

Back-pressure Level Meter LE100



LE100



General Description

Specifically designed for the measurement of liquid chemical levels.

The specific gravity compensation function eliminates the need to set liquid level with actual liquid and is easily accomplished during chemical change.

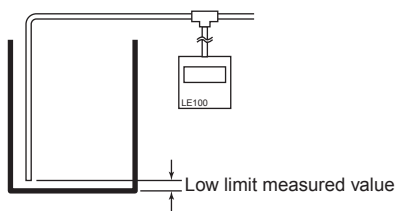
The LE100 measures liquid levels by supplying inactive gas at fixed pressure to the sensor tube installed in the storage tank. Back-pressure is determined by measuring the changing liquid level. The sensor tube pressure varies proportionately to changes in liquid level.

Features

- ☆ Level settings 6 or 8 points
- ☆ Measuring range 0 to 1000 mm
- ☆ Selectable display units (mm, %, l, cc, Pa, KPa)
- ☆ High repeatability 0.3% full scale
- ☆ Specific gravity compensation
- ☆ One - touch empty adjustment
- ☆ One - touch span adjustment
- ☆ Volume compensation
- ☆ Digital communication (Optional)
- ☆ Monitoring output (Optional)

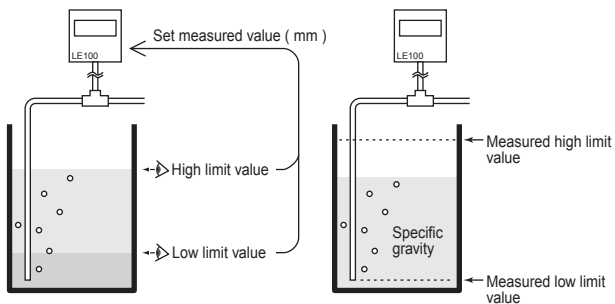
Empty adjustment function

Empty adjustment function can adjust the displayed low limit measured value to the purge pressure at the end of the sensor tube exposed to atmosphere.



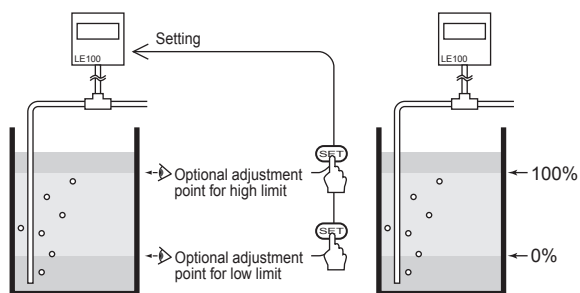
Specific gravity compensation with actual liquid

The specific gravity and high/low limit measured values are computed automatically and the liquid level (mm) is displayed linearly by inputting two optional points of actual liquid levels.



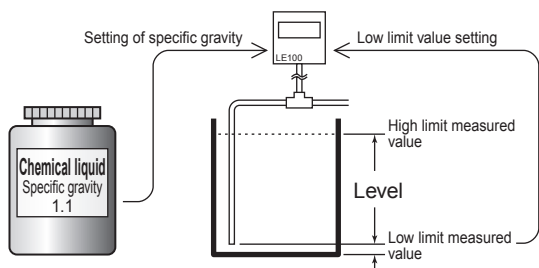
Span adjustment function

The percentage value display within a 0 to 100% range is achieved by setting the optional high and low limit adjustment points.



Specific gravity compensation

The high limit value is automatically computed and the liquid level is displayed linearly by setting the specific gravity of the liquid and the low limit measured value. If the specific gravity is known, the high limit measured value can be set without presence of actual liquid.

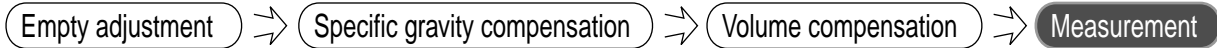


Features

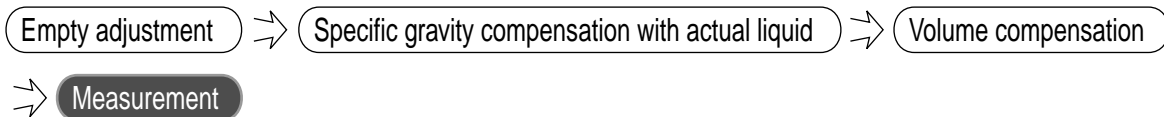
Liquid volume measurement

LE100 converts the change of back-pressure caused by the rise and fall of chemical liquid level into the actual chemical liquid volume for display in milliliters (ml) or liters (l).

- When specific gravity is known

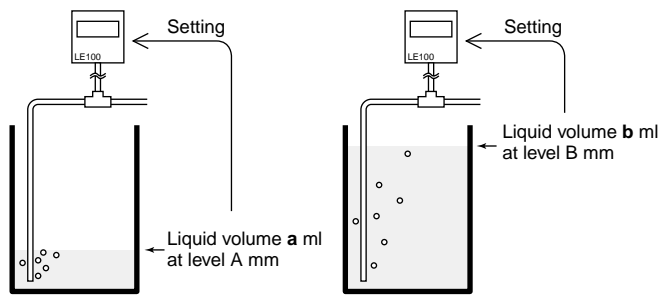
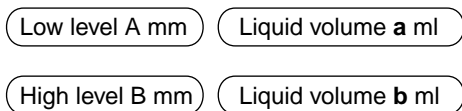


- When specific gravity is unknown



- When the tank has a simple shape

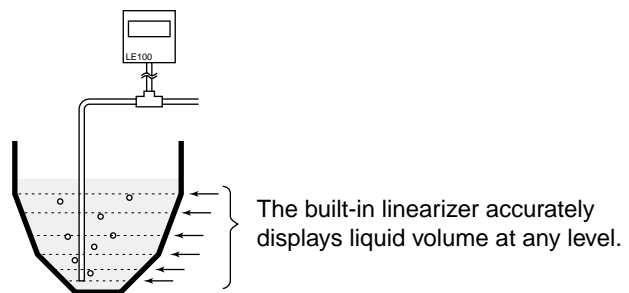
Liquid volume in a tank with simple shape changes linearly in relationship to liquid level. When the liquid volumes (ml/l) of optional high/low points are set, the liquid volume measurement is accurately displayed.



- When the tank has a complex shape

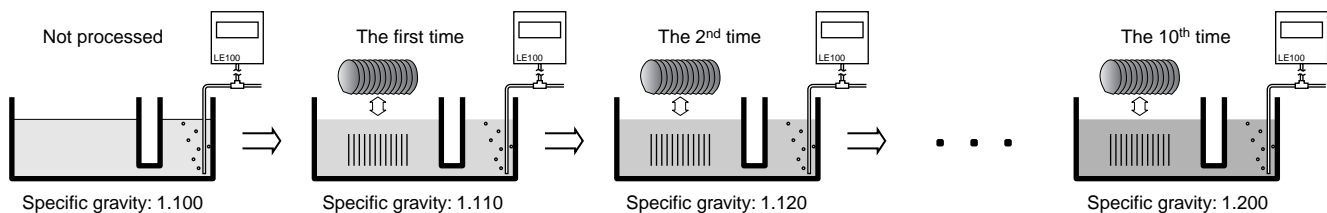
Liquid volume in a tank with a complex shape changes depending on variations of the tank shape. The LE100 has up to 11 adjustment points that compensate for these variations to linearize the displayed value throughout the measurement range.

The built-in linearizer has a maximum of 11 adjustment points.



Automatic specific gravity compensation

The LE100 automatically compensates for specific gravity according to the number of times a semiconductor wafer is chemically-processed in the same tank liquid.



This illustration shows how the LE100 automatically adjusts specific gravity compensation between 1.10 to 1.20 through ten processing cycles. The counting of wafer processing cycles can be entered manually at the front keypad with contact input or digital communication.

Specifications

Inputs

Number of inputs :	1 point
Input medium :	Non-corrosive gas
Input pressure range :	0 to 9.8 kPa
Zero point revision range :	± 5.0% of full span
Sampling time :	0.2 sec
PV digital filter :	1 to 100 sec (No filter when setting 0)
(First order lag filter)	

Level setting

Number of set points :	6 points (8 points optional)
Setting range :	Same as units and range.
Setting resolution :	Same as PV. (See <i>Units and range</i> table)

Display

Input display :	7 segments LED (4 figures, green, height : 7.6 mm)
Set display :	7 segments LED (4 figures, orange, height : 7.6 mm)
Action display :	Point LED (green, OUT1 to 8)
Unit display :	Point LED (green, mm, %, l, ml, Pa, kPa)

Performance

Repeatability :	± 0.3 % of full span
Non-linear :	± 0.5 % of full span
Temperature characteristic :	Zero output : ± 0.04 % of full span / °C
	Span output : ± 0.04 % of full span / °C

• All performance characteristics have a measuring accuracy of ± one digit.

Specific gravity compensation

Number of set points :	1 point
Setting range :	0.800 to 2.500
Setting resolution :	0.001

Empty adjustment

Through the use of the empty adjustment, the tube tip can cancel an offset to an atmospheric open state.

Specific gravity compensation with actual liquid

Number of set points :	2 points
Setting range :	Scaling low limit to high limit.
Setting resolution :	1

• A specific gravity compensation with actual liquid measurement determines the liquid's specific gravity and allows calculation of either high or low limit values.

Span adjustment function

Number of set points : 2 points

• The percentage value display within a 0 to 100% range is achieved by setting the optional high and low limit adjustment points.

Volume compensation function

Number of set points :	2 to 11 points
Setting range :	Scaling low limit to high limit.
Setting resolution :	Same as PV. (See <i>Units and range</i> table)

• Settable when unit is *l* or *ml*.
 • Linearization setting allows the LE100 to display a liquid volume value.
 • Measuring accuracy can not be guaranteed if the setting extends over the inflection point or if a 1mm level change is greater than 4.4% of the total volume.

Automatic specific gravity compensation

• Automatic specific gravity compensation is achieved by defining initial and final specific gravity settings and the number of processing times. Output activation point then becomes constant despite varying specific gravity.

Level setting with actual liquid

Number of set points : 1 to 6 points (1 to 8 points optional)

• Each output activation point can be set in relation to actual liquid level.

Outputs

Number of outputs :	1 to 6 points (1 to 8 points optional)
Output action :	Process high, Process low, Deviation high, Deviation low
Setting range :	Same as input range.
Deviation setting range :	-10 to 10 mm
Differential gap :	0.0 to 10.0% of span
Output timer :	0 to 600 sec.
Hold action :	ON / OFF settable
Interlock :	Settable independently for each output
Output type :	Selectable for each output either for ON or OFF at operation
Output :	Open collector output 24V DC 50 mA

Hold function

Peak hold :	Highest measured value is held
Bottom hold :	Lowest measured value is held

- The Hold function is always operational.
- After the Hold function is confirmed by operator, it can be reset at the front panel keypad.
- When instrument power supply is OFF, Hold data is not backed up.

Contact input

(Optional)

Number of inputs :	1 point
• Auto-zero (empty adjustment) activation or incremental count of the number of processing times.	
Input type :	Non-voltage contact input
	a) OPEN : 500kΩ or more
	b) CLOSE : 10Ω or less

• Possible to be activated by open collector output.

Monitor output

(Optional)

Number of outputs :	1 point
Output :	0 to 2.5V DC (Load resistance : More than 1kΩ)
Input impedance :	Less than 0.1Ω
Output data type :	Process value
Output scaling :	Available to high and low setting
Output accuracy :	±0.3% of span
Ripple of output :	±0.1% of span or less than 1 mV (resistive load)
Output resolution :	More than 10 bit

Communications

(Optional)

Communication method :	Based on RS-485 (two-wire)
Synchronous method :	Start-stop synchronous
Communication speed :	2400, 4800, 9600, 19200 BPS (Selectable)
Bit configuration :	a) Start bit : 1
	b) Data bit : 7 or 8
	c) Parity bit : Without, Odd or Even
	d) Stop bit : 1 or 2

Maximum connection : 31

General specifications

Supply voltage :	21.6 to 26.4V DC (Rating 24V DC)
Power consumption :	Less than 130 mA
Memory backup :	Backed up by EEPROM
	Data retaining period : Approx. 10 years
Insulation resistance :	More than 20MΩ (500V) between measured terminals and ground terminal
	More than 20MΩ (500V) between power terminals and ground terminal
Dielectric voltage :	1000V AC for one minute between measured terminals and ground terminal
	1200V AC for one minute between power terminals and ground terminal
Power failure :	A power failure of 30 ms of less will not affect the control action.
Weight :	Approx. 150g
Ambient temperature :	0 to 50°C (32 to 122°F)
Ambient humidity :	45 to 85% RH
Operating environment :	Free from corrosive and flammable gas and dust.

Compliance with standards

- CE marked pending
- UL recognized pending
- CSA certified pending



Back-pressure Level Meter LE100

Model and Suffix Code

Specifications	Model and Suffix Code	
Model	LE100-	<input type="checkbox"/> <input type="checkbox"/> * <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/> / <input type="checkbox"/> Y
Number of outputs	6 points 8 points	6 8
Power supply	24V DC	6
Contact input (DI)	Not supplied External contact input	N 1
Communication	Not supplied RS-485	N 5
Monitor output	Not supplied Monitor output	N 1
Waterproof and dustproof	Not supplied Waterproof and dustproof (To be released soon)	N 1
Connector type	10 pins type *1 16 pins type *1	1 2
Attached connector	Not supplied For 10 pins type (Model code: W-BP-01-N or equivalent) *2 For 16 pins type (Model code: W-BP-02-N or equivalent) *2	N 1 2

*1 When 8 output points, contact input or communication functions are selected, only the 16 pin connector is available.
*2 When using a connector (W-BP-03-N or equivalent) intended for monitor use, AWG # 28 ~ 22 wire is required.

Units and range

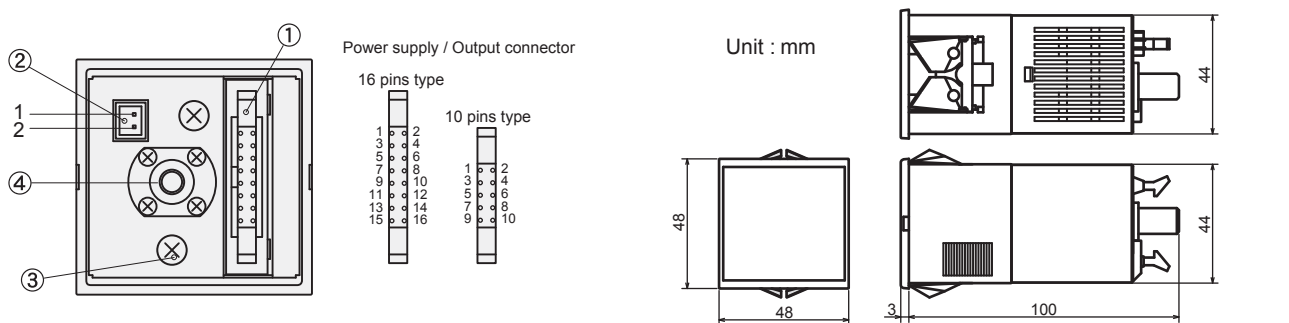
Set code	Unit	Range
0	mm	0 to 400 (1250) *High limit value is decided by the measurement of specific gravity.
1	%	0.0 to 100.0
2	l	0 to 360 *Decimal point is decided by the setting of decimal point position.
3	ml	0 to 360 *Decimal point is decided by the setting of decimal point position.
4	kPa	0 to 9.807
5	Pa	0 to 9807

Cable

Specifications	Model and Suffix Code	
Cable name	W-BP-	<input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/> 000
Connector type	10 pins type, Power supply / Output connector	0 1
	16 pins type, Power supply / Output connector	0 2
	Monitor output connector	0 3
Cable length	Unit : mm (1,000 to 10,000 mm, Specify every 1000 mm units) No connector on open end.	<input type="checkbox"/> 000

• Model code of connector without cable : For 10 pins type: W-BP-01-N, For 16 pins type: W-BP-02-N, For monitor: W-BP-03-N

External Dimensions and Rear Terminals



① Power supply / Output connector

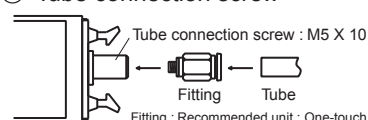
Pin number	Description	
16 pins	10 pins	
1	T/R(A)	Communications
2	T/R(B)	
3	SG/DI	
4	DI	Contact input
5	1	Open collector output
6	2	
7	3	
8	4	
9	5	
10	6	
11	7	Power supply
12	8	
13	9	
14	10	
15	COM(-) 24V DC	
16	+24V DC	

② Monitor output connector

Pin number	Description
1	+ Monitor output
2	-

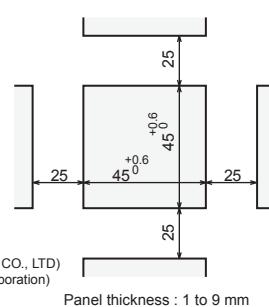
③ Ground terminal Screw size : M3 X 6

④ Tube connection screw



Fitting : Recommended unit : One-touch fitting PC6-M5SUS (NIHON PISCO CO., LTD)
Quick-action fitting TS6-M5-SUS (Koganei Corporation)
Tube : Fluorocarbon resin tube φ6 x φ4
*The fitting and tube shall be prepared separately.

• Panel cutouts



Connector type

Power supply / output connector	Monitor output connector
10 pins type : PS-10PE-D4LT1-LP1 *1	S2B-XH-A *2
16 pins type : PS-16PE-D4LT2-M1 *1	

*1 Manufactured by Japan Aviation Electronics Industry, Limited

*2 Manufactured by JST Mfg. Co., Ltd.

