SWIFT

WEIGHING INDICATOR AND HIGH SPEED TRANSMITTER

OPERATION AND CONFIGURATION MANUAL

Revision: March 2014 (English)
For software versions: 1.000X

SWIFT

CALIBRATION RECORD

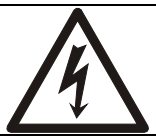
Record the calibration settings in the following table.

Serial Number:	
Model:	
Operating Voltage:	**12-24 VDC**
Purchase Date:	
Installation Date:	
Calibration Coefficients: ZERO: SPAN:	
Access Code (ID):	**2802**

WARNING
Keep this number in a safe place. This will be the only one that will let you access the protected parameters (scale definition, calibration and others)

SAFETY PRECAUTIONS

WARNING-SHOCK HAZARD
For proper earthing, the safety earth wire (green or green/yellow) must be connected to the general earth wire.



WARNING-SHOCK HAZARD
Due to the risk of electrical shock, this instrument must be installed only by qualified personnel.

WARNING-SHOCK HAZARD
Signals connected to the communications modules
(RS-232 y RS-485) should be provided by a power supply with SELV (very low security levels)

CAUTION
Calibration and configuration must be performed only by qualified personnel.

CAUTION
The integrated circuits in the SWIFT are sensitive to electrostatic discharge (ESD). Be sure to follow proper procedures for transporting, storing and handling ESD-sensitive components.

CAUTION
Reference should be made to the enclosure in which the SWIFT is going to be mounted: Degree of mechanical protection against impact according to EN62262: indoor use IK05, IK08 for outdoor use.

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1 Introduction

1.1 Indicator Characteristics

1.1.1 Load Cell connection

Full scale input signal	±3,9 mV/V
Input impedance	200 MΩ (typical)
Internal resolution	Converter AD 24 bits, 16.700.000 counts (± 8.350.000)
Measurement rate	2.400 measurements per second
Linearity error	≤ 0,01 % of measurement level
Zero stability	150 nV/ºC max.
Span stability	3,5 ppm/ºC max.
Excitation voltage	5,0 ± 0,5 VDC
Transducer minimum resistance	58Ω (6 cells of 350Ω, 12 cells of 700Ω)
Transducer maximum resistance	1.000 kΩ
Wire length	400 m/mm^2 max. (6 wires) 30 m/mm^2 max. (4 wires)

1.1.2 Operator Interface

Main display	6 digit LED 10 mm
Keyboard	Keyboard with 5 keys

1.1.3 Serial Communications

COM1:	Bi-directional RS-232 (Dist. up to 15m)
COM2:	Half-duplex RS-485, (Dist. up to 1.200m and 32 devices) Own protocols:, Modbus (RTU and ASCII)
Transmission rates	115200, 57600, 38400, 19200, 9600 and 4800 bauds
Number of bits and parity	8 bits no parity, 8 bits “even” parity an 8 bits “odd” parity

1.1.4 Input/Output Options

3 digital inputs	Opto-isolated with status LED $V_{ILOW} \leq 0,8V$; $V_{IHIGH} \geq 4V$; $V_{IMAX} = 30V$
3 digital outputs	Relay outputs with status LED: Normally Open (N.O) Umax: 30V/AC 30V/DC; Imax: 100mA
Analog output (Only SWIFT A version)	Galvanic insulation output, 16-bits D/A Voltage output: 0 –10.5V (nom); load > 10kΩ Current output: 0 – 21mA; loop resistance<500 Ω

1.1.5 Power

Power supply:	10V to 28V DC
Consumption:	4W (max.)

1.1.6 Environmental and Mechanical

Operating temperature	-20ºC to 50ºC
Storage temperature	-25ºC to 60ºC
Size	146,5 x 76 x 35 mm
Weight	0,3 kg
Mounting	DIN-Rail mounting
Ingress protection ratio	IP40

1.2 Key board

The keyboard is located on the front of the instrument and has 5 keys. These keys have simultaneous detection of pressing in more than one key.

Keys	Normal status	Setup mode
EXIT	Exit any operation	Up a level / exit configuration mode
0	Acquire a Zero	Move to the left (Cursor) / change option
T	Tare the scale	Move to the right (Cursor) / change option
F	Setpoints programming	Increase the digit (Cursor)
↵	Print	Selection / Down a level / Confirm

1.3 Display and Luminous Information

The indicator consists of a main display, four luminous weight indicators and 6 digital input/output indicator status lights. The arrangement can be seen in figure 1.3.1.

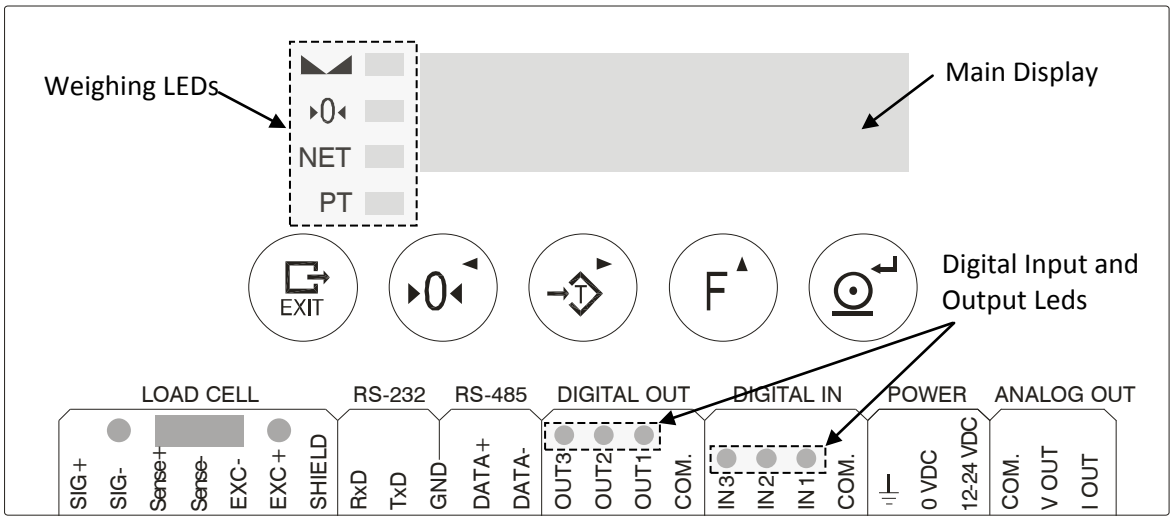


Figure 1.3.1 Display and luminous information

1.3.1 Weighing function LEDs

Indicator	Meaning
◣◢	Scale is in standstill mode
0	Zero
NET	Tare
PT	Prefixed tare

1.4 Label with characteristics and metrological identification

It is located on the rear side of the indicator, as shown in figure 1.4.1. It is a safety label which contains the characteristics of the device, and metrological values and marks.

Figure 1.4.1 Label with characteristics and metrological identification layout

1.5 Error Messages

Main Display	Condition	Solution
Err 0	Scale is not empty	Remove the weight
Err 1	EEPROM failure	Contact your technical service
Err 2	Incorrect entered value	Enter a value inside the range
Err 3	The option that is trying to access is not available with the current configuration	Check that the selected working mode and the configuration of the device allow access to this option
Err.rEF	No signal from the load cell	Check connector and load cell cable
Err 99	Reset caused by software supervisor	Contact your technical service if problem persists
AdC.Err	ADC error	Check connector and load cell cable
AdC.FAL	ADC failure	Contact your technical service
AoUt.FA	Analog output failure	Contact your technical service
------	Weight exceeds the maximum capacity Enter signal exceeds the maximum range	Remove weight Check installation
------	Enter signal under the minimum range	Check installation
Err.Prn	Weight on the scale under the minimum weight	Place a weight above the minimum value (see 3.3.7)
Err.CAP	Not accomplished: $\frac{MAX}{DIV} \leq 100000$	Check that MAX value is correct Change DIV to accomplish the relation
Err.d 1	Not accomplished: $\frac{MAX}{DIV} \leq 100000$	Check that DIV value is correct Change MAX to accomplish the relation
Lo_bAt	Power failure	Check power supply
CAL.toP	The maximum number of calibrations (9.999) has been reached	Contact your technical service
	Unplugged	Plug it in
	Indicator failure	Contact your technical service

1.6 Maintenance

1.6.1 Cleaning

a. Unplug the device from supply.
b. Clean the indicator with a clean and dry cloth.

CAUTION
Never use alcohol or solvents to clean the indicator. These chemical products could damage it.
Make sure that water does not enter the indicator. It could damage electronic components.

2 Operation

2.1 Turning the indicator on

To turn the indicator on, connect it to the power supply. The switch on process will first display a test countdown sequence, with the weighing LEDs blinking at each step. The sequence ends with the software version (5), the equipment serial number (5nr), and finally the number of performed calibrations (nC).

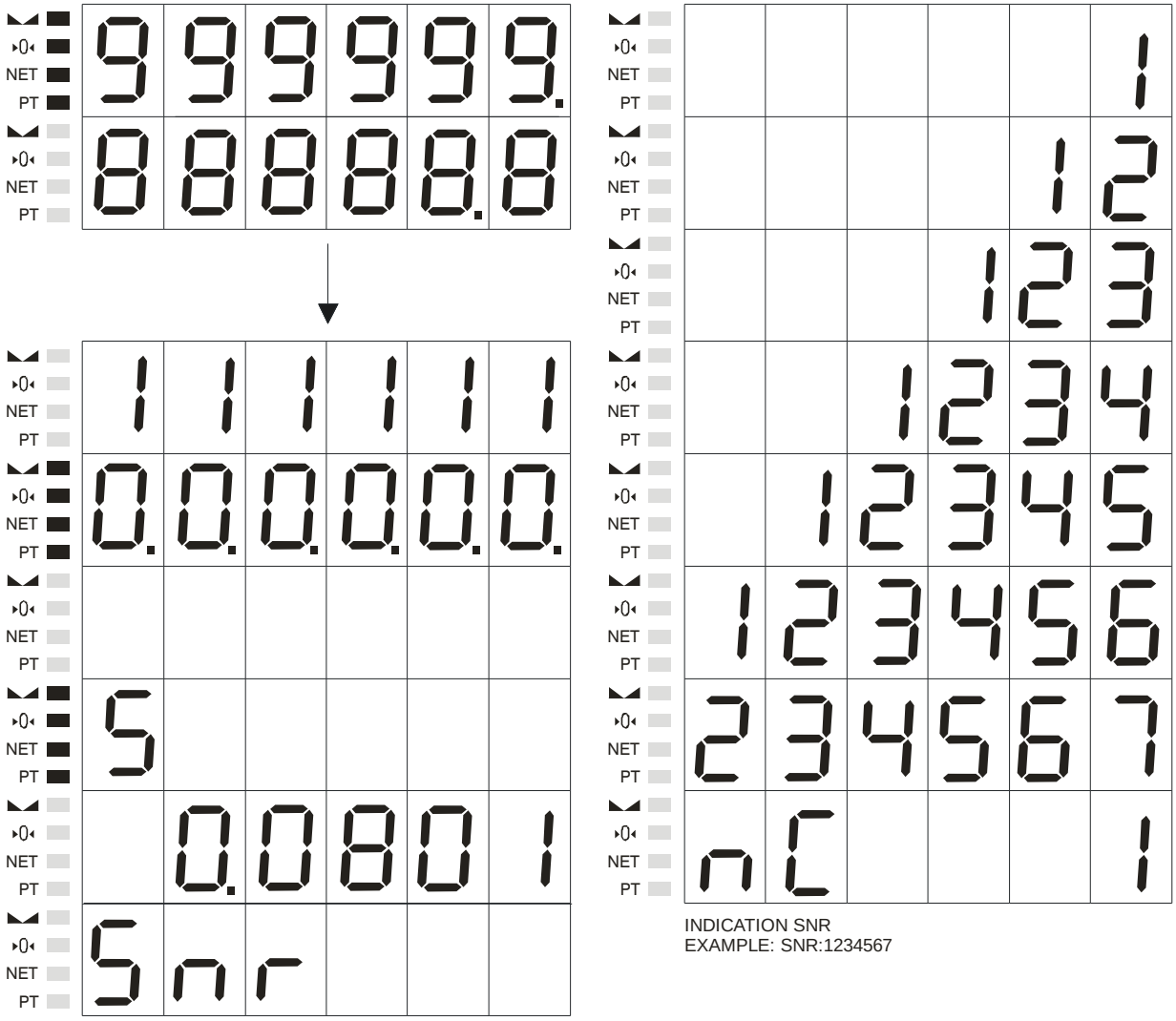


Figure 2.1.1 Switch on sequence

It is recommended that the instrument is allowed to warm up and stabilize for a period of 30 minutes before using it, especially before a calibration. In order to avoid warm up time and potential condensation in case of significant changes in the outside temperature, the device can be left permanently connected.

2.2 Entering Values

To use some of the equipment functions, it is necessary to enter numerical values. Use the arrow keys to enter these values. Use right → and left →0← arrow keys to select the digit to be modified, and the up F arrow keys to increase its value.

2.3 Normal Weighing

The measured weight is displayed.

2.4 Zero

The indicator has a manual zero-ing function. When you press the Zero key the indicator stores the current weight value as the zero of the system.
This key acts according to how the 0-top has been defined (see 3.2.5).
Operation:

It is possible to lock the zeroing key (see 3.3.6).

2.5 Tare

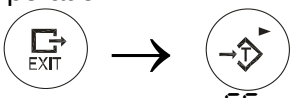
2.5.1 Activate tare

Press the Tare key. The current value will be stored as tare. The NET led lights up.
Operation:

It is possible to lock the tare key (see 3.3.6).

2.5.2 Clearing a Tare Value

To clear a tare register in normal operation, that is to say when the tare lock option is on (see 3.3.4), press Exit and then the Tare key.
Operation:



If the tare lock is oFF then the tare is automatically deactivated if the conditions described in 3.3.4 are met.
It is possible to lock the clearing tare key (see 3.3.6).

2.6 Ticket Printout

To print a ticket through RS-232 communication port press the print key. If the weight is under the divisions introduced in PRINT MIN function (see 3.3.7), the display shows "Err.Prn". The RS-232 communication port should be configured as ticket mode, see 3.5.1.
Operation:

Ticket ID: 1	
Gross	100.0 kg
Tare	0.0 kg
Net	100.0 kg

Figure 2.6.1 Ticket example

It is possible to lock the print key (see 3.3.6).

2.7 Setpoint

By pressing the F key, the short configuration set point menu is accessed. In this menu you can configure the weight value at which the selected output operates.

Operation:

F

The screen where you should select the number of the set point to configure appears:

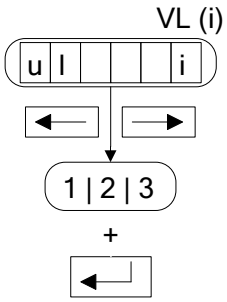


Figure 2.7.1 Setpoint

To select the setpoint use these keys. The enter key allows us to get into the edit mode. Press Enter to accept. Press Exit if you want to exit the menu without making any changes.

If you want to enter a negative set point, the minus sign should be placed in the digit to the left.

The message Err 2 will appear if we set a higher value than the capacity of the scale or an incompatible value due to the scale division.

Exit:

EXIT

When parameter d_LoC i is on then the message LoC (locked) will be shown and will blink three times, this parameter cannot be modified from this menu.

To lock the setpoint key F, see 3.3.6.

3 Configuration

3.1 Introduction

Inside the configuration menu and the calibration menu, we can find different types of parameters:

a) Free access, they can always be read and modified.

b) Protected, they can always be read but only modified under certain conditions. There are two types of parameters:

-Metrological parameters: These parameters affect directly the calibration counter, in the schemes are accompanied by the Ⓟ symbol. To be able to modify these parameters it is necessary to set the correct PIN number and the calibration switch (see figure 3.1.1) should be in the unlock position when getting into the configuration menu.

-None-metrological parameters: These parameters do not affect to the calibration counter, in the schemes are accompanied by the 🄿 symbol. To be able to modify these parameters it is only necessary to set the correct PIN number, independently of the calibration switch position.

The calibration counter is shown on the display when turning on the indicator.

To prevent access to the protected parameters there is a switch located in the left side of the indicator, just above the load cell connector. In the left position the switch allows protected parameters to be changed, but in the right position the protected parameters cannot be changed.

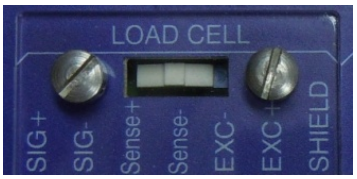


Figure 3.1.1 Calibration switch detail

Figure 3.1.2 shows the basic menu structure:

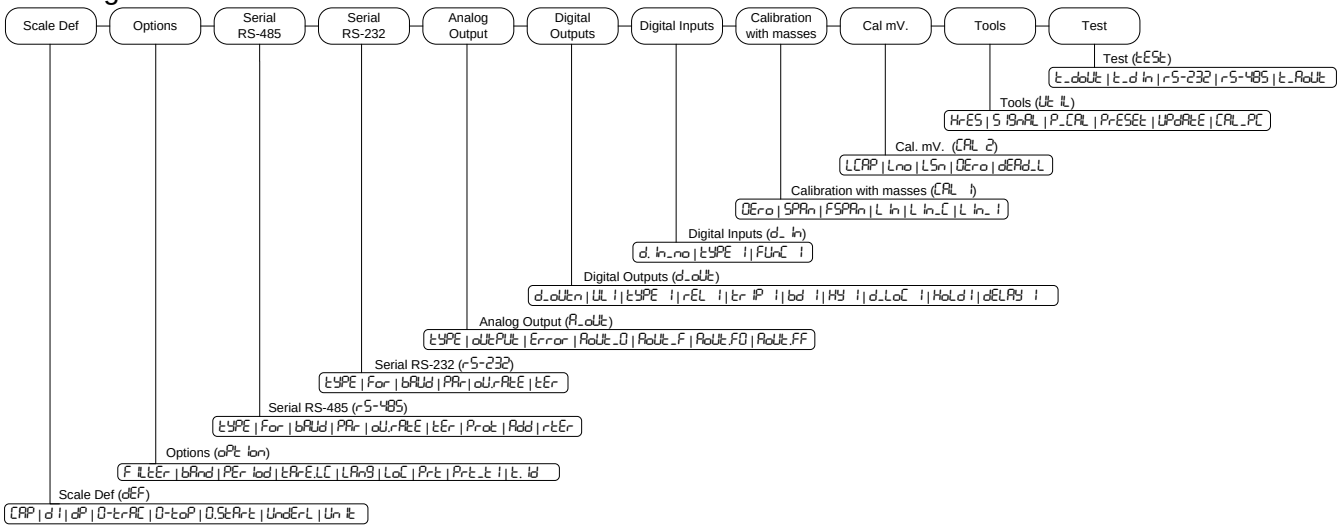


Figure 3.1.2 Basic menu structure

To enter inside the configuration menu, it is necessary following these steps:

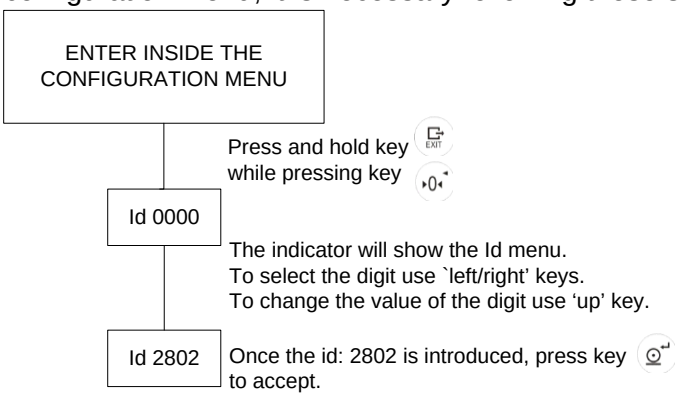
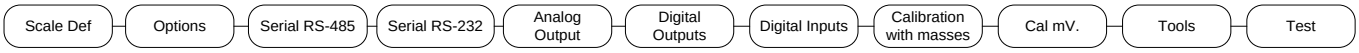


Figure 3.1.3 Enter in the configuration menu

Once we have introduced the Id_2802 of the device (optional), we are inside the configuration menu, being the first configuration screen and from there we can move along the configuration menu.



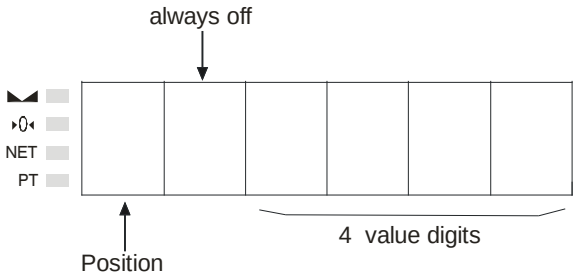
Enter key validates the selection. If we ignore to enter the Id (press enter key with 0000 indication) or we input a wrong number, we will get access to the menu but we will not be able to change protected parameters, marked with a Ⓟ. The factory access code can be found on page 1 and cannot be modified.

Once entered in the calibration-configuration menu, the display will show us the position where we are.

To move through the menus use the cursors. To move in the same level with left (◄) and right cursor (►), to change the level, use enter and exit keys. Once the parameter is selected, if you want to change it, press enter key and set the desired value with increase key (▲), select the digit or chose an option with (◄►) keys. To accept the selection press enter key. Exit from menu press exit key.

It is recommended to print the calibration parameters, once the system is configured, using P_cal function in submenu options (see 5.1.3).

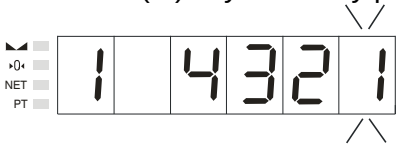
Entering values and scrolling through the display digits should be performed as follows, for coefficients over 6 digits:



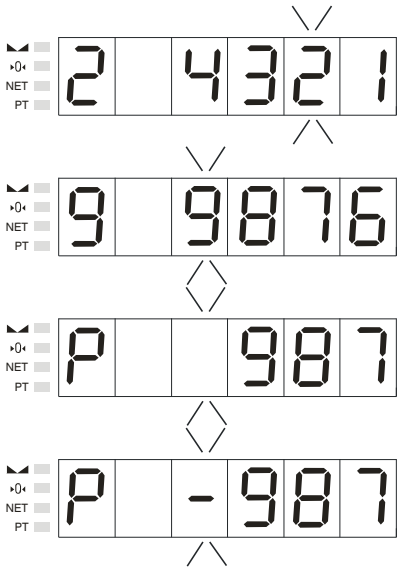
To enter:

Use (◄►) keys to move through the digits.

Use (▲) key to modify parameters.



Digit in position 1 only can be shifted to the left.



When pressing (◄) moves the digit to the next

The sign digit is the last position to the left. No possible to perform shifts to the left (◄).

Change the sign or the digit value (in “P” position), press (▲).

3.2 Scale Definition

Within the Scale Definition configuration level, parameters showed in Figure 3.2.1 can be found.

Once we have introduced the Id_2802 of the device (optional), we are inside the configuration menu (the first screen) and from there, we can move along the configuration menu.

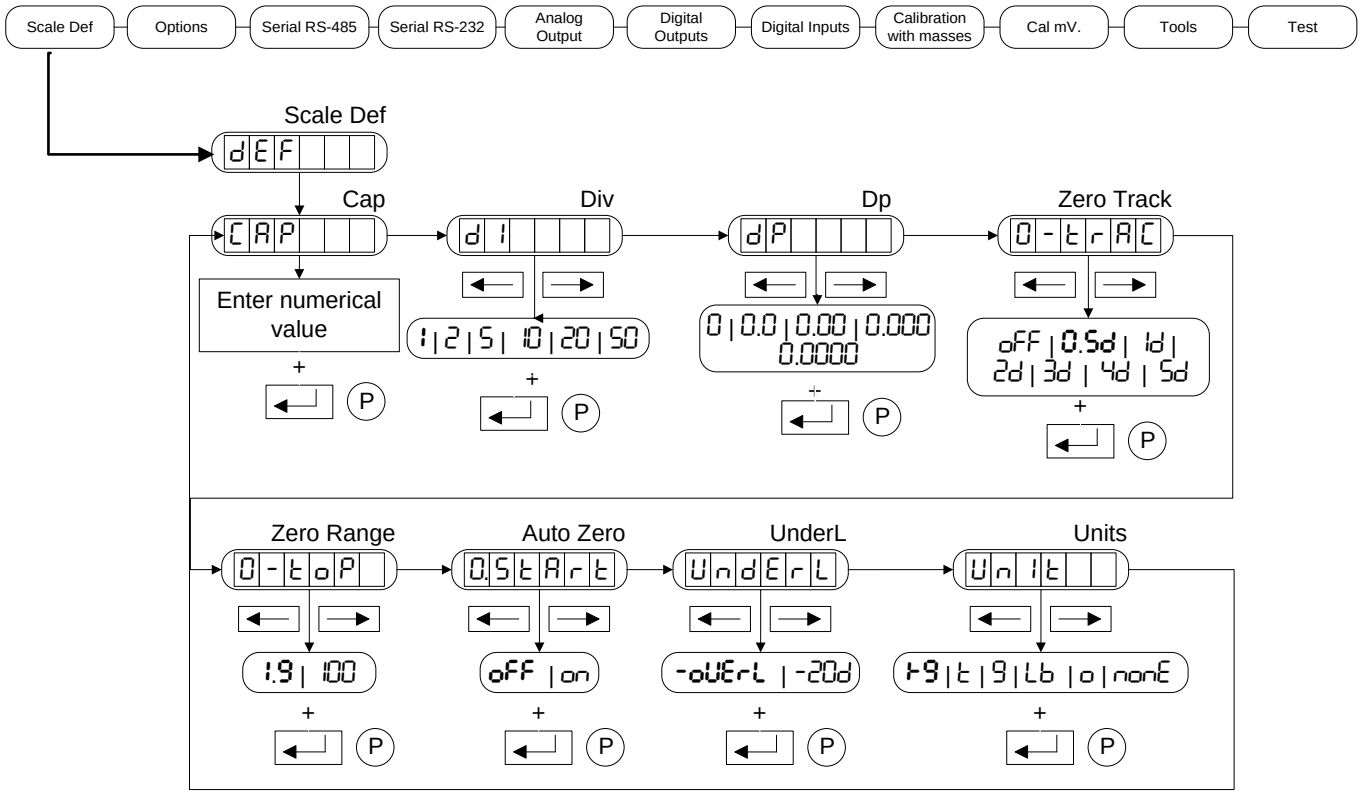


Figure 3.2.1

3.2.1 MAX (CAP)

Maximum capacity of the scale.

3.2.2 DIV (d I)

Value of the scale division.

3.2.3 DP (dP)

Position of the decimal point. By pressing the arrow keys you can move the decimal point to the desired position so, the division of the scale would be in the same unit than the capacity of the scale.

3.2.4 ZERO TRACK (0-trAC)

The level at which the system is automatically zeroed as long as the weight is within the selected band and it is stable.

These are the options:

oFF:	Deactivated function
0.5d:	± 0.5 divisions
1d:	± 1 division
2d:	± 2 divisions
3d:	± 3 divisions
4d:	± 4 divisions
5d:	± 5 divisions

The indicator performs the zero tracking, in the order of 0,5d/seg.

3.2.5 ZERO RANGE (0-toP)

The range within which the scale may be zeroed (→0← key and zero track).

These are the options:

1,9%: Allows performing a zero if the weight value is ≤1.9% of the maximum capacity.

100%: Allows performing a zero for the 100% of the maximum capacity.

3.2.6 AUTO ZERO (0.StArt)

The indicator zeroes when it is turned on.

These are the options:

on:	Activated function
oFF:	Deactivated function

Recommendation:

Silos/ Tanks/ Hoppers	oFF
Platforms	on

3.2.7 Minimum Range Limit (UndEr L)

Selecting the point at which the computer indicates the input error signal below the minimum range(------).

These are the options:

-oUEr L:	Lower range equal to the maximum range changed sign
-20d:	Lower range equal to -20 divisions.

3.2.8 UNITS (Un It)

Weight unit of the scale.

These are the options:

Kg:	Kilogram	Lb:	Pound
t:	Ton	o:	Ounce
g:	Gram	nonE:	None

3.3 Options

Within the Options configuration level, parameters showed in Figure 3.3.1 can be found.

Once we have introduced the Id_2802 of the device (optional), we are inside the configuration menu, being the first configuration screen and from there, we can move along the configuration menu.

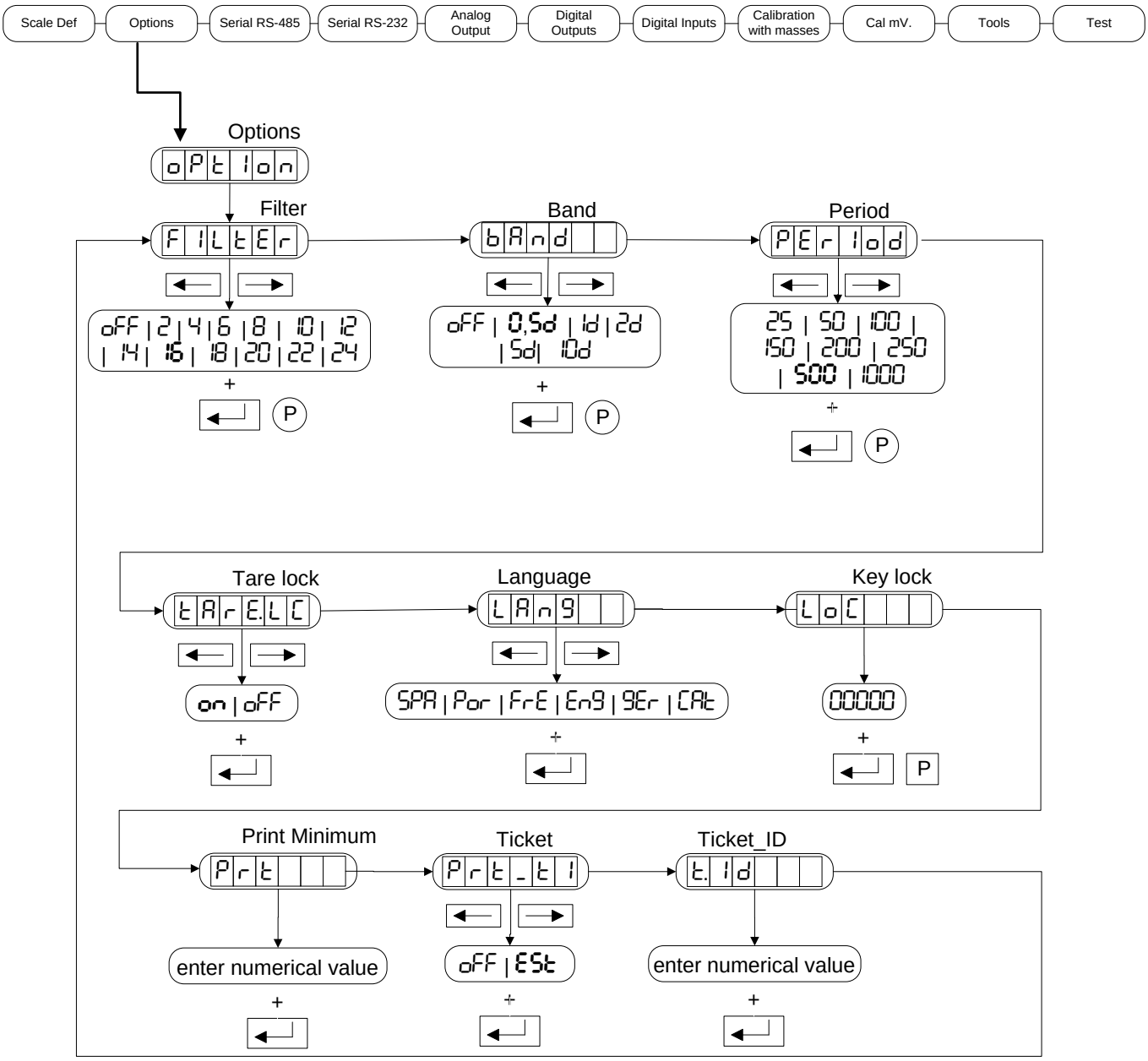


Figure 3.3.1 Options

3.3.1 FILTER (FILtEr)

Filter level. You can choose different filter levels or deactivate this function. The higher the selected value, the higher the filter level.

These are the options:
oFF, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 2

Next, we show the equivalence table between the type of filter and its stabilization time (settling time).

FILTER LEVEL	SETTLING TIME
0	-
2	65 ms
4	67 ms
6	85 ms
8	85 ms
10	85 ms
12	125 ms
14	285 ms
16	600 ms
18	1305 ms
20	1568 ms
22	2200 ms
24	2732 ms

SETTLING TIME: Time taken for the device versus a change in the input signal.

In figure 3.3.1.1 we can see the ADC response against an input weight variation.

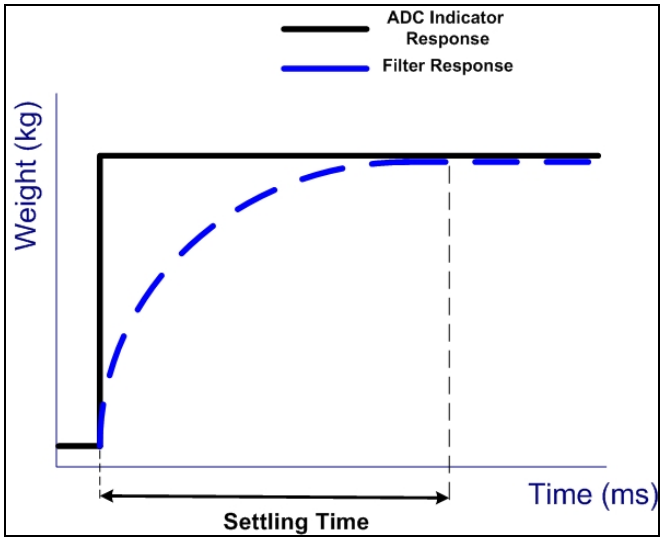


Figure 3.3.1.1

3.3.2 BAND (bAnd)

Inside this menu, we can find the necessary parameters that will help us to define the stability of the system. To meet the stability condition we must fulfill that: the weight does not exceed the defined band, in a period of time.

The level at which motion is detected. Out of this level there is no stability.

oFF:	Deactivated function (the device always shows “stable weight”)
0.5d:	Half division
1d:	One division
2d:	Two divisions
5d:	Five divisions
10d:	Ten divisions

3.3.3 PERIOD (PEr Iod)

Inside this menu, we can find the necessary parameters that will help us to define the stability of the system. To meet the stability condition we must fulfill that: the weight does not exceed the defined band, in a period of time

Period of time in which we want the weight remains within the selected stability band.

The possible options are:

25	25 milliseconds
50	50 milliseconds
100	100 milliseconds
150	150 milliseconds
200	200 milliseconds
250	250 milliseconds
500	500 milliseconds
1000	1000 milliseconds

3.3.4 TARE LOCK (tArE.LC)

It allows activating and deactivating the tare lock.

The possible options are:

on, oFF

If that option is on the tare is locked (keeps the tare). That is the equipment default option and under which the tare is activated until it is manually deactivated (see 2.5.2). When that option is oFF the tare acts as follows: if after removing the weight its value is within the range of ¼ divisions around zero then the equipment automatically deactivates the tare.

3.3.5 LANGUAGE (LAnG)

You can choose among different languages for the printed ticket.

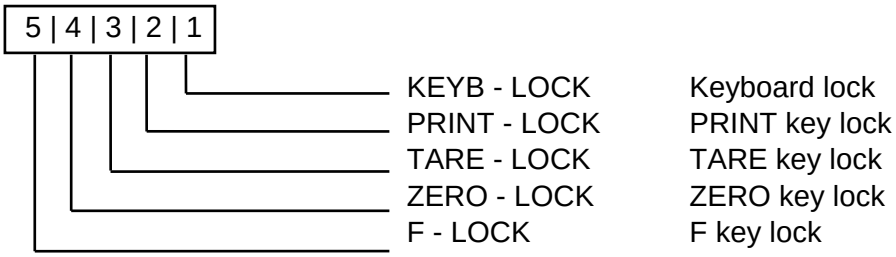
The possible options are:

SPA:	Spanish
Por:	Portuguese
FrE:	French
EnG:	English
GEr:	German
CAt:	Catalan

3.3.6 KEY LOCK (LoC)

It locks the keyboard. The parameter treatment is performed with a 5 digit binary number. The value 1 locks the function and the value 0 releases it.

These are the options:



3.3.7 PRINT MINIMUM (PrE)

Is the minimum weight value in divisions at which a print ticket request it is accepted. The value can be within 0 and 255 divisions. Any attempt to make an impressions with the weight below the programmed, the error Err.Prn will be displayed.

3.3.8 TICKET (PrE_E 1)

Select the type of ticket to be printed with the Print key.

These are the options:

oFF: No ticket printing

ESt: Standard ticket

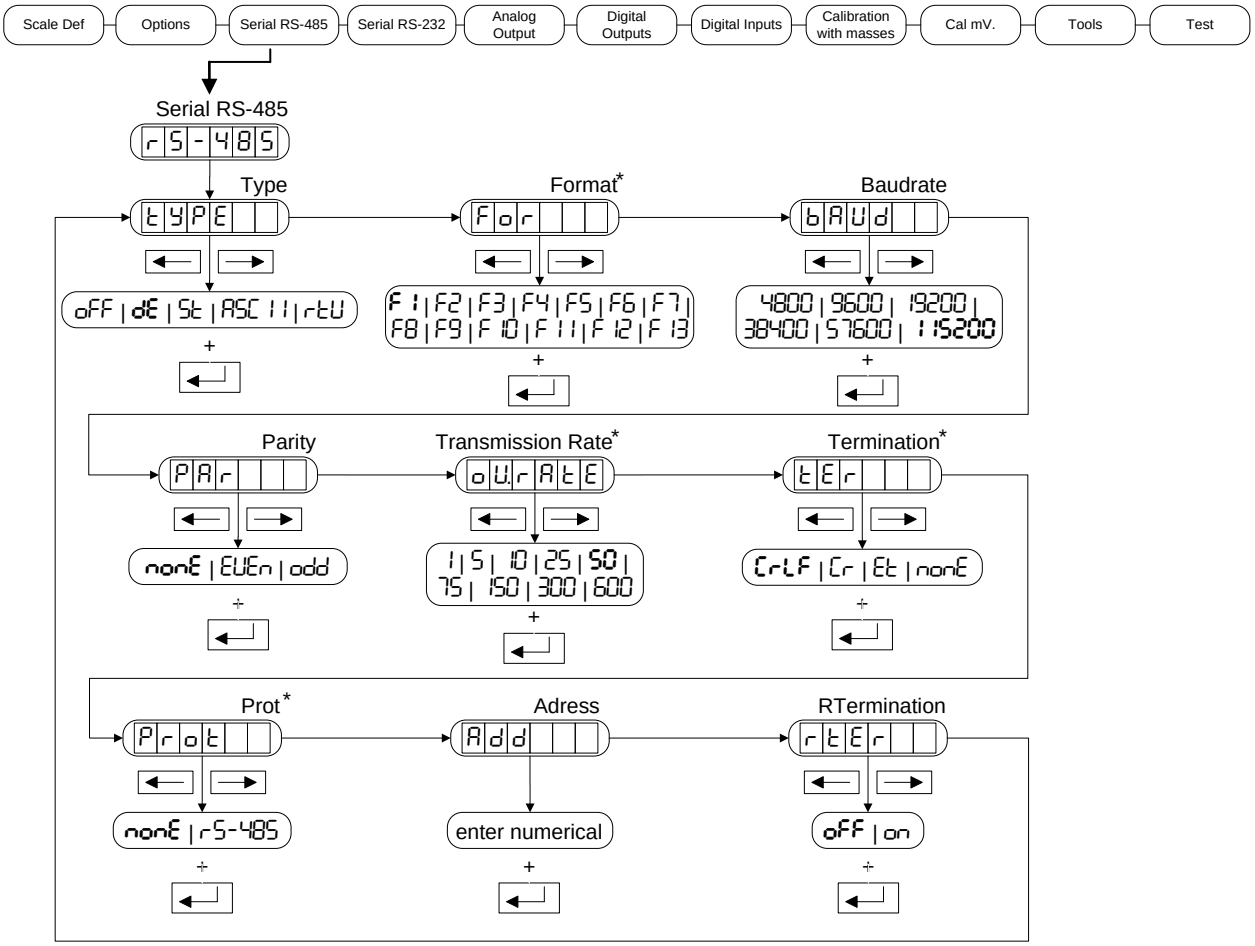
3.3.9 TICKET_ ID (E Id)

Edit the number of the next printing ticket. The minimum value is 1 and the maximum is 65.000. If a higher or a lower value is introduced, the Err 2 will be displayed.

3.4 Communication port RS-485

Within the Communication port RS-485 level, parameters showed in Figure 3.4.1 can be found.

Once we have introduced the Id_2802 of the device (optional, if we want modify protected parameters), we are inside the configuration menu, being the first configuration screen and from there we can move along the configuration menu.



* When TYPE parameter is in mode ACII or RTU, these functions are not enabled.

Figure 3.4.1 Communication port RS-485

3.4.1 MODE (tYPE)

Transmission mode.
These are the options:

DEACTIVATED (oFF):	No data transmission
DEMAND (de**):**	Data transmission on external request through the serial port
STREAM (St):	Continuous data transmission
ASCII (ASC II):	MODBUS ASCII
RTU (rtU):	MODBUS RTU

3.4.2 FORMAT (For)

Format of the transmitted data, for DEMAND and STREAM.
These are the options:
F 1, F2, F3, F4, F5, F6, F7, F8, F9, F 10, F 11, F 12, F 13 (see 6.2.2)

3.4.3 BAUD (bAUd)

Transmission speed
These are the options:
4800, 9600, 19200, 38400, 57600, 115200

3.4.4 PARITY (PAr)

Number of data bits and parity
These are the options:

nonE:	8 bits data, no parity
EUEn:	8 bits data, 1 bit even parity (even)
odd:	8 bits data, 1 bit odd parity (odd)

3.4.5 TRANSMISSION RATE (oU.rAtE)

In the STREAM mode, is the number of transmissions per second. Possible options are:
1, 5, 10, 25, 50, 75, 150, 300, 600

It should be noted that the format and the baud rate may limit the actual shipping.

3.4.6 TERMINATION (tEr)

Termination of the data for DEMAND and STREAM
These are the options:

CrLF	<CR>,<LF>
Cr	<CR>
Et	<ETX>
nonE	nothing

3.4.7 PROTOCOL (Prot)

Protocol communication port. Possible values:

nonE:	No protocol
rS-485:	Own RS-485 protocol

3.4.8 ADD (Add)

It is the address of the equipment in a RS-485 network. We can connect up to 32 devices in the bus.
Possible address values are: 01-99
When having some devices connected to the same bus, they should have different addresses.

3.4.9 RTer (rtEr)

Is the termination resistor for RS-485 bus. Possible values are:
oFF, on

We must have this option on when the device is connected to the beginning or end of the 485 bus. We have connected this resistor at each end of the bus.

3.5 Communication port RS-232

Within the Communication port RS-232 level, parameters showed in Figure 3.5.1 can be found.

Once we have introduced the Id_2802 of the device (optional, if we want to modify the protected parameters), we are inside the configuration menu, being the first configuration screen and from there we can move along the configuration menu.

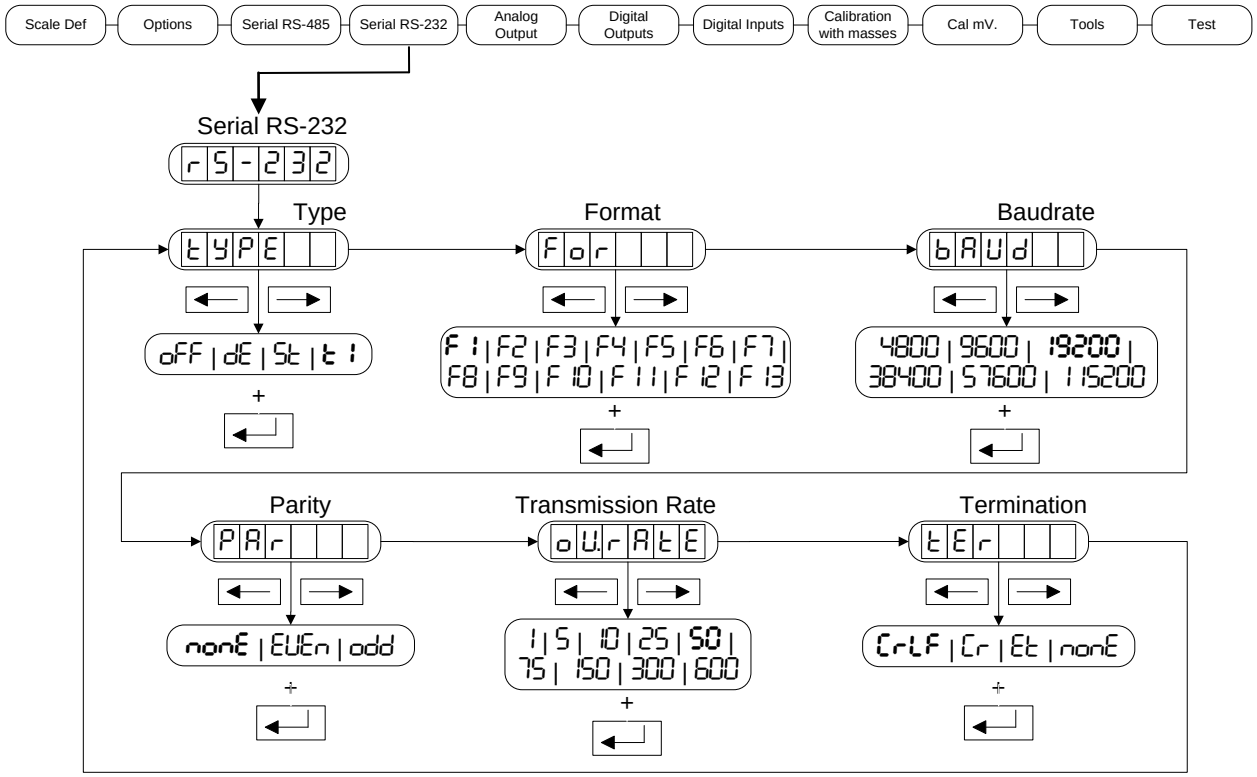


Figure 3.5.1 Communication port RS-232

3.5.1 MODO (tYPE)

Transmission mode.
These are the options:

DEACTIVATED (oFF):	No data transmission
DEMAND (dE):	Data transmission on external request through the serial port
STREAM (St):	Continuous data transmission
TIQUET(t 1):	Print out ticket

3.5.2 FORMAT (For)

Format of the transmitted data, for DEMAND and STREAM
These are the options:
F 1, F2, F3, F4, F5, F6, F7, F8, F9, F 10, F 11, F 12, F 13 (see 6.2.2)

3.5.3 BAUD (bAUd)

Transmission speed
These are the options:
4800, 9600, **19200**, 38400, 57600, 115200

3.5.4 PARITY (PAr)

Number of data bits and parity.
These are the options:

nonE:	8 bits data, no parity
EUEn:	8 bits data, 1 bit even parity (even)
odd:	8 bits data, 1 bit odd parity (odd)

3.5.5 TRANSMISSION RATE (oU.rAtE)

In the STREAM mode, is the number of transmissions per second. Possible options are:
1, 5, 10, 25, **50**, 75, 150, 300, 600

It should be noted that the format and the baudrate may limit the actual shipping.

3.5.6 TERMINATION (tEr)

Termination of the data for DEMAND and STREAM.
These are the options:

CrLF	<CR>,<LF>
Cr	<CR>
Et	<ETX>
nonE	nothing

3.6 Analog Output

(Trying to access to this menu with a device without analog output will show in the screen Err 3)

Within the Analog output configuration level, parameters showed in Figure 3.6.1 can be found.

Once we have introduced the Id_2802 of the device (optional, if we want to modify protected parameters), we are inside the configuration menu, being the first configuration screen and from there we can move along the configuration menu.

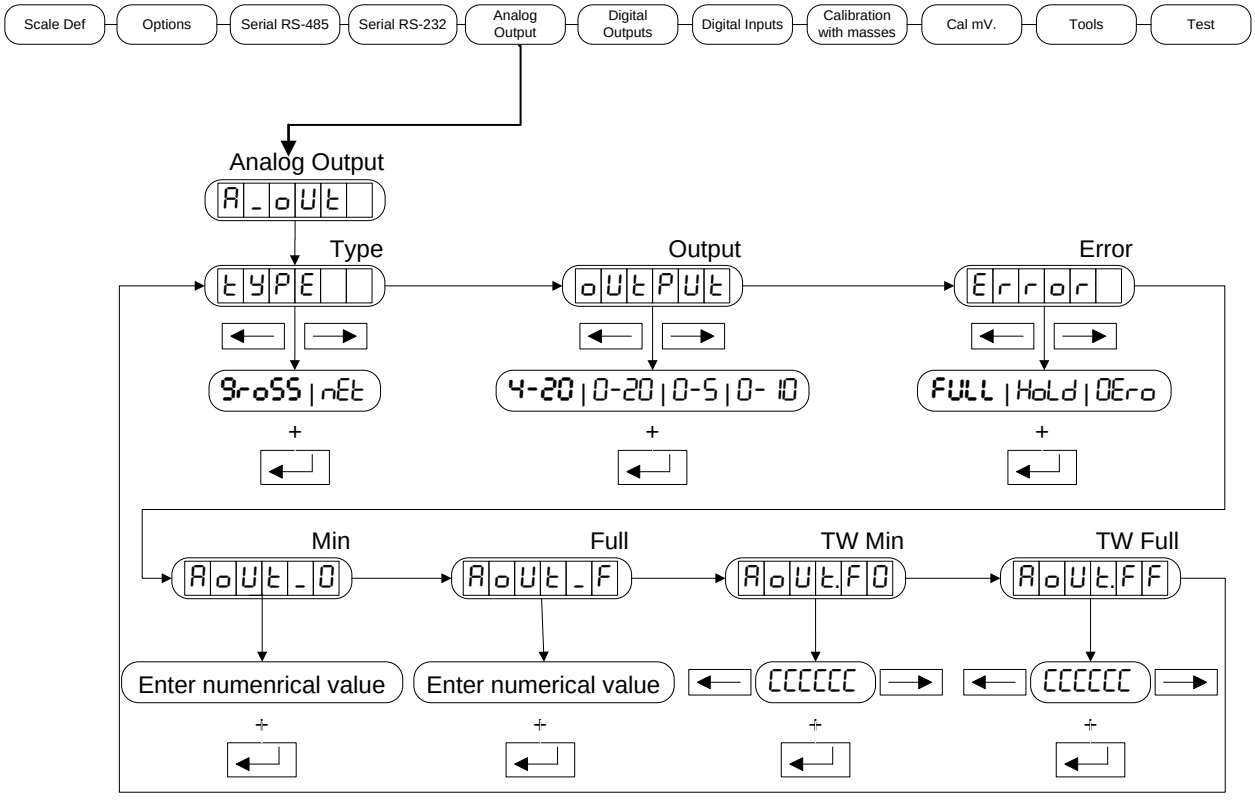


Figure 3.6.1 Analog Output

3.6.1 TYPE (tYPE)

Weight value for the analog output signal
These are the options:

GroSS	Gross weight value is taken as reference
nEt:	Net weight value is taken as reference

3.6.2 OUTPUT (oUtPUt)

Possible options:

0-20	mA
4-20	**mA**
0-5	V
0- 10	V

When configuring the analog output, please check the physical wire connection according to the diagram wiring.

3.6.3 ERROR (Error)

Output in case of system error
These are the options:

FULL:	Salida = MAX
HoLd:	Salida no se cambia
0Ero:	Salida = MIN

3.6.4 MIN (AoUt_0)

Minimum capacity for the analog output range.

3.6.5 FULL (AoUt_F)

Maximum capacity for the analog output range.

3.6.6 TW MIN (AoUt_F0)

Fine adjustment for the minimum analog output. Modify the level pressing the arrow keys (◄►).

3.6.7 TW FULL (AoUt_FF)

Fine adjustment of the maximum analog output. Modify the level pressing the arrow keys (◄►).

3.7 Digital Outputs

Within the Digital outputs configuration level, parameters showed in Figure 3.7.1 can be found.

Once we have introduced the Id_2802 of the device (optional, if we want to modify the protected parameters), we are inside the configuration menu, being the first configuration screen and from there we can move along the configuration menu.

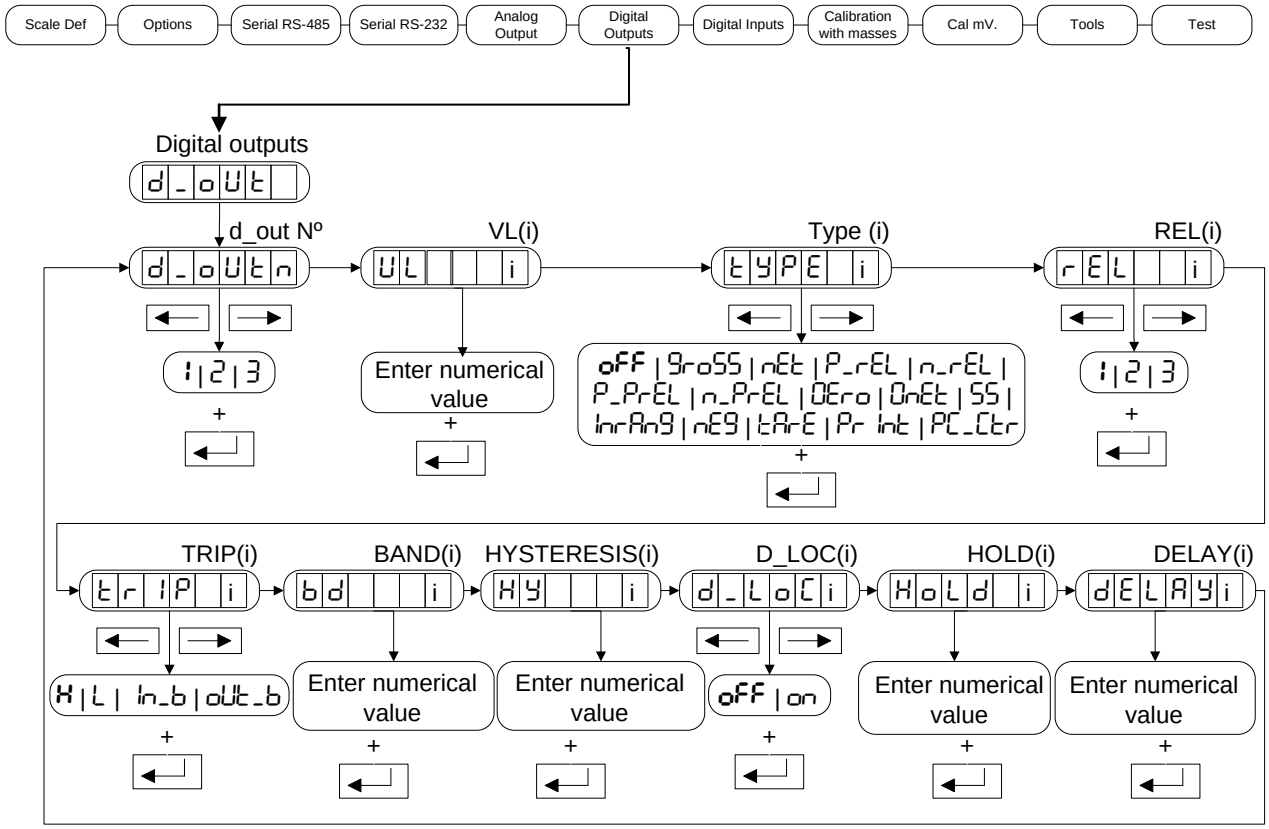


Figure 3.7.1 Digital outputs

3.7.1 D_OUT Nº (d_out n)

Digital output number
Possible options:
1, 2, 3

3.7.2 VL(i) (UL)

Is the value at which the selected output operates. This value should be between –MAX and MAX and also should be compatible with the scale division (d 1 and dP, see 3.2.2 and 3.2.3). This value never can be smaller than -99999. If the introduced value is incorrect the display will show the error Err 2.

3.7.3 TYPE(i) (tYPE)

Type of output action.
These are the options:

OFF (oFF):	Deactivated
GROSS (Gross):	Gross weight value as reference
NET (nEt):	Net weight value as reference
+REL (P_rEL):	Set point trips on the absolute set point value, VL(i), plus the relative value, REL(i)
-REL (n_rEL):	Set point trips on the absolute set point value, VL(i), minus the relative value, REL(i)
+%REL (P_PrEL):	Similar to +REL/-REL except the set point trips on the absolute set point value plus a percentage of the relative value
-%REL (n_PrEL):	Similar to +REL/-REL except the set point trips on the absolute set point value minus a percentage of the relative value
ZERO (Zero):	The output trips if a zero is in the system
ZERONET (ZnEt):	The output trips if the net mode is activated and the display shows a zero
SS (SS):	The output trips if the scale is in the Standstill state
INRANGE (InrAnG):	The output trips if the weight value is within ±MAX
NEG (nEG):	The output trips if the weight value is under zero
TARE IN (tArE):	The output trips if a tare is in the system
PRINT (Pr Int):	The output trips while printing
PC_Ctr (PC_Ctr):	Output controlled by the serial port

3.7.4 REL(i) (rEL)

It defines the reference SETPOINT number on which ±REL or ±%REL are applied. It should be considered that the output number that we are defining must be higher than the reference number. If this condition is not fulfilled, the error message "rEL_Err" will appear on the auxiliary display.

These are the options:
1, 2, 3

3.7.5 TRIP(i) (tr IP)

Configures the trip action for the digital outputs, when it depends on the programmed weight value VL(i). See figures 3.7.5.1 y 3.7.5.2.
These are the options:

H (High):	Trip when weight <VL(i)
L (Low):	Trip when weight >VL(i)
In_b (In-Band):	Trip hen weight>VL(i)+BD(i) or weight<VL(i)-BD(i)
out_b (Out-Band):	Trip when VL(i)-BD(i)<weight<VL(i)+BD(i)

If the digital output is set in the PC_Ctr mode of the tYPE(i) parameter (see 3.7.3), when you turn on the equipment the output configuration is determined by this operation mode.

HIGH:	ON
LOW:	OFF

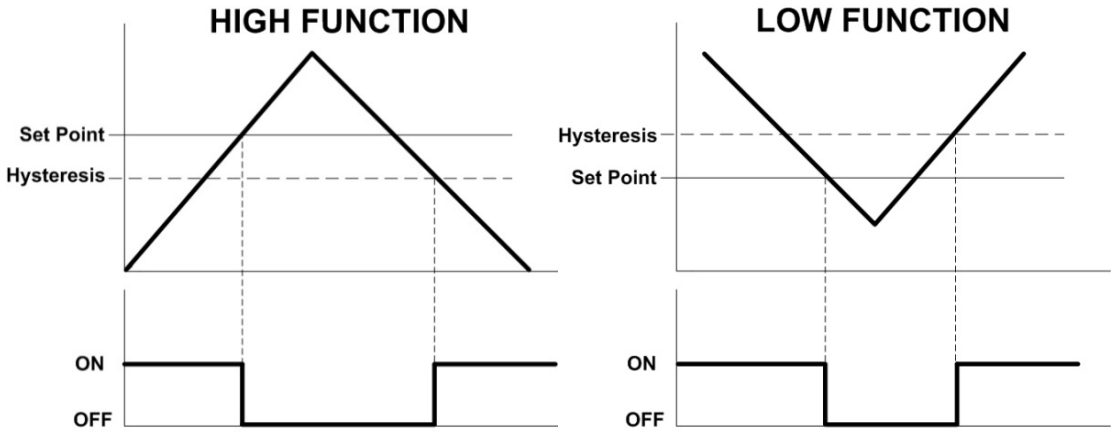


Figure 3.7.5.1 Set point Actuation TRIP High and Low

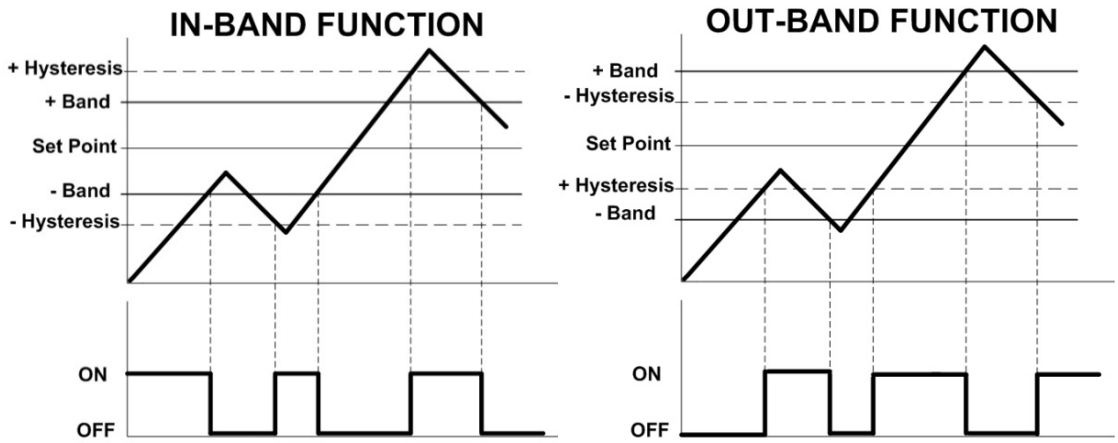


Figure 3.7.5.2 Setpoint Actuation TRIP In-Band and Out-Band

3.7.6 BAND(i) (bd)

A numerical value which determines the value of the IN_B and OUT_B selections of the TRIP parameter

3.7.7 HYSTERESIS(i) (HY)

Determines the hysteresis value which prevents chattering of the digital output.

3.7.8 LOCKED(i) (d_LoC)

It blocks the modification of VL(i) value through the keyboard (key F▲; see 2.7).

3.7.9 HOLD(i) (HoLd)

Is the option to program the minimum activation time of the selected output.

Possible values: 0.0 – 20.0 s. If the programmed time is higher than 20.0 s the display will show the error Err 2.

3.7.10 DELAY(i) (dELAY)

Is the option to program a delay in seconds to activate the digital output. If during this configured time the activation condition disappears, the output will not activate.

Possible values: 0.0 – 20.0 s. If the programmed time is higher than 20.0 s the display will show the error Err 2.

3.8 Digital Inputs

Within the Digital inputs configuration level, parameters showed in figure 3.8.1 can be found.

Once we have introduced the Id_2802 of the device (optional, if we want to modify the protected parameters), we are inside the configuration menu, being the first configuration screen and from there we can move along the configuration menu.

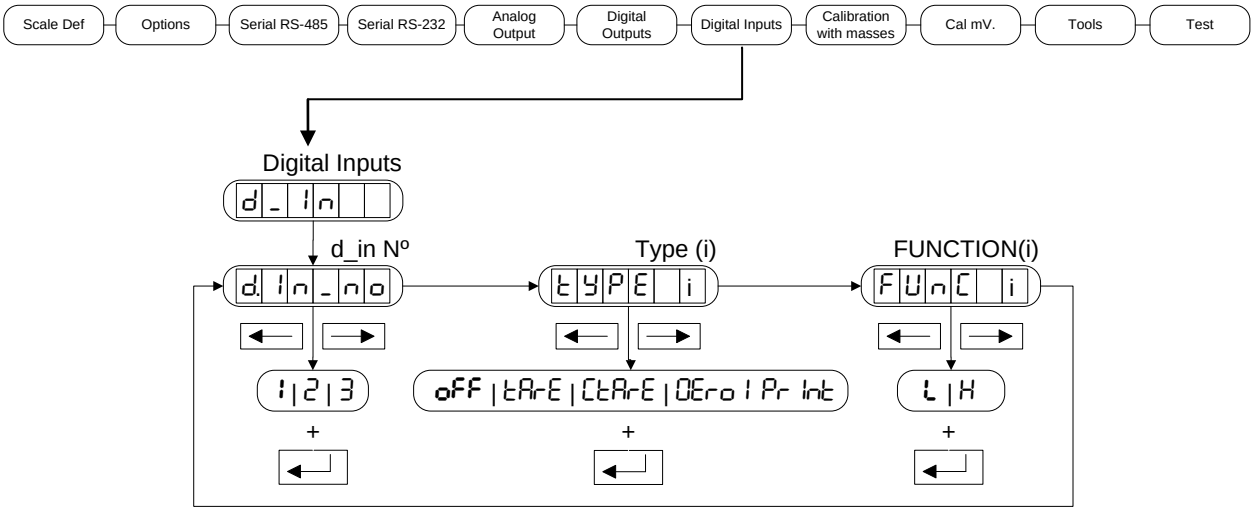


Figure 3.8.1 Digital inputs

3.8.1 D_IN NUM (d_ In no)

Digital input number.
These are the options:
1, 2, 3

3.8.2 TYPE(i) (tYPE)

Input action.
These are the options:

OFF (oFF):	Deactivated
TARE (tArE):	Tare
CLRTARE (CtArE):	Deactivate tare
ZERO (0Ero):	Zero
PRINT Pr Int):	Print

3.8.3 FUNCTION(i) (FUnC)

Input action mode:
These are the possible options:

LOW:	From HIGH to LOW (Falling edge)
HIGH:	From LOW to HIGH (Rising edge)

3.8.4 Examples of application

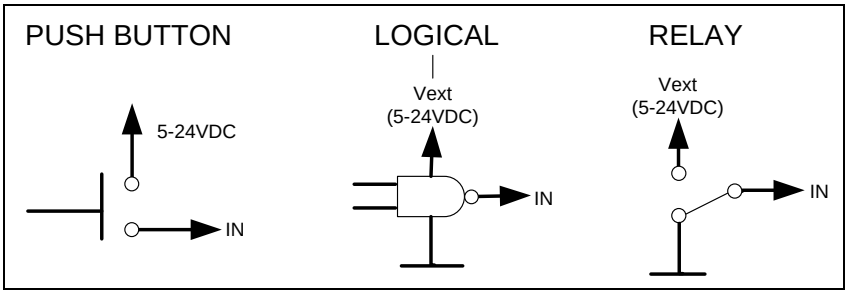


Figure 3.8.3.1 Examples of application

4 Calibration

4.1 Calibration with masses (CAL 1)

Within the Calibration with masses (CAL 1) configuration level, parameters showed in Figure 4.1.1 can be found.

Once we have introduced the Id_2802 of the device (optional, if we want to modify the protected parameters), we are inside the configuration menu, being the first configuration screen the next; from here, we can move along the configuration menu.

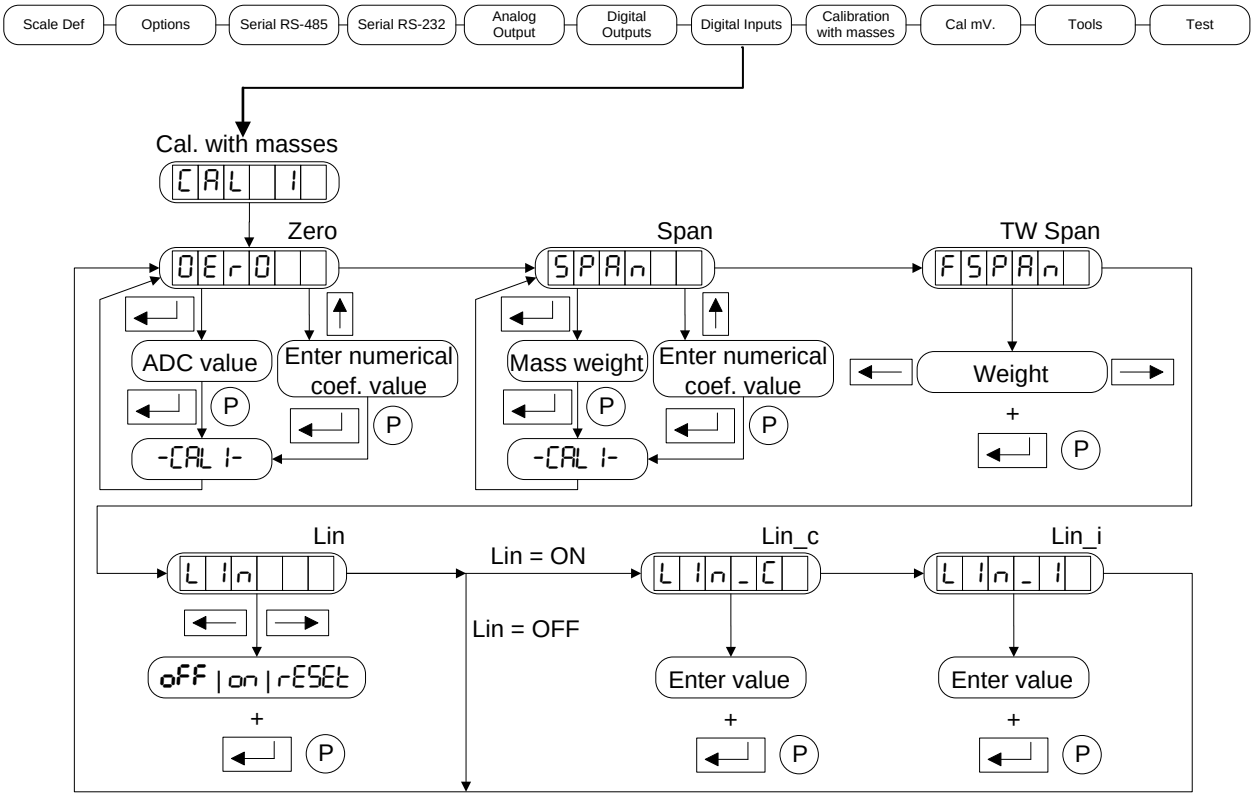


Figure 4.1.1 Calibration with masses

4.1.1 ZERO (0Ero)

- Automatic zero adjustment: To automatically adjust the zero value make sure there is no weight on it and press the enter key. The indicator will show the present coefficient value. On pressing enter again the message *CALIB* will be shown while the indicator assesses the present value. Once accepted it will be stored. It is recommended to keep this coefficient value or print it by means of printing the parameters (see 5.1.3).

- Manual zero adjustment: this coefficient is the internal value of the ADC, and corresponds to the calibration zero value; to introduce manually the zero value (F) key has to be pressed. Then we select the corresponding digit with the Arrow Left and Arrow Right keys (◄►). The selected digit value is modified with Arrow Up key (▲). If a negative value has to be introduced it can only be done with the first left digit. The negative sign appears after the 9 number.

4.1.2 SPAN (SPAn)

- Automatic span adjustment: To automatically adjust the span, place a certified test weight on the scale and press Enter. The maximum scale value is displayed, if the weight placed on the scale is different, key in the real value. Press the Enter key and *CALIB* is displayed while the unit calculates the span coefficient. After accepting it, it is stored. It is recommended to keep this coefficient value or print it by means of printing the parameters (see 5.1.3).

- Manual span adjustment: this coefficient is an internal software value that corresponds to the calibration coefficient gain value, of the scale. To introduce manually the span value (F▲) key has to be pressed. Then we select the corresponding digit with the Arrow Left and Arrow Right keys (◄►). The selected digit value is modified with Arrow Up key (▲). If a negative value has to be introduced it can only be done with the first left digit. The negative sign appears after the 9 number.

ATTENTION
The zero and span coefficients value is obtained by means of the impression of the parameters (see 5.1.3)

4.1.3 TW SPAN (FSPAn)

Span fine adjustment. Use the right/left arrow keys to adjust this value. Press Enter to store the value.

4.1.4 LIN, LIN_C y LIN_I (L in,L in_C,L in_ I)

To activate the linearity adjustment function.
These are the options:
OFF: Linearity adjustment deactivated
ON: Linearity adjustment activated
RESET: Linearity adjustment deactivated and linearity adjustment parameters cleaning
In On position, you access parameters LIN POINT, LIN COR.
LIN_C: Applied load (known value of the mass chosen for the correction)
LIN_I: Indication of the applied load
These parameters allow the correction of a possible non linearity in the system.
This adjustment is performed in the point you choose from 0 to MAX.
After adjusting the scale (zero and span), if a linearity error is detected due to a discrepancy between the load and the system indication, choose a point where discrepancy is more significant and then adjust linearity.
The linearity error disappears at that point and is fundamentally reduced in the rest of points (see figure 4.1.4.1)**.**

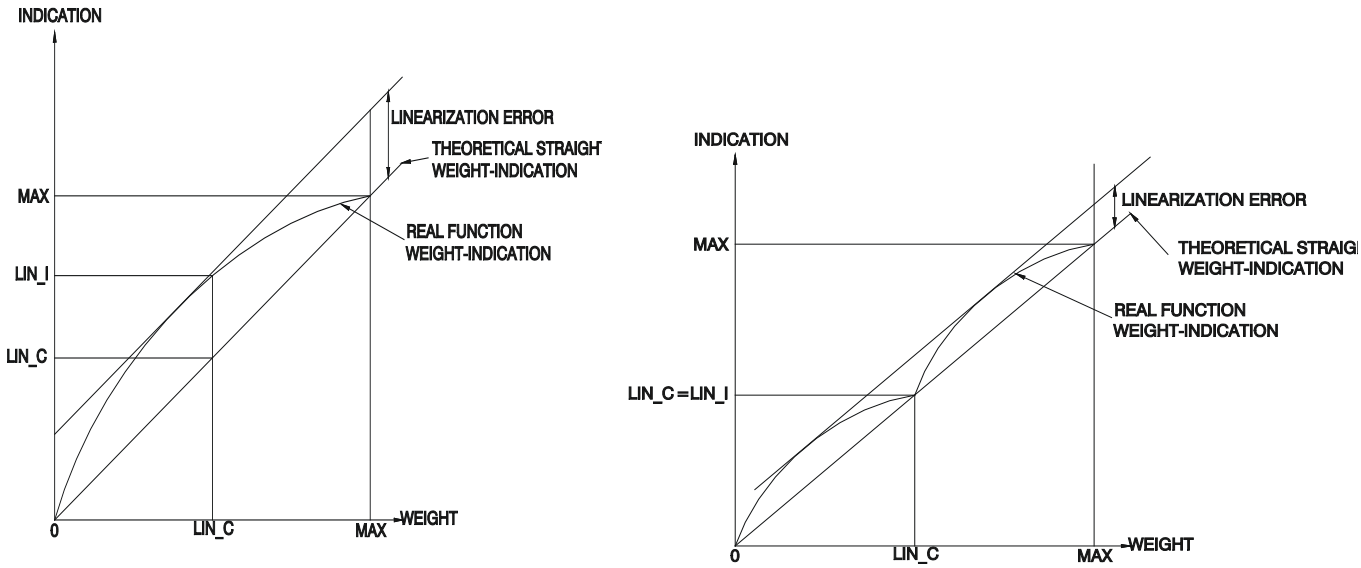


Figure 4.1.4.1 Behavior linearity adjustment, before and after, respectively

This is the procedure:

1-Select the Reset option in the LIN parameter, in order to assess the system linearity without any pre-existing correction. The LIN parameter is deactivated and any previous correction is deleted.

2-Place a known load in a point of the range where there is a significant linearity error. Note down the indication value.

3-Select ON in the LIN parameter and then you gain access to LIN_C and LIN_I parameters.

4-Key in the load value in the LIN_C parameter and press Enter to confirm.

5-Key in the indication value in the LIN_I parameter and press Enter to confirm.

6-The correction has been made.

7-This procedure can be repeated without clearing the previous correction (continue from point 2).

This adjustment calculates an internal algorithm which will be applied whenever the LIN parameter is ON, even if the indicator is redefined or recalibrated. That is why it is important to deactivate it or delete it if its application is not important anymore.

However, whenever a span adjustment is made (SPAN parameter), in the moment of validating the calculated coefficient a message notifies us that the LIN parameter is activated, where appropriate.

4.2 Numerical Calibration (CAL 2)

If there is no reference weight value, it is possible to make a theoretical calibration using capacity and sensibility values (mV/V) of the load cells used.

For a calibration of maximum precision you always have to use the calibration with masses.

Within the numerical calibration level, parameters showed in Figure 4.2.1 can be found.

Once we have introduced the Id_2802 of the device (optional, if we to want modify the protected parameters), we are inside the configuration menu, being the first configuration screen the next; from here, we can move along the configuration menu.

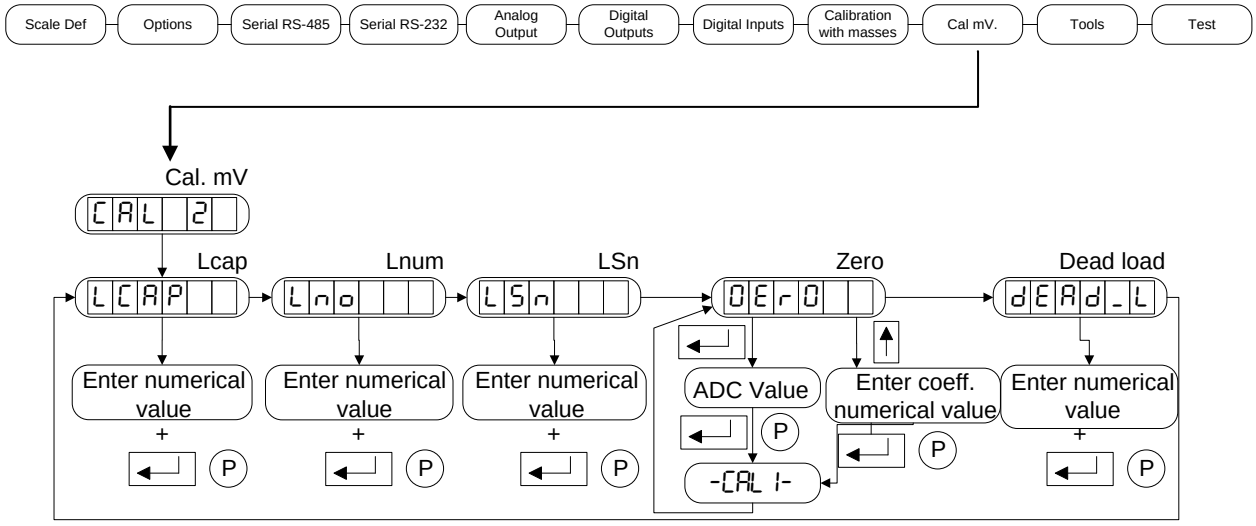


Figure 4.2.1 Numerical calibration

4.2.1 LCAP (LCAP)

Nominal capacity (Emax) of one of the load cells from the scale. It is expressed in the same decimal point used in MAX and DIV (see scale definition 3.2.1, 3.2.2 and 3.2.3).

4.2.2 LNUM (Lno)

Number of load receiver supports. All supports must be counted, both those which rest on load cells and those which do not.

4.2.3 L Sn (LSn)

Load cells nominal sensibility in mV/V (if values are not the same, calculate the average).

4.2.4 ZERO (0Ero)

- Automatic zero adjustment: To automatically adjust the zero value make sure there is not any weight on it and press the enter key. The indicator will show the present coefficient value. On pressing enter again the message *CALIB* will be shown while the indicator assesses the present value. Once accepted it will be stored. It is recommended to keep this coefficient value or print it by means of printing the parameters (see 5.1.3).

- Manual zero adjustment: this coefficient is the internal value of the ADC, and corresponds to the calibration zero value; to introduce manually the zero value (F) key has to be pressed. Then we select the corresponding digit with the Arrow Left and Arrow Right keys (◄►). The selected digit value is modified with Arrow Up key (▲). If a negative value has to be introduced it can only be done with the first left digit. The negative sign appears after the 9 number.

ATTENTION
The zero and span coefficients value is obtained by means of the impression of the parameters (see 5.1.3)

4.2.5 Dead load (dEAd_L)

It is the dead load of the structure.

By changing this parameter changes the zero of the system. This parameter can be used in scales where is not possible to empty the scale to perform the zero calibration of the system.

It can be used in the following cases:

- In a weighing system where is not possible to empty it, to perform the zero calibration, but we know the dead load of the structure: the zero calibration of the system can be done, without being necessary empty the scale, according to procedure “example of use 1”.

- In a weighing system where is not possible to empty it, to perform the zero calibration, we do NOT know the dead load, but we know the net weight of the product. In this case, we can perform the adjustment of the system and deduce the dead load of the system, according to procedure “example of use 2”. The accuracy of the dead load obtained, depends on the accuracy of the net weight.

We should keep in mind when modifying this parameter, we are modifying the zero of the system and consequently, the internal calibration counter will increase.

If we modify the gain of the device (SPAn), the dead load of the system will be recalculated. The same happens when doing a zero through ZERO option (see 4.2.4).

Example of use 1: Performs the zero adjustment of the system, knowing its dead load.

1. First of all, we should define the weighing system through menu dEF (see 3.2).
2. Once the definition it is done, we have to enter in menu CAL 2 (see 4.2) and set the capacity, sensitivity and number of load cells.
3. Next, we have to set the Dead Load value of the structure (dEAd_L), (see 4.2).

Example of use 2: Performs the deduction of the Dead Load of the system, knowing its net Weight of the product.

1. First of all, we should define the weighing system through menu dEF (see 3.2).
2. Once the definition it is done, we have to enter in menu CAL 2 (see 4.2) and set the Dead Load value to 0.
3. Next, we have to perform the numerical calibration of the gain. We have to set the capacity, sensitivity and number of load cells, (see 4.2).
4. With menu Weight x10 (H_rES) (see 5.1.1), we can see the weight of the scale multiplied by ten. This weight is the gross weight (GW) above the load cells.
5. We will calculate the Deal Load of the system by subtracting the gross weight (GW), obtained in paragraph 4, the net weight NW (known or estimated) of the material inside the silo. So Deal Load is DL= GW – NW.
6. Now we have to set this value of Deal Load obtained in (dEAd_L), and validate the value.
7. Once the (dEAd_L) value is validated, the device recalculates the new zero and adjusts the system, saving the adjustment parameters.

5 Tools & test

5.1 Tools

Within the tools level, parameters showed in Figure 5.1.1 can be found.

Once we have introduced the Id_2802 of the device (optional, if we want to modify the protected parameters), we are inside the configuration menu, being the first configuration screen the next; from there, we can move along the configuration menu.

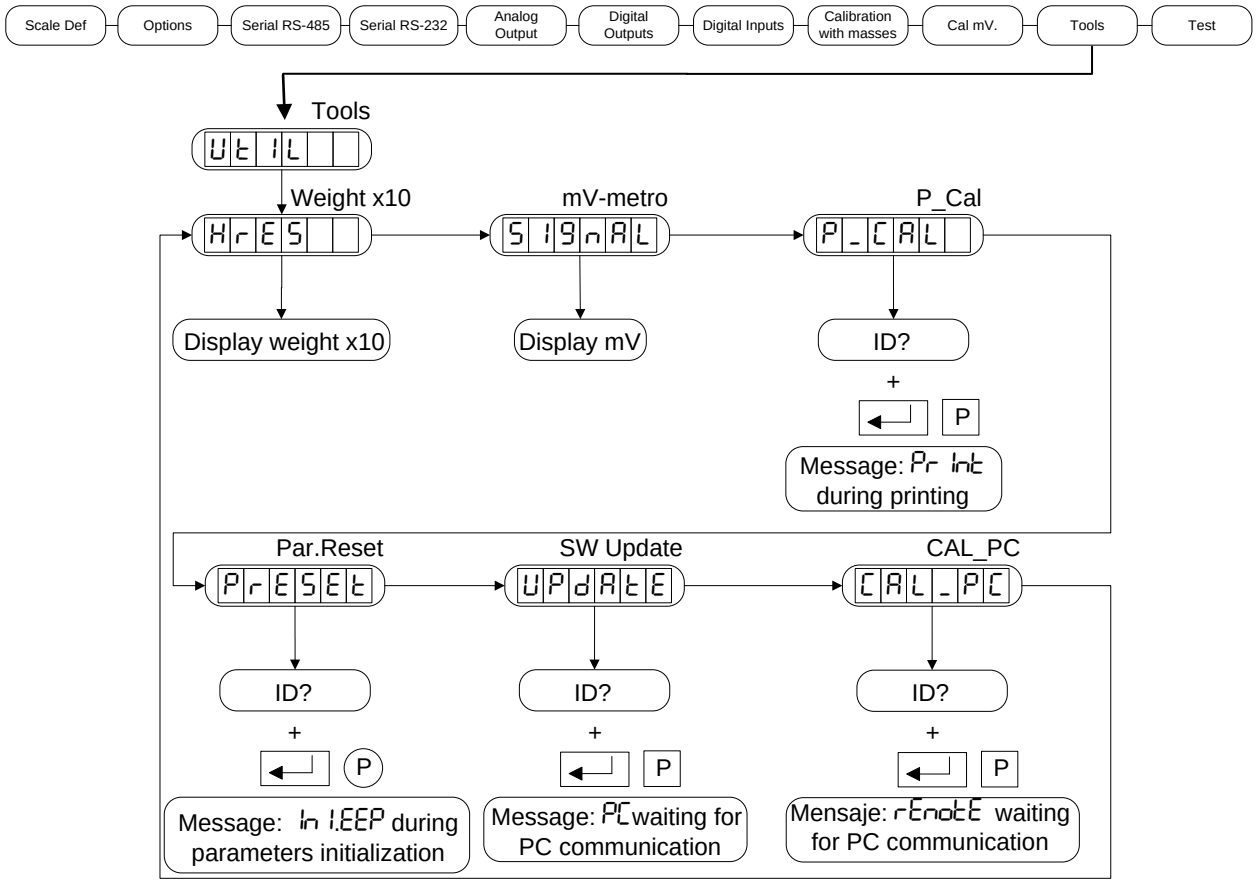


Figure 5.1.1 Tools

5.1.1 Weight x10 (H_rES)

Displays the weight value with a resolution multiplied by ten.

5.1.2 mV-Metro (SIGnAL)

Displays the ADC value output in mV.

5.1.3 Print Cal (P_CAL)

Allows the user to print the parameters through RS-232 port.

5.1.4 Par.Reset (PrESEt)

Resets all the parameters to the default configuration.

5.1.5 SW Update (UPdAtE)

It allows the user perform a software device update, through a PC program (Bootloader SWIFT). It is necessary to place the right PIN number, afterwards, the device stays waiting the PC communication. If communication is not running and EXIT key is pressed, the device will restart.

5.1.6 Remote Calibration (CAL_PC)

It allows the user perform a remote calibration, through a PC program. It is necessary to place the right PIN number, afterwards, the device stays waiting the PC communication.

To modify metrological parameters, it is necessary that the calibration switch (see figure 3.1.1) unlocked, at the time of entering the configuration menu.

Changing these parameters will increase the calibration counter. If communication is not running and EXIT key is pressed, the device will restart.

5.2 Test

Within the test level, parameters showed in Figure 5.2.1 can be found.

Once we have introduced the Id_2802 of the device (optional, if we want modify protected parameters), we are inside the configuration menu, being the first configuration screen and from there we can move along the configuration menu.

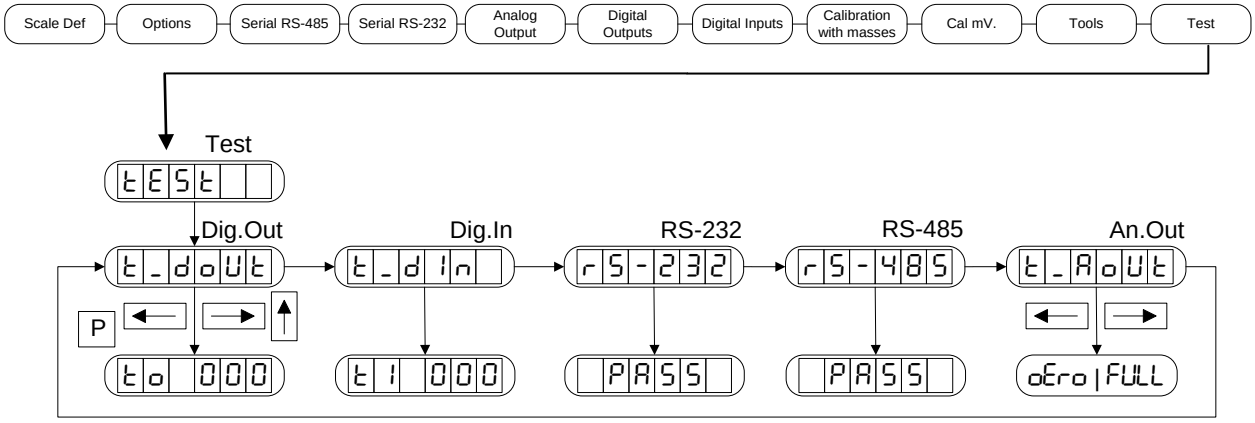


Figure 5.2.1 Test

5.2.1 Digital outputs (t_doUt)

This option, allows the user doing a test for the digital outputs, by activating (1) or deactivating (0) these outputs. To select an output, we use right and left key. To activate (1) or deactivate (0) the output press (F▲) key

This option allows to enable (1) / disable (0) the digital outputs to execute a function test.
To select one the outptut we move the left/rights keys. To enable (1) / disable (0) press the UP key.
To access this option the pin number is mandatory.

5.2.2 Digital inputs (t_d In)

This option allows you check if the digital inputs are enabled (1) or not (0)

5.2.3 RS-232 (rS-232)

This option allows you to test the RS-232 serial port. Make an electronic bridge between Rx and Tx. The display shows (PASS) if is successfully, or (-FA IL-) if not exceded.

5.2.4 RS-485 (rS-485)

This option allows you to test the RS-485 serial port. To pass this test, leave the port without connecting strips. The display shows (PASS) if is successfully, or (-FA IL-) if not exceded.

5.2.5 Analog output (t_AoUt)

This option allows you to test the analog output. It shows the value of zero (oEro) and full scale (FULL).

Esta opción permite hacer un test de la salida analógica. Nos mostrará el valor del cero (oEro) y del fondo de escala (FULL). The kind of output will depend on how you have configured (see 3.6.2)

6 Communications

The device has two serial communication ports:
One serial port RS-485 half-duplex and a second port RS-232.
The communication channel behavior is selected in paragraph 3.4 for RS-485 and in paragraph 3.5 for RS-232.

6.1 Communication general characteristics

The RS-232 port supports the communication formats shown in paragraph 6.2. The RS-485 port besides communication formats of paragraph 6.2, also supports net communication through simple format (see 6.4) in MODBUS protocol (ASCII or RTU). The protocol selection is performed in paragraph 3.4.1.

6.2 General Characteristics of the Remote Controller

6.2.1 Remote Controller Commands

Operation Commands:

A	Query/Set weight in F4 format
G	Equivalent to EXIT + TARE keys
P	Query/Set weight with response according to the selected format (see 3.4.2)
Q	Equivalent to PRINT key
R	Reset system
T	Equivalent to TARE key
Z	Equivalent to ZERO key
S	Equivalent to Σ key
E	Equivalent to EXIT + Σ keys
$	Weight query/set: The command does not require <CR>
STX, ENQ, ETX	Weight query: the command does not require <CR>
SYN	Weight query: the command does not require <CR>

SETPOINTS Programming: Allows the VL(i) parameter from the i digital output to be changed (see 3.7.2).

The decimal point is taken from the system.
In case of TYPE(i) = ±REL o ±%REL: VL(i) = pppppp/100 %.

Program:

S	P	i	±	p	p	p	p	p	p	p

Consult:

S	P	i	?

It returns the value in the programmed format.

Data transfer in ASCII format:

± :	Sign: + positive value; - negative value
i :	Digital output number (1 - 4)
p :	Weight (7 digits)

REMOTE Mode: It allows changing the i digital output, provided that this is programmed TYPE(i) = REM (see 3.7.3)

Act:

X	O	i	x

Consult:

X	O	?

Answer:

X	O	X_8	X_7	X_6	X_5	X_4	X_3	X_2	X_1

Data transfer in ASCII format:

i : Digital output number (1 - 4)

X_n : Status of the digital output (n): 0 = OFF; 1 = ON

Read digital inputs: It allows reading the status of the digital inputs

Consult:

X	I	?

Answer:

X	I	X_8	X_7	X_6	X_5	X_4	X_3	X_2	X_1

Data transfer in ASCII format:

X_n: Status of the digital input (n): 0 = Low; 1 = High

6.2.2 Data Format

F1 Format:

<STX>	POL	ppppppp	U	G/N	S	T

F2 Format:

''	POL	nnnnnnn	T

F3 Format:

<STX>	'1'	' '	'0'	' '	POL	nnnnnnn	<ETX>	T

F4 Format:

POL	aaaaaaa	T

F5 Format:

<STX>	' '	POL	nnnnnnn	<ETX>	T

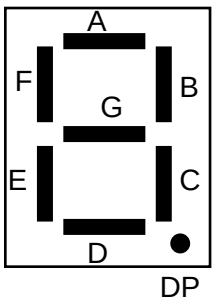
F6 Format:

Used for a remote display. The content of the display is transmitted in hexadecimal.

D7	D6	D5	D4	D3	D2	D1	Status	T

Digit code:

bit 7: segment DP
bit 6: segment A
bit 5: segment B
bit 4: segment C
bit 3: segment D
bit 2: segment E
bit 1: segment F
bit 0: segment G



Status code:

bit 7: accumulation activated
bit 6: 0 fixed
bit 5: 0 fixed
bit 4: piece counting activated
bit 3: preset tare (PT)
bit 2: ZERO
bit 1: NET
bit 0: STABLE

F7 Format:

<STX>	status	POL	ppppppp	T

The status is obtained when you add to $0x20_{hex}$ the values of the lighted status LEDs:

Gross= $0x01_{hex}$ Zero= $0x08_{hex}$

Net= $0x02_{hex}$ Standstill=$0x20_{hex}$

F8 Format:

<STX>	POL	‘ ‘	ppppppp	‘ ‘	Unit	Unit	‘ ‘	Mode	Mode	‘ ‘	T

UNITS: kg = ‘KG’ MODE: Gross= ‘BR’

lb = ‘lb’ Net= ‘NT’

F9 Format:

ppppppp	T

F10 Format:

<STX>	<STA>	ppppppp	T

<STA>: status, 1 character: "+" positive weight

"-" negative weight

"?" unsteady weight

F11 Format:

<STX>	‘ ‘	‘ ‘	‘ ‘	Polarity	ppppppp	T

Polarity: "-" Negative weight

";" Zero or positive weight

F12 Format:

<STX>	<STA>	“ “	weight	T

<STA>: status, 1 character: "S" steady weight

"N" unsteady weight

Weight: without decimal point → 6 digits

with decimal point → 7 digits

F13 Format:

<STX>	“ “	<STA>	weight	T

<STA>: status, 1 character: "S" steady weight

"N" unsteady weight

Weight: without decimal point → 5 digits

with decimal point → 6 digits

Definitions			
<STX>	Start of Text (ASCII 2)		
<ETX>	End of Text (ASCII 3)		
<ENQ>	Enquire (ASCII 5)		
<SYN>	Synchronous Idle (ASCII 22)		
<CR>	Carriage Return (ASCII 13)		
<LF>	Line Feed (ASCII 10)		
‘ ‘	Space character		
‘0’	Character ‘0’		
‘1’	Character ‘1’		
ppppppp	Weight value, 7 characters		
nnnnnnn	Net weight value, 7 characters		
aaaaaaa	Analog/Digital converter filtered output, 7 characters		
POL	Polarity:	‘ ‘	Weight > 0
		‘-‘	Weight < 0
U	Units:	K	kg
		T	t
		G	g
		L	lb
		‘ ‘	oz, without unit
G/N	Gross/Net:	G	Gross
		N	Net
S	Status:	‘ ‘	Valid weight
		M	Motion
		O	Overload
		I	Invalid weight
T	Termination:	CR	
		CR + LF	
		ACK (ASCII 6)	
		NAK (ASCII 21)	

6.3 Protocol RS-232

This is the communication between two pieces of equipment, point per point, with a maximum distance of 15 m.

Protocol format:

Command	CR

All commands in section 6.1.

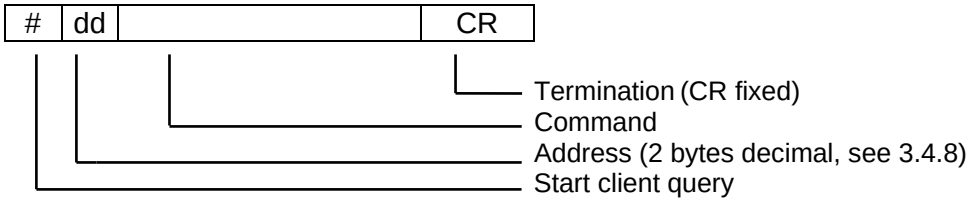
6.4 Network Communications (RS-485)

This is the communication between several items of equipment (100 maximum) in a BUS with a maximum link distance of 1,200 m.

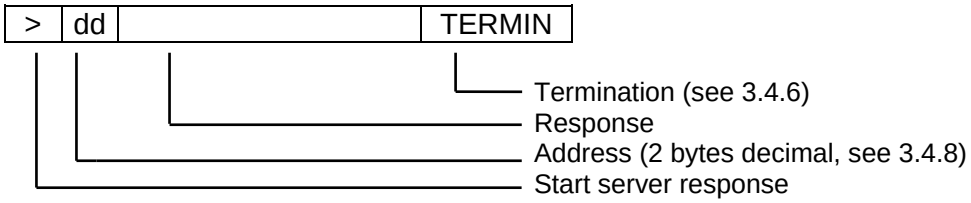
The SWIFT indicator can only be the SERVER and it must be assigned a unique address from 1 to 99.

Client queries and servers responses have the following formats:

Client query:



Server response:



There are three types of responses:

Data	Received and responded query command
ACK	Received and understood command
NAK	Received but not understood command

6.5 MODBUS Protocol

6.5.1 General Characteristics

The MODBUS protocol that incorporates this device is based on the specifications of the guide "***MODBUS over serial line specification and implementation guide V1.02"*** published by the Modbus Organization (*www.modbus.org*).

This protocol allows interconnecting multiple devices (server) to a device (client); this client is able to interact individually with them through RS-485 channel. There are two different formats for MODBUS communication – ASCII and RTU- both supported for this device.

To activate the MODBUS protocol in the device, ASCII or RTU format in option TYPE (see 3.4) should be selected. Parameters baud rate and parity must be the same in the SWIFT as in all the others. It is also necessary to configure the bus address on each device to be able to identify each device in the bus (see 3.4.8)

6.5.2 MODBUS supported functions

Function	Description
01(0x01)	READ COILS
02(0x02)	READ DISCRETE INPUTS
03(0x03)	READ HOLDING REGISTER
04(0x04)	READ INPUT REGISTER
05(0x05)	WRITE SINGLE COIL
06(0x06)	WRITE SINGLE REGISTER
15(0x0F)	WRITE MULTIPLE COIL
16(0x10)	WRITE MULTIPLE REGISTER

Table 6.5.2.1

6.5.3 Warnings and saving parameters in the NVM (nonvolatile memory)

Many of the writing parameters are saved in NVM. This memory has limited writing cycles (typically 100.000), so we should avoid writing continuously on it.

In E2PROM column is indicated if a Holding Register is saved or not in the NVM. Set points (registers from 41010 to 41015) are saved directly when modifying. The rest of parameters only are saved in E2PROM when the correspondent command (the 32) is written in the command register (register 41001).When turning off the device, if the writing command is not executed the written value will not be stored, recovering the last stored value.

6.5.4 Parameters and variables addressing

The access and distribution to the parameters and variables in MODBUS registers is as follows:

1. The digital inputs reading are done by the command READ DISCRETE INPUTS. See table *Discrete inputs 6.5.10.3*.1.
2. The digital outputs state reading is done by the command READ COILS. See table *Coils* 6.5.10.4.
3. The digital outputs writing is done by the command WRITE SINGLE COIL or WRITE MULTIPLE COIL. See table *Coils* 6.5.10.4. To be able to write in a digital output is necessary to be configured as remote control (PC_Ctrl). See paragraph 3.7.3.
4. The only reading parameters or variables are read by the command READ INPUT REGISTER. See table *Input Registers 6.5.10.2*.1
5. The reading/writing parameters are read by the command READ HOLDING REGISTER and are written by the command WRITE SINGLE REGISTER and WRITE MULTIPLE REGISTER. See table *Holding Registers* 6.5.10.1.1. When writing a 32 bits variable, it is important to keep in mind that should be done by command WRITE MULTIPLE REGISTER because MODBUS single register has 16 bits.

6.5.5 Command Register

The command register (holding register 41001) is used to execute functions in the device. These functions can be tare, safe parameters in NVM, etc. In table 6.5.7.2 there the available commands are listed. The execution is performed by writing the correspondent code in this register. The PREFIXED TARE function needs writing the first tare value in command data register (addresses 41002, 41003). If for any reason, the command cannot be executed the system will give an error message.

6.5.6 Returned Error Codes

When the device receives a MODBUS command (correct address and checksum) answers with the data requested or with a status operation indication. When an error appears, answers with the following standard codes:

Error	Code	Possible causes
ILLEGAL FUNCTION	1	- Received function do not recognized by the device - Wrong received format command
ILLEGAL DATA ADDRESS	2	- No registers in this address - Intent to write in only read register - Intent to write in register only accessible in REMOTE mode - Intent to partial (one register) write in a 32 bits (two registers) variable
ILLEGAL DATA VALUE	3	- Wrong written value in a variable. - Example: out of range, not compatible with scale division, etc… - Written command do not recognized in command register (see 6.5.5)
SERVER DEVICE FAILURE	4	- Error when saving in NVM (nonvolatile memory). - Intent to write in a digital output not configured as remote mode (PC_Ctrl)
SERVER DEVICE BUSY	6	- At this moment the device cannot process the command

Table 6.5.6.1

6.5.7 Using the command register

Besides the reading and writing parameters and variables through the MODBUS registers, the user can execute actions in the device through the command register. We use the following registers.

Command Registers		
Address	**Description**	**Comments**
41001	Command Register	See table 6.5.7.2
41002	Command Data (H)	
41003	Command Data (L)	
41004	Status Command Register	Only read. See table 6.5.7.3

Table 6.5.7.1

The command register reading (41001) has the same answer as the status register (41004).

Writing a command code in the command register will cause an action according to the following table:

Available Commands	
Code	**Function**
1	Zeroing
2	Automatic Tare
3	Prefixed tare.(first of all write the tare value in the command register data)
6	Exit tare
7	Print (prints a ticket if RS-232 port is configured in ticket mode)
30	Reset device
32	Save in NVM (nonvolatile memory) the modified registers
1100	Cancel (allows to cancel functions, if for any reason they stay in a state indefinitely because a non-stability or a load cell error)

Table 6.5.7.2

During command 32 execution (save in NVM) the device response with error code 6 (SERVER DEVICE BUSY) to any MODBUS command.

When sending 1(zero), 2 (automatic tare) and 7 (print) commands, the device can take a while for executing them (i.e. non stable weight). During this time if we attempt to read the command status through 41001 or 41004 registers, we will get the correspondent code function and value 4 in status (executing command pending).

When a function is in 4 status (executing pending) is possible to send the Cancel command (code 100) to cancel it. When reading the status register command afterwards the cancel command has been sent we can have two different answers:

1. Cancel code function and status 2 (error): Indicates there is no executing pending function.
2. Function codes 1, 2 or 7 and status 8 (cancel command): Indicates corresponding function has been canceled**.**

Reading the status register (41004) we can tell if the command has been successfully executed. The read data format is as follows:

Status register reading (16 bits)	
High byte (8 bits)	**Low byte (8 bits)**
Executing command code (according to table 6.5.7.2)	Status: **Value** | **Command execution** 1 | Correct 2 | Error during execution 4 | Execution pending 8 | Cancelled command through executing cancel command (code 100)

Table 6.5.7.3

Command 3 (Prefixed Tare) needs a previous writing in data register (41002 and 41003). Is a 32 bits value, this value should be within the scales capacity and should be compatible with the scale division. If these conditions are not accomplished an error will be shown during the command execution.

Command 32 (save in NVM) saves the data in a nonvolatile memory. If this command is not sent, data will be lost when restarting the device. The writing in a nonvolatile memory is a slow process, during this time the device answer with the error SERVER DEVICE BUSY.

6.5.8 Numerical data format

Registers in MODBUS protocol has 16 bits size. To transmit the three basic numerical variables we use the following format:

Byte variables (8 bits):

16 bits Register	
MSB (Most significant byte)	**LSB (Low significant byte)**
0x00	Valor de la variable (8 bits)

Table 6.5.8.1

Integer variables (16 bits):

16 bits Register	
MSB (Most significant byte)	**LSB (Low significant byte)**
Variable (MSB)	Variable (LSB)

Table 6.5.8.2

Long variables (32 bits):

We use two registers: Assuming that we define the variable as four bytes numbered from 1 to 4 with 1 being the least significant would have the following format:

First register 16 bits	
MSB (Most significant byte)	**LSB (Low significant byte)**
4th Byte of the variable	3rd Byte of the variable

Table 6.5.8.3

Second register 16 bits	
MSB (Most significant byte)	**LSB (Low significant byte)**
2nd Bite of the variable	1st Bite of the variable

Table 6.5.8.4

6.5.9 MODBUS address conversion:

Data register tables have their addresses in standard Modbus format. To convert this address into the necessary message for the Modbus format, these operations should be done:

1. If the address of the table is lower than 1000 then you have to subtract 1 to send it to the device. Example: Digital output 1 access is through COIL 1, its address is 00001. The message should send the address 0.
2. If the address is higher than 1000 and has the following format 1xxxx, 3xxxx or 4xxxx, we have to delete the first digit and the remaining number should be subtract 1. This is the value to send. Example: To access to Command register 41001, we have to send 1000 address in decimal (03E8 hexadecimal).

6.5.10 Registers address tables

In these tables are indicated the addresses and the content of all the available registers.

In the first column you can find the address register and in the second and third column are the address converted to the required MODBUS command format, in hexadecimal and in decimal.

6.5.10.1 Holding Registers

These are read/write registers used to modify or consult parameters of the device. You can also execute functions through the command register.

Related function (decimal code function): READ HOLDING REGISTER (03), WRITE SINGLE REGISTER (06), WRITE MULTIPLE REGISTER (16)

Address Register	Address Hexa. Command	Address Decimal Command	Length (Words)	Description	Format	Values Range / Comments	E2PROM (10)
41001	03E8	1000	1	Command Register	Integer	See table "K" (1)	No
41002	03E9	1001	2	Command Data (H)	Long	See table "K"	No
41003				Command Data (L)		See table "K"	No
41004	03EB	1003	1	Status Register	Integer	Read only. See table "L"	No
				Setpoints			
41010	03F1	1009	2	Setpoint 1 (H)	Long	-CAP…CAP (2)	Yes (9)
41011				Setpoint 1 (L)			
41012	03F3	1011	2	Setpoint 2 (H)	Long	-CAP…CAP (2)	Yes (9)
41013				Setpoint 2 (L)			
41014	03F5	1013	2	Setpoint 3 (H)	Long	-CAP…CAP (2)	Yes (9)
41015				Setpoint 3 (L)			
41016	03F7	1015	2	Temporal Setpoint 1 (H)	Long	-CAP…CAP (2)	No
41017				Temporal Setpoint 1 (L)			
41018	03F9	1017	2	Temporal Setpoint 2 (H)	Long	-CAP…CAP (2)	No
41019				Temporal Setpoint 2 (L)			
41020	03FB	1019	2	Temporal Setpoint 3 (H)	Long	-CAP…CAP (2)	No
41021				Temporal Setpoint 3 (L)			
				RS-485 Menu (11)			
41040	040F	1039	1	Type	Byte	0:Off,1:dE,2:St,4:ASCII,5:RTU	Yes
41041	0410	1040	1	Format	Byte	0…12 (3)	Yes
41042	0411	1041	1	Baudrate	Byte	0…5 (4) See table "F"	Yes
41043	0412	1042	1	Parity	Byte	0…2 → 0:None, 1:Even, 2:Odd	Yes
41044	0413	1043	1	Ou. Rate	Byte	0…7 (5) See table "G"	Yes
41045	0414	1044	1	Termination	Byte	0…3 (6) See table "H"	Yes
41046	0415	1045	1	Protocol	Byte	0: None, 1: RS485	Yes
41047	0416	1046	1	Address	Byte	1…99	Yes
41048	0417	1047	1	Bus termination	Byte	0: R.Termination OFF 1: R.Termination ON	Yes
				RS-232 Menu (11)			
41050	0419	1049	1	Type	Byte	0…3 → 0:Off,1:dE,2:St,3:Ti	Yes
41051	041A	1050	1	Format	Byte	0…12 (3)	Yes
41052	041B	1051	1	Baudrate	Byte	0…5 (4) See table "F"	Yes
41053	041C	1052	1	Parity	Byte	0…2 → 0:None, 1:Even, 2:Odd	Yes
41054	041D	1053	1	Delay	Byte	0…7 (5) See table "G"	Yes
41055	041E	1054	1	Termination	Byte	0…3 (6) See table "H"	Yes
				A_Out Menu			
41060	0423	1059	1	Type	Byte	0:Gross 1:Net	Yes

Address Register	Address Hexa. Command	Address Decimal Command	Length (Words)	Description	Format	Values Range / Comments	E2PROM (10)
41061	0424	1060	1	Output	Byte	0: 4-20mA, 1: 0-20mA, 2: 0-5V, 3: 0-10V	Yes
41062	0425	1061	1	Error	Byte	0:FULL, 1: HOLD, 2: MIN	Yes
41063	0426	1062	2	Aout_0 (H)	Long	0…CAP (2)	Yes
41064				Aout_0 (L)			Yes
41065	0428	1064	2	Aout_F (H)	Long	0…CAP (2)	Yes
41066				Aout_F (L)			Yes
41067	042A	1066	1	Aout.F0	Integer	0…0xFFFF	Yes
41068	042B	1067	1	Aout.FF	Integer	0…0xFFFF	Yes
				D_Out Menu			
				Digital Output 1			
41070	042D	1069	2	VL1 Setpoint 1 (H)	Long	-CAP…CAP (2)	Yes
41071				VL1 Setpoint 1 (L)			Yes
41072	042F	1071	1	Type 1	Byte	0…14 (7) See table "I"	Yes
41073	0430	1072	1	Rel 1	Byte	0…2 0:Setpoint 1 1:Setpoint 2 2:Setpoint 3	Yes
41074	0431	1073	1	Trip 1	Byte	0…3 (8) See table "J"	Yes
41075	0432	1074	2	Band 1 (H)	Long	0…CAP (2)	Yes
41076				Band 1 (L)			Yes
41077	0434	1076	2	Hy 1 (H)	Long	0…CAP (2)	Yes
41078				Hy 1 (L)			Yes
41079	0436	1078	1	d_Loc 1	Byte	0:OFF, 1:ON	Yes
41080	0437	1079	1	Timer 1	Byte	0…200 200 equals to 20.0s	Yes
41081	0438	1080	1	Delay 1	Byte	0…200 200 equals to 20.0s	Yes
				Digital Output 2			
41090	0441	1089	2	VL2 Setpoint 2 (H)	Long	-CAP…CAP (2)	Yes
41091				VL2 Setpoint 2 (L)			Yes
41092	0443	1091	1	Type 2	Byte	0…15 (7) See table "I"	Yes
41093	0444	1092	1	Rel 2	Byte	0…3 0:Setpoint 1 1:Setpoint 2 2:Setpoint 3	Yes
41094	0445	1093	1	Trip 2	Byte	0…3 (8) See table "J"	Yes
41095	0446	1094	2	Band 2 (H)	Long	0…CAP (2)	Yes
41096				Band 2 (L)			Yes
41097	0448	1096	2	Hy 2 (H)	Long	0…CAP (2)	Yes
41098				Hy 2 (L)			Yes
41099	044A	1098	1	d_Loc 2	Byte	0:OFF, 1:ON	Yes
41100	044B	1099	1	Timer 2	Byte	0…200 200 equals to 20.0s	Yes
41101	044C	1100	1	Delay 2	Byte	0…200 200 equals to 20.0s	Yes
				Digital Output 3			
41110	0455	1109	2	VL3 Setpoint 3 (H)	Long	-CAP…CAP (2)	Yes
41111				VL3 Setpoint 3 (L)			Yes
41112	0457	1111	1	Type 3	Byte	0…15 (7) See table "I"	Yes
41113	0458	1112	1	Rel 3	Byte	0…3 0:Setpoint 1 1:Setpoint 2 2:Setpoint 3	Yes
41114	0459	1113	1	Trip 3	Byte	0…3 (8) See table "J"	Yes
41115	045A	1114	2	Band 3 (H)	Long	0…CAP (2)	Yes
41116				Band 3 (L)			Yes
41117	045C	1116	2	Hy 3 (H)	Long	0…CAP (2)	Yes
41118				Hy 3 (L)			Yes
41119	045E	1118	1	d_Loc 3	Byte	0:OFF, 1:ON	Yes
41120	045F	1119	1	Timer 3	Byte	0…200 200 equals to 20.0s	Yes

Address Register	Address Hexa. Command	Address Decimal Command	Length (Words)	Description	Format	Values Range / Comments	E2PROM (10)
41121	0460	1120	1	Delay 3	Byte	0…200 200 equals to 20.0s	Yes
D_In Menu							
Digital Input 1							
41130	0469	1129	1	Type 1	Byte	0: OFF 1: TARE 2: CLR TARE 3: ZERO 4:PRINT	Yes
41131	046A	1130	1	Func 1	Byte	0: LOW 1: HIGH	Yes
Digital Input 2							
41135	046E	1134	1	Type 2	Byte	0: OFF 1: TARE 2: CLR TARE 3: ZERO 4:PRINT	Yes
41136	046F	1135	1	Func 2	Byte	0: LOW 1: HIGH	Yes
Digital Input 3							
41140	0473	1139	1	Type 3	Byte	0: OFF 1: TARE 2: CLR TARE 3: ZERO 4:PRINT	Yes
41141	0474	1140	1	Func 3	Byte	0: LOW 1: HIGH	Yes
Binary Mode Outputs							
41150	047D	1149	1	Binary mode status	Byte	0:OFF 1:ON (12)	No
41151	047E	1150	2	Setpoint 1 BINOUT (H)	Long	–CAP…CAP (1)	No
41152				Setpoint 1 BINOUT (L)			
41153	0480	1152	2	Setpoint 2 BINOUT (H)	Long	–CAP…CAP (1)	No
41154				Setpoint 2 BINOUT (L)			
41155	0482	1154	2	Setpoint 3 BINOUT (H)	Long	–CAP…CAP (1)	No
41156				Setpoint 3 BINOUT (L)			
41157	0484	1156	2	Setpoint 4 BINOUT (H)	Long	–CAP…CAP (1)	No
41158				Setpoint 4 BINOUT (L)			
41159	0486	1158	2	Setpoint 5 BINOUT (H)	Long	–CAP…CAP (1)	No
41160				Setpoint 5 BINOUT (L)			
41161	0488	1160	2	Setpoint 6 BINOUT (H)	Long	–CAP…CAP (1)	No
41162				Setpoint 6 BINOUT (L)			
41163	048A	1162	2	Setpoint 7 BINOUT (H)	Long	–CAP…CAP (1)	No
41164				Setpoint 7 BINOUT (L)			

Table 6.5.10.1.1

(1) Table “K” commands are executed writing the value in this register. Read this registers returns the operation status (same as register 41004)
(2) This value should be multiple to the digital division. The decimal point does not take into account. CAP is the scale capacity. This value cannot be lower than -99999 (display capacity).
(3) Refers to the 13 possible values 0…12 that correspond to F1 to F13 formats respectively.
(4) Refers to the 7 possible baud rate values 4800, 9600, 19200, 38400, 57600, 115200.
(5) Refers to the 7 possible values OFF, 100, 250, 500, 1000, 2000, 5000,10000.
(6) Refers to the 4 possible values CRLF, CR, ETX, NONE.
(7) Refers to the 15 possible values. See table “I”
(8) Refers to the 4 possible values HIGH, LOW, INBAND, OUTBAND
(9) These values are directly saved in E2PROM, without sending command through the command register
(10) In the column are indicated if the register is saved in E2PROM. The register is saved after written command 32 in the command register, except the set points that are saved directly when writing the registers.
(11) Parameter’s changes in serial ports are effective after reset the device. So, it is mandatory, to send the E2PROM records command to not lose any changes.
(12) When the register 41150 (Binary mode status) is set to 1, digital outputs acts in binary mode and disable the D_OUT menu configuration.

Table "K"	
Available Commands	
Code	**Function**
1	Semi-automatic Zeroing
2	Semi-automatic Tare
3	Prefixed tare.(first of all write the tare value in the command register data)
6	Exit tare
7	Print (prints a ticket if RS-232 port is configured in ticket mode)
30	Reset device
32	Save in E2P
100	Cancel (allows to cancel functions, if for any reason they stay in a state indefinitely because a non-stability or a load cell error)

Table 6.5.10.1.2

Table "L" **Reading command status register (16 bits)**	
High byte (8 bits)	Low byte (8 bits)
Executing command code (according to table command 6.5.7.2)	Status: **Value** – **Command execution** 1 – Correct 2 – Error during execution 4 – Execution pending 8 – Cancelled command through executing cancel command (code 100)

Table 6.5.10.1.3

While executing a command the device returns an error code 0x06 (SERVER DEVICE BUSY) to any client command.

Table "F"	
Code identification for Baudrate parameter	
Code	**Baudrate**
0	4800
1	9600
2	19200
3	38400
4	57600

Table 6.5.10.1.4

Table "G"	
Code identification for Ou. Rate parameters (Transmission rate)	
Code	**Transmission rate**
0	1
1	5
2	10

3	25
4	50
5	75
6	150
7	300
8	600

Table 6.5.10.1.5

Table "H"	
Code identification for Termination parameters	
Code	**Termination**
0	CR LF
1	CR
2	ETX
3	NONE

Table 6.5.10.1.6

Table "I"	
Code identification for Type parameters in digital outputs	
Code	**Function**
0	OFF
1	GROSS
2	NET
3	P_REL
4	N_REL
5	P_PREL
6	N_PREL
7	ZERO
8	ZERO NET
9	SS
10	INRANG
11	NEG
12	TARE
13	PRINT
14	PC_CTRL

Table 6.5.10.1.7

Table "J"	
Code identification for TRIP parameters in digital outputs	
Code	**TRIP**
0	HIGH
1	LOW
2	INBAND
3	OUTBAND

Table 6.5.10.1.8

6.5.10.2 Input Registers

Read only registers, to consult weight data or specific device data.
Related function (decimal code function): READ INPUT REGISTER (04)

Address Register	Address Hexa. Command	Address Decimal Command	Length (Words)	Description	Format	Read Data
30010	0009	9	2	Net weight (H)	Long	
30011				Net weight (L)		
30012	000B	11	2	Gross weight (H)	Long	
30013				Gross weight (L)		
30014	000D	13	2	Tare (H)	Long	
30015				Tare (L)		
30016	000F	15	1	Weight status	Byte	See table "A"
30017	0010	16	2	A/D converter internal counts (H)	Long	
30018				A/D converter internal counts (L)		
30019	0012	18	1	mV/V	Integer	(1)
30020	0013	19	1	mV/V status	Byte	See table "B"
30021	0014	20	1	Analog output status	Integer	(2) See table "C"
30022	0015	21	1	Instrument “On-line”	Byte	
30023	0016	22	1	Digit display 1	Byte	See table "D"
30024	0017	23	1	Digit display 2	Byte	See table "D"
30025	0018	24	1	Digit display 3	Byte	See table "D"
30026	0019	25	1	Digit display 4	Byte	See table "D"
30027	001A	26	1	Digit display 5	Byte	See table "D"
30028	001B	27	1	Digit display 6	Byte	See table "D"
30029	001C	28	1	Display Led status	Integer	See table "E"
30030	001D	29	1	Software version "AB"	Integer	Software version "ABCDEFGH" ASCII code of every character. Example:"1.00204" H digit always is 0x00
30031	001E	30	1	Software version "CD"	Integer	
30032	001F	31	1	Software version "EF"	Integer	
30033	0020	32	1	Software version "GH"	Integer	
30034	0021	33	2	Indicator serial number (H)	Long	Serial Nº 0000000…9999999
30035				Indicator serial number (L)		

Table 6.5.10.2.1

(1) The mV/V is indicated in absolute value (without sign). In the status register, reg. 300020 the polarity is indicated. If the absolute value exceeds 65535 the Overflow bit of the status register is activated and remains fixed in 65535.
(2) The high byte indicates the state and the low byte indicates the output.

Table "A"			
Status register			
Bit	**Description**	**Meaning**	
		0	1
0	Weight Stable	No	Yes
1	Zero Indication	No	Yes
2	Tare Led	Off	On
3	Tare Led Preset	Off	On
4	Underload	No	Yes
5	Overload	No	Yes
6	Error Ref.	No	Yes
7	ADC error	No	Yes

Table 6.5.10.2.2

Table "B"			
Indication mV/V, status register			
Bit	**Description**	**Meaning**	
		0	1
0	Sign	+	-
1	Overflow *	No	Yes
2	Error Ref.	No	Yes
3	ADC error	No	Yes

Table 6.5.10.2.3

*Overflow bit is activated when mV/V value is higher than 65535 or lower than -65535 to indicate the read value is wrong.

Table "C"			
Analog output status			
High Byte		**Low Byte**	
0x00	No error	0x00	4-20mA
		0x01	0-20mA
		0x02	0-5V
0xFF	Analog output not available	0x03	0-10V

Table 6.5.10.2.4

Table "D"

Corresponding digit segments to bits

	REGISTER DATA							
	D7	**D6**	**D5**	**D4**	**D3**	**D2**	**D1**	**D0**
Segment line	dp	a	b	c	d	e	f	g

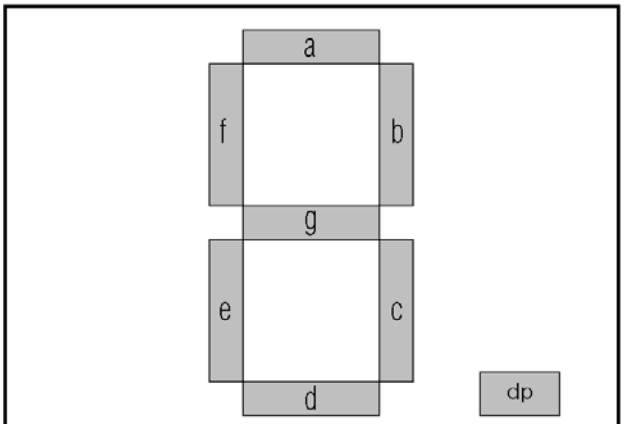


Table 6.5.10.2.5

Table "E"	
Correspondence bits- LED status	
Bit	**Indication**
0	PTare
1	Net
2	Zero
3	Stable
4	Out 1
5	Out 2
6	Out 3
7	In 1
8	In 2
9	In 3

Table 6.5.10.2.6

6.5.10.3 Discrete Inputs

Only read registers, to consult the status of the three digital inputs.
Related function (decimal code function): READ DISCRETE INPUTS (02)

Address Register	Address Hexa. Command.	Address Decimal Command	Description	Comment
10001	0000	0	Digital input 1	Status digital input 1
10002	0001	1	Digital input 2	Status digital input 2
10003	0002	2	Digital input 3	Status digital input 3

Table 6.5.10.3.1

6.5.10.4 Coils

Read/write registers to consult/modify the status of the three digital outputs.

A digital output only can be modified from MODBUS if it is configured (parameter Type) as remote mode (PC_CTRL).

Related functions (decimal code function): READ COILS (01), WRITE SINGLE COIL (05), WRITE MULTIPLE COIL (15).

Address Register	Address Hexa. Command	Address Decimal Command	Description	E2PROM	Comment
00001	0000	0	Digital output 1	NO	Read/write digital output 1
00002	0001	1	Digital output 2	NO	Read/write digital output 2
00003	0002	2	Digital output 3	NO	Read/write digital output 3

Table 6.5.10.4.1

6.5.11 Binary mode on digital outputs

Operating in binary mode, the three relays work together as a binary output of 3 bits to show 8 different levels controlled by net weight. These levels are controlled by 7 setpoints that can only be programmed and consulted through MODBUS. These setpoints are independent of the three setpoints VL(1), VL(2) and VL(3) of D_OUT configuration.

This mode can be activated or disabled by a register (Binary mode status) only accessible through MODBUS. These registers are reinitialized to zero every time the device is powered on (the value of the registers are not saved in E2PROM memory).

When the binary mode is activated, the D_OUT configuration is disabled and the outputs trigger according to net weight and the binary setpoints configuration (VLB(1)…VLB(7)) programmed in registries 41151 to 41164 on MODBUS as the following figure shows:

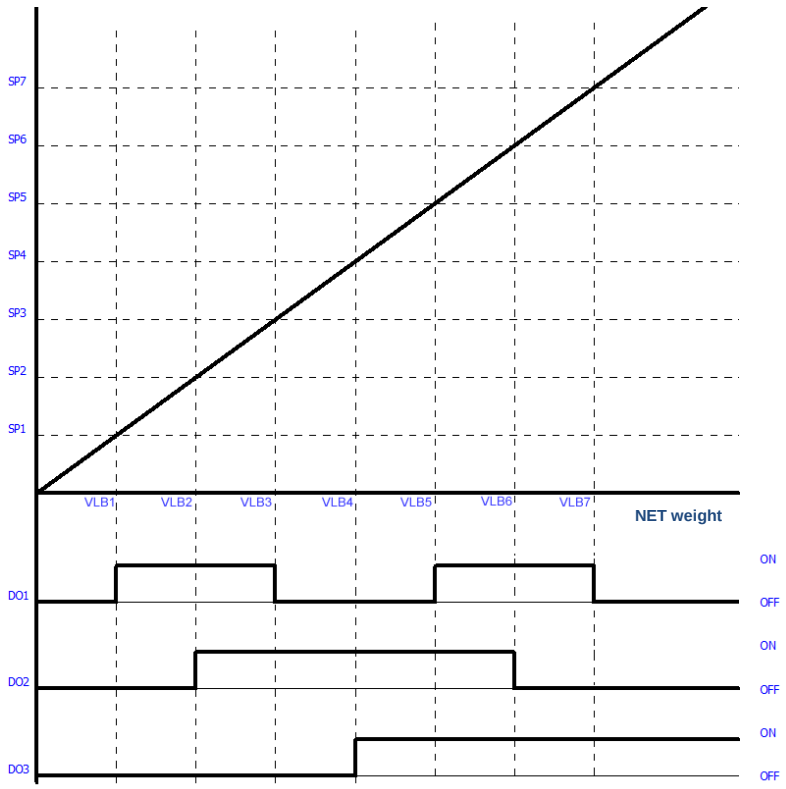


Figure 6.5.11.1 Response of digital outputs in binary mode

VLB1…VLB7: are the values of net weight programmed as the 7 binary setpoints (MODBUS 41151 to 41164 registers) and must contain valid values in ascending order, it means VLB2 must to be higher than VLB1, and VLB3 must to be higher than VBL2, etc.

Digital outputs trigger according to the binary Gray code configuration: 000, 001, 011, 010, 110, 111, 101, 100. This configuration allows changing only one relay between one output and the next output.

The table 6.5.10.1.1 shows the 8 Holding Registers to control the relays in binary mode (Gray code).

None of these registers are saved on E2PROM memory. Restarting the device sets to zero all the 7 binary setpoints and the 41150 register (Binary mode status), so digital outputs start working in the standard mode configured in the D_OUT menu.

Trying to access to digital output configuration or pressing (F▲) key while working in the binary mode, will show in the screen Err 3.

7 Connections

Shown below are the signal matching and connections, marked on the front panel of the device:

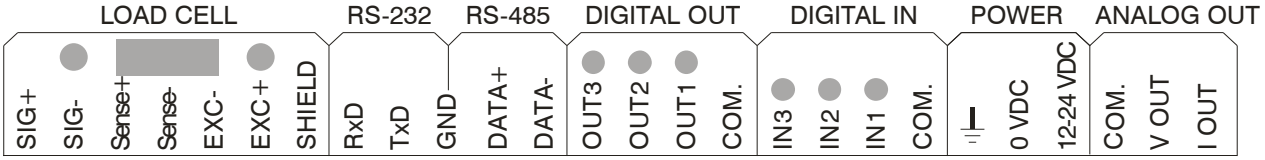
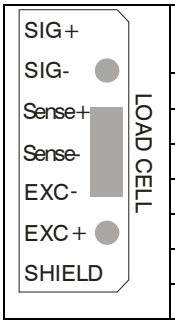


Figure 7.1 Connections matching

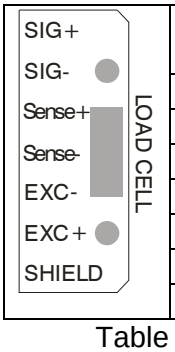
7.1 Load cell connection



SIGNAL	UTILCELL Cell Wire Colour
SIG+	Red
SIG-	White
SENSE+	Blue
SENSE-	Yellow
EXC-	Black
EXC+	Green
SHIELD	Shield

Table 7.1.1 6-wire connection load cell

In the case of using 4-wire connection cable, a bridge between EXC+ to SENSE+ and EXC- to SENSE- should be made.



SIGNAL	UTILCELL Cell Wire Colour
SIG+	Red
SIG-	White
SENSE+	bridge to EXC+
SENSE-	bridge to EXC-
EXC-	Black
EXC+	Green
SHIELD	Shield

Table 7.1.2 4-wires connection load cell

7.2 Load cell sealing

The sealing of the load cell connection, should be done by using a transparent plastic plate that avoids the possibility to unscrew the connections once is installed.

This plastic plate should be sealed through two screws, which fix the plate to the device.

8 Appendix: Power supply accessory

8.1 Features:

Power supply 100 – 240V AC

- Universal AC input/Full range
- Protections: Short circuit / Overload / Over voltage
- Cooling by free air convection
- Can be installed on DIN rail TS-35/7,5 or 15
- Isolation class II
- LED indicator for power on
- No load power consumption<0,5W
- 100% full load burn-in test

8.2 General specifications

OUTPUT	DC VOLTAGE	24V
	RATED CURRENT	0,63A
	CURRENT RANGE	0 ~ 0,63A
	VOLTAGE ADJ RANGE	21,6 ~ 26,4V
	VOLTAGE TOLERANCE	± 1,0%

INPUT	VOLTAGE RANGE	85 ~264VAC 120 ~370VDC
	FRECUENCY RANGE	47 ~ 63 HZ
	AC CURRENT	0,88A/115VAC 0,48A/230VAC

ENVIRONMENT	WORKING TEMP	-20 ~ +60ºC
	WORKING HUMIDITY	20 ~ 90 % RH non condensing
	STORAGE TEMP. HUMIDITY	-40 ~ +85ºC, 10 ~ 95%RH
	TEMP. COEFFICIENT	±0,03 % / ºC (0 ~ 50ºC)
	VIBRATION	± 1,0%

SAFETY & EMC	SAFETY STANDARDS	UL609050-1, TUV EN609050-1 approved, design refer to EN50178
	WITHSTAND VOLTAGE	I/P-O/P:3KVAC
	ISOLATION RESISTANCE	I/P-O/P:100M Ohms / 500VDC / 25ºC / 70% RH
	EMC EMISSION	Compliance with EN55011, EN55022 (cispr22), EN61204-3 Class B, EN61000-3-2, -3
	EMC IMMUNITY	Compliance with EN61000-4-2, 3, 4, 5, 6, 8, 11, EN55024, EN61000-6-2, EN61204-3, heavy industry level, criteria A

OTHERS	MTBF	1172,3K hrs min. MIL-HDBK-217F (25ºC)
	DIMENSIONS	25 x 93 x 56 mm (W x H x D)
	TRANSPORT WEIGHT	0,1 KG

8.3 Conformity Declaration

MEAN WELL

CE

EC-Conformity Declaration

For the following equipment :

Product Name: Switching Power Supplies

Model Designation:DR-15-X (X=5,12,15,24)

is herewith confirmed to comply with the requirements set out in the Council Directive, the following standards were applied :

RoHS Directive (2011/65/EU)

Low Voltage Directive (2006/95/EC) :

EN60950-1:2006+A11+A1+A12 TUV certificate No : R50058736

Electromagnetic Compatibility Directive (2004/108/EC) :

EMI (Electro-Magnetic Interference)

Conducted emission / Radiated emission	EN55022:2006+A1:2007	Class B
	EN55011:2007+A2:2007 (Group 1)	Class B
	EN61000-6-3:2007	
Harmonic current	EN61000-3-2:2006	
Voltage flicker	EN61000-3-3:2008	

EMS (Electro-Magnetic Susceptibility)

EN55024:1998+A1:2001+A2:2003 EN61204-3:2000 EN61000-6-2:2005

ESD air	EN61000-4-2:2009	Level 3	8KV
ESD contact	EN61000-4-2:2009	Level 2	4KV
RF field susceptibility	EN61000-4-3:2006+A1:2008	Level 3	10V/m
EFT bursts	EN61000-4-4:2004	Level3	2KV/5KHz
Surge susceptibility	EN61000-4-5:2006	Level 4	2KV/Line-Line
Conducted susceptibility	EN61000-4-6:2009	Level 3	10V
Magnetic field immunity	EN61000-4-8:1993+A1:2001	Level 4	30A/m
Voltage dip, interruption	EN61000-4-11:2004	>95% dip 0.5 periods	30% dip 25 periods >95% interruptions 250 periods
Keyed carrier immunity	ENV50204:1995	Level 3	10V/m 900MHz

Note:
The power supply is considered as a component that will be operated in combination with final equipment. Since EMC performance will be affected by the complete installation, the final equipment manufacturers must re-qualify EMC Directive on the complete installation again. For guidance on how to perform these EMC tests, please refer to TDF (Technical Documentation File).

This Declaration is effective from serial number EB2xxxxxx

Person responsible for marking this declaration :

Mean Well Enterprises Co., Ltd.
(Manufacturer Name)

No.28, Wuquan 3rd Rd., Wugu Dist., New Taipei City 248, Taiwan (R.O.C.)
(Manufacturer Address)

Johnny Huang/Senior Verification Engineer : (Signature)
(Name / Position)

Ted Cheng/Product Manager : (Signature)
(Name / Position)

Taiwan
(Place)

Dec. 20, 2012
(Date)

Version : 2

9 Appendix: Installation in protected area