NEOMETRIX

The Complete Engineering Solutions Company

`

OPERATIONAL MANUAL

Nitrogen Generator With Air Compressor For Filling Of Nitrogen Cylinder (Compressor With Adaptor)

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INDEX

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OPERATING PROCEDURE

1. Switch ON the control supply switch.
2. Once the pressure reaches to 7.0 to 7.5 Kg/cm2, switch ON the Air Dryer switch.
3. Push the knob button to start the diesel engine.
4. As soon as the engine starts, air compressor at 7 bar enters into the nitrogen plant.
5. Once the pressure in Dry Air Receiver reaches to 7 Kg/cm2 switch ON the PSA Module.
6. Once the Surge Tank Pressure reaches to 5.8 Kg/cm2 open the Bottom Needle valve of N2
7. Rota meter and adjust the flow to 2 Nm3/hr by the top side Needle valve.
8. Vent the gas for 10 minutes and then start using it by switching On the Vent Valve ON Switch.
9. Hydraulic booster operated by the diesel engine will boost the nitrogen at 200 bar.
10. Booster is single stage & single acting type,
11. A booster outlet has two check valve fitted. this valve will stop the back flow of the nitrogen.
12. And this nitrogen at outlet will fill into the main cylinder.

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GENERAL SAFETY

READ MAINTENANCE MANUAL & FOLLOW MAINTENANCE SCHEDULE

- During, running some parts like Engine body, booster and connecting lines can become dangerously hot .Avoid touching hot surfaces particularly exhaust system.
- Keep a due distance from operating equipment while working.
- Before starting remove any tools that were used during connection of the lines of the equipment. Make sure all connection are tight & there is no leakage from any connections.
- Fully tighten the fuel/oil/power pac/water filling caps after refilling. Leave an adequate space in hydraulic tank because of expansion.
- When there is any possibility of accidental short circuit, connection leakages (air/oil) immediately disconnect the power supply of the equipment.
- Unauthorized modification to the equipment may impair the function & / or safety & effect the life of the system. Follow relevant environmental protection regulation when disposing oil, fuel, coolant, electrolyte, filter cartridges, hydraulic oil .

DO & DO NOT

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DO:-

- Study maintenance manual in details.
- Keep equipment room in well ventilation.
- Use genuine spare parts during service.
- Use proper tools to suit the job & avoid unnecessary dismantling.
- Keep all filling caps, connection fittings, nuts & bolt tight.
- Check hydraulic oil, engine oil, lubricating oil level & air supply , if necessary.
- Change lubricating oil, hydraulic oil & filter cartridges in accordance with schedule for maintenance.
- Use only filtered fuel & oils for the system.
- Attend immediately any connection leakage and unusual sound & carry necessary repairs.
- Read the manual of individual system for additional information, if required.
- Always keep the equipment in good condition.
- Stop the system before any cleaning is done.
- Moisture removal from compressor time to time.
- Keeps diesel engine idling for few minutes before stopping.
- Use arrow marks & legends for proper working of the system.

DO NOT:-

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- Neglect the routine / preventive maintenance.
- Repair or tightening of any connection during running.
- Unnecessarily interfere with any adjustment break the equipment seals for which guarantee will be null & void.
- Attempt to start the system unless the fault detected is rectified.
- Use any grade oil in the system.
- Modify the system by yourself, unauthorized may impair the function.
- Use recalculated hydraulic oil & diesel oil, filter cartridges.
- Ignoring the alignment of pulley belts in the system.
- Touching of the connection lines during running.

AIR-COOLED DIESEL ENGINES

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TYPE GA-75

GENERAL SAFETY:

READ MAINTENANCE MANUAL & FOLLOW MAINTENANCE SCHEDULE:

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1. When running engine surface can become dangerously hot. Avoid touching hot surfaces particularly exhaust system.
2. Before proceeding with any operation engine, stop it allow it to cool. Never carry any operation when the engine is running.
3. Children and animal must be kept at a due distance from operating equipment in order to prevent hazards.
4. Before starting, remove any tools that were used to service the engine and/or equipment. Make sure all guards have been refitted.
5. Fully tighten the fuel/oil/water filling caps after refilling. Leave an adequate space in tank to avoid overspill because of expansion.
6. When there is possibility of accidental short circuit, disconnect the battery negative cable first & connect it last
7. Unauthorized modification to the engine may impair the function &/ or safety & affect engine life. Follow relevant environment protection regulation when disposing oil, fuel, coolant, electrolyte, filter cartridges, & other harmful waste.

INSTRUCTION FOR STORAGE

TEMPORARY PROTECTION (1 TO 6 MONTHS)

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1. Run engine at low idle for at least 15 minutes.
2. Fill crankcase with protection oil MIL-1-644-P9 & run the engine at 3/4 maximum speed for 5-10 minutes.
3. With engine hot, drain oil & fill with normal oil.
4. Remove fuel line, drain tank & clean thoroughly cylinder & cylinder head fins.
5. Dismantle fuel filter, replace element if dirty.
6. Remove injector, pour a tablespoon of SAE 30 oil in cylinder & turn crankshaft to spread oil. Reassemble injector.
7. Spray SAE 10 W oil in exhaust & intake manifolds, rocker arms, valves, tappet & protect unpainted parts with grease.
8. Wrap engine in a plastic sheet, store engine in a dry place, possibly off the ground & away from high power ines.

Permanent protection (over 6months)

After following the same procedure as above, we recommend taking the following additional precautions. Treat lubrication and injection systems, and all moving parts with anti-rust with MIL-L-21260 P10 Grade 2, SAE 30 characteristics (such as ESSO Rust-Ban 339, Valvoline Tectyl 873) by turning engine & discharging excess Grade 3 characteristics (such as ESSO Rust-Ban 392: Valvoline Tectyl 894).

Return to service

1. Clean exterior & remove protections & covers.

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2. Remove anti-rust products from exterior with appropriate solvent or grease solvent.
3. Dismantle injector fill with normal engine oil & turn crankshaft a few times.
4. Remove oil sump & remove oil containing protect agent.
5. Check injector calibration, valve clearance, cylinder head torque, oil filter & air cleaner. If engine has been stored for a long period (over six months) inspect one bearing for possible corrosion marks. Make normal pre-starting checks as indicated before staring engine.

Technical Specification

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Vertical, single cylinder, air-cooled, cold starting, compression ignition, four stroke, high speed diesel engines.

MODEL		1510
BORE	mm	85
Stroke	mm	90
Displacement	cm^3	510
Compression ratio	-	17.5:1
Fuel Tank capacity	litres	5.5
Oil Sump capacity	litres	1.75
Lube Oil Consumption	kg/hr	0.022
Dry weight	kg	59

RPM		**2200**	**300**
	NB DIN 6270	**7.5**	**10**

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HP	NA DIN 6270	**6.8**	**9**
	BS 5514 1987	**6.8**	**9**
	IS 10001/1981	**6.3**	**8.3**
SFC	gm/bhp/hr	**182**	**205**

MODEL		**1510**
DIRECTION OF ROTATION when viewed from Ptd End.	-	Anticlockwise
Governor Type	-	Centrifugal Governor
Muffler (silencer)type	-	Reflection Type
Type of Lubrication	-	Forced
Type of Fuel Filter	-	0.2 ltr Bosch
Type of Air Filter	-	Oil bath type – Engine mounted
Startings	-	Rope start/ optional 12 V Electric start
Dry Weight	Kg (Involute Design)	62
Dry weight	Kg(symmetrical Design)	63
Diemension L X W X H	mm(involute design)	412 x 537 x 581
Diemension L X W X H	mm(symmetrical design)	400 x 537x 581

ENGINE RATINGS & DERATING

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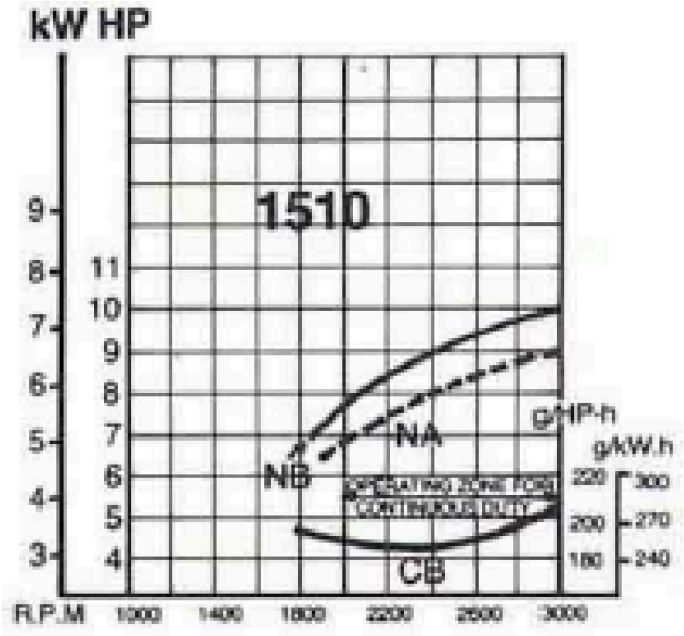
NB DIN 6270 – Service Rating: For continuous light duty with variable speed and variable load.

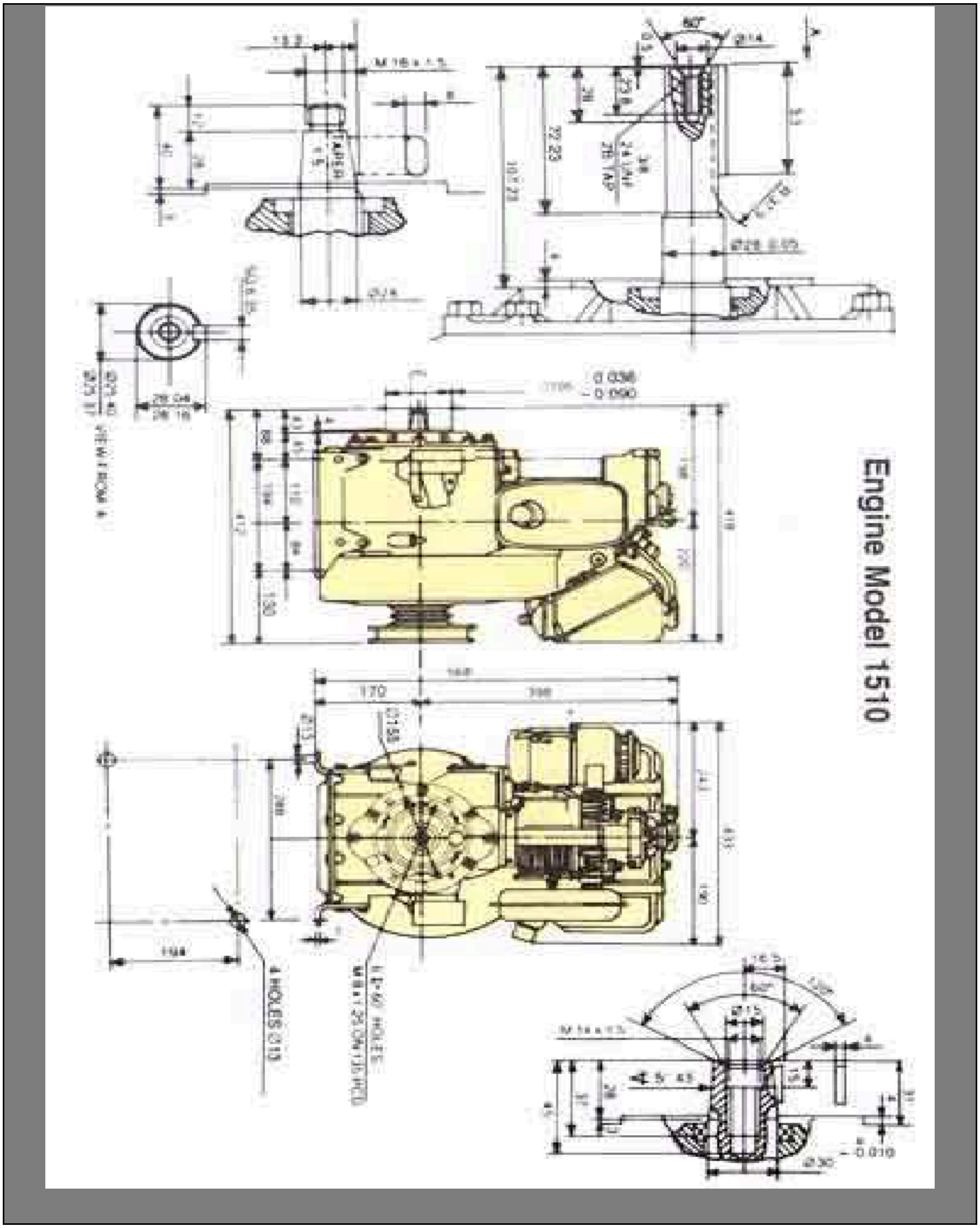
NA DIN 6270 BS 5514:1987 IS 10001/1981 – Continuous Rating: For continuous duty with constant speed with provision for 10% overload.

HPs indicated are valid for fully run in engines fitted with standard air cleaner and standard exhaust silencer. The maximum HP is guaranteed with a tolerance of 5%.

Approximately 1.4% for every 100 M altitude & 2% for every 5% C above 27^{0}C. The engine power is limited by site conditions.



Performance curve


Engine Model 1510

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Engine Design

SCHEDULE FOR MAINTENANCE ADJUSTMENT & REPAIR

					Hours							
S.NO.	OPERATION		8	40	50	100	200	300	400	1000	1500	3000
1	Cleaning	Air Cleaner (*)	•									
		Breather (*)										•
		Fins (*)				•						
		Injector						•				
		Lub Oil Filter				•		•				
2	Check	Oil-Level - Air cleaner	•									
		- Crank Case	•									
		Tight Delivery line union						•				
		Rocker Arm Clearance						•	Every 300hrs			
		Injector Calibration						•				
3	Replacement	Oil-Air Cleaner (**)			•	•	•	•	•	Every 100 hrs		
		CrankCase(*)			•		•					
		Fuel Filter Cartridge						•	Every 250- 300 hrs)			
4	Overhaul	Partial (***)									•	
		Total										•

(*) Daily under heavy conditions.

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(***) Checking cylinder, piston rings, guides, springs & seat grinding, decarbonizing head & cylinder, injector & pump overhaul.

RECOMMENDATION OF LUBRICATION OIL

Oil supplier	Brand name	Lub Oil Grade
Greaves Cotton Ltd.	Greaves Maxtherm	API CH4(15W 40)
Bharat shell	Shell Remula	API CH4(15W 40)
Pennzoil	L L Diamond	API CH4(15W 40)
APAR	AGIP Tristar Super	API CH4(15W 40)
Petronas	Uranal	API CH4(15W 40)

Note: “GREAVES MAXTHERM (API CH4 (15W 40) is most preferred.

IMPORTANT:-

1) Use same grade /brand oil in the crankcase.
2) The first oil changes in a new /overhauled must be after 1000kms. Of working.
3) Use of oil other than our recommended oil will make our warranty null & void.
4) To avoid adverse effect on engine performance. Do not use adulterated diesel fuel, adulterated engine oil & coolant.

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TROUBLE SHOOTING

T Code	TROUBLE	PROBABLE CAUSES	SUGGESTED REMEDY
ETS1	Engine Fails to Start	**A-Faulty Fuel Supply** No Fuel in tank Obstructed fuel lines Fuel filter clogged. Air in the Fuel system Faulty fuel injection Pump. Delivery valve of the F.P. Sticking. Injector sticking. Injector Not properly adjusted.	Fill tank with clear diesel. Flush out pipes & tighten the connections. Change fuel filter. Bleed out air. Calibrate/replace fuel pump at authorized service Centre. Replace delivery valve. Test & calibrated the injector or replace at authorized service Centre.
		B. Poor compression Valve sticking Cylinder head loose. Piston rings stuck in the grooves. Worn cylinder liner & piston Valve not sealing properly	Free the valve by slight hammering on Valve springs Tighten all nuts. Check the rings, clean the piston & if necessary replace with new. Replace piston barrel kit use o/s piston & rings after re-boring cylinder. Check Valve springs, Lap valves/ Valve seals if necessary, Check tappet clearance.

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		C. Faulty electrical System Discharged battery. Cable connection loose or incorrect cable connection loose or incorrect. Check, correct & tighten. Faulty staring switch. Faulty starter motor.	 Re-charge/ Replace. Check, correct & tighten. Replace. Repair/ Replace.
ETS2	**Engine starts but runs irregularly & stops**	**A –Faulty Fuel Supply** Air in the fuel line. Fuel Filter clogged. Clogged tank vent hole in the cap. Faulty fuel pump. Faulty injector nozzle. Water in the fuel tank **B- faulty compression** Broken valve springs, valve sticking **c-incorrect setting** low idling speed	 Bleed the system Change the fuel filter cartridge Clean. Repair/ change the pump. Repair/ change the nozzle. Drain the tank & fill clean fuel. Change the springs, free the valve.. Set the idling speed as recommended.
ETS3	**Poor acceleration**	**A-Faulty Fuel system** Hardened rack in governor/pump. Incorrect injection timing. **B-Repairs** Broken governor spring **C-Faulty operation** Engine overloaded	Make the rack free, check & adjust the injection timing by changing shim thickness. OR Repair/ Replace fuel pump Replace. Check & reduce the load.

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ETS4	**Unsteady speed (Hunting)**	**A. Faulty Fuel system** Hardened fuel pump rack **B. Faulty Lubrication** Excessive oil in the sump.	Make the rack free. Check & drain excess oil.
		C-Incorrect Setting Governor linkage sluggish, Wrongly set or intermediate links loose.	Check the governor linkage for free movement & set right
E7S5	**Black Smoke**	**A-Faulty Fuel system** Injector not properly set Extra fuel control lever struck OIL entering the cylinder **B-Lack of proper maintenance** Clogged air cleaner Blocked exhaust pipe. Excessive carbon on cylinder head & piston. **C. Repairs** Excessive cylinder & piston wear. **D. Faulty operation** Engine overloaded.	Test & calibrate the injector, set the injector pressure to its value pressure to its value or replace if necessary Check and adjust. Check the stem seal of valve & valve guide internal diameter. Clean / replace air filter cartridge Knock out soot Decarbonize cylinder head & piston Check cylinder bore, piston. If required replace or use oversize piston rings etc. Check & reduce the load.
ETS6	**White / Blue Smoke**	**A-Faulty Lubrication** Oil level in the sump too high. **B-Lack of proper maintenance** Excessive idling, Incomplete “run in”	Check & drain out excess oil. Reset idling speed. Complete the “running in period” with 70% load

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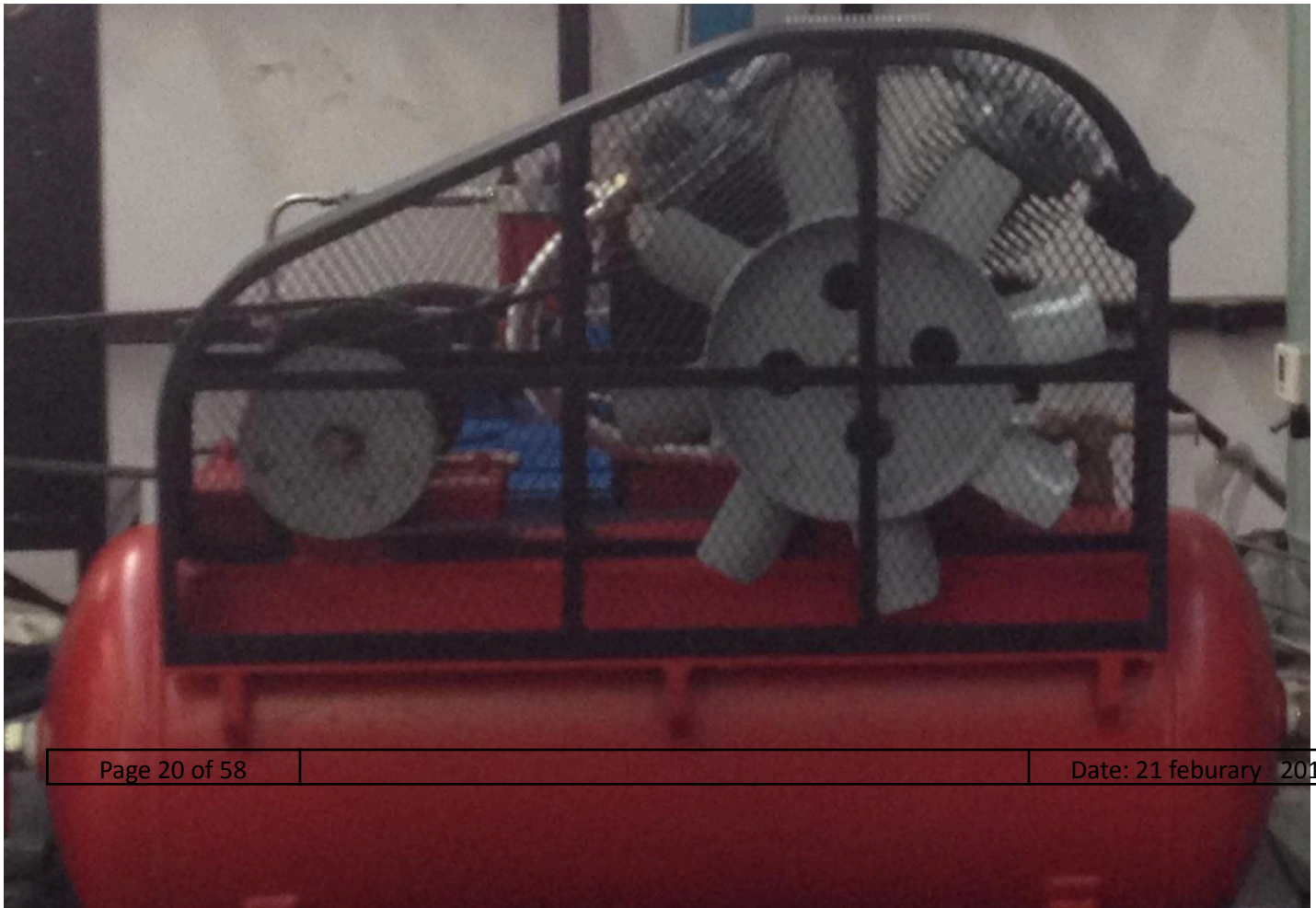
ETS7	**Low Lube oil pressure**	**A-Faulty Lubrication** Oil pressure relief valve sticking Or not properly adjusted Worn oil pump Faulty pressure gauge Oil leakage from pipe connections	 Check the spring change if necessary Replace Replace Check, tighten & replace the pipes, If necessary
		B- Incorrect setting Excessive clearance in the bearings	Check & replace bearings.

AIR COMPRESSOR



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AIR COMPRESSOR

Air compressor (without Electric Motor) and its Accessories Output capacity: 8.8 CFM at 12kg/cm2 pressure.160L tank capacity

FEATURES

1. Designed for continuous duty.
2. Deep finned cast iron cylinders, aluminums cooler tubes ensuring superior heat dissipation for higher operating efficiency.
3. Aero dynamically designed fan with large blades for higher air flow.
4. Efficient cooling to ensure operation at higher ambient temperature of up to 50deg. C.
4. Totally enclosed belt guard for utmost safety conforming to euro norms.
5. Air-receiver, conforming to ASME & Euro norms.
6. Optimal distribution of load on cylinders for energy efficiency (2 stage model)
7. Long life of motor due to no-load starting by built in unloaded.
8. Study, robust cast iron crankcase.
9. Forged steel crankshaft supported at both ends for higher dynamics stiffness & least vibrations.

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10. Optimal operating speed for longer service life.
11. Pressure relief valve provided after each stage of compression for safety.
12. Convenient oil sight glass & oil drain.
13. Stainless steel valves for lower wear & lasting compression efficiency.
14. Efficient air filter to ensure clean intake air for long service life.
15. Low expansion alloy piston with international standard piston rings for positive sealing at elevated temperature.
16. Testing as per IS 5456 standards for guaranteed output.

NEOMETRIX

The Complete Engineering Solutions Company

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The ELGI Edge - In Black & White

Model	Piston Displacement		Free Air Delivery*		Motor Power		Compressor	Tank Capacity	Overall Dimensions	Net Weight
	lpm	cfm	lpm	cfm	HP	kW	rpm	Litres	(LxBxH) mm	kg
SS SERIES (Maximum Pressure 9kg / cm² / 128 psi, Single Stage)										
SS 03 070 H	360	12.7	256	9.0	3.0	2.2	550	160	1300X525X1075	205
SS 05 070 H	605	21.4	443	15.6	5.0	3.7	925	220	1705X525X1075	265
SS 07 070 H	921	32.5	708	25.0	7.5	5.5	690	220	1705X575X1100	307
SS 10 070 H	1228	43.4	950	33.6	10.0	7.5	920	220	1705X575X1100	322
								420	1650X813X1250	367
SS 15 070 H	1853	66.4	1390	49.1	15.0	11.0	925	500	1900X875X1505	514
TS SERIES (Maximum Pressure 12kg / cm² or 175 psi, Two Stage)										
TS 03 120 H	311	10.98	250	8.8	3.0	2.2	925	160	1300X525X1075	200
								220	1705X525X1075	225
TS 05 120 H	501	17.7	410	14.5	5.0	3.7	925	220	1705X525X1085	275
TS 07 120 H	700	24.7	580	20.5	7.5	5.5	1050	220	1705X575X1110	275
TS 10 120 H	1001	35.4	853	30.1	10.0	7.5	750	220	1705X645X1195	450
								420	1635X895X1340	500
TS 15 120 H	1535	54.3	1250	44.1	15.0	11.0	1150	500	1880X895X1340	575

*Measured as per IS 5456 at working pressures for SS models at 7kg/cm² and for TS models at 10kg/cm²

Key product feature	Benefits
Cast iron block	Our performs and outlasts aluminium block compressor
Continuous duty rating	No stand-by compressor required
High efficiency, lower rpm	Lower wear & tear
Pressure switch with unloader*	Easy starting and increased motor life
Totally enclosed belt guard	Full protection against accidents
Inter stage pressure relief valve	Provides extra safety
Air receiver (ASME / Euro norms)	Totally safe, as per international standards
Low outlet air temperature	Long life of downstream accessories & machine components
Testing as per IS 5456 standards	Guaranteed output

* Future available with select models only

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HYDRAULIC BOOSTER

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TECHNICAL SPECIFICATION:

1. Barrel of Italian honed tube.
2. Bronze piston diameter 70mm.
3. Pneumatic Flange SS304
4. Pneumatic Bore- 70mm.
5. Hydraulic Bore – 140mm.
6. Max. Outlet pressure 200 bar.
7. Check valves
   a. SSCH series (SS-CHME8-1)
      ½" MNPT, Cracking Pressure-1 psi,
      Working Pressure-250 bar
   b. SS315
      ½" NPT (F) both sides
      Cracking pressure-1 bar,
      Working Pressure -250 bar.
8. Piston Seals K03-P
   58X70X7.8 (L-8) HCOPUR
   O-ring cord (Length 198.8857, OD-3.00)

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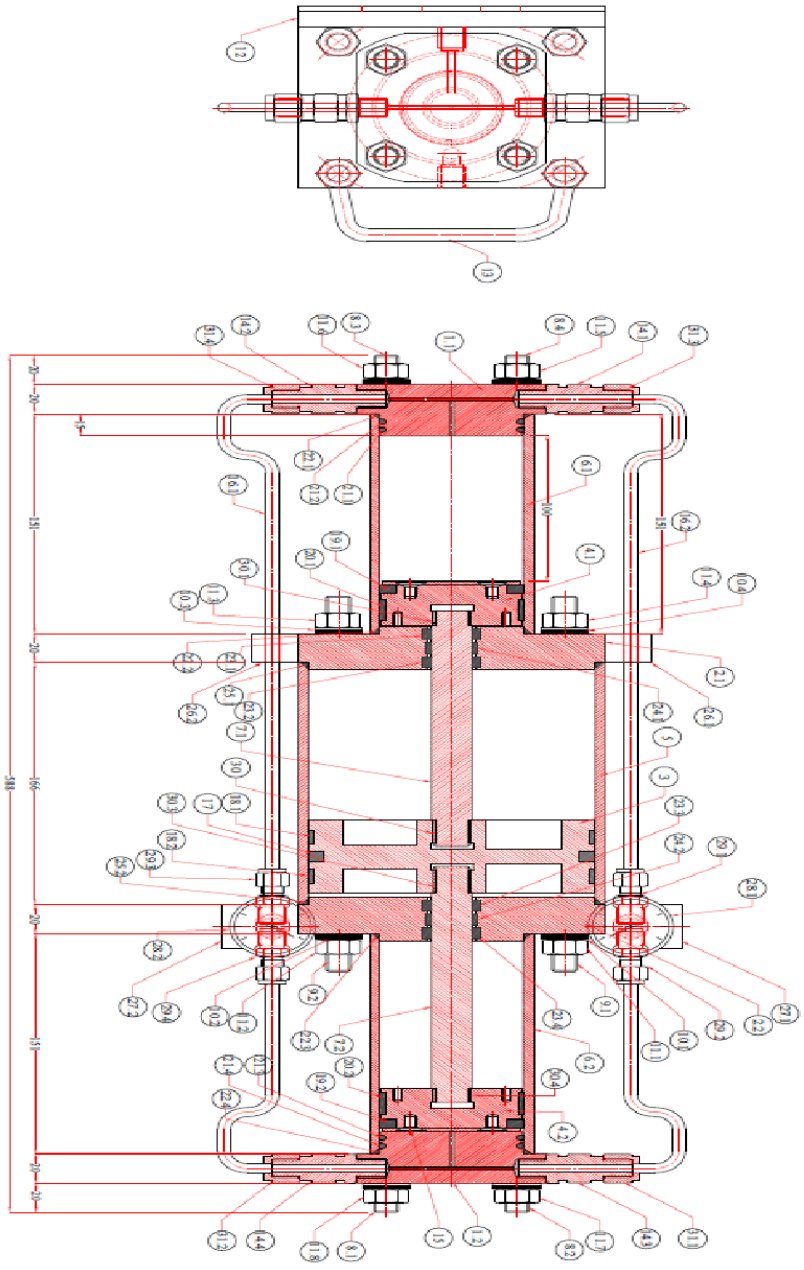
SYMMETRICAL DESIGN OF THE HYDRAULIC BOOSTER



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HYDRAULIC POWER PAC

Technical specification:

1. **Dowty Pump 40 lpm, Max.pressure 132 bars.**
2. **EPE Filter 10 micron.**
3. **Rexroth DC valve 4/2.**
4. **Strainer 100 micron.**
5. **MS (mild steel) Tank capacity 250 ltrs.**

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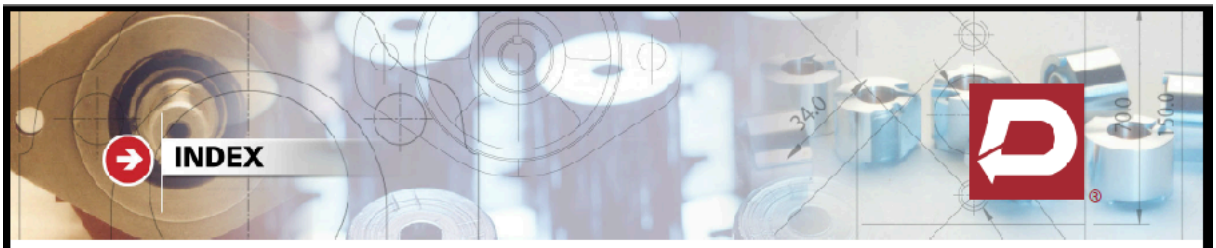
Dowty Pump 40 lpm, Max.pressure 132 bars_1P-3090



GROUP 1P – P3000 SERIES

PERFORMANCE DATA

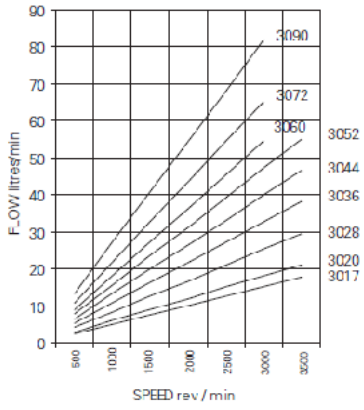
Pressures quoted are relief valve maximum by-pass
Performance with SAE 20W oil at 50° C

PUMP TYPE	Nominal Displacement	Nominal Delivery @ 1500 rpm & Pressure P	Maximum Continuous Pressure P		Speed at Maximum Continuous Pressure P	
	cc/rev	lpm	psi	bar	max	min
3017	5.13	7.70	3000	207	3500	500
3020	6.07	9.10	3000	207	3500	500
3028	8.47	12.70	3000	207	3500	500
3036	10.93	16.40	3000	207	3500	600
3044	13.33	20.00	3000	207	3500	500
3052	15.73	23.60	3000	207	3500	600
3060	18.20	27.30	3000	207	3500	650
3072	21.80	32.70	2525	174	3000	650
3090	27.27	40.90	2000	138	2400	650

TYPICAL PERFORMANCE

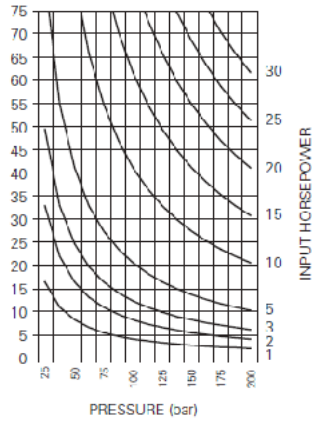
TYPICAL PUMP DELIVERY

Flow at Max. Pressure.



TYPICAL INPUT HORSEPOWER

Fluid SAE 20W
Fluid Temperature 50° C



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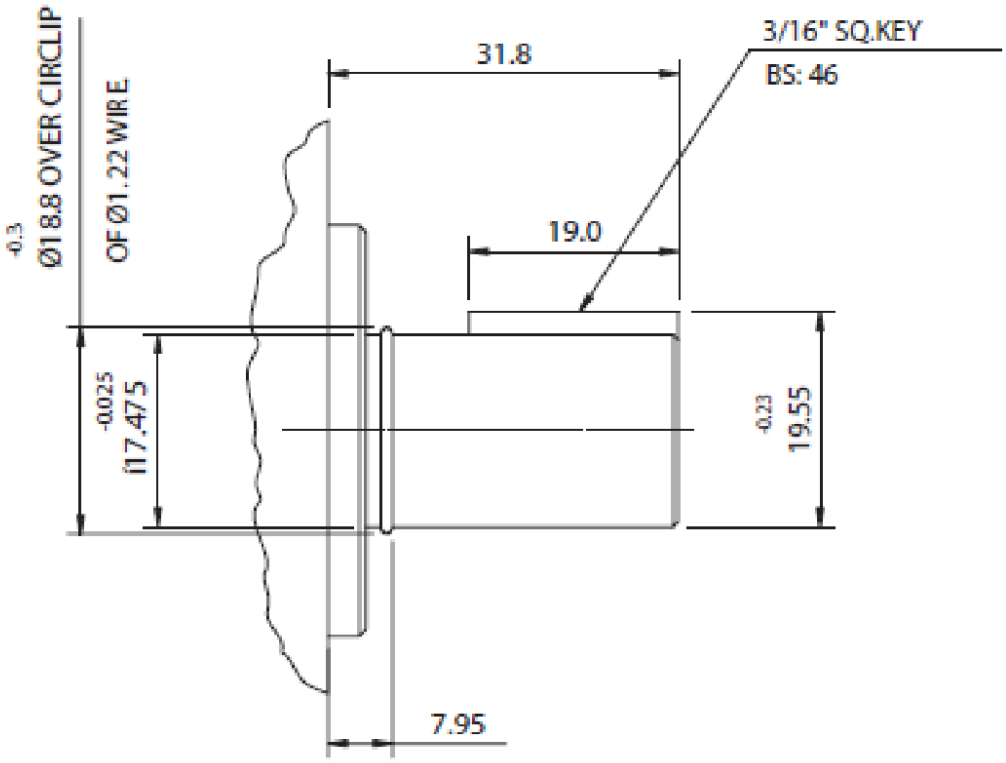
3/16" SQ.KEY
BS: 46
31.8
19.0
Ø18.8 -0.3 OVER CIRCLIP
OF Ø1.22 WIRE
17.475 -0.025
19.55 -0.23
7.95

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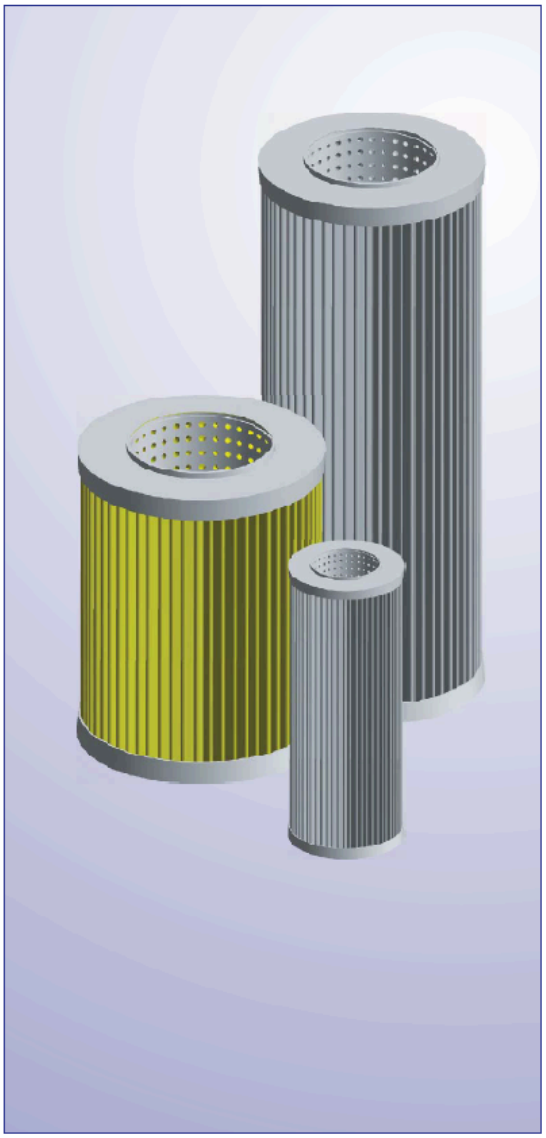
EPE Filter 10 micron

EPE
Filters . Accumulators
an ISO 9001 Company

Filter Elements



Filter media for all applications

Made out of glassfibre-paper, filter-paper, wire mesh, nonwovens and metal fibre

Achievable oil cleanliness up to ISO 12/8/3 (ISO4406)

Filtration ratio βx = 1000

Cleanable filter media

Superior dirt holding capacity using multiple layer technology

Filtration grade: 1– 1500 µm
Filter area: 10cm2 – 4.8 m2

EPE PROCESS FILTERS & ACCUMULATORS PVT LTD
An ISO 9001 Company
Techni Towers
C-54/A, A.P.I.E., Balanagar
Hyderabad-500 037, A.P. India.
Tel. Nos.: 23776803/23776804/23871445
Fax Nos. : 040-23871447.
Internet : www.epe-india.com
E-mail : business@epe-india.com.

Note : Technical specifications are subject to change.

Filter Elements for EPE-Industrial Filters

Application
Filtration of hydraulic fluids, lubricants, industrial liquids and gases

Construction
Special star pleated filter media that is mounted on a perforated support tube.
It is glued with a 2-component adhesive in a longitudinal direction and with metal end-caps.
Sealed with O-ring or profile seal.

Filter Media
H...-XL
Combination of inorganic glass-fibre paper laminated with protective nonwoven media, high dirt holding capacity through 2-layer glass-fibre technique.
Filtration grade: 1/3/6/10/16/20 µm "absolute" accordingly to ISO 4572. Performance data for ISO 16889 refer to "Filter element characteristics".
Use: For highest cleanliness requirements of hydraulic fluids and lubricants.
Non-cleanable.

G...
Surface filter made of stainless steel mesh 1.4401 and 1.4572, underlaid with supporting mesh.
Mesh size: 10-1500 µm "Nominal".
Use: For protective, surface, coarse and pre-filtration.
Cleanable, regenerative.
(see separate information in this catalogue).

P...
Low-priced depth filter made from filter paper, underlaid with supporting mesh.
Made of special impregnated cellulose fibres to resist moisture and swelling.
Filtration grade: 5/10/25 µm "nominal".
Use: For coarse and preliminary filtration.
Non-cleanable.

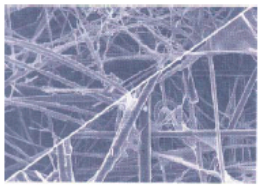
M...
Depth filter in stainless steel fibre 1.4404 with supporting fabric underlay.
Filtration grade: 5/10/15 µm "absolute" accordingly to ISO 16889.
Use: For highest cleanliness requirements with aggressive industrial and chemical liquids at high operating temperatures.
Cleanable dependant on application.
(see separate information in this catalogue).

VS...
Surface filter of extremely solid reinforced fibre made of polyethylene-wrapped polypropylene fibre.
Filtration grade: 10/25/40/60 µm "nominal"
Use: Surface, coarse and pre-filtration.
Especially recommended for cooling lubricants.
Non-cleanable.

AS...
Nonwoven media with water-absorbent material combined with glass fibre media.
Filtration grade: 1/3/6/10/20 µm "absolute" accordingly to ISO 16889.
Use: Dehydration of hydraulics, lubricants and air.
Non-cleanable.

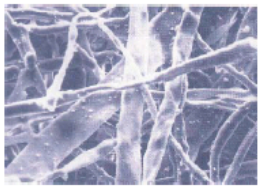
Electronic Microscope Pictures of EPE Filter Media

H...-XL
Glass fibre media
H1XL
H3XL
H6XL
H10XL
H16XL
H20XL

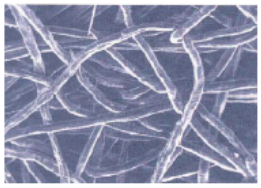


G...
Stainless steel mesh
G10
G25
G40
G60-G1500

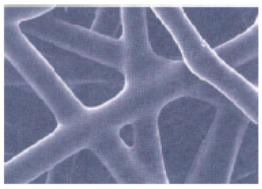
P...
Filter paper
P5
P10
P25



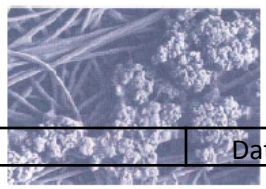
M...
Metal fibre
M5
M10
M15



VS...
Nonwovens
VS10
VS25
VS40
VS60



AS...
Water-absorbent media
AS1
AS3
AS6
AS10
AS20



Filter Element Characteristics

Filtration grade and achievable oil cleanliness code

Besides the direct protection of machine components, the most important target when using an industrial filter is to achieve a given oil cleanliness. This is defined by oil cleanliness codes which classify the particle size distribution of the existing contamination.

The table on the right side contains recommendations for filter media selection dependent on application and shows typical reachable oil cleanliness codes per ISO 4406 or NAS 1638.

Filter performance

Filtration ratio β_x

The filtration ratio β_x represents the most important filter efficiency characteristic for a hydraulic filter. As an average value during initial and final test Δp it is measured by the multi pass test method according to ISO 16889, using ISOMTD test dust contaminant. It is defined as the ratio of particles upstream divided by the particles downstream larger than size of interest.
In earlier times the β-ratio was measured according to the multi pass test as per ISO 4572. The test results from ISO 4572 are not directly comparable to those of ISO 16889. Further Information about the β-ratio characteristic is given in our technical documentation.

Dirt holding capacity

This is also measured using the Multipass test and gives the amount of test dust ACFTD or ISOMTD that the filter media can retain until a definite increase in pressure is reached.

In comparison to the conventional filter material, the EPE H-XL material displays superior dirt holding capacity, due to its two separate filter layers.

Δp (Pressure Drop)

The sizing of the EPE filter and filter element by means of the initial Δp or pressure drop can be easily carried out with the selection program "EPE-FILTERSELECT", which is available on request. Additionally, the pressure drop curves are shown in the filter catalogues.

Filter Element Test

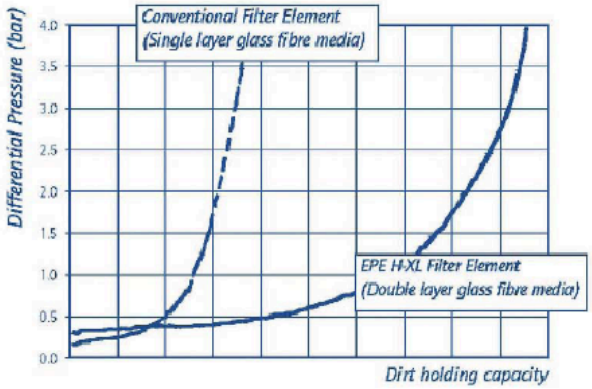
EPE Filter elements are tested at our own test benches in accordance with various ISO test standards.

Use	Required oil cleanliness in accordance with ISO 4406 (NAS 1638)	Recommended Filter Media/ Filtration grade
System with extreme dirt sensitive parts and very high usage. Filling servo installations	≤ 16/12/9 (3)	H1XL/1 µm
System with dirt sensitive parts and very high usage. Servo valve systems.	≤ 18/13/10 (5)	H3XL/3 µm
Systems with proportional valves and pressure > 160 bar	≤ 19/14/11 (6)	H6XL/6 µm
Modern industrial hydraulic directional valves	≤ 20/16/13 (8)	H10XL/10 µm
Industrial hydraulic with large tolerances and low Dirt sensitivity.	≤ 21/17/14 (10)	H20XL/20 µm

Typical β values up to 4 bar Δ-p filter element

Filter media	Particle size "x" for various β-ratios measured according to ISO 16889		
	$\beta x = 75$	$\beta x = 200$	$\beta x = 1000$
H1XL	< 4.0µm(c)	< 4.0µm(c)	< 4.0µm(c)
H3XL	4.0µm(c)	< 4.5µm(c)	5.0µm(c)
H6XL	4.8µm(c)	5.5µm(c)	7.5µm(c)
H10XL	6.5µm(c)	7.5µm(c)	9.5µm(c)
H16XL	13.5µm(c)	16.0µm(c)	19.5µm(c)
H20XL	18.5µm(c)	20.0µm(c)	22.0µm(c)

Superior dirt holding capacity of H-XL Filter Elements



Production quality (Bubble Point Test)	ISO 2941
Performance filter test (Multipass Test)	ISO 16889
Δp (Pressure loss) characteristic lines	ISO 3968
Compatibility with hydraulic fluid	ISO [illegible]
Collapsibility pressure test	ISO 2941
Flow fatigue test	ISO 3724

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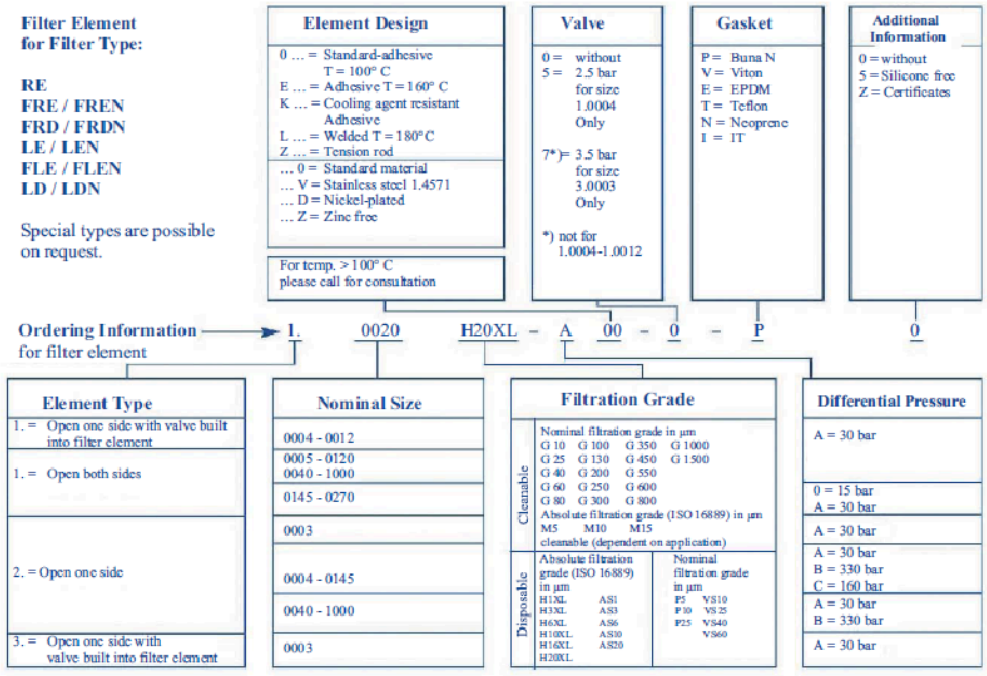
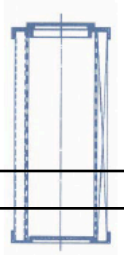
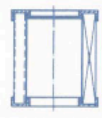
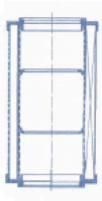
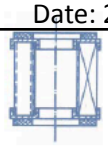

Filter Element for Filter Type:
RE
FRE / FREN
FRD / FRDN
LE / LEN
FLE / FLEN
LD / LDN
Special types are possible on request.
Element Design
0 ... = Standard-adhesive T = 100° C
E ... = Adhesive T = 160° C
K ... = Cooling agent resistant Adhesive
L ... = Welded T = 180° C
Z ... = Tension rod
... 0 = Standard material
... V = Stainless steel 1.4571
... D = Nickel-plated
... Z = Zinc free
For temp. > 100° C please call for consultation
Valve
0 = without
5 = 2.5 bar for size 1.0004 Only
7*) = 3.5 bar for size 3.0003 Only
*) not for 1.0004-1.0012
Gasket
P = Buna N
V = Viton
E = EPDM
T = Teflon
N = Neoprene
I = IT
Additional Information
0 = without
5 = Silicone free
Z = Certificates
Ordering Information for filter element
1. 0020 H20XL - A 00 - 0 - P 0
Element Type
1. = Open one side with valve built into filter element
1. = Open both sides
2. = Open one side
3. = Open one side with valve built into filter element
Nominal Size
0004 - 0012
0005 - 0120
0040 - 1000
0145 - 0270
0003
0004 - 0145
0040 - 1000
0003
Filtration Grade
Cleanable
Nominal filtration grade in µm
G 10 G 100 G 350 G 1000
G 25 G 130 G 450 G 1500
G 40 G 200 G 550
G 60 G 250 G 600
G 80 G 300 G 800
Absolute filtration grade (ISO 16889) in µm
M5 M10 M15
cleanable (dependent on application)
Disposable
Absolute filtration grade (ISO 16889) in µm
H12XL A51
H13XL A53
H6XL A56
H10XL A510
H16XL A520
H20XL
Nominal filtration grade in µm
P5 VS10
P10 VS25
P25 VS40
VS60
Differential Pressure
A = 30 bar
0 = 15 bar
A = 30 bar
A = 30 bar
A = 30 bar
B = 330 bar
C = 160 bar
A = 30 bar
B = 330 bar
A = 30 bar
Filter Element for Filter Type:
TLF
SG / SE
RA / RL / DR
L / D / F
ZH
Special types are possible on request.
Element Design
0 ... = Standard-adhesive T = 100° C
E ... = Adhesive T = 160° C
K ... = Cooling agent resistant Adhesive
L ... = Welded T = 180° C
Z ... = Tension rod
... 0 = Standard material
... V = Stainless steel 1.4571
... D = Nickel-plated
... Z = Zinc free
For temp. > 100° C please call for consultation
Valve
0 = without
Seal
P = Buna N
V = Viton
E = EPDM
T = Teflon
N = Neoprene
I = IT
X = Special
0 = without For 1.10-1.225/450, 1.E10-1.E225/450, 6.56-6.560
Additional Information
0 = without
5 = Silicone free
C = Silica Gel For 7. only
Z = Certificates
Ordering Information for filter element
2. 140 G60 - A 00 - 0 - P 0
Element Type
1. = Open both sides
1.E = Open one side
1. = Open both sides
2. = Open one side
4. = for 20 L only
6. = for SG and SE only
7. = for TLF only
Z. = for ZH only
Nominal Size
10 to 225/450 for return filter, for valve
10 to 225/450 for return filter, without valve
361 to 1801, 360 to 1800 without valve only
10 to 900 without valve only
06 to 20
56 to 560 without valve and O-ring only
002/004/006/007/008 Without valve only
30 to 220
Filtration Grade
Cleanable
Nominal filtration grade in µm
G 10 G 100 G 350 G 1000
G 25 G 130 G 450 G 1500
G 40 G 200 G 550
G 60 G 250 G 600
G 80 G 300 G 800
Absolute filtration grade (ISO 16889) in µm
M5 M10 M15
cleanable (dependent on application)
Disposable
Absolute filtration grade (ISO 16889) in µm
H12XL A51
H13XL A53
H6XL A56
H10XL A510
H16XL A520
H20XL
Nominal filtration grade in µm
P5 VS10
P10 VS25
P25 VS40
VS60
Differential Pressure
A = 30 bar
A = 30 bar
A = 30 bar
C = 160 bar
D = 60 bar
A = 30 bar
B = 330 bar
C = 160 bar
D = 60 bar
A = 30 bar
S = Standard
S = Standard
B = 330 bar
C = 160 bar

`

Type	Nominal Size	Number per Filter housing	Type Nominal Size	Illustration
FRE FRD FLE FLD	0005 0008 0013 0015 0018 0020 0030 0045 0060 0095 0145 0200 0270	1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x	1.0005 1.0008 1.0013 1.0015 1.0018 1.0020 1.0030 1.0045 1.0060 1.0095 1.0145 1.0200 1.0270	1 
FRE FRD FLE FLD	0190 0290 0400 0540 0600 0810 1080 1350	3 x 3 x 3 x 3 x 4 x 4 x 5 x 6 x	1.0095 1.0145 1.0200 1.0270 1.0200 1.0270 1.0270 1.0270	
FREN FRDN FLEN FLDN According to DIN 24550	0040 0063 0100 0160 0250 0400 0630 1000	1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x	1.0040 1.0063 1.0100 1.0160 1.0250 1.0400 1.0630 1.1000	
FREN FRDN FLEN FLDN According to DIN 24550	1260 2000	2 x 2 x	1.0630 1.1000	
FRE	0003	1 x	3.0003 with valve	2 
FRE	0003	1 x	2.0003 without valve	3 
RE	0004 0006 0010 0012	1 x 1 x 1 x 1 x	1.0004 1.0006 1.0010 1.0012	4 
LE LD	0003 0005 0008 0013 0015 0018 0020 0030 0045 0060 0095 0145	1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x	2.0004 2.0005 2.0008 2.0013 2.0015 2.0018 2.0020 2.0030 2.0045 2.0060 2.0095 2.0145	5 
LEN LDN According to DIN 24550	0040 0063 0100 0160 0250 0400 0630 1000	1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x	2.0040 2.0063 2.0100 2.0160 2.0250 2.0400 2.0630 2.1000	

Type	Nominal Size	Number per Filter housing	Type Nominal Size	Illustration
16 RA 16 DR	10 18 32 56 90 140 225 225/360 225/450	1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x	1.10 1.18 1.32 1.56 1.90 1.140 1.225 1.225/360 1.225/450	6 
16 RA 16 DR	10 18 32 56 90 140 225 225/360 225/450	1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x	1.E10 1.E18 1.E32 1.E56 1.E90 1.E140 1.E225 1.E225/360 1.E225/450	7 
16 RA 16 DR 25 L 100 L 25 D 100 D	360 560 900 1400 1800	1 x 1 x 1 x 1 x 1 x	1.360 1.560 1.900 1.1400 1.1800	8 
16 L 16 D 16 RA 16 DR	2200 3200 5400 7200	4 x 4 x 4 x 4 x	1.560 1.900 1.1400 1.1800	
16 RL 16 DR 25 L 100 L 25 D 100 D	361 561 901 1401 1801	1 x 1 x 1 x 1 x 1 x	1.361 1.561 1.901 1.1401 1.1801	9 
16 L 16 D 16 RA 16 DR	2201 (2202) 3201 (3202) 5401 (5402) 7201 (7202) 8401 (8402) 10801 (10802) 12601 (12602) 14401 (14402)	4 x 4 x 4 x 4 x 6 x 6 x 7 x 8 x	1.561 1.901 1.1401 1.1801 1.1401 1.1801 1.1801 1.1801	
ZH	30 90 120 180 220	1 x 1 x 1 x 1 x 1 x	2.Z30 2.Z90 2.Z120 2.Z180 2.Z220	10 
25 / 100 250 / 400 L, D, F	10 18 32 56 90 140 225 360, 225/360 460, 225/460 560 900	1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x	2.10 2.18 2.32 2.56 2.90 2.140 2.225 2.360 2.460 2.560 2.900	11 
20 L	6 10 20	1 x 1 x	4.06 4.10 4.20	12 
SG SE	56 90 140 225 360 460 560	1 x 1 x 1 x 1 x 1 x 1 x 1 x	6.56 6.90 6.140 6.225 6.360 6.460 6.560	13 
TLF	1 2 3 4 5 6 7 8	1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x	7.002 7.002 7.004 7.004 7.004 7.006 7.007 7.008	14 

Aquasorb - AS... Water-absorbing Filter Elements

EPE Aquasorb filter elements are used to remove water from hydraulic and lubricating oil, as well as to dehumidify air.
Water, even when present in only small amounts above the adsorption level of oil, can accelerate the aging of the oil through oxidation.
Increased corrosion and a higher level of wear are the result. Water can also cause change of the condition of certain oil additives, and also produce precipitation in the form of solid, slimy substances that can prematurely block the pores of the filter in use.

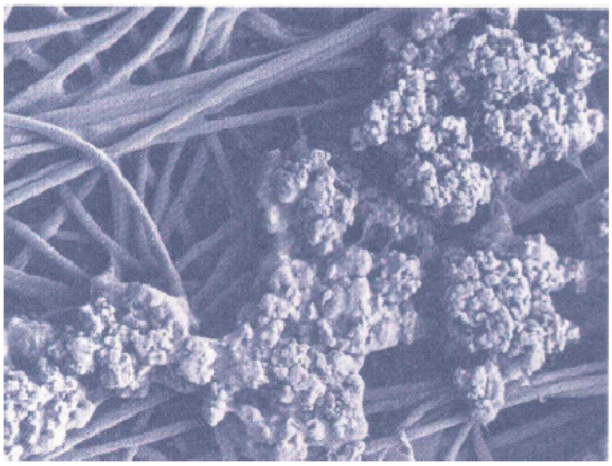
Operational Aspects
EPE Aquasorb filter elements, like the EPE industrial filter elements, have a pleated design, but also have a non woven media type layer covered with a water-adsorbing substance in form of granulates.
Depending upon filtration grade, the corresponding glass fibre filter media (1 µm - 20 µm) is fitted behind the nonwoven media.

Effectiveness
The effectiveness of the EPE Aquasorb elements has been proven in internal tests and in scientific experiments verified by an independent organisation.
The water content (free water) can be reduced to approximately the saturation level of the oil.
The effectiveness and the water adsorption are dependent on the surface pressure of the filter, the oil viscosity and the oil temperature.
The values of water adsorption and changes due to increased viscosity are shown opposite.

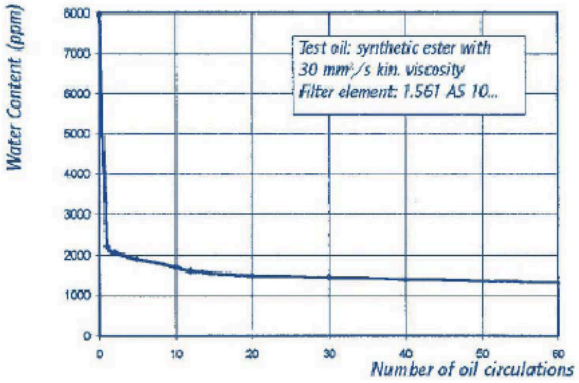
Concept and Scope
EPE Aquasorb elements are to be so selected that the drop of pressure at the beginning does not exceed 0.2 bar. They are used preferably as by-pass filters in low pressure < 5 bar. The filter element is to be changed when a differential pressure of 1.5 bar is reached.

Ordering Information
EPE Aquasorb filter elements can be ordered using the following code in accordance with the current EPE catalogue:

E.g. 1.0270-AS10-A-00-0-P



Reduction of water content of hydraulic oil using AS elements



Typical water adsorption with a selection of EPE filter elements

Filter Element	Nominal Flow[1] (l/min)	Water Absorption[2] (ml)
1.561	37	476
1.1801	112	1428
1.0060	40	511
1.0270	267	3454
2.225	8	104
2.0045	28	365

Water adsorption in relation to oil viscosity

Oil Viscosity (mm2/s)	15[3]	30	46	120
Water Absorption	100% (= reference mark)	70%	58%	38%

The size selection of the EPE AS filter element can also be executed by the "EPE-FILTERSELECT" program.

[1] = Maximum recommended flow rate
[2] = Water adsorption of free, undissolved water at 15 mm2/s and the indicated nominal flow rate
[3] = Reference viscosity

`

Cleaning of G... & M... Filter Elements

Which filter elements are cleanable?
Before cleaning first check whether the filter element in use is re-usable (cleanable) or a disposable filter element.
EPE filter elements with the following materials are cleanable:

Wire Mesh G10 - G40
As this material is a surface filter it is generally cleanable.
Cleaning is however time consuming, due to the fine mesh, when compared to coarse filter material.
The opposite table shows how to clean these filter elements effectively.

Wire Mesh G60 - G1500
This typical surface filter material can be readily cleaned.
Cleaning can be carried out in accordance with the instructions opposite.

Metal Fibre M5, M10, M15
As this material is composed of stable stainless steel fibres that are closely woven and integrated together, it is classified as a cleanable material.
Cleaning of this material is difficult due to its depth filtration, and should be supported using an ultrasonic bath.

Cleaning or Replacing?
Before a G- or M-element can be cleaned, one must remove the filter element and check to see whether cleaning makes sense.
Does the fabric contain, for example, a good deal of fibrous substances with a material finer than G 40 or the M-material, an effective and complete cleaning is often no longer possible.
Wire mesh which has been recognizably damaged through too-frequent cleaning must be replaced.

Generally it is valid to say: The finer the mesh, the thinner the wire.
Therefore it is necessary, particularly with fine mesh, that a cleaning method must be chosen that is gentle to the materials.

Please make sure that the wire mesh and the metal fibre are not torn, otherwise you won't have sufficient filtration effect.

Manual and simple cleaning methods for G- and M-Elements

Method	Wire mesh G10, G25, G40 Metal fibre M5, M10, M15
Pre-cleaning chemically	Allow the filter element to dry-out for approx. 1 hour. Afterwards wash with solvent.
Pre-cleaning mechanically	Free from large direct particles with a soft brush. To prevent damage to the high quality filter material, do not use hard or sharp objects.
Main cleaning Mechanically/ chemically	Place the pre-cleaned element in a ultra sonic bath with special solvent. Continue ultrasonic cleaning until contamination has disappeared.
Inspection	Visually check condition of material for intactness. Replace filter element when obviously damaged.
Preservation	After drying the cleaned element spray with conservation fluid and place in dust-proof plastic cover.

Method	Wire Mesh G60 - G1500
Pre-cleaning chemically	Allow the filter element to dry-out for approx. 1 hour. Afterwards wash with solvent.
Pre-cleaning mechanically	Free from large dirt particles with a soft brush. To prevent damage to the high quality filter material, do not use hard or sharp objects.
Main cleaning mechanically/ chemically	Steam-out with hot wash solution (water with corrosion prevention fluid).
Inspection	Visually check condition of material for intactness. Replace filter element when obviously damaged.
Preservation	After drying the cleaned element, spray with conservation fluid and place In dust-proof plastic cover.

Automatic Cleaning

Method	Wire mesh G10, G25, G40, G60 - G1500 Metal fibre M5, M10, M15
Pre-cleaning Chemically	As detailed above
Main cleaning mechanically/ chemically	With special cleaning equipment for filter elements. These usually involve a fully automatic and combined cleaning, including ultrasonic, mechanical and chemical cleaning. The best possible results are obtained through a gentle cleaning.

Frequency of Cleaning
Experience shows that filter elements with G10, G25, G40, as well as M5 and M10 can be cleaned upto a maximum of ten times. Wire mesh > 60 µm can usually be used more than ten times. Repeated use is, however, heavily dependent on the amount and type of contamination as well as the pressure level (End-Δp before removing the filter element). To obtain maximum re-use, we recommend changing fine mesh and the M-material when an End-Δp of 2.5 bar is reached. The values quoted are for obvious reasons only recommended values for which there is no guarantee.

`

1. **_____Rexroth DC valve 4/2.**

Rexroth DC valve 4/2.

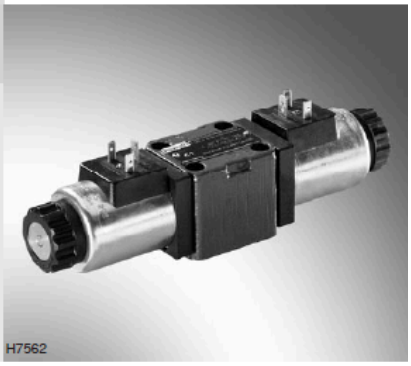
Electric Drives and Controls | Hydraulics | Linear Motion and Assembly Technologies | Pneumatics | Service

Rexroth
Bosch Group

3/3, 4/2 and 4/3 directional poppet valve with solenoid actuation

RE 22035/06.10 1/16
Replaces: 12.08

Type SEC



Size 6
Component series 1X
Maximum operating pressure 420 bar *[6100 psi]*
Maximum flow 25 l/min *[6.6 US gpm]*

Table of contents

Features

- Direct operated directional poppet valve with solenoid actuation
- Porting pattern according to ISO 4401-03-02-05 and NFPA T3.5.1 R2-D03
  Blocked connection tight
- Safe switching also with longer standstill periods under pressure
- Wet-pin DC voltage solenoids with detachable coil (AC voltage possible by means of a rectifier)
- Solenoid coil can be rotated by 90°
- Electrical connection as individual connection
- Central connection possible via double valve mating connector
- With concealed manual override, optional

NEOMETRIX

The Complete Engineering Solutions Company

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Ordering code

	SEC	6		1X	/	C				/			*

Main ports
2 = **2**
3 = **3**
4 = **4**

Poppet valve

Size 6 = **6**

Symbol e.g. E, etc.
possible design see page 3

Component series 10 to 19 = **1X**
(10 to 19: Unchanged installation and connection dimensions)

Solenoid with detachable coil = **C**

DC voltage 12 V = **G12**
DC voltage 24 V = **G24**
DC voltage 26 V = **G26**
DC voltage 48 V = **G48**
DC voltage 96 V = **G96**
DC voltage 110 V = **G110**
DC voltage 125 V = **G125**
DC voltage 205 V = **G205**
DC voltage 220 V = **G220**

without manual override = **no code**
with manual override = **N**
with concealed manual override = **N9**

AC voltage mains (permissible voltage tolerance ±10 %)	**Nominal voltage of the DC solenoid in case of operation with alternating voltage**	Ordering code
110 V - 50/60 Hz	96 V	G96
120 V - 60 Hz	110 V	G110
230 V - 50/60 Hz	205 V	G205

[1] Locating pin ISO 8752-3x8-St,
Material no. **R900005694** (separate order)

[2] Mating connectors, separate order, see page 11 and data sheet 08006.

[3] For the connection to AC voltage mains, a DC voltage solenoid **must** be used, which is controlled via a rectifier (see table above).

With an individual connection, a mating connector with integrated rectifier can be used (separate order, see page 11 and data sheet 08006).

Further details in the plain text

no code = **with** locating hole [1]
/62 = **with** locating hole and locating pin ISO 8752-3x8-St

Seal material
no code = NBR seals
V = FKM seals
(other seals upon request)

Attention!
Observe compatibility of seals with hydraulic fluid used!

no code = without check valve insert, without throttle insert, without orifice insert
P... = with check valve insert, with throttle insert, with orifice insert
(for more information and selection table see page 11 to 15)

Electrical connection
K4 [2; 3; 4] **=** **without** mating connector, single connection with connector according to DIN EN 175301-803
K72L [2] **=** **without** mating connector, single connection 4-pin with connector M12x1, integrated interference protection circuit, operating display LED
K73L [2] **=** **without** mating connector, single connection 4-pin with connector M12x1 (no connection pin 1 to pin 2), integrated interference protection circuit, operating display LED
C4 [2] **=** **without** mating connector, with connector AMP Junior-Timer

Coil connection combinations:

	K4	K72L	K73L	C4
G12	✓	–	–	✓
G24	✓	✓	✓	✓
G26	✓	–	–	✓
G48	✓	–	–	–
G96	✓	–	–	–
G110	✓	–	–	–
G125	✓	–	–	–
G205	✓	–	–	–

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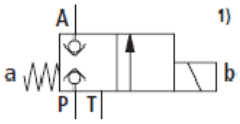
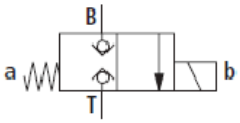
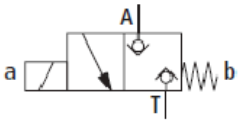
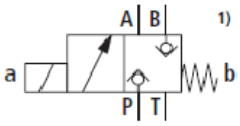
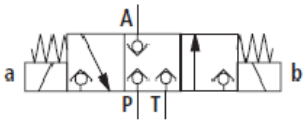
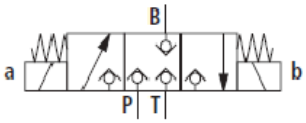
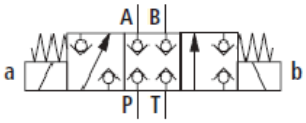
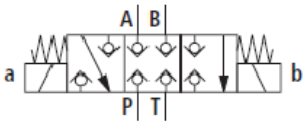
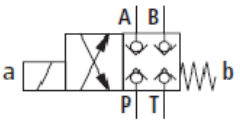
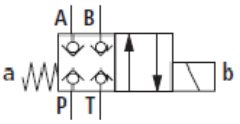
Spool symbols

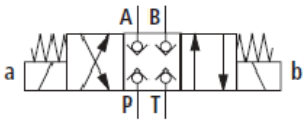
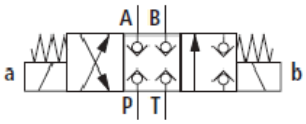
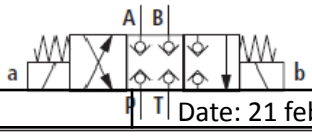
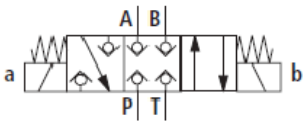
2/2 directional poppet valve	
Ordering code	**Symbol**
E61B	
E40B	
E69A	
E18A	

3/3 directional poppet valve	
Ordering code	**Symbol**
E35	
E100	
E13	
E22 [2]	

[1] Port T must be connected for pressure compensation.

[2] Port P doesn't have to be be connected.

4/2 directional poppet valve	
Ordering code	**Symbol**
EA	
EB	

4/3 directional poppet valve	
Ordering code	**Symbol**
E	
E61	
E40	
E89	

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Function, section

General

The directional valve Type SEC is a directional poppet valve with solenoid actuation. It controls start, stop and direction of the flow and basically comprises a housing (1), the solenoid (2) as well as the hardened valve system (3).

The manual override allows for the the switching of the valve without solenoid energization.

Basic principle

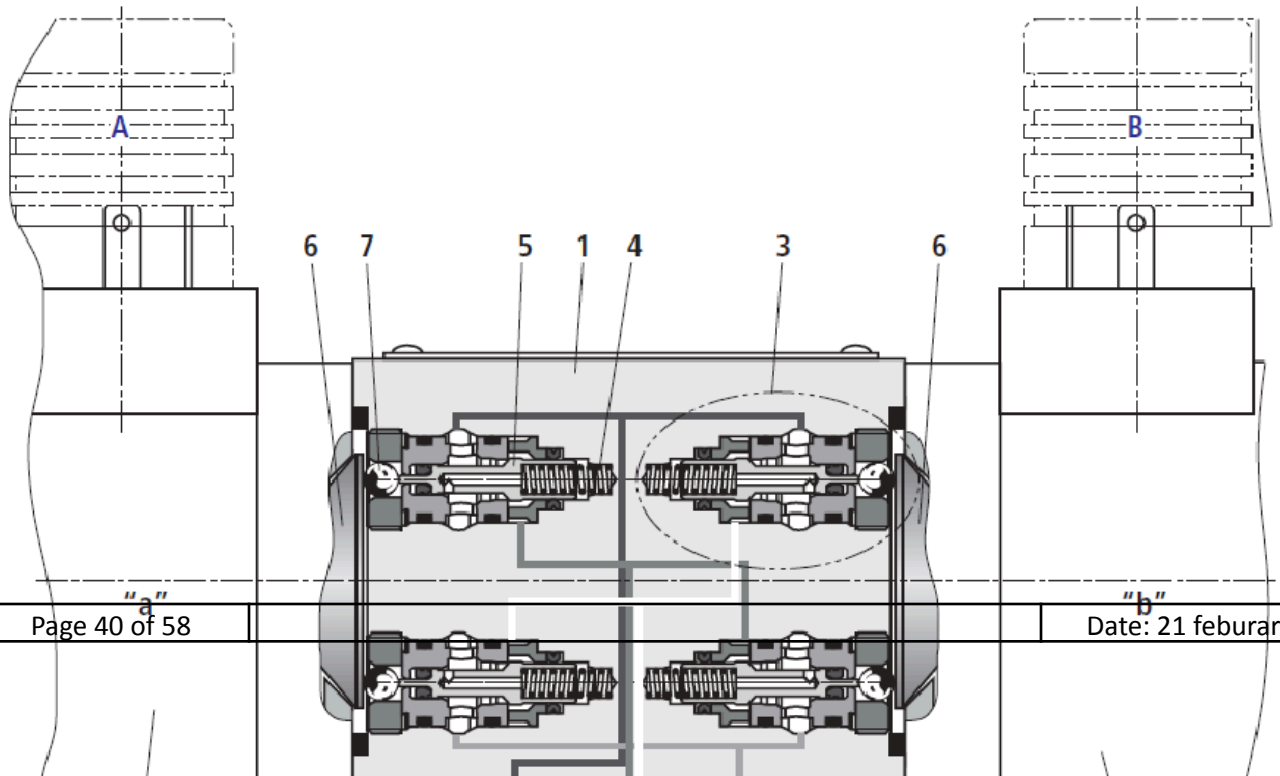
In the initial position, the control spool (5) is pushed onto the seat by the spring (4). The force of the solenoid (2) acts via an actuating element (6) and the ball (7) on the control spool (5). Depending on the spool, up to four valve systems (3) are installed in the housing that can be connected in different ways.

Attention!

It has to be made sure that the specified maximum flow is not exceeded! An orifice insert must be used for limiting the flow, if necessary (see page 11).

Depending on the production tolerances, a pump or tank preopening of the valve results. That is why different pressure courses may result during the switching process in valves of the same type.

One valve alone must never be used for holding loads or for positioning.



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Technical data (For applications outside these parameters, please consult us!)

general

Weight	– 3/3 directional poppet valve	kg *[lbs]*	2.14 *[4.72]*
	– 4/2 directional poppet valve	kg *[lbs]*	1.8 *[3.97]*
	– 4/3 directional poppet valve	kg *[lbs]*	2.14 *[4.72]*
Installation position			Any
Ambient temperature range		°C *[°F]*	–30 to +50 *[–22 to +122]* (NBR seals) –20 to +50 *[–4 to +122]* (FKM seals)
Vibration test according to IEC 68-2-36			10 g RMS, 20 to 2000 Hz, test time 60 min per axis

hydraulic

Maximum operating pressure	– Port A, B, P	bar *[psi]*	420 *[6100]*
	– Port T	bar *[psi]*	$p_T < p_P$, however max. 100 *[1450]* (energized) $p_T < 20$ *[290]*, if $p_A / p_B = 0$ (de-energized)
Maximum flow		l/min *[US gpm]*	25 *[6.6]*
Hydraulic fluid			Mineral oil (HL, HLP) according to DIN 51524 [1]; fast biodegradable hydraulic fluids according to VDMA 24568 (see also data sheet 90221); HETG (rape seed oil) [1]; HEPG (polyglycols) [2]; HEES (synthetic esters) [2]; other hydraulic fluids upon request
Hydraulic fluid temperature range		°C *[°F]*	–30 to +80 *[–22 to +176]* (NBR seals) –20 to +80 *[–4 to +176]* (FKM seals)
Viscosity range		mm^2/s *[SUS]*	2.8 to 500 *[35 to 2320]*
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 [3]

[1] Suitable for NBR and FKM seals

[2] Only suitable for FKM seals

[3] The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

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Technical data (For applications outside these parameters, please consult us!)

electrical

Type of voltage			Direct voltage	Alternating voltage
Available voltages (special voltages upon request)		V	12, 24, 26, 48, 96, 110, 125, 205, 220	Only possible with rectifier [4]
Voltage tolerance (nominal voltage)		%	±10	
Power consumption		W	30	
Duty cycle (ED)		%	100	
Switching time according to ISO 6403 [5]	– ON	ms	max. 70	
	– OFF	ms	max. 45	
Maximum switching frequency		1/h	3600	
Protection class according to DIN EN 60529	– Version "K4", "K72L", "K73L"		IP 65 (with mating connector mounted and locked)	
	– Version "C4"		IP 66 (with mating connector mounted and locked)	
Maximum coil temperature [6]		°C *[°F]*	120 *[248]*	

[4] – Mating connectors with rectifier see page 11
– Possible voltages see page 2
– Rectifiers from the customer must comply with the relevant standards as well as the coil performance data!

[5] The switching times are measured according to ISO 6403 with HLP46, ϑ_{Oil} = 40 °C ± 5 °C *[104 °F ± 9 °F]* and refer to a pressure change of 5 %. With other oil temperatures, deviations are possible!

[6] Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

When establishing the electrical connection, the protective earthing conductor (PE ⏚) has to be connected properly.

☞ **Notes!**

– Operation of the manual override is only possible up to a tank pressure of ca. 50 bar *[725 psi]*. Avoid damage to the bore for the manual override! (Special tool for actuation, separate order, Material no. **R900024943**). The simultaneous operation of both solenoids with 100 % duty cycle is not possible. If both solenoids are operated, a maximum duty cycle of 10 % is admissible.

– The solenoids shut-off generates voltage peaks that can be reduced by using suitable diodes.

– Assembly, commissioning and maintenance see data sheet 07300

– In set-up mode, an H position can be achieved by actuating both coils (only with 4/3 directional poppet valve with spool symbol "E"). In order to avoid overheating of the coil, the duty cycle must in intermittent operation S3 (according to

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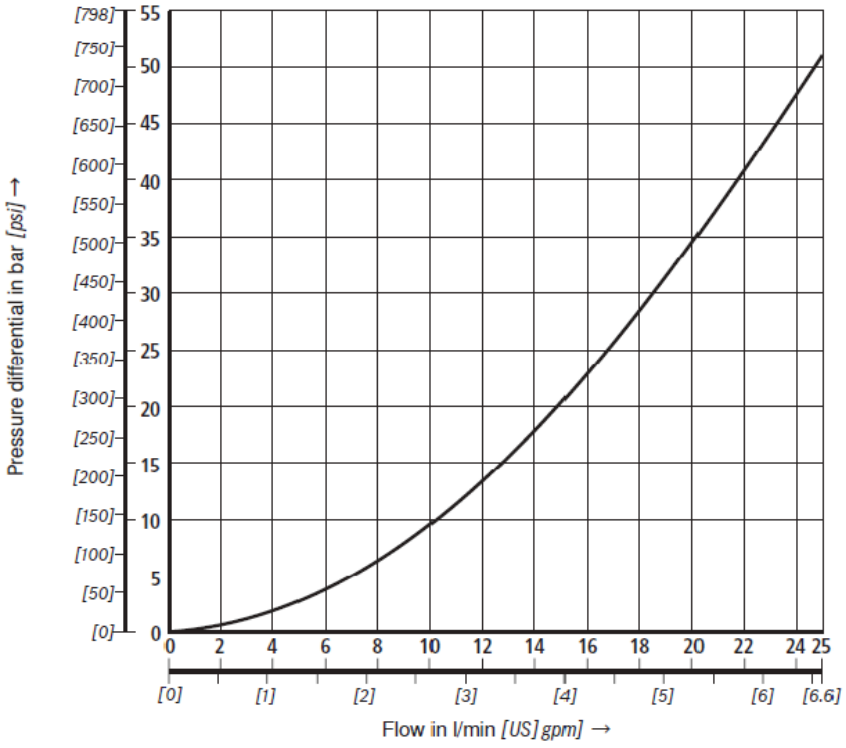
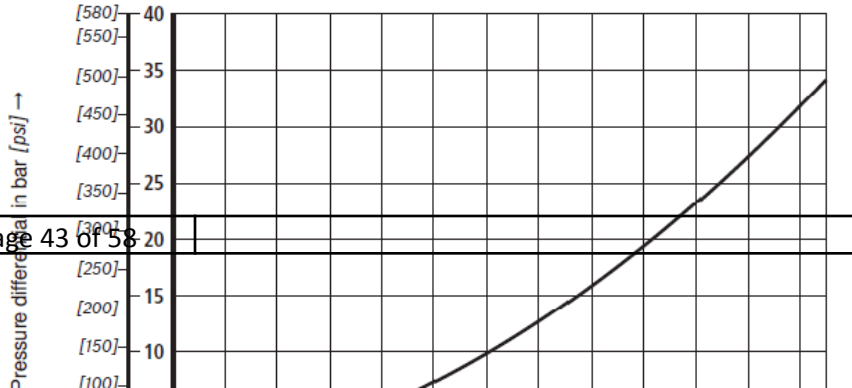
Characteristic curves (measured with HLP46, ϑ_{Oil} = 40° C ± 5 °C *[104 °F ± 9 °F]*)

Δp-q_V characteristic curves



Δp-q_V characteristic curves
Check valve insert



☞ **Note!**

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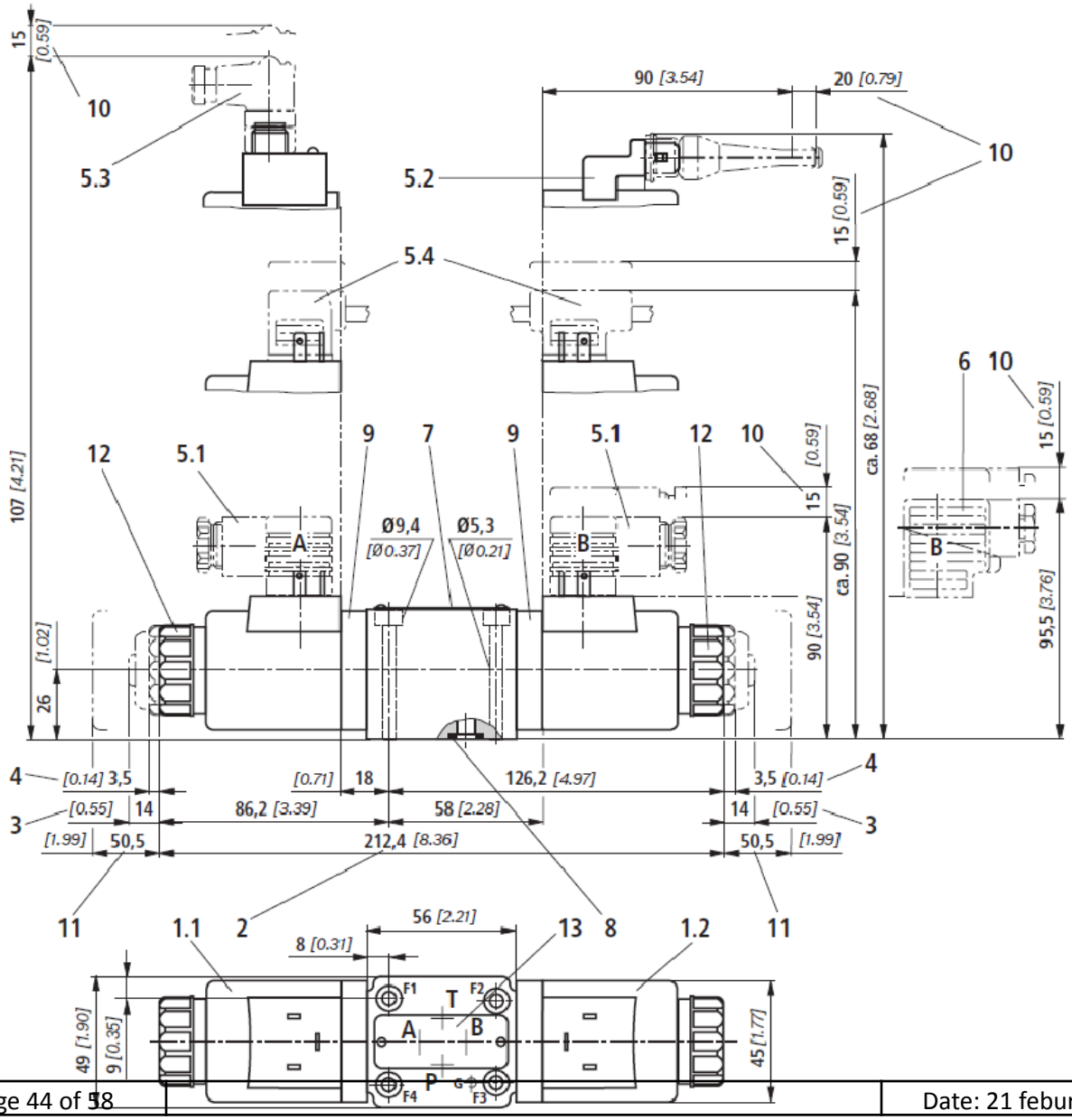
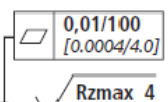
Unit dimensions (dimensions in mm *[inch]*)



Item explanations and **valve mounting screws** see page 10.



NEOMETRIX

The Complete Engineering Solutions Company

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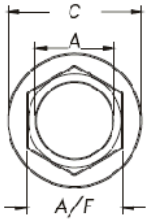
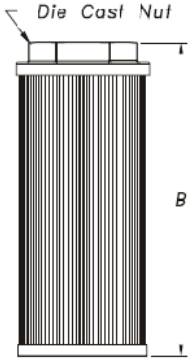
Strainer 100 micron

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
- FLEXIBLE MAGNETIC WRAP AVAILABLE





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

SC3	-010	-**	-**	-**	-**	-**
SERIES	SIZE	PORT THDS. SIZE	PORT THDS. CONNECTION	MICRONS. OPTIONAL#	FEATURE. SPECIAL 1	FEATURE. SPECIAL 2
		REFER TAB E	B-BSPP - STD	149 - SS 100 MESH STD	P P 3 - 3 PSI ByPass	M - Magnet Wrap

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PSA(Pressure Swing Adsorption) NITROGEN PLANT GAS PLANT

ABBRIVATIONS

PSA : Pressure Swings Adsorption (The main Technology)
CMS : Carbon Molecular Sieves (used as the main desiccant for Nitrogen Generation)
ZMS : Zeolite Molecular Sieves (Used as desiccant in Air Drying Unit)

STARTUP PROCEDURE

1. Switch ON the control supply switch.
2. Once the pressure reaches to 7.0 to 7.5 Kg/cm2, switch ON the Air Dryer switch.
3. Once the pressure in Dry Air Receiver reaches to 7 Kg/cm2 switch ON the PSA Module.
4. Once the Surge Tank Pressure reaches to 5.8 Kg/cm2 open the Bottom Needle valve of N2 Rotameter and adjust the flow to 2 Nm3/hr by the top side Needle valve.
5. Vent the gas for 10 minutes and then start using it by switching On the Vent Valve ON Switch.

SHUT DOWN PROCEDURE

1. Switch OFF the Vent Valve Switch.
2. Closed the Rotameter Bottom valve only.
3. Switch OFF the PSA Module Switch.
4. Switch OFF the Air Dryer Switch.
5. Switch OFF the Control Supply Switch

CHECK POINTS

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1. The Air Pressure must be observed & maintain between 6.5-7.5 Kg/cm2.
2. The inlet air temperature should be in between 35 to 40 Deg C maximum for better efficiency
3. The Candle Filter drain valves should be opened twice a shift of 8 hours.
4. The candle of pre filter shall be cleaned every month.
5. If in the drain of Activated Carbon Filter is observed then the Activated Carbon charge should be replaced.
6. It is recommended to change the activated Carbon Filter desiccant every year or maximum 15 months in order to save guard the Life of PSA Module Desiccant which is CMS (Carbon Molecular Sieves).
7. The Dryer & PSA sequence must be observed once in a shift.
8. It is advised to check for Topping-Up of Desiccant after 6 months and then after every year with the help of ZMS & CMS.
9. The functioning (opening & closing) of all 11 Automatic Changeover valves should be checked every day.
10. The manual Valves fitted in PSA Module, one for Inlet Air Control & other for Nitrogen Output Control shall never be disturbed as it will disturb the purity of nitrogen produced. Also the final product Needle valve fitted after the Vent Solenoid valve should never be disturbed as excessive product flow will lead to over burden on CMS, resulting deterioration of nitrogen purity.
11. The Nitrogen Rota meter shall be operated very carefully as sudden opening will break the tube and the Operator may get injured, hence the ideal way of operating shall be like the top side valve shall be open fully and slowly the bottom Needle valve shall be opened slowly and almost one full turns. Now adjust the top Rota meter valve to adjust the flow to 2 Nm3/hr.
12. Never open or tight any pressure gauge, Pressure switch or any other mounting when the plant is under pressure as it may lead to accident/injury.
13. Never try to breathe near exhaust silencers of PSA Module as it can cause health hazard.
14. Never empty the vessels when plant is not in use. The pressure inside the vessels shall prevent the atmospheric air to entre in to CMS bed.
15. Specifications of all critical components and all pressure vessels is being attached as per details below.
16. A Log Book must be maintained as per details below.

SPECIFICATION OF COMPONENTS

1.	**Ceramic Candle Filter**	**:**	**1 No.**
	No. of	:	1 No.
	Size	:	100 Dia x 600 L
	No. of Candle	:	1 No.
	Rating of candle	:	1 micron
	Design code	:	IS 2825 latest
	Design pressure	:	8 Kg/cm2
	Design temperature	:	55 Deg C.
	Hydro test pressure	:	12 Kg/cm2
	MOC shell & dished end	:	IS 2062

`

2.	**Activated Carbon Filter**	**:**	**1 No.**
	No. of	:	1 No.
	Size	:	150 Dia x800 L
	Design code	:	IS 2825 latest
	Design pressure	:	8 Kg/cm2
	Design temperature	:	55 Deg C.
	Hydro test pressure	:	12 Kg/cm2
	MOC shell & dished end	:	IS 2062
	Volume	:	12 Liters

3.	**Heatless Air Dryer**	**:**	**1 No.**
	No. of Absorbers	:	2 Nos.
	Size	:	100 Dia x 1000 L
	Design code	:	IS 2825 latest
	Design pressure	:	8 Kg/cm2
	Design temperature	:	55 Deg C.
	Hydro test pressure	:	12 Kg/cm2
	MOC shell & dished end	:	IS 2062
	Volume	:	8 Liters each

4.	**Dry Air Receiver**	**:**	**1 No.**
	No. of	:	1 No.
	Size	:	250 Dia x 1200 L
	Design code	:	IS 2825 latest
	Design pressure	:	8 Kg/cm2
	Design temperature	:	55 Deg C.
	Hydro test pressure	:	12 Kg/cm2
	MOC shell & dished end	:	IS 2062
	Volume	:	60 Liters

5.	**PSA Module**	**:**	**1 No.**
	No. of Absorbers	:	2 Nos.
	Size	:	150 Dia x 1000 L
	Design code	:	IS 2825 latest
	Design pressure	:	8 Kg/cm2
	Design temperature	:	55 Deg C.
	Hydro test pressure	:	12 Kg/cm2
	MOC shell & dished end	:	IS 2062
	Volume	:	16 Liters each

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6.	**N2 Surge Tank**	**:**	**1 No.**
	No. of	:	1 No.
	Size	:	600 Dia x 1250 L
	Design code	:	IS 2825 latest
	Design pressure	:	8 Kg/cm2
	Design temperature	:	55 Deg C.
	Hydro test pressure	:	12 Kg/cm2
	MOC shell & dished end	:	IS 2062
	Volume	:	60 Liters

7.	**Pressure Gauges**	**:**	**6 No.**
	Range	:	0-10 Kg/cm2
	Type	:	4” size complete SS 304
	Size	:	3/8” screwed

8.	**Pressure Switches**	**:**	**2 No.**
	Range	:	0-10 Kg/cm2
	Type	:	Bourdon type
	End connection	:	¼” screwed

9.	**Changeover Valves 2 way**	**:**	**6 No.**
	Type	:	Diaphragm type
	Size	:	1/2” screwed
	Designs pressure	:	10 Kg/cm2

10.	**Changeover Valves 2 way**	**:**	**4 No.**
	Type	:	Dome type
	Size	:	1/2” screwed
	Designs pressure	:	10 Kg/cm2

11.	**3 Way Valve**	**:**	**1 No.**
	Type	:	Dome type
	Size	:	1/2” screwed
	Designs pressure	:	10 Kg/cm2

12.	**Solenoid Valves**	**:**	**9 No.**
	Type	:	2 way 3 port NC : 5 No., NO : 4 No.
	Size	:	¼” screwed

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	Supply voltage	:	12 V DC
13.	**Rotameter**	**:**	**1 No.**
	Size	:	½" screwed
	Range	:	0.5-5.0 Nm3/hr
	Operating pressure	:	5.5 Kg/cm2

14. Desiccants.

a) Activated Carbon

Used in	:	Activated Carbon Filter
Make	:	Oriental carbon
Size	:	50 mesh
Quantity used	:	25 Kg

b) Activated Alumina

Used in	:	Activated Carbon Filter, ADU & PSA Towers
Make	:	AGC
Size	:	3-5 mm Dia Balls
Quantity used	:	15 Kg

c) Zeolite Molecular Sieves

Used in	:	ADU Towers
Make	:	CECA, France
Size	:	2-3 mm Dia Balls
Quantity used	:	12 Kg

d) Carbon Molecular Sieves

Used in	:	PSA Towers
Make	:	CECA, France
Size	:	1.6 mm Dia Pallets
Quantity used	:	18 Kg

15.	**PLC**	**:**	**1 No.**
	Make	:	Siemens
	Specifications	:	12 DI/8 DO
	Supply voltage	:	12 V DC

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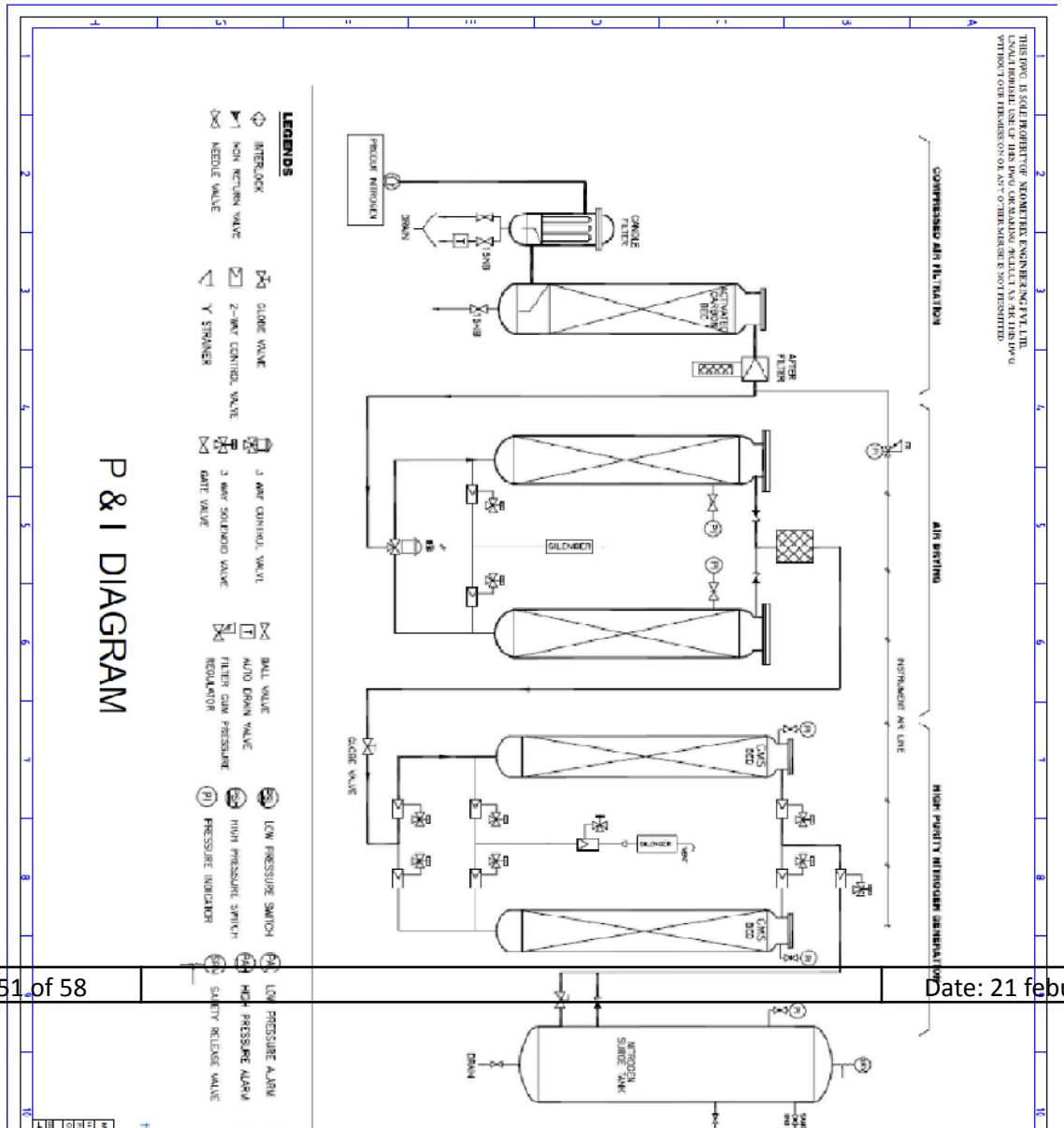
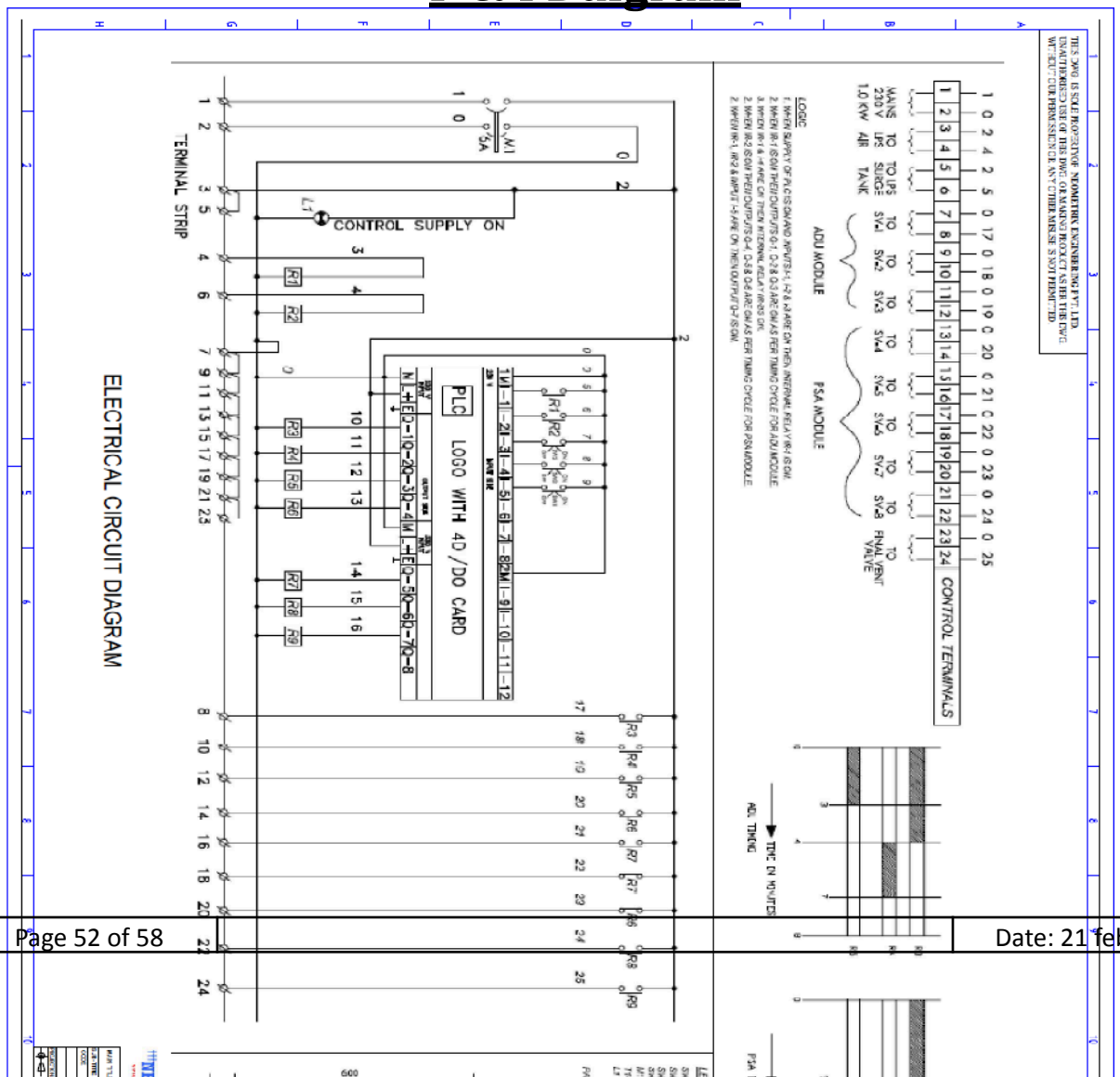

P & I DIAGRAM
LEGENDS
INTERLOCK
NON RETURN VALVE
NEEDLE VALVE
Y STRAINER
GLOBE VALVE
2-WAY CONTROL VALVE
3 WAY CONTROL VALVE
3 WAY SOLENOID VALVE
GATE VALVE
BALL VALVE
AUTO DRAIN VALVE
FILTER CUM PRESSURE REGULATOR
LOW PRESSURE SWITCH
HIGH PRESSURE SWITCH
PRESSURE INDICATOR
LOW PRESSURE ALARM
HIGH PRESSURE ALARM
SAFETY RELEASE VALVE
COMPRESSED AIR FILTRATION
AIR DRYING
HIGH PURITY NITROGEN GENERATION
PRECOOLER
NITROGEN
DRAIN
COALESCING FILTER
ACTIVATED CARBON BED
AFTER FILTER
SILENCER
INSTRUMENT AIR LINE
GLOBE VALVE
CMS BED
BLOWER
NITROGEN SURGE TANK
THIS DWG. IS SOLE PROPERTY OF NEOMETRIX ENGINEERING PVT. LTD.
UNAUTHORISED USE OF THIS DWG OR MAKING PRODUCT AS PER THIS DWG
WITHOUT OUR PERMISSION OR ANY OTHER MISUSE IS NOT PERMITTED.

`

P & I Daigram


ELECTRICAL CIRCUIT DIAGRAM
TERMINAL STRIP
CONTROL SUPPLY ON
PLC
LOGO WITH 4D/DO CARD
ADU MODULE
PSA MODULE
CONTROL TERMINALS
MAINS 230V 1.0 KW
TO LPS AIR TANK
TO LPS SURGE
TO SV1
TO SV2
TO SV3
TO SV4
TO SV5
TO SV6
TO SV7
TO SV8
TO FINAL VENT VALVE

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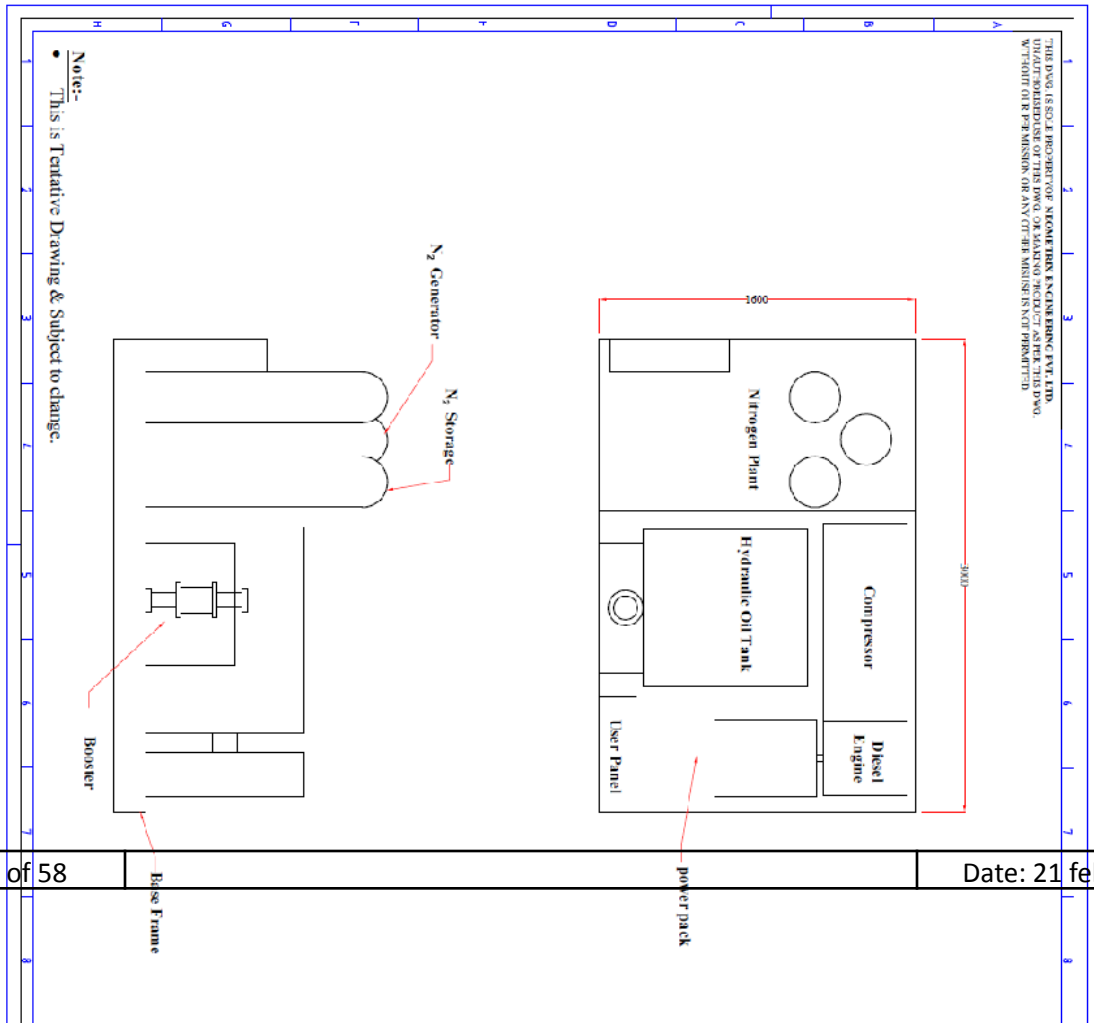
Electrical circuit daigram

G A Drawing



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Bill of materials

S.N.	Items	Specification	Qty.	make	Model
1	Air compressor (without Electric Motor) and its accessories	Output capacity: 8.8 CFM at 12kg/cm2 pressure.160L tank capacity	1	Elgi	TS03120HN
2	Diesel Engine	G-1510 (9H.P/3000RPM) Air cooled,electric start,with Battery charging unit(BCU) with std.tool kit.	1	Graeves cotton	G-1510
3	PSA N2 Plant	Out put flow 2 Nm3/h,input power-200W,out put pressure 5 bar,Moisture-atm dew point of (-) 60 degree	1	Molsieve	MN2MS

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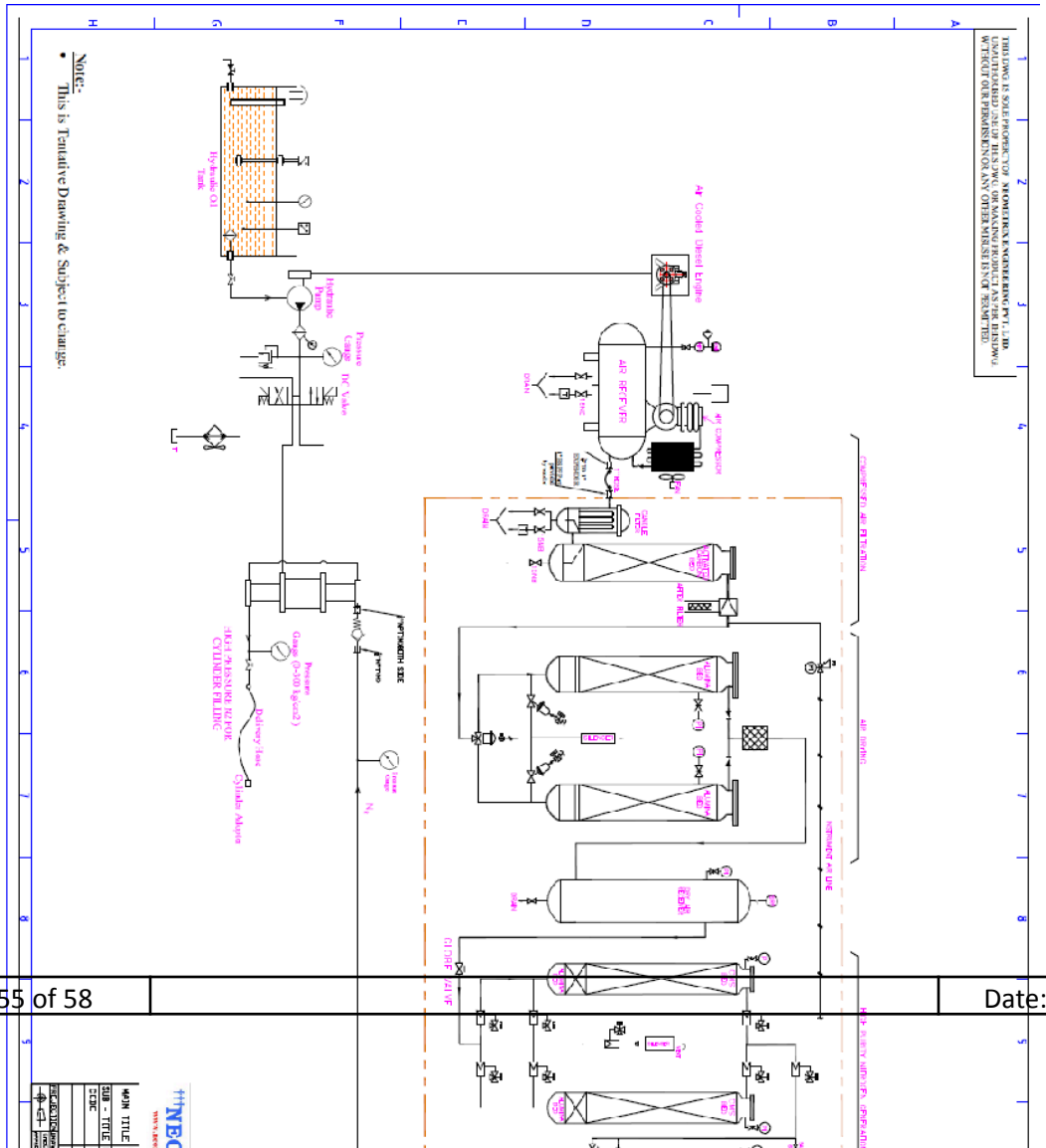
4	Booster Hydraulic Driven	200 bar outlet pressure	1	Paskals	P-HB-2S-T-200
5	Piston Seal	Piston Seal 58x70x7.8 (L=8) H-ECOPUR O-Ring Cord (Length: 198.857, OD: 3.000)	1	SKF	K03-P
6	Check valve	W.P.250 bar,1/2'' BSP(F) both side	4	Tubefit	
7	Hydraulic Power pack	Hydraulic pressure 50 bar,20 lpm gear pump,3 hp motor,	1	Neometrix	HPP-H/3-F/ 20-220VAC

P & I DAIGRAM



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MAINTENANCE INSTRUCTION

Daily check:-

- Diesel engine oil.
- Lubrications engine oil.
- Hydraulic oil of power pack.
- Air in the compressor.
- Dryer & PSA sequence.
- DC valve
- Operating valves (closing & opening) time of PSA to time for relief of air.
- Working of the both heat exchanger.

Weekly check:

- Candle filter drain valve of PSA.
- Candle of Pre filter of PSA.
- Pulley belts alignments.
- Tightening of connection fittings.

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Monthly check & Yearly check:-

- Topping-Up of Desiccant after 6 months and then after every year with the help of ZMS & CMS.
- Belt pulley alignment in engine coupled with compressor.
- Belt change, if necessary.
- Greasing in the radial ball bearing used.
- Change the pneumatic seals & hydraulic seals of the booster, if required.

TROUBLE SHOOTING

- Compressor fails to start, check the supply and remove moisture.
- Engine starts but runs irregularly & stops
  1. Check Fuel in the tank.
  2. Check the air in the fuel line, bleed it.
  3. Filter clogged, change or clean it.
  4. Faulty fuel pump, repair / change the pump.
  5. Faulty injector nozzle, repair / change the nozzle.
  6. Water in the tank, drain the tank & fill the clean fuel.
- Hydraulic power pack not working,
  1. Check the wire connection of the motor used.
  2. Filter clogged, change/ repair the filter cartridges.
- PSA (Pressure swing adsorption) not working.

  1. The Air Pressure is not reaching to desired level of 6.5 to 7.5 Kg/cm2

  A .Please checks & cleans the ceramic candle filter
  B. Please check & replace the Activated Charcoal bed.
  C. Please check & clean the after filter after the Activated Charcoal Filter.
  D. Please check any of the Air Dryer valve is leaking
  E. Please check any of the NRV of Air Drying unit is leaking.
  F. Verify the Pressure gauges
  E. Any other problem, please check with us.

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2. The functioning of Air Dryer is erratic

A. Please check the functioning of all 3 automatic valves
B. Please check for supply & working of all 3 Solenoid valves.
C. Please check whether the Instrument air is adequate i.e. 6 Kg/cm2.
D. Verify that the Air Pressure is reaching to 7.0 Kg/cm2 in ADU Towers
Any other problem, please check with us.

3. The functioning of PSA Module is erratic

A. Please check the functioning of all 8 automatic valves
B. Please check for supply & working of all 5 Solenoid valves.
C. Please check whether somebody disturbed the Air Inlet Valve to PSA or Product N2 Valve is disturbed.
D. Verify that the Air Pressure is reaching to 7.0 Kg/cm2 in PSA Towers
E. Any other problem, please check with us.