USER OPERATING AND MAINTENANCE MANUAL OF HYDRAULIC POWER PACK 230LPM/210 BAR

Project : HYDRAULIC POWER PACK 230LPM/210 BAR

Document Prepared and Published By

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- State of the art Test Rig Design, Development, Fabrication, Installation, Commissioning, Training & Support.
- Refurbishment/ Up gradation of the Existing Test Rigs.
- Maintenance (AMC) contracts of Existing Test Rigs.
- Operations Contract for the Test Rigs.
- Setting up of complete Testing Infrastructure including civil infrastructure.

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Chapter 1

Chapter 1.1 Do's & Don'ts for the System

1.1 Do's:

- ✓ Read the User Manual in detail before operating the System.
- ✓ Check that all the manual valve of the system is open when the system is in operation.
- ✓ As certain what tools and equipment are required to carry out the job.
- ✓ Use proper tools to suit the job and avoid unnecessary dismantling.
- ✓ Ensure that all nuts, screws, pipe connectors and covers are properly tightened.
- ✓ Check the proper grounding of the system before operating.
- ✓ Check all the supplies voltage.
- ✓ Make sure the coupling is tight before operating.
- ✓ There should be no loose wiring and all the naked contacts are well insulated.
- ✓ All the power supplies are in operation mode before running the application.
- ✓ Make sure all rotating elements are covered.
- ✓ Insulate electrical (internal and external) motor connections.
- ✓ In case of high vibration in the system immediately shut down the testing.
- ✓ Before starting the test ensure proper mounting of the motor with the shaft.
- ✓ Only trained/qualified service personnel are authorized to service the unit.
- ✓ Connect the unit only to the recommended mains sockets.
- ✓ Turn off the main MCB of the power supply when not to be used for a long time.

1 .2 Don'ts:

- × Do not touch the sensors or their mountings.
- × Do not touch any wire inside the panel.
- × Do not run the machine without opening of manual valve.
- × Do not touch any rotating part when in operation.
- × Do not put the system in irregular surface.
- × Do not change the readings of electrical instrument
- × Do not run the motor/start test if the mounting bolts/fasteners are loose.
- × Do not tamper with the power supply trim pots as this may lead to change in voltage levels and damage expensive components.
- × Do not open the door of panel without turning OFF the main MCB.
- × Do not increase the voltage level of the power supply beyond the rated voltage of the test motor.
- × Do not operate the system with wet hands.
- × Do not pull the wires coming out of the power pack.
- × Do not start the test sequence without the coupling the motor with the shaft.
- × Do not tamper or change the wiring without the presence of trained NEOMETRIX Personnel as this may lead to unwanted results and also damage the components.

Chapter 02

Warnings:

- Make sure that all electronic products are earth-grounded, to ensure Personal safety and proper operation.

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- All sensors are that is RTD and all the very sensitive; please never try to touch them.

CHAPTER 03

INTRODUCTION OF HYDRAULIC POWER PACK 230LPM/210 BAR

HYDRAULIC POWER PACK 230LPM/210 BAR: Hydraulic power pack shall cater for supply of Hydraulic oil to 6 (Six) No's of Servo hydraulic actuators (500kN range) working simultaneously in synchronization mode under load (up to 500 kN) at 210 bar pressure and at 200 - 230 l/min.it is a testing facility of servo hydraulic actuator in which we supply motor 110 kw & axial piston for creating 210 bar pressure and 200-230 LPM flow. A motor 11kw for a vane pump is used for cooling of oil up to 50 deg C. with Reservoir 1500 ltrs, as Per Technical Specification.

A flow meter is used for measure the flow 200- 230 LPM with high pressure up to 210 bars. Accumulator is used to reserve the pressurized fluid i.e. hydraulic energy which is used due pressure drop in the system. Pressure relief cum unloading valve is used to loading & unloading of system. Due to loading of pressure and flow system will go with high temperature so Shell & tube type heat exchanger is used to maintain the temperature of hydraulic fluid with a vane pump with 390 LPM flow. For maintaining the NAS class different type of filters are used in main line pressure, return pressure & offline cooling system. This machine has two control systems one is main control panel & another is remote control panel.

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OPERATING PROCEDURE

HYDRAULIC POWER PACK 230LPM/210 BAR

(i) Parameter to be check before starting the machine.

a) All connection like wiring & fittings should be proper tight.
b) Main line hose and return line hose should be connected to the test unit.
c) Check the hydraulic oil tank level physically by oil level gauge (3.0). There is automatic interlock is given by oil level switch (8.0)

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d) Check Main on/off this should be off condition.

e) Check shut off valve (34.0) & (32.0) should be open before starting the machine.

f) Check all filter clogging indicator, it should be green.

g) Water inlet line butterfly valve (21.0) & water outlet line valve should be open for cooling of oil.

h) Ensure machine is remote or local control.

(II) Step for operating the machine

(a) Connect the hose of main line to the test unit & connect the hose of return line to the manifold.

(b) Open the shut off valve (32.0) & (34.0) as per given image.

(c) Open the butterfly valve (21.0) for the cold water supply for the heat exchanger.

(d) Switch on the main supply of control the panel.

(e) Change the switch button of remote/local as per operator choice .if operator wants to run the machine in local control then turn the switch in local if operator wants to run the machine in remote then turn the remote control.

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(f) For local control panel operator will monitor the test parameter on local control panel

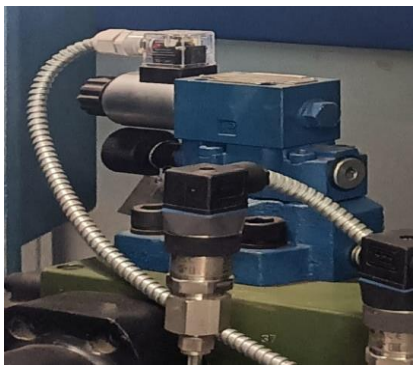
(g) For remote control both switch should be in remote mode and operator will monitor the test parameter on remote panel.

(h) Always keep the machine in low pressure condition before the start the main motor (23.0)

(i) Press the push button of cooling motor. Starting the cooling line motor the pump will offline circuit will activate.

(j) After 15 min later press the push button of main motor start.

(k) Operator can set pressure as per requirement with help of pressure relief unloading cum valve by manual. It is already preset @ 210 bars.



(l) Operator can read all parameter local or remote Panel. Main line pressure and cooling line pressure return line pressure.

(m) Main pump flow is 200 -230 LPM .Operator can see the flow on main control screen.

Chapter: 05

Troubleshooting & troubleshooting Remedy

Sr No.	Troubleshooting	Possible cause	
1	**Main pump & cooling line running but pressure not achieved**	Faulty mechanical drive	**Maintain the drive speed as per recommended speed**
		Drive power too low	
		Insufficient suction conditions, e.g. air in the suction line, insufficient diameter of the suction line, viscosity of the hydraulic fluid too high, suction height too high, suction pressure too low, contaminants in the suction line.	Machine or system manufacturer (e.g. optimize inlet conditions, use suitable hydraulic fluid). Completely air bleed axial piston unit, fill suction line with hydraulic fluid. Remove contaminants from the suction line.
		Hydraulic fluid not in optimum viscosity range.	Use suitable hydraulic fluid (machine/ system manufacturer).
		External control of the control device defective	Check external control
		Malfunction of the control device or controller of the axial piston unit.	control device need to be set /change
		Wear of axial piston unit.	Exchange axial piston unit
2	**insufficient flow**	Drive speed too low.	Maintain the drive speed as per requirement for flow
		Insufficient suction conditions, e.g. air in the suction line, insufficient diameter of the suction line, viscosity of the hydraulic fluid too high, suction height too high, suction pressure too low, contaminants in the suction line.	Machine or system manufacturer (e.g. optimize inlet conditions, use suitable hydraulic fluid). Completely air bleed axial piston unit, fill suction line with hydraulic fluid. Remove contaminants from the suction line
		Hydraulic fluid not in optimum	Use suitable hydraulic

		viscosity range	fluid
		External control of the control device defective	Check external control
		Wear of axial piston unit.	Exchange axial piston unit
		Mechanical damage to the axial piston unit	Exchange axial piston unit,
3	**Excessive hydraulic fluid temperature and case temperature**	Excessive inlet temperature at the axial piston unit	Machine/system manufacturer: inspect system, e.g malfunction of the cooler, insufficient hydraulic fluid in the reservoir
		Malfunction of the pressure control valves (e.g. high-pressure relief valve, pressure cutoff, pressure controller)	Contact to supplier
		Wear of axial piston unit.	Exchange axial piston unit,
4	**Accumulator not working**	Gas discharged	Gas Need to charge
5	**Machine not start**	oil temp high	Check oil heat exchanger
		Oil level low	fill the hydraulic oil
		Oil level high	Fill the oil by refilling pump as per suggested oil level
		Pressure relief unloading cum valve solenoid problem	Check solenoid it repair or change also repair relief valve
		Machine in local & remote mode	Check inter lock
		Filter clogging	Change filter element

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Preventive Maintenance Check list

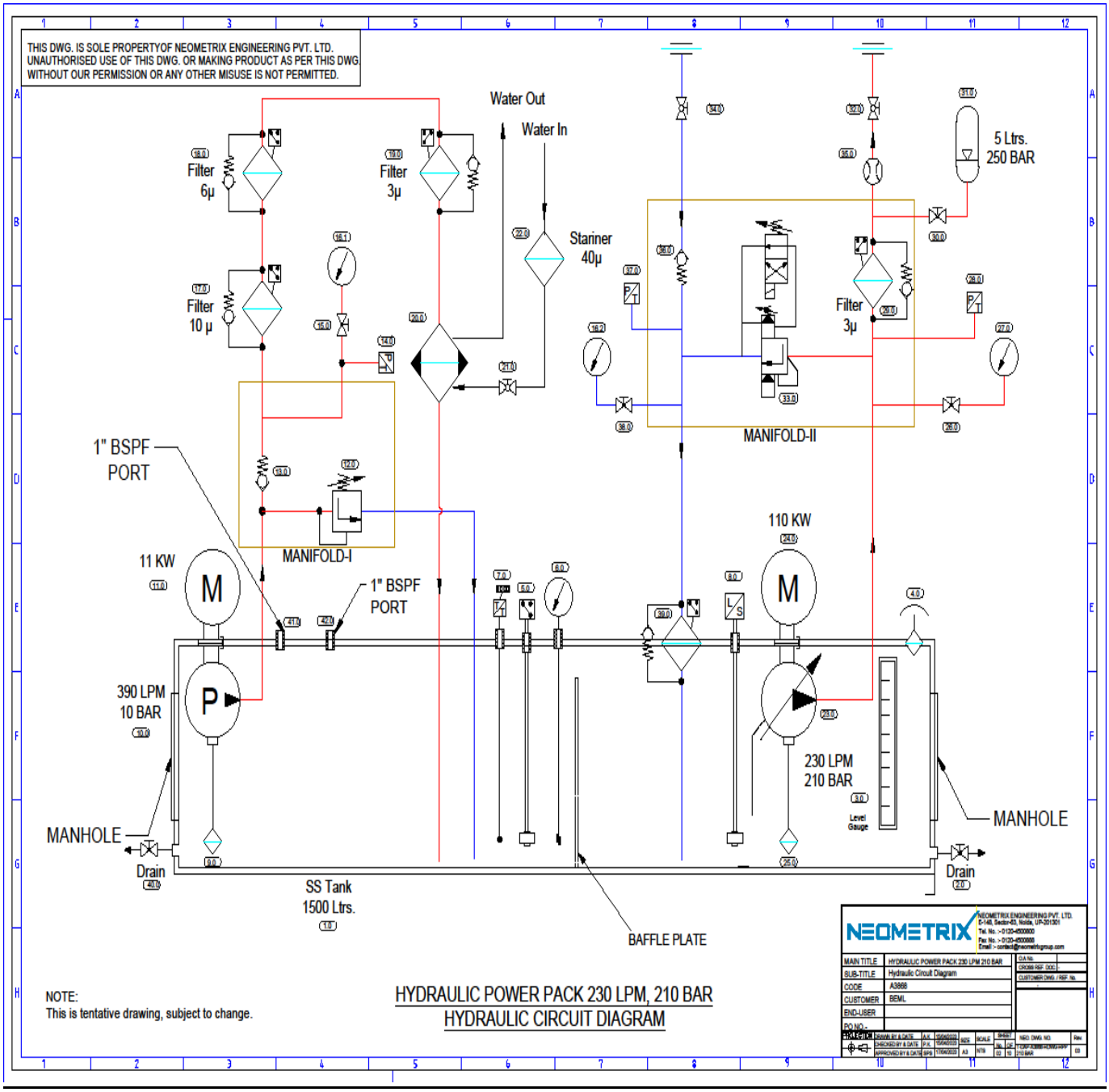
Sr No.	Activity	Work activity	Frequency					
			Daily	Weekly	Monthly	Quartly	Half yearly	Yearly
1	Machine	Machine cleaning	√					
2	All fittings & wiring	All fittings & wiring should be proper tightened	√					
3	Oil tank	Check manhole leakage		√				
4	Heat exchanger	If not cooling then check internal shell & tube damage			√			
5	Motor	Fan cooling & shaft			√			
6	Pump	Shaft coupling & bell housing				√		
7	Temp transmitter	Float				√		
8	Pressure gauge	Calibration						√
9	Pressure transmitter	Calibration						√
10	Suction strainer	Clogging					√	
11	Filter	Change element after					√	

		clogging						

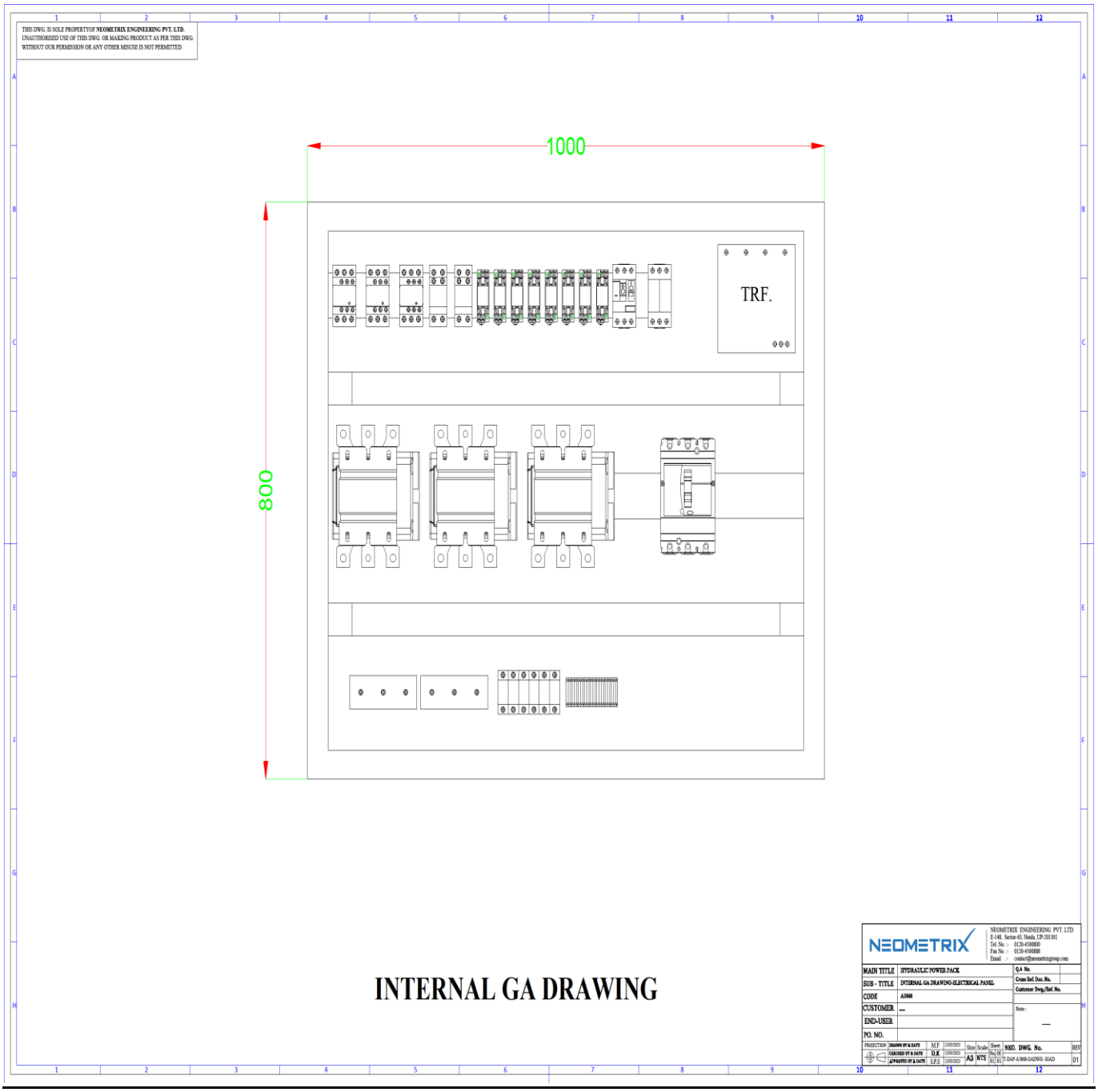
Chapter: 07

List of Attached Drawings:

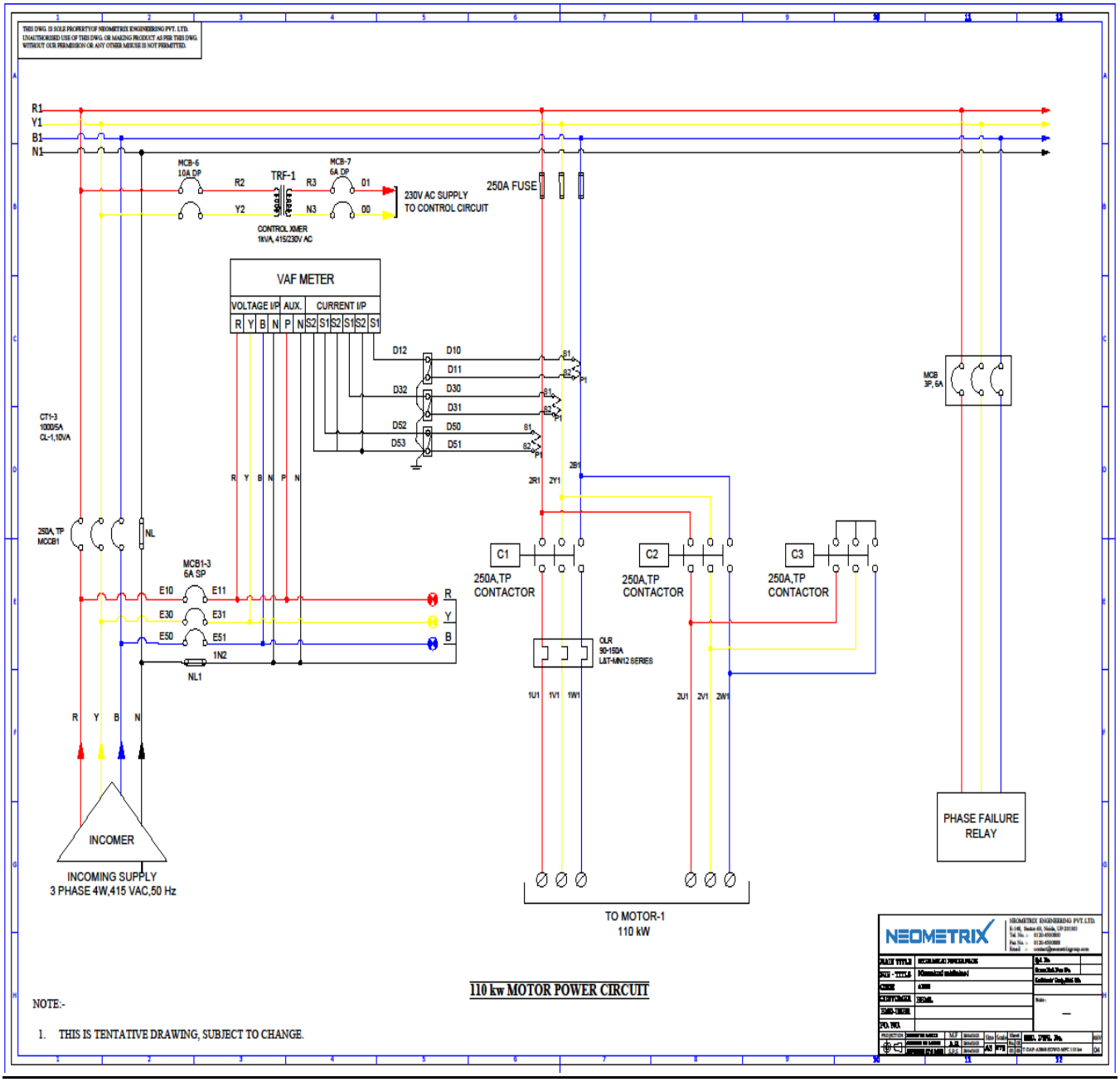
a) Hydraulic circuit diagram



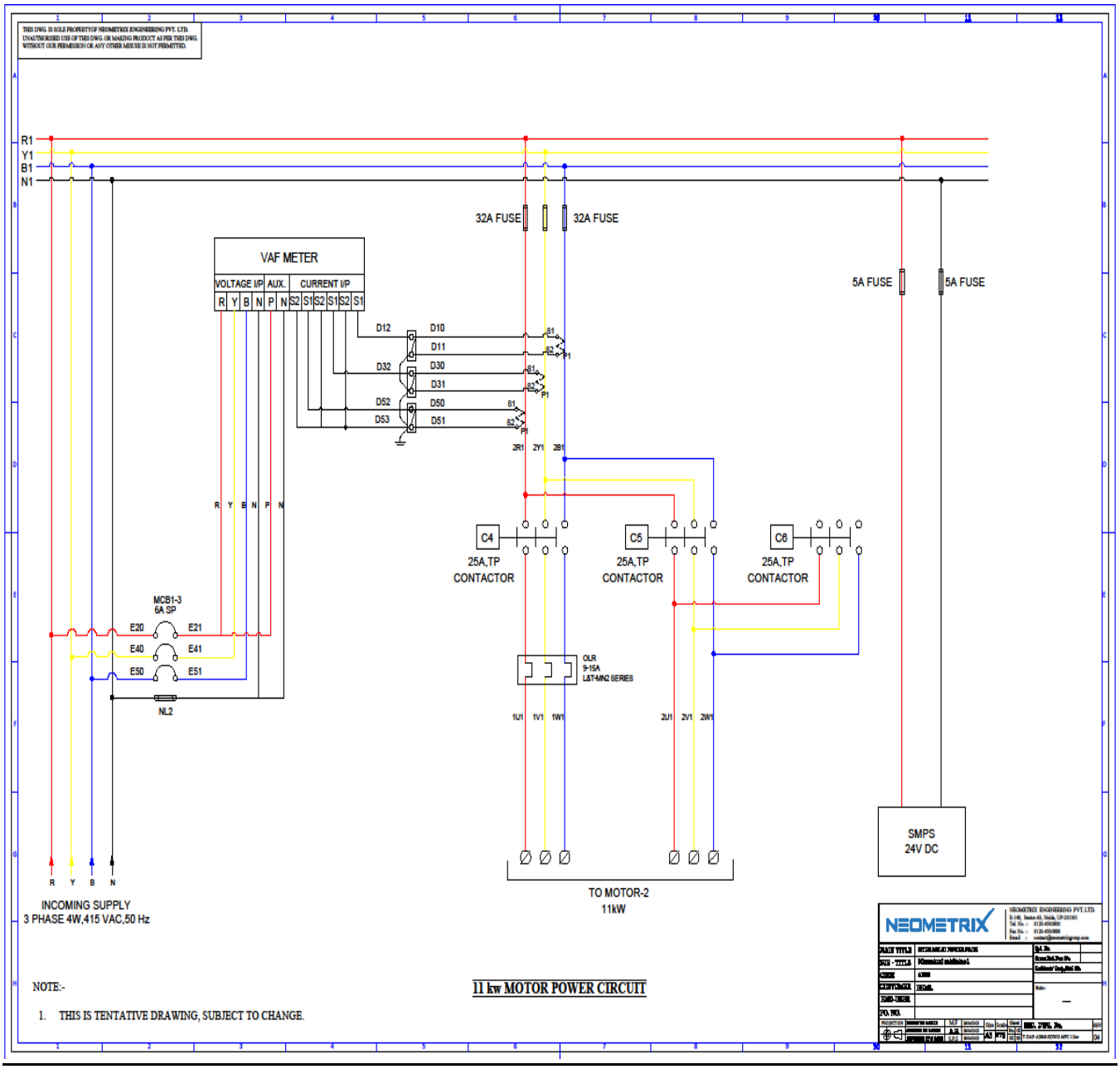
(b) Electrical circuit drawing -01/06



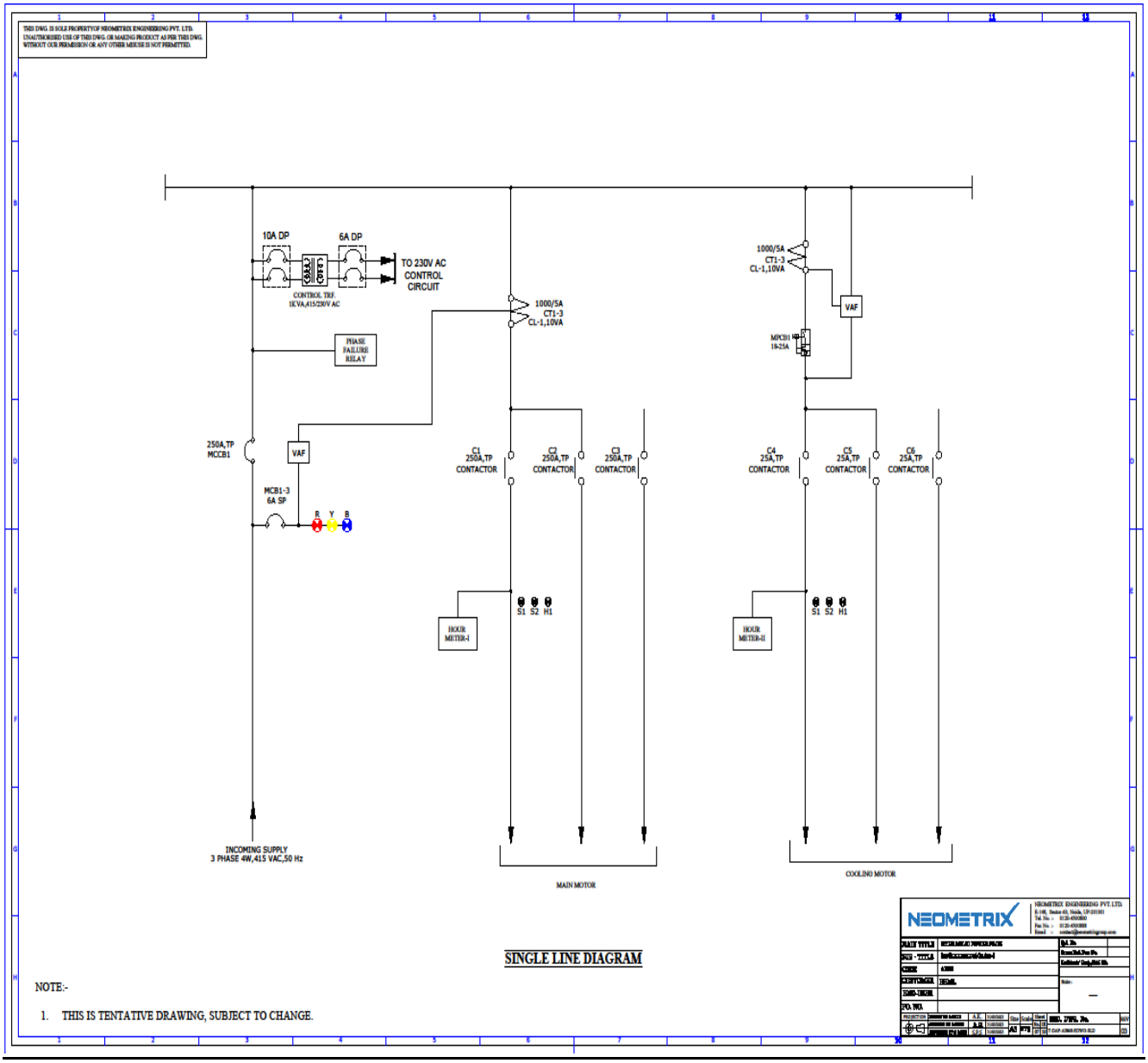
(c)Electrical circuit drawing -02/06



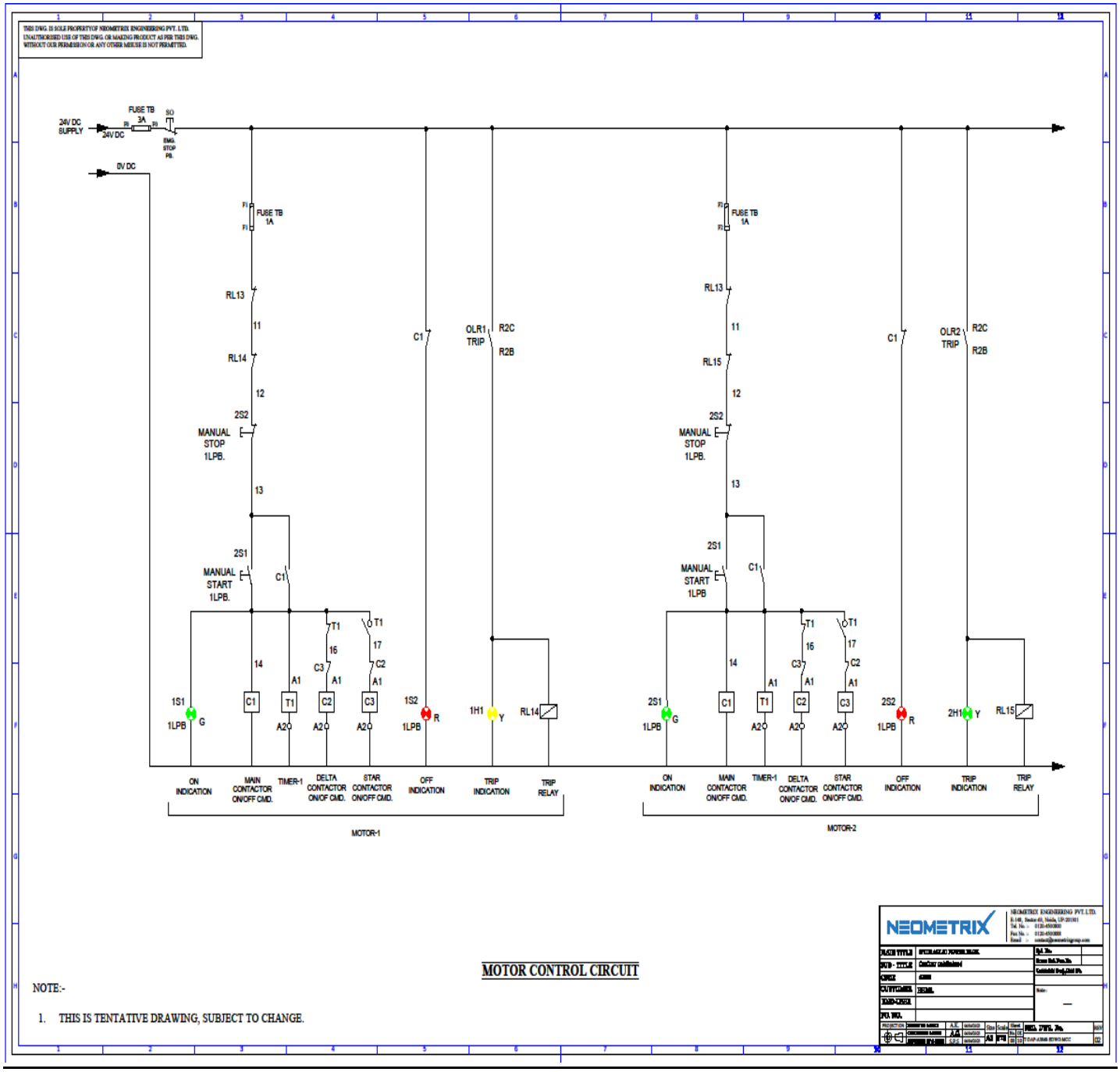
(d)Electrical circuit drawing -03/06



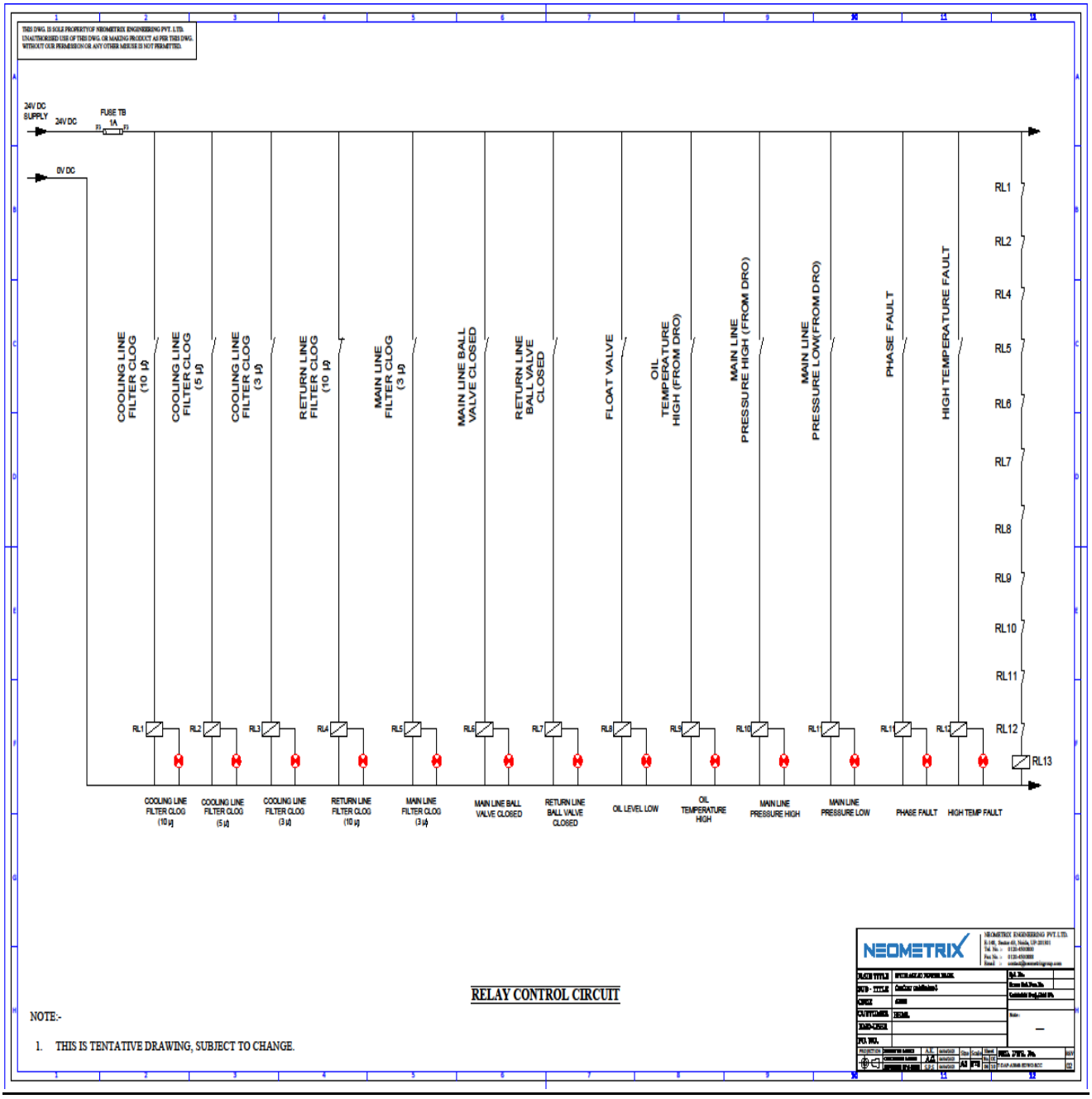
(e)Electrical circuit drawing -04/06



(f)Electrical circuit drawing -05/06



(g)Electrical circuit drawing -06/06



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Bill of Material

S.No	CKT. Code	Nx part no	Item name	Item Specification	Make	Qty
1	1.0	2A3868P0001	Oil Tank	Tank Capacity- 1560 Litters Dimension Outer-1500mm(L)X1300mm(W)X800mm (Height) with manhole, Thickness -5 MM, Top plate with MS & THK :10 MM , Hydraulic Oil : ISO VG 46 : MOC : SS-304	Neometrix	1
2	2.0	2A3868F0001A	Drain Valve	Ball valve Size : 1" BSPF both sides , hand lever operated , Nominal pressure: 30 bar	Festo	1
3	3.0	2A3868P0002	Oil Level Gauge	O-ring type construction , Centre to centre distance : 254 mm , Total Length -289 mm, Max Working Temperature-70 deg C Working Media- ISO VG 46	Hydro line	1
4	4.0	2A3868P0003	Filler Breather	Capacity : 65 CFM , Filter size : 10 micron , Threaded size: 2" BSPP	Hydro line	1
5	5.0	2A3868P0004	Temperature Switch	Switching@50 deg C, Maximum Working Temp -70 deg C, Working Media- ISO VG 46	Dan	1
6	6.0	2A3868P0005	Temperature Gauge	Temp gauge range : 0-100 deg C ,Dial size: 100 mm , Stem length : 900 mm ,Stem diameter: 6 mm , connection : standard	wika	1
7	7.0	2A3868P0006	Temperature Transmitter	0-100 deg C, Stem Length- 900 mm, 2 Wire with RTD sensor	Wika	1
8	8.0	2A3868P0007	Oil Level Switch	float high level length from top -75mm, Float low level length from top -400 mm , Total Stem Length=500 mm Max Working Temperature-70 deg Working Media- ISO VG 46	Pune Techtrol	1
9	9.0	2A3868P0008	Suction strainer	MAX. Working Tem: 80° C. Filtration :149 MICRONS Woking fluid : ISO VG 46	Hydro line	1
10	10.0	2A3868P0009	Cooling Line Pump P2	vane pump , Woking Pressure : 10 bar , Flow- 400 Lpm, Working Temp- 70 Deg C,	Veljan	1
11	11.0	2A3868P0010	Cooling Line Motor M2-Flanged Mounting	TEFC ,3-phase squirrel cage induction motor , Rated output power : 11 Kw ,Rated spped : 1470 rpm , Voltage : 415 V Flanged Mounted, IE3, 4 Pole	ABB	1
14	12.0	2A3868P0011	Pressure Relief Valve -Sub plate Type for cooling line	Flow rating -400 Lpm, Pressure 0-10 Bar, Sub plate Type , Maximum Working Temperature-70 deg C	Rexroth	1
15	13.0, 36.0	2A3868P0012	Check Valve	Sub plate type check valve, working pressure :10 bar , cracking pressure : 0.5 bar working media : ISO VG 46 , Working temp : 70 deg C	Poly hydraon	2
16	14.0, 37.0	2A3868P0013	Pressure Transmitter	Non-linearity up to 0.125 % of span, Output signal : 4-20 mA ,0-20 Bar, Working Temp-70 Deg C, ISO VG 46	WIKA	2
17	(15.0,16.1); (38.0, 16.2)	2A3868P0014	Pressure Gauge (16.1,16.2) With Snubber	working pressure : 0-10 Bar ,6" Back Mounted, Working Temp-70 Deg C, ISO VG 46	WIKA	2

			(15.0,38.0)			
19	17.0	2A3868P0015	Offline Filter-10 Micron	Inline Filter ,Flow Capacity-600 Lpm ,Working Pressure-10 Bar Micron Rating -10 micron , Beta Ratio>1000, Maximum Working Temperature- 70 deg C, Working Media- ISO VG 46 End Connection SAE Flange	MP FILTRI	1
21	18.0	2A3868P0016	Offline Filter-6 micron	Inline Flow Meter ,Flow Capacity-600 Lpm ,Working Pressure-10 Bar Micron Rating -6 micron , Beta Ratio>1000, Maximum Working Temperature- 70 deg C, Working Media- ISO VG 46 End Connection SAE Flange	MP FILTRI	1
23	19.0	2A3868P0017	Offline Filter-3 micron	Inline Filter ,Flow Capacity-600 lpm ,Working Pressure-10 Bar Micron Rating -3 micron , Beta Ratio>1000, Maximum Working Temperature- 70 deg C, Working Media- ISO VG 46 End Connection SAE Flange	MP FILTRI	1
26	20.0	2A3868P0018	Heat Exchanger	Horizontal Shell and Tube Type -Copper Tubes Oil Inlet Temperature- 50 deg C Oil Outlet Temperature Requirement-40 deg C Oil Flow- 400 Lpm, Water Inlet Temperature- 30 deg C	ABACUS	1
27	21.0	2A3868P0019	Butterfly valve	3" Flange Type .Working Pressure -10 Bar Ball Valve, moc:SS	Cair	1
29	22.0	2A3868P0020	Strainer	Y-type Water line side strainer , size : 40 micron, connection : 3" flange type	cair	1
30	23.0	2A3868P0021	Main Pump P1	Variable Displacement Pump with Pressure Cut off Flow- 230 Lpm (160 cc @ 1450 Rpm), Working Pressure - 230 Bar ,Maximum Working Temperature- 70 deg C	Rexroth	1
31	24.0	2A3868P0022	Main Motor M1-Flanged Mounting	TFFC , 3 -phase , squirrel cage induction motor , rated voltage : 415 v , rated frequency : 50 Hz, degree of protection: IP55 , Rated power : 110 Kw Motor , Flanged Mounted ,IE3 , 4 Pole	ABB	1
34	25.0	2A3868P0023	Suction strainer	MAX. Working Tem: 80° C. Filtration :149 MICRONS working fluid : ISO VG 46	Hydro line	1
35	(26.0,27.0)	2A3868P0024	Pressure Gauge (27.0)With Snubber (26.0)	0-400 Bar ,6" Back Mounted, Working Temp-70 Deg C, ISO VG 46	WIKA	1
36	28.0	2A3868P0025	Pressure Transmitter	0-400 Bar ,Working Temp-70 Deg C, ISO VG 46	WIKA	1
37	29.0	2A3868P00226	High Pressure Filter-3 Micron	Flow Capacity - 400 Lpm, Working Pressure- 250 Bar Maximum Working Temp- 70 deg C Filtration 3 Micron , Beta Ratio >1000, Manifold Bottom Mounting ,Working Media- ISO VG 46 End Connection SAE Flange /End connection -	HYDAC	1
40	30.0	2A3868P0027	Shut of Valve for Accumulator	1-1/4" BSPF .Working Pressure -250 Bar Ball Valve	Hydac	1
41	31.0	2A3868P0028	Accumulator	Working Pressure Hydraulic Side- 250 Bar Charging Pressure -250 Bar Volume Capacity- 4 litres Working Temperature - 70 deg C Working Media-ISO VG 46	HYDAC	1

42	32.0,34.0		Shut off valve	1.5" BSPF .Working Pressure -250 Bar Ball Valve	Hydac	2
43	33.0	2A3868P0029	Pressure Relief Cum Unloading Valve-SUBPLATE MOUNT	Flow-250 Lpm, Pressure Range 0-350 Bar, Working Temperature Maximum- 70 deg C, Subplate Type, with 24 V loading unloading signal	Rexroth	1
45	35.0	2A3868P0030	Digital Flow Meter	Flow 0-300 Lpm, Working Pressure -400 Bar, Working Temp-70 Deg C, ISO VG 46	VSE	1
47	39.0	2A3868P0031	Return Line Filter	Flow Capacity-600 Lpm, Working Pressure-10 Bar,Tank Maximum Working Temp- 70 deg C Mounted,Micron Rating-10 Micron , Beta Ration>1000,Working Media- ISO VG 46	MP FILTRI	1

Spare list BOM

Sr No	Item name	Part no	Specification	Make	Qty
1	Spare Elements for Offline Filter-10 Micron	2A3868P0032	Flow Capacity-600 Lpm, Working Pressure-10 Bar, Tank Mounted, Micron Rating-10 Micron , Beta Ration>1000,Working Media-ISO VG 46	MP FILTRI	2
2	Spare Elements for Offline Filter-6 Micron	2A3868P0032	For Offline Filter -6 Micron Model LMP4006BWF1A06NP01	MP FILTRI	2
3	Spare Elements for Offline Filter-3 Micron	2A3868P0034	For Offline Filter -3 Micron Model LMP4006BWF1A03NP01	MP FILTRI	2
4	Spare Elements for Return Line Filter-10 Micron	2A3868P0035	Flow Capacity-600 Lpm, Working Pressure-10 Bar, Tank Mounted, Micron Rating-10 Micron , Beta Ration>1000,Working Media-ISO VG46	MP FILTRI	2
5	Spare Elements for High Pressure Filter-3 Micron	2A3868P0036	For High Pressure Filter-3 Micron Model FHF3253BAN7A03NP01	HYDAC	2
6	O-ring		As per requirement	Standard	2
7	Seal		As per requirement	Standard	2

Chapter: 09

SALES /SERVICE/SUPPORT CONTACT DETAILS -

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