

NEOMETRIX



“High speed bearing endurance test
rig”

By:

Neometrix Engineering (P) Limited

E-148, Sector-63

Noida India - (U.P.)

Pin-201301

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About Company

NEOMETRIX Engineering Pvt. Ltd. is a complete engineering solutions company based in New Delhi.

We specialize in CUSTOM BUILT Data Acquisition Systems.

We have expertise in various engineering domains like Complete PC Based Automation Solutions, Controlled Monitoring and Simulation Design Architecture, Electronics/ Electrical Test Benches, Fluid Systems, Chemical Processes, Chemical Engineering, Hydraulics, ATF, Mechanical, Pneumatic, Oxygen/ Helium (High Purity Gases).

We have experts in Mechanical Engineering, Electrical/ Instrumentation Engineering, Software, Civil Engineering, Aeronautical engineering and other engineering fields.

The company has a team of ~80 highly qualified engineers and has an experience of more than 100 successfully delivered projects. We are very closely working with HAL, RDSO, Railways, Defence Establishments, Labs and Private Industries.

The founder is graduate from IIT Kanpur and the company remains very closely linked with IITs. We utilize the expertise available there as and when required. Neometrix is working with IIT professors on several consultancy projects. We take extensive consultancy help from IIT.

Neometrix has an extensive VENDOR Base in NOIDA/New Delhi (NCR Region) and complete system integration is implemented at its NOIDA facilities.

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Neometrix NOIDA facility is a 10,000 sq. feet state of the art office infrastructure housing 50+ engineers from various engineering domains. With such alliances and our own detail engineering capabilities, we are in a position to deliver you state of the art world class Engineering Systems and facilities.

We have supplied following Test Rigs/ Systems to various customers, mainly in DEFENCE (Please note that not all systems are mentioned here):

- (i) Fully Automated Computerized Universal General Purpose Hydraulic Test Bench
- (ii) Computerized Rudder Test Equipment
- (iii) Computerized Tail Plane Test Equipment
- (iv) Computerized Booster Test Equipment: Please note that the Operating Temperature in this rig is 120 Degree C.
- (v) Computerized Pneumatic Test Bench
- (vi) PC Based Automation of Jaguar Alternator Test Bench
- (vii) Fully Automated PC Based Ejection Release Unit Test Bench
- (viii) Fully Automated PC Based Timer Test Benches
- (ix) Fully Automated PC Based Counter Test Benches
- (x) Fully Automated PC Based Static Inverter Test Bench
- (xi) Fully Automated PC Based Display Test Bench
- (xii) Fully Automated Universal Hydraulic Test Bench for SU 30 project.
- (xiii) Fully Automated Avitron Test Bench
- (xiv) Multiple (~10 Nos.) Oxygen Test Benches for SU 30 project
- (xv) Pneumatic PC Based Gauge Pressure switch Test Rig
- (xvi) Pneumatic PC Based Absolute Pressure switch Test Rig
- (xvii) NPRC (Nozzle Pressure Ratio) Test Rig (ATF Based)
- (xviii) DTSN Pump Test Rig (ATF Based)
- (xix) Data Acquisition System for Air Brake Lab (RDSO)

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INTRODUCTION

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Objective: - The objective of the “High speed bearing endurance test rig” is to measure the bearing endurance life at different radial and axial loading condition.

Machine Name:- “HIGH SPEED BEARING ENDURANCE TEST RIG”

Purpose of operation:-

- 1) To measure the endurance life of the bearings at different radial and axial loading condition.

Description:- The “HIGH SPEED BEARING ENDURANCE TEST RIG” is developed for measuring the endurance life of the bearings at different RPM and different radial and axial loading conditions.

It consists of:-

- 1) 3-Phase motor with Drive system
- 2) Gear Box- To rotate the shaft from 0 to 70000 RPM..
- 3) Bearing Loading fixture- For applying radial and axial load.
- 4) Bearing Lubrication Power Pack- This system is used for bearing lubrication.
- 5) Gear box Lubrication System- - This system is used for Gear Box lubrication.
- 6) Heater- For increasing the oil temperature from 35 °C to 200 °C.
- 7) Industrial IPC and TFT- For control and logic for the machine functioning.
- 8) Bearing Engagement And Dismantling Fixture- This fixture is used for bearing engagement and dismantling on the shaft.

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- 9) Safety Coupling- This coupling is used for connecting the main motor to gear box. Maximum torque it can sustain up to 300 N-m.
- 10) BKC Couplings- It is used for connecting the gear box to torque sensor and torque sensor to bearing shaft.
- 11) Torque Sensor- This sensor is used for measuring the torque applied by the bearing shaft on the gear box output shaft.
- 12) Load Cell- This sensor is used for measuring the radial and axial load on the shaft.
- 13) Casting Bed- This is the main surface on which main motor, gear box and bearing loading fixture connected to each other.



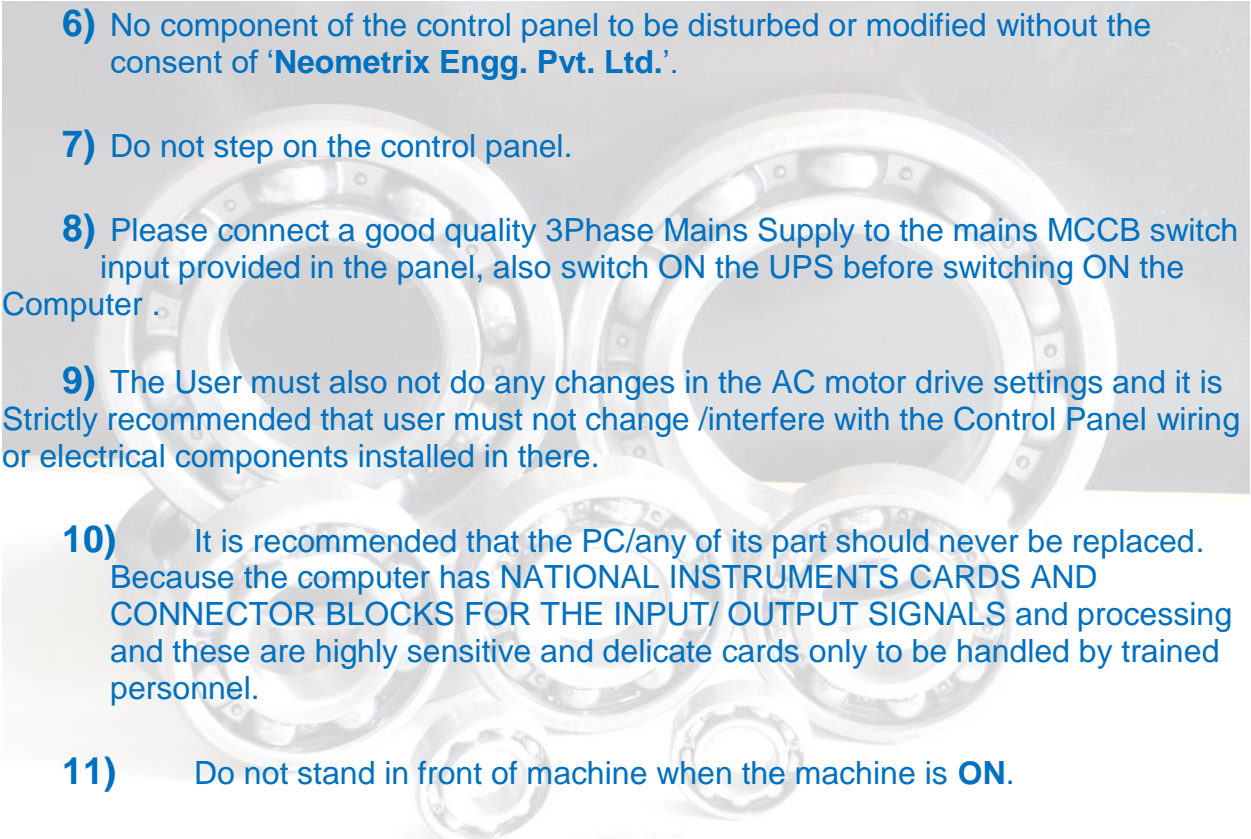
Chapter 2 Safety Precaution



Safety Precautions!!!

- 1) Keep distance from moving parts of Test System while operating.

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- 2) Change the test bearings after confirming that the upper housing is fixed on the safety pins.
 - 3) No loose parts should be lying on the machine while operation.
 - 4) To stop machine immediately press '**EMERGENCY**'.
 - 5) Switch '**OFF**' machine when not in use.
- 
- 6) No component of the control panel to be disturbed or modified without the consent of '**Neometrix Engg. Pvt. Ltd.**'.
 - 7) Do not step on the control panel.
 - 8) Please connect a good quality 3Phase Mains Supply to the mains MCCB switch input provided in the panel, also switch ON the UPS before switching ON the Computer .
 - 9) The User must also not do any changes in the AC motor drive settings and it is Strictly recommended that user must not change /interfere with the Control Panel wiring or electrical components installed in there.
 - 10) It is recommended that the PC/any of its part should never be replaced. Because the computer has NATIONAL INSTRUMENTS CARDS AND CONNECTOR BLOCKS FOR THE INPUT/ OUTPUT SIGNALS and processing and these are highly sensitive and delicate cards only to be handled by trained personnel.
 - 11) Do not stand in front of machine when the machine is **ON**.
 - 12) Always follow the user manual for operating the RIG.

Chapter 3 Basic Layout



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Basic Layout of the “High Speed Bearing Endurance Test Rig”



Operating Process:-

User must follow these for start the RIG:-

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1) First ON the UPS from the back door of the main panel.



Main operating Panel

- 2) Now start the IPC by pushing the **ON** switch.
- 3) Observe all the sensors are **OK** and not showing the red light on the main panel.
- 4) Then start the both power pack motor (3 ϕ and 1 ϕ) of bearing and gear box lubrication system by toggle switch.
- 5) Start heater of the bearing lubrication power pack and set temperature according to requirement.
- 6) Set the voltage of proportional flow control valve (Bearing lubrication power pack) according to flow requirement.

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- 7) Check all the transmitter like pressure, temperature and flow are according to condition or not.(Software will automatically check pressure, temperature and flow)
- 8) Check the chiller line is **ON** or not.
- 9) After checking the entire instrument wait 10 minute for internal lubrication in gear box as well as bearing loading fixture.
- 10) Now start the main motor by main motor toggle switch.
- 11) Start the axial and radial loading by the electronic pressure regulator, according to the loading schedule.
- 12) Motor RPM can increase by changing the frequency.
- 13) User can see all the parameter on main panel.
- 14) The whole system is safe by many interlocks, which automatically stop the system if any error occur in the system.
- 15) The reports of the loading and testing will be saved in the default REPORT (C:\CVRDE\report) folder.
- 16) User can take a print out of this or may store in remote computer, file will be in word format which is editable and have an option to paste picture at the end of the report file.

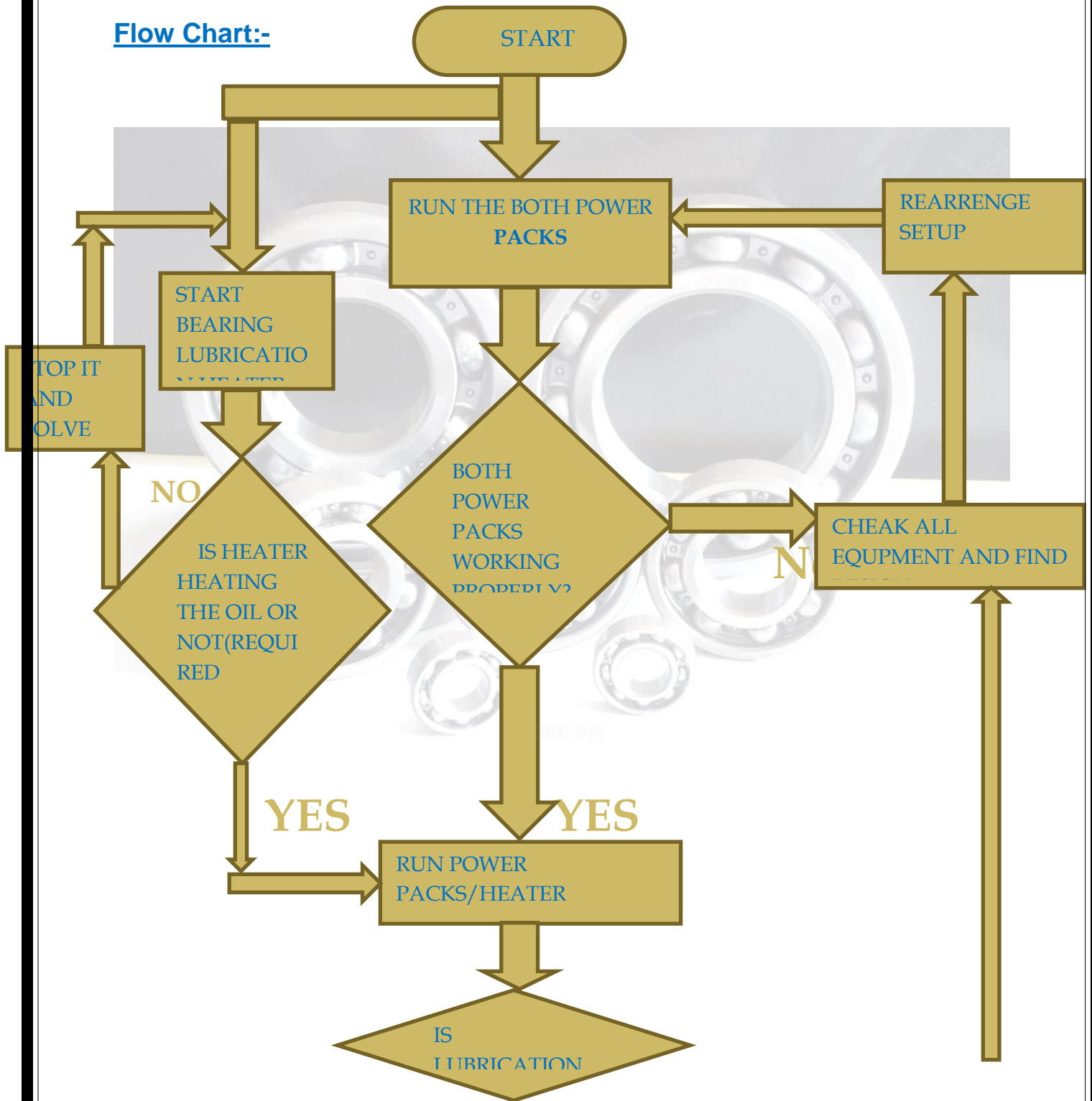
Software Handling Instruction:-

This manual contains information regarding safety operation of the HIGH SPEED BEARING ENDURANCE TEST RIG. Operator must read this manual before attempting any test on RIG.

When user starts application, this is the main panel on screen. User must enter a valid user name and password to proceed. If you are an authorized person then only you can execute the Test. Default user name & password is a (as per factory setting). Administrator can change this at any time.

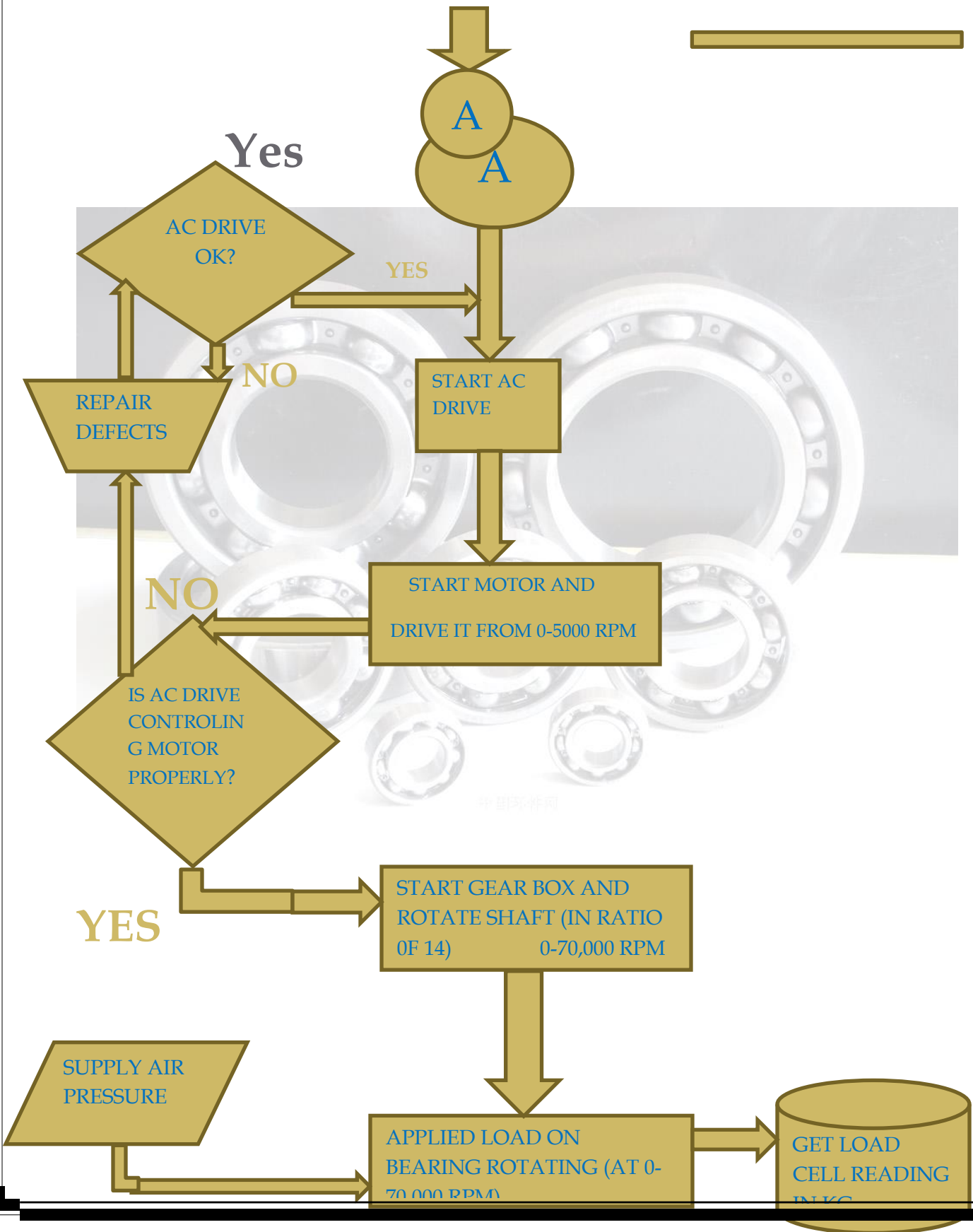
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Flow Chart:-

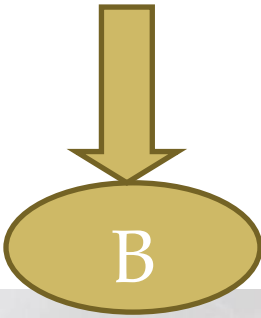


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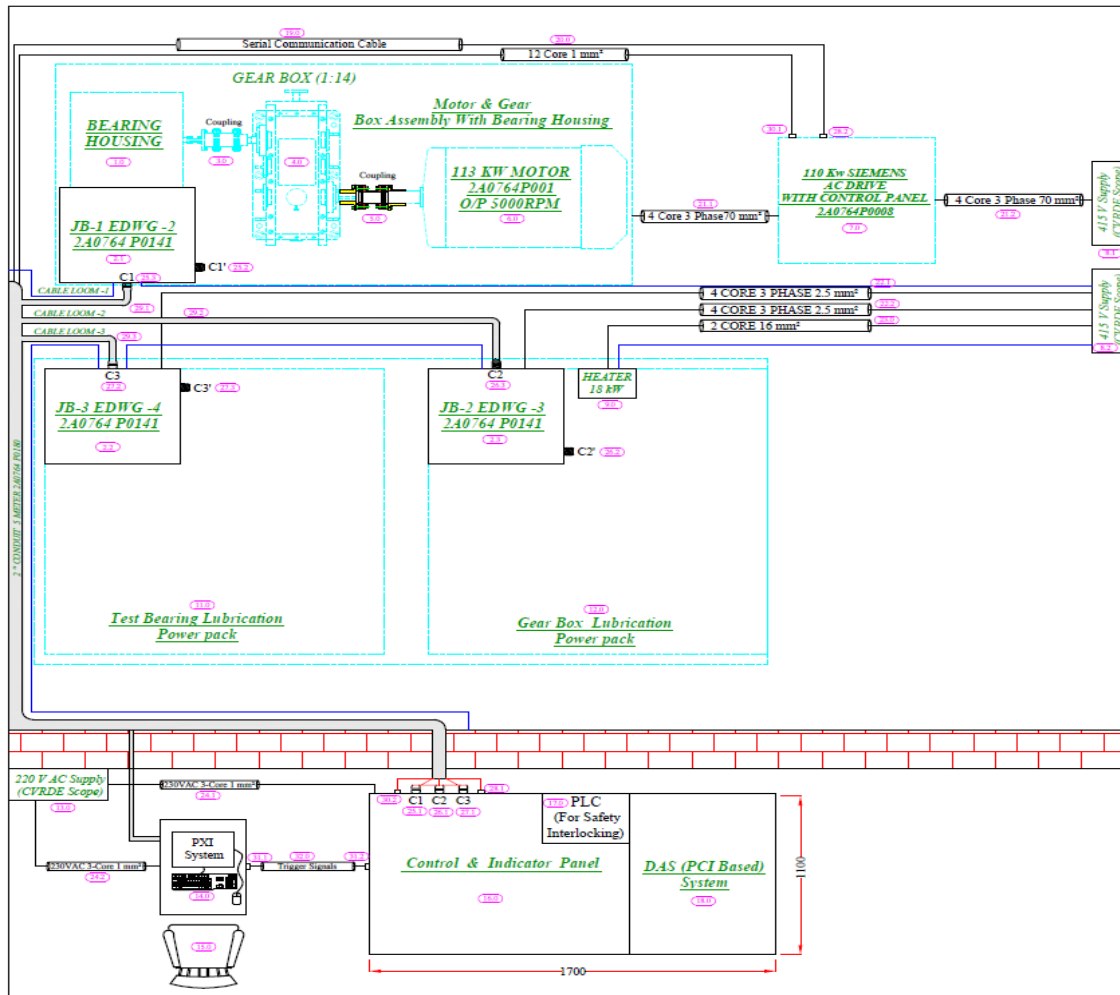


ELECTRICAL CIRCUIT DETAIL

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Sl. No.	Item Description	Neometrix Code	Qty.	SL No.	Item Description	Neometrix Code	Qty.
16.	Control Panel	2A0764P0006	01	32.	6 Core Cable 0.5 mm ²	2A0764P0153C	4 M
15.	Chair	2A0764 P0105	01	31.	6 Pin Connector	2A0764P0205	02
14.	PLC System	2A0764 P0100	01	30.	12 Pin Connector	2A0764P0204	02
13.	220 V AC Supply	CVRDE Scope	01	29.	Loom 1, 2 & 3 Junction Box to PLC	1-TRD-0396V-08	03
12.	Power Pack for Gear Box	Assvaac-C'	01	28.	Connector for Serial Communication	2A0764P0217	02
11.	Power Pack for Bearing Lubrication	Assvaac-D'	01	27.	25 Pin Connector-3 for Bearing Lubrication JB-3	2A0764P0205	03
10.	Air Vessel	Assvaac-B'	01	26.	25 Pin Connector-2 for Gear Box JB-2	2A0764P0205	03
9.	Heater 18 kW	Assvaac-B'	01	25.	25 Pin Connector-1 for Loading JB-1	2A0764P0205	03
8.	415 V Supply (CVRDE Scope)	CVRDE Scope	02	24.	230V AC 3 Core 1 mm ²	2A0764P0153	8 M
7.	110 kW Siemens AC Drive with Control Panel	2A0764P0008	01	23.	2 Core, 16 mm ²	2A0764P0155	10 M
6.	113 kW Motor, O/P 5000 RPM	2A0764P0008	01	22.	4 Core, 3 Phase, 2.5 mm ²	2A0764P0152	12 M
5.	Coupling b/w Motor & Gear Box	2A0764P0119	01	21.	4 Core, 3 Phase, 70 mm ²	2A0764P0154	10 M
4.	Gear Box	2A0764P0101	01	20.	12 Core 0.5 mm ²	2A0764P0150	5 M
3.	Coupling Gear Box Output	2A0764P0120	01	19.	Serial Communication b/w Drive & PLC	2A0764P0217	15 M
2.	Junction Box	2A0764 P0141	03	18.	DAS (PCI Based System)	2A0764P0109	01
1.	Bearing Housing Assembly	2A0764P0130	01	17.	PLC	2A0764P0124	01

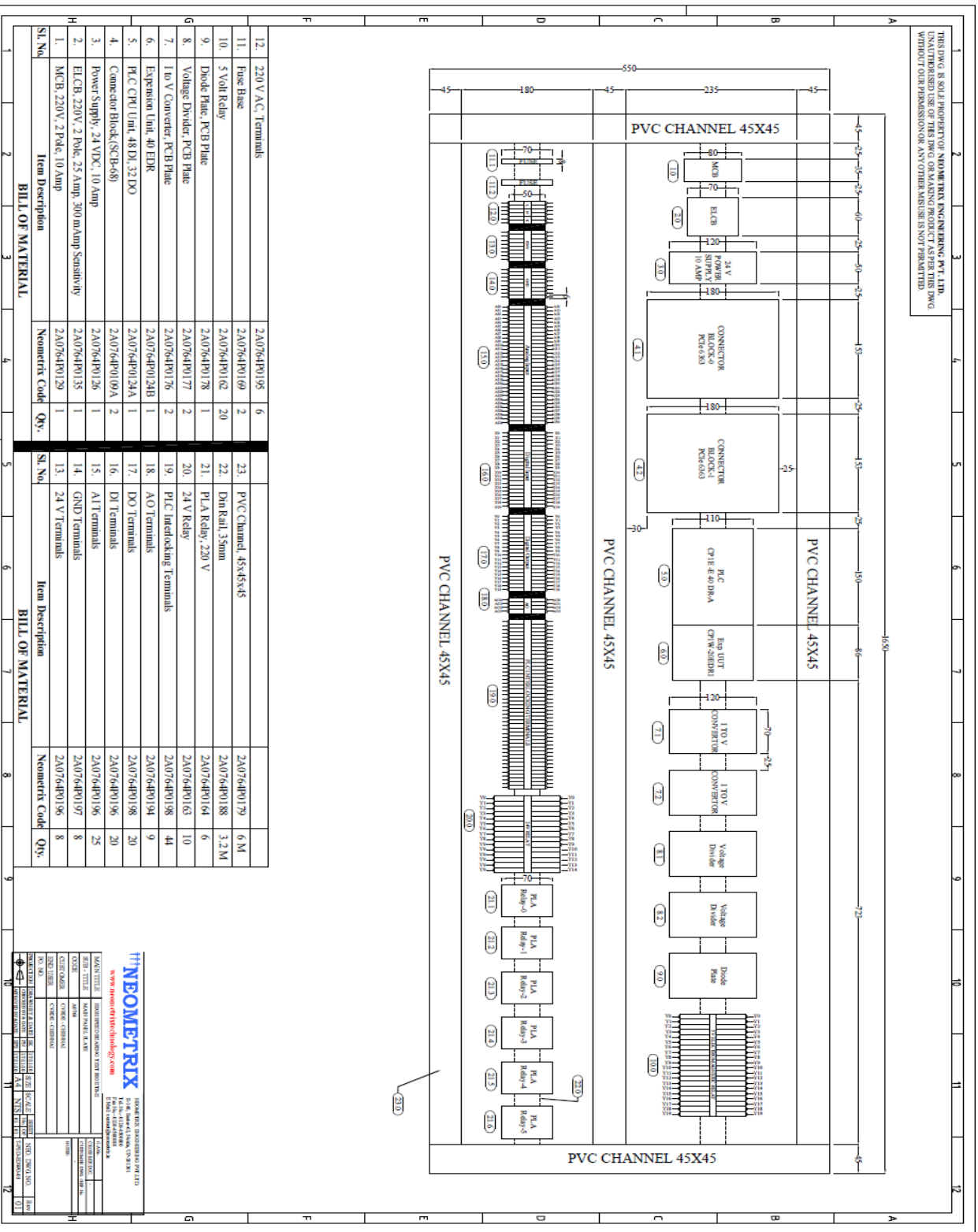
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NEOMETRIX ENGINEERING PRIVATE LIMITED
P-148, SECTOR-63, NOIDA
Tel. No - 0120-4509000
Fax No - 91-120-4100088
E-Mail: contact@neometrix.in

MAIN TITLE	HIGH SPEED BEARING TEST RIG (ETR-I)	WEIGHT-	
ASSEMBLY	MAIN ASSEMBLY		
PART	ELECTRICAL GA DRAWING		
DESIGNED BY	SK	SCALE	NTS
DRAWN BY	SK	PROJECTION	1st Angle
CHECKED BY	PN	SHEET NO.	REV. 01
APPROVED BY	SPS	DWG. NO. -	T-PED-EDWG-00

Electrical circuit-1

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Electrical circuit-2

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 FEROZ KHAN PURA, LUDHIANA-141015, PUNJAB, INDIA.
 TEL: +91-181-2601001 FAX: +91-181-2601002
 WWW.NEOMETRIXENGINEERING.COM

DATE: 11/01/2018
 DRAWN: RAVI
 CHECKED: RAVI
 DESIGNED: RAVI
 PROJECT: CONTROL ROOM

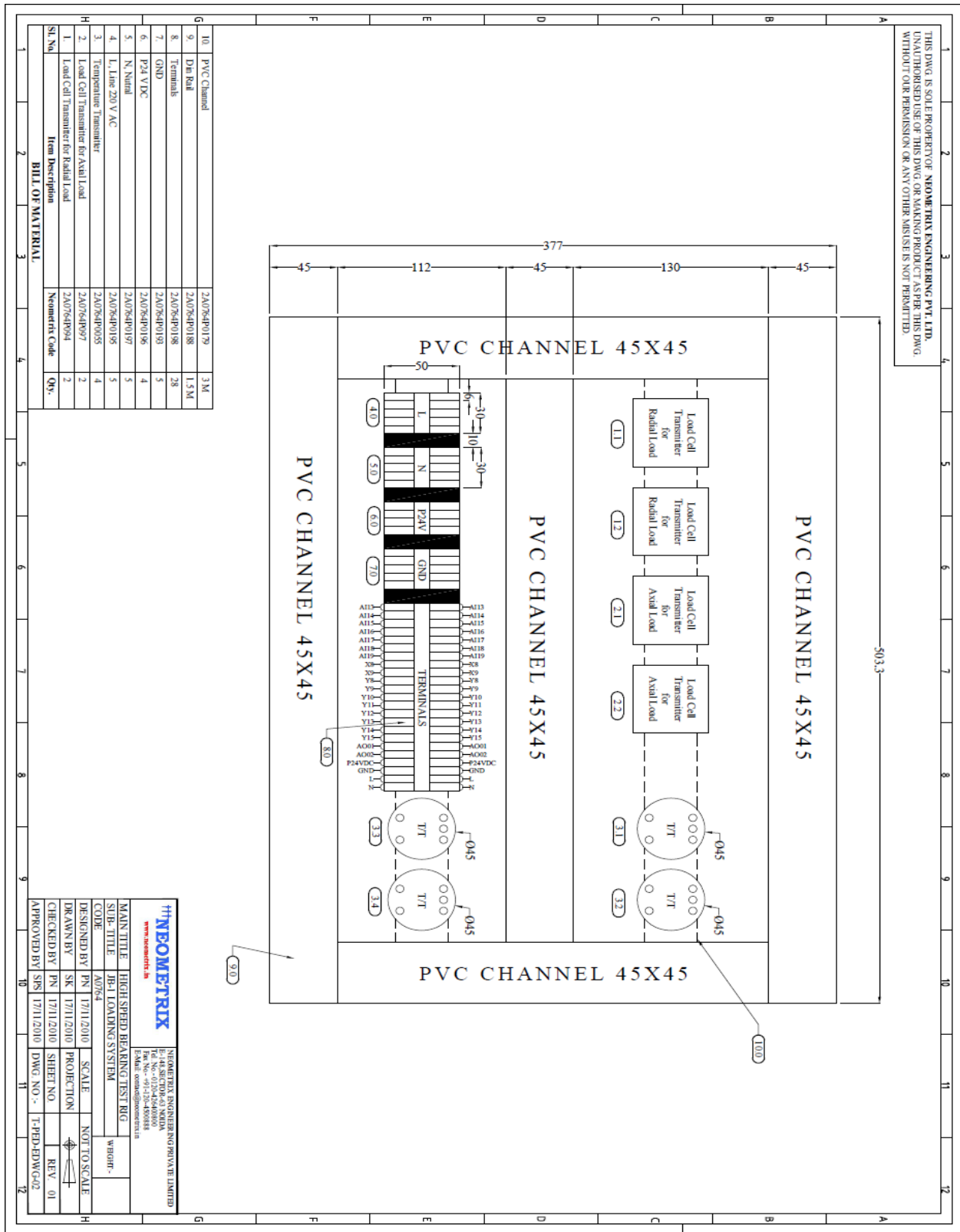
SCALE: AS SHOWN
 SHEET NO: 11/01/2018
 TOTAL SHEETS: 11

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Sl. No	Item Description	Neometrix Code	Qty.
10	PVC Channel	2A0764P0179	3 M
9	Dir Rail	2A0764P0188	1.5 M
8	Terminals	2A0764P0198	28
7	GND	2A0764P0193	5
6	PE/AV	2A0764P0195	4
5	N, Neutral	2A0764P0197	5
4	L, Line 220 V AC	2A0764P0195	5
3	Temperature Transmitter	2A0764P0005	4
2	Load Cell Transmitter for Axial Load	2A0764P0197	2
1	Load Cell Transmitter for Radial Load	2A0764P0194	2

NEOMETRIX		NEOMETRIX ENGINEERING PRIVATE LIMITED	
www.neometrix.in		Plot No. 44, SECTOR-42, NARAINA	
Main Title: HIGH SPEED BEARING TEST RIG		Pin No. - 110045	
Sub-Title: IBI LOADING SYSTEM		Maha. Code: 02000000000000000000	
Code: A0764	Scale: NOT TO SCALE	Designed By: PN	17/11/2010
Drawn By: SK	Projection: 1st	Checked By: PN	17/11/2010
Approved By: SRS	DWG. NO.:	T-FBD-EDWG-02	

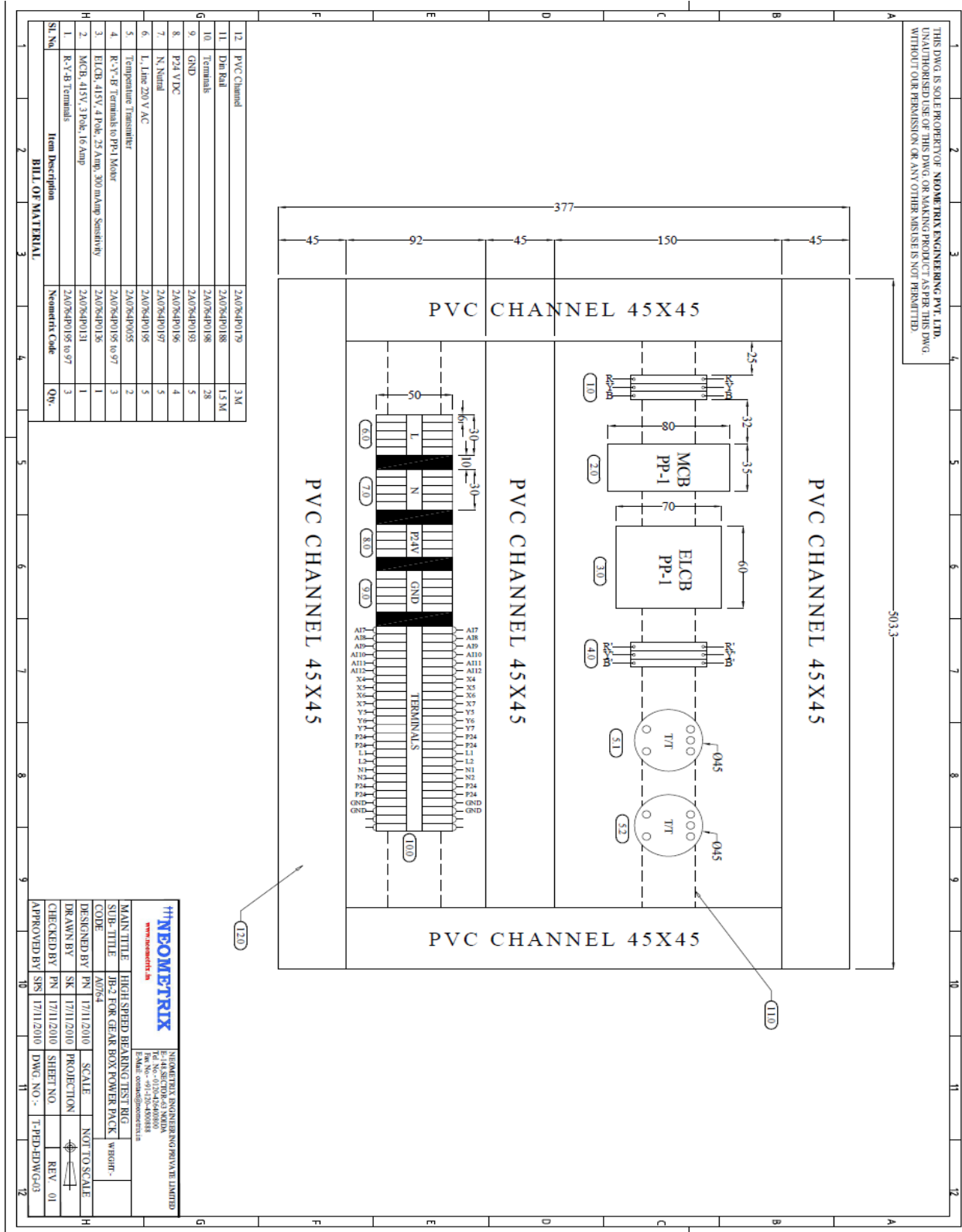
Electrical circuit- 3

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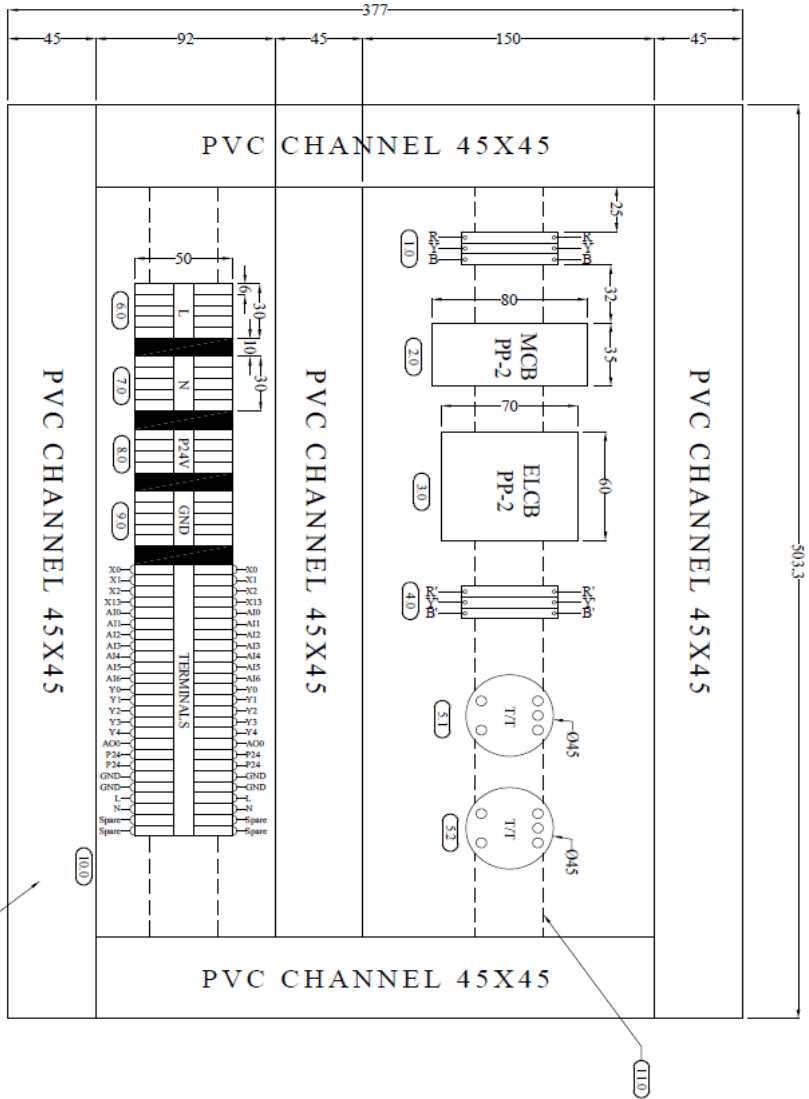
Electrical circuit- 4

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12	PVC Channel	2A07640179	3M
11	Dr Rail	2A07640188	1.5M
10	Terminals	2A07640198	28
9	GND	2A07640193	5
8	P24 V DC	2A07640196	4
7	N, Neutral	2A07640197	5
6	L, Line 220 V AC	2A07640195	5
5	Temperature Transmitter	2A07640055	2
4	R-Y-B Terminals to PFI Motor	2A07640195 to 97	3
3	ELCB, 415V, 4 Pole, 25 Amp, 300 mAmp Sensitivity	2A07640136	1
2	MCB, 415V, 3 Pole, 16 Amp	2A07640131	1
1	R-Y-B Terminals	2A07640195 to 97	3
SP. No	Item Description	Neometrix Code	Qty.

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NEOMETRIX ENGINEERING PRIVATE LIMITED
 Plot No. 45, Sector 44, Gurgaon
 Haryana - 122002
 Tel. No. - 0120-4588888
 Email: com@neometrix.in

MAIN TITLE	HIGH SPEED BEARING TEST RIG	SCALE	NOT TO SCALE
SUB-TITLE	JR-3 for Bearing Lubc Power Pack	PROJECTION	W80H-
CODE	A0764		
DESIGNED BY	PN 17/11/2010		
DRAWN BY	SK 17/11/2010		
CHECKED BY	PN 17/11/2010		
APPROVED BY	SPS 17/11/2010		

APPROVED BY SPS 17/11/2010 DWG. NO. - T-PED-EDWG-04

1 2 3 4 5 6 7 8 9 10 11 12

1 2 3 4 5 6 7 8 9 10 11 12

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Electrical circuit- 5



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Electrical circuit- 6

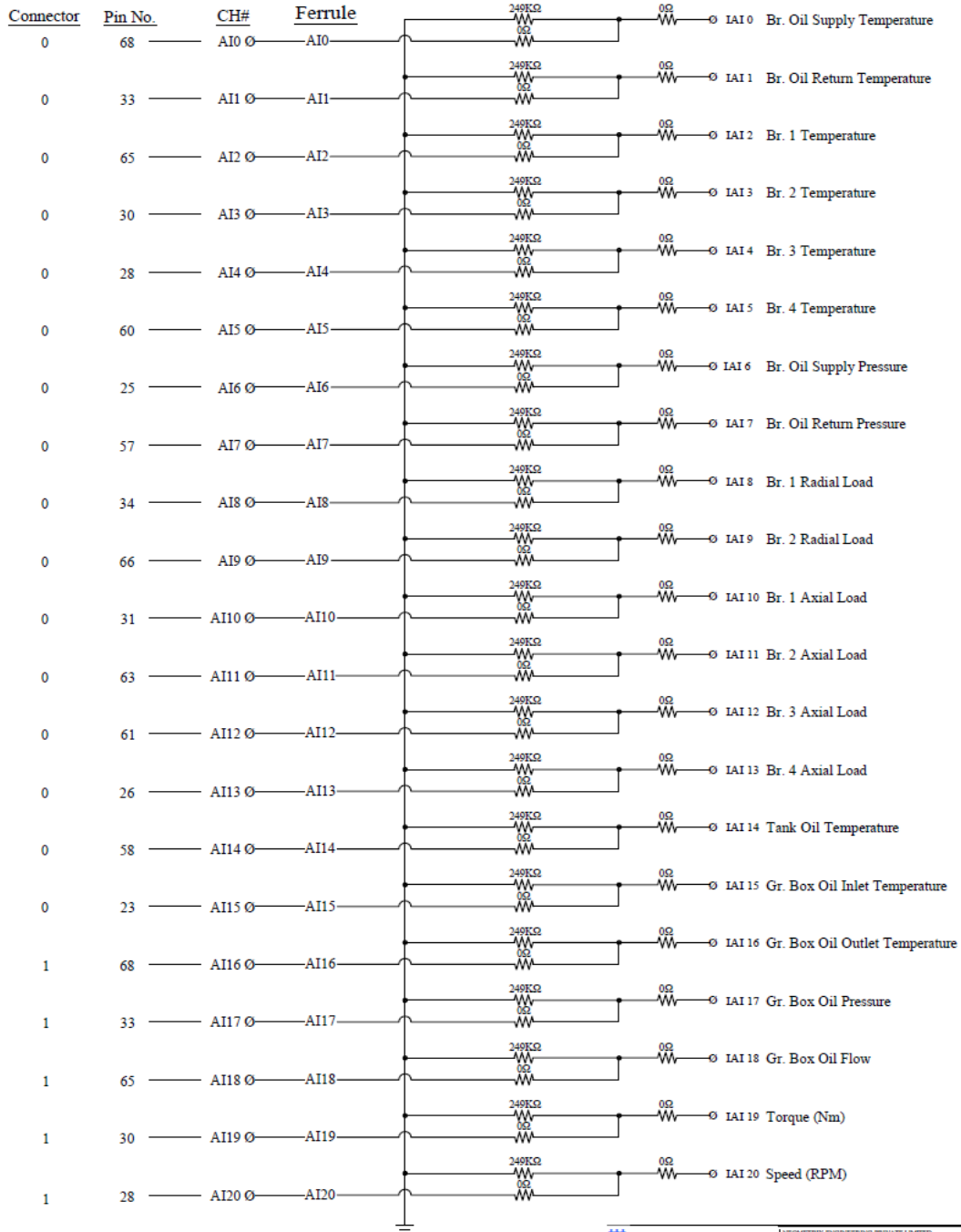


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I TO V CONVERTER (1.0) ANALOG INPUT



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NEOMETRIX ENGINEERING PRIVATE LIMITED
E-146, SECTOR-43, NOIDA-201301 (I.P.)
Tel. Phone No. - 0120-450800
Fax No. - 0120-450808
E-Mail: Contact@neometrix.in

MAIN TITLE	HIGH SPEED BEARING TEST RIG	SCALE	
SUB-TITLE	I TO V CONVERTER CIRCUIT DIAGRAM	DATE	08/09/2007
CODE	AD754	DESIGNED BY	
CUSTOMER	CVRDE CHENNAI	CHECKED BY	
END USER	CVRDE CHENNAI	APPROVED BY	
APPLICATION		PROJECT NO.	NEOMETRIX DWG. NO.
DRAWN BY	AD754	DATE	08/09/2007
CHECKED BY		SCALE	1:1
APPROVED BY		SHEET	1 OF 1
		REV	1-PEP-EDW06
		REV	01

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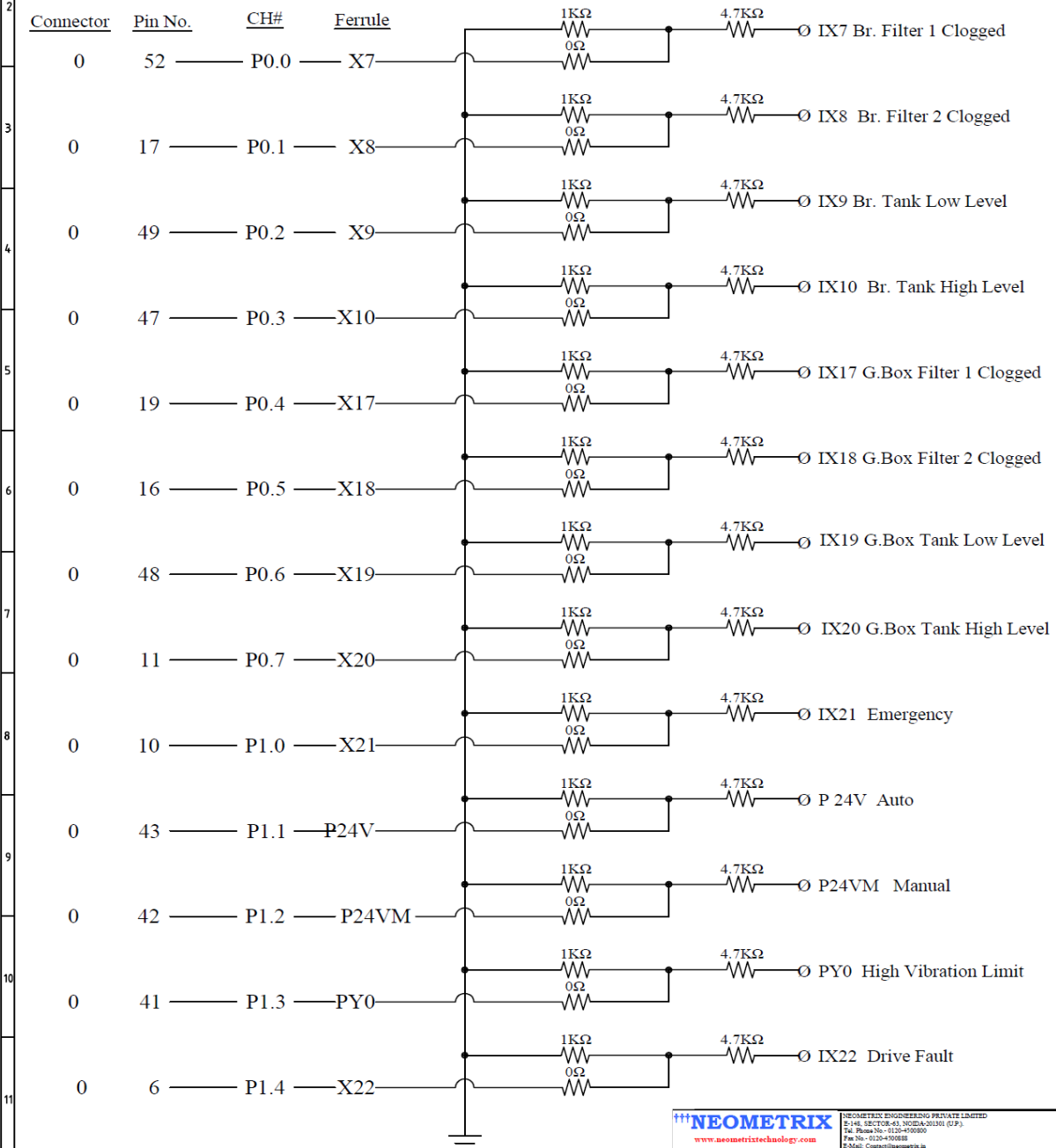
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VOLTAGE DIVIDER (1.0) DIGITAL INPUT



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		Tel. No: 0120-4500900	
		Fax No: 0120-4500888	
		E-Mail: Control@neometrix.in	
MAIN TITLE	HIGH SPEED BEARING TEST BBO	DATE	
SUB-TITLE	VOLTAGE DIVIDER CIRCUIT DIAGRAM	DESIGNER	
CODE	A0764	CHECKED BY	
CUSTOMER	CVRDE CHENNAI	DATE	
END USER	CVRDE CHENNAI	PROJECT	
APPLICATION			
PROJECTION	1ST ANGLE	DATE	
		SCALE	
		SHEET	
		NEOMETRIX DWG NO.	
		REV	
		T-PED-EDWG-07	01

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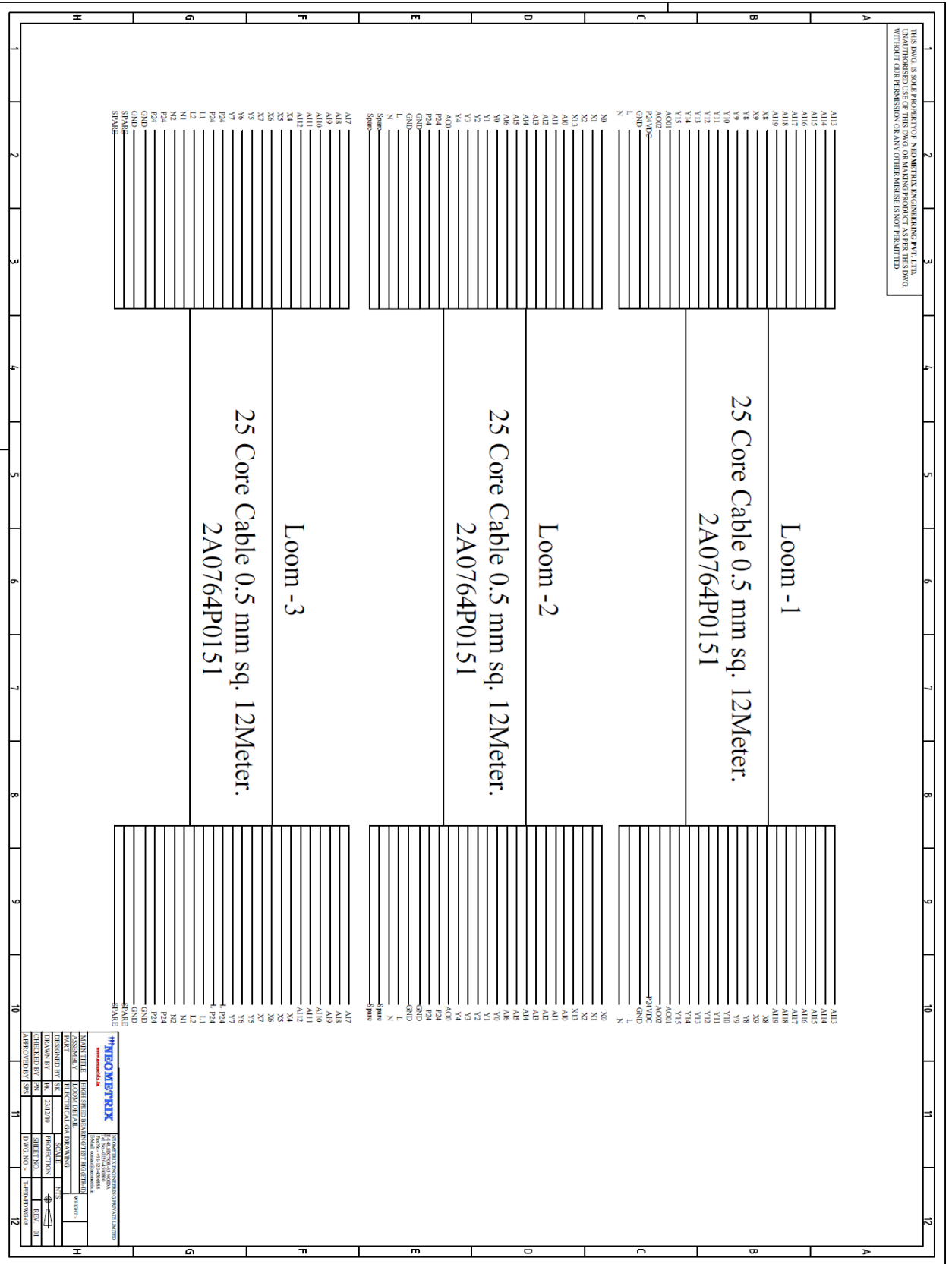
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Loom -1

25 Core Cable 0.5 mm sq. 12Meter.
 2A0764P0151

Loom -2

25 Core Cable 0.5 mm sq. 12Meter.
 2A0764P0151

Loom -3

25 Core Cable 0.5 mm sq. 12Meter.
 2A0764P0151

NEOMETRIX		NEOMETRIX ENGINEERING PVT. LTD.	
INDIA		PLOT NO. 10, INDUSTRIAL AREA, PHASE - I, GATE NO. 1, NEW DELHI - 110028	
DESIGNED BY	HEMANT KUMAR	CHECKED BY	HEMANT KUMAR
DRAWN BY	HEMANT KUMAR	DATE	12/11/20
APPROVED BY	HEMANT KUMAR	PROJECT NO.	
DATE	12/11/20	DWG. NO.	2A0764P0151
SCALE	1:1	REVISED BY	
DATE		DATE	

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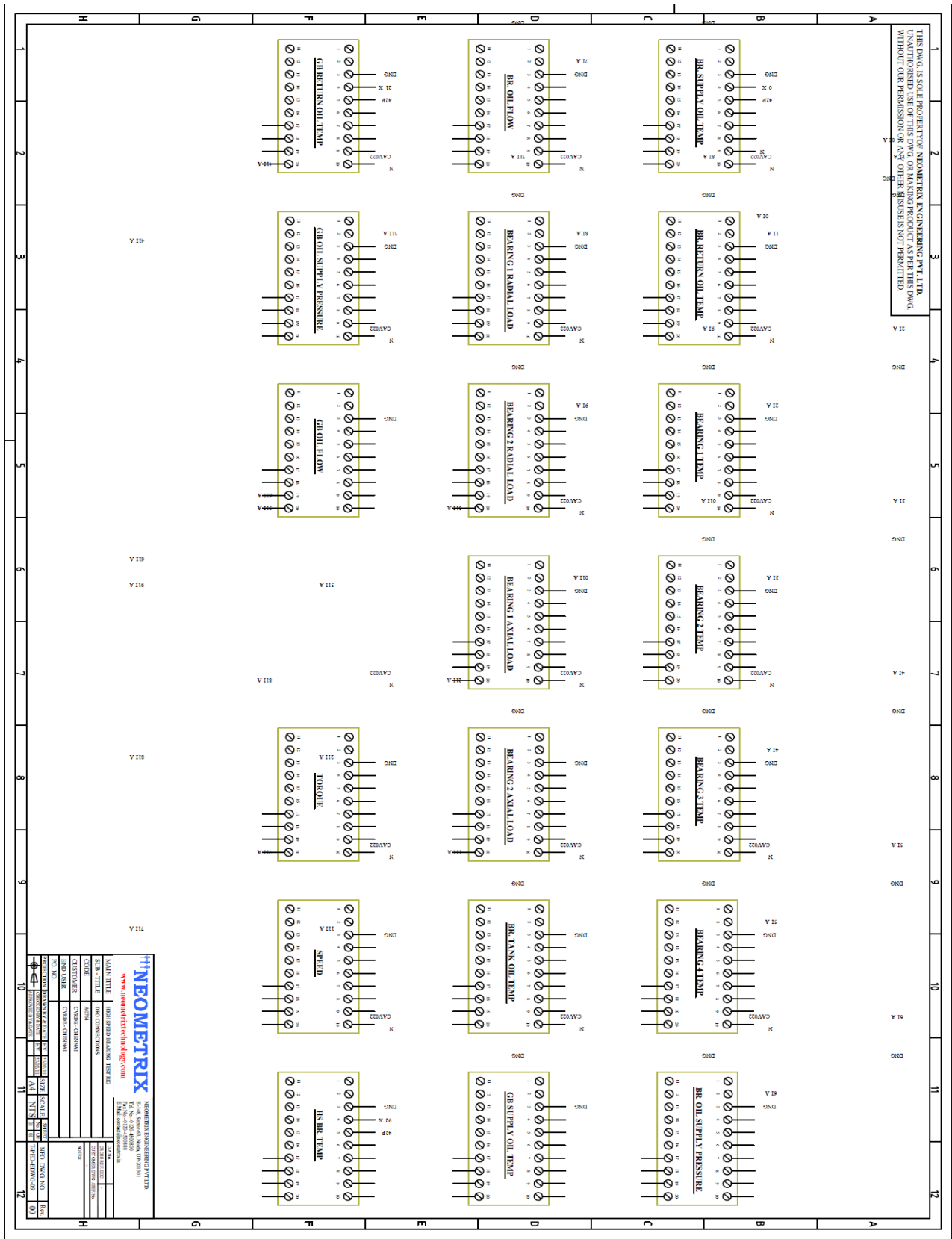
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Electrical circuit- 10

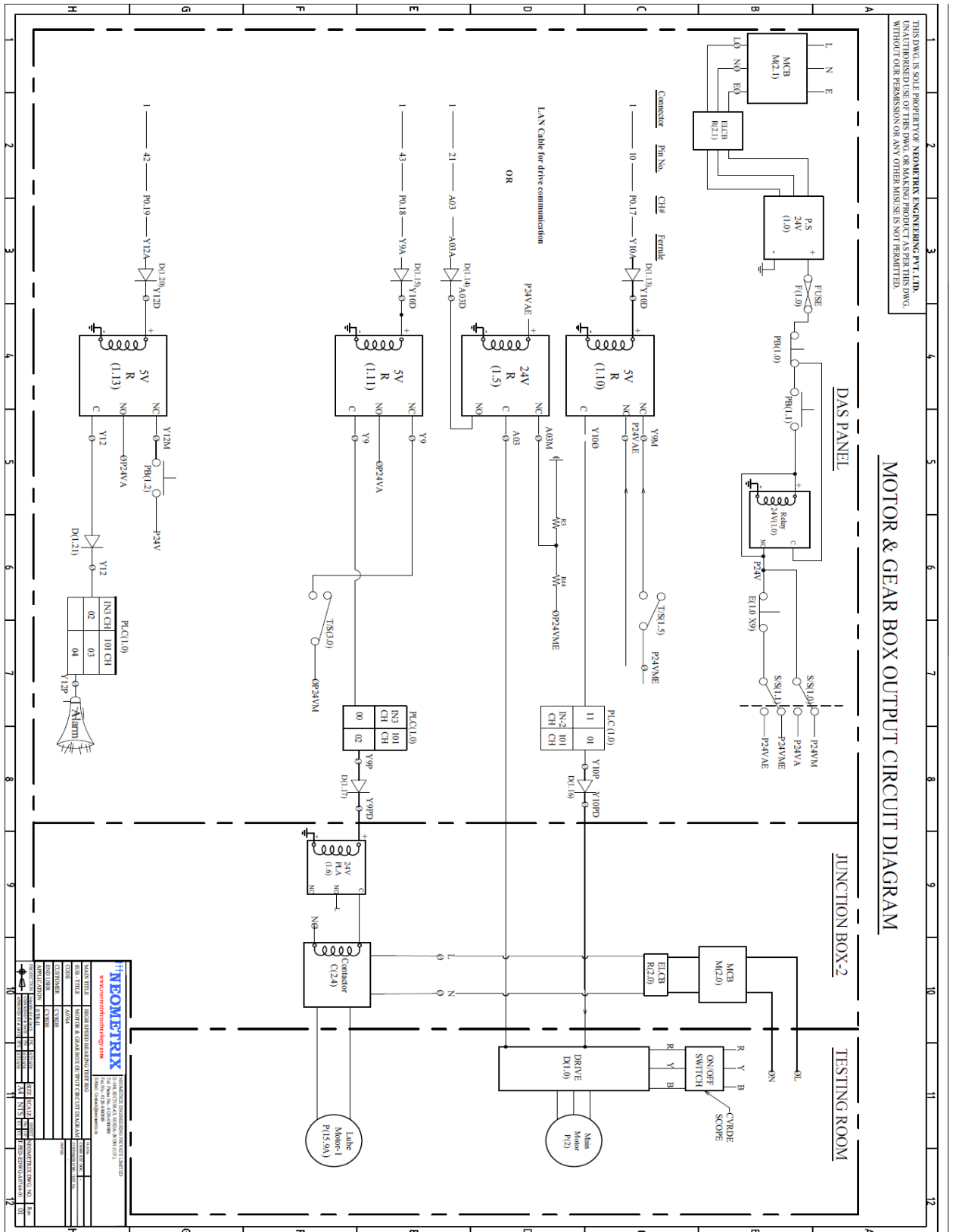


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MOTOR & GEAR BOX OUTPUT CIRCUIT DIAGRAM



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www.neometrix.com		12/12, Sector 10, Gurgaon, Haryana	
DATE	12/12/2012	SCALE	AS SHOWN
DESIGNER	ADARSH	CHECKED	ADARSH
DRAWN	ADARSH	APPROVED	ADARSH
CUSTOMER	ADARSH	DATE	12/12/2012
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CLIENT	ADARSH	CLIENT NAME	ADARSH
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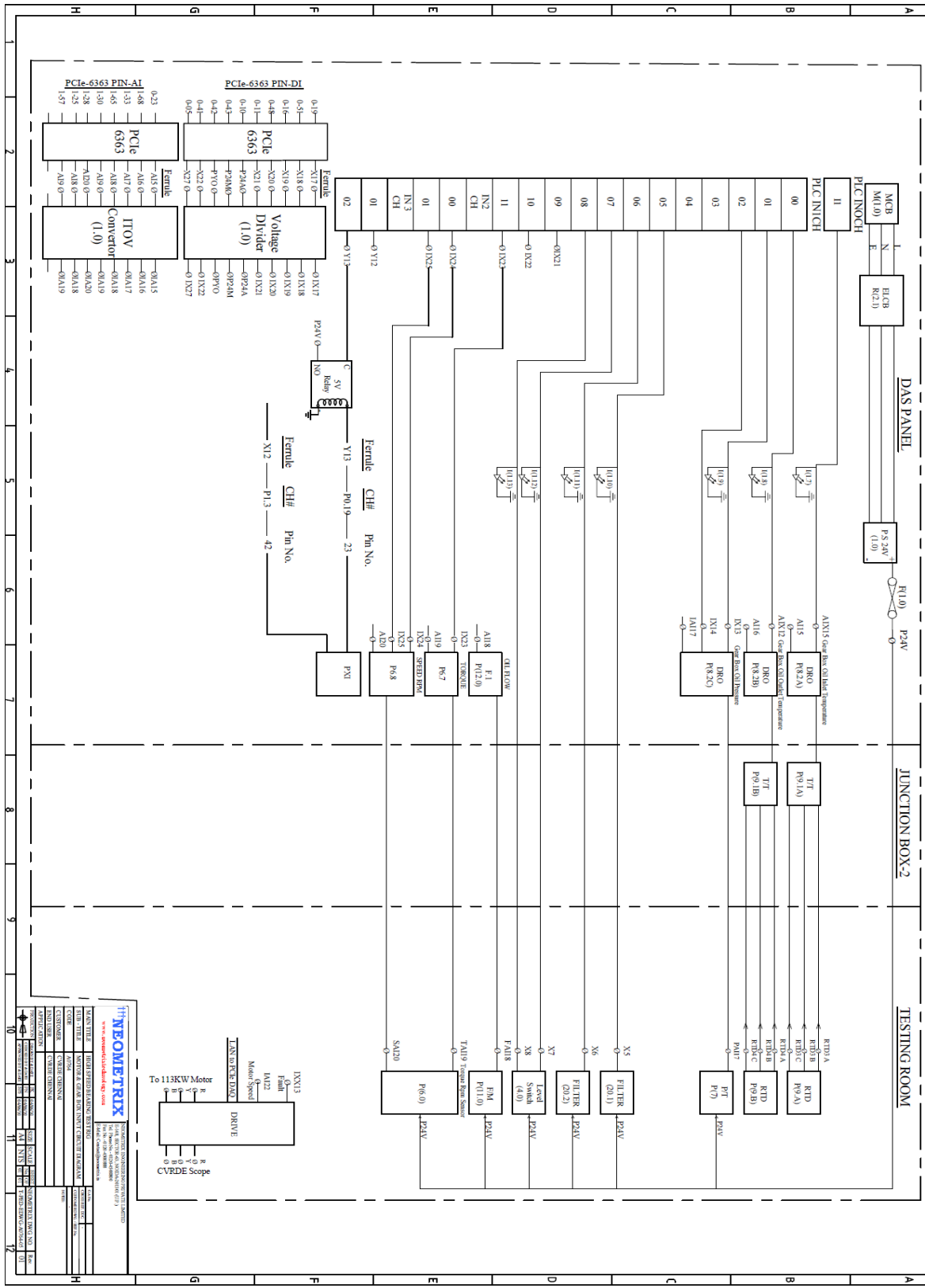
Electrical circuit- 11



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MOTOR & GEAR BOX INPUT CIRCUIT DIAGRAM



REV	DATE	BY	CHKD	DESCRIPTION
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2	10/10/2018
3	10/10/2018
4	10/10/2018
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Electrical circuit- 12

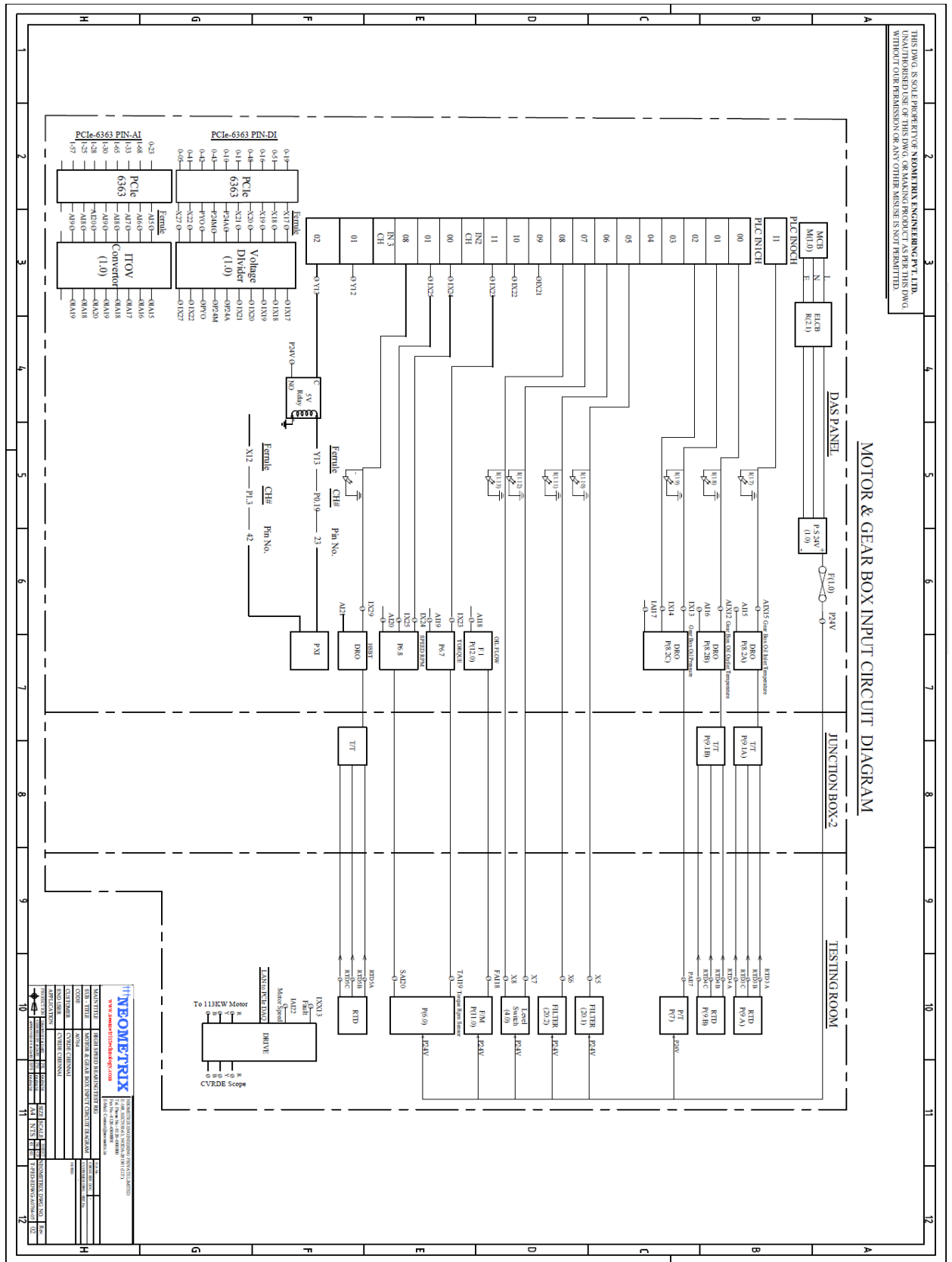
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MOTOR & GEAR BOX INPUT CIRCUIT DIAGRAM



NO.	DESCRIPTION	DATE	BY	CHECKED
1	DESIGNED			
2	CHECKED			
3	APPROVED			

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PLOT NO. 14, SECTOR 14, GATEWAY INDUSTRIAL ESTATE,
PUNE - 411 004, INDIA

NEOMETRIX

Electrical circuit- 13



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Digital Input PLC CIRCUIT DIAGRAM Digital Output

Signal Name	Ferrule	INO CH	100 CH	Ferrule	Signal Name
Br. oil Supply High Limit Temp	IX0	00	00	Y0P	Bearing Motor
Br. Oil Return High Limit Temp	IX1	01	01	Y1P	Radial Load
Bearing -1 High Limit Temp	IX2	02	02	Y2P	Radial Unload
Bearing -2 High Limit Temp	IX3	03	03	Y3P	Axial Load
Bearing -3 High Limit Temp	IX4	04	04	Y4P	Axial Unload
Bearing -4 High Limit Temp	IX5	05	05	Y5P	Heater-1
Br. oil Supply High Pressure	IX6	06	06	Y6P	Heater-2
Bearing Oil 1 Clogged	IX7	07	07	Y7P	Heater-3
Bearing Oil 2 Clogged	IX8	08	101 CH	Y8P	Heater-4
Bearing Oil Low Level	IX9	09	00	Y9P	Main Motor
Bearing Oil High Level	IX10	10	01	Y10P	G.B. Lube Motor-1
Gear Box High Oil Supply Temp	IX11	11	02	Y11P	G.B. Lube Motor-2
		IN1 CH	03	Y12P	Alarm
G. box High Oil Return Temp	IX12	00	04		
G. box Oil Low Pressure	IX13	01	05		
Drive Motor Trip	IX14	02	06		
Lube Motor-2 Start Signal	IX15	03	07		
Lube Motor-2 Stop Signal	IX16	04			
Oil Filter 1 Clogged	IX17	05			
Oil Filter 2 Clogged	IX18	06			
G. box Tank Low Level	IX19	07			
G. box Tank High Level	IX20	08			
Emergency	IX21	09			
Drive Fault	IX22	10			
Troque high limit	IX23	11			
		IN2 CH	00		
Speed High Limit	IX24	01			
Speed Low Limit	IX25	01			
Bearing Motor Input	Y0	02			
Radial Load	Y1	03			
Radial Unload	Y2	04			
Axial Load	Y3	05			
Axial Unload	Y4	06			
Heater-1	Y5	07			
		08			
		09			
		10			
Main Motor Input	Y9	11			
		IN3 CH	00		
GB Lube Motor 1 Input	Y10	00			
Alarm Enabled	Y12	01			
Vibration Limit	PYO	02			
24 Auto	Y24VA	03			
Pneumatic Pressure Limit	IX26	04			
Cooling Water	IX27	05			

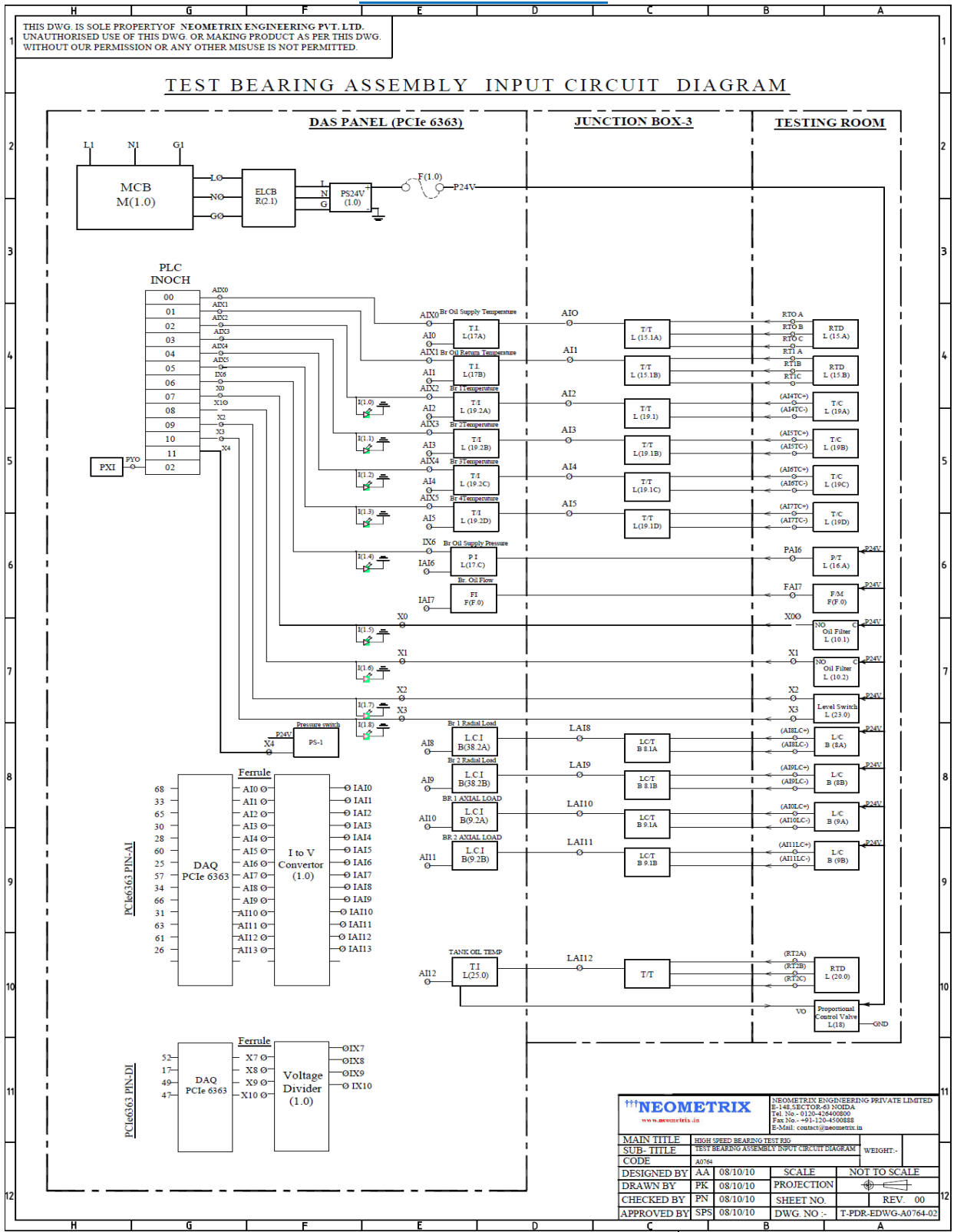
NEOMETRIX www.neometrixtechnology.com		NEOMETRIX ENGINEERING PRIVATE LIMITED E-04, SECTOR-43, Gurgaon, 201301 (G.P.) Tel. No:- 0120-450980 Fax No:- 0120-450988 E-Mail: Contact@neometrix.in	
MAIN TITLE	HIGH SPEED BEARING TEST RIG	DATE	
SUB-TITLE	PLC CIRCUIT DIAGRAM	CREATED BY	SK
CODE	2018	CHECKED BY	SK
CUSTOMER	KYRDE CHEMNAL		
END USER	KYRDE CHEMNAL		
APPLICATION			
PROJECT NO.	NEOMETRIX/PLC/18/01	SIZE	A4
SCALE	1:1	DATE	18/04/2018
NEOMETRIX DWG NO.	18/04/2018	REV.	01

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Electrical circuit- 14

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TEST BEARING ASSEMBLY INPUT CIRCUIT DIAGRAM



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E-141 SECTOR-09 NOIDA
Tel. No. - 0120-22440000
Fax No. - 91-120-4100888
E-Mail: contact@neometrix.in

MAIN TITLE	HIGH SPEED BEARING TEST RIG		
SUB- TITLE	TEST BEARING ASSEMBLY INPUT CIRCUIT DIAGRAM		
CODE	A0764	WEIGHT:-	
DESIGNED BY	AA 08/10/10	SCALE	NOT TO SCALE
DRAWN BY	PK 08/10/10	PROJECTION	
CHECKED BY	PN 08/10/10	SHEET NO.	REV. 00
APPROVED BY	SPS 08/10/10	DWG NO. :-	T-PDR-EDWG-A0764-02

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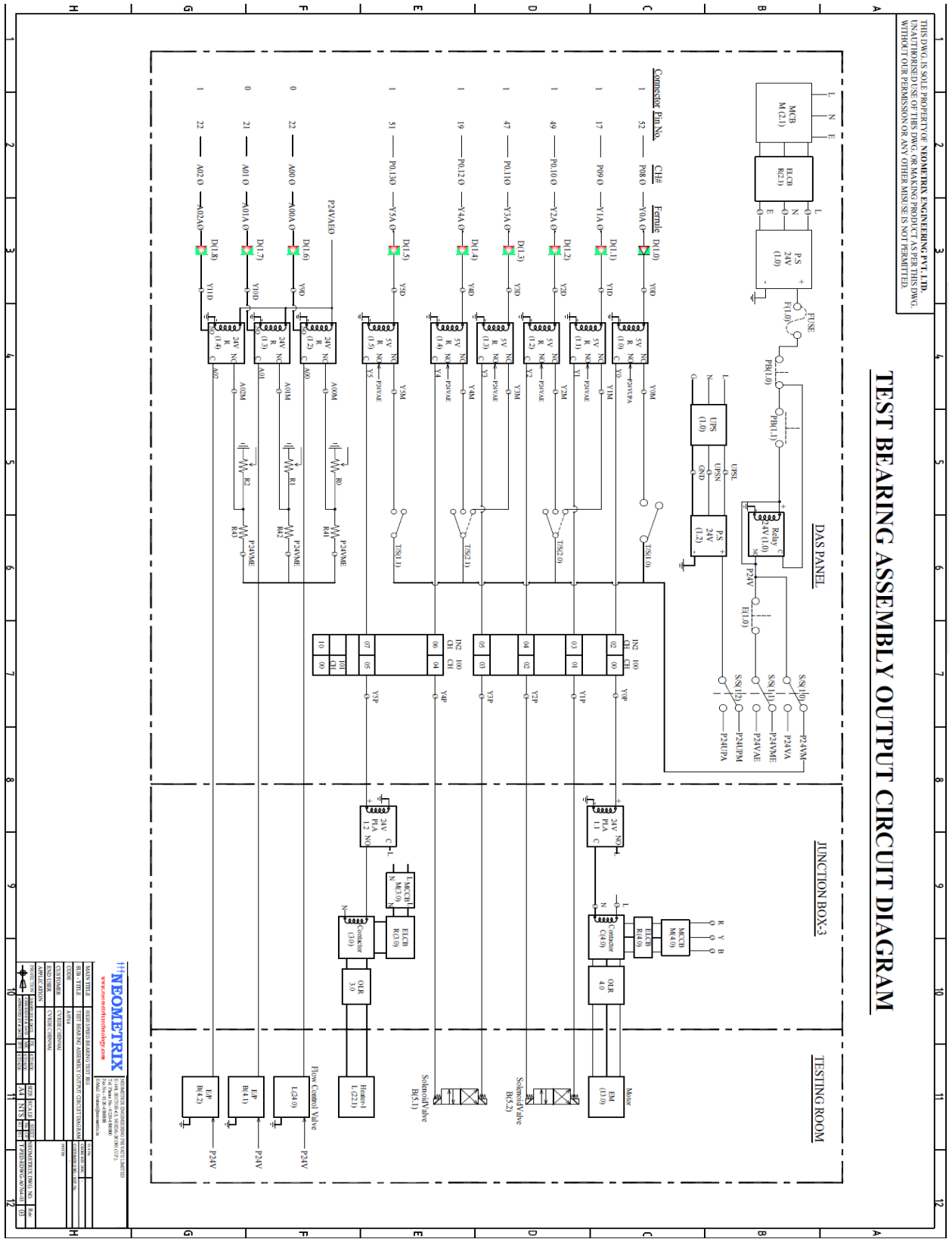
Electrical circuit- 15



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TEST BEARING ASSEMBLY OUTPUT CIRCUIT DIAGRAM



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INPUT& OUTPUT DETAIL:-

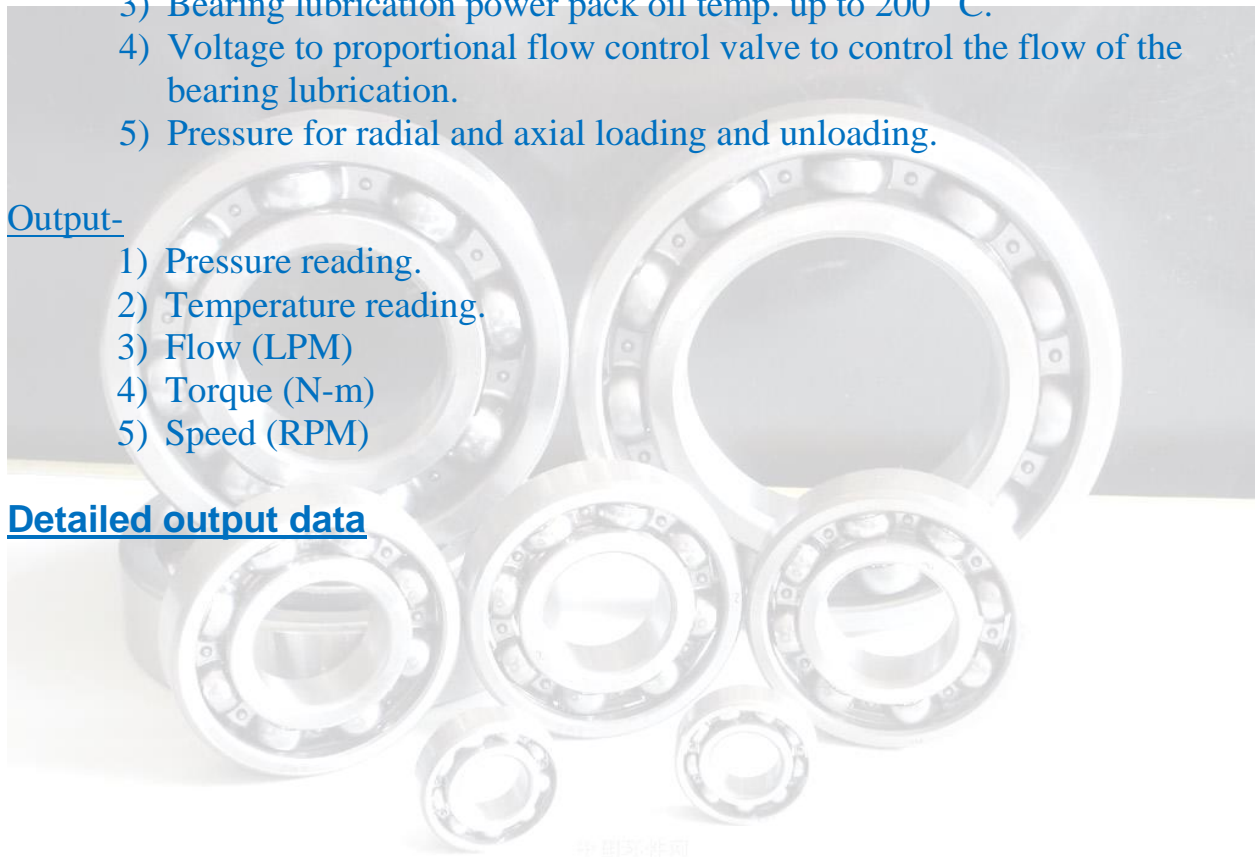
Input-

- 1) Power supply 220V AC, 415 V 3-Phases to main motor, Power pack motors.
- 2) Power supply 220V AC, 1-Phases to cooling motors of power pack
- 3) Bearing lubrication power pack oil temp. up to 200⁰ C.
- 4) Voltage to proportional flow control valve to control the flow of the bearing lubrication.
- 5) Pressure for radial and axial loading and unloading.

Output-

- 1) Pressure reading.
- 2) Temperature reading.
- 3) Flow (LPM)
- 4) Torque (N-m)
- 5) Speed (RPM)

Detailed output data



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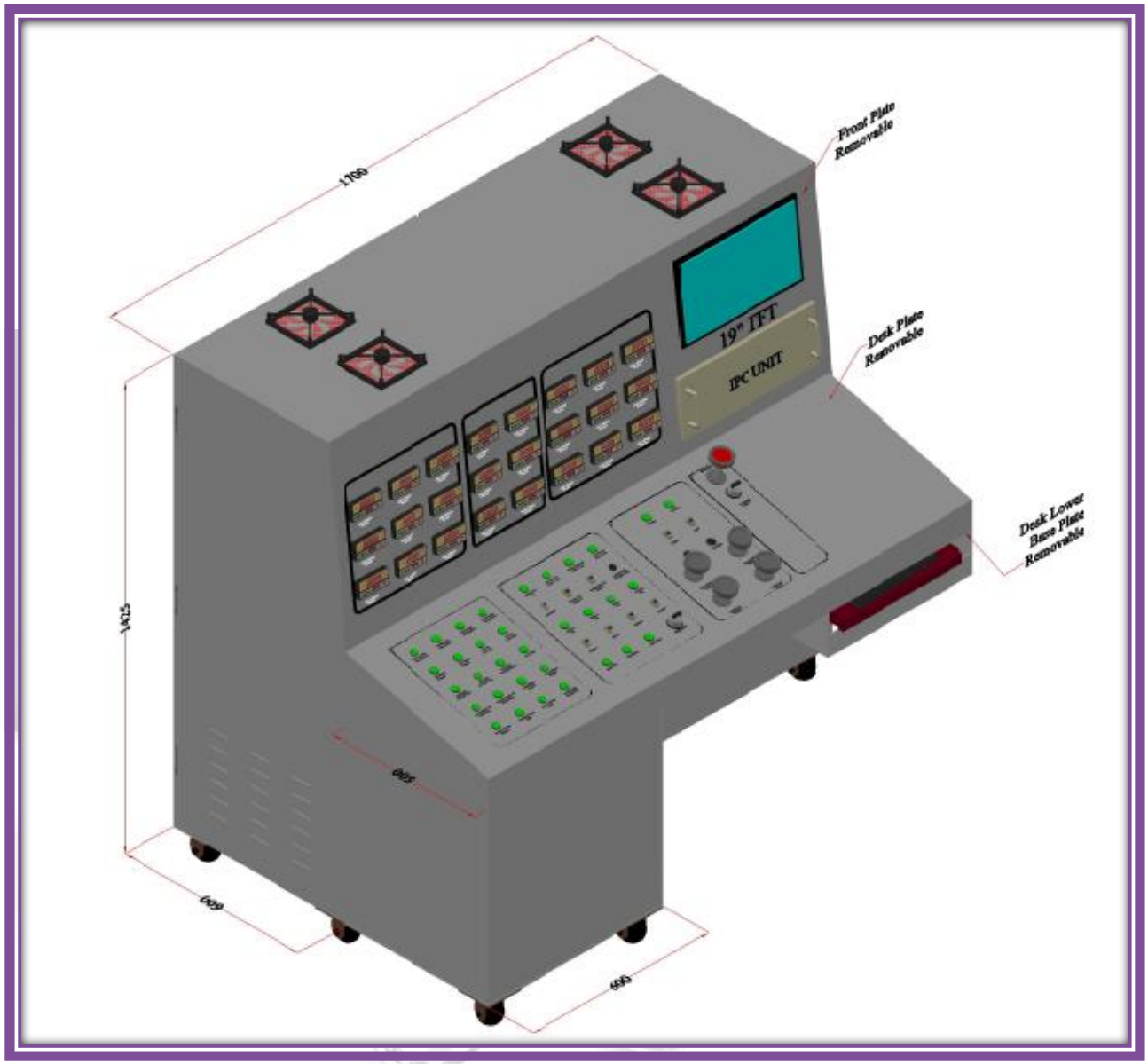


Panel Layout:-



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Main Panel 3-D layout

Mechanical Material List:-

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- 1) Gear Box
- 2) Casting Bed
- 3) Bearing loading fixture
 - a) Upper housing
 - b) Bottom housing
 - c) Linear guide rail mounting fixture
 - d) Radial loading piston
 - e) Radial loading pin
 - f) Axial loading fixture
 - g) Bearing Disc
 - h) Bellow cylinder
 - i) Nozzle
 - j) Heater
- 4) Power Packs

1) Gear Box :-

This gear box is used for multiplying the motor speed. The maximum speed that it can provide is 70000 RPM.

Gear box Specification

Input maximum speed	:	5000 RPM
Output Maximum Speed	:	70000 RPM
Gear ratio	:	14
Factor	:	2
Center Distance	:	300 mm
Design Standard	:	AGMA 6011 I-03
Number of stage	:	Double
Shaft orientation	:	Parallel
Teeth Design	:	Single Helical
Efficiency	:	85% (Minimum)
Bearing	:	Steel Backed-Fe410WA-IS-2062
Hydro Dynamic Journal Bearing		

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Gear Box

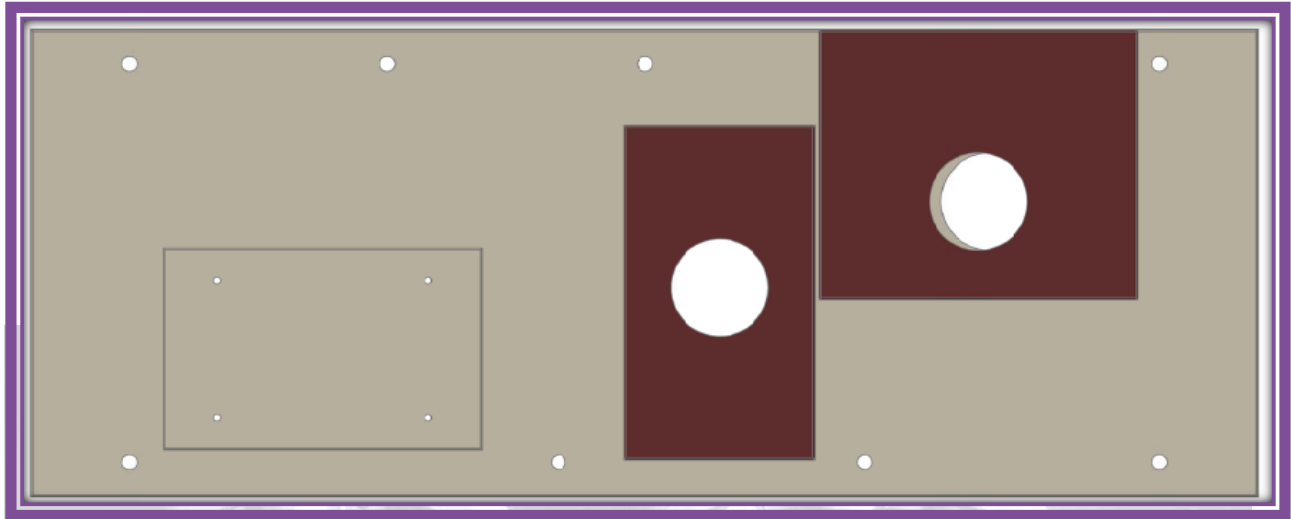
2) Casting Bed :-

The bed is made of cast iron material. The chemical composition of the material reduces the vibration produce by the motor and gear box.

Chemical composition

C – 3.2% to 3.8%
Mg- 0.4% to 1%
Cr- 0.2% to 0.6%
Si- 1% to 2%
S- 0.015% (max^m)

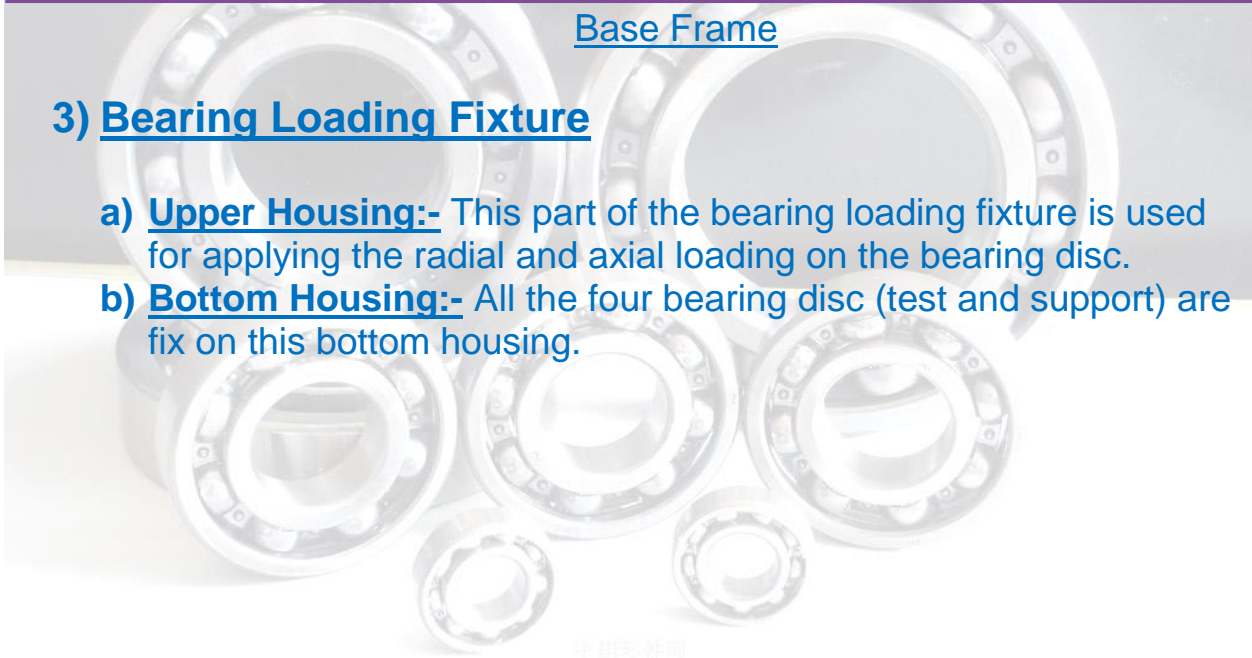
P- 0.015% (max^m)



Base Frame

3) Bearing Loading Fixture

- a) Upper Housing:- This part of the bearing loading fixture is used for applying the radial and axial loading on the bearing disc.
- b) Bottom Housing:- All the four bearing disc (test and support) are fix on this bottom housing.



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Top Housing

Bottom

Bill Of Material

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Drive, Gear Box, Support Bearing with Lubrication System

ITEM DESCRIPTION	ITEM SPECIFICATION	MODEL NO.	MAKE
Gear Box	Power: 113 KW, Input Speed:5000 RPM, Output speed: 70000 RPM, Gear Ratio: 14, Service Factor: 2, center Distance: 300 mm, Design Standard: AGMA 6011 I -03, Number of Stage: double, Shaft Orientation: Parallel, Teeth Design: Single Helical, Efficiency: 85% (Minimum), Lube Oil Flow Rate: 30 LPM, Bearings : Steel Backed – Fe410WA-IS-2062, White Metal Lining – Grade BS 3332, Hydro dynamic Journal Bearings.	DSG-300	Triveni

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Coupling Between Motor and Gear Box	<p>Items: Torque limiter couplings: Application: between motor (113 kW) and Gear Box Speed: 5000 RPM One side Motor Shaft: æ60m6 (required interference press fit) Second side (Gear Box side): æ40h6 (with positive tolerance 0.000mm to 0.016 mm) Torque limiting at 300 Nm (torque should never go beyond this value)</p>	SKB-EK-500	Triveni/Cubic Transmission/JA KOB-Germany
Coupling at Gear Box output	<p>Flexible Coupling, 70000 RPM, working Torque : 12 Nm, Coupling Torque Capacity: 50 Nm, to absorb slight radial misalignment. One side: $\Phi 20H7$, other side: $\Phi 19H7$ and shaft gripping/un-gripping by four LN Screw Tightening/Loosing. Balanced. As per Drawing., Misalignment Capacity: 0.5 and 0.07mm, axial and lateral respectively. radial misalignment: Max 2 degrees</p>	ESM-A 50 special	JAKOB-Germany
Coupling between Torque Sensor and Bearing Housing	<p>Flexible Coupling, 70000 RPM, working Torque : 12 Nm, Coupling Torque Capacity: 50 Nm, to absorb slight radial misalignment. One side: $\Phi 19H7$, other side: $\Phi 18H7$ and shaft gripping/un-gripping by four LN Screw Tightening/Loosing. Balanced. As per Drawing. Misalignment Capacity: 0.5 and 0.07mm, axial and lateral respectively. radial misalignment: Max 2 degrees</p>	ESM-A 50 special	JAKOB-Germany
Main Motor	<p>1PL6 Motor, 113 KW, 372 nm, 2900 rpm, max speed: 5000 rpm with built-in Encoder 1024 ppr, Satisfy the attached Test Schedule, Torque never go beyond 290 Nm with help of Drive, Shaft Center height: 180 mm, Shaft Dia: $\Phi 60$mm</p>	1PL6184-4HL00-0AA0	Siemens/standard

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Vector Control AC Drive	Vector Control AC Drive MM440, 110 KW, with Dynamic Braking with encoder card, full fill the both Test Schedule attached, the max. speed of motor is up to 5000 RPM with the help of this drive, Torque of Motor Never goes beyond 290 Nm by the help of this Drive. (Torque Control by This Drive to Limit the max. value up to 290 Nm), min & max ramp up & down time option	6SE6440-2UD41-1FA1	Siemens/ABB/standard
Control Panel for Drive	as per attached BOM and Enclosure of Dimensions(2000x800x600)		Siemens/ABB/standard
Mechanical bed/fixture for Motor and Gear Box system	Material MS, to suit system as per drawing		Neometrix
Control Panel Enclosure assembly	Size: Width X Depth X Height): 1800 X 600 X 2150 mm (aprox.) as per drawing		APW/Standard
Contact Less Torque and Speed Sensor with Calibration certificate with Panel Mount Digital Indicators	Speed Range : 0 to 70000 , Torque Range:0 to 50 N-m, Accuracy:±0.1% of Full scale		Manner/Reputed Make
Digital Indicator for Torque in Nm with Calibration Certificate	5 digit Panel Meter : 96x48mm, 100-240VAC , Input : 0 to 10 Volts DC, Out Put: 4 to 20 m Amp, Torque Display Range: 0 to 50Nm with least count of 0.01Nm, Calibrated to read in Nm	K3HB-XVD 100-240VAC + K33-L1A	Omron
Digital Indicator for Speed in RPM with Calibration Certificate	5 digit Panel Meter : 96x48mm, 100-240VAC, Input: 2 pulse per turn, TTL 0/5 volts. Speed Range : 0 to 80000 RPM, Output: 4 to 20 m Amp, Speed Display Range: 0 to 80000 RPM with least count of 1 RPM. Calibrated to read in RPM	K3HB-RNB 100-240VAC + K33-L1A	Omron
Pressure Transmitter with Calibration Certificate	0 to 6 bar, transmitter Out put :4 to 20 mA , Compatible to use with Hydraulic Oil ISO VG 46, Working Temperature: 0 to 70°C	S-10 Series	Wika
DRO for Temp & Pressure Transmitter with two alarm option for Interlocking with Calibration Certificate	Display in Bar for Pressure and °C for Temperature, Size: 96 X 48 mm	SV8-BDC-10	Waaree/Standard

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Temperature Transmitter with Calibration Certificate	Range: 0-160°C, 4-20mA output, Compatible to use with Hydraulic Oil ISO VG 46, Working Temperature: 0 to 70°C	RTD PT-100 Simplex , 3 wire + Signal Transmitter	Waaree/Standard
Brazed Type Heat Exchanger	Heat Removal Capacity: 8 kW, Heat Exchanger, Water Cooled, Water Requirement: 50 LPM@18°C	CB 52-20 L	Alfa Laval/Standard
Turbine Flow Meter with Calibration Certificate	Range: 7.6 to 56 LPM, Temp.: 0°C to 70 °C, Compatible to use with Hydraulic Oil ISO VG 46	FTB-1413	Rockwin/Omega
DRO for Flow Meter with Calibration Certificate	Display	DPF701	Rockwin/Omega
Sampling Port with suitable minimess hose (2 meter)	Diagnostic Coupling, Metal Protective Cap, Viton, Working Pressure 630 bar, Size: 1620 X G1/4 Male	MMC1620G02E-V-20	Hyloc/parker
Accelerometer			In scope of CVRDE-Chennai
Power Pack for Gear Box Reservoir	30 LPM, 3.5 bar		
MS, Oil Capacity: 150 Liter, Tank Capacity: 180 Liter			
Filler Breather		FSB25	Hydroline
Level Indicator		LG2-10	Hydroline
Level Switch		SDN102	Shridhan
Drain Valve	CS Body, G1/2"		Audco/Standard
Suction Strainer	1" BSPP Female	SC3-010	Hydroline
NRV	Polyhydron	C-S-10-1	Polyhydron
Gear Pump	30 LPM @ 2880 RPM, 3.5 bar	F002 E 10004	Rexroth
Motor	0.75kW, 415 Volts AC, 50 Hz, 3-phase, 3000 RPM		Parker/Atos/Rexroth/Standard
Bell Housing and Coupling	to suit		Dyna/Hydac/KTR /Love joy/Standard
Base Plate/Base Frame for Motor	to suit	Fabricated	Neometrix
Relief Valve	Sub plate mount, Hand Knob, Size: NG20, Pressure 25 bar, Set pressure 1.5 to 2 bar	DPR-H-20-S-25	Polyhydron
Isolation valve	NG06, Subpalte Mount		Supper/Hyloc/PolyhydronStandard

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Low Pressure Inline Filter with Electrical Clogging Indicator	10 micron, Max. Working Pr.: 25 Bar Filtering Media : Beta micron Filtration Grade : 10 Microns (Absolute) Connection : G 2" With Optical and Electrical Clogging Indicator & Seals in Nitrile Pressure Drop in clean condition with VG 68 cST Oil At 70 LPM Flow & 50°C temp less than 0.28 Bar	RF BN/HC 330 G 10 D1.x/- L24 /H	Hydac/Standard
Temperature Gauge with calibration Certificate	Range: 0-150°C, Dial Size: 100 mm, with stem length 50 or 70 mm, 1/2" Connection	R5502	Wika
Pressure Gauge with calibration Certificate	Range: 0 to 21 bar, Dial Size: 100mm, 1/2" BSPP Male Bottom Connection, in line mounting	232-series	Wika
Manifold M1	As per Drawing	Fabricated	Neometrix
Manifold M2	As per Drawing	Fabricated	Neometrix
Pipe and Fittings	MS/CS Fitting		

Bearing Assembly & Loading System:

Item	Item specification	Model No.	Make	Quantity
Air Line Ball Valve	ON/off valve, G1/2, Working Pressure: 12 bar	Model: QH-1/2, Part No.9543	Festo/SMC/Standard	1
Air Pressure Regulator WITH FILTER with Pressure Gauge	Inlet Pressure: 12 Bar, Out let: 0 to 10 bar	Model No. LFR-1/2-D-MIDI, Part No. 162730	Festo/SMC/Standard	1
Pressure Gauge	Range: 0 to 16 bar, Dial Size: 50 mm	Model No. FMA-50-16-1/4-EN, Part No. 159600	Festo/SMC/Standard	2

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E/P Regulator	Input pressure: 10 bar, Pressure Out put: 0 to 10 bar, Regulating Voltage: 0 to 10 Volt DC	Model No. MPPE-3- 1/8-10-010, Part No.187348	Festo/SMC/ Standard	2
Plug s. w cable for EPR		Model No. KMPPE-B- 5, Part No. 161878	Festo/SMC/ Standard	2
Solenoid Valve	5/2 double coil, 24VDC	Model No. MFH-5-1/4, Part No. 6211	Festo/SMC/ Standard	2
Solenoid coil for Solenoid Valve		Model No. MSFG- 24/42-50/60, Part No. 4527		2
Solenoid Valve	3/2 , 24 VDC, 1/4" size	MFH-3-1/4	Festo	1
Cylinder Actuator for Axial Loading	Compact Cylinder of 80 mm BORE, 20 mm Stroke, double acting.	Model No. ADVU-80- 20-P-A, Part No. 156570	Festo/SMC/ Standard	4
Cylinder Actuator for Radial Loading (Single Convolute air bellow assembly)	Single Convolute air bellow assembly, Max. Load: 68 kN@8 bar pressure at min. height	FS 530-11	Contitech/S tandard	1
Load cell for radial Load with Calibration Certificate	Range: 0 to 25kN, Accuracy:± 0.1% , working Temperature: 150 degree C	LPX-2.5t	HBM/PT Newzee land/Magtrol /Standard	2
Load Cell Transmitter	Input signal : LPX-2.5t, out put signal: 4 to 20 mA	PT100LC	PT/Standard	2
Digital Indicator with Calibration Certificate	Input/output: 4 to 20 mA, two alarm option	SV8-BDC-10	Waaree/Sta ndard	2
Load cell for Axial Load with Calibration Certificate	Range: 0 to 2.5kN, Accuracy:± 0.1% , Normal working Temperture	LPX-250	HBM/PT Newzee land/Magtrol /Standard	4
Load Cell Transmitter	Input signal : LPX- 2500, out put signal: 4 to 20 mA	PT100LC	PT/Standard	4
Digital Indicator with Calibration Certificate	Input/output: 4 to 20 mA, two alarm option	SV8-BDC-10	Waaree/Sta ndard	4
Test Bearing Spindle with Bearing Disc for Bearing Size(ID X OD X Width):20 X 47 X 14 mm	Speed Range: 70000 RPM and Load as per RFQ (with Drawing Set)	Fabricated	Neometrix/S tandard	1

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Fixture/Housing for Bearing Lubrication and Loading System	size : to suit system, Load : as per RFQ(with Drawing Set)		Neometrix/Standard	1
Pressure Gauge	Range: 0 to 6 bar, 50 mm, 1/4" connection, with flange	MA-40-6-g1/4-EN	Festo/SMC/Standard	1
Pressure Regulator with Gauge	Range: 0 to 12 bar, 1/4" connection, with flange	LR-1/4-D-Mini	Festo/SMC/Standard	2
Pressure Regulator	Range: 0 to 7 bar, 1/4" connection, with flange	LR-1/4-D-7-O-Mini	Festo/SMC/Standard	1
Needle Valve	1/4"	GRA-1/4-B	Festo/SMC/Standard	1
Transparent Window for Bearing Housing			Standard	1
Pressure Switch		Model No. PEV-1/4-SC-OD, Part No. 161760	Festo/SMC/Standard	1



Item	Item specification	Model No.	Make	Quantity
Air Line Ball Valve	ON/off valve, G1/2, Working Pressure: 12 bar	Model: QH-1/2, Part No.9543	Festo/SMC/Standard	1
Air Pressure Regulator WITH FILTER with Pressure Gauge	Inlet Pressure: 12 Bar, Out let: 0 to 10 bar	Model No. LFR-1/2-D-MIDI, Part No. 162730	Festo/SMC/Standard	1
Pressure Gauge	Range: 0 to 16 bar, Dial Size: 50 mm	Model No. FMA-50-16-1/4-EN, Part No. 159600	Festo/SMC/Standard	2

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E/P Regulator	Input pressure: 10 bar, Pressure Out put: 0 to 10 bar, Regulating Voltage: 0 to 10 Volt DC	Model No. MPPES-3- 1/8-10-010, Part No.187348	Festo/SMC/Stan- dard	2
Plug s. w cable for EPR		Model No. KMPPE-B-5, Part No. 161878	Festo/SMC/Stan- dard	2
Solenoid Valve	5/2 double coil, 24VDC	Model No. MFH-5-1/4, Part No. 6211	Festo/SMC/Stan- dard	2
Solenoid coil for Solenoid Valve		Model No. MSFG-24/42- 50/60, Part No. 4527		2
Solenoid Valve	3/2 , 24 VDC, 1/4" size	MFH-3-1/4	Festo	1
Cylinder Actuator for Axial Loading	Compact Cylinder of 80 mm BORE, 20 mm Stroke, double acting.	Model No. ADVU-80-20- P-A, Part No. 156570	Festo/SMC/Stan- dard	4
Cylinder Actuator for Radial Loading (Single Convolute air bellow assembly)	Single Convolute air bellow assembly, Max. Load: 68 kN@8 bar pressure at min. height	FS 530-11	Contitech/Stan- dard	1
Load cell for radial Load with Calibration Certificate	Range: 0 to 25kN, Accuracy:± 0.1% , working Temperature: 150 degree C	LPX-2.5t	HBM/PT Newzee land/Magtrol/St andard	2
Load Cell Transmitter	Input signal : LPX-2.5t, out put signal: 4 to 20 mA	PT100LC	PT/Standard	2
Digital Indicator with Calibration Certificate	Input/output: 4 to 20 mA, two alarm option	SV8-BDC-10	Waaree/Standar d	2
Load cell for Axial Load with Calibration Certificate	Range: 0 to 2.5kN, Accuracy:± 0.1% , Normal working Temperature	LPX-250	HBM/PT Newzee land/Magtrol/St andard	4
Load Cell Transmitter	Input signal : LPX-2500, out put signal: 4 to 20 mA	PT100LC	PT/Standard	4
Digital Indicator with Calibration Certificate	Input/output: 4 to 20 mA, two alarm option	SV8-BDC-10	Waaree/Standar d	4
Test Bearing Spindle with Bearing Disc for Bearing Size(ID X OD X	Speed Range: 70000 RPM and Load as per RFQ (with Drawing Set)	Fabricated	Neometrix/Stan dard	1

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Width):20 X 47 X 14 mm				
Fixture/Housing for Bearing Lubrication and Loading System	size : to suit system, Load : as per RFQ(with Drawing Set)		Neometrix/Stan dard	1
Pressure Gauge	Range: 0 to 6 bar, 50 mm, 1/4" connection, with flange	MA-40-6-g1/4-EN	Festo/SMC/Sta ndard	1
Pressure Regulator with Gauge	Range: 0 to 12 bar, 1/4" connection, with flange	LR-1/4-D-Mini	Festo/SMC/Sta ndard	2
Pressure Regulator	Range: 0 to 7 bar,1/4" connection, with flange	LR-1/4-D-7-O-Mini	Festo/SMC/Sta ndard	1
Needle Valve	1/4"	GRA-1/4-B	Festo/SMC/Sta ndard	1
Transparent Window for Bearing Housing			Standard	1
Pressure Switch		Model No. PEV-1/4-SC- OD, Part No. 161760	Festo/SMC/Sta ndard	1
Plug Socket for Pressure switch		Model No. MSSD-C-4P, 171157	Festo/SMC/Sta ndard	1