

## THE WORLD'S FIRST RACK MOUNTED Active Power Filter **Enersine ESD34**

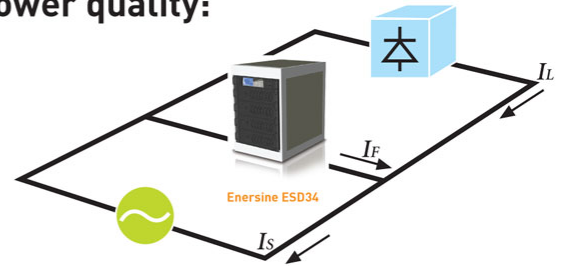


### Enersine ESD34 Benefits

- Remove Odd & Even Harmonics from 2<sup>nd</sup> to 51<sup>st</sup> orders
- Improve lagging & leading Power Factor at input to loads
- Compensate unbalance Loads
- Reduce Apparent Power (kVA) consumption at supply source
- Help avoid the need for oversized neutral conductors and transformer
- Help resolve nuisance tripping of MCCBs due to harmonics

## Enersine ESD34, the true harmonic solution, is a solid-state power converter that brings about the following advantages to improve power quality:

- Remove Odd & Even Harmonics from 2<sup>nd</sup> to 51<sup>st</sup> orders.
- Improve lagging & leading Power Factor at input to loads
- Compensate unbalance Loads
- Reduce Apparent Power (kVA) consumption at supply source
- Help avoid the need for oversized neutral conductors and transformer
- Help resolve nuisance tripping of MCCBs due to harmonics



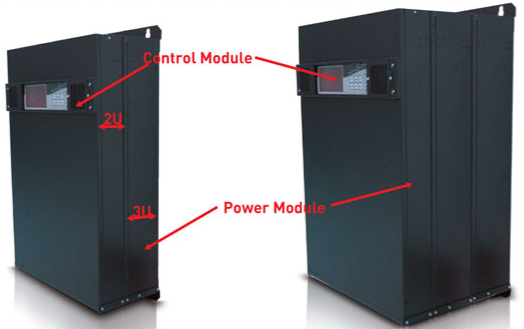
### Harmonic Attenuation Ratio

The compensation ability of the Enersine APF is defined in terms of Harmonic Attenuation Ratio (HAR, ILH, ISh). Typically it is greater than 10.

Enersine APF behaves like a harmonics current generator. It will measure the harmonics generated from the non-linear loads and cancel these harmonics with a newly generated, opposite phase shifted harmonics current of the same amplitude.

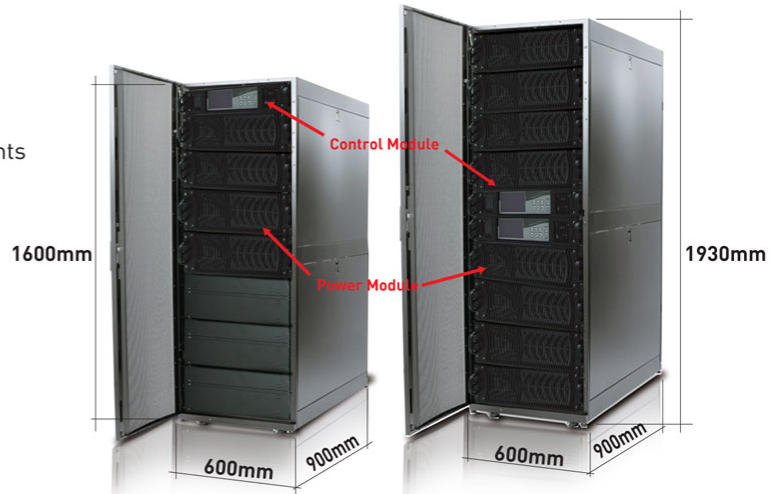
## Rack/Wall Mount Design

The APF is designed in standard 19" rack mounting and wall mounting configuration, which enables its integration even in the most difficult of environment with space constraints



Wall Mount 30A system

Wall Mount 60A system



Rack Mount 120A system

Rack Mount 240A system

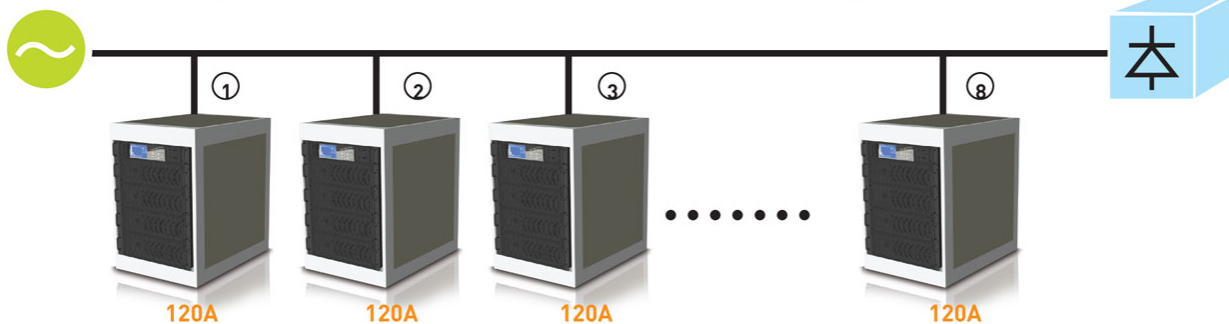
## Power Modules Flexibility

The APF is fully modular, which allows the addition of up to 4 power modules to achieve higher power rating in the system for future expansion.



## System Modules Flexibility

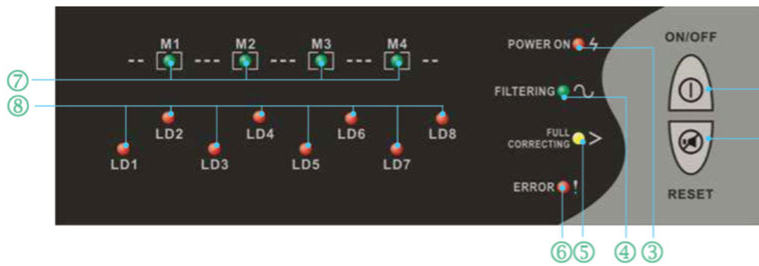
Install for operation in parallel to increase system power capacity. The maximum parallel operation configuration is 8 control modules using same or different capacities, with maximum rating of 960A for common CT sensing.



Max. 120A x 8 = 960A

## User-Friendly Control Panel

Enersine APF is equipped with a user friendly control panel with 16 LED indicators. It is simple to turn the unit on or off and features buzzer silence and system status from 4 LEDs including Power On, Filtering, Full Correcting, & Error.

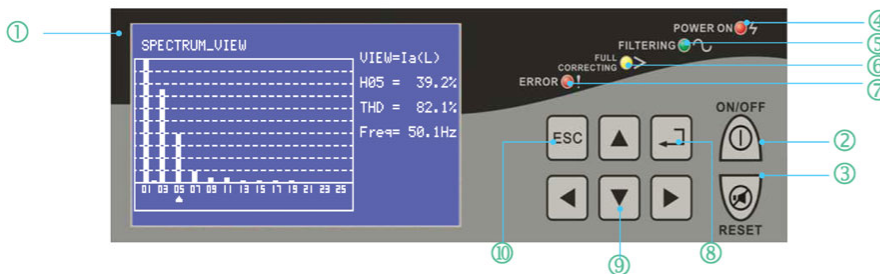


- 1 ON/OFF Keypad
- 2 Reset (& Alarm Silence) Keypad
- 3 Power On Indicator
- 4 Filtering Indicator
- 5 Full Correcting Indicator
- 6 Error Indicator
- 7 Power Module Status Indicators
- 8 Alarm Indicators

## Optional - LCD Control Panel

The LCD panel comes with special blue back light display offering access to all parameters, waveforms, & spectrums for management of both Enersine and system power quality. The graphic LCD display & control panel gives easy access for load, source and Enersine:

- Complete with V, I, F, PF, kVA, THD parameters
- Waveforms & harmonics spectrum
- Control commands & settings
- Status & alarms
- Events log



- 1 Display Screen
- 2 ON/OFF Keypad
- 3 Reset (& Alarm Silence) Keypad
- 4 Power On Indicator
- 5 Filtering Indicator
- 6 Full Correcting Indicator
- 7 Error Indicator
- 8 Confirmation/Enter Key
- 9 Directional Scrolling Key
- 10 Escape/Cancel Key

## Remote Monitoring and Signalling

Enersine APF provide advanced comprehensive communication interface:

### 1 Standard Communication Card

- a) USB + Serial Port RS232 Ports
- b) Dry Contact
  - i) 5 Output Dry Contacts
  - ii) 1 Input Dry Contact
  - iii) 1 EPO

### 2 Optional Communication Interface

- a) RS485/422
- b) Ethernet Card (SNMP)

## Optional - Monitoring Software ESD-Link34

A windows-based remote monitoring software ESD-Link34 is available as option to allow the user to

- Monitor and Control the system up to 255 Units (Power + Control modules)
- Adjust Parameters, Waveform, and Spectrum
- Adjust Compensation and Dry Contact setting
- Access Parallel information and Event Logs



## General Characteristics

Equipment Storage Temperature	-20°C to +70°C
Operating Temperature	+0°C to +40°C
Relative Humidity	<95%
Operating Altitude	<1000 m
Reference Harmonic Standard	EN61000-3-4, IEEE 519-1992

## Electrical Specification

System Description		1 Control Module + 1 Power Module	1 Control Module + 2 Power Modules	1 Control Module + 3 Power Modules	1 Control Module + 4 Power Modules	2 Control Modules + 5 Power Modules	2 Control Modules + 6 Power Modules	2 Control Modules + 7 Power Modules	2 Control Modules + 8 Power Modules
Model Number	Unit	ESD34030	ESD34060	ESD34090	ESD34120	ESD34150	ESD34180	ESD34210	ESD34240
Line Voltage	V	400 +15%, -20%							
Phase/Wires		3 phase 4 wires/3wires on site selectable							
Frequency	Hz	50/60±3 (Auto Sensing)							
Compensating Current Per Phase	Amps	30	60	90	120	150	180	210	240
Compensating Current in Neutral	Amps	90	180	270	360	450	540	630	720
Harmonic Compensation		- Compensates from 2 <sup>nd</sup> to 51 <sup>st</sup> harmonics order - Programmable up to 12 different harmonics order simultaneously							
Power Factor Compensation		Power factor can be programmed from 0.7 lagging to 0.7 leading.							
CT ratio		Programmable Auxiliary CT Ratio Primary Ampere of CT : 100A-10000A Secondary Ampere of CT : 1A/5A(Optional)							
Transient Response Time	msec	<20							
Inrush Current		Less than rated current							
Parallel		Up to 8 Control Modules for common CT sensing							
Current Limitation		Yes, at full correcting							
Maximum Heat-loss	Watt	650	1250	1850	2450	3050	3650	4250	4850

## Mechanical Specification

Control Module		Rack Mount Type		Wall Mount Type	
Description		APF ESD 3P4W Control Module LED	APF ESD 3P4W Control Module LCD	APF ESD 3P4W Control Module LED	APF ESD 3P4W Control Module LCD
Module Part Number	Unit	ESD34-CR035-400E-E	ESD34-CR035-400E-C	ESD34-CW035-400E-E	ESD34-CW035-400E-C
Specifications		Control 1~4 power modules, 400V			
Dimension (WxHxD)	mm	440 x 88 (2U) x 710		440 x 710 x 88 (2U)	
Weight	Kg	~15			
Colour		RAL9011 (PANTONE Process Black C)			
Protection Index		IP20 as standard. IP45 or higher (Option)			

Power Module		Rack Mount Type		Wall Mount Type	
Description		APF ESD 3P4W Power Module		APF ESD 3P4W Power Module	
Module Part Number	Unit	ESD34-PR035-400E-X		ESD34-PW035-400E-X	
Harmonic Current Compensation		35A when use as 1 module, in 30A step for 2 modules and above			
Dimension (WxHxD)	mm	440 x 132 (3U) x 710		440 x 710 x 132 (3U)	
Weight	Kg	~28			
Colour		RAL9011 (PANTONE Process Black C)			
Protection Index		IP20 as standard. IP45 or higher (Option)			

Designed & Engineered by

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