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Operating Manual COSFI100V

updated: 2018-09-07/Fu
from Firmware: 0-05

- Motor load relay, current direction relay

New, Firmware 0-05:
Pr4 optimised for own consumption of energy / preventing from feeding-in of energy
for Display the firmware version press Set for >10s

Table of contents

1 Application and brief description

Motor load monitors monitor motors for overload and/ or underload. They are simply wired into the motor supply line and evaluate the phase angle between the voltage and the motor current or, optionally, the active current. That facilitates monitoring drive motors which enables, for instance, detecting a break in a V-belt or the blockage of a filter or valve.
As current directional relays, they monitor the direction of the flow of current to generators and whether current is being supplied or consumed.
The digital display and many adjustment facilities allow optimising the device for each task.

Cosfi application / Active current

- V-belt monitoring
- Fan monitoring
- Pump monitoring
- Conveying equipment (message if low is too low)
- Stirrers
- Wear monitoring
- Tool wear
- Load protection of motors, plants and drives

Current direction application

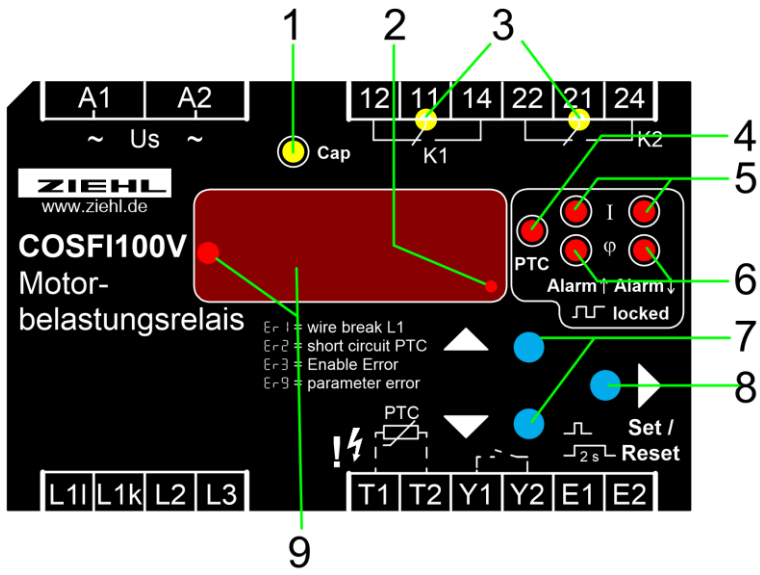
- Warning or shutdown if a generator is consuming instead of supplying current
- Optimizing of own consumption of energy in photovoltaic plants. Consumers can be switched on or off depending on power available. By measuring current at the feed point it can be detected, wheather there is enough power available to start heat pumps, cooling units or other consumers.
- Limiting feeding-in power or preventing from feeding-in at plants for own generation of electricity

2 Summary of the functions

In an alternating current motor (inductive load), the current follows phase angle φ. If the load is decreasing, it increases so that the power factor (cosfi) decreases. This change of phase angle is a gauge of the change of the load on the motor. The COSFI100V motor load monitor is suitable for sinusoidal alternating current signals.

- Digital displays for the power factor (cosfi) and active current
- Inductive / capacitive load display
- 2 limits / output relay
- Each adjustable for min, max, or min/max
- Monitoring of 2 x cosfi, 2 x active current or 1 x cosfi and 1 x active current
- Current display scalable (converter factor)
- Hysteresis and switching delay adjustable
- Auto-reset or locked shutdown
- Restarting attempts programmable 0…10
- Auto-enable via current (> 0.2A) or via start signal (open bridges E1 - E2)
- Power-on delay can be adjusted 0…99s
- Current input max. 10A through current transformer (sec. 5A) 500 A
- Wire break in current measurement circuit
- PTC thermistor input with short-circuit detection
- Distributor housing for panel mounting 4TE, front-to-back size 55mm
- Mounting on 35mm DIN EN 60715 standard rail or with screws (optional)

3 Display and controls



1 LED Cap (yellow)

OFF	Inductive or resistive load
ON	Capacitive load

2 Last decimal point (red)

Off	Display mode
Illuminated	Configuration mode
Flashes	Menu mode

3 LEDs relay status (yellow)

OFF	Relay is released
ON	Relay operating

4 LED PTC (red)

OFF	PTC normal temperature
ON	PTC excess temperature
FLASHES	PTC ready for reset after excess temperature
FLASHES and Er2	PTC short circuit

5 LEDs active current limit value undercut / exceeded (red)

ON, A1 or A2	Limit value undercut / exceeded
FLASHES, A1L or A2L	Ready for reset after undercutting / exceeding the limit value
FLASHES	Restart was attempted
OFF	Limit value not undercut / exceeded

6 LEDs cos φ limit value undercut / exceeded (red)

ON, A1 or A2	Limit value undercut / exceeded
FLASHES, A1L or A2L	Ready for reset after undercutting / exceeding the limit value
FLASHES	Restart was attempted
OFF	Limit value not undercut / exceeded

7 Up / Down key (in display mode, normal state)

Press briefly	Change into the menu mode (see Point 8.5)
Press for > 2s:	Displays the MAX (Up) and MIN (Down) measurement, pressing the Set key for ≥ 2s in addition deletes the saved value

8 Set/Reset key (in display mode, normal state)

Press briefly	Changes the limits in PR 1 and 2 (Easy Limit)
Press for > 2s:	Reset after locked alarm (manual restart)
Press for > 4s:	Displays the program, e.g. Pr1
Press for > 10s:	Displays the software version e.g. 00.0

9 4-digit digital display with sign LED (red)

Sign LED indicates the direction of current, illuminated = negative current direction
Depending on the program, display of the current cos φ and/or the active current
Displays the alarm messages e.g. A1, A2L ,…
Displays the errors with error code e.g. Er1, Er2, …
On as 1000 digit for adjust dAL and(doF, only Pr4), dAl(doF) = Value + 1000s

4 Detailed description

4.1 Description of the connections

Connection	Function
A1 and A2	Control voltage Us, see 12. Technical data
11, 12, 14	Relay K1, Menu item AL 1.
21, 22, 24	Relay K2, Menu item AL2.
E1 – E2 Enable input (Pr1…3)	Floating break contact from motor contactor
	Adjustable through menu item En . (on , oFF)
	Contact closed = COSFI100V disabled, no evaluation, good state
	open = COSFI100V enabled, evaluation after enable time active
Y1 – Y2 external reset	Floating normally open contact
	Function same as pressing the Set/Reset key for >2s
T1 – T2 PTC input	PTC thermistor connection from motor / generator winding
	Adjustable through menu item PtC. (oFF , AL 1 , AL2)
	Short-circuit monitored, coupled with LED PTC
L1l	Phase L1, load side
L1k	Phase L1, power plant side
L2	Phase L2 with 3-phase connection, neutral conductor with 1-phase connection
L3	Phase L3 with 3-phase connection

4.2 Functional characteristics

Functional characteristics	Explanation
Sign	Indicates the direction of current
	Motor: positive = power consumption, negative = power delivery
	Generator: positive = power delivery, negative = power consumption
Min. load current (only Pr1…3)	To enable evaluation in program 1…3, the load current must be > 0.2A, below that the relay switches into good state (no alarm)
Automatic reconnection attempts (only Pr1…3)	If a locking relay function was selected for the relay, an adjustable number of automatic reconnection attempts will be performed before final switch-off of this relay.
	An automatic reconnection attempt is started when a limit is undercut or exceeded
	The time until the next reconnection attempt is displayed or counted-down in seconds
	All reconnection attempts failed → Locked shutdown
	Reset through the Set key or by closing bridge Y1 – Y2, resets the previous reconnection attempts
Enable time, Start-up bypass time (only Pr1…3)	No evaluation takes place during this time, respectively, the alarms are suppressed; the alarms are detected only after this enable time has expired
	Enable input active (En) on : Enable time starts when Input E1 – E2 is opened **or** the enable input is deactivated (En) oFF : The enable time starts as soon as load current becomes > 0.2A
	Enable time starts if an automatic reconnection attempt was undertaken
Wire break L1	A wire break in the line from L1 can only be detected if the enable input is being used
	If the load current < 0.2 A and the enable input is open and the enable time has expired, a wire break is detected → Er 1 , relays switches into alarm state
Current factor for current transformer	To enable correct display of the measurement or the limit value, the transmission ratio of the current transformer can be set in Programs 2 and 3.

5 Important notice

Inputs T1 – T2, Y1 – Y2, E1 – E2 are not potential isolated to the measurement inputs L1l, L1k, L2, L3. Sufficient insulation of the PTC thermistor is mandatory!

WARNING

Hazardous electrical voltage!
Can lead to electric shock and burns.
Before starting work, switch plant and device voltage-free.

The flawless and safe operation of a device requires that it is shipped and stored appropriately, professionally installed and put into operation and operated according to its intended use.
Only people who are familiar with the installation, commissioning and operation and who have qualifications corresponding to their job are permitted to work on the device. They must comply with the contents of the operating instructions, the notices attached to the device and the relevant safety regulations for constructing and operating electrical plants.
The devices are built and certified in accordance with EN 50178 / EN 60 947 and leave the factory in a safe and technically flawless condition. To maintain this state you must comply with the safety regulations indicated with "Caution" in the operating instructions. Non-compliance with the safety regulations can lead to death, bodily injury or property damage on the device itself and on other devices and equipment.
If the information in the operating instructions is insufficient at any time, please contact us directly or contact the representation responsible for you.
Instead of the industrial norms and stipulations stated in the operating instructions and applicable in Europe, you must comply with the valid and applicable regulations in the country of utilisation if the device is used outside of the area of application

Caution! If the operating current execution is programmed for all relays, a failure of the control voltage or the device will not be detected. When using as a monitoring device, the operator must ensure that this error is detected through periodic performance tests. We recommend programming and correspondingly evaluating at least one relay in closed-circuit current execution.

When connecting through a current transformer, use a current transformer with 5A secondary as otherwise the measurement range is greatly reduced.
Set the transmission ratio of the current transformer under the current factor parameter.
Resolution active current = Current factor * 0.1 A

6 Mounting

The device can be mounted:

- Distribution board or switch cabinet on 35 mm rails according to EN 60715
- With M4 screws for wall installation (additional bar not included in the scope of delivery)

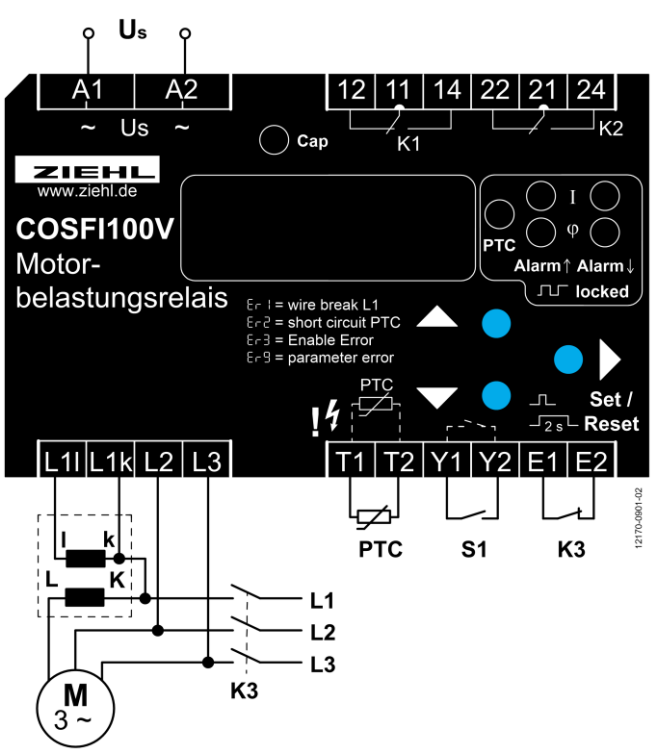
Connect in accordance with the connection diagram or the rating plate.

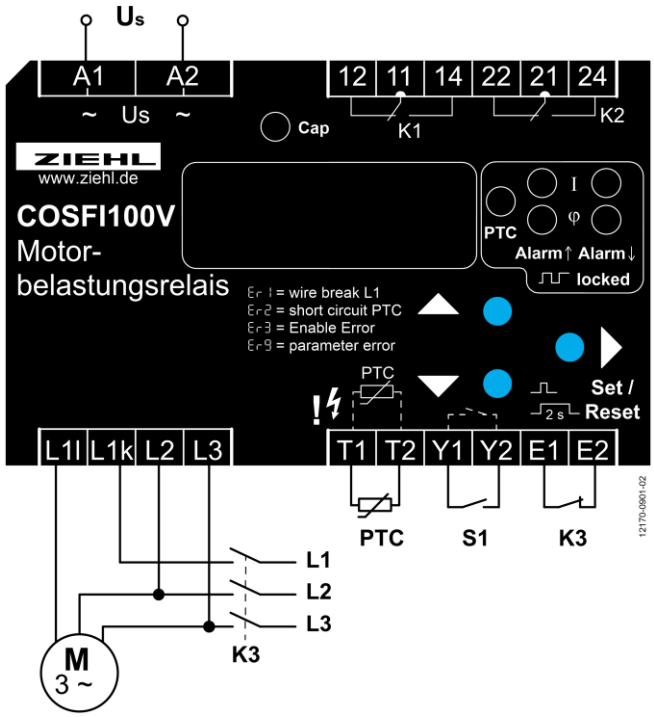
Comply with the maximum permissible temperature when installing in a switch cabinet. Ensure sufficient clearance to other devices or heat sources. If cooling is inhibited, e.g., through close proximity to devices with increased surface temperature or interference with the cooling-air current, the permissible ambient temperature is decreased.

Caution!
Before applying mains voltage to the device, make sure that the control voltage U_S complies with the mains voltage connected to the device!

7 Connection diagram

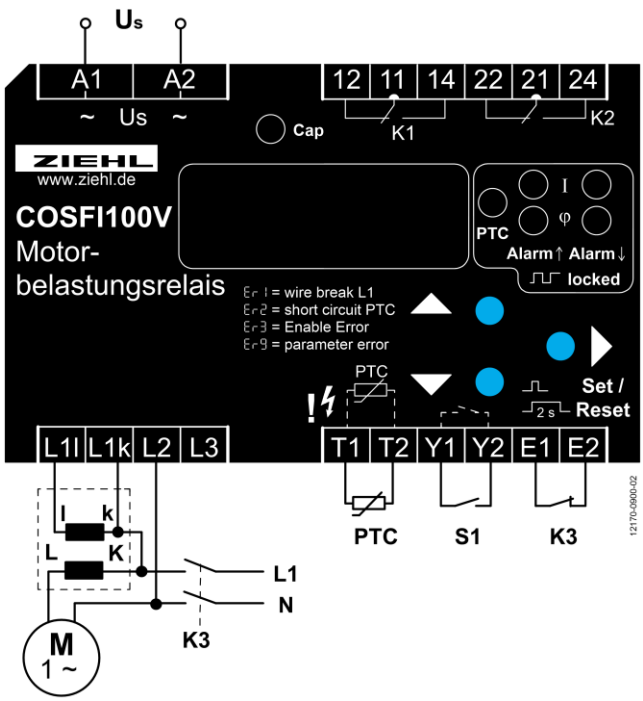
7.1 Motor, 3-phase

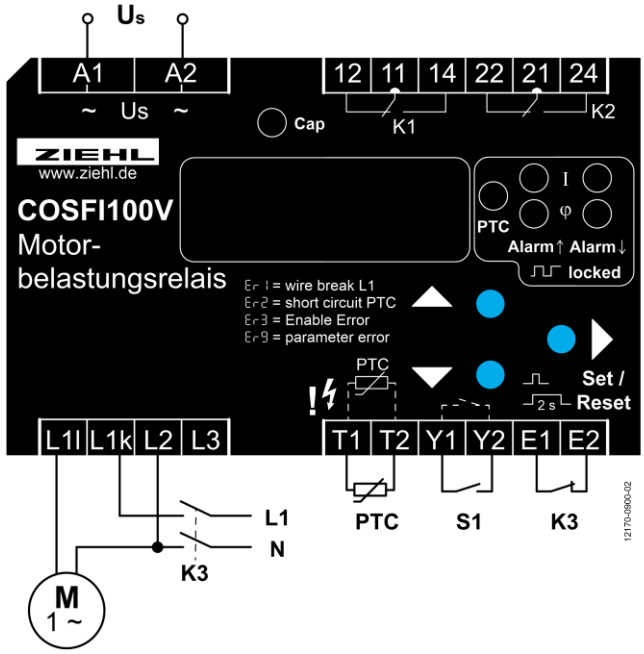




If load current < 10A, connection without a current transformer is possible.

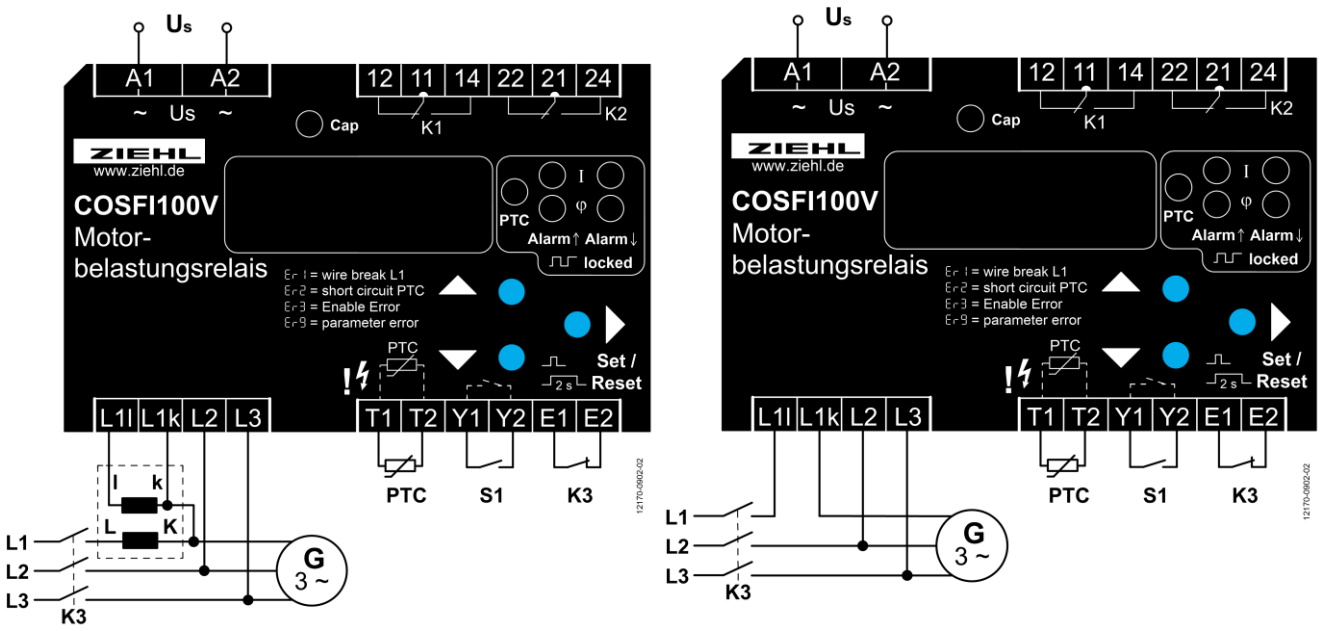
7.2 Motor, 1-phase





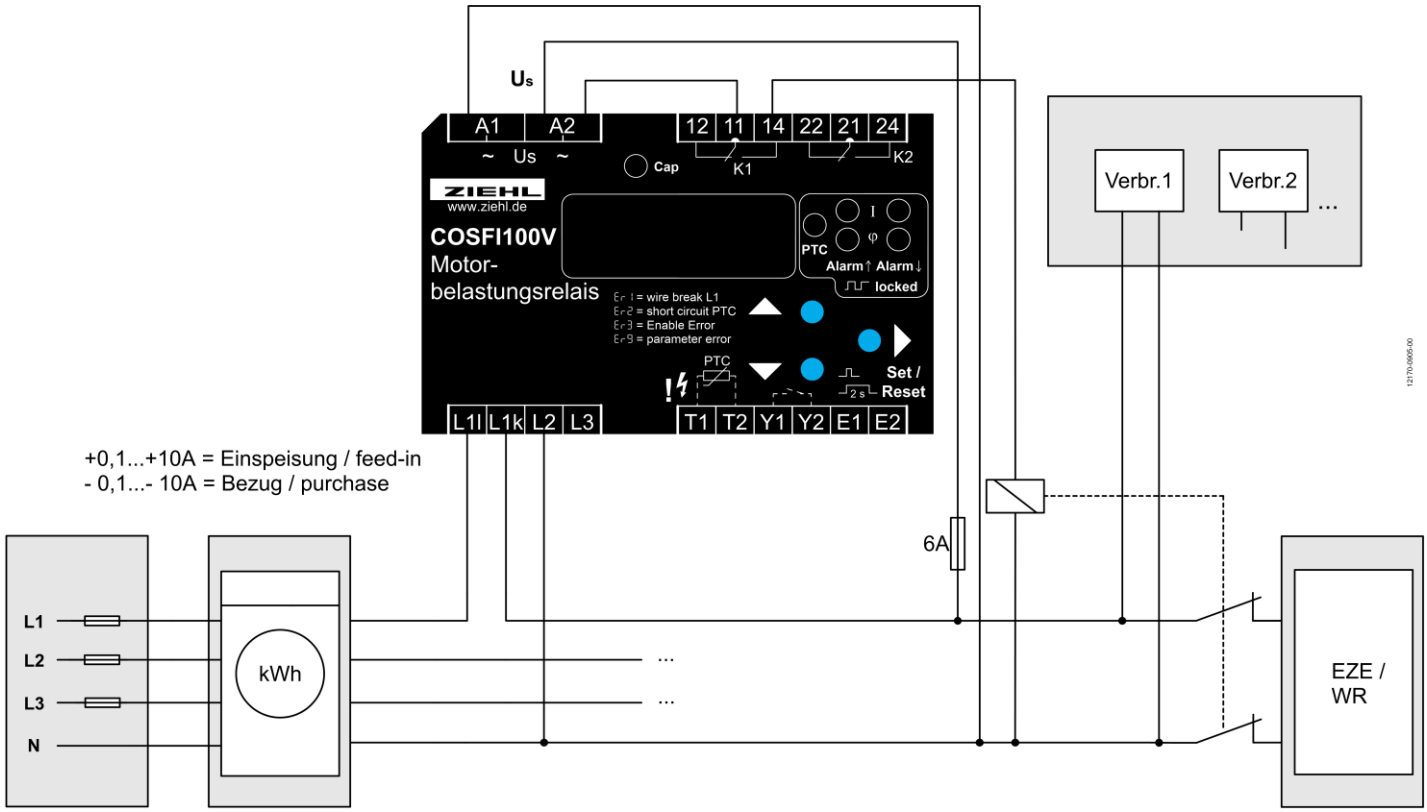
If load current < 10A, connection without a current transformer is possible.

7.3 Current direction monitoring (generator) 3-phase

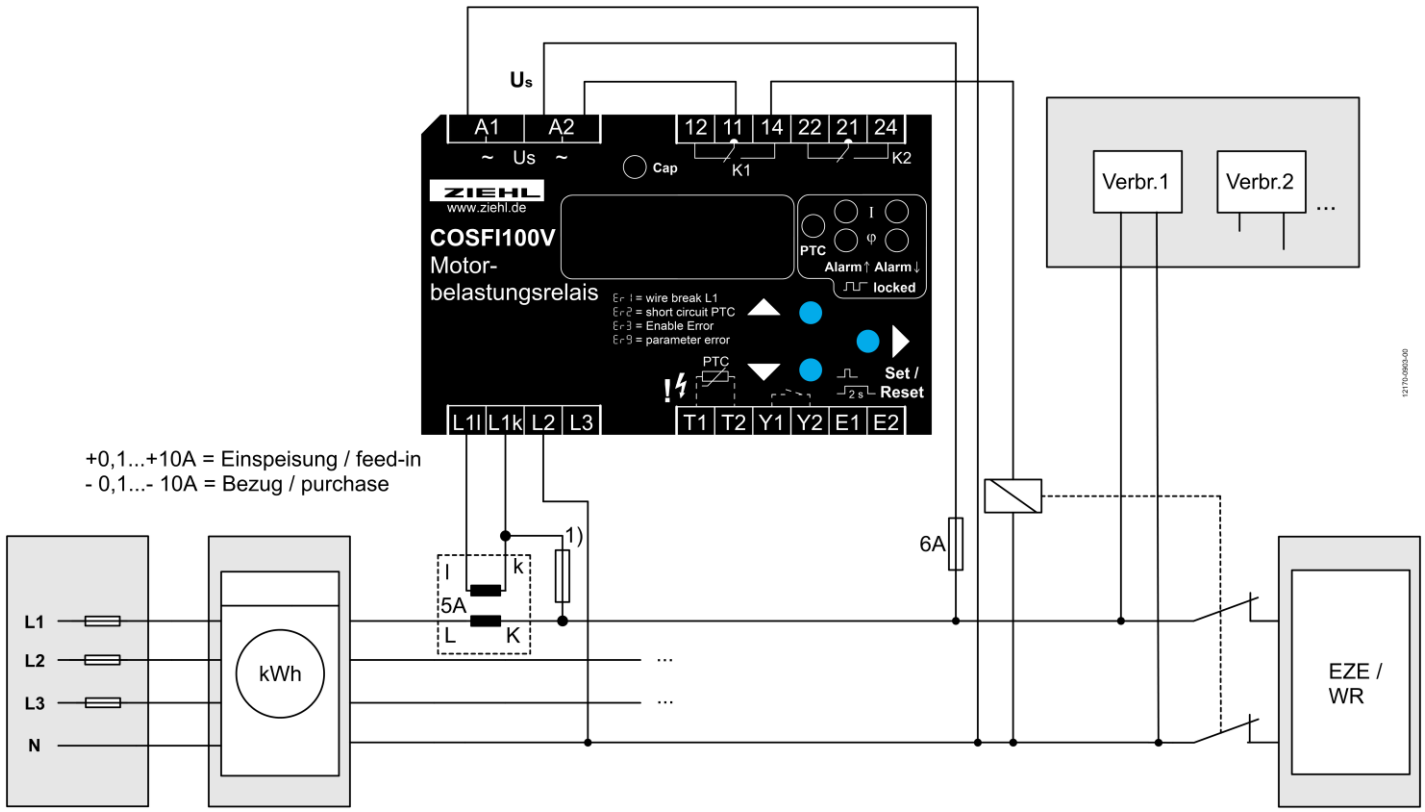


If load current < 10A, connection without a current transformer is possible.

7.4 Feeding-in, limiting or preventing from, without current transformer



7.5 Feeding-in, limiting or preventing from, with current transformer



1) Fuses only when line protection necessary

7.6 Explanation of limiting of or preventing from feeding in

Set program 4 for this application.
Factory setting for Pr4 :

	Parameter	Factory setting	My data
Alarm 1 (K1) AL1	AL1 (Limit)	-0.1	
	FUn (Function)		
	AL- 4-- (Limit high, only 4-H ,)	1.0	
	H (Hysteresis)	5.00	
	dAL (delay Alarm)	1	
	doF (switch back delay)	2	
	rEL (relay function)	A	

Connection according to connection plan. Use Alarm 1 (K1). For second limit use Alarm 2 (K2) and set parameters accordingly.

Function:
Preventing from feeding in public grid by switching off of 1-phase inverters.
When feeding in 3 phases 3 COSFI100V are required.

Negative sign: purchase (-)
Positive sign: feeding-in (+)

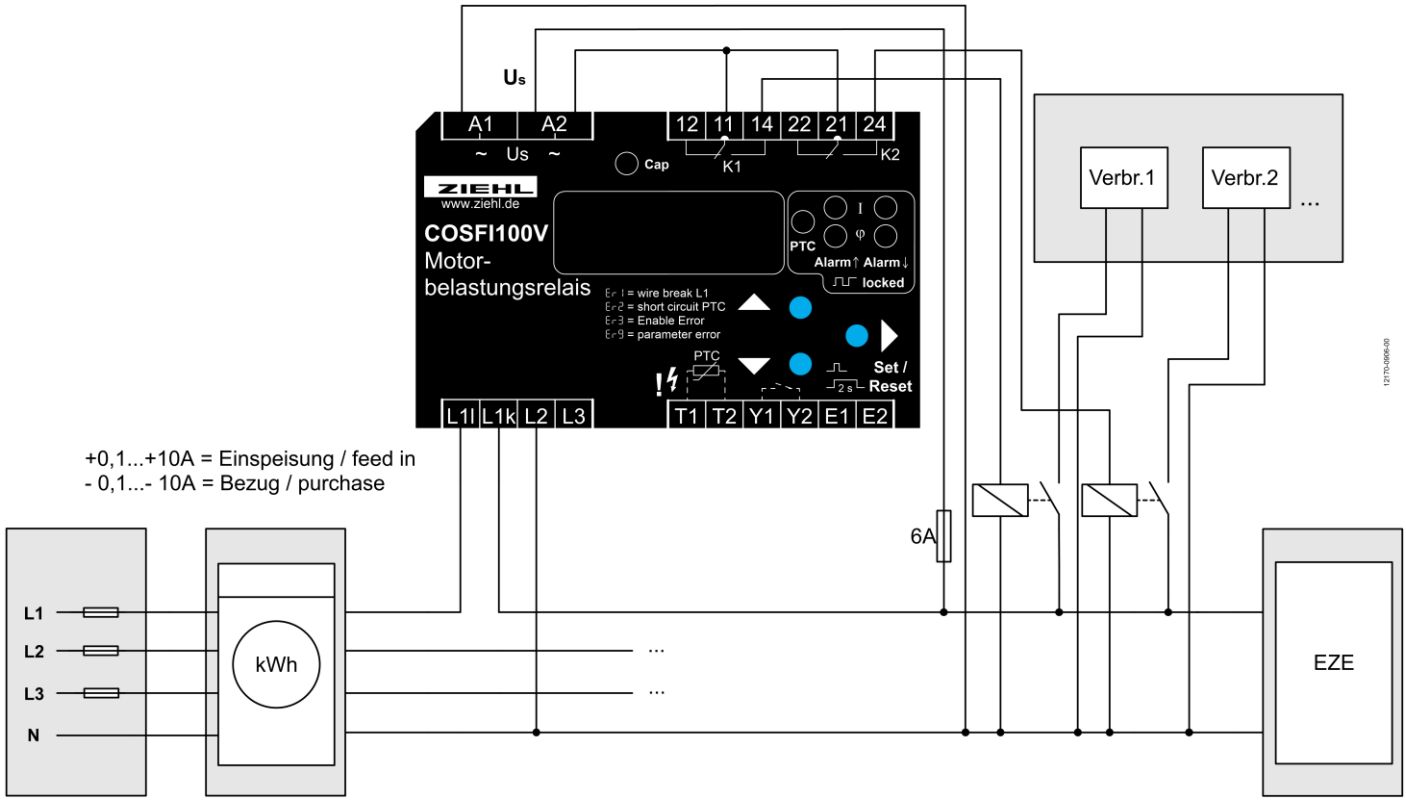
Switch off point: Limit AL1 (-0,1 A), must be close to 0 A
Switch back point: Limit AL1 + hysteresis H → -0,1 A - 5,0 A = -5,1 A
This value must be adapted to the feeding-in current.
(hysteresis > feeding-in current).

Description of function:
- Inverter is switched off (11-12 opens, 11-14 closes) as soon as limit AL1 (-0,1 A) is reached and delay Alarm dAL (1 s) has elapsed.
- Inverters are switched off and feeding-in is prevented close to 0 A.
- as soon as purchase of current rises again (sign -) and switch back point (-5,1 A) is reached (limit AL1 (-0,1 A) - hysteresis H (5,00 A)), switching back delay doF (2 s) is started, relay K1 releases (11 – 12 close, 11-14 open) after delay

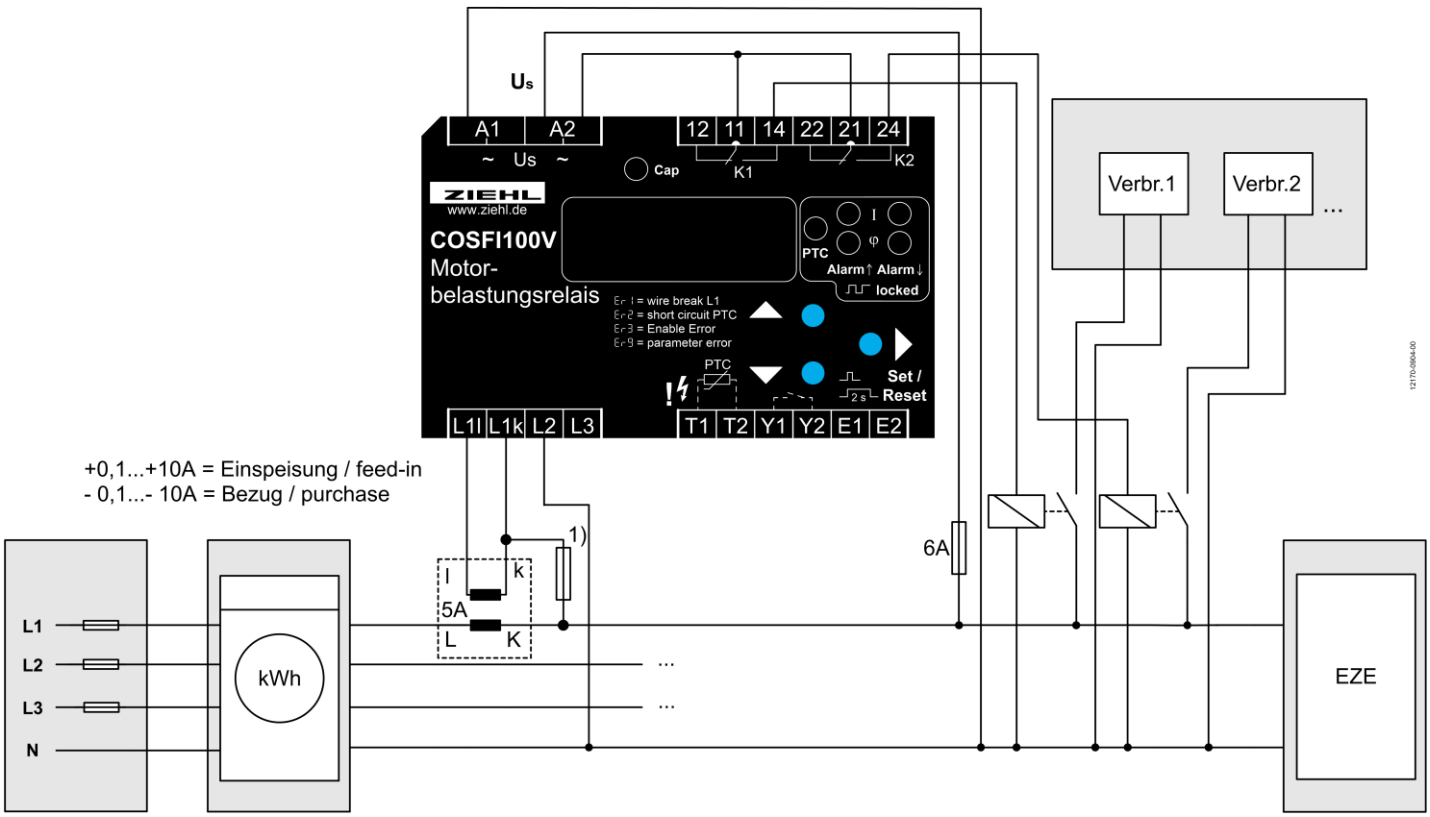
Tipp: See diagram 8.5 for changing parameters.

Attention:
Switching back point has to be set to a value that prevents restart of feeding-in as soon as inverter has been switched off. Restart of feeding-in starts only after signal has come below switching back point (factory setting = -5,1 A).

7.7 Increasing of own consumption without current transformer



7.8 Increasing of own consumption with current transformer



1) Fuses only when line protection necessary

Explanation increasing own consumption of energy

Set program 4 for this application.
Factory setting for Pr4 :

	Parameter	Factory setting	My data
Alarm 2 (K2) AL2	AL2 (Limit)	6.5	
	FUn (Function)		
	AL- HI (Limit high, only HYS ,)	8.00	
	H (Hysteresis)	6.00	
	dAL (delay Alarm)	5	
	doF (switch back delay.)	2	
	rEL (relay function)	A	

Connection according to connection plan. Use Alarm 2 (K2). For second limit use Alarm 1 (K1) and set parameters accordingly.

Function:
Optimizing of own consumption by switching on additional loads as soon as current in one phase is exceeded. When feeding in 3 phases 3 COSFI100V are required.

Negative sign: purchase (-)
Positive sign: feeding-in (+)

Switch on point: Limit AL2 (+6,5 A)
This value has to be adapted to consumption or load.
Switch back point: Limit AL2 - hysteresis H → +6,5 A - 6,0 A = 0,5 A
When purchase of current is permitted when load is on, hysteresis may be >limit (switch back point negative).

Description of function:
- Load is switched on (21-24 closes) as soon as limit AL2 (+6,5 A) is reached and delay Alarm dAL (5 s) has elapsed.
- when feeding-in current (sign +) comes below switch back point +0,5 A (Limit AL2 (+6,5 A) - hysteresis H (6,00 A)) , switching back delay doF (2 s) is started, relay K1 releases (11 – 12 close, 11-14 open) after delay.
- Smart selection of switch on and switch back points allow switching of 2 loads in 2 steps. E.g. Alarm 1 can switch on a small load (current consumption 2 A) when feeding-in reaches 3 A. If feeding-in continues rising and reaches 4 A, Alarm 2 can switch on a second load (current consumption 5 A). If switch back points are selected accordingly (e.g. 0,5 A for Alarm 1 and Alarm 2 with a longer switch back delay doF for Alarm 2) the small consumer at Alarm 2 is switched off. Current drops below 0 A (= purchase) for doF of Alarm 1 only. When 3 A are reached with load at Alarm 2 on again, Alarm 1 switches on the smaller load additionally. Alarm 1 also switches on the small load, when Alarm 2 switches it off or when it is switched off for other reasons.

Tipp: See diagram 8.5 for changing parameters.
To prevent loads from frequent switching, delay alarm dAL and switch back delay doF can be set to up to 1.999 s.
This prevents e.g. heat pumps from frequent switching at volatile feeding in.
At processes that may not be interrupted for longer than 1.999 s, an external timing relay is required.

8 Commissioning

8.1 Program setup

The appropriate program must be set on the COSFI100V correspondent with the application (cosfi or cosfi plus active current or active current). That is taken care of during commissioning.

Pr	Measured quantity	Limits
1	cos φ	AL1 and AL2
2	Active current	AL1 and AL2
3	cos φ and active current	cos φ: AL1, active current: AL2
4	Active current	AL1 and AL2

Adjustment process:

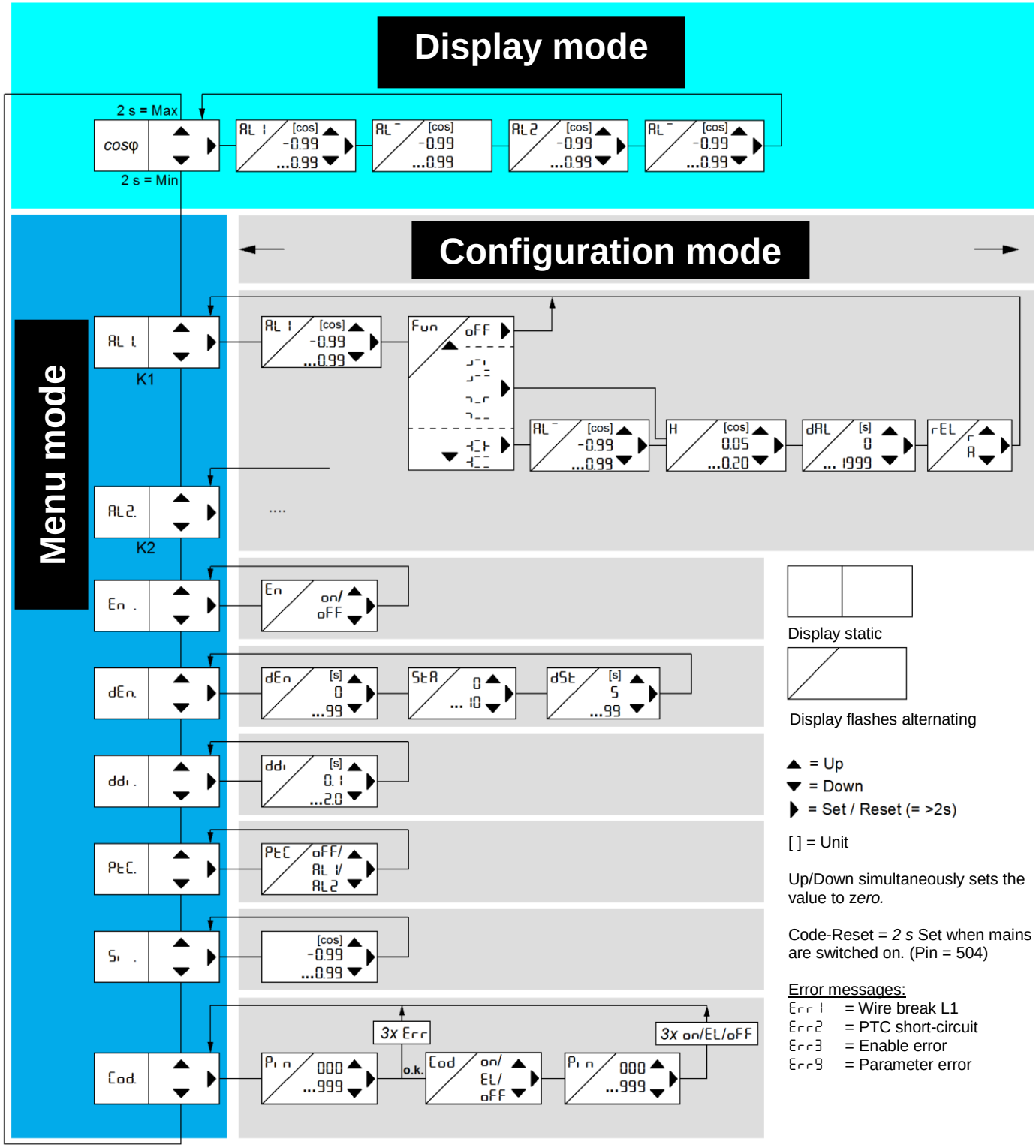
- Switch off the control voltage on COSFI100V
- Keep the Set key pressed and switch the control voltage on again

  ⇒ Pr 1 appears in the display after 10s
- Release the Set key
- Set the program with the UP/DOWN keys
- Press the Set key

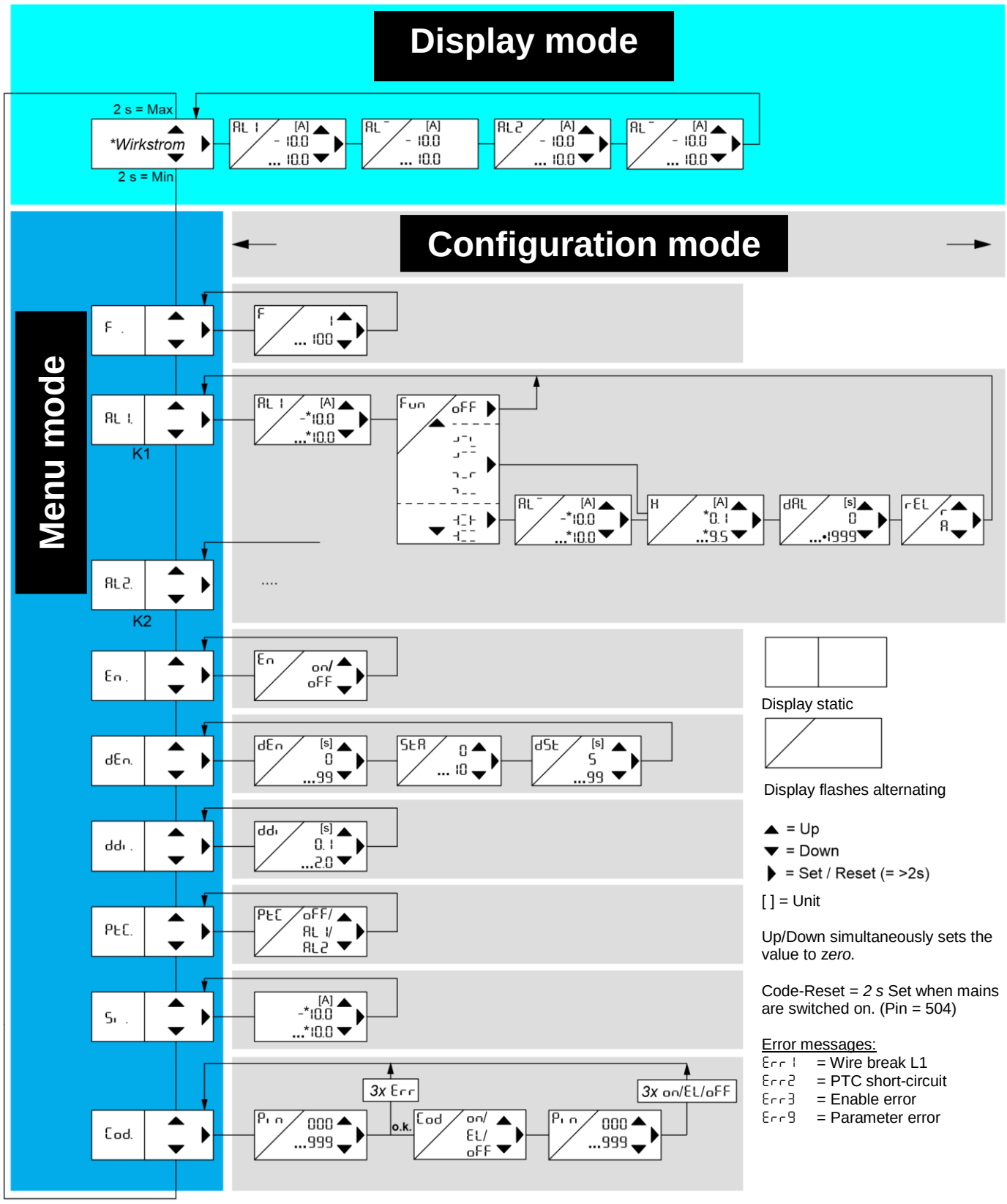
  ⇒ Device resets and starts

Hint: When changing programs, all parameters of the selected program are reset to "factory settings" (see table "Factory settings"), only change the parameters after selecting the correct program.

8.2 Pr1 / AL1 and AL2: cos φ

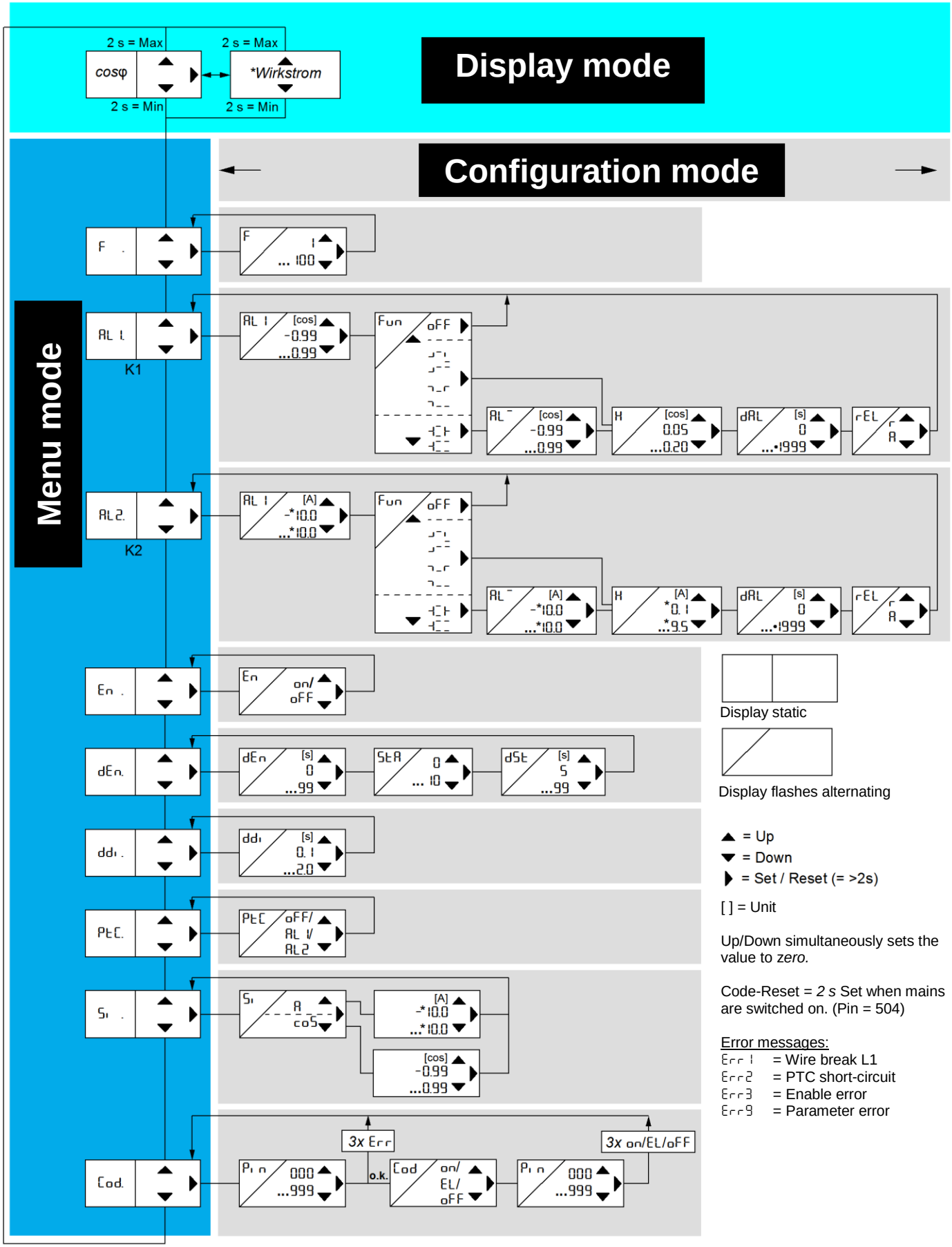


8.3 Pr2 / AL1 and AL 2: Active current (with current direction)



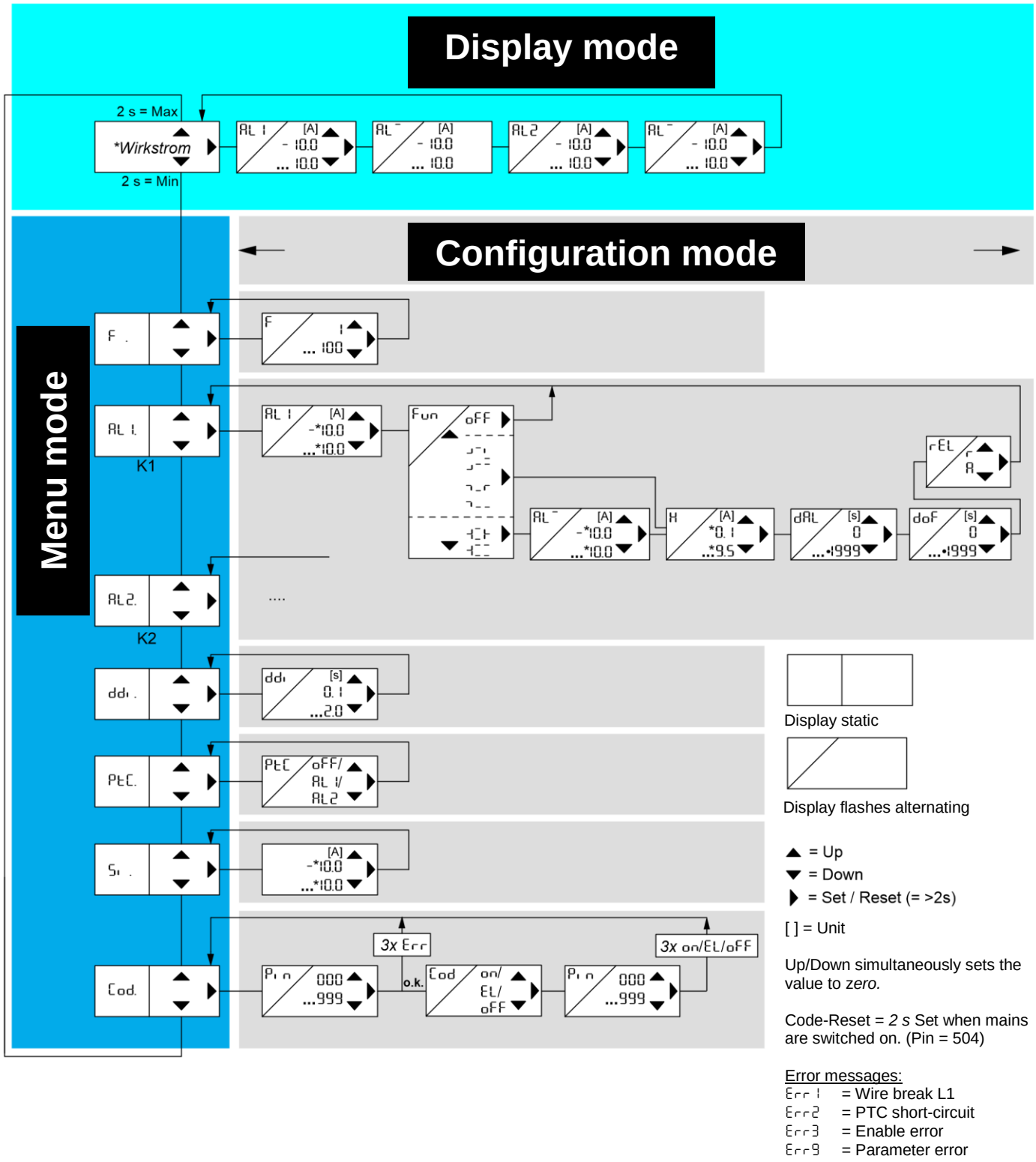
* at current factor F > 1 the displayed values are multiplied by the factor.
Resolution 0,1 A x factor e.g. 2,0 A at current transformer 100/5 A.

8.4 Pr3 / AL1: cos φ and AL 2: Active current (with current direction)



* at current factor F > 1 the displayed values are multiplied by the factor.
Resolution 0,1 A x factor e.g. 2,0 A at current transformer 100/5 A.

8.5 Pr4 / AL1 und AL 2: Active current (with current direction)



* at current factor F > 1 the displayed values are multiplied by the factor.
Resolution 0,1 A x factor e.g. 2,0 A at current transformer 100/5 A.

8.6 Description of the parameters

Parameter	Display	Explanation	Adjustment range
Current factor (Pr 2 to 4)	F	Set ratio of the current transformer, measurement, limit value * current factor = display value	1 … 100
Limit value	AL1 AL2	Limits for the alarms, Alarm 1 for Relay K1 and Alarm 2 for Relay K2	-0.99 … 0.99 - 10.0 … 10.0
Switching function	FUn	With H-r , H-- , an upper limit must be set in addition	
Upper limit	AL-	With switching function H-r or H-- upper limit, if AL- < AL1 , AL2 → Error message Err	-0.99 … 0.99 - 10.0 … 10.0
Hysteresis	H	Reset value is computed depending on the switching function L-r , L-- , H-r , H-- → 0.0 (limit value) - 0.10 (hysteresis) = 0,7 (reset value) r-r , r-- , H-r , H-- → 0.50 (limit value) + 0.10 (hysteresis) = 0.6 (reset value)	0.05 … 0.20 0.1 … 9.50
Alarm delay	dAL	An alarm is suppressed for the set time (seconds)	0 … 1999
Delay Off	doF	Reset is delayed for the set time (seconds)	0 … 1999
Relay function	rEL	Break current r : Relay is pulled up in good state (= no alarm) and releases when the alarm value is reached. Alarm even when the control voltage is switched off Operating current A : Relay has released in good state and operates (attracts) when the alarm value has been reached. No alarm when the control voltage is switched off and during device faults.	r , A
Enable input	En	on if external enable input is being used, oFF if external enable input is not being used	on … oFF
Enable time	dEn	Set start-up bypass time	0 … 99
Reconnection attempts	StA	Set the number of automatic reconnection attempts	0 … 10
Reconnection attempt queue time	dSt	Time to wait until the next reconnection attempt	5 … 99
Delay display	ddi	Interval during which the display in the display mode is updated	0.1 … 2.0
PTC thermistor Input	PtC	Configure PTC depending on the application	oFF , AL1 , AL2

8.7 Display mode

(last decimal point off)

In the display mode, the COSFI100V is in the normal state; the current cos φ and/or active current is displayed here depending on the program. In addition, the alarm messages (e.g. A1 , A2L ,…) and error codes (e.g. Er1 , Er2 , …) are also displayed.

Function key Set / Reset	Press briefly: Changes the limits in PR 1 and 2 (only if Easy Limit is enabled)
	Press for > 2 s: Resets after locked alarm
	Press for > 4 s: Display program
	Press for > 10 s: Displays the software version e.g. 00.0
Function key Up / Down	Press briefly: Changes into the menus mode
	Press for ≥2 s: Displays MAX and MIN measurements, additionally pressing the Set key for ≥ 2s deletes the saved values

8.8 Menu mode

(last decimal point on)

The menu mode is used to select the menu items. If no key is pressed for 30s, one automatically returns to the display mode.

Function key Set / Reset	Press briefly: Changes into the configuration mode
	Press for ≥2 s: Returns to the display mode (the most recently set values are then applied)
Function key Up / Down	Press briefly: Selects menu item; switches to the display mode

8.9 Configuration mode

(last decimal point flashes)

The value of a parameter can be set in the configuration mode. The display continually alternates between the parameter name and the currently set value until the Up/Down key is pressed, which changes the value of the parameter. If no key is pressed for 2s, the display starts alternating again.

If no key is pressed for 30s (simulation mode 15 min), one automatically returns to the display mode (the most recently set value is applied during this)

Function key Set / Reset	Press briefly: The settings are applied; continues to next parameter. After the last parameter, change into menu mode
	Press for ≥2 s: Returns to the display mode (the most recently set values are then applied)
Function key Up / Down	Press short/long: Changes the parameter value (fast/slow)

Hint: Pressing the Up and Down keys simultaneously sets the adjustable value to zero. If you keep the Up or Down key pressed while setting a value, the speed of the change in the display is accelerated.

8.10 Alarm configuration

Adjustment process:

	• Select the menu item with the Up/Down key until …
*	⇒ Display F .
*	• Press the Set key
*	⇒ Display F / 1 (Current factor / Value) flash alternately
*	• Set the desired value with the Up and Down keys
*	• Press the Set key
	⇒ Display F .
	• Press Down key
	⇒ Display AL 1.
	• Press the Set key
	⇒ Display AL 1. / 0.50. (Alarm 1 / Limit value) flash alternately
	• Set the desired limit using the Up and Down keys
	• Press the Set key
	⇒ Display FUn. / n_r. (Function / Parameter) flash alternately
	• Set the desired parameter using the Up and Down keys
	• Press the Set key
	⇒ Display AL1. / 0.80. (Alarm / Limit value) flash alternately
	• Set the desired limit using the Up and Down keys
	• Press the Set key
	⇒ Display H . / 0.05. (Hysteresis / Value) flash alternately
	• Set the desired value with the Up and Down keys
	• Press the Set key
	⇒ Display dAL. / 0. (Delay Alarm / Time) flash alternately
	• Set the desired time using the Up and Down keys
	• Press the Set key
	⇒ Display rEL. / r. (Relay / Parameter) flash alternately
	• Set the desired parameter using the Up and Down keys
	• Press the Set key
	⇒ Display AL 1.
	• Press Down key
	⇒ Display AL2.
	• Repeat configuration for Alarm 2
*	only in programs 2 and 3 (see also 8.2…8.5 control diagram)

8.11 Enable, Delay-Display and PTC configuration

Adjustment process:

	• Select the menu item with the Up/Down key until …
*	⇒ Display En . (Enable)
	• Press the Set key
*	⇒ Display En / oFF (Enable / Parameter) flash alternately
	• Set the desired parameter using the Up and Down keys
	• Press the Set key
*	⇒ Display En . (Enable)
	• Press Down key
*	⇒ Display dEn. (delay Enable)
	• Press the Set key
*	⇒ Display dEn / 10 (Delay Enable / Current time) flash alternately
	• Set the desired time using the Up and Down keys
	• Press the Set key
*	⇒ Display StA. (Starts)
	• Press the Set key
*	⇒ Display StA / 0. (Starts / Number) flash alternately
	• Set the desired number using the Up and Down keys
	• Press the Set key
*	⇒ Display dSt. (Delay Start)
	• Press the Set key
*	⇒ Display dSt / 20. (Delay Start / Current Time) flash alternately
	• Set the desired time using the Up and Down keys
	• Press the Set key
*	⇒ Display dEn. (Delay Enable)
	• Press Down key
	⇒ Display dd1 . (Delay Display)
	• Press the Set key
	⇒ Display dd1 / 0.5 (Delay Display / Current Time) flash alternately
	• Set the desired value with the Up and Down keys
	• Press the Set key
	⇒ Display dd1 . (Delay Display)
	• Press Down key
	⇒ Display PtC. (Delay Alarm)
	• Press the Set key
	⇒ Display PtC / oFF (PTC / Current Parameter) flash alternately
	• Set the desired parameter using the Up and Down keys
	• Press the Set key
	⇒ Display PtC. (Delay Alarm)
*	not in all programs adjustable

8.12 Simulation

Depending on the program, the cos φ, the active current or both can be simulated here. All device functions operate as if this value is actually being measured. Alarm and error messages are only indicated with the LEDs and not in the display.
If no key is pressed for 15 minutes, the device automatically switches back to the display mode.

Adjustment process:

	• Select the menu item with the Up/Down key until…
	⇒ Display SI .
	• Press the Set key
*	⇒ Display SI / coS (Simulation / Measurement)
*	• Set the desired measurement value using the Up and Down keys
*	• Press the Set key
	⇒ Display 0.00
	• Set the desired value with the Up and Down keys
	• Press the Set key (exits the simulation mode)
	⇒ Display SI .
*	only in programs 2 and 3 (see also 8.2…8.5 control diagram)

8.13 Code block

Here, the set parameters can be protected by activating a code lock.
The device acknowledges an incorrect entry with Err (flashes three times).

Adjustment process:

• Select the menu item with the Up/Down key until…
⇒ Display Cod. (Code lock)
• Press the Set key
⇒ Display PIn. / 0. (pin / pin code) flash alternately
• Use the Up and Down keys to set the **saved** pin code (**factory setting is** 504.)
• Press the Set key
• Set the desired code lock using the Up and Down keys: ○ oFF. off, all parameter can be changed ○ EL. ***EasyLimit*** solely the alarm values can be changed. ○ on. on, no parameter can be changed
• Press the Set key
⇒ Display PIn. / 504. (Pin / Pin code) flash alternately
• Set the desired new pin code with the Up and Down keys (caution: write down the pin code)
• Press the Set key
⇒ Code lock on, display on flashes three times ⇒ Code lock EasyLimit, Display EL flashes three times ⇒ Code lock off, display oFF flashes three times
⇒ Return to menu mode, menu item code lock

8.14 Possible indications in display

Display mode

A1 , A2 A1L , A2L	Alarm1, Alarm2 active in addition "L", (locked), reset required to reset
Er1	Wire break L1
Er2	PTC short-circuit
Er3	Enable error, E1-E2 closed but load current > 0.2A
Er9	Parameter error (upper limit < lower limit)
r88	Time in sec. until next reconnection attempt 8

Menu mode / Configuration mode

F	Current factor
AL1 , AL2	Limits
coS	cosφ
A	Active current
FUn	Switching function
⌐-L , ⌐--	Limit exceeded, limit exceed locked
⌐_r , ⌐__	Limit undercut, limit undercut locked
⊣⊐⊢ , ⊣⊐⊐	Window monitoring, window monitor locked
AL¯	Upper limit during window monitoring
H	Hysteresis
dAL	Alarm delay
doF	Reset time
rEL	Relay function
r , A	Zero signal current, operating current
En	Enable
on , oFF	On, Off
dEn	Delay Enable, enable time
StA	Starts, number of automatic reconnection attempts
dSt	Delay starts, waiting time between reconnection attempts
ddi	Delay display, to quiet down the display
PtC	PTC thermistor
Si	Simulation
Cod	Code lock
Pin	Pin code (factory setting 504)
EL	Easy Limit (only limits can be set)

9 Factory settings and software version

When changing programs, all parameters are reset to the factory settings.

Menu point	Parameter	Factory setting Value			My data
		Pr 1	Pr2	Pr3	
F	F (current factor)	-	1	1	
Alarm 1 AL 1	AL 1 (limit value)	0.50	2.0	0.50	
	FUn (function)	n_r	n_r	n_r	
	AL¯ (limit high)	0.80	5.0	0.80	
	H (hysteresis)	0.10	0.5	0.10	
	dAL (delay Alarm)	0	0	0	
	rEL (relay function)	r	r	r	
Alarm 2 AL2	AL2 (limit value)	0.50	2.0	2.0	
	FUn (function)	n_r	n_r	n_r	
	AL¯ (limit high)	0.80	5.0	5.0	
	H (hysteresis)	0.10	0.5	0.5	
	dAL (delay Alarm)	0	0	0	
	rEL (relay function)	r	r	r	
En	En (enable)	oFF	oFF	oFF	
dEn	dEn (delay enable)	10	10	10	
	StA (starts)	0	0	0	
	dSt (delay starts)	20	20	20	
ddi	ddi (delay display)	0.5	0.5	0.5	
PtC	PtC (PTC thermistor)	oFF	oFF	oFF	
Si	Si (simulation)	0.00	0.0	0.00	
Cod	on / EL / oFF	oFF	oFF	oFF	
	Pin	504	504	504	

Display the program: Press the "Set" key for 4 s in the display mode.
Display the software version: Press the "Set" key for 10 s in the display mode.

10 Maintenance and repair

The COSFI100V is maintenance-free. Periodically test for proper functioning.

11 Troubleshooting and measures

Error	Cause	Remedy
EEE or -EEE appears in the display	Measurement is in excess / undercut range	If no current transducer is being used, set current factor to 1
		The measured cos φ or active current is too high, comply with the measurement range
Er1 appears in the display	Wire break L1, E1 - E2 open but load current < 0.2A	Check to see if the enable contact is connected correctly (Motor/Generator off→ E1 – E2 closed)
		Check Line L1 for wire break
		Error must be cleared with reset or by closing Y1 – Y2 for >2s.
Er2 appears in the display	PTC short-circuit	There is a short-circuit in the PTC circuit
Er3 appears in the display	Enable error, E1 - E2 closed but load current > 0.2A	Check to see if enable contact is connected correctly (Motor/Generator on → E1 – E2 open) Error must be cleared with reset or by closing Y1 – Y2 for >2s.
Er9 appears in the display	Parameter error	Limit value AL1 / AL2 must be smaller than the related upper limit AL-
LED PTC illuminated but no PTC connected	PTC not connected	Set parameter PtC to oFF
	Motor too hot	Motor must cool down
Device cannot be configured / only the limits can be configured	Code lock, Easy Limit	The code lock provides protection against unauthorized manipulation on the device. If the code lock is active, the parameters cannot be changed. The pin can be set by the user. <u>Pin code unknown? -> Perform a code reset:</u> ▪ While switching-on the control voltage, keep the "Set" key pressed for **2 s** ⇒ The display changes 888 – Cod – oFF – 888 ⇒ Release the Set key Code lock is switched off, Pin code is 504
Device does not switch	L1l and L1k mixed up (Direction of current is false)	Check the wiring in accordance with the connection diagram! Pay attention to the sign LED!
	Change of measured value too low	For underload monitor cos φ, for overload monitor current

12 Technical data

Control voltage Us:	
Part no. P 222534	AC 196… 264 V, 48…62 Hz, < 5 VA
Measurement range:	
cos φ	-0.99…0.99
Active current	-10.0…10.0 A without current transformer
Overload max.	15 A 10 s, 20 A 5 s
	-500…500 A with current transformer sec. 5 A
Resolution active current	Current factor * 0.1 A
Measurement accuracy cos φ	± 0.05
Measurement accuracy active current	10% ± 0.2 A
Repetition precision	max 2%
Precision of the display	max ± 1 digit
Measurement time	< 500 ms
Input voltage L1, L2, L3	AC 100…400 V, 48…62 Hz
PTC thermistor connection:	PTC error acc DIN 44081/82
Number	1…6 PTC (250 Ω) in series
Shut-down value	3.3 kΩ … 4 kΩ, typically 3.65 kΩ
Reset value	1.5 kΩ … 1.65 kΩ, typically 1.6 kΩ
Terminal voltage	2.5 V with R ≤ 250 Ω, ≤ 5 V with R = 4 kΩ
Sensor current	≤ 1.25 mA
Power consumption	≤ 2 mW
Relay output:	2 x 1 change-over contact (CO)
Switching voltage	max. AC 415 V
Switching current	max. 5 A
Breaking capacity	max. 1250 VA (resistive load)
	max. 48 W at DC 24 V
Reduction factor at cos φ 0.7	0.5
UL electrical ratings:	3 A Resistive, 240 VAC
	D300 1 A 240 VAC
Nominal operating current Ie:	
AC15	Ie = 1 A Ue = 400 V
	Ie = 2 A Ue = 250 V
DC13	Ie = 2 A Ue = 24 V
	Ie = 0.2 A Ue = 125 V
	Ie = 0.1 A Ue = 250 V
Recommended fuse NO	4 A time-lag or miniature circuit-breaker MCB B4
Recommended fuse NC	3,15 A time-lag
Contact service life, mech.	1 x 10^7 operating cycles
Contact service life, electr.	1 x 10^5 operating cycles at AC 250 V / 5 A
	2 x 10^5 operating cycles at AC 250 V / 3 A
	6 x 10^5 operating cycles at AC 250 V / 1 A
Test requirements	EN 50178 / EN 60 947
Rated impulse withstand voltage	4000 V
Surge category	III
Pollution level	2
Rated insulation voltage Ui	250 V
Operating time	100 %
Permissible ambient temperature	-20 °C... +55 °C
	EN 60068-2-2 dry heat
EMC - noise immunity	EN 61000-6-2
EMC - noise emission	EN 61000-6-3

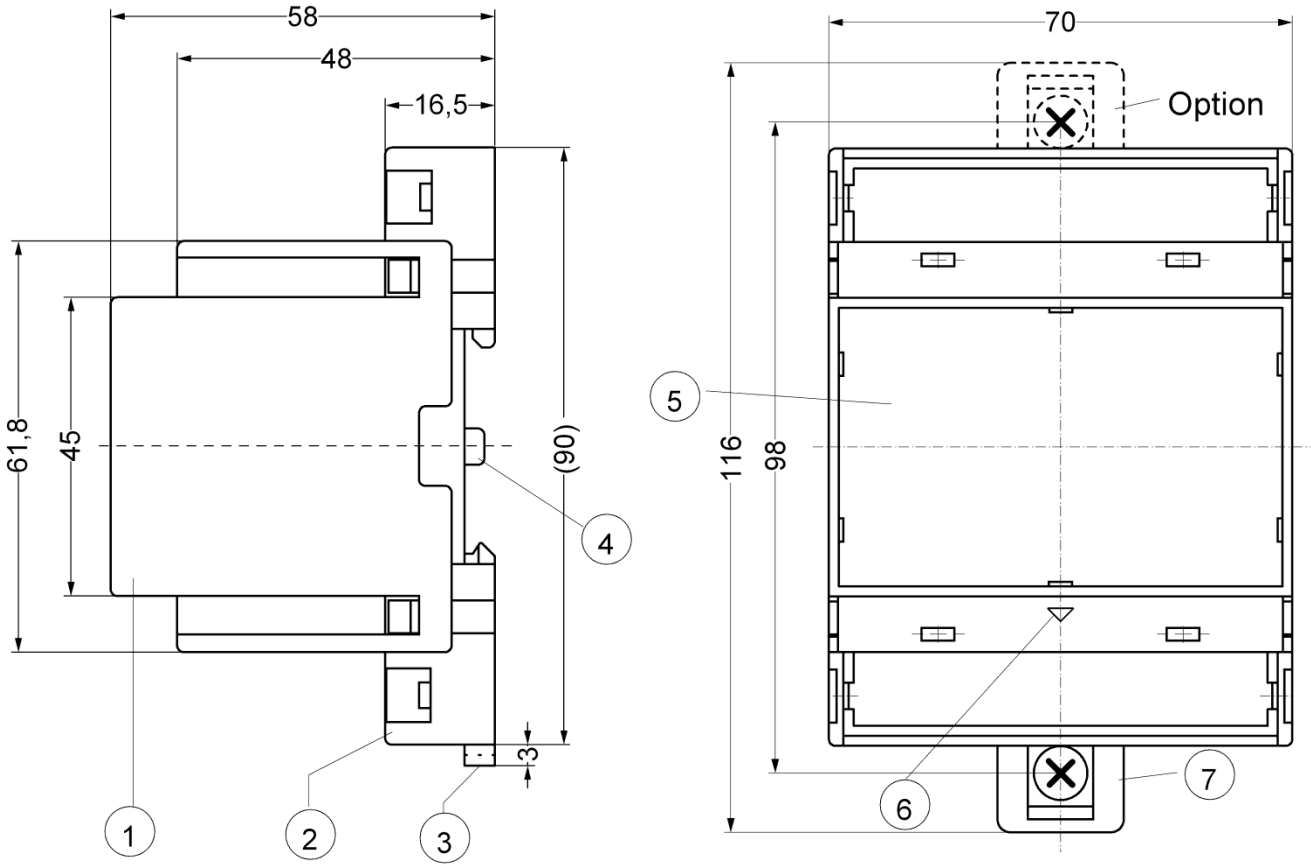
Vibration resistance EN 60068-2-6	2…25 Hz ±1.6 mm 25 ... 150 Hz 5 g

Housing:	Type V4, distribution board
Front-to-back size	55 mm
Width:	4 TE
Dimensions (W x H x D)	70 x 90 x 58 mm
Wiring connection single strand	per 1 x 4 mm^2
Finely stranded with wire end ferrule	per 1 x 2.5 mm^2
Protection class, housing	IP 20
Protection class, terminals	IP 20
Mounting	Snap-on fastening on 35 mm mounting rail acc EN 60 715 or with M 4 screws (additional bar not included in the scope of delivery)
Weight:	approx. 300 g

We reserve the right to make technical changes

13 Mounting type V4

Dimensions in mm



3 Bar for snap mounting
4 Latch for sealing
5 Front panel
6 Identification for down / position downward
7 Bar for wall mounting with screws. Bar drill hole Ø 4.2 mm / for fixing to wall with screws, Ø 4.2 mm.

Sie finden diese und weitere Betriebsanleitungen, soweit verfügbar auch in englisch, auf unserer Homepage www.ziehl.de.

You find this and other operating-manuals on our homepage www.ziehl.de, as far as available also in English.