Parsmega
industrial automation

User Manual

Load Cell Transmitter

PM-LTD11R

Version: 1.1 Release Date: 03/01/2023

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Contents

1 Introduction

1.1 Purpose of the manual

This manual contains all the information needed to set up, install, wiring and communicate with the PM-LTD11R module.

1.2 Technical knowledge Required

In order to understand this booklet, a basic acquaintance with electrical topics is required.

1.3 manual validation

This manual is valid for this specification.

MODEL	Hardware	Software
PM-LTD11R	V2.1	V12.0

1.4 technical support

To get technical support through the following contact:

- Email: **info@parsmega.com**
- Phone: **+98 21 91009955**
- WhatsApp: **+98 9981122566**

2 safety tips

- Starting the module by non-experts and ignoring the commands may cause serious damage to the module.
- This module does not directly pose a risk to human life.
- The use of this module is not approved for use in life-threatening devices.

3 Description

3.1 Basic Description

PM-LTD11R is a multi-purpose and flexible load cell indicator transmitter that has the capability of reading weight.
This module has the ability to connect to a computer and control equipment such as (HMI and PLC).
Due to the special features designed in this module, you can easily have a modern weight measurement system.

3.2 Module Uses

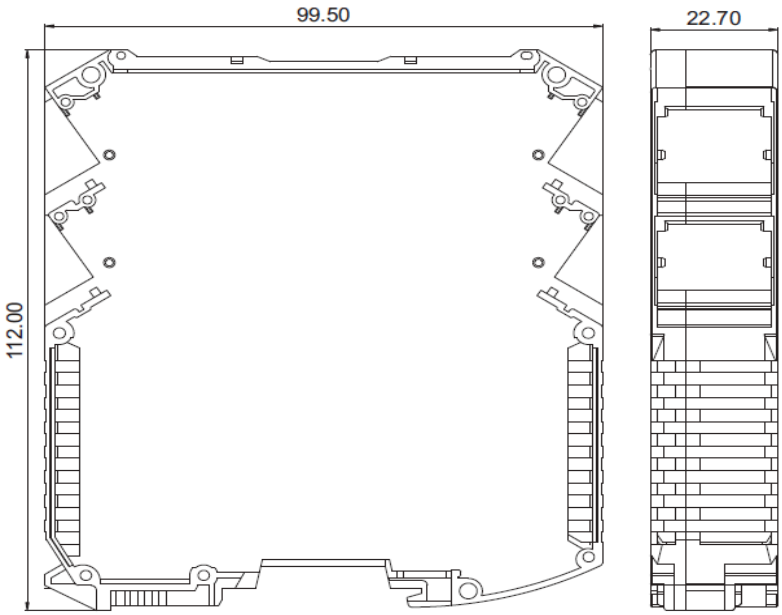
This weight display and reading module is a very suitable option for applications where a weight or force sensor is used. Such as:

- Road scale
- Bag filler
- Packaging machines
- Transit weighing
- Tensile and compression testing machines
- Weighing the elevator cabin

3.3 Technical specifications

- Isolated RS485 serial communication with MODBUS protocol support (RTU, ASCII)
- Wide range of RS485 port baud rate (from 2400 to 230400)
- Wide sampling range
- Weight reading with an accuracy of 1:100,000
- Ability to define 10 programs (profiles)
- Ability to define 5 load cells and maintain calibration of all load cells
- Automatic calibration without the need for weight calibration
- digital outputs (in the new series outputs are relays) with user adjustable functions
- 3 digital inputs with user configurable functions
- Ability to display load cell output voltage (for load cell testing)
- The working temperature range is -30 ~ +50 degrees Celsius

3.4 Indicator Dimensions



4 Installation

4.1 Observe EMC item

This product is designed and manufactured to work in industrial environments. However, for proper operation, you should check and eliminate the issues that cause the module to malfunction.

4.2 Things that cause system disruption

- Electromagnetic field
- Telecommunication cables
- Power circuit cables

4.3 Things to consider

4.3.1 Convenient ground connection

• When installing the module on the panel body, make sure that the panel body is connected to the ground.

• All ineffective metal parts are (firmly) grounded.

• When connecting varnished wires to ground connection, remove the varnish from that part.

4.3.2 Appropriate wiring method

• Divide your system cables into different groups (high voltage, power supply, and signal, analog).

• Always transfer the power cable from another duct.

• Always place your analog cables close to the body of the panel and rails (which are grounded).

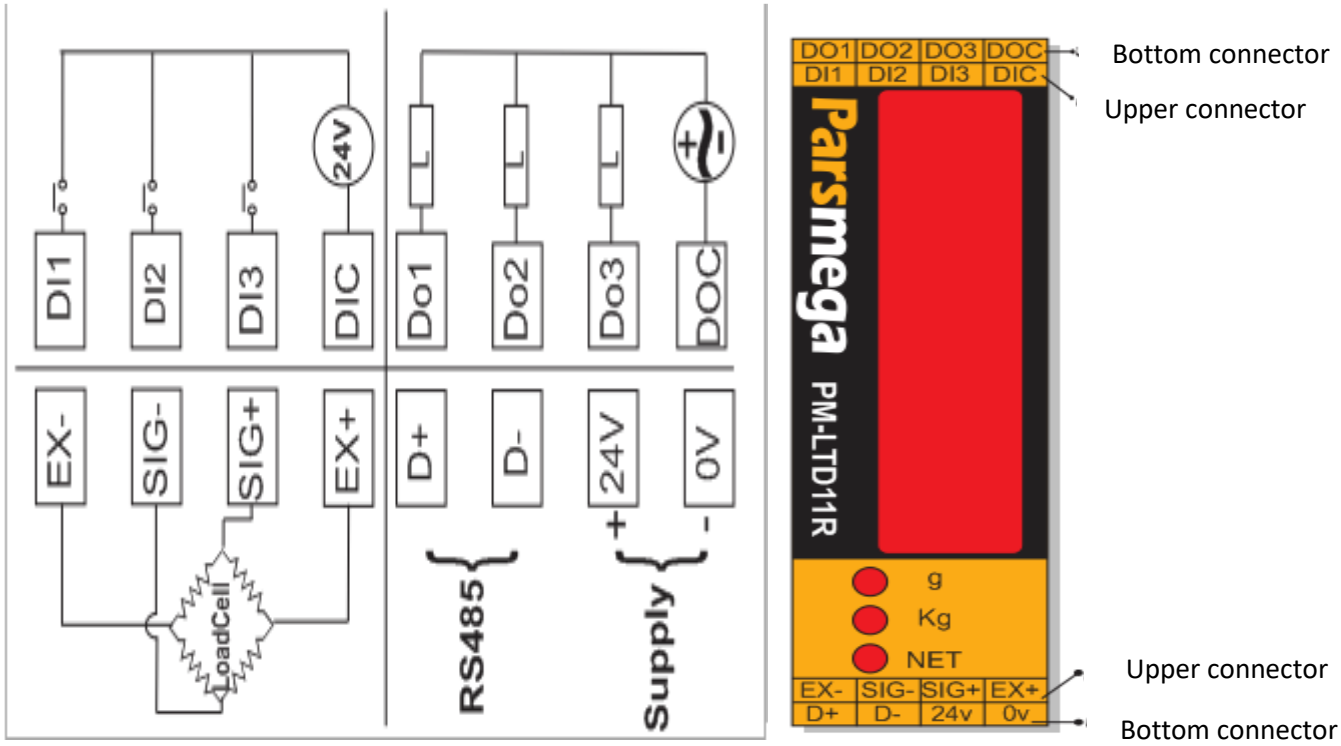
4.3.3 Cable shield connection

• Make sure the shields are properly grounded.

• Try to keep a small part of the cable without a shield.

5 Indicator Panel and Connections

All connections of this module are screws.



Connection view of the indicator transmitter

5.1 Connections Group

The connections of this module include 5 main group:

- Power
- Digital inputs
- Analog outputs
- RS485 serial
- Load cell

5.2 Connection Power

The suitable power supply for this module is 24VDC. Observe safety precautions when connecting and using the module.

5.3 Digital Inputs Connection

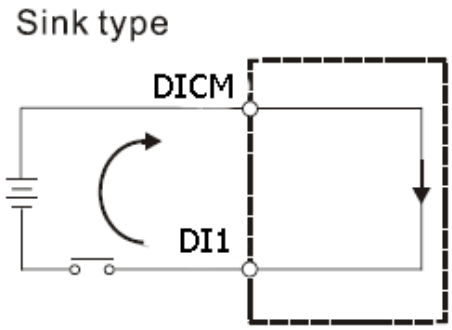
This module has four digital inputs as follows.

Label	Application
D I1	Digital input 1
D I2	Digital input 2
D I3	Digital input 3
D IC	Common digital inputs

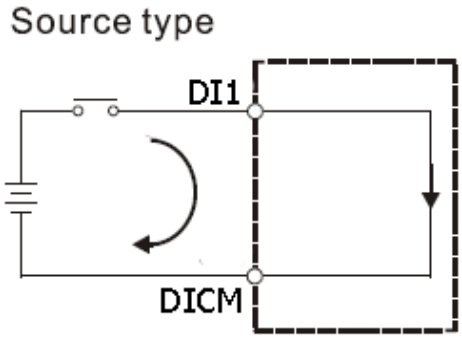
- A voltage level of 16 to 24 volts is required to activate the digital inputs.
- According to the customer's request, this voltage can be changed.
- For each input, a specific function can be defined, when the input is activated, the corresponding function is performed. This topic will be fully discussed in the digital input parameters section.
- Inputs will be activated on the rising edge.

The wiring method is as follows :

- Sink type (low active)



- Source type(High Active)



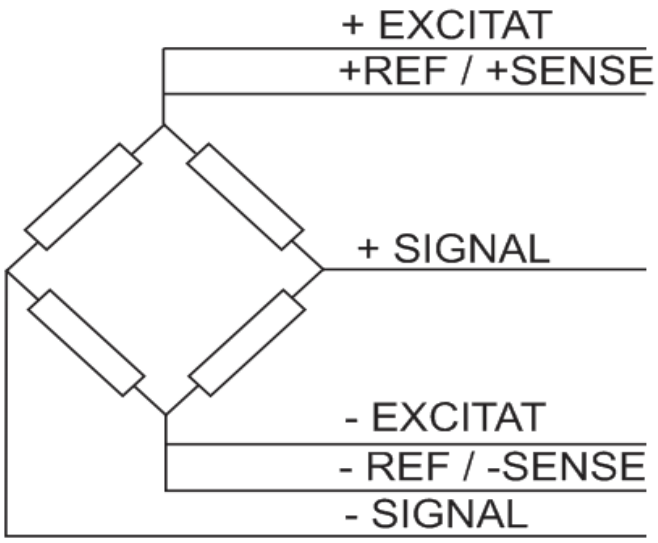
5.4 Load Cell Connection

Load cells with the following capabilities can be connected to this module:

- Output voltage 1mV/V to 7 mV/V
- Load cell excitation voltage in this device is 5 volts.

Label	Function
EXC +	Positive excitation voltage
SIG +	Positive sensor output voltage
SIG -	Negative sensor output voltage
EXC -	Negative excitation voltage

The figure below is a technical view of a load cell



- It should be noted that the only way to secure the cable against noise is to properly connect the shield to the ground.
- Only a few centimeters of the end of the cable should be left without the shield and at the same point the shield should be connected to the ground connection with a strong clamp.
- If using a 6-wire load cell, the -EXCITAT and -REF / -SENSE wires must be connected to each other, as well as the +EXCITAT and +REF / +SENSE wires must be connected to each other.

5.5 Digital Output

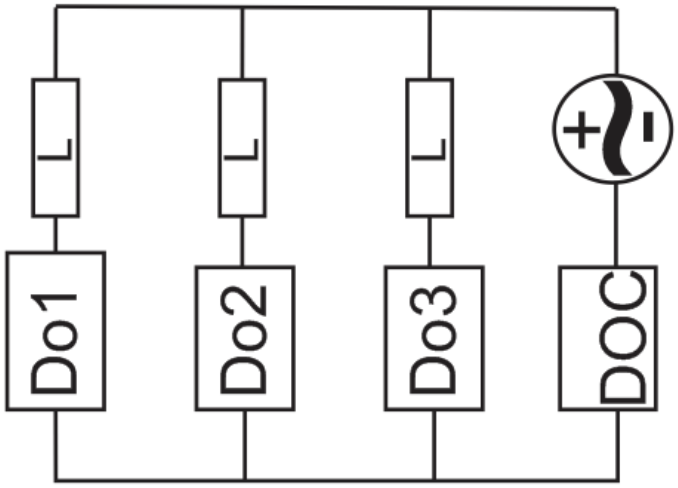
Note: Be sure to know the status of the outputs before connecting them. At the time of initial setup, all the outputs may be active.

This module has three digital outputs as follows:

Label	Function
DO1	Digital Output 1
DO2	Digital Output 2
DO3	Digital Output 3
DOC	The common voltage of the outputs

- The maximum allowed output current range for output relays is 5 amps. (If the current passes more than the allowed limit, there is a possibility of damage to the relay).
- Activation of the outputs depends on the setting of the parameters, which will be discussed in the parameters section.

How to wire digital outputs



5.6 RS485 serial connection

This module is equipped with an RS485 serial port on which the MODBUS (RTU, ASCII) protocol is implemented.

RS485 port isolation specifications:

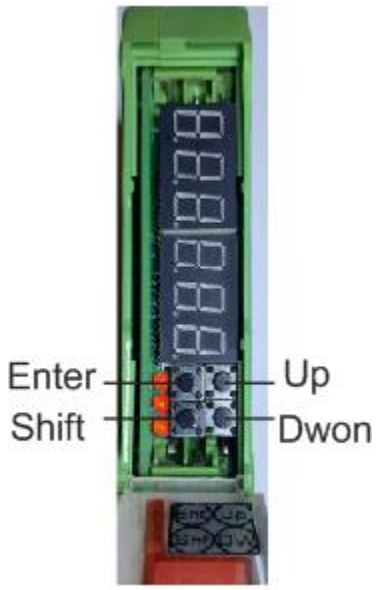
±10 kV ESD protection

Label	Function
+ D RS485	Positive Data
- D RS485	Negative Data

5.7 Indicator Panel

This indicator module has four push buttons and three LEDs.

The keys have different and adjustable functions in different situations, and the LEDs can show different states, which can be selected in the indicator settings section of these parameters.



Enter key (or Tare, this function can be adjusted)

Shift key (or Tare Reset, this function is adjustable)

Down key (or Capture, this function can be adjusted)

Up key (or Max Reset, this function can be adjusted)

The following table shows the functions of the keys in different menus and situations

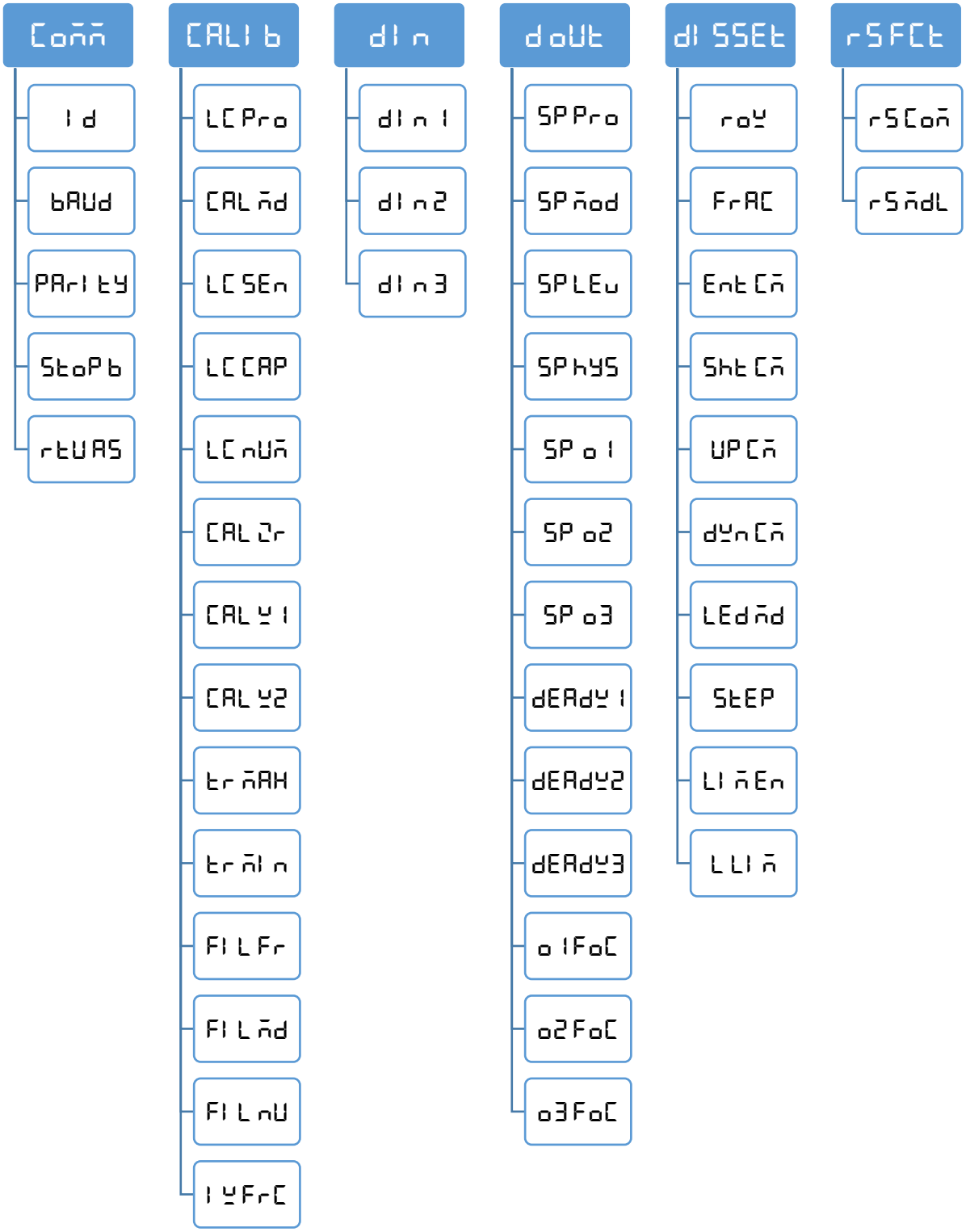
Keys	When setting parameter		Inside the settings menu		Out of the settings menu	
	hold	press	hold	press	hold	press
Enter/Tare	Confirm parameter changes	Cancel parameter change	Enter the selection menu	Back to the previous menu	Enter the settings menu	Tare*
◄ Shift / Tare Reset	Shift between parameter digits	Shift between parameter digits	---	---	---	Reset Tare*
▲ Up / Capture	Continuous increase of the parameter	Parameter increase	----	Go to the top menu	---	Capture*
▼ Down Max Reset	Continuous reduction of the parameter	Parameter reduction	---	Go to the menu below	---	Max Reset*

The duration of holding the key to confirm the function is 3 seconds.
*Defined functions are default and can be changed by the user. For more information, read the indicator settings section.

6 Indicator parameters and menus

- All parameters are set with default values at the time of purchase.
- You can also do this with the reset command.
- The length of all variables is word
- Some parameters require a reboot to take effect.
- The parameters and menus of the device have different categories for settings, which we will explain below and their parameters. In the next table, we see the general structure of the menus.

6.1 Menu structure table



6.2 How to work with menus

1- To enter the settings, you must hold the EntEr key for 3 seconds. After entering the settings, the word Conn is displayed on the top line, which is the first category of settings and related to the communication settings of the device.

2- Now you can select other setting category with ▲/▼ key.

3- After selecting the setting category, you can enter the parameters of that setting category by holding the EntEr key.

4- If you select and enter the Conn settings category, the term Id will be displayed. Which represents the value of the Id parameter of the device's Modbus connection.

5- Now you can select other parameters with the ▲/▼ key.

6- After selecting the parameter, you can edit the value of that parameter by holding the EntEr key.

7- If you select and enter to edit the parameter Id, the value of the parameter will start flashing.

8- Now you can change the value of the parameter with the ▲/▼ key and use the ◄ key to select more valuable digits (tenths, hundredths or hundredths and tenths in decimal numbers) to change.

9- After setting the appropriate value, you can save the parameter by holding the EntEr key. The word "SAvEd" is also displayed to confirm the operation.

Hints:

- In each step, by pressing the EntEr key, you can go back to the previous step, exit the settings menu, or cancel saving the parameter value.
- Parameter values have a predefined limit, for example, the value of the Conn->Id parameter can be selected between 1 and 247.

6.3 Communication settings menu and parameters (CoMM)

In the CoMM menu, it is related to the serial communication settings, in which there are the following sub-menus:

- Id (Device ID): In Modbus communication, each device connected to the bus has a unique ID.
- bAUd (Baud Rate): In this menu, the RS485 serial data transmission speed can be adjusted.
- PArIty (Parity Bit): In this menu, the parity bit of RS485 serial communication can be set.
- StoPb (Stop Bit): In this menu, the number of RS485 serial communication stop bits can be set.
- rtUAS (RTU/ASCII): In this menu, RTU or ASCII type of Modbus communication is selected.

Note that the system must be reset once to apply the above parameters.

Communication parameters menu table:

Menu Title	Menu Parameter	Default
Id	1~247	1
bAUd	2400 4800 9600 14400 19200 28800 38400 57600 76800 115200 230400	9600
PArIty	none = nonE odd = odd even = EuEn	even
StoPb	1stop bit = 1bIt 2 stop bit = 2bIt	1 bit
rtUAS	RTU = rtU ASCII (8bit) = ASCII	RTU

Address table of communication parameters:

Title	Variable Type	Length	Rediang Writing	Address	Description	Default
ID	Unsigned int	1	RW	40001 0 d 0 h	1~247	1
Baud Rate	Unsigned int	1	RW	40002 1 d 1 h	0~10 0=2400 1=4800 2=9600 3=14400 4=19200 5=28800 6=38400 7=57600 8=76800 9=115200 10=230400	2
parity	Unsigned int	1	RW	40003 2 d 2 h	0=none 1=odd 2=even	2
Stop bit	Unsigned int	1	RW	40004 3 d 3 h	0=1 bit 1=2 bit	0
Mode	Unsigned int	1	RW	40005 4 d 4 h	0=RTU 1=ASCII (8bit)	0

6.4 Calibration menu and parameters (CALI b)

In the calibration menu, it is related to the calibration settings and setting the specifications of the load cell. The sub-menus of this menu are:

- LC Pro (Load cell Profile): In this device, it is possible to define a calibration profile for 5 load cells.

for example:

We have 2 different load cells, number one is 50 kg and number two is 100 kg.

First, we set the LC Pro parameter to LC Pr 1 and perform the calibration steps for that load cell.

To define the second load cell, the same steps as above are repeated, only instead of LC Pr 1, we write LC Pr2 option in LC Pro.

In this way, LC Pr 1 profile has 50 kg load cell calibration values and LC Pr2 profile has 100 kg load cell calibration values.

Now, to call any of the profiles, just set the LC Pro parameter equal to the value of the profile.

Note: If you do not need to connect and replace different load cells, do not change this parameter.

- CAL Md (Calibration Mode): For each load cell, it is possible to calibrate in two ways:

1- Automatic calibration using the values of the calibration sheet with the load cell

2- Weight calibration using reference weight

For automatic calibration, set CAL Md to AtUo and for weight calibration to WEI GhT.

For automatic calibration, three parameters LC SEn, LC CAP and LC nUM should be entered.

For weight calibration, CAL Y 1, CAL Zr and CAL Y2 parameters should be entered according to the calibration instructions.

In general, calibration with reference weight is more accurate than automatic calibration mode.

- LC SEn (Load Cell Sensitivity): It is the amount of voltage that the load cell puts at its maximum capacity for each excitation volt in the output, whose unit is mV/V. which is included in the load cell calibration sheet.
- LC CAP (Load Cell Capacity): It is the working capacity of the load cell, which is included in the load cell calibration sheet.
- LC nUM (Load Cell Number): The number of load cells connected in parallel to the module can be determined by this parameter.
- CAL Zr (Zero): By entering this parameter and saving it, zeroing will be done. It should be noted that the value of the parameter cannot be changed and only saving it is enough to perform zeroing.
- CAL Y 1 (Calibration Weight 1): For calibration, you must place a reference weight whose exact mass you know on the load cell, then enter the weight value in the Calibration Weight 1 parameter and confirm.
- CAL Y2 (Calibration Weight 2): For calibration, you must place a reference weight whose exact mass you know on the load cell, then enter the weight value in the Calibration Weight 2 parameter and confirm.

Note: The calibration guide section explains how to calibrate using both methods.

- tr MAH (Tare Max Limit): This parameter is to limit the Tare weight, if the total weight given is greater than this parameter, the Tare operation will not be performed.
- tr MI n (Tare min Limit): This parameter is to limit the Tare weight, if the total weight given is less than this parameter, the Tare operation will not be performed.

Note: Tare Max Limit and Tare min Limit parameters are to avoid applying excessive force to the load cell. If the weight on the load cell exceeds this value, the device does not allow the user to reset the weight to zero, for example, if a 50 kg load cell is connected to the device and the Tare Max Limit is equal to 40 kg, if the weight is more than 40 kg Yes, the weight does not become zero by executing the command SafarTare.

- FI LFr (Filter Frequency): This parameter sets the sampling frequency of the analog signal. It should be noted that the higher value of this number increases the speed of sampling and decreases its accuracy. It is necessary to choose the right amount for different uses.

• FILnd (Filter Mode): to select the type of filter function. (In this model, as a Moving filter, this parameter is set to 0 and cannot be changed).

• FILnU (Filter Number): This parameter is used to determine the number of averaging samples. For example, if this parameter is equal to 10, the length of the averaging array is equal to 10, and the averaging is done from the last 10 samples. Of course, in the averaging process, the newest sample enters the array and the oldest sample is removed from it, until the effect of the new sample appears in the filter output. to be It should be noted that the higher value of this number decreases the speed of weight changes and increases its accuracy. It is necessary to choose the right amount for different uses.

• IUFrC (Integer weight fraction): In the Integer weight register (in the reading parameters section), the weight value is correctly displayed. Using this variable, you can determine the number of numbers that must be correctly displayed after the decimal point.

The menu table of calibration parameters and the address table of calibration parameters are as follows.

Calibration parameters menu table

Menu Title	Menu Parameter	Default
LCPro Load cell profile	LCPr 1 - Load cell profile number 1 LCPr2 - Load cell profile number 2 LCPr3 - Load cell profile number 3 LCPr4 - Load cell profile number 4 LCPr5 - Load cell profile number 5	LCPr 1
CALmd Calibration mode	AtUo -automatic calibration yEIGht -weight calibration	AtUo
LCSEn Output voltage per volt	It is included in the load cell calibration sheet.	2.001 mv/v
LCCAP Load cell weight capacity	It is included in the load cell calibration sheet.	50 kg
LCnUm Number of connected load cells	The number of load cells used to measure weight.	1numbers
CAL0r Zero calibration	By entering this parameter and saving it, zeroing will be done.	____
CAL y1 Weight calibration 1	Enter and read the calibration reference weight point one	0 Kg
CAL y2 Weight calibration 2	Entering and reading the second point calibration reference weight	50 Kg
trmAH Upper range of tare	The maximum weight allowed for tare operation	20 kg
trmIn Lower range of tare	The minimum weight allowed for tare operation	-10 kg

FILFr Sampling frequency	4.7Hz 10Hz 20Hz 30Hz 40Hz 50Hz 60Hz 96Hz 120Hz 150Hz 200Hz 240Hz 300Hz 400Hz 600Hz 800Hz 960Hz 1200Hz 1600Hz 2400Hz 4800Hz	50Hz
FILād Filter type	unchangeable	--
FILnU The number of averaging samples	To determine the number of averaging samples	10 numbers
IYFrC decimal number	The decimal number that is converted to an integer in the integer variable	3

The address of the parameters of the load cell:

Title	Variable Type	Length	Writing Ability	Address	Description	Default
Load cell Profile	unsigned int	1	RW	40109 108 d 6C h	0~4	0
Output voltage per volt	float	2	RW	40051 50 d 32 h	mv/v	2
Load cell Weight Capacity	float	2	RW	40053 52 d 34 h	kg	50
Number of connected load cells	Unsigned int	1	RW	40055 54 d 36 h	-	1

Address of calibration parameters:

Title	Variable Type	Length	Writing Ability	Address	Description	Default
Calibration mode	unsigned int	1	RW	40077 76 d 4C h	0=Automatic Mode 1= Weight Mode	0
The value of the first calibration reference weight	float	2	RW	40078 77 d 4D h	kg	0
Second calibration reference weight value	float	2	RW	40080 79 d 4F h	kg	0

The address of the parameters related to the Tare range:

Title	Variable Type	Length	Writing Ability	Address	Description	Default
The lower range of stone fragment weight	float	2	RW	40068 67 d 43 h	kg	-5
The upper range of the weight of tare	float	2	RW	40070 69 d 68 h	kg	50

The address of the parameters related to the correct weight and the decimal variable:

Title	Variable Type	Length	Writing Ability	Address	Description	Default
Net weight of channel 1	signed long	2	R	40146 145 d 91 h	-	-
fraction	Unsigned int	1	RW	40148 147 d 93 h	0~6	3

The address of the sampling filter parameters:

Title	Variable Type	Length	Writing Ability	Address	Description	Default
The number of averaging samples	Unsigned int	1	RW	40044 43 d 2B h	2~50	10
Sampling frequency	Unsigned int	1	RW	40045 44 d 2C h	0=4.7 1=10 2=20 3=30 4=40 5=50 6=60 7=96 8=120 9=150 10=200 11=240 12=300 13=400 14=600 15=800 16=960 17=1200 18=1600 19=2400 20=4800	0
Filter type	Unsigned int	1	RW	40046 45 d 2D h	0=simple 1=smart	unchangeable

6.5 Menu and parameters of digital inputs (dIn)

The device has 2 digital inputs. A specific function can be defined for each digital input. For this purpose, a parameter is assigned to each input. It is also possible to view the status of the inputs through serial communication and use them as an independent input. For each of the functions, there is a corresponding code, by placing that code in the corresponding parameter of each input, when the inputs are activated, the desired function is executed.

Note: The performance of the inputs is with a rising edge, and the level of the input remaining active does not mean that the command will be executed permanently.

- dIn 1dIn2dIn3: The code related to the function of the first, second and third input

Menu table of digital input parameters

Menu Title	Menu parameter	Default
dIn1	nonE = No function tArE =Tare command execution ZEro = Zero execute the command to zero tArrS = Tare Reset n-nrS = Max & Min Weight Reset CAPtr = Recording the net weight in the current weight register CALIb1 = Calibrate 1 CALIb2 = Calibrate 2 CLrSo = Calibration Restore	nonE
dIn2 dIn3	dIn1	nonE

Address table of digital input parameters

Title	Variable Type	Length	Writing Ability	Address	Description	Default
First input command code	Unsigned int	1	RW	40121 120 d 78 h	0 = None 1 = Tare 2 = Zero 3 = Tare Reset 4 = Max & Min Weight Reset 5 = Weight Capture Trig 6 = Calibrate 1 7 = Calibrate 2 Calibration=8 Restore	None
Secound input command code	Unsigned int	1	RW	40122 121 d 79 h	Same as input command code one	None
Third input command code	Unsigned int	1	RW	40123 122 d 7A h	Same as input command code one	None
Inputs status display	Unsigned int	1	R	40016 15 d F h	-	-

Note: through serial communication and by reading the "input status display parameter" it is possible to check the activation or non-activation status of the inputs. In this parameter, the first input is in the LSB.

6.6 Menu and display parameters and keyboard (dISPLAY)

- rOW: Row, with this parameter, you can select the variable that should be displayed. For example, you can choose net weight, reference weight, etc.

• FrAC: Fraction This parameter specifies the number of variable decimals displayed. For example, if the read weight is equal to 123.456, if 0 is selected for this parameter, the number 123 will be displayed, and if 2 is selected for this parameter, the number 123.45 will be displayed.
Note: If it is not possible to display the selected number of decimals, the number of decimals will be corrected automatically. For example, if the value of the parameter is 3 in the above example, it will be displayed as 123.456, but if the weight changes and reaches the value of 1234.567, the number will be displayed as 1234.56.
• EntCn: Enter Key Command This parameter specifies the function of the first key (Menu/Tare) in the mode outside the menus. This is the default value for Tare.
• ShtCn: Shift Key Command This parameter specifies the function of the second key (◄/Reset Tare) in the mode outside the menus. This is the default value for Tare Reset.
• UPCn: Up Key Command This parameter specifies the function of the third key (▼) in the mode outside the menus. This is the default value for Capture Trige.
• dynCn: Down Key4 Command This parameter specifies the function of the fourth key (▲) in the mode outside the menus. This value is by default for Max min Reset.
• LEdMd (LED Mode): This parameter determines the performance of the LEDs of the display, if the state of the inputs is IStat, and if PnLtG, the specified parameters on the panel are in kg units, and if PnLG, the specified parameters are on It displays the panel with the warm unit.
• StEP: It is inactive.
• LImEn (Limit Enable): It is inactive.
• LLIn (Low Limit): It is inactive.

Table of display menus and keyboard:

Menu Title	Menu Parameter	Default
roY Display parameter	nEtY = Net weight is displayed GroSY = The total weight is displayed nAHY = The maximum net weight is displayed nEtY = The minimum net weight is displayed nEtY = Recorded weight (Capture Weight) is displayed dI StA = The status of the inputs is displayed doStA = The output status is displayed LCnu = The output voltage of the load cell is displayed	nEtY
FrAC Decimal number of display	The number of decimal places of the displayed number is specified from 0 to 5	3
EntCn Enter key function code	nonE=No function tArE = Tare command ZEro = Zero command tArrS = Tare Reset n-nrS = Max & Min Weight Reset CAPtr = Weight Capture Trig CALIb1 = Calibrate 1 CALIb2 = Calibrate 2 CLrSo = Calibration Restore	tArE
ShtCA Shift key function code	Like the function code of the enter key	tAr rS
UPCA Up key function code	Like the function code of the enter key	n-n rS

dyn CA Down key function code	Like the function code of the enter key	CAP tr
LEd nd Led display mode	I StAt= Display status of inputs PnL tG= display the specified parameters on the panel and Clio gram unit PnL G= display the specified parameters on the panel and heating unit	I StAt
StEP Display Step	Deactive	1
LI nEn	Deactive	--
L I LA	Deactive	--

Address table of display parameters and keyboard:

Title	Variable Type	Length	Writing ability	Address	Description
Row display variable	unsigned int	1	RW	40182 181 d B5 h	0~7 0=Net Weight 1=Gross Weight 2=Max Weight 3=Min Weight 4=Capture Weight 5=Input State 6=Output State 7=Loadcel Voltage
Decimal	unsigned int	1	RW	40183 182 d B6 h	0~5

Step	float	2	RW	40187 186 d BA h	Deactive
Enter Enter key command	unsigned int	1	RW	40189 188 d BC h	0~8 **0** = None **1** = Tare **2** = Zero **3** = Tare Reset **4** = Max & Min Weight Reset **5** = Weight Capture Trig **6** = Calibrate 1 **7** = Calibrate 2 Calibration=**8** Restore
Shift key command	unsigned int	1	RW	40190 189 d BD h	0~8 Same as Enter
Up key command	unsigned int	1	RW	40191 190 d BE h	0~8 Same as Enter
Down key command	unsigned int	1	RW	40192 191 d BF h	0~8 Same as Enter
LED Mode	unsigned int	1	RW	401193 192 d C0 h	0=Input State 1=panel & Kg unit 2=panel & g unit

6.7 Relay outputs menu and parameters (d oUt)

• SP Pro: SET point profile another feature of this module is to define a profile for the output set points. Imagine you have given three set points to the module and you are using it, but you want to set a few more different set points and only you need to call them. For example, a packaging machine is working, set points are given to the module and its output is used. Now, when the product is changed, you need to change the Set Points. For this purpose, just change the value of the SP Pro parameter and select the appropriate profile, so that the new set point values are replaced. Currently, up to 10 profiles can be defined (0~9).

• SP nod: SET point, the device has three relay outputs, the outputs are triggered based on the comparison of the base weights (bEt Pol nt) with the net weight parameter.

There are 2 modes for activating outputs:

Indpen: Independent Mode In this mode, each output independent of other set points is compared only with its corresponding set point, if the value of the net weight is smaller than the weight of the set point, the corresponding output is activated and otherwise it is deactivated.

Net Weight < Set Point X -> Outx On

Net Weight > Set Point X -> Outx Off

Example:

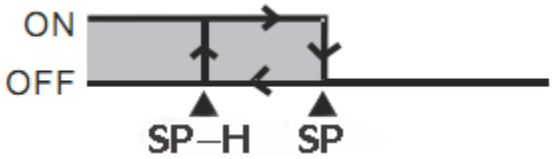
Out 1	Net Weight	Set Point 1
on	11 Kg	12 Kg
off	13 Kg	12 Kg

Inbet: Mode In between in this mode, the net weight is compared with the next and previous Set Point values. And if it is located between each of the set points, the corresponding output will be activated. The following table shows how to compare and activate the outputs.

Comparison	Out 1	Out 2	Out 3
Net Weight<S.P1	On	Off	Off
S.P1<Net Weight<S.P2	Off	On	Off
S.P2<Net Weight<S.P3	Off	Off	On

SErIAL: Serial Mode In this mode, the outputs are activated and deactivated independently of the weight and through serial communication. "Relay" output parameters, if the number one is written in the parameter corresponding to each output, the output will be activated, and if zero is written, the output will be deactivated. If this mode is active, the outputs can be activated and deactivated from the panel through the sub-menus in the "Relay Outputs Menu and Parameters" section (sub-menus o1FoC o2FoC o3FoC).

- SPLEu: (Set Point Level) the level type of the outputs can be changed through this parameter, that is, the outputs can be set as Normally Open or Normally Close.
- SPHYS: (Set Point Hysteresis) is intended to prevent outputs from playing when a Hysteresis is turned off. The performance is such that when the output is activated at the time of shutdown, the weight of the set point is subtracted from the Hysteresis value and compared with the net value, and if the net weight is less than the result of the subtraction of the Set Point and Hysteresis, the desired output is not is activated This parameter can be considered as zero.



- SPo1: (Set point1) in this menu, a set weight value is placed for the first output, which is compared with the net weight, and the result of the comparison is applied to the output of relay one.
- SPo2: (Set point2) in this menu, a set weight value is placed for the second output, which is compared with the net weight, and the result of the comparison is applied to the second relay output.

- SP o3: (Set point3) in this menu, a set weight value is placed for the third output, which is compared with the net weight, and the result of the comparison is applied to the third relay output.
- dEAd 1: (Dead Weight1) the dead weight related to Set point 1 is set in this menu.
- dEAd2: (Dead Weight2) the dead weight associated with Set point 2 is set in this menu.
- dEAd3 : (Dead Weight3) the dead weight associated with Set point 3 is set in this menu.
  In some cases, in weighing systems, there is an air gap between the main source and the weighing system (for example, the air gap between the hopper and the weighing chamber).
  In order to eliminate the effect of this weight on the road (so-called dead weight), a parameter with the same name is embedded in the module, which has an independent value for each Set Point.
- The value of Dead Weight also changes for each profile, that is, an independent Dead Weight is saved for each Set Point.
  - o 1FoC: output1 Force, this parameter can be used to test the output of relay 1, for this purpose, we put it in the section "menu and parameters of relay outputs" under the SP mod menu in SEri AL serial mode.
  - o2FoC: (output1 Force, this parameter can be used to test the output of relay 2, for this purpose, we put it in the section "menu and parameters of relay outputs" under the SP mod menu in SEri AL serial mode.
  - o3FoC: output1 Force, this parameter can be used to test the output of relay 3, for this purpose, we put it in the section "Relay Outputs Menu and Parameters" under the SP mod menu in SEri AL serial mode.

In the following, the menu table and the address table of the parameters of the output section are shown:

Table of relay output menus

Menu Title	Menu parameter	Default
SP Pro Profile Set point	ProF 1 = Output settings profile 1 ProF2 = Output settings profile 2 ProF3 = Output settings profile 3 ProF4 = Output settings profile 4 ProF5 = Output settings profile 5 ProF6 = Output settings profile 6 ProF7 = Output settings profile 7 ProF8 = Output settings profile 8 ProF9 = Output settings profile 9 ProF 10 = Output settings profile 10	ProF 1
SP mod Comparison mode set point	IndPEn = An independent comparison mode InbEt = Mode of comparison between a SErIAL = Serial mode	IndPn 1
SPLEu تغییر سطح عملکرد خروجی	dISAbL =Normally Open EnAbLE =Normally Close	dISAbL
SPhyS Hysteresis value Setpoint	This value is considered as hysteresis for all outputs.	0
SPo1 Base weight 1	Set point Base weight 1	0
SPo2 Base weight 2	Set point Base weight 2	1

SP 03 Base weight 3	Set point Base weight 3	2
dEAd 1 Dead weight 1	Dead weight of one for output of one	0
dEAd2 Dead weight 2	Dead weight two for output two	0
dEAd3 Dead weight 3	Dead weight three for output three	0
o1Fo Output test one	oFF =Activate on = Deactive	oFF
o2Fo Output test Two	oFF =Activate on = Deactive	oFF
o3Fo Output test three	oFF =Activate on = Deactive	oFF

Address table of relay output parameters

Title	Variable type	Length	Writing ability	Address	Description	Default
SET POINT 1 Base weight 1	float	2	RW	40088 87 d 57 h	kg	2
SET POINT 2 Base weight 2	float	2	RW	40090 89 d 59 h	kg	2
SET POINT 3Base weight 3	float	2	RW	40092 91 d 5B h	Kg	2

Profile number	unsigned int	1	RW	40096 95 d 5F h	0~10	0
Hysteresis	float	2	RW	40097 96 d 60 h	kg	1
Change the level of Inverse function	unsigned int	1	RW	40099 98 d 62 h	0= Disable 1= Enable	0
Comparison mode	unsigned int	1	RW	40100 99 d 63 h	0=independent1 1=in between1 2=independent2 3=in between2 4=serial	0
Dead weight 1	float	2	RW	40101 100 d 64 h	-	0
Dead weight 2	float	2	RW	40103 102 d 66 h	-	0
Dead weight 3	float	2	RW	40105 104 d 68 h	-	0
Out1 Serial force	Unsigned int	1	RW	40022 21 d 15 h	0= off 1=on	-
Out2 Serial force	Unsigned int	1	RW	40023 22 d 16 h	0= off 1=on	-
Out3 Serial force	Unsigned int	1	RW	40024 23 d 17 h	0= off 1=on	-

Digital outputs Condition	Unsigned int	1	R	40017 16 d 10 h	The active or non-active status of the outputs can be checked. The first output is at LSB.	outputs

Using out Serial Force parameters, if the output comparison mode is defined as serial, the digital outputs can be stimulated and the outputs act independently of the weight and like an output card.
This feature is very useful for you during startup. For example, using this feature, you can be sure of the correct wiring of your system.

6.8 menu and parameters to return to factory settings (rSFCt)

In this menu, there is the ability to return all the settings of the device to the default state. In addition, the serial communication settings can be reset to default only by yourself. For this, it is enough to enter the relevant menu, first the reload option will be displayed, then the Enter key will be held for more than three seconds to confirm the reset action, after that the phrase "Off on" will be displayed with a flashing face, exit the relevant menu and turn off the device. Turn off and on to reset.

- rSCon: Communication Reset to Factory this option is used to reset serial communication settings.
- rSAdL: Mdule Reset to Factory This option is used to reset the settings of the entire device.

Return to factory settings menu table:

Menu Title	Menu Parameter	Default
rSCon Reset serial settings	rELoAd = Restore serial communication settings	--
rSAdL Reset all settings	rELoAd = Restore all device settings	--

6.9 Module information parameter

• This parameter can only be accessed through serial communication and cannot be seen through the indicator menus.
• All the following parameters are read only

Title	Variable type	Length	Reading Writing	Address	Description	Default
Firmware ver	Float	2	R	40007 6 d 6 h		
Hardware ver	Float	2	R	40009 8 d 8 h		
Model	Unsigned int	1	R	40011 10 d A h		
Serial number	Unsigned long	2	R	40012 11 d B h		

6.10 Weight Parameters

Title	Variable type	Length	Reading Writing	Address	Description	Default
Totsl weight	float	2	R	40026 25 d 19 h	kg	-
Net weight	float	2	R	40028 27 d 1B h	kg	-
Tare weight	float	2	R	40030 29 d 1D h	kg	-
Raw **adc** data without filter	u long	2	R	40032 31 d 1E h	-	-

Filtered raw **adc** data	u long	2	R	40034 33 d 21 h	-	-
input voltage millivolts	float	2	R	40036 35 d 23 h	mv	-
Maximum weight	float	2	R	40159 158 d 9E h	kg	
Minimum weight	float	2	R	40161 160 d A0 h	kg	
Weight momentary	float	2	R	40163 162 d A2 h	kg	
The difference in weight at a certain time **Delta W**	float	2	R	173	Deactive	
Specific time for weight difference **Delta t**	Unsigned int	1	RW	172	Deactive	5
rate of weight change	float	2	R	175	Deactive	-

• Gross weight displays all the weight on the load cell.

• Net weight indicates the total weight minus the tare weight.

• Tare weight

Unfiltered ADC data is the raw value read from the ADC.

• Filtered raw data read from ADC.

• It is the voltage that appeared at the output of the load cell. This value is in millivolts.

• The two registers of the highest and lowest weight are constantly monitoring the net weight, and if the current weight is more or less, these two registers replace the previous value with the new value.

(An instruction is also included to reset the contents of both registers with the weight of the same moment.)

• The function of the current weight register is that by sending the corresponding code (Capture), the current weight is placed in this register.

• In cases where there is a need to read the amount of weight change per unit of time, the registers of weight difference and time difference are placed. Also, the register of the rate of weight change per unit of time is obtained from the division of the above registers and is provided to the user.

• In cases where it is necessary to read the weight in "Long" format, the following table is provided.

Note that the value of the fraction is determined by the user.

For example, if the weight value is 1.235 kg and the fraction value is 3, the content of the corresponding register will be 1235.

Title	Variable type	Length	Reading Writing	Address	Description	Default
Net weight of channel 1	signed long	2	R	40146 145 d 91 h	-	-
fraction	Unsigned int	1	RW	40148 147 d 93 h	0~6	3

6.11 Commands

All commands are written in a register, the specifications of that register are as follows.

All commands will be executed after 500 milliseconds at most.

Title	Variable type	Length	Reading Writing	Address	Description	Default
Command register	Unsigned int	1	W	40062 61 d 3D h	-	-

The list of commands is as follows

Number	Function	Code
1	None	0
2	Tare	1
3	Zero	2
4	Tare Reset	3
5	Reset Max and Min Weight	4
6	Capture current weight	5
7	Calibration trigger 1	6
8	Calibration trigger 2	7
9	Calibration Restore	8
10	Communication Reset to factory setting	9
11	Reset to factory setting	12

All values are in decimal.

Number 1: None
No function (default value)

Number 2: Tare
With this command, the current weight on the load cell is considered as the Tare weight and is written in the Tare weight register.

Note that before applying this command, you must set the zero limit values

Tare High limitation and Low tare limitation have been set correctly.

The order is applied only if the gross weight is in the following range.

Low Tare limitation < Gross weight < High Limitation

Number 3: **Zero**
This command is used to zero the total weight and net weight.

It is recommended to use this command only during calibration and use Tare command at other times.

Number 4: Tare Reseet
This command is used to zero the Tare weight value.

Number 5: Reset Max and Min Weight
By executing this command, the highest and lowest weight registers will be set with the current weight value.

Number 6: Capture current weight
By executing this command, the current weight will be placed in the current weight register.

Number 7: Calibration trigger 1 Perform the first stage of weight calibration
In weight calibration, calibration is done in 2 steps.

This command will perform the first stage of weight calibration.

In the first step, the maximum value of 5% of the load cell range should be written in the Calibration Weight 1 register, then the same amount of weight should be placed on the weighing system, and then this command would be sent.

For this, you need to send the value of 7 decimals to the Command register.

Number 8: Calibration trigger 2 to perform the second stage of weight calibration
This command will perform the second stage of calibration

At this stage, a specific weight should be at least 50% of the total weight on the weighing system; And the exact amount of this weight has been poured on the Calibration Weight 2 register. At this stage, you can do this by sending 7 decimal numbers to the instruction register.

Number 9: Calibration restore
This command returns the last calibration coefficient. This command is only for weight calibration and is not related to automatic calibration.

Number 10: return the settings of serial communication parameters to the default mode
You can use this command in cases where you want to restore only the serial communication settings to their original state. For this purpose, the value of 9 decimals must be sent to the instruction register.

After sending this command, you need to turn the module off and on again for the changes to take effect.

Number 11: Return to the initial settings
In cases where you need to return the module to the initial settings, you can send this command.

• **Note** that the parameters of the communication group also return to their default values.

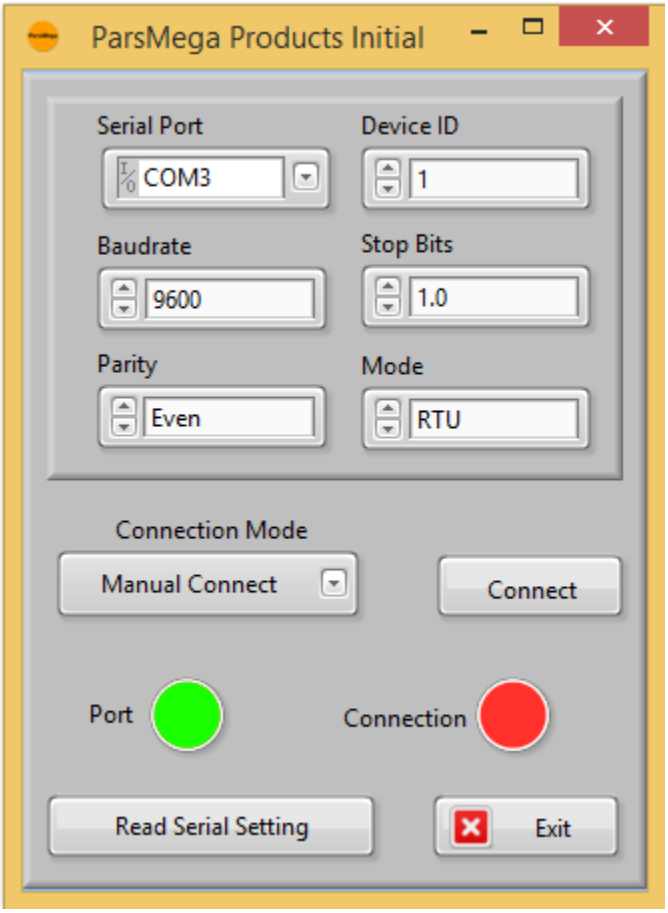
• After sending this command, you need to turn the module off and on again for the changes to take effect.

7 Computer software for transmitter settings

In order to set up and monitor the transmitter, a computer program has been prepared by Pars Mega Company, which includes all the features of the transmitter.

7.1 Introduction

By running the program, the following page will be opened at first:



Serial Port: The number of the serial port to which the transmitter is connected.

When the correct port is selected, the Port indicator will turn green.

Device ID: ID of the transmitter, which is 1 by default in the transmitter.

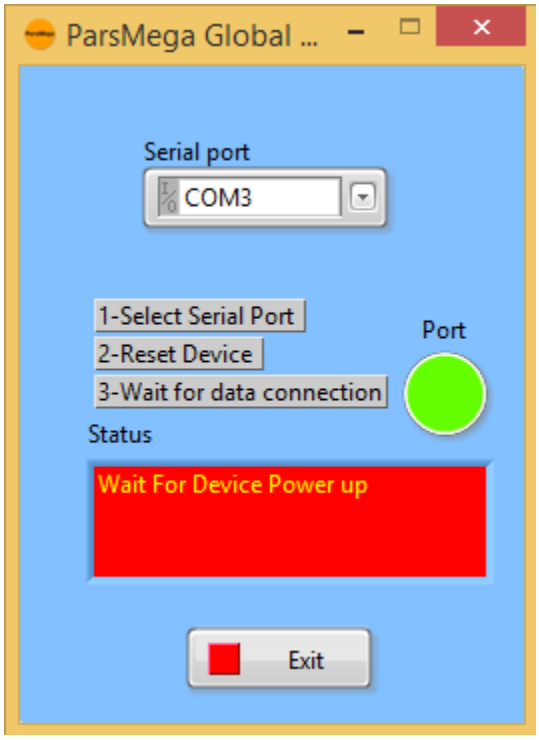
Baud Rate: The baud rate of serial communication is 9600 by default.

Stop Bit: The Stop bit specifier is in serial communication and is 1 bit by default.

Parity: The serial communication parity parameter is even by default.

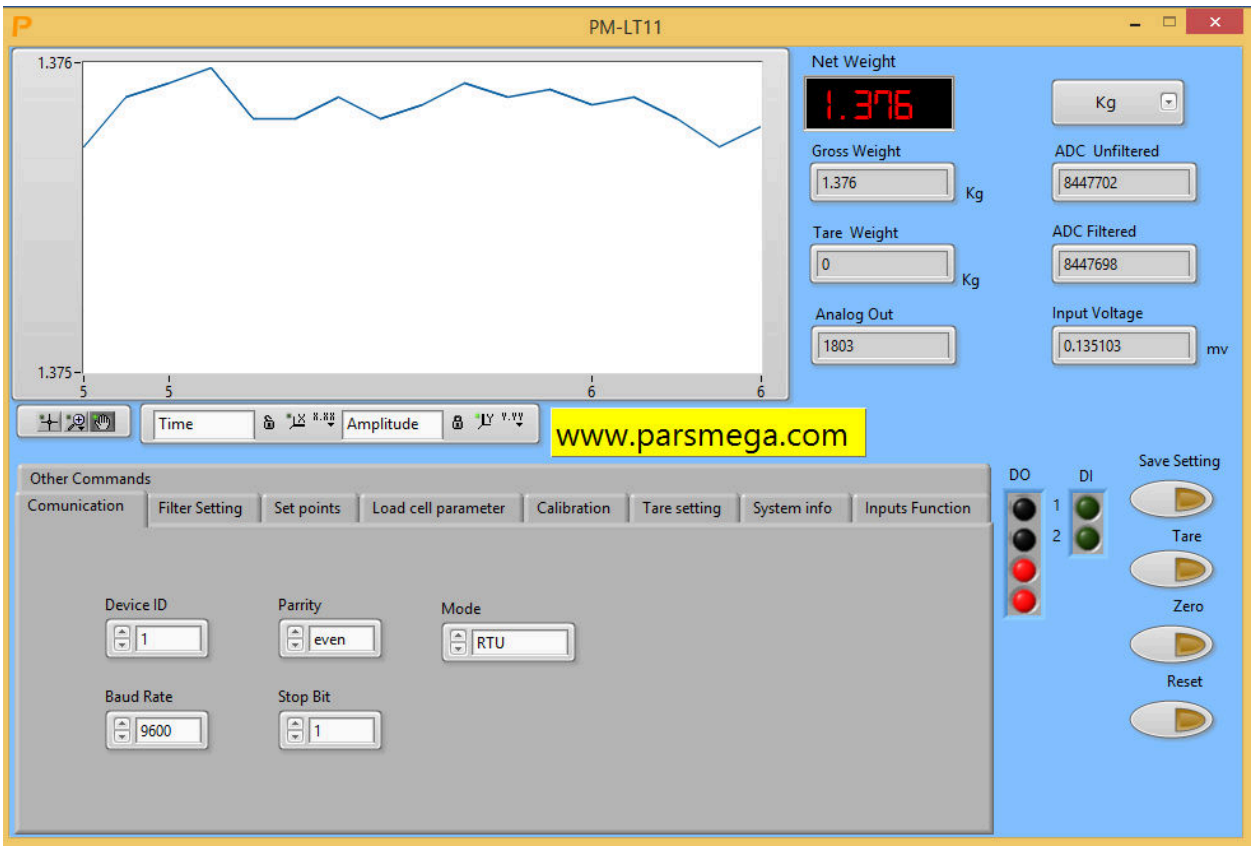
When the connection is established, the Connection indicator will turn green and this page will be closed automatically and the main page of the program will be opened.

Read Serial Setting: If you do not know what settings are on the device and communication is not established, press this button to go to another page where it is possible to read these parameters.



If you have pressed the "Read Serial Setting" button on the previous page, the above page will open, after opening this page, first select the port (if selected correctly, the port will turn green) and then turn the device off and on. After reading these values, this page is closed and the main page is opened.

7.2 Program manin page



د The Save Setting button is for saving the settings.

The Tare button is for stone chips.

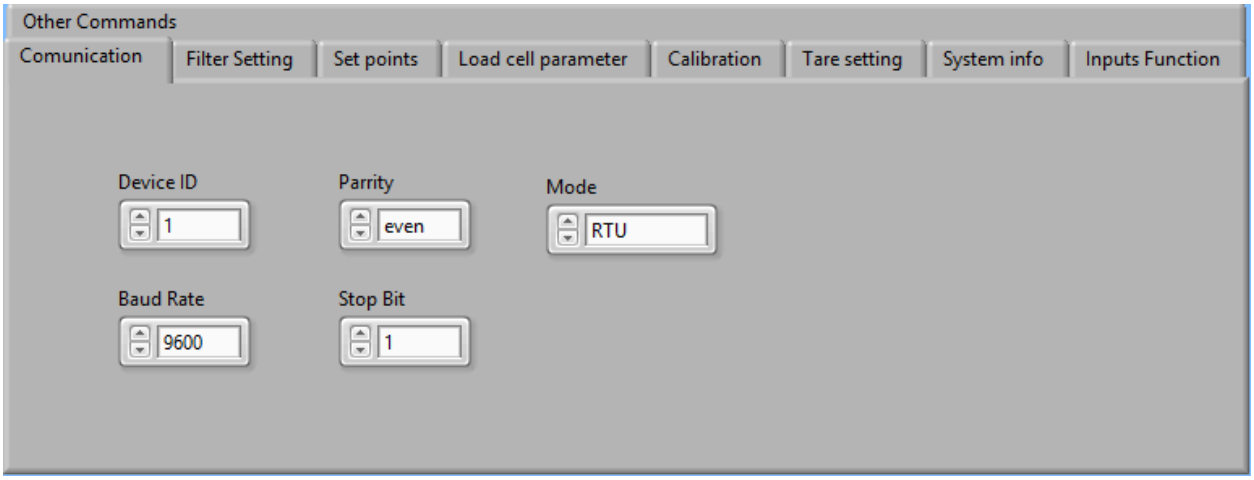
The Reset button is for restarting.

Transmitter variable values:

- ADC Unfiltered raw value of ADC without filtering
- ADC Filtered Raw ADC value with filter applied
- Gross Weight Total weight amount
- Net Weight
- Tare Weight
- Input Voltage The output voltage value of the load cell
- Analog Out Analog output value

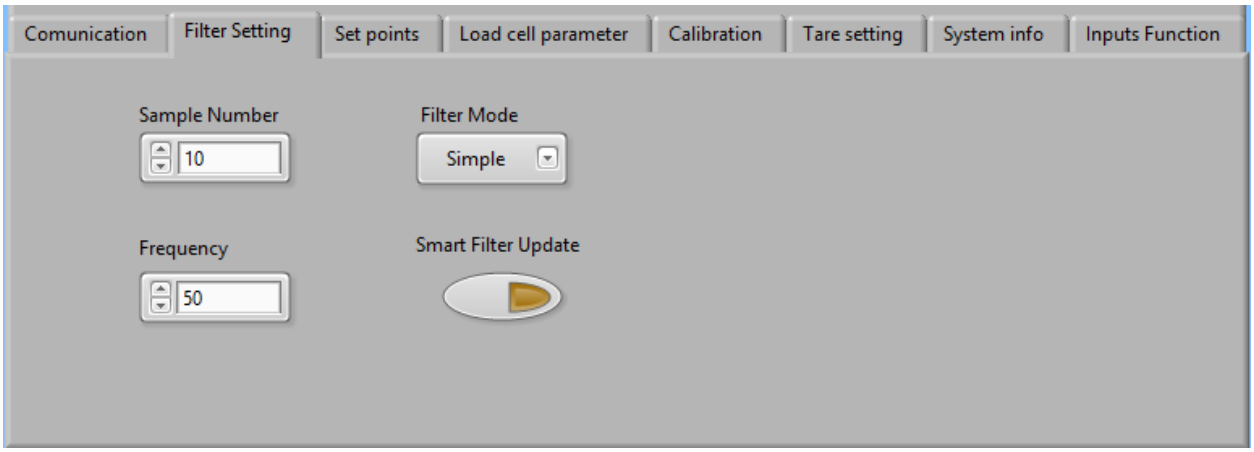
Adjustable transmitter values:

7.2.1 RS485 serial communication setting



* Please note that the transmitter needs to be reset once to apply the changes related to the serial communication settings.

7.2.2 Filter related settings



Filter Mode is a type of filter that can be simple or intelligent Moving.

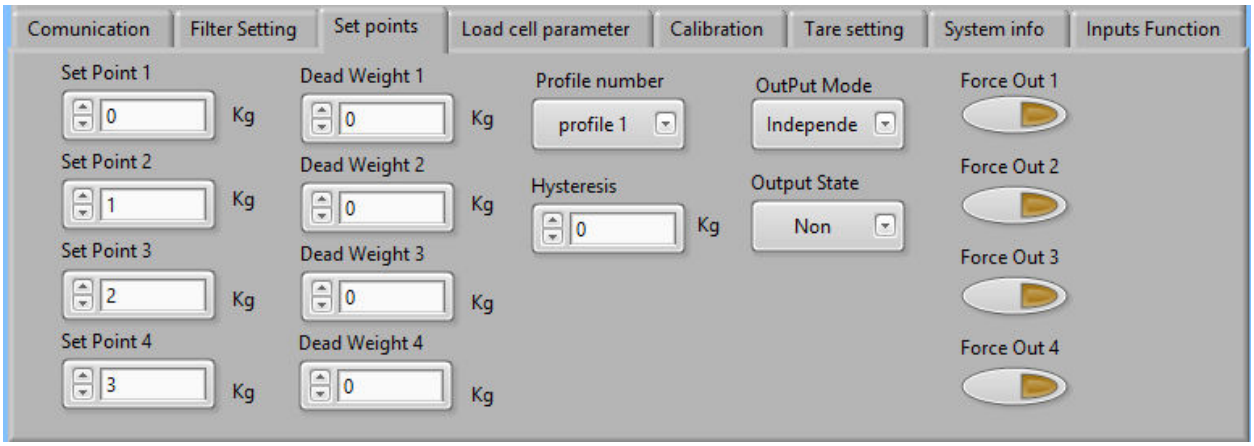
Smart Filter Update is the automatic setting of the smart filter that is explained in the filter parameters section.

After pressing this button for 10 seconds, the system should be in a state without tension and conflict.

Sample Number The number of samples to filter.

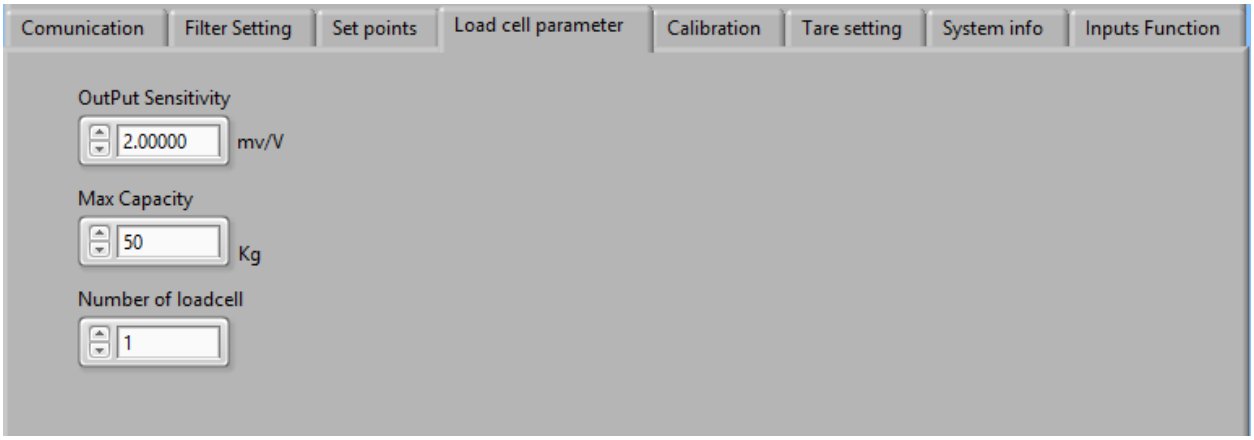
Frequency sampling speed.

7.2.3 Settings related to digital outputs



These parameters are fully explained in "6.10 Set points parameters".

7.2.4 Settings related to load cell values

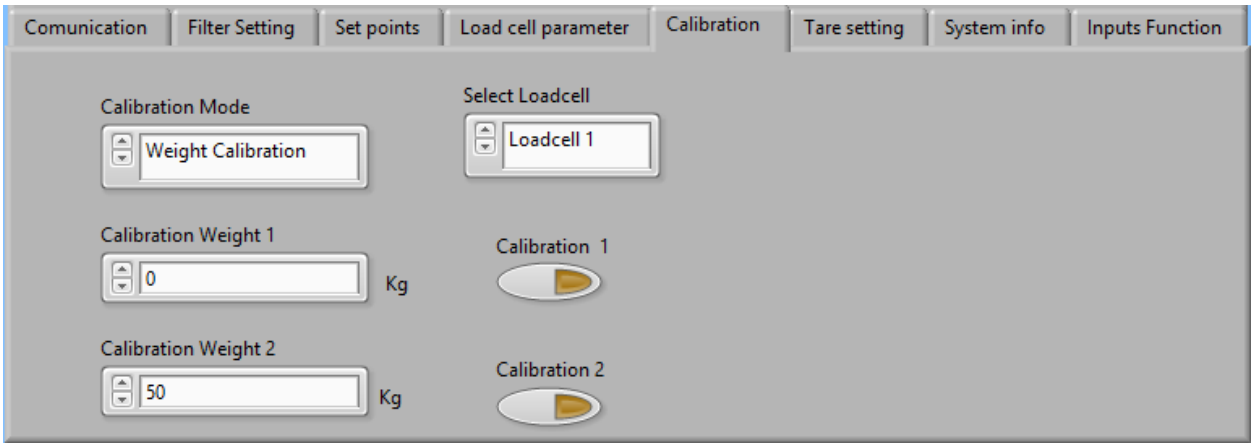


Output Sensitivity is the amount of voltage that the load cell puts in the output at its maximum range for each excitation volt. You can find this value with the same name in the load cell sheet.

Max Capacity is the maximum working range of the load cell.

Number of Load cells is the number of parallelized load cells.

7.2.5 Settings related to calibration



- Be sure to hit the Save button after completing the calibration.

To perform weight calibration, perform the following steps:

1- Set Calibration Mode to Weight calibration
2- Putting the system in no-load mode and pressing the ZERO button.
3- Placing a load with a specific weight on the weighing system (up to 5% of the total range of the load cell)

(In this section, you can use the no-load mode, in this case, enter the value 0 as "Calibration weight 1" in the next section.

4- Entering the exact weight of the load in Calibration weight 1
5- Hitting the Calibration button 1
6- Placing a load with a specified weight on the weighing system (at least 50% of the total range of the load cell)
7- Entering the exact weight of the load in Calibration weight 2
8- Hitting the Calibration 2 button
9- Save calibration

For automatic calibration, perform the following steps:

1- Enter the load cell values in the Load cell Parameter section.
2- Set Calibration Mode to Automatic Calibration.
3- Calibration storage