

Specifications

Digital Indicator

CSD-903-EX

Spec. No. EN382903-EX-H

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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 (Changeable: 5 V or 2.5V) within 180 mA, with remote sensing.
- Applicable transducers Up to 6 pieces of strain gage applied transducers(350 ohm) can be connectable in parallel.
- 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 \pm 2.5 mV/V
- Non-Linearity 0.01 %F.S.
- Temperature coefficient
Zero point \pm 0.2 μ V/ $^{\circ}$ C
(When the calibration at 0.2 μ V/d or more of the input sensitivity.)
Sensitivity \pm 0.000 8 %F.S./ $^{\circ}$ C
(When the calibration at 0.2 μ V/d or more of the input sensitivity.)
- Input noise \pm 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 Hz, 4 Hz, 6 Hz, 8 Hz and 10 Hz
(At the default setting of analog filter, digital filter and stabilization filter.)
- A/D sampling 200 times/s (Changeable: 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 (Changeable: 2, 5, 10, 20 or 50.)
 - 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 -9 999 999 999 to 9 999 999 999, 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 Changeable: OFF, Brand/Accumulation times/Accumulation value(8 digit), Brand/ Accumulation times/Last Accumulated data, Brand/Accumulated data/Accumulation value (8 digit), Brand/Last Accumulated data/OK, Brand/ Accumulated times/OK, Brand/OK/Accumulation value(8 digit), Brand/Near zero/Full, OK/OVER/UNDER, Brand/OK/FREE FALL, Brand/S1/S2, Brand/ S1/S3, Brand/S1/S4, Brand/S2/S3, Brand/S2/S4, Brand/S3/S4, Brand/OK, Brand/OVER/UNDER, Brand/Accumulation times, Brand/Accumulation value(10 digit) or Brand/Last Accumulated data,
* At the time of Function setting, [Load value + Unit] is 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

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- Display rate 4 times/s (Changeable: 20 times/s.)
- Decimal point display Changeable: no display, 10¹, 10², 10³ or 10⁴.
- Unit display Changeable: no display, g, kg, t, N, kN or lb.
(Green colored fluorescent display tube)

2-3. Specifications for setting

- Internal setting value
 - EEPROM Calibration data, Data that relates to calibration, Accumulation value, Accumulation times data, Comparator set value
 - SRAM Tare data, Zero tracking data, Zero set data, Preset tare weight 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 mode], [C Function mode] and [SQ Function mode].
Change to the condition before setting the condition of each mode.
- ACCUM./◀ Executes the accumulation/Carry the setting value
- PRESET TARE/▶ Used in setting the preset tare weight cancellation
/Borrow 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 None, Print, Hold, Batch start, Emergency stop, Zero Clear, Tare Clear and Accumulation Clear/Carry the set value/Registration of set value

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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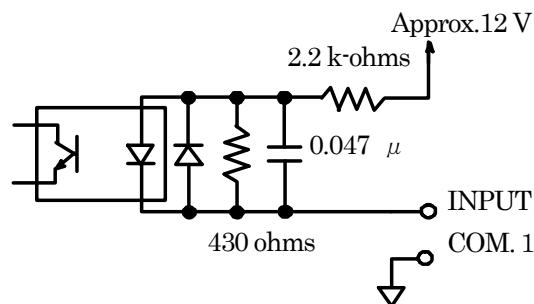
- Input signals of external control

9 functions in the followings 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
- Discharge start
- Last accumulated data clear
- Accumulation clear
- Error reset
- Print command
- Manual free fall compensation
- Forced batch finish
- Forced discharge finish
- Accumulation clear for all brands
- * Above are pulse input, and effective only once at the pulse width of 50 ms or more.
- Change of Flow/Discharge (ON: Discharge, OFF: Flow)
- Hold
- Emergency stop
- Display of NET (With ON, the net weight is displayed when the Gross weight is shown.)
- Brand No.1
- Brand No.2
- Brand No.4

* 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 the serial interface are connected.

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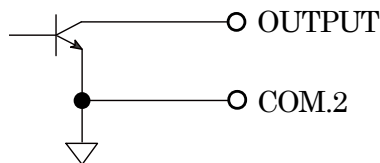
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- External control output signals
13 functions in the followings can be arbitrarily selected.
 - OFF
 - RUN
 - Stable
 - During tare weight cancellation
 - Display of gross
 - Display of net
 - Zero point
 - During hold
 - Error
 - Abnormal weight
 - Measuring sequence error
 - ZERO Band
 - OK (S0),
 - Full flow (S1)
 - Medium flow (S2)
 - Dribble flow (S3)
 - Over (S4)
 - Under
 - Full
 - During measurement
 - Batch finish
 - Discharge (Open the discharge gate)
 - Discharge finish (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 this to [On delay] or [Off delay].
- Conversion times of comparator
Changeable: 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 the common are connected.

* 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 bps, 2 400 bps, 4 800 bps, 9 600 bps, 19 200 bps and 38 400 bps.

Data bit length : Selectable from 7 bit and 8 bit.

Parity bit : Selectable from none, even number and odd number.

Stop bit : Selectable from 1 bit and 2 bit

Terminator : Selectable from CR+LF and 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

* When Stream is selected in Data transmission mode, only one unit can be connected with CSD-903.

Terminating resistance : Externally

Data transmission mode : Selectable from Command, Modbus, Stream, Synchronizing with finish signal, Synchronising with accumulated signal and Synchronizing with print signal.

- RS-485 terminal board configuration

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

- * Internal circuit and common are connected.

* 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 brand and 4-steps comparator.
- (7) Changing the set value of brand and 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 set of the basic function, I/O setting, measuring operation and sequence control setting.
- (11) Communication error code (error code related 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 The non-linearity is compensated by 3 points or less.
- Switch of brand Up to 8 kinds of brand can be set. The set value of the comparator can be registered respectively and those accumulation value, etc., can be recorded.
- Accumuration function The load data is adding accumulated, and the frequency and total value are memorized.
- Preset tare weight cancellation Cancell the tare weight amount according to the set value input digitally.
- Net weight offset function Set and offset the amount of the tare weight beforehand when you know the tare weight.
* You can not use it together with Preset tareweight cancellation.
- Net weight sign reverse function Reverse the sign of the net weight display in simple comparative discharge mode, and the net weight data output outside.

3. General specifications

- Operating temperature/humidity range
 - Temperature -10 °C to 50 °C
 - Humidity 85 %RH or less (Non condensing.)
- Stored temperatre range -20 °C to 60 °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. 10 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)
- Dustproof and waterproof IP65 or equivalent at front panel section in mounting the gasket.
(When the panel gasket provided is mounted.)
- 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

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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
Resolution	Approx 1/12 000 or more
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
Resolution	Approx 1/12 000 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. $V_{CE}=DC30 V$, $I_C=DC20 mA$ 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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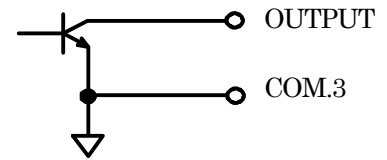
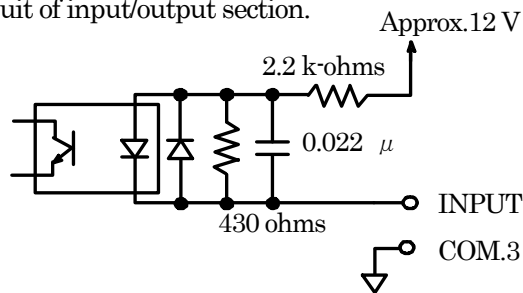
Connector pin configuration of BCD output

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 connected.

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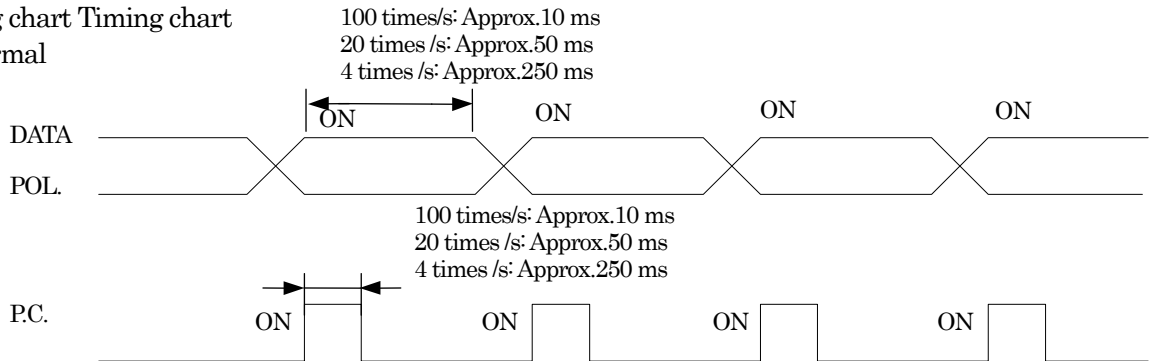
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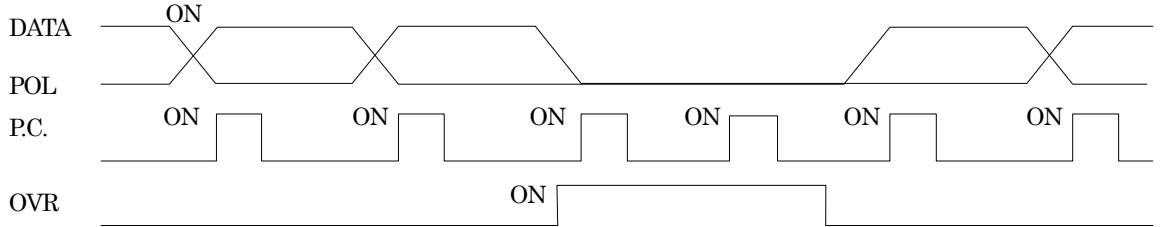
• Timing chart Timing chart

(1) Normal



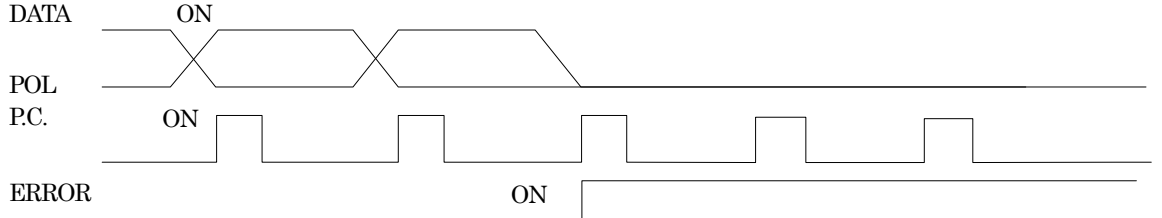
* Output transistor is turned on (Negative logic in electrical theory) when all of the P.C., DATA and POL output the data.

(2) When data is over



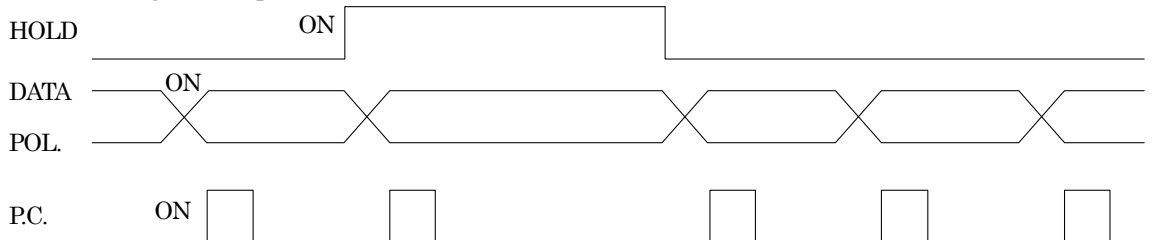
* Output transistor of OVR signal is turned on (Negative logic in electrical theory) during the output of OVR. Moreover, output transistor of all of the DATA, P.C. and POL is turned OFF (Positive logic in electrical theory) during the output of OVR.

(3) When error is occurred



*Output transistor of ERROR signal is turned on (Negative logic in electrical theory) during the output of ERROR. Moreover, output transistor of all the P.C. DATA and POL is turned off (Positive logic in electrical theory) during the output of ERROR.

(4) When HOLD signal is input.



*Output transistor of P.C. is turned off (Positive logic in electrical theory) during input of HOLD signal.

*However, P.C. is turned 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 bps, 2 400 bps, 4 800 bps, 9 600 bps, 19 200 bps and 38 400 bps.
 - Data bit length : Selectable from 7 bit and 8 bit
 - Parity bit : Selectable from None, Even and Odd number.
 - Stop bit : Selectable from 1 bit and 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
 - Data transmission mode : Selectable from Command, Stream, Synchronized with print signal, Synchronized with finish signal and Synchronized with accumulation signal.

- 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 and the external control input are connected.
- 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) Change of condition.
 - (6) Reading out the brand and the comparator set value.
 - (7) Change of the brand and the comparator set value.
 - (8) Reading out the comparator judgement.
 - (9) Load calibration.
 - (10) Reading out the set value of various functions.
 - (11) Change of the set value of various functions.
 - (12) 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 bps, 2 400 bps, 4 800 bps, 9 600 bps, 19 200 bps. and 38 400 bps.

Data bit length : Selectable from 7 bit and 8 bit

Parity bit : Selectable from None, Even and Odd number.

Stop bit : Selectable from 1 bit and 2 bit

Terminator : Selectable from CR+LF and 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)

* When the Stream mode is selected in the Data transmission mode, the number that can be connected with CSD-903 becomes only one unit.

Terminal resistace : Internal

(Selects the presence by connection of terminal board.)

Data transmission mode : Selectable from command or stream

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 and the external control input are connected.

- 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) Change of condition.
- (6) Reading out the brand and the comparator set value.
- (7) Change of the brand and the comparator set value.
- (8) Reading out the comparator judgement.
- (9) Load calibration.
- (10) Reading out the set value of various functions.
- (11) Change of the set value of various functions.
- (12) 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 station, 2 stations and 4 stations.
- Specifications
 - Baud rate : Selectable from 156 kbps, 625 kbps, 2.5 Mbps, 5 Mbps and 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 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) Change of condition.
 - (6) Reading out the brand and the comparator set value.
 - (7) Change of the brand and the comparator set value.
 - (8) Reading out the set value of various functions.
 - (9) Change of the set value of various functions.
- * 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, please refer to specifications of EzCTS.

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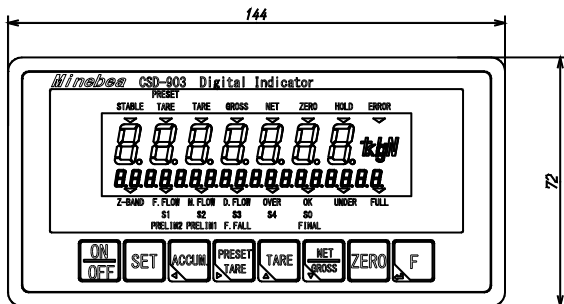
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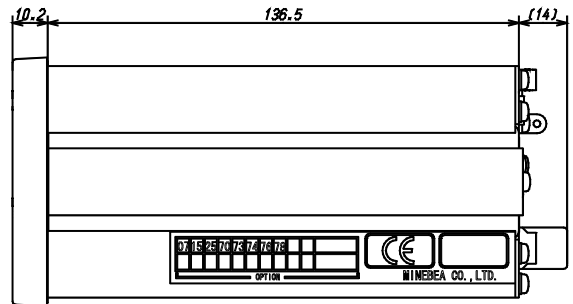
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7. Outline dimensions

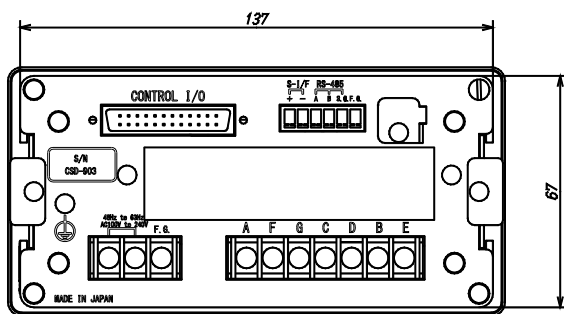
Front panel



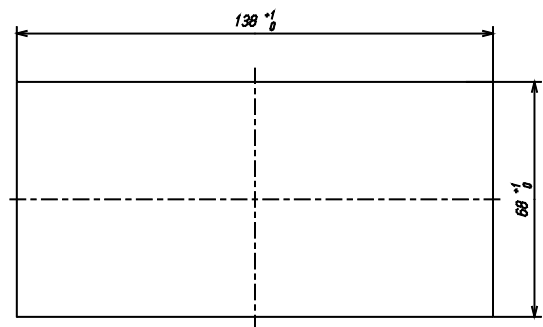
Side



Rear panel



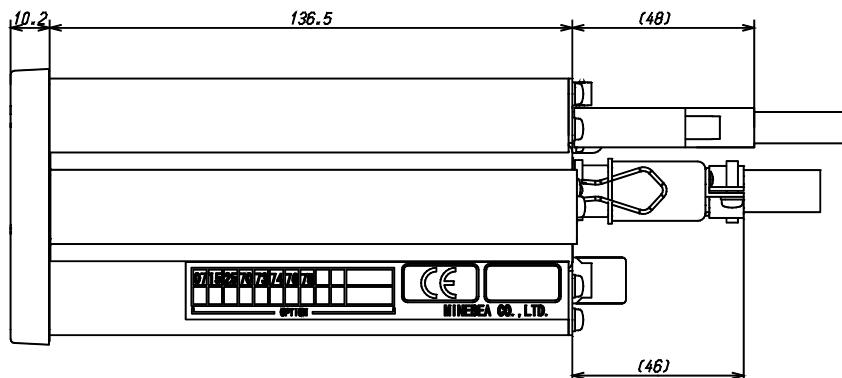
Panel cut size



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

Specifications

CSD-903-EX

Spec. No. EN382903-EX-H

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8. Conformity standard

- This instrument has suited the following standard.
 - EN61326-1:2013
“Electrical equipment for measurement, control and laboratory use – EMC requirements”
“Immunity test requirements for equipment intended for use in industrial locations”
 - EN61010-1:2010
“Safety requirement for electrical equipment for measurement, control and laboratory use—
Part1 : General requirement”
 - EN50581:2012
"Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances" (RoHS Directive)
 - Annex C (Performance level H) of JIS B 7611-2:2015
“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.