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GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS



DRAFT SPECIFICATION
FOR
CONTROL COMMUNICATION EQUIPMENTS FOR OFC USING 2-WIRE TELEPHONES.
(CCEO)

SPECIFICATION NO. RDSO/SPN/TC/66/2007

Revision 0.0

TELECOM DIRECTORATE
RESEARCH DESIGNS & STANDARDS ORGANISATION
LUCKNOW-226011

1.0 FOREWORD:

- 1.1 This draft specification no. RDSO/SPN/TC/66/2007 has been prepared based on the recommendation of the 34th TCSC approved by Railway board vide letter no.2004/Tele/TCM/1 dated 01.06.2007.
- 1.2 As suggested by members of TCSC, this draft specification is being circulated for comments and suggestions to all the railways/users. On receipt of the same, it will be incorporated in the final draft specification for implementation in the railways.
- 1.3 In the absence of IRS specification, the procurement may be made as per draft specification.
- 1.4 This specification requires references to the following standards specifications:

SN	Specification No.	Description
1.	IRS: S-23	Electrical Signaling and Interlocking Equipment
2.	IRS: TC-38	4-Wire Control Telephone with Way Station Equipment
3.	IRS: TC-60	4W/2W Train Traffic Control Equipment with DTMF Signalling.
4.	IS-9000 (Series)	Basic Environment Testing Procedure for Electronic and Electrical items.
5.	TEC GR/TEL-02/04 Sept02	Electronic Tone/Pulse Switchable Telephone Instruments.
6.	IRS: TC-59	Radio Patching Device
7.	RDSO/SPN/TL/23/99 Ver. 3 Amendment 1	48V DC SMPS power plant for Indian Railway Telecom Equipment.

Wherever reference to any of the above specification appears in this document, it shall be taken as a reference to the latest version of the specification unless the year of issue of the specification is specifically stated.

2.0 SCOPE:

- 2.1 This specification covers the requirements of Control Communication Equipments for OFC System using 2-Wire Telephones(CCEO) which will be used for Section Control, Deputy Control, Traction Power Control, Engineering control etc. at a Control Office & Station.
- 2.2 The system does not cover requirements of external underground cables like PIJF, quad for connection between CCEO Equipments with the telephones.

3.0 GENERAL REQUIREMENTS

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- 3.1 The Control Communication Equipments for OFC System using 2-Wire Telephones(CCEO) shall permit working of voice communication and signaling on Optical Fibre Communication System. The General Block Diagram of CCEO is shown at Annexure-I. The CCEO shall consists of following seven segments**
- (i) Control Room Equipment(CRE) :
 - (ii) Test Room Equipment(TRE) :
 - (iii) Local Telephone Equipment(LTE) :
 - (iv) Multi Telephone Waystation Equipment(MTWE) :
 - (v) Remote Patching Equipment(RPE) :
 - (vi) Three Way Amplifier(TWA):
 - (vii) Two-Wire Dialling Control Telephone(TDCT) :
- 3.2 CCEO System shall work on Optical Fibre Communication System based 4-Wire Voice Frequency(VF) Channel having impedance of $600 \pm 10\%$. This OFC System based 4-Wire Voice Frequency(VF) Channel is provided throughout the Control Section.
- 3.3 CCEO System shall work on this OFC System based 4-Wire Voice Frequency(VF) Channel with DTMF and VF Signal having typical transmission level of -4dBm to -8dBm. Although the CCEO System shall be designed for interfacing with OFC System based 4-Wire Voice Frequency(VF) Channel interface at unity input-output level, however it should be able to accommodate a level variation of ± 6 dB.
- 3.4 All the segments of CCEO shall work on -48 V DC, having working voltage range of -48 V DC $\pm 20\%$. All the segments of CCEO except TDCT at “-48V Power Line” shall be protected with pluggable Surge Protection Devices(SPDs) which consists of combination of varistors/suppressor diodes and GD tube with voltage & current limiting facilities. These SPDs shall have an indication function to indicate the prospective life and failure mode to facilitate the replacement of failed SPDs. This protection at “-48V Power Line” shall be in compliance to IEC 61643-1 and having Nominal Discharge Current of ≥ 700 Amp of 8/20 S, Maximum Discharge Current of ≥ 2 K Amp of 8/20 S and Voltage Protection Level of ≤ 350 V.
- 3.5 The TRE, LTE, MTWE, RPE and TWA shall be 19” Rack mountable, however provision shall exists for MTWE to mount it on wall. All the equipment shall be provided with “Lock & Key” arrangement to prevent unauthorized use.
- 3.6 All the interconnection between different segments of CCEO System and their connection with OFC System shall be through “Lockable Plug & Socket” arrangement.
- 4.0 CONTROL ROOM EQUIPMENT(CRE)**
- 4.1 The Control Room Equipment(CRE) shall be a desk type equipment for the controller’s use with following specifications and features.

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- 4.2 It shall be desk type with single push button calling arrangement. It shall have minimum 40 Push Buttons with Page-Shift Push Button, for calling TDCT or Way Station Equipment. This will yield to a calling capacity of minimum 80.
- 4.3 Provision shall exits to configure minimum 5 Push Buttons or Page-Shift Push Button as Group Buttons for calling a group of TDCT or Way Station Equipment.
- 4.4 It shall have the facility to call individual TDCT, or a group of TDCT, by single push button, directly or following the Page-Shift push button. This action will initiate a ring at the TDCT and provide an audio feedback to the controller. The feedback tone will be 'positive' type. Refer to Para 3.5.6.
- 4.5 Facility shall exist to backup the station numbers, which are programmed into the Control Room Equipment. This backup record shall be stored in the Test Room equipment to be used by the Control Room Equipment whenever required. All these actions shall be carried out with normal working connection arrangement, without any need for additional wiring or hardware.
- 4.6 All Push Buttons with Page-Shift Push Button shall be programmable to a TDCT number or a TDCT group number.
- 4.7 It should also be possible to program these push buttons to Way Station Equipment numbers, which use the 'two digit' codes and work in accordance to IRS TC-60 specification. These 'two digit' codes shall not interfere with TDCT numbers and vice-versa.
- 4.8 The controller's equipment shall also have minimum 10 Push buttons with 'Page-Shift' push button, for calling Local Telephone. This will yield a minimum 20 Local TDCT calling capacity.
- 4.9 Controller shall be able to call any Local Telephone, by pressing single push button, directly or following the Page-Shift push button.
- 4.10 All the virtual 20 push button, for calling the Local Telephone, shall have pre assigned numbers.
- 4.11 The Control Room shall be equipped with microphone and loudspeaker for conversing on line along with individual volume controls for both. The microphone shall be of 50-15000 Hz Frequency Response and 2 mV/pa Sensitivity having 600 Ohm Impedance. The Loudspeaker shall be 100 mm, 4 Watt round paper cone type. Microphone and loudspeaker shall be from reputed manufacturers like Phillips and Ahuja.
- 4.12 Besides microphone and loudspeaker the controller equipment shall also be equipped with handset to converse on line. The changeover from microphone to handset should be automatic along with visual indication.
- 4.13 For monitoring the outgoing speech level, a level indicator shall be provided on the Control Room Equipment. On the Control Room Equipment a display shall be provided for displaying the numbers being called.

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- 4.14 The Control Room Equipment will be connected to the Test Room Equipment on four twisted telecom pairs.
- 4.15 The Control Room Equipment shall work on DC, derived from Test Room Equipment. The maximum cable length between Test Room and Control Room shall be 200 mts.
- 4.16 Glass epoxy PCB of 1.6 mm minimum thickness shall only be used. The PCB shall be coated with epoxy base anti-fungal varnish to provide protection against dust, humidity, fungal infection and mechanical abuses. The copper cladding thickness shall not be less than 35 microns and shall be suitably tinned.
- 4.17 The PCBs shall be of modular constructions to facilitate maintenance suitable arrangements to ensure fixing of PCBs at its designated place in correct manner in the layout shall be provided. Means of easy extraction of PCB and locking arrangement to prevent loose contacts due to vibrations shall be provided.
- 4.18 The equipment shall be self checking. All status "OK" shall be displayed by displaying two illuminated dots on 7 segment displays.

5.0 TEST ROOM EQUIPMENT(TRE)

- 5.1 The Test Room Equipment (TRE) shall be designed to be installed in a 19" communication rack. The connectors on TRE shall be of Plug-In type to facilitate easy replacement.
- 5.2 The Test Room Equipment shall be directly interfaced to the OFC System for the Control Circuit on 4-Wire configuration. Gain settings of ± 6 dB shall be available for DTMF and VF Signals on the trans and receive channel of the equipment.
- 5.3 The VF channel shall provide interface as a 'digital branching in both direction' configuration arrangement with a 600 ohms interfacing impedance with a unity input-output level arrangement.
- 5.4 The TRE shall also have another identical channel with similar characteristics for connecting to another Control Circuit on OFC System if needed.
- 5.5 The Test Room Equipment shall be provided with a numeric push button pad and an alpha numeric LCD display.
- 5.6 The Test Room staff shall be able to call any TDCT or Local Telephone by using the numeric push button for composing the number. It will be also possible to initiate a call to a Way Station Equipment using the TC-60 code structure.
- 5.7 The Test Room staff shall be able to converse on line by using a handset.
- 5.8 A monitor speaker shall be provided along with volume control for monitoring the conversation on line.

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- 5.9 A level indicator for monitoring the trans and receive channels shall be available on the panel.
- 5.10 Glass epoxy PCB of 1.6 mm minimum thickness shall only be used. The PCB shall be coated with epoxy base anti-fungal varnish to provide protection against dust, humidity, fungal infection and mechanical abuses. The copper cladding thickness shall not be less than 35 microns and shall be suitably tinned.
- 5.11 The PCBs shall be of modular constructions to facilitate maintenance suitable arrangements to ensure fixing of PCBs at its designated place in correct manner in the layout shall be provided. Means of easy extraction of PCB and locking arrangement to prevent loose contacts due to vibrations shall be provided.
- 5.12 The equipment shall be self checking. All status "OK" shall be displayed by displaying two illuminated dots on 7 segment displays.

6.0 LOCAL TELEPHONE EQUIPMENT(LTE)

- 6.1 The Local telephone Equipment (LTE) shall be designed to be installed in a 19" communication rack.
- 6.2 The Local Telephones Equipment shall be able to cater to 20 Local Telephones.
- 6.3 These telephones shall work on a pair and connect on one-to-one basis, in star connection configuration from LTE, using a twisted telecom pair having loop resistance of less than 1200 Ohm.
- 6.4 The telephone instrument used as Local Telephone will be a TDCT instrument, identical to what is used with MTWE.
- 6.5 The Local Telephone connected to the LTE will have facility to get called by CRE and TRE but will have no dialling facility.
- 6.6 On picking up the handset, the Local Telephone will get connected to the control circuit. The CRE shall have facility to disconnected any particular Local Telephone if he desires to do so.
- 6.7 Glass epoxy PCB of 1.6 mm minimum thickness shall only be used. The PCB shall be coated with epoxy base anti-fungal varnish to provide protection against dust, humidity, fungal infection and mechanical abuses. The copper cladding thickness shall not be less than 35 microns and shall be suitably tinned.
- 6.8 The PCBs shall be of modular constructions to facilitate maintenance suitable arrangements to ensure fixing of PCBs at its designated place in correct manner in the layout shall be provided. Means of easy extraction of PCB and locking arrangement to prevent loose contacts due to vibrations shall be provided.
- 6.9 The equipment shall be self checking. All status "OK" shall be displayed by displaying two illuminated dots on 7 segment displays.

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7.0 MULTI TELEPHONE WAYSTATION EQUIPMENT(MTWE)

- 7.1 The Multi Telephone Waystation Equipment (MTWE) shall work on -48 volt dc. This device will be wall-mounting type and will be mounted next to the OFC equipment. Arrangement shall also exist to mount this equipment on a standard 19” rack.
- 7.2 The MTWE shall be directly interfaced to the OFC for the control circuit on 4-wire circuit configuration. Gain settings of ± 6 dB shall be available for DTMF and VF signals on the trans and receive channel of the equipment.
- 7.3 The VF channel shall provide interface as a ‘digital branching in both direction’ configuration arrangement with a 600 ohms interfacing impedance with a unity input-output level arrangement.
- 7.4 A total four numbers of Two-wire Dialling Control Telephones (TDCT) will be connected to the equipment, each on a twisted telecom pair.
- 7.5 A feedback tone will be generated by the MTWE whenever a ring to one of its TDCT is received.
- 7.6 The feedback tone will be ‘positive’ type. that will be initiated only if the telephone ringing current is detected. In situation where the wire pair connecting the TDCT is broken no feedback should be generated, however in situations where the wire pair is shorted together, the feedback tone generation may take place.
- 7.7 The MTWE shall provide four independent calling numbers for the four TDCT connected to it. Each will also be settable for a group number.
- 7.8 The MTWE have facility to program each of the TDCT for dialling or non-dialling mode.

8.0 REMOTE PATCHING EQUIPMENT(RPE)

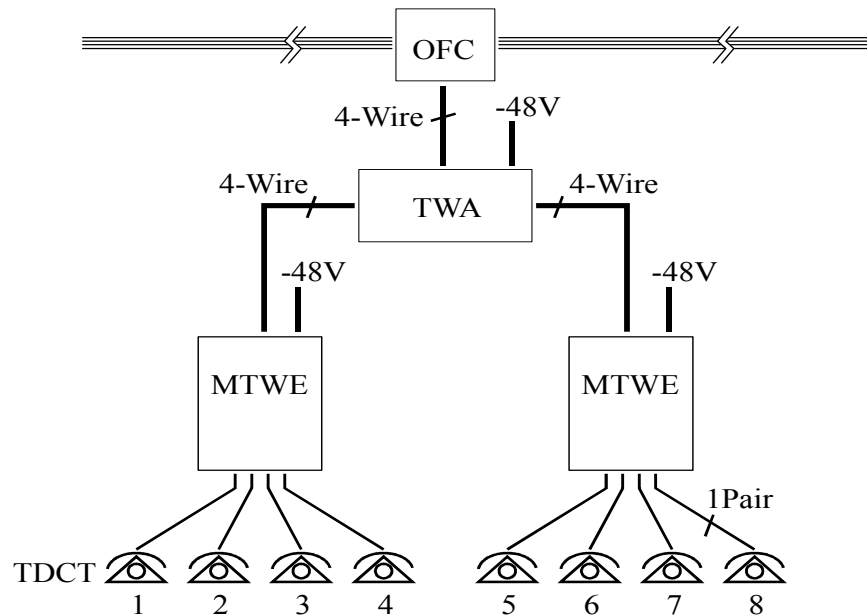
- 8.1 This device will be wall-mounting type and will be mounted next to the OFC equipment. Arrangement shall also exist to mount this equipment on a standard 19” rack.
- 8.2 The RPE will be able to interconnect (patch) two VF 4-wire channels of 600 ohms impedance to each other. It should be possible to interconnect the two channels by a local command (from the RPE panel) or from a remote command (from TRE).
- 8.3 The interconnecting path for the two channels will have transformer isolation and active components as well. With this, the channels will remain isolated and also provide impedance isolation between each other.
- 8.4 The PRE will provide a unity gain path for the patching channels.
- 8.5 The channel patching status should be seen on the PRE panel. The action of patching and un-patching (releasing) the channel shall be carried out by pressing a push button on the RPE panel, when operated locally.

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- 8.6 For remote operations RPE will have the following features and functions.
- 8.6.1 The TRE will be able to perform the ‘patching’ and ‘un-patching’ action on any particular RPE by a command addressing its number.
 - 8.6.2 It should also be possible for the TRE to get the status report (patched or un-patched condition) of any particular PRE by addressing a particular PRE.
 - 8.6.3 The addressing numbers of RPE will be from 1 to 9. It shall be possible to manage up to nine PRE on a control circuit.
 - 8.6.4 The remote commands will make use of calling protocol similar to that used for MTWE.
 - 8.6.5 The installed location of a RPE may be anywhere on the control section, from test room to the far end station point.

9.0 THREE WAY AMPLIFIER(TWA)

- 9.1 The Three Way Amplifier (TWA) shall work on -48 volt dc. This device will be wall-mounting type and will be mounted next to the OFC equipment, with in ten meters. Arrangement shall also exist to mount this equipment on a standard 19” rack.
- 9.2 The equipment will provide a unity gain three way branch amplifier configuration. Wherever more than one MTWE is to be deployed, the TWA can be used as to provide the additional 4-wire branch connection while keeping unity gain and impedance isolation.
- 9.3 The TWA shall directly interfaced to the OFC for the control circuit on 4-wire circuit configuration and have a 600 ohms. No gain setting will be required for interfacing.
- 9.4 The TWA will be used as a means to provide connections to additional MTWE and not to branch out the control circuit to open line.



Using Three Way Amplifier (TWA) for working two MTWE at a location.

10.0 TWO-WIRE DIALLING CONTROL TELEPHONE(TDCT)

- 10.1 The Two-wire Dialling Control Telephone (TDCT) will be a desk instrument in plastic body with a handset and a numeric dial.
- 10.2 This telephone shall work on a pair and connect on one-to-one basis, in star connection configuration from MTWE, using a twisted telecom pair having loop resistance of less than 1200 Ohm.
- 10.3 The TDCT will have the following features and functions.
- 10.3.1 As soon as the handset is lifted, the telephone should get connected to the control circuit with Rx path being made through but keeping the Tx path disconnected. The Tx of the handset will be enabled either by tapping the cradle switch or by pressing any one of the key switched on the telephone, except # and * switch.
- 10.3.2 The telephone will ring whenever it is called by CRE, TRE or any other TDCT. The telephone bell will ring irrespective of its on-hook or off-hook condition.
- 10.3.3 The ring will last for a period of ONE minutes(adjustable from 30 Seconds to 3 Minutes) whenever called, and shall get terminated as soon as the handset is taken off-hook. In case the handset is already off-hook, then a momentary on-hook action shall terminate the ring.
- 10.3.4 A visual indication will get registered whenever a ring is received and remain till the instrument undergoes an on-hook to off-hook action.

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- 10.4 The TDCT will have 3x4 standard telephone key pad and will function on pulse dialling system.
- 10.5 The required working characteristics of TDCT being unique, so it is necessary that this instrument is specially designed for working with the MTWO system while keeping all other user functions similar to those found in standard electronic telephone conforming to TEC GR/TEL-02/04 Sep 02.

11.0 TESTS AND PERFORMANCE REQUIREMENT

11.1 Unless otherwise specified, all the tests shall be carried out under prevalent ambient atmospheric conditions.

11.2 Type Test

11.2.1 The following shall constitute Type Test:

A minimum of one sample of CRE, TRE, LTE & TWA and two samples of MTWE, RPE & TDCT are required for type test. These samples shall not form part of supply.

- a) Visual Inspection (Clause 11.4)
- b) Applied high voltage test (Clause 11.5)
- c) Insulation resistance test (Clause 11.6)
- d) Operation test (Clause 11.7)
- e) Performance test (Clause 11.8)
- f) Climatic severity test (Clause 11.9)
- g) Vibration test (Clause 11.10)

11.3 Acceptance Test.

11.3.1 The following shall constitute the acceptance test on MTWE, RPE & TDCT and shall be carried out as per sampling plan specified in Clause No. 15. For CRE, TRE, LTE & TWA acceptance test shall be carried out on complete offered lot .

- a) Visual Inspection (Clause 11.4)
- b) Applied high voltage test (Clause 11.5)
- c) Insulation resistance test (Clause 11.6)
- d) Operation test (Clause 11.7)
- e) Performance test (Clause 11.8)

11.3.2 Any other tests as required by the inspecting authority to ensure that equipment is in conformity with the requirement of the specification shall also be done.

ROUTINE TEST

11.3.3 The manufacturer shall certify that all the tests given in para 11.3.1 have been successfully carried out on all the equipments offered for inspection. He shall produce those tests results at the time of inspection.

11.3.4 The manufacturer shall under take auditing of the components/devices for ensuring the reliability. Audit record shall be shown to the inspection authority.

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11.4 **Visual Inspection**

Visual inspection shall be carried out as per clause 14.2 of IRS:S-23 to the extent applicable.

11.5 **Applied High Voltage Test.**

The equipment shall stand without any damage a test voltage of 1KV, applied for a period of one minute, between the body and all the current carrying terminals looped together.

11.6 **Insulation Resistance Test**

The insulation resistance measured with 100V DC between the body and the current carrying terminals looped together shall not be less than 20 mega ohms.

11.7 **Operation Test**

The Control Office Equipments(CRE, TRE, LTE & TWA) shall be connected to Way Station Equipment(MTWE, RPE & TDCT) and it shall be tested for:

- (i) Ringing and Ring Back Tone.
- (ii) Long Ring
- (ii) Repeat Ring.
- (iii) Group Calling.
- (iv) Reset
- (v) Delete
- (vi) General Call
- (vii) Satisfactory speech.

The Operation Test shall be conducted as per Operation Test Procedure proposed by manufacturer duly reviewed and approved by RDSO/Lucknow.

11.8 **Performance Test**

11.8.1 The Performance Test shall be conducted as per Performance Test Procedure proposed by manufacturer duly reviewed and approved by RDSO/Lucknow. The Performance Test shall be conducted preferably at RDSO/Lucknow, however in case of any difficulty of infrastructure or any other facility at RDSO/Lucknow, the Performance Test may be conducted at Manufacturer's Premises or in any other mutually agreed Test Laboratory.

11.9 **Climatic Test-degree of severity**

This shall exclude microphone, loudspeaker, handset and TDCT.

11.9.1 **Dry Heat Test** shall be done in two phases-operational and storage. Operation test shall be done at $55^{\circ}\text{C} \pm 3^{\circ}\text{C}$ for 16 hrs. and the operation of the equipment shall be tested after completion of the test as per clause no. 11.7. The storage test shall be conducted at $70^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for 16 hrs with a recovery time of 8 hrs. The test shall be conducted as per IS:9000 Part III. Operation of the equipment shall be tested after completion of the test as per Clause 11.7.

11.9.2 **Damp Heat(study state) :** The equipment shall be subjected to $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ with RH not less than $93\% \pm -2\%$ for 24 hrs. On completion of the duration of the test the equipment shall be taken out and shall be wiped with dry cloth to remove the condensed water if any from the surface. The equipment shall then be kept in a recovery chamber at $27^{\circ}\text{C} \pm 5\%$ RH for 6 hrs and the insulation resistance shall be measured as per clause 11.6 pt. IV. The IR value shall not be less than 10M ohms. The operation of the equipment test shall be done as per clause 11.7.

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11.9.3 **Cold Storage Test** shall be done at -10°C to + 3°C for 16 Hours with the recovery time of 8 hrs. The test shall be conducted as per IS:9000 Part-II. The operation of the equipment shall be tested as per clause 11.7.

11.10 **Vibration Test**

11.10.1 The equipment shall be subjected to vibration test as per IS:9000 (Part VIII)

- | | | | |
|------|---------------------------------|---|-----------------------------------|
| (i) | Freq. Range | : | 10Hz to 55 Hz. |
| (ii) | Vibration amplitude | : | 0.35mm |
| iii) | Duration of endurance for sweep | : | 20 sweeps cycles(10Hz-55Hz-10Hz) |
| iv) | No. of axes | : | 3 coordinate axes. |
| v) | Duration at resonant frequency | : | 30 minutes+/- 1 minutes. |

11.11 After completion of climatic and vibration tests the equipment shall be visually inspected to check for any damaged or cracked parts and performance test shall be carried out as per Clause 11.8.

11.0 **MANUFACTURE**

11.1 The manufacturer shall ensure that in addition to all the provisions of this specification the requirements of other specifications referred to in this specification as far as they are applicable and any specification prescribed by purchaser are fully complied with.

11.2 Workmanship limits and fits insulating materials, electro-magnetic coils, electrical contacts, terminals, wiring, rejection, marking and identification, packing and warranty shall be in accordance with the requirements in IRS: S-23.

11.3 The manufacturer shall have suitable inspection facilities and testing equipment at their works.

11.4 The manufacturer shall provide training to Rly. Staff free of cost for one week at his works.

12.0 **MANUFACTURER'S IDENTIFICATION**

12.1 A metal plate containing the following information shall be firmly secured to the equipment:

- Manufacturer's Name and Address.
- Year of manufacture and serial number.
- IRS Specification No.
- Indian Railways.

13.0 **PACKING**

13.1 The equipment shall be so packed as to permit convenient handling and to protect against loss or damage during transit and storage. The following information shall be given on the packing case:

- Name of manufacturer

- b) Year of manufacture
- c) Arrow indicating top side.
- d) Fragile
- e) Address of consignee.

14.0 INSTRUCTION BOOKS, MEASURING INSTRUMENTS AND WARRANTY.

- 14.1 The following documents in booklet forms shall be supplied with each equipment:-
- a) Operating instruction manual
 - b) Maintenance instruction and maintenance preventive schedule to be carried out.
 - c) Technical instruction manual giving details of circuit and connection diagrams, values of rating of all components, PCBs wiring etc.
- 14.2 complete details of the measuring equipment required for servicing shall be provided.
- 14.3 List of the recommended lifetime spares shall also be provided with the equipment.
- 14.4 Unless and otherwise agreed between purchaser and manufacturer, the equipment shall have warranty for satisfactory working for a period of one year after installation or two years from the date of purchase, whichever is earlier.
- 14.5 All the components used in the equipment shall be of high grade quality from reputed manufacturer.
- 14.6 Data sheet for switches microphone loudspeaker shall be submitted by the manufacturer.

15.0 SAMPLING

- 15.1 Unless otherwise agreed to by the purchaser and the supplier the double sample plan given below shall be adopted.

Lot consisting of MTWE/RPE/TDCT	1 st Sample size	2nd Sample size	Combined Sample Size	Acceptance number	Rejection Number.
1	2(N1)	3(N2)	4(N1+N2)	5(C1)	6(C2)
Under 25	3	6	9	0	2
25 to 50	7	14	21	0	3
51 to 100	10	20	30	0	3
101 to 200	13	26	39	0	5
201 to 300	20	40	60	1	5
301 to 500	25	50	75	1	6

- 15.2 The number of 4Wire MTWE/RPE/TDCT (N1) as given in col.2 shall first be selected and subjected to the acceptance test. If in the first sample, the number of defective

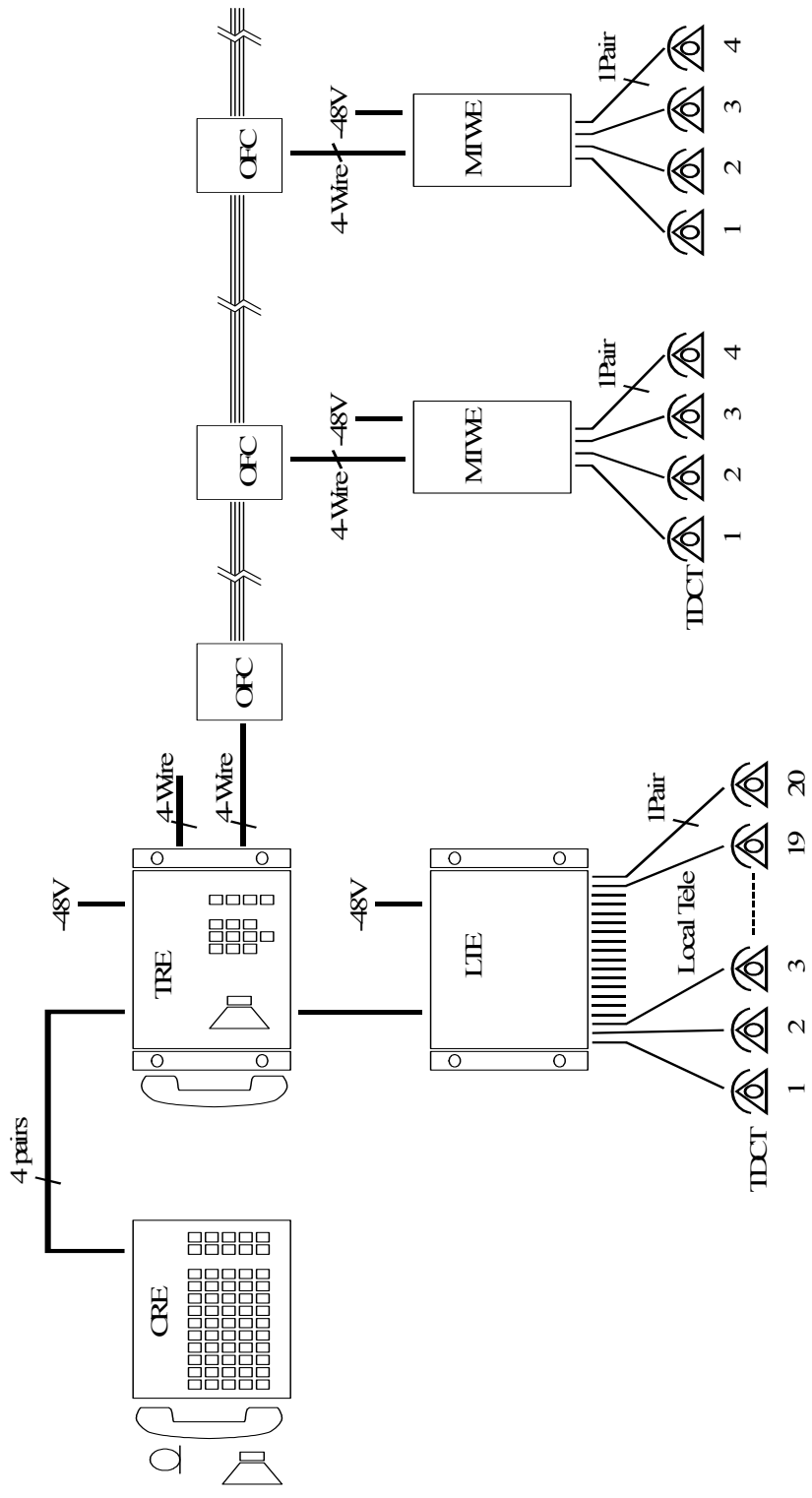
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MTWE/RPE/TDCT that is those falling in one or more acceptance tests is less than/equal to the corresponding number (C1) given in Col 5. The lot shall be considered as conforming to the requirements of the acceptance test If the number of defective MTWE/RPE/TDCT in the first sample is greater than or equal to the rejection number given in Col 6, the lot shall be considered as not conforming to the requirement of the acceptance test. If number of defective MTWE/RPE/TDCT in the first sample lies between (C1) and (C2) a second sample of size (N2) as given in Col 3 shall be selected and subjected to acceptance test. If in the combined sample, the number of defective MTWE/RPE/TDCT is less than (C2) the lot shall be considered as conforming to the requirements of acceptance test.

- 15.3 The sample shall be selected at random from at least 10% of the packages for random selection of packages, all the packages in the lot shall be managed in a serial order and every 't' the package shall be selected until the requisite number of packages is obtained.

't' being the integral part of $\left(\frac{\text{Total number of packages in the list}}{\text{Total number of packages to be selected}} \right)$.

ANNEXURE -I



MIWO System Block diagram