

2.4 to 34.5 KV Metal Enclosed Harmonic Filter Banks



**6.0 MVAR, 12.47 KV, Two Stage Automatic 5th and 7th High-Pass
Harmonic Filter Assembly built for North Slope Alaska Operations**



**6.0 MVAR 5th and 7th "H" Type Harmonic Filter
for a 25,000 HP Gas Pipeline Compressor**

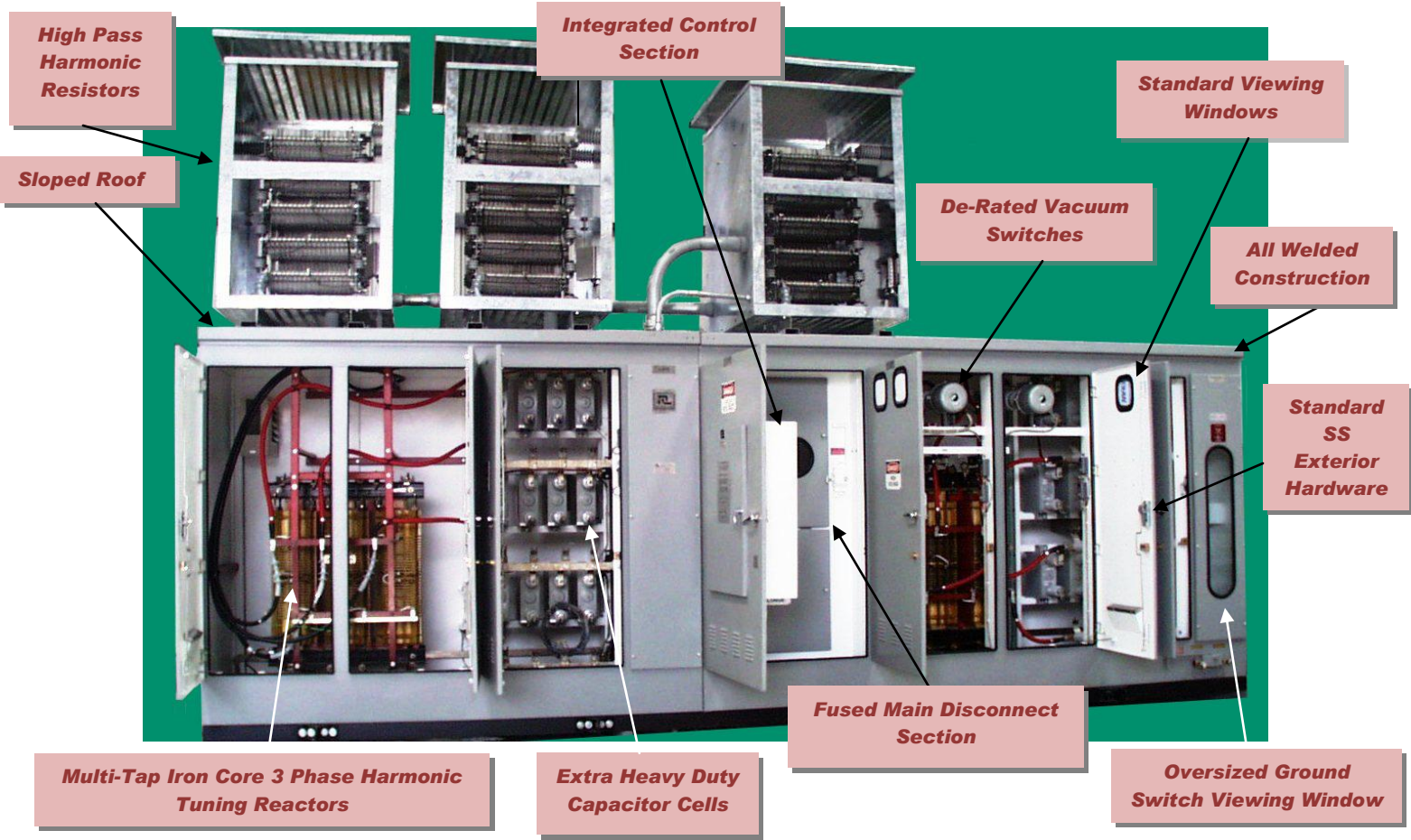
Phaseco, Inc. custom designed metal enclosed harmonic filters rated up to 30 MVAR. These high quality units are designed to mitigate harmonics and improve overall power factor for the industrial, commercial, utility and institutional customer.

We provide both fixed and automatically switched designs in system voltages from 2.4 kV through 34.5 kV RMS. We utilize both air and iron core harmonic suppression tuning reactors as major components in our filters.

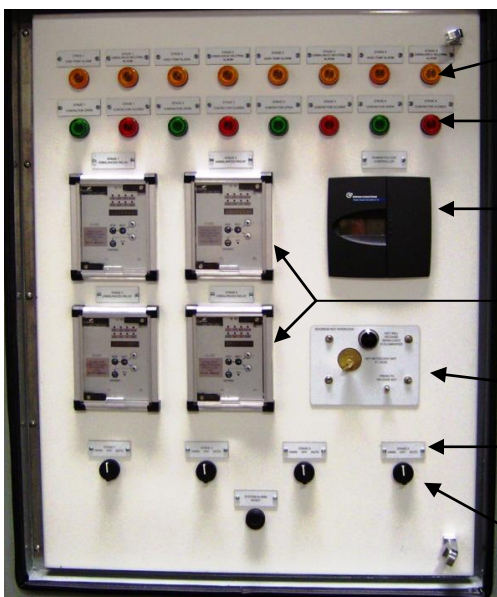
Major Features include:

- Free-standing, all welded, compartmentalized enclosures
- Notch, High Pass, "C", "H", or multi-frequency harmonic filter circuits
- Air and Iron Core Tuning Reactors
- De-rated EXD heavy duty capacitors
- De-rated vacuum switches
- Integral control and over-current protection systems
- Draw-out vacuum circuit breaker or Fused main disconnect switch
- Equipment meets or exceeds ANSI, IEEE, NEC and NESC standards

Equipment Features



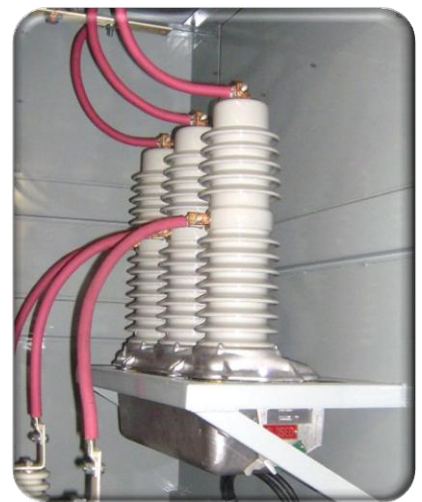
Integrated Control Section for Automatic Control and Protective Relays



- Amber Warning Lights for HI-Temp & Blown Fuse
- RED & GREEN Stage ON/OFF indicating Lights
- Solid State Power Factor Controller. Other optional styles available
- Digital 59N Unbalance Relays for Blown Fuse Indication
- Electrical Solenoid Coordinated Key Interlock
- Engraved Nameplates permanently mounted w/SS screws
- AUTO / OFF / ON switches for each Automatic Stage

Metal-Enclosed Harmonic Filter Banks

VACUUM SWITCHES



Both Single and Three Phase Vacuum Switches are available for 15-35 KV Applications. All vacuum switches are de-rated for harmonic applications



**Three Phase 15 kV, Iron Core Reactor with
Multiple Taps**

Iron Core Harmonic Filter Reactors

Single and Three phase, dry type or fluid filled iron core reactors are available. Reactors provide inductance to tune the harmonic filter bank to the required frequency while reducing frequency and magnitude of inrush currents resulting from back-to-back switching.

Major Features Include:

- Grain oriented Steel Core
- 100% Copper Winding
- Class H insulation
- Vacuum Impregnated
- Plus & Minus taps for field adjustment
- Thermal Protection

Air Core Harmonic Filter Reactors

Single Phase, dry type air core reactors are available. Air core reactors are used in conjunction with capacitor banks to form series tuned harmonic filter circuits, or in conjunction with capacitor banks and resistors to form a broad band harmonic filter circuit.

Major Features Include:

- Epoxy impregnated, fiberglass encapsulated windings
- Aluminum Conductors
- Plus & Minus taps for field adjustment
- Construction complies with C.57.21-1990 and IEEE standards



**Single Phase 15 kV, Air Core Reactors with
Multiple Taps**

Zero Voltage Closing Controlled Vacuum Switches



OPTIONAL ACCESSORIES

ROOF BUSHINGS TO FACILITATE CONNECTING TO OVER-HEAD BUS IN SUBSTATIONS

DRAW-OUT VACUUM CIRCUIT BREAKER CAN BE PROVIDED FOR OVER-CURRENT PROTECTION AND DISCONNECTING FROM THE POWER SOURCE

DIGITAL POWER METER SUITED FOR MANY POWER AND CONTROL APPLICATIONS CAN BE PROVIDED

ZERO VOLTAGE CLOSING CONTROLLED VACUUM SWITCHES CAN BE PROVIDED TO REDUCE CAPACITOR SWITCHING TRANSIENTS

STAINLESS STEEL & ALUMINUM ENCLOSURES ARE AVAILABLE FOR EXTREME ENVIRONMENTAL APPLICATIONS

REPRESENTATIVE APPLICATIONS



- Steel
- Wind Farms
- Refining & Petrochemical



2.4 MVAR 15 KV AUTOMATIC 5th HARMONIC FILTER IN A SS 316 ENCLOSURE

