RESEARCH DESIGNS & STANDARDS ORGANISATION
MANAK NAGER, LUCKNOW – 226 011

INDIAN RAILWAY STANDARD SPECIFICATION
FOR
BLOCK PROVING BY AXLE COUNTER USING UFSBI (BPAC)

SPECIFICATION NO. - IRS:S-105/2025

Reasoned Document

SIGNAL DIRECTORATE

RESEARCH DESIGNS & STANDARDS ORGANISATION
MINISTRY OF RAILWAYS
MANAK NAGER, LUCKNOW – 226 011

<table>
<tr><th>Spec. Cl. No</th><th>Specification Clause</th><th>Railway / Vendor Comments</th><th>RDSO Remarks</th></tr>
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<td>0.2</td>
<td>This specification requires reference to the following Indian Railway Standards (IRS) and Indian Standards (IS) and RDSO/SPN.

<table>
<tr><td>RDSO/ SPN/147</td><td>Specification of Universal Fail-Safe Block Interface (UFSBI)</td></tr>
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<tr><td>IRS:S:104</td><td>Specification of Universal Fail-Safe Block Interface (UFSBI)</td></tr>
<tr><td>RDSO/SPN/189</td><td>Specification of Modular Terminal Blocks, Fuse Terminal Blocks & Miniature Fuse Links of International Standard for Railway Signalling</td></tr>
<tr><td>IRS:TC- 55</td><td>Specification for 24 Fiber armored optical fiber cable</td></tr>
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<td>3.1.11</td>
<td>Faceplate shall be covered with colorless (transparent) acrylic sheet of 4 mm thickness ±0.5mm as per IS: 7569. Acrylic sheet should not have any scratch, air bubbles, foreign material or any other marks.</td>
<td>----</td>
<td>Faceplate shall be covered with colorless (transparent) acrylic sheet of 4 mm thickness ±0.5mm as per IS: 7569 or polycarbonate sheet with thickness 3 mm. Acrylic/polycarbonate sheet should not have any scratch, air bubbles, foreign material or any other marks.</td>
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3.1.12	Transparent acrylic sheet shall be fixed on top of the faceplate by a removable frame of minimum 3 mm thickness.	----	Transparent acrylic/polycarbonate sheet shall be fixed on top of the faceplate by a removable frame of minimum 3 mm thickness.
3.1.30.2	**Key & Switches:** The switches and keys shall be of different make. The LCB key or Shunt Release Key is L&T make (ESBEE brand) or Siemens make with catalog number HK85C3 or 3SU1050-4BF01-0AA0 for Key Actuator & ~~H~~C61A2 (1 NO) / HC61B2 (1NC) 3SU1400-1AA10-1BA0 (1 NO), 3SU1400-1AA10-1CA0 (1 NC) for elements. The SM's key is Siemens make with catalog number CES1 or 3SB50004AA01& for actuator 3SB04 00-0B or 3SB54000E for element.		**Key & Switches:** The switches and keys shall be of different make. The LCB key or Shunt Release Key is L&T make (ESBEE brand) or Siemens make with catalog number HK85C3 or 3SU1050-4BF01-0AA0 for Key Actuator & ~~H~~C61A2 (1 NO) / HC61B2 (1NC) 3SU1400-1AA10-1BA0 (1 NO), 3SU1400-1AA10-1CA0 (1 NC) for elements. There shall be provision of monitoring the position of LCB keys through datalogger for monitoring the position of LCB key in single line system. The SM's key is Siemens make with catalog number CES1 or 3SB50004AA01& for actuator 3SB04 00-0B or 3SB54000E for element.

3.2	**UNIVERSAL FAIL-SAFE BLOCK INTERFACE:** Universal Fail-Safe Block Interface (UFSBI) required to interface the conventional block instruments over Telecom cable, voice/ data channels of any media like OFC, & Digital Radio using proper multiplexer.	---	Universal Fail-Safe Block Interface (UFSBI) required to interface the conventional block instruments over Telecom cable (IRS:TC 30), voice/ data channels of any media like OFC (IRS:TC 55), & Digital Radio using proper multiplexer. The summary of error codes shall be pasted inside the equipment (front door) for ready reference and early troubleshooting of failures.
3.3	**Single Section Digital Axle Counter** Single Section Digital Axle Counter consists of a pair of axle detectors connected together by a transmission medium in VF range. It is capable of counting axles, count-comparisons, supervision, relay drive and transmission of counts and health of axle detector. Digital Axle Counter track relay output is available at both ends of the track section.	------	~~**Single Section Digital Axle Counter**~~ **Digital Axle Counter(DAC):** ~~Single Section~~ Digital Axle Counter consists of a pair of axle detectors connected together by a transmission medium in VF range. It is capable of counting axles, count-comparisons, supervision, relay drive and transmission of counts and health of axle detector. Digital Axle Counter track relay output is available at both ends of the track section.

3.5	**Quad Cable Or Voice channel:** Railways shall provide 4 pair copper conductors or 3 voice channels in OFC for single line block working and 5 pair copper conductor or 4 voice channels in OFC for double line block working from station to station. Cable shall be as per specification IRS:TC 30.	-----	**Quad Cable Or Voice channel:** **For single line section:** Railways shall provide 4 pair copper conductors or 3 voice channels in OFC for single line block working with single DAC/5 pair copper conductors or 4 voice channels in OFC with dual DAC. **For double line section:** Railways shall provide 5 pair copper conductor or 4 voice channels in OFC for double line block working with single DAC/7 pair copper conductors or 6 voice channels in OFC with dual DAC from station to station. Telecom Cable shall be as per specification IRS:TC 30.
3.8.1	Number of relays used for Double **Line Block working is 29 nos.** and for **Single Line Block working is 31 nos**. All the relays used as per the circuit diagram shall be of RDSO approved make. Relays used as repeater of external relays shall be of 1000 ohms. Relay Rack can be separate or it can be in the same cabinet of UFSBI. The Electronic Fail Safe Timer (IRS: S - 61) shall be micro controller based only. Alternatively, to minimize the number of relays, 2 out of 2 digital	**CSE/SER Comments**- To minimize failure of UFSBI on account of Rely contact failure, duplication of relay contact may be considered (SN-2328).	Number of relays used for Double **Line Block working is 29 nos.** and for **Single Line Block working is 31 nos**. All the relays used as per the circuit diagram shall be of RDSO approved make. Relays used as repeater of external relays shall be of 1000 ohms. Relay Rack can be separate or it can be in the same cabinet of UFSBI. The Electronic Fail Safe Timer (IRS: S - 61) shall be micro controller based only. Paralleling of spare contacts available in relays to be done to minimize relay contact failures. Alternatively, to minimize the number of relays, 2 out of 2 digital hardware logic (incompliance with CENELEC SIL-4 standard) based on reliable PLD / CPLD of reputed make like LAITICE / ALTERA / XYLINX, may be used to implement the Block Interlocking Logic with same functionality without any change in hardware / software or interfacing circuit of UFSBI (as per ~~RDSO/SPN/147~~IRS:S:104). The hardware logic module for Single Line and Double Line should be distinctly different and it shall not be possible to inter-change the modules. UFSBI should retain its functionality of Inter-station Block communication as per IRS:S-105 2012.

	hardware logic (incompliance with CENELEC SIL-4 standard) based on reliable PLD / CPLD of reputed make like LAITICE / ALTERA / XYLINX, may be used to implement the Block Interlocking Logic with same functionality without any change in hardware / software or interfacing circuit of UFSBI (as per RDSO/SPN/147). The hardware logic module for Single Line and Double Line should be distinctly different and it shall not be possible to inter-change the modules. UFSBI should retain its functionality of Inter-station Block communication as per IRS:S-105 2012.		

3.8.4.2	Every wire should be terminated properly. Termination of wires shall be done on non-disconnecting type terminals of Phoenix/Wago make with DIN rail mounting arrangements.	-----	Every wire should be terminated properly. Termination of wires shall be done on non-disconnecting type terminals of Phoenix/Wago make with DIN rail mounting arrangements (as per RDSO/SPN/189).
3.8.4.3	Individual termination shall be marked with a unique number for easy identification.	----	Individual termination shall be marked with a unique number for easy identification using ferrules.
22.1	The manufacturer shall warrant the Block Panel covered by this specification to be free from defects in design, material and workmanship under ordinary use and service, his obligation under this warranty being limited to replace free of cost the Block Panel which shall be found defective before installation in the field within one year after delivery to the purchaser.	-----	~~The manufacturer shall warrant the Block Panel covered by this specification to be free from defects in design, material and workmanship under ordinary use and service, his obligation under this warranty being limited to replace free of cost the Block Panel which shall be found defective before installation in the field within one year after delivery to the purchaser.~~ The warranty for the equipment shall be in accordance with IRS specification No.S-23 or with latest amendment.