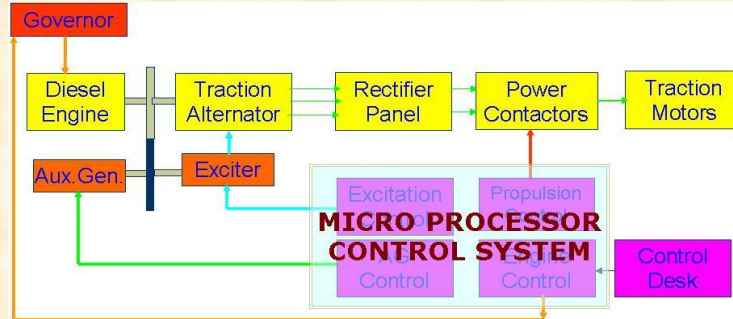


INTRODUCTION

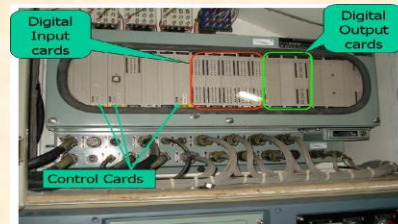
This system is a centralized control system through microprocessor. It receives various digital input signals either from control desk or MU wires.



It also receives feed back signals from individual output devices indicating their status (energized / de--energized). All the analog parameters like voltages, currents, pressures and temperatures are sensed through various sensors and are connected to this control system for monitoring. All the speed signals from traction motors and engine are connected as frequency input signals to this control system

SALIENT FEATURES

- ✓ Fault diagnostics
- ✓ Self Diagnostics
- ✓ Fault tolerance
- ✓ Historical data
- ✓ Self-Load Box Test.
- ✓ Event Recorder
- ✓ Auto Flasher
- ✓ Automatic fault recovery
- ✓ Digital setting of parameters



- ✓ Self-test to digital inputs and Outputs
- ✓ Auto Emergency Brake system
- ✓ Optimum utilization of power
- ✓ Multi Reset Vigilance Control Device
- ✓ Short term rating of Traction Motors
- ✓ Proportionate power reduction



ADDITIONAL ITEMS

1. Control Unit {19 Cards in Slot 1 to 19 (L to RH)}

2. Display Unit

3. Analog Distribution Units

4. RPM Distribution Unit

5. Current Sensors

Tr. Alt. Arm. Current (TAAI)

Tr. Motor Current (TMAI)

Exciter Arm. Current (EXAI)

Aux. Gen. Armature current (AGAI)

Battery charging current ((BATI)

Exciter field current (EXFI)

Aux. Gen. Field Current (AGFI)

Tr. Alt. neutral to ground leakage current (TANGI)

Battery negative to ground leakage current (BANGI)

6. New Breakers—MPCB —Micro processor CB

PLPB – Pre Lubrication Pump Breaker

7. Voltage Sensors

Tr. Alt. Voltage (TAV)

Load Control Pot Voltage (LCPV)

Battery Voltage (BATV)

Braking Potentiometer Voltage (BKCPV)

Aux. Gen. Armature Voltage

8. Temperature Sensors

Eng. Water temperature (EWT)

Lube Oil Temperature (EOT)

Ambient air temperature (AAT)



9. Pressure Sensor-

Main Res. Air Pressure (MRPR)
Brake Pipe pressure (BPP)
Brake Cylinder Pressure (BCP)
Altitude (APR)
Lube Oil Pressure (LOP)
Booster Air Pressure (BAP)
Fuel Oil Pressure (FOP)

10. Speed Sensors

Traction Motor RPM
Engine Speed

11. Resister Unit

12. Memory freeze Unit

13. Motor Cut Out Switch Unit

14. VCD Magnet Valve



DISPLAY AND MENU NAVIGATION OF FAULT

A) Press 'Menu' key, The following Main Menu appears

- 1) Faults
- 2) Display Mode
- 3) Test Mode
- 4) Exit

1. Faults
2. Display Mode
3. Test Mode
4. Exit

B) Press key '1' to select 'Faults' Submenu appears as

- 1) View active Faults
- 2) Clear Active Faults

1. View Faults
2. Clear Faults

C) Press key '2' to select 'Clear Active Faults'

1. View Active faults → Registered faults if any will be displayed. User can navigate through the faults using down arrow key until 'No more faults logged' message is displayed.--Press 'MENU' key to select 'Exit' option.

2) Clear Active faults → "Use '0' to clear faults" Message will be displayed. After few seconds Logged faults are

displayed one by one. After noting down the faults, to clear fault, press '0' key. and down arrow key to see next fault. Based on the severity of the fault, if pass code is prompted, enter the pass code to clear the fault other wise the fault will be cleared and next logged fault is displayed

Continue the above till all faults are cleared. Press 'MENU' key to select exit . Press 'Exit' option

Display Mode: Through this mode various 10 screen i.e. Excitation, Auxiliary, wheel slip, Mixed, driver display, MCBG status, collective data, Digital IP, Digital OP and HP Status are displayed.

Test Mode :Through this mode various test like load box test and other test for Relay, inputs, outputs and self load test can be performed.

SAFETY ALARM INDICATIONS ON C.B.PANEL

Indication A.G Fail

Reason Aux. Gen Failed and Batteries are not Charging
Message "2000- No Battery charging due to major faults" or "1061 –Battery Voltage is Low".

Action Check for tripped AGFB & MB1 breakers
Check for tightness of ESS connector at ESS

Other Messages

- 1062 – Battery voltage is high
- 1141 – AG output high fault
- 1142 – Battery chg current high
- 1143 – AG output over current fault
- 1144 – AG field over current
- 1145 – AG output open circuit fault
- 1146 – AG field circuit open or short

Indication CK Tip weld

Reason Main tips of CK1/2/3 got welded
Message "1029- Cranking Contactor stuck closed"
"2029- Cranking Contactor stuck closed"



Action Shut down the engine Open Battery knife switch.
Separate the welded tips with wooden stick.
Alarm stops & reset message is displayed

Indication Overload

Reason TA Field current is more than 280 Amps
Message "1027-Alternator Field Over Current Fault"
Action Bring throttle to Idle. The fault is reset automatically
Reset message is displayed.

Indication DEB (CAR)

Reason DEB (Car) Circuit Breaker Tripped/ OFF
Message "1156-DEB Car Body breaker Off"
Action Check up any problem with motor and switch ON
DEB circuit breaker.

Indication DEB (Eng)

Reason DEB (Eng) Circuit Breaker Tripped/ OFF
Message "1155-DEB Engine breaker Off"
Action Check up any problem with motor and switch ON
DEB circuit breaker

SAFETY ALARM INDICATIONS ON CONTROL STAND

Indication CEB FAIL

Reason CEB Circuit breaker tripped/OFF
Message "2022-Switch ON CEB breaker" with buzzer If CEB
is not switched on within 30 minutes a message
CEB breaker OFF".is logged in fault data
Action Check up any problem with motor and switch ON
CEB circuit breaker.

Indication Low Lube Oil

Reason LLOB in WW Governor tripped
Message "1005-LLOB Trip-Reset plunger "
Action Reset LLOB . Reset fault as per procedure or wait
for 20 sec till system recovers from fault

Indication Hot Engine

Reason Water Temp is more than 90 deg C.
Message "2008-Engine Temp High. Reduce Power" for 5 sec
"1006-Hot Engine " " 2026-Hot Engine"
Action Ensure Radiator Fan is working normally. Do fast
pumping manually otherwise power is de-rated by
20%per every degree. Driver can work with reduced
power up to 95 degree C.

Indication Ground LED

Reason TANGI detected power circuit is ground
Message "1007-Power circuit ground"
Action Bring TH to IDLE & wait for 15 Sec. Fault cleared
automatically.

Indication Wheel slip LED

Reason Difference of wheel RPM & one of wheel is
physically slipping from track.
Message "2582- High wheel slip occurred " Sander relay
operated. Auto sanding is applied.
Action Don't reduce the notch as loco is moving. If WS is
continues, ensure sanders working.

Indication VCD lamp

Reason Pilot has not performed any loco operation or not
pressed VCD reset switch within 60 seconds.
Message "VCD Time out. Press VCD reset"
Action Press VCD Reset button once or perform any loco
operations as listed under VCD explanation.

Indication AFL LED

Reason Unauthorized BP reduction.
Message ----
Action Ensure there is no unauthorized BP reduction due
to train parting, if not press AFL reset switch to
reset flasher lights.

Important Don'ts

1. Do not keep TE Limit switch in 'Limit' position unnecessarily when not required.
2. Do not keep MCOS in OFF position while all motors are working
3. Do not start the loco without ensuring ON position of above switches.
4. Do not crank the engine with MCB1 & MCB2 in ON position. Otherwise penalty brakes are applied if BCP is not build up with in 94 seconds.
5. Do not release the start button till cranking contactor pick up. Otherwise the time starts again.
6. Do not keep MCB1 & MCB2 in ON position in rear locomotive. Otherwise load meter does not respond in rear loco.
7. Do not keep the EPG cutout switch in ON position in rear / dead locos. Otherwise MR pressure reduces.
8. Do not release loco brakes while loco is stabled. Otherwise VCD apply penalty brakes.
9. Do not reduce notch for momentary wheel slip while loco is moving.
10. Do not reduce notch for the message 'TM# Excess Current' while the loco is moving unless and until warranted by railroad signals.
11. Do not release brakes till the locomotive is ready to move after total power loss at 95deg centigrade. (@ 90deg. Centigrade of engine temperature.)
12. Do not isolate VCD magnet valve cutout cock unless and until the valve is leaking.
13. Do not try to reset penalty brakes if
 - a) Loco is moving or
 - b) Throttle is in Notch /Dy brake
 - c) VCD lamp is blinking

Disclaimer

The information given in this pamphlet does not supersede any existing provisions laid down in RDSO and Rly. Board's instructions. This document is not statutory and instructions given in it are for the purpose of guidance only. If at any point contradiction is observed, Rly. Board/RDSO's guidelines or Zonal Rly.'s instructions may be followed.



GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS
(For Official Use)

Pamphlet on Micro Processor Based Control System fitted on Alco Loco



IRCAMTECH/Mech/2011/MPCS /1.0
July I 2011

Contact Address:
Indian Railways

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