OIL LUBRICATED SCREW AIR COMPRESSOR

Owner's Manual

K75-100B
K75-100VSDB

75 & 100 HP
(55 & 75 kW)

Save These Instructions

13-28-652
Version 00
Revision A
November 2024

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1 Introduction

1.1 Scope and Target Audience

This manual's intent is for electricians and operators for site planning, installation and operation guidelines for the compressor. These operating instructions contain all of the documentation required for safe operation and maintenance of the compressor. This includes installing and connecting the compressor, commissioning and operating the compressor.

Safety Requirements

In addition to all the other information in these operating instructions, the general safety instructions are located in the Safety Manual and must absolutely be read.

For supporting documentation, refer to Product Manual table below.

Product Manuals	
Safety Manual	13-28-628
Parts List Manual	13-28-512
Service Manual	13-28-612
Controller Manual	13-28-624

1.2 Notes

General Notes

The operating instructions must be read and applied by any person assigned to work with and on the compressor.

It is strongly recommended the controller manual be read prior to operating the compressor package.

Regardless of these operating instructions, the laws, regulations, directives, and standards in force in the installed location and the country of use must be followed.

Training

Operator training at site is performed by authorized service technicians. These operating instructions serve as training documents, along with the repair instructions, which are provided only in conjunction with service training.

These measures ensure that the assigned work can be completed reliably.

Guarantee

DV Systems is not liable for the functional safety of the compressor if any actions are taken that are contrary to the intended use, or if used for any other purpose than those listed in the operating instructions.

DV Systems refuses any guarantee or liability for cases of:

- Operating errors
- Use of the compressor other than as intended
- Damages resulting from foreseeable misuse or failure to follow the operating instructions
- Damages or injuries caused by third party components
- Use of replacement or wear parts or consumable materials that are not provided or recommended by DV Systems
- Inadequate maintenance. Modifications to the compressor.

The guarantee and liability conditions of the general terms and conditions of DV Systems are not expanded by the notes above.

Warranty

The conditions of the DV Systems Warranty are set out in the company's Standard Limited Warranty statement, provided with the machine documentation package.

Register the Unit to activate the warranty by completing the online warranty registration at:

https://gdg.gardnerdenver.com/DV-Rotary-Warranty

USE ONLY DV SYSTEMS GENUINE PARTS. USING NON-GENUINE PARTS FOR SERVICING OR REPAIRS WHILE THE COMPRESSOR IS WITHIN THE WARRANTY PERIOD WILL INVALIDATE YOUR WARRANTY.

To receive the extended warranty, please refer to the Premium Warranty document for the list of requirements.

Copyright

Resale

If the compressor is resold, these operating instructions must be provided to the new operator along with the compressor. If necessary, the operating instructions must be reordered from DV Systems by providing the order confirmation number. The compressor may not be resold without these operating instructions in any case.

1.3 Intended Use

The compressor uses the best available technology and meets applicable safety requirements at the time of sale, in the context of correct usage.

The design cannot prevent foreseeable misuse, nor all other residual risks, without limiting the functionality of correct usage.

The compressor is designed for the compression of atmospheric air (compressed air for driving pressure equipment). The compressor is not suitable for the compression of other gases.

The compressor is considered to be used correctly if the following points are also covered:

- The compressor is used in accordance with these operating instructions.
- The operator’s work procedures and operating instructions are followed.

Any other use, or use exceeding these limits, is considered to be improper. The manufacturer is not liable for any resulting damages. The user alone bears the entire risk.

Correct usage also includes following the operating instructions and complying with the inspection and maintenance instructions.

Other Provisions

The use of the compressor can cause hazards to life and limb of the user or third parties, or damage to the compressor or other property, if the compressor:

- Is not used properly.
- Is operated by untrained personnel.
- Is modified or altered.
- The safety instructions are not followed.

The following apply in addition to these operating instructions:

- Applicable accident prevention regulations. Generally recognized safety rules.
- Country-specific regulations.

Installation Site / Altitude

The compressor is intended to be installed in a suitable compressor room.

Depending on the operating pressure, ambient humidity, and ambient temperature at which the compressor is operated, the permissible altitude of the installation site is limited. The permissible site altitude is determined by DV Systems for each individual case in consultation with the customer.

Above 1,000 masl (3280 fasl), end user may have to adjust (lower) working pressure to compensate for the cooling efficiency of the motor. Maximum recommended altitude is 1,500 masl (4921 fasl).

Pressure Equipment

A pressure safeguard (pressure relief or the like) that conforms to the applicable specifications must be provided for the pressure equipment and systems installed in the compressed air supply network, considering the weakest pressurized component.

Work Environment

The lighting intensity in the area of the compressor must be ≥ 200 lx in normal operation.
The lighting intensity must be ≥ 500 lx for inspection and maintenance work.
The ambient temperature for operation.

1.4 Foreseeable Misuse

Incorrect Usage and Abuse

The following rationally foreseeable applications (incorrect usage) do not comply with the intended use:

- Compressing gases other than atmospheric air.
- Operation outside of the permissible operating limits, even if exceeded for only a short time, or if not immediately detectable.
- Operation outside of the permissible ambient temperatures.
- Intake of non-atmospheric air (over pressure or under pressure).
- Use as a respiratory air compressor. Manipulation of sensor signals.
- Changing signals from sensors.
- Operation without protective and safety devices.
- Operation with defective, deactivated, or manipulated protective and safety devices, or safety values, or operation with other safety-related defects.
- Use by private users or users without technical training.
- Operation outside of industrial premises.
- Failure to comply with maintenance intervals.
- Failure to perform maintenance and repairs.
- Incorrectly executed maintenance and repairs.

Limitations on Use

Operation of the compressor is not permitted:

- Outside of the permissible ambient temperatures.
- Above the permissible elevation of the installation site.
- On a foundation that does not have sufficient load capacity.
- In areas with explosive atmosphere.

1.5 Service

In case of questions, problems with compressor or spare parts orders, contact your DV Systems distributor/dealer. Trained expert staff will quickly and properly make repairs with genuine DV Systems replacement parts. Genuine DV Systems replacement parts are manufactured with state-of-the-art technology and guarantee reliable operation.

With inquiries or when ordering replacement parts, please provide the package model name, package serial number, and year of manufacture as listed on the unit nameplate (Figure 1-1). Providing this information helps to ensure that you will receive the right information or the necessary replacement part.

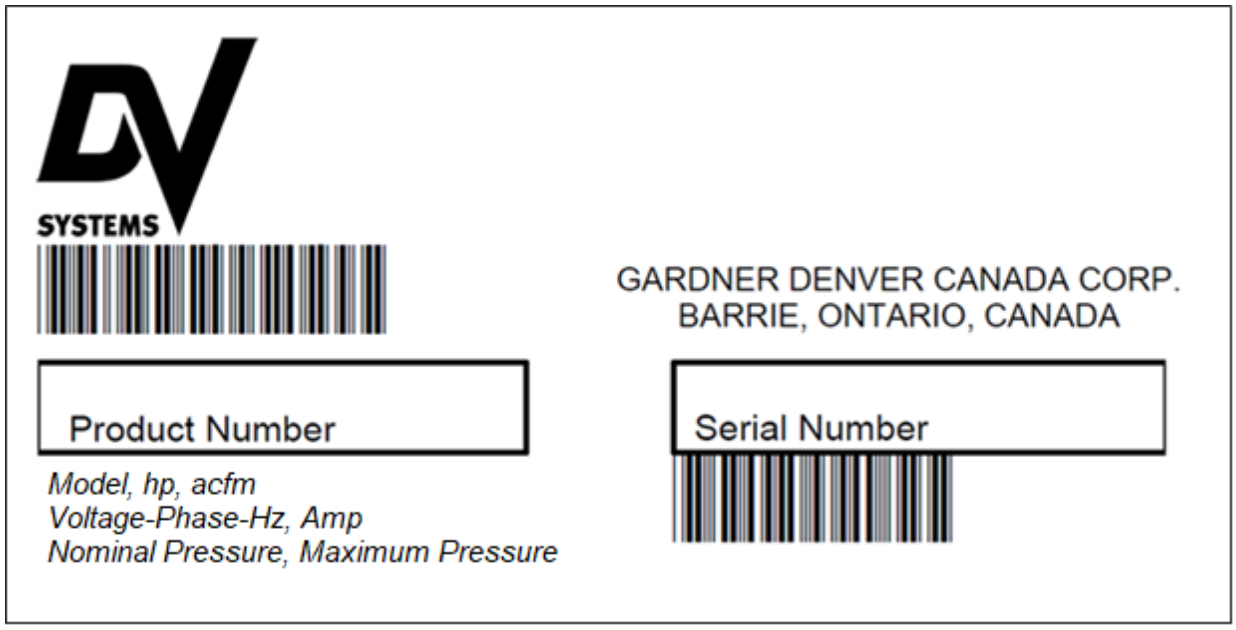


Figure 1-1

Product Number	
Serial Number	
Model	
HP	
ACFM	
Voltage	
Phase	
Amp	
Hz	
Maximum Pressure	

Your DV Systems Distributor:

Name:	
Address: _____	
_____	
_____	
Telephone:	Fax:
Contact:	Spare Parts:
	Service:

2 Design and Function

2.1 General Description

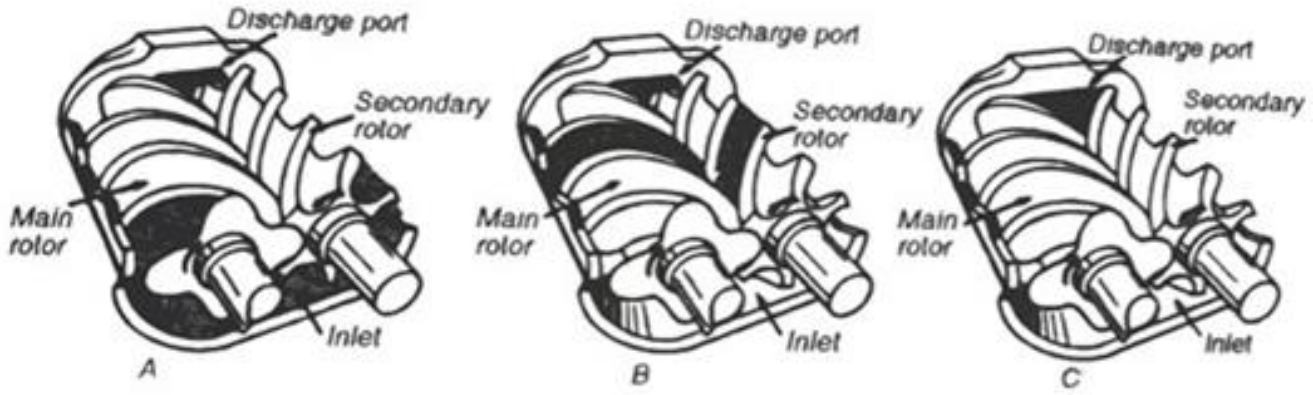


Figure 2-1 Compressor Cycle

Compressor - The rotary screw compressor is a single stage, positive displacement rotary machine using meshing helical rotors to effect compression. Both rotors are supported between high-capacity anti-friction bearings located outside the compression chamber. Roller bearings are used at the inlet end of the rotors to carry part of the radial loads. Angular contact ball and roller bearings at the discharge end locate each rotor axially and carry all thrust loads and the remainder of the radial loads.

Compression Principle - (Figure 2-1) Compression is accomplished by the main and secondary rotors synchronously meshing in a one-piece cylinder. The main rotor has five (5) helical lobes 90° apart. The secondary rotor has six (6) matching helical grooves 72° apart to allow meshing with main rotor lobes.

The air inlet port is located on top of the compressor cylinder near the drive shaft end. The discharge port is near the bottom at the opposite end of the compressor cylinder. *Figure 2-1 is an inverted view to show inlet and discharge ports*. The compression cycle begins as the rotors unmesh at the inlet port and air is drawn into the cavity between the main rotor lobes and the secondary rotor grooves (A). When the rotors pass the inlet port cutoff, air is trapped in the interlobe cavity and flows axially with the meshing rotors (B). As meshing continues, more of the main rotor lobe enters the secondary rotor grove, normal volume is reduced and pressure increases.

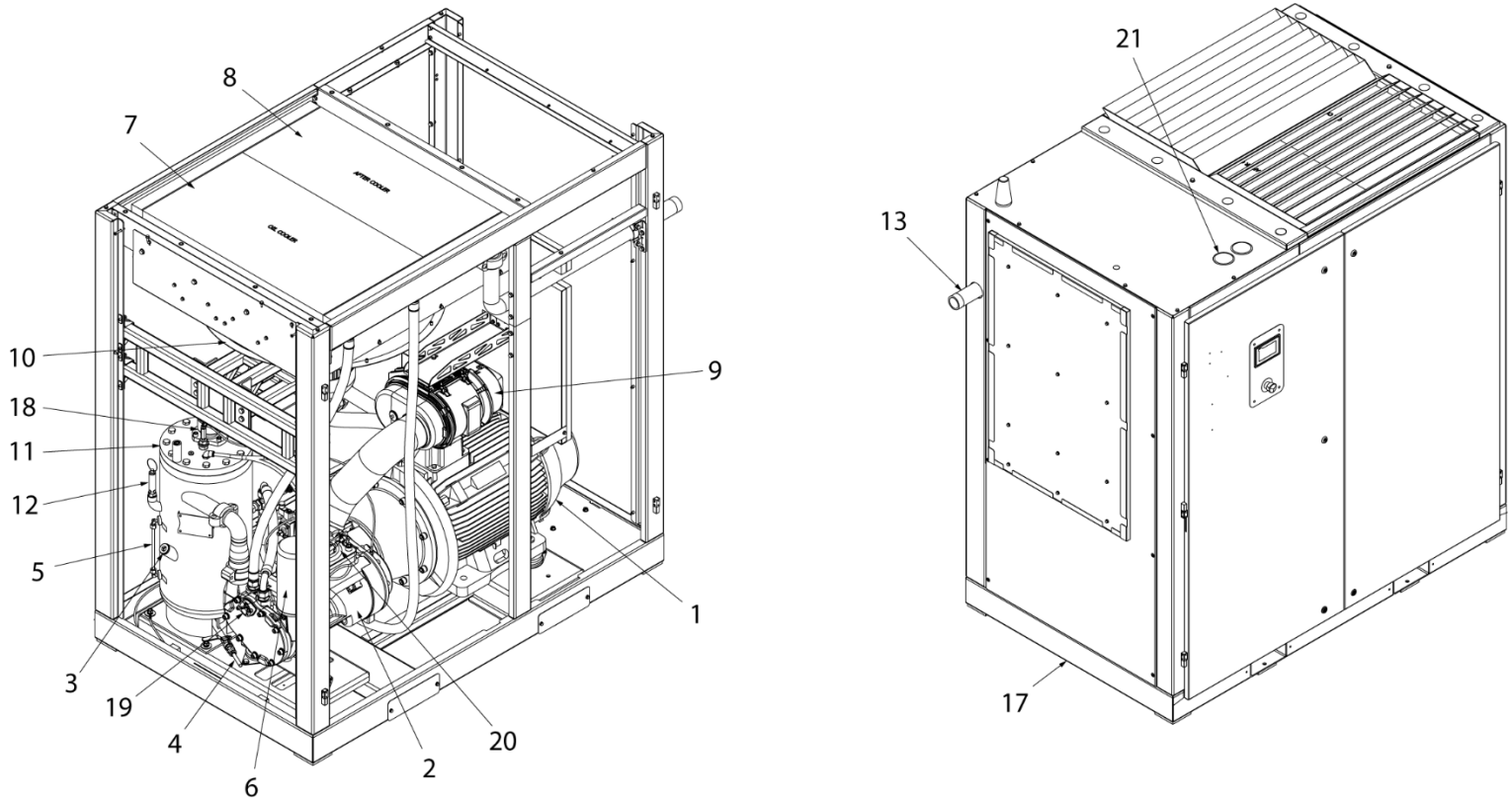
Oil is injected into the cylinder to remove the heat of compression and seal internal clearances. Volume reduction and pressure increase continues until the air/oil mixture trapped in the interlobe cavity by the rotors passes the discharge port and is released to the oil reservoir (C). Each rotor cavity follows the same “fill-compress-discharge” cycle in rapid succession to produce a discharge air flow that is continuous, smooth and shock free.

Air flow in the compressor system - Air enters the air filter and passes through the inlet unloader valve and on into the compression chamber where oil is injected into the air. After compression, the air/oil mixture passes into the oil reservoir where most of the entrained oil is removed by velocity change and impingement and drops back into the reservoir. The air and remaining oil then pass through the air/oil separator. The air then passes through the minimum pressure/check valve, the after cooler and the optional moisture separator and into the plant air lines.

Lubrication, Cooling and Sealing - Oil is forced by air pressure from the oil reservoir through the oil cooler, thermostatic mixing valve, and oil filter and discharge into the compressor main oil gallery. A portion of the oil is directed through internal passages to the bearings and shaft oil seal. The balance of the oil is injected directly into the compression chamber to remove heat of compression, seal internal clearances and lubricate the rotors.

Electronic Controls - The main components of the electronic control system are the Touchscreen Display and panel mounted I/O Module. A detailed description of the controller operation can be found in the controller manual provided with the package.

2.2 Construction of the Compressor



1. Motor
2. Compressor / Air End
3. Oil Filling Port
4. Oil Drain
5. Oil Level Indicator
6. Oil Filter
7. Oil Cooler
8. After Cooler
9. Air Filter
10. Cooling Fan
11. Oil / Pressure Reservoir
12. Pressure Relief Valve
13. Compressed Air Outlet
14. Compressor Controller
15. Emergency Stop Button
16. Control Cabinet
17. Base Frame
18. Minimum Pressure & Non-Return Valve
19. Thermal Mixing Valve
20. Inlet Valve
21. Feed Cable Entry

Figure 2-2 Compressor Illustration

2.3 System Schematic

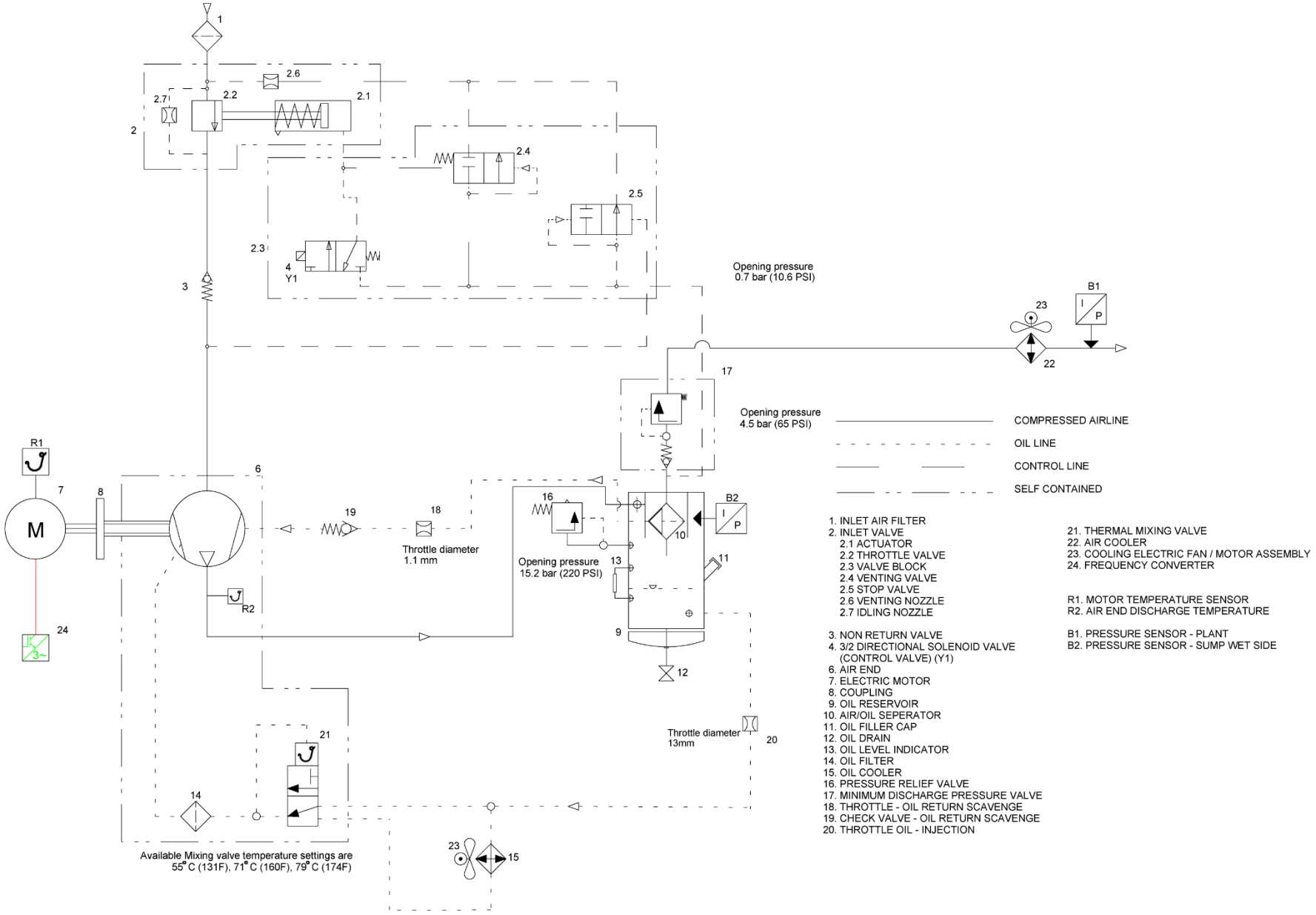


Figure 2-3 System Schematic

Miscellaneous Control Devices - Refer to Figure 2-3 for the schematic diagram of the control system.

Air Inlet Filter (1) - Captures solid impurities in the air stream entering compressor inlet. It also attenuates noise emitted by the compressor inlet.

Inlet Valve (2) - This device controls the intake of atmospheric air entering the compressor during the Load/Unload phases of operation.

- **During the Loaded State**: The **Y1 Solenoid Valve (4)** is energized. The air circulated in the system passes through the solenoid into the lower control area of the **Actuating Cylinder (2.1)**, forcing the **Throttle Valve (2.2)** to open. Both **Venting Valve (2.4)** and **Stop Valve (2.5)** are closed.

- **During the Unloaded State**: The **Y1 Solenoid Valve (4)** is de-energized. The lower control area of the **Actuating Cylinder (2.1)** is ventilated through the **Y1 Solenoid Valve (4)**, the pressure spring in the actuating cylinder causes the **Throttle Valve (2.2)** to close. The oil reservoir is depressurized through the **Venting Valve (2.4)**. The balance between the amount of air vented through the **Venting Nozzle (2.6)** and aspired through the **Idling Nozzle (2.7)** allows the oil reservoir to maintain approx. 29 PSI (off-load pressure) for oil to circulate in the system during operation.

Y1 Solenoid Valve (4) - This 3/2 Directional solenoid valve controls the position of the inlet valve in response to signals from the Controller.

Electric Motor (7) - Drives the **Compressor (6).** It is energized by the Wye/Delta starter (variable frequency drive in variable speed models), which in turn is controlled by the controller.

Pressure Reservoir (9) - Separates by inertial effects the bulk of the compressed air and injection oil streams and serves as a sump for the latter.

Fine Air/Oil Separator (10) - Intercepts and coalesces the aerosol oil stream in the compressed air exiting the inertial separation process within the reservoir.

Oil Filler Cap (11) - Oil fill port on the reservoir.

Oil Drain (12) - Ball valve drains the oil from the reservoir and the oil trapped in the oil cooler and associated hoses.

Oil Level Indicator (13) - This gauge is located on the oil reservoir and indicates the oil level.

Oil Filter (14) - Captures solid impurities in the oil entering the compressor injection port.

Oil Cooler (15) - The air-cooled heat exchanger removes heat from the oil stream prior to injection.

Pressure Relief Valve (16) - This device protects the pressure containing components of the compressor package against high pressure exceeding 220 psig (15.2 barg).

Minimum Discharge Pressure/Check Valve (17) - This device maintains minimum pressure 65 psig (4.5 barg) within the air/oil sump, thus ensuring adequate lubricating oil injection flow to the compressor even when no air delivery into the system is taking place. It also functions as a check valve to prevent reversed air flow from the system line during compressor stoppage.

Oil Fine Separator Extractor / Oil Return Scavenge (18) - Oil extractor orifice / throttle (18), controls the amount of oil and compressed air that is returned from the air/oil separator back into the compressor.

Air Cooler (22) - The air-cooled heat exchanger removes heat from the air stream prior to exit from the package.

Pressure Sensor - Sump Wet Side (B2) - This device is connected to the oil sump. It converts the pressure in the oil sump into an electrical signal for use by the controller for monitoring and control. Its signal, when compared to that of sensor **(B1)**, indicates the pressure loss across the air/oil separator element and it can also trigger a shutdown event in case an exceedingly high pressure is detected.

Temperature Sensor (R2) - This device is connected to the air end discharge. It converts the temperature in the oil into an electrical signal for use by the controller for monitoring and control. Its signal is used to monitor compressor temperature and trigger a shutdown event in case an exceedingly high is detected.

⚠ DANGER

Air/Oil Under Pressure

- Air/oil under pressure will cause severe personal injury or death.
- Shut down compressor, relieve system of all pressure, disconnect, lockout and tagout power supply to the starter before servicing the unit.

⚠ CAUTION

- Compressor, air/oil reservoir, separator chamber and all piping and tubing may be at high temperature during and after operation.
- Use of improper lubricants will cause damage to equipment. Do not mix different types of lubricants or use inferior lubricants.
- Improper equipment maintenance with use of synthetic lubricants will damage equipment. Oil filter and oil separator change intervals remain the same as for DV Systems genuine lubricants.
- High temperature operation can cause damage to equipment or personal injury. Do not repeatedly restart the unit after high temperature stops operation. Find and correct the malfunction before resuming operation.
- Read the oil level when the unit is shut off for an accurate measurement.
- All materials used in DV Systems compressor units are compatible with our DV Lube synthetic rotary screw lubricants. Use caution when selecting downstream components such as air line lubricating bowls, gaskets and valve trim.
- DV Lube synthetic rotary screw lubricants are not compatible with low nitrile Buna N or acrylic paints.
- DV Lube synthetic rotary screw lubricants are compatible with most air system downstream components.

Compressor Oil System - Lubricating oil is employed to absorb the heat of compression, lubricate moving parts and seal internal clearances between the rotor and the air cylinder. Pressure differential between the air/oil sump and the final injection point into the compressor is used to move the oil mass through the various oil system components.

Oil exits the air/oil sump and is delivered to the heat exchange and thermal mixing valve, where cold (oil cooler branch) and hot (oil bypass branch) are mixed to the desired compressor injection temperature. The tempered oil is cleansed via the oil filter before injection into the compressor casing.

Recommended Lubricant – DV Systems compressors are factory filled with one of several lubricants. These lubricants are formulated to the highest quality standards and are factory authorized, tested and approved for use in rotary screw compressors. Lubricants are available through your authorized DV Systems compressor distributor.

Oil Specifications - This machine has a standard factory fill with 8000-hour lubricant. Food Grade Oil is also available for factory fill.

Oil Level Gauge indicates the amount of oil in the oil reservoir. Read oil level when unit is shut off and the foam has settled out. In operation the oil level will fluctuate as the compressor loads and unloads. Adequate oil level falls between the MAX and MIN limits of the sight tube.

- Approximate oil system total capacity is 34 L (9 gal)

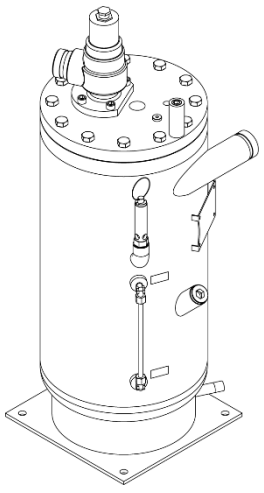


Figure 2-4 Oil Level Gauge

Before draining, adding, or changing the lubricant oil in the compressor, be aware of the following hazards associated with these tasks:

Safety Data Sheets (SDS) are available for all lubricants at www.dvsystems.com

2.4 Moisture in the System

During periods of low ambient temperatures, light duty cycles, high humidity, or in the event of thermal mixing valve malfunction, the oil charge residing in the sump may not reach a high enough temperature to keep water vapor from condensing as liquid water, a condition that contaminates the oil charge, may cause excessive oil carryover, or result in compressor failure.

To help the end user determine if the compressor package is operating under potential water condensing conditions, the charts in Figures 2-7 and 2-8 have been provided. To use, find the prevailing ambient temperature along the horizontal scale of the chart, move vertically from this point until intercepting the slanted line corresponding to the operating discharge pressure; and finally, move horizontally from this point to read the corresponding water vapor dew point on the vertical scale. The compressor discharge temperature must be maintained at a minimum of 5.5°C (10°F) above this dew-point temperature to prevent condensation accumulation in the lubricant reservoir. Note that the charts conservatively assume 100% relative humidity for the ambient air.

The presence of water in the oil may be identified by one of the following means:

- Oil drawn from the oil sampling valve attached to the oil cooler.
- Oil volume drained during an oil exchange.
- Periodic (e.g., every 2000 hours) oil sample analyzed by a reputable laboratory.

If water is found in the oil, drain sufficient volume of oil until no visible water is found, the heavier water will collect at the low elevations of the oil system, thus it will likely be expelled first. If this condition persists, consider the following solutions to avoid water condensation in the compressor oil:

- Make sure that the correct setting for the thermostatic mixing valve element is used, value is stamped on valve body.
- If the standard thermostatic element does not prevent water condensation, consult your application with DV Systems. The standard thermostatic element may be replaced with a high temperature one. Depending on the prevailing ambient temperature, the controller setting for the high discharge temperature shutdown may have to be reset to 115°C (240ºF) also.

Thermostatic Mixing Valve - This device, housed within the compressor body, mixes hot and cooled oil and delivers a tempered mixture to the oil filter and finally the compressor injection port, see Figure 2-2 for its location.

Its thermostatic element expands with heat, and it will stroke from just opening to fully open state within a 13°C (24°F) temperature change. Within these two temperature limits, the valve gradually mixes hot separator oil with cooled heat exchanger oil to maintain a nearly constant oil injection temperature. Above this range of oil temperature, the valve blocks all hot oil and only cooled oil is delivered.

The valve's nominal setting is stamped on the valve body. It may be verified by immersing the valve assembly into an open container with lubricating oil, raising its temperature to its nominal setting and checking that the element strokes fully from closed to open.

The compressor is built with standard thermal mixing valve that is best suited for the model configuration. In extreme environmental condition, thermal mixing valve can be replaced with the alternate mixing valve kit shown in the below table.

HP	ORDER PRESSURE (PSI)	THERMAL MIXING VALVE KIT #		
		55°C (131°F)	**71°C (160°F)**	**79°C (174°F)**
75	145 PSI (VSD)	N/A	**304DFX1409 (STD)**	N/A
	110 PSI (FS)	303DFX1409	**304DFX1409 (STD)**	N/A
	125 PSI (FS)	303DFX1409	**304DFX1409 (STD)**	N/A
	175 PSI (FS)	N/A	**304DFX1409 (STD)**	305DFX1409*
100	175 PSI (VSD)	N/A	**304DFX1409 (STD)**	N/A
	110 PSI (FS)	**303DFX1409 (STD)**	304DFX1409	N/A
	125 PSI (FS)	**303DFX1409 (STD)**	304DFX1409	N/A
	175 PSI (FS)	303DFX1409	**304DFX1409 (STD)**	N/A

Oil Sump (Reservoir) - This device provides the inertial separation of air and oil streams discharged by the compressor, the bulk (98%) of the air/oil separation is done at this step. It also serves as a holding and degassing volume for the major portion of the oil charge. It provides limited air storage for control and gauge actuation.

Air/Oil Separator - This device provides the final (2%) of the air/oil separation, typically 2 ppm oil content at the final discharge of the compressor package. It is housed in a removable spin-on cartridge.

Its high level of performance may be affected by the following conditions:

- Compromised media (e.g., ruptured).
- Contaminated media (e.g., vanish, moisture, inadequate oil type).
- High oil level in oil sump.
- Blockage of oil return orifice.
- Abnormally frequent or fast depressurization cycles.

Oil separator element life cannot be predicted; it will vary greatly depending on the conditions of operation, the quality of the oil used and the maintenance of the oil and air filters. The condition of the separator can be determined by pressure differential or by inspection.

Separator Pressure Differential - The pressure drop across the separator is equivalent to the difference between the two (2) pressure sensors in use. Use the measured pressure difference to forewarn of a potentially contaminated air-oil separator element:

- The pressure differential value may be calculated by subtracting the system pressure value from the compressor discharge pressure value.
- A pressure differential of 8 psi (.55 bar) may indicate a moderately dirty element.

A pressure differential of 15 psi (1 bar) may indicate a severely dirty element, replace as soon as possible.

⚠ CAUTION

- Using an oil separator element at excessive pressure differential can cause damage to equipment.
- Replace the separator when the pressure differential has reached 15 psi (1 bar).

The following charts are easily used by reading the ambient temperature along the bottom axis of the chart and then reading the appropriate pressure curve to determine the corresponding dew-point temperature on the left axis of the chart. The compressor discharge temperature must be maintained at a minimum of -12°C (10°F) above this dew-point temperature to prevent condensation accumulation in the lubricant reservoir. These charts assume 100% relative humidity.

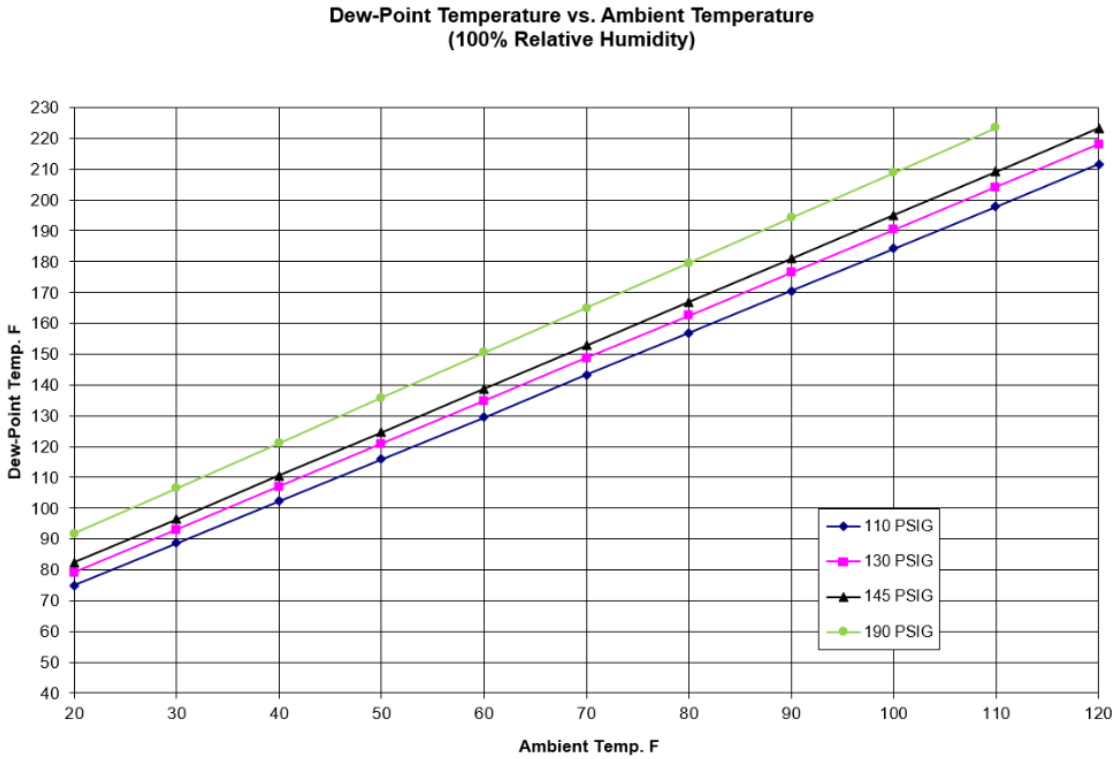


Figure 2-7 Dew Point Chart °F

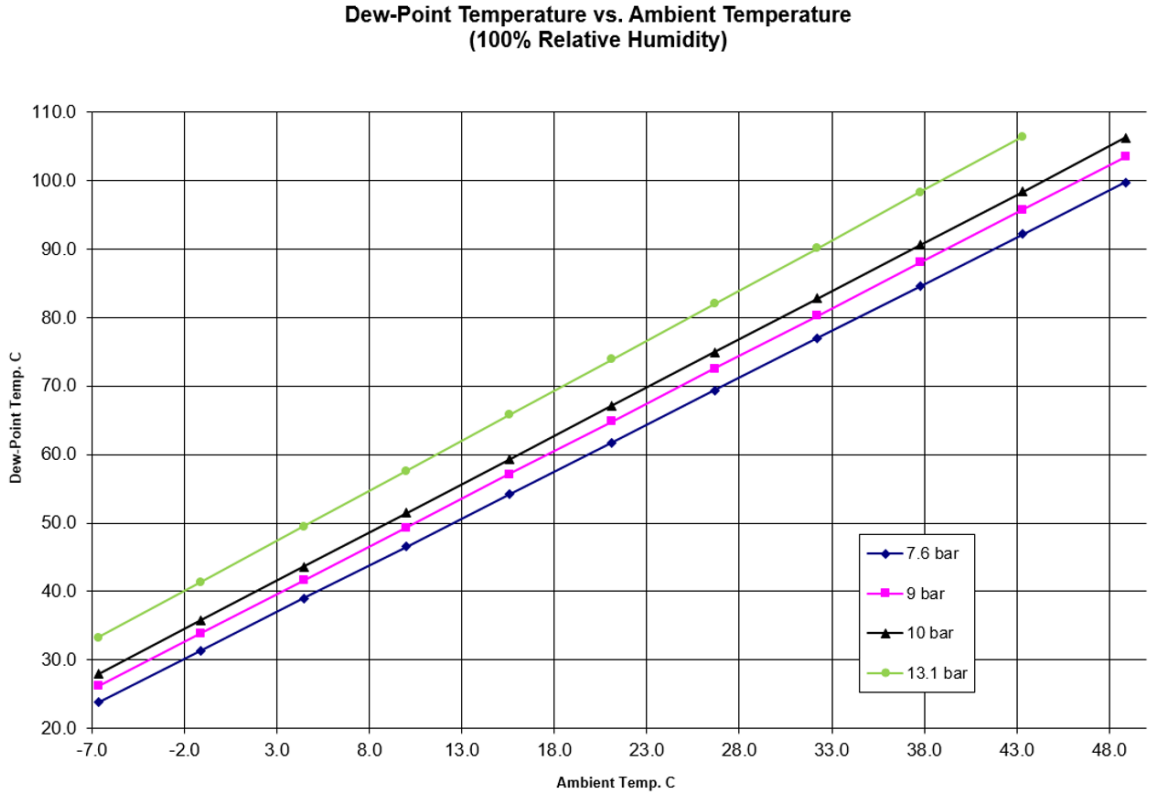


Figure 2-8 Dew Point Chart °C

Oil/Air Heat Exchangers (coolers) – The heat of compression absorbed by the oil injected into the compressors (for cooling and lubrication) is ultimately rejected in a convenient medium such as air, for these air-cooled cores. The compressor's main motor utilizes a shaft mounted fan to provide the cooling air for the heat exchanger.

Ventilation Configuration – Air-cooled cores (radiator-type) are provided as standard feature. One (1) axial fan, located below the heat exchanger delivers an air stream to meet the cooling demands of the air/oil combination heat exchanger on its way out the package.

Refer to Figure 2-9 for estimates of ventilation requirements. Please note that the air-cooled package requires the combined total of the heat exchanger plus the enclosure ventilation flow rates (which include motor ventilation and compressor intake). Furthermore, when package location makes it necessary to duct fresh cooling air in/out, these ducts must be sized with a maximum (total) pressure loss of 0.1-inch water gauge to avoid impacting the heat exchanger cooling air system. An external ventilation fan may be required to properly evacuate hot air from the compressor room.

Minimum Cooling Air Flow Requirements	
K75-100/K75-100 VSD	5950 cfm (168.5 m^3/min)

Figure 2-9 Air Flow Chart

⚠ CAUTION

- Do not oil this element. Do not wash in inflammable cleaning fluids. Do not use solvents other than water. Improper cleaning may damage the element.
- Never operate the unit without the element. Never use elements that are damaged, ruptured or wet. Never use gaskets that won't seal. Keep spare elements and gaskets on hand to reduce downtime. Store elements in a protected area free from damage, dirt and moisture. Handle all parts with care.

NOTICE

Use only genuine DV Systems air filter elements on DV Systems compressor units. Genuine parts are available through your authorized DV Systems distributor.

Compressor Air Filter - This device cleans the air stream entering the compressor inlet and is furnished as standard equipment on the compressor package. It is a two stage, high efficiency, cellulose media element housed in a non-corrosive housing.

Efficient compressor package operation depends on the unrestricted, clean supply of fresh air delivered by the air filter. In turn, the longevity of the filter element depends on the cleanliness of the local environment.

2.5 Oil Circuit

The path of oil flow varies depending on the oil temperature and the thermal mixing valve setting.
55°C (131°F), 71°C (160°F) and 79°C (174°F) thermal mixing valve options are available based on the model configurations.

The oil flows from the pressure reservoir (-9-) into the oil thermostat (-21-). With oil temperatures less than the thermostat temperature setting, the oil flows via the by-pass of the oil cooler directly into the oil filter (-14-) and is then injected into the screw compressor (-6-).

With oil temperatures of between 55°C (131°F) and 68°C (154°F) (between 71°C (160°F) and 85°C (185°F) with 71°C (160°F) thermal mixing valve), the oil flow is divided and fed into the oil cooler (-15-) and the by-pass.

With oil temperatures above 68°C (154°F) and 85°C (185°F) with 71°C (160°F) thermal mixing valve, the entire oil flow is directed via the oil cooler through the oil filter into the screw compressor.

The oil separated by the oil separator element (-10-) is fed through an oil scavenge line to the screw compressor.

The entire oil circulation is based on a differential pressure in the system. Considering the pressure difference of approx. 24 PSI within the oil circuit, the oil is then injected into the screw compressor with approx. 93 PSI (6 BAR) at a reservoir pressure of e.g. 122 PSI.

When the screw compressor is in the off-load state, a sufficiently high pressure differential and thus the required oil injection quantity is achieved owing to the fact that when the inlet valve (-2-) is closed, a vacuum pressure occurs in the intake connection and at the place of injection.

Excess pressure of approx. 29 PSI (2 BAR) (off-load pressure) is produced in the pressure reservoir at the same time.

2.6 Air Circuit

The intake air passes through the intake filter (-1-) and the inlet valve (-2-) into the screw compressor (-6-). During the compression process, the intake air is cooled via the injected oil. The developed air/oil mixture flows tangentially into the oil reservoir (-9-). After pre-separation and subsequent fine separation by the separator element (-10-), the compressed air with a low oil content is fed via the minimum pressure valve (-17-) and the air cooler (-22-) into the consumer network.

2.7 System Control

(See also operating instructions for the compressor controller)

Standstill of the system

- If the plant is shut down, the inlet valve (-2-) is closed by a pressure spring at the adjusting cylinder (-2.1-).
- The Y1 Solenoid valve (-4-) is de-energized.
- The oil separator vessel is released via venting valve (-2.4-) and stop valve (-2.5-) to atmospheric pressure.

Starting the system

- The motor starts up in the Y-mode.
- The inlet valve is closed.
- The compressor aspires a certain amount of air through a bypass valve (-2.7-) with check valve. Pressure builds up in the oil reservoir.
- The oil supply of the screw compressor takes place through a drop in pressure between the pressure vessel and the injection spot in the screw compressor.
- As the drive motor is switched over to Δ operation, the Y1 Solenoid valve (-4-) is energized and open.
- The air circulated in the system streams over the Y1 Solenoid valve (-4-) in the lower control area of the operating cylinder (-2.1-). The venting valve (-2.4-) is closed. The upper control space of the adjusting cylinder is ventilated.
- The throttle valve in the regulator opens.
- At a reservoir pressure of approx. 65 PSI (4 BAR), the minimum pressure valve (-17-) opens.
- Compressed air is now delivered into the consumer network.
- The system is now running on-load state.

Stopping the system

- Y1 Solenoid valve (-4-) is de-energized when the STOP button on the operating panel of the compressor controller is pressed.
- The upper control space of the adjusting cylinder (-2.1-) is ventilated by the Y1 Solenoid valve (-4-), the pressure spring in the adjusting cylinder causes the throttle valve (-2.2-) in the suction regulator to close.
- The oil reservoir is depressurized through the venting valve (-2.4-) to off-load and operation pressure (residual pressure)
- After a set timeout, the drive motor (-7-) and the cooling air ventilator motor (-23-) are shut down.

Automatic operation (open-close operation)

- When the pressure reaches the unload set point at the plant pressure sensor (-B1-), Y1 Solenoid valve (-4-) is de-energized.
- The lower control space of the adjusting cylinder (2.1) is ventilated by the Y1 Solenoid valve (-4-), the pressure spring in the adjusting cylinder causes the throttle valve (-2.2-) in the inlet valve to close.
- The oil reservoir tank is relieved to blow down pressure (residual pressure) via the venting valve (-2.4-).
- The screw compressor is now running in the off-loaded state.
- When the pressure at the network pressure sensor (-B1-) does not fall to the load set point within the set motor run-on time, the drive motor (-7-) and the cooling fan (-23-) are shut down and the system is depressurized to atmospheric pressure.
- The system is now in the “stand-by” mode and can restart at any time when the network pressure falls to the load set point (see section “Starting of the system”).

- When the pressure falls to the load set point before the set motor run-on time has elapsed, Y1 Solenoid valve (-4-) is energized again.
- The unit now changes over to on-load state.

⚠ WARNING

Do not stop the Unit using the Emergency Stop Button unless there is a danger to the product or of personnel injury.

Using the Emergency Stop Button, disconnect, or breaker to stop the Unit will not all the Unit to go through an unloading sequence, and could result in damage to the Motor, Starter, or other electrical components. Damage caused in this manner is not covered by the manufacturer's Warranty.

3 Transport and Installation

3.1 Transportation

Delivery

The compressor is bolted down to a shipping pallet and covered in plastic packaging wrap.

Receiving

When received, check for shipping damage.

1. Check the delivery for visible damage.
2. Use the packing list to check the delivery for completeness.
3. Immediately inform the freight forwarder, insurance, and DV Systems of any missing parts or damage.

Weight

The values listed below are approximate values, they refer to a screw compressor unit including oil fill.

Air-cooled unit	
K75B	4150 lbs.
K100B	4360 lbs.
K75VSB	4204 lbs.
K100VSDB	4400 lbs.

⚠ DANGER

Danger to life

Danger to life from tipping or falling parts.

- A suitable forklift with sufficiently long forks must be used to transport the compressor.
- Use forks only at the labeled lifting points.
- The compressor, even in its packed state, may not be transported by crane.
- During transport, no persons may be present in the hazard area. In particular, do not reach in or allow the feet to pass beneath the suspended compressor.

⚠ CAUTION

- Only use the fork slots for lifting. Do not use other places such as motor, compressor or discharge manifold piping as lifting points.
- The eyebolts or lugs provided on the motor are for lifting the motor only and should not be used to lift any additional weight. All eyebolts must be securely tightened. When lifting the motor, the lifting angle must not exceed 15°. Failure to observe this warning may result in damage to equipment or personal injury.
- Do not electric weld on the compressor or base; bearings can be damaged by passing of current.

NOTICE

Property damage

- Do not lift up or latch the compressor system by its enclosure.
- Note fork length of forklift.
- Use only lifting points identified in manual.

Transporting the Compressor

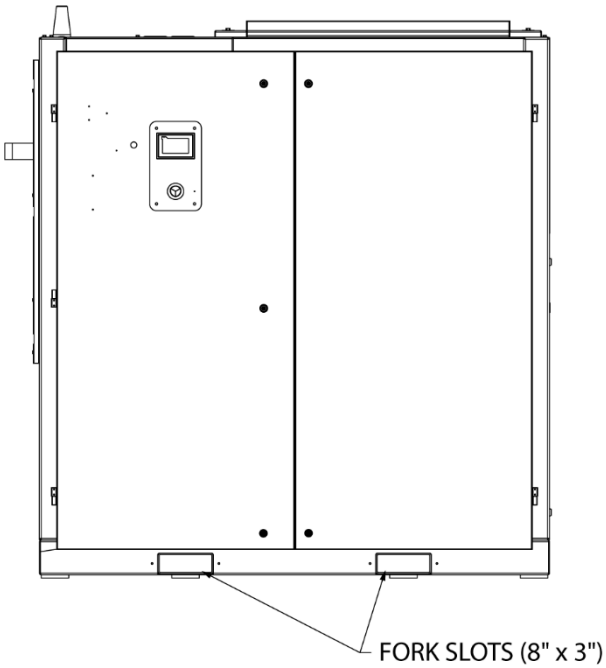


Figure 3-1 Lifting points

3.2 Installation

Requirements for the Installation Site

DANGER

Risk of injury

Danger from improper installation

- Consider the permissible load capacity of the foundation.
- Make sure the foundation is solid and flat.
- The compressor must be installed with full contact on a foundation with sufficient structural strength.
- The compressor must not be operated on the transport pallet.
- No flammable or explosive materials may be stored near the compressor.
- Do not operate the compressor with the fan and belt guard removed. Exposed fan and belts may cause injury to personnel.

The compressor should be installed, whenever possible, in a clean, well-lighted, well ventilated indoor area with ample space all around for maintenance. Select a location that provides a cool, clean, dry source of air.

It is not recommended to relocate inlet filter or duct to the inlet filter. This is due to enclosure modifications that would be required that could negatively affect the structural integrity of the enclosure.

The compressor must be installed with full contact on a foundation with sufficient structural strength. The bearing surface must be level to within 3mm (0.12").

The installation site (compressor room) should be of sufficient size that on side ("A") a minimum clearance of 1.22 m (48”) and on side ("B") a minimum clearance of 1.22m (48”) may not be undershot. The clearance above the compressor should be at least 1.52m (60”). There should also be appropriate access space for maintenance work.

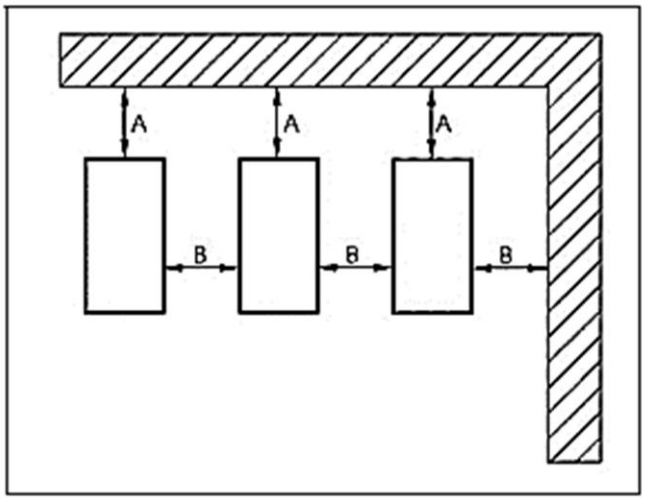


Figure 3-2 Installation / Clearances

- Set up the compressor so that there is sufficient access and that the required cooling is ensured.
- Do not block the air inlet.
- Avoid moisture.

The screw compressor unit has to be levelled. The system may not be run while on the transport pallet.

A minimum distance from walls, other machines, etc. should be maintained so that there is sufficient clearance for maintenance and repair work (see Fig. 3-2).

During operation of the screw compressor unit, heat is generated by the electric motor and the compression process. The screw compressor radiates a part of this heat into the surroundings.

Proper ventilation has a considerable effect on the service life and the performance of a compressor.

Ventilation and Exhaust

⚠ DANGER	
	**Danger of asphyxiation** Danger from asphyxiation due to insufficient ventilation and exhaust. ➢ The operator must provide sufficient ventilation and exhaust of the compressor room.

In order to be able to dissipate the heat produced during operation, the compressor room must have sufficient volume and good ventilation.

The fresh air opening should be located as low as possible. The exhaust opening should be located as high as possible.

Cover ventilation openings with screens in order to prevent dirt from entering the compressor room.

The design of ventilation system is based primarily on the required amount of cooling air.

The minimum cooling air volume required by these screw compressors are as follows:

K75-100/K75-100 VSD	5950 cfm (1685 m^3/min)

If local conditions are unfavorable, install air ducting. The flow speed of the cooling air should not exceed 17 ft./sec. We recommend a minimum channel cross section of 10 sq.ft.

NOTICE

The stated minimum cross-section refers to a maximum duct length of 5 m (16.4 ft.) and a maximum of one bend. In the event of differing values (over 5 m (16.4 ft.)), more than one bend, filter cartridges, screens, etc.), please contact your technical adviser.

DV Systems screw compressors are rated for ambient temperatures and cooling temperatures of 5°C (41°F) to 40°C (104°F).
In the case of temperatures other than the above limiting values, please consult your technical adviser.

In order to ensure good heat dissipation, the installed auxiliary fans should be designed for air volume about 15 to 20% greater than the required cooling air volume for the compressor.

When installing several compressors in one compressor room, use the sum of the required cooling air volumes for all the compressors in the room.

When package location makes it necessary to duct fresh cooling air in/out, these ducts must be sized with a maximum (total) pressure loss of 0.1-inch water gauge to avoid impacting the heat exchanger cooling air system. An external ventilation fan may be required to properly evacuate hot air from the compressor room.

The following illustration shows the recommended ventilation requirements.

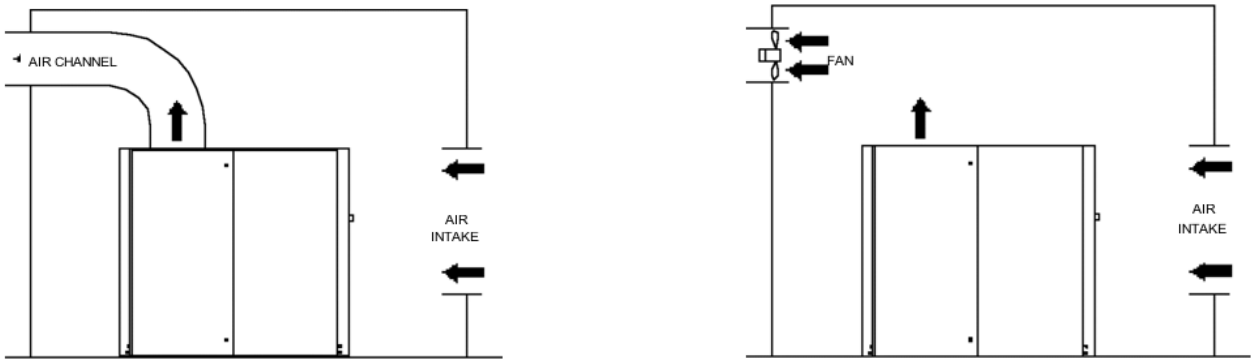


Figure 3-3 Compressor Room Ventilation

1. Place the compressor down at the correct location.
2. Ensure that the bearing surface is even to within 3mm (0.12"). The compressor does not have any leveling means fitted on it.

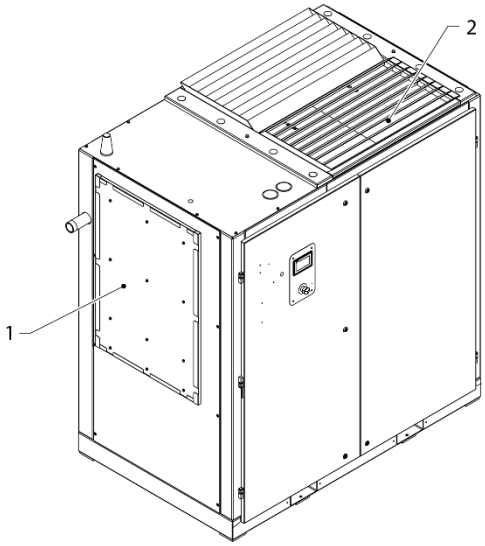


Figure 3-4

1. Package Air Intake with removable inlet baffle assembly for direct duct connection
2. Package Air Exhaust with removable exhaust louver for direct duct connection

⚠ DANGER	
	**Risk of injury** Danger from improper installation ➢ Consider the permissible load capacity of the foundation. ➢ Make sure the foundation is solid and flat. ➢ The compressor must be installed with full contact on a foundation with sufficient structural strength. ➢ The compressor must not be operated on the transport pallet. ➢ No flammable or explosive materials may be stored near the compressor.

Foundation - Ensure that the unit is anchored to the floor using isolator pads. When anchoring the unit, ensure that there is approx. 1/4” (0.75 cm) between the nut and the compressor foot (as shown in Figure 3-5 below). Do not bolt down tightly. Vibration pads are sold separately in the Installation Kit IK75100B.

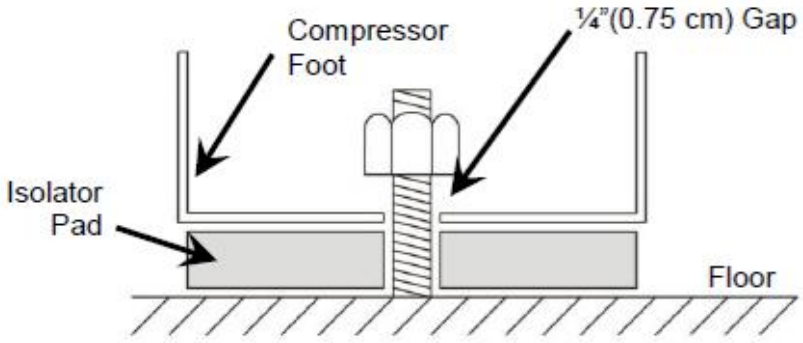


Figure 3-5

4 Preparing for Commissioning

4.1 Piping

Remove all blank flanges, stoppers, caps, and desiccant bags before installing the piping.

Distributor piping and pipe connections must be the correct size and designed for the operating temperatures and pressures.

Label the compressed air and water lines according to local requirements.

Support all piping appropriately. Pipes must not bear any loads.

If compressed air hoses are used, they must be of the correct size and must be suitable for the operating pressure and temperature. Do not use worn, damaged, or substandard hoses.

A shutoff valve should be installed in the supply line, so that the compressor can be isolated for maintenance purposes.

The drain line running away from the condensate connection must be pitched at no greater than 5 m (16.4 ft.).

An air tank of sufficient volume should be installed (as a buffer) between the compressor and the compressed air network. Storage siting differs based on the capacity control type and application. Please consult DV systems for siting the air receiver.

4.2 Compressed Air Connection

⚠ WARNING

Risk of injury

- A defective connection to the compressed-air system may jeopardize safe operation of the compressed-air system.
- When connecting the compressor outlet to the customer's existing compressed-air system, check that the necessary operating temperatures, operating pressures as well as the necessary connecting flange or connecting thread are appropriate and in perfect working order.
- For connections with hoses, take steps so that if an end breaks free it won't "whip" around dangerously.

NOTICE

Aftercoolers, separators, collecting reservoirs and the compressed-air linesmust be equipped with drain facilities at their lowest points to drain collected liquids. These facilities have to be fitted to allow the observance of the draining of such liquids. Hand-operated drain facilities have to be actuated in accordance with the operating instructions.

Automatic drain facilities have to be checked for proper function at regular intervals. When draining condensates into a collecting line, which also collects the condensate from other machines, make sure that the collecting line is free from back pressure at all lines. When draining condensate, observe the corresponding regulations for waste water disposal.

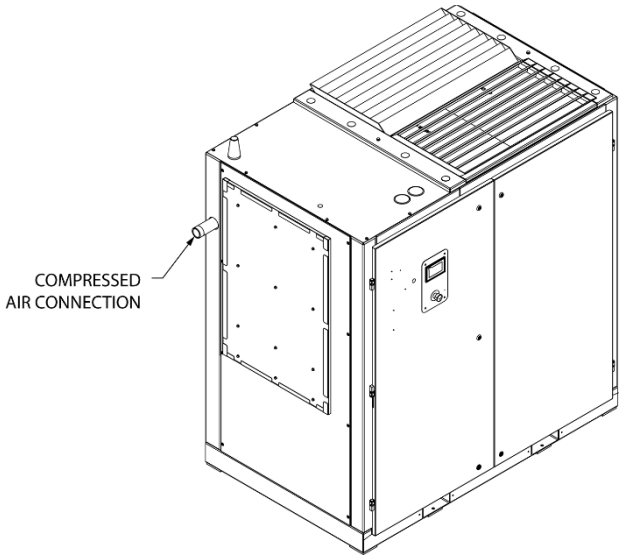


Figure 4-1 Compressed Air Connection

The compressed-air line system is connected at the compressed air outlet of the screw compressor.

For this, you should use a flexible connection (e.g., compressed air hose, compensator). Flexible braided hose is included in the installation kit, IK75100B

Connection size: 2-11½" NPT (M)

4.3 Optional Moisture Separator/Trap

The unit can be provided with an optional moisture separator and trap that is field-installed downstream of the after cooler. It is best practice to have the customer pipework outfitted with a moisture trap or other type of component to prevent condensed moisture from backfilling the compressor.

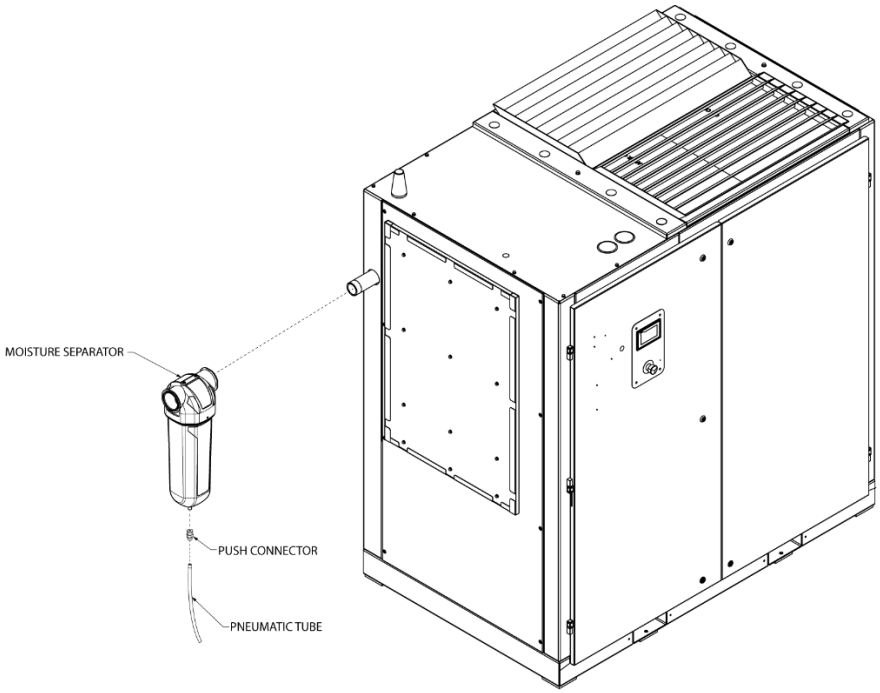


Figure 4-2 Moisture Separator

The separator removes the liquid water from the compressed air stream by inertial effects and collected in the lower bowl. The collected water is evacuated by a float-type drain valve.

4.4 Electrical Connection

⚠ DANGER

Risk of strong damages and fire on the electric power components.

- The power supply to the compressor side has to be fitted for industrial equipment and fulfilling the requirements of NFPA 79 and CSA C22.2 No.301. Any kind of operation outside of the stated limits of NFPA 79 and CSA C22.2 No.301 is inadmissible.
- The electrical connection should be made by a qualified electrician.

⚠ DANGER

High Voltage – Hazard of Electric shock, burns, or death

Dangerous and deadly electrical voltage

- Work on the electrical equipment may be performed only by specialized electrical technicians.
- Only units with Variable Frequency Drives, there is a risk of electric shocks due to charged capacitors! Isolate the compressor and wait 10 minutes before touching any electrical parts.
- Check the DC bus voltage.

⚠ WARNING

- If local regulations are stricter than the values given below, observe the stricter regulations.
- If the electrical connection is made to a non-earthed three-phase system (IT network), please see the corresponding notes in the included frequency converter documentation.
- If a residual current device (RCD) is used to monitor the earthing connection in the system for earth faults, to prevent interruptions only Type B devices (adjustable trip setting and delay) may be used.
- Install all covers and panels before applying power to the unit.
- Failure to install proper fuse protection may void the unit warranty.
- This product must be connected to a grounded, metallic, permanent wiring system, or an equipment-grounding terminal or lead on the product.

NOTICE

Disturbances in the electrical supply grid

- Speed-controlled compressor system with variable speed drives can cause disturbances in low-voltage grids. For this reason, this drive system is not intended for use on the public low-voltage grid that feeds residential areas.

The compressor system is completely finished at the factory according to EN 60204 (Industrial Machinery).

- The power supply to the compressor must be suitable for industrial equipment and must meet all requirements of EN60204-1/IEC60204-1. If the installation conditions deviate from the conditions as described in EN 60204, contact DV Systems.
- Provide the electrical connection and protective measures according to VDE, BS, or local requirements. As a rule, additional regulations from the corresponding power company must also be complied with.
- A main switch must be fitted on-site upstream of the compressor (DIN EN 1012 - 1) insofar that such a switch has not already been fitted in the factory as a special accessory. The main disconnect switch must meet the requirements of the safety standard EN 60 204-1 (Electrical Equipment for Machinery) and EN 60947-2 (Low Voltage Equipment).
- The compressor must be protected by suitable line fuses according to EN 60269-1 (Low Voltage Directive).
- If other electrical circuits are run to the electronic controller afterward, such as lighting, heating, or the like, that are not disconnected by the main disconnect switch, then these excepted electrical circuits must be labeled and run separately per EN 60204. Warning labels must also be installed near the main disconnect switch and near these circuits.
- Should an electrical connection to an unearthed AC electrical circuit (IT network) be made, observe the instructions in the supplied documentation of the frequency converter (only VSD compressors).

Unit Electrical Connection - The following instructions are required when connecting power supply to unit:

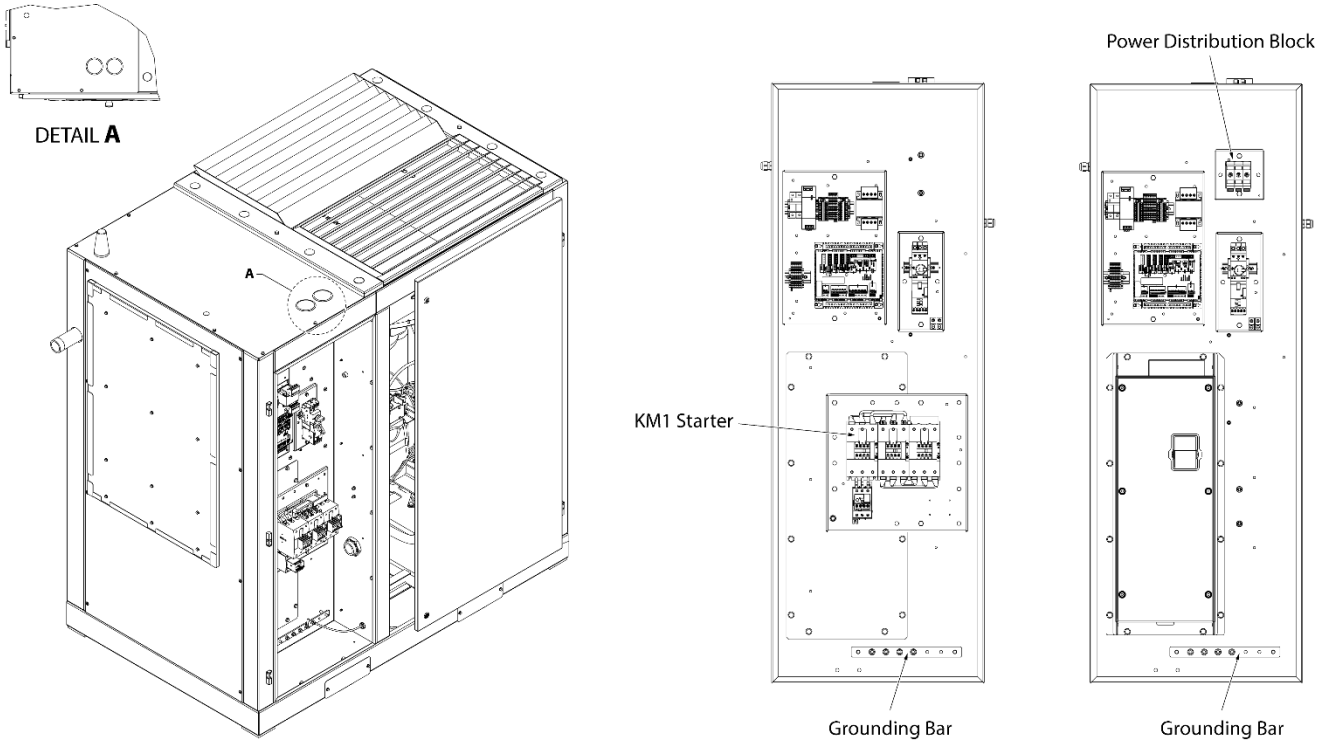


Figure 4-3

1. The electrician is to bring power to the Unit through the conduit hole located on the Top Panel. The electrical panel is accessible by means of opening the Front Door.
2. Refer to the electrical schematic and engineering data sheet to size the correct disconnect / breaker and wire size.
3. Connect ground wire to Protective Earth terminal on the grounding bar.
4. For Fixed Speed units: Bring power to L1, L2, L3 of the KM1 starter.
5. For Variable Speed units: Bring power to L1, L2, L3 of the Power Distribution Block.

Electrical Wiring - On standard units, the compressor package is factory wired for all connections from the starter to the motor, for the horsepower and voltage specified on the order. The standard unit is supplied with totally enclosed motors and a NEMA 1 starter and controls enclosure.

Electrical Wire Sizing - A certified electrician familiar with Canadian Electric Codes and applicable local codes shall size the electrical power wires serving the compressor package.

For variable speed packages only, refer to BP-39-DS for appropriate supply conductor size.

Grounding - Equipment must be grounded in accordance with C22.2 No. 0.4 of the Canadian Electric Code.

⚠ DANGER

- Failure to properly ground the compressor package could result in injury or death.
- Install ground wiring in accordance with the Canadian Electrical Code and any applicable local codes.

4.5 Check main motor overload on FS, Check fan motor overload on all units

Check main motor overload on fixed speed models, check fan motor overload on all units (FS & VSD models) in accordance with the enclosed circuit diagram for the compressor. Set the protection switch to the value stated in the table corresponding to the mains voltage and frequency (see circuit diagram).

PACKAGE HP	Voltage	Motor Protector Dial Setting (FS Only)	Fan Protector Dial Setting
75	460	52.0 A	4.7 A
	575	41.1 A	3.8 A
100	460	69.7 A	4.7 A
	575	55.1 A	3.8 A

4.6 Checking the Oil Level

⚠ DANGER

Air/Oil Under Pressure

- Air/oil under pressure will cause severe personal injury or death.
- Shut down compressor, relieve system of all pressure, disconnect, lockout and tagout power supply to the starter before servicing the unit.

⚠ CAUTION

Slip hazard

Slip hazard due to spilled consumables

- Clean up escaped consumable materials immediately.
- Avoid direct contact with consumables. Wear personal protective equipment.

NOTICE

Do not mix oils with different specifications.

If the compressor system is delivered without oil, oil must first be filled into the air/oil reservoir up to the “maximum oil level” mark.

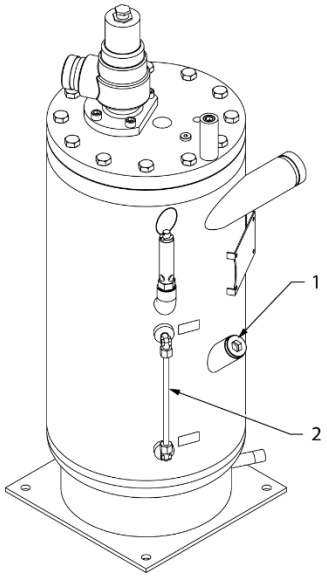


Figure 4-4

1 Oil filler cap (R1")
2 Oil level gauge

Check the oil level as follows:

- Shut off the compressor with the STOP button.
- Wait at least 5 minutes until the oil has settled, i.e. until the air has bubbled out.
- The oil level should be checked at each pause in operation and at regular intervals using the oil level gauge (-2- Fig. 4-4) on the oil reservoir.
- The oil level must lie between the “Max. Oil level” and “Min. Oil level”.
- If required, top up oil. Use DV Systems oil only.
- Close the oil filler cap (-1- Fig. 4-4) firmly.

5 Commissioning and Operation

5.1 First Commissioning (Rotation Check)

⚠ DANGER

High Voltage – Hazard of Electric shock, burns, or death

- Electrical shock can cause injury or death. Open main disconnect switch, lockout and tagout before working on control box.

⚠ DANGER

High Discharge Air Pressure

- Operation at excessive discharge air pressure can cause personal injury or damage to equipment. Do not adjust the operating discharge air pressure above the maximum stamped on the unit nameplate.

⚠ DANGER

Risk of injury

The direction of rotation of the drive motor can only be checked with the enclosure open.

- Before switching on, ensure that there is no one in the hazard zone.
- Keep a safe distance away from rotating parts of the machine.
- Wear hearing protection.
- Operate the compressor only when the enclosure is closed, except for test runs.

⚠ DANGER

Release Air Pressure

- Always stop the unit and release air pressure before removing oil filler plug.
- Failure to release pressure may result in personal injury or death.

⚠ DANGER

- The compressor starts and stops automatically. Automatic restarting can cause injury or death.
- Shut down compressor, relieve system of all pressure, disconnect, lockout and tagout power supply to the starter before servicing the unit.

⚠ WARNING

Risk of injury

- The enclosure doors must be closed and latched to keep the compressor package from overheating when the compressor is running.
- After an emergency stop, be sure that the pressure in the air/oil reservoir is less than 5 psig (.34 barg). Wait one minute or more before restarting.
- The controller has an automatic start/stop sequence built in. You do **NOT** need to close the air service valve.
- Closing the air service valve on start-up or prior to shutdown will cause rapid cycling, and could cause a high pressure shutdown.

⚠ CAUTION

- Operation with incorrect motor rotation can damage equipment and cause oil eruption from the compressor inlet.
- When checking motor rotation, induce minimum rotation (less than one revolution if possible).
- Never allow motor to reach full speed.
- The compressor unit's direction of rotation must be checked every time the compressor package or its main motor is reconnected to the power supply.

⚠ CAUTION

- Failure to properly ground the compressor package could result in controller malfunction.

NOTICE

Regular maintenance and replacement at required intervals of the oil filter, air filter and air/oil separator is necessary to achieve maximum service and extended drain intervals of DV Systems genuine DV Lube lubricants. Use only genuine DV Systems filters designed and specified for this compressor.

NOTICE
Although every compressor has already undergone a test run at the factory, and has been checked thoroughly again prior to shipping, the possibility of transport damage cannot be eliminated. ➢ Check the compressor again for damage before commissioning and observe it during the first few hours of operation. ➢ When the compressor system is connected to a power source for the first time, always check the drive direction of the drive motor. The compressor controller provides a jogging function under the diagnostics menu. See the controller manual for additional instruction. Incorrect rotation of the compressor may cause serious damage, even during short periods of operation.

The screw compressor unit is completely factory-assembled. It can be directly connected to the compressed air mains by means of a flexible connection.

First commissioning is carried out as follows:

- Remove transport guards, if fitted.
- Check the oil level in the oil reservoir (also see section 4.6, figure 4-4).
- Check settings of the fan motor protection switch on all the units and main overload setting on fixed speed machines**.** See Section 4.5
- Check and re-tighten all connecting terminals of the electrical control.
- Turn on the main power supply switch.
- After the power supply is switched on, the compressor controller will boot to the home screen. The fault shown on the display [power supply fault] must be acknowledged in the alarm screen prior to starting the unit.
- After the acknowledgement, the message [READY TO START] appears on the display, unless another fault is present. Resolve any other faults before starting the unit.
- The factory settings of the Load, Target and Unload set points are saved in the compressor controller and depend on the pressure variant of the compressor (see nameplate fig. 1-1, stage pressures = maximum operating pressure). These settings can be checked or changed in the Settings -> Control menu (further information can be found in the compressor controller operating manual).
- Temporarily remove the panel in order to check the direction of rotation. See (-1- Fig. 5-1) for the prescribed direction of rotation of the drive motor of the geared compressor. See (-1- Fig. 5-2) for the prescribed direction of rotation of the drive motor with direct drive. For the prescribed direction of rotation of the fan, see direction of rotation arrow on the fan.
- Use the jog motor function in the diagnostics menu to jog and check direction of rotation of the main and fan motor
- With a wrong direction of rotation, de-energize/lock out and correct the direction of rotation by flipping two of the power leads at the input side of the KM1 starter for the fixed speed unit or at the input side of the power distribution block on the variable speed unit.

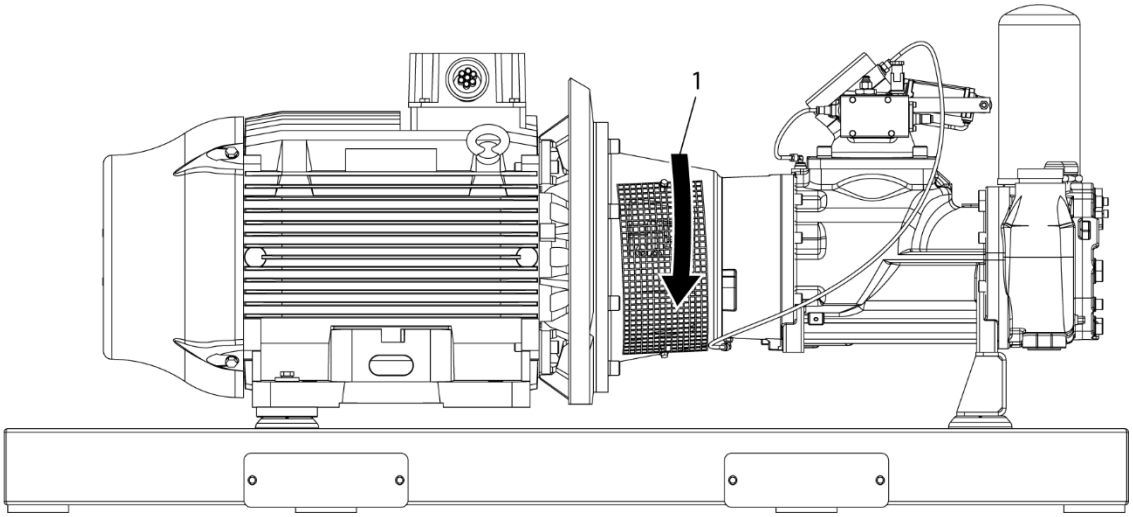


Fig. 5-1

1. Drive motor direction of geared compressors

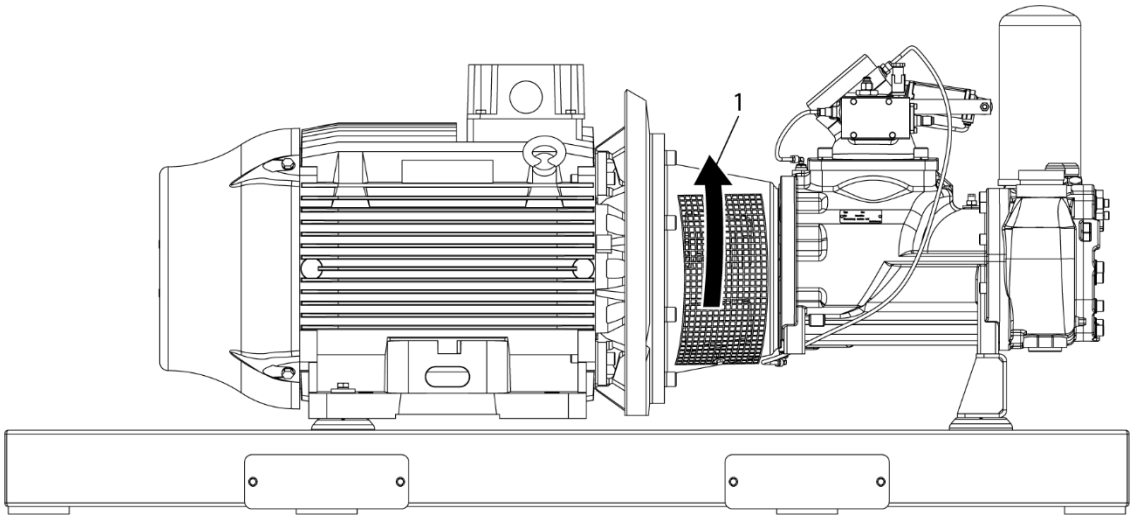


Fig. 5-2

1. Drive motor direction with direct drive

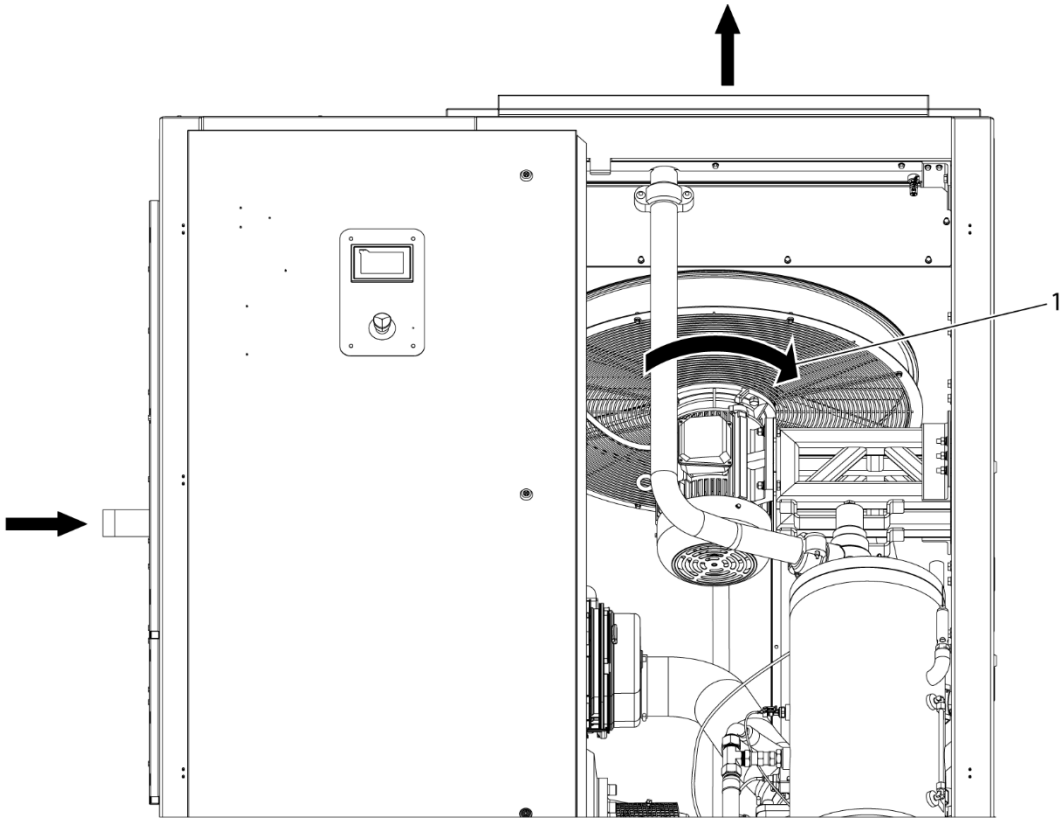


Fig. 5-3

NOTICE
For switching the compressor off “normally”, use only the stop push-button (-3- Fig.5-4), but not the EMERGENCY STOP push-button. After having been switched off, the compressor is after-cooled for 30 seconds (soft stop).

Temperature start-up protection

The screw compressor unit will not start up if the ambient temperature is lower than 5°C (41°F).

5.2 Normal Operation

NOTICE
Only for units with Variable Frequency Drives: If the compressor has been in storage for a substantial period of time (up to 2 years), switch the main power supply switch on (ON) at least one (1) hour prior to commissioning. This ensures the operability of the capacitors and prevents any damage from occurring. If the compressor has been in storage for longer than 1 year, please contact an authorized DV Systems Distributor prior to start-up.

Before commissioning the compressor, all the electrical and electronic components and units should be checked for the ingress of water or condensation.
If the electronic control system was removed during shut down, it must be re-installed.
Then proceed as described in “First Commissioning” section.

5.3 Display of the Compressor Controller

⚠ WARNING	
	The compressor can be automatically started at any time when it is in enabled mode.

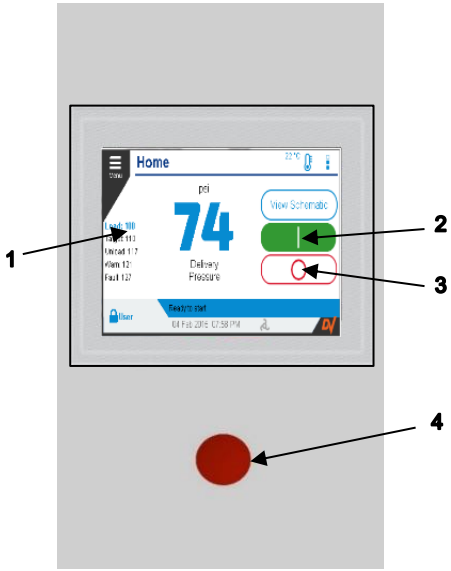


Figure 5-4 Controller display

1. Touchscreen Display
2. Start push-button [I]
3. Stop push-button [O]
4. Emergency stop

Switching on

Press start button < I > (-2- Fig. 5-4) on the control panel.

- The compressor switches on.
- The compressor runs automatically (automatic mode).

Operating states

During automatic mode, the compressor can be in one of the following operating states:

- Ready to start (Standby) [Ready to start]
- Loaded operation [On-Load]
- Partial load operation (on-load operation at reduced speed only VSD compressors) [On-Load]
- Idle [Off-Load]

Observations during operations

During operation the compressor must be regularly checked to ensure leak-tightness of the oil circuit.

Switching Off

NOTICE
The unit may only be shut down using the emergency stop button in real emergencies. When shutting down normally, please use the O (STOP) key.

Press stop button < O > (-3- Fig. 5-4) on the control panel, not the Emergency Stop button (-4- Fig. 5-4).

- After shutdown, the compressor has a run on time of 30-50 seconds (soft stop).

Emergency Stop

⚠ WARNING	
	➢ Do not stop the Unit using the Emergency Stop Button unless there is a danger to the product or of personnel injury. ➢ Using the Emergency Stop Button, disconnect, or breaker to stop the Unit will not allow the Unit to go through an unloading sequence, and could result in damage to the Motor, Starter, or other electrical components. Damage caused in this manner is not covered by the manufacturer's Warranty.

The emergency stop button (-4- Fig. 5-4) is located below the compressor controller. It is used to immediately shut down the unit. Only use the Emergency Stop button to shut down the unit in emergencies.

Using the Emergency Stop

1. Press the <E-stop> button. The compressor is brought to a safe condition.
2. Correct the fault that was the reason for the emergency stop. See the "fault correction" chapter.
3. Unlock the <E-stop> button.
4. Start up the compressor. See the paragraph "Commissioning after a fault".

5.4 Routine Commissioning

⚠ WARNING	
	Rotating parts inside the unit may lead to injuries, e.g., cutting of finger or hand. ➢ Before commissioning make sure that no one is located in the danger zone of the motor/screw compressor! ➢ After doing work: Check that all safety equipment is reinstalled and that all tools have been taken out! ➢ Only operate the screw compressor with the coverings closed!

Routine commissioning includes commissioning after maintenance:

- Check the oil level in the oil reservoir.
- Open shut-off valves between the screw compressor, reservoir and pipe.
- Turn on the main power supply switch.
- After the power supply was switched on, the compressor controller will boot to the home screen. The fault shown on the display [power supply fault] must be acknowledged in the alarm screen prior to starting the unit.
- After the acknowledgement, the message [READY TO START] appears on the display, unless another fault is present.
- Press START button [I] (-2- Fig. 5-4).
- To switch off the compressor in the usual way use the STOP button (-3- Fig. 5-4) and not the emergency STOP button (-4- Fig. 5-4). After shutdown the compressor has a run on time of 30-50 seconds (soft-stop). The time remaining is counted down on the display.

Temperature start-up protection

The screw compressor unit will not start up if the ambient temperature is lower than 5°C (41°F).

5.5 Commissioning after Extended Downtime

For commissioning after an extended idle period, contact your DV Systems distributor.

5.6 Commissioning after a Fault

NOTICE
Property damage Avoid switching on the compressor multiple times without clearing the fault, as this can lead to significant machine damage. ➢ Switch on the compressor only after the fault has been cleared.

Recommissioning after a fault (automatic shutoff)

Faults are shown in the "Fault memory" display memory.

1. Switch off the main disconnect switch and secure it against switching on again.
2. Clear the fault. See the “fault correction” chapter in the Service Manual.
3. Switch on the main disconnect switch.
4. Acknowledge the fault in the Fault memory menu.
5. After acknowledgement, the message [Ready to start] appears on the display, as long as no other fault is present.
6. Press the start button < I > on the control panel.
   - The compressor switches on.
   - The compressor runs in automatic mode.

6 Appendix

6.1 Decommissioning

Routine Decommissioning

Routine decommissioning includes, for example, decommissioning for maintenance work.

1. Lockout and Tagout.
2. Close the shutoff valves between the compressor and the compressed air network.
3. Relieve the pressure in the aftercooler by carefully opening the pressure relief valve.

Decommissioning for an Extended Period of Time.

For decommissioning for more than six months, contact DV Systems distributor.

Final Decommissioning

In order to prevent renewed commissioning of the compressor or misuse by unknown persons, the compressor must be rendered unusable.

The compressor is made unusable by removing the electronic controller.

6.2 Consumables and Auxiliary Materials

The compressor contains approximately 34 L (9 gal) of oil.

Safety Data Sheets

When handling consumables and auxiliary materials, the associated Safety Data Sheets must be adhered to.

NOTICE
The following aspects must be taken into account for storage of storing compressors: The compressor should be stored in a dry building which should be heated if possible. This is particularly true during the months of winter. The coolant is to be completely drained where there is a risk of frost (t < 1°C (34°F) (compressor stage, coolers, system containers, water filters, storage containers, lines, and valves). If there is a risk that the temperature will fall or rise above the limits of -10°C (14°F) to 65°C (149°F), the electrical controller must be removed and stored in ambient temperatures of 5°C (41°F) to 30°C (86°F).

6.3 Disassembly

⚠ WARNING	
	**Damage to health** Risk of damage to health from consumables and auxiliary materials Consumables and auxiliary materials can cause irreparable damage to health, induce allergies, or irritate mucous membranes. ➢ Follow the locally applicable operating instructions and hazardous material Safety Data Sheets when handling consumables and auxiliary materials. ➢ Avoid direct contact with consumables and auxiliary materials. Wear personal protective equipment. ➢ In case of injuries associated with consumables and auxiliary materials, consult a physician and indicate the material involved. ➢ Keep the Safety Data Sheet for the causative material available.

⚠ CAUTION	
	**Slip hazard** Slip hazard due to spilled consumables ➢ Clean up escaped consumable materials immediately. ➢ Avoid direct contact with consumables. Wear personal protective equipment.

Prerequisites

- The compressor is shut down.
- The compressor is electrically disconnected.
- The main disconnect switch is switched to OFF and secured against restarting.
- The compressor is not pressurized.
- Liquids and greases are removed to the greatest extent possible.

⚠ DANGER	
	**Electric shock** Deadly electrical voltage ➢ Work on the electrical equipment may be performed only by authorized electrical technicians.

1. Disconnect the feed cables. See wiring diagram.
2. Remove the feed cables.
3. Apply seal plugs to the feed line openings.

Removing the Pipework

1. Disconnect the compressed air connection.
2. Disconnect the condensate drain lines.
3. Allow the condensate to drain out completely.
4. Clean up any escaped condensate immediately.

Draining the Lubricating Oil

1. Open the enclosure, create access.
2. Place a suitable container below the oil drain.
3. Open the drain valve and allow oil to drain out completely. Dispose of the lubricating oil.
4. Close the drain valve.
5. Close the enclosure.

Remove the Oil Filter

Remove all oil filters in the lubrication system. Dispose of the filters.

- Oil filter
- Oil fine separator

Remove the Air Filter

Remove all filter elements and filter mats. Dispose of filter elements and filter mats.

- Air filter cartridge
- Filter mat
- Switch cabinet cooling air inlet filter
- Control air filter

6.4 Disposal

General

The compressor must be dismantled and removed by technicians. The applicable local safety and environmental protection regulations must be complied with.

When disposing of materials that are hazardous to health, the instructions on the corresponding Safety Data Sheets must be followed.

Packaging materials, cleaning agents, and used or residual consumables must be fed to recycling in accordance with the regulations applicable at the installation site.

For additional information, contact your local representative or visit:
www.dvsystems.com

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