

Chapter 3

Installation and commissioning

Content

This chapter contains the most important information on transporting, installing and storing the compressor.

General Information

The installation plan and the technical data of this specific screw compressor model can be ordered from RENNER GmbH. The compressor is delivered on a euro-pallet, packaged in a carton and labelled.



Danger of tipping!

The machine can tip over at an inclination of more than 10°! Use suitable transport means such as a forklift, lifting gear or loading harness. Support it from the side.

Unpacking the machine has no special requirements and the (interim) storage in the transport packaging is also not problematic. Protect the compressor against tilting over by storing it on level, firm ground.



Dispose of the packaging material (carton / marked sheets) separately.

This chapter is subdivided into the following sections:

Overview

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3.2	Connections	3-3
3.3	Compressor start-up	3-5

3.1 Compressor installation

Content

This section contains important instructions which you need to observe in order to safely install the compressor and to prevent damage or malfunction.



Warning!

Follow the safety instructions!

Always remain outside the danger zone of a raised load!

Compressor installation

Key word	Ensure that
Installation site	<ul style="list-style-type: none"> • Surface: Flat, level, firm • Building ceilings: Check load bearing capacity • Air: As cool as possible, clean, frost-free, as little damp as possible Temp.: +5°C (41°F) - +40°C (104°F)* • Sufficient ventilation in the room • Air intake must be sufficiently unobstructed • Arrange the air intake opening in such a way that no loose items can be sucked in • The installation site is illuminated (to read off the instruments, carry out maintenance work...)
Lifting work	<ul style="list-style-type: none"> • Secure any loose, swinging or pivoting parts before lifting the compressor • Use suitable lifting gear (weight acc. to data sheet) • Always remain outside the danger zone of a raised load
Conduits, pressure pipes	<ul style="list-style-type: none"> • Remove all blank flanges, stoppers, covers and bags with drying agents before mounting conduits • Please ensure that the connection from the aftercooler to the compressed air system can expand as a result of heat and must be connected by means of a flexible hose.
Exhaust air	<ul style="list-style-type: none"> • An exhaust duct must at minimum have the diameter of the cooler outlet area and can be 3m in max. length with one bow of 90°; for longer ducts, use additional fans with 20% more power than the compressor fan • When installing several compressors please ensure that no compressor sucks in the heated exhaust air from another compressor

* Please ask your retailer in the event of higher temperatures.

3.2 Connections

Content

This section covers important instructions which you need to observe in order to safely connect the compressor to the compressed air system as well as the electrical supply.



Warning!

Before connecting the machine to the compressed air system, all conduits and hose connections inside the compressor must be checked and, if necessary, retraced.

For plants with pressure tanks, an acceptance check of the air collection tank must be made by a compressed air tank expert before commissioning.
Start an inspection log!

A Compressed air connection

The system has all the required conduits and is ready for operation.

The following must be observed when connecting to the compressed air system:

Compressed air connection

Key word	Ensure that
Pressure	<ul style="list-style-type: none">• Suitable screws and conduits are used for the operating pressure• The end pressure of the system is not higher than stated on the rating plate.• A non-return valve between the machine and the compressed air system is not required as it has already been integrated in the machine.
Connection	<ul style="list-style-type: none">• Connect the system without voltage and isolated against vibrations to the compressed air system e.g. by using a flexible hose
Shut-off valve	<ul style="list-style-type: none">• The additional installation of a shut-off valve is recommended to facilitate maintenance tasks at the compressor without de-pressurising the compressed air system.
Condensate	<ul style="list-style-type: none">• An automatic steam trap can be integrated behind the after cooler for improved condensate separation from the compressed air

3.2 Connections (continuation)



B Electrical connection

Attention! All wiring work on the controls, and the compressors have to be carried out in consideration of the 5 safety rules.

Five safety rules:

Before starting work

- switch off
- lock against reclosure
- check that lines and equipment dead
- ground and short circuit phases
- cover, partition or screen of adjacent line sections

Only the connection to the electricity supply is now required for the machine which is now ready to use with all conduits installed.

The machine must only be connected by an electrician!

The following must be observed when connecting to the mains supply:

Electrical connection

Key word	Ensure that
Voltage	<ul style="list-style-type: none"> The machine is only connected to the voltage stated on the engine rating plate
Rotation	<ul style="list-style-type: none"> The rotational direction is observed under all circumstances! Based on the attached arrows. Checking the rotational direction see chap. 3.3/3.4. Not necessary for frequency-controlled compressors
Fuses	<ul style="list-style-type: none"> Customer to install the main fuse and circuit breaker with the EMERGENCY STOP function; these must be able to switch at least 1.1 times the motor output and must be clearly allocated to the machine Ensure that the mains supply is sufficiently secured (see data sheet)
Connection	<ul style="list-style-type: none"> The supply cable must be situated such that there is no danger of tripping over it Insert the cable with leads L1, L2, L3, N and PE through the PG connection in the connection box <p>Connect the leads to terminals L1, L2, L3 N (wire 4) and PE respectively</p>

Warning: if possible do not use plugs !!

3.3 Compressor start-up

Content

This section covers important information which you need to observe in order to start up the compressor safely.

General points

Each component of the machine is tested at the factory in continuous operation after the final assembly. The test ensures that the components indicate the data given and operate fault-free. During the initial hours of operation the machine must be watched to determine any possible malfunctions.



Important!

The respective operating manuals must be read and observed for machines with additional optionally installed components (electronic control, frequency converter, refrigerant dryer).

Preparation

The following points must be observed and carried out before the first start-up:



Step	Task to be carried out / Points to be observed:
1	Have an electrician tighten all screw and terminal connections in the control cabinet
2	The motor bearings of compressors, without permanent greased motor bearings, that are unused longer than 6 month have to be regreased before putting into operation
3	<p>A clearly visible sign must be affixed to machines with remote control with the following wording:</p> <p>Warning! This machine is remote controlled and may start without warning!</p> <p>When controlling the machine remotely you must take the safety precautions which prevent the machine from starting up while it is controlled or maintained; place a relevant instruction on the remote control switch</p>
4	Do not use the emergency or main switch to switch the machine off during normal operations see chapter 4 "Normal Mode Operation" (Pages 4-5)

3.3 Compressor start-up (continuation)

Checking the rotational direction INFO

When first starting up the machine, as well as after each change to the electrical feed line, the rotation of the screw compressor must be checked.
The rotation of the V-belt pulley must follow the direction of the attached arrows! If necessary, reconnect the connecting cable (electrician).




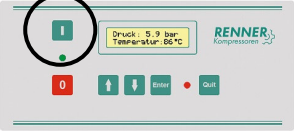


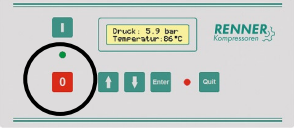

WARNING!

The rotation control must be carried out as a two-hand operation!

An incorrect rotation for longer than 2 seconds will lead to faults in the screw compressor!

There is a danger from moving parts when checking the rotation with the safety doors open!

Proceed as follows when checking the rotation:

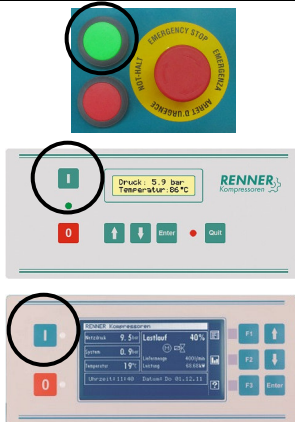
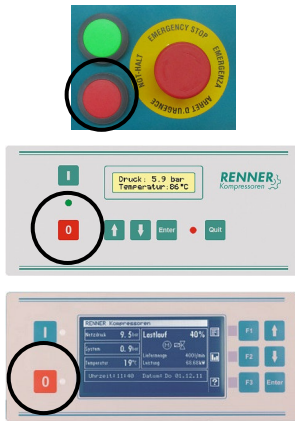
Step	Operation:	Figure / Expl.
1	Open the front door	
2	Start the compressor by tapping the green start button once with the one hand; immediately let go of the button	  
3	Within 2 seconds stop the compressor by pressing the red stop button with the other hand.	  

3.3 Compressor start-up (continuation)

Test run INFO

Carry out a test run so that the oil can be distributed throughout the machine.

Conduct a test run

Step	Operation:	Figure / Expl.
1	Open the shut-off valve. Press the start button and let the machine run for approx. 5 seconds.	
2	Press the stop button.	
3	Repeat points 1 and 2 twice.	

Chapter 4

Operation / Normal use

Content

This chapter covers the information required for normal operation of the compressor.

Overview

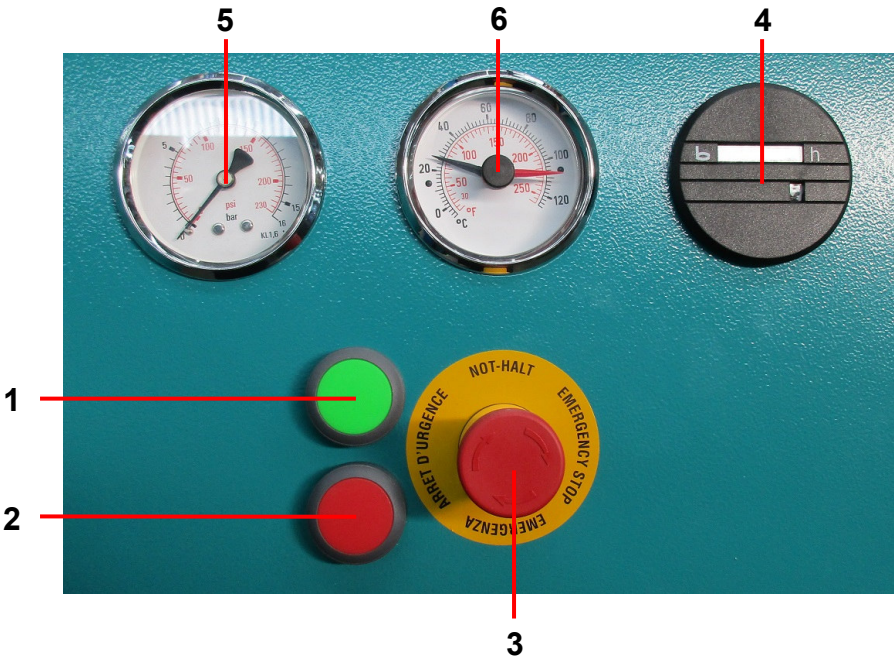
This chapter is subdivided into the following sections:

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4.1 Control instrumentation RENNERlogic

Content This section provides an overview of the instrumentation control RENNERlogic.

Figure
Instrumentation
components
RENNERlogic



Function
Instrumentation
components
RENNERlogic

The control components have the following function(s):

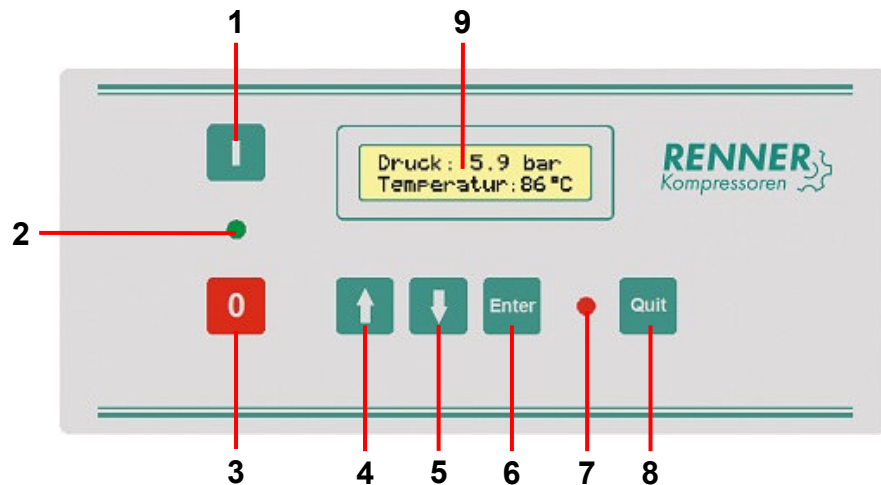
Item	Description	Function/Use
1	Start button	Starts the compressor Note: The main switch must be switched on. The main switch is installed by the customer.
2	Stop button	Stops the compressor
3	Emergency Stop	Stops compressor immediately in emergency
4	Operating hour meter	Counts the number of hours the compressor has actually run
5	Pressure gauge <i>Working pressure</i>	Displays working pressure setting
6	Temperature display <i>Combistat</i>	Displays the oil temperature and operating temperature

4.2 Control instrumentation RENNERtronic

Content

This section provides an overview of the instrumentation control RENNERtronic.

Figure
Instrumentation
control
RENNERtronic



Function

Instrumentation
control
RENNERtronic

The instrumentation control has the following function(s):

Item	Description	Function
1	Compressor ON / Start	Switches the compressor on
2	LED (green)	Service LED
3	Compressor OFF/ Stop	Switches the compressor off
4	Arrow key UP	The UP key takes you to the previous menu item and increases parameter values. Also serves to call up the INFO level (in conjunction with the Enter key)
5	Arrow key DOWN	The DOWN key takes you to the next menu item and decreases parameter values. Also serves to call up the INFO level (in conjunction with the Enter key)

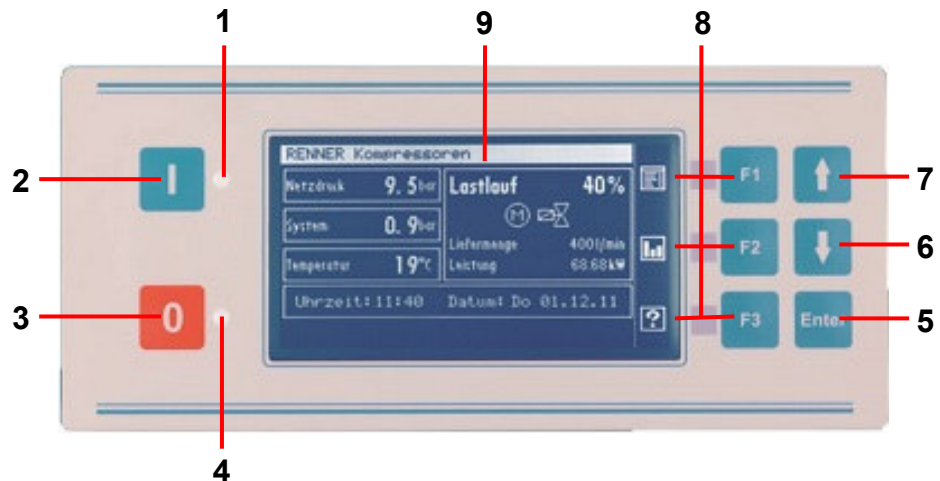
Item	Description	Function
6	Enter	Select a menu item. Confirm or save entries or changes.
7	LED (red)	Fault / maintenance LED
8	Quit	Quit discards inputs and ends a selected menu item. It also acknowledges warning and error messages.
9	Display	Displays the parameters and the error/warning messages. 1st line: Displays current operational data 2nd line: Displays menu values as well as error and warning messages.

4.3 Control instrumentation RENNERtronic plus

Inhalt

This section provides an overview of the instrumentation control RENNERtronic plus.

Figure
Instrumentation
control
RENNERtronic
plus



Function
Instrumentation
control
RENNERtronic
plus

The instrumentation control has the following function(s):

Pos.	Bezeichnung	Funktion
1	LED (green)	Service LED
2	Compressor ON / Start	Switches the compressor on
3	Compressor OFF / Stop	Switches the compressor off
4	LED (red)	Fault / maintenance LED
5	Enter	Select a menu item. Confirm or save entries or changes.
6	Arrow key DOWN	The DOWN key takes you to the next menu item and decreases parameter values.
7	Arrow key UP	The UP key takes you to the previous menu item and increases parameter values.
8	Function keys F1, F2, F3	On the display (9) to the left of the function keys, there is always the current assignment
9	Display	Displays the parameters and the error/warning messages.

4.4 Starting normal operation

Content

The following section explains how to start the compressor and contains essential points for normal operation.



Danger!

There are moving parts inside the compressor housing which can cause serious injuries.
Never operate the compressor with the housing open!

Before starting the compressor

Check the following points before starting the compressor:


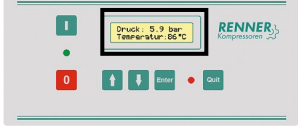




- Is the oil level sufficiently high?
- Is the main switch on?
- Are any existing shut-off valves open?

Start compressor and monitor in normal operation

Step	Operation	Figure / Expl.
1	Press the <i>Start</i> button to start the compressor.	
2	Monitor the following points at regular intervals during operation:	
2a	Working pressure The working pressure displayed must not exceed the maximum permissible value specified on the type plate. If this is the case, switch off the compressor immediately.	

4.4 Starting normal operation (continuation)

Monitor normal
operation
(contd.)

Step	Operation	Figure / Expl.
2b	<p>Oil temperature and operating temperature The oil temperature and operating temperature must not exceed 110°C. If 110°C is exceeded the compressor will cut out automatically.</p> <p>Important! Should the compressor fail to cut out automatically it must be switched off immediately by hand!</p>	  
2c	<p>Operating hour meter Various maintenance work must be carried out after a specified number of operating hours. The exact maintenance intervals and relevant servicing work are listed in the maintenance schedule.</p>	  

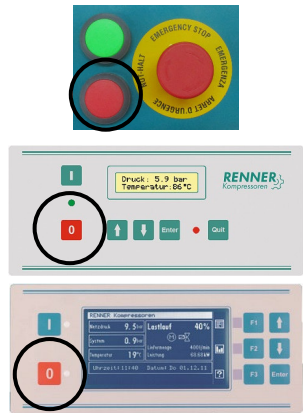
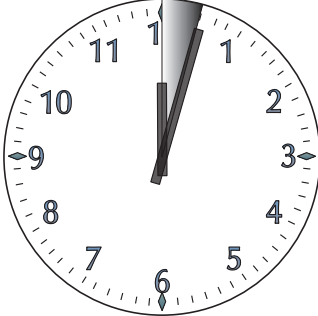

4.5 Switching off the compressor

Content

This section explains how to switch off the compressor in normal operation and/or at the end of operations.

Stop normal operation

To switch off the compressor carry out the steps below in the order listed:

Step	Operation	Figure / Expl.
1	Press the red <i>Stop</i> button while the compressor is running to shut down the compressor.	
3	<p>The compressor now switches to the follow-on time and stops automatically after that.</p> <p>NB! The follow-on time must not be shorter than the pre-adjusted time! (A longer period of time is no problem).</p>	
4	Press the Emergency Stop to secure the compressor <i>Emergency Stop</i>	

4.5 Switching off the compressor (continuation)

Completely shut off If you want to shut off the compressor completely: (e.g. after completing the work), then in addition to the above steps, you must also turn off the main switch.



Note:

Switching the machine off via the red emergency stop button can lead to the oil frothing up in the separator tank. Possible consequences:

- Exit of oil exit with the discharge air.
- Oil overflow in the separator cartridge
- The compressed air could contain oil when re-starting the machine.

Although this is not usually critical and is normalised during operations, in certain cases, it could however become necessary to replace the separator cartridge.

4.6 Remedying malfunctions in normal operation

Content

This section contains advice on remedying malfunctions.



Danger!

Human error in remedying faults or lack of professional training can lead to serious damage to property or physical injury. It is therefore essential that faults are rectified by duly qualified persons.

Before removing faults

Always take the following steps before starting any work:

- Switch the compressor and main switch off!
 - Discharge all the compressed air from the compressor and air vessel!
-

Malfunctions

The following faults may occur during operation:

Fault	Possible Cause	Remedy
System starts starting	<ul style="list-style-type: none">• No power• Loose cables or fuses• Motor protection switch has cut out• Combistat cut out / defective• Connecting lines to Combistat are kinked	<ul style="list-style-type: none">➤ Establish power supply➤ Retighten cables or fuses➤ Unlock motor protection switch (switch cabinet)➤ Ensure correct cooling; install new Combistat if defective➤ Ensure correct guiding of connection cables

Continued overleaf

4.6 Remedying malfunctions in normal operation (continuation)

Malfunctions (contd.)

Fault	Possible Cause	Remedy
System starts with difficulty	<ul style="list-style-type: none"> • Time for star-delta connection too long or too short • Machine is under compression load • Voltage fluctuations in the grid • Ambient temperature too low causing excess viscosity of oil • Oil is too viscous 	<ul style="list-style-type: none"> ➤ Check and correct time setting, correct setting 3-6 seconds, adjust on Relay K 1T ➤ Determine reason ➤ Check solenoid valve and relief valve and change if necessary ➤ Heat installation location ➤ Select correct type of oil: RENNER VDL N ISO 68 or 46 for low temperatures.
Compressor cuts out before reaching discharge pressure	<ul style="list-style-type: none"> • Motor overload tripping • Combistat cuts out due to excessively high temperature • Short circuit in trip line 	<ul style="list-style-type: none"> ➤ Check and adjust overload setting; check and adjust discharge pressure switch setting; check supply lead for phase failure. ➤ Ensure correct cooling; install new Combistat if defective ➤ Eliminate cause of short circuit, change defective fuse

Continued overleaf

4.6 Remedying malfunctions in normal operation (continuation)

Malfunctions (contd.)

Fault	Possible Cause	Remedy
Motor overload tripping (therm. overcurrent relay) has stopped the system	<ul style="list-style-type: none"> Blocked system Phase failure Motor over-loaded Ambient temperature too high 	<ul style="list-style-type: none"> ➤ Eliminate reason for seizure ➤ Check supply line ➤ Check and adjust overload setting; check and adjust discharge pressure switch setting ➤ Ensure adequate ventilation
Combistat cuts out due to excessively high temperature	<ul style="list-style-type: none"> Insufficient oil Oil filter clogged Oil thermostat defective Oil cooler dirty Compressor incorrectly installed Combistat defective or incorrectly set 	<ul style="list-style-type: none"> ➤ Check and adjust oil level ➤ Change oil filter ➤ Replace oil thermostat ➤ Clean oil cooler (air or oil side) ➤ Refer to recommendations for installation ➤ Adjust or replace Combistat
Safety valve blows	<ul style="list-style-type: none"> Safety valve defective Oil separator cartridge clogged 	<ul style="list-style-type: none"> ➤ Change safety valve ➤ Change separator cartridge

Continued overleaf

4.6 Remedying malfunctions in normal operation (continuation)

Malfunctions (contd.)

Fault	Possible Cause	Remedy
Oil in compressed air	<ul style="list-style-type: none"> • Oil scavenge line and nozzle in oil sight glass clogged • Separator cartridge defective • Oil tank level too high • Compressor was stopped before end of run-on time 	<ul style="list-style-type: none"> ➤ Have oil scavenge system cleaned ➤ Check cartridge and replace if necessary ➤ Rectify oil level ➤ Never switch off compressor until run-on time has elapsed
Compressor does not vent during continuous operation; compressor does not cut out during intermittent operation, i.e. safety valve blows	<ul style="list-style-type: none"> • Upper trigger point of discharge pressure switch set too high • Solenoid valve defective • Relief valve defective • Minimum pressure valve jamming 	<ul style="list-style-type: none"> ➤ Reset discharge pressure switch ➤ Change solenoid valve ➤ Change relief valve ➤ Check and adjust minimum pressure valve
Compressor vents continuously; low volumetric capacity	<ul style="list-style-type: none"> • Solenoid valve defective • Relief valve defective • Electric supply to solenoid valve disconnected • Auxiliary contact on Y-contactor defective 	<ul style="list-style-type: none"> ➤ Change solenoid valve ➤ Change relief valve in intake regulator ➤ Restore supply line connection ➤ Check switch and replace if necessary
Non-existent or insufficient discharge capacity	<ul style="list-style-type: none"> • Intake filter clogged • Intake regulator or intake valve jamming or positioned incorrectly (continuous operation) • Leaks in the system 	<ul style="list-style-type: none"> ➤ Change air filter ➤ Check regulator and butterfly valve and clean bearing and guides ➤ Rectify leaks

Continued overleaf

4.6 Remedying malfunctions in normal operation (continuation)

Malfunctions (contd.)

Fault	Possible Cause	Remedy
Intake regulator does not close at discharge pressure	<ul style="list-style-type: none"> • Actuating cylinder defective, no control pressure • Nozzle blocked or frozen 	<ul style="list-style-type: none"> ➤ Install new actuating cylinder, check solenoid valve ➤ Clean nozzle
Pressure vessel not depressurising	<ul style="list-style-type: none"> • Non-return valve defective 	<ul style="list-style-type: none"> ➤ Change non-return valve
Oil in compressor, oil mist on venting	<ul style="list-style-type: none"> • Loose connection in oil line • Check seal on oil drain plug • Machine is shut off if under load (e.g. emergency stop switch) • Check condition and fit of O-ring on intake regulator 	<ul style="list-style-type: none"> ➤ Tighten connection ➤ Tighten screw, seal if necessary ➤ Do not switch compressor off until it has coasted for three minutes, or check the minimum run-on time and set to three minutes ➤ Fit new O-ring if necessary
System runs noisily	<ul style="list-style-type: none"> • V-belts not correctly tensioned • V-belt sets not compatible • V-belt pulleys not aligned with each other 	<ul style="list-style-type: none"> ➤ Check V-belt tension and tighten if necessary ➤ Replace with matching set of belts ➤ Check alignment of pulleys and adjust if necessary