ZIEHL industrie – elektronik GmbH + Co KG
Daimlerstr.13, 74523 Schwäbisch Hall, Germany
+ 49 791 504-0, info@ziehl.de, www.ziehl.de

Operating Manual UR840IP

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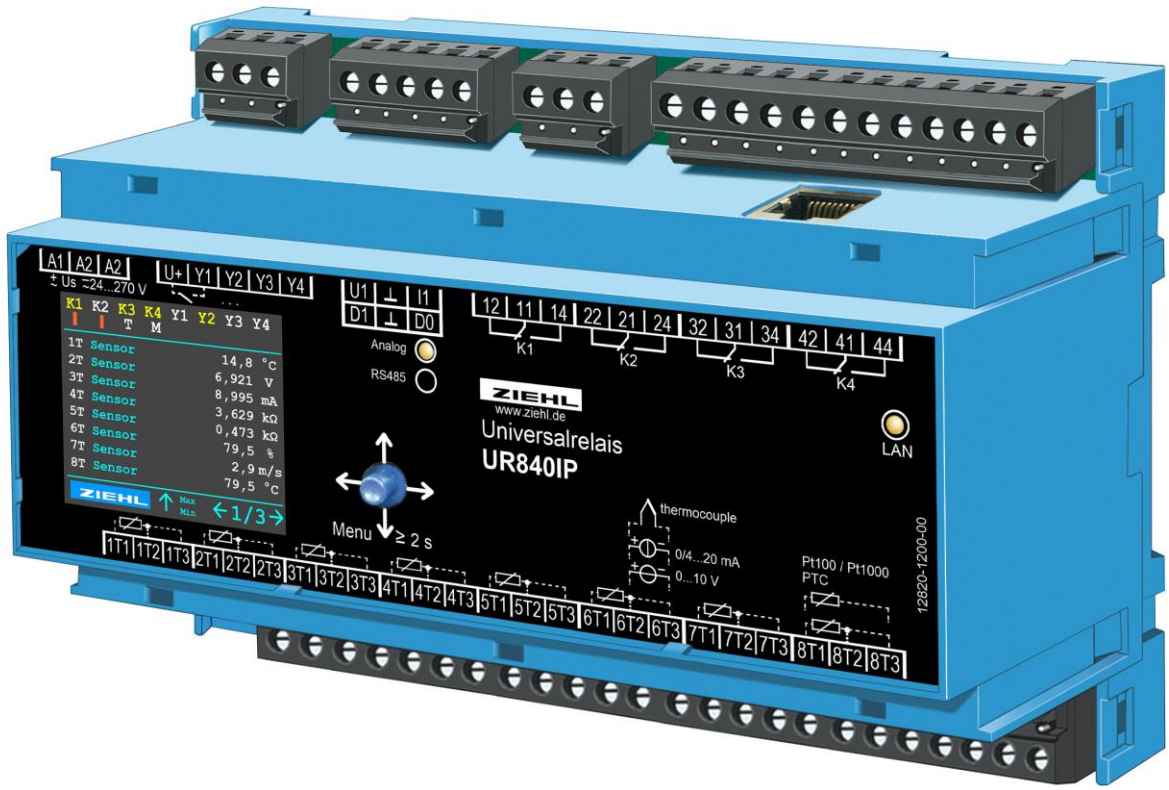
from Firmware: 0-00

For more information and help about this product please scan the QR-Code or choose the following link: UR840IP

Operating manual, Quick guide, Datasheet, Connection diagram, CAD Data
Firmwareupdates, FAQ, Videos about installation and settings, Certificates

- Universal relay with integrated web server and display

Optional analog output or switchable RS485 interface



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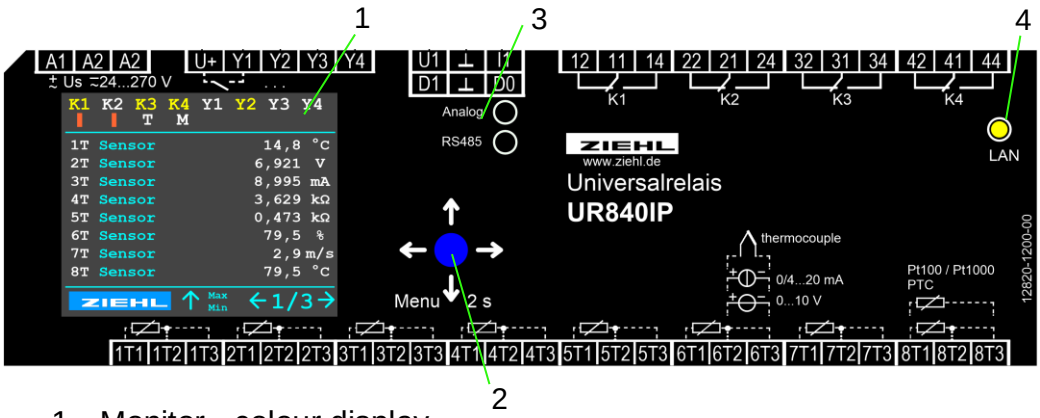
1 General Notes

Compliance with the following instructions is mandatory to ensure the functionality and safety of the product. If the following instructions given especially but not limited for general safety, transport, storage, mounting, operating conditions, commissioning and disposal / recycling are not observed, the product may not operate safely and may cause a hazard to the life and limb of users and third parties.

Deviations from the following requirements may therefore lead both to the loss of the statutory material defect liability rights and to the liability of the buyer for the product that has become unsafe due to the deviation from the specifications.

2 Display and controls



1. Monitor - colour display
   - K1 ... K4
     - white text => relay de-energised
     - yellow text => relay energised
     - coloured bar under the relay designation
       1. increasing bar => delay time alarm on active
       2. decreasing bar => delay time alarm off active
       3. Red flashing bar => manual intervention necessary, alarm can be reset (push button 2s upwards, or external switch on Y1 ... Y4)
       4. "M" => relay is in manual mode (energised (yellow) or de-energised (white) depending on the colour of the relay designation)
   - Y1 ... Y4
     - white text => digital input open
     - yellow text => digital input closed
   - Measured value is highlighted in orange
     - Sensor has exceeded a limit value
   - ERR
     - At least 1 error is present (a detailed description of the active error is shown on the display from page 4)
2. Control element - joystick button
3. Terminal + LEDs Analog / RS485
   - Either an analog output 0/2...10V and 0/4...20mA or an RS485 interface can be used. The LED indicates the active interface.
   - Bus terminating resistors of the RS485 interface can be activated / deactivated via the menu / Web.
4. LED Ethernet connectivity

3 Application and short description

Web-enabled universal relay with Ethernet interface and 8 inputs for temperature sensors and all common analog signals.
The UR840IP can be connected to the network or the Internet and easily operated and queried from a PC using an Internet browser via TCP/IP. No extra software or prior knowledge is required for operation.
Universal relays UR840IP monitor and log up to 8 different input signals simultaneously. Up to 16 limit values can be assigned to each of the 4 output relays, one for each input (1T ... 8T) and one for each virtual measured value (1V ... 8V).

4 Functions overview

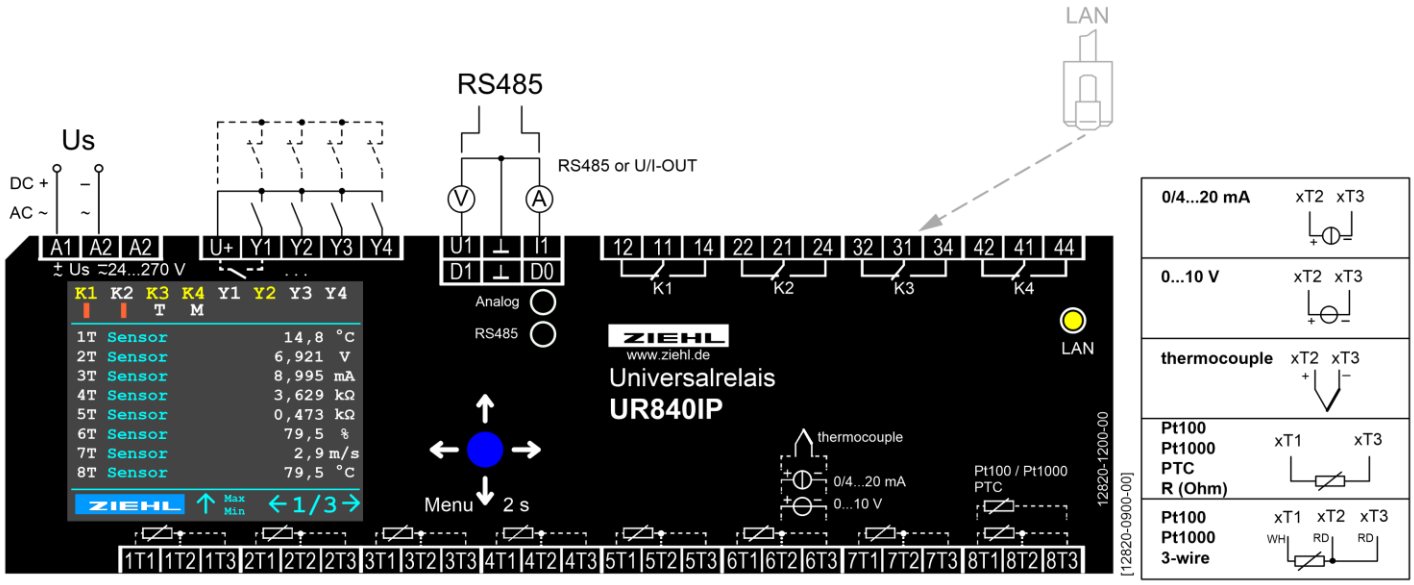
- 8x measurement and monitoring of all common sensors
- 8x virtual sensors
  - Differential measurement of measured values that can be freely parameterised
  - Min/max values from up to 8 measured values
- 4x relay outputs (1 changeover contact each)
  - Alarm K1 (11/12/14) ... K4 (41/42/44)
- Fault message for sensor breakage, short circuit and device error can be freely parameterised on each of the 4 relays
- All measured values can be read at a glance
- Simple operation via joystick button
- Modbus TCP
- Wide-range power supply AC/DC 24-270 V
- Integrated web server for measured value queries, configuration and firmware updates
- 2x analog output (1x voltage, 1x current) - **either RS485 or analog can be activated in the menu**

- RS485 interface (Modbus RTU) - **either RS485 or analog can be activated in the menu**

Functions / setting options
Alarm:

- A separate alarm value can be set for each sensor for each alarm (relay K1 ... K4).
- Sensor fault and device fault can be parameterised for each alarm.
- Freely adjustable delay times for “Alarm on” and “Alarm off”
- **2 of X**
  - The “2 of X” function only triggers the alarm if at least 2 of the sensors parameterised for this alarm fulfil the alarm conditions.
  - INFO: If only 1 sensor is parameterised for this alarm, this function cannot be activated.
- locked alarm
  - Each alarm can be set to “locked” yes / no
- Relay function on alarm
  - on
  - off
  - manual on (if a relay is set to “manual”, it permanently retains this status)
  - manual off

5 Wiring diagram



*) Bus terminating resistors can be activated / deactivated via the menu / web.

Attention! *)
The xT3 terminals must not be earthed. Possible earthing of this terminal falsifies the measurement data and correct operation of the device cannot be guaranteed.

5.1 Ethernet

Ethernet socket for network cable

6 Important notes

WARNING!
Dangerous electrical voltage!
Can lead to electric shock and burns.
De-energise the system and device before starting work.

If the temperature sensors are installed in transformers or motors with a voltage >300V, they must have double or reinforced insulation suitable for the measurement.

All cables (sensors, reset, Ethernet) that are >30m must be shielded.
The shield must be earthed on one side of the device.

Note on insulation for inputs and outputs as well as relay contacts:
Unless otherwise specified, the devices have basic insulation corresponding to the rated insulation voltage of the device. If the application requires higher isolation or safe separation, this must be ensured by additional measures.

Attention!
The temperature sensors are connected to terminals 1T1, 1T2, 1T3, etc. These plug-in contacts have a special contact material and may only be used for connecting the sensors.

The proper and safe operation of a device requires that it be properly transported and stored, professionally installed and put into operation and operated as intended.
Only persons who are familiar with the installation, commissioning and operation of the appliance and who have the appropriate qualifications for their work may work on it. You must observe the contents of the operating instructions, the instructions on the device and the relevant safety regulations for the installation and operation of electrical systems.
The appliances are built and tested in accordance with DIN VDE/EN/IEC and leave the factory in a technically safe condition.
To maintain this condition, you must observe the safety instructions labelled "Attention" in the operating instructions. Failure to follow the safety instructions may result in death, personal injury or damage to the appliance itself and to other appliances and equipment.
If the information contained in the operating instructions is not sufficient in any case, please contact us directly or your local representative.
Instead of the industrial standards and regulations specified in the operating instructions and applicable in Europe, you must observe the relevant regulations applicable in the country of use when using the appliance outside their area of application.

7 Assembly

The device can be attached:

- Distributor installation on 35 mm mounting rail according to EN 60715
- With M4 screws for wall mounting. (additional latches not included)
- Connect according to the wiring diagram or rating plate

In the supply line near the appliance (easily accessible), a switch labelled as a disconnecting device and an overcurrent protection device (rated current ≤ 10 A) must be fitted.

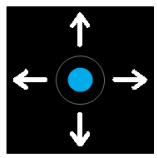
Observe the maximum permissible temperature for installation in the switch cabinet. Ensure sufficient distance from other devices or heat sources. If cooling is made more difficult, e.g. due to close proximity of devices with a higher surface temperature or obstruction of the cooling air flow, the permissible ambient temperature is reduced.

8 Commissioning

8.1 Notes on operation

↑ Actuation upwards …
Display page 1/3: min/max values
Menu: Scroll upwards
Parameter: Increase value
Locked alarm: 2s reset

← Actuation to the left …
Display page: previous display page
Menu: back
Parameter: navigate to the left



→ Actuation to the right…
Display page: next display page
Menu: Call up submenu / parameter
Parameter: navigate to the right

↓ Actuation downwards ...
Display page: Press and hold for 2s, menu is called up
Menu: Scroll down
Parameter: Reduce value

8.2 Switch on the device / language selection and date setup

When the device is switched on for the first time, the language selection screen appears. Once the desired language has been selected, the setting for the current date and time appears. These settings are required for the alarm counter to function correctly. If the date has not been set, the alarm counter will display the year 1970. After these settings have been made, monitoring starts. The settings for the language, date and time can be changed at any time in the menu (Settings -> Language / Date / Time) or through the web browser.

8.3 Device in the network

For full utilisation, the UR840IP must be connected to a network via Ethernet. Subsequently, the measured value display and the complete parameterisation can then be carried out via a web browser on the computer. Basic knowledge of network technology is required for configuration.

8.3.1 Find device on the network

Network with DHCP server:
After connecting to the network, the device automatically receives an IP address.
Query the IP address on the device:

- In menu mode, open the “Network” menu item, or on the 3rd display page
- Settings for the network parameters DHCP, IP address and subnet mask can be viewed and changed

Setting up a network without a DHCP server / manual IP address:
The relevant network parameters can be set and changed directly on the device:

- Open the “Network” menu item in menu mode
- Settings for the network parameters
  - Set DHCP to “off”,
  - Set IP address and subnet mask

Connection:
Start web browser on computer and enter the IP address in the address bar.

8.3.2 Access via web browser

After calling up the IP address, the device logs into the web browser.

8.4 2-wire - line calibration

Short-circuit the wire at the sensor and measure the resistance. We generally recommend laying 2 or 3 wires to each sensor. If in a 2-wire connection a mutual (ground) return circuit with the same conductor cross-section is used, the currents are cumulative, and so is the voltage drop on the mutual cable. The compensation value RK to be entered is then calculated as follows: RK = (n+1) x RL/2 (RL = total line resistance, n = number of sensors)

9 Operation

9.1 Parameter description

Menu	Parameter	Explanation	Setting range
Sensors 1T ... 8T	Type	Setting the connected sensor type	off, Pt100, Pt1000, PTC, Thermocouple type B, E, J, K, L, N, R, S, T 0...10V, 2...10V 0...20mA, 4...20mA 500Ohm, 30kOhm
	Line resistance	Line resistance from the device to the sensor. Setting in ohm, or as a 3-wire with own measurement of the line resistance. This parameter only affects sensor types Pt100 and Pt1000.	3-wire, 0.0 … 99.9 Ω
	Scaling	Measurement data can be scaled into other units	off, on
	Zero point	Zero point for scaling	xxxxx
	Full scale	Full scale for scaling	xxxxx
	Decimal point	Arrangement of the decimal point	XXXX XXX.X XX.XX X.XXX
	Unit	Predefined units for the scaled value. (A freely defined text can also be entered via Web)	°C, V, mV, A, mA, Ω, kΩ, user-defined
Virtual sensors V1 … V8	Function	Applied function of virtual sensor	off, difference xT-yT, absolute difference xT-yT, min. value, max. value
	Sensors	Sensors selection xT	1T ... 8T
	Sensors 2	Sensors selection yT	1T ... 8T
	Unit	Predefined units for the virtual sensor. (A freely defined text can also be entered via Web)	°C, V, mV, A, mA, Ω, kΩ, user-defined
Alarm K1 … K4	Sensors	Assignment of which sensors should act on this alarm	1T … 8T, V1 … V8
	2 of X	If this function is on, 2 of the assigned sensors must meet the alarm conditions to trigger an alarm.	on, off

		Function can only be activated if 2 sensors are assigned to this alarm.	
	Alarm on	Limit value per sensor for “Alarm on” **Can ONLY be parameterised via web server!**	Permitted ranges stored for each sensor type
	Alarm off	Limit value per sensor for “Alarm off” **Can ONLY be parameterised via web server!**	Permitted ranges stored for each sensor type
	Delay alarm on	Delay time between reaching the switch-off value and switching the relay	00:00 … 59:59 mm:ss
	Delay alarm off	Delay time between reaching the switch-back value and switching the relay	00:00 … 59:59 mm:ss
	Relay function on alarm	Function of how the relay should behave in the event of an alarm.	on, off, manual on, manual off
	Locked alarm	If the function is activated, the alarm must be reset manually on the device, via the web browser or via an external button.	on, off
	Sensor fault	Selection of the sensors for which the relay emits a fault message in the event of a sensor fault.	1T ... 8T
	Device errors	Activation to report a device error with this relay	on, off
Digital inputs Y1 … Y4	Type	Can be switched, whether the device reacts to an NO/ NC contact	Open, Close
	Function	Function of the digital input	Off, Reset, Manual relay on, Manual relay off
Analog / RS485	RS485 <-> analog output switchover		Analog, RS485
Analog output	OUT 1 voltage	range	0 … 10V 2 … 10V
		Sensors that act on this analog output	1T ... 8T
		Temperature output	Min. temperature, max. temperature
		Zero point	-31,500 … 31,500
		Full scale	-31,500 … 31,500
	OUT 1 current	range	0 … 20mA 4 … 20mA
		Sensors that act on this analog output	1T ... 8T
		Temperature output	Min. temperature, max. temperature
		Zero point	-31,500 … 31,500
		Full scale	-31,500 … 31,500
RS485 – Modbus	Interface protocol	UR840IP as slave participant or as Modbus master	Modbus RTU, Modbus master (for URB40)
	BUS address	Bus address of the UR840IP	001 … 247
	Baud rate	Communication speed	4,800, 9,600, 19,200, 57,600
	Parity	Parity bit	No, odd, even

	Stop bits	Number of stop bits	1 … 2
	Bus terminating resistor	Bus terminating resistor UR840IP	off, on
	Relay box active	External relay box URB40 active	off, on
	Relay box RS485 address	Bus address of the URB40 relay box	001 … 247
	Relay box bus terminating resistor	Bus terminating resistor URB40	off, on
Network	Network	Active interface	on, off
	DHCP	Dynamic Host Configuration Protocol (DHCP) The device is assigned its IP address by the server	on, off
	IP address	Manual setting of the IP address in the network	xxx.xxx.xxx.xxx
	Subnet mask	Manual subnet mask setting	xxx.xxx.xxx.xxx
	Gateway	IP address of the gateway	xxx.xxx.xxx.xxx
	DNS server	IP address of the DNS server	xxx.xxx.xxx.xxx
	MAC address	MAC address of the UR840IP	xxx.xxx.xxx.xxx
Settings	Language	Setting the language on the display	German, English
	Date	Setting the current date	
	Time	Setting the current time	
	Display interval	Duration for updating the display	0.1 … 2.0 s
	Brightness	Display brightness	20 … 100%
	Dimming time	Duration until the display brightness is reduced	00:10 … 59:59 mm:ss
	Factory settings	Loading the parameters of the currently active programme	No, Yes
	Code lock	Code protection so that the device can be protected Factory settings 504	on, off
Info	Firmware version	Display of the currently installed firmware version	
	Serial number	Display of the serial number	
	Operating hours counter	Operating hours of the device	
	Comment	Customer comment (can be set via the website)	
Counter	Alarm counter	Alarm counter separately for each alarm	Last 20 alarms
	Reset	Clearing the alarm counter and the sensor statistics 1	
	Relay counter last reset	Timestamp of the last reset of the relay counter	
	Relay counter overview	Number of relay switching operations	
	Relay counter list reset	Reset the relay counters	

9.2 Code lock / Code reset

The device can be protected against unauthorised changes to the device (via joystick button) using the code lock (Menu -> Settings -> Code lock). A pin code is used for this purpose (**factory setting: 504**).

Reset pin code / switch off code lock
on the device:

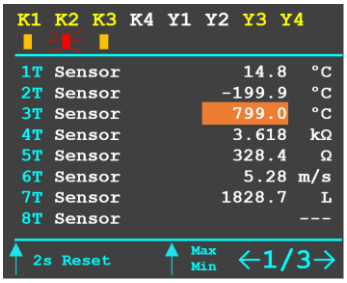
- Disconnect the supply voltage
- Press the joystick button upwards (and keep it pressed)
- Switch on the supply voltage (keep the joystick button pressed)
- After approx. 4s the reset menu appears, select Code lock and press the button to the right
- Code lock is switched off, pin code is reset to = 504

Via web interface:

- In the System menu: Switch off code lock and accept with "Save" button

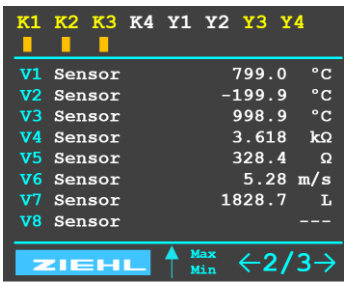
9.3 Description of the display pages

9.3.1 Measured value page (1/3)



- Measured values of all 8 sensors at a glance
- Sensor names (9 characters) can be set via the website
- If a measured value triggers an alarm, it is highlighted in colour
- If, instead of the measured value
  - "---" is displayed, this sensor is deactivated.
  - ">>>" or "<<<" is displayed, the current measured value is greater or less than the measuring range
  - "0Ω" indicates a short circuit in the sensor
  - "∞Ω" indicates an interruption in the sensor
- Joystick button
  - Short upward => display page for min. / max. values
  - For a latched alarm ready to reset, press up for 2 seconds to reset the alarm

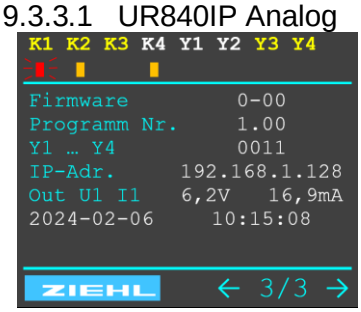
9.3.2 Virtual sensors (2/3)



- Measured values of all 8 sensors at a glance
- Sensor names (9 characters) can be set via the website
- If a measured value triggers an alarm, it is highlighted in colour
- If, instead of the measured value
  - "---" is displayed, this sensor is deactivated.
  - ">>>" or "<<<" is displayed, the current measured value is greater or less than the measuring range
  - "0Ω" indicates a short circuit in the sensor
  - "∞Ω" indicates an interruption in the sensor
- Joystick button
  - Short upward => display page for min. / max. values
- For a latched alarm ready to reset, press up for 2 seconds to reset the alarm

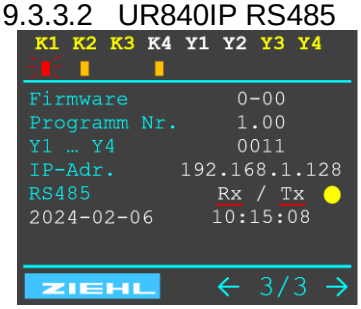
9.3.3 Info page (3/3)

9.3.3.1 UR840IP Analog



- Firmware version currently installed
- Digital inputs Y1...Y4: 0 = open, 1 = closed
- Current IP address of the device
- Current voltage / current values of the analog outputs
- Current date and time

9.3.3.2 UR840IP RS485



- Firmware version currently installed
- Digital inputs Y1...Y4: 0 = open, 1 = closed
- Current IP address of the device
- Activity on the RS485 bus (flickering of the yellow dot)
- Current date + time

9.4 Special functions

9.4.1 2 of X

The “2 of X” function can be activated for each alarm. This means that at least two of the sensors assigned to this alarm must fulfil the conditions for the alarm for the alarm to be triggered.

- For the function to be selected, at least two sensors must be parameterised to the desired alarm.
- Sensor faults are ignored. If only 2 sensors are assigned to a “2 of X” alarm and one of these sensors has a sensor fault (short circuit or interruption), it is no longer possible to trigger an alarm. In this case, monitor the sensors for faults in another alarm.

9.4.2 Difference between 2 measured values (virtual sensors)

9.4.2.1 Difference

Each virtual sensor can be parameterised to the difference type (Diff xT-yT). This measurement input therefore calculates the difference between the two selected sensors.

9.4.2.2 Absolute difference

With the absolute difference measurement, only the difference between the two selected sensors is formed. The result is always a positive value.

9.5 Simulation

If required (commissioning, troubleshooting, ...), individual functions (sensor values, relay states) can be simulated. The simulation can be started via the web interface (Home -> start Simulation). Simulation mode is always active for 15 minutes from the last action or can be deactivated directly by the user. Simulation values overwrite the current measurement and alarm values.

9.6 Alarm counter

There are separate alarm counters for each alarm. These alarm counters store the last 20 shutdowns with cause and exact time stamp. If a date around 1970 is displayed instead of the correct time, the set date + time of the real-time clock is not correct. For remedy see Troubleshooting and measures.

9.7 Relay counter

There are 2 separate relay counters for each relay. One can be reset by the user, so that all switching operations during a project can be logged, the other cannot be reset. This means that all switching operations since the device was built can be traced.

9.8 Modbus

R840IP always has a Modbus TCP interface. In addition, a RS485 interface can also be activated if no analog output is required. For further information, see the Modbus operating instructions.

10 Web interface

If the device is connected to an Ethernet network, it can be conveniently parameterised via a computer web browser.

10.1 Home

Status displays of

- all active measured values
  - min. / max. values with time stamp
- Alarm status
  - Active delay times

Individual displays are hidden as long as the corresponding functions are not active.
If new firmware is available, a message appears and the device can be updated (update notification on the "System" page must be active).

10.1.1 Simulation

- Simulation of measured values
- Simulation of relay outputs

10.2 Configuration

For settings for all function parameters and a description of these parameters see "Parameter description".

10.3 System

- Device name (appears in the header of the web page)
- Version information (see "Parameter description")
- Display settings for LCD display (see "Parameter description")
- Code lock (see "Parameter description")
- Firmware update
  - Update notification (message when update is available)
  - Firmware status, if necessary, the firmware update can be carried out via the update button
  - Manual update installation:
    - Select firmware (select downloaded firmware)
    - Manual update installation (selected firmware is uploaded and installed)
- Configuration (last changes to the device are saved with date/time and the user name, see user administration)
  - Save configuration (download the system configuration for saving and transferring to other devices)
  - Load configuration (load and activate a saved configuration in the device). Activated user administration is deactivated. No passwords are transferred.
- Reset
  - Set factory reset (optionally with/without network parameters)
  - Perform a restart

10.4 Network

- Network settings
- Modbus settings (Modbus TCP protocol on port 502)
- Time server settings and time zone settings (for current time in the device, important for analysing error memory in the device)

10.5 User

- User administration (provide device with read and write authorisation for users in the network)
- User (activate user and create name and password)

- User name for guest when logging in (fixed, cannot be changed): “gast”, “Gast”, “guest”, “Guest” or leave blank
- User authorisations (define which users have which rights on which pages)

Attention: Changes (also to passwords) are only applied after saving (Save button)

10.6 Logging

10.6.1 Interval logging

Ring memory for 1537 logs possible, max. logging time depends on the set interval

Interval	Logging duration in days and hours	
10s	0d	4:16h
1min	1d	1:37h
10min	10d	16:10h
1h	64d	01:00h

10.6.2 Event logging

Ring memory for 300 logs possible, logging always takes place when a relay changes state. The following data is logged at this time:

- UTC time + set local time
- Current sensor values (each sensor individually)
- Current values of the virtual sensors
- Current alarm status (each alarm individually)
- Current relay status
- Simulation
- Error messages
- Trigger / reason

10.7 Counter

10.7.1 Alarm counter

The alarm counter displays the last 20 alarms per alarm. The originator, the cause and the associated timestamp are displayed.

10.7.2 Relay counter

The relay counter shows all switching operations of the individual relays. One counter can be reset by the user, the other counter counts all switching operations since the device was built.

10.7.3 Operating hours counter

Current operating time of the device.

11 Firmware update

If a newer firmware version is available, an update can be carried out as follows...

- Website “System” – Firmware update – Update notification = active:
  - An update message appears when the device is called up via a web browser
  - Confirm the message, the current firmware is downloaded and installed

- Website “System” – Firmware update – Update notification = inactive:
  - Press the “Update” button, the current firmware is downloaded and installed

- Download the firmware from www.ziehl.com and then …
  Website “System” – Firmware update – Manual update installation
  - Press the “Select firmware” button, the selected firmware is transferred to the device.
  - Press the “Manual update installation” button to install the transferred firmware.

12 Troubleshooting and measures

Error	Cause	Remedy
Relay does not switch on or off when an alarm is reached	Relay has been parameterised to “manual on” or “manual off”. An “M” appears in the display under the respective relay	Parameterize the relay in the associated alarm (Menu -> Alarm -> Relay function on alarm)
A date around 1970 appears in the alarm counter The display (footer) repeatedly shows “no time”	The correct date / time was not set when the device was started	- In Menu -> Settings -> Set date / time correctly - Activate a time server via the website (network) or set manually
The display shows ∞Ω instead of the measured value	The associated sensor has an interruption in one or more sensor lines	Check sensor cable and replace, if necessary.
	2 wire Pt100 / Pt1000 sensor connected and 3 wire set in the configuration	Check sensor. Adjust setting to 2 wires with corresponding lead resistance.
The display shows **0Ω** instead of the measured value	The associated sensor has a short circuit between two sensor cables.	Check sensor cable and replace, if necessary.
Display shows nothing	• Control voltage not connected • Fuse has tripped • Device has an internal fault	• Connect control voltage • Replace fuse • Send the device in for repair
“>>>” or “<<<” is displayed instead of the measured value	Sensor value is greater or less than the permissible measuring range	Check sensor and replace, if necessary
Display is too dark	The display is dimmed after the set time (Menu -> Settings -> Dimming time), the set brightness is too low (Menu-> Settings -> Brightness)	Increase the brightness of the display or extend the dimming time for automatic dimming. **Device:** Menu -> Settings -> Dimming time / Brightness **Website:** System -> Display settings -> Brightness / Dimming time
Device cannot be parameterised The display shows “Code lock” for each parameter	Code lock active	If there are problems with the code lock (forgotten code), the lock can be switched off and the code reset to 504 by holding the button up (approx. 5s) when switching on the mains. The code lock can now be reset
No access via Ethernet	DHCP is switched on, but no IP address has been assigned	Check DHCP server or assign a fixed IP address
	Invalid network range	Check the address range of the IP address and the subnet mask
No parameters can be changed via the web browser	User administration active and no write authorisation available for current user	Assign write authorisation for the current user or deactivate user management. If the admin password is not known, user management can be deactivated on the device. Disconnect the device from the mains voltage, press and hold the button upwards, apply mains voltage, reset user administration
Analog output gives 0 … 10V => 0V,	Sensor short circuit of a selected sensor	Check sensors and rectify short circuit

2 … 10V => <=1.8V, 0 … 20mA => 0mA, 4 … 20mA => <=3.6mA off		
Analog output gives 0 … 10V => 11V, 2 … 10V => 11V, 0 … 20mA => 22mA, 4 … 20mA => 22mA off	Sensor interruption of a selected sensor	Check sensors and rectify interruption

13 Disposal

Disposal must be carried out properly and in an environmentally friendly manner in accordance with legal regulations.
ZIEHL is registered with the EAR Foundation (Waste Electrical and Electronic Equipment Register) under WEEE no: DE 49 698 543.

14 Technical data

Control voltage US:	DC/AC 24 … 270 V, 0/50/60 Hz	
Tolerance	DC 20.4 … 297 V	AC 20… 297 V
Power consumption:	< 4 W	< 11 VA

Relay outputs K1 … K4 (Alarm 1 …4)	Changeover contact
Switching voltage	max. AC 300 V; DC 300 V
Starting current open (NO)	AC 15 A 4s 10% ED
Minimum values voltage/current	12 V 10 mA
Conventional thermal current I_{th}	max. 5 A
Switching capacity max. AC cos φ = 1	2000 VA
Switching capacity max. DC (ohmic)	0.3 A 300 V; 0.4 A 120 V; 0.8 A 60 V; 8 A 30 V
Electrical contact service life cos φ = 1	cos φ = 1 -> 5 x 10^5 switching cycles at 250 V / 2 A
Mechanical contact service life	3 x 10^7 switching cycles
Short-circuit strength (NO)	4 A slow or LS switch B4
Short-circuit strength (NC)	3.15 A slow
switching capacity Utilisation category	AC-15 Ie = 3 A Ue = 250 V
	DC-13 Ie = 2 A Ue = 24 V
Rated operating current Rated operating voltage	DC-13 Ie = 0.4 A Ue = 120 V
	DC-13 Ie = 0.2 A Ue = 240 V
UL electrical ratings	250 V ac, 3 A, general use
	240 V ac, 1/4 hp, 2.9 FLA
	120 V ac, 1/10 hp, 3.0 FLA
	C300

Digital inputs	approx. DC 18 V / 3.5 mA
Type	Optionally programmable normally closed or normally open contact
Function	Reset, relay manually on, relay manually off

Sensor inputs

Pt100, Pt1000 according to EN60751

	Measuring area °C		Short circuit in ohms	Interruption in Ohm	Sensor resistance + lead resistance
Sensor	Min.	Max.	<	>	Max
Pt100	-199.9	800.0	15	400	500
Pt1000	-199.9	800.0	150	4000	4100
PTC			20	20,000	

*if no value between 3,800 and 20,000 ohms was previously measured

Tolerance	±0,5% of measured value ±1K
Sensor current	≤ 1 mA

Thermocouples according to EN60584

Type	Measuring area °C		Error °C
Sensor	Min.	Max.	
B	0.0	1820.0	≤ ± 2 °C T > 300 °C
E	-270.0	1000.0	≤ ± 1 °C
J	-210.0	1,200.0	≤ ± 1 °C
K	-200.0	1,372.0	≤ ± 2 °C
L	-200.0	900.0	≤ ± 1 °C
N	-270.0	1,300.0	≤ ± 2 °C
R	-50.0	1,770.0	≤ ± 2 °C
S	-50.0	1770.0	≤ ± 2 °C
T	-270.0	400.0	≤ ± 1 °C

Temperature drift	< 0.01 % / K
Measurement error of the sensor cable	+ 0.25 µV / Ω
Temperature error of the reference junction	<± 5 °C

Voltage / current input

	Input resistance	Max. permissible signal	Measurement error input signal
0/2 … 10 V	12 kΩ	27 V	< 0.1%
0/4 … 20 mA	18 Ω	100 mA	< 0.5 %

Temperature drift	< 0.02 % / K

Resistance measurement (PTC, 500Ω, 30kΩ)

Resistance measurement (PTC, 500Ω, 30kΩ)	< 0.2 % of the measured value ± 0.5 Ω
Measuring error 0.000 ... 30,000 kΩ	< 0.5 % of the measured value ± 2 Ω
Sensor current	≤ 1 mA

Measuring cycle, measuring time t_M

max. cycle time with 8x Pt100, Pt1000 3-wire	<1,5 s
1x Pt100, Pt1000 2-Leiter	≤ 200ms
1x Pt100, Pt1000 3-Leiter	≤ 400ms
1x Thermoelement	≤ 400ms
1x PTC, 500Ω, 30kΩ	≤ 150ms
1x 0/2…10V, 0/4…20mA	≤ 40ms
Reaction time	t_M + ≤ 500ms

Analog outputs (optional)	U1, I1
Voltage output	DC 0/2 … 10V
Accuracy	0.3% of final value (from 0.1V)
Temperature drift	< 0.01% / K
Resolution	11.6 bit <3.1mV
Load	≥ 1 kΩ
Current output	DC 0/4 … 20mA
Accuracy	0.3% of final value (from 0.1mA)
Temperature drift	< 0.015% / K
Resolution	11.6 bit <6.1mV
Load	≤ 500 Ω
Load error	(250 Ω – Load) / 250 Ω * 0.3% of the current

RS485 interface (optional)	
Protocol	Modbus RTU
Address / bus number	1 … 247
Baud rate	4,800 9,600 19,200 57,600
Parity	No, odd, even
Stop bit	1 … 2

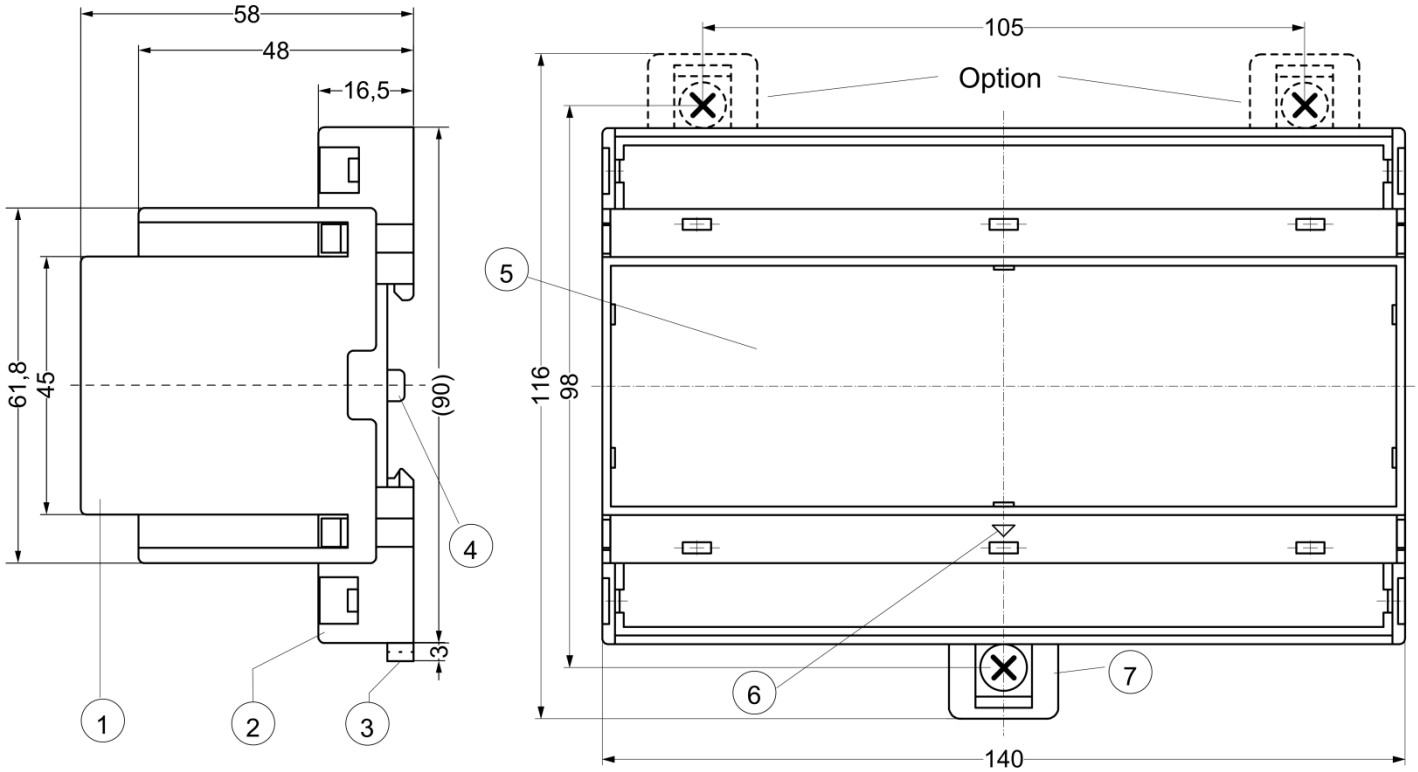
Test conditions	EN 61010-1
Rated impulse withstand voltage	4000 V
Overvoltage category	III
Pollution degree	2
Rated insulation voltage Ui	300 V
Duty cycle	100 %
Reinforced insulation (safe isolation)	
US – relays	6mm (DC 3,540V)
US – sensor inputs	6mm (DC 3,540V)

Us – electronics, reset, Ethernet	6mm (DC 3,540V)
Sensor inputs - relays	6mm (DC 3,540V)
Sensor inputs – electronics, reset, Ethernet	6mm (DC 3,540V)
Relay - Ethernet	6mm (DC 3,540V)
Basic insulation	
Relay - Relay	3mm (DC 1420V)
No galvanic isolation	Analog output, RS485, digital inputs, Ethernet
Ethernet interface	**RJ45 connection**
Speed	10 / 100 Mbit/s
Real-time clock	
Power reserve	> 11 days at 25°C
Time deviation	±3 ppm
EMV tests	**EN 61326-1 - industrial environment**
Interference emission	EN 61326-1; CISPR 11 Class A
Interference immunity	EN 61326-1 - industrial environment
Fast transient disturbances (burst)	EN 61000-4-4 Pulses 5/50 ns, f = 5 kHz, t = 15 ms, T = 300 ms Us, Analogoutput, Relay ±4,5 kV Digitalinput, RS485 ±3,5 kV Sensorinputs ±2,5 kV
High-energy surge voltages (surge)	IEC 61000-4-5 ±2 kV
Discharge of static electricity	IEC 61000-4-2 ± 4 kV Contact discharge, ± 8 kV air discharge
Installation conditions	
Perm. ambient temperature	-20 °C ... +65°C
Perm. storage temperature	-20 °C …+70 °C
Mounting height	< 2,000 m above sea level.
Climate resistance	5-85% rel. humidity, no condensation
Perm. wiring temperature	-5 °C …+70 °C
Vibration resistance EN 60068-2-6	2 … 13.2 Hz ±1 mm 13.2 ... 100 Hz 1 g 2…25 Hz ±1.6 mm 25 ... 150 Hz 5 g
Housing	**V8 design, distributor installation**
Installation depth	55 mm
Width	8 TE
Dimensions (B x H x T)	140 x 90 x 58 mm
Single-wire cable connection	1 x 0.34 - 1.5 mm² / AWG 22 - 14
Fine stranded with wire end ferrule	1 x 0.1 - 1.0 mm² / AWG 27 - 16
Stripping length / tightening torque	8 mm / 0.5 Nm
Protection class housing / terminals	IP 30 / IP20
Fastening	Snap-on mounting on mounting rail 35 mm according to EN 60 715 or screw mounting M 4 (additional bolt not included)
Weight	approx. 350 g

Subject to technical changes

15 V8 design

Dimensions in mm



1 Cover
2 Base
3 Bar for snap mounting
4 Latch for sealing
5 Front panel insert
6 Position downward
7 Bolt for wall mounting with screws. Bolt hole Ø 4.2 mm