HPS TruWave™

Active Harmonic Filter

power to perform

Hammond Power Solutions

HPS TruWave™
Active Harmonic Filter

HPS TruWave™ active harmonic filter (AHF) is a comprehensive and flexible solution for harmonic mitigation. It provides the advanced control and proven reliability that your facility needs to solve power quality issues.

It monitors the load current and very quickly responds to the power system distortion as it develops. A corrective current is injected to effectively cancel out the harmonics required from the upstream power source. The result is a harmonic load on the power system that is acceptable, with more balanced current and voltage waveforms.

HPS TruWave operates at one of the highest efficiencies for any AHF, ensuring that losses are minimized. HPS TruWave is a critical addition to any plant or facility requiring IEEE-519 compliance.

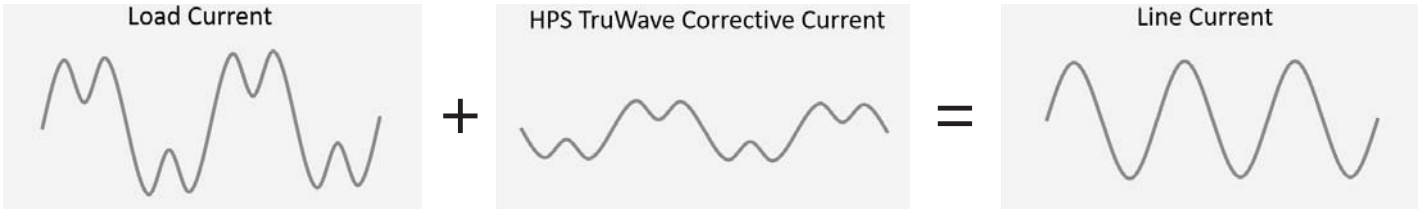
POWER QUALITY & HARMONIC DISTORTION

Power quality problems are one of the major causes of unscheduled down time, equipment malfunction and damage. The majority of power quality issues are a result of harmonic distortion.

Causes: Non-linear loads such as variable frequency drives (VFDs), DC drives and induction heating systems.

Consequences:
- Overheating of electrical equipment
- Loss of efficiency
- Nuisance tripping
- Premature equipment failure
- Interference with communication systems

POWER QUALITY & HARMONIC DISTORTION SOLUTION



Current harmonics generated by VFDs.

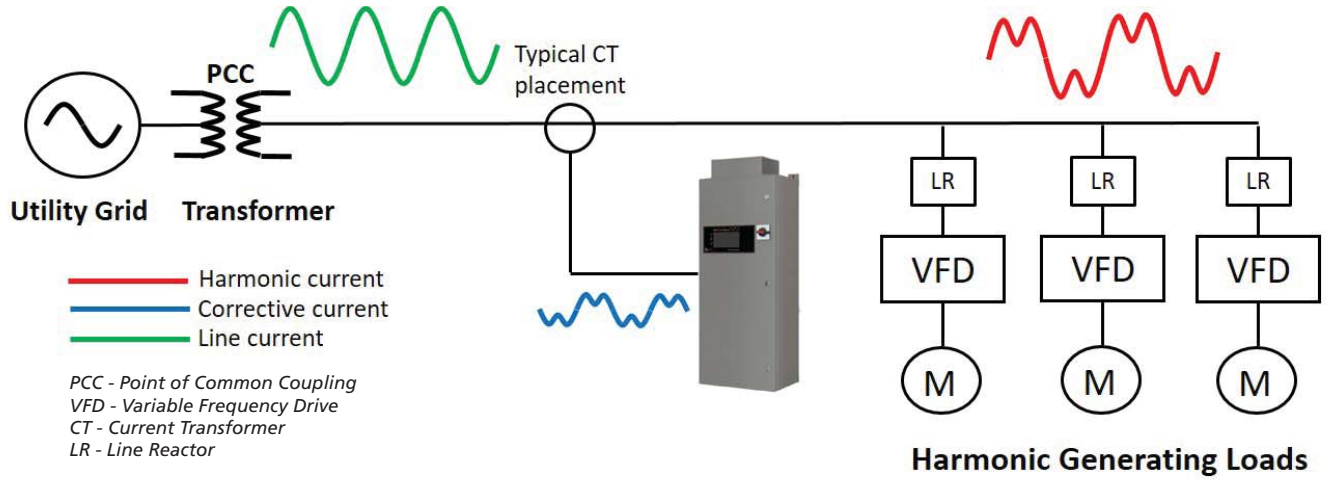
Corrective current injected by Active Filter

Line current with a minimum power losses and disturbances seen by power system

HPS TruWave OPERATION PRINCIPLE

Each AHF unit is connected in parallel with non-linear loads that require harmonic compensation. The current sensors placed on the bus are continuously monitoring the load harmonics. The switching devices (IGBTs) inside the AHF unit inject the corrective currents to cancel out harmonic currents generated by non-linear loads. The result is an ideal line current with minimum power losses and disturbances seen by the transformer.

Example Installation



WHAT YOU GAIN

Compared to other power quality technologies HPS TruWave provides an efficient and reliable solution.

Profitability
Active harmonic filters are the world's most flexible solution for power quality issues.

Energy Savings
Combine the most efficient active harmonic filters with proven system efficiency gains.

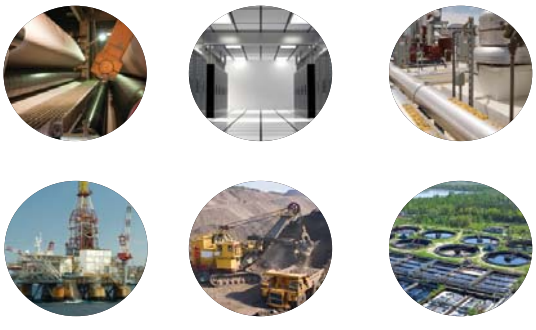
Improved Reliability
Increased electrical power quality results in increased uptime and reduces nuisance tripping events.

Advanced Remote Management
Scaling of different size CTs is accomplished with front LCD touchscreen.

APPLICATIONS

Critical applications require IEEE-519 compliant power systems. Below are some examples of industries with critical applications:

- Chemical Processing
- Data Centers
- HVAC Systems
- Material Handling
- Mining
- Oil & Gas
- Pulp & Paper
- Hospitals
- Wastewater Treatment Plants



HPS TruWave™
Active Harmonic Filter

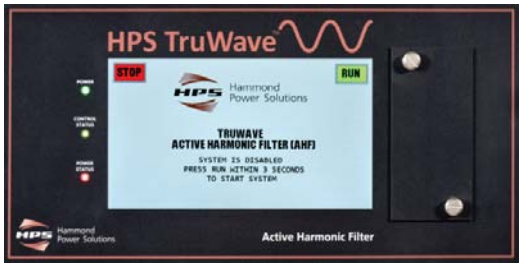
ADDED FEATURES FOR IMPROVED PERFORMANCE

The HPS TruWave™ is a true Active Filter and is a comprehensive solution for harmonic mitigation and power factor correction.

- Actively reduces harmonic distortion to below 5% complying with IEEE-519 recommendation
- Improves power factor resulting in decreased utility cost
- Parallel system installation to accommodate large scale applications
- 98% operation efficiency to lower operational costs and increased reliability
- Balances three phase loads for increased usable system capacity
- Corrects for single/multiple loads enabling cost effective solutions

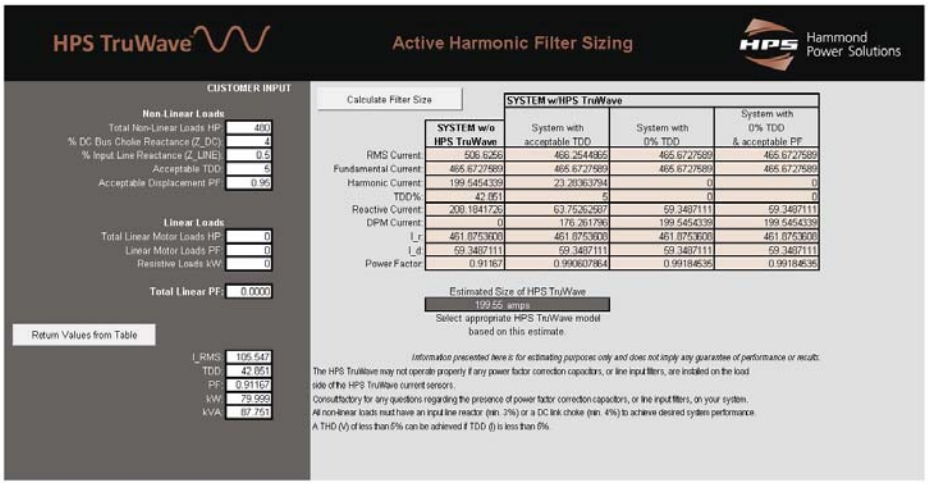
ADVANCED LCD TOUCHSCREEN DISPLAY

- Detailed power quality information for evaluation of the effectiveness of the system
- Detailed historical data
- FDR data information
- LED indicators
- Firmware update via front panel interface with flash drive
- Troubleshooting via the front display, serially over ethernet, or using flash drive
- Easy access to ethernet communication interface
- CT diagnostic and auto-correction



ACTIVE HARMONIC FILTER SIZING TOOL

HPS TruWave™ AHF can be sized using an Excel-based program. It uses your basic system data to generate accurate harmonic and power quality analysis to select the HPS TruWave unit for your unique applications.



Specifications

Hammond Power Solutions

Electrical Product Characteristics

Voltage Rating:	208-480 VAC; +12%/-15% (600 VAC with the use of autotransformer) 3 phase, 3 wire, plus ground
Current Rating:	50A, 100A, 150A, 200A, 300A @208-480VAC (40A, 80A, 120A, 160A, 240A @600VAC)
Frequency:	50Hz or 60Hz, ±5Hz

Please consult HPS for system configuration requiring 4 wire systems.

Environmental Conditions

Ambient Operating Temperature:	0°C to 40°C
Humidity:	95% maximum non-condensating
Altitude:	≤ 1000m, (derate 1% per 100m above)
Storage Temperature:	-20°C to +60°C
Cooling Configuration:	Internal forced air
Enclosure Type:	Open or Type 1

Technical Product Characteristics

Harmonic Attenuation:	< 5% TDD as per IEEE 519-2014 (typically requires either 3% line reactor or 4% DC choke)
Harmonic Cancellation:	2nd to 51st
Power Factor:	Up to 0.99 immediately upstream of installation point - may depend on system loading
Efficiency:	98% at full load (industry-leading)
Control Scheme:	Full spectrum cancellation
Control Response Time:	500µs (industry-leading)
Overload Capability:	300% peak, 100% RMS
Display:	6" by 3.5" dust tight graphic colour LCD touchscreen
Operator Interface:	HMI colour LCD touch screen
Approval:	UL & cUL Listed
Display Parameters:	Power quality information, operating parameters, operational status
Touchscreen Functions:	Run, stop, menus, parameter set-up
Communication Capability:	Ethernet (optional Ethernet/IP and Modbus TCP)
Parallel Operation:	Up to 10 units per set of CT
Protection Class:	Class T fuses rated at 200,000 AIC

Current Transformer (CT) Information: Required with each AHF

Current Transformer:	5 A secondary; 400 Hz rated Accuracy: 1-4%
Quantity of CT:	2 for 3 phase loads (3 required when line to neutral single phase loads present)
CT Position:	Phase A and B of the incoming line (3 phase loads); Phase C (if single phase loads present)
CT Programming:	Via front LCD touch screen

Part Number Guide

	ACTIVE FILTER MODEL NUMBER											OPTIONS INDICATOR[1]			
	Family				Generation	Voltage Rating	Current Rating			Filter Enclosure		Suffix			
Example	W	A	H	F	1	K	1	0	0	F	-	E	6	P	1
	WAHF = TruWave Active Harmonic Filter Prefix				1 = 1st Generation	D = 240V K = 480V	050 = 50A 100 = 100A 150 = 150A 200 = 200A 300 = 300A			F = Open Frame A = Type 1		Communication Options: E = Ethernet[2] I = Ethernet/IP T = Modbus TCP Frequency Options: 6 = 60Hz[2] 5 = 50Hz Voltage Options: B = 208V H = 400V P = 600V - requires autotransformer Used on system greater than 480V[3]: 1 = Autotransformer provided by HPS 2 = Autotransformer provided by customer			

[1] Options Indicator = Separate items that are either configured via software, factory installed or stand alone.
[2] Default options - ignore if all following characters are default values.
[3] 480V units can also be used up to 690V, with an autotransformer. The current rating at higher voltage will be derated.

We're here to support you

No other company can offer our service and quality in a full range of products.

Fast On-Site Response

On-site technicians are available to assist with any technical problems or issues that cannot be resolved over the phone.

Partner Support

HPS is supported by a National Representative and Distributor network.

Power Quality Products

We carry an extensive inventory of other power quality solutions including Harmonic Mitigating Transformers, Drive Isolation Transformers and Reactors.

Live Telephone Technical Support

Our inside sales team is available to quickly answer your questions. They are technically trained and able to answer most questions right over the phone.

Online Training

HPS Academy has many interactive training presentations on topics such as our products, company, regulations and so much more. Short quizzes are available to ensure participants understand the information presented.
www.hpsacademy.com

Technical Webinars

HPS offers interactive webinar presentations to provide customers with detailed product solutions. To schedule a webinar email:
marketing@hammondpowersolutions.com

240V System Voltage Open Frame 60 Hz

Rated Current	Catalog Number	Enclosure	Frame	Overall Dimensions (Inches)			Approx. Weight (lbs.)	Watts Losses (kW)	Mtg Type W - Wall F - Floor
				Width	Depth	Height			
50	**WAHF1D050F**	Open	WF1	16.9	12.7	45	135	0.9	W
100	**WAHF1D100F**	Open	WF2	16.9	12.7	45	175	1.7	W
150	**WAHF1D150F**	Open	WF3	22	13.7	54	245	2.5	W
200	**WAHF1D200F**	Open	WF4	22	13.7	54	280	3.3	W
300	**WAHF1D300F**	Open	WF5	27	13.7	56	400	5.1	F

240V System Voltage Type 1 60 Hz

Rated Current	Catalog Number	Enclosure	Frame	Overall Dimensions (Inches)			Approx. Weight (lbs.)	Watts Losses (kW)	Mtg Type W - Wall F - Floor
				Width	Depth	Height			
50	**WAHF1D050A**	Type 1	WA1	21	14.25	53	230	0.9	W
100	**WAHF1D100A**	Type 1	WA1	21	14.25	53	270	1.7	W
150	**WAHF1D150A**	Type 1	WA2	27	16.5	63.5	440	2.5	W
200	**WAHF1D200A**	Type 1	WA2	27	16.5	63.5	480	3.3	W
300	**WAHF1D300A**	Type 1	WA3	33	18	75	630	5.1	F

480V System Voltage Open Frame 60 Hz

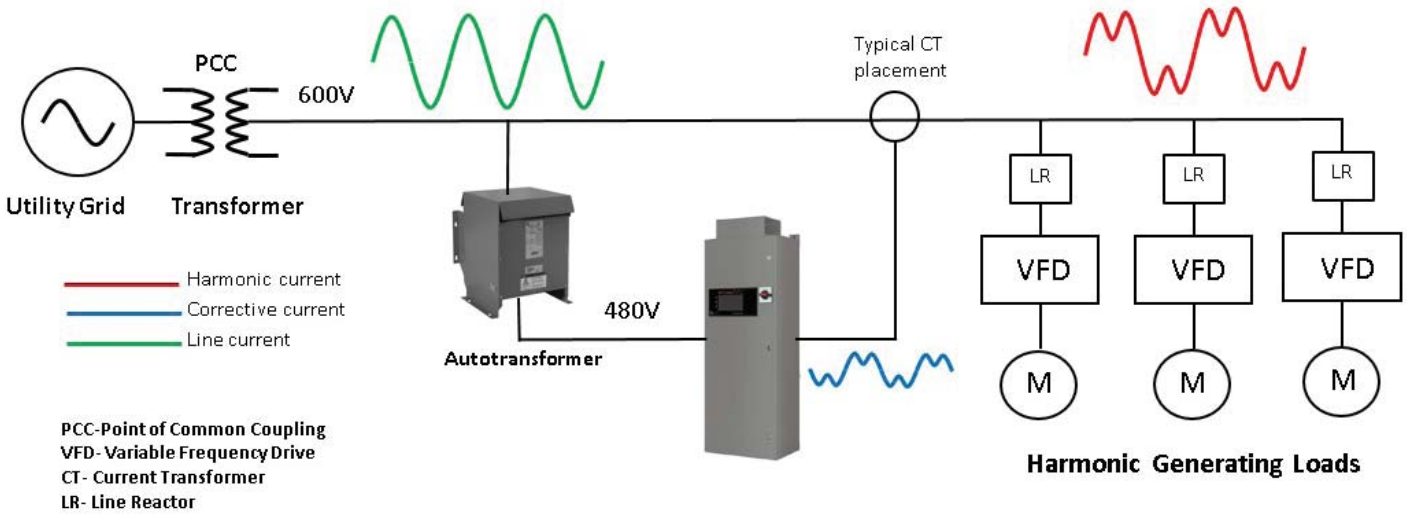
Rated Current	Catalog Number	Enclosure	Frame	Overall Dimensions (Inches)			Approx. Weight (lbs.)	Watts Losses (kW)	Mtg Type W - Wall F - Floor
				Width	Depth	Height			
50	**WAHF1K050F**	Open	WF1	16.9	12.7	45	135	0.9	W
100	**WAHF1K100F**	Open	WF2	16.9	12.7	45	175	1.7	W
150	**WAHF1K150F**	Open	WF3	22	13.7	54	245	2.5	W
200	**WAHF1K200F**	Open	WF4	22	13.7	54	280	3.3	W
300	**WAHF1K300F**	Open	WF5	27	13.7	56	400	5.1	F

480V System Voltage Type 1 60 Hz

Rated Current	Catalog Number	Enclosure	Frame	Overall Dimensions (Inches)			Approx. Weight (lbs.)	Watts Losses (kW)	Mtg Type W - Wall F - Floor
				Width	Depth	Height			
50	**WAHF1K050A**	Type 1	WA1	21	14.25	53	230	0.9	W
100	**WAHF1K100A**	Type 1	WA1	21	14.25	53	270	1.7	W
150	**WAHF1K150A**	Type 1	WA2	27	16.5	63.5	440	2.5	W
200	**WAHF1K200A**	Type 1	WA2	27	16.5	63.5	480	3.3	W
300	**WAHF1K300A**	Type 1	WA3	33	18	75	630	5.1	F

600V Operation

In order for AHF to operate at 600V, an autotransformer is required. The resultant 600V current will be de-rated by a factor of 1.25.



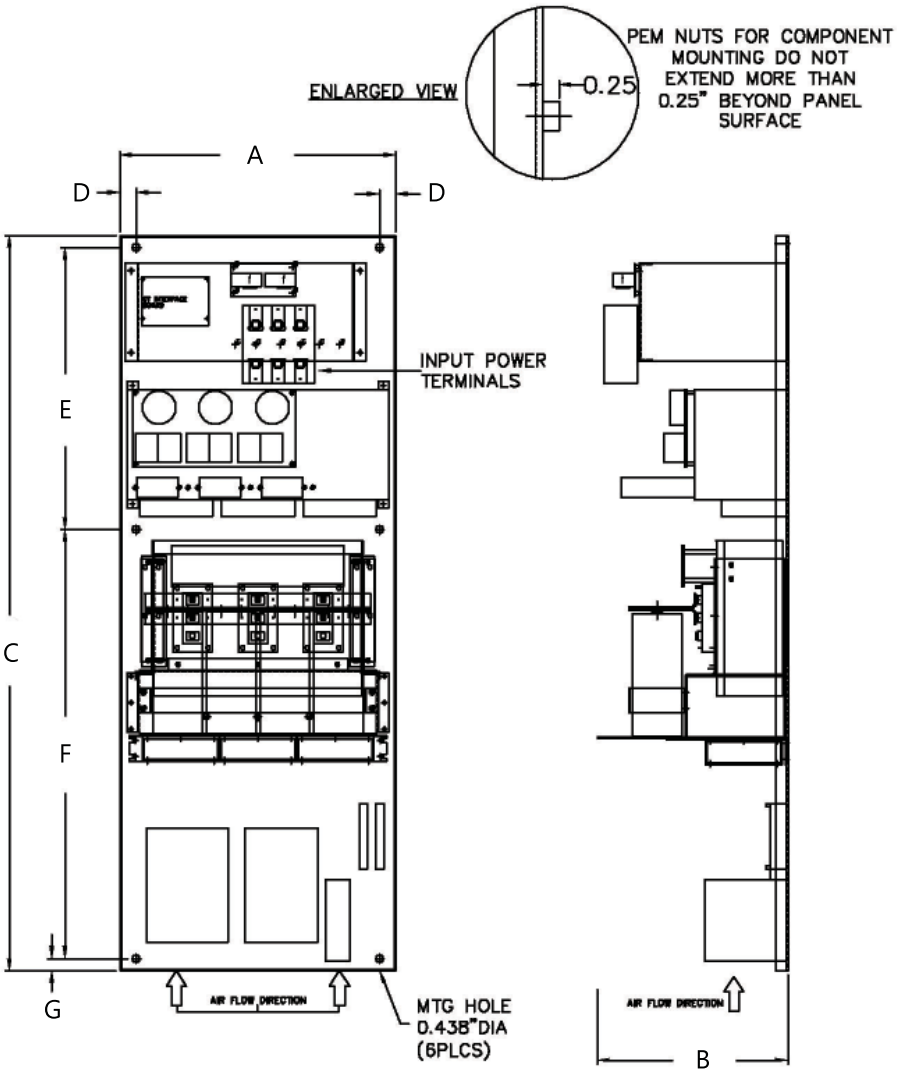
600V System Voltage (480V units with an autotransformer) Open Frame 60 Hz

Rated Current with Autotransformer	Items Required	Enclosure	Frame	Overall Dimensions (Inches) Width	Depth	Height	Approx. Weight (lbs.)
40	**WAHF1K050F-E6P1**	Open	WF1	16.9	12.7	45	135
	Autotransformer	Type 3R	-	23.9	25	28.75	360
80	**WAHF1K100F-E6P1**	Open	WF2	16.9	12.7	45	175
	Autotransformer	Type 3R	-	23.9	25	28.75	360
120	**WAHF1K150F-E6P1**	Open	WF3	22	13.7	54	245
	Autotransformer	Type 3R	-	23.9	25	28.75	425
160	**WAHF1K200F-E6P1**	Open	WF4	22	13.7	54	280
	Autotransformer	Type 3R	-	23.9	25	28.75	425
240	**WAHF1K300F-E6P1**	Open	WF5	27	13.7	56	400
	Autotransformer	Type 3R	-	26	25	38	715

600V System Voltage (480V units with an autotransformer) Type 1 60 Hz

Rated Current with Autotransformer	Items Required	Enclosure	Frame	Overall Dimensions (Inches) Width	Depth	Height	Approx. Weight (lbs.)
40	**WAHF1K050A-E6P1**	Type 1	WA1	21	14.25	53	230
	Autotransformer	Type 3R	-	23.9	25	28.75	360
80	**WAHF1K100A-E6P1**	Type 1	WA1	21	14.25	53	270
	Autotransformer	Type 3R	-	23.9	25	28.75	360
120	**WAHF1K150A-E6P1**	Type 1	WA2	27	16.5	63.5	440
	Autotransformer	Type 3R	-	23.9	25	28.75	425
160	**WAHF1K200A-E6P1**	Type 1	WA2	27	16.5	63.5	480
	Autotransformer	Type 3R	-	23.9	25	28.75	425
240	**WAHF1K300A-E6P1**	Type 1	WA3	33	18	75	630
	Autotransformer	Type 3R	-	26	25	38	715

FIGURE 1

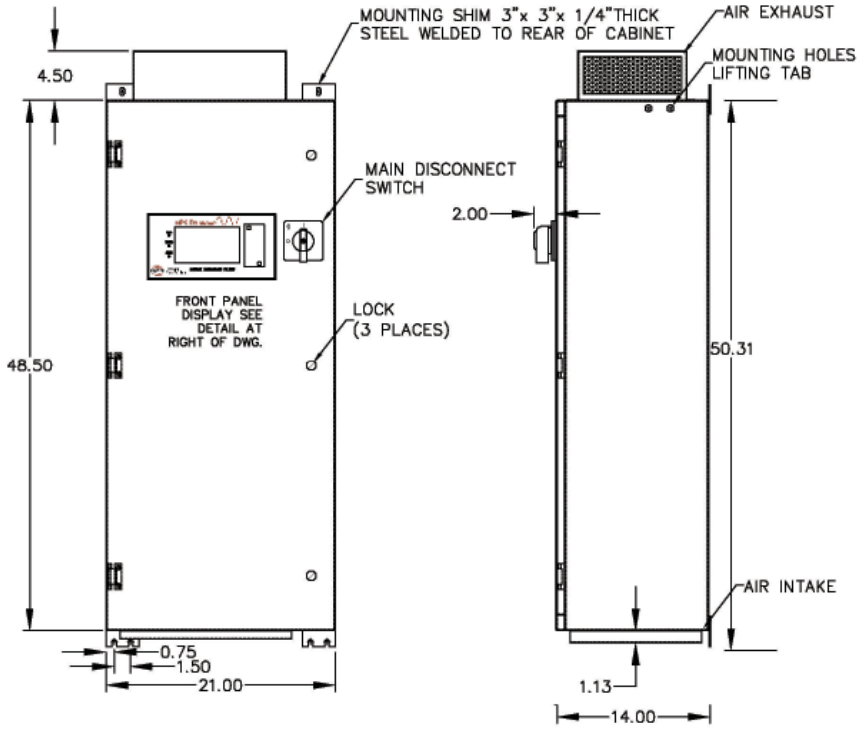


FRONT VIEW SIDE VIEW

Panel Style	Fig. #	Dimensions in Inches						
		A	B	C	D	E	F	G
WF1	1	16.90	11.70	45.00	1.00	17.25	26.25	0.75
WF2	1	16.90	12.82	45.00	1.00	17.25	26.25	0.75
WF3	1	22.00	12.54	54.00	1.00	20.50	32.00	0.75
WF4	1	22.00	13.54	54.00	1.00	20.50	32.00	0.75
WF5	1	27.00	13.56	56.00	1.00	21.50	32.50	1.00

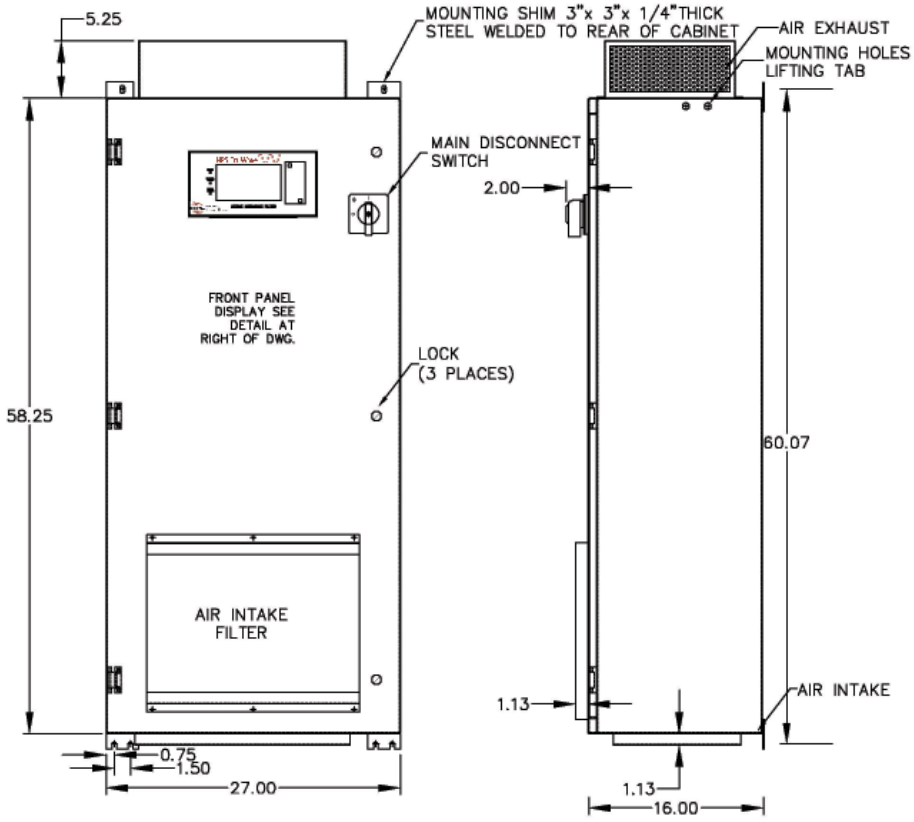
Enclosed Drawings

FIGURE WA1



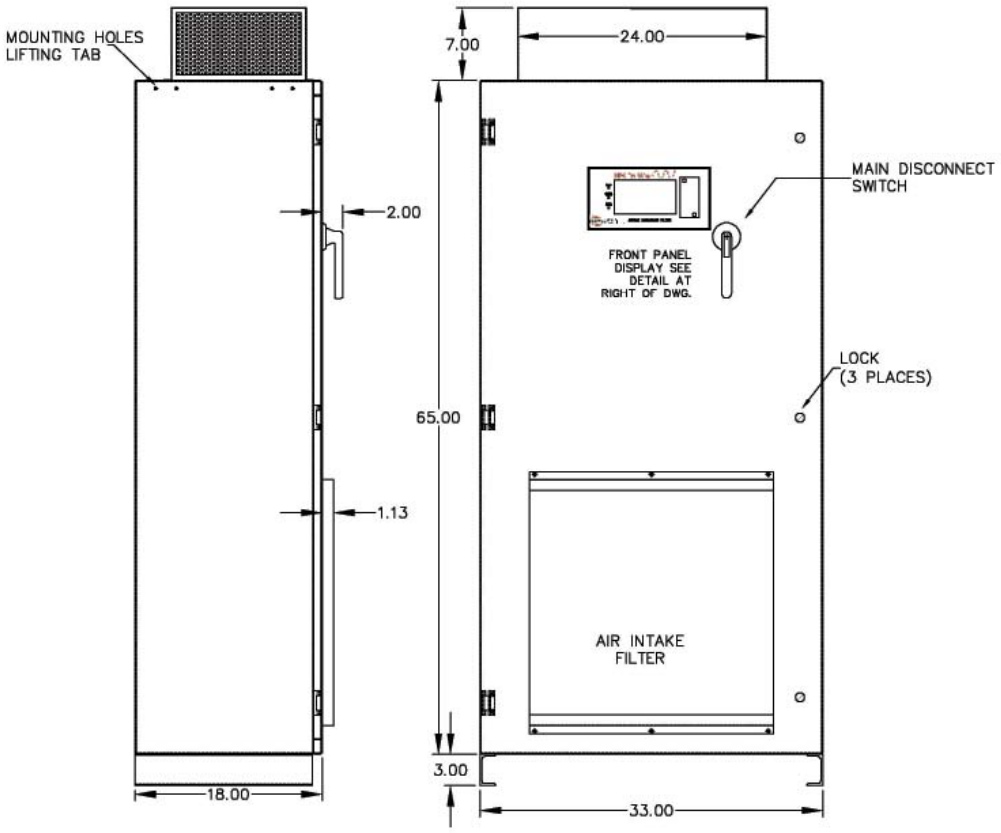
FRONT VIEW SIDE VIEW

FIGURE WA2



FRONT VIEW SIDE VIEW

FIGURE WA3



SIDE VIEW FRONT VIEW

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Distributed by:

TRUBRO
April 2019