





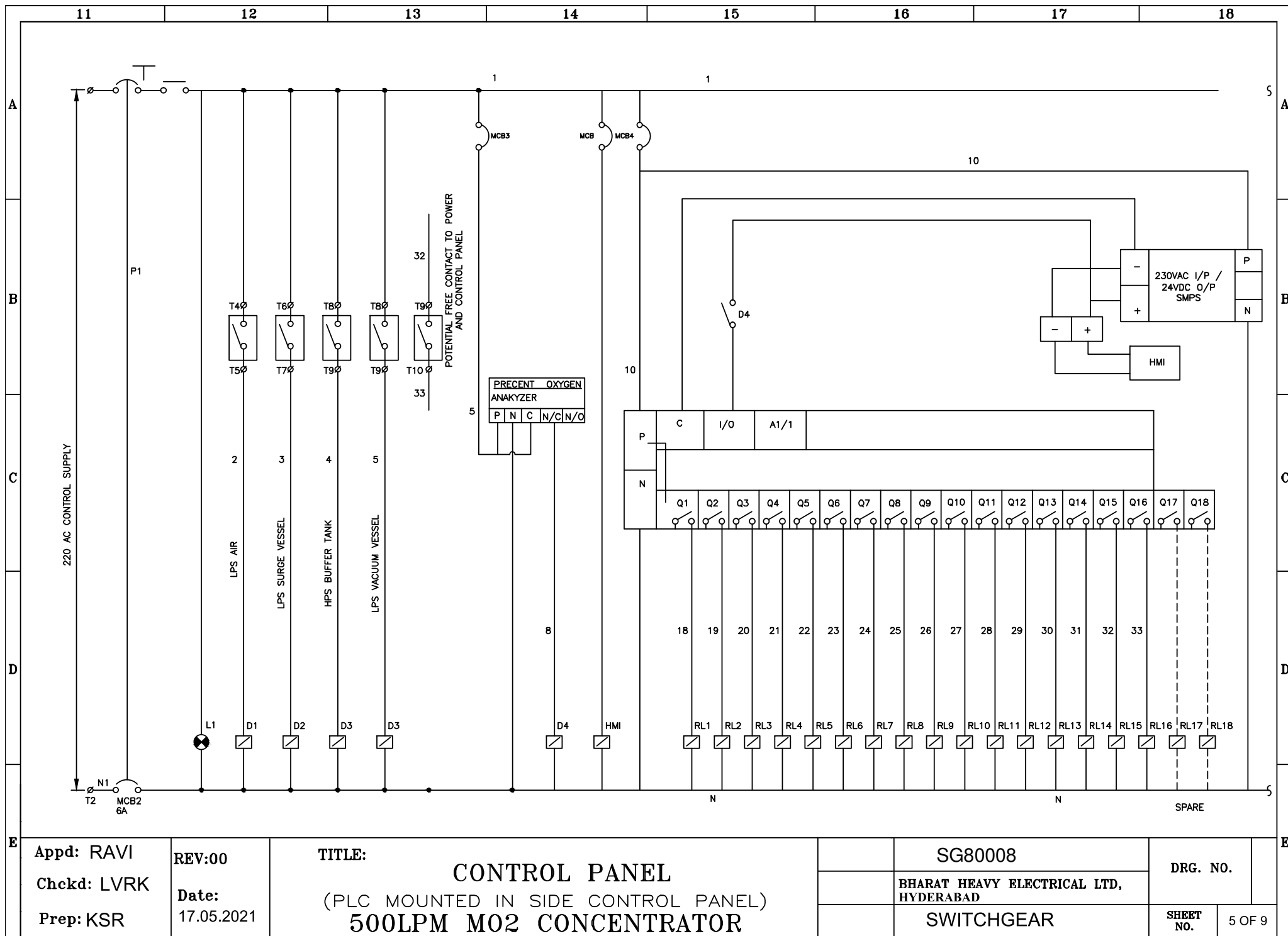
TD-106-1 Rev No. 5	Form No.	<div style="text-align: center;">  <h2 style="margin: 0;">PRODUCT STANDARD</h2> <h2 style="margin: 0;">SWITCHGEAR</h2> <h2 style="margin: 0;">HYDERABAD</h2> </div>	Product STD NO.	SG 80008
			Rev No 00	
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<div style="text-align: center;"> <u>PLC & CONTROL PANEL FOR 500LPM OXYGEN GENERATOR UNIT</u> <u>Material code: SG9780008004</u> </div> <p>1. Technical Specification for Control Panel:</p> <p>(i) Control Panel shall be to feed power for continuous operation to 1 no. air compressor & 1 no. vacuum pump, 1no of auto drain trap, 1 no. solenoid operated vacuum vent valve (VV) and PLC etc as per the scheme.</p> <p>(ii) The PLC circuit diagram shall be as attached in sheet no. 7 of this document. In case of any query, party may ask BHEL directly.</p> <p>(iii) There shall be one cabinet for 'PDB- MO2 Conc.'. The Size of one Cabinet can be tentatively taken by party.</p> <p>(iv) Environmental condition: Panel shall be kept in covered shed (open from all sides). The surrounding temperature can reach up to 60°C and relative humidity up to 95%.</p> <p>(v) Degree of Protection shall be IP:65 or better.</p> <p>(vi) The Panel Board shall be Cubicle design, compartmentalized, wall mounted, free standing, Provision for incoming & outgoing cables shall be through cable alley.</p> <p>(vii) Cable Entry shall be from bottom only.</p> <p>(viii) Features of Control Panel: Cabinets shall be manufactured with front & rear doors/ covers of cold rolled (CR) sheet steel of minimum 2.0 mm thickness. Load bearing parts shall be of 2.5mm minimum thickness. Alternately, load bearing part mounted on 7 fold or more profile structure with minimum thickness of 1.5mm is acceptable. Base frame will be made of 3 mm. Anti-vibration rubber sheet mat of minimum thickness 15 mm to be supplied duly mounted between cabinets base frame. The chemical pre-treatment shall be done on ferrous components prior to manufacturing/ painting by 7 tank process. The cabinet shall be powder coated with minimum 75-micron thickness.</p> <p>(ix) Each drive shall give following feedback/ display at control panel for - Motor ON/ OFF/ overloaded/ Control Supply OK as per scheme with suitable lamps/ indicators.</p> <p>(x) Make of items shall be as under:</p> <ul style="list-style-type: none"> (a) Contactors/ Aux relays AC/ Overload relay: L&T/ Siemens/ Schneider (b) MPCB/ SDF unit/: L&T/ Siemens/ Schneider/ GE. (c) Digital Indicators- Omron, Messibus, reputed. (d) Lamps/ PB: L&T/ Siemens/ Schneider/ GE 				
Revisions: Refer to record of revisions:		Prepared: K. SANGEETHA	Approved: RAVI J	Date: 17.05.2021

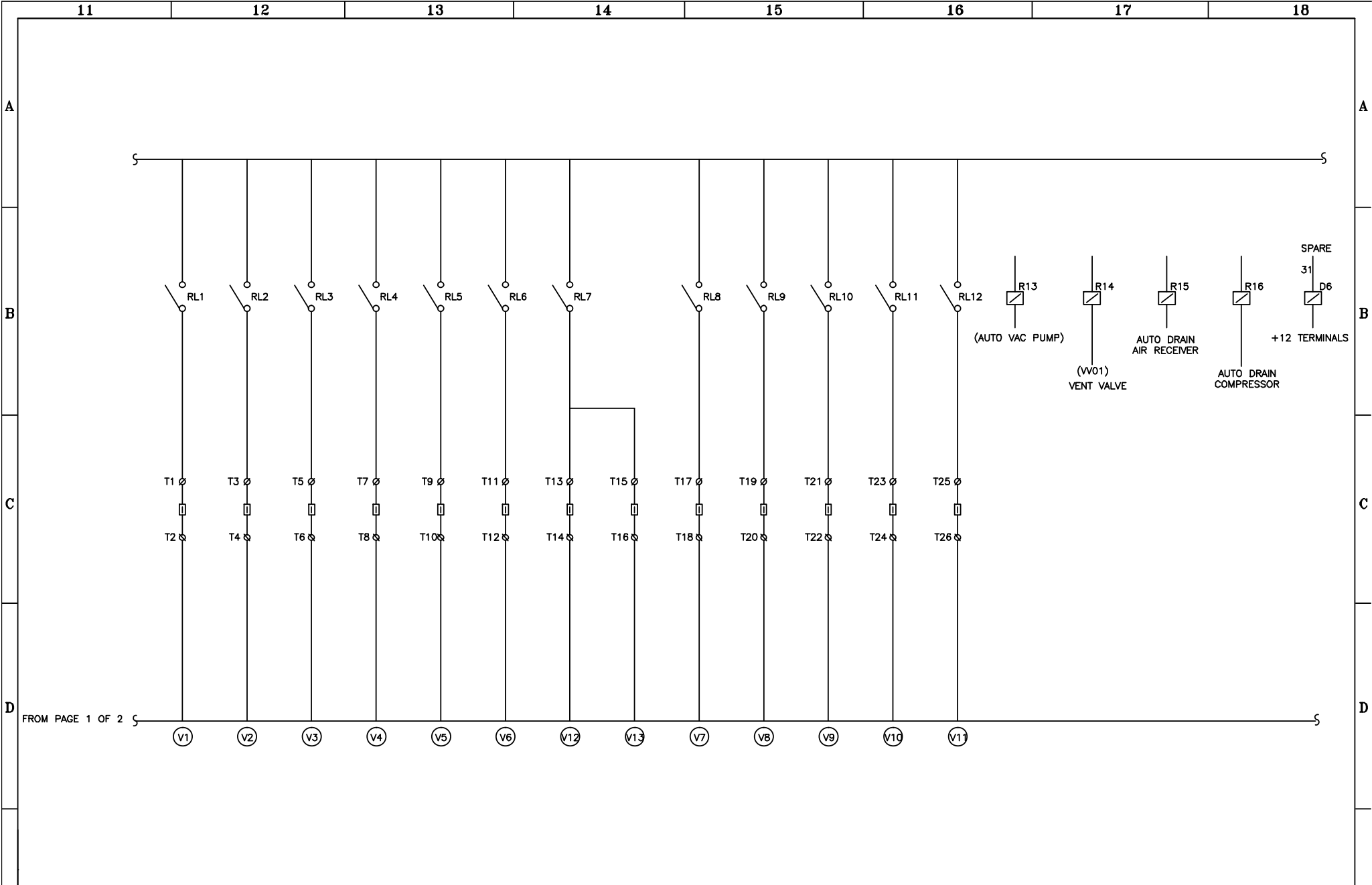
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company.		<p>(e) Ammeter/ CT: AE/ MECO/ standard (f) MCB: Legrand/ Indo Asian/ GE/ standard/Siemens (g) Control Transformer: Standard (if required)</p> <p>(xii) All control wiring shall be done by 1.5 mm² copper wire for AC module & 2.5mm² for CT connection (where applicable). Door earthing shall be done by Green Cu wire 2.5mm². Power wiring shall be done by suitable size Copper cable.</p> <p>All CT's connection for meters shall be through CT's shorting terminals.</p> <p>2. Brief Description of the system for which PLC is to be designed:</p> <p>The PLC is to be designed for continuous automatic operation of Solenoid operated Valves for Medical Oxygen Concentrator plant. The system comprises of air compressor, vacuum pump motor, starter and control system etc. The condensed water is drained out through a timer operated auto drain valve. Air is then passed through a twin tower. At a time one tower will be in operation & other shall be under purging/ regeneration mode through vacuum pump.</p> <p><u>For the automatic changeover of tower from one to another a suitable sequence in PLC to be provided.</u></p> <p>Total cycle time for adsorption/regeneration is of 2 x 45 to 2 x 90 seconds depending upon type of operating pressure, output pressure and required purities. The unit is selected with a time cycle of 70+70 seconds initially.</p> <p>3. Specification for PLC to be designed:</p> <p>2.1 Technical requirement</p> <p>a) PLC-MO2 Concentrator shall comprise of CPU, PSU, Input- output modules Digital/ Analog), HMI etc for control / operate solenoid valves (11 nos. approx. of rating 230VAC) at schedules time intervals as per the bar chart provided as per Sheet No 7 below & 4 nos. pressure switches meeting system requirement.</p> <p>b) Scope of supply shall include</p> <p>b.1) Complete PLC for Medical Oxygen concentrator b.2) Commissioning of PLC at BHEL Hyderabad b.3) PLC Logics & Pre- Loaded Software b.4) 1-2 RED/GREEN lamps as on requirement basis.</p>				
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company.		<p>c) PLC shall also include provision of 220/230V AC as per the scheme attached along with this document.</p> <p>d) 415 V, 3-phase AC feeder shall be provided to the Party as per control panel scheme. Party to make suitable arrangement for 230V AC supply for PLC system. Other required voltages shall be derived internally in PLC cabinet by the vendor.</p> <p>e) Environmental condition: PLC shall be kept in covered shed (open from all sides). The surrounding temperature can reach upto 60°C and relative humidity upto 95%. Suitable protection class for PLC to be chosen.</p> <p>f) Vendor can give fresh appropriate size of PLC cabinet subject to BHEL approval.</p> <p>g) Make of PLC shall be Phoenix/ Wago/ Siemens/ ABB/ Fanuc/ Alan Bradley/ Schneider. Any other make shall be subjected to BHEL approval.</p> <p>h) Items like Cabinet, Power supply module, Timers, TB's, relays, bus bars, earthing requirement, indications which are part of PLC and required for completeness of the system to be included by the vendor in the offer.</p> <p>i) The PLC system shall be mounted in DIN Rail in a fabricated cabinet meeting general specifications.</p> <p>4. Datasheet for the PLC (for PSA timing)</p> <table border="0"> <tr> <td>Cycle time</td> <td>- (45 + 45) to (90 + 90) Seconds (Editable).</td> </tr> <tr> <td>Selected initially</td> <td>70 + 70 Seconds (As per Sheet No 7)</td> </tr> <tr> <td>Number of inputs/outputs</td> <td>- As required (12 Outputs)</td> </tr> <tr> <td>Input Voltage</td> <td>- 230 V., A.C.</td> </tr> <tr> <td>Operating Temp.</td> <td>- Up to 60Deg. C (Max.)</td> </tr> <tr> <td>Rel. Humidity</td> <td>- 5 to 95%</td> </tr> <tr> <td>Mounting</td> <td>- Wall mounted/ DIN Rail mounted inside panel</td> </tr> <tr> <td>Make</td> <td>- With preface HMI</td> </tr> <tr> <td>Quantity</td> <td>- 1 Set</td> </tr> </table> <p>Note: This PLC shall be used to operate solenoid valves as per Sequence Chart attached herewith (Sheet No 7).</p>					Cycle time	- (45 + 45) to (90 + 90) Seconds (Editable).	Selected initially	70 + 70 Seconds (As per Sheet No 7)	Number of inputs/outputs	- As required (12 Outputs)	Input Voltage	- 230 V., A.C.	Operating Temp.	- Up to 60Deg. C (Max.)	Rel. Humidity	- 5 to 95%	Mounting	- Wall mounted/ DIN Rail mounted inside panel	Make	- With preface HMI	Quantity	- 1 Set
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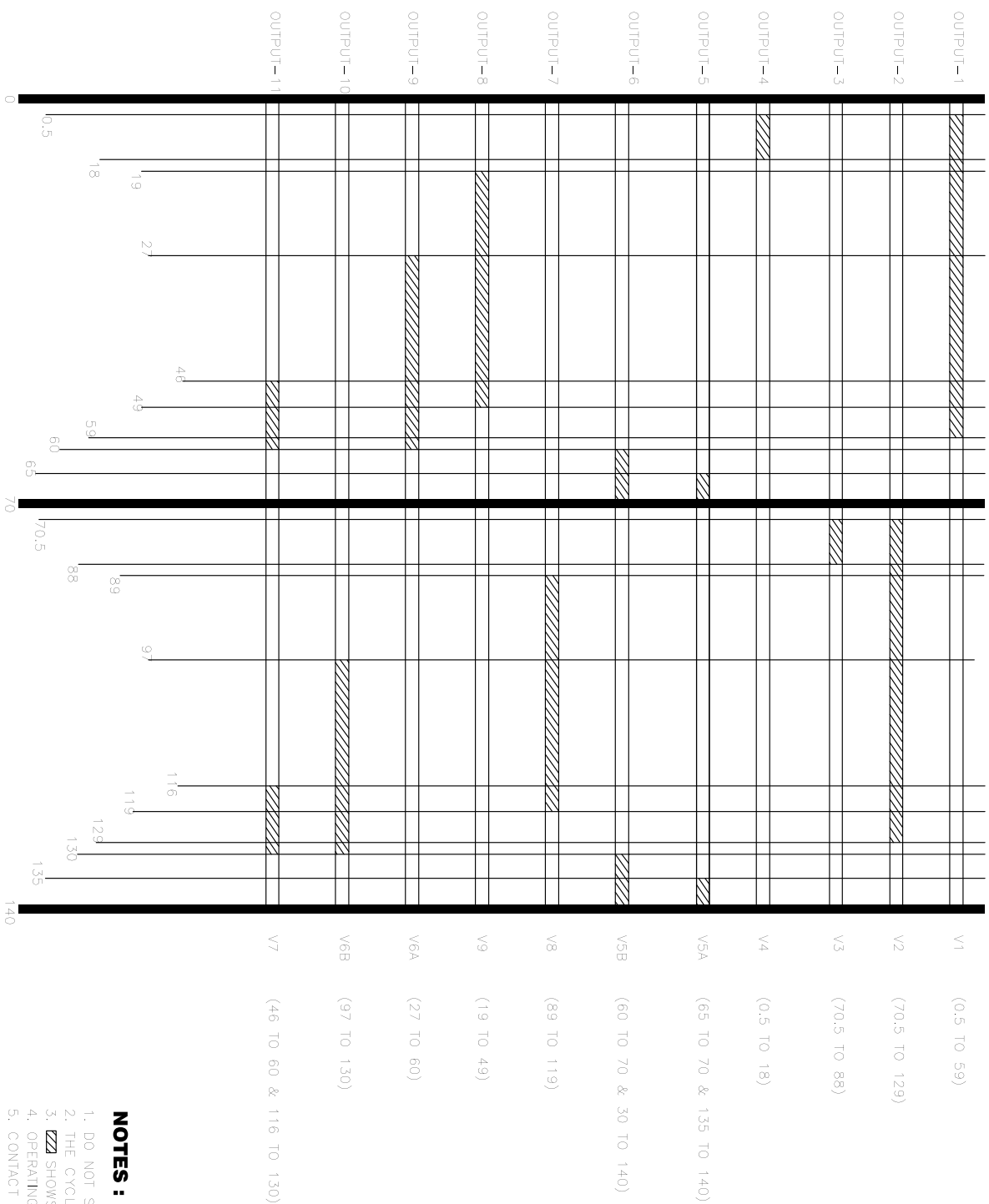
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<p style="text-align: center;"> COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company. </p>		<p>5. Quality assurance Inspection and Testing Requirement:</p> <ul style="list-style-type: none"> i) QP to be furnished by manufacturer as per their standard practices (Optional). ii) Test report / certificates to be furnished by the manufacturer. iii) COC to be furnished by the manufacturer (for catalogue items) <p>6. Painting, Conservation and Packing:</p> <p>Cleaning, painting conservation and packing shall be as per manufacturer standard practices.</p> <p>7. Warranty:</p> <p>The equipment is provided with warranty against faulty / defective material / workmanship / manufacturing defects for 18 months from the date of dispatch or 12 months from the date of commissioning whichever is earlier.</p> <p>8. Documents Required:</p> <p>Following documents and drawings shall be furnished by manufacturer:</p> <ul style="list-style-type: none"> • Make and Model and Schematic Arrangement drawing • GA drawings including weight and dimensions. • Technical Datasheet • Bill of Materials • Installation, Operation & Maintenance manual containing QAP, datasheet, test certificates, catalogue, List of spares, etc. <p>9. Wiring diagram/ Line diagram for PLC is as per below sheet no. 5 ,6 & 8</p>								
				<table border="1" style="width: 100%;"> <tr> <td data-bbox="315 1864 948 1955"> Revisions: Refer to record of revisions: </td> <td data-bbox="948 1864 1146 1955"> Prepared: K. SANGEETHA </td> <td data-bbox="1146 1864 1325 1955"> Approved: RAVI J </td> <td data-bbox="1325 1864 1523 1955"> Date: 17.05.2021 </td> </tr> </table>					Revisions: Refer to record of revisions:	Prepared: K. SANGEETHA
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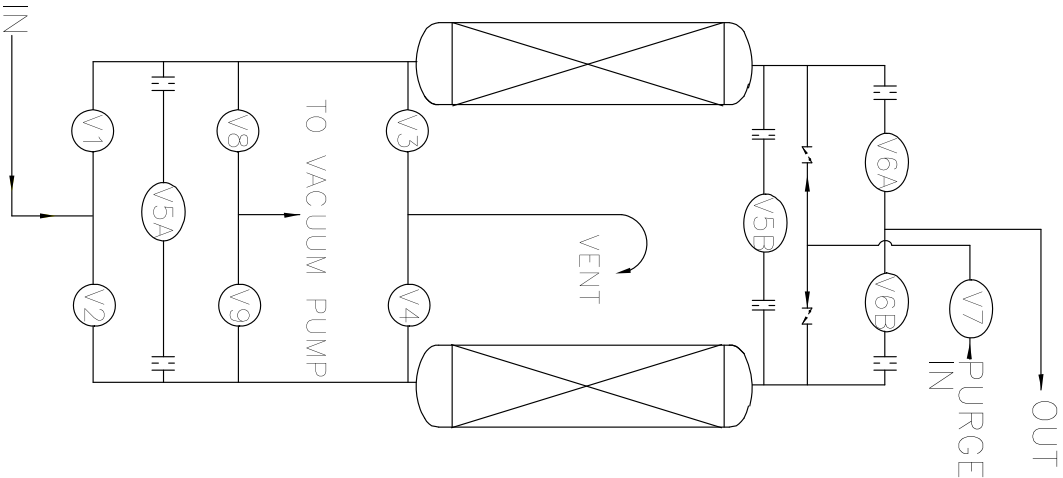
Appd: RAVI		REV:00	TITLE CONTROL PANEL (PLC MOUNTED IN SIDE CONTROL PANEL)		SG80008		DRG. NO.	
Chckd: LVRK		Date:			BHARAT HEAVY ELECTRICAL LTD, HYDERABAD			
Prep: KSR		17.05.2021			SWITCHGEAR		SHEET NO.	6 OF 9

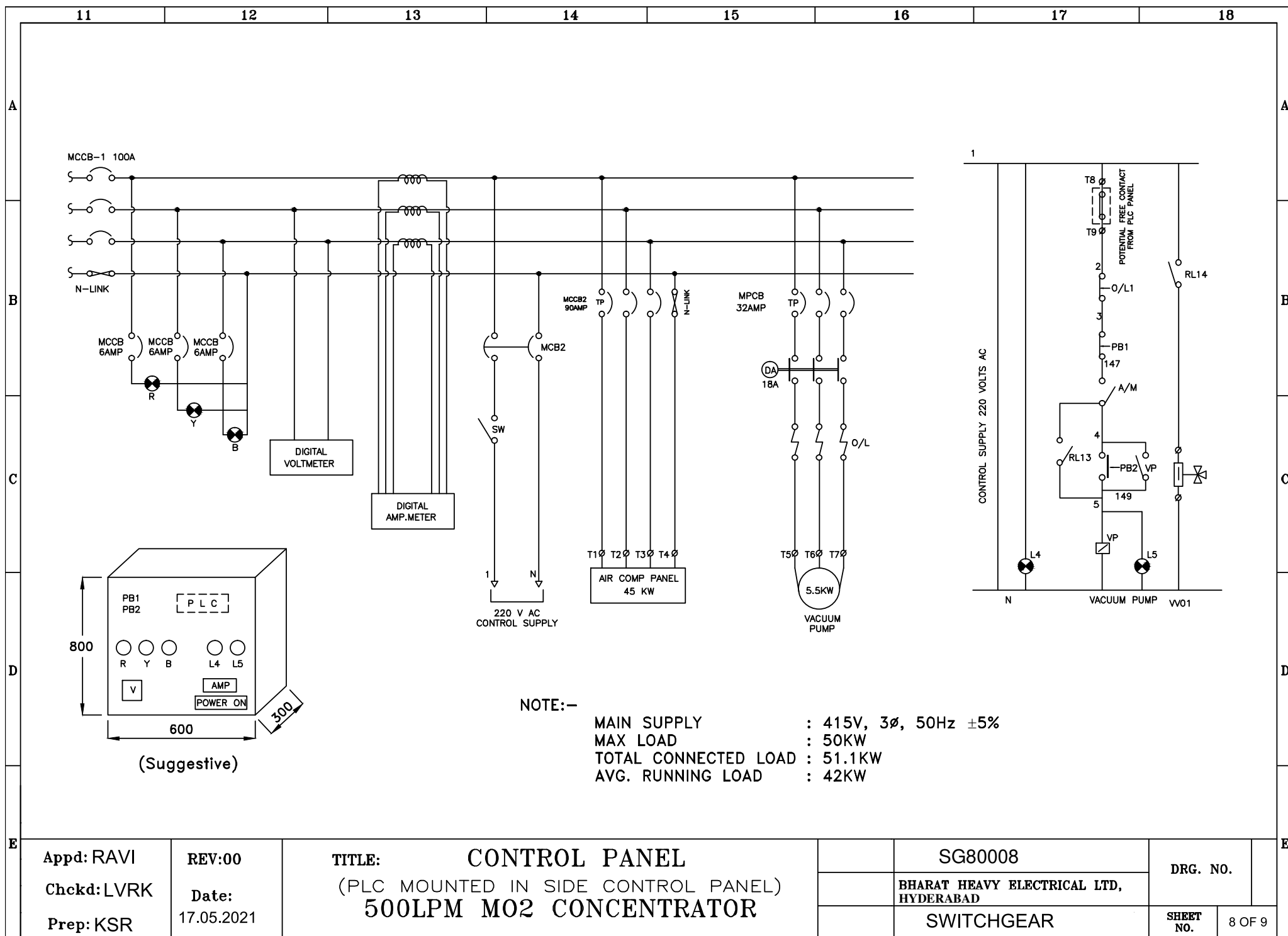


Status of all SOLENOID VALVES i.e. 11 nos. solenoid valves, Auto Drain valve & Vent valve shall be visible on HMI.

NOTES :

1. DO NOT SCALE THE DRG. ASK IF IN DOUBT.
2. THE CYCLE SHALL BE REPEATED AFTER EVERY CYCLE TIME COMPLETION
3. SHOWS VALVES ENERGISED / OPEN
4. OPERATING VOLTAGE SHALL BE 220 VAC.
5. CONTACT RATING SHALL BE 220 VOLTS, 5 AMPS.
6. TOTAL NO. OF OUTPUTS : 12





Appd: RAVI

REV:00

TITLE:

CONTROL PANEL

SG80008

DRG. NO.

Chckd: LVRK

Date:

(PLC MOUNTED IN SIDE CONTROL PANEL)

BHARAT HEAVY ELECTRICAL LTD,
HYDERABAD

Prep: KSR

17.05.2021

500LPM MO2 CONCENTRATOR

SWITCHGEAR

SHEET
NO.

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Rev No. 001

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RECORD OF REVISIONS

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