plum GAS

MacR6-Z0-P

Gas pressure logger

Installation manual

Product codes: Z0_311_xxx_0x**2, Z0_311**_xxx_1x_0x**2**
Modem: LTE-M/NB-IoT/2G
Communication protocol: Gaz-Modem2/3 (GM)
Transmission protocol: TCP/IP / UDP
Applies to the following firmware: Program series: S013.xx

Implicitly read the user manual, which contain all necessary information about appliance, including safety information. This is only a supporting document, which includes only selected information, useful during device installation. Installation manual is only an annex to the main document.

User manual along with information regarding safety and a template of EU conformity declaration is available on website https://gas.plum.pl/en/ under Products / Flow and pressure loggers / MacR6-Z0-P section (direct link in QR code).

QR code link:

Safety - preliminary information

MacR6-Z0-P data logger is an 'ia' intrinsically safe, explosion proof device and can be installed in 0,1 or 2 explosion zone of gases and vapors which are placed in IIA explosive group and temperature class T1, T2, T3, T4. Ex mark Ex II 1G Ex ia IIA T4 Ga . Device installation in explosion hazard areas must comply with requirements of applicable regulations.

Minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres are prescribed in Directive 1999/92/EC of the European Parliament and of the Council of 16 December 1999 (ATEX 137 'Worker Protection Directive').

Use of the device is only possible in areas where the GSM module in operation does not cause interference with other equipment (e.g. medical equipment).

Under certain extreme circumstances, the plastic enclosure may store an ignition-capable level of electrostatic charge. The device should not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge. The equipment shall only be cleaned with a damp cloth.

Internal intrinsically safe circuits, including pressure sensors internal circuits, do not stand 500V test given in EN60079-11 to earthed or isolated metal parts of its enclosure. The type of protection does not depend on the separation. Metal bushings of product and metal parts of its pressure sensors are galvanically connected. It must be considered during installation.

The device has a built-in pressure sensor PS type. Metal enclosure of sensor must be grounded. Product must be taken as grounded. It must be considered during installation.

The device is powered by a lithium-thionyl battery with a nominal voltage of 3.6V, size D, conforming to IEC 60086-1. Only the battery types and manufacturers listed below should be used:
1) LS33600, manufactured by Saft Specialty Battery Group.

There is a danger of explosion if the battery is replaced by an incorrect type.
Replacement of the battery, installation of the SIM card and connection of the external antenna cable are only permitted outside the hazardous area.

The function and parameters of some inputs/outputs depend on the product version, details are given in user manual of the device.

To ensure safety, it is essential to read the following instructions before installing the device.

Required accessories

- TORX type T10 screwdriver

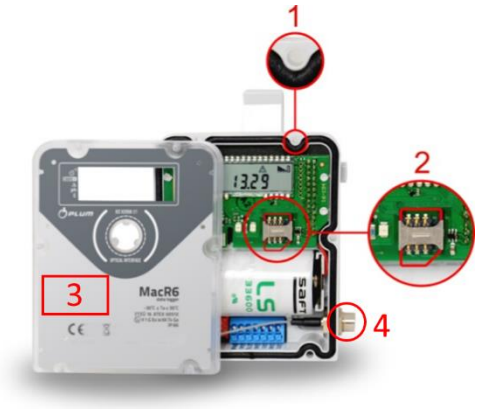
- Android smartphone with Bluetooth support

- MicroSIM standard card

- OptoBTEx 2 interface

Pre-assembly

- Remove the six TORX T10 screws on the back of the housing (1) using a screwdriver.
- The battery has been disconnected in the unit for transport using an insulating spacer. The spacer must be removed before installation.
- After removing the front cover, place the SIM card in the slot with the correct orientation (2).
- Once the SIM card is in place, insert the battery and screw the device together.
- Screw the antenna into the FME socket (4)
- After installation, stick one of the 2 supplied stickers with the device identification data onto the front cover (3).



Wall or gas pipe installation

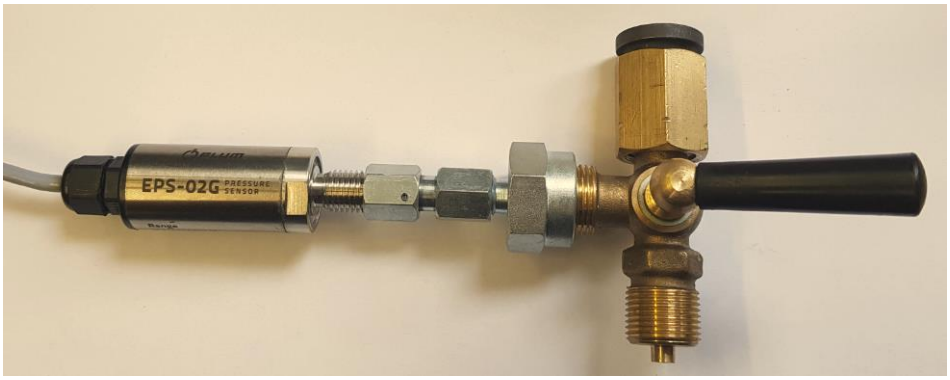
- For wall or pipe mounting, use the bracket as shown in the illustration. First install the bracket using worm ties / self-locking ties or screws.
- Then place the unit in it by sliding it in until it clicks into the bracket.

Fitting pressure sensors to the gas system

- Depending on the design, the MacR6-Z0-P recorder can be equipped with one or two PS type pressure sensors, permanently connected to the recorder:

Sensor thread: M12x1.5

- It is recommended that the connection is made via a gas shut-off valve or a three-way manometer cock, which will also enable calibration of the sensor.



In the case of overpressure sensors, zeroing of their readings must be carried out (compensation of atmospheric pressure values). Zeroing must be carried out before the sensor is fitted (so that the sensor measures atmospheric pressure) or after fitting, in the case where this has been done via a three-way manometer cock). For details, see ‘Zeroing of pressure sensor readings’..

Device start-up

- If the device has an extinguished display (it is in storage mode), bring the magnet or OptoBTEx (or OptoBTEx 2) several times close to the OPTICAL INTERFACE window so that **SLEEP 3**, **SLEEP 2**, **SLEEP 1** appear successively on the display. When **StArt** appears, move the magnet away and the device starts operating.

- ext, start up the OptoBTEx head (not applicable to OptoBTEx 2), apply it to the OPTICAL INTERFACE window and then, on an Android smartphone, launch the configuration ConfIT! data loggers app, available free of charge at: **https://play.google.com/store/apps/details?id=com.plum.pl.confit**

QR code link:

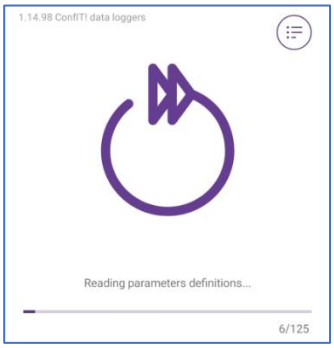
The MacR6-Z0-P data loggers can also be configured using a PC and the ConfIT! application, available free of charge at: **https://gas.plum.pl/en/product/confit/**

Connecting the device with a smartphone and the ConfIT! data loggers app

- In the ConfIT! data loggers, select the Bluetooth communication channel type:

- Select the device type specific to the interface used: OptoBTEx or OptoBTEx 2 (in the case of OptoBTEx 2, if there is more than one such interface in the environment, the device search must first be enabled in the application options)
  In the case of OptoBTEx 2, select the correct interface from the displayed list of searched devices
- The application will start communication and you will be prompted to enter the Bluetooth pairing code of your smartphone with the OptoBTEx, enter: 1234. The picture shows the correct connection of the logger with the smartphone and the main window of the application.
  The LED in the interface must be on the right hand side looking at the front of the device and must be lit continuously during transmission.

- Correct communication with the device results in the display of the message “Reading parameter values”. Once all parameters have been loaded, the application will proceed to the main configuration window.



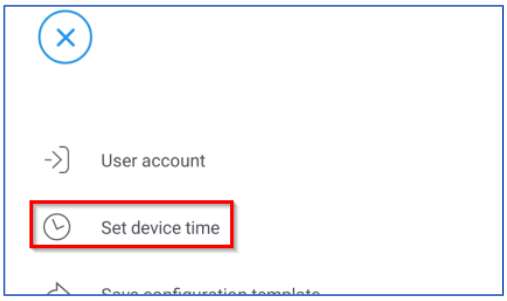
If a Bluetooth connection is made and OptoBTEx is used, this is automatically maintained by the application, so there is no need to remove the interface from the recorder.
If OptoBTEx 2 is used, the connection is automatically established while the configuration of the recorder is being read/written.

Setting the device clock

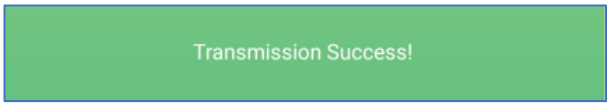
As the battery is disconnected with an insulating spacer during transport of the device, the device clock is not set. It is necessary to check the correct date and time on the device and set it to the correct one.

The application in the header shows the date and time of the recorder, the same as displayed on the LCD screen of the device.

- Setting the device clock is done from the right menu of the application and selecting the option ‘Set device clock’.

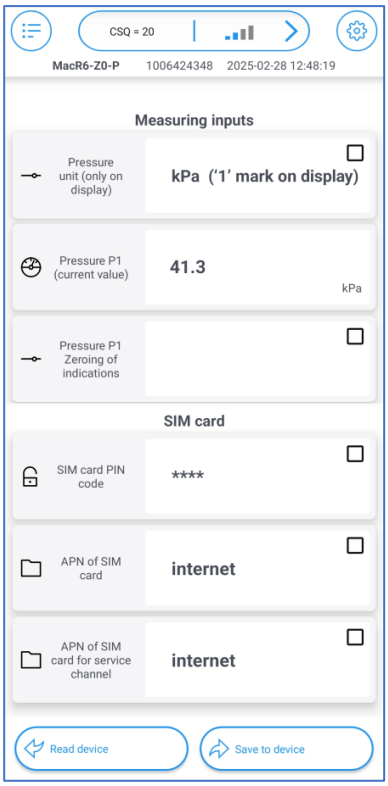


- The application allows you to select how the device's time is automatically synchronized with your smartphone's clock - setting local or winter time. It also allows you to set the clock manually.
- Correct setting of the clock will end with the message ‘Transmission Success!’.



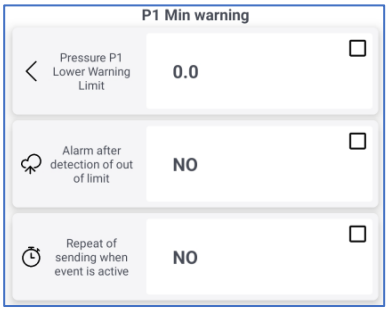
Configuration parameters

- The main programme window after start-up shows the current pressure values and the most important configuration parameters necessary for correct operation of the device at a specific measuring point.
  It is possible to set the values:
  - Pressure unit on the display
  - Zeroing of pressure sensors indications
  - PIN code for the SIM card
  - APN of the SIM card
  - Site ID
  - GPS location
  - User password

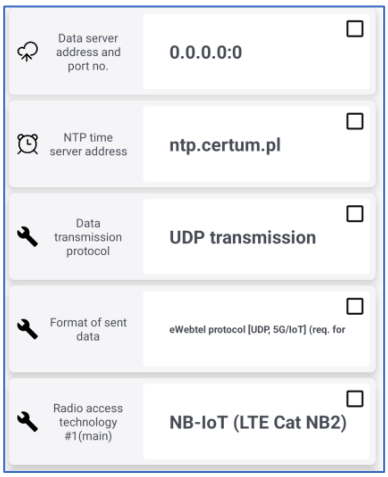


- In the left menu of the application there are grouped setting categories where additional device parameters can be configured, e.g.:
  - **Extended configuration** allows the following settings to be set, among others:
    - Registration period
    - Measuring period
    - GM address
    - Zeroing of pressure sensor indications
    - Removing an adjustment

- **Event-related data sending** allows the following settings to be set, among others:
  - Lower and upper warning limits of pressure measurement
  - Lower and upper alarm limits of pressure measurement
  - Alarming after detection of exceeding the limit
  - Renewed dispatching when the alarm is in progress

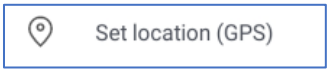


- **Connection settings** allows the following settings to be set, among others:
  - Address of the data server and port number (e.g. **ewebtel.com:88**)
  - Data transmission protocol
  - Format of sent data
  - Radio access technology



Overview of example data collection systems depending on the use of HTTP headers in format of sent data	
HTTP headers required	**No HTTP headers**
eWebtel	AVE2

The application allows the location of the device (GPS coordinates of the installation site) to be programmed, so that it can be displayed on a map in a data server (e.g. ewebtel.com). The location of the device (GPS coordinates) can be set from the right-hand menu of the app by selecting 'Set location (GPS)'. This will trigger the GPS module on the smartphone, search for the GPS coordinates and automatically store them on the device.



Zeroing of pressure sensor indications

In the case of overpressure sensors, zeroing of their indications must be carried out (compensation of atmospheric pressure values). The zeroing must be performed before the sensor is mounted (so that the sensor measures atmospheric pressure) or after mounting, in the case where this has been done via a three-way manometer valve).

Before zeroing the indications, atmospheric pressure must be applied to the pressure sensor.
It is recommended that this process is carried out via a three-way manometer valve or by unsealing the system at a point other than on the pressure sensor thread, so as not to cause mechanical stress to the sensor diaphragm.

Zeroing of indications can be performed in the Configuration category (main application window) or Extended Configuration.

To zero the readings of the pressure sensor P1, program the parameter 'Pressure P1 Zeroing of indications' to "YES"
This will cause the message 'P CAL 1' to appear on the device display, which means that the sensor P1 has been calibrated. This process takes approximately one minute.

For the pressure sensor P2, set the parameter 'Pressure P2 zeroing of indications' which will display 'P CAL 2' on the LCD.

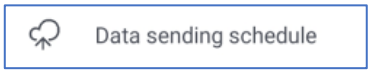
Zeroing the pressure sensor indications will result in a pressure value close to zero when measuring atmospheric pressure.

After reconnecting the pressure sensor to the gas system, the service menu 'PrESS' (pressure measurement test) must be activated on the recorder. The device will then start taking a pressure measurement every 5 seconds and this value will be presented on the screen for a period of one minute. In this way, you can immediately check that the pressure measurement is consistent with the indication of the mechanical manometer.

If an error is made during the above procedure, the calibration corrections must be removed and the zeroing performed again. The delete option is available in the **Extended Configuration** category in the application.
Deleting calibration corrections for pressure sensor P1 involves programming the parameter 'Pressure P1 Removing of adjustments' to 'YES' (and similarly for sensor P2).

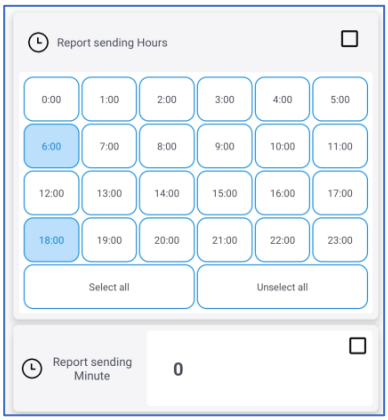
Schedules for data sending

Data sending schedules are set from the left-hand menu of the application and by selecting the ‘Data sending schedule’ option.



The application allows the device to set 1 to 24 daily schedules for reporting data to the server. The setting consists of selecting the hours at which the device should send data to the server. It is also possible to set the exact minute of data sending.

It is also possible to send data only on specific days of the week or month.

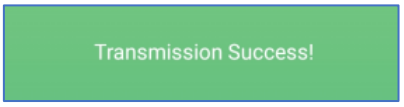


Device configuration

- Set all required device parameters.
  The modified parameter will be marked in blue and the box ‘to be modified’ will be marked

- After setting the new parameter values, use the ‘Save to device’ button

- Correct programming of the device will end with the message ‘Transmission Success!’.



- The blue markers next to the modified parameters will change to green.

- To check that all parameters have been set correctly, use the ‘Read Device’ button and ensure that the set values are correct.

Installation mode

The installation mode is used to check whether the device connects to the data server and to send the device identification data to the server.

- The installation mode ‘InStAL’ is activated via ‘Installation’ button in right menu of application

The installation mode can also be started without the application.
Start-up is done by activating the service menu ‘InStAL’ (device installation) on the device by bringing the magnet or OptoBTEx head several times close to the OPTICAL INTERFACE window so that the display shows ‘InStAL’, ‘CSO.’, “rEPort”... until ‘InStAL’ appears. The installation process will start once all indicators ◀ have disappeared.

- The start of the ‘InStAL’ installation process will cause the antenna symbol on the display to start blinking. This indicates that the device's modem is switched on.

- After several seconds, the GSM signal level indicator will permanently light up on the display. The number of dashes indicates the GSM signal level.
- After a few seconds, the G symbol indicating GPRS operation will blink.
- After a few seconds, the symbol will blink to indicate that the device is sending data to the server.
- Once the data has been transmitted correctly, the G i symbols will light up permanently.
- The antenna symbol will blink for a few more seconds, then the unit's display will switch to the normal display cycle of date/time/pressure/other parameters.
- The pressure value P1 is displayed when the indicator is only visible at the P1 symbol

- The pressure value P2 is displayed when the indicator is only visible at the P2 symbol

The number displayed in the first position from the right indicates the unit in which the pressure value is presented.

Pressure unit	Digital unit designation shown on the display
kPa	1
bar	2
PSI	3
mbar	4

- When the device starts up, the display will (or may) additionally show the following symbols:

	Battery status indicator
G	GPRS connectivity indicator. Blinking indicates an active connection. Continuous lighting symbolises the modem's last correct connection. No icon indicates no connectivity at the last connection attempt.
	Data dispatch indicator. Blinking indicates active upload. Steady light indicates that the device has sent data to the system. No icon indicates unsuccessful data transmission.
	The indicator indicates that the device has received data (e.g. configuration data) from the system.

- Activating the ‘CSQ’ service menu allows you to check the cellular signal level (CSQ) and the correct antenna placement. The CSQ test takes 1 minute. In most cases, a CSQ ≥ 9 is sufficient for correct operation of the recorder.

For systems that read data from the MacR6-Z0-P (such as AVE2) but do not receive data (such as eWebtel), it is necessary to temporarily set the data dispatch schedule for a time close to the time of installation of the device in order to confirm communication with the system, and after confirmation of operation, to set the target data dispatch schedule..

Technical support

Service Department
phone no.: +48 85 749 71 63
email: support@plum.pl