

THE DRIVING FORCE BEHIND POWERFUL IDEAS

ELECTRONIC INTERLOCKING SYSTEM FOR SIGNALING MEI 633



MEDHA[®] 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

- Meets CENELEC SIL-4 Safety Specification.
- Can handle upto 2048 vital Inputs/Outputs
- Modular System Design, which is scalable to suit the needs of a specific installation.
- Time tested and Safety-proven Relay Based Boolean logic is used for Interlocking.
- System can be operated using Domino Type Control Panel or PC based VDU Control Terminal.
- Easy upgrade of Application Data in case of any Yard modification.
- Provision to expand the Interlocking and IO capacity by cascading two EI Systems.
- Can be configured as a Distributed or Centralised Interlocking System
- Inherently Fail-safe Relay Driver used to drive the Vital Output Relays.
- Highly Reliable and Standardised hardware



ELECTRONIC INTERLOCKING SYSTEM FOR SIGNALING MEI 633

MEDHA's Electronic Interlocking System MEI 633 is a fail-safe, state-of-the-art Distributed Interlocking System. The System has been designed to CENELEC Standards to meet SIL-4 safety specification. It is based on two out of two architecture with a hot standby provision and automatic change-over facility. The System provides all the Interlocking features including Route Setting, Route Release, Point Operation, Track Occupancy Monitoring, Overlap Protection, Crank Handle Operation, Level Crossing Gate Interlocking, and provision for Block working.

The Central Interlocking Unit (CIU) uses Two out of Two Architecture with two independent channels computing the Vital Interlocking Logic and a Supervisory Processor monitoring the two Vital computing channels. Hot standby with automatic change-over facility is provided. Redundant communication channels to Object Controller (OC) and Panel Processor (PP) are provided through two Communication Processors. OFC interface with Ring configuration is used for communication between CIU and OC, CIU and PP. Independent Power Supplies are provided for each Processor module for maximizing availability.

Object Controllers (OC) control the field gear through Fail-safe Signaling Relays. One CIU can be connected to a maximum of 32 OCs. Each OC is capable of handling 24 Vital Outputs and 40 Vital Inputs. Two Communication Modules are included in each OC to provide redundant communication channel with CIU. Each OC consists of 8 Wayside Function Modules (WFMs), with each WFM capable of handling 8 Inputs or 8 Outputs. Each WFM is further based on two out of two architecture with two independent channels handling each Vital I/O. Redundant Power supplies are provided for WFMs for maximum availability.

Panel Processor provides the Interface between the Operator's Control Cum Indication Panel and the CIU. Redundant Processors with Independent Power Supplies are provided for maximum availability. System can be controlled either by Operator Control Panel or Visual Display Unit (LCD Display) based Control Terminal through software.

A Windows based user friendly, graphical Application Generation Tool Suite with high level of automation is provided for generation of Yard specific Application Data. The Tool Suite also provides the facility for Reverse Compilation and Relay Diagram Generation for easy verification of Application Data.

The Maintenance Terminal provides the Diagnostic Interface through Online and Off-line Event & Fault and Yard Status Display with Date and Time Stamp. The Maintenance Terminal records all the Events and Faults. The recorded events can be replayed to view the Yard Status at any given time.



CONTROL CUM INDICATION PANEL

Salient Features

- Modular System Design, which is scalable to suit the needs of a specific installation.
- The number of Object Controllers, the number of Input and Output Modules in each OC, and the Input and Output modules required for the Panel Processor can be selected to suit the Yard Interlocking Requirement.
- A Single failure in any CIU module does not cause any change in the Vital Output States. The Faulty module is shut down and a Fault Message is generated. The System continues to work with the standby module. The faulty module can be replaced without interrupting the Yard Operation.
- CIU can be connected to a maximum of 32 Object Controllers, each capable of handling a maximum of 24 Vital Outputs and 40 Vital Inputs.
- Relay Based Boolean logic provides maximum flexibility to the User to design the Interlocking logic to meet any special Interlocking requirements for a specific installation.
- VDU based Control Terminal provides Menu Driven Operation. Confirmation is taken from the Operator for Emergency Operations. Facility for Locking selected Operation is provided with Password protection.
- System based on Cyclical operation whereby all inputs are updated, outputs are computed and updated every system cycle of 333ms.
- Vital Outputs are continuously monitored through readback of Vital Relay Contacts. In case a Wrong Side Failure is detected, the Primary Negation is activated to drop the Vital Cut-off Relay, thus cutting-off the Supply to all the Vital Outputs of the faulty Object Controller.
- Secondary Negation is provided in Central Interlocking Unit. If Vital Cut-off Relay fails to negate the wrong side failure, then CIU shuts down.
- Isolation and Double Cutting arrangement is provided for the Vital Inputs and Vital Outputs.
- All Vital Inputs and Outputs are provided with Reverse polarity, Surge, Overload and Short Circuit protection.
- EMI/EMC and ESD Protection.
- Easy Maintainability is achieved by using high reliability hardware, modular design and extensive built-in fault diagnostics capability.
- Maintenance Terminal provides the Event log information of both Active and Standby Interlocking Channels.
- Internal Log of Events and Faults maintained by the CIU with Date and Time stamps.
- Additional provision for connecting External Datalogger.
- Fault Codes are displayed along with Fault Messages on the Front Panel Display housed in CIU Rack.
- Independent Voltage and Health Monitoring provided for each redundant channel.
- Three levels of Watchdog monitoring provided for all Vital Modules.
- Software Safety provisions to protect Vital data integrity during communication as per CENELEC Standards for Safety-related Communication in Closed Transmission Systems.
- Extensive built-in Periodic Self-checks of Hardware and Software Integrity.



OBJECT CONTROLLER



VDU



RELAY ROOM

Technical Specifications

Power Supply	:	110 / 24 V DC
Power Consumption	:	75W for CIU and PP, 150W for Object Controller
Cycle Time	:	333 ms
No. Of Vital IOs	:	2048
No. Of Non Vital IOs	:	3072
Operating Temperature	:	-10° C to 70° C
Relative Humidity	:	Upto 95% at 40° C
Communication	:	OFC Interface with Ring Configuration operating at 115.2 kbps for
		<ul style="list-style-type: none"> ● PP/VDU Control Terminal ● Object Controllers ● EI Cascading
		RS232 Interface operating at 115.2 kbps for
		<ul style="list-style-type: none"> ● Maintenance Terminal ● Front Panel Display ● External Datalogger
Mechanical Structure	:	Plug-in Modules housed in 19" Racks