

Specifications

Digital Indicator

CSD-903-EX

Spec. No. EN382903-EX-B

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1. General

This instrument is the digital indicator suitable for butcher scale and the platform scale system.

2. Specifications

2-1. Specifications for analog

- Bridge power supply DC10 V \pm 0.5 V (5 V, 2.5V) within 180 mA, with remote sensing
- Applicable transducers Up to 6 pieces of strain gage applied transducers(350 ohm) can be connectable.
- Input sensitivity 0.2 μ V/d or more (d=minimum scale)
- Input range -3.1 mV/V to 3.1 mV/V
- Zero adjustment range ± 2.5 mV/V
- Non-Linearity 0.01 %F.S.
- Temperature coefficient
Zero point ± 0.2 μ V/ $^{\circ}$ C
(When the calibration is made at 0.2 μ V/d or more of the input sensitivity.)
Sensitivity ± 0.0008 %F.S./ $^{\circ}$ C
(When the calibration is made at 0.2 μ V/d or more of the input sensitivity.)
- Input noise ± 0.2 μ V_{p-p} or less
(At the default setting of analog filter, digital filter and stabilization filter.)
- Analog filter Select from 2,4,6,8 and 10 Hz
(At the default setting of analog filter, digital filter and stabilization filter.)
- A/D sampling 200 times/s (Changeable to 20 times/s.)
- A/D internal resolution 24 bits

2-2. Specification for digital

- Main display (Load display)
 - Display range $-999\ 999$ to 999 999
 - Display increment 1 (2, 5, 10, 20 or 50 changeable)
 - Display unit 7-segment green colored fluorescent display tube with character's height 11.55 mm , 7 digits
 - Over display “-OL” display at minus over, “OL” display at plus over
 - AD value over display “-OVF” display at minus over, “OVF” display at plus over
- Sub display
 - Display range Accumulation total display $-19\ 999\ 999$ to 99 999 999,
Accumulation times 0 to 999 999.
 - Display unit 7-segment green colored fluorescent display tube with character's height 5 mm , 18 digits
 - Display contents OFF, Accumulation times/Accumulation value, Last Accumulated data/
Accumulation value, Accumulation times/Last Accumulated data, Last
Accululated data/OK, Accumulated times/OK, OK/Accululated value,
OK/Over/Under and Near zero/Full
* At the time of Function setting, “Load value + Unit” can be displayed.
- Condition display STABLE, PRE.TARE, TARE, GROSS, NET, CZ, HOLD, ERROR, Z-BAND
OK/S0/FINAL, F.FLOW/S1/PRELIM2, M.FLOW/S2/PRELIM1
D.FLOW/S3/F.FALL, OVER/S4, UNDER, FULL
- Display rate 4 times/s (20 times/s changeable)
- Decimal point display No display, 10¹, 10², 10³ and 10⁴ changeable.
- Unit display No display, g, kg, t , N, kNor lb changeable
(Green colored fluorescent display tube)

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2-3. Specifications for setting

- Internal setting value

EEPROM

Calibration data, and the data that relates to calibration, Accumulation value, Accumulation times data, ComParator set value

SRAM

Tare data, Zero tracking data, Zero set data, Preset tare data,

Backup time

Approx. 10 years in 25°C (Use of lithium battery)

2-4. Function of front panel sheet key switch

ON/OFF

Executes the light on (ON) or the light off(OFF) of display

SET

Shifts to Function, C Function and SQ Function mode.

Changes to the former condition before setting each condition of mode.

ACCUM./ ◀

Executes the accumulation/Carry up the setting value

PRESET TARE/ ▶

Used in setting the fixed value of the tare weight cancellation

/Carry down the set value

TARE/ ▲

Executes or clears the tare weight cancellation/Set value increment

NET/GROSS / ▼

Changeover the display for net weight or gross weight/Decrement of set value

ZERO

Zero compensation of gross weight

F/ ⏴

Selects from Non, Print, Hold, Output the load data from the serial interface./Registration of set value

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2-5. External control function

Pin configuration of external control I/O connector

A1	Input-1	B1	Output-1
A2	Input-2	B2	Output-2
A3	Input-3	B3	Output-3
A4	Input-4	B4	Output-4
A5	Input-5	B5	Output-5
A6	Input-6	B6	Output-6
A7	Input-7	B7	Output-1
A8	Input-8	B8	Output-8
A9	Input-9	B9	Output-9
A10	COM.1	B10	Output-10
A11	COM.2	B11	Output-11
A12	Output 13	B12	Output-12

* Attached suitable plug : Main body FCN-361J024-AU, Cover FCN-360C024-B (Made by Fujitsu)

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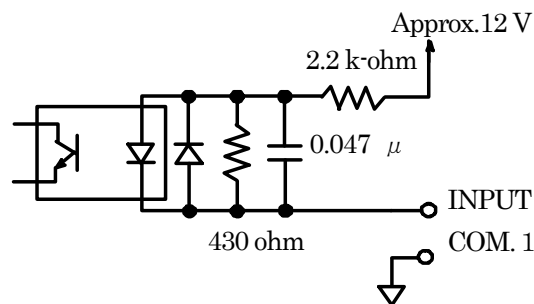
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- Input signals of external control 9 points

9 functions in the following can be arbitrarily selected.

- OFF
- “ON/OFF” key operation
- “SET” key operation
- “ACCUM” key operation
- “Preset tare” key operation
- “Tare” key operation
- “NET/GROSS” key operation
- “ZERO” key operation
- “F/↙” key operation
- Zero clear
- Tare clear
- Flow start
- Weigh-out start
- Clear the last accumulated data
- Accumulation clear
- Error cancellation
- Print command
- Emergency stop
- * Above are pulse input, and effective only once at the pulse width of 50 ms or more.
- Change of Flow/Weigh out (ON: Weigh-out, OFF: Flow)
- Hold
- Display of NET (With ON, the net weight is displayed when the Gross weight is shown.)
- * Above are level input, and effective during the input of short for 50 ms or more.

- Equivalent circuit of the external control input section



- * An internal circuit and photo-coupler are insulated.
- * The common and serial interface are common.

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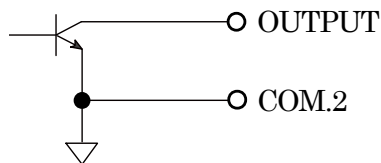
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- External control output signals
13 functions in the following can be arbitrarily selected.
 - OFF
 - RUN
 - Stable
 - During canceling the Tare weight
 - Display of gross
 - Display of net
 - Center zero
 - During the hold
 - Error, Abnormal weight
 - Measuring sequence error
 - Z-Band
 - OK (S0),
 - Big flow (S1)
 - Middle flow (S2)
 - Small flow (S3)
 - Over (S4)
 - Under
 - Full
 - During weighing
 - Finish weighing
 - Discharge (between the discharge gate)
 - Finish Discharge (between the discharge gate)

- Equivalent circuit of external control output



Rated open collector $V_{CE} = DC35 V_{max}$, $I_C = DC40 mA_{max}$

* An internal circuit is insulated by photo-coupler.

* COM.1 and COM.2 are insulated.

2-6. Comparator function

- Set value —999 999 to 999 999
- Numbers of setting 4 points of S1, S2, S3 and S4
- Set value of hysteresis data width 0 to 99 digit
- Direction of hysteresis Whichever changeable to “On delay” or “Off delay”
- Conversion times of comparator Changeable to 200 times/s or 20 times/s
(Synchronous with the A/D sampling times.)

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2-7 .2-wires method serial interface

- Specifications

Baud rate : 600 bps
Data bit length : 8 bit
Parity bit : Odd number
Stop bit : 1 bit
Start bit : 1 bit
Transmission data : Binary code, BCD

* An internal circuit and photo-coupler are insulated.

* The external control input and common are common.

* Suitable plug of attached connector: XW4B-06B1-H1 (made by Omron)
(Common with RS-485 equipped as a standard.)

2-8 .RS-485 interface

- Specifications

Baud rate : Selectable from 1 200, 2 400, 4 800, 9 600, 19 200 or 38 400 bps.
Data bit length : Selectable from 7 bit or 8 bit.
Parity bit : Selectable from none, even number or odd number.
Stop bit : Selectable from 1 bit or 2 bit
Terminator : Selectable from CR+LF or CR.
Communication method : Half duplex
Synchronous method : Start stop synchronous method
Address : Select one from 0 to 31.
Communication data : ASCII code
Cable length : Approx. 1 km
Connectable units : 32 units at maximum
Terminating resistance : Externally
Data transmission mode : Selectable from command or modbus

- RS-485 terminal board configuration

A	Send / Receive A
B	Send / Receive B
S.G.	Signal ground

* Internal circuit and common are common.

* Suitable plug of attached connector: XW4B-06B1-H1 (made by Omron)
(Common with 2-wires method serial interface shown in 2-7.)

- Function

- (1) Reading out the load.
- (2) Reading out the accumulated total value.
- (3) Reading out the accumulated frequency value.
- (4) Reading out the condition.
- (5) Changing the condition.
- (6) Reading out the set value of 4-steps comparator.
- (7) Changing the set value of 4-steps comparator.
- (8) Changing the load calibration.
- (9) Reading out the basic function, I/O setting, Measuring operation and sequence control setting.
- (10) Changing the setting of the basic function, I/O setting, Measuring operation and sequence control setting.
- (11) Communication error code (error code as to the communication)

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2-9. Various function

- Zero tracking Stabilize the fluctuation of the zero point in a constant condition.
- Digital filter Data is stabilized through the calculation process with the software in CPU.
- Stabilized filter The digital filter is reinforced and stabilized only when the width of the change of the load is constant.
- Calibration LOCK switch This switch locks the calibration function.
- Digital linearize Executes the compensation of the non-linearity by the max. 3 points or less.
- Accumuration function The load data is adding accumulated, and the frequency and total value are memorized.
- Preset tare Executes tare weight cancellation according to the set value input digitally.

3. General specifications

- Operating temperature/humidity range
 - Temperature $-10\text{ }^{\circ}\text{C}$ to $50\text{ }^{\circ}\text{C}$
 - Humidity 85 %RH or less (Non condensing.)
- Stored temperature range $-20\text{ }^{\circ}\text{C}$ to $60\text{ }^{\circ}\text{C}$
- Power supply
 - Power supply voltage AC100 V to AC240 V (Permissible variable range AC85 V to AC264 V)
 - Power supply frequency 50/60 Hz
 - Power consumption Approx. 8 VA (without options, at AC100 V)
Approx. 18 VA (with options at AC100 V)
- Outline dimensions 144 mm(W)× 72 mm(H)× (less than)146.7 mm(D)
(excludes protruding parts)
- Weight Approx. 1.0 kg (without options)

4. Specifications at the time of shipment

- Bridge power supply DC10 V
- Span adjustment 10 000 display at the input of 0.3 mV/V
- The minimum scale 1

5. Accessories

- Instruction manual 1 piece
- Time lag fuse (2.5 A) 1 piece (2.5 A)
- I/O connector for external control 1 piece (connector: FCN-361J024-AU, connector cover: FCN360C024-B)
- Connector for standard communication 1 piece (plug :XW4B-06B1-H1)
- Short bar, between A-F and C-G 2 pieces
- Panel mount gasket 1 piece
- Connector for BCD output 1 piece (Attached only when optional BCD output is installed.)
- Instruction manual for optional CC-Link 1 piece (Attached only when optional CC-Link interface is installed.)
- CC-Link connector 1 piece (Attached only when optional CC-Link interface is installed.)

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6. Options

6-1. Current output

• Parts No.	CSD903-P07
• Specifications	
Output	DC4 mA to 20 mA
Load resistance	510 ohm or less
Non-linearity	0.02 %F.S.
Over range	Approx. DC2.4 mA at “-OL” display and approx. DC21.6 mA at “OL” display
Output times	4 times/s, 20 times/s (Synchronous to display times) * An internal circuit and photo-coupler are insulated.
Effect due to temperature	
Zero point	±0.005 % F.S./ °C
Sensitivity	±0.01 % F.S./ °C

6-2. Voltage output

• Parts No.	CSD903-P25
• Specifications	
Output	DC0 V to 10 V
Load resistance	5 k-ohm or more
Non-linearity	0.02 %F.S.
Over range	Approx. DC-1 V at “-OL” display and approx. DC11 V at “OL” display
Output times	4 times/s, 20 times/s (Synchronous to display times) * An internal circuit and photo-coupler are insulated.
Effect due to temperature	
Zero point	±0.015 % F.S./ °C
Sensitivity	±0.015 % F.S./ °C

6-3. BCD output

• Parts No.	CSD903-P15
• Specifications	
Output	BCD 8 digits, parallel output with polarity(POL.) applied(Output ON with minus, and output OFF with plus.), P.C.(Print command) Turning on during fixed time after conversion of BCD output is completed. ERROR ON when the various error occurs. OVR(Over) Stable Gross weight ON when the BCD output is gross weight * Above are open collector outputs. $V_{CE}=DC30\text{ V}$, $I_C=DC20\text{ mA}$ at Maximum * The output is OFF, except for the measurement mode.
Input	HOLD Holding the BCD output BCD-ENABLE Compulsorily turned off for the output related with BCD. (Hi-impedance) * Above are level input, and effective during the input of short more than 100 ms.

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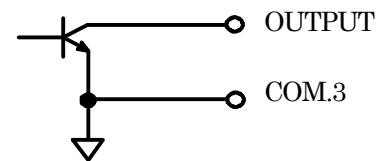
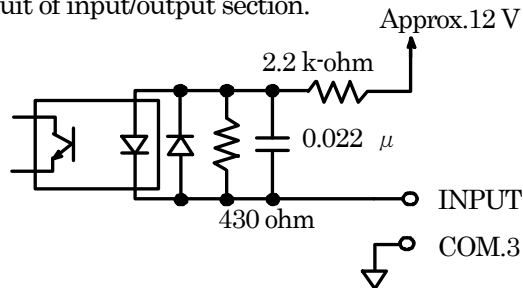
Connector pin configuration of BCD output

Suitable plug : 57-30500

1	1×10^0	18	2×10^4	35	2×10^7
2	2×10^0	19	4×10^4	36	4×10^7
3	4×10^0	20	8×10^4	37	8×10^7
4	8×10^0	21	N.C.	38	Decimal point 10^1
5	1×10^1	22	N.C.	39	Decimal point 10^2
6	2×10^1	23	POL.	40	Decimal point 10^3
7	4×10^1	24	COM.3	41	Decimal point 10^4
8	8×10^1	25	ERROR	42	Stability
9	1×10^2	26	1×10^5	43	N.C.
10	2×10^2	27	2×10^5	44	Gross weight
11	4×10^2	28	4×10^5	45	BCD-ENABLE
12	8×10^2	29	8×10^5	46	OVR.
13	1×10^3	30	1×10^6	47	P.C.
14	2×10^3	31	2×10^6	48	P.C.
15	4×10^3	32	4×10^6	49	HOLD
16	8×10^3	33	8×10^6	50	COM.3
17	1×10^4	34	1×10^7		

* Don't connect with N.C. pin.

- Equivalent circuit of input/output section.



- * An internal circuit and photo-coupler are insulated.
- * The external control input and common are common.

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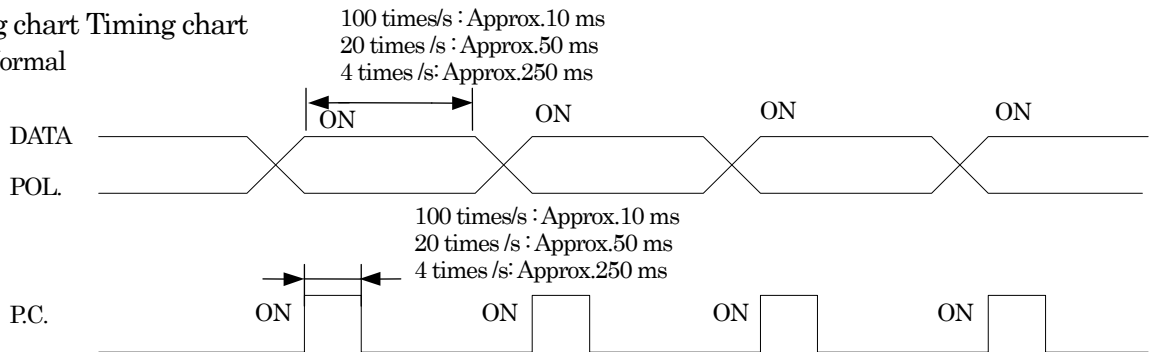
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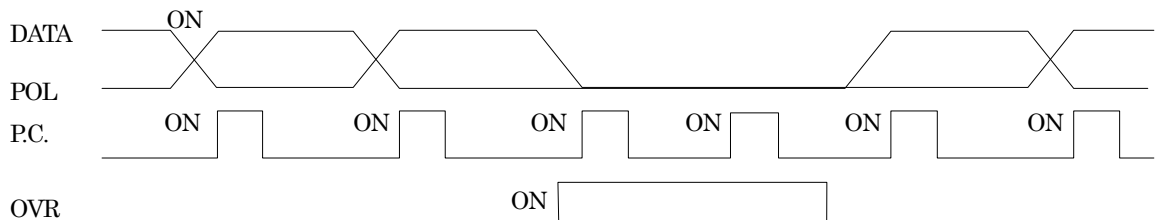
• Timing chart Timing chart

① Normal



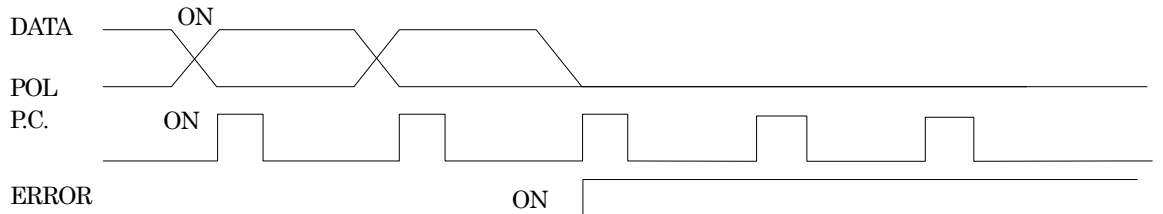
* Output transistor will be ON (Negative logic in electrical theory) when all of the P.C., DATA and POL output the data.

② When data is over



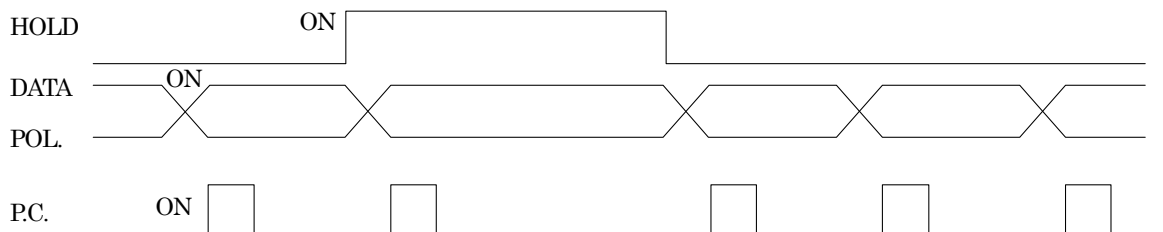
* Output transistor of OVR signal will become ON (Negative logic in electrical theory) during the output of OVR. Moreover, output transistor of all of the DATA, P.C. and POL will become OFF (Positive logic in electrical theory) during the output of OVR.

③ When error is occurred



* Output transistor of ERROR signal will become ON (Negative logic in electrical theory) during the output of ERROR. Moreover, output transistor of all the P.C. DATA and POL will become OFF (Positive logic in electrical theory) during the output of ERROR.

④ When HOLD signal is input.



* Output transistor of P.C. becomes OFF (Positive logic in electrical theory) during input of HOLD signal.

* However, P.C. will become OFF after the one shot operation.

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6-4 .RS-232C interface

- Parts No. CSD903-P74
- Specifications
 - Baud rate : Selectable from 1 200, 2 400, 4 800, 9 600, 19 200 and 38 400 bps.
 - Data bit length : Selectable from 7 bit or 8 bit
 - Parity bit : Selectable from None, Even or Odd number.
 - Stop bit : Selectable from 1 bit or 2 bit
 - Terminator : Selectable from CR+LF or CR
 - Communication method : Half duplex
 - Synchronous method : Start-stop synchronous method
 - Communication data : ASCII code
 - Cable length : Within 15 m

- Connector pin configuration of RS-232C Suitable plug : DE-9S-NR by JAE or equivalent..

Pin No.	Signal name
1	CD
2	TXD
3	RXD
4	N.C.
5	S.G.
6	N.C.
7	RTS
8	CTS
9	N.C.

- * Connector plug is not attached.
- * The engagement fixation stand screw is inch screw.
- * Don't connect with N.C. pin.
- * An internal circuit is insulated by photo-coupler.
- * Common with the external control input.

- Function

- (1) Reading out the load.
- (2) Reading out the accumulated total value.
- (3) Reading out the accumulated frequency value.
- (4) Reading out the condition
(Accumulation, Stable, Fixed tare weight cancellation, Tare weight cancellation, Gross weight, Net weight, Zero, Unit)
- (5) Change of condition
(Zero set, Tare weight cancellation, Tare weight cancellation clear, Accumulation, Accumulation clear, Gross weight display, Net weight display)
- (6) Reading out the comparator set value.
- (7) Change of the comparator set value.
- (8) Reading out the comparator judgement.
- (9) Communication error code (error code for the communication)

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6 - 5 .RS-422/485 interface

- Parts No. CSD903-P76
- Specifications
 - Baud rate : Selectable from 1 200, 2 400, 4 800, 9 600, 19 200 and 38 400 bps.
 - Data bit length : Selectable from 7 bit or 8 bit
 - Parity bit : Selectable from None, Even or Odd number.
 - Stop bit : Selectable from 1 bit or 2 bit
 - Terminator : Selectable from CR+LF or CR
 - Communication method : Half duplex
 - Synchronous method : Start-stop synchronous method
 - Address : Selectable one from 0 to 31.
 - Transmission data : ASCII code
 - Cabel length : Approx. 1 km
 - Connectable units : 32 units at the maximum (RS-422 : 10 units)
 - Terminal resistance : Internal
(Selects the presence by connection of terminal board.)
- Input/output monitor with LED
- Changeover the RS-422/485 : Set by function.

- Terminal configuration of RS-422/485

Terminal Name	Signal name
SDA	Differential output
SDB	Differential output
RDA	Differential input
RDB	Differential input
TRM	Terminal resistance
S.G.	Signal ground

* An internal circuit is insulated by photo-coupler.

* Common with the external control input.

- Function

- (1) Reading out the load.
- (2) Reading out the accumulated total value.
- (3) Reading out the accumulated frequency value.
- (4) Reading out the condition
(Accumulation, Stable, Fixed tare weight cancellation, Tare weight cancellation, Gross weight, Net weight, Zero, Unit)
- (5) Changing the condition
(Zero set, Tare weight cancellation, Tare weight cancellation clear, Accumulation, Accumulation clear, Gross weight display, Net weight display)
- (6) Reading out the comparator set value
- (7) Changing the comparator set value.
- (8) Reading out the comparator judgement.
- (9) Communication error code (error code for the communication)

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6-6.CC-Link interface

- Parts No.: CSD903-P73
- Version of CC-Link : Ver.1.10
 - Occupied stations Nos. : Selectable from 1, 2 or 4 stations.
- Specifications
 - Baud rate : Selectable from 156 kbps, 625 kbps, 2.5 Mbps, 5 Mbps or 10 Mbps.
 - Communication method : Poling method
 - Synchronous method : Bit synchronous method
 - Transmission route : RS-485 bus
 - Transmission format : HDLC conforming
 - Remote station : 01 to 64 when one station is occupied.
01 to 63 when two stations are occupied.
01 to 61 when four stations are occupied.
 - Connectable units : 64 units at maximum with occupied one station.
32 units at maximum with occupied two stations.
16 units at maximum with occupied four stations.
 - Connectable cable : Shielded twist pair special cable for "CC-Link"
 - Termination : Attached with 110 ohm resistance externally.
 - Status LED : Display the communication status by four (4) LEDs of "RUN", "ERR", "SD" and "RD".

• Connector configuration of CC-Link

Pin No.	Signal name	Signal name
1	DA	Signal cable at DA side
2	DB	Signal cable at DB side
3	DG	Signal cable ground
4	SLD	Shield
5	FG	Frame ground

* Suitable plug for CC-Link connector plug : MSTB 2, 5/5-ST-5, 08 ABGY AU (made by Phoenix Contact.)

* "SLD" and "FG" are connected in the instrument.

* An internal circuit is insulated by photo-coupler.

• Function

- (1) Reading out the load.
- (2) Reading out the accumulated total value
- (3) Reading out the accumulated frequency value
- (4) Reading out the condition
- (5) Changing the condition
- (6) Reading out the set value 4-steps comparator.
- (7) Changing the set value of 4 steps comparator.
- (8) Changing the setting of basic function, I/O, measurement operation and sequence control.
- (9) Reading out the setting of basic function, I/O, measurement operation and sequence control.

* CC-Link is abbreviation of Control & Communication Link.

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6 - 7. Combination of optional products

P07 : Current output (4 mA to 20 mA)

P25 : Voltage output (DC0 V to 10 V)

P15 : BCD output

P73 : CC-Link interface

P74 : RS-232C interface

P76 : RS-422/485 interface

* **Whichever only one option can be installed.**

6 - 8. EzCTS (Ez Communication Tool Software)

The PC that installs EzCTS and connects with CSD-903, can read and write the parameter set with CSD-903.

※ For details, EzCTS please refer to specifications.

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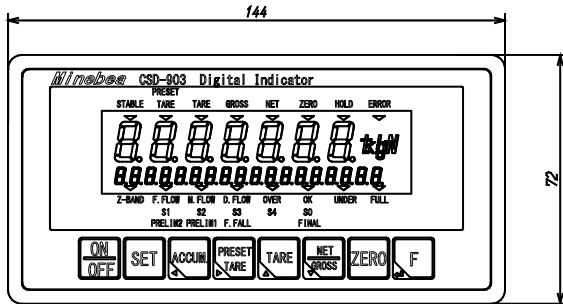
CSD-903-EX

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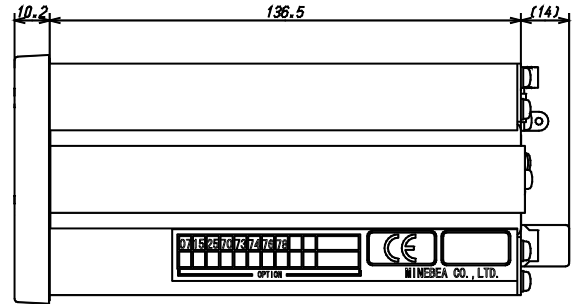
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7. Outline dimensions

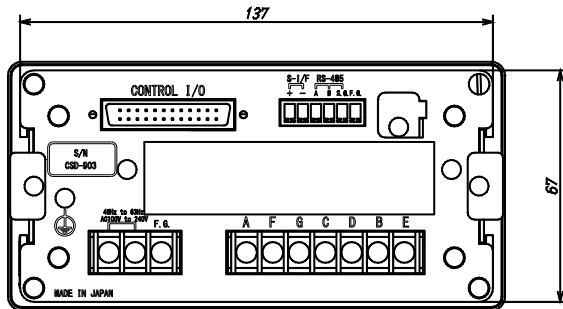
Front panel



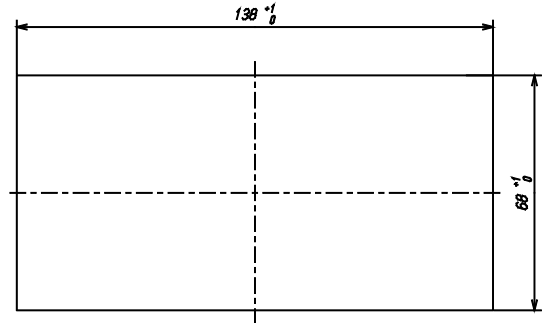
Side



Rear panel



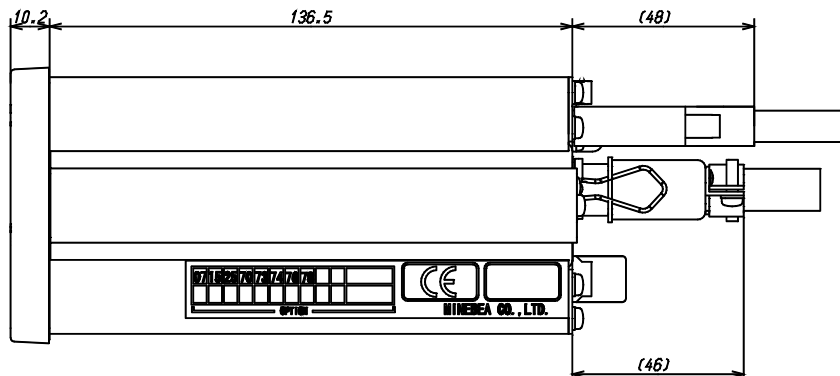
Panel cut size



Unit : mm

* We recommend that the digital indicator CSD-903-EX should install with the center of panel cut as the standard. When installation is made with the corners as the standard, there may have the case that some space is occurred from the front panel.

External control input plug, the upper side with the BCD plug installed.



Unit : mm

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8. Conformity standard

- This instrument has suited the following standard.
 - EN61326 : 2006
“Electrical equipment for measurement, control and laboratory use – EMC requirements”
“Immunity test requirements for equipment intended for use in industrial locations”
 - EN61010-1 : 2001
“Safety requirement for electrical equipment for measurement, control and laboratory use—
Part1 : General requirement”
Annex C (Performance level H) of JIS B 7611-2 : 2009
“Non-automatic weighing instruments—Metrological and technical requirements and tests
—Part 2 : Measuring instruments used in transaction or certification”

8-1 .Wiring

① About cable

- Use the shielded cable for all connections expects a power cable.

② Shield processing

- For the cable of load cell, make connection with the E terminal on the terminal board of load cell.
- For the analog voltage output and analog current output, make connection with the F.G. terminal on the analog output terminal board.
- For the BCD output, make contact with the shield and the metal shell section of connector directly by using the connector with the metal shell attached.
- For the RS-232C interface, make contact with the shield and the metal shell section of connector directly by using the connector with the metal shell attached.
- For the RS-422/485 interface, make connection with the F.G. terminal on the RS-422/485 terminal board.
- For the standard RS-485,2 wire serial interface, make connection with the F.G. terminal on the standard RS 485,2 wire serial interface terminal board.
- For the CC-Link interface, make connection with the F.G. terminal on the CC-Link terminal board.

③ Grounding

- The ground of this instrument shall apply the individual ground by using the protective ground terminal.

④ Setting Function

- Please observe the following conditions strictly when this instrument suits the JIS standard.

* Specifications and Outline dimensions and so on which have printed may subject to change for the purpose of improvement without notice.