AD-4401A

Weighing Indicator

Simplified Instruction Manual

A&D

3-23-14 Higashi-Ikebukuro, Toshima-ku,
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1WMPD4003052A

1. Safety Precautions

Read the following precautions carefully before using the indicator.

[Precautions for designing]

⚠ **WARNING**

● Provide an external safety circuit to the indicator so that the safety of the whole system can be secured even if errors occur in the external power supply or in the indicator.

[Precautions for installation]

⚠ **WARNING**

● Do not use the indicator in the following environments:
  - where the temperature and the humidity exceed the specifications
  - where corrosive gases or flammable gases exist
  - where the indicator gets wet with oil, chemicals or water
  Please note that securing the indicator to the control panel will provide the indicator outside of the control panel with IP65 protection.
● When installing or removing the indicator, be sure to turn off all used external power supplies beforehand.

[Precautions for wiring]

⚠ **WARNING**

● When wiring the indicator, be sure to turn off all used external power supplies beforehand.
● When wiring is complete, be sure to attach the terminal block cover provided with the indicator.
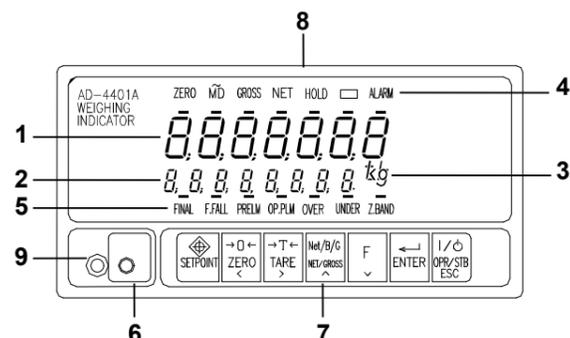● Be sure to earth ground the indicator.

⚠ **CAUTION**

● Do not clamp control wires or communication cables with power lines or place them close to power lines.
● Place the load cell cable sufficiently away from high frequency circuits such as high voltage power lines and inverter load circuits.

2. Part Names

2.1. Front Panel

No.	Name
Numerical Display	
1	Main
2	Sub
3	Unit
Status Display (Upper)	
4	ZERO / STABLE (MD: Motion detection) / GROSS / NET / HOLD / FUNCTION ▭ / ALARM

Status Display (Lower) *	Normal batching	Loss-in-weight batching	Check weighing
5	Final weight / Free fall / Preliminary / Optional preliminary / Overweight / Underweight / Near-zero	Final weight / Free fall/Preliminary / Full / Overweight / Underweight / Near-zero	Near-zero / Lo-Lo / Lo / Go / Hi / Hi-Hi

Key Switches	6	CAL (Calibration) key
	7	SETPOINT: Sets the setpoint values for batch weighing and check weighing.
		ZERO: Sets the gross value to zero when the weight value is within the zero setting range. (Default zero setting range: 2% of maximum capacity)
		TARE: Saves the current gross value as tare and sets the net value to zero.
		NET/GROSS: Selects the weight value display method, gross or net.
		Function: No function is assigned in the default setting.
		ENTER: Does not function alone.
		ON/OFF: Turns the display on or off.
Other	8	Rating label (Accessory)
	9	Sealing cover

* Attach the accessory status label when performing loss-in-weight batching or check weighing.

2.2. Rear Panel
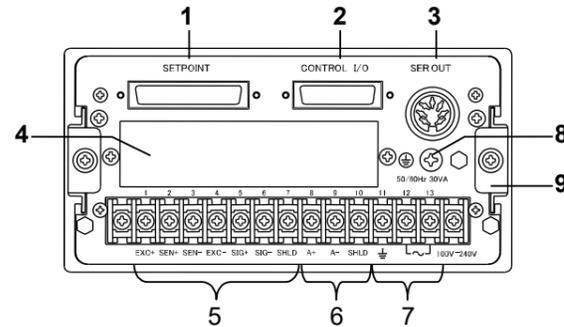
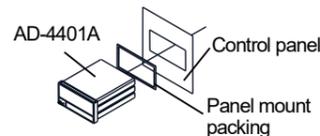| No.	Name	No.	Name
1	SETPOINT input connector	6	Optional analog 4-20 mA output terminal block
2	CONTROL I/O connector	7	AC power input terminal block
3	SER.OUT (Standard serial output) connector	8	Protective conductor terminal
4	Option slot	9	Slide rail
5	Load cell input terminal block		

2.3. Accessories

Name	Qty.	Name	Qty.
Terminal block cover	1	Panel mount packing	1
Terminal block cover securing screw	2	Rubber foot	4
Connector for the CONTROL I/O	1	Rating label	1
Connector for the SER.OUT	1	Status label	1

3. Installation to Control Panel

Make a hole in a control panel as shown below.

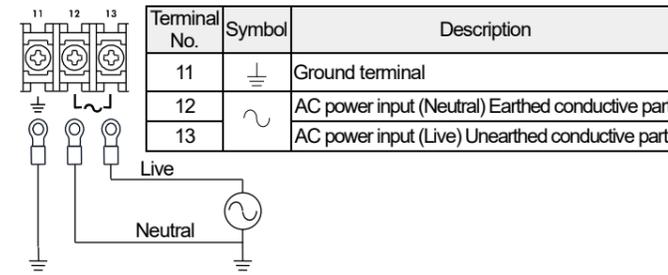| 138 $^{+1}_{-0}$ |
|---|
| Panel thickness 1.6 to 3.2 |

68 $^{+1}_{-0}$

Unit: mm
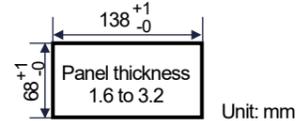
Remove the slide rails on both sides and insert the AD-4401A with the accessory panel mount packing through the hole into the panel.
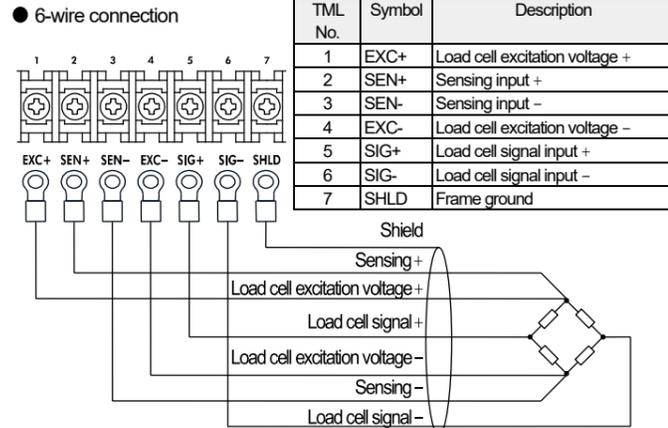
Insert the slide rails from behind.

AD-4401A
Control panel
Panel mount packing
Slide rails
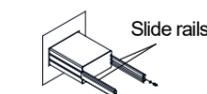
4. Connection to Power Supply

Terminal No.	Symbol	Description
11	⏚	Ground terminal
12	∿	AC power input (Neutral) Earthed conductive part
13	∿	AC power input (Live) Unearthed conductive part

Live

Neutral

5. Connection to Load Cell

● 6-wire connection

TML No.	Symbol	Description
1	EXC+	Load cell excitation voltage +
2	SEN+	Sensing input +
3	SEN-	Sensing input –
4	EXC-	Load cell excitation voltage –
5	SIG+	Load cell signal input +
6	SIG-	Load cell signal input –
7	SHLD	Frame ground

Shield
Sensing +
Load cell excitation voltage +
Load cell signal +
Load cell excitation voltage –
Sensing –
Load cell signal –

For 4-wire connection, short-circuit the terminals No.1 and No.2, and terminals No.3 and No.4.
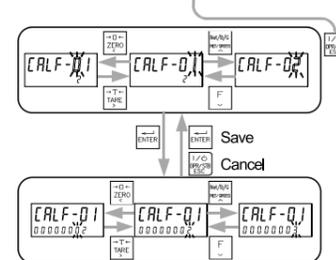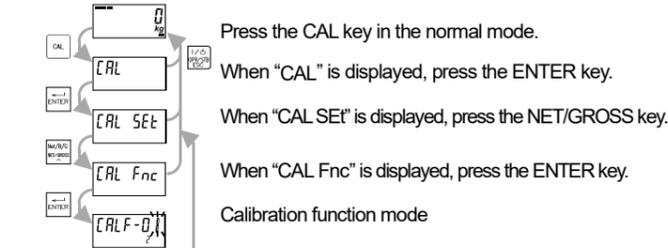
6. Calibration

Calibrates the AD-4401A to convert the signal from the load cell to a mass value correctly.
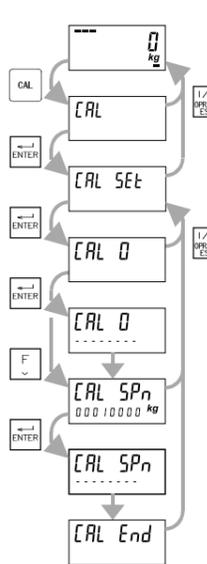
6.1. Calibration Setting

Set the following calibration functions which are required for calibration using calibration weights.

CALF-	Item	Setting Value	Default	CALF-	Item	Setting Value	Default
01	Unit	0: None 1: g 2: kg 3: t 4: lb	2	03	Minimum division	1、2、5、10、20、50 d	1
02	Decimal point position	0: 0 (No D.P.) 1: 0.0 2: 0.00 3: 0.000 4: 0.0000	0	04	Maximum capacity	0 to 999999	20000

The rest skipped (For details, refer to the instruction manual)

Press the CAL key in the normal mode.

When "CAL" is displayed, press the ENTER key.

When "CAL SEt" is displayed, press the NET/GROSS key.

When "CAL Fnc" is displayed, press the ENTER key.

Calibration function mode

Save
Cancel

6.2. Calibration Using Calibration Weights

Press the CAL key in the normal mode.

When "CAL" is displayed, press the ENTER key.

When "CAL SEt" is displayed, press the ENTER key.

Zero calibration
Press the ENTER key when the STABLE (MD) status is turned OFF.
When the Function key is pressed, the AD-4401A proceeds to span calibration without performing zero calibration.
Dashes are displayed in the sub-display and zero calibration is performed.

Span calibration
Set the calibration weight value in the sub-display.
Press the ENTER key when the STABLE (MD) status is turned OFF.
Dashes are displayed in the sub-display and span calibration is performed.

Press the ON/OFF key twice to return to the normal mode.

7. Functions

When the AD-4401A is powered ON, all the segments of the display turn ON and OFF to check the display. Then the AD-4401A enters the normal mode and starts weighing.
If the AD-4401A is powered OFF during the OFF mode (with the display OFF), the AD-4401A will be in the OFF mode when powered ON.

7.1. Control I/O

CONTROL I/O
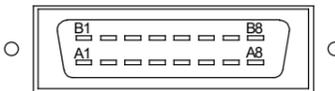
Connector for the Control I/O
• Connector: OTAX N361J016AU (A&D Part No.: 1JI361J016-AG)
• Connector Cover: OTAX N360C016B (A&D Part No.: 1JI360C016-B)

Pin No.	Description		Description		Pin No.
A1	Zero setting	Input	Near-zero	Output	B1
A2	Tare	Input	Underweight, Hi-Hi	Output	B2
A3	Weighing start	Input	OK, Hi	Output	B3
A4	Emergency stop	Input	Large flow, Full, Go	Output	B4
A5	Discharge start	Input	Medium flow, Lo	Output	B5
A6	Key lock	Input	Small flow, Lo-Lo	Output	B6
A7	Input common		Discharge	Output	B7
A8	Output common		Weighing end	Output	B8

The above are the default settings. Assigned functions can be changed for each pin.

Connection Diagram

Control input
- ON voltage: 5 V or less
- ON current: 3 mA or more
- OFF current: 1 mA or less

AD-4401A

Control output
- Maximum load voltage: 30 VDC
- Maximum load current: 50 mA/point
- Voltage drop at ON: 1 V or less
- Leakage current at OFF: 0.1 mA or less

AD-4401A

7.2. Setpoint Input

Setpoints are set using the setpoint input from external devices.
Setpoints that cannot be set using the setpoint input are set using key switches.
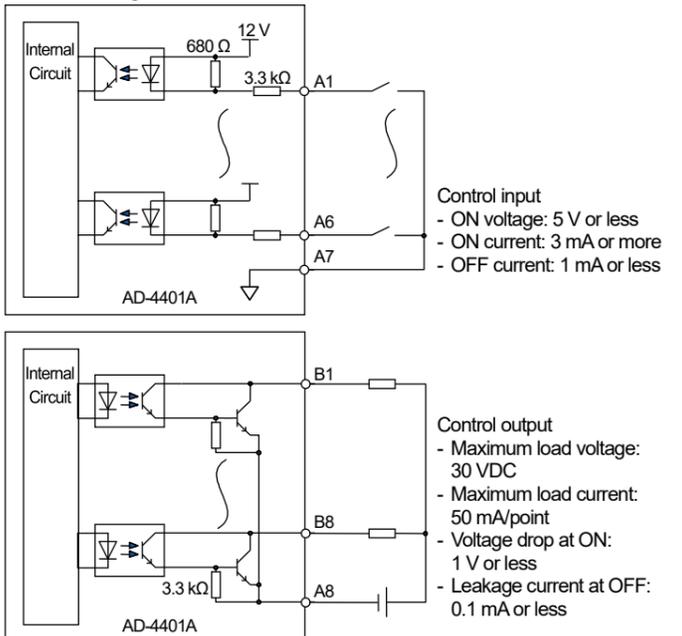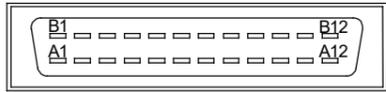
SETPOINT

Connector for the setpoint
- Connector: OTAX N361J024AU (A&D Part No.: 1JI361J024-AG)
- Connector cover: OTAX N360C024B (A&D Part No.: 1JI360C024-B)

The connector is not provided and must be supplied by the user.
Settable setpoints depend on the weighing mode.
For details, refer to the instruction manual.

Connection Diagram

Setpoint input is 4 x 16 key matrix input.

AD-4401A
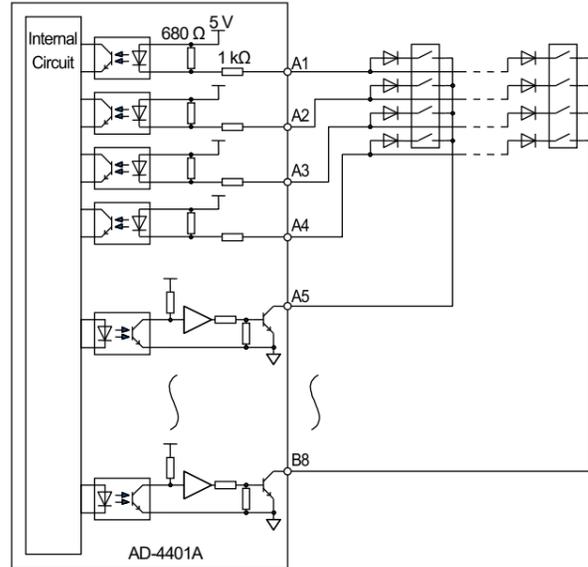
Key scan output
- Voltage drop at ON: 1 V or less
- Leakage current at OFF: 0.1 mA or less

Key scan input
- ON voltage: 1 V or less
- ON current: 3 mA or more
- OFF current: 1 mA or less

7.3. Standard Serial (Current Loop) Output

Pin Assignment

SER.OUT

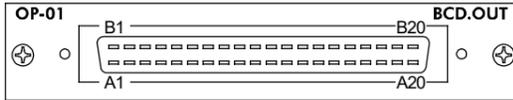| Pin No.	Description	
1	NC	
2	Frame ground	
3	Current loop output	No sign
4	NC	
5	Current loop output	No sign
6	NC	
7	NC	
Shell	Frame ground	

Connector for the standard serial (current loop) output
- Connector: Hosiden TCP0576-715267 (A&D Part No.: 1JATCP0576)

Communication Specifications (Default)

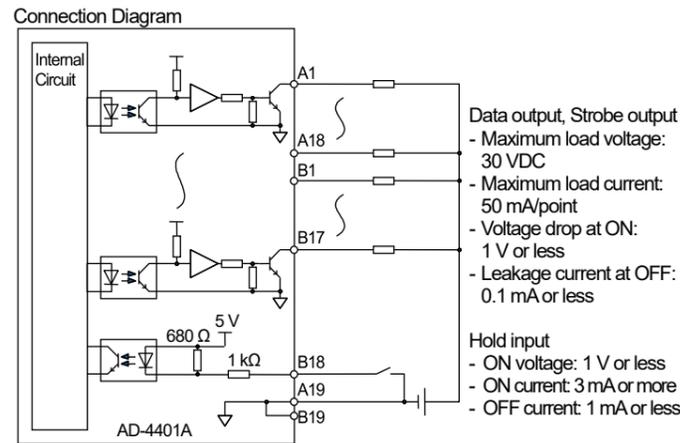| Signal level	Current loop 0 to 20 mA
Baud rate (Si F-03)	2400 bps
Character bit length	7 bits
Parity	Even
Star bit length	1 bit
Stop bit length	1 bit
Code	ASCII
Terminator	CR LF

Communication Functions
Interval output at the display update rate. (Default)

7.4. Option-01 BCD Output
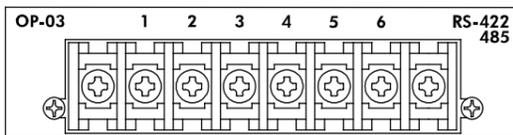
OP-01   BCD.OUT

Connector for the Option-01 BCD output
- Connector: OTAX N361J040AU (A&D Part No.: 1JI361J040-AG)
- Connector cover: OTAX N360C040B (A&D Part No.: 1JI360C040-B)

Pin No.	Description	Description	Pin No.
A1	1	2	B1
A2	4	8	B2
A3	10	20	B3
A4	40	80	B4
A5	100	200	B5
A6	400	800	B6
A7	1000	2000	B7
A8	4000	8000	B8
A9	10000	20000	B9
A10	40000	80000	B10
A11	100000	200000	B11
A12	400000	800000	B12
A13	OFF: Overload	ON: Positive OFF: Negative	B13
A14	ON: Stable	ON: Net value OFF: Gross or Tare value	B14
A15	Decimal point position		B15
A16	A15 = ON, B15 = ON, A16 = ON, B16 = ON: None A15 = OFF, B15 = ON, A16 = ON, B16 = ON: 0.0 A15 = ON, B15 = OFF, A16 = ON, B16 = ON: 0.00 A15 = ON, B15 = ON, A16 = OFF, B16 = ON: 0.000 A15 = ON, B15 = ON, A16 = ON, B16 = OFF: 0.0000		B16
A17	Unit A17 = OFF, B17 = OFF: None or kg A17 = ON, B17 = ON: g A17 = OFF, B17 = ON: t A17 = ON, B17 = OFF: lb		B17
A18	Strobe output	Hold input	B18
A19	Common	Common	B19
A20	Frame ground	Frame ground	B20

Connection Diagram

AD-4401A

Data output, Strobe output
- Maximum load voltage: 30 VDC
- Maximum load current: 50 mA/point
- Voltage drop at ON: 1 V or less
- Leakage current at OFF: 0.1 mA or less

Hold input
- ON voltage: 1 V or less
- ON current: 3 mA or more
- OFF current: 1 mA or less

7.5. Option-03 RS-422/485

OP-03   1   2   3   4   5   6   RS-422 485

Terminal No.	Description	
1	Send data +	
2	Send data −	
3	Receive data +	
4	Receive data −	
5	Open-circuit:	Disable the terminal resistor
	Short-circuited to No. 4:	Enable the terminal resistor
6	Signal ground	

The communication specifications and communication functions are the same as those for the RS-232C.

Connection Diagram
RS-422

AD-4401A | Master
1 Send data +
2 Send data −
3 Receive data +
4 Receive data −
5 Terminal resistor
6 Signal ground
100 Ω
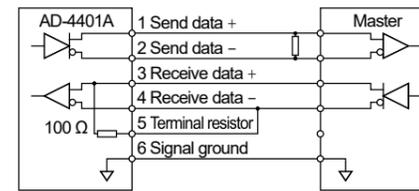
2-wire RS-485

To use the 2-wire RS-485, set "RS-422/485 electrical specifications (rS F-08)" to 2.
Short-circuit the terminals No.1 and No.3, and the terminals No.2 and No.4.
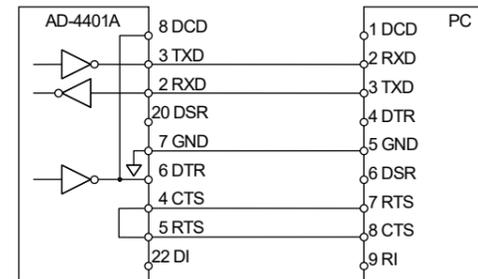Terminal resistors must be installed on both ends of the circuit.

AD-4401A   Master
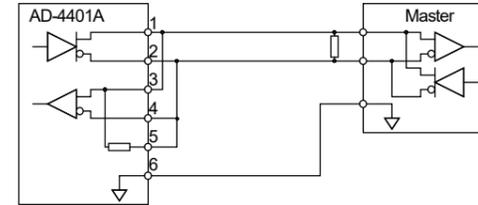
7.6. Option-04 RS-232C

OP-04   1 — 2   RS-232C
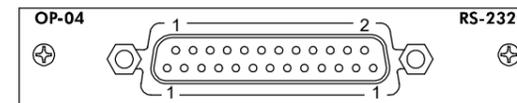
The applicable connector is a D-sub 25-pin male connector. The locking screw is M2.6. The connector is not provided and must be supplied by the user.

Pin No.	Description	Pin No.	Description
1	FG	7	GND
2	RXD	8	DCD
3	TXD	9 to 19	NC
4	CTS	20	DSR
5	RTS	21 to 25	NC
6	DTR		

Connection Diagram
Connection to a PC serial port is as follows.

AD-4401A   PC
8 DCD   1 DCD
3 TXD   2 RXD
2 RXD   3 TXD
20 DSR   4 DTR
7 GND   5 GND
6 DTR   6 DSR
4 CTS   7 RTS
5 RTS   8 CTS
22 DI   9 RI

Communication Specifications (Default)

Signal Level (rS F-08, rS F-09)	RS-232 compliant	Start bit length	1 bit
Baud rate (rS F-03)	9600 bps	Stop bit length (rS F-06)	2 bits
Character bit length (rS F-05)	7 bits	Code	ASCII
Parity (rS F-04)	Even	Terminator (rS F-07)	CR LF

Communication Functions
Interval output at the display update rate. (Default)

7.7. Option-07 Analog 4-20 mA Output

A+   A-   SHLD

Terminal No	Symbol	Description
8	A+	Analog current output +
9	A−	Analog current output −
10	SHLD	Frame ground

When the optional analog 4-20 mA output is not installed, the terminals No.8 and No.9 are vacant.
Check the 07 column of the option list on the side of the indicator casing.

Connection Diagram

A+   A-   SHLD

Applicable solderless terminal: R1.25-3
Applicable wire size: 0.3 to 0.75 mm^2
Use a 2-wire shielded twisted pair cable.
External load resistance: 0 to 600 Ω

Shield
Analog current +
Analog current −
External load resistance
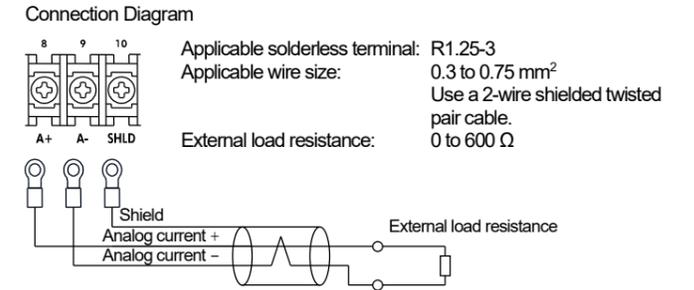
8. Software Version

Confirm the software version in the normal mode by doing the following:

1. Press and hold the ENTER key and press the SETPOINT key.
2. Press and hold the ZERO key and press the ENTER key.
3. Press the Function key.
4. Press the ENTER key.
   The software version is displayed in the sub-display.
5. Press the ON/OFF key twice to return to the normal mode.

9. Specifications

Dimensions	144 (W) x 72 (H) x 197 (D) mm	
Operating temperature and humidity range	-10 °C to 40 °C Less than 85%RH, non-condensing	
IP rating	When the indicator is secured to the control panel: Outside of the control panel: IP65 Inside of the control panel: IP2X	
Power supply	Power supply voltage	100 to 240 V AC +10% -15% 50/60 Hz ±5%
	Maximum apparent power	30 VA
	Rush current	100 V AC: 15A or less, 200 V AC: 30A or less
	Fuse	Internal (Not user replaceable)
Load cell input	Excitation voltage	10 VDC ± 5% 230 mA Up to eight 350 Ω load cells can be connected in parallel. 6-wire type with remote sensing
	Signal input range	0.0 to 3.2 mV / V
	Minimum input sensitivity	0.3 µV
	Zero calibration range	0.0 to 2.0 mV / V
	Nonlinearity	±0.01%
	Temperature coefficient	Zero drift: ± 0.2 µV / °C RTI Typ. Span drift: ± 8 ppm / °C Typ.
	Sampling rate	100 times/s
Display	Main display	7-digit VFD with character height of 13 mm
	Sub-display	8-digit VFD with character height of 7 mm
	Unit	g, kg, t, lb or none (selectable)
	Status display	14
Key switches	Key switch	7
	Key switch with sealing cover	1
External Input / output	Control I/O	Non-voltage contact input: 6 points NPN open collector output: 8 points
	Setpoint input	Key matrix input
	Standard serial output	Current loop output
Option boards	BCD output	
	RS-422/485	A dedicated slot is available only for analog 4-20 mA output. Among other option boards, only one can be installed.
	RS-232C	
	Modbus TCP	
	Analog 4-20 mA output	

External Dimensions

144   197   7,14   154   21
72

137   1384
67

Panel cutout dimensions
Panel thickness: 1.6 to 3.2

Unit: mm