










Type			P1-A	P1-P	P1-S	P1-SP	P1-SA
Definiton			Motor protection relay	Motor protection relay	Motor protection relay	Motor protection relay	Motor protection relay
Order Number			270150	270151	270152	270153	270154
Casing Width(mm)			17.5	17.5	17.5	17.5	17.5
Connections			Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal
Network			3Ø with neutral	1Ø with neutral	3Ø with neutral	3Ø with neutral	3Ø with neutral
Monitoring Functions	Phase Failure	Fixed delay time	500msec	-	500msec	500msec	500msec
	Phase Sequence	Fixed delay time	-	-	500msec	500msec	-
	Fixed Unbalanced Protection	Limit	± 20%	-	-	-	± 20%
		Hysteresis	3% x Un ≈ 6,9VAC	-	-	-	3% x Un ≈ 6,9VAC
		Delay time	500msec	-	-	-	500msec
	Extremely High-Low Voltage Protection	Upper limit	310 VAC (L-N)	-	310 VAC (L-N)	310 VAC (L-N)	310 VAC (L-N)
		Lower limit	140 VAC (L-N)	-	140 VAC (L-N)	140 VAC (L-N)	140 VAC (L-N)
		Hysteresis	6 VAC	-	6 VAC	6 VAC	6 VAC
		Delay time	100msec	-	100msec	100msec	100msec
	PTC Protection	Fixed delay time	-	2000msec	-	2000msec	-
		Threshold	-	1100Ω	-	1100Ω	-
Response time for monitoring any function			Max.250msec	Max.250msec	Max.250msec	Max.250msec	Max.250msec
Type of Output			Relay	Relay	Relay	Relay	Relay
Auxiliary contacts	Type	1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)
	Max ratings-AC (for NO side)	10A/250V; 1250 VA	10A/250V; 1250 VA	10A/250V; 1250 VA	10A/250V; 1250 VA	10A/250V; 1250 VA	10A/250V; 1250 VA
	Max ratings-DC (for NO side)	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W
	Mechanical life time	≥ 10 <sup>7</sup> operations	≥ 10 <sup>7</sup> operations	≥ 10 <sup>7</sup> operations	≥ 10 <sup>7</sup> operations	≥ 10 <sup>7</sup> operations	≥ 10 <sup>7</sup> operations
	Electrical life time operations (for NO side)	5×10 <sup>4</sup> (5A@250VAC) 1×10 <sup>5</sup> (5A@30VDC)	5×10 <sup>4</sup> (5A@250VAC) 1×10 <sup>5</sup> (5A@30VDC)	5×10 <sup>4</sup> (5A@250VAC) 1×10 <sup>5</sup> (5A@30VDC)	5×10 <sup>4</sup> (5A@250VAC) 1×10 <sup>5</sup> (5A@30VDC)	5×10 <sup>4</sup> (5A@250VAC) 1×10 <sup>5</sup> (5A@30VDC)	5×10 <sup>4</sup> (5A@250VAC) 1×10 <sup>5</sup> (5A@30VDC)
Supply Voltage			85-320VAC from L1-N	85-320VAC from L1-N	85-320VAC from L1-N	85-320VAC from L1-N	85-320VAC from L1-N
Supply Frequency			35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz
Permissible ambient temperature	During operation	-20 to +60 °C	-20 to +60 °C	-20 to +60 °C	-20 to +60 °C	-20 to +60 °C	-20 to +60 °C
	During storage	-40 to +75 °C	-40 to +75 °C	-40 to +75 °C	-40 to +75 °C	-40 to +75 °C	-40 to +75 °C
Relative Humidity			Max. 95% (no condensation)	Max. 95% (no condensation)	Max. 95% (no condensation)	Max. 95% (no condensation)	Max. 95% (no condensation)
Operating frequency			35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz	35-70 Hz

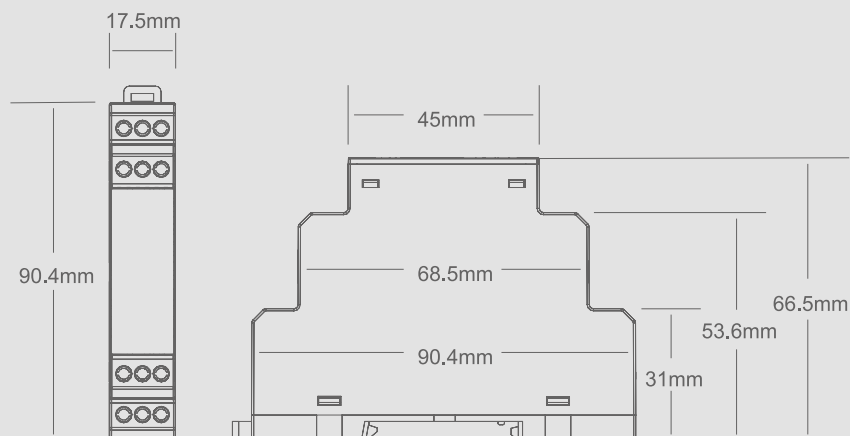


						
P1-SAP	P1D-SA	P1D-SAP	P1-SU 230A	P1-SU 230C	P1-SU 115A	P1-SU 115C
Motor protection relay	Motor protection relay	Motor protection relay	Motor protection relay	Motor protection relay	Motor protection relay	Motor protection relay
270155	270254	270255	270400	270401	270402	270403
17.5	17.5	17.5	17.5	17.5	17.5	17.5
Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal	Screw terminal
3Ø with neutral	3Ø without neutral	3Ø without neutral	3Ø with neutral	3Ø with neutral	3Ø with neutral	3Ø with neutral
500msec	500msec	500msec	<1sec	<1sec	<1sec	<1sec
500msec	-	500msec	<1sec	<1sec	<1sec	<1sec
± 20%	± 20%	± 20%	-40%	-40%	-40%	-40%
3% x Un ≈ 6,9VAC	3% x Un ≈ 12VAC	3% x Un ≈ 12VAC	3% x Un ≈ 12VAC	3% x Un ≈ 12VAC	3% x Un ≈ 12VAC	3% x Un ≈ 12VAC
500msec	500msec	500msec	<1sec	<1sec	<1sec	<1sec
310 VAC (L-N)	510 VAC (L-L)	510 VAC (L-L)	-	-	-	-
140 VAC (L-N)	240 VAC (L-L)	240 VAC (L-L)	-	-	-	-
6 VAC	6 VAC	6 VAC	-	-	-	-
100msec	100msec	100msec	-	-	-	-
2000msec	-	2000msec	-	-	-	-
1100Ω	-	1100Ω	-	-	-	-
Max.250msec	Max.250msec	Max.250msec	Max.250msec	Max.250msec	Max.250msec	Max.250msec
Relay	Relay	Relay	Relay	Relay	Relay	Relay
1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)	1 NO (SPST)	1 C/O (SPDT)	1 NO (SPST)	1 C/O (SPDT)
10A/250V; 1250 VA	10A/250V; 1250 VA	10A/250V; 1250 VA	10A/250V; 1250 VA	10A/250V; 1250 VA	10A/250V; 1250 VA	10A/250V; 1250 VA
5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W	5A/30VDC; 150W
≥ 10 <sup>7</sup> operations	≥ 10 <sup>7</sup> operations	≥ 10 <sup>7</sup> operations	≥ 10 <sup>7</sup> operations	≥ 10 <sup>7</sup> operations	≥ 10 <sup>7</sup> operations	≥ 10 <sup>7</sup> operations
5×10 <sup>4</sup> (5A@250VAC) 1×10 <sup>5</sup> (5A@30VDC)	5×10 <sup>4</sup> (5A@250VAC) 1×10 <sup>5</sup> (5A@30VDC)	5×10 <sup>4</sup> (5A@250VAC) 1×10 <sup>5</sup> (5A@30VDC)	5×10 <sup>4</sup> (5A@250VAC) 1×10 <sup>5</sup> (5A@30VDC)	5×10 <sup>4</sup> (5A@250VAC) 1×10 <sup>5</sup> (5A@30VDC)	5×10 <sup>4</sup> (5A@250VAC) 1×10 <sup>5</sup> (5A@30VDC)	5×10 <sup>4</sup> (5A@250VAC) 1×10 <sup>5</sup> (5A@30VDC)
85-320VAC from L1-N	150-500VAC from L2-L3	150-500VAC from L2-L3	180-265VAC from L3-N	180-265VAC from L3-N	90-150VAC from L3-N	90-150VAC from L3-N
35-70 Hz	35-70 Hz	35-70 Hz	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz
-20 to +60 °C	-20 to +60 °C	-20 to +60 °C	-20 to +60 °C	-20 to +60 °C	-20 to +60 °C	-20 to +60 °C
-40 to +75 °C	-40 to +75 °C	-40 to +75 °C	-40 to +75 °C	-40 to +75 °C	-40 to +75 °C	-40 to +75 °C
Max. 95% (no condensation)	Max. 95% (no condensation)	Max. 95% (no condensation)	Max. 95% (no condensation)	Max. 95% (no condensation)	Max. 95% (no condensation)	Max. 95% (no condensation)
35-70 Hz	35-70 Hz	35-70 Hz	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz

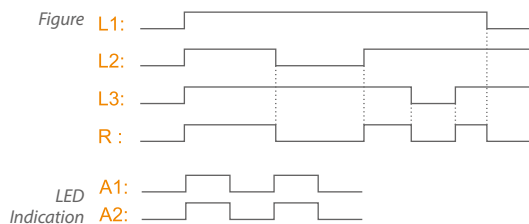
Type		P1-A	P1-P	P1-S	P1-SP	P1-SA
Degree of protection		IP20	IP20	IP20	IP20	IP20
Power consumption	DC	-	-	-	-	-
	AC	<3VA	<3VA	<3VA	<3VA	<3VA
Permissible mounting position		any	any	any	any	any
Weight(gr)		66	65	65	69	65
Schematics						
Dimensional Drawings						



P1-SAP	P1D-SA	P1D-SAP	P1-SU 230A	P1-SU 230C	P1-SU 115A	P1-SU 115C
IP20	IP20	IP20	IP20	IP20	IP20	IP20
-	-	-	-	-	-	-
<3VA	<4VA	<4VA	<13VA	<13VA	<4.5VA	<4.5VA
any	any	any	any	any	any	any
69	70	74	59	59	59	59



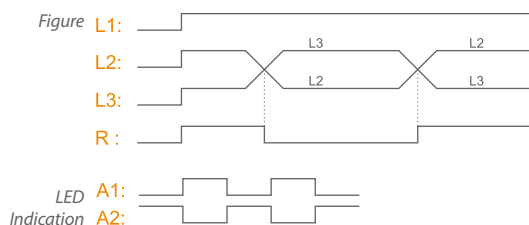
## Phase Failure / Off delay operation



If a phase failure occurs the output relay de-energizes in 500msec.

The fault is indicated by flashing LED A1 and LED A2 simultaneously. The output relay re-energizes automatically as soon as the voltage returns to the tolerance range.

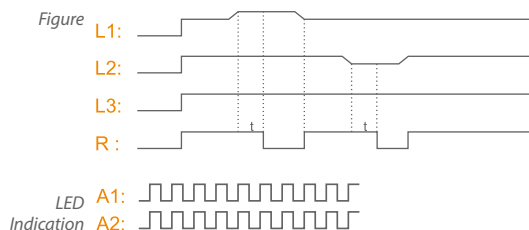
## Phase Sequence Error / Off delay operation



If a phase sequence error occurs the output relay de-energizes in 500msec.

The fault is displayed by alternated flashing of the LEDs A1 and A2. The output relay re-energizes automatically as soon as the phase sequence is correct again.

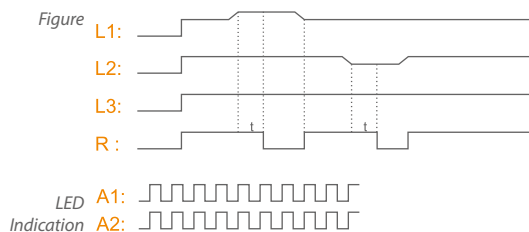
## Adjustable Unbalance Protection / Off delay operation



If the voltage to be monitored exceeds or falls below the set phase unbalance threshold percentage ( $\geq 20\%$ ), the output relay de-energizes after time delay (0.1-10s). The fault is indicated by flashing LED A1 and LED A2 quickly and simultaneously.

As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of  $3\% \times U_n$  the output relay re-energizes automatically.

## Fixed Unbalance Protection / Off delay operation

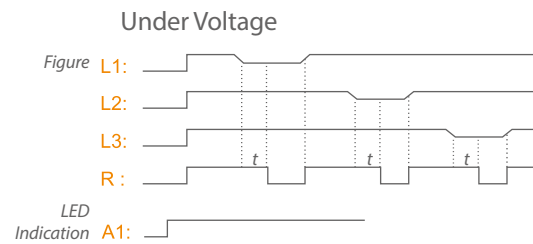
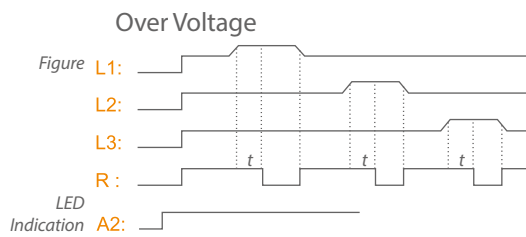


If the voltage to be monitored exceeds or falls below the set phase unbalance threshold percentage ( $\geq 20\%$ ), the output relay de-energizes after time delay (2sec). The fault is indicated by flashing LED A1 and LED A2 quickly and simultaneously.

As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of  $3\% \times U_n$  the output relay re-energizes automatically.

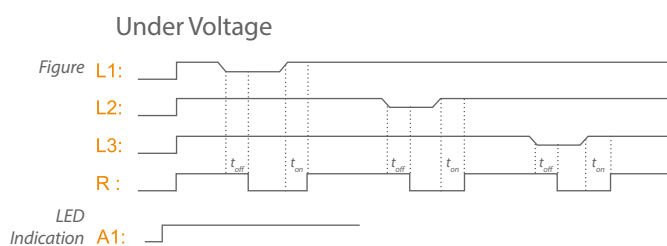
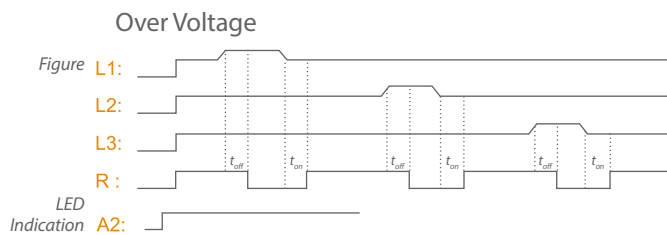


## Adjustable Voltage Protection / Off delay operation



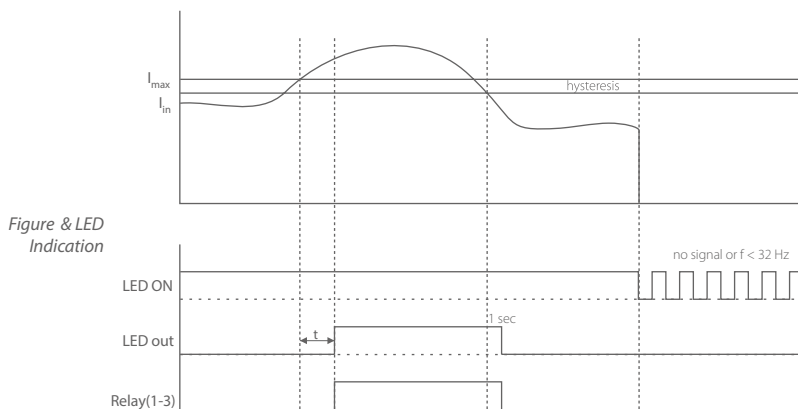
If the voltage to be monitored exceeds or falls below adjusted high limit or low limit value, the output relay de-energizes after time delay(0.1-10s). The fault type is indicated by LEDs A1 or A2 with constant light. As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 6VAC, the output relay re-energizes automatically.

## Adjustable Voltage Protection / On-Off delay operation (Available only for V1-T)



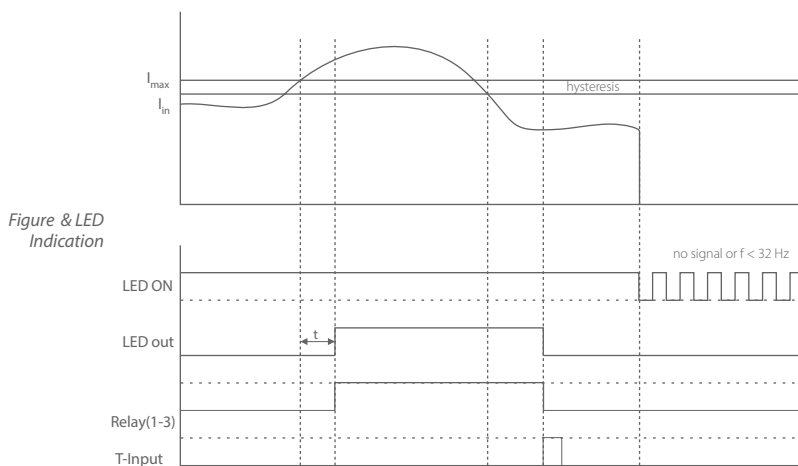
If the voltage to be monitored exceeds or falls below adjusted high limit or low limit value, the output relay de-energizes after  $t_{off}$  time delay(0.1-10s). The fault type is indicated by LEDs A1 or A2 with constant light. As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 6VAC, the output relay re-energizes after  $t_{on}$  time delay(0.1-10s).

## Adjustable Current Protection / On delay operation



### AUTOMATIC MODE

If the current to be monitored exceeds adjusted high limit value, the output relay de-energizes after time delay(0.1-10s). As soon as the current returns to the tolerance range, taking into account adjusted hysteresis (5-20%) and 1 second safety time, the output relay re-energizes automatically.

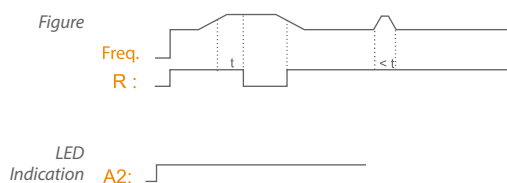


### MANUAL MODE

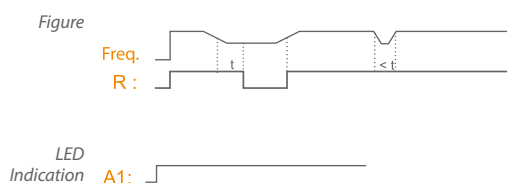
If the current to be monitored exceeds adjusted high limit value, the output relay de-energizes after time delay(0.1-10s). After the current returns to the tolerance range, taking into account adjusted hysteresis (5-20%) and 1 second safety time, the output relay waits till trigger input is applied. After that it re-energizes automatically.

## Adjustable Frequency Protection / Off delay operation

### Over Frequency



### Under Frequency

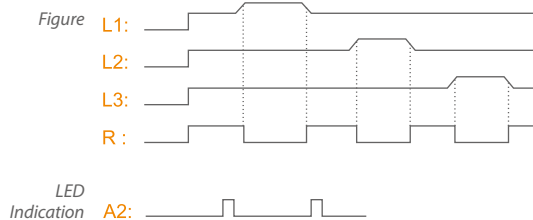


If the frequency to be monitored exceeds or falls below adjusted high limit or low limit value, the output relays de-energizes after time delay(1-10s). The fault type is indicated by LEDs A1 or A2 with constant light. As soon as the frequency returns to the tolerance range, taking into account a fixed hysteresis of 0.4kHz, the output relay re-energizes automatically.



## Extremely High-Low Voltage Protection / Off delay operation

### Over Over Voltage

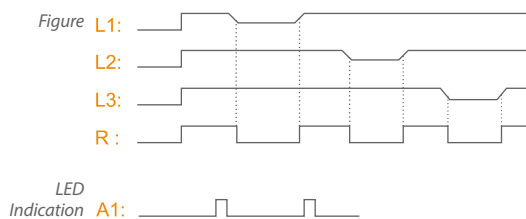


If the voltage to be monitored exceeds 310VAC for star connection device or 510VAC for delta connection device, output relay de-energizes immediately.

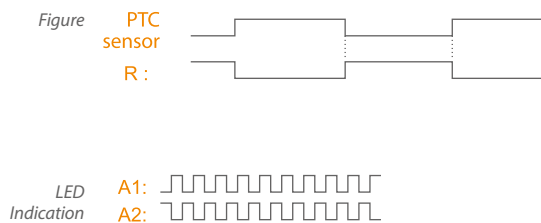
If the voltage to be monitored falls below 140VAC for star connection device or 240VAC for delta connection device, output relay de-energizes immediately.

The fault type is indicated by LEDs A1 or A2 with blinking. As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 6VAC, the output relay re-energizes automatically.

### Under Under Voltage



## PTC Protection / Off delay operation



In order to use this function, PTC temperature sensors must be connected to the relay's PTC input. Under normal operating conditions the PTC resistance is below the response threshold. If the motor heats up excessively, it means resistance value is increased, the output relay de-energizes after 2 seconds delay.

The output relay re-energizes automatically as soon as the motor heat turns back to its normal operating conditions.



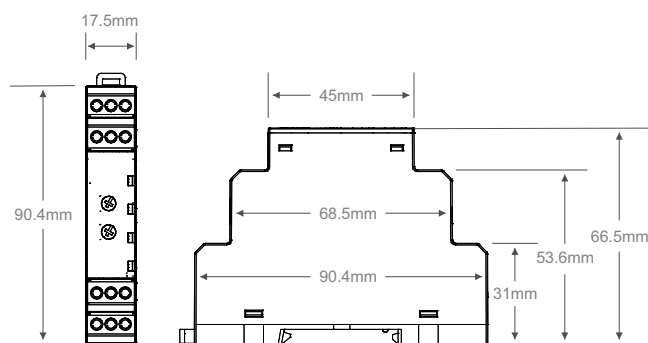
# Klemsan®

## P Series

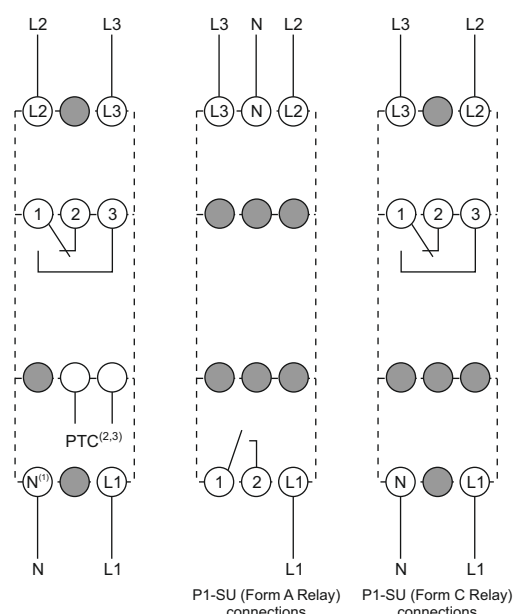
### Protection Relays

Operating voltage (U <sub>N</sub> )	85 .. 320V AC (P1 Series, except P1-P) 18 .. 320V AC/DC (P1-P) 150 .. 500V AC (P1D Series) 180 .. 265V AC (220V P1-SU Series) 90 .. 150V AC (110V P1-SU Series)
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Supply input	L1 - N (P1 Series) L2 - L3 (P1D Series) L3 - N (P1-SU Series)
Operating frequency	35 .. 70 Hz (P1, P1D Series) 50 .. 60 Hz (P1-SU Series)
Voltage measurement range	U <sub>N</sub>
Unbalance delay	2 second
Unbalance threshold	± %20 (P1, P1D Series) - %40 (P1-SU Series)
Unbalance hysteresis	%3 x 230V AC (P1 Series) %3 x 400V AC (P1D Series)
PTC alarm threshold	≈1100Ω
Over over voltage threshold	310V AC (P1 Series) 510V AC (P1D Series)
Under under voltage threshold	140V AC (P1 Series) 240V AC (P1D Series)
Output contact	1 C/O (P1, P1D, P1-SU Series) 1 NO (P1-SU Series)
Maximum switching current	10A
Maximum switching voltage	250V AC
Maximum switching power	1250VA
Operating temperature	-20°C .. 60°C
Storage temperature	-40°C .. 75°C
Protection class	IP20
Connection	Rail mounted



Dimensions



- (1) : This terminal is closed in the devices without neutral connection  
(2) : PTC terminals must be shorted when not used  
(3) : This terminals are closed in the devices without PTC protection

Connections

FAILURE TYPE	LED INDICATION	DESCRIPTION
phase failure	A1: A2:	L1: L2: L3: R:
phase sequence error	A1: A2:	L1: L2: L3: R:
unbalance	A1: A2: devices with neutral connection $A(\%) = \frac{V_{LN(max)} - V_{LN(min)}}{230V} \times 100$ devices without neutral connection $A(\%) = \frac{V_{LL(max)} - V_{LL(min)}}{400V} \times 100$	L1: L2: L3: R:
PTC error	A1: A2:	PTC sensor R:
over over voltage	A2:	L1: L2: L3: R:
under under voltage	A1:	L1: L2: L3: R:
frequency error (F < 32Hz or F > 100Hz)	ON:	Freq. R:

type	neutral connection	phase failure	phase sequence	unbalance	PTC protection	over over/under under voltage protection	form a relay	form c relay	order no
P1-A	✓	✓		✓		✓		✓	270 150
P1-P	✓				✓			✓	270 151
P1-S	✓	✓	✓					✓	270 152
P1-SP	✓	✓	✓		✓			✓	270 153
P1-SA	✓	✓	✓	✓		✓		✓	270 154
P1-SAP	✓	✓	✓	✓	✓	✓		✓	270 155
P1D-SA		✓	✓	✓	✓	✓		✓	270 254
P1D-SAP		✓	✓	✓	✓	✓		✓	270 255
P1-SU 230A	✓	✓	✓	✓			✓		270 400
P1-SU 230C	✓	✓	✓	✓				✓	270 401
P1-SU 115A	✓	✓	✓	✓			✓		270 402
P1-SU 115C	✓	✓	✓	✓				✓	270 403