Parsmega
industrial automation

User Manual

Load Cell Transmitter

PM-LT12T

Version: 1.0 Release date: 28/01/2023

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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-LT12T 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-LT12-T	V1.2	V1.5

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-LT12-T is a multi-purpose and flexible two-channel load cell transmitter that can read the weight of two load cells simultaneously.

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 weighing system.

3.2 Module Uses

This weight 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

- Ability to connect 2 load cells simultaneously
- 6 digital outputs (3 outputs for each channel)
- 4 digital inputs (with the ability to assign functions by the user)
- Isolated RS485 serial communication with MODBUS (RTU, ASCII) protocol support
- Wide range of port 485 baud rate (from 2400 to 230400)
- Wide range of sampling
- Weight reading with an accuracy of 1:100,000
- The ability to define 5 load cells and maintain the calibration of all load cells (for each channel)
- Ability to define 10 profiles for digital outputs
- Automatic calibration without the need for weight calibration
- Ability to display load cell output voltage (for load cell testing)

- Working temperature range -30 ~ +50 degrees Celsius

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).

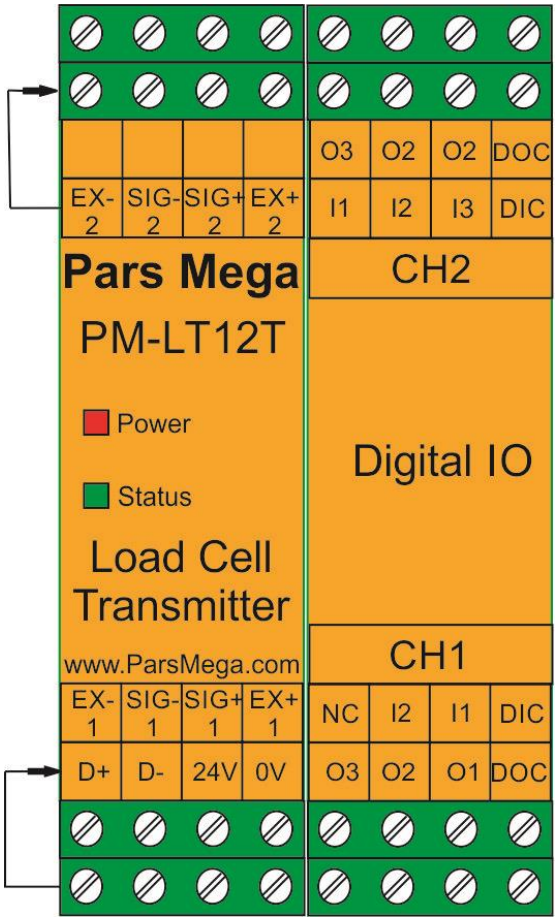
4.3.3 Cable shield connection

• Make sure the shields are properly grounded.

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

5 connections

All connections of this module are screws.



5.1 Connections Group

The connections of this module include 5 main group:

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

5.2 Power Supply connection

The proper power supply for this module is24 v dc .

Terminal 1 : 0 v

Terminal 2 : +24 v

5.3 Connecting digital input

This module has 2 digital inputs as follows:

Label	Application
I1	Digital input 1
I2	Digital input 2
I3	Digital input 3
I4	Digital input 4
DIC	Common digital inputs

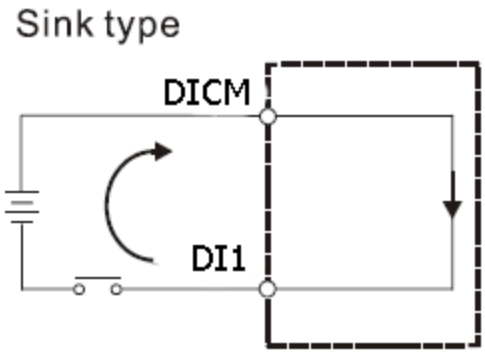
- .To activate the digital inputs, a voltage level of 12 to 24 volts is required
- For each input, a specific function can be defined, when the input is activated, the corresponding function is performed. This topic will be fully discussed in .the digital input parameters section

The wiring method is as follows :

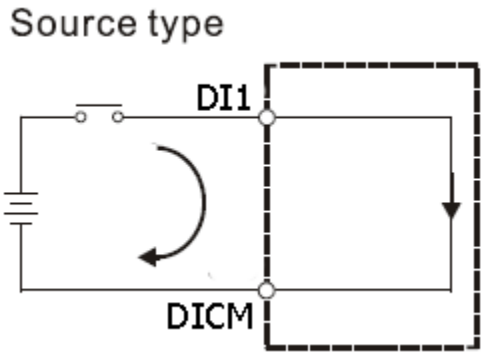
Considering that it is possible to activate inputs in both directions (bi polar).

The wiring of both modes is shown in the figure below.

- Sink mode(low active)



- Source mode(High Active)



5.4 Output connections

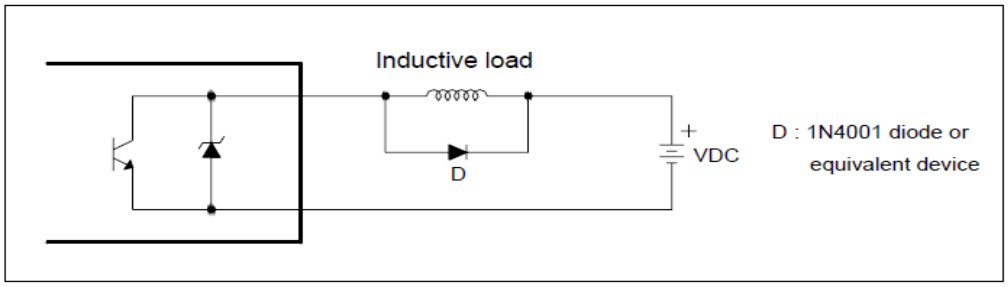
Attention

Be sure to know the status of the outputs before connecting them. During the initial setup, all the outputs may be active.

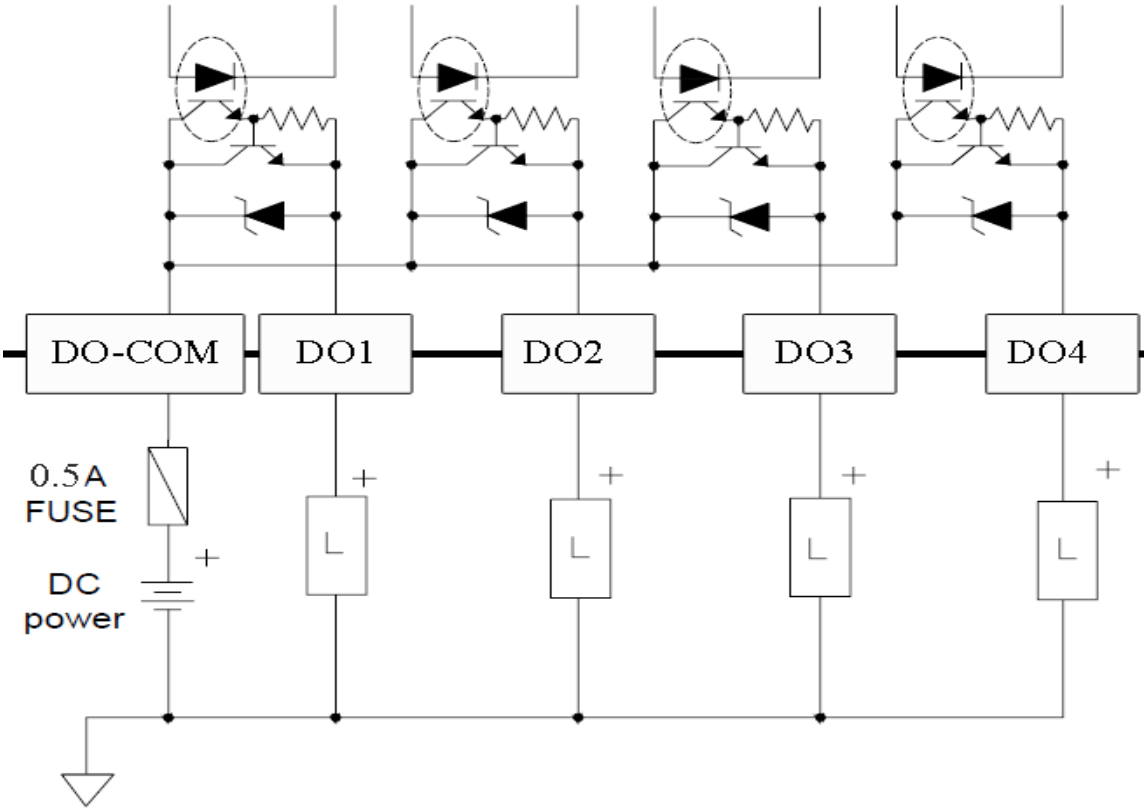
This module has 6 digital outputs as follows:

Label		Application	
CH1	O1	Channel 1	Digital output 1
	O2		Digital output 2
	O3		Digital output 3
	DOC		The common voltage of the outputs
CH2	O1	Channel 2	Digital output 1
	O5		Digital output 2
	O3		Digital output 3
	DOC		The common voltage of the outputs

- The output voltage range is between 5 and 30 V DC and the maximum current is 200 mA (in the case that the output is transistorized).
- Outputs 1 to 3 correspond to the first channel and 4 to 6 correspond to the second channel.
- The activation of the outputs depends on the setting of the parameters, which will be discussed in the parameters section.
- **Attention**, in case of using selfie load (for example, between relays) in digital outputs, freewheeling diode must be used.



How to wire digital outputs



- Note that the above output is a SOURCE digital output (that is, it can only connect and disconnect the positive voltage).

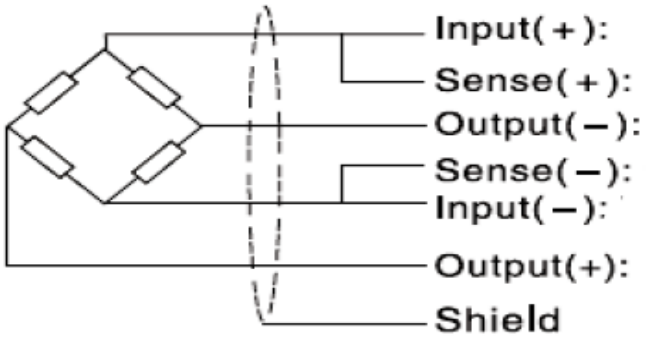
5.5 Load cell connection

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

- Output voltage 1 up to 4mv/V
- Accepting the excitation voltage of 5V

Label	Function
EXC+	Positive excitation voltage
SIG+	Positive output voltage of the sensor
SIG-	The negative voltage of the sensor output
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.

5.6 Isolated RS485 connection

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

Label	Function
D+	Positive data
D-	Negative data

6 parameters

All parameters are set with default values at the time of purchase.

You can also do this with the reset to factory setting command.

For ease of work, the parameters are divided into different groups.

• The length of all variables is word

• If the save command is not sent after making changes to the parameters, the previous values will be valid after the device is turned off and on.

• Some parameters need to be restarted to apply changes.

• There are 3 types of addresses in the address field:

The first address is related to software whose addressing format is 40001.

Such as: fatek plc programming environment, opc server.....

The second address is related to programming environments where the address starts from 0 and is in decimal type.

The third address is related to the programming environment where the address starts from 0 and is in hex type.

6.1 communication parameter

Title	Variable Type	The Length	Address	Description	Default
ID	Unsigned int	1	40001 0 d 0 h	1~247	1
Baud Rate	Unsigned int	1	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	40003 2 d 2 h	0=none 1=odd 2=even	2
Stop bit	Unsigned int	1	40004 3 d 3 h	0=1 1=2	0
Mode	Unsigned int	1	40005 4 d 4 h	0=RTU 1=ASCII(8 bit) 2=ASCII(7 bit)	

Note: Note that the system must bereset once to apply the above parameters .

6.2 Module information parameter

- All the following parameters are read only

Title	Variable type	the length	Address	Description	Assumption
Firmware ver	Float	2	40007 6 d 6 h		
Hardware ver	Float	2	40009 8 d 8 d		
Model	Unsigned int	1	40011 10 d AH		103
Serial number	Unsigned long	2	40012 11 d Bh		

6.3 Status parameters of inputs and outputs

Title	Variable type	the length	reading writing	Address	Description	Assumption
Digital inputs	Unsigned int	1	R	40016 15 d F h	-	-
Digital outputs	Unsigned int	1	R	40017 16 d 10 h	-	-

- The first input is in the LSB.
- The first outputis in the LSB .

6.4 Outputs force change parameter

Title	Variable type	the length	Ability to write	Address	Description	Assumption
Out1	Unsigned int	1	w	40022 21 d 15 h	-	-
Out2	Unsigned int	1	w	40023 22 d 16 h	-	-
Out3	Unsigned int	1	w	40024 23 d 17 h	-	-
Out4	Unsigned int	1	w	40236 235 d EB h	-	-
Out5	Unsigned int	1	w	40237 236 d EC h	-	-
Out6	Unsigned int	1	w	40238 237 d ED h	-	-

• Note that reading these parameters does not indicate the status of the outputs.

Digital outputs can be stimulated using these parameters.

This feature is very useful for you during setup.

For example, using this feature, you can be sure of the correct wiring of your system

6.5 Weight display parameter

Title	Variable type	the length	Ability to write	Address	Description	Assumption
Total weight of channel 1	float	2	R	40026 25 d 19 h	kg	-
Net * weight of channel 1	Float	2	R	40028 27 d 1B h	kg	-
Channel 1 fragment weight	float	2	R	40030 29 d 1D h	kg	-
Rawadc data without channel 1 filter	U long	2	R	40032 31 d 1F h	-	-
Channel 1 filtered raw data	U long	2	R	40034 33 d 21 h	-	-
input voltage Millivolt channel 1	float	2	R	40036 35 d 23 h	mv	-
Total weight of channel 2	float	2	R	40150 149 d 95 h	kg	
Channel 2 * net weight	Float	2	R	40152 151 d 97 h	kg	
Channel 2 fragment weight	float	2	R	40154 153 d 99 h	kg	

Raw adc data without channel 2 filter	U long	2	R	40156 155 d 9B h	-	
Channel 2 filtered raw data	U long	2	R	40158 157 d 9D h	-	
input voltage Millivolt channel 2	float	2	R	40160 159 d 9F h	mv	

* According to the request of respected customers to place the two-channel weight value in consecutive addresses for ease of reading the two channels, in addition to the mentioned addresses, the addresses d 231 and d 233 have been made available for this purpose.

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

• Net weight indicates the total weight with the Tare weight fraction.

• Tare weight

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

• Filtered raw data (Filtered ADC data) that is read from the ADC.

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

• In cases where weight reading is required in "Long" format, the following table is provided.

It should be noted that the fraction value is determined by the user.

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

Title	Variable type	the length	reading writing	Address	Description	Assumption
fraction	Unsigned int	1	RW	40251 250 d FA h	0~6	3
Net weight of channel 1	signed long	2	R	40252 251 d FB h	-	-
Channel 2 net weight	signed long	2	R	40254 253 d FD h	-	-

6.6 Filter parameter

These parameters are to prevent system output vibration and are very important.

Title	Variable Type	The length	Writing Ability	Address	Description	Default
Channel 1 sampling number	Unsigned int	1	RW	40044 43 d 2B H	2~50	10
Channel 1 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	0

					12=300 13=400 14=600 15=800 16=960 17=1200 18=1600 19=2400 20=4800	
Channel 2 sampling number	Unsigned int	1	RW	40168 167 d A7 h	2~50	10
Channel 2 sampling frequency	Unsigned int	1	RW	40169 168 d A8 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

• Note that as the sampling value increases, the accuracy of the output increases and its speed decreases.

• By increasing the frequency, the speed increases and the accuracy decreases.

6.7 Load cell parameter

This module has two types of calibration:

- automatic
- weighty

Automatic calibration: In this type of calibration, there is no need to calibrate, you can read the correct weight just by entering the information about the load cell. Note that in this calibration, all the weight on the load cell is read as gross weight.

The required information is given in the table below.

Title	Variable type	the length	Ability to write	Address	Description	Assumption
Output voltage per volt Channel 1	float	2	RW	40051 50 d 32 h	mv/v	2
Maximum weight of channel 1 load cell	float	2	RW	40053 52 d 34 h	kg	50
The number of load cells connected to channel 1	Unsigned int	1	RW	40055 54 d 36 h	-	1
Output voltage per volt Channel 2	float	2	RW	40179 178 d B2 h	mv/v	2
Maximum weight of	float	2	RW	40181 180 d B4 h	kg	50

load cell channel 2						
The number of load cells connected to channel 2	Unsigned int	1	RW	40183 182 d B6 h	-	1
The most weight Channel 1	float	2	R	40256 255 dFF H	kg	
The lowest weight Channel 1	float	2	R	40258 257 d 101 h	kg	
Weight momentary Channel 1	float	2	R	40260 259 d 103 h	kg	
The most weight Channel 2	float	2	R	40267 266 d 10A H	kg	
The lowest weight Channel 2	float	2	R	40269 268 d10C h	kg	
Weight momentary Channel 2	float	2	R	4071 270 d 10E h	kg	

- These parameters are available in the load cell guide sheet.
- The output voltage per volt is the output sensitivity.
- The maximum readable weight is available as maximum capacity in the load cell guide sheet.
- The number of load cells in the default mode is 1. If more than 1 load cells are paralleled together, this number should be entered in the number of load cells parameter.

- The value of the highest and lowest weight is placed in the related registers and it is reset with the weight value of the same moment with a command that is given in the command table.
- When the momentary weight registration command is executed, the weight of that moment is placed in the "momentary weight" register.

6.8 Tare setting parameters

To avoid unwanted or wrong zeroing, there are two limiting parameters that must be within this range when zeroing the gross weight.

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

Low Tare limitation < Gross weight < High Limitation

Title	Variable type	the length	Ability to write	Address	Description	Assumption
Lower range of channel weight 1	float	2	RW	40068 67 d 43 h	kg	-5
Upper range of channel weight 1	float	2	RW	40070 69 d 45 h	kg	50
Lower range of channel weight 2	float	2	RW	40202 201 d C9 h	kg	-5
Upper range of channel weight 2	float	2	RW	40204 203 d CB h	kg	50

6.9 Calibration parameters

Title	Variable type	the length	Ability to write	Address	Description	Assumption
Calibration type Channel 1	Unsigned int	1	RW	40077 76 d 4C h	0=Automatic Mode 1=Weight Mode	0
Reference weight 1 channel 1	float	2	RW	40078 77 d 4D h	kg	0
Reference weight 2 channels 1	float	2	RW	40080 79 d 4F h	kg	0
Calibration type Channel 2	Unsigned int	1	RW	40190 189 d BD h	0=Automatic Mode 1=Weight Mode	0
Reference weight 1 channel 2	float	2	RW	40191 190 d BE h	kg	0
Reference weight 2 channel 2	float	2	RW	40193 192 d C0 h	kg	0

The steps and methods of weight calibration will be explained below.

6.9.1 Lod cell profile

First, we write the number 0 in the Load cell profile register and perform the calibration for the 50 kg load cell, and at the end, I write the Save command in the Command register.

To define the second load cell, write the number 1 in the Load cell profile register and perform the calibration for the 100 kg load cell, and at the end write the Save command in the Command register.

Now, to call each of the profiles, we write the same number that we wrote in the Load cell profile register when defining it.

Note that after changing the profile, if you do not send the Save code, it will be done with the same profile after restarting. A maximum of 6 profiles can be defined for the transmitter (0~5).

Title	Variable type	the length	Ability to write	Address	Description	Assumption
Lodcell profile Channel 1	Unsigned int	1	RW	40109 108 d 6C h	-	0
Lodcell profile Channel 2	Unsigned int	1	RW	40195 194 d C2 h	-	0

6.10 Channel 1 digital output setting parameters

Title	Variable type	the length	Ability to write	Address	Description	Assumption
SET POINT 1	float	2	RW	40088 87 d 57 h	kg	2
SET POINT 2	float	2	RW	40090 89 d 59 h	kg	2
SET POINT 3	float	2	RW	40092 91 d 5B h	Kg	2
Profile number	Unsigned int	1	RW	40094 93 d 5D h	0~10	0

Hysteresis	float	2	RW	40095 94 d 5E h	kg	1
Inverse	Unsigned int	1	RW	40097 96 d 60 h	0=Disable 1=Enable	0
Mode	Unsigned int	1	RW	40098 97 d 61 h	0=independent 1=before between	0
Dead weight 1	Float	2	RW	40099 98 d 62 h	-	0
Dead weight 2	Float	2	RW	40101 100 d 64 h	-	0
Dead weight 3	Float	2	RW	40103 102 d 66 h	-	0

6.11 channel 2 digital output setting parameters

Title	Variable type	the length	Ability to write	Address	Description	Assumption
SET POINT 1	float	2	RW	40110 109 d 6d h	kg	2
SET POINT 2	float	2	RW	40112 111 d 6F h	kg	2
SET POINT 3	float	2	RW	40115 113 d 71 h	Kg	2

Profile number	Unsigned int	1	RW	40116 115 d 73 h	0~10	0
Hysteresis	float	2	RW	40117 116 d 74 h	kg	1
Inverse	Unsigned int	1	RW	40119 118 d 76 h	0=Disable 1=Enable	0
Mode	Unsigned int	1	RW	40120 119 d 77 h	0=independent 1=before between	0
Dead weight 1	Float	2	RW	40121 120 d 78 h	-	0
Dead weight 2	Float	2	RW	40123 122 d 7A h	-	0
Dead weight 3	Float	2	RW	40125 124 d 7C h	-	0

6.11.1 Set points

This module has 6 digital outputs (3 for each channel) that change mode according to the set point and net weight values.

There are two modes for comparing set points and net weight.

Writing the value 0 in this variable activates the first mode and writing 1 activates the second mode.

First mode: Independent

In this case, 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.

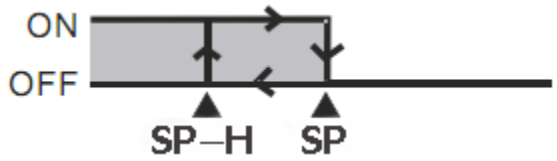
Net Weight < Set Point X -> Outx On

Net Weight > Set Pont X -> Outx Off

: Example

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

Note that a Hysteresis is considered to prevent the outputs from playing. The function is that when the output is activated at the time of shutdown, the weight of the set point is subtracted from the Hysteresis value and a comparison is made.



You can set this value to 0

Second mode (comparative): In between

In this case, the weight is compared with the next and previousSet Point values.

Net Weight<S.P1	Out 1 On	Out 2 Off	Out 3 Off	Out 4 Off
S.P1<Net Weight<S.P2	Out 1 Off	OUT 2 On	OUT 3 Off	Out 4 Off
S.P2<Net Weight<S.P3	Out 1 Off	Out 2 Off	OUT 3 On	Out 4 Off
Net Weight < S.P4	Out 1 Off	Out 2 Off	OUT 3 Off	Out 4 On

Note that you can reverse the state of the outputs by setting the inverse parameter.

6.11.2 Programs profile

Another feature of this module is **profile definition**for set points.

Imagine that you have given four set points to the module and you are using it, but you want to set some other set points and call them only when needed.

For example, a packaging machine is working, set points have been given to the module and its output has been used. Now, when the product is changed, you need to change the set points. For this purpose, the only thing required is to change the Profile parameter.

Currently, up to 11 profiles can be defined (0~10).

*Transistor outputs can be positive or negative according to the customer's order.

6.11.3 dead weight

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.

6.12 Digital input parameters

Title	Variable type	the length	Ability to write	Address	Description	Assumption
Input1 code	Unsigned int	1	RW	40130 129 d 81 h	-	0
Input2 code	Unsigned int	1	RW	40131 130 d 82 h	-	0

Input3 code	Unsigned int	1	RW	40132 131 d 83 h	-	0
Input4 code	Unsigned int	1	RW	40149 148 d 94 h	-	0

A specific function can be defined for each digital input.

For each input, a parameter is assigned that can be set.

For any function you intend to perform, give the code of that instruction to this parameter.

For example, if you want the operation to be performed when the first input (Tare) is activated, first get the Tare command code from the command table (in this case, the code is 13 decimal).

It is enough to write the 13 decimal number in the register corresponding to the first input (Input1 code) so that after this input the Tare operation is performed.

It should be noted that the performance of the inputs is on the rising edge, and at the active level of the input, it does not mean that the command is executed permanently.

6.13 commands list

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

All commands will be executed after 300 milliseconds at most.

Title	Variable type	the length	Ability to write	Address	Description	Assumption
Command register	Unsigned int	1	W	40062 61 d 3D h	-	-

The list of commands is as follows:

Number	function	code
1	Save Settings Save settings	12
2	Tare Paresang channel 1	13
3	Calibration trigger 1 channel 1 calibration	14
4	Calibration trigger 2 channel 1 calibration	15
5	Reset	17
6	Save & Reset	18
7	Reset to factory settings	20
8	Communication Reset to factory setting	21
9	Zero channel 1	22
10	Zero and Save channel 1	24
11	Tare and Save channel 1	25
12	Calibration Restore channel 1	26
13	Calibration trigger 1 channel 2 calibration	27
14	Calibration trigger 2 channel 2 calibration	28
15	Tare Paresang channel 2	29

16	Zero channel 2	30
17	Tare and Save channel 2	31
18	Zero and Save channel 2	32
19	Calibration Restore channel 2	33
20	Zero channel 1 and channel 2	40
21	Tare channel 1 and channel 2	41
22	Calibration trigger 2 and Save Perform the second step of channel 1 calibration and save	42
23	Calibration trigger 2 and Save channel 2 calibration and save	43
24	The present weight is recorded in the "Maximum weight of channel 1" register	44
25	The current weight is recorded in the "lowest weight of channel 1" register	45
26	The current weight is recorded as the highest and lowest in both registers	46
27	The current weight is recorded in the "current weight of channel 1" register	47
28	The present weight is recorded in the "Lowest weight of channel 2" register	48
29	The current weight is recorded as the highest and lowest in both registers	49
30	The current weight is recorded in the "current weight of channel 2" register	50

All values are in decimal.

Number 1: Save Setting

Note that all your settings on the parameters are on the temporary memory of the module, and in order to transfer these settings to the retentive memory, you must use the save settings command. For this purpose, you must send the 12 decimal number to the address 40062.

Number 2: Tare channel 1

With this command, the current weight on load cell channel 1 is considered as Tare weight and is placed in the Tare weight register.

It should be noted that before applying this command, you must have correctly set the values of the zero limits, which are Tare High limitation and Tare low limitation.

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

Low Tare limitation < Gross weight < High Limitation

Number 3: Perform the first stage of channel 1 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 reference weight register No. 1 (Calibration Weight 1), 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 14 decimal value to the command register.

Number 4: Performing the second stage of channel 1 weight calibration

This command will perform the second stage of calibration

At this stage, a certain 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

reference weight register No. 2 (Calibration Weight 2). At this stage, you can do this by sending 15 decimal numbers to the instruction register.

Number 5: Reset command

When you need to reset the module, you can send this command to the instruction register. After sending this command, the complete reset will be done 2 seconds later. During these 2 seconds, the system will not perform any operation.

Number 6: Save and reset command

This command is provided to the user for the convenience of saving and resetting consecutively

After sending this command, first all the parameters are saved and then the system is reset.

Number 7: 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 if the save command is not sent after this command, the previous values will be valid after the reset.

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

Number 8: Returning the settings of serial communication parameters to the default mode

In cases where you intend to return only the serial communication settings to the initial state, you can use this command. For this purpose, the value of 21 decimals must be sent to the instruction register.

After sending this command, you need to reset the module to apply the changes.

• After sending this command, there is no need to send a save command and this is done automatically.

Number 9: Zero channel 1

This command is used to zero the gross weight and net weight of channel 1.

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

Number 10: Zero and Save channel 1

This command is the same as the Zero command of channel 1, with the difference that after performing the Zero action, the Zero parameters are saved and there is no need to send the Save command.

Number 11: Tare and Save channel 1

This command is the same as the Tare command, with the difference that after the Tare operation, the Tare parameters are saved and there is no need to send the save command.

Number 12: Calibration restore channel 1

This command returns the last calibration coefficient of channel 1. In order for this coefficient to be applied forever, you must use the Save command after this command. This command is only for weight calibration and is not related to automatic calibration.

Number 13: Performing the first stage of channel 2 weight calibration

In weight calibration, calibration is done in 2 steps.

This command will perform the first stage of weight calibration.

At this stage, the maximum value of 5% of the load cell range should be written in the reference weight register No. 1 (Calibration Weight 1), 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 27 decimals to the Command register.

Number 14: Performing the second stage of channel 2 weight calibration

This command will perform the second stage of calibration

At this stage, a certain 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 reference weight register No. 2 (Calibration Weight 2). At this stage, you can perform the second stage of calibration by sending 28 decimal numbers to the instruction register.

Number 15: Tare channel 2

With this command, the current weight on channel 2 load cell is considered as Tare weight and is placed in the Tare weight register.

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

Set the maximum Tare load and minimum Tare load correctly.

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

Minimum Tare load < Gross weight < Maximum Tare load

Number 16: Zero channel 2

This command is used to zero the total weight and net weight of channel 2.

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

Number 17: Tare and Save channel 2

This command is the same as the Tare command of channel 2, with the difference that after performing the Tare operation, the Tare parameters are saved and there is no need to send the save command.

Number 18: Zero and Save channel 2

This command is the same as the Zero command of channel 2, with the difference that after performing the Zero action, the Zero parameters are saved and there is no need to send the Save command.

Number 19: Calibration restore channel 2

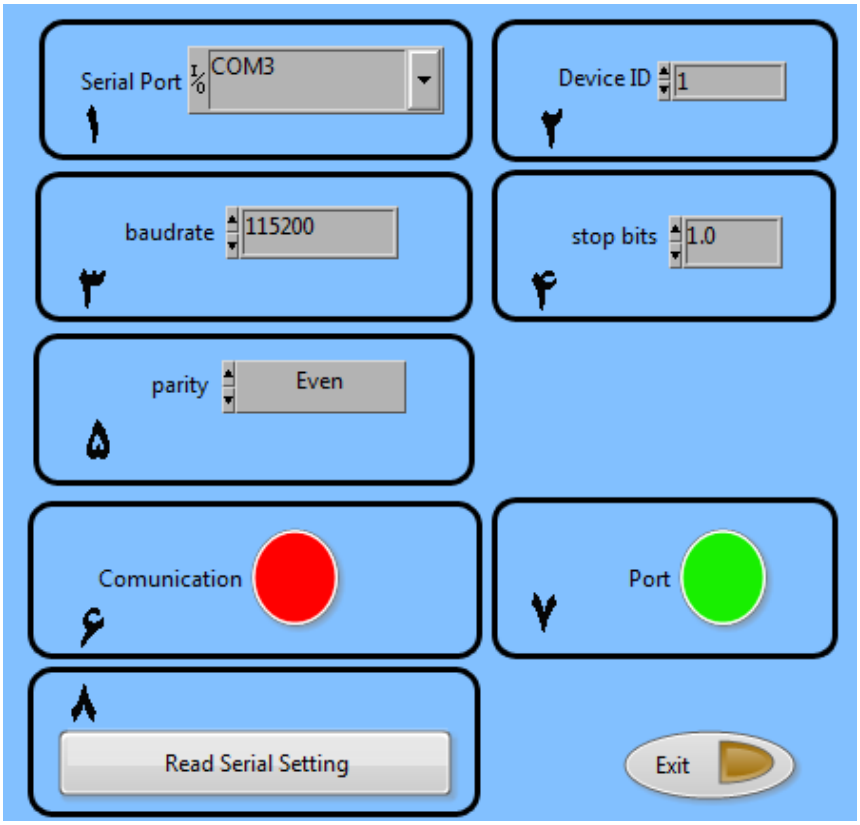
This command returns the last calibration coefficient of channel 2. In order for this coefficient to be applied forever, you must use the Save command after this command. This command is only for weight calibration and is not related to automatic calibration.

7 Transmitter settings software

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 open at first:



Number 1: The number of the serial port to which the transmitter is connected.

When the correct port is selected, the indicator number 7 will turn green.

Number 2: ID of the transmitter, which is 1 by default in the transmitter.

Number 3: Serial communication baud rate is 9600 by default.

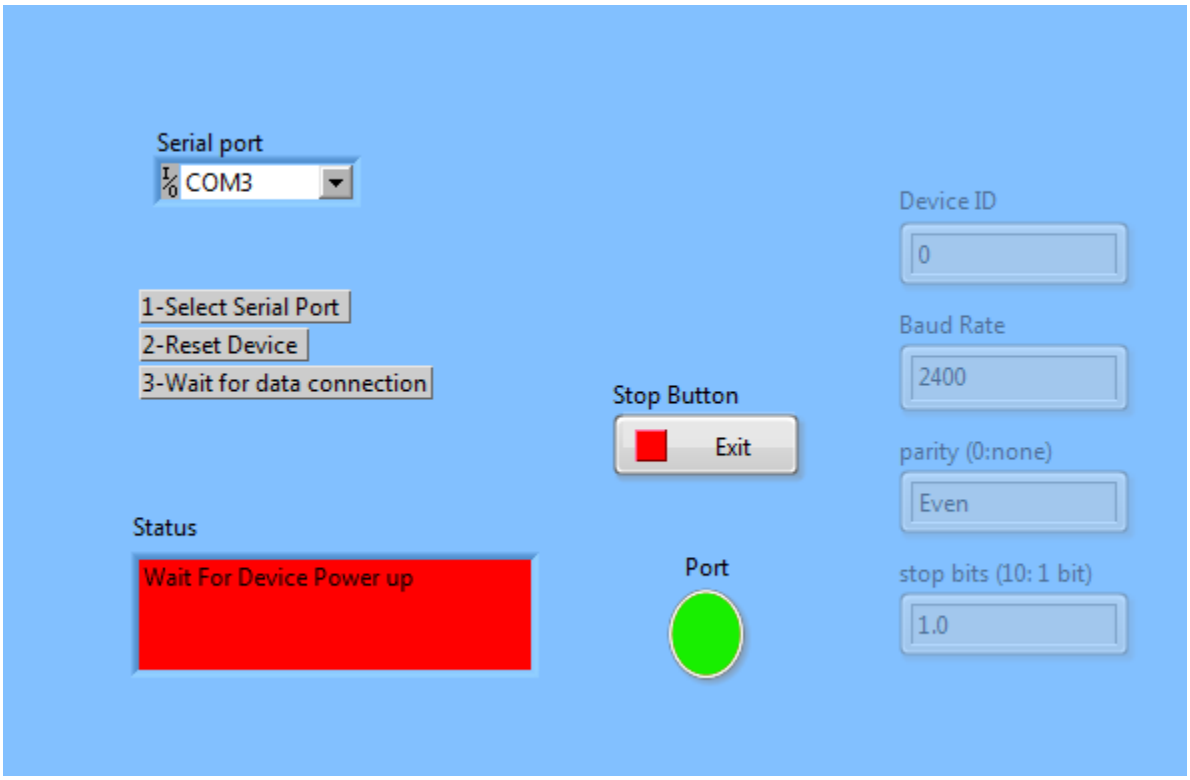
Number 4: The Stop bit specifier is in serial communication and is 1 bit by default.

Number 5: It specifies the parity of serial communication and it is even by default.

Number 6: When the connection is established, this indicator will turn green and this page will be closed automatically and the main page of the program will be opened.

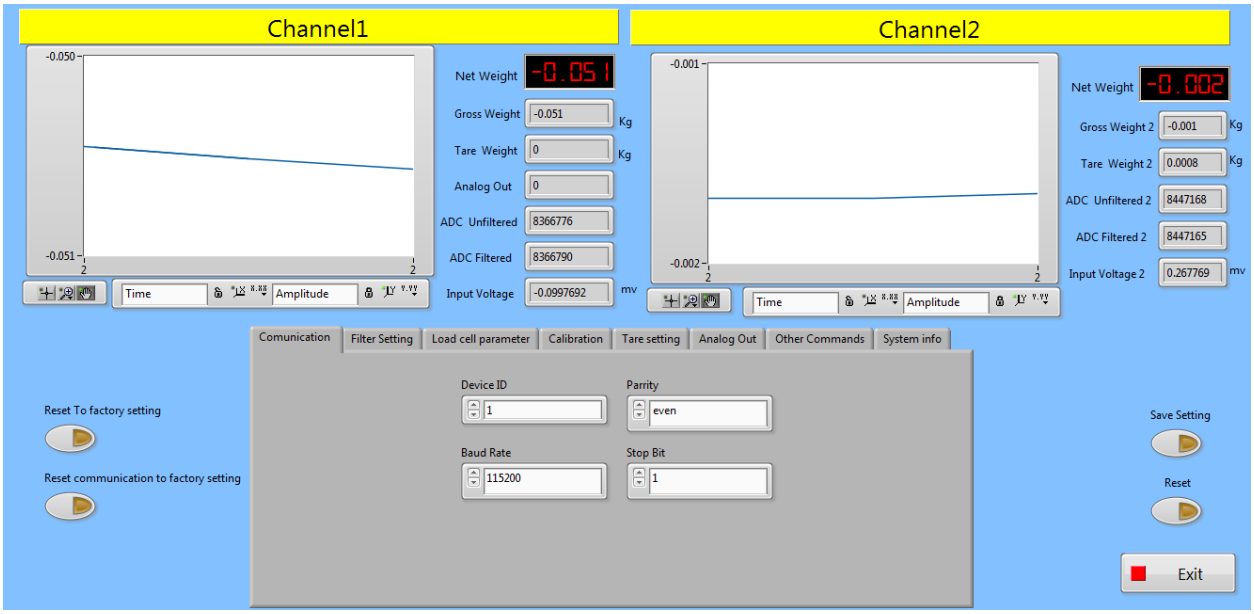
Number 7: indicates the status of the selected port: red color for error and green color for no error

Number 8: If you don't 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 be 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 The main page of the program



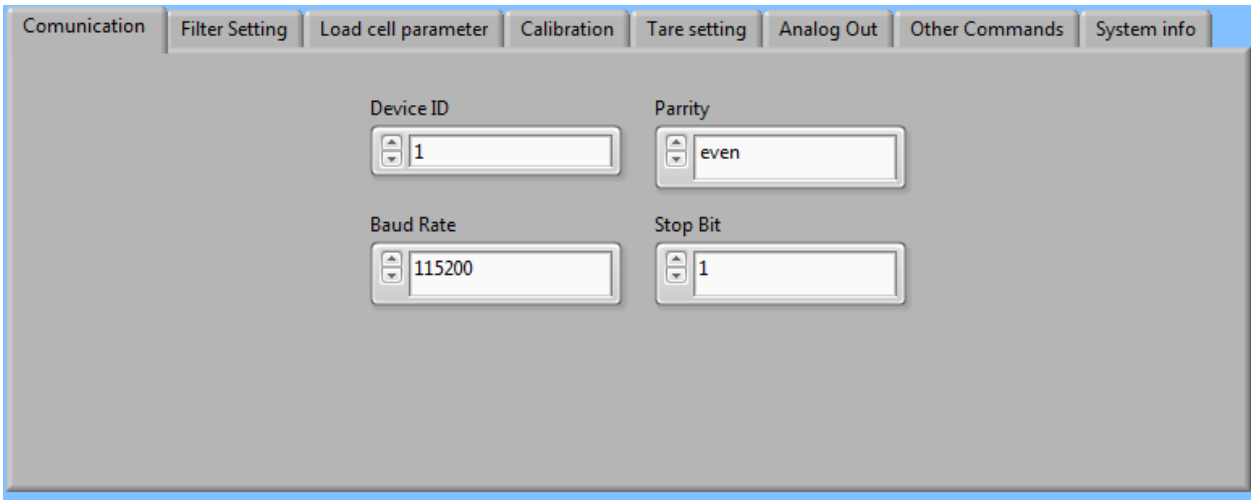
Exit button is for closing the program.

- Save Setting button is for saving settings.
- The Reset button is for restarting.

Transmitter variable values

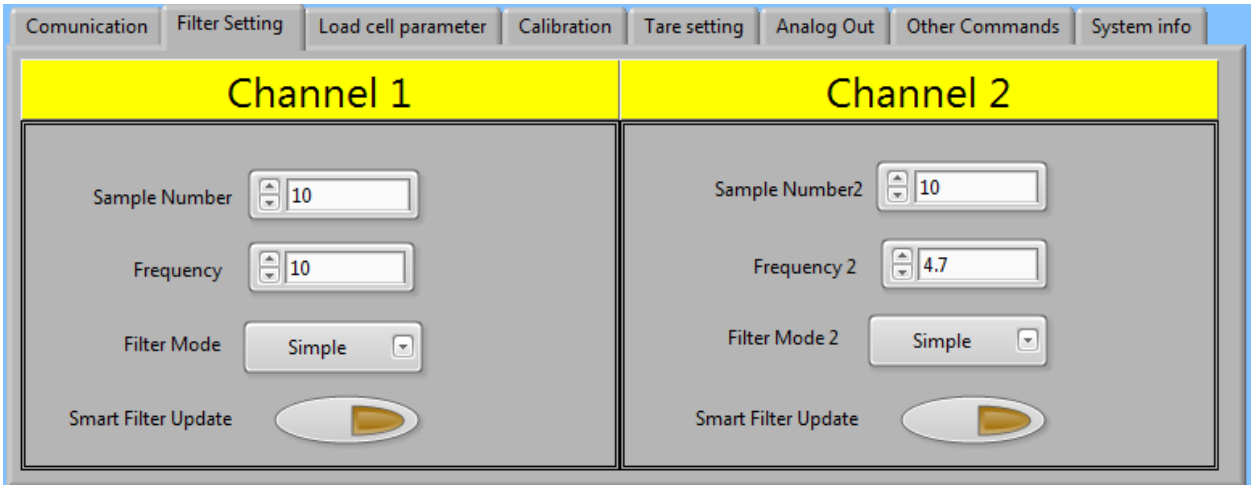
- ADC Unfiltered raw value of ADC without filtering
- ADC Filtered Raw ADC value with filter applied
- Gross Weight Total weight amount
- Net Weight
- Tare Weight
- Input Voltage The output voltage value of the load cell
- Analog Out analog output value (0 to 65535)

7.3 RS485 serial communication



*Please note that to apply the changes related to the serial communication settings, you need to reset the transmitter once.

7.4 Filter



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

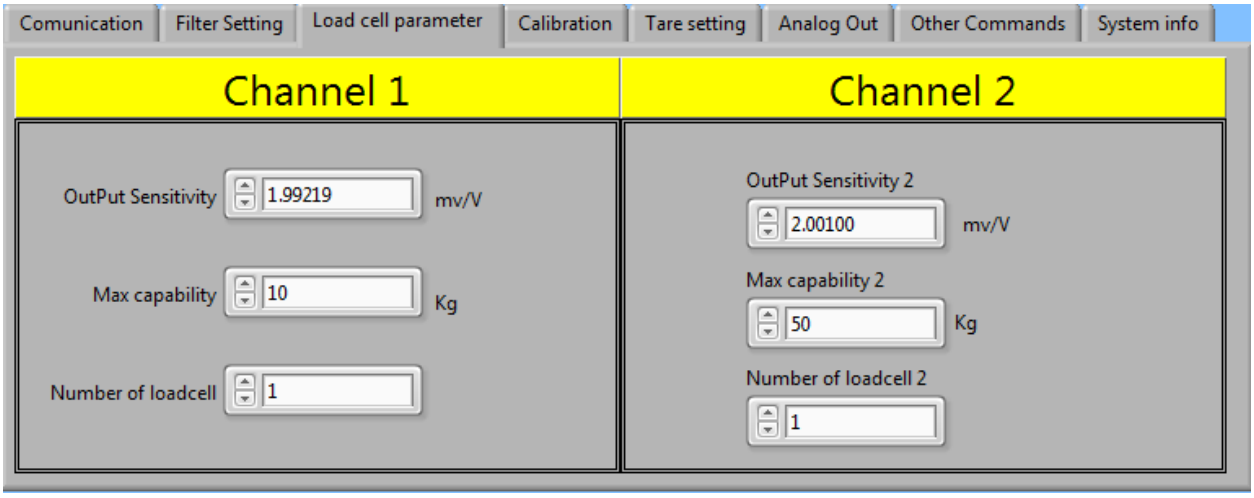
Smart Filter Update is the automatic setting of the smart filter that is explained in the filter parameters section. After pressing this button for 10 seconds, the system should be in a state without tension and conflict.

Sample Number The number of samples to filter.

Frequency sampling speed.

It should be noted that by increasing the sampling speed, the accuracy of sampling decreases.

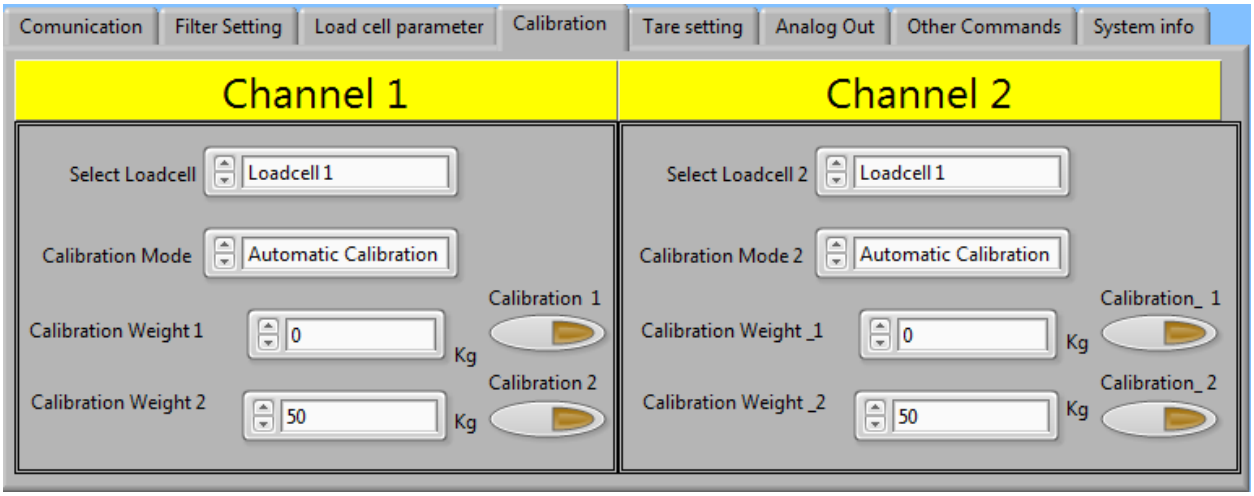
7.5 Load cell parameters



Output Sensitivity is the value of the voltage that the load cell puts in its maximum range for each volt of stimulation. You can find this value with the same name on the accompanying sheet of the load cell.

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

7.6 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 (maximum 5% of the total range of the load cell)

(In this section, you can use 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, do the following steps:

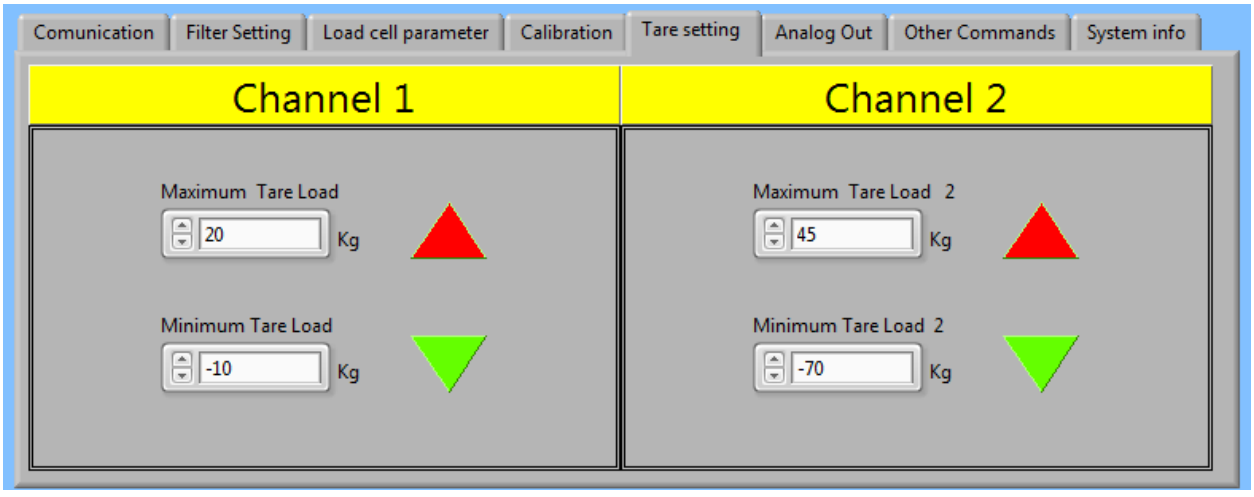
1- Enter the load cell values in the Load cell Parameter field.

2- Set Calibration Mode to Automatic Calibration.

3-Calibration storage

7.7 broken stone

To set the allowed area of Tare, the relevant values are entered in this section



The Tare action is performed only if it is between the Maximum Tare and Minimum Tare areas.

7.8 Other commands

In this section, other commands are placed