

Phase monitoring Type PS - Phase asymmetry - Phase sequence

General

The PS-type phase protector safeguards electromotors against 2-phase operation even in the case of feedback via the motor. Depending on the model, the device has the following functions or connections.

Nowadays, more and more modern electrical switching plants for power generation and distribution, tooling and finishing machinery and a number of other drives are equipped with metering and control devices. However the use of such instruments also requires that the mains voltage feed varies only slightly from the

rated value, as otherwise the necessary accuracy of the measuring results or control commands will not be achieved. In case of deviations in the rated voltage either exceeding or falling below a pre-defined value, the plant must be switched off, or at least warn the operator via an optical or acoustic signal.

Special applications where these PS devices can be put into operation are building machinery, hoisting plants, escalators and travelling staircases, cranes, tooling machinery of all kinds, and all switching frequency motors with high starting and braking times.

Integrated in a 12-pole plastic quick-mount housing and meeting the regulations of the automobile and machine tool industry, the PS device offers optimal protection against load fluctuations and phase failures in the 3-phase network, and against thermal overload.

	PS2DK	PSSW1	DRR10	DRR20	COSFI100V
Asymmetrie/ Ausfall	X	X		X	
Phasenfolge	X	X	X	X	
Unterspannung		X		X	
Überspannung		X			
Kaltleiter-Anschluss			X		
automat. Drehrichtungskorrektur			X	X	
Überwachung COSFI/ Wirkstrom					X
Stromrichtungserkennung					X
Bauform	K	K	V4	K	V4

Phase-Asymmetry Relay Type PS2DK

Monitoring of Phase-Asymmetry and Phase Sequence

Phase-Asymmetry Relay PS2DK



Phase asymmetry relays PS2DK are used for the protection of electric motors against asymmetries in the 3-phase mains without neutral and for monitoring the phase-sequence.

The switching-point is adjustable and can be adapted to the situation in the mains.

If a motor, running with 2 phases, creates the 3rd phase, the sensitivity can be increased.

With mains with high harmonics it can be necessary to reduce the sensitivity..

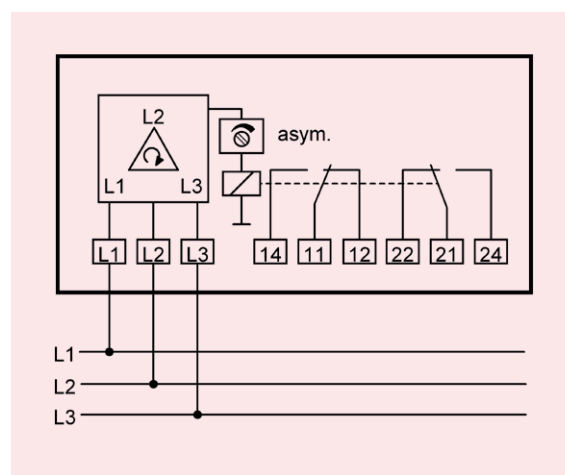
When the sensitivity is reduced to minimum (25% = potentiometer turned fully right), the device works as a phase-sequence relay. It trips only at wrong phase-sequence or missing phase.

If there is a wrong phase-sequence when switching on the device, the relay does not pick up.

- Monitoring of phase-asymmetry
- Monitoring of phase-sequence
- Adjustable sensitivity 5...25 %
- Output-relay with 2 change-over contacts
- Switching delay adjustable 0,1 ... 5 s
- LED for display state of operation

Order-number

P222505



Technical Data

Rated supply Voltage Us

3-phase 380-415 V, without neutral

Admissible tolerance

+10%...-15%

Power consumption

app. 3 VA

Frequency

50/60 Hz

Relay output

2 change-over contacts

Type of contact

type 2 see "General technical informations"

Test conditions

see "General technical informations"

rated ambient temperature range

-20°C...+55°C

Switching point asymmetry

adjustable 5...25%

Hysteresis

app. 2%

Delay at phase-loss (< 240 V)

app. 0,2 s

Switch-back delay at voltage recovery

app. 0,5 s

Switching-delay at asymmetry

adjustable 0,1...5 s

Switching point at symmetric

not defined

decrease of voltage

Dimensions (H x W x D)

Housing K: 75 x 22,5 x 115 mm

Attachment

on 35 mm DIN-rail or with screws M4 (option)

Protection housing / terminals

IP 30/20

Weight

150 g

Monitor for 3-phase Type PSSW1

Phase Asymmetry, Phase Sequence, Over- and Undervoltage

PSSW1



Relays for 3-phase networks type PSSW1 monitor 3-phase networks for phase-sequence, asymmetry and over- and undervoltage.

Applications: Monitoring of 3-phase-networks at heat pumps, compressors or at machines at building sites.

Functions:

- Over- and undervoltage, adjustable $\pm 2-20\%$ (common)
- Asymmetry adjustable 5-15%
- Phase loss
- Phase sequence
- Switching delay adjustable 0,1-12 s (for voltage and asymmetry)
- Bifrequential measuring input 50/60 Hz

Displays:

4 LEDs for:

- Over-/undervoltage
- Asymmetry
- Phase-sequence/loss
- State of relay

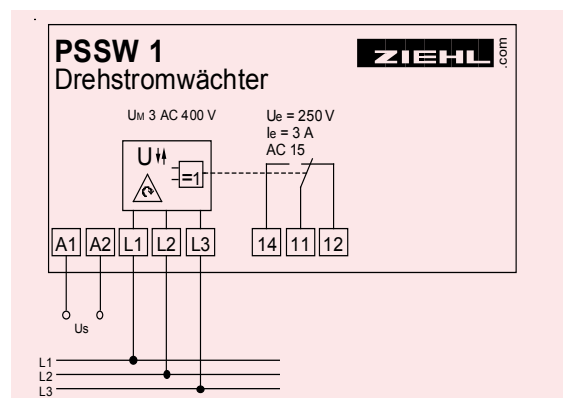
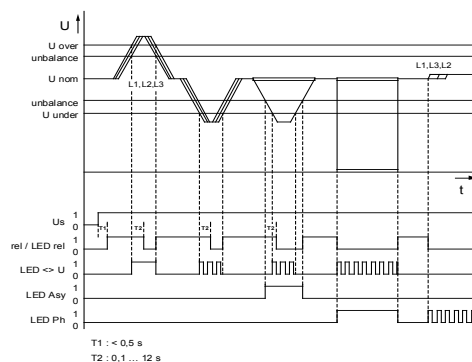
Order-numbers:

supply-voltage AC 230 V

P222525

supply-voltage AC 400 V

P222526



Technical Data

Rated supply voltage U_s
Admissible tolerance U_s

AC230 V, alt. AC 400 V, 50/60 Hz, < 3 VA
 $\pm 20\%$

Output relay
Type of contact

1 change-over contact (co)
type 2 see "general technical informations"

Test conditions
Rated ambient temperature range

see "general technical informations"
-20°C...+55°C

Monitoring asymmetry
Hysteresis
Switching delay

switching point adjustable 5...15 %
app. 2 %
adjustable 0,1...12 s

Loss of voltage
Hysteresis
Switching delay

switching point app. 50 %
app. 5 %
0,1 s

Under-/overvoltage
Switching point
Hysteresis
Switching delay

measuring voltage 3 AC 400 V
adjustable $\pm 2...20\%$ (common, symmetric)
app.1 %
adjustable 0,1-12 s

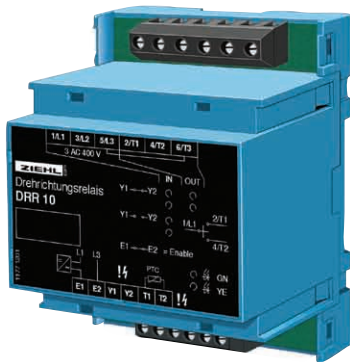
Dimensions (h x w x d)
Attachment
Protection housing / terminals
Weight

housing K: 75 x 22,5 x 110 mm
on 35 mm DIN-rail or with 2 screws M4 (option)
IP 40 / IP 20
160 g

Phase-Sequence Relay Type DRR10

automatic change of wrong Phase-Sequence

DRR10



Phase-sequence relays DRR10 measure the sequence of the phases when being switched on and switch - if necessary - the rotation of the field by changing 2 phases.

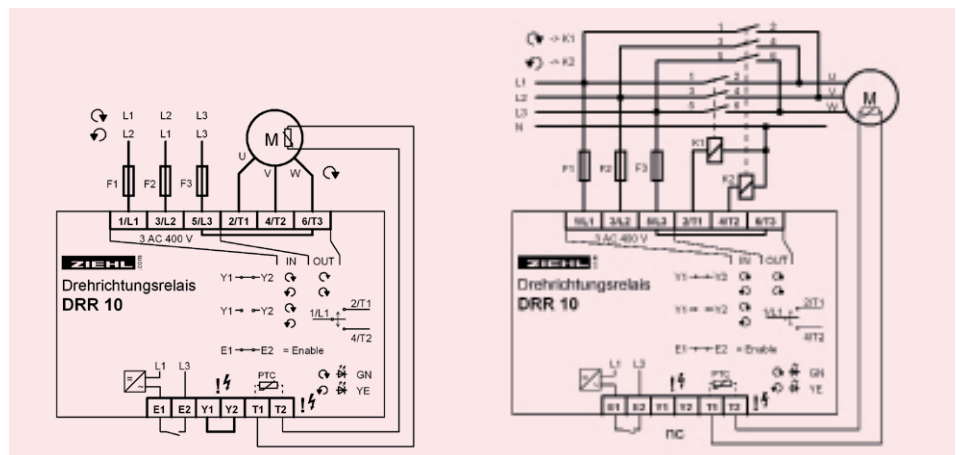
The integrated PTC-monitor protects the motor from overheating.

Applications are especially machines and equipment, that is operated at variable locations e.g. at building sites. Pumps, compressors and vacuum cleaners always run correctly. No more search for faults or change of wiring necessary.

- automatic change of wrong phase-sequence when connected falsely
- running backward of motors is avoided
- integrated PTC-protection for motor
- enable-input for direct switching on/off of the motor with DRR10
- max. 3 x 12 A
- switch-on currents 30 A / max. 4 s / 60 A / max. 1 s
- higher currents with external contactors
- integrated protection for relay contacts
- integrated protection from over-temperature
- housing for mounting in fuse-boxes or switchgear-cabinets, mounting height 55 mm

order-number: P222546

2



Technical Data

rated supply voltage U_s
admissible tolerance U_s

3 AC 400 V, 50/60 Hz, < 3 VA
+10% ... -20%

relay output
switching voltage
conventional thermal current I_{th}
switch-on current (10% on)
recommended fuse
expected contact life mech.
expected contact life electr.

2 x 2 normally opened contacts (no)
max. AC 440 V
12 A
30 A / max. 4 s, 60 A / max. 1 s
gG/gL 16 A
30 x 10⁶ operations
1 x 10⁶ operations at AC 400 V / 3 A
2 x 10⁵ operations at AC 400 V / 6 A cosφ 0,5

inputs
T1 - T2
E1 - E2

without separation of potential from supply-voltage
PTC-thermistors according to DIN 44081/44082
potential-free contact for AC 400 V

rated ambient temp. range

-20°C...+55°C

housing (H x W x D) mm
fitting position
attachment

design V4: 90 x 70 x 58 mm
any
on 35 mm DIN rail according to EN 60715 or
2 screws M 4

protection housing/terminals
weight

IP 30 / IP 20
app. 230 g

Phase Sequence-Change Relay DRR20

with integrated Monitoring of Undervoltage and Asymmetry

Phase Sequence-Change Relay DRR20



Phase-Sequence-Change Relays DRR20 measure the sequence of the phases and switch – if necessary the rotation of the field. At the output (connect relays K1 and K2 in series in this application) two contactors are connected. The contactor at the normally-open contact of K2 switches the phases 1:1 without changing them, the second (at normally-closed contact) changes 2 phases.

When switching on with phase-sequence ok, relay K2 picks up. With wrong phase-sequence it remains released. After K2 has switched, K1 picks up. K1 also releases first. This makes sure, that no wrong contactor can be picked up under any condition. Additionally the DRR20 monitors the three phases for asymmetry and undervoltage. If the limits are exceeded, the K1 switches off (respectively doesn't pick up) and protects the connected motor from damage. The device can also be used as a monitor for undervoltage, asymmetry or phase-sequence.

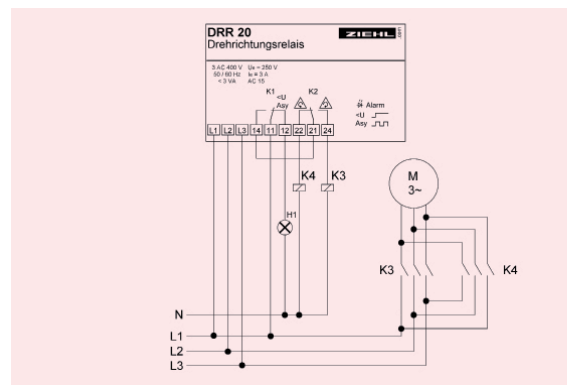
Applications are machines and equipment that is operated at variable locations, e.g. at building

sites. Pumps, compressors and vacuum-cleaners always run correctly and they are protected from damage by undervoltage or asymmetry.

- automatic change of wrong phase-sequence when connected falsely (2 contactors afforded)
- running backward of motors is avoided
- no switching on at asymmetry or undervoltage
- relay K2 picks up when phase-sequence is correct
- relay K1 picks up (after K2) when symmetry and voltage is correct
- 3 LEDs for state of relays and errors
- measuring-voltage 3 AC 400 V
- limit asymmetry adjustable 5...25 %
- limit undervoltage adjustable 70...95 %
- alarm-delay adjustable 0,1...10 s (undervoltage and asymmetry)
- no supply-voltage required

Order-number

P222551



Technical Data

Rated supply voltage U_s
Admissible tolerance U_s
Output relay
Type of contact

Output relay
Type of contact
Test conditions
Rated ambient temperature range

Limit asymmetry
Limit undervoltage
Hysteresis
Delay undervoltage/asymmetry
Delay phase-loss (<60% U_s)
Pick-up delay after recovery of U_s
Delay K2 - K1

Dimensions (h x w x d) mm
Fitting position
Attachment

Protection housing / terminals
Weight

3-phase, 400 V without N
+10%...-30%
ca. 3 VA
50/60 Hz

2 change-over contacts (co)
type 2 see "general technical informations"
see "general technical informations"
-20°C...+55°C

adjustable 5...25 %
adjustable 70...95 %
app. 2%
adjustable 0,1...10 s
< 0,2 s
< 0,5 s

app. 100 ms

housing K: 75 x 22,5 x 115 mm
any
on 35 mm DIN rail according to EN 60715 or
2 screws M 4
IP 30/20
150 g

Load and Current-Monitor COSFI100V

Over- and Underload, $\cos\phi$ and True Current

COSFI100V



Load monitors protect motors in 1- or 3-phase mains from over- or underload. They are simply switched into the supply-line of the motor and monitor the phase angle between voltage and current and/or the true current.

The power factor $\cos\phi$ has its greatest alteration at small loads at the motor. Therefore monitoring this parameter is suitable to recognize underload.

The current of the motor increases most at high loads. Provided that the motor is not oversized, the current is more suitable for monitoring overload.

The COSFI100V can monitor both values. It is even possible to monitor the power factor with alarm 1 for underload and protect the drive from overload by monitoring the current with alarm 2.

This allows detection of a breaking V-belt or clogging of a filter or a valve. A local sensor near the motor is not necessary.

As **monitor for current direction** it monitors if a generator produces or consumes energy.

With its digital display and many setting options, it can be individually adapted to the application.

Application $\cos\phi$ / true current:

- Monitoring of V-belt (slip and destruction)
- Fan-monitoring
- Pump-monitoring
- Conveyor systems
- Agitators
- excessive wear
- wear-out of tools
- Protection of motors, drives and plants from overload

Application current direction:

- Warning or shut-down when a generator consumes instead of produce energy

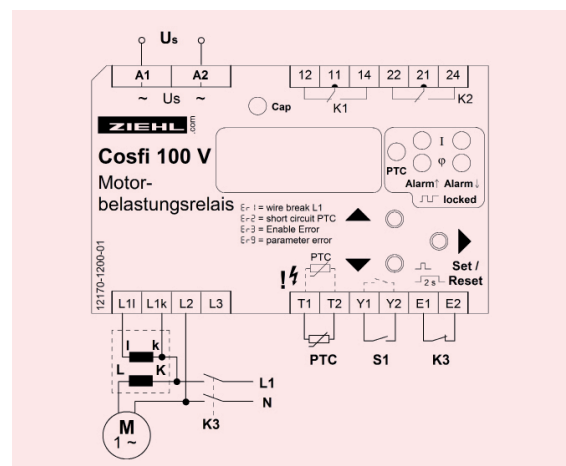
Function and features:

At an AC-motor (inductive load) the phase of the current is retarded to the voltage by the phase angle ϕ . With decreasing load, this angle increases and the $\cos\phi$ decreases. Thus the load at the shaft of the motor can be measured.

The load monitor COSFI100V can measure sinusoidal signals.

- for networks AC and 3 AC
- Digital display for $\cos\phi$ and true current
- 2 limits / alarms
- min, max or min/max for each alarm
- Monitoring of 2 x $\cos\phi$, 2 x true current or 1 x $\cos\phi$ and 1 x true current
- Scaling of display (factor of current-transformer)
- Hysteresis and switching-delay programmable
- Auto-reset or interlocked switching
- Programmable attempts (1...10) for restart
- Auto-enable (current) or external signal
- Start-up delay programmable 0...99 s
- Current input max. 10 A, more with transformers
- Detection of breaks
- Input for PTC-thermistors
- Housing for mounting in fuse-boxes or switchboards

Order-numbers: AC 230 V **P222534**
AC 400 V **P222535**



Technical Data COSFI100V

Rated supply voltage U_s	AC 400 V, +10%/-15%, 3VA, 50 Hz AC 230 V, +10%/-15%, 3VA, 50 Hz
Power factor ($\cos\varphi$)	-0,99...+0,99
Hysteresis ($\cos\varphi$)	0,05...0,20
Nominal current of motor	0,2...10 A (higher currents with current-transformers)
Overload capacity	10 A continuously, 15 A max. 3 s
Input Voltage L1-L2-L3	AC 100...400 V, 48...62 Hz
Relay	2 change-over contacts (co)
Type of contact	Type 2 (see "general technical informations")
Test conditions	see "general technical informations"
Rated ambient Temp. Range	-20°C...+55°C
Dimensions (H x W x D) mm	Design V4: 90 x 70 x 58 mm, mounting height 55 mm
Attachment	on rail 35 mm according to EN 60 715 or with screws M4 (option)
Protection Housing/Terminals	IP 30/IP 20
Weight	app. 300 g