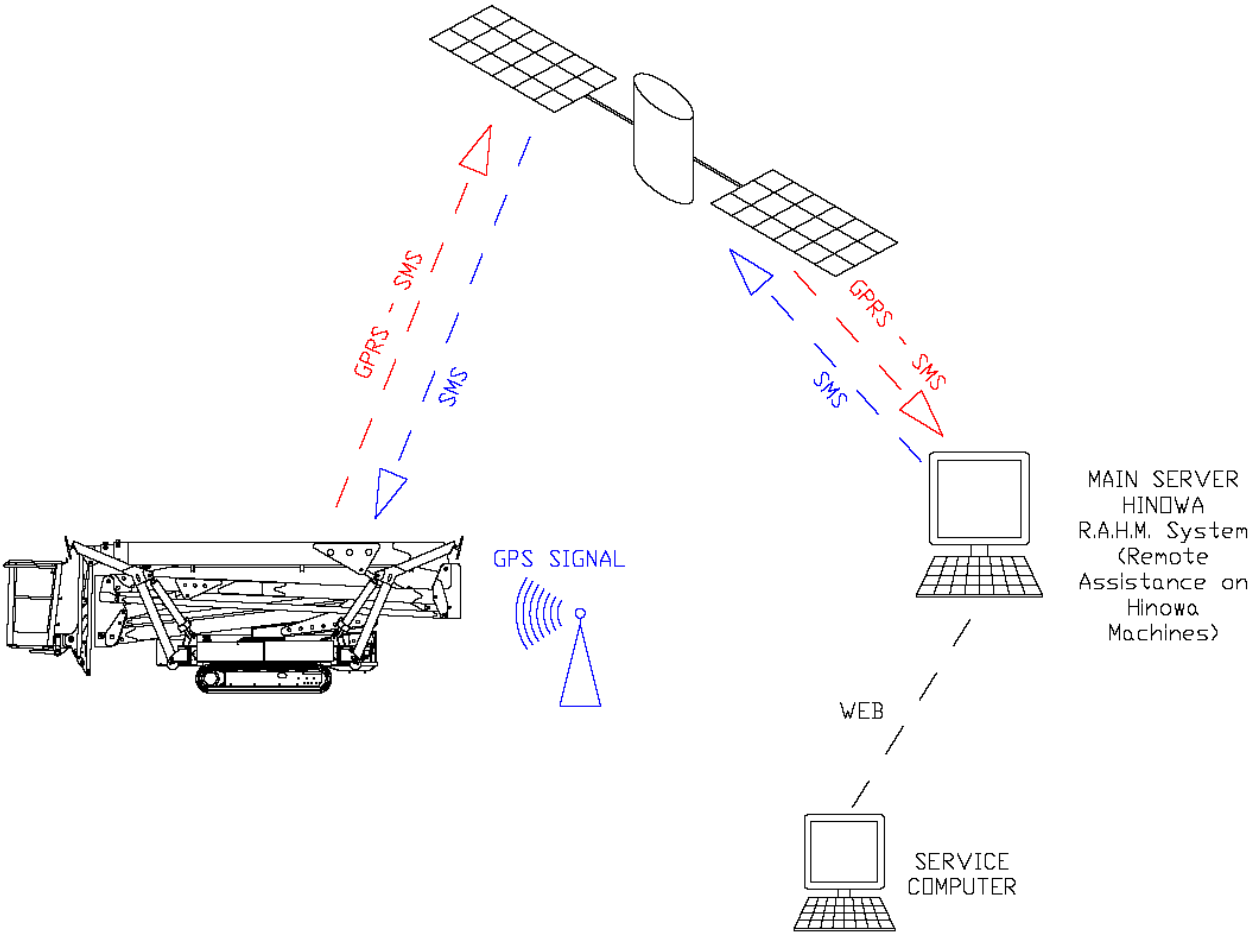
RAHM HANDOUT
Remote Assistance on Hinowa Machine

LightLift 2312

DMARAHM10109

R.A.H.M. (Remote Assistance on Hinowa Machine) is a program running on a web server used to acquire technical information on the LL2312 platforms over a remote connection. The main board on the machine includes a GPRS-GPS transmitter. Using this transmitter, the machine, when suitably queried, can send its position and status to the Hinowa central server. Consequently, the owner of the machine or the designated Hinowa service centre can find out the status and position of the machine at all times.



Each machine is identified by its own USERNAME and PASSWORD. To query the machine, simply connect on the web to the Hinowa server and type the username and password of the machine in question.

N.B. The Internet connection to the platform is also available when the machine is off. Only two days after the platform's electrical system was last shut down (ignition key OFF or battery disconnected) will the modem switch off, meaning remote communication to the machine is no longer possible until it is started again (with the battery connected, power up the board by turning the ignition key ON to activate the modem).

The correct operation of the system depends on there being network coverage in the place where the machine is located at the moment the user makes the call. The modem on the platform, in fact, once having received the GPS call message from the Hinowa server, will search for the GPRS and GPS networks so as to be able to send the server the information (this operation may

take a few minutes). If network coverage in the area is not sufficient, the modem will not be able to send the information to the server, and consequently the machine cannot be contacted.

REMOTE CALL TO THE MACHINE

1. Connect to the Hinowa web server by typing the URL: **http://rahm.hinowa.com**

2. Once the opening page has been displayed, enter the name and password of the machine being queried.

3. A screen will then be shown indicating the machine serial number and the type of action required. Clicking the home icon returns to point 2.

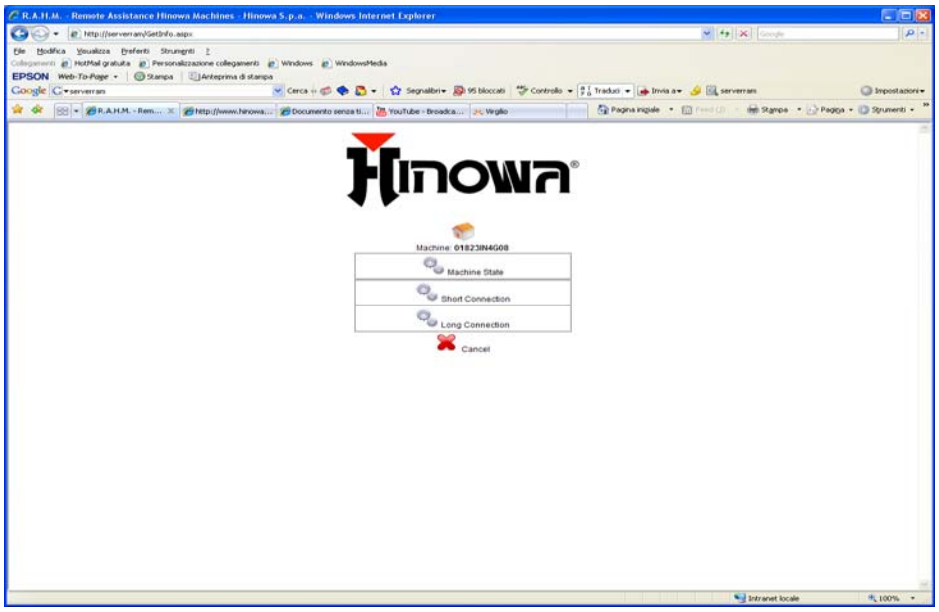
➔ **Choose GET INFO.**

4. A new screen will be displayed showing the menu for selecting the type of connection.

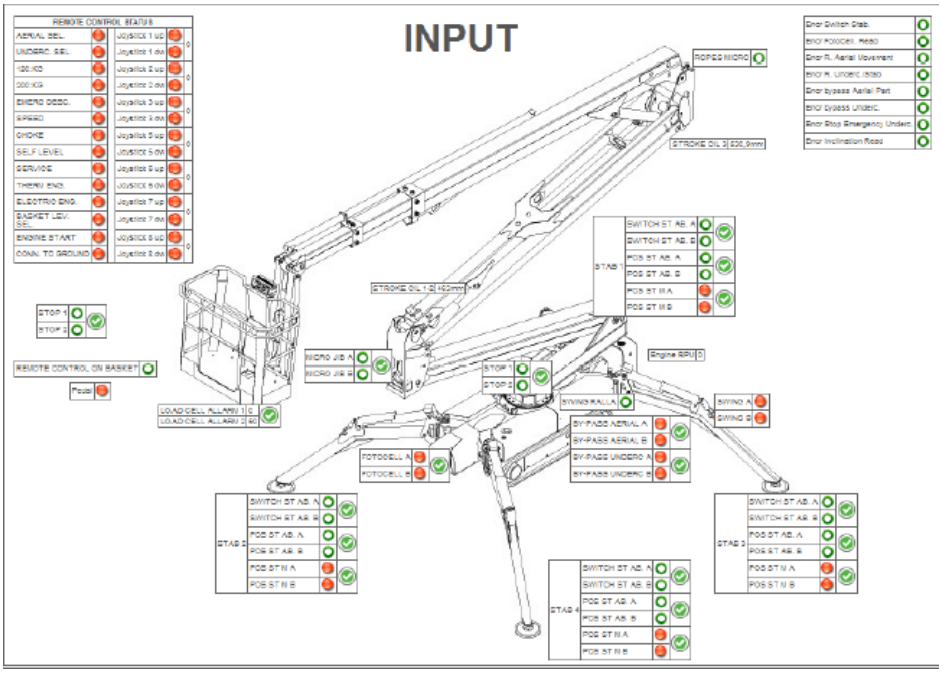
a) **MACHINE STATE:** the machine will send two messages 30 seconds apart, with information on the machine relating to that precise instant.
b) **SHORT CONNECTION:** the machine will send a series of messages around 9 seconds apart for a total of 1 minute (machine status at different instants).
c) **LONG CONNECTION:** the machine will send a series of messages around 10 seconds apart for a total of 3 minutes (machine status at different instants).

By choosing options b) or c), the operator of the machine can be asked to perform certain operations, showing how the control module reacts to the controls via the remote connection. The machine state, on the other hand, simply displays the status of the machine at a given moment.
N.B. If the machine's modem cannot connect to the GPRS network, whatever option has been selected (a, b, c), the modem will send an SMS with the instant status of the machine, i.e. only the machine state information will be available.

Choose the desired option.

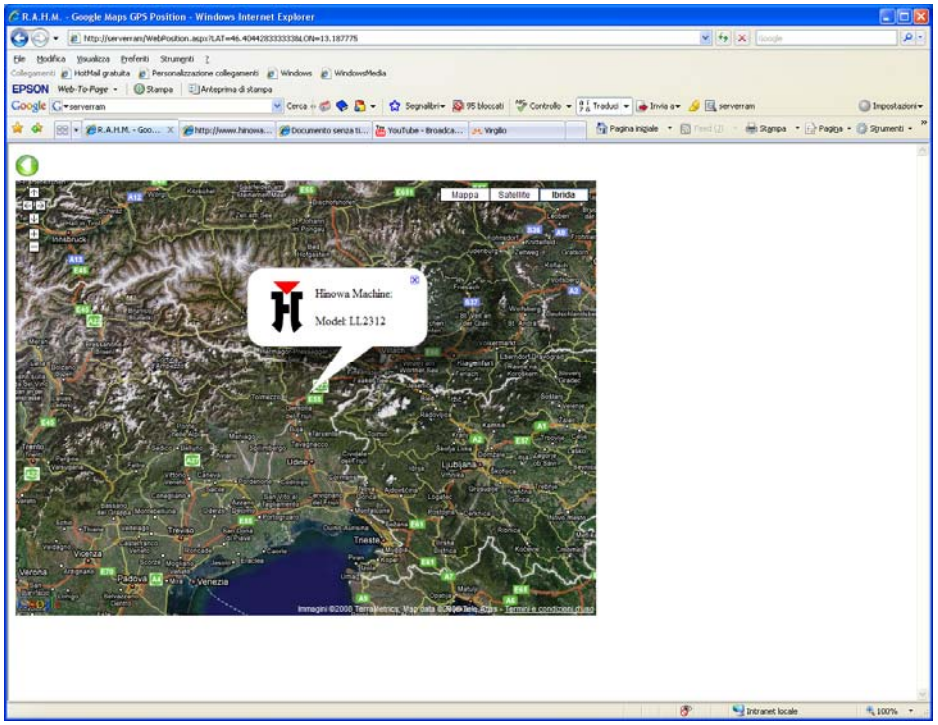


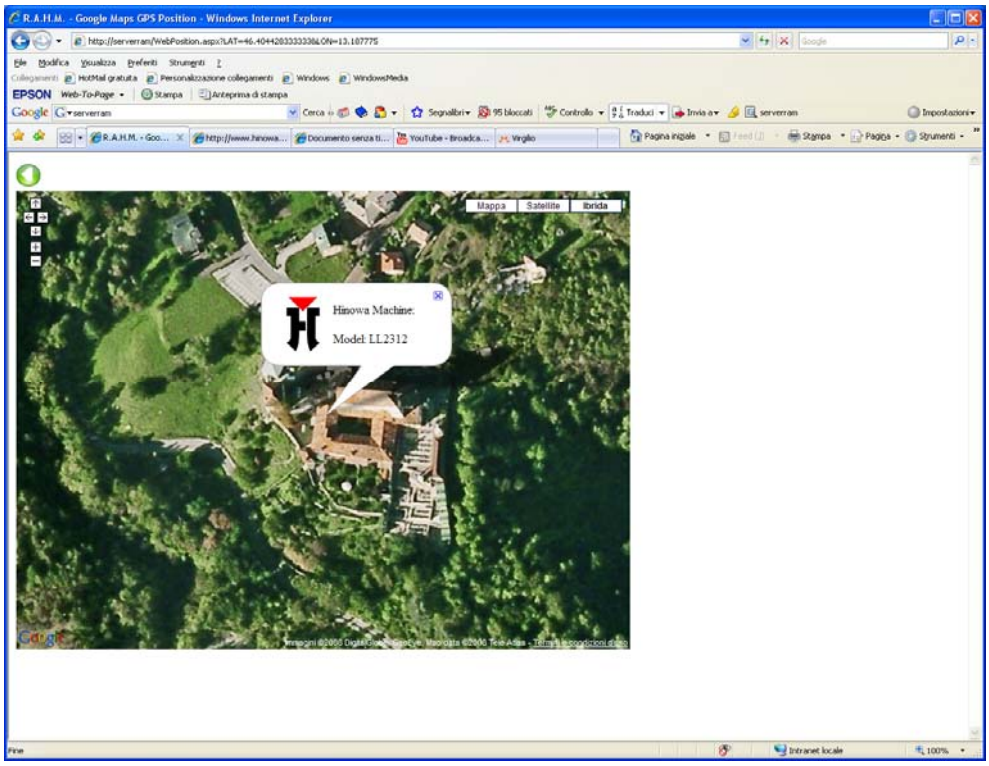
5. After a certain time - depending on the signal strength - in which data is exchanged with the machine, if the connection is successful the **INPUT and OUTPUT** screen will be displayed. If this screen is not shown, check that the machine has not been left off for more than two days (in this case, start it and repeat the connection) or if possible try moving the machine.



The light blue arrows at the top right are used to scroll from one message to the next, sent by the machine to the server at different times (including those sent during previous connections). The instant at which the current message was sent by the machine to the server (instant of the machine "snapshot") is displayed at the top left (**Checking time**). At the top right is the current Greenwich mean time. From this screen, to return to point 4 click the tool icon at the top (**Get machine state**). Clicking the orange circle (**Update state**), on the other hand, refreshes the page, showing the last message received (only when a short or a long connection is in progress).

6. Clicking the globe symbol (**Get position**) on the Input screen displays the position of the machine using the GOOGLE MAPS interface, so as to be able to pinpoint the exact position where the platform is located.





Return to the INPUT and OUTPUT screen by selecting the green arrow at the top left, to exit the display of the machine select the **HOME** icon at the top left of the INPUT and OUTPUT screen.

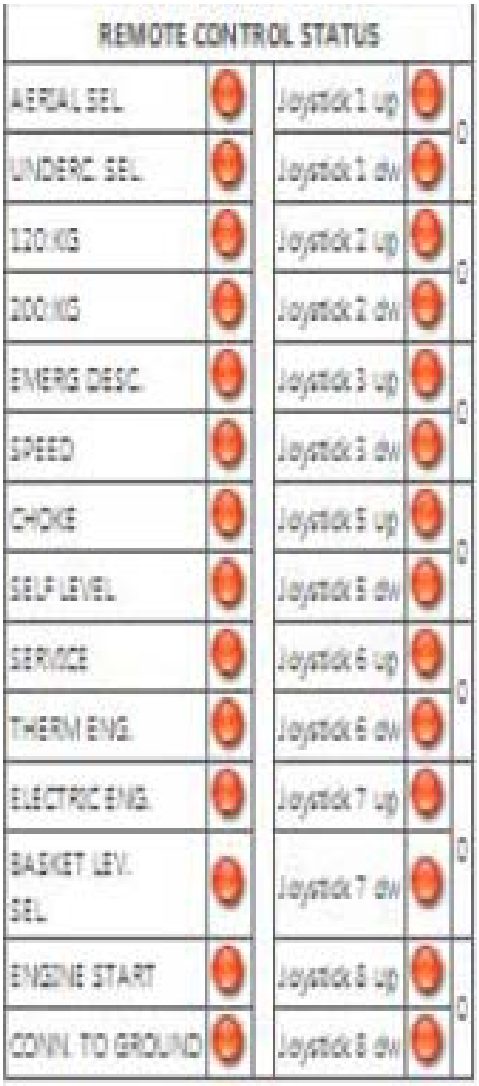
7. If **HISTORY** is selected in point 3 rather than **GET INFO**, the log of past calls made to the machine is shown, without acquiring the current status. As in point 5, the light blue arrows scroll from one message to the next, sent by the machine at different times in the past. To return to point 4 from this screen, click the tool icon at the top (**Get machine state**).

INTERPRETING THE INPUT SIGNALS

The **INPUT** screen displays the status of all the signals that the main control module receives from the various devices on the machine. Below is a description of the information shown on the screen.

The ***Remote Control Status*** table at the top left indicates the status of the signals sent from the remote control to the main control module at the instant the information is being transmitted by the machine.

- indicates that the control is not active
- indicates that the control is active



The right column shows the status of the joysticks on the remote control, numbered in increasing order from left to right (e.g. Joystick 1 refers to the joystick that moves the left track and 1st-2nd arm). UP and DW indicate the movement of the joystick in one direction and the opposite respectively. The number on the right indicates the movement step of the joystick, consequently zero means the joystick is at rest, with the number increasing in proportion to the movement of the joystick, up to a maximum of 127 steps, when the movement of the joystick reaches the limit.

The left column, on the other hand, indicates the status of the buttons on the remote control; this is green only if an operator on the machine was pressing that specific button at the instant the information is sent by the modem. Below is the meaning of the messages:

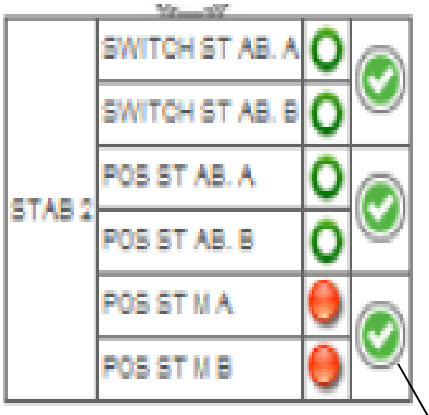
Aerial Sel → Button 1, yellow, select aerial part
Underc Sel → Button 7, green, select undercarriage
220 KG → Button 2, select 120 kg
200 KG → Button 3, select 200 kg
Emerg Desc → Button 4, select emergency descent
Speed → Button 5, select engine/motor speed
Choke → Button 6, select glow plug pre-heating
Self Level → Button 8, select self-levelling
Service → Button 9, select service menu
Thermic Eng → Button, select engine
Electric Eng. → Button, select electric motor
Basket Lev Sel → Key, select cage levelling
Engine Start → Engine ignition button
Conn to ground → Status of the remote control selection key on the ground (green means key turned to the right).

The ***ERROR*** table at the top right, on the other hand, indicates whether the control module has detected errors in the double control devices on the machine. The control switches in fact have two electrical lines that must be in the same state at all times. When the two lines for the same device are in a different status, there is discordance between the two safety lines on the board, indicated by the red dot in the table. Below is the meaning of the messages in the table (shown on the right).

- signal congruent: no faults present
- signal not congruent: fault present

Error Switch Stab → Status of the eight stabiliser switches
Error Fotocell. Read → Status of the photoelectric cells
Error R. Aerial Movement → Status of the aerial part safety devices
Error R. Underc/Stab → Status of the undercarriage safety devices
Error Bypass Aerial Part → Status of the aerial part safety device bypass key
Error Bypass Underc → Status of the undercarriage safety device bypass key
Error Stop Emergency/Underc → Status of the emergency stop on the ground
Error Inclination Read → Inclination meter alignment status

Below is the meaning of the various signals on the main INPUT screen:



For each of the four stabilisers, the status of the lines for the two switches is shown (line a or line b).

Switch st ab → when the stabiliser touches the ground
when the stabiliser is lifted off the ground

Pos st ab → stabiliser open (max stabilization area).
stabiliser closed or reduced area

PosM ab → stabiliser opened (max or reduced area)
stabilizer closed

The signals on the 2 lines are congruent

The signals on the 2 lines are not congruent

Micro jib → when the jib is closed
when the jib is open

Stop → when the stop button is released
when the stop button is pressed

Remote control on basket → when the remote control is in its housing on the cage
when the remote control is not in its housing

Pedal → when the pedal is pressed
when the pedal is not pressed

Load cell alarm → when the weight in the cage is below the weight selected on the remote control
when the weight in the cage exceeds the weight selected on the remote control
(the value in kg read by each weight sensor line is also indicated)

Photocell → when the photocell is correctly aligned
when the photocell is not aligned

Bypass aerial → when the aerial part safety device bypass key is turned to the left
when the aerial part safety device bypass key is not turned to the left

Bypass underc → when the undercarriage safety device bypass key is turned to the right
when the undercarriage safety device bypass key is not turned to the right

Proximity → when the position of the aerial part does not interfere with the stabilisers
when the position of the aerial part may interfere with the stabilisers

Swing a b → areal part inside the reduced working area (40° between outrigger2 and outrigger 4). Switch released. *Optional for reduced area.*
aerial part outside the reduced working area (switch pressed). *Optional reduced area.*

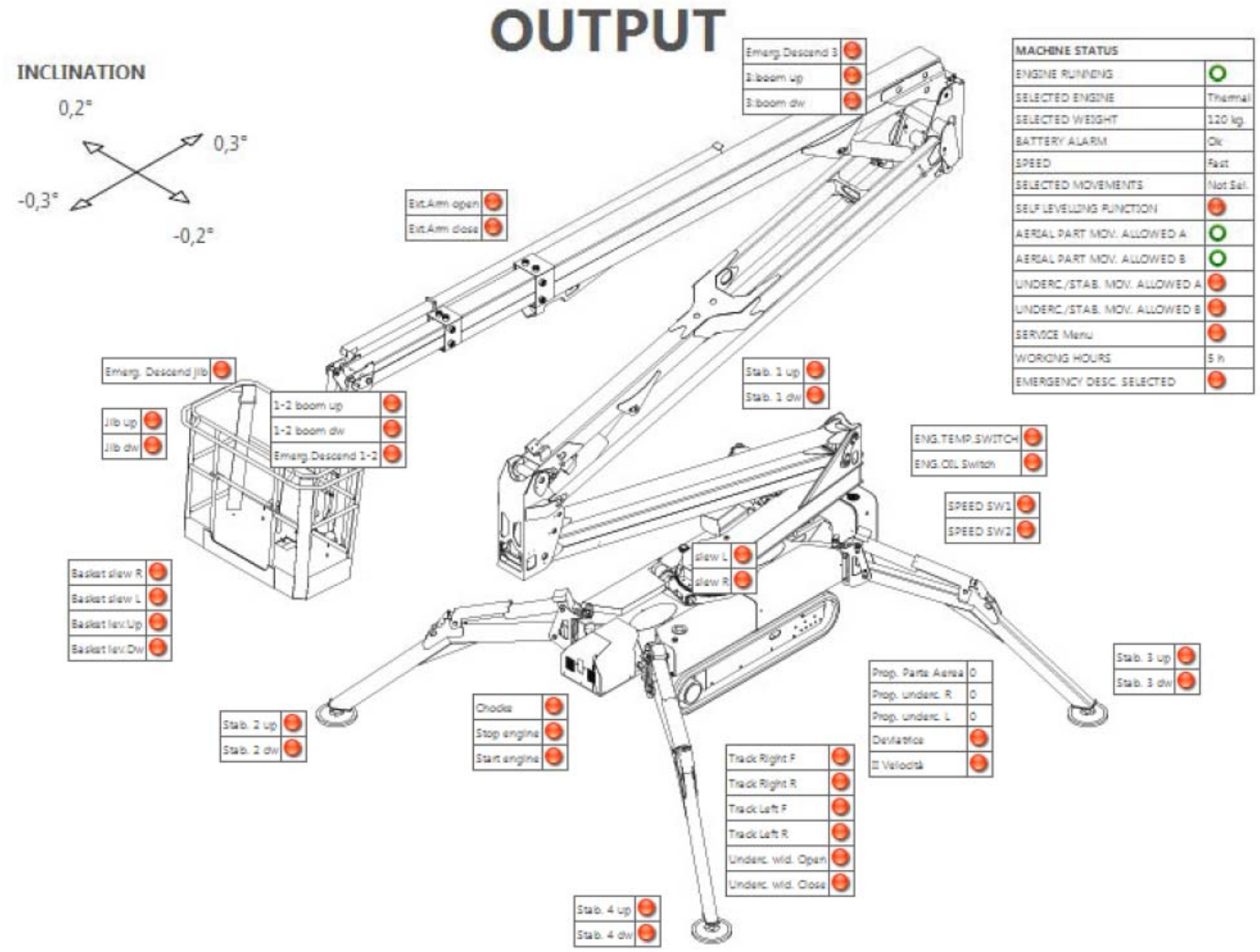
Engine RPM → signals the diesel engine speed

Ropes micro → when the cable switch is in the correct position
when there is an error with the cable switch

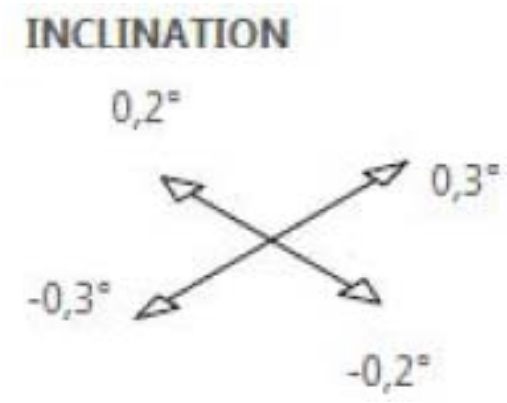
Stroke Cyl → indicates the rod opening position in mm on the 1st-2nd arm and 3rd arm cylinders
NOTE: for the effective stroke of the cylinder, the value read must be reduced by 30mm.

INTERPRETING THE OUTPUT SIGNALS

The output screen is used to analyse the status of the output signals from the main control module at the instant the corresponding input is detected.

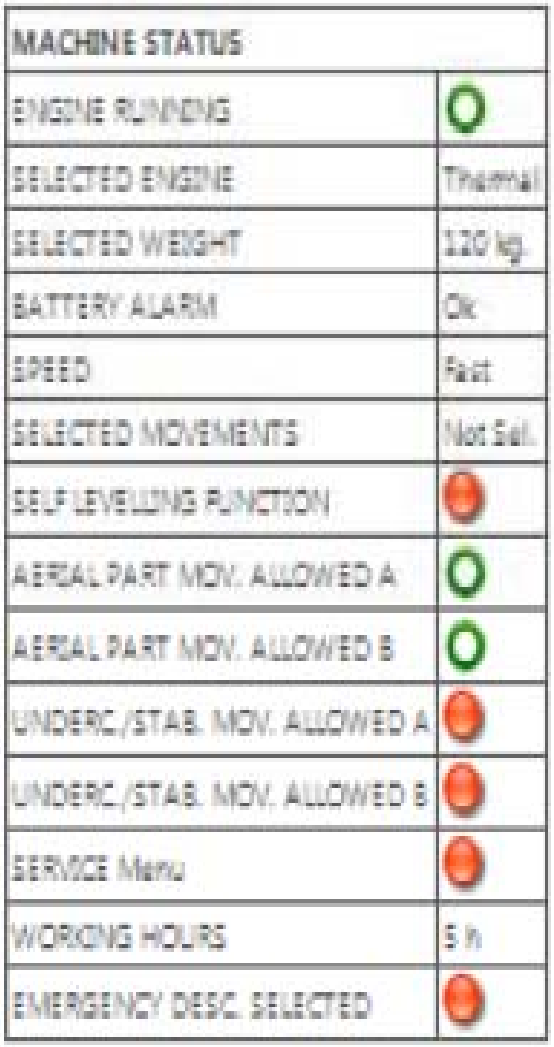


Below is the meaning of the information shown on the screen.



Indicates the inclination of the machine with reference to the 2 axes (lengthwise and transverse).

The ***MACHINE STATUS*** table at the top right indicates the status detected by the control module, which then sends the information to the remote control display, thus enabling or disabling the controls to the hydraulic actuators.



Engine running → engine on
engine off

Selected engine → Combustion engine
Electric motor

Selected weight → 120 kg
200 kg

Battery alarm → indicates if the battery level is ok (>10V)

Speed → Fast (if selector on "hare")
Normal (if selector on N)
Slow (if selector on "tortoise")

Selected movements → Aerial (from button 1)
Ground (from button 7)
Not sel. (no selection)

Self levelling function
→ when self-levelling is in progress
self-levelling not active

Aerial part mov. Allowed a
→ when safety device line a to the aerial part allows movements
when safety device line a to the aerial part does not allow movements

Aerial part mov. Allowed b
→ when safety device line b to the aerial part allows movements
when safety device line b to the aerial part does not allow movements

Underc/stab mov. Allowed a
→ when safety device line a to the undercarriage allows movements
when safety device line a to the undercarriage does not allow movements

Underc/stab mov. Allowed b
→ when safety device line b to the undercarriage allows movements
when safety device line b to the undercarriage does not allow movements

Service menu → when the service menu is active
when the service menu is not active

Working hours → indicates the machine operating hours

Emergency desc selected → when the board detects button 4 (emerg. descent) as pressed
when the board detects button 4 (emerg. descent) as released

Below is the meaning of the various signals on the main OUTPUT screen:

In general:

→ when the board is sending 12V to the coil corresponding to the device in question on the hydraulic distributor, so as to activate the movement
when the board is not sending the output to the coil

The meaning of the abbreviations used to indicate the different actuators that control the movements (e.g. coils on the distributors, coils on the emergency descent valves, etc.) is shown below:

Emerg. Descend 3 → coil for 3rd arm emergency descent
3 boom up → coil on aerial part distributor, open 3rd arm
3 boom dw → coil on aerial part distributor, close 3rd arm
Ext. Arm open → coil on aerial part distributor, open telescopic arm
Ext. Arm close → coil on aerial part distributor, close telescopic arm
Emerg. Descend jib → coil on jib cylinder valve for emergency descent
Jib up → coil on aerial part distributor, open jib arm
Jib dw → coil on aerial part distributor, close jib arm
1-2 boom up → coil on aerial part distributor, open 1st-2nd arm
1-2 boom dw → coil on aerial part distributor, close 1st-2nd arm
Emerg. Descend 1-2 → coil on 1st-2nd arm cylinder valve for emergency descent
Stab 1 up → coil on ground distributor, raise stabiliser 1 *(same for 2-3-4)*
Stab 1 dw → coil on ground distributor, lower stabiliser 1 *(same for 2-3-4)*
Speed SW1 → output signal from board to activate 2200 rpm *(on petrol engine)*
Speed SW2 → output signal from board to activate 3600 rpm *(on petrol engine)*
Track Right F → coil on ground distributor, right track forwards
Track Right R → coil on right ground distributor, right track backwards
Track Left F → coil on left ground distributor, left track forwards
Track Left R → coil on left ground distributor, left track backwards
Underc. Wid. Open → coil on right ground distributor, extend undercarriage
Underc. Wid. Close → coil on right ground distributor, close undercarriage
Slew L → coil on aerial part rotation device, rotate left
Slew R → coil on aerial part rotation device, rotate right

Other data on the OUTPUT page*:*

Choke → when the board is sending the diesel engine glow plug pre-heating signal
when the board is not sending the diesel engine glow plug pre-heating signal

Stop Engine → petrol engine only, when the board disables the 12V signal and the engine cannot be started
petrol engine only, when the board sends the 12V signal and the engine can be started

Start Engine → when the board is sending the 12V signal to the engine starter motor
when the board is not sending the 12V signal to the engine starter motor

Prop. Aerial Part → value that indicates the output the control module is sending to the aerial part proportional valve (from min 0 to max 127)

Prop. underc. R → value that indicates the output the control module is sending to the right undercarriage proportional valve (from min 0 to max 127)

Prop. Underc. L → value that indicates the output the control module is sending to the left undercarriage proportional valve (from min 0 to max 127)

Selector →  when the control module is powering the selector valve (oil from the second pump delivered to the left ground part distributor)
 when the control module is not powering the selector valve (oil from the second pump sent to the aerial part distributor)

2nd speed →  when the board is sending 12V to the coil to change gear on the tracks
 when the board is not sending 12V to the coil to change gear on the tracks

The following two items should be considered as INPUTS, and are in fact two signals that are sent from the diesel engine to the main control module:

Eng temp switch ***(diesel engine only)***→  when there is an alarm on the diesel engine cooling water temperature sensor
 when there is no alarm on the diesel engine cooling water temperature sensor

Eng. Oil switch ***(diesel engine only)***→  when the engine oil pressure is too low or the engine is off
 when the engine oil pressure is OK with the engine running