



PRESSURE SENSOR Equipment manual

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En

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Note: This manual refers to a specific regulation.

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PRESSURE SENSOR

RF-CH20



Index

1. DESCRIPTION AND CHARACTERISTICS	5
2. DISPLAY AND BUTTONS	6
3. EQUIPMENT DIMENSIONS	7
4. MENU STRUCTURE	8
5. DISPLAYING AND CHANGING PARAMETERS	11
6. EQUIPMENT COMMUNICATIONS PROTOCOL	12
7. EQUIPMENT ENERGY MANAGEMENT	15
8. RADIO FREQUENCY PARAMETERS	16
9. SENSOR CALIBRATION	16
10. AUTOZERO	17
11. ADC	17
12. ERROR CODES AND POSSIBLE SOLUTIONS	17



1. DESCRIPTION AND CHARACTERISTICS

The **RF_CH20** is a radio transmission device with built-in pressure sensor. The equipment sends the data to a Radio Frequency receiver with built-in USB to communicate with a PC. The main features of the equipment are:

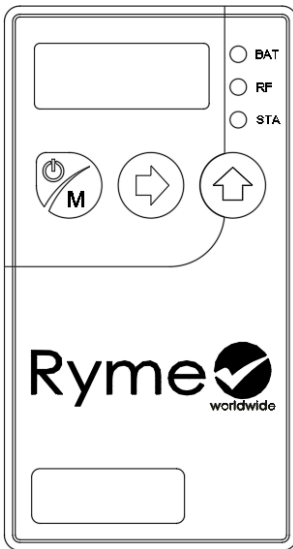
- ✔ Pressure measurement up to 20 bar.
- ✔ 5-digit display and three information LEDs.
- ✔ Communications by radio frequency 868Mhz.
- ✔ Rechargeable battery and battery level warning.
- ✔ Firmware upgradeable via USB.

The unit has a WheatStone bridge pressure sensor, a 16bit converter and a 3.7 volt, 1400mAh rechargeable battery. The unit can be charged through the Mini USB port with any standard 5v 500ma charger or through the bottom contacts attached to the unit.

2. DISPLAY AND BUTTONS

Button functions.

The unit has three keys to access the unit's query and configuration menus.



- a. Pressing the Esta key for 500ms will turn on the equipment.
- b. While the equipment is on and out of the menus, a press of more than 2" turns the equipment off.
- c. While inside the setting menus, a press of 2" returns the equipment to the main screen.
- d. It is used to navigate through the parameters.
- e. It is used to accept a modified parameter.

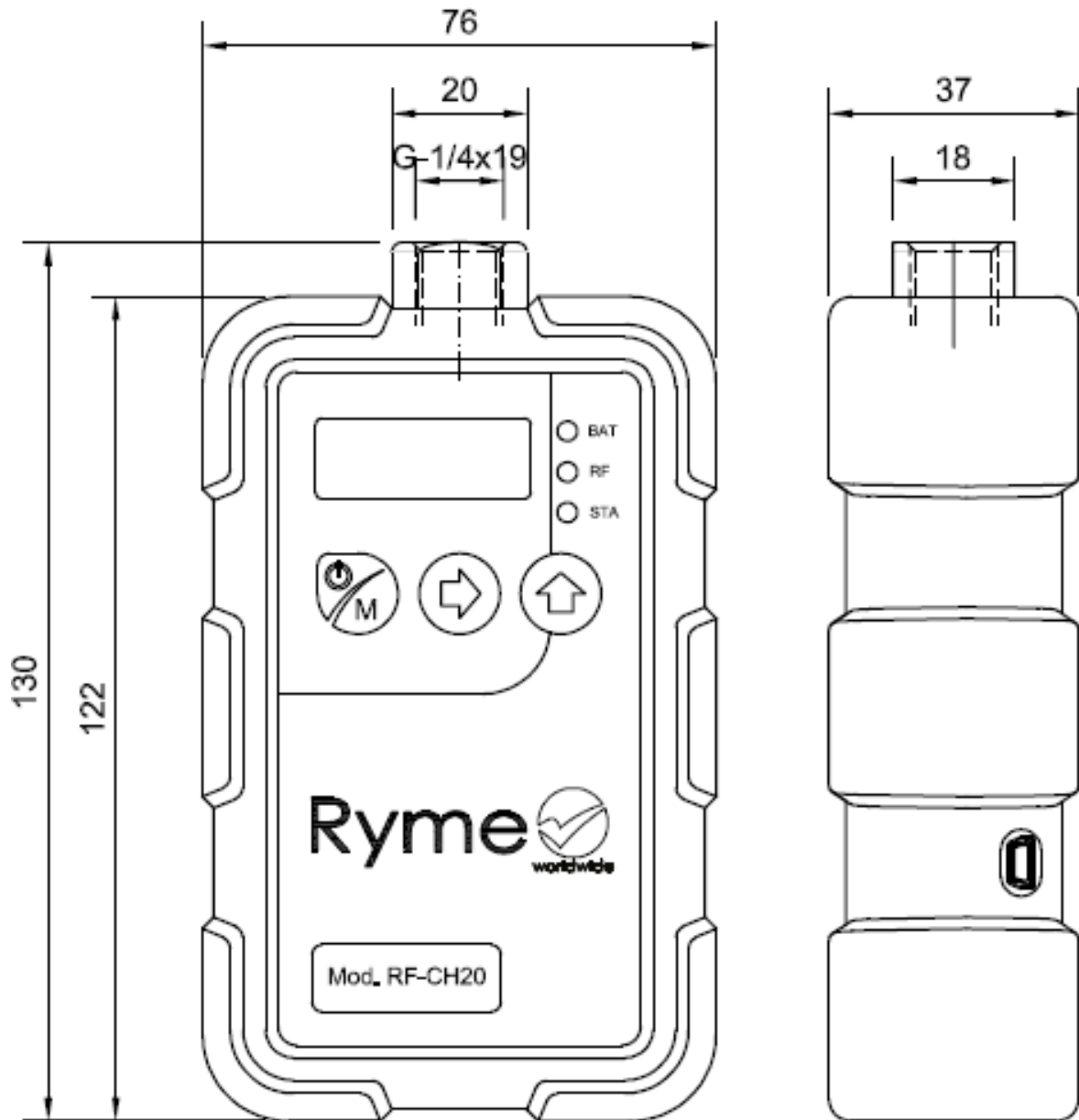
- a. During menu navigation it is used to enter to modify the parameters.
- b. While a data is being modified, it is used to change digits.

- a. During menu navigation it displays the parameter value for 1".
- b. While a parameter is being modified, it increments the flashing digit from 0 to 9.

Note: After two minutes without pressing any key, the instrument automatically returns to the main measurement screen.



Led	Features
BAT	Charger connected
RF	Data frame sent by the equipment by RF
STA	Operating status of the measuring or standby equipment. <u>Led flashing:</u> Equipment in Low Power Mode. <u>Fixed Led:</u> Equipment in Measurement Mode.

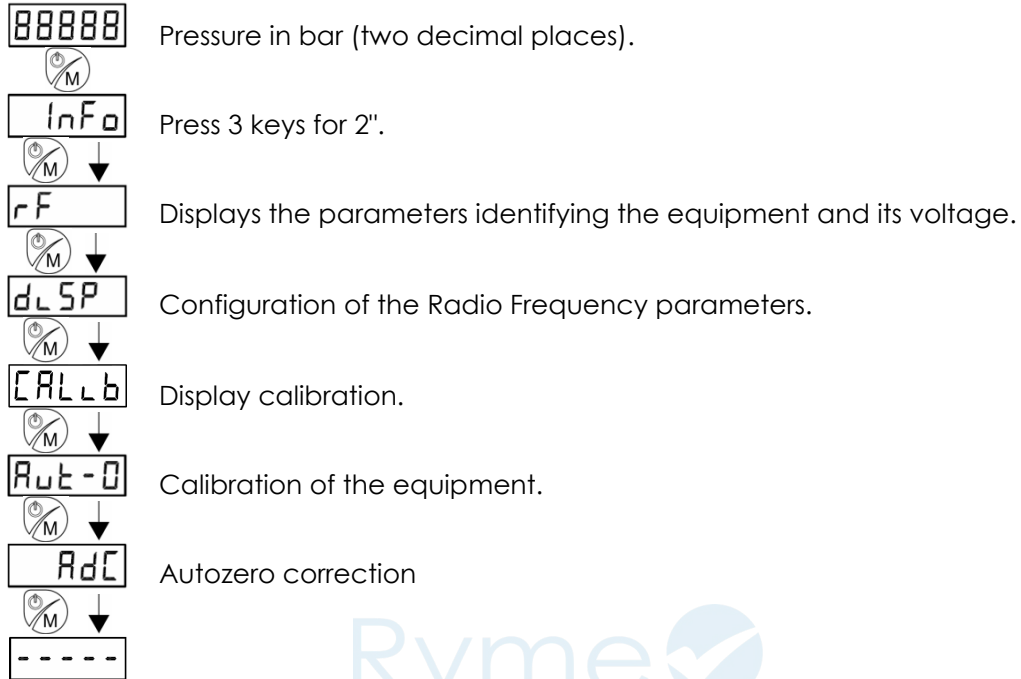
3. EQUIPMENT DIMENSIONS





4. MENU STRUCTURE



The menu has a cyclic structure as shown in the diagram.











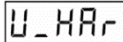





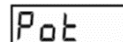
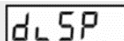

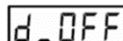

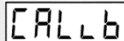




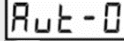



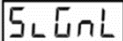
Press the keys   simultaneously for 2 seconds and then press the menu key to navigate through the device parameters.




When in any menu, pressing the key  for 2 seconds returns to the main screen, pressing the key  for 2 seconds from the main screen switches the unit off.

The menu has a cyclic structure as shown in the diagram.

Press the keys   at the same time for 2 seconds and successively press the menu key to navigate through the device parameters.

	Main screen	Pressure value
		Press the keys   during 2".
		Equipment information menu.
 ↓		Network Management.
		Equipment shutdown time in seconds if no key is pressed and there is no radio communication.
		Model: Valid model: CHR
		Firmware version of the RF_CH20 unit Valid values: 1.01 and higher.
		Hardware version of the equipment.
		Battery voltage
		Resets all equipment values to their default values.
		Radio frequency menu
 ↓		Radio frequency channel on which the equipment communicates.
		Emission power of the radiofrequency module in Db's.
		Display configuration options.
 ↓		Automatic shutdown time of the display in seconds. The equipment will continue to communicate by radio frequency (maximum 600, minimum 10 seconds).
		When this parameter is set to "Yes", the sensor measurement will not be shown on the display and the word "ryne" will be displayed instead.
		Sensor Calibration menu.
 ↓		Sensor idle value.
		Value in hundredths of Bars applied to the sensor.
		Sensor sensitivity.
		Maximum value for the auto Zero setting (set to "00000" to deactivate this option).
 ↓		
		Mv/v value of the converter.







To return to the main measurement screen, press the key  for 2 seconds.


From the main screen, press the key  for 2 seconds to switch off the instrument.



5. DISPLAYING AND CHANGING PARAMETERS

Within the menus the parameters are changed as follows:

- ✔ Press  to display the main value.
- ✔ Press  to select the parameter to be changed.
- ✔ Press  to change to the digit to be changed (In flashing).
- ✔ Press  to change the value of the flashing digit (if no digit is flashing the value is changed by pressing  directly).
- ✔ Press  twice to save the value.

INFO: If the key  is pressed to change a data and it is not confirmed within 8". The change will not be saved.

6. EQUIPMENT COMMUNICATIONS PROTOCOL

The design of the communications protocol has been developed on the basis of the current communications protocol currently used by RYME in order to minimize the impact of equipment upgrades.

COMMAND FORMAT

Syntax:

	Comand	Direction	Checksum	Character End Plot
Length (bytes)	2	2	2	2
ASCII	MM	01	01	CR LF
HEX	4D 4D	30 31	30 31	0D 0A

ADDRESSING

Allowed addresses range from 1 to 98, with 00 being the BROADCAST address and 99 the address of the USB Adapter Sticks.

CHECKSUM



The checksum is calculated by XORing all frame parameters except the End of Frame characters.

The result in Hexadecimal is sent in two different ASCII characters by dividing the high and low part of the checksum result in Hexadecimal.

Example:

Comand	Awakening device number 2	MM02	0x4D 0x4D 0x30 0x32
Checksum	4D Xor 4D Xor 0x30 Xor 0x32 =	06	0x30 0x36 CR LF
Comand complete	4D 4D 30 32 30 36 0D 0A	In ascii:	MM0206<CR><LF>
HEX			

COMMAND TABLE

- ✔ In the following table of commands all of them are addressed to device 01.
- ✔ All commands end with the <CR><LF> (0x0D 0x0A).
- ✔ CS = Checksum byte in two ASCII characters.

Comand	Description	Syntax	Answer	Comment
Operation mode				
MM	Change to custom status	MM01CS<CR><LF>	MM01CS<CR><LF>	
MS	Switch to Standby Standby	MS01CS<CR><LF>	MS01CS<CR><LF>	
MO	Off mode, equipment off	MO01CS<CR><LF>	MO01CS<CR><LF>	
Ma	Device status	Ma01CS<CR><LF>	Ma01MxCS<CR><LF>	x=M (Status Measure) x=S (StandBy status)
Measurement mode				
Vj	Order measurement	Vj01CS <CR><LF>	Vj014E205<CR><LF> WM015<CR><LF>	Measurement = 20000 (200Bares) 5= Bat Nivel 6: VB ≥ 3.6v 5: VB ≥ 3.4v 4: VB ≥ 3.2v L: VB < 3.2v The equipment is not in measurement mode.
Configuration mode				
SS	Request serial number	SS01CS <CR><LF>	SS01170E59CS<CR><LF> SS0117123FCS<CR><LF>	Equipment with serial number = 1511001 Equipment with serial number = 1511999
SD	Show display size	SD01xCS<CR><LF>	SD01xCS<CR><LF>	x=1 (Measured sample) x=0(Rynne sample on screen) x=0(Rynne sample on screen)
SC	Rf Channel	SC01xxCS<CR><LF>	SC01xxCS<CR><LF>	Rf channel: allowed channels range from 0 to 31
SP	Power Rf	SP01xCS<CR><LF>	SC01xCS<CR><LF>	Power of Rf: 0=13Bd;

- 1=10Bd
- 2=7Bd
- 3=4Bd
- 4=1Bd
- 5=-2Bd
- 6=-5Bd
- 7=-8Bd

Calibration mode

CZ	Adjust Zero	CZ01xxxxCS<CR><LF>	CZ01xxxxCS <CR><LF>	xxxxx = Sensor zero value in bars
CL	Adjust load	CL01xxxxCS<CR><LF>	CL01xxxxCS<CR><LF>	xxxxx = Current value applied to the sensor for calibration Ex: 2000 (0x07D0) CL0107D0 5D




7. EQUIPMENT ENERGY MANAGEMENT

The RF_CH20 has a rechargeable 3.7 volt, 1400mAh Lithium-Polymer battery.

To optimize consumption and avoid costs, there are two parameters to turn off the display and/or the equipment automatically.

`DISP` → `t_off` → **Automatic display shutdown time**: Each time the power button is pressed the display will remain active for the value programmed in this parameter of the Display submenu. The minimum value is 10 seconds.

`Info` → `t_off` → **Automatic equipment shutdown time**: The equipment will remain active the value programmed in this parameter as long as there is no activity in the equipment.

The equipment will remain active the value programmed in this parameter as long as there is no activity in the equipment 



8. RADIO FREQUENCY PARAMETERS

The RF_CH20 communicates with a PC via a Radio Frequency link in the free 868 Mghz band.

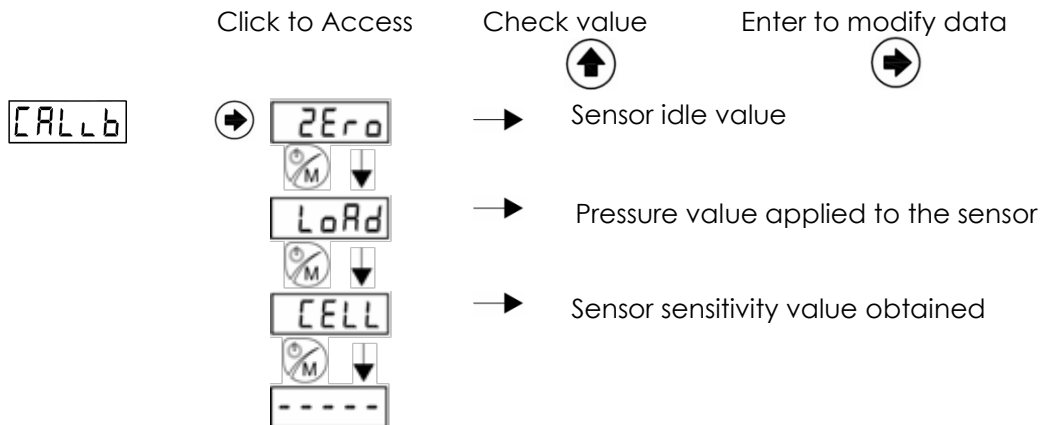
The USB stick creates a network in the 868 Mghz frequency where up to 31 different channels can be used in the same installation. It is also possible to select the transmitting power of each device.

To create a network on a given channel, all devices and the USB receiver must be set to the same channel. Also, each device connected in the same network must have a unique address to avoid communication conflicts.

The radio frequency commands can be set with the commands indicated in the protocol or by using the keyboard.

9. SENSOR CALIBRATION

The instrument can be adjusted with the commands indicated in the protocol or by using the keypad. In the calibration menu the instrument can be set to display the exact measurement in bars after calibrating the instrument.



10. AUTOZERO

When the equipment is at rest and totally stable and also the value read is lower than the value programmed in parameter Aut-0, the equipment will perform an autozero operation.

This function can be deactivated by setting the value `UaLwE` a 0.

11. ADC

Displays the value read in mv/v by the 16-bit converter.

12. ERROR CODES AND POSSIBLE SOLUTIONS

The following errors detected may be displayed on the screen:

Descripción de Error	Solución
<code>Err1</code> Sensor connection error.	Check sensor wiring
<code>Err2</code> Negative Overload	Check sensor wiring
<code>Err3</code> Positive overload.	Check sensor wiring
<code>Err6</code> Loss of data in memory	Perform a Software Reset to the Equipment
<code>Err7</code> Sensor with very low nominal load. Incorrect calibration	Re-adjust the equipment, performing a zero and a full scale.