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GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

Technical specification of Multi – resetting type Vigilance Control Device (VCD) for Diesel Locomotives

Specification no. MP.0.34.00.04
(Revision-04)
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Revision sheet

S. No.	Clause	Amended/Deleted	Nature of Amendment/Deletion
1	5.1.5	Amended	To specify IEC no. for Shocks & Vibrations tests.
2	6.2.6	Amended	To include Electrical circuit showing interfacing of VCD with existing DMR circuit for diesel electric locomotives as Annexure-VI.
3	6.2.10	Amended	Para re-defined
4	6.5.1	Amended	As Diesel loco B.C Pressure has been reduced from 2.5 kg/cm² to 1.8 kg/cm².
5	6.6	Amended	To include Amendment No. 1.
6	6.8	Amended	VCD indicator cum reset unit is closed Box type equipment hence 'PANEL' word has been replaced by 'UNIT'.
7	8.2	Amended	Due to changes made in para 9.1
8	9.1	Amended	Group A & B tests specified
9	10.1	Amended	To include Amendment No. 2. To modify the statement regarding prototype developmental P.O.
10	11.2	Amended	To specify the tests to be performed.
11	Annexure-II	Amended	To replace existing Rotex magnet valve (Model no. Rotex-20106-10-4G) by modified Magnet valve which is suitable to pickup at $\leq$ 48V DC (Model no. Rotex-3332-10-4G).
12	Annexure-IV	Amended	To add Dimension for mounting hole location (added dimension 223)
13	Annexure-V	Amended	Same as para 6.8
14	Annexure-VI	Added	Same as para 6.2.6.

INDEX

1.0 Scope

1.1 This specification covers the manufacture, supply, installation and testing of the "Alertness Alarm & Safety control Device" i.e. Multi - resetting vigilance control device (VCD) to be fitted on diesel locomotives on the Indian Railways.

2.0 Introduction

2.1 The Vigilance Control Device *(VCD) is* provided to enhance the safety of locomotive operation by ensuring alertness of the crew all the time. The system shall be of multi - resetting type i.e. acknowledgement of the system is not only by means of pressing reset push button but by the other normal driving activities (i.e. throttle handling, dynamic brake application, operation of horns, sanders or application of brakes), of the driver during the train operation. This reduces the strain on the driver, as he is not required to press the reset push button always when operating other controls of the locomotive.

3.0 Definitions

3.1 Throughout this specification and in any other specification here to annexed, the terms.

3.1.1 **"Purchaser**" means the President of the Republic of India;

3.1.2 **"Engineers"** means the Research Designs & Standards Organisation, Ministry of Railways, Manak Nagar, Lucknow – 226011.

3.1.3 **"Inspecting Officer"** means the person(s), firms(s) or department(s) and his deputies nominated by the purchaser to inspect the stores on his behalf;

3.1.4 **"Contractor"** means any person, firm or company with whom the order for the supply of the stores to be placed;

3.1.5 **"Sub contractor"** means any person, firm or company from whom the contractor may obtain any material or fittings to be used in the supply of or manufacture of stores;

3.1.6 **"Contract Drawings" or "Exhibited Drawings"** mean the drawings, which are exhibited or specified for the guidance of the contractor;

4.0 General requirements

4.1 VCD shall normally require the presence of the driver near the control stand from which the locomotive is being operated.

4.2 The electrically operated magnet valve of the device shall be designed to work on the normally de-energised principle.

4.3 The device shall be capable of being worked off batteries, and / or auxiliary generator provided on the locomotive.

4.4 The device shall ensure that the locomotive is brought to a halt if the driver were incapacitated at the controls.

4.5 The electrical wires shall be suitably numbered and properly tagged in order to facilitate identification. The electrical connections of positive and negative terminal shall be of different colours in order to distinguish between them. The wires should be laid properly in a conduit. Loose and dangling wires will not be acceptable.

4.6 The sub-assemblies and components of the device shall be properly housed and shall be easily accessible for maintenance and inspection. The diagram of the control unit/main unit of VCD showing out line dimensions is enclosed as annexure-IV.

4.7 When the device is worked off the electric circuit in the locomotive, it shall be connected to the general wiring of the locomotive by plugs or any other suitable connections not requiring soldering.

4.8 If any pneumatic valves are used in the device, functioning of the valves should not be affected by moisture, dirt, temperature, fluctuation of pressure etc.

4.9 The audible warning shall be of sufficient volume and pitch to enable it being clearly heard above the drone of the running locomotive and the visual indication light prominent enough to be detected immediately on flashing.

5.0 Service conditions and design features

5.1 The equipment shall be capable of working satisfactorily under the service conditions indicated below.

5.1.1 Altitude: - Mean sea level to an altitude of 1000 meters.

5.1.2 Relative Humidity:- Up to 100 %

5.1.3 Temperature (Ambient air):- -5 deg to 55 deg C. The air temperature inside the traction vehicle (in the vicinity of equipment) may reach up to 70 deg C.

5.1.4 Ambient conditions:- The equipment shall be capable of operating efficiently inspite of dust, dirt, mist, torrential rain, heavy sand or snow storms, presence of oil vapours and radiant heat etc. to which rolling stock is normally exposed in service.

5.1.5 Vibrations and shocks: - The equipment shall be designed to withstand vibrations and shocks normally encountered in rail traction without damaging the equipment. Shock & Vibration test shall be done as per IEC 61373(category 1, Class-B).

5.1.6 Spikes & surges:- Provision shall be made for suppression of transients (Spikes & surges). The equipment shall withstand, without damage, the surge test mentioned in Clause '12' of IEC 571-1977 and clause 3.4 of IEC 60571.

5.1.7 Equipment voltage:- The supply voltage for the equipment shall be from DC supply source normally consisting of accumulator battery and/or an auxiliary generator.
The nominal voltages are as follows.

Diesel locomotives 72 volts DC

The limits of voltage in which the equipment shall operate satisfactory are as under.

Diesel locomotives 50 volts to 90 volts

5.1.8 Air pressure:- The main reservoir air pressure on the locomotives shall normally be 10 kg/cm². However, the equipment shall operate satisfactorily up to maximum pressure of 11 kg/cm².

6.0 Technical Requirements

6.1 Acknowledgements

6.1.1 Any of the following activities of the driver/crew occurring during vigilance cycle period T0, i.e. 60 seconds will serve as an acknowledgement of the Vigilance Control Device and the timer will be reset automatically to its initial position.

i) Vigilance cycle reset push button pressed
ii) Change of throttle handle position
iii) Change of dynamic brake handle position (Change in voltage across BKCP (Braking control potentiometer), such that at-least four equally spaced steps can be sensed.)
iv) Operation of horns
v) Operations of sanders
vi) Application of brake through automatic brake valve (Additional C2W Relay valve control pressure falling below 4.5 kg/cm².) or Release of brake through automatic brake valve (Additional C2W Relay valve control pressure increasing above 4.8 kg/cm².).

6.1.2 The Vigilance cycle reset push button shall be located in the control stand in such a position that it is easily accessible to the driver without leaving his seat. In case of locomotive with two control stands/cabs, the reset push button shall be provided on both control stands/cabs and connected in series.

6.2 System Operation

6.2.1 VCD system begins to work with vigilance cycle time (T0) of 60 seconds.
6.2.2 The crew has to acknowledge the device within T0 time by pressing reset push button or by any of the operation given above.
6.2.3 The vigilance cycle time (T0) starts again.
6.2.4 If the above acknowledgements is not received within stipulated T0 time, the VCD /system will begin yellow flashing light as warning for a time period (T1) seconds. This light shall be provided on each control stand/ cab.
6.2.5 If by the end of period T1 an acknowledgement by the crew/driver is not received, the Vigilance Control Device/system, will give audible alarm in addition to the yellow flashing light for a time period (T2) seconds (Warning light shall continue to flash during T2 period).
6.2.6 If, by the end of period T2, an acknowledgement is not received, the Vigilance control system shall

(i) Initiate penalty brake application, which shall continue for a period (T3) seconds even if a reset acknowledgement is received during this T3 time period; and
(ii) Provide signal to DMR which will operate to bring the engine to 'idle' for diesel locomotive (Annexure –VI).

Counter shall be provided which shall increase by one unit whenever penalty brake application takes place. This counter shall be visible to the driver so that reading can be noted whenever crew changes takes place.

6.2.7 The audible warning shall be silent (stop) during the T3 time period. However, the yellow flashing light as warning shall continue to flash as in period T2 (Total flashing time in seconds = T1+T2+T3).

6.2.8 At the end of time period T3, warning-flashing light shall extinguish, and the device can be reset by crew/driver.

6.2.9 During the periods T0, T1 and T2 the device may be reset to the beginning by any acknowledgement by the crew.

6.2.10 If the Vigilance control re-set button remains in press position for more than 60 sec, the cycle should start from Warning Level I (T1).

6.2.11 The device shall ensure that the locomotive comes to halt in case driver is incapacitated at the control stands.

6.2.12 The time sequence of system operation mentioned above are summarised in the table below:

Operating cycles	Time periods in seconds	Indications	Whether VCD can be reset or not by reset push button / acknowledgements
Vigilance cycle (T0)	60	None	Yes
Warning cycle (T1) Level I	17 $\pm$ 2	Yellow flashing light	Yes
Warning cycle (T2) Level II	17 $\pm$ 2	Yellow flashing light and alarm sounds	Yes
Penalty brake (T3) Level I, (i) Initiate penalty brake application; and (ii) Provide signal to DMR which operates to bring the engine to 'idle'	34 $\pm$ 2	Yellow flashing light remains but alarm stops	No
Penalty brake (T4) Level II	Until reset	None	Yes , Only by reset push button

6.2.13 The magnet valve for operating penalty brake is in the scope of supply of the tenderer. The magnet valve is to be provided in the path line between A9 to MU2B valve in order to drop control pressure up to control port of additional C2 relay valve, which should in turn to drop Brake Pipe pressure to apply penalty brake by VCD. Schematic diagram is given in Annexure II.

6.3 Fail Safe Feature during fault in the Vigilance control system

The system shall be fail safe i.e. DMR should operate and penalty brake shall initiate for any fault in the Vigilance control system and a fault indication given to the driver. The counter shall not read application of such penalty brakes. The fault cycle period shall be set at 34 secs, during which the brake application cannot be cancelled. Only after the expiry of the fault cycle, and the throttle handle has been set to idle position, an attempt can be made by the driver to reset the fault condition, and resume normal vehicle operation using the Vigilance Control Device reset push button. In case it is not possible to reset the fault condition, the Vigilance control system should be isolated.

6.4 Isolation of Vigilance control

The vigilance control shall be provided with an arrangement through which it can be by passed in case it becomes defective/malfunctions. This arrangement shall be accessible only on breaking of a seal or a glass cover.

6.5 Vigilance Suppression

6.5.1 There shall be a provision to suppress the operation of Vigilance control devise when continuous proof of driver's vigilance is not required. Such suppression shall take place if Brake cylinder pressure is ≥ 1.6 kg/cm². Suppression shall be cancelled i.e VCD shall be re-activated when Brake cylinder pressure is ≤ 1.3 kg/cm². The tapping of pressure sensor for above pressure sensing, will be taken from delivery pipe line of brake cylinder charging C2W relay valve.

6.5.2 Vigilance suppression shall not function during T1, T2 and T3 periods, as well as during Fault cycles.

6.6 Vigilance control system during MU operation.

6.6.1 The Vigilance control system shall be disabled on a trail locomotive in multiple operations. The vigilance shall be automatically suppressed whenever both control stands are set to the 'OFF' position ie MCB1 and MCB2, of trail loco, are set to 'OFF' position.

6.6.2 Automatic suppression of VCD as mentioned in para 6.6.1 can take place only if the locomotive is in T0, T1 or T2 period of vigilance cycle at the time of setting both MCB1 and MCB2 in 'OFF' position.

6.7 Compatibility with other equipments

VCD shall be compatible with Anti collision device (ACD) (or other similar device)i.e both VCD and ACD may be fitted on the same locomotive without affecting the functioning of each other.

6.8 VCD Indicator cum Reset Unit

VCD indicator cum Reset Unit shall be provided on each control stand. Its design shall conform to Annexure-V of this specification. ON/OFF of VCD indicators in different situation shall be as per table given below.

Indicator	Colour	Lead loco		Trail loco	
		VCD working	VCD By passed	VCD working	VCD By passed
Alerter light(Warning Flashing Light)	Yellow	During T1, T2 & T3 cycle	OFF	OFF	OFF
Proving light(VCD working)	Blue	ON	OFF	ON	OFF
VCD By pass indicator	Yellow	OFF	ON	OFF	ON
MU Trail mode	Green	OFF	OFF	ON	OFF

indicator					
Penalty brake indicator	Red	During T3, T4 cycle and fault in VCD system	OFF	OFF	OFF

6.9 Suggested Materials for assembly of VCD

Suggested list of materials which may be used for assembly of VCD conforming to this specification are given in Annexure-III. This is an indicative list for guidance of manufacturers.

7.0 Inspections and Testing

7.1 During the developmental stage, for proper control & monitoring, RDSO will be the Controlling Agency. The supplier shall submit its offer of equipment to RDSO along with all the details of equipment as per Annexure 1. The firm will be inspected to check capacity and capability of manufacturing. If found suitable, product will be taken up further for prototype inspection and testing.

7.2 The whole of the materials or fittings used in the construction of the work shall be subjected to inspection by the inspecting officer and shall be to his entire satisfaction.

7.3 The inspecting officer shall have the power to:

.1 Adopt any means he may consider necessary to satisfy himself that all the materials or fittings specified are actually used throughout the construction.

.2 Visit at any reasonable time and without previous notice, either Contractor's works or his subcontractor's works to inspect the manufacture and quality of the work at any stage.

.3 To reject any material or fittings that do not conform to the relevant standard specifications or have not been manufactured in accordance with approved practices. The rejected materials or fittings shall be marked in a distinguishable manner and shall be disposed off in such manner as the inspecting officer may direct.

7.4 The tests for which facilities are not available may be carried out at RDSO or any other approved laboratory, for which the testing charges shall be payable by the supplier.

7.5 No test piece shall be cut from any material or fittings until it has been stamped with such identifying marks as the inspecting officer may require.

7.6 No work shall be packed or dispatched until it has been passed by the inspecting officer, but the contractor's responsibility for its efficiency in every way, shall remain the same as if the work had been manufactured and tested by him.

7.7 Should any part of system / device require alteration, or any defect appear during the tests or trials, the contractor shall without any extra charge make such alterations or rectify the defect to the satisfaction of the inspecting officer.

7.8 Copies of manufacture's test certificate, guaranteeing performance of the equipments, shall be supplied in duplicate along with the delivery of each set of equipment.

7.9 Internal test results conducted by the Contractor shall be handed over to the inspecting officer before commencement of the tests and trials.

7.10 In the event of a dispute between the Inspecting Officer and the Contractor, the decision of the purchaser shall be final and binding.

7.11 The contractor shall provide, free of charge, labour and appliances and testing of the whole of the work under the contract, whether inspected at his own or his sub-contractor's premises, and shall make provisions in his orders to his Sub-contractors for the inspection and testing of materials or fittings at their works, unless permission is given by the Inspecting Officer for the same to be inspected after delivery at the contractor's works.

8.0 Category of tests

8.1 Type test

Type test shall be carried out on two units of equipment as per vendor's design and drawings before provisional approval from RDSO. If RDSO feels to conduct type test on some more units the samples will be picked up at random for further validations of design and drawings. This option shall be exercised by RDSO based on the performance of the unit till design is validated. Once design is validated the final approval shall be given by the RDSO.

8.2 Routine test

Routine tests shall include all tests specified in Group 'A' mentioned in para 9.1 below and other tests to be specified in the QAP.

8.3 Investigation test

Whenever considered necessary by the engineers or the inspecting officer, the investigation tests are to be carried out on a single piece in order to obtain additional information on its performance.

8.4 Endurance test

The components, need frequent operations, are subjected to endurance test during type test for different cycles/ operations to check the mechanical strength of individual components, assemblies and sub assemblies. This test shall be carried out during type testing.

9.0 List of Tests

9.1 VCD will be tested mechanically and electrically to prove its functional reliability as per details given below.

Group 'A' tests		
S.N	**Nature of Test**	**Details**
1	Visual Inspection	As per clause 10.2.1 of IEC 60571

2.	Performance Test	As per clause 10.2.2 of IEC 60571
3.	Reversal of Polarity	This is a design feature as per clause 5.2.6 of IEC 60571. The effectiveness of Reversal Polarity protection is tested over a period of not less than 1 minute within the specified voltage range. After this test the system shall be connected correctly and the performance checked. No degradation permitted.
4.	Effect of voltage variation	As per clause 3.1.1.1 of IEC 60571
5.	Insulation resistance test (with wiring harness)	As per clause 10.2.9.1 of IEC 60571
6.	High voltage test (Flash test)	This is done on the complete unit. The insulation between all terminals coupled tightened and earthed, shall withstand for one minute, 1000 V r.m.s, 50 Hz supply applied in such a manner as to avoid any ac voltage provided. During the test the maximum leakage current shall be measured which shall not exceed 0.005 A.
7.	Di-electric test (Applicable only if VCD unit has more than one PCB)	If the unit has only one PCB then High voltage test & Di-electric test are common. If no of PCB's exist, High voltage test as above and Di-electric test As per clause 10.2.9.2 of IEC 60571 is to be done.
Group 'B' tests		
8.	Weather proof ness test	As per clause 10.2.4 & 10.2.5 of IEC 60571
9.	Temperature variation .1 Cooling test .2 Temperature rise test (with enclosure)	As per clause 10.2.3 & 2.1.2 of IEC 60571
10.	Surge test	As per clause 10.2.6 IEC 60571. The test circuit given in figure 4a of IEC 60571 shall be followed. The wave form A is to be followed.
11.	Vibration & shock tests (with enclosure)	As per clause 10.2.11 of IEC 60571
12.	Endurance test	The equipment shall be continuously worked for 125,000 cycles (approx. 90 days). These tests shall be carried out at the nominal operating voltage. The tests shall be acceptable if the equipment performs satisfactorily throughout the tests and also after the tests.

13.	RFI radiated	As per clause 10.2.8.2 of IEC 60571
14.	Inducted RF field conducted	As per clause 4.6 of IEC 61000 The signal is applied to DC power in lines. The frequency shall be varied progressively over the range 0.5-0.8 MHz and the voltage level is 3 v/m (level 2). During or after the test, no degradation of performance shall be allowed and the system shall work normally after the test.
15.	Electrical fast transient/ burst (capacitive coupling)	As per clause 4.4 of IEC 61000. The signal shall be applied to the data lines and voltage applied 0.25 Kv (level 1) [capacitive coupling]. Degradation of performance shall be allowed during the test but these should not be loss of function and the system shall work normally after the injected signals are removed.
16.	Electrical fast transient/ burst (direct injection)	As per clause 4.4 of IEC 61000. The signal shall be applied to DC power lines and voltage applied is 2 Kv (level 3). Direct Injection. Degradation of performance shall be allowed during the test but these should not be loss of function and the system shall work normally after the injected signals are removed.
17.	Power frequency magnetic field	As per clause 4.8 of IEC 61000 The signal shall be applied to the enclosure at the equipment. The magnetic field applied shall be 30 A/m(level 3). During or after the test no degradation of performance shall be allowed.
18.	Salt Mist Test	As per clause 10.2.10 of IEC 60571

10.0 Field Trial

10.1 After successful prototype development and testing, field performance of at least 10 VCD units will be monitored. The performance of the VCDs in field will be monitored for at least 12 months. Installation of the first prototype shall be the responsibility of the supplier. Assistance with regard to labour and other facilities which are available in the sheds/production units would, however, be provided to the supplier during prototype installation

10.2 On satisfactory performance in field, the firm will be placed in category-II**,** i.e. under development source in RDSO Vendor Directory. Field trial performance of the Vigilance Control Device already fitted on the locomotives will continued to be monitored till first overhauling of Vigilance Control Devic i.e. four years from commissioning. If performance of these Vigilance Control Devices is satisfactory till 1st overhauling, and performance feedback on further orders received during the Ist , 2nd ,3rd year after being placed in category II is satisfactory then the firm may be upgraded to category-I.

11.0 Regular Inspection

11.1 Regular inspection of the equipment shall be carried out by the purchaser or his nominee. The supplier shall provide, without extra charges, for material, equipment, tools and any other assistance, which the purchaser or his nominee may consider necessary for any test and examination. The supplier shall make available manufacturing drawings and material specifications of the components to the inspecting authority at the time of inspection.

11.2 Supplier will offer VCD for inspection after complete checking by them. The test results of every VCD will be submitted to the inspecting authority. Inspecting authority shall carry out all tests necessary to prove that the equipment fulfils the technical requirements, covered in this specification. However, Group 'A' tests mentioned in para 9.1 above, are mandatory.

11.3 Sample Size (As per IS: 2500 Part 1)
Sample size for various tests is given below.

Lot size	For tests in Group A	
	Sample size	Number of rejection acceptable
Upto 25	3	0
25-50	5	0
50-75	8	0
75-100	10	0
More than 100	10% of the lot	0

Samples should be picked up at random from the lot. If rejection number is more than the acceptable limit, inspection will be stopped and entire lot will be tested again by the firm. After checking the firm will re offer the lot for re inspection. Again sample checking will be done by the inspecting authority. If second time also rejection is more than the acceptable limit, entire lot will be rejected.

12.0 Installation

12.1 Installation of the device shall be done by the Purchaser under supervision of contractor.

12.2 Instructions on installation procedure shall be supplied by the contractor at least two months before the despatch of the equipment.

12.3 Suitable mounting arrangements to the equipments shall be provided to check /arrest the transmission of the normal vibrations/shocks/bumps experienced on locomotives during its service.

12.4 Special mounting and other arrangements for arresting the heat flow to the equipments shall be provided if the equipment is to be installed in the nose compartments of the diesel locomotives.

12.5 As far as possible the installation of the VCD shall be arranged so as to reduce the effects of external electrical disturbance and not influenced by electromagnetic field present inside the vehicle.

12.6 The supply to the equipment should, if possible, be provided by a separate conductor connected as directly as possible to the source. This conductor should be used only for the supply to electronic circuits. Field Trial

13.0 Technical Documents and Drawings

13.1 The supplier shall supply along with the offer two copies of layout drawings, operating instructions, maintenance instructions, spare parts catalogue, and trouble shooting instructions and testing instructions of the complete assembly. The supplier shall also submit drawings for individual assembly and sub assembly. The supplier shall submit his offer and also all other information in English.

13.2 Offer should include the requirement of spares for a period of three years. The quotation for spares shall indicate the cost of individual components/assembly/subassemblies

13.3 The supplier shall indicate the maintenance and testing facilities required in the shed for proper upkeep of the equipment supplied by him and shall submit the list of such equipment with details including cost of individual equipment.

13.4 The contractor shall indicate the period after which the components of the device (VCD) must be complete overhauled and such information shall be supported by certificates from previous.

13.5 Contractor shall indicate details of marketing/manufacturing arrangements, if any, with other firms in India and/or outside India. The contractor shall also indicate the indigenous and the detailed programme for indigenous manufacture giving lists of specific items and their prices.

13.6 The contractor shall indicate particulars of maintenance facilities, which he recommends, for being set up in central workshops and in maintenance depots for their equipments of 50 sets of device in the first instance.

14.0 After Sales Service

14.1 Supplier shall arrange to supply along with the equipment, maintenance manuals of the equipment one with each set. Manual shall contain information pertaining to detailed dimensional drawings indicating mounting arrangement layout, sub

assemblies, principle of operation, maintenance schedules, trouble shooting, details of special tools if required, parts catalogue and testing procedure of the equipment being supplied. Updated position of modifications will also be incorporated.

14.2 Adequate number of colored wall charts showing pictorial view of components along with part nos. will be given. The copies of Maintenance Manual and wall charts are meant for wider circulation for Railways and fresh copies shall be furnished as stipulated even if there are no changes in the manual and wall charts furnished against earlier contract.

15.0 Performance Guarantee

The supplier should give a guarantee of two years for the satisfactory working of the VCD. Any equipment / component except consumable items which fails during guarantee period, shall be replaced free of cost by the supplier.

16.0 Training

Training of purchaser's personnel for operation and maintenance of the vigilance control device shall be given by the contractor free-of-charge. Demonstration of the working of the device on locomotive shall be given by the contractor free-of-charge.

17.0 Technical clarifications

Any other technical clarifications with regard to this specification may be obtained from Director General (Motive Power), RDSO, Manak Nagar, Lucknow –226 011

18.0 Deviation

The supplier shall submit clause wise comments and shall indicate the deviation, if any, with the reasons thereof.

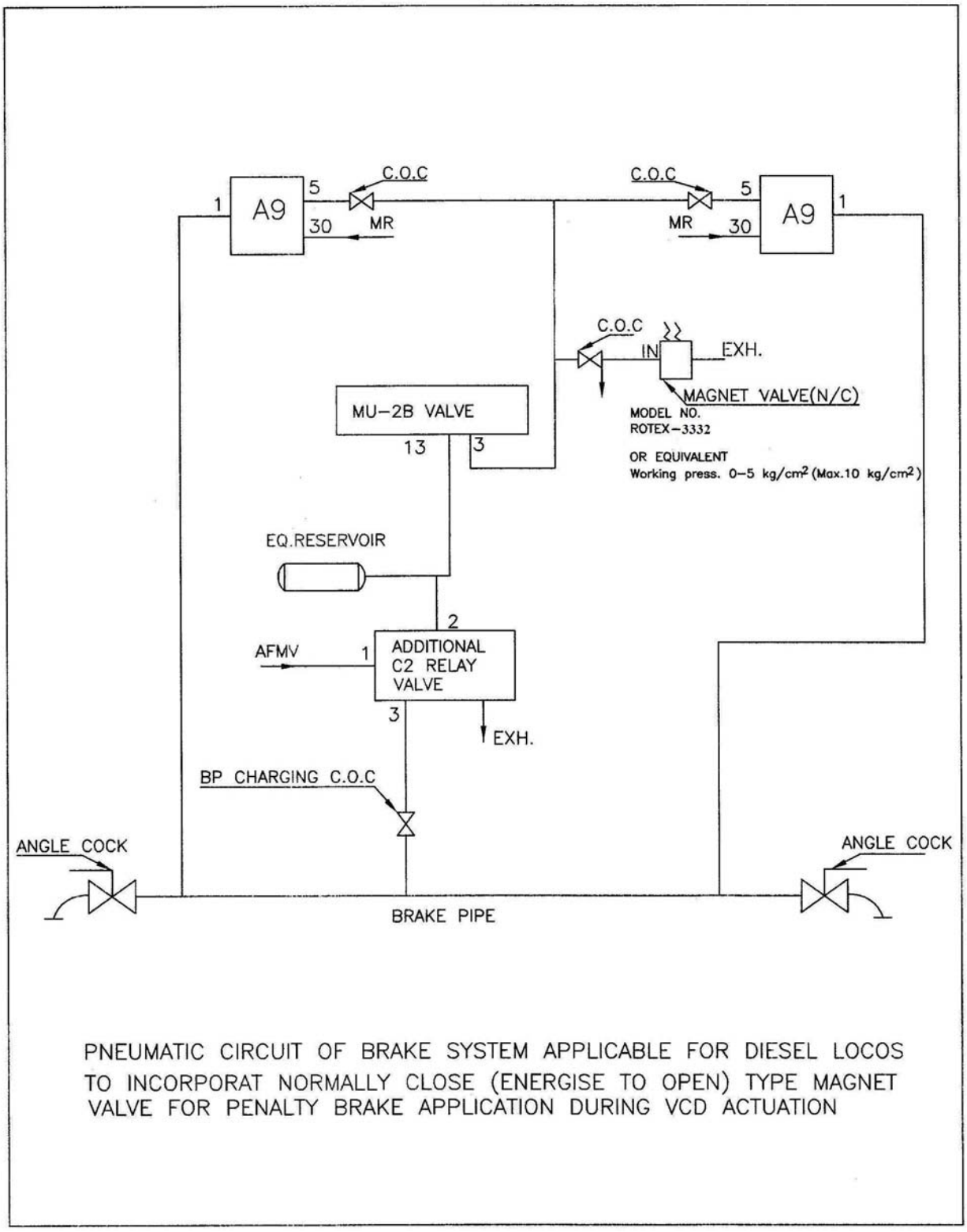
Annexure-I

Technical Details Of VCD

Following details shall be furnished by the supplier along with the offer:

1. Overall dimensions and mounting arrangement.
2. Maximum operating pressure.
3. Normal working pressure.
4. Weight of the complete unit.
5. List and details of customers where VCD have been offered
6. Foreign collaboration, if any, for manufacturing of VCD for locomotive application.
7. The details of type and routine tests before despatch to the Purchaser.
8. A certificate from recognised testing laboratory covering testing of electronic equipments used in the VCD system in accordance with IEC- 60571. The results of tests required to be given are given in para 9.1 of this specification.
9. Working details.

Annexure II
REV-01



PNEUMATIC CIRCUIT OF BRAKE SYSTEM APPLICABLE FOR DIESEL LOCOS TO INCORPORAT NORMALLY CLOSE (ENERGISE TO OPEN) TYPE MAGNET VALVE FOR PENALTY BRAKE APPLICATION DURING VCD ACTUATION

Annexure-III

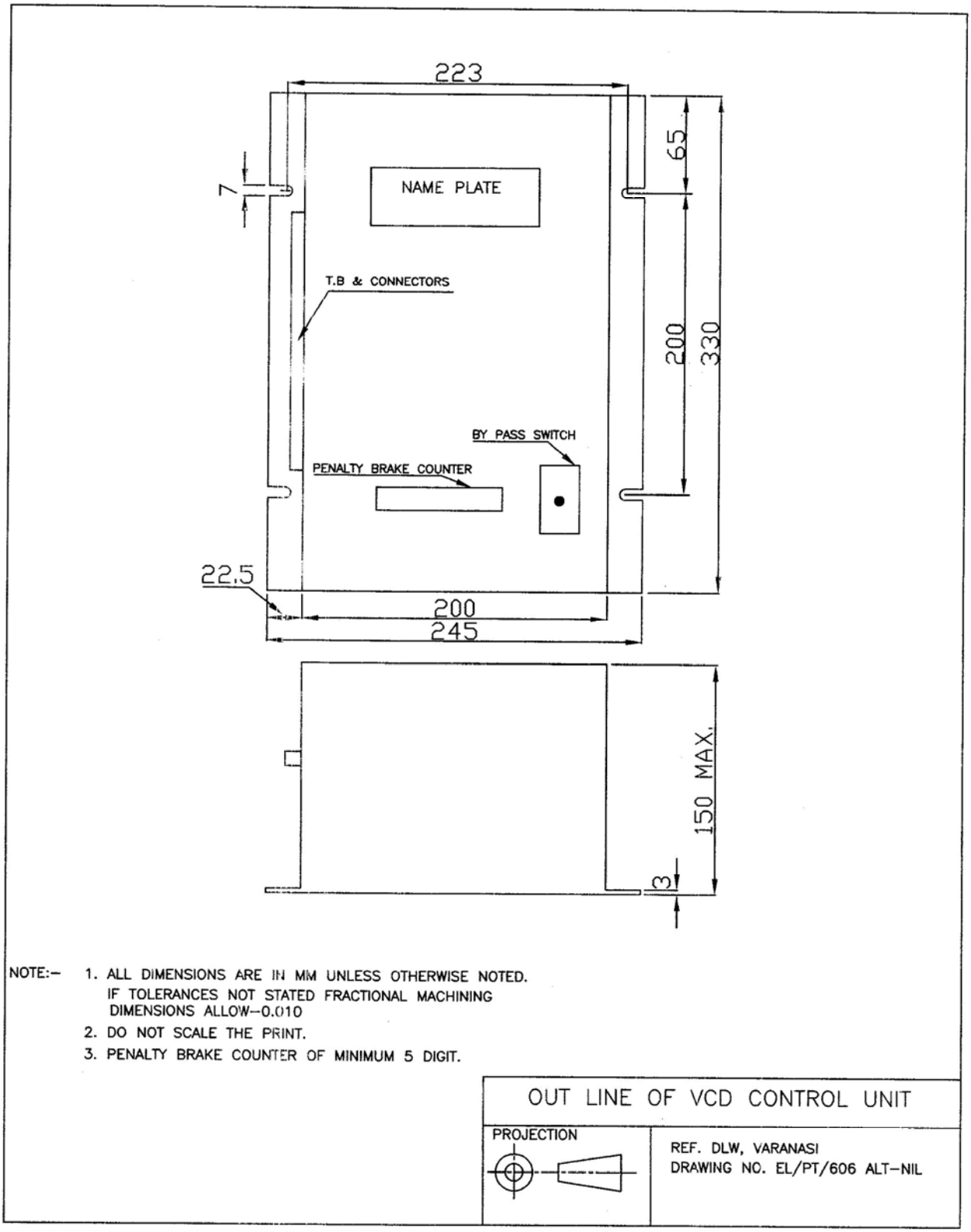
Suggested Materials for assembly of VCD

List of suggested materials which may be used in assembly of VCD is given below:

1. Voltage sensing module (multiple input channels and one out put)
2. **ON** delay Electronic Timer.
3. **OFF** delay Electronic Timer.
4. Blocking Diode
5. Electro Magnet relay
6. Electro Magnetic connector
7. Piezo Electronic Buzzer
8. Reset Button (Mushroom Type)
9. Indicator Electronic
10. Toggle switch
11. Rotex magnet valve (2 way)
12. Pressure switch e.t.c

Teflon wire, 16 SWG wires, 16 SWG Terminal Shoe, Terminal Block, etc.

Annexure-IV
REV-01



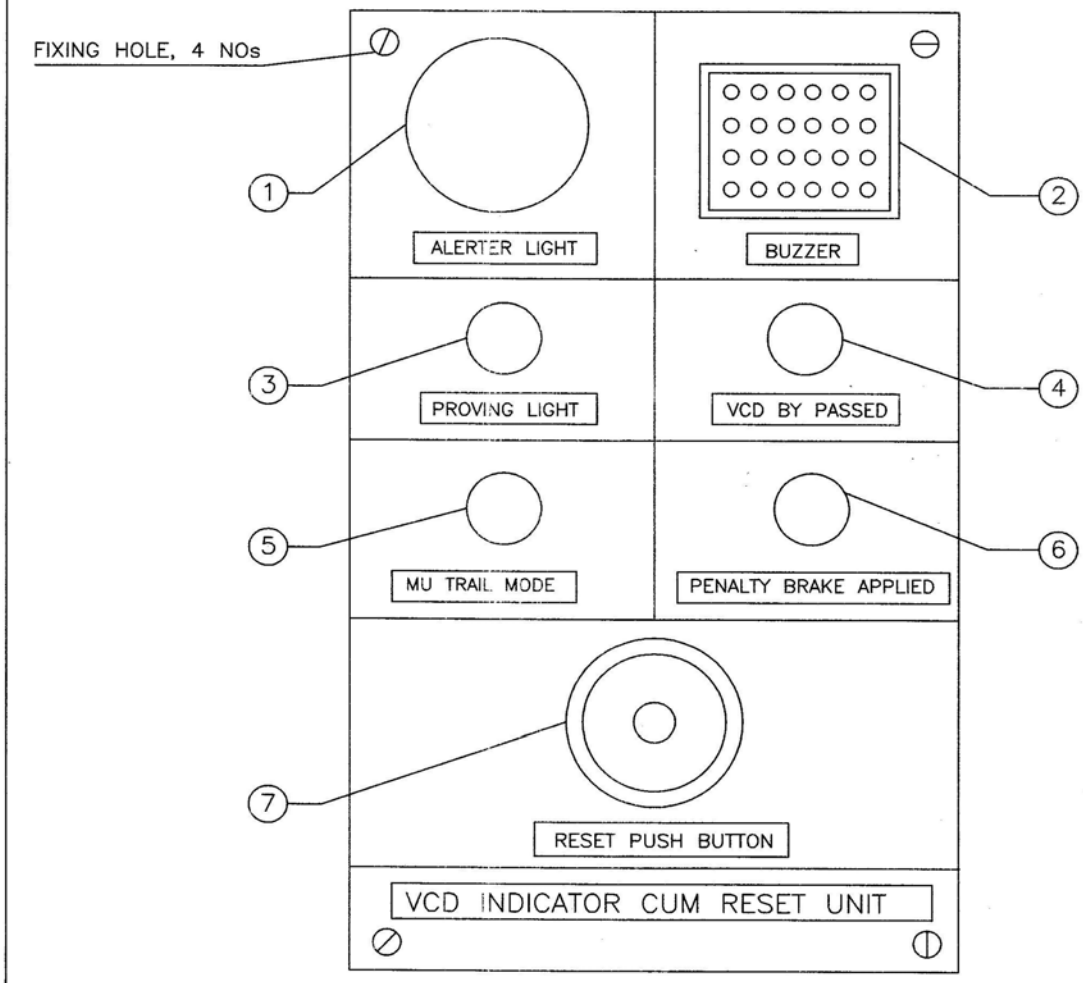
NOTE:–
1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE NOTED. IF TOLERANCES NOT STATED FRACTIONAL MACHINING DIMENSIONS ALLOW–0.010
2. DO NOT SCALE THE PRINT.
3. PENALTY BRAKE COUNTER OF MINIMUM 5 DIGIT.

OUT LINE OF VCD CONTROL UNIT

PROJECTION

REF. DLW, VARANASI
DRAWING NO. EL/PT/606 ALT–NIL

Annexure-V
REV-01



S.NO	ITEM	DESCRIPTON
7	RESET PUSH BUTTON	SELF MOUNTING TYPE, MUSHROOM TYPE TO BE FITTED IN 30.5 mm DIAMETER HOLE.
6	PENALTY BRAKE INDICATOR	RED LED BASED LIGHT
5	MU TRAIL MODE INDICATOR	GREEN LED BASED LIGHT
4	VCD BY PASS INDICATOR	YELLOW LED BASED LIGHT
3	PROVING LIGHT	BLUE LED BASED LIGHT
2	BUZZER	SOUND LEVEL 100 DECIBEL MINIMUM
1	ALERTER LIGHT	22.5 mm DIAMETER, 72 VOLT DC MULTI--LED YELLOW COLOUR INDICATOR.

NOTE:– 1. QUANTITY/LOCO: 2.
2. DIMENSIONS OF LIGHT INDICATORS CUM RESET FIXING PLATE SHALL BE DECIDED BY USER.
3. LETTERING SHALL BE AS SHOWN ABOVE.

OUT LINE OF VCD INDICATOR CUM RESET UNIT TO BE MOUNTED ON DRIVER'S CONTROL STAND

Annexure-VI

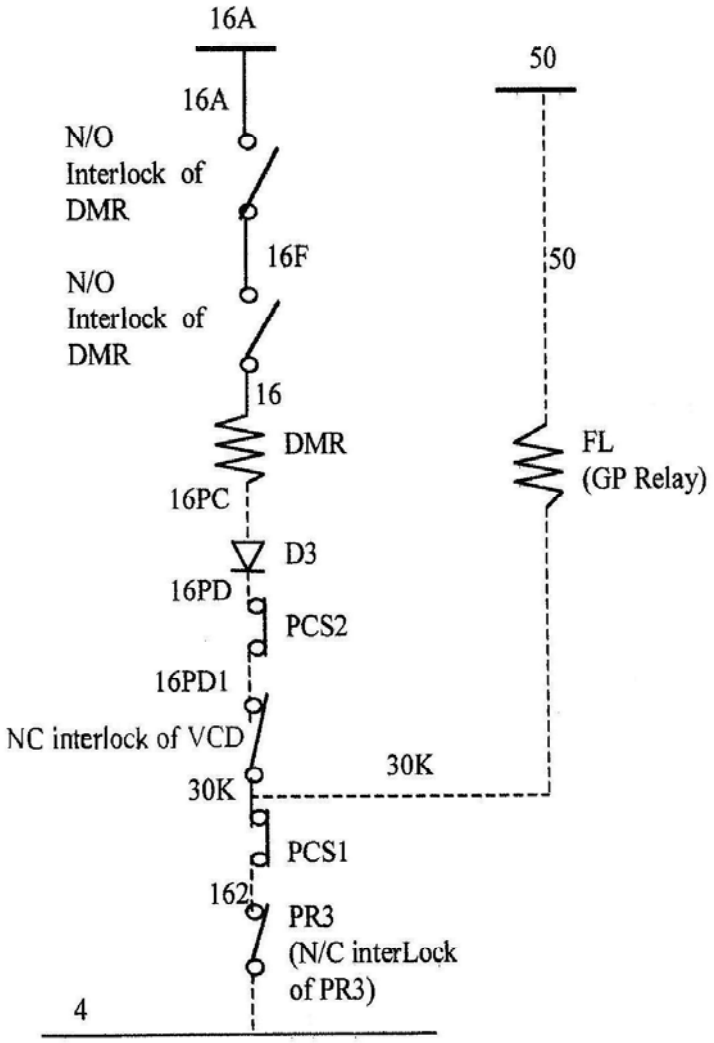


FIG: ELECTRICAL CIRCUIT SHOWING INTERFACIING OF VCD WITH EXISTING DMR CIRCUIT for diesel electric locomotives

Note: - N/C Type interlock of VCD with its Relay shall be provide within VCD control unit.

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e-mail : dmpbkh@gmail.com

सत्यमेव जयते

भारत सरकार - रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
लखनऊ - 226 011
Government of India-Ministry of Railway
Research Designs & Standards Organisation
Lucknow - 226 011

An ISO 9001:2000 Organisation

Dated: 26.03.10

No. SD.DEV.VCD.1

TITLE: -AMENDMENT NO. 1 OF March' 2010

TECHNICAL SPECIFICATION OF MULTI - RESETTING TYPE VIGILANCE CONTROL DEVICE (VCD) FOR DIESEL LOCOMOTIVES
(Specification No. MP.0.34.00.04 (Rev.04), December 2008)

Clause No.10.0 of the above-referred specification is being revised as follows:-

Clause No.	**Detail**
10.0	**Field Trial and approval**
10.1	After successful prototype development and testing, field performance of at least 10 VCD units will be monitored. The performance of the VCDs in field will be monitored for at least 12 months. Installation of the first prototype shall be the responsibility of the supplier. Assistance with regard to labour and other facilities which are available in the sheds/production units would, however, be provided to the supplier during prototype installation
10.2	On satisfactory performance in field, the firm will be placed in Part-II of RDSO Vendor Directory. Up-gradation from Part-II to Part-I shall be done as per criteria laid down in 'Guidelines for vendor approval No. MPG 0002 (latest version).

The above amendment may kindly be incorporated in your copy of the specification.

(B. Attri)
Director Standards(MP)
for Director General/MP

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&

17. C.D.E. Diesel Locomotive works, Varanasi.
18. Chief Admn. Officer, D.M.W., Patiala
19. EDME(Traction), Railway Board, Rail Bhawan, New Delhi-110001.
20. Electrical Dte/RDSO/LKO

(B. Attri)
Director Standards(MP)
for Director General/MP

Copy to:

1. M/s Medha Servo Drives Pvt. Ltd., P-4/5B, I.D.A., Nacharam, Hyderabad-500076
2. M/s Laxven System, Plot No.7, EC(Ext), Kushaiguda, Hyderabad-500062.
3. M/s Autometers Alliance Ltd., C-63, Sector-57, Noida-201307.
4. M/s Faiveley Transport India Ltd., P.B.No.39, Harita, Hosur-635109.