

Mega-Hard Load Moment Indicator Operators Manual



Rev 11 OME
2-9-12
HC0102A
Software HD05_6a
Software HD14_1
Software HD29



PSR Professional Service & Repair Inc.

Professional Service & Repair Inc. is a full-service mobile crane repair, inspection, and certification company. At Professional Service & Repair we understand the critical aspect of your crane being operational to your project schedule and budget. We will deliver world class service to have your crane operational in the minimum amount of time.

PSR is the global provider for sales, repair and installation of Load Moment Indicating (LMI) systems, Anti-Two Block Systems (A2B), and Rated Capacity Indicating systems. Please contact us with your crane repair and certification needs today.

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**P.O. Box 6506
Columbus, GA
31917-6506**

Introduction



You will find this mark on the components of your equipment. It certifies that the product conforms to the European Directives and SAE Standards.

Your choice of this product shows your attention to quality and the safety of your company's activity. We congratulate you on your decision and are proud of your choice of the known tradition of quality of 3B6 systems on mobile machinery. To obtain the best performance from this system we recommend that you read through this manual before using the device.

•

You will become familiar with its commands and with its various operating modes.

You will certainly note that we have tried to interpret your every need and requirement in all planning activities:

Style, practicality, reliability, precision and adaptability

Thank you, for choosing 3B6 products!

WARNING

For a proper use of the system carefully read this page.

MAINTENANCE *The Mega-Hard HC102A system must be disconnected when welding, battery replacement or battery charging can seriously damage the system.*

MACHINE WASHING *If washing the machine with a high pressure power wash be sure to protect all the systems components from direct spraying to avoid damage to the components.*

WARRANTY

THERE ARE NO WARRANTIES, EXPRESSED OR IMPLIED, MADE BY EITHER THE DISTRIBUTOR OR THE MANUFACTURER ON NEW 3B6 SYSTEMS AND COMPONENTS, EXCEPT THE MANUFACTURER'S WARRANTY AGAINST DEFECTS, MATERIAL AND WORKMANSHIP SET OUT BELOW.

NEW EQUIPMENT WARRANTY

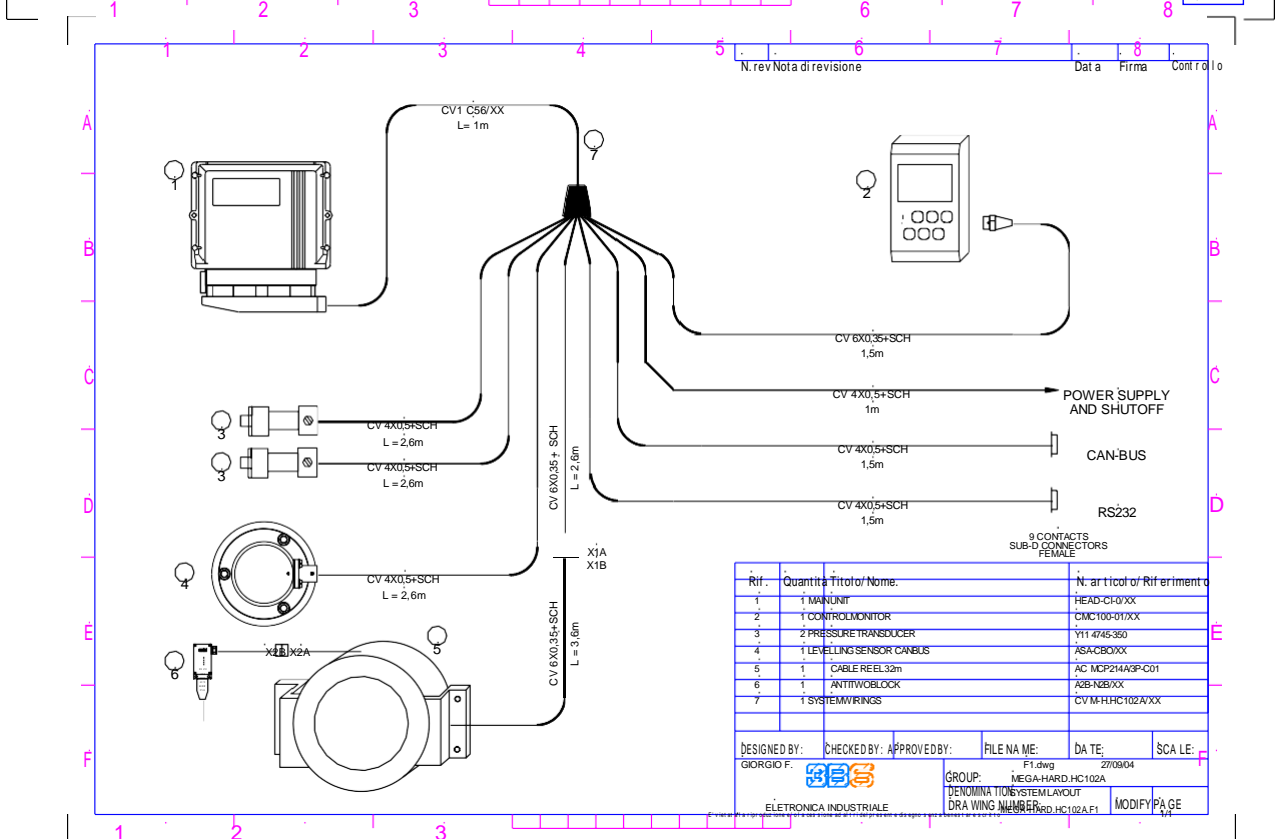
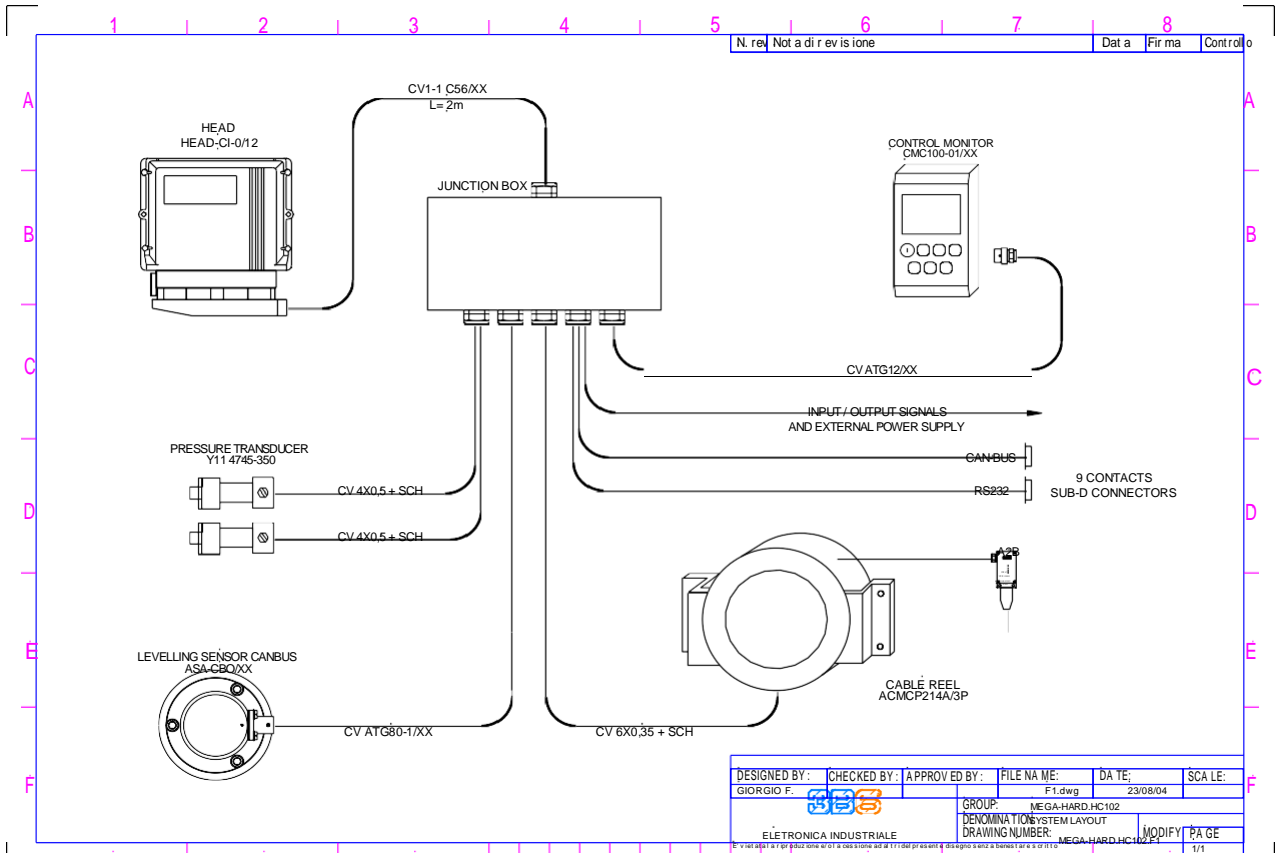
“The manufacturer warrants each new product made by the manufacturer to be free from defects in material and workmanship, its obligation and liability under this warranty being limited to replacing free of charge at its factory any part proving defective under normal use and service within twelve (12) months from the date of initial sale, providing the product is on record with the manufacturer as being installed by the distributor. If the product is not on record as being installed by the distributor, the manufacturer will consider the date of shipment from the factory as the date of initial sale. This warranty is in lieu of all other warranties, expressed or implied and the obligation and liability of the manufacturer under this warranty shall not include any transportation or other charges or the cost of installation or any liability for direct, indirect or consequential damages or delay resulting from the defect. Any operation beyond rated capacity or the improper use of the product or the substitution upon it of parts not approved by the manufacturer shall void this warranty. This warranty covers only the products of 3B6. The products of other manufacturers are covered only by such warranties as made by their manufacturers.

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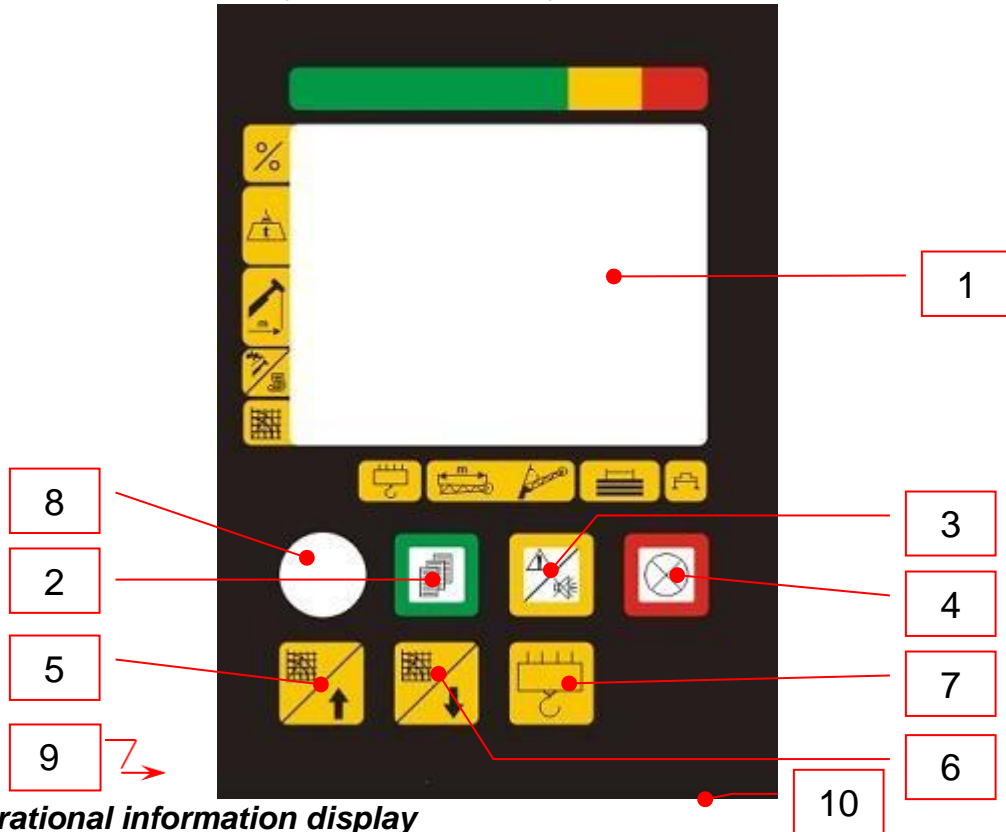
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System Layout



System Display Functions



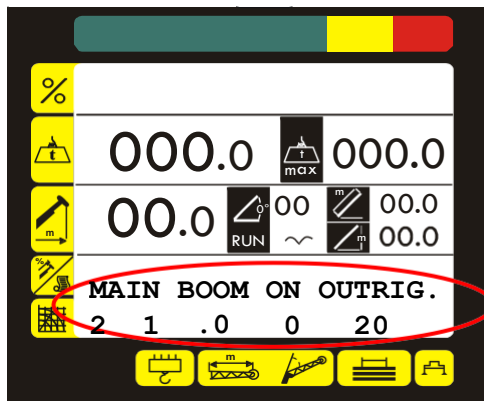
- 1 **Operational information display**
- 2 **Green pushbutton/lamp** :When pressed it will allow the operator to scroll the other data pages. When illuminated indicates working in safe condition.
- 3 **Yellow pushbutton/lamp** : When illuminated system is working in the 90% capacity range (Pre-warning). Disable pre-warning alarm by depressing and used for TARE function. The TARE function will automatically erase after any single movement of the boom. This function is not available during warning and alarm conditions.
- 4 **Red pushbutton/lamp**: When illuminated system has reached maximum allowable capacity 100% (Shutoff condition), The pushbutton also confirms a selection function.
- 5 **Operating mode selection pushbutton** to increase the value (see page 14).
- 6 **Operating mode selection pushbutton** to decrease the value (see page 14).
- 7 **Parts of line selection** pushbutton (see page 15).
- 8 **Bypass key-switch** for dump valves.

WARNING: Use of this feature requires authorized personnel only. Disabling this feature shall result in personal injury or damage to the machine.

- 9 **Audible alarm (Horn)** located on the back of the panel.
Intermittent alarm = pre-alarm condition; 90% capacity
Continuous alarm = alarm condition 100% capacity (shut off condition).
- 10 **Display contrast adjustment** used to adjust the contrast of the display in high and low light conditions for better visibility

System Start Up

The Mega-Hard HC102 will automatically power up once the machine is started. The unit will perform its self test then return to the last selected program in a shut off condition. If the selected program is correct confirm it by press and releasing the RED pushbutton to confirm it, the system will reset in a normal operational condition.



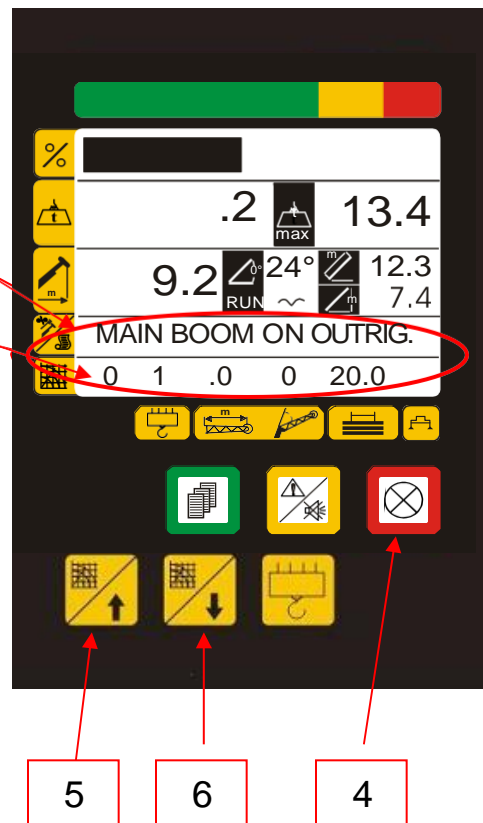
Changing the Program Mode

Press and release the Up(5) or Down(6) arrow pushbutton, the display will indicate a program (zone 1-8) and the load chart code (zone 1-9a).

- Press and release the UP (5) (increase) or Down (6) (decrease) pushbutton until the display indicates the program (Zone 1-8) and the code (Zone 1-9a) of the correct operating mode.

Please refer to the load charts table supplied by the manufacturer for the Operating Mode list.

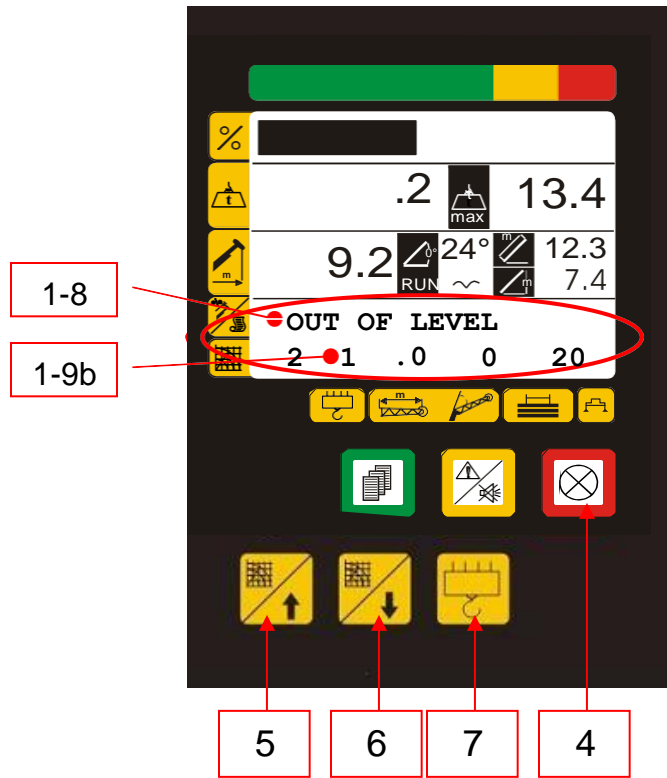
- Press and release the red button (4) to confirm the selection



Part of line Selection

To Change Part of line,
 Press and release the Yellow pushbutton (7),
 the display (zone 1-9b) can be changed by
 increasing using the UP pushbutton (5) or
 decreasing using the Down pushbutton (6).
 Press and release the Red pushbutton (4) to
 confirm the change.

NOTE : If the applied load is greater than the
 permissible line load , the system will indicate
 an error message and go into an
 overload/shutdown condition.



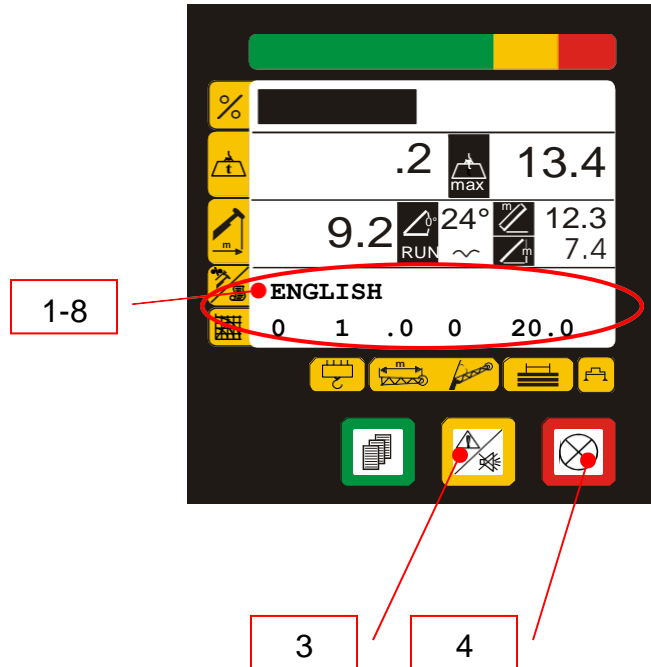
Language Selection

Setting up the language:

To change the language:

Press and release the Red pushbutton (4)
 and (zone 1-8) will indicate the current
 language. To change the language press
 and release the Yellow pushbutton (3) until
 you see the language you want to select.
 Now press and release the Red pushbutton
 (4) to confirm it.

Languages available
 (English, Spanish, German and French)



Out of Level load chart 2 to 5 degrees out of level chart and Extended slope range

The machine is equipped with a slope sensor located on the upper of the machine behind the hydraulic swivel. The Mega-Hard will automatically select the reduced capacity chart when the machine is out of level by 2 degrees and will continue on the reduced load chart between 2 and 5 degrees. When the slope sensor reaches 5.1 degrees out of level on either X or Y axis the system will shutdown and indicate an overload condition (1-8) and the maximum capacity will indicate 0 weight (16). The machine is equipped with a slope sensor located on the upper of the machine behind the hydraulic swivel.

When the system changes load charts the rated capacity will change (fig 16a) and the SL1 (fig 16b) will change to SL2 (fig 16). These two values work in conjunction with the slope sensor to indicate what chart you are on. When the slope returns to a normal level condition (0 – 2.0 degrees) the system will automatically select the standard load chart (SL1) for normal capacity. See page 7 for programming mode.

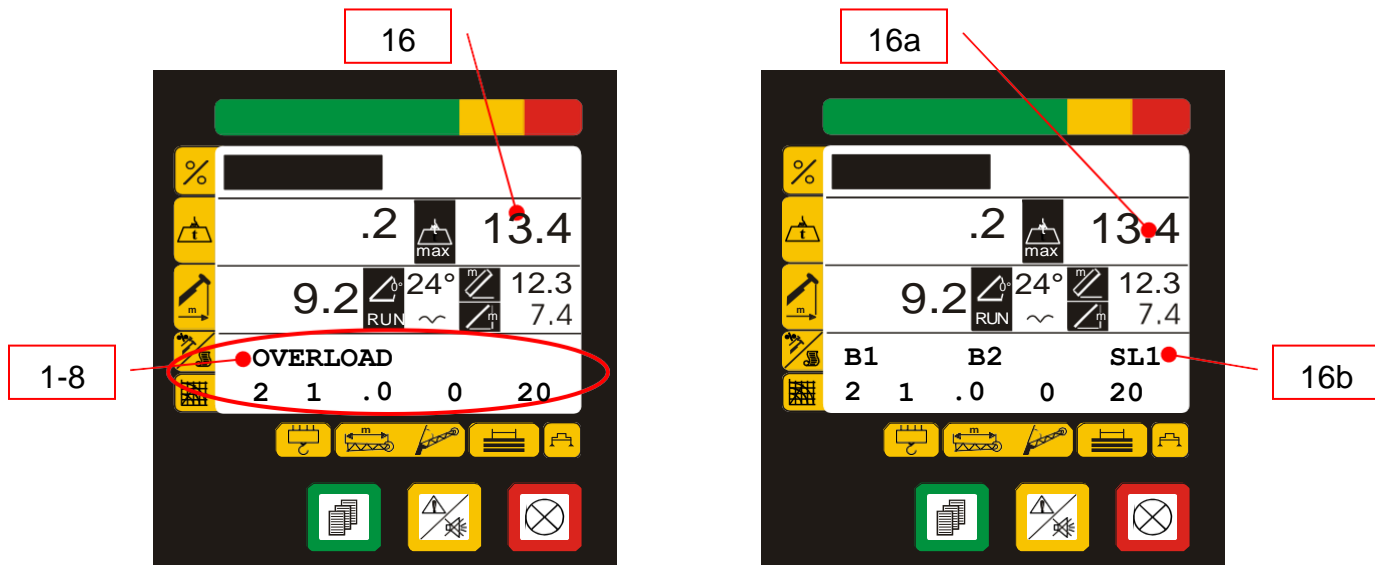
SL1 is level condition load chart to 1.9 degrees slope

SL2 is the load chart from 2 –5 degrees slope and also for extended 10 degree slope range if option is incorporated.

Optional

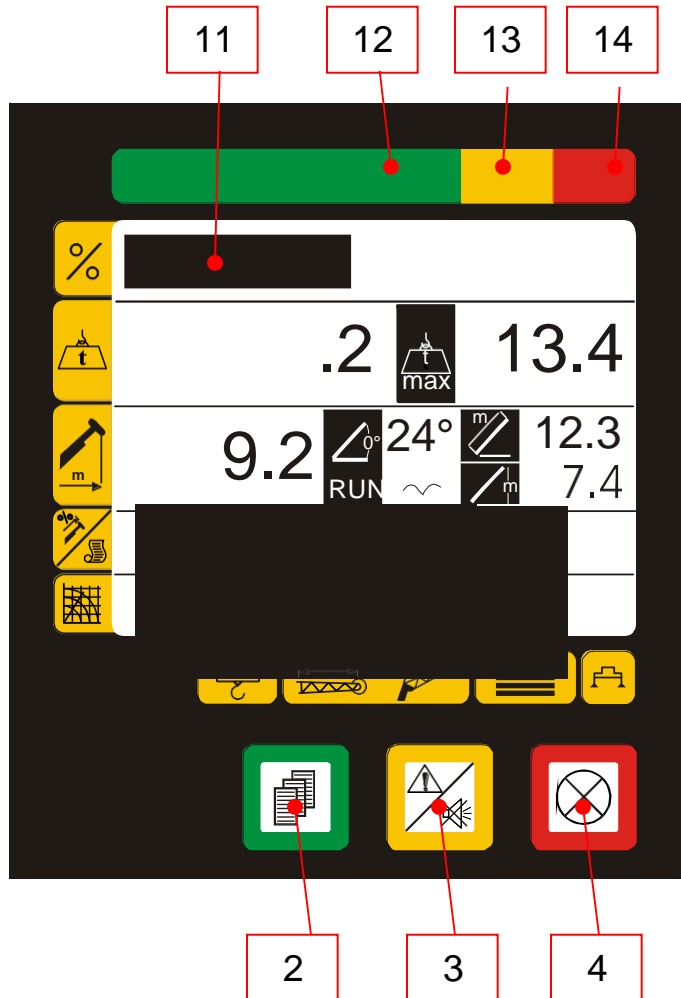
Machines equipped with an extended range (above 5 degree) uphill slope angle range only.

The system will perform as above when the angle reaches 2 degrees the load chart will automatically change to the reduced chart and the SL1 will change to SL2. The machine will be able to lift on an uphill direction only and will shutoff when exceeding preset limits when slewing. If the slope is exceeded the system will indicate an overload condition.



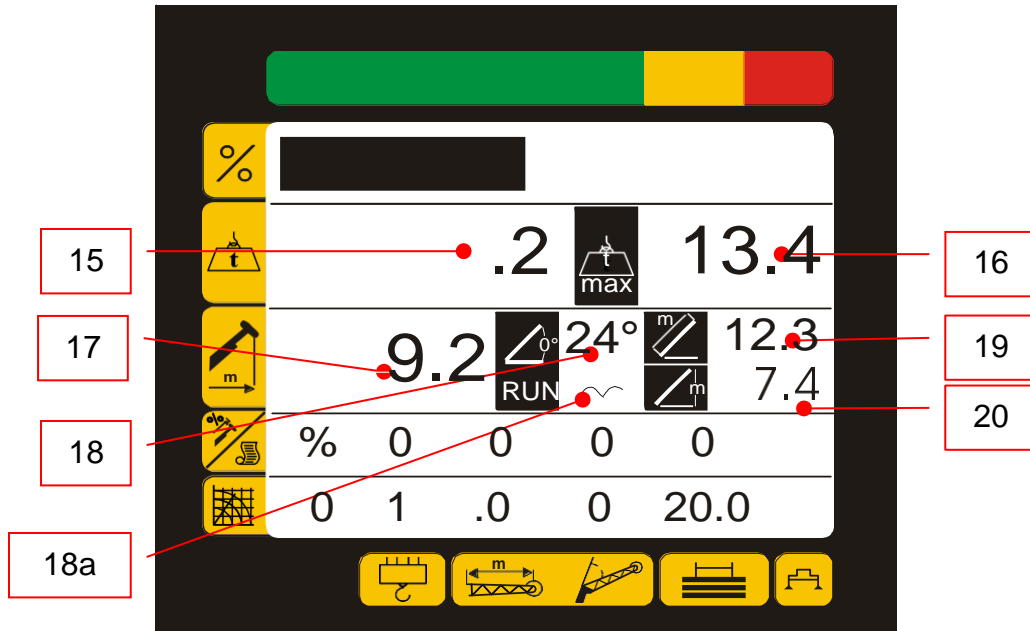
Display Monitoring Lifting Conditions/Percentage/Alarms

The Mega-Hard HC102 is equipped to indicate the condition of the lift, continuously comparing the system with the load charts.



- 11 **LCD bar** indicating the applied load in percentage to the maximum allowable load in that operation mode (program).
- 12 **Green reference** : Normal operating area.
- 13 **Yellow reference** : Pre-warning area (90% of maximum capacity)
- 14 **Red reference** : Shut-off area (100% of maximum capacity)
(Lifted load higher than at 100% of maximum admitted load).
- 2 **Green light illuminated:** Normal Operating area
- 3 **Yellow light illuminated:** Pre-warning area (90% capacity, Intermittent audible alarm activated)
- 4 **Red light illuminated:** Shut-off area (100% capacity, Continuous audible alarm)

Display Monitoring



15 **Applied Load;** Indicated in pounds x 1000

16 **Rated Load:** Indicated in pounds. X 1000

17 **Radius:** Indicated in feet and tenths.

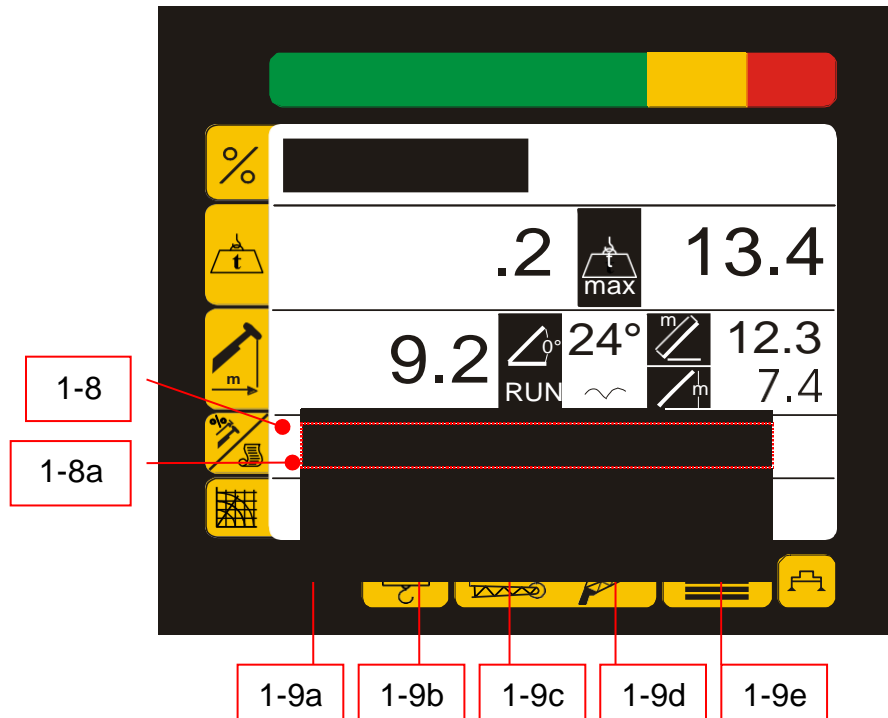
18 **Main Boom Angle:** Indicated in degrees

18a **Run:** Indicates system is operating and communicating with electronics (symbol moves)

19 **Length:** Indicated in feet.

20 **Height:** Indicated in feet measured from the ground.

Display Monitoring Information



1-8) **WRITTEN TEXT**

The following information are displayed : the % of boom length, alarms and warning messages, operating mode during selection procedures.

This written message appears after the operating mode has been selected.

a) **BOOM SINGLE ELEMENT EXTENSIONPERCENTAGE**

(0% = element completely closed; 100% = element completely extended).

a) **OPERATING MODE SELECTED CODE:** Corresponds to the load charts which must be selected related to the crane configuration.

1-9b) **PART OF LINES** manually selectable.

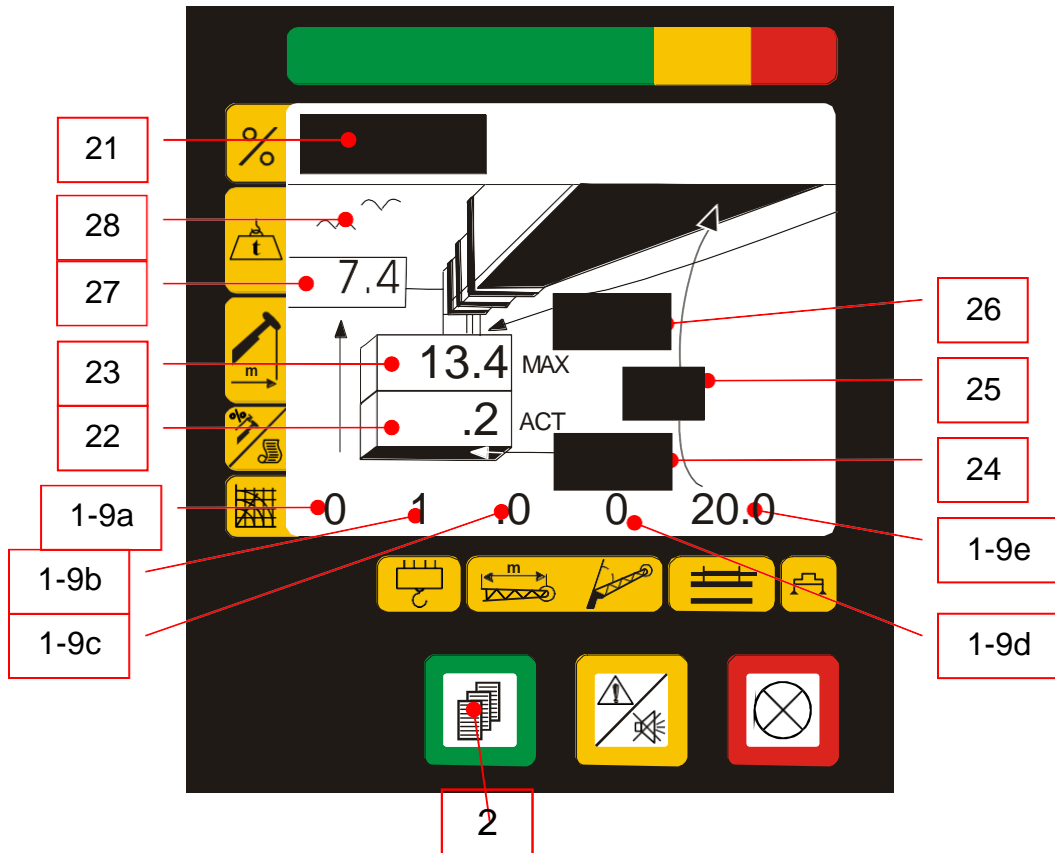
1-9c) **JIB LENGTH** : corresponds at the jib's extension related to the load chart selected 1-9d)

JIB ANGLE : corresponds to the jib's angle referred to the load chart selected

1-9e) **COUNTERWEIGHT VALUE** :It indicates the counterweight value referred to load chart selected

Graphic Display Information

Press and release the Green pushbutton (2) to change the display to the graphics display and to return back to normal display.



- 21 **LCD bar:** Indicating the applied load in percentage referenced to rated load.
- 22 **Applied load:** Indicated in pounds x 1000.
- 23 **Rated Load:** Indicated in pounds x 1000.
- 24 **Radius:** Indicated in feet.
- 25 **Main Boom Angle:** Indicated in degrees.
- 26 **Length:** Indicated in feet
- 27 **Height:** Indicated in feet measured from the ground.
- 28 **Run:** Indicates the system is operating or communicating with electronics (symbol moving)

1-9a **OPERATING MODE SELECTED CODE :**

Corresponds to the load charts table which must be selected related to the crane.

1-9b **PART OF LINES** manually selectable.

1-9c **JIB LENGTH :** corresponds to the jib's extension related to the table chart selected 1-9d

JIB ANGLE : corresponds to the jib's angle referred to the table chart selected

1-9e **COUNTERWEIGHT VALUE :** it indicates the counterweight value referred to table chart

Display messages

The information displayed on the display (zone 1-8) are the following :

1)



This message appears when the Anti two block alarm is activated.

2)



This message appears when the applied load has exceeded the rated load with reference to the load chart.

3)



Message appears if the maximum angle was selected and the actual value is higher than the value stored.

4)



Message appears If the maximum height was selected and the actual value is higher than the value stored.

5)



Message appears if the maximum radius was selected and the actual value is higher than the value stored.

Display messages

The information displayed on the display (zone 1-8) are the following :

6)



Message appears when the By-pass key-switch is activated.

7)



Message appears if the cylinder rise on the maximum position.

8)



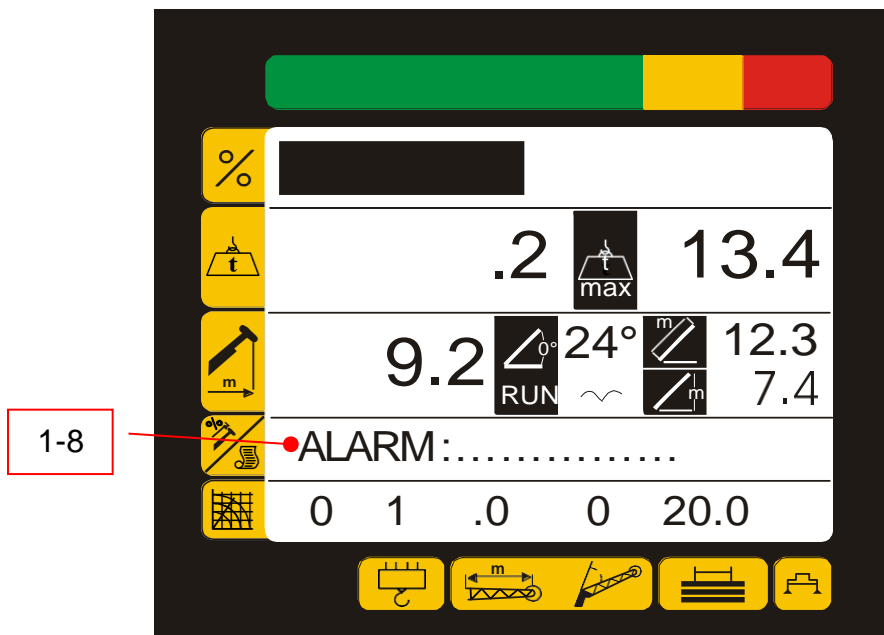
Message appears when the radius reaches the minimum value in accordance with the load chart.

Alarm Codes and Actions

Alarm code	Description	What to do
1	Memory data not reliable	<ul style="list-style-type: none"> • Switch the system off and on. <i>If the alarm persists, please, contact Technical Assistance 815-633-9126:</i> • Verify that E2prom chip is fitted properly in its socket. • Re-enter data and save them again • Replace the E2PROM chip and recalibrate the machine
2	Angle sensor reading lower than the minimum value	<ul style="list-style-type: none"> • Verify that the wiring and the connectors are not in short circuit. <i>If the alarm persists, please, contact Technical Assistance :</i> • Verify the angle sensor integrity.
3	Angle sensor reading higher than the maximum value	<ul style="list-style-type: none"> • Verify that the cable or the connector wiring is not open <i>If the alarm persists, please, contact Technical Assistance :</i> • Verify the angle sensor integrity.
6	Length sensor value lower than the minimum value	<ul style="list-style-type: none"> • Verify that the wiring and the connectors are not in short circuit <i>If the alarm persists, please, contact Technical Assistance:</i> Verify the length transducer integrity
7	Length Sensor value higher than the maximum value	<ul style="list-style-type: none"> • Verify that the cable or the connector wiring is not open <i>If the alarm persists, please, contact Technical Assistance :</i> • Verify the length transducer integrity
8	Piston side pressure sensor value lower than the minimum.	<ul style="list-style-type: none"> • Verify that the cable or the connectors wiring are not in short circuit <i>If the alarm persists, please, contact Technical Assistance :</i> • Verify the pressure transducer integrity
9	Piston side pressure sensor value higher than the maximum.	<ul style="list-style-type: none"> • Verify that the cable or the connector wiring are not open <i>If the alarm persists, please, contact Technical Assistance :</i> • Verify the pressure transducer integrity
10	Rod side pressure sensor value lower than the minimum	<ul style="list-style-type: none"> • Verify that the cable or the connectors wiring are not in short circuit <i>If the alarm persists, please, contact Technical Assistance :</i> • Verify the pressure transducer integrity
11	Rod side pressure sensor value higher than the maximum.	<ul style="list-style-type: none"> • Verify that the cable or the connector wiring are not open <i>If the alarm persists, please, contact Technical Assistance :</i> • Verify the pressure transducer integrity
20	Reading Slope sensor (Tilt) value.	<p>Verify that the cable or the connector wiring are not in short circuit</p> <p><i>If the alarm persists, please, contact Technical Assistance</i></p> <p>Sensor located under boom on upper of machine.</p>

Auto-Diagnostics

The LMI is equipped with an auto diagnostic system, which will detect faulty pressure transducers, boom angle/length sensor, broken cables or internal electronic faults. When an alarm occurs, the LMI will shutdown and display an alarm message (zone 1-8). Troubleshooting is accomplished by the alarm codes indicated on the display to detect the problem.



The codes are reported in the following list, that also includes some hints to solve the problem and get back to normal working conditions.

AUTO DIAGNOSTIC

System internal monitoring

Geometric data and load data

These readings indicate the internal status.

Starting from the main working data page press and release the Green pushbutton (2)

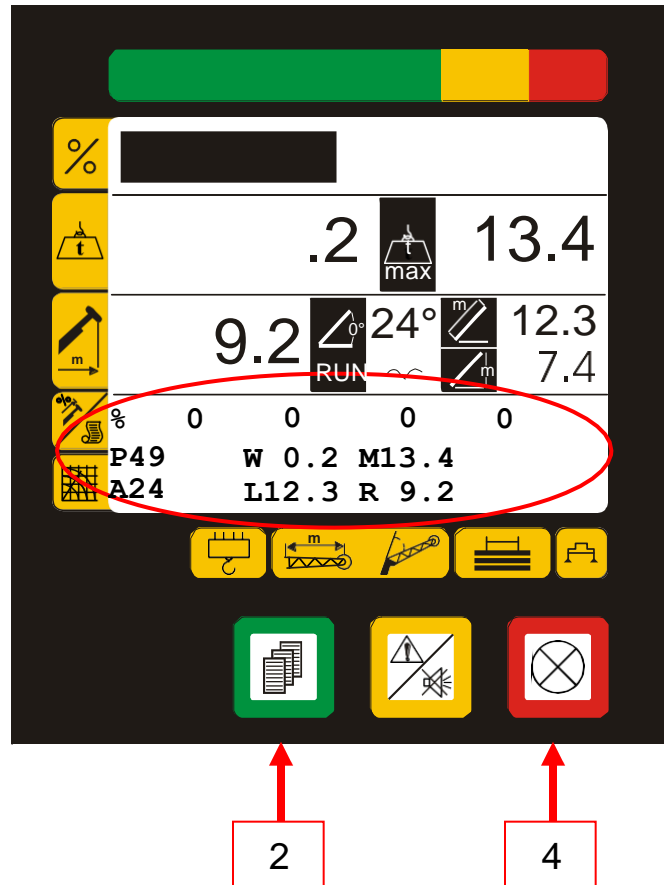
two to enter the diagnostics pages.

The display will indicate the control page, giving

geometric data and main cylinder differential pressure summary.

The displayed parameters are as follows:

- P : Main cylinder differential pressure in Bars of pressure;
- W : Applied load in kilos x1000;
- M : Rated load in current program in kilos x 1000
- A : Actual angle in Degrees;
- L : Actual boom length in meters;
- R : Radius from center of rotation in meters



To return to the main page, press and release the Green pushbutton (2).

AUTO DIAGNOSTIC

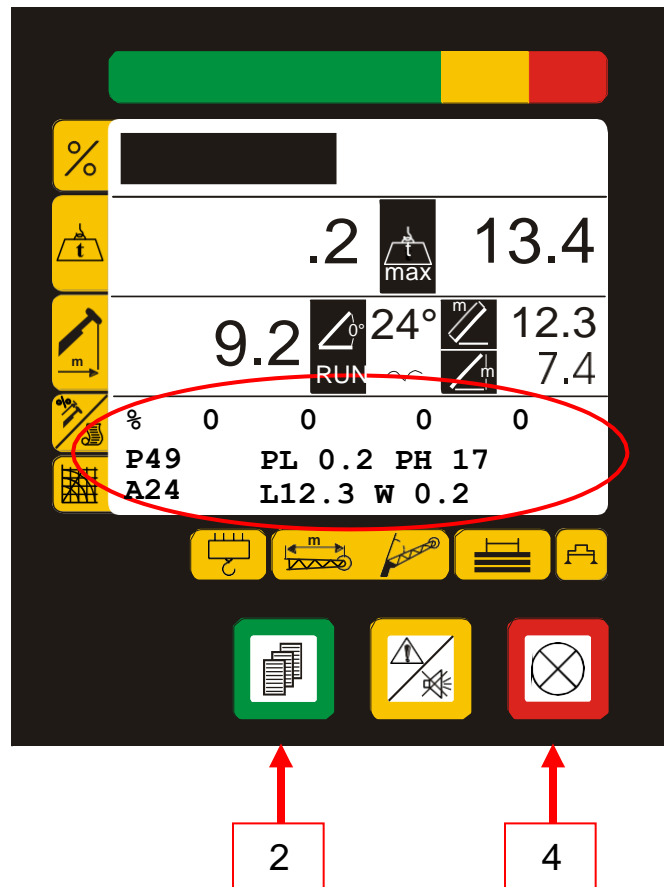
System internal working conditions monitoring

Hydraulic pressure data

Press and release the Red pushbutton (4) the display indicates the individual hydraulic pressures summary :

The displayed parameters are as follows:

- P : Main cylinder differential pressure in Bars of pressure;
- PL : Main cylinder piston side pressure in Bars of pressure;
- PH : Main cylinder rod side pressure in Bars of pressure;
- A : Actual angle in Degrees;
- L : Actual boom length in Meters;
- W : Lifted load weight in kilos x 1000;



To return to the main page, press and release the Green pushbutton (2).

AUTO DIAGNOSTIC

System internal monitoring

Sensor Digital Signals

Press and release the RED pushbutton (4) the display will indicate the **first** page indicating the **pressure transducers and length/angle sensors digital signals and tension corresponding to the actual measurements.**

The displayed parameters are as follows: 0

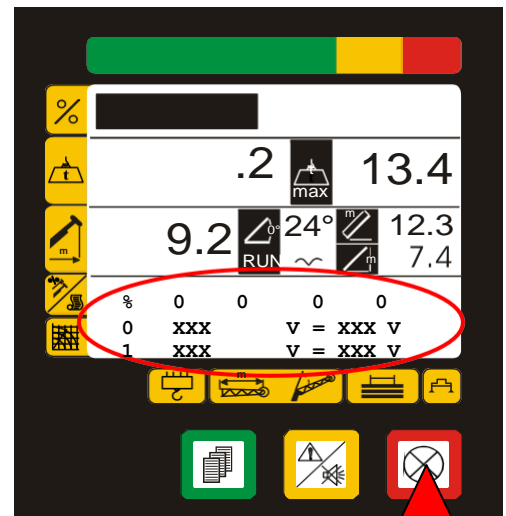
xxx : Main cylinder piston side pressure
value in Bits; between 0 and 4092 (*)

V = xxx v : Tension value.

1 xxx : Main cylinder rod side pressure value in
Bits; between 0 and 4092 (*)

V = xxx v : Tension value.

(*) = Due to 12 bits A/D Converter



Press and release the RED pushbutton (4) the display will indicate the **first** page indicating the **pressure transducers and length/angle sensors digital signals and tension corresponding to the actual measurements.**

The displayed parameters are as follows:

2 xxx : Angle value in Bits;
between 0 and 4092 (*)

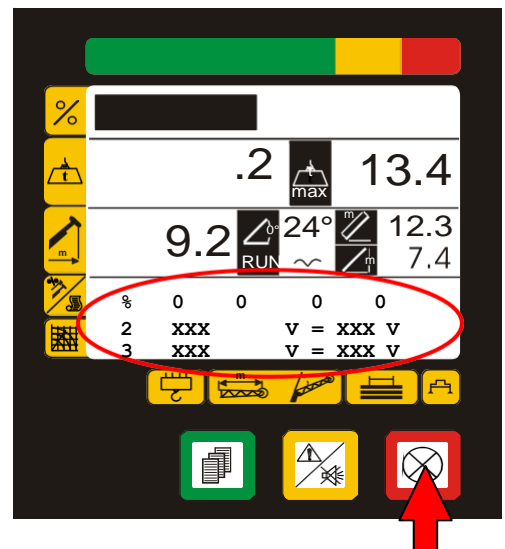
V = xxx v : Tension value.

3 xxx : Boom Length value in Bits;
between 0 and 4092 (*)

V = xxx v : Tension value.

(*) = Due to 12 bits A/D Converter

To return to the main page, press & release the Green pushbutton.



AUTO DIAGNOSTIC

System internal monitoring

Sensors Digital Signals

Press and release the RED pushbutton (4) the display will indicate the **next** page indicating **digital signals corresponding to the measurements of the other analog inputs:**

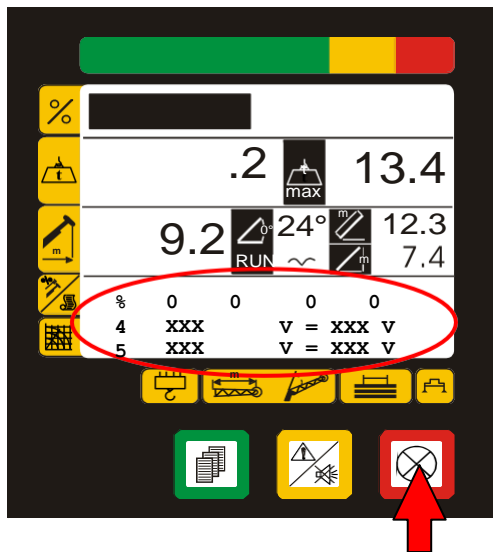
The displayed parameters are as follows:

4 xxx : not used;

V = xxx v : Tension value.

5 xxx : not used;

V = xxx v : Tension value.



Press and release the RED pushbutton (4) the display will indicate the **next** page indicating **digital signals corresponding to the measurements of the other analog inputs:**

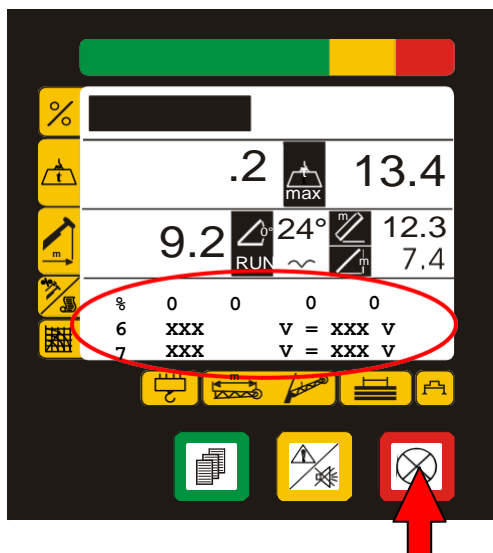
The displayed parameters are as follows:

6 xxx : not used;

V = xxx v : Tension value.

7 xxx : not used;

V = xxx v : Tension value.



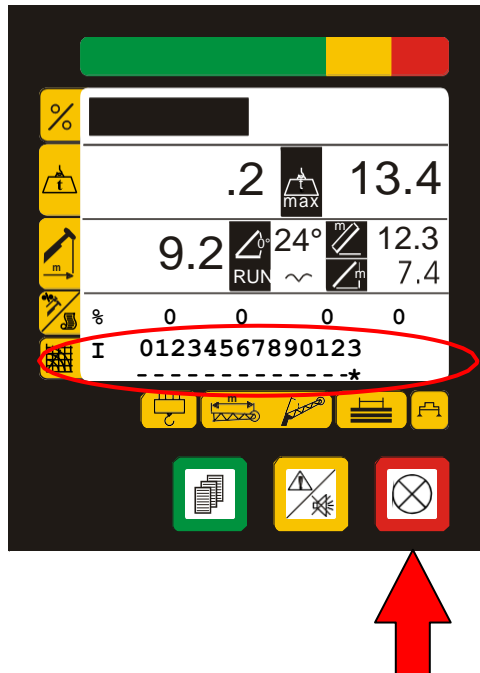
To return to the main page, press and release the Green pushbutton (2).

AUTO DIAGNOSTIC

System internal monitoring

Status of Digital Inputs from external components

Press and release the RED pushbutton (4), the display indicates the **summary of the ON/OFF selections given by external micro-switches**:



Digital Inputs (I)

The upper row indicates the Input number, while the lower row indicates its status. The symbol “*” means **active Input**, the symbol “-” means **non active Input**.

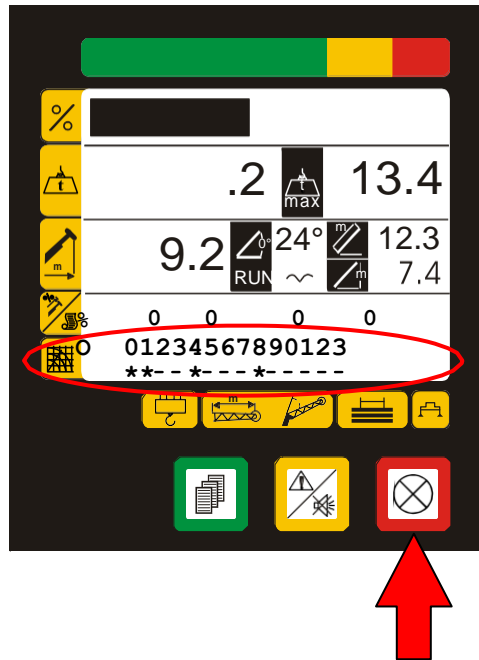
- 0 : Anti two block switch
- 1 : Rope end winch 1
- 2 : Rope end winch 2
- 3 : Max cylinder position
- 4 : Basket
- 5 : Axle blocked
- 6 : Front position
- 7 : Outrigger
- 8 : Exclusion key
- 9-N : Not used

AUTO DIAGNOSTIC

System internal working conditions monitoring

Status of Digital Outputs to external components

Press and release the RED pushbutton (4), the display indicates the **Outputs of the system status summary (automatic signals)**:



Digital Outputs (O)

The upper row indicates the Output number, while the lower row indicates its status. The symbol “**” means **active Output**, the symbol “-” means **non active Output**.

- 0 : Winch up
- 1 : Winch down
- 2 : Telescope out
- 3 : Telescope in
- 4 : Lift cylinder up
- 5 : Lift cylinder down
- 6: Overload

To return to the main page, press and release the Green pushbutton (2).

Spandeck #**Component list for kit number
RCL 126632**

126624	<i>CMC Display with mounting CMC100-01/10</i>
126626	<i>HEAD Electronic Unit HEAD-C1-0/12</i>
126849	<i>Complete system wiring harness CVM.H.HC102A/10</i>
126627	<i>Cable Reel 32/40 meter W/ 1 x DTM06-6S 6-contact connector and 1 x PX0731/S 3-contact connector socket ACMCP214A/3P</i>
126628	<i>Dual Slope Sensor ASACBO/31</i>
126847	<i>Weld plate w/hardware for (126628) Dual slope sensor Y5ASAM18</i>
126631	<i>A-2-B Switch CVA2B-N2B/10 3 ' 4-Cond cable and 1 x PX0731/P 3-contact connector pin</i>
126746	<i>A-2-B Counterweight w/chain WE4KG</i>
126629	<i>350 bar pressure sensor Y114745-350</i>
126848	<i>Roller-guide M.B. RGC-02/10</i>
126859	<i>20' EXT kit consists of</i>
126860	<i>1 x 21 ' 4-cond cable and 2 x PX0732/S 3-contact socket CVATG93-1/10 126861 1 x 3' 4-cond cable and 2 x PX0731/P 3-contact pin CVATG92-1/10</i>
126862	<i>20' JIB kit consists of</i>
126863	<i>1 x 21 ' 4-cond cable and 2 x PX0732/S 3-contact socket CVATG93-1/10 126864 1 x 3' 4-cond cable and 2 x PX0731/P 3-contact pin CVATG92-1/10</i>
<i>DTM06-6P</i>	<i>6 - contact connector pin</i>
<i>DTM06-6S</i>	<i>6 - contact connector socket</i>
<i>PX0731/P</i>	<i>3 - contact connector pin</i>
<i>PX0732/S</i>	<i>3 - contact connector socket</i>

Wiring Diagram

