

THE DRIVING FORCE BEHIND POWERFUL IDEAS

MICROCONTROLLER BASED GOVERNOR - MEG 601



MEDHATM 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

- No need of regular maintenance
- No hunting in Engine RPM
- Effective control for complete combustion of fuel improves fuel efficiency and reduces pollution
- Load Control interface with Excitation system to limit HP at each Notch.
- User programmable engine parameters for optimizing performance for different classes of locomotives
- Continuous display of engine status parameters on a vacuum fluorescent display
- User programmable Engine RPM, LOPS levels and Fuel Rack limit for each notch.
- User programmable Booster Air Pressure Vs Fuel Limit curve.
- Online fault diagnostics and fault message display.
- Error log with date and time stamp.

CONTROL UNIT



MICROCONTROLLER BASED GOVERNOR MEG 601

Application

This is a reliable, economical and maintenance free alternative to the hydraulic governor popularly used for diesel engine control of diesel electric locomotives.

Operating Principle

MEDHA's Microcontroller Based Governor-Type MEG 601 consists of a control unit mounted in the drive cab, and an actuator unit mounted on the engine in place of hydraulic governor. The governor controls engine speed, based on throttle handle position (popularly known as notch). Engine RPM is measured from a Tacho generator or Engine speed sensor mounted on the engine. Digital PID control is used to calculate desired fuel rack position dynamically, based on the selected notch on throttle handle and measured engine RPM. A stepper motor drive is used to control the fuel rack of diesel engine. The governor also controls electrical load on the engine, so as to limit horsepower at each notch to a preset level, through an electrical interface with the excitation system of locomotive. Booster (Turbo) air pressure is measured through a pressure sensor mounted in the air manifold, and movement of fuel rack is limited as a function of this pressure so as to prevent incomplete combustion, black smoke, excessive engine temperature, fuel wastage etc. Lube oil pressure is continuously monitored and engine is shutdown if the lube oil pressure is less than the specified pressure at each notch position so as to protect the engine from damage due to malfunction of lube oil pump etc.

Salient Features

- 16-bit microcontroller based design
- Stepper motor used for high precision position control of fuel rack
- Digital PID control. No potentiometer settings and no adjustments required for lifetime.
- Tuning for each individual engine is not required. Once tuned digitally for a given class of locomotives, say WDM3A or WDM2, the same parameters can be programmed for all engines of that class.
- Parameters are tuned using a laptop computer. A user-friendly menu driven laptop software provided for modifying parameters or downloading error logs.
- Electro magnetic clutch used for automatic shutdown of engine, in case of power failure or any other major malfunction in the equipment.
- Fail safe features for various failure modes.
- Electronic and Mechanical Over Speed Trip (OST) testing through key-lock switch.
- Boost Air Pressure based Fuel limit control can be bypassed through a switch.
- Functional plug-in modules for ease of servicing.



ACTUATOR UNIT

Technical Specifications

Operating Supply Voltage	:	40 VDC to 90 VDC, 22VDC for 0.8 seconds during cranking.
Speed (User settable)	:	8 Engine speed steps as selected by Notch
Accuracy of Control	:	± 3RPM
Engine Parameters Displayed	:	<ul style="list-style-type: none"> • Notch Position, Engine RPM • Fuel Rack Position in mm • Boost Air Pressure in Kg/cm² • Lube Oil Pressure in Kg/cm² • Fuel Oil Pressure in Kg/cm² • LCR Position in Hours Minutes format.