

TCS

Turbine control system



The TCS was designed and is manufactured by AVIO. It performs the control and monitoring of the LM2500 Gas Turbine (GT). AVIO supplies this Gas Turbine and Control System worldwide. Versions of this system have been in use for over 30 years in both naval and industrial applications.

- Fully military qualified
- Easily customised for the control of:
 - LM 500
 - LM 2500+G4
 - LM 2500 enhanced
- Low manning: high level of automation in normal and emergency operations
- Ancillary management
- Remote monitoring for maintenance operations

Main characteristics

Power supply:

Voltage	115Vac
Absorbed power	400 VA
Electric Interface	Connector Mil-C-5015G
Dimensions (W x D x H)	800 x 500 x 2000 mm
Weight	300 kg
Mechanical interface	with shock absorbers



Stand Alone Unit Fully integrated

- Vibration tracking filter
- Dedicated GT control core unit
- Final driver for FMV & VSV
- HMI touch screen
- Embedded diagnostics

Environmental conditions/specifications

Operating Temperature	0 / +60 °C	GE	M50TF3886-S5
Storage temperature	-40 / +70 °C	GE	M50TF3832-S2
Maximum humidity	95% (non condensing)	Shock	MIL-S-901D / NAV-30-A001
Permanent inclination	15° (in all directions)	Vibration	MIL-STD-167-1 / NAV-30-A002
Temporary rolling	45°	Noise	MIL-STD-167-1 / NAV-30-A002
Protection	IP 55	EMC	MIL-STD-461C
		Environ.	MIL-STD-810



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TCS Functions

Core control loops:

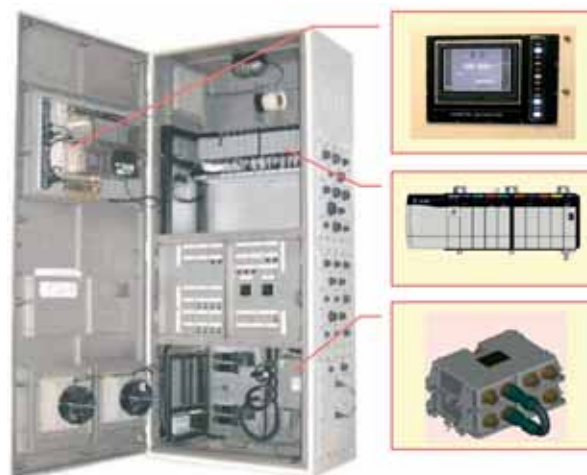
- GG control & accel/decel limits
- PT inlet temperature control
- PT speed control & accel/decel limits (power generation only)
- PT max speed & max accel limits & torque computation & limit (mechanical drive only)
- VSV control schedule
- Compressor discharge temperature & press control (LM2500+ only)
- Fuel flow schedule
- Isochronous or droop mode of operation (power generation only)
- Predisposition for load sharing (power generation only)

Control & Monitoring:

- GT module ventilation system
- Gas generator motoring valves command (Hydraulic or air system, excluding Hydraulic starting Skid system command/ monitoring)
- Starter lube oil pressure control (Hydraulic starter only)
- GT manual monitoring for cool down after hot protection
- Water washing sequence
- Start/stop & event counters plus cycles counters to allow GT health evaluation
- High GT vibration (GG & PT) conditioning (via tracking filter system) operating at GG and PT rotors frequency

Safety:

- GG redundant Overspeed Protection (separate from the control CPU)
- PT redundant Overspeed Protection (separate from the control CPU)
- PT over temperature Protection
- FMV & VSV valves fail
- Stall detection protection
- Low GT lube oil pressure protection
- High lube oil bearing temperature
- High GT vibration (GG & PT) alarm/ protection
- Fuel shutoff valves current monitoring
- Loss of flame protection



- User friendly HMI
- Solid state VDU with touch screen
- SCADA environment

- COTS
- Ancillaries management
- IEC 1131 environment

- Dedicated high power control unit
- "Core" GT controls & hard wired safeties
- Vibration tracking filter