

MaterMacc

USE MANUAL

X3



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1 INTRODUCTION

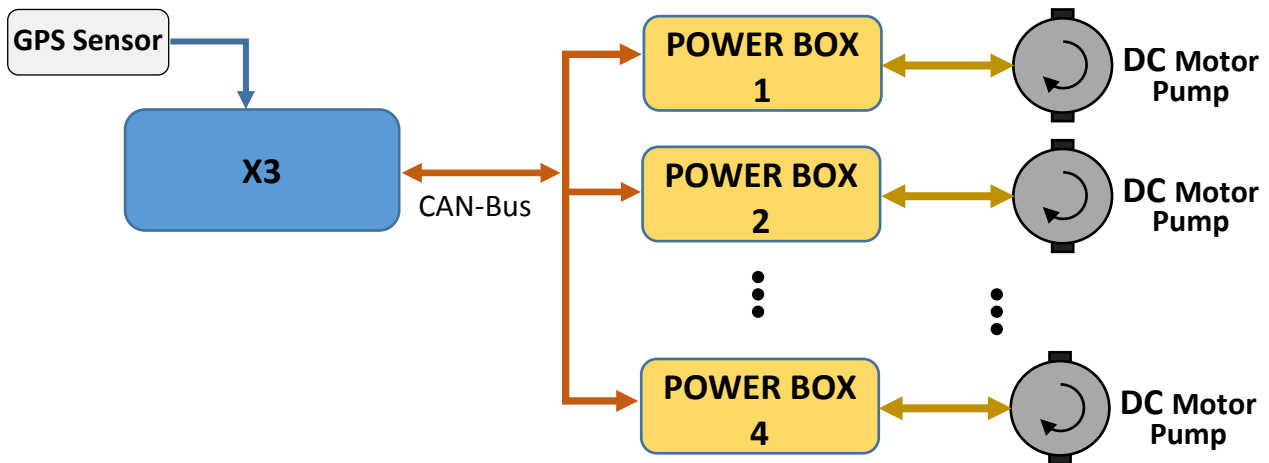
This document describes the operation, settings and operating modes of the X3 control unit to manage the automatic distribution system proportional to advancement.



The distribution system mainly consists of:

- X3 Control unit
- POWER BOX From one to four units for DC motor control
- GPS SENSOR Unit of measure of the earth speed with GPS system

These components are connected as follows:



The Control unit and the Power Box are independently powered by the tractor battery, while the GPS Sensor unit and the sensors used are powered by the unit to which they are connected.

The X3 control unit with one or more Power Box units are the essential elements for system operation and they cannot be used separately. Any disconnections or breakage of the connecting cable prevent operation and the motor remains stationary.

Whereas the GPS Sensor unit is optional and installed according to system needs.

1.1 MANUAL UPDATE

The information, descriptions and illustrations contained in this manual reflect the state at the time of marketing the equipment.

For technical or commercial reasons, the Manufacturer reserves the right to make changes to the equipment, at any time. These changes do not oblige the Manufacturer to intervene on the equipment marketed until that moment, or consider this publication inadequate.

Any additional information that the Manufacturer deems necessary to provide must be stored with the manual and be considered an integral part thereof

1.2 COPYRIGHT

The copyright of this manual belongs to the equipment Manufacturer. This manual contains technical texts, drawings and illustrations that cannot be disclosed or transmitted to third parties, in whole or in part, without the written permission of the equipment Manufacturer.

2 WARRANTY

- On delivery, check that the equipment has not been damaged during transportation and that the accessories are integral and complete.
- Possible claims must be submitted in writing within 8 days from receipt.
- The warranty is valid for one year, against all material defects, from the date of delivery of the machine.
- The warranty does not include shipping costs (the material travels at the recipient's risk).
- The warranty does not cover any damage caused to persons or property.
- The warranty is limited to the free repair or replacement of the faulty part.
- Dealers and users cannot claim any compensation from the manufacturer for any damage that they may suffer (labour, transport costs, defective work, direct or indirect accidents, loss of earnings on the harvest, etc.).

3 WARRANTY FORFEITURE

In addition to that specified in the supply contract, the warranty becomes void:

- If the limits given in the technical data table or in other tables in the manual are exceeded.
- If the instructions in this manual have not been carefully followed.
- In case of incorrect use, defective maintenance or errors made by the customer.
- If non-original spare parts have been used.
- The contractual warranty is not applied if the above conditions are not complied with, even partially.
- The use of spare parts not approved by the Manufacturer invalidates any warranty and relieves the same or the Dealer from any liability for malfunctions or accidents.
- The removal or modification of guards and protections relieves the Manufacturer from any liability for damage caused to property and/or persons.
- The Manufacturer is at your full disposal to ensure immediate and accurate technical assistance and everything that may be needed for the best operation and maximum performance of the equipment.

4 SAFETY NOTES

Carefully read these notes beforehand to safely use the equipment.

4.1 POWER SUPPLY

- The product must be powered with the indicated type of current.

4.2 MAINTENANCE

- The maintenance procedures that can be performed by the operator are described in the customer documentation provided with the product.
- Do not perform unspecified maintenance described in the customer documentation.

4.3 CLEANING THE PRODUCT

- Before cleaning, disconnect the equipment power supply cable.
- Use specific multi-purpose spray cleaning products, as the use of products other than those recommended may cause degradation and possible dangerous situations.

4.4 ELECTRIC SAFETY

- Only use the power supply cable supplied with the equipment.
- Do not place the equipment where the power supply cable may be trodden on.
- Do not place any kind of objects on the equipment.
- If any of the situations listed below occur, turn off the equipment immediately and disconnect the power supply cable.
 - The equipment emits an unusual noise or smell.
 - The power supply cable is damaged or worn.
 - Liquid was poured into the equipment.
 - Part of the equipment has been damaged.
- Call the authorised assistance centre to solve the problem.

4.5 OPERATING SAFETY

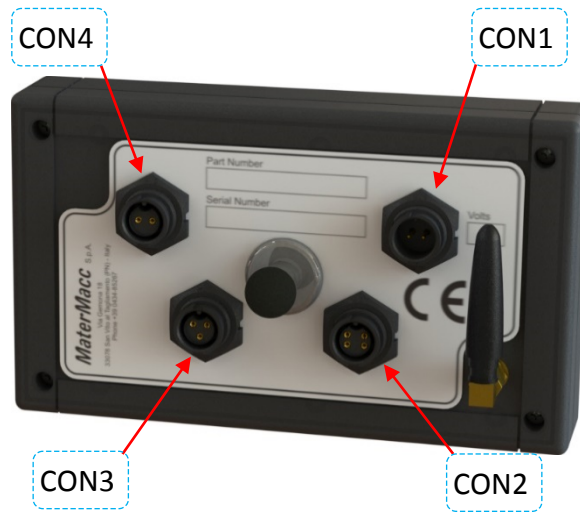
- Do not perform maintenance procedures unless specifically described in the documentation or you have been trained by an authorised local dealer.
- Always follow all warnings and instructions stated on the equipment or provided with it.
- Always be very careful when moving or transferring the equipment.
- Always arrange the equipment in a sufficiently spacious environment to allow maintenance.
- Do not install the equipment near a heat source

4.6 PRODUCT RECYCLING AND DISPOSAL

- In compliance with European regulations, electric and electronic equipment must not be disposed of with household waste.
- In EU member states, private persons are required to dispose of electrical equipment in special places free of charge. For more information, contact the local disposal authority.
- For more information, contact the local disposal authority or request specific instructions.

5 X3 CONNECTORS

There are four circular connectors on the back of the X3 control unit for use as follows:



- **CON1** 12V Power supply input
- **CON2** CAN-Bus connection and Power Box activation
- **CON3** Connection to GPS Sensor or speed sensor
- **CON4** Connection to Start-Stop Sensor

To avoid incorrect connections, the connectors are different both in terms of number of feet and kind.



NOTE



For proper equipment use, the **CON1** and **CON2** connectors are always connected as they enable powering the control unit and activating and communicating with the distribution unit.

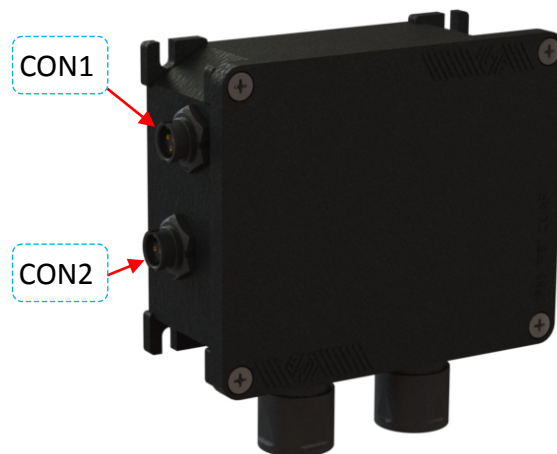
The provided connections are:



	<p>CON1 - Power supply Input</p> <p>pin1 Gnd, battery 12 Volt return</p> <p>pin2 +12 Volt</p>
	<p>CON2 - CAN-Bus connection and Power Box activation</p> <p>pin1 Gnd, Power Box enable 12 Volt return</p> <p>pin2 CAN-Bus Low</p> <p>pin3 + 12 Volt Power Box enable</p> <p>pin4 CAN-Bus High</p>

	<p>CON3 - Connection to GPS Sensor or speed sensor</p> <p>pin1 +12 Volt sensor power supply</p> <p>pin2 Gnd, sensor power supply 12 Volt return</p> <p>pin3 Signal from GPS Sensor or other</p>
	<p>CON4 - Connection to Start-Stop Sensor</p> <p>pin1 Gnd, return for Start-Stop Signal</p> <p>pin2 Start-Stop Signal</p>

5.1 POWER BOX CONNECTORS

The POWER-BOX unit integrates the control, limiting and verification functions of the electrical power applied to the distribution pump associated with it. There are circular connectors on the side of the Power Box for use as follows:



	<p>CON1 - Earth speed sensor connection</p> <p>pin1 +12 Volt sensor power supply</p> <p>pin2 Gnd, sensor power supply 12 Volt return</p> <p>pin3 Signal from earth speed sensor</p>
	<p>CON2 - Connection to Start-Stop Sensor</p> <p>pin1 Gnd, return for Start-Stop Signal</p> <p>pin2 Start-Stop Signal</p>

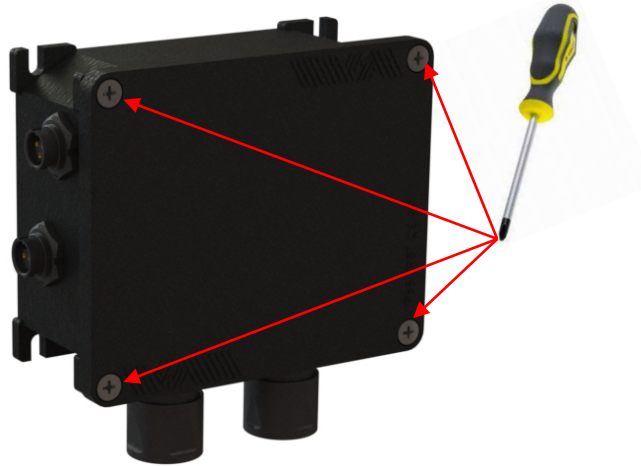
Use of the sensors connected to this unit is programmed in the X3 control unit.

5.2 POWER BOX IDENTIFICATION NUMBER

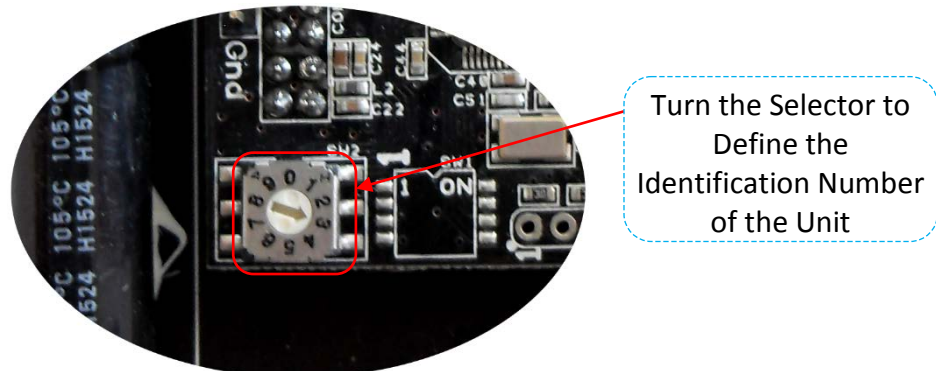
When managing multiple POWER-BOX remote units, each unit must be uniquely identified with a number between 1 and 4.

As shown below, this number is displayed next to the work data and regardless of the position it is assigned at hardware level on the electronic board housed in the container of the Power Box itself.

In order to access the identification number definition you must open the Power Box cover by loosening its four cross screws:



There is a rotary selector with 10 positions marked with numbers from 0 to 9 on the electronic board, next to the main input connector of the power supply cables.



Using a small flat screwdriver, turn the selector bringing the arrow to the desired identification number.

ATTENTION

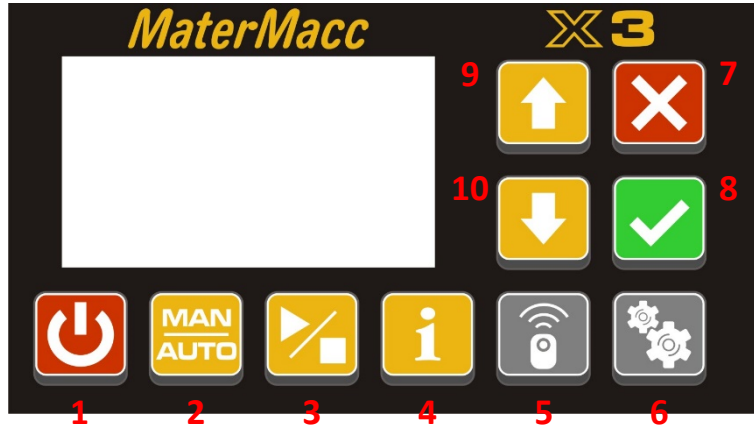


The operations described in this paragraph must be performed with the equipment NOT POWERED. We, therefore, recommend disconnecting the 13-pole socket and turning off the X3 control unit.











6 THE X3 CONTROL UNIT KEYBOARD

The X3 control unit, control and management element, is installed in the tractor cab.

This unit comes with graphic display and keyboard described below:



The following table summarises the basic functions of the keyboard buttons.

1		On and Off
2		Change of mode from Automatic to Manual and vice-versa
3		Start and Stop of Motors in Manual mode
4		Change of displayed data and specific settings
5		Activation of the radio remote control
6		Access to the list of parameters
7		Cancelling of operation in progress
8		Acceptance or Confirmation of operation in progress
9		Parameter scrolling or increase
10		Parameter scrolling or decrease

6.1 POWER-ON



By pressing this button the control unit turns on and emits a beep: the start screen is displayed for a few seconds as shown below:

```

MaterMaccX3
Firmware r. 2.00
ID Code: 05BF-A7D0-E42B
Rem. Key: 00000 - 00000
  
```



By keeping the power-on button pressed, this screen remains visible for as long as the key is pressed. This way you can easily read the displayed data and, in particular:

- **MaterMacc X3** : control unit name.
- **Firmware r.** : firmware revision.
- **ID Code** : identification code of the control unit.
- **Rem. Key** : coding key for the remote controls.

After the power-on screen, the display shows the main page as below:

```

PROGRAM 1      8,327 Km
s2      AUTO  400,01
 0,0l | 0,0ll l/ha  
 0,0ml | 0,0ml
           " 1,29 bar 12,6 Km/h
  
```

ATTENTION



When switched-on the system is in **automatic mode**, so if the Start-Stop signal is active and the Speed Sensor provides a speed higher than zero, the distributor motors will be started according to the work program settings.

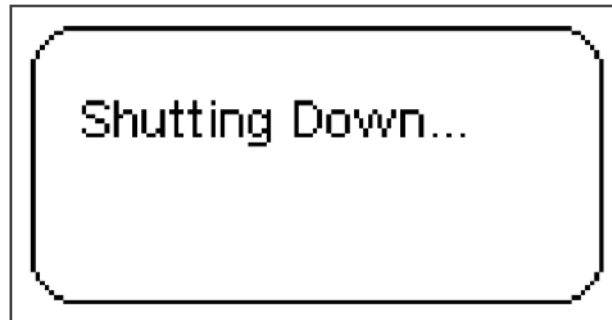
6.2 SHUTDOWN



1 s

By keeping the power-on button pressed, the control unit starts emitting beeps for about one second, after which the irreversible shutdown procedure is started. If the button is released during the beep sequence, before starting the shutdown procedure, the system is not turned off and everything continues regularly.

The following screen is displayed when the shutdown procedure starts:



The Power Box remote units are deactivated and the last changed data is recorded during the shutdown procedure.

REMEMBER



The shutdown operation also performs an emergency function as, regardless of the operating mode or state of the motors, the system is stopped and the remote devices disconnected.

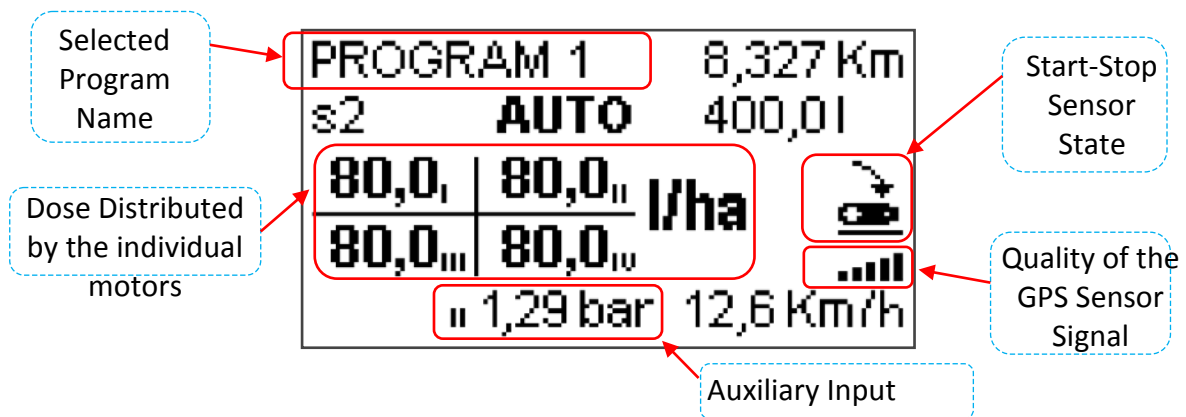
NOTE



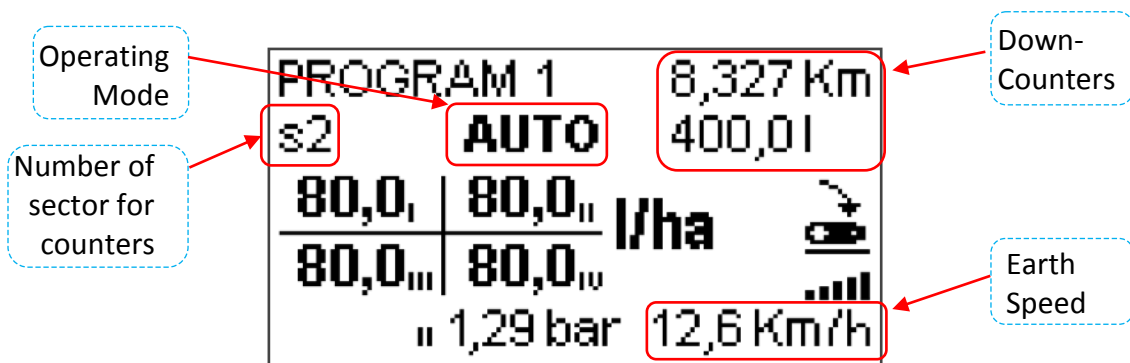
After turning off the control unit, wait at least 5 seconds before attempting to turn it on again: otherwise, pressing the power-on button will not produce any effect.

7 OPERATING PAGES OVERVIEW

The **main page**, shown below, contains many indications whose meaning is described below:



and also...



The constantly visible data, regardless of the selections, are:

- **Program Name:** name defined by the operator.
- **Operating M:** Automatic, Manual or Remote operating mode.
- **Distributed Dose:** current value of the instantaneous dose for each individual motor, calculated according to the vehicle speed and performed work settings: reference to the motor number is given in Roman numerals next to the numeric value.
- **Start-Stop Sensor State:** icon representing the work or pause condition.
- **Earth Speed:** vehicle speed received by the GPS Sensor or calculated by the advancement pulses based on the operator settings.

Below the data displayed according to the operator settings, which can or cannot be present:

- **Number of sector for counters:** if not visible, use the total counters only.
- **Quality of the GPS Sensor Signal:** visible if using a GPS Sensor.
- **Down-Counters:** visible if activated under its item of the advanced parameters.
- **Auxiliary Input:** together with the remote unit reference, this data is visible if enabled in at least one remote unit (Power Box). The value displayed for all remote units whose sensor is enabled is constantly changed, every two seconds.



Pressing this button switches to the next page, that is the work data page as shown below:

Page Title	FEEDBACK DATA	1 of 4	Page Number
	11,27 _i 11,28 _{ii}		
	11,26 _{iii} 11,27 _{iv}	l/min	
		3,755 ha/h	Data as in the Main Page
	" 1,29 bar 12,6 Km/h		

The work data is divided into four pages, which can be displayed with the Up and Down keys. The basic data, as described on the main page, is always shown at the bottom.



Pressing the Up or Down button switches to the next or previous page of the work data, as shown below.

FEEDBACK DATA	2 of 4
15,2 _i 15,3 _{ii}	A motors
15,3 _{iii} 15,1 _{iv}	
	13,6 V battery
" 1,29 bar 12,6 Km/h	

FEEDBACK DATA	3 of 4
75 _i 76 _{ii}	%Power
73 _{iii} 74 _{iv}	
" 1,29 bar 12,6 Km/h	

FEEDBACK DATA	4 of 4
1,30 _i 1,29 _{ii}	bar
1,21 _{iii} 1,18 _{iv}	
" 1,29 bar 12,6 Km/h	

The pages contain the work data for each individual remote unit described below.

Page 1:

- **Quantity of product dispensed per minute:** measure calculated based on the flow meter signal.
- **Hectares worked per hour:** estimate of hectares worked per hour based on the current earth speed.

Page 2:

- **Motor current:** current measured on the motor (other than the absorbed current).
- **Battery voltage:** the voltage level from the battery to the first Power Box.

Page 3:

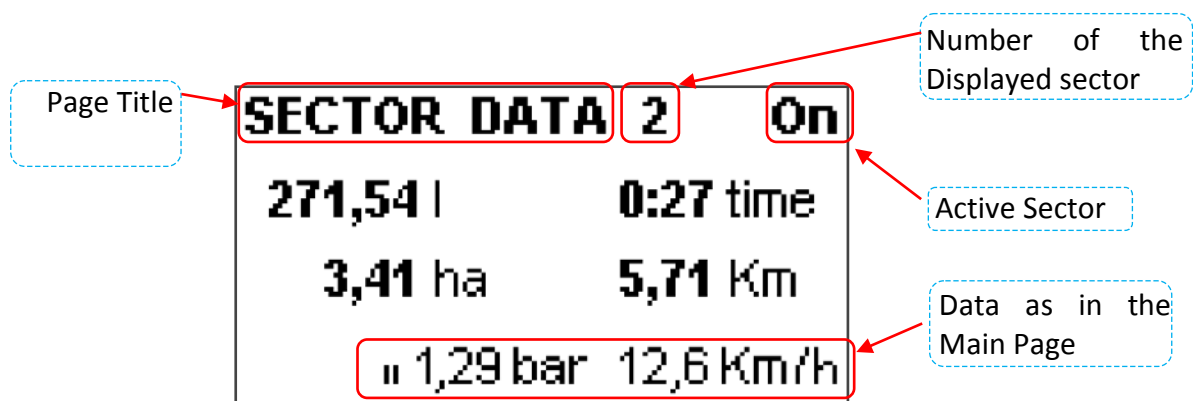
- **Motor Power Command:** power percentage sent to the motor.

Page 4:

- **Auxiliary input value:** value.



Pressing this button again, regardless of the work page displayed, switches to the next page, that is to the sector data page as shown below:

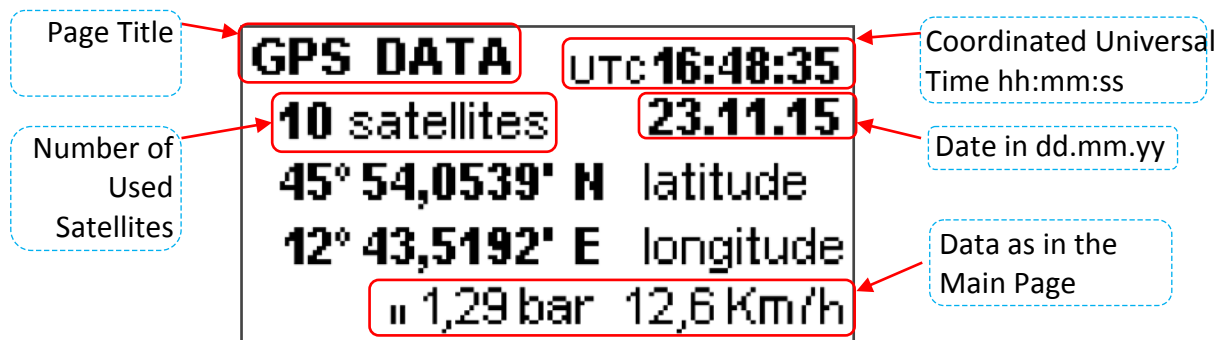


This page displays the data of the counters for the displayed sector:

- **Quantity of dispensed product:** measure calculated based on the signal of the operating motors' flow meters.
- **Hectares worked:** measure calculated based on the operator settings and space covered by the vehicle.
- **Worked time:** hours and minutes of the net work time of the distribution motor.
- **Space covered:** kilometres of the net worked space during the distribution motor operation.
- **Active Sector:** print of the word "On" if the sector number is active.
- **Basic data:** as in the main page, the auxiliary inputs and earth speed data is repeated here.



Continuing to press this button switches to the next page of the GPS Sensor data, if on, as shown below:



This page displays the data provided by the GPS Sensor:


- **UTC, coordinated universal time:** reference time to Greenwich meridian 0 (UK).
- **Date:** date at Greenwich meridian 0 (UK).
- **Number of used satellites:** the number of satellites used by the GPS system to calculate the earth speed and position (an animated icon appears during the satellite search phase).
- **Latitude and Longitude:** geographic coordinates of the position obtained by the GPS system.



Pressing this button again takes the system to the main page.

NOTE



Pressing the Cancel key  using the normal scrolling of the pages displays the main page.

7.1 POWER BOX REMOTE UNIT CONNECTIONS

The X3 control unit can simultaneously connect up to four Power Box remote units: each of these controls and manages the respective motor that drives the product distribution pump assigned to it.

The Power Box number that the X3 control unit waits to connect and manage is defined in the program parameter *"Power Box Number"* (see parameter description). According to this number, the control unit waits to connect the Power Box units with identification assignment or address from 1 to the envisaged number.

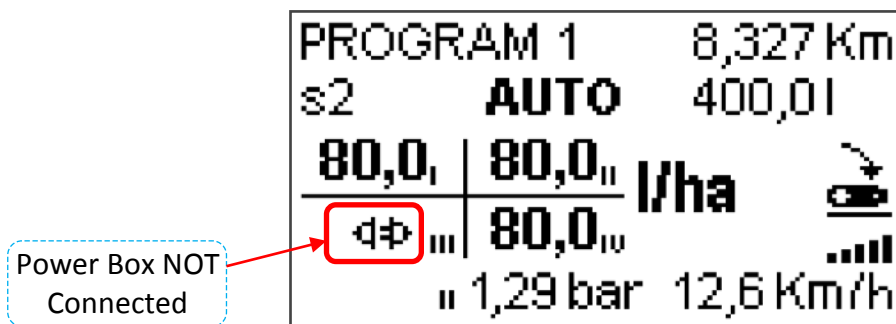
ATTENTION



If, for example, the program parameter *"Power Box Number"* is 2, a Power Box with ID of 3 or 4 is ignored and not connected. It will be connected and managed only if the parameter *"Power Box Number"* is set at 3 or 4.

Whereas, when the program parameter *"Power Box Number"* is 1, only the first recognised Power Box will be managed and controlled, regardless of the ID number. In this case, the system returns to the operating mode for single Power Box.

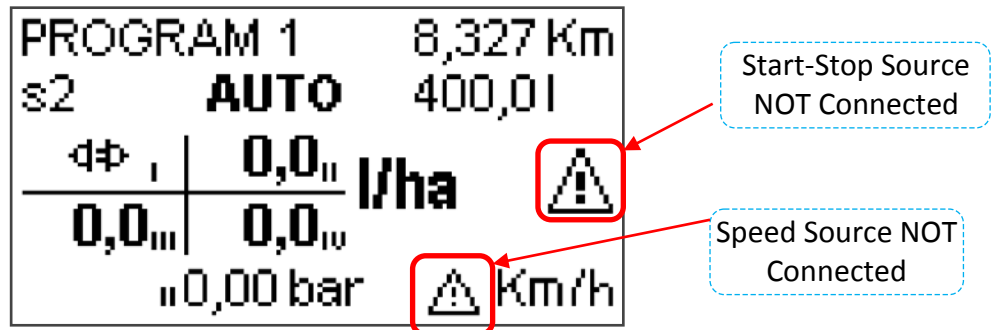
When a Power Box unit is expected by the X3 control unit but is not connected, instead of the numeric values the display shows an animation indicating failed connection, as shown below:



The Speed and Start-Stop signals can be connected to the X3 control unit and to any of the Power Box units connected and expected by the work program.

The choice of which source to use for these signals is made in the program parameters (see parameter description).

It may occur that the source of these signals is a non-connected Power Box unit, or that connection has been lost (due to disconnection, failure or other). In this case, the main page displays the icons to indicate this situation which the operator is required to solve.



When one of these essential signals is missing, the automatic distribution is locked and the motors stopped.

NOTE



The connection and/or disconnection of a Power Box is fully automatic and managed by the X3 control unit.

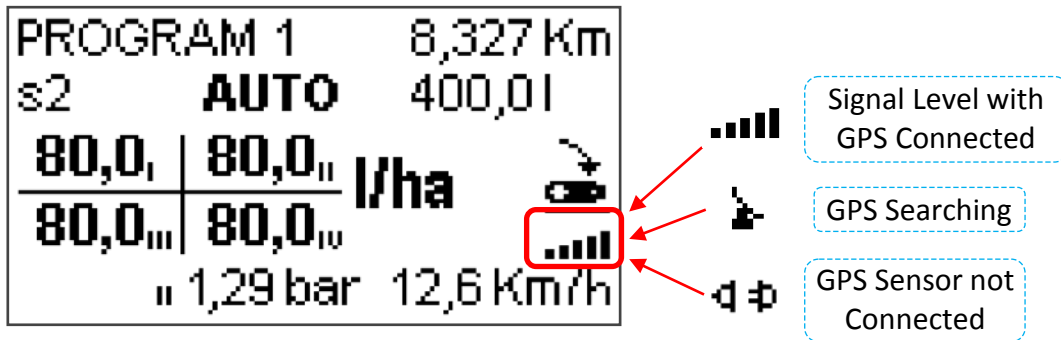
However, connections or disconnection are signalled by a set of beeps that alert the operator.

No confirmation or operation is required by the operator. The remote unit that temporarily loses connection (to be reported to assistance), if in automatic mode, resumes the distribution functions; whereas, in manual mode, the motor is stopped until a next start command is given by the operator.

7.2 GPS SENSOR SIGNALS

There is an area on the main operating screen that reports the operating state of the GPS Sensor, when used as speed source.

The state of operation of the GPS Sensor is represented by an icon as follows:



This image represents the signal level, that is the number of satellites received by the GPS Sensor. The higher the number of visible vertical bars, the better the accuracy of the earth speed measure. We recommend waiting a few seconds longer to operate with no less than 3 bars ■■■.



This animated icon indicates that the GPS Sensor is properly connected but searching for the GPS satellite signal. With this image you cannot work automatically because the GPS Sensor will provide zero earth speed.



This animated icon indicates that the GPS Sensor, used as speed source, is not connected. Even in this case you cannot work automatically, as there is no active and working source for the earth speed.

REMEMBER



Immediately after switching-on the X3 control unit, with GPS Sensor connected, it will be necessary to wait some time for the GPS receiver to hook up to the satellite constellation and provide a reliable earth speed.

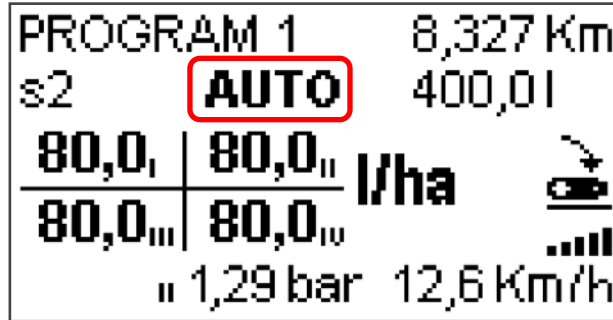
Turning on the control unit inside buildings or structures with roof, extends the waiting time. In special cases, the GPS Sensor may always remain in search mode.

We recommend turning on the system when you are outdoors.

8 AUTOMATIC MODE

When turned on, the X3 control unit sets itself in automatic mode, ready to activate the distribution motor based on the signals from the connected devices.

The automatic mode is indicated with the word "AUTO" on the main page:



Control of the distribution motors, connected units, depends on the following stored parameters:

- **Dose** to be distributed, in litres per hectare.
- **Work width**, defined a number of rows multiplied by the distance between rows.
- **Product Constant**, that is the conversion constant of pulses received by the flow meter in litres.
- **Earth Speed**, received by the GPS Sensor or calculated by the measured advancement pulses.

The way in which the distribution motor is activated depends on these other parameters

- **Start Command**: command percentage value to motor at restart when the Start-Stop signal changes.
- **Duration of the Start phase**: maximum time of "Start Command" in absence of a valid earth speed value.

The "Start Command" value is applied for at least half a second, even if a value other than earth speed zero is already present.

Switching from pause to start or distribution is subject to the Start-Stop signal, the state of which is represented by an icon as shown below:





Pressing the Up or Down buttons increases or decreases by one, for all units, the distributed dose with respect to the value stored in the program parameter in use.

By keeping the buttons pressed, the increase or decrease will be continuous and faster.



Pressing this button **during active distribution** directly switches from automatic mode to manual mode and vice-versa. By switching to manual mode the motors maintain the running state at the current operating speed.

Manual mode activation, with the motors stopped, is preceded by a selection as described below.

This button only has effect from the main operating page.

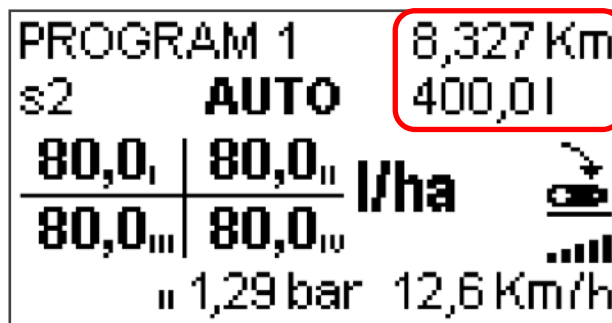
ATTENTION



By switching from automatic to manual mode, the last value of the power command to the motors is recorded and maintained. It is therefore up to the operator, in manual mode, to decide whether to stop the motor or change its speed.

8.1 DOWN-COUNTERS

If enabled in the advanced parameters, there are two down-counters on the main operating screen showing a space and quantity as shown below:



These counters are decremented starting from a certain quantity defined by the operator, by measuring the product dispensed by the motor of **remote unit number 1**. The working space counter is calculated based on the remaining product, at the dose defined and work width.



Keeping this key pressed enters the down-counter quantity value editing. A beep indicates to the operator that the editing is active and so that the desired value can be set. A flashing rectangle appears that surrounds the quantity value being edited.

0.5 s



Pressing the Up or Down buttons increases or decreases the quantity: by keeping the buttons pressed, the increase or decrease will be progressively faster.



Keeping this key pressed sets the quantity value at the default value recorded in the advanced parameters and a beep is emitted.



Pressing this button confirms the set value and a beep is emitted.



Pressing this button exits the editing in progress and the quantity value is returned to the initial one, before the editing began.

NOTE



If the counter quantity value is zero, entering the editing mode displays the default value recorded in the advanced parameters.

ATTENTION



The down-counters operate on the setting and operation data of remote unit number **1** only.

9 MANUAL MODE

When working in multi Power Box, the switch to manual mode is preceded by selecting the motors to be controlled.

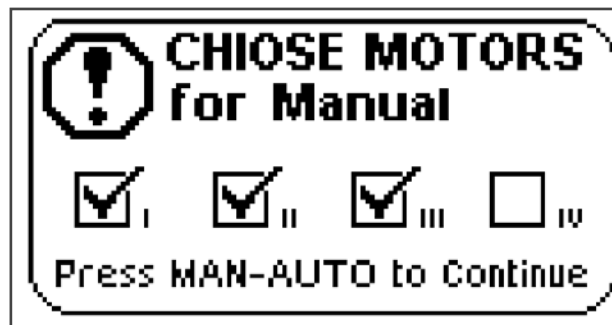


Pressing this button in automatic mode, with the motors stopped, activates the manual mode preceded by the display of the motor selection page. A beep is emitted to indicate the mode change.

Vice-versa, pressing this button in manual mode directly switches to automatic mode without any other signals.

This button only has effect from the main operating page.

The manual mode is preceded by the following screen for selecting the motors to be activated:



Pressing the Up or Down buttons moves between boxes: the selected box flashes.



Pressing this button alternately activates or deactivates the selected motor to enable or disable it to manual control. A beep is generated when the motor is activated.

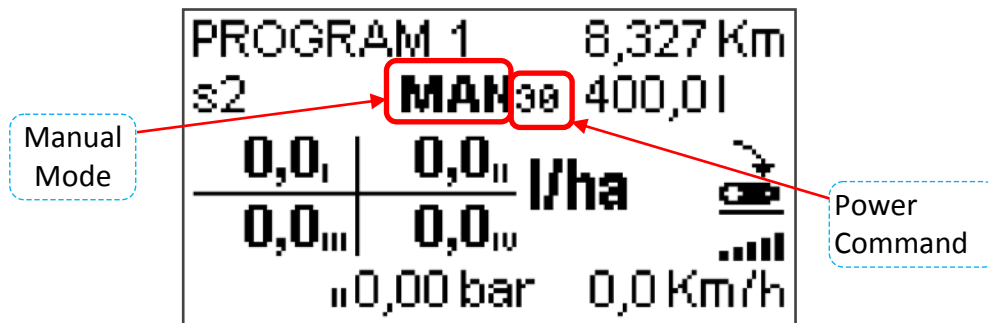


Pressing this button confirms the motor selector for manual mode and switches to real control. If no motor is selected, pressing this key returns the system to automatic mode.



Pressing this button exits the current operation and the system returns to automatic mode.

The manual mode is indicated with the word "MAN" on the main page. The power command value is shown next to the word:



The motor power command is set at the default value of 30%. In any case, the motor is stopped.



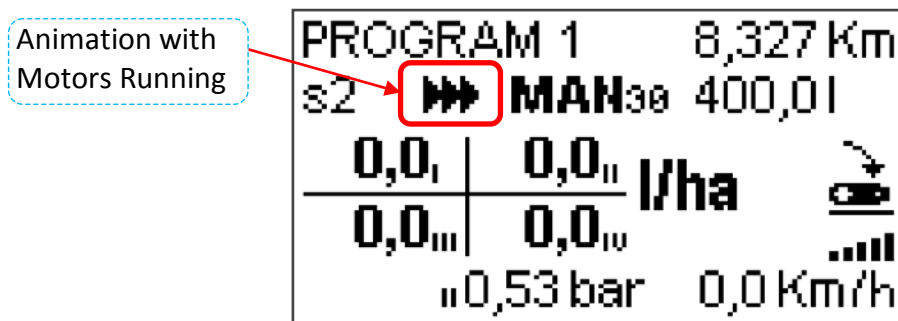
Pressing the Up or Down buttons, on the main page only, increases or decreases in steps of 5% the motor power command value between 5% and 100%. By keeping the buttons pressed, the increase or decrease will be continuous and faster.



Pressing this button alternately starts or stops the distribution motors selected for the manual mode at the defined power value.

This button also has effect from the work data pages.

An animation on the main page indicates that the selected motors are running. With motors stopped the animation is not visible.



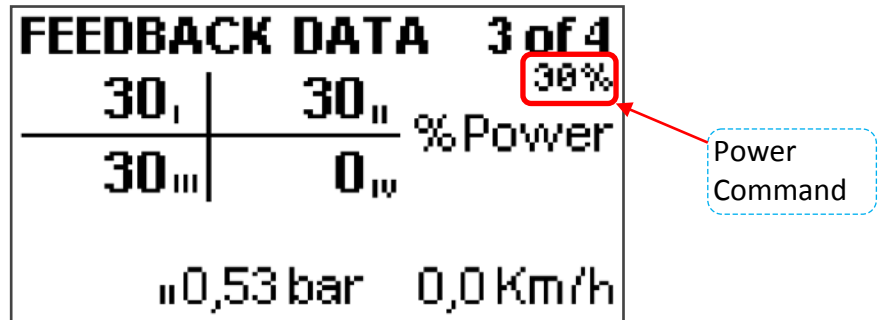
0.5 s

Keeping this key pressed directly switches to the remote manual mode, that is it enables the control unit to receive commands from the radio device. A beep signals the activation of this mode.

Since the system is already in manual mode, activation of the remote mode is not preceded by the motor selection but the already defined selection is considered valid and operational.

The remote mode is described in the next paragraph.

In manual mode, the motor power command value is also displayed in the work data pages, as shown below:



9.1 REMOTE MANUAL MODE

The remote mode allows the manual control of the motors by means of a radio control. Since, in any case, this is a manual control, switching to remote manual mode is preceded by selecting the motor to be controlled, as already described in the previous paragraph.

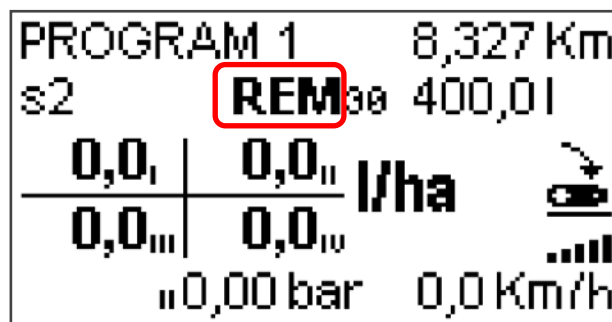


Keeping this key pressed switches to the remote manual mode, preceded by the display of the page for selecting the motors. A beep is emitted to indicate the mode change.

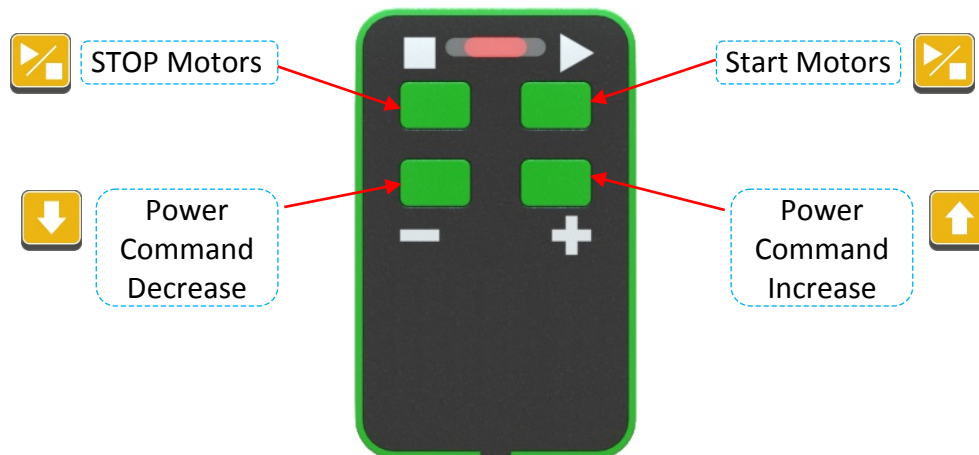
This button only has effect from the main operating page.

0.5 s

The remote manual mode is indicated with the word "REM" on the main page:



All manual commands as previously described are active in the remote manual mode, as well as the remote device commands as shown below:



The correct reception of a valid remote command received from the control unit will produce a beep. This audible warning allows you to verify the reception radius of the control unit and the proper operation of the remote system in general.



Pressing this button with the remote manual mode active, switches to simple manual mode, where the remote commands are not active.

This button only has effect from the main operating page.



Pressing this button with the remote manual mode active, switches to automatic mode and the remote commands are disabled.

This button only has effect from the main operating page.

REMEMBER



The remote manual mode has a limited duration, defined in the advanced parameters.

After the established time without receiving any remote command, the control unit disables the remote mode and switches to manual, stopping the distribution motors if running.

10 SECTOR COUNTERS



Pressing this button, one or more times, switches to the sector data page.



A total of 10 sectors can be displayed and made operative:

- **Sector data from 1 to 9:** updated when active.
- **Total sector data:** always updated, regardless of the active sector number.

The active sector is recognised by the word “On” top-right of the screen.

When a sector is active, its counters are updated based on the distributed data collected by all running motors. The data for all other sectors, except the total, is not updated but remains unchanged in the memory.



Pressing the Up or Down buttons cyclically switches between sectors, from the total sector to sector 1, then 2, up to 9 to then restart, or vice-versa.



0.5 s

Sector Activation: keeping this key pressed activates the sector whose number is displayed. The control unit emits a beep to confirm the operation and the word “On” appears on the screen.



2 s

Data reset: by keeping this button pressed the control unit starts emitting beeps for about two seconds, after which the sector data is reset and an extended beep is emitted. If the button is released during the beep sequence, the data is not reset and everything continues normally.

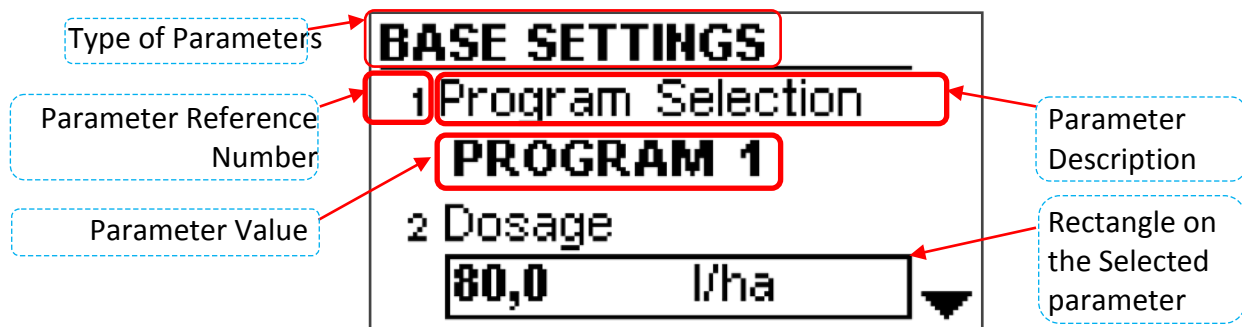
11 PARAMETERS

The parameters are divided into three categories

- **BASIC PARAMETERS** settings directly related to system management to observe the desired distribution dose.
- **ADVANCED PARAMETERS** settings not frequently used concerning certain aspects of control unit and system management.
- **DRIVER PARAMETERS** specific settings to manage and control the distribution motor of the remote units connected: access to these parameters assumes that the remote unit is connected and working and that it is provided in the *Power Box number* (program parameter) which you intend to use.



Pressing this button accesses (or exits) the parameters page starting from the basic parameters.



The parameters page displays the following data:

- **Type of Parameters:** Basic, Advanced or Driver data.
- **Reference Number:** unique numeric value identifying the parameter.
- **Parameter Description:** descriptive text of the displayed parameter.
- **Parameter Value:** number or text of the parameter, followed by the unit of measurement if provided.

The selected parameter has an outline rectangle that flashes when the edit mode is started.

On the right, the page displays two arrows in the shape of a triangle; one facing down and one facing up. They indicate the possibility of scrolling the list of parameters in the visible direction.




Pressing the Up or Down buttons scrolls the list of parameters. The arrows on the right margin are updated to indicate the presence or absence of parameters before or after those displayed.

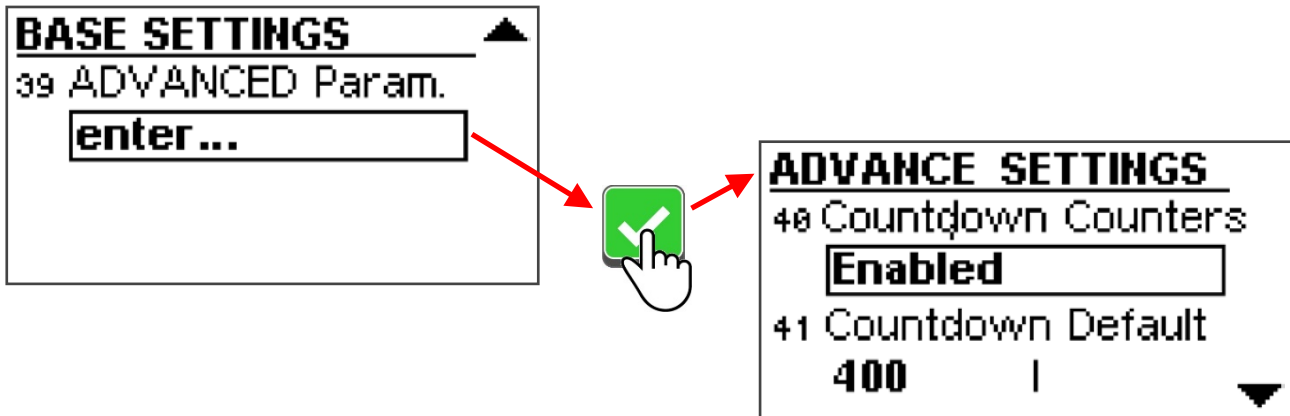


Parameter Edit Start: pressing this key accesses the edit mode of the selected parameter; a beep is emitted to confirm the operation and the outline rectangle starts to flash.



Pressing this button will return to the list of higher level parameters or, at the end, goes back to the main page.

If the selected parameter refers to the list of advanced or driver parameters, pressing  switches to the list of selected parameters, as shown below:




REMEMBER



Some parameters may not be editable or accessible depending on the choices made on other parameters. For example, the speed constant will not be available if the earth speed comes from the GPS Sensor, or the Driver parameters will not be accessible if the Driver is not connected.

11.1 EDITING A PARAMETER VALUE

Pressing  accesses the edit mode of the selected parameter.

Some parameters have numeric values, others have predefined fields to select the desired value or function.



Edit Parameter Value: use the Up or Down keys to edit the parameter, increasing or decreasing it within the provided maximum and minimum value.

Keeping the buttons pressed when the parameter is numeric, speeds up the increase or decrease.



Confirm Parameter Value: pressing this key confirms the value of the parameter changed using the Up or Down keys: a beep is emitted to confirm the operation and the outline rectangle stops flashing.



Pressing this button exits the editing in progress and the parameter value is returned to the previous one, before the editing began.

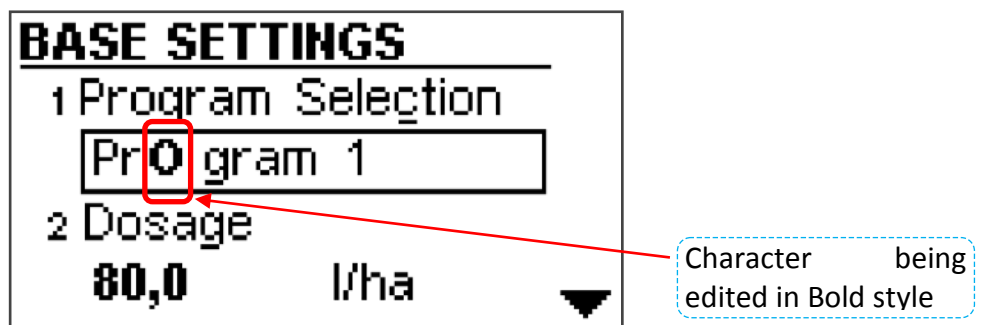
11.2 EDITING THE PROGRAM NAME

The program name is a text parameter that the operator can change.



0.5 s

Keeping this key pressed accesses the **edit text** mode. The control unit emits a beep and sets itself for character editing, one at a time, starting with the first character on the left. The character being edited is printed in bold while the remainder of the text is printed with normal character



Edit Character: Use the Up or Down keys to edit the bold character, scrolling between uppercase, lowercase and numeric alphabet.

Keeping the button pressed progressively speeds-up the character scrolling.



Confirm the Character: pressing this key confirms the chosen character that is printed normally: the system switches to the next character, highlighting it in bold.



Deleting the Character: pressing this button deletes the current character and the text on the right moves by one position.



0.5 s

Text confirmation: keeping this key pressed saves and activates the edited text. The control unit emits a beep to confirm the operation and exits the edit mode.



0.5 s

Reset changes: keeping this button pressed exits the current editing: the program name is reset to the previous text, before the editing began.

ATTENTION

The maximum length of the program name is 15 characters.

Nevertheless, the system may limit the program name to a smaller number of characters if the typed text appears to occupy more than the maximum allowed size on the screen.

Texts with wide letters, such as “W” or “M”, may be shorter than texts with narrow letters such as “l” or “t”.

REMEMBER

Two temporary characters are used during text editing, to recognise the space character (·) and the end of the text (*). These special symbols are only visible in this mode and not on the final program name.

The operator can quickly and easily return the program name to the original default text. In this case it is not necessary to access editing, but by selecting the Program name simply keep the Cancel button pressed as described below.



3 s

Resetting Program Name to Default text: by keeping this key pressed the control unit starts emitting beeps for about three seconds, after which the program name is reset to the default text and an extended beep is emitted to indicate the performed operation.

If the button is released during the beep sequence, the program name is not edited and everything continues normally.

11.3 PRODUCT CONSTANT CALIBRATION

The Product Constant value is an essential data for distributing the desired dose and represents the number of pulses per litre (imp/l) of distributed product.

The value of this constant can be known beforehand when using components such as flow meters or calibrated counters, or can be determined by the calibration operation described herein.



0.5 s

Calibration Activation: keeping this key pressed on the selection of the calibration constant, switches to the product constant calibration page. The control unit emits a beep to warn the operator.

The calibration mode is a manual control mode and, therefore, the motors not involved are kept stationary.

ATTENTION



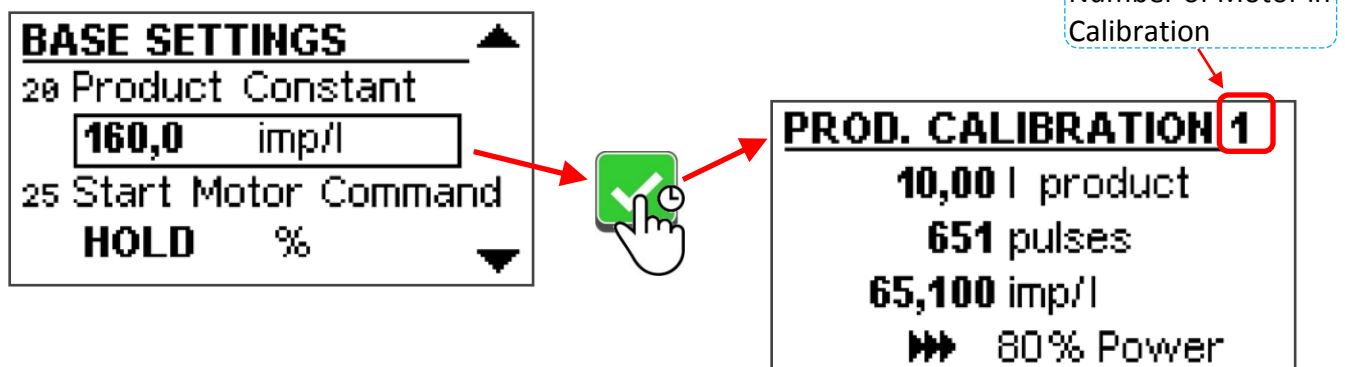
The product constant can be unique for all the distribution motors of the units connected, or different and each unit uses its own set value.

When the product constant is unique, the calibration procedure operates solely and exclusively with the motor of remote unit number 1.

ATTENTION



Access to the calibration page is not permitted when the remote unit is not connected or the system is in automatic mode with the distribution motors running.



The product calibration page shows the motor number and the following data:

- **Product Quantity:** is the product collected and measured during calibration.
- **Pulses:** number of pulses from flow meter that the system counts during the distribution motor operation.

- **Product Constant:** provisional calculation of the constant based on the product quantity and number of pulses measured.
- **Motor Command:** animation and command percentage of the distribution motor.

Below is the typical sequence for calibration operations:

1. Setting of the motor command percentage.
2. Start of the distribution motor.
3. Wait for dispensing of the desired product quantity.
4. Stop of the distribution motor.
5. Measure the quantity actually dispensed and enter the value on the screen.
6. Save the calibration constant and exit.

The sequences are not binding but all steps can be repeated as you see fit.

Below the commands provided for this operation:



Pressing the Up or Down buttons increases or decreases the motor power command value. By keeping the buttons pressed, the increase or decrease will be continuous and faster.



Pressing this button alternately starts or stops the distribution motor at the defined power value. The pulses are counted and the calibration constant immediately updated during motor operation.



0.5 s

Keeping this key pressed activates the remote manual mode. A beep signals the activation of this mode.



Pressing this button with the remote mode active, switches to simple manual mode, where the remote commands are not active.



2 s

Product Constant Recording: by keeping this key pressed the control unit starts emitting beeps for about two seconds, after which the product constant value displayed is recorded in the active program only, and an extended beep is emitted to indicate the performed operation.

If the button is released during the beep sequence, the system does not record the value and everything continues normally.



Pressing this button exits the calibration page and returns to the basic parameter page.

ATTENTION

Exiting the calibration procedure with a valid but not recorded calibration constant, requires confirmation of the operation so as not to lose any acquired data.

11.3.1 MODIFICATION OF THE PRODUCT QUANTITY UNDER CALIBRATION

The product quantity is proposed by the system when you enter the calibration page and can be modified by the operator to set the correct and measured value.



0.5 s

Keeping this key pressed enters the product quantity value editing. A beep indicates to the operator that the editing is active and so that the desired value can be set. A flashing rectangle appears that surrounds the quantity value being edited.



Pressing the Up or Down buttons increases or decreases the quantity: by keeping the buttons pressed, the increase or decrease will be progressively faster.



Pressing this button confirms the set value and a beep is emitted.



Pressing this button exits the editing in progress and the quantity value is returned to the initial one, before the editing began.

When changing the quantity, the update of the product constant calibration is immediately displayed.

11.4 ADVANCEMENT CONSTANT CALIBRATION

Like the Production Constant, the Advancement Constant is also an essential data for distribution motor management and application of the desired dose. This constant is the advancement space for each speed sensor pulse, when using encoder, sound wheels or pulse devices.

The value of this constant can be known beforehand when using encoder or calibrated devices, or can be determined by the calibration operation described herein.

REMEMBER



When setting the GPS Sensor as speed source, the advancement constant value is not accessible or editable since this device obtains the speed data directly from the GPS receiver.



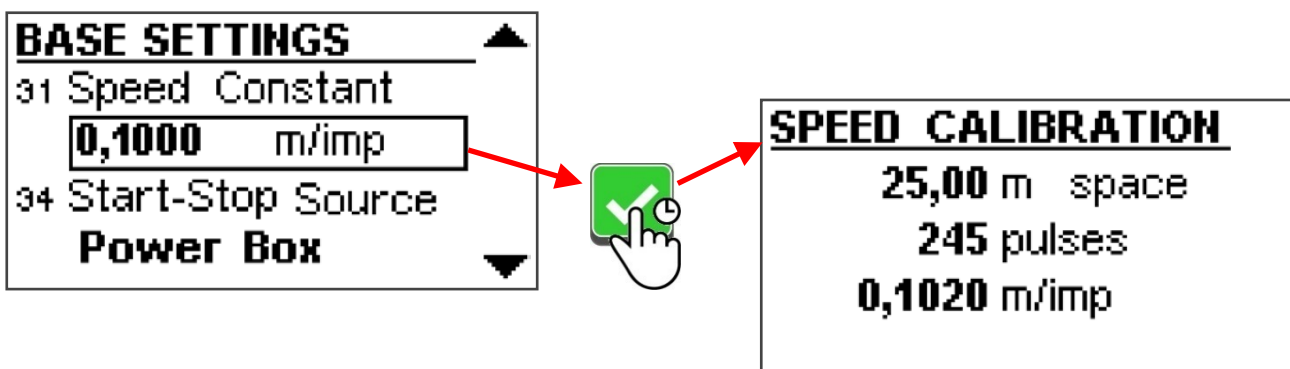
0.5 s

Calibration Activation: keeping this key pressed on the selection of the advancement constant, switches to the Advancement Constant calibration page. The control unit emits a beep to warn the operator.

ATTENTION



The calibration page cannot be accessed if the system is in automatic mode and the distribution motor is running.



As shown, the calibration page displays the following data:

- **Calibration Space:** is the distance travelled and measured during calibration.
- **Pulses:** number of speed sensor pulses that the system counts during the vehicle advancement in the calibration space.
- **Advancement Constant:** provisional calculation of the constant based on the distance travelled and number of pulses measured.

Below is the typical sequence for calibration operations:

1. Setting of the calibration space to be travelled.
2. Tractor advancement for the defined space.
3. Tractor stop.
4. Measure of the distance actually travelled and correction of the value on the screen.
5. Save the calibration constant and exit.

The sequences are not binding but all steps can be repeated as you see fit.

Below the commands provided for this operation:



2 s

Advancement Constant Recording: by keeping this key pressed the control unit starts emitting beeps for about two seconds, after which the product constant value displayed is recorded in the active program, and an extended beep is emitted to indicate the performed operation.

If the button is released during the beep sequence, the system does not record the value and everything continues normally.



Pressing this button exits the calibration page and returns to the basic parameter page.

ATTENTION



Exiting the calibration procedure with a valid but not recorded calibration constant, requires confirmation of the operation so as not to lose any acquired data.

11.4.1 MODIFICATION OF THE CALIBRATION SPACE

The calibration space is proposed by the system when you enter the calibration page and can be modified by the operator to set the correct and measured value.



0.5 s

Keeping this key pressed enters the calibration space editing. A beep indicates to the operator that the editing is active and so that the desired value can be set. A flashing rectangle appears that surrounds the space value being edited.



Pressing the Up or Down buttons increases or decreases the value: by keeping the buttons pressed, the increase or decrease will be progressively faster.



Pressing this button confirms the set value and a beep is emitted.



Pressing this button exits the edit in progress and the calibration space value is returned to the initial one, before the editing began.

When changing the calibration space, the update of the advancement constant is immediately displayed.

11.5 LIST OF PARAMETERS

As described in the previous paragraphs, the parameters are divided into three categories and each parameter has a reference number for fast traceability.

11.5.1 BASIC PARAMETERS

- | | | |
|-----------|------------------------------|--|
| 1 | Program Selection | name of selected program, visible on the main page. |
| 2 | Dose applied | dose in litres per hectare (l/ha) to be distributed, valid for each connected unit

If the dose differentiation has been enabled for the individual units connected (see <u><i>different dose</i></u> parameter) and depending on how many units are provided (see <u><i>Power Box number</i></u> parameter), this parameter changes name and the other doses will also be visible as follows: <ul style="list-style-type: none"> 2 Motor 1 Dose 3 Motor 2 Dose 4 Motor 3 Dose 5 Motor 4 Dose |
| 10 | Motor 1 Rows | number of rows to calculate the work width for motor 1. This parameter acts together with the <u><i>distance between rows</i></u> parameter to correctly define the motor speed.

Depending on how many units are to be managed (see <u><i>Power Box number</i></u> parameter), the number of rows for the other motors will also be visible: <ul style="list-style-type: none"> 11 Motor 2 Rows 12 Motor 3 Rows 13 Motor 4 Rows |
| 14 | Distance between rows | parameter which multiplied by <u><i>rows for Motor</i></u> gives the work width for the individual motors. This value is an essential data for the correct distribution of the desired dose. |
| 15 | Total work width | this parameter, used for the sector data, allows the correct calculation of the worked surface: it has no relevance in the calculation of the motor speed. |
| 20 | Product Constant | value measured in pulses per litres (imp/l) is applied to each connected unit. Together with the number of rows and distance between rows, is an essential parameter for the correct distribution of the desired dose.

If the product constant differentiation has been enabled for the individual units connected (see <u><i>Different Prod. Const.</i></u> parameter) and depending on how many units are envisaged (see <u><i>Power Box number</i></u> parameter), this parameter changes name and the other constants will also be visible as follows: <ul style="list-style-type: none"> 20 Product Constant 1 21 Product Constant 2 22 Product Constant 3 23 Product Constant 4 |

- 25 Command to Start** this parameter is the command given to the motors when the Start-Stop sensor gives consent to distribution.
- This command is maintained, in the absence of the tractor speed, for a maximum time defined by the Start phase duration parameter. If, in the meantime, the tractor resumes at speed greater than zero, the system adjusts the distribution motors so as to ensure the desired dose. After the set time with the tractor still stationary, the motors are stopped.
- The value is between 10 and 100% or Prior, which is intended to store the last command value used before the pause determined by the Start-Stop sensor in Stop position.
- 26 Start phase duration** is the command to Start time from when the Start-Stop sensor gives consent to distribution with the tractor stopped. After this time the distribution motors are stopped.
- 30 Speed Source** choice of source to determine the tractor speed. Depending on how many units are provided (see Power Box number parameter) the following options are available:
- GPS Sensor (input on X3 control unit)
 - Local Pulses (input on X3 control unit)
 - Power Box 1
 - Power Box 2
 - Power Box 3
 - Power Box 4
- Use of the GPS Sensor, which can only be connected to the control unit, uses a serial connection while the other choices imply the use of pulse speed sources for which the advancement constant must be defined.
- 31 Advancement Const.** measured in metres per pulses, is a value derived from the speed transducer data or obtained by direct calibration. It is an essential element for calculating the tractor speed and therefore for the correct distribution of the desired dose.
- 34 Start-Stop Source** choice of source for the Start-Stop sensor. Depending on how many units are provided (see Power Box number parameter) the following options are available:
- This Unit (input on X3 control unit)
 - Power Box 1
 - Power Box 2
 - Power Box 3
 - Power Box 4
- 35 Start-Stop Polarity** this parameter defines the closed or open polarity of the Start-Stop sensor for consent to product distribution.
- 36 Start-Stop Filtering** filtering time for the Start-Stop sensor state change. This parameter is intended to avoid possible imprecise bounces or switch-overs; the greater the filter time the worse will the control reaction of the distribution motor to the Start-Stop sensor state change be. We recommend values below 0.4 seconds.

- 38 Power Box Number** value between 1 and 4 for defining the remote unit number that the X3 control unit intends to connect and control. The screens with the remote unit data are adapted depending on this parameter value.
- If the user decides to work with a single Power Box, the X3 control unit sets itself in single Power Box mode and operation.

11.5.2 ADVANCED PARAMETERS

- 40 Down-Counter** enabling of down-counters shown on the main screen. If not enabled they will not be displayed.
- 41 Default Counter** default quality for down-counter when it reaches zero. This data generally coincides with the capacity of the tank installed.
- 45 Different Doses** this parameter enables the dose differentiation for each individual remote unit expected. When enabled, the dose parameter for each individual motor becomes accessible, otherwise the dose is unique.
Parameter not visible with the control unit in single Power Box mode.
- 46 Different Prod. Const.** this parameter enables the product constant differentiation for each individual remote unit expected. When enabled, the product constant parameter for each individual motor becomes accessible, otherwise it is unique for all units.
Parameter not visible with the control unit in single Power Box mode.
- 50 Remote Duration** this value is the maximum duration of the remote mode in the absence of remote commands received. After this time the system disables the remote mode and returns the system to manual mode.
- 51 LCD Brightness** backlight value of the LCD display of range 0.. 100%.
- 52 LCD Bright. Duration** backlight on duration from when the last keyboard button was pressed or from last remote command received.
The **0** value is equivalent to backlighting always on.
- 53 Language** choice of language used in the X3 control unit texts.
- 60 Adjust. Readiness** value between 1 and 40 for the distribution motor reaction to the changes in tractor speed or distribution conditions.
Attention: excessively high values can cause instability and oscillations.
- 65 Reset Default** reset of the control unit and remote units connected to the default values entered at time of manufacture.
Attention: this operation is in fact a memory reset of the control unit and remote units connected and deletes all changes made to the work program, system counters and any other parameter. Before proceeding an explicit operator confirmation will be required.

11.5.3 DRIVER PARAMETERS (POWER BOX from 1 to 4)

70 Type of Product	choice of product type to correctly display the unit of measure of the distributed quantity. The options available are: <ul style="list-style-type: none">• Liquid (l)• Solid (Kg)
71 Rated Current	rated current of operation of the distribution motor. Below this value the system operates regularly, while above it the system signals the overload alarm.
72 Maximum Current	maximum current of the distribution motor beyond which it is immediately stopped to avoid irreversible failures.
73 PWM Frequency	PWM bridge frequency to control the distribution motor.
78 Aux. Inp. Enabl.	enabling to use the auxiliary sensor. The auxiliary sensor is normally used to measure the distribution pressure, but it can perform other roles since it is a fully configurable input.
79 Aux Inp. Signal	for the auxiliary sensor it is the definition of the type of electrical connection between the following options: <ul style="list-style-type: none">• Analog. 4-20 mA• Analog. 0-10 V• Digital• RPM Measure The RPM measure is used to estimate the rpm of pumps, motors or other.
80 Aux Inp. Size	unit for type of measure performed by the auxiliary sensor. The options available are: <ul style="list-style-type: none">• bar (pressure)• m (level)
81 Aux Inp. Polarity	this parameter defines the <i>closed</i> or <i>open</i> polarity of the auxiliary sensor when the <i>Aux Inp. Signal</i> is Digital. In this case the sensor performs a warning function such as the tank almost empty signal, which activates on the chosen polarity.
82 Aux Inp. Full Scale	when it is an analogue type sensor, this parameter defines the value corresponding to the envisaged full scale. This way, the electrical measure of the current or voltage on the sensor can be traced to the measure of the physical size detected. When the auxiliary input is defined for the RPM measure, this parameter is the ratio between the number of pulses received for each machine revolution (imp/rev).
83 Aux Inp. Filtering	filtering time for the auxiliary sensor state change when configured as digital, or time constant for dimming or stabilising the displayed analogue value. We recommend values between 1 and 3 seconds.
94 IDCode	unambiguous Power Box identification code.

- 95 Firmware Release** Power Box firmware version
- 96 Type of Unit** type of PowerBox unit connected.

12 ALARMS

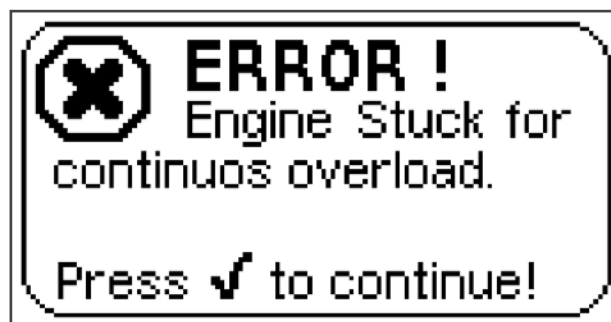
The alarm, meaning the malfunction, anomaly or failure signals, are managed and displayed according to the priority assigned as follows:


- **HIGH priority** display of a specific alarm screen with distribution motor lock.
- **LOW priority** display of a numeric code on the main screen:

12.1 HIGH PRIORITY ALARMS

The high priority alarms are those alarms that automatically prevent the proper operation of the distribution motor or are caused by overloads or overcurrents so the motor lock is intended to protect the electronics and the motor itself against irreversible damage.

A serious alarm is displayed with a full screen message like this one:



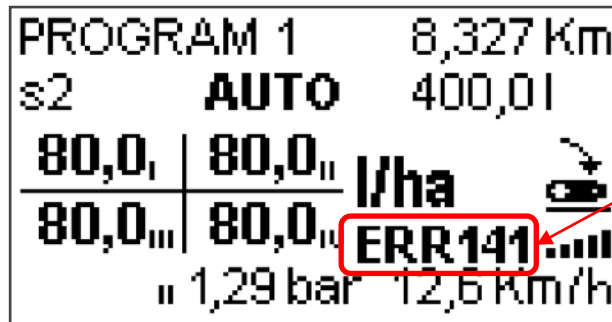
All system functions are locked until the operator presses the confirmation button .


This type of alarms are:

- Overload of the Power Box power control.
- Motor stop for absence of pulses from flow meter (in automatic mode).
- Motor stop for continuous overload (rated current exceeded).
- Motor stop for overcurrent (maximum current exceeded).
- Motor stop due to short-circuit.

12.2 LOW PRIORITY ALARMS

The low priority alarms are displayed on the main page as flashing as follows:



PROGRAM 1	8,327 Km
s2	AUTO 400,01
80,0 _i	80,0 _{ii} l/ha
80,0 _{iii}	ERR141 
1,29 bar	12,6 Km/h

The alarm code appears flashing and accompanied by intermittent beeps. If there are several active alarms, the corresponding codes alternate on the screen.

Pressing any keyboard button silences the alarm and stops the sequence of beeps: when new alarms occur, the acoustic signal resumes.

When the alarm ceases, the acoustic signal and corresponding code disappear unless there are alarms for which silencing by the operator is required.

REMEMBER



The purpose of the *silence* request for certain alarms before disappearing, is to inform the operator of the particular anomaly. Despite being a low priority alarm, the operator still needs to be informed.

12.3 ALARMS CODES

Please remember that the elements cooperating for system operation are five at most, to which the following alarm code groups are assigned

- ERR codes from **10** to **39** X3 Control unit alarms
- ERR codes from **140** to **169** POWER BOX 1 alarms
- ERR codes from **240** to **269** POWER BOX 2 alarms
- ERR codes from **340** to **369** POWER BOX 3 alarms
- ERR codes from **440** to **469** POWER BOX 4 alarms

All Power Box alarm codes derive from and can be traced back to numbers from 40 to 69. The number of the Power Box that generated it is added as first digit.

This way code 140 or 240 etc., represents the same type of alarm but generated by Power Box 1 for code 140, or Power Box 2 for code 240 and so on. The following description indicates **n40** or **n41** etc. as the alarm code that is common to all Power Boxes, being **n** the number of the Power Box in alarm.

Below is a list of alarm codes with the description of their meaning, the possible cause and solution.

ERR 10

ERR **n40** High battery voltage, above 18 Volt

The system can still work, but the chances of the electronic components breaking increases.

This alarm can be caused by the tractor alternator which causes an overload of the discharging or damaged battery, or by an error in the wiring on 12/24 Volt mixed powered tractors.

ERR 11

ERR **n41** Low battery voltage, below 11 Volt

If the voltage is too low, the system can work but the distribution motor capacity will be below the defined specifications.

Start the tractor engine to recharge the battery. If this alarm comes from a Power Box, with distribution motor running, there may be an excessive voltage drop on the cables, on the 13-pin connector plugged-in incorrectly or on the battery terminals.

ERR 12

ERR **n42** Low Sensors power supply voltage

If the voltage is too low the system in automatic mode cannot work since it is not possible to guarantee the proper operation of the sensors.

Check the sensor wiring, possible short-circuits, cable failures or other.

This alarm can be concomitant with the low battery voltage alarm, in which case correct the general voltage drop.

ERR 13**ERR n43 Low CAN BUS power supply voltage**

This alarm means there is a problem on the CAN-BUS communication line, which may not work properly, or in the electronics hardware.

Check the wiring and if the problem persists contact technical assistance.

ERR 14**ERR n44 Earth speed Sensor input anomaly**

This alarm is generated for the pulse speed inputs when the input signals exceeds the maximum frequency or there are invalid pulses that compromise proper measurement.

Check the advancement constant value and the correct sensor connection. If the problem persists contact technical assistance.

ERR 15**ERR n45 Start-Stop input anomaly**

This alarm is generated when there are status changes or high-frequency change-overs on this input that are not envisaged.

Check that the Start-Stop sensor is mechanically positioned and works without vibrations and also check the proper wiring.

If the problem persists contact technical assistance.

ERR 16**ERR n46 Loss of parameters in Memory**

The loss of operating data from the memory of the various units does not prevent the system from working properly because the default data is used.

Try changing a parameter of the unit in alarm to verify whether the loss was occasional or if there is a persistent hardware problem.

If the problem occurs at each power-on, contact technical assistance.

ERR 17**ERR n47 Error in saving data in the Memory**

The unit in alarm is unable to save a parameter change in the memory, or in general update the work data.

Try changing a parameter of the unit in alarm to verify if the error persists, in which case contact technical assistance.

ERR 18**ERR n48 High temperature**

The unit in alarm has reached a temperature exceeding 80°C. Check the actual temperature increase and, if confirmed, take the necessary measures to cool-down the unit. To work with this alarm active, significantly increases the likelihood of hardware failures.

If this alarm has no practical feedback (when touched, the unit is cold or just slightly warm) contact technical assistance.

ERR n27 Error in the distributed dose.

The dose to be distributed deviates by more than 25% (in excess or defect) from that set in the work program in use. The causes of this alarm are:

- Tractor speed too high for the desired distribution dose or for distribution motor capacities.
- Product finished (empty tank).
- Clogging of the distribution ducts.
- Sustained tractor speed instability.
- Value of the adjustment readiness program parameter too high or too low.
- Error in the distance between rows program parameter.
- Error in the number of rows program parameter.
- Error in the product constant program parameter.

ERR 28 Overload on the POWER BOX power supply.

The X3 control unit provides an auxiliary power supply to activate the Power and turn on the main relay.

This alarm indicates that the current absorption on this line is excessive or there is a short-circuit.

Check the wiring and if the problem persists contact technical assistance.

ERR 29 Connection timeout with GPS Sensor

This alarm is generated following failure to acknowledge (connection) the GPS Sensor connected to the X3 control unit.

Check the wiring and if the problem persists contact technical assistance.

ERR n49 Flow meter input anomaly

This alarm is generated when the input signal exceeds the maximum frequency or there are invalid pulses that compromise proper measurement.

Check the correct sensor connection. If the problem persists contact technical assistance.

ERR n50 Lack of flow meter pulses

With the distribution motor running, this alarm indicates that there are no pulses from the flow meter. The causes of this alarm are:

- Product finished (empty tank).
- Clogging of the distribution ducts.
- Damaged flow meter.
- Incorrect flow meter wiring.
- Failure of the Distribution motor or of the pump connected to it.

If the problem persists contact technical assistance.

ERR n51 Distribution motor in Overload

The motor current exceeds the defined *rated current*. If this condition persists, the motor is locked within a maximum of 10 seconds; the higher the overload current the shorter the time to lock the motor.

The causes of this alarm are:

- High tractor speed and motor under stress.
- Clogging of the distribution ducts.

If the problem persists contact technical assistance.

ERR n52 Distribution motor current beyond the maximum

The motor current exceeds the defined *maximum current*. The motor is immediately locked to avoid damaging it.

The possible causes of this alarm are:

- Clogging of the distribution ducts.
- Failure of the Distribution motor.

If the problem persists contact technical assistance.

ERR n53 Distribution motor in short-circuit

The causes of this alarm are:

- Motor locked due to clogging of the distribution ducts
- Motor wiring damage.
- Motor failure.

If the problem persists contact technical assistance.

ERR n54 Distribution motor lock

This alarm is the result of other high priority alarms that are managed with a dedicated screen. The appearance of this code is only temporary since operator intervention has already been requested.

ERR n55 Distribution motor out of control

The distribution motor is running regardless of the system control. Likely failure of the Power Box hardware. Contact technical assistance.

ERRn56 Battery power supply not selectable (faulty relay)

When shut-down or when the control unit is switched off, the main power supply of the Power Box is disconnected by a relay. This alarm indicates that the relay is faulty or has stuck contacts so the unit in alarm actually remains on.

Try turning the control unit off and several times and, if the problem persists, contact technical assistance.

Note: it is possible to operate normally even in the presence of this alarm. However, when work is completed, disconnect the 13-pin connector to make sure that the Power Box is not powered and so that it does not discharge the tractor battery.

13 OPERATING OVERVIEW IN SINGLE POWER BOX MODE

When the *Power Box Number* parameter is one, or when the Power Box remote unit identification is more than four, meaning an unexpected identification in the multi Power Box control, the X3 control unit sets itself to control a single remote unit, regardless of whether or not there are more units.

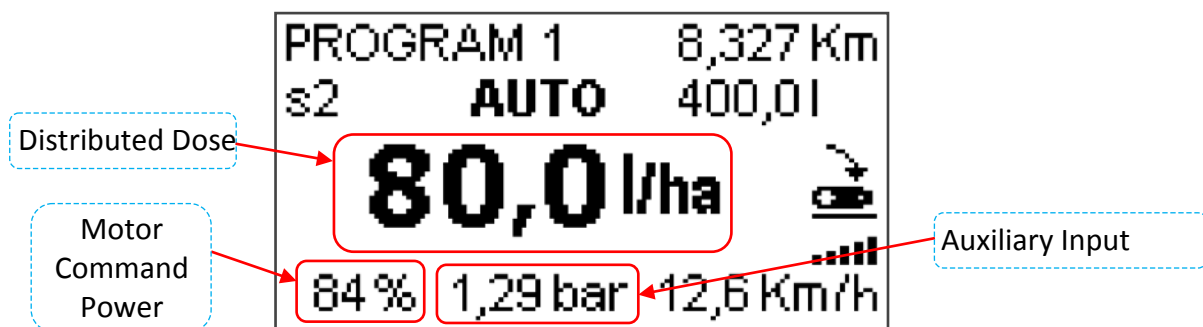
If the distribution system is organised with multiple Power Boxes and the operator decides to work with a single remote unit, it is **mandatory** to disconnect the unused remote units leaving the 13-pin connector open. With all remote units connected, the X3 control unit will connect and work unpredictably with any of the Power Boxes detected.

Below are the main differences in the main data display.

The operation analysed in the previous chapters remain valid, as do the setting parameters and the various signals.

13.1 MAIN PAGE DATA ORGANISATION

Unlike that stated in chapter 7, in the single Power Box control, the main page only differs in the data shown below:

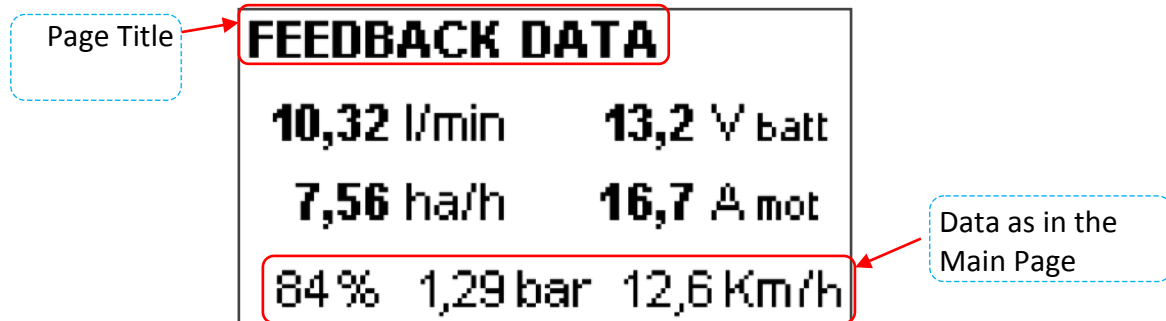


Remember that display for the following data depends on the operator settings:

- **Number of sector for counters:** if not visible, use the total counters only.
- **Quality of the GPS Sensor Signal:** visible if using a GPS Sensor.
- **Down-Counters:** visible if activated under its item of the advanced parameters.
- **Auxiliary Input:** visible if enabled in the Power Box specific parameters.

13.2 WORK DATA ORGANISATION


Compared to that stated in chapter 7, the work page in single Power box control is **unique** and includes the data as follows:



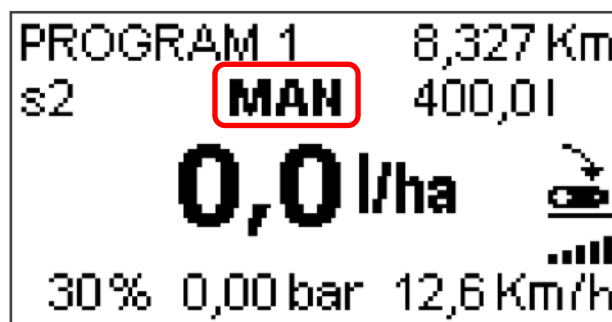
This page displays the instantaneous work data of the connected Power Box only, that is:

- **Quantity of product dispensed per minute:** measure calculated based on the flow meter signal.
- **Hectares worked per hour:** estimate of hectares worked per hour based on the current earth speed.
- **Battery voltage:** the voltage level from the battery to the Power Box.
- **Motor current:** current measured on the motor (other than the absorbed current).
- **Basic data:** as in the main page, the power data to the motor, auxiliary input and earth speed data is repeated here.

13.3 MANUAL MODE FOR SINGLE POWER BOX

Unlike that stated in chapter 9, switching to manual mode or vice-versa occurs immediately by pressing the button . No request or additional operation is made to the operator.

The manual mode is indicated by the word "MAN" on the main page, while the power command value applied or intended to be applied to the motor is displayed bottom-left.



The manual operating features are unchanged with respect to that set out in chapter 9.

13.4 ALARMS CODES FOR SINGLE POWER BOX

The alarm codes described in chapter 12.3 remain valid for the single Power Box also.

The alarm code indicated with, for example, **ERRn40** or **ERRn41**, simply becomes **ERR40** and **ERR41**. The number **n**, reference of the Power Box in alarm, disappears and the codes are assigned to the following groups:

- ERR codes from **10** to **39** X3 Control unit alarms
- ERR codes from **40** to **99** POWER BOX alarms

14 TECHNICAL FEATURES

14.1 X3

Electrical Features

- *Rated Power Supply Voltage:*.....12 ÷ 15 Volt (protected from polarity reversal)
- *Power supply Current*< 120 mA backlighting at 100%
< 60 mA backlighting off
(sensors and remote unit excluded)
- *Minimum power supply voltage:*7 Volt with maximum backlighting at 15%
- *Maximum power supply voltage:*< 20 Volt
- *Rated Voltage for the speed sensor:*.....12.0 ± 0.25 Volt
- *Current available for the speed sensor:* < 800 mA (protected from overload and short-circuit)
- *Pulse signal on Speed Input:*NPN type (open collector)
- *Maximum Pulse Frequency on Speed Input:*.....1200 Hz (duty cycle 50 %)
- *Signal on Start-Stop Input:*.....NPN type (open collector)

Environmental specifications

- *IP Protection rating*IP 54
- *Operating Temperature Range*-20°C ÷ 60°C

Mechanical features

- *Dimensions*.....155 x 95 x 32 mm (connectors excluded)
- *Weight*.....0.5 Kg

Accessories included in the supply

- *Double fulcrum articulated hitch*
- *4-Button radio control*

14.2 POWER BOX

Electrical Features

- *Rated Power Supply Voltage:*.....12 ÷ 15 Volt (protected from polarity reversal)
- *Power Supply Current (sensors and motor excluded):*.....< 60 mA
- *Activation Current for the Load Relay*.....< 130 mA (rated at 12 Volt)
- *Minimum power supply voltage:*11 Volt (operating motor)
- *Maximum power supply voltage:*< 20 Volt
- *Maximum Current to motor:*.....< 30 Ampere (protected from short-circuit)
- *Rated Voltage for the speed sensor:*12.0 ± 0.25 Volt
- *Current available for the speed sensor:* < 800 mA (protected from overload and short-circuit)
- *Pulse signal on Speed Input:*NPN type (open collector)
- *Signal on Start-Stop Input:*NPN type (open collector)
- *Maximum Frequency for Pulse inputs:*.....1200 Hz (duty cycle 50 %)

Environmental specifications

- *IP Protection rating*IP 65
- *Operating Temperature Range*-20°C ÷ 60°C

Mechanical features

- *Dimensions*.....140 x 115 x 60 mm (connectors excluded)
- *Weight*.....1.5 Kg

14.3 GPS SENSOR

Electrical Features

- *Rated Power Supply Voltage:*.....7 ÷ 18 Volt (protected from polarity reversal)
- *Power supply Current:*.....< 55 mA
- *Coupling time to the GPS constellation:*< 60 seconds (in free space)
- *Connection with X3:*RS232
- *Speed upgrade rate:*.....10 samples per second
- *Pulse signal option:*NPN type (open collector)
- *Constant for Pulse signal:*1 cm/pulse

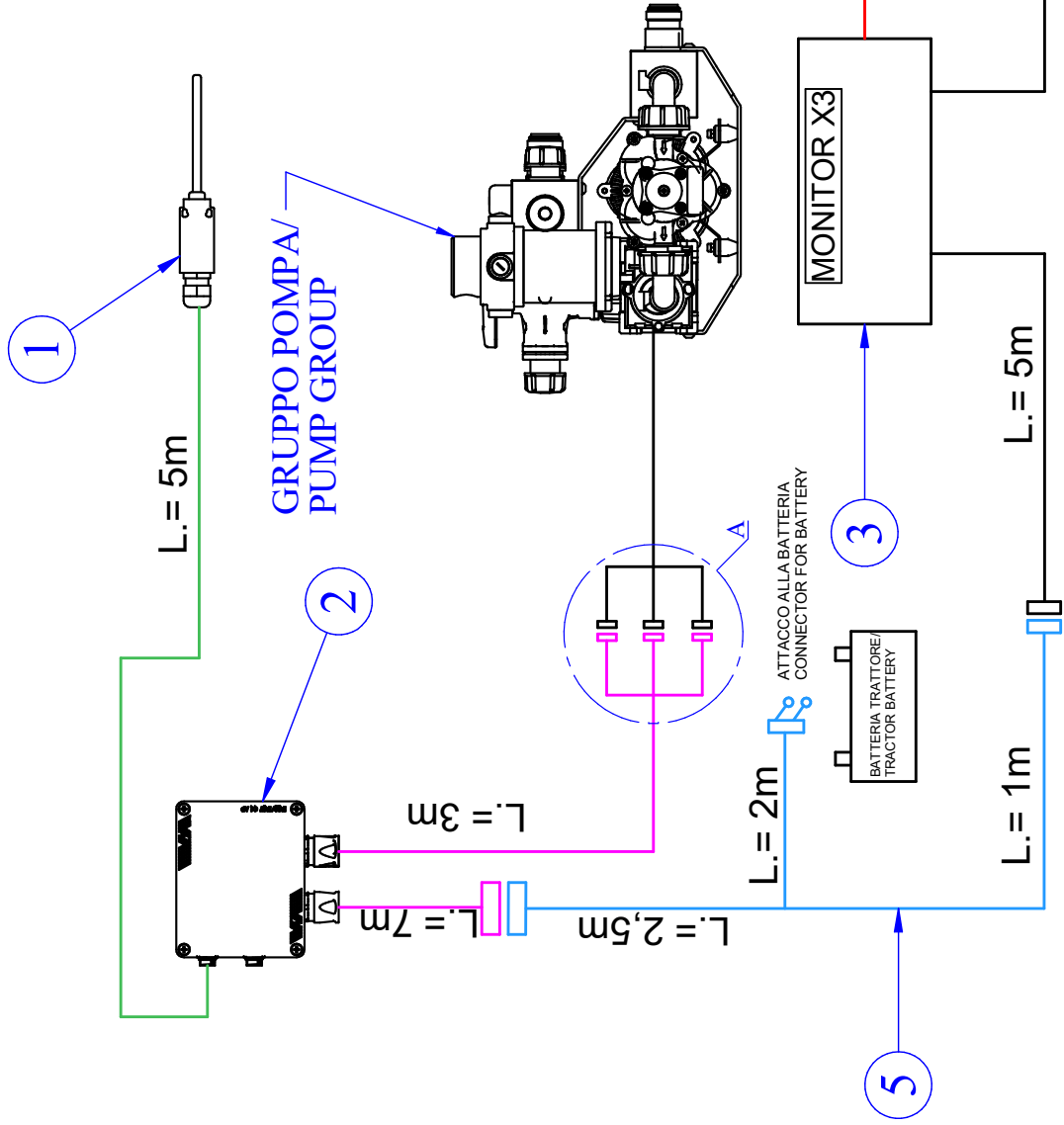
Environmental specifications

- *IP Protection rating*IP 65
- *Operating Temperature Range*-20°C ÷ 60°C

Mechanical features

- *Dimensions*.....Ø 72, H 40 mm (connectors excluded)
- *Weight*.....0.5 Kg

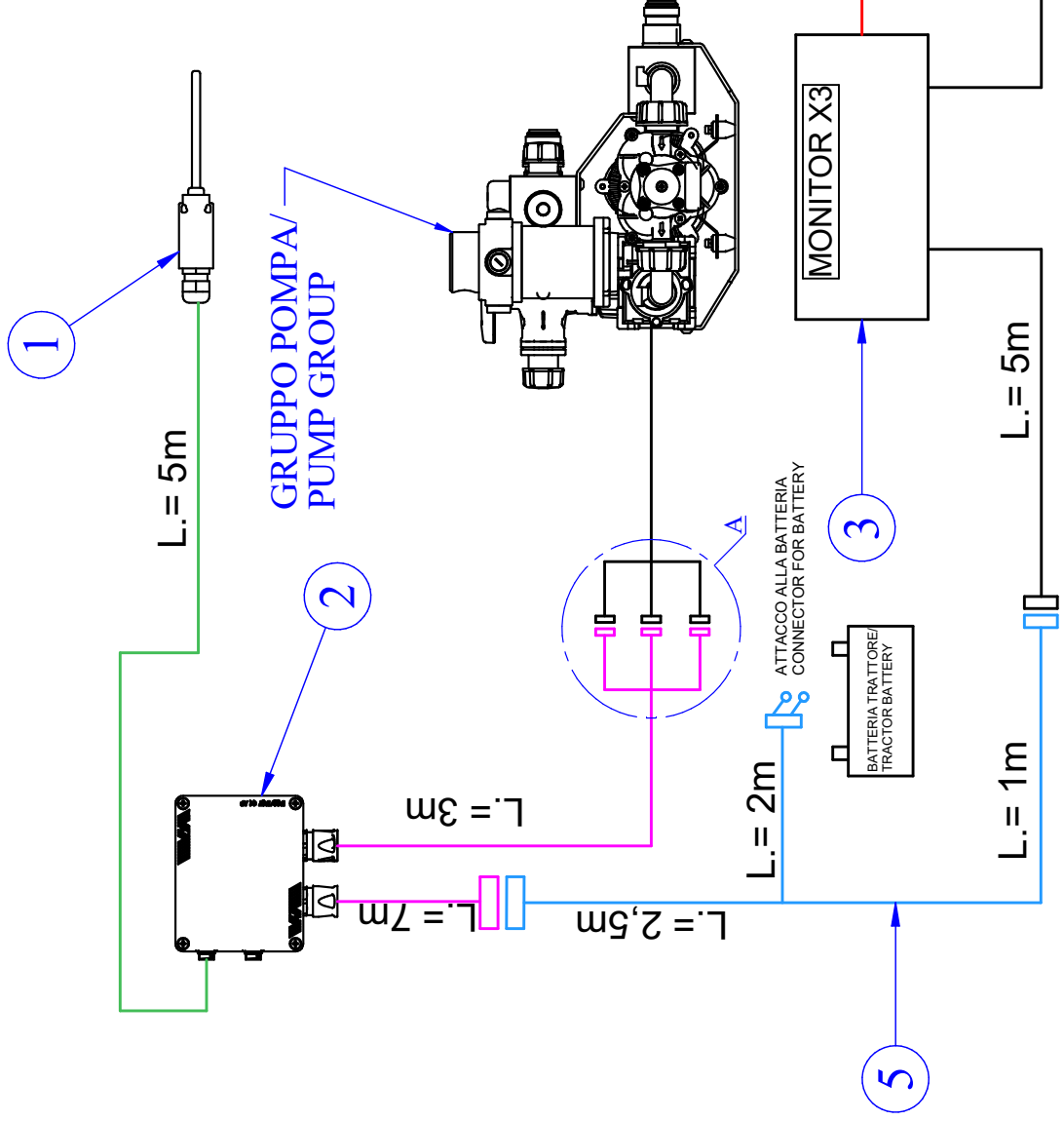
Pos.	Codice	Q.tà	Descrizione
1	59950028	1	SENSORE ASTAFLEX START/STOP CAVO 5M
2	59920024	1	ECU MATERMACC "X3" 12VDC 20A
3	59920002	1	MONITOR MATERMACC "X3" 12VDC CAN-BUS RADIOCOMANDO
4	59940070	1	SENSORE GPS 3P 3M
5	59930386	1	CABLAGGIO 13P F2,5M - 2M BATT. - 1M CAN-BUS



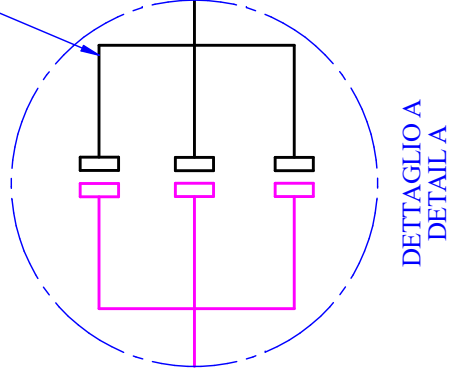
CONNESSIONI ALLA POMPA/PUMP CONNECTIONS:
 - MOTORE/MOTOR
 - ENCODER
 - TRASDUTTORE DI PRESSIONE/
 PRESSION TRANSDUCTOR

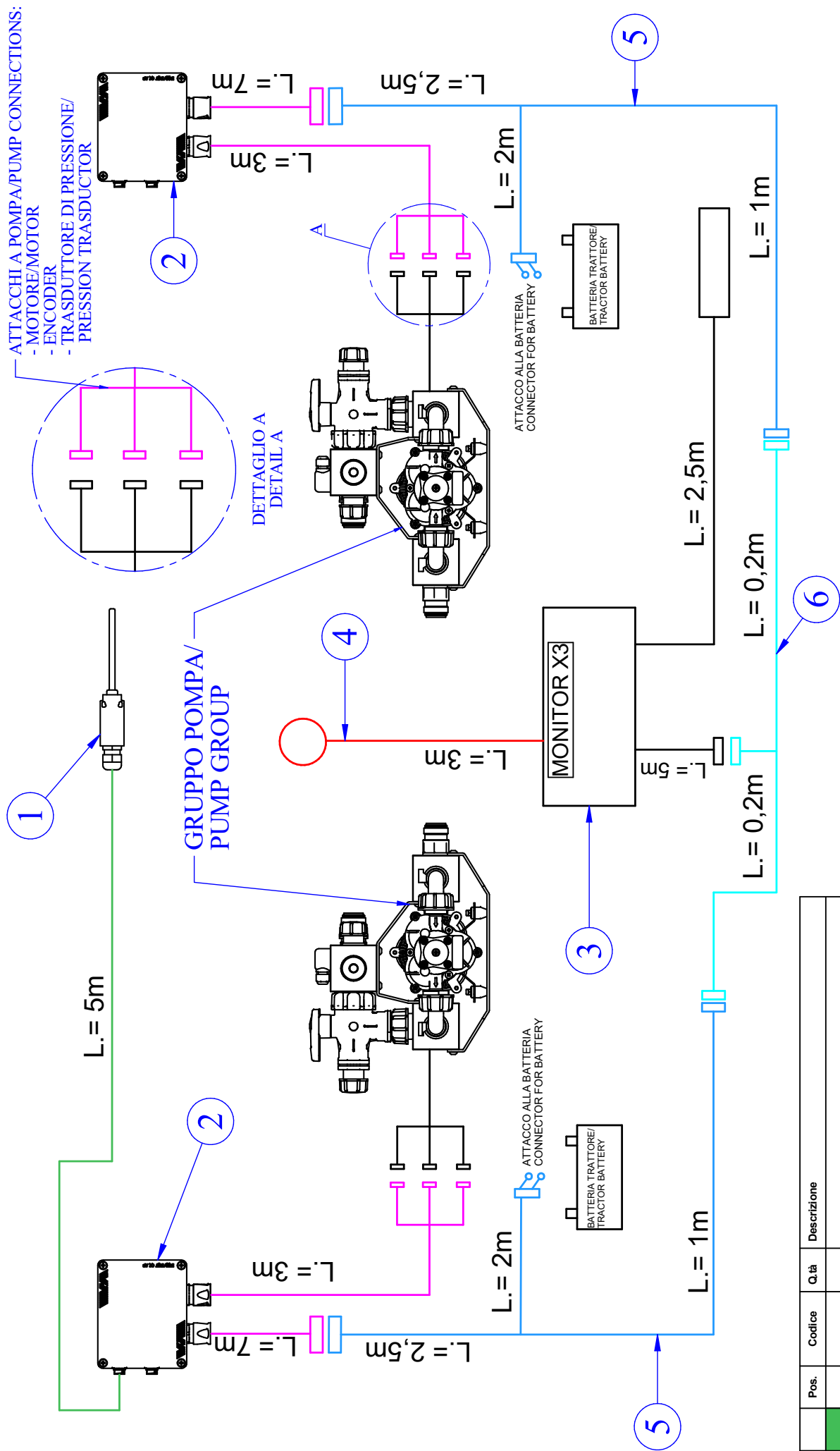
DETTAGLIO A
 DETAIL A

Pos.	Codice	Q.tà	Descrizione
1	59950028	1	SENSORE ASTAFLEX START/STOP CAVO 5M
2	59920024	1	ECU MATERMACC "X3" 12VDC 20A
3	59920002	1	MONITOR MATERMACC "X3" 12VDC CAN-BUS RADIOCOMANDO
4	59940070	1	SENSORE GPS 3P 3M
5	59930386	1	CABLAGGIO 13P F2,5M - 2M BATT. - 1M CAN-BUS

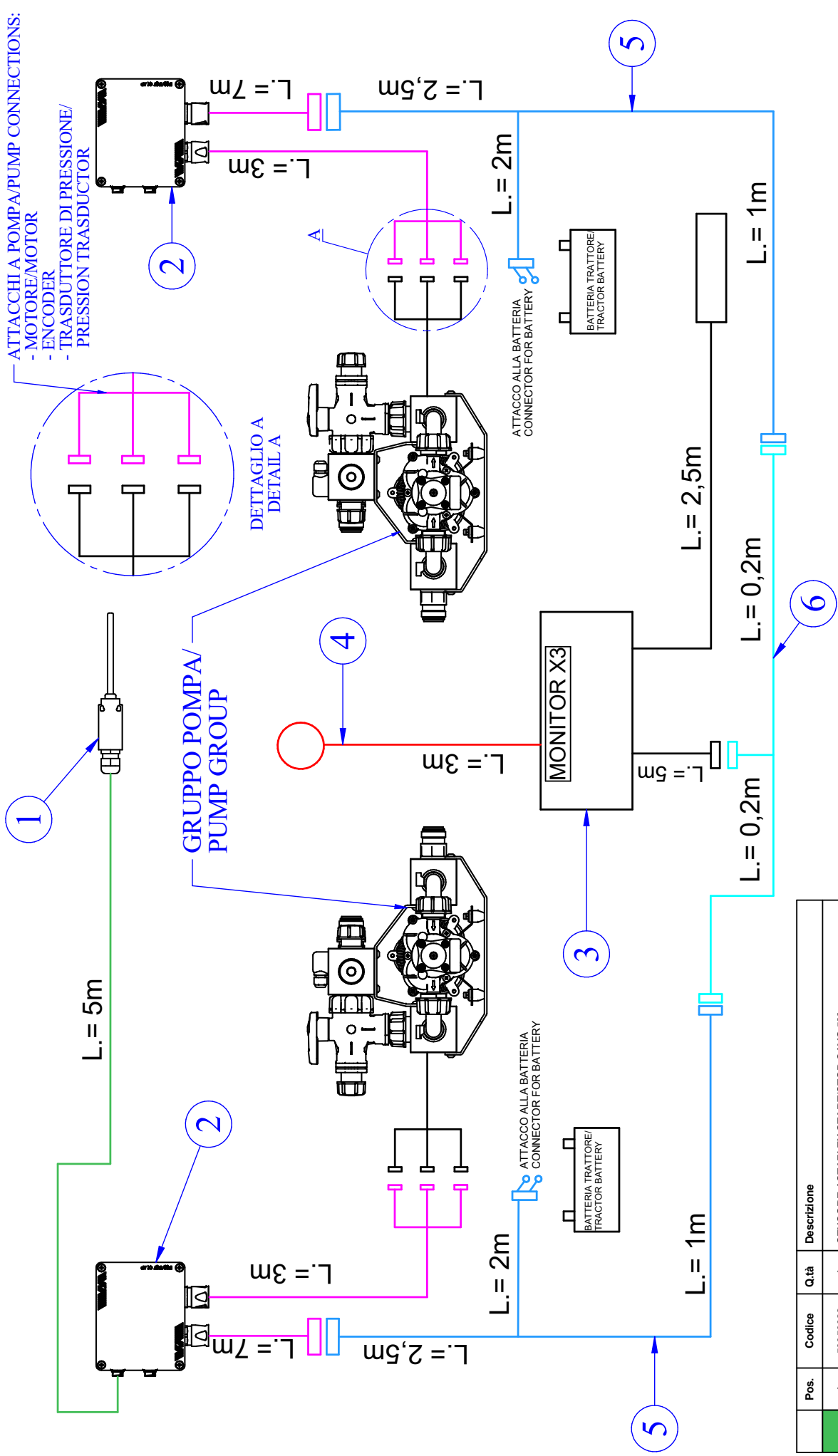


CONNESSIONI ALLA POMPA/PUMP CONNECTIONS:
 - MOTORE/MOTOR
 - ENCODER
 - TRASDUTTORE DI PRESSIONE/
 PRESSION TRANSDUCTOR





Pos.	Codice	Q.tà	Descrizione
1	59950028	1	SENSORE ASTAFLEX START/STOP CAVO 5M
2	59920024	2	ECU MATERMACC "X3" 12VDC 20A
3	59920002	1	MONITOR MATERMACC "X3" 12VDC CAN-BUS RADIOCOMANDO
4	59940070	1	SENSORE GPS 3P 3M
5	59930386	2	CABLAGGIO 13P F2,5M - 2M BATT. - 1M CAN-BUS
6	59930387	1	CABLAGGIO UNIONE ECU PER MONITOR "X3"



Pos.	Codice	Q.tà	Descrizione
1	59950028	1	SENSORE ASTAFLEX START/STOP CAVO 5M
2	59920024	2	ECU MATERMACC "X3" 12VDC 20A
3	59920002	1	MONITOR MATERMACC "X3" 12VDC CAN-BUS RADIOCOMANDO
4	59940070	1	SENSORE GPS 3P 3M
5	59930386	2	CABLAGGIO 13P F2,5M - 2M BATT. - 1M CAN-BUS
6	59930387	1	CABLAGGIO UNIONE ECU PER MONITOR "X3"

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