

DS200 Series

Tuned Fixed Filter Capacitor Bank



Low Voltage Solution in Fixed Power Factor and Harmonic Correction to the Motor



Power transmission and distribution networks are designed to operate with sinusoidal voltage and current having constant frequency. However, there are a number of non-linear loads, such as thyristor drives and converters that generate harmonics to the network. This causes distortion in the voltage and current wave forms.

The use of Variable Speed Drives and other static power conversion equipment has grown rapidly in recent years. With this growth has come concern over the level of current harmonics generated by such equipment. Harmonic currents and the voltage distortion these currents create can have devastating effects on a power distribution system and its connected equipment.

The Gentec DriveSaver **DS200** tuned frequency in the resonant circuit formed by the capacitance of the power capacitor and the network inductance may match an existing harmonic frequency. If there is harmonic current source for the particular harmonic frequency in the network, the harmonic current of this frequency may reach as high 20 times the normal level.

The DriveSaver **DS200** series is a proven advance in the area of passive harmonic mitigation. This device can meet the most stringent limits of IEEE STD 519 at an equivalent size and cost. When the application calls for a truly cost effective harmonic solution, the Gentec **DS200** is the real logic solution.



Rated for:

- 20 to 1000 HP Motors
- 208 to 600 volts
- Nema – 1, 12, 3R Enclose

TECHNICAL DATA - DS200 Series

Rated Voltage / Phase	208 to 600 volts / 3 phases
Rated Frequency	50 Hz or 60 Hz
Rated Power	20 to 2000 HP
Tuned Frequency	5 th and 7 th harmonic (other tune frequency on request)
Insulation Level	3 kV
Continuous Overvoltage	110 %
Harmonic Dimensioning	IEEE 519
Mounting Type	Floor Mounting
Enclosure Type	Indoor and outdoor
Temperature Class	0 °C to 45 °C
o Average 24h:	+35 °C
Certification	cCSAus
Color	ASA 61 (Light Grey)
Construction Standard	UL, CSA

The front-end rectifiers of 3-phase, 6-pulse static power converters (AC-DC), such as those found in variable speed drives, are considered non-linear because they draw current in a non-sinusoidal manner. The current harmonics they generate are predominantly the 5th and 7th with 11th, 13th and other higher orders also present but at lower levels.

Power distribution systems that carry a heavy non-linear load component will often experience problems due to excessive harmonic currents. Problems that can arise include:

- *Power factor correction capacitor failures*
 - *Overheating cables, transformers and other distribution equipment*
 - *Distortion of the voltage waveform (typically flat-topping) especially when operating on emergency standby generators*
 - *False tripping of circuit breakers*
 - *Premature failure of motors, generators and other rotating equipment*
- Misoperation or component failure in PLC's, computers and other sensitive loads



HARMONIC TREATMENT OPTIONS

There are various methods presently available for treatment of VSD harmonics. Each has its advantages and disadvantages but none can achieve the price/performance level of the DS200.

Major advantage:

- Treats all major harmonics generated by Variable Speed Drives and other 3-phase rectifier loads (5th, 7th, 11th, 13th ...)
- **Easily applied to input of a single VSD
No need to phase shift against other VSD's**
- Suitable for application on multiple VSD's provided only VSD's are connected
- **Will meet IEEE 519 standard for both current and voltage distortion**
- Input current demand distortion < 5% over entire operating range
- **Power factor improvement**
- Compatible with engine generators since capacitive reactance is < 20% of rated kVA even under light loads
- **No resonance with other power system components or attract line side harmonics**
- Suppresses overvoltages caused by capacitor switching and other fast changing loads
- **Eliminates need for drive isolation transformers, AC line reactors and DC link chokes**
- Removal of harmonics improves overall system power factor

Saves energy by reducing upstream harmonic losses while operating at > 99% efficiency

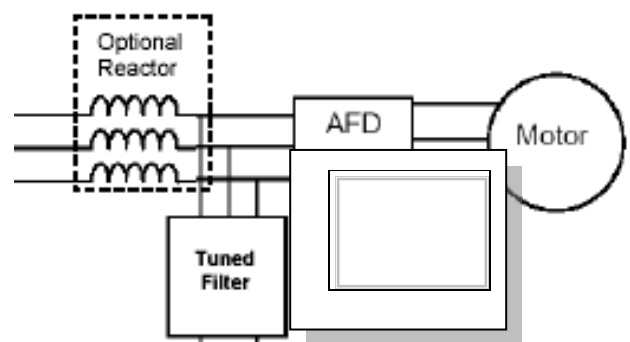
➤ Technical Data DS200 Series

Standard Features and Options:	Series I	Series II
Enclosure floor mounted (Type 1, 2, 3R)	1, 2, 3R, 12	1, 2, 3R, 12
Three points lockable door handle	▪	▪
Light Beige Grey (other color on request)	▪	▪
Top or Bottom Cable Entry	▪	▪
Capacitors space / KVAR max / Unit (Custom Staging Ratios)	1, 2, 4	1, 2, 4
Incoming Silver Flashed Copper Bus 50 ka, 30 kV BIL c/w Lugs	▪	▪
Power and Control Wires	T90 / T105	T90 / T105
DSHI Capacitor (Heavy Duty Type on Request)	▪	▪
Current limiting fuses HRC type ___ amps 200 ka	▪	▪
Magnetic Contactor c/w Special Switching Devices	▪	▪
Tuned Reactor c/w Thermal Detection Device	5 th or 7 th	5 th or 7 th
Control Transformer c/w Fuses Protection	▪	▪
Thermostatic Ventilation System	O	O
Optional(s)		
Current Transformer (Split Core Type)	O	O
Main Breaker or Fuses Disconnect	O	O
Blown fuses indicating light c/w push bottom test	O	O
Main current metering c/w ammeter and phase selector	O	O
Electric door interlock	O	O
Kirk Key system interlock with the remote main breaker	O	O
Special Metering Arrangement	O	O
Disconnect switches interlocked with doors and main supply	O	O

▪ Standard O = Optional

➤ Technical Application

The **DriveSaver DS200** Tuned Harmonic Passive Filter is specially designed for higher level of Harmonic suppression. This is ideally suitable for industries AFD (variable Frequency Drive) where higher levels of Current Harmonics are recorded (like >20% THD). This DriveSaver ensures Effective Harmonic Filtration for Industries having 40% and above of Current Harmonics generating Loads. This Harmonic Filter also improves the Power Factor effectively. A Complete Harmonic Analysis of the total system can identify clearly the level of Harmonics for proper selection of Harmonic Suppression Devices. This DriveSAverr is available as Automatic Switched Variable Filter or Fixed Filter.



DS200 FIXED REACTIVE POWER COMPENSATION FOR AC & DC DRIVE AFFECTED BY HARMONICS

Fixed tuned filters **DS200 Series** are used to compensate the reactive power in individual, standard-power devices or groups of devices in networks affected by harmonics. The use of fixed capacitors equipped with reactors prevents any harmful resonance phenomena between the network inductance and the capacitance of the power capacitor.

A fixed tuned filter consists of a reactor connected in series with the power capacitor and AC or DC drive unit. The capacitance of the capacitor is selected to reach the desired compensation power. The inductance of the reactor is selected so that the tuned frequency of the series resonant circuit formed by the capacitor and the reactor is lower than the lowest harmonic frequency between the network phases. The lowest harmonic frequency present in the system is normally the 5th (300 Hz).

Below the resonant frequency of the tuned filter, such as the fundamental Frequency (60 Hz), the tuned filter is capacitive, that is, it produces reactive power. Above the resonant frequency, the tuned filter is inductive and it cannot amplify the typical harmonic frequencies such as the 5th, 7th, 11th harmonics. A fixed tuned filter also eliminates lower order harmonics from the system to some extent.



A fixed tuned filter is usually connected in parallel with the device or the group of devices to be compensated. In this way, the capacitor is switched on and off simultaneously with the load to be compensated. When necessary, a contactor and a fuse base can be installed inside the box in a case when the tuned filter is wanted to be controlled separately. The fuse base can also be replaced by a moulded-case circuit-breaker.

The cable entries are located at both ends of the box, which enables cable extension. It is also possible to mount the box on a wall with the support iron bars.

