PHOOLTAS

PHOOLTAS TRANSRAIL LIMITED

RAIL BOUND MOBILE VEHICLE (8 -WHEELER)

MODEL : RBMV.02.B

G A U G E : 1676 mm

OPERATION MANUAL

REFERENCE NO. OM/302B/3K23, REV.:-00

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1. INTRODUCTION

PHOOLTAS make Rail Bound Mobile Vehicle with MMU equipment (Model-RBMV.02.B) is a 8 Wheeler, twin power pack, self-propelled car. RBMV is idle vehicle for rail track civil maintenance work to run on B.G schedule of DFCC network. RBMV has been provided with hydraulic knuckle boom crane (Total 2 Nos) i e, one no. each end on RBMV. RBMV and its mounted cranes are suitable to load – unload rail maintenance material at required site from loading platform and attached BFRS which are usually used for shipping at track site construction and maintenance work. RBMV is equipped with multiple maintenance units (MMU) and various other necessary tools & spares which are used in emergency and routine maintenance-inspection of track. Therefore proper maintenance of RBMV is necessary to ensure the reliability and availability in emergency and for regular maintenance work of track. This Operation and Maintenance manual of 8 Wheeler RBMV has been prepared with the objective of making operating personnel aware to correct operation and maintenance techniques adopted in field.

This vehicle has been provided with two knuckle boom crane with load lifting capacity (1 ton at 15M reach), suitable storage rack, cubical, cupboards, pigeon box for MMU tools and spares track maintenance work. Vehicle has been equipped with A.C cabins for Crew and drivers which is an ideal vehicle for RBMV work.

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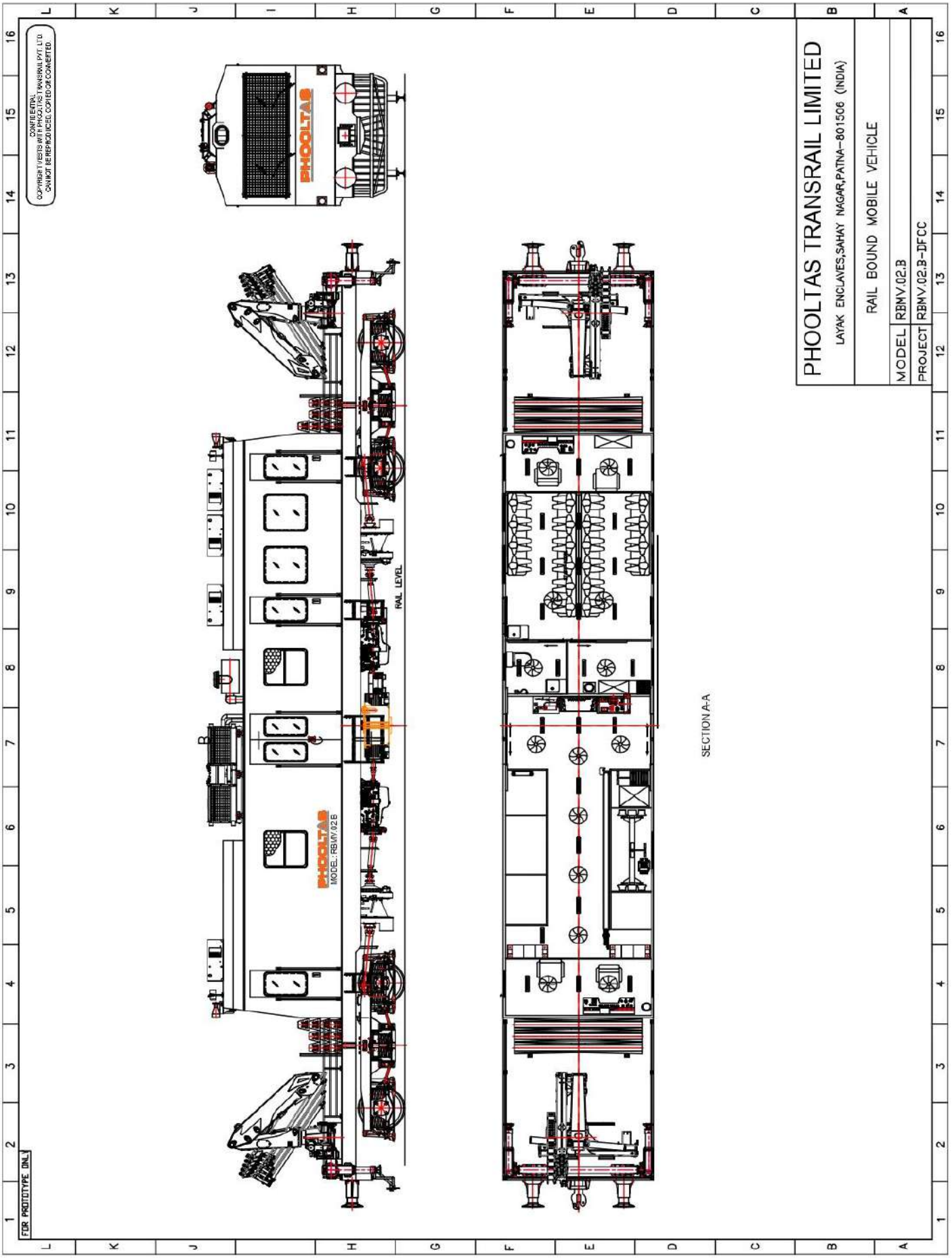
PHOOLTAS TRANSRAIL LIMITED
LAYAK ENCLAVES,SAHAY NAGAR,PATNA–801506 (INDIA)
RAIL BOUND MOBILE VEHICLE
MODEL RBMV.02.B
PROJECT RBMV.02.B-DFCC
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PHOOLTAS
MODEL: RBMV.02.B
RAIL LEVEL
SECTION A-A

G.A LAYOUT

3. GENERAL LAYOUT

S. No.	Components	Qty.
1.	Engine	02
2.	Transmission	02
3.	Cardan Shaft – 1 (Trans To ADGB)	02
4.	Cardan Shaft – 2 (Engine To Trans)	02
5.	Cardan Shaft – (Auxiliary Alt. Drive)	02
6.	Axle Drive Gear Box (Hydrodynamic Drive)	02
7.	Bogie	02
8.	Wheel	08
9.	Coil Spring Suspension Assembly	08
10.	Clasp Type Brake Assembly	08
11.	Air Cleaners	02
12.	Radiator, Roof Mounted	01
13.	Air Compressor (Engine Mounted)	02
14.	Auxiliary Alternators, Kel 4.5 Kw, 110v/ Equivalent	02
15.	Hydraulic Tank With Oil Cooler	01
16.	Coolant Tank 100 Lts. With Water Fitting Arrangement To Radiator	01
17.	Water Raising Apparatus	01
18.	Fuel Tank – 700 Ltrs.	01
19.	110v Battery Box	01
20.	T.C Cooler	02
21.	Driver's Seat	02
22.	Cattle Guard	02
23.	Control Panel	02
24.	Foldable Seats	02
25.	Fixed Railing	12
26.	Camera	02
27.	Horn	02
28.	Stabilizers	04
29.	Hand Holds	16
30.	Flasher Lights	02
31.	Foot Steps	08
32.	Tool Box	02
33.	Crew Seats	20
34.	C.B.C Couplers	02
35.	Fire Extinguishers	02
36.	Crane	02
37.	Air Conditioner	04
38.	Buffers	04
39.	Marker Light	04
40.	Lifting Bracket	04
41.	Electrical Wiper And Washer Assembly (2 Front & 2 Rear)	04
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47.	Swing Door (Cabin & Staff Room)	06
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4. GENERAL

This manual is required to pay attention and followed by the operator and supervisor for ensuring efficient and trouble-free operation of the plant.

This manual is required to be carefully preserved for all the time along vehicle, so that, whenever it become necessary, it can be referred for operational pre-requisites and recommended maintenance instructions and schedules.

SAFETY RULES

Most accidents are caused by someone due to failure of following simple and fundamental safety rules or precautions.

Regardless of the care used in the design and construction of the machinery, there are many points that cannot be completely safeguarded.

A careful operator is the best insurance against an accident.

THE COMPLETE OBSERVANCE OF ONE SIMPLE RULE WOULD PREVENT MANY SERIOUS ACCIDENTS.

THE RULE IS

NEVER ATTEMPT TO CLEAN OIL, OR ADJUST ANY MACHINE PART WHILE IT IS IN MOTION.

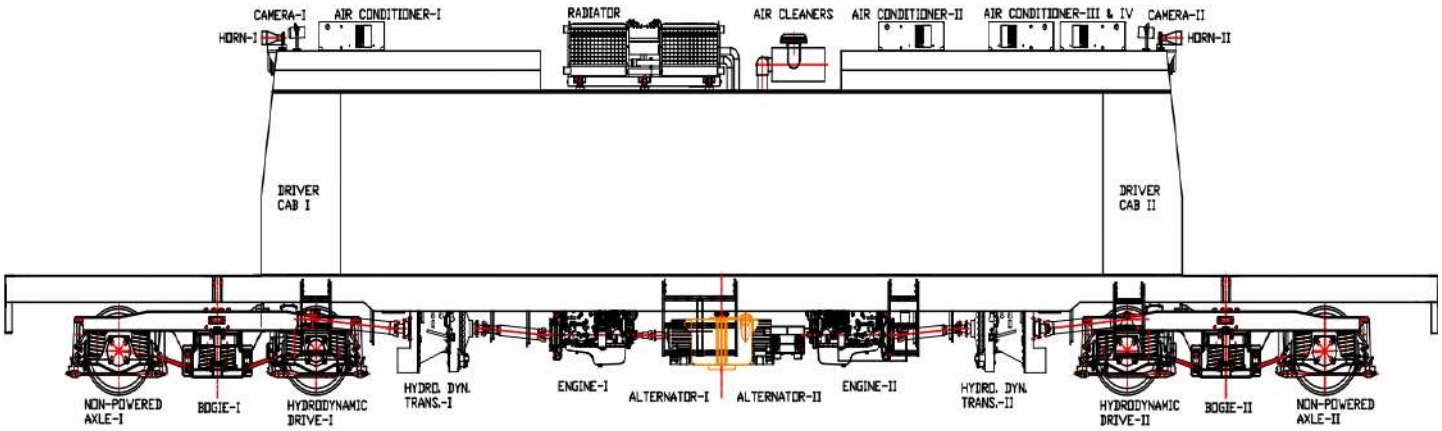
5. Vehicle Basic Data

1	Track gauge	1676 mm
2	Overall length	21000 (Over body)
3	Overall width	3245 mm
4	Overall height	4245 mm
5	Wheel Base	14783 (CRS of bogie) 2896 (Bogie wheel base)
6	Max. weight	68 000 kg (Tare) 80 000 kg (Gross)
7	No. of Axles	4 (2 Powered & 2 Non-Powered) (Bo- Bo type)
8	Maximum Axle load	20 tons
9	Wheel diameter	952 mm
10	Engine Power	450 HP x 2 Nos.
11	Maximum Operating Speed	100 km/h on level track (Hydrodynamic)
12	Curve	10 deg.
13	Super elevation	185 mm
14	Maximum cant deficiency	100 mm
15	Grade ability	3% with trailing load
16	Crane	Hydraulic knuckle boom crane floor mounted having 360 degree slewing with lifting capacity of 1000 kgs. at 15 mtrs radius with feature with height and slew restriction. Control Radio remote and manual. Accessories lifting hook.

6. POWER TRAIN

The Power Train of the 'PHOOLTAS' RBMV is provided with twin power packs, each consisting of the following:

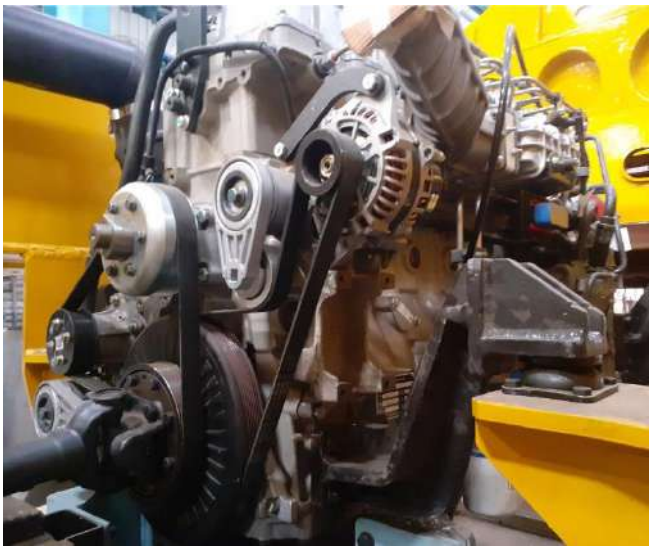
Power from the Engines are transmitted to the attached Hydrodynamic, Driven axle drive gear boxes through Carden Shafts to powered bogies either side.



6.1) ENGINE & ACCESSORIES

The RBMV is powered by a diesel engine of Ashok Leyland make, model NEP.-6 developing 450 HP at 2200 rpm. The engine is equipped with a suitable flywheel and flywheel housing to match the Hydrodynamic Transmission. The engine is suitably matched with the torque converter.

A.L Engine (i)



A.L Engine (ii)

6.2) AIR INTAKE

The air intake of the engines are equipped with and air cleaner and roof mounted composite radiator with charge air cooler (CAC) which provides cooler, sensor I take of air for more efficient combustion and reduced internal stresses for longer life.

Air Intake

6.3) ENGINE LUBRICATION

The engine lubricating system comprises of an oil-sump, integral engine lubrication pump oil pump, full flow lube oil-filter and a lube oil cooler. The lubricating system is suitably pressurized.

Engine lubrication

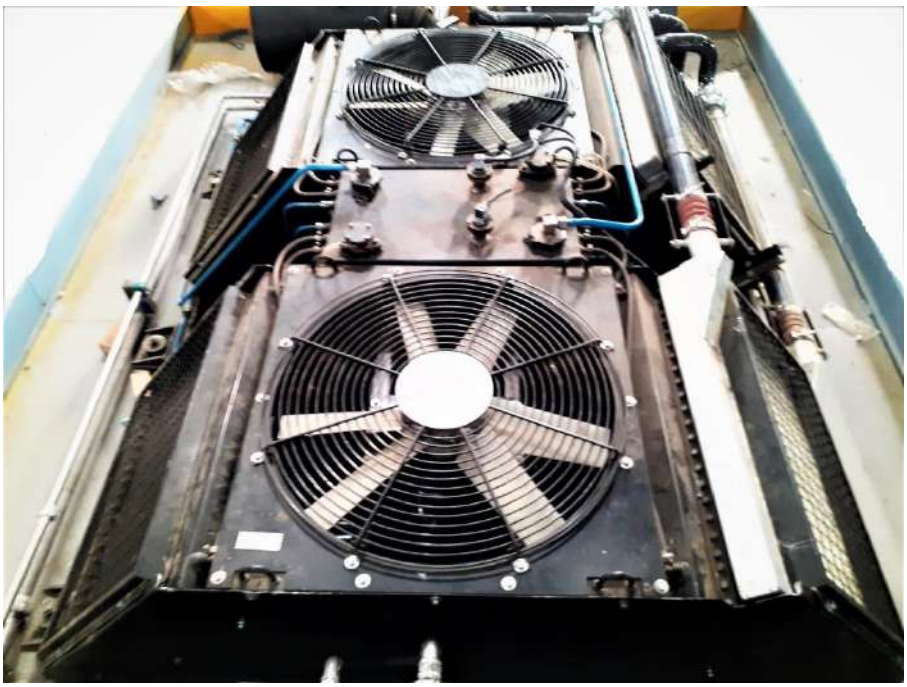
6.4) EXHAUST

The engine exhaust is discharged onto the track through an exhaust manifold and an axial flow silencer. Care is taken to limit the exhaust back pressure to a pre-determined value to ensure optimum engine performance and prevent over-heating.

Silencer

6.5) COOLING SYSTEM

The cooling system serves to protect the Engine and Hydrodynamic transmission (engine oil and transmission oil) against over-heating and ensures optimum performance by regulating the operating temperature to the prescribed limits. Cooling water from the engine flows into the radiator. The water is cooled due to air-flow across the radiator. The cooled water maintains the lube oil temperature within the prescribed limits. The hot Transmission oil flow is cooled by engine coolant in line mounted T.C. oil cooler. The cooling system also incorporates a water pump and a thermostat. The system is adequately vented and pressurized to prevent any possibility of cavitation.
A battery operated coolant-raising pump with coolant tank is provided to fill coolant in radiator as required.



Radiator

6.6) ENGINE FUEL SYSTEM

A bigger diesels tank with suction strainer, water separator with hand prime pump, and fuel line filter are provided for both engines.

Engine fuel system

6.7) ELECTRICALS

i. The engine starting and its electronics and E.C.U control system is 24V D.C comprising of battery bank, charging alternators of 100 amps capacity and electric starter.
ii. RBMV has 110V Aux. Alternator and battery 120 A.H for Aux. Electrical loaded

6.8) ENGINE CONTROLS

The engine is equipped with electronics throttle, C.C.U unit , E.C.U. unit, power changed over, relay box electronic display unit with RPM, oil pressure, battery charging indicator, water temperature and engine safety switches, low coolant level indicator and others control.

C.C.U

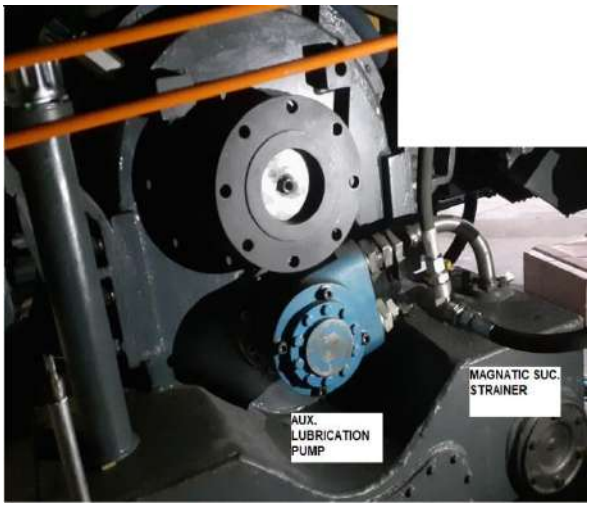
E.C.U

6.9) HYDRODYNAMIC TRANSMISSION

Each Engine CRT 5633 of AVTEC Make, Hydrodynamic Transmission that allows for nearly equal speeds in forward and reverse directions. The transmission is matched with the engine. The gear shifting from low to high & vice versa automatic and manual feature has been provided. The transmission are remotely mounted. Engine has a standard Fly wheel & housing with flexible coupling to drive cardan shaft connected to hydrodynamic transmission input which allow smooth torque transmission at full power. The transmission is provided with an output flange connected to the Axle Drive Gear box mounted on the inner axle of both bogies through suitable cardan shafts. The heat generated in the transmission oil is dissipated through T.C- oil cooler in radiator coolant.

Hydrodynamic transmission has integral oil sump with Aux. Lubricating oil pump.
Hydraulic power provided to radiator fan drive hydraulic motor and hydraulic crane by hydraulic pumps mounted on transmission P.T.O's

Hydrodynamic Transmission



Transmission Aux. Lubrication pump

6.10) P.T.O GEAR BOX FOR CRANE DRIVE PUMP

Transmission side window has been provided with a P.T.O gear box which drives hydraulic pump for crane operation.

PTO Gear Box for Crane Drive Pump

Crane Drive Pump

6.11) TRANSMISSION TO ADGB COUPLING

Transmission to axle drive gear box is powered by robust cardan shaft.

Cardan shaft

6.12) ENGINE TO TRANSMISSION COUPLING

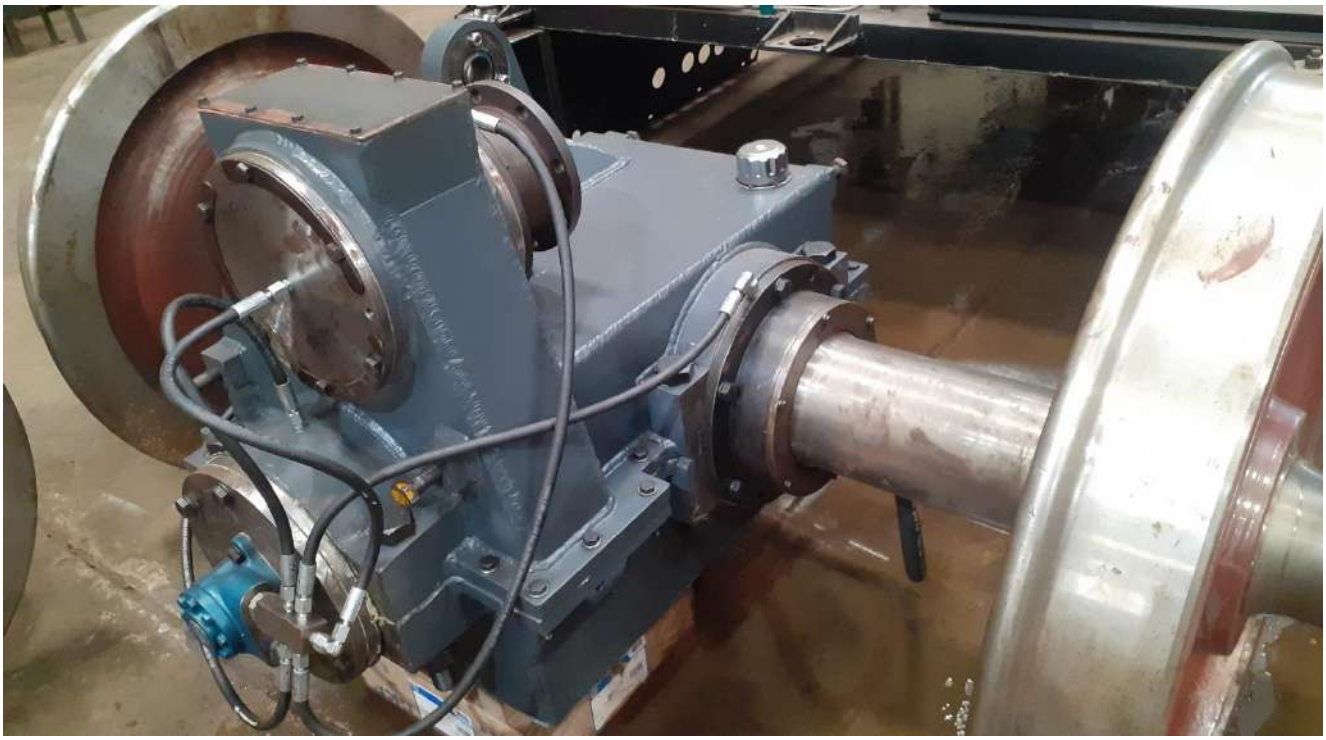
A Vulcan flexible coupling is fitted engine. A suitable cardan shaft is connected to this flexible coupling and transmission input flange.

Vulcan flexible coupling

Cardan shaft

6.13) POWERED AXLE WITH AXLE DRIVE GEAR BOXE WITH WHEEL AND AXLE BOX (HYDRODYNAMIC DRIVEN)

The Axle Drive Gearbox is of double reduction type consisting of a helical spur gear primary stage and a spiral bevel crown gear fitted on to the Axle. Power from the Cardan Shaft is transmitted to the crown gears through the bevel pinion through the primary spur gear reduction.



Wheels, Axles, Axle Boxes And ADGB Hydrodynamic

WHEELS

The RBMV has 8 wheels of 952 mm diameter confirming to IRS-19/93. The wheels are of solid rolled type. The wheel profile confirm to RDSO Drg. No. SK-91146. The wheels are hydraulically pressed onto the axle. The RBMV is a 8 Axle Vehicle with each inner axles are powered of both bogies and each outer axle are non-powered. The powered axles conform to IRS-43-92. Adequate precautions are taken during the design to account for the shocks and stresses to which the axle is subjected.

AXLE BOXES

Each axle box is provided with one spherical Roller bearing encased in end covers for protection against dust, weather etc. Axle box Construction is wing type standard for IR which has seats for helical coil springs, and guide- ways for the suspension system. Both lateral and longitudinal guidance is provided at the axle box.

TORQUE ARM

Torque arms are provided over the axle drive gear boxes to provide a reaction against twisting action.

One end of each arm is connected to the respective axle-drive-gear box body bracket through a radial spherical bearing and the other end is connected to the under frame through suitable rubber elements.

6.14) NON-POWERED AXLE WITH WHEEL AND AXLE BOX

Non-powered axle wheel Assembly Is fitted with each bogie as vehicle load shearing and brake performing. Each component in bogie's are fitted with as per IR standard.

NON-POWERED

WHEELS

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6.15) VEHICLE MOUNTED CRANE

Knuckle Boom crane capacity (Lift-1000kg at 15meters radius) Hydraulic knuckle boom crane has been mounted on floor (1nos each end of vehicle) with material lifting hook. Crane operation control is made by radio remote control, during failure of electronic control a manual lever operation of crane control feature is also available.

Any further information refer to hydrolift crane manual.

Knuckle Boom Crane

Crane Control Panel

6.16) CREW CABIN

One air condition crew cabin with seat & berth has been provided for crew comfort.

6.17) MATERIAL CABIN

Suitable storage rack for efficiency multiplier tools like abrasive rail cutter, heck saw rail cutter, drilling machine, chamfering kit, rail tensor, horizontal rail bender, rail straightener, sleeper space adjuster, concrete sleeper breaker with grinder, concrete sleeper drilling machine, hydraulic extractor of ERC, set of Jacks, Thermit welding suitable, weld trimmer, gas cutting etc.

6.18) BIO TOILET & PANTRY

Vehicle has been provided with one no. Bio Toilet & one pantry compartment for crew comfort. Water storage tank has been provided on roof top with water filling arrangement from either side has been arrange through check valve & water inlet neck.

6.19) GEN SET 3 KVA 220V AC (SINGLE PHASE)

A portable 3KVA genset is provided for hand drill tool & pantry equipment.

3 KVA 220V AC single phase dg set

6.20) UNDERFRAME

The under-frame is of structural steel. It is designed to withstand static and dynamic stresses under loaded conditions. Suitable camber is provided to compensate for deflection under load. All the principal assemblies are located on the under-frame to achieve longitudinal and lateral balancing, The RBMV under-frame is capable to withstand required end load applied at the buffer in gross condition.

The under-frame is fitted with component CBC & Buffers at both ends. The vehicle is designed to with stand a horizontal squeeze load of 102 tons applied at buffers.
Lifting pads and jacking-points are provided at suitable locations on the under-frame.
All steel used is as per IRS / RDSO Specifications.

6.21) BODY

The Body structure is made of pressed steel members or any other suitable material of required cross-sections as per IRS / RDSO Standards, welded together to form a firm and rigid structure, capable of withstanding the specified loads.
Free circulation of air is ensured between the outer-sheet and the inner paneling. Crew & driver and lobby area are air condition.

(i) The Body skeleton is welded to the under-frame.
(ii) The complete body is protected from corrosion and drumming effect.

6.22) DRIVER'S CAB

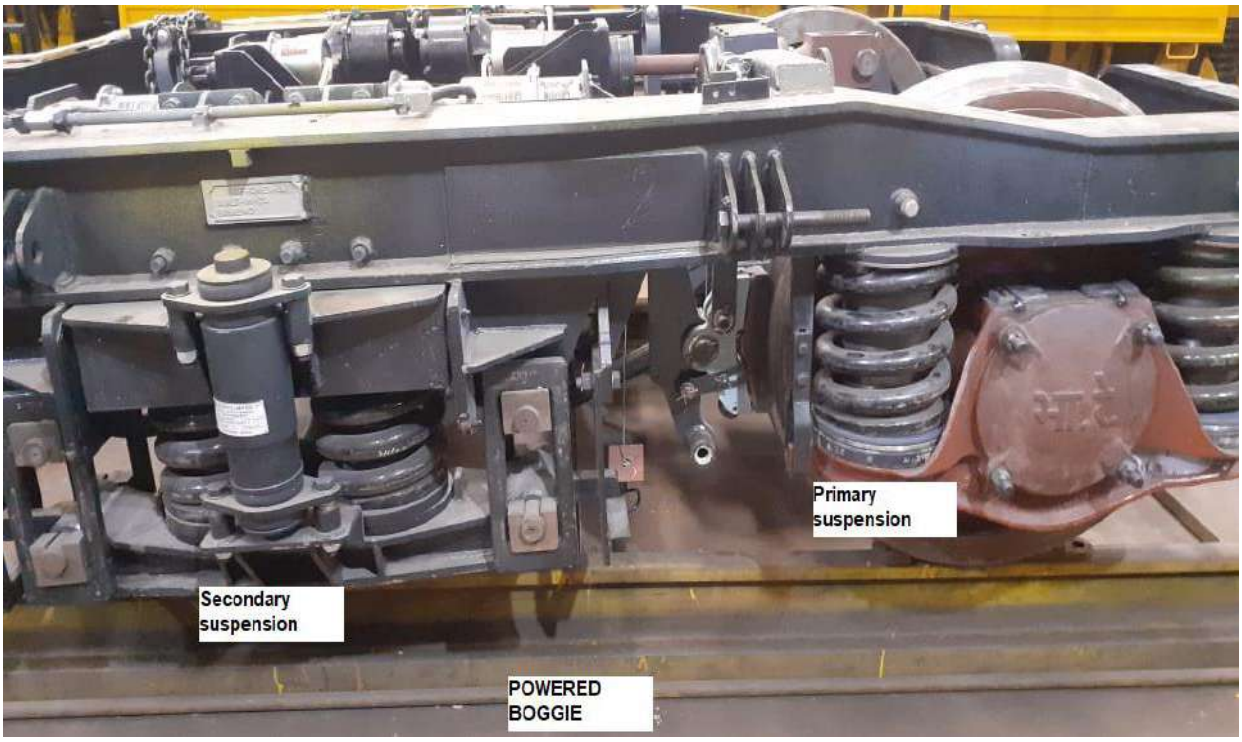
The Drivers' cabs are provided at both ends with control panel for driving the vehicle in both the directions. Driver's seat is of revolving type with adjustable height.

Driving cab and crew cabin are provided with air condition as per customer requirement.

6.23) SUSPENSION SYSTEM

The coil spring type primary & secondary with hydraulic dampers suspension system incorporated in the RBMV car to provide adequate riding comfort and safe running at maximum travel speeds.

Bogie-Bogie type arrangement is provided with both primary and secondary suspensions generally confirming to the design as per ICF specification for SV/DPC bogies Relative motion between the under frame & bogies are guided along the vertical plane and the longitudinal movement and constrained within predetermined limits.
The entire suspension system is designed to sustain a dynamic augmentation.



Bogie Suspension System

6.24) ELECTRIC SYSTEM

24V DC system - Each Power pack of RBMV has a 24V electrical system 300Ah battery capacity for engine starting, engine control and hydraulic control with 24V battery charging alternator.

110V DC system - each power pack drives and aux. Alternator to charge 110V 120Ah battery capacity to cater the aux. Electrical load like head light, flasher lights, cab lights, fans & etc.

110V DC Battery box

24V DC Battery

6.25) BRAKE SYSTEM

The 'PHOOLTAS' RBMV is equipped with an effective single pipe graduated release air braking system having the following brakes: - A9 independent brake etc., SA9, Parking brake, Emergency brake, VDC and penalty brake.

(i) Release position
(ii) Minimum reduction position.
(iii) Full service position
(iv) Emergency position.

Brake control panel

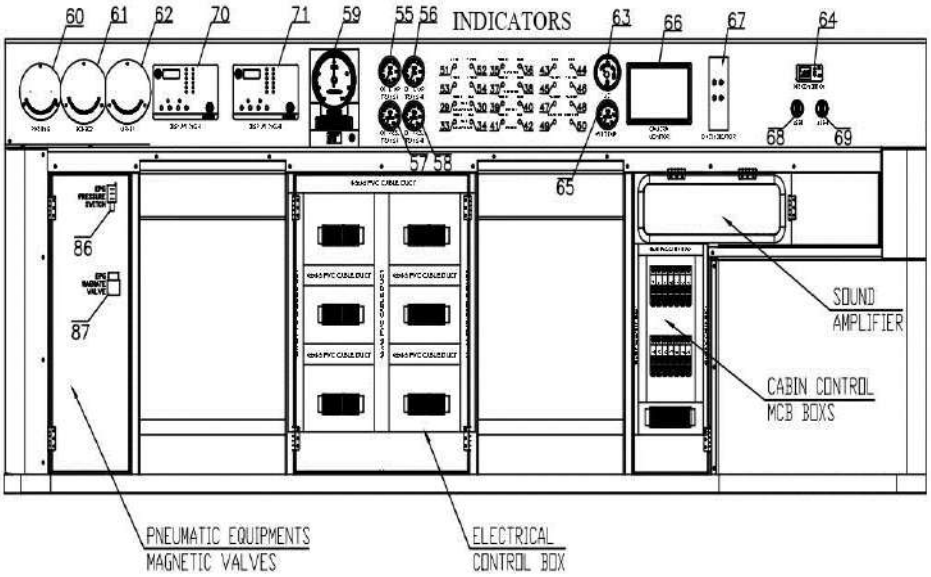
6.26) AIR COMPRESSOR

Engine mounted air compressors are provided with both engines. Displacement of each air compressor is 630cc per revolution. Air pressure Cut-in & cut-out are 7 kg/cm² & 8 kg/cm² respectively.

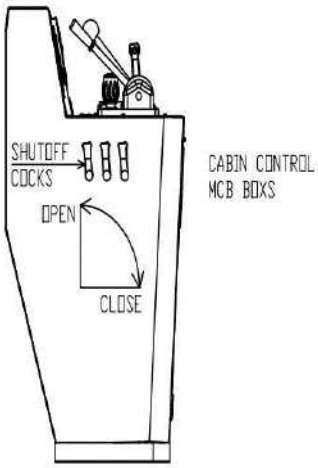
Air compressor

6.27) CONTROL PANEL

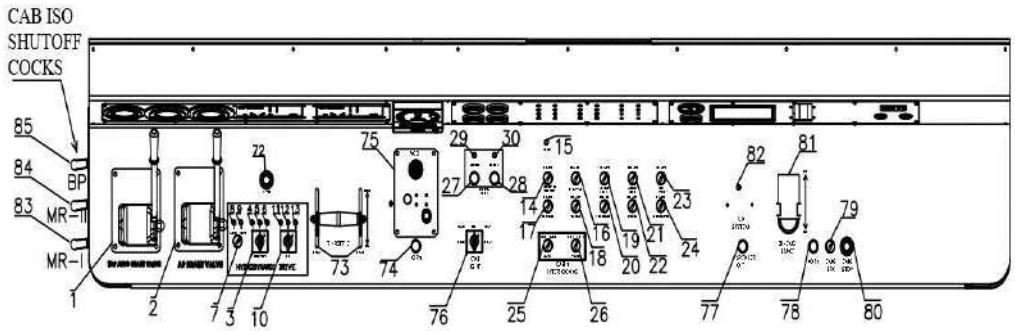
DRIVER CONTROL PANEL-I



FRONT VIEW



SIDE VIEW



TOP VIEW

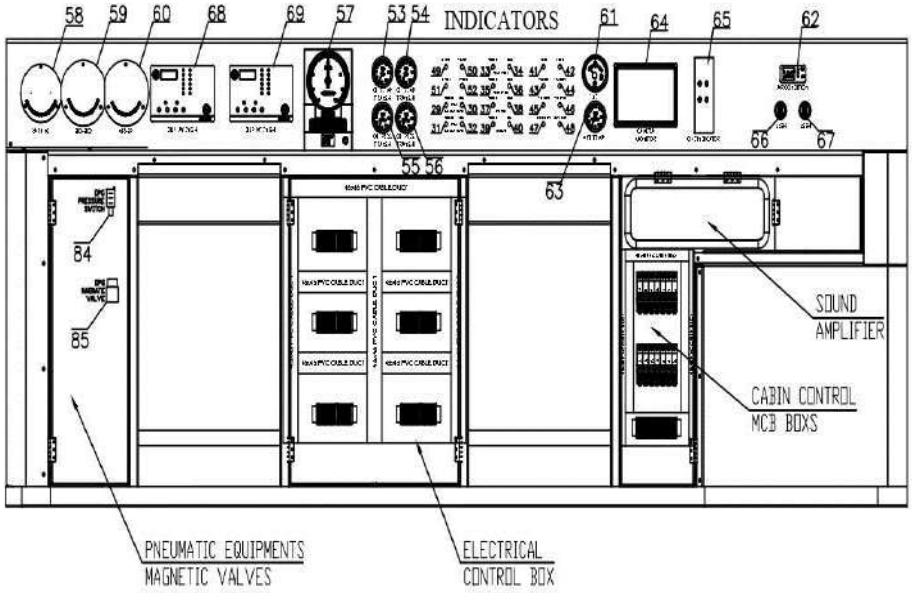
DRIVER CONTROL PANEL-I

S. No.	DESCRIPTION	Qty.
1	SA-9 BRAKE VALVE	01 No.
2	A-9 BRAKE VALVE	01 No.
3	ROTARY S/W FOR DIRECTION	01 No.
4	INDICATOR FOR FWD DIRECTION	01 No.
5	INDICATOR FOR NEU.	01 No.
6	INDICATOR FOR REV DIRECTION	01 No.
7	AUTO/MANUAL DRIVE SELECTOR S/W (HYDRODYNAMIC)	01 No.
8	INDICATOR FOR HYDRODYNAMIC MANUAL MODE ON	01 No.
9	INDICATOR FOR HYDRODYNAMIC AUTO MODE ON	01 No.
10	ROTARY S/W FOR GEAR SELECTION	01 No.
11	INDICATOR FOR LOW SPEED	01 No.
12	INDICATOR FOR MED SPEED	01 No.
13	INDICATOR FOR HIGH SPEED	01 No.
14	10 KMPH SPD. SELECTION SWITCH	01 No.
15	BRAKE APL. INDICATOR	01 No.
16	BY PASS SELECTION SWITCH	01 No.
17	MRK LIGHT SELECTION SWITCH	01 No.
18	TAIL. LIGHT SELECTION SWITCH	01 No.
19	W-LIGHT CAB-I SELECTION SWITCH	01 No.
20	FLASH LIGHT SELECTION SWITCH	01 No.
21	W-LIGHT CAB-II SELECTION SWITCH	01 No.
22	CAMERA SELECTION SWITCH	01 No.
23	OHE BYBASS SELECTION SWITCH	01 No.
24	WIPER MOTOR SELECTION SWITCH	01 No.
25	24V DC CABIN INTERLOCKING SELECTION SWITCH	01 No.
26	110 V CABIN INTERLOCKING SELECTION SWITCH	01 No.
27	PARKING BRAKE APPLIED PUSH BUTTON	01 No.
28	PARKING BRAKE RELEASE PUSH BUTTON	01 No.
29	INDICATOR FOR PARKING BRAKE APPLIED	01 No.
30	INDICATOR FOR PARKING BRAKE RELEASE	01 No.
31	INDICATOR FOR RADIATOR WATER LEVEL NORMAL ENGINE-I	01 No.
32	INDICATOR FOR RADIATOR WATER LEVEL LOW ENGINE-I	01 No.
33	INDICATOR FOR RADIATOR WATER LEVEL NORMAL ENGINE-II	01 No.
34	INDICATOR FOR RADIATOR WATER LEVEL LOW ENGINE-II	01 No.
35	INDICATOR FOR TRANSMISSION-I OIL TEMP. NORMAL	01 No.
36	INDICATOR FOR TRANSMISSION-I OIL TEMP. HIGH	01 No.
37	INDICATOR FOR TRANSMISSION-II OIL TEMP. NORMAL	01 No.
38	INDICATOR FOR TRANSMISSION-II OIL TEMP. HIGH	01 No.
39	INDICATOR FOR HYD. TEMP. NORMAL	01 No.
40	INDICATOR FOR HYD. TEMP. HIGH	01 No.

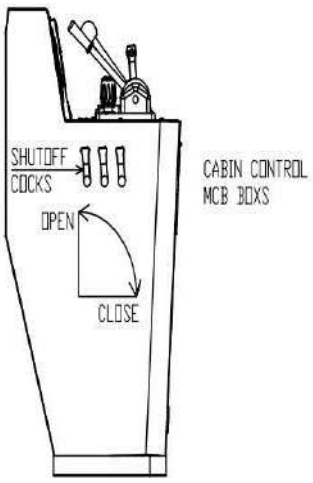
41	INDICATOR FOR HYD. LEVEL NORMAL	01 No.
42	INDICATOR FOR HYD. LEVEL HIGH	01 No.
43	INDICATOR FOR RRU-I	01 No.
44	INDICATOR FOR RRU-II	01 No.
45	INDICATOR FOR STAB.-I	01 No.
46	INDICATOR FOR STAB.-II	01 No.
47	INDICATOR FOR STAB.-III	01 No.
48	INDICATOR FOR STAB.-IV	01 No.
49	INDICATOR FOR CRANE-I ON	01 No.
50	INDICATOR FOR CRAN-II ON	01 No.
51	INDICATOR FOR 24V ON	01 No.
52	INDICATOR FOR 110V ON	01 No.
53	INDICATOR FOR E STOP-I	01 No.
54	INDICATOR FOR E-STOP-II	01 No.
55	TRANS. OIL TEMP. GAUGE-1	01 No.
56	TRANS. OIL TEMP. GAUGE-2	01 No.
57	TRANS. OIL PRESSURE GAUGE-1	01 No.
58	TRANS. OIL PRESSURE GAUGE-2	01 No.
59	SPEED CUM RECORDER	01 No.
60	PARKING GAUGE	01 No.
61	DUPLEX PRESS. GAUGE (BC1,BC2)	01 No.
62	DUPLEX PRESS. GAUGE (MR-BP)	01 No.
63	FULE LEVEL GAUGE	01 No.
64	AC DISPLAY	01 No.
65	HYD. TEMP. GAUGE	01 No.
66	TFT MONITOR	01 No.
67	OHE DEVICE	01 No.
68	USB POWER PORT 24V DC-I	01 No.
69	USB POWER PORT 24V DC-II	01 No.
70	ENGINE-I DISPLAY	01 No.
71	ENGINE-II DISPLAY	01 No.
72	ENGINE EMG. STOP SWITCH	01 No.
73	THROTTLE	01 No.
74	HORN PUSH BUTTON	01 No.
75	VCD RESET UNIT	01 No.
76	HEAD LIGHT SELECTION SWITCH	01 No.
77	SPEAKER OFF PUSH BUTTON	01 No.
78	HORN PUSH BUTTON	01 No.
79	EMG BRK. SELECTION SWITCH	01 No.
80	ENGINE EMG STOP SWITCH	01 No.
81	D-1 EMG BRAKE VALVE	01 No.
82	P.A SYSTEM	01 No.
83	MR-I	01 No.
84	MR-II	01 No.

85	BP	01 No.
86	EPG PRESSURE SWITCH	01 No.
87	EPG MAGNETIC SWITCH	01 No.

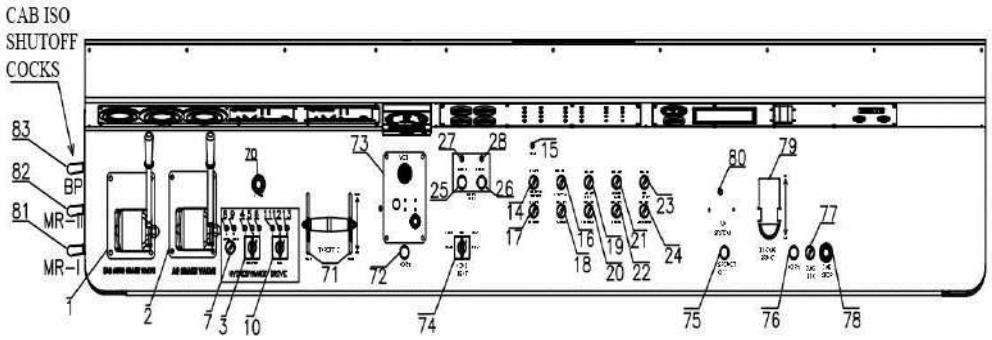
DRIVER CONTROL PANEL-II



FRONT VIEW



SIDE VIEW



TOP VIEW

DRIVER CONTROL PANEL-II

S. No.	DESCRIPTION	QTY.
1	SA-9 BRAKE VALVE	01 No.
2	A-9 BRAKE VALVE	01 No.
3	ROTARY S/W FOR DIRECTION	01 No.
4	INDICATOR FOR FWD DIRECTION	01 No.
5	INDICATOR FOR NEU.	01 No.
6	INDICATOR FOR REV DIRECTION	01 No.
7	AUTO/MANUAL DRIVE SELECTOR S/W (HYDRODYNAMIC)	01 No.
8	INDICATOR FOR HYDRODYNAMIC MANUAL MODE ON	01 No.
9	INDICATOR FOR HYDRODYNAMIC AUTO MODE ON	01 No.
10	ROTARY S/W FOR GEAR SELECTION	01 No.
11	INDICATOR FOR LOW SPEED	01 No.
12	INDICATOR FOR MED SPEED	01 No.
13	INDICATOR FOR HIGH SPEED	01 No.
14	10 KMPH SPD. SELECTION SWITCH	01 No.
15	BRAKE APL. INDICATOR	01 No.
16	BY PASS SELECTION SWITCH	01 No.
17	MRK LIGHT SELECTION SWITCH	01 No.
18	TAIL. LIGHT SELECTION SWITCH	01 No.
19	W-LIGHT CAB-I SELECTION SWITCH	01 No.
20	FLASH LIGHT SELECTION SWITCH	01 No.
21	W-LIGHT CAB-II SELECTION SWITCH	01 No.
22	CAMERA SELECTION SWITCH	01 No.
23	OHE BYBASS SELECTION SWITCH	01 No.
24	WIPER MOTOR SELECTION SWITCH	01 No.
25	PARKING BRAKE APPLIED PUSH BUTTON	01 No.
26	PARKING BRAKE RELEASE PUSH BUTTON	01 No.
27	INDICATOR FOR PARKING BRAKE APPLIED	01 No.
28	INDICATOR FOR PARKING BRAKE RELEASE	01 No.
29	INDICATOR FOR RADIATOR WATER LEVEL NORMAL ENGINE-I	01 No.
30	INDICATOR FOR RADIATOR WATER LEVEL LOW ENGINE-I	01 No.
31	INDICATOR FOR RADIATOR WATER LEVEL NORMAL ENGINE-II	01 No.
32	INDICATOR FOR RADIATOR WATER LEVEL LOW ENGINE-II	01 No.
33	INDICATOR FOR TRANSMISSION-I OIL TEMP. NORMAL	01 No.
34	INDICATOR FOR TRANSMISSION-I OIL TEMP. HIGH	01 No.
35	INDICATOR FOR TRANSMISSION-II OIL TEMP. NORMAL	01 No.
36	INDICATOR FOR TRANSMISSION-II OIL TEMP. HIGH	01 No.
37	INDICATOR FOR HYD. TEMP. NORMAL	01 No.
38	INDICATOR FOR HYD. TEMP. HIGH	01 No.
39	INDICATOR FOR HYD. LEVEL NORMAL	01 No.
40	INDICATOR FOR HYD. LEVEL HIGH	01 No.
41	INDICATOR FOR RRU-I	01 No.

42	INDICATOR FOR RRU-II	01 No.
43	INDICATOR FOR STAB.-I	01 No.
44	INDICATOR FOR STAB.-II	01 No.
45	INDICATOR FOR STAB.-III	01 No.
46	INDICATOR FOR STAB.-IV	01 No.
47	INDICATOR FOR CRANE-I ON	01 No.
48	INDICATOR FOR CRAN-II ON	01 No.
49	INDICATOR FOR 24V ON	01 No.
50	INDICATOR FOR 110V ON	01 No.
51	INDICATOR FOR E STOP-I	01 No.
52	INDICATOR FOR E-STOP-II	01 No.
53	TRANS. OIL TEMP. GAUGE-1	01 No.
54	TRANS. OIL TEMP. GAUGE-2	01 No.
55	TRANS. OIL PRESSURE GAUGE-1	01 No.
56	TRANS. OIL PRESSURE GAUGE-2	01 No.
57	SPEED CUM RECORDER	01 No.
58	PARKING GAUGE	01 No.
59	DUPLEX PRESS. GAUGE (BC1,BC2)	01 No.
60	DUPLEX PRESS. GAUGE (MR-BP)	01 No.
61	FULE LEVEL GAUGE	01 No.
62	AC DISPLAY	01 No.
63	HYD. TEMP. GAUGE	01 No.
64	TFT MONITOR	01 No.
65	OHE DEVICE	01 No.
66	USB POWER PORT 24V DC-I	01 No.
67	USB POWER PORT 24V DC-II	01 No.
68	ENGINE-I DISPLAY	01 No.
69	ENGINE-II DISPLAY	01 No.
70	ENGINE EMG. STOP SWITCH	01 No.
71	THROTTLE	01 No.
72	HORN PUSH BUTTON	01 No.
73	VCD RESET UNIT	01 No.
74	HEAD LIGHT SELECTION SWITCH	01 No.
75	SPEAKER OFF PUSH BUTTON	01 No.
76	HORN PUSH BUTTON	01 No.
77	EMG BRK. SELECTION SWITCH	01 No.
78	ENGINE EMG STOP SWITCH	01 No.
79	D-1 EMG BRAKE VALVE	01 No.
80	P.A SYSTEM	01 No.
81	MR-I	01 No.
82	MR-II	01 No.
83	BP	01 No.
84	EPG PRESSURE SWITCH	01 No.
85	EPG MAGNETIC SWITCH	01 No.

7. OPERATION

7.1 OPERATION OF VEHICLE

Before operating the equipment read this manual thoroughly and operate accordingly instruction given below should be strictly followed for trouble free running of RAIL BOUND MOBILE VEHICLE (RBMV).

A. PREPARATION BEFORE START:

Perform following checks on the vehicle when started for the first time in the day.

1. Check for any leakage of engine lub oil, Transmission oil, ADGB oil, hydraulic oil and
2. Water underneath of vehicle, if noticed attend and rectify / top up if level is low.
3. Check correct oil level in engine & sump by dipstick, top up if it is low.
4. Check correct oil level in transmission oil sump by dipstick, top up it is low.
5. Check correct oil level in ADGB by dipstick, top up it is low.
6. Drain the condensed water from CDC, MR-1, MR-2 & MR-3 daily.
7. Ensure sufficient fuel level in the vehicle fuel tank.
8. Ensure Hyd. Crane and its accessories are fully closed and locked & stabilizers are fully locked.
9. Ensure all safety pins/locks & power line fasteners are ok.
10. Battery cut out switchs (24V &110V) has to be turned to 'ON' position and it's safety MCB's should also be turned ON (Located in made cab near door). Then driver has to go in cabin1 for electrical control power selection for operative cabin (cabin1 or cabin2), this cabin change over switch (**Cabin 1-off- Cabin 2**) is provided in cabin-1 on driver desk.
11. If cabin 1 is selected for operation, then MCB's of this control desk should be made 'ON' .

B. STARTING THE ENGINE:

1. Turn control panel main MCB's to ON position.
2. Insert the ignition key on digital display of engine & turn the key to ON/RUN position. Ensure all the electric indicators, gauges & meters are functioning properly. Ensure transmission is in neutral condition.
3. Keep the parking brake push button in applied position.
4. Turn the ignition key further to crank the engine , Do not crank starter motor more than 5 seconds in one stroke.
5. Attempt if engine does not get start in first attempt wait at least for 60 seconds for reattempt to start the engine.

C. SETTING THE VEHICLE IN MOTION:

1. Run the engine idle for 5 minutes and then gradually accelerate the engine to 2200 rpm by electronics throttle combined lever on control panel and raise the air pressure/MR pressure up to 8 kg/cm^2.
2. As the pressure of the MR will reach to 8 kg/cm^2, the Un-loader valve provided in the pneumatic circuit will starts functioning and will maintaining the air pressure 7-8 kg/cm^2(cut in-cutout pressure).
3. Press the horn switch to blow horn as required before moving the vehicle as alertness to surroundings.
4. A-9 automatic brake valve lever & D-1 emergency brake valve lever are in fully released position.
5. Ensure BP line pressure in gauge is reach 5 kg/cm^2.
6. Release the parking brake by pressing parking push button switch indication will glow and air parking gauge shows zero pressure .
7. Check the functioning of service brake (A-9), Stand by brake (SA-9) and emergency brake (D-1) by applying & releasing individually, provided on control panel L.H side (A-9 & SA-9) and R.H side (D-1) of the driver's seat.
8. Applying & releasing of brakes can be noticed on the duplex BC pressure gauge provided on the control panel.
9. Maximum brake pressure of the brake chamber is 1.8 kg/cm^2 .

10. Traction mode switch - Hydrodynamic auto and manual mode can be selected through mode selection switch provided at driver desk.
11. Before engaging the transmission keep throttle in idle position
12. As hydrodynamic mode have been selected then choose the drive option by **auto/manual** switch. Now in manual drive operation, **direction selector switch** has to be positioned in desired direction (forward or reverse). Now shift the gear range selection switch from neutral to low position. Now slowly raise the engine throttle to move the vehicle.
13. To increase further vehicle speed shift the transmission range selector switch to next (intermediate) range and further to high range position.
14. To decrease the vehicle speed shifts the transmission range selector switch towards low range & decrease the throttle.

D. STOPPING THE VEHICLE:

1. Apply the service brake (A-9) gradually by moving the brake lever in apply zone gradually to lower the BP pressure for brake application. Ensure the brake is functioning,BC Pressure both bogie indication will appear in duplex pressure gauge reading (BC1 & BC2).
2. Stand by independent brake (SA-9) can also be used if vehicle is running alone to stop the vehicle.
3. At extreme worse position D-1 emergency brake can also be applied for stopping the vehicle.
4. Now move transmission range and direction selector switch to neutral position.

E. STOPPING THE ENGINE:

1. Ensure the throttle lever in idle position.
2. Apply the parking brake and ensure parking brake pressure in (PK) gauge is zero.
3. Turn the ignition key to OFF position & take out the key. To stop the engine one emergency push button switch is also provided on driver desk.
4. Turn the main MCB of control panel to OFF position.
5. Turn the cabin selector switch to “OFF” position.
6. Turn the battery cut out switches and MCB’s to ‘OFF’ position (Located in mid cab near side boor).

7.2 DIRECTION REVERSING SAFETY

Shift of transmission range & direction selector switch from any higher range to neutral or neutral to any higher range is acceptable but changing of direction of the vehicle from forward to reverse or reverse to forward should only be possible if vehicle speed is below 2kmph or vehicle is in fully stopped position**.** This safety is already provided by speedometer signal to traction control circuit.

7.3 VCD

VCD is provided with a provision of vigilance cycle, warning cycles and penalty – brake cycles. The drivers should take care of the operations in the OHE otherwise penalty brake will be applied & the same shall be recorded. The detailed functioning is tabulated below:-

The system LAX-VCD-D is a microprocessor based multi-resettable and fail safe system. The system is designed to work on normally DE-energized principle.

The system is based on a number of time cycles such as Vigilance cycle (To), Warning cycle (T1), waning cycle (T2), Penalty brake cycle (T3), Penalty brake cycle (T4).

Operation cycle	Time period in seconds	Indications	Remarks
Vigilance cycle (T0)	60	None	VCD can be reset
Warning cycle (T1)	17	Yellow flashing light	VCD can be reset
Warning cycle (T2)	17	Yellow flashing light & alarm	VCD can be reset
Penalty brake cycle (T3)	34	Yellow flashing light but alarm stops	VCD cannot reset
Penalty brake cycle (T4)	Until reset	None	VCD can be reset by push button

VIGILANCE CYCLE TIME (T0)

The cycle has a preset period set at 60 seconds. This cycle is automatically restarted when the driver performs some positive action such as gear changing, application of brakes, horn, operate on of vigilance push button etc. In normal conditions, if the driver is periodically performing some positive action, the cycle will continually reset and will never run to completion. If the driver is periodically per forming some positive action, the cycle will continually reset and will never run to completion. If the driver fails to perform such an action within the cycle period, the cycle period will be completed. At that instant, the second time cycle (Warning cycle) will be initiated. If the Vigilance push button switch remains in press / release position more than 60 sec, the system enters into the warning cycle T1.

THE SYSTEM IS RESET BY OPERATION OF THE FREQUENTLY OPERATED CONTROL FUNCTION BY THE DRIVER SUCH AS :

1. Operation gear change.
2. Operation of horns.
3. Operation of standby brake (A9)
4. Operation of standby brake (SA9)
5. Operations of emergency brake.
6. Operation of vigilance reset push button switch.

WARNING CYCLE (T1) :

The cycle has a preset period of 17 seconds. During this cycle a Yellow, flashing LED warns the driver to acknowledge the VCD reset push button. If the driver acknowledges during this cycle, the cycle is terminated and vigilance cycle is restarted. If the driver fails to acknowledge, VCD goes to next warning cycle.

WARNING CYCLE (T2) :

The cycle has a preset period of 17 seconds. During this cycle a Yellow, flashing LED and audio alarm warns the driver to acknowledge the VCD push button. If the driver acknowledges during this cycle, the cycle is terminated and vigilance cycle is restarted. If the driver fails to acknowledge, VCD goes to application of penalty brake.

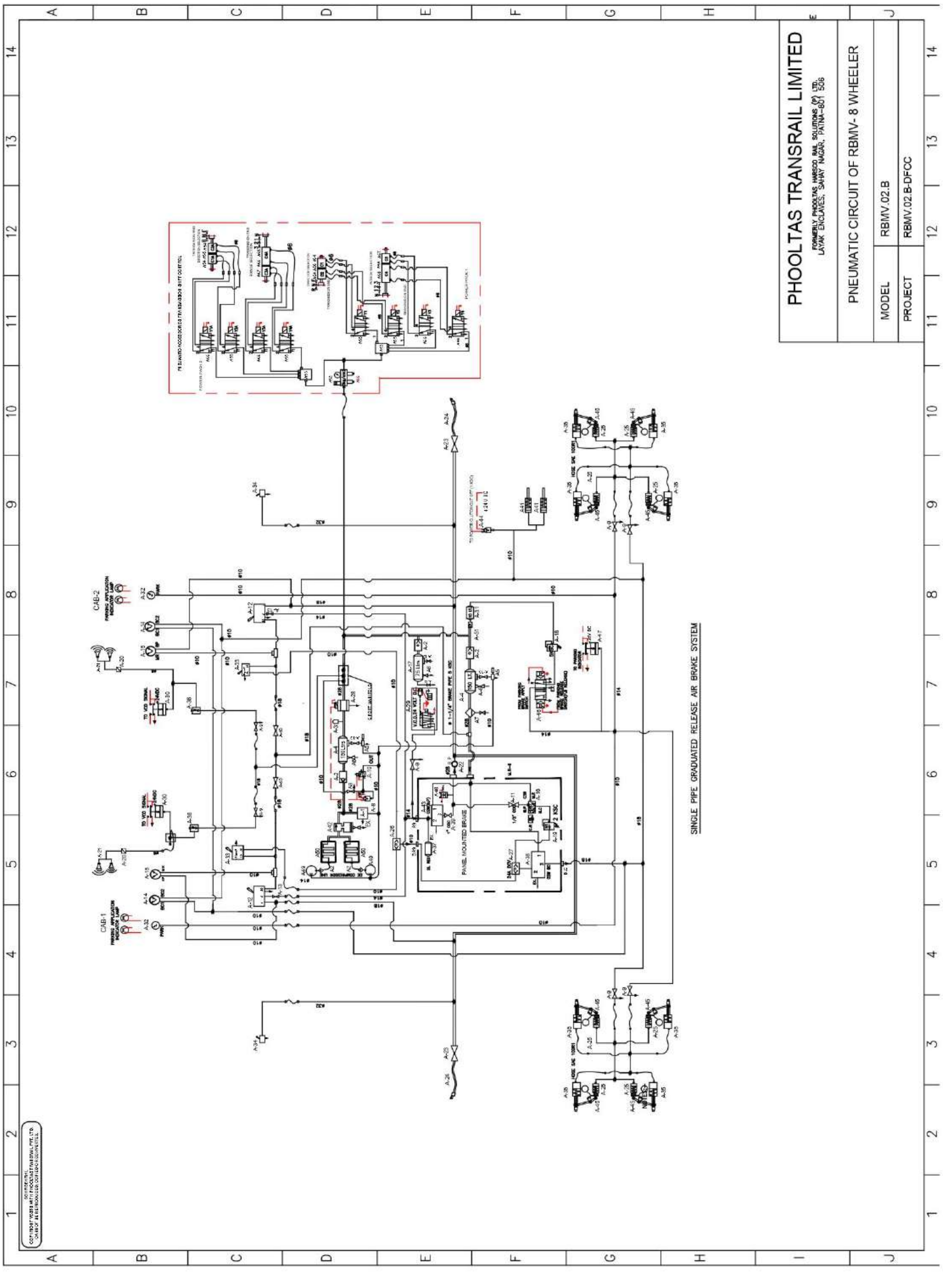
PENALTY BRAKE CYCLE (T3) : (APPLICATION OF PENALTY BRAKE)

The cycle has a preset period of 34 seconds. A penalty brake indication (RED LED blinking) is also provided during this cycle. During this cycle. During this cycle an output signal is generated to DMR, which will bring the locomotive to idle position. During this cycle, the driver cannot reset the VCD after the completion of this cycle, the system enters into next penalty brake cycle (T4). The penalty brake counter is incremented by one during this cycle. Data will be logged with date and time stamp at the start of T3 time (Application of penalty brake).

PENALTY BRAKE CYCLE (T4) : (RELEASE OF PENALTY BRAKE)

This cycle is a continuous cycle and will be reset only when the following conditions are fulfilled
(a) Throttle handle has been brought to IDLE
(b) Vehicle speed is Zero / BCP is >=2.3 kg / cm^2
(c) RESET button is pressed.

When the above conditions are met, the penalty brake is released and visual warning is cancelled and normal vehicle operation can be re-established. Data will be logged with date and time stamp at the end of T4 time. (Penalty brake release).


PHOOLTAS TRANSRAIL LIMITED
FORMERLY PHOOLTAS HARSCO RAIL SOLUTIONS (P) LTD.
LAYAK ENCLAVES, SAHAY NAGAR, PATNA-801 506
PNEUMATIC CIRCUIT OF RBMV- 8 WHEELER
MODEL RBMV.02.B
PROJECT RBMV.02.B-DFCC
SINGLE PIPE GRADUATED RELEASE AIR BRAKE SYSTEM
CAB-1
CAB-2

8) PNEUMATIC CIRCUIT WITH COMPONENT (3020800000)

S. No.	DESCRIPTION	Qty.
A1	UNLOADER VALVE	01 No.
A2	1" CHECK VALVE	05 Nos.
A3	SAFETY VALVE TYPE J-1 SET AT 8.5 Kg/cm2.	01 No.
A4	M.R-I AND MR-II RESERVOIR (150 Ltrs EACH)	02 No.
A5	Auto drain valve with timing reservoir type D-1	03 No.
A6	½" Drain cock	03 Nos.
A7	J- Air filter with drain cock	01 No.
A8	PRESSURE SWITCH RT-116 SET TO CLOSE AT 8Kg/cm2 OPEN AT 7Kg/cm2	01 No.
A9	3/8" ISO cock with vent	08 Nos.
A10	3–WAY MAGNET VALVE 24V D.C.NORMALLY CLOSED	01 No.
A11	1" ISOLATING COCK WITH OUT VENT,P/MTD.	01 Nos.
A12	A-9 Auto brake valve	02 Nos.
A13	½" ISO cock	05 Nos.
A14	4" Duplex press gauge (BP)	02 Nos.
A15	4" Duplex press gauge (MR)	02 Nos.
A16	C3W DIST. VALVE WITH SUPPORT/CONTROL RESERVOIR AND FILTER, P/MOUNTED	01 No.
A17	M.R-III, RESERVOIR 100 Ltrs	01 No.
A18	N1-REDUCING VALVE SET AT 5 kg/cm2.	03 Nos.
A19	N1-REDUCING VALVE SET AT 2 kg/cm2,P/MTD.	02 No.
A20	1/4" BSP 2 WAY HEAVY DUTY DIRECT ACTING SOLENOID VALVE FOR HORN 24V DC 2S025-08	02 Nos.
A21	PNEUMATIC HORN(DOUBLE TONE)	02 Nos.
A22	2 Way Dirt collector	01 No.
A23	ANGLE COCK (BP)(AS PER RDSO DRG. NO. WD-88123/S-02)	02 Nos.
A24	HOSE WITH DUMMY COUPLING (BP)	02 Nos.
A25	SPRING BRAKE ACTUATOR (PARKING BRAKE)	08 Nos.
A26	GRADUATED HAND CONTROL VALVE (FOR PARKING BRAKE)	02 Nos.
A27	24 A DOUBLE CHECK. VALVE, P/MOUNTED	05 Nos.
A28	AIR DRYER-OF RDSO APPROVED	01 No.
A29	V.C.D control Assembly 24 V DC	01 No.
A30	PRESSURE SWITCH (VCD SIGNAL), 3Kg/cm2 to 4Kg/cm2	02 Nos.
A31	RESURVOIR 10 LTR	02 Nos.
A32	4'' PARKING BRAKE INDICATOR GAUGE	02 Nos.
A33	SA-9 BRAKE VALVE SET AT 2 kg/cm2	02 Nos.
A34	EAB/D-1 EMERGENCY BRAKE VALVE	02 Nos.
A35	8" BRAKE CYLINDER,JSL TYPE,WITH TRUNION	08 Nos.
A36	PRESSURE PROTECTION VALVE	02 Nos.
A37	RESERVOIR-2 LTRS.(B.P.EQUALISE)	01 No.
A38	C-2W RELAY VALVE (B.C.), P/MOUNTED	01 No.
A39	1" ISOLATING COCK WITHOUT VENT,P/MTD.	01 No.
A40	3/8" ISO COCK WITHOUT VENT	01 No.
A41	SINGLE ACTING SPRING RETURN CYL. (TRANS. POWER CUT OFF CYL. (1 kg/cm^2)	01 Nos.

A42	1"CDC WITH 7L RESERV WITH DRAIN COCK	01 No.
A43	C-2W RELAY VALVE (B.P.), P/MOUNTED	01 No.
A44	PRESSURE SWITCH/W RT-200 POWER CUT OFF (0.5kg/cm^2/1 kg/cm^2)	01 No.
A45	MECHANICAL QUICK RELEASE MECHANISUM	04 Nos.

PNEUMATIC CIRCUIT DESCRIPTION –RAIL BOUND MODILE VEHICLE 8-WHEELER
PART NO.:-3020800000 MODEL NO. :- RBMV.02.B

8.1) GENERAL:

RBMV-8 wheeler pneumatic system consists of single pipe graduated air release type braking with fail-safe system & vigilance control device (VCD). It also consists of pneumatic controls from operator desk like horn, transmission shift control and traction power cut-off etc.

8.2) OPERATING SYSTEM OF BRAKING:

MR charging & pressure control:

In ref to pneumatic control diagram MR–1 & MR–2 Item no. A-4 & A-17 get charge by engine driven compressors item no. A-49 through a suitable after cooler and condensed dirt collector item no. A-50 & A-42. A suitable capacity air dryer item no. A-28 is also provided in circuit for air purification. To protect the air pressure in reservoirs, non-return valves item no. A-2 are provided. An unloader valve item no. A-1 is fitted in circuit after the compressor delivery line to maintain air pressure in the circuit. Manual drain cocks item no. A-6 and auto drain valve item no. A-5 are provided with reservoirs to vent out the moisture. To give loading and unloading signal to unloader valve a suitable electro pneumatic valve item no. A10 and pressure switch item no. A8 are provided to act as electro pneumatic governor (EPG). Is provided in the circuit. Pressure setting of electro pneumatic governor pressure switch item no. A8 is set to close at 8 KSC and open at 7 KSC. To protect the system if unloader circuit fails a J1 safety valve item no. A3 is set at 8.5 KSC.

8.3) BRAKE SYSTEM:

RBMV –8 wheeler is provided with panel brake system (single pipe graduated release type air brake) with partial, full and emergency application feature. Brake panel has consist of C3W distributor valve with control reservoir item no. A16, Two C2W relay valve, one with a control reservoir item no. A43 & A37 for producing BP air pressure in the system. and other one C2W relay valve item no. 38 is provided to produce BC pressure in the system by getting regulated signal from C3W distributer valve and N1 reducing valve item no. A16 & A19. A double check valve item no. A27 is provided with outlet port on signal port of C2W relay valve BC. Double check valve one inlet port is connected from SA9 valve output from independent brake and other port is connected from N1 reducing valve at panel for application of RBMV as required. Panel has provided with isolating cock item no. A11 & A39 for isolating of distributor valve and C2W relay BP in case of as it required.

RBMV control desk has standard locomotive application brake component such as A-9 brake valve item no. A-12, SA-9 brake valve item no. A-33 and D-1 emergency brake valve item no. A-34. Each control desk have been provided with pressure indication gauge like MR, BP, BCI- BCII, parking gauge (Park),brake pipe (BP) item no. A15, A14, A53, A54 and A32. Parking push button and apply release indicator are also provided on control desk. Brake pipe pressure (BP) is set at 5 KSC through A-9 brake valve in each cab. BC pressure is set at 2 KSC through N-1 reducing valve item no. A-19 and SA-9 valve item no. A-33.

8.4) IN-NORMAL RUNNING (A9 BRAKE RELEASE CONDITIONS):

In normal running condition of operating desk isolating cock item no. A-9 will be kept on and non-operating desk should be kept off. A9 valve isolating cock item no. A13 of operating desk should be kept on and non-operating should be kept off. SA9, D-1 and parking brake lever are kept in brake release position.

At this condition, A9 brake valve will give signal to C2W relay valve BP item no. A43 on panel brake to deliver 5kg/cm2 BP pressure to C3W distributer valve as well as through BP line provided across the vehicle, end stock shutoff cocks should be remain closed. At this stage C3W distributer valve BC signal will get vent out and BC pressure from brake chamber will also vent out through C2W relay (BC) item no. A38 at panel brake assembly so there will be no brake pressure indication on BC pressure gauge.

8.5 A-9 BRAKE APPLICATION:

Whenever A9 brake valve lever is moved towards brake application like partial brake, full brake or emergency position, BP pressure is drop by regulation of A-9 brake valve from C2W relay (BC) and C3W distributer valve. At this condition C3W distributor valve item no. A-16 gives BC output signal to N-1 reducing valve item no. A-19 to operate the C2W relay valve item no. A-38 form where air pressure goes to BC line for brake chamber item no. A35 to apply the brake. When A-9 lever is moved to release position BP pressure rises up to 5 KSC & C3W distributor valve vent signal out from N-1 reducing valve and thus, C2W relay valve item no. A-38 also exhausts the supplied air from BC line to release the brake application.

8.6) SA-9 BRAKE APPLICATION:

SA-9 item no. A33 brake valve is an independent brake valve, which is set at 2 KSC. In case of A9 brake valve circuit failure or RBMV working alone this brake valve may be used as stand by brake valve. Whenever this brake lever is moved in apply position, a pneumatic signal goes to C2W relay (BC) item no. A-38 through double check valve item no. A-27 to apply the brake. When lever is moved in release position, signal is vent out from SA-9 brake valve and thus C2W relay valve exhaust the supplied air from BC line to release the brake.

8.7) D-1 EMERGENCY BRAKE VALVE:

Emergency brake valve item no. A-34 is mounted at operator desk at right side which applied to vent the BP rapidly to quick application of C2W relay valve of BC line item no. A-38, through C3W distributor valve BC signal at emergency and panic condition.

8.8) PARKING BRAKE:

For parking brake application and release, each operator desk has been provided with electrical push button switch to operate an electro magnet valve item no. A-46 to provide air pressure to spring applied brake chamber to release parking brake. 5 KSC pressure is required to release fully parking brake for which one N1 reducing valve item no.-A-18 set at 5 KSC is provided in the circuit. Manual quick release mechanism is provided with each parking brake chamber to release parking brake in case of towing of RBMV by other power and non-availability of Air pressure.

8.9) VIGILANCE CONTROL SYSTEM:

Vigilance control system consists of a magnet valve, Pressure switch and a VCD unit item no. A-29. VCD magnet valve is connected before port no. 2 of C2W relay valve-(BP) item no. A-43. VCD time setting is done as per standard norm. Electrical signal to suppress the VCD is achieved from various pressure switches item no. A-48 and A54 such as horn, BC line and driver hand press VCD button. Whenever there is delay to operate the signal to suppress the VCD; VCD unit will supply the electrical signal to operate the audio / buzzer for few second. If still, there is no response from operator then, VCD unit will supply the electrical signal to electromagnetic valve to exhaust the BP line, thus brake gets applied.

8.10) PNEUMATIC ACCESSORIES:

Pneumatic accessories RBMV - 8 Wheeler has been provided with hydrodynamic transmission shift control electro pneumatic components like, electro pneumatic valve air service unit and pneumatic cylinder are provided in circuit. Additional air tapping point is also provided to operate any auxiliary air unit or tool if required.

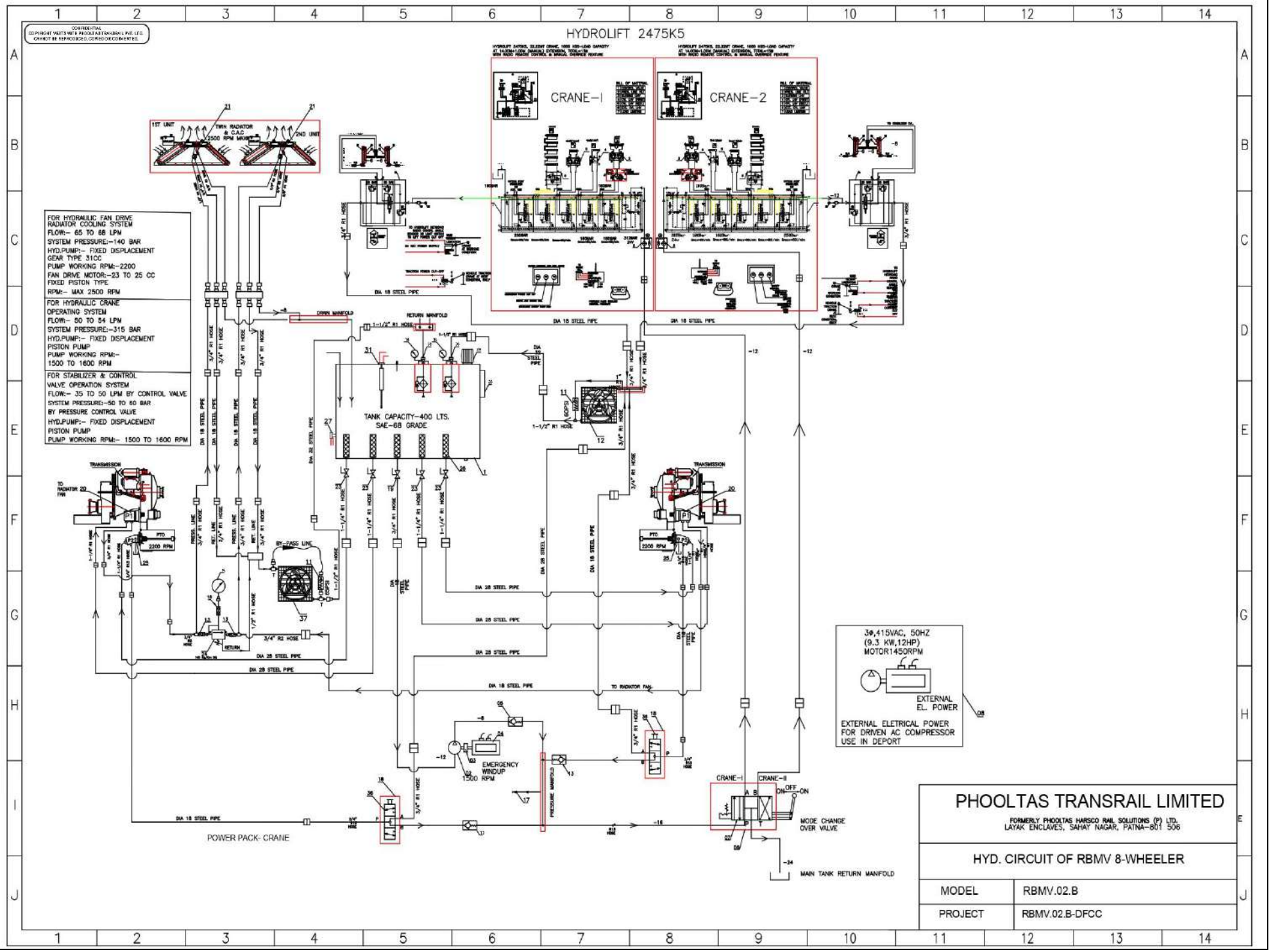
Whenever BC line pressure rises up to 0.5 to 1 KSC, pressure switch item no. A-44 will supply the electrical signal to power cut-off and bring throttle of engine at idle and hydrodynamic transmission power cut-off.

Additional shut off cocks item no. A-9 and A-13 are provided at various locations in the circuit to isolate the required section whenever required.

8.11) BRAKING IN HAULING / TRAIN FORMATION:

a. If RBMV -8 Wheeler is hauling a trailing load / coach. As RBMV is provided with BP cock and hose coupling to maintain 5KSC BP pressure to attached trailing BFR/ coach to release the brakes for traction. Brake will be operated from RBMV A-9 brake valve from operator control desk along trailing BFR as required for normal operation.

b. If RBMV -8 Wheeler is hauled by a loco/power car: As RBMV is provided with single through pipe connected to a C3W distributor valve reservoirs. BP cocks and hose coupling are provided to get supply 5KSC BP pressure from attached power car to release the brakes for traction. Brake will be operated from power car A-9 auto brake valve from operator control desk along RBMV as required for normal operation.


HYDROLIFT 2475K5
CRANE–1
CRANE–2
FOR HYDRAULIC FAN DRIVE RADIATOR COOLING SYSTEM
FLOW:– 65 TO 68 LPM
SYSTEM PRESSURE:–140 BAR
HYD.PUMP:– FIXED DISPLACEMENT GEAR TYPE 31CC
PUMP WORKING RPM:–2200
FAN DRIVE MOTOR:–23 TO 25 CC FIXED PISTON TYPE
RPM:– MAX 2500 RPM
FOR HYDRAULIC CRANE OPERATING SYSTEM
FLOW:– 50 TO 54 LPM
SYSTEM PRESSURE:–315 BAR
HYD.PUMP:– FIXED DISPLACEMENT PISTON PUMP
PUMP WORKING RPM:– 1500 TO 1600 RPM
FOR STABILIZER & CONTROL VALVE OPERATION SYSTEM
FLOW:– 35 TO 50 LPM BY CONTROL VALVE
SYSTEM PRESSURE:–50 TO 60 BAR
BY PRESSURE CONTROL VALVE
HYD.PUMP:– FIXED DISPLACEMENT PISTON PUMP
PUMP WORKING RPM:– 1500 TO 1600 RPM
1ST UNIT
2ND UNIT
TWIN RADIATOR & CAC 2500 RPM MAX
TANK CAPACITY–400 LTS. SAE–68 GRADE
TRANSMISSION
PTO 2200 RPM
BY–PASS LINE
EMERGENCY WINDUP 1500 RPM
PRESSURE MANIFOLD
MODE CHANGE OVER VALVE
MAIN TANK RETURN MANIFOLD
POWER PACK– CRANE
3Ø,415VAC, 50HZ (9.3 KW,12HP) MOTOR1450RPM
EXTERNAL EL. POWER
EXTERNAL ELETRICAL POWER FOR DRIVEN AC COMPRESSOR USE IN DEPORT
PHOOLTAS TRANSRAIL LIMITED
FORMERLY PHOOLTAS HARSCO RAIL SOLUTIONS (P) LTD.
LAYAK ENCLAVES, SAHAY NAGAR, PATNA–801 506
HYD. CIRCUIT OF RBMV 8-WHEELER
MODEL RBMV.02.B
PROJECT RBMV.02.B-DFCC

9. HYDRAULIC CIRCUIT WITH COMPONENTS (3020900000)

S. No.	DESCRIPTION	QTY.
1.	HYD. TANK 400 LTRS.	01 NO.
2.	EMERGENCY GEAR PUMP	01 NO.
3.	HYDEX GEAR COUPLING	01 NO.
4.	EMERGENCY PUMP DRIVE ELECTRICAL MOTOR 3HP	01 NO.
5.	IN LINE CHECK VALVE 5 PSI ½”	01 NOS.
6.	SUB PLATE 06 SIZE SERIES 1"PORT	01 NO.
7.	3 POSITION DIRECTION CONTROL VALVE	01 NOS.
8.	EXT. ELC. POWER DRIVEN AC COMPRESSOR (DEPORT USE)	01 NO.
9.	2 POSITION VALVE (PUMP POWER SELECTION)	04 NOS.
10.	SUB PLATE 03 SERIES	04 NOS.
11.	IN LINE CHECK VALVE (BYPASS) 3 BAR, 1" PORT	02 NOS.
12.	OIL COOLER 1-1/2",110/24VDC FAN DIA 400, MODEL-AH-1680, 26.5 KW,FLOW 300 LPM	01 NO.
13.	IN LINE CHECK VALVE 5 PSI 3/4"	04 NOS.
14.	DIRT INDICATOR GAUGE 1/8”	01 NOS.
15.	PRESSURE GAUGE 0 TO 400 KG/CM.SQ.	03 NOS.
16.	GAUGE CONNECTOR	03 NOS.
17.	QUICK CONNECT COUPLING 1/2"	02 NO.
18.	3/4" SUB PLATE FOR 2 POSITION DIRECTION VALVE	02 NOS.
19.	BALL VALVE (LOW PRESSURE) 3/4"	01 NOS.
20.	SINGLE GEAR PUMP FOR RADIATOR FAN DRIVE MOTOR	02 NOS.
21.	FAN DRIVE HYD. MOTOR	02 NOS.
22.	RADIO REMOTE CONTROL FOR 4 SECTION MANUAL VALVE CRANE MECANICAL RADIO REMOTE CONTROL SYSTEM	02 NO.
23.	BALL VALVE (LOW PRESSURE) 1-1/2"	03 NOS.
24.	PRESSURE RELIVE VALVE	01 NO.
25.	BEND AXIS FIXED DISP. PISTON PUMP FOR CRANE AND PLATFORM REXROTH 32 CC-A17FO032/10NLWKOE81-0	02 NOS.
26.	SUCTION STRAINER 1-1/2" PORT 150 MICRONS	05 NOS.
27.	HIGH TEMP. SEAFTY SWITCH 85°C	01 NO.
28.	LEVEL GAUGE WITH TEMP. INDICATOR	01 NO.
29.	FILLER BREATHER	01 NO.
30.	RETURN FILTER ASSEMBLY 1-1/2" PORT 10MICRON FILTER FLOW 200LPM	01 NOS.
31.	LOW OIL SAFETY SWITCH	01 NO.
32.	PILOT OPERATOR CHECK VALVE	04 NOS.
33.	STABILIZER CYLINDER	04 NO.
34.	3 POSITION STABILISER CONTROL VALVE	02 NO.
35.	HIGH PRESSURE SHUT OFF COCK 1/2"	04 NO.
36.	2 POSITION MANUAL DIRECTION CONTROL VALVE 03 SERIES	02 NO.
37.	OIL COOLER 1-1/2",110/24VDC FAN DIA 350	01 NO.

HYDRAULIC CIRCUIT OF RAIL BOUND MOBILE VEHICLE (MODEL No. 8B0302)
PART NO.:– 3020900000, MODEL- RBMV.02.B

GENERAL :

8 Wheeler RBMV consist of many hyd. operated units such as radiator cooling fan drive, crane operation and air conditioning drive. Each unit are placed suitably connected in hyd. circuit with various control valve to perform the operation.

Circuit has been provided with various hyd. components such as strainer, oil filter, oil cooler and system control valves like check valve, flow control valve, over center valve, low oil level & high temperature safety switch for trouble free operation of unit.

Hydraulic. circuit working description are given as below. :

9.1) HYDRAULIC POWER PACK:

a. Engine transmission mounted double pump (Item no.-25) for radiator fan and A.C drive.
b. Engine transmission mounted piston pump (Item no.-20) for crane operation.
c. External electrical power operated motor and hyd. pump (Item no.-8 & 10) to drive one air conditioner when vehicle halt in depot.
d. Battery operated emergency windup motor & pump (Item no.-4 & 2).

A single large size of hyd. tank (Item no.-1) is provided which consist of suction strainers (Item no.-26), return filter (Item no.-30), low oil safety switch (Item no.-31) and high temperature safety switch (Item no.-27). Tank outlet ports are connected with shut off cock (Item no.-23 & 19) to suction line of various pump. Hyd. oil coolers (Item no.-12) and its choking. protection safety bypass check valve (Item no.-11) are provided to maintain safe working temperature i.e below 85ºC.

9.2) CRANE OPERATION:

To operate cranes, piston pumps (Item no.-33) are mounted on both main traction engines transmission P.T.O. window. Each pump has sufficient oil flow and pressure to operate one crane at a time.

There is a 3 position direction control valve (Item no.-7) which used as work mode selection valve to used one engine running power to operate one crane at a time. Crane will be operated by radio remote control with better work visibility as desire. Crane unit control circuit are provided with all desire safety features.

Crane stability is in ensure by 4 nos. stabilizer cylinder (Item no.-36). A priority 3 way flow control valve (Item no.-32) provide hyd. flow to stabilizer through control valve (Item no.-33). Shut off cock (Item no.-35) and pilot check valve (Item no.-37) are provided in stabilizer circuit as a safety.

9.3) TWIN RADIATOR FAN & AIR CONDITIONER DRIVE:-

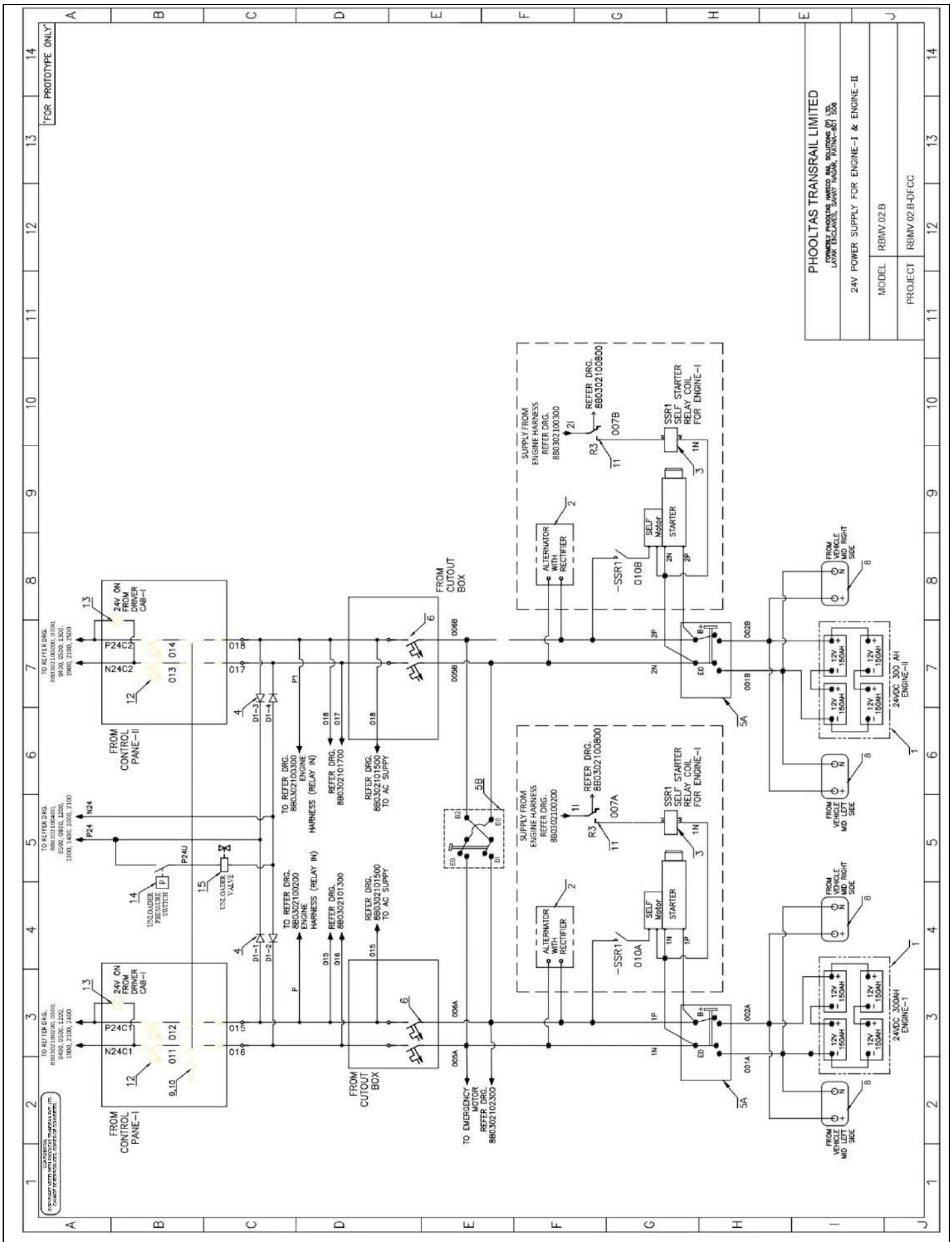
A tandem pump item no 25 are provided on both main traction power transmission driven P.T.O. When main engine run, its one outlet of pump operate one engine radiator fan motor item no. 32 for cooling of coolant & charge air cooler, 2nd outlet drive to air conditioner item no. 18 through flow divider item no. 38 .Pressure control valve item no. 24 are used in all pump pressure circuit to protect the system.

9.4) EXTERNAL ELECTRICAL POWER TO ONE AIR CONDITIONER:-

One electrical motor & hydraulic pump item no 8,10 are provided in the hyd. circuit.
This pump will be used to drive only one air conditioner unit by external electrical power supply to when vehicle is halt in depot and main engine are not in working. Suitable power socket and operating switches are provided in the vehicle for external power supply in depot.

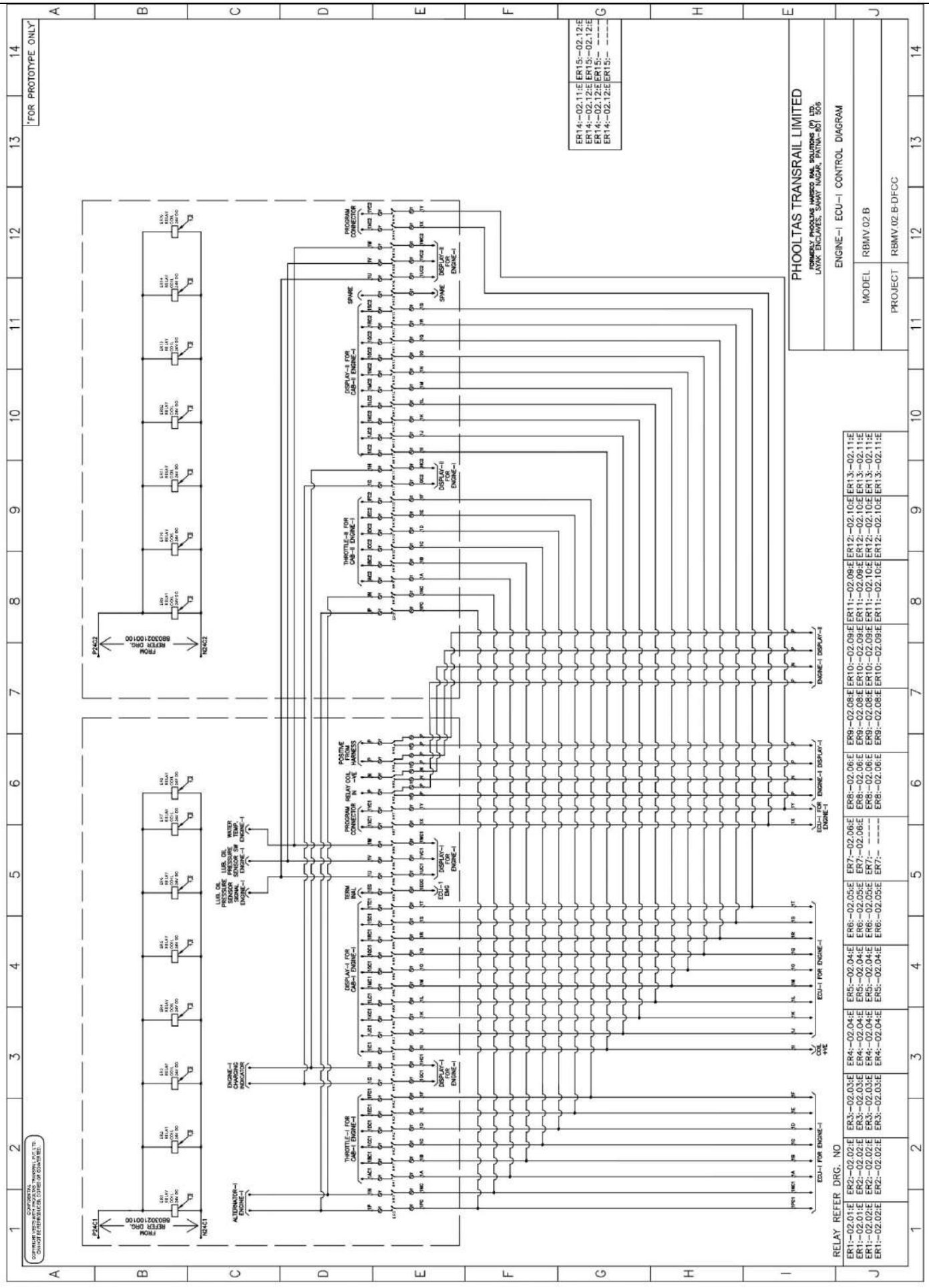
9.5) BATTERY OPERATED EMERGENCY HYD. POWER:-

To wind up the crane, platform and telescopic seat, There is a battery operated electrical motor and a small hyd. pump item no. 2 & 4 are provided in the circuit .In emergency situation this power will be use to wind up the extended unit if main & auxiliary power will be fails.



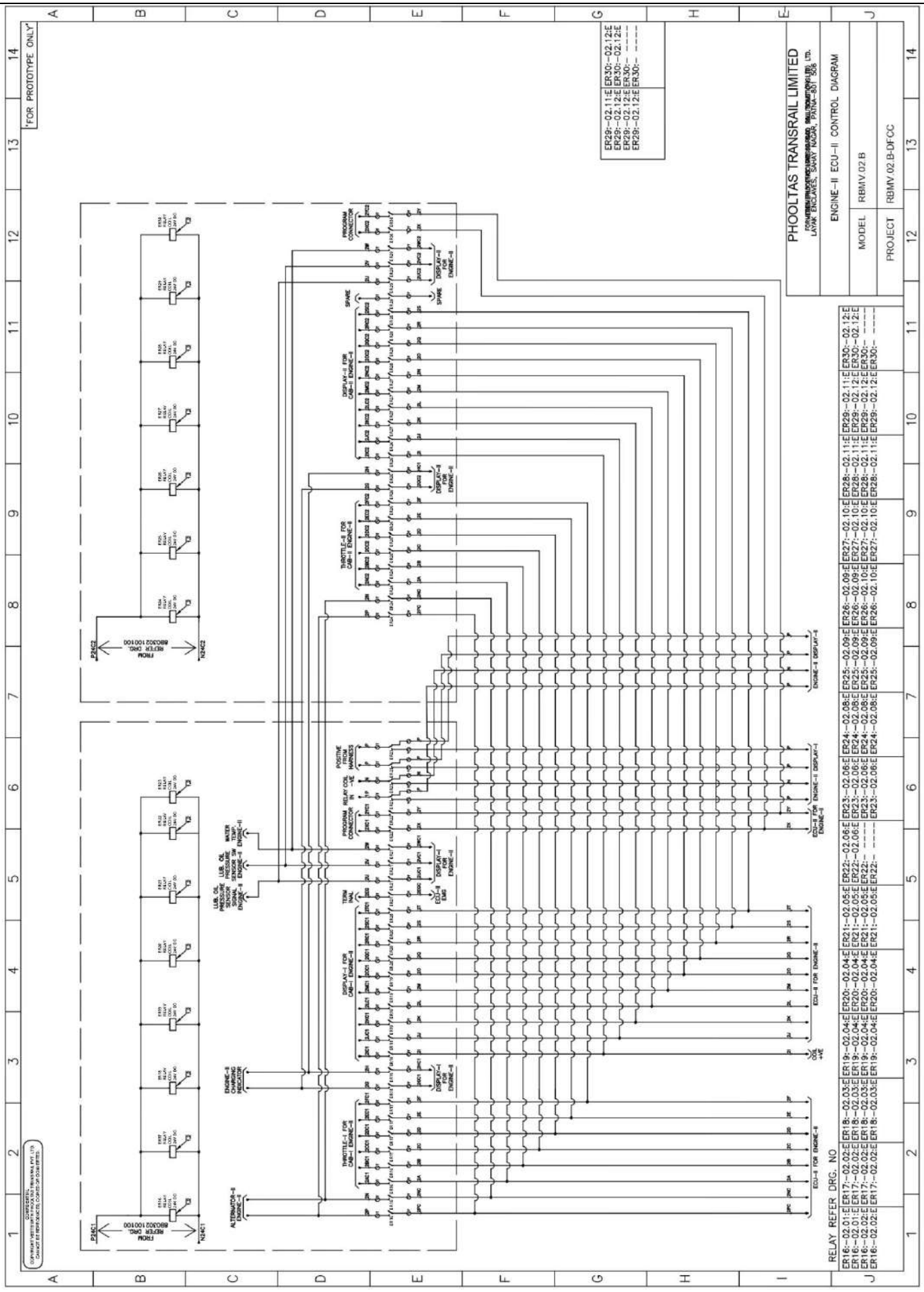
10.1) 24V POWER SUPPLY FOR ENGINE-I & ENGINE-II (3021001000)

S. NO.	DESCRIPTION	QTY.
1	12V 150 AH BATTERY	8 nos
2	ALTERNATOR 24V, 100A, MAKE- LUCAS TVS	2 nos
3	SELF STARTER RELAY	2 nos
4	DIODE IN5408 (D1 TO D4)	4 nos
5A-5B	BATTERY CUT OFF SWITCH 100 AMP	3 nos
6	40A DP MCB, DC	2 nos
7	6A SP MCB, DC	4 nos
8	SOCKET 2 POLE 20 AMP. FOR BATTERY CHARGING	4 nos
9	3P SEL. SWITCH WITH KEY OPERATING	1 no.
10	NO ELEMENT FOR S/W	4 nos
11	RELAY NO/NC CONTACT (R3)	2 nos
12	25A DP MCB, DC	2 nos
13	GREEN INDICATOR 24VOLT DC	2 nos
14	UNLOADER PRESSURE SWITCH	1 no.
15	UNLOADER VALVE	1 no.



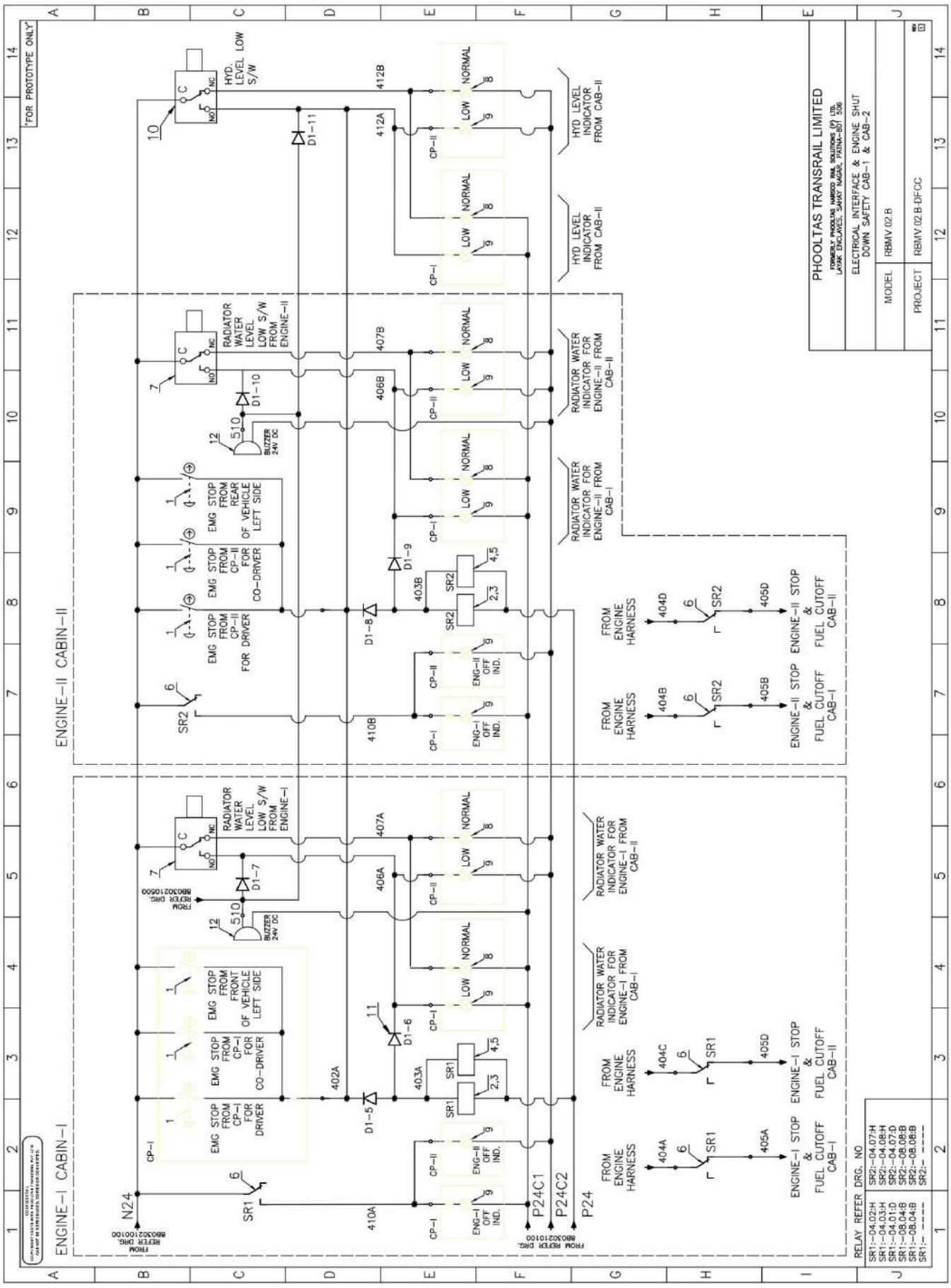
10.2) ENGINE-I ECU-I CONTROL DIAGRAM (3021002000)

S. NO.	DESCRIPTION	QTY.
1	RELAY 14 PIN 6A 24V DC 4 C/O	15 nos
2	RELAY BASE 14 PIN	15 nos



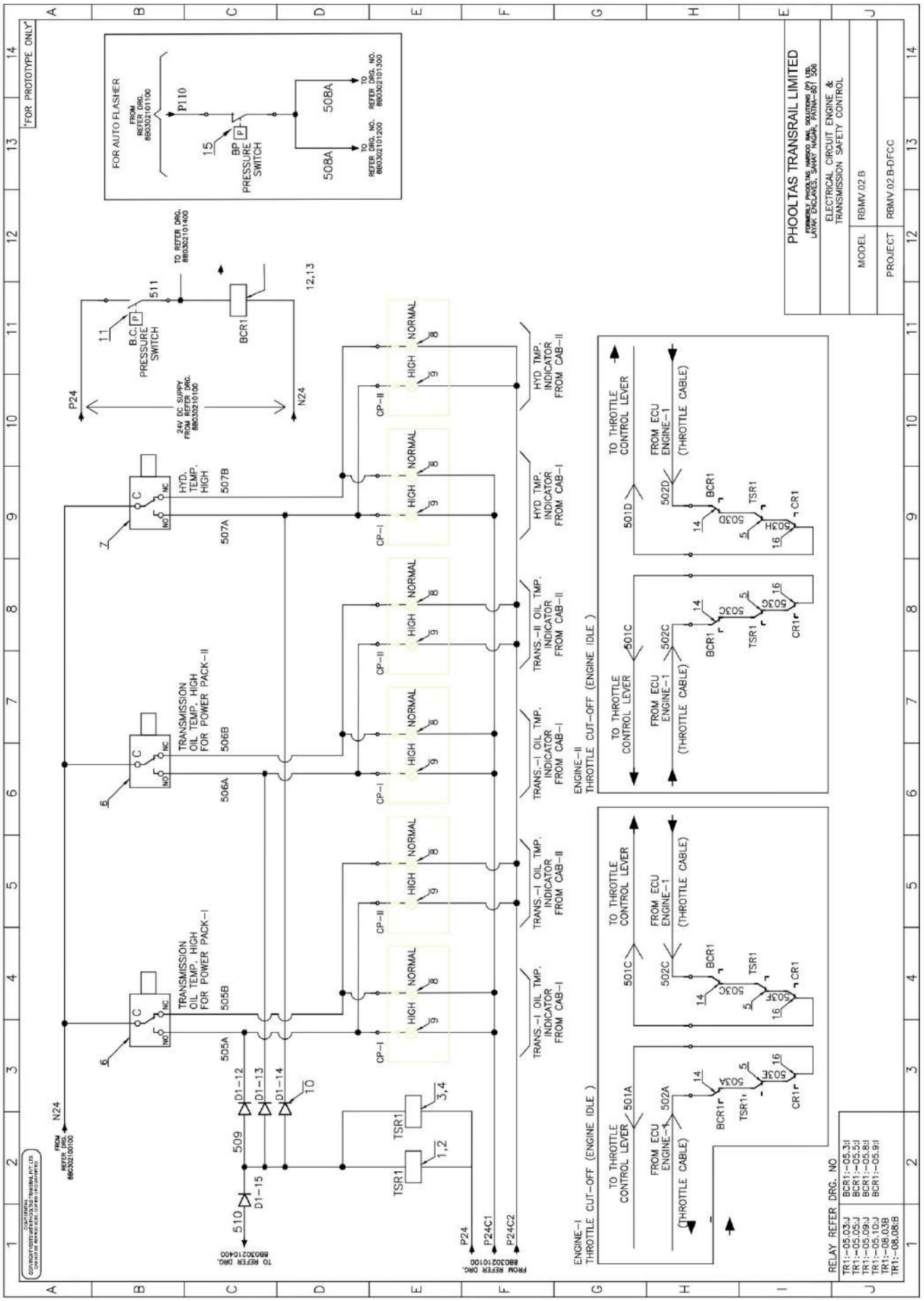
10.3) ENGINE-II ECU-II CONTROL DIAGRAM (3021003000)

S. NO.	DESCRIPTION	QTY.
1	RELAY 14 PIN 6A 24V DC 4 C/O	15 nos
2	RELAY BASE 14 PIN	15 nos



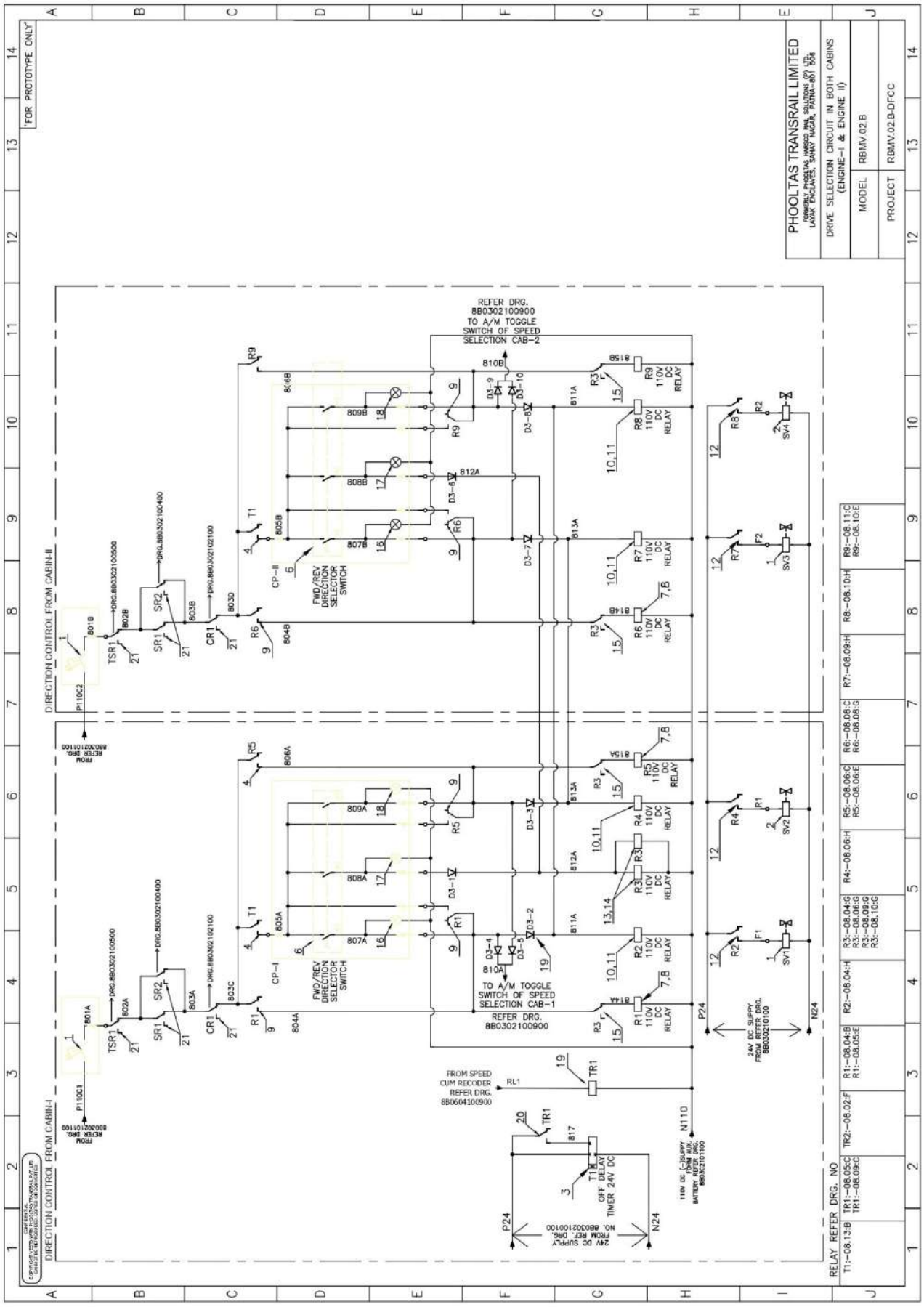
10.4) ELECTRICAL INTERFACE & ENGINE SHUT DOWN SAFETY CAB-1 & CAB-2 (3021004000)

S. NO.	DESCRIPTION	QTY.
1	RED EMERGENCY SWITCH MUSHROOM TYPE WITH NO POINT	12 nos
2	4 C/O RELAY, 24V DC (SR1 & SR2)	2 nos
3	4 C/O RELAY BASE (SR1 & SR2)	2 nos
4	2 C/O RELAY, 24V DC (SR1 & SR2)	2 nos
5	2 C/O RELAY BASE (SR1 & SR2)	2 nos
6	RELAY NO/NC CONTACT (SR1 & SR2)	6 nos
7	RADIATOR WATER LEVEL LOW SAFETY SWITCH, MAKE-SHRIDHAN	2 nos
8	GREEN INDICATOR 24VOLT DC	6 nos
9	RED INDICATOR 24VOLT DC	10 nos
10	HYD. LEVEL LOW SWITCH (HYDRAULICCKT)	1 no.
11	DIODE IN5408 (D5 TO D8)	4 nos
12	BUZZER 24VOLT V DC	2 nos



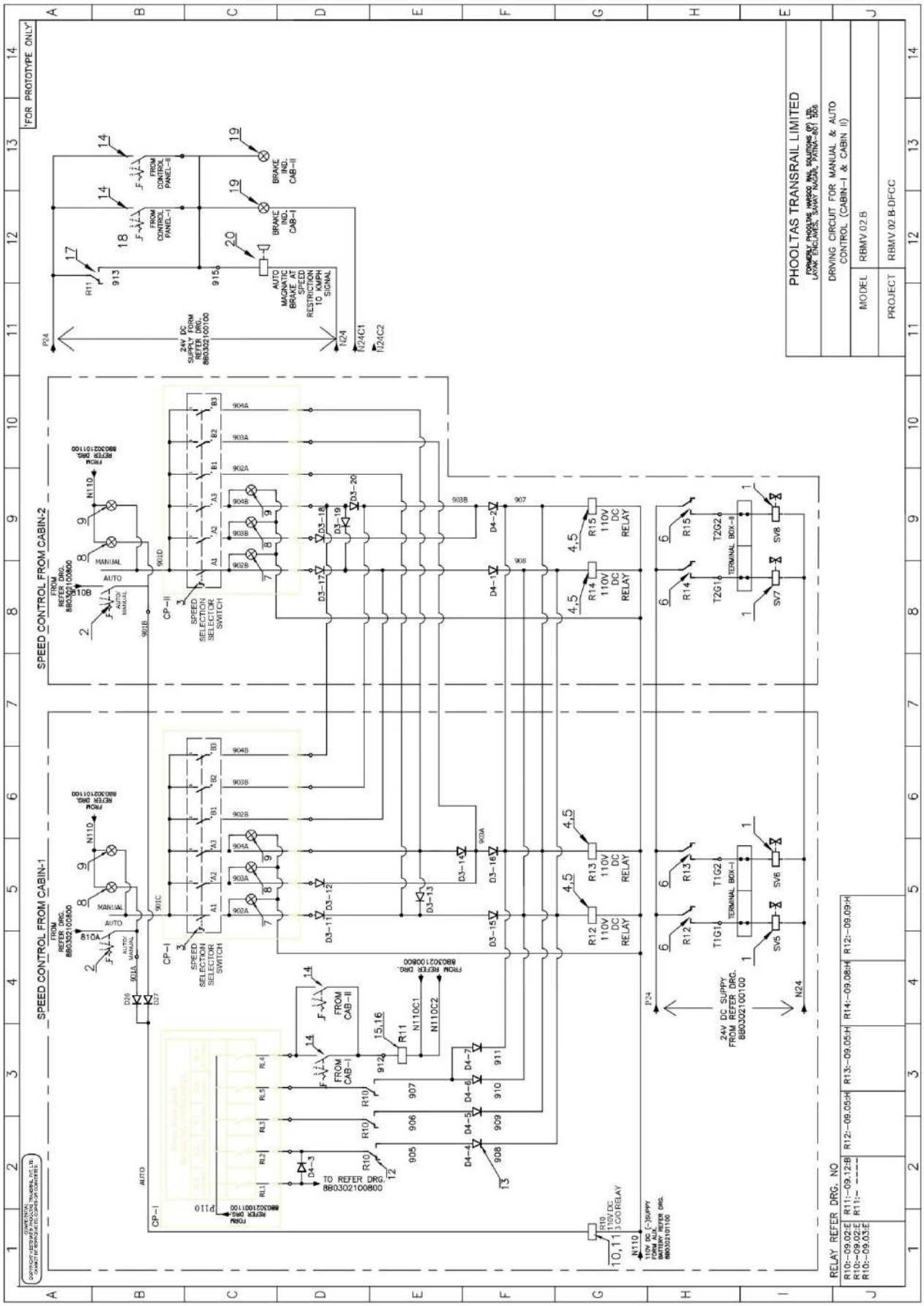
10.5) ELECTRICAL CIRCUIT ENGINE & TRANSMISSION SAFETY CONTROL (3021005000)

S. NO.	DESCRIPTION	QTY.
1	4 C/O RELAY, 24V DC (TSR1)	1 no.
2	4 C/O RELAY BASE (TSR1)	1 no.
3	2 C/O RELAY, 24V DC (TSR1)	1 no.
4	2 C/O RELAY BASE (TSR1)	1 no.
5	RELAY NO/NC CONTACT (TSR1)	4 nos
6	TRANSMISSION OIL TEMP. HIGH	2 nos
7	HYDRAULICTEMP. HIGH SWITCH	1 no.
8	INDICATOR 24VOLT DC GREEN	6 nos
9	INDICATOR 24VOLT DC RED	6 nos
10	DIODE IN5408 (D9 TO D11)	3 nos
11	B.C. PRESSURE SWITCH	1 no.
12	4 C/O RELAY, 24V DC (BCR1)	1 no.
13	4 C/O RELAY BASE (BCR1)	1 no.
14	RELAY NO/NC CONTACT (TSR1)	4 nos
15	B.P. PRESSURE SWITCH	1 no.



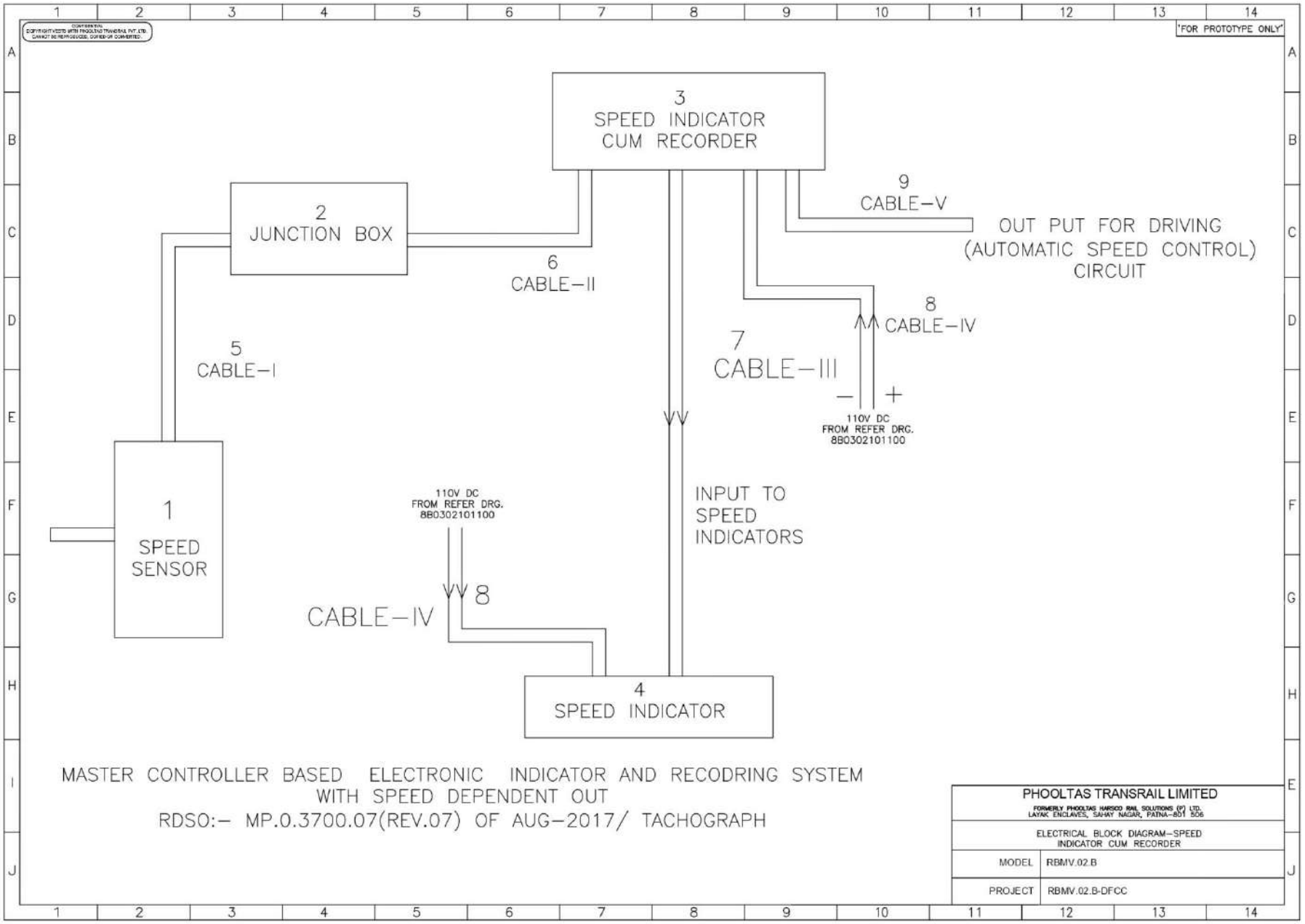
10.6) DRIVE SELECTION CIRCUIT IN BOTH CABIN (ENGINE-I & ENGINE -II) (3021006000)

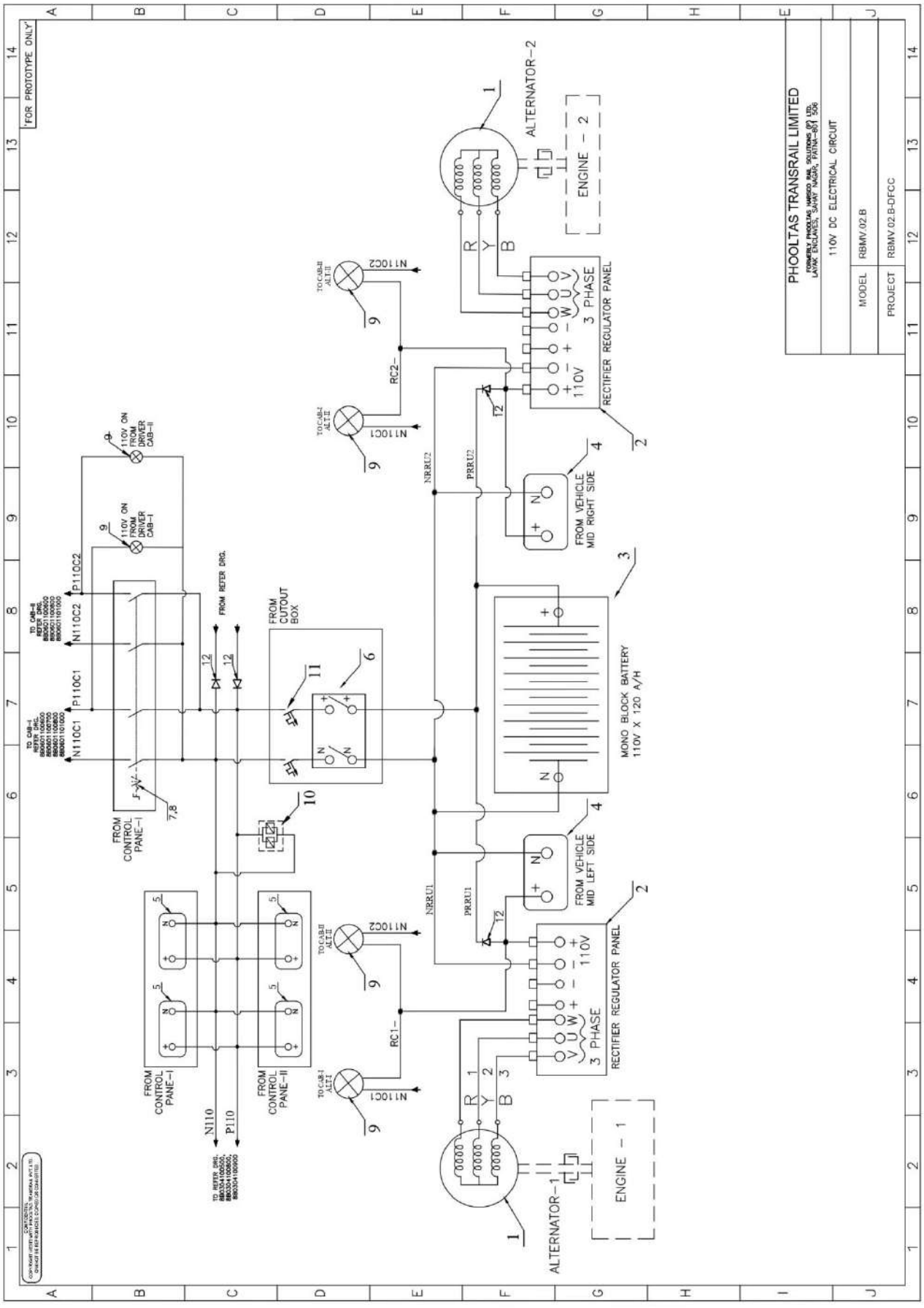
S. NO.	DESCRIPTION	QTY.
1	SINGLE SOLENOID VALVE 110V DCFOR FWD DIRECTION CONTROL	2 nos
2	SINGLE SOLENOID VALVE 110V DC FOR REV DIRECTION CONTROL	2 nos
3	OFF DELAY TIMER 1 C/O, (T1) COIL 24V DC	1 no.
4	TIMER (T1) NO/NC CONTACT	2 nos
5	DIODE IN5408 (D12 TO D21)	10 nos
6	16A ROTARY SWITCH SINGLE POLE, 4 WAY,61050 FOR DIRECTION FWD/REV	2 nos
7	8 PIN, 2 CHANGEOVER RELAY (R1,R5,R6,R9) 110V DC	4 nos
8	8 PIN 2 CHANGEOVER RELAY BASE (R1,R5,R6,R9)	4 nos
9	RELAY NO/NC CONTACT (R1,R5,R6,R9) FOR 2 CHANGEOVER REALY	8 nos
10	5 PIN, 1 CHANGEOVER RELAY (R2,R4,R7,R8) 110V DC	4 nos
11	5 PIN 2 CHANGEOVER RELAY BASE (R2,R4,R7,R8)	4 nos
12	RELAY NO/NC CONTACT (R2,R4,R7,R8) FOR 1 CHANGEOVER REALY	4 nos.
13	14PIN, 4 CHANGEOVER RELAY (R3) 110V DC	2 nos
14	14PIN, 4 CHANGEOVER RELAY BASE (R3)	2 nos
15	RELAY NO/NC CONTACT (R3) FOR 4 CHANGEOVER REALY	4 nos
16	GREEN INDICATOR 110V DC FOR FORWARD DIRECTION	2 nos
17	YELLOW INDICATOR 110V DC FOR NEUTRAL DIRECTION	2 nos
18	BLUE INDICATOR 110V DC FOR REVERSE DIRECTION	2 nos
19a	5 PIN, 1 CHANGEOVER RELAY (TR2) 110V DC	1 no.
19b	5 PIN, 1 CHANGEOVER RELAY BASE (TR2)	1 no.
20	RELAY NO/NC CONTACT (TR2) FOR 2 CHANGEOVER REALY	1 no.
21	RELAY NO/NC CONTACT (TSR1,SR1,SR2,CR1)	8 nos



10.7) DRIVER CIRCUIT FOR MANUAL & AUTO CONTROL (CABIN-I & CABIN-II) (3021007000)

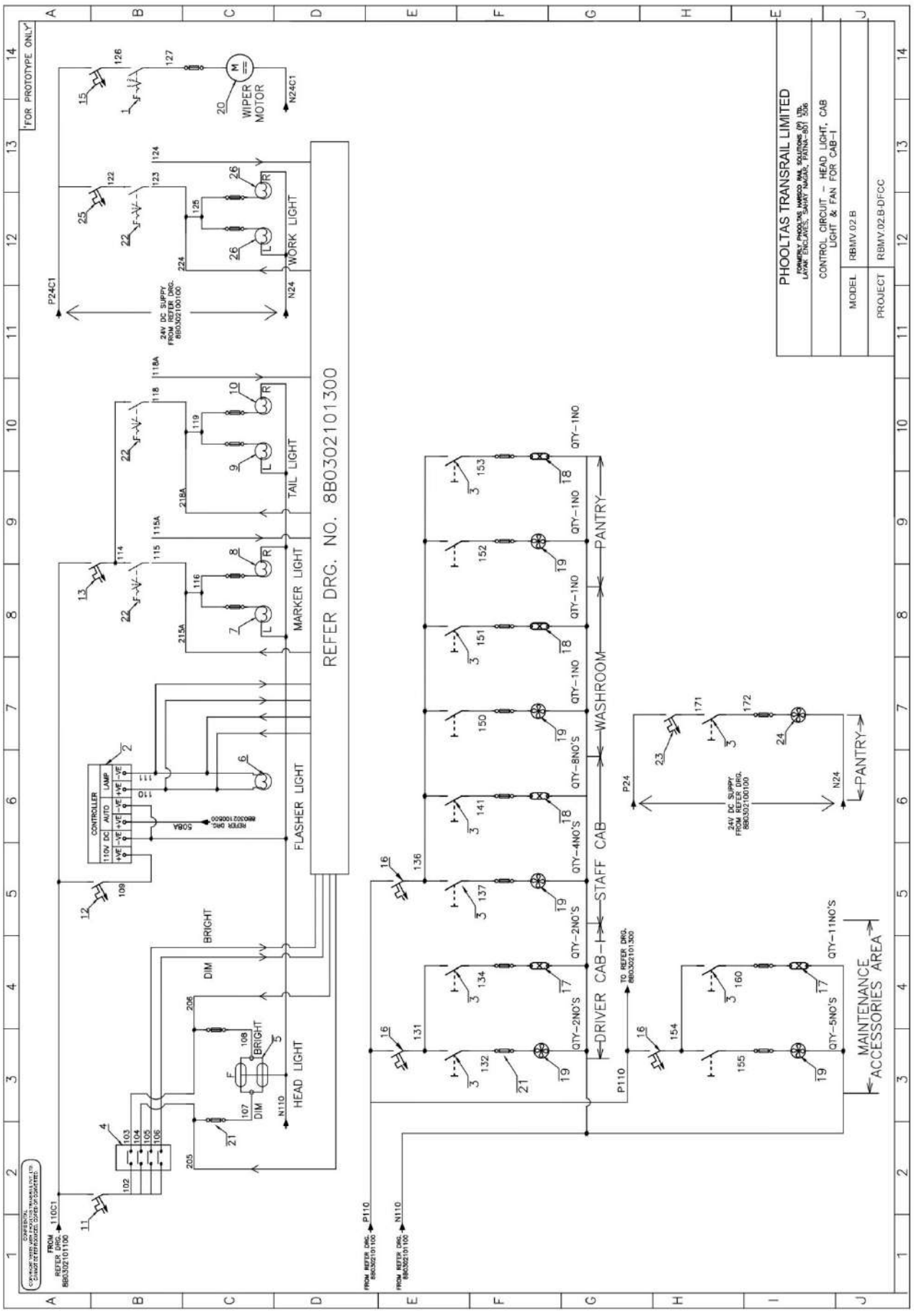
S. NO.	DESCRIPTION	QTY.
1	SINGLE SOLENOID VALVE 24V DC FOR SPEED SELECTION (BOTH TRANS.)	4 nos
2	AUTO/MANUAL 3P SELECTOR SWITCH	2 nos
3	16A ROTARY SWITCH, 2P3W, GEAR SEL., 61080	2 nos
4	5 PIN,1C/O RELAY COIL(R12,R13,R14,R15)110V	4 nos
5	5 PIN,1C/O RELAY BASE(R12,R13,R14,R15)	4 nos
6	RELAY NO/NC CONTACT (R12,R13,R14,R15) FOR 1 CHANGEOVER REALY	4 nos
7	GREEN INDICATOR 110V DC FOR SPEED-1	2 nos
8	YELLO INDICATOR 110V DC FOR SPEE-2	4 nos
9	BLUE INDICATOR 110V DC FOR SPEED-3	4 nos
10	3 C/O RELAY COIL (R10) 110V DC	1 no.
11	3 C/O RELAY BASE(R10)	1 no.
12	RELAY NO/NC CONTACT (R10)	3 nos
13	DIODE IN5408 (D22 TO D38)	17 nos
14	ON/OFF 2P SELECTOR SWITCH NO ELEMENT FOR S/W	8 nos
15	2 C/O RELAY COIL (R8) 110V DC	1 no.
16	2 C/O RELAY BASE(R8)	1 no.
17	RELAY NO/NC CONTACT (R8)	2 nos
18	RED INDICATOR 24VOLT DC	2 nos
19	SOLENOID VALVE 24V DC	1 no.


"FOR PROTOTYPE ONLY"
3
SPEED INDICATOR
CUM RECORDER
2
JUNCTION BOX
6
CABLE–II
9
CABLE–V
OUT PUT FOR DRIVING
(AUTOMATIC SPEED CONTROL)
CIRCUIT
8
CABLE–IV
7
CABLE–III
5
CABLE–I
– +
110V DC
FROM REFER DRG.
8B0302101100
1
SPEED
SENSOR
110V DC
FROM REFER DRG.
8B0302101100
INPUT TO
SPEED
INDICATORS
CABLE–IV
8
4
SPEED INDICATOR
MASTER CONTROLLER BASED ELECTRONIC INDICATOR AND RECODRING SYSTEM
WITH SPEED DEPENDENT OUT
RDSO:– MP.0.3700.07(REV.07) OF AUG–2017/ TACHOGRAPH
PHOOLTAS TRANSRAIL LIMITED
FORMERLY PHOOLTAS HARSCO RAIL SOLUTIONS (P) LTD.
LAYAK ENCLAVES, SAHAY NAGAR, PATNA–801 506
ELECTRICAL BLOCK DIAGRAM–SPEED
INDICATOR CUM RECORDER
MODEL RBMV.02.B
PROJECT RBMV.02.B-DFCC



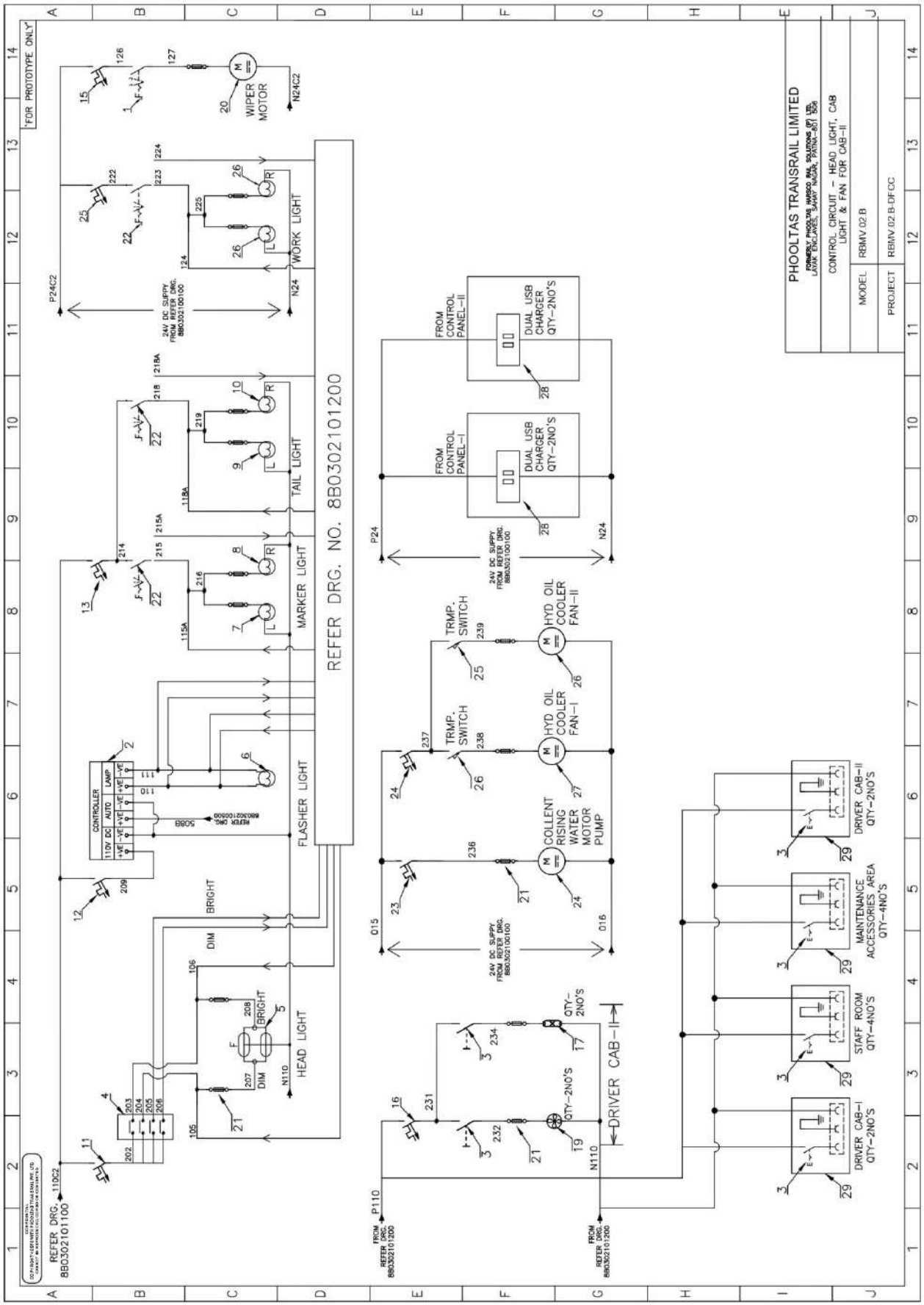
10.8) 110V DC ELECTRICAL CIRCUIT (3021008000)

S. NO.	DESCRIPTION	QTY.
1	AUXILLIARY ALTERNATOR 4.5 KW,110V	2 nos.
2	RECTIFIER REGULATOR PANEL	2 nos.
3	BATTERY110V X 120 AH	1 no.
4	SOCKET 2 POLE 20 AMP. FOR BATTERY CHARGING	2 nos.
5	SOCKET 2 POLE 20 AMP. FOR HAND SIGNALS	4 nos.
6	BATTERY CUT OFF SWITCH100AMP	1 no.
7	3 POS. SEL. S/W WITH KEY OPERATE	1 no.
8	NO ELEMENT FOR S/W	2 nos.
9	NO ELEMENT FOR S/W	6 nos.
10	AIR DRYER PURGE VALVE	1 no.
11	40A DP MCB, DC	1 no.
12	25A DIODE, MODEL NO-25HM160 M8 WL, MAKE-RUTTONSHA	4 nos.



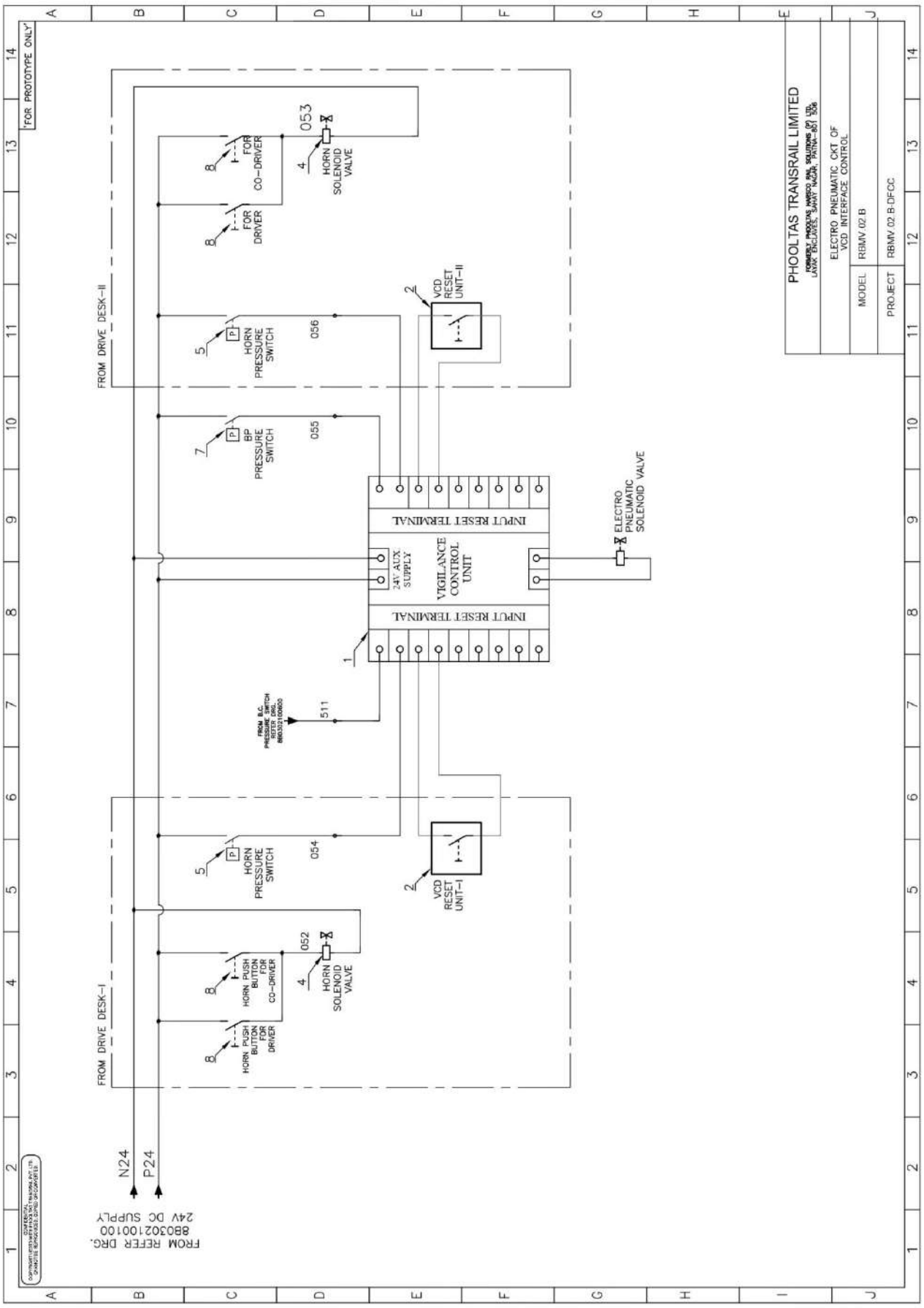
10.9) CONTROL CIRCUIT – HEAD LIGHT, CABIN LIGHT & FAN FOR CAB-I (3021009000)

S. NO.	DESCRIPTION	QTY.
1	ON/OFF 2P SELECTOR SWITCH	1 no.
2	FLASHER LIGHT CONTROL UNIT	1 no.
3	ONE WAY SWITCH, COLOR-WHITE	40 nos
4	ROTARY SWITCH 1P 5W-HEAD LIGHT	1 no.
5	HEAD LIGHT 110V DC	1 no.
6	FLASHER LIGHT 110V DC	1 no.
7	MARKER LIGHT LEFT 110V DC	1 no.
8	MARKER LIGHT RIGHT 110V DC	1 no.
9	TAIL LIGHT LEFT 110V DC	1 no.
10	TAIL LIGHT RIGHT 110V DC	1 no.
11	MCB 6A SP FOR HEAD LIGHT	1 no.
12	MCB 6A SP FOR FLASHER LIGHT	1 no.
13	MCB 6A SP FOR MAR.&TAIL LIGHT	1 no.
14	MCB 16A SP FOR WIPER MOTOR	1 no.
15	MCB 6AMP FOR LIGHT & FAN	3 nos
16	DRIVER CAB LIGHT 110V, 18W	2 nos
17	DRIVER CAB LIGHT 110V, 9W	21 nos
18	FAN 110V DC	13 nos
19	WIPER 24V DC	1 no.
20	GLASS FUSE	46 nos
21	ON/OFF/ON 3P SWITCH	2 nos
22	MCB 6A SP FOR EXHAUST FAN	1 no.
23	8" FAN EXHAUST 24V DC	1 no.
24	MCB 6A SP FOR WORK LIGHT	1 no.
25	WORK LIGHT RIGHT 24V DC	2 nos



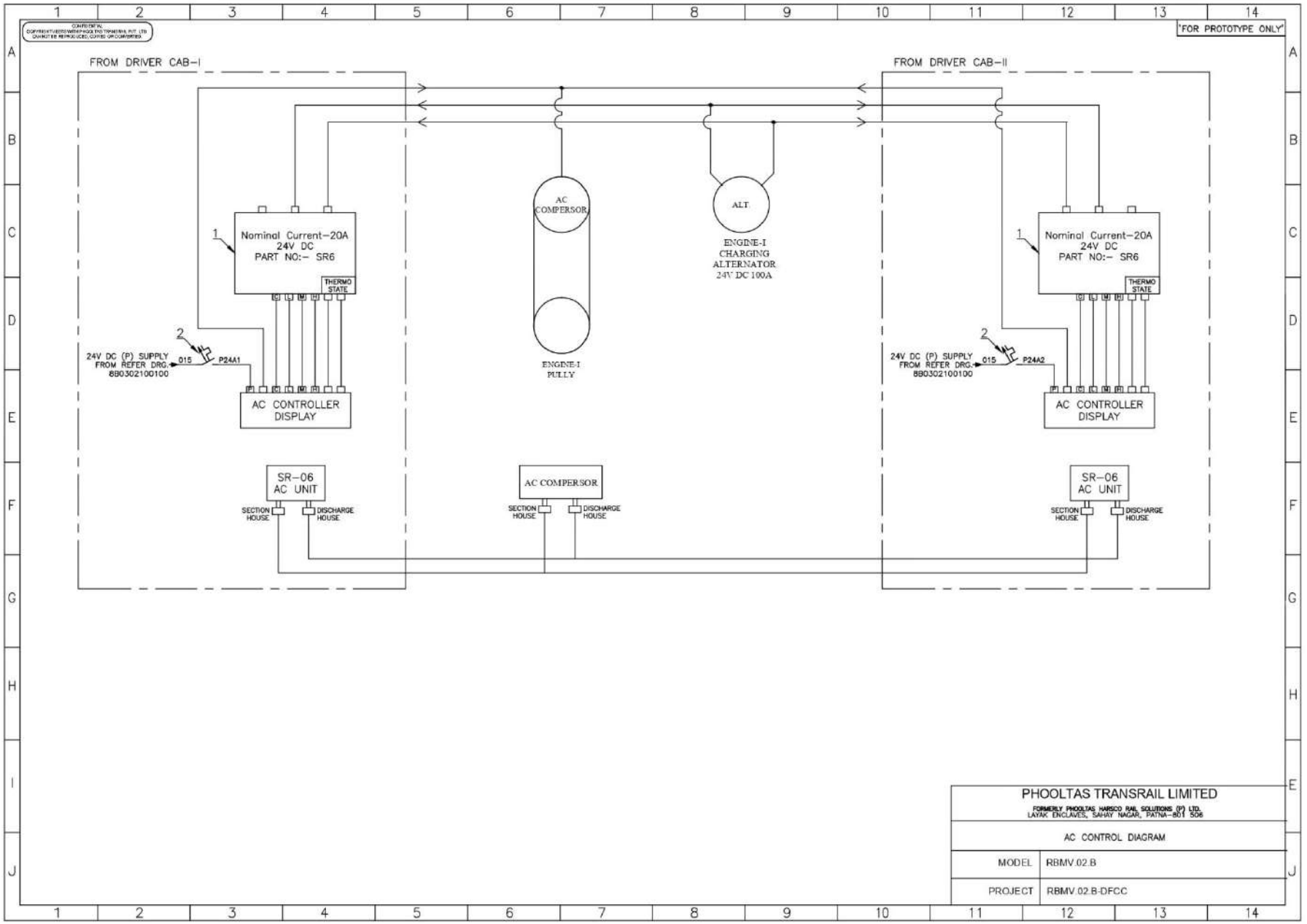
10.10) CONTROL CIRCUIT – HEAD LIGHT, CABIN LIGHT & FAN FOR CAB-I (3021010000)

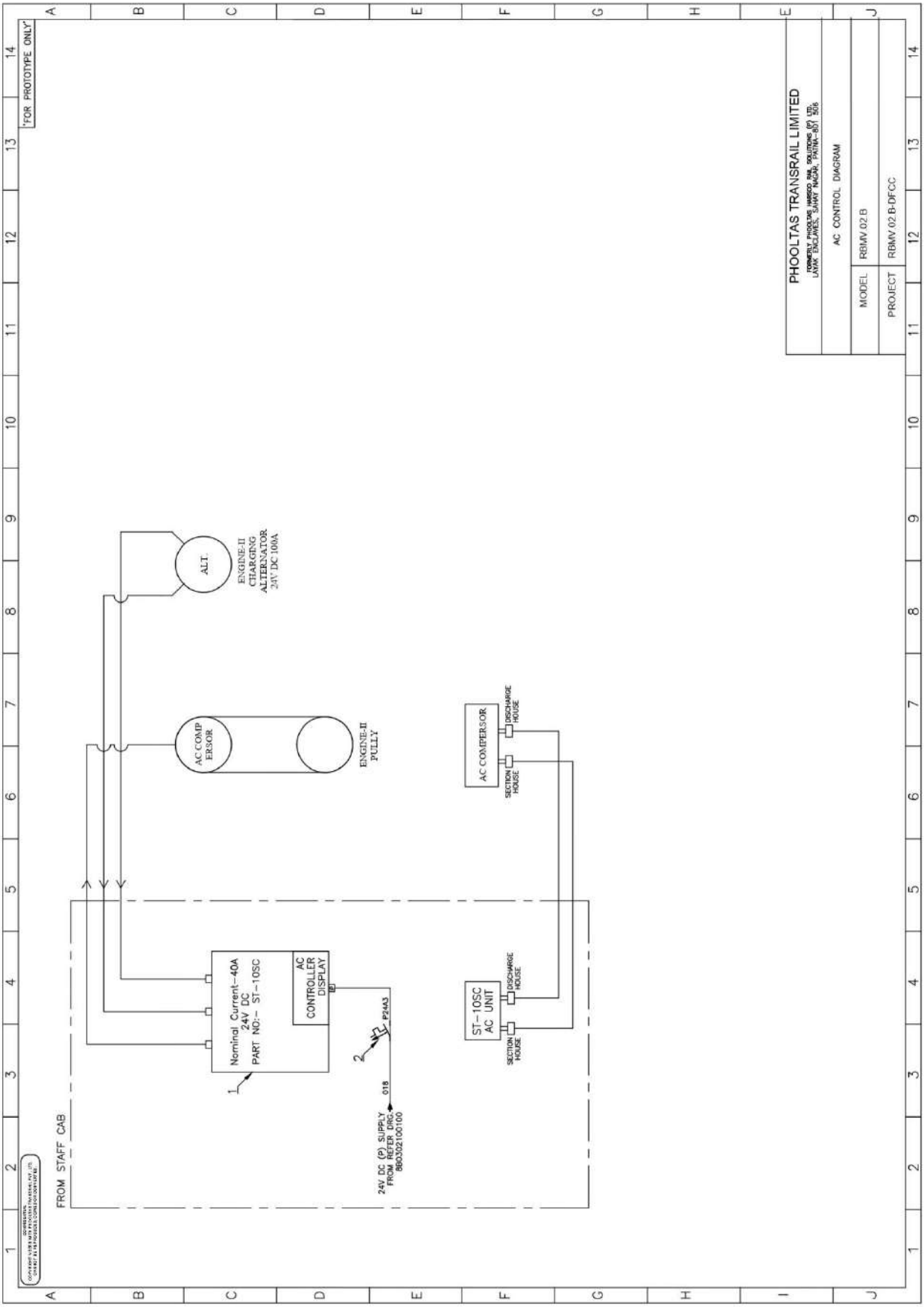
S. NO.	DESCRIPTION	QTY.
1	ON/OFF 2P SELECTOR SWITCH	1 no.
2	FLASHER LIGHT CONTROL UNIT	1 no.
3	ONE WAY SWITCH, COLOR-WHITE	17 no.
4	ROTARY SWITCH 1P 5W FOR HEAD LIGHT	1 no.
5	HEAD LIGHT 110V DC	1 no.
6	FLASHER LIGHT 110V DC	1 no.
7	MARKER LIGHT LEFT 110V DC	1 no.
8	MARKER LIGHT RIGHT 110V DC	1 no.
9	TAIL LIGHT LEFT 110V DC	1 no.
10	TAIL LIGHT RIGHT 110V DC	1 no.
11	MCB 6A SP FOR HEAD LIGHT	1 no.
12	MCB 6A SP FOR FLASHER LIGHT	1 no.
13	MCB 6A SP FOR MAR.&TAIL LIGHT	1 no.
14	MCB 16A SP FOR WIPER MOTOR	1 no.
15	MCB 6AMP FOR LIGHT & FAN	1 no.
16	DRIVER CAB LIGHT 110V, 18W	2 nos
17	FAN 110V DC	2 nos
18	WIPER 24V DC	1 no.
19	GLASS FUSE	15 nos
20	ON/OFF/ON 3P SWITCH	2 nos
21	MCB 16A SP FOR WATER MOTOR	1 no.
22	0.23KW 24V DC MOTOR	1 no.
23	MCB 16A SP FOR HYDRAULICOIL COOLER FAN	1 no.
24	TEMPERATURE SWITCH VARUAVKE TYPE (25°C - 90°C)	2 nos
25	HYDRAULICOIL COOLER FAN	2 nos
26	DUAL USB CHARGER	4 nos
27	TWIN SOCKET	14 nos



10.11) ELECTRO PNEUMATIC CKT OF VCD INTERFACE CONTROL (3021011000)

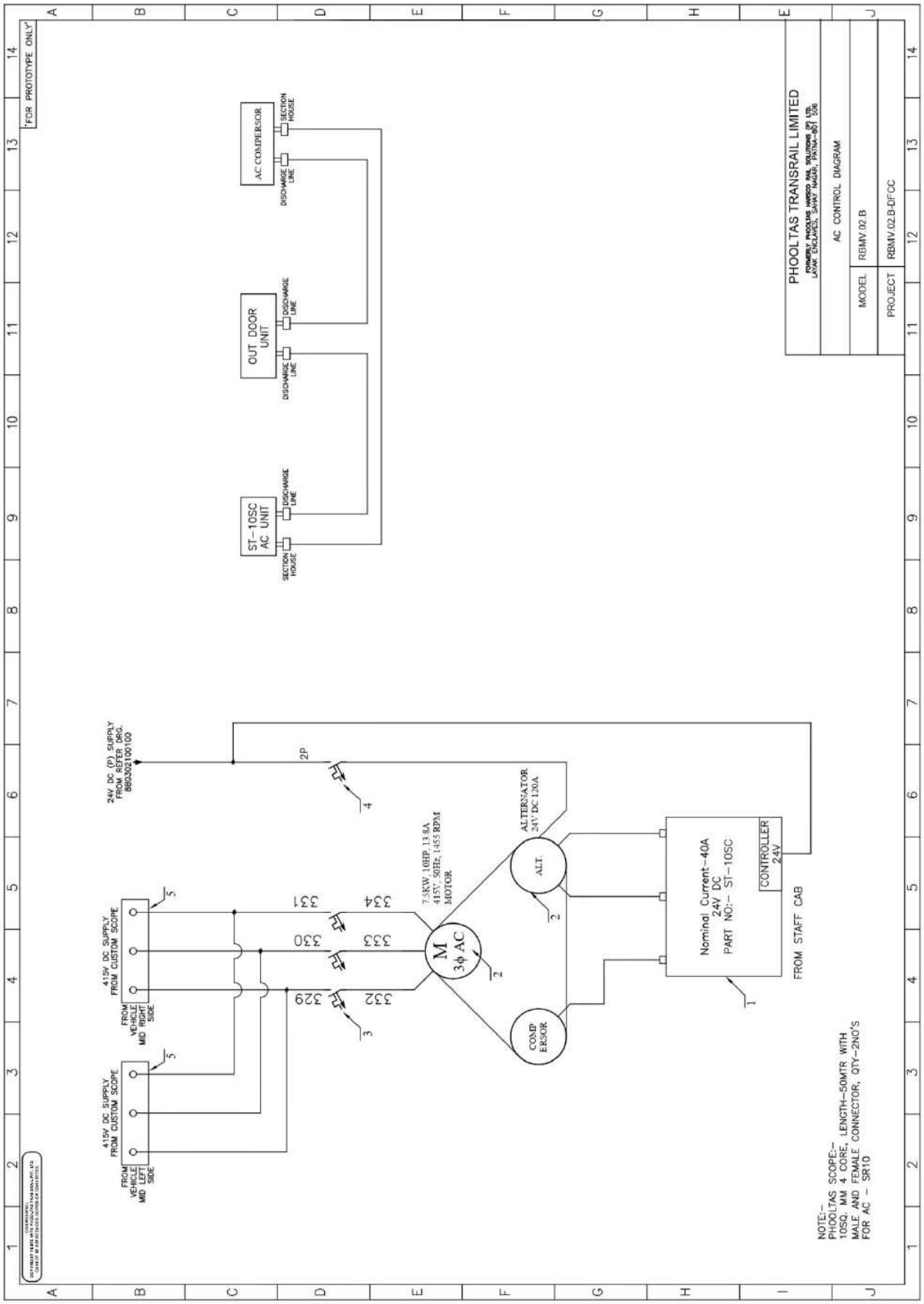
S. NO.	DESCRIPTION	QTY.
1	VCD CONTROL UNIT	1 no.
2	VCD RESET UNIT	2 nos
3	HORN SOLENOID VALVE	2 nos
4	HORN PRESSURE SWITCH	2 nos
5	B.C PRESSURE SWITCH	2 nos
6	HORN PUSH BUTTON SWITCH YELLOW NO	8 nos
7	ELECTRO PNEUMATIC SOLENOID VALVE	1 no.


'FOR PROTOTYPE ONLY'
FROM DRIVER CAB–I
FROM DRIVER CAB–II
Nominal Current–20A
24V DC
PART NO:– SR6
THERMO STATE
24V DC (P) SUPPLY
FROM REFER DRG.
8B0302100100
015
P24A1
P24A2
AC CONTROLLER DISPLAY
AC COMPERSOR
ENGINE-I PULLY
ALT.
ENGINE-I CHARGING ALTERNATOR 24V DC 100A
SR–06 AC UNIT
SECTION HOUSE
DISCHARGE HOUSE
PHOOLTAS TRANSRAIL LIMITED
FORMERLY PHOOLTAS HARSCO RAIL SOLUTIONS (P) LTD.
LAYAK ENCLAVES, SAHAY NAGAR, PATNA–801 506
AC CONTROL DIAGRAM
MODEL
RBMV.02.B
PROJECT
RBMV.02.B-DFCC



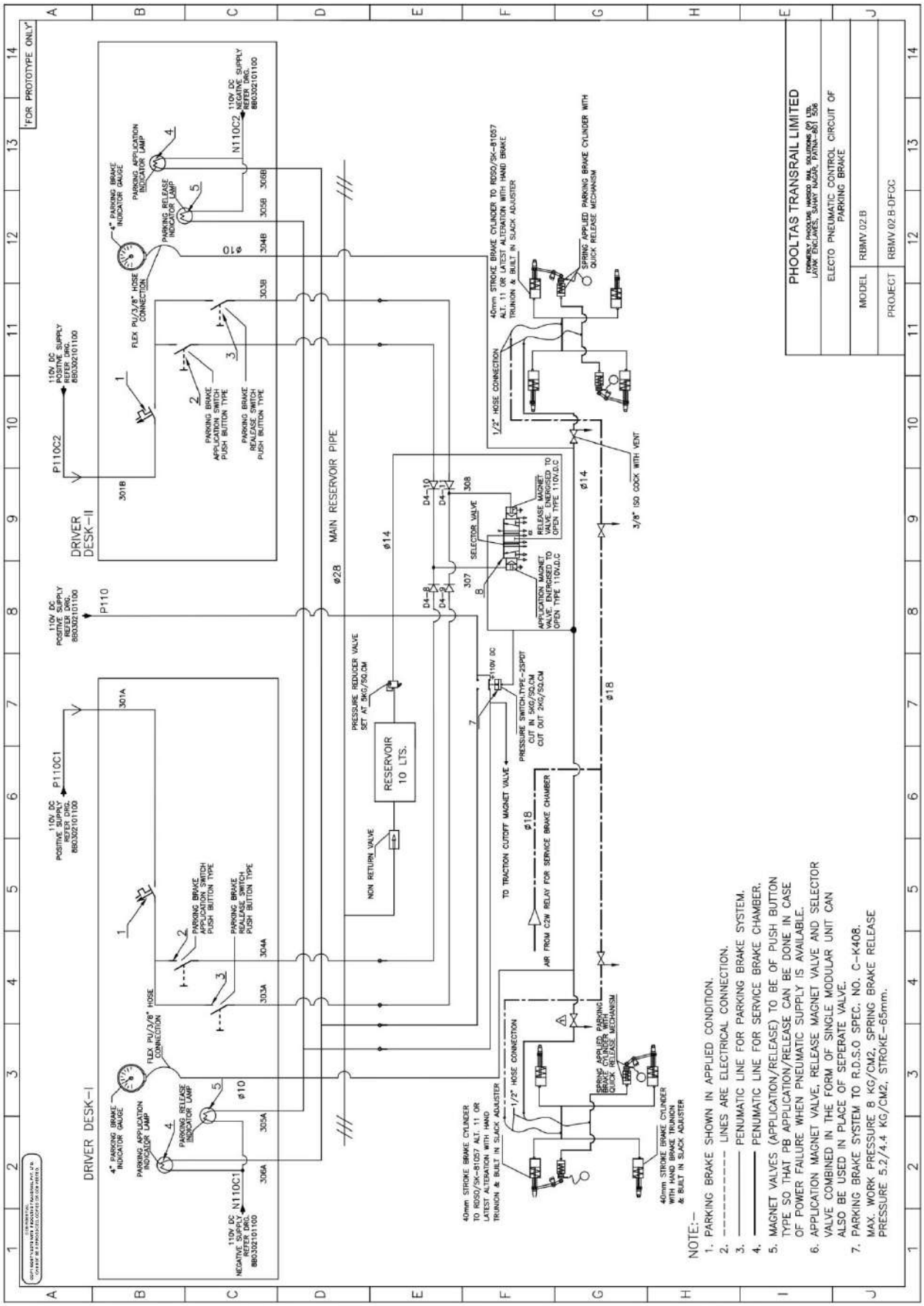
10.12) AC CONTROL DIAGRAM (3021012000)

S. NO.	DESCRIPTION	QTY.
1	40A AC, 24V DC, PART NO- ST-10SC	4 no.
2	6A SP MCB, DC	4 no.



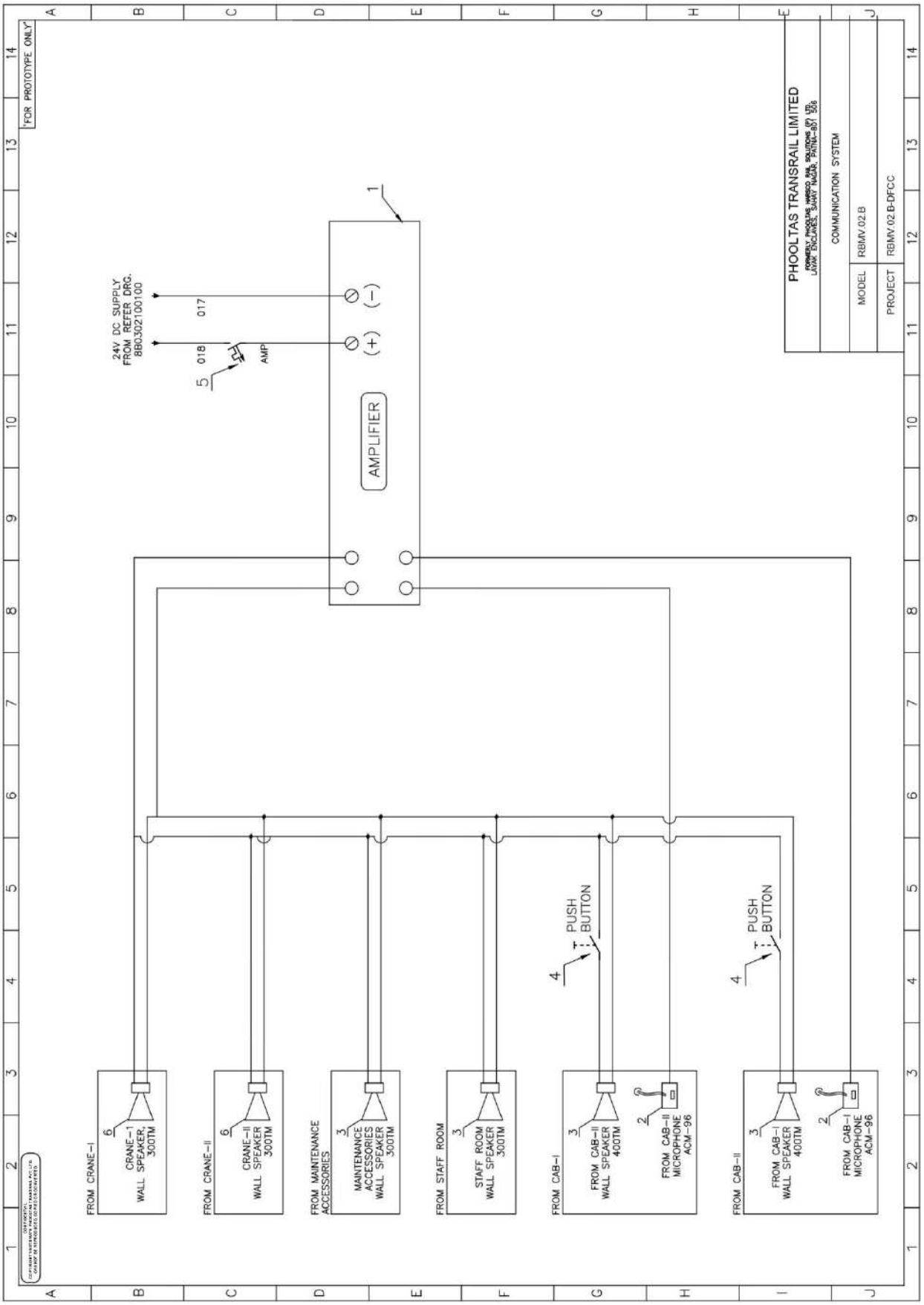
10.13) AC CONTROL DIAGRAM (3021013000)

S. NO.	DESCRIPTION	QTY.
1	40A AC, 24V DC, PART NO- ST-10SC	1 no.
2	THREE PHASE MOTOR & ALTERNATOR	1 no.
3	32A TP MCB, AC	1 no.
4	6A SP MCB, DC	1 no.
5	5 PINS PANEL MOUNTING SOCKET 30A 415V	2 no.



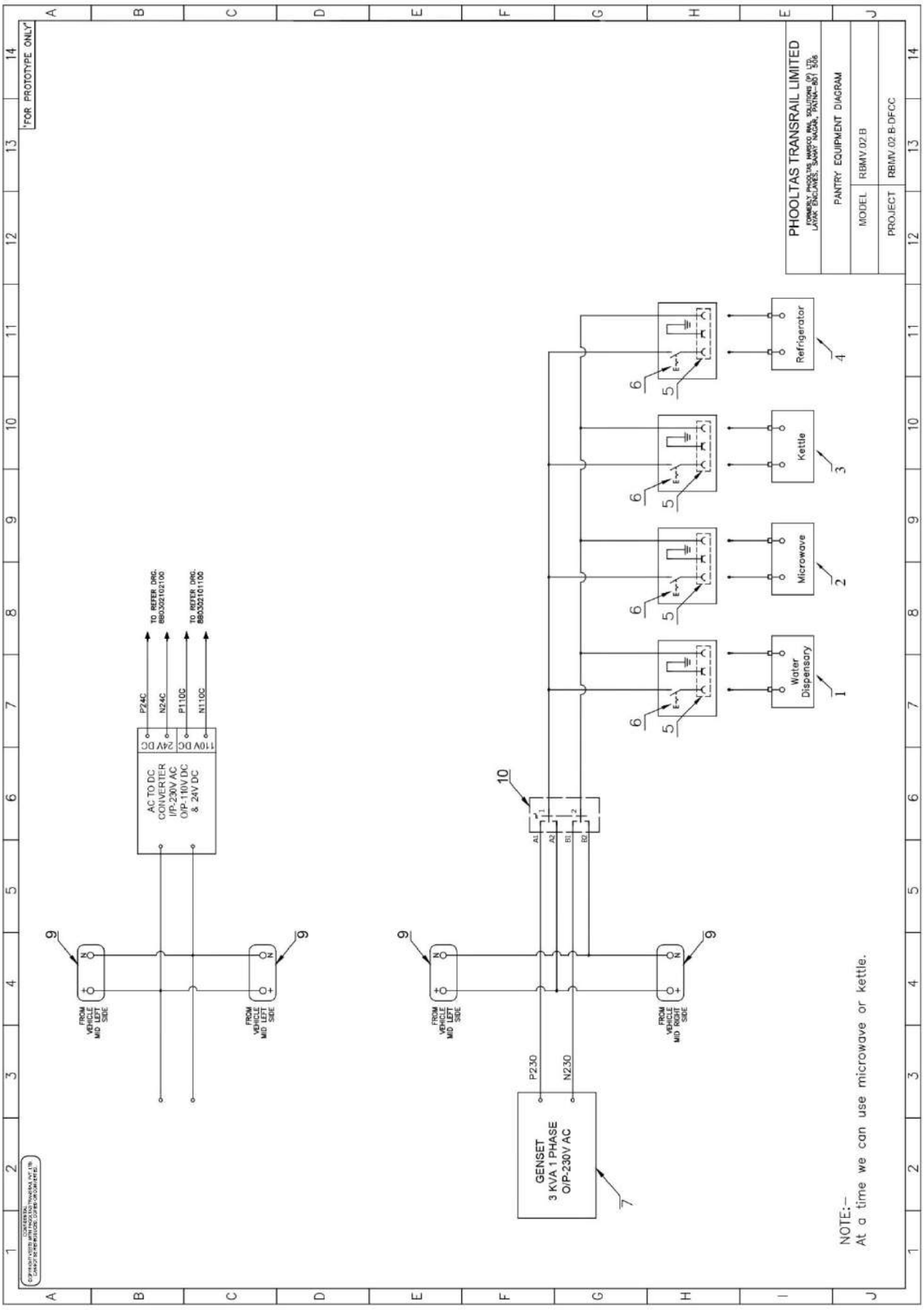
10.14) ELECTRO PNEUMATIC CONTROL CIRCUIT OF PARKING BRAKE (3021014000)

S. NO.	DESCRIPTION	QTY.
1	6A SP MCB	2 nos
2	PARKING BRAKE APPLICATION RED PUSH BUTTON SWITCH	2 nos
3	PARKING BRAKE RELEASE GREEN PUSH BUTTON SWITCH	2 nos
4	PARKING APPLICATION RED INDICATOR 110V DC	2 nos
5	PARKING RELEASE GREEN INDICATOR 110V DC	2 nos
6	DIODE IN5408 (D39 TO D42)	4 nos
7	PARKING PRESSSURE SWITCH	1 no.
8	SELECTOR VALVE 110V DC	1 no.



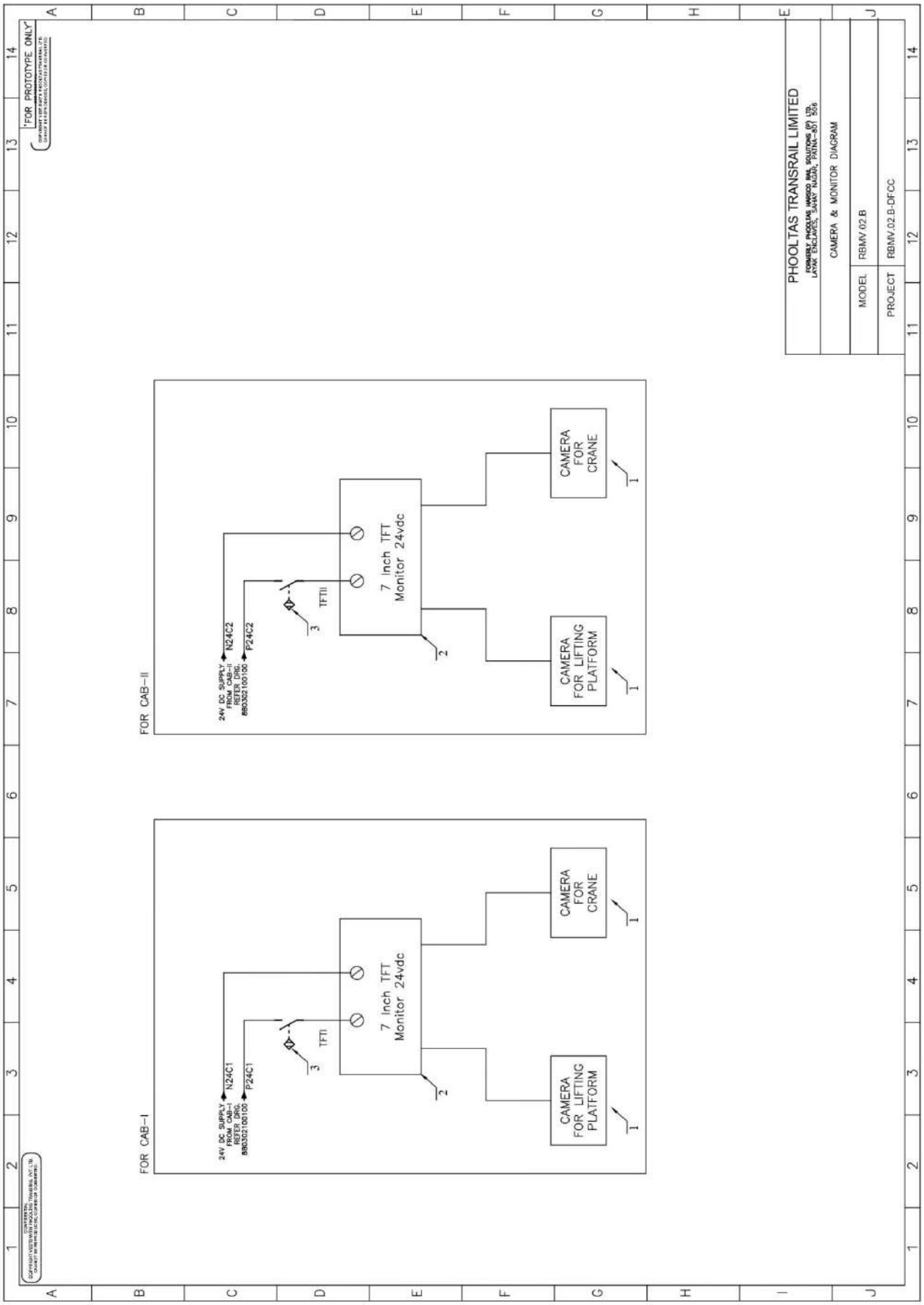
10.15) COMMUNICATION SYSTEM (3021015000)

S. NO.	DESCRIPTION	QTY.
1	AMPLIFIER	1 no.
2	MICROPHONE	2 nos
3	WALL SPEAKER, 300TM	4 nos
4	YELLOW PUSH BUTTON SWITCH WITH NO ELEMENT	4 nos
5	MCB 16A SP	1 no.
6	WALL MOUNTED, OUTDOOR SPEAKER	2 nos



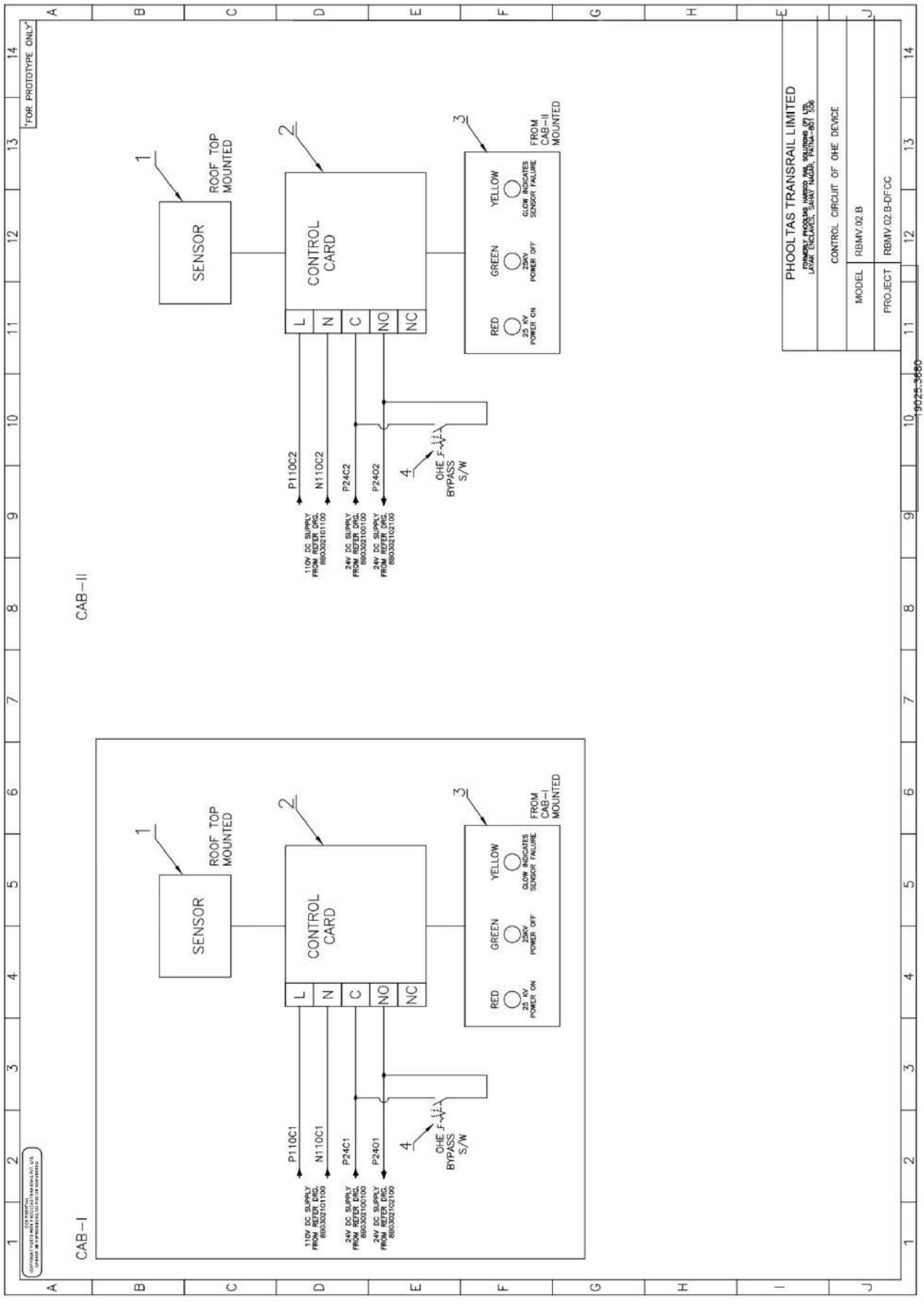
10.16) PANTRY EQUIPMENT DIAGRAM (3021016000)

S. NO.	DESCRIPTION	QTY.
1	Water Dispensary, 230v Ac 500w	1 no.
2	Microwave 230v Ac, 1150w	1 no.
3	Kettle, 230v Ac, 1500w	1 no.
4	Refrigerator, 230v Ac, 65w	1 no.
5	Socket, Color-White	4 nos
6	10a 1 Way Switch, Color-White	4 nos
7	Honda Genset Eu30is	1 no.
8	AC TO DC Converter, CAPACITY- 2.0KVA, I/P-230VAC, O/P-110V DC & (B) 24 VDC	1 no.
9	Socket 2 Pole 20 Amp.	4 nos
10	Changeover Switch 2 Pole 2 Way,25amp, Make-Gic, 61026	1 no.



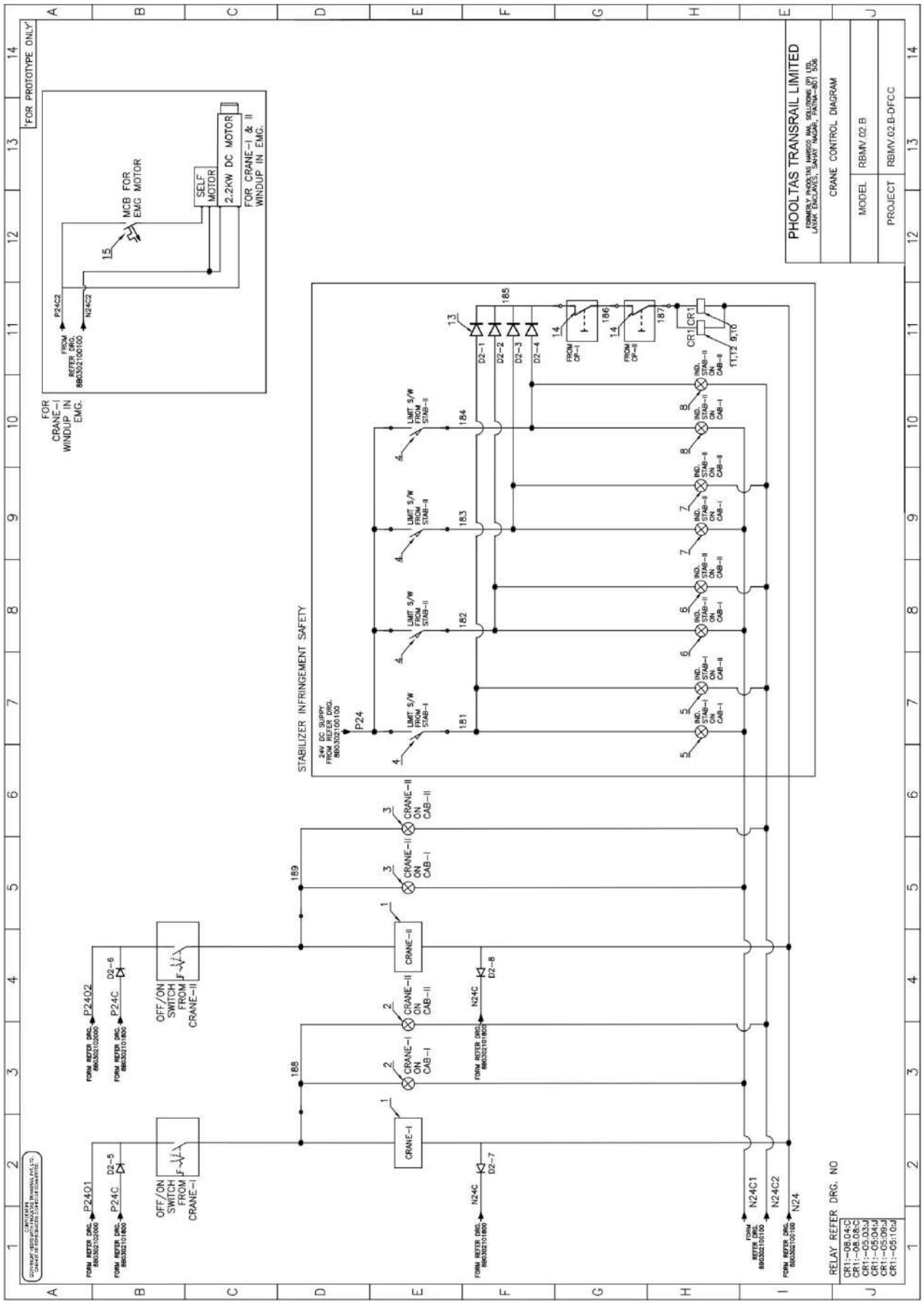
10.17) CAMERA & MONITOR DIAGRAM (3021017000)

S. NO.	DESCRIPTION	QTY.
1	Camera	4 nos
2	7 Inch (with Recording) TFT monitor	2 nos
3a	ON/OFF 2P SELECTOR SWITCH	2 nos
3b	NO ELEMENT FOR S/W	2 nos



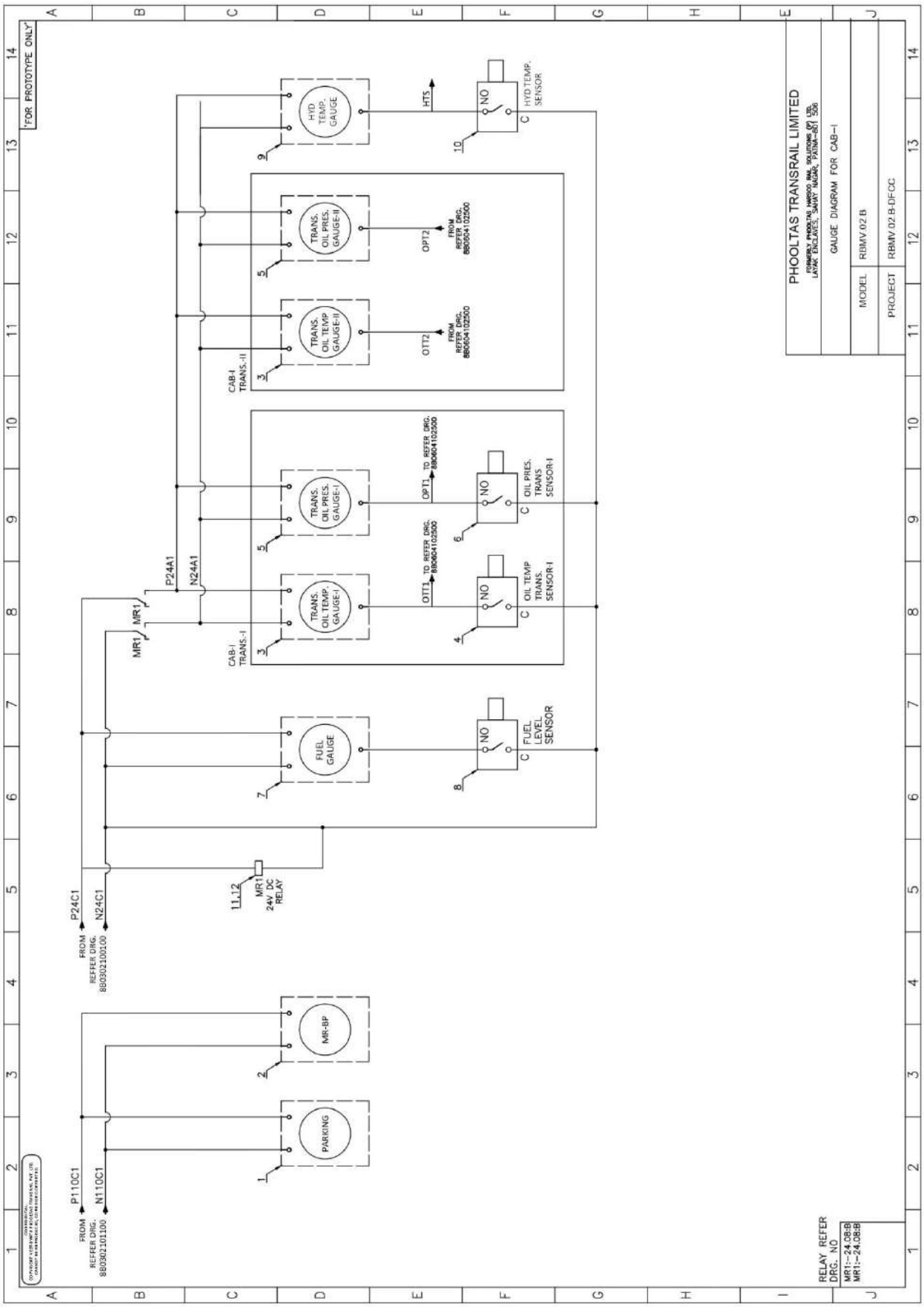
10.18) CONTROL CIRCUIT OF OHE DEVICE (3021018000)

S. NO.	DESCRIPTION	QTY.
1	OHE SENSOR	2 set.
	OHE CONTROL CARD	
	OHE DISPLAY	
2	OFF/ON SWITCH FOR OHE BYPASS	4 nos



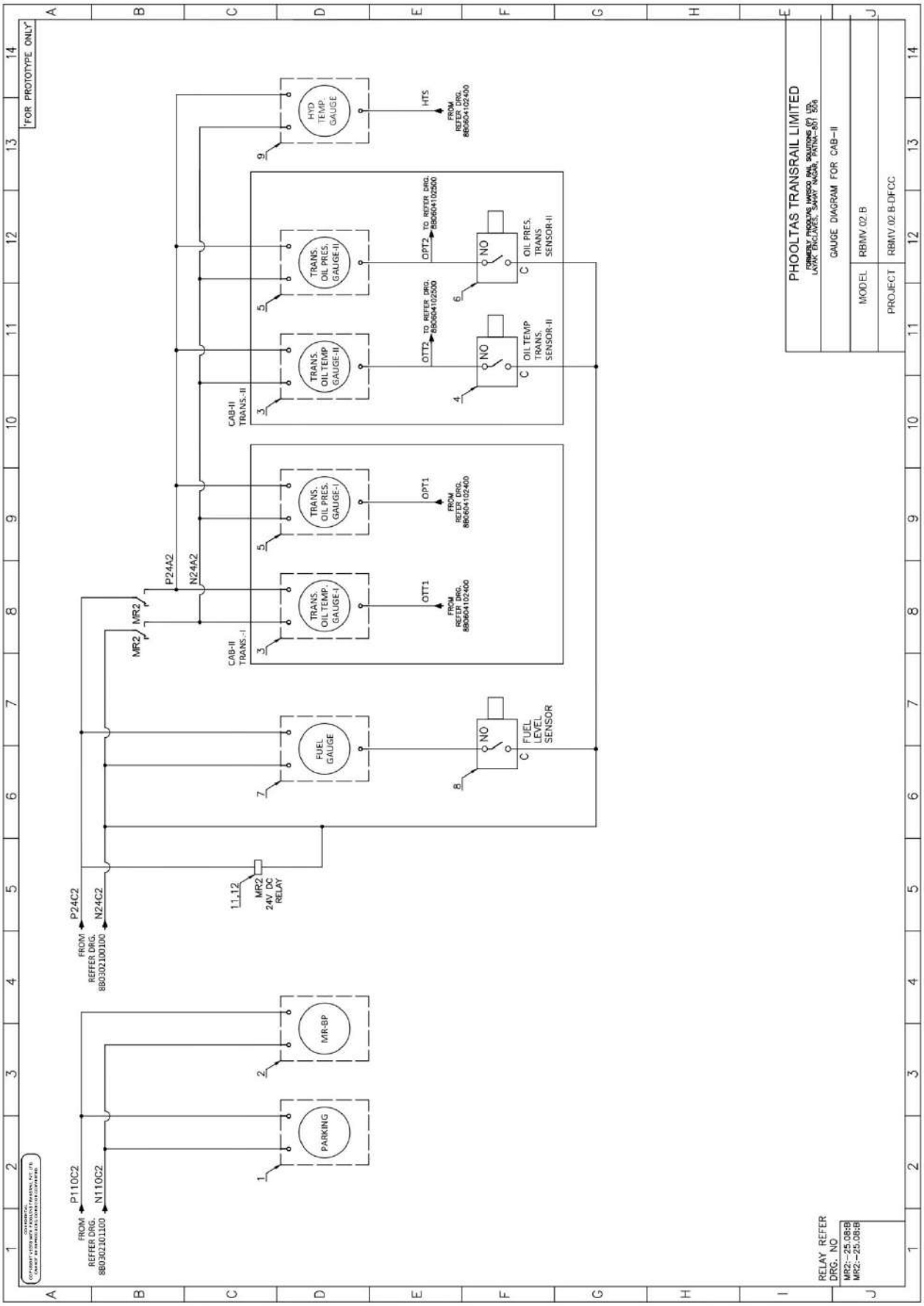
10.19) CRANE CONTROL DIAGRAM (3021019000)

S. NO.	DESCRIPTION	QTY.
1	CRANE	2 nos
2	CRANE-1 ON IND. GREEN	2 nos
3	CRANE-2 ON IND. GREEN	2 nos
4	LIMIT SWITCH	4 nos
5	RED IND. STAB-I ON	2 nos
6	RED IND. STAB-II ON	2 nos
7	RED IND. STAB-III ON	2 nos
8	RED IND. STAB-IV ON	2 nos
9	2 C/O RELAY, 24V DC	1 no.
10	2 C/O RELAY BASE	1 no.
11	4 C/O RELAY, 24V DC	1 no.
12	4 C/O RELAY BASE	1 no.
13	DIODE IN5408 (47 TO 50)	4 nos
14	BY PASS SWITCH GREEN PUSH BUTTON WITH NO TYPE	4 nos
15	6A SP MCB, DC	1 no.



10.20) GAUGE DIAGRAM FOR CAB-I (3021020000)

S. NO.	DESCRIPTION	QTY.
1	CRANE	2 nos
2	CRANE-1 ON IND. GREEN	2 nos
3	CRANE-2 ON IND. GREEN	2 nos
4	LIMIT SWITCH	4 nos
5	RED IND. STAB-I ON	2 nos
6	RED IND. STAB-II ON	2 nos
7	RED IND. STAB-III ON	2 nos
8	RED IND. STAB-IV ON	2 nos
9	2 C/O RELAY, 24V DC	1 no.
10	2 C/O RELAY BASE	1 no.
11	4 C/O RELAY, 24V DC	1 no.
12	4 C/O RELAY BASE	1 no.
13	DIODE IN5408 (47 TO 50)	4 nos
14	BY PASS SWITCH GREEN PUSH BUTTON WITH NO TYPE	4 nos
15	6A SP MCB, DC	1 no.



10.21) GAUGE DIAGRAM FOR CAB-II (3021021000)

S. NO.	DESCRIPTION	QTY.
1	4" PARKING BRAKE GAUGE	1 no.
2	4" DUPLEX PRESS. GAUGE (MR-BP)	1 no.
3	TRANSMISSION TEMPERATURE GAUGE	2 nos
4	TRANSMISSION TEMPERATURE SENSOR	1 no.
5	TRANSMISSION OIL PRESSURE GAUGE	2 nos
6	PRESSURE SENSOR/SENDER, ES2PM-200	1 no.
7	FUEL LEVEL GUAGE ELECTRICAL, VEETHREE 24V DC	1 no.
8	FUEL LEVEL SENSOR, 24V DC	1 no.
9	HYD. TEMPERATURE GAUGE	1 no.
10	HYDRAULICTEMPERATURE SENSOR	1 no.
11	2 C/O RELAY, 24V DC (MR1)	1 no.
12	2 C/O RELAY BASE (MR1)	1 no.
13	RELAY NO/NC CONTACT (MR1)	2 nos

24 VOLT POWER SUPPLY FOR ENGINE- I AND ENGINE- II (3021001000)

DESCRIPTION

Rail Bound Mobile Vehicle has been provided with twin engine power pack for main traction. Each engine has 1 set of 24V, 300AH battery (Item no.1). Battery boxes are mounted both side of under frame. The 24V DC supply goes to self-starter through battery cut off switch (Item no.5A), Battery Cutout box is locked at center cabin near Hydraulic Tank.

When 24V DC battery cutoff switch is made ON,

Supply from both cut off switch (item no-5A) goes to input terminal of 3P 2W selector switch key operated (item no.9,10) through MCB (item no-6).

One addition

al Cut-Off switch (Item no.5B) is provided ahead of both battery cut-off switches as a combination switch to provide a power if any one battery bank run down & not able to crank that engine, this is emergency combination power cutoff switch for starting the engine.

In case :-

1. Any one battery bank is run down or discharge and not able to fully crank the engine for starting, then Cut-Off switch (Item no.5B) will be made ON to crank the engine.

Engine battery Charging system 24V DC:-

- As per ckt each engine has mounted one 24V DC Alternator (Item no.2) which provides 24V DC supply for charging the Battery. Further alternator supply power to engine controls, compressor un-loader switch and other 24V DC electrical Load.
- In case of longer idle stay of vehicle without engine running, Ckt has been provided with two no's External charging socket for each battery bank (Item no-8) for externally suitable battery charger 24V DC to avoid deep discharging of batteries.

110 VOLT AUX. ALTERNATOR FOR AUX. LOAD

Auxiliary Power supply:- For fans, lights, hydrodynamic transmission valves, air dryer valve, speedo meter, OHE sensor & etc.

Rail Bound Mobile Vehicle has two traction engine, each engine front end drives an Aux. Alternator (item no-1) through a small cardan shaft.

Auxiliary alternator 4.5KW (Item no.1) under slung mounted are connected to Engine-I and Engine-II which gives output (120V +/- 5% DC, min/max-700 to 2500 RPM) through both Rectifier regulator panel (Item no.2) for required control.

The function of Rectifier regulator unit (Item no.2) converts 3 phase AC Voltage to 120V DC for 110V DC 120Ah battery bank charging. 110V DC Battery composite (6V X 19 No's) boxes are mounted both side of under frame.

Ckt has been provided with two indication lamp (Item no-9) at both driver control panel which connected Rectifier regulator unit as per drawing which show healthy condition of Aux. Alternator.

From RRU unit 110V DC supply goes to cut off switch (Item no.6), Battery Cutout box is locked at center cabin near Hydraulic Tank.

When 110V battery cutout switch is made ON,

Supply from cut-off switch (item no-6) goes to input terminal of 3P 2W selector switch key operated (item no.7,8) locked on Driver control desk of cab-I, this switch is provided for 110V Power supply selection & interlock for aux. Controls in both cabins. From cutoff switch power directly goes to Air dryer (item no. 10) & speedo meter through MCB (item no-11).

ENGINE CONTROL 24V DC SYSTEM

ENGINE-I ECU-I (3021002000) & ENGINE-II ECU-II (3021003000) CONTROL DIAGRAM

Engine starting/stopping & safety:

After switching ON the 24V DC battery cutoff switches & power supply MCB's (item no-6) power goes to cab-I for operative/control cabin selection switch (3P 2W selector switch, Item no-9,10).

This switch can be operated to choose engine power control from cabin-I or cabin-II, this way this switch provided for 24V cabin control power selection & interlocking.

CAB-I

If cabin-I is selected then power goes to MCB's power distribution panel on control desk at cabin-I, after MCB switching ON (item no-12) the engine power MCB power goes to both ECU BOX-I & II for individual engine controls (engine display, throttle & ECU) &, each ECU is connected with eight relay box (ER1 - ER8, item no-1,2) **ENGIN-I ECU-I BOX** & (ER16 - ER-23, item no-1,2) **ENGIN-II ECU-II BOX.** Now this way engine ECU, Engine Control Display & Throttle are connected for operation at cabin-I Each engine has individual ECU, two control display, two throttle control (both throttle mechanically connected) to operate the engines form both cabins.

Once 24V DC power is selected for cabin-I. Each engine has control & display unit with starting Key (3Position, OFF-ON-CRANK), both has to be engine started individual, For controlling the engine RPM electronics throttle liver is operated.

Stopping Engine:

1. Stopping by starting key - Each engine has OFF position in starting key, once Key is turned to OFF position, power supply in ECU/EDC control cut off, thus engine gets stop.

2. By emergency stop switch :- Emergency switch NO type (item no-1) is provided on control desk & at various location to stop the fuel supply to stop the engine.

Engine Safety : Each engine has provided with following safety feature.

1. Radiator water Level Low :- Engine gets shutdown & indication "ON" on control desk.
2. Low lube oil pressure:- Engine gets shutdown & indication "ON" on engine display unit.
3. Engine Speed too high:- Engine gets shutdown & indication "ON" on engine display unit.
4. Engine Water temp. Too high:- Engine gets idle & indication "ON" on engine display unit
5. Engine boost air pressure low:- Engine gets idle & indication "ON" on engine display unit.
6. Fuel in water:- Engine will not start, gets stop & indication "ON" on engine display unit.

CAB-II

After switching ON the 24V DC battery cutoff switches & power supply MCB's (item no-6) power goes to cab-I for operative/control cabin selection switch (3P 2W selector switch, item no-9,10).

This switch can be operated to choose engine power control from cabin-I or cabin-II, this way this switch provided for 24V cabin control power selection & interlocking.

If cabin-II is selected then power goes to MCB's power distribution panel on control desk at cabin-II, after MCB switching ON (item no-12) the engine power MCB power goes to both ECU BOX-I & II for individual engine controls (engine display, throttle & ECU) &, each ECU is connected with eight relay box (ER9 - ER15,item no-1,2) **ENGIN-I ECU-I BOX** & (ER24 - ER-30item no-1,2) **ENGIN-II ECU-II BOX.** Now this way engine ECU, Engine Control Display & Throttle are connected for operation at cab-II **Engine starting/Stopping & Engine safety feature & operation are similar to cabin-I .**

ELECTRICAL POWER SUPPLY FOR DRIVE CONTNROL (3021008000 & 3021009000)

Traction drive power Selector master Switch (item no-7,8) is provided In Cabin-I for selection of Cabin-I or Cabin-II .

If cabin-I selected, then supply goes to 110V Drive power MCB (item no.1) at cabin-I driver desk. This MCB further supply power to drive mode selection switch (item no-6). Now power is available on **drive mode selector switch unit**, this selector switch will provide the mode of operation,

Supply goes to **direction selector switch**, (Item no-6,3 Position, Fwd-Nut-Rev) through Timer relay NO contact (Item no-4), direction could be selected as desired & indication will glow in control panel.

DRIVE SELECTION CIRCUIT IN BOTH CABINS ENGINE-I & ENGINE-II (3021008000)

DESCRIPTION

Circuit details of Transmission :

1) Transmission-I directional control:-Transmission-I directional control represents the electrical circuit of control panel which controls the drive of vehicle either from cab-I or cab-II. The circuit consists of following items:-

- Rotary switch single pole 3 way with off (Item no.6)
- Indicators green, yellow, red (Item no.16, 17, 18)
- Diode strip
- Terminal Box
- Single solenoid valve for direction control (Item no.1 & 2)

2) **Transmission-II directional control:-** Transmission-II directional control represents the electrical circuit of control panel which controls the drive of vehicle either from cab-I or cab-II. The circuit consists of following items:-

- Rotary switch single pole 3 way with off (Item no.6)
- Indicators green, yellow, red (Item no.16, 17, 18)
- Diode strip
- Terminal Box
- Single solenoid valve for direction control (Item no.1 & 2)

3) Direction reversing speed protection feature:- An Off Delay Timer (Item no-3) is provided in circuit. Operator will be able select or revers the direction if speed of the vehicle is nearly stop (Rang: - 0-2KMPH) as safety of transmission.
Off-delay timer (Item-3), gets supply on timer coil from speed cum recorder (RL1).

Transmission-I & II directional control in cab-I:-

- Forward position (F) of the rotary switch (Item no.6) for Transmission – I & II directional control in cab-I gives supply 807A to forward indicator (Item no.16) & relay coil (item no-10,11, R2 & R8) & (item no-7,8, R1) through diode, and relay will be hold (R1, R2 & R8) & and relay contact will be change after operating and relay common terminal (item no-12, R2 & R8) is connected with P24, which comes diode (item no.4) and relay NO point (item no-12, R2, R8) is connected terminal Box-I, & terminal Box-II (F1 or R2) and further the output supply F1 goes to forward directional single solenoid valve SV1 (Item no.1) & which engages the transmission clutch as well as the output supply R2 goes to reverse directional single solenoid valve SV4 (Item no.2) & which engages the transmission clutch & vehicle moves in forward direction.
- Neutral position (N) of the rotary switch (Item no.6) for Transmission-I & II operate neutral in cab-I gives supply 808A to neutral indicator (item no-17) & relay coil (item no-13,14, R3) through diode and relay common terminal (item no-15, R3) is connected with relay no point (item no-9, R1, R5, R6, R9), after operate relay R3 relay (item no-13,14), it will be cut all supply & vehicle will be neutral.

DRIVE SELECTION CIRCUIT IN BOTH CABINS ENGINE-I & ENGINE-II (3021008000)

DESCRIPTION

Reverse position (R) of the rotary switch (Item no.6) for Transmission – I & II directional control in cab-I gives supply 809A to reverse indicator (Item no.18) & relay coil (item no-10,11, R4 & R7) & (item no-7,8, R5) through diode, and relay will be hold (R4, R5 & R7) & and relay contact will be change after operating and relay common terminal (item no-12, R4 & R7) is connected with P24, which comes diode (item no.4 & relay NO point item no-12, R4, R7) is connected terminal Box-I, & terminal Box-II (R1 or F2) and further the output supply R1 goes to reverse directional single solenoid valve SV2 (Item no.2) & which engages the transmission clutch as well as the output supply F2 goes to forward directional single solenoid valve SV3 (Item no.2) & which engages the transmission clutch & vehicle moves in reverse direction.

Transmission-I & II directional control in cab-II :

- Forward position (F) of the rotary switch (Item no.6) for Transmission – I & II directional control in cab-II gives supply 807B to forward indicator (Item no.16) & relay coil (item no-10,11, R7 & R4) & (item no-7,8, R6) through diode, and relay will be hold (R6, R7 & R4) & and relay contact will be change after operating and relay common terminal (item no-12, R7 & R4) is connected with P24, which comes diode (item no.4 & relay NO point (item no-12, R4, R7) is connected terminal Box-I, & terminal Box-II (R1 or F2) and further the output supply F2 goes to forward directional single solenoid valve SV3 (Item no.1) & which engages the transmission clutch as well as the output supply R1 goes to reverse directional single solenoid valve SV2 (Item no.2) & which engages the transmission clutch & vehicle moves in forward direction.
- Neutral position (N) of the rotary switch (Item no.6) for Transmission-I & II operate neutral in cab-II gives supply 808B to neutral indicator (item no-17) & relay coil (item no-13,14, R3) through diode and relay common terminal (item no-15, R3) is connected with relay no point (item no-8, R1, R5, R6, R9), after operate relay R3 relay (item no-15), it will be cut all supply & vehicle will be neutral.
- Reverse position (R) of the rotary switch (Item no.6) for Transmission – I & II directional control in cab-II gives supply 809B to reverse indicator (Item no.18) & relay coil (item no-10,11, R8 & R2) & (item no-7,8, R9) through diode, and relay will be hold (R8, R9 & R2) & and relay contact will be change after operating and relay common terminal (item no-12, R8 & R2) is connected with P24, which comes diode (item no.4 & relay NO point (item no-12, R8, R2) is connected terminal Box-I, & terminal Box-II (R2 or F1) and further the output supply R2 goes to reverse directional single solenoid valve SV4 (Item no.2) & which engages the transmission clutch as well as the output supply F1 goes to forward directional single solenoid valve SV1 (Item no.1) & which engages the transmission clutch & vehicle moves in reverse direction.

DRIVE SELECTION CIRCUIT IN BOTH CABINS ENGINE-I & ENGINE-II (3021009000)

DESCRIPTION

Now power is available on speed control selection switch. Item no-2 (3 Position, Auto-Off-Manual),

If Auto Mode drive is selected: This feature is based on wheel mounted techno meter signal output which give 110V signal to electro-pneumatic valve operated control of transmission through relay no contact (item no-6, R12, R13, R14, R15 . Once auto mode is selected, Low Gear will be get engage and vehicle move as per engine throttle position maximum and vehicle speed up to 25KMPH. Further intermediate /medium gear position will get engage automatically and vehicle speed up to 55KMPH. Further high gear position will get engage automatically and vehicle speed up to 120KMPH. During normal operation vehicle speed will get automatically control as per techno meter signal supply and power cutoff at various speed automatically. **Normally Auto mode drive selection is made for longer distance of drive.**

If Manual Mode drives is selected:

As direction has been selected by direction selector switch (item no-6) In manual mode power is available on speed selection switch item no-3, (4 Position OFF-LOW-MED.-HIGH).

After selection Manual:

Driving circuit for manual control cabin -I:

110V DC Positive Output supply 901C from auto/manual selector switch (Item no.2) is connected to rotary switch, 2 pole 3way (Item no.3). The driving circuit is controlled through following positions of rotary switch:

1. Select Position-I of the rotary switch 2 pole 3 way (Item no.3) for Transmission – I & II speed control in cab-I gives supply 902A & 902B to speed-I indicator (Item no.7) & relay coil R12 (item no-4,5) & relay R14 (item no-4,5) through diode & it's common terminal R12 & R14 (item no-6) is connected to 24V DC supply P24 which comes from diode (item no.4) & relay NO terminal R12 & R14 (item no-6) is connect solenoid valve (item no-1) of Transmission-I speed control and single solenoid valve (item no-1) of Transmission-II & operate first speed.
2. Select Position-II of the rotary switch 2 pole 3 way (Item no.3) for Transmission – I & II speed control in cab-I gives supply 903A & 903B to speed-II indicator (Item no. 8) & relay coil R13 (item no- 4, 5) & relay R14 (item no-4, 5) through diode & it's common terminal R13 & R15 (item no-6) is connected to 24V DC supply P24 which comes from diode (item no.4) & relay NO terminal R13 & R15 (item no-6) is connect solenoid valve (item no-1) of Transmission-I speed control and single solenoid valve (item no-1) of Transmission-II & operate second speed.
3. Select Position-III of the rotary switch 2 pole 3 way (Item no.3) for Transmission – I & II speed control in cab-I gives supply 904A & 904B to speed-III indicator (Item no.9) & relay coil R12 & R13 (item no-4, 5) & relay R14 & R15 (item no-4, 5) through diode & it's common terminal R12, R13, R14 & R15 (item no-6) is connected to 24V DC supply P24 which comes from diode (item no.4) & relay NO terminal R12, R13, R14, & R15 (item no-6) is connect solenoid valve (item no-1) of Transmission-I speed control and single solenoid valve (item no-1) of Transmission-II & operate third speed.

Driving circuit for manual control cabin -II:

110V DC Positive Output supply 901D from auto/manual selector switch (Item no.2) is connected to rotary switch, 2 pole 3way (Item no.3). The driving circuit is controlled through following positions of rotary switch:

1. Select Position-I of the rotary switch 2 pole 3 way (Item no.3) for Transmission – I & II speed control in cab-II gives supply 902B & 902A to speed-I indicator (Item no.7) & relay coil R14 (item no-4,5) & relay R12 (item no-4,5) through diode & it's common terminal R12 & R14 (item no-6) is connected to 24V DC supply P24 which comes from diode (item no.4 & relay NO terminal R12 & R14 (item no-6) is connect solenoid valve (item no-1) of Transmission-I speed control and single solenoid valve (item no-1) of Transmission-II & operate first speed.

2. Select Position-II of the rotary switch 2 pole 3 way (Item no.3) for Transmission – I & II speed control in cab-II gives supply 903B & 903A to speed-II indicator (Item no. 8) & relay coil R15 (item no- 4, 5) & relay R13 (item no-4, 5) through diode & it's common terminal R13 & R15 (item no-6) is connected to 24V DC supply P24 which comes from diode (item no.4) & relay NO terminal R13 & R15 (item no-6) is connect solenoid valve (item no-1) of Transmission-I speed control and single solenoid valve (item no-1) of Transmission-II & operate second speed.

3. Select Position-III of the rotary switch 2 pole 3 way (Item no.3) for Transmission – I & II speed control in cab-II gives supply 904B & 904A to speed-III indicator (Item no.9) & relay coil R14 & R15 (item no-4, 5) & relay R12 & R13 (item no-4, 5) through diode & it's common terminal R12, R13, R14 & R15 (item no-6) is connected to 24V DC supply P24 which comes from diode (item no.4) & relay NO terminal R12, R13, R14, & R15 (item no-6) is connect solenoid valve (item no-1) of Transmission-I speed control and single solenoid valve (item no-1) of Transmission-II & operate third speed.

DRIVING CIRCUIT FOR MANUAL CONTROL CABIN-I & CABIN-II (3021009000)

DESCRIPTION

Speed limit 10KMPH Control (while Crane are Working):-

For safety aspect crane has provided with limit switches in rest/closed condition to provide vehicle full travel speed for longer distance travel.

The control circuit has been provided with individual limit switch at crane at rest which is connected with power supply to a electro pneumatic valve to actuate brake with a control pressure. This brake is operated two ways.

1. Automatic control form speedo meter signal operated
2. Manual remotely push button operated from both operator desk

Auto Speed limit 10KMPH Control:-

24V DC supply comes RL4 form speed cum recorder at 10-12KMPH, This supply goes to relay coil (item no.-15,16/R11) through speed limit selector switch (item no.14) which is located at both control panel desk & relay common point (item no.17, R11) is connected to 24V DC (P24), & relay NO point (item no.17, R11) is connected to Auto Magnetic Brake (item no.20).

Manual control:

24V DC supply comes (P24) Main MCB (item no.6) through diode (item no.4) to selector switch (item no.14) input point & o/p point of selector switch (item no.14) is connected to Auto Magnetic Brake (item no.20). After operating this switch brake will be apply.

ELECTRICAL POWER SUPPLY FOR CONTROL OF CRANE (3021019000)

DESCRIPTION

Electrical power supply provision has been made form cabin-I & cabin-II as desired during operation of Crane, Lifting platform, Measuring Pantograph.

Electrical power supply for Control of Crane-I

Powering from Cabin-I: - 24V DC supply from OHE controller (item no.-2) cabin-I to first crane control OFF/ON switch on crane control box.

Electrical power supply for Control of Crane-II

Powering from Cabin-II: - 24V DC supply from OHE controller (item no.-2) cabin-II to second crane control OFF/ON switch on crane control box.

CONTROL CIRCUIT- HEAD LIGHT, FLASHER LIGHT, MARKER LIGHT, TAIL LIGHT (3021009000 & 3021010000)

DESCRIPTION

HEAD LIGHT FRONT:

Multi position selector switch (item no.4) on drive desk is getting 110V DC power form Key operated Selector Switch (item no. 7,8) through MCB (item no.-11) . This selector switch is used to power forward head light (item no. 5) & read head light (item no. 5) as per desired requirement.

FLASHER LIGHT:

Flasher controller (item no.2) is getting 110V DC power form Key operated Selector Switch (item no. 7,8) . Through MCB (item no.12). This flasher light will be operate by Manual/Auto.

This flasher controller (item no.2) has in inbuilt two position - Auto position (emergency Brake Position) and Manual Position (driver operated in emergency).

Auto Operation for Flasher Light:

Flasher light (Item no.6) in cab-I & cab-II also gets positive input supply 508A & 508B from B.P. Pressure switch NO terminal (item no. 15), if B.P pressure pipe drops below 2.5kg or emergency brake is apply.

Manual Operation for Flasher Light:

During emergency in night if vehicle has be halted in main line, than driver has to make caution/alertness indication to fallowing train drivers on either side running track. This flasher switch should be kept in manual power position.

Marker Light:

During night & Foggy condition marker light has to be powered for vehicle moment direction. Driver has to make caution/alertness indication to fallowing train drivers on either side running track.

ON/OFF/ON selector switch (item no.22) on drive desk is getting 110V DC power form Key operated Selector Switch (item no. 7, 8) through MCB (item no.-13) . This selector switch is used to power marker light.

Tail Light:

During night & Foggy duration marker light has to be powered for vehicle moment direction. Driver has to make caution/alertness indication to fallowing train drivers on either side running track.

ON/OFF/ON selector switch (item no.22) on drive desk is getting 110V DC power form Key operated Selector Switch (item no. 7,8) through MCB (item no.-13) . This selector switch is used to power Tail light.

CONTROL CIRCUIT- CAB LIGHT & FAN FOR CAB-I & CAB-II (3021009000 & 3201010000)

FAN CONTROL:

FAN power supply is connected to MCB (item no. 16), For operating each fan's has individual one way switch located on side wall.

CAB LIGHT CONTROL:

Cabin Light power supply is connected to MCB (item no. 16), For operating each light's has individual one way switch located on side wall.

WIPER CONTROL:

Each cabin wiper motor and wiper arm are provided which operation OFF/ON switch on drive desk. Wiper motor (item no. 20) power supply is connected to MCB (item no. 15), For operating wiper has individual OFF/ON selection switch (item no. 1) located on driver desk.

ELECTRO PNEUMATIC CIRCUIT OF VCD INTERFACE CONTROL (3021011000)

DESCRIPTION

VIGILANCE CONTROL DEVICE (VCD):

Vigilance control device (Item no.1) interface control is provided for safety operation. It is connected with various operating input signals for vigilant operation, or to keep operator alert while vehicle is in starting condition. If driver does not operate Time to time any control such horn, brake & etc then V.C.D will give signal to penalty brake (electro pneumatic valve) to drop BP Brake pipe pressure for brake application.

VCD cycle reset operations:

1. Operation of Horn push button (Item no. 9)
2. Application/release of brake through SA9 brake valve whose pneumatic line is connected to B.C. pressure switch (Item no. 6)
3. Application/release of brake through A9 brake valve whose pneumatic line is connected to B.P. pressure switch (Item no. 7)
4. Vigilance cycle reset push button pressed

Operational control supply of the circuit is as follows:

24V DC positive output supply P24 & N24 through diode is connected to following:

(i). Common terminal of Electro-pneumatic governor switch A8 (Item no.10)
(ii). Common terminal of Horn pressure switch A48 (Item no. 5) in cab-I & cab-II
(iii). Common terminal of B.C pressure switch A48 (Item no. 6)
(iv). Common terminal of B.P pressure switch A40 (Item no. 7)

Operation of Horn push button (Item no.8) in cab-I gives positive output supply to Horn solenoid valve (Item no.4) in cab-I. From Horn solenoid valve (Item no.4) in cab-I, pneumatic line is connected to Horn pressure switch (Item no.5) in cab-I. After receiving pneumatic input from Horn solenoid valve (Item no.4), common terminal of Horn pressure switch (Item no.5) gives supply to NO terminal which further gives output to VCD unit (Item no.1) for resetting.

Operation of Horn push button (Item no.8) in cab-II gives positive output supply to Horn solenoid valve (Item no.4) in cab-II. From Horn solenoid valve (Item no.4) in cab-II, pneumatic line is connected to Horn pressure switch (Item no.5) in cab-II. After receiving pneumatic input from Horn solenoid valve (Item no.2), common terminal of Horn pressure switch (Item no.5) gives supply to NO terminal which further gives output to VCD unit (Item no.1) for resetting.

ELECTRO PNEUMATIC CIRCUIT OF VCD INTERFACE CONTROL (3021011000)

1) Application/release of brake through A9 brake valve whose pneumatic line is connected to B.P. pressure switch (Item no.7):

- Pneumatic line is connected from A9 brake valve to B.P. pressure switch (Item no.7). When A9 brake is applied, B.P. pressure switch (Item no.7) gets pneumatic input from A9 brake valve and contact terminal of B.P. pressure switch (Item no.7) changes. 24V DC positive output supply goes from Common terminal of B.P pressure switch (Item no.7) to NO terminal of B.P pressure switch (Item no.7) which further gives output to VCD unit (Item no.1) for resetting.

2) Application/release of brake through SA9 brake valve whose pneumatic line is connected to B.C. pressure switch (Item no.6)

- Pneumatic line is connected from SA9 brake valve to B.C. pressure switch (Item no.6). When A9 brake is applied, B.C. pressure switch (Item no.6) gets pneumatic input from SA9 brake valve and contact terminal of B.C. pressure switch (Item no.6) changes. 24V DC positive output supply goes from Common terminal of B.C. pressure switch (Item no.6) to NO terminal of B.C. pressure switch (Item no.6) which further gives output to VCD unit (Item no.1) for resetting.

3) Vigilance cycle reset push button pressed:

- VCD reset push button is pressed by operator showing alertness, penalty brake will not be applied in vehicle with in specified time period**.**

PARKING BRAKE CONTROL DESCRIPTION (3021014000)

Parking brake Control at Driver Desk-I:

110V DC positive supply (P110C1) comes from selector switch (item no.-7, 8) to parking brake MCB (Item no. 1) locked at MCB box at operator desk. MCB (item no. 1) output is connect to push button (item. 2 & 3).
Parking brake Application switch NO–Type (Item no.2) and parking brake Release switch NO-Type (Item no.3). The supply P110 connected to common terminal of pressure switch (parking brake feedback indication) (Item no.7) through diode.
When operator press (item no-3) parking brake release switch then supply goes to parking brake electro pneumatic selector valve (item no-8) to energized the valve to release parking brake and indication (item no. 5) will glow through pressure switch.
When operator press (item no-2) parking brake application switch then supply goes to parking brake electro pneumatic selector valve (item no-8) to energized the valve to application parking brake and indication (item no. 4) will glow through pressure switch.

Parking brake Control at Driver Desk-II:

110V DC positive supply (P110C2) comes from selector switch (item no.-7,8) to parking brake MCB (Item no. 1) locked at MCB box at operator desk. MCB (item no. 1) output is connect to push button (item. 2 & 3).
Parking brake Application switch NO–Type (Item no.2) and parking brake Release switch NO-Type (Item no.3). The supply P110 connected to common terminal of pressure switch (parking brake feedback indication) (Item no.7) through diode.
When operator press (item no-3) parking brake release switch then supply goes to parking brake electro pneumatic selector valve (item no-8) to energized the valve to release parking brake and indication (item no. 5) will glow through pressure switch.
When operator press (item no-2) parking brake application switch then supply goes to parking brake electro pneumatic selector valve (item no-8) to energized the valve to application parking brake and indication (item no. 4) will glow through pressure switch.

11. INSTRUCTIONS FOR DRIVER / OPERATOR

Although the instructions in detail are explained in the operating manual. This instruction should be kept in driver cab as ready reference.

i. Ensure correct levels of lub. Oil, radiator water, hydraulic oil, transmission oil, ADGB oil and fuel in tank.

ii. Ensure shut off valve of hydraulic tank is in ON position.

iii. Ensure swiveling platform & pantograph are fully lowered & locked.

iv. At Driver's operating cabin: - electrical cabin selector switch, MCB & cabin isolating shut off cocks should be made ON for operation. Ensure non operative cabin pneumatic shut off cocks & electrical power cutoff switch should be kept in OFF position.

v. Don't engage the transmission in any direction if MR pressure & parking brake pressure are below 5 kg/cm² (Cut in - cutout pressure 7 kg/cm² – 8 kg/cm²).

vi. Blow Horn & release the brakes (BC pressure 0 kg/cm² & parking above 5 kg/cm²) before engaging the transmission.

vii. Before changing the direction (forward to reverse or vice – versa) of vehicle, it should stop fully.

viii. Before stopping the engine bring engine throttle & transmission selection lever in idle / neutral position.

ix. Whenever driver leaves the vehicle: - apply parking brake; ensure transmission selector is in neutral. Stop the engine, take our ignition key and all MCB & main switches should be in OFF position. Isolate the cabin cocks by shut of cocks.

x. Whenever vehicle is hauled; parking brake should be released manually by quick release lever / cable are provided at bogie side hanger bracket.

xi. Be vigilant about VCD functioning to avoid unwarranted penalty brake application.

xii. Before starting the Aux. engine for crane. Pl. check the level of Lube oil for sufficient level.

xiii. To record the Aux. engine operation - hours, Pl. maintains a log – book to ensure timely change of Lube oil (Refer manual).