ADN Pesage

MS100 WEIGHING CONTROLLER

USER MANUAL

REV 02.xx.01

TABLE OF CONTENTS

1 GENERAL

1.1 Version

The MS100 is available in 4 versions, differentiated by type of power supply and casing.
- 10V to 30V DC supply or 90V to 260V 50Hz power grid.
- flush-fitting into board, IP65 connection through partitioning,
- wall or table mounting. In this last case, the stainless steel housing is fitted with cable glands.

1.2 Features offered as standard

- 24-key keyboard with 6 programmable keys,
- 14mm 6-figure red electroluminescent display,
- 6 warning lights showing condition of outputs,
- 6 warning lights showing instrument condition for controlled weighing,
- memory saved without batteries or cells.
- programme and DSD (alibi memory) FLASH memory,
- programme updated by downloading from PC serial port,
- 2 relays with 230V 6A contacts in dosage programmable standards in thresholds or in PV-GV or in PV+Seuil2.
- formula file with selection using a number,

4 programmable remote control inputs and a Completed Operation output,
- programmable operating mode: IPFNA, one- or two-speed dosage,
- print-out ticket customisable on keyboard in simplified or detailed mode,
- dialogue using MODBUS on basic RS485/232 serial port,
- keyboard operation keys can be disabled independently one from the other,
- function keys programmable one to one in a large choice of operations,
- local or remote semi-automatic tare and zero setting,
- direct manual tare setting from digital keyboard,
- bi-scales,
- installed web server, ready to host Ethernet card without needing to install software either on the PC or on display.

1.3 Connecting systems

- by 15- and 9-point CANON connectors
- One 7-point unpluggable terminal plug for power supply and basic relay contacts

1.4 Options

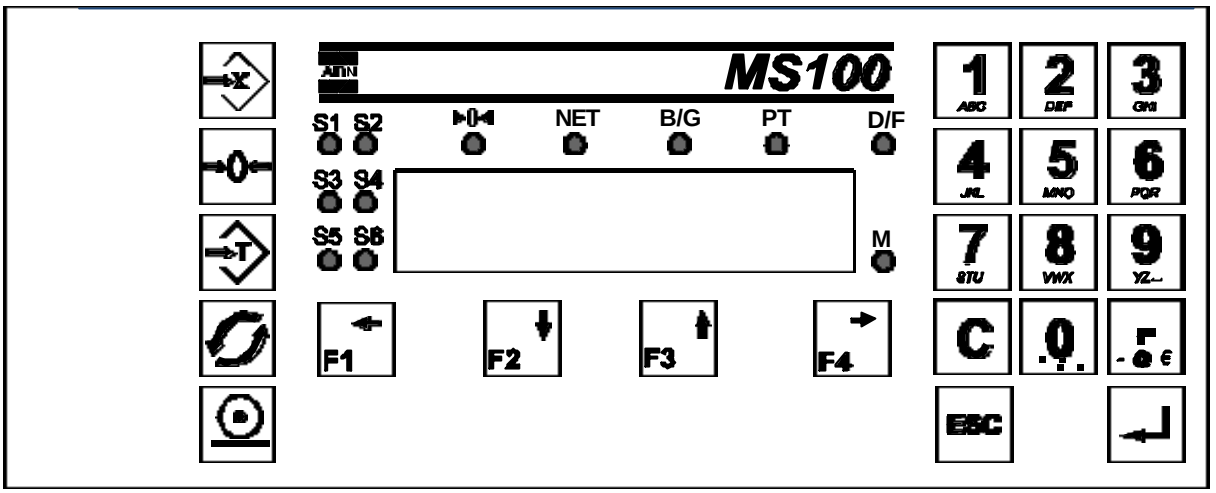
The options need an extension card itself fitted with 4 supplementary relays linked to a 8-point terminal block.
Two option card spaces are available on the extension card. One detachable cache on rear face should be removed for the connecting system for each slot.
The system automatically detects any option cards; the set-up menus for these cards only appear if the corresponding cards are present.

1.5 Option cards

- 0-10V / 4-20mA analog output,
- RS232/485 COM2 interface,
- Ethernet interface with HTTP server and MODBUS/TCP protocol
- time clock,
- PROFIBUS DP interface
- BCD interface

2 PRESENTATION

2.1 Front panel



2.1.1 Keyboard keys


Semi-automatic zero key


Semi-automatic tare key


Temporary secondary information display key


Weight printout / save key


Parameter key

One of the programmable function keys to execute a function or display/key in

Menu exit and current input cancellation button


"Confirm" key (ENTER)

"Delete" key during numeric and alphanumeric inputting

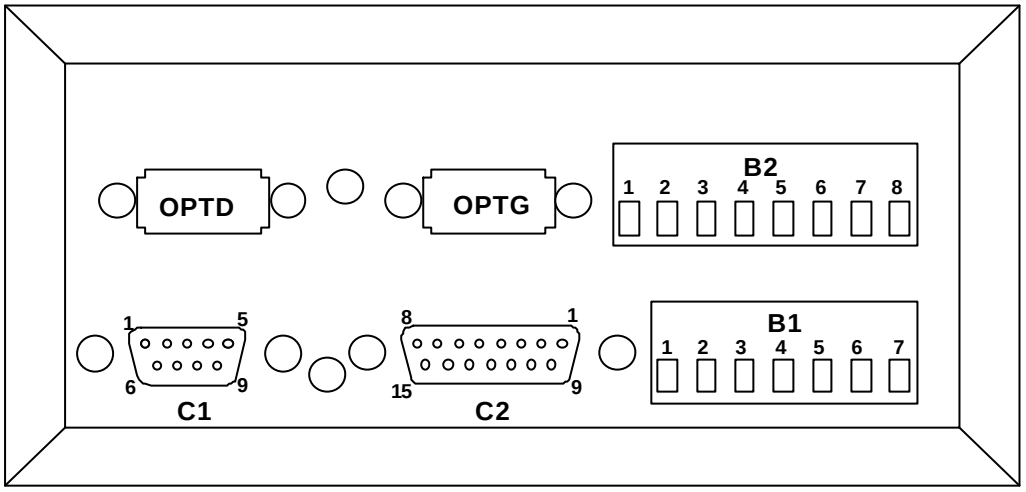
One of the numeric/alphanumeric keypad keys

2.1.2 Warning lights

Keyboard warning lights giving continuous readout of instrument condition.

S1-S6 Lit: relay contact of corresponding output is open; if not lit, closed
▶0◀ Lit: Gross weight is centred on zero at less than a ¼ division
NET Lit: tare is applied
B/G Lit: gross weight displayed
PT Lit: manual tare is applied
D/F Lit: display other than of weight is operating
M Lit: weight is stable

2.2 Rear panel



In its standard configuration the MS100 has one single card placed in the lower part. Terminal block B1 and main C1 and C2 connectors are on this card

A second card can be installed on the upper part of the housing to extend instrument capacity. This “extension card” has 4 supplementary relays and has 2 “right option" and "left option" internal connectors for installing option cards.
Relay working contacts are available on connector B2.

2.3 MS100 connecting system

STANDARD

B1 : Relays 1 & 2 outputs relay contacts along with 3 supply terminal blocks
C1 : load cell connector(s) for female CANON 9-point socket
C2 : 15-point CANON connector for 5 logic inputs and RS485/232 inputs

ON EXTENSION CARD

OPTD : Slot for option card seen at left when looking at front panel
OPTR : Slot for option card seen at right when looking at front panel
B2 : Detachable terminal block Relays 3, 4, 5 and 6 work contacts.

Note: Installing an extension card will require complete removal of rear panel (5 screws).

2.4 Metrological settings protection screw (legal parameters).

This screw is located between connectors C1 & C2.
When this screw is “screwed down”, the instrument’s metrological settings may be viewed but cannot be modified. When the screw is in the “unscrewed” position, the settings can be changed.

3 MESSAGES AVAILABLE AT SWITCH-ON

The 6-digit screen shows two messages successively at switch-on:

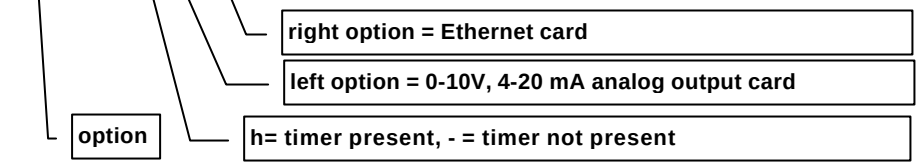
- program number for 5 seconds followed by version number, for example:

P	A	0	2	0	4

Where P means program, 02 is program identification number, and 04 is version number

- information on options available shows for 5 seconds, for example:

o			h	1	3



The three digits at the right of the screen show details of options available:

-	-	-	No option
-	0	0	Only 4-relay extension
-	X	0	4-relay extension - left slot being used by an option card
-	0	Y	4-relay extension - right slot being used by an option card
-	X	Y	4-relay extension - left and right slots being used by two option cards
h	-	-	Only time clock
h	0	0	Time clock with 4-relay extension
h	X	0	Time clock - 4-relay extension - left slot being used by an option card
h	0	Y	Time clock - 4-relay extension - right slot being used by an option card
h	X	Y	Time clock - 4-relay extension - left and right slots being used by two option cards

Option card encoding can be done in the two extension option connectors:

-1- 0-10V, 4-20 mA analog output card
-2- RS232/485 serial output card
-3- Ethernet card
-4- Profibus card

Pressing any key interrupts the display of this information.

4 ERROR MESSAGES

Overload

Underload

Measuring error
Signal from load cell is not correct.

5 OPERATOR/MACHINE INTERFACE

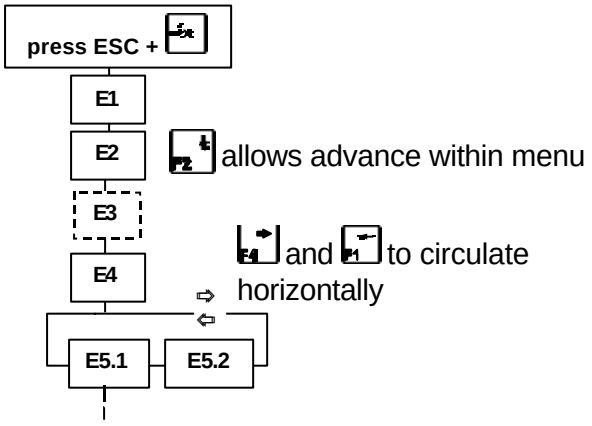
The MS100 has a numeric and alphanumeric keypad to facilitate keying in information in association with function key.

5.1 Menu system

Data for viewing or modification is mostly set out in menus.

The data name is displayed in the menu, and then the value of this data is in the following element. Some data is not to be inputted but is to be chosen from pre-established values.

These are represented graphically to facilitate menu description and explanation. Example: we open a menu by pressing on ESC for a long time and then on



At menu opening element E1 appears. Press to display element E2.

Use to move through the menu from one element to the following, from top to bottom.

Element E3 in dotted form shows that it is related to the value whose name is displayed in E2.
E3 can both be viewed and modified.

E4 displays the name of data to be chosen from between E5.1 and E5.2. Use horizontal arrow keys to pass from one to the other.

In the example we have opened a menu with the following elements:
E1: "PAr S1" menu name (threshold 1 parameters).
E2: "hySter" data name can be modified (hysteresis) in relation to threshold 1.
E3: Threshold 1 hysteresis value that can be modified.
E4: "SEnS=" data name to choose
E5.1 Choice for upward function direction.
E5.2 Choice for downward function direction.

To recognise element type:
Type E1 messages: Fixed display,
Type E2 messages: Fixed display,
Type E3 messages: Flashing digit inviting operator to modify that value,
Type E4 messages: Fixed display,
Type E5.1 & E5.2 message choice: All digits flashing, inviting operator to make a choice.

Use the summary in chapter 6.2.1 to do a test on a menu, so as to learn how to operate the menu system.

5.2 Modifying a numeric value

The inputted figures go in from right to left depending on their tabulation.

Button C deletes the figure just entered.

Pressing ↵ or F2 or F3 saves the value tabulated.

A "REFUSE" message displays if the values inputted are invalid or illogical.

5.3 Modifying an alphanumeric value

Alphanumeric keying is useful for inputting references and print-out ticket headings.

The character to be inputted is indicated by a digit flashing.

The digit to the left of the one that first flashes is the one to be inputted. Use F1 and F4 to move to modify another character.

To select a particular symbol, press as many times as necessary on the related key.

Other useful buttons:

C Delete character just entered.

or insert character space that you can then modify.

Change case from upper to lower or from lower to upper. Case always starts as upper case.

Places mark at text end. This function limits number of text characters by terminating such input at the desired point.

6 USING MS100 IN “INDICATOR” MODE

The MS100 has a sizable programme memory that can hold several applications. At this point there are three applications:

- INDICATOR: This is the most current mode with “Tare, Gross, Net” functions,
- GROSS DOSING: No automatic taring at beginning of filling
- NET DOSING: Automatic taring befor beginning filling

In both DOSING modes, the net weight is used for comparison with target.

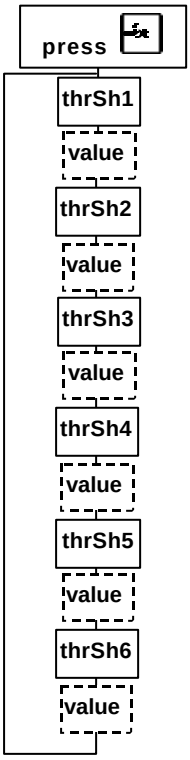
Since the installer has great scope for programming the instrument, we describe its operation and use here with a “workshop” configuration.

6.1 Using threshold relays

The relays installed in the instrument are used to supply “open/closed” logic information depending on the weight indicated being higher or lower than the value programmed by the user for the threshold concerned.
The basic version MS100 is supplied with two relays corresponding to thresholds 1 & 2. The (optional) extension card allows the installation of 4 extra relays for thresholds 3 to 6.
Relay 2 and relay 6 can be re-assigned for the needed “function executed” signal when remote control inputs are used.

6.1.1 Modifying a threshold value by conventional method:

Use  to gain access to threshold values. The menu is as follows:



When viewing the menu, first the parameter name is displayed, then its value displayed when going to the following element.

We know it is showing a value since the unit figures flash in this case even when the displayed message is not flashing when showing the parameter name. (see chapter 5.1).

The value keyed in should be within the instrument measuring range.

If a relay is used for the “function executed” signal, the corresponding menu element will not be displayed.

PLEASE NOTE: If there is no extension card, access to thresholds 3 to 6 will not be possible.

6.1.2 Modifying a threshold value by simplified method:

F1 to F4 keys have been programmed in the factory for direct keying in for thresholds 1 to 4.

To modify threshold 2 for example:

Press F2.
The message "thrSh2" displays briefly then the current threshold 2 value displays with the figures flashing.
The threshold 2 value can then be modified as indicated in chapter 5.2

6.2 Setting up threshold relay parameters

The operational parameters for each threshold output are as follows:
- hysteresis value,
- direction of functioning,
- weight category associated with the threshold (gross or net weight)

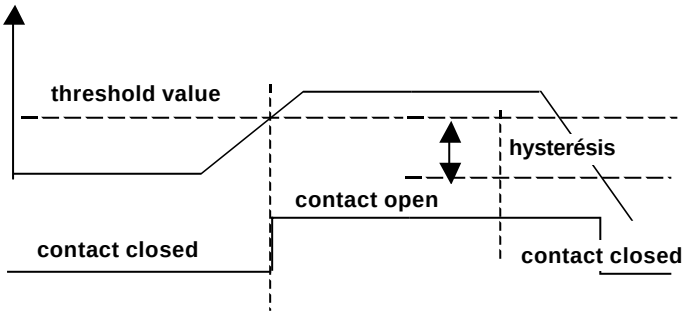
Definition of terms:
Lock-on:
Weight value that changes output relay status (contact opens).

Lock-off:
Weight value that returns output to initial status (contact closes).

Hysteresis:
Difference between lock-on and lock-off weights.

upward:
Output status change when weight figure crosses threshold in upward direction (contact opens).

downward:
Output status change when weight figure crosses threshold in downward direction.



Lock-on value - Lock-off value = hysteresis

Lock-on:
Weight reaches and passes threshold value

Lock-off:
Weight figure descends below lock-off threshold.

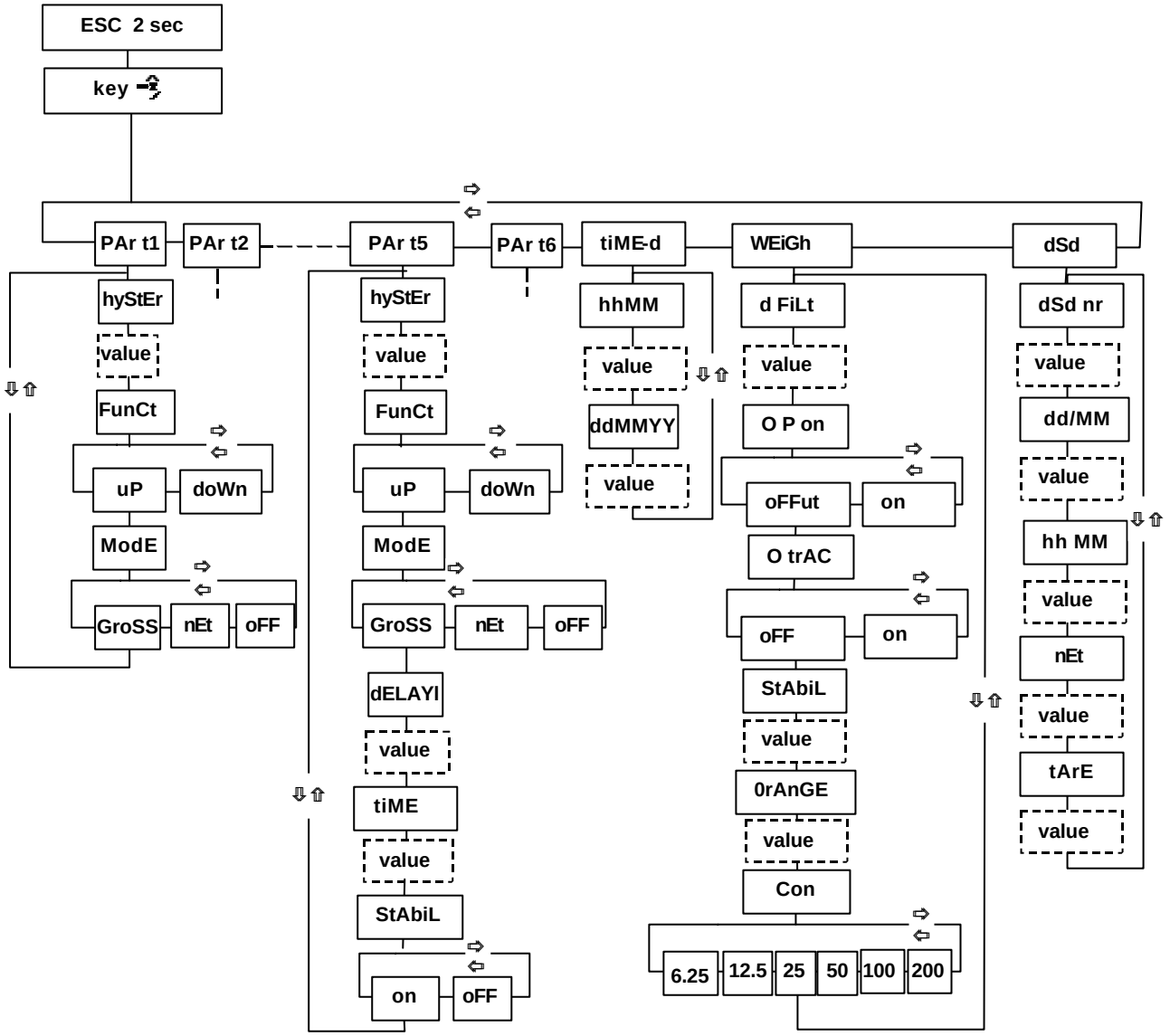
Threshold relay functioning can be associated with gross or net weight figures.

See ESC + synopsis in chapter 6.2.1 to locate threshold operating parameters.

When the apparatus is off the relay contacts are open.

6.2.1 ESC + menu synopsis

This menu allows setting up of the way in which the thresholds operate. However it also enables the setting of time and date, measuring filters and other weighing operating parameters. It also gives access to stored data playback through the DSD data storage device.

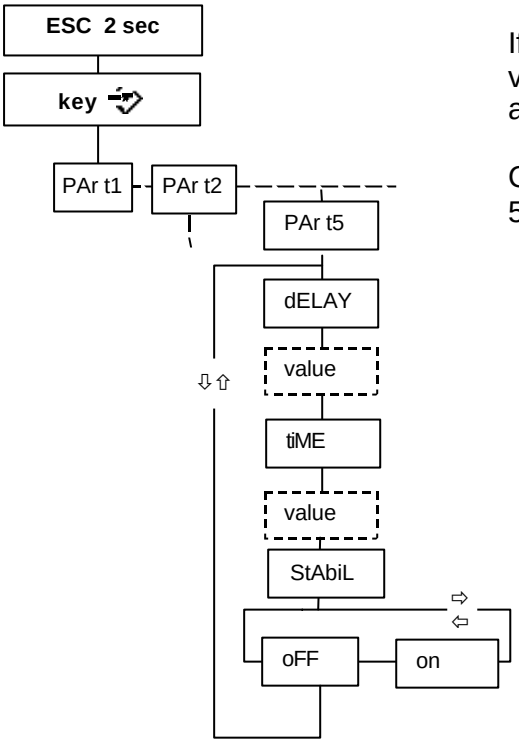


PAr t1	= Threshold 1 parameters,
hyStEr	= Hysteresis,
FunCt	= Direction of functioning,
ModE	= Gross or net weight function,
dELAY and tiME	= see next page for details
tiME-d	= Current date and time,
hhMM	= hour & minute,
ddMMYY	= Day & month & year,
d FiLt	= Digital filter,
O P on	= Gross weight zeroing at power on
O trAC	= Zero tracking,
StAbiL	= Stability criterion (in ¼division multiples),
OranGE	= zero range where zero request can be made,
Con SP	= Analog/digital conversion speed in number of conversions per second,
dSd	= Data storage device,
dSd nr	= DSD number etc,
dd/MM	= Day & month of storage
hhMM	= Hour and minute of storage,
nEt	= saved net weight,
TArE	= saved Tare.

6.2.2 Threshold 5 characteristics

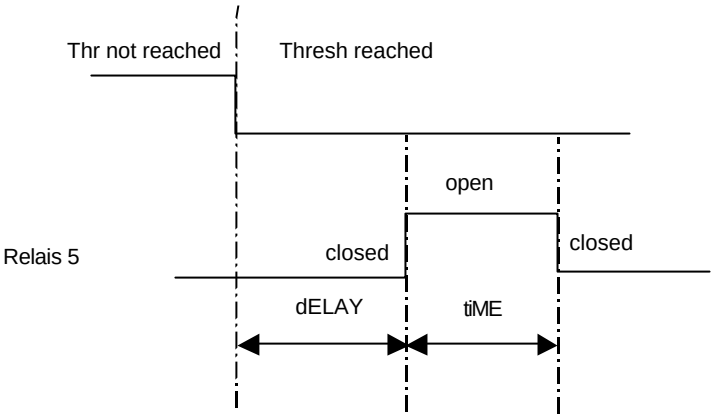
The functioning of relay 5 differs from other threshold relays in the sense that two delay parameters and the parameter linking its operation to measuring stability can be added.

Values are expressed in seconds. For example, 2.5 for two-and-a-half seconds.



If for example relay 5 is set to the figure with a 5-second value in delay and 5 seconds in time (duration), it operates as follows:

Contact opens five seconds after weight crosses threshold 5, then closes again five seconds later.



To adjust relay 5 time delays:

- go to menu (ESC +), use and to select "Par t5" (Threshold 5 parameters).
- use to access and modify parameters dELAY et tiME as required.

If the StAbiL parameter is set at “on”, then relay 5 will change status only if the stability criterion is satisfied.

6.3 Weighing functions

Weighing functions are as follows:
- gross weight zero setting,
- semi-automatic taring,
- manual taring,
- logging weight reading,

6.3.1 Gross weight zero setting,

1) controlled mode:

A request using  is accepted if:
- weight is stable (warning light M is lit),
- weight is within ± 2% limit of range.

2) no-controlled mode:
- weight is stable (warning light M is lit),
- weight is within the limits set by the "OrAnGE" value in (ESC +  + "WeiGh") menu.

Modifying zero range setting in no-legal mode:
See synopsis 6.2.1 for access to WEiGh/StAbiL parameter. This parameter is expressed in percentage of scale.

PLEASE NOTE: this range cannot exceed 20%.

6.3.2 Semi-automatic taring,

Basics of tare, gross and net weights:
We will consider a product contained within packaging. The packaging weighs 25g and the product content weighs 150g. The total weight is thus 175g.
Net weight = 150g.
Gross weight = 175g.
Tare weight = 25g.

To get the net weight of a product inside packaging, all you have to do is to place the empty packaging on the weighing machine and make a request for semi-automatic taring:
- packaging weight is entered into the memory
- screen shows a weight equal to 0,
- green warning light is lit, indicating taring is active,

From that moment, if a product is in the packaging its net weight is displayed on the screen.

The request for semi-automatic taring is subject to the weight being stable (light **M** illuminated) in the same way as is the request for zero. It is accepted over the whole range of the scale.

Press  to do a semi-automatic tare .

6.3.3 Manual (direct) tare

This function allows subtracting a keyed-in value from current weight.

To carry out a manual tare:
Use keyboard to input the value to be shielded. The message “d tArE” briefly displays at first numerical button press, signalling that a direct tare is about to be tabulated.
Press tare button ⇨ when the tabulated value is correct.
- the weight displayed becomes equal to the preceding weight less the tabulated value,
- **NET** warning light is illuminated,
- **PT** warning light (Preset Tare) is illuminated signalling that the manual tare is activated.

6.3.4 Reset of current tare

To reset a tare in action, just enter a manual tare with a zero keyed-in value.
The displayed weight becomes the gross weight. The tare memory is reset and the **NET** warning light goes out.

To delete tare reading:
Input 0, then press ⇨.
The remote control can be used to do this function.

6.3.5 Weight recorded/saved

Press Ω to record,save a weight value.
NOTE: this function is subject to the stability check.
The effects of this action are:
- to update counter-totalisers with counter incrementation,
- issue a ticket to any connected printers,
- record weight information in the alibi (DSD) memory if this device is active.

It is also possible to use a remote control to record a weight reading if the installer technician has programmed it to this effect.

6.3.6 Saving to alibi (DSD) memory

The alibi memory is a data storage device (DSD) that writes the following weight data into no-volatile memory:
- storage number,
- day month,
- hour minute,
- net weight,
- tare weight.

This set of data forms a logging-in within the DSD.
See chapter 11.5 concerning access to data recorded in the DSD.

NOTE: When the recorded tare value is viewed, the PT warning light illuminates if it is a manual tare reading and not a semi-automatic tare reading.

7 USING MS100 IN “DOSING” MODE

This mode uses the output relays to automate a process of filling a container or bag. It also allows automatic extraction. At the end of the cycle the dose value can be automatically recorded in the DSD if it is active.

The purpose is to stop material inflow when the programmed quantity has been reached.

If the installer technician has programmed the apparatus in "net", a new weight zero setting is automatically carried out when the start cycle is requested.

In all cases, even in “gross” mode, the net weight is the value compared to the required value in acting on the output relays.

This means that the current tare is taken into account for weight comparison.

If a manual tare has been key-in before cycle start, it will be cancelled if the “net” mode is programmed.

7.1 Using relays

In this operating mode, the relays are used in the following way:
Relay 1: low speed control,
Relay 2: high speed control,
Relay 5: “Weigher Ready” information with associated delays,
Relays 3, 4 and 6: in threshold relays freely usable.

7.2 Modifying dosing parameters

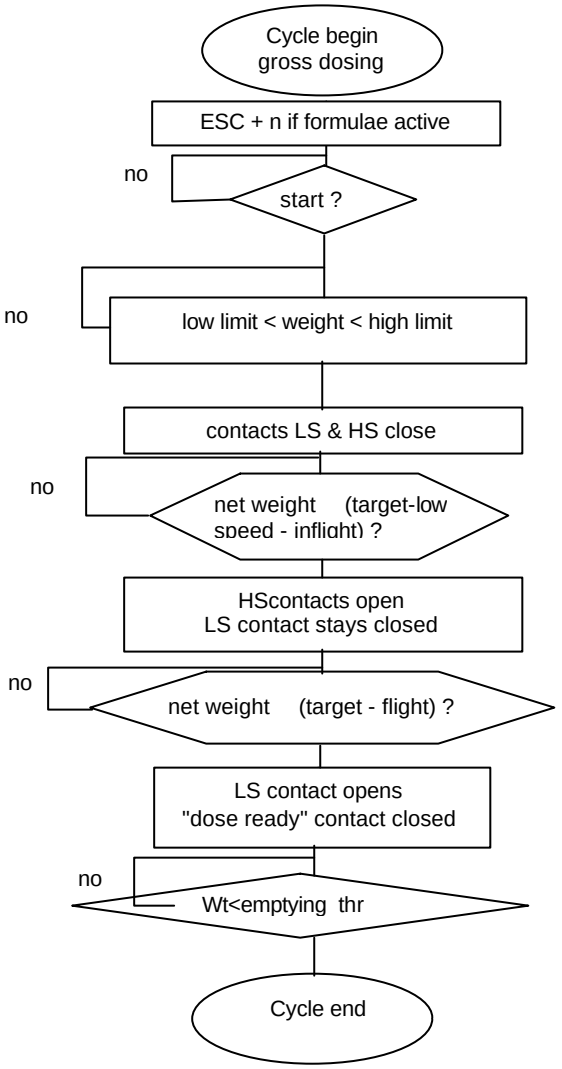
These values are accessible in read-write in the menu that opens with  . If the installer technician has planned for functioning without formulae, pressing this key directly goes to the first dosage value that has been set. If the installer technician has enabled operation with memorising of 20 formulae, pressing  brings up "ForMuL", inviting the operator to key in the formula number to be used or modified.

Use  or  to move around in this menu.

DOSAGE MENU		
ForMuL	(Formula N°)	Value displayed is modifiable between 1 and 20
tArGEt	target weight	Target dose weight Value must be within measuring range
inFL	inflight	Inflight correction value
L SP	Low Speed	Slow-down range (low speed dosing)
L LiM	(Low Limit)	Lower limit where package is empty
H LiM	(High Limit)	Upper limit where package is empty
E thr	(Emptying threshold)	Detects empty packaging or empty vessel
thrSh3	(Threshold 3)	Thresholds 3, 4 and 5 have formulae if they exist They are freely assignable
thrSh4	(Threshold 4)	
thrSh6	(Threshold 6)	Not functional for this if being used for "Function complete”

Then the formulae are operational, use  and  to move through them in sequence.
If you need access to an exact formula, for example formula 15, input the formula number (15) at menu entry just after pressing  .

7.3 “Gross” operating cycle



Looping if packaging weight incorrect.

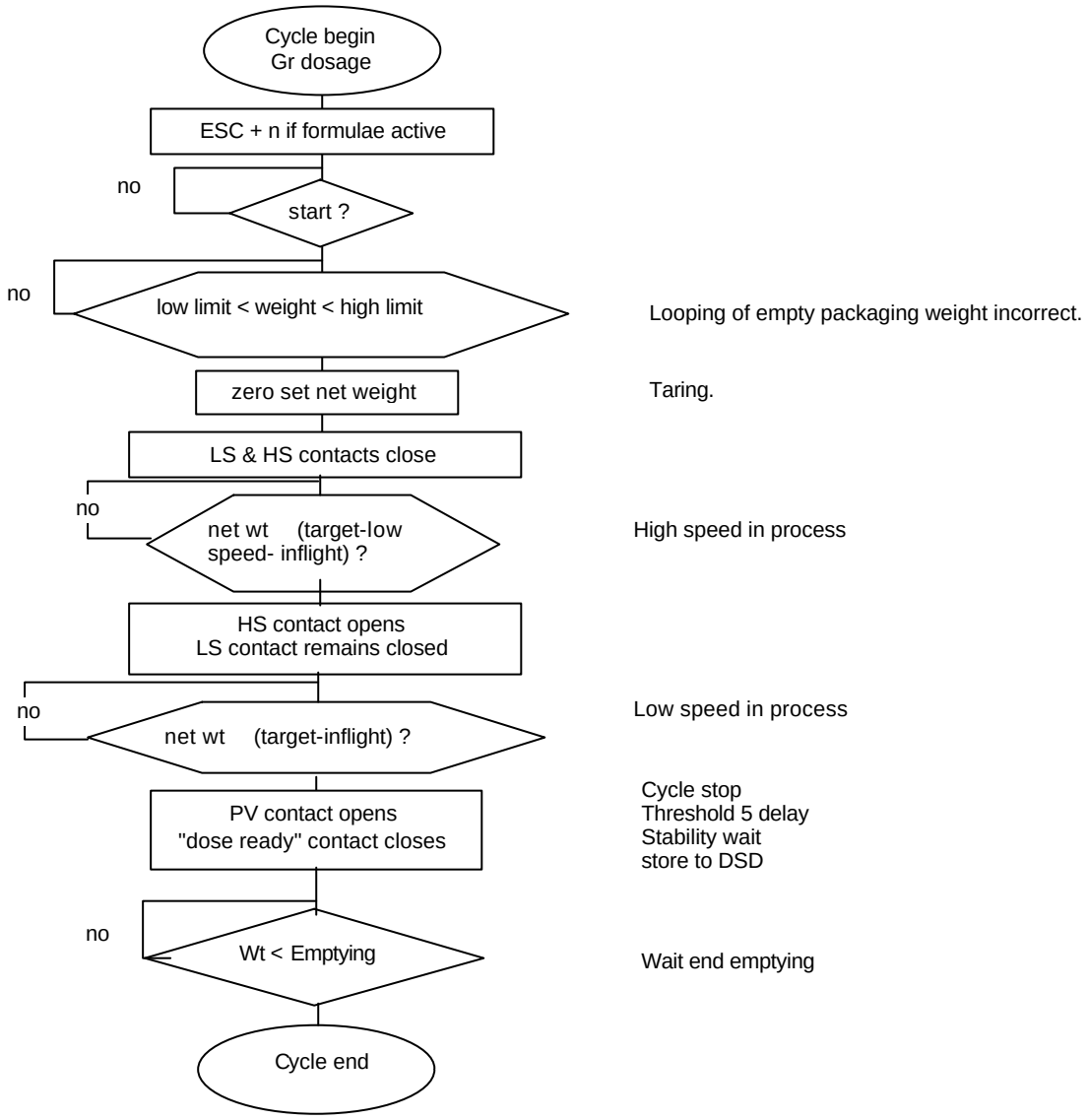
High speed in process

Low speed in process

Threshold delay
Waiting stability
store into DSD

Waiting passage of gross weight under threshold at end of emptying

7.4 “Net” operating cycle

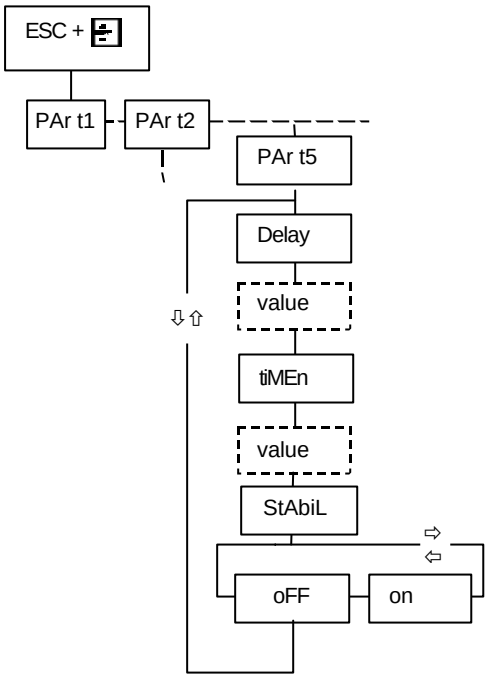


7.5 Notes on DOSAGE menu

Automatic print-out:
Weight recording with totaliser update is automatic at end of threshold 5 time-out
If the DSD is active, all dosing results will be stored.

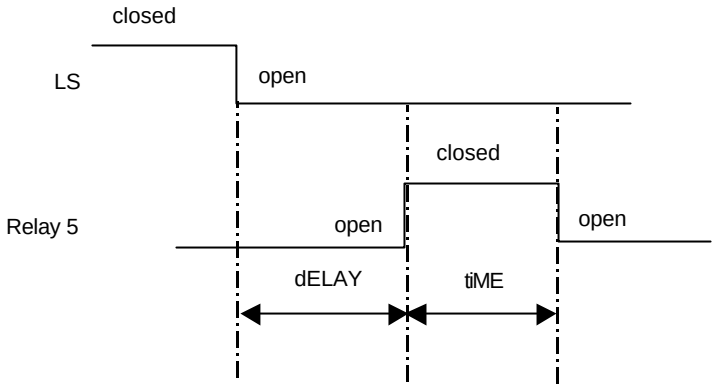
7.5.1 Threshold 5 characteristics

When the MS100 is in "dosage” mode, relay 5 operation is different from the other threshold relays since the hysteresis and function direction parameters are suppressed. The two delay parameters and the parameter linking its functioning to measuring stability remain.
In the two operating modes: Weight and Dosage, dELAY, tiME and STABIL parameters are operational.
This parameter is expressed in seconds. For example, tab in 2.5 for to get two-and-a-half seconds.



Thus relay 5 is used, in dosing, as “dose ready” or “filling end”.

The dELAY and tiME parameters control the relay contact closing impulse for the tiME after a dELAY period starting from the instant of LS opening or the moment of crossing Threshold 5 if operating in Weighing mode.



To adjust relay 5 time delays:

- go to menu (ESC +), use and to select "Par S5" (Threshold 5 parameters).
- use to access and modify parameters dELAY et tiME as required.

If the StAbiL parameter is set at “on” then relay 5 will change status only if the stability criterion is satisfied.

PLEASE NOTE: Access to Threshold 3, 4 & 6 parameters is possible on if an extension card carrying 4 supplementary relays is installed.

8 USING FORMULAE

It is possible to save to memory and recall all the threshold and dosage values under formula numbers if the installer technician has enabled this possibility.
If this is the case, “ForMuL” displays on access to menu using key X thus enabling selection of the formula number either to create a new formula or to gain access to one already created.

The indexing does not operate when keys F1 to F4 are used to select threshold values: keys F1 to F4 systematically select the values for formula n° 1. It is necessary to use key X to gain access to the values saved in the memory under a formula number other than formula n° 1.
The standard version does not have this functionality installed.

8.1 Selecting a formula

Key ESC then 5 to select formula number. The apparatus waits while the desired formula number is keyed in.

9 User-programmed functions

The user can programme the following:

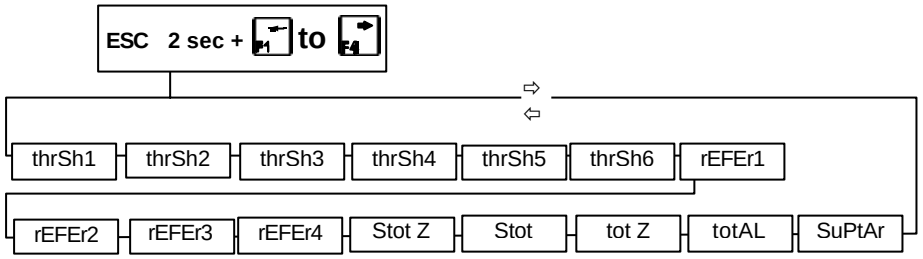
- temporary information that can be displayed using the change display key.
- this information should appear on the printed-out ticket when logging a weight value,
- this function operates on pressing any one of the F1, F2, F3 & F4 keys.

9.1 Programming the F1 to F4 function keys

These keys are available so that the user can execute a function, display or directly key in a value.

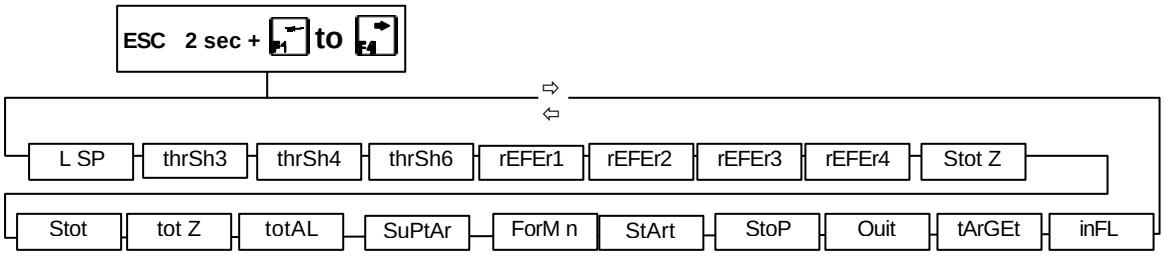
Possibilities in "INDICATOR" mode:

- keying thresholds 1 to 6,
- keying refs 1 to 4,
- suppressing tare,
- sub-total print-out (quantity and number) without reset,
- sub-total print-out (quantity and number) with reset,
- sub-total and total (quantities and numbers) print-out without reset,
- sub-total and total (quantities and numbers) print-out with reset.



Possibilities in "DOSAGE" mode:

- key in target,
- key in inflight,
- key in low speed,
- key in threshold 3, 4 or 6
- keying refs 1 to 4,
- suppressing tare
- key in formula number,
- start cycle,
- stop,
- quit (emergency stop).
- sub-total print-out (quantity and number) without reset,
- sub-total print-out (quantity and number) with reset,
- sub-total and total (quantities and numbers) print-out without RAZ,
- sub-total and total (quantities and numbers) print-out with RAZ,



9.2 Programming the key

Pressing this key displays annexe information for 5 seconds. If this key has been programmed to display several annexe information items; each key press brings up the successive information annexe in turn.

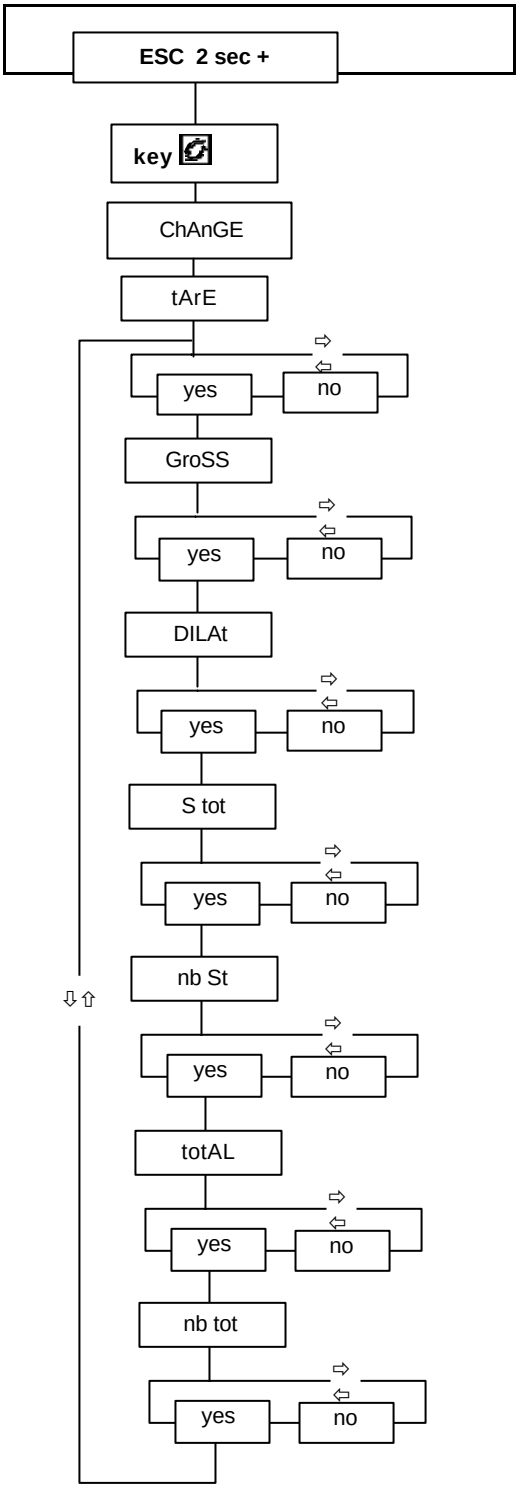
When a particular information item is brought up, the display returns to the “net weight” reading after 5 seconds.

Annexe information items that can be displayed are as follows:
- gross weight,
- tare,
- weight dilated 10 times,
- sub-total,
- number of weighings in sub-total
- total,
- number of weighings in total.

Follow the synopsis opposite to programme the key:

PLEASE NOTE:
The dilated weight remains on display for 1 minute (rather than 5 seconds) before the screen returns to displaying net weight.

Menu glossary:
ChanGE = CHANGE (menu name)
tArE = TARE,
GroSS = GROSS WEIGHT,
diLAt = DILATED WEIGHT DISPLAY (10x),
S tot = SUB-TOTALISER,
nb St = NUMBER OF WEIGHTS IN SUB-TOTALISER,
totAL = TOTAL,
nb tot = NUMBER OF WEIGHTS IN TOTALISER.



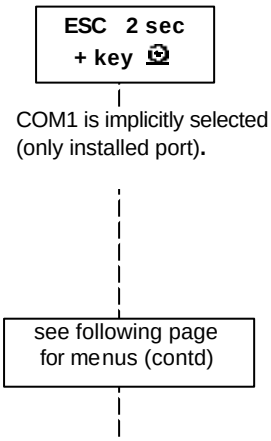
9.3 Personalising printed tickets

The standard MS100 version has a serial port. As an option, up to two supplementary cards can be fitted to the left and right connectors designed to take option cards (oPt L & oPt r).
The MS100 recognises the presence of the cards and brings up the corresponding menus as a consequence.

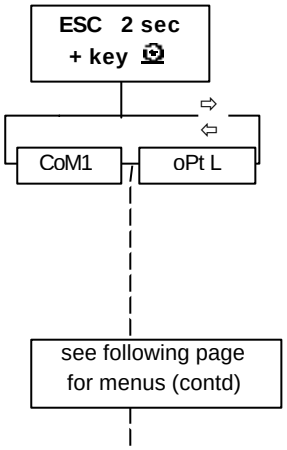
You can choose to programme the following for each installed port:
- standard ticket print-out,
- total ticket,
- sub-total ticket,
- weight recording ticket.

Selecting serial port for programming print-out tickets:
No choice is available in the basic version since only one port is available. In this case, go directly to the COM1 basic port ticket programming menu.
If one or two other serial ports are installed in the left or right slots, you can choose between COM1, OPT L or OPT r as follows:

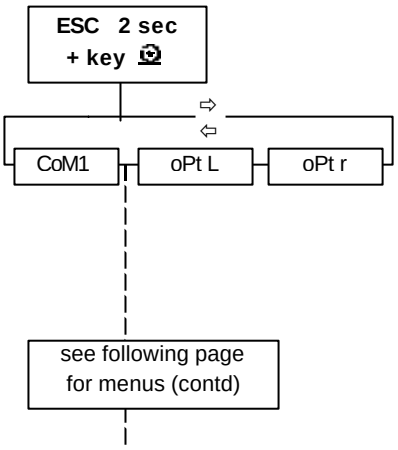
No option card



Serial option card in left slot



Left and right slots occupied by serial cards

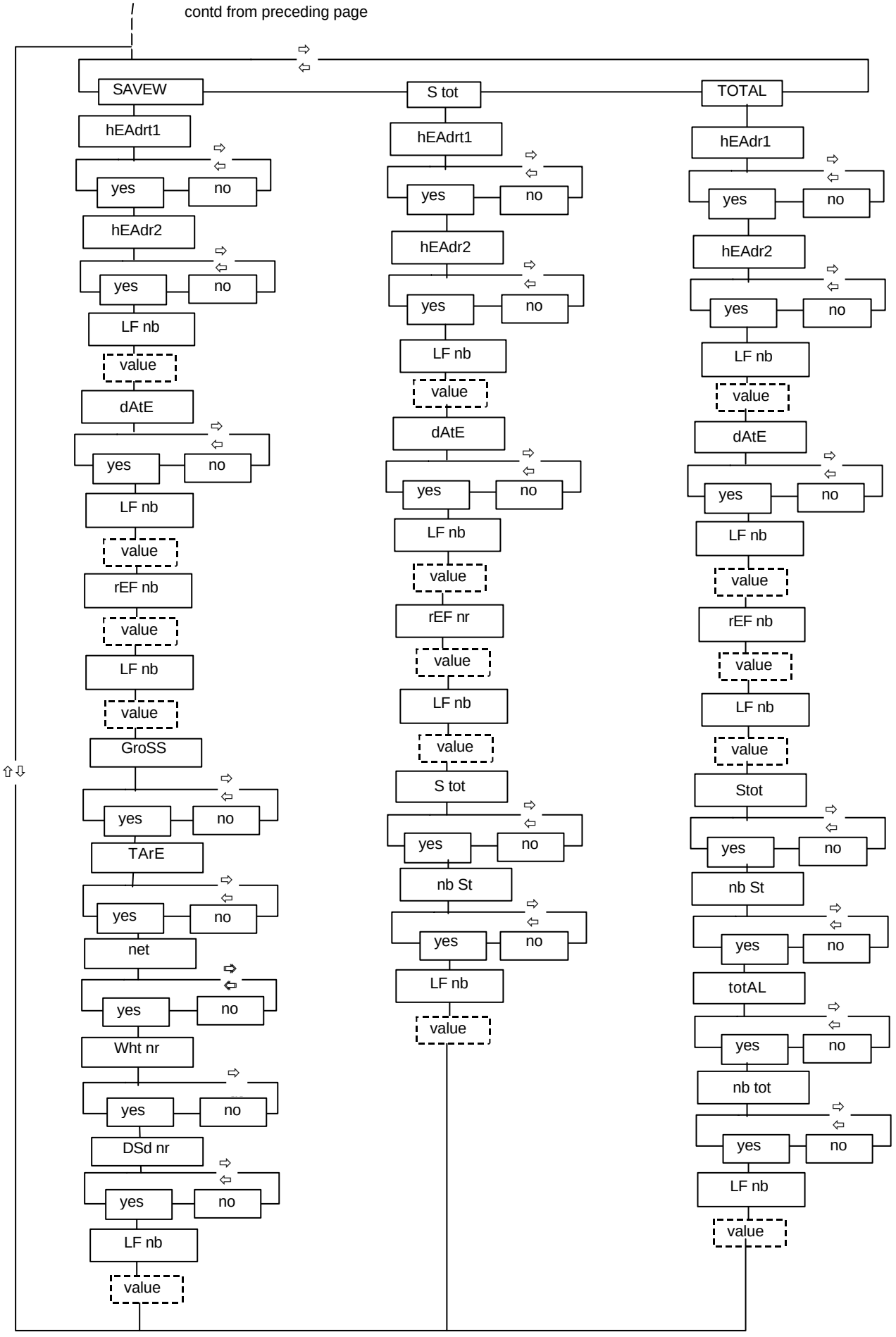


The menus on the following page show printable data in order from ticketing beginning.

Some data categories need the value to be keyed in, for example the number of line breaks or the number of references to be printed.

Other data categories require a yes or no response depending on whether you want to see the information on the ticket or not.

The dotted menu items indicate that there is a value to be inputted or modified using a numeric keyboard.


contd from preceding page
SAVEW
hEAdrt1
yes
no
hEAdr2
yes
no
LF nb
value
dAtE
yes
no
LF nb
value
rEF nb
value
LF nb
value
GroSS
yes
no
TArE
yes
no
net
yes
no
Wht nr
yes
no
DSd nr
yes
no
LF nb
value
S tot
hEAdrt1
yes
no
hEAdr2
yes
no
LF nb
value
dAtE
yes
no
LF nb
value
rEF nr
value
LF nb
value
S tot
yes
no
nb St
yes
no
LF nb
value
TOTAL
hEAdr1
yes
no
hEAdr2
yes
no
LF nb
value
dAtE
yes
no
LF nb
value
rEF nb
value
LF nb
value
Stot
yes
no
nb St
yes
no
totAL
yes
no
nb tot
yes
no
LF nb
value

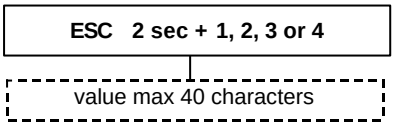
Glossary:

hEAdr = HEADING
SAVE W = WEIGHT RECORDED
LF nb = LINE BREAKS
rEF nb = NO OF REFERENCES
Wht nr = WEIGHT NUMBER
dSd nr = DSD number
nEt = NET WEIGHT
GroSS = GROSS WEIGHT
tArE = TARE

9.4 Keying in references

Keying in a reference can be done either using ESC (2 secs) + reference number (1 to 4) or by programming one of the F1-F4 function keys for the reference desired.

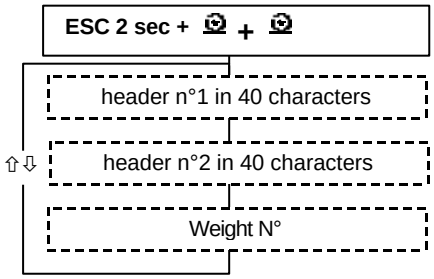
Standard method:



Dotted menu items indicate that there is a value that can be modified over 40 columns using numbers and letters.

To modify reference values see chapter 5 on how to key in or modify alphanumeric values.

9.5 Programming headings and weight number



Dotted menu items indicate that there is a value that can be modified over 40 columns using numbers and letters.
Weight number is accessible for the case where you want to initialise its value to a well-defined value. It is in the form of a numeric value in contrast to the headers.

Example of a ticket for recording weight:

PARISIAN GROUP AND ASSOCIATES	<-- header n°1
10 Short Street - AMBRIDGE DO15 4QX	<-- header n°2
	<-- line feed
	<-- line feed
26/06/06 15:12	<-- date & time
	<-- line feed
	<-- line feed
ref 1: -	<-- reference 1
ref 2: -	<-- reference 2
ref 3: -	<-- reference 3
ref 4: -	<-- reference 4
	<-- line feed
	<-- line feed
	<-- line feed
Gross weight 9.2 kg	<-- gross weight variable
Tare : 1.5 kg	<-- tare weight variable
Net weight: 7.7 kg	<-- net weight variable
Weight No : 34	<-- weight number variable
DSD No : 0	<--DSD number variable

9.6 Sub-totals and totals

The MS100 has a totaliser and a sub-totaliser. Each logging of a weight updates these totalisers. Updating means accumulating successive net weight values in the totaliser when a weight recording happens.
This also involves increasing the weighings number value by 1 (incrementing).

A specific printed ticket can be printed out with totaliser data accompanied by headings and reference if the installer technician ha programmed one of the function keys to do that.
The installer technician can also set up an external wired push button to one of the remote control inputs that the installer has programmed to do that.

10 CABLING INPUTS AND OUTPUTS

10.1 Basic on/off outputs

Relay 1 contact is a threshold contact in “weighing” configuration and low speed control in “dosing” configuration.
Relay 2 contact is a threshold contact in “weighing” configuration but you can use this contact in “function complete” if you use the remote control. If the apparatus is configured to operate in “dosage” mode, this contact will serve as a high speed control.

Term'l	TERMINAL BLOCK B1		
1	THRESHOLD 1	LOW SPEED	
2			
3	THRESHOLD 2	HIGH SPEED	FUNCTION EXECUTED
4			
5	EARTH		
6	0 V DC SUPPLY * + 10 to + 30 V DC SUPPLY	AC SUPPLY * 90V to 260V	
7			

PLEASE NOTE:
The MS100 is available in DC power supply and AC grid power supply versions.

* In ATEX:
11 V to 28 V DC supply version,
100 V to 250 V AC grid supply version, all frequencies.

10.2 Basic on/off inputs

The MS100 controller is supplied with a small supply feed available on connector C2 so as easily to use on/off inputs also sited on this connector.

terminal	CONNECTOR C2
4	0 V SUPPLY OUTPUT
11	12 V SUPPLY OUTPUT
8	12 V = DOWNLOADING REFERENCE AT 0 V
1	INPUT 1 (active with 12 V to 24 V)
2	INPUT 2 (active with 12 V to 24 V)
3	COMMON TO OPTOCOUPLE INPUTS
9	INPUT 3 (active with 12 V to 24 V)
10	INPUT 4 (active with 12 V to 24 V)

Each input can be programmed so as to allow control of one of the following functions:
- gross weight zeroing,
- semi-automatic taring,
- suppression of possible tare in memory,
- recording weight reading,
- sub-counter-totaliser zeroing with associated ticket print-out,
- ticket print-out associated with sub-counter-totaliser without reset,
- counter-totaliser zeroing with associated ticket print-out,
- ticket print-out associated with counter-totaliser,
- start,
- stop,
- quit (emergency stop),
- dose authorisation.

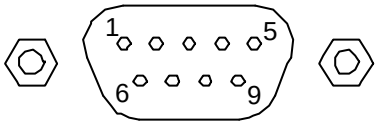
10.3 On/off outputs on optional B2 connector

The extension card is provided with 4 supplementary relays each with a working contact.
Output slot assignments are as follows:

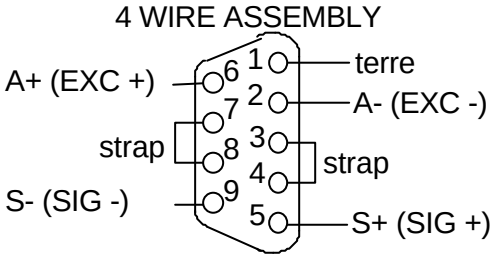
Tm' l	TERMINAL BLOCK B2
1	THRESHOLD 3
2	
3	THRESHOLD 4 or dose cycle in process (installer)
4	
5	THRESHOLD 5 in Weighing, Dose Ready in Dosing
6	
7	THRESHOLD 6 or Function Executede (installer)
8	

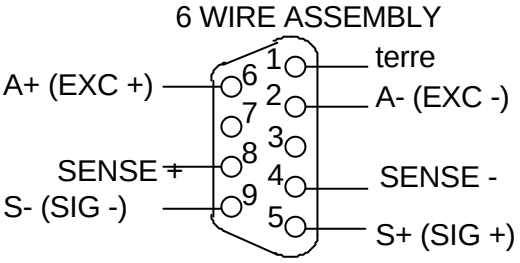
10.4 LOAD CELL SOCKET WIRING (C1)

View from behind base of load cell or junction box plug is as follows:



So that the cabling is compatible with other products of our company, the cabling diagram is as follows:

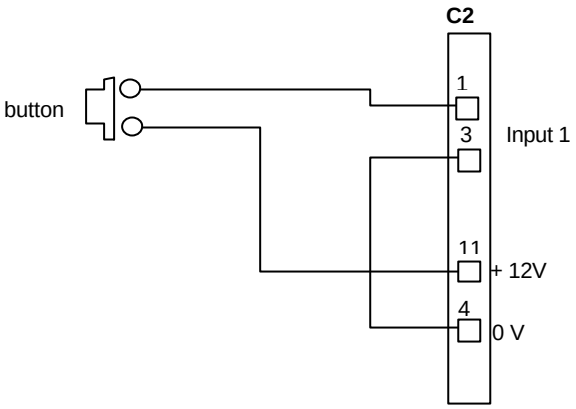




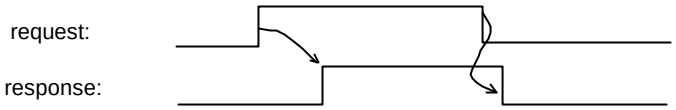
In the “4-wire” diagram, do not forget to use a strap to link the supply leads to the returns, as above. It is preferable to use the 6-wire set-up to neutralise weight drift caused by temperature variations that influence the voltage drop across supply leads from sensor or sensors.

10.5 Cabling remote control (C2)

Note that the 4 on/off inputs are programmed by the installer technician.
We suppose that input 1 is programmed for “gross zero request” by the installer and that we wish to use an external push button (BP) to set gross zero for the weight displayed:



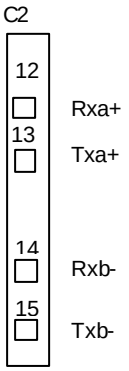
Relays 2 or 6 can be programmed by the installer to respond to a request from the remote control. The response diagram is as follows:



If the MS100 accepts the request, the output passes to 1. It reverts to zero when the request reverts to zero.

10.6 Cabling COM1 RS232 (C2) serial output

10.7 Cabling COM1 RS485 (C2) serial output



11 METROLOGICAL CALIBRATION AND SETTINGS

The MS100 can directly be set from the keyboard using a known substantial weight as a reference in internal calculations during the calibration phase. These adjustments are instantaneous.

11.1 Range and divisions

The division is the smallest value that can be displayed. The range is the largest value that can be displayed, and is a multiple of the division. The number of points that can be displayed is given by the quotient of the scale divided by the division**.**

For example, a 60,000 kg scale in 0.020 kg steps gives 3000 points.

The installer technician sets these values.

Protection / sealing:
To gain access to metrological setting, the controller must not be sealed.
To unseal the controller, the pin between the sensor connector and 15-point connector must be unscrewed by two or three turns.

11.2 Adjusting dead load (initial zero)

Check that the load holder is clean and stable.

Pres ESC for 3 seconds, then press  .

The message "ZEro ?" is displayed.

Confirm by pressing  .

If the operation is successful, “0” displays.

PLEASE NOTE: If the measurement from the sensors is negative, then initial zero cannot be done.

11.3 Adjusting span

Pres ESC for 3 seconds, then press  .

The message "SPAn ?" is displayed.

Confirm by pressing  .
The message "rEF" displays for a short period. Key in the reference weight value to be used.
PLEASE NOTE: this value should be a multiple of the division.

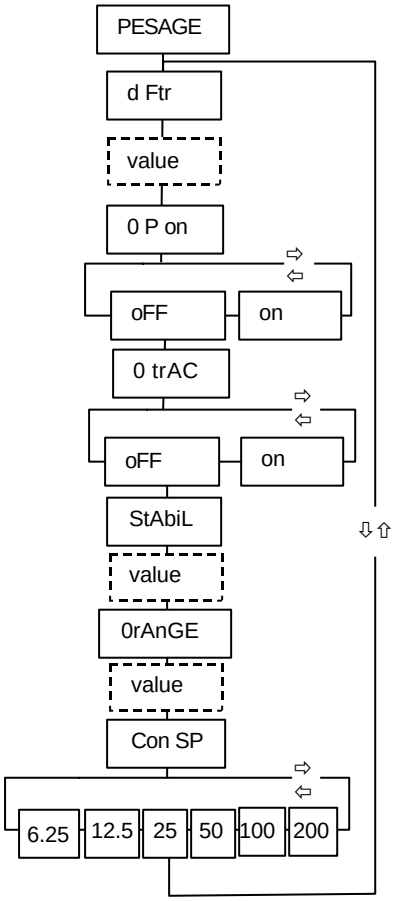
If the operation is successful, the keyed-in value remains on display without flashing. If not, the tabulated value disappears and the initial value re-displays.

NOTE: Do not forget to screw in the setting protection pin and particularly do this without using a wrench or spanner so as to avoid any deterioration of the equipment.

11.4 Other settings related to metrological aspects

These settings are as follows:
- digital filter,
- Zero function at on/off switch-on,
- on/off follower Zero function,
- stability criterion in number of quarter-divisions,
- range within which zero request is authorised,
- analogue/digital conversion system conversion speed.

Key in ESC + ⇨, then use F1 and F4 to select "WEiGh".



Digital filter: "d Ftr"
Here we fix the number of measurements from which to obtain a smoothed-out average.

Zero at switch-on: "0 P on"
We decide here if the apparatus should be set at zero, or not, at each switch-on. PLEASE NOTE: If this function is enabled and a switch-on happens when the load holder is not empty, the apparatus locks up.

Zero tracking: "0 trAC"
Here we “absorb” small drifts that happen following dust intrusion or from the effect of temperature variation on sensors.

Stability criterion: "StAbiL"
By default the ¼division is used to check the difference between two successive weight readings so as to establish if the weight is stable or not.
This parameter value is increased in some cases so as to give a better apparent stability.
However it is forbidden to modify this value when in controlled weighing mode.

Zero range: "0rAnGE"
This range is ± 2% of the scale (see 5.2.1) by default. It should not be modified in controlled weighing mode. If not in this mode the range can be enlarged up to 20%.

Conversion speed: "Con SP"
Possible speeds are: 6,25/sec, 12,5/sec, 25/sec, 50/sec, 100/sec, and 200/sec.

11.5 Access to data saved in DSD

ESC + → gives the DSD heading that leads to the access menu: (see ESC + → menu in 6.2.1).
At this menu key in the desired log number and you gain access to the data in that log.
You can then scan the menu to obtain logged information as follows:
- dSd nr: DSD log number,
- dd/MM: day and month,
- hh MM: hours and minutes,
- net: net weight
- tare: tare weight

11.5.1 Deleting DSD data

When you are positioned on the "dSd nr" menu item, press C to delete all data.

11.5.2 Recovering DSD data

When position over "DSD" pressing  sends data to the COM1 serial port (controlled at the printer).

Transmission and speed formats are identical to the parameters used for printing. It is possible to recover data in a terminal such as WINDOWS Hyper Terminal.

It is then very easy to save the data received and transfer it to EXCEL to carry out data processing.
To recover data from DSD in a PC under WINDOWS, proceed as follows:
Launch the executable Programmes/Accessories/Communications/HyperTerminal.
Click on File/Properties. In the formula that appears:
- connect by using: Choose PC port used (COM1 or COM2).
- click on configure and adjust parameters as follows: 38400 Bauds, 8 bit, without parity, without flow control, 1 bit stop
- click on Transfer/Capture text, choose the directory and type in file name,

- on MS100 side, press **ESC** for 2 seconds, then press  ,
- use  to select DSD and then press 

Once the DSD data has been received:

- go to PC and click on Transfer/Capture text/Arreter (*text/stop*).

The data is in the file carrying the name that you keyed in the directory that you chose.

Under Excel, open file by choosing "all files" and select "Separator=Tabulations".

The recovered data will have the following appearance:

Date	Time	Record number	Net weight (kg)	Tare (kg)
28/08	05:14	1	1.2440	0.0120
28/08	05:28	2	1.4340	0.0120
28/08	05:38	3	1.3960	0.0120
28/08	05:45	4	1.5060	0.0120
28/08	05:58	5	1.5880	0.0120
28/08	06:09	6	1.5580	0.0120
28/08	06:15	7	1.4200	0.0120
28/08	06:22	8	1.3400	0.0120
28/08	06:37	9	1.4480	0.0120
28/08	06:45	10	1.1160	0.0120
28/08	07:02	11	1.2440	0.0120
28/08	07:10	12	1.4220	0.0120
28/08	07:19	13	1.5740	0.0120
28/08	07:38	14	1.7340	0.0120
28/08	10:44	15	1.5720	0.0120
28/08	10:52	16	0.2940	0.0120

11.5.3 Using a serial port to recover DSD contents

This functionality should be activated by the installer technician. This uses an ASCII protocol that works as follows:

When the apparatus receives letter D followed by its slave number, it sends the DSD contents to the serial output being considered.

This serial output can no longer be used for a printer. If needed, serial cards can be added over and above the base serial output if the extension card is present.

12 HOW TO. . .

Configure F1 to conceal it in Start-Cycle:
For that the apparatus has to be configured in dosage mode (see installer).
Press ESC for 3 seconds.
When display flashes with hyphens at bottom, press [F1].
Press [F4] as many times as necessary to have **StArt** appear in the display.
Finish by pressing  .
From now on pressing F1 will launch the dosage.

Use F1 directly to enter target value for dosing
For that the apparatus has to be configured in dosage mode (see installer).
Press ESC for 3 seconds.
When display flashes with hyphens at bottom, press [F1].
Press [F4] as many times as necessary to have **tArGEt** (instruction) appear in the display.
Finish by pressing  .
From now on pressing F1 will launch the instruction.

Use F4 to enter reference from the printed ticket:
Press ESC for 3 seconds.
When display flashes with hyphens at bottom, press [F4].
Press [F4] as many times as necessary to have **rEFEr1** (reference 1) appear in the display.
Finish by pressing  .
Before using  to log the weight , the user could press [F4] to modify the reference

Recover data from DSD in a PC:
See 11.5.2 and 11.5.3.
The installer should configure the serial port that will serve in the dialogue with the PC using ASCII protocol. A slave number must also be chosen (17 by default).
Then the connected PC sends character D followed by the slave number to the indicator, it sends the DSD contents to its serial output.

Use a PC to read weight
The installer should configure the serial port that will serve in the dialogue with the PC using ASCII protocol. A slave number must also be chosen (17 by default).
Then the connected PC sends character P followed by the slave number to the indicator, it sends the current weight reading to the serial port output.

Empty DSD:
Press ESC for 3 seconds.
When display flashes with hyphens at bottom, press  .
Press [F4] as many times as necessary to have **dSd** appear in the display.
Press [F2] once to have the message **dSd nr** appear in the display.
Press [C]. The message EFFAC? appears.
Press  if you want to delete the DSD contents; if not press [ESC].

dead load adjustment:
Press ESC for 3 seconds.
Press  .
The message **ZEro ?** appears.
Press  to confirm or press [ESC] to abort.

Span adjustment
Press ESC for 3 seconds.
Press  .
The message **SPAn?** appears.
Press  to confirm or press [ESC] to abort.
Input value of reference weight used for setting and confirm by  .

Modify division value and instrument measuring range.
Call the installer technician who alone has access to this adjustment.

Modify time-lag linked to threshold 5:
Press ESC for 3 seconds.
When display flashes with hyphens at bottom, press  .
Press [F4] as many times as necessary to have **Par t5** appear in the display.
Press [F2] twice and modify the displayed value as needed. For example 4.5 for four seconds and five-tenths of a second.
Press  to confirm or press [ESC] to abort.

De-activate relay n° 3 output:
Press ESC for 3 seconds.
When display flashes with hyphens at bottom, press  .
Press [F4] as many times as necessary to go to the last item on the menu.
Select Without (without), by pressing [F4} as many times as necessary.
Confirm this choice with  .
The procedure is the same for disabling other outputs.
Warning lights indicating the status of disabled outputs are always out.

What do the L LiM (low limit) and H LiM (high limit) parameters do in the  menu?
It is a safety device used mainly when dosing in a package or receptacle placed on a platform. If the receptacle is not present, the system stops the dosing process and thus loss of dose.
LbASSE and LhAutE form a fork in which the empty container should be placed.

Inputting a manual tare directly on the numeric keyboard without passing through a menu:
For that, the installer technician should have authorised direct taring at installation.
Use a numeric keypad to key in tare value to be inputted.
Press  .
The inputted tare is active.

Use  to display active tare value and total value.
Press ESC for 3 seconds.
"**ChAnGE**" appears then "**tArE**".
Press [F2]. "**YES**" appears, flashing.
Press  to confirm or press [ESC] to abort.
Press [F2] up to the point where "**totAL**" appears.
Press [F2]. "**YES**" appears, flashing.
Press  to confirm or press [ESC] to abort.
Press [ESC] to quit.

You can now press  once to display active tare value.

You can now press  twice to display total value.

Delete active tare:
Key in a nil tare value (0) in manual tare mode (see above on inputting manual tare).

Modify measurement digital filtering:
The parameter concerned can be found in the WEiGh (*weighing*) menu. Gain access to this menu as follows:
Press ESC for 3 seconds.

When display flashes with hyphens at bottom, press  .
Press [F4] as many times as necessary to have **WEiGh** appear in the display.
Press [F2] once to have the message **d FiLt** (digital filter) appear.
Press [F2] and modify the displayed value as needed. For example 20 to average over 20 measurements.

Increase stability criterion so that stability warning light flashes less.
This is possible only on condition that the apparatus is not configured for legal weighing.

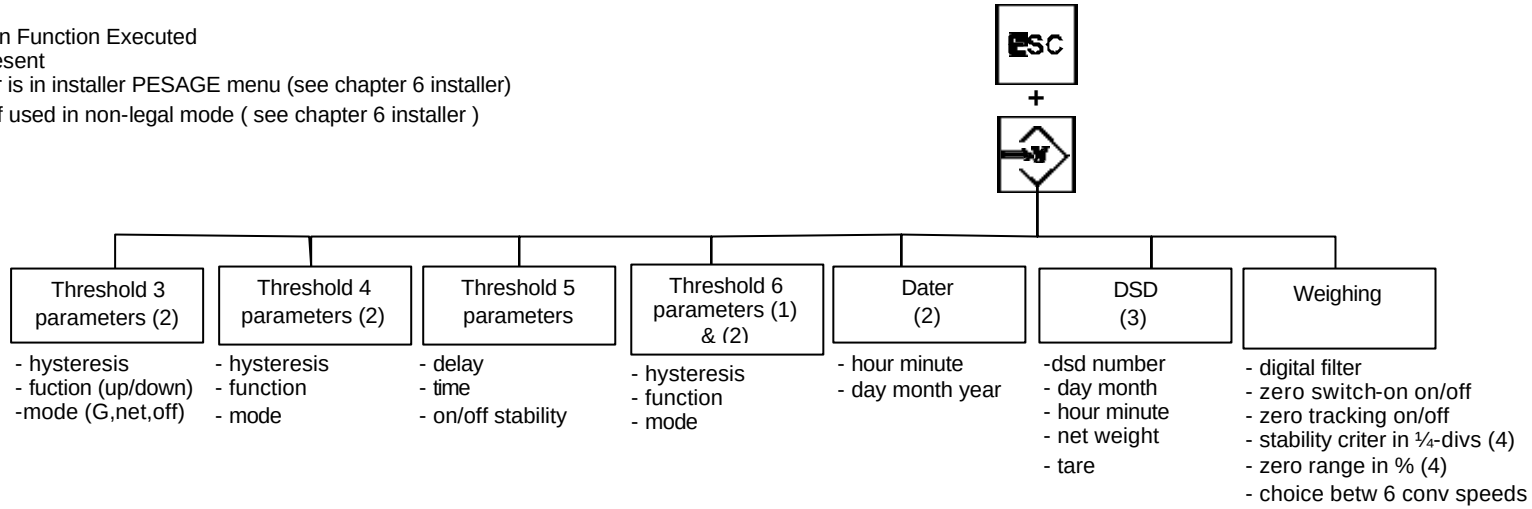
Use [F2] in the **WEiGh** menu (see modify measuring filtering), to position in **StAbiL** (stability criterion).
Press [F2] once again to advance to criterion value, and modify as required.
1 = ½ division (default value as legal criterion).
2 = 2 quarter-divisions
3 = 3 quarter-divisions
etc. . .
The higher the number of quarter-divisions, the less the warning light M (motion) will remain lit without flashing.

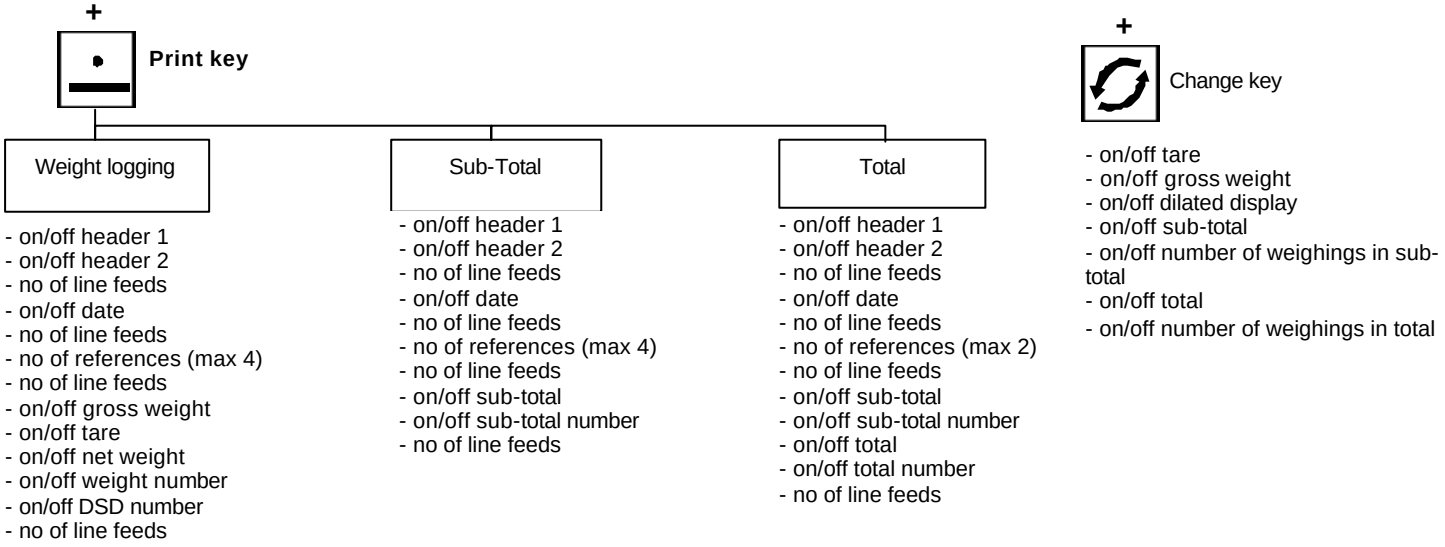
Why the PT warning light is lit:
This light is lit (along with the NET light) when manual taring is active.
When the NET light is lit on its own, semi-automatic taring is active.

When a semi-automatic tare is requested while the manual tare is active, the manual tare is overridden. At that moment, the PT warning light goes out and the NET warning light remains lit.

12.1 Summary of ESC + X menu in “DOSAGE” configuration

(1) if not used in Function Executed
(2) if option present
(3) if parameter is in installer PESAGE menu (see chapter 6 installer)
(4) modifiable if used in non-legal mode (see chapter 6 installer)





12.2 Summary of ESC + X menu in "INDICATOR" configuration

(1) if not used in Function Executed
(2) if option present
(3) if parameter is in installer PESAGE menu (chapter 6)
(4) modifiable if used in non-legal mode (see installer) (chapter 6)