Mahindra & Mahindra

SWARAJ

User & Maintenance Manual Document

Hydraulic Test Rig of Rear Cover Sub Assembly

Test Rig No.:- A1110

Submitted by:
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Company Introduction

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.

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 t**

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 is 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)

Hydraulic Test Rig

Description & Introduction of Hydraulic Test Rig:

Hydraulic test Rig are use for testing of rear cover sub assembly of a tractor by using hydraulic power pack . It consist of:

1) 3-Phase induction motor (20HP,3HP,2HP)
2) LVDT- It is used as an electrical transformer for measuring linear displacement.
3) Actuator- For creating impact pressure.
4) PC and touch screen display system-For control and logic for the machine functioning.
5) Control Panel-For 3 phase supply to motor, drive and control hardware.
6) RTD to measure the temperature electrically in current form.
7) DC valveare allow fluid flow into different paths from one or more sources.
8) Relief Valveused to control or limit the back pressure
9) Non return Valvenormally allows fluid to flow through it in only one direction
10) Pump is a device used to displace the fluids
11) Temperature gauge are used to measure the temperature mechanically.
12) Pressure Gauge are used to measure the pressure mechanically
13) Heater(4 Kw) each.
14) Temperature Transmitter are used to measure the temperature
15) Pressure Transmitter are used to measure the

Safety Precautions

Safety Precautions:

- For safety Purpose Please go Through the USER MANUAL thoroughly before performing any Test on this Test Bench.
- Before performing any test on the test bench see whether all the toggle switches are in there respective position in accordance with the manual.
- Please read this manual before operating the system and follow the instructions carefully.
- Signal words CAUTION and NOTE have special meanings.
- CAUTION indicates a potentially hazardous situation which, if not avoided, may result in damage.

NOTE indicates information to assist maintenance and better running of the system.

- Make sure that all electronic products are handled properly, to ensure Personal safety and proper operation

Do's& Don'ts for the System:

Do's:

Read the User Manual fully before operating the System.

Check the proper closing of the Supply Voltage of the system When not in operation.

Don'ts:

1. **Never work on the drive, motor cable or motor when input power is applied.**

2. **Don't touch any Circuitry inside the panel.**

TESTING PROCEDURE

TESTING GUIDELINES:

User must follow these steps to execute the Program.

1) First step is to ON the 3 phase supply from the main supply board.

2) Press **POWER SUPPLY ON** green button on the front panel to start the machine

3)Follow all software instruction at the time of execution

4)Then Press **SYSTEM ON** button on the front panel to start the system.

AUTO mode:

In AUTO mode all the control is done by Front control panel

1) Press the selector switch on **AUTO** mode.

2) Start both the heater through toggle switch wait until the temperature of oil reaches t **40-50** degrees centigrade in summer & **50-60** degrees centigrade in winter.

3) Now start the clamping motor to **ON position** through toggle switch check that th pressure at the clamping gauge is 200 bar.

4) Checking of **external stopper (clamp)** by the auxiliary panel

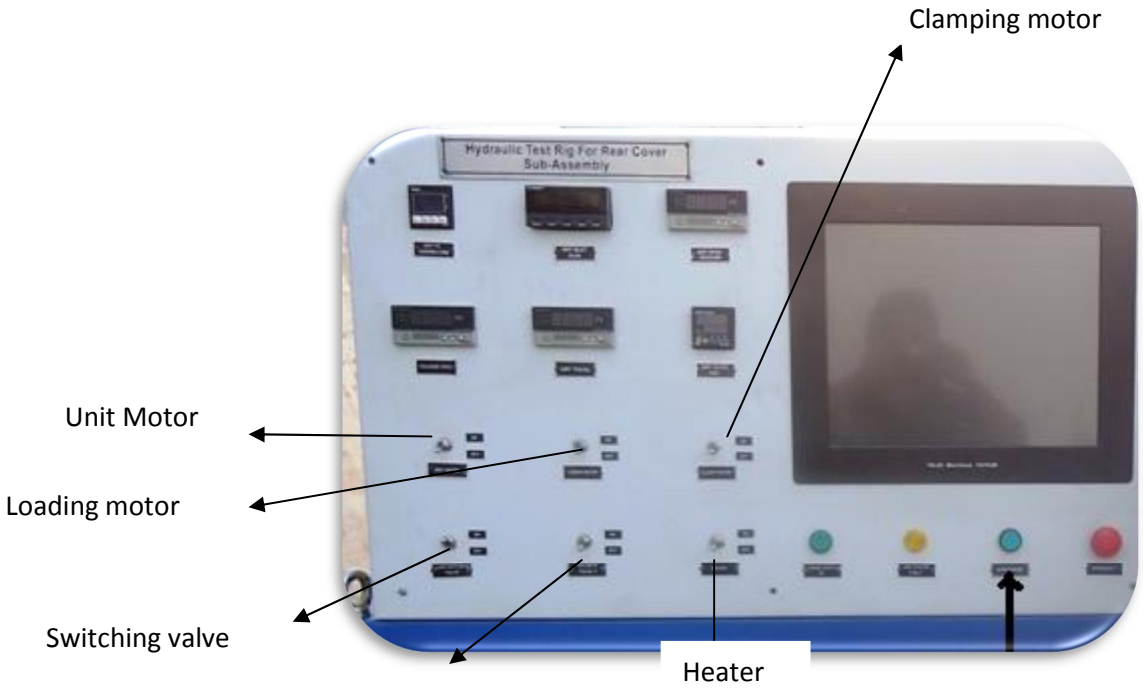
a) Turn the toggle 1 towards **ON** side (up position) to clamp the unit.

b) Turn the toggle 1 towards **ON** side (down position) to decamp the unit.

5) Now start the Unit main motor .

a) Start unloading valve and adjust the pressure **@ 165** bar on gauge by using relief cur unloading valve.

6) Now start the loading motor to **ON position** through toggle switch.



7) Then start testing at **full load** & **full engine rp** Front panel

a) Turn the selector switch no. 1 towards **16/24** lpm discharge side & check the oil flow at flow meter unit LCD. It should be **16/ 24** lpm at this position (16 lpm for 1000 kg & 24 lpm for 1500 kg.

b) Turn the selector switch no. 2 toward on side & check the oil pressure at gauge no. 2. The pressure at gauge no. 2 should be **35/45** Kg/cm sq. (35 Kg/cm sq. for 1000 Kg & 45 Kg/cm sq. for 1500 Kg)

c) Raise the position lever upward, the lift arm should go upward within **2.3-2.6**seconds.

8) Then start testing at **full load**& **engine idle rpm** (Type B)**.**

a) Turn the selector switch no. 1towards **5/7**lpm discharge side & check the oil flow at flow meter unit LCD. It should be **5/7**lpm at this position (5lpm for 1000 kg & lpm for 1500 kg.

b) Turn the selector switch no. 2 toward on side & check the oil pressure at gauge no. 2. The pressure at gauge no. 2 should be **35/45** Kg/cm sq. (35 for 1000 Kg & 45 for 1500 Kg)

c) Raise the position lever upward, the lift arm should go upward within **2.3-2.6** seconds.

9) Now raise the lift arm and check all the above conditions raise until th unit crack pressure @ 165 bar.

MANUAL mode:

In manual mode all the control is done by back control panel

1) Start both the heater wait until the temperature of oil reaches to 40-50 degree centigrade in summer & 50-60 degrees centigrade in winter.

2) Press **CLAMP MOTOR** push button on the hydraulic panel to start the clam motor and finally clamp the unit.

Clamp motor

Actuator motor

3) Now start the Unit main motor

a) Start unloading valve and adjust the pressure **@ 165** bar by using relief cum unloadin valve.

4) Press on the **ACTUATOR MOTOR** push button on the hydraulic panel to start the actuato Cylinder motor.

Heaters

Unloading Valve

5) Then start testing at **full load** & **full engine rpm** (Type A)

a) Turn the selector switch no. 1 towards **16/24** lpm discharge side & check the oil flow at flow meter unit LCD. It should be **16/ 24** lpm at this position (16 lpm for 1000 kg & 24 lpm for 1500 kg.

b) Turn the selector switch no. 2 toward on side & check the oil pressure at gauge no. 2. The pressure at gauge no. 2 should be **35/45** Kg/cm sq. (35 Kg/cm sq. for 1000 Kg & 45 Kg/cm sq. for 1500 Kg)

c) Raise the position lever upward, the lift arm should go upward within **2.3-2.6**seconds.

6) Then start testing at **full load**& **engine idle rpm** (Type B)**.**

a) Turn the selector switch no. 1towards **5/7**lpm discharge side & check the oil flow at flow meter unit LCD. It should be **5/7**lpm at this position (5lpm for 1000 kg & lpm for 1500 kg.

b) Turn the selector switch no. 2 toward on side & check the oil pressure at gauge no. 2. The pressure at gauge no. 2 should be **35/45** Kg/cm sq. (35 for 1000 Kg & 45 for 1500 Kg)

c) Raise the position lever upward, the lift arm should go upward within **2.3-2.6** seconds.

7) Now raise the lift arm and check all the above conditions raise until th unit crack pressure @ 165 bar.

BILL OF MATERIAL

BILL OF MATERIAL OFUNIT HYDRAULIC POWER PACK

Ckt No.	Item	Specification	Model No.	Make	Qty
1	**Reservoir**	Tank capacity: 500 Liter Material : MS	Fabricated, As per Drawing	Hydmark	1
2	**Filler Breather**	Flange mounted, tank top mounted720 lpm	FSB-25	Hydroline	1
3	**Level Gauge**	Visible Range :76mm, Total Length:159mm ,	LG2-10	Hydroline	1
4	**Level indicator**	Low Level	SDN 102	Shridhan Automation	1
5	**Drain Valve**	Full Bore, CS BODY, G1/2 Both side	DN20314PN30	Leeflow	1
6	**Temperature Gauge with Calibration Certificate**	Range: 0 to 100 degree C, Dial Size: 4”, Stem length: 250 mm(approx.) stem diameter: 8 mm, Process Connection : 1/2” BSPP	3825-B9-11	Wika	1
7	**RTD**	Range: 0 to 150Degree C, Stem length: 300 mm(approx.) Stem diameter: 8 mm, Process Connection : 1/2” BSPP , 3-wire connection ,Output :- 4-20 mA	PT-100	Waaree	1
8	**Suction Strainer**	149 micron, 60 LPM Flow Capacity	SC3015	Hydroline	2

	9	**Suction valve with Limit switch**		3SE3 100 -1E	Siemens	1
	10	**Heater**	Heating Capacity=4KW	OHST40157/.5	Escorts	2
	11	**Baffles**	For providing restriction of large size impurities	Fabricated MS	Standard	1
	12	**External Gear Pump**	Working pressure Max-210 bar Displacement:- 8.3 CC	2.00686E+11	Buckher	1
	14	**Electric Motor**	Flange+ Foot mounted, 15 KW/20HP, 2995rpm,26A Run though Variable Frequency Drive at various speed	HX160MLD4	ABB	1
	15	**Bell housing & Geared Coupling**	To suit the above motor & pump		Standard	1
	16	**VFD for above motor**	To vary the frequency through the drive corespondingly to vary the speed of the motor , 15KW	ACS-550	ABB	1
	17	**High pressure hose**	3/4", Length As per requierment	W.P.275BAR4000PSI	Parker	1
	18	**NRV**	Cracking Pressure:- 0.5 Bar, NG-20, inline mounted	RV-20-01.X/H	Rexroth	1
	19	**Pressure Gauge with calibration certificate**	Range:- 0-260 bar , Dial size:- 4" , 1/2" BSPP connection , line mounted	232.50.100	Wika	1
	20	**Pressure Transmitter with calibration certificate**	Range:- 0-300 bar , Process connection 1/2" BSPP	S10	Wika	1

	21	**Relief cum Unloading Valve**	DC Valve, 4/2 Normally Open	3WE6B62/EG24N9K4	Rexroth	1
	22	**Pressure Line Filter**	10 micron , 40lpm @ 280 bar With By pass Option , Electrical & Visual Clogging Indicator	DBBN/HC110G20D1.1/L24	Hydac	1
	23	**Flow Meter withn Connector Cable**	Flow range:- 2.8 - 28 lpm , Max. Pressure:- 210 bar , Pulse type	FTB-1422	Omega	1
	25	**Suction Strainer**	Flow Range: 120 lpm Line size: 1-1/2"	SC3-030	Hydac	1
	2	**Magnetic Tank Cleaner**	Mount insde the tank, Length: 350 mm	MT-12	Hydroline	1
	2	**Drain Valve for unit collecting tank**	3/8" port, CS body		Leeflow	
	2	**Digital Panel meter with analog out board**	Input - Flow meter pulse , Output- 4-20 mA	DPF-702 DPF-700A	Omega	1
	2	**Temperature Controller**	Output 4-20mA	E5CZ-R2T	Omron	1
	2	**Timer**	Size-48 mm, Red Led Display, Supply voltage: 220 Volt	CT4S	Autonics	1
	2	**Tower Light with Buzzer**	3 Stake (Red,Green, Yellow), 220Volt	HY-TWB-3-24VDC	Autonics	1

BOM of Loading Power-Pack System

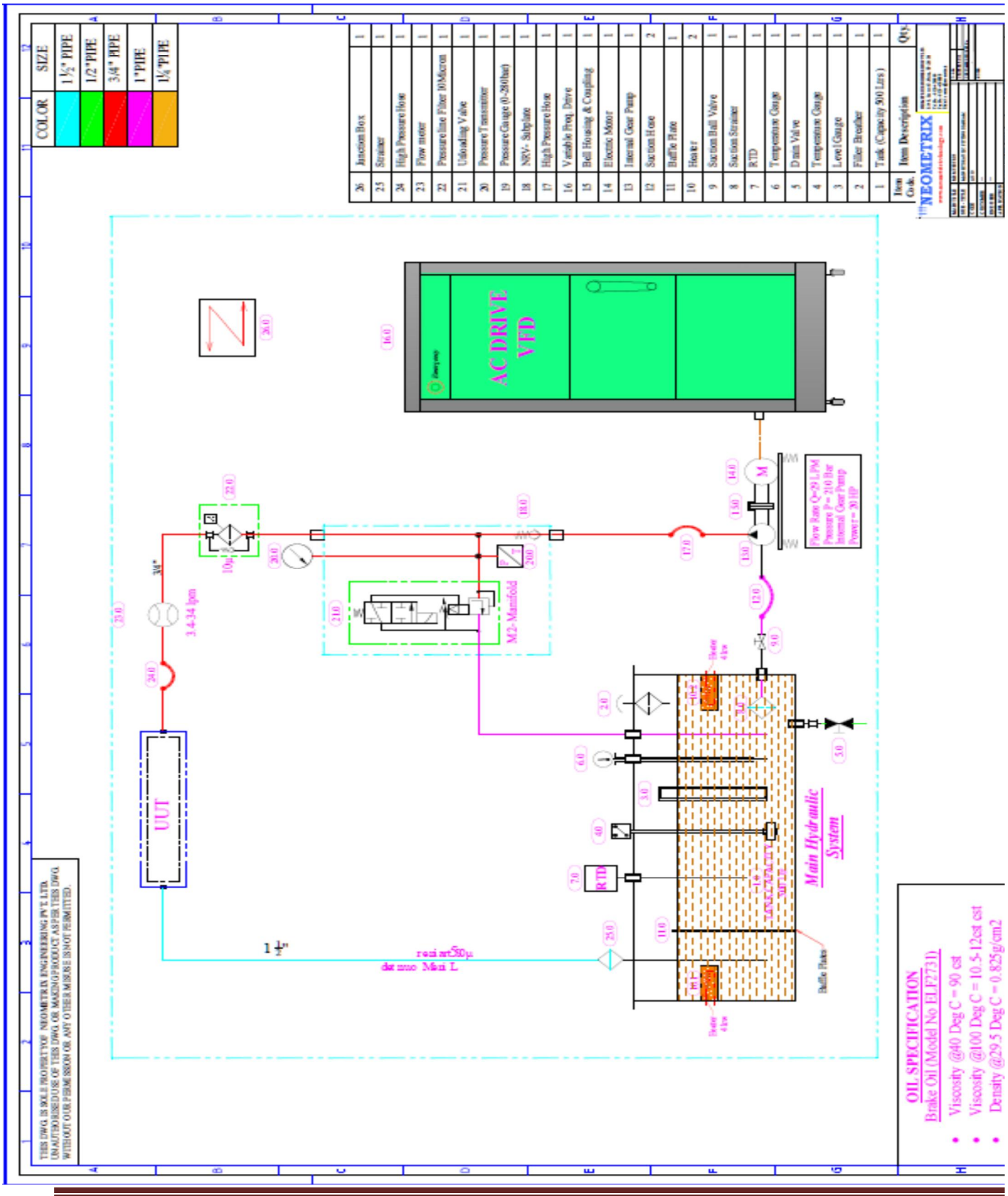
S.No.	CKT No.	Item	Specification	Model No.	Make	Qt
1	1	**Reservoir**	Tank capacity: 300 Liter Material : MS	Fabricated, As per Drawing	Hydmark	1
2	2	**Filler Breather**	150 lpm	FSB 05	Hydroline	1
3	3	**Level Gauge**	Visible Range: 76mm, Total Length:159mm	LG2-10	Hydroline	1
4	4	**Level Switch**	Low Level	SDN 102	Shridhan Automation	1
5	5	**Drain Valve**	Full Bore, CS BODY, G1/2 Both side	DN20 1/2 PN30	Leeflow	1
6	6	**Temperature Gauge with Calibration Certificate**	Range: 0 to 100 degree C, Dial Size: 4”, Stem length: 250 mm(approx.) stem diameter: 8 mm, Process Connection : 1/2” BSPP	3825-B9-09	Wika	1
7	7	**RTD**	Range: 0 to 150Degree C, Stem length: 300 mm(approx.) stem diameter: 8 mm, process Connection : 1/2” BSPP	PT 100	Waaree	1
8	8	**Suction Strainer**	149 micron, 60 LPM Flow Capacity	SC3015	Hydroline	2
9	9	**Gear Pump for Actuator**	Pressure Max-150 bar Flow-10Lpm		Rexroth	1

10	10	**Electric Motor for above pump**	2hp , 1450 rpm, 4 pole	M2BA090L-4	ABB	1
11	11	**Bell housing & Geared Coupling**	To suit the above Motor & Pump		Standard	1
12	12.1	**Pressure Line Filter(Actuater)**	10 micron , 40lpm @ 280 bar with by pass option , electrical & visual Clogging Indicator	LFBN/HC1101C10D1.0/L24	Hydac	1
	12.2	**Pressure Line Filter(clamp)**	10 micron , 40lpm @ 280 bar with by pass option , electrical & visual Clogging Indicator	DFBN/HC60G16D1.X/L24	Hydac	1
13	13.2	**Pressure Gauge with calibration certificate for actuator**	Range:- 0-160 bar , Dial Size:- 4" , 1/2" BSPP connection , Inline mounted	228764-77-25	Wika	1
	13.1	**Pressure Gauge with calibration certificate for clamp**	Range:- 0-160 bar , Dial Size:- 4" , 1/2" BSPP connection , Inline mounted	228764-76-9	Wika	1
14	13	**Actuator Relief Valve**	Relief Range:- Upto 150 Bar	DBDS6P18/315	Rexroth	2
15	15	**D.C. Valve**	4/3 DC Solenoid Valve , NG 10 , P Port is connected to T	4WE6G62/E G24 N9K4	Rexroth	2
16	16	**Pressure transmitter**	0-250 bar	UPA51	Barksdale	1
17	17	**Flow control Valve with NRV Bypass**	Connecting Size-=1/2"		Rexroth	2
18	18	**Double Acting Actuator**	Cylinder Bore Dia.-70mm,Piston Dia.-45mm,Stroke Length	As per drawing	Fabricated	1

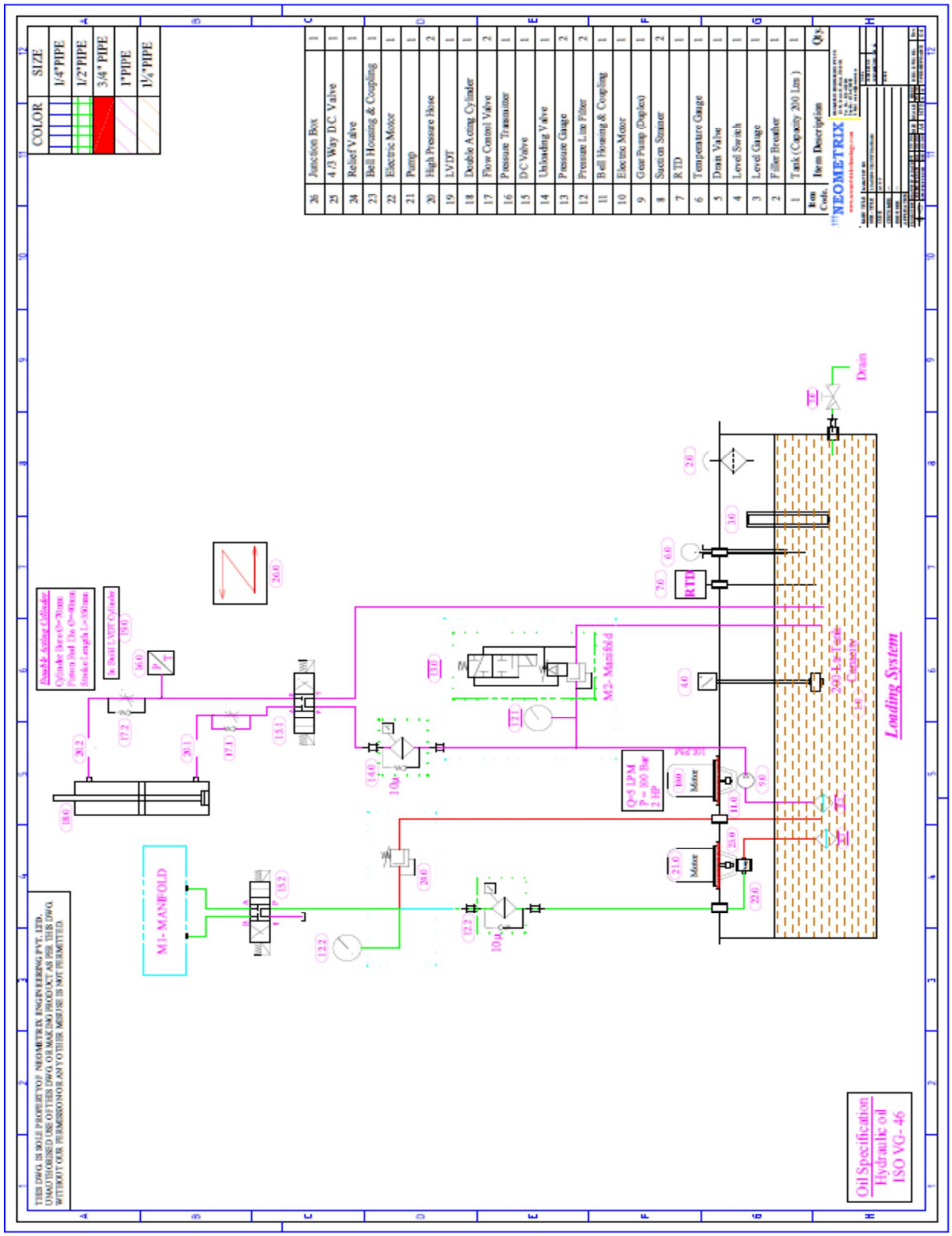
19	19	**LVDT+Position magnet+ Cable Connector**	Mounted inside the Hydarulic Actuator	PCST24-M18-350-10V-L02-KAB3M , PCSTM AG2-G2 , KAB-5M-M1218F1G	ASM-sensor	1
20	20	**High Pressure hoses**	Working Pressure : 210 Bar, 3/4 " Length -	In Neometrix Scope	Parke	2
21	21	**Pump for Clamp**	Flow:- 5 Lpm @ 200 Bar		Buckher	1
22	22	**Electric Motor for Clamp**	2Kw , 1450 rpm	3GBA102001-BHB	ABB	1
23	23	**Bell housing & Geared Coupling**	To connect motor with pump		Standard	1
24	24	**Clamp Relief Valve**	Relief Range:- Upto 150 Bar	DBDS6P18/315	Rexroth	1
25		**Hydraulic Swing Clamp with Strap (with Overload protection)**	Clamping Force :- 22.6 KN @ 200Bar clock wise , Double/single Acting, Stroke:- 24 mm ,Bottom Mounting , Cylinder Volume:- 28cc	3530300 & 3603100	Hy-Power Clamp	2
26		**Hydraulic Swing Clamp with Strap (with Overload protection)**	Clamping Force :- 13.9KN @ 200Bar clock wise , Double/single Acting, Stroke:- 24 mm ,Bottom Mounting	3520300 & 3601400	Hy-Power Clamp	8

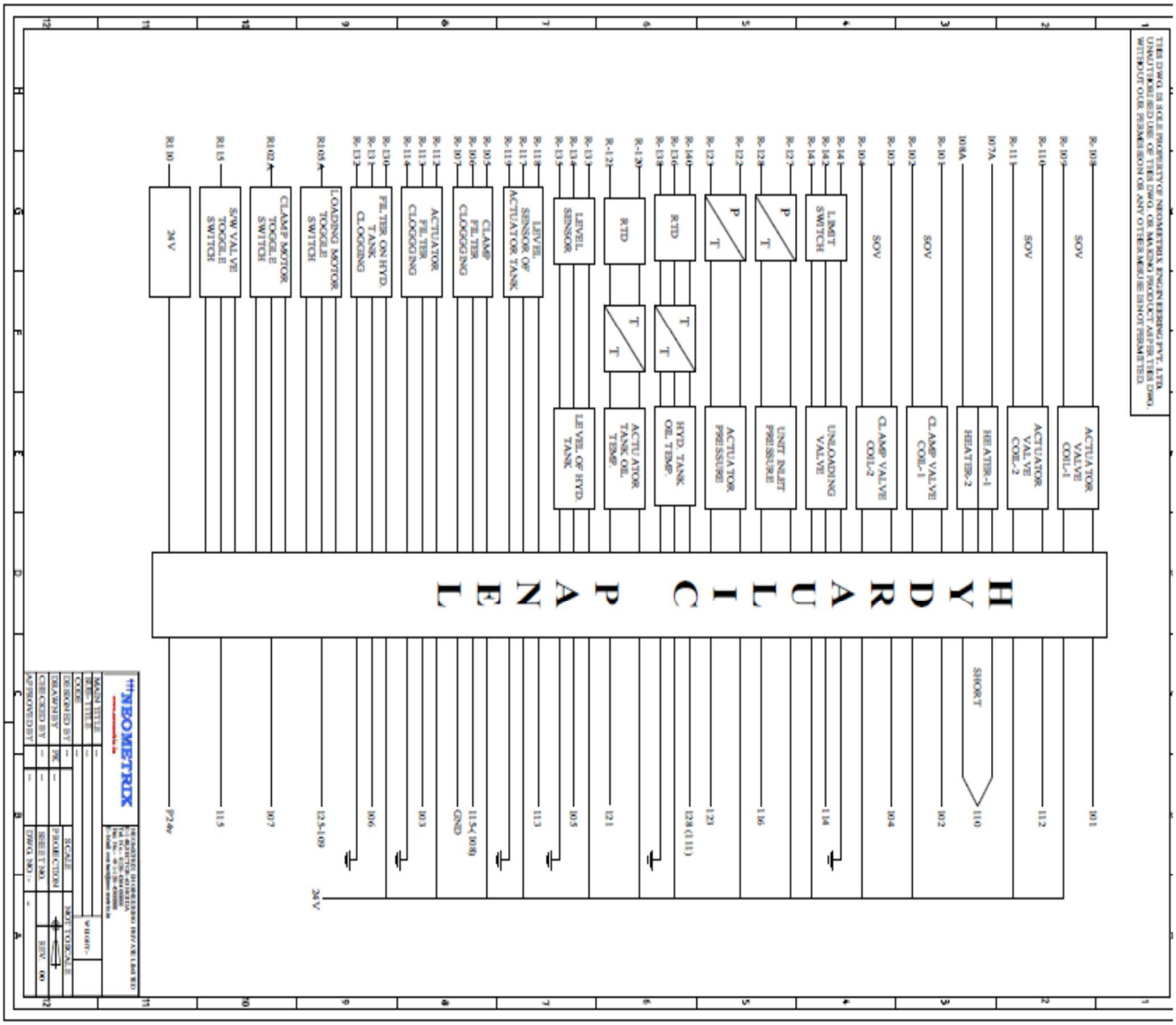
MECHANICAL CIRCUIT DRAWING

Main Hydraulic Power Pack Circuit:



Loading Power Pack Circuit




HYDRAULIC PANEL
SOV
ACTUATOR VALVE COIL-1
SOV
ACTUATOR VALVE COIL-2
HEATER-1
HEATER-2
SOV
CLAMP VALVE COIL-1
SOV
CLAMP VALVE COIL-2
SOV
UNLOADING VALVE
LIMIT SWITCH
P T
UNIT INLET PRESSURE
P T
ACTUATOR PRESSURE
P T
HYD. TANK OIL TEMP.
RTD
T T
ACTUATOR TANK OIL TEMP.
RTD
T T
LEVEL OF HYD TANK
LEVEL SENSOR
LEVEL SENSOR OF ACTUATOR TANK
CLAMP FILTER CLOGGING
ACTUATOR FILTER CLOGGING
FILTER ON HYD. TANK CLOGGING
LOADING MOTOR TOGGLE SWITCH
CLAMP MOTOR TOGGLE SWITCH
S/W VALVE TOGGLE SWITCH
24 V
SHORT
24V
GND

Power Pack Description:-

The Power pack consist of 2 part:

1)Main hydraulic power pack

2)Loading power pack

Main Features of the **Main hydraulic power pack**:

- Oil reservoir capacity: 500 Liters.
- Use Grade ELF 2731 brake oil.
- Filtration: Return line: 10 micron &Suction Line filer: 50 micron.
- Ensure clockwise rotation of electric motor.
- Ensure high level of oil on indicator.
- Magnetic tank cleaner.
- Heater of 4 KW each

Main Features of the **Loading power pack**:

- Oil reservoir capacity: 200 Liters.
- Use Grade VG 46 Hydraulic oil.
- Filtration: Return line: 10 micron & Suctionstrainer : 149 micron.
- Ensure clockwise rotation of electric motor.
- Ensure high level of oil on indicator

User must not enter in this section as per safety purpose and to perform hazardless execution c application. User must not adjust the flow control valve; this is already set as per the softwar application requirement. There are pressure indicators and oil level indicator on front to show th values.Pressure gauge , temperature gauge, DC valve , Unloading Valve, Relief Valve are connected o the top of the tank which perform their function as per instruction.

Maintenance Schedule:

a) **Daily Maintenance:**

i) **Clean the system on daily basis.**

b) **Weekly Maintenance:**

i) **Clean wire mesh in the unit on weekly basis.**
ii) **Clean magnetic tank cleaner rod weekly basis inside the main hydraulic tank.**
iii) **Clean suction strainer inside the unit system.**

c) **Monthly Maintenance:**

a) **Clean main hydraulic and loading tank on monthly basis by man hole.**
b) **Clean suction strainer inside the main hydraulic system and load system.**

CATALOGS

Motor (ABB):

TEFC, S1 Duty
415V+/-10%, 50Hz+/-5%
Combined variation (absolute sum 10%)

Insulation class F
Temperature rise class B (75°C)

HX Serie

2 Pole Ambient 45°C

Output		Frame Size	Rated	Current		Efficiency			Power factor			Torque		T_n	T_{hot}	T_{cold}	Weight	GD^2
kw	hp		spd.(rpm)	I_n(A)	I_s/I_n	FL	3/4FL	1/2FL	FL	3/4FL	1/2FL	T_s/T_n	T_{max}/T_n	N_m	(S)	(S)	kg	kgm^2
0.37	0.5	HX71A2	2790	1.0	4.2	0.60	63.0	59.0	46.0	0.80	0.73	2.0	2.4	1.3	5	12	10	0.001
0.55	0.75	HX71C2	2790	1.4	4.3	68.0	64.0	57.0	0.81	0.74	0.63	1.8	2.3	1.9	5	12	14	0.002
0.75	1.0	HX80A2	2780	1.8	4.8	73.0	72.0	68.0	0.82	0.76	0.66	2.0	2.3	2.6	7	16	10	0.002
1.1	1.5	HX80C2	2780	2.5	4.8	74.0	73.0	70.0	0.81	0.74	0.63	2.1	2.3	3.8	7	16	14	0.003
1.5	2.0	HX90SLA2	2840	3.2	5.7	77.5	76.0	74.0	0.82	0.76	0.66	2.1	2.7	5.0	6	14	22	0.007
2.2	3.0	HX90SLC2	2840	4.5	5.8	79.5	79.0	77.0	0.86	0.76	0.66	2.0	2.8	7.4	5	10	24	0.008
3.7	5.0	HX100LB2	2830	7.2	6.0	80.0	79.5	77.5	0.87	0.84	0.74	2.2	2.7	12.5	5	10	35	0.026
5.5	7.5	HX132SMA2	2875	10.5	6.0	84.2	83.5	81.0	0.85	0.81	0.72	2.3	3.0	18.3	9	20	55	0.044
*7.5	10	HX132SMB2	2850	14.0	6.0	85.0	84.5	84.0	0.88	0.86	0.80	2.1	3.0	25.1	9	20	60	0.052
7.5	10	HX132SMC2I	2870	13.4	6.4	86.0	86.0	85.0	0.91	0.88	0.80	2.4	3.0	25.0	9	20	70	0.072
9.3	12.5	HX132SMC2	2860	16.5	6.0	86.0	85.5	85.0	0.89	0.87	0.81	2.5	3.5	31.1	9	20	70	0.072
*11	15	HX160MLA2	2895	20.0	6.0	87.5	86.5	84.0	0.85	0.81	0.72	2.2	2.8	36.3	12	28	110	0.113
11	15	HX160MLB2i	2900	20.0	6.2	88.5	88.0	87.0	0.86	0.81	0.72	2.2	2.8	36.2	12	28	120	0.128
*15	20	HX160MLB2	2895	27.0	6.0	88.5	87.5	86.5	0.87	0.84	0.76	2.4	2.8	49.5	12	28	120	0.128
15	20	HX160MLD2i	2900	26.0	6.4	90.0	90.0	88.0	0.87	0.84	0.76	2.2	3.0	49.4	12	28	130	0.152
*18.5	25	HX160MLD2	2900	32.5	6.0	91.0	90.5	88.5	0.90	0.84	0.76	2.5	2.9	60.9	12	28	130	0.152

4 Pole Ambient 45° C

Output		Frame Size	Rated	Current		Efficiency			Power factor			Torque		T_n	T_{hot}	T_{cold}	Weight	GD^2
kw	hp		spd.(rpm)	I_n(A)	I_s/I_n	FL	3/4FL	1/2FL	FL	3/4FL	1/2FL	T_s/T_n	T_{max}/T_n	N_m	(S)	(S)	kg	kgm^2
0.25	0.33	HX71A4	1385	0.8	3.5	63.0	61.0	55.0	0.80	0.64	0.51	1.9	2.2	1.7	7	16	13	0.002
0.37	0.50	HX71B4	1370	1.1	3.5	63.0	61.0	55.0	0.70	0.58	0.46	2.0	2.5	2.6	7	16	13	0.003
0.55	0.75	HX80B4	1400	3.5	1.5	65.0	64.0	58.0	0.80	0.67	0.51	1.8	2.3	3.8	6	14	13	0.008
0.75	1.0	HX80D4	1380	4.5	2.0	68.0	67.0	62.0	0.80	0.69	0.55	1.8	2.3	5.8	4	9	15	0.007
1.1	1.5	HX90SLB4	1420	5.0	2.6	74.0	73.5	71.0	0.80	0.72	0.57	1.9	2.6	7.4	5	10	23	0.012
1.5	2	HX90SLD4	1415	5.0	3.4	76.0	75.5	72.5	0.80	0.75	0.62	1.9	2.6	10.1	5	10	25	0.015
2.2	3	HX100LA4	1415	5.0	4.8	78.0	77.5	75.0	0.80	0.73	0.60	2.1	2.7	14.9	5	12	35	0.020
3.7	5	HX112M4AK	1425	6.0	7.6	83.0	83.0	82.0	0.80	0.76	0.65	2.2	2.8	24.8	5	12	45	0.044
5.5	7.5	HX132SMB4	1440	6.0	11.2	84.5	84.5	82.0	0.80	0.71	0.58	2.2	3.0	36.5	7	16	60	0.060
7.5	10	HX132SMC4	1440	6.0	14.8	86.0	86.0	84.5	0.80	0.74	0.63	2.1	3.0	49.7	7	16	70	0.088
9.3	12.5	HX160MLA4	1450	6.0	19.0	88.0	88.0	87.0	0.80	0.73	0.60	2.1	2.7	61.3	7	16	105	0.167
11	15	HX160MLB4	1455	6.0	22.0	89.0	89.0	88.0	0.80	0.74	0.63	2.2	2.8	72.2	8	18	125	0.208
*15	20	HX160MLD4	1455	6.0	29.5	88.5	87.5	86.5	0.80	0.76	0.66	2.1	2.8	99.1	12	28	145	0.252

6 Pole Ambient 45° C

Output		Frame Size	Rated	Current		Efficiency			Power factor			Torque		T_n	T_{hot}	T_{cold}	Weight	GD^2
kw	hp		spd.(rpm)	I_n(A)	I_s/I_n	FL	3/4FL	1/2FL	FL	3/4FL	1/2FL	T_s/T_n	T_{max}/T_n	N_m	(S)	(S)	kg	kgm^2
0.25	0.33	HX80B6K	895	0.8	3.5	63.0	59.0	53.0	0.70	0.59	0.47	1.9	2.2	2.7	10	24	13	0.006
0.37	0.50	HX80B6	895	1.2	3.5	63.5	61.0	55.0	0.70	0.59	0.47	1.9	2.2	4.0	10	24	13	0.006
0.55	0.75	HX80D6	900	1.6	3.5	66.0	64.0	60.0	0.73	0.65	0.50	1.9	2.2	5.8	10	24	15	0.008
0.75	1	HX90SLA6	910	2.1	3.5	68.0	66.5	63.0	0.70	0.66	0.52	1.7	2.0	7.9	10	24	22	0.011
1.1	1.5	HX90SLD6	915	2.9	3.5	72.0	70.5	66.0	0.70	0.66	0.52	1.8	2.1	11.5	10	24	25	0.015
1.5	2	HX100LB6	935	4.0	4.5	75.5	74.0	71.0	0.70	0.61	0.48	2.2	2.5	15.3	9	20	35	0.026
2.2	3	HX112MA6	940	5.7	5.0	78.5	78.0	75.0	0.70	0.56	0.47	2.0	2.5	22.4	8	19	45	0.044
3.7	5	HX132SMC6K	960	8.3	5.5	83.0	83.0	81.0	0.70	0.66	0.53	2.2	2.6	36.8	8	19	70	0.088
5.5	7.5	HX132SMD6	955	12.2	5.5	83.5	83.0	80.0	0.70	0.65	0.52	2.3	2.8	55.0	7	16	75	0.108
7.5	10	HX160MLB6	965	15.5	5.5	87.5	87.5	86.5	0.80	0.71	0.58	2.1	2.4	74.2	9	20	125	0.288
*9.3	12.5	HX160MLC6	960	19.4	5.5	86.5	85.5	83.5	0.80	0.71	0.58	2.0	2.4	92.5	8	18	145	0.326
9.3	12.5	HX160MLD6i	965	19.5	6.0	88.0	88.0	87.0	0.80	0.71	0.58	2.1	2.6	92.0	8	18	155	0.372
*11	15	HX160MLD6	960	23.0	5.5	88.0	87.0	86.0	0.80	0.72	0.59	2.0	2.4	109.0	9	20	155	0.372

8 Pole Ambient 45° C

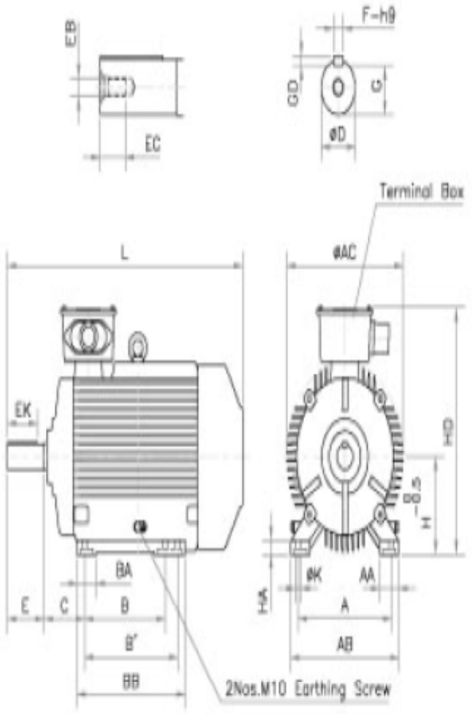
Output		Frame Size	Rated	Current		Efficiency			Power factor			Torque		T_n	T_{hot}	T_{cold}	Weight	GD^2
kw	hp		spd.(rpm)	I_n(A)	I_s/I_n	FL	3/4FL	1/2FL	FL	3/4FL	1/2FL	T_s/T_n	T_{max}/T_n	N_m	(S)	(S)	kg	kgm^2
0.37	0.5	HX90SLA8	680	1.4	2.8	58.0	55.0	48.0	0.65	0.55	0.40	1.6	1.9	5.2	10	24	22	0.012
0.55	0.75	HX90SLD8	680	1.9	3.2	63.0	60.0	54.0	0.63	0.55	0.40	1.8	2.1	7.7	10	24	25	0.015
0.75	1	HX100LA8	695	3.1	3.0	63.0	62.0	57.0	0.56	0.50	0.37	1.8	2.1	10.3	10	24	35	0.020
1.1	1.5	HX100LB8	695	3.9	3.0	62.5	62.0	57.0	0.59	0.51	0.38	1.8	2.3	15.1	10	24	35	0.026
1.5	2	HX112MA8	700	4.8	3.5	69.0	67.0	62.0	0.60	0.51	0.41	1.8	2.3	20.5	9	20	45	0.044
2.2	3	HX132SMB8	710	6.3	4.1	77.0	75.0	72.0	0.65	0.55	0.42	1.9	2.4	29.6	8	19	60	0.060
3.7	5	HX160MLA8K	715	8.4	5.1	82.0	81.0	77.0	0.77	0.69	0.55	1.8	2.5	49.4	8	19	110	0.240
5.5	7.5	HX160MLB8	715	12.0	5.1	84.0	83.0	80.0	0.79	0.72	0.59	1.8	2.5	73.5	9	20	125	0.288
7.5	10	HX160MLD8	715	16.0	5.1	85.0	84.0	82.0	0.79	0.72	0.59	1.8	2.5	100.0	13	29	140	0.372

I_n=Nominal or rated current
I_s=Starting current
T_n=Nominal or rated torque in Nm
T_{max}=Maximum torque
T_s=Starting torque
T_{cold}=Cold withstand time
T_{hot}=Hot withstand time
*These motors have temperature rise of class F

Note: All performance figures are subjected to IS tolerances

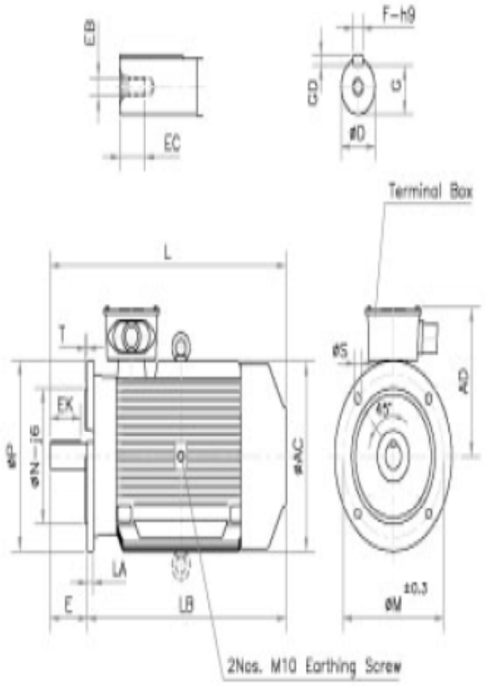
HX 160, HX, HX+ 180, 200 (Foot Mounted)

Mounting Designation B3, B6, B7, B8, V5, V6



HXF 160, HXF, HXF+ 180, 200 (Flange Mounted)

Mounting Designation B5, V1, IM3001

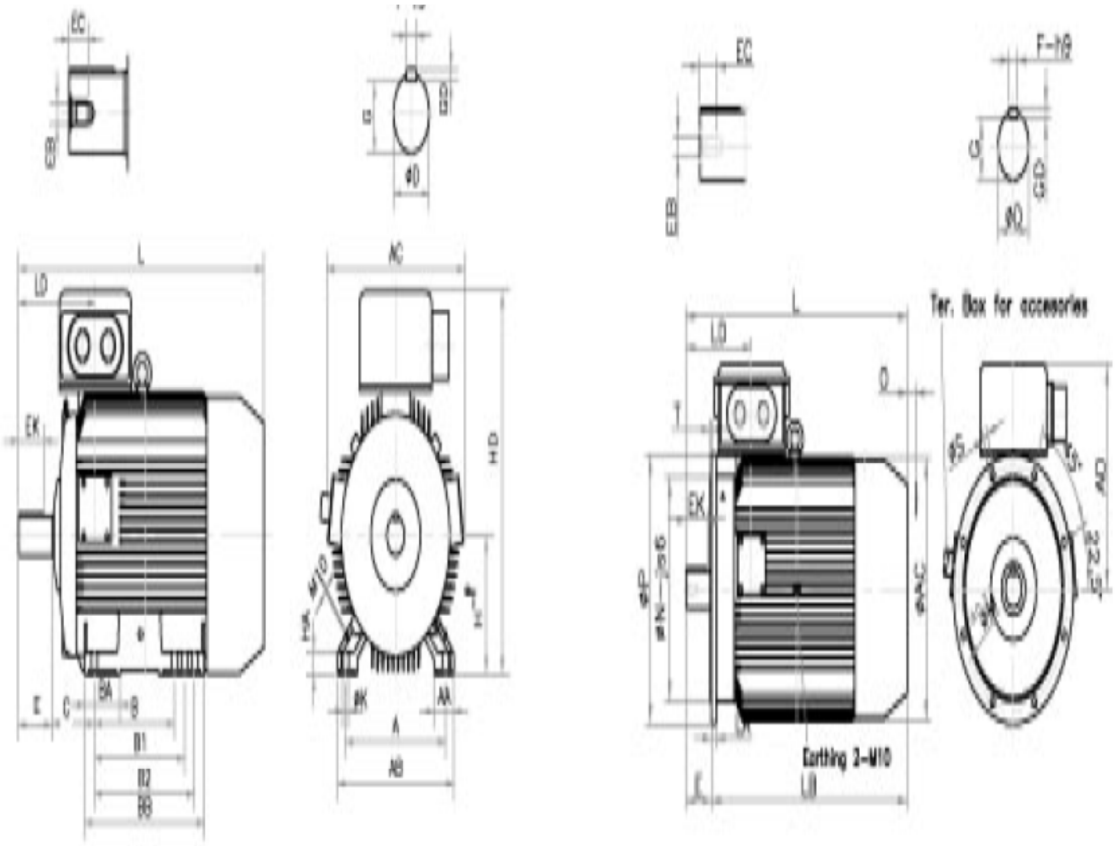


Frame	A	AA	AB	AC	B	B'	BA	BB	C	D – Tol.	E	EB	EC	EK
HX 160ML	254	60	310	305	210	254	65	310	108	42 – k6	110	M16	36	90
HX,HX+180ML	279	58	324	348	241	279	53	324	121	48 – k6	110	M16	36	90
HX,HX+200ML	318	70	378	381	267	305	81	354	133	55 – M6	110	M20	42	90

Frame	F	G	GD	H	HA	HD	K	L	Bearing	
									DS	NDS
HX 160ML	12	37	8	160	22	415	15	675	6309ZZ C3	6308ZZ C3
HX,HX+180ML	14	42.5	9	180	26	455	15	705	6310ZZ C3	6309ZZ C3
HX,HX+200ML	16	49	10	200	30	495	19	731	6312ZZ C3	6311ZZ C3

Frame	AC	AD	D – Tol.	E	EB	EC	EK	F	G	GD	L	LA
HXF 160ML	305	255	42 – k6	110	M16	36	90	12	37	8	675	16
HXF,HXF+180ML	348	275	48 – k6	110	M16	36	90	14	42.5	9	705	20
HXF,HXF+200ML	381	295	55 – m6	110	M20	42	90	16	49	10	731	20

Frame	LB	M	N	P	S	T	Bearing	
							DS	NDS
HXF 160ML	565	300	250	350	19	5	6309ZZ C3	6308ZZ C3
HXF,HXF+180ML	595	300	250	350	19	5	6310ZZ C3	6309ZZ C3
HXF,HXF+200ML	621	350	300	400	19	5	6312ZZ C3	6311ZZ C3



Type	A	AA	AB	AC	B	B1	B2	BA	BB	C	D – Tol.	E	EB	EC
M2BA315SML 2 pole	508	120	620	645	406	457	508	180	608	216	65 – m6	140	M20	40
(SM Frame) 4...8 pole	508	120	620	645	406	457	508	180	608	216	80 – m6	170	M20	40
M2BA315SML 2 pole	508	120	620	645	406	457	508	180	608	216	65 – m6	140	M20	40
(ML Frame) 4...8 pole	508	120	620	645	406	457	508	180	608	216	90 – m6	170	M24	48

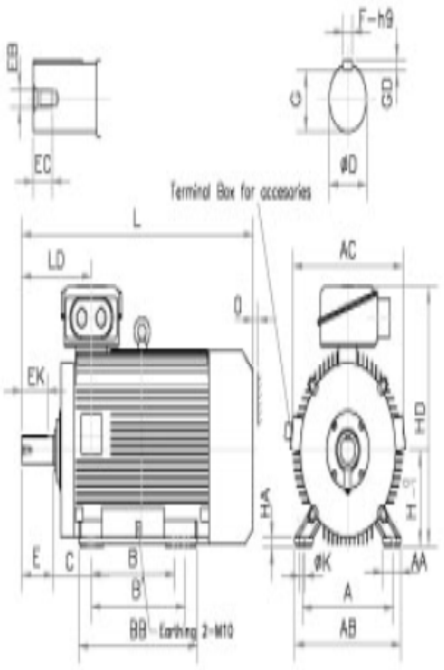
Type	AC	AD	D – Tol.	E	EB	EC	EK	F	G	GD	L	LA	LB
M2BAF315SML 2 pole	645	557	65 – m6	140	M20	40	115	18	58	11	1215	22	1075
(SM Frame) 4...8 pole	645	557	80 – m6	170	M20	40	130	22	71	14	1245	22	1075
M2BAF315SML 2 pole	645	557	65 – m6	140	M20	40	115	18	58	11	1215	22	1075
(ML Frame) 4...8 pole	645	557	90 – m6	170	M24	48	130	25	81	14	1245	22	1075

Type	EK	F	G	GD	H	HA	HD	K	L	LD	O	Bearing DS	Bearing NDS
M2BA315SML 2 pole	115	18	58	11	315	50	872	28	1215	360.5	115	6316 C3	6316 C3
(SM Frame) 4...8 pole	130	22	71	14	315	50	872	28	1245	390.5	115	6319 C3	6316 C3
M2BA315SML 2 pole	115	18	58	11	315	50	872	28	1215	360.5	115	6316 C3	6316 C3
(ML Frame) 4...8 pole	130	25	81	14	315	50	872	28	1245	390.5	115	6319 C3	6316 C3

Type	LD	M	N	P	S	T	O	Bearing DS	Bearing NDS
M2BAF315SML2 pole	360.5	600	550	660	24	6	115	6316 C3	6316 C3
(SM Frame) 4...8 pole	390.5	600	550	660	24	6	115	6319 C3	6316 C3
M2BAF315SML2 pole	360.5	600	550	660	24	6	115	6316 C3	6316 C3
(ML Frame) 4...8 pole	390.5	600	550	660	24	6	115	6319 C3	6316 C3

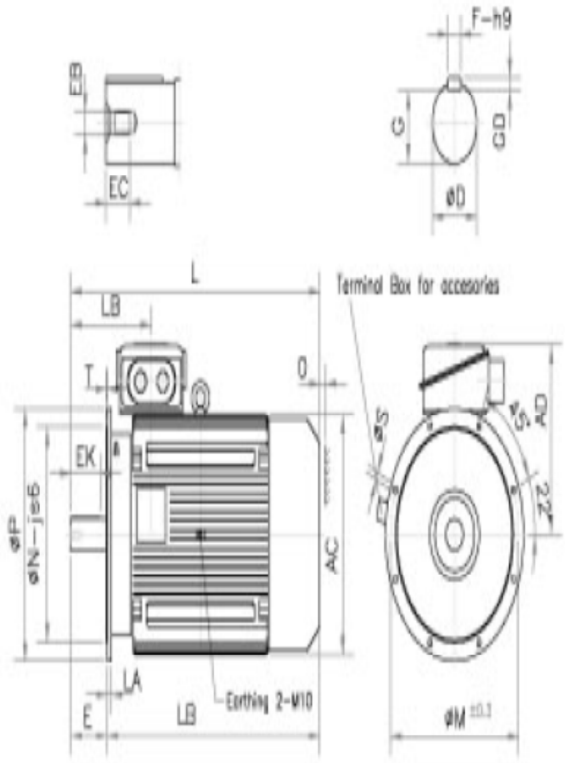
M2BA 355 (Foot Mounted)

Mounting Designation B3, IM1001



M2BA 355 (Flange Mounted)

Mounting Designation B5, IM3001



Frame	A	AA	AB	AC	B	B'	BA	BB	C	D – Tol.	E	EB	EC
M2BA355SM 2 pole	610	120	710	738	500	560	160	732	254	75 – m6	140	M20	40
4...8 pole	610	120	710	738	500	560	160	732	254	100 – m6	210	M24	48
M2BA355SM 2 pole	610	120	710	738	560	630	160	794	254	75 – m6	140	M20	40
4...8 pole	610	120	710	738	560	630	160	794	254	100 – m6	210	M24	48

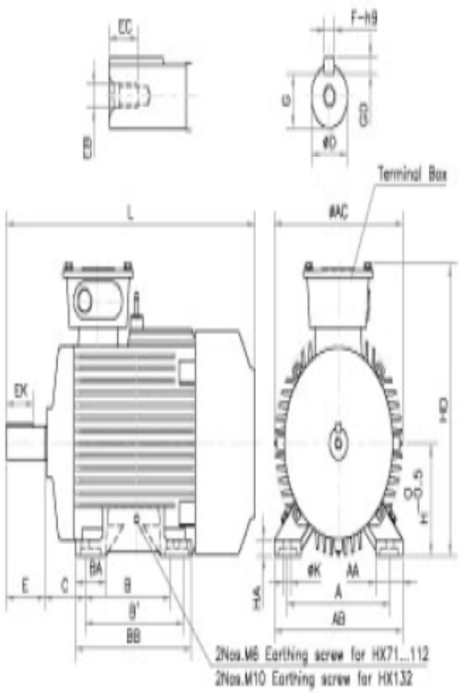
Type	AC	AD	D – Tol.	E	EB	EC	EK	F	G	GD	L	LA	LB
M2BAF315SML 2 pole	738	610	75 – m6	140	M20	40	115	20	67.5	12	1399	25	1259
(SM Frame) 4...8 pole	738	610	100 – m6	210	M24	48	170	28	90	16	1469	25	1259
M2BAF315SML 2 pole	738	610	75 – m6	140	M20	40	115	20	67.5	12	1504	25	1364
(ML Frame) 4...8 pole	738	610	100 – m6	210	M24	48	170	28	90	16	1574	25	1364

Type	EK	F	G	GD	H	HA	HD	K	L	LD	O	Bearing DS	Bearing NDS
M2BA355SM 2 pole	115	20	67.5	12	355	33	965	28	1399	395	130	6319 C3	6319 C3
4...8 pole	170	28	90	16	355	33	965	28	1469	465	130	6322 C3	6319 C3
M2BA355SM 2 pole	115	20	67.5	12	355	33	965	28	1504	395	130	6319 C3	6319 C3
4...8 pole	170	28	90	16	355	33	965	28	1574	465	130	6322 C3	6319 C3

Type	LD	M	N	P	S	T	O	Bearing DS	Bearing NDS
M2BAF315SML2 pole	395	740	680	800	24	6	130	6319 C3	6319 C3
(SM Frame) 4...8 pole	465	740	680	800	24	6	130	6322 C3	6319 C3
M2BAF315SML2 pole	395	740	680	800	24	6	130	6319 C3	6319 C3
(ML Frame) 4...8 pole	465	740	680	800	24	6	130	6322 C3	6319 C3

HX 71...132 (Foot Mounted)

Mounting Designation B3, B6, B7, B8, V5, V6

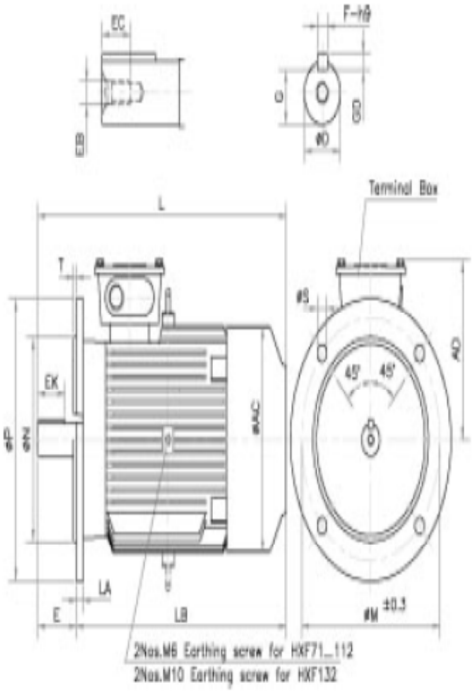


Frame	A	AA	AB	AC	B	B'	BA	BB	C	D – Tol.	E	EB	EC	EK
HX 71	112	25	130	136	90	–	26	110	45	14 – j6	30	M5	12	16
HX 80	125	25	147	152	100	–	30	126	50	19 – j6	40	M6	17	24
HX 90SL	140	27	162	174	100	125	30	151	56	24 – j6	50	M8	19	32
HX 100L	160	42	200	200	140	–	47	180	63	28 – j6	60	M10	22	42
HX 112M	190	48	230	221	140	–	47	180	70	28 – j6	60	M10	22	42
HX 132SM	216	48	256	258	140	178	47	218	89	38 – k6	80	M12	28	60

Frame	F	G	GD	H	HA	HD	K	L	Bearing	
									DS	NDS
HX 71	5	11	5	71	9	185	7	253	6203ZZ C3	6202ZZ C3
HX 80	6	15.5	6	80	10	200	10	290	6204ZZ C3	6203ZZ C3
HX 90SL	8	20	7	90	13	236	10	332	6205ZZ C3	6205ZZ C3
HX 100L	8	24	7	100	15	261	12	387	6306ZZ C3	6206ZZ C3
HX 112M	8	24	7	112	18	283	12	392	6307ZZ C3	6206ZZ C3
HX 132SM	10	33	8	132	20	323	12	468	6308ZZ C3	6307ZZ C3

HXF 71...132 (Flange Mounted)

Mounting Designation B5, V1



Frame	AC	AD	D – Tol.	E	EB	EC	EK	F	G	GD	L	LA	LB	M
HX 71	136	114	14 – j6	30	M5	12	16	5	11	5	253	9	223	130
HX 80	152	120	19 – j6	40	M6	17	24	6	15.5	6	290	10	250	165
HX 90SL	174	146	24 – j6	50	M8	19	32	8	20	7	332	10	282	165
HX 100L	200	161	28 – j6	60	M10	22	42	8	24	7	387	11	327	215
HX 112M	221	171	28 – j6	60	M10	22	42	8	24	7	392	11	332	215
HX 132SM	258	191	38 – k6	80	M12	28	60	10	33	8	468	12	388	265

Frame	N – Tol.	P	S	T	Bearing	
					DS	NDS
HX 71	100 – j6	160	10	3.5	6203ZZ C3	6202ZZ C3
HX 80	130 – j6	200	12	3.5	6204ZZ C3	6203ZZ C3
HX 90SL	130 – j6	200	12	3.5	6205ZZ C3	6205ZZ C3
HX 100L	180 – j6	250	15	4	6306ZZ C3	6206ZZ C3
HX 112M	180 – j6	250	15	4	6307ZZ C3	6206ZZ C3
HX 132SM	230 – j6	300	15	4	6308ZZ C3	6307ZZ C3

Filters:

Model Code

DF BN/HC 30 T B 3 A 1 . X / 12 - V B6

Filter Type
DF = Inline filter

Element Media
BH/HC = Betamicron® *(High Collapse)* BN/HC = Betamicron® *(Low Collapse)*
V = Metal Fiber W/HC = Wire Screen

Size
30, 60, 110, 160, 240, 280, 330, 660, 1320

Pressure Range
T = 420 bar

Size and Nominal Connection
B = 1/2 Threaded *(size 30 only)* I = SAE 3/4" Code 62 Flange *(sizes 60-140 only)*
C = 3/4 Threaded *(sizes 60-140 only)* J = SAE 1 1/4" Code 62 Flange *(sizes 160-280 only)*
E = 1 1/4 Threaded *(sizes 160-280 only)* L = SAE 2" Code 62 Flange *(sizes 330-1320 only)*
F = 1 1/2 Threaded *(sizes 330-1320 only)*

Filtration Rating *(microns)*
3, 5, 10, 20 = BH/HC, BN/HC 3, 5, 10, 20 = V 25, 74, 149 = W/HC

Type of ΔP Clogging Indicator
A, B/BM, C, D

Type Number
1 = One piece bowl *(sizes 30-660 only)* 2 = Two piece bowl *(sizes 660-1320 only)*

Modification Number *(latest version always supplied)*

Port Configuration
(omit) = BSPP
3 = NPT ports – NPT ported filters will be SAE with adaptors in each port
12 = SAE straight thread o-ring boss ports
16 = SAE flange ports *(sizes 60-1320 only)*

Seals
(omit) = Nitrile (NBR) standard
V = Fluoroelastomer (FPM)
EPR = Ethylene Propylene (EPDM) Seals *(subject to minimum quantities)*

Bypass Valve
(omit) = Non-bypass B3 = Bypass *(3 bar)* B6 = Bypass *(6 bar)*

Supplementary Details
SO103H = Modification of BN4HC *(Low Collapse)* Element For Phosphate Esters
SO155H = Modification of BH4HC *(High Collapse)* Element For Phosphate Esters
SO184 = G-1/2 Drain in Bowl Option For Sizes 60 - 280 *(comes standard for sizes 330, 660, & 1320)*
W = Indicator with brass piston *(for use with water based fluids)*
L24, L48, L110, L220 = Lamp for D-type clogging indicator *(LXX, XX = voltage)*
T100 = Indicator Thermal Lockout, 100°F *(C and D indicators only)*

Replacement Element Model Code

0030 D 010 BN4HC / V

Size
0030, 0060, 0110, 0160,
0240, 0280, 0330, 0660, 1320

Filtration Rating *(micron)*
3, 5, 10, 20 = BH4HC, BN4HC
3, 5, 10, 20 = V
25, 74, 149 = W/HC

Element Media
BH4HC, BN4HC, V, W/HC

Supplementary Details
(omit) = standard
V = Fluoroelastomer (FPM) seals

Clogging Indicator Model Code

VD 5 B . X /

Indicator Prefix
VD = G 1/2 6000 psi

Trip Pressure
2 = 29 psid (2 bar) *(option)*
5 = 72 psid (5 bar) *(standard)*
Optional 15 psid (1 bar) & 116 psid (8 bar) available upon request

Type of Indicator
A = no indicator, plugged port
B/BM = Visual pop-up *(auto/manual reset)*
C = Electric switch
D = Electric switch and light

Modification Number

Supplementary Details

Seals
(omit) = Nitrile (NBR) *(standard)*
V = Fluoroelastomer (FPM)

Light Voltage *(D type indicators only)*
L24 = 24V L110 = 110V

Thermal Lockout *(VM, VD types C, D, J, and J4 only)*
T100 = Lockout below 100°F

Underwrighters Approval *(VM, VD types C, D, J, and J4 only)*
CRUUS = Electrical Indicators
(For additional details and options, see Clogging Indicators section.)

Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

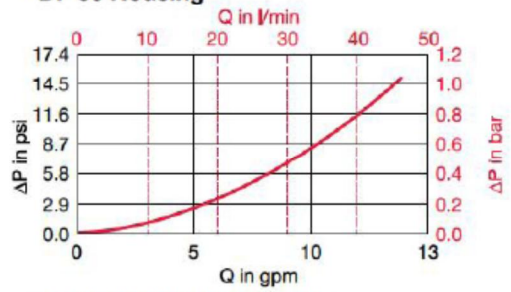
Housing Curve:

Pressure loss through housing is as follows:

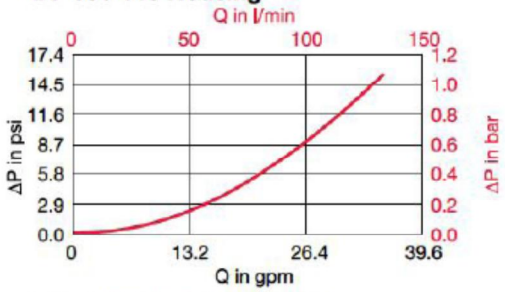
$$\text{Housing } \Delta P = \text{Housing Curve } \Delta P \times \frac{\text{Actual Specific Gravity}}{0.86}$$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! *(see sizing section on page 19)*

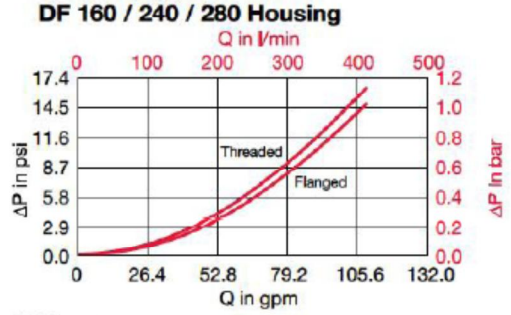
DF 30 Housing



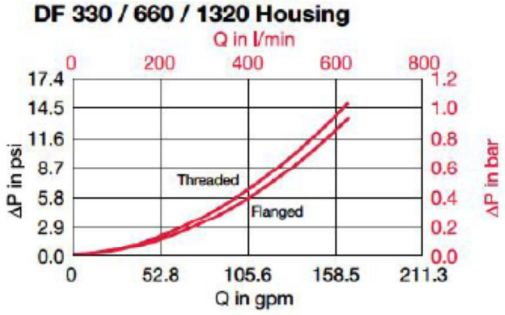
DF 60 / 110 Housing



DF 160 / 240 / 280 Housing



DF 330 / 660 / 1320 Housing



Element K Factors

$$\Delta P \text{ Elements} = \text{Elements (K) Flow Factor (From Tables Below)} \times \text{Flow Rate (gpm)} \times \frac{\text{Actual Viscosity (SUS)}}{141 \text{ SUS}} \times \frac{\text{Actual Specific Gravity}}{0.86}$$

Size	...D...BN4HC (Betamicron® Low Collapse)			
	3 µm	5 µm	10 µm	20 µm
0030	3.504	2.374	1.251	0.618
0060	1.582	1.116	0.723	0.433
0110	0.819	0.585	0.361	0.205
0160	0.718	0.480	0.252	0.193
0240	0.450	0.333	0.196	0.128
0280	0.220	0.171	0.092	0.071
0330	0.294	0.215	0.163	0.095
0660	0.136	0.099	0.061	0.044
1320	0.068	0.048	0.030	0.021

Size	...D...BH4HC (Betamicron® High Collapse)			
	3 µm	5 µm	10 µm	20 µm
0030	5.000	2.780	1.989	1.042
0060	3.210	1.785	0.993	0.669
0110	1.394	0.819	0.488	0.307
0160	0.919	0.569	0.322	0.240
0240	0.578	0.374	0.214	0.158
0280	0.313	0.184	0.097	0.090
0330	0.422	0.244	0.154	0.108
0660	0.179	0.106	0.055	0.049
1320	0.089	0.054	0.031	0.024

Size	...D...V Elements			
	3 µm	5 µm	10 µm	20 µm
0030	1.011	0.740	0.411	0.200
0060	0.877	0.511	0.296	0.183
0110	0.452	0.304	0.182	0.118
0160	0.251	0.177	0.123	0.079
0240	0.169	0.137	0.093	0.062
0280	0.126	0.093	0.064	0.041
0330	0.121	0.097	0.065	0.043
0660	0.063	0.050	0.034	0.021
1320	0.032	0.026	0.018	0.012

Size	...D...W/HC Elements
	25, 50, 74, 100, 149, 200 µm
0030	0.166
0060	0.042
0110	0.023
0160	0.016
0240	0.010
0280	0.009
0330	0.008
0660	0.004
1320	0.002

Process connection
Cu-alloy,
lower mount (LM) or back mount (BM),
NS 50, 63: G ¼ B (male), 14 mm flats
NS 100: G ½ B (male), 22 mm flats

Pressure element
NS 50, 63:
< 60 bar: Cu-alloy, C-type
≥ 60 bar: Cu-alloy, helical type
NS 100:
< 100 bar: Cu-alloy, C-type
≥ 100 bar: Stainless steel 316L, helical type

Movement
Cu-alloy

Dial
NS 50, 63: Plastic ABS, white, with pointer stop pin
NS 100: Aluminium, white, black lettering

Pointer
NS 50, 63: Plastic, black
NS 100: Aluminium, black

Window
Plastic, crystal-clear

Case
Natural finish stainless steel, with pressure relief at case circumference, 12 o'clock.
O-ring seal between case and connection.
Scale ranges ≤0 ... 6 bar with compensating valve to vent case.

Bezel ring
Crimp ring, glossy finish stainless steel, triangular bezel

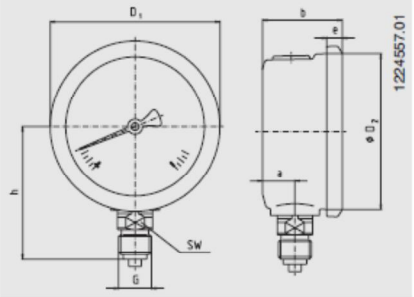
Filling liquid
Glycerine 99.7 %

Options

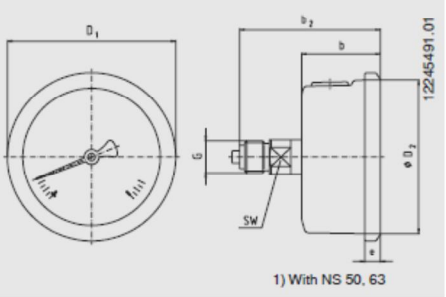
- Measuring system and movement from stainless steel (model 233.53)
- NS 100: Zero adjustment (in front)
- Increased medium temperature with special soft solder
  - NS 50, 63: 100 °C
  - NS 100: 150 °C
- Ambient temperature resistant -40 ... +60 °C with silicone oil filling
- Panel mounting flange, stainless steel, for back connection
- Surface mounting flange, stainless steel (not NS 50)
- Mounting clamp (for back connection)

Dimensions in mm

Lower mount (LM)

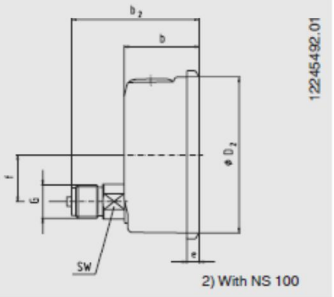


Centre back mount (CBM) 1)



1) With NS 50, 63

Lower back mount (LBM) 2)



2) With NS 100

NS	Dimensions in mm										Weight in kg
	a	b ± 0.5	b_2 ± 0.5	D_1	D_2	e	f	G	h ± 1	SW	
50	12	30	55	55	50	5.5	-	G ¼ B	48	14	0.15
63	13	32	56	68	62	6.5	-	G ¼ B	54	14	0.21
100	15.5	48	81.5	107	100	8	30	G ½ B	87	22	0.80

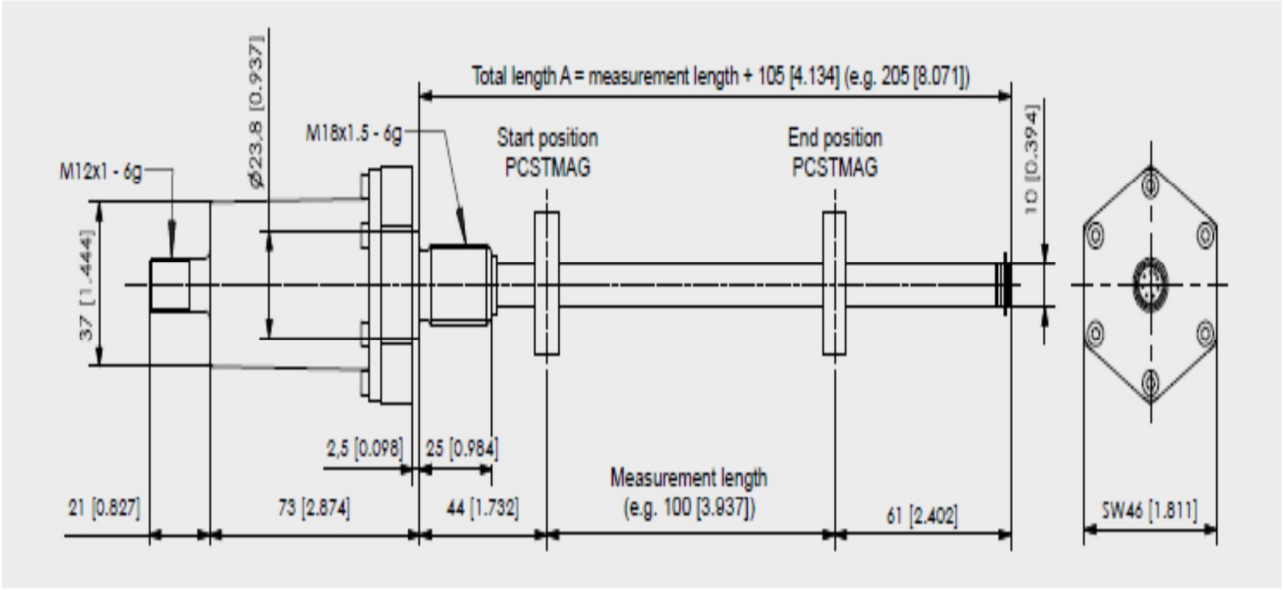
Process connection per EN 837-1 / 7.3

Ordering information
Model / Nominal size / Scale range / Connection size / Connection location / Options

LVDT:

POSICHRON®
PCST24
Rod-Style Design

ASM®



Dimensions in mm [inch]

Dimensions informative only.
For guaranteed dimensions consult factory.

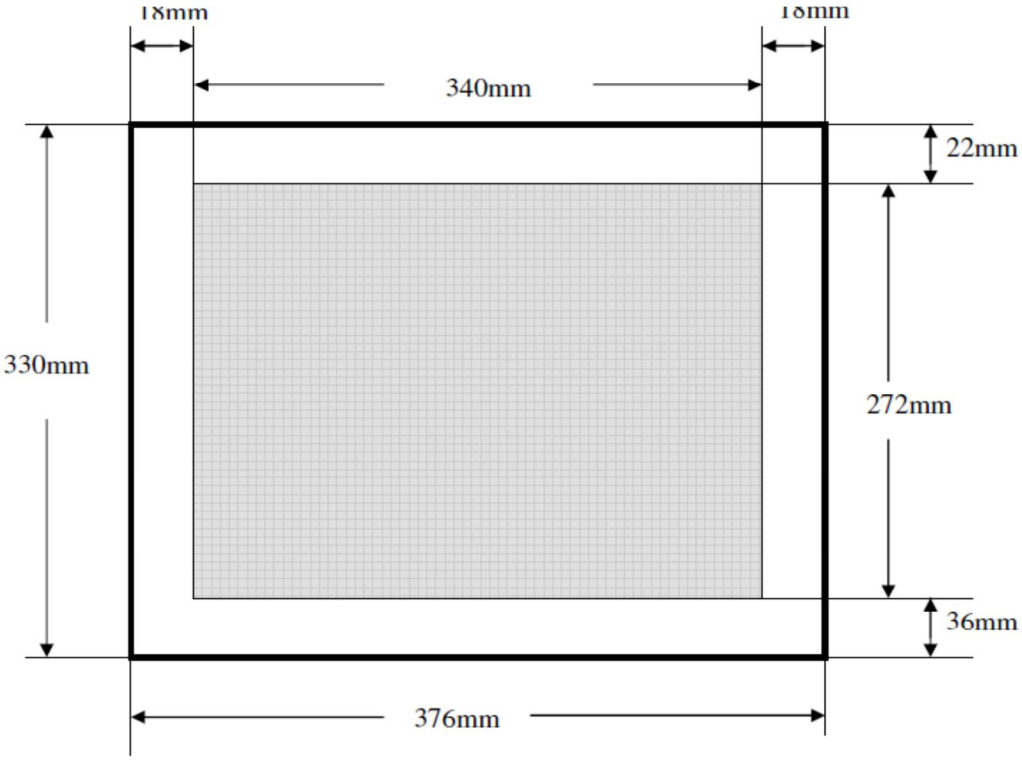
CLAMP:

TOUCH SCREEN DISPLAY:

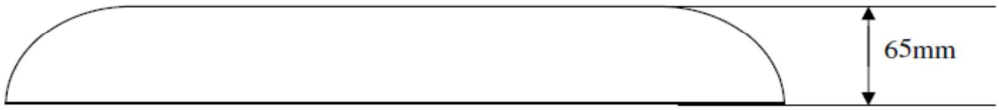
Size: 17" (4:3)

Make & Model:
AOC 177Sa LCD TFT
Monitor

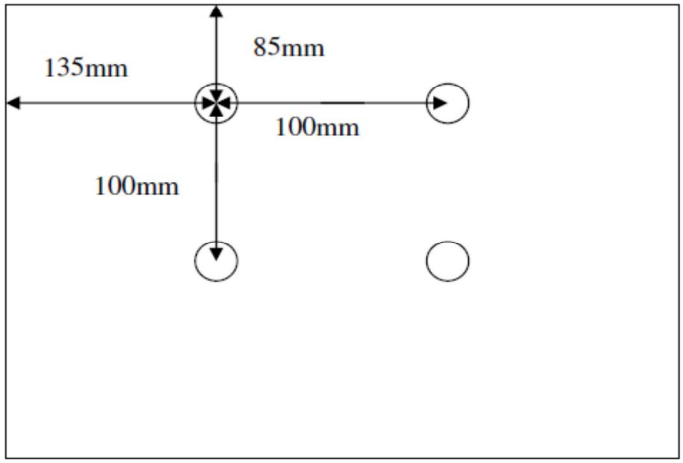
Date: 09/02/10



Front View



Top View



Back View
VESA mount

Available

Monitor stand not included. All Dimesions in mm. Subject to +/- 5mm

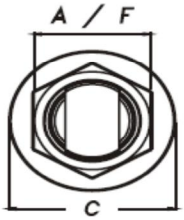
FLOW METER:

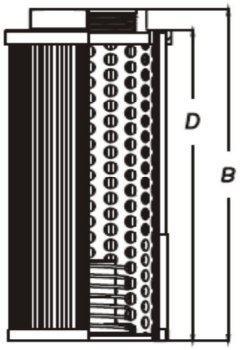
LEVEL SWITCH:

SUCTION STRAINER:

SUCTION STRAINER - S C 3

- REUSABLE SS 100 MESH / 149 MICRON STD.
- ALUMINIUM DIE CAST NUT
- STEEL CAP / SUPPORT TUBE
- CONTINUOUS EPOXY BOND
- MAX. WORKING TEMP. 80° C.
- SUITABLE FOR HYDRAULIC / MINERAL OIL





MODEL NO	FLOW LPM	THREAD SIZE A	CODE	OVERALL LENGTH B	DIA NUT CAP LENGTH D	NUT C	A/F	SCREEN AREA (SQ. CMS)	WT KGS
SC3 -002	8	1/4	02	90	77	46	24	187	0.10
SC3 -003	12	3/8	03	90	77	46	24	187	0.10
SC3 -005	20	1/2	04	105	92	46	30	226	0.10
SC3 -007	28	3/4	06	109	94	64	35	406	0.20
SC3 -010	40	1	08	139	124	64	46	542	0.20
SC3 -015	60	1-1/4	10	139	125	86	51	929	0.30
SC3 -020	80	1-1/2	12	168	154	86	60	1161	0.35
SC3 -030	120	1-1/2	12	200	186	86	60	1393	0.40
SC3 -040	160	2	16	235	220	100	70	1806	0.55
SC3 -050	200	2	16	260	245	100	70	2032	0.60
SC3 -075	300	2-1/2	20	211	186	150	90	2787	0.85
SC3 -100	400	3	24	272	247	150	100	3677	1.00
SC3 -150	600	3	24	345	320	150	100	4838	1.25

MODEL CODE : ASSEMBLY

SC3	-015	-**	-**	-**	-**	-**
SERIES	SIZE	PORT THDS. CODE SIZE	PORT THDS. CONNECTION	MICRONS. OPTIONAL #	FEATURE. SPECIAL 1	FEATURE. SPECIAL 2
		REFER TABLE OMIT IF STD	B-BSPP - STD N-NPT - OPTIONAL	149-SS 100MESH- STD 125/100/74/63 - Microns OPTIONAL	RB3 - 3 PSI BYPASS Optional	

OMIT IF STANDARAD

CONSULT FACTORY, FOR OPTIONAL / SPECIAL FEATURE

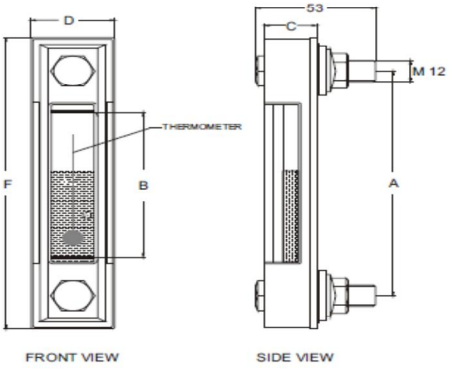
DIMENSIONS IN MM FOR REFERENCE ONLY

AIR BREATHER:

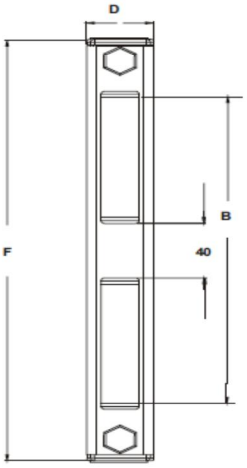
LEVEL GAUGE:

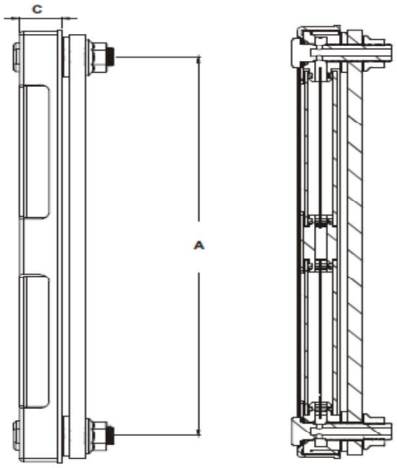
LEVEL GAUGE - LG 6

- 'O' RING TYPE CONSTRUCTION / STURDY DIE CAST COVER
- 3 SIZES 3", 5" & 10" BETWEEN BOLT CENTRES
- FOR NON PRESSURISED TANKS ONLY
- CAN BE MOUNTED ON TAPPED HOLES
- SUITABLE FOR MINERAL / PETROLEUM BASED OILS
- MAXIMUM TEMPERATURE 80° C



LG 6 - 03 & 05





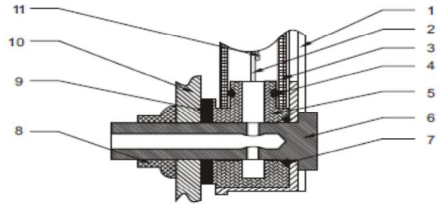
LG 6 - 10

MODEL	A	B	C	D	F	WT KGS
LG 6 - 03	76.2	32	23	35	111	0.23
LG 6 - 05	127.0	76	23	35	162	0.26
LG 6 - 10	254.0	200	23	35	289	0.36

MODEL CODE : ASSEMBLY

LG	- 05	T	- M 10	- X
SERIES	SIZE INCH	FEATURE OPTIONAL #	FEATURE SPECIAL #	FEATURE OPTIONAL#
LG 6	03 - 3"	T - THERMOMETER (OMIT IF NOT REQD)	M12 - STD (M12 X 1.75 BOLT) Omit If Std	No Nuts (For Fitting On Tapped Holes)
	05 - 5"		M10 - SPECIAL (M10 X 1.50 BOLT)	
	10 - 10"		UNC - SPECIAL (1/2" - 13 UNC)	

NOTE : BOLT TORQUE TO BE LIMITED TO 3 FT LBS
OPTIONAL / SPECIAL FEATURE - OMIT IF NOT REQUIRED



1	COVER
2	INDICATOR
3	TUBE
4	'O' RING (13.8 I.D. X 2.4 c.s.d.)
5	END PIECE
6	BOLT M12
7	'O' RING (12.0 I.D. X 3.0 c.s.d.)
8	NUT (FLANGED & SERRATED)
9	WASHER (27 O.D. 12 I.D. X 3 t)
10	TANK WALL
11	THERMOMETER (OPTIONAL)

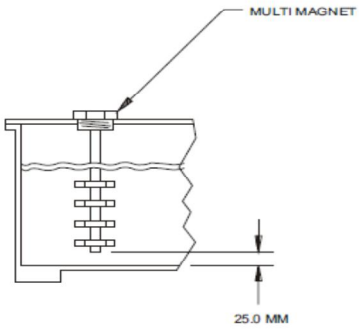
DIMENSIONS IN MM FOR REFERENCE ONLY

1

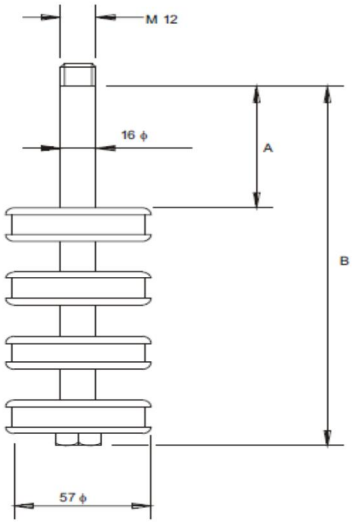
MAGNETIC TANK CLEANER:

MAGNETIC TANK CLEANER

- NO MOVING PARTS
- DECREASES WEAR ON PUMP/ VALVES ETC.
- ELIMINATES TROBLESOME FERROUS FINES
- KEEPS HYDRAULIC OILS CLEANER
- EASILY REMOVED WITHOUT DOWNTIME OR LOSS OF OIL
- IMPROVED PERFORMANCE WHEN USED WITH DIFFUSER
- EXCEPTIONALLY EFFICIENT LARGE CERAMIC MAGNETS



TYPICAL INSTALLATION



MULTIMAGNET - MAGNETIC TANK CLEANER

MODEL	A	B	WT KGS
MT - 12	70	300	0.80
MT - 18	125	450	0.95
MT - 21	200	525	1.05
MT - 24	275	600	1.15

DIMENSIONS IN MM FOR REFERENCE ONLY

DIRECTIONAL CONTROL VALVE:

4/3, 4/2 and 3/2 directional valve with wet-pin DC solenoids

RE 23164/08.05 1/8
Replaces: 23163

Type WE 6 ...H

Size 6
Component series 7X
Maximum operating pressure 315 bar
Maximum flow 60 l/min

Table of contents

Features

- Direct operated directional spool valve with solenoid actuation, standard version
- Position of ports to DIN 24340 form A
- For subplates, see data sheet RE 45052 (separate order)
- Wet-pin DC solenoids
- Electrical connection as individual connection
- Concealed manual override
- Solenoid coil can be rotated
- Pressure-tight chamber needs not to be opened when coil is to be replaced

Information on available spare parts:
www.boschrexroth.com/spc

Spool symbols