

Description

The AIM FA series single-phase Active Harmonic Filters (AHFs) are designed to isolate harmonic currents and thereby protect equipment on your power distribution system, with or without compensation displacement power factor (dpf – phase shift).

The AIM FA AHFs should be used in power circuits of widely dispersed computer networks in banks, dealing rooms and ‘smart devices’ in buildings.

The AIM FA series single-phase AHFs can be installed without modification to existing power line wiring, and will operate without any adjustments as equipment variations cause power line conditions to change.

Benefits

- Reduction of harmonic distortion;
- Reduction of peak line current;
- Reduction of rms current;
- Reduction of start-up current on switch on;
- Reduction of potentially harmful network interference;
- Reduction of power cable cross-section;
- Reduction in size of line fuses;
- Prevents overheating in power distribution equipment and wiring, often referred to as ‘smoking neutrals’;
- Prevents unnecessary limitations on normally available power;
- Prevents interference, ‘glitches’ and loss of data in computers, telephone and other information transmission equipment;
- Prevents damage to power sensitive user equipment.

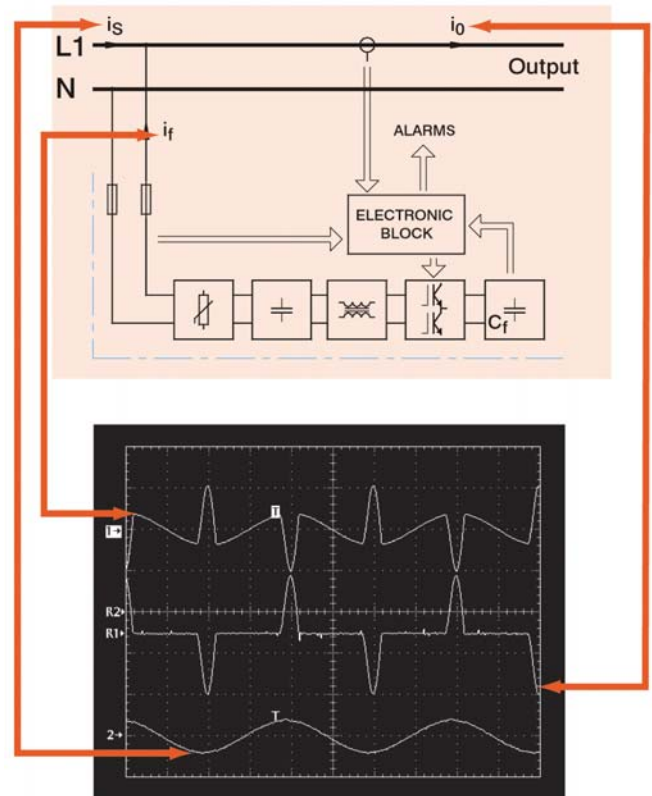


19 inch Rack Version

Operating Principles

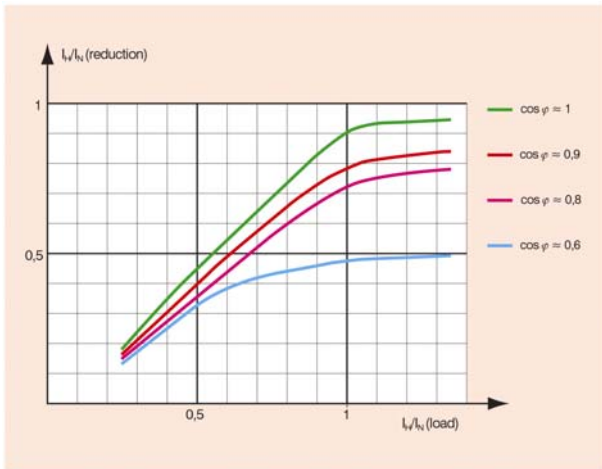
The following are shown on the diagram: input fuses, surge protection system, passive LC Filter, transistor inverter (IGBT), capacitor bank C_f , connected in a steady-voltage circuit, and control unit. The control unit determines the shape of the current generated by the inverter by comparing the load current with a model sine wave. This current results in a sinusoidal flow of current from the AC network when added to the current of the load. The operation of the active filter is possible due to a bi-directional energy flow within the inverter-capacitor system (C_f).

Fig 1. Current Flow Diagram

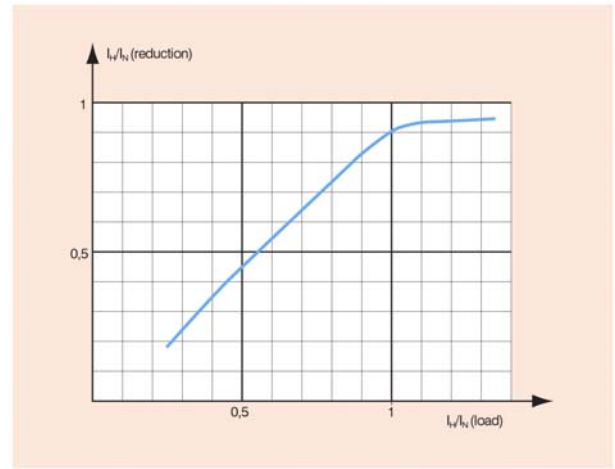


15Amp AIM AHF

Efficiency of the Active Filters - Nonograms



Total load current harmonic reduction
– compensation displacement power factor ON

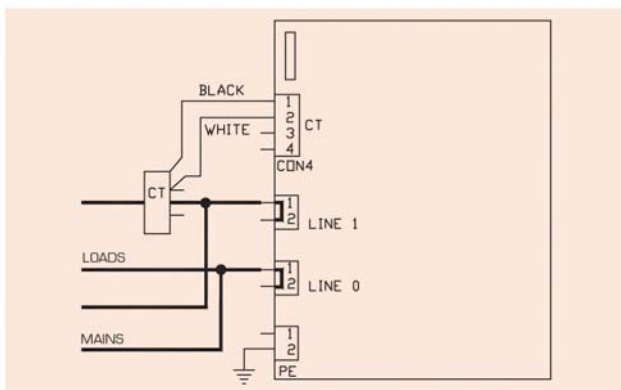


Total load current harmonic reduction
– compensation displacement power factor OFF

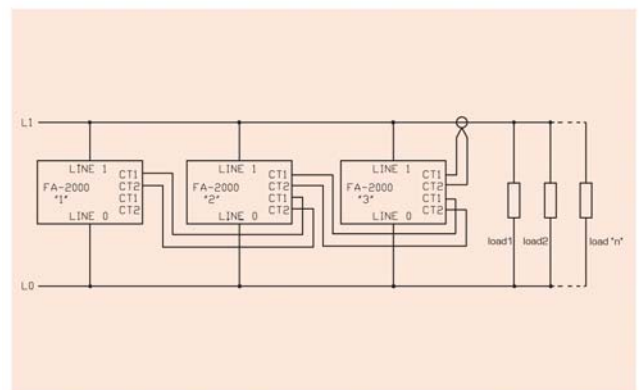
ATTENUATION COEFFICIENT OF HARMONICS (for nominal load)

Component number	2	3	4	5	7	8-11	12-15	16-21	22-27	28-31
Load I_H / Line I_H	10	15	20	25	30	30	15	7	7	6

System Configurations

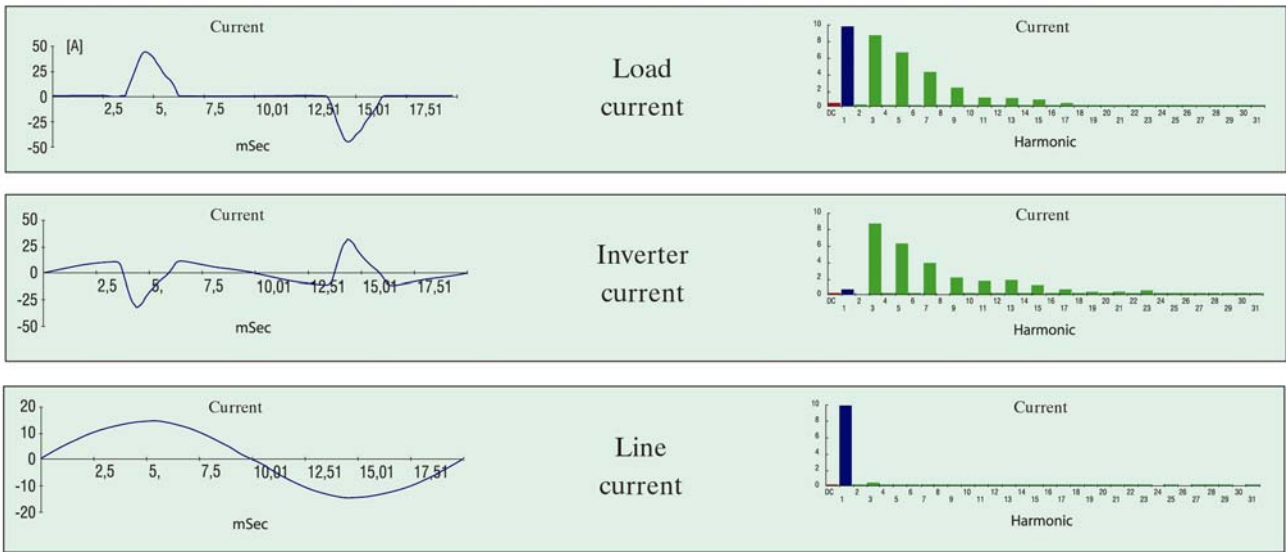


Terminals of phase circuits
for the single phase filter



Installation diagram for the parallel operation
of three single-phase filters

Typical Measurements for PC-Type Load



Load current: Single Phase Readings					Line current: Single Phase Readings				
	Frequency	Power	RMS	Current		Frequency	Power	RMS	Current
	49,97	2,21	15,46	228,2		49,97	2,25	15,46	228,3
		3,53	45,99	316,3			2,26	45,99	316,1
		0,16	0,3	0,3			0,0	0,3	0,3
		14,59	2,98	1,39			4,75	2,98	1,52
	4° lead	0,63	2,08	2,08		4° lead	0,64	2,17	2,17
		1,00	16,03	4,8			1,00	1,22	4,9
Harm.	Freq.	V Mag	%V RMS	V F°	I Mag	%I RMS	I F°	Power (KW)	
DC	0,00	0,34	0,15	0	0,43	2,75	0	0,00	0,00
1	49,97	228,14	99,98	0	9,79	63,39	4	2,23	2,25
2	99,94	0,25	0,11	103	0,34	2,18	91	0,00	0,00
3	149,90	1,77	0,77	132	8,59	55,62	-172	0,01	0,00
4	199,87	0,03	0,01	-134	0,22	1,42	-93	0,00	0,00
5	249,84	3,97	1,74	170	6,53	42,23	15	-0,03	0,00
6	299,81	0,09	0,04	68	0,08	0,53	82	0,00	0,00
7	349,78	1,81	0,79	-18	4,18	27,06	-155	-0,01	0,00
8	399,74	0,05	0,02	77	0,03	0,20	128	0,00	0,00
9	449,71	0,38	0,16	-106	2,19	14,20	47	0,00	0,00
10	499,68	0,03	0,01	-59	0,09	0,57	-76	0,00	0,00
11	549,65	0,09	0,04	65	1,18	7,61	-88	0,00	0,00
12	599,62	0,08	0,03	90	0,08	0,53	94	0,00	0,00
13	649,58	0,28	0,12	-33	1,04	6,76	139	0,00	0,00
14	699,55	0,02	0,01	-59	0,03	0,20	-93	0,00	0,00
15	749,52	0,09	0,04	-32	0,88	5,70	-20	0,00	0,00
16	799,49	0,03	0,01	-120	0,02	0,12	-61	0,00	0,00
17	849,46	0,16	0,07	53	0,49	3,16	174	0,00	0,00
18	899,42	0,06	0,03	122	0,04	0,28	94	0,00	0,00
19	949,39	0,20	0,09	-60	0,09	0,57	40	0,00	0,00
20	999,36	0,05	0,02	-96	0,04	0,24	-107	0,00	0,00
21	1049,33	0,02	0,01	-78	0,22	1,42	-23	0,00	0,00
22	1099,30	0,05	0,02	57	0,01	0,08	34	0,00	0,00
23	1149,26	0,08	0,03	133	0,25	1,62	163	0,00	0,00
24	1199,23	0,02	0,01	111	0,03	0,20	148	0,00	0,00
25	1249,20	0,08	0,03	-66	0,12	0,77	-32	0,00	0,00
26	1299,17	0,02	0,01	115	0,03	0,20	-32	0,00	0,00
27	1349,13	0,08	0,03	25	0,11	0,73	39	0,00	0,00
28	1399,10	0,00	0,00	-164	0,03	0,16	119	0,00	0,00
29	1449,07	0,08	0,03	156	0,21	1,38	-160	0,00	0,00
30	1499,04	0,05	0,02	-60	0,01	0,08	172	0,00	0,00
31	1549,01	0,05	0,02	-4	0,21	1,33	17	0,00	0,00

Product Specifications

Technical Data: AIM FA Series Single Phase Active Harmonic Filters

Model Number	Input Voltage (V)	Frequency (Hz)	Output Current (Arms)	Corrected Power (KVAR)	Power Losses (W)	Dimensions H x W x D (mm)	Weight (Kg)
FA-2000-120	120	60	30	3	170 W	210 x 175 x 370	9
FA-2000-208	208	60	15	3	150 W	210 x 175 x 370	9
FA-2000-230	220/230	50	15	3	150 W	210 x 175 x 370	9
FA-2000-380	380/400	50	10	3	120 W	210 x 175 x 370	9

General Specification

Input Voltage

Input Frequency:

Ambient Temperature:

Altitude:

Humidity:

Input Interrupting Capability:

Transient Withstanding Capacity:

Parameter Adjustments:

Protection Class

Control and Indication Panel

Remote Indicator (Relay Output)

Output Performance: (Typical)

- Single Phase – 120, 208, 220, 230, 380, 400V; $\pm 10\%$
- 50 or 60 Hz, $\pm 1\%$
- Enclosed Operating – From 0°C to 40°C
- Chassis Operating - From 0°C to 55°C
- Storage - From -30°C to +85°C
- Sea level to 1000 Meters without derating
- 95% noncondensing
- Less than 15KVA – 100,000 A fuses.
- Greater than 15KVA – 200,000 A fuses.
- Per IEEE 587.
- None required.
- IP 20
- Switch
 - On / Off / Reset
- Indicators
 - Power Applied
 - Operate
 - Fault
 - At maximum capacity
 - Temp Warning
- Temperature
- Voltage
- Fault
- % THD – Less than 5% total, no one harmonic in excess of 3% (voltage).
- % TCD - Less than 5% total, no one harmonic in excess of 3% (current).

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