the zero setting will move to the same position.
Example: PRR100 response for rated capacity value +015000
0,+001000<CR><LF>
Example: PRR100 response for rated capacity value +1.5000
0,+0.1000<CR><LF>
・ Refer to "11-1 Zero Functions" for details on the zero setting function.

26. LVS: Level test function setting

Settings	
Command	LVSa,b,±cccccc<CR>
Command parameters	・ a Level test ON/OFF 0: OFF, 1: ON ・ b Data addition 0: OFF, 1: ON ・ cccccc Level test value -099999 to +099999 Specify 7 characters including the sign (+/-) (1 sign character + 6 digits including the decimal point). If a decimal point is not included (or if the number of digits is insufficient), pad the empty leading digits with zeros.
Command byte length	15 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Loading	
Command	PRR031<CR>
Command parameters	None
Command byte length	7 bytes
Response	a,b,±cccccc<CR><LF>
Response parameters	・ a Level test ON/OFF ・ b Data addition ・ ±cccccc Level test value
Response byte length	13 bytes
Explanation/other information	
・ Compatible with the setting save command ("/M"). ・ Sends an error response ("35 ng: Undefined command, response outside setting range") if a parameter outside the setting range is sent. ・ If the decimal point position of the rated capacity value is changed through calibration, the decimal point position of the level test function setting will move to the same position. Example: Rated capacity value +015000 LVS1,1,+001000<CR> Example: Rated capacity value +1.5000 LVS1,1,+0.1000<CR> ・ Refer to "11-6 Level Test Function" for details on the level test function.	

27. HLD: Hold command

Settings	
Command	HLD<CR>
Command parameters	None
Command byte length	4 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Explanation/other information	
・ The measurement status of this device changes each time this command is executed. Refer to "11-2-3 Hold Command, Reset Command" for details.	

28. RST: Reset command

Settings	
Command	RST<CR>
Command parameters	None
Command byte length	4 bytes
Response	ok<CR><LF>
Response parameters	None
Response byte length	4 bytes
Explanation/other information	
・ The measurement status of this device changes each time this command is executed. Refer to "11-2-3 Hold Command, Reset Command" for details.	

29. CCT: Control input status confirmation (NC-100A-01 function)

Loading	
Command	CCT<CR>
Command parameters	None
Command byte length	4 bytes
Response	a<CR><LF>
Response parameters	・ a Control input status 0: Input OFF, 1: Input ON
Response byte length	3 bytes
Explanation/other information	
・ This function is specific to NC-100A-01. Sends an error response ("35 ng: Undefined command, response outside setting range") if this command is sent to a device other than NC-100A-01. ・ If there are any abnormalities, refer to "14 TROUBLESHOOTING" and perform troubleshooting. ・ Refer to "13-2 Control I/O (NC-100A-01 Function) " for details on the control I/O function.	

30. CHK: Self-check execution

Loading	
Command	CHK<CR>
Command parameters	None
Command byte length	4 bytes
Response	abc<CR><LF>
Response parameters	・ a Result of Memory check 0: Not abnormal, 1: Abnormal ・ b Result of bridge power supply voltage check 0: Not abnormal, 1: Abnormal ・ c Result of sensor signal wiring check 0: Not abnormal, 1: Abnormal
Response byte length	5 bytes
Explanation/other information	
・ The response is provided approximately 500 milliseconds after the command has been received. The above time may vary depending on the baud rate. ・ If there are any abnormalities, refer to "14 TROUBLESHOOTING" and perform troubleshooting. ・ Refer to "11-9 Self-Check Function" for details on the self-check function.	

31. SYS: Model, etc. acquisition

Loading	
Command	SYS<CR>
Command parameters	None
Command byte length	4 bytes
Response	NC-100A-aa,bb.bb,ccccccccc<CR><LF>
Response parameters	・ aa Model designation number ・ bb.bb Firmware version ・ ccccccccc Serial number (nine alphanumeric characters)
Response byte length	28 bytes
Explanation/other information	
・ Sends the device model, firmware version, and serial number.	

13-1-7.Data Acquisition Commands

32. GDT: Measurement data acquisition

Loading	
Command	GDT1<CR>
Command parameters	None
Command byte length	5 bytes
Response	D1±aaaaaa<CR><LF>
Response parameters	・ ±aaaaaa Measurement data -099999 to +099999 Returned as a fixed length of 7 characters including the sign (+/-) (1 sign character + 6 digits including the decimal point). If a decimal point is not included, the empty digits are padded with leading zeros. Examples: Measurement data is +999.99 D1+999.99<CR><LF> Measurement data is -99 D1-000099<CR><LF> Original value exceeds +7.5500 mV/V D1+OFL_IN<CR><LF> Original value falls below -7.5500 mV/V D1-OFL_IN<CR><LF> Measurement data exceeds +099999 or +999.99 D1+OFL_DP<CR><LF> Measurement data falls below -099999 or -999.99 D1-OFL_DP<CR><LF>
Response byte length	11 bytes
Explanation/other information	
・ The response is provided approximately 20 milliseconds after the command has been received. The above times will vary depending on the baud rate. ・ If OFL_IN or OFL_DP is included in the response parameter, an abnormality may have occurred. Refer to "14 TROUBLESHOOTING" and perform troubleshooting. ・ Refer to "10 DATA ACQUISITION" for details on measurement data acquisition.	

33. GOD: Original value acquisition

Loading	
Command	GOD<CR>
Command parameters	None
Command byte length	4 bytes
Response	D0±a.aaaa<CR><LF>
Response parameters	・ ±a.aaaa Original value (mV/V) -7.5000 to +7.5000 If the original value falls outside the above range due to out-of-range input, the following is displayed. [Example]: If the original value exceeds +7.5500 mV/V: D0+ OFL<CR><LF> If the original value falls below -7.5500 mV/V: D0- OFL<CR><LF>
Response byte length	11 bytes

Explanation/other information
・ The response is provided approximately 20 milliseconds after the command has been received. The above times will vary depending on the baud rate. ・ If OFL is included in the response parameter, an abnormality may have occurred. Refer to "14 TROUBLESHOOTING" and perform troubleshooting. ・ Can acquire the signal (original value) from the strain gage transducer being input to this device. ・ The unit is (mV/V).

34. GST: Status acquisition

Loading	
Command	GST<CR>
Command parameters	None
Command byte length	4 bytes
Response	Sabcdefghijk<CR><LF>
Response parameters	・ a Comparator 0 0: OFF, 1: ON ・ b Comparator 1 0: OFF, 1: ON ・ c Comparator 2 0: OFF, 1: ON ・ d Comparator 3 0: OFF, 1: ON ・ e All comparators OFF 0: Any comparator is ON, 1: All comparators are OFF. ・ f Normal interval (detecting, not holding) 0: Not measuring, 1: Measuring ・ g Detecting interval 0: Not detecting, 1: Detecting ・ h Hold interval 0: Not holding, 1: Holding ・ i Input overflow 0: Not abnormal, 1: Abnormal ・ j Data overflow 0: Not abnormal, 1: Abnormal ・ k CAN output error 0: Not abnormal, 1: Abnormal
Response byte length	14 bytes
Explanation/other information	
・ The response is provided approximately 20 milliseconds after the command has been received. The above times will vary depending on the baud rate. ・ Refer to "10-1 Data Acquisition Commands" for details on status. ・ This will be 1 if ON, or 0 if OFF.	

13-1-8.Error Message

35. ng: Undefined command, response outside setting range

Response	
Response	ng<CR><LF>
Response parameters	None
Response byte length	4 bytes
Explanation/other information	
・ Returns this response if the command is undefined or the setting command is outside the settable range.	

13-1-9.PRR: Parameter Loading

This section describes the PRR commands, which are used to read setting parameters for the setting commands of this device.
Lists are provided below. These also indicate for which command each PRR command applies.
Refer to the command pages for details on commands and parameters.
Some commands are available for all models of this device, while other commands are available only for specific models. These are listed separately.

1. Commands for all models of this device

Command	Response	Description	Reference
PRR010<CR>	±a.aaaa, ±bbbbbb<CR><LF>	Calibration setting value	6 VCL: Actual load calibration 7 EIC: Sensitivity registering calibration 8 EID: TEDS calibration
PRR011<CR>	±a.aaaa<CR><LF>	No-load zero value	4 ZAD: No-load zero calibration 5 VRC: Numeric value registering calibration
PRR020<CR>	aaaa,b,c,d<CR><LF>	Smoothing settings	14 SSM: Smoothing function setting
PRR030<CR>	±aaaaaa<CR><LF>	Additional value setting	15 SZM: Additional value function setting
PRR031<CR>	a,b,±cccccc<CR><LF>	Level test settings	26 LVS: Level test function setting
PRR042<CR>	aaaaaa<CR><LF>	ON hysteresis setting value	13 SCH: Comparison value ON hysteresis and OFF hysteresis setting
PRR043<CR>	aaaaaa<CR><LF>	OFF hysteresis setting value	
PRR050<CR>	±aaaaaa<CR><LF>	Comparator 0 setting value	11 SCV: Comparison value setting
PRR051<CR>	±aaaaaa<CR><LF>	Comparator 1 setting value	
PRR052<CR>	±aaaaaa<CR><LF>	Comparator 2 setting value	
PRR053<CR>	±aaaaaa<CR><LF>	Comparator 3 setting value	
PRR054<CR>	a,b,c,d<CR><LF>	Comparator detection direction setting value	12 SCF: Comparator detection direction setting
PRR063<CR>	aa<CR><LF>	Measurement condition setting value	22 SOP: Measurement condition number selection 23 COP: Measurement condition overwriting
PRR070<CR>	aa,b,c,d.dd,e.ee<CR><LF>	Hold function setting value	10 SMF: Hold mode setting

Command	Response	Description	Reference
PRR090<CR>	aaaaaa,b.bb<CR><LF>	Automatic zero compensation function setting value	9 SZT: Automatic zero compensation setting
PRR100<CR>	a,±bbbbbb<CR><LF>	Tare zero function setting value	25 ZON: Tare zero function, digital zero function setting
PRR101<CR>	a,±bbbbbb<CR><LF>	Digital zero function setting value	
PRR110<CR>	aaaaaaaaa<CR><LF>	User string saving function setting value	21 UAS: User string saving function setting

2. Command specific to NC-100A-01

Command	Response	Description	Reference
PRR080<CR>	a,b<CR><LF>	Control input, control output function setting value	16 SIO: Control I/O function setting (NC-100A-01 function)

3. Commands specific to NC-100A-10

Command	Response	Description	Reference
PRR120<CR>	aaa,bbbbbbbb<CR><LF>	CAN ID setting value	17 CID: CAN ID setting (NC-100A-10 function)
PRR121<CR>	aa<CR><LF>	CAN output baud rate setting value	18 CBR: CAN output baud rate setting (NC-100A-10 function)
PRR122<CR>	aa<CR><LF>	CAN output interval setting value	19 COI: CAN data output interval setting (NC-100A-10 function)
PRR123<CR>	a<CR><LF>	CAN ID format setting value	20 CCF: CAN ID mode standard/extended switching (NC-100A-10 function)

13-2.Control I/O (NC-100A-01 Function)

This section describes the control input function and control output function for NC-100A-01.

13-2-1.Control Input Function Details

The control input terminals of this device can be used to perform some RS-485 command functions.
The control input function setting command can be used to set functions performed using control input for this device.
The control input status acquisition command can be used to confirm the control input status of this device.
Control input turns ON when the IN terminal and INCOM terminal of this device are connected.
It turns OFF when the IN terminal and INCOM terminal are not connected.
Refer to "16 SIO: Control I/O function setting (NC-100A-01 function)" for details on the control input function setting command.
Refer to "29 CCT: Control input status confirmation (NC-100A-01 function)" for details on the control input function status confirmation command.

The functions and operations that can be set through control input for this device are described in the table below.

Parameter	Function	Operation
0	None	Status where control input is not received.
1	Reset command	A reset command is input when control input is turned ON. Refer to "11-2 Hold Function" for details on operations.
2	Hold command	A hold command is input when control input is turned ON. Refer to "11-2 Hold Function" for details on operations.
3	Tare zero execution & Application to measurement data enabled (Not retained when power supply turned OFF),	Registers measurement data from when control input switched from OFF to ON as the tare zero value, and subtracts this from measurement data. Refer to "11-1-5 Tare Zero Function Using the Control Input Function of NC-100A-01" for details on operations.
4	Digital zero execution & Application to measurement data enabled (not retained when power supply turned OFF)	Registers measurement data from when control input switched from OFF to ON as the digital zero value, and subtracts this from measurement data. Refer to "11-1-6 Digital Zero Function Using the Control Input Function of NC-100A-01" for details on operations.

13-2-2.Control Output Function Details

The control output for this device outputs ON/OFF linked with some status conditions of this device.
When the control output is OFF, open collector output switches to the H level.
When the control output is ON, open collector output switches to the L level.
The status linked with the control output of this device is set using "16 SIO: Control I/O function setting (NC-100A-01 function)."

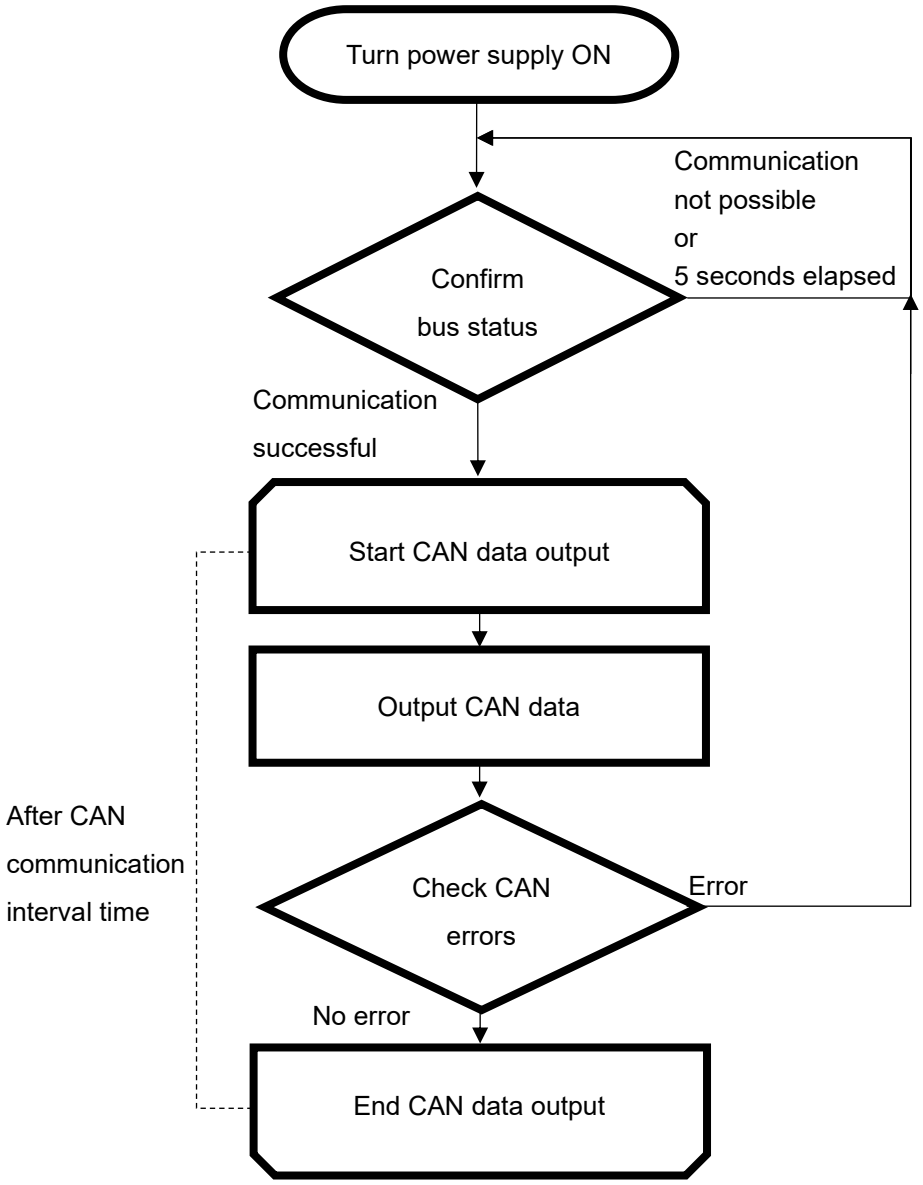
The status conditions that can be linked are described in the table below.

Parameter	Function	Operation
0	Always OFF	Status where the control output of this device is always OFF.
1	Healthy	While this device is operating, the control output of this device will always be ON.
2	Comparator 0 comparison result	The control output of this device is linked with the comparison result of comparator 0.
3	Comparator 1 comparison result	The control output of this device is linked with the comparison result of comparator 1.
4	Comparator 2 comparison result	The control output of this device is linked with the comparison result of comparator 2.
5	Comparator 3 comparison result	The control output of this device is linked with the comparison result of comparator 3.
6	ON when comparison result of all comparators is OFF	Switches ON when the comparison result of all comparators of this device is OFF. Switches OFF if the comparison result of any comparator is ON.
7	Input overflow, measurement data overflow	Switches ON if the measurement data input for this device is excessive, or if measurement data overflows.

13-3.CAN (NC-100A-10 Function)

13-3-1.Outline

This device provides CAN communication functionality.
After performing the procedures up through "7 TURNING THE POWER SUPPLY OF THIS DEVICE ON," this device will output CAN measurement data and the status of this device.
The CAN communication operation flowchart of this device is shown below.



Details are provided below.

• Confirm bus status

Confirms the baud rate setting on the bus.

This device is in listen-only mode when communication starts.

If there is communication between other devices on the bus

Loads the bus settings from the communication between other devices. If the settings match those of this device, this device exits listen-only mode and begins outputting CAN data.

If there is no communication for 5 seconds on the bus

This device exits listen-only mode and outputs data. If there is a response from the master, it begins outputting CAN data.

If there is no response, this device determines that its settings differ from the bus settings and returns to listen-only mode.

• Output CAN data

Sends CAN data packets according to the CAN data output interval.

If a communication error occurs during CAN data output, this device stops communication and once again confirms the bus status. If the status is not "bus off," it resumes communication.

13-3-2.CAN Output Data Format

The CAN output data format of this device is described below.

CAN data length		8 bytes
Measurement data	Size	4 bytes
	Data format	Signed single-precision floating-point type
Internal status	Size	4 bytes
	Data format	Unsigned integer type
Endian	Little endian	

• Measurement data

Measurement data is output as a single-precision floating-point type.

• Internal status

The internal status of NC-100A-10 is output as an unsigned integer type.
Details are provided below.

Bit	Value when ON	Status content	When 0	When 1
b0	0x00000001	Comparator 0 status	OFF	ON
b1	0x00000002	Comparator 1 status	OFF	ON
b2	0x00000004	Comparator 2 status	OFF	ON
b3	0x00000008	Comparator 3 status	OFF	ON
b4	0x00000010	All comparators OFF status	Any ON	All OFF
b5	0x00000020	Normal interval	NO	YES
b6	0x00000040	Detecting interval	NO	YES
b7	0x00000080	Hold interval	NO	YES
b8	0x00000100	Original value exceeded	OFF	ON
b9	0x00000200	Measurement data exceeded	OFF	ON
b10-31	0x00000400 - 0x80000000	Reserved	Always 0	

13-3-3.CAN Communication Conditions

NOTE	
Take note of the bus usage when setting the output interval of this device.	
	If a CAN data output interval that is too fast compared with the CAN output baud rate is selected, it will increase usage on the CAN bus, which could impede communication throughout the entire CAN bus and cause failures in other devices. Example: If the CAN output baud rate is 500 kbps and the CAN output interval is 0.5 milliseconds, the bus usage for this device would be approximately 40% If the bus usage exceeds 30%, it could become impossible to communicate as configured. Be especially careful when setting the CAN data output interval of this device.
Do not set this device with the same CAN ID as another device on the bus.	
	If this device is set with the same CAN ID as a node on the same bus, it could prevent normal communication and cause failures in other devices.

The CAN communication conditions that can be set in this device are listed below.
These conditions are set using RS-485 commands.

- CAN ID
  Sets the CAN ID for data output by this device.
  One can be registered for standard, and one can be registered for extended.
  Set by selecting either standard or extended for the output format.
  Refer to "17 CID: CAN ID setting (NC-100A-10 function)" and "20 CCF: CAN ID mode standard/extended switching (NC-100A-10 function)" for details.

- CAN output baud rate
  Sets the communication baud rate for data output by this device.
  Refer to "18 CBR: CAN output baud rate setting (NC-100A-10 function)" for details.

- CAN data output interval
  Sets the output interval for data output by this device.
  Refer to "19 COI: CAN data output interval setting (NC-100A-10 function)" for details.

The recommended setting value for the CAN data output interval of this device differs depending on the CAN output baud rate.
The recommended CAN output interval setting values for each CAN output baud rate are listed below.

	CAN output interval (ms)										
CAN output baud rate (kbps)	0.5	1	2	5	10	20	50	100	200	500	1000
10							✓	✓	✓	✓	✓
20							✓	✓	✓	✓	✓
25						✓	✓	✓	✓	✓	✓
33.3						✓	✓	✓	✓	✓	✓
50					✓	✓	✓	✓	✓	✓	✓
62.5					✓	✓	✓	✓	✓	✓	✓
83.3					✓	✓	✓	✓	✓	✓	✓
100				✓	✓	✓	✓	✓	✓	✓	✓
125				✓	✓	✓	✓	✓	✓	✓	✓
250			✓	✓	✓	✓	✓	✓	✓	✓	✓
500		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1000	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

14.TROUBLESHOOTING

14-1.Issues Concerning Turning Power Supply ON

Issue	What to check	Solution
The power LED does not light up.	Check the power supply voltage specifications of the power supplied to this device.	Confirm that the power supply voltage being used matches the power supply voltage specifications of this device (DC 10 to 30 V), and make sure to use a power supply where voltage fluctuations are within ±10% the nominal voltage.
	Check the wiring of this device.	Wire according to the instructions in "5 WIRING TO THIS DEVICE."
	Check the installation of this device.	Secure using screws that are 10 mm or shorter from the mounted surface to the end of the screw.

14-2.Issues Concerning Communication

Issue	What to check	Solution
There is no response to commands.	Check the order of communication.	Send commands only after communication has been established by sending "1 <ENQ>: Establish communication." Refer to "13-1 RS-485 Commands" for details.
	Check the RS-485 communication settings.	Ensure that the communication settings of this device match those of the control device to connect to this device. Refer to "6-1 Setting of RS-485 Communication Setting Switches" for details on RS-485 communication condition settings.
	Check the communication ON/OFF switch.	Turn the communication ON/OFF switch on this device ON.
	Check the wiring of this device.	Wire according to the instructions in "5 WIRING TO THIS DEVICE."
	Check the installation of this device.	Secure using screws that are 10 mm or shorter from the mounted surface to the end of the screw.
An "ng<CR><LF>" command response is received.	Check the format of the command.	Confirm that the command is being sent in the proper format. Refer to "13-1 RS-485 Commands" for details.
	Check the wiring of this device.	Wire according to the instructions in "5 WIRING TO THIS DEVICE."
	Check the installation of this device.	Secure using screws that are 10 mm or shorter from the mounted surface to the end of the screw.
The STATUS LED is lit up in red.	Check the wiring of this device.	Wire according to the instructions in "5 WIRING TO THIS DEVICE."
	Check the installation of this device.	Secure using screws that are 10 mm or shorter from the mounted surface to the end of the screw.
	Check the communication ON/OFF switch.	Turn the communication ON/OFF switch on this device ON.
	Check the CAN communication settings. (For NC-100A-10)	The STATUS LED lights up in red if CAN communication is not being performed properly, even if RS-485 communication is being performed properly. Confirm the information in "13-3 CAN (NC-100A-10 Function)" and check the CAN settings.

Issue	What to check	Solution
There is an error parameter in the CHK command response.	The memory check response is "1: Abnormal"	Check the usage environment, and restart this device. If the same error is output, contact KYOWA sales personnel or your nearest dealer.
	The bridge power supply voltage check response is "1: Abnormal"	Check the wiring and connection with the sensor, check the usage environment, and restart this device. If the same error is output, contact KYOWA sales personnel or your nearest dealer.
	The sensor signal wiring check response is "1: Abnormal"	Check the wiring and connection with the strain gage transducer, and check the usage environment. If the same error is output, contact KYOWA sales personnel or your nearest dealer.

14-3.Issues Concerning Measurement

Issue	What to check	Solution
Measurement data is fixed and does not change.	Check the wiring of this device.	Wire according to the instructions in "5 WIRING TO THIS DEVICE."
	Check the installation of this device.	Secure using screws that are 10 mm or shorter from the mounted surface to the end of the screw.
	Check the rated capacity value and rated output value.	Data may not change if the ratio between the rated output value and the rated capacity value is extremely small. Use the PRR command to check the rated output value and rated capacity value settings. If the settings are not as expected, perform calibration. Refer to "13-1-9 PRR: Parameter Loading" for details.
	Check the status of this device.	Send "34 GST: Status acquisition" and check the hold status of this device. If it is unexpectedly in the hold status, send "28 RST: Reset command." Refer to "11-2 Hold Function" for details. If the control input function is set to hold command (NC-100A-01 function), measure the current between the IN and INCOM terminals and confirm that it has not been switched ON unexpectedly. Refer to "13-2 Control I/O (NC-100A-01 Function)" for details.
	Confirm that the level test function is not ON.	Use the PRR command to check the level test setting value. If the setting is not as expected, change it. Refer to "11-6 Level Test Function" for details.
	Check the minimum scale setting value.	Measurement data will not change if the minimum scale setting value is too large compared with the amount of change. Use the PRR command to check the minimum scale setting. If the setting is not as expected, change the minimum scale setting. Refer to "11-4 Smoothing Function" for details.

Issue	What to check	Solution
An overflow is occurring.	Check the wiring of this device.	Wire according to the instructions in "5 WIRING TO THIS DEVICE."
	Check the installation of this device.	Secure using screws that are 10 mm or shorter from the mounted surface to the end of the screw.
	Check the measurement data response.	"+OFL_DP" "-OFL_DP" The ratio between the rated output value and the rated capacity value may be extremely large. Use the PRR command to check the rated output value and rated capacity value settings. If the settings are not as expected, perform calibration. Refer to "9 CALIBRATION" for details. "+OFL_IN" "-OFL_IN" Results are outside the input voltage range. Check the sensor and wiring.
	Check the additional value and level test settings.	The unexpected overflow may be caused by the additional value or level test setting. Use the PRR command to check the settings. If the setting is not as expected, change the additional value or level test setting. Refer to "11-5 Additional Value Function" and "11-6 Level Test Function" for details.
	Check the tare zero and digital zero settings.	The unexpected overflow may be caused by the tare zero or digital zero setting value. Use the PRR command to check the settings. If the setting is not as expected, change the tare zero or digital zero setting. Refer to "11-1 Zero Functions" for details.

Issue	What to check	Solution
The measurement data number differs significantly from the actual output.	Check the wiring of this device.	Wire according to the instructions in "5 WIRING TO THIS DEVICE."
	Check the installation of this device.	Secure using screws that are 10 mm or shorter from the mounted surface to the end of the screw.
	Check the installation site of the strain gage transducer.	Confirm that the strain gage transducer is placed on a flat surface and that the position of the measured object is aligned with the measuring unit of the transducer. Inappropriate placement may prevent accurate measurement.
	Check the additional value and level test settings.	The unexpected value may be caused by the additional value or level test setting. Use the PRR command to check the settings. If the setting is not as expected, change the additional value or level test setting. Refer to "11-5 Additional Value Function" and "11-6 Level Test Function" for details.
	Check the tare zero and digital zero settings.	The unexpected value may be caused by the tare zero or digital zero setting value. Use the PRR command to check the settings. If the setting is not as expected, change the tare zero or digital zero setting. Refer to "11-1 Zero Functions" for details.

15.PRODUCT SPECIFICATION

Unit Specifications

Name		Digital conversion unit
Model		NC-100A-01(RS-485, Control IO) NC-100A-10(RS-485, CAN output)
Channels		1
Terminal Block		One-touch type terminal
Measuring targets		Strain gage transducers
Compatible bridge resistance		350 to 1000 Ω
TEDS	Interface	IEEE1451.4 Mixed Mode Transducer Interface Class2
	Applicable transducer	Should have information written in accordance with IEEE template No. 33, cable length should be 30 m or less
Bridge excitation *1		5 VDC ±5%
Measuring range		±7.5 mV/V (Input range including zero adjustment range)
Frequency response		DC to 200 Hz (±1 dB)
Sampling speed		2404 times/s
AD converter resolution		24 bits
Original value Accuracy *1,*2		Within ±0.1% FS
Measure value Accuracy *1,*2		Within ±0.1% FS
Nonlinearity *1,*2		Within ±0.1% FS
Control input		Only NC-100A-01 Points: 1 Formats: Non-voltage contact signal or open collector (NPN) Functions can be changed by setting (zero, reset, hold, etc.).
Control output		Only NC-100A-01 Points: 1 Formats: Open collector (NPN) (30 VDC, 20 mA max.) Functions can be changed by setting (healthy, comparison results, errors, etc.).
Stability *1		Temperature Zero point: Within ±0.4μ V_{RTI}/ºC Sensitivity: Within ±0.01 %/ºC Time Zero point: Within ±2.0 μV_{RTI}/8h Sensitivity: Within ±0.1 %/8h
Power supply		10 to 30 VDC, 3 W or less (24 VDC, 350 Ω load)
Operating temperature		-20 to 60 ºC
Operating Humidity		20 to 80 % (non-condensing)
Storage temperature		-20 to 60 ºC
Dimensions		57.4 W ×92.0 D ×20.0 H mm (Excluding protrusions)
Weight		Approx. 100 g

*1 The measuring unit specifications apply to the state in which the temperature has stabilized after a preheating time of 30 minutes.

*2 Calibration settings rated capacity value 15000, rated output 7.5mV/V.

Vibration resistance	29.4 m/s^2 (3 G), 5 to 200 Hz (12 cycles for each axis, 10 minutes/cycle)
Shock resistance	294 m/s^2 (30 G), 11 ms or less, half sine wave
Withstand Voltage	NC-100A-01: 250 VAC for 1 minute between power supply and sensor input 250 VAC for 1 minute between power supply and RS-485 signal 250 VAC for 1 minute between power supply and control IO signal 250 VAC for 1 minute between RS-485 signal and sensor control IO signal NC-100A-10: 250 VAC for 1 minute between power supply and sensor input 250 VAC for 1 minute between power supply and RS-485 signal 250 VAC for 1 minute between power supply and CAN signal 250 VAC for 1 minute between RS-485 signal and sensor CAN signal
Operating environment	Indoor use, Pollution degree 2, Altitude up to 2000 m
Degree of Protection	IP20 (JIS C 0920 / IEC 60529)
Standard Accessories	Main unit cover, 4 screws for fixing the main unit cover, 4 rubber feet, Setting software *1

Function

Calibration *2	Actual load calibration, Sensitivity registering calibration, Numeric value registering calibration, TEDS calibration
Control *2	Zero, Hold, Reset
Check *2	Memory, Bridge excitation, Sensor
Smoothing *2	Moving average: 1 to 1200 times IIR filter: LPF 30, 60, 120 Hz Amplitude ratio at cutoff frequency: -3±1 dB Attenuation characteristics: -18 dB/oct. or less Min scale: 1, 2, 5, 10, 20, 50, 100, 200, 500, and 1000 counts
Hold mode *2	Types: Normal, Arbitrary point hold, Peak hold, Interval definition peak hold, Time specification peak hold, Bottom hold, Interval definition bottom hold, Time specification bottom hold, Peak-to-peak hold, Interval definition peak-to-peak hold, Time specification peak-to-peak hold Detect time: 0.01 to 9.99 s Delay time: 0.00 to 9.99 s
Level test *2	Output of arbitrary values possible Addition of set value: Enabled, Disabled Setting range: ±99999 Level test: ON, OFF
Comparator *2	Compare set values and measured data and output as control output or status. Setting range: ±99999 Hysteresis: ON hysteresis, OFF hysteresis Hysteresis range: 0 to 99999 ON hysteresis and OFF hysteresis can be set separately.

*1 It can be downloaded from our website.

*2 Set using RS-485 command.

RS-485

Baud rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
Signal system	Half duplex system
Bit configurations	Data bits: 7, 8 Stop bit: 1, 2 Parity bit: Odd, Even, None
Device ID	01 to 99
Terminating resistor	Can be switched using the switch on this unit.

CAN (NC-100A-10 only)

Baud rate *1	10, 20, 25, 33.3, 50, 62.5, 83.3, 100, 125, 250, 500, 1000 kbps
Output rate *1	0.5, 1, 2, 5, 10, 20, 50, 100, 200, 500, 1000 ms
Data length	8 bytes (little endian): Data float type 4 bytes Status int type 4 bytes, outputs measurement status etc.
CAN ID *1	Standard format: 0x000 to 0x7FF Extended format: 0x00000000～0x1FFFFFFF
Terminating resistor	Can be switched using the switch on this unit.

Optional Accessories

U-17	S32-7 to 4 conductors with shield wire, bared at the tip（0.5m）
U-18	S32-7 to 4 conductors with shield wire, bared at the tip（1.0m）
U-19	S32-7 to 4 conductors with shield wire, bared at the tip（2.0m）
U-20	S32-7 to 4 conductors with shield wire, bared at the tip（5.0m）
U-25 *2	S32-7 to 6 conductors with shield wire, bared at the tip（0.5m）
U-26 *2	S32-7 to 6 conductors with shield wire, bared at the tip（1.0m）
U-27 *2	S32-7 to 6 conductors with shield wire, bared at the tip（2.0m）
U-28 *2	S32-7 to 6 conductors with shield wire, bared at the tip（5.0m）

This product does not contain the 10 restricted substances beyond the maximum concentration limit under RoHS Directive (2011/65/EU, (EU)2015/863). * Excluding exemptions allowed under RoHS Directive (2011/65/EU, (EU)2015/863).

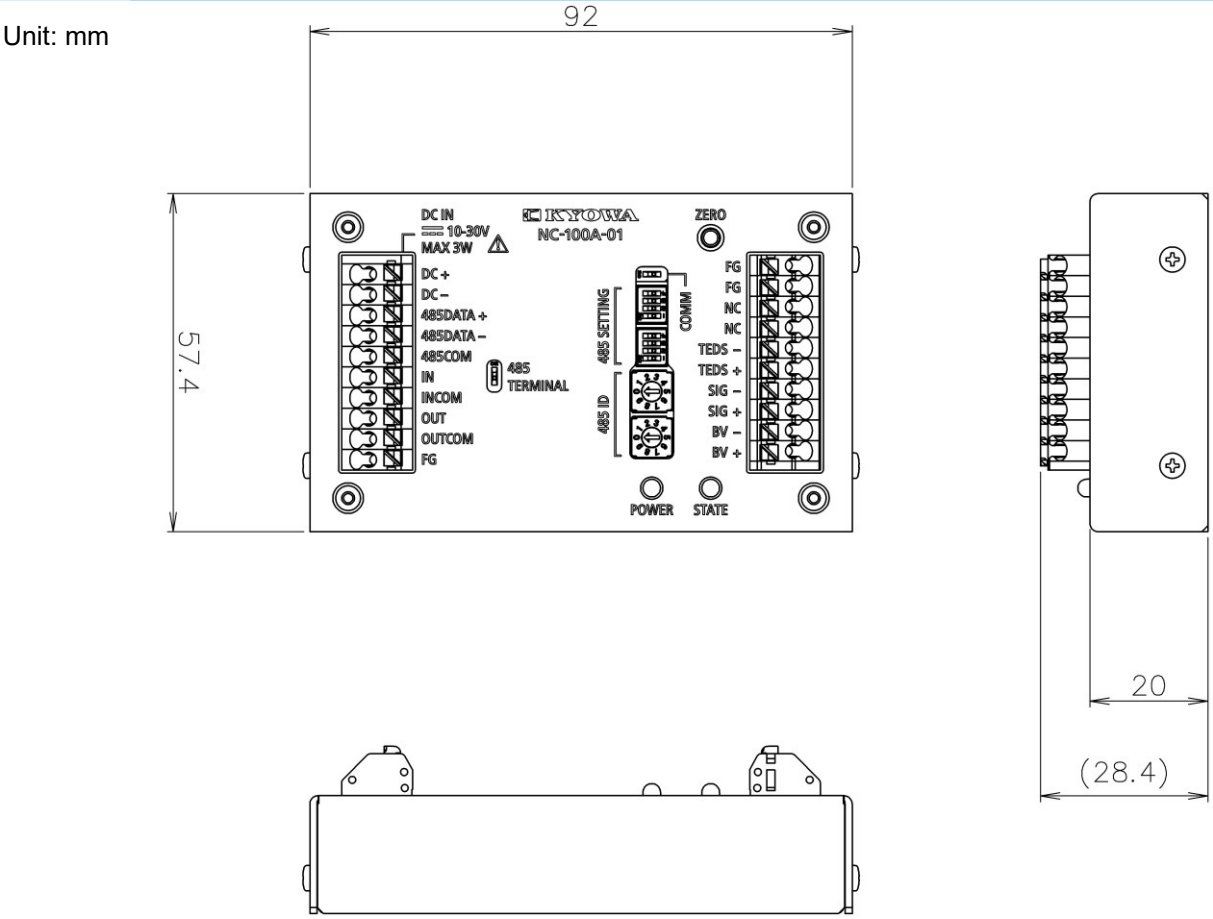
*1 Set using RS-485 command.

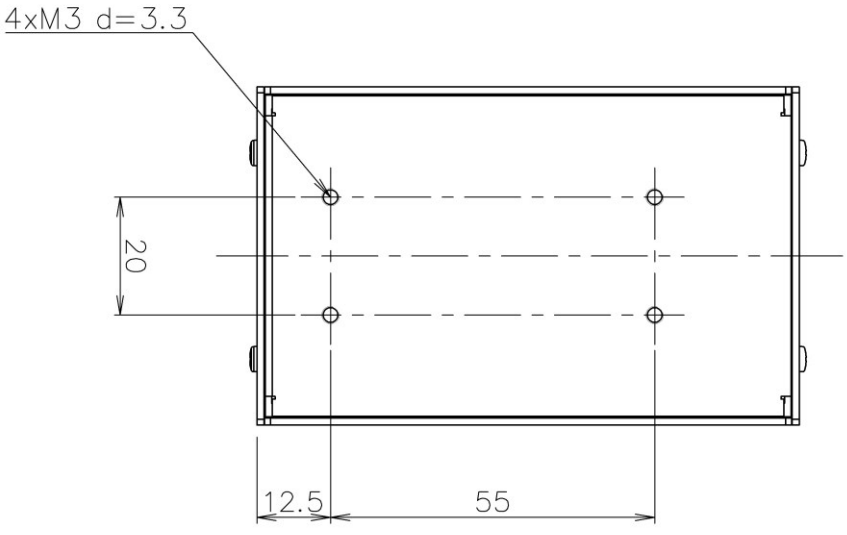
*2 Remote sensing not supported.

16.OUTLINE DRAWINGS

16-1.NC-100A-01

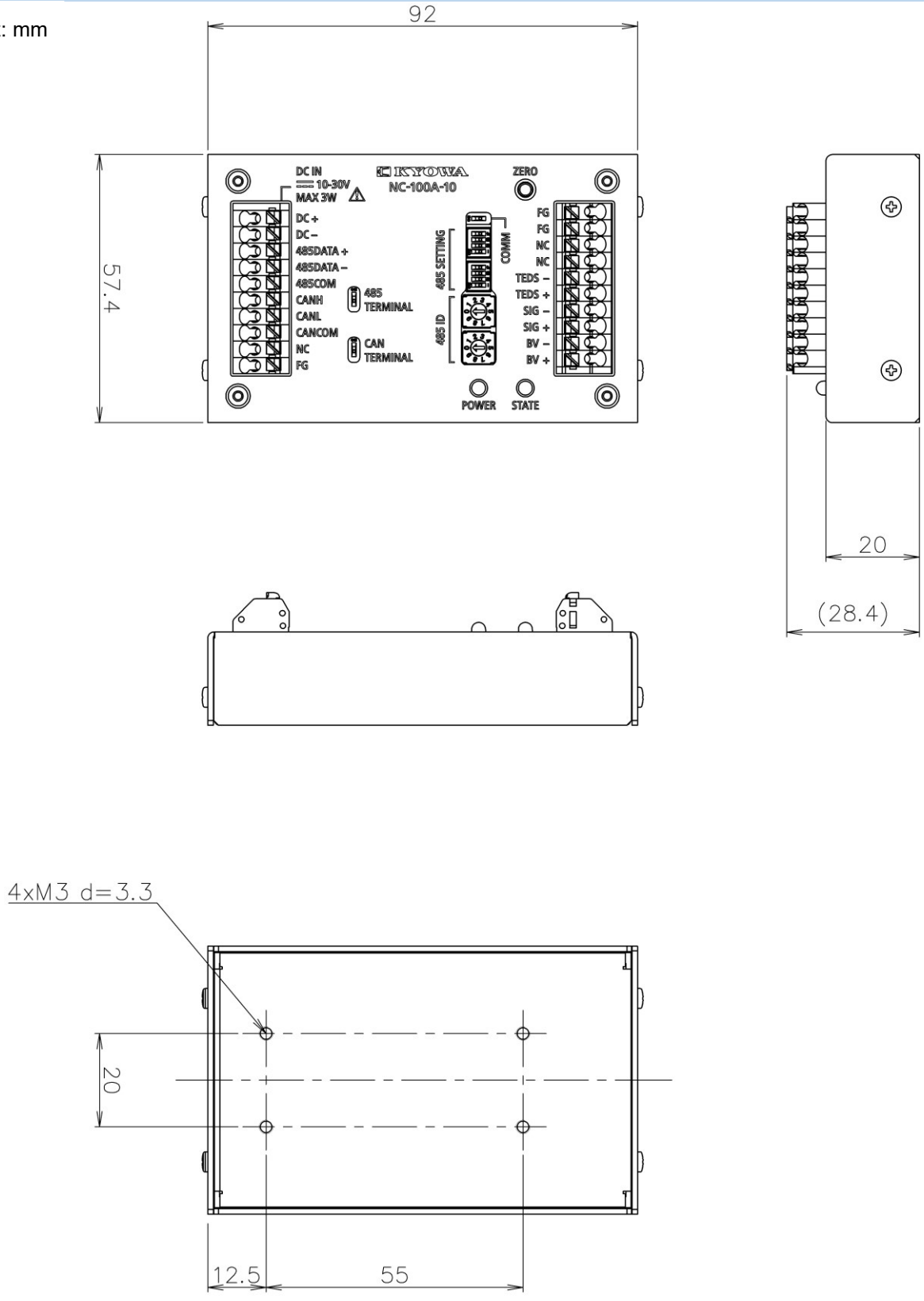
Unit: mm





16-2.NC-100A-10

Unit: mm



KYOWA ELECTRONIC INSTRUMENTS CO., LTD
3-5-1 Chofugaoka, Chofu, Tokyo, 182-8520, Japan
https://www.kyowa-ei.com/en/