

ZL95 FLUOROPOLYMER PRESSURE TRANSDUCER WITH DISPLAY INSTALLATION AND MAINTENANCE SHEET



⚠️ WARNING! READ ⚠️ BEFORE INSTALLATION

1. GENERAL:

A failure resulting in **injury** or **damage** may be caused by excessive overpressure, excessive vibration or pressure pulsation, excessive instrument temperature, corrosion of the pressure containing parts, or other misuse. Consult Ashcroft Inc., Stratford, Connecticut, USA before installing if there are any questions or concerns.

2. OVERPRESSURE:

Pressure spikes in excess of the rated overpressure capability of the transducer may cause **irreversible electrical and/or mechanical damage** to the pressure measuring and containing elements.

Fluid hammer and surges can destroy any pressure transducer and must always be avoided. A pressure snubber should be installed to eliminate the damaging hammer effects. Fluid hammer occurs when a liquid flow is suddenly stopped, as with quick closing solenoid valves. Surges occur when flow suddenly begins, as when a pump is turned on at full power or a valve is quickly opened.

Liquid surges are particularly damaging to pressure transducers if the pipe is originally empty. To avoid damaging surges, fluid lines should remain full (if possible), pumps should be brought up to power slowly, and valves opened slowly. To avoid damage from both fluid hammer and surges, a surge chamber should be installed.

Symptoms of fluid hammer and surge's damaging effects:

- Pressure transducer exhibits an output at zero pressure (large zero offset).
- Pressure transducer output remains constant regardless of pressure
- In severe cases, there will be no output.

FREEZING:

Prohibit freezing of media in pressure port. Unit should be drained (mount in vertical position with electrical termination upward) to prevent possible overpressure damage from frozen media.

3. STATIC ELECTRICAL CHARGES:

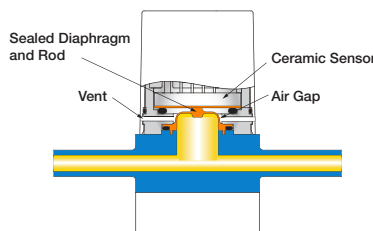
Any electrical device may be susceptible to damage when exposed to static electrical charges. To avoid damage to the transducer observe the following:

- Ground the body of the transducer **BEFORE** making any electrical connections.
- When disconnecting, remove the ground **LAST!**

Note: The shield and drain wire in the cable (if supplied) is not connected to the transducer body, and is not a suitable ground.

Introduction

The ZL95 is a fluoropolymer pressure transducer with display designed for use in semiconductor processes that require PTFE/PFA wetted parts for improved chemical compatibility for use in corrosive gases and fluids. A secondary isolation diaphragm and vent design isolates the ceramic sensing element from corrosive gases and liquids.



Mounting

When installing the ZL95, follow the manufacturers recommended installation instruction for the specific compression fitting ordered. When using the ZL95 with viscous fluids, Ashcroft recommends that flow through style transducers should be mounted in the horizontal position to reduce output errors.

Although the unit can withstand normal vibration without damage or significant output effects, it is always good practice to mount the transducer where there is minimum vibration.

Noise

For minimum noise susceptibility, avoid running the transducer's cable in a conduit that contains high current AC power cables. Where possible avoid running the cable near inductive equipment.

Shield Wiring - (Cable Termination Only)

Connect the braided shield to the guard terminal on the reading instrument (meter, etc.) if available or to ground or to the negative terminal of the power supply.

Storage

The ZL95 should be stored in a dry, cool and dust free environment.

Maintenance

In general, a periodic inspection of the ZL95 should be performed at least twice a year or as needed.

This inspection should include:

- A. Visual inspection
- B. Check of the pressure inlets for corrosion, clogging or leaking
- C. Verify the output using calibrated gauges

The ZL95 is not field repairable and should be returned to Ashcroft for evaluation.

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Electric Connection

Colored cables are used as described below. Confirm the connection before power is on. Warm up the unit and allow it to stabilize for about five minutes after power up and before adjusting the zero point and starting measurements.

Wiring for Analog Outputs

- Brown - Power source (+)
- Blue - Common for power source (-) and analog output (-)
- Black - Open collector output 1
- White - Open collector output 2
- Orange - Analog output (+)

Internal Type

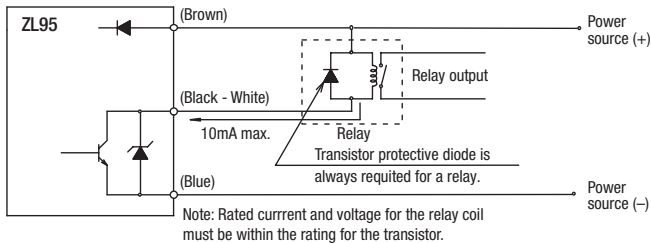
Output Type: The comparator output comprises open collector output. The analog output comprises current or voltage output.

“Open collector” means that the collector of an output transistor is open for the user to use for any desired user defined application. Accordingly, the user is free to use the open collector output in any way.

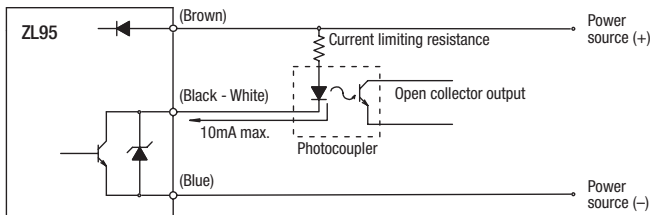
The output transistor is rated for 30 VDC, 10 mA. Be sure not to exceed this rating.

1. Wiring for Open Collector

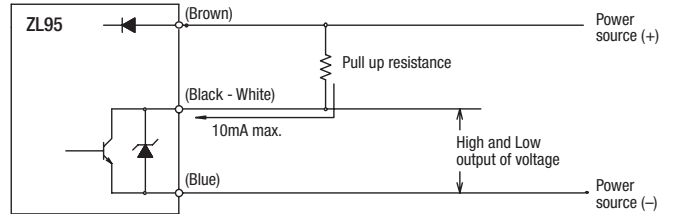
a. with relay



b. with photocoupler

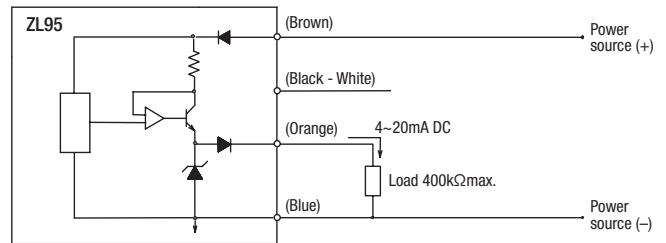


c. Voltage Output

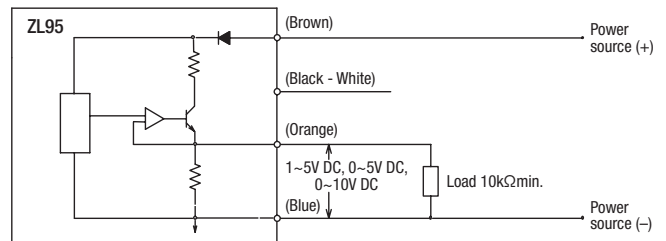


2. Wiring for Analog Outputs

a. 4-20 mA output



b. Voltage Outputs



Noise Precautions

• Power Lines

Noise on the power lines can cause fluctuating pressure indication and incorrect operation. Check the cable routing for the DC power lines and use a power source of a high noise removal rate.

• Output Lines

The internal circuit of the open collector output is connected to that of the output line. Take a special care when routing the wires and make the wires as short as possible.

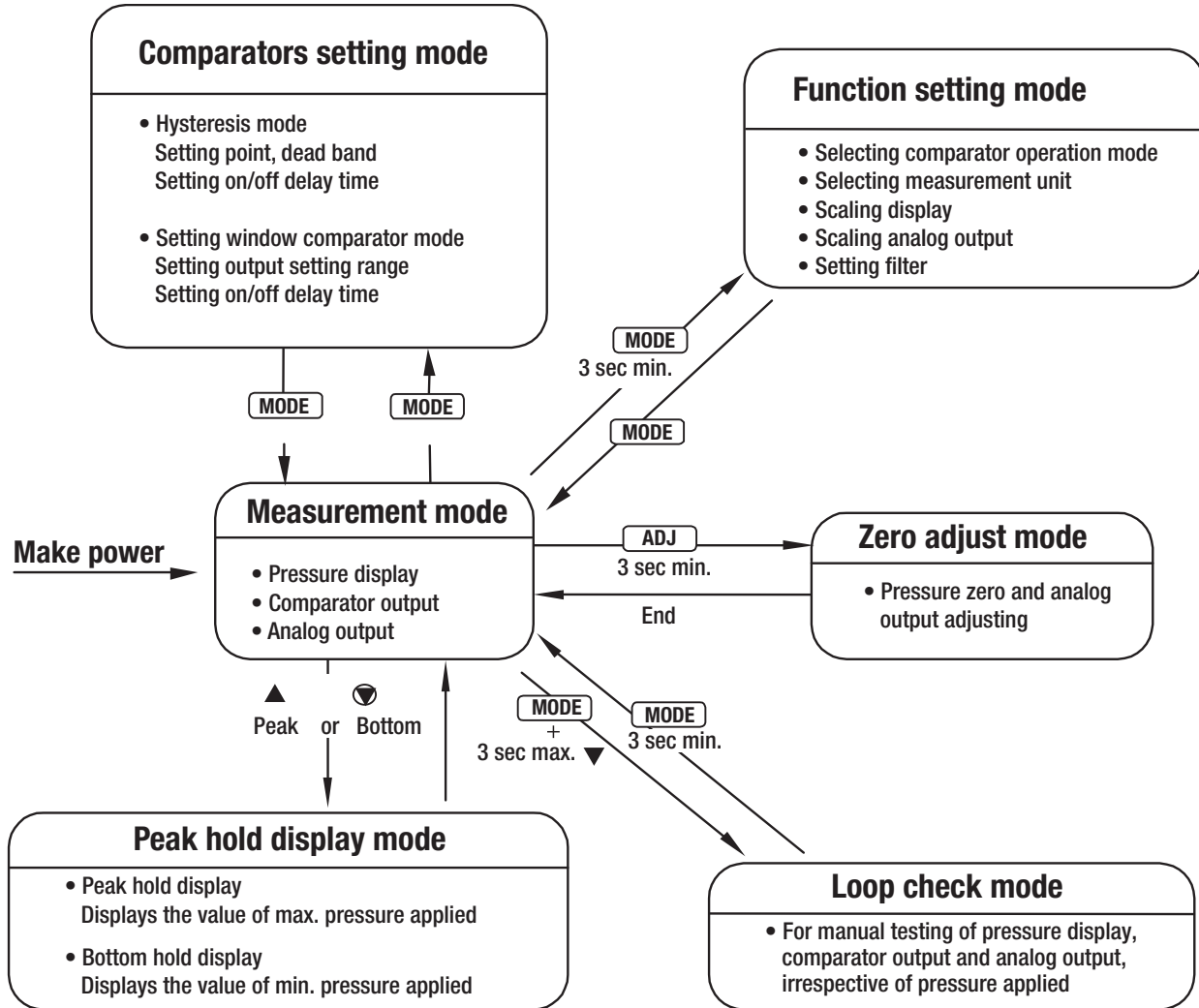
• Induced Noise

The unit may operate erroneously when subjected to external induction. Keep off a noise source, change the direction, or provide a magnetic or static shield, etc.

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MODE AND THEIR FUNCTION



Panel Functions

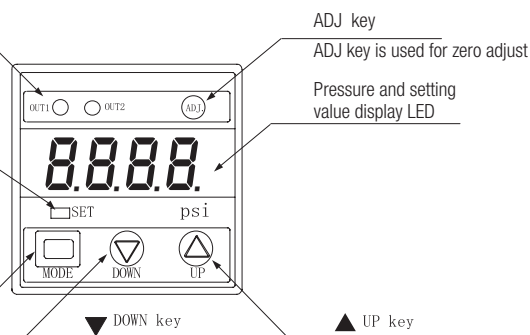
Comparator (OUT1) operation display LED (red)
Comparator (OUT2) operation display LED (red)
These are the comparator output monitors.
It lights up when output is ON.

Setting mode (SET) operation display LED (orange)

This is the setting mode confirmation LED. It lights up for function and comparator setting mode, blinks for loop check, peak and bottom display, and goes off for all other modes.

MODE key

MODE key is used to select an operation mode and switch between sub modes.



ADJ key

ADJ key is used for zero adjust

Pressure and setting value display LED

DOWN key

DOWN key is used to set values and select items. It displays bottom hold value in the measurement mode.

UP key

UP key is used to set values and select items. It displays peak hold value in the measurement mode.

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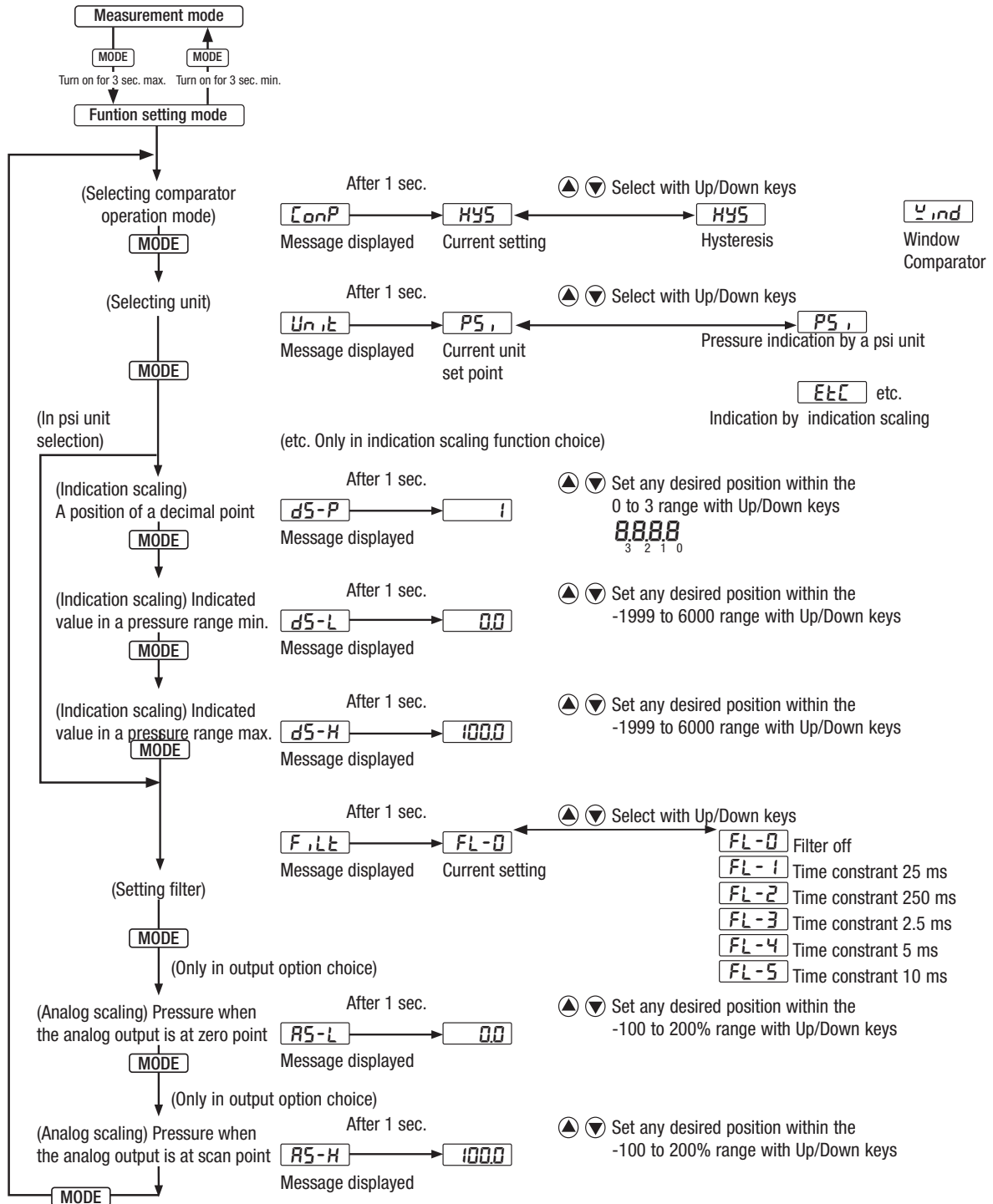


Programming Procedure

The programming mode is activated by pressing the Mode Key for more than 3 seconds. The Set LED will light up to let you know that you are in the programming mode.

The programming mode can be used to set the comparator output, unit of measure, filtering (response time) and scaling of the analog output.

The basic programming map:



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• Selecting Comparator Operation Mode

Select “Selecting Comparator Operation Mode” with the **MODE** key. The message **Comp** is displayed for one second and then the current operation mode is displayed. Select either Hysteresis or Window Comparator Operation with the Up/Down keys.

• Choice of Indication

Select “Selecting Unit” with the **MODE** key. The message **Unit** is displayed for one second and then the current unit is displayed. Select pressure indication by a psi unit, either pressure indication by indication scaling with an UP/DOWN key.

Pressure range and the indication max.

Pressure range (psi)	Indication max.	Indication scaling
	psi	etc
0 ~ 45	45.0	
0 ~ 75	75.0	

• Scaling LED Indication

When the operator selects **ELC** in the selection of unit, the LED value for applied pressure is scaled to any desired value. This function is used to scale the LED value for min./max. pressure range value. It does not affect the relation between applied pressure and analog output.

Select “Indication Scaling” with the **MODE** key. The message **d5-P** is displayed for one second and then the decimal position for the current pressure Indication is displayed. Change the value with the Up/Down keys.

Set the Indication value for min. and max. pressure range in like manner using the **MODE** and Up/Down keys.

The Indication value for the min./max. pressure range is stored internally as arithmetic coefficients. From this time on, whenever you select the unit **ELC**, the value is scaled by this coefficient and LED displayed.

Example: The 0.0 to 75.0 psi indication for pressure range 0 to 75 psi (0 to 100%F.S.) is changed to the 0 to 100 indication.

- d5-P** Position of decimal point
(from the least digit) 1 → 0
- d5-L** Indication value for minimum
pressure range 0 → 0
- d5-H** Indication value for maximum
pressure range 75 → 100

• Setting Filter

The ZL95 transducer incorporates a digital filter with five time constants. Use the filter when pressure changes considerably, making it difficult to read the indication. The selected filter will be reflected in the comparator and analog output.

Select “Setting Filter” with the **MODE** key. **FLt** message is displayed for one second and then the current setting is displayed. Select a new filter time constant with the Up/Down keys.

- FL 0** No filter
- FL 1** 25 ms time constant
- FL 2** 250 ms time constant
- FL 3** 2.5 s time constant
- FL 4** 5 s time constant
- FL 5** 10 s time constant

• Scaling Analog Output (factory shipping option)

This mode is used to set a pressure corresponding to analog output zero point (4 mADC, 0 VDC or 1 VDC)/span point (20 mADC, 5 VDC or 10 VDC).

Select “Analog Scaling” with the **MODE** key. A message **R5-L** is displayed for one second and then the pressure corresponding to the current analog output zero point (4 mADC, 0 VDC or 1 VDC) is displayed in a percentage of the full scale of the pressure range. Enter the desired value with the Up/Down keys.

Set the pressure for analog output span point **R5-H** in like manner using the **MODE** key and Up/Down keys.

Example: The unit of 4 to 20 mADC output with pressure range 0 to 75 psi (0 to 100%F.S.) is changed to 4 to 20 mADC output with 0 to 72.5 psi.

- R5-L** Pressure at analog output
zero point : 0.0%F.S. → 0.0%F.S.
(will output 4 mADC with pressure range 0%F.S.)
- R5-H** Pressure at analog output
span point: 100.0%F.S. → 96.7%F.S.
(20 mADC with pressure range 96.7%F.S.)

COMPARATOR SETTING

• Setting Procedure

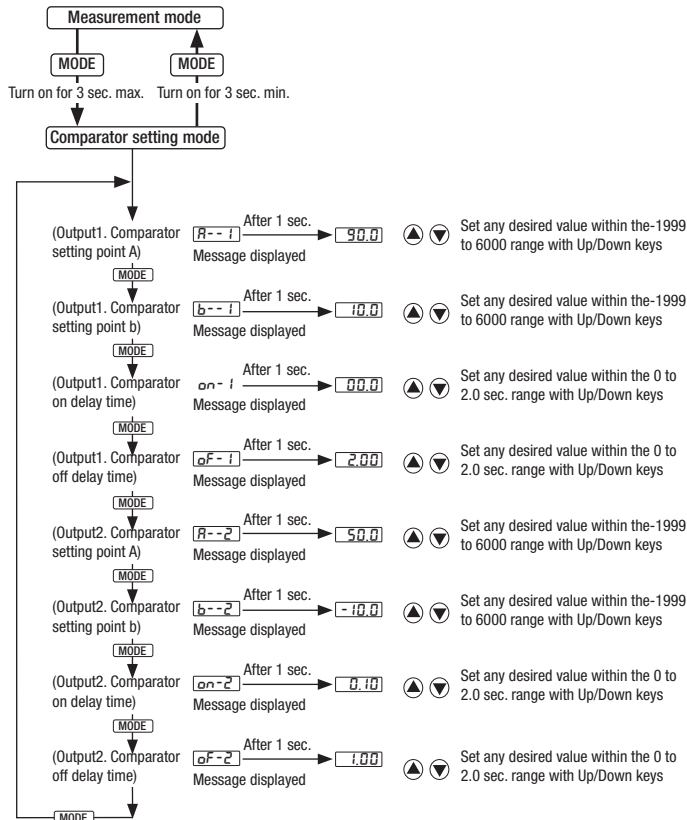
The comparator incorporates two points of OUT1 and OUT2. For each of them, you may collectively select and set two kinds of operation modes: of “Hysteresis (upper/lower limits)” and “Window Comparator.” For both modes, you may set a maximum of two seconds of On/Off delay time for OUT1 and OUT2 individually. When the comparator output conditions are satisfied as described below, respective outputs enter into the ON state and the Monitor LED (OUT1, OUT2) is lighted.

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Press the **MODE** key (release within three seconds) in the measurement mode to enter into the comparator setting mode. The “Set” LED flashes to confirm you are in the comparator setting mode.

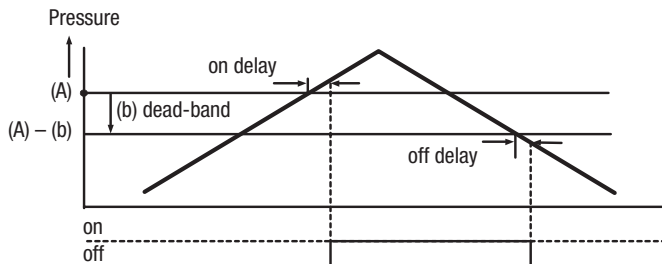
This mode is used to set operating pressure for comparator outputs. The values entered in this mode will become “A” and “b” of hysteresis and window comparator selected in the function setting mode (selection of comparator operation mode).



COMPARATOR OPERATION (HYSTERESIS)

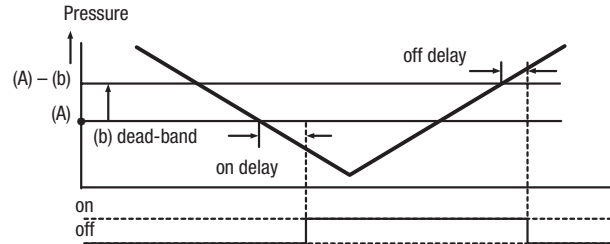
• Setting the upper limit

This is the mode in which the comparator operates with the setting item (A) as the upper limit. The upper limit setting is determined when you select a positive figure (including 0) for setting item (b).



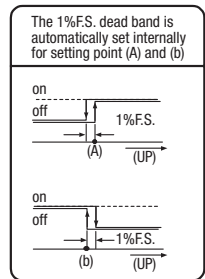
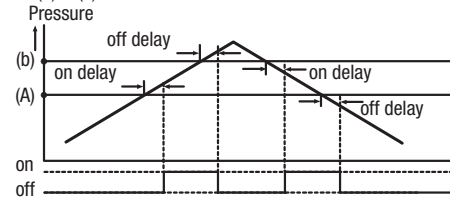
• Setting the lower limit

This is the mode in which the comparator operates with the setting item (A) as the lower limit. The lower limit setting is determined when you select a negative figure for setting item (b).

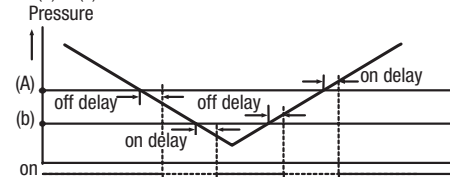


• Operation of window comparator

• For (A) ≤ (b)



• For (A) > (b)



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• Factory shipping value

	Setting item	Setting value	Selecting range
1	Selection of comparator operation mode	Hysteresis mode	Hysteresis mode
			Window mode
2	Selection of indication	psi	psi
3	Indication scaling	45.0, 75.0	-1999 ~ 6000
4	Setting filter	FL-0 (No filter)	FL-0(No filter) FL-3(2500ms)
			FL-1(25ms) FL-4(5000ms)
			FL-2(250ms) FL-5(10000ms)
5	Analog scaling	Pressure at zero point	0.0 (%)
		Pressure at span point	100.0 (%)
6	Comparator setting 1 & 2	Setting point	50 %F.S.
		Dead band	10 %F.S.
		On delay	0.00 (sec)
		Off delay	0.00 (sec)
7	Hysteresis of window comparator	1 %F.S.	
8	Outside of pressure range	Upper limit	110 %F.S.
		Lower limit	-10 %F.S.
9	Outside of adjusting the zero point	± 10 %F.S.	

OTHER FUNCTIONS

• Basic Key Operations

In all setting mode, values are set with the ▲ ▼ keys. Use ▲ key to increase and ▼ key to decrease the value. Values continuously increase or decrease in three different speeds of choice when ▲ ▼ key is held for more than 0.5 seconds. ▲ ▼ keys are also used for setting comparator, unit and filter in the function setting mode.

Do not use a needle or other pointed items to operate the keys.

• Adjusting the Zero Point

When setting is at Measurement mode, and ZL95 is not connected to process line (as the pressure should be equal to atmosphere) release the hand after holding **ADJ.** key for three seconds (until SET LED is flashing). ZL95 will automatically adjust its zero point after approximately one second, and the indicated pressure shall be zero. **GRD** will be displayed when zero point adjustment is complete. An error **Err** sign will be displayed for one second indicating that zero adjustment is incomplete, when exerted pressure is outside ± 10%F.S. of range.

• Loop Check

The operator can manually test pressure indication, analog outputs and comparator with the ▲ ▼ keys irrespective of the pressure applied. This may be used for simulation of wiring check for analog outputs, comparator outputs, etc.

Press the **MODE** key + ▼ key in the measurement mode. A message **LoOP** is indicated for one second, indicating that you have entered into the loop check mode. The “Set” LED flashes to confirm you are in measurement mode.

The operator can change the pressure indication value manually with the ▲ ▼ keys. The analog and comparator outputs also vary in accordance with the Indication. Press the **MODE** key for more than three seconds to return to the measurement mode.

• PeakHold

The ZL95 unit keeps the maximum and minimum pressure level applied to the pressure port as peak and bottom value, respectively, in the internal memory. The peak and bottom values are displayed as long as you press and keep pressed the ▲ and ▼ keys, respectively. When you select this operation, a message **PERF** is displayed for one second and “SET LED” lamp blinks.

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Peak and bottom values can be reset when ZL95 is re-powered up or by the following procedure:

- Resetting peak value: While pressing and holding ▲ key, press ▼ key
- Resetting bottom value: While pressing and holding ▼ key, press ▲ key

• KeyLock

You may nullify the key operations to prevent inadvertent overwriting of setting values. Once the key lock is set, the function setting, comparator setting, zero point adjustment, and loop check modes cannot be accessed. The key lock cannot be re-set by re-powering ZL95. It can only be reset by the following unlocking procedure.

Press **MODE** key + ▲ key in the measurement mode. A message **LoLH** is displayed for one second, indicating that the unit has entered into the key lock state.

To reset, also press **MODE** key + ▲ key. A message **UnLH** is indicated for one second, indicating that the unit is unlocked.

• Error Indication

An error message and a measuring pressure are alternately displayed when one of the following occurs while it is in Measurement mode or Loop Check mode.

Error display	Contents	Action
FFF	A pressure equal to or above 110%F.S. of sensor range is applied <i>OR</i> when indicated value exceeded 6000	Reduce pressure to rated range
-FFF	A pressure equal to or above -10%F.S. of sensor range is applied <i>OR</i> when indicated value exceeded -1999	
DErr	When, in zero adjustment, it is pressurized pressure of ±10%F.S. range outside of pressure range	Open the unit to the atmosphere and adjust zero point again

• Backup of set point

This has EEPROM built-in inside and maintains set point/ some active state for power interruption.

Setting values stored in memory	States stored in memory
All set point in a function setting mode and comparator setting mode	Key lock/ unlock

Outside dimensions diagram (mm)

