

PHASE FAILURE RELAYS

1
2
3
4



These relays are suitable for monitoring incoming 3- phase supply from Mains (Electricity distribution line).

Being independent of load, they can be used for any HP/KW rating of load.

MODELS

VSP D1, VSP D2, VPG D1, USP D1

P1 PFS1, P1 PFS2

S2 VMR1, S2 VMR2, S2 VMR3, S2 VMR6, S2 VMR8

ALV D2, D2 VMR2,

S1 VMR7, F3 VSR4,

S1VSP1, S1SUR1



FEATURES

- Fixed/adjustable unbalance settings
- Fixed/adjustable under-voltage/over-voltage settings
- Fixed/adjustable trip delays
- Built-in or external power supply
- Resetting Auto / Manual / Remote
- Output contacts: 1 CO or 2 CO
- Choice of enclosures (DIN-Rail, Flush, Plug-in)
- Models with Micro-Controller based design
- 2 Line Alpha-Numeric LCD display (For F3 VSR4 model)
- Serial Communication (RS 232/485) Port (for F3 VSR4 model)
- Use of SMD Technology
- User-friendly LED indications

PROTECTIONS / FUNCTIONS

- Phase Failure (Phase Loss / Single Phasing),
- Phase sequence reversal,
- Voltage Unbalance,
- Under Voltage,
- Over Voltage
- Dry Run

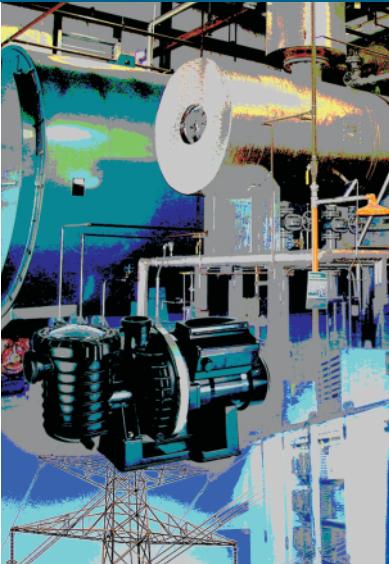
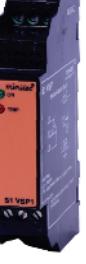
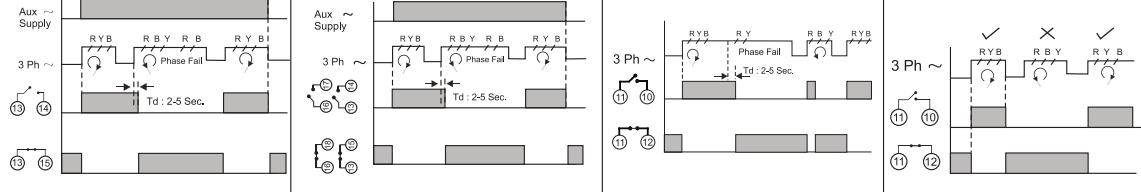
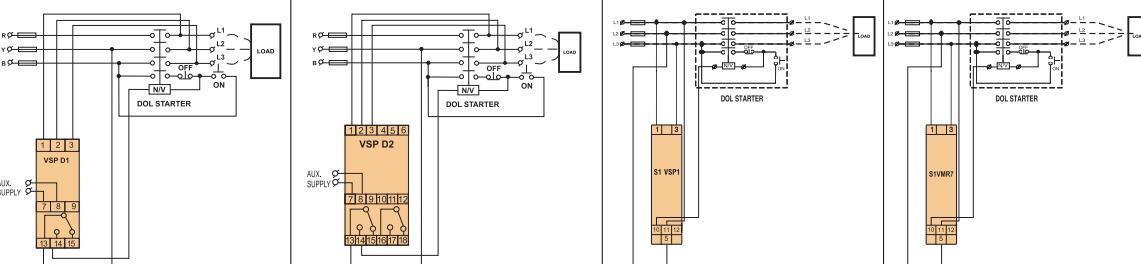
Ordering Instructions

- Product Family Name
- Model Name
- System Supply Voltage & Frequency
- Aux. Supply / Control supply voltage

TWIN AC CONTROLLER

MODEL
PROTOCOL COM - 4

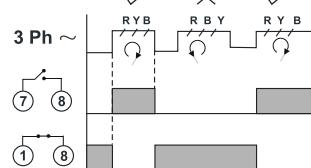
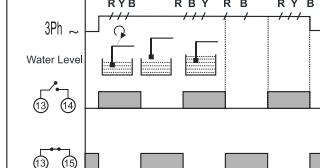
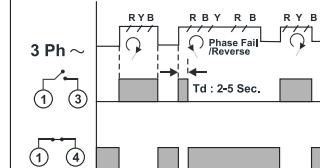
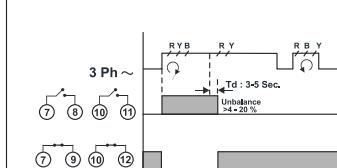
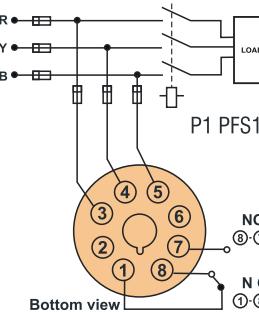
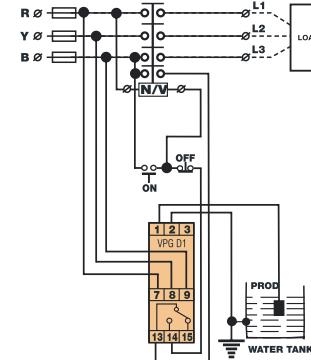
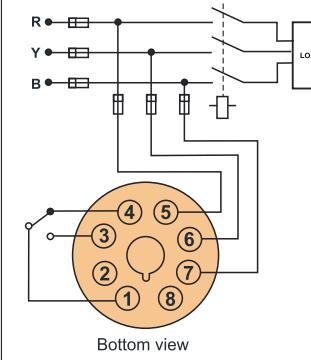
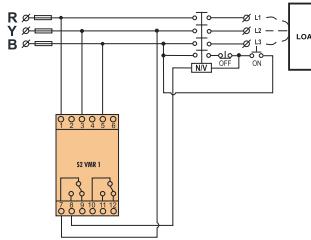
P H A S E F A I L U R E R E L A Y S

VSP D1 Phase Failure Relay	VSP D2 Phase Failure Relay	S1 VSP1 Phase Failure Relay	S1 VMR7 Phase Sequence Relay
			
<p>Phase Failure, Unbalance, Phase Sequence, Auto Reset, Fixed Unbalance Setting, 1 CO output Relay</p>	<p>Phase Failure, Unbalance, Phase Sequence, Auto/Manual/Remote Reset, Adjustable Unbalance setting, 2 CO output relay</p>	<p>Phase Failure, Unbalance, Phase Sequence, Auto Reset, Fixed Unbalance Settings, 1 CO Output Relay</p>	<p>Phase Sequence, Auto Reset, 1 CO output relay</p>
Supply Voltage Note: Mention specific voltage System (Fixed/wide range) in order Auxiliary	100-120/220-240/380-440 V AC ±20% 50 Hz / 60 Hz	100-120/220-240/380-440 V AC ±20% 50 Hz / 60 Hz	415 VAC ± 20%, 50 Hz / 60 Hz ± 3%
Output Contacts	1 CO	2 CO	1 CO
Trip Setting (Volts)			
Phase Sequence	Yes	Yes	Yes
Phase Unbalance	40 V ± 6 V (fixed)	30 V to 70 V ± 6 V (adjustable)	60 V ± 6 V (fixed)
Trip Time Delay			
On Phase Failure/Unbalance	3.5 sec. ± 1.5 sec.	3.5 sec. ± 1.5 sec.	3.5 sec. ± 1.5 sec. Instant for RP
For level sensing	N.A.	N.A.	N.A.
Resetting Mode	Auto	Auto / Manual / Remote	Auto
Weight	320 gms.	400 gms.	71 gms
Dimensions (mm)			
Overall (L x W x D)	76 x 30.5 x 117.5	76 x 56.5 x 117.5	96 X 17.5 X 60
Mounting (L x W)	68 centre to centre / 35 mm rail Mounting	67 x 46 / 35 mm rail Mounting	35 mm DIN rail mounting
<ul style="list-style-type: none"> • Wherever not specified Contact Rating : 5A @ 230 VAC (resistive) • * Available on request. 			
			
			

Relay contact position shown in 'Power off' condition

PHASE FAILURE RELAYS

minilec®

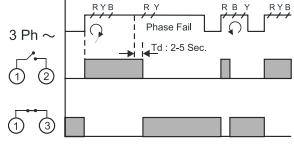
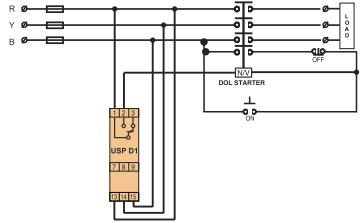
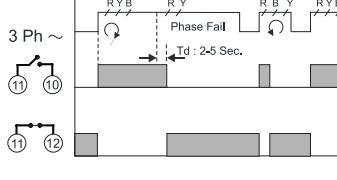
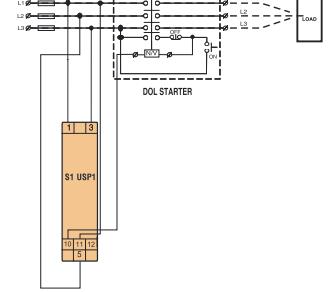
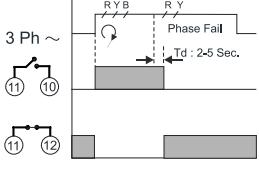
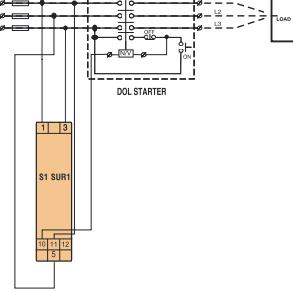
P1 PFS1 Phase Sequence Relay	VPG D1 Phase Failure Relay + Lower Water Level Guard	P1 PFS2 Phase Failure Relay	S2 VMR1 Phase Failure Relay
			
Phase Sequence, Auto Reset, 1 CO output relay	Single phasing, reverse phasing, unbalanced supply, Auto reset, 1 CO output contact Suitable for any HP/kW rating submersible pumps Low water level guard for dry running protection	Phase Failure, Unbalance, Phase Sequence, Auto Reset, fixed unbalance setting, 1 CO output relay	Microcontroller design, SMD Technology, Phase Failure, Unbalance, Phase Sequence Auto/Manual Reset, Adjustable Unbalance setting, 2 CO output relay
110/ 220/ 380/ 415 VAC ± 10%, 50 / 60 Hz	415VAC ± 20%, 50 Hz ± 3%	110 / 240 / 380 / 415 V AC ±10%, 50 / 60 Hz	100-120 / 220-240 / 380-440V AC, -25+20%, 48-63 Hz
Built-in	Built-in	Built-in	Built In
1 CO	1 CO	1 CO	2 CO
Yes	Yes	Yes	Yes
-	40 V ± 6 V (fixed)	40V ± 6V (fixed)	4 % TO 20 % (Variable) ± 5% of full scale.
Instant	3.5 Sec ± 1.5 Sec	3.5 sec. ± 1.5 sec.	4 Sec ± 1 Sec / RP-Instant
N.A.	3.5 Sec ± 1.5 Sec	N.A.	N.A.
Auto Reset	Auto Reset	Auto	Auto/ Manual Reset (Selectable by Front Push Button)
90 gms.	300 gms.	175 gms.	100 gms (Approx.)
50 x 40 x 80	76 x 30.5 x 117.5	50 x40 x 80	90 X 35 X 60
8 Pin Plug - In	68 centre to centre / Panel Mounting & 35 mm rail Mounting	8 - Pin Plug-in	35 mm Rail Mounting
			
			

Relay contact position shown in 'Power off' condition

Note: S2 Series - RoHS Product available on request.

CE marked VSP D1, VSP D2 available on request.

PHASE FAILURE RELAYS

	USP D1 Phase Failure Relay	S1 USP1 Phase Failure Relay	S1 SUR1 Phase Failure Relay
			
	Phase Failure, Unbalance, Phase Sequence, Auto Reset, Fixed Unbalance Setting, 1 CO output relay	Phase Failure, Unbalance, Phase Sequence, Auto Reset, Fixed Unbalance Settings, 1 CO Output Relay	Phase Failure, Unbalance, Auto Reset, Fixed Unbalance Settings, 1 CO Output Relay
Supply Voltage <small>Note: Mention specific voltage System (Fixed/wide range) in order Auxiliary</small>	415 VAC ± 20%, 50 Hz ± 3%	415 VAC ± 20%, 50 Hz / 60 Hz ± 3%	415 VAC ± 20%, 50 Hz / 60 Hz ± 3%
Output Contacts	Built In	Built In	Built In
Trip Setting (Volts)	1 CO	1 CO	1 CO
Phase Sequence	Yes	Yes	N.A
Phase Unbalance	60 V ± 6 V (fixed)	60 V ± 6 V (fixed)	60 V ± 6 V (fixed)
Under Voltage	For 380-440V AC For 220-240V AC For 100-120V AC		
Over Voltage	For 380-440V AC For 220-240V AC For 100-120V AC	NA	NA
Trip Time Delay			
On Phase Failure	3.5 sec. ± 1.5 sec.	3.5 sec. ± 1.5 sec.	3.5 sec. ± 1.5 sec.
On UV/OV			
Resetting Mode	Auto Reset	Auto Reset	Auto
Weight	100 gms (Approx.)	70 gms (Approx.)	70 gms (Approx.)
Dimensions (mm)			
Overall (L x W x D)	76 x 30.5 x 117.5	96 X 17.5 X 60	96 X 17.5 X 60
Mounting (L x W)	68 centre to centre / 35 mm rail Mounting	35 mm DIN rail mounting	35 mm DIN rail mounting
<ul style="list-style-type: none"> Wherever not specified Contact Rating : 5A @ 230 V AC (resistive) * CE marked products available on request. 	 	 	 

Relay contact position shown in 'Power off' condition

Note: S2 Series - RoHS Product available on request.
CE marked HLV D2, ALV D2, VMR D2 available on request.

PHASE FAILURE RELAYS

minilec®

ALV D2

Phase Failure with UV / OV Relay



Phase Failure, Unbalance,
Phase Sequence, under voltage,
Over Voltage, Auto Reset,
Fixed Unbalance setting,
Adjustable UV/OV settings,
2 CO output relay

S2 VMR2

Phase Failure Relay



Microcontroller design,
SMD Technology,
Phase Failure, Unbalance,
Phase Sequence, under voltage,
Over Voltage, Auto reset,
Fixed Unbalance setting,
Fixed UV/OV settings,
2 CO output relay

S2 VMR6

Phase Failure with UV / OV Relay



Phase Failure, Unbalance, Phase
Sequence,
Under Voltage, Over Voltage, Auto
Reset, Fixed Unbalance Settings,
Adjustable UV / OV Settings, Neutral
Fail, 2 CO output relay

110 / 240 / 380 / 415 / 440 V AC $\pm 20\%$, 50 / 60 Hz
110 V (Fixed) or (220-230-240) or (380-415-440) VAC $\pm 20\%$ selectable

100-110-120 / 220-230-240 / 380-415-440 V AC -25+20%,
Selectable by Front Knob, 48-63 Hz

415 V AC $\pm 20\%$ (fixed)

2 CO

2 CO

2 CO

Yes

Yes

Yes

40 V ± 6 V (fixed)

10% (Fixed) $\pm 10\%$

94 V ± 6 V ph- ph (fixed)

80% to 95% (adjustable)

- 20% (Fixed)

75% to 95% of 415 VAC

105% to 120% (adjustable)

+ 20% (Fixed)

105% to 125% of 415 VAC

3.5 secs. ± 1.5 sec

2 - 5 Sec. (Fixed) / RP-Instant

5 sec. ± 1 sec for UB/SP/UV/OV, Instant for RP,
Less than 2 secs. for NF.

Less than 2 secs.

Auto Reset

Auto Reset

400 gms.

100 gms (Approx.)

110 gms.

76x 56.5 x 117.5

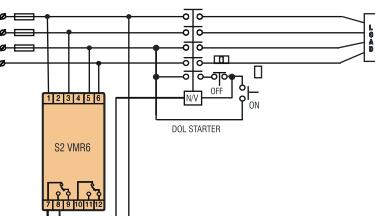
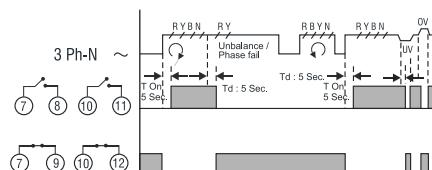
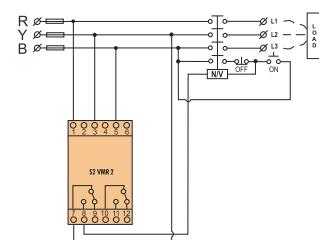
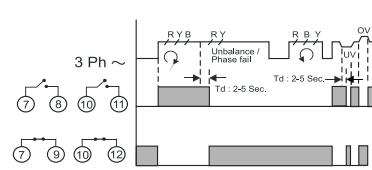
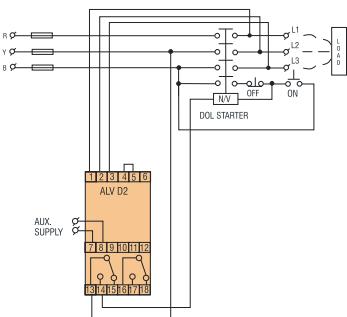
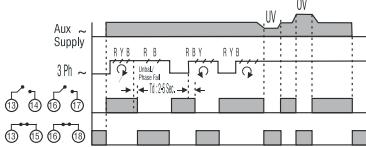
90 X 35 X 60

90 x 35 x 60

67 x 46 / 35 mm rail Mounting

35 mm Rail Mounting

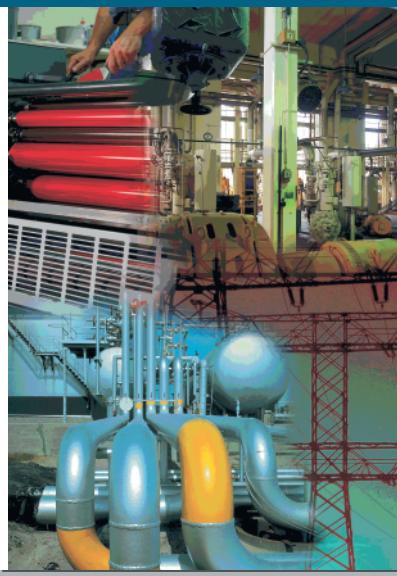
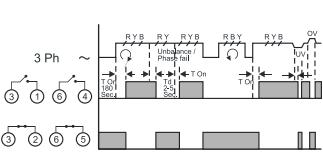
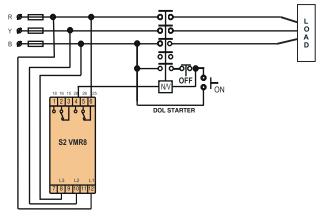
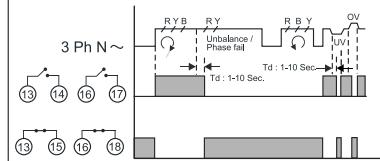
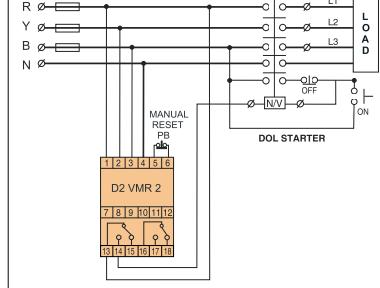
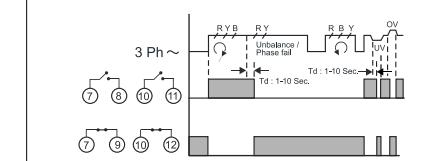
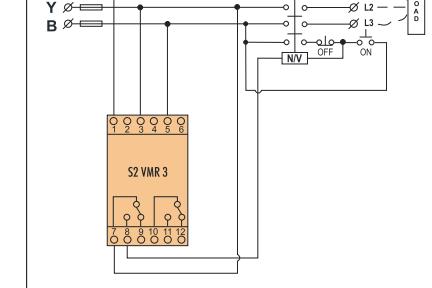
35 mm rail mounting



Relay contact position shown in 'Power off' condition

Note: Product available on request - P2 PFV1, P2 SMV1, VMR D2 & HLV D2

PHASE FAILURE RELAYS

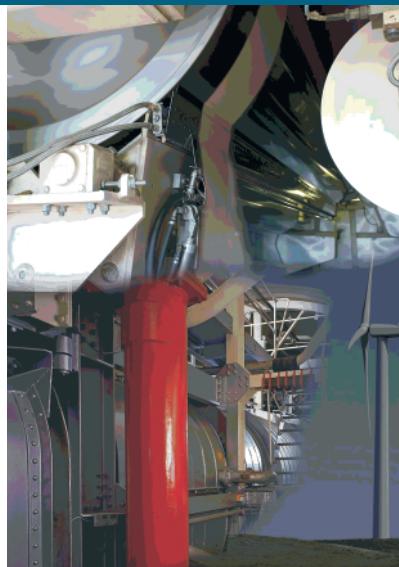
S2 VMR8 Phase Failure Relay	D2 VMR2 Phase Failure with UV / OV (3Ø-4W)	S2 VMR3 Phase Failure with UV / OV Relay
 <p>Phase Failure, Unbalance, Phase Sequence, Under Voltage, Over Voltage, Auto Reset, Fixed Unbalance Settings, Fixed UV/ OV Settings, 2 CO output relay</p>	 <p>CE CSA C US</p> <p>Suitable for 3 Ph-4W system, Microcontroller design, Absolute values of UV/OV settings Phase Failure, Unbalance, Phase Sequence, under voltage, Over Voltage Neutral Fail Auto/Manual reset, Adjustable settings for Unbalance, UV/OV and trip delays, 2 CO output relay, Fixed failsafe-non-failsafe logic.</p>	 <p>CE CSA C US</p> <p>Microcontroller design, SMD Technology, Absolute values of UV/OV settings, Phase Failure, Unbalance, Phase Sequence, under voltage, Over Voltage Auto/Manual reset, Adjustable settings for Unbalance, UV/OV and trip delays, 2 CO output relay, Failsafe-non-failsafe selectable</p>
Supply Voltage Note: Mention specific voltage (Fixed/wide range) in order System 415 V AC ± 20% Auxiliary Built-In	100-120 / 220-240 / 380-440V AC -25%+20%, 48-63 Hz Built In (from 3 Phases)	100-120 / 220-240 / 380-440V AC -25%+20%, 48-63 Hz Built In (from 3 Phases)
Output Contacts 2 CO	2 CO	2 CO
Trip Setting (Volts) Phase Sequence Yes Phase Unbalance 40 V ± 4 V (10 % ± 10% of set value-fixed) Under Voltage For 380-440V AC 85% of 415 V AC (fixed) For 220-240V AC For 100-120V AC Over Voltage For 380-440V AC 110 % of 415 V AC (fixed) For 220-240V AC For 100-120V AC	Yes 4 % - 20 % [Variable] 165-245V AC [Variable] 95-135V AC [Variable] 45-65V AC [Variable] 230-310V AC [Variable] 130-170V AC [Variable] 60-80V AC [Variable]	Yes 4 % - 20 % [Variable] 285-425V AC [Variable] 165-225V AC [Variable] 75-115V AC [Variable] 400-520V AC [Variable] 230-290V AC [Variable] 105-145V AC [Variable]
Trip Time Delay On Phase Sequence Instant for RP/OV On SP/UV/OV 3.5 ± 1.5 sec. fixed for UB/SP/UV	Instant 1 To 10 Sec [Variable]	Instant 1 To 10 Sec [Variable]
Resetting Mode Auto Reset	Auto/ External Manual Reset (External NC Push Buttons)	Auto/ Manual Reset [Selectable]
Weight 150 gms.	300 gms.	110 gms (Approx.)
Dimensions (mm) Overall (L x W x D) 110 x 35 x 60 Mounting (L x W) Screw Mounting	76 X 56.5 X 117.5 67 x 46  / 35 mm rail Mounting	90 X 35 X 60 35 mm Rail Mounting
<ul style="list-style-type: none"> Wherever not specified Contact Rating : 5A @ 230 V AC [resistive]   <p>Relay contact position shown in 'Power off' condition</p> <p>Note: S2 Series - RoHS Product available on request.</p>	  <p>Relay contact position shown in 'Power off' condition</p> <p>Note: Product available on request - P2 PFV1, P2 SMV1</p>	  <p>Relay contact position shown in 'Power off' condition</p> <p>Note: Product available on request - P2 PFV1, P2 SMV1</p>

PHASE FAILURE RELAYS

minilec®

F3 VSR4

Voltage Scanner [3 Ph - 3 W/ 4 W]



3-Phase 3-Wire or 3-Phase 4-Wire voltage monitoring & display, Phase Failure, Unbalance, Phase Sequence, under voltage, Over Voltage, Auto / Manual Reset, Adjustable unbalance trip setting, Adjustable under/over voltage settings, adjustable trip delay, RS232/485 communication port, Failsafe-non-failsafe selectable, 2 CO output relay, True RMS Values

Supply Voltage

Note: Mention specific voltage (Fixed/wide range) in order	System	110 / 415 V AC + 20%,-30% (3 Ph-3 W or 3 Ph-4 W selectable)
	Auxiliary	24 VDC / 90-270 V AC/DC, 50 Hz/ (60 Hz) ± 3%

Output Contacts

Trip Setting (Volts)	2 CO & RS 232 (optional)
----------------------	--------------------------

Phase Sequence	Yes
Phase Unbalance	1 - 20 % (Adjustable)

Under Voltage	1 - 15V below nominal voltage (for 3 Ph. 3 W) 1 - 15V below nominal voltage (for 3 Ph. 4 W)	1 - 80V below nominal voltage (for 3 Ph. 3 W) 1 - 50V below nominal voltage (for 3 Ph. 4 W)
Over Voltage	1 - 35V above nominal voltage (for 3 Ph. 3 W) 1 - 25V above nominal voltage (for 3 Ph. 4 W)	1 - 60V above nominal voltage (for 3 Ph. 3 W) 1 - 25V above nominal voltage (for 3 Ph. 4 W)

Trip Time Delay

On Phase Sequence	RP - Instant
On SP/UV/OV	1 - 59 secs. or 1-5 mins Selectable

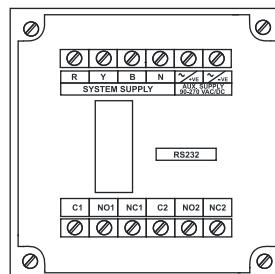
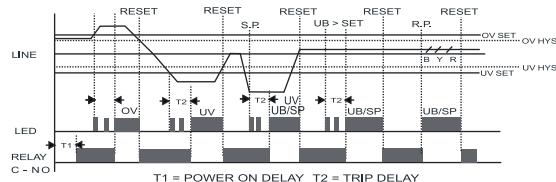
Resetting Mode	Auto/ Manual Reset [Selectable]
----------------	---------------------------------

Weight	800 gms
--------	---------

Dimensions (mm)

Overall (L x W x D)	96 x 96 x 130
Mounting (L x W)	92 x 92 mm

- Wherever not specified Contact Rating : 5A @ 230 V AC (resistive)



Relay position shown in 'Power off' condition

Note: S2 Series - RoHS Product available on request.

TWIN AC CONTROLLER

PROTOCOL-4

Twin AC Controller



Protocom 4 is useful for two AC installations in small offices / businesses, ATM centers, residential houses, for AC units of 1 or 1.5 Tons. Single AC Operation Alternate Mode. Single Or Both AC Operations Based On Temp. Rise In Alternate Mode. Built-in protection against UV, OV & OL for both AC units.



PROTOCOL-4 saves energy by alternatively using only one air conditioner (or both in case of temp rise) and that too only when it is required depending upon logic selected. Two Types of different operational logics can be selected with Protocom-4 through front Keys and display. These LOGICS are as follows.

LOGIC OF OPERATION

- 1) Only one AC at a time will run for set time cycle in alternate mode. Changeover will take place only if a) Cycle time is completed. b) Running AC trip due to fault condition (UV/OV, UL/OL).
- 2) One AC will be running as normal running AC for set time cycle. If temp rises above set point of both AC ON, second AC is switched ON as stand - by running AC. This AC will be running until temp drops below both hysteresis level. When temp drops second AC will be switched OFF (LIFO). In case both ACs are running and cycle time of first AC completed & temp drops below both hysteresis set point, first started AC will be made OFF (FIFO) and running AC will be consider as normal running AC.

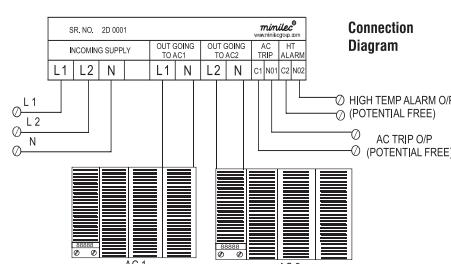
FUNCTIONING

NORMAL CYCLIC OPERATION - After power ON display will start showing input AC1, AC2 voltages, AC1 & AC2 current and room temp with scanning time of 3 sec. AC1 will become ON for next set time cycle. After completion of timing cycle, it will be OFF and second AC will ON (Depending upon temp setting). Second AC will remain ON for next set time cycle. This operation will be repeated in cyclic mode. When AC is ON, respective LED glow steady. Every time any AC will be made ON after set ON delay.

UNDER VOLTAGE & OVER VOLTAGE : The PROTOCOL-4 monitors voltage of both phases connected & offers built-in protection against under voltage (def 170 VAC with auto reset gap of 6VAC) & over voltage (def 270 VAC with auto reset gap of 6VAC). Upon arising one of above condition running AC will switch OFF after trip delay (def-5 sec) & AC trip relay turn ON. (Manually AC trip relay can be made OFF by pressing UP & DOWN key simultaneously.) UV/OV trip conditions are separated by LED steady & flashing effect. Alternative AC will be switched ON & will operate for next time cycle.(See fig 1)

UNDER LOAD / OVER LOAD- The PROTOCOL-4 monitors current of both Acs independently & protects the AC against over /under load condition depending on set value. After occurrence of fault running AC will switch OFF after UL/OL trip time delay. AC trip relay also activated after trip delay & remain ON till starting of another AC. Alternative AC will be switched ON for next time cycle resetting previous fault indication. UL/OL LED remain steady for UL & remain flashing for OL. (Manually AC trip relay can be made OFF by pressing UP & DOWN key simultaneously).If both ACs trips by UL/OL then these faults automatically reset after 3 min.(see fig 1)

ROOM TEMP. HIGH : The PROTOCOL-4 operates the AC by sensing the room temperature with help of temp sensor. Please keep sensor position properly so as to sense room temp correctly. After power ON or during running of any AC, the ambient temperature is monitored and if it is above set HT level then HT ALARM LED turns on, also HT alarm relay gets energized after trip delay(def- 60 sec). ALARM relay remain in energized condition till the ambient temp reduces below the hysteresis level of HT. HT ALARM relay can be made off manually by pressing UP & DOWN key simultaneously. See fig 2 for AC1, AC2 ON/OFF depending upon set temperature.



System supply	240 V AC, ±20%, [L1, L2 & N]
Frequency	50 (60) Hz, ±3%
Output Relay Contact	1 NO + 1 NO + 1 NO + 1 NO
Output Contact Rating	30 Amp @ 240 V AC (RLY 1 & RLY 2) 5 Amp (for RLY 3 & RLY 4)
Current Setting	1-20 Amp (Variable)
Power ON Delay	2 - 600 Sec.
Cyclic time Delay	3 Min. To 24 hours.
LED Indication	
AC On	Green
Alarm	Red
UV / OV	Red
UC / OC	Red
Enclosure	Sheet metal fabricated and powder coated
Dimension (mm)	
Overall (LxWxD)	141 x 193.9 x 72
Mounting (L x W)	117 x 169.5
Weight	1100 gms.

Trip settings, time delay and resettings

Parameters	Under Voltage	Over Voltage	Over Load	Over Temperature
Trip Setting	120-210 VAC	240-300 VAC	5-20 AMP (Settable by Keys & Display (Default Set - 20 A))	22-45°C (Settable by Keys & Display (Default Set - 35°C))
Hysteresis for Auto Reset	6 VAC ± 3 VAC	6 VAC ± 3 VAC	N. A.	1°C - 10°C (Default - 3°C)
Trip Time Delay	5 SEC.	5 SEC.	2 - 5 SEC	2 - 900 Sec. (Default Set-600 Sec)

Logic Setting Single ac operation only in alternate mode.

single or both ac operation based on temp. rise in alternate mode.

Setting Keys 4 Nos of Front Keys

