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DIGITAL INDICATOR

SM110, 150

- INSTRUCTION MANUAL -

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Checks install place and connection prior to setting, caution the following instruction.

* No power ON/OFF switches.
Cautions to operate from the voltage supply the moment.

* Input/output part are not isolated electrically. Use the specific cable to protect indicator against over voltage and current and indicator get to the ground connection

* Setting lock mode for system and data protection

* Do not internal disjointing and adjustment voluntarily because the indicator is composed of electron component and P.C.B circuit to sharp at the static electricity .

DACELL is not liability for mistake to use that change a property voluntarily, change design, adjustment voluntarily, user carelessness cause defect.

1. Installation

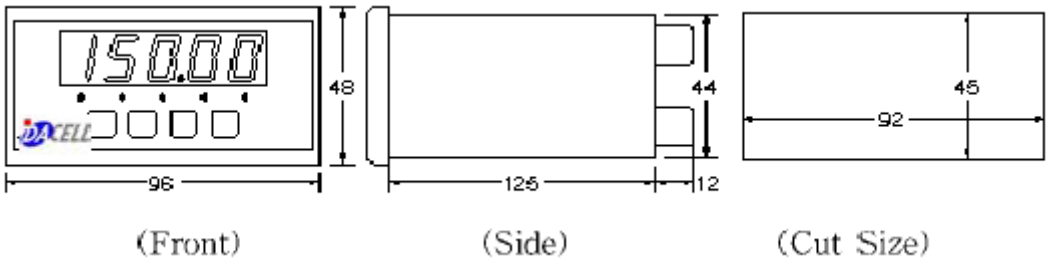
1) Product Spec.

- Spec : 96 ㎜×48 ㎜/3.78“ × 1.89"(1/8 DIN)
depth : 126 ㎜/4.96"
- SIZE : 92 ㎜(+1.0/-0) × 45 ㎜(+0.8/-0)
3.62“(+0.04/-0)× 1.77“(+0.03/-0)

* Mount the indicator using Bracket.

* Get a indicator into front of the panel and fixing guide push in a terminal direction and volt fix.

* Thickness of mounting plane : 1 ㎜ ~ 8 ㎜



(Front) (Side) (Cut Size)

2) Install place

Install the indicator separately from switching device and relay, avoid installation as follows.

* MC, Switching device, relay * Thyristor unit

* Motor * Dust, moisture, corrosion gas, heat line exist place.

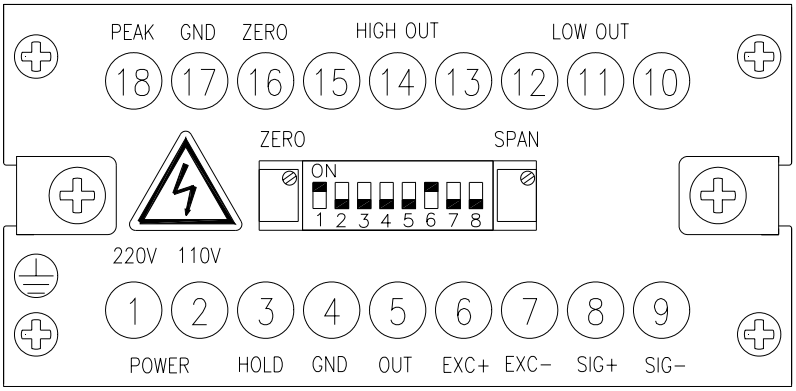
* Operating temperature : 0 ~ 50℃

3) Power characteristics

* Install line filter if harmonic source and arc welder exist around.

* Separate sensor and control line from power line

2. Connection and wiring



1) AC input : 1 and 2 ports, 110/ 220V (50Hz/60Hz).

Separate power cable from sensor cable.

Refer to 5-1).

2) HOLD : 3 and 4 ports.

short state : current display value holding

open state : current value display(normal operation mode)

3) ANALOG OUTPUT : 4 → － (GND), 5 → ＋

Analog output is as following voltage or current

DIP switch 5 on : voltage output.

DIP switch 5 off : current output.

ON	Voltage Output (0-5V, 1-5V ,0-10V, 2-10V)
OFF	Current Output (0-10 ㎃, 0-20 ㎃, 4-20 ㎃)

Adjust zero point and maximum point of analog output using

zero and span VR

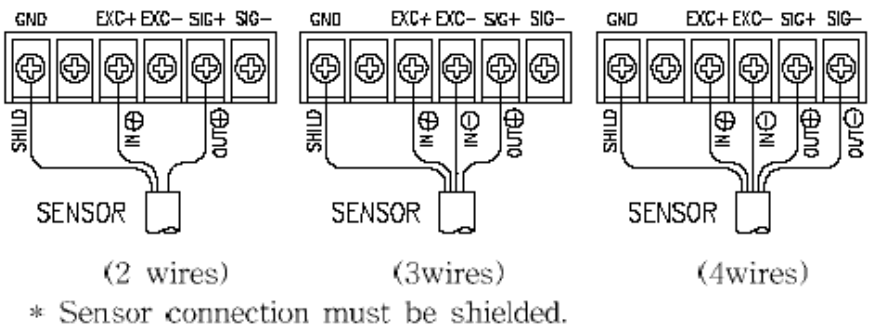
signal 0 : zero VR → 0V, signal max : span VR → 10V

zero range : -3V~ ＋3V, span : 10.5V

0 ~ 10V : Switch 5 off → current output mode (0 ~ 20 ㎃)

4) SENSOR connection port : 6,7,8,9 ports

Set the hardware and software as following conditions.



* Sensor connection must be shielded.

6 and 7 port : excitation voltage (power for sensor)

* EXC+ : +2.5Vdc * EXC- : -2.5Vdc
* Load current : Max 120mA (EXC = 5Vdc)
  Max 60mA (EXC = 10Vdc)

8 and 9 port : signal connection ports(output of sensor).

----- HARDWARE setting -----

* DIP S/W 1 on : sensor output is 0.700mV/V - 1.249mV/V.
* DIP S/W 2 on : sensor output is 1.250mV/V - 1.749mV/V.
* DIP S/W 3 on : sensor output is 1.750mV/V - 2.499mV/V.
* DIP S/W 4 on : sensor output is 3.000mV/V - 3.499mV/V.

☞ Must be among four switched on only one in accordance with kind of sensor.
☞ Under 0.700mV/V or over 3.500mV/V are option.

------ SOFTWARE setting-----

* In cal mode, input as follows according to sensor output.

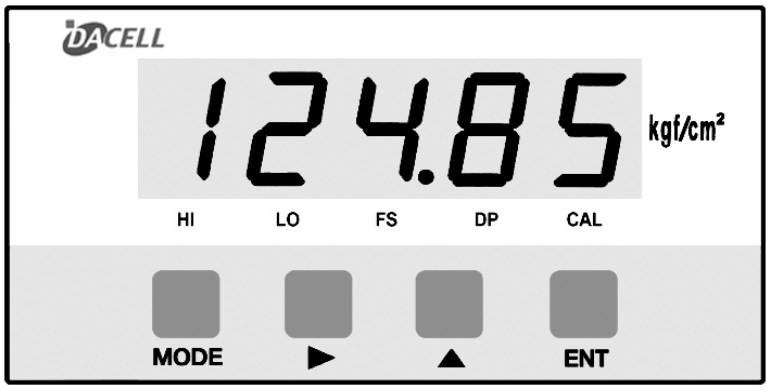
5) RELAY OUTPUT : A(NO) and B(NC) contact.

* Capacity AC -- 250V/5A Max, 125V/10A Max,
  DC -- 30V/5A Max,
* Output of transistor NPN open collector is option.
* LOW OUT : A contact ON (≤ setting data)
  10-NO, 11-COM, 11-NC
* HIGH OUT : A contact ON (> setting data)
  13-NO, 14-COM, 15-NC.

6) ZERO : External reset port. When (16) and GND port are shorted, display is zero. maximum measurement data of indicator is removed.

7) PEAK : Display maximum measurement data when (18) and GND port are shorted. Display present measurement data in case of open. Refer to 6-3) (auto peak function).

3. DISPLAY and KEY operation



1)DISPLAY : 4½ Digit LED

* Key operation start : press to MODE key.
  Key operation exit : press to ENT key.
* Display : setting mode and operation mode.
  1. Setting mode : data confirmation or correction.
  2. Operation mode : normal operation state.
  3. Press to MODE key : setting mode.
     Press to ENT key : operation mode.

2) L.E.D Display

LED state		Description
HI	operation	Display operation mode of high relay.
	setting	Confirm and adjust high data
LO	operation	Display operation mode of low relay.
	setting	Confirm and adjust low data
FS	setting	Confirm and adjust full scale data. Input the full range or capacity of sensor.
DP	setting	Confirm and adjust decimal point.
CAL	setting	key in sensor output data (mV/V)* refer to 6 - 1)
FS+CAL	setting	auto calibration execution mode. cal data is adjusted automatically.* refer to 3 - 6)
FS+ DP	setting	Adjust display time and unit of measurement data* refer to 6 - 2)
DP+CAL	setting	Software adjustment mode.* refer to 6 - 3)
FS+ DP+CAL	operation	Set or reset data lock mode* refer to 3 - 4)

3) KEY operation

Key	result	Description
	Mode select	1. HI→LO→FS→DP→CAL→FS+CAL→FS+ DP→DP+CAL 2. All FND of selected mode will blink.
	Position select	3. Press key : **1**0000→**1**000→**1**00→**1**0→**1** Selected digit position will blink 4. DP(decimal point mode) : decimal point position movement key. 10.000→100.00→1000.0→10000
	Number select	5. Data correction key. 6. 5 digit → 1, -1, -, non 7. The others 1→2→3→4→5→6→7→8→9→0
	Input	8. Input data. After setting up must press key therefore become input.
+	Auto zero	9. Sensor : No load state(0V, 4 mA) 10. Display : 0

Key	result	Description
+	Lock mode	11. Protect setting data. 12. Reset lock mode to adjust data

4) PROTECTION mode

Use this mode for protection and security of System.
high, low data is possible to adjust irrespectively.

Mode	confirm and setting
Unlock	* Press and key during 5 sec at the same time FS, DP, CAL LED will light up and reset lock mode (data correction enable)
Lock	* Press and key during 5 sec at the same time in unlock mode : FS, DP, CAL LED turn off (lock mode) * power off : Set lock mode automatically.

5) AUTO ZERO mode

Initialize sensor and indicator.

Execute this mode at unlock mode.

Execution process (display : operation mode)

(1) Sensor : no load.

(2) Voluntary data display.

(3) Press key and key at the same time.

Zero display (ex : 0, 0.0, 0.00, 0.000)

(4) This data is memorized to indicator though power turn off.

(5) If operate mode with input signal to remain, this point is memorized zero point.

6) AUTO CALIBRATION mode

Convenience to use when do not know calibration data of sensor or displayed the measurement value differently.

EX)	At sensor Supply : 100.00 kg/㎠
	Display : 100.05 or 99.05 kg/㎠
	Adjustment : 100.00 kg/㎠

(1) Adjust zero point of indicator.

(2) Apply known load to sensor. Large load is high safety.

(3) Press key: F.S and CAL L.E.D turn on at the same time.

(4) As example table, 100.05 or 99.05 will blink.

(5) After correction of 100.00 using key and key, press key.

(6) 100.05 is display correction of 100.00.

(7) At this time, cal data is corrected minutely.

(8) If corrected cal data is over limits of 2-4), correct of DIP S/W setting and again set the auto calibration.

4. Operating flow chart

Install and connection --Mount indicator to panel and make connection. (Check AC POWER 110/220V)

↓

Unlock mode -- Press + key(data protection unlock)

↓

DATA Input -- Set data(high, low, F.S, DP, CAL),refer to 6

↓

DIP S/W setting --sensor output data ---DIP S/W 1, 2, 3, 4
analog output ---- DIP S/W 5
filter frequency ---- DIP S/W 6, 7, 8

↓

Auto zero -- Sensor : no load
Press + key (auto zero)

↓

AUTO CAL ---Execute auto calibration.

↓

Mode Check ---Check function(Relay output,analog output, reset, hold, peak).

↓

Lock mode setting --Press + key(data protection mode)

5. HARDWARE

1) Selection of AC input power

(1) Separate P.C.B from case.

(2) The following label is existed under power transformer

① ② ③ ④	110V : connect 1 and 2
110 220 110	connect 3 and 4
	220V : connect 2 and 3

2) Transformation of SAMPLING TIME

15 times/sec (standard).

(1) The following label is existed on the P.C.B

○ ○ ○	15 times/sec : connect 1 and C
15 C 30	30 times/sec : connect 2 and C

3) Setting of DIP switch

After connection, dip s/w must be set.

ON	1	2	3	4	5	6	7	8
	1 mV/V	1.5 mV/V	2 mV/V	3 mV/V	voltage current	1Hz	10Hz	100Hz

1~4 S/W :One of 1,2,3 or 4 turn on according to sensor output value (mV/V)

5 S/W : Turn on or off according to analog output

6,7,8 S/W : Analog input filter frequency 6,7,8 turn off : 4 ㎑

6. SOFTWARE

1) CALIBRATION DATA

Set data as follows according to sensor output value.

Confirm calibration data after auto calibration execution.

1 mV/V range --- 0.700 ~ 1.249 mV/V

1.5 mV/V range --- 1.250 ~ 1.749 mV/V

2 mV/V range --- 1.750 ~ 2.499 mV/V

3 mV/V range --- 2.500 ~ 3.500 mV/V

2) Adjustment of display time and measurement data unit

(1) Press mode key, FS + DP LED turn on at the same time.

(2) 01.01 is displayed.

(3) Display time (set 1 times : fastest, set 15 times : slowest)

0 1 . 0 1 Setting of displat time / Setting of adjustment width	
01 - After 1 times sampling, display	01 : display 1, 2, ……, 9
02 - After 2 times "	02 : display 2, 4, 6, 8, 0(even)
: :	05 : display 5, 10, 15
: :	10 : display 10.....90
14 - After 14 times "	20 : display 20, 40, 60, …
15 - After 15 times "	50 : display 50, 00

3) PROGRAM (SOFTWARE) OPTION

(1) Press mode key, DP + CAL LED turn on at the same time.

mode	display	description
Adjustment of peak hold mode	0 x x x	peak hold on : display maximum measurement data peak hold off : display present measurement data.. reset : stored maximum measurement data is removed.
	1 x x x	peak hold on(only) : display and reform maximum measurement data peak hold off : stored maximummeasurement data is removed automatically.

mode	display	description
Parity of Display	x 0 x x	standard type. ex) + 20mA : display 1000.0
	x 1 x x	display (+) to (−) signal and display indicate opposite. ex) + 20mA : display -760.0
Tracking mode of zero point	x x 0 x	standard type. Display 0 : trace minute signal to 0
	x x 1 x	Display 0 : display minute signal. Use in case of leakage measurement.
Average value display of Signal	x x x 0	display measurement signal immediately.
	x x x 1	display average value of measurement signal (7 times sampling).

7. ALARM OUTPUT (RELAY OUTPUT)

High and low relay are a and b contact respectively.

Contact capacity is maximum AC 250V/5A and DC 30V/5A.

Relay contact operating time is maximum (1/Sampling Time) mm Sec

* Output of transistor NPN open collector is option.

mode	setting	relay
HIGH RELAY	high data > setting value	ON
	high data ≤ setting value	OFF
LOW RELAY	low data ≤ setting value	ON
	low data > setting value	OFF

8. TECHNICAL DATA

item	data
allowed time temperature	−40 ~ 80℃
operating temperature	0℃ ~ 50℃
power of sensor	5Vdc or 10Vdc
input signal type	1 ~ 3mV/V
max. load current	10Vdc/60 ㎃, 5Vdc/120 ㎃
frequency response	Max 5 ㎑
analog output	0 ~ 10V,0 ~ 20 ㎃,1 ~ 5V, 4 ~ 20 ㎃
relay output	220V/5A (a,b contact)
relay response	Max 66 ㎜/sec
nonlinear characteristics	±0.02%/F.S
temperature coefficient	±0.02%F.S/℃
display size	14 ㎜×8 ㎜
sampling time	15 times/sec, 30 times/sec
filter frequency	1 ㎐, 10 ㎐, 100 ㎐, 4 ㎑
short protection circuit	protection circuit (insert)
max. display range	-19999 ~ 19999
size	w 96 ㎜×h 48 ㎜×d 126 ㎜
power	110Vac, 220Vac (50 ~ 60 ㎐)

9. Unit Label change

* Unit label is optional.
* In the case of exchanging label, refer to as follows

1, Separate P.C.B from the case.

2, Remove Conventional unit label and then adhere new label.

3, Put together indicator in reverse process.

10. Trouble shooting and correction

problem	cause	correction
Display drifts	* Defective Sensor * AC noise in power line * Defective connection to sensor (Noise) * Input filter set incorrectly	* Check sensor state and output * Check power line and connection * Check connection to sensor * Check filter DIP switch * 6-2) check display time * 6-3) Change to AV mode
Display 19999 only	* Discordance between sensor output and DIP S/W setting * Open and short of sensor in/output line	* Check DIP switch about sensor output * Check sensor wiring
Display change --	* Exchange of sensor input line. * data setting error	* Check sensor connection. * refer to 6-3)
Not able to select FS,DP,CAL	* Data Protection	* Turn off data protection refer to 3- 4)
Analog output Problem	* Defective voltage and current signal * Difficulty of setting * When 0 ~ 5V output is required.	* Check DIP Switch 5 * Adjust zero and span VR refer to 2-3) * Connect 1/4W 500Ω accuracy resistor between GND and OUT port * Contact the manufacturer.
Other noise protection		* Connection noise filter with AC input line * Set noise filter to coil in parallel * Check the shield.
* If you have any questions, please contact the manufacturer.		