HIRSCHMANN
A BELDEN BRAND

qSCALE maestro

PLC v01.00.00

Contents

Operators Manual

Issue H – 01/2018
HMI v01.00.00
This document has the order number:
MAN-QSCA-O-0007

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VERSION OVERVIEW

Issue	Date	Description	Editor
A	10/2017	Initial Release (HMI v01.00.00)	RBM
B	11/2017	Replaced Cover Image and added references to vSCALE D2 Console	RBM
C	11/2017	Added error code 1F01 handling information to section 3.1 Section 5.5 changed system information icon.	RBM
D	11/2017	Section 5.5 changed system information icon.	RBM
E	11/2017	Added Error Code List	RBM
F	11/2017	Tweaked grammar, wording and formatting throughout manual.	RBM
G	12/2017	Corrected wording and moved Alarm Volume section to the Service Manual.	RBM
H	1/2018	Changed override alarm behavior.	RBM

Introduction

About this manual

This manual is a component of the equipment or systems supplied by Hirschmann Automation and Control GmbH. Keep this manual in a safe place and ensure that it is available to all users.

Liability disclaimer

The contents of this manual are subject to change. Hirschmann Automation and Control GmbH do not provide any guarantee for this material, including the associated guarantee regarding marketability and suitability for certain intended purposes. Hirschmann Automation and Control GmbH accept no liability for errors in the contents of the manual or for direct or indirect damage in connection with the provision and use of the manual.

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Trademarks

The rendition of common names, trade names, trademarks etc. in this documentation should not be construed to mean that such names, even without special identification, are free in the sense of trademark and trademark protection legislation and hence usable by anyone.

Use for the intended purpose

This device/system is intended exclusively for the tasks described in this manual. Any other use shall be construed as being inappropriate. The manufacturer accepts no liability for damage caused by inappropriate or impermissible use. This device / system may only be used if it is in perfect technical condition.

Qualification of the operating personnel

Only appropriately qualified personnel may work with this device / system, i.e. persons:

- who are familiar with the operation or installation and commissioning
- who know the current regulations for the prevention of accidents

Marking of Notices

Dangers and other important notices are marked as follows in this user manual:

WARNING

Warning of direct threat of personal injury and damage to property.

Instructions on precautions to avert the danger.

CAUTION

Warning of dangerous situations. Also warns of damage to property.

Instructions for averting the danger.

IMPORTANT

Warning of possibly damaging situation for the product.

Instructions for avoiding the possibly damaging situation.

NOTE

Usage instructions and information, but no dangerous situation.

HINT

Supplementary comments and recommendations for the user.

1 Safety Instructions

WARNING

Imminent threat of personal injury and damage to property due to incorrect system settings!

The correct adjustment of the RCL to the current set-up status is essential for the correct function of the system and of the machine.

The RCL can only operate correctly if all settings are entered correctly according to the current set-up status during the SETUP procedure.

The settings can only be carried out by operators who are completely familiar with the operation and functions of the machine and the RCL.

The correctness of these settings must be guaranteed before starting the machine operations!

IMPORTANT

Connection to the wrong power supply will cause damage to the device.

The device may only be connected to a DC voltage source of 10 V to 30 V!

1.1 EC Conformity Declaration

CE

The technical design and construction of the **qSCALE maestro** system corresponds to requirements of the EMC directive 2004/108/EC and therefore carries the CE symbol.

The device complies with the following standards:
EN 12895:200, EN 13309:2010, EN ISO 14982: 2009

The full conformity declaration is available from the manufacturer on request.

2 Product Description

The **vSCALE D2 / D3 maestro console** is the interface of the Rated Capacity Limiter system (RCL).
The RCL monitors the sensors and detects a machine overload status depending on various parameters.

The machine driver is warned before the onset of an overload status via visual and audible warning signals.

The RCL comprises:

- **qSCALE S6 maestro central control unit**
- **vSCALE D2 / D3 maestro console**
- various sensors for detection of machine status and environmental conditions

The vSCALE D2 / D3 maestro console is used for:

- programming and inputting operating parameters
- displaying the current machine operating data

NOTE

This user manual contains information about the vSCALE D2 / D3 maestro console, mode selection, operation, sensor calibration and maintenance.

WARNING

Although the system incorporates functions for monitoring adjustable geometrical limit values with visual and audible warnings and a relay output in the event of limit values being exceeded, the system cannot be used as an operational limit switch.

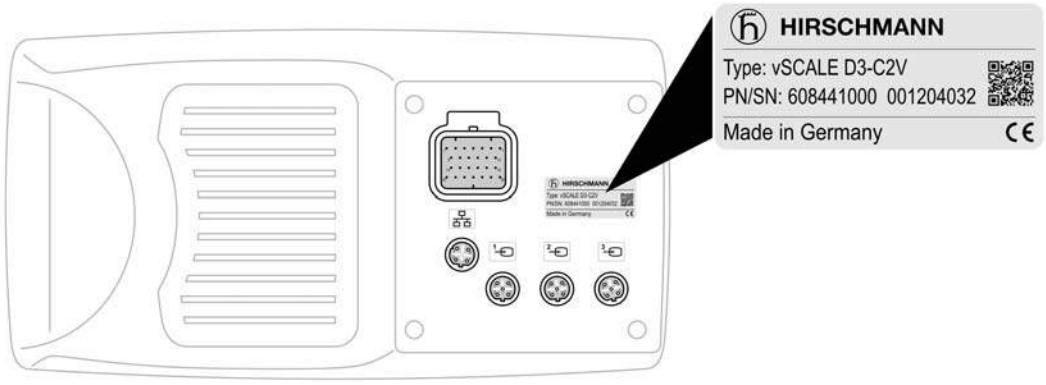
The machine driver is responsible for the safe operation of the machine.

2.1 Product Identification

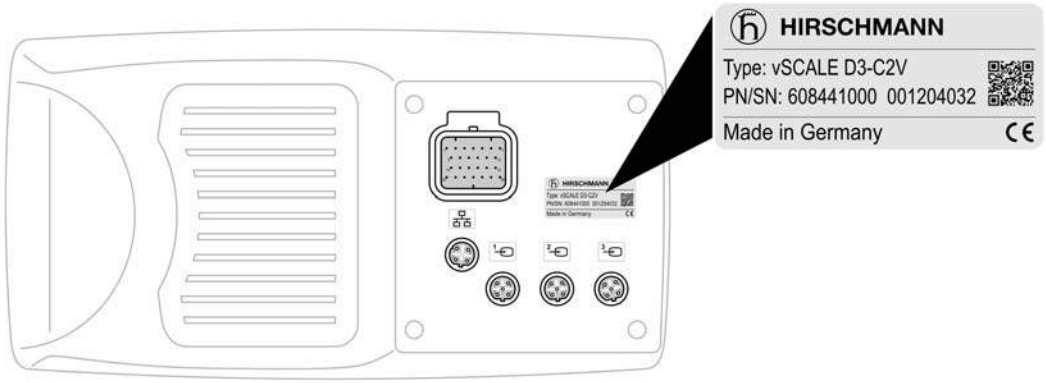
The type plate carries the unique identification of the operating console. It is located on the back of the device.

Please ensure you make a note of all the information on your type plate for queries about this product.

Type plate
(Example for D3)



Type plate
(Example for D2)



2.2 Overview of Console Elements

Function Keys F1-F8 (F1 – F12 in 7" display version.) Function Varies by screen

Feedback Elements (See Section 2.3)

Rotary Encoder with Pushbutton Function For Selection and Confirmation

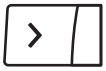
Display with **RCL Main Menu**

"Home" Key (Return to RCL Main Operating Screen)

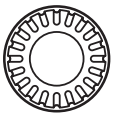
"Set" Key Selects Settings / Silences Alarm

USB 2.0 interface (used for service purposes)

"Escape" Key Aborts Function / Returns to previous screeen



Function Keys F1 to F12: Calls Functions



Encoder With Pushbutton Function: For Selection and Confirmation

SET key: Selects Settings / Silences Alarm

HOME key: Returns to Main Working Screen

ESCAPE key: Aborts Function

2.3 Overview Feedback Elements

Light Sensor: Not Used

Operating Display: Green While Supply Voltage is Connected

USB Data Display: Yellow During Data Exchange via Front USB Port

Wireless Indicator: Not Used

Multi-Function Light:

Flashes Red/White while in error state

Blue while setting the operating mode

Green while in operation

Yellow Machine nearing operational limit

3 Operating Mode Selection

This chapter contains information, advice and instructions for choosing an operating mode.

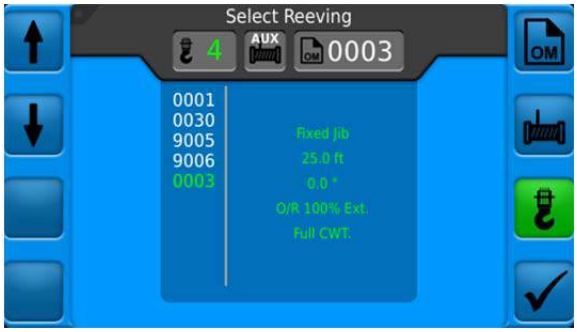
3.1 Switching Device On and Off

The load limiting device has no on/off switch. The console automatically switches on with PTO power.

After boot-up, the following appears on the display:

Initial Display After Boot-Up:

Operating Mode Selection Screen



If the machine configuration has not changed, check displayed configurations. If OK, press 

Then check outriggers and confirm with 

The Main Working Screen is then displayed.

If the machine configuration has changed see Setting Operation Mode in **Section 3.2**

System Malfunction?

In the event of a system malfunction an error code is displayed in the bottom right of the display:

The error codes and what they mean are explained in the error codes table in **Section 6.3**.

The device is not ready for operation until all faults have been rectified and no error codes are displayed. The error codes are displayed in red color. The warning codes are displayed in yellow color.

When confirming the operating mode, if the **vSCALE D2/D3 maestro console** does not have a working Ethernet connection to the **qSCALE S6 maestro central control unit**, the operating mode will default to 0000 and error code 1F01 will be displayed.

The **vSCALE D2/D3 maestro console** must be properly connected to the **qSCALE S6 maestro central control unit**, before confirming the operating mode. See the Service Manual for details.

3.2 Setting the Operation Mode

SETUP Procedure

The RCL must be adjusted to the current machine setup status by completing the full SETUP procedure after start-up and after any change to the machine configuration.

The system is not ready to operate until the full SETUP procedure has been completed.

WARNING

Imminent threat of personal injury and damage to property due to incorrect system settings!

The correct adjustment of the RCL to the current set-up status is essential for the correct function of the system and of the machine.

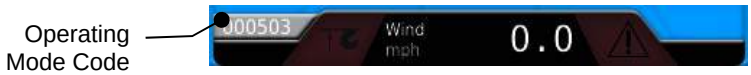
The RCL can only operate correctly if all settings are entered correctly according to the current set-up status during the SETUP procedure.

The settings can only be carried out by operators who are completely familiar with the operation and functions of the machine and the RCL.

The correctness of these settings must be guaranteed before operating the machine!

Operating Mode

Depending on the inputs during the SETUP procedure and on various sensor values, the determines the corresponding operating mode with the associated lifting capacity table. The operating mode used by the system at any given time is displayed as a code in the status row:



Process

The process for setting the RCL to the current machine status (SETUP procedure) includes the following steps:

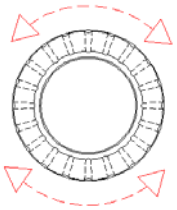
- Entering Operating Mode selection screen from the Main Working Screen or automatically after the console is powered on.
- Entering the number of rope reeving.
- Selection of the hoist used.
- Selecting the operating mode that matches the current outrigger and jib status.
- Overview of inputs

NOTE

The process for setting the RCL to the current set-up status (SETUP procedure) will vary by machine model. The following is an example machine.

Selection

Selection is with the rotary control:

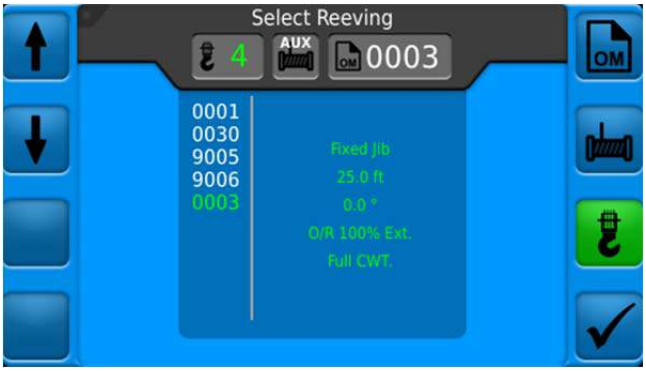


Optionally press “up arrow”  or “down arrow”  function keys to select options.

Start SETUP

Operating Mode Setup can be called from the main RCL operating menu by pressing the  function key.

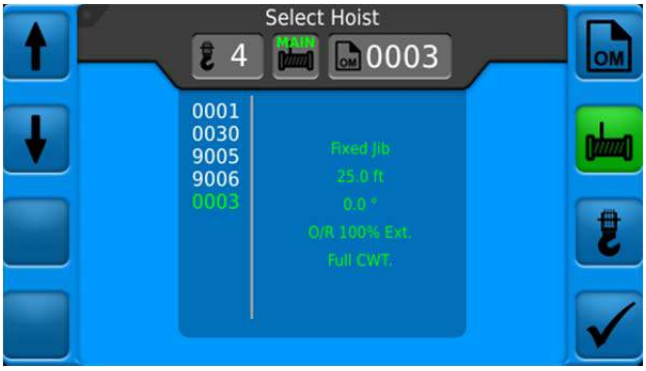
Select Reeving



Selection:

- Press the  button to enter the Select Reeving Menu.
- When the Reeving Button turns green  you can adjust the Reeving value.
- Use rotary knob or up and down arrows to select reeving amount.

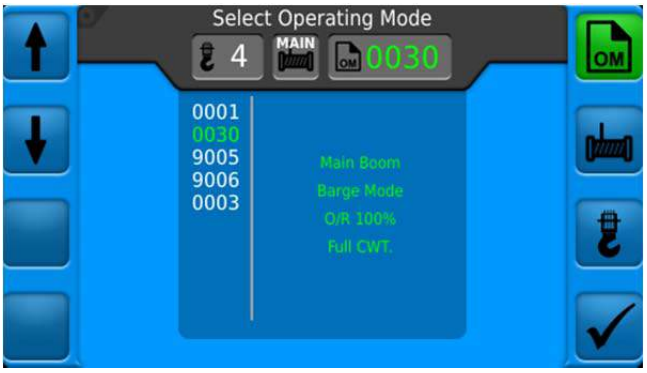
Select Hoist



Selection:

- Press the  button to enter the Select Hoist Menu.
- When the Hoist Button turns green  you can adjust the Hoist option.
- Use rotary knob or up and down arrows to select Hoist.

Select Operating Mode



Selection:

- Press the button to enter the Operatig Mode Menu.
- When the Operating Mode Button turns green you can adjust the Operating Mode number.
- Use rotary knob or up and down arrows to select the operating mode that corresponds to the current machine setup. Ensuring that the Jib and Outriggers match the description shown on the right.

Confirm Selections

After selecting the appropriate modes press or to set the selected operating mode.

Check that the outriggers are in the cor-rect position for the selected mode and that the machine is stable and press or .

The selected mode, reeving and hoist will be displayed.

Press or again to confirm the settings are accurate and return to the Main Working Screen using the newly selected operating mode.

4 Operation

After the operating mode is set, the RCL is ready to use.

The machine operator must be familiar with all operating elements of the RCL before operating the machine.

All settings must be checked by hoisting a known load and comparing the information with that displayed by the RCL.

WARNING

Imminent threat of personal injury and damage to property due to incorrect system settings!

The correct adjustment of the RCL to the current set-up status is essential for the correct function of the system.

The correctness of these settings must be guaranteed before operating the machine!

4.1 Main Working Screen

The RCL Main Working Screen is the central operating image during machine operation and the starting point for the selection of various functions. You can return to this screen from any other screen by pressing the “Home” button.

Load Capacity Utilization (Bar Chart)

Current Load

Rope Reeving

Radius of Boom

Calculated Height of boom tip

The Information Bar shows current wind speed on the main screen and maximum/current load on any other screen.

Operating Mode

Warning Lights (See Section 4.1.1)

Load Capacity Utilization %

Maximum Lifting Capacity

Length of Boom

Angle of Boom

Error Code, Displayed as required (See Section 4.5)

Other indicators such as Jib Length and Jib Angle may be displayed on the Main Operating Screen and can be set up in the Settings Menu.

Function Keys

- Settings (see Section 5.1)
- Camera (see Section 4.6)
- Work Area Limitations (see Section 4.2)
- Set or Disable Tare (see Section 4.3)
- Set Operating Mode (see Section 3.2)
- Temporarily Mute Alarm (And after muting, display warnings. See Section 4.4)

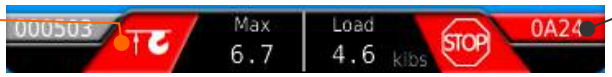
Function keys with no assigned symbol are not active:

4.1.1 Warning Lights / Audible Alarm

Various warning symbols are shown in the information bar as required and are visible from any screen:

Example

Warning Symbols



Error Code

Depending on the cause of the warning the following also occurs:

- audible alarm is activated
- error code is displayed (see error table in appendix)
- status is recorded in the data logger

Acknowledging Alarm

The audible alarm can be suppressed for a short period by pressing the  function key. See **Section 4.4** for more detail.

Early overload warning

This yellow symbol flashes to indicate that the machine load is or has already exceeded 90% of the safe working load. An overload status may be imminent!

Overload/Error

This red symbol is lit to indicate that an error has occurred such as the maximum machine load has been reached or exceeded.
The audible alarm sounds an uninterrupted tone.

RCL bypass

These red symbols flash on and off during the manual override of the power-off function of the safe load indicator. This status is recorded in the data logger. An audible alarm will be triggered and may be muted by the  function key. (See **Section 4.4** for more detail.)

Stroke End (A2B)

This red symbol lights up to indicate that a two-block event has occurred.

A stroke end status is recorded if the load block comes into contact with the boom head. There is a danger in this case that the lifting rope will break and the load will drop. A stroke end state can be caused by the load being pulled against the boom head or the boom being extended or raised without playing out the lifting rope.
The audible alarm sounds an uninterrupted tone.

4.2 Work Area Limitations

The RCL system has programmable functions for monitoring geometrical limits of the working area:

- Height Monitoring > See **Section 4.2.1**
- Radius Monitoring > See **Section 4.2.2**
- Boom Angle Monitoring > See **Section 4.2.3**
- Wind Speed Monitoring > See **Section 4.2.4**

Programming is carried out via an interactive menu.

The functions can be set individually or in combination. Active limit values are indicated by the display of color-highlighted symbols.

Exceeding a programmed limit value causes a corresponding color change in the limit symbol on the main menu to be displayed and an audible alarm warning to be sounded.

Color Meanings

Blue — No Limits Set

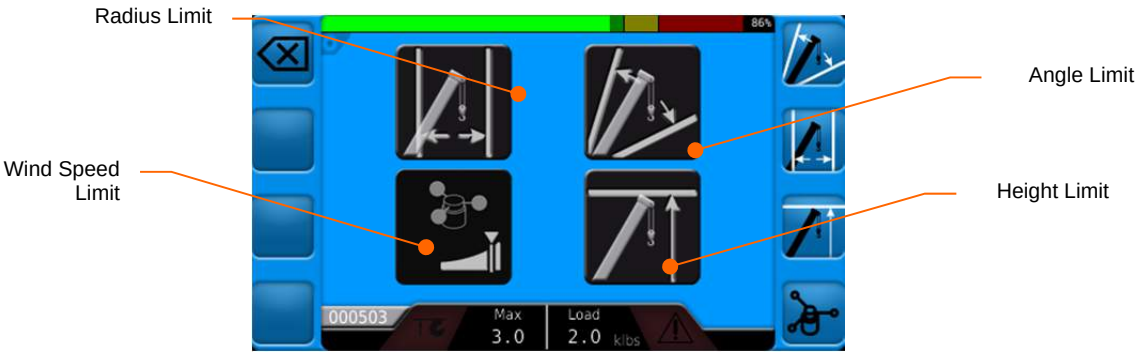
Green — Within Valid Limits

Yellow — Warning Condition / Approaching Limit

Red — Outside Limit

CAUTION

Machine movements are not switched off when limit values are exceeded.



Function Keys


Angle Limit (see **Section 4.2.3**)


Radius Limit (see **Section 4.2.2**)


Height Monitoring (see **Section 4.2.1**)

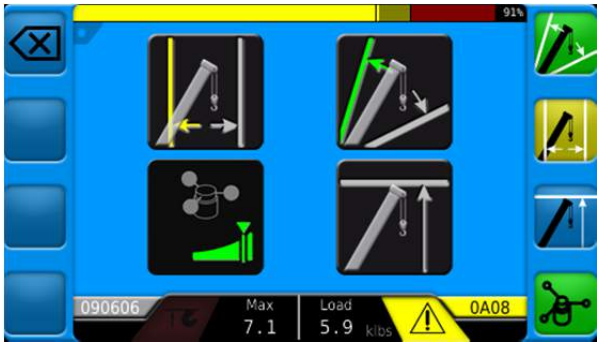

Wind Speed Limit (see **Section 4.2.4**)


Deactivate all Limits

The colors of the function buttons and symbols will change depending on the state of the limit.

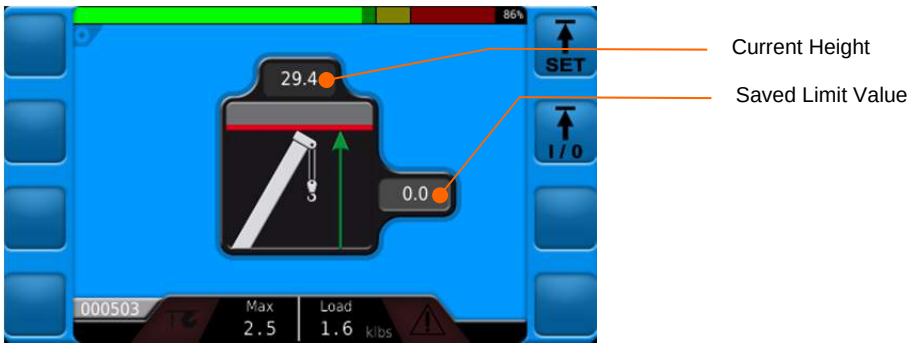
Color Meanings:

- Limit inactive or not programmed
- Limit active
- Limit Nearing Maximum Value
- Limit value reached or exceeded



4.2.1 Height Monitoring

Boom Height Limit is able to be programmed.



Function Keys

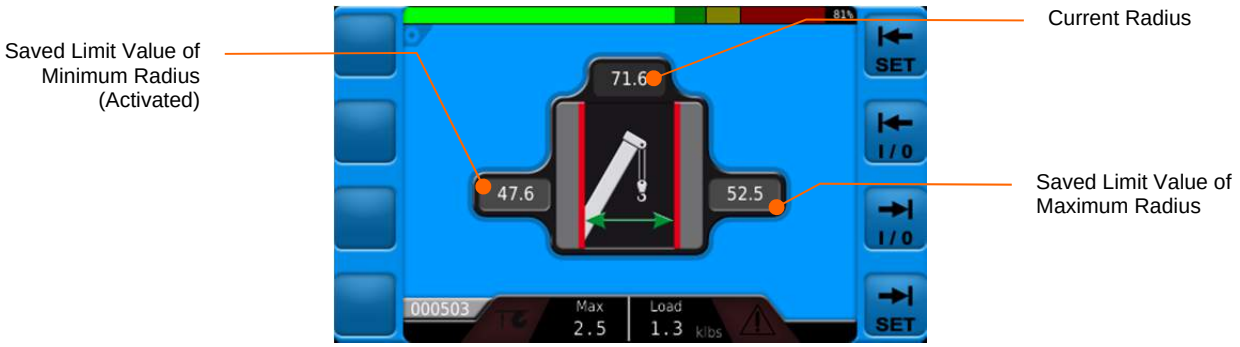
Save Current Boom Head Height as Limit Value

Return to Limit Menu

Turn On/Off Height Limit

4.2.2 Radius Monitoring

Upper and Lower Radius Limits are able to be programmed.



Function Keys

Save Current Radius as Maximum Radius Limit

Save Current Radius as Minimum Radius Limit

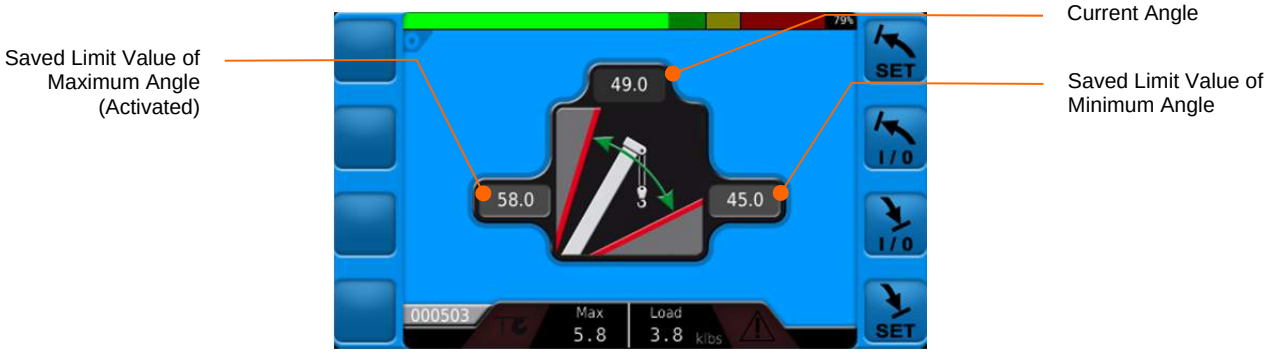
Turn On/Off Maximum Radius Limit

Turn On/Off Minimum Radius Limit

Return to Limit Menu

4.2.3 Boom Angle Monitoring

Upper and Lower Boom Angle Limits are able to be programmed



Function Keys

Save Current Radius as Maximum Angle Limit

Save Current Radius as Minimum Angle Limit

Turn On/Off Maximum Angle Limit

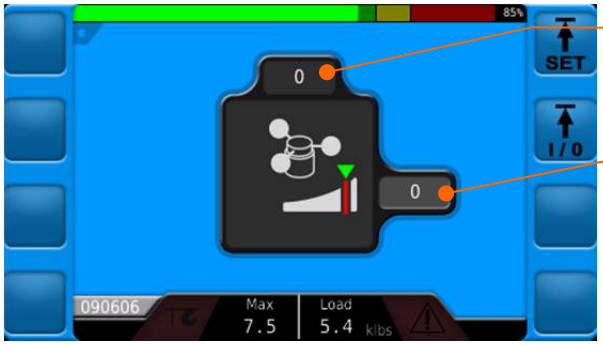
Turn On/Off Minimum Angle Limit

Return to Limit Menu

4.2.4 Wind Speed Monitoring

Maximum safe operating Wind Speed can be programmed

HOME → LIMITS → WIND SPEED



Current Measured Wind Speed

Wind Speed Limit Set

Function Keys

Sets Upper Wind Speed Limit (see instructions, below)

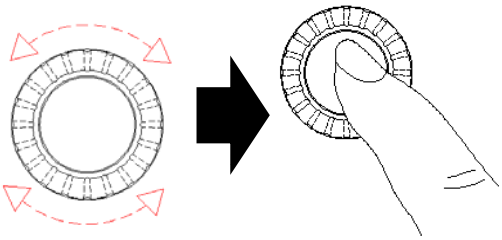
Turn On/Off Maximum Wind Speed Limit

Return to Limit Menu

Instructions

1. Press 

2. Use the rotary knob to select the numbers. Pressing the knob to move to the next digit.



3. Press the  button to add a decimal point.
4. Use the  button to change the input between a negative or positive value.
5. Use the  or  buttons to select the number in the chosen direction. (The selected digit turns green.)
6. Use the  button to delete the currently selected digit.
7. Press  to confirm the wind speed limit as entered.

4.3 Tare Weight

This function key is used to remove the weight of the hoisting gear and load block from the displayed load..

Pressing this button sets the load value to zero in order to subsequently display only the weight of the load and not the lifting apparatus.

The tare is removed when the operating mode changes, the length or angle of the boom changes, or 

pressed.

NOTE

The current load includes the weight of the load block, the lifting rope and all load-slinging attachments.
The net load is the actual load on the hook without load-slinging attachments.
Environmental influences can lead to incorrect displays (e.g. wind affecting the boom or load).

4.4 Switching Off Audible Alarm

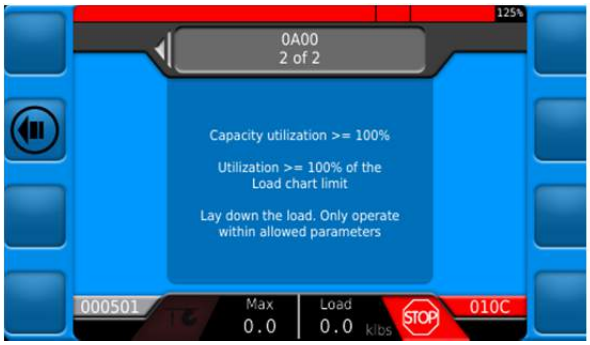
When an error event occurs, the silence function button on the Main Working Screen will turn green and pressing it will suppress the audible alarm for 5 minutes.

Pressing the “SET” function key will also suppress the audible alarms.

4.5 Error Events

Pressing the “Silence” function button will momentarily display the “Error Event” function button. Pressing the “Error Event” function button will bring up the Error Event Page, which displays error specific information.

If the Alarm is already muted the “Silence” button will be greyed out but will still display the “Error Event” button if pressed.



Error Event Page Example

Use the Rotary Knob  or the “Left Arrow” and “Right Arrow” function keys to scroll through the errors.

Press the “HOME” or “ESCAPE” key to return to the RCL Main Working Screen.

4.6 Camera

If an external camera in installed it can be viewed from the console by pressing the button.

Function Keys

Rotates Camera Display

Maximizes or Minimizes Camera display

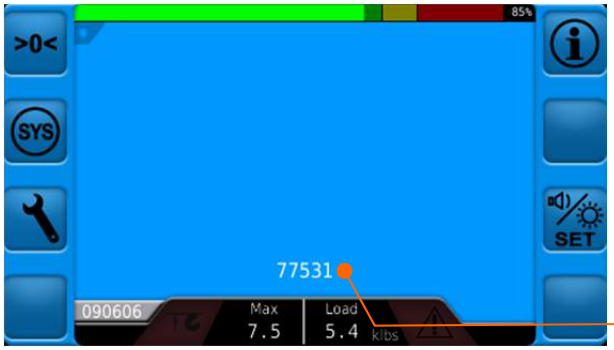
Return to Main Working Screen

5 Service and Maintenance

5.1 Settings Menu

System settings can be found under the Settings Menu.

HOME → SETTINGS



Daily Password Seed. See service manual for details.

Function Keys

Sensor Calibration (See **Section 5.4**)

Machine Information Screen (See **Section 5.2**)

System Information (See **Section 5.5**)

User Screen (See **Section 5.3**)

System Settings (See Service Manual)

5.2 Machine Information

The Machine Information Screen shows the Machine Model, Machine Serial Number as well as Digital Outputs, Analog Inputs, and Digital Inputs.

HOME → SETTINGS → MACHINE INFO

5.2.1 System Version Information

HOME → SETTINGS → MACHINE INFO → VERSION INFO

The System Version Information Screen shows the Machine Serial Number, Operating System and Software Versions.

5.2.2 Status of Digital Outputs

The system Digital Output Information is displayed here. See the Service Manual for more detail.


HOME

→


SETTINGS

→

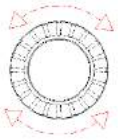

MACHINE INFO

→


DIGITAL OUTPUTS

If Green, Output is 'High'
If Red, Output is 'Low'

Digital Output Status

Use the Rotary Knob  or the "Up Arrow"  and "Down Arrow"  function keys to scroll through the list of outputs.

5.2.3 Status of Digital Inputs

The system Digital Input Information is displayed here. See the Service Manual for more detail.

If Green, Input is 'High'
If Red, Input is 'Low'

Use the Rotary Knob  or the "Up Arrow"  and "Down Arrow"  function keys to scroll through the list of inputs.

5.2.4 Readings of Analog Sensors

Readings of the analog sensors can be called up. See the Service Manual for more Detail.

HOME → SETTINGS → MACHINE INFO → ANALOG INPUTS

Use the Rotary Knob or the “Up Arrow” and “Down Arrow” function keys to scroll through the list of inputs.

5.3 User Screen

Alarm volume, display brightness, key brightness, and measurement units can be selected in the User Screen.

HOME SETTINGS USER SCREEN

Function Keys

 Alarm Volume (See Service Manual)

 LCD Screen Brightness (See **Section 5.3.1**)

 Key Brightness (See **Section 5.3.2**)

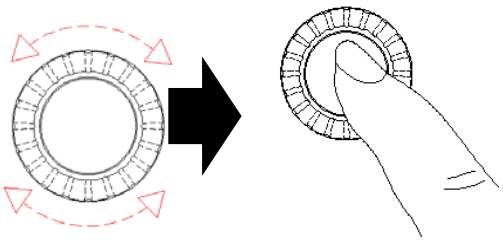
 Unit Selection (See **Section 5.3.3**)

5.3.1 LCD Brightness

The LCD Screen brightness can be adjusted in the User Screen.

Use the rotary knob to adjust the brightness.

Pressing the knob or  to confirm.

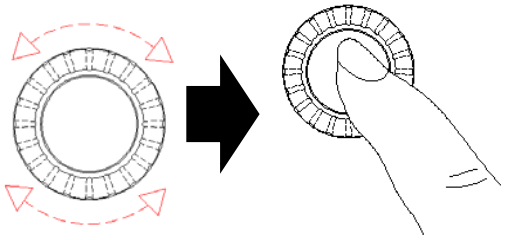


5.3.2 Key Brightness

The Brightness of the Keys on the console can be adjusted in the User Screen.

Use the rotary knob to adjust the brightness.

Pressing the knob or  to confirm.



5.3.3 Unit Selection

The measurement units can be switched between US and SI units.

HOME → SETTINGS → USER SCREEN → UNIT SELECTION

Press the 

key to switch units. The key will change to show the current selection:

For SI Units

For US Units

5.4 Sensor Calibration

The sensors must be calibrated before operation after installation.

HOME → SETTINGS → SENSOR CALIBRATION

Function Keys

Angle Sensor Calibration (See Service Manual)

Length Sensor Calibration (See Service Manual)

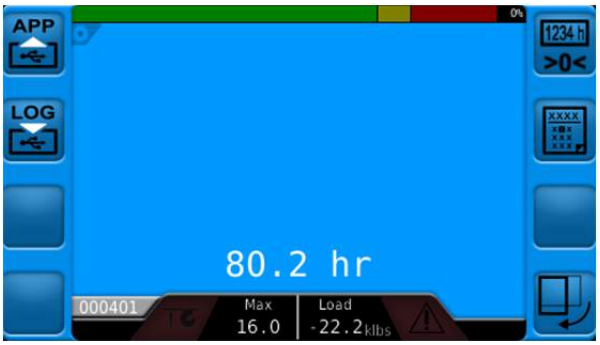
Luffing Cylinder Tuning (See Service Manual)

Function Keys may vary by machine model depending on the sensors being used.

5.5 System Information

From the System Information screen you can set the Date and Time, view and reset the runtime of the system, rotate the display, download the event recorder data, and download updates from the USB.

HOME → SETTINGS → SYSTEM INFORMATION



Function Keys

- APP — Download application data from USB (See Service Manual)
- LOG — Log debug data to USB (See Service Manual)
- XXXX — Change Date and Time (See Service Manual)
- 1234 h >0< — Reset System Runtime (See Service Manual)
- Rotate Display (See Service Manual)

5.6 Screen Capture

The system has the capability of taking screenshots and saved to either:

1. USB Drive
2. Internal Memory

5.6.1 Taking Screen Captures

On any screen:

- Press and hold the “HOME”  function button
- Press the “SET”  function button
- Release both the “HOME” and “SET” function buttons simultaneously
- A screen shot of the current screen will be saved.

5.6.2 Saving Screen Captures

If a USB drive is installed in the console, the screen capture will be saved to the USB drive.

If a USB drive is **not** installed in the console, the image will be saved to the internal memory of the console.

If using internal memory, only 20 images may be saved. After 20 images are saved, additional screen captures will not be saved. The saved images can be transferred to a USB drive. This is done by:

1. Installing a USB drive
2. Take a new screenshot.
   Once a screenshot is taken the images in internal memory are copied to the USB drive and removed from internal memory.

5.7 Maintenance and Repair

Maintenance

The **qSCALE S6 maestro central control unit** and **vSCALE D2 / D3 maestro consle** contain no wearing parts and therefore cannot be opened. If you notice malfunctions or differences between actual and displayed measured values, you should switch the device off and have it checked and, if necessary, repaired immediately by an authorized Hirschmann service partner.

Cleaning

Clean the surface and the front screen of the device occasionally with a damp cloth and a mild detergent. Never use abrasive or aggressive detergents as these may damage the device.

IMPORTANT

Device may be damaged by the use of high-pressure cleaners.

The device must not be treated with a high-pressure cleaner or similarly aggressive method under any circumstances!

Usage

Condensation inside the qSCALE S6 maestro console can damage electronic components or the LCD and can condense at the inner side of the front glass/touch. Although the qSCALE S6 maestro console is designed as a closed housing with a Gore-Tex-Membrane for breathing, condensation may occur as a physical effect, if the console is exposed to unfavorable temperature/humidity cycles, which pumps humidity inside the housing.

Repair

Damage to the front foil can lead to the penetration of moisture and dirt into the interior of the device, which must then be properly repaired without delay.

Keep the contacts and the area around the device connectors clean and check occasionally that all connections are secure.

If parts are damaged, they must be properly repaired or replaced immediately.

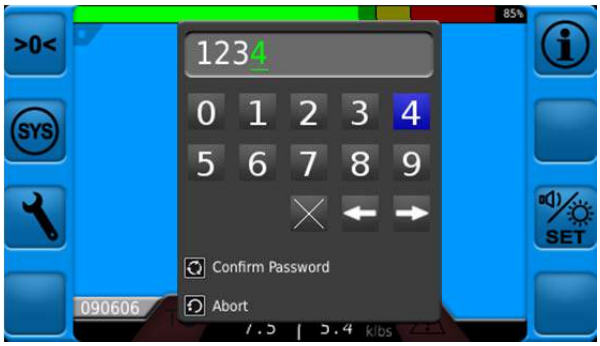
6 Appendix

This appendix contains additional technical information and the full table of error codes.

6.1 Technical Data

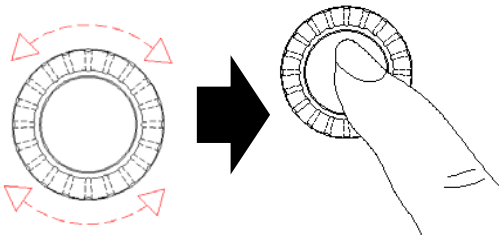
Operating voltage	9…36 V DC, suitable for 12 and/or 24 V on-board power supply
Overvoltage protection	overvoltage up to max. 48V DC / 2 minutes
Reverse polarity protection	up to -48V DC
Display	4.3“ TFT Color Graphic LCD, 480 x 272 Pixel (WVGA) Or 7“ TFT Color Graphic LCD, 800 x 480 Pixel (WVGA)
Brightness	400 cd/m²
Contrast	400:1 or 500:1
Illumination	LED, adjustable brightness
Audible alarm	built-in, output for external horn
Dimensions	See Service Manual
Operating temperature range	-40ºC to +75ºC
Protection class	IP66 and IP67 according to ISO 20653: Road Vehicles – Degrees of protection (IP-Code) – Protection of electrical equipment against foreign objects, water and access
Scope of supply	- vSCALE D2 / D3 maestro console (depending on scope of delivery with pre-fitted bracket for RAM Mount) - Mount articulated mounting - User manual (PDF file or on data storage device)

6.2 Password Entry



Password entry is done by the following instructions:

Use the rotary knob to select the numbers,
pressing the knob to move to the next digit.



Use the  or  buttons to select the number in the chosen direction. (The selected digit turns green and will be replaced by the next selection.) Use the  button to delete the currently selected digit.

Press  to confirm the password as displayed.

6.3 Error Codes Table

The first one or two digits of an error code can determine what type of error is occurring

00xx	General Error	Other
2xxx		Module Error
3xxx		Module Error
1Fxx		System
01xx	Limiter Error	Global Cut
02xx		Single Cut
03xx		Error
04xx		Warning
05xx		Pre-Warning
0Axx	Kinematic Error	Kinematic
0Bxx		Kinematic
11xx	Parameter Errors	Cable Break / Lower Limit
12xx		Short-Circuit to Ground
13xx		Short-Circuit / Upper Limit
14xx		Module Error
15xx		Output Deactivated
16xx		Sensor Supply Voltage Error
17xx		Data Error / CAN Error
18xx		Timeout / CAN Timeout
19xx		Safety Error
1Axx		Parameter Error
1Bxx		Unspecified Error

Error Code	Description	Solution
Limiter Errors 0100 – 05FF		
E0100	Min radius limit underrun (global cut)	Boom down to a valid load-chart radius and angle
E0101	Max radius limit exceeded (global cut)	Boom up to a valid load-chart radius and angle
E0102	Main boom angle too low (global cut)	Boom up to a valid load-chart radius and angle
E0103	Main boom angle too high (global cut)	Boom down to a valid load-chart radius and angle
E0104	Jib angle limit underrun (global cut)	Move the jib up to a load chart permissible radius or angle
E0105	Jib angle limit exceeded (global cut)	Move the jib down to a load chart permissible radius or angle
E010A	Slew angle left to large (global cut)	Return to the permitted Working Range (load chart)
E010B	Slew angle right to large (global cut)	Return to the permitted Working Range (load chart)
E010C	Min length limit underrun (global cut)	Telescope into the permitted Working Range (load chart)
E010D	Max length limit exceeded (global cut)	Telescope into the permitted Working Range (load chart)
E010E	Min height limit underrun (global cut)	Move the boom into the permitted Working Range (load chart)
E010F	Max height limit exceeded (global cut)	Move the boom into the permitted Working Range (load chart)
E012D	Max length limit exceeded (global cut)	Telescope into the permitted Working Range (load chart)
E0140	Min radius limit underrun (global cut)	Move the Jib down to a valid radius and angle
E0141	Max radius limit exceeded (global cut)	Boom up to a valid radius and angle
E0142	Main boom angle too low (global cut)	Boom up to a valid radius and angle
E0143	Main boom angle too high (global cut)	Move the Jib down to a valid radius and angle
E0144	Jib angle limit underrun (global cut)	Move the jib up to a valid radius or angle
E0145	Jib angle limit exceeded (global cut)	Move the jib down to a valid radius or angle
E0146	Jib angle limit underrun (global cut)	Move the jib up to a valid radius or angle
E0147	Jib angle limit exceeded (global cut)	Move the jib down to a valid radius or angle
E014A	Slew angle left to large (global cut)	Rotate to the permitted Working Range
E014B	Slew angle right to large (global cut)	Rotate to the permitted Working Range
E014C	Min length limit underrun (global cut)	Telescope into the permitted Working Range
E014D	Max length limit exceeded (global cut)	Telescope into the permitted Working Range
E014E	Min height limit underrun (global cut)	Move the boom into the permitted Working Range (load chart)
E014F	Max height limit exceeded (global cut)	Move the boom into the permitted Working Range
E0150	Min wind speed limit underrun (global cut)	Operation is restricted to permitted conditions
E0151	Max wind speed limit exceeded (global cut)	Operation is restricted to permitted conditions
E0411	Max wind speed limit exceeded (Warning)	Operation is restricted to permitted conditions (load chart)

Error Code	Description	Solution
Kinematic Errors 0A00 – 0AFF		
E0A00	Capacity utilization >= 100%	Lay down the load. Only operate within allowed parameters
E0A08	Capacity utilization >= 90%	Warning: Operating close to Cut-off
E0A20	Shutdown due to overload	Lay down the load. Only operate within allowed parameters
E0A21	Overload Warning	Warning: Operating close to Cut-off
E0A24	A2B switch	Lower the load
E0A33	System Bypass	Warning: Load monitoring inactive
E0A35	Bypass A2B switch	Warning: Load Lift not monitored

Error Code	Description	Solution
Sensor & I/O Errors 1100 – 1BFF		
E1**X**00	Sensor Error: IOLength1	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**01	Sensor Error: IOAnglE1	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**02	Sensor Error: IOPiston1	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**03	Sensor Error: IORod1	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**04	Sensor Error: IOLength2	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**05	Sensor Error: IOAngle2	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**06	Sensor Error: IOPiston2	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**07	Sensor Error: IORod2	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**18	Sensor Error: IOInput1	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**19	Sensor Error: IOInput2	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**1A	Sensor Error: IOInput3	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**1B	Sensor Error: IOInput4	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**1C	Sensor Error: IOInput5	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**1D	Sensor Error: IOInput6	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**1E	Sensor Error: IOInput7	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**1F	Sensor Error: IOInput8	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**20	Sensor Error: IOForcE1	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**21	Sensor Error: IOForce2	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**28	Sensor Error: IOSlew1	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**2C	Sensor Error: IOMAnglE1	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**2D	Sensor Error: IOMAngle2	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**2E	Sensor Error: IOMAngle3	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**2F	Sensor Error: IOMAngle4	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor

Error Code	Description	Solution
E1**X**34	Sensor Error: IOWind1	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**38	Sensor Error: IOIncX1	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**39	Sensor Error: IOIncY1	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**3C	Sensor Error: IOMaxA2B1	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**44	Sensor Error: IOCutByp1	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**61	Actuator Error: IOCut	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**63	Actuator Error: IORigging	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**6C	Actuator Error: IOLampGreen	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**6D	Actuator Error: IOLampYellow	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**6E	Actuator Error: IOLampRed	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**7E	Actuator Error: IOOutput1	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**7F	Actuator Error: IOOutput2	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor
E1**X**80	Actuator Error: IOOutput3	Check the CAN connections and wiring, the sensor calibration, and the CAN configuration. Replace faulty sensor

Error Code	Description	Solution
General Errors		
E0090	Operating mode changed	Not Available
E00FC	Controller Not Initialized	The error will clear when the system finishes the initialization process
E1F00	System Error	Turn the Ignition off and on again. Consult Customer Service if the error occurs again
E1F01	Timeout	Check the bus cabling or connector. Try turning the Ignition off and on again. Consult Customer Service if the error occurs again
E1F02	Timeout	Turn the Ignition off and on again. Consult Customer Service if the error occurs again
E1F03	Timeout	Turn the Ignition off and on again. Consult Customer Service if the error occurs again
E1F04	Timeout	Turn the Ignition off and on again. Consult Customer Service if the error occurs again
E1F05	Timeout	Turn the Ignition off and on again. Consult Customer Service if the error occurs again
E1F06	Timeout	Turn the Ignition off and on again. Consult Customer Service if the error occurs again
E1F07	Timeout	Turn the Ignition off and on again. Consult Customer Service if the error occurs again
E1F10	Computer operation error	Turn the Ignition off and on again. Consult Customer Service if the error occurs again
E1F18	Serial Number wrong or not set	Set Serial Number to valid entry
E1F1F	Outputs deactivated	Information: Subsequent errors resulting from another system error
E1F2F	Outputs deactivated	Information: Subsequent errors resulting from another system error
E1F41	Battery voltage	Call Customer Service to have the unit replaced
E1F44	CAN bus network error	Check the CAN cabling and supply voltage. Try turning the Ignition off and on again. Consult Customer Service if the error occurs again
E1F4F	Version Error	Call Customer Service to have the unit or software replaced
E2001	Module Error	Turn the Ignition off and on again. Consult Customer Service if the error occurs again
E2005	Module Error	Turn the Ignition off and on again. Consult Customer Service if the error occurs again
E2015	Module Error	Select a valid Operating Mode
E3001	Module Error	Turn the Ignition off and on again. Consult Customer Service if the error occurs again

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What is your opinion about this manual? We always try to describe the products fully in our manuals, as well as providing important background knowledge to ensure trouble-free operation.

We take the task of continuous improvement and reduction of errors very seriously. Your comments and suggestions help us to increase the quality and level of information for this document.

Your assessment of this manual:

	excellent	good	satisfactory	so-so	poor
Accuracy	O	O	O	O	O
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Examples	O	O	O	O	O
Structure / Layout	O	O	O	O	O
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Notes