Product Description
- Climate Controller for buildings
- Controls Water Cycle, Refrigeration and Heating
- 6 Temperature Probes, 6 Relays, 4 Digital Inputs, Analogue Output
- Rail Mounting

Standard Funktions
- Refrigeration, Heating
- Valve Control
- PID-Control
- Fan Control
- Setpoint shifting by outdoor temperature
- Mirroring of Actual-/Setpoint Values to the Analogue Output

ELREHA

ELEKTRONISCHE REGELUNGEN GMBH

Technical Manual **5311108-00/06e/00**

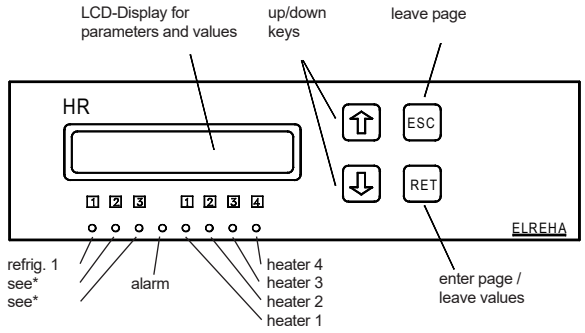
2018-05-30 tkd/jr

Heating / Climate Controller

from Softw.Vers. **2.01 (Rev.P)**

Type: HR 3166

Operating / Operating Elements



* LED 2 (left)
If forerun controller activated only: Valve closed
If climate controller activated only: Fan L1
Both activated: 'Valve closed' from forerun contr.

* LED 3 (left)
If forerun controller activated only: Valve opened
If climate controller activated only: Fan L2
Both activated: "Valve open" from forerun controller

Programming

All readable and adjustable values (parameters) of the **HR** controller are listed on several pages. While normal operation or if no key is pressed for about 3 minutes, the display shows the following information:

1. priority: current failure (only if there is a failure at the moment)
2. priority: controller states (e.g. if it is turned OFF by a digital input)
3. priority: the selected 'Basic Display'

Call up and changing of parameters:

Key	Action
ESC	.....If no pagename is displayed
⇧ ⇩	.....Select desired page
RET	.....Enter this page
⇧ ⇩	.....Select parameter
RET	.....Start programming, parameter name flashes. Eventually, the unit asks here for an access code
⇧ ⇩	.....Adjust desired value. Pressing and holding a key effects that the value will be incremented or decremented automatically faster and faster.
RET	.....Leave programming mode, confirm new value
ESC	.....Back to page overview.

Identification

If this display appears

```
Identification
Enter :> 0 <
```

then this parameter is protected by a password. The controller expects a code number. This code-no. (Code 1) is related from the actual time of the day as the sum of the **hour (0...23) plus 10**

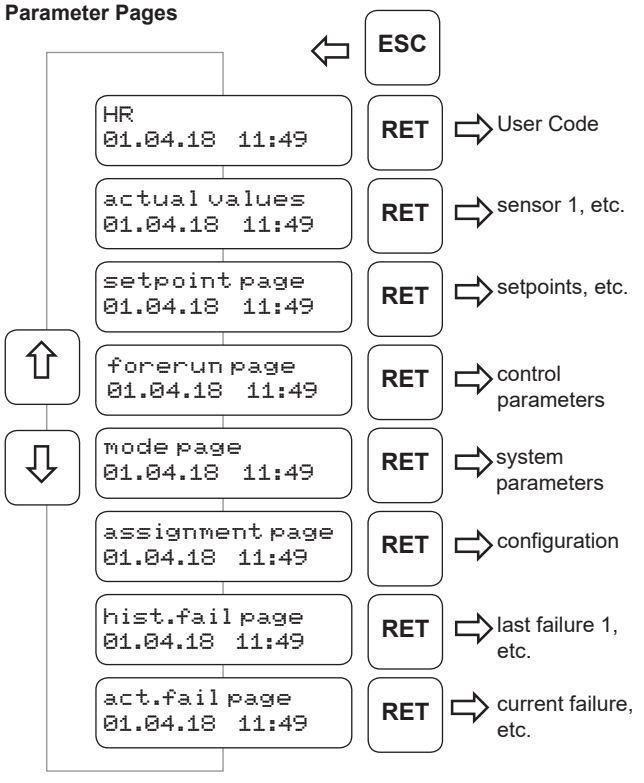
Changing User level (Details see page 4)

To change the user level do the following:
- Select "Basic Display", press key "RET"
- Enter code of the desired user level
  - Code for the service level is: (fixed) - **88** -
  - Code for the confoguration level: **month + hour + 20**

Language Switching

The used language in the display can be changed at "*Sprache/Language*" (Mode Page) from german to english.

Parameter Pages



In controllers which contain older software versions, some functions may not be available !

Caution **Please note Safety Instructions !**

Technical Data

Supply voltage ..... 230V AC, 50-60Hz
Power consumption ..... max. 9VA
Ambient temperature ..... 0...+50°C
Ambient humidity ..... max. 85% r.H., not condensing
Inputs ..... 6x temperature sensor, TF 201 (PTC) or TF 501 (Pt1000)
Measuring-/Display Range ..... max. ± 100°C
(!! Please note the design caused temperature ranges of the sensors !!)
Accuracy ..... ±0.5K over the range -35..+25°C
for the ambient temperature range 10..30°C
Digital- (OC) inputs ..... 4x mains voltage, 3mA max.
Relay Outputs ..... 6x SPDT, isolated,
Contact Rating ..... 8A cosphi=1, 250VAC
Analogue outputs (alternatively) ..... 0...10V or
0/4...20mA (max. working resistance 500 ohms)
Ranges ..... see parameter pages
Interfaces ..... 1x RS 232, 2x RS 485
Data storage ... (up to softw.vers. 1.9) typ. 3 years without mains voltage
from software version 2.00) unlimited
Real time clock ..... x-tal, with automatic summer/winter switching
runtime (up to softw.vers. 1.9) typ. 3 years without mains voltage
(from softw.vers. 2.00) typ. 10 days without mains voltage
Housing ..... plastic, for 35mm DIN-rails
pluggable screw terminals, IP 30

Accessories

- Temperature probes TF 201 or TF 501 (Pt1000)

CONNECTION INFORMATION & SAFETY INSTRUCTIONS

Notice

Product warranty does not cover damage caused by failure to comply with these operating instructions! Nor will ELREHA be held liable for any personal injury or damage to property caused by improper handling or failure to observe the safety instructions and recommendations contained in this or any other ELREHA supplied document related to this product! This manual contains additional safety instructions throughout the functional description. Please pay close attention to these instructions!

Danger

TO AVOID RISK TO HEALTH OR POSSIBLE LOSS OF LIFE, DO NOT OPERATE IF:

- The device has visible damage or doesn't work
- After a long storage period under unfavourable conditions
- The device is heavily soiled or wet
- When shipped under inadequate conditions
- Never use this product in equipment or systems that are intended to be used in applications or under circumstances that may affect human life. For applications requiring extremely high reliability, please contact the manufacturer before use.
- **This product may only be used in the applications described on page 1.**
- **Electrical installation and placement into service must be performed by qualified personnel only.**
- **To avoid the risk of Electrical Shock, all 'PE' terminals must be connected to ground. Without adequately grounding the unit, the internal noise filter will not work, which can cause faulty readings, or inaccurate displayed values to occur.**
- **Never operate the device without the supplied enclosure.**
- **To prevent electrical shock, the device may only be operated in a closed control cabinet or control box.**
- **Be sure to observe all local, state, or federal safety regulations in the location that the unit is installed.**

Caution

- Before installation, verify that the control specifications suit the application details. Damage may occur if the unit is operated outside of its specified limitations.
Examples:
  - Supply voltage (printed on the type label).
  - Environmental limits for temperature/humidity.
  - Maximum current rating for the relays.
- Do not install sensor cables in parallel to high current cables. Shielding must be connected to PE at the end close to the controller. If not, inductive interferences may occur. The wire gauge should be no less than 0,5mm².
- Mounting the controller close to power relays is not recommended, due to the risk of strong electro-magnetic interference, which can cause the unit to malfunction!
- Ensure that the interface wiring meets all the necessary requirements.
- All used temperature sensors must be identical. Never use different types at the same time. This will not work.

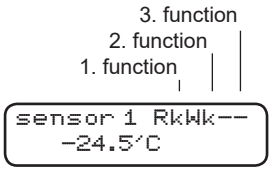
Notice

Cleaning
The use of a dry, lint-free cloth is sufficient to clean the product. Never use liquids or acidic fluids! Risk of damage!

Istwerte, Informations- und Statusanzeigen

All actual values are shown on the '*actual values*' page.

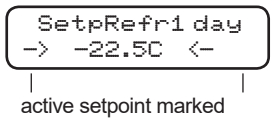
Display of the Temperatures
"*sensor1*" - "sensor*7*" display their actual probe value in the range of -90...+150°C. At the same time, the display shows the functions which are assigned to the sensor. (shorthand symbols: see actual values page).



Special case probe 7
The probe 7 is not directly connected at the HR but at the superior VPR-System. The measured value will be provided via the data interface.

Display Correction
Directly at the temperature values a correction of the actual value is possible. The set correction value will be displayed in the mode page at the parameters '*corr probe 1-6*', at that position it can be also be varied. Correction values of switched off probes do not appear.

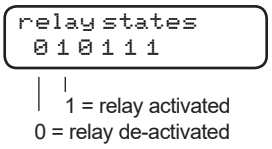
Setpoints
The active day or night setpoints are indicated on the display by "->" and "<-".



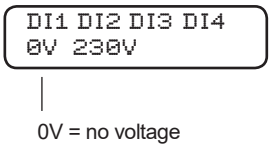
Time Information
The actual values page delivers all runtime and remaining time information of running timers, so it is possible to read the exact time up to the start of a special function.

Status Displays

Relay 1.....Relay 6



Digital Input DI 1.....DI 4

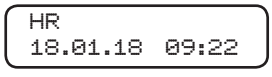


Temperature Probes
There are two types of temperature sensors which can be used:
- **TF 201**, PTC sensor (2000 ohms @25°C)
- **TF 501**, Pt1000-Fühler (1000 ohms @0°C)

The type can be selected at parameter '*probe*' (Mode Page).

"Standard Display" - Function

After switching on the controller, the display will indicate the 'Standard Display' after some seconds (in case of a failure it will display the actual failure). factory set is the actual value of probe 1.



This will also displayed if you have selected any parameter and you haven't touch a button for more than 3 minutes.

If you think that it is suggestive to show any sensor value as permanent parameter, do the following:

Change permanent parameter

- Select the parameter you want to have as 'Standard Display'
- Press "⇧" and "⇩ " simultaneaously.
  The display becomes dark for a moment, after that the selected parameter will be shown as the "standard display".

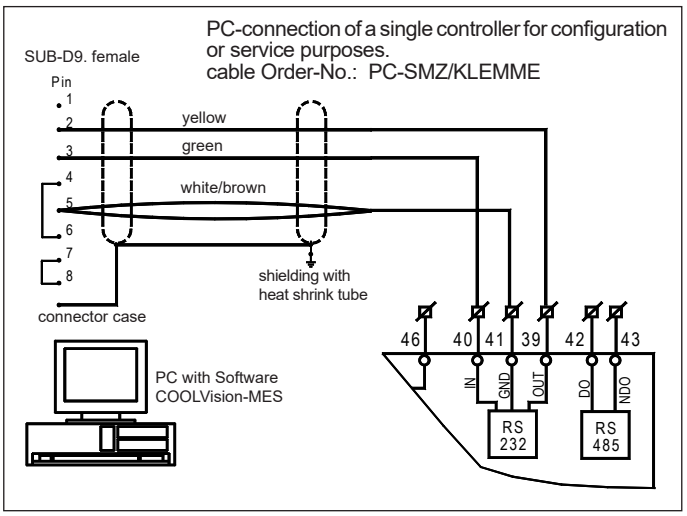
Failure Messages / Failure Memory / Failure Codes

All failures will be stored with date and time of their appearance. To display this messages, 2 pages exist:

- The "*Actual failures page*" contains all current failures in a short form. To make more than one current failure visible, use the 'up/down'-keys. If a sensor is short or broken, this message also appears on the actual value display.
- The "*Historic failures*" page contains the last **15** failures with date and time of their appearance.

Failure Codes

---- ..... no failure
Init ..... first initialisation of the controller or data lost
Hard ..... hardware failure has occured
On ..... Mains voltage was switched on (hist. failure listing only)
Off ..... mains voltage was switched off (hist. failure listing only)
UnOn ..... Controller was switched on via data interface/DI input (hist. failure listing only)
UnOf ..... Controller was switched off via data interface/DI input (hist. failure listing only)
CiOn ..... Circuit(s) are switched on via data interface/DI input (hist. failure listing only)
CiOf ..... Circuit(s) are switched off via data interface/DI input (hist. failure listing only)
Ass ..... Assignment failure
Pbr1 ..... Probe 1 is broken or assigned/not connected. Also a TF 501 may be selected but a TF 201 connected. The higher resistance of the TF 201 would then be interpreted as an interruption.
Pbr2 ..... ditto for probe 2
Pbr3 ..... ditto for probe 3
Pbr4 ..... ditto for probe 4
Pbr5 ..... ditto for probe 5
Pbr6 ..... ditto for probe 6
Psh1 ..... Probe 1 shorted. Also a TF 201 may be selected but a TF 501 connected. The lower resistance of the TF 501 would then be interpreted as a short circuit.
Psh2 ..... ditto for probe 2
Psh3 ..... ditto for probe 3
Psh4 ..... ditto for probe 4
Psh5 ..... ditto for probe 5
Psh6 ..... ditto for probe 6
LTCL ..... Low temperature climate control (cooling/heating)
LTH2 ..... Low temperature alarm heater 2
LTH3 ..... Low temperature alarm heater 3
LTH4 ..... Low temperature alarm heater 4
LTFL ..... Low temperature 'Flow temperature control' (cooling/heating)
HTCL ..... Overtemperature climate control (cooling/heating)
HTH2 ..... Overtemperatur alarm heater 2
HTH3 ..... Overtemperatur alarm heater 3
HTH4 ..... Overtemperatur alarm heater 4
HTFL ..... Overtemperature 'Flow temperature control' (cooling/heating)
WNCl ..... Climate control switched off via digital input
WNH2 ..... Heating circuit 2 switched off via digital input
WNH3 ..... Heating circuit 3 switched off via digital input
WNH4 ..... Heating circuit 4 switched off via digital input
WNFl ..... Flow temperature control switched off via digital input



Access Protection / Unauthorized changing of parameters

User levels

To avoid parameter changing by unauthorized persons, 3 different user levels are available:

1. **Customer Level**
   In this level setpoints can be changed, but it is impossible to change the configuration of the unit.
2. **Service Level** (call-up with code 2)
   Here the service contractor finds parameters and information for start-up and service.
3. **Configuration Level** (call-up with code 3)
   Here you can change all parameters, even the fundamental functions to assign inputs and outputs.

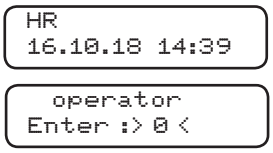
In the single levels only the accessable parameters will be displayed (marked by 'Level 1,2,3' on the parameter pages).

Using the Access Protection

The parameter „*operator layer*“ on Mode Page is factory set to „no“. Thus you will see all parameters, the same as if the 'Configuration-Level' would be active.
After start-up, you protect the controller unit effectively by changing parameter „*operator layer*“ (mode page) to „yes“. If you don't touch any key for at least 3 minutes or if you switch off power for a moment, the protection will be activated. Thus only the parameters of the **Customer Level** can be displayed.
All other parameters are hidden now and can be accessed only by knowing the code.

To change from Customer Level to Service- or Configuration Level do as follows:

- Select 'basic Display',
- Press key "RET",
- Enter code for desired level.



Change parameters

To change a parameter in the single user levels, the unit frequently expects an additional 'Identification Code'.
As long as parameter "*operator layer*" is not set to "no", the unit changes to the **Customer Level** if no key is pressed for about 3 minutes.

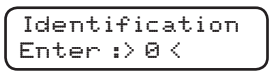
Codes for Customer Levels

Code 2: ..... Fixed Code: - **88** - (calls up Service Level)

Code 3: ..... **Month + Hour + 20**
(calls up Configuration Level)
Example: (Note: Real-time clock must be set to the right time and date before.)
You want to change a parameter at a day in june at 9:35 in the morning. Identification Code = 6 + 9 +20 = **35**.

Parameter Protection / Identificaton

Almost all parameters, except the temperature setpoints, are protected by a simple password.
If you have to change a parameter and you have pressed the "RET"-key, this display appears:



The controller expects now the input of a code-no. This code-no. (Code 1) is related from the actual time of the day as the sum of the

hour (0 to 23) plus 10

Example:
At 9:35 a.m. the code is 9 + 10 = 19.
At 21:35 (9:35 p.m.) the code would be 21 + 10 = 31.

If you have pressed no key for about 3 minutes, the parameters are locked again automatically.

Configuration Concept

The HR controller has a ´**free configurable concept**', that means all in/outputs have no fixed functions. All inputs and outputs (*6 relays, 6 sensors, 4 digital (DI)-inputs, 1 analogue output*) can be configured to work with any integrated control functions or all of the 4 control circuits.

Sensors
Each sensor is able to fulfill up to 3 functions at the same time (function sensor X a, function sensor X b, function sensor X c, X = sensor no.). *e.g.:*
1. control sensor and alarm sensor simultaneously
2. control sensor and defrost sensor simultaneously, e.g to control a chiller cabinet at the air outlet.

Digital Inputs (DI, OptoCoupler Inputs)
Each digital input can be assigned to one of the possible functions.

Relay Outputs
Each relay can be used to control one of the possible functions. The same function can even be allocated to multiple relays.

Parameters
Parameters of functions which are not assigned will not appear in the parameter pages to improve survey.

Assignment
The function of each input and output can be preset on the 'assignment page'. The assignment can be done by the keys or via interface.

Parameterlisten

Actual Value Page	Disp	Level	Range	Factory Setting
Probe 1 ..... + funct		1	Display range -90/+150°C, calibration range +/- 10K	calibr. = 0
Probe 2 ..... + funct			At the top/right the shorthand symbols of the functions assigned to this probe	
Probe 3 ..... + funct			will be displayed.	
Probe 4 ..... + funct				
Probe 5 ..... + funct				
Probe 6 ..... + funct				
Probe 7 ..... + funct	X	1	Not connected at the HR, but provided by the VPR.	
			Shorthand symbols of the probe displays:	
			Cc = control/climate, C2 = contr. 2, C3 = contr. 3, C4 = contr. 4, Cf = control/forerun	
			Wc = alarm/Climate, W2 = alarm 2, W3 = alarm 3, W4 = alarm 4	
			Di = display, Ot = outdoor temperature, Sc = shifting of cooling 1	
clim.(ate) setpoint	X	1	(cooling/heating incl. shifted climate)	
heat.(ing) setpoint 2	X	1	current, possibly shifted	
heat.(ing) setpoint 3	X	1	current, possibly shifted	
heat.(ing) setpoint 4	X	1	current, possibly shifted	
flow setpoint	X	1	(incl. shifting via outdoor temp.)	
rem. alarm delay	X	1	Time up to an alarm	
rem. refr(igeration) delay	X	1	Time up to start of cooling	
rem. heat.(ing) delay	X	1	Time up to start of heating	
rem. flow delay	X	1		
operating state	X	1	Controller on/off and states of VI, H1-H4 and K1	
day/night operat.	X	1	day, night	
analog value	X	1	0%0, 0V0, 0m00	
DI1 DI2 DI3 DI4	X	1	Voltage at this inputs	
relay states	X	1	States of the relays 1-6, 1 = activated, 0 = de-activated	

Climate Page	Level	Range	Factory Setting
SetpRefr.1 day	1	-80,0...120,0°C	25,0°C
SetpRefr.1 day2	1	-80,0...120,0°C	25,0°C
SetpRefr.1 night	1	-80,0...120,0°C	28,0°C
SetpRefr.1 ni2	1	-80,0...120,0°C	28,0°C
SetpHeat.1 day	1	-80,0...120,0°C	20,0°C
SetpHeat.1 day2	1	-80,0...120,0°C	20,0°C
SetpHeat.1 night	1	-80,0...120,0°C	18,0°C
SetpHeat.1 ni2	1	-80,0...120,0°C	18,0°C
Hyst. Refr.1	2	0,1...20,0K	1,0K
Hyst. Heat.1	2	0,1...20,0K	1,0K
warn low clim	2	-80,0...120,0°C	0,0°C
warn up clim	2	-80,0...120,0°C	35,0°C
fan start delay	2	00:00 ... 10:00 mm:ss	01:00
fan trailing	2	00:00 ... 10:00 mm:ss	01:00
fan delta L1	2	Offset to the basic setting, 0,0...10,0K	2,0K
fan delta L2	2	Offset to L1, 0,0...10,0K	2,0K
SetpHeat 2 day	1	-80,0...120,0°C	20,0°C
SetpHeat 2 day2	1	-80,0...120,0°C	20,0°C
SetpHeat 2 night	1	-80,0...120,0°C	18,0°C
SetpHeat 2 ni2	1	-80,0...120,0°C	18,0°C
Hyst. Heat 2	2	0,1...20,0K	1,0K
warn low heat.2	2	-80,0...120,0°C	0,0°C
warn up heat 2	2	-80,0...120,0°C	35,0°C
SetpHeat.3 day	1	-80,0...120,0°C	20,0°C
Setp.Heat.3 day2	1	-80,0...120,0°C	20,0°C
Setp.Heat.3 night	1	-80,0...120,0°C	18,0°C
Setp.Heat.3 ni2	1	-80,0...120,0°C	18,0°C
Hyst. Heat.3	2	0,1...20,0K	1,0K
warn low heat.3	2	-80,0...120,0°C	0,0°C
warn up heat.3	2	-80,0...120,0°C	35,0°C
SetpHeat 4 day	1	-80,0...120,0°C	20,0°C
SetpHeat 4 day2	1	-80,0...120,0°C	20,0°C
SetpHeat 4 night	1	-80,0...120,0°C	18,0°C
SetpHeat 4 ni2	1	-80,0...120,0°C	18,0°C
Hyst Heat.4	2	0,1...20,0K	1,0K
warn low heat 4	2	-80,0...120,0°C	0,0°C
warn up heat 4	2	-80,0...120,0°C	35,0°C
refrShift refLim 1	2	-80,0...120,0°C	20,0°C
refrShift range 1	2	-80,0...120,0°C	32,0°C
refrShift factor 1	2	-10.0...+10,0 K/K	0
heatShift low 1	2	-80,0...120,0°C	15,0°C
heatShift up 1	2	-80,0...120,0°C	25,0°C
heatShift fact 1	2	-10.0...+10,0 K/K	0
heatShift low 2	2	-80,0...120,0°C	15,0°C
heatShift up 2	2	-80,0...120,0°C	25,0°C
heatShift fact 2	2	-10.0...+10,0 K/K	0
heatShift low 3	2	-80,0...120,0°C	15,0°C
heatShift up 3	2	-80,0...120,0°C	25,0°C
heatShift fact 3	2	-10.0...+10,0 K/K	0
heatShift low 4	2	-80,0...120,0°C	15,0°C
heatShift up 4	2	-80,0...120,0°C	25,0°C
heatShift fact 4	2	-10.0...+10,0 K/K	0
buildConst Refr	2	(for climate only) 00:00 ... 24:00 hh:mm	02:00
tempThreshRefr	2	(for climate only) -80,0...120,0°C	25,0°C
buildConstHeat	2	(for climate only) 00:00 ... 24:00 hh:mm	06:00
tempThreshHeat	2	(for climate only) -80,0...120,0°C	16,0°C

Notice

Parameters marked with "**Disp**" are for Information only and cannot be adjusted.

The numbers in column "**Level**" show the user level, where this parameters are displayed. The standard level shows only parameters with code1, the service level shows parameter with code 1&2, the configuration level shows all parameters.

Flow Page	Disp	Level	Range		Factory Setting
flow setp day		1	-80,0...120,0°C		22,0°C
flow setp day2		1	-80,0...120,0°C		22,0°C
flow setp night		1	-80,0...120,0°C		22,0°C
flow setp night2		1	-80,0...120,0°C		22,0°C
flow hyst		2	0,1...20,0K		1,0K
warn low flow.		2	-80,0...120,0°C		4,0°C
warn up flow		2	-80,0...120,0°C		120,0°C
PID prop band		2	0,1...20,0 K		4,0K
PID integr time		2	off, 00:01 ... 10:00 mm:ss		off
PID attack time		2	off, 00:01 ... 00:10 mm:ss		off
output del ana		2	(analogue function flow) 00:00 ... 04:00 mm:ss		00:20.
step size ana		2	(analogue function flow) 1...100 %		5 %
perioTime relay.		2	(for valve open/close) 00:00 ... 04:00 mm:ss		30 sec
runtime relay		2	1...240 sec. (for valve open/close) 00:01 ... 04:00 mm:ss		00:01.
outdTemp range		2	-80,0...120,0°C (flow control only)		-12,0°C
outdTemp heatLim		2	-80,0...120,0°C (flow control only)		20,0°C
outdTemp factor		2	0...10,0 K/K (flow control only)		1,6 K/K
buildConst flow		2	0...1440 min. (flow control only)		360 min.
tempThresh flow		2	-80,0...120,0°C (flow control only)		16,0°C
flow max.		2	-80,0...120,0°C		70,0°C

Mode Page	Disp	Level	Range		Factory Setting
compound assign		2	0 (no), 1, 2, 3 (only for cooling 1)		0
setpoint layer		1	0, 1		0
tempAlarm delay		2	00:00 mm:ss ... 2:00:00 h:mm:ss		00:00
DI alarm delay		2	00:00 ... 10:00 mm:ss		00:05
DI analog value		2	0...100 %, voltage, current		0
Setp mirr lowLim		2	(for analogue output) -80,0...120,0°C		0,0°C
Setp mirr uppLim		2	(for analogue output) -80,0...120,0°C		50,0°C
NightOp ON		2	off, 00:00 ... 23:59 hh:mm.		off
NightOp OFF		2	off, 00:00 ... 23:59 hh:mm		off
probe		3	0 = TF 501, 1= TF 201		0
corr probe 1		2	off, -10,0...10,0 K		0,0 K
corr probe 2		2	off, -10,0...10,0 K		off
corr probe 3		2	off, -10,0...10,0 K		off
corr probe 4		2	off, -10,0...10,0 K		off
corr probe 5		2	off, -10,0...10,0 K		off
corr probe 6		2	off, -10,0...10,0 K		off
name probe 1		2	max. 16 characters		probe 1
name probe 2		2	max. 16 characters		probe 2
name probe 3		2	max. 16 characters		probe 3
name probe 4		2	max. 16 characters		probe 4
name probe 5		2	max. 16 characters		probe 5
name probe 6		2	max. 16 characters		probe 6
name probe 7		2	max. 16 characters		probe 7
name of unit		3	max. 16 characters		HR
operator layer		3	no, yes		no
software vers		1	HR		
current time		1			
current date		1			
timezone offset		2	-720...720 min.		60 min.
summer/winter sw.		2	no, EU from 1996, variable		EU from 1996
summerOn month		2	(for variable only) 1...12		3
summerOn day		2	(for variable only) 0(Sund.)...6		0
summerOn x-day		2	(for variable only) 0...5(last), 0 = aus		5
summerOn hour		2	(for variable only) 0...23		2
summerOff month		2	(for variable only) 1...12		10
summerOff day		2	(for variable only) 0(Sund.)...6		0
summerOff x-day		2	(for variable only) 0...5(last), 0 = aus		5
summerOff hour		2	(for variable only) 0...23		2
language/Sprache		2	german, englisch, french, dutch		
baudrate		3	0= auto, 1=1200, 2=2400, 3=4800, 4=9600, 5=19200, 6=28800, 7=38400, 8=57600, 9=115200 (!! from SoftwVers. 2.00 '0= auto' is not longer available !!)		4 (9600)
address in netwk		3	0...63 (!! never use address 64)		78

Notice

Parameters marked with "**Disp**" are for Information only and cannot be adjusted.

The numbers in column "**Level**" show the user level, where this parameters are displayed. The standard level shows only parameters with code1, the service level shows parameter with code 1&2, the configuration level shows all parameters.

Assignment Page	Level	Range	Factory Setting
function relay 1	3	off= ---, on, refrig 1, heating 1, heating 2, heating 3, heating 4 fan, fan L1, fan L2, close valve, open valve, release valve, alarm	refrig 1
function relay 2	3	ditto	heating 1
function relay 3	3	ditto.	fan
function relay 4	3	ditto.	fan L1
function relay 5	3	ditto.	refrig 1
function relay 6	3	ditto.	heating 1
function DigInp 1	3	off= ---, night operat.act, night operat.pas, setpoint layer, unit off act, unit off pass, clim off act, clim off pass, refr1 off act, refr1 off pass., heat1 off act, heat1 off pass, heat2 off act, heat2 off pass, heat3 off act, heat3 off pass, heat4 off act, heat4 off pass, heat1-4 off act., heat1-4 off pass, flow off act, flow off pass, analog value, climWarn act. (switches circuit off), climWarn pass. (switches circuit off), heat2 warn act. (switches circuit off), heat2 warn pass. (switches circuit off), heat3 warn act. (switches circuit off), heat3 warn pass. (switches circuit off), heat4 warn act. (switches circuit off), heat4 warn pass. (switches circuit off), flowWarn act. (switches circuit off), flowWarn pass. (switches circuit off)	unit off act.
function DigInp 2	3	ditto.	night operat.pas
function DigInp 3	3	ditto.	setpoint layer
function DigInp 4	3	ditto.	analog value
function probe 1a	3	--- =probe off, contr.refr-heat1, control heat2, control heat3, control heat4, flow control, warn climate, warn 2, warn 3, warn 4, warn flow, display, outdoor temp, refr.shift 1, heating shift	contr.refr-heat1
function probe 1b	3	ditto.	warn climate
function probe 1c	3	ditto.	---
function probe 2a	3	ditto.	---
function probe 2b	3	ditto.	---
function probe 2c	3	ditto.	---
function probe 3a	3	ditto.	---
function probe 3b	3	ditto.	---
function probe 3c	3	ditto.	---
function probe 4a	3	ditto.	---
function probe 4b	3	ditto.	---
function probe 4c	3	ditto.	---
function probe 5a	3	ditto.	---
function probe 5b	3	ditto.	---
function probe 5c	3	ditto.	---
function probe 6a	3	ditto.	---
function probe 6b	3	ditto.	---
function probe 6c	3	ditto.	---
function probe 7a	3	ditto.	display
function probe 7b	3	ditto.	
function probe 7c	3	ditto.	
analog function	3	0V, 4mA, 10V / 20m3A, PIDflow 0-10V, PIDflow 10-0V, PIDflow 4-20mA, PIDflow 20-4mA, setpMirrRefr1, SetpMirrHeat1, SetpMirrHeat2, SetpMirrHeat3, SetpMirrHeat4, fan 0-10V, fan4-20mA	0V
D12	2	Function digital input 1+2	(display only)
D34	2	Function digital input 3+4 (*shorthand symbols*)	(display only)
		NGHT=day/night operation active nght=day/night operation passive setp=Setpoint level OFF=Controller off active, off=Controller off passive, CLOF=Climate off active, CLof=Climate off passive, R1OF=Climate / Cooling off active, R1of=Climate / Cooling off passive, H1OF=Climate / Heating off active, H1of=Climate / Heating off passive, H2OF=Heating 2 off active, H2of=Heating 2 off passive, H3OF=Heating 3 off active, H3of=Heating 3 off passive, H4OF=Heating 4 off active, H4of=Heatingz 4 off passive, HxAU=Heating 1-4 off active, Hxau=Heating 1-4 off passive, FLOF=Forerun off active, FLof=Forerun off passive, Ana=Analogue value, CLWN=Climate Alarm active (switches circuit off), CLwn=Climate Alarm passive (switches circuit off), H2WN=Heating 2 Alarm active (switches circuit off), H2wn=Heating 2 Alarm passive (switches circuit off), H3WN= Heating 3 Alarm active (switches circuit off), H3wn=Heating 3 Alarm passive (switches circuit off), H4WN=Heating 4 Alarm active (switches circuit off), H4wn=Heating 4 Alarm passive (switches circuit off), FlWN=Forerun / Alarm active (switches circuit off), Flwn=Forerun / Alarm passive (switches circuit off)	
R13	2	Function of relays 1-3	(display only)
R46	2	Function of relays 4-6	(display only)
		Shorthand symbols: On=on RF1=Refrigeration 1 HE1=Heating 1 HE2=Heating 2 HE3=Heating 3 HE4=Heating 4 fan=Fan faL1=Fan L1 faL2=Fan L2 Vcl=Valve close Vop=Valve open Vre=Valve release Wrn=Alarm	

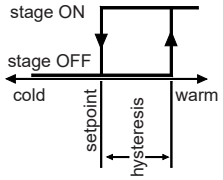
Cooling / Heating (Climate Control)

Control circuits
This controller is able to control up to 4 independent cooling circuits, each with an own setpoint. Circuit 1 allows cooling and heating, the circuits 2-4 are provided for heating.

Temperature Probes
To each circuit, multiple probes can be assigned. The coldest or warmest of the probes triggers the control function.

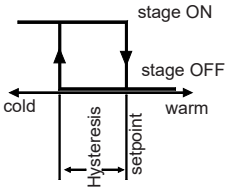
Caution
In the control circuit 1, where cooling and also heating is possible, an unfavorable placement may trigger cooling and heating at the same time, because no averaging is performed. So please pay attention to a matching placement and setpoint settings.

Cooling (Circuit 1)
The temperature is determined by '*SetpRefr.1...*' and controlled by switching via the relay '*refrig 1*'. The switch-off of the refrigeration corresponds to the currently valid setpoint.
If the measured temperature (probe '*contr.refr-heat1*') exceeds the setpoint + the set hysteresis ('*Hyst. Refr.1*', Climate page) the cooling relay will be triggered.



The cooling relay can be locked via the data interface as well as by a digital input (function Digital Input x: *refr1 off act* or *pass*).

Heating (Circuits 1-4)
The heating temperature is determined by the setpoints '*SetpHeat x*' (Climate page), measured by the probes '*control heat 2-4*' and controlled via the assigned heating relay (*heating 1-4*). Also here the switch-off of the heating corresponds to the currently valid setpoint.
The hysteresis (*hyst heat 1-4,* Climate page) is always below the setpoint.



Low Temperature Alarm
If the temperatures of the control circuits falls below the each set alarm limits ('*warn low clim*' - '*warn low heat 2-4*') at the assigned alarm probes (*warn climate*, *warn 2-4*), then after the alarm delay ('*tempAlarm delay*', mode page) an alarm will be triggered via the alarm relay.

Overtemperature Alarm
If the temperatures of the control circuits exceed the each set alarm limits ('*warn up clim*' - '*warn up heat 2-4*') at the assigned alarm probes (*warn climate*, *warn 2-4*), then after the alarm delay ('*tempAlarm delay*', mode page) an alarm will be triggered via the alarm relay.

notice
If necessary, the circuits 2-4 can also be used exclusively as alarm circuits.

Second setpoint (night operation)

For each of the 4 circuits a second setpoint is available. This setpoints can be set by the parameters which are supplemented by '*...night or ni2*' (Climate Page). This can be used for night operation or other energy savings. The toggling between these setpoints can be made by the internal clock or by a digital input.
The setpoint which is in use at the moment is marked by two arrows like: '-> <-'.
In the 'Actual Value Page' (*day/night operat.*) you also see if day or night setpoint is in use.

Internal toggling
The parameters '*NightOp ON*' (mode page) and '*NightOp OFF*' determine the period when the 2nd setpoint will be active.
If both times are switched to 'off', the function is disabled. If a digital input is configured for external day/night switch (function ‚*night operat. ...*') and activated, this path will always take precedence.

External toggling
If the ‚*night operat...*' DI input is activated, the 2nd setpoint is activated all time and the internal timer is disabled. If the toggling of the setpoints should only be done externally, the both internal times must be switched to 'off'.

Second Set of Setpoints

The controller offers two sets (layers) of setpoints, where the first layer of setpoint is used during normal operation and the alternative layer (...2) of setpoints with other temperatures is used e.g. for other products which will be stored only sometimes.
The setpoint which is in use at the moment is marked by two arrows like: '-> <-'.

Toggling between the setpoint layers
1. internal: with parameter '*setpoint layer*' (Mode page)
2. external: assign function '*setpoint layer*' to one of the digital inputs. If the input is connected to mains phase, the 2nd layer is in use.

Setpoint shifting

For each of the four control circuits, the setpoints can be made dependent to a temperature by an assigned temperature probe. Also multiple probes can be assigned to this function. In this case, the coldest value will be used to shift the heating and the warmest to shift the cooling.
Parameter sets for cooling (only circuit 1) and heating (circuits 1-4) are available.

Cooling
To one (or multiple) probe(s) the function '*refr. shift 1*' can be assigned. The temperature range, within which the shifting can be done, will be set by the parameters '*refrShift refLim 1*' (upper limit, Climate page) and '*refrShift range 1*'. If the temperature changes within this range, the setpoints will be shifted by the value set with '*refrShift factor 1*', optional up or down.
(shift value: actual value **-** shift low * shift factor).

Above the upper limit the maximum shift will be done (shift value: shift up **-** shift low * shift factor).

Below the lower limit the setpoint will not be changed and with probe failures no shifting will be done.

Heating
To one (or multiple) probe(s) the function '*heatShift*' can be assigned. For each of the four heating circuits the shifting range can be set individually.
For this, the parameters '*heatShift up X*' (upper limit, Climate page. X describes the circuit 1-4) and '*heatShift low X*' can be used. If the temperature changes within this range, the setpoints will be shifted by the value '*heatShift factor x*', optional up or down.
(shift value: actual value **-** shift low * shift factor).

Above the upper limit the maximum shift will be done. (shift value: shift up **-** shift low * shift factor).

Below the lower limit, the setpoint will not be changed and with probe failures no shifting will be done.

The parameters '*heatShift up X*', '*heatShift fact X*' and '*heatShift fact X*' will be displayed only, if the matching heating circuit and the probe is configured.
That means that at least once the function '*heating shift*' (Assignment page, function probes) has been assigned.

Calculation Example for a shifting of the heating function

Parameters:
Upper limit = 20°C Low limit = 5°C Factor = -1,5 K/K Setpoint heat circuit = 50 °C

The calculation of the operating points depends on the actual value of the leading probe.

Actual value 0 °C ..... Is lower than the low limit, no shifting
Actual value 10°C .... Shifting: Actual value (10°C) **-** low limit (5°C) * factor (-1,5K/K) = -7,5 K
Resulting setpoint: Setpoint (50°C) + shifting (-7,5K) = **42,5 °C**
Actual value 25°C .... Is higher than the upper limit, maximum shifting will used.
Shifting: Upper limit (20°C) **-** low limit (5°C) * factor (-1,5K/K) = -22,5 K
Resulting setpoint: Setpoint (50°C) + shifting (-22,5K) = **27,5 °C**

Building Constant

At the shifting of setpoints by the outdoor temperature it may be useful to consider structural conditions, which affect to the heat distribution resp. heat storage of the building.

Refrigeration
The parameter "*tempThreshRefr.*" represents an outdoor temperature limit. Below this, no cooling is possible. If this limit will be increased, the time '*buildConst Refr*' (Climate page) is running out.
Only after this time, the cooling control will be released.
If within the '*buildConst Refr*'-time the outdoor temperature falls below the set value again, the timer will not be resetted immediately, but only driven back with a double speed.
So short-term fluctuations does't affect very strong to the delay time.

Heating
As with the refrigeration, also for the heating individual constants can be set.
Here '*tempThreshHeat*' ist the outdoor temperature limitation value. Only below this, heating is possible. '*buildConstHeat*' describes the period of time, within this a shifting of the heating setpoints is not possible. Also here the heating function can be released only after the time has been run down, because the timer will not be resetted immediately while falling below the limit.

Fan Control

Fan control via relays
For air distribution up to 3 fans can be used, which can be switched by an assigned relay (fan, fan L1 and fan L2).
The relay 'fan' switches on after the start of cooling or heating and the delay time '*fan start delay*' (Climate page). If cooling or heating are switched off, the fan relay runs up to the time '*fan trailing*' (Climate page) has been expired, no hysteresis available.
The relay 'fan L1' will be released only after the temperature offset '*fan Delta L1*'. Relay 'fan L2' switches at a distance to 'fan L1', defined by '*fan Delta L1*' (Climate page).
Both additional stages have a switching hysteresis corresponding to ½ of the set value of '*fan Delta Lx*', but the maximum value is limited to 1K.

Fan control via analogue output
A fan control is also possible via an analogue output. For this, the parameter '*analog function*' (Assignment page) must be set to '*fan 0-10V*' or '*fan 4-20mA*'.
The selected analogue output sends a signal which is proportional to the setpoint deviation.
In the cooling mode the control range is located above the current cooling setpoint, in the heating mode the control range is located below the heating setpoint.
The proportional range is defined by the parameters '*fan Delta L1*' and '*fan Delta L2*' (Climate page).
At a setpoint deviation of '*fan Delta L1*' + '*fan Delta L2*' the analogue output signal reaches 100%.
At a setpoint deviation < '*fan Delta L1*' a minimum output signal will be maintained which depends on this settings:

Minimum output signal =
fan Delta L1 / (fan Delta L1 + fan Delta L2)
* 100 (% of the control range).

Cooling resp. heating must be switched on for that, that means the switching point has already been reached. If the actual value is located within the hysteresis range of the cooling resp. heating function and the respective function is not requested, the analogue output signal remains at 0%.
Example in cooling mode:

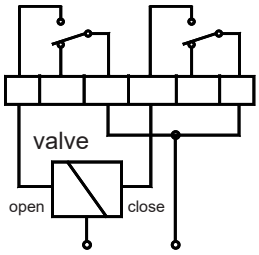
Settings
Setpoint = 23,0°C, Hysteresis = 0,2K,
fan Delta L1 = 0,2K, fan Delta L2 = 1,8K

Result
Switching point: setpoint + hysteresis = 23,2°C.
Prop.-range: fan Delta L1 + fan Delta L2 = 2,0K
Max. output signal at 25,0°C.
Min. output signal = 10% in the temperature range within 23,0...23,2°C (if cooling is already switched on, otherwise 0%).

Forerun Control

The control of the forerun function can be done by switching an assigned relay or via the analogue output.
The temperature is measured by the probe 'flow control' and determined by the setpoints '*flow setp ...*' (Flow Page).
For the forerun control also a hysteresis ('*flow hyst*', Flow Page) and alarm limits ('*warn low flow*' and '*warn up flow*', Flow Page) are available.

Fan control via relay
Depending one relay will be assigned to the functions 'close valve' and 'open valve'.
So a control output can be realized which allows the functions ON/OFF/PAUSE for the valve.



Forerun shifting via outdoor temperature
For the forerun control it is useful to make the setpoints dependent to an outdoor temperature to prevent constant manual changes.
For this, an outdoor temperature probe gets the function 'function probe.... = *outdoor temp.*'.
The temperature range for the shifting is defined by the parameters '*outdTemp range*' (low limit, Flow Page) and '*outdTemp heatLim*'.
If the outdoor temperature decreases by a certain amount within these limits, the setpoints will be lifted by the factor set by '*outdTemp factor*'.
(Example factory set: Value 1,6K/K -> If the outdoor temperature is reduced by 1K, the setpoints will be increased by 1,6K).

Building constant
Also with the shifting of setpoints by the outdoor temperature it may be useful to consider structural conditions.
The parameter '*tempThresh flow*' defines an outdoor temperature limit, above which no control of the forerun parameters is possible.
If the value falls below this limit, the time '*buildConst flow*' (Flow Page) runs down.
After this time has been run down, the forerun control will be released.
If within the '*buildConst flow*'-time the outdoor temperature increases the set value again, the timer will not be resetted immediately, but only driven back with a double speed.
So short-term fluctuations does't affect very strong to the delay time.

Valve Release
A relay can assigned to the function 'release valve'. The relay is always switched on if the forerun control is active. If the forerun control will be deactivated, this relay will also be switched off, e.g. to switch off a connected control system.

Digital Inputs (DI, Optocoupler Inputs)

Switching OFF Controller
Sometimes it is necessary to switch off positions completely including the controller, but if this controller works in a network, the bus-master detects a malfunction and generates an alarm. Because of this it is useful to switch off the controller to prevent this alarm.
If a digital input is assigned to the function '*OFF*' and is connected to phase, all control functions are disabled. The display continues working, but no alarm will be activated. This is memorized in the list of the 'historical failures'. The function 'off' (lower case) disables the functions with 0V at the digital input.

Climate control off
If a digital input is assigned to the function '*clim off act*' and connected to phase, then all control functions in the climate listing (cooling/heating) will be switched off.
'*clim off pass*' disables the functions with 0V at the digital input.

Climate control off with Alarm
If a digital input is assigned to the function '*climWarn act*' and connected to phase, then all control functions in the climate listing (cooling/heating) will be switched off and at the same time an alarm will be released after the delay time '*DI alarm delay*' (Mode Page). '*climWarn pass*' triggers this function with 0V at the digital input.

Heating off
Each of the heating functions can be switched off individually active or passive (0V) by a digital input with the assigned function '*heat x act*' or '*heat x pass*'. It is also possible to switch off all 4 heating functions at the same time with the assigned function '*heat1-4 off act*' or '*heat1-4 off pass.*'

Heating off with Alarm
Each of the heating functions can be switched off individually (like above). With the assigned parameters '*heat x warn act*' and '*heat x warn pass*' at the same time an alarm will be released after the delay time '*DI alarm delay*' (Mode Page) has been run down.

Forerun Control off
The forerun control can be switched off by a digital input (active or passive). For this, an input must be assigned to the function '*flow off act*' or '*flow off pass*'. If the controller will be switched off via this way, all relays of the forerun control will be de-activated.

Forerun Control off with Alarm
The forerun control can be switched off by a digital input (active or passive). With the assigned parameters '*flowWarn act*' and '*flowWarn pass'* at the same time an alarm will be released after the delay time '*DI alarm delay*' (Mode Page) has been run down.

Day/Night switching

see page 8

Real Time Clock

The built-in real time clock is buffered for a period where mains voltage is switched off (3 years up to softw.vers. 1.xx, appr. 10 days from softw.vers. 2.xx). Date and Time can be set on the 'Mode Page'. Factory set is a GMT +01:00 ('timezone offset'= 60 min.), which is valid for mid europe. If the controller is used in other zones, the values can be readjusted.

Summer/Winter Time (Daylight Saving Time) Switching / Time Zones
An automatic summer / winter switching (parameter „*summer/ winter*“) considers the current EU-rules from 1996 (EU 96), but it can also switched off or set as necessary.

Variable Time Zones
By parameter "*timezone offset*" the summer/winter time switching can be adapted as necessary.

"*summerOn month*" (fact.set: march, 3rd)
The month before summertime begins
"*summerOn day*" (fact.set: 0, sunday)
The day of the week where summertime begins
"summerOn *x-day*" (fact.set: 5, last sunday)
The day no. x in the month set with "summerOn day*"*
"*summerOn hour*" (fact set: 2, (2:00 am))
The hour of the beginning of the summertime

"*summerOff month*" (fact.set: october, 10th)
The month of the end of the summertime
"*summerOff day*" (fact.set: 0, monday)
The day of the week where summertime ends
"*summerOff x-day*" (fact.set: 5, last sunday)
The day no. x in the month set with "*summerOff day*"
"*summerOff hour*" (fact.set: 2, 2:00 am)
The hour of the end of the summertime

All time settings are preset in winter time.

Unit Text

In the mode page you have the possibility to define a specific text (max. 16 characters) for the controller, e.g. „Heating 1st floor“. This name will be indicated on the screen of the VPR compound controller or another superordinate system.

Change text:

- select parameter „name of unit“ (mode page)
- „**RET**“ Start programming, the first character position flashes
- "⇧ ⇩" change character
- „**RET**“ the next character flashes
- "⇧ ⇩" change character
  ....and so on
- press „**RET**“ to confirm the last character

Probe Texts

For each of the 7 probes a description text with max. 16 characters can be set. With this, the probe can be described clearly on the local display or at a high-level system.

How to change the text:

- Select 'name probe x' (Mode Page)
- Programming as described at 'Unit Text'

Analogue Output

The analogue output can be used to transfer different system signals as a voltage or a current signal.
Parameter 'analog value' (Actual value page) shows the current output signal as a %-part of the selected range, 'analog function' (Assignment Page) determines the behaviour of the output.

Test Functions

0V = voltage output = 0V, current output = 0 mA (fixed)
4mA = voltage output = 2V, current output = 4 mA (fixed)
10V/20mA = voltage output = 10V, current output = 20mA (fixed)

Transmission of setpoints (incl. possible offsets)

The range limits are determined by the parameters '*Setp mirr lowLim*' and '*setp mirr uppLim*' (Mode Page).

SetpMirrRefr1 = The outputs provide an image of the active cooling setpoint in control circuit 1.
SetpMirrHeat1 = The outputs provide an image of the active heating setpoint in control circuit 1.
SetpMirrHeat2 = The outputs provide an image of the active heating setpoint in control circuit 2.
SetpMirrHeat3 = The outputs provide an image of the active heating setpoint in control circuit 3.
SetpMirrHeat4 = The outputs provide an image of the active heating setpoint in control circuit 4.

Forerun Control with the Analogue Output, (PID controller)

PIDflow 0-10V = PID controller with 0-10V DC signal for the forerun control
PIDflow 10-0V = PID controller as above, but with inverted signal
PIDflow 4-20mA = PID controller with 4/20 mA signal for the forerun control
PIDflow 20-4mA = PID controller as above, but with inverted signal

To adapt the controller to the process the following parameters can be set at the Flow Page:

'PID prop band' .....Proportionalbereich, symmetrisch um Sollwert 1
'PID integr. time'.....integral time (I-part)
'PID attack time' .....derivative time (D-part)
'output del ana' .....output delay
'step size ana*'*.....step width

How to affect the analogue output manually

For certain operations it might be usefull to affect the output signal manually. Each of the 4 digital inputs can be configured for influencing the analogue output. If a digital input is activated, the analogue output delivers fixed, previously determined values. With this function, e.g. valve drives can be closed/opened or driven to a specific position.

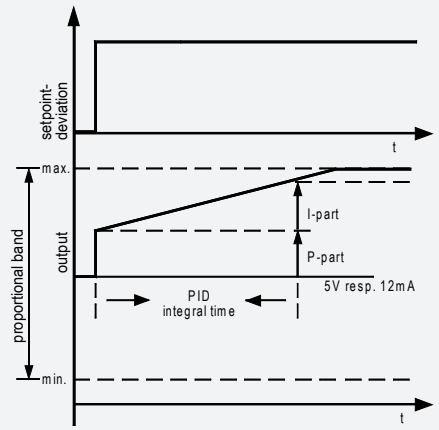
'*function DigInp x'* (Assignment Page)
= configuration of the digital (DI) input
'*DI analog value'* (Mode Page)
= value of the output signal in %/V/mA, if the DI input has been activated

Fan Control with the Analogue Output

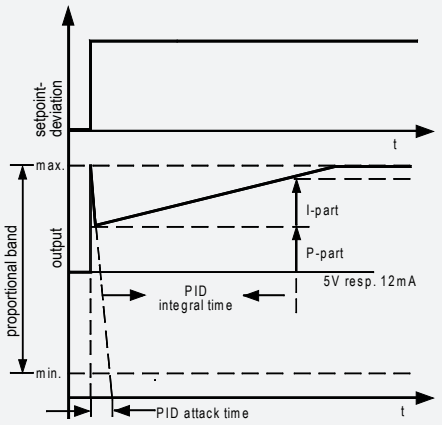
fan 0-10V = Fan control via the 0...10V output
fan4-20mA = Fan control via the 4...20mA output

A detailled description you will find under 'Fan Control'.

Control Characteristic



PI-control, D-part de-activated



PID-control

Actuating Variable Delay

For using control processes with large reaction times the controller offers an 'Actuating Variable Delay'.

1. Analogue Output
If the controller sends a signal which initiates the analogue output to rise or to fall, then an adjustable delay time ('*output del ana*', Flow Page) starts. Within this time period, the output signal is able to alter only by a specific %-part ('*step size ana*').
If '*step size ana*' is set to '100%' and '*output del ana*' set to '0', then the function is disabled.

2. Relay Output
In applications with motorized actuators, the Actuating Variable Delay takes effect by clocking the cooling resp. heating relays. If the controller sends a signal to initiate a relay permanently ON, an adjustable time period '*perioTime relay*' (Flow Page) starts. Within this period, the relay is engaged for the time set by '*runtime relay*' (Flow Page).
If '*runtime rel*' is equal to '*perioTime relay*' or exceeds it, then the function is disabled, the relay switches as normal again.

Networking by RS-485-Bus *(E-LINK-Protocol)*

All HR controllers can be networked together with other ELREHA-control devices. For this duty ELREHA has developed *E-LINK*, a transmission protocol, which will be transmitted on a two-wire bus-system based on the RS-485-Standard.
With E-LINK, up to **78** controllers are able to communicate.
Each controller in a network has its individual address („*address in netwk*“, Mode Page). This address is necessary for selecting the right controller while a data package is transmitted on the network bus. The data transmission speed defaults to 9600 baud but can be set at '*baudrate*' (Mode Page).
If the controllers are not networked, these parameters have no function.

Caution **Never use address 64 !!**

Communication with VPR systems
The HR controller can be used as intelligent controller in co-operation with the compound control system VPR. In this case, it is controlled by the VPR. So the HR needs an individual address („*address in netwk*“, Mode Page)

Each controller can be assigned to a certain compound ('*compound assign'*, Mode Page) or can work independent. This enables the VPR to transmit specific information to the controllers assigned to the compound while a failure occurs.
More detailed information you will find in the technical manual of the VPR compound system.

Behavior in case of the VPR-function 'Low Power Optimization'

If this feature is used in the VPR-system, the VPR can disable the refrigeration functions of the HR for a certain time, even though the refrigeration setpoint is increased. The fans and the heating continues working, they will be disabled in case of compound failure only.

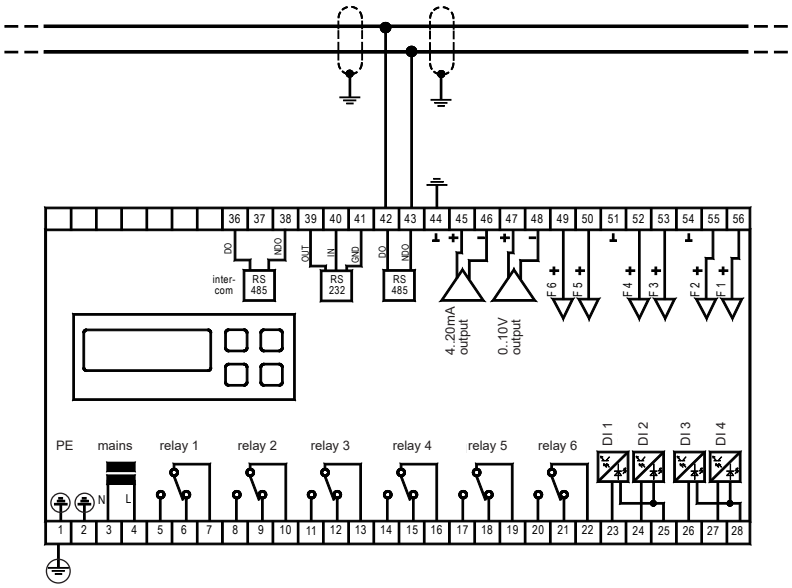
Data transmission disturbances

If the controller gets no new information from the VPR while a data interruption, the controller continues working with the actual settings unless probe 7 was provided by the VPR system. At a disturbance that lasts for more than 5 minutes, the probe will be switched off automatically and ignored by the control function. If the data transmission restarts, the 'external' probe 7 will be activated again.

Wiring of data lines

The Line-Interface resp. Line-Bus (RS-485) allows to connect the controller to a central unit.
Configuration:

- Use standard "twisted pair" data cable
- Each module/controller gets an individual address
- The best signal-to-noise ratio you get when each PE connector is grounded the shortest way
- The unshielded part of the data cable must be as short as possible.



Note Protective Earth

Earth

Connection of Remote Displays

The controllers of the HR series are prepared for connecting the series TAA xx15 Remote Displays. These displays are able to display the values of all 6 connectable sensors alternatively.
The TAA display must be connected to the RS-485-interface "intercom".
Up to 6 TAA xx15 can be connected, each TAA is able to display any sensor value.

Power Supply
The TAA can be supplied by the HR controller or by an external transformer.

Notice **The controllers of the series HR are able to supply 2 TAA Remote Displays max.!**

Parameterizing
The HR controller needs no special settings. At the TAA the # of the sensor to display must be set by an incremental switch at the rear side of the housing.

Installation / Start-Up

A few seconds after power-up the display shows the 'Standard Display' or an active failure message. Any key turns the backlight on. If the device is switched on the first time, you are now invited to change or confirm the language.

Start-up course
- determine the function of all inputs and outputs on the assignment page. (only possible in the 'configuration level', which is the factory setting.
- select type of used temperature sensors ('*probe*', Mode Page).
- correct the displayed temperature values if necessary („*corr probe..*“, mode page).
- set time and date

These are the most important steps for a basic configuration. Upon that, adapt the other parameters like setpoints, delay times, etc. as described in the parameter pages.

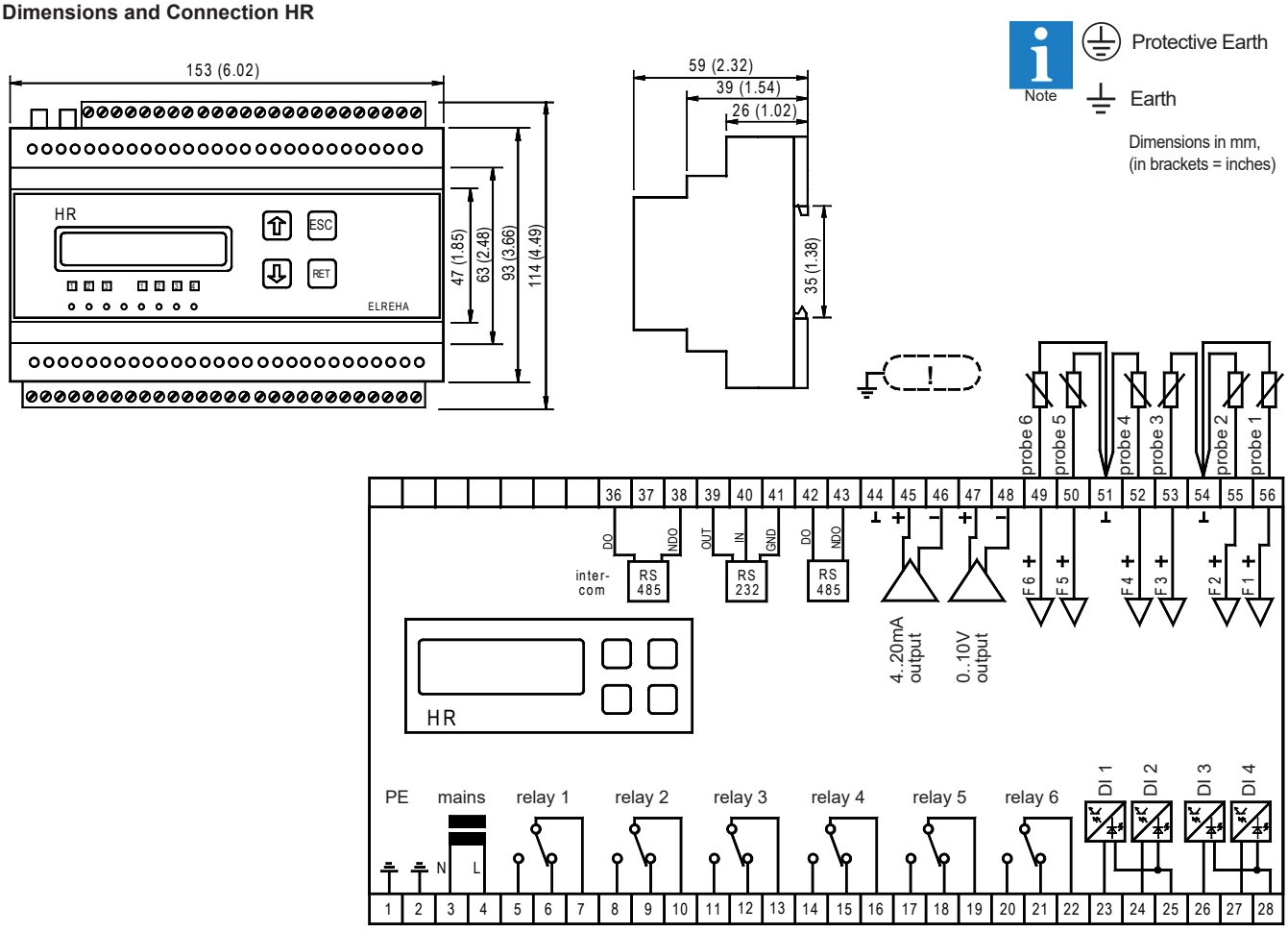
Start-up in a data network
- set the address of the controller (Mode Page)
- verify the baudrate (Mode Page)
- Load the parameters from the PC to the controller (upload).

The controller gives you an overview about the controlled unit on the '*Actual value page*', i.a.:

- temperatures (all probes)
- remaining delay times
- state of the digital inputs
- state of the relais

If failures are present, they are listed on the "act.failure page"

Dimensions and Connection HR



EC Declaration of Conformity

CE

*For the device **HR 3166** we state the following:*
*When operated in accordance with the technical manual, the criteria have been met that are outlined in the EMC Directive **2014/30/EC** and the Low Voltage Directive **2014/35/EC**. This declaration is valid for those products covered by the technical manual which itself is part of the declaration.*

Following standards were consulted for the conformity testing to meet the requirements of EMC and Low Voltage Guidelines:

EN 55011:2016+A1:2017, EN 61010-1:2010, EN 61326-1:2013 **CE marking of year: 2018**

This statement is made for the manufacturer / importer *by:*

ELREHA Elektronische Regelungen GmbH
D-68766 Hockenheim
www.elreha.de
(*Name / Address*)

Werner Roemer, *Technical Director*

Hockenheim .....**2018-05-24**.....
City *Date* *Signature*

Notice

This manual, which is part of the product, has been set up with care and our best knowledge, but mistakes are still possible. Technical details can be changed without notice, especially the software. Please note that the described functions are only valid for units containing the software with the version-number shown on page 1 of this manual. Units with an other version number may work a little bit different.