

DIAPHRAGM COMPRESSORS MAINTENANCE PLANNING



Diaphragm Compressors Burton Corblin®

Time meter	Running Hours recorded from first compressor start up																																															
Record Hours	50	500	1 000	1 500	2 000	2 500	3 000	3 500	4 000	4 500	5 000	6 000	7 000	8 000	9 000	10 000	11 000	12 000	13 000	14 000	15 000	16 000	17 000	18 000	19 000	20 000	22 000	24 000	26 000	28 000	30 000	32 000	34 000	36 000	38 000	40 000	42 000	44 000	46 000	48 000								
500 Hours per year	S	A	A	A	A	B	A	A	A	A	E																																					
Years ▶		1	2	3	4	5	6	7	8	9	10																																					
2000 Hours per year	S	A	A	B	A	B	A	C	A	B	A	D	A	C	A	B	A	B	A	C	A	E																										
Years ▶		1 st year			2nd year			3rd year			4	5	6	7	8	9	10																															
4000 Hours per year	S	A	A	A	B	A	C	A	B	A	C	A	B	A	C	A	B	A	D	A	B	A	C	A	B	A	D	A	B	A	C	A	B	A	C	A	B	A	C	A	B	A	E					
Years ▶		1 st year				2nd year				3rd year				4th year				5th year				6th year				7th year																						
6000 Hours per year	S	A	A	A	B*	A	C	A	B*	A	C	A	B*	A	C	A	B*	A	D	A	B*	A	C	A	B*	A	C	A	B*	A	C	A	B*	A	C	A	B*	A	C	A	B*	A	E					
Years ▶		1 st year				2nd year				3rd year				4th year				5th year				6th year																										
8000 Hours per year	S	A	A	A	B*	A	C	A	B*	A	C	A	B*	A	D	A	B*	A	C	A	B*	A	C	A	B*	A	C	A	B*	A	C	A	B*	A	C	A	B*	A	C	A	B*	A	E					
Years ▶		1 st year				2nd year				3rd year				4th year				5th year				6th year																										

- S Start up inspection**
 - Oil drain & oil filter replacement, crankcase cleaning. • Strainer cleaning
 - Suction filter control • Compressors components control
- A Intermediate inspection**
 - Compressors components and compressor parameters controls
- B Intermediate inspection**
 - Oil drain • Compressor components and parameters controls • Head valves replacement. • Gas filter element replacement
- C Maintenance**
 - Drain & Casing cleaning • Oil filter element & oil circuit components replacement. • Head valves and Gas filter element replacement • Controls
- D Special Maintenance**
 - Maintenance C +** Crankcase control & oil pump • Pressure vessel control • Piston ring replacement • Controls
- E Mecanical Mainten.**
 - Maintenance D +** • Crankcase maintenance • Small, big, roller bearings replacement. • Controls • Limiter • Compensator

* Oil circuit components: Oil pressure limiteur, Compensating pump components and check valves, Cylinder check valves, are key components for the compressor efficiency.

Diaphragms components are to be integrated but can't appear in a Standard maintenance schedule (To many parameters are to be considered)

PARTS Refer to Storage Instructions for maintenance A B C D on page 2 and specific tools available
Refer to Instructions for mechanical maintenance E on page 3 & 4

Diaphragm Compressor Spare parts list

Serial n° : _____

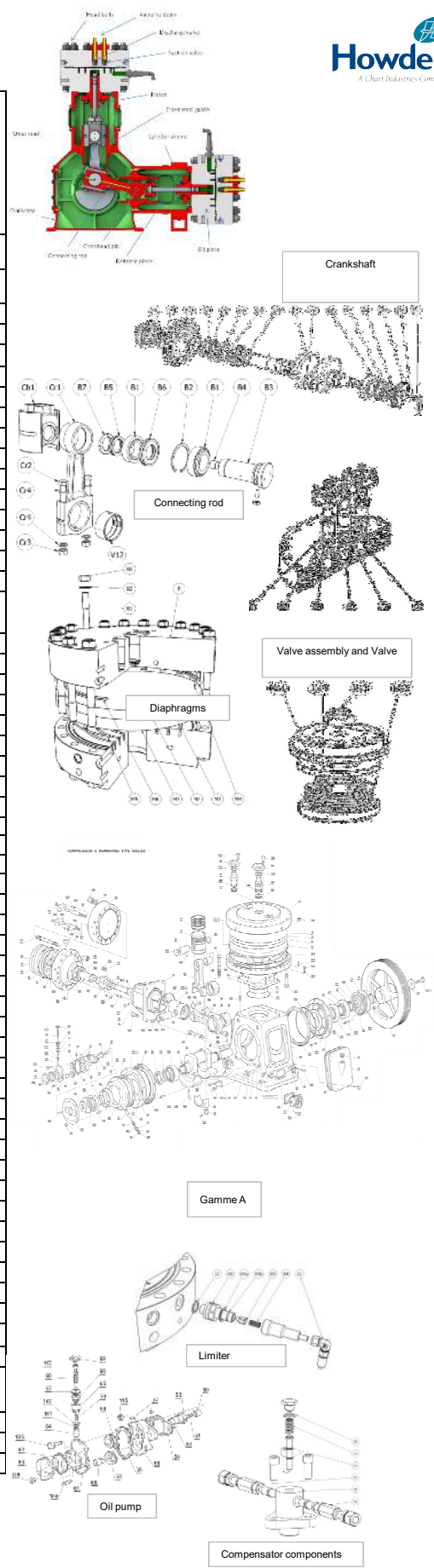


Gamme A

Gamme D

Gamme DL

	Compressor Start-Up	Check				
		Intermediate Inspection A	Intermediate Inspection B	Maintenance C	Special Maintenance D	Mechanical Maintenance E
Crankcase parts						
Bearing Flywheel Side + Washer x2 + SKF nuts + lock washers	Set					●
Bearing Opposite Flywheel Side + SKF nuts + lock washers	Set					●
Big end bearing + Cr4	Set					●
Small end bush	Set					●
Crosshead pin (+circlips ext./int. + plugs + o/rings)	Set					●
Oil Filter Cartridge + gasket	Set	●	●	●	●	●
Oil Drain	Liter					●
Oil strainer	piece					●
Oil level	piece					●
Door Gaskets (including gasket under screw)	Set			●	●	●
Gaskets (Cord)	Set				●	●
Seal Blue Paste (tube)	piece					●
Oil cooler gasket set	Set					●
Shaft end gasket (Crankshaft)	piece					●
Oil pump	Set					●
Oil pump pinions + screws	Set					●
Rotating seal connector + flexible st. steel + accessories	Set					●
All crankcase gaskets & o'rings	Set					●
Cylinder parts						
Piston Seal Ring	Set				●	●
Piston Guide Ring	Set				●	●
Liner o'ring	piece				●	●
Suction Check Valve Assembly	Set		●	●	●	●
Discharge Check Valve Assembly	Set		●	●	●	●
Suct. & Disch. Check valve spring	Set	●				●
Suct. & Disch. Check valve disc	Set	●				●
Gas side diaphragm	piece	●		●	●	●
Intermediate diaphragm	piece	●		●	●	●
Oil side diaphragm	piece	●		●	●	●
Gaskets						
Check valves gaskets (o'ring Holddown)	Set	●	●	●	●	●
O'ring for detection (R2 type - if applicable)	piece	●		●	●	●
Gas plate o'ring	piece	●		●	●	●
Plate plug o'rings (BS rings)	piece	●		●	●	●
Detection o'ring	piece	●		●	●	●
Oil plate o'ring	piece	●		●	●	●
Hydraulic circuit						
Limiters						
Pressure limiter assembly	piece					●
Gasket set	Set	●		●	●	●
Limiters Wear Parts	Set			●	●	●
Compensator						
Compensating pump	piece					●
Compensator suction check valve	piece	●		●	●	●
Compensator dis. check valve	piece	●		●	●	●
Head oil Check Valve	piece	●		●	●	●
Head oil Check Valve gasket	piece	●		●	●	●
Piston Spring	piece	●		●	●	●
Piston Seal Ring	Set	●		●	●	●
Compensating Pump Gasket set	Set	●		●	●	●
Oil Piping						
VBO oil fitting gasket set (ref. VBJTN-KIT)	Set			●	●	●
Gas Piping						
Gas Piping gaskets suction & discharge (o'ring, spiral, copper,...)	Set		●	●	●	●
Package						
V-belts	Set				●	●
Gas Filter Cartridge & O'rings	piece		●	●	●	●



How to use the document

Parts to be stored for routine maintenance operations

Refer to maintenance planning to adjust when yearly operating time is under 8000 hours.

Capital parts correspond to long delivery time components. To be stored to avoid long stops of site operations.

Diaphragm Compressors

Complement to maintenance E

Warning ! When maintenance planning drives to maintenance type E, your equipments age is from 6 years to 8-10 years old. **Complementary operation** may have to be considered. This is particularly necessary when site operating conditions are difficult. (Corrosive gases, and atmosphere, aggressive environmental conditions (Marine, desert environments), or heavy duty compression conditions. Below list give you indications about important controls that we recommend to check carefully.

Parts	Categories	Defect Description	Risk	Operations
Mechanical assembly		Excessive clearance between piston and cylinder liner (Valid for Piston with no segmentation).	Excessive oil volume passing through the piston affects compressor efficiency.	Parts replacement if necessary after mechanical parts clearance control.
		Particles Inclusions, corrosion and geometrical defects are the initiators of diaphragm ruptures.	Repeated and premature diaphragm discs ruptures.	Head Curves Inspection. Gas plate and oil plate curves refactoring to remove surface defects.
		Oil degradation (Halocarbon oils).	Mechanical ruptures.	Oil sample analysis in laboratory.
		Gas plate water cooling circuit clogging.	Heat in heads not evacuated properly Can affect gas quality. Temperatures not compatible with the Atex Zone.	Head plates and water circuit cleaning.
		Improper mechanical torques or mechanical clearances.	Component failures. Gas or oil leakage.	Check of defects. Change of sealing parts and possible up grades.
		Bolts deformation, fragilisation, and threads damaged. The originators are the corrosive atmospheres, extreme environments, dismantling frequency, and specific stresses on bolts. Wear is not homogeneous.	Parts can get loose. This can generate a compressor breakdowns. Leak tightness is compromised by poor tightening on clamping areas.	Bolts check and torque controls. Change of worn bolts.
Process		General check of polymer base components affected by atmosphere, light...	Prevent compressor and ancillary equipments from premature wear, function default for gas tightening, and compressor control and monitoring.	Test, Repair, Replacement.
		Piping corrosion.	Fluids leaks and pollution.	Check and rebuild.
		Pressure vessels corrosion	Gas leaks, or gas pollution.	Inspection and rebuild.
		Piping & Filtration clogging	Gas flow decrease and energy losses	Cleaning & replacement
		O'rings (Polymers ageing and degradation).	Prevent compressor and ancillary equipments from premature wear, function default for gas tightening, and compressor control and monitoring.	Test, Repair, Replacement.
Package		Valves & regulating equipments.	Flow losses. Operation troubles.	Test, Repair, Replacement.
		Equipment Support & Anchoring.	Vibrations & damage consequences in relation.	Inspection & Reconstruction.
Instrumentation		Instrumentation, Electricity and Logics.	Lack of signal or information is corrupted (Consequence on operations & safety).	Inspection & Reconstruction.
		Connections and wire (polymer base).	No signal or corrupted (Consequence on operations & safety).	Inspection & Reconstruction.
Driver		Motor.	Failure & safety.	Check and revision.
		Power Cabinet Check.	Failure & safety.	Follow constructor recommendations.
Regulation		Safety valve.	To be checked and review to be in conformity with applicable regulation.	Documentation & Revalidation.
		Pressure vessels.	To be checked and review to be in conformity with applicable regulation.	Documentation & Revalidation.
		ATEX & EC directives preservation.	Site and operator safety.	Conformity check. Ensure that aging of equipments, or site changes doesn't affect equipments ensuring ATEX and EC compliance. Possible study for conformity compliance.
Up grade	Howden propose modernisation and improvements such as the following : Limiter models, Piston with rings, Compensator forced feed lubrication, Monitoring (Vibration, Oil cycle Measuring Kit), PSV, Head filling systems. Head o'ring installation or improvement.			

We recommend this compressor control to be conducted by Howden field engineers. Our specialists ensure a serious compressor check. They can also identify equipments improvements to better cover site expectations in terms of performance, safety and availability.