

**hertz**  
KOMPRESSOREN

**HBD SERIES**  
**4-37 kW (5.5-50 HP)**



**COMPRESSED**  
AIR ADVISORS

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# HERTZ KOMPRESSOREN

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## 1 GENERAL

### 1.1 Foreword

HERTZ KOMPRESSOREN combines quality, reliability and availability with 50 years of experience and serves to its customers in the best way with the machine it has developed.

Thank you for choosing our product.

These operating instructions contain all information on the installation, maintenance and safely use of your product.

**Please read this manual. Do not use your product before reading.**

### 1.2 Cautions

The compressor must be used only by the authorized persons.

Please obey all the safety measures and instructions for operation set forth herein. To do so will not only allow minimizing the risk of potential accidents, but also elongate the usable life of your machine.

### 1.3 Copyright

All rights of these operating instructions are reserved by HERTZ KOMPRESSOREN . The manual may not be entirely or partially reproduced, changed and distributed in any manner.

### 1.4 Warranty and Liability

Before installation and operation of the compressor, be sure that this manual has been duly read by the authorized personnel (mechanics, maintenance staff and all users).

Due to the complex nature of the compressor, its operation by the unauthorized people may result in accidents and injuries, and make the machine out of warranty.

The compressor would be out of warranty in the following cases:

- Any change or modification on the compressor or control unit without a prior consent of HERTZ KOMPRESSOREN.
- Operation or maintenance by the unauthorized people,
- Use of any spare parts not approved by HERTZ KOMPRESSOREN,
- Improper installation of the security and safety devices,
- Operation of the compressor in contradistinction with the instructions for use and safety measures.



## 1.5 Type Approval and Genuine Spare Parts

All the parts and components of the HERTZ HBD Belt Drive Series compressors are certified to local standards for satisfaction of all the applicable standards and type approvals.

HERTZ COMPRESSOR may not be kept responsible for any possible accidents and damages to arise out of the use of non-approved spare parts.



**Only use the HERTZ approved parts and components for your safety and security.**

## 1.6 Technical Service

Please do not hesitate to get contact with our technical service for any problems with your compressor.

**HERTZ KOMPRESSOREN USA, Inc.**

**3320 Service St.**

**Charlotte, NC 28206**




**Phone : +1-704-579-5900**

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## 1.7 Descriptions and Warnings

*Table 1 Descriptions and Warnings*

Symbols	Descriptions
	High risks and important warnings.
	Explanations on specific cases.
	Overall comments and general listing.

## 2 SAFETY

### 2.1 Operating Conditions

- Make sure that use and maintenance of your compressor are made by an authorized person.
- Do not use your compressor until these operating instructions have been understood.
- Do not neglect the maintenance of your compressor.
- Only air and inert gases can be used with this compressor (for more detail, please contact your authorized service representative).
- Use your compressor in environments with a temperature range of 35 °F (+2 °C) and 110 °F (+43 °C). (In the case of different temperatures, please contact your authorized service representative.)
- For other operating conditions not specified in the operating instructions please note that the written consent of HERTZ KOMPRESSOREN is required.
- When you allow other people to use your compressor make sure the individuals have read these instructions.
- In case of failure to comply with the conditions described in the operating instructions, remember that there may be large-scale accidents where your compressor becomes unusable and fatal injuries.
- If you think that there is a security breach or fault related to the compressor;
  - Do not start your compressor.
  - Report to the authorized person as soon as possible.
  - Hang a warning sign related to the case to a portion of the compressor that can be seen.
  - Make sure that the power cables **are not connected** so that your compressor is not used by third parties.

### 2.2 Unauthorized Modifications/Changes

- Do not make any modification/change on your compressor without consent of HERTZ KOMPRESSOREN.
- Unauthorized changes may cause malfunction and a reduction in the life of your compressor as well as serious injury.



**Remember that your compressor may be out of warranty as a result of changes made without the consent of HERTZ KOMPRESSOREN.**

**2.3 Compressed Air Line Connections**

- To obtain maximum efficiency from compressor; make sure that you are using equipment that comply with the specifications of your compressor.
- Ensure that compressed air line elements are connected properly, sealed and that this line is not exposed to high temperatures. Also keep the mentioned fasteners away from environments with dust, chemical fumes, moisture and corrosion.
- Stop your compressor before you remove or replace compressed air line components (filters, etc.). Make sure that the compressed air within the compressor is discharged (check the gauge).
- Make sure no living thing can approach to the compressed air line outlet of the compressor and take the necessary security measures.
- Do not use the compressed air for any purpose cleaning, joking, etc. on any living thing.
- Do not try to breathe in the compressed air and do not use it for ventilation.
- Do not change the safety valve settings and pressure switch. Be sure to make periodic checks.
- Do not close the outlet valve while the compressor is running or do not operate your compressor when the outlet valve is closed. Otherwise, your compressor can be stopped with the high pressure error.

**2.4 Fire and Explosion Risk**

- Do not keep any flammable chemicals around or on top of your compressor. If you see such an item around your compressor, clean this item immediately.
- In any danger of fire, turn off your compressor, make sure the main switch is turned off. Eliminate all the factors that may cause fire. Do not allow approaching with combustible materials next to your compressor.
- Do not allow formation of oil slick outside of the compressor cabinet. In necessary cases, clean these areas with special cleaning non-combustible materials.
- In any maintenance, cleaning or other operations like these of your compressor, make sure that all power cables are unplugged.
- Make sure that your compressor's electrical and pressure connections remain in good condition. When you identify damaged cable or pipes, turn off the compressor, than change them and check these connections frequently.
- Always keep a filled and maintained fire extinguisher next to your compressor.
- Be sure that all the electrical cables belonging to compressor are installed and there is no cable looseness and breaks. Replace any broken and loose cables immediately for the purpose of safety.

- Do not place combustible materials such as a piece of cloth, sawdust, paper-like solids around your compressor.
- Do not operate compressor without creating adequate ventilation condition.

## 2.5 Moving Parts

- Do not operate the compressor when the coupling and fan casings are removed.
- Keep your hands, arms and clothes away from rotating parts as much as possible. When there is a situation that requires you to approach rotating parts, be sure that you are not wearing baggy clothes.
- Make sure that the main power cord is disconnected in advance so that your compressor is not started during repair and maintenance unintentionally.
- The running compressor can be turned off quickly with the effect of the intake fan. In such a case, make sure that do not let your hands and fingers from pinching.
- When running your compressor, keep all the living things away from the compressor to protect them against damage that may be caused by jetting and exploding.
- If you will use your compressor with remote control make sure that the necessary warning indicators show this status. In this way, a user near your compressor will be aware of the situation and understand that he/she should stand at a necessary safety distance.
- In order to prevent accidents that may occur due to lubricants such as oil, water etc. always keep the area around your compressor, the cantilever floors such as stairs clean.
- While controlling inside of the machine, ensure adequate lighting for the rotating parts to be seen.

## 2.6 Combustible and Sharp Surfaces


- Some parts in your compressor (screw unit, radiator, separator tank, oil filter, etc.) can reach high temperatures during operation and can cause burns if contacted. Do not touch these surfaces.
- Do not ignore that the oil used in the system while the compressor is running may reach high temperatures.
- In the event of oil leakage from your compressor, disconnect the main power by shutting down via the emergency switch without manual intervention.
- Never contact or make any move towards your compressor during operation. Do not use objects such as rod, cable, stick etc. for this purpose.
- Stay away from all air outlets of your compressor (safety and relief valves, nozzles, etc.). Do not forget that the air discharged from the air outlets is hot and may cause injury.
- While authorized personal is doing any work related to your compressor, wear protective helmets, glasses and gloves.

- Always keep a first aid kit in the work area of your compressor and consult a doctor even in the slightest injury.

## 2.7 Combustible and Irritant Substances

- Never inhale the compressed air. Remember that this could cause serious injury or death.
- Never connect the compressed air to a respiratory equipment or device.
- Never discharge the compressed air to an environment where living things exist.
- Run your compressor only in environments with adequate ventilation.
- Install your compressor away from all kinds of combustible, dusty, humid, chemical environments such as sandblasting machine, oven and machinery making chemical processes.
- Industrial machine oil is used in compressor. Avoid any contact with eyes and skin that may occur with such oil. In case of contact, rinse immediately with plenty of water.

## 2.8 Electrical Accidents

- In addition to the advice and information in this guide, you must install your compressor in accordance with all national and international standards. All electrical wiring connections of your compressor must be performed by qualified technicians.
- Make sure that your compressor is grounded properly. Make sure that the grounding cable is connected to the point marked in the  electric panel of the compressor.
- Keep your body, your hand tools and conductive materials away from the parts of your compressor where electrical current passes through.
- When performing maintenance, repair or adjustment associated with electrical components, make sure that your feet are not on the wet ground and you are working on an insulating material.
- Try to do all works associated with electrical components with your right and single hand. Thus, the risk of the current to reach the heart in a possible electrical leakage will be reduced.
- Repair and corrective actions should be performed in a dry, clean, ventilated environment on an insulating layer.
- While the compressor is running, keep the door of the electrical cabinet absolutely shut, if you need to open the door, stop your compressor and power off via the main switch.
- Check all connections carefully after the installation before the first run of your compressor.

## 2.9 Important Points Before You Begin

- Thoroughly check your compressor before you start the compressor. If you think that something is wrong with your compressor, do not start the compressor.

- Make sure that all protection and security pieces are in place. Do not start your compressor without replacing the damaged parts or completing the missing parts.
- If the compressor is large enough for a person to enter in it or if the relevant persons are performing tasks inside, inform the other staff about this situation and keep the doors of the compressor open.
- Make sure that there is no one inside before closing the doors of the compressor.
- Make sure that the moving parts within the compressor work without any friction.

## 2.10 Compressor and Environmental Cleaning

- Make sure to stop the compressor and cut the energy completely before cleaning your compressor.
- To prevent a possible fire, keep your compressor away from the dust, oil, garbage and oil machine. Keep the flammable liquids away from sparks and heat and store them in a separate containers
- If there is any leakage in your compressor, have it repaired by informing your authorized service as soon as possible.

## 2.11 Personal Protection and Safety

Company managers should ensure that all required standards and rules are complied with on the use of compressors.

- Do not approach your compressor with damaged and loose clothing. Otherwise, the clothes may get caught on the moving parts and may cause serious injury.
- If deemed appropriate or in cases of necessity take extra security measures such as glasses, gloves, helmets.
- In cases that will prevent you from making healthy decisions (drugs, alcohol use, fatigue, etc.) do not approach and start your compressor.
- Do not wear a headset to listen to music or the radio while operating your compressor.
- Keep your hands and body away from the moving parts in the compressor. Otherwise, accidents which may cause serious injury may occur.
- Do not operate compressor without installing the shields.



**2.12 Safety and Warnings**



Safety precautions are described as "danger-warning" in necessary conditions.

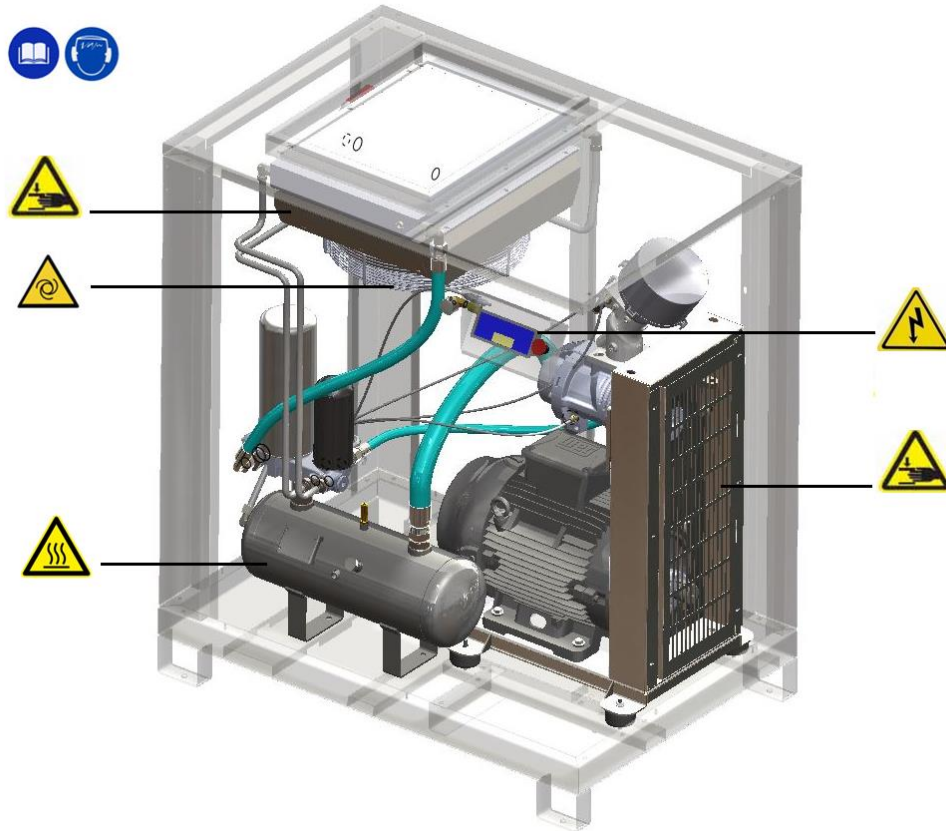








Figure 1 HBD 22 Safety and Warnings

Safety Sign	Description
	Rotating Parts!
	Hot Surface!
	High voltage!
	Equipment starts automatically

Safety Sign	Description
	Wear earpieces!
	Please read the operating instructions!

Read the safety and protection precautions before starting the compressor.

- Keep clean any warning signs, and make sure that they are readily visible on the compressor.
- Clean the warning signs with soap and water and dry with a soft cloth.
- Replace any damaged warning signs. Complete any missing warning signs.
- After removal of any part or component with warning sign thereon, make sure that the warning sign is replaced after replacement of the same part or component.



**Place the new warning signs on clean and dry surfaces. Make sure that no air bubbles are left between the sign and the surface.**

### 2.13 Recommendations

- Make sure that the shields are installed after any repair, maintenance and adjustment done on your compressor.
- After any repair, maintenance and adjustment on the compressor be sure that there would be left no part, component, cleaning materials and hand tools around the compressor.
- Be sure that the moving parts are not in touch of the other parts.
- Be sure that all the electrical wires are properly connected to the right points on the compressor.
- When the compressor would not be used for a long time, store it in a dry and warm place.



## 2.14 Air Filter

- The air filter is exclusively for the air intake and may not be used for any other purpose.
- Do not attempt any punching or cutting works on the air filter.
- Avoid impact and attempts that may damage the filter in the course of filter maintenance.

## 2.15 Safety and Protection Systems

- Motor over current control system
- Fan motor over current control system
- Phase order, shortage and imbalance control system
- Main motor PTC relay
- Screw high temperature control system
- High pressure control system
- Separator dirtiness warning system
- Air filter dirtiness warning system
- High pressure safety valve
- Emergency stop button
- Service warning system
- Alarm warning system

## 2.16 Noise Protection

Thanks to the special sound insulated cabinets of HERTZ HBD Belt Drive Series, the noise level of the compressor in operating condition has been minimized.

## 2.17 Environmental Conscience

Take care of the cleaning for environmental preservation, and act in compliance with the respective laws and regulations. Keep the below listed waste materials away from the nature. Take action to properly dispose of them.

- Used waste oil, grease and all other excessively polluted materials,
- Cleaning substances,
- Accumulated oil resulting from condensed oil steams.

### 3 COMPRESSOR OPERATON

#### 3.1 General View of HBD 22 Belt Drive

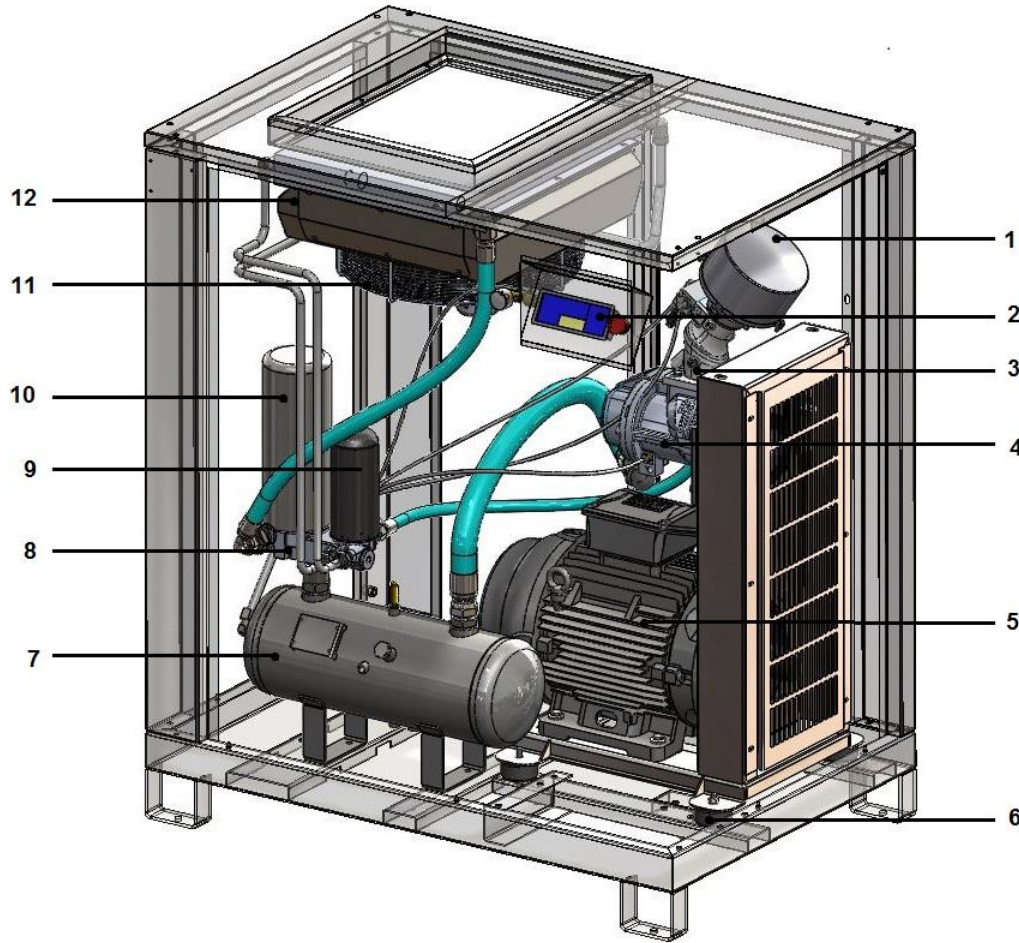


Figure 2 HBD 22 Belt Drive Model

Table 2 Main Parts of HBD 22 Belt Drive Model

REF	PART NAME	REF	PART NAME
1	Air Filter	7	Air-Oil Separator Tank
2	Controller	8	Multiblock
3	Intake Valve	9	Oil Filter
4	Airend	10	Oil Separator
5	Motor	11	Fan
6	Vibration Pad	12	Fan Housing

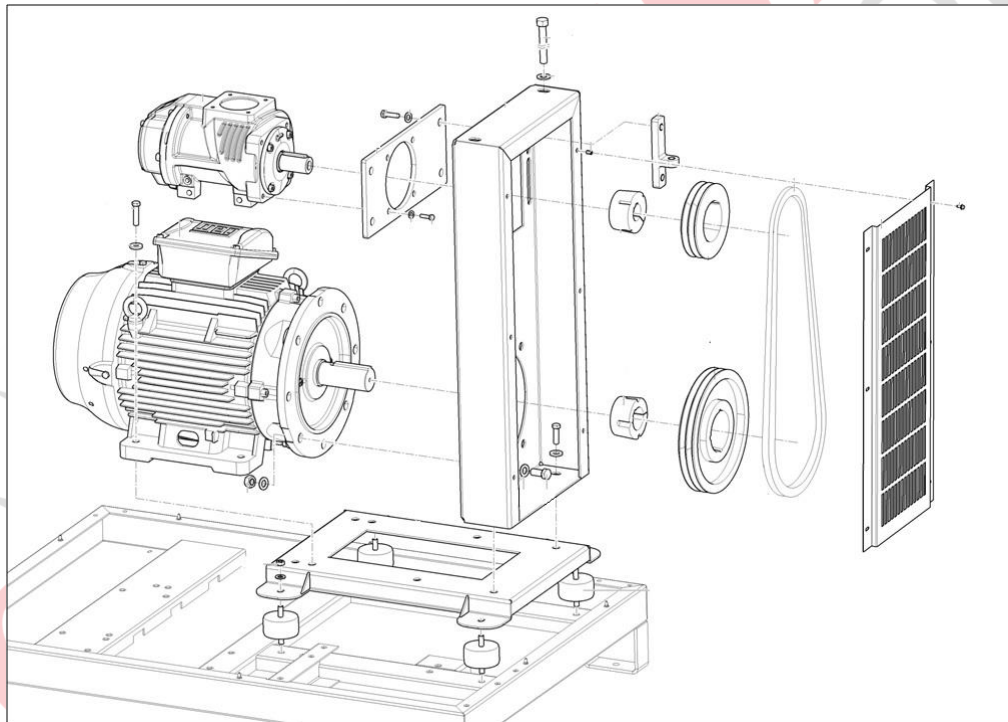
**3.2 Compressor Operation**

HERTZ HBD Belt Drive Series which is the screw air compressor series of HERTZ that is built with quality components and durability that has been proven for years.

**3.2.1 Drive and Control**

HERTZ HBD Belt Drive Series compressors are powered by an electric motor which provides the mechanical drive force required for the screw unit to produce the compressed air. This system comprises of a frame, motor, screw unit, pulley and belt.

HERTZ HBD Belt Drive Series compressors are operated and controlled by an electronic control system. Satisfying any applicable legal conditions, this control system is under the liability of HERTZ COMPRESSOR.



**Figure 3** HBD 22 Belt Drive System

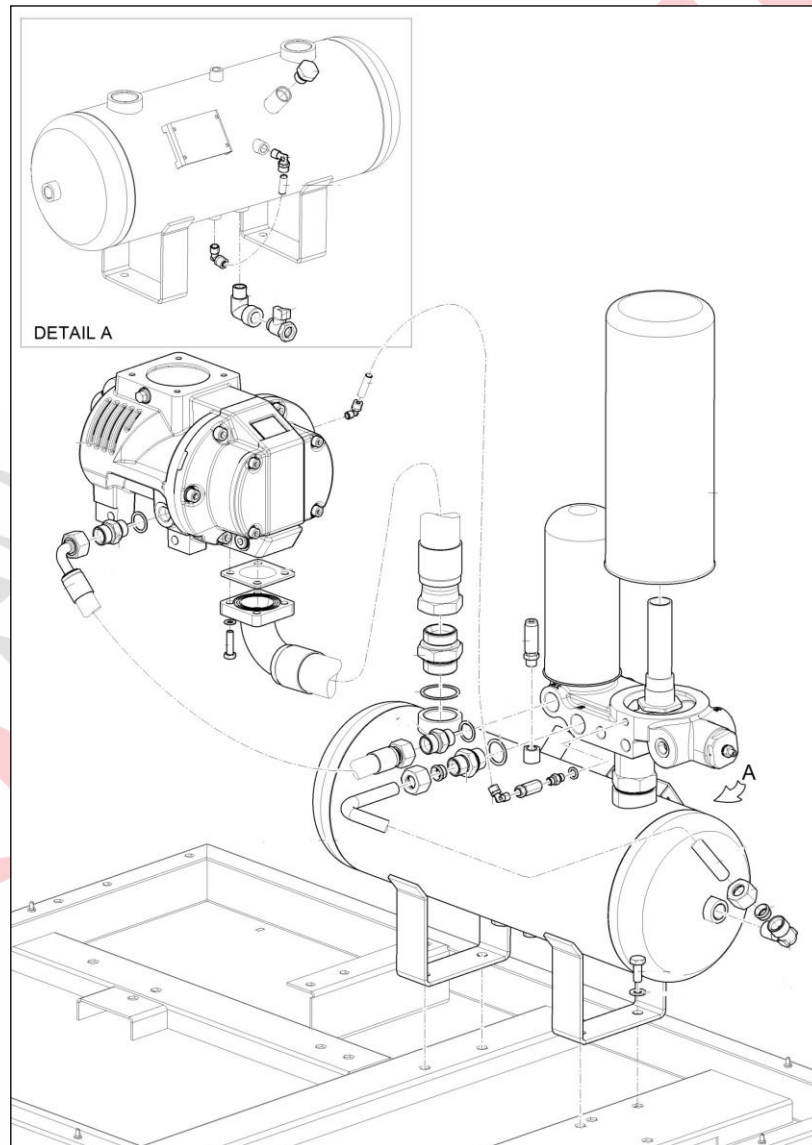
### 3.2.2 Pressure System

The pressure system comprises of a screw unit, separator, tank, separator and minimum pressure valve and oil return (scavenge) line circuit.



**When there is pressure inside the compressor, do not attempt to remove any cover or part. First stop the compressor, and be sure that the entire pressure is eliminated.**

- The air – oil mixture received from the screw unit is delivered to the separator tank.
- The separator tank has been designed as to reduce the airborne oil.

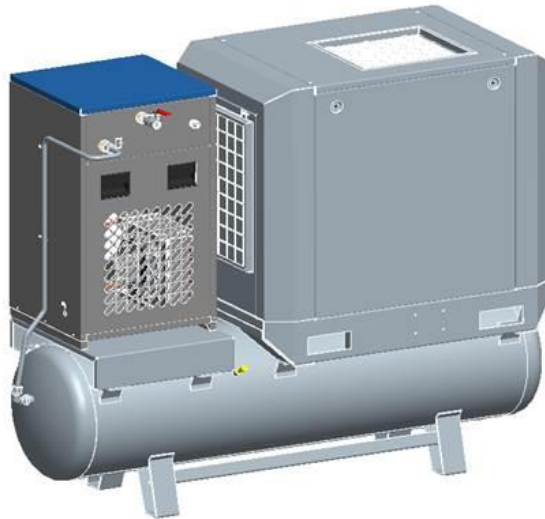


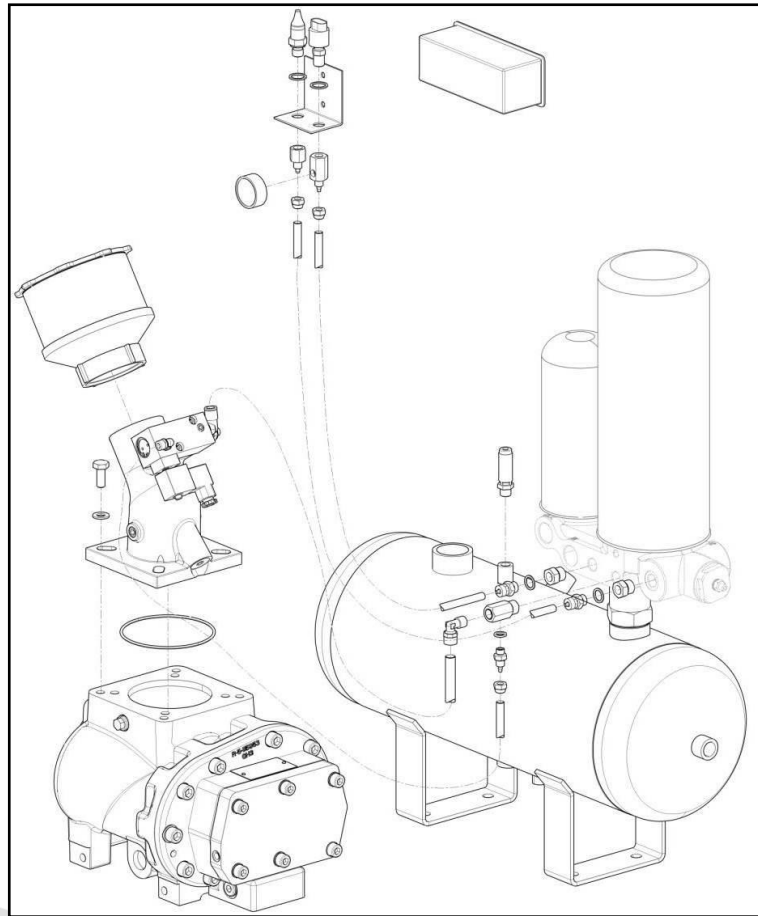
**Figure 4** HBD 22 Pressure System

- The air-oil mixture in the separator tank goes to the separator filter. The specially designed separator filter keeps the airborne oil particles outside, so that only pure air can enter inside.
- In the course of this filtering process, a negligible amount of oil penetrates into the separator, and accumulates under the filter.
- The oil at the bottom of the separator is returned to the screw unit by passing through the oil return (scavenge) line with the aid of the pressure difference between the tank and the screw unit, so that it is prevented for the compressor to push oil into the system with the air speed, and oil is not lost.
- The minimum pressure valve in the separator tank cover keeps the pressure in the tank till it reaches to 43-58 psig (3 - 4 bar) with the compressor being under load. This pressure value is required for a proper air-oil separation and oil circulation.
- The minimum pressure valve does not allow the compressed air in use to return to the separator tank when the compressor is shut down or shifted in idle. In cases where the pressure of utility line (outside pressure) is less than 58 psig (4 bar) at the initial start of the compressor, the minimum pressure valve does not allow any air intake till the pressure in the separator tank becomes equivalent to the outside pressure.
- There is a safety valve to prevent any possible hazards for excessive pressure increase in the separator tank in case of any failure and blockade.
- If the screw unit temperature increases 226 °F (108°C), the respective temperature sensor would detect it, whereupon the electronic control module stops the compressor before any failure occurs.

### 3.3 Intake and Control System

It filters any harmful dusts that may be sucked by the compressor from the external environment, so that the compressor works at the preset pressure interval. This system comprises of two subassemblies, i.e. the Intake System and the Intake Control System.





**Figure 6** HBD Compact

### 3.3.1 Intake System

The abrasives in the air drawn by the compressor enter any point where the oil penetrates in the compressor, and abrades the surfaces it contacts. The bearings life, O-rings and seals are rapidly shortened as a result of the increased friction. Furthermore, the filters clogged by dust suck less air. Due to blockade, both the cooling and intake air quantities are reduced, so that the compressor capacity is diminished with the operating temperature rising. The higher operating temperature has adverse effects on all the internal parts and components of the compressor. The hoses are hardened, the bearings are worn, and the oil is degraded in shorter times. Hence, the failure in handling regular and timely cleaning and maintenance does not allow saving, but results in higher power consumption and increased operating costs. The intake system comprises of a panel filter outside the compressor, and an air filter and connection hoses inside the compressor.

### 3.3.2 Intake Control System

The intake control system comprises of an intake regulator, solenoid valves, control airline hoses and safety pressure switch. It uses the pressure switch to be able to obtain the pressure information in systems with electronic control module and inverter.

The intake control system aims at operating the compressor in a most cost efficient manner.

- The intake system remains closed at the time of compressor start-up, so that the overloading is prevented to ensure a smooth start.
- It ensures the compressor motor to rotate with very low power by re-closing the intake when the desired pressure values are reached; instead of frequent stop-and-go, air intake by the compressor only is prevented and economy is provided.
- Depending on the pressure of your utility line, the electronic control module or pressure switch controls the intake regulator, so that the compressor air intake is opened and closed by the intake regulator.
- When the compressor is stopped, the residual pressure in the separator tank acts in reverse direction to force the screw to turn in reverse direction. At that time, the intake regulator acts as a check valve to close the intake, so that both the screw reverse turning and the oil backflow are prevented.

### 3.4 Cooling and Lubrication System

The compressor cooling system comprises of a radiator, cooling fan, oil filter, separator tank, connection hoses and piping. Some models are optionally equipped with thermostatic valves.

- The pressure in the separator tank diverts the oil first towards the radiator, and then to the oil filter, and finally to the low pressure side of the screw unit.
- The oil passes through the oil filter to eliminate the harmful particles before entering the screw unit.
- The high amount of oil sprayed over the rotors rapidly turning inside the screw unit squeezes the air in rotors and adheres to the rotor surface for sealing. Furthermore, it is the same oil to lubricate the roller bearings that support the rotors.

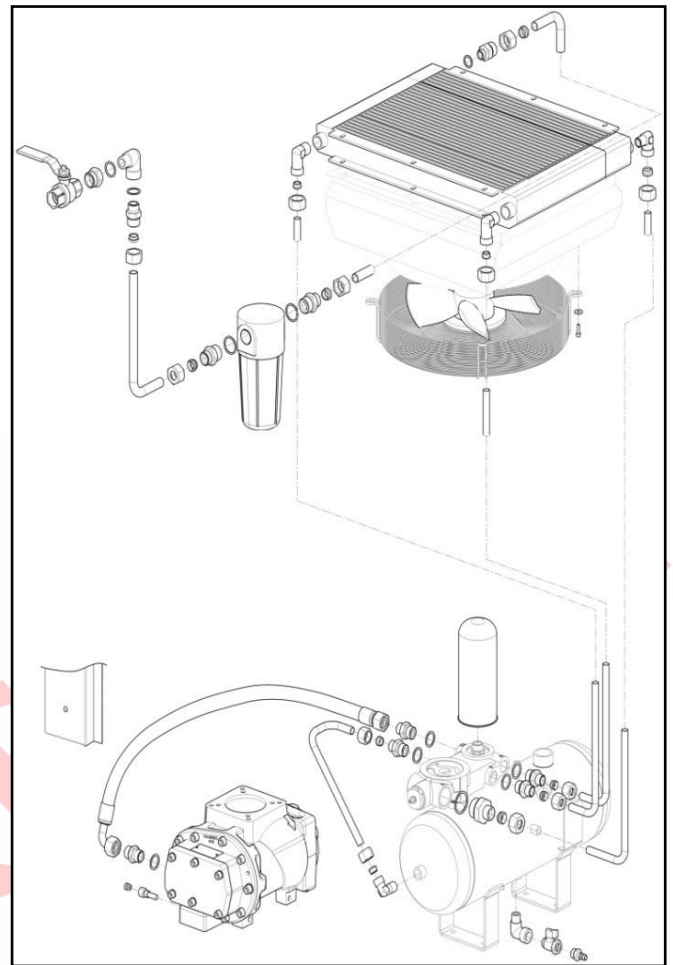
The oil has three basic functions in the screw compressors:

- To take on the heat induced by the rotor friction and air compression inside the screw unit, and transfer the same heat to such cooling components as radiator and water exchanger,
  - To form a film layer for sealing between the stator and the rotors.
  - To lubricate the rotors and the bearings that supports the rotors.
- The air-oil mixture is sprayed from the screw unit into the separator tank. Thanks to the special design of the separator tank, the air flow formed inside the tank ensures that the oil particles in the air-oil mixture become heavier by combining and are diverted onto the inner surface of the tank. In this way, the oil does not entirely attack onto the separator so that the separator smoothly operates for long times.
  - The pulverized oil constrained in the air is held when passing through the filter.
  - The oil separated air passes through the minimum pressure valve and then the cooling radiator, and finally dispatched into the airline.
  - And the oil remaining in the separator tank is cooled down in the cooling radiator, and then re-dispatched to the oil filter.

The separator tank has three functions:

To perform the oil pre-separation process with its special design,

- To maintain the compressor oil and
- To protect the separator filter.



**Figure 7** HBD 22 Belt Drive Cooling and Lubricating System



## 4 TECHNICAL DATA

### 4.1 Technical Specifications of the Compressor

Table 3 Technical Specifications of the Compressor

Compressor Models	Nominal Pressure P <sub>sig</sub> (Bar)	Capacity cfm (m <sup>3</sup> /min)	Operating Voltage V	Operating Frequency Hz	Ambient Temperature °F (°C)	Cooling Fan Flow Rate cfm (m <sup>3</sup> /h)	Oil Type	Oil Capacity Gallon (l)	
HBD 4	100 (6.9)	20.84 (0.59)	230/460	60	35°F to 110°F (+2 °C to 43°C)	2350 (3990)	SMART OIL 6000	1.4 (5)	
	125 (8.6)	18.72 (0.53)	230/460	60			SMART OIL 6000		
	150 (10.3)	17.3 (0.49)	230/460	60			SMART OIL 6000		
	175 (12)	15.19 (0.43)	230/460	60			SMART OIL 6000		
HBD 5	100 (6.9)	28.96 (0.82)	230/460	60		2350 (3990)	SMART OIL 6000		
	125 (8.6)	27.55 (0.78)	230/460	60			SMART OIL 6000		
	150 (10.3)	24.72 (0.70)	230/460	60			SMART OIL 6000		
	175 (12)	23.31 (0.66)	230/460	60			SMART OIL 6000		
HBD 7	100 (6.9)	43.79 (1.24)	230/460	60		2330 (3960)	SMART OIL 6000		
	125 (8.6)	39.20 (1.11)	230/460	60			SMART OIL 6000		
	150 (10.3)	33.90 (0.96)	230/460	60			SMART OIL 6000		
	175 (12)	28.25 (0.8)	230/460	60			SMART OIL 6000		
HBD 11	100 (6.9)	67.8 (1.92)	230/460	60		4267 (7250)	SMART OIL 6000		1.6 (6)
	125 (8.6)	62.51 (1.77)	230/460	60			SMART OIL 6000		
	150 (10.3)	55.44 (1.57)	230/460	60			SMART OIL 6000		
	175 (12)	50.5 (1.43)	230/460	60			SMART OIL 6000		
HBD 15	100 (6.9)	80.52 (2.28)	230/460	60	4267 (7250)	SMART OIL 6000			
	125 (8.6)	74.87 (2.12)	230/460	60		SMART OIL 6000			
	150 (10.3)	69.57 (1.97)	230/460	60		SMART OIL 6000			
	175 (12)	65.69 (1.86)	230/460	60		SMART OIL 6000			

Compressor Models	Nominal Pressure Psig (Bar)	Capacity cfm (m <sup>3</sup> /min)	Operating Voltage V	Operating Frequency Hz	Ambient Temperature °F (°C)	Cooling Fan Flow Rate cfm (m <sup>3</sup> /h)	Oil Type	Oil Capacity Gallon (l)
<b>HBD 15L</b>	<b>100</b> (6.9)	<b>96.76</b> 2.74	230/460	60	<b>35°F to 110°F</b> (+2 °C to 43°C)	<b>2943</b> (5000)	SMART OIL 6000	<b>2.9 (11)</b>
	<b>125</b> (8.6)	<b>86.87</b> 2.46	230/460	60			SMART OIL 6000	
	<b>150</b> (10.3)	<b>76.63</b> 2.17	230/460	60			SMART OIL 6000	
	<b>175</b> (12)	<b>70.98</b> 2.01	230/460	60			SMART OIL 6000	
<b>HBD 18</b>	<b>100</b> (6.9)	<b>118.66</b> 3.36	230/460	60		<b>2943</b> (5000)	SMART OIL 6000	
	<b>125</b> (8.6)	<b>105.95</b> 3.0	230/460	60			SMART OIL 6000	
	<b>150</b> (10.3)	<b>93.94</b> 2.66	230/460	60			SMART OIL 6000	
	<b>175</b> (12)	<b>88.29</b> 2.50	230/460	60			SMART OIL 6000	
<b>HBD 22</b>	<b>100</b> (6.9)	<b>139.49</b> 3.95	230/460	60		<b>2943</b> (5000)	SMART OIL 6000	
	<b>125</b> (8.6)	<b>127.49</b> 3.61	230/460	60			SMART OIL 6000	
	<b>150</b> (10.3)	<b>113.36</b> 3.26	230/460	60			SMART OIL 6000	
	<b>175</b> (12)	<b>107.36</b> 3.04	230/460	60			SMART OIL 6000	
<b>HBD 30</b>	<b>100</b> (6.9)	<b>195.32</b> 5.53	230/460	60		<b>3672</b> (6240)	SMART OIL 6000	<b>3.4 (13)</b>
	<b>125</b> (8.6)	<b>170.6</b> 4.83	230/460	60			SMART OIL 6000	
	<b>150</b> (10.3)	<b>156.11</b> 4.42	230/460	60			SMART OIL 6000	
	<b>175</b> (12)	<b>141.25</b> 4.00	230/460	60			SMART OIL 6000	
<b>HBD 37</b>	<b>100</b> (6.9)	<b>243.35</b> 6.89	230/460	60	<b>3672</b> (6240)	SMART OIL 6000		
	<b>125</b> (8.6)	<b>219.69</b> 6.22	230/460	60		SMART OIL 6000		
	<b>150</b> (10.3)	<b>200.62</b> 5.68	230/460	60		SMART OIL 6000		
	<b>175</b> (12)	<b>180.1</b> 5.10	230/460	60		SMART OIL 6000		

\*The above information is description-qualified and the company reserves the right to change. For failures and ordering spare parts refer to the diagram and parts list at the end of this book. Mentioning the type and serial number of your compressor when ordering will help both you and our company for the quickest and most accurate information.

## 4.2 HBD Series Technical Values

Table 4 HBD Series Technical Data

MODEL	MOTOR POWER (kW/HP)	AIR RECIEVER TANK SIZE Gal (l)	DIMENSIONS DxWxH (mm)	DIMENSIONS DxWxH (in)	AIR OUTPUT PIPE DIAMETER (in)	WEIGHT (kg)	WEIGHT (lbs)
HBD 4	4/5.5	80 (303)	1932x550x1350*	76.1x21.6x53.8*	NPT (1/2")	350	772
			1932x550x1350**	76.1x21.6x53.8**	NPT (1/2")	320	705
			875x550x860***	34.4x21.6x33.8***	NPT (1/2")	180	397
HBD 5	5/7	80 (303)	1932x550x1338*	76.1x21.6x52.7*	NPT (1/2")	372	820
			1932x550x1338**	76.1x21.6x52.7**	NPT (1/2")	340	750
			1025x550x835***	40.4x21.6x32.8***	NPT (1/2")	200	441
HBD 7	7/10	80 (303)	1938x550x1457*	76.3x21.6x57.1*	NPT (3/4")	357	787
			1938x550x1457**	76.3x21.6x57.1**	NPT (3/4")	325	716
			1025x550x835***	40.4x21.6x32.8***	NPT (3/4")	185	407
HBD 7	7/10	120 (454)	1986x650x1587*	78.2x25.6x62.5*	NPT (3/4")	397	875
			1986x650x1587**	78.2x25.6x62.5**	NPT (3/4")	365	805
			1025x550x835***	40.4x21.6x32.8***	NPT (3/4")	225	496
HBD 11	11/15	120 (454)	1986x650x1587*	78.2x25.6x62.5*	NPT (3/4")	522	1151
			1986x650x1587**	78.2x25.6x62.5**	NPT (3/4")	490	1080
			1217x650x915***	47.9x25.5x36***	NPT (3/4")	300	661
HBD 15	15/20	120 (454)	1986x650x1587*	78.2x25.6x62.5*	NPT (3/4")	562	1239
			1986x650x1587**	78.2x25.6x62.5**	NPT (3/4")	530	1168
			1218x650x915***	47.9x25.5x36***	NPT (3/4")	340	750
HBD 15L	15/20	NA	1275x850x1465	50.2x33.5x57.7	NPT (1")	480	1058
HBD 18	18/25	NA	1275x850x1465	50.2x33.5x57.7	NPT (1")	500	1102
HBD 22	22/30	NA	1275x850x1465	50.2x33.5x57.7	NPT ( 1")	530	1168
HBD 30	30/40	NA	1605x1030x1750	63.2x40.6x69.1	NPT (1 1/4")	790	1742
HBD 37	37/50	NA	1605x1030x1750	63.2x40.6x69.1	NPT ( 1 1/4")	830	1830

\* With dryer, \*\* With tank, \*\*\* Without tank

4.3 Plates located on your compressor

4.3.1 Plate on the Case

<b>hertz</b> KOMPRESSOREN		3320 Service St. Charlotte, NC 28206 USA P: +1-704-579-5900 F: +1-704-579-5997 www.hertz-kompressoren.com		<b>CE</b> 2287	
TYPE TIPO		SERIAL NO NO. SERIAL			
PRESSURE PRESIÓN		PSI	MANUF. DATE FECHA DE FABRIC.		
CAPACITY CAPACIDAD		CFM	VOLTAGE VOLTAJE	460V AC/3Ph. PE~	
NOM. POWER POTENCIA NOM.		kW hp	FREQUENCY FRECUENCIA	60 Hz	
WEIGHT PESO		lbs			

Figure 8 Plate on the Case

4.3.2 Plate on the Oil Tank (Without ASME)

<b>hertz</b> KOMPRESSOREN		3320 Service St. Charlotte, NC 28206 USA P: +1-704-579-5900 F: +1-704-579-5997 www.hertz-kompressoren.com		<b>CE</b> 0408	
Manufactured and Certified by DALGAKIRAN A.Ş. TURKEY					
Max. Pressure PS Presión máxima PS		PSI	Act. Thick Vessel Recipiente espesor real		in
HYD. Test Pressure Ph HYD. Presión de prueba Ph		PSI	Corrosion All Corrosión general		in
Max. Temp. Tmax. Temperatura máxima Tmax.	100/212	°F	Manufacture Date Fecha de fabricacion		
Min. Temp. Tmin. Temperatura mínima Tmin	-10/+14	°F	Serial No No Serial		
Volume V Volumen V		gal.	Design Code Código de diseño	EN 286-1	

Figure 9 Plate on the Oil Tank

4.3.3 Plate on the Oil Tank (With ASME)

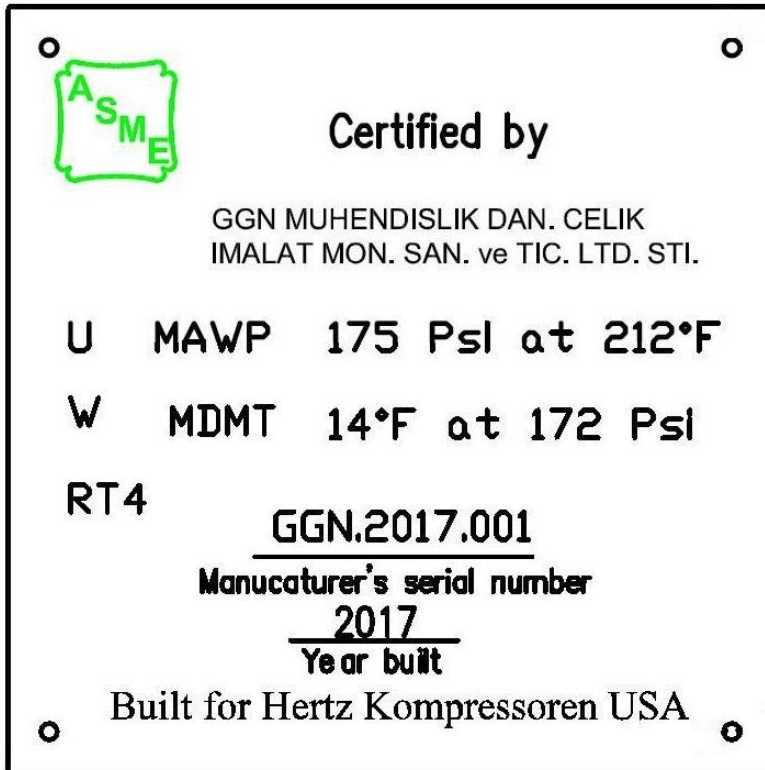


Figure 13 Plate on the Oil Tank for ASME

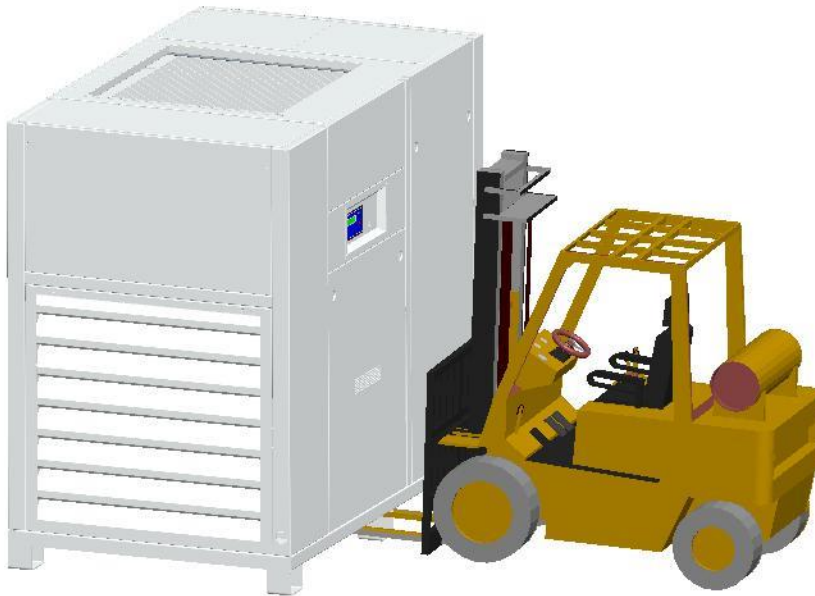
### 5 TRANSPORTATION, HANDLING, INSTALLATION

#### 5.1 Transportation and Handling

##### 5.1.1 Transportation

- Be sure to check the compressor for any possible damage and deficient parts at the time of delivery.
- In case of any damage on the compressor package, notify your logistics company first and then HERTZ KOMPRESSOREN.

##### 5.1.2 Handling

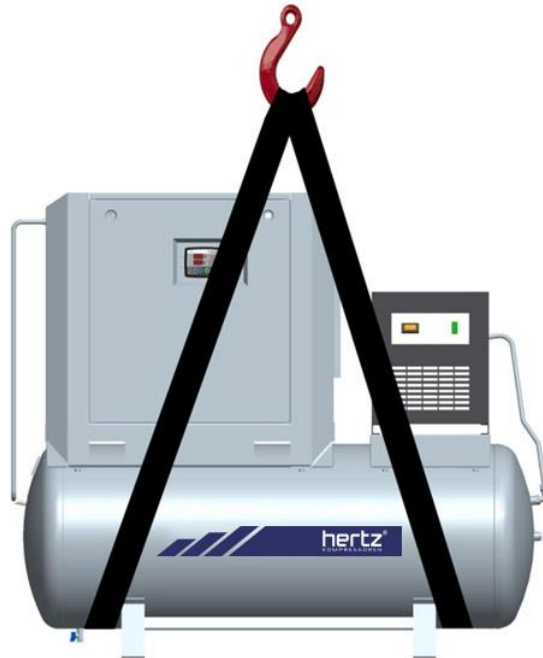


**Figure 10** Transportation Compressor with Forklift

- Use a forklift to lift the compressor.
- Before lifting the compressor, be sure that the forklift supports are properly adjusted.



**Figure 11** Transportation of Compressor with Forklift



**Figure 12** Transportation of Compressor with Hanger



**Figure 13** Transportation of Compressor with Hanger

- While the compressor is carried by forklift, pay attention to carry it not higher than necessary for slow and easy handle (Figure 10).
- Before lifting a compressor on pallets by a forklift, be sure that the compressor has been strongly and safely mounted on the pallets. Otherwise, the compressor might fall down from the pallets, resulting in damages and injuries.
- If there is no forklift or the available forklift does not properly work in the installation site, use a crane and hanger as shown on the Figure 12-13 to lift the compressor.
- Recheck any screws and bolts that might have loosen and lost in transit.
- Be sure that all the ropes, hooks and similar equipment to be used for lifting and supporting are of such quality and strength as to safely carry the compressor. If you do not know the exact weight the compressor before transportation and handling, do not attempt carrying it before learning its actual weight.
- Act slowly and carefully when carrying the compressor. Any crash and falling may result in such damages as may jeopardize proper operation of the internal parts and components of the compressor.
- Be sure that there is no person standing under the compressor when lifting up and down.
- The compressor should be placed on a surface of adequate capacity to carry the compressor weight.



### 5.1.3 Storage

If the compressor is to be stored before installation, do not open its package, and check the following conditions:

- The storage area temperature should be of 35 °F (+2 °C) and 110 °F (+43 °C).
- The storage area should be dry, covered, shockproof, and resistant to the weather conditions.
- HERTZ COMPRESSOREN could be safely stored for maximum 6 months. If you are storing more than 6 months, apply HERTZ COMPRESSOREN long term storage procedure.

### 5.1.4 Long Term Storage Procedure

#### 5.1.4.1 Storage Preparation

- Remove air intake filter and store in a clean secure area.
- Drain oil from sump tank and plug.
- Fill air end with the original lubricant as indicated by decal on the sump tank. Plug or blind flange the inlet connection.
- On water cooled packages, drain water from all coolers and piping and fill with 50/50 Glycol/Water solution. Plug inlet and outlet connections. (Not required for air cooled machines).
- On air side of coolers, moisture separators and traps, blowout with dry air to remove moisture. Plug connections.
- Blow control air lines with dry air to remove moisture. Seal or plug openings on blow-down valve and relief valves.
- Tag all plugs which must be removed before start-up.
- Place desiccant in starter/control box. If the box has gasket door - check integrity for sealing; correct if necessary. If the box does not have a gasket door, seal the box seams with moisture resistant tape to prevent moisture ingress.
- Megger motor. Record and place reading on a tag secured to the motor eye bolt.
- Grease motor bearings.
- Complete any additional storage requirements per the motor manufacturers recommendations.
- Tape copy of storage instructions in plastic-envelope to outside of package or cover.

**5.1.4.2 Storage**

- It is preferred that the package be stored in a controlled environment. If this is not possible, as a minimum it should be protected from the elements with an adequate cover which will not allow condensate to collect within it.
- Monthly, rotate the drive shaft 1 1/2 turns in opposite direction to the normal rotation.
- Maintain motor in accordance with motor manufacturer recommendations during storage period.

**5.1.4.3 Startup**

- Follow start-up instructions in the motor manual.
- Megger the motor. Compare with tag on motor eye-bolt taken at time of storage. See motor manufacturers recommendations for reference.
- If water cooled, remove glycol from coolers and associated piping.
- Remove all plugs where tagged.
- Manually rotate the motor shaft in the direction of rotation to remove fluid from the aircend.
- Drain the sump and plug.
- Check minimum pressure valve for free movement.
- Fill the sump with a fresh charge of compressor fluid.
- Install air filter, blowdown valve, relief valve, and any other components that were removed in preparation of, or during, storage.
- Remove dessicant from starter/control box.
- Follow the compressor manual for normal start-up procedure.

## 5.2 Compressor Placement and Connections



**Figure 14** Compressor Placement in Room

- The compressor should be placed on a straight and smooth surface of adequate capacity to carry the compressor weight. When the compressor is placed on such a surface, even though not necessary, we recommend to anchor the machine to the surface.
- The compressor room should be easily accessible and well illuminated.
- Leave an adequate service area around the compressor with a clearance of from the lateral walls and ceiling (See Page 32-33 for all dimensions).
- Any necessary actions should be taken against fire and corrosion hazards in the operating site.
- No piping load (tensions caused by tight connections or seasonal temperature differences) should be transferred onto the compressor through external connections.
- If the air installation takes place above the compressor level, do not install the compressor connection pipe below the main pipeline, as the water to accumulate at the compressor outlet could flow back during stop and empty operation, and the O-rings and gaskets in the valves could be damaged.
- Be sure that your air installation equipment, pipes and fittings are suitable to the operating pressure, and free from and damage or defect.

- Select the air installation pipe diameter, dryer and line filters in compliance with your air utility capacity. (It would be appropriate to use larger capacity pipes for your installation in consideration of the future possible growth and capacity increase of your company).
- Install a separate line (water discharge line) for the condensate discharge of the filter, dryer and air tank, so that the floor of the compressor room would not be wet unnecessarily.
- Add an air outlet and power socket for general purpose in the compressor room.
- The compressor has been designed for indoor use. Available room layout and arrangement pattern is as shown in Figure 14.
- Get contact with the authorized service or sales representative for any different requirements on the compressor or air system.
- Select the air installation in consideration of the customer requirements. It would be preferable to install a loop instead of a straight one. The pressure loss would likely increase depending on the pipe cross-section at the end of the straight lines. Where there is a receiver that has high interim consumption or periodical shock consumption, the pressure losses could be experienced.
- You can use the below formula to calculate the ideal pipe diameter for your air installation:
- The valves, reducers, elbows, T-bar etc. used in the air installation result in pressure loss in the products. Hence, your design of installation must take into account the pressure loss of each connection element. In this context, you can see at the following table of equivalent pipe lengths how many meters of pipe are approximately needed for each element.

**Table 5** Schedule of Equivalent Pipe Lengths

Equivalent Pipe Lengths Schedule							
TYPE	Pipe Diameter (ft)						
	1"	1 1/2"	2"	3"	4"	5"	6"
Stop Valve	0.98	1.64	2.29	3.28	4.92	6,56	8.20
Angled Elbow	4.92	8.2	11.48	16.4	22.96	32.8	49.2
Elbow	0.984	1.64	1.968	3.28	4.92	6.56	8.2
Large Elbow	0.492	0.82	0.984	1.64	2.624	3.28	4.92
T-bar	6.56	9.84	13.12	22.96	32.8	49.2	65.6
Reducer (2/1)	1.64	2.296	3.28	6.56	8.2	11.48	13.12

Example: Using the same installation, for which the pipe length was found to be 328 ft in the *Table 5-6-7-8*, when you use 8 pieces of elbows of the same internal diameter of 1" , and 6 pieces of Tbar, and 2 pieces of stop valves, to keep the pressure loss at the same level, you can use the following formula:

$(8 \times 0.98) + (6 \times 6.56) + (2 \times 0.98) = 49.82 \text{ft}$ , and  $328 - 49.82 = 278.18$  foot maximum pipeline, using the above components.

### 5.3 Compressor Room Ventilation

- To keep the operating temperature at a certain value, place the compressor at a place of adequate air flow. The temperature of the compressor operating room should not be less than 35 °F (2 °C), nor higher than 104 °F (40 °C). Do not place the compressor in any place where the temperature is less than 35 °F (+2 °C). Heat the compressor room if necessary.
- If you think that there would be no adequate air flow in the compressor operating room, you are suggested to arrange appropriate room ventilation, or discharge the hot air emitted from the compressor outside the compressor room. In this arrangement, the hot air emitted from the compressor room should not be returned to the compressor room. Hence, the hot air discharge and the room air inlet should not take place at the same front.
- Hot air outlet duct, should be bigger than compressor's hot air outlet cover and shouldn't be too long or sinuous as to create large losses.
- If it is wanted to operate the compressor without discharge whole inside the room, and discharge the hot air to outside the room through a fan, a fan of the equivalent capacity with the fan on the compressor would be simply sufficient. Place this fan as near as possible to the hot air outlet of the compressor.
- The area of clean air intake should roughly and practically be 1.5 to 2 folds of the compressor intake grill field.
- The compressor hot air outlet should not take place on the same wall with the windows where the fresh air could enter the room.
- Take action to keep the compressor cooling radiator away from the direct sunlight or regional strong winds.
- Prevent the compressor room to be exposed to hazardous gas and steam as well as the heat and abrasive dusts emitted by such equipment as the central heating boiler or generating sets.

## 5.4 Electrical Connection

Have the electrical connections of the compressor made by a qualified electrician. Electrical diagrams and spare parts lists of your compressor are provided in addition to the manual.

Your compressor has been designed to work in three-phase systems. Voltage and frequency information is located on the plate of your compressor. The information on the supply cable is provided for your information in the following table.

Incorrectly setting the control transformer poses a risk to the trouble-free operating of the system. Checking the setting of the control transformer is part of commissioning and part of regular inspection/maintenance because the supply voltage can change.

The correct setting should be checked by measuring the control transformer's output voltage while the system is running with a load.

### 5.4.1 HBD Series Cable Section

- It is however highly recommended to keep the voltage drop over the supply cables at nominal current below 5% of the nominal voltage.
- Branch circuit breaker must be installed on site. It is suggested on electrical wiring diagram.
- Calculation method according UL 508A, table 28.1 column 5: allowable ampacities of insulated copper conductors (167 °F (75 °C)).
- The gauges named in the table correspond to those in UL508A. (Rubber sheathed cable at 86 °F and max. 55 yd (50m) cable length).



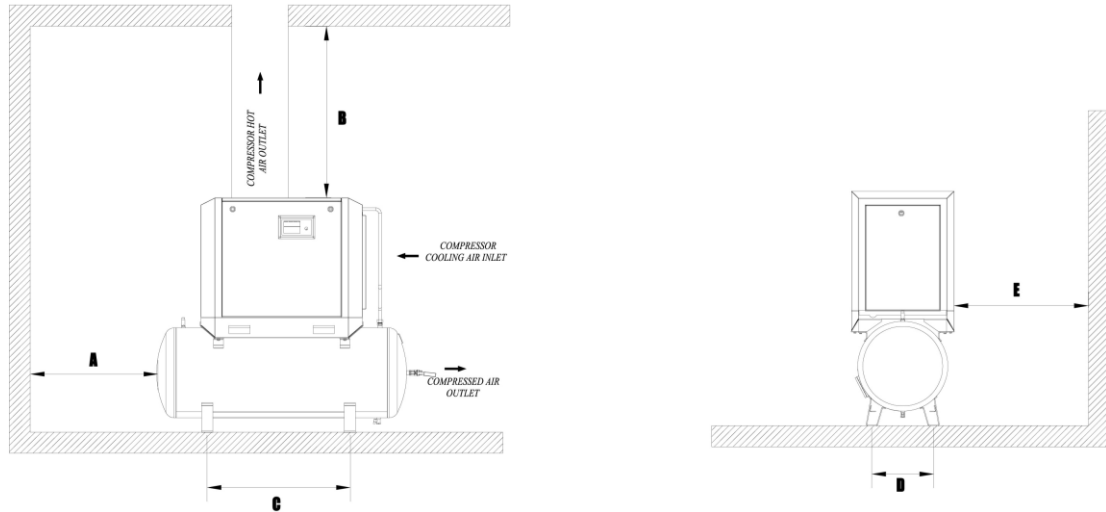
Local regulations remain applicable if they are stricter than the values proposed below.

**Table 6.1** HBD Cable Sections

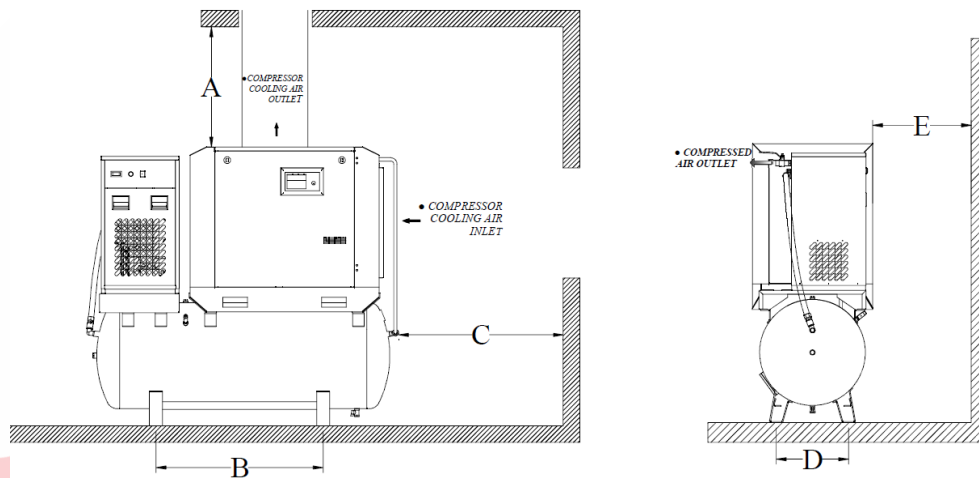
MODEL	CABLE SECTION(AWG) 230V	CABLE SECTION(AWG) 460V
HBD 4	4xAWG10	4xAWG10
HBD 5	4xAWG10	4xAWG10
HBD 7	4xAWG8	4xAWG10
HBD 11	3xAWG6+AWG8	4xAWG10
HBD 15	3XAWG4+AWG8	4xAWG8
HBD 18	3XAWG3+AWG8	4xAWG8
HBD 22	3XAWG2+AWG6	3xAWG6+AWG8
HBD 30	3XAWG1/0+AWG6	3XAWG4+AWG8
HBD 37	3XAWG2/0+AWG6	3XAWG3+AWG8

\* Power supply cables to be sized and installed by a qualified electrician. If different length of power cable is required, the cross-section of the power cable may need to be changed. In this case please contact your local service organization.

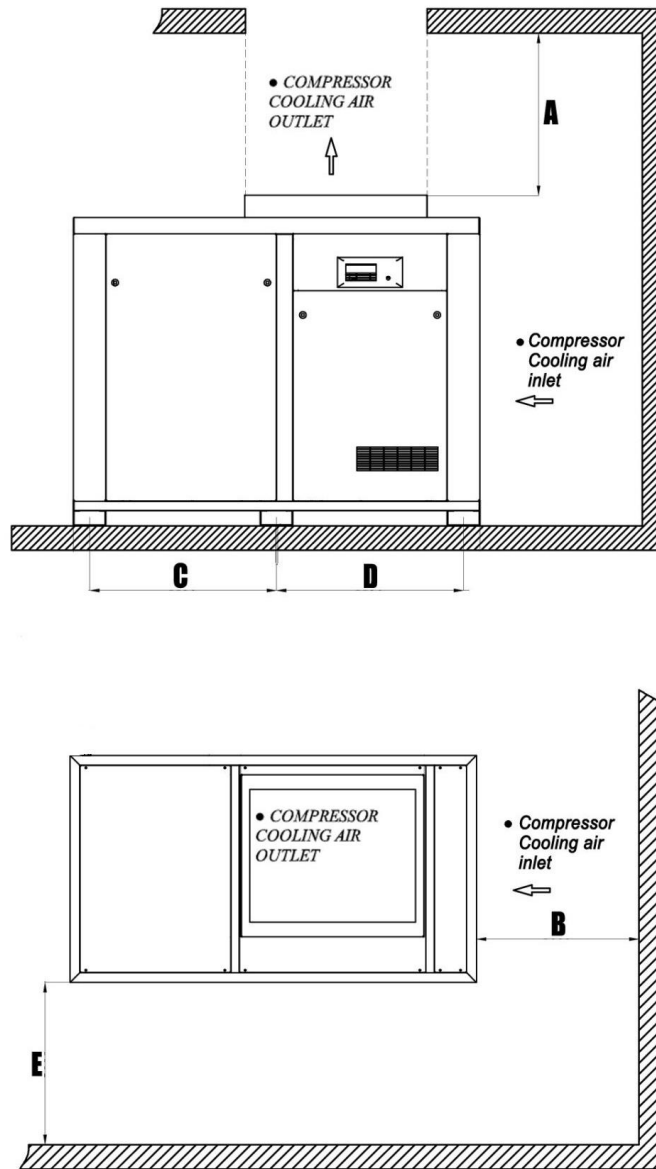
5.5 Compressor Layout Plans



Compressor Model	A (inch/mm)	B (inch/mm)	C (inch/mm)	D (inch/mm)	E (inch/mm)
HBD 4	39.37(1000)	39.37 (1000)	31.49(800)	14.56(370)	39.37(1000)
HBD 5			39.96(1015)	17.32(440)	
HBD 7					
HBD 11					
HBD 15					



Compressor Model	A (inch/mm)	B (inch/mm)	C (inch/mm)	D (inch/mm)	E (inch/mm)
HBD 4	39.37(1000)	39.37(1000)	39.37(1000)	14.56(370)	39.37(1000)
HBD 5		39.96(1015)		17.32(440)	
HBD 7					
HBD 11					
HBD 15					



Compressor Model	A (inch/mm)	B (inch/mm)	C (inch/mm)	D (inch/mm)	E (inch/mm)
HBD 4	39.37(1000)	39.37(1000)	30.7(780)	19.68(500)	39.37(1000)
HBD 5					
HBD 7					
HBD 11			35.43(900)	23.62(600)	
HBD 15					
HBD 15L			44.33(1126)	31.49(800)	
HBD 18					
HBD 22			28.07(713)	28.07(713)	
HBD 30					
HBD 37					



## 6 OPERATION

### 6.1 General

The system has been provided with an electronic control module to easily monitor the operating and setting values of the compressor. Any necessary electrical and mechanical measures have been taken for the operating safety. Following are listed some equipment and components of the compressor for your information.

### 6.2 Some Compressor Equipment

- **Control Module:** It is an electronic unit on which all the alarms, failures, maintenance times and intervals could be monitored.
- **Screw Unit:** It is the compressor unit that produces compressed air.
- **Motor:** It provides the mechanical excitation required for the screw unit.
- **Coupling:** It is the machine part that transfers the mechanical drive force from the motor to the machine.
- **Intake regulator:** It is placed on the screw unit. It controls the compressor air intake for loaded and unloaded conditions.
- **Control Solenoid Valve:** It is placed on the block connected to the intake regulator. It checks the air delivered to the intake regulator to shift the compressor to loaded or idle position.
- **Safety Valve:** It is settled on the compressor oil tank. When the pressure inside the compressor oil tank extremely increases due to a failure, it releases the pressure for safety.
- **Minimum Pressure Valve:** It is placed on the separator tank cap. In the compressor; just from the beginning of the loaded operation, it keeps the compressor internal at minimum 29-43.5 psig (2 – 3 bar) for oil circulation. Furthermore, it prevents the pressure backlash from the air tank into the compressor in idle operation and during shutdown of the compressor.
- **Radiator:** It cools down the oil circulating inside the compressor oil circuit and the air generated by the compressor.
- **Emergency Stop Button:** Press it to stop the compressor in case of emergency. The button has been designed to keep locked when depressed. Slightly turn clockwise to set it in normal position.
- **Gauge:** Shows the gas pressure.
- **Pressure Sensor:** It electronically converts the pressure data into the analog signal, and communicates to the control module.
- **Temperature Sensor:** It electronically converts the temperature data into the analog signal, and communicates to the control module.

- **PTC:** It is embedded between the motor windings. It stops the compressor when the windings are over heated and prevents the motor windings from burning.
- **Pressure Switch:** The safety pressure switch provides security by stopping the compressor in case that the internal pressure exceeds the value set for any reason.

### 6.3 Start-up Procedure

- Check the power and air connections before starting up the compressor.
- Check the internal parts and connections of the compressor. Be sure that it was not damaged in transit.
- Be sure that the cooling air inlet and outlet of the compressor are not closed at all. Do not cover the compressor by cloth, nylon, etc. If covered, do not attempt starting up the compressor before removing the cover.
- Inside the power board of the compressor takes place a “phase control relay” that continuously controls the power phases. If you connect the phases in wrong order or there is any voltage imbalance or lack of connection, the phase control unit would not allow the compressor to start. You will see a visual sign of phase error on the control panel display. In case of the reverse connection of phase ends, cut the power and reverse the two phase cable connections of the compressor mains line. If there is a phase failure or imbalance, the problem is related to the mains network, so that you should report it to the authorized electrical staff or the competent authorities.
- After completion of the compressor power and air installation works, call the authorized service for start-up. The service staff will perform overall checks, commission the compressor, and provide useful information on the system and compressor maintenance.
- Check oil level. Transparent hose is connected on the separator tank body to easily monitor the oil level. Check the oil level when the compressor is in stop mode. The oil level may change in the course of operation.
- If the oil level is low, filled it to full line.
- Energize the compressor. However, be sure to check if the compressor turns in right direction. **The compressor turning direction should be absolutely checked in start-up.** Remove any necessary covers.
- Inspect the air end driven, and press the “**Start**” button, and let the compressor works for a short time (1-2 sec), and then immediately press the “**Emergency Stop**” button to shut down the compressor. It should turn in the arrow direction when looking from the screw shaft side (see arrow direction just above the screw).
- If the turning direction is correct, thoroughly open the compressor output valve, and restart the compressor.
- Shut down the valve at the air tank outlet to fill up the tank.

- Check the pressure raise on the compressor control unit display or on the gauge on the control panel.
- Check if the pressure reaches the preset value, and the compressor is set in idle position.
- If the air pressure in the tank does not reduce, the compressor would automatically stop a certain time after its start up in idle position. Wait for a few minutes, and then open the tank outlet valve to check the compressor switches into the load position at the preset pressure value.
- 10-15 minutes later, check the operating temperature of the compressor, and be sure that it is normal 176-194°F (80-90°C). Stop the compressor, and de-energize it, and visually inspect the internal parts and components of the compressor. This check is important against any possible oil leak or loosening.
- Your compressor has undergone an overall functioning and safety test in operating condition. The initial checks aim at preventing any possible damage on the compressor in transit or during installation. If you do not detect any problem at the end of all the checks, you can start up the compressor.

#### 6.4 Daily Start Procedure

You can perform a few simple daily checks before starting up the compressor under normal conditions. The daily maintenance procedure is described in detail in the 9th chapter.

- Check if there is any failure signal on the compressor panel.
- Inspect the internal parts and components for oil leaks or any possible damages.
- Start up the compressor, and monitor its operation for a short time.
- Check the front panel to see that there is no failure sign, and that the operating pressure and temperature values are normal.
- When the compressor works under load, see the oil flow in the separator and oil return line (scavenge).

As such simple checks would allow you early detect any possible errors and failures on the compressor, you would not suffer any time loss due to unnecessary shutdowns for failure.

## 6.5 Compressor Start-up in cold and after long shutdowns



Please contact your authorized service representative.



*Figure 15 HBD 15 With Dryer and Tank Model Overview*

## 7 FAILURES

### 7.1 General

The information in this section has been compiled on the experiences gained through field service operations and factory tests.

The failure signs, symptoms and causes are listed by the frequency of feedback from the service technicians.

As the systems and failures are usually correlated as of the compressor nature, it is a must to clearly understand the actual cause of the failure before attempting any repair or part replacement.

It would be useful to perform a comprehensive visual check before taking any action for the experienced problems.

A good monitoring of the failures would make it possible to prevent any possible damages to occur in the course of repair works.

In particular:

- Unless otherwise is stated, perform all the checks when the compressor power is completely disconnected.
- Check all the power connections for any possible loosening.
- Check any parts and components that may be affected by short circuit or temperature.
- Check any possible damages and loose points on the hoses, pipes and connections in the air and oil circuits.

If the problem persists in spite of all actions taken as per this manual for any failure, please contact our service department.



**It is the most reliable action to apply to our authorized service stations for any troubleshooting, maintenance and repair works for the safety of your compressor and facility.**



**Any attempt without sound knowledge may create adverse effects, and result in unnecessary shutdown of your plant facility and high cost damages.**

## 7.2 Failures, Reasons and Solutions

Table 7 Failures and Solutions

FAULT	CAUSE	REMEDY
<b>Compressor does not operate.</b>	No power.	Check the voltage at the main fuse input.
	Control and input fuse blown.	Check the fuses.
	Mains voltage low, imbalanced or the phases are reverse.	Check the warning message on the control panel.
	The compressor stopped for any failure.	Check the warning message on the control panel.
	The compressor is started without discharging the internal pressure.	The compressor does not start for 1 minute once it is stopped in order to release the internal pressure. Try to start the compressor again 1 minute later.
<b>The compressor hardly operates</b>	Insufficient section of the input feeder cable	This problem is observed in the installations where the cables of improper thickness are used. With the compressor being in STOP position, measure the input voltage while continuing measurement. If the voltage reduces to less than 5% (460>437 or 230>218) of the required voltage level, it means that the cable section is insufficient. Use cables of appropriate section for connection.
	Low voltage.	If the mains voltage is %5 or more less than the preset voltage setting of the compressor, it is understood that the problem is caused by the mains voltage or the installed power of your facility.
	Low ambient temperature.	If the ambient temperature is less than 35 °F (0°C), the oil will be thickened, so the compressor will start under a load and possibly trip overloads.
	Mechanical problem in the motor or screw	De-energize the compressor, and check if the coupling easily turns. If it turns abnormally difficult, it means that there is a mechanical failure in the motor or screw; call the authorized service station.
	Intake regulator failure.	The intake regulator clamp is closed at the time of start-up; it may remain open for a mechanical problem, so that the compressor tries to start against load, and therefore hardly starts up. With the compressor in STOP position with no internal pressure, check that the clam is fully closed. The clamp might be stuck in open position. Call the authorized service station.

FAULT	CAUSE	REMEDY
<p><b>Compressor doesn't generate air.</b></p>	Air filter clogged.	Check the air filter and replace if necessary.
	Compressor does not shift from star to delta	The star-delta setting may be changed. Check the setting (4-8 seconds). Turn on the compressor, and follow the contactors on the power board. It should release K3 contactor and pull K2 contactor at the end of the preset period of time. If not, the contactor coil terminals may be loose, or the coil may be burnt.
	Intake regulator failure.	The intake regulator clamp may be stuck, and can't open completely. Call the authorized service station.
	Minimum pressure valve fails	The minimum pressure valve O-ring and gaskets may be damaged, and therefore cannot hold the internal pressure. If the internal pressure does not rise, the intake regulator does not open, so that the compressor is not switched to the load position. Replace the gasket and O-rings.
	Intake regulator solenoid failure.	Check the control power supply to the solenoid valve (in loaded operating mode). If the power supply is normal; it means that the solenoid coil is burnt. Replace the coil.
	Rapid discharge solenoid valve failure.	Check the control power supply to the solenoid valve (during operation of the compressor). If the power supply is normal; it means that the solenoid coil is burnt. Replace the coil.
	There is leak in the air line connections.	Check the connections of the hoses and pipes for loose connections. Replace any damaged connections.
<p><b>The pressure value of the compressor exceeds the set value.</b></p>	Pressure setting changed.	Check the pressure settings.
	Intake regulator failure.	The intake regulator clamp may be stuck in opened position. Call the authorized service station.
	Intake regulator solenoid failure.	If the solenoid valve is energized normally, the solenoid valve might have been stuck. Call the authorized service station.

FAULT	CAUSE	REMEDY
<p><b>Compressor cannot reach the maximum pressure.</b></p>	<p>The system air consumption is higher than the compressor capacity.</p>	<p>Close the tank outlet valve to see that the compressor can reach the maximum pressure; and observe that the pressure rises and the compressor STOPS at the set pressure value. If the pressure does not rise, there must be another failure. Call the authorized service station.</p>
	<p>There is leak in the air line connections.</p>	<p>Check your airline and connections.</p>
	<p>Excessive dirt in the air filter.</p>	<p>Stop the compressor and check the air filter, replace it if it is dirty.</p>
	<p>Intake regulator failure.</p>	<p>The intake regulator clamp may be stuck, and can open very less. Call the authorized service station.</p>
	<p>Screw unit failure.</p>	<p>If the screw unit is damaged, a loud working sound is heard. Call the authorized service station.</p>
<p><b>Compressor consumes excessive oil.</b></p>	<p>Scavenge orifice clogged.</p>	<p>While the compressor is running, check the oil flowing through the scavenge monitoring hose. If you cannot see the oil flowing, stop the compressor. Clean the scavenge orifice with a thin wire or compressed air. Start the compressor and check the oil flow; top up the oil if necessary.</p>
	<p>Separator element damaged</p>	<p>If you detect oil leaking from the air tank at the time of water discharge, replace the separator element.</p>
	<p>Oil leak in the compressor body.</p>	<p>Oil accumulation is seen on ground under the leaking part. Check and tighten the connections in the oil circuit. If the oil leak persists, call the service station.</p>
	<p>The compressor is exposed to excessive heat.</p>	<p>Where the ambient temperature is over <u>104°F (+40 °C)</u> and the compressor unit is exposed to direct sunlight, the oil loss may increase since the expansion will increase and the oil will become thinner than usual.</p>
	<p>Recommended oil is not used.</p>	<p>Use of oil of a different type or with different specifications might result in damages in the course of time; use the recommended oil.</p>



FAULT	CAUSE	REMEDY
<b>Safety valve opens.</b>	Operating pressure settings changed.	Check the pressure settings and/or the safety pressure switch settings
	Separator clogged.	Check the internal pressure gauge while the compressor is running at full load or a value close to it. If the internal-external pressure difference is close 21.7 psig (1.5 Bar), then your separator is clogged. Replace the separator.
	Intake regulator failure.	The intake regulator clamp may be stuck in opened position. Call the authorized service station.
	Intake regulator solenoid failure.	Check the control power supply to the solenoid valve (in loaded operating mode). If the power supply is normal; it means that the solenoid coil is burnt. Replace the coil.
	Safety valve settings changed.	If the safety valve opens earlier than the set value although it is set properly, replace the valve.
<b>The main motor thermal switch stops the compressor.</b>	Thermal switch fails, or settings are wrong.	Use a clamp-on ammeter (with the compressor in full load) to check if the current passing through the thermal switch is balanced and in normal limits (current difference less than 10% between phases). If the thermal switch opens before the preset current value, it is faulty. Replace the switch.
	Low voltage.	If the mains voltage is 5% or less below the set voltage value, check the mains or facility installed power.
	Compressor passes over the pressure settings.	Take the measures mentioned above.
	Separator clogged.	Check the internal pressure gauge while the compressor is running at full load or a value close to it. If the internal-external pressure difference is close to 21.7 psig (1.5 Bar), then your separator is clogged. Replace the separator.
	Screw unit failure.	It may be understood from extremely loud operation of the compressor. Call the authorized service station.
	Problem in the main motor.	In case of operating currents are higher than the normal limits, it is possible for the motor to be overloaded. With the covers open, start the compressor for a short time to listen the motor sound. Motor may be burnt or may have bearing problems. Call the authorized service station.

FAULT	CAUSE	REMEDY
<p><b>The operation temperature increases when the compressor switches to idle.</b></p>	<p>Blockage in the oil filter or in the oil circuit.</p>	<p>If cloth or foreign material is slipped into the separator tank during maintenance, this will cause blockage in the oil circuit. Be careful about this during maintenance. As the structure of the filters other than the original oil filter can be different, it can resist to oil passages. If there is fine dust or abrasive gas in the environment, the oil, oil filter and separator will be affected adversely.</p>
<p><b>The compressor does not automatically STOP at idle</b></p>	<p>Idle waiting time setting was changed</p>	<p>Check the idle waiting time setting.</p>
	<p>The compressor switches to load again before the set duration.</p>	<p>If the idle duration of the compressor is shorter than the set waiting time, the compressor will not stop since it will switch to load again. This is normal.</p>
<p><b>The fan motor thermal switch stops the compressor.</b></p>	<p>Thermal switch fails, or settings are wrong.</p>	<p>Use a clamp-on ammeter (with the compressor in full load) to check if the current passing through the thermal switch is balanced and in normal limits (current difference less than 10% between phases). If the thermal switch opens before the preset current value, it is faulty. Replace the switch.</p>
	<p>The panel filter or radiator cores are clogged; hot air outlet is blocked.</p>	<p>Make sure that the compressor is healthily ventilated. Replace the clogged panel and the air filters. Use pressurized air to clean the radiator slices. Do not block the hot air outlet and do not narrow the outlet section if ducts are used.</p>
	<p>There is a problem in the fan motor.</p>	<p>In case of operating currents are higher than the normal limits, it is possible for the motor to be overloaded. With the covers open, start the compressor for a short time to listen the motor sound. Motor may be burnt or may have bearing problems. Call the authorized service station.</p>

FAULT	CAUSE	REMEDY
<b>Pressure safety switch stops the compressor.</b>	Operating pressure settings changed.	Check the pressure settings.
	Separator clogged.	Check the internal pressure gauge while the compressor is running at full load or a value close to it. If the internal-external pressure difference is close to 21.7 psig (1.5 Bar), then your separator is clogged. Replace the separator.
<b>Compressor operating noise is higher than the normal limits.</b>	Mechanical connections are loose	Check that all mechanical connections are properly tightened. (Tightness of motor, screw, coupling and fan connections is of great importance in terms of security.)
	There is a problem in the motor bearings.	Operate the compressor for some time with the bonnets open and listen to the sound of the motor. If there is an abnormal noise coming from the bearings, call the service station.
	Mechanical problem in the screw unit.	A loud noise is heard during operation, which is easily distinguishable. Call the authorized service station.
<b>Compressor operating temperature is higher than the normal limits.</b>	Low oil level.	Check the oil level, and complete if low.
	High ambient temperature.	Check the ambient temperature.
	Ventilation problem in the compressor room.	In a room with a smaller intake window than the compressor's intake area, the hot air output of the compressor can't be discharged outside the room efficiently. If the radiator is exposed to direct sunlight, or there is a high reverse wind blow or a handicap preventing air discharge. Take any necessary measures.
	Radiator slices or fan blades dirty/clogged.	Check and clean.
	Air filter dirty/clogged.	Check and replace.
	Mechanical problem in the screw unit.	It may be understood from extremely loud operation of the compressor. Call the authorized service station.

FAULT	CAUSE	REMEDY
<b>The internal pressure does not decrease although the compressor is at idle.</b>	Minimum pressure valve fails	The minimum pressure valve loses the air in the system. Replace the gasket and O-rings.
	Intake regulator failure.	Intake regulator is not fully shut. Call the authorized service station.
<b>Oil degrades very quickly; separator clogged in a short time.</b>	Failure in using the recommended oil, or the genuine separator.	Use the recommended oil and the genuine separator.
	Very high ambient humidity	Take measures for decreasing the humidity.
	Fine dust, gas etc. degrading the oil features in the working environment	In the sanding, casting, chemistry and paint / finishing facilities, the compressor rooms should be installed away from these factors.
	Compressor continuously works in high ambient temperature	Working temperature of the compressors that operate near the boiler room, generating set room or any other rooms of inadequate ventilation would adversely affect the separator life.
<b>Contactors contacts are quickly worn (frequent sticking)</b>	Low voltage.	If the mains voltage is %5 or more less than the preset voltage setting of the compressor, it is understood that the problem is caused by the mains voltage or the installed power of your facility.
	Very short star-delta switchover	If the start-delta switchover time is set very short, the motor is loaded before full cycle, so that the contactor contacts are exposed to current extremely higher than the normal limits. In such cases, the contacts may be stuck, and the motor be burnt. The star-delta switchover time is 4-8 seconds (depending on the compressor type). don't set a shorter time. The old contact sets should always be replaced with genuine parts.
	Contact set used is not genuine.	Non-genuine contact sets have very low electrical strength. Call the service station for the supply of genuine spare parts.

FAULT	CAUSE	REMEDY
<b>Compressor stops due to high temperature.</b>	Temperature settings changed.	Check the temperature settings.
	High ambient temperature.	Check the ambient temperature in the compressor room, and take any necessary measures.
	Insufficient ventilation.	In a room with a smaller intake window than the compressor's intake area, the hot air generated by the compressor can't be discharged outside the room efficiently. If the radiator is exposed to direct sunlight, or there is a high reverse wind blow or a handicap preventing air discharge. Take any necessary measures.
	Low oil level.	Check the oil level, and complete if low.
	Oil filter clogged.	Replace the oil filter.
	Expired oil.	The oil with a darker color than usual means it has expired. Replace the oil. If you have to perform this task frequently check the operating conditions.
	Air filter dirty/clogged.	Replace the air filter.
	Panel filter dirty/clogged.	Check and clean or replace.
	Radiator slices and/or fan blades dirty/clogged.	Check and clean.
	Outlet vent is too long or gets narrow.	Take any necessary measures.
Covers open.	Close the covers.	
<b>The compressor operates more noisily as it approaches the upper pressure</b>	There is a problem in the motor bearings.	Check and replace the motor bearings.
	Mechanical problem in the screw.	It may be understood from extremely loud operation. Call the authorized service station.
<b>The belt is quickly ruined</b>	Pulley settings are incorrect	Check and correct the pulley setting. Call the authorized service station.
	Operates continuously in high temperature and corrosive environment	Call the authorized service station.
	Belt tension is less or more than usual	Call the authorized service station.

## 8 MAINTENANCE

Be sure to carefully read the user manual before maintenance. Do not forget that the maintenance performed by the authorized people would elongate the useful life of your compressor. Before maintenance, make sure that the power supply to the compressor, relieve the system of all pressure, is connect, lockout and tagout the power supply to the compressor package before removing valves, caps, plugs, fittings, bolts and filters.



**As the compressor is a complicated machine, any maintenance to be carried by the unauthorized and non-trained people would render the entire warranty invalid, and possibly result in damages and injuries.**



**Please call your HERTZ KOMPRESSOREN customer service for the compressor maintenance.**

**HERTZ KOMPRESSOREN USA, Inc.**

**3320 Service St.**

**Charlotte, NC 28206**

**Phone : +1-704-579-5900**

**Fax : +1-704-579-5997**

**E-Mail : [info@hertz-kompressoren.us](mailto:info@hertz-kompressoren.us)**

## 8.1 Safety during maintenance

Before maintenance, make sure that the power supply to the compressor, relieve the system of all pressure, is connect, lockout and tagout the power supply to the compressor package before removing valves, caps, plugs, fittings, bolts and filters. Place a warning sign, plate etc. in a visible place on the compressor to show that the maintenance work is in progress.

- After shutting down the compressor, please wait till it cools down. Touching hot points on the compressor may result in injuries.
- Be sure that the pressurized air is discharged from the compressor before maintenance.
- High current passing through the circuit. Check the current in the circuit during maintenance. Don't forget that current passes through the main switch even when it is off and provide current to the mentioned components only.
- Unless you turn off the mains voltage, there is a high voltage in the compressor power system, even if the compressor does not operate.
- After maintenance, be sure that all the safety measures are restored.
- Only the authorized staff must be allowed to handle maintenance of the compressor.

## 8.2 Periodical Maintenance Check List

### 8.2.1 Daily Maintenance

- Check the oil level of the compressor, add oil if required (*See, Figure 17*).

Transparent hose is connected on the separator tank body to easily monitor the oil level. Check the oil level when the compressor is in stop mode. (The oil level may change in the course of operation.) If the oil is low, fill it to top of fill line. If you add oil frequently, it means that there is problem in your compressor. Review the failures section to understand it.

- In the course of operation, check the warning signs and operating values on the control panel.
- Check discharge pressure and temperature.

### 8.2.2 Every 125 hours operation

- Clean the compressor panel filter by pressurized air.
- Use pressurized air to clean the radiator. The cleaning operation will keep the exterior cooling surfaces clean and ensure effective heat dissipation.
- Check the compressor internal parts and components for oil leaks or damages.

### 8.2.3 Every 2000 hours operation or 6 months

- As indicated by the controller, replace the oil filter element (*See, Figure 18*). If it does not reach 2000 hours within 6 months, replace it once 6 months at any rate.
- Clean or replace the control box filter.
- Check belt tension. See, Table 8
- As indicated by the controller, replace the air filter element (*See, Figure 20-21*). If it does not reach 2000 hours within 6 months, replace it once 6 months at any rate. Operating conditions determine the frequency of service.

**8.2.4 Every 4000 hours operation or 12 months**

- Visually check for leakage on the shaft seal, replace as required.
- Replace the panel filter element (See, Figure 19). If it does not reach 4000 hours within 12 months, replace it once 12 months at any rate.
- Replace Air/Oil Separator, separator element if spin-on type.

If it does not reach 4000 hours within 12 months, replace it once 12 months at any rate. Operating conditions determine the frequency of service (See, Figure 22). If you detect a differential pressure of 1,5 bar (21.7 psig) between the internal and external pressures, the separator must be replaced even if the replacement time is not over.

- Check the scavenge line, replace the check valve, if necessary clean the scavenge line.
- Check the relief valve.
- Check the condensate drain.

**8.2.5 Every 8000 hours operation or 12 months**

- Replace lubricant oil and oil filter. If it does not reach 8000 hours within 12 months, replace it once 12 months at any rate. Operating conditions determine the frequency of service (See, Figure 17-18).
- Check the inlet valve, service if necessary; replace repair kit parts.
- Check minimum pressure valve, service if necessary; replace repair kit parts.
- Check thermostatic valve operation, service if necessary; replace repair kit parts.

**8.2.6 Every 16000 hours operation or 24 months**

- Replace Belts
- Check solenoid valves / vacuum switch operation, replace if necessary.
- Check blow-down valve operation, replace if necessary.
- Check thermistor probes operation, replace if necessary.
- Check control valves and pressure regulator, replace if necessary.
- Check hoses, replace if necessary.



### 8.3 Maintenance Instructions

#### 8.3.1 Compressor Oil

Your compressors use HERTZ SMARTOIL 6000 branded full synthetic compressor oil. As can be seen below, these are special lubricants produced in consideration of the compressor operation mode.

- As the oils and lubricants of different type and characteristics also differ as of chemical composition and additives, mixing them with each other or use different types of oils in the compressor would cause damages of high cost.
- Do not add any oil additive in the compressor oil, it is done in some engine oils. As the oil used is a special recipe for this compressor, it already includes any necessary additives.
- Only use approved compressor oil, when two oils are mixed with each other; it turns and damages all the filters in the compressor. If you go on using the compressor in this condition, permanent damages would occur in the screw unit within a few days.
- To avoid any improper use, do not keep other types of oils and lubricants beside the compressor.
- Please call our service or sales department for your inquiries of to fit your specific needs and lubricants.

#### HERTZ SMARTOIL 6000

Is a superior quality oil specially designed for screw compressors. It is the most ideal choice for use in the compressors with its extraordinary resistance with advanced water-air separation feature.

- **Oxidation Resistance:**  
The air compression releases high temperatures. The oil not properly protected against oxidation is rapidly oxidized and starts accumulating some points. It in turn results in lower performance, wears and increased maintenance costs. HERTZ Smartoil 6000 prevents or minimizes the oxidation thanks to its additive contents.
- **Component Protection Against Corrosion:**  
It protects the parts and components against corrosion, so that they would have a longer service life.
- **Good Air Separation:**  
It rapidly separates from air to prevent cavitation, so that it enhances compression.
- **Sealing Compatibility:**  
It has an excellent compliance with all the gaskets and seals used in the compressors.
- **Health and Labor Safety:**  
It must be avoided particularly for the used oils and lubricants to get contact with the skin, and the affected area should be washed with abundant water and soap.

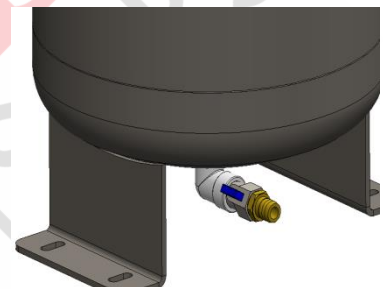
• **Typical Physical Data:**

<b>HERTZ SMARTOIL</b>	<b>6000</b>
ISO Viscosity	46
Kinematic Viscosity@ 40 °C cSt.	46
Viscosity Index	135
Density @ 15 °C kg/l	0,843
Yield point °C	<-45
Flashing Point °C	230

**8.3.2 Oil Replacement**

Replace the oil in the compressor at suitable intervals for the oil type used.

- Shut down the compressor.
- If the compressor is cold (not working), first operate it for 5 to 10 minutes to warm the oil, and then switch off it.
- Allow 3-5 minutes for the internal pressure to be discharged and the oil to settle downwards.
- Remove the oil filler plug and oil filter.
- Open the oil discharge valve under the separator tank to completely discharge the oil. Upon full discharge of the oil flow, close the oil discharge valve.
- If oil filter mounted upside-down, fill the new oil filter with clean oil and install filter. If oil filter mounted upside, install without filling oil.
- Fill the oil up to top level of your compressor.
- Replace the oil filling plug, and complete all the connections.
- Operate the compressor for a few minutes to check any possible oil leaks from the internal parts and components.
- Stop the compressor, and wait for the oil to settle, and check the oil level, and complete if necessary.



**Figure 16 Oil Discharge**



**Figure 17 Oil Level**

### 8.3.3 Oil Filter Replacement

Replace the oil filter at each oil replacement.  
 To replace the oil filter;  
 Stop the compressor and wait for the internal pressure to be released.

- Use the filter wrench to remove the old filter.
- Clean the surface on which the filter gasket seats.
- If oil filter mounted upside-down, fill the new filter element with oil, and slightly grease the gasket. If oil filter mounted upside, install without filling oil.
- Place the filter, and thoroughly tighten it by hand.
- Avoid any attempt to damage the filter cartridge.
- Restart the compressor and check it for leaks.



Figure 18 Oil Filter Replacement



**Always use the genuine HERTZ spare parts to minimize the risk of damage on the oil filter element and compressor. The other brand filter elements may not have satisfactory maximum pressure values.**

### 8.3.4 Panel filter replacement

- The ventilation fan of your compressor needs high amount of free air. The operation of this filter causes the compressor to take in the dust of working environment. Depending on the degree of dustiness in the operating space, the panel filter may be rapidly clogged.
- When the panel filter is clogged, the aid intake is reduced, resulting in increase of the compressor operating temperature. Furthermore, as the intake speed would reduce with the filter clogging, it would be harder for the dust particles to pass through the filter.

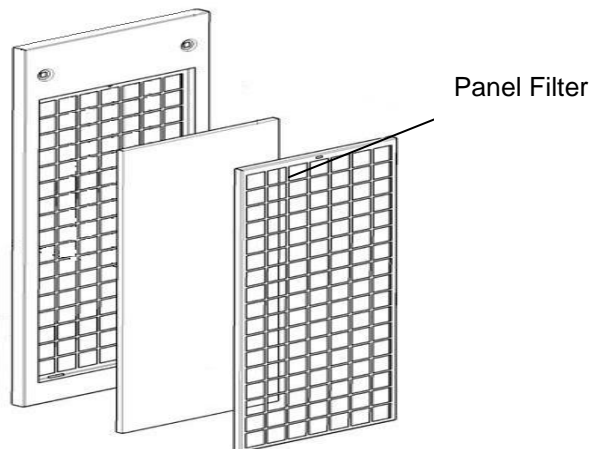


Figure 19 Panel Filter Replacement

- Frequently clean the panel filter. For this purpose, remove the filter cover sheet by loosening the corner bolts, and apply compressed air at the back of the filter (outwards). When the dust on filter is removed, you can use the filter again. The panel filter is characteristically oily to some extent. If you fail to clean it for long times, this oil is hardened, which makes the cleaning impossible. In such cases, replace the filter.

To replace the panel filter;

- Stop the compressor. Remove the bolt at the top of the perforated pouch holding the filter, and take the perforated pouch out.
- Replace the new filter, and screw the perforated pouch in place.

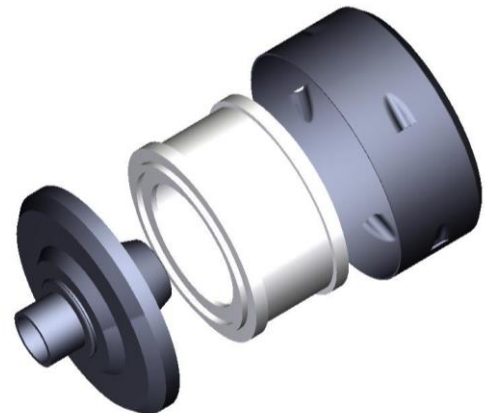
### 8.3.5 Air filter replacement

- The air filter inside the compressor aims at holding the dust before entering the compressor air filter. Apply compressed air outwardly to clean the air filter.
- In cases where the air filter is not properly cleaned, the separator filter used in separation of oil and air from each other is rapidly clogged.

The frequency of air filter replacement depends on the environmental conditions and maintenance intervals; it should be performed average once 2000 hours or semiannually. More frequent replacements might be needed if the environment is extremely dusty. To replace the air filter;

In 7.5 - 20 HP machines;

- Pull and open the air filter lid.
- Remove the old filter.
- If necessary, wipe the housing with a lint-free cloth.
- Install the new filter.
- Place and tighten the lid.
- Restart the air filter meter.
- Replace the filter once 2000 hours. More frequent replacements might be needed if the environment is extremely dusty.



**Figure 20** Air Filter Replacement

In 25 - 50 HP machines;

- Loosen the clamp at the connection part.
- Pull and remove the air filter.
- If necessary, wipe the housing with a lint-free cloth.
- Install the new filter.
- Fit the filter in its place, and tighten the clamp.



**Figure 21** Air filter used in 30 - 50 HP compressors

### 8.3.6 Replacement of Separator Element

Regularly replace the separator element once a year. It is impossible to clean this filter.

To replace the separator element:

Spin-On type separators used in power machines;

- Stop the compressor, and wait for the complete discharge of the internal pressure.
- Use the filter wrench to remove the old separator element.
- Slightly lubricate the new separator seal.
- Place the filter, and thoroughly tighten it by hand.
- Restart the compressor, and check it for leaks from the seals and other connections.



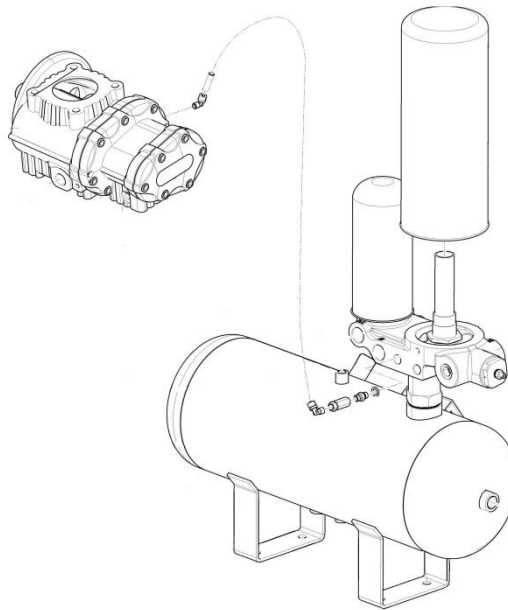
**Figure 22** Separator Element Replacement

### 8.3.7 Maintenance of the Cooling Radiator

- The panel filter should be routinely cleaned to keep the radiator clean.
- As the cooling air flows between the cooling radiator slices, some quantity of dust may enter between the slices, and clog the radiator slices like in the panel filter. Apply (from outside to inside) pressurized air between the slices at the back of the radiator for cleaning.
- If the dust between slices meets the oil, it may be caught and hardened; in such cases, spray a non-flammable industrial cleaner between the radiator slices for cleaning.

### 8.3.8 Maintenance of the separator oil return line (scavenge)

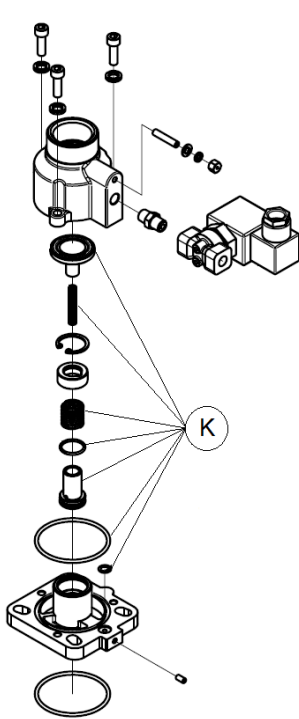
- While the separator filter separates the air from oil, some oil penetrates inside from the filter element. This oil is recycled into the system through the oil return line.
- When the compressor operates under load, the oil flow should be observed from the oil return line hose.
- If the small hole (orifice) in the oil return line is clogged the oil level in tank rapidly decreases, resulting in oil flow into the compressed air system.
- If you detect any oil flow during the water discharge under the air tank or the compressor oil level continuously reduces at each daily oil level checks, the scavenge line might be clogged. Stop the compressor, and remove the scavenge line, and clean the small hole (orifice) in the scavenge line by compressed air or a piece of thin wire.
- Do not enlarge the scavenge orifice diameter, or the compressor capacity reduces.



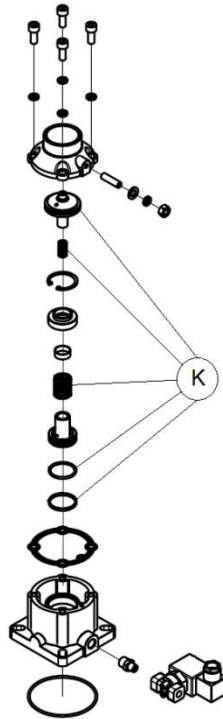
**Figure 23** Scavenge Line

**8.3.9 Intake Valve Maintenance Kit**

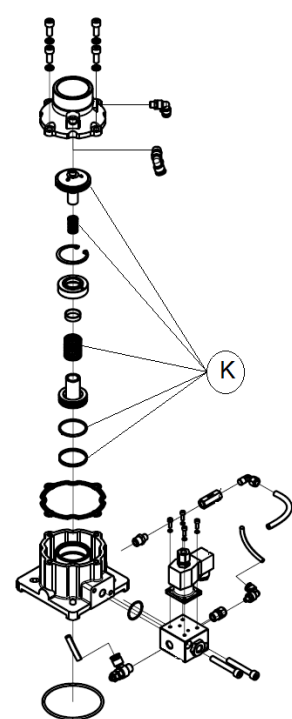
Intake Valve kit replacement is performed every 8000 hours or 12 months whichever comes first. All parts in the kit must be replaced together. Failure to replace the intake valve repair kit on time can cause permanent damages to the compressor and downtime.



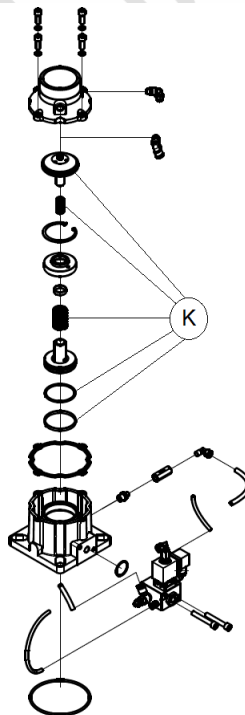
**HBD 4-5-7 Models**



**HBD 11-15 Models**

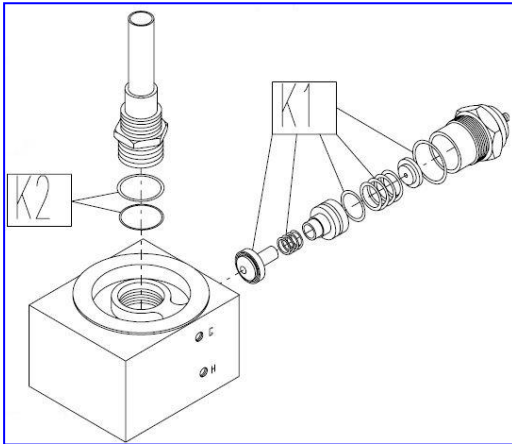


**HBD 15L-18-22 Models**

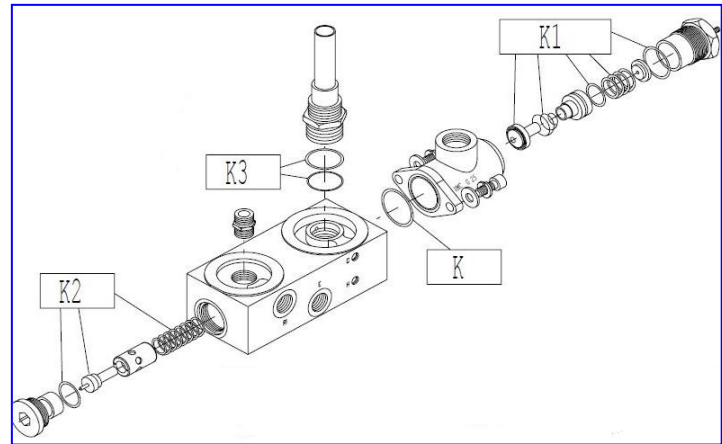


**HBD 30-37 Models**

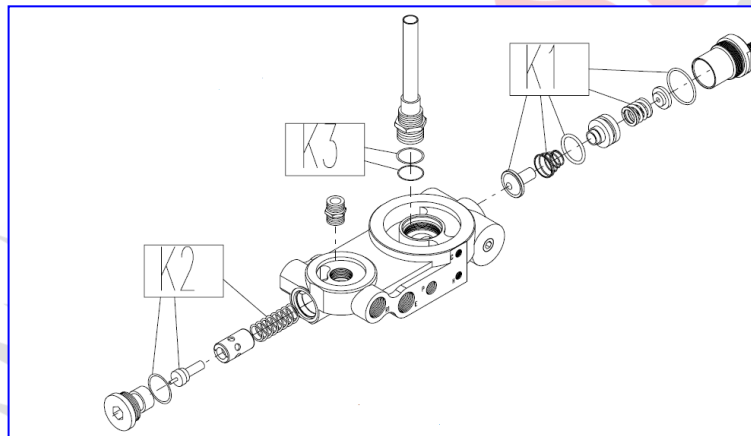
**8.3.10 Thermostatic Valve Maintenance Kit and Thermal Element Replacement**



**HBD 4-5-7 Models**



**HBD 18-22-30-37 Models**



**HBD 11-15 Models**

Thermostatic Valve combination block kit replacement is performed every 8000 hours or 12 months whichever comes first. The kit contains minimum pressure valve repair kit (K1), thermostatic valve repair kit (K2) and separator tube O-rings. For trouble-free operation of your compressor, the kits should be replaced in a timely manner.

Thermal element (K1) replacement is performed every 8000 hours or 12 months whichever comes first. For trouble-free operation of your compressor, the kits should be replaced in a timely manner.



**8.3.11 Motor Maintenance**

For the electric motors to have long life and operate in high performance, the following measures should be taken:

- Properly ground the compressor.
- Do not change the pressure, thermal current and time settings for the compressor operation. In cases where the preset value is exceeded, the load would be increased, so that the motor current would be higher. It may result in failure of your motor.
- Do not use any separator, oil filter and similar products beyond their useful service life. As the failure in performing maintenance works in due time would mechanically force the system, the compressor and motor would be overloaded, and their useful life would be shortened.
- Keep clean the cooling fan, ventilation ducts and fan protective cover grill.
- The altitude from sea level and ambient temperature directly affects the motor cooling coefficient. In standard conditions, your motor would properly work without any problem in 1000 meter altitude and up to the ambient temperature of 40 degrees Celsius. The loading rate should be reviewed in higher altitudes and temperatures.

<u>ALTITUDE (up to)</u>	<u>1000</u>	<u>1500</u>	<u>2000</u>	<u>2500</u>	<u>3000</u>	<u>3500</u>	<u>4000</u>	<u>meters</u>
%	100	98	95	91	87	83	78	

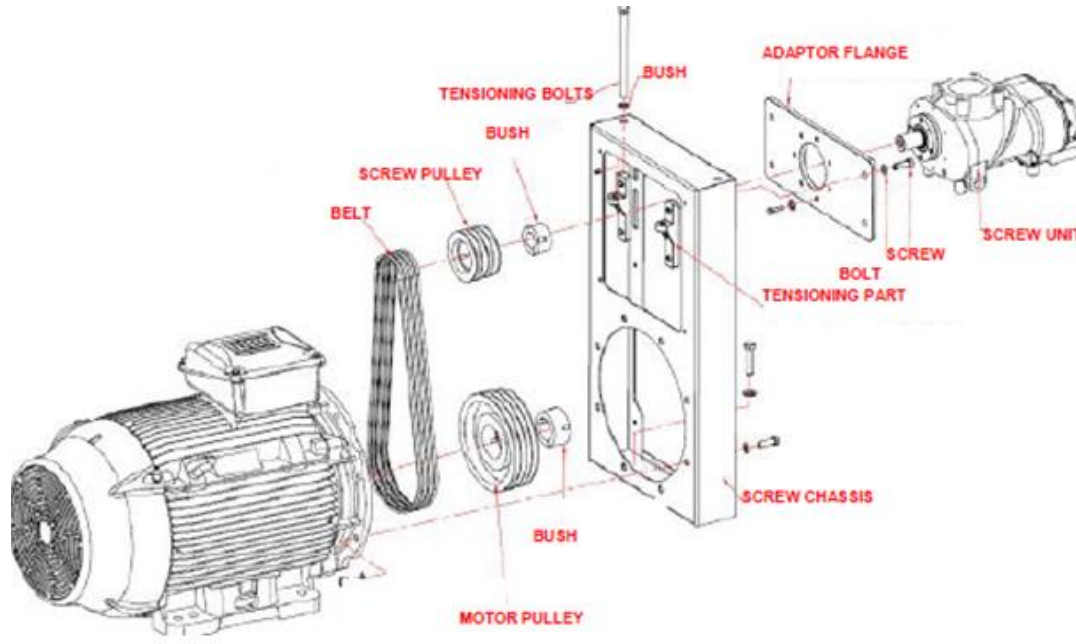
  

<u>AVG. TEMPERATURE (up to)</u>	<u>30</u>	<u>35</u>	<u>40</u>	<u>45</u>	<u>50</u>	<u>55</u>	<u>60</u>	<u>°C</u>
%	100	100	100	97	93	87	82	

**8.3.12 Bearing Grease**

- The standard motors 5.5 to 50 HP (4 kW to 37 kW) are maintenance free without any need for lubrication by the use of ZZ series bearings. However, the bearings should be lubricated for motors with higher power output. The type and amount of the grease to be used for the bearings is shown on the motor label. If the grease type is not shown on the motor label contact our service department. You compressor has been filled with motor bearing grease before factory dispatch. If it is not shown on the motor plaque or any other locations, apply grease based according to manufacturer manual of operation depending on the ambient temperature and other conditions.
- If you are storing more than 6 months, apply bearing grease before the first start.

### 8.3.13 Belt replacement and adjustment



**Figure 24 Belt Drive System**

- Stop the compressor, and disconnect the compressor power supply from the main switch.
- Loosen 4 “HOLDER” bolts to release the “HANGERS”.
- Loosen the “TENSIONING” bolts to release the belt.
- Slowly turn the pulleys, and remove the belts. Be careful for your fingers not to be caught between the belt and the pulley.
- Slowly turn and replace the new belts of original size.
- Take care for the belt not to overturn when being replaced.
- There are equivalent number of canals in the belt and pulley. Be sure that the belt perfectly fits on the both pulleys in the canals in opposite canals of the same level.
- Tighten the “TENSIONING” bolts in balanced manner to get the belt tensioned.
- Tighten the “HOLDER” bolts to complete adjustment.
- Use a proper gauge to check the front sides of the motor and screw pulley in the same direction in horizontal and vertical positions.
- Recheck all the screws and bolts for any possible loosening.
- Energize and restart the compressor. Check the belt vibrations in operating condition; if the belt vibrates while operating, it means that the belt is loose, or the pulleys are not properly aligned. Then, accurately readjust the pulley. Keep in mind that the belt life would be very short, and the compressor would likely be damaged due to overheating, vibration and similar reasons if the pulleys are not properly adjusted.

- Measure belt tension and ensure it meets the specifications (Table 8).
- Adjust the belt until you see that the compressor rotates in the same frequency at idle and under load.
- If the belt is left loose while it is at idle, it flaps and this is visible. If this is the case, tighten it until it is straightened.

**Table 8** Belt Tension Requirements

Model	Motor Power	Pressure	First Time	Re-tension	First Time	Re-tension
	HP	PSIG	Hz	Hz	N	N
HBD 4	5.5	100	149	131	307	236
		125	151	132	314	241
		150	148	130	314	241
		175	150	131	322	247
HBD 5	7	100	121	106	250	192
		125	117	102	248	190
		150	114	100	243	187
		150	110	97	238	183
HBD 7	10	100	139	122	297	229
		125	144	126	308	237
		150	143	125	312	240
		175	142	125	321	247
HBD 11	15	100	113	99	292	224
		125	112	98	296	228
		150	108	95	281	216
		175	113	99	294	226
HBD 15	20	100	104	91	303	233
		125	106	93	311	239
		150	105	92	320	247
		175	108	94	329	253
HBD 15L	20	100	75	65	574	441
		125	71	62	549	423
		150	77	67	588	452
		175	76	67	579	445
HBD 18	25	100	68	60	496	381
		125	68	60	479	369
		150	67	59	499	384
		175	70	62	523	402
HBD 22	30	100	67	59	477	367
		125	67	59	486	374
		150	67	58	488	376
		175	69	60	506	389
HBD 30	40	100	67	59	514	395
		125	70	62	541	416
		150	72	63	557	428
		175	68	60	531	409
HBD 37	50	100	68	60	543	418
		125	68	60	549	422
		150	70	61	559	430
		175	72	63	575	443

**Table 9** Periodical Maintenance Schedule

<b>MAINTENANCE TO BE PERFORMED</b>	<b>Maintenance Table</b>												
	As reflected by Controller	Per oil analysis results	Daily Maintenance	Every 125 hours	2000 hours / 6 months	4000 hours / 12 months	6000 hours / 18 months	8000 hours / 12 months	16000 hours / 24 months	10000 hours / 30 months	16000 hours / 36 months	14000 hours / 42 months	30000 hours / 48 months
<i>Check Oil Level</i>			<input checked="" type="checkbox"/>										
<i>Check Discharge Pressure and Temperature</i>			<input checked="" type="checkbox"/>										
<i>Check Control Panel For Advisory Text Messages</i>			<input checked="" type="checkbox"/>										
<i>Check The Compressor Cooler, Clean If Necessary</i>				<input checked="" type="checkbox"/>									
<i>Check, Replace If Necessary; Solenoid Valve and Vacuum Switch</i>									<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>
<i>Check, Replace If Necessary; Thermistor Probes</i>									<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>
<i>Check, Replace If Necessary; Blown Down Valve</i>									<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>
<i>Check, replace If Necessary; Hoses</i>									<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>
<i>Check, replace If Necessary; Condensate Drain</i>									<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>
<i>Check, replace If Necessary; Pressure Transducer</i>									<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>
<i>Check Loose Power Connection</i>					<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Check Belt Tension, replace if necessary</i>					<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Clean The Compressor Panel Filter</i>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Clean The Control Box Panel Filter</i>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Air / Oil Leaks or Damages</i>					<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Replace Oil Filter Element</i>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Replace Air Filter Element</i>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Replace Panel Filter Element</i>					<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Replace Air/Oil Separator ( Spin-On Type)</i>	<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
<i>Replace Belts</i>									<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>
<i>Oil Replacement (Smart Oil 6000)</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>
<i>Oil Sample</i>		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Motor Greasing</i>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Check Pressure Relief Valve</i>								<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
<i>Multiblock Service Kit Replacement</i>								<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
<i>Intake Valve Service Kit Replacement</i>								<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
<i>Line Filter Kit Replacement (At least once per year)</i>								<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>

*Table 10 Maintenance Records*

MAINTENANCE RECORDS			
Compressor Type			
Serial No			
DATE	WORKING HOURS	MAINTENANCE ACTION	PERFORMED BY

