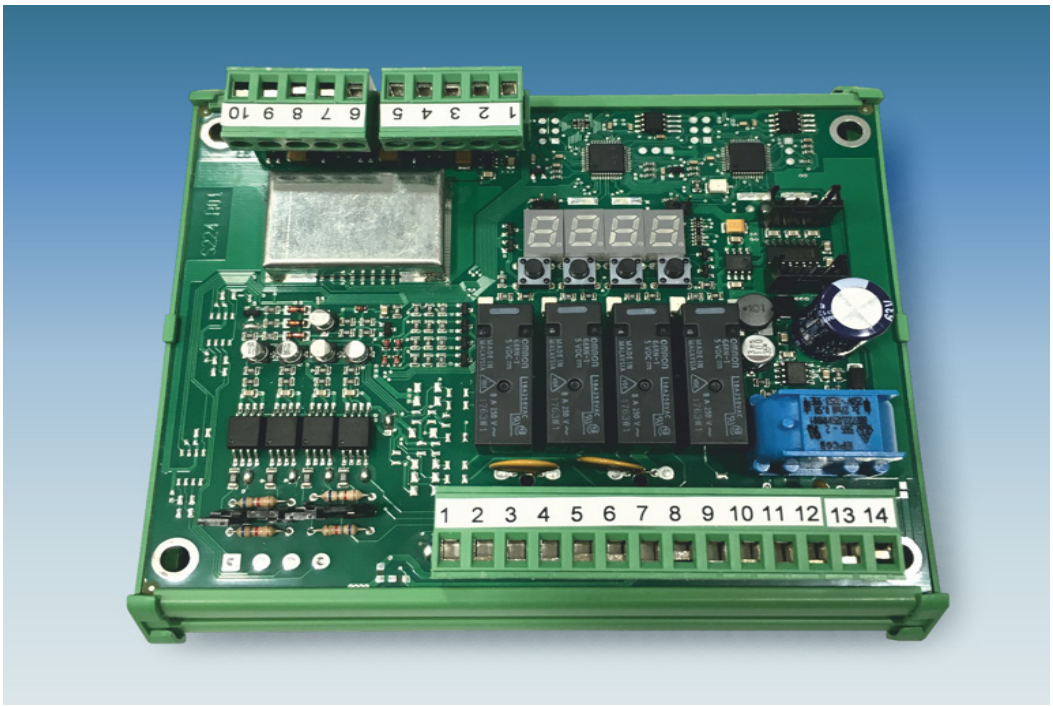
LOADGUARD

Electronic load limiter

TECHNICAL MANUAL

For OPTO / Analog OPTO versions



Software version PW6616

INDEX

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CAUTIONS

READ this manual BEFORE operating or servicing the instrument.

FOLLOW these instructions carefully.

SAVE this manual for future use.

CAUTION Installation and maintenance of this instrument must be allowed to qualified personnel only. Be careful when you make inspections, testing and adjustment with the instrument on. Make the electrical connections in the absence of the power supply. Do not observe this precaution can be dangerous.

DO NOT allow untrained staff to operate, clean, inspect, repair or tamper with this tool.

SYMBOLS

The following are the symbols used in the manual to draw the reader's attention:

Attention! This operation must be performed by qualified personnel.

Pay particular attention to the following.

Read more.

The message shown on the display is blinking.

The message shown on the display is fix.

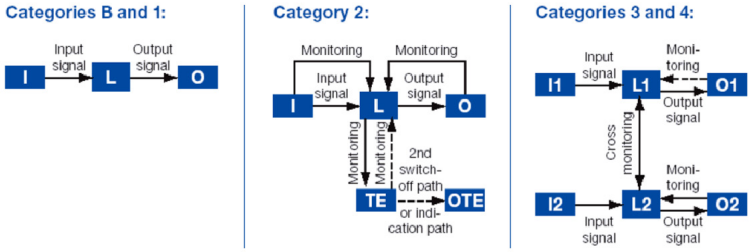
INTRODUCTION

LOADGUARD is housed in a holder to be hooked directly on DIN / OMEGA. The coupling is designed for use with DIN rails (EN60715).

LOADGUARD is a redundant system for the limitation of the load, manufactured in compliance with the Performance Level PL d, according to ISO standard EN13849-1, corresponding to the Safety Integrity Level (SIL 2 IEC 62061).

Performance Level (EN 13849-1)	Failure Probability per hour [1/h]	SIL Level according with EN IEC 62061
b	$3 \cdot 10^{-6} \leq PFH_D < 10^{-5}$	SIL 1
c	$10^{-6} \leq PFH_D < 3 \cdot 10^{-6}$	SIL 1
d	$10^{-7} \leq PFH_D < 10^{-6}$	SIL 2
e	$10^{-8} \leq PFH_D < 10^{-7}$	SIL 3

Table of correspondence PL-SIL



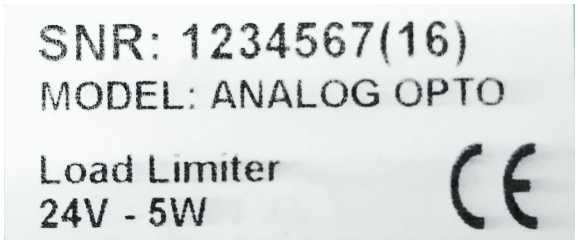
Through the programming of 2 levels (pre-alarm and alarm) the load detected is constantly checked and eventually the lockout relay is activated. Other possible alarm conditions are monitored: imbalance of the 2 acquisition channels, load cells connections missing, incorrect power supply, self-diagnosis. The instrument also has two optional analog outputs with a working range 4÷20mA, respectively associated with the two weight acquisition channels.

Each channel has a separate logic. Both channels are verified an independent "watchdog" (category 3 according to EN13849). Each channels is provided with: a ADC converter that acquires the signal of the load cell, a microcontroller that receives the data from the ADC, two control relays.

Each microcontroller has a "watchdog" interior, an external voltage monitor and data memory (EEPROM). Both microcontrollers are monitored by an independent extra "watchdog" able to send the alarm relay in case the system does not work properly. The diagnostic system also provides continuous monitoring of the load cell cables and indicates a possible anomaly. Furthermore, if the analog or digital power supplies come out from the operation fields a specific alarm condition is determined. If there were no conditions to work correctly, the relays would be immediately put in an alarm state (de-energized).

The parameter settings are made through four mechanical buttons and the visualization is on 4 red display (7-segment red LED 7mm). Each relay has a LED to indicate its status.

IDENTIFICATION PLATE OF THE INSTRUMENT



It's important to communicate this data, in the event of a request for information. The software number and release number are shown on the cover of the manual and also displayed when the instrument is switched on. The label indicates the voltage that must be applied to the contacts relay.

The disposal must be in compliance with national and local regulations in the process of treating materials.

The instrument LOADGUARD must be properly disposed as electronic waste.

WARNINGS

The following procedures must be executed by qualified personnel. All connections should be done when the instrument is turned off.

SPECIFICATIONS

Power supply:	10 to 30 VDC protected against inverted polarity. Protection with self-resetting fuse.
Consumption:	Max 6 W
Insulation:	Class III (only the card)
Operating temperature:	-10°C ÷ +50 ° C (max 85% humidity non-condensing)
Storage temperature :	-20°C ÷ +60 ° C
Display:	Numeric 4-digit 7-segment red LED (h 7 mm)
Keyboard:	N. 4 mechanical buttons
Led:	N. 4 LED indicators that indicate the status of the relay outputs
Dimensions of the board:	134 mm x 107 mm x 30 mm (WxHxD) including terminal lockouts (OPTO version) 171 mm x 107 mm x 30 mm (WxHxD) including terminal lockouts (OPTO ANALOG version)
Installation:	With 4 screws or on a DIN rail or on a OMEGA bar
Connections:	Plug-in terminals screw pitch 5.08 mm, (3.81 mm for the cells and Analog Output)

N. 2 load cells indipendent inputs with the following characteristics:

N. load cells:	Max 4 cells of 350 ohm in parallel with the reference. Load cell power supply short-circuit protected.
Linearity:	<0.01% of full scale
Temperature drift:	<0.002% of full scale/°C
Internal resolution:	24-bit
Weight display resolution:	Up to 10.000 divisions on the payload
Measuring range:	From -3.9 mV / V to +3.9 mV / V
Digital Filter:	Selectable 0.25 Hz to 3 Hz
Zero and full scale Calibration:	Auto (theoretical) or executable from the keyboard.
Control cable interruption cell:	Present
Alarm outputs:	4 relay output (max 48 Vdc/ac a changeover contact) 2 A relay contact capacity
N. 2 Analog Outputs:	Current 4÷20 mA
Resolution:	16-bit
Calibration:	Digital from keypad
Impedance:	300 Ohms Maximum
Linearity:	0.03% of full scale
Temperature drift:	0.001% of full scale/°C
N. 2 microcontrollers with cross-checking	
Micro Characteristic:	32-bit ARM Cortex-M0
Memory Program Code:	32 Kbytes FLASH reprogrammable on-board RS232
Data memory:	8 Kbytes
Compliance with:	EN61000-6-2, EN61000-6-3 for EMC EN61010-1 for Electrical Safety EN13849-1 parts of the systems of control related to the security

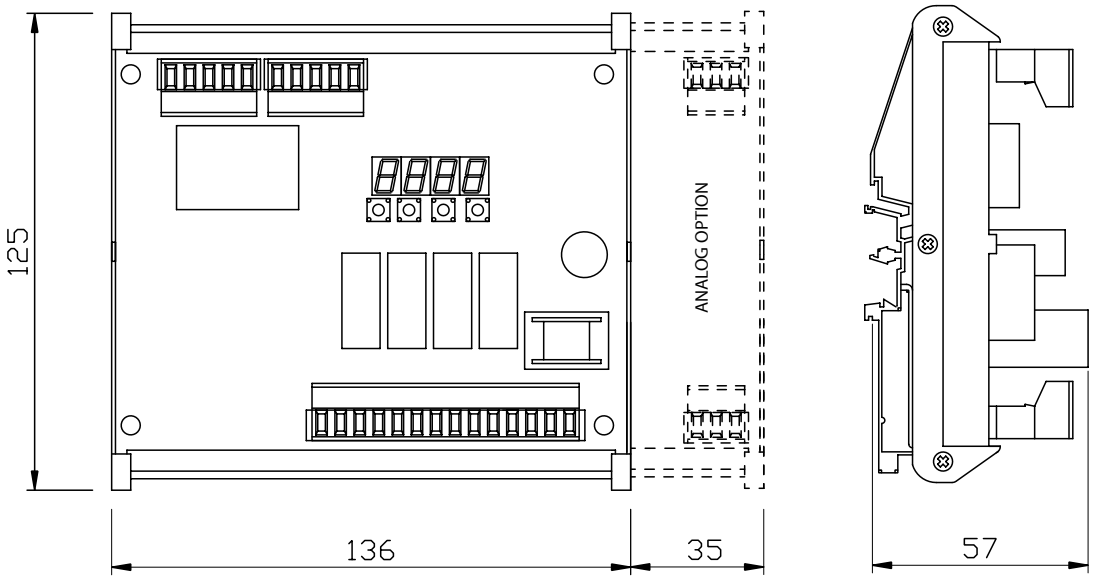
INSTALLATION

GENERAL

The LOADGUARD is composed of a base board housed in a plastic case for DIN rail 35mm.

The LOADGUARD should not be immersed in water, undergo water jets and cleaned or washed with solvents. Do not expose to heat or direct sunlight.

DIMENSIONS



ELECTRICAL INSTALLATION

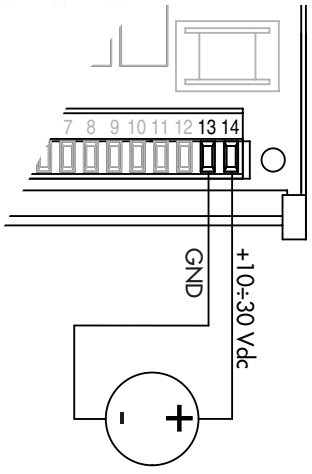
The LOADGUARD uses for the electrical connection 5.08 mm removable terminal lockouts and 3.81 for load cells and Analog Output.

The load cell cable must be shielded and channeled away from the power cables to prevent electromagnetic interference.

POWER SUPPLY OF THE INSTRUMENT

The instrument is supplied via terminals 13 and 14. The power supply cable must be channeled separately from other cables. The supply voltage is electrically isolated.

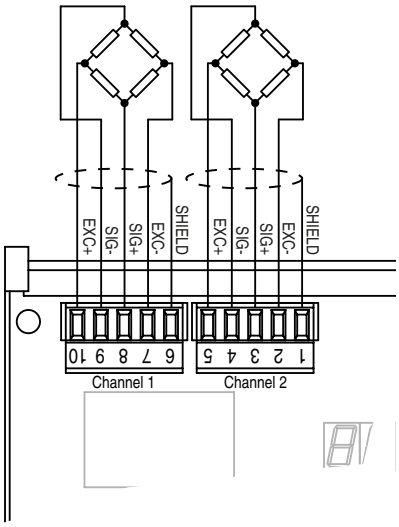
Supply voltage: 10-30V DC, max 4W



LOAD CELLS CONNECTION

The load cell cable must not be channeled with other cables, but must follow their own path. The instrument can be connected up to a maximum of four load cells 350Ω in parallel for each measuring channel. The supply voltage of the cells is 4 VDC and is protected by a temporary short circuit. The measuring range of the instrument involves the use of load cells with a sensitivity of up to 3.9 mV/V. The load cell cable must be connected to the terminal 1÷5 for channel 2 and the terminal 6÷10 for channel 1. Connect the shield to the relative cell clamp.

The instrument is designed for the connection of double bridge load cell (redundant), with acquisition of the dual-channel signal. If the load cell cable involves the use of remote sense, connect these wires with the load cell power supply wires.



RELAY OUTPUTS CONNECTION

To meet the safety requirements the pre-alarm and locking outputs are both obtained with 2 relays in series, driven by two microcontrollers. The series connection is made inside the instrument, in such a way that they are available on the terminal contacts for the loads of pre-alarm and lock. The contacts of the relays used are normally open and are closed during normal operation in the absence of the alarm.

WIRING DIAGRAM FOR THE INSTALLER

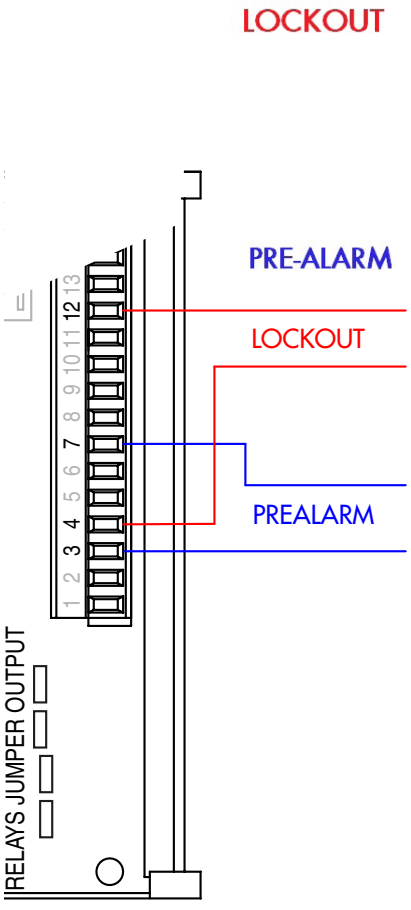
NUM.	Terminal lockout 14P pitch 5:08
3	Prealarm Contact
7	Prealarm Contact
4	Lockout Contact
12	Lockout Contact

To wire the signal contacts of the pre-alarm relay is needed to use the COM pre-alarm contact (terminal 3) and the normally open pre-alarm contact (terminal 7). In order to get the status feedback of the relay, is needed to place a resistance between the COM (terminal 3) and the normally open contact (terminal 7).

To wire the signal contacts of the lockout relay is needed to use the COM lockout contact (terminal 3) and the normally open lockout contact (terminal 7). In order to get the status feedback of the relay, is needed to place a resistance between the COM (terminal 4) and the normally open contact (terminal 12).

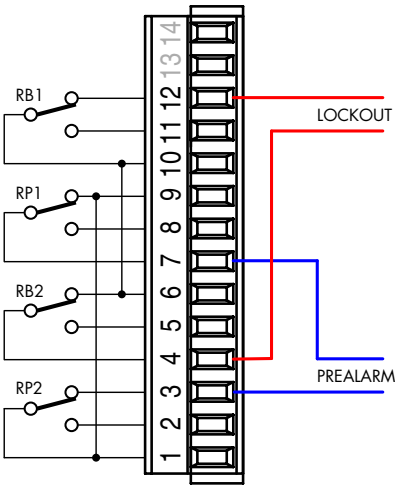
In the case of a voltage of 24 V, the load should have a maximum impedance of 1 kOhm and a power of 0.5 W.

In the case of a voltage of 48 V the load must have an impedance up to 3 kOhm and a minimum power of 0.7 W The instrument must be configured according to the voltage of the contacts: either 24 or 48 V. When using 24 V the jumpers must be closed. With 48 V the jumper must be opened.



INTERNAL WIRING DIAGRAM

NUM.	Morsettiera 14P passo 5.08
1	RP2 Relé di preallarme canale 2 COM
2	RP2 Relé di preallarme canale 2 NC
3	RP2 Relé di preallarme canale 2 NO
4	RB2 Relé di blocco canale 2 COM
5	RB2 Relé di blocco canale 2 NC
6	RB2 Relé di blocco canale 2 NO
7	RP1 Relé di preallarme canale 1 COM
8	RP1 Relé di preallarme canale 1 NC
9	RP1 Relé di preallarme canale 1 NO
10	RB1 Relé di blocco canale 1 COM
11	RB1 Relé di blocco canale 1 NC
12	RB1 Relé di blocco canale 1 NO



CONNECTING ANALOG OUTPUTS

Only for LOADGUARD ANALOG OPTO version. The analog outputs are located on one side of the base board.

The operation range provided is 4 to 20 mA. The maximum load is 300 ohms.

To realize the connection use a shielded cable, taking care to connect only one of the two ends to the terminal 1 or 6 (screen), to the terminal lockout used for the connection of the load cells.

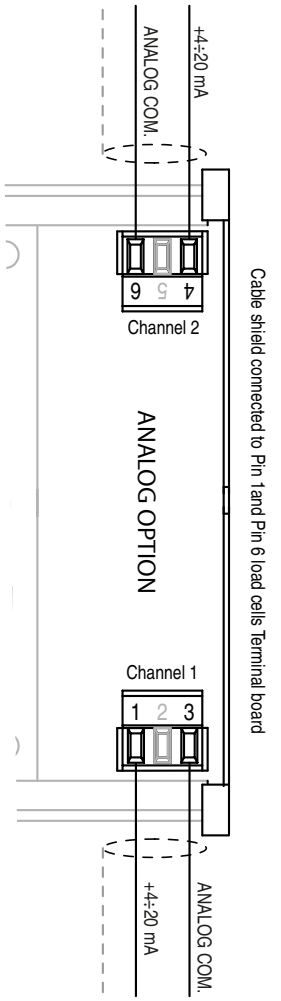
To make the connection use an appropriate shielded cable as short as possible and separated from the power cables.

NUM.	3P terminal strip pitch 5.08
4	+ Analog output mA
5	
6	GND Analog Output

(analog output 2)

NUM.	3P terminal strip pitch 5.08
1	+ Analog output mA
2	
3	GND Analog Output

(analog output 1)



INSTRUMENT FRONT PANEL

The LOADGUARD is equipped with a 4-digit display, 4 status LED relay and 4 keys.

In this operating mode the display shows the weight.

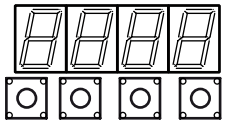
The set-up parameters are easily accessed and modified through the use of the 4 front buttons used to select, edit, confirm and save the new settings.

DISPLAY

In the programming procedure, the display shows the sequence of parameters and their values that allow the operator to configure the instrument.

USE OF THE KEYS

The instrument is programmed by 4 KEYS located below the display, since there are no identification on the board. Since there are no identification on the board, to facilitate the user, on this manual, the keys are identified by numbers from 1 to 4 from left to right.



During the programming procedures pay attention to any temperatures above 50 °C which may occur in the vicinity of the keys and also to any voltages which may occur on the electronic board. The voltages do not usually exceed 30Vdc.

KEY	FUNCTION during main SET-UP menu
3	Exit the Set-up menu/Go back to upper level.
4	Enter the menu./ Enter the set-up/confirm selected parameters
2	Go to the next menu.
1	Back to the previus menu.

KEY	FUNCTION during SET-UP parameters
1	Increase the blinking digit / select the pevious value.
2	Decrease the blinking digit / select the next value.
3	Select the next digit. If the blinking digit is the last on the right go back to the firs digit on the left.
4	Confirm and save the value set

To exit and save the changed data, press the 3 Key until the indicator returns to the operating mode.

DISPLAY INDICATIONS

The display check is done when switching the instrument on. Then it appears an identification code of the software and its version. It is important to communicate this code in case of request for assistance. If during the ignition of the instrument the operating alarm are not recognized, a contacts initial test is done

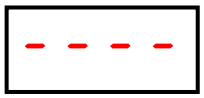
During this phase, the relays are energized to verify proper operation. The test of the contacts is run in 4 phases:

1. Check the condition of the opening of the contacts.
2. Check the prealarm contact closure referred to the MICRO 1, and the contact lockouting referred to the micro 2.
3. Control the operation of the "watchdog", during this phase the closed contacts at point 2 are opened for a short period.
4. Check the closure of the lockouting contact referred to the micro-1 and the prealarm contact referred to the micro-2.

REPORTING ERRORS

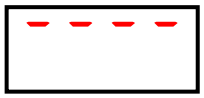
Normally, the display indicates current measure of the load cells. In this condition, you can start a procedure for programming the instrument.

In this operating mode, the display may report the following error codes.



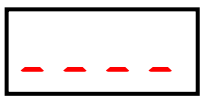
WEIGHT NOT VALID WHEN SWITCHING ON

At switching on, before the acquisition of the signal and awaiting the execution of the automatic zero weight, the display shows a message of invalid weight.



REPORTING OF OVERLOAD

When the gross weight exceeds by more than 9 divisions the maximum capacity of the weighing system, or when the weight value is greater than the maximum value displayable, the screen displays this message.



UNDERWEIGHT REPORTING

When the gross weight is negative and greater than 4 digits, the screen displays this message of underweight.

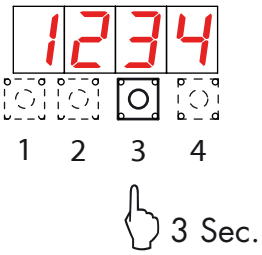
ALARMS

ALARM	DISPLAY	RELÉ ACTION
LOAD CELL CONNECTION MISSING. The last displayed digit identifies the load cell channel reference. If the error occurs on both channels, the error displayed first is the one referred to channel 1	nC0.1	Prealarm + Lockout
WRONG LOAD CELL CONNECTION The last displayed digit identifies the load cell channel reference. If the error occurs on both channels, the error displayed first is the one referred to channel 1.	E.C0.1	Prealarm + Lockout
LOAD CELL SIGNAL OUT OF NEGATIVE RANGE The signal of the load cells is lower than -3.9mV/V, probably due to a connection error. The last displayed digit identifies the load cell channel reference. If the error occurs on both channels, the error displayed first is the one referred to channel 1.	L.SI.1	Prealarm + Lockout
LOAD CELLS SIGNAL OUT OF POSITIVE RANGE The signal of the load cells is higher than +3.9mV / V, probably due to a connection error. The last displayed digit identifies the load cell channel reference. If the error occurs on both channels, the error displayed first is the one referred to channel 1.	H.SI.1	Prealarm + Lockout
FAULTY RELAY CONTACTS. The instrument monitors the voltages on the relay contacts continuously. In case of non-closure or opening of the contacts you receive this alarm. This error will appear if the load is not connected between COM and Normally Open contacts of the relay (see page 7)	E.rEL	Prealarm + Lockout *
FAULTY WATCHDOG. When swithched on, the instrument checks the proper functioning of the "watchdog" signal. If an error occurs, you receive this alarm.	EtAG	Prealarm + Lockout *
UNPROGRAMMED PREALARM THRESHOLD	No message	Prealarm
UNPROGRAMMED LOCKOUT THRESHOLD	No message	Prealarm + Lockout
WEGHT DIFFERENCE BETWEEN THE CHANNELS. The load cells weight-signal does not match. If there is a difference higher than the programmed weight value you receive this alarm.	dIFF.	Prealarm + Lockout *
INTERNAL FAULT: CHANNELS CONNECTION MISSING. The microcontroller communication between the 2 channels is absent.		Prealarm + Lockout *
INTERNAL FAULT: HARDWARE. Internal voltage levels out of range or intervention of the watchdog	E. uC	Prealarm + Lockout *
INTERNAL FAULT: MISSING LOAD CELLS SIGNAL ACQUISITION. In this case there is a system fault signal acquisition. The last displayed digit identifies the load cell channel reference. If the error occurs on both channels, the error displayed first is the one referred to channel 1	E.Ad.1	Prealarm + Lockout
INTERNAL FAULT: MEMORY SETUP PARAMETERS. The control system of the data stored in the memory found an error.	E.rEr	Prealarm + Lockout
WEIGHT CALIBRATION MISSING. This message indicates that calibration is missing. To eliminate this message perform the calibration procedure as described on page 15 of this manual. This message appears after the reset of the instrument parameters.	nCAL.	

CAUTION: To meet safety requirements, alarms marked with the symbol remain active even if the condition that caused the alarm is no longer detectable. To restore operation, you must first remove power to the instrument.

VIEWING, ZEROING WEIGHT

After being calibrated, at power on the display shows the current weight.



WEIGHT VISUALIZATION OF THE SECOND WEIGHING CHANNEL

Press and hold for 3 seconds the 3 Key to display the weight of the second channel. The weight value of the cell channel 2 is "flashing", to be distinguished from the weight value display of the first cell channel. To return to display cell channel 1, press and hold the 3 Key for 3 seconds.

CONFIGURATION

GENERAL

All functions of the LOADGUARD can be activated and modified by accessing a simple setup menu, shown on the next page. All settings selected or activated remain stored even after switching off the unit.

The LOADGUARD is preconfigured with a default setting. On the following pages are shown the "Default" values of each parameter

With the first installation in the field changes are necessary in order to obtain a correct indication of the displayed weight (Theoretical adjustment).

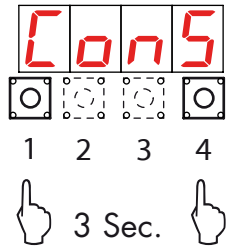
This may be required when you purchase LOADGUARD.

The settings of the setup menu can be changed using the 4 front buttons.

Procedure of Changing and input parameters:

The setup parameters are grouped into a number of main menus.

To access the setup menu press simultaneously for 3 seconds, the keys 4 and 1.



The display shows the message ConS which is the first main menu

Use buttons 1 and 2 to select the menu you want to change

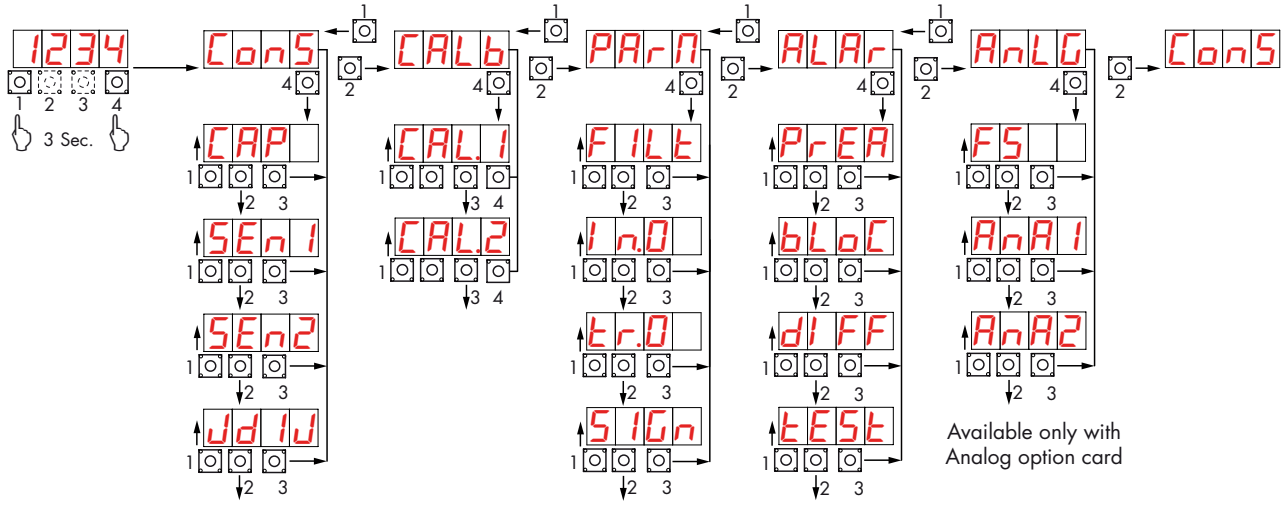
Press the 4 key to enter the selected menu.

KEY	FUNCTION during main SET-UP menu
3	Exit the Set-up menu/Go back to upper level.
4	Enter the menu./ Enter the set-up/confirm selected parameters
2	Go to the next menu.
1	Back to the previus menu.

KEY	FUNCTION during SET-UP parameters
1	Increase the blinking digit / select the pevious value.
2	Decrease the blinking digit / select the next value.
3	Select the next digit. If the blinking digit is the last on the right go back to the firs digit on the left.
4	Confirm and save the value set

Note:To exit and save the changed data, press 3 Key until the unit returns to the operating mode.

CHART MENU

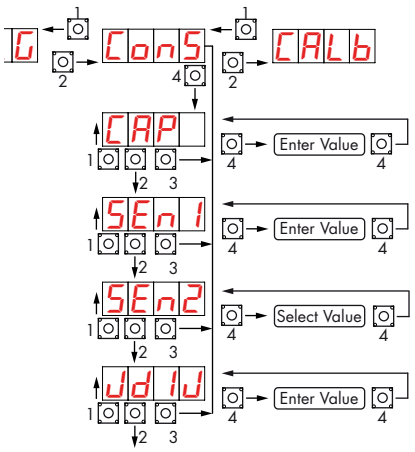

1234
3 Sec.
ConS
CAP
SEn 1
SEn2
Jd 1J
CALb
CAL 1
CAL2
PArN
FILt
In.0
tr.0
SIGn
ALAr
PrEA
bLoC
dIFF
tESt
AnLG
FS
AnA1
AnA2
ConS
Available only with
Analog option card

CONFIGURATION PARAMETERS

By setting the parameters listed below, the LOADGUARD full scale theoretical calibration is performed .

You must complete these steps with the zero calibration described in the following page. The procedure ensures, in the absence of mechanical problems, a good accuracy of the system (maximum error <1% FS).

CAP CAPACITY OF THE WEIGHING SYSTEM



Defines the value corresponding to the sum of the rated capacity of the load cells. In case of systems with only one load cell and "N" fixed bearings, insert the value of the cell capacity multiplied by the total number of supports. This figure represents the full scale value of the weighing system.

Following the change of the parameter value, the datasheet calibration of the weight is recalculated.

Values: 1 to 9999

Unit: Same visualization

Default: 1000

SEn1 SENSITIVITY OF THE LOAD CELL CHANNEL 1

SEn2 SENSITIVITY OF THE LOAD CELL CHANNEL 2

Set the value corresponding to the sensitivity average of the load cells, in mV/V. Accepted values are between 0.5 and 4 mV/V. If no values are programmed, the value assumed is 2mV/V.

Following the change of the sensitivity value the datasheet calibration is recalculated.

Range: 0.5000 to 4.0000 mV/V

Default: 2.0000

dIVd DIVISION VALUE

The relationship between the capacity of the system and the MEASUREMENT unit represents the resolution of the system (number of divisions).

Following the change of the capacity, the division value is automatically selected to the best of 5000 divisions.

Following the change of the division value, if not changed the capacity of the system, ithe datasheet calibration is not recalculated.

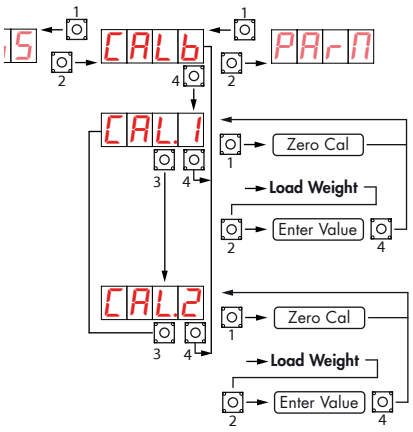
Values: 0.001 to 5

Unit: Same visualization

Default: 1

CALIBRATION

The calibration method described herein must be performed with the use of sample weight and/or pre-weighed product.



Before proceeding with the scale calibration always perform the zero calibration.

During calibration the display shows the weight intermittently with the word CAl

During linearization the display shows the weight intermittently with the word L inn, where n is displayed instead of the number of linearization point to be set (from 1 to 5 linearization points). The weight value displayed refers to cell channel 1 but the calibration is applied to both channels simultaneously.

During the calibration procedure the alarm management is disabled.

CAUTION: At swithing off without exiting the set-up menu, all th-eprogramming done is not saved.

Note. In case the system gives linearity erreor after calibration, it is necessary to check that the weighing system is free of any mechani-cal constrains.

ZERO CALIBRATION

Run the operation CAl with the scale empty (including the fix tare) and with the weight stable. The zero point of the system is done by pressing the 1 key.

The displayed weight is reset and the display shows cal alternatively to 0. You can repeat this operation several times.

FULL SCALE CALIBRATION

Before doing this, put the dead loads on the scale and wait for the stabilization. The display shows a weight value.

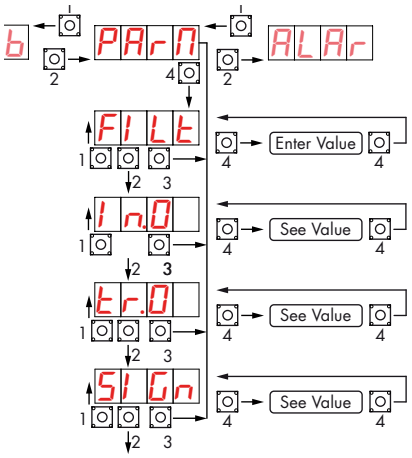
Press the 2 key to adjust the weight. The display shows 0000 with the first digit blinking.

Use Keys 1, 2 and 3 to set the weight. Once you have set the weight value, press Key 4. The display shows Cal alternatively with the weight value. If the entered value is greater than the resolution of the instrument, the weight is not accepted and the display fshows an error message.

It 's always possible to repeat the full scale calibration.

WEIGHING PARAMETERS

The parameters included in this menu allow to adjust the timing of the display update, the acquisition and the visualization of the load cell signal.



FILt WEIGHT FILTER

This parameter adjusts the refresh speed of the display and the analog output.

Low values of the filter speed up the display refresh.

High values of the filter slow down the display refresh.

High values of the filter slows down the display update.

Value	*Update*	*Response*
0	16,7 Hz	3 Hz
1	16,7 Hz	2,5 Hz
2	12,5 Hz	1,5 Hz
3	12,5 Hz	1 Hz
4	10 Hz	0,7 Hz
5	10 Hz	0,55 Hz
6	8,3 Hz	0,4 Hz
7	6,2 Hz	0,35 Hz
8	6,2 Hz	0,3 Hz
9	4 Hz	0,25 Hz

Default: *5*

In.0 AUTOZERO AT POWER ON

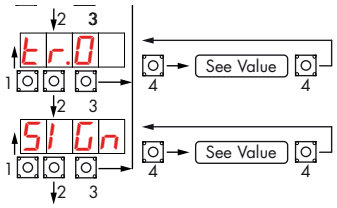
This parameter defines the maximum resettable weight upon power on.

This operation corresponds to a zero calibration of the system and is executed only if the weight is stable and below the set value.

Value from 0 to the value of the CAP parameter.

Default: 0

tr.0 ZERO TRACKING



This function allows a momentary zero calibration compensating the eventual temperature drift of the weight.

At power off it automatically returns to the previous calibration.

The maximum weight resettable by this parameter is 2% of the range of the system.

To disable this feature, use the value 0.

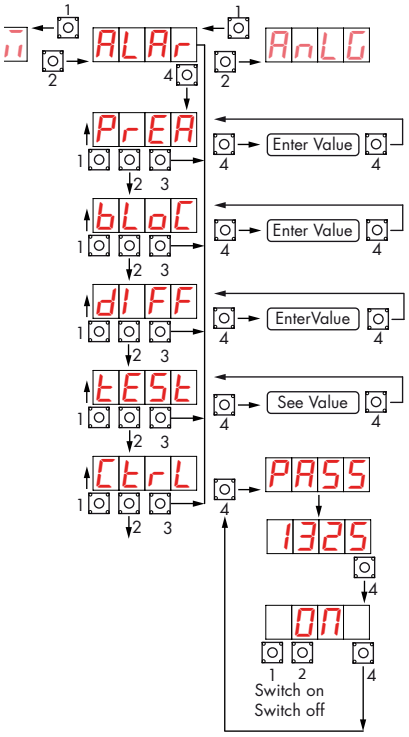
Value	*Change*
0	*Control OFF*
1	*0.5 div/sec*
2	*1 div/sec*
3	*2 div/sec*
4	*3 div/sec*

Default: 0

SIGn LOAD CELLS SIGNAL TEST

The signal from the load cells is given in mV / V with 2 decimals of resolution.

ALARM PARAMETERS



PrEA PREALARM THRESHOLD

The load threshold is expressed in absolute value. When the load reaches this threshold, the contact opens for prealarm. The hysteresis is fix at 2 divisions.

Values: 1 to 9999

Unit: Same visualization

Default: 1000

bLoC LOCKOUT THRESHOLD (ALARM)

The load threshold is expressed in absolute value. When the load reaches this threshold, the lockout contact opens. The hysteresis is fix at 2 divisions.

Values: 1 to 9999

Unit: Same visualization

Default: 1000

dIFF MAX LOAD DIFFERENCE BETWEEN THE 2 CHANNELS

The load values detected by the 2 acquisition channels are continously compared by 2 microcontrollers exchanging the values acquired. This parameter represents the maximum deviation between the two values (parameter is expressed as "weight"): when the difference is higher the alarm is activated. You can not program this parameter to 0.

Values: 1 to 9999

Unit: Same visualization

Default: 1000

tESt CONTACTS AUTOTEST

In addition to the contacts lockout test carried out continuously by the instrument, this process is done with an automatic contacts test. The relays are opened and closed in sequence and the voltage of each contact is measured. At the end of the sequence a message is displayed:

PASS	Test OK
FAIL	Incorrect functioning

ANALOG OUTPUTS

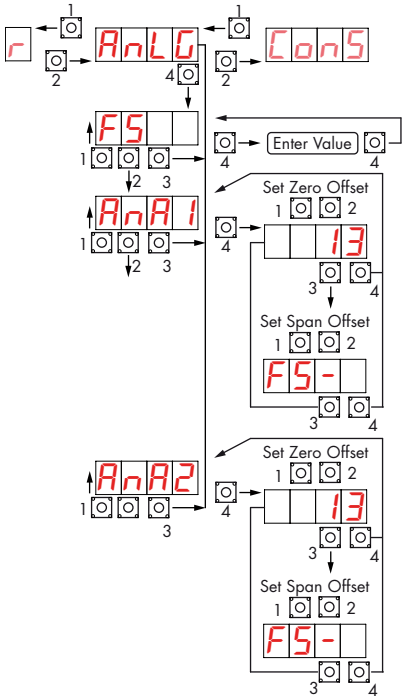
FS FULL SCALE ANALOG OUTPUT

Weight corresponding to the full-scale of the analog output, this value may be different from the value of the maximum capacity of the weighing system.

Values: 1 to 9999

Unit: Same visualization

Default: 1000



AnA1 ANALOG OUTPUT 1 CALIBRATION

AnA2 ANALOG OUTPUT 2 CALIBRATION

Measuring with a tester the analog output to perform the zero calibration and full scale. Use keys 1 and 2 to adjust the analog output, press and hold the key for a more rapid change. Use 3 key to select the Zero or Full Scale calibration. Press the 4 key to end the calibration of the analog output.

The analog output signal is updated at a frequency of 2 Hz

At the analog output signal is applied the same filter used for the weight display value.

In case of normal operation mode (no alarm detected), both analog outputs operate with the average value of the weight (arithmetic average of the two channels weight). In the presence of the alarms, the weight average is not calculated, the analog outputs work individually with the weight value of the corresponding cell channel.

When the weight exceeds the programmed full scale, the analog output takes a value greater than the full scale value of the analog output up to a limit value (saturation).

When the weight is negative, the output takes a value lower than the zero value, up to a limit value (saturation).

NOTES