



Operating and Assembly Instructions

Electronic function module UO-EM-ERC

Evaluation to U-ONE® - electronic position switch

Read the Operating and Assembly Instructions prior to assembly,
starting installation and handling!
Keep for future reference!



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1 General

1.1 Information about the operating and assembly instructions

These operating and assembly instructions provide important instructions for working with the device. They must be carefully read prior to starting all tasks, and the instructions contained herein must be followed.

In addition, applicable local regulations for the prevention of industrial accidents and general safety regulations must be complied with.

For other non SIL certified electronic function modules please refer to the separate Operating and Assembly Instructions.

1.2 Scope of supply

The scope of supply of the electronic function module position switch UO-EM-ERC includes the Operating and Installation Instructions and the programming software ERCPPro (on CD) and the programming cable.

The Operating and Installation Instructions for further electronic function modules is also included on the supplied CD.

1.3 Explanation of symbols

Warnings are indicated by symbols in these operating and assembly instructions. The warnings are introduced by signal words that express the scope of the hazard.

The warnings must be strictly heeded; you must act prudently to prevent accidents, personal injury, and property damage.



WARNING!
Indicates a possibly dangerous situation that can result in death or serious injury if it is not avoided.



CAUTION!
Indicates a possibly dangerous situation that can result in minor injury if it is not avoided.



CAUTION!
Indicates a possibly dangerous situation that can result in material damage if it is not avoided.



NOTES!
Indicates useful tips and recommendations as well as information for efficient and trouble-free operation.



NOTES!
Do not use a hammer or similar tool when installing the device due to the risk of damage occurring to the bearings or coupling!



DANGER!
Life-threatening danger due to electric shock!
Indicates a life-threatening situation due to electric shock. If the safety instructions are not complied with there is danger of serious injury or death. The work that must be executed should only be performed by a qualified electrician.

1.4 Disclaimer

All information and instructions in these operating and assembly instructions have been provided under due consideration of applicable guidelines, as well as our many years of experience.

The manufacturer assumes no liability for damages due to:

- Failure to follow the instructions in the operating and assembly instructions
- Non-intended use
- Deployment of untrained personnel
- Opening of the device or conversions of the device

In all other aspects the obligations agreed in the delivery contract as well as the delivery conditions of the manufacturer apply.

1.5 Copyright



NOTE!

Content information, text, drawings, graphics, and other representations are protected by copyright and are subject to commercial property rights.

It is strictly forbidden to make copies of any kind or by any means for any purpose other than in conjunction with using the device without the prior written agreement of the manufacturer. Any copyright infringements will be prosecuted.

1.6 Guarantee terms

The guarantee terms are provided in the manufacturer's terms and conditions.

1.7 Customer service

For technical information personnel is available that can be reached per telephone, fax or email. See manufacturer's address on page 2.

2 Safety



DANGER!

This section provides an overview of all the important safety aspects that ensure protection of personnel, as well as safe and trouble-free device operation.

If these safety instructions are not complied with significant hazard can occur.

2.1 Responsibility of the owner

The device is used in commercial applications. Consequently the owner of the device is subject to the legal occupational safety obligations, and subject to the safety, accident prevention, and environmental protection regulations that are applicable for the devices area of implementation.

2.2 Personnel

Qualified personnel only are permitted to install, mount, program, commission, operate, maintain and take out of service the devices.

Qualified personnel are people who have received

- training to qualify as an electrician or
- instructions from qualified trades personnel

entitling them to work with and on devices, systems, machinery and plant in accordance with generally accepted standards and safety engineering guidelines.

In addition, the owner is obliged to deploy only personnel who

- are familiar with the fundamental regulations covering work safety and accident prevention,
- have read and understood the chapter "Safety" in these Operating and Installation Instructions,
- and are familiar with the basic and specialist standards that apply to the specific application.

2.3 Special dangers

Residual risks that have been determined based on a risk analysis are cited below.

Electrical current



DANGER!

Life-threatening danger due to electrical shock!

There is an imminent life-threatening hazard if live parts are touched. Damage to insulation or to specific components can pose a life-threatening hazard.

Therefore:

Immediately switch off the device and have it repaired if there is damage to the insulation of the power supply.

De-energize the electrical equipment and ensure that all components are connected for all tasks on the electrical equipment.

Keep moisture away from live parts. Moisture can cause short circuits.

Safeguarding against restart



DANGER!

Life-threatening danger if restarted without authorization!

When correcting faults there is danger of the power supply being switched on without authorization.

This poses a life-threatening hazard for persons in the danger zone.

Therefore:

Prior to starting work, switch off the system and safeguard it from being switched on again.

3 Technical Data

3.1 Construction

The electronic function module UO-EM-ERC receives the supply voltage and the raw data from the decoder module. The outputs of the switching contacts (error, relays 1-6) are executed with relays. The Handshake – output is executed with a solid state relay and the preset - run input with an opto-coupler.

3.2 Short description

The Universal encoder system U-ONE with the base unit UOM (H) 4 (1) L-1212 and the electronic function modules UO-EM-D2 (-D41) and UO-EM ERC is a position switch. Configurable function module is connected to a PC with Windows® operating system (version XP, Vista, Windows 7 and Windows 8 / 8.1) and the supplied programming software. The physical interface is RS232 (via the decoder).

The 6 switches are switched depending on the set switching points. The switch outputs are galvanically isolated from the electronics and the PC interface. The system status is available at the Error output.

3.3 Position switch

The basic unit provides the raw position data. These are offset in the module with the offset values. These data are used to determine the position. Depending on the programmed switching points, the output relays are switched.

The device contains for each switching output a safety relay with forcibly guided contacts. Internally, the current switching state is monitored.

The module contains 6 identical switching channels (R1 to R6). The switch state is indicated by green LEDs (lit LED = closed switch).

A separate diagnostic switch (Error) includes an error-free diagnosis. This is also indicated by a green LED on the front of the module. If an error is detected, the switch opens and a red LED lits.

3.4 Preset input

Connection:

The preset input is galvanically isolated and can be connected high or low active.

The handshake output is designed as optorelay. It can be connected as high or low active.

Funktion:

A rising edge at preset input sets the current position to the programmed preset value in the module.

To avoid interference, the input is provided with a debounce time of 100ms.

The handshake output indicates the function "Preset setting" by means of a closed relay. The duration of the signal depends on the duration of the signal at the preset input. Pulse stretching is used to simplify signal evaluation. The minimum pulse length is 100 ms. The handshake output is also activated when the preset value is set using the operating software (ERCPro).

3.5 Type plate /connection diagram





Typ : UO-EM-ERC
Type

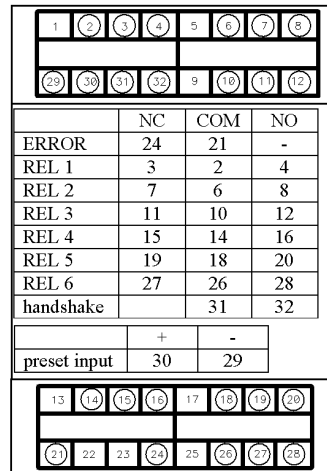
ID : 19596

S/N : **123456** Bj/Y : 2014



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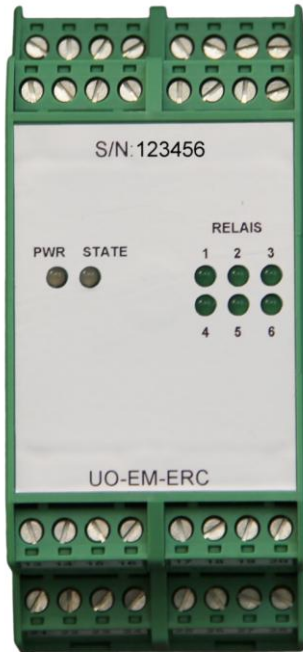




3.6 Connected loads environment

Description	Value
Supply voltage	Supply via bus connections (12 ... 30 V DC)
Power consumption	max. 6 W
Connection	COMBICON®-terminal strips
Switching outputs R1 – R6	Relays with forcibly guided contacts max. 250V AC/DC, 500mA
Switching output Error	Relay contact max. 250V AC/DC, 500mA
Preset input	potential free voltage 12 ... 30 V DC / approx. 5 mA
Programming interface	RS 232
Connecting diagram	EL 777
Device temperature range	-25 ... + 70 °C
Degree of protection	IP20

3.7 Connectors and Indicators



Indicators	
R1 – R6	LEDs light up when switches are closed
State	Green LED Lit: Operational Red LED lit: Error condition
PWR	Red LED lit: Module is operational

3.8 Mounting the module

Snap the modules onto the top-hat rail and slide together.



ATTENTION!

Ensure you do not damage the connectors when you snap the modules onto the rail and push them together!

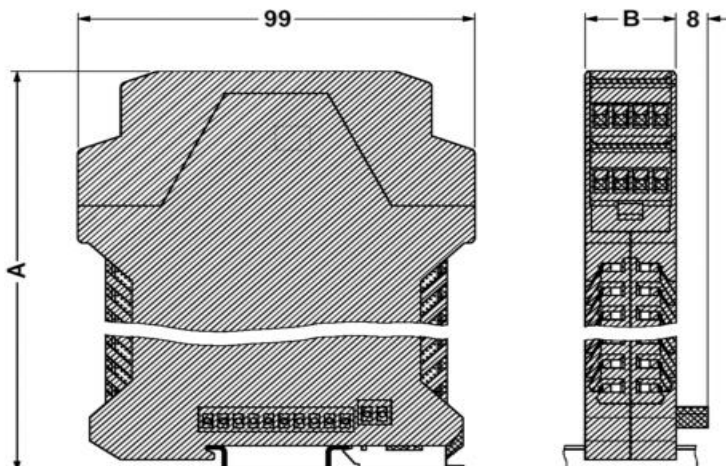
The module must be mounted in a voltage-free state!

Ensure the modules contact reliably when joining them together on the top-hat mounting rail.

Fit the supplied shrouding covers to both ends of the mounted terminals.

Follow the connection diagram!

3.9 Dimension drawing

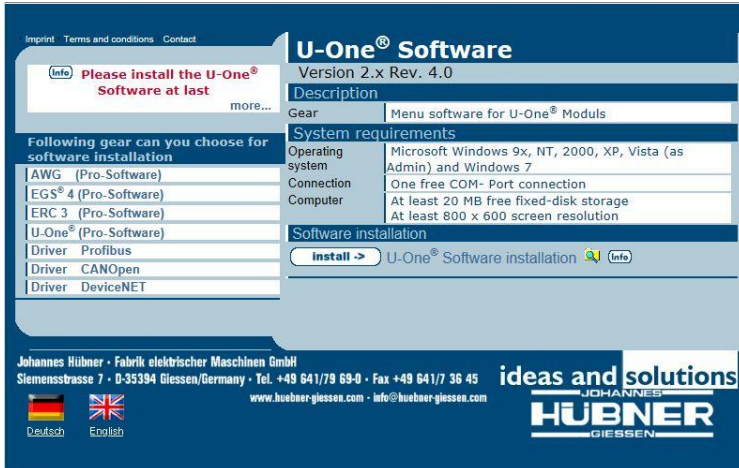


A = 114,50 mm
B = 45 mm

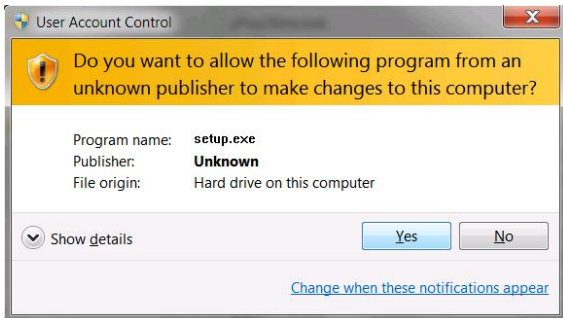
4 Installation and Configuration

4.1 Installing the software

Place the CD into the CD drive or, alternatively run the file: index.html.



Select "U-One® (Pro-Software)" in the left column then click the "Install ->" button. When the dialog box "Internet Explorer - Security Warning" is displayed



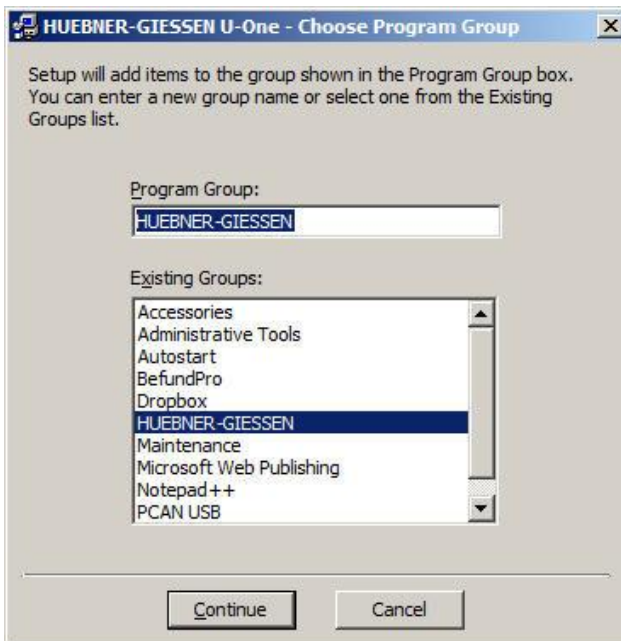
Click the "Run" button. The installation software will now launch.



Click the "OK" button in the dialog box "HUEBNER-GIESSEN U-One Setup".



Then click the Install software button in the dialog box "HUEBNER-GIESSEN U-One Setup."



Then click the "Continue" button in the dialog box "HUEBNER-GIESSEN U-One - Choose Program Group."



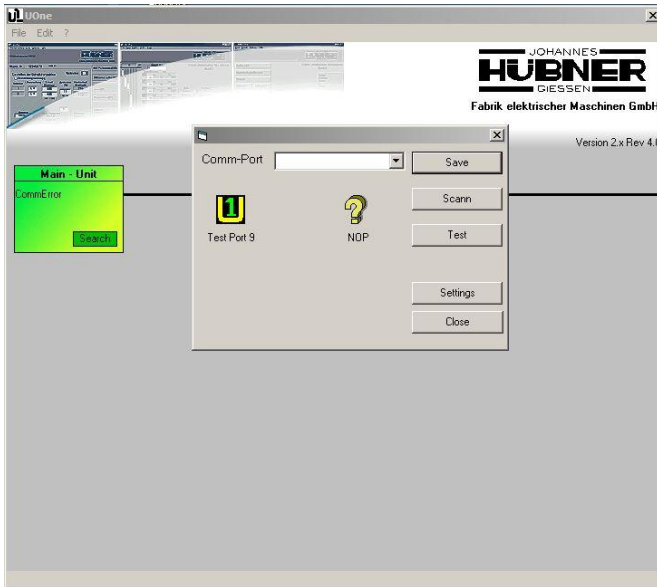
Die Installation der Software U-One mit „OK“ abschließen.

Analog zu dieser Installation die anderen benötigten Programme installieren.

Module	Programm
UO-EM-EGS4	EGS4 (Pro-Software)
UO-EM-ERC	ERC3 (Pro-Software)
UO-EM-AMS	AWG (Pro-Software)

4.2 Configuration of the software

Launch the configuration program (UONE) as administrator.

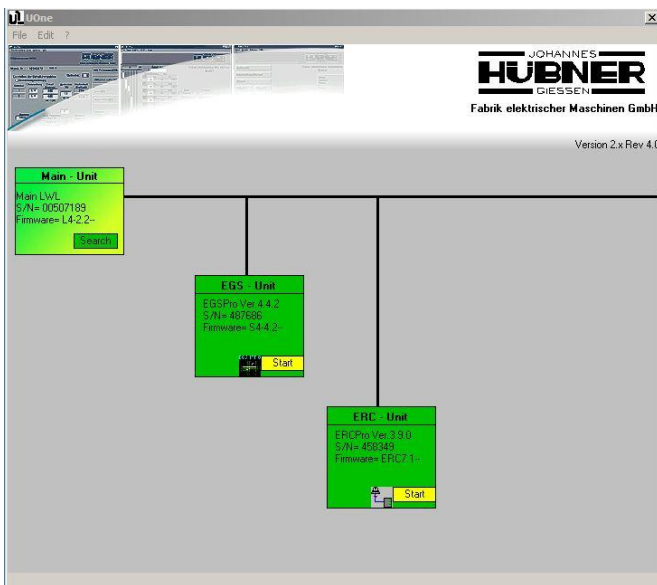


When an UO-EM-D2 (or D41) module is connected and switched on, click the "Scan" button; if that is not the case, select "Serial interface" from the "Settings" menu. Click the "Save" button. Configuration is now complete.

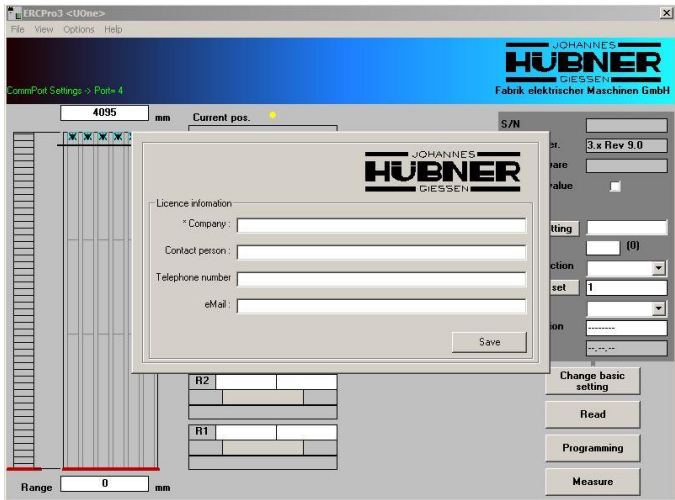
4.3 Operating the software

Launch the configuration program (UONE)

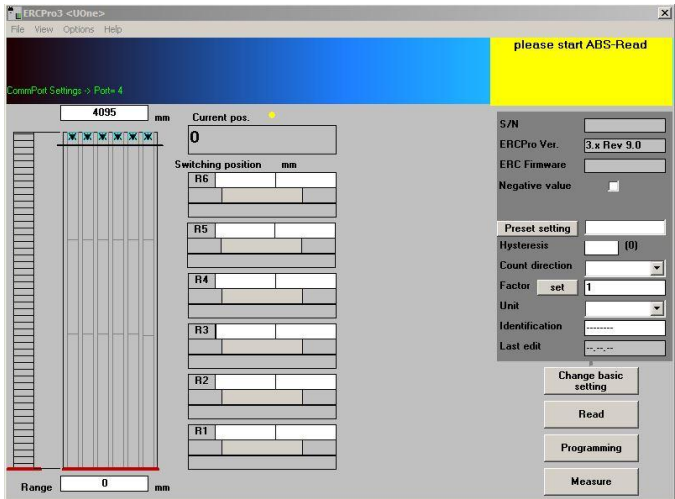
The UONE overview screen opens to provide a graphic overview of the connected modules.



Now click the "Start" button in the ERC - Unit graphic icon to launch the program ERCPro3.

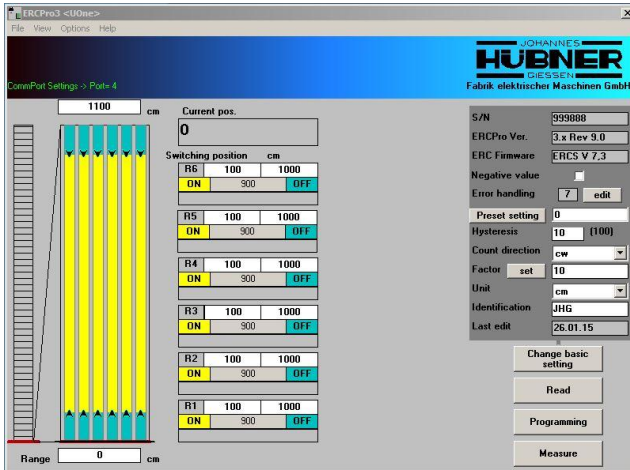


Complete the fields in the Licence information dialog box, then click the "Save" button. The Licence information dialog box will then close.

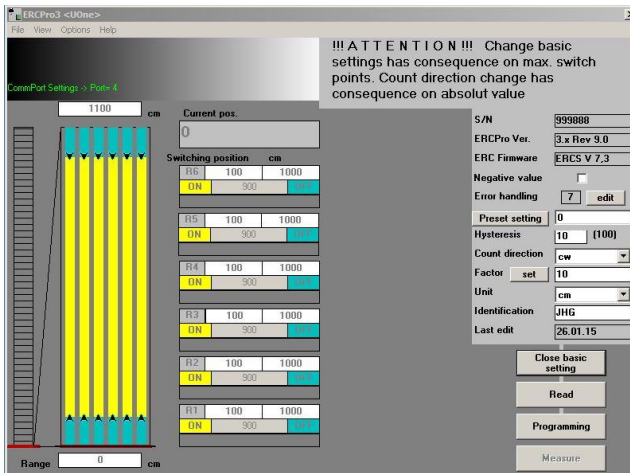


Data must be read-out of the module. To do so, click the "Read" button. Data from the module populate the fields. A flashing yellow dot signalizes that position data is being read out of the module.

4.4 Change default settings



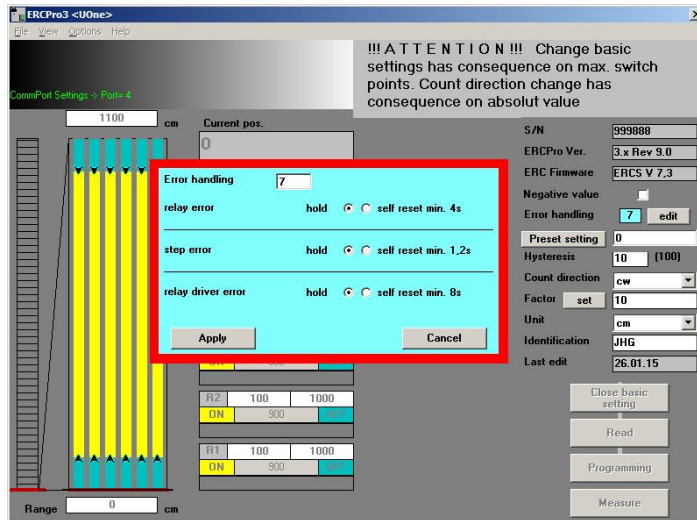
It is possible to change the basic ERC unit settings (dark-grey shaded area). To do so, click the "Change basic settings" button.



1. S/N
This field displays the serial number of the module; this information is read only and cannot be changed.
2. ERCPro Ver.
This field displays the version of the programming software; this information is read only and cannot be changed.
3. ERC Firmware
This field displays the firmware version of the UO-EM-ERC – module; this information is read only and cannot be changed.
4. Negative value
When the Negative value box is selected, the displayed value range is placed in the middle of the value range of the basic unit. The display can now display positive and negative numbers.

5. Error handling

Click the "Edit" button. The "Error handling" dialog box opens, in which the type of error handling procedure is determined for internally recognized errors and warnings.



It is possible to program each error so that the ERC module stores the error until the supply voltage is switched off (hold) or is applied for a fixed time period (pulse).

When in the operating mode "Pulse" the module resets the error automatically after a fixed time period elapses.

In that event the higher-level controls are responsible for storing the error information.

Once you have selected the desired option, click the "Apply" button.

6. Preset setting

The preset value for the module is entered in this field. This value is transmitted immediately to the UO-EM-ERC module when you click the "Preset setting" button.

The position value is always set to this value when the hardware input "Preset setting" is activated.

7. Hysteresis

The switching hysteresis is entered in this field (switch-on and reset hysteresis of the relays). The value is entered in encoder increments (1-255). This determines the difference between the switch-on and switch-off points of a switching point.

8. Count direction

The selected option determines if the position value increases when the encoder shaft is turning in a clockwise or anti-clockwise direction.

9. Factor

It is possible to enter a conversion factor in this field. Raw encoder data are multiplied by this factor and displayed.

Caution!!!

Any changes to this setting will influence the switching points. You will need to check and possibly adapt the corresponding settings (see chap. 4.5).

10. Unit

It is possible to select a character string from the Unit drop-down list, which is displayed as the unit of the displayed values. It is also possible to define the character string in the system settings.

11. Identification

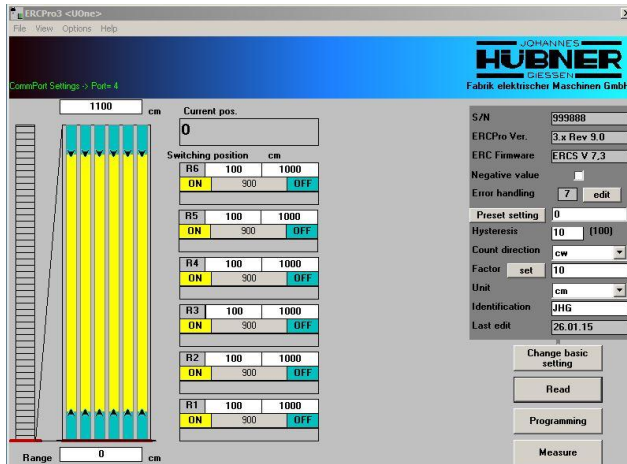
The character string entered in this field serves to identify the module. The user is able to choose the characters in the string up to a maximum of eight characters.

12. Last edit

The date data was last transmitted to the module is displayed in this field.

To write the data to the module click the button "Programming". By contrast, if you do not wish to save the edited data click the "Close basic setting" button.

4.5 Change switching points



It is possible to adjust the range of the graphic display by entering positions in both "Range" fields.

The ERC module offers 6 independent channels, each of which has a relay as output stage. 2 switching points can be assigned to each channel. The programmed switching range may also exceed the zero reference point.

The switch-on points are entered in the left field, and the switch-off point points in the right field. When entering the switching points please note that they are scaled according to the set "factor". The value range of the encoder (factor = 1) is 0 to $2^{24}-1$ (16777215).

Several options are available to the user to complete the fields:

- Enter value manually.
- Click the value in the field "Current pos." and copy the value to the target field by holding down the left mouse button in a drag-and-drop operation
- Hold down the left mouse button to move the yellow bar. The lower limiting arrow moves the entire bar, the upper limiting arrow changes the length of the bar.

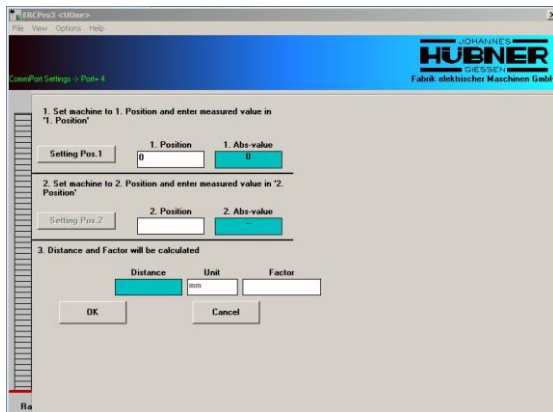
It is possible to invert the switching function of the channel by double-clicking "ON" or "OFF".

Click the "Programming" button to write and save the new values to the ERC module.

4.6 Measure function

The "Measure" function is an aid that makes it possible to determine the scaling factor. It can be used when the scaling factor of the system is unknown. It is essential when using the program that the speed ratio between the mounted position of the encoder and the axis to be configured is constant and there is a linear relation between the axis position and the data word of the encoder.

To start the function, click the "Measure" button.



Caution! The absolute value of position 1 must be less than the absolute value of position 2; moreover, zero crossing is not allowed between these two positions.

The accuracy of the calculation is greater when both positions on the axis are as far apart as possible.

Move the axis to the first position. The current raw encoder data are displayed in the field "1. Abs-value". Now enter the desired value in the field "1. Position". To apply the data, click the "Setting Pos. 1" button.

Now move the axis to the second position. The current raw encoder data are displayed in the field "2. Abs-value". Now enter the desired value in the field "2. Position". To apply the data, click the "Setting Pos. 2" button. The factor will now be calculated and displayed in the field "Factor".

Click the "OK" button to store the value in the buffer memory. Click the "Cancel" button to abort the procedure and close the dialog box.

The message "Factor = xxxxx" is now displayed in the message area of the UONE overview screen. If you wish to use this value, you must enter it in the field "Factor" (see Change basic settings).

4.7 Pulldown-Menu „file“

In the File menu it is possible to save, load and print out data as well as change program settings.



1. Read parameters

"File→Load.." opens the "Open *.DAT file" dialog box. Select and load the parameter file (*.DAT) into the programming software.

To be able to transmit the data to the module, you must click the "Programming" button.

Caution! The preset value is not transmitted and must be set separately.

2. Save parameters

"File→Save as.." opens the Save as dialog box. To save the parameters (settings) select a destination folder and specify a file name for the parameter file (*.DAT).

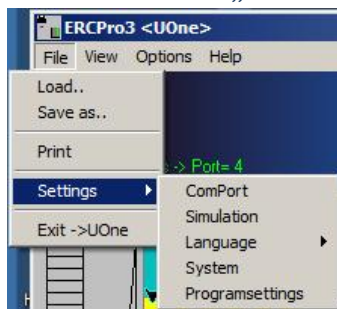
3. Print

File → Print" prints the parameter on the standard printer.

4. Exit

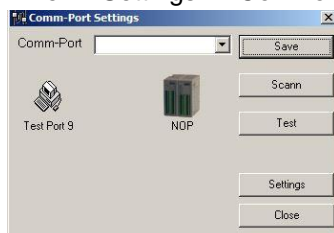
"File → Exit ->U-One" terminates the program and launches the configuration program (UONE).

4.8 Pulldown-Menu „file → settings“



1. Communication port

"File → Settings → ComPort" opens the Comm-Port Settings dialog box.



Under normal circumstances users are not required to use this menu item, because the settings in the configuration program (UONE) have already been set. If it is not possible to establish a com-

munications with the module, carry out the settings as described in chapter 4.2 Configuration of the software).

2. Simulation

"File → Settings → Simulation" sets the software to "showroom" mode to be used for demonstration purposes only.

3. Select language

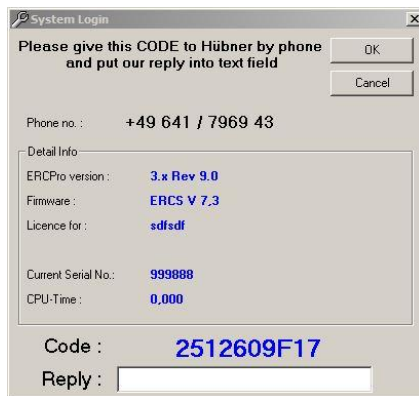
"File → Settings → Language" enables the user to set the desired user interface language.

Selection	User interface
Deutsch	Deutsch
English	English
User	Is not longer supported

4. Factory settings

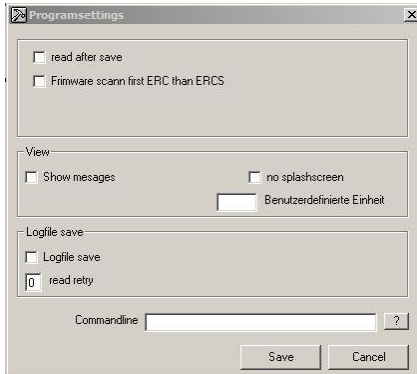
"File → Settings → System" launches a menu to request a code.

It is only possible to request a code over the phone.



5. Program settings

"File → Settings → Programsettings" opens the Programsettings dialog box.

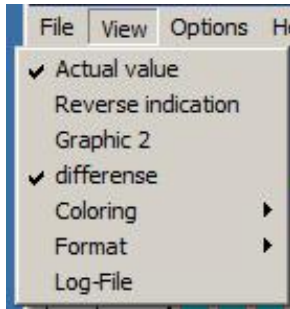


User selectable settings are listed in the table below.

Description	Function
read after save	After the switching points are programmed the "read" command is executed (corresponds to clicking the "Read" button). This function is always activated no matter what selection is made.
Firmware scan first ERC than ERCS	This setting is required for other devices and is of no relevance in this instance.
Show messages	Activates additional messages.
no splashscreen	Program information is not displayed when the program is launched.
User defined unit	Text field for user defined unit. This is determined when making basic settings. The characters are saved locally on the PC.
Logfile save	Save data communication with the module to a file.
read retry	It is possible to enter a value in this field in the event communication problems arise (< 10). Communications are slowed if the value is too high.
Commandline	This is reserved for future programming options, it remains unused.

4.9 Pulldown-Menu „View“

Settings for the graphic user interface are made in this menu.



1. Position display
"View → Actual value" switches the position display bar on or off in the switch graphic overview.
2. Zero reference point of position display
"View → Reverse indication" reverses the fields displaying the range view (top <-> bottom).
3. Position display
"View → Graphic 2" opens the GRAPHIC 2 overview with a different representation of the actual position.
4. Difference display
"View → Difference" switches the display showing the difference between the switching points (relay on range) on and off.
5. Coloring
"View → Coloring" allows the user to define the color representation of the graphic interface. You must close and relaunch the software for the changes to take effect.
6. Format option
"View → Format" enables the user to select the display resolution. It is possible to make this setting independent of the position display and the switching points. To confirm this setting click the "Read" button.
7. Display log file
"View → Log-File" opens the log file in an editor.

4.10 Pulldown menu "Options"

"Options → Visual setting" switches the option on and off that enables the user to set the switching points by moving the bars.

4.11 Pulldown menu "Help"

"Help → Info ERCPro3" displays the program information dialog box.

4.12 Proper use

The electronic function module UO-EM-ERC of the universal encoder system U-ONE serves as a position switch; it is designed and built to operate exclusively with the basic unit UOM(H) 4(1)L-1212 and the electronic function module UO-EM-D2 (-D41) for the sole purpose described in this manual.

We do not accept liability of any kind for damages arising from improper use of the device. The owner bears sole responsibility for any improper use.

4.13 Improper use

- Do not use the device in potentially explosive areas.
- It is not permitted to use the device in locations higher than 3000 m above sea level.

4.14 Faults table

Faults	Possible cause	Remedy
Diagnostic switch does not close	No supply voltage <u>Check basic unit:</u> Green LED in terminal box does not lit. <u>Check electronic modules:</u> No LEDs lit	Check connection cable and supply voltage
	An fault was detected. Red LED on the ERC module lit. „Ready“ – LED on the decoder does not lit	Check supply voltage on the basic unit Check fibre optic cable
	An fault was detected. Red LED on the ERC module lit. „Ready“ – LED on the decoder lit	Read out fault memory with programming software

Contact Hubner-Service (page 2) if none of the actions listed above provides a solution!

4.15 Error table

Error report	Description	Remedy
0) Internal ERROR (EEPROM to RAM)	The checksum for a data record in the EEPROM is invalid Possible cause: The supply voltage was too low during an EEPROM write operation	<ul style="list-style-type: none"> - Preset setting (see chap.4.4) - Check and enter switching points (see chap.4.5) - Check and enter basic settings (see chap.4.4)
1) Relais ERROR	The setpoint and actual switching status of a relay do not match Possible cause: The supply voltage was too low during a switching operation The ambient temperature is too high Resistance across relay contact too high	<ul style="list-style-type: none"> - Switch voltage supply off and back on again - Ensure ambient temperature is within range (see chap.3.6) - Always switch off unused switching channels (see chap.4.5)
3) Base unit error	Die received position data is invalid Possible cause: A fibre-optics cable is faulty The power supply to the basic unit is outside of the allowable range The basic unit is faulty	<ul style="list-style-type: none"> - Test fibre-optics cable - Check the power supply to the basic unit - Replace the basic unit
4) Step error !	Received position data is inconsistent Possible cause: A fibre-optics cable is faulty The power supply to the basic unit is outside of the allowable range The basic unit is faulty Error in multiturn encoder	<ul style="list-style-type: none"> - Test fibre-optics cable - Check the power supply to the basic unit - Replace the basic unit
5) Base unit error D2	The D2 (D41) – decoder has detected a communication error Possible cause: A fibre-optics cable is faulty The power supply to the basic unit is outside of the allowable range The basic unit is faulty	<ul style="list-style-type: none"> - Test fibre-optics cable - Check the power supply to the basic unit - Replace the basic unit
7) CRC ERROR	Error ratio of data transmission checksum too high Possible cause: A fibre-optics cable is faulty	<ul style="list-style-type: none"> - Test fibre-optics cable

Contact Hubner-Service (page 2) if none of the actions listed above provide a solution!

5 Transport, packaging and storage

5.1 Safety information concerning transport



CAUTION!

Material damage caused by improper transport!

Observe the symbols and information on the packaging:

- Do not throw - risk of breakage
- Keep dry
- Do not expose to heat above 40 °C or direct sunlight.

5.2 Goods inward inspection

Check the delivery immediately upon receipt for transit damage or short delivery.

Inform the carrier immediately on receipt if you determine that damage has occurred during transit (take photos as proof).

5.3 Packaging (disposal)

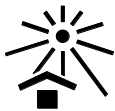
The packaging is not taken back; dispose of according to the respective valid statutory provisions and local regulations.

5.4 Storing packages (devices)



Keep dry

Keep packages dry and free from dust; protect from moisture.



Protect against heat

Protect packages from heat above 40 °C and direct sunlight.

If you intend to store the device for a longer period of time (> 6 months) we recommend you use protective packaging (with desiccant).



NOTES!

Turn the shaft of the device every 6 month to prevent the bearing grease solidifying!

5.5 Returning devices (repairs/goodwill/warranty)

Devices that have come into contact with radioactive radiation or radioactive materials are not taken back.

Decontaminate devices that have may come into contact with harmful chemical or biological substances before returning.

They must also be accompanied by a safety clearance certificate.



5.6 Disposal

The manufacturer is not obliged to take back the device.

The device is classed as electronic equipment and subject to the WEEE Directive; observe local, country-specific laws when disposing of the device.

For information on environmentally sound disposal please contact your local authority or a specialist disposal company.

6 EU-Declaration of Conformity

	<h3 style="margin: 0;">EU-Konformitätserklärung</h3> <p style="margin: 0;">(EU-Richtlinie 2014/30/EU)</p> <h3 style="margin: 0; color: #003366;">EU-Declaration of Conformity</h3> <p style="margin: 0; color: #003366;">(EU-Directive 2014/30/EU)</p>	
<p>Hersteller / Manufacturer: Johannes Hübner Fabrik elektrischer Maschinen GmbH</p> <p>Anschrift / Address: 35394 Giessen, Siemensstrasse 7</p> <p>Produktbezeichnung / Product designation:</p> <p>Elektronik-Funktionsmodul UO-EM-ERC Electronic function module UO-EM-ERC</p> <hr/> <p>Die bezeichneten Produkte stimmen in der von uns in Verkehr gebrachten Ausführung mit den Vorschriften folgender Europäischer Richtlinien überein:</p> <p style="color: #003366;">The products described above in the form as placed on the market are in conformity with the provisions of the following European Directive:</p> <p>2014/30/EU (Ausgabe / Version 2014-02-26) Richtlinie des Europäischen Parlaments und des Rates vom 26. Februar 2014 zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit <u>Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility</u></p> <hr/> <p>DIN EN 55011 (Ausgabe / Version 2011-04) Industrielle, wissenschaftliche und medizinische Geräte - Funkstörungen - Grenzwerte und Messverfahren <u>Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement</u></p> <hr/> <p>DIN EN 61326-1 (Ausgabe / Version 2013-07) Elektrische Mess-, Steuer-, Regel- und Laborgeräte - EMV-Anforderungen - Teil 1: Allgemeine Anforderungen <u>Electrical equipment for measurement, control and laboratory use - EMC requirements -- Part 1: General requirements</u></p> <hr/>		
Unterschrift: 	Frank Tscherney (Geschäftsführer / General manager)	Giessen, 17.01.2017