

# SCHEDULE OF RATES

SECR (S&T)  
2021



**SOUTH EAST CENTRAL RAILWAY**



दक्षिण पूर्व मध्य रेलवे  
SOUTH EAST CENTRAL RAILWAY



कार्यालय  
प्रधान मुख्य संकेत एवं दूरसंचार इंजीनियर  
द्वितीय तल  
दपूमरे जोनल मुख्यालय बिल्डिंग  
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No. SECR/S&T/WC/

Date 18.01.2021

**CSTE/Con, CSTE/Proj, CSTE/Proj-II  
SrDSTE/Co/BSP, SrDSTE/R & NGP.**

**Sub : Schedule of Rates (SOR)- 2021 for S&T Works in SECR.**

Competent authority (PCSTE) has approved Schedule of Rates (SOR)-2021 for S&T works. Copy of SOR-2021 has been uploaded on PCSTE folder. This SOR shall be adopted by all the divisions and field units on SECR with immediate effect.

This is for your information and adherence please.

SURESH  
KUMAR  
SOLANKI  
Digitally signed by  
SURESH KUMAR  
SOLANKI  
Date: 2021.01.18  
18:39:25 +05'30'

**(S K Solanki)**  
**Chief Signal Engineer**  
**SEC Railway**

Copy to :

PCSTE/SECR, PFA/SECR, FA&CAO/CON/BSP for kind information, pl.  
Sr. DFM/BSP, R & NGP for information, pl.

## **PREFACE**

**Schedule of Rates for Signaling & Telecom works are not available on SECR. With sanction of major works like quadrupling/tripling/doubling of lines, automatic signaling, replacement works of RRI and PI etc, it has become incumbent upon the office to issue SOR to facilitate executives in preparing estimates/schedules expeditiously and without much hassles. SOR also helps in dealing with variations, during course of execution, as variation limit of 25% is affected on SOR schedule as whole and not on individual item.**

**JAG level committee of four members was formed by competent authority for preparation of S&T SOR-2021. The committee of DyCSTE/Con/SDL as convenor, DyFA&CAO/F&B/BSP as finance member, DyCSTE/Hq as technical member-I and DyCSTE/Tele/Hq as technical member-II was constituted with approval of PCSTE & PFA.**

**This is a maiden attempt by SECR(S&T) in this direction. All efforts have been made to make SOR comprehensive, exhaustive, precise and to the point, yet some errors might have been crept in. Suggestions for inclusion of any matter or for the improvement or amendment of any particular provision contained herein may be intimated to the office of Principal Chief Signal & Telecom Engineer, SECR, Bilaspur. They can also mail it on [cse@secr.railnet.gov.in](mailto:cse@secr.railnet.gov.in) or [dycstehq@secr.railnet.gov.in](mailto:dycstehq@secr.railnet.gov.in).**

**The SOR-2021 will be applicable for all S&T works in construction, project unit as well as open line in SECR.**

**(S. K. SOLANKI)  
CSE/SECR**

## **GUIDELINES FOR USING “SOR – 2021”**

1. This Schedule of Rates (SOR)-2021 mainly covers the S&T items which are frequently used by Divisions/Project/Construction units for Signal & Telecom works.
2. SOR-2021 may be used for estimation, preparation of tender schedules, quotations, work orders, uploading of tender schedule on IREPS and it can be used for all the provisions of tenders/contracts related to SOR in the SOP/GCC.
3. The directives/guidelines of RDSO, Railway Board & Hq issued from time to time with regard to drawings & specifications will be adhered to by divisions and field units without any deviation.
4. Although SOR-2021 has been prepared with due care, any discrepancies wrt specification, description etc shall be brought to the notice of PCSTE/SECR immediately for correction/modification.
5. In many items references of Drawing /Annexures etc has been made. Executive of the field unit shall ensure the attachment of such Annexures/ Drawing etc in the tender document.
6. Payment terms are defined for each item in the SOR to distinctively indicate whether any item is “Supply” item or otherwise.
7. In some of the items of SOR-2021, Detailed Technical Specification / Drawing/ Configuration of system need to be specified as per requirement of the tendered work. The same shall have to be incorporated in the tender document by concerned Tendering Authority. Such requirement has also been mentioned in the description of the SOR item.
8. For adopting a uniform & transparent policy in inspection of items, Inspecting Authority has been prescribed for each item in the SOR-2021 as per the extant guidelines of RDSO. For critical items, RDSO inspection has been made mandatory irrespective of the cost, the same has been incorporated in the SOR-2021 for such items. This will ensure reliability and quality of the items procured. If there is any change in the critical safety item list of RDSO or any item being delisted from RDSO vendor list whose inspection is now not being done by RDSO, the same should be brought to notice of CSTE for change / modification in the SOR-2021.

9. In some items of SOR-2021 where Consignee inspection is mentioned subject to procurement from RDSO approved vendor as per the extant policy, the responsibility of ensuring the procurement from RDSO approved source is with the Consignee. Consignee shall keep documents (viz GST challan from the supplier, Bills / certificate from RDSO approved vendor as the case may be and waybill etc) as proof of procurement with him.
10. Although year of specifications for various items of RDSO is given in the schedule, latest amendments/version should be ensured by divisions and field units. Further, in case there is any requirement of change in description / specification / inspection of an item of SOR due to the change in specification by RDSO, the same shall be informed promptly and brought to the notice of CSTE for change in specification/ description / inspection authority of such item in the SOR-2021.
11. In case of ambiguity in any of the items, the clarification can be asked in writing by any unit from PCSTE/SECR. The doubt regarding the item shall be clearly spelled out in writing by such field unit. PCSTE/SECR will issue a due clarification in this regard.
12. Items other than those covered in Schedule of Rates (SOR), shall be considered as Non-Schedule Items. The Non-Schedule Items (NS), if required by divisions and field units, will be taken separately in tender schedules/work quotations etc as per extant instructions. However, realistic rate assessment has to be done separately for such items.
13. Divisions & field units should send the details of new items to be included in SOR based on their requirement. For inclusion of new items in SOR, divisions & field units should also send the LAR or latest available rates for such items based upon market survey so that new S&T items may be included in next revision/updation of SOR.

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## DOCUMENTATION CONTROL

### **SOR Committee Members :**

<b>Name</b>	<b>Organization</b>	<b>Designation</b>	<b>Level</b>
Shri Bhaskar Verma	S&T/SECR	Dy.CSTE/Con/SDL	Convener
Shri S. Mohapatro	Accounts/SECR	DyFA&CAO/F&B/BSP	Finance Member
Shri Alok Tiwari	S&T/SECR	Dy.CSTE/HQ	Technical Member-I
Shri K. P. Saraswat	S&T/SECR	DyCSTE/Tele/HQ	Technical Member-II

Approved by      – **PCSTE/SECR.**

PDF Verified by -      Shri Alok Tiwari, DyCSTE/Hq and  
   Shri K P Saraswat, DyCSTE/Tel/Hq

Signed and Issued by - Shri K P Saraswat, DyCSTE/Tel/Hq



SOUTH EAST CENTRAL RAILWAY			
SCHEDULE - "A"			
(Execution of Out Door Signalling work)			
	<b>General instructions :</b>		
	(1) For trenching, cable laying, Provision of RCC/DWC/GI/RCC hume pipe/HDD method for track/road/platform/culvert/bridge etc. to be followed as specified in Technical Circular No : 2 of 1988 & correction slip No. S/318/1748 dt 15.03.2000 issued by CSTE/ SE Railway & Guidelines on Signalling cable Laying Issued by Signal Directorate, RDSO, Version-1.0, Effective from dt 31.10.2011.		
	(2) <b>All the surfaces shall be repaired and brought back to its original condition</b> , as the case may be. All nut, bolts, washers etc to be of SS.		
	(3) The standard ratio of cement, sand, 25mm stone chip shall be 1:3:6 respectively, wherever concreting & foundation of signal, location, etc is involved.		
	(4) All the sundry materials will be provided by the contractor at site like : cement, sands, bricks, 25 mm or 1" stone chips for concreting, bolts, nuts, washers (all SS), hylem sheet of thickness 12 mm, ferrules, anti- corrosive/Red oxide/Weather proof/Acid proof paint, MS plates/angles/flats, anchor (foundation) bolts, MS clamps, screws, eyelets, pvc bunching tape, buttons, condenser, resistance, varnish, fevicol, soldering/ welding material, copper lug, charcoal, salt, salmoniac, 6 SWG GI- wire, speed board, screen with MS frame, MS pin, boss pin, 6 mm rivet, split pin, angle cleats to drg. no- 22859/T/SE, 1" dia GI pipe, 6/8-SWG soft bond wire, flexible wire, channel pin, heat shrinkable tape, suitable compound for fixing lead wire, 1.5 " GI/HDPE pipe for point machine/axle counter, 18 mm Hylum sheet for location box/composite rack shelf and 12 mm for cable termination in location box/ CT Rack/Composite rack, etc, transpaent sheet for box, lock for box make Godrej or similar, insulated strip, sulfuric acid, distilled water, cup board, sunmica, cable fixing clamps. etc. so as to complete the the individual job as per schedule description.		
	(5) All the materials of 'Supply' Schedule will be got issued by the contractor from stores and transported to the site as per the requirement. Rest all sundry materials will be supplied by contractor at site to complete the execution of work.		
	(6) The contractor has to conduct detailed site survey of the cable route, prepare a plan to get approval of the Railway, putting white lime powder marking before excavation of earth under supervision of railways authorised representative.		
Sl. No.	Description	Unit	Rate
<b>1</b>	Excavation of <b>trench</b> and clearing of roots of trees, bushes, ballast and reconditioning etc., including bailing out water and disposal of extra soil.		
	<b>(i) all soils including soft rocky area.</b>		
	(a) Depth 1.2 Mtr. & width 0.3 Mtr.	Km	92,115
	(b) Depth 1.0 Mtr. & width 0.3 Mtr.	Km	76,590
	<b>(ii) Hard rocky area including concreting.</b>		
	(a) Chase cutting and smoothening of inside surface of sizes 0.08 m deep and 0.17 m width at platform and cemented floor area.	Mtr	115
	(b) Cutting the <b>masonry wall</b> to the depth of 0.25m to 0.75m at the entry of room placing of flexible HDPE pipe or G.I.Pipe (including supply) of suitable size as per drawing No. RE/S&T/ALD/SK/161/81.	No	582
	<b>(iii) Track crossing, Road Crossing by pushing method (HDD method) at culverts/ track / pucca road crossing at a depth not less than 1 meter with reference to bottom of rail/road surface including supply of GI/HDPE pipe .</b>		
	(a) <b>HDPE pipe/DWC pipe(4 inch dia)</b>	Mtr	1,080
	(b) <b>GI pipe</b> with 76 mm dia, Spec. No. -1239 medium grade (for the length of pushing more than 05 meters).	Mtr	2,246
<b>2(a)</b>	<b>Laying of Signalling Cable/Power/Quad cable / PLJF cable</b> in the excavated trench to Drg.No:CON/SK/T/5.Transportation, supply of 'U' clamps and anchoring of cable at every 10 Mtrs with 'U' clamp to Drg.No:CSTE/C/Cable/81 including back filling with excavated earth and ramming of trenches after cable laying.		
		Km	16,740
<b>(b)</b>	<b>Laying of Power cable</b> in the same excavated trench to Drg.No:CON/SK/T/5.Transportation, supply of 'U' clamps and anchoring of cable at every 10 Mtrs with 'U' clamp to Drg.No:CSTE/C/Cable/81. Transportation, supply and placement of <b>2nd class bricks</b> in the trench length wise between power cable & other signalling/quad cable in the same trench all along the trench (4.5 bricks approx per Mtr.) including back filling with excavated earth and ramming of trenches after cable laying.		
		Km	25,526



(c)	<b>Laying and Fixing of galvanised iron pipe (GI Pipe)</b> with threaded collars (for jointing pipe) of 80 mm nominal dia Spec.No.IS-1239 medium grade, on bridges, culverts, drains including supply and transportation of GI pipes and all other materials required for fixing the pipe to Drg.No.Con/SK/T/2 and drawing of Signal/Power/Quad cables inside the pipe with masonry works over the entire length of the bridge and at entry and exit of the culvert and curing for 72 hrs, drilling of holes on the pipe at 10 cm apart to be clamped 2 Mtrs apart on culvert, for the Signalling, quad, power cable.	Mtr	761
(d)	<b>Laying of RCC pipe</b> including supply of required quantity at site with collars (for jointing pipe) 150 mm nominal dia to Spec.No:IS-458 in excavated trench and laying of Signalling/ Power cable/PIJF cable/ Quad cables/HDPE pipe through RCC pipe. Power cable shall be laid in the same trench alongwith signalling/Quad cables but in a separate pipe RCC pipe at track/pucca road/ Platform crossing/ level crossing gate etc.	Mtr	775
(e)	<b>Laying of Double Walled Corrugated Pipe</b> length 6 meter, 120mm outer dia ,103.5mm inner dia with couplers as per specification no. BSEN 50086-2-4 for under ground power/communication /signal cable protection and used for track/pucca road/ Platform crossing/ level crossing gate etc.	Mtr	158
(f)	<b>Laying of half round RCC hume pipe with 150 mm dia &amp; 1 mtr long including supply at site on single/multiple cable laid in the trench .</b>	Mtr	254
(g)	<b>Laying of second class bricks</b> including supply of required quantity at site on single/multiple cable laid in the trench (Approx 9 bricks per mtr).	Km	32,603
	<b>NOTE :</b> (1) This includes guarding of cables, relaying of cables and redoing of cable jointing in case of the thefts or otherwise at contractor's own cost for item no. <b>1 to 2</b> as mentioned above till commissioned.		
3	<b>Shifting of cables</b> in roll with or without wooden drums from other than nominated consignee depot and meggering before loading and after laying, and recording the values in cable insulation register along with representative of Railways.	Drum/Roll	1,282
4	The excavation of pit, casting of concrete foundation including surrounding earthwork along the foundation, erection, installation and wiring of <b>steel apparatus case</b> , fixing of terminals, fuse blocks, signal transformer, current transformer, filament switching unit, track battery chargers, adjustable/fixed resistances, choke coils, Fuses, Relays, E type locks , termination of cables, cable insertion, wiring to draw 110V AC therefore in the new apparatus case as required, testing, commissioning including subsequent alterations (if required), bunching of cables, earthing of cable, armours etc. Painting of the apparatus case inside and outside after clearing the surface thoroughly and first coating of anti -corrosive paint and subsequent two coatings of Alluminium paint outside and Red Oxide inside and lettering. 18 mm Hylum sheet for location box shelf and 12 mm for cable termination in location box.		
(a)	<b>Steel apparatus case (Large)</b> to Drg.No. CON/SK/T/8 with 4 Nos. of foundation bolts 20mm x 460mm to Drg.No. SA-112 A/M or latest.	No	17,067
(b)	<b>Steel apparatus case (half)</b> with 4 Nos. of SS foundation bolts 20mm x 460mm to Drg.No. SA-112 A/M or latest.	No	8,534
(c)	<b>Steel apparatus case (Quarter)</b> to Drg.No. RE/S&T/Sig./Tender/SK/5A/91 with 4 Nos. of SS foundation bolts of size 20mm x 300mm or latest.	No	4,266
	<b>NOTE:-</b> Payment can be released in a part for the above said work after completion of-		
	(i) Foundation- 30% ,		
	(ii) Errection - 15% ,		
	(iii) Wiring, testing, painting, sand filling, plastering, earthing & writings etc - 45% ,		
	(iv) Commissioning - 10% of the rate.		
5	<b>(a) Alteration/ Modifications in the existing location boxes</b> , fixing of equipments, cable insertion, termination, wiring, testing & commissioning, two coat painting, lettering to suit the circuits as per approved wiring diagrams. This includes filling with sand and plastering the same.	No	2,548
	<b>(b) Shifting of existing location boxes</b> to facilitate earthwork of Engg./Con. This includes filling with sand and plastering inside location boxes.	No	3,580

6	Earthwork in <b>raising or lowering ground</b> level and dressing of all finished work in all type of soils as directed by the Rlys. Engr. This includes clearing of site from vegetation, trees plants etc. before dumping and spreading of earth and is inclusive of lead lift.	Cum	58
7	<b>Cement Concrete</b> of proportion 1:3:6 with graded aggregate of size 25mm. and below.	Cum	2,943
8	Excavation of earth pit, transportation, placing and fixing of <b>earth electrode</b> with construction of cement encloser to Drg.No.CON/SK/T/9 and CON/SK/T/9A and drawal of GI wire wrapped on MS strip (35 x 6 mm) from earth electrode to all signalling equipments, including fixing and soldering of lugs at both end of the wire.	Each	1,941
9(a)	Installation of <b>signal posts for Multiple Aspect Colour Light Signals complete</b> with signal units, bases, LED unit, fixing and wiring of current transformers of LED units, ladders & other fittings, excavation of pit, casting of cement concrete foundations with necessary water outlets, erection and fixing of complete fittings of the signal/signal post with necessary earthed screen protection arrangement, including drawing of cable through signal posts, termination of cables, wiring, testing and commissioning, two coat painting and lettering, supply and fixing of speed boards if required for the following:- NOTE:- The foundation for Multiple Aspect Colour Light Signal Post drg. No. Con/SK/T/12 and the foundation bolts shall be of sizes 24 mm x 915 mm to Drg. No. SA- 116A/M and bolts for each foundation for above shall be of size 20 mm x 305 mm to Drg. No. SA-110A/M ( 4 nos. for each) with two nuts and two washers each per bolt.		
	(i) 2 ASPECT	No	17,378
	(ii) 3 ASPECT/4 ASPECT	No	19,551
(b)	Installation of <b>signal posts for Multiple Aspect Colour Light Signals complete</b> with signal units, bases, LED unit, fixing and wiring of current transformers of LED units, ladders & other fittings, excavation of pit, casting of cement concrete foundations <b>as per RDSO drawing no.- RDSO/M-00011/R4</b> with necessary water outlets, erection and fixing of complete fittings of the signal/signal post with necessary earthed screen protection arrangement, including drawing of cable through signal posts, termination of cables, wiring, testing and commissioning, two coat painting and lettering, supply and fixing of speed boards if required for the following:- NOTE:- The foundation for Multiple Aspect Colour Light Signal Post drg. No. Con/SK/T/12 and the foundation bolts shall be of sizes 24 mm x 915 mm to Drg. No. SA- 116A/M and bolts for each foundation for above shall be of size 20 mm x 305 mm to Drg. No. SA-110A/M ( 4 nos. for each) with two nuts and two washers each per bolt.		
	(i) 2 ASPECT	No	17,378
	(ii) 3 ASPECT/4 ASPECT	No	19,551
(c)	Fixing of <b>calling-on signals/dependent shunt signals</b> with enameled markers including drawing of cable through the signal post, termination of cables, wiring, fixing of calling- on/dependent shunt signal legend board, LED, two coat painting and lettering, testing and commissioning as required.	No	4,629
(d)	Installation, testing and commissioning of <b>Position Light shunt signal (Independent)</b> , posts complete with lamps/LED lamps, LED units, Bases and other fittings, excavation of pit, casting of cement concrete foundation, fixing of complete fittings of signal, LED lamps, current regulator including foundation bolts, washers, nuts, termination of cables, wiring, painting and lettering as required. NOTE:- The foundation for position light shunt signal Drg. No. Con/SK/T/13 and bolts for each foundation for above shall be of size 20 mm x 305 mm to Drg. No. SA-110A/M ( 4 nos. for each) with two nuts and two washers each per bolt.	No	3,856
	Note: Payment can be released in a part for the above said works after completion of-		
	(i) Foundation- 30%,		
	(ii) Erection - 15% ,		
	(iii) Wiring, testing, painting, sand filling, plastering, earthing & writings etc - 45% ,		
	(iv) Commissioning - 10% of the rate.		
10	Fixing, cable drawing and termination, wiring, painting, lettering, testing and commissioning of <b>Junction type Route indicator</b> complete along with lamp/LED unit		
	(i) 1/2 Way	No	2,110
	(ii) 3/4 Way	No	3,086
11(a)	<b>Alteration/modification, testing, commissioning, two coat painting, lettering of the existing 2 Aspect/3 Aspect/4 aspect signals/shunt signals/calling on signal/</b> LC gate to suit the circuit per approved wiring diagram including fixing of LED/Singal lamps and their wiring.	No	1,274

(b)	Installation, testing and commissioning of <b>route indicator</b> LED type.	No	1,064
12	(a) Supply & Erection alongwith casting of foundation of <b>Stop board /Sighting board/SLB/BSLB/legend board</b> as per approved drawings.	Each	5,094
	(b) Supply of retro reflective signal/shunt signal enameled number legend board of size- 300mm X 200mm X 3mm (minimum) made up of alluminium composite - 4 panel (ACP) with white back ground and alphabets/numbers in black along with fixing clamps.	Each	308
	(c) Installation of retro reflective signal/shunt signal enameled number legend board .	Each	77
13	Excavation & casting of <b>pedestal foundation</b> for left/right hand boom of lifting barriers.	each	9,427
14	Excavation & casting of <b>foundation for stop post.</b>	Each	1,453
15	Erection and <b>commissioning of Lifting Barrier assembly complete</b> including boom support, positive boom locking device, Emergency crank handle attachment, Timer unit to adjust the time for operating the barrier, Fixing of Hooters/Flashers on either side of gate barriers, 1 (one) control panel, weather proof painting, lettering, Neccessary MS weight for balancing the booms, etc.	Set	17,912
16	<b>Dismantling of the following: -</b>		
	<b>i) Signal posts/BSLB/SLB/Stop Board.</b>	No	232
	<b>ii) Steel apparatus case with fittings.</b>	No	232
	<b>iii) Relay racks with all fittings, battery racks complete, Equipment rack complete, SM's slide.</b>	No	360
	<b>iv) Battery charger, Battery set etc.TLBI, DLBI and other Misc. equipments.</b>	No	229
	<b>v) Complete lever frames, inside and Outside leads, all ground gears.</b>	No	12,193
	<b>vi) Lifting barrier complete.</b>	No	3,623
	<b>vii) TLJB/Point JB</b>	No	60
	<b>viii) Electric Point Machine</b>	No	603
	<b>ix) Operating cum indication Panel.</b>	Station	2,415
	<b>x) Location Foundation(By hydraulic breaker)</b>	No	1,087
	<b>xi) Signal Foundation(upto ground level by hydraulic breaker).</b>	No	2,174
17	Collecting, stacking with deployment of Man power, Hydra etc for Loading/ Unloading and <b>Transportation of Materials (Fresh/Released/ Unused)</b> from (i) work site to GSD/Raipur, (ii) work site to the store of SSE(SIG)/CON,(iii) any store depot to any other store depot over Indian railways as decided by Railway Administration by suitable Trucks and stacking properly.	Ton-Km	38
18	<b>Shifting of existing cables</b> by providing location boxes and pieces of signalling cables as required in the yard to facilitate the engineering department for earth work for laying new lines. (work will be executed in presence of Railway representative). The cost towards new location foundation shall be given vide item No.10(a/b/c) when the length of trench is less than 150 meters.	per site	30,189
19	Execution of Quad cable joint using thermoshrink/Universal jointing kit for derivation/termination <b>joints with VF Transformers</b> on Quad/jelly filled Telecom Cable.	No	2,294

20	Execution of <b>straight through joint</b> on Quad cable/10-20-50 pairs PIJF cable using thermoshrink jointing kit. This includes jointing kit, transformers, excavation of cable joint pit of size 1.2m x 1.2m x 1.0m for jointing of cables, back filling and ramming after jointing.		
		No	1,408
21	Installation, testing and commissioning of <b>track circuits</b> as per Drg.No:SK/DRG/OL/27 and track bonding plan including drilling of 9/32" holes on rails, provision of bonding, block joints (90R/52Kg/60 Kg) with machined fish plate or Glued Joints, fixing and painting of track lead junction boxes, fixing of 25 mm nominal dia GI pipe of required length with 9/32" holes at 10 cm. apart for protection of tail cables, insulation of lead wires from rails using heat shrinkable tape, insulation of traction bonds below rails with 3mm thick heat shrinkable tapes, fixing of lead wire suitably with sleepers. Provision of tail cable termination, fixing of double track lead wires, jumper wires, terminals, track charger, adjustable/fixed resistance, choke coil, fuses, battery, track relay etc., and also lettering/numbering of track lead junction boxes, block joints and track circuits.		
	<b>(a) Straight portion of track circuit</b>	Set	3,832
	<b>(b) Point and crossing portion of track circuit</b>	Set	4,209
22	Installation (including over hauling) of <b>Electric point machines</b> on MS plate fixed on wooden/PSC sleepers complete with crank handle key Interlocking arrangement as per the drawing approved by Railways, junction boxes (as suggested by the railway) with 1 1/2" dia G.I.pipe/HDPE pipe of required length up to point machine, ground connections, including smithy works involved, insulation of MS plate on which the point machine is to be fixed from the gauge tie plate involving revetting/welding of angle, cleats, termination of cables, wiring, preliminary adjustment for operation of point by crank handle and subsequent final adjustment, painting and lettering as required, testing and commissioning of the same.		
		Each	12859
23	Installation, Testing and Commissioning of Digital Axle Counter and field training (One man day per set) at site and training to the field staff at site for three days.		
		Set	48,608
24	Installation, testing and commissioning of <b>sliding boom LC gates</b> complete which includes casting of concrete foundation including surrounding earthwork along the foundation (Dia-30 cm & depth-100 cm total ten numbers per gate), fixing and welding of channel, fixing of clamps, cutting of rail post, fixing of lock post with two numbers excavation of Pit casting of concrete foundation for "B" type foundation per gate, laying of cable for road crossing and fixing of MS plate/channel also as requirement of the site condition.		
		Set	37,853
25	Excavation of pit, casting of foundation, fixing of pedestals, wheels, stop posts, cranks, compensators Boom rest etc. & installation of winch and lifting barrier set of level crossing gate complete in all respect including provision of boom locking arrangements with fixing of pulley stakes, signal lamp, wiring of signals, lamp wiring and adjustment of operation of gate from winch etc., painting/lettering, testing and commissioning of LC gate with the following accessories/set:- i) 2(two) lifting barriers with all accessories. ii) 1 (one) winch iii) Positive Boom locking arrangements for above iv) Ground levers 1-way/2-way with E-type lock fixing. v) Fixing of pulley stacks 1-way/2-way as required for the work. vi) Fixing and wiring of Horizontal/vertical wheels 1-way/2-way. vii) Fixing of Hooters/Flashers on either side of gate barriers. This includes running of rodding together with smithy works (forge welding) and wire transmission, fixing of E-type lock on winch and lever quadrant and matching etc.including joints of wire with jointing materials.		
		Set	14,584
26	Installation and <b>Fixing of "E" type lock along with Welding Work .</b>		
		No	704
27	Design, installation, testing & commissioning of MSDAC outdoor work.		
		No	16,480
28	Deployment of Prokline/ Hydra operation at site for exposing the buried cables or relocation the Location Box/ Signal Post with foundation as per the advice of Railway site engineer.		
		Hour	603
29	Supply of Unskilled labour for immediate restoration of normal traffic by jointing Signalling/Telecom/Power cables of damaged during excavation of earth work of engineering department or for shifting, stacking of stores materials. Unskilled staff will remain available in working hours.		
		Man-Day	266
30	Physical tracing and opening/locating of existing working cables by precession digging for diversion of cables in connection with cable clearance for engineering earth work without interfering the circuits as per the advice of Railway site engineer.		

		Mtr	241
31	Switching/shifting of working cables conductors from the existing CTR/CRR/Location box to the new CTR/CRR/Location box with parallel patching without interfering the working signalling circuits in presence of Railway engineer at site.	No. of conductors	24
32	Fixing of concrete <b>cable route marker</b> at 30-40 meter and at diversion point including supply & transportation of cable route marker at site. Detail size & fixing of cable route marker should be followed as per drawing no. SDO/Cable laying/020.	No	415
33	Conduction of FAT, when FAT is not conducted at Railway premises.	station	30,189
34	Re-deployment of skilled/unskilled staff of contractor, if NI/CRS inspection/opening of line is deferred beyond 30 days from the date of issuing certificate duly signed by site engineer of railway & contractor to this affect that the status of work in all respects is in readiness stage to undertake the NI/conduct CRS inspection/opening of the line with the station concerned. (In this regard, the certificate is to be submitted to DyCSTE/Con duly signed by site engineer of railway & contractor).	station	2,41,507
35	Deployment of security personnel for guarding of EI installation whenever required as per advice of DyCSTE round the clock, if date of NI/CRS inspection/ opening of line is deffered beyond 30 days from the date of completion of work of the station. (A completion certificate to be submitted to Dy. CSTE/Con/BSP duly signed by site engineer of railway & contractor, if NI/CRS inspection is deffered beyond 30 days from the date of completion of work of a station) .	per month/ station	24,151
36	Small value Engg. items, required if any, to be executed at site as per advise of DyCSTE, shall be paid as per prevailing SOR of Engg. deptt. of SECR at the time of execution.	lumsu /site	60,377
37	Supply, Transportation, fabrication and fixing of Hylum sheet of 12 mm thickness as per site requirement.	sq meter	2,525

SOUTH EAST CENTRAL RAILWAY			
SCHEDULE - "A1"			
(Execution of Indoor Signalling work)			
	<b>General instructions :</b>		
	(1) All the sundry materials will be provided by the contractor at site like : cement, sands, bricks, 25 mm or 1" stone chips for concreting, bolts, nuts, washers, (all SS), hylem sheet of thickness 12 mm, ferrules, anti- corrosive/Red oxide/Weather proof/Acid proof paint, MS plates/angles/flats, anchor (foundation) bolts, MS clamps, screws, eyelets, pvc bunching tape, buttons, condenser, resistance, varnish, fevicol, soldering/ welding material, copper lug, charcoal, salt, salmomiatic, 6 SWG GI- wire, speed board, screen with MS frame, MS pin, boss pin, 6 mm rivet, split pin, angle cleats to drg. no- 22859/T/SE, 1" dia GI pipe, 6/8-SWG soft bond wire, flexible wire, channel pin, heat shrinkable tape, suitable compound for fixing lead wire, 1.5 " GI/HDPE pipe for point machine/axle counter, 18 mm Hylum sheet for location box/composite rack self and 12 mm for cable termination in location box/ CT Rack/Composite rack, etc, transpaent sheet for box, lock for box make Godrej or similar, insulated strip, sulphuric acid, distilled water, cup board, sunmica, cable fixing clamps. etc. so as to complete the the individual job as per schedule description.		
	(2) All the materials of 'Supply' Schedule will be got issued by the contractor from stores and transported to the site as per the requirement. Rest all sundry materials wil be supplied by contractor at site to complete the execution of work.		
Sl. No.	Description	Unit	Rate
1(a)	<b>Q-series/Composite Relay Racks and cable termination racks (New).</b>	No	48,363
(b)	<b>Alteration of existing Q-series/Composite Relay Racks and cable termination racks.</b>	No	19,785
	NOTE: Payment can be released in a part for the above said work after completion of-		
	(i) Errection- 15%,		
	(ii) Wiring, testing, painting, earthing & writings etc - 75% ,		
	(iii) Commissioning of Relay rack/Composite rack/CTR- 10% of Schedule rate.		
2	Installation and wiring of <b>Rotary key transmitters/KLCR</b> on teak wood board enclosed inside a suitable box with front transparent check cover with locking arrangement. This includes 3/4" thick teak wood boards, transparent sheet for box, locking arrangement. 2 nos.of locks for box and 1 No. lock for front transparent sheet.		
		Each	507
3(a)	Installation of <b>battery rack</b> and fixing of 1.5 inch thick salwood shelves on battery racks, fixing of terminal blocks, aluminum wiring ladder with insulated MS strips over the battery rack and upto equipment racks or relay racks with necessary wall cutting and masonry works alongwith termination of cables including painting and lettering and provision of suitable anticorrosive paints/coating on sal wood shelves for protection of corrosive effects of acid. This includes placing of batteries and connection thereof .		
		Each	2,384
(b)	Erection and wiring of <b>equipment rack</b> as per Drg No. CON/SK/T/14 and fixing of 1" sal wood planks, aluminum ladder with insulated aluminum strips (size 25mmx25mmx5mm) over the equipment racks and upto relay racks with necessary wall cutting and masonry works thereon and placing of all power equipment on equipment rack like switches, transformers, voltage stabilisers, transformer rectifier sets, DC-DC converter on suitable fixed sal wood board; fabrication, supply, installation wiring of 230V AC switchboard, including termination of cables, painting and lettering as required.		
		Each	1,765
4	Charging and installation of <b>secondary cell 2 V</b> (lead acid type), and preparation of electrolyte for lead acid cells. If power is not available at site of work, charging may be done at nearby location as per convenience of the Railway. Initial Charging to be done in presence of Rlys representative from executive agency as well as maintenance org, with uninterrupted supply.		
	<b>(i) 2 Volt 40AH</b>	Each	310
	<b>(ii) 2 Volt 80AH</b>	Each	310
	<b>(iii) 2 Volt 120 AH</b>	Each	310
	<b>(iv) 2 Volt 200 AH</b>	Each	310
	<b>(v) 2 Volt 300 AH</b>	Each	310
5	Installation, cable termination, on the terminals fixed inside the <b>block counter cup board</b> to be made by the contractor as per the advice of the Railway engineer at site. Wiring, painting, lettering, testing and attending to faults therein and commssioning of double line Block instrucment working (in pair), on block counter cup-board along with fixing of block bell equipment and filter units as per the instrutions of the Railways' representative.		
		No	5,833

6	Installation, cable termination, wiring, testing & <b>commissioning of Integrated power supply panel</b> as per approved power supply diagram and specification. The contractor has to supply arrangements at central relay room, goomties on original tracing paper of size 60cm.x42cm. with 8 computer prints in the format supplied by railways.	No	8,876
7	Installation, wiring as per approved wiring diagram, testing and <b>commissioning of control panel</b> (operation cum indication panel) complete with termination of cable, painting and lettering as required. Cable termination in MS rack with ¾th inch thick sal wood strips including fabrication thereof as per requirement of the Railway. Fixing of cable with MS clamps, fixing of terminal block, M.S. wiring ladder with insulated M.S. strips from relay room to panel room, painting and lettering, filling sand under control panel rest table, cable duct, covering the open space around the control panel rest table with bricks lining, masonry work and plastering the same with cement required.	Each	19,568
8	Installation testing and <b>commissioning of DATA LOGGER</b> as per RDSO's Specn. including networking and central monitoring along with installation of remote monitoring software and hardware. The contractor is also required to list out the no. of analog & digital inputs for wiring & operation of the datalogger by taking approval of the Rly. for those inputs. This includes training to 4 staffs at site.	No	12,782
9	Installation testing and commissioning of <b>Disitilled water plant/Demineralised plant.</b>	No	3,309
10	Modifications of the existing <b>domino type Control cum indication panel</b> as per approved panel diagram, testing and commissioning with termination of cable, painting and lettering as required. Including replacement of dominoes, addition of new dominoes, laying of indoor cable if required between control pannel and CT rack, Cable termination as per requirement of the Railway. Fixing of cable, fixing of terminal block, M.S. wiring ladder with insulated M.S. strips from relay room to panel room, filling in sand under control panel rest table, cable duct, covering the open space around the control panel rest table with bricks lining, masonry work and plastering the same.	Each	4,630
11	Installation, wiring as per approved wiring diagram with latest alterations, testing and <b>commissioning of reset cum indication panel of existing digital axle counter</b> of concerned section.	Set	3,742
12	<b>Maintenance of the installation</b> under competent supervisor of contractor.	day	620
13	Installation, cable termination, wiring, testing of <b>magneto telephones.</b>	No	999
14	Installation, cable termination, testing and <b>commissioning of 10/20/50 Pair CT Boxes.</b>	No	786
15	Installation, cable termination, wiring, testing and commissioning of <b>Auto Changeover panel.</b>	No	6,208
16	(a) Wiring of door detection Proximity switch to the tag block of dataloggers/RTU (This includes provision of casing and capping and other wiring accessories, excluding 16/0.2 wire which will be supplied by Railways). This includes incorporation of this contact in datalogger simulation & datalogger report.	Station	1,242
	(b) Installation, testing of door contacts and <b>validation and proximity switch data through Dataloggers/RTU.</b> This includes incorporation of this contact in datalogger simulation & datalogger report.	Station	1,242
	(c) Development of door ' <b>close and open</b> ' <b>software logics</b> module & its implementation.	Station	1,242



17	Modification/Alteration of Data Logger/RTU Digital Input, validity & yard simulation in both end station of IBS as per directive of Railway Representative .		
		Station	43,453
18	Alteration Modification, cable termination, wiring, testing & commissioning of <b>existing Integrated power supply panel</b> as per approved power supply diagram and specification. The contractor has to supply arrangements at central relay room, goomties on original tracing paper of size 60cm.x42cm. with 8 computer prints in the format supplied by railways.		
		No	7,227
19	Provision of simulation arrangement(Track and Point simulation board as well as signal lamp simulation board) and its complete wiring ; arrangement of free home, advance starters, IBS etc as may be required with block working with required temporary relay wiring for controlling the train movement in NI - period with the provision of temporary miniature operation cum indication panel board; deputation of fitter round the clock in NI - period for assisting simulation testing for all the routes as per approved RCC by the Railway officials ; mobilization of additional man power for attending to the Pre - NI block and commissioning of the station within prescribed time limit of NI - period as decided by Railway officials; deputation of staff (one fitter & one helper) at the station for attending to the packing and reallignment of point and crossing etc, in connection with P. Way block for a period of 30 days beyond the commissioning date.		
	(a) Station upto 6 lines	No	3,72,446
	(b) Station more than 6 lines	No	6,20,743
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	<b><u>SOUTH EAST CENTRAL RAILWAY</u></b>		
	<b><u>SCHEDULE -'A2'</u></b>		
	<b><u>(Signalling Design &amp; Drawing)</u></b>		
	<b>Execution to be made by the contractor in Autocad as per following :</b>		
	<b>1. SEC Railway Practice in conformity with GR, SR &amp; SEM.</b>		
	<b>2. As per latest typical circuit diagram and guidelines of SEC railway.</b>		
<b>Sl. No.</b>	<b>Description</b>	<b>Unit</b>	<b>Rate</b>
<b>1</b>	<b><u>Design &amp; Preparation of Circuits and drawings</u></b>		
	Design, Preparation & checking of documents and Circuit diagram and drawings		
	a) Design and development of <b>Route Control Chart (RCC) in size B(A3) as per SEM.</b>	No of sheet	1,004
	b) Design and development of <b>Front Plate Diagram(FPD) conventional/Dual VDU FPD in size W(A1) as per SEM.</b>	No of station	5,024
	c) Design and development of <b>Station working rule Diagram (SWRD) based on SIP of station in size U(A3) as per SEM.</b>	No of station	5,024
	d) (i) Design & development of <b>cable corage plan</b> in size U(A3) as per SEM.	No of station	2,511
	(ii) Design & development of <b>cable route plan</b> in size U(A3) as per SEM.	No of station	1,256
	(iii) Design & development of <b>Track bonding plan</b> in size U(A3) as per SEM.	No of station	1,256
	e) Design and development of <b>Circuit Diagram/Logic in size B(A3) as per SEM</b> sheet including contact analysis.	No of sheet	1,004
	f) <b>Other Signalling Drawing in size U(A3) as per SEM</b> sheet (wiring in location box)	No of sheet	1,004
	g) <b>Maintenance Register</b> as per Requirement	No	125
	h) <b>Miniature diagram in size B(A3)</b>	No	1,004
	i) Approval for safety aspect of Circuit diagram by contractor not below than retired SS officer if required	Sheets	125
	j) Development of SIP based on ESP on size W(A1)	No of station	5,024
	k) Photocopy of various drawing in A3 size paper single side.	No	2
<b><u>Notes :</u></b>			
	1. Contractor has to collect approved Signal Interlocking Plan (SIP)/ESP from the Rly.		

	2. After design, development & Preparation of RCC, FPD, SWRD & Miniature Diagram, contractor has to submit initially two (02) sets of paper print for checking in the Rly office. Thereafter, contractor will collect one (01) set of checked copy for necessary correction/modification/alteration, if any in the RCC, FPD, SWRD and miniature diagram .
	3.Only minor corrections, if any will be incorporated in the original tracing paper will be done by the Railways.
	4. If there are major corrections/mistakes found during checking on paper print by Railways, then the same one (01) set of the original prints tracing papers & two (02) sets of paper prints has to be re-submitted for checking & approval.
	5. After approval contractor will collect approved copies and submit 3 sets of RCC, FPD & Miniature Diagram paper print alongwith, original tracing paper.
	6. All Soft copies of drawing must be made in atleast AutoCAD 2000 or latest version (drg file format) & all the CD's must be scanned with proper updated antivirus application before submitting to Design & Drawing Section. The CDs will be scanned in Design & Drawing Section where if any virus is found, new CDs containing soft copies must be submitted by the contractor.
	7. After commissioning of the work, contractor shall prepare all the completion drawings in 2 sets and put up it to approval of Rlys. Within one week and subsequently after their approval submit the original prints on tracing papers. After approval on the original tracing all drawings in 3 sets except SIP in 06 nos. of hard copy/ blue print along with the original tracing complete in all respects and two sets of soft copies in CDROM to be handed over to the railways.
	8. In course of execution of the work, any future development, additions and alterations etc. also to be incorporated in the circuit diagram as well as soft copy by the contractor at the completion stage.
	9. Each mistake in RCC /FPD or WD will deduct penalty of Rs.250/-.
	10. All the drawing should be provided on good quality plotter paper.
	11. The alteration/modification in drawings due to changes in approved SIP/ESP will be paid seperately.
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<b><u>SOUTH EAST CENTRAL RAILWAY</u></b>			
<b><u>SCHEDULE -'B'</u></b>			
<b><u>(SUPPLY OF FERROUS MATERIALS)</u></b>			
<b>General Note :</b>			
(a) The Materials which is to be inspected by RDSO should be supplied from RDSO approved vendors.			
(b) Following critical items will continue to be inspected by RDSO as per instruction contained in Board's letter 74/RS(G)/379/2Pt Dt. 04.03.1991 and 18.06.1991:- i. All types of signalling relays; ii. Block instruments; iii. Axle counter equipments; iv. Signal machines; v. Point machines; vi. Colour light signal transformers vii. Electrical signal lamps; viii. Voltage stabilisers and other power supply equipment. ix. Electric signal reversers; x. Signal roundels and lenses; xi. Electric lever lock and circuit controller. xii. Circuit controller; xiii. Electric key transmitter; xiv. Fuses, Fuse Block & Terminal blocks (PBT Type); xv. Electric Point and lock detector.			
(c) Signalling item having RDSO specification will be inspected by RDSO provided the order value is more than Rs. Five Lakh as mentioned vide Railway Board's letter No. 2000/RG(G)/379/2 Dt. 06.09.2017.			
Sl. No.	Description	Unit	Rate
1	(a) Signal Colour light Multi unit long range working on 110 V, AC 50 C/s.complete but without lamp, transformer and lenses and suitable for 140 mm dia. Post with expanded metal netting. Drg. No. SA//23023 A/M to CM (Adv.) Alt- 7 for metal netting. Spec. IRS:S-10/78, IRS:S-26/64, IRS:S 23/88. <b>Inspection by RITES.</b>		
	i) 3 Aspect Drawing No: SA- 23002 A/M . Alt.8.		
		No	17,030
	ii) 2 Aspect Drawing No: SA- 23003 A/M . Alt. 8.		
		No	14,598
	iii) 4 Aspect Drawing No:SA- 23001 A/M . Alt. 8.		
		No	18,820
	(b) Supply of 2 Aspect signal unit in FRP body without Lenses and transformer as per RDSO spec. No. RDSO/SPN/194/2006 . <b>Inspection by RITES.</b>		
		No	32,681
	(c) Supply of 3 Aspect signal unit in FRP body without Lenses and transformer as per RDSO spec. No. RDSO/SPN/194/2006. <b>Inspection by RITES.</b>		
		No	35,227
	(d) Supply of 4 Aspect signal unit in FRP body without Lenses and transformer as per RDSO spec. No. RDSO/SPN/194/2006. <b>Inspection by RITES.</b>		
		No	39,820
2	<b>Shunt signal position light type</b> complete with post base Drg No. SA 23840 Adv.Alt.1, S-23203 Adv., with 90 mm dia mounting socket Drg No S-23845 (Adv.). <b>Inspection by RITES.</b>		
		No	6,078

3	<b>Shunt signal dependent type</b> Drg.No.SA-23840(Adv) Alt.1 & S-23845 Adv. with off-set bracket to Drg. No. SA23080 Adv. Alt. 1 & specn. No. IRS:S-10/78 to suit 140mm. Outside dia post complete. <b>Inspection by RITES.</b>	No	4,498
4	<b>Calling on signal (CLS Type )</b> Drg.No: SA-24351(Adv.), Spec.No.IRS-S-10/78, IRS :S-26/64. <b>Inspection by RITES.</b>	No	2,732
5	<b>Route Indicator junction</b> direction 5 lamp type with Arms and drum complete but without lens and lamps, 3 way RH/LH.Drg.No.SA23403(Adv) for 3 way.Spec.No.IRS:S-66/84 with latest amd, IRS:S- 23/88, IRS:S-10/78, IRS:S-26-64. <b>Inspection by RITES.</b>	No	16,567
6 (a)	<b>Tubular post</b> for CLS 5.5 Mtr. Spec.IRS.S-6/81. <b>Inspection by RITES.</b>	No	2,857
(b)	<b>Signal.base</b> 140mm.dia(type tube) Drg.No.S-2011/M. <b>Inspection by RITES.</b>	No	7,134
7	<b>Ladder 5.5Mtr</b> for CLS Drg.No.SA-23156(Adv)Alt-1.Spec.No.IRS-S-10. <b>Inspection by RITES.</b>	No	4,082
8	<b>Off set bracket</b> for colour light 140 mm. outside dia post Drg. No. SA-23080(Adv) Alt-1.IRS-S- 10-78. <b>Inspection by RITES.</b>	No	974
9	(a) <b>Route Indicator Multi Lamp Theatre Type</b> with lamp holder, lamps and transformer as per RDSO Drg. No. SA23761; & Spec. no. IRS :S:23 <b>Inspection by Rep. of Railway Engineer.</b>	No	57,247
	(b) <b>Supply of Multi lamp Route Indicator (LED single digit)</b> from 1 to 9 with white LED (without housing); details- Single digit LED route indicator capable of displaying 1 to 9, visibility of 400m in clear day light, option for white colors chromaticity as per BS-1376 standard, LED's with junction temperature>100 degree C, lamp proving compatible with normal bulb type multi lamp route indicator, retrofits the existing conventional multi lamp type route indicators, input operating voltage 110V AC +-20%, uniform intensity over entire operating range operating temperature -10 degree C to +60 degree C. <b>Inspection by Rep. of Railway Engineer.</b>	No	62,959
	(c) <b>Supply of Housing rack for 1-9 Multi lamp Route Indicator with mounting socket on signal post (LED single digit).</b> <b>Inspection by Rep. of Railway Engineer.</b>	No	20,309
10	<b>Marker 'C'</b> non-illuminated Drg. SA- 2435 (Adv.) Spec. No. IRS-S-7 . <b>Inspection by Rep. of Railway Engineer.</b>	No	320
11	<b>Marker 'P'</b> non-illuminated Drg. SA- 23455 (Adv.) Spec.No. IRS-S-7. <b>Inspection by Rep. of Railway Engineer.</b>	No	321
12	<b>Marker 'G'</b> non-illuminated Drg. SA- 23476 (Adv.) Spec. No. IRS-S-7. <b>Inspection by Rep. of Railway Engineer.</b>	No	321
13	<b>Marker '-IB'</b> non-illuminated Drg. SA- 2435 (Adv.) Spec. No. IRS-S-7. <b>Inspection by Rep. of Railway Engineer.</b>	No	321
14	<b>Steel Apparatus Case(Large)</b> as per Drg.No.Con/SK/1/1/86 , with E type lock on both side having ward No.32. <b>Inspection by RITES.</b>	No	15,782
15	<b>Supply of Steel apparatus case (Half)</b> RE type as per Drg. No. RE/S&T/ALD/SK/220/82 Alt.A and 221/82 with Alt. B. <b>Inspection by RITES.</b>	No	7,757

16	Supply of Steel Apparatus Case(quarter) as per sketch No. RE/S&T/ALD./SK/227/82 corrected upto 30686 & 228/82 corrected upto 18/1/93, with E type lock having ward No.32. The key & handle should be at the rate of one each per two junction boxes. <b>Inspection by RITES.</b>	No	3,388
17	Relay Rack for 'Q' Series Relay as per Drg. No: SK/DRG/OL/SER/192 SH 2/2. The relay racks must be powder coated of stone grey colour. <b>Inspection by Rep. of Railway Engineer.</b>	No	9,386
18	Composite Relay Rack as per drg.No.SK/DRG/OL/SER/192- SH1/2.The relay racks must be powder coated of stone grey colour. <b>Inspection by Rep. of Railway Engineer.</b>	No	10,395
19	Equipment rack with 1" thick sal wood shelves for fixing equipments as per Drg.No.CON/SK/ T/14. <b>Inspection by Rep. of Railway Engineer.</b>	No	4,668
20	Battery Rack with 1½" inch thick sal wood shelves on battery rack as per Drg. No.SK/Drg/OL/102. <b>Inspection by Rep. of Railway Engineer.</b>	No	5,564
21	Cable termination racks as per Drg. No:SK/DRG/OL/SER/197. The relay racks must be powder coated of stone grey colour. <b>Inspection by Rep. of Railway Engineer.</b>	No	3,088
22	Wiring ladder of 25x25x3mm. Aluminum angle and 20x3mm.flat, 2 Mtr. <b>Inspection by Rep. of Railway Engineer.</b>	Mtr	267
23	Negative Bus bar 16 way 18 ". <b>Inspection by Rep. of Railway Engineer.</b>	No	226
24	Foundation 'A' type Drg No.IRS-S-3529/M Alt-1, Specn No. IRS-S-10/78 . <b>Inspection by Rep. of RITES.</b>	No	1,829
25	Earth Electrodes to Drg. No: Con/SK/8/3/84. <b>Inspection by Rep. of RITES.</b>	No	1,213
26	Lifting barrier complete (with fracture segments) with winch and positive boom locking for level crossing complete 10m. To RDSO Drg. No. SA-8835 Alt-1 for lifting barrier & SA-8132A (Adv.) Alt.1 for winch. <b>Inspection by Rep. of RITES.</b>	No	1,40,748
27	Supply of pinnacle SA-2019A for tubular signal post . <b>Inspection by Rep. of RITES.</b>	No	784
28	Pad Locks of godrej make model Nav-tal - 6 Levers - Long Shackle (3 keys) or latest. <b>Inspection by Rep. of Railway Engineer.</b>	No	550
29	Supply of pipe lock signal unit ( Handcuff lock)(Minimum one key for each lock). <b>Inspection by Rep. of Railway Engineer.</b>	No	123
30	(a) Supply of Distribution board , Make MATRIX or similar. Size : 600 x 800 mm x 220 mm. <b>Inspection by Rep. of Railway Engineer.</b>	No	4,154
	(b) Installation of Distribution board , Make MATRIX or similar. Size : 600 x 800 mm x 220 mm.	No	1,038
31	(i) Supply of following material, <b>Inspection by Rep. of Railway Engineer.</b>		
	(a) 2 conductor through terminal block, 1000 Volt Ac, 125 AMP, suitable for conductor of size : 10,16 & 25 sq mm, wago model No. 285 135 Grey colour; make wago or similar. (10 sq mm- 1000 no., 16 sq mm- 300 no. , 25 sq mm-100 no.)	No	486

	(b) Adjacent Jumper for above TB, WAGO PNo. 285.435	No	107
	(c) Protective warning marker for above P No. 285-420	No	31
	(d) Shock protector for above : P No. 285-421	No	23
	(e) WMB multi marking system for above , P No. 2009-115	No	4,010
	(f) Rail for above 35mm x 15 mm, 2.3 mm thick no. 210 -198	No	11,168
	(g) Operating tools with partially insulated shaft, P No. 210-721	No	842
	(ii) Supply of following material, Inspection by Rep. of Railway Engineer.		
	(a) 2 conductor through terminal block, 1000 Volt Ac, 232 AMP, suitable for conductor of size : 70 sq mm, wago model No. 285 195 Grey colour. make wago or similar.	No	2,050
	(b) Adjacent Jumper for above TB, WAGO PNo. 285.450	No	542
	© Protective warning marker for above P No. 285-440	No	36
	(d) Shock protector (finger guard) for above : P No. 285-169	No	36
	(e) Rail for above 35mm x 15 mm, 2.3 mm thick no. 210 -198	No	11,168
	(f) Allen Key WRENCH with partially insulated shaft, P No. 285 -172	No	1,015
32	Wire IG 8 SWG for Bonding. Insp. by : Rep. of Railway Engineer. Note:-This item will be issued to contractor from Railway store only for picking of existing track circuits during Pre-Pre-NI & Pre-NI work.	Kg	59
33	PVC insulated GI flexible wire for lead wire of track circuit used in Railway signalling. Dia 6mm (19 Sqmm cross sectional area) Constriction 7x7 core WSC. Lay Right Hand ordinary. Finish Galvanised. Tensile strength 125-140kgf/sqmm. Confirming to IRS S3-61. PVC thickness 1mm. O.D. 8mm. Colour of PVC Red- 50% & Black-50%. Make:Bharat or similar. Inspection by Rep. of Railway Engineer. Note:- This item will be issued to contractor from Railway store only for picking of existing track circuits during Pre-Pre-NI & Pre-NI work.	Mtr	66
34	Channel pin 7 mm dia. Inspection by: Representative of Railway Engineer. Note: - This item will be issued to contractor from Railway store only for picking of existing track circuits during Pre-Pre-NI & Pre-NI work.	No	1
	<b>NOTE:</b>		
	Before placing order for all the materials to the firms concerned, Prior approval to be obtained from Railway 's Engineer.		
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<b><u>SOUTH EAST CENTRAL RAILWAY</u></b>			
<b><u>SCHEDULE -'B1'</u></b>			
<b><u>Supply of Signalling Battery (Secondary cell)</u></b>			
<b>General Note :</b>			
(a) The Materials which is to be inspected by RDSO should be supplied from RDSO approved vendors.			
(b) Following critical items will continue to be inspected by RDSO as per instruction contained in Board's letter 74/RS(G)/379/2Pt Dt. 04.03.1991 and 18.06.1991:-			
i. All types of signalling relays;			
ii. Block instruments;			
iii. Axle counter equipments;			
iv. Signal machines;			
v. Point machines;			
vi. Colour light signal transformers			
vii. Electrical signal lamps;			
viii. Voltage stabilisers and other power supply equipment.			
ix. Electric signal reversers;			
x. Signal roundels and lenses;			
xi. Electric lever lock and circuit controller.			
xii. Circuit controller;			
xiii. Electric key transmitter;			
xiv. Fuses, Fuse Block & Terminal blocks (PBT Type);			
xv. Electric Point and lock detector.			
(c) Signalling item having RDSO specification will be inspected by RDSO provided the order value is more than Rs. Five Lakh as mentioned vide Railway Board's letter No. 2000/RG(G)/379/2 Dt. 06.09.2017.			
<b>Sl. No.</b>	<b>Description</b>	<b>Unit</b>	<b>Rate</b>
<b>1</b>	<b>BATTERIES :</b>		
	(a) <b>Low maintenance lead acid stationary secondary cells</b> for S&T installations made of hard rubber container and with initial charging of nominal voltage 2 volts as per Specn.No.IRS-S-88/2004 with latest amd. <b>Inspection by RDSO.</b>		
	<b>i) 80 AH</b>	No	3036
	<b>ii) 120 AH</b>	No	5056
	<b>iii) 200 AH</b>	No	5574
	<b>NOTE :</b>		
	Before placing order for all the materials to the firms concerned, Prior approval to be obtained from Railway 's Engineer.		
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<b><u>SOUTH EAST CENTRAL RAILWAY</u></b>			
<b><u>SCHEDULE - 'B2'</u></b>			
<b><u>(Supply of Signalling materials)</u></b>			
<b>General Note:-</b>			
(a) The Materials which is to be inspected by RDSO should be supplied from RDSO approved vendors.			
(b) Following critical items will continue to be inspected by RDSO as per instruction contained in Board's letter 74/RS(G)/379/2Pt Dt. 04.03.1991 and 18.06.1991:- i. All types of signalling relays; ii. Block instruments; iii. Axle counter equipments; iv. Signal machines; v. Point machines; vi. Colour light signal transformers vii. Electrical signal lamps; viii. Voltage stabilisers and other power supply equipment. ix. Electric signal reversers; x. Signal roundels and lenses; xi. Electric lever lock and circuit controller. xii. Circuit controller; xiii. Electric key transmitter; xiv. Fuses, Fuse Block & Terminal blocks (PBT Type); xv. Electric Point and lock detector.			
(c) Signalling item having RDSO specification will be inspected by RDSO provided the order value is more than Rs. Five Lakh as mentioned vide Railway Board's letter No. 2000/RG(G)/379/2 Dt. 06.09.2017.			
Sl. No.	Description	Unit	Rate
1	(i) <b>Cable PVC</b> insulated single core unsheathed with plain annealed copper conductor as per the colour coding scheme of Railways. Spec. no: IRS-S-76/89 with latest ammendment. <b>Inspection by RDSO.</b>		
	(a) 7/0.75 mm dia.(Red & Black)	Km	47,061
	(b) 3/0.75 mm dia. (Red & Black)	Km	22,816
	(c) 16/0.2 mm dia. (80% grey & 20% yellow)	Km	10,784
	(d) Jumper wires : 1x0.6 mm Dia. ( In combination of colours as desired by Railways)	Km	3,378
	(e). Indoor cable as per IRS-S-76/89 with latest ammendment. 60x0.6 mm dia,	Km	1,47,469
	(f). Indoor cable as per IRS-S-76/89 with latest ammendment. 40x0.6 mm dia,	Km	1,25,184
	(ii) <b>Cable PVC</b> insulated single core unsheathed with plain annealed copper conductor as per the colour coding scheme of Railways. Spec. no: IRS-S-76/89 with latest ammendment. <b>Inspection by Rep. of Railway Engineer.</b>		
	(a) 1x 1.5 Sq mm flexible wire (Red-45%, Black-45% & Green-10%).	Km	26,569

	(b) 1x 2.5 Sq mm flexible wire (Red-15%, Black-50% , Green-20%, blue-7.5% & Yellow-7.5 %).	Km	35,877
	(c) 1x 4.0 sq mm flexible wire (Red-45%, Black-45% & Green-10%).	Km	39,683
	(d) Multi strand ISI copper cable (10 Sq.mm ) (Red-45%, Black-45% & Green-10%).	Km	1,16,166
	(e) Multi strand ISI copper cable (16 Sq.mm ) (Red-45%, Black-45% & Green-10%).	Km	1,22,245
2	a) <b>Electric point operating machine</b> IRS type ( AC immunity 160 V AC) non trailable, to operate on 110 V DC complete with lock, detector, cable termination box and slides for lock and detector- rotary locking, universal type as per specification IRS-S-24/2002 & For Motar IRS:37/82 with latest amendment, Drg. No. RDSO/S 10800 ( for motor Drg. no. RDSO-S/10910). <b>Inspection by RDSO.</b>	No	96,469
	b) <b>Ground connection</b> for universal type point machines (110V DC) complete with insulating materials (5 Rods) as per Drg.No.(I)SA 8805(ii)RDSO/S/3273(iii)RDSO/S/3271 (IV) RDSO/S/ 3267 (v)RDSO/S/3269, Switch extension bracket RDSO/S/3264 & Drive lug S 8806 . <b>Inspection by RITES.</b>	Set	18,579
	(c ) Electric Point Machine-IRS type 220mm Throw(CG make), High thrust(AC immunity 160 V AC), non-trailable to operate on 110 V DC complete with Lock & Detector slides, cable terminal box and Clamp lock & Ground connections for 60 Kg. Rail confirming to IRS: S 24 /2002 & Assy. Drg. no.- RDSO/S/11000 & for Motor IRS : S 37/82. Details of Ground connection : Ground connection clamp type for 60 Kg rail 220 mm throw as per Crompton Greaves drawing (i) Lock Rod Drg. CSQ- 3456-57-58-59, (ii) Detector Rod Drg. No. CSQ-34-36-37, (iii) Drive Rod Drg. no. CSQ-3460. This also includes supply of insulating materials as required for each set. <b>Inspection by RDSO.</b>	Set	2,00,459
3	a) <b>Track feed Battery chargers</b> 110V-AC 50 C/S with boost and trickle charging for 1 or 2 or 3 cells 80 A.H.Spec.No.IRS:S-89/2013 with latest amd. <b>Inspection by RDSO.</b>	Each	5,172
	b) <b>Track lead Junction Box(4-way)</b> made of fibre re-inforced plastic Drg. SI-10272 Alt. 'B'. as per Spec. No. IRS: S-10/78. This also includes 4 nos. of PBT terminals for the same. <b>Inspection by RITES.</b>	No	1,039
	c) <b>Track feed resistance</b> 30 ohms (2,4,8,16 Ohms) Drg. No. SA-20166 (Adv. ) Spec. No: IRS. S/23. <b>Inspection by RITES.</b>	No	171
	d) <b>Choke coil 'B' Type</b> as per spec. no:IRS:S-65/83 with latest amendment if any. <b>Inspection by RDSO.</b>	No	4,594
4	(a) <b>Non-deteriorating type low voltage electric fuse</b> for Railway signalling, rated voltage 240 V AC/DC fuse with cylindrical cap without indication size :14x 51 mm. Spec. no: IRS-S-78/92 with latest amendment if any. <b>Inspection by RDSO.</b>		
	(i) 1 Amp fuse catridge	No	65
	(ii) 02 Amp fuse catridge	No	81
	(iii) 04 Amp fuse catridge	No	81

	(iv) 06 Amp fuse cartridge	No	73
	(v) 16 Amp fuse cartridge	No	79
	(b) Fuse Block for above fuse cartridge, Spec. no: IRS-S-75/2006(rev-2) with latest amendment if any. <b>Inspection by RDSO.</b>	No	189
	(c) Polymeric Positive Temperature co-efficient device self restoring type 6 Amps, 16 V DC with soldering of 16/0.2 copper wire leads and crimping of copper pin type lugs suitable for Railway signal and Telecom applications. Technical details (i) Holding current- 6Amps, (ii) Max Fault current rating- 100 Amps, (iii) Trip current- 10.2 Amps, (iv) Max time to trip time- 3.3 sec. (v) Max power dissipation - 2.8 watt, (vi) Max resistance= 0.028 ohms, (vii) Minimum resistance= 0.01 ohms, (viii) Max. Voltage rating= 16 VDC. <b>Inspection by RITES.</b>		
		No	48
<b>5</b>	<b>ARA terminal for Signalling Installation with PBT materials . Inspection by RDSO.</b>		
	6 Way (ARA terminal) Drg No.SA-23756 Alt3, Specn No. IRS-S-75/2006 (Rev.-2) with latest amd.		
		No	361
<b>6(a)</b>	<b>Wago / phoenix terminal blocks (Part no.280-874). 4 conductor disconnect terminal block. Inspection by Rep. of Railway Engineer.</b>		
		No	76
	It includes :		
	(i) <b>4 conductor disconnect terminal block</b> for test and measurement; 0.08 mm.sq.- 2.5mm.sq., Center marking with slot test for test plug dia 2mm/0.079 In and dia 2.3mm/0.091 in; Carrier rail din 35: front-entry; with knife disconnect large cage clamp@connection, grey.		
		No	
	(ii) End and intermediate plate, 2.5 Mm/0.394 in wide carrier rail din 35, grey (Wago part no. 249-117)		
		No	
	(iii) Screw end stop for carrier rail		
		No	
	(iv) steel carrier rail;35 X 7.5 mm, 1 mm /0.039 in thick; unslotted (Part no. 210-229/PW11-0000).		
		No	
	(v) WSB quick marking system; horizontal; 1 ... 10 (10x); for width 5-17.5 Mm; 10 strips of 10 marker per strip (100) per card; consecutive numbers white (Part no. 209 - 502S).		
	(vi) Adjacent jumper nominal current 24A; Insulated Grey.		
		No	
<b>(b)</b>	<b>Wago / phoenix make. Inspection by Rep. of Railway Engineer</b> (i) with Screw , Cage Clamp Connection, 2-Conductor through Terminal Block for 0.08 mm-2.5 mm <sup>2</sup> , 800v/24A, mounting Carrier Rail Din 35; Front-Entry; Cage Clamp Connection, make - wago/Phoenix.		
		No	54
	(ii) End Plate suitable for item (i) terminal block, make - wago/Phoenix.		
		No	2
	(iii) Screw end stop; 10 mm/0.394 in wide; for carrier Rail din 35 Rail, grey, make - wago/Phoenix.		
		No	7
	(iv) Carrier Steel Rail 35x7.5 mm, 1mm/0.039 thick unslotted, make - wago/Phoenix.		
		No	57

	(v) WSB Quick Marking System; Horizontal; 1 ... 10 (10x); For Width 5- 17.5 mm; 10 Strips Of 10 Markers Per Strip (100) Per Card; Consecutive Numbers Each Strip, White, make - wago/Phoenix.	No	29
	(vi) Adjacent jumper nominal current 24A; Insulated Grey, make - wago/Phoenix.	No	2
7	<b>Key Lock `E` type</b> with key Drg.No.SA-3376/M. Alt-2. Spec.No.IRS-S-30/64 different ward . <b>Inspection by Rep. of Railway Engineer.</b>	No	1,750
8	<b>Flasher &amp; Hooter</b> for LC gates (1 set shall comprise for 1 level crossing). <b>Inspection by Rep. of Railway Engineer.</b>	Set	10,682
9	(a) <b>Electric Key Transmitter (RKT)</b> single Drg. No. : SA -22601(Adv.) Alt.4 with ward No. 2 to 9, spec. no: IRS-S - 21/2001 with latest amendment. <b>Inspection by RDSO.</b>	No	6,172
	(b) Key Lock Relay working with 24 V DC Non ACI type 4F/4B, Spec. no. IRS: S-23, IRS:S-34 & IRS: S-46. <b>Inspection by RDSO.</b>	No	9,244
10	<b>Block Bell equipment</b> complete as per Drg. No. TCA-15080 (Adv) Alt-1 & specn No. IRS-TC-44/88 with latest amendment. <b>Inspection by Rep. of Railway Engineer.</b>	No	4,460
11	<b>Filter unit</b> as per Drg. No. TCA-20080 & Specn No. IRS:S68/89 with latest amendment. <b>Inspection by RDSO.</b>	No	29,254
12	Supply of the following <b>furnitures</b> for SM / relay room. <b>Inspection by Rep. of Railway Engineer.</b>		
	(a) <b>Chair</b> . Model PCH-5001T(Revolving) or latest. Make: Godrej .	No	14,405
	(b) <b>Table</b> of Godrej make. Model No. WT 718 + ERU or latest	No	14,375
	(c) <b>Wooden</b> stool height 2 feet	No	610
	(d) 2 drawer filling cabinet STVFXDM 2086 or latest. Make: Godrej .	No	19,770
13	<b>200- Way Tag Block</b> Spec.IRS-S-77/91 with latest amd & with Drg.No.SA-24751, 52, 53. <b>Inspection by Rep. of Railway Engineer.</b>	No	3,096
14	<b>Block Instrument Double Line, Lock &amp; Block, 3-pos</b> complete with Telephone, condenser, Induction Coil etc with arrangement for commutator Handle Lock. As per Drawing No. SA-22781 ( adv) Alt-1. Spec No.IRS-S-22-91 and IRS-S-23.2 Nos with circular gong as per Dwawing No. SA-22912. <b>Inspection by RDSO.</b>	No	52,718

15	<b>Float/Boost Battery charger</b> input voltage 230V AC single phase 50 C/S output voltage 24 V DC, output current 30 Amp., floor mounting as per Specn.NO.IRS-S-86/2000 with latest amendment if any. <b>Inspection by Rep. of Railway Engineer.</b>	No	61,885
16	<b>Key lock facing point</b> hand Plunger type-single with E type lock, key and stretcher bar. Drg No. SA-3148/M(IRS) Alt-1, specn No.IRS:S-10/78. <b>Inspection by RITES.</b>	No	4,898
17	Supply of <b>clip on meter AC/DC</b> with carrying case make <b>Fluke</b> or similar with standard accessories along with engineering and operating manual. <b>Inspection by Rep. of Railway Engineer.</b>	No	14,713
18	Supply of <b>disitilled water plant/Demineralised palnt</b> of (10-50-100 liter per hour) make Laptech/shivam or indicated by Railways. <b>Inspection by Rep. of Railway Engineer.</b>	No	27,468
19	<b>20 pair CT Box.</b> <b>Inspection by Rep. of Railway Engineer.</b>	No	2,419
20	Supply of <b>Universal thermoshrink jointing</b> kit for derivation/ transformer joint for Jelly filled Six quad cable conforming to RDSO Spec.No :IRS-TC-77/2006(Rev.1) (With latest amendment). <b>Inspection by RITES.</b>	No	4,133
21	Supply of different type of <b>dominoes</b> complete with button assemblies and indication to suite for modification of the existing operation cum indication panel as per approved Front Plate Diagram. <b>Inspection by Rep. of Railway Engineer.</b>	No	2,332
22	<b>2 Core Screened</b> (sheilded ) cable size 16/0.20 mm(0.5 sq. mm. Whole) 650 volt grade as per specification No. IS 694/77 with jacket, make Empire or similar. <b>Inspection by Rep. of Railway Engineer.</b>	Mtr.	37
23	(a) <b>Supply of IPS SMR 110V DC 20Amp.</b> as per specification No. RDSO/SPN/165/2012, version-3.0 or latest. Make: M/s Statcon Ltd, compatable for the M/s Statcon IPS. <b>Inspection by Rep. of Railway Engineer.</b>	No	52,428
	(b) Supply of <b>IPS DC-DC converter 24-32V DC 10Amp.</b> as per specification No. RDSO/SPN/165/2012, version-3.0 or latest. Make:M/s Statcon Ltd, compatable for the M/s Statcon IPS . <b>Inspection by Rep. of Railway Engineer.</b>	No	13,676
	(c) Supply of <b>IPS transformer 220 V AC /110V AC 1000 VA.</b> as per specification No. RDSO/SPN/165/2012, version-3.0 or latest. . Make:M/s Statcon Ltd, compatable for the M/s Statcon IPS. <b>Inspection by Rep. of Railway Engineer.</b>	No	13,676
24	(a) Supply of <b>IPS FRBC Module of rating 110V/20Amp.</b> as per specification No. RDSO/SPN/165/2012, version-3.0 or latest. Make:M/s HBL Ltd, compatable for the M/s HBL IPS. <b>Inspection by Rep. of Railway Engineer.</b>	No	81,590
	(b) Supply of <b>IPS DC-DC converter 24-32V 10Amp.</b> as per specification No. RDSO/SPN/165/2012, version-3.0 or latest. Make:M/s HBL Ltd, compatable for the M/s HBL IPS. <b>Inspection by Rep. of Railway Engineer.</b>	No	27,670
	(c) Supply of <b>IPS transformer of rating 500 VA.</b> as per specification No. RDSO/SPN/165/2012, version-3.0 or latest. . Make:M/s HBL Ltd, compatable for the M/s HBL IPS. <b>Inspection by Rep. of Railway Engineer.</b>	No	24,832
	(d) Supply of <b>IPS Inverter 1.5KVA for IPS.</b> as per specification No. RDSO/SPN/165/2012, version-3.0 or latest. . Make:M/s HBL Ltd, compatable for the M/s HBL IPS. <b>Inspection by Rep. of Railway Engineer.</b>	No	88,684
	(e) Supply of <b>IPS DC-DC converter 24-32V 5Amp.</b> as per specification No. RDSO/SPN/165/2012, version-3.0 or latest. Make:M/s HBL Ltd, compatable for the M/s HBL IPS. <b>Inspection by Rep. of Railway Engineer.</b>	No	24,832
	(f) Supply of <b>Station monitoring panel(ASM)</b> as per specification No. RDSO/SPN/165/2012, version-3.0 or latest. . Make:M/s HBL Ltd, compatable for the M/s HBL IPS. <b>Inspection by Rep. of Railway Engineer.</b>		

		No	17,737
	(g) Supply of <b>SCU Card</b> as per specification No. RDSO/SPN/165/2012, version-3.0 or latest. . Make:M/s HBL Ltd, compatable for the M/s HBL IPS. <b>Inspection by Rep. of Railway Engineer.</b>		
		No	31,217
25	(a) Supply of <b>IPS SMR 110V/20Amp.</b> as per specification No. RDSO/SPN/165/2012, version-3.0 or latest. Make:M/s Amarraja Ltd, compatable for the M/s Amarraja IPS. <b>Inspection by Rep. of Railway Engineer.</b>		
		No	75,204
	(b) Supply of <b>IPS DC-DC converter 24-32V/ 5Amp.</b> as per specification No. RDSO/SPN/165/2012, version-3.0 or latest. Make:M/s Amarraja Ltd, compatable for the M/s Amarraja IPS. <b>Inspection by Rep. of Railway Engineer.</b>		
		No	23,413
	(c) Supply of <b>IPS transformer 230 V AC /110V AC 1000 VA.</b> as per specification No. RDSO/SPN/165/2012, version-3.0 or latest. .Make:M/s Amarraja Ltd, compatable for the M/s Amarraja IPS. <b>Inspection by Rep. of Railway Engineer.</b>		
		No	31,926
	(d) Supply of <b>Inverter 2KVA for IPS</b> as per specification No. RDSO/SPN/165/2012, version-3.0 or latest. .Make:M/s Amarraja Ltd, compatable for the M/s Amarraja IPS. <b>Inspection by Rep. of Railway Engineer.</b>		
		No	73,785
	(e) Supply of <b>2.0 Kva CVT Regulator for IPS.</b> as per specification No. RDSO/SPN/165/2012, version-3.0 or latest. .Make:M/s Amarraja Ltd, compatable for the M/s Amarraja IPS. <b>Inspection by Rep. of Railway Engineer.</b>		
		No	90,103
	(f) Supply of <b>3.0 Kva CVT Regulator for IPS.</b> as per specification No. RDSO/SPN/165/2012, version-3.0 or latest. .Make:M/s Amarraja Ltd, compatable for the M/s Amarraja IPS. <b>Inspection by Rep. of Railway Engineer.</b>		
		No	1,10,962
	(g) Supply of <b>60-66V/5A DC-DC Converters for IPS.</b> as per specification No. RDSO/SPN/165/2012, version-3.0 or latest. .Make:M/s Amarraja Ltd, compatable for the M/s Amarraja IPS. <b>Inspection by Rep. of Railway Engineer.</b>		
		No	26,073
26	Supply of <b>Double Walled Corrograted Pipe</b> length 6 meter, 120mm outer dia ,103.5mm inner dia with couplers as per specification no. BSEN 50086-2-4 for under ground power/communication /signal cable protection. One six meter pipe with collar at both end shall be counted a unit for the purpose of payment. <b>Inspection by Rep. of Railway Engineer.</b>		
		No	1,379
27	Supply of junction box for point machine as per the drawing number 59/17 issued by CSTE/SECR. <b>Inspection by Rep. of Railway Engineer.</b>		
		No	932
28	Supply and installation of 'AXLE COUNTER section ' Board on steel rectangular board of size 600mmX1000mm, 3mm thick legend on coloured retroreflective tape engineering grade( yellow background, lettering AXLE COUNTER section in black)as per GR and rectangular board fitted on rail post through 2 nos. of suitable clamps. <b>Inspection by Rep. of Railway Engineer.</b>		
		No	8,796
29	(a) Supply of rotary CAM swith 4 NO/4NC . Current capacity 6 Amps DC type, -4TD46B, make- KAYCEE or similar. <b>Inspection by Rep. of Railway Engineer.</b>		
		No	416
	(b) Installation of above rotary CAM swith 4 NO/4NC .		
		No	103
	<b>NOTE:</b>		
	Before placing order for all the materials to the firms concerned, Prior approval to be obtained from Railway 's Engineer.		
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<b>SOUTH EAST CENTRAL RAILWAY</b>			
<b>SCHEDULE -'B3'</b>			
<b>(Supply of Electrical &amp; Electronics materials)</b>			
<b>General Note :</b>			
<b>(a) The Materials which is to be inspected by RDSO should be supplied from RDSO approved vendors.</b>			
<b>(b) Following critical items will continue to be inspected by RDSO as per instruction contained in Board's letter 74/RS(G)/379/2Pt Dt. 04.03.1991 and 18.06.1991 :</b> <b>i. All types of signalling relays;</b> <b>ii. Block instruments;</b> <b>iii. Axle counter equipments;</b> <b>iv. Signal machines;</b> <b>v. Point machines;</b> <b>vi. Colour light signal transformers</b> <b>vii. Electrical signal lamps;</b> <b>viii. Voltage stabilisers and other power supply equipment.</b> <b>ix. Electric signal reversers;</b> <b>x. Signal roundels and lenses;</b> <b>xi. Electric lever lock and circuit controller.</b> <b>xii. Circuit controller;</b> <b>xiii. Electric key transmitter;</b> <b>xiv. Fuses, Fuse Block &amp; Terminal blocks (PBT Type);</b> <b>xv. Electric Point and lock detector.</b>			
<b>(c) Signalling item having RDSO specification will be inspected by RDSO provided the order value is more than Rs. Five Lakh as mentioned vide Railway Board's letter No. 2000/RG(G)/379/2 Dt. 06.09.2017.</b>			
<b>SR. No.</b>	<b>Description</b>	<b>Unit</b>	<b>Rate</b>
<b>1</b>	(a) Relay, Non-AC Immune, plug-in type, Style "QN1", Neutral line, 24V DC <b>12F.4B</b> contacts, front and back contacts metal to carbon with plug board, retaining clip & connectors conforming to BRS:930, IRS:S 34 & IRS:S 23. The interlocking code for this unit shall be ABCDE. <b>Inspection by RDSO.</b>	No	3821
	(b) Relay, Non-AC Immune, plug-in type, Style "QN1", Neutral line, 24V DC <b>8F.8B</b> contacts, front and back contacts metal to carbon with plug board, retaining clip & connectors conforming to BRS:930, IRS:S 34 & IRS:S 23. The interlocking code for this unit shall be ABCDF. <b>Inspection by RDSO.</b>	No	3821
	(c) Relay, AC Immune, plug-in type, Style "QNAI", Neutral line, 24V DC <b>12F.4B</b> contacts, front and back contacts metal to carbon with plug board, retaining clip & connectors conforming to BRS:931A, IRS:S 60, IRS:S 34 & IRS:S 23. The interlocking code for this unit shall be ABDFH. <b>Inspection by RDSO.</b>	No	4032
	(d) Relay, AC Immune, plug-in type, Style "QNAI", Neutral line, 24V DC <b>8F.8B</b> contacts, front and back contacts metal to carbon with plug board, retaining clip & connectors conforming to BRS:931A, IRS:S 60, IRS:S 34 & IRS:S 23. The interlocking code for this unit shall be ABDGH. <b>Inspection by RDSO.</b>	No	4032
	(e) Relay AC immune Plug in type Style'QNNA1', twin neutral line, 24VDC <b>6F/2B</b> contacts each for LH and RH, front and back contact metal to carbon , complete with plug board, retaining clips and connectors conforming to BRS:960,IRS:S 60, IRS:S 34 & IRS:S 23. Interlocking code of this unit shall be CDEHX. <b>Inspection by RDSO.</b>	No	5085
	(f) Relay AC immune Plug in type Style'QNNA1', twin neutral line, 24VDC <b>4F/4B</b> contacts each for LH and RH, front and back contact metal to carbon , complete with plug board, retaining clips and connectors conforming to BRS:960,IRS:S 60, IRS:S 34 & IRS:S 23. Interlocking code of this unit shall be ACDHJ. <b>Inspection by RDSO.</b>	No	5085
	(g) Relay Plug in type Style'QL1', Magnetically latched neutral line, 24VDC <b>11F/4B</b> contacts each, front and back contact metal to carbon , complete with plug board, retaining clips and connectors conforming to BRS:935A, IRS:S 34 & IRS:S 23. Interlocking code of this unit shall be ABDEG. <b>Inspection by RDSO.</b>	No	6770
	(h) Relay, Non AC Immune, plug-in type, Style `QTA2; Neutral track, 9 ohm, <b>4F.2B</b> contacts, front and back contacts metal to carbon, complete with plug-board, retaining clip and connectors conforming to BRS:939A,BRS:966 (Appendix F2), IRS:S 34 & IRS:S 23. The interlocking code for this unit shall be FGHKX. <b>Inspection by RDSO.</b>		

	No	3891
(i) Relay AC Immune, plug in type, STYLE <b>QBAT</b> , DC Biased track, 9 Ohms, <b>2F-2B</b> , Contacts, front and back contacts metal to carbon complete with plug -board, retaining clip and connectors conforming to RDSO/SPN/84-88, IRS:S 34 & IRSS:23. The interlocking code for for this unit shall be ABEJX. <b>Inspection by RDSO.</b>		
	No	6489
(j) Relay, AC Immune, plug-in type, Style ' <b>QSPAT</b> ', Neutral line, slow to pickup, 24V DC, <b>8F.4B</b> contacts, front and back contacts metal to carbon, complete with plug board, retaining clip & connectors conforming to BRS:933A, IRS:S 60, IRS:S 34 & IRS:S 23. The interlocking code for this unit shall be ABDEJ. <b>Inspection by RDSO.</b>		
	No	4944
(k) Relay Non- AC Immune, Plug in type, style ' <b>QNNI</b> ', twin neutral line, 24V DC, <b>4F/4B</b> contacts, each for LH & RH, front & back contacts metal to carbon, complete with plug board, retaining clips and connectors, conforming to BRS: 960, IRS: S 34 & IRS : S23. The interlocking code for this unit shall be ACEHJ. <b>Inspection by RDSO.</b>		
	No	4944
(l) Relay Non- AC Immune, Plug in type, style ' <b>QNNI</b> ', twin neutral line, 24V DC, <b>6F/2B</b> contacts, each for LH & RH, front & back contacts metal to carbon, complete with plug board, retaining clips and connectors, conforming to BRS: 960, IRS: S 34 & IRS : S23. The interlocking code for this unit shall be ACDEK. <b>Inspection by RDSO.</b>		
	No	4944
(m) <b>Universal relay</b> , plug in type, style AC/LED all aspects AC lamp proving relay unit with in built current transformer type, slow release neutral line relay <b>4F/4B</b> contacts, front and back contacts metal to carbon, shall be suitable for working in series with the 110AC LED signal lamp rated at 15W conforming to RDSO specn. no. BRS:941A , STS/E/RELAYS/AC LIT/LED Signal/09-2002, Amdt-1 with latest. <b>Inspection by RDSO.</b>		
	No	5015
(n) Relay, AC Immune, plug-in type, Style " <b>QNA1K</b> ", Neutral line, 24V DC 1000 ohms 6F.6B contacts, front and back contacts metal to carbon with plug board, retaining clip & connectors conforming to BRS:931A, IRS:S 60, IRS:S 34 & IRS:S 23 & RDSO Spec. no. STS/E/Relay/UEA(PI). The interlocking code for this unit shall be CDEKY. <b>Inspection by RDSO.</b>		
	No	4804
(o) Relay, Non-AC Immune, plug-in type, Style " <b>QS3</b> ", Neutral line, tractive armature 24V DC 1000 ohm <b>6F.6B</b> contacts, front contacts metal to carbon and back carbon metal to metal/carbon complete with plug board, retaining clip & connectors conforming to BRS:930, IRS:S 34 & IRS:S 23 & RDSO Spec. no. STS/E/Relay/UEA(PI). The interlocking code for this unit shall be BDEKX. <b>Inspection by RDSO.</b>		
	No	5758
(p) Relay, <b>point contactor unit</b> , Non-AC Immune plug-in type, 24V DC and capable of controlling Electric point machine operating on 110V DC conforming to IRS:S 46, IRS:S 34 & IRS:S 23. The unit shall consist of N/R relay (Neutral line relay with two coils), XR relay (24V DC Neutral relay), W(N)R/W(R)R- mechanically interlocked relay & WCR (Heavy duty contact or relay with 16 Ampere breaking capacity). All the above relays shall be mounted on pre-wired base plate. <b>Inspection by RDSO.</b>		
	No	39318
(q) <b>Relay Flasher</b> , (Anuvidyut make or Similar) Electronic solid state input 24V. DC at 40/60 flashes per minute. Specification No.RDSO/SPN/173/2002. <b>Inspection by Rep. of Railway Engineer.</b>		
	No	2212
(r) Relay , Non-AC Immune, plug-in type, style " <b>QS3</b> ", Neutral line, tractive armature, 12 V DC , 1000 ohm 4F.4B contacts, front contacts metal to carbon and back contacts metal / carbon, complete with plug board, retaining clip & connectors conforming to BRS: 930A, IRS: S 34 & IRS: S 23. The interlocking code pin for this unit shall be CDEKX. <b>Inspection by RDSO.</b>		
	No	3962
(s) <b>Timer Relay</b> Fail safe type of electronic time delay device - 24 Volt DC (Anuvidyut make or similar) for Rly. Signalling as per Spec. No. IRS:S-61/2000 with latest amendment. The interlocking code pin for this unit shall be AFGKY. (with a time setting of <b>120 seconds</b> ). <b>Inspection by RDSO.</b>		
	No	2544
(t) <b>Timer Relay</b> Fail safe type of electronic time delay device - 24 Volt DC (Anuvidyut make or similar) for Rly. Signalling as per Spec. No. IRS:S-61 with latest amendment. The interlocking code pin for this unit shall be AFHKY. (with a time setting of <b>60 seconds</b> ). <b>Inspection by RDSO.</b>		
	No	2544
(u) <b>Timer Relay</b> Fail safe type of electronic time delay ( <b>30 Seconds</b> ) Operating voltage 24V.DC confirming to Specn. No. IRS-S-61/2000 (Micro Controller Design) with latest amendment. <b>Inspection by RDSO.</b>		
	No	2544

	(v) Relay AC Immune, Plug-in type, Style – <b>QSRA1</b> DC Neutral Line, slow to release 24V DC, <b>8F-4B</b> contacts. Front and Back contacts metal to carbon, complete with plug board, retaining clip and connectors with latest amendment. The interlocking code for this unit shall be ADEFJ. <b>Inspection by RDSO.</b>		
		No	5085
<b>2</b>	<b>Relay DC Polarised 3-Position</b> 77 Ohm. 1N/1R contacts metal to metal, centre biased armature. IRS:S-31-80,(Rev) IRS:S:34 & IRS:S:23. <b>Inspection by RDSO.</b>		
		No	9844
<b>3</b>	<b>Electronic Magneto telephone</b> desk type to Specn No.IRS-TC-79/2000. <b>Inspection by Rep. of Railway Engineer.</b>		
		Pair	4414
<b>4</b>	(i) Supply of <b>Single section Digital Axle counter</b> as per RDSO specification no. RDSO/SPN/177/2012(Ver- 3) or latest, Phase Reversal Type, consisting of the following:-  (a) High frequency Tx coil & Rx coil (Each set consists of Web mounting type 2 nos. Tx and 2 nos. Rx coil) =1 set. (b) Track side digital axle counter unit DACF-710P =2 Nos. (c) Vital Relay box duly wired =2 nos. each with 2 nos. of 24 V, 1000 ohms, "Q" type relays. (d) Clamp with deflector plates and hardware etc =4 Nos. (e) Reset box = 2 Nos. (f) Surge voltage protection device box =2 Nos. <b>Inspection by RDSO.</b>		
		set	505512
	(ii)High frequency Tx coil & Rx coil = 1 set , including mouting accessories, fasterning parts, protective tubes, etc, (Each set consists of Web mounting type 2 nos. Tx and 2 nos. Rx coil with 15 m cable) . <b>Inspection by RDSO.</b>		
		set	49147
<b>5</b>	(a) Supply of <b>datalogger system</b> for Railway S&T installation as per RDSO specification no. IRS:S-99/2006 (ammedent - 3) or latest with -  (i) Digital Input 512, Analog Input 64. <b>Inspection by RDSO.</b>		
		No	497388
	(ii) Digital Input 1024, Analog Input 64. <b>Inspection by RDSO.</b>		
		No	623709
	(b) (i) Installation, wiring, testing and commissioning of Digital Input 512, Analog Input 64 <b>datalogger system</b> as per RDSO specification no. IRS:S-99/2006 (ammedent - 3) or latest including networking and central monitoring along with installation of remote monitoring software and hardware. The contractor is also required to list out the no. of analog & digital inputs for wiring & operation of the datalogger by taking approval of the Rly. for those inputs. This includes training to 4 staffs at site.		
		No	29408
	(ii) Installation, wiring, testing and commissioning of Digital Input 1024, Analog Input 64 <b>datalogger system</b> as per RDSO specification no. IRS:S-99/2006 (ammedent - 3) or latest including networking and central monitoring along with installation of remote monitoring software and hardware. The contractor is also required to list out the no. of analog & digital inputs for wiring & operation of the datalogger by taking approval of the Rly. for those inputs. This includes training to 4 staff at site.		
		No	46786
	(c) Supply of External leased line modem as per RDSO specication no. IRS:S-99/2006 amadt-3 or latest.. <b>Inspection by RDSO.</b>		
		No	28071
<b>6 (i)</b>	(a) Supply of block proving with <b>Digital Axle Counter</b> as per RDSO spec. no. IRS: S - 105/2012 or latest using <b>UFSBI &amp; Block panel</b> for <b>single</b> line operation. <b>Inspection by RDSO.</b>		
	Note:-The above consisting of following :-		
	<b>For Single line</b>		

	(1) Universal fail safe block interface as per RDSO Specn no. RDSO/SPN/147/2005 (Latest amendments)- 2 nos. (2) SM's Panel (RDSO/S/32019 tentative- 2 nos. (3) Relay Rack with locking and sealing arrangement duly wired (as per RDSO/S/32020 -tentative)- 2 nos. (4) Relays:- QN1- 44 nos., QNA1-12 nos. QL1- 4 nos. Timer- 2 nos. (5) Block Telephone- 2 nos.		
		Pair	1028577
	(b) Transportation, Installation, testing and commissioning of block proving with DAC using UFSBI & Block panel complete set as mentioned above.		
		Pair	90440
	(c) Supply of Automatic Media changeover of UFSBI working on redundant channels for data transmission on OFC/ Quad. <b>Inspection by Rep. of Railway Engineer.</b>		
		Pair	35386
	(d) Supply of Modem compatible with existing UFSBI system (for secondary/back up media) along with class D /Type III SPD for communication line (2 wire Tx & 2 wire Rx) to UFSBI for different surges. Make:- OBO Betterman/ CITELE or similar. <b>Inspection by Rep. of Railway Engineer.</b>		
		Pair	69087
	(e) Installation, testing and commissioning of Automatic Media changeover Modern for use with secondary/back up media.		
		Pair	17850
(ii)	(a) Supply of "Universal fail Safe Block Interface" to interface with SGE type Double line Block Instrument (DLBI) for IB signalling over telecom cable or voice/ Data channel or suitable to work on OFC/Quad cable as per RDSO spec.' no.- RDSO/SPN/147/ 2005 with latest amendment without the provision of Relay. (Relay will be supplied by Railway). <b>Inspection by RDSO.</b> The work to be executed as per directives of the Representative of Railway Engineer.		
		Pair	627642
	(b) Installation, testing and commissioning of "Universal fail Safe Block Interface" to interface with SGE type Double line Block Instrument (DLBI) complete set as mentioned above.		
		Pair	156910
7	(A) <b>Earthing and bonding</b> system as per RDSO Spec. No. RDSO/SPN/197/2008, RDSO Drg. No. SDO/RDSO/E&B/001 dt. 19.09.08 and RDSO Drg. No. SDO/RDSO/E&B/002 dt. 19.09.08. Earthing and bonding system for Relay Room, IPS Room, SPD Box, Operator panel in SM's room, signalling equipments in Station building, Block circuit, SSDAC, etc. <b>Inspection by RITES.</b>		
(a)	Supply of "Permanent and Maintenance Free Earth pits materials". 1 Set PMF earth pit consisting of:		
(i)	17 mm diameter and minimum 3 m long Copper Bonded Steel Rod - 1 No		
(ii)	GEM- 25 lb - 3 Bags		
(iii)	25*6*150 mm Cu Bus Bar- 2 No		
(iv)	Cu lugs and nut bolt 2 nos		
(v)	Supply for Connection between Earthpits and MEBB It includes 35 sq mm multi-strand pvc insulated single core Cu cable (15 mtr Lump Sum).		
(vi)	Supply for Internal connection from MEBB To SEBB and to other equipments. (50 mtr Lump Sum). It includes 16 sq mm and 10 sq mm multi strand pvc insulated single core Cu cable.		
		No	23526
	(B) Installation, testing and commissioning of Permanent and Maintenance Free Earth pits.		
		No	5882
	Installation charges : Earthpit (1 Set) It includes,		
(i)	Civil works related to earth pit digging, PMF earth pit installation, backfilling and chamber making.		
(ii)	Materials for chamber including Chamber Cover.		
8	(a) Supply of <b>protocol converter</b> to suit with the dataloggers of the station. <b>Inspection by Rep. of Rly.</b>		
		No	12833
	(b) Installation and wiring of <b>protocol converter</b> to suit with the dataloggers of the station.		
		No	3208
9	<b>Electrically operated lifting barrier</b> complete as per RDSO SPN no. 208/2012 Ver-2 with latest Amendment, operating voltage 110V AC, without hand generator, length of the boom is 9.76 meter / 32 feet. <b>Inspection by RDSO.</b> Note:- Spare shall also be supplied as per RDSO specifications (rates for them are included above).		
		Set	548759

10	<b>Control Panel</b> (operation-cum indication console Domino type) to RDSO Spec. No. 36/87 size of each domino will be 54+10mm X 34+7mm. 25% panel LEDs, all type of dominos and buttons assemblies complete as spare to be supplied. This includes cable termination MS rack with 3/4" thick wood strips including fabrication thereof as per the requirement of the Rly. terminations of cables, fix of terminal blocks, terminals, painting and lettering as required. <b>Inspection by Rep of Railway Engineer.</b>	No	374980
	Note:-MS angle/flat, teak wood, bolts & nuts, screws, shelves etc. required as above shall be supplied by the contractor.		
11	Control Panel for Mid section interlocked LC Gate/IBS(operation-cum indication console Domino type)/ <b>Siding motor operated point operation pannel /Non Interlocking pannel</b> to RDSO Spec. No. 36/87 size of each domino will be 54+10mm X 34+7mm. 25% panel LEDs, all type of dominos and buttons assemblies complete as spare to be supplied. This includes cable termination MS rack with 3/4" thick wood strips including fabrication thereof as per the requirement of the Rly. terminations of cables, fix of terminal blocks, terminals, painting and lettering as required. <b>Inspection by Rep. of Railway Engineer.</b>	No	44258
	Note:- MS angle/flat, teak wood, bolts & nuts, screws, shelves etc. required as above shall be supplied by the contractor.		
12	Supply of <b>Transformer 230V /110V, single phase, 1KVA capacity</b> , Spec. no.-IRS:S-72/88 with latest amendment. <b>Inspection by RDSO.</b>	No	5454
13 (i)	(a) Supply of Remote terminal unit with 64 digital & 16 analog inputs with modem as per RDSO spec. no - IRS-S- 99/2006 or latest . <b>Inspection by RDSO.</b>	No	200509
	(b) Installation, Wiring, Testing and commissioning of Remote terminal unit with 64 digital & 16 analog inputs with modem as per RDSO spec. no - IRS-S- 99/2006 or latest .	No	20052
14	(a) Supply of Remote terminal unit with 128 digital & 16 analog inputs with modem as per RDSO spec. no - IRS-S- 99/2006 or latest. <b>Inspection by Rep. of RDSO.</b>	No	240611
	(b) Installation, Wiring, Testing and commissioning of Remote terminal unit with 128 digital & 16 analog inputs with modem as per RDSO spec. no - IRS-S- 99/2006 or latest .	No	24061
15	Supply of <b>fault analysis software for RTUs</b> .The work to be executed as per directives of the Repr. of CSTE/Con. <b>Inspection by Rep. of Railway Engineer.</b>	No	16253
16	(a) Supply of <b>Surge &amp; lightening protection device</b> . Make - Reliance Electricals or similar. <b>Inspection by Rep. of Railway Engineer.</b>	No	2411
	(b) Transportation, installation of <b>Surge &amp; lightening protection device as mentioned above.</b>	No	603
17	Supply of <b>Door Proximity switches</b> along with 2 way rigid connector for wire termination between proximity switches and Datalogger Tag blocks as per specs. <b>Inspection by Rep. of Railway Engineer.</b>	No	669
18	Supply of <b>Multi Section Digital Axle Counter</b> evaluation arrangement with required interface cards / Electronics for working of track side detection arrangement, Reset & Co-operation arrangement, Modem for communication between Evaluators, Communication arrangement with track side electronics for working of 3 track sections (4Detection points) for functioning of Intermediate Block Signalling and Block Proving Axle Counter. This shall also include necessary power supply arrangement for working of the system. Proper & recommended earthing as well as surge & lightening protection arrangement shall also be provided. The system supplied shall have approval / cross approval of RDSO. Other technical details are indicated in the <b>Annexure-D. Inspection by RDSO.</b>	Set	1469076

<b>19</b>	Supply of <b>Tool Kit for Multi Section Digital Axle Counter. Inspection by Rep. of Railway Engineer.</b>		
		Set	140357
<b>(a)</b>	Fluke 289 or latest Digital multimeter of for MSDAC system with Probe set = One no.		
<b>(b)</b>	Torque wrenches 25-135 N/Mtr		
<b>(c)</b>	Set of Spanners Screw driver and soldering iron suitable for MSDAC.		
<b>(d)</b>	Dummy wheel		
<b>(e)</b>	Marking Jig		
<b>(f)</b>	Adapter Card		
<b>(g)</b>	DAC EC Card Puller		
<b>(h)</b>	<p>Micro proceser based portable data analyser for down loading Event logger data for analysis and report generation for Digital Axle counter Model with (a) CPO-Intel Centrino Duo Moblie Technology with Intel Core 2 DUO Processor T 7200 or better 2 GHz, 4 MB L2 Cache of better. (b) Mother Board- Intel 945 GM/PM Chipest. (c) Operating system- Preload with Vista Bussiness and free open Software.(d) Procesar/Memory/System Bus- 667 MHz FSB or better,(e) Main Memory- DDR2-667 MHz (f) optical Drive-Intenal 8XDVD+/- RW Combination Drive (SuperMulti ) with dual layer write and read capabilities or better with software, (g) Graphics Accelerator - Intel (R) Media Accelerator-950 Graphics:Upto 224 MB shared system memory, resolution 2048 X 1536, (h) Display- 15.4" TFT WXGA Display (1280 X 800 resolution) (i) Interfaces-IEEE 1394 integrated port (10/100/1000); 4* USB PORT + 1* Powered USB (D-Bay), 1* serial port RJ45 Ethernate port,RJ11 Morden port; external VGA port;Video: 15-pin moniter connector, Componet Video &amp; Audio jacks;Built in Microphone;Bluetooth 2.0, (j) Wireless LAN - Intel (r) PRO /Wireless 3945.</p> <p>[SOR-2021 for S&amp;T works-Sch 'B3' item no. 27(i)]</p>		
	Network Connection 802.11 a/g Wi-Fi enabled., (k) Modem Internal 56 kbps or better,		
<b>20</b>	Supply of <b>Detection Point complete with track side</b> electronics compatible to work with the evaluation system supplied as per item No.1 above along with mechanical fixtures & fittings, power supply arrangement, Counting Heads with necessary fixing arrangement on rails including connecting cables of recommeded length duly housed in suitable enclosure. <b>Inspection by RDSO.</b>		
		No	393773
<b>21</b>	Supply of <b>Reset boxes complete</b> compatible with the evaluation system supplied under item No.22 above containing individual resetting arrangement of each track sections. <b>Inspection by RDSO.</b>		
		No	94567
<b>22</b>	Change over Switch 230V, 30A, Anchor make. <b>Inspection by Rep. of Railway Engineer.</b>		
		No	831
<b>23</b>	Supply of VF tapping termination transformer to specification IRS-TC-22/76 for 470:1120, 1120:600, 1120:1120. <b>Inspection by Rep. of Railway Engineer.</b>		
		No	1106
<b>24</b>	(a) Supply of <b>fuse indication cum monitoring and automatic changeover system</b> as per RDSO specification no. RDSO/SPN/209/2012 Rev. 0 or latest. The system shall be supplied along with all standby fuses placed in the system. In addition to it, spare quantity of 100% fuses of each type shall also be supplied along with the system. <b>Inspection by RDSO.</b>		
	<b>For 32 fuses per set (Upto 4 Amps):-</b>	Set	37882
	<b>For 24 fuses per set (Upto 10 Amps):-</b>	Set	37882
	(b) Transportation, installation, testing & commissioning of <b>fuse indication cum monitoring and automatic changeover system</b> as mentioned above.		
		No	9469
<b>25</b>	(a) Supply of <b>Earth Leakage Detector</b> (12 nos. channel) as per RDSO specification no. RDSO/SPN/256/2002 or latest having 6 digit counter, 12 Channel bus bar voltage of 110 V / 60 V / 12 V in AC DC measurement in 19" sub rack along with insulation resistance meter, remote indication & buzzer in ASM room at station of Bilaspur/Raipur/Nagpur Division. The tenderer should submit three years warranty certificate along with supply of material. <b>Inspection by RDSO.</b>		
		No	131577
	(b) Transportation, installation, testing & commissioning of <b>Earth Leakage Detector</b> as mentioned above.		
		No	32894

26	(a) A pair consist of two numbers of CYGNUS 835(V.21 to E1 converter) with the following configuration:- (1) UP link port: One E1 interface(120 ohms Blanced) with RJ45 connector. (2) User DTE port: one no. of 2-wire analog voice channel interface compatible with V.21 standard. (3)Automatic changeover: The automatic changeover feature allows the axle counters to be get connected via a hot stand by redundant copper path if the E1 link fails or if the CYGNUS 835 unit is powered off. (4)Backup link capacity: Facility is provided to check the live availability of the changeover backup copper circuit when it is not being used for user data communication. (5) V.21 modem signal monitoring: Facility is provided to check the local signal status between the conencte axle counter and CYGNUS 835. This facility will not be available when E1 link to remote CYGNUS 835 units is down and the user device communication has switched over to the backup copper link. (6) Alarm relay: potential free relay contac is provided to indicate alarm conditions such as unit power down, E1 link down, back up link down, CD down, customer may connect this relay output through a data logger in order to monitor the alarm status from a central site, or use it for raising an alarm using external circuitry. (7) Line quality monitoring: Facility is provided to monitor the error rate of the E1 link against a programmable preset level. The product may be configured to report a condition where the E! channel error rate exceeds the specified limit over a certain period. (8) Event logs and statistics: Facility provided to fetch the time stamped event such as unit power ON/OFF, E1 link UP/down, copper back up link UP/Down, V.21 modem signal status changes, and also a statistical prewsentation of the same. (9) SMS alert: Facility provided to send SMS alert in case alarm condition develops. [This facility requires an external GSM modem and it not covered under the scope of this quotation.] (10) Power supply: 48 V DC; ordering time option of 24 VDC available as an alternative. (11) Industrial grade components. <b>Inspection by RITES.</b>				Pair	77196
	(b) Installation charges for two numbers of CYGNUS 835(V.21 to E1 converter). Note- the price for installation will not be included any cabling charges, splicing charges, power supply arrangement etc.				Pair	11529
27 (i)	Supply Fire Alarm System of Microprocessor based intelligent, addressable, modular, 1 loop (minimum 125 detector/devices per loop-expandable to 2 loops) Fire Alarm Control Panel with LCD display with 320 Character with soft keys for displaying alarm, events and operating functions, Day/ Night operation function, Remote maintenance service feature etc. The panel should be multi-protocol ie able to support at least 2 additional different makes of addressable detectors. The panel should have minimum two relay outputs & 1 Monitored Sounder Output. It should have provision to be connected to repeater panels in future. The panel shall capable to operate on 240 volts AC power supply, automatic battery charger, 24 volts, sealed lead acid maintenance free batteries sufficient for 24 hours normal working and then be capable of operating the system for 30 minutes during emergency condition as per detailed specifications complete as required. Panel Should Be VdS/UL/FM/EN/LPCB Certified as per RDSO Specification No. RDSO/SPN/217/2016 Ver 1 or latest. <b>Inspection by Rep. of Railway Engineer. Annexure: E</b>				No	83776
(ii)	Supply of Auto Telephone Dialer (GSM) complying to the RDSO/SPN/217/2016 Ver 1. or latest. <b>Inspection by Rep. of Railway Engineer.</b>				No	9520
(iii)	Supply of Analogue Addressable Multisensor Detector with multiple sensitivity( adjustable at site) levels , programmable for timed automatic sensitivity selection with base, and other accessories as required and Detectors shall be dS/UL/FM/EN/LPCB listed. The Detectors shall comply to the RDSO/SPN/217/2016 Ver 1 or latest. <b>Inspection by Rep. of Railway Engineer.</b>				No	3712
(iv)	Supply of Manual call points, Push type & resettable with key, with In-built isolator. Shall be VdS/UL/FM/EN/LPCB compliant and shall comply to the RDSO/SPN/217/2016 Ver 1 or latest. <b>Inspection by Rep. of Railway Engineer.</b>				No	5712
(v)	Supply of Output Module which will provide potential free (NO/NC) contact to existing Data Logger. Complying to the RDSO/SPN/217/2016 Ver 1 or latest. Note:- The contractor will provide potential free contact for goomty and Relay Room only. The connectivity with existing data logger will be done by Railway. <b>Inspection by Rep. of Railway Engineer.</b>				No	8949
(vi)	Supply of Hooter cum Strobe complying to the RDSO/SPN/217/2016 Ver 1 or latest. <b>Inspection by Rep. of Railway Engineer.</b>				No	7806
(vii)	Supply of 2C 1.5 sq mm twisted shielded armoured copper cable. <b>Inspection by Rep. of Railway Engineer.</b>				mtr	124
(viii)	Supply of isolator devices for every 20 detectors, complying to the RDSO/SPN/217/2016 Ver 1 or latest. <b>Inspection by Rep. of Railway Engineer.</b>				No	3808



(ix)	Installation, Testing and commissioning of all above items as per requirement at site. The work will execute as per instruction of representative of Railway Engineer.		Stn	17553
28	Synchronised and combined AMMONIA PRINTING AND DEVELOPING MACHINE(Light source in watts 3KW speed in cm/Min 100cm to 1200cm/min/max), or latest or similar. <b>Inspection by Rep. of Railway Engineer.</b>		No	247716
29	HP/OEM approved document scanner/Printer/Fax A3 /Legal size Resolution in dpi 300,speed in PPM 20, ADF capacity 50, Flate Bed Size NA, Document size legal or latest or similar. <b>Inspection by Rep. of Railway Engineer.</b>		No	72290
30	Cable Route locator, make- 3M Dynatel, Model no- 2250- U3P3 microprocessor based system or similar for tracing of path of underground cables, both copper & fibre optics having specification:- Coupler Size 3.00 Inch; Direct Connect Cable- Large Clips; Number of Frequencies- 4; Operating Temperature Range -20 to 50 Degree Celsius; Storage Temperature -40 to 70 Degree Celsius; Transmitter Output- 3 Watt. <b>Inspection by Rep. of Railway Engineer.</b>		No	367404
31	(a) Supply of Multi Section Digital Axle counter system (MSDAC) having atleast 5 detection points and 4 track section, including multiplexures cards, modems, BBT etc., if any, and fully equipped with all cards / modules for which system is designed conforming to RDSO as per specn. No. SPN/176/2005. This includes supply of all the track side junction boxes, detection points, track clearance relays (preferably 'Q' series relays, reset panel and all other accessories, including multiplexures, modems, cards, modules if any) to make the system complete and fully equipped as design for. This also includes both manual and auto resetting system with co-operative type resetting features. All the multi section digital axle counters (MSDAC) equipment to be provided with efficient, lightning and surge protections along with earthing arrangement which also to be supplied along with the system. <b>Inspection by RDSO.</b>	No	No	2916869
	(b) Installation, testing and commissioning of Multi Section Digital Axle counter system as mentioned above.	No	No	16241
32	Hand Operated <b>Earth tester</b> 4 terminal type with complete testing kit, carrying case and manufacturer calibration test certificate, Nippen make or similar, Range : 0-10 Ohms. <b>Inspection by Rep. of Railway Engineer.</b>	Each		7330
33	Hand Operated <b>Insulation tester</b> with test lead, carrying case and manufacturer calibration test certificate, Nippen make or similar, Range : <b>100 Volt</b> , 100 M Ohms. <b>Inspection by Rep. of Railway Engineer.</b>	Each		6178
34	Hand Operated <b>Insulation tester</b> with test lead, carrying case and manufacturer calibration test certificate, Nippen make or similar, Range : <b>500 Volt</b> , 200 M Ohms. <b>Inspection by Rep. of Railway Engineer.</b>	Each		6530
35	Supply of 2 conductor through terminal block, 1000 Volt Ac, 125 AMP, suitable for conductor of size : 10, 16 & 25 sq mm, wago model No. 285 135 Grey colour; make wago or similar.(10 sq mm- 1000 no., 16 sq mm-300 no., 25 sq mm-100 no.) <b>Inspection by Rep. of Railway Engineer.</b>	No		515
36	Supply of. Adjacent Jumper for above TB, WAGO P No. 285.435. <b>Inspection by Rep. of Railway Engineer.</b>	No		110
37	Supply of Protective warning marker for above P No. 285-420. <b>Inspection by Rep. of Railway Engineer.</b>	No		32
38	Supply of Shock protector for above: P No. 285-421. <b>Inspection by Rep. of Railway Engineer.</b>	No		23
39	Supply of WMB multi marking system for above, P No. 2009-115. <b>Inspection by Rep. of Railway Engineer.</b>	No		4210
40	Supply of Rail for above 35mm x 15 mm, 2.3 mm thick no. 210 -198. <b>Inspection by Rep. of Railway Engineer.</b>	No		11700
41	Supply of Operating tools with partially insulated shaft, P No. 210-721. <b>Inspection by Rep. of Railway Engineer.</b>	No		880
42	Supply of Allen Key WRENCH with partially insulated shaft, P No. 285 -172. <b>Inspection by Rep. of Railway Engineer.</b>	No		1025
43	Supply of Single Line Directional Panel for Auto Signalling in 3rd Line with Dominos made of PBT & switches. <b>Inspection by Rep. of Railway Engineer.</b>	No		37500

<b>44</b>	Installation, testing & commissioning of Single Line Directional Panel for Auto Signalling in 3rd Line with Dominos made of PBT & switches.		
		No	22500
<b>45</b>	ACR Card (Siemens Make). <b>Inspection by RDSO.</b>		
		No	6075
<b>46</b>	Design, Installation, testing and commissioning of MSDAC complete. (Including mounting rack and all kind of fixture for complete installation and commissioning of MSDAC).		
		No	93266

<b>For Item no-20</b>	<b>ANNEXURE-D : REQUIREMENTS OF MULTI SECTION DIGITAL AXLE COUNTER SYSTEM</b>			
	1. The MSDAC system supplied shall have approval of RDSO as per specification no. RDSO/SPN/176/2005 (Version 2) with latest amendments & manufacturer's specifications or shall have cross approval of RDSO for the product being offered.			
	2. Axle counting system shall be complete with mounting arrangement, power supply arrangement, necessary interface for providing information of status of track sections to pick up signalling relays track section-wise.			
	3. The MSDAC equipment shall be provided with all the necessary and recommended protection devices for lightening and surge protection.			
	4. Railways shall make available 60 Volt/24 Volt DC supply for functioning of MSDAC. However, at most of the stations, and IBS locations, necessary power supply systems for operation of MSDAC have been included in the tender schedule and same shall be supplied and installed as per the details indicated in the tender schedule.			
	5. The track clear/occupied information supplied by the system for each track section shall be utilized for energizing vital signaling relay. This information shall be required for interlocking.			
	6. The system shall have facility of 'Preparatory Reset' of individual track section.			
	7. Connecting cable provided along with track device should be of adequate length (not less than 5.0 meter) to connect to the track side electronics which will be installed in the "Location Box" being provided by Railways / contractor. The connecting cable must be duly protected by high quality pipe (sample must be approved by Engineer in charge of the work), suitable for underground application & laid at an adequate depth.			
	8. Tenderer shall ensure that the installation of MSDAC equipment shall be done by manufacturer of the equipment/their authorized technical staff.			
	9. Necessary technical documents, installation & maintenance manuals, trouble shooting procedure details and any other required technical information regarding MSDAC supplied shall be provided to ensure proper installation/ maintenance/repair of MSDAC as per manufacturer's specifications/stipulations.			
	10. Tenderer shall provide training of Railway's officials in software and hardware to enable maintenance of supplied MSDAC system. The quality of training should be such that at the end of the training the Railway officials will be able to install/ commission and maintain the equipment. They shall be trained in all aspect of system design, engineering inspection, testing, execution, commissioning, fault diagnosis operation and maintenance of the system as whole and also all constituent equipments. Training shall be imparted preferable at work site / Railway depot nominated by engineer in charge / manufacturer's premises. training material shall be supplied by contractor. The cost of Training is included in item no. 20 to 23 of Sch. 'B-3'. and item 27 of Sch- 'A'.			
	<b>11. Tenderer should submit authorization from Original Equipment Manufacturer to supply of equipment against this tender, if awarded.</b>			
	<b>12. Tenderer should submit commitment from Original Equipment Manufacturer for supply of spares if required, for next five years, if awarded.</b>			
<b>For Item 29</b>	<b>Annexure -'E'</b>			
	<b>Control Panel features :</b>			
i)	The Control Unit shall have 4 Zone.			
ii)	The Control Unit shall have sufficient input ports for connecting various sensors/detectors alongwith their interfaces.			
iii)	3. The entire system shall be suitable to operate at 24V±20% DC as well as on 230 Volts ± 20%, 50 Hz single phase AC supply with 24 V DC sealed maintenance free battery with battery charging system as secondary source with a power back-up of at least 6 hours.			
iv)	The panel of the control unit shall have the facility of buzzer silence, alarm silence and alarm activate, lamp test & reset.			
v)	The control Unit shall have proper display to show the information.			
vi)	Normal loop voltage: 20.7V DC, Common Hooter Output: 24V @ 1A			
	<b>Smoke Detector features :</b>			
i)	Smoke detector shall be of Optical (Photoelectric) smoke detector.			
ii)	Smoke detector shall be robust, rugged, temperproof & suitable for surface mounting.			
iii)	Smoke detector shall incorporate integral Dual LED indicator to show the status of the detector. phase AC supply with 24V DC sealed maintenance free battery with battery charging system as secondary source with a power back-up of atleast 6 hours.			

iv)	Smoke detector shall have suitable indications for indicating Normal healthy mode & Alarm Indication mode.
v)	Smoke detector shall be able to detect smoke and shall communicate alarm signal to Control unit when optical density of smoke exceeds by 0.1 db/m (10 m visibility).
vi)	Power Supply : DC Input Supply: 12-28V DC.
vii)	Alarm Indication: Continuous flashing of LED (preferably RED).
	<b>Panic Indicator Features:</b>
i)	Alarm LED.
ii)	Key Resetttable.
iii)	Power Supply: 24 V.
	<b>Indoor Hooter Features:</b>
i)	Operating voltage: 24V DC.
ii)	Power: max 5 watts.
iii)	Sound Level: 90 db or better.
iv)	Rugged Casing.

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SOUTH EAST CENTRAL RAILWAY			
SCHEDULE - 'C'			
(Execution of Telecom work)			
	General instructions :		
Sl. No.	Description of Work	Unit	Rate
1	Location survey of cable route and preparation of tentative and final cable route plan as per approved format in the section including supply of final route plan after the cables are laid and commissioned indicating clearly the exact position of the cable, joints and other critical items with reference to OHE mast & other fixed point, etc. in 12( twelve) Nos. hard bound copies on white bond paper of maximum A-3 size (well documented and bound with plastic covers).	Rkm	950
2(a)	Excavation of trenches of following depth and width at the bottom of the trench including clearing of roots bushes etc. for all types of soils including morrum, hard soil mixed with boulders etc. This work include back filling the trench, ramming, consolidation of soil as well as disposal of extra soil after cable is placed in the trench. After mansoon the route is to be attended for back filling the rain cuts, wash out of soils where ever found.		
	i) Depth 1.2 Mtr. & Width 0.3 Mtr.	Km	93076
	ii) Depth 1.0 Mtr. & Width 0.3Mtr.	Km	77389
2(b)	Excavation of trenches including clearing of roots of trees etc. in hard/rocky soil by chiseling up to a depth of minimum 0.6 Mtr. and width 0.3 Mtr. at the bottom, supply and placing RCC hume pipe section as per drawing on sieved soil of 30mm over cable / HDPE pipe and concreting through - out the length upto a layer of 75mm. Then back filling the trench and then ramming of soil .	Km	336450
2(c)	Cutting the chase upto a depth of minimum 500 mm.and smoothening of inside surface in concrete and beds of rocks, cable laying/ placing HDPE pipe & concreting upto the ground level.	Mtr	540
2(d)	Cutting of solid rocks making channels 150 mm wide at the bottom X 200 mm deep by chase cutting & concreting upto the ground level after cable laying/ placing HDPE pipe.	Mtr	432
3	Laying and Fixing of galvanised iron pipe (GI Pipe) with threaded collars (for jointing pipe) of 80 mm nominal dia Spec.No.IS-1239 medium grade, on bridges, culverts, drains including supply and transportation of GI pipes and all other materials required for fixing the pipe to Drg.No.Con/SK/T/2 and drawing of Signal/Power/Quad cables inside the pipe with masonry works over the entire length of the bridge and at entry and exit of the culvert and curing for 72 hrs, drilling of holes on the pipe at 10 cm apart to be clamped 2 Mtrs apart on culvert, for the Signalling, quad, power cable.	Mtr	748
4	Laying of RCC pipe including supply of required quantity at site with collars (for jointing pipe) 150mm nominal dia to Spec.No:IS-458 in excavated trench (at bridges, culverts, roads, under railway track,Platform crossing, level crossing gate etc.) and drawing of HDPE pipe/ Power cable/ Quad cables/Jelly filled cables , etc. through pipe.	Mtr	763
5	Track crossing, Road Crossing by pushing method (HDD method) at culverts/ Railway track / pucca road/Kuchha road at a depth not less than 1 meter with reference to bottom of rail/road surface including supply of GI/HDPE pipe .		

	<b>(a) HDPE pipe/DWC pipe(4 inch dia)</b>	Mtr	1062
	<b>(b) GI pipe</b> with 76 mm dia, Spec. No. -1239 medium grade (for the length of pushing more than 05 meters).	Mtr	2210
<b>6</b>	Transportation including loading/unloading of <b>HDPE pipe</b> from the stores of railway to the work site, laying of the same (with 4 mm nylon rope pre-inserted inside the HDPE pipe) in excavated trench/already laid GI/RCC pipes/tubes, jointing, levelling and end sealing the pipes.	Km	7762
<b>7</b>	Transportation, loading/unloading of OFC from the stores of railway to the work site with care, pushing/pulling OFC through the HDPE pipes, sealing of the duct by sealling /caps plugs. The cable is to be laid by mechanised means. At inaccessible places where mechanised laying is not possible, the cable is to be laid manually by pulling through pre inserted rope. This also includes testing of cable drums in the store premises before transportation and submissions of results thereof. Empty cable drums to be returned by the contractor. The cable drums with unused cable at site to be returned by the contractor to the stores depot of SSE/Tele/Con/BSP.	Km	18672
<b>8</b>	<b>Laying of Quad Cable, PIJF cable of different sizes, power cable</b> of different size in the excavated trench, inside GI,RCC and HDPE pipes. This includes loading/unloading & transportation of cables from the stores of railway as per the availability. Wherever several cables of different categories have to be laid in the same trench/path, the provision of seperation of various cable should be as advised by the site incharge of the Railway. Empty cable drums to be returned by the contractor. The cable drums with unused cable at site to be returned by the contractor from site to Stores depot Bilaspur.	Km	16479
<b>9(a)</b>	Supply and placing of warning tape Orange colour of 100 mm wide printed in black as "CAUTION OFC CABLE" at every 1 mtr. interval (minimum) and to be laid in the trench in station area and as directed by the representative of Railway.	Km	14419
<b>9(b)</b>	Supply, transportation, placing and positioning breadth-wise of standard second class <b>bricks</b> in excavated trench on the laid cable at the rate of 9 bricks per metre in the stations (Home signal to Home Signal) and colony area and at the locations as advised by site incharge of Railway.	Km	21869
<b>9(c)</b>	Fixing of concrete <b>cable route marker</b> at 50 meter(approx) and at diversion point including supply & transportation of cable route marker at site. Detail size & fixing of cable route marker should be followed as per drawing no. SDO/Cable laying/020. Marker should be written as "RLY TELE"(both side).	No	408
<b>10</b>	<b>Cutting the masonry wall to the depth of 0.25m to 0.75m</b> at the entry of room placing of flexible HDPE pipe or G.I.Pipe (including supply) of suitable size as per instructions of Railway site in charge and repairing of masonry wall and cement plastering after the cable is taken inside the flexible HDPE pipe/G.I.Pipe with clamps as per drawing No. RE/S&T/ALD/SK/161/81.	No	573

11(a)	Transportation, installation of <b>optical fibre joint closure and splicing of Optical fibre cable (2 x 24 fibres) and testing</b> , Optical fibre cable splicing shall be done in the presence of Railway's representative. Only joint closure shall issued by the Railway. All other tools/test equipments required shall be arranged by the Contractor. This also includes excavation of earth for construction of masonry pit of bricks (inside complete plastered), the inner size of pit 1.2m x 1.2m (depth 0.75m) in all types of soils for keeping cable coils at the location of OFC joints, filling the pit with sand after jointing of cables, ramming and covering with RCC slab as per Drg. and instructions of site incharge of Railway.	No	19019
11(b)	Transportation, installation of <b>Optical Fibre termination box and splicing of Optic Fibre Cable (24 fibre)</b> inside the termination box with provision of taking out fibre of OFC as required. This includes supply of installation accesories (as required) as detailed in technical specification and advised by Railway's Engineer-at-site. This also includes End to End testing of all fibres of the optical fibre cable terminated between cable hut to cable hut of each station.	No	21705
12	Transportation & Execution of following kinds of <b>joints on Quad Cable using thermoshrink jointing kit</b> . This also includes excavation of cable joint pit of size 1.2m x 1.2m x 1.0m in all types of soil for jointing of copper cables, back filling and ramming after jointing.		
	(a) Derivation/ transformer joints with V.F. Transformers and derivation joint for L.C.Gate & Pump House on Quad/jelly filled Telecom Cable.	No	1993
	(b) <b>straight through joint on Quad cable/10-20-50 pairs PIJF Cable</b>	No	1385
13	<b>Transportation and fixing of following types of C.T.Box and termination of cable as per details of jointing schedule approved by the Railway Engineers.</b>		
	(a) <b>10 pair C.T.Box (wago type)</b>	No	792
	(b) <b>20 pair C.T.Box (wago type)</b>	No	792
	(c) <b>50 pair Cast Aluminium C.T.Box (Including supply and Inspection by representative of CSTE/ Con /BSP .)</b>	No	3803
14	Provision of <b>Earthing protection arrangement</b> as per RDSO drawing no. TCA 565 (Adv.). All the materials including earth electrodes required for the work to be supplied by the contractor.	No	8680
15	Supply transportation, fixing, wiring, termination of cable, erection of rail post of size 2.8mtrs including foundation of post in cement concrete (1:2:4) as per the direction of the site Engineer incharge of Railway, testing and commissioning of six pin emergency socket box complete cast iron make as per Drg. No. SE/T/50/76. This include transportation of rail posts (provided by the Railway) from Bilaspur or any place in the section to work site, fixing of 40 mm dia G.I.Pipe and emergency socket box. Cast iron emergency socket box with complete fittings are to be first supplied to the stores of SSE/T-W/BSP and then collected from there for execution. Supply of U-bolt for fixing emergency socket, cutting of Rails to the size and welding of G.I.Pipe on the rail post will be done by the Contractor. This work includes painting of rail posts with black and white paints after two times primer coating. <b>Note :- 10 Nos of emergency sockets with complete fittings including Cast iron box to be supplied extra as spare within the same cost.</b>	No	11504



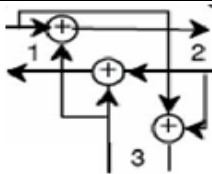
16	Transportation, <b>Wiring and installation of magneto telephone</b> at L.C.Gate/pump house or the places as advised by the site incharge.This includes supply and fixing of Telephone rack of approved design by the contractor.	No	990
17	<b>Dismantaling of unused/old emergency socket post</b> approximate dimention Height -1.25 mtr * cross section- 15 cm x15 cm (drg enclosed) and transportation from site to GSD store/Raipur, which includes excavation of soil/concrete to a depth of 15 cm from the surface and back filling and ramming after cutting the post.This is required to avoid projection of remain of post over the ground level.The contractor must ensure, that rail post shall be cut below the normal ground surface area.	No	892
18	<b>Shifting/ re-location</b> , fixing, erection of rail post of size 2.8mtrs and testing of <b>emergency socket</b> as per direction of site engineer of railway. This includes excavation of trenching for shifting the existing 10/20 PIJF cable, clearing of existing Rail post with foundation and re-erection of same rail post.	No	1053
19	Transportation, installation, testing & commissioning of 4W way station equipment DTMF type and way station 4W control telephone including termination of the electric wires, battery wires, switch board cable on the equipment. The termination shall be done using eyelets of required size. The way station equipments shall be fixed over the wall on board of approved design. Board and all the materials required for fixing and termination to be supplied by the contractor.	No	480
20	Transportation, installation and commissioning of 12V. Power supply unit for telecom installations at wayside stations on wall mounting stand of approved design including termination of Power supply cable all other materials required for fixing and termination to be supplied by the contractor.	No	480
21	Transportation, Installation & commissioning of SDH ADM, Primary D/I MUX with all accessories and power supply, racks, runway ladder etc. in cable huts including wiring of all the equipments up to C.T. Box install for Outdoor/ Derivation cables as per the requirement at each station. Note:- The work involves fixing of 19" rack,Installation & wiring of equipment connecting to 48 V. bus bar including supply of all wires and connectors. The equipment shall be mounted in shelves of standard 19" racks. All 21 E1 streams shall be suitably terminated on Digital Distribution Frame. All the wiring shall be done in accordance with wiring instructions given in as per Annexure-VII .	Stn	44126
22	Supply, Installation and commissioning of Surge & Lightning protection arrangement in the cable huts for all the equipments including all the circuits derived from MUX at the stations and Ring Earth (Six Earth pits). Each earth shall be as per RDSO Specification No.RDSO/SPN/197/2008 (drawings enclosed)	No	49643
23	Installation and commissioning of Fibre Distribution Frame.	No	944
24	Supply and fixing of PVC casing caping 25mm x 25mm size for indoor wiring. This includes drawal of wires in the casing caping and termination of wire at end point. The work should be carried out as per the instruction of Railway site Engineer.	Mtr	43
<b>Annexure-VII for item Sl. No. 21 of Schedule-C</b>			
<b>WIRING INSTRUCTIONS</b>			

	The schematic layout of the equipment rack and the appropriate protection arrangement, cable terminations, U-link panels if any, etc. shall be submitted by the Tenderer. The detailed layout design of the equipment rack shall be got approved by the contractor from the purchaser's Engineer well in advance.
	<ul style="list-style-type: none"> <li>• All the indoor cables/power supply wires/Patch cords/Pigtails etc. shall be taken through overhead aluminum ladder from equipment rack to the cable termination boxes. The width of this ladder shall not be less than 9 inches and aluminum angles (1.5"X1.5") and plates shall be approx. 3mm. thick.</li> </ul>
	<ul style="list-style-type: none"> <li>• The indoor wiring on wall shall be taken on suitable slotted PVC channels (min. 2"x 2") &amp; flexible PVC conduit as per instructions of Railway's Engineer in charge.</li> </ul>
	<ul style="list-style-type: none"> <li>• 48V DC supply from charger to battery shall be extended using 16 Sq. mm. stranded PVC insulated copper cable. All the power cables shall be color coded as per standard practices.</li> </ul>
	<ul style="list-style-type: none"> <li>• 48V DC supply shall be extended to equipment rack using 4 Sq. mm. stranded PVC insulated copper cable with standard color coding as per standard practices. The voltage drop from the load point to equipment rack shall not be more than 500 mV.</li> </ul>
	<ul style="list-style-type: none"> <li>• All power cable termination shall be done using suitable size of lugs.</li> </ul>
	<ul style="list-style-type: none"> <li>• AC &amp; DC power cable shall run through separate PVC conduits/channels.</li> </ul>
	<ul style="list-style-type: none"> <li>• The DTMF way station equipments and 12 V power supply units shall be mounted on 16mm thick white laminated board fixed on the wall through 3mm thick mild steel angles as per instructions of Railway's engineer at site. The angles shall be painted in black.</li> </ul>
	<ul style="list-style-type: none"> <li>• Arrangements shall be made for mounting Fibre Distribution Frame and Fibre Termination Box at appropriate place on the rack so as to avoid exposure of pigtails from rodent attacks.</li> </ul>
	<ul style="list-style-type: none"> <li>• Necessary mounting accessories for mounting of transformers and U-Link panels shall be provided by the contractor</li> </ul>
	<ul style="list-style-type: none"> <li>• The protection against surge, transients and lightening should be graded and provided at 230V AC input to the battery charger ('X' Protection), 48V DC input to the equipments ('y' Protection) and channel level output from the equipment for extending telephone circuits etc, ('Z' Protection) , Gas Discharge tubes in tandem with MOVs of appropriate capacity shall be provided.</li> </ul>
	The contractor shall do ring earthing as per enclosed drawing and specification. The recommended value of earth resistance is not more than one ohm. All the materials required for earthing i.e. earth electrode, bus-bar, interconnecting cable, charcoal, common salt etc. required for the work should be supplied by the contractor as per enclosed drawing and specifications

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<b><u>SOUTH EAST CENTRAL RAILWAY</u></b>			
<b><u>SCHEDULE - 'D'</u></b>			
<b><u>(Supply of Telecom materials)</u></b>			
<b>NOTE:</b>			
1	Only those materials to be supplied by the Contractor under Schedule-D shall be issued by the Railway for execution of work. Any other material required for the work unless specifically mentioned shall be arranged by the Contractor at no extra cost.		
2	Telecom item having RDSO specification will be inspected by RDSO provided the order value is more than Rs. Five Lakh as mentioned vide Railway Board's letter No. 2000/RG(G)/379/2 Dt. 06.09.2017.		
3	The Materials which is to be inspected by RDSO should be supplied from RDSO approved vendors.		
Sl No.	Description of Materials	Unit	Rate
1	Supply of <b>Optical fibre joint closure for straight</b> through joint with modification for 24 fibre OFC as per Specification. No. RDSO/SPN/TC/68/2013 (with latest amendment) complete with all accessories ( <b>sealing with mechanical clamp facility</b> ) make Raychem or similar. <b>Inspection by RITES.</b>	No	3483
2	Supply of Optical fibre termination box for 2 x 24 fibre armoured cable complete with all accessories with the fixing arrangement to accommodate all the fibres as per specification No. IRS:TC:81-2000 (with latest amendment). <b>Inspection by Rep. of Railway Engineer.</b>	No	4057
3	Supply of Universal thermoshrink jointing kit for derivation/ transformer joint for Jelly filled Six quad cable conforming to RDSO Spec.No :IRS-TC-77/2006(Rev.1) (With latest amendment). <b>Inspection by RDSO.</b>	No	3425
4	Supply of Thermoshrink jointing kit for 10/20/50 pair Jelly filled cable conforming to RDSO Spec.No.RDSO/SPN/TC/57/2006 (Rev.0) (With latest amendment). <b>Inspection by RDSO.</b>	No	3425
5	(a) Supply of VF Tapping Transformer 1120:470 (rack mountable) as per specification No. IRS-TC-22/76(With latest amendment). <b>Inspection by RDSO.</b>	No	1037
	(b) Supply of VF Tapping Transformer 1120:1120 (rack mountable) as per specification No. IRS-TC-22/76(With latest amendment). <b>Inspection by RDSO.</b>	No	1120
	(c) Supply of VF Tapping Transformer 1120:600 (rack mountable) as per specification No. IRS-TC-22/76(With latest amendment). <b>Inspection by RDSO.</b>	No	1120
6	Supply of permanently lubricated HDPE pipe with outer dia 50mm, inner dia - 42mm thickness - 4mm with suitable couplers, plugs, end caps etc. as per technical specification No. G/CDS-08/01 Dec. 1999. Supply to be made in length of 500 mtrs with + /-10% tolerance. <b>Inspection by RITES.</b>	Km	99200
7	Supply of 4 wire Way-station Control Equipment DTMF type as per IRS Spec. No. : TC 60/2007(with latest amendment) including way station control telephone as per RDSO spec. no.IRS TC 38-97(latest amendment). <b>Inspection by RDSO.</b>	No	6657
8	Supply of 12 V. Power supply unit for Telecom. Installation for way-side equipment in 25 KV Electrified area suitable for 6 equipment of DTMF type as per IRS Spec. No : TC 72-97(with latest amendment) including 12V, 7AH maintenance free battery. <b>Inspection by Rep. of Railway Engineer.</b>	No	7456
9	Supply of one quad VF transformer assembly 2T for quad cable (470 : 1120) for derivation joints to specification No. IRS-TC-76/2000(With latest amendment). <b>Inspection by RDSO.</b>	No	1892
10	Supply of loose tube fibre pigtail with FC/PC connector at one end each of 8 Mtrs. Length as per TEC Specification No. G/OFJ-01/03 JUN 99 (With latest amendment). <b>Inspection by RITES.</b>	No	1352
11	Supply of following type of Wago Make Terminal block(with lever type disconnection & reconnection facility) duly fitted in C.T. box of approved quality, suitable for termination of 0.9mm wire. <b>Inspection by Rep. of Railway Engineer.</b>		
	(a) 10 Pair	No	1817
	(b) 20 Pair	No	2865

12	Supply of following types of twisted pair PVC switch board cable, conductor of size 0.6mm. dia annealed copper conforming to IRS-TC-24/91 or ITD 1138. <b>Inspection by Rep. of Railway Engineer.</b>		
	(a) 5 pair	Mtr	24
	(b) 10 pair	Mtr	39
	(c) 20 pair .	Mtr	66
13	(i) Motorola VHF Mobile Synthesized Trans-receiver, Model-GM-339, 146 to 174 MHz frequency range 16 programmable channels, 25 watt RF power out put maximum 2/5 KHz channel spacing compact palm microphone, Cable and hang up clip, non locking mounting bracket power cable, limited accessory connectors front facing internal speaker operators handbook mini UHF Male to Female adaptor (Antenna) is not included.. <b>Inspection by RITES.</b>		
	(ii) 1/4 wave VHF rooftop mount mobile whip Antenna with mounting bracket 30 Mtr cable and mini UHF connector.		
	(iii) 3 DB gain VHF roof top mount mobile whip Antenna with mounting bracket 30 Mtr. Cable and mini UHF connector.		
		Set	30222
14	Supply of managed expandable rack type STM-4, equipped STM-1, ADM S1.1, as per technical Specification no. TEC GR NO. GR/SDH-10/02 March 05 (with latest amendment) with 2 Nos. STM-1 aggregate Optical interface upgradable to STM-4, 21 E1s, and minimum 8 Nos. of 10/100 base T Ethernet port, Orderwire, Power supply unit, subrack, DDF, Installation materials, manuals and other accessories . The equipment should be TEC/BSNL/RDSO approved .The equipment should be fully wired for its ultimate capacity and provide redundancy for Power supply and Synchronisation. It shall be possible to use the full capacity of the equipment by adding additional tributary cards. The upgradation of STM-1 to STM-4 shall be without change of any internal hardware of the STM equipment. The STM equipment shall have in-built L2 switch for Ethernet ports. Make -Tejas, compatible to existing STM System in the section. <b>Inspection by RDSO.</b>	No	311694
15	Supply of programmable Primary Digital Drop Insert Multiplexer complete with all accessories from RDSO approved vendor as per RDSO specification IRS TC 68-12 (with latest amendment) including connectors and cables required for installation including 100 pair Krone type MDF. Each channel card shall have minimum four channels per card. The single sub rack shall be capable of being equipped up to min. 60 Channels without additional power supply unit. Specification as per <b>Annexure I</b> . The MUX shall be wired & equipped for 30 channels, with following circuits:- 16 Nos. VF 2W/4W E & M circuits, 8 nos. of 2 wire FXO circuits, 6 Nos. 2W.Subs/Hotline circuits along with ringer card., compatible to existing PUNCOM make MUX. <b>Inspection by RDSO.</b>	No	217922
16	Supply of covered 19" racks (2200MM(H)X600MM(W)X600MM(D).) complete with all fittings for housing the sub-rack SDH ADMs & PD MUXs( as per instruction of railway ) fully wired including Power Supply Distribution system, rack exhaust fan(48vdc) and other installation accessories for installation. Note : It should have door on both sides with locking arrangement. (Make: APW or RITTAL or similar) <b>Inspection by RITES.</b>	No	62049
17	Supply of SMPS based battery chargers for telecom use 48 volts, 25 Amps in 1+1 configuration modules of 25 Amps each with automatic switching between the modules as per RDSO Specification no. RDSO/SPN/TL/23/99/V3 (with latest amendment) along with two potential free contacts for monitoring AC/DC failure through EMS. Preferably Amaraja or Statcon make. <b>Inspection by RDSO.</b>	No	135332
18	Supply of 48 Volt,200 AH maintenance free VRLA batteries duly charged as per specification no. IRS:S-93/96A (with latest amendment). <b>Inspection by RDSO.</b>	Set	137067
19	Supply of Fibre Distribution Frame (24 Fibre) as per RDSO specification No. 81-2000 (Part-D) (with latest amendment) including 24 Nos. FCPC adopter. <b>Inspection by RDSO.</b>	No	4280
20	Supply of UTP CAT 6 Cable (Roll is 305 Mtr). Make Amp or Molex. <b>Inspection by Rep. of Railway Engineer.</b>	Mtr	37
	<b>Annexure-I for item Sl. No. 15 of Schedule-D</b>		
	<b>PRIMARY DIGITAL DROP INSERT MUX:</b>		

	The MUX shall be programmable drop insert MUX with conference facility and shall have the facility of Network Monitoring and control (Clause 6.7 IRS- TC-68-04) The PD MUX shall be equipped and completely wired for 30 channels or latest. The Primary digital MUX shall conform to RDSO specification IRS TC 68-04 and shall fulfill the following requirements:
	1. The MUX Sub rack shall have minimum 16 slots to support up to minimum 60 Channels without additional Power supply unit and Ringer unit to give full flexibility for installation, channel programming and future expansion. The channel side interface cards shall be installed station wise as per the requirement. It shall also be possible to extend the services of one sub rack to another sub rack.
	2. The offered Primary Multiplexer and channel unit should work on Distributed Power Supply i.e. each card including system cards and channel interfacing cards of the MUX shall have circuitry within built DC-DC converter.
	3. All the cards shall be completely software programmable. There shall be no jumper or switch settings or other hardware settings. Software can be changed to realize above mentioned configurations. It shall be possible to configure the transmit levels and receive levels for the voice channels/circuits via software. The systems in the network shall be manageable through the central NMS as well as via LCT.
	4. Channel units associated with primary multiplexer shall be hot replaceable with out disturbing the operation of primary multiplexer. It shall be possible to remove and insert any card without the need of switching off the power supply. It shall also not interrupt the traffic anywhere else except for the affected card. Failure of any channel unit associated with Primary multiplexer, shall not affect the operation of primary multiplexer.
	5. It shall be possible to increase the capacity by addition of the modules. All capacity expansion shall be non disruptive to existing traffic under all circumstances. Capacity expansion shall not need powering off of the equipment.
	6. The configuration of the 2 Mbit/s Primary Multiplexer system shall be based on Loop-Protected system. The hardware of primary multiplexer offered shall support the following functionalities along with voiced and data channel units ;
	• Terminal Multiplexer
	• Protected terminal multiplexer
	• Drop/Insert and Bypass multiplexer
	• Loop-Protected multiplexer
	7. The offered Primary Multiplexer and various channel units shall be capable of functioning with Power Supply Range of 36 to -72 VDC.
	8. Drop/Insert Primary Multiplexer shall support Omnibus operation of Voice (in digital format) and Data channel in following fashion:
	
	9. Primary Multiplexer shall support thirty (30) three way omnibus channel configuration between tributary A & Tributary B and Drop timeslots, irrespective of timeslot content (either voice or SCADA/data).
	10. Primary Multiplexer shall have cross-connection granularity of $n \times 8$ Kbit/s.
	11. Maintenance shall be possible on all aggregate and channel links through loop backs.
	12. The input 2Mbps ports shall be for 120 Ohm, balanced input. The length of channel O/P cables shall be min. eight meters for flexibility of MDF mounting in Termination rack.

SOUTH EAST CENTRAL RAILWAY			
SCHEDULE -'E'			
( Execution & Supply of new Electronic Interlocking/SSI System )			
Sl. No.	Description	Unit	Rate
1	Design, manufacture and <b>supply of Electronic Interlocking (EI) system</b> complete as per RDSO specification no. <b>RDSO/SPN/192/2005</b> with latest amendment, and special conditions of contract mainly consisting of Central processing equipment, Interfacing Equipment/ Relays as per RE requirements and hot standby with Dual VDU [two nos. of industrial grade high resolution VDUs (54" or higher size-4K) conforming to SIL-II certification for operator console at central location, Interfacing Relays, Interconnecting cables and jumper wires, three nos. of Maintenance Terminals (PC & VDU as maintenance console-42" (Industry standard PC) along with laser printer at central & end goomties locations housing for EI Equipments and Relay Racks, Fixture, Class 'A' protection at each SSI room/goomty, mounting arrangements and accessories necessary to make the EI system functional, Tentative SIP is enclosed for station. This provision of hot-standby arrangement must have the supply, installation and commissioning of associated cards for the above arrangement such as communication card, synchronization card and others cards as required with supply & installation of supporting software and drives etc. also Optical Fiber link with loop back (Protection ring) between center to end goomties. (Detail connectivity of EI's through OFC between center to two end goomties are enclosed). (Module wise rates, inspection authority and quantity has to be enclosed in a separate sheet, without which offer will not be considered.) Embedded industrial grade fan less PCs should be of rugged and reliable type like MOXA series V 2406, Kontron MPCX28R, MEN BC50M or latest with compact flash drives in non-AC and in normal environment to be used. Minimum requirement of Embedded PC for EI shall be as per RDSO TAN no. STS/E/TAN/3007 dated 2.11.12 (General requirement is enclosed in <b>Annexure 'A'</b> ). The optical fiber connectivity with fiber management and diagnostic analysis system shall be provided to connect EI with SM room PC terminal. All interface relays for EI shall be supplied by Railways. Supply of essential spares (10% of main equipment module against the no.-1.). (Module wise rates, inspection authority and quantity should be given in separate sheet.). Supply and installation of one PC based work station for data input and configuration, simulation and functional testing, diagnostic & trouble shooting and commissioning of EI System. Instruments and Tool Kits required for trouble shooting and repair of hardware and software.		
	Less than 100 Routes	Per Bit	96,724
	More than 100 Routes	Per Bit	83,589
2	Installation, wiring, Programming, testing (FAT & SAT) and <b>commissioning of EI equipment supplied</b> as per item no.1 above including transportation from consignee depot to site as per original manufacturer's specifications & RDSO specification STE/E/TAN/3012 dt 28.4.2014 or latest and provision of NMS for OFC as per TAN no/STS/E/TAN/3012 under supervision of OEM's Engineer / authorised representative. This also cover the installation of networking of datalogger.		
		System	6,25,674
3	Earthing of EI equipment, relay rack and power equipment etc to be done along with the supply of all requisite materials, earthing shall be in the form of Ring Earth conforming to RDSO spec RDSO/SPN/197/2008 (with a minimum 6 maintenance free earth electrodes) using copper rings with earth resistance less than 1 ohm. The earthing shall be maintenance free. The ring earth shall be connected to copper flat of size 25x3 mm in the relay room and IPS room. The copper flat fixed on the wall to the entire breadth of Relay room and IPS room as an earth bus bar and all earth connections shall be taken from it. A, B, C & D class protection shall be provided for all EI equipment.		
		Job	1,45,808
4	Supply of <b>completion drawings and documents of 02 sets</b> as per special condition of contract.		
		Route per	583
5	<b>Training of Railway personnel</b> in installation, commissioning, testing, trouble shooting, repairing, modification & alteration in EI system, including supply of hard copies of course module, etc. at site and OEM's manufacturing/production premises.		
		Man/D	1,275



	<b>NOTE:</b>
1	Before placing order for all the materials to the firms concerned, Prior approval to be obtained from Railway 's
	<b>REQUIREMENTS OF ELECTRONIC INTERLOCKING SYSTEM</b>
	1. The Electronic Interlocking System supplied shall have approval of RDSO as per specification no. RDSO/SPN/192/2005 or with latest amendment.
	2. The Electronic Interlocking System shall be complete with power supply arrangement.
	3. The equipment shall be provided with all the necessary and recommended protection devices for lightening and surge protection.
	4. Tenderer shall ensure that the installation of Electronic Interlocking System equipment shall be done by manufacturer of the equipment/their authorized technical staff.
	5. Necessary technical documents, installation & maintenance manuals, trouble shooting procedure details and any other required technical information regarding Electronic Interlocking System supplied shall be provided to ensure proper installation/ maintenance/repair of Electronic Interlocking System as per manufacturer's
	6. Tenderer shall provide training of Railway's officials in software and hardware to enable maintenance of supplied Electronic Interlocking System. The quality of training should be such that at the end of the training the Railway officials will be able to install/commission and maintain the equipment. They shall be trained in all aspect of system design, engineering inspection, testing, execution, commissioning, fault diagnosis operation and maintenance of the system as whole and also all constituent equipments. Training shall be imparted preferable at work site/Railway depot nominated by engineer in charge / manufacturer's premises. Training material shall be supplied by the contractor.
	7. Tenderer should submit authorization from <b>Original Equipment Manufacturer</b> to supply equipment against this tender, if awarded.
	8. Tenderer should submit the commitment from <b>Original Equipment Manufacturer</b> for supply of spares if required, for next five years, if awarded.
	<b>Annexure-A for Item Sl. No.1 of Electronics Interlocking (EI) System</b>
	<b>Minimum requirement of Embedded PC for Electronics Interlocking (EI)</b>
	<b>CPU</b> : AMD T52R 1.5 GHz or Intel Atom N270 1.6 GHz processor or Intel ® Atom™ Z530 1.6 GHz or above or better
	<b>OS (Pre-installed)</b> : Linux or Windows Embedded Standard 2009 or above/better version OS
	<b>System Memory</b> : 1 X 200-pin DDR2 SODIMM socket support DDR2 533 up to 1GB, built in 1 GB minimum
	<b>Storage</b> :
	Built-in - 40 GB Onboard Industrial DOM to store OS minimum
	<b>Other Peripherals</b> :
	<b>KB/MS</b> : 1 PS/2 interface supporting standard PS/2 keyboard and mouse through Y-type cable or USB mouse.
	<b>Audio</b> : Line-in, Line-out interface
	<b>* Display</b>
	<b>* Ethernet Interface</b>
	<b>LAN</b> : 2 auto sensing 10/100 Mbps ports (M12)
	<b>* Serial Interface</b>
	Serial Standards : 4 RS-232/422/485 ports* * software selectable (DB9 male)
	<b>* Environmental Limits</b>
	Operating Temperature : Wide temp. Models: 10 to 70 °C (40 to 158°F)
	Ambient Relative Humidity : 5 to 95% (non condensing)
	Anti vibration : EN 50155 Standard, (Railway Applications - Electronic Equipment on Rolling Stock)
	Anti shock : EN 50155 Standard (Railway Applications - Electronic Equipment on Rolling Stock0)
	<b>* Power Requirements</b>
	Input Voltage : 9-36 or 12 to 48 VDC, Note: Compliant with EN 50155 on 24 VDC
	<b>* Standards and Certifications</b> :
	Rail Traffic : EN 50155 (Railway Applications - Electronic Equipment on Rolling Stock)
	<b>* Warranty</b>
	Warranty Period : 2 years and supplier to give additional 3 years.
	Fan less : Yes

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**ISSUED BY :**  
**SIGNAL & TELECOMMUNICATION DEPARTMENT**  
**SOUTH EAST CENTRAL RAILWAY**