INDUSTRIAL

SCREW AIR COMPRESSOR VSDD 2.2KW 3HP/10BAR 160L

SAVE THESE INSTRUCTIONS

Please read and comply with these original instructions prior to the initial operation of your appliance and store them for later use or subsequent owners. Apart from the notes contained herein the general safety provisions and rules for the prevention of accidents of the legislator must be observed.

Warnings and notes that are attached on the appliance provide important notes for the safe operation.

Jefferson®
PROFESSIONAL TOOLS & EQUIPMENT

Features

- Variable Speed 2.2kW Motor
- Direct Driven
- IE4
- Permanent Magnet Motor
- Oil Cooled Motor
- Coaxial All In One Motor Design
- Single Phase
- 160L Air Receiver
- Easy Access Maintenance
- Sound Level 75dB(A)
- Colour Touch Screen Control Pad
- Wheel-Mounted

Product Specification

Description:	Screw Air Compressor 3HP 2.2kw/10bar
Model:	JEFCIND160S-3
Pressure:	10bar (145psi)
Motor power (kW) / Horse Power :	2.2kW / 3HP
Motor overload Amps:	9.2A
Motor speed RPM:	1160
Voltage/Frequency:	1 Phase : 230V/50HZ (7.7A)
Air Receiver:	160L
Controller:	PLOT MAM6080
Free Air Delivery (FAD):	8CFM (220ltr/min)
Exhaust volume / exhaust pressure:	0.29/0.7 (m3/min)/Mpa
	0.26/0.8 (m3/min)/Mpa
	-
Cooling Methods:	Oil-cooled
Oil Capacity:	1.6 L
Driving Mode:	Direct Driven
Start-up method:	Soft start
Protect Grade:	IP65
Dimensions:(mm)	1100 x 540 x 1250mm
Net Weight:	160 Kg
Noise:	75dB(A)
Outlet pipe diameter:	G 3/4”
Maximum exhaust temperature:	105°C
Max oil temperature:	105°C
Safety Valve Settings:	11bar

Working Principle

The complete working cycle of a screw compressor can be divided into three processes: suction, compression and exhaust. As the rotor rotates, each pair of intermeshing teeth completes the same working cycle one after the other, so for the sake of simplicity, we will study the entire working process of a pair of teeth here.

a. Suction process: When the rotor starts to rotate, the inter dental volume is formed due to the gradual disengagement of one end of the teeth. The expansion of this interdental volume creates a certain vacuum inside it, and this interdental volume is only connected to the suction port. Hence, the air flows into it under the action of pressure difference. In the subsequent rotor rotation process, the positive rotor teeth are constantly disengaged from the teeth of the negative rotor. The interdental volume will not increase again. The interdental volume is disconnected from the suction port, the air is enclosed between the teeth, and the suction process is over.

b. Compression process: As the rotor rotates, the volume between the teeth is constantly reduced due to the engagement of the rotating teeth. The volume occupied by the air enclosed in the interdental volume also decreases, increasing pressure and thus the compression of the air.

c. Exhaust process: As the volume between the teeth decreases, the gas with exhaust pressure is continuously transported to the exhaust opening and discharged. This process continues until the end profile is fully engaged. At this point, the compressed air in the interdental volume is completely discharged through the exhaust orifice, and the volume of the closed interdental volume becomes zero, completing the exhaust process.

Product Description

Description of the compressor
Our screw compressors are the result of many years of research and development. Combined with high-quality standards, these prerequisites guarantee the manufacture of screw compressors with long life, high reliability and high operational efficiency. The products can meet all environmental requirements.

Specifications for use
The machines and units in this range are manufactured according to proven technology and recognised safety rules. However, they may still pose a threat to the life and limb of the user or third parties or cause damage to the machine and other material property if:

- The scope of use is incorrect
- The machine is unreasonably modified or altered
- Operation by unqualified persons
- Non-observance of safety rules

Anyone authorised to operate, maintain or repair the machine must therefore read and follow the safety procedures. If required, a signature can be requested to confirm this. In addition, the following must be observed:

- Relevant accident prevention rules
- National regulations
- Recognised safety regulations
- The machines and units in this series must be used in perfect technical conditions.
- They must be used following the scope of use and the guidelines set out in the operating instructions.
- The user must be safety conscious.
- The user must be fully aware of the dangers involved in operating the machine.
- In the event of any functional failure, especially if it affects safety.
- It must be repaired by an authorised person in good time!

Operating the machine within the scope of use also means observing the guidelines in the operating manual, carrying out the required checks and maintenance, etc.

Maintenance
The machine needs regular maintenance to ensure it meets the requirements of the screw compressor or compressor unit. It's important to follow the maintenance schedule, especially in tough working conditions.

Service
If there is a breakdown or the need for spare parts, please get in touch with our special compressor supplier. In the event of damage to the equipment, our trained service personnel will provide a prompt and good repair service using our original spare parts. Genuine spare parts are manufactured using the most sophisticated technology, thus ensuring the reliable operation of the machine.

Guarantee
Before operating the machine, it is essential that you know exactly the machine and the relevant instructions.
We cannot be held responsible for the safety of operation if the machine is not used by the scope of the application or for purposes other than those mentioned in these instructions.

We will not accept warranty claims in the event of the following:
- Operating errors
- Improper maintenance
- Wrong use of auxiliary materials
- Non-use of our original parts
- Modification or alteration of the equipment

We do not extend the warranty and indemnity conditions of the General Conditions by the above description.
The manufacturer will accept no claims or warranty claims for any unauthorised alterations to the compressor, compressor station or for the installation of parts not approved by the manufacturer.

Safety procedures
The safety procedures in the operating instructions must be strictly observed.

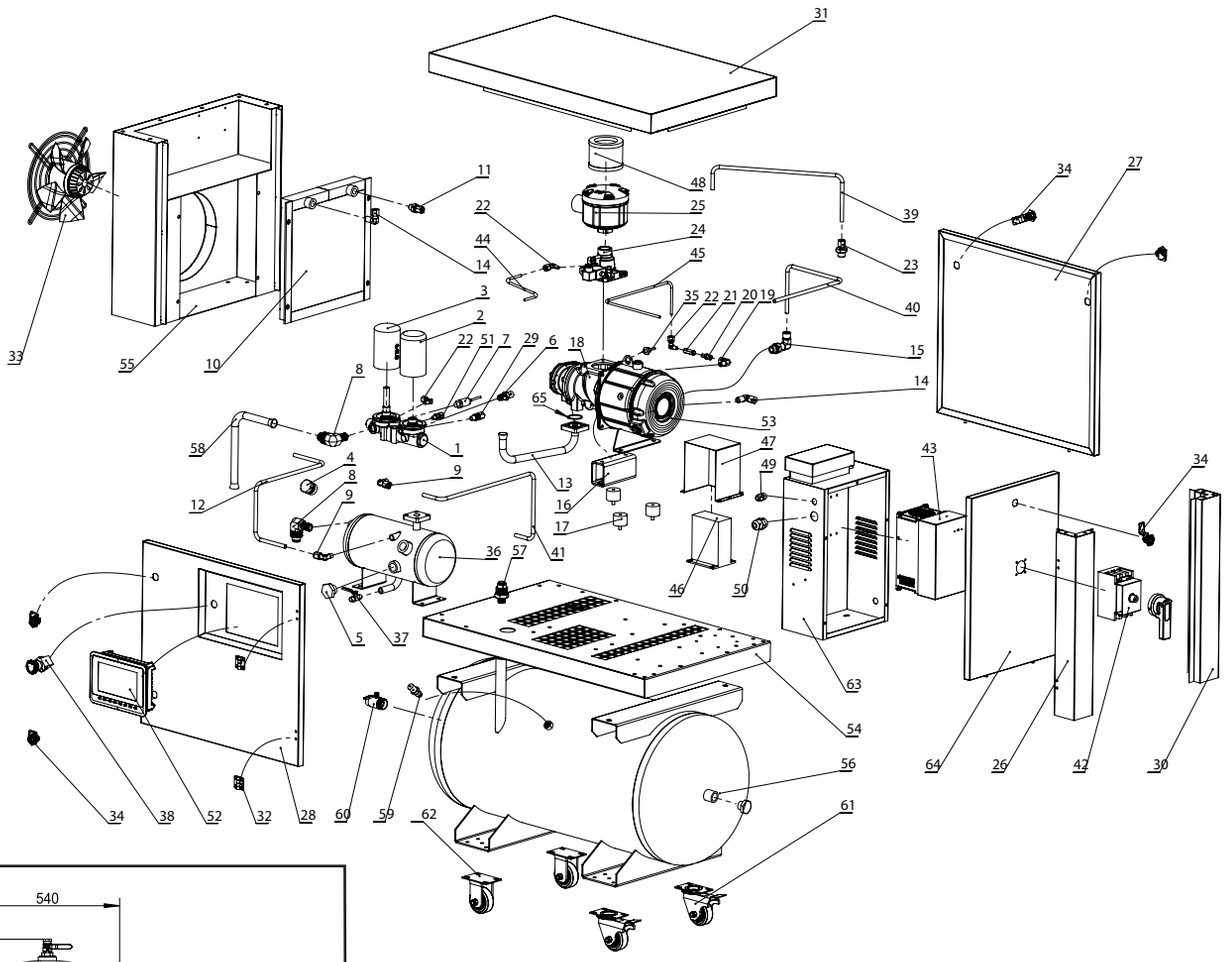
Technical changes
During technical development, we reserve the right to modify components without notice.

Parts Breakdown

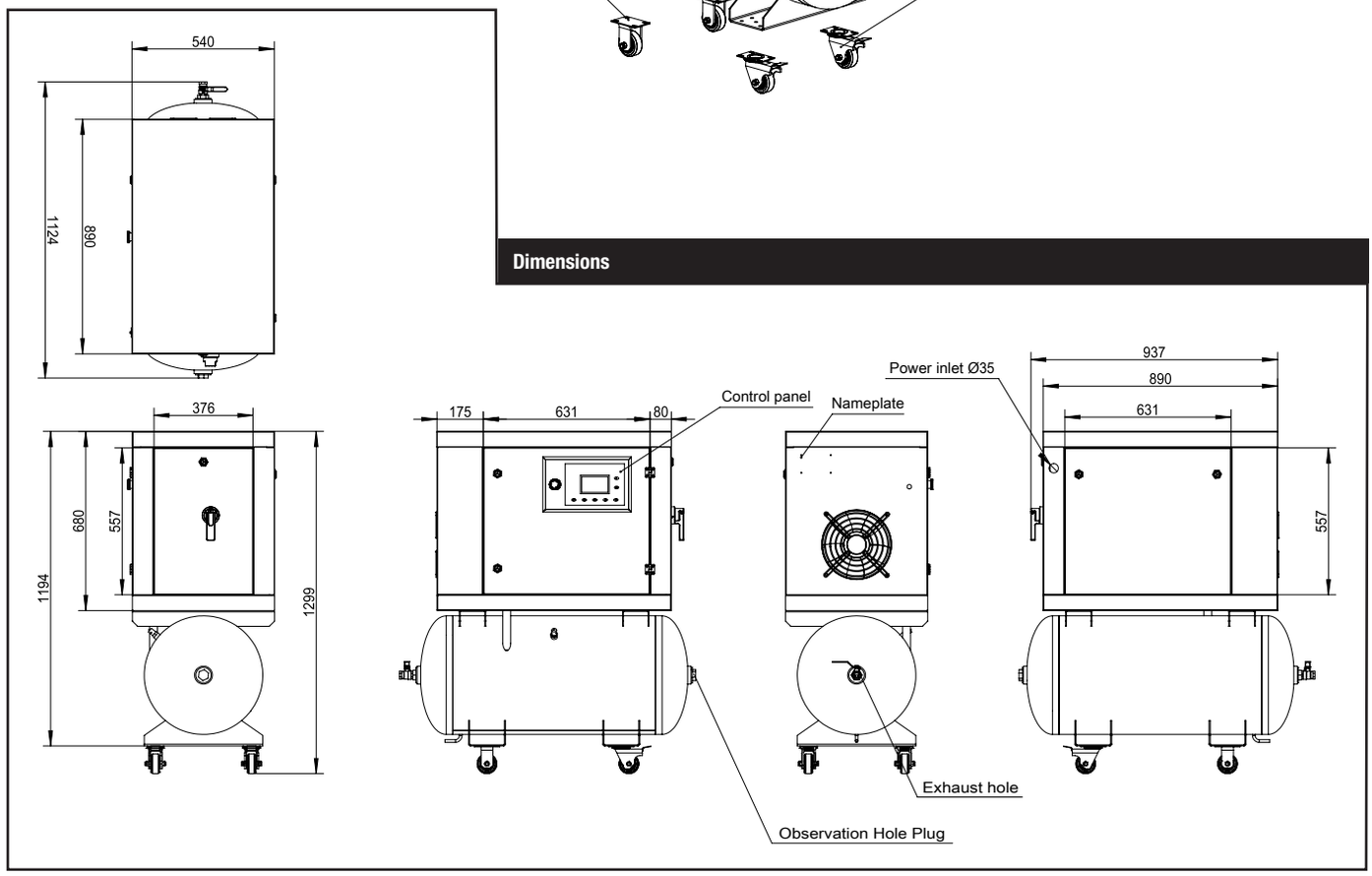
	item	qty
1	combined valve	1
2	oil filter	1
3	oil air separator	1
4	refueling cock	1
5	oil leveler (with float)	1
6	safety valve	1
7	pressure sensor	1
8	directional adapter	2
9	joint	2
10	radiator	1
11	joint	1
12	outlet pipe for oil and air tank	1
13	exhaust pipe for air end	1
14	adjustable connector	2
15	90°adjustable sleeve adapter	1
16	headstock	1
17	vibration insulation pad	3
18	air end assembly	1
19	right angle elbow	1
20	straight joint	1
21	oil return check valve	1
22	joint	3
23	joint	1
24	intake valve	1
25	air filter shell assembly	1
26	front right column	1
27	back door	1
28	front door	1
29	joint	1
30	right rear column	1
31	roof	1
32	hinge	2
33	cooling fan	1
34	door lock	5
35	temperature sensor	1
36	oil and air tank	1
37	ball valve	1
38	emergency stop switch	1
39	radiator outlet pile	1
40	return oil pipe for air end	1
41	return oil pipe for motor	1
42	circuit breaker	1

	item	qty
43	inverter	1
44	release pipe	1
45	secondary oil return pipe	1
46	DC reactor	1
47	reactor cover	1
48	air filter element	1
49	cable fixator	1
50	cable fixator	1
51	joint	1
52	PLC controller	1
53	motor assembly	1
54	bottom plate	1
55	left door	1
56	observation hole	1
57	straight joint	1
58	exhaust pipe for air and oil tank	1
59	safety valve	1
60	ball valve	1
61	3 inch universal wheel	2
62	3 inch directional wheel	2
63	electric cabinet	1
64	right door	1
65	O ring	1

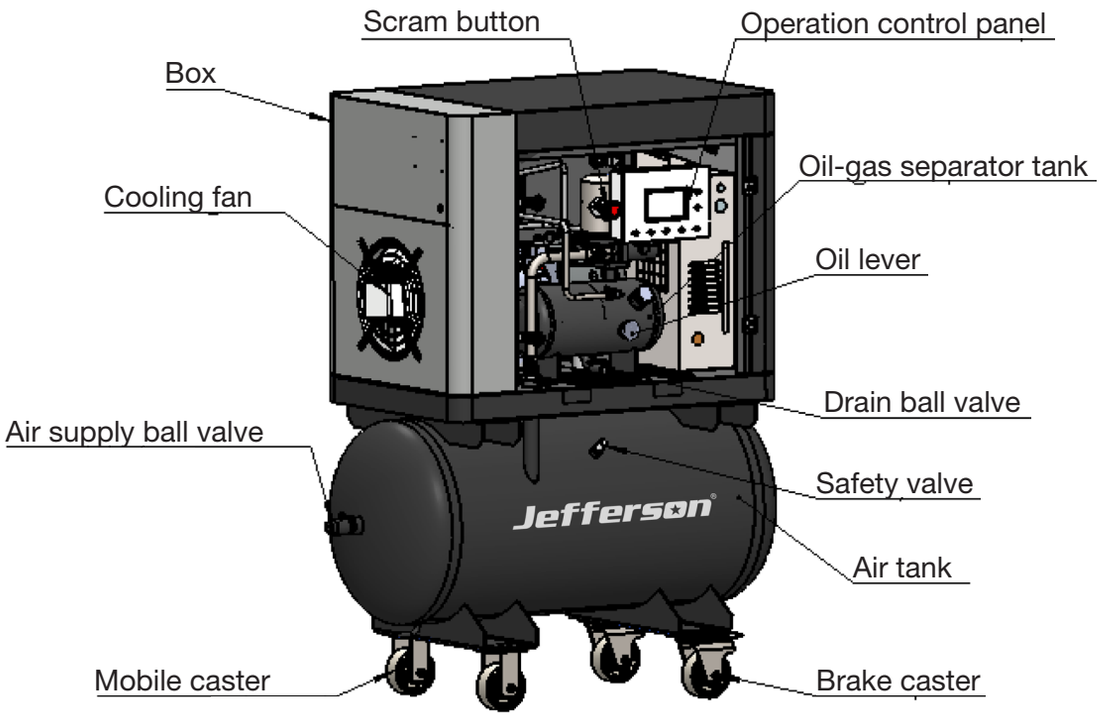
Parts Breakdown

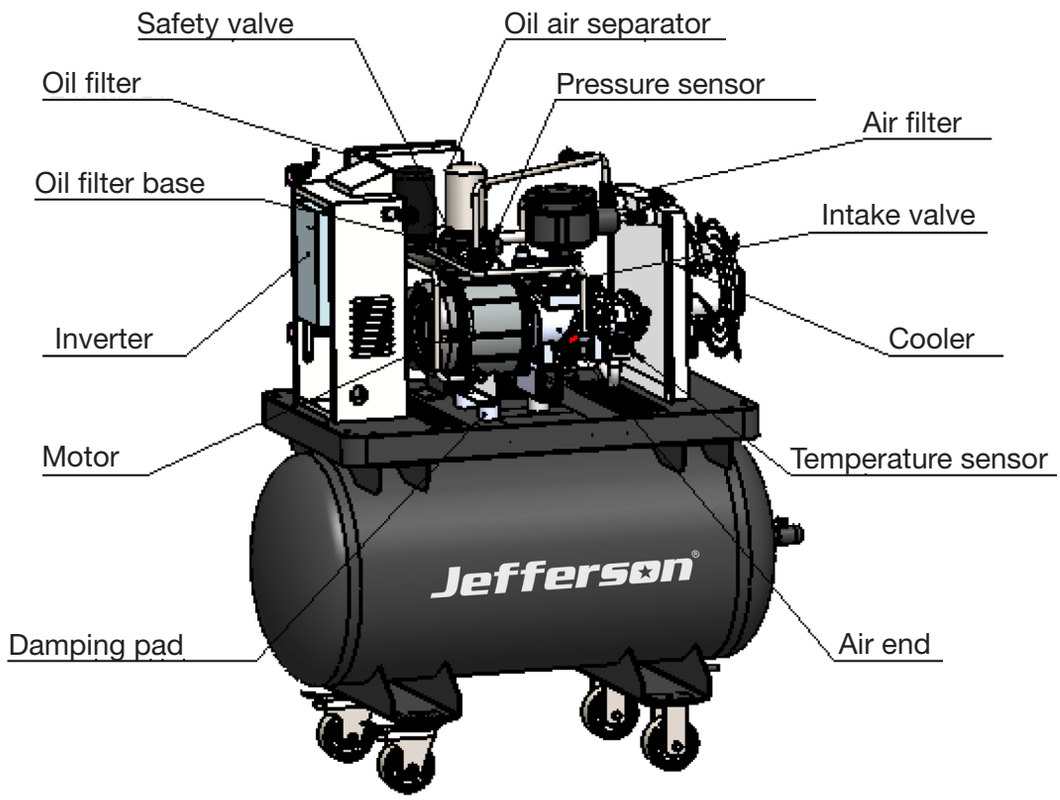


Dimensions



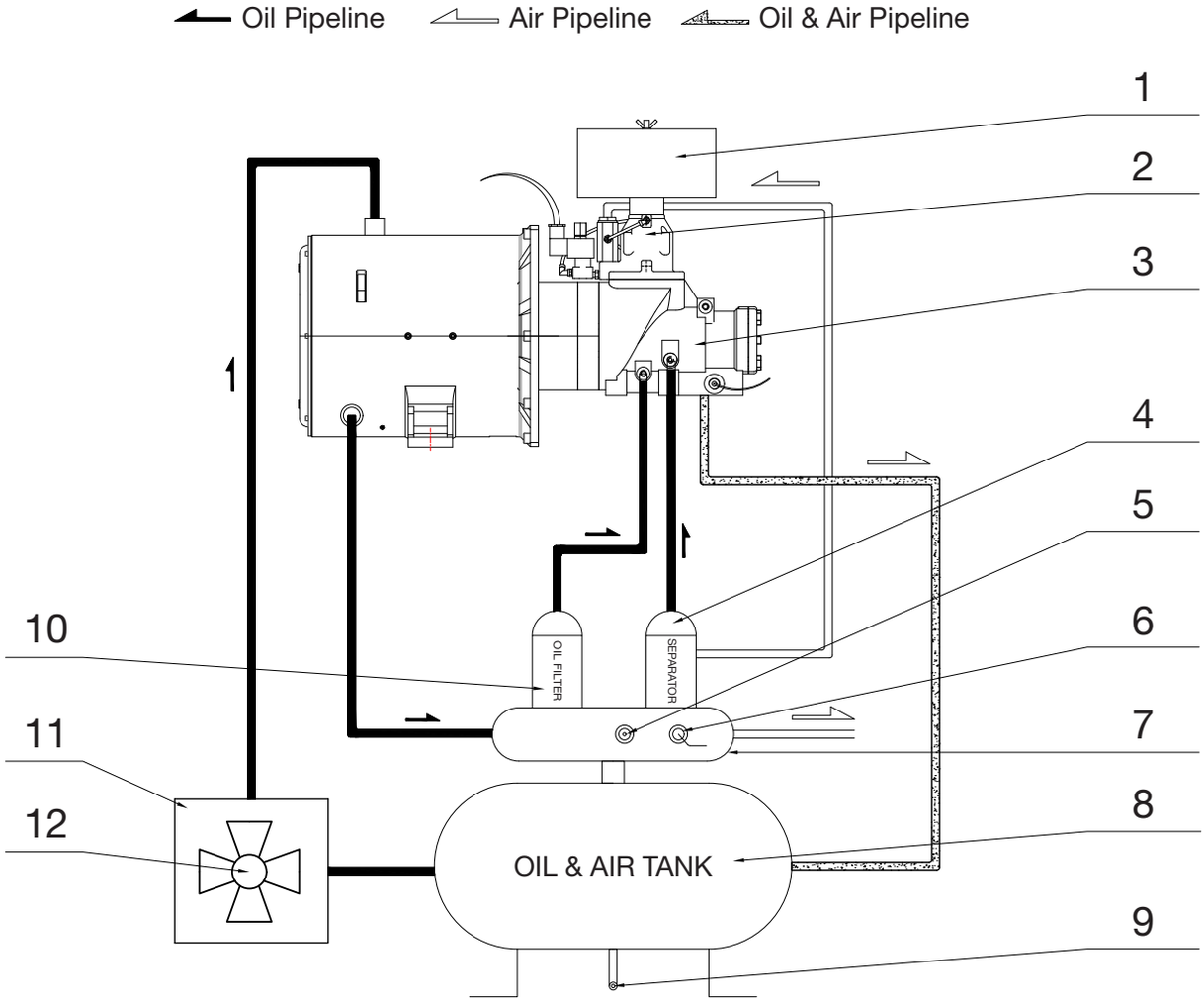
Parts Diagram





Parts Diagram / list

OIL COOLING SYSTEM PIPELINE FLOW DIAGRAM



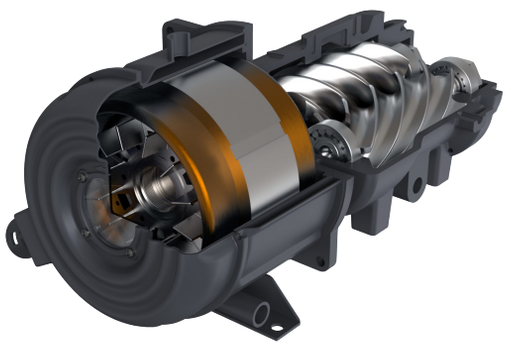
1	air filter	7	combined valve
2	inlet valve	8	oil air tank
3	air end	9	ball valve
4	oil air separator	10	oil filter
5	safety valve	11	radiator
6	pressure sensor	12	cooling fan

High-efficiency oil-cooled permanent magnet motor

IP65 oil-cooled motor, high protection grade, no bearing mechanical loss, no cooling fan loss, low noise and low vibration.
The efficiency is 3%-10% higher than the same capacity asynchronous motor.

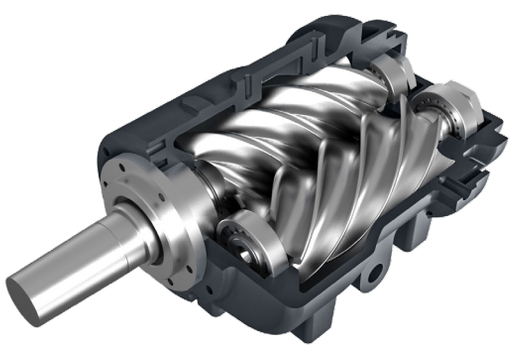
Coaxial all-in-one design

The host and motor share a shaft design, without intermediate transition parts, such as a centre bracket, coupling, pulley, gear, etc. Transmission loss is reduced to zero, and transmission efficiency is 100%



High-efficiency screw host

The host adopts a new generation of the asymmetrical profile, 5:6 spiral rotor, from line seal to seal technology upgrade, improving gas production efficiency and large rotor diameter. Low speed ensures that the host noise is small and long life.

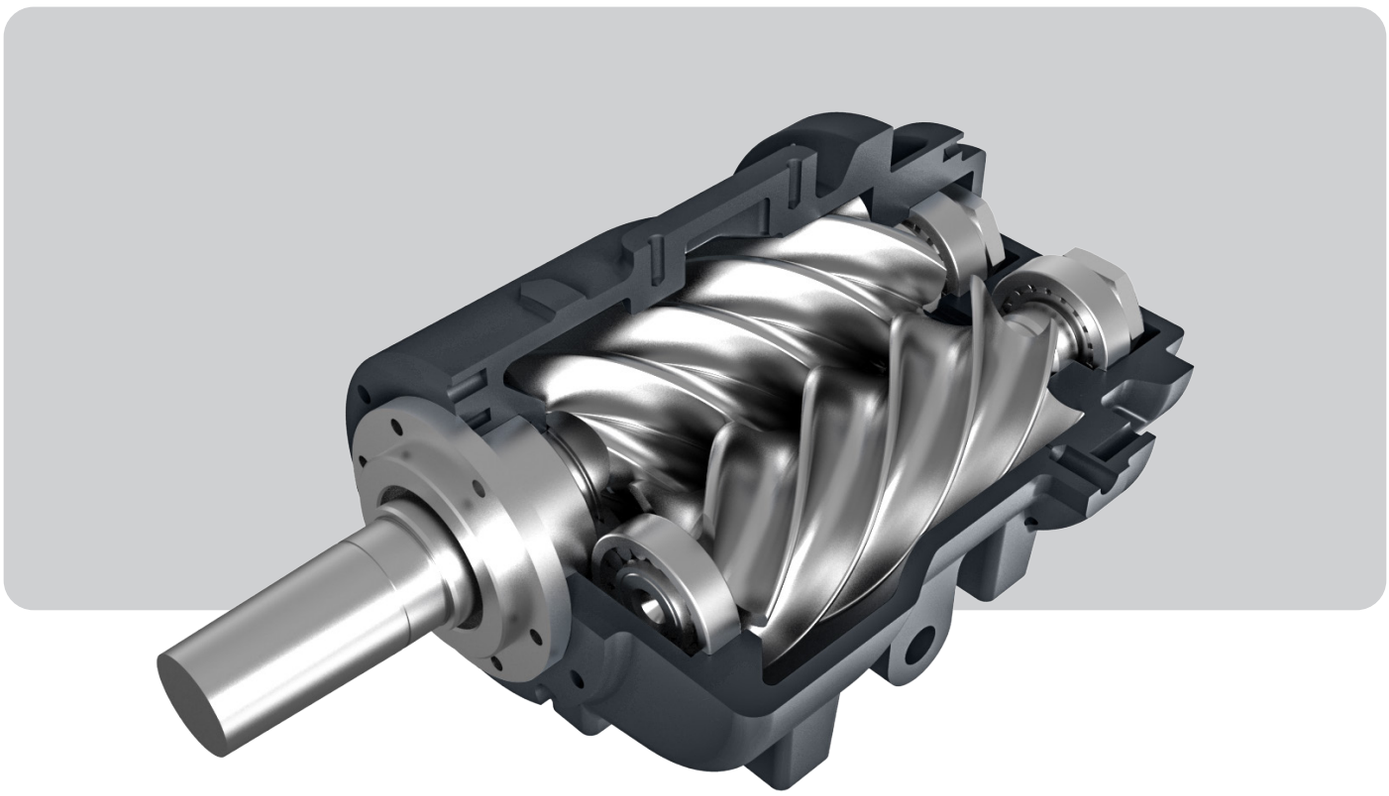


High-efficiency permanent magnet synchronous motor

No rotor slip, no electrical excitation, no fundamental iron and copper losses in the rotor and less heat generation, reducing stator current and stator resistance losses-IP55 protection grade ensure safe and reliable equipment operation. The motor has a 3-10% higher efficiency compared to asynchronous motor of the same capacity. High motor efficiency is maintained especially at low speeds.

Motor features

- Direct Driven
- Variable speed 2.2kW motor
- IE4
- Single phase
- Oil cooled motor
- Permanent magnet motor
- Coaxial all in one motor design
- 1160 RPM



VSDD 2.2kW 3HP

IE4
Super Premium Motor Efficiency

Operation Notice

- Please read all the operation manual before operating the set and keep this manual for further reference.

Features

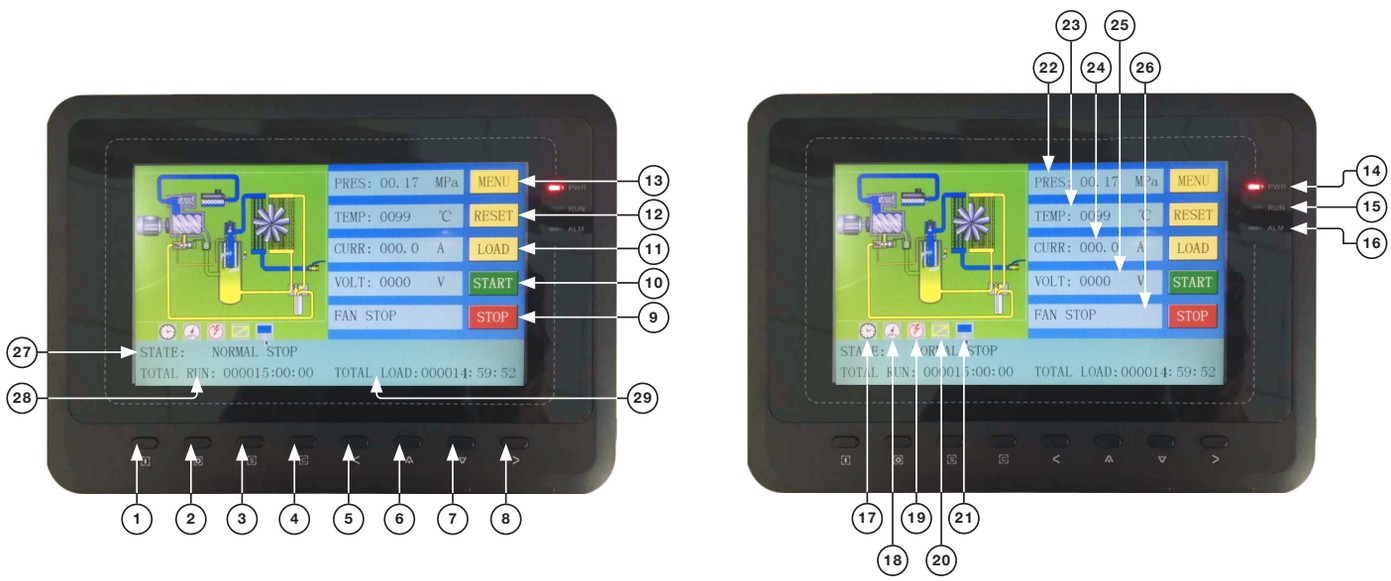
- Multiple run mode optional.
- 7 inch colour screen, with button and touch panel.
- Support real time power consumption and accumulative power consumption measurement.
- Scheduled on/off function and scheduled pressure function optional
- More accurate in writing frequency to control inverter through 485 communication
- Free to control all inverter supporting protocol.
- Open phase ,current overload ,current unbalance, high voltage, low voltage protection for motor.
- High integration, high reliability, high cost performance

Basic Operation

Monitoring interface and key descriptions

1. Basic Operation - Button explanation

RETURN	Return key: When the touch screen is in the parameter interface, press this key to return to the system monitoring interface.
UP	Press this key to flip the screen to the previous page.
DOWN	Press this key to flip the screen to the next page.
START	Start the button to activate the air compressor.
STOP	Press the stop key to stop the compressor from running. The compressor stops in the stopping mode.
RESET	Reset key, when the compressor reports an inverter fault, you can reset the inverter fault with this key.



Basic Operation Description.

1. Start Button:

When compressor is at stop status, press this button to start the compressor.

When compressor is set as master (No.1) in block status ,press this button to start the compressor and activate block mode function at the same time.

2. Stop Button:

When the compressor is at running status, press this button to stop the compressor

When compressor is set as master (No.1) in block status, press this button to stop compressor and block function as well;

3. Set Button; Load / unload button:

When the compressor is at running status ,press this button to load or un-load.

When modifying data in textbox, press this button to save data and exit modification status.

When cursor is on any page icon, press this button to execute the corresponding function.

4. Return button / Reset button:

When the controller is at an alarm and stop status, press this button for 5s to reset.

When modifying data, press this button to exit data setting mode.

When viewing the menu, press this button to return to previous menu.

5. Move Left Cursor:

When checking data in text box, press this button to enter data modifying mode, data starts to blink from right to left .

When modifying data in text box, press this button to move the cursor to the left data

When modifying data in data set and display icon, press this button to modify and save the data

When cursor is in the page icon, press this data to move to the previous icon.

6. Move up / Increase Values.

7. Move down / Decrease Values:

When checking the data, press this button to move downward the cursor to next icon;

When modifying data in text box, press this button to decrease the current data

When the current page is at run parameter, press this button to swift to the next page

8. Move right / Enter.

When checking data in text box, press this button to enter data modifying mode, data starts to blink from left to right .

When modifying data in text box, press this button to move the cursor to the right data

When modifying data in data set and display icon, press this button to modify and save the data

When cursor is in the page icon, press this data to move to the next icon.

9. Stop
10. Start
11. Touch screen Load mode.
12. Touch screen reset mode.
13. Touch screen Menu.
14. Power LED. Lights when mains power is on.
15. Compressor Run LED. Light when motor is running.
16. Alarm / Alert LED.

Indicator is blinking when controller is alarming;, Indicator is alight when compressor is alarm and stop ,Indicator is off after error is cleared and reset.

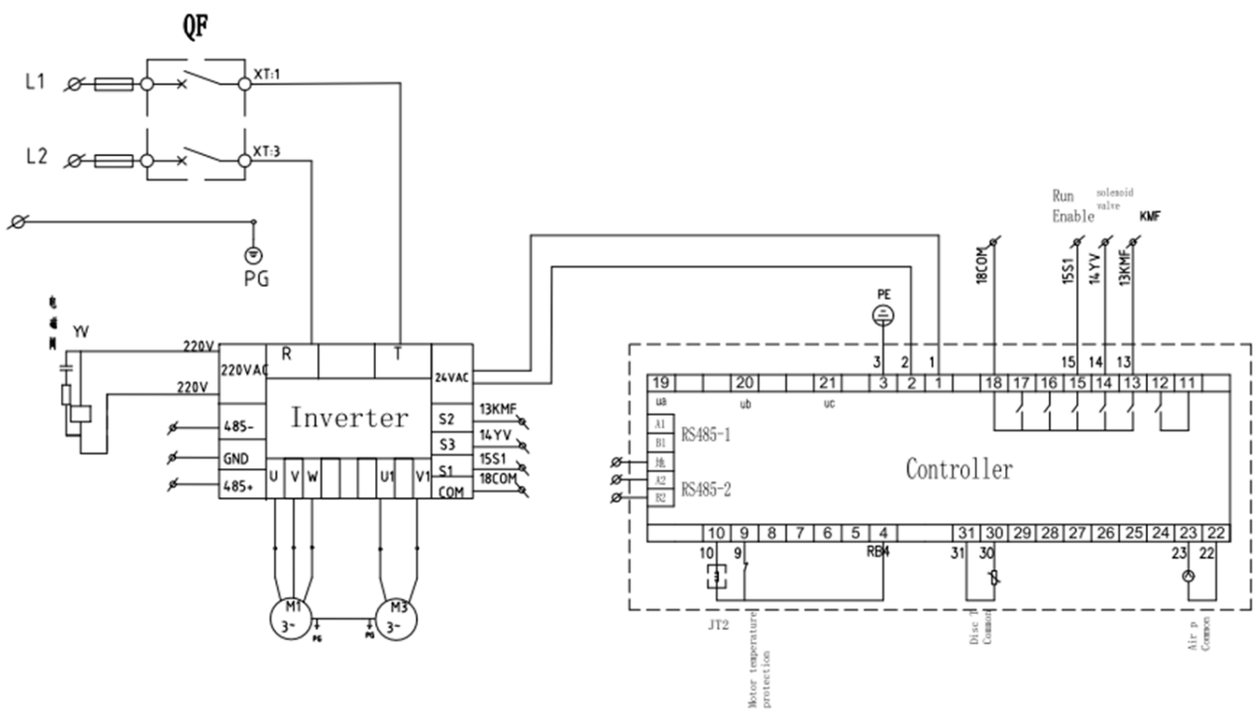
17. Standard ON/OFF setting mode.
18. 18: Standard Pressure Setting mode.
19. 19: Restart is activated.
20. 20: Remote is activated.
21. Computer Icon.
22. Pumping / Receiver Pressure.
23. Internal Cabinet / Pump Temperature.
24. Current Draw (Amps).
25. Inverter Voltage.
26. Cooling Fan Status - ON/OFF.
27. Compressor Current State - RUN / OFF/ LOAD / UNLOAD.
28. Total Hours - this is the total hours the compressor has been switched on.
29. Total Load / Run Hour - this is the total hours that the compressor has been on load / pumping. The compressor is set up to run in a standard generic mode. The majority of the menu is locked and needs access via passwords. SIP (Industrial Products) Ltd has access to the codes which will only be been available for special applications.

Specification

Specification	Current Range (A)	Corresponding main motor power (kw)	Remark	Description
JEFCIND160S-03.0	8-20	Below 11		Fan has three levels of current, such as 0.2-2.5A, 1-5A and 4-10A, determined-by current of motor

Electric Circuit Drawing

Figure 6.1 PM variable frequency electrical schematic diagram



Description of air compressor parameters and functions

1. User parameters and function book

Name	Set initial value	Function description
Upper-pressure limit	0.65MPa	Load pressure value.
Lower pressure limit	0.8MPa	Unload pressure value.
Set working pressure	0.70MPa	Sets the supply pressure when the compressor is running steadily. When the pressure is toggled around this pressure, the controller adjusts the drive operating frequency so that the supply pressure is close to the value set here.
Fan start temperature	85ºc	Control fan start.
Fan stop temperature	75ºc	Control fan stop.
Oil filter timing	0000H	Accumulated use time of the oil filter.
Oil separator timing	0000H	Accumulated use time of the oil separator.
Vapour filter timing	0000H	Accumulated use time of the air filter.
Grease Timing	0000H	Accumulated grease usage time.
Lube oil timing	0000H	Accumulated use time of lubricating oil.
Acceleration time	0035s	The acceleration time prevents the motor speed from increasing too fast due to the short acceleration time and excessive frequency increase when the compressor starts.
Acceleration time	0035s	The acceleration time prevents the motor speed from increasing too fast due to the short acceleration time and excessive frequency increase when the compressor starts.
Deceleration time	0026s	The deceleration time prevents the motor speed from dropping too fast when the compressor enters the idling process due to the short deceleration time and excessive increase in frequency.

2. Manufacturer's parameters and functional descriptions

Name	Set initial value	Set initial value
Exhaust warning temperature	105ºc	Warning when the actual exhaust temperature is higher than the set temperature.
Exhaust Alarm temperature	110ºc	Alarm shutdown when the actual exhaust gas temperature is higher than the set temperature.
Stopping pressure	1.00MPa	Alarm shutdown when the actual supply pressure is higher than the set pressure.
Frequency upper limit	150.0Hz	Maximum permissible operating frequency of the compressor when loaded.
Lower frequency limit	075.0Hz	The minimum working frequency allowed when the pressure exceeds the set working pressure but does not reach the unloading pressure during regulation.
Proportional gain	0050	Tracking of the set working pressure is fast and slow; large values are tracked fast and oscillate easily; small values are tracked slowly and regulated slowly
Integral gain	2.00	Track the set working pressure fast and slow and determine the steady-state error. The value of large tracking steady-state error is small; a value of small tracking slow, the steady-state error is large.
Oil filter setting	500H	Set the maximum use time of the oil filter; when the cumulative use time exceeds this value, prompt a warning.
Oil Fine Separator setting	500H	Set the maximum use time of the oil separator. A warning will be prompted when the cumulative use time exceeds this value.
Air filter setting	500H	Set the maximum use time of the air filter. A warning will be given if the accumulated use time exceeds this value.
Grease setting	500H	Set the maximum use time of the grease and warn if the accumulated use time exceeds this value.
Lubricant setting	500H	Set the maximum use time of the lubricating oil and warn if the accumulated use time exceeds this value.
Start-up delay time	0030s	After stopping the machine, stopping it after a long time empty, or stopping it after a fault, this time must be delayed before it can be restarted.
Pressure sensor range	1.6MPa	Set according to the sensor type selected by the user.
Power adjustment factor	100	Used to calibrate the power display when the power display is inaccurate.
Unloading delay time	060s	Unload continuous run time, after which time the unit stops automatically.
Equipment number	*****	The manufacturer enters the factory number of the device.

Air compressor warnings and alerts

When the air compressor or drive fails, a warning will be generated and the corresponding fault name will be displayed on the control interface, with specific instructions as follows:

1. Exhaust temperature is too high warning prompt when the exhaust temperature exceeds the warning temperature, the operator is prompted on the control interface that the "exhaust temperature is too high".
2. Oil filter warning prompt when the oil filter use time reaches the set value, the operator is prompted to "maintain the oil filter" on the control interface.
3. Oil separator warning prompt when the use time of the oil separator reaches the set value, the operator is prompted on the control interface to "maintain the oil separator".
4. Gas filter warning prompt when the lubricating oil usage time reaches the set value, the operator will be prompted to "maintain the air filter" on the control interface.
5. Lubricant warning prompt when the lubricating oil use time reaches the set value, the operator is prompted to "maintain the lubricating oil" on the control interface.
6. Grease warning prompt when the grease usage time reaches the set value, the operator will be prompted to "maintain the grease" on the control interface.
7. Air compressor unloading operation prompt when the air supply pressure of the compressor is higher than the upper-pressure limit, the operator will be prompted to “unload operation” on the control interface.
8. Air compressor loading operation prompt when the air supply pressure of the compressor is lower than the lower pressure limit, the operator is prompted to “load operation” on the control interface.
9. Stop command status prompt when a stop key is pressed, the operator is prompted “stopping in progress” on the control interface.
10. Driver fault alarm when a drive fault occurs, the operator is prompted “Drive Fault” on the control interface. Please check the drive for the specific type of fault and deal with it according to the type.(Touch screen only, see remarks)
11. Phase sequence error warning prompt when the protector detects the wrong phase input, the operator will be prompted with a “phase sequence error” on the control interface.
12. Warning prompt for motor temperature protection when the motor temperature is too high or the temperature sensor is disconnected, the operator will be prompted to “motor temperature is too high” on the control interface.
13. High-pressure warning prompt when the feedback gas supply pressure exceeds the gas supply alarm pressure, the operator will be prompted “pressure too high” on the control interface.
14. Warning prompt for high exhaust temperature when the exhaust temperature exceeds the alarm temperature, the controller alarm will stop, and the operator will be prompted on the control interface, “Exhaust temperature is too high”.
15. Fan overload warning prompt when the fan is overloaded or has other faults, the control interface will prompt the operator to “fan overload”.
16. Warning prompt for unconnected pressure sensor the controller will alarm and stop when the pressure sensor is disconnected or out of order. The operator will be prompted on the control interface to “not connected to the pressure sensor”.
17. Emergency stop warning prompt when the external emergency stop button is pressed, the operator is prompted to “emergency stop” on the control interface.

Drive fault diagnosis and countermeasures

1. Fault alarms and countermeasures

The H2 drive has several warning messages and protection functions. If an abnormal fault occurs, the protection function will be activated, the drive will stop output, the drive fault relay contact will be activated, and the fault code will be displayed on the drive display panel. Before seeking service, the user can follow the instructions in this section to conduct a self-examination, analyse the cause of the faultand find a solution. If you cannot find a solution, please seek technical support, contact the agent from whom you purchased the drive or contact our company directly.

Drive fault diagnosis and countermeasures (cont.)

Fault name	Operation panel display	Troubleshooting	Troubleshooting measures
Under-voltage fault	E001	Transient power failure the voltage at the drive input not within the range required by the specification Abnormal bus voltage Rectifier bridge and buffer resistor are not normal Drive board abnormal Abnormal control board	Reset fault Adjust voltage to normal range Seeking technical support Seek technical support
Acceleration over-current	E004	Ground or short circuit in the drive output circuit Acceleration time too short Manual torque boost or inappropriate V/F curve Low voltage Start-up of the rotating motor Sudden load during acceleration Drive selection too small	Troubleshoot peripheral problems Increase acceleration time Adjust manual boost torque or V/F curve Adjust voltage to normal range Select speed tracking start or restart after the motor has stopped Eliminate sudden load increases Select a drive with a higher power rating
Deceleration over-current	E005	Ground or short circuit in the drive output circuit Deceleration time too short Low voltage Sudden load during deceleration No braking unit and braking resistor installed	Troubleshoot peripheral faults Increase deceleration time Adjust voltage to normal range Eliminate sudden load increase Add braking unit and resistor
Constant speed over-current	E006	(Short circuit or leakage current in the operation) The load is too large, and the drive is undersized	Eliminate sudden load increase Select a drive with a higher power rating or lighten the load
Accelerated over-voltage	E002	High input voltage External forces dragging the motor during acceleration Acceleration time too short No braking unit and braking resistor installed	Adjusting the voltage to the normal range Remove this power or add a braking resistor Increase acceleration time Add braking unit and resistor
Deceleration Over-voltage	E00A	High input voltage External dragging of click during deceleration Deceleration time too short No braking unit and braking resistor fitted	Adjust voltage to normal range Remove this power or add a braking resistor Increase deceleration time Add braking unit and resistor
Constant velocity over-voltage	E003	High input voltage An external force is dragging the motor during operation	Adjust voltage to normal range
Drive overload	E008	Excessive load or motor blocking The drive selection is too small	Reduce load, check the motor and mechanical condition Select a drive with a higher power rating
Motor overload	E007	Motor protection parameter PB.01 is set appropriately Is the load too large, or is the motor blocked? The drive is undersized	Set the correct parameters Reduce the load and check the motor and mechanics Choose a drive with a higher power rating
Input phase loss	E012	Three-phase input power is not normal Drive board abnormal The abnormal main control board	Check and eliminate any problems in the peripheral circuitry Seek technical support

Drive fault diagnosis and countermeasures (cont.)

Module overheating	E00E	High ambient temperature Blocked air ducts Damaged fan Module abnormalities Inverter module damaged	Reduce ambient temperature Clean out air ducts Replace the fan Seek technical support to replace the thermistor Seek technical support to replace the inverter module
Communication time-out fault	E018	The upper computer is not working properly RS485 communication line is not working properly Incorrect baud rate PA.00 setting Incorrect setting of communication parameter PA group	Check upper unit wiring Check communication cables Set the correct type of communication expansion card Set communication parameters correctly
Contactor suction failure	E017	The Contactor 24V power supply is not normal Other faults	Replace the contactor Seek technical support
Buffer resistor overload fault	E014	Input voltage is not within the range specified in the specification Unstable input voltage causes bus voltage to jump frequently around the Under voltage point	Replace the contactor Seek technical support
Current detection fault	E015	Hall device abnormal Abnormal driver board	Seek technical support to replace the Hall device Seek technical support to replace the drive board
Short circuit to earth fault	E023	Motor shorted to ground Motor not shorted to ground	Replace cable or motor. Replace drive board
Rapid current limit timeout fault	E032	Acceleration and deceleration times are too short Torque boost or V/F curve inappropriate Start on a motor that is rotating Excessive load	Increase acceleration and deceleration times Adjust torque boost or V/F curve Select speed tracking before starting or wait for the motor to stop before starting. Increase drive power
Motor overheating fault	E047	Loose temperature sensor wiring Motor temperature too high	Test temperature sensor wiring and troubleshoot Reduce the load frequency or take other cooling measures to dissipate heat from the motor.
Air compressor pressure overload fault	E056	The air compressor's actual pressure is too high. The sensor is not accurate fault	Check the compressor pressure, inspect the pressure sensor, and perform troubleshooting.
High air compressor exhaust temperature fault	E057	Poor heat dissipation, low oil, etc., in air compressors	Check the air compressor for ventilation, lubricant level, etc
Air compressor fan overload fault	E058	Excessive load, bearing wear, and other mechanical failure	Check setting data, voltage, bearings, piping and other mechanical faults.
Failure to connect the pressure sensor	E059	Disconnected sensor line, bad sensor, reverse sensor connection	Check wiring and pressure sensors
Phase sequence detection error fault	E046	Reverse phase sequence on the input side of the air compressor, phase breakage	Check and troubleshoot compressor wiring

Common faults and how to deal with them

The following fault conditions may be encountered during the use of the drive. Please refer to the following for a simple fault analysis:

Serial number	Fault phenomenon	Troubleshooting	Troubleshooting measures
1.	No upper limit display or garbled code	Strange input power to the driver. Poor contact of the 8-core cable connecting the driver board to the control board. They have damaged the internal device of the driver.	Check the input power supply. Re-plug the 8-core cable. Seek factory service
2.	Power-on alarm “E023.”	Motor or output line shorted to ground. Damaged driver.	Measure insulation of motor and output wires with a shake table. Seek factory service
3.	Frequent E00E (module overheating) faults	Carrier frequency set too high. Damaged fan or blocked air duct. Damage to drive internals (thermocouple or other).	Reduce load frequency. Replace fan/clean air duct. Seek factory service
4.	The motor does not rotate after a drive is running.	Damaged or blocked motors. Incorrect parameter setting.	Replace motor or obvious mechanical problems. Check and reset.
5.	S terminal failure	Wrong parameter setting. Incorrect wiring. Faulty control board.	Check and reset relevant parameters. Rewire. Seek factory service.
6.	Drive frequently reports over-current and over-voltage faults .	Incorrect acceleration and deceleration times. Load toggle	Set the appropriate acceleration and deceleration times. Seek factory service.

Warnings and Precautions

Machine power distribution

a. According to the characteristics of the power, voltage and frequency of the air compressor, choose a matching power supply and a suitable power cord (if the conditions allow it, a cable with excellent performance, such as high-temperature resistance and anti-ageing should be configured to avoid the failure of the air compressor caused by the power cord and the power supply).

b. The cross-sectional area of the power cord shall not be less than the data listed in Table below.

Minimum cross-sectional area of power cables (copper conductor mm2) extrapolated

Product code	Motor power (KW)	Cross-sectional area(mm2)
JEFCIND160S-03.0	2.2	2.5

c. Depending on the power and voltage of the air compressor, a full-time electrician should select and configure an appropriate air switch to protect the electrical power system and ensure safety. See Figure 1

Figure 1 Air switch

Warnings and Precautions cont.

d. The air compressor must be reliably earthed to prevent leakage of electricity and the danger caused by static electricity.
e. A separate set of electrical power supply units should be considered for large displacement air compressors to avoid affecting the normal work of other equipment, otherwise, it is not conducive to the normal use of the air compressor (which can lead to the screw machine protection device operating)

Cautions
a. To prevent damage to the air compressor from bumps during storage and transport, some models are shipped with the transport fastening screws locked in place. The user must loosen the fasteners before use. See Figure 2.

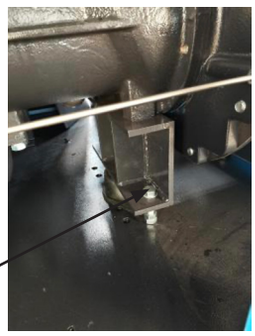


Figure 2. Fastening bolts

b. The new machine must be operated by a person appointed or approved by the company for commissioning.
c. The operator must read, understand and follow the machine's operating procedures, precautions and maintenance instructions.
d. Air compressors without a storage tank must be equipped with a storage tank before use.
e. Air compressors must not be changed and set at rated working pressure at will to avoid motor overload damage.
f. Air compressors must work in a well-ventilated indoor environment below 45°C.
g. The power supply access line must be fitted with terminals to ensure that the terminal block screws are tight, reliable and will not come loose. A full-time electrician must install the electrical cable. (see Figure 3)

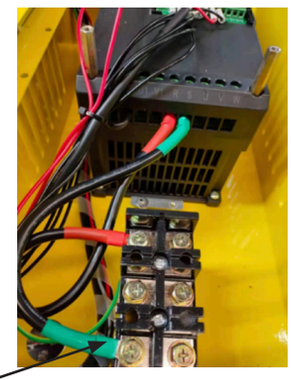


Figure 3. Wire head terminals

h. Prolonged operation of the air compressor at a pressure lower than 0.4Mpa is strictly prohibited.
i. Keep the lubricating oil on the oil mark. It is strictly forbidden to mix two different brands of oil to avoid the accumulation of coke in the piping system, which may cause major accidents.
j. It is strictly forbidden to overhaul electrical appliances and wiring without cutting off the power supply.
k. It is strictly forbidden to overhaul the pressure-volume and pressure pipeline without unloading the pressure.
l. Remove water from the oil and gas cylinder in time.
m. The exhaust temperature should be between 70 and 105°C.
n. When maintaining and cleaning parts, flammable, explosive and volatile cleaning agents should not be used, but non-corrosive and safe solvents should be used.
o. Do not force the compressor on when there is a fault indication; find out the cause and deal with it accordingly.

Warnings and Precautions cont...

Warning labels

Serial Number:	Name:	Graphic:	Description:
1.	Safe Use of Electricity		Ensure the working supply voltage Disconnect the power supply when operating
2.	Beware of electric shock		Beware of electrical components such as live and leaking bodies
3.	Danger Warning		Observe and heed the warning messages
4.	Read the instructions		Read the instructions before using the machine
5.	Fire hazard		Keep flammable and explosive substances away from the machine
6.	Blasting hazard		Do not weld or repair the gas tank.
7.	Danger of electric shock		Do not place the appliance in wet areas or outdoors to prevent electrical leakage due to low electrical insulation resistance.
8.	Beware of air leaks		Do not allow air to escape from this area.
9.	Be careful with your hands		Avoid drive components

Warnings and Precautions cont...

Warning labels cont.

Serial Number:	Name:	Graphic:	Description:
10.	Motor steering		Ensure the motor is running in the right direction when turning on the machine or changing the wires to avoid serious machine failure.
11.	Beware of hot hands		This is a hot surface to avoid burns.

Equipment Installation

Installation site selection and cooling and ventilation systems

To use the air compressor properly, the installation site must be properly planned to provide the air compressor with a good environment during use and maintenance. A good site should have the following basic conditions.

a) The air compressor should be installed in a clean, dry, well-ventilated room, free from dust and harmful gases.
b) The working environment temperature should not be higher than 45°C. The relative humidity of the surrounding atmosphere should be less than 80%.
c) The installation ground must be solid and flat to keep the compressor level.
d) If you plan the site as an air compressor station, it should be equipped with suitable compressed air handling equipment, valves and piping pressure vessels by the relevant regulations.
To ensure good heat dissipation and maintenance space for the air compressor, the distance from the wall of the air compressor should not be less than 1 metre, and the top should retain a space of more than 1.5 metres to avoid the formation of a winding bridge between the discharged hot air and the incoming cold air. For poorly ventilated machine rooms should also be equipped with exhaust air devices.

Equipment Operation

1.The transport shockproof fixing bolts should be loosened before use (see Note in CAUTIONS)
2.The air compressor should have a suitable gas storage tank before use (see Table 1 - Main technical parameters table).
3.Test run of the new machine
a. Test the voltage by Safety protection (Machine power distribution-a) should comply with the relevant regulations, connect the earth wire as required in item (Machine power distribution-d), and connect the power wire as required in (Machine power distribution-b and c) The cross-sectional area and length of the power wire should comply with the provisions of Table 2.
b. Check that the oil and gas cylinder's oil level is between the upper and lower limit lines.
c. To ensure the start-up's safety, ensure there are no people, foreign objects, tools, and other flammable and explosive items in the unit.
d. Add about 0.2 litres of special lubricating oil to the compressor from the air inlet valve (or release it from the oil and gas cylinder) and rotate the head for a few revolutions to prevent damage due to loss of oil in the dynamic and static discs of the compressor during start-up (use a funnel with a strainer to filter the oil when refuelling to prevent foreign objects from entering the head).
e. Send power to the compressor control panel.
f. Pointing test: the air compressor should be pointed 2 to 3 times before official use, i.e. start and stop immediately to observe whether the air compressor's rotation direction is correct and whether there are any abnormal noises and vibrations.
g. Formal starting operation: Press the start button again to start the air compressor running.
h. After starting the equipment, the motor is set to start Y-Δ and the operation starts with slow acceleration in a Y-shaped way. After a few seconds, it automatically switches to Δ-a shaped way for rapid acceleration until the normal speed. If there is any abnormal situation, the stop button should be pressed to stop the operation.
i. Stop: Press the stop button to stop the operation of the compressor. The compressed air in the pressure line will be unloaded through the unloading valve when the machine is stopped to prepare the machine for the next no-load start. A slight bleeding sound can be heard at this point, which is normal.

Equipment Operation cont.

4.Safety protection

a. Motor protection

Serial number	Fault condition	Fault display	Cause
1.	Out of phase	Shutdown	Power supplies. Contactors. Motor wiring faults
2.	Overload	Shutdown	Increased load or mechanical failure
3.	Blocked rotation	Shutdown	Increased load or mechanical failure
4.	Unbalance	Shutdown	Unstable three-phase supply voltage or motor circuit failure
5.	Short circuit	Shutdown	Severe leakage, short circuit between motor turns or incorrect current setting

b) Exhaust gas (oil) overrun protection
When the exhaust gas (oil) temperature reaches the set alarm temperature, a message will appear in the controller, and the alarm will sound. When the temperature reaches the set stop temperature, the controller executes the command and stops the compressor. When the phase sequence of the three-phase power supply connected to the compressor differs from the phase sequence set by the controller, the controller cannot output the start signal, and the motor cannot start working. In this case, exchanging any two-phase power supply lines and seeing the motor steering is only necessary.
c) Exhaust pressure overpressure protection
When the exhaust pressure exceeds the set high limit value, the controller will execute the command and stop.
d) Sensor failure protection
When the pressure or temperature sensor disconnection fails, the controller will execute the command and stop.

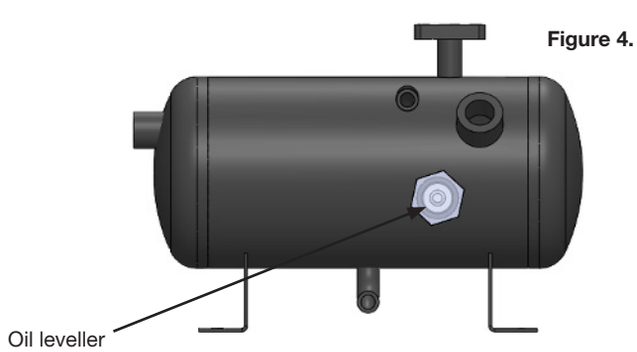
Use and maintenance

1. Daily use and maintenance (as specified in Maintenance planning Table)

2. Pre-start inspection and maintenance
a) Check and maintain the cleanliness and integrity of the equipment.
b) Check and maintain the integrity of electrical components and secure wiring.
c) Check and keep fasteners locked and reliable.
d) Check and adjust belt tightness and replace if necessary.
e) Check, adjust, and if necessary, replace couplings or cushion blocks.
f) Check, add and replace lubricant if necessary.

The oil level should be maintained between the upper and lower red lines of the oil mark, see Figure 4.

Figure 4.



Special screw machines lubricants should be used (contact us for information).

Use and maintenance cont

The oil should be filtered through a clean funnel (filtering accuracy 12um)
If the oil is to be replaced, the old oil must be drained first. See figure 5

Drain (oil) valve

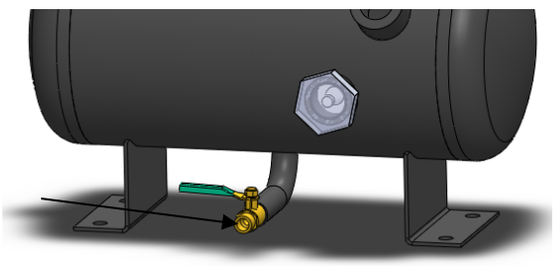
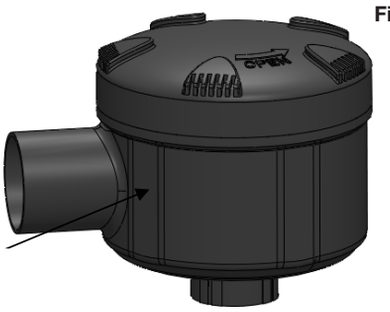


Figure 5

g. Check and, if necessary, drain the condensate from the oil and air cylinder (open the drain valve at the bottom of the cylinder slightly and drain the condensate until it flows out of the lubricant).
h. Check, clean, and, if necessary, replace the air filter element. See Figure 6.

Figure 6

The air assembly contains a filter



i. Check, clean, and, if necessary, replace the oil-air separator element, see Figure 7.

Oil and gas separator filter

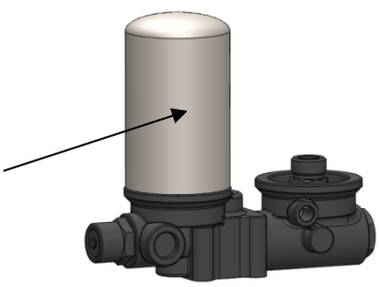


Figure 7

j. Check, clean, and, if necessary, replace the oil circuit filter. See Figure 8

Oil filter

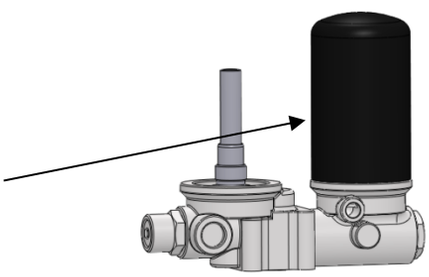


Figure 8

Use and maintenance cont

3. Check at start-up

a. Check that the operating buttons are operating normally.
b. Check for abnormal sound, vibration and oil leakage.
c. Check whether the instrumentation, such as pressure gauge, oil thermometer, ammeter and indicator, is normal.
d. Check if the oil return pipe is normal.
e. Check whether the automatic stopping pressure and automatic starting pressure are normal (there is a difference between the pressure sensor and the pressure gauge).
f. Check whether the unloading valve is deflated during the shut-down.
g. Check if the exhaust temperature is normal.
h. Check that the voltage and current are normal.
i. Check, clean, and replace the safety valve if necessary.
j. Check motor insulation resistance.
k. Record daily voltage, current, air pressure, exhaust temperature and oil level, and record working hours, maintenance and abnormal conditions each shift.

4. Treatment of prolonged downtime

When shutting down for a long time, the equipment should be sealed and treated
a. Clean up the equipment and apply the appropriate amount of anti-rust oil to the parts that are prone to rust.
b. Wrap all electrical equipment, such as motor control panels and all valves, meters and indicators in plastic or greaseproof paper.
c. Drain water from the oil cooler (oil and gas cylinder), the gas cooler and the gas storage tank.
d. Wrap the whole unit in plastic paper or similar.
e. If the storage site is to be transferred, lock the transport fixing screws.

To restart a sealed air compressor, first measure the insulation resistance of the motor (not less than 1MΩ) and then follow the operating instructions in Article (Equipment operation - 3.Test run of the new machine) Air compressors that have been sealed for more than 1 year should have their lubricating oil replaced.

Note: The "✓" sign in the table is for user maintenance work items, and the "✓" sign is for entrusted service centre overhaul items. The "¤" sign indicates that the new machine must be replaced after 500 hours of continuous operation and 3000 hours of work. Machine working time of 6000 hours a year for the following maintenance projects

Table - Maintenance planning

Serial number	Inspection items	Work content	Maintenance cycle						Notes
			Daily	Weekly	Monthly	Semi - annual spot checks	Annual minor maintenance	Every two years maintenance	
1.	Fasteners	Inspection of bolts and drive	✓						Bolts and drive components are not dislodged or loosened
2.	Couplings	Checking couplings	✓						normal concentrically and no damage
3.	Oil return line strainer	Check the screen			✓				No debris
4.	Transparent return line oil return condition	Make sure oil return is normal	✓						Smooth oil return

Serial number	Inspection items	Work content	Maintenance cycle						Notes
			Daily	Weekly	Monthly	Semi - annual spot checks	Annual minor maintenance	Every two years maintenance	
5.	Unloading valve	Determine shutdown and bleeding	✓						Normal unloading and deflating when the machine is stopped
6.	Lubricating oil	Check oil level and oil quality	✓						Oil level should be within the warning line, no oxidation and discolouration
7.	Discharge air (oil) temperature	Determine exhaust gas temperature	✓						Temperature 70-105°c is normal
8.	Voltage Current	Check voltage & current	✓						Within 1.2 times the rated current
9.	Air filter	Cleaning		✓					Change filter element only
10.	Oil and air cylinder drainage	Drain Water		✓					Discharge from oil discharge valve
11.	Anti-dust screen	Cleaning and maintenance			✓				Remove and clean
12.	Piping system	Check for oil and gas leaks	✓						No oil or gas leaks
13.	Circuit system	Wire terminals or display messages	✓						No prompt messages, disconnected wires, etc.
14.	Oil circuit filter	Check cleaning			✓				Replace cartridge parts only
15.	Oil and gas separator cartridge	Cleaning and replacement			✓				Replace only cartridge parts
16.	Motor insulation	Check insulation resistance	✓						Greater than 2MΩ at 500V
17.	Main machine mechanical seals	Check for leaks						✓	Oil leakage less than 1.5g/h
18.	Safety valves	Check action sensitivity				✓			Under the state of rated pressure, pulling the unloading ring of the safety valve with less than 1Kg can discharge and clear the foreign matter
19.	Automatic stop & start pressure	Check action sensitivity	✓						Stopping pressure, starting pressure is normal
20.	Cooler	Maintain and clean	✓						Clean the surface dirt by blowing
21.	Oil level indicator	Check clarity	✓						Replace when oil level is not clear
22.	Belts, pulleys	Check tightness or replace	✓						Squeeze the central position of the belt with the thumb to ensure that it is 10 to 15mm and free from damage.

Faults and troubleshooting			
Serial number	**Fault Phenomenon**	**Cause of fault**	**Troubleshooting**
1.	The motor won't start	• No voltage input or abnormal voltage • Lack of phase (motor makes a "humming" sound) • The wrong phase of the power supply or main controller failure • Fuse blown • Burned or malfunctioning AC contractor contacts • Pressure switch (pressure sensor) failure • The motor burnt out, bearing damaged • Blockage due to headstock stalling or bearing damage • Temperature sensor protection • Current protector in operation	• Checking the power supply circuit • Check the power cable terminals and the electronic controller, and interconnect terminals. • Switch phase sequence and overhaul or replace the mains control • Replace fuses after confirming that the check circuit is correct • Repair or replace • Repair or replace • Repair or replace • Repair or replace • Identify the cause and troubleshoot • Identify the cause and troubleshoot
2.	Motor starts frequently	• Start-up delay out of control • Severe pipe leakage • Insufficiently large storage tank	• Check or reset delay and master controls and replace • Check for leaks and remove • Increase gas storage tank or replace with larger one
3.	Exhaust (oil) temperature too high	• The ambient temperature is too high • Cooler too dirty, poor heat dissipation • Clogged oil circuit • The temperature sensor is not working • Insufficient lubricating oil • Cooling fan failure	• Increase ventilation in a plant room • Clean coolers • Inspect and unclog • Repair and replace • Increase lubricating oil • Inspect or replace
4.	Low exhaust pressure	• Pressure switch, force sensor, main controller failure • Excessive air consumption • Severe pipe leakage • Clogged air filter • Faulty air inlet valve • Clogged oil/gas separator • Leaky unloading solenoid valve • Rotating V-belt slipping	• Repair, adjustment or replacement • Inspection of piping, purchase of additional air compressors or control of air consumption • Repair and, if necessary, replace • Clean or replace filter elements • Repair or replace • Clean or replace • Repair or replace • Check, adjust, and replace
5.	High oil consumption	• Blocked oil return line • Oil and gas separator beyond the maintenance period • Oil level is too high • Faulty minimum pressure valve • No special oil used	• Clean or replace • Clean or replace • Lower oil level • Repair or replace • Change special lubricant
6.	Abnormal rattles and vibrations	• Loose fasteners, worn or damaged motor or mainframe bearings • Worn belts • Worn or loose couplings • Foreign matter in rotary parts such as the head, motor, or fan	• Repair or replace • Replace belts • Check, tighten or replace • Repair or replace
7.	Premature lubricating oil deterioration	• Old lubricant not drained • No special oil used • Exhaust air temperature too high	• Drain old oil and replace with new special oil • Replace special lubricant • Increase ventilation, reduce ambient temperature or overhaul temperature control valves and cooling systems

Faults and troubleshooting cont.			
Serial number	**Fault Phenomenon**	**Cause of fault**	**Troubleshooting**
8.	The air filter leaking oil when the machine is stopped	• Intake valve failure • Minimum pressure valve backfiring • Unloading the solenoid valve does not bleed	• Repair or replace • Repair or replace • Repair or replace
9.	Motor spinning slowly, causing high current or tripping	• Faulty head, motor and bearings • Drive V-belt too tight • Low input voltage (wire too long, wire diameter too small) • Poor circuit contact • Too large differential pressure in the pipeline (blocked filter element) • Severe imbalance in the three-phase voltage • Poor contact or insufficient switching gate current capacity • No special lubricant used	• Repair or replace • Check and adjust the head • Adjust wires • Repair or replace • Repair or replace • Check and remove • Repair or replace • Replace special lubricant
10.	The cooling fan not turning	• Too high temperature, too much current, overload protector operated • Lack of phase • Faulty thermostat or main controller • Three-phase resistance value does not match (motor burned out) • Faulty fan bearing	• Repair or replace • Check circuit and AC contractor • Repair or replace • Repair or replace • Repair or replace

EC Declaration of Conformity

We, Jefferson Professional Tools & Equipment, as the authorised European representative of the manufacturer, declare that this equipment conforms to the requirements of the following:

CE

Directive	Description	Notified Body
EN 1012-1: 2010 EN 60204-1: 2018 2006/42/EC	Compressors and vacuum pumps standards. Safety of machinery. Electrical equipment of machines - General requirements. The Machinery Directive.	**Intertek Testing Services Zhejiang Ltd.**, Hangzhou Branch, 4th Floor, Building 4#, No. 22, 22nd Street, Qiantang District Hangzhou, China 310018
2014/68/EU	Pressure Equipment Directive	**TÜV Rheinland Industrie Service GmbH** Notified Body for pressure Equipment, ID-No. 035 Am Grauen Stein, D-51105 Köln, Germany

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Product Codes: JEFCIND160S-03.0

Measured Sound Power Level: 70dB (A)

Guaranteed Sound Power Level: 75dB (A)

Description: Screw Air Compressor VSDD 2.2kW 3HP/10bar 160L

Signed: Stephen McIntyre

Operations Manager

Date: 9th October 2022

Name and address of manufacturer or authorised representative:

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