

# BIRKENSTOCK G M B H

Compressed Air Technology • D - 33442 Herzebrock - Clarholz

## INSTRUCTION MANUAL FOR ELECTRIC COMPRESSORS

**MODEL: Ps x V BETWEEN  
200 and 1000  
DESIGN: STATIONARY OR MOBILE  
COMPRESSOR BRIDGE ASSEMBLED  
ON THE VESSEL**

# **CE 0091**

### **1.0 Please observe the following prior to commissioning**

Read and follow this instruction manual carefully before starting to use the compressor. No liability will be assumed for any damages or malfunctions that are caused by improper handling, or non-observance of and failure to comply with this instruction manual.

#### **1.1 Initial inspection**

This electric compressor is a serial pressure device in the sense of Article 1 of Directive 97/23/EC and Article 1 of Directive 87/404/EEC. In accordance with Annex 5, Point 25 - Inspection of special pressure equipment pursuant to § 17 of the Industrial Safety Regulations (BetrSichV), an inspection for series manufactured systems can be conducted by an approved inspection body on a sample prior to commissioning, without reference to the installation location, provided that the maximum allowable pressure PS and applicable volume V for the device or vessel does not exceed 1000 bar. litres. This inspection prior to the initial commissioning phase has already been conducted at the manufacturing plant by an expert from TÜV.

The manufacturer has already conducted an in-house risk assessment for this electric compressor for the purpose of § 3 of the Industrial Safety Regulations (BetrSichV).

#### **1.2 Note for the operator**

The manufacturer has already performed a risk analysis and a risk assessment in accordance with the Pressure Equipment Directive 97/23/EC at the manufacturer's plant

### **2.0 Technical specifications**

Information for the operator:

All of the relevant technical data for identifying your electric compressor can be found on the type plate; as a representative example you will see the following information:

Compressor type	K 18 500/ 90/ 400
Max. flow rate	500 l/min
Max. delivery quantity	350 l/min
Motor capacity	(400 V) 3 KW
Tolerable compressor discharge pressure	10 bar
Max. compressor speed	1,200 rpm
Number of cylinders	2
Vessel size	90 litres
CE mark	CE-D 0091
Device No.	-----
Year of construction	_____

## **2.1 Direction of rotation of the compressor**

Compressors with a single phase AC motor (230 V) automatically rotate in the correct direction. These compressors should not be operated with an additional extension cable or cable drum.

When using compressors with a three-phase motor (400 V) the correct direction of rotation must be observed (as indicated by a red arrow on the V-belt guard).

If the compressor rotates in the wrong direction, then 2 phases must be exchanged with one another.



**CAUTION!** This work should only be conducted by a qualified electrician.

## **3.0 Type test! Note: No external interference!**

The electric compressor is tested in terms of its construction. This electric compressor should not be subjected to any kind of external interference or modifications of a technical nature. Modifications and/or amendments to the design may only be implemented after approval by the manufacturer; in the event of non-compliance the guarantee, warranty and the general operating licence shall expire.



**Important ! Pay special attention to the following !**

The electric compressor is equipped with an overpressure safety valve. This valve, which is factory sealed, has an important safety function as it prevents the maximum allowable working overpressure value from being exceeded.

No modifications and/or adjustments may be made to this valve. In the event of a defect the overpressure safety valve should only be replaced with a new part.

If the seal of the safety valve is tampered with, it shall result in immediate expiration of the operating license!

Automatic operation of the electric compressor is effected by an electro-pneumatic pressure switch.

The ON and OFF switching points are factory preset to their optimum setting.

When using electric compressors in a single phase AC configuration / 230 V, the max. start-up pressure should not exceed 5 bar.

 **Note! Important information!**

Changes to the ON and OFF switching points should only be conducted by a qualified electrician when the tank is pressurised.  
In the event of a defect the pressure switch should only be replaced with a new part.

If the ON or OFF switching points should be adjusted, they have to be reset. Otherwise, the permanent stability of the compressed air tank is not ensured. Please note the setting information of the tank manufacturer. The operating manual which is included with this machine is enclosed as an annex.

 **4.0 Electrical connection**

**Important information!**

Before connecting the compressor to the mains supply make sure that the current type and voltage rating of your mains supply match the current type and voltage rating specified on the type plate. Observe the regulations stipulated by your electric power plant.

Electric compressors in a single phase AC configuration (230 Volt/ 50 Hz) must be safeguarded as follows:

1.5 KW D motor	>>> 16 amp	slow blow fuse
2.2 KW D motor	>>> 16 amp	slow blow fuse


If the AC motor is overloaded, the thermal safety motor switch on the motor is activated.

In this case, set the CONDOR pressure switch to the position / **ZERO**, release the compressed air tank to **0 bar**.

**Only then restart the motor safety switch.**

Electric compressors in a three phase configuration (400 V/50 Hz) with up to 4 kW drive capacity are delivered with a mains plug ready for connection.

Electric compressors with a drive capacity greater than 4 kW are controlled by a star-delta connection and commissioned by the ON/OFF switch.

 **CAUTION!** The star-delta connection should only be installed by a qualified electrician.

**4.1 Installation**

The electric compressor must be easily accessible from all sides and the minimum distance to the nearest wall must be at least 60 cm.

 **Important information!**

The **OFF push button** must be accessible at all times and it should not be obscured by any obstacles!

The installation space must be at least 27 m<sup>3</sup> and it must conform to the relevant provisions stipulated by the local building authority and local fire department.

 **Important information!**

Both the compressor and electric motor are cooled by cooling air.

It must be ensured that sufficient SUPPLY and EXHAUST air is able to flow through the installation room.

As a guideline approx. 20 m<sup>3</sup>/min of air can be assumed. The suction power of the compressor is also included in this value.

The site of installation must be free from dust and paint mist, as well as other hazardous substances in solid, liquid or gaseous form. The installation space must comply with the provisions stipulated by the local building authority.

 **Note !**

The required bearing capacity of the flooring surface should be at least 250 Kg/m<sup>2</sup>. The floor space should be level.

 **Caution! Observe without fail!**

Do not store any flammable substances close to the compressor. Do not operate the compressor in the blazing sun or in the rain. Do not install or operate a heating system in close proximity to the compressor under any circumstances!

Make absolutely sure that no hazardous air mixtures are drawn in by the intake filter (hazardous air mixtures are, for example, solvent vapours, dust and other harmful substances).

Open flames, welding work, sparks (e.g. generated by an angle grinder) near the compressor are strictly prohibited.

The electric compressor has been subjected to a conformity assessment procedure by the manufacturer in accordance with Directive 2000/14 EC (Noise Emission Directive). In accordance with EN ISO 3744: 1995 and EN ISO 3746: 1995 the noise emissions are as follows:

Measured sound power level :	85 dB (A)
Guaranteed sound power level:	89 dB (A)

The noise level (LpA) has been measured : the measurement was conducted in conformity with the standard.

Stationary electrical compressors may not be connected to the compressed air supply with fixed pipe lines. To avoid vibration transfers between the electrical

compressor and the compressed air pipeline supply (or between the electrical compressor and machine), a flexible industrial hose must be attached in accordance with EN 854 2 TE; DIN 20021 with a clear interior diameter of at least 12 mm, a hose length of at least 600 mm, approved for a work pressure of at least 40 bar.

## **5.0 Operation**

### **5.1 Commissioning - Switching on the compressor for the first time**

Before commissioning it is important to ensure that the current type, frequency and voltage rating of your mains supply correspond with the details specified on the type plate of the electric motor and the type plate of the compressor.

When the compressor's site of installation is secured it can be switched on.

When doing this connect the compressor to the mains supply and the compressed air hose to the air extraction point.

Check the oil level via the oil sight glass on the compressor. The oil level should not fall below the centre of the oil sight glass.

Electric compressors with a drive capacity of up to 4 kW are switched ON and OFF directly by actuating the pressure switch.

Before it is switched on the electric compressor must be located on an even and secure foundation.



#### **Note!**

After you have commissioned the electric compressor it will continue operation automatically. As soon as the factory preset switch-off point is reached the compressor switches off automatically.

### **5.2 Operation in winter**

During the winter months the compressor oil in the crankcase may become somewhat viscous. If this occurs it could hamper the compressor's start-up phase. It is therefore recommended to operate the compressor in a well-ventilated room at an ambient temperature of at least + 5<sup>0</sup> C.

### **5.3 Operating time - duty cycle of the compressors**

Electric compressors of this series and configuration have a duty cycle of up to 60%.

## **6.0 INFORMATION FOR OPERATING PERSONNEL**

Compressed air is a form of energy - therefore electric compressors and compressed air equipment should only be operated by trained personnel who

- are over the age of 18
- possess the necessary degree of expertise with regard to equipment and procedures and who are expected to fulfil their tasks in a reliable manner.

Persons over the age of 16 may also operate electric compressors provided

- that - this is necessary for achieving their training objective
- they are supervised by an older, specialised person.

## **7.0 MAINTENANCE, INSPECTION AND CARE**

### **7.1 Draining the condensate**

Condensate forms in the pressure vessel during operation.

This condensate should be drained and disposed of properly at regular intervals (see the table below) by lightly turning the drain plug which is located at the bottom of the vessel (2 to 3 rotations should be suffice).

You can also install an automatic condensate drain valve and an oil/water separation system as an optional extra -

for further information please contact your specialised dealer.

### **7.2 Changing the oil**

The first oil change should be conducted after max. 100 operating hours; however this should be at least 1 x per year (see the table below).

Only compressor oil designated **BK 100** should be used. This is a special compressor oil and it should not be mixed with HD or SAE oils, as this could cause damage to the compressor.

The quantity of compressor oil is determined by the size of the compressor. The following table illustrates the amount of oil required for your compressor:

<b><u>Compressor type</u></b>	<b><u>Required amount of oil in litres</u></b>
K 8	0.40
K 11	0.50
K 17	1.00
K 18	1.00
K 24	1.80
K 28	1.80
K 30	1.45
K 35	1.45
K 50	1.75
K 60	3.00
K 100	4.00



### **Caution! Observe without fail!**

The compressor oil must be disposed of properly; contact your specialised dealer for further information.

Never pour the oil into the sewage system or dispose of it in the environment!

Improper disposal will be severely penalised!

### **7.3 Air intake filter**

The air intake filter contains an air filter insert. This is to be cleaned on a regular basis by blasting compressed air from the inside to the outside of the filter.

The air filter should be cleaned on a monthly basis (see the table below) and the air filter insert should be exchanged once to twice a year, depending on the degree of contamination.

## **7.4 Inspection : Re-tightening all screw connections**

It is recommended to re-tighten all bolts and screw connections after the first 5 hours of operation.

## **7.5 Further inspections recommended by the manufacturer**

The following inspections are recommended every six months:

### **a) Visual inspections**

- Check the entire compressor for loss of oil
- Check all pressure pipes and screw connections for leaks
- Check protective equipment (belt guard)
- Check the stability of the electric compressor
- Check electrical wires for signs of wear
- Check the outer integrity of the pressure vessel

### **b) Functional tests**

- Check to make sure the manometer is intact and that it displays the vessel pressure
- Check the function of the pressure relief valve by actuating it

## **7.6 Summary of maintenance and inspection tasks, transport and subsequent disposal**

	Every week	Every month	Every 500 hours	At least 1 x per year
Condensate drain	X			
Oil contro (oil level and consistency)		X		
V-belt tension (condition)			X	
Air filter inspection (air filter exchange if applicable)		X		
Pressure setting (inspection)			X	
Overall cleaning				X
Oil change (at least 1 x per year) We recommend: Special compressor oil BK 100				X
Electrical connection inspection				X

The electric compressor is not suitable for elevation with lifting equipment as there are no corresponding lugs.

The electric compressor is to be disposed of in accordance with the applicable environmental regulations.

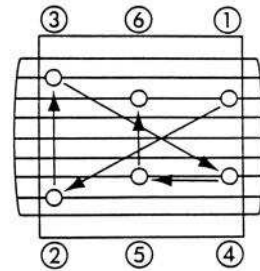
When the electric compressor has reached the end of its service life all reusable components should be disassembled and transferred to the appropriate recycling facilities in accordance with the applicable legal requirements.

## **7.7 Re-tightening the cylinder head bolts**

The cylinder head bolts should be re-tightened after the electric compressor has been operated at its intended location for the first time. The cylinder head bolts should be re-tightened when the compressor is at operating temperature. When doing this they should be re-tightened in the order shown in the illustration below using the following tightening torques:

Compressor type	Tightening torque (in Kp/m)	Tightening torque (in Nm)
K 8	1.7	16.7
K 11/K 17 / K 18 / K 24	2.9	28.4
K 28 / K 30 / K 35	4.5	44.1
K 50	8.0	78.5
K 60	4.5	44.1
K 100	8.0	78.5

Re-tightening sequence



## 8.0 CONDUCT IN THE EVENT OF MALFUNCTIONS



### Note! Observe the safety precautions!

Before conducting any maintenance or repair work on the compressor it is essential to remove the mains plug and discharge the compressed air from the pressure vessel.

Work on the electrical components should only be conducted by a recognised and approved electrical technician.

Never loosen any parts on the compressor if the pressure vessel is still pressurised. - Risk of injury -

If the compressor has been shut down by the motor circuit breaker as a result of a malfunction, the compressed air must be completely discharged from the pressure vessel prior to re-commissioning to ensure an easier start-up operation.

## 9.0 DECOMMISSIONING

The compressor can be shut down at any time, even during operation, by actuating the OFF button.



### Important information !

Never shut down the compressor by removing the mains plug!

In principle the compressor should only be shut down by actuating the OFF button!

## 10.0 SPARE PARTS

If you require any spare parts, please specify the following information when ordering:

- Type of compressor
- Year of construction
- Type of attached compactor
- Spare part number and name of the desired spare part



If you have any further queries,  
please contact your specialised dealer.

Your specialised dealer