

OPERATING INSTRUCTIONS

VP Series

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1 General

This user manual describes safe and appropriate Operation of the system. Compliance with all specified safety notes and instructions and all local accident prevention regulations and general safety provisions that are valid in the operational area of the machine is imperative.

Before beginning all work on the system, this user manual and particularly the chapter on "Safety" and the corresponding safety notes must be fully read. The contents must be understood.

This user manual is part of the system. These instructions should be kept in the immediate vicinity of the system and be accessible at any time for persons working on or with the system. The user manual must always be passed on with the system.

Explanation of Symbols

Important safety-related notes are marked with symbols in this user manual. It is compulsory that the notes provided on work safety are complied with and followed. Take particular care in these cases in order to avoid accidents, personal damage and damage to property.



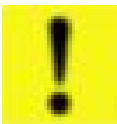
WARNING! Danger of injury or death!

This symbol identifies notes that may result in an impairment of health, injuries, permanent bodily harm or even death if they are not observed.



WARNING! Hazard of electric current!

This symbol points out a dangerous situation caused by electric currents. Failure to observe these safety notes can result in the risk of major injuries or death. The work to be performed may only be carried out by an inducted electrical specialist.



CAUTION! Damage to property!

This symbol identifies advice; non-compliance may result in damages, malfunctions and / or failure of the system.

Other valid documents

Components from other manufacturers may be installed in the system. These purchased parts have been subjected to risk assessment by the manufacturers. The constructions' conformity with the valid European and international regulations is declared by the manufacturers. The declaration of conformity from these manufacturers, as well as the operating, maintenance and repair instructions on the respective device components are to be considered part of the documentation for

this machine. The instructions on safety, setup and installation, operation, repair, dismantling and disposal of the components contained in the manufacturer's documentation must be fully followed by the system operating personnel.

Liability and Warranty

All details and notes in this user manual have been compiled under consideration of the valid regulations, current state of technology and our years of knowledge and experience. This user manual must be carefully read before beginning all work on and with the system.

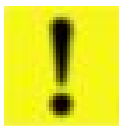
The manufacturer cannot be held liable for any damage or malfunctions resulting from non-observance of these operating instructions. The text and visual presentations do not necessarily correspond with the scope of supply. Illustrations and graphics are not to scale. In the case of special designs, use of additional order options or due to the latest technological modifications, the actual scope of supply may differ from the details and information as well as the visual presentations described or shown here. Please contact the manufacturer in case of any questions. We reserve the right to technical modifications of our product as part of enhancing its usage properties and further development.

Copyrights

This user manual should be treated confidentially. It is exclusively intended for persons deployed to work on and with the system. All contained data, texts, drawings, pictures and other images are protected under applicable copyright law and further industrial property rights. Any misuse is liable to prosecution. Distribution to third parties as well as reproduction in any kind and form – also of extracts – as well as exploitation and/or notification of the contents are not permitted without prior written approval of the manufacturer. Violations shall give rise to damages. The originator reserves the right to make further claims. We reserve all rights to exercise our industrial property rights

Spare parts

Only use the manufacturer's original spare parts.



CAUTION!

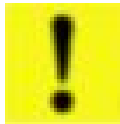
Wrong or faulty spare parts may result in damages, malfunctions or total failure of the system.

In the case of use of any unapproved spare parts, all guarantee, service, compensation for damages and liability claims against the manufacturer, his agents, traders or representatives are not applicable.

Disposal

Unless no other return or disposal agreement has been arranged, the individual components shall be recycled after having been properly disassembled.

- Scrapping of metallic material
- Recycling of plastic components
- Sorting and disposing of other components in accordance with material type.



CAUTION!

Waste from electronic and electrical equipment, electronic components, lubricants and other auxiliary materials are subject to hazardous waste treatment and must be disposed of by specialized companies only!

Safety

The system has been built in accordance with the generally accepted engineering standards valid at the time of development and manufacture and is deemed to be operationally safe. The system may be the source of hazards if it is used by staff who have not been professionally trained, or is used incorrectly or abnormally.

This chapter, "Safety", provides an overview of all significant safety aspects for optimum protection of persons as well as safe and trouble-free operation of the system.

Foreseeable correct use

The gas compressor system is suitable as standard for the compression of Nitrogen gas at a pressure of 5 to 10 Bar to a final pressure of up to 300 bar. Use of this compressor system in other fields of application requires the manufacturer's approval.

Operational safety is only guaranteed if the system is used as intended.

Foreseeable Incorrect use

The compressor station is designed to be operated with compressed air or Nitrogen gas only. In case you intend to use other materials, please contact the manufacturer before doing so.

CAUTION!



Any usage beyond the intended use and/or different type of use of the system is forbidden and is not valid as the intended use.

All types of claims against the manufacturer and/or his authorized representative due to damages caused by unintended use of the system are excluded.

Damage resulting from unintended use is the sole responsibility of the operator.

Intended use also refers to correct compliance with the operating conditions, as well as the details and instructions in this user manual.

The system may only be operated with the parts listed in the scope of supply.

Read the manual

Any person performing work on or with the system must have read and understood these instructions prior to commencing work on the system. This also applies if the person in question has already operated, or received training from the manufacturer on this type of system or a similar type.

Familiarity with the content of the user manual is one of the prerequisites for protecting personnel against hazards and for avoiding errors and hence for operating the system safely and without malfunction. We recommend that the operating company should obtain written confirmation from staff that they are familiar with the user manual.

Changes and Modifications to the System

To avoid hazards and to ensure optimal performance, no modifications, additions or conversions may be made to the system which has not been explicitly authorized by the manufacturer. All pictograms, signs and labelling found on the system must be kept in a good, legible condition and must not be removed. Damaged or illegible pictograms, signs and labelling must be replaced immediately.

Responsibility of the Operating Company

These instructions should be kept in the immediate vicinity of the system and be accessible at any time for persons working on or with the system.

The system may only be operated in a technically appropriate and operationally safe state. The system must be checked for intactness prior to each and any start.

All user manual instructions shall be observed fully and without limitation.

Along with the specified safety notes and instructions in this user manual, the local accident prevention regulations and general safety provisions that are valid in the operational area of the system, as well as valid environmental protection regulations, must be observed and complied with.

The operating company and the company's authorized personnel are responsible for fault-free operation of the system as well as for clear specifications on areas of responsibility for installation, operation, maintenance and cleaning of the system. The operating company has to ensure that the supply of liquid carbon dioxide is interrupted if the supply of drive air is interrupted.

Requirements of personnel

Only authorized and instructed specialized personnel may work on and with the system. Members of personnel must have received an induction on possible risks. The term specialized personnel refers to persons who are capable of assessing their work and recognizing the possible risks involved due to their specialist training, knowledge and experience, as well as knowledge of the relevant regulations. If members of personnel do not have the necessary knowledge, training must be provided accordingly.

The areas of responsibility for work on and with the system (installation, operation, maintenance, repair) must be clearly specified and complied with so that areas of competency are clear from a safety point of view. Only such persons may work on and with the system that can be expected to perform their duties reliably. People who are under the influence of drugs, alcohol or medication that may affect their reactions may generally not work with the system. The valid age and specific job regulations for the site where the system is used must be observed when choosing personnel. The operator must ensure that unauthorized persons are kept at a sufficient distance from the machine. Any changes to the system that affect safety must be immediately reported by staff to the operating company.

Work Safety

Personal damages and damages to property when working with and on the system can be avoided by following the specified safety notes and instructions in this user manual. Non-observance of these notes may result in hazards for persons and damage or destruction of the system.

In the case of failure to comply with all specified safety notes and instructions in this user manual and all local accident prevention regulations and general safety provisions that are valid in the operational area, all liability claims and claims for compensation for damages against the manufacturer or a commissioned agent are excluded



Personal protection equipment

When working on or with the equipment, the following shall be worn:

(To be supplemented by customers internal regulations)

– **Protective clothing**

closely fitting work clothes (low tearing strength, no loose sleeves, no rings and other jewellery etc.)

– **Safety shoes**

to protect feet against heavy falling parts and slipping on flooring that is not skid resistant.

– **Protective goggles**

to protect eyes from flying parts and fluids.



Additional requirement for cleaning work:

– **Working gloves**

to protect against friction, abrasion, puncture and severe injuries of the hands as well as against contact with hot surfaces and substances hazardous to health.



Hazards Originating from the System

The system was subjected to risk assessment. The resulting construction and design of the system corresponds with the current state of technology. The system is operationally safe when used as intended. However, a residual risk always remains!

WARNING!

Pneumatic energy can cause major injuries. In the case of damage to individual components, highly pressurized mediums can escape and lead to physical and/or property damages!

_ Depressurize the system before beginning any work

– Do not remove, modify or put safety installations out of operation.

_ Pressure settings may not be changed beyond the values and tolerance ranges specified in the user manual.



WARNING! Danger of suffocation!

The compressor has dynamically loaded seals, therefore certain leaks are possible. Nitrogen displaces oxygen so the system may not be used in closed rooms and sufficient ventilation must be provided.



WARNING! Hazard of flying particles!

The compressor station can generate very high pressures. Therefore, it is mandatory to maintain a proper safety distance and follow adequate safety precautions.

OPERATING INSTRUCTIONS

Controls

The Maximator UK VP15/15 is a highly developed programmable logic controller (PLC) and man-machine interface control solution developed specifically by Maximator for its range of gas preparation equipment. The control system handles all control and monitoring of the equipment.

This manual section includes all the information about how to operate and monitor the equipment,

including:

- system setup - changing settings
- monitoring operation of the equipment
- the alarm system
- logging of data



A	Reset
B	Fault Lamp
C	Emergency stop
D	Pressure switch

Note: Layout and position of controls may differ.

Emergency Stop

Every gas preparation system has at least one emergency stop push button in an easily visible location.

Reset Push Button/Master Relay

The blue reset push button is used to energise the master control relay. The master control relay is a power relay, which provides power to all solenoids and coils controlling the equipment on the unit. Unless the master control relay is energised, the equipment cannot function. When turning on the power, it is always necessary to energise the Master control relay. To energise the master control relay, first ensure the emergency stop push button(s) are released by twisting the red knob until a click is felt. Then press the blue reset button. To check the status of the master control relay, go to the status screen. This will show the relay as either „OFF“ or „ON“. The relay must be „ON“ for the unit to operate correctly. See later this section for more information.

Fault Lamp

An alarm lamp is provided on the front of the control panel. This illuminates to indicate a critical alarm. If the red alarm lamp is lit and not flashing, then there is either a critical alarm or an emergency stop is pressed.



RUNNING THE EQUIPMENT

Preparing to run – start-up checks

Turn on the power at the main isolator. Make sure that the emergency stop pushbutton is released (twist the knob anti clockwise until you hear a „click“). Press the blue „RESET“ button. Then touch the RESET button on the screen to clear alarms.

Make sure that the gas compressor unit is ready for operation:

- The unit must be commissioned - see installation and commissioning instructions, and contact your Maximator distributor or agent for help and advice.
- Inlet LP gas supply must be connected
- The HP receiver isolating valves (where fitted) must be open.
- The HP gas outlet must be connected to the factory distribution system.
- The compressor oil level must be checked.
- There must be no obstructions to cooling airflows around the equipment, or to the safe rotation of rotating parts. Guards must be in place.

Once the start-up checks have been made, the equipment can be put into operation.

Compressor ON/OFF

To run the Compressor, touch the ON/OFF icon “A”. If there are no faults and the Master control relay is energised, the icon will change to green, and the compressor will be in Automatic mode.

Depending upon the pressure in the HP gas receiver, and if LP gas is available, the compressor may start cycling, or may be placed in “Standby”. Check the screen to see the status of the compressor. To turn the compressor off touch the ON/OFF icon “A” again. It will change to grey.



Reset

The „RESET“ key on the interface is different from the green reset pushbutton on the control panel. This key is used to reset the control system after a critical fault. If a critical fault occurs, such as an oil fault or motor overload, the compressor will be stopped immediately, and the screen will display the fault. The red alarm lamp will light up. To acknowledge the alarm and reset the control system to allow the compressor to run again, you must press the „RESET“ key. If the alarm condition is no longer present, the red alarm lamp will go out, and it will be possible to restart the compressor.

Autovent

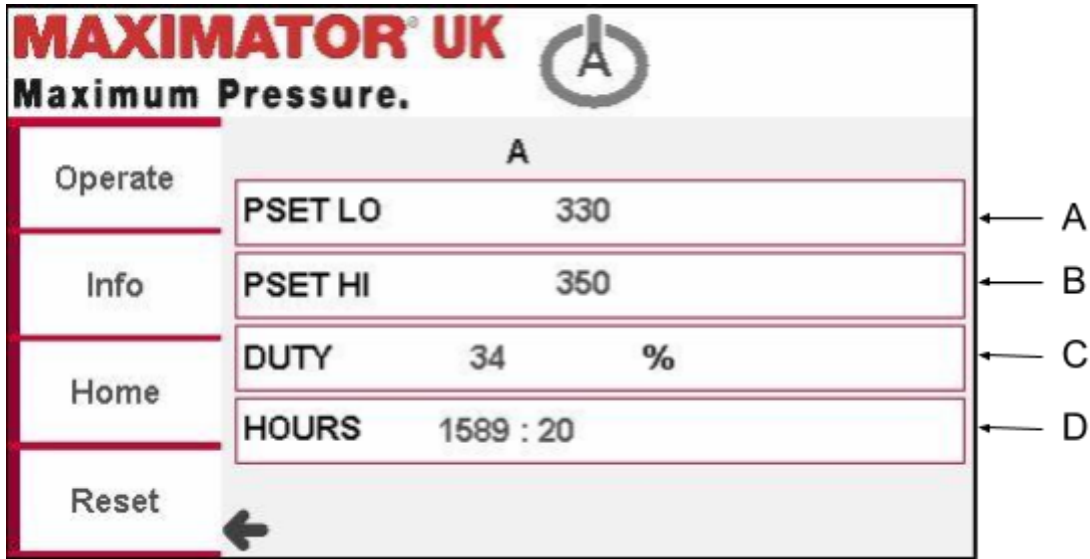
The unit is programmed to ensure the compressor must stop every 30-60 minutes for 1 minute. This ensures that the micro filter element is vented regularly.

“Operate” Screens

The “Operate” screens are used to see compressor status messages and operating pressures and to change the start and stop pressures for the compressor.



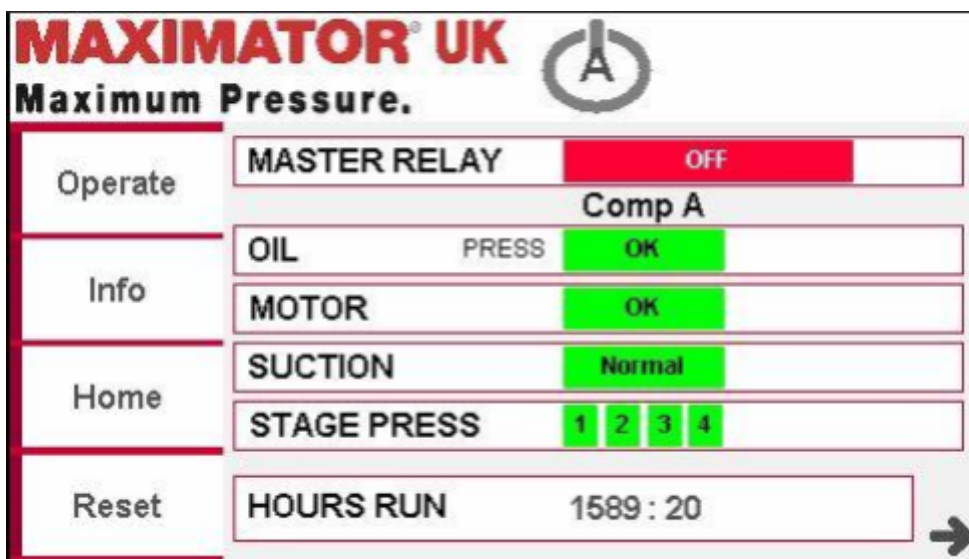
A	Compressor status bar. Shows compressor messages and hours run. OFF - Compressor inactive STANDBY - Compressor Stopped. Will start when HP outlet pressure drops below the Low pressure setting. RUN - Compressor running. Will stop when HP outlet pressure rises above the high pressure setting. Other messages show alarm messages, according to the conditions.
B	Compressor system inlet pressure, compressor suction pressure and high pressure outlet pressures.



A	HP Outlet pressure low setting.
B	HP Outlet pressure high setting.
C	Duty indicator. Shows the percentage of time the compressor has been running in the past 2 hours.
D	Hours run by the compressor.

“Info” Screen

The “Info” screen shows the status of the compressor system and indicates alarms. Touch the Reset button to reset alarms.



Non-Critical Alarms

Non-Critical alarms are system alarms which may stop equipment from running, but which can be reset automatically by the control system. These faults are faults which the control system can handle, and include:

- Low suction pressure - Normally caused by the LP gas inlet supply running low. The control system will hold the compressor off until there is enough gas pressure at the gas inlet (Normally 4 Barg)
- Starts hold - The compressor is held off for an appropriate time, to prevent the motor from overheating from starting too frequently.

Critical Alarms

Critical alarms are those which require intervention from the user. They cannot be reset automatically by the system, either because they need the user to manually reset something (e.g. motor overload), or because to automatically reset the fault could lead to a serious failure. Critical alarms require the user to remove the cause of the fault, and reset the control system using the „RESET“ key on the interface panel. Critical alarms include:

- Oil Fault - critical low oil pressure.
- Gas Temperature - Gas outlet from the compressor is too high
- High Suction pressure - The suction vessel pressure has become high enough to risk damaging the compressor.
- High stage pressure - One of the compressor stages is running at an abnormally high pressure.
- Motor overload - The overload has tripped and must be manually reset.
- Emergency stop - The user has pressed an emergency stop pushbutton and the master control relay has been de-energised. The screen shows the alarm condition of the compressor. As mentioned above, the appropriate screen will automatically be shown in the event of a critical alarm: