INSTALLATION and OPERATING INSTRUCTIONS

NOVARIS TECHNOLOGIES SURGE FILTERS

Medium Current Three Phase

Thank you for choosing a Novaris Technologies surge filter for your protection requirements. This manual explains the operation and features of your filter as well as installation information. In addition troubleshooting and maintenance guides are provided.

For this filter to function correctly, it must be installed as described. Please instruct your installation personnel to read this manual before proceeding with installation.

WARNING: THIS UNIT IS DESIGNED FOR CONNECTION TO THE AC MAINS. DANGEROUS VOLTAGES EXIST ON COMPONENTS INSIDE THE CASE. THIS PRODUCT MUST BE INSTALLED BY A LICENCED ELECTRICAL CONTRACTOR IN ACCORDANCE WITH AUSTRALIAN STANDARD AS3000 OR THE RELEVANT COUNTRY WIRING RULES.

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1. Operation

Novaris Technologies power line surge filters are designed for the protection of sensitive equipment from the damaging effects of lightning surges, power transients and RF interference.

Novaris Technologies hardwire filters comprise MOV surge protection plus LC low pass filters for both single and three phase applications. The prime surge diverting elements are metal oxide varistors of a rating chosen to suit the application. This is primarily based upon current rating of the filter but high surge rating options are available for high exposure sites.

Three stages of protection include metal oxide varistors, inductors and capacitors forming a low pass filter and a final stage of metal oxide varistors.

The first stage of protection consists of the metal oxide varistors. MOVs are connected between each phase and neutral to absorb transverse mode surges usually generated by load switching and other power system disturbances. These MOVs in conjunction with the gas arrestor between neutral and ground absorb common mode surges most often caused by lightning induced disturbances or power system earth faults.

Novaris Technologies power filters are designed for general installation at any point in a LV distribution system. When installed near a main switchboard close to the building MEN point the neutral-earth components serve no function but are necessary when the filter is installed at distribution boards some distance from the MEN point to remove possible induced common mode voltages.

The second stage of the filter consists of the inductors and capacitors. The LC section low pass filter elements further attenuate surge voltages already clamped by the MOV stages. In addition the filter stages attenuate noise and power system harmonics. Filter cut-off frequency is around 800Hz. The filter stage is designed to attenuate both transverse and common mode noise.

Metal oxide varistors are voltage dependent electrical resistors with symmetrical V/I characteristics. Their resistance value decreases with increasing voltage, thus "short-circuiting" a further rise in overvoltage. The metal oxide varistors in Novaris Technologies filters are conservatively rated to handle a large number of surge events. However due to the unpredictable nature of transients a varistor may occasionally be overloaded. To sense the integrity of each varistor a fuse is connected in series with each MOV.

Should an overload occur the varistor leakage current will increase causing the fuse to blow.

To sense this condition the terminal voltage of each varistor is monitored. A Digital (Percentage active) or LED relevant to MOV condition is normally ON .and an alarm component condition is signalled to the alarm circuitry.

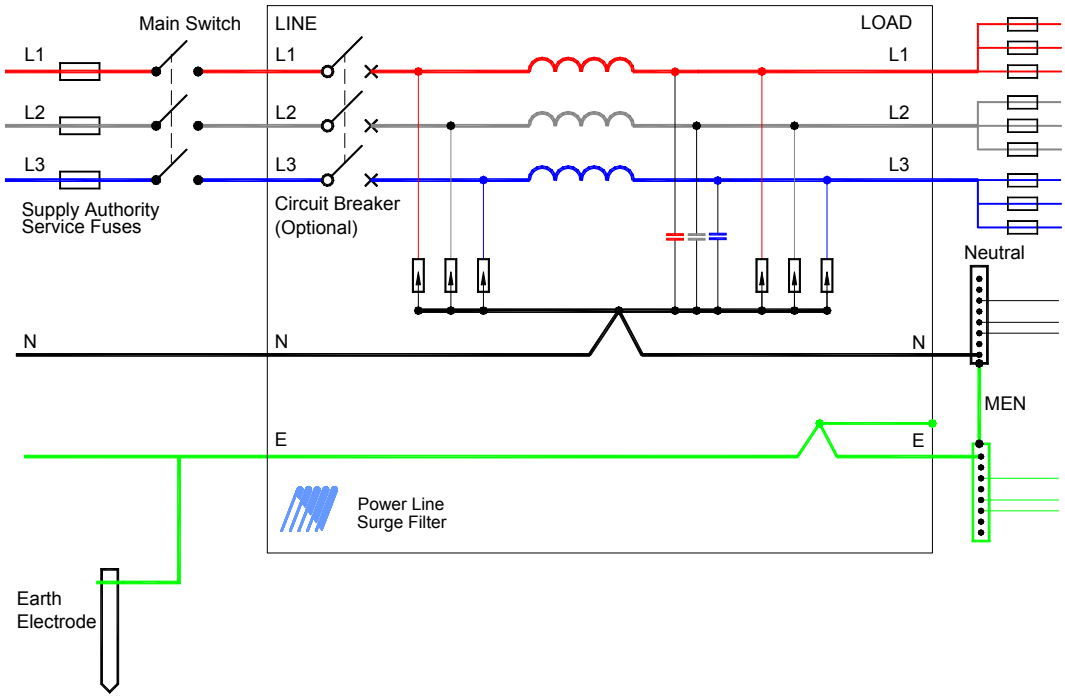
External alarm provision is available via a voltage free changeover contact accessible via terminals on the filter backplane.

2. Specifications

No phases:	3
Rated operating voltage:	240V $AC_{(L-N)}$
Rated VA:	32A 21KVA 40A 28.8KVA 63A 45.3KVA 125 90KVA
Maximum operating voltage:	275V $AC_{(L-N)}$
Insertion voltage drop:	<2V per phase at full load
Efficiency:	99%
Protection modes:	Transverse and common mode
Surge withstand: (8/20us impulse)	SF3xx 16KA per phase SF3xx-40 40KA per phase SF3xx-80 80KA per phase SF3xx-120 120KA per phase SF3xx-160 160KA per phase SF3xx-200 200KA per phase
Frequency response:	3dB point 800Hz
Internal protection:	Each surge diverter individually protected with series fuse and thermal overload indication.
Alarms:	LED display of surge diverter function for 16KA and 40KA versions. Digital display of % active for 80KA-200KA units using MULTIMOV. External alarm via voltage N/O contact. Other options available.
Dimensions backplane:	450H x 350W x 120D – **16kA - 40kA** 450H x 350W x 200D – **40kA – 200kA**
Dimensions enclosure:	500H x 400W x 120D **- 16kA - 40kA** 500H x 400W x 200D **- 40kA – 200kA**
Enclosure:	Pressed steel powdercoated.
Environmental rating:	IP55
Location:	Main switchboard or distribution board in all TN and TT distribution systems.

3. Installation

One of the most important factors determining the performance of Novaris Technologies filters is the manner in which they are installed.



It is mandatory that Novaris Technologies filters be installed by a licensed electrician in accordance with Australian Standard AS3000 or the relevant country wiring rules. To meet AS3000 the filter must be protected by a circuit breaker or fuses of rating equal to the current rating of the filter. 125A filters may be fitted with line fuses. If these are not included the filter must be preceded by external fuses or a circuit breaker.

If some latitude is allowed in the positioning of this filter, choose a location which affords a short direct run to a substantial earthing point, either a station earth bar or switchboard earth bus.

The filter should be installed before any earth leakage protection devices although earth leakage is negligible and once power is applied ELCB operation will not be affected.

The purpose of the filter is to remove surges and other transient overvoltage disturbances which may be caused by induction or direct injection. It is therefore vital to segregate input and output cabling. Do not run these cables in a common duct. Treat the input cabling as "dirty".

The optimum cabling configuration is to run input or line side cabling in the bottom left hand side of the cabinet and output or load cabling out the bottom right hand side.

Correct earthing is essential. Run an earth conductor of size specified in AS3000 or the relevant wring rules to the nearest earth bar or station earth bus. Avoid sharp bends and keep the earth conductor as short as possible. The best earth connection is made with 25 x 3mm copper strap. Otherwise use at least 16mm^2 conductor.

Connect the external alarm if necessary. A voltage free N/O contact is provided. Rewiring the alarm connections to the line and load side surge diverters may modify this. Maximum conductor size is 2.5mm^2. These contact descriptions relate to the power on condition. Under normal operating conditions the relay is energised.

After installation the filter may be tested for continuity and insulation with a hand held multimeter. A megger test will indicate excessive leakage, as it will cause the surge suppression components to operate.

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4. Maintenance

Novaris Technologies surge filters are virtually maintenance free. Should any abnormality arise the filter will initiate an alarm condition, which will enable the external alarm. Inspection of the internal alarms will reveal the nature of the fault. Note that a power failure will be interpreted as an alarm condition.

The surge diverting components are all enclosed in metal cases and may be replaced individually. These devices are either DIN rail mounted and may be clipped in and out. Alternatively MULTIMOV surge diverters may be panel mounted. These are simply held in place with four screws.

DANGEROUS VOLTAGES EXIST INSIDE THE CABINET.
THIS WORK SHOULD ONLY BE CARRIED OUT BY QUALIFIED PERSONNEL.

In all cases of suspected faults contact your distributor or Novaris Technologies Pty Ltd for advice.

A filter exhibiting an alarm condition does not necessarily have to be taken out of service. In most cases some form of protection will still be provided.

80kA, 120kA, 160kA and 200kA versions feature redundant line side MULTIMOV surge diverter segments so that a segment failure will not effect filter performance.

5. Warranty

This is limited to 5 years and is given by Novaris Technologies Pty Ltd (Novaris) to the original purchaser of products made by Novaris ("the products'). The warranty certificate must be completed by the distributor and the purchaser in order to claim under this warranty.

1. What Novaris will do

If the product fails under normal use and service because of a manufacturing defect in materials or workmanship within 5 years from the date of purchase Novaris will at its option, either repair or replace the product with an equivalent product. The repaired or replacement product will be warranted under the terms of this warranty for the remainder of the warranty period for the product originally supplied.

2. How to obtain warranty service

To obtain warranty service you must return the product to Novaris. The product must be accompanied by the warranty certificate duly completed along with your sales receipt or invoice. Freight and insurance is your responsibility.

3. What is not covered

This warranty does not cover any failure of equipment not supplied by Novaris or any consumables* attached to or forming part of the product nor does it cover any failure of or damage to the product due to:

(a) it being connected to equipment or accessories not authorised by Novaris.
(b) improper handling, misuse, neglect, accident, improper installation or non compliance with the directions for use;
(c) any alteration or modification which in the opinion of Novaris will affect the ability to service the product, or
(d) repair by anyone other than an authorised Novaris service agent

No guarantee is given concerning the operation of surge or transient protection products since atmospheric lightning discharges are an unpredictable process subject to the laws of nature and independent of human control. The products do not provide total protection. Component parts of some products may be sacrificial when exposed to the effects of lightning and also voltage surges and transients. Novaris does not guarantee repair or replacement services will be available after expiration of the 5 year warranty period.

4. Rights under the Trade Practices Act

It is acknowledged by Novaris that, under applicable State and Commonwealth Law certain conditions may be implied and rights and remedies conferred on the purchaser in relation to the product which cannot be excluded, restricted or modified by agreement (non excludable rights).

Novaris disclaims all express or implied conditions and warranties in relation to the product other than the express terms of this warranty and any excludable rights. Novaris' responsibility to the Purchaser is, where permitted , limited to the undertakings stated in section 1 of this warranty and subject to the above, in no event is Novaris liable (where before or after discharge of the contract for supply of the product or otherwise) for any loss or damage suffered by the Purchaser as the user caused or contributed to by negligence of Novaris, its servants or agents, nor is Novaris liable for special, incidental, indirect or consequential loss or damage suffered by the Purchaser including but not limited to economic loss, loss of profit or revenue or reputation or costs arising from the loss of use of the product.

*consumables include indicator lamps and illumination sources, items made wholly or partly of glass or ceramic material, electrical elements, transformer windings, electric motors, reconditioned parts and batteries.