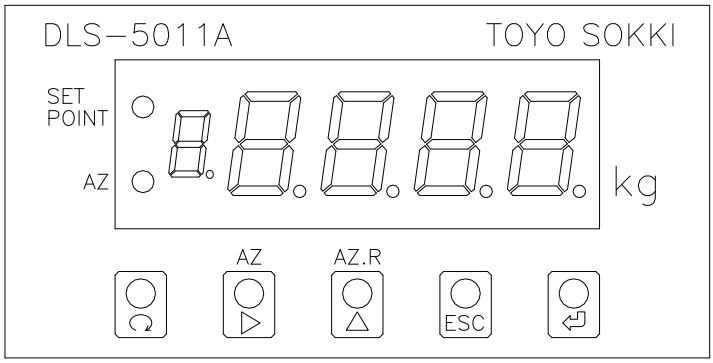
DIGITAL INDICATOR

MODEL D L S – 5 0 1 1 A

OPERATION MANUAL



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※This operation manual conforms to ROM version 2.00 and later.
(Models delivered after Apr. /2008)
ROM version can be checked in Test Mode.
RoHS Compliant

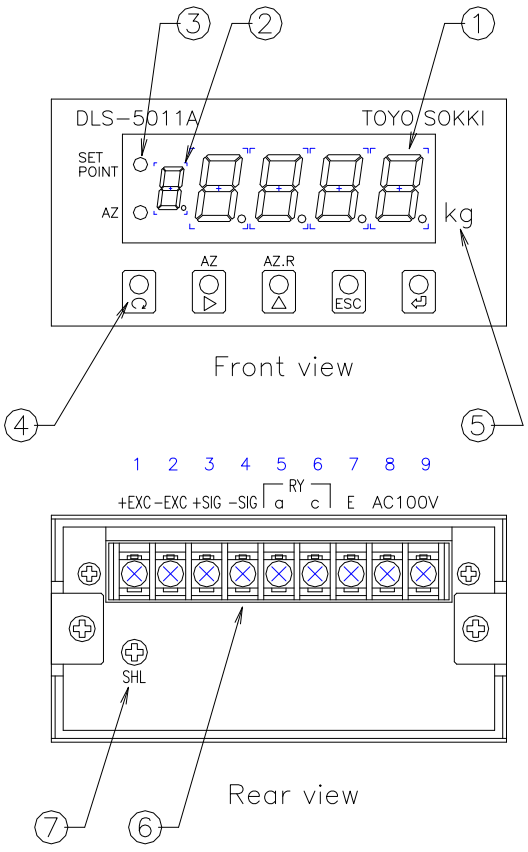
This document is translated from MA4-00129-R4 (Japanese)

§1. Summary

The Model DLS-5011A is a simple digital indicator dedicated to strain gauge transducers that is optimal for a weighing system such as a platform scale or a tank. It is equipped with Auto-Zero (AZ) and Comparator function.
Various settings can be easily done by key switches.
Power is supplied with AC85～132V while DC20～27V can also be selected at the time of order.
Sensor applied voltage is 5V as standard and can be selected 2.5V at the time of order.

§2. Appearance and Each part name

Appearance of the unit



① Measured value indicator
Indicate the measured value in Measuring Mode.
Indicate the setting value or item in Function Mode.

② Polarity indicator and Guide display
Indicates '−' when the measured value is minus in Measuring Mode. Also indicate function as Guide display in Function Mode.

③ Status LED
Each LED is turned ON when a comparator or AZ is in operation.

④ Key switches
Each operation or function is set by the following key switches
(ITEM), (NEXT), (UP), (ESC), (ENTER)

⑤ Unit seal

Except of kg, paste the desired unit seal.
Unit seal: kg, g, t, N, kN, N·m, kN·m, kPa, MPa, mm, %

⑥ Terminal block

7.62mm pitch crimp terminal. Connect to Load Cell, Relay and Power line.

⑦ Shield terminal

Connect a shield line of Load Cell cable.

§3. Operation

This digital indicator has three operation modes as the followings

3 – 1) Measuring Mode
The measured value is indicated on the indicator. And accept Auto Zero operation.

1). Auto Zero (AZ) and cancel Auto Zero (AZ.R) operation
Press ▷ [AZ] key for 1 second to operate Auto-Zero
Press △ [AZ.R] key for 1 second to cancel Auto-Zero

3 – 2) Function Mode
This mode is used to confirm and change the setting of each function.

1). How to enter Function Mode
After pressing ∩ key 3 times at Measuring Mode, guide display becomes C. and quantitative value of comparator is displayed.
To keep pressing ∩ key, each function is displayed in turn and setting value or item can be confirmed.
Press ESC key to return to Measuring Mode.

2). How to change the setting
After pressing ▷ key while in Function Mode, the value or characters start to blink.
There are three ways to change the setting.

① Setting numerical value – Comparator Quantitative value, Hysteresis, Preset Tare, Span Calibration
Change a numerical value by ▷, △ key to the desired numerical value.

② Selecting a candidate – Comparator Judgement, Decimal Point position, Minimum Scale, Digital Filter
Select an item or the value by ▷ key.

③ No setting a value nor selecting – Zero Calibration, Test Mode

Press ↵ key to memorize the setting and display SET for 2 seconds and return to Measuring Mode.
When tEST is blinking and press ↵ key 3 times, enter Test Mode.
When pressing ESC key, do not change the setting and return to Function Mode.

3 – 3) Test Mode
This mode is used to check whether this unit is operated normally.
Test Mode is mentioned at Section §8.

Operation Hints

When the value or characters are blinking, the setting will be changed by pressing ↵ key. If it is not blinking, it will not be changed.

During setting (the value or characters are blinking), if you press ESC key, setting value or item is not changed and the blinking stops and it return to Function Mode. This can also be used as CANCEL during setting.

This unit keeps measuring and its comparator is working even in Function Mode.
Once pressing ↵ key and memorizing the setting, this unit operates function with the changed setting.

In Function Mode, it return to Measuring Mode without changing the setting by pressing ESC key at least two times.

3 – 4) Function of each key

① [ITEM] Key
Press this key 3 times in Measuring Mode to enter Function Mode.
This key is also used to select a function in order in Function Mode.

② [NEXT] Key
Press this key for 1 second in Measuring Mode to operate Auto Zero function.
This key is also used to select a digit, an item or the value in Function Mode.

③ [UP] Key
Press this key for 1 second in Measuring Mode to cancel Auto Zero function.
This key is also used to change the numerical value of the selected digit in Function Mode.
This key is also used to select a function in reverse order in Function Mode.

④ [ESCAPE] Key
This key has no operation in Measuring Mode.
Press this key in Function Mode to return to Measuring Mode.
Press this key at setting value or selecting an item in Function Mode to stop setting or selecting.

⑤ [ENTER] Key
Press this key while the value or character is blinking in Function Mode, it memorizes the setting and updates a function.
After the setting has been changed, SEt is displayed for 2 seconds and return to Measuring Mode.
If the setting is invalid, an error Err is displayed for 2 seconds and return to Measuring Mode and the setting is ignored.
If this key is pressed while the value or character is not blinking in Function Mode, nothing happens.

3 – 5) List of setting Items in Function Mode

① Comparator Quantitative value [c.]
4 digit (9999 at the time of shipment)

② Comparator Hysteresis value [H.]
2 digit (00 at the time of shipment)

③ Comparator Judgement [c.]
Item
UP +polarity, Upper limit judgement (UP at the time of shipment)
dn +polarity, Lower limit judgement
-UP –polarity, Upper limit judgement

④ Preset Tare value [t.]
4 digit (0000 at the time of shipment)

⑤ Zero Calibration [0.AdJ]
Press [▷] key to let [0.AdJ] blink and press [↵] key to calibrate zero point.
(Fixed 0)

⑥ Span Calibration [S.]
4 digit (5000 at the time of shipment)

⑦ Decimal Point [P.] (0 at the time of shipment)
Item
0 No decimal point
0.0 After decimal point 1 digit
0.00 After decimal point 2 digit
0.000 After decimal point 3 digit

⑧ Minimum Scale [S.] ※ Please note that the Guide display is same as span calibration.
Item (1 at the time of shipment)
1 Minimum scale : 1
2 Minimum scale : 2
5 Minimum scale : 5
10 Minimum scale : 1 0

⑨ Digital Filter [F.] Number of times of moving average (4 at the time of shipment)
Item
1 Function OFF
2 Moving average : 2 times
4 Moving average : 4 times
8 Moving average : 8 times
16 Moving average : 16 times
32 Moving average : 32 times

⑩ Shift to Test Mode [tESt]
Press [↵] key 3 times after pressing [▷] key to shift to Test Mode.

§4. Function

4 – 1) Auto Zero function

Press ▷ key for 1 second in Measuring Mode, after memorizing the measured value as the offset level, displayed value is set to be zero, and from that point display the amount of increase and decrease in NET Value. (Display the value subtracted the offset level from Gross value).

Different from zero calibration, it is possible to operate AZ in all the rage of measured value.

Cancellation (return to Gross value) is also possible.

LED [AZ] will be lighted up when AZ is operated.

Press △ key for 1 second in Measuring Mode to cancel (reset) AZ function.

4 – 2) Preset Tare function

After setting preset Tare value, this unit always subtract preset Tare value from the measured value. This is used to measure an object which has a known container weight.

After zero point calibration or span calibration has been done, Tare value will be reset to be zero.

4 – 3) Minimum Scale function

By setting the minimum scale (scale division), it is possible to change the displayed scale interval to 1, 2, 5 or 10.

Even if minimum scale has been changed, span volume will not be changed. In case of decreasing minimum scale, if the displayed resolution is insufficient, it will be an error.

When span calibration is carried out, if the resolution cannot meet the requirement of minimum scale, it will change minimum scale automatically and secures the resolution.

After span calibration, please confirm the setting of minimum scale.

Quantitative value of comparator can be set no relation of minimum scale but it compares with the displayed value with specified minimum scale.

4 – 4) Digital Filter function

This function is used to stabilize the indication when there is a fluctuation of the measured value due to vibrations and so on are applied to the sensor.

Stabilization is carried out by moving average of incoming data.

As the number of times of moving average increases, indication will be more stabilized, but the response to indicate the value becomes slower, so please select the number in accordance to the condition of input signal.

When this function is not used, please set '1' (OFF).

4 – 5) Cal-Lock function

In order to avoid span volume vanished or modified by wrong operation, there is a lock function of prohibiting span calibration.

①Turn power ON while pressing ESC key or press ESC key 3 times within 3 seconds after power ON, which enables you to enter Cal-Lock function.

②Alternates following guide each time pressing ▷ key.

cAL. : Cal-Lock disable, Span calibration permitted.

Loc. : Cal-Lock enable, Span calibration prohibited.

③After selecting Call-Lock status, pressing △ key or by turning power OFF and ON, return to Measuring Mode and the setting status is effective.

If trying span calibration during Cal-Lock status, Loc. is displayed instead of SET and returns to Measuring Mode. Span calibration value will not be changed.

In case of delivering this unit after calibrated at our factory, there is a case of Cal-Lock being enabled. If this unit is already comprised in a system and the power cannot be turned OFF, enter Test Mode once. Press ▷ key 3 times when displaying program version in Test Mode to reset this unit. Press ESC key 3 times within 3 seconds right after reset, it is able to enter Cal-Lock function.

4 – 6) Comparator function

By comparing the measured value with quantitative value which set at Function Mode, this function outputs judgement by means of Relay contact. Hysteresis value can also be set. At the time of Make of Relay contact, LED [SET POINT] will be lighted up.

1). Range of setting value

Quantitative value	0 to 9999
Hysteresis value	99

2). Operation Mode

Quantitative value is set without polarity, but selecting + polarity or – polarity is possible. Select upper limit or lower limit judgement depending on an application of supplying or discharging control.

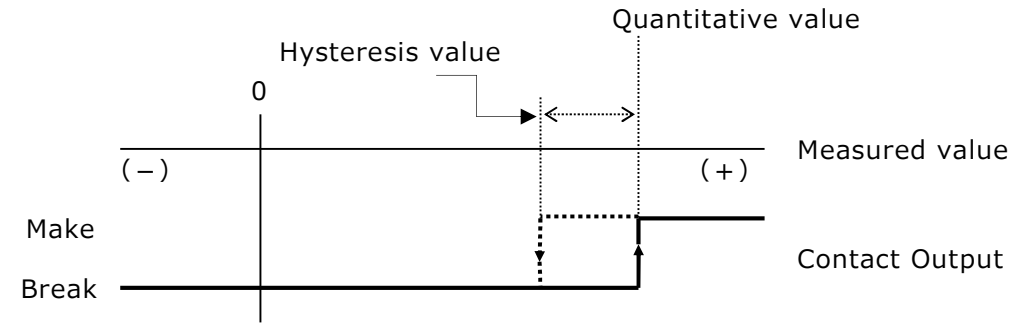
These settings can be selected from following 3 kinds of modes.

a) + polarity, Upper limit judgement
b) + polarity, Lower limit judgement
c) – polarity, Upper limit judgement

3). Explanation of each Operation Mode

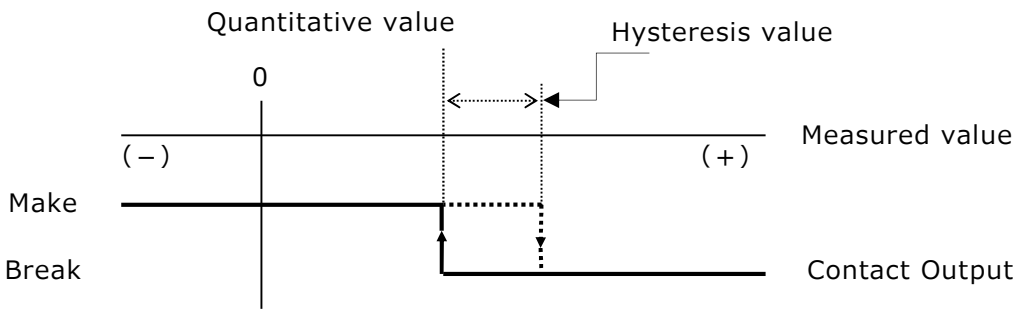
a) Upper limit judgement, under comparison of + area.
In case of supplying control, use this mode.

Judgment of comparison
Contact output Make : Measured value ≧ Quantitative value
Contact output Break : Measured Value < Quantitative value – Hysteresis value



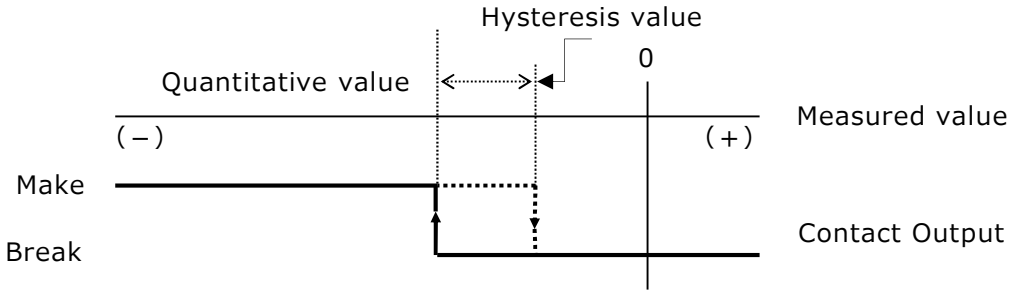
b) Lower limit judgement, under comparison of + area.
In case of discharging control, use this mode.

Judgment of comparison
Contact output Make : Measured value ≦ Quantitative value
Contact output Break : Measured value > Quantitative value + Hysteresis value



c) Upper limit judgement, under comparison of – area.
In case of cutting-out by discharging control, use this mode.
The discharge amount is displayed by pushing an AZ key before discharging the measured object.

Judgment of comparison
Contact output Make : Measured Value ≦ (−Quantitative value)
Contact output Break : Measured Value ＞ (−(Quantitative value−Hysteresis value))



§5. Option (provided at the time of shipment)

Power supplied voltage of this unit is AC85～132V as standard, but also provided DC20～27V as option.
Sensor applied voltage is 5V as standard but also provided 2.5V as option.
Please specify at the time of order.

§6. Calibration

Calibration is performed by 'Actual Load Calibration' using a weight or other article with a known weight as a reference.
In case of purchasing this unit together with Load Cell as a set, there are cases where calibration has already been done.
When calibration has being done, the setting of preset Tare in Function Mode will be zero.

6 – 1) Necessary setting before calibration

In case of Cal-Lock status, unlock the Cal-Lock first.
Please refer to 4 – 5) Cal-Lock function for the method of unlock.

6 – 2) Method of calibration by actual load

1). Remove a load from Load Cell and perform zero point calibration.
- ①Press ↻ key 3 times. Enter Function Mode. Guide display will show [CAL].
- ②Press ↻ key 4 times. [0.AdJ] is displayed.
- ③Press ▷ key. Indication of [0.AdJ] start blinking.
- ④Press ↵ key. Calibration at zero point is performed.
  When calibration performed successfully, [SET] is displayed for 2 seconds and measured value shall be 0. [Err] is indicated if it exceeds the range of zero point calibration.

2). Place a weight or other article with a known weight on Load Cell and perform span (sensitivity) calibration.
- ①Press ↻ key 3 times. Guide display will show [C.].
- ②Press ↻ key 5 times. Guide display will show [S.].
- ③Press ▷ key and select a digit to change. Press △ key and change the value of selected digit to make the value of a known weight.
- ④Press ↵ key. Span calibration is performed.
  When calibration performed successfully, [SET] is displayed for 2 seconds and the measured value shall be the value of a known weight. [Err] is indicated if it exceeds the range of span calibration.
  To interrupt this procedure, press ESC key while the value is blinking, the blinking will stop, press ESC key again, it shall return to Measuring Mode.

3). Unload a weight or other article from Load Cell.

4). Check the minimum scale setting.
In case resolution cannot be achieved at the minimum scale which set at Function Mode, the minimum scale will automatically be changed in order to achieve the resolution. Therefore please check the setting of minimum scale after span calibration.

It is also possible to change the minimal scale (number of skips) of 1, 2, 5, 10 notch. Even if the minimum scale is changed, the span calibration value will not be changed.
- ① Press ↻ key 3 times. Guide display will show [C.].
- ② Press ↻ key 7 times. Guide display will show [S.] and current minimum scale will be displayed. The setting of minimum scale is to select a candidate.
  ※ Please note that Guide display is same as span calibration Guide display.
- ③ Press ▷ key to change the minimum scale to desired value and then press ↵ key and [SET] is displayed for 2 seconds . To cancel the setting, press ESC key.

5). Check that the measured value is zero.
If the measured value is other than zero, please repeat the procedures from 1).

6). Set decimal point position and digital filter if needed.

§7. Troubleshooting

If this unit does not work properly, please take the following measures. If the trouble still cannot be solved, then please contact our company.
At query, please inform us the model name, product serial number, and conditions of this unit as detailed as possible. The model name of Load Cell or sensor connected to this unit should be also informed.

7 – 1) Basic check point

1). Please check if using a correct power supply.
this unit is supplied voltage with AC85～132V as standard or DC20～27V as option.

2). Please check that wires are connected to the terminal base correctly and firmly.

7 – 2) Precautions at the time of calibration

1). Error occurs at the time of zero point calibration.

・In case of exceeding the setting range of zero point.
To perform zero point calibration, Load Cell output with no load should be in the range of -2.8～+2.8mV/V

2). Error occurs at the time of span calibration, or display value is not correct as set in span calibration. Or minimum scale is not correct as set in Function Mode.

・This unit cannot measure in a system that the sum of initial tare value and measured value exceed 3.3mV/V.

・In case resolution cannot be achieved at the minimum scale which set at Function Mode, the minimum scale will automatically be changed in order to achieve the resolution.

Since the input sensitivity of this unit is 1μV/digit, the maximum display resolution is 1/5,000 when input 1.0mV/V, and it is 1/2,000 at the time of 0.4mV/V. Resolution of exceeding these values cannot be set.

7 – 3) Countermeasures for unusual display

1). The measured value is blinking (over load indication) when not overloaded
A part of sensor cable might be broken or a sensor itself might be defective.
Please confirm the input voltage (mV/V) from a sensor in Test Mode.

7 – 4) Judgement whether this unit has malfunction

1). Please confirm whether a sensor excitation voltage is correct. Disconnect a sensor from this unit and check the voltage by a tester between #1(+EXC) and #2(-EXC) of terminal block. Please check whether it is stable at 5V±0.25V(EXC=5V) or 2.5V±0.13V (EXC=2.5V)
If it is unstable, power circuit for a sensor in this unit is failure.

2). Short-circuit (Jumper between No.3 (+SIG)～No.4 (-SIG)) of the output voltage of a sensor at terminal block and display input voltage (mV/V) in Test Mode. Then please check if the input voltage is stable nearest to zero.
If unstable, this unit is failure.
If stable, please check a sensor side.

3). Checking a Relay contact output
Please check the Relay contact output in Test Mode.

7 – 5) Checking a sensor (Load Cell)

Good or bad rough judgement can be done by measuring input/output resistance and insulation resistance because the Load Cell is structured by a bridge circuit. (Please make sure to power OFF this unit first and disconnect Load Cell before checking resistance)

1). Fault judging method by resistance of Load Cell
Check bridge resistance of Load Cell by a tester and confirm whether input/output resistance are correct.

2). Fault judging method by insulation resistance of Load Cell
Measure the insulation resistance between shield line and other with voltage less than 50V. If the insulation resistance shows more than 1000MΩ, insulation of Load Cell is no problem.

§8. Test Mode

The response of Relay contact output and indication of display is different during Test Mode. Please take measures to connected external equipment to keep it from abnormality. Test Mode confirms conditions of this unit by manual operation.

8 – 1) Basic Operation

1). To enter Test Mode, select [tESt] in Function Mode and press ▷ key let the indication blink and press ↵ key 3 times.
Also enter to it by pressing ↵ key 3 times within 3 seconds after power ON.
To leave Test Mode, turn power OFF or press ▷ key 3 times during Program Version Display.
The test item will proceed to the next by pressing ↺ key. The next to the end of the item is the top of the item.

8 – 2) Each function

1). Program Version display — Program Version : [P.]
Displays software version of this unit.
Display : 2.00····· shows Ver. 2.00
If you press ▷ key 3 times in this mode, return to Measuring Mode.

2). LED test — LED : [d.]
① Pressing ▷ key, LED [SET POINT] will be lighted up.
② Pressing ▷ key, LED [AZ] will be lighted up.
③ Pressing ▷ key, each segment of 7-segment LED will be lighted up in turn.
④ Pressing ▷ key, all segments of Guide display will be lighted up.
⑤ Pressing ▷ key, each digit of all segments of the measured value will be lighted up in turn in the following sequence.
(10^3 digit→10^2digit→10^1digit→10^0digit)

3). Key test — KEY : [K.]
Display the allocated number of the key. If you press ↺ key first, it will move to next item, so please press other than ↺ key to start with.
↺ key 1 (If you press twice, it will move to the next item)
▷ key 2
△ key 3
ESC key 4
↵ key 5

4). Relay Output test — Relay out : [r.]
Every time pressing ▷ key, the display alternates to indicate [on] or [oFF]. Relay output is Make at the time of [on] and Break at the time of [oFF].

5). Input voltage display (mV/V) — mV/V : [S.]
Guide display [S.] is displayed for a moment and then display the value of input voltage (mV/V) from Load Cell. It will indicate '–' polarity when input voltage is minus.
Accuracy is ±5% at standard sensitivity (1.0mV/V).
When an error of [A/D over] occurs, the value of input voltage will be blinked.

§9. Installation and Connection method

9 – 1) Installation environment etc.

1). Operating temperature range is −10℃～+40℃
Please install in a place not exposed to direct sunlight.

2). This unit is operated on AC85～132V (standard) or DC 20～27V (option)
In case stable power supply for AC85～132V is not available, use of a constant-voltage transformer is recommended.

3). This unit is designed to fix by a panel-mount.
Please make use of the attached metal fittings to fix it on.

9 – 2) Terminal Connection

Wiring to this unit is made through the terminal block on the rear panel.
Please use crimp terminals for M3 with a width of max. 6mm for connection.

No.	Signal Connection		
1	+EXC	Excitation voltage to Load Cell (+)	
2	−EXC	Excitation voltage to Load Cell (−)	
3	+SIG	Input voltage from Load Cell (+)	
4	−SIG	Input voltage from Load Cell (−)	
5	RY-out a	Contact output 'a'	
6	RY-out c	Contact output 'c'	
7	E	Grounding	
8	Power	AC85～132V (standard)	DC20～27V (option)
9	Power	AC85～132V (standard)	DC0V (option)

1). Sensor

The cable wiring color varies depending on the manufacturer or a model. Refer to the Test Report attached to Load Cell, check the signal name and color, and connect correctly and firmly.
Please use a 4-core shielded cable and connect the shield wire to the screw underneath the terminal block for shielding.
Also wire apart from a power line or a motor drive line with noise to prevent malfunction.
This unit has not a function of remote sensing. If connecting Load Cell with 6-core wire of remote sensing, connect +SEN together with +EXC and −SEN together with −EXC.

2). Contact output

Contact rating is DC24V 1A, AC125V 0.5A (Resistive Load).
When powered OFF, Relay contact is in Beak position.
Please take countermeasures for noise with a diode for DC Load and with a spark killer for AC Load both on loading side. (For noise prevention, the use of DC Load is recommended.)

3). Grounding

Please connect the earth-line with a ground resistance 100Ω or less.

4). Power Source

Power supplied voltage is AC85～132V (standard) or DC20～27V (option). Please check a name plate of this unit and confirm whether the supplied voltage is correct.
Please make a twist of power line when AC powered.

§10. Specifications

10－1) Analog and A/D converter part

1).	Input sensitivity:	1μV/digit or more(EXC=5V), 0.5μV/digit or more(EXC=2.5V) Display resolution: Max. 1/5,000 at 1.0mV/V input
2).	Non-linearity:	±0.05%FS±1 count
3).	Temperature characteristics:	Zero point ±0.01%FS/℃ Sensitivity ±0.01%Reading/℃
4).	Frequency characteristics:	approx. 1 Hz (-3dB) (Digital filter function setting at DF=4)
5).	Transducer power supply:	DC5V±5%,60mA (standard) DC2.5V±5% 30mA (option) (Four 350Ωtype or One 120Ωtype sensor can be connected)

10－2) Display part

1). Display element

①Measured value display:	LED 7-segment,4-digit, Red, character height 14mm
②Guide display:	LED 7-segment,1-digit, Red, character height 8mm
③Status display:	LED、Red, 2 pcs

2). Measured value display

①Maximum reading:	±9999 (Zero suppress reading)
②Display resolution:	1/9,999 maximum at input sensitivity 2.0mV/V 1/5,000 maximum at input sensitivity 1.0mV/V When input signal is out of the range ±3.3mV/V or the measured value exceeds ±9999, over indication is displayed.
③Decimal point:	0 to 3 digit after decimal point (Nil, 0.0, 0.00, 0.000)
④Over indication:	All digit blink when the measured value exceeds ±9999
⑤Unit:	kg Other unit is pasted by unit seal as the following. kg, g, t, N, kN, N·m, kN·m, kPa, MPa, mm, %
⑥Sampling cycle:	250msec. (4 times/sec)

3). Status display: SET POINT, AZ

10－3) Zero point and Sensitivity correction

1). Zero point correction:	adjustable by input signal of −2.8～2.8mV/V (by key)
2). Sensitivity correction:	adjustable by span volume of −3.0～3.0mV/V (by key)

※ The sum of initial Tare value (zero point input value) and maximum measured value (span amount) should not exceed ±3.3 mV/V.

10－4) I/O part

1). Operation switches

①Key switch:	5 keys

2). Control output

①Output signal:	Relay contact output: 1 point 'a' contact (Break at powered OFF)
②Contact capacity:	DC 24V, 1A (resistive load) AC125V, 0.5A (resistive load)

1 0 – 5) Specifications of each function

Please refer section §4 for details of each function.
- Auto Zero function (AZ)
- Preset Tare function
- Minimum Scale function
- Digital Filter function
- Cal Lock function
- Comparator function

1 0 – 6) General

1).	Measures for power failure (backup of memory):	Each data is written in a non-volatile memory (EEPROM) (Maximum 100,000 times).
2).	Power supplied voltage:	AC85～132V, 50/60Hz : standard DC20～27V : option
3).	Power consumption:	approx. 10VA
4).	Operating Temperature and Humidity range:	−10～+40℃, 20～85% R.H. (without condensation)
5).	Mounting:	Panel mounting type
6).	Mass:	approx. 1kg

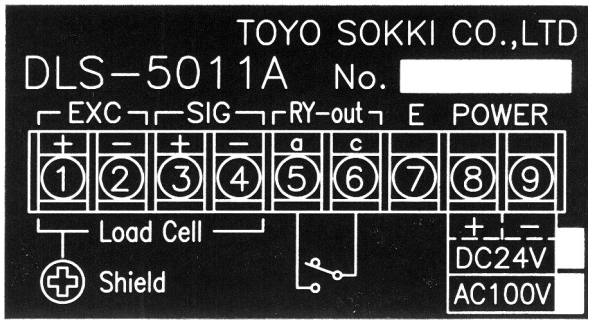
§1 1. List of Models and Accessories

1 1 – 1) Model

Prior to use, please confirm the model name and power supplied voltage with a name plate attached to this unit.

EXC=2.5V ← Applied voltage to Load Cell.
Only attached EXC=2.5V selected

Model → name



←Serial number

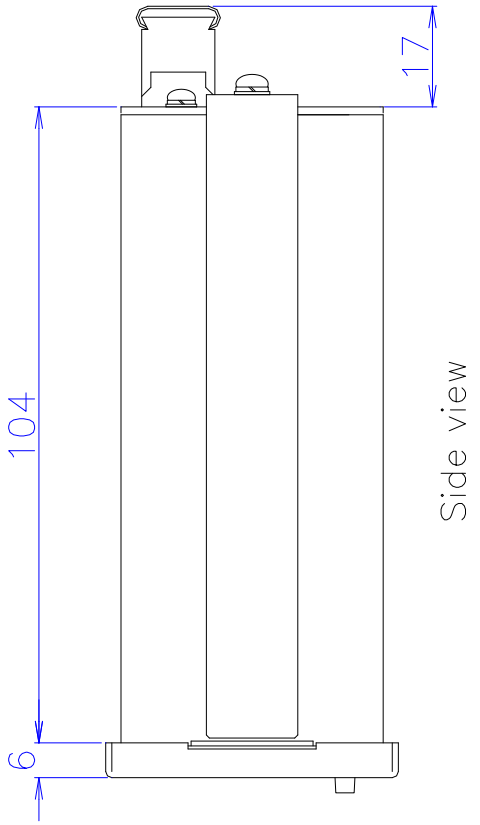
Power supplied voltage
←DC20～27V, marking (option)
←AC85～132V,marking (standard)

Power supplied voltage is AC85～132V as standard and DC20～27V is also available as an option.
If the power supplied voltage is incorrect, this unit is damaged. Please check carefully a marking of the power supplied voltage and the power supply which are going to use.

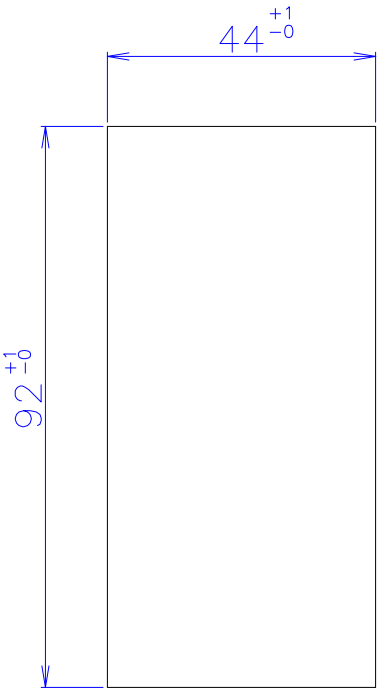
1 1 – 2) Accessories

1).	Operation manual	1 copy
2).	Unit seal	1 pc
3).	Terminal base cover	1 pc

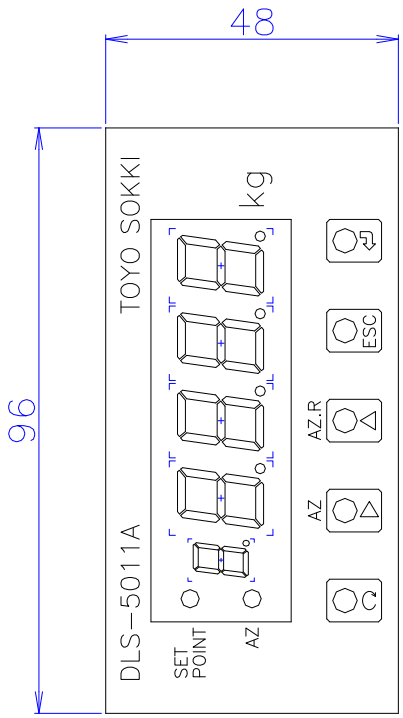
§12. Dimensional drawing



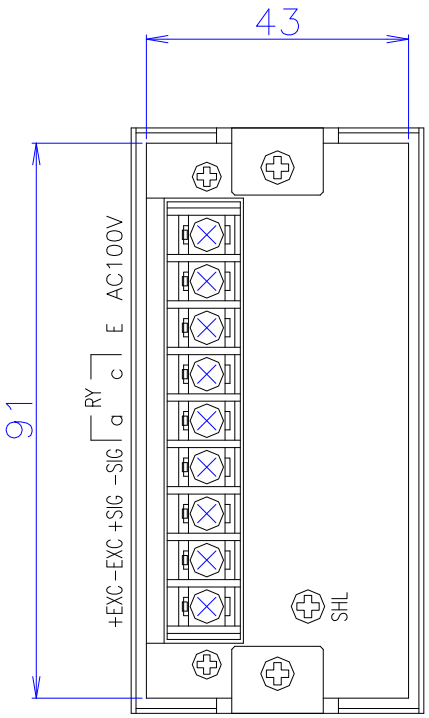
Side view



Panel cut



Front view



Rear view

§13. List of Functions

Mode	Key/Display	Function	Remark
Measuring Mode	∩	Enter Function Mode	Press ∩ key 3 times
	▷	Auto Zero (AZ)	Press ▷ key for 1 second
	△	Auto Zero Reset (AZ.R)	Press △ key for 1 second
Function Mode	c.	Comparator quantitative value	Numerical Setting
	H.	Hysteresis	Numerical setting
	c.	Comparator judgement	Candidate selection
	t.	Preset Tare value	Numerical setting
	0.AdJ	Zero point calibration	Press ▷ key to blink Press ↵ key to calibrate
	S.	Span calibration	Numerical setting
	P.	Decimal point position	Candidate selection
	S.	Minimum scale(Skip number)	Candidate selection
	F.	Digital Filter	Candidate selection
	tESt	Shift to Test Mode	Press ▷ key to blink Press ↵ key 3 times to shift
(When display does not blink)	∩	Move to next item	
	△	Move to previous item	
	▷	Move to setting state	
	ESC	Move to Measuring Mode	
(When display blink)	∩ or ESC	Let display to stop blinking	
	▷	Select candidate or digit to change	
	△	Change numerical value of blinking digit	
	↵	Decide setting (Memorize)	Return to Measuring Mode after SEt Displayed for 2 sec
Cal-Lock Selection	ESC	Enter Cal-Lock selection	Turn power ON while pressing ESC key
	▷	Selection of Lock/Unlock	cAL.(Un-Lock), Loc.(Lock)
	△	Return to Measuring Mode	
Test Mode	P.	Program Version display	Press ▷ key 3 times to leave Test Mode
	d.	LED test	Press ▷ key to vary pattern of LED in turn
	U.	Key test	∩=1 ▷=2 △=3 ESC=4 ↵= 5
	r.	Relay output test	Press ▷ key to output ON/OFF
	S.	Display input voltage (mV/V)	