

General

Asymmetry-adjusted phase protection relays are designed to protect the three-phase motors with sensitive asymmetry values from errors due to mains voltage.

Device Usage and Working Principle

Connect the device according to the connection diagram. Adjust the asymmetry, error delay time and reset time settings of the device according to the operating voltage values of the load. When the device is energized, if the voltage values are normal according to the set asymmetry value, the relay is activated and the relay led (☑) is on. In the models with phase sequence control, the phase sequence must also be correct. In the models with PTC, the PTC temperature should be within the nominal values range. When the voltage values exceed the set asymmetry set value, the asymmetry error LED (Asm.) led is on and the device waits for the delay time (DT). After the time is up, the relay gets de-activated and the relay led is off. When voltages return to normal values, the device waits for the reset time (RT). After the time is up, the asymmetry error LED (Asm.) led is off, the relay gets activated and the relay LED is on.

Relay is Activated: 2 (COM) and 3 (NC) short circuit, 1 (NC) and 2 (COM) open circuit.

Relay is De-activated: 2 (COM) and 1 (NC) short circuit, 3 (NC) and 2 (COM) open circuit.

Required Settings:

ASM: Asymmetry Set Value, ASM LED lights when the difference between voltages is above this value.

DT: Delay Time is the time to wait before entering the asymmetry error.

RT: Reset Time is the time to wait for the relay gets activated when the voltages return to normal.

How to Calculate Asymmetry?

Asymmetry calculation is made according to the following formula and the most appropriate asymmetry set value is adjusted to the load.

Asymmetry = $\left(\frac{\text{Max. Voltage} - \text{Min. Voltage}}{\text{Max. Voltage}} \right) \times 100$

Example: $\left(\frac{245 - 200}{245} \right) \times 100 = \%18,3$

Protection Functions

Asymmetry Protection - To enter the error state: If the voltage difference between phases exceeds the asymmetry set value, the asymmetry error LED is on continuously, the device waits until the set error delay time (DT), then the relay gets de-activated and the relay led is off.

Asymmetry Protection - Exiting the error state: If the voltage difference between the phases decreases by 5 of 1 the set asymmetry set value, the device waits until the set reset time (RT). The asymmetry error LED is off, the relay gets activated and the relay LED is on.

High Voltage Protection - To enter the error state: If one or more of the phases exceeds 300V for FKM-05 and 05F, exceeds 500V for FKT-06/06F and 06PF, the asymmetry error LED flashes, the relay gets de-activated and the relay LED is off.

High Voltage Protection - Exiting the error state: When all of the phases are below 290V for FKM-05 and 05F, below 495V for FKT-06/06F and 06PF, the device waits until the set reset time (RT). After the time is up, the asymmetry error LED is off, the relay gets activated and the relay LED is on.

Low Voltage Protection - To enter the error state: If one or more of the phases falls below 140V for FKM-05 and 05F, below 240V for FKT-06/06F and 06PF, the asymmetry error LED will flash, the relay gets de-activated and the relay LED is off.

Low Voltage Protection - Exiting the error state: When all of the phases are over 145V for FKM-05 and 05F, over 270V for FKT-06/06F and 06PF, the device waits until the set reset time (RT). After the time is up, the asymmetry error LED is off, the relay gets activated and the relay LED is on.

Insufficient Supply Protection - To enter the error state: If all of the phases fall below 115V for FKM-05 and 05F, below 200V for FKT-06/06F and 06PF, the ON and ASM LEDs flash, the relay gets de-activated and the relay led is off.

Insufficient Supply Protection - Exiting the error state: When all of the phases are over 145V for FKM-05 and 05F, over 270V for FKT-06/06F and 06PF, the device waits until the set reset time (RT). After the time is up, the asymmetry error LED is off, the relay gets activated and relay LED is on.

Phase Sequence Protection: If the sequence of the phases connected to the device is reverse, the phase sequence error led (☒) is on and the relay is not activated. (FKM-05F and FKT-06F/06PF only)

Phase Absence Protection: If one of the phases is interrupted, the device gets de-activated the relay. The phase sequence error led (☒) lights steady on models with phase sequence control. In case of models with no phase sequence control, the Err. LED flashes.

Neutral Absence Protection: If the neutral line is interrupted, the device gets de-activated the relay. The phase sequence error led (☒) flashes on models with phase sequence control. In case of models with no phase sequence control, the Err. LED flashes. (FKM-05 and FKM-05F only)

PTC Protection: When the temperature value of the PTC exceeds the nominal value, the PTC led turns on and the device releases the relay. **If PTC will not be used in FKT-06PF, the PTC terminal must be short-circuited.**

NOTE: Phase-Neutral for FKM-05 and 05F in the above description, Phase-to-phase voltage values are given for FKT-06/06F and 06PF.

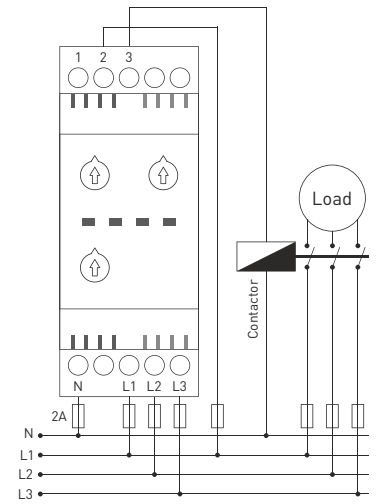
Technical Specifications

Operating Voltage	: 3x380V AC 50/60Hz.
Nominal Operating Voltage	: 220V AC 50/60 Hz.(FKM-05/05F) 380V AC 50/60Hz.(FKT-06/06F/06PF)
Asymmetry	: %5 - %25
Delay Time	: 0,1 sec. - 20 sec.
Reset Time	: 0,1 sec. - 20 sec.
Operating Power	: <6VA
Operating Temperature	: -20°C.....+55°C
Display	: 4x LEDs
Connection Type	: Mounting on DIN rail.
Weight	: 0,210 kg.
Contact	: 5A / 250VAC Resistive Load
Operating Altitude	: <2000m
Cable Diameter	: 2,5mm ²

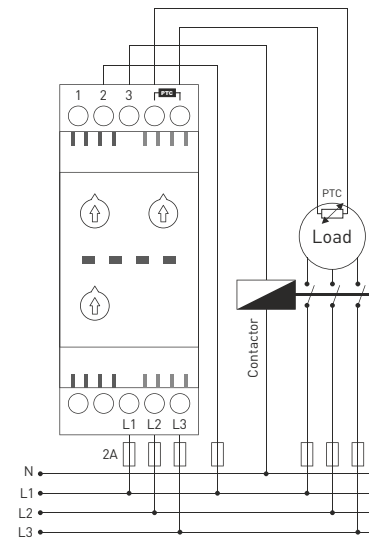
Contact:

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Connection Diagram
for FKM-05/05F

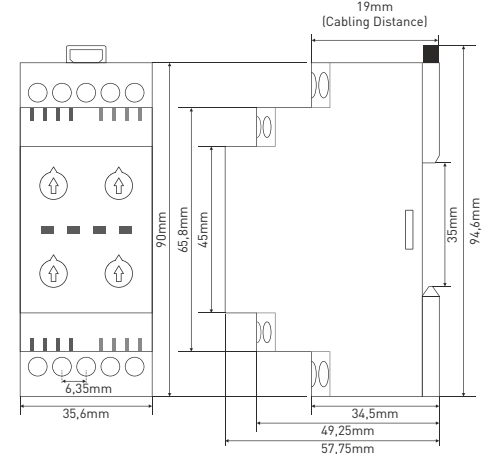


Connection Diagram
for FKT-06/06F/06PF



If PTC will not be used in FKT-06PF, the PTC terminal must be short-circuited.

Dimensions



Maintenance

Switch off the device and release from connections. Clean the trunk of device with a swab. Don't use any conductor or chemical might damage the device. Make sure device works after cleaning.

Warnings

- Please use the device according to the manual.
- Don't use the device in wet.
- Include a switch and circuit breaker in the assembly.
- Put the switch and circuit breaker nearby the device, operator can reach easily.
- Mark the switch and circuit breaker as releasing connection for device.

MADE IN TURKEY