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IdroMOP H6

USE AND INSTALLATION MANUAL

IdroMOP

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1. USER MANUAL PRESENTATION

This manual contains instructions for the installation, configuration, use and maintenance of the device described for the control, management and monitoring of agricultural irrigation machines.
The manual is divided into sections, each of which deals with a series of topics, divided into chapters and paragraphs. The general index lists all the topics covered in the entire manual. Page numbering is sequential and each page displays its page number. This manual is intended for the user responsible for the configuration, use and maintenance of the device and relates to its technical life after its production and sale.
In the event that it is subsequently transferred to third parties for any reason (sale, loan for use, or any other reason), the device must be delivered complete with all documentation.
The information, descriptions and illustrations contained in the Manual reflect the version reported. The Manufacturer reserves the right to make any changes to the equipment at any time for technical or commercial reasons. It is recommended to read this manual carefully and in full.

1.1 ADDITIONAL DOCUMENTATION

Please refer to the **www.idromop.com** website to download the updated version of the documentation.

1.2 DECLARATION OF CONFORMITY

All products are tested and fine-tuned by the manufacturer before shipping and delivery to the customer.

The product has been designed, manufactured and tested to meet all specific standards (see the declaration of conformity), if installed and configured in a workmanlike manner.
If the installation, configuration, use and / or maintenance of the device are not carried out in a workmanlike manner, anomalies may occur during use, and safety problems may also occur. Inappropriate installation, configuration and maintenance will void the warranty terms.

This product is an electronic instrument and therefore is not subject to the requirements of EEC Directive 89/392 (Machinery Directive). Therefore, it is stated that if such a tool is used as a component part of a machine, it cannot be turned on if the machine does not meet the requirements of the Machinery Directive. The marking of the instrument does not relieve the customer from fulfilling the legal obligations relating to their finished product.
The electronic control unit described in this documentation is accompanied for sale by the declaration of conformity, drawn up in accordance with the laws in force in the European territory. In case of non-presence it is still possible to download it from the manufacturer's website: **www.idromop.com.**

1.3 MANUFACTURER DATA

Company	**IdroMOP srl**
HQ	**Viale del lavoro 9, 36049 Sovizzo (VI), Italy**
Vat Nr.	**IT03951780240**
Phone	**+39 0444 1240784**
Email	**info@idromop.com**
Web Site	**www.idromop.com**

1.4 WARRANTY

IdroMOP srl products are manufactured and delivered on the basis of our production codes expressly stated in the order. The date stated in the order and/or confirmation is however not binding, but with a margin of 14 days. IdroMOP srl guarantees that each item is free from defects if used properly under normal operating conditions of use and not tampered with.
IdroMOP srl products are guaranteed for a period of twelve months from the date of production indicated on the products themselves; an extension of the guarantee period is excluded.
The warranty covers the free repair of products with manufacturing defects and/or the replacement of parts recognised as faulty.
All interventions on IdroMOP srl products will be carried out only at our workshop. Transport costs and risks will be borne by the customer. Any materials sent freight collect will be rejected.
Damage caused by neglect, incorrect or improper installation, non-compliant use, phenomena not depending on normal use and operation are excluded from the warranty.
The warranty is invalidated if the product has been tampered with or the action of personnel not authorised by IdroMOP srl is evident.
In the case of repairs carried out during the warranty period, any parts replaced (which are in no case returned) will have a warranty coverage of six months, or in any case not less than the remaining portion of the warranty.
The replacement of products and the extension of the warranty following failure is excluded.
Compensation for direct or indirect damage of any kind to property or persons due to the use or suspension of use of the products is excluded.
Any changes to the products requested by the customer due to his incorrect order, must be agreed in advance with the Sales Department and anticipated by written order before shipping the material to IdroMOP srl .
The Customer must perform an incoming INSPECTION of the materials and/or components, for conformity with what has been ordered and confirmed by IdroMOP srl, the check must also concern the technical functioning, the quantities, and the documents received, IdroMOP srl will not accept complaints or returns for non-conformity of any kind after 8 days from the receipt of the goods.
Any request for penalties as compensation for damages or for any other reason is expressly excluded.
The present supply and warranty conditions are an integral part of the supply contract executed with the order by the customer and the order confirmation by IdroMOP srl.
The Court of Vicenza has sole jurisdiction for any dispute.

1.5 AUTHORIZED ASSISTANCE

Assistance on the product must be performed directly by IdroMOP srl or by a qualified technician appointed by the same.

If it is deemed necessary to claim under warranty, please indicate the following data:

Model of device
Serial number of device
Date of purchase (attach documentation)
Detailed description of the issue

1.6 GENERAL SAFETY RULES

Avoid exposing the control unit in environmental situations that favor the entry of dust, chemicals or liquids inside.
It is recommended to protect the display area with particular attention, reducing direct sunlight as much as possible.
Always use the utmost caution when moving or transferring the equipment. In case of use with a remote control system, make sure that the machine is not accessible to people or things during operation.
The equipment must be powered with a DC voltage between 10Vdc and 30Vdc
Always check the polarity of the power source.
In case of customization of the motor wiring supplied with the equipment, strictly respect the positions of the electrical signals provided on the connector and the size of the electrical cables.
If the device is not used for a long period, it is recommended to store it in a dry environment protected from external agents such as rain and ice; make sure to disconnect the power cables from the electrical system.

1.6.1 SAFETY RULES FOR THE USE OF ID4 PLATFORM DEVICES

The ID4 platform allows you to remotely monitor, control and modify the parameters of the IdroMOP and IrriMOP devices.

Use of the ID4 platform is restricted to authorised staff only.
Improper use of the ID4 platform, such as uncontrolled start-up of machines or incorrect modification of working parameters, could be dangerous to people and/or property.

In order to be able to access their machines remotely in total safety, the ID4 platform requires the operator to declare, under their own responsibility, that the machine is in safe operating condition and ready to execute the remote start command.

Industry 4.0 and industrial remote control are regulated by specific European Directives in order to protect the safety of the company and the operators themselves.

When we speak of remote control we mean the possibility of intervening, by means of special commands, on industrial plants that are not under the immediate control of the operator. There are therefore regulations specifying when it is permitted and when it is not, to use remote control for safety reasons.

This is possible when:

- The machine is visible to the operator.
- The machine is not in close proximity to other operators who might physically be exposed to risks associated with remote intervention.
- Alarms are never silenced, just in case there are problems that need to be remedied promptly.
- The area of the remotely controlled machinery is protected and cannot be reached directly either by the user or by anyone else passing in front of it. Specific signage must also be in place.
- Only one control station is active.
- Software connection systems only allow connection to the selected machine.
- There is a stable network that minimises transmission errors.
- It is not possible to connect to the machine without first obtaining consent from the local operator.

All standards relevant to remote control are taken from the European Directives UNI EN ISO 10218-2:2011 and UNI EN ISO 13849-1:2016.

1.7 RESIDUAL RISKS

During the design phase, IdroMOP srl carried out an in-depth risk analysis on the device in question.
From this analysis, risks that cannot be eliminated by their nature emerged. These risks have therefore been examined individually, and guidelines on how to avoid them have been emphasized in this manual. It is therefore important that any user responsible for the installation, configuration, use and maintenance of the IdroMOP electronic control unit has previously read the manual.

Already in the design phase, solutions have been adopted aimed at making the use of the device safe in all phases of use: transport, assembly, adjustment, use and maintenance.

1.8 LOCATION

It is good to keep some aspects in mind before proceeding with the handling, installation and subsequent use of the device. In particular, it is necessary to check some factors:
The area of use and storage of the IdroMOP electronic control unit should be chosen so that it cannot be hit by jets of steam, water or other liquids (especially if corrosive). Although it can be installed in an outdoor environment, it must be placed inside an electrical panel that can protect it from atmospheric agents.

Operating temperatures -10 ° C to +55 ° C
Storage temperatures -20 ° C to + 65 ° C
Maximum relative humidity conditions 90%

1.9 HANDLING

When handling the device, special attention must be paid to the care of the knob, keypad, screen and connectors; any shocks could compromise its use.

1.10 INSTALLATION AND CONFIGURATION

The installation and configuration must be carried out by specialized personnel authorized by IdroMOP srl who must first check that the electrical system of the destination system is up to standard, equipped with a grounding line and a residual current device (RCD).

1.10.1 PRELIMINARY CHECK

Check the various parts of the device for physical damage due to knocks, tears or abrasions. If any damage is found, stop the procedure in progress and report the nature of the damage to the manufacturer's customer support department.

1.10.2 INSTALLATION

The following recommendations must be scrupulously observed when installing the device:

- Always connect the device in accordance with the indicated connections and type of sensors and/or actuators.
- Check that the absorption and consumption of the connected devices is compatible with the technical characteristics of the device.
- Install the device in a dry location, away from possible contamination by corrosive liquids Protect the front panel of the device from direct sunlight
- Install the device at least 50 cm away from heat sources that could damage the device's internal/external electronic components
- Avoid mounting the device on supports that subject the most delicate parts, such as the knob and display, to excessive mechanical stress and/or vibration
- It is strictly forbidden to use a battery charger for emergency start-up; even in this case, the manufacturer will not be liable under warranty for damage to electronic components
- Ensure that the programmed configuration is consistent with the application
- Before working on the rotating parts of the motor, it is strongly recommended to switch off the motor and disconnect terminal 50 (starter) on the starter motor

1.10.3 CONFIGURATION

For the correct configuration procedure of the device, refer to the various menus described in this document and check that all the parameters enabled are consistent with the specifications of the machine on which it is installed.

1.11 USE

For the correct procedure for using the device, follow the instructions in this manual scrupulously. In the event of any unforeseen and dangerous anomaly occurring during a phase of device start-up and operation, it is recommended to switch it off, disconnect the removable connector, wait about ten seconds and connect the connector again. If the malfunction persists, disconnect the power supply and contact the service centre immediately.

1.12 MAINTENANCE

Maintenance operations must be carried out by personnel who have previously read the manual. Any type of cleaning or physical maintenance must always be carried out with the system switched off and disconnected from the power supply. In carrying out these interventions, strictly follow the instructions in this manual.

For any maintenance and cleaning operations, in addition to the instructions contained in this manual, the general safety standards and, if necessary, the general safety standards at work in force in the place where these operations are carried out must be observed.

1.13 PERIODIC MAINTENANCE

Periodically it is necessary to clean the IdroMOP electronic control unit from any accumulation of dust and dirt that may have formed on its external surface. If necessary, use compressed air to remove dust. You can also use a non-abrasive damp cloth that is free of alcohol or aggressive solvents. Do not use abrasive sponges, chemical solvents or detergents.
During cleaning, avoid allowing water to come into contact with internal electrical components.

1.14 EXTRAORDINARY MAINTENANCE

Extraordinary maintenance is required in case of failures or breakages, unforeseeable accidents or inappropriate use of the device. The situations that may arise from time to time are completely unpredictable and therefore it is not possible to describe appropriate intervention procedures. If necessary, consult the manufacturer's technical service to receive the appropriate instructions for the situation.
All interventions, mechanical, electrical or electronic, ordinary or extraordinary, must in any case be carried out by specialized and authorized personnel from our service department.

1.15 OUT OF SERVICE

The device is manufactured and constructed according to criteria of robustness, durability and flexibility which allow it to be used for many years. Once it has reached the end of its technical and operational life, it must be decommissioned to prevent further use for the purposes for which it was originally designed and built, while still making it possible to reuse the raw materials that make it up.

2. INTERFACE

2.1 KEYBOARD

2.1.1 ON | OFF BUTTON

Briefly press the ON/OFF button to turn on the device. Wait for the system to initialize until an acoustic signal is emitted, after which the home screen will appear. To turn off the device, press and hold the ON/OFF button for more than 3 seconds until the message "SHUTTING DOWN" appears.
For units with remote control, WAIT FOR THE SYSTEM TO SHUT DOWN AUTOMATICALLY.

2.1.2 MENU BUTTON

Briefly press the MENU button to access the main menu.

2.1.3 IRRIGATION BUTTON

Briefly press the IRRIGATION button to open the irrigation dashboard.

2.1.4 ENGINE BUTTON

Briefly press the ENGINE button to open the engine dashboard.

2.1.5 START | STOP BUTTON

Briefly press the START button to start irrigation.
This command is accepted only if there are no active alarms.
Briefly press the STOP button to end irrigation.

2.1.6 EMERGENCY BUTTON

Briefly press the EMERGENCY button to immediately stop the machine.

2.1.7 INCREASE BUTTON

Press and hold the INCREASE button to increase the desired speed or pressure.

2.1.8 DECREASE BUTTON

Press and hold the DECREASE button to decrease the desired speed or pressure.

2.2 KNOB

Rotate the knob clockwise to move to the next dashboard, or counterclockwise to return to the previous one.

Press and hold the knob for at least 3 seconds to access the work, configuration, and diagnostics menus.

Rotate the knob clockwise to scroll down the menu, or counterclockwise to scroll up.

Briefly press the knob to select a menu item or parameter to edit.

Rotate the knob clockwise to increase the value of the selected parameter, or counterclockwise to decrease it.

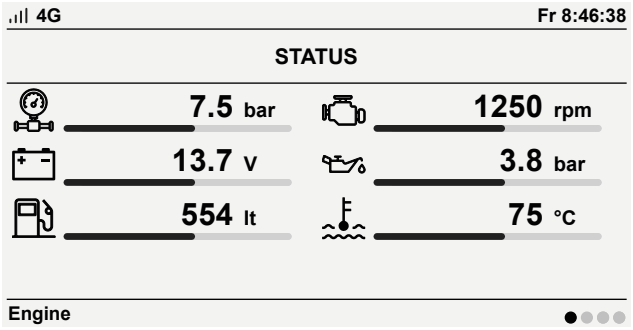
2.3 SCREEN

2.3.1 TOP BAR

The top bar displays connection status and modem status information on the left, and the current date and time on the right. If available, the “GPS” indicator will also be displayed to indicate satellite connection.

2.3.2 DASHBOARD

The dashboard is shown in the central area of the screen and displays the main information, grouped by category.
At the top, a status bar is present, while the central section displays all instruments related to the selected dashboard.

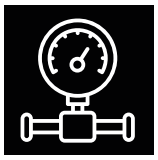


2.3.3 INSTRUMENT

Instruments generally consist of an identifying icon and a numerical value with the relevant unit of measurement.
If the value has defined thresholds or limits, a progress bar is also displayed for better understanding of the acceptable range.

2.3.4 WARNING LIGHT

If the instrument is linked to a specific input, the background of the related icon will indicate its status.
Normally, a WARNING is indicated by a yellow light above the icon and may lead to shutdown if the condition persists beyond a predefined time set by the manufacturer.
A red light indicates an ACTIVE ALARM with an imminent controlled shutdown of the machine.
A blinking yellow/red light indicates that engine/water-related alarms have been disabled.
IdroMOP is not responsible for the disabling of active alarms.



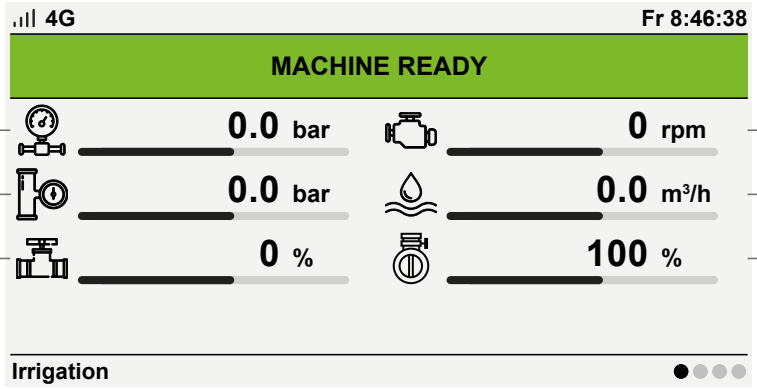
2.3.5 BOTTOM BAR

The bottom bar shows, on the left, the index of the current page and the working mode; on the right, the position of the current dashboard.
If a warning or alarm is triggered, the position will indicate the active anomaly state on the specific dashboard: a blinking yellow dot signals a warning state; a blinking red dot signals an alarm state.

3. DYNAMIC DASHBOARD

The number of dashboards and instruments inside varies depending on the application type configured by the manufacturer.

3.1 IRRIGATION DASHBOARD



3.1.1 WATER PRESSURE

Value expressed in bar and acquired by the pressure transducer connected to pins **[J04]** (signal) and **[J17]** (positive under key).

MENU --> OPERA --> ENABLE \ DISABLE PRESSURE SWITCH

Enables or disables the water protection of the system; the DISABLED status is signaled through the flashing yellow/red light.

Any failure, failure to connect or incorrect configuration of the sensor will be reported through the warning light and the yellow flashing progressive bar.

3.1.2 ENGINE SPEED

Value expressed in rpm and acquired from an alternator phase (typically W), connected to pin **[J07]** or of the CAN BUS communication line if the motor is electric.
When the external start input is activated the procedure will be signaled with the engine warning light becoming green and yellow/red status bar with acoustic signaling.
The yellow light signals the activation of the STOP input connected to the pin **[J06]** while the red light signals the activation of the EMERGENCY input connected to the pin **[J25]**.
Limits and thresholds for generating alarms are defined by the parameters: **[E06]** and **[E08]**.

3.1.3 SUCTION DEPRESSION

Value expressed in bar and acquired by the vacuum transducer connected to pins **[J03]** and **[J16]**. Any failure, failure to connect or incorrect configuration of the sensor will be reported through the warning light and the progressive bar which will flash yellow.

3.1.4 FLOWMETER

Value expressed in m^3/h and acquired by the flow meter connected to pins **[J40]** and **[J34]**. Visible only if the parameter **[E14]** is configured; otherwise the input will be handled as a flow switch and the tell-tale will indicate its status.
Limits and thresholds for generating alerts are defined by the parameters: **[M/A12]** and **[M/A13]**.
In the automatic program, at the end of time **[A11]**, if the system is in tolerance with respect to the settable thresholds **[A12]**, **[A13]**, the light turns green. In the manual program, after a period determined by the acceleration time **[E01]**, with stable pressure and engine rpm, the system will calculate the tolerance on the reached flow rate and the warning light will become green if the system is in tolerance.

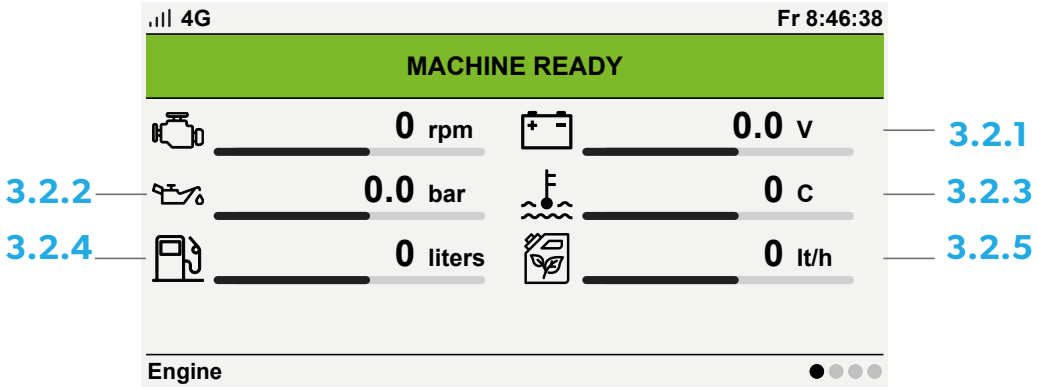
3.1.5 PRIMING VALVE

Value expressed in **%** and acquired by the servomotor connected via CANBUS.

3.1.6 HIGH PRESSURE VALVE

Value expressed in **%** and acquired by the servomotor connected via CANBUS.

3.2 ENGINE DASHBOARD



3.2.1 BATTERY

Value expressed in volts and acquired directly from the device power supply.
The yellow warning light indicates no charging by the alternator (D+) connected to pin **[J26]**.
If the battery voltage drops below 11 Vdc (or 21 Vdc for 24 Vdc systems) for more than 20 seconds the warning message is generated
LOW BATTERY.
If the battery voltage drops further below 10.5 Vdc (or 20 Vdc for 24 Vdc systems) the **BATTERY OUT** alarm message is generated for more than 10 seconds.
Under 9 Vdc the device will turn off independently 10 seconds after detecting the shutdown threshold.

3.2.2 ENGINE OIL PRESSURE

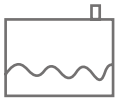
Value expressed in **bar** and acquired by the sensor connected to the pin **[J02]**. The yellow light signals the activation of the bulb connected to the pin **[J38]**; condition that if maintained it will generate the alarm message "OIL PRESSURE ANOMALY".

NOTE: It is normal condition to display the BATTERY and ENGINE OIL PRESSURE warning light active with the engine off.

3.2.3.1 ENGINE TEMPERATURE

Value expressed in **Celsius** and acquired by the sensor connected to the pin **[J30]**. The yellow light signals the activation of the bulb connected to the pin **[J23]**, a condition which if maintained will generate the alarm message "HIGH ENGINE TEMPERATURE".

3.2.3.2 RADIATOR WATER LEVEL



This indicator overrides the ENGINE TEMPERATURE display as it has priority and signals the activation of the bulb connected to pin **[J24]**;
condition that if maintained it will generate the alarm message "LOW RADIATOR WATER LEVEL".

3.2.4 FUEL TANK LEVEL

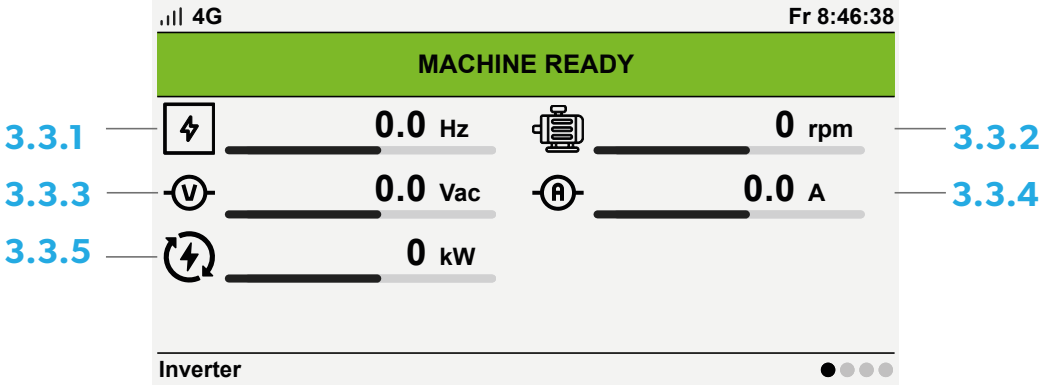
Value expressed in **liters** and acquired by the sensor connected to the pin **[J31]**. The yellow light signals the activation of the contact connected to pin **[J39]**, a condition which if maintained for the time set in **[U16]** will generate the alarm message "FUEL RESERVE".

3.2.5 CONSUMPTION

Value expressed in **lt/h** and available only for engines with CAN bus interface, otherwise it is not displayed.

3.3 INVERTER DASHBOARD

This dashboard appears only if an inverter is configured in the **[F05]** parameter.



3.3.1 MOTOR POWER FREQUENCY

Value expressed in **hertz** and acquired by the inverter.

3.3.2 RPM ELECTRIC MOTOR SPEED

Value expressed in **rpm** and acquired by the inverter.

3.3.3 VOLTAGE POWER SUPPLY ELECTRIC MOTOR

Value expressed in **volts** and acquired by the inverter.

3.3.4 MOTOR CURRENT

Value expressed in **amperes** and acquired by the inverter.

3.3.5 POWER ABSORBED ELECTRIC MOTOR

Value expressed in **watts** and acquired by the inverter.

3.4 VALVE DASHBOARD

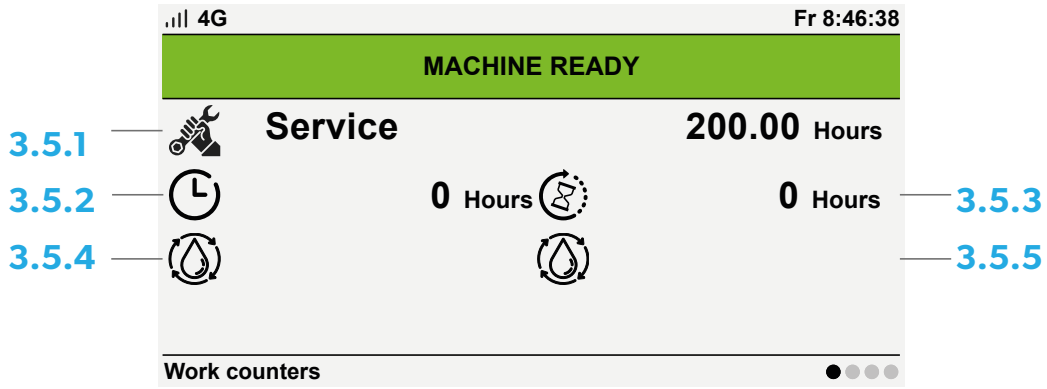
3.4.1 PRIMING VALVE

Value expressed in **%** and acquired by the servomotor connected via CANBUS.

3.4.2 DELIVERY VALVE

Value expressed in **%** and acquired by the servomotor connected via CANBUS.

3.5 COUNTER DASHBOARD



3.5.1 HOURS OF MAINTENANCE

Value expressed in hours; countdown counter indicating the remaining time until the next maintenance.

MENU --> METERS --> REFILL MAINTENANCE

Reload the maintenance counter with the value set at **[U10]**.

3.5.2 COUNT PART HOURS

Value expressed in hours; reports the operating hours since the last reset.

MENU --> COUNTERS --> RESET PARTIAL COUNTER

Reset partial counter.

3.5.3 COUNT TOTAL HOURS

Value expressed in hours and not modifiable; reports total operating hours.

3.5.4 PARTIAL LITRE COUNT

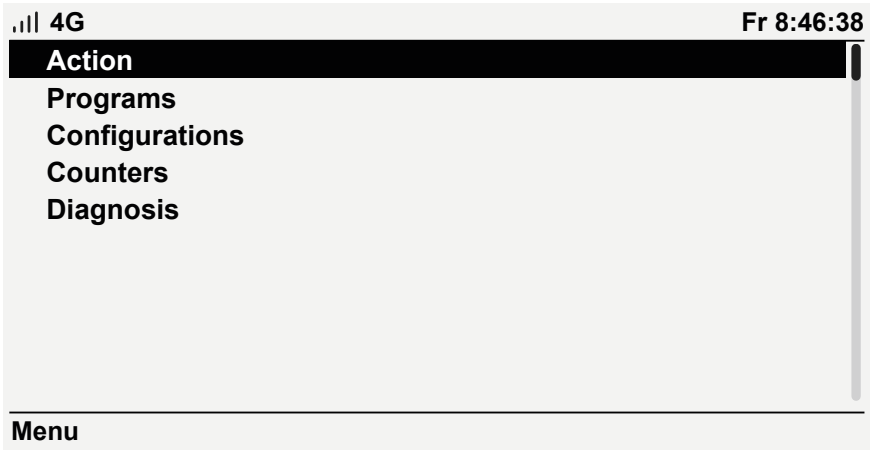
Value expressed in m^3. It automatically resets with each new watering.
This value is displayed only if range reading via **[E07]** is enabled.

3.5.5 TOTAL LITRE COUNT

Value expressed in m^3 x 1000, not modifiable.
This value is displayed only if range reading via **[E07]** is enabled.

4. ACTION

The dynamic ACTION menu lists all the quick actions allowed in the current state of the machine:



4.1 REMOVE ALARM

Allows you to remove the alarm signal.

4.2 ACTIVATE AUTOMATIC/MANUAL CONTROL

Allows selecting either the automatic or manual operating program either with the machine stopped or during irrigation.

NOTE: If you switch from manual to automatic in irrigation, the reference pressure will be taken as the one at the time of changing the working mode for automatic control.

4.3 SET WATERING TIME

Allows you to change the watering time **[M/A01]** during watering.

4.4 ENABLE / DISABLE WATER PROTECTION

Allows enabling or disabling threshold control for pressure and flow rate. This action is available only in MANUAL CONTROL.

NOTE: IdroMOP does NOT assume responsibility for disabling control over the intervention thresholds for pressure and flow rate.

4.5 ENABLE /DISABLE ENGINE PROTECTION

Allows enabling or disabling protection inputs dedicated to motor protection: **[J23]**, **[J24]**, **[J26]**, **[J36]** and **[J38]**.

NOTE: IdroMOP does NOT assume responsibility for disabling alarms.

4.6 PERFORM /FINISH PRIMING

It allows priming of the pump to be performed, or terminated, manually before starting irrigation. This action is available only in MANUAL CONTROL.

4.7 DELIVERY VALVE CONTROL

Allows you to control the opening of the delivery valve through the INCREMENTA and DECREMENTA buttons. This action is only possible when the machine is running.

4.8 PERFORM /FINISH REGENERATION

Allows starting or ending irrigation, if the engine is electronic.

5. MANUAL PROGRAM

5.1 DURATION OF WORK

[M01] Indicates duration of irrigation. The value 00:00 indicates a manual program without end-of-watering conditions.
Time starts when the plant exceeds the minimum pressure **[M05]**.

DEFAULT	MINIMUM	MAXIMUM
0:00 h:m	48:00 h:m	0:00 h:m

5.2 EXCLUSION TIME PRESSURE CONTROL

[M04] Delay time on minimum pressure control.

DEFAULT	MINIMUM	MAXIMUM
0:30 m:s	60:00 m:s	3:00 m:s

5.3 MINIMUM SYSTEM PRESSURE

[M05] Control parameter that allows you to detect the dry-running condition
This parameter represents the minimum pressure value that must be reached to allow the motor pump to pass into working mode.

DEFAULT	MINIMUM	MAXIMUM
0.0 bar	13.0 bar	3.0 bar

5.4 MAXIMUM SYSTEM PRESSURE

[M06] Indicates the maximum permitted pressure limit, beyond which the engine will be stopped with deceleration. It is recommended to set this value at least 2 bar below the plant failure threshold.

DEFAULT	MINIMUM	MAXIMUM
3.0 bar	25.0 bar	12.5 bar

5.5 ENGINE WORKING SPEED

[M07] Engine rotation speed at work.

DEFAULT	MINIMUM	MAXIMUM
E06	E08	E06

5.6 ALARM DELAY ABOVE/UNDER PRESSURE

[M08] Defines the delay before triggering an alarm due to overpressure or underpressure.
The overpressure and underpressure thresholds are calculated by applying the parameters **[M09]** and **[M10]** to the working pressure.
The working pressure is acquired after an engine speed stabilization time determined by the acceleration time.
In the event that the system pressure leaves the aforementioned thresholds for a time greater than the set value, the engine will be stopped with deceleration.

DEFAULT	MINIMUM	MAXIMUM
0:02 m:s	10:00 m:s	0:20 m:s

5.7 UNDER PERMITTED PRESSURE

[M09] This parameter determines the tolerance under the working pressure, beyond which, after the time **[M08]**, the pressure alarm is generated with consequent deceleration and engine stop.

DEFAULT	MINIMUM	MAXIMUM
0.2 bar	5.0 bar	1.0 bar

5.8 OVER PRESSURE ALLOWED

[M10] This parameter determines the tolerance above the working pressure, beyond which, after the time **[M08]**, the over-pressure alarm is generated with consequent deceleration and engine stop.

DEFAULT	MINIMUM	MAXIMUM
0.2 bar	5.0 bar	1.0 bar

5.9 TIME EXCLUSION FLOW CONTROL

[M11] Determines the intervention delay of a possible alarm for minimum range **[M12]** or maximum range **[M13]**. Visible only if the **[E14]** parameter is configured.
If the range control is not present, set the value to 0.

DEFAULT	MINIMUM	MAXIMUM
0:00 m:s	30:00 m:s	0:00 m:s

5.10 MINIMUM PLANT FLOW RATE

[M12] This parameter indicates the minimum accepted flow rate.
The minimum flow rate is controlled when the working pressure is reached, after the flow rate control exclusion time **[M11]**. If this parameter is set to 0.0 this value is not considered. Visible only if the **[E14]** parameter is configured.

DEFAULT	MINIMUM	MAXIMUM
0 m^3/h	250 m^3/h	0 m^3/h

5.11 MAXIMUM PLANT FLOW RATE

[M13] This parameter indicates the maximum accepted flow rate.The maximum flow rate is controlled when the working pressure is reached, after the flow rate control exclusion time **[M11]**. If this parameter is set to 0.0 this value is not considered. Visible only if the **[E14]** parameter is configured.

DEFAULT	MINIMUM	MAXIMUM
0 m3/h	250 m3/h	0 m3/h

6. AUTOMATIC PROGRAM

6.1 DURATION OF WORK

[A01] Indicates duration of irrigation. The value 00:00 indicates an automatic program without end-of-watering conditions.
Time starts when the plant exceeds the minimum pressure **[A05]**.

DEFAULT	MINIMUM	MAXIMUM
0:00 h:m	48:00 h:m	0:00 h:m

6.2 IRRIGATION CYCLES

[A02] This parameter defines the number of consecutive irrigation cycles.
With values greater than 1 you will also have to set the parameter **[A03]**.

DEFAULT	MINIMUM	MAXIMUM
1	1	1

6.3 BREAK BETWEEN WATERINGS

[A03] Indicates breaks between consecutive watering cycles.
This parameter is accessible only if **[A02]** is set greater than 1.

DEFAULT	MINIMUM	MAXIMUM
0:10 h:m	24:00 h:m	0:00 h:m

6.4 MAXIMUM PIPE FILLING TIME

[A04] Indicates the maximum time within which the system must reach the minimum pressure **[A05]**, in the pipe filling phase.

DEFAULT	MINIMUM	MAXIMUM
0:30 m:s	60:00 m:s	3:00 m:s

NOTE: It is recommended to set values higher than the actual time. Once the minimum pressure is reached it will automatically go into irrigation.

6.5 MINIMUM SYSTEM PRESSURE

[A05] Control parameter that allows you to detect the condition of anomaly of dry running. This parameter represents the minimum pressure value that must be reached to allow the motor pump to pass into working mode.

DEFAULT	MINIMUM	MAXIMUM
0.1 bar	10.0 bar	3.0 bar

NOTE: It is recommended to set a pressure 2-3 bar lower than the working pressure, to promote correct filling of the pipes and facilitate more precise regulation once irrigation has started.

6.6 MAXIMUM SYSTEM PRESSURE

[A06] Indicates the maximum permitted pressure limit, beyond which the engine will be stopped with deceleration.
It is recommended to set this value at least 2 bar below the plant failure threshold.

DEFAULT	MINIMUM	MAXIMUM
3.0 bar	25.0 bar	12.5 bar

6.7 WORKING PRESSURE

[A07] Indicates the working pressure to be reached in the plant.

DEFAULT	MINIMUM	MAXIMUM
A05	A06	8.0 bar

6.8 ALARM DELAY ABOVE / BELOW PRESSURE

[A08] Determines the intervention delay of a possible alarm due to overpressure or underpressure.
The overpressure and underpressure thresholds are calculated by applying the parameters **[A09]** and **[A10]** to the working pressure. In the event that the system pressure leaves the aforementioned thresholds for a time greater than the set value, the engine will be stopped with deceleration.

DEFAULT	MINIMUM	MAXIMUM
0:02 m:s	10:00 m:s	0:20 m:s

6.9 UNDER PERMISSIBLE PRESSURE

[A09] This parameter determines the tolerance under the working pressure, beyond which the pressure alarm is generated with consequent deceleration and engine stop. After time **[A08]**.

DEFAULT	MINIMUM	MAXIMUM
0.2 bar	5.0 bar	1.0 bar

6.10 OVER PRESSURE ALLOWED

[A10] This parameter determines the tolerance above the working pressure, beyond which the over-pressure alarm is generated with consequent deceleration and engine stop. After time **[A08]**.

DEFAULT	MINIMUM	MAXIMUM
0.2 bar	5.0 bar	1.0 bar

6.11 EXCLUSION TIME FLOW CONTROL

[A11] Defines the delay before triggering an alarm for minimum range **[A12]** or maximum range **[A13]**. Visible only if the **[E14]** parameter is configured.
If the flow control is not present set to zero.

DEFAULT	MINIMUM	MAXIMUM
0:00 m:s	30:00 m:s	0:00 m:s

6.12 MINIMUM FLOW RATE THRESHOLD

[A12] This parameter indicates the minimum accepted flow rate.
The minimum flow rate is controlled when the working pressure is reached, after the flow rate control exclusion time **[A11]**. If this parameter is set to 0.0 this value is not considered. Visible only if the **[E14]** parameter is configured.

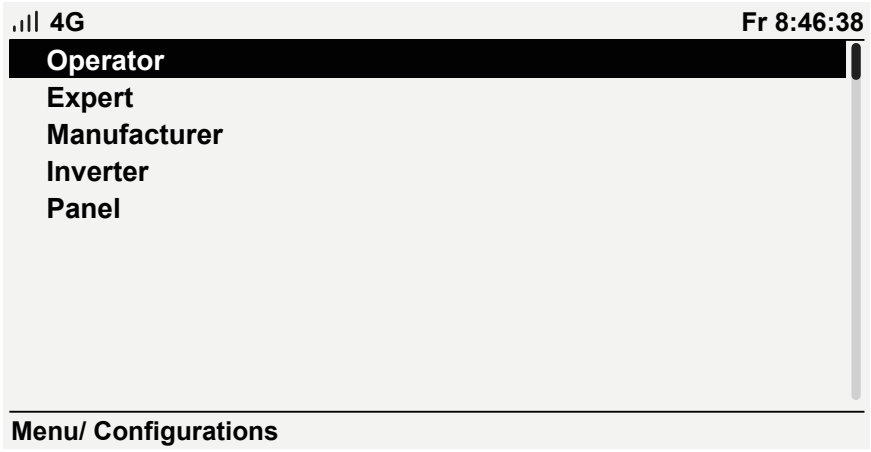
DEFAULT	MINIMUM	MAXIMUM
0 m^3/h	250 m^3/h	0 m^3/h

6.13 MAXIMUM LOAD THRESHOLD

[A13] This parameter indicates the maximum accepted flow rate.
The maximum flow rate is controlled when the working pressure is reached, after the flow rate control time **[A11]**. If this parameter is set to 0.0, this value is not considered. Visible only if the **[E14]** parameter is configured.

DEFAULT	MINIMUM	MAXIMUM
0 m^3/h	250 m^3/h	0 m^3/h

7. OPERATOR CONFIGURATIONS



7.1 PUMP PRIMING TIME

[U01] Maximum time for priming procedure.
If, before the end of this time, the system detects a pressure greater than the value set at **[U02]**, the priming procedure will be completed early and the engine will be started. Visible only if the **[F06]** parameter is configured.
If after the set time the pressure is lower than the parameter **[U02]**, the control unit will go into alarm for failure to prime.

DEFAULT	MINIMUM	MAXIMUM
0:00 m:s	5:00 m:s	2:30 m:s

7.2 END PRIMING PRESSURE

[U02] Pressure to be reached to conclude the priming procedure.
Parameter accessible only if a priming system is selected via parameter **[F06]**.

DEFAULT	MINIMUM	MAXIMUM
0.00 bar	3.00 bar	1.00 bar

7.3 ENGINE PROTECTION

[U04] Enable or disable engine protection.

7.4 PREHEATING TIME GLOW PLUGS

[U05] Glow plug preheat activation time via auxiliary output **[J13]**. This time is ignored if the engine temperature exceeds 50°C. Visible only if the **[F09]** parameter is configured as PREHEAT.

DEFAULT	MINIMUM	MAXIMUM
0.0 s	15.0 s	8.0 s

7.5 ENGINE HEATING TIME

[U06] Time after starting during which the engine is maintained at idle speed.

DEFAULT	MINIMUM	MAXIMUM
0:00 min	10:00 min	0:00 min

7.6 ENGINE COOLING TIME

[U07] Time prior to shutdown during which the engine is maintained at idle speed. This time is ignored in the event of an engine alarm.

DEFAULT	MINIMUM	MAXIMUM
0:00 min	10:00 min	0:00 min

7.7 SOFT-START TIME

[U08] Activation time of the external soft-start module via the auxiliary output **[J13]**. Visible only if the **[F09]** parameter is configured as SOFT-START.

DEFAULT	MINIMUM	MAXIMUM
0 s	60 s	0 s

7.8 EXCLUSION TIME FLOW SWITCH

[U09] Delay time for flow detection.
After this time, if the sensor detects the lack of flow for more than 10 seconds, the engine will be stopped with deceleration.

DEFAULT	MINIMUM	MAXIMUM
0 min	60 min	0 min

7.9 STOP DUE TO OVERPRESSURE

[U11] If set to NORMAL once the overpressure threshold is exceeded, the machine will stop with deceleration but the alarm will NOT be generated and the machine will be able to restart without resetting the alarms.
If, on the other hand, it is set as an ALARM, the control unit will signal the alarm which must be reset before the next start.

NORMAL	ALARM

7.10 STOP DELAY PRESSING FOR FUEL RESERVE

[U12] Delay time on engine shutdown due to fuel reserve input **[J39]**.

DEFAULT	MINIMUM	MAXIMUM
0 h:m	8:00 h:m	2:30 h:m

7.11 STOP FOR ADJUSTMENT ERRORS

[U13] If set to NORMAL after an adjustment error condition the machine will stop with deceleration but the alarm will NOT be generated and the machine can restart without resetting the alarms. If, on the other hand, it is set as an ALARM, the control unit will signal the alarm which must be reset before the next start.

NORMAL **ALARM**

7.12 BLINKING

[U14] Defines which events trigger the flashing light.

EVERY EVENT **ONLY ALARMS**
EXTERNAL START

7.13 SERVICE

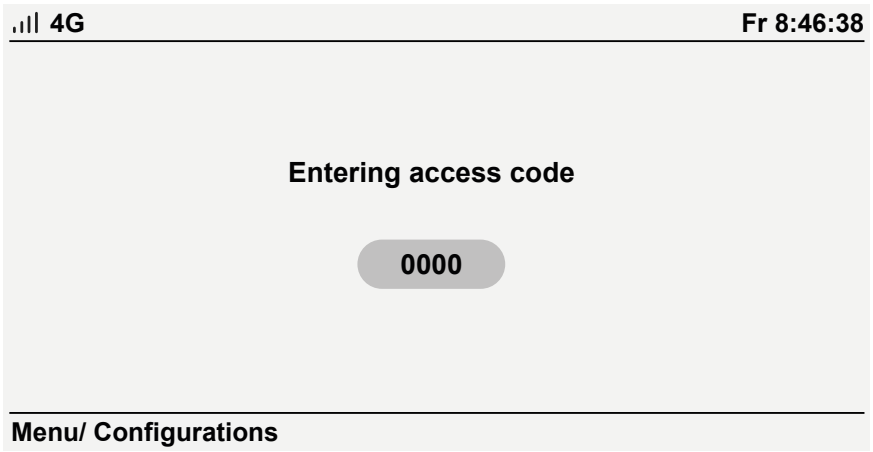
[U16] Working hours after which the control unit will report the request for new maintenance of the machine.

DEFAULT	MINIMUM	MAXIMUM
0 h	500 h	200 h

NOTE: Achieving this condition does not prevent the operation of the machine; it is only a notice/recommendation to carry out the necessary maintenance of the mechanical parts subject to wear.

8. EXPERT CONFIGURATION

Access code: **123**



8.1 ACCELERATION TIME

[E01] Time taken to accelerate from idle speed to maximum permissible speed. Intermediate speeds will be reached following the ramp defined by the set time.

DEFAULT	MINIMUM	MAXIMUM
0:03 m:s	5:00 m:s	0:40 m:s

8.2 DECELERATION TIME

[E02] Time taken to decelerate from maximum allowable speed to idle speed. Intermediate speeds will be reached following the ramp defined by the set time.

DEFAULT	MINIMUM	MAXIMUM
0:03 m:s	5:00 m:s	0:30 m:s

8.3 DEAD TIME ACCELERATOR

[E03] Correction time on the idle position of the accelerator-ready actuator. Before each ignition the actuator will extend the set time, allowing startup at a higher speed.

DEFAULT	MINIMUM	MAXIMUM
0.0 s	10.0 s	0.5 s

8.4 GAIN ADJUSTMENT

[E04] Reactivity index on pressure regulation; the higher this value, the faster the regulator will respond to a pressure change.

DEFAULT	MINIMUM	MAXIMUM
10 %	100 %	80 %

8.5 MINIMUM PULSE CONTROL

[E05] Minimum correction applied to the actuator placed on the accelerator during adjustment.

DEFAULT	MINIMUM	MAXIMUM
10 ms	F28	20 ms

8.6 ENGINE IDLE SPEED

[E06] Minimum engine speed.
If **[F02]** is configured as TIER III, STAGE IV or STAGE V, this parameter is automatically set to 900 rpm.

DEFAULT	MINIMUM	MAXIMUM
800 rpm	E08	900 rpm

8.7 CONSTANT ENGINE SPEED

[E07] Rotation speed achieved and maintained when the engine is switched on until it is switched off.
Visible only if the **[F01]** parameter is configured as HYBRID.

DEFAULT	MINIMUM	MAXIMUM
E06	E08	E06

8.8 ENGINE OVERSPEED THRESHOLD

[E08] Maximum permissible speed beyond which the engine will be shut down with deceleration.

DEFAULT	MINIMUM	MAXIMUM
E06	3000 rpm	1900 rpm

8.9 ENGINE START DELAY

[E09] Delay time for engine ignition after START.

DEFAULT	MINIMUM	MAXIMUM
0 s	60 s	0 s

8.10 ENGINE SPEED LIMIT PIPE FILLING

[E10] Maximum RPM limit during the pipe filling phase as defined by time **[E15]**. Once reached, the machine will remain at the set revolutions until the minimum pressure **[A05]** is reached.

8.11 INITIAL VALVE OPENING

[E11] Degrees of opening of the delivery valve in rest conditions, i.e. with the engine off. Visible only if the parameter **[F06]** is configured as an ELECTRIC PUMP.

DEFAULT	MINIMUM	MAXIMUM
0 deg	50 deg	0 deg

8.12 RPM THRESHOLD HIGH PRESSURE VALVE OPENING

[E12] Engine speed beyond which the delivery valve will start opening if the condition determined by the parameter **[E13]** is also satisfied.

DEFAULT	MINIMUM	MAXIMUM
E06	E08	1150 rpm

8.13 THRESHOLD BAR HIGH PRESSURE VALVE OPENING

[E13] Water pressure beyond which the delivery valve will start opening if the condition determined by the parameter **[E12]** is also satisfied.

DEFAULT	MINIMUM	MAXIMUM
1.0 bar	5.0 bar	2.0 bar

8.14 TYPE OF FLOW METER

[E14] Water flow reading enablement via external sensor or algebraic calculation:

ABSENT	**DN80**
DN150	**1/10L**
1/100L	**1/1000L**

8.15 ACCELERATION TIME IN PIPE FILLING

[E15] Time taken by the engine to change from idle speed **[E06]** to the limit threshold pipe filling engine speed **[E10]** during the pipe filling phase.

9. MANUFACTURER CONFIGURATION

Access code: **Reserved**

9.1 MACHINE TYPE

[F01]

ELECTRIC PUMP: the internal combustion engine is not present;

HYBRID: the internal combustion engine is present and is kept at a constant speed to perform the function of power generator;

MOTOR PUMP: the internal combustion engine is present and the rotation speed will be adjusted via actuator or CANBUS line.

9.2 ENGINE INTERFACE

[F02]

Technology adopted for engine interfacing:

ABSENT	**TIER3**
ACCELERATOR	**STAGE IV**
STAGE V < 55kW	**STAGE V > 55kW**

Visible only if the **[F01]** parameter is configured as HYBRID or MOTOR PUMP.

9.3 ENGINE MANUFACTURER

[F03]

Engine manufacturer, which establishes what type of communication protocol to use:

UNKNOWN	**IVECO**
JCB	**DEUTZ**
SCANIA	**JOHN DEERE**
VOLVO	**KOHLER**
DOOSAN	**KUBOTA**
YANMAR	

Visible only if the **[F02]** parameter is configured as TIER3, STAGE IV, STAGE V < 55kW or STAGE V > 55kW.

9.4 INVERTER

[F05]

Visible only if the **[F01]** parameter is set to ELECTRIC PUMP or HYBRID.
Connected inverter model:

ABSENT	**ABB ACQ580**
SOFT-START	**EMOTRON FDU 2.0**
EMOTRON FDU 2.1	

9.5 PRIMING

[F06] Technology adopted for pump priming:

ABSENT	**ELECTRIC PUMP**
COMPRESSOR	**TANK**

9.6 HIGH PRESSURE VALVE

[F07] Enabling the delivery valve:

ABSENT	**PRESENT**

9.7 PNP AUXILIARY OUTPUT

[F09] Indicates the function of the auxiliary output **[J13]**:

ABSENT	**PREHEAT**
SOFT-START	**ALARM**
SHUT DOWN	**CRUISE CONTROL**

9.8 NPN AUXILIARY OUTPUT

[F10] Indicates the function of the auxiliary output **[J41]**:

ABSENT	**ELECTROMAGNET**
PRIMING	

9.9 EMERGENCY POLARITY

[F13] Emergency Entry Rest Status **[J25]**:

NA: normally open and active if connected to ground;
NC: normally closed and active if NOT connected to ground.

9.10 RADIATOR LEVEL INPUT POLARITY

[F14] Rest state of the sensor installed in the radiator to monitor the cooling liquid level **[J26]**:

NA: normally open and active if connected to ground;
NC: normally closed and active if NOT connected to ground.

9.11 EXTERNAL STOP

[F15] Enable or disable input **[J6]**.

9.12 START/EXTERNAL STOP

[F16] Enable or disable input **[J37]**.

9.13 ENGINE OIL PRESSURE TRANSDUCER

[F17] Engine oil pressure sensor model:

ABSENT	**VEGLIA**
VDO	**TPO0403**

9.14 MOTOR TEMPERATURE TRANSDUCER

[F18] Engine temperature sensor model:

ABSENT	**VEGLIA**
VDO 120	**VDO 150**
TTA0402	**JCB**
F16173	

9.15 TANK LEVEL TRANSDUCER

[F19] Fuel level sensor model:

ABSENT	**0-320 OHM**
180-0 OHM	**ELCOS GAR-15**

9.16 TANK CAPACITY

[F21] Fuel tank capacity.

DEFAULT	**MINIMUM**	**MAXIMUM**
0 lt	2000 lt	600 lt

9.17 ACCELERATOR HANDLING TIME

[F23] Throttle shift time from idle limit switch to maximum limit switch.

DEFAULT	**MINIMUM**	**MAXIMUM**
2.0 s	12.0 s	6.0 s

9.18 ENGINE RPM THRESHOLD STARTED

[F24] Engine speed beyond which the engine is considered to have started.

DEFAULT	**MINIMUM**	**MAXIMUM**
200 rpm	600 rpm	350 rpm

9.19 ENGINE SPEED CONVERSION RATIO

[F25] Calibration ratio for correct reading of engine rpm.

DEFAULT	**MINIMUM**	**MAXIMUM**
0.100	1.000	0.320

10. INVERTER CONFIGURATION

Access code: **Reserved**
Parameters determined from engine registration plate data.

10.1 ENGINE RATED FREQUENCY

[V01] Parameter determined from the nameplate data of the electric motor **[F05]**.

DEFAULT	MINIMUM	MAXIMUM
24 Hz	90 Hz	50 Hz

10.2 RATED ENGINE VOLTAGE

[V02] Parameter determined from the nameplate data of the electric motor **[F05]**.

DEFAULT	MINIMUM	MAXIMUM
300 V	700 V	400 V

10.3 RATED MOTOR CURRENT

[V03] Parameter determined from the nameplate data of the electric motor **[F05]**.

DEFAULT	MINIMUM	MAXIMUM
5.0 A	120.0 A	60.0 A

10.4 RATED ENGINE POWER

[V04] Parameter calculated from **[V02]** and **[V03]**.

10.5 ENGINE RATED ASYNCHRONOUS SPEED

[V05] Parameter determined from the nameplate data of the electric motor **[F05]**.

DEFAULT	MINIMUM	MAXIMUM
1000 rpm	4000 rpm	3000 rpm

10.6 NUMBER OF MOTOR POLES

[F06] Parameter determined from the nameplate data of the electric motor **[F05]**.

DEFAULT	MINIMUM	MAXIMUM
2	10	2

10.7 ENGINE COSFI

[V07] Parameter determined from the license plate data of the electric motor **[F05]**.

DEFAULT	MINIMUM	MAXIMUM
0.45	1.00	0.86

10.8 MINIMUM ENGINE SPEED

[V08] Minimum rotation speed of the electric motor.

DEFAULT	MINIMUM	MAXIMUM
1500 rpm	2400 rpm	1800 rpm

10.9 ACCELERATION / DECELERATION TIME

[V09] Time to change from minimum to maximum speed and vice versa.

DEFAULT	MINIMUM	MAXIMUM
00:05 m:s	5:00 m:s	00:30 m:s

11. PANEL CONFIGURATIONS

11.1 SERIAL NUMBER

[*SN] Device serial number.

11.2 FIRMWARE VERSION

[*FW] Firmware version of the device.

11.3 ICCID

[* ICCID] Identification number of the data SIM present inside the device if it is equipped with it.

11.4 REV MODEMS

[*MODEM REV] Modem firmware review.

11.5 MODEM TEMP

[*MODEM TEMP] Temperature modem.

11.6 PANEL ID

[P01] Device identification number within a possible network.

11.7 PANEL LANGUAGE

[P02] Language displayed by the device. Available languages:

ITALIAN
FRENCH
GERMAN
ENGLISH
SPANISH

11.8 YEAR

[P03] Current year of the device.

11.9 DATE

[P04] Today's date of the device.

11.10 TIME

[P05] Current device time.

11.11 NETWORKING

[P06] Network in use:

AUTOMATIC	**GSM**
UMTS	**LTE**
GSM/LTE	**UMTS/LTE**
GSM/UMTS/LTE	

11.12 DISABLE WATERING PAGE

[P11] Enable or disable the watering page (first work page).

11.13 BACKLIGHT DURATION

[P12] Screen backlight time.
If set to 0, the screen always remains illuminated.

DEFAULT	MINIMUM	MAXIMUM
0 min	10 min	3 min

11.14 BRIGHTNESS

[P13] Setting the screen brightness.

DEFAULT	MINIMUM	MAXIMUM
10 %	90 %	60 %

11.15 DISPLAY POSITION X

[P14] Horizontal position of the graphics page displayed on the display.

DEFAULT	MINIMUM	MAXIMUM
0 px	10 px	7 px

11.16 DISPLAY POSITION Y

[P15] Vertical position of the graphics page displayed on the display.

DEFAULT	MINIMUM	MAXIMUM
5 px	30 px	15 px

12. PRIMING SERVOMOTOR

Access code: **Reserved**

12.1 ZERO POSITION

[G01] Indicates the mechanical limit switch status and sets the zero procedure.

12.2 DIRECTION

[G02] Valve direction of rotation:

CLOCKWISE	ANTI-CLOCKWISE

12.3 FULL OPENING

[G03] Degrees of complete valve opening.

DEFAULT	MINIMUM	MAXIMUM
0 deg	3600 deg	90 deg

12.4 MINIMUM OPENING SPEED

[G04] Minimum valve rotation speed.

DEFAULT	MINIMUM	MAXIMUM
5 deg/s	45 deg/s	25 deg/s

12.5 MAXIMUM OPENING SPEED

[G05] Maximum valve rotation speed.

DEFAULT	MINIMUM	MAXIMUM
5 deg/s	45 deg/s	25 deg/s

12.6 LOCATION

[G06] Current valve opening position.

13. HIGH PRESSURE SERVOMOTOR

Access code: **Reserved**

13.1 ZERO POSITION

[H01] Indicates the mechanical limit switch status and sets the zero procedure.

13.2 DIRECTION

[H02] Valve rotation direction:

CLOCKWISE **ANTI-CLOCKWISE**

13.3 FULL OPENING

[H03] Degrees of complete valve opening.

MINIMUM	MAXIMUM	DEFAULT
0 deg	3600 deg	90 deg

13.4 MINIMUM OPENING SPEED

[H04] Minimum valve rotation speed.

MINIMUM	MAXIMUM	DEFAULT
0.1 deg/s	2.5 deg/s	0.5 deg/s

13.5 MAXIMUM OPENING SPEED

[H05] Maximum valve rotation speed.

MINIMUM	MAXIMUM	DEFAULT
0.1 deg/s	2.5 deg/s	2.0 deg/s

13.6 POSITION

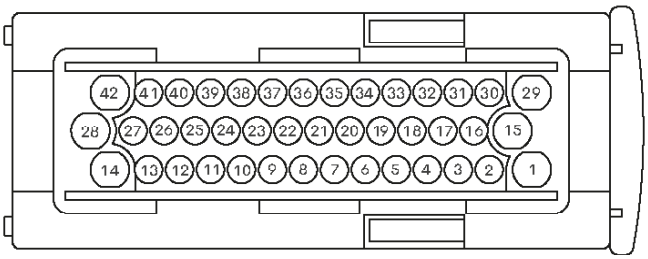
[H07] Current opening position of the valve.

13.7 ZERO SEARCH

Select parameter **[B01]** and use the increment or decrement button to move the valve until it is fully closed. Then, hold down the knob to record the new zero position. Select parameter **[B06]** to check correct opening.
If the maximum valve opening is not accurate, it can be adjusted using parameter **[B03]**.

CAUTION: Check that the valve opens with the increment button; otherwise, it is necessary to reverse the direction of rotation with parameter **[B02]**.

14. ELECTRIC CONNECTIONS



LEGEND:

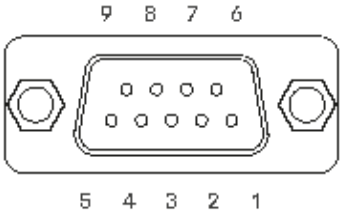
DI: Digital inputs	10
FDI: Frequency digital input	2
VAI: Voltage analogue inputs	3
CAI: Current analogue inputs	3 (4 - 20 mA)
PI: Power input	
PO: Power output	
DO: Digital output	
MO: Engine output	2
PNP: PNP outputs	3
NPN: NPN outputs	2
CB: CANBUS	1

(Contact insertion on flying connector)

PIN	REF.	FEATURES	DESCRIPTION
J1	31-GND	PI	BATTERY NEGATIVE
J2	-	VAI	ENGINE OIL PRESSURE SIGNAL
J3	-	CAI (4-20mA)	WATER VACUUM SIGNAL
J4	-	CAI (4-20mA)	WATER PRESSURE SIGNAL
J5	-	DI	PRIMING COMPLETED CONSENT
J6	-	DI	EXTERNAL STOP
J7	W-RPM	FDI	ENGINE SPEED SIGNAL
J8	CLUTCH	MO (5A max)	ENGINE 2 -
J9	CLUTCH	MO (5A max)	ENGINE 2 +
J10	ACCELERATOR	MO (5A max)	ENGINE 1 -
J11	ACCELERATOR	MO (5A max)	ENGINE 1 +
J12	EV	PNP (5A max)	SOLENOID VALVE
J13	-	PNP (5A max)	AUXILIARY PNP OUTPUT
J14	50	PNP (10A max)	STARTER SIGNAL
J15	15/54	PO (10A max)	IGNITION SWITCHED POSITIVE
J16	15/54	PO (5A max)	IGNITION SWITCHED POSITIVE
J17	15/54	PO (5A max)	IGNITION SWITCHED POSITIVE
J18	15/54	PO (5A max)	IGNITION SWITCHED POSITIVE
J19	15/54	PO (5A max)	IGNITION SWITCHED POSITIVE

J20	-	CB	CAN L
J21	-	CB	CAN L
J22	-	CAI (4-20mA)	WATER LEVEL SIGNAL
J23	ATA	DI	ENGINE HIGH TEMPERATURE ALARM
J24	H2O	DI (NO/NC Normally open/closed)	LOW COOLANT LEVEL ALARM
J25	-	DI (NO/NC)	EXTERNAL EMERGENCY
J26	D+	DI/DO	ALTERNATOR D+
J27	-	NPN (5A max)	BLINKER
J28	+30	PI (12/24 Vdc)	BATTERY POSITIVE
J29	31-GND	PI	BATTERY NEGATIVE
J30	-	VAI	ENGINE TEMPERATURE SIGNAL
J31	-	VAI	FUEL LEVEL SIGNAL
J32	31-GND	PI	BATTERY NEGATIVE
J33	31-GND	PI	BATTERY NEGATIVE
J34	-	CB	CAN H
J35	-	CB	CAN H
J36	COMMON RAIL	DI	FUEL PRESSURE FAULT
J37	-	DI	EXTERNAL START/STOP
J38	BPO	DI	LOW OIL PRESSURE ALARM
J39	-	DI	FUEL RESERVE ALARM
J40	-	FDI	FLOW SWITCH SIGNAL
J41	-	NPN (5A max)	AUXILIARY NPN OUTPUT
J42	+30	PI (12/24 Vdc)	BATTERY POSITIVE

15. SERIAL COMMUNICATION



(Insert contacts on flying connector)

15.1 RS232 SERIAL

Communication channel for exclusive use IdroMOP

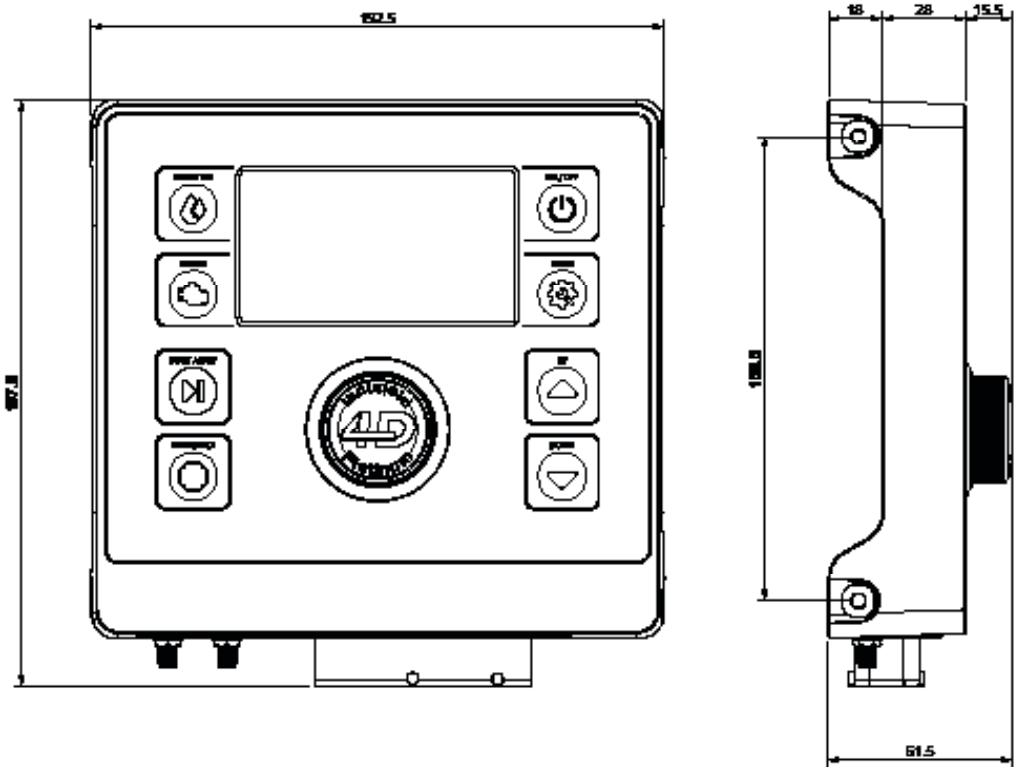
DS2 TX Line
DS3 RX Line
DS5 [31] Reference

15.2 RS485 SERIAL

Communication channel for external INVERTER

DS8 A+ Line
DS9 B- Line
DS6 [31] Reference

16. MECHANICAL DIMENSIONS



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