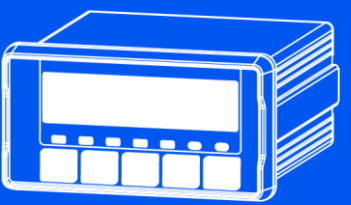
INDUSTRIAL WEIGHING SOLUTION™

CI-170A

Weighing Indicator



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OWNER'S MANUAL

CAS

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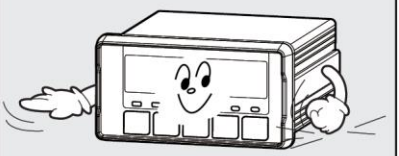
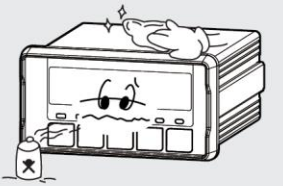
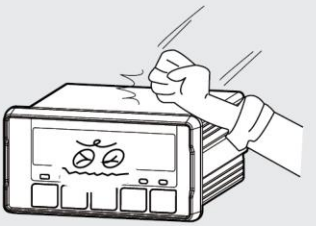


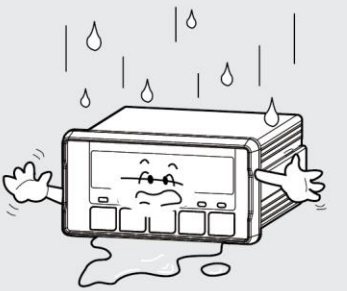
◆ Place the indicator on a flat and stable surface.



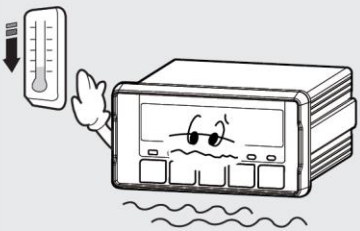
◆ Do not use inflammable materials in cleaning.



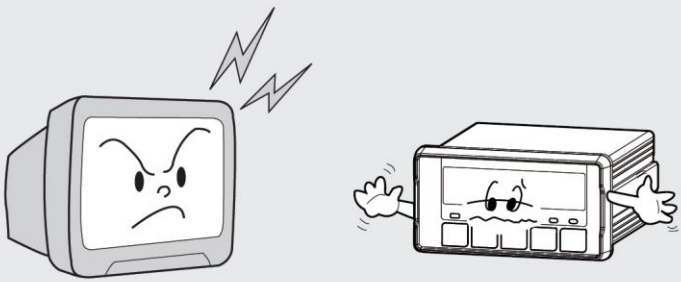
◆ Do not severely press because the light pressing of keys can incite the operation.



◆ Keep the main body from rain and keep in dry area.



◆ Do not subject the scale to sudden temperature changes.



◆ Keep the scale away from strong EMI noises may cause incorrect weight readings.

INTRODUCTION

We greatly appreciate your purchase of the CI-170A series weighing indicator.
These goods perform excellently and exhibit splendid properties through strike tests.
CAS indicator (CI-series) is delicately designed to coincide with the special requirements of several industrial fields and includes many functions and various external interfaces. Also, it is programmed for the user's convenience and contains help display functions that are easily accessible.
Before using CI-170A series, it is recommended that you read this manual carefully so you may use this device to its full potential.

THE FEATURES OF CI-170A SERIES

(1) Features.

- ■ High quality, high accuracy
- ■ Panel-specific indicator (DIN SIZE : 96 * 48 mm)
- ■ Appropriate for weight and measurement system
- ■ Easy operation and various options
- ■ Display of 6 digit(7 segment)
- ■ RFI/EMI screened
- ■ Watchdog circuitry(System restoration).
- ■ Weight back-up(Memory the weight at sudden power failure)

(2) Main Function

- ■ Store date, time and calculated data at sudden power failure
- ■ Adjustable display rate(Digital filter function)
- ■ Tare weight setting with keys
- ■ Users can set maximum weight which users want to and division at one's disposal
- ■ Self test hardware function
- ■ Independent zero calibration
- ■ Serial printer connection
- ■ External input/output (option)
  : 2 external input 4 external output(zero, 1 step, 2 step, final)
- ■ Print date and time by inner clock(option)
- ■ Analog out (option)

TECHNICAL SPECIFICATION

Analog Part & A/D Conversion	
Load cell excitation voltage	DC 5 V
Zero adjust range	0.05 mV～5 mV
Input sensitivity	0.36 uV/D
	2 uV/D (CE)
Nonlinearity	0.01 % F.S.
A/D internal resolution	1/1,000,000
A/D external resolution	1/30,000(Max.)
A/D conversion speed	320 times/sec

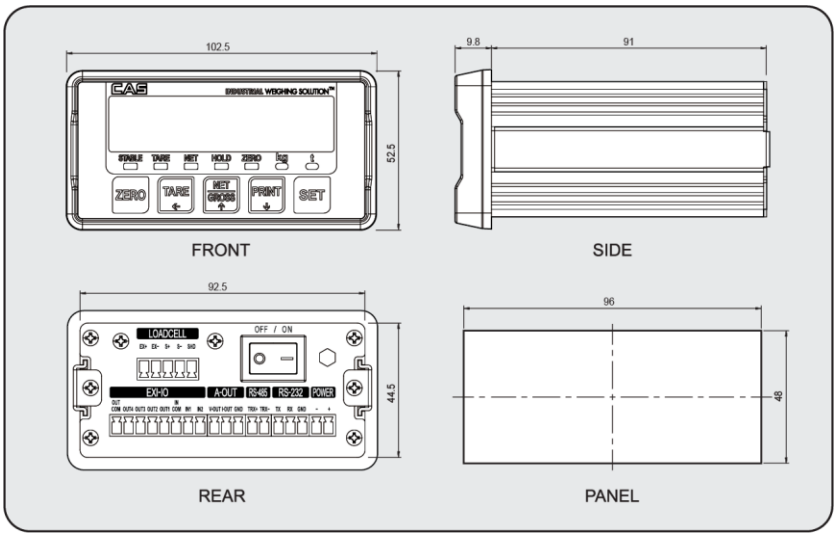
Digital Part	
Span calibration	Full Digital Calibration (Single pass automatic span calibration)
Input noise	below ±0.3μVpp
Input impedance	over 10MΩ
Display	7 Segment(6 digit)
Maximum capacity	999999
Division	× 2, ×5, ×10, ×20, ×50
Display below zero	"-" minus signal
Permitted limit tare	Full capacity

Key	Description
"STABLE" ■LAMP	Weight is stable
"TARE" ■LAMP	Tare is used
"NET" ■LAMP	ON(NET weight), OFF(GROSS weight)
"HOLD" ■LAMP	Hold in Weight
"ZERO" ■LAMP	"0" kg

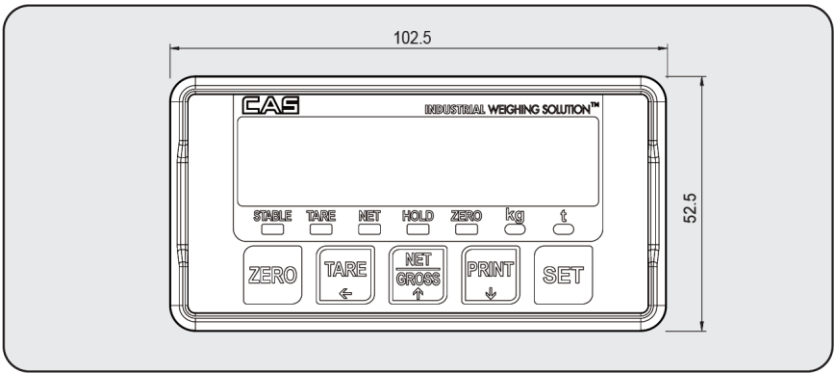
General Specification	
Power	DC 9~24 V 1.5 A
Size	96(W)×100.8(D)×48(H)
Temperature	-10℃～＋40℃
Weight	Approx 0.4 kg
Power Consumption	Approx 2W

Option Part	
Option-1	RS-485(Serial)
Option-2	Inner Clock
Option-3	Analog Out
Option-4	Relay (2 Input, 4 Output)

MEASURE OF APPEARANCE



FRONT PANEL



(1) Display lamp(■)

- ■ ST lamp: turn on when the weight is stable.
- ■ TARE lamp: turn on when tare weight is stored.
- ■ NET lamp: turn on when the current weight is NET weight.
- ■ HOLD lamp: turn on when the weight is held while weighing moving or alive things.
- ■ ZERO lamp: turn on when the current weight is 0 kg.
- ■ kg lamp: turn on when the weight unit is kg.
- ■ t lamp: turn on when the weight unit is ton.

(2) Keyboard

- Used to return the display to the 0.
- User set the zero range within 4% or 10% of the maximum capacity(GEN.09).
- Used to enter the TEST mode.

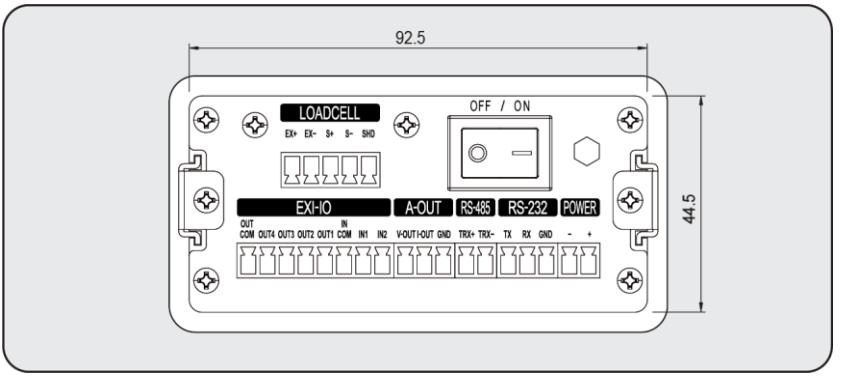
- Used to weigh item by using the container.
- When this key is pressed, the scale stores current weight as the tare weight.
- If you press TARE key in unload condition, tare setting is released.
- Used to enter the SET mode.

- Use this key to switch from GROSS to NET weight.
- The annunciators and display will alternate between GROSS and NET as well.
- In case tare weight is REGISTERED, tare plus item's weight is GROSS weight and only item's weight is NET weight.
- When the lamp turning on, it means NET weight.
- Used to enter the CAL mode.

- When you press this key, the current designated printing form is printed.
- Use this key when weighing data is printed.

- Some functions can be defined to the needs.(GEN.20)
- Press and hold SET key to enter the menu mode.

REAR PANEL



■ POWER S/W : POWER ON/OFF
■ LOAD CELL : Port for connecting load cell
1 : EX+ 2 : EX- 3 : SIG+ 4 : SIG- 5 : GND
■ DC(POWER) : 9~24V 1.5A
■ SERIAL : RS-232C
■ SERIAL : RS-485C (option)
■ A-OUT : Analog Out port (V-Out : Voltage, I-Out : Current) (option)
■ EXT-IO : External input/output port (option)

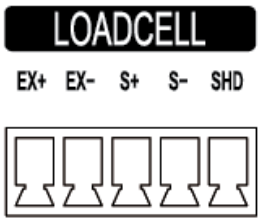
INSTALLATION & CONNECTION

(1) Load Cell Connection

Pin 1: Excitation voltage+
Pin 2: Excitation voltage-
Pin 3: Sense voltage+
Pin 4: Sense voltage-
Pin 5: Shield

■ Connecting method

▶Ref. Each L/C manufacturer's or model's wire color could be different. In that case, please note the following diagram.



■ Manufacturer's wire colors

Connector / Company	Pin 1 (EX+)	Pin 2 (EX-)	Pin 3 (SIG+)	Pin 4 (SIG-)	Pin 5 (GND)
CAS	RED	WHITE	GREEN	BLUE	CASE
KYOWA	RED	BLACK	GREEN	WHITE	CASE
INTERFACE	RED	BLACK	GREEN	WHITE	CASE
P.T	RED	BLACK	GREEN	WHITE	CASE
BLS	GREEN	BLACK	WHITE	RED	YELLOW
SHOWA	RED	BLUE	WHITE	BLACK	CASE
SHINKOH	RED	BLACK	GREEN	WHITE	CASE
TMI	RED	WHITE	GREEN	BLUE	YELLOW
TML	RED	BLACK	WHITE	GREEN	CASE
TFAC	RED	BLUE	WHITE	BLACK	YELLOW
HUNTLEIGH	GREEN	BLACK	RED	WHITE	CASE

DISPLAYING METHOD

(1) Number

NUMBER	DISPLAY	NUMBER	DISPLAY
0		5	
1		6	
2		7	
3		8	
4		9	

(2) Alphabet

Alphabet	DISPLAY	Alphabet	DISPLAY	Alphabet	DISPLAY	Alphabet	DISPLAY
A		H		O		V	
B		I		P		W	
C		J		Q		X	
D		K		R		Y	
E		L		S		Z	
F		M		T			
G		N		U			

TEST MODE

(1) How to Enter

Turn on the power while pressing the "ZERO" key on the front of the indicator.
※When test is done, Press SET key.

(2) Available Keys

Set key: Used for moving to the next test menu.
Other keys: Used for changing the preset value.

(3) Test Menu(TEST 1 - TEST 8)

TEST 1 : Key test
TEST 2 : Display test
TEST 3 : Load cell test and A/D conversion test
TEST 4 : Serial interface test
TEST 5 : Printer test
TEST 6 : A-out test(OPTION)
TEST 7 : External input/output test(OPTION)
TEST 8 : RTC test(OPTION)

TEST 1

FUNCTION : Key test		
KEY	**DISPLAY**	**DESCRIPTION**
SET key : next menu Other keys: Perform test	Key number ex) In case of Zero key 1	Press the key to be test and the No of key mode should identify with code of key as the follows. If you press Set key, it will be moved to test 2.

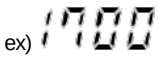
<Key List>

Key name	No
ZERO	1
TARE, ◀	2
N/G, ▲	3
PRINT, ▼	4
SET	5

TEST 2

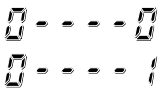
FUNCTION : Display test		
KEY	**DISPLAY**	**DESCRIPTION**
SET key : next menu		TEST 2 is performed. If you press Set key, it will be moved to test 3

TEST 3

FUNCTION : A/D converter test		
KEY	**DISPLAY**	**DESCRIPTION**
ZERO key: Cancel SET key : next menu	Display digital value of current weight. ex) 	Display digital value of current weight. This value means converted digital value under actual condition. If you press Set key, it will be moved to test 4.

► Note 1. Check whether digital value is changing.
If the digital value is fixed or zero is displayed, please check the connection of load cell.

TEST 4

FUNCTION : RS-232, RS-485 test with computer(Serial port)		
KEY	**DISPLAY**	**DESCRIPTION**
▲ Key : Value change ZERO key: Cancel SET key : next menu		Waiting for transmission and reception Received: none, Transmitted : 1

► Note 1. Do this test after the connection of serial port of computer and serial port of indicator is done.
Note 2. Send no.1 in computer keyboard and check if indicator receives no.1
Send no.1 in indicator keyboard and check if computer receives no.1
Note 3. Do this test after baud rate is specified in SET mode (RS-232 : F2-03 and RS-485 : F2-08).

TEST 5

FUNCTION : Printer test(PRINTER)		
KEY	**DISPLAY**	**DESCRIPTION**
SET key : next menu	Good	No error in printer. Do this test after connection serial printer.

TEST 6 (OPTION)

FUNCTION : A-OUT test		
KEY	**DISPLAY**	**DESCRIPTION**
▲ Key : Value change ZERO key : Cancel SET key : next menu	25 P	The output level of Aout is raised by 25% each time the ▲ key is pushed.

TEST 7 (OPTION)

FUNCTION : External Input / Output test		
KEY	**DISPLAY**	**DESCRIPTION**
▲ Key : Value change ZERO key : Cancel SET key : next menu	I - X O - X - - - - - - - - - - I - 2 O - 4	Displayed in the external input section when there is an external input. Push ▲ key to execute weighing external output input : 2, output : 4

TEST 8 (OPTION)

FUNCTION : RTC test		
KEY	**DISPLAY**	**DESCRIPTION**
SET key : next menu	SEC XX	XX : Displaying the progress of seconds (SEC)

CALIBRATION MODE

(1) How to Enter

Turn on the power while pressing “NET/GROSS” key on the front of the indicator.

(2) Calibration Menu(CAL 1 - CAL 9)

CAL 1: Maximum capacity set
CAL 2: Minimum division set
CAL 3: Zero & Span calibration
CAL 5: Direct calibration
CAL 6: Zero adjustment
CAL 7: Factor calibration
CAL 8: Gravity adjustment
CAL 9: Setting dual range

CAL 1

CAL 1-1

FUNCTION : Set Unit

Set Unit : kg, ton

KEY	DISPLAY	DESCRIPTION
▲, ▼ Key : Value change ZERO Key : Cancel SET Key : Save and next menu	**kg**	Unit : kg
	ton	Unit : ton

CAL 1-2

FUNCTION : Setting Maximum Value

Range of set value : 1 ~ 99,999

KEY	DISPLAY	DESCRIPTION
▲ Key : Value change ◀ Key : Digit change ZERO Key : Cancel SET Key : Save and next menu	5000	Max value = 5000 kg
	20000	Max value = 20000 kg

► Note 1. It means the maximum weight value to be weighed by the scale.

CAL 2

FUNCTION : Minimum division and decimal position setting Range of set value : 0.001 ~ 50		
KEY	**DISPLAY**	**DESCRIPTION**
▲, ▼ Key : Value change ZERO Key : Cancel SET Key : Save and next menu	1 0.2 0.05 0.001	1 kg 0.2 kg 0.05 kg 0.001 kg

► Note 1. To end CAL2, press CANCEL key when a decimal point is set.

Note 2. Set the external resolution within 1/30,000 as the value by dividing the maximum weight by the minimum division.
If the external resolution is 1/30,000 or more, Err 21 is shown.

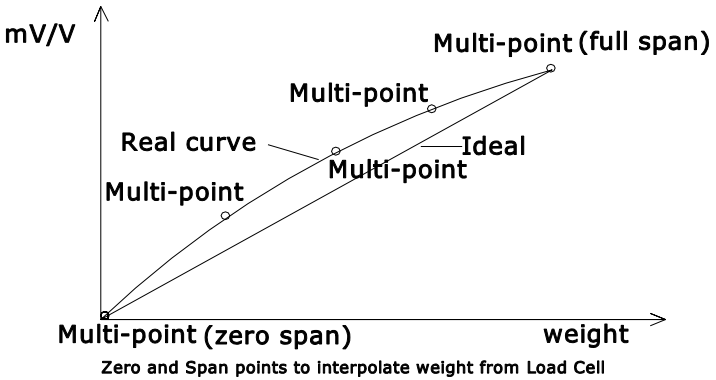
Note 3. The position of a decimal point is decided by the position of a decimal point for the minimum division set in CAL2.

CAL 3

CAL 3-1

Function : Setting Multi Calibration Step Range of set value : 1 ~ 5		
KEY	**DISPLAY**	**DESCRIPTION**
▲, ▼ Key : Value change ZERO Key : Cancel SET Key : Save and next menu	STEP- 1	Setting multi calibration for step 1 (CAL3-3 and CAL 3-4 are carried out once)
	STEP- 5	Setting multi calibration for step 5 (CAL3-3 and CAL 3-4 are carried out five times.)

► Note 1. A function to use, when the output of load cell is corrected by setting multiple points in some sections because the actual curve of load cell is not a straight line.



Zero and Span points to interpolate weight from Load Cell

CAL 3-2

Function: Zero Calibration		
KEY	**DISPLAY**	**DESCRIPTION**
ZERO Key : Cancel SET Key : Save and next menu	UnLoAd	Empty the load tray and press the setup key.
	1234	The current weight value is displayed. Confirm 'Stable' and press the setup key.
	- - -	Zeroing in progress...

► Note 1. If zeroing finished with no error, it moves to Setting Weight (CAL 3-3) although no key is pressed.

CAL 3-3

Function: Setting Weight Range of set value: 1 ~ 99,999		
KEY	**DISPLAY**	**DESCRIPTION**
▲ Key : Value change ◄ Key : Digit change ZERO Key : Cancel SET Key : Save and next menu	LOAD 1	It means the weight setting mode. (Number = multi calibration number)
	W=100.00	100.00 (unit: Kg or Ton)
	W= 0.10	0.10 (unit: Kg or Ton)

► Note 1. Set the weight within a range of 10% ~ 100%.

CAL 3-4

Function: Weight Calibration		
KEY	**DISPLAY**	**DESCRIPTION**
ZERO Key : Cancel SET Key : Save and next menu	LoAd	Load the weight set in CAL 3-3 and press the setup key.
	12345	The current weight value is displayed. Confirm 'Stable' and press the setup key.
	- - -	Span adjustment in progress...

► Note 1. CAL 3-3 and CAL 3-4 are repeated as many as STEP is set in CAL 3-1.
At this time, the weight value should be set to a value greater than the previous one.
Note 2. Move to CAL-3 if the span adjustment is over with no error.

CAL 5 (Direct Calibration)

CAL 5-1

Function: Direct input about the zero value of loadcell Range of set value: 1 ~ 99,999		
KEY	**DISPLAY**	**DESCRIPTION**
▲ Key : Value change ◀ Key : Digit change ZERO Key : Cancel SET Key : Save and next menu	ZE-CAL	Direct zero input mode
	0.0000	Loadcell zero = 0.0000 mV/V
	0.1000	Loadcell zero = 0.1000 mV/V

CAL 5-2

Function: Direct input about the span value of loadcell Range of set value: 1 ~ 99,999		
KEY	**DISPLAY**	**DESCRIPTION**
▲ Key : Value change ◀ Key : Digit change ZERO Key : Cancel SET Key : Save and next menu	SP-CAL	Direct span input mode
	1.2000	Loadcell span = 1.2000 mV/V
	2.0000	Loadcell span = 2.0000 mV/V

CAL 6

Function: Zero adjustment - calibration when any zeroing error occurs.		
KEY	**DISPLAY**	**DESCRIPTION**
ZERO Key : Cancel SET Key : Save and next menu	Z-CAL	Empty the load tray and press the setup key.
	1234	The current weight value is displayed. Confirm 'Stable' and press the setup key.
	- - -	Zero adjustment in progress...

Note 1. Use this function when zeroing is not passed for any shock to the load cell.
The range of zero adjustment is 0 ~ 2mV/V.

CAL 7

Function: Factor Calibration		
KEY	**DISPLAY**	**DESCRIPTION**
▲ Key : Value change ◀ Key : Digit change ZERO Key : Cancel SET Key : Save and next menu	NOTUSE	This function cannot be used because of multi calibration.
	FACtor	It means you entered the factor correction mode.
	12345	The current factor is displayed.

Note 1. As this is a menu to set the weight setup with no weight, general users have no need to use it.

Note 2. This can be used only when the range of multi calibration in CAL 3-1 is set to 1.
"NOT USE" is displayed when the range of CAL 3-1 is set to 2 or larger.

Note 3. Enter a password to enter the factor correction mode.

CAL 8

Function: Gravity Adjustment		
KEY	**DISPLAY**	**DESCRIPTION**
▲ Key : Value change ◀ Key : Digit change ZERO Key: Cancel SET Key: Save and next menu	G-CAL Gr-CAL 9.XXXX Gr-SET 9.XXXX	It means you accessed to the menu for the gravity adjustment. Set the gravity for the production place. Set the gravity for the place to use the product.

Note 1. If the gravity of the indicator production place is different from that of the place to use, the gravity adjustment can be done using this function.

CAL 9

CAL 9-1

Function: Setting Dual Range
Range of set value: 0 ~ 1

KEY	DISPLAY	DESCRIPTION
▲ Key : Value change ZERO Key: Cancel SET Key: Save and next menu	DUAL- 0	Dual range function is not used.
	DUAL- 1	Dual range function is used.

Note 1. If the resolution capability is 1/10,000 or higher, "OVER" message is displayed and return to the CAL menu mode.

CAL 9-2

Function: Setting the applied section for the Dual Range
Range of set value: 0 ~ 99999

KEY	DISPLAY	DESCRIPTION
▲ Key : Value change ◄ Key : Digit change ZERO Key: Cancel SET Key: Save and next menu	M 1000	Dual range is applied to less than 1000kg.
	M 5000	Dual range is applied to less than 5,000kg.
	M 10000	Dual range is applied to less than 10,000kg.

Note 1. If the input value is greater than the maximum value, "ERR SET" message is displayed and returned to the CAL menu mode.

SET MODE

(1) How to Enter

Turn on the power while pressing the "TARE" key on the front of the indicator.

(2) Available Keys

Used to save inputted value and exit to menu selection.

Used to set the current value to zero.

Used to set the current value ×10.

Used to set the current value +1.

Used to set the current value -1.

(3) Set Value Conversion Menu

Classification	Menu	SubMenu	Initial Value
1. General Setting (1. GEN)	GEN.01	Set AD speed	1
	GEN.02	Set average Filter Buffer	10
	GEN.03	Set digital filter buffer	0
	GEN.04	Set use key lock	0
	GEN.05	Set Key Operating Conditions	1
	GEN.06	Set stable range	1
	GEN.07	Set Automatic Zero Tracking Compensation	1
	GEN.08	Set Weight Back-up	0
	GEN.09	Set Zero range	10
	GEN.10	Set Tare range	100
	GEN.11	Set Init Zero	10
	GEN.12	Set Overload range	9
	GEN.13	Set Hold Type	0
	GEN.14	Set Hold Canceling Conditions	0
	GEN.15	Set average hold time	30
	GEN.16	Set Auto Hold Range	10
	GEN.17	Set Auto Hold Canceling Range	10
	GEN.18	Set the use of Set key	0
	GEN.20	Initializing of set values	0

Classification	Menu	SubMenu	Initial Value
2. Communication Setting (2. COMM)	COMM.01	Set Device ID	0
	COMM.02	Set RS232 Port	0
	COMM.03	Set RS232 Baud Rate	3
	COMM.04	Set RS232 Out Data	0
	COMM.05	Set RS232 Output Format	0
	COMM.06	Set RS232 Output mode	0
	COMM.07	Set RS485 Port	0
	COMM.08	Set RS485 Baud Rate	3
	COMM.09	Set RS485 Out Data	0
	COMM.10	Set RS485 Output Format	0
	COMM.11	Set RS485 Output mode	0
3. Print Setting (3. PRT)	PRT.01	Print use setting	0
	PRT.02	Print Form	0
	PRT.03	Print Line Feed	1
	PRT.04	Set Print Condition	0
	PRT.05	Set Print Out Condition	0
4. RTC Setting (4. RTC) (OPTION)	RTC.01	Set Date	-
	RTC.02	Set Time	-
5. A-OUT Setting (5. AOUT) (OPTION)	AOUT.01	A-out Range	0
	AOUT.02	V-out Range	2
	AOUT.03	I-out Range	3
	AOUT.04	Dual output mode	1
	AOUT.05	Minimum weight of A-out	0
	AOUT.06	Maximum weight of A-out	Max weight
	AOUT.07	Adjust zero of A-out	4000
	AOUT.08	Adjust span of A-out	20000
6. Relay Setting (6. EXIO) (OPTION)	EXIO.01	Relay Out mode	0
	EXIO.02	Ext input 1	0
	EXIO.03	Ext input 2	1
	EXIO.04	Relay Reverse On/Off	0
	EXIO.05	Set Start Delay Time for completed Relay	10
	EXIO.06	Set Operating Duration Time for completed Relay	10

1. General Function

Menu-GEN.01: Set AD Speed

Function	AD Speed Setting	
Set Range (0 ~ 6)	Display Part	Meaning
	ADC. 0	Converting speed 5 times per second
	ADC. 1	Converting speed 10 times per second
	ADC. 2	Converting speed 20 times per second
	ADC. 3	Converting speed 40 times per second
	ADC. 4	Converting speed 100 times per second
	ADC. 5	Converting speed 160 times per second
	ADC. 6	Converting speed 320 times per second

Note 1. After changing the AD speed, press 'Set' key to display the weight using the altered value.
(Press 'Set' after checking the changed value to return to the previous mode)

Menu-GEN.02: Set average filter

Function	Average filter Setting	
Set Range (1 ~ 50)	Display Part	Meaning
	Fil. XX **Initial Value : 10**	Setting the number of buffers in the average filter

Note 1. Set based on the environment. (The rate of change of weight may slow)

Menu-GEN.03: Set digital filter

Function	Average filter Setting	
Set Range (0 ~ 5)	Display Part	Meaning
	IIR. XX **Initial Value : 0**	0 : Filter not use 1 ~ 5 : Filter intensity

Note 1. Set based on the environment. (The rate of change of weight may slow)

Menu-GEN.04: Set use key lock

Function	Set use key lock	
Set Range (0 ~ 1)	Display Part	Meaning
	LOCK. 0	Unlock front key
	LOCK. 1	Lock front key

Menu-GEN.05: Set Key Operating Conditions

Function	Key Operating Conditions(Zero, Tare) Setting	
Set Range (0, 1)	Display Part	Meaning
	K-ST. 0	Always in operation
	K-ST. 1	Operates only if the weight is stable

Menu-GEN.06: Set Stable Weight Range

Function	Stable Weight Range Setting	
Set Range (0~99)	Display Part	Meaning
	STAB XX **Initial Value : 1x 0.5 division**	Stability lamp is turned ON when weight change is such that the width of change in a given time is within the set value x 0.5 division

Note 1. This function verifies the stable status when the weight fluctuation does not exceed 0.5x the readability setting within the set time.

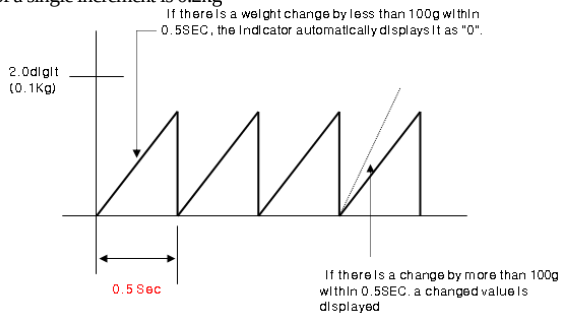
Note 2. The number should be made large and small for high-vibration and low-vibration environments respectively to quickly stabilize the weighing status.

Menu-GEN.07: Set Automatic Zero-set Range

Function	Automatic Zero-set Range Setting	
Set Range (1~99)	Display Part	Meaning
	ZTR. XX **Initial Value : 1x 0.5 division**	Stability lamp is turned ON when weight change is such that the width of change in a given time is within the set value x 0.5 division

Note 1. This function automatically corrects the zero-set if the weight does not exceed a set readability range within a set time when at zero-set state.

Ex) If the MENU [GEN-07] is set to "1" when the maximum labeled increment is 120.0kg and the value of a single increment is 0.2kg



Menu-GEN.08: Set Weight Back-up

Function	Weight Back-up Setting	
Set Range (0, 1)	Display Part	Meaning
	WBUP. 0	Weight back up function is not used
	WBUP. 1	Weight back up is used (based on operation)

Menu-GEN.09: Set Zero Key Range

Function	Zero Key Range Setting	
Set Range (1 ~ 99)	Display Part	Meaning
	ZKR. XX **Initial Value : 10 %**	Zero operates up to within +/- ○○% of the maximum weight

Menu-GEN.10: Set Tare Key Range

Function	Tare Key Range Setting	
Set Range (1 ~ 100)	Display Part	Meaning
	TKR. XX **Initial Value : 100 %**	Tare operates up to within +/-○○% of the maximum weight

Menu-GEN.11: Set Initial Zero Range

Function	Initial Zero Range Setting	
Set Range (1 ~ 99)	Display Part	Meaning
	ZIR. XX **Initial Value : 10%**	Initial zero operates within +/-○○% of the Gross Weight

Menu-GEN.12: Set Overload Range

Function	Overload Range Setting	
Set Range (1 ~ 99)	Display Part	Meaning
	OVRD. XX **Initial Value : 9 x 1 Digit**	Overweight from the next to 0 x 1 Digit of the maximum weight

Menu-GEN.13: Set Hold Type

Function	Hold Type Setting	
Set Range (0 ~ 3)	Display Part	Meaning
	HOLD.00	Average Value Hold
	HOLD.01	Peak Hold
	HOLD.02	Sampling Hold
	HOLD.03	Automatic Hold

Menu-GEN.14: Set Hold Canceling Conditions

Function	Hold Canceling Conditions Setting	
Set Range (0 ~ 2)	Display Part	Meaning
	HD-C.00	Hold is canceled when it becomes zero
	HD-C.01	Hold is canceled when Hold key is entered
	HD-C.02	Hold is canceled when Hold less key entered

Menu-GEN.15: Set average hold time

Function	Set average hold time	
Set Range (1 ~ 99)	Display Part	Meaning
	HD-T. XX **Initial Value : 30 x 0.1 sec**	When the weight change width changes within the automatic hold range setting value, auto hold operation after set value x 0.1 second.

Menu-GEN.16: Set Auto Hold Range

Function	Set auto hold range	
Set Range (5 ~ 50)	Display Part	Meaning
	AH-S. XX **Initial Value : 10 x 1 Digit**	Auto hold operation when weight change width is less than set value. x 1 digit.

Menu-GEN.17: Set Auto Hold Canceling Range

Function	Set auto hold canceling range	
Set Range (2 ~ 99)	Display Part	Meaning
	AH-R. XX **Initial Value : 10 %**	Auto hold cancel when weight change width is larger than set value

Menu-GEN.18: Set the use of set key.

Function	Set the use of set key	
Set Range (0 ~ 4)	Display Part	Meaning
	FKEY.00	Set key used as the hold key.
	FKEY.01	Set key used as the total print key.
	FKEY.02	Set key used as the start key.
	FKEY.03	Set key used as the tare clear key.
	FKEY.04	Set key used as the hold clear key.

Menu-GEN.20: Initializing of set values

Function	Initializing of set values	
Set Range (0, 1)	Display Part	Meaning
	INIT. 0	No set values of the product are initialized to factory shipping state
	INIT. 1	All set values of the product are initialized to factory shipping state

2. Communication Setting

Menu-COMM.01: Equipment Number

Function	Equipment Number	
Set Range (0 ~ 99)	Display Part	Meaning
	D-ID. XX **Initial Value : 0**	Desired device ID may be entered.

Note 1. This function can be used as the indicator unique ID when using COMMAND mode.

Menu-COMM.02: Set RS232 Port

Function	RS232 Port Setting (Parity-RS232)	
Set Range (0 ~ 5)	Display Part	Meaning
	CPR1. 0	Data Bit 8, Stop Bit 1, Parity Bit : None
	CPR1. 1	Data Bit 7, Stop Bit 1, Parity Bit: Even
	CPR1. 2	Data Bit 7, Stop Bit 1, Parity Bit: Odd
	CPR1. 3	Data Bit 7, Stop Bit 2, Parity Bit: Odd
	CPR1. 4	Data Bit 8, Stop Bit 1, Parity Bit: Even
	CPR1. 5	Data Bit 8, Stop Bit 1, Parity Bit: Odd

Menu-COMM.03: Set RS-232C Baud Rate

Function	RS232 Baud Rate Setting	
Set Range (0 ~ 7)	Display Part	Meaning
	CBR1. 0	1,200 bps
	CBR1. 1	2,400 bps
	CBR1. 2	4,800 bps
	CBR1. 3	9,600 bps
	CBR1. 4	19,200 bps
	CBR1. 5	38,400 bps
	CBR1. 6	57,600 bps
	CBR1. 7	115,200 bps

Menu-COMM.04: Set RS232 Out Data

Function	RS232 Out Data Setting	
Set Range (0 ~ 2)	Display Part	Meaning
	CWT1. 0	Displayed value is transmitted
	CWT1. 1	Gross Weight is transmitted
	CWT1. 2	Net weight is transmitted

Menu-COMM.05: RS232 Output Format

Function	RS232 Output Format	
Set Range (0~2)	Display Part	Meaning
	CFM1. 0	22 byte of CAS
	CFM1. 1	10 byte of CAS
	CFM1. 2	18 byte Format(AND, FINE)

Note 1. Refer to <Appendix 1> for the communication format

Menu-COMM.07: RS232 Communication Method

Function	RS232 Communication Method (Output mode)	
Set Range (0~7)	Display Part	Meaning
	CMD1. 0	Data is not transmitted
	CMD1. 1	Transmitted only if the print key is pushed
	CMD1. 2	Transmitted in both stable/unstable cases (Stream Mode)
	CMD1. 3	Transmitted only if the weight is stable
	CMD1. 4	Command Type 1
	CMD1. 5	Command Type 3
	CMD1. 6	Modbus protocol
	CMD1. 7	MIGUN protocol

Note 1. Refer to Appendix 2, 3 for command types.
Note 2. Refer to Appendix 5 for MIGUN protocol.

Menu-COMM.07: Set RS485 Port

Function	RS485 Port Setting (Parity Bit – RS485)	
Set Range (0~5)	Display Part	Meaning
	CPR2. 0	Data Bit 8, Stop Bit 1, Parity Bit : None
	CPR2. 1	Data Bit 7, Stop Bit 1, Parity Bit: Even
	CPR2. 2	Data Bit 7, Stop Bit 1, Parity Bit: Odd
	CPR2. 3	Data Bit 7, Stop Bit 2, Parity Bit: Odd
	CPR2. 4	Data Bit 8, Stop Bit 1, Parity Bit: Even
	CPR2. 5	Data Bit 8, Stop Bit 1, Parity Bit: Odd

Menu-COMM.08: Set RS-485 Baud Rate

Function	RS485 Baud Rate Setting	
Set Range (0 ~ 7)	Display Part	Meaning
	CBR2. 0	1,200 bps
	CBR2. 1	2,400 bps
	CBR2. 2	4,800 bps
	CBR2. 3	9,600 bps
	CBR2. 4	19,200 bps
	CBR2. 5	38,400 bps
	CBR2. 6	57,600 bps
	CBR2. 7	115,200 bps

Menu-COMM.09: Set RS485 Out Data

Function	RS485 Out Data Setting	
Set Range (0 ~ 2)	Display Part	Meaning
	CWT2. 0	Displayed value is transmitted
	CWT2. 1	Gross Weight is transmitted
	CWT2. 2	Net weight is transmitted

Menu-COMM.10: RS485 Output Format

Function	RS485 Output Format	
Set Range (0 ~ 2)	Display Part	Meaning
	CFM2. 0	22 byte of CAS
	CFM2. 1	10 byte of CAS
	CFM2. 2	18 byte Format(AND, FINE)

Note 1. Refer to <Appendix 1> for the communication format

Menu-COMM.11: RS485 Communication Method

Function	RS485 Communication Method (Output mode)	
Set Range (0 ~ 7)	Display Part	Meaning
	CMD2. 0	Data is not transmitted
	CMD2. 1	Transmitted only if the print key is pushed
	CMD2. 2	Transmitted in both stable/unstable cases (Stream Mode)
	CMD2. 3	Transmitted only if the weight is stable
	CMD2. 4	Command Type 1
	CMD2. 5	Command Type 3
	CMD2. 6	Modbus protocol
	CMD2. 7	MIGUN protocol

Note 1. Refer to Appendix 2, 3 for command types.
Note 2. Refer to Appendix 5 for MIGUN protocol.

3. Print Function Setting

Menu-PRT.01: Print use Setting

Function	Print use Setting	
Set Range (0~3)	Display Part	Meaning
	PTYP. 0	Printer is not used
	PTYP. 1	CAS DEP Ticket Print Standard Type
	PTYP. 2	CAS DLP Label Print Standard Type
	PTYP. 3	CAS BP Label Printer

Menu-PRT.02: Print Form

Function	Set Print Form	
Set Range (0~3)	Display Part	Meaning
	PFOM. 0	Print Form 1 (Date, Time, Weighing No., Net Weight) BP Print Form 1(FORM1)
	PFOM. 1	Print Form 2 (Date, Time, Gross Weight, Tare, Net Weight) BP Print Form 2(FORM2)
	PFOM. 2	Print Form 3 (Date, Time, Net Weight) BP Print Form 3(FORM3)
	PFOM. 3	Print Form 4 (Date, Time, Serial No., Net Weight) BP Print Form 4(FORM4)

【 Form 1 】
Date, Time,
Weighing No., Net Weight

```
2016.07.07      12:30:46
No.      1        50.0 kg
No.      2       100.0 kg
No.      3       200.5 kg
```

【 Form 2 】
Date, Time,
Gross Weight, Tare,
Net Weight

```
2016.07.07      12:30:46
Gross :        1000.0 kg
Tare  :           0.0 kg
Net   :        1000.0 kg
Gross :        2000.0 kg
Tare  :         500.0 kg
Net   :        1500.0 kg
```

【 Form 3 】
Date, Time,
Time, Net Weight

```
2016.07.07              12:30:46
10:10:30    Net :        50.0 kg
11:00:32    Net :       100.0 kg
12:30:34    Net :       200.5 kg
```

【 Form 4 】
Date, Time,
Serial No., Net Weight

```
2016.07.07      12:30:46
     1,        1000.0 kg
     2,         200.5 kg
```

☐ CAS DLP Protocol

Parameter	Description	Data Length
V00	Gross Weight	7 byte
V01	Tare Value	7 byte
V02	Net Weight	7 byte
V03	Barcode (net weight)	6 byte
V04	Item Number	2 byte
V06	Print count	2 byte
V07	Date	10 byte
V08	Time	8 byte

☐ CAS BP Series Printer Protocol

.Parameter	Description	Data Length
V00	Gross Weight	7 byte
V01	Tare Value	7 byte
V02	Net Weight	7 byte
V03	Net (‘.’ omit) : for bar code	6 byte
V04	Item Number	2 byte
V05	Print count	3 byte
V06	Date	10 byte
V07	Time	8 byte
V08	Unit(kg)	2 byte
V09	Total Net (‘.’ include)	9 byte

Menu-PRT.03: Set Print Line feed

Function	Set Print Line feed	
Set Range (0~9)	Display Part	Meaning
	PLFD. 1 **Initial Value: 1**	Set a spacing between lines as the set value upon printing

Menu-PRT.04: Set Print Condition

Function	Set Print Condition	
Set Range (0~2)	Display Part	Meaning
	PRAN. 0	Print out only if the weight value is +
	PRAN. 1	Print out only if the weight value is -
	PRAN. 2	Print out regardless of whether the weight value is +/-

Menu-PRT.04: Set Print Out Condition

Function	Set Print Out Condition (Printing condition)	
Set Range (0~2)	Display Part	Meaning
	PRCS. 0	Manual Print (Printed only if the print key is pushed)
	PRCS. 1	Automatic Print (Printed automatically if the weight value is stabilized)
	PRCS. 2	Finish Print (Printed automatically if the finish signal out in relay operation)

4. RTC Setting (Option)

Menu-RTC.01: Set Date

Function	Set Date	
Number Key	Display Part	Meaning
: Data Designation	10.08.17	August 17th, 2010

Menu-RTC.02: Set Time

Function	Set Time	
Number Key	Display Part	Meaning
: Data Designation	11.30.10	30 minutes and 10seconds past 11 o'clock

5. Analogue Output Setting (Option)

Menu-AOUT.01: A-out activation range setting

Function	Set A-Out range	
Set Range (0, 1)	Display Part	Meaning
	AOBI. 0	Unipolar(operating in +weight)
	AOBI. 1	Bipolar(operating in ±weight)

Menu-AOUT.02: V-out range setting

Function	V-out range	
Set Range (0 ~ 4)	Display Part	Meaning
	VRAN. 0	V-out is closed
	VRAN. 1	0V ~ 5 V
	VRAN. 2	0V ~ 10 V
	VRAN. 3	±5 V
	VRAN. 4	±10 V

Note 1. Simultaneous output is not used. Therefore the V-out output range settings are applied with priority during setting.
Note 2. When only using I-out, the V-out output range must be set to 0.

Menu-AOUT.03: I-out range setting

Function	I-out range	
Set Range (0 ~ 3)	Display Part	Meaning
	IRAN 0	I-out is closed
	IRAN. 1	4 mA ~ 20 mA
	IRAN. 2	0 mA ~ 20 mA
	IRAN. 3	0 mA ~ 24 mA

Menu-AOUT.04: Dual output(V-out & I-out)

Function	Dual output(V-out & I-out)	
Set Range (0, 1)	Display Part	Meaning
	DUON. 0	Dual output disabled
	DUON. 1	Dual output enabled

Menu-AOUT.05: Minimum weight of A-out

Function	Minimum Output Weight Value upon Using Analog Out option	
Set Range (0 ~ Max weight)	Display Part	Meaning
	1000 2000 **Initial value : 0**	Minimum output at 1000 kg Minimum output at 2000 kg

Menu-AOUT.06: Maximum weight of A-out

Function	Maximum Output Weight Value upon Using Analog Out option	
Set Range (0 ~ Max weight)	Display Part	Meaning
	1000	Maximum output at 1000 kg
	2000	Maximum output at 2000 kg
	Initial value : Max weight	

Menu-AOUT.07: Adjust zero of A-out

Function	Adjust the Zero Output upon Using Analog Out option	
Set Range (0 ~ 24000)	Display Part	Meaning
	0000	0.000mA, 0V output
	4000	4.000mA, 2V output
	4015	4.015mA, 2.007V output

Note 1. The example is based on settings of 0~10V, 0~24mA.
Note 2. The Micro-adjustment function does not work during simultaneous output of V-out and I-out.

Menu-AOUT.08: Adjust Span of A-out

Function	Adjust the Maximum Output upon Using Analog Out option	
Set Range (0 ~ 24000)	Display Part	Meaning
	10000	10.000 mA, 4.16 V output
	20000	20.000 mA, 8.33 V output
	24000	24.000 mA, 10.0 V output

Note 1. The example is based on settings of 0~10V, 0~24mA.
Note 2. The Micro-adjustment function does not work during simultaneous output of V-out and I-out.

6. Relay Setting (Option)

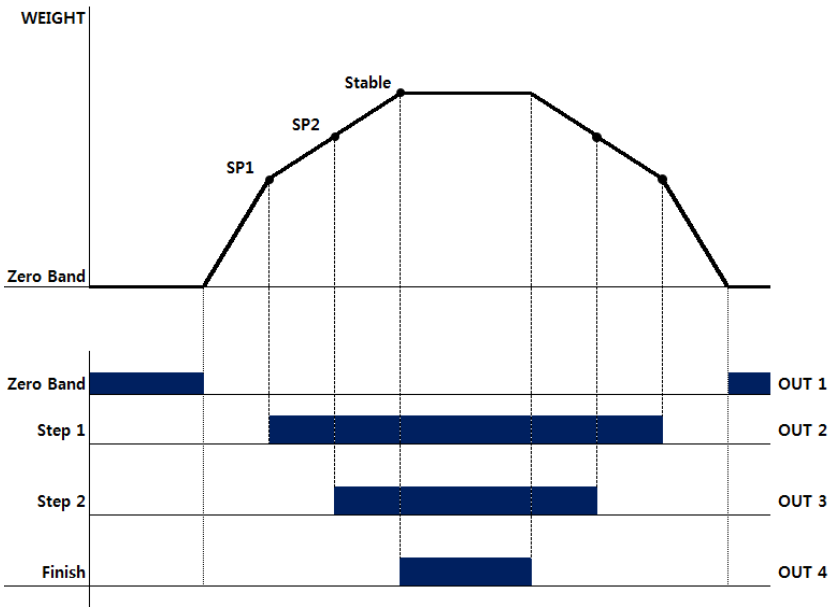
Menu-EXIO.01: Set Relay mode

Function	Set Relay mode	
Set Range (0~4)	Display Part	Meaning
	EXMD. 0	Limit Mode
	EXMD. 1	Limit type Checker Mode
	EXMD. 2	Checker Mode
	EXMD. 3	Programmable Mode
	EXMD. 4	Packer Mode

※ Set the SP(Set Point) in the SET MODE

※ W = Weight

<Limit Mode>

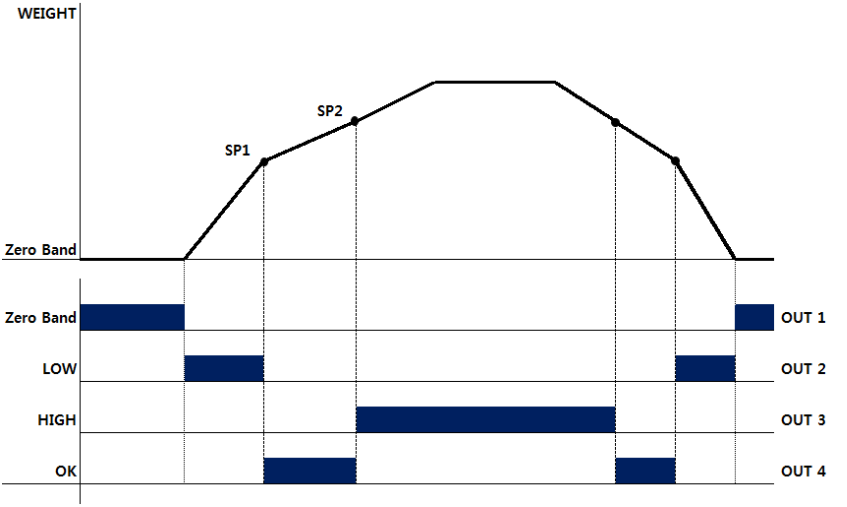


Note.

1. Set value input requirement: SP2 > SP1
2. Relay Output

Step 1 : W ≥ SP1 → ON
Step 2 : W ≥ SP2 → ON
Finish : W ≥ SP2 & Stable → ON
Near zero : Set value ≥ 0 range output

<Limit type Checker Mode>

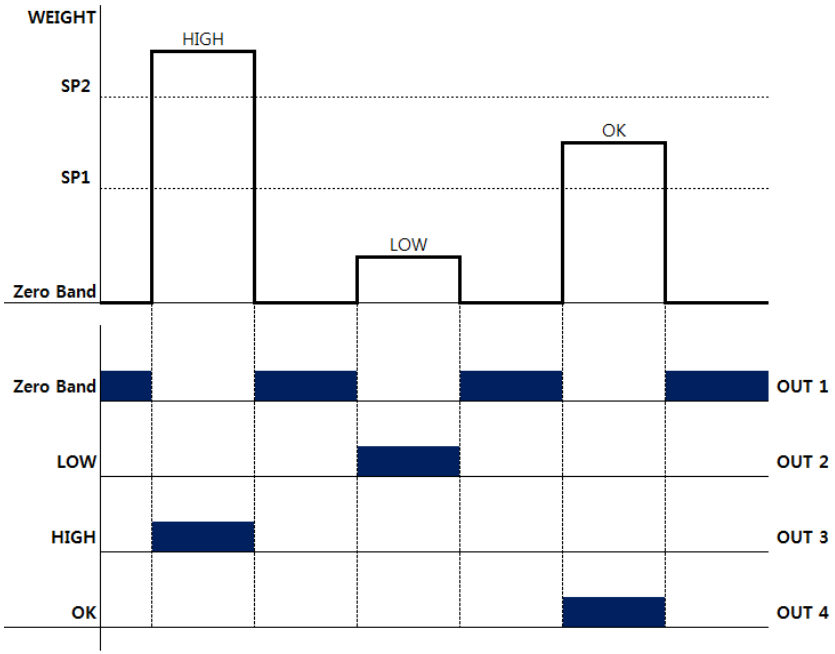


Note.

1. Set value input requirement: SP2 > SP1
2. Relay Output

LOW : SP1 ≥ W → ON
HIGH : W ≥ SP2 → ON
Finish(OK) : SP1 < W < SP2 → ON
Near zero: Set value ≥ 0 range output

<Checker Mode>



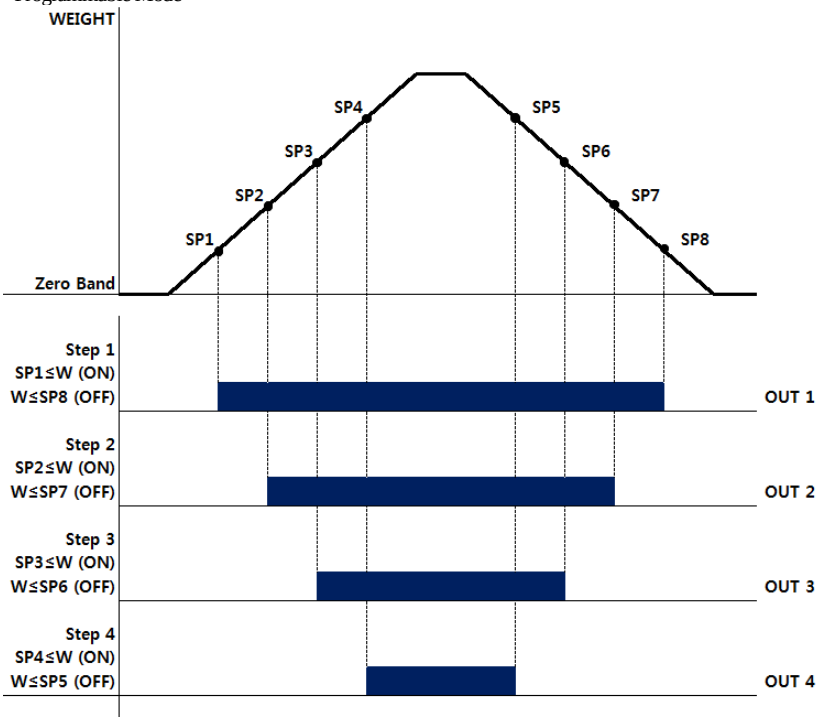
Note.

1. Set value input requirement: SP2 > SP 1
2. Relay Output

LOW : SP1 ≥ W → ON
HIGH : W ≥ SP2 → ON
Finish(OK) : SP1 < W < SP2 → ON
Near zero: Set value ≥ 0 range output

3. Whenever stable, each output set.
4. No change the status until come back to the Zero Band

<Programmable Mode>



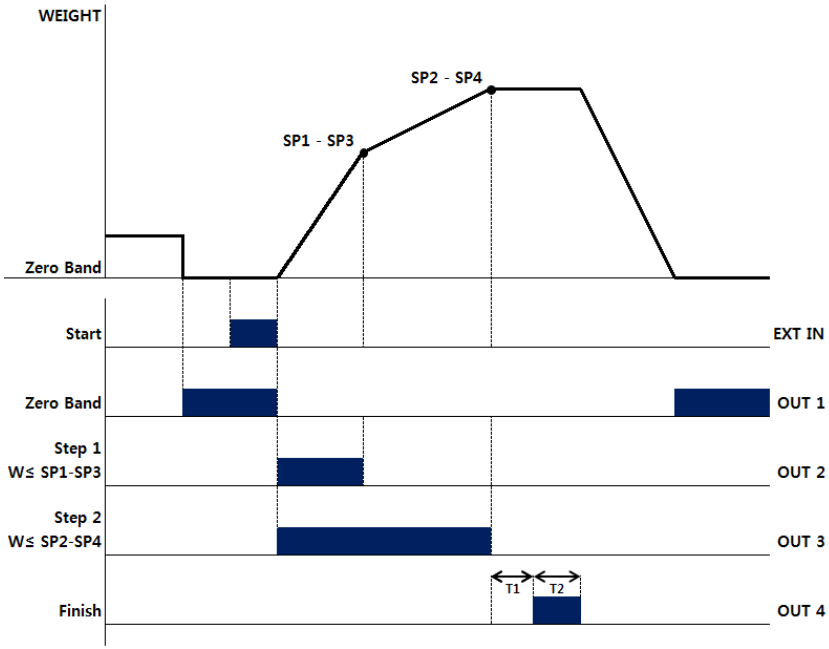
Note.

1. Set value input requirement: SP4 > SP3 > SP2 > SP1, SP5 > SP6 > SP7 > SP8
2. Relay Output

Step 1 : W ≥ SP1 → ON, W ≤ SP8 → OFF
Step 2 : W ≥ SP2 → ON, W ≤ SP7 → OFF
Step 3 : W ≥ SP3 → ON, W ≤ SP6 → OFF
Step 4 : W ≥ SP4 → ON, W ≤ SP5 → OFF

3. When it increases, External output ON. When it decreases, External output OFF

<Packer Mode>



Note.

1. Set value input requirement: SP2 > SP1
2. T1 : Start Delay Time for completed Relay
   T2 : Operating Duration Time for completed Relay
   EXT IN : Set the Start key
3. Relay Output

Step 1 : Start → ON, (W ≥ SP1 – SP3) → OFF
Step 2 : Start → ON, (W ≥ SP2 – SP4) → OFF
Finish : After Step2 and T1, ON for T2
Near zero: Set value ≥ 0 range output

Weighing Output Information per Mode

Relay Mode	OUT 1	OUT 2	OUT 3	OUT 4
▫ 1_Limit Mode	Zero	Step 1 SP1 ≤ W	Step 2 SP2 ≤ W	Finish(Stable)
▫ 2_Limit type Checker Mode	Zero	LOW W ≤ SP1	HIGH SP2 ≤ W	Finish(OK) SP1< W<SP2
▫ 3_Checker Mode	Zero	LOW W ≤SP1	HIGH SP2 ≤W	Finish(OK) SP1< W <SP2
▫ 4_Programmable Mode	Step 1 SP1≤W (ON) W≤SP8 (OFF)	Step 2 SP2≤W (ON) W≤SP7 (OFF)	Step 3 SP3≤W (ON) W≤SP6 (OFF)	Step 4 SP4≤W (ON) W≤SP5 (OFF)
▫ 5_Packer Mode	Zero	Step 1 W ≤ SP1-SP3	Step 2 W ≤ SP2-SP4	Finish

Menu-EXIO.02: Set Ext Input 1

Function	Set Ext Input 1	
Set Range (0 ~ 5)	Display Part	Meaning
	EIN1. 00	External In1 is zero key
	EIN1. 01	External In1 is tare/tareless key
	EIN1. 02	External In1 is print key
	EIN1. 03	External In1 is hold keyy
	EIN1. 04	External In1 is hold clear key
	EIN1. 05	External In1 is start key

Menu-EXIO.03: Set Ext Input 2

Function	Set Ext Input 2	
Set Range (0 ~ 5)	Display Part	Meaning
	EIN2. 00	External In2 is zero key
	EIN2. 01	External In2 is tare/tareless key
	EIN2. 02	External In2 is print key
	EIN2. 03	External In2 is hold key
	EIN2. 04	External In2 is hold clear key
	EIN2. 05	External In2 is start key

Menu-EXIO.04: Relay Reverse On/Off

Function	Relay Reverse On/Off	
Set Range (0, 1)	Display Part	Meaning
	EREV. 00	Relay Reverse OFF
	EREV. 01	Relay Reverse ON

Menu-EXIO.05: Set Start Delay Time for completed Relay

Function	Set Start Delay Time for completed Relay	
Set Range (10 ~ 99)	Display Part	Meaning
	ERST. 10	Delayed by 00 x 0.1 Sec

Menu-EXIO.04: Set Operating Duration Time for completed Relay

Function	Set Operating Duration Time for completed Relay	
Set Range (0 ~ 99)	Display Part	Meaning
	EROT. 10	Delayed by 00 x 0.1 Sec

Weighing Mode

(1) How to Enter

Turn ON/OFF switch on and you will enter the Weighing Mode.

(2) Key Usage in Weighing Mode

Return the display to the ZERO.

Used to subtract the weight of container placed on the platform.
When this key is pressed, the scale stores current weight as the tare weight. If you press "TARE" key in unload condition, tare setting is released.

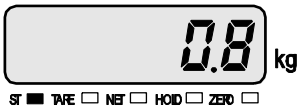
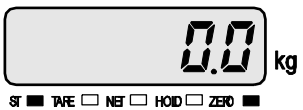
Toggle key between GROSS weight and NET weight. The annunciators and display will alternate between GROSS and NET as well.
In case tare weight is registered, tare and item's total weight is G. weight and only item's weight is N. weight.

Used to print the print FORM you've chosen in SET mode.

Some functions can be defined to the needs. (GEN.20)

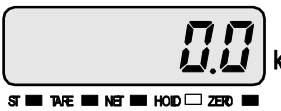
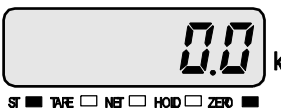
(3) Main Usage of CI-170A (Example 1 - Example 5)

■ Example 1. Zero Compensation

	Display & Key	On platform	Description
Step 1		Empty	Zero point drift.
Step 2	☞ ZERO		Press ZERO key when the weight is stable.
Step 3		Empty	ZERO compensation: The present value is returned the display to the ZERO.

► Note 1. It shall be in zero range to 4% or 10% of maximum capacity in Set menu of GEN.09.
Note 2. Non-ability in HOLD state of the weight.
Note 3. Non-ability in setting tare.

■ Example 2. Tare Function Usage

	Display & Key	On platform	Description
Step 1		Container	Tare weight: 200kg
Step 2	☞ TARE	Container	Store current weight as the tare weight.
Step 3		Container	To be turned on tare lamp means that tare is registered in. Net weight is on the display.
Step 4		Container+ Content	Gross: 700kg Net: 500kg TARE and NET key is turned on.
Step 5		Unload	Gross: 0.0kg Net: -200.0kg Tare function is turned on.
Step 6	☞ TARE	Unload	If you press TARE key in unload condition, tare setting is released.
Step 7		Unload	Gross: 0.0kg Net: 0.0kg Tare function is turned off.

► Note. TARE Range ≤ maximum capacity.
Press TARE key when the weight is stable.

※If you press TARE key in unload condition, tare setting is released.

■ Example 3. To display NET or GROSS weight.

	Display & Key	On platform	Description
Step 1		Container And Content (Article)	Article weight: 10.00kg Tare weight: 5.00kg Net weight is on the display now.
Step 2	☞ NET/GROSS		
Step 3		Container and Content (Article)	Gross weight is on the display now.
Step 4	☞ NET/GROSS		
Step 5		Container and Content (Article)	Net weight is on the display now.

► Note. GROSS annunciator appears when gross weight is on the display.
GROSS annunciator disappears when net weight is on the display.

■ Example 4. Set point changing

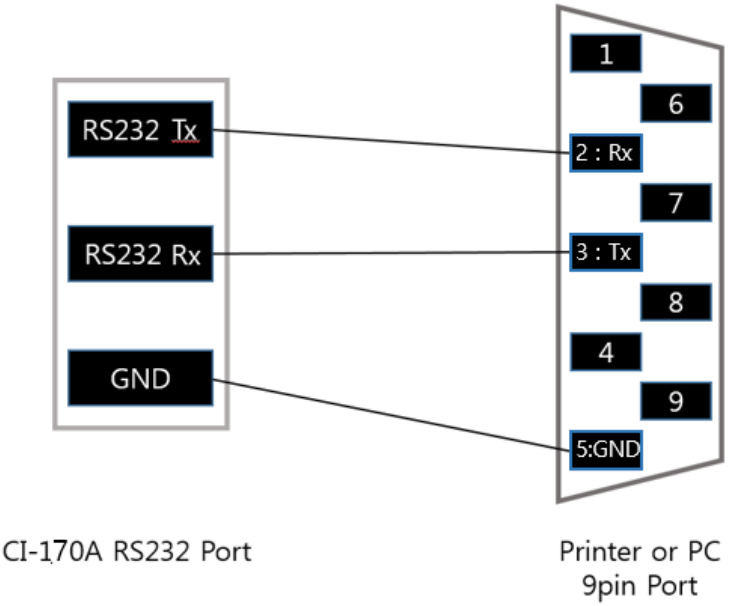
(1) How to Enter
In weighing mode, press and hold SET key, then move to menu mode.
In the menu, use ▲ key and SET key, move to **3. SP** menu.

	Display & Key	On platform	Description
Step 1	SP-1		Displayed current setpoint number
Step 2	01.000 ☞ ◀ ▲ ▼		Change the set point value
Step 3	☞ SET		Set point is saved
Step 4			Repeat setp1~3 until end point of max set point

■ Example 5. Print weighing data

	Display & Key	On platform	Description
Step 1		Article	
Step 2	☞ PRINT		Press PRINT key.
Step 3			Weighing data is printed.

RS232 Communication Pin Map



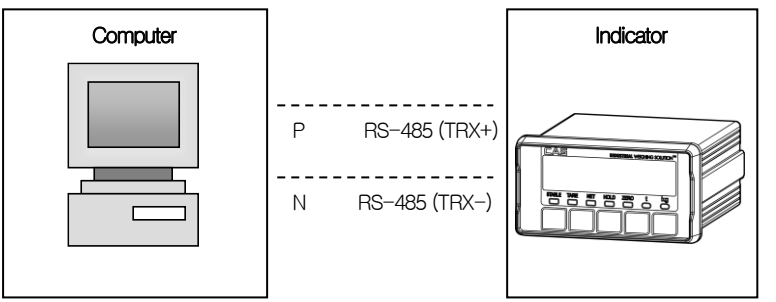
Note. BP-DT4 pin map is twisted Rx(2), Tx(3).

RS485 Communication Pin Map (Option)

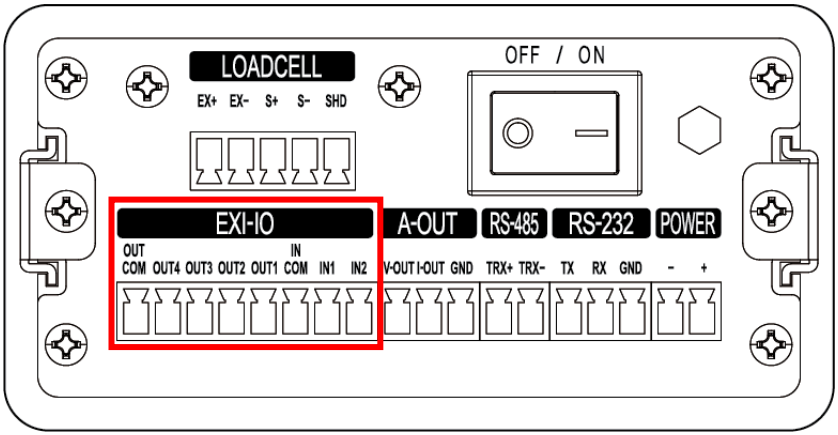
RS-485 transmit signals with the voltage difference, which are more stable for electric noises than other communication methods.

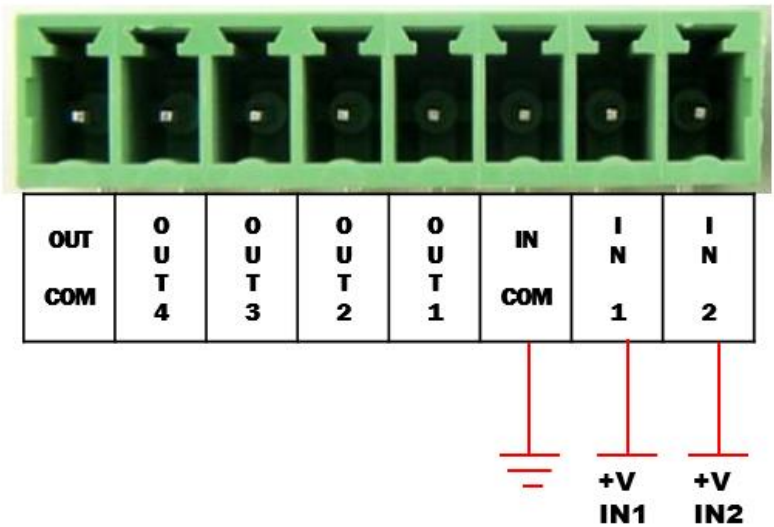
In addition, the AC Power Cable or other electric wires should be placed separately, and the shield cable (0.5Φ or more) dedicated to communications should be applied.

The recommended use distance is within 1.2km.



EXT Input / Output Connection (Option)

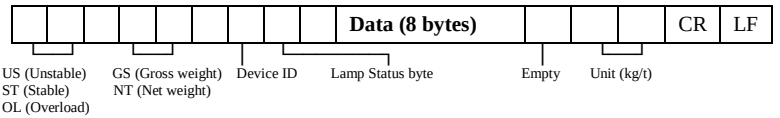




※ If 5 to 24 voltage applies to input terminals, a signal inputs to each of terminal.

Appendix 1> Data format

* 22 Bytes for CAS



▣ Device ID: Send ing1 byte of device ID to selectively receive the information from the indicator to the receiver. (Device ID is set in COMM.01.)

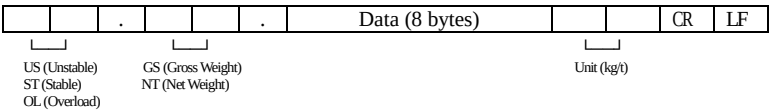
▣ Lamp Status Byte

Bt7	Bt6	Bt5	Bt4	Bt3	Bt2	Bt1	Bt0
1	Stable	1	Hold	Printer	Gross Weight	Tare	Zero Point

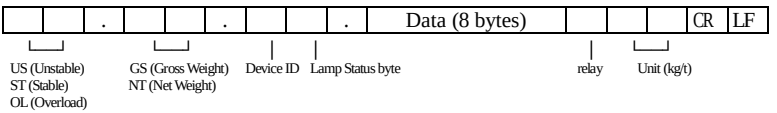
* 10 Bytes for CAS

Data (8bytes)	CR	LF

* 18 Bytes for AND



* 22 Bytes for CAS (Relay status)



- Relay status bytes

Bt7	Bt6	Bt5	Bt4	Bt3	Bt2	Bt1	Bt0
Out8	Out7	Out6	Out5	Out4	Out3	Out2	Out1

*Weight Date (8 byte)

Example weight	Byte No							
	1	2	3	4	5	6	7	8
13.5kg	‘ ‘	‘ ‘	‘ ‘	‘ ‘	‘1’	‘3’	‘.’	‘5’
135kg	‘ ‘	‘ ‘	‘ ‘	‘ ‘	‘1’	‘3’	‘5’	‘ ‘
-135kg	‘-‘	‘ ‘	‘ ‘	‘ ‘	‘1’	‘3’	‘5’	‘ ‘

Appendix 2> Command Mode 1 Description

CAS <NT-500 Command>

Indicator Reception	Function	Indicator Response
dd RW CR LF	Request for Weight Data	Transmit the data in the set format upon command input
dd MZ CR LF	Same as Zero Key	Execute the zero and retransmit dd MZ CR LF to PC upon command input
dd MT CR LF	Same as Tare Key	Execute tare and retransmit dd MT CR LF to PC upon command input
dd PN 00 CR LF	Input Item No.(00~50)	Change the item no. and retransmit dd PN 00 CR LF to PC upon command input.
dd OP CR LF	Same as Start Key	Execute the start and retransmit dd OP CR LF to PC upon command input

* dd : Device ID. (ASCII Code : 0×30 (hex), 0×31(hex if the Device ID is "01")

* 00000,00 : Set value for upper limit/lower limit/upper limit fall/lower limit fall

(ASCII Code : 0x30(hex), 0x30(hex), 0x33(hex), 0x34(hex),

0x35(hex) if the set value is "00345")

* When it fails to execute the command : ! CR LF is transmitted to the computer.

* When there is an error in the command : ? CR LF is transmitted to the computer.

Appendix 3> Command mode 3 Description

CI-5000 : Transmission only if data is requested (1 byte communication)

Appenix 5> ASCII Table

CHA	CODE	CHA	CODE	CHA	CODE	CHA	CODE	CHA	CODE	CHA	CODE
Space	32	0	48	@	64	P	80	`	96	p	112
!	33	1	49	A	65	Q	81	a	97	q	113
“	34	2	50	B	66	R	82	b	98	r	114
#	35	3	51	C	67	S	83	c	99	s	115
$	36	4	52	D	68	T	84	d	100	t	116
%	37	5	53	E	69	U	85	e	101	u	117
&	38	6	54	F	70	V	86	f	102	v	118
‘	39	7	55	G	71	W	87	g	103	w	119
(	40	8	56	H	72	X	88	h	104	x	120
)	41	9	57	I	73	Y	89	i	105	y	121
*	42	:	58	J	74	Z	90	j	106	z	122
+	43	;	59	K	75	[	91	k	107	{	123
,	44	<	60	L	76	\	92	l	108	|	124
-	45	=	61	M	77	]	93	m	109	}	125
.	46	>	62	N	78	^	94	n	110	~	126
/	47	?	63	O	79	_	95	o	111	End	0

Appendix 4>MODBUS-RTU PROTOCOL

The registry read and write shown below of MODBUS-RTU protocol can be managed based on the requirements included in the reference document regarding the **Modicon PI-MBUS-300** standard.
For selection of communication with Modbus-RTU, the serial communication settings paragraph has been included.
If specific data has been recorded directly in EEPROM type memory, it is recommended that unnecessary work at the aforementioned position be avoided as the memory is limited in its write activation (100,000).
The below number is, when coming after 0x, is described in a decimal or a hexadecimal method.

MODBUS-RTU DATA FORMAT

Data transferred by the Modbus-RTU protocol has the following characteristics.
- Start bit 1
- Data bit 8 (smallest bit sent first)
- Parity bit setting (instrument setting)
- Stop bit setting (instrument setting)

MODBUS SUPPORTED FUNCTIONS

From the commands capable of being used in the Modbus-RTU protocol, only the following are used in communication management with the instrument. Other commands may not be accurately interpreted and may cause error or shutdown the system.

Function	Explanation
03(0x03)	READ HOLDING REGISTER
16(0x10)	PRESET MULTIPLE REGISTERS

The request cycle is integrated with the preset communication speed. (The instrument requires a transfer delay of at least 3 bytes to reply to the request)
Delay parameters exist in the serial communication setting, and directly affect the number of request possible in a unit time by additionally delaying the reply from the instrument.
For additional information about this protocol, refer to the PI_MBUS_300 normal technical specifications.
Typically, the request and reply for the slave instrument is composed as follows.

FUNCTION 3: Read holding registers

Request

Address	Funcion	Register1 Address	No. register	2 bytes
A	0x03	0x0000	0x0002	CRC

Total. bytes = 8

Reply

Address	Funcion	No.bytes	Register1	Register2	2 bytes
A	0x03	0x04	0x0064	0x00C8	CRC

Total. bytes = 3 + 2*No. register + 2

-number of register = number of modbus register to be read, start at address 1 register.

-number of byte = number of bytes in the following data

FUNCTION 16: Preset multiple registers

Request

Addr	Funcion	Add. Reg.1	No.reg.	No. bytes	Val. Reg. 1	Val. Reg. 2	2 bytes
A	0x10	0x0000	0x0002	0x4	0x0000	0x0000	CRC

Total. bytes = 7 + 2*No. register + 2

Reply

Address	Funcion	Add.Reg.1	No.reg.	2 bytes
A	0x10	0x0000	0x0002	CRC

Total. bytes = 8

-No. registers = number of modbus register to be read, start at address 1 register
-No. bytes = Number of following data bytes
-Val.reg.1 = Content of starting register
In the reply, the number of converted redcodes starting from address 1 is included.

Appendix 5. <How-to-Use the MIGUN protocol>

1. BCC (Check sum) auto used

When you send a command to an indicator, you receive data with BCC if the data includes BCC, and when you send a command that does not contain BCC, you receive data except BCC.

TO → INDICATOR	Command Description	Indicator Response
STX ID. NO. WZER BCC ETX	Command to set "ZERO"	STX ID. NO. WZER ACK BCC ETX or STX ID. NO. WZER NAK BCC ETX

▶ Format when Commanded by PC (Includes BCC)

STX(1) ID.NO.(2) COMMAND(4) BCC(2) ETX(1)

STX	ID.NO		WZER				A9 (BCC)		ETX
02H	30H	31H	57H	5AH	45H	52H	41H	39H	03H

※ Calculation on the Check-Sum computes the total sum of values from "STX" to prior to "BCC," and only transmits single digit and double digit numbers in the range of 10's. For example, if the calculated Check-Sum value is "1A9," then the last two characters "A" and "9" will be converted to ASCII and be transmitted as "41H" and "39H."

▶ Format when Commanded by PC (Excepts BCC)

STX(1) ID.NO.(2) COMMAND(4) ETX(1)

STX	ID.NO.		WZER				ETX
2H	30H	31H	57H	5AH	45H	52H	03H

- ID.NO. : F20 Set Device Number = 01(30H 31H)

(Recommended) To prevent DATA ERROR, BCC is recommended for use.

▶ Indicator Data Transmission Format (Includes BCC)

STX(1) ID.NO.(2) COMMAND(4) ACK(1) BCC(2) ETX(1)

STX	ID.NO.		WZER				ACK	AF(BCC)		ETX
2H	30H	31H	57H	5AH	45H	52H	06H	41H	46H	03H

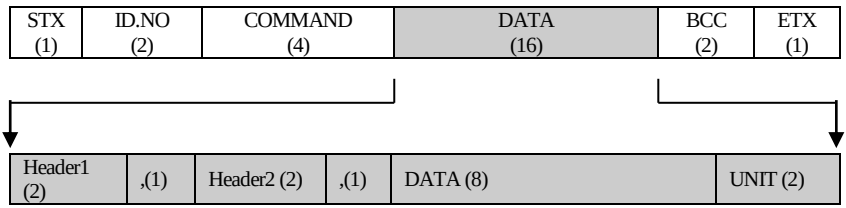
● ACK :06H = Transmission Complete (Normal Operation) , NAK : 15H Transmission Unsuccessful (Re-transmit)
● BCC : 30H + 31H + 57H + 5AH + 45H + 52H + 06H= 1AFH

▶ Indicator Data Transmission Format (Excepts BCC)

STX(1) ID.NO.(2) COMMAND(4) ACK(1) ETX(1)

STX	ID.NO.		WZER				ACK	ETX
2H	30H	31H	57H	5AH	45H	52H	06H	03H

● ACK : 06H = Transmission Complete (Normal Operation) , NAK : 15H Transmission Unsuccessful (Re-transmit)



※ DATA1 (16)

1. Header1
ST = Stable, US = Unstable, OL = Over Load

2. Header2
NT = Net Weight , GS = Gross Weight

3. DATA
Weight including code and decimals

4. UNIT
Kg = kg, Ton = t.

▶ COMMAND MODE (READ COMMAND)

TO → INDICATOR	Command Description	Indicator Response
STX ID. NO. RTIM BCC(9D) ETX	Command to transmit the Indicator's TIME DATA	Transmit TIME DATA (6) - STX ID.NO. RTIM 000000 BCC ETX
STX ID. NO. RDAT BCC(8C) ETX	Command to transmit the Indicator's DATE DATA	Transmit DATE DATA (6) - STX ID. NO. RDAT 000000 BCC ETX
STX ID. NO. RCNO BCC(93) ETX	Command to transmit the Code Number	Transmit Code Number (6) - STX ID. NO. RCNO 000000 BCC ETX
STX ID. NO. RPNO BCC(A0) ETX	Command to transmit the Part Number	Transmit P/N (2) - STX ID. NO. RPNO 00 BCC ETX
STX ID. NO. RTAR BCC(9A) ETX	Command to transmit the weight value of "KEY Tare"	Transmit KEY Tare (6) - STX ID. NO. RTAR 000000 BCC ETX
STX ID. NO. RCWT BCC(A1) ETX	Command to transmit the "Current Weight Value"	Transmit the "Current Weight Value" - STX ID. NO. RCWT DATA1 BCC ETX
STX ID. NO. RSUB BCC(9D) ETX	Command to transmit the "Sub-total"	- STX ID. NO. RSUB P/N(2) CODE(6) COUNT(6) S.T.W(8) BCC ETX No Decimal Place
STX ID. NO. RGRD BCC(90) ETX	Command to transmit the "Grand-Total"	- STX ID.NO. RGRD P/N(2) CODE(6) T_COUNT(6) G.T.W(10) BCC ETX No Decimal Place
STX ID. NO. RSP1 BCC ETX	Command to transmit the DATA of the Step 1	Transmit the Step 1 DATA (6) - STX ID.NO. RSP1 000000 BCC ETX
STX ID. NO. RSP2 BCC ETX	Command to transmit the DATA of the Step 2	Transmit the Step 2 DATA (6) - STX ID.NO. RSP2 000000 BCC ETX
STX ID. NO. RSP3 BCC ETX	Command to transmit the DATA of the Step 3	Transmit the Step 3 DATA (6) - STX ID.NO. RSP3 000000 BCC ETX
STX ID. NO. RSP4 BCC ETX	Command to transmit the DATA of the Step 4	Transmit the Step 4 DATA (6) - STX ID.NO. RSP4 000000 BCC ETX
STX ID. NO. RSP5 BCC ETX	Command to transmit the DATA of the Step 5	Transmit the Step 5 DATA (6) - STX ID.NO. RSP5 000000 BCC ETX
STX ID. NO. RSP6 BCC ETX	Command to transmit the DATA of the Step 6	Transmit the Step 6 DATA (6) - STX ID.NO. RSP6 000000 BCC ETX

▶ COMMAND MODE (WRITE COMMAND)

PC → INDICATOR	Command Description	Indicator Response
STX ID. NO. WTAR BCC(9F) ETX	Command to set "TARE"	STX ID. NO. WTAR ACK BCC ETX or STX ID. NO. WTAR NAK BCC ETX
STX ID. NO. WTRS BCC(B1) ETX	Command for "TARE RESET"	STX ID. NO. WTRS ACK BCC ETX or STX ID. NO. WTRS NAK BCC ETX
STX ID. NO. WZER BCC(A9) ETX	Command to set "ZERO"	STX ID. NO. WZER ACK BCC ETX or STX ID. NO. WZER NAK BCC ETX
STX ID. NO. WPRT BCC(AE) ETX	Command to run "PRINT"	STX ID. NO. WPRT ACK BCC ETX or STX ID. NO. WPRT NAK BCC ETX
STX ID. NO. WGPR BCC(A1) ETX	Command to run "GRAND-PRINT"	STX ID. NO. WGPR ACK BCC ETX or STX ID. NO. WGPR NAK BCC ETX
STX ID. NO. WDAT DATE BCC(C6) ETX ex) STX ID.NO WDAT 090903 C6 ETX	Command to convert the date of the TIMER stored in the Indicator to 2009. Sept. 3rd.	STX ID. NO. WDAT ACK BCC ETX or STX ID. NO. WDAT NAK BCC ETX
STX ID. NO. WTIM TIME BCC(D7) ETX ex) STX 01 WTIM 123456 D7 ETX	Command to convert the time of the TIMER stored in the Indicator to 12: 34: 56.	STX ID. NO. WTIM WCK BCC ETX or STX ID. NO. WTIM NAK BCC ETX
STX ID.NO. WPNO P/N(2) BCC(06) ETX ex) STX 01 WPNO 01 06 ETX	Command to change the "PART NUMBER" to 01 value that is being sent.	STX ID. NO. WPNO ACK BCC ETX or STX ID. NO. WPNO NAK BCC ETX
STX ID. NO. WCNO C/N(6) BCC(CD) ETX ex) STX 01 WCNO 123456 CD ETX	Command to change the "CODE" to the 123456 value that is being sent.	STX ID. NO. WCNO ACK BCC ETX or STX ID. NO. WCNO NAK BCC ETX
STX ID. NO. WHOL BCC(9B) ETX	Command to set "HOLD"	STX ID. NO. WHOL ACK BCC ETX or STX ID. NO. WHOL NAK BCC ETX
STX ID. NO. WHRS BCC(A5) ETX	Command for "HOLD RESET"	STX ID. NO. WHRS ACK BCC ETX or STX ID. NO. WHRS NAK BCC ETX
STX ID. NO. WSTR BCC ETX	Command for "START"	STX ID. NO. WSTR ACK BCC ETX or STX ID. NO. WSTR NAK BCC ETX
STX ID. NO. WSTO BCC ETX	Command for "STOP"	STX ID. NO. WSTO ACK BCC ETX or STX ID. NO. WSTO NAK BCC ETX
STX ID. NO. WGRO BCC ETX	Command for "Gross / Net"	STX ID. NO. WGRO ACK BCC ETX or STX ID. NO. WGRO NAK BCC ETX
STX ID. NO. WTNO K / T(6) BCC ETX ex) STX ID.NO WTNO 000000 BCC ETX	Command to change "Key Tare" to the DATA value that is being sent	STX ID. NO. WTNO ACK BCC ETX or STX ID. NO. WTNO NAK BCC ETX

STX ID. NO. WSP1 SP1(6) BCC ETX ex) STX ID.NO WSP1 000000 BCC ETX	Command to change "Step 1" to the DATA value that is being sent	STX ID. NO. WSP1 ACK BCC ETX or STX ID. NO. WSP1 NAK BCC ETX
STX ID. NO. WSP2 SP2(6) BCC ETX ex) STX ID.NO WSP2 000000 BCC ETX	Command to change "Step 2" to the DATA value that is being sent	STX ID. NO. WSP2 ACK BCC ETX or STX ID. NO. WSP2 NAK BCC ETX
STX ID. NO. WSP3 SP3(6) BCC ETX ex) STX ID.NO WSP3 000000 BCC ETX	Command to change "Step 3" to the DATA value that is being sent	STX ID. NO. WSP3 ACK BCC ETX or STX ID. NO. WSP3 NAK BCC ETX
STX ID. NO. WSP4 SP4(6) BCC ETX ex) STX ID.NO WSP4 000000 BCC ETX	Command to change "Step 4" to the DATA value that is being sent	STX ID. NO. WSP4 ACK BCC ETX or STX ID. NO. WSP4 NAK BCC ETX
STX ID. NO. WSP5 SP5(6) BCC ETX ex) STX ID.NO WSP5 000000 BCC ETX	Command to change "Step 5" to the DATA value that is being sent	STX ID. NO. WSP5 ACK BCC ETX or STX ID. NO. WSP5 NAK BCC ETX
STX ID. NO. WSP6 SP6(6) BCC ETX ex) STX ID.NO WSP6 000000 BCC ETX	Command to change "Step 6" to the DATA value that is being sent	STX ID. NO. WSP6 ACK BCC ETX or STX ID. NO. WSP6 NAK BCC ETX

※ACK = Transmission Complete (Normal Operation) , NAK = Transmission Unsuccessful (Re-transmit)

※ BCC(XX) = XX is the BCC value when ID. NO. is set as 01.

Communication Error Management

The management of communication data error must be controlled by CRC (cycle redundancy check).

If a communication error occurs, the slave does not reply to any request.

The master must consider the time-out before receiving the reply. If no reply is received, it can be inferred that a communication error has occurred.

If the data strings have been accurately received but cannot be executed, an exceptional response is required. The contents are as follows.

Exceptional response

Address	Function	Code	2bytes
A	Funct + 0x80		CRC

CODE	DESCRIPTION
1	Invalid or unsupported function (ILLEGAL FUNCTION)
2	When the stated data address cannot be used (ILLEGAL DATA ADDRESS)
3	When the received data value is invalid (ILLEGAL DATA VALUE)
4	Error in the CRC code (CRC Error)

Register List

The Modbus-RTU protocol registers capable of being executed in this instrument are as follows.

R = Register that can be used as read-only
W= Register that can be used as write-only
R/W = Register that can be used as for both read and write
H = Higher word of the Double word composing the register
L = Lower word of the Double word composing the register

REGISTER	DESCRIPTION	Input value	Saving to EEPROM	ACCESS
40002	Type of instrument	-	-	R
40008	GROSS WEIGHT H	-	-	R
40009	GROSS WEIGHT L	-	-	R
40010	NET WEIGHT H	-	-	R
40011	NET WEIGHT L	-	-	R
40014	Raw AD Data_H	-	-	R
40015	Raw AD Data_L	-	-	R
40017	Set point 1 H	0~99999	Y	R/W
40018	Set point 1 L	0~99999	Y	R/W
40019	Set point 2 H	0~99999	Y	R/W
40020	Set point 2 L	0~99999	Y	R/W
40021	Set point 3 H	0~99999	Y	R/W
40022	Set point 3 L	0~99999	Y	R/W
40023	Set point 4 H	0~99999	Y	R/W
40024	Set point 4 L	0~99999	Y	R/W
40037	Ext_Input	-	-	R/W

40038	Ext_Output	-	-	R/W
40042	Analog out Span Weight H	0~99999	Y	R/W
40043	Analog out Span Weight L	0~99999	Y	R/W
40044	Analog out Zero Adjust H	0~99999	Y	R/W
40045	Analog out Zero Adjust L	0~99999	Y	R/W
40046	Analog out Span Adjust H	0~99999	Y	R/W
40047	Analog out Span Adjust L	0~99999	Y	R/W
40050	Analog Out V-Out range Setting	0~99999		
40051	Analog Out I-Out range Setting	0~99999		
40052	Analog Out Dual-Out range Setting	0~99999		
40060	ADC Speed	0~99999	Y	R/W
40062	AD Filter Size	0~99999	Y	R/W
40069 ~ 40080	Reserved		-	-
40053	Ext_Input		Y	R/W
40060	Ext_Output		Y	R/W
40062	Analog out Span Weight H		Y	R/W
40063	ADC reserved		-	-
40064	ADC reserved		-	-
40065	ADC reserved		-	-
40066	ADC reserved		-	-
40067	ADC reserved		-	-
40068	ADC reserved		-	-
40081	Stable range	0~99	Y	R/W
40082	Zero tracking range	0~9	Y	R/W
40083	Weight back up	0 : OFF 1: ON	Y	R/W

40084	Zero key range	0~99	Y	R/W
40085	Tare key range	0~99	Y	R/W
40086	Initial zero range	0~99	Y	R/W
40087	Overload range	0~9	Y	R/W
40088	reserved		-	-
40089	Zero, Tare, Gross/Net, Hold, Tare Clear, Hold Clear	1 : Zero 2 : Tare 3 : Gross/Net 4 : Hold 5: Tare Clear 6: Hold Clear	Y	W
40090	reserved		-	-
40151	Device Number		Y	R/W
40152	Comm transmit time		Y	R/W
40153	RS232 parity bit		Y	R/W
40154	RS232 Baudrate		Y	R/W
40155	RS232 output data(Gross/Net)		Y	R/W
40156	RS232 output format		Y	R/W
40157	RS232 output mode		Y	R/W
40158 ~ 40170	reserved		-	-
40171	Set Year		Y	R/W
40172	Set Month		Y	R/W
40173	Set Date		Y	R/W
40174	Set Hour		Y	R/W
40175	Set Minute		Y	R/W
40176	Set Second		Y	R/W
40178 ~ 40199	reserved		-	-

Error Message

1. Errors that can occur in weight calibration mode

Error	Cause	Solution
Err 20	The set resolution has exceeded the allowance limit of 1/30,000.	Lower resolution. Resolution = maximum allowed weight/value of 1 increment. Adjust maximum allowed weight in CAL 1 of weight calibration mode or adjust the value of 1 increment in CAL 3 of weight calibration mode to adjust to below 1/30,000.
Err 22	The counterweight for span adjustment has been set to less than 10% of maximum weighing scale capacity.	Set the counterweight weight as greater than 10% of the maximum scale capacity (set in CAL 1) in CAL 4 of weight calibration mode.
Err 23	The counterweight for span adjustment has been set to exceed 100% of the weighing scale capacity.	Set the counterweight weight to within the maximum weighing scale capacity (set in CAL 1) in CAL 4 of weight calibration mode.
Err 24	Span is too low.	Setting the present resolution is not possible as there is an issue with the load cell or the load cell output is too small. Reset the weight calibration by reducing the resolution. PCS, PERCENT Sample weight is too small
Err 25	Span is too high.	There is an issue with the load cell or the load cell output is too high. Redo steps from weight setting CAL 4 zero-set adjustment. PCS, PERCENT Sample weight is too great.
Err 26	Zero-set is too high.	Check if the load plate of the weighing scale is clear. After verifying in Test Mode 3, redo the weight calibration.
Err 27	Zero-set is too low.	After checking the force applied to the weighing scale load plate in Test Mode 3, redo the weight calibration.
Err 28	Weight is unstable.	Check if the load cell connector is properly connected.

2. Errors that can occur in weighing mode

Error	Cause	Solution
Err 01	Due to unstable load the weighing scale cannot be reset.	Move the weighing scale to a flat, vibration-free surface and turn on the power.
Err 02	Load cell is not properly connected or there is a problem with the A/D convertor.	Check if the main body and the load plate are connected properly.
Err 08	The zero-set key, container key and start key are set not to function when the load is unstable.	In F22 of the Conversion Mode, set the zero-set key, container key and start key activation conditions based on the environment of use.
Err 09	The current weight exceeds the zero-set range.	In F09 of Conversion Mode set the activation range to within 2% or 10% of the maximum capacity.
Err 10	The weight of the container being designated exceeds the maximum capacity of the weighing scale.	Set the container weight to be less than the maximum capacity.
Err 13	When calibrating the weight the set zero-set has been exceeded.	Check the status of the load plate and redo the weight calibrations.
Err 15	In Command Mode, the Item Code has exceeded the set range.	Check the Item Code range
Err 82	There is a problem with the A/D convertor.	Please contact the A/S center.
OVER	The current load on the load plate is too heavy, and exceeds the allowance limit.	Do not place weight exceeding the capacity limit on the weighing scale. If the load cell is damaged, it must be replaced.

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Weighing Indicator

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9005-I7A-0033-0 2019. 9