

Overview

Klemsan phase monitor relays monitor phase loss, phase sequence, voltage asymmetry, over- and undervoltage, and neutral loss in 3-phase systems. Housed in compact 18mm DIN-rail enclosures, these relays use TRMS measurement for high accuracy and offer both fixed-protection models requiring no adjustment and adjustable models with trimpots for setting asymmetry threshold, voltage limits, and time delays. LED indicators provide immediate fault notification, and all models include a 10A (AC)/5A (DC) SPDT relay output. Protection of motors and voltage systems is simplified without the need for complex configuration.

Features

- Compliant with EN 60255-1
- For monitoring of AC 3-phase (star and delta) at 50/60 Hz
- TRMS measurement for high accuracy
- Fixed protection models (FP1Y, FP1D, FP1YA) require no adjustment or configuration
- Adjustable protection models (P1Y, P1D) with trimpot settings for:
 - Asymmetry threshold $\pm(5\text{--}30\%)$
 - Overvoltage and undervoltage limits (separate trimpots on select models)
 - On-delay time (0.1–10s)
- Detection of:
 - Phase loss
 - Phase sequence (wrong phase sequence)
 - Voltage asymmetry
 - Overvoltage and undervoltage (select models)
 - Neutral loss (select models)
 - PTC motor winding temperature (select models)
- With or without neutral connection (3P4W or 3P3W)
- Output: 1 changeover contact (SPDT), 10A
- Red LED indicators for fault notification
- Orange LED indicator for relay output status
- 18mm compact body — DIN norm housing
- DIN rail mount per IEC/EN 60715

Applications

- Motor protection in 3-phase voltage systems against phase loss, wrong phase sequence, and voltage asymmetry
- Overvoltage and undervoltage protection for motors and voltage systems (adjustable P1Y/P1D models)
- PTC motor winding temperature monitoring to prevent overheating damage (FP1Y-SFP, FP1D-SFP, P1D-M2WSP, P1Y-M2WSP models)
- Protection of motors in star or delta connection configurations
- Neutral loss detection in 3-phase with neutral (4-wire) systems
- Changeover to emergency supply or alarm output after fault detection

**FP1Y-SF-230****P1Y-M1WASFN-100-200**

Klemsan[®] Phase Monitor Relays

Adjustable Phase Monitor Relays Selection

Klemsan Adjustable Protection Phase Monitor Relays			
Part Number	Price	Description	Drawing Link
<u>P1Y-ASF-230</u>	\$31.00	Klemsan phase monitor relay, 3-phase, 35mm DIN rail mount, 85–300 VAC input voltage, SPDT, 10A contact rating, screw terminal(s), LED indicator(s), adjustable settings, phase reversal, phase loss and phase unbalance protection.	<u>PDF</u>
<u>P1D-ASF-400</u>	\$32.00	Klemsan phase monitor relay, 3-phase, 35mm DIN rail mount, 150–500 VAC input voltage, SPDT, 10A contact rating, screw terminal(s), LED indicator(s), adjustable settings, phase reversal, phase loss and phase unbalance protection.	<u>PDF</u>
<u>P1Y-M1WASFN-100-200</u>	\$35.00	Klemsan phase monitor relay, 3-phase, 35mm DIN rail mount, 75–250 VAC input voltage, SPDT, 10A contact rating, screw terminal(s), LED indicator(s), adjustable settings, phase reversal, phase loss, phase unbalance, over-under voltage and neutral loss protection.	<u>PDF</u>
<u>P1Y-M1WASFN-170-280</u>	\$35.00	Klemsan phase monitor relay, 3-phase, 35mm DIN rail mount, 85–300 VAC input voltage, SPDT, 10A contact rating, screw terminal(s), LED indicator(s), adjustable settings, phase reversal, phase loss, phase unbalance, over-under voltage and neutral loss protection.	<u>PDF</u>
<u>P1D-M1WASF-175-345</u>	\$37.00	Klemsan phase monitor relay, 3-phase, 35mm DIN rail mount, 130–430 VAC input voltage, SPDT, 10A contact rating, screw terminal(s), LED indicator(s), adjustable settings, phase reversal, phase loss, phase unbalance and over-under voltage protection.	<u>PDF</u>
<u>P1D-M1WASF-295-480</u>	\$37.00	Klemsan phase monitor relay, 3-phase, 35mm DIN rail mount, 150–500 VAC input voltage, SPDT, 10A contact rating, screw terminal(s), LED indicator(s), adjustable settings, phase reversal, phase loss, phase unbalance and over-under voltage protection.	<u>PDF</u>
<u>P1Y-M2WSP-100-200</u>	\$40.00	Klemsan phase monitor relay, 3-phase, 35mm DIN rail mount, 75–250 VAC input voltage, SPDT, 10A contact rating, screw terminal(s), LED indicator(s), adjustable settings, phase reversal, phase loss, PTC, overvoltage, undervoltage and neutral loss protection.	<u>PDF</u>
<u>P1Y-M2WSP-170-280</u>	\$40.00	Klemsan phase monitor relay, 3-phase, 35mm DIN rail mount, 85–300 VAC input voltage, SPDT, 10A contact rating, screw terminal(s), LED indicator(s), adjustable settings, phase reversal, phase loss, PTC, overvoltage, undervoltage and neutral loss protection.	<u>PDF</u>
<u>P1D-M2WSP-175-345</u>	\$42.00	Klemsan phase monitor relay, 3-phase, 35mm DIN rail mount, 130–430 VAC input voltage, SPDT, 10A contact rating, screw terminal(s), LED indicator(s), adjustable settings, phase reversal, phase loss, PTC, overvoltage and undervoltage protection.	<u>PDF</u>
<u>P1D-M2WSP-295-480</u>	\$42.00	Klemsan phase monitor relay, 3-phase, 35mm DIN rail mount, 150–500 VAC input voltage, SPDT, 10A contact rating, screw terminal(s), LED indicator(s), adjustable settings, phase reversal, phase loss, PTC, overvoltage and undervoltage protection.	<u>PDF</u>

Klemsan Adjustable Protection Phase Monitor Relays Product Guide							
Part Number	Connection Type	Phase Loss Protection	Phase Sequence Protection	Asymmetry Protection	PTC	High / Low Voltage Protection	Neutral Break Protection
<u>P1Y-ASF-230</u>	3P4W	✓	✓	✓	–	–	✓
<u>P1D-ASF-400</u>	3P3W	✓	✓	✓	–	–	–
<u>P1Y-M1WASFN-100-200</u>	3P4W	✓	✓	✓	–	✓	✓
<u>P1Y-M1WASFN-170-280</u>	3P4W	✓	✓	✓	–	✓	✓
<u>P1D-M1WASF-175-345</u>	3P3W	✓	✓	✓	–	✓	–
<u>P1D-M1WASF-295-480</u>	3P3W	✓	✓	✓	–	✓	–
<u>P1Y-M2WSP-100-200</u>	3P4W	✓	✓	–	✓	✓	✓
<u>P1Y-M2WSP-170-280</u>	3P4W	✓	✓	–	✓	✓	✓
<u>P1D-M2WSP-175-345</u>	3P3W	✓	✓	–	✓	✓	–
<u>P1D-M2WSP-295-480</u>	3P3W	✓	✓	–	✓	✓	–

Adjustable Phase Monitor Relays Specifications

Klemsan Adjustable Protection Phase Monitor Relays Technical Specifications					
Parameter	P1Y-ASF-230	P1D-ASF-400	P1Y-M1WASFN-100-200	P1Y-M1WASFN-170-280	P1D-M1WASF-175-345
Operating Voltage	85–300 VAC ±20%	150–500 VAC ±20%	75–250 VAC ±20%	85–300 VAC ±20%	130–430 VAC ±20%
Nominal Voltage	230 V LN	400 V LL	100–200 V LN	170–280 V LN	175–345 V LL
Operating Frequency	50/60 Hz				
Supply Terminals	L2-L3				
Supply Burden	4.8 kΩ	7 kΩ	4.8 kΩ		7 kΩ
Phase Loss Threshold	Un × 60%				
Asymmetry Threshold Value	±(5–30%) / Off				
Voltage Protection Range Low/High	N/A		±(5–30%) / Off		
Hysteresis	3%				
Output Contact	1 C/O (SPDT)				
Max. Switching Voltage	250 VAC / 30 VDC				
Max. Switching Current	10A (AC) / 5A (DC)				
Max. Switching Power	1250 VA / 150W				
Energization Delay	< 1s				
Fault Delay — Phase Loss	ton: 500 ms, toff: 500 ms				
Fault Delay — Phase Sequence	ton: 500 ms, toff: 500 ms				
Fault Delay — Asymmetry	ton: 0.1–10s, toff: 500 ms				
Fault Delay — High/Low Voltage	N/A		ton: 0.1–10s, toff: 500 ms		
Fault Delay — Neutral Break	ton: 500 ms, toff: 500 ms	N/A	ton: 500 ms, toff: 500 ms		N/A
Fault Delay — PTC	N/A				
PTC Inputs (Burden)	N/A				
PTC Alarm Threshold — Short Circuit	N/A				
PTC Alarm Threshold — High Value	N/A				
Over Voltage Category	CAT III (IEC 60664)				
Protection Degree	IP20 (IEC 60529)				
Pollution Degree	2				
Power Consumption	< 13 VA				
Operating Temperature Range	-20 to +60 °C [-4 to +140 °F]				
Max. Surrounding Air Temp	50 °C				
Activated Relays at Max Temp	1				
Activated PTC at Max Temp	N/A				
Cable Cross Section	0.2–2.5 mm² / 14–26 AWG solid or stranded				
Screw Tightening Torque	0.6 N·m				
Cable Stripping Size	8mm/9mm				
Housing Width	18mm				
Wire Type	60/75 °C copper (CU) only				
Mounting	35mm DIN rail (IEC/EN 60715)				
Standard	EN 60255-1				
Agency Approvals	cULus (UL 508), CE				

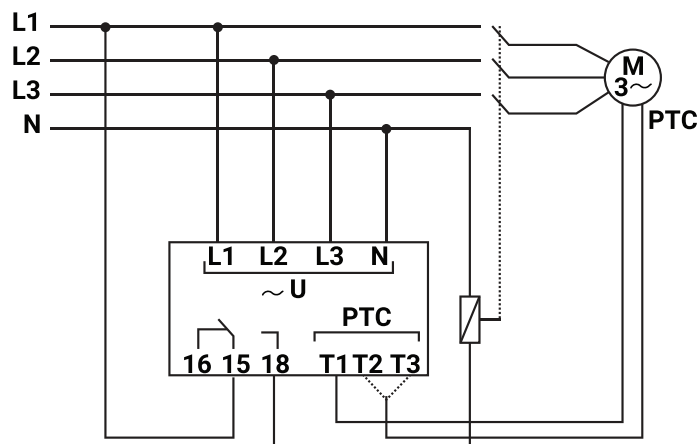
Adjustable Phase Monitor Relays Specifications

Klemsan Adjustable Protection Phase Monitor Relays Technical Specifications (cont'd)					
Parameter	P1D-M1WASF-295-480	P1Y-M2WSP-100-200	P1Y-M2WSP-170-280	P1D-M2WSP-175-345	P1D-M2WSP-295-480
Operating Voltage	150–500 VAC ±20%	75–250 VAC ±20%	85–300 VAC ±20%	130–430 VAC ±20%	150–500 VAC ±20%
Nominal Voltage	295–480 V LL	100–200 V LN	170–280 V LN	175–345 V LL	295–480 V LL
Operating Frequency	50/60 Hz				
Supply Terminals	L2-L3	Any two terminals			
Supply Burden	7 kΩ	4.8 kΩ		7 kΩ	
Phase Loss Threshold	Un × 60%				
Asymmetry Threshold Value	±(5–30%) / Off	N/A			
Voltage Protection Range Low/High	±(5–30%) / Off				
Hysteresis	3%				
Output Contact	1 C/O (SPDT)				
Max. Switching Voltage	250 VAC / 30 VDC				
Max. Switching Current	10A (AC) / 5A (DC)				
Max. Switching Power	1250 VA / 150W				
Energization Delay	< 1s				
Fault Delay — Phase Loss	ton: 500 ms, toff: 500 ms				
Fault Delay — Phase Sequence	ton: 500 ms, toff: 500 ms				
Fault Delay — Asymmetry	ton: 0.1–10s, toff: 500 ms	N/A			
Fault Delay — High/Low Voltage	ton: 0.1–10s, toff: 500 ms				
Fault Delay — Neutral Break	N/A		ton: 500 ms, toff: 500 ms	N/A	
Fault Delay — PTC	N/A	ton: 2s, toff: 1s			
PTC Inputs (Burden)	N/A	T1-T2 (4.7 MΩ), T1-T3 (6.85 MΩ)			
PTC Alarm Threshold — Short Circuit	N/A	20Ω			
PTC Alarm Threshold — High Value	N/A	2.7 kΩ			
Over Voltage Category	CAT III (IEC 60664)				
Protection Degree	IP20 (IEC 60529)				
Pollution Degree	2				
Power Consumption	< 13 VA				
Operating Temperature Range	-20 to +60 °C [-4 to +140 °F]				
Max. Surrounding Air Temp	50 °C	60 °C		50 °C	60 °C
Activated Relays at Max Temp	1				
Activated PTC at Max Temp	N/A	2			
Cable Cross Section	0.2–2.5 mm² / 14–26 AWG solid or stranded				
Screw Tightening Torque	0.6 N·m				
Cable Stripping Size (Min / Max)	8mm/9mm				
Wire Type	60/75 °C copper (CU) only				
Mounting	35mm DIN rail (IEC/EN 60715)				
Standard	EN 60255-1				
Agency Approvals	cULus (UL 508), CE				

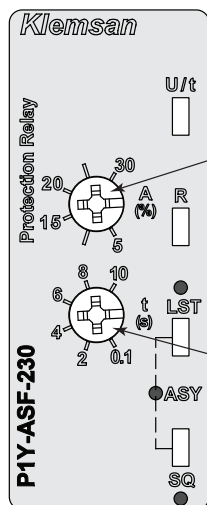
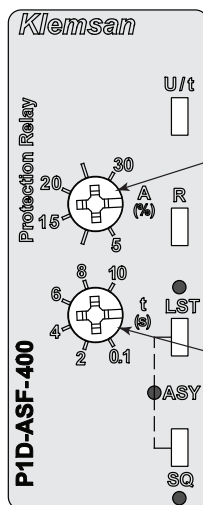
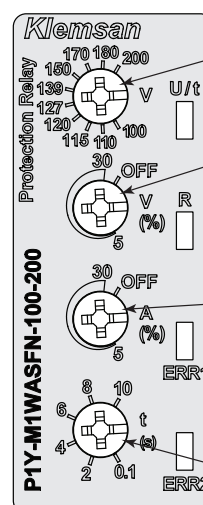
Adjustable Phase Monitor Relays LED Operation

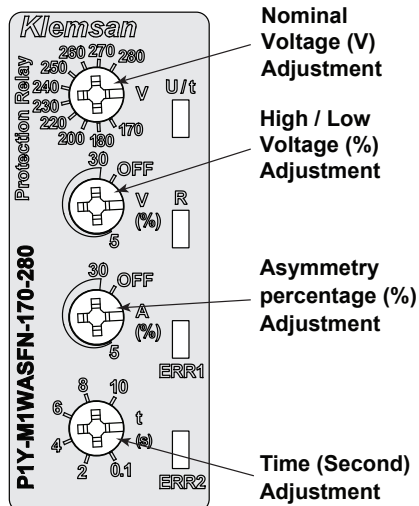
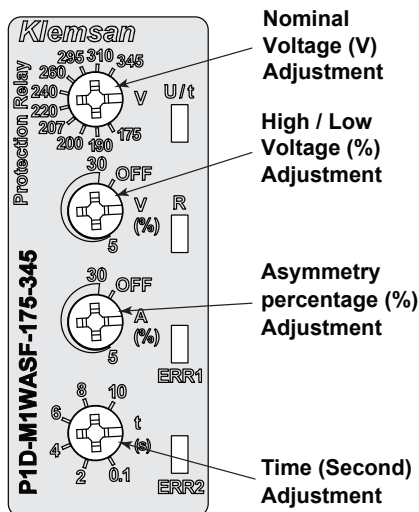
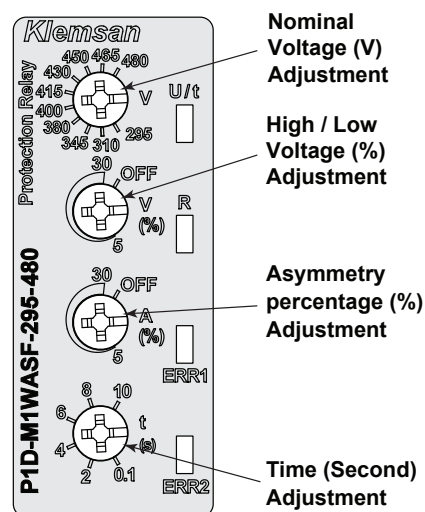
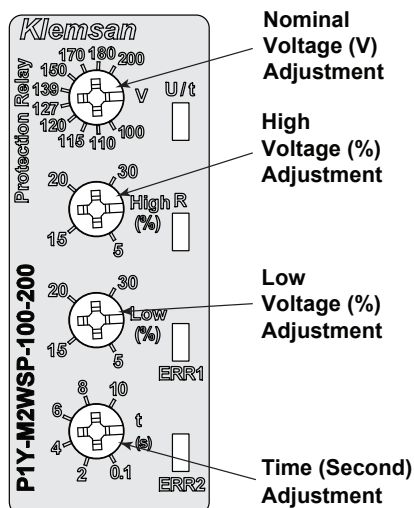
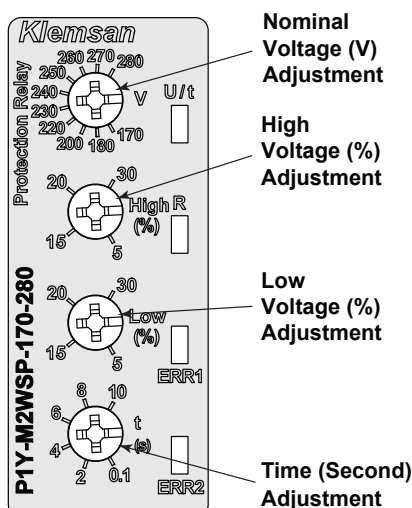
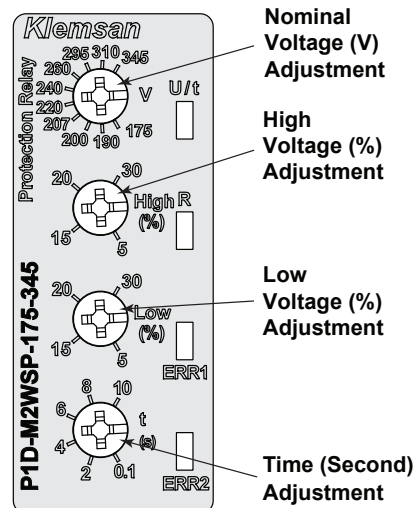
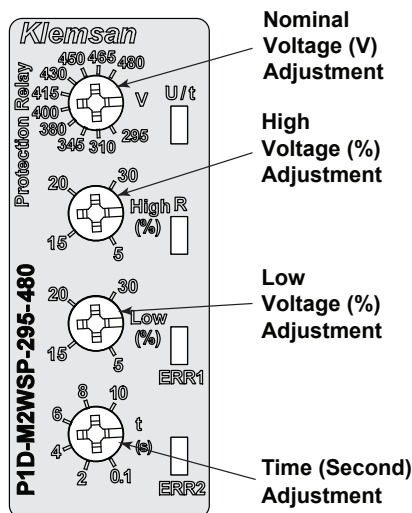
Klemsan Adjustable Protection Phase Monitor Relays LED Operation		
Fault Types	Relay Actions	LED Display
Phase Loss: When any of the measuring signals fall below 60% of the rated voltage, a phase loss fault occurs. The relay action and the LED display pattern are shown in the adjacent figures.		Err1 Err2
Neutral Break: If a neutral wire break or an unconnected neutral is detected in a product with neutral connection, a neutral break fault occurs. The relay action and the LED display pattern are shown in the adjacent figures.		Err1 Err2
Phase Sequence: When the angles between the signals entering the L1, L2 and L3 inputs are less than 60° or more than 180°, a phase sequence fault occurs in cases where the phases are not connected in sequence. The relay action and the LED display pattern are shown in the adjacent figures.		Err1 Err2
Asymmetry Fault: Asymmetry value is calculated by dividing the max. difference between the phase voltage by the nominal voltage. According to this formula, if the asymmetry value is higher than the asymmetry limit, an asymmetry fault occurs. The relay action and the LED display pattern are shown in the adjacent figures.		Err1 Err2
High Voltage Fault: If the signal applied from the L1, L2 and L3 signals, is higher than the set high voltage limit, a high voltage fault occurs. The relay action and the LED display pattern are shown in the adjacent figures.		Err1 Err2
Low Voltage Fault: If the signal applied from the L1, L2 and L3 signals, is lower than the set low voltage limit, a low voltage fault occurs. The relay action and the LED display pattern are shown in the adjacent figures.		Err1 Err2
PTC Fault: a. PTC High Value Fault: When T1-T2 or T1-T3 detects a high value, a PTC high value fault occurs. The relay action and the LED display pattern are shown in the adjacent figures.		Err1 Err2
b. PTC Short Circuit Fault: A PTC short circuit fault occurs when there is a short circuit between PTC inputs T1-T3. The relay action and the LED display pattern are shown in the adjacent figures.		Err1 Err2

Adjustable Phase Monitor Relays Wiring Diagram



Adjustable Phase Monitor Relays Adjustments

**P1Y-ASF-230****P1D-ASF-400****P1Y-M1WASFN-100-200**

Adjustable Phase Monitor Relays Adjustments (cont'd)**P1Y-M1WASFN-170-280****P1D-M1WASF-175-345****P1D-M1WASF-295-480****P1Y-M2WSP-100-200****P1Y-M2WSP-170-280****P1D-M2WSP-175-345****P1D-M2WSP-295-480**