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AVS User Manual Jan 2021
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SOLLATEK AUTOMATIC VOLTAGE SWITCHER (AVS)
AVS100, AVS3P-0 & AVS303

Instruction manual

AVS100

AVS3P-0

AVS303

Important: This manual contains important safety instructions.
Keep this manual handy for reference.

INTRODUCTION

Without doubt, power interruptions cause major problems for home and business computing. An unpredictable power supply can lead to worrying problems such as surges, spikes, lightning strikes, brown-outs, power-cuts (black-outs), power-back surges, mains over-voltage, and complete failure - all of which can damage electrical and electronic equipment. If any of these should occur, there's a strong chance you will suffer from loss of critical data, lowered productivity and even damage to your expensive equipment.

Sollatek encompasses a wide range of power protection products for use in many different industries where clean, regulated mains power is critical to their continued operation.

For more information on our range of power protection products, contact us now.

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THE SOLLATEK AUTOMATIC VOLTAGE SWITCHER (AVS) RANGE

The Sollatek Automatic Voltage Switcher (AVS) range prevents damage to equipment from over and under voltage levels of any duration. They work by disconnecting power when voltage levels exceed set parameters. Reconnection takes place when power returns to normal.

Fully automatic in operation. All these products provide power-back surge protection as standard by their in-built start-up delay and voltage monitoring.

Additionally, all models include surge and spike protection.

Contents

AVS100

The is AVS100 is an Automatic Voltage Switcher rated at 100 Amps.
If the voltage goes above or below the pre-set limits (the 'window'), then the AVS100 will switch off. Once the voltage returns within the window limits, the AVS will wait for a pre-set time, continuing to check the voltages, before automatically turning the load back on.

OPERATION

1. Make sure that your load does not exceed the rating of the AVS. (100 Amps for the AVS100).
2. The limits of the AVS are set for a window of 190-260 volts. If a different window is required, please refer to your dealer.
3. The AVS has to be wired to the mains supply and to the equipment it is supplying. Please refer to the wiring diagram.
4. On first switching on, there will be no output for the wait time of approximately three minutes while the AVS monitors the mains. If a different wait time is required, please refer to your dealer. For that period the yellow LED indicates that the mains are within acceptable limits, after which the green LED goes on and the load is connected. The red LED indicates that the mains supply is outside the window, and the load is disconnected.
5. It is recommended that the AVS is kept switched on, and the appliance switched on and off to prevent activating the time delay every time the appliance is switched on.

SPECIFICATIONS

Model AVS100	110V	230V
Current (Amps)	100	100
Nominal voltage(V)	110	230
Wait time (mins)	3 mins	3 mins
Under-voltage disconnect(V)	92	185
Over-voltage disconnect(V)	132	265
Hysteresis(V)	3-5V	3-5V
Socket type	screw terminals	screw terminals
Fused plug	N/A	N/A
RFI protection	No	No
Transient suppression	Yes >6.5kA	Yes >6.5kA
Spike protection(J)	80	160

CONNECTION:
CAUTION: IF THE AVS IS ALREADY WIRED, MAKE SURE IT IS DISCONNECTED FROM THE MAINS BEFORE YOU DO ANY OF THE FOLLOWING;

1. Open the door to obtain access to connection terminals.
2. Insert cable from the mains supply through the cable entry at the top of the box.

AVS100 INPUT

L (Live)	to	Terminal L1 of contactor
N (Neutral)	to	Neutral IN terminal block
E (Earth)	to	Earth IN terminal block

3. Insert cable to appliance through cable entry at bottom of box.

AVS100 OUTPUT

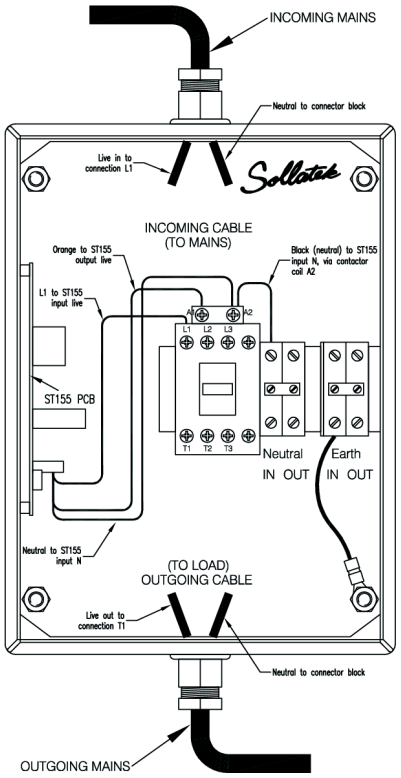
L (Live)	to	Terminal L1 of contactor
N (Neutral)	to	Neutral OUT terminal block
E (Earth)	to	Earth OUT terminal block

4. Ensure connections are secure and close door.

NOTES:

* The fuse in the terminal compartment is NOT for the load. It is a spike protection fuse. Replace with 4 Amp anti-surge 20x5mm fuse.
* The AVS must be mounted securely on a wall
* The supply to the AVS100 must be fitted with a 100A fuse or less.

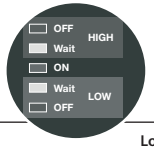
AVS100 CONNECTION DIAGRAM



AVS3P-0

The AVS3P-0 is an Automatic Voltage Switcher designed to protect three phase loads from voltage fluctuations, over voltage, under voltage, surges, dips and frequent start/stops. The output is a single volt-free changeover contact, rated at 16A. This is intended to control an external contactor, control circuit, start/stop system or alarm. If the voltage on any one phase goes above or below the pre-set limits (the 'window'), then the AVS will switch off. Once the voltage returns within the window limits, the AVS will wait for a pre-set time, continuing to check the voltages, before automatically turning the load back on. The over voltage, under voltage and delay settings are all adjustable using controls in the terminal compartment of the AVS3P. The standard window that is considered acceptable is 185V-260V(320V-450V three phase). Outside these limits electronic and electrical equipment are likely to be damaged.

Five LEDs accurately display the status of the AVS in the following symmetrical traffic light design:



LED Colour	Indicating	Load Status
Red	High incoming voltage	OFF
Yellow	AVS is in wait state after a high voltage transition	OFF
Green	Mains normal	ON
Yellow	AVS is in wait state after a low voltage transition	OFF
Red	Low incoming voltage	OFF

OPERATION

1. Connect the AVS in accordance with the wiring diagram opposite (fig 1). Ensure that the R, S & T sensing connections to the AVS come from the supply side of the contactor.
   Note: a good neutral connection must be provided from the supply.
2. The output from the AVS is a changeover relay with volt-free contacts. There is a common (C), a normally open (NO) and normally closed (NC) contacts. When the AVS3P-0 is in the Red or Amber condition then C is connected to NC. When the AVS3P-0 displays Green then C is connected to NO. Make sure that the control current you wish to switch does not exceed the rating of the AVS3P-0 relay (max 16Amps).
3. If the AVS is the only thing to control the contactor (or load, or alarm, etc), then the 'C' and 'NO' AVS contacts can be used to connect power to the contactor coil (method A). If however, there are other circuits/equipment that also must control the contactor, then the AVS contacts can be used to interrupt the contactor coil supply from there (method B) or used in conjunction with a start/stop or other system, e.g. method C.

4. Set limits of the AVS3P-0 using the thumb-wheel adjustment inside the terminal compartment. Ensure that limits set are safe for the load being protected. For example: Low =185V and High = 260V is normally considered safe for most equipment but you should check with the equipment manufacturer's information.
5. Set the time delay control using the thumb-wheel adjustment inside the terminal compartment. This will depend on your load and how it is operated. As a general guide, compressors and refrigeration equipment will need at least 3 minutes; motors, pumps, etc should not be started too frequently so may be 2 minutes minimum, electronic loads 0.5 minutes. The 'Off' position gives just 10 seconds. The equipment manufacturer should be consulted on the best setting.
6. At first switching on, there will be no output during the Delay period. For that period the yellow LED indicates that the mains supply is within acceptable limits, after which the green LED goes on and the output relay changes state to turn the load on.

SPECIFICATIONS

Model AVS3P-0	115V	240V
Current (Amps)	16A@230V	16A@230V
Nominal voltage(V)	115/200V	230/240V
Wait time (mins)	10 secs to 10mins	10 secs to 10mins
Window limits	adjustable	adjustable
Hysteresis(V)	2	4
Socket type	direct via brass screw terminal	
Fused plug	N/A	N/A
RFI protection	No	No
Attenuation(db)	No	No
Transient suppression	Yes	
Spike protection(J)	80J@115V	160J@230V
Max consumption	35VA	35VA
Max supply (phase to neutral)	160V	320V

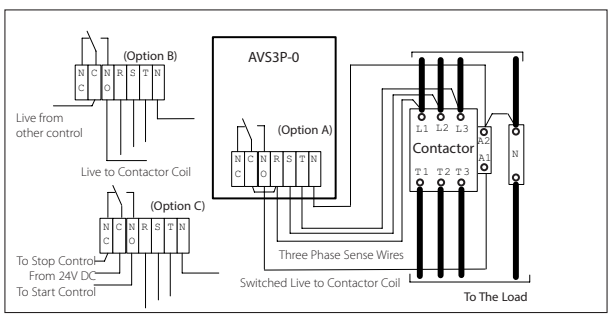
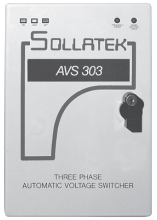


Figure 1. AVS3P-0 wiring diagram



AVS303

The AVS303 is a Three Phase Automatic Voltage Switcher which protects against over voltage and under voltage on any one of the three phases as well as loss of one or more phases. Indication and/or disconnection as a result of mains frequency error of phase sequence error is available as an option.
The AVS303 incorporates a contactor to switch the full load current. The AVS303-xx is available in different sizes ranging from 23Amps to 1250Amps (the -xx relates to the model number, ie: AVS303-23 is a 23Amp per phase AVS303).

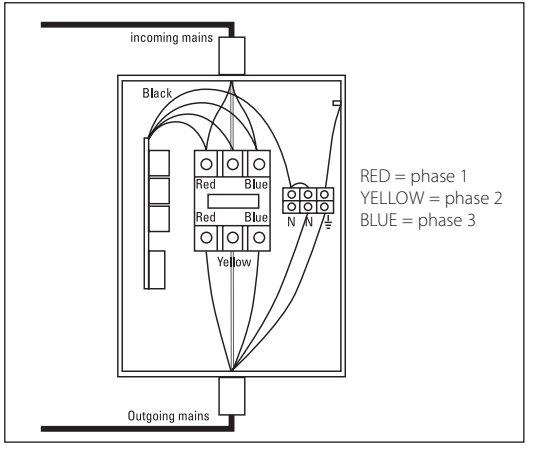
The options for the AVS303 are:
- Frequency error (OPT/01)
- Phase sequence error (OPT/02)
- Or both (OPT/03)

OPERATION

1. Make sure that your load does not exceed the rating of the AVS303.
2. The limits of the AVS303 are set for a window of 190-260 volts line to neutral. If a different window is required, please refer to your dealer.
3. If an option board is fitted please ensure the d.i.l. switches are set correctly as detailed in the separate instructions.
4. Connections of the three phases from the mains (INCOMING CABLE) and to the load (OUTGOING CABLE) are made to the contractor. It is essential that the incoming NEUTRAL is connected to the terminal block.
5. On first switching on, there will be no output for approximately one minute while the AVS303 monitors the mains. For that period the yellow LED indicates that the mains are within acceptable limits, after which the green LED goes on and the load is connected. The red LED indicates that the mains is outside the window, and the load is disconnected.
6. Frequency and Phase Error indications, where fitted, are by separate red LEDs.

SPECIFICATIONS

Model AVS303	
Current (Amps)	23 to1250
Nominal voltage(V)	230/400
Wait time (mins)	10 secs to 10 minutes
Under-voltage disconnect(V)	190V (150 - 230V)
Over-voltage disconnect(V)	260V (150 - 230V, also off)
Hysteresis(V)	4
Socket type	direct via brass screw terminal
Fused plug	N/A
RFI protection	No
Transient suppression	Yes >6.5kA
Spike protection(J)	160



WIRING

From the incoming mains:

1. Connect Neutral to the Neutral on the terminal block
2. Connect Phase 1 to where the RED WIRE is connected on the contactor
3. Connect Phase 2 to where the YELLOW WIRE is connected on the contactor
4. Connect Phase 3 to where the BLUE WIRE is connected on the contactor

For the outgoing mains: mirror the above connections.

SOLLATEK PRODUCT RANGE COMPARISON CHART

The following chart gives an overview of most of the Sollatek range of products and the protection they offer.

	 Spikes/Surges	 RFI / Noise	 High Voltage	 Low Voltage	 Basic Lightning	 Advanced Lightning	 Power Cuts	 Power-Back Surges	 Telecom Surges	Amps	Single Phase	Three Phase	Connection
HivoltGuard	✓		✓		✓			✓		5	✓		Plug/socket
FridgeGuard	✓			✓	✓			✓		5	✓		Plug/socket
VoltGuard	✓		✓	✓	✓			✓		7	✓		Plug/socket
Automatic Voltage Switcher AVS13	✓		✓	✓	✓			✓		13	✓		Plug/socket
Automatic Voltage Switcher AVS13L	✓	✓	✓	✓	✓	✓		✓		13	✓		Plug/socket
Automatic Voltage Switcher AVS15	✓		✓	✓	✓			✓		15	✓		Plug/socket
Automatic Voltage Switcher AVS30	✓		✓	✓	✓			✓		30	✓		Direct wiring
Automatic Voltage Switcher AVS100	✓		✓	✓	✓			✓		100	✓		Direct wiring
LightningGuard	✓		✓	✓	✓			✓	✓	5	✓		Direct wiring+data
Automatic Voltage Switcher AVS303	✓		✓	✓	✓			✓		23 to 1250		✓	Direct wiring
Automatic Voltage Switcher AVS3P-03	✓		✓	✓	✓			✓		Unlimited		✓	Direct wiring
MultiGuard	✓									13	✓		Plug/socket
SpikeGuard	✓				✓					13	✓		Plug/socket
PureAC	✓	✓	✓		✓					3 to 13	✓		Plug/socket
Distribution Surge protector DSP	✓				✓	✓				Unlimited		✓	Direct wiring
CommsGuard	✓				✓					13			Direct wiring+data
Sollatek Voltage Switcher SVS	✓		✓	✓	✓			✓		1 to 75	✓	✓	Plug/socket+Direct wiring
Automatic Voltage Regulator AVR	✓		✓	✓	✓					up to 700/ phase	✓	✓	Plug/socket+Direct wiring
Ultima UPS	✓	✓	✓	✓	✓		✓	✓	✓	1 to 20	✓		IEC

POWER PROBLEMS
AND THEIR ASSOCIATED CAUSES

All electrical and electronic equipment, connected to the mains supply is at risk of being damaged from spikes, surges, lightning, brown-outs, power-cuts (blackouts), power back surges, and over-voltage. The following is a summary of the main types of power problems, causes and how these affect electrical and electronic equipment.


Spikes/Surges

Spikes/Surge: Very short, (one millisecond) event of very high surge in voltage to thousands of volts and amps. Spikes are common in all parts of the world and repeated exposure to spikes will damage electronic equipment and corrupt data.
What causes it? Switching on/off of nearby equipment, lightning, motors starting etc.


RFI / Noise

RFI (Radio Frequency Interference)/Noise: High frequency disturbances that occur within a short period of time (milliseconds). RFI & noise are very common in all parts of the world and are the main cause of data corruption.
What causes it? Generated by high frequency noise from nearby equipment like TV, radio equipment, transmitters, mobile phones, switching on/off of certain loads, fluorescent lights, motor speed controls, light dimmers.


High Voltage

Over-Voltage: Long duration (milliseconds, seconds, minutes, hours or days) rise in the voltage above acceptable limits. Depending on the level of the over-voltage, the damage can be instantaneous, severe and irreparable.
What causes it? On return of mains supply after power cuts, under-sized utility oscillating between periods of brown-outs and over-voltage or accidental (e.g. accidental connection between two phases).


Low Voltage

Brown-Out: Long duration of low voltage (milliseconds to seconds, minutes, hours or days). Very common in parts of the world especially where the power utilities are over-stretched. Prolonged and frequent brownouts cause the equipment to malfunction or not work at all. Repeated episodes are certain to cause damage. Motors and compressors (and therefore fridges, freezers, coolers, air-conditioners and pumps) are especially at risk. In time, damage is certain.
What causes it? Most commonly an over-stretched utility, especially in areas of poor power distribution infra-structure and remote areas. Common in dry seasons where water is used for electricity generation.


Basic Lightning

Basic Lightning: Direct or nearby strikes can cause minor problems or severe disturbances and damage. Lightning produces spikes/surges, over-voltage or power cuts.
What causes it? The surge is generated by either a direct hit, or indirectly striking underground or overhead lines and transmitting high surges to connected equipment in nearby buildings.


Power Cuts

Power-cuts: Common in many countries in the world, especially in areas of frequent voltage problems. Sudden loss of power can cause damage ranging from corruption of data to mechanical faults as equipment is stopped while in operation.
What causes it? Power or sub station failure, breakdown in the distribution network, or simply a plug being pulled out accidentally.


Power-Back Surges

Power-Back Surges: These typically occur when power returns after a power-cut and connected equipment receives a surge of electricity at an over-voltage level, which can be very damaging (see above).
What causes it? Power back surges are created by the utility, when it restores supply at an above normal voltage in order to compensate for the demand as connected equipment re-starts simultaneously.


Telecom Surges

Telecom surges, spikes and lightning: Short term, high voltage and current phenomena occurring on the telephone lines. Can cause irreparable damage to any piece of equipment connected to the incoming line. The telephone line itself may even be damaged or destroyed in severe cases.
What causes it? Telecom spikes are caused by lightning striking either the telephone line directly or an object near it.