

PULSE INSTRUMENTS

CL7635S

Free Chlorine Monitor and Controller

User Manual



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1. Overview

The Pulse Instruments CL7635S is a multi-capable free chlorine monitor and controller.

- Measurement range 0 to 200 ppm, depending on sensor choice.
- Simple set up and installation.
- Built in control for chlorine pump injection.
- Built in Pump and Alarm status lights.
- Simple Alarm with High and Low Limits
- NEMA 4X Waterproof Enclosure

2. Specifications

2.1 Controller Specifications

Condition	Specifications
Range (Sensor)	0-10 ppm (PICL801) / 0-200 (PICL802)
Resolution	0.1 ppm
Input	4 to 20 mA
Output	4 to 20 mA (isolated retransmission)
Relay	(2) 5A @ 120/240 VAC, (1) Alarm Relay
Operating Temperature	0 to 50 °C
Power	110 VAC; 50/60 Hz, 15VA
Enclosure Rating	NEMA 4X / IP65

2.2 Sensor Specifications

	PICL801	PICL802
Measurement Range	0-10 ppm	0-200 ppm
pH Range	5.5-8.0	6.8-8.0
Temperature Range	0 to 45°C (32 to 113°F)	0 to 45°C (32 to 113°F)
Max Pressure	14.7 psi	14.7 psi
Output	4 to 20 mA	4 to 20 mA
Flow Range	0.2-0.6 GPM	0.13-0.44 GPM
Power	24V DC	24V DC
Cross Sensitivity	Bromine, Ozone, Chlorine Dioxide	HOCl, Bromine, Ozone, Chlorine Dioxide
Replacement Membrane Part #	FCLA-2016	103462
Replacement Electrolyte Part #	FCLA-2015	103474

The instrument has 7 segments and 4 digits LED displays. It has 8 keys, which allows access to all of available functions. The upper keys are for zero and sensitivity calibration of the readout and to confirm the set points value. All these functions can be then protected by means of password. The scale of the instrument can be configured in the range -1999/9999, by selecting the lower and the higher values and the decimal point position. In case of the over/under range

the instrument shows the message .

The instrument features an input I_1 (I^+) for a transmitter active output or from a two wire current loop transmitter that is powered by the instrument itself. In addition an input I_2 (I^-) is available in order to allow a differential measuring between two transmitters with the same measuring scale. In case of input current over/under range the instrument shows the messages . In case of differential measuring, if one of the two inputs

is in over/under range, the instrument shows the message showing indeterminate measuring. In this condition the set points are deactivated, the alarm relay is activated and the output current is fixed to the max value corresponding to 20.50 mA.

3. Functions

3.1 Operation

The CL7635S controller reads the amount of free chlorine from the free chlorine ppm sensor. If the free chlorine ppm measurement is below the setpoint, the controller will activate the pump to inject chlorine until the ppm setpoint is reached. If the ppm measurement falls below or raises above the two alarm setpoints, the alarm light will activate. If the flow switch is engaged, the pump and alarm control will function normally. Otherwise, the pump and alarms are deactivated, but ppm measurement continues.

3.2 Control

The basic system for monitoring and control is the controller described in this instruction manual and the 0/20 mA or 4/20 mA transmitter connected to a suitable sensor.

The instrument has the necessary electric circuits and firmware to perform the following functions:

- Visualization of the measuring in the selectable range from -1999 to 9999, corresponding to the 0/20 mA or 4/20 mA input from an external device.
- It provides the V_{dc} power to the 4/20 mA loop powered transmitter.
- It automatically adjusts the measurement, if dosing pumps or solenoids are connected to the specific relays.
- It gives an alarm, if the measurement goes outside the low/high limit values.
- It provides an analog output for recording and acquiring the measuring values.
- It receives an external free voltage contact that activates the alarm or the hold condition.
- In some applications it is necessary to measure before and after the process in order to obtain the difference of the two measuring. This unit allows a differential measuring, by using two transmitters featuring the same measuring scale.

The instrument performs the following functions in case of differential measurement:

- Visualization of the differential measuring between two 0/20 mA or 4/20 mA signals applied to the positive and negative input of the instrument.
- It provides the Vdc power to the 4/20 mA loop powered transmitters.
- It automatically adjusts the value, if dosing pumps or solenoids are connected to the specific relays.
- It gives an alarm, if the measurement goes outside the low/high limit values.
- It provides an analog output for recording and acquiring the measuring values.
- It receives an external free voltage contact that activates the alarm or the hold condition.

3.2 Safety Alarm

The instrument has an alarm relay, which contact is SPDT type. The alarm condition is activated during the indeterminate differential measuring and it can be configured for higher or lower values of the measuring compared to the set ones. The presence of the contact on the logic input, coming from an external device (if this function is activated). The alarm status can be seen on the RED LED marked ALARM placed to the top of the display. During the phase of activated delay, the LED will flash. The operator can set the activated/deactivated (Act/Dea) status of relay corresponding to the alarm condition and the delay function.

4. System Components

Chlorine Controller and Monitor	CL7635S
Free Chlorine Sensor (0–10 ppm)	PICL801
Manifold for PICL801 w/ Flow Switch	MF-PICLD-FS
Free Chlorine Sensor (0-200 ppm)	PICL802
Manifold for PICL802 w/ Flow Switch	MF-WCDBL-FS

4.1 Instrument Layout

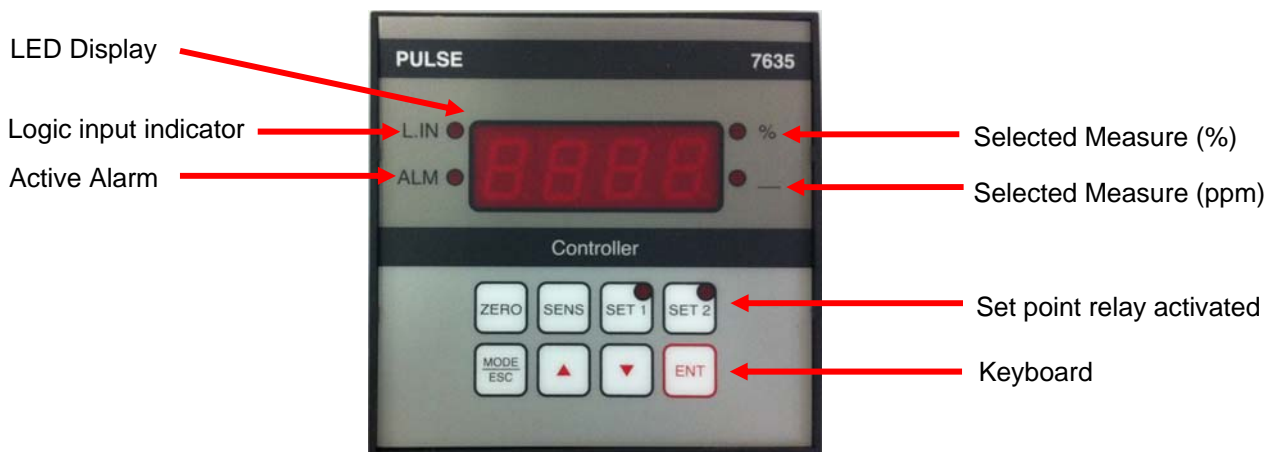


Figure 1: Instrument Layout

4.2 Operation Key

ZERO	Starts Zero Calibration.
SENS	Starts Sensitivity Calibration.
SET 1	Starts Set point 1 Calibration.
SET 2	Starts Set point 2 Calibration.
MODE/ESC	Visualizes Instrument functions and Exit without changing the values.
▲	Increases the values and changes options.
▼	Decreases the values and changes options.
ENT	Enter the new values and starts the visualized functions.

5. Installation

The two primary components: control panel and electrode, should be preferably mounted as close to one another as possible, no greater than 50 feet apart.

5.1 Mounting and Location

Mount the control panel on a secure stand, bracket, or wall using the mounting feet provided. The location of the control panel should be determined according to process layout, keeping in mind that it is preferable to locate the control panel in a dry environment, whenever possible, even though it is rated for wet environments at NEMA 4X.

The control panel should be accessible for routine maintenance, and easy viewing of the front digital display as well as the visual alarm. It should also be located with enough space underneath of at least two feet for mounting the injection manifold, along with the switches and cables.

5.2 Electrical and Power

The control panel is supplied with a three prong grounded plug. Extra attached loads such as valves, mixers, and other such devices, should be accounted for in the total electrical requirements.



WARNING: To reduce the risk of electric shock, the control panel must be plugged into a grounded outlet with ratings conforming to the requirements of the control panel, and any other electrical loads connected to it. The control panel should be connected to a good ground. **DO NOT USE ADAPTERS!** All wiring must conform to local electrical codes.



WARNING: Do not supply any voltage to the analog output terminals or logic input terminals to avoid damages on the output circuits. Connect only to passive input devices

5.3 Sensor Wiring

The power requirement for this meter is 110 VAC or 220 VAC, 50/60Hz. This meter does not have a power switch.

Caution: Contact capacity is AC 250V, 3A. Do not exceed capacity. Be sure to ground the instrument properly.

The sensor produces an approximate output of 4 mA in air and 20mA at the top range of free Chlorine output (0-200ppm)

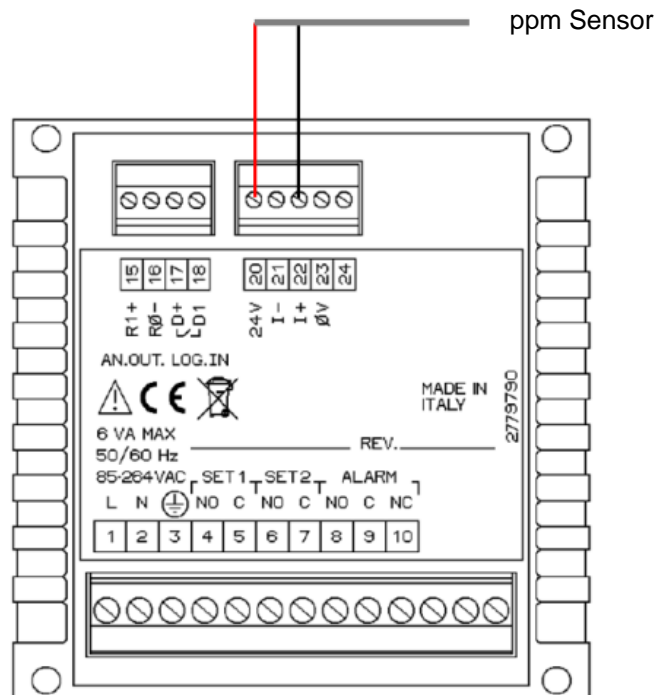


Figure 2: Sensor Wiring

The input signals connection is the most critical part because of possible interferences. Make sure to send just signals coming from simulators or transmitters in order to avoid damage to the input circuits.

- Use a good quality cable.
- Avoid cable interruption. If necessary use a high isolation junction box and protect it from the moisture.
- Keep the cable far from power cables into the switch board as well and verify if the transmitters have the passive or the active analog output.

The passive output transmitters need the power from the CL7635S while the active output transmitters are already provided with the power supply and they do not need the power from the CL7635S.

Connecting the transmitter with active analog output consists of the following:

- Connect the positive of the transmitter to the terminal 22 marked I+ (See Fig. 2).
- Connect the zero of the transmitter to the terminal 23 marked 0V

Connecting two transmitters with active analog output for differential measuring consists of the following:

- Connect the positive output of the transmitter 1 to the terminal 22 marked I+
- Connect the positive output of the transmitter 2 to the terminal 21 marked I-
- Connect the zero of the transmitters 1 and 2 to the terminal 23 marked 0V.

In this case the display will show the difference between I+ and I- signals.

Connecting the transmitter with passive analog output (two wire 4/20 mA power loop) is as follows:

- Connect the positive of the transmitter output to the terminal 20 marked 24V (See Fig. 2).
- Connect the negative of the transmitter output to the terminal 22 marked I+

Connecting two transmitters with passive analog output for differential measuring is as follows:

- Connect the positive output of the transmitters 1 and 2 to the terminal 20 marked 24V.
- Connect the negative of the transmitter 1 output to the terminal 22 marked I+
- Connect the negative of the transmitter 2 output to the terminal 21 marked I-.

In this case the display will show the difference between I+ and I- signals.

6. Configuration / Setup

6.1 Power Up



To set up a new unit, first check that the power supply connections are correct, that the outlet is 110 VAC, and that the connection and power source are clean of any ground loops, inductive loads or magnetic fields. Shared loads on the same circuit may cause interference; therefore a clean power circuit is recommended. Also, when using the AC supply, ensure that a 3-way grounded main lead is used to connect the unit.

Switch on the power to the unit. The switch light should turn on the front instrument displays with indicated values on their screen.

6.2 Main measurement

L.IN display shows the measuring value (or the differential value if the differential input has been selected) in % or in a CUSTOM unit (ppm) as configured. The front panel LED is lit according to the selected measurement.

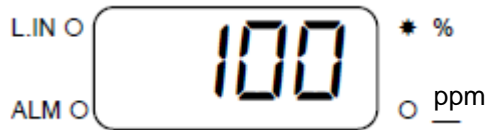




Figure 3: Display

If the measuring value is under range/over range, the following messages will appear `- o. r. -` or `- u. r. -`. If the instrument is configured for differential measurement and if any one of the input currents is over/under range, the following message of indeterminate measuring will appear `----`. It is possible to start the calibration procedure, the set points setting (if those functions have been enabled in the set up menu).

By pressing the  key the LED 4 or 5 on the front panel are switched off and the analog output range and the expected current on the load `out 0-20 mA 10.00` or `out 4-20 mA 10.00` are displayed.

The input current value can be visualized by pressing  and it is displayed as `(i n.1 mA)`, followed by the input current value.

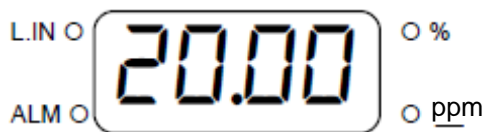


Figure 4: Input current

If the unit is in differential mode, it displays `(i n.2 mA)` message followed by the secondary current value as shown in Figure 5.

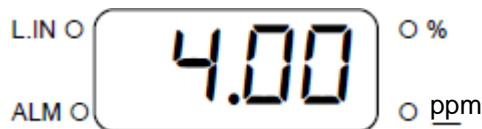



Figure 4: Input Current 2 in differential mode.

6.3 Set Up

By pressing the  **twice**, the unit displays **SEt-UP PrESS Ent** to access the menu upon entering the password as shown in Figure 5.

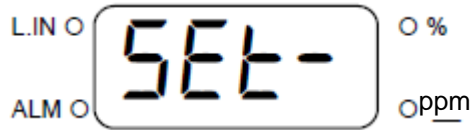



Figure 5: Set up Menu

6.4 Configuration

By pressing the  **three times**, the unit displays **ConF iD. PrESS Ent** message to access the configuration menu upon entering the password as shown in Figure 6.

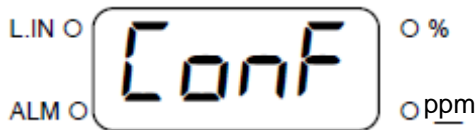



Figure 6: Configuration Menu.

6.5 Firmware Release

By pressing the  **four times**, the unit displays **bc7635 r 1.00** message to show the unit p/n and the release of the firmware installed in the unit.

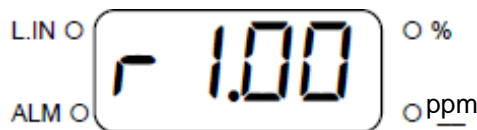


Figure 7: Firmware Release Menu.

The unit returns to its main menu if the  button is pressed one more time.

All the functioning operations must be done with sensor or simulator connected to the unit. If the input terminals are not connected to a current source, the unit will show 0 mA. Verify if the configuration, the set point and the alarm parameter are suitable for the current application. Verify if the configuration, the set point and the alarm parameter are suitable for the current application. The display, LED and keys in the front panel allow the operator to perform the preliminary check. The light display indicates that the unit is powered and the power circuits are working correctly.

The following steps are required to be verified before configuring the controller.


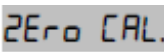
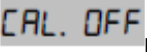



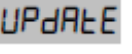
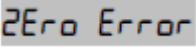
- Transmitters are connected and working correctly.
- Analog output, if necessary.
- Eventual actuation of the relays 1 and 2.
- Alarm relays if required.
- Logic input if required.
- Power supply and ground.

If the transmitter is connected correctly, the system will operate properly and it will need only the calibration and the set point/ alarm values setting.


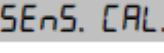
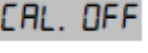



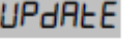
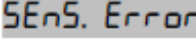
6.6 Calibration




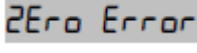
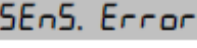
The following calibration is suggested to check periodically the operation of the unit. Use a mA simulator. Simulate the mA values from 0 to 20 mA or from 4 to 20 mA. We suggest to simulate 0 mA or 4 mA to calibrate the zero and 10/12 mA to calibrate the sensitivity. The output will correspond to the selected scale in the configuration menu. The user can calibrate the unit according to the output of the specific transmitter as well.

1. Zero Calibration









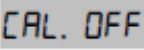


By pressing the  button, the unit displays  message followed by the actual value, or  message if the calibration has been disabled in the Set Up. Use  and  keys to change the values according to the input and press  button to confirm and end the calibration. As a result, either  or  message is displayed. The zero error confirms that calibration is not performed.

2. Sensitivity Calibration


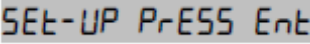






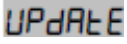

Similarly, by pressing the  button, the unit displays  message followed by the actual value, or  if the calibration has been disabled in the set up. Use  and  keys to change the values according to the input and press  button to confirm and end the calibration. As a result, either  or  message is displayed. The sensor error confirms that the calibration is not performed.

If the operator requires restoring the factory settings of the zero or sensitivity, press    together. The two error messages informs that the new value has been changed > 10% of the full scale (message ) and the sensitivity is <12, 5% or > 250% (message )

6.7 Set Point

By pressing the  or  keys, the unit will show  ()  or  message depending on the configuration followed by the actual value. Use  and  keys and the  message will appear if the calibration has been disabled. Press  to confirm and end the calibration settings. Press  key in case to exit from the current procedure without changing the previous data.


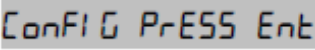

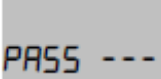



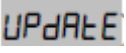
6.8 Set -up







Press  key **Two** times, the unit shows  message and then by pressing  key the unit requires the password to proceed further. Enter the password and press  button to confirm it. If password is not used just continue by pressing  button. Use  and  keys to change the necessary values or options shown on the display. Once confirmed press  key and if the value is modified, then  message is displayed. Press  to exit without saving any changes. The set-up menu has the following sections which are displayed in the controller as shown in Table 1 once the Set Up menu is selected.

S.NO	Display	Message Type	Actual Setting
1.1	1.1 CAL. Funct ion	Inhibition of zero/sensitivity calibration and set point change.	(On/OFF)
3.1	3.1 SEt 1 dELAY	Delay (in seconds) of the set point 1 delay	
3.2	3.2 SEt 2 dELAY	Delay (in seconds) of the set point 2 delay	
4.1	4.1 Lo ALARn	Minimum Alarm value	The measuring unit is shown by corresponding LED 4 and 5 on front panel
4.1	4.1 Hi ALARn	Maximum Alarm value	The measuring unit is shown by corresponding LED 4 and 5 on front panel
4.3	4.3 ALARn dELAY	Alarm delay in seconds	
6.1	6.1 LoG ic InPUt	Logic Input Default: Off.	(On/OFF)
3.2	10.1 SEt-UP PASS	Password for the set up menu	---

Table 1: Set- up Menu

6.9 Configuration Settings:

Press  key **three** times, the unit shows  message and then by pressing  key the unit request the password as shown by the  message. The configuration menu has the  or  keys to change the values or options in the display and  key to confirm the value or option and followed by  message.

Configuration Menu			
S.NO	Display	Message Type	Actual Setting
1.1	1.1 I nPUT	Input Current range Default: 4-20	(4-20/0-20)
1.2	1.2 TYPE I nPUT	Input Type (Single or Differential) Default: Single	(SInG/dIFF.)
1.3	1.3 DECIMAL Po int	Decimal point position (To adjust the decimal point)	(9999/999.9/99.99/9.999)
1.4	1.4 Lo Po int	Value corresponding to 0(4)mA input current Default: 0	Input the desired values using  and  keys and press 
1.5	1.5 HI Po int	Value corresponding to 20mA input current. Default value is 10 for a 10ppm sensor and 200 for a 200ppm sensor	Input the desired values using  and  keys and press 
1.6	1.6 MEAS. Unit	Measuring Unit (% or Custom) Default: Custom	(PERC/CUST.) Custom option allows activating the ppm measurement.
3.1	3.1 SEt 1 Funct ion	Min/Max function of the set point 1 (LO/HI)	(Lo/HI). Activate High or Low set point for Set 1 Function
3.2	3.2 SEt 2 Funct ion	Min/Max function of the set point 2 (LO/HI)	(Lo/HI). Activate High or Low set point for Set 2 Function.
4.1	4.1 ALARm Funct ion	Status of Alarm relay (Activated/Deactivated) Default: Activated	(Act/dEA.) Choose based on application.
5.1	5.1 out	Analog Output range (0/20mA or 4/20mA) Default: 4-20	(0-20/4-20) in mA
6.1	6.1 LOG ic InPUT	Logic input function (Hold or Alarm)	(HoLd/ALAR.)
11.1	11.1 ConF IG. PASS	Changing of password to access the configuration menu	Enter the actual password

7. Maintenance

7.1 Electrode Cleaning

Remove the electrodes from the manifold / flow cell. Take a 1:100 diluted solution of acid to water in a cup, and place the electrode front tip in the solution at least two inches deep, for approximately one minute. Rinse the tip with tap water. Then clean the electrodes with mild liquid detergent by dipping into the solution and agitating for approximately one minute. Rinse the tip of the electrode with tap water.

7.2 Calibration

1. Remove the terminal block on the chlorine dioxide meter located inside of the system control panel.
2. Adjust the trimmer marked "ZERO" on the chlorine dioxide transmitter to 0 ppm.
3. Connect the terminal block back onto the meter.
4. Place the chlorine dioxide electrode into a known standard solution and allow sufficient time for the electrode to reach the buffer solution value.
5. Adjust the trimmer marked "SENS." on the chlorine dioxide meter located inside of the control panel to standard solution value. The electrode is now calibrated.

7.3 Chemical Metering Pump

WARNING: Always wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

Periodically check the chemical tank level to avoid the pump from operating without liquid. Check the pump operating condition at least every 6 months: pump head position, screws, bolts, and seals. Check more frequently if using aggressive chemical. Also, clean the hydraulic parts, such as valves and filter, as often as needed (See pump manual for details).

8 Contact

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