Phase Protection Relay
User Manual



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V.25.1

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PROPER USE AND SAFETY REQUIREMENTS



Cut all the power when connecting and disconnecting the device to a panel.



Do not clean the device with a solvent or similar material. Only use a dry cloth.



Please do not intervene to the device when a technical problem is encountered and get in contact with a technical service within the shortest time.



If the warnings are not taken into account, our company or the authorized dealer shall not be held responsible for the negative consequences.



Do not dispose in the trash, the device must be delivered to the collection centers (electronic device recycling centers). It should be recycled or disposed of without harming human health and environment.



The installation, assembly, activation and operation of the device should be done and used by only expert professionals and in accordance with safety regulations and instructions.

1. INTRODUCTION

1.1. General Features

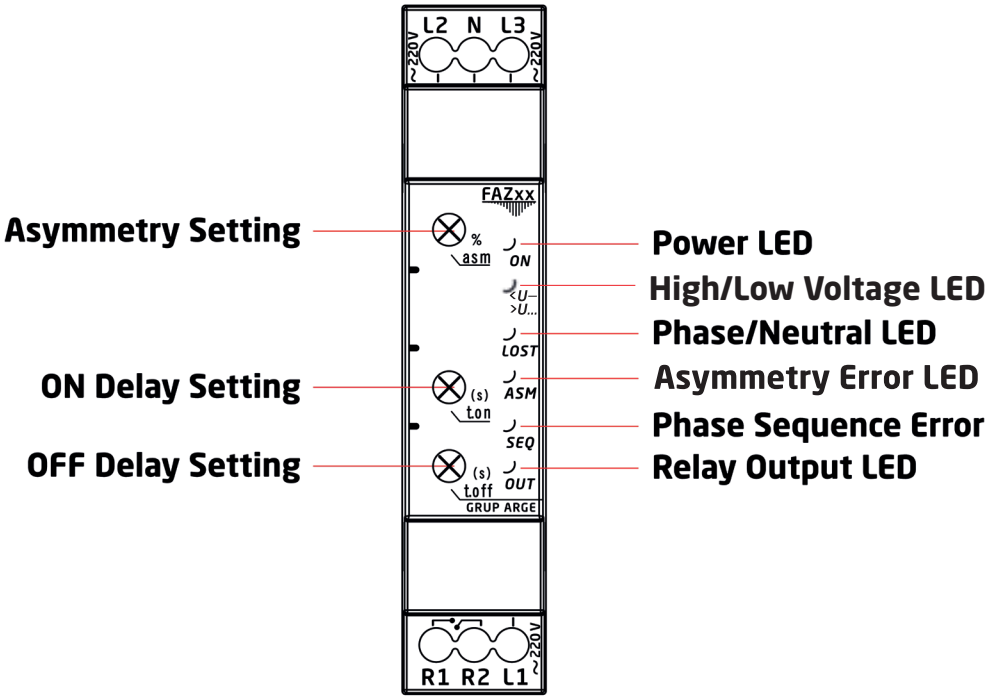
Phase Protection Relay functions as a critical protection device in electrical power systems. Its main purpose is to detect problems such as Phase Absence, Neutral Absence, Phase Sequence, Phase Asymmetry (Unbalance), Over Voltage and Under Voltage etc. in three-phase electrical power systems and to protect electrical equipment and systems by taking necessary measures.

This device is used to ensure the safety of sensitive and high value industrial equipment such as electric motors, pumps, compressors. There are relays that operate according to fixed asymmetry limits, as well as relay types with adjustable asymmetry limits. This feature allows for protection suitable for different applications.

1.2. Technical Features

Operating Voltage:	3 x 380 V AC + N (FAZ01, FAZ02, FAZ03, FAZ04) 3 x 380 V AC (FAZ11, FAZ12, FAZ13)
Connection Type:	(3P4W - Three Phase + Neutral) - (FAZ01, FAZ02, FAZ03, FAZ04) (3P3W - Three Phase without Neutral) - (FAZ11, FAZ12, FAZ13)
Operating Frequency:	50 / 60 Hz
Asymmetry Setting:	%20 Fixed Asymmetry (FAZ01) %40 Fixed Asymmetry (FAZ03) %5-35 Adjustable and Closable (FAZ02, FAZ04, FAZ11, FAZ12, FAZ13)
Low Voltage Setting:	270 – 370 V AC (FAZ13)
High Voltage Setting:	410 – 510 V AC (FAZ13)
Pull / Release Delay:	0.1 sec. – 20 sec.
Relay Output:	1 × N/O, 5 A @ 250 VAC
Hysteresis:	Un x %2
Adjustment:	Potentiometer
Indicator:	5 LEDs
Ambient Temperature:	-5°C to +50°C
Protection Class:	IP20
Mounting:	DIN Rail

1.3. LED Descriptions



Note: Devices without neutral have no N connection.

1.4. LED Warnings

ON LED	<U/>U LED	LOST LED	ASM LED	SEQ LED	OUT LED	
◐	◐	◐	◐	◐	○	**Supply Voltage Too Low Warning** (LEDs flash once per second)
○	◐	◐	◐	◐	○	**Internal Device Error** (LEDs flash once per second)
◐	◐	◐	◐	◐	○	**Supply Voltage Too High Warning** (LEDs flash 4 times per second)
○	◐	◐	◐	◐	○	**Neutral / Phase Reverse Connection Warning** (LEDs flash 4 times per second)

Note: Depending on the model, LEDs that are not available on the device will not be taken into consideration.

Table:1

* ◐ Flasher

1.5. Use of the Device

Phase Protection Relays;

With the “Asm” adjustment knob, the maximum asymmetry value that can occur between the phases is set. When the knob is set to “off” on the scale, the related function is deactivated. With “t.on” the pull-up delay of the relay is set, with “t.off” the release delay of the relay in case of a fault is set.
“Max” and “Min” knobs are used to set the limits between which the voltage level of the phases will be between. When the voltage level goes out of the limits, the relay releases at the end of the delay time. When the voltage level reaches the limit values, the relay pulls out.

1.6. Selection Table

Product Name	FAZ01	FAZ02	FAZ03	FAZ04	FAZ11	FAZ12	FAZ13
Neutral Connection	√	√	√	√			
Non-Neutral Connection					√	√	√
Neutral Break Detection	√	√	√	√			
Phase Sequence Control			√	√	√	√	√
Phase Absence Detection	√	√	√	√	√	√	√
Fixed Asymmetry	20%		40%		40%		
Adjustable Asymmetry		%5-35		%5-35		%5-35	%5-40
Adjustable Pull Delay		√		√		√	
Adjustable Switch-On Delay		√		√		√	√
Insufficient - Overfeeding Warning	√	√	√	√	√	√	√
Low Voltage Control							A
High Voltage Control							A
Relay Output	1 x N/O, 5 A @ 250 VAC	1 x N/O, 5 A @ 250 VAC	1 x N/O, 5 A @ 250 VAC	1 x N/O, 5 A @ 250 VAC	1 x N/O, 5 A @ 250 VAC	1 x N/O, 5 A @ 250 VAC	1 x N/O, 5 A @ 250 VAC
Supply	3 Phase-Neutral	3 Phase-Neutral	3 Phase-Neutral	3 Phase-Neutral	3 Phase	3 Phase	3 Phase

A: Adjustable and closable.

Table:2

1.7. Functions

Neutral Break Detection (FAZ01, FAZ02, FAZ03, FAZ04):

In the event of a neutral disconnection, the relay releases abruptly without waiting for a delay time, the LOST fault LED illuminates. When the connection fault is removed, the LOST LED goes off immediately and the relay pulls out after the set pull delay time expires.

Phase Absence Detection:

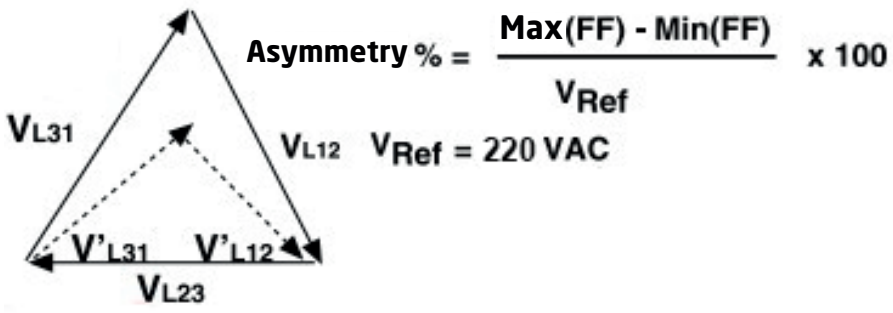
In the event of a break in any of the phases, the relay abruptly releases without waiting for the delay time, the LOST fault LED illuminates. When the connection fault is removed, the LOST LED goes out immediately and the relay pulls out after the set pull-up delay expires.

Phase Sequence Control (FAZ03, FAZ04, FAZ11, FAZ12, FAZ13):

When the phase sequence is detected to be incorrect, the relay releases abruptly without waiting for the delay time, the SEQ error LED lights up. When the phase sequence is correct, the SEQ LED goes out immediately and the relay pulls out after the set pull delay time has elapsed.

Asymmetry Control:

When the voltage imbalance between phases exceeds the fixed or set asymmetry value, the ASM LED lights immediately, the relay releases at the end of the delay time. When the asymmetry falls below the fixed or set value, the ASM fault LED turns off immediately, the relay pulls out at the end of the delay time.



Adjustable Pull and Release Delay (FAZ02, FAZ04, FAZ12, FAZ13):

With the “t.on” scale, the pull-up delay of the relay is set and with the “t.off” scale, the release delay of the relay in case of fault is set.

Insufficient / Over Supply Warning:

When the average of the three phase inputs supplying the device falls below “0.5xUn”, the device gives an insufficient supply warning by flashing the LEDs on the device once per second (See Table 1). The relay is released without delay.

When all of the phases supplying the device exceed “1.5xUn”, the LEDs on the device are turned on and off 4 times per second and an over supply warning is given (See Table 1).

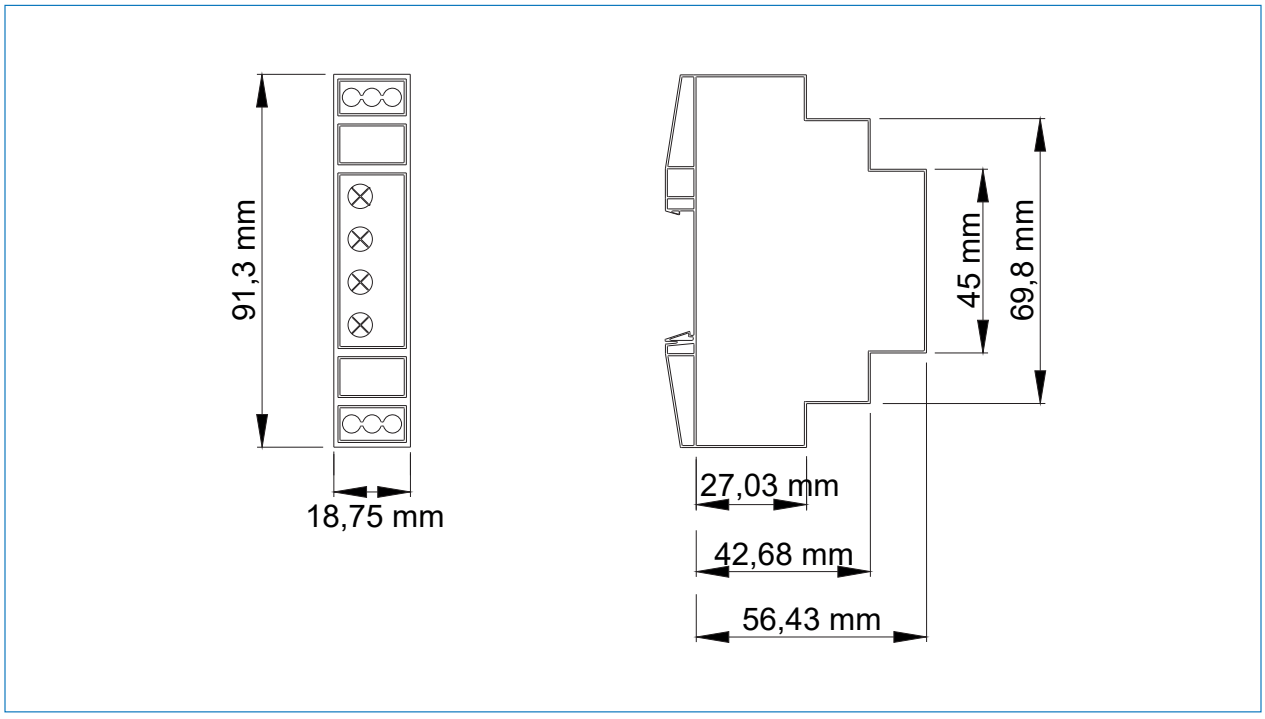
Low / High Voltage Control (FAZ13):

If any of the phases goes out of the set max / min limit values, <U->U… fault LED lights up and the relay releases at the end of the delay time. When the voltages reach the set limit values, <U->U… fault LED turns off and the relay starts to output.

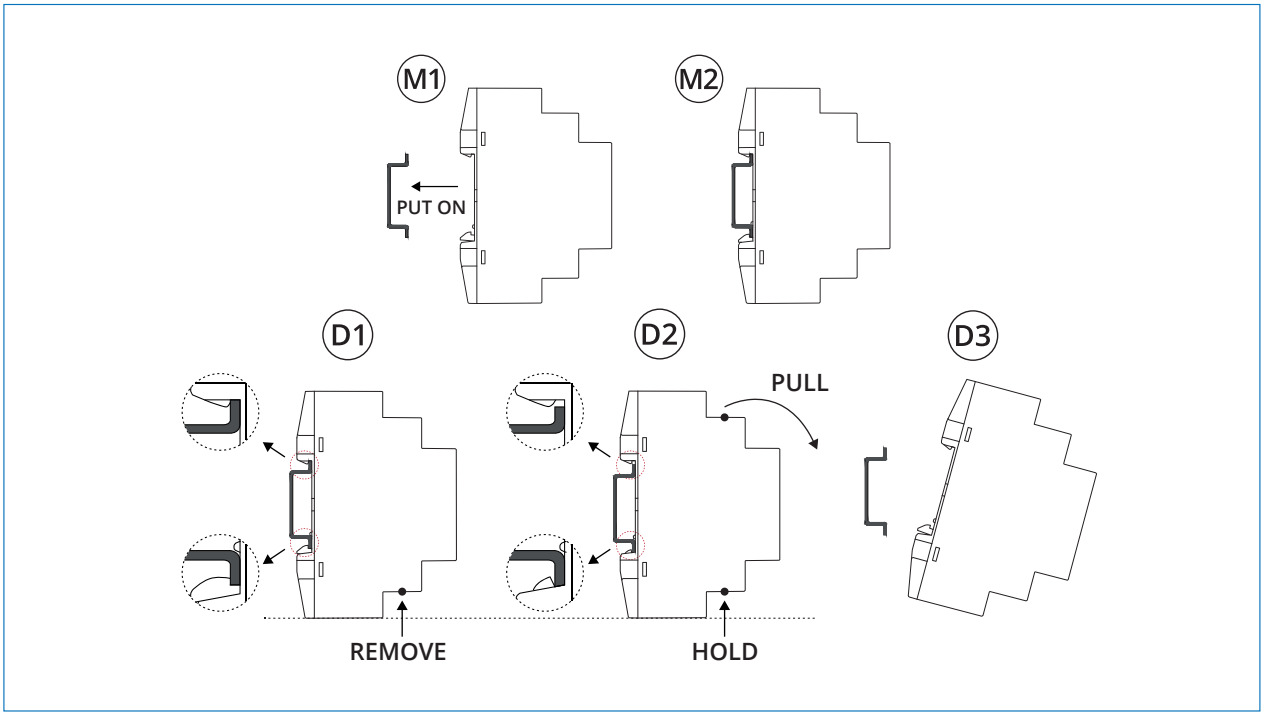
In Device Error Warning:

When the device detects a fault in its own hardware, it gives an insufficient supply warning by flashing the LEDs on it once per second (See Table 1). The relay is released without delay.

1.8. Technical Drawing



1.9. Product Assembly and Disassembly



1.10. Connection Diagram

