

Technical Manual

KR 1954/58/62

No. 5310789-00/06E

Compressor-Stage-Controller KRI 1954/58/62

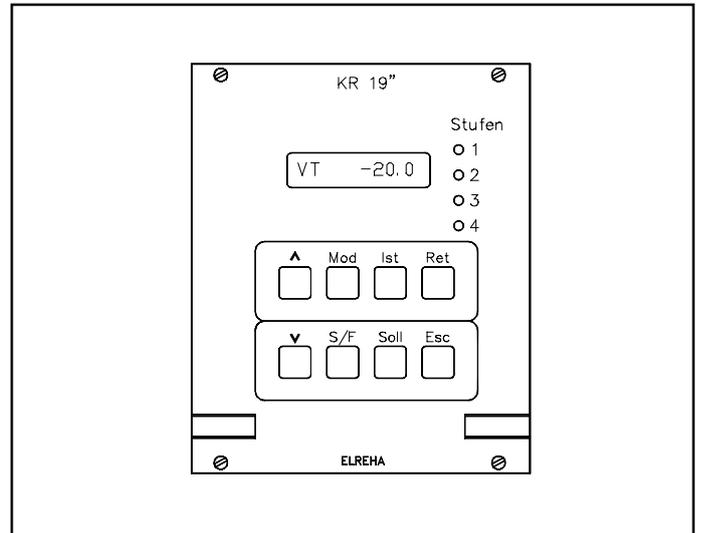
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Inhalt

General	1
Construction	1
Technical Data	1
Functional Description	2
Input Values	2
Functions	
Actual Values	2
Setpoints	2
2nd Setpoint	2
Suction Pressure Optimization	
by room temperature	3
2nd correction value	3
External setpoint switch/shift	3
Stage control	4
Base Load Change	4
Power Optimization (LOPT)	4
Operation Signals	4
Manual Operation	4
Suction Pressure Limit	4
Fast Backrun	4
Peak Load Limit	4
Alarm Message Input	5
Networking	5
Failure Handling / Failure Messages	5
Operating	
Operating Elements	6
Keys and Display	6
DIP-switches	6
Programming	6
Access Code	6
Installation / Startup / Notes	7
Appendix	
Dimensions	8
Wiring	9
Parameter Lists	10/11

General

The stage controllers of the KR/KRI series are specialized modules for compressor compounds which control all important functions like compressor control, suction pressure optimizing, automatic base-load switch and peak load limitation. All single or multistep compressors up to 12 stages (KR/KRI 1962) can be controlled. All parameters can be read from the display and edited by the keys on the front, a separate programming unit is not necessary. All parameters will be stored by a battery backed-up memory.



Construction

The stage controller is protected by a slide-in module for 19"-subracks or 19"-panel housings. All electrical connectors are located on the rear side of the module.

Type Overview

KR 1954..... 4 stages for 4 compressors max.
 KR 1958..... 8 stages for 8 compressors max.
 KR 1962..... 12 stages for 8 compressors max. with 12 stages
 KRI 1954 / 1958 / 1962
 like above, but forerun if pressure decreases, backrun if pressure increases.

Technical Data

Supply Voltage	220 V; 50 Hz
Power Consumption	approx. 15 VA
max. Ambient Temperature	0...+60°C
Input for Pressure Transmitter	4...20mA
Temp.-Sensor / 2.Offset	TF 201 (see text)
Message Inputs	230V / 50 Hz
Relay Outputs, potential free,	
Contact Rating	Stage Relays..... 10A (cosphi=1)/250 V
	Alarm relay..... 1 A / 250 V
Interface	RS 232 (V 24)
Transmitter Supply	22V±10%, 40mA max.
Realtime Clock.....	X-tal, automatic summer / winter-switch
Data Storage	typ. 10 years
Housing	Aluminium-module for 19"-subrack

Functional Description

Input Values

The KR/KRI unit gets the following input values:

- Actual Suction Pressure
- Room Temperature
- Offset values
- Compressor-Feedback Message
- Alarm Message
- Fast Backrun Signal
- Load Limit Signals

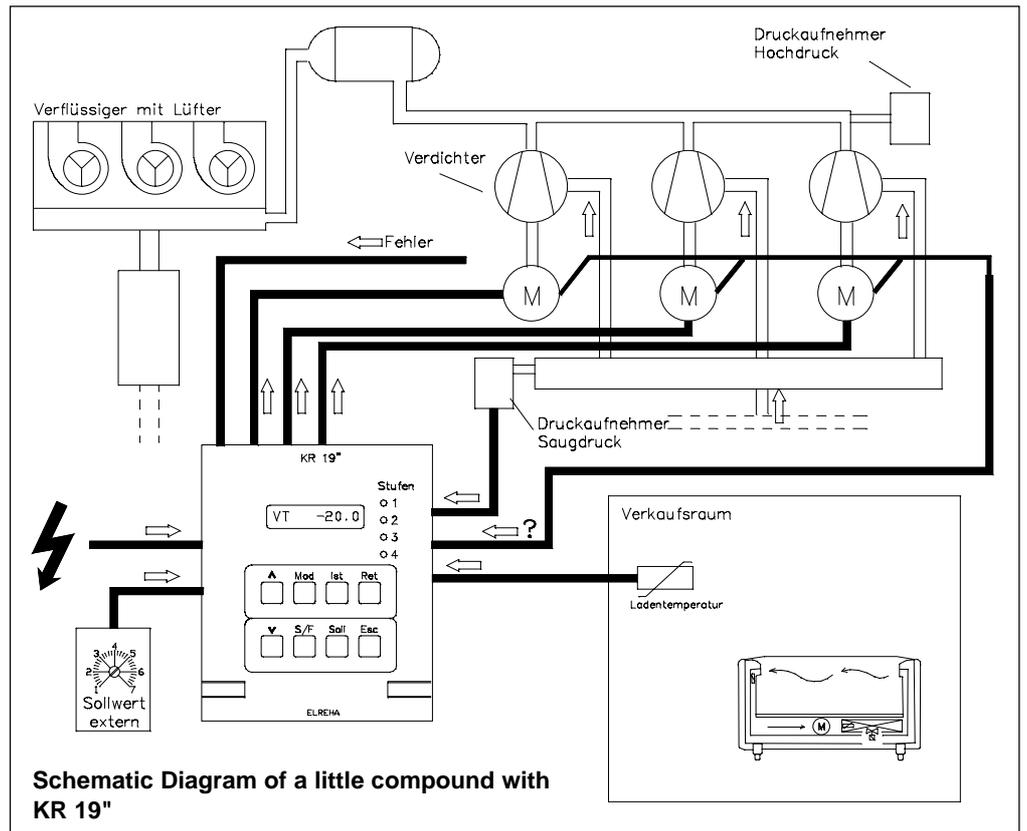
Actual Values

If a transmitter input is selected by parameter "Input" (Mode-List), the KR unit expects a 4-20mA signal from a suction pressure transmitter. This pressure value can be read at "PR" (Actual Values List and Mode-List). By the help of a selected refrigerant table (Mode-List) the KR/KRI unit calculates the equivalent evaporation temperature and displays it at "VT". Informations about the used transmitter the KR/KRI gets by the parameters "po" (lower pressure border) and "pb". "pb" is the range of the transmitter according to 4-20mA.

Examples:

If you use a transmitter with the range -0,5bar (4mA) and +7bar (20mA) "po" must be set to "-0,5" and "pb" must be set to "7,5". If you use a transmitter with the range 2bar (4mA) and 8bar (20mA) "po" must be set to "2" and "pb" must be set to "6".

The actual temperature value can be read at "A1" and "A2" (Actual List). The pressure display "PR" and the actual temperature values can be corrected by "n1" thru "n4" (Mode List).



Schematic Diagram of a little compound with KR 19"



Note:

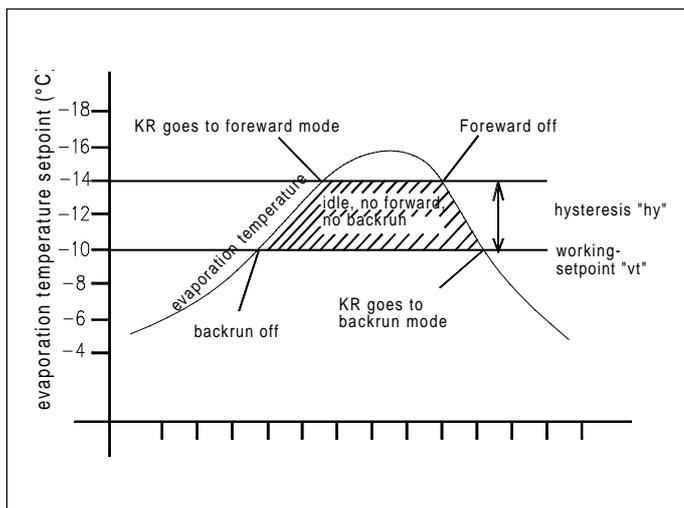
Optional a temperature sensor can be used to get an input value, so the KR/KRI can work with brine-chiller systems or similar. For this operation mode you must use the temperature sensor at terminals z24/d24 (normally room sensor). Parameter "Input" (Mode-List) must be changed to "T".

Setpoints

The settable evaporation temperature setpoint is named "vs". If this value is reached, the KR unit goes to 'Backrun' (KRI: Forward). This setpoint can now be affected by the values of the temperature sensors (see suction pressure optimizing, later in this text), the effective setpoint is calculated of "vs" and the correction values and is named "vt". The KR/KRI goes to "Forward" (KRI: Backrun), if the actual, calculated temperature value exceeds the setpoint "vt"+"hy" (hysteresis). Within these borders the unit is in idle mode (neutral zone), no stages will switch ON or OFF.

Second Setpoint

The KR/KRI can work with a second setpoint "vt" which can be activated by the internal clock. The precondition is that you don't use a second correction temperature sensor at the same time, because this input is used for calculating the second setpoint. The KR/KRI gets an information about the second setpoint indirectly by entering a value for increasing/decreasing ("a2", Setpoint List). The input for the second correction value (z26/d26) must be terminated by a 1.6 kOhm resistor. The intergrated real time clock can switch to the second setpoint. "e2" = time 2nd setpoint ON, "a2" = time 2nd setpoint OFF (Mode-List).



Examples for the parameters "a2" (Second correction value slope, setpoint list) :

- +2,0 = 1st. setpoint + 20 K
- +1,8 = 1st. setpoint + 18 K
- +1,6 = 1st. setpoint + 16 K
- +1,4 = 1st. setpoint + 14 K
- +1,2 = 1st. setpoint + 12 K
- +1,0 = 1st. setpoint + 10 K
- +0,8 = 1st. setpoint + 8 K
- +0,6 = 1st. setpoint + 6 K
- +0,4 = 1st. setpoint + 4 K
- +0,2 = 1st. setpoint + 2 K
- 0,0 = 1st. setpoint
- 0,2 = 1st. setpoint - 2 K
- 0,4 = 1st. setpoint - 4 K
- 0,6 = 1st. setpoint - 6 K
- 0,8 = 1st. setpoint - 8 K
- 1,0 = 1st. setpoint - 10 K
- 1,2 = 1st. setpoint - 12 K
- 1,4 = 1st. setpoint - 14 K
- 1,6 = 1st. setpoint - 16 K
- 1,8 = 1st. setpoint - 18 K
- 2,0 = 1st. setpoint - 20 K

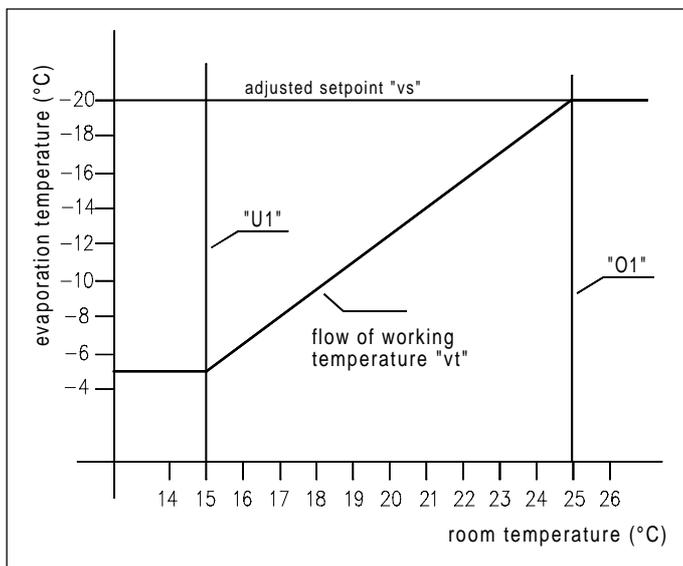
Because the increase/decrease value set by "a2" is not changed while changing the setpoint "vs", the 2nd setpoint shifts the same amount.

Suction pressure optimizing by room temperature

For energy saving pressure optimizing a temperature sensor (room sensor) can measure the temperature at the position of the refrigerated cases. This temperature effects an automatic suction pressure increasing if the room temperature decreases. Parameter "F1" (Mode-List) must be set to "Korr". The range borders the correction is effective within are factory set to 25..15 °C but can be changed if possible (parameter "O1" and "U1", Mode-List). The slope of this temperatur-based correction, that means the value of the evaporation temperature shift per °C temperature change at the temperature sensor can be set too (parameter "a1", slope, Setpoints List).

If the temperature sensor fails, the KR assumes that the sensor signal is at its upper range border. If the automatic correction is not necessary, sensor inputs must be terminated by 2.0 kOhm resistors and the slope must be set to 0.0.

Example: The set evaporator temperature "vs" is -20°
 Correction range lower limit "U1" is 15°C
 Correction range upper limit "O1" is 25°C
 Slope "a1" is 1,5 K/K



Second correction value

For additional optimizing of the suction pressure a second temperature sensor can be used. The function is identical with the input "room temperature", the adjustable parameters are analogous "a2", "O2" and "U2".

Note: If it is intended to use the KR in a chiller system, a limit sensor can be necessary. It is possible to define the sensor at z26/d26 (normally 2nd correction value) as a limit sensor by changing parameter "F2" (Mode-List) to "Begr". Then parameter "w2" (Setpoint List) represents the limit setpoint. If the measured temperature reaches or falls short of "w2", then all stages will be de-activated without time delay.

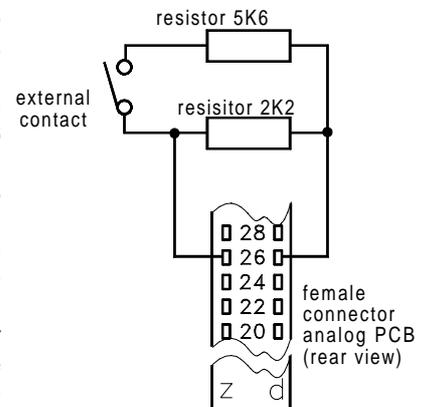
External setpoint switch : The input "2nd correction value" can be used alienated to realize an external setpoint switch. In this case the values of a temperature sensor are simulated by switched resistors.

As change-over switch any potential free switch can be used.

Example:

Simulation of 2 temperatures. If the contact is open, 2,2 kOhms take effect (appr. 40°C), if the contact is closed, 5,6 kOhms are switched parallel which corresponds to appr. -5°C.

So one leave the setpoint shift range defined by parameters "O2" and "U2". After adjusting the shift slope by parameter "a2", the function works. The alteration of the working setpoint "vt" is calculated as follows:
 Value for "O2" - value for "U1" x "a2"



Example 1: Reduce a setpoint of -10°C by 12K

Mode List F2 = KORR Setpoint-List vs = -10°C
 O2 = 25°C a2 = -1,2
 U2 = 15°C

Example 2: Elevate a setpoint of -16°C by 21K

Mode List F2 = KORR Setpoint-List vs = -16°C
 O2 = 25,5°C a2 = +2,0
 U2 = 15°C

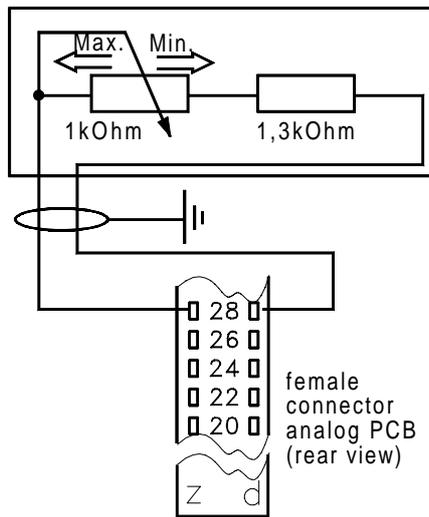
External setpoint shift

The sensor input "room temperature" can be used alternatively to shift the working setpoint "vt" by an external potentiometer (see example). For this, parameter "F1" must be changed to "ExtS". The range borders (shift from...to) of the external shift can be set by "e0" and "eb" (Mode-List). Parameter "es" (Setpoint-List) shows the amount of shift by the external potentiometer.

Example:

Setpoint shift by potentiometer, range $\pm 5K$.

Parameter
e0 = -5
eb = +10

Stage Controller

The stage controller of the KR/KRI unit is suitable for single stage or multistage refrigerant compressors. The kind of connected compressors is set by parameter "Komp1...Komp8" (no. of stages of the single compressors, Mode-List). The assign of the relay outputs depends on this entries.

1. Example: 4 single stage compressors, relay 1 = compr. 1 etc.
2. Example: 2 compressors with an additional power stage each
 - relay 1 = compressor 1 ON
 - relay 2 = compressor 1 power valve ON
 - relay 3 = compressor 2 ON
 - relay 4 = compressor 2 power valve ON

The KR/KRI shows on its Actual List if it runs in Forward, Idle or Backrun Mode. The switch delays can be set individually for Forward Mode (Parameter 01v...08v, Mode-List) and Backrun Mode (Parameter 01r...08r, Mode-List).

This set times are minimum times which can be increased by the trend of the evaporator temperature.

The KR/KRI detects, if the evaporator temperature increases (prev), decreases (last) or stops (idle) and displays this trend (Istwertliste). If delay times are still running, they will be stopped while the actual temperature moves towards the setpoint. So the times were lengthened to suppress the needless switch of the next stage. The delay times come on if the evaporator temperature hold out (idle) or moves away from the setpoint.

Base Load Change

The KR/KRI measures and stores the runtimes of the connected compressors. This runtimes can be read like on an external runtime-counter (Parameter LA1...LA8, Actual List). Additionally the KR/KRI counts the runtimes of the parameters "L1" thru "L8" (relative runtime, Mode-List). Always if one of the compressors has reached 100 hours relative runtime, all relative runtimes will be set back by 50 hours, so it is secured that all runtimes are equal after a while. The next compressor the KR/KRI selects in Forward Mode is the compressor with the shortest relative runtime.

The unit considers the special base load change requirements of multistage compressors automatically.

The base load change function can be disabled (set parameter "GU" to "0", Mode-List).

To prevent the connected compressor motors from overload, a maximum continuous runtime can be preset by "ZR" (Mode-List). After this timer is run down, the motor will be stopped and another one will be selected. If a motor is switched off, it first can be switched on again after timer "AZ" (minimum stop-time, Mode-List) is run down.

Power Optimization (LOPT)

If the optimization parameter "LOPT" (Mode-List) is set to on, the backrun function while using multistage compressors will be modified. Before a compressor motor will be switched off, the KR/KRI switches off power valves of other running compressors first.

Operation Signals

The unit expects a feedback signal from each compressor, which comes from a position after the security chain and the manual switch. This signal informs the unit about the real operation state. This feedback signal is absolutely necessary for operation. Only if this signal is present, stages can be switched and runtimes can be measured.

If the KR/KRI switches on an output relay for a compressor and no voltage appears at the feedback message input because this compressor is failed or switched off manually, alternately the next ready compressor will be switched on without time delay. There is a time range set by parameter "TS" (Mode-List) the unit waits for the feedback signal. After "TS" is run down, the relay for the selected compressor will be disabled. After this, the operation readiness of this compressor will be detected in cycles of approx. 40 seconds.

The feedback signal inputs are assigned to the compressors with the same numbers, e.g. compressor 1/feedback input 1 etc. The same is valid for multistage compressors, e.g. if the KR 1958 must control 2 compressors with 2 power valves each, the feedback signal inputs 1 and 2 must be used.

Manual Operation

For service purposes the unit can be switched to Forward/Backrun Mode manually by parameter "MO" (Mode-List). While Manual Mode the display flashes like while a failure message.

Suction Pressure Limitation

The unit contains the function of a suction pressure limiter. If the pressure falls short of a given limit value (Parameter "ud", Setpoint-List), all compressors will be switched off immediately.

Fast Backrun

If mains voltage is connected to this input, all compressors will be switched off immediately.

Peak Load Limitation

To limit the maximum load at certain times 3 mains voltage inputs are available which limit the number of switchable compressors. If the inputs are activated, always the compressors with the longest runtime will be disabled. Which compressors remains, you see on this table:

If the feedback signal is still present or which Load Limitation Signal is present you can read at "Lab" (Mode-List).

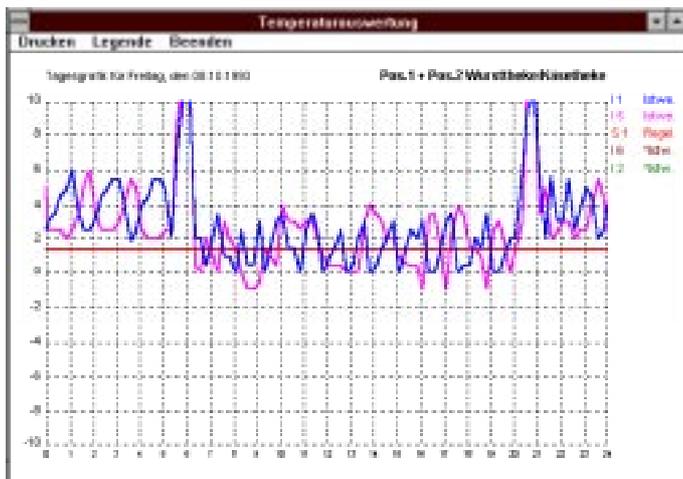
selected compressors	load limit signal no.			at fast backrun
	1	2	3	
1	1	1	1	0
2	1	1	1	0
3	2	1	1	0
4	3	2	1	0
5	4	3	2	0
6	5	3	2	0
7	6	4	3	0
8	6	4	4	0

Failure Message Input

If no voltage is present at this input, all compressors will be switched off immediately and the alarm relay will be de-activated (active=off) to forward an alarm by the N/C-contact. The display flashes with the message "Verbund" (compound).

Remote Operation

The KR 19" units can be remote controlled via their built-in serial interface to realize compound monitoring or data logging,



Protocol example with MMA-Software



The KRI-unit cannot be remote controlled !

Failure handling / Failure Messages

The KR/KRI unit shows failure message on its display and forwards them via alarm relay depending on their priority. An alarm message can be reset by pushing any key. The alarm relay will then be re-activated and the display shows the normal values. But as long as the failure is present, the display continues flashing. To read an actual failure message, push key "ESC" at any time.

Failure Table:

failure display	failure	alarm relay de-activated
Bruch F1	press. transmitter signal broken (or less than 4mA)	yes
Bruch F2	correction sensor 1 broken (or temperature >55°C)	yes
Bruch F3	correction sensor 2 broken (or temperature >55°C)	yes
Bruch F4	room temperature sensor broken (or temperature >55°C)	yes
Stör F1	press. transmitter signal short (or > 20mA)	yes
Stör F2	correction sensor 1 short (or temperature <-35°C)	yes
Stör F3	correction sensor 2 short (or temperature <-35°C)	yes
Stör F4	room temperature sensor short (or temperature <-35°C)	yes
AD-Error	Internal failure, AD-converter defect	yes
UD-Begr.	suction pressure limit reached	no
Manuell	manual operation ON	no
Verbund	security chain open, no voltage at input 'compound'	yes
Select	more stages selected than available	no
Ur-Init	Data loss of the unit, resp. first startup	yes

Operating

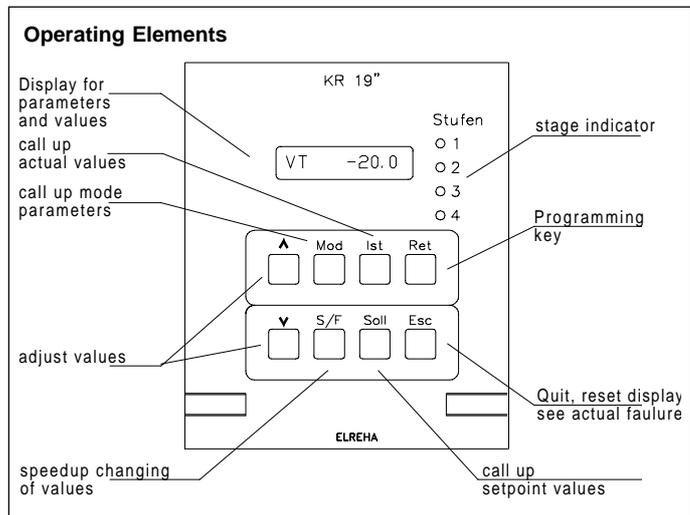
Programming

Keyboard and Display

The 8 keys and the display are located on the front of the unit and are suitable for selection and programming of parameters.

The 8-digit dot-matrix display improves the comprehensibility of the messages even without a manual.

The 8 keys have the following functions:

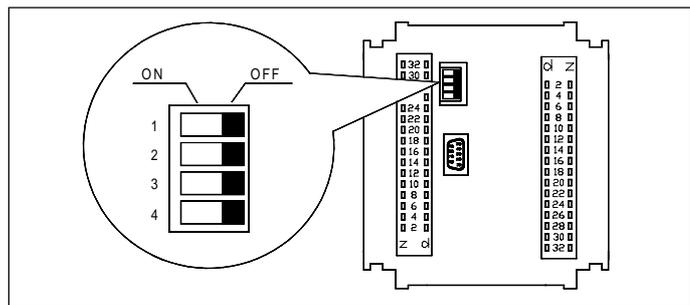


- '^' = increase displayed value
- 'v' = decrease displayed value
- 'S/F' = speeds up above functions
- 'MOD' = list of Mode Parameters
- 'IST' = list of Actual Values
- 'SOLL' = list of Setpoint Values
- 'RET' = enter programming mode - you are now legal user and can program any value
- 'ESC' = return to normal display mode

DIP-switches

On the rear side of the unit there are 4 switches for the preset of the unit:

- Switch 1: possibility of programming the marked "" parameters
- Schalter 2: selects stages 5...8
- Schalter 3: selects stages 9...12
- Schalter 4: no function

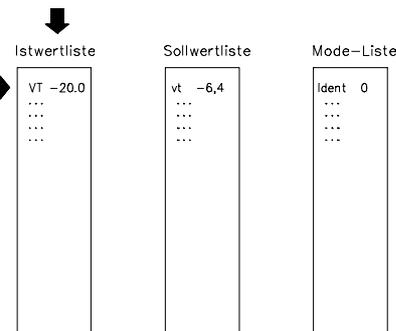


The switches 2 and 3 are factory set, please don't change their position.

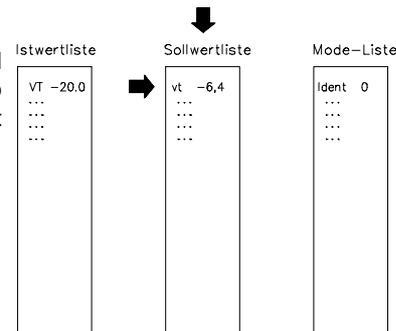
Unit	switch 2	switch 3
KR/KRI-1954	OFF	OFF
KR/KRI-1958	ON	OFF
KR/KRI-1962	ON	ON

All parameter of KR/KRI are distributed to 3 lists, the Actual List, the Setpoints List and the Mode List.

In normal operation mode or if no more key is pressed for about 1 minute, the KR/KRI display shows the actual evaporator temperature.

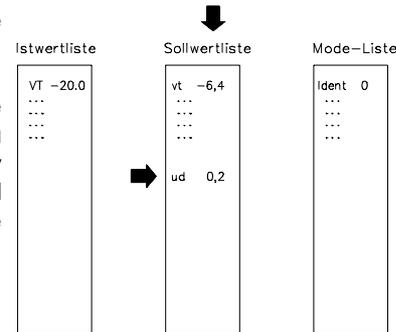


To select the desired parameter, you have to select first the list that contains this parameter. (see overview later)



Every keypress shows the next parameter on the list.

If you have reached the desired parameter, you must push the "RET" key to start programming and changing the value by the arrow-keys.



To speed-up the change, press key "S/F" together with an arrow-key. Another push on the key "RET" or one of 3 List-keys stores the new value.

To change value like hours:minutes after the 1st "RET" the minutes and after the 2nd "RET" the hours can be changed.

The marked parameters ('X') can be changed only if DIP-switch 1 on rear side of the unit is set to 'ON' its position. While this switch is 'ON', the all control functions are disabled. Parameter "Lab" in the Mode-List shows the value "5".

Access Code

To prevent the KR/KRI from unauthorized operating, you need to identify yourself by entering a certain programmers code. This code is calculated by adding '10' to the actual hour.

Example: If the clock in the unit is correct and you want to enter some changes at 9:35, your acces code is '19'. At 13:00 (1:00pm) the acces code is '13', and so on.

if no key is pressed for about 1 minute, or the hours change while entering new values, you must re-enter a new access code.

Installation / Startup

This chapter shall give you a little help to startup the stage controller.

 Care for sufficient ventilation in the cabinet. High ambient temperatures decrease the lifetime of electronic components.

 Before applying voltage to the controller make sure that all wiring is installed correctly and in accordance with local regulations. All sensor cables must be shielded types with one side of the shielding connected to PE. Don't assemble sensor cables next or parallel to power cables to avoid electromagnetic disturbances. Make sure to have a shielding within the cabinet, not only up to the input terminals of the cabinet. The PE-terminal must be connected to PE to ensure the internal filter can work. The cross-section of the used cables is not critical, cables from 0,5 sqmm can be used.

 If one of the sensor inputs is not necessary, it must be terminated by a resistor. (see values on connection sheet)

 Please note the polarity of the pressure transmitter. The feedback signals must be present, compressor 1 -> feedback input 1, etc. Frequently one forget that at input "compound" (z6, analog PCB) 230 V must be present.

 Switch on supply voltage and wait for the display. If the display does not switch on after a few seconds, please check supply voltage. (Voltage not present or internal fuse defect).

Now the display shows the actual evaporator temperature or a failure message. If the display shows "Ur-Init", please push any key to reset this message. This message may only appear while the first startup. If the message "Verbund" appears, no voltage is present at the input "compound".

If the messages "Stör Fx" or "Bruch Fx" appear, the corresponding sensor is not connected or failed or a termination resistor is not present.

If the message "Select" appears, you have selected too many compressor stages in the Mode List (Komp1...Komp8) or the DIP-switches 2 and 3 are in a wrong position.

If all failures are removed, the unit must be adapted to the refrigeration plant. Set DIP-switch 1 to the "On"-position, so you can adjust the runup-parameters. First adjust the internal clock and enter your acces code. If the stored runtimes in the unit are not set to '0', the memory can be erased by parameter "Init".

 Now adjust the following :

- the used refrigerant,
- the maximum continuous runtime of your compressors,
- the minimum stop-time of your compressors,
- set the no. of compressors or compressor stages.

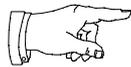
Example: 4 single compressors, Parameter "Komp1" thru "Komp4" must be set to "1", all others to "0"
2 compressors with an additional power valve each, "Komp1" and "Komp2" are set to "2", all others to "0".

- Adjust the desired forward and backrun delays.

 Select the kind of input sensors, set parameter "Input" to "P" if a presseure transmitter is used. Now the unit expects the data of this transmitter. (Example: transmitter 4..20mA/-0.5..7bar, p0=-0.5, pb=7.5). Please check if the measured values are displayed correctly, little correction can be made by parameters "n1" thru "n4".

 Now the KR/KRI is read for operation and the setpoint, hysteresis, etc. can be entered.

 Don't forget at the end, to switch DIP-witch 1 to the "Off"-position, because otherwise the unit does not work.

 Please wait, if the display shows "Vor" (Forward) in the Actual List. After the entered delay and the minimum stop time is run down, the first compressor stage must start. If not, please check parameter "Lab". If the value of this parameter is from 1..4, an external load limitation signal is present. If "Lab" is '5', DIP-switch 1 is not set to the "Off"-position. If a compressor starts and switch off after approx. 2 seconds, please check the compressors feedback signal. This feedback signal must be 230 volts, after the compressor was switched on by the KR/KRI. Please note the order of the feedback signals.

The KR/KRI unit shoulf work normally now.

 Note for storing the controller unit:
The KR/KRI can be reset to the factory status. All stored data like runtimes, setpoints, etc. will then be erased and set to the default values (see tables). To do this, set parameter "Init" auf "1" and switch off the unit for 5 seconds minimum.

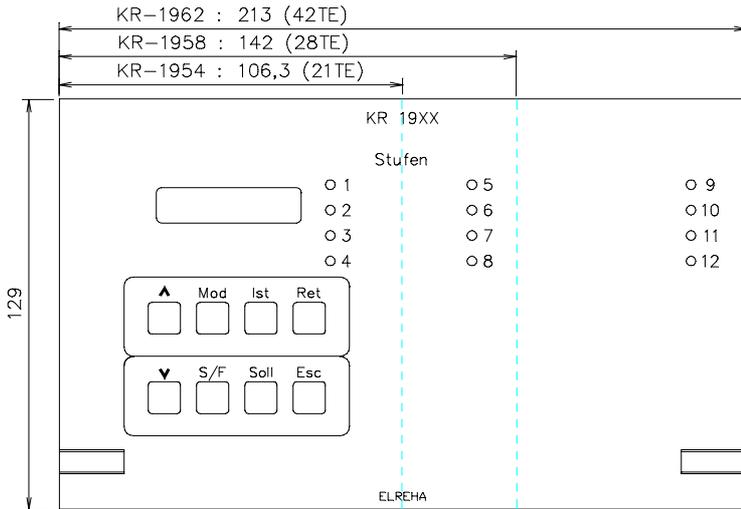
 Runtime adjust after compressor change
If an interchange of a compressor is necessary, the runtime counter can be adjusted. After a reset of one of the parameters "L1..L8" (which is assigned to the new compressor, Mode-Liste) to "0", the new compressor will be preferred while the next 50 hours.

Appendix

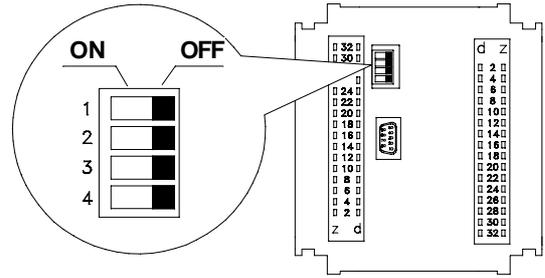
Accessories (not included)

Temperatur Sensor.....	Typ TF 201
Pressure Transmitter.....	Typ DG xx
Female Connectors / solder tags....	Order.No: 107-0907-0151
or	
Female Connectors / flat plugs.....	Order.No: 107-0907-0090
Subrack, e.g.	Order.No 107-0300-0076

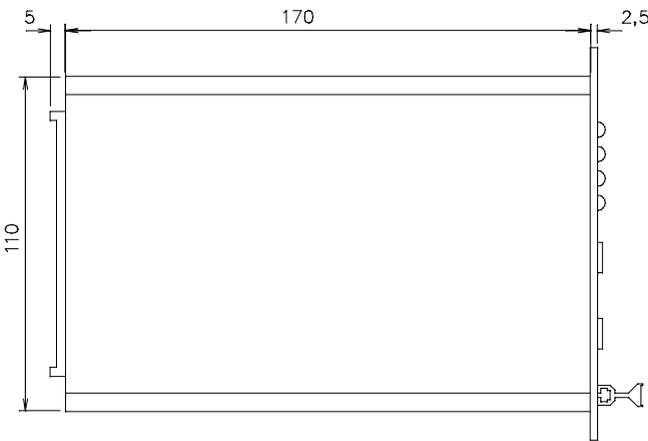
Dimensions



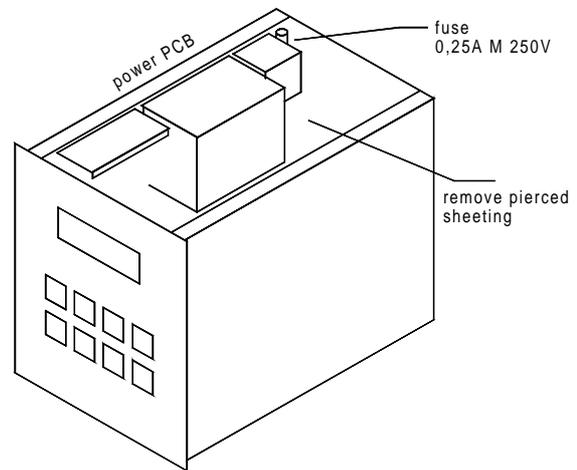
DIP-switches



View from left side



Fuse position

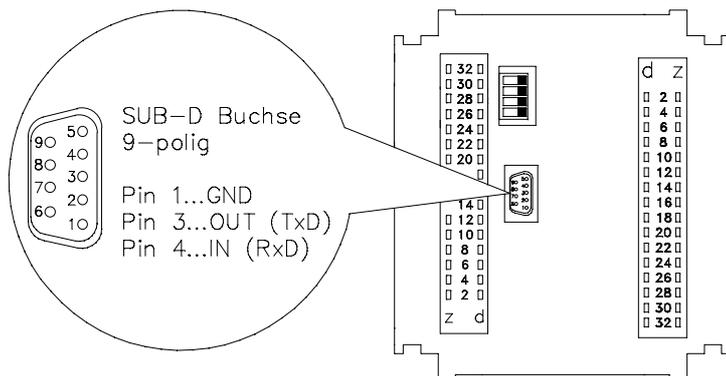


Interface

V-24 (RS-232)

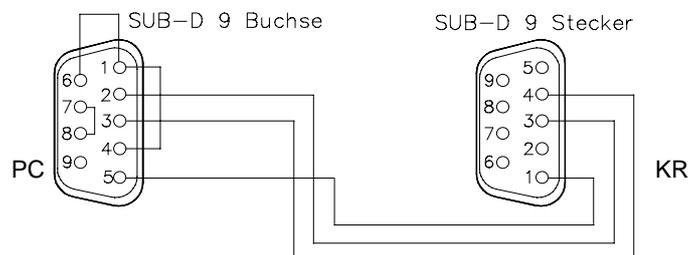
Transmission parameters:

9600 baud
 even parity
 7 data bits
 1 stop bit



PC-data cable

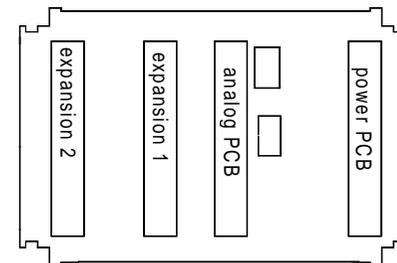
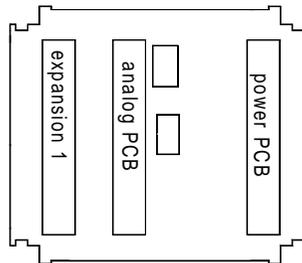
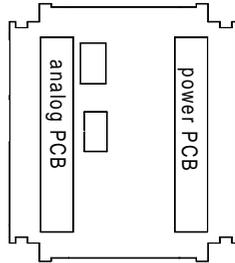
(for program KRBed / DOS)



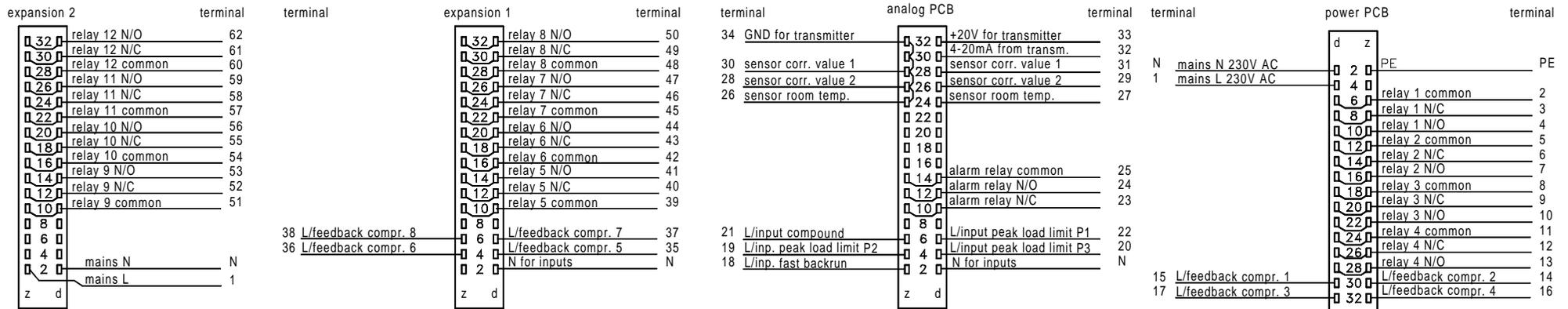
Terminals

Position of the PCB's in types

- KR-1954
- KR-1958
- KR-1962
- (rear view)



Wiring of the single PCB's



Unused sensor inputs must be terminated by resistors.

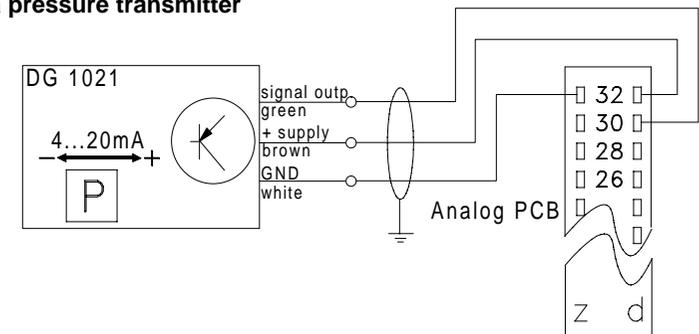
- 32d - 30d : 2,2kOhm
- 28z - 28d : 2,2kOhm
- 26z - 26d : 2,2kOhm
- 24z - 24d : 2,2kOhm

In temperature mode :

- sensor at 24z/24d = control sensor
- sensor at 26z/26d = limit sensor

Wiring diagrams show connectors equal to DIN 41612, type 'F', rear view. The 'terminal' numbers are used in ELREHA pre-wired sub-racks.

Wiring of a pressure transmitter



Parameter Lists

On this and the following page you find the three parameter-lists IST (actual), SOLL (setpoints) und MODE (operation modes).



Parameters marked with "Display only" are for information purposes and cannot be changed



Note:

In these lists you will find all possible parameters. If you have selected an operation mode which does not use one of the parameters, this parameter will not be displayed.



Default values are factory set values.

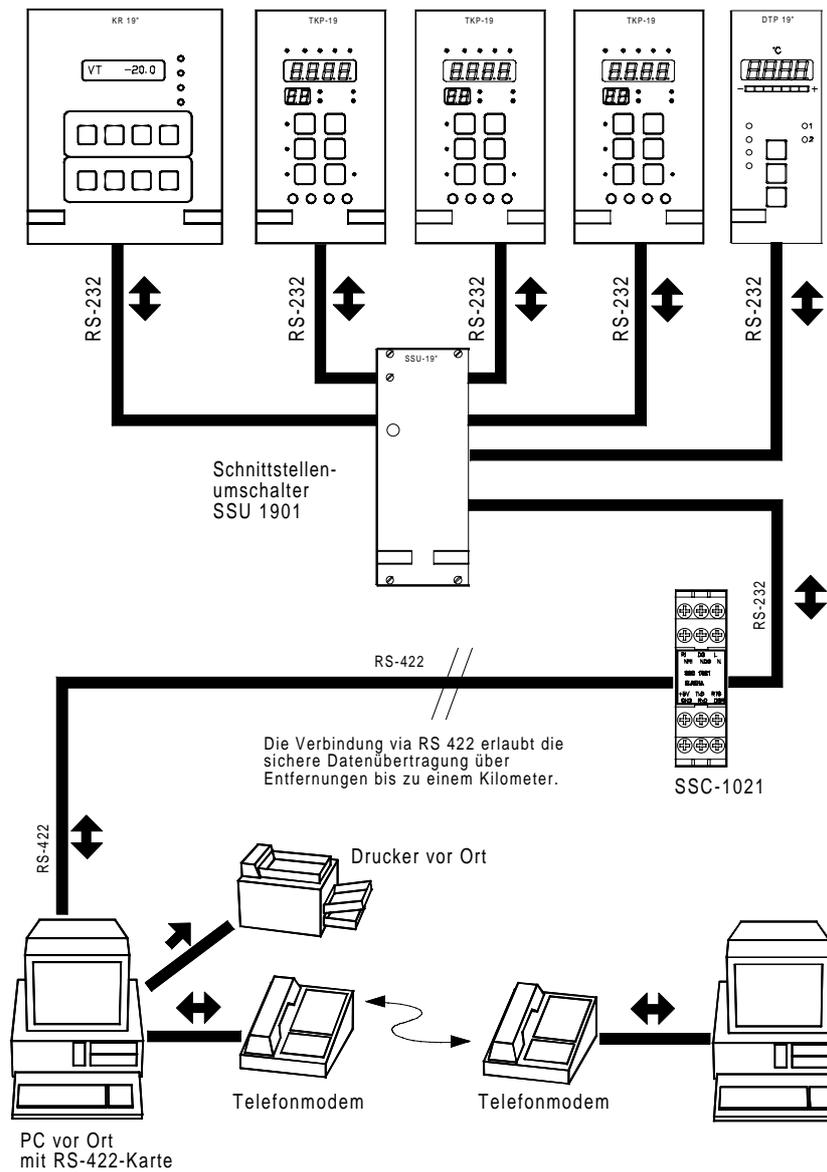
Actual Values	Display only	Description	ph. dim.
VT.....	X	Actual evaporating temperature, calculated from the actual suction pressure	°C
Vor..... Rück..... Neutral.....	X	Forward, neutral, backstroke; actual state of the stage controller	
T...Prev T...Idle T...Last	X	Trend of the actual value: Prev=rising, Idle=no change, Last=descending	
A1.....	X	Actual value of the (shop-) temperature sensor	°C
A2.....	X	Actual value of the second correction dimension	°C
PR		Analogue pressure value (act.val.) of the transmitter	bar
LA1	X	Absolute-runtimes of the compressor stages (runtime-counter)	h:min
thru		"	
LA12	X	"	h:min

Setpoint List	Disp. only	Description	phys. dim	Default-value	Your Value
vt	x	Actual operation setpoint, calculated with the entered setpoint "vs" and the corrections by the dimension "A1" and "A2".	°C		
hy		Hysteresis resp. 'Dead Zone' (effective from setpoint to higher temp. direction)	°C	2.0	
vs		Entered setpoint of evaporating temperature (backstroke starts, KRI: forward)	°C	-150	
es		External setpoint shift (replaces a1 if input F1 is used for external setpoint shift)	K		
a1		Shop temperature slope	K/K	+1.0	
a2		Second shift dimension slope	K/K	+0.5	
w2		Setpoint of limit sensor (replaces a2 if F2 is declared as a limit sensor)	°C		
ud		Suction pressure limit, all compressor will be switched off	bar	-0.5	

Mode-List	DIP 1= "ON"	Description	Adjustabler range	Default value	Your value
Ident		Demands the input of the right Id-No to change parameters		0	
Uhr		Actual time (adjustable without Id-No.)			
e2		ON-time for correction sensor 2	00:00 thru 23:59	00:00	
a2		OFF-time for correction sensor 2	00:00 thru 23:59	24:00	
P(press. only), R12,R13,R22, R23,NH3,R114, R123,R134a, R502,HP62 (AZ50),HP80 (R404), HP81		used refrigerant		R22	
LOPT		EIN (ON) or AUS, (OFF) additional function for optimized switch-off of multi-step compressors	EIN, AUS	AUS	
Load		Load a file-no. with factory-set parameters and values (files available on demand only)		0	
MO		Operation mode Auto = Automatic-Operation Vor = forced forward stroke Rück = forced backstroke	Auto, Vor, Rück	Auto	
ZR		maximum continuous run of compressors	1...9 hours	3h00	
AZ		minimum compressor pause	1...9 minutes	3:00	
Lab		Actual peak-load limit states 1 = peak-load limit 1 2 = peak-load limit 2 3 = peak-load limit 3 4 = fast backstroke 5 = system backstroke			
Komp1		Number of stages of the individual compressor. Please set to "0" if a compressor does not exist.	0...12	4	
thru			"	0	
Komp8			"	0	
O1v		Forward delays of the individual compressors resp. stages in min:sec (logical sequence	0:00 thru 30:00	1:00	
thru			"	"	
O8v			"	"	
O1r		Backstroke delays of the individual compressors resp., stages in m:sec (logical sequence)	0:00 thru 30:00	"	
thru			"	"	
O8r			"	"	
L1	X	Relative runtime of compressors 1...8 in minutes and seconds (You will find the absolute values in the actual-list)	0...100		
thru			"		
L8	X		"		
F2	X	Definition of sensor 2 Korr = correction sensor Begr = limit sensor	Korr., Begr.	Korr.	
F1	X	Definition of sensor 1 Korr = correction sensor ExtS = external setpoint shift	Korr., ExtS	Korr.	
Input	X	Definition of main input dimension P = pressure transmitter T = temperature sensor	P, T	P	
.....	X	Pressure "bar" relative or absolute	relativ, absolut	relativ	
PR	X	Pressure analogue value in (bar)			
po	X	This value (in bar) supplies the transmitter with 4mA		-0,5	
pb	X	Range of the transmitter from 4...20mA		+7,5	
n1	X	Display correction for PR (pressure display)	+/- 5,0		
n2	X	Display correction for A1 (shop-temperature)	+/- 5,0		
n3	X	Display correction for A2 (second shift dimension)	+/- 5,0		
n4	X	Display correction for KT (if Input = "T")	+/- 5,0		
O1	X	Upper range limit for correction 1		+25,0	
U1	X	Lower range limit for correction 1		+15,0	
O2	X	Upper range limit for correction 2		+25,0	
U2	X	Lower range limit for correction 2		+15,0	
TS	X	Time the KR waits for a feedback-message	0:02 thru 1:00	30 sec.	
GU	X	Base-Load Change, 1 = ON	1, 0	1	
e0	X	Lower value of the external setpoint correction (K)			
eb	X	Range of the external setpoint correction (K)			
Init	X	General-reset, all entered and stored parameters and values will be set to default.		0	

Parameters marked with "x" only appears if DIP-switch 1 on the rear side of the cassette is set to "ON"-position

Networking Example



EG-Statement of Conformity



We state the following: When operated in accordance with the technical manual, the criteria have been met that are outlined in the guidelines of the council for alignment of statutory orders of the member states on electro-magnetic consistency (89/336/EWG). 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 with regard to electromagnetic consistency:

IEC 1000-4-1, IEC 1000-4-2, IEC 1000-4-3*, IEC 1000-4-4, IEC 1000-4-5, EN 55011 B, EN 50081, Teil 1 und 2; EN 50082, Teil 1 und 2

This statement is made from the manufacturer / importer
ELREHA Elektronische Regelungen GmbH
 68766 Hockenheim

by:
**Klaus Birkner, Development and
 and leader of the EMC-Laboratory** (Name / Anschrift / name / adress)

Hockenheim 23.1.97
 Ort/city Datum/date

Unterschrift/sign

*The conformity with IEC 1000-4-3 is derived from the IEC 1000-4-2 and IEC 1000-4-4 test results. The correlation with IEC 1000-4-3 is based on test results which are located on site at the manufacturer.

This manual has been set up with care and best knowledge, but mistakes are still possible. If you have any problems, difficulties or questions please don't hesitate asking our technical support. 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 number shown on page 1. Units with an other software number can work a little bit different. You will find this software number on the label of the unit too.

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set up:	3.2.97	tsd/jr
checked:	3.2.97	ql/kb
approved:	3.2.97	tl/wr