MESTA ELECTRONICS

DPM™
Digital Power Manager™

Active Harmonic Filter

- Reacts instantly to varying load conditions
- Actively eliminates harmonic distortion
- Provides active power factor correction
- Balances three phase lines
- Facilitates IEEE 519-1992 compliance

Pioneers in Power Electronics

www.mesta.com ♦ 1-800-535-6798

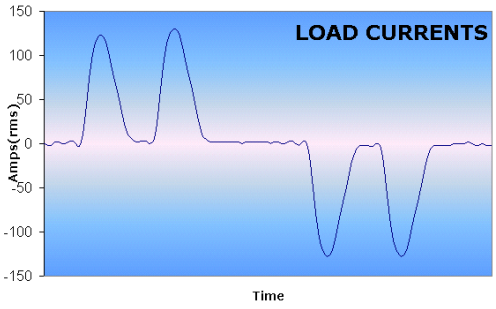
Mesta DPM™ Active Harmonic Filter

Features:

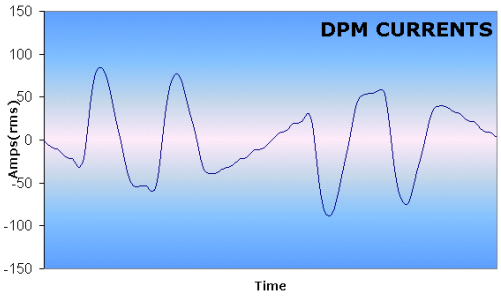
- Actively Eliminates Harmonic Distortion
- Improves Power Factor to near Unity
- Balances Three Phase Line Current from the Utility
- Advanced control provides instantaneous response to load changes and superior system stability·
- Built in Power Analyzer for monitoring system performance
- Units can be paralleled for higher current applications
- UL and CUL Listed

Benefits:

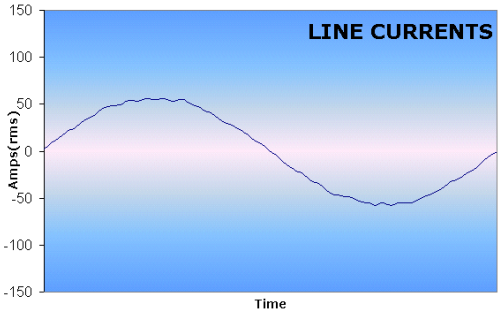
- Reduces harmonic distortion to the levels needed for IEEE 519-1992 compliance
- Does not require a detailed engineering study for proper sizing and application of the filter
- Instantaneous response eliminates the probability of high transient harmonics during sudden load changes
- Reduces utility costs by eliminating harmonics and increasing the power factor to near unity
- Prevents overheating and extends operational life of plant equipment
- Balancing of three phase lines effectively increases usable system capacity
- System can correct harmonics for entire facilities or a single load



Sample DC Bridge Load
Power Factor (Total PF) =0.70
Total Harmonic Distortion (THD_{RMS})=69.72%



Mesta DPM active harmonic correction
480V-50A-3 phase delta Mesta DPM Unit
Approximately 85% loaded



Actual current drawn from utility
Power Factor (Total PF)=1.00
Total Harmonic Distortion (THD_{RMS})=2.54%

Electronic equipment and controls, such as AC/DC motor drives, AC/DC heating equipment, computers, and other commonly used devices immensely overburden electric utilities with harmonic distortion. These nonlinear loads, uniquely characterized with high current crest factor (C.F.) and low power factor (P.F.), create harmonic distortion within facilities and on the utility grid. This harmonic distortion can result in the overheating of electrical apparatus, premature equipment failure, and interference with the operation of electronic controls. Electric utilities are using more sophisticated metering equipment to monitor power factor so that distortion power factor is now measured in addition to the traditional displacement power factor. This can result in substantially higher charges on a facility's utility bill or other penalties imposed by the utility supplier. Many electrical consultants are therefore including compliance with IEEE 519-1992 requirements in their design specifications. These IEEE requirements limit the amount of harmonic distortion that installed equipment and facilities can inject back onto the utility lines.

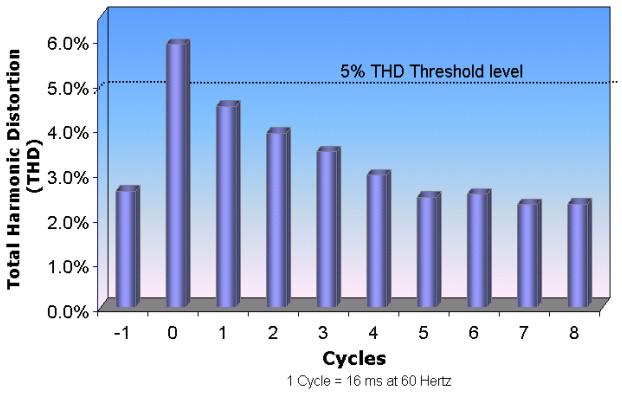
Many passive approaches have been devised in the past, aimed to minimize harmonic distortion. Special transformers, and passive filters have all brought some type of harmonic relief, but not without severe limitations. Since the generated harmonics are a function of the actual load, which can vary during the course of operation, it is nearly impossible to design a passive filter in advance, which will be effective for all loads and harmonic conditions.

The Mesta DPM™ is a true active filter. Its implementation does not require detailed knowledge regarding the nature of the load(s), or the type of harmonics present. The Mesta DPM™ responds to the exact need as it develops. The degree of the load non-linearity, which determines the amount as well the type of the harmonics involved, will determine the degree of the filter's activity. A linear load, with zero harmonics and unity power factor, will make the presence of the filter undetectable. Conversely, an inductive or capacitive load, or a load with a high degree of non-linearity, will require a high degree of the filter's activity.

Shown to the left are actual current curves of a non-linear load with 69.72% THD, the corrective current of a Mesta DPM™, and the resulting sinusoidal line current. The resulting sinusoidal line current in this example has a THD of less than 3% and a power factor of 1.00.

Mesta DPM™ Transient Response

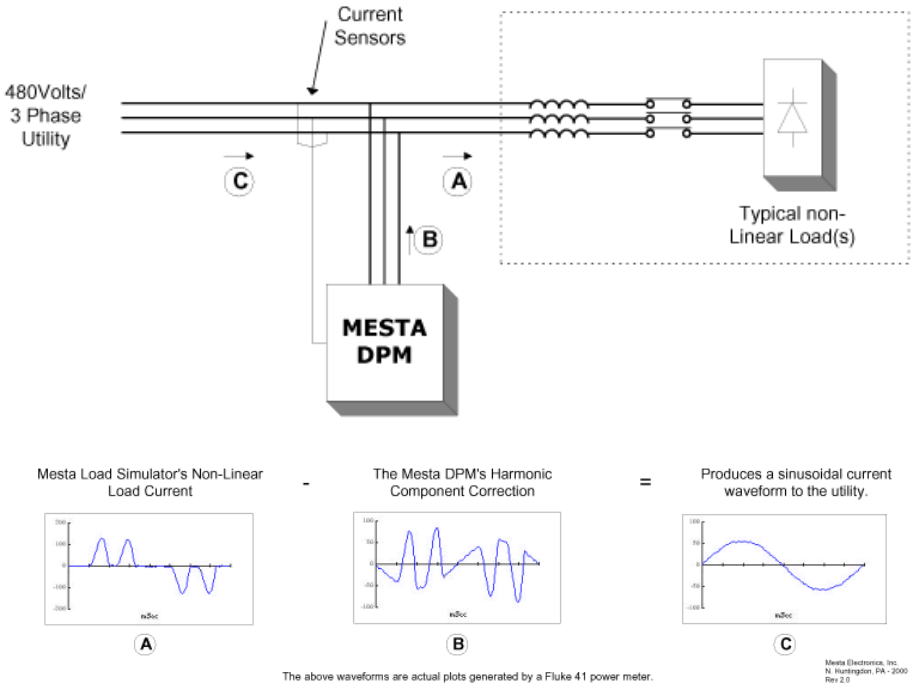
The bar graph below represents the transient response capability of the Mesta DPM™ Active Filter. During the testing represented by the graph, the non-linear load was increased by a step of 50%, while the Total Harmonic Distortion of the load remained constant at 75% THD. The first bar in the plot (-1 cycle) represents the corrected line current with a steady-state THD of less than 3% prior to the step load change. The time zero cycle bar designates the absolute maximum 6% line THD within the first cycle after the step load change. The next cycle bar demonstrates the speed at which the line's THD is reduced back to less than 5%. This level of performance and stability eliminates the possibility of high amplitude transient harmonics being reflected back to the utility, or any other equipment, during sudden load changes.

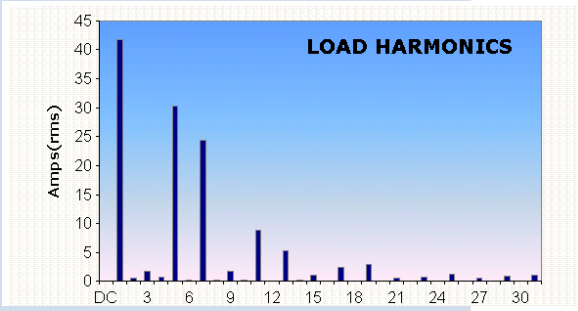


The Mesta DPM™ output coexists in parallel with the utility voltage, while it is precisely phase-locked and voltage-equalized. The DPM™ utilizes high frequency current sensors to continuously monitor the load harmonics and instantaneously directs the energy/current flow in and out of it's IGBT based inverter to make the resulting line current harmonic free, balanced, and at unity power factor.

The parallel installation of the Mesta DPM™ Active Filter results in higher overall efficiency than series installed devices. Due to the fact that the Mesta DPM™ is a parallel installed device, it does not need to be sized to provide 100% of the current required by the load(s). It only has to be sized to provide the harmonic and out-of-phase current drawn by the non-linear load(s). The utility provides the resulting 60/50 Hz fundamental current. This configuration results in a smaller more efficient solution for harmonic correction.

Mesta DPM™ Installation Diagram





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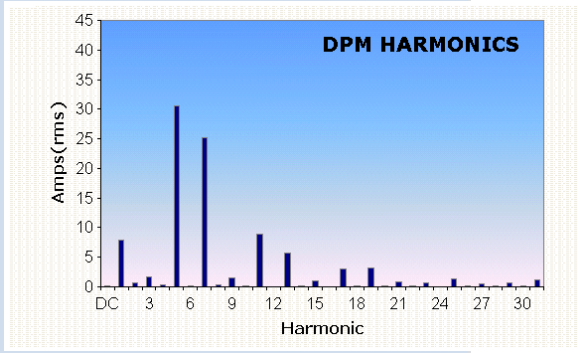

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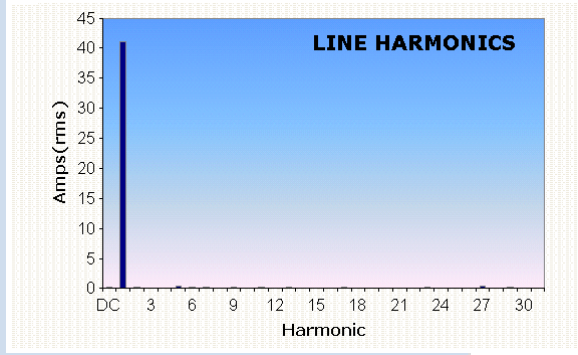

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Commitment to Quality & Service

Mesta's cutting-edge technology and products emerge from our outstanding engineering and production teams. From design to shipment, our products are extensively tested to meet and exceed the customer's expectations and industrial standards. We strive to make advanced technology, high reliability and customer satisfaction synonymous with the Mesta name.

MESTA Electronics

Mesta DPM™ (Digital Power Manager™) Specifications

Model (*)	Total Corrective Current	Enclosure	Dimensions (HxWxD in.)	Weight (est. lbs.)	Losses/max load (kw)	Fan/ Blower total CFM
3ACDPM050-480-1	50 amps	NEMA 1/ wall mount	56x20x14	275	1.3	345
3ACDPM050-480-O	50 amps	Open Panel	52x16.9x12.7	165	1.3	345
3ACDPM100-480-1	100 amps	NEMA 1/ wall mount	52x27x16	325	2.4	780
3ACDPM100-480-O	100 amps	Open Panel	48.5x22x13.6	200	2.4	780
3ACDPM150-480-1	150 amps	NEMA 1/ wall mount	63x27x16	430	3.6	780
3ACDPM150-480-O	150 amps	Open Panel	59.5x22x13.6	275	3.6	780
3ACDPM200-480-1	200 amps	NEMA 1/ floor mount	77x36x20	800	4.8	1200
3ACDPM300-480-1	300 amps	NEMA 1/ floor mount	77x36x20	850	7.0	1800

Electrical * (for 240V & 208V applications replace "480" in model # with "240")
Voltage: 480, 240, 208 VAC, 3 phase, 3 wire plus ground
Frequency: 60 Hz, ± 5 Hz

Performance specifications for a properly sized system
Limit harmonic current to < 5% TDD immediately upstream of installation point as per IEEE 519-1992, table 10.3
Power Factor: Near unity (.99) immediately upstream of installation point
Line Current Balancing: ± 1% immediately upstream of installation point
Efficiency: 97% at full load
Crest Factor Capability: 3.0

Overload Protection
Output is electronically current limited to 300% peak, 100% rms of current rating
Fuses provide redundant overload protection
Over temperature protection

Indicators and Controls
LCD Touchscreen display provides power quality information, operating parameters, operational status
Touch Screen Functions: Run, Stop, Menu, System Parameters Setup
RS232 interface for remote communications with system
Relay contacts provide system run, fault and max load status
(3 relays rated @ 125VAC/0.5A or 24VDC/1.0A)

Physical
Operating Temperature: 0 to +40 ° C ambient without derating
Humidity: 95% maximum non-condensing
Storage Temperature: -20 to +40 ° C
Cooling: internal forced air
Power: hardwired internal (top access)

Third Party Certifications
UL and CUL Listed

Options (consult factory)
50 Hz models
Voltage options
Enclosure types
Multiple unit configurations
Ethernet Communications

300-amp Nema 1 DPM™

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MADE IN THE U. S. A.

12/01/09 Specifications are subject to change without notice.