

Research Designs & Standards Organisation
Traction Installation Directorate

Reasoned document based on the comments and suggestions on draft specification for numerical control logic relay (NCLR) and Control Panel for Automatic Phase Switching Section (APSS) for 25 kV single phase 50 Hz ac traction power supply system of Indian railway

S.N	Cl.	Description	Comments from M/s ALIND	Comments from Ashida	RDSO's remarks
1.	1.1	Last line Purchaser shall provide three insulated overlaps as per the Annexure along with CBs, CTs & PTs at SP (or at any desired location) associated with Automatic Phase Switching Section (APSS) built by 3 IOLs. Circuit Breaker rated for APSS operation will be provided as per RDSO specification No TI/SPC/PSI/LVCBIN/0120 with latest amendments.	Nil	Nil	Last line modified as "Purchaser shall provide three insulated overlaps along with CBs, CTs & PTs at SP (or at any desired location) associated with Automatic Phase Switching Section (APSS) built by 3 IOLs. Circuit Breaker rated for APSS operation will be provided as per RDSO specification No TI/SPC/PSI/LVCBIN/0120 with latest amendments.
2.	6.0	Digital Control Logic Relay	Numerical Control Logic Relay. The relay is working on numerical algorithm as the latest technology demands it. Hence all DCLR mentioned in the specification shall be NCLR	Nil	Accepted. Numerical Control Logic Relay (NCLR) incorporated in the specification
3.		To operate Automatic Phase Switching Section a Digital Logic Controller Relay shall be used for switching of CBs to changeover the supply from Feed-A to Feed-B (vice versa) within 300ms	To operate Automatic Phase Switching Section a Digital Logic Controller Relay (1 no. s main and 1 no. as backup operation shall be switched to backup module in case of any failure on main relay) shall be used for switching of CBs to changeover the supply from Feed-A to Feed-B (vice versa) within 300ms.	Nil	In the event when locomotive is approaching the APSS and the NCLR gets fail, the chances of WPC cannot be avoided. WPC relay will act and trip the concerned feeder CB. The feed extension shall be required to normalise the loco operation till the NCLR is attended and

			For fail safe switching operation, backup relay shall be provided for each line.		rectified. To avoid the above backup relay may be considered.																		
4.	6.1.13	The DLCR should have facility to record at least one month data of all digital and logical status with time stamped during the operation along with events of various tele-signals and telecommand received from RCC through SCADA in built memory provided.	The DLCR should have facility to record latest 5000 digital and logical status events with time stamped during the operation along with events of various tele-signals and telecommand received from RCC through SCADA in built memory provided. Depending on the density of route the events to be stored for one month of operations shall be gigantic.	The DLCR should have facility to record latest 5000 digital status and minimum 5 logical DR with time stamped during operation events of various tele signals and tele command received from RCC through SCADA in inbuilt memory provided. Depending on the density of route, definition of one month storage is difficult.	Accepted and incorporated in the specification. Clause 6.1.14 merged in the clause 6.1.13.																		
5.	6.1.28(v)	Parameter setting	Can be eliminated. This feature not advised considering the risk of changing the settings through SCADA.	Shall be deleted. Changing the settings through SCADA is risk Factor.	Accepted. Incorporated in the specification																		
6.	6.1.34	Time tagged measurand Switch-in Current – I- 1 Switch-in Current – I- 2 Switch-in Current – I- 3 VT Voltage – V- 1 VT Voltage – V- 2	Nil	Nil	Ms Synergy pointed out that the INF 141, 142, 143 are reserved for auto reclosure function as per IEC 103 standard. Hence modified INF are 149,150,151, 152 & 153 respectively. The same incorporated in the specification.																		
7.	6.1.35	TRIP- VT- 2 DEAD - INF 106 Relay Bypass Enable/Disable - INF 126	TRIP- VT- 2 DEAD - INF 201 Relay Bypass Enable/Disable - INF 116	FUN & INF for control direction for CBs <table border="1"> <tr> <td>CB1 Open</td> <td>127</td> <td>123</td> </tr> <tr> <td>CB1 Close</td> <td>127</td> <td>125</td> </tr> <tr> <td>CB2 Open</td> <td>131</td> <td>135</td> </tr> <tr> <td>CB2 Close</td> <td>131</td> <td>136</td> </tr> <tr> <td>CB3 Open</td> <td>131</td> <td>141</td> </tr> <tr> <td>CB3 Close</td> <td>131</td> <td>142</td> </tr> </table>	CB1 Open	127	123	CB1 Close	127	125	CB2 Open	131	135	CB2 Close	131	136	CB3 Open	131	141	CB3 Close	131	142	Accepted . INF modified
CB1 Open	127	123																					
CB1 Close	127	125																					
CB2 Open	131	135																					
CB2 Close	131	136																					
CB3 Open	131	141																					
CB3 Close	131	142																					
8.	9.1	The Digital Logic Controller Relay shall be mounted in the dedicated Control Panel provided in the TSS/SP. Apart from Digital Logic Controller Relay, Panel shall	There should be separate control and relay panel for each line equipped with all requisite relays and associated equipment. This will facilitate the movement and erection at appropriate place in the room at SP, which has a space constraint.	Nil	The single panel as small as possible shall be made based on the site condition. If site condition compels to make two small panel the vendor may go for																		

		comprise of the following auxiliary relays:	Panel shall comprise the following The Numerical Control Logic Relay (NCLR) For Automatic Switching at APSS. Two modules in each panel (1no. as main and 1no. as backup) 2		supply of separate control and relay panel as per no. of line. However, one Control & Relay panel for single line may be considered to make it uniform and standard one for all locations. Regarding provision of two NCLR. One as main and other as backup. Please refer S. No. 2 above.
9.	9.1 (2&3)	Master Trip Relay as per TI/SPC/PSI/PROTCT/6071 with A&C Slip No. 1 2. for CB opening 3. for CB closing	Nil	Master Trip Relay or high duty contactor required in each CB for CB Opening and Closing. Internal mounting Contactors can be reduce the panel size.	Accepted and incorporated in the specification. Use of contactors can reduce the panel size.
10.	9.3	The control panel shall have modular construction to facilitate ease of expansion and replacement. The instruments, control switches, main relays, and indicating lamps shall preferably be mounted on front side of the control panels. Equipment like balance protection relays, auxiliary relays, indications, alarm acknowledgement push button & control switches, push button for DC fail & DC low/high alarm accept and test etc. shall be provided on side or rear panels. Terminal blocks, etc. may be mounted at suitable place inside the panel.	The control panel shall have modular construction to facilitate ease of expansion and replacement. The instruments, control switches, main relays, and indicating lamps shall preferably be mounted on front side of the control panels. Equipment like balance protection relays, auxiliary relays, indications & control switches etc. shall be provided on front side of the panel. Terminal blocks, ICT for telemetering etc. may be mounted at suitable place inside the panel. The provision for alarm may be declined as SP is unmanned.	Nil	ICT for telemetering not required. Not accepted. The provision for alarm may be declined as SP is unmanned. Accepted and incorporated the specification accordingly.
11.	9.14	All the modules and DLCR, dc and ac supplies, equipment in switch yard, annunciation windows and	All the modules and NCLR, dc and ac supplies, equipment in switch yard and other peripheral equipment, measuring instruments	Nil	DLCR is incorporated with NCLR at places in the specification.

		other peripheral equipment, measuring instruments required for the control panel shall be hard wired in control panel. For all the external connections there shall be terminal blocks for terminating the connections.	required for the control panel shall be hard wired in control panel. For all the external connections there shall be terminal blocks for terminating the connections. The provision for annunciator may be declined as SP is unmanned.		The provision for annunciator may be declined as SP is unmanned. Accepted and incorporated the specification.
12.	9.16	Each CB shall be controlled by 3 position (trip- neutral - close) control switches having spring return to neutral feature and pistol grip handle along with 2 NO contacts each for TRIP & CLOSE commands	Nil	Each CB shall be controlled by 3 position (trip- neutral - close) control switches having spring return to neutral feature and pistol grip handle or push button for TRIP & CLOSE commands having 2 NO contacts each. Push button can reduce the panel size.	Accepted. Incorporated in the specification accordingly.
13.	9.26, 9.26.1, 9.26.2	9.26 MIMIC DIAGRAM 9.26.1 Automatic semaphore LED type indication shall be incorporated in the mimic diagram to indicate the ON/OFF position of circuit breakers. 9.26.2 The position 25 kV isolators shall be represented on the mimic diagram by manually operated semaphore switches.	This section may be eliminated as this panel doesn't require any mimic representation.	Nil	Accepted and incorporated in the specification.
14.	10.1	All panel wiring shall be done with 1100 V grade PVC insulated single core, tinned annealed stranded copper conductors for service in extremely tropical climate.	Nil	All panel wiring shall be done with 1100 V grade PVC insulated single core, tinned annealed stranded copper conductors for service in extremely tropical climate.	Accepted and incorporated accordingly.
15.	10.2	The wires shall be stranded, with strands of suitable diameter which shall be mentioned in the design document submitted for approval.	Nil	Shall be deleted	Accepted and incorporated in the specification.

16.	13.1	Master Trip Relay: DLCR as explained above shall open the corresponding feeder circuit breaker on sensing of current, through a high speed self-reset, electromagnetic type master tripping relay. The relay operating time shall not be more than 10 ms and its resetting time shall not be more than 100ms. The relay shall be capable of handling the current of the CB trip coil.	Minimum 10,000 operations is demanded for tripping relays as per RDSO spec 6071 and IEC 60255-1 for protection application. However our NCLR will withstand 10,00,000 operations (mechanical endurance) and electromagnetic type high speed master tripping relays (AEMS 32) will withstand 1,00,000 operations (mechanical endurance). The master trip relay shall have the mechanical endurance not less than 1,00,000 operations.	Nil	Accepted and Clause 13.1 modified by adding line "The master trip relay shall have the mechanical endurance not less than 1,00,000 operations."
17.	15.2.1(ii)	OPERATION TESTS: Operation tests on all equipment to prove correctness of wiring of various circuits including indications, alarms, operation of relays and annunciation etc.	OPERATION TESTS: Operation tests on all equipment to prove correctness of wiring of various circuits including indications and operation of relays etc. The provision of alarm and annunciator may be declined as SP is unmanned.	Nil	Accepted and incorporated in the specification.
18.	16.2	The tenderer shall furnish the technical specification and descriptive literature of various modules covering their operational aspects, instruments, interposing CTs etc.. He shall also submit, along with the tender, the schematic diagram of switching, control and annunciation scheme to enable the purchaser to make assessment of the proposal.	The tenderer shall furnish the technical specification and descriptive literature of various modules covering their operational aspects, instruments, interposing CTs etc. He shall also submit, along with the tender, the schematic diagram of switching, control to enable the purchaser to make assessment of the proposal. The provision for annunciator may be declined as SP is unmanned.	Nil	Accepted and incorporated in the specification.
19.	16.4(v)	Schematic diagram of Alarm, indication circuits (annunciation scheme).	This section may be eliminated as this panel doesn't require annunciation.	Nil	As alarm and annunciation due to unmanned post have been eliminated in above clauses, this clause has no meaning and deleted in the specification.

20.	Anx D 3,4	Automatic semaphore Indicators for CB(Red) Manually operated Semaphores for isolators(Red)	This section may be eliminated as this panel doesn't require mimic drawing.	Nil	Accepted and incorporated in the specification.
21.	Anx D 15	Items defined in Clause 10.1 of this specification.	Items defined in Clause 9.1 of this specification.	Nil	Accepted and incorporated in the specification.