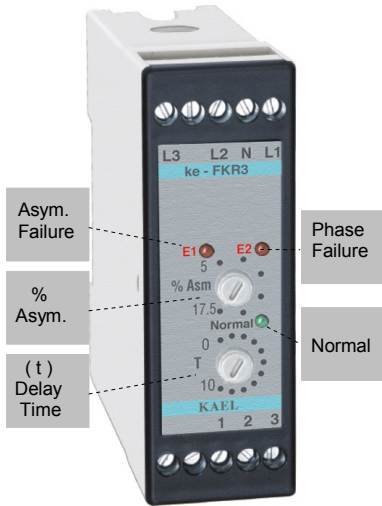


ke - FKR3

PHASE FAILURE and PHASE SEQUENCE DEVICE

- ▶ Asymmetry % Adjustment
- ▶ Phase Sequence
- ▶ Phase Failure
- ▶ Delay Time Adjustment

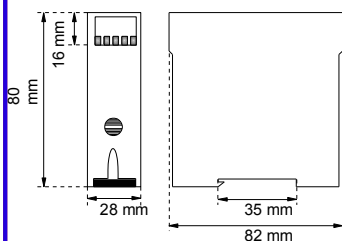


Application Areas:

- Protection of electrical motors
- Protection of 3 phase systems

TECHNICAL DATA:

| | |
|----------------------------|--|
| Rated Voltage | : 3 Phase and 1 Neutral 230 VAC |
| Operating Range | : (0.8 - 1.2) x Un (Un nominal voltage) |
| Frequency | : 50/60 Hz |
| Asymmetry Adj. | : Phase to phase 5 - 17,5% |
| Delay Time Adj. | : 1 - 10 sec. |
| Output Contacts (1-2) | : Normally Open Contact |
| Contact Current | : Max. 5 A / 240 VAC |
| Power Consumption | : < 8 VA |
| Device Protection Class | : IP20 |
| Connector Protection Class | : IP00 |
| Ambient Temperature | : -5°C...+50°C |
| Connection Type | : To connection rail in electrical panel |
| Dimensions | : 28x82x80 mm |

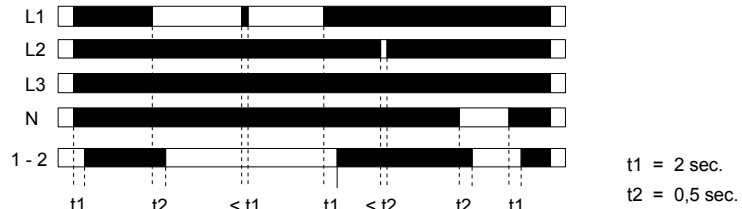


General:

In three phase systems, when phase sequence is correct and there is no asymmetry between phases, **normal** LED is turned on and relay contact is energised. Protection functions of ke-FKR3 are given below.

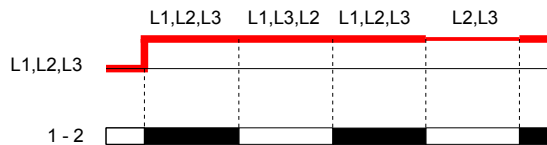
▶ Phase Failure:

In case of absence of at least one phase, relay immediately de-energises its contact and **E2** LED is turned on.



▶ Phase Sequence:

In case of wrong phase order, both of **E1** and **E2** LEDs are turned on at the same time and relay does not energise its contact. If phase order is corrected, both of **E1** and **E2** LEDs are turned off and relay energises its contact.



▶ Voltage Asymmetry (asym. %) (5-17.5 %) :

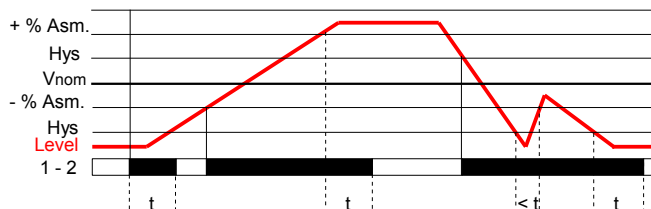
Phase to phase asymmetry is adjusted using the adjustment knob in the range of (5-17.5%). If asymmetry exceeds adjusted value, LED **E1** starts to flash and at the end of delay time (1-10s) **E1** LED is turned on continuously and relay contact is de-energised.

To return normal state, voltage asymmetry value must be under 20% of adjusted value (hysteresis). If phase-to-phase asymmetry value returns to normal region in a shorter time than adjusted delay time, relay does not de-energise its contact and LED **E1** stops flashing.

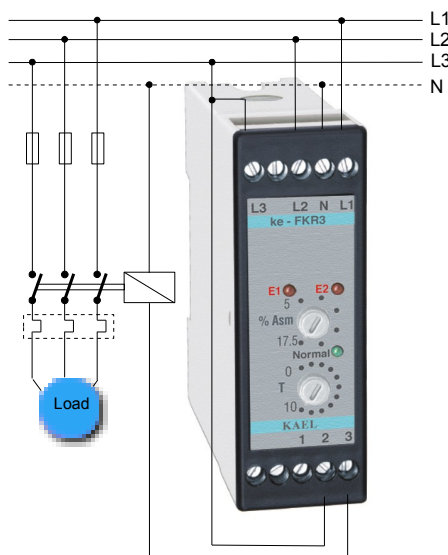
Example: Let's say that asymmetry value is set to 15% for a 3 x 380VAC. In this case, relay contact is de-energised at $(380 - (380 \times 0.15)) = 323$ V.

Re-energising the contact is performed at $323 + (380 \times 15\% \times 20\%) = 334$ V. (20% is the hysteresis).

$$\text{Asym \%} = \frac{(V_{\max} - V_{\min})}{380} \times 100 \quad \text{Hys} = 380 \times (\text{Asym \%}) \times (20 \%)$$



Simple Connection :



L1, L2, L3 : 3 x 380 V ac
L1, N : 220 V ac

