



THE DRIVING FORCE BEHIND POWERFUL IDEAS

## 180kVA STATIC CONVERTER MIN184



**MEDHA<sup>TM</sup> Servo Drives Pvt. Ltd.**, established in 1984 is an R&D focussed company dedicated to railway products. Over last 25 years, MEDHA's inhouse design teams have developed various world class hi-tech products and systems for application in Locomotives, Coaches and Stations/ Yards. MEDHA's state of art Design Centre and Manufacturing facilities employs over 900 people who are constantly striving to apply latest technologies to create innovative products in wide range of fields like Control Electronics, Power Electronics, Electro-mechanical systems and Signaling Systems. All new developments and modifications go through stringent testing, validation and verification of both hardware and software, many times going beyond customer specification requirements.

MEDHA has well equipped manufacturing facilities that are **ISO 9001:2000** certified by American Quality Assessors (accredited by **ANAB**). Facilities include automated assembly of Surface Mounted Devices on PCBs, CNC machines, various test equipment and custom test jigs for in process and final inspection of all manufactured goods. MEDHA supplies products for Locomotives including IGBT based AC Traction Control Systems for Diesel Locomotives, various models of microprocessor based Locomotive Control Systems including control panel and electricals for Diesel and Electric locomotives, microprocessor based Governors, 180 kVA 3 phase Static Converters for Electric Locomotives, Speed and Event recorders, TFT LCD Driver Display screens, End of Train Telemetry, etc. For signaling applications, MEDHA has developed Electronic Interlocking system and Integrated Signaling Power Supplies. For coaches, MEDHA supplies various models of underslung naturally cooled inverters ranging from 2.5 kVA to 50 kVA.

### F E A T U R E S

- IGBT & Microcontroller based technology.
- Excellent Thermal Margins.
- Output Voltage Harmonic Distortion less than 8%.
- Output Current Harmonic Distortion less than 5%.
- Near Unity input power factor.
- Chopper based battery charger included.



## 180kVA STATIC CONVERTER - MIN184

### Application

This System converts 760V AC or 830V AC, 50Hz single phase power to 415V AC, 3 phase, 50Hz power, suitable for powering auxiliary motor/fan loads in Electric locomotives. MIN184 soft-starts the motors whereby the motors are gradually accelerated from standstill to rated speed in a controlled manner. This ensures that the motors do not draw excessive starting currents, and load contactors are not damaged due to excess currents on load switching.

In built SMPS based battery charger will charge the 110V DC battery and will supply power to loco control system. SMPS based battery charger has very low output ripple with precisely settable current value and an independently controlled battery path current. This charger is also suitable for VRLA batteries.

### Operating Principle

180kVA Static Converter accepts single-phase supply from the Auxiliary winding of the locomotive main transformer and derives a stable, 620V DC link with the help of a phase-controlled rectifier. Specially designed input circuit arrangement makes sure that the input current drawn is in-phase with the input voltage, over the entire range of catenary voltages. DC link supplies power to an IGBT based three-phase inverter, which gives 415V AC, 3-phase, 50Hz sine wave output.

Battery Charger also takes input supply from the locomotive main transformer and steps it down to 140V AC, then a full wave rectifier converts the AC voltage into 200V DC and finally a Switched Mode Power Supply (SMPS) will control the output voltage to required 110V DC.

### Salient Features

- Soft start of motors avoids excessive currents from motor contactors
- Near Unity input power factor
- Vacuum Fluorescent Display is used for clear and bright display of all critical system parameters.
- Input Voltage, Input current, three phase Output Voltages and Output Currents, along with system status are displayed on VFD.
- Protection against: Open circuit in auxiliary winding, Earth Fault, Auxiliary Converter phase fault, Short-circuit at output, Overload protection, Input Fuse failure, High/Low voltage in DC link, Power supply failure to control circuits, Transient discharge current protection at input and output side, Input over/under Voltage, Input over current, Reverse polarity protection for Battery Charger, Over current protection at Battery Charger DC output, and Over Temperature.
- Latest 100 faults can be logged in system memory. These faults can be downloaded to a PC along with date and time stamp for further analysis and corrective action.
- Designed for Railway application taking care of Vibration, Shocks, temperature and other climatic and environmental conditions.
- Designed to meet IEC- 60571, IEC- 61287, IEC- 60310, IEC- 61373, IEC- 61000 and RDSO Spec no- ELRS/SPEC/SI/0015

### Technical Specifications

|                               |   |  |
|-------------------------------|---|--|
| Input Voltage                 | : | 760 or 830 V 1Ph 50Hz (±3%) Minimum Operating Voltage: 646V, Maximum Operating Voltage: 1106V (corresponding to catenary voltage of 17.5kV and 30kV) |
| Operating Temperature Range   | : | 0°C to +70°C   |
| Input Power Factor            | : | >0.9 over entire input voltage range   |
| Output Voltage                | : | 415V ±5%, 3-phase (sine wave), 50Hz ±3%  |
| Output Power                  | : | 180kVA, @ 0.8P.F.  |
| Short time Rating             | : | (600 Amps for 5 sec)   |
| Efficiency (at nominal input) | : | >93% at 80% load   |
| Battery Charger output        | : | Nominal Output Voltage: 110V DC settable<br>Nominal Output Current: 22 Amps settable<br>Output current ripple: <1%.                                  |
| Outside Dimensions (mm)       | : | 1650mm(H) x1740mm (W) x700mm (L)   |
| Weight of complete Unit       | : | 1450Kg. (Approx.)  |