PQI HarMitigator™

I_0Filter™

Zero-Sequence Filter for High K-Factor Loads

A Solution for Voltage Distortion and Network Communication Problems

PRODUCT BENEFITS

- Reduces 'penalty losses' due to zero-sequence currents
- Reduces apparatus heating and A/C loading
- Reduces power costs
- Provides an attractive 'payback' and return-on-investment
- Reduces voltage distortion to <4% THD_V at electronic loads
- Reduces neutral-to-ground voltages to <4V at electronic loads
- Restores switch-mode power supply's 'ride-through' capability
- Balances feeder and bus phase currents
- Increases feeder and bus capacity
- Protects upstream neutral conductor
- Increases conventional (K-1) transformer capacity by up to 54%
- Assures system compatibility with sensitive electronic loads

PRODUCT DESCRIPTION

I_0Filters™ are highly effective, three-phase, four-wire, passive electromagnetic filters with ultra-low zero-sequence impedance. These filters have been specifically designed to provide a parallel path for all zero-sequence harmonic currents that are generated by phase-to-neutral connected non-linear electronic loads. Power quality benefits are optimized when filters are installed as close as possible to these electronic loads.

Type 'Z' *parallel shunt* filters are normally applied at all sub-panels, which supply single-phase non-linear electronic loads, via three-phase circuit breakers. Whether specified at the design stage for a new project or applied in an existing sub-system, these filters are normally sized for potential harmonic levels. This application philosophy eliminates the need to increase filter capacity as zero-sequence loading increases in the future.

Type 'Z' filters alone will normally achieve the recommendations and requirements of IEEE Std. 519-1992 in single-phase, non-linear load environments. When it becomes necessary to mitigate the power quality problems associated with positive- and negative-sequence harmonic currents, zero-sequence harmonic filters may be applied in combination with Type 'DY' ***Distribution TransFilters***™.

Type 'YV' *series directional* and 'ZV' *series non-directional* filters are normally applied in series with groups of sub-panels that supply single-phase non-linear electronic loads. Whether specified at the design stage for a new project or applied in an existing sub-system, these filters are normally sized for connected kVA loading. These filters may also be used to mitigate positive- and negative-sequence harmonic currents.

The application of zero-sequence harmonic filters will improve any limitations on branch circuit length and/or loading. These limitations are graphically detailed in two PQI publications entitled: (i) *'Neutral-to-Ground Voltage vs. Branch Circuit Length & Loading for Typical Non-Linear Electronic Workstation Loads'* and (ii) *'Neutral-to-Ground Voltage vs. Branch Circuit Length & Loading for Typical 120V Non-Linear Electronic Gaming Machine Loads'*.

The ROI, payback and power quality benefits associated with ***I_0Filters***™ are maximized when applied as part of an engineered harmonic mitigation solution.

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SELECTION TABLES

Neutral Amps.	KVA	Enclosure Size (Inches)	Weight (lbs.) *
25	3	15.50W x 11.00D x 14.25H	85
40	5	15.75W x 15.50D x 21.00H	120
60	7	15.75W x 15.50D x 21.00H	135
75	9	20.25W x 13.50D x 18.25H	165
100	12	20.25W x 13.50D x 18.25H	210
150	18	20.25W x 18.25D x 18.25H	240
175	21	20.25W x 18.25D x 26.50H	300
225	27	20.25W x 18.25D x 26.50H	310
250	30	20.25W x 18.25D x 26.50H	340
300	36	24.50W x 21.50D x 31.50H	375
350	42	24.50W x 21.50D x 31.50H	400
500	60	24.50W x 21.50D x 31.50H	525
600	72	30.75W x 27.75D x 30.75H	690
800	97	30.75W x 27.75D x 30.75H	860
1000	120	30.75W x 27.75D x 30.75H	900
Other	TBD	TBD	* = Approx

The above weights and measures apply to filters up to 600V with a NEMA 1 enclosure and a standard temperature rise (150°). Multiple output units and some options may change the enclosure size and weights. Consult PQI for detailed product information for these and other configurations. Enclosure provided will be determined by PQI unless otherwise specified.

TECHNICAL SPECIFICATIONS

UL Listed
CSA Approved
Related Standards: CSA C9-M1981, CSA 22.2 No.47-1977
CSA C802.2-00, UL-506, ANSI C75.110
NEMA ST-20, NEMA TP-1

Voltage Class:	1.2kV	[Standards to 35kV]
BIL Rating:	10kV	[Standard for Class]
Voltage:	208/120	[All Standards to 35kV]
Frequency:	60Hz	[50Hz][400Hz][Other]
Type:	ANN	
Temp. Rise:	150^0 C	[130^{0}C][115^{0}C][80^{0}C][Other]
Insulation Class:	220^0 C	

Definitions

Type:	Z (Parallel – Shunt) YV (Series – Directional) ZV (Series – Non-Directional)
ANN	Cooling Medium – Air, Internal & External Circulation - Natural
Hz:	Frequency
kVA:	Power Rating of Filter
V:	Voltage
Temp:	Temperature Rise 150ºC (Standard) [130ºC][115ºC][80ºC] [Other]

Options

Phase Shift: [Type YV only]	0°, 15°, 20°, 30°, 40°, 45° [Other]
Enclosure NEMA 1:	N1 (Standard)
NEMA 3R:	N3R (Optional)
Other:	(Optional)
Analog Meter:	[Measures Neutral Current] (Optional)
TS:	Thermal Sensors
Color:	PQI White [ASA 61 Gray][Other]

Catalogue Number Configuration

Type(Phase Shift)–Hz–kVA–V–Temp–Options

Sample Catalogue Number

Z– 60–009–120/208–150–N3R

PQI HarMitigator™ & I_0Filter™ for High K-Factor Loads are trademarks of *POWER QUALITY* INTERNATIONAL, INC.

PQI Warranty - 10 years pro-rated.
All specifications are subject to change without notice. Revision 1, January 2005

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