

Operating instructions

Belt-driven screw compressors

Series

S 31-2...S 341

SD 40-2...SD 150

SF 60-2...SF 150

SDF 60-2...SDF 150

S 40-2...S 50-2 BLUEKAT

Separate manuals:

Compressor control

Refrigeration compressed air dryer (SD / SDF)

Frequency converter (SF / SDF)

Operating instructions for belt-driven screw compressors

- S 31-2 (22 kW)
- S 40-2 / SD 40-2 (30 kW)
- S 50-2 / SD 50-2 (37 kW)
- S 60-2 / SD 60-2 (45 kW)
- S 61-2 / SD 61-2 (45 kW)
- S 75-2 / SD 75-2 (55 kW)
- S 90-2 / SD 90-2 (65 kW)
- S 100-2 / SD 100-2 (75 kW)
- S 101 / SD 101 (75 kW)
- S 125 / SD 125 (90 kW)
- S 150 / SD 150 (110 kW)
- S 151 (110 kW)
- S 180 (132 kW)
- S 220 (160 kW)
- S 271 (200 kW)
- S 341 (250 kW)

- SF 60-2 / SDF 60-2 (45 kW)
- SF 100-2 / SDF 100-2 (75 kW)
- SF 150 / SDF 150 (110 kW)

- S 40-2 BLUEKAT (30 kW)
- S 50-2 BLUEKAT (37 kW)

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1.1 General safety instructions

**Caution!**

Nonobservance of the following safety instructions may lead to injuries and damage to the compressor.

Also observe the generally valid safety and accident prevention regulations in addition to the information in these operating instructions!

Safety instructions for compressor operation

1. Ensure that no commissioning and maintenance work on the compressor is undertaken until these operating instructions are understood.
2. Only use the compressor for its intended use, as described in these operating instructions.
3. The owner must ensure,
 - that only appropriately trained and authorized personnel work on this compressor,
 - that no persons work on this compressor, whose ability to react is restricted due to misuse of e.g. drugs, alcohol, medication etc.,
 - that the operating, maintenance and repair personnel has been made fully familiar with all safety instructions, and that they are being observed,
 - that the compressor is only operated in a safe operating condition.
4. Avoid any operating method which may impair the safety of the compressor.
5. Always wear your compulsory personal protective equipment as a protection against injuries from sharp corners or edges when working on the compressor.
6. To avoid dangers from debris or parts lying around, the service area of the compressor has always to be kept tidied up and clean.
7. Always squat when working on components mounted at low height, never stoop. When working on components mounted higher up always stand upright and erect.
8. Do not exceed the limit value for the final compression pressure specified on the type plate.
9. Do not operate the compressor without the attendant protection and safety devices.
Do not dismantle any built-in safety devices or put them out of operation.
Ensure that all safety claddings and doors are closed prior to commissioning/starting up the compressor and that they are not opened during operation.
10. Place the compressor out of operation as described in these operating instructions, when dismantling the safety claddings or safety devices for repair or maintenance work. Reattach and close all cladding and safety devices immediately upon completion of the repair or maintenance work.
11. Only operate the compressor using the additional equipment (options) recommended or authorized by the manufacturer.

12. Undertake conversions and modifications of the compressor only with BOGE prior approval, taking all relevant safety regulations into consideration. The manufacturer is not liable for damages resulting from independent modifications on the compressor.
13. Never start the compressor when one or several parts (e.g. cable, plug) are damaged, when not in perfect working order and when damage is detected or suspected.
14. Observe all safety and danger signs directly attached on the compressor!
15. The compressed air/oil receiver and the BLUEKAT converter are pressure devices and require testing in accordance with international standards.
16. To avoid damages, special precautions have to be taken during (re-) operation of compressors with frequency control, if the frequency converter was cut off from the power supply for a longer period of time (> 12 months). In this case please contact the BOGE-Service.

Special hazard warnings

- Always wear your compulsory personal protective equipment when working on pressure pipes and connections!
- A protective grid serves to prevent you from accidentally reaching into the impeller of the cooling fan.



Caution: Risk of injury!

Never operate the compressor with dismantled protective grid! There is a constant danger of accidentally reaching into the impeller of the cooling fan! Please note that the cooling fan may run on for a certain time even after the compressor has been switched off!

- During operation, the compressor generates a high sound pressure level which may cause permanent hearing damage due to continuous noise stress. As a rule, the compressor may only be operated with its housing cover closed. Make sure to additionally wear a hearing protection in case of a noise pressure level above 80 dB(A)!

Electrical energy hazards



Caution: Voltage!

There is danger of life when working on the electrical equipment of the compressor!

- Disconnect mains connection prior to starting to carry out works on the compressor and use padlock to secure against switching on again.
- Only duly authorized professional electricians (e.g. plant electricians) are allowed to carry out works in the electrical area of the machine.
- Make sure to check the electrical equipment of the compressor at regular intervals for defects such as loose connections or scorched cables and have any defects repaired immediately.
- Make sure to have all electrical equipment and fixed electrical installations checked by a professional electrician at least every 4 years.
- Any modifications that may have been carried out after examination must conform to DIN EN 60204-1:2007.
- Make sure to check all safety installations on the machine for proper functioning at regular intervals.
- Only use original fuses.

Obligations of the owner

The owner is obliged to,

- operate the compressor only in technically perfect condition,
- check the Emergency Stop device of the compressor regularly for completeness and functionality,
- assess the hazards of the machine working places in his area of responsibility and to issue the ensuing operating instructions,
- to name a person responsible being in charge of the safe operation of the machine as well as the coordination of all service work performed on it,
- avoid stress situations while operating the compressor by means of technological and organizational operation scheduling,
- ensure a proper workplace lighting at the compressor control section according to the local health and safety regulations,
- observe the safety data sheet of the used lubricants and to customize the personnel all information as to said data sheet,
- provide the compulsory personal protective equipment and to stipulate and check the wearing of said protective equipment on a regular basis,
- assign the personnel responsible for various tasks and work on the machine,
- instruct the personnel on a regular basis with respect to all obligations as to compressor related preservation of safety and tidiness.

Personnel requirements

Work on and with the compressor may only be carried out by personnel duly authorized by the owner of the compressor.

The personnel working on the compressor has to observe all industrial safety regulations and operating instructions, properly recognize responsibilities and read and understand the operating instructions. It is essential to wear the compulsory personal protective equipment when working on the compressor!

Personal protective equipment

In general for all work on the compressor

- protective clothing,
 - chemicals resistant gloves,
 - slip-resistant safety shoes and
 - hearing protection, if applicable
- are compulsory.

For special duties

- protective helmets (for transport work with lifting gear) and
 - safety goggles (when working on the compressed air system, on the control pneumatics and/or on the cooling system of the built-in dryer)
- must be worn.

Before starting work using oils or greases a skin protection cream must be applied. Having finished the work a skin care product must be applied.

Safety instructions for maintenance and repair of the compressor**Caution!**

Only use original spare parts, compressor oils and operating materials released by BOGE during repair or maintenance!

**Caution: Voltage!**

When working on the electrical system there is a constant danger of getting into contact with live parts!

To avoid such dangers the mains connection must be equipped with a disconnecting device!

The power disconnecting device has to meet the requirements of DIN EN 60204-1:2007!

1. Ensure that maintenance work is only carried out by appropriately trained persons.
2. Ensure that setting work, malfunction rectification and repair is only carried out by specialists or appropriately trained persons.

3. Prior to maintenance or repair work:
 - Switch off the compressor using the OFF button.
 - Press Emergency Stop button.
 - Open power disconnecting device.
 - Secure power disconnecting device against unintentional switching on by means of a padlock.
 - Fix a warning label to the control and fill in the name of the person responsible who is authorized to switch on the machine again.
 - Check to ensure that all parts are currentless.
 - Disconnect the compressor from the compressed air network (relieve or block pressurized lines).
 - Allow converter to cool off for several hours (only applies to screw compressors S 40-2 BLUEKAT and S 50-2 BLUEKAT)
4. Exercise extreme caution during repair or maintenance work requiring the compressor to be operational.
Ensure that persons keep out of reach of the hazardous area.
5. Ensure that work on the electrical equipment is only executed by qualified electricians.
6. Work on parts and devices under current is prohibited. Exceptions are governed by the appropriate regulations, e.g. DIN VDE 0105.
7. Prior to starting work on the electrical system the power supply has to be switched off and secured against unintentional switching on again. Immediately after having finished the work all dismantled claddings and safety devices must be refitted.
8. The operator is responsible to check the compressor daily for externally visible damage and defects, and to immediately report any changes (including operational behaviour).
9. When the automatic restart (Auto-Restart) is activated, the compressor will start automatically following a voltage loss. Prerequisite: The net pressure is lower than the set switch-on pressure.

Safety instructions for maintenance and repair on integrated converter (BLUEKAT series)



Caution!

Maintenance and repair work on integrated converter of the S 40-2 BLUEKAT and S 50-2 BLUEKAT series may be carried out by specially trained BOGE service personnel only.

Non-observance may cause physical injuries and damage to the compressor station.

Accident prevention regulations

The owner of a compressor plant is responsible to ensure that it is properly installed, operated and maintained.

Prior to commissioning, owners in the Federal Republic of Germany urgently have to read the currently valid regulations of the Main Association of the Industrial Employers' Liability Insurance. Apart from other regulations particularly the Ordinance on Industrial Safety and Health (BetrSichV) is applicable.

The regulations are available at the following locations:

Berufsgenossenschaft (Industrial Employers' Liability Insurance)
Carl-Heymanns-Verlag KG, Luxemburger Straße 449, D-50939 Köln
Beuth Verlag GmbH, Burggrafenstraße 6, D-10787 Berlin

For operation of the compressor plant outside the Federal Republic of Germany, the accident prevention regulations of the country, where the compressor is operated, must be observed in addition to the data contained in these operating instructions. In the event that measures are required above and beyond the legal regulations specified in the Federal Republic of Germany or the data contained in these operating instructions, then it is of utmost importance that these be carried out prior to commissioning the compressor plant.

1.2 Introduction

The purpose of these operating instructions is to familiarize the user with the function and all application possibilities of the compressor.

These operating instructions contain important information on how to operate the compressor safely, economically and according to its intended use. Observing these operating instructions will assist in avoiding danger, to reduce repair costs and down times and to increase the reliability and service life of the compressor. It contains important information concerning the required maintenance and repair measures, assists in case of malfunctions and contains data concerning spare and wearing parts.

The operating instructions must be available to the compressor operating personnel at the place of operation, at all times.

The operating instructions must be carefully read and applied by all persons engaged to undertake the following work on the compressor:

- Operation, including fault rectification and daily care
- Maintenance (service, inspection, repair)
- Commissioning
- Transport

The compressor and its additional equipment must not be installed and commissioned until the operating instructions are understood.

These operating instructions can be supplemented with instructions on the basis of existing national regulations concerning accident prevention and environmental protection.

In the illustrations, the compressor is shown in part without safety cladding or safety devices for better visualization. However, operation without these components is prohibited!

Symbols used

In these operating instructions the most important safety notes and tips are especially characterized by the following symbols:

**Caution: Risk of injury!**

This symbol indicates information warning of possible danger to life and limb of the operator or other persons.

**Attention!**

This symbol indicates information warning of dangers to life and limb of the operator or other persons or dangers, which might destroy or damage the compressor.

**Caution: Voltage!**

This symbol indicates information warning of life threatening electrical voltage levels.

It indicates work which must be exclusively performed by skilled electricians.

**Note!**

This symbol indicates information and tips concerning the economical and careful operation of the compressor.

Symbols on the compressor

**Note!**

All warning signs on the compressor and in its surrounding must always be kept in a legible condition. Missing or damaged signs must be replaced at once!

The following symbols and warning signs are fitted on the compressor:

**Warning!**

Hot surfaces: Do not touch!

**Warning!**

The unit is operated by remote control, and might start without warning!

**Note!**

Instructions for the operating personnel must be read!

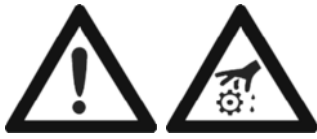
**Prohibited!**

Never open the valve before the air hose (connection to the compressed air network) is connected!

**Warning of hand injuries!**

Any works on the belt drive may only be carried out when the compressor is at standstill and secured against unintentional switching on!

Intended use

**Caution!**

BOGE compressors, including their additional equipment, are exclusively intended for the compression of air in industrial applications. The air taken in must not contain any explosive or chemically instable gases or vapours. Do not exceed the specified final compression temperature.

BOGE compressors are designed for stationary operation. Ensure that they are only installed and operated in dry and clean rooms.

The emergency stop device of the compressor (emergency stop switch/button) is exclusively intended to switch off the compressor in case of emergency.

Operation and control are designed to be executed by trained and authorized operators.

Foreseeable Misuse

**Caution!**

Never direct the produced compressed air towards persons. Danger to life!

Oil is injected into the pressure rooms of the compressor.

Only use the produced compressed air for breathing or let it come in contact with foods, if it was treated beforehand.

This BOGE compressor is not explosion protected.

Do not operate in explosive areas or in a possibly explosive atmosphere!

Do not operate the compressor in rooms in which extreme dust, toxic or flammable vapours and gases may occur.

The emergency stop device of the compressor (emergency stop switch/button) may not be used for operational tripping of the compressor. Make sure to actuate the OFF button for operational tripping of the compressor.

The following is not permitted:

- Compression of other media than those mentioned under intended use or compression of air loaded with contaminants.
- Exceeding the final compression pressure indicated on the type plate.
- Altering the safety devices and safety cladding or placing them out of operation.
- Removing or painting over signs and symbols on the compressor.
- Operation of the compressor by unauthorized or untrained persons.

Intended use of the integrated converter (BLUEKAT series)

In accordance with its intended purpose the BLUEKAT converter is exclusively designed for the treatment of compressed air of screw compressors, with the hydrocarbons contained in the air being catalytically oxidized.

The catalyst operating temperature in the catalyst bed should be approx. 200°C \pm 5% in the flow through mode. In order to avoid prolonged preheating phases and delays in compressed air production, the compressor station should not be unplugged too often.

Only hydrocarbon based oils (synthetic or mineral) may be used as compressor lubricants. All lifetime specifications are based on a max. additive content of 5 %. Silicon based oils may not be used.

**Note!**

Any modifications not authorized by BOGE to the control and the switch cabinet layout of the converter will result in expiration of any warranty claims against BOGE.

**Note!**

Opening and replacement of the converter by any personnel not authorized or trained by BOGE will result in immediate expiration of any warranty claims against BOGE.

Transport damage

BOGE does not accept any liability for breakage or transport damage. Please inspect the compressor immediately after delivery and direct damage claims to the last haulier – even when the packing is not damaged! To safeguard claims against the haulier we recommend leaving the machine, devices and packing material in the same condition as they were in when the damage was detected.

In the event of any other complaints, please inform us within six days after arrival of the delivery.

Data on the type plate

Enter the data of your compressor from the type plate or enclosed data sheet in the illustration below. This will ensure that in the event of enquiries, you will always have the most important data to hand.

This will ensure that in the event of enquiries, you will always have the most important data to hand.

	
Type	_____
Year of construction	_____
Serial number	_____
F.a.d.	_____ m ³ /min
Final compression pressure	_____ bar
Motor speed	_____ min ⁻¹
Motor power	_____ kW
 Otto-Boge-Straße 1-7 · D-33739 Bielefeld · Telefon (05206) 601-0 Postfach 100713 · D-33507 Bielefeld · Fax (05206) 601-200 www.boge.com · info@boge.com	

Fig. 1.1: Data on the type plate

Service

Please do not hesitate to contact BOGE service if you have any questions.
Please call:

Telephone: +49 5206 601-140

In the event of inquiries, always specify the following data of your compressor to prevent any delays:

- Type
- Year of manufacture
- Machine number



Attention!

Only BOGE service technicians or persons authorized by BOGE in writing may repair or alter the compressor during the warranty period. Otherwise all warranty claims will expire!

2.1 Technical data

Technical data S 31-2...S 100-2 / SD 40-2...SD 100-2, part 1

Type		S 31-2	S 40-2 SD 40-2	S 50-2 SD 50-2	S 60-2 SD 60-2	S 61-2 SD 61-2	S 75-2 SD 75-2	S 90-2 SD 90-2	S 100-2 SD 100-2
Dimensions									
– Height (silenced)	[mm]	1450	1450	1450	1450	1450	1450	1450	1450
– Height (silenced) SD	[mm]	1665	1665	1665	1665	1910	1910	1910	1910
– Height (super silenced)	[mm]	1950	1950	1950	1950	1950	1950	1950	1950
– Width (silenced/super silenced)	[mm]	1620	1620	1620	1620	2000	2000	2000	2000
– Depth	[mm]	960	960	960	960	1065	1065	1065	1065
Weight									
– silenced	[kg]	740	740/835	760/870	840/950	1100/1325	1180/1460	1250/1360	1290/1390
– super silenced	[kg]	770	770/865	790/900	870/980	1150/1375	1230/1510	1300/1410	1330/1440
Air cooling	Max. sound pressure level accord. to DIN EN ISO 2151:2009	[dB(A)]							
	– silenced / super silenced	[dB(A)]	73/68	76/71	78/72	78/73	77/71	79/73	80/73
	Reference surface measure – silenced / super silenced	[dB(A)]	15/16	15/16	15/16	15/16	16/17	16/17	16/17
	Sound power level – silenced / super silenced	[dB(A)]	88/84	91/87	93/88	93/89	93/88	95/90	96/90
Water cooling	Max. sound pressure level accord. to DIN EN ISO 2151:2009	[±3 dB(A)]							
	– silenced / super silenced	[dB(A)]	72/67	75/70	77/71	77/72	76/70	78/72	79/72
	Reference surface measure – silenced / super silenced	[dB(A)]	15/16	15/16	15/16	15/16	16/17	16/17	16/17
	Sound power level – silenced / super silenced	[dB(A)]	87/83	90/86	92/87	92/88	92/87	94/89	95/89
Compressor									
max. final compression temperature	[°C]	110	110	110	110	110	110	110	110
Volume flow according to ISO 1217 appendix C at:									
– $p_{\max} = 8$ bar	[m³/min]	3.88	5.17	6.35	7.00	7.70	9.33	10.80	12.10
– $p_{\max} = 10$ bar	[m³/min]	3.30	4.63	5.78	6.34	6.92	8.30	9.65	10.50
– $p_{\max} = 13$ bar	[m³/min]	2.58	3.82	4.95	5.36	5.87	7.11	8.45	9.20
Drive motor									
Rated power	[kW]	22	30	37	45	45	55	65	75
Rated speed									
– 50 Hz	[min⁻¹]	3000	3000	3000	3000	3000	3000	3000	3000
– 60 Hz	[min⁻¹]	3600	3600	3600	3600	3600	3600	3600	3600
Protection type	IP	55/23	55/23	55/23	55/23	55/23	55/23	55/23	55/23
Design	IMB	3	3	3	3	3	3	3	3
ISO class		F	F	F	F	F	F	F	F
Electrical connection									
Mains voltage ^{1) 2)}	[V]	400	400	400	400	400	400	400	400
Frequency ¹⁾	[Hz]	50	50	50	50	50	50	50	50
Min. fuse protection ^{3) 4)}	[A]	50	80	80	100	100	125	160	200
Recommended fuse protection ^{3) 4)}	[A]	63	80	100	125	125	160	160	200

¹⁾ Standard equipment. Mains voltages and frequencies are specified on a plate in the switch cabinet.

²⁾ Required for the refrigeration compressed air dryer 230 V / 50 Hz.

³⁾ Only for 400 V / 50 Hz. The fuse values change in the case of other mains voltages and frequencies.

⁴⁾ Use fuse gL – gG or circuit-breaker with C-characteristic only.

Technical data for S 101...S 341 / SD 101...SD 150, part 1

Type		S 101 SD 101	S 125 SD 125	S 150 SD 150	S 151	S 180	S 220	S 271	S 341
Dimensions									
– Height (silenced)	[mm]	1750	1750	1750	2005	2005	2005	2145	2145
– Height (silenced) SD	[mm]	2153	2153	2153	–	–	–	–	–
– Height (super silenced)	[mm]	2250	2250	2250	2505	2505	2505	2645	2645
– Width (silenced/super silenced)	[mm]	2365	2365	2365	2265/2565	2265/2565	2265/2565	3100	3100
– Depth	[mm]	1335	1335	1335	1585	1585	1585	1910	1910
Weight									
– silenced	[kg]	1960	1980	2040	3100	3200	3200	4500	5000
– super silenced	[kg]	2020	2040	2100	3200	3300	3300	4600	5100
Air cooling	Max. sound pressure level accord. to DIN EN ISO 2151:2009	[±3 dB(A)]							
	– silenced / super silenced	[dB(A)]	76/72	79/74	79/74	83/74	83/74	83/74	84/77
	Reference surface measure								
	– silenced / super silenced	[dB(A)]	17/18	17/18	17/18	18/19	18/19	18/19	18/19
Water cooling	Sound power level								
	– silenced / super silenced	[dB(A)]	93/90	96/92	96/92	101/93	101/93	101/93	105/99
	Max. sound pressure level accord. to DIN EN ISO 2151:2009	[±3 dB(A)]							
	– silenced / super silenced	[dB(A)]	72/70	73/71	73/71	79/71	79/71	79/71	86/79
Compressor	Reference surface measure								
	– silenced / super silenced	[dB(A)]	17/18	17/18	17/18	18/19	18/19	18/19	18/19
	Sound power level								
	– silenced / super silenced	[dB(A)]	89/88	90/89	90/89	97/90	97/90	97/90	104/98
Drive motor									
max. final compression temperature	[°C]	110	110	110	110	110	110	110	110
Volume flow according to ISO 1217 appendix C at:									
– p _{max} = 8 bar	[m³/min]	13.1	15.7	18.4	19.4	23.3	27.9	34.7	40.7
– p _{max} = 10 bar	[m³/min]	11.4	13.7	16.3	17.0	20.8	25.1	30.5	37.1
– p _{max} = 13 bar	[m³/min]	9.8	12.0	14.2	14.4	17.8	21.7	24.7	31.7
Electrical connection									
Mains voltage ¹⁾	[V]	400	400	400	400	400	400	400	400
Frequency ¹⁾	[Hz]	50	50	50	50	50	50	50	50
Min. fuse protection ^{2) 3)}	[A]	200	250	250	250	315	400	500	630
Recommended fuse protection ^{2) 3)}	[A]	200	250	250	250	315	400	500	630

¹⁾ Standard equipment. Mains voltages and frequencies are specified on a plate in the switch cabinet.

²⁾ Only for 400 V / 50 Hz. The fuse values change in the case of other mains voltages and frequencies.

³⁾ Use fuse gL _ gG or circuit-breaker with C-characteristic only.

Technical data for S 31-2...S 100-2 / SD 40-2...SD 100-2, part 2

Type		S 31-2	S 40-2 SD 40-2	S 50-2 SD 50-2	S 60-2 SD 60-2	S 61-2 SD 61-2	S 75-2 SD 75-2	S 90-2 SD 90-2	S 100-2 SD 100-2
Oil filling quantity									
Oil receiver volume	[l]	46	46	46	46	71	71	71	71
Total oil filling quantity	[l]	28	28	28	28	42	42	42	42
Oil topping up quantity between min. + max.	[l]	6	6	6	6	8	8	8	8
Intake air temperature									
– min.	[°C]	+ 5	+ 5	+ 5	+ 5	+ 5	+ 5	+ 5	+ 5
– max.	[°C]	+ 40	+ 40	+ 40	+ 40	+ 40	+ 40	+ 40	+ 40
Air cooling	Cooling air requirement								
	– free-standing installation	[m³/h]	9000	11000	13000	13000	16000	17200	18400
	– with supply and exhaust air duct	[m³/h]	4500	5500	6500	6500	8000	8600	9200
	– free ventilator pressure	[Pa]	60	60	60	60	60	60	60
Water cooling	– free ventilator pressure	[mm WC]	6	6	6	6	6	6	6
	Cooling air requirement								
	– free-standing installation	[m³/h]	2000	2000	2000	2000	2000	2000	2000
	– with supply and exhaust	[m³/h]	1000	1000	1000	1000	1000	1000	1000
	Required cooling water quantity								
	– delta t = 15 K	[m³/h]	1.200	1.630	2.010	2.450	3.000	3.540	4.090
	– delta t = 30 K	[m³/h]	0.600	0.815	1.005	1.225	1.500	1.770	2.045
	Max. cooling water quantity	[m³/h]	3.5	3.5	3.5	3.5	4.2	4.2	4.2
	Cooling water inlet temperature								
	– min.	[°C]	+ 5	+ 5	+ 5	+ 5	+ 5	+ 5	+ 5
	– max.	[°C]	+ 30	+ 30	+ 30	+ 30	+ 30	+ 30	+ 30
	Cooling water outlet temperature								
	– max.	[°C]	+ 45	+ 45	+ 45	+ 45	+ 45	+ 45	+ 45
Operating pressure sensor ¹⁾ (factory settings)	Cooling water pressure								
	– min.	[bar]	2	2	2	2	2	2	2
	– max.	[bar]	10	10	10	10	10	10	10
	– p _{max} = 8 bar: Switch-off press. p _{max}	[bar]	8	8	8	8	8	8	8
	Switch-on press. p _{min}	[bar]	7	7	7	7	7	7	7
	– p _{max} = 10 bar: Switch-off press. p _{max}	[bar]	10	10	10	10	10	10	10
Safety valve	Switch-on press. p _{min}	[bar]	9	9	9	9	9	9	9
	– p _{max} = 13 bar: Switch-off press. p _{max}	[bar]	13	13	13	13	13	13	13
	Switch-on press. p _{min}	[bar]	12	12	12	12	12	12	12
	Activation pressure at:								
	– p _{max} = 8 bar	[bar]	11	11	11	11	11	11	11
	– p _{max} = 10 bar	[bar]	11	11	11	11	11	11	11
	– p _{max} = 13 bar	[bar]	14	14	14	14	14	14	14

¹⁾ Compressors for other operating pressures p_{min} = p_{max} – 1 bar.

Technical data for S 101...S 341 / SD 101...SD 150, part 2

Type		S 101 SD 101	S 125 SD 125	S 150 SD 150	S 151	S 180	S 220	S 271	S 341
Oil filling quantity									
Oil receiver volume	[l]	120	120	120	188	188	188	230	230
Total oil filling quantity	[l]	65	65	65	100	100	100	113	113
Oil topping up quantity between min. + max.	[l]	10	10	10	16	16	16	20	20
Intake air temperature									
– min.	[°C]	+ 5	+ 5	+ 5	+ 5	+ 5	+ 5	+ 5	+ 5
– max.	[°C]	+ 40	+ 40	+ 40	+ 40	+ 40	+ 40	+ 40	+ 40
Air cooling	Cooling air requirement								
	– free-standing installation [m³/h]	20000	32000	32000	32000	48800	48800	56000	66000
	– with supply and exhaust [m³/h]	10000	16000	16000	16000	24400	24400	28000	33000
	– free ventilator pressure [Pa]	60	60	60	60	60	60	60	60
Water cooling	– free ventilator pressure [mm WCColumn]	6	6	6	6	6	6	6	6
	Cooling air requirement								
	– free-standing installation [m³/h]	3400	3400	3400	3400	10000	10000	10000	10000
	– with supply and exhaust [m³/h]	1700	1700	1700	1700	5000	5000	5000	5000
	Required cooling water quantity								
	– delta t = 15 K [m³/h]	4.090	4.900	6.000	6.000	7.190	8.720	10.900	13.600
	– delta t = 30 K [m³/h]	2.045	2.450	3.000	3.000	3.595	4.360	5.450	6.800
	Max. cooling water quantity [m³/h]	9.0	9.0	9.0	9.0	12.0	12.0	13.6	13.6
	Cooling water inlet temperature								
	– min. [°C]	+ 5	+ 5	+ 5	+ 5	+ 5	+ 5	+ 5	+ 5
	– max. [°C]	+ 30	+ 30	+ 30	+ 30	+ 30	+ 30	+ 30	+ 30
	Cooling water outlet temperature								
	– max. [°C]	+ 45	+ 45	+ 45	+ 45	+ 45	+ 45	+ 45	+ 45
	Cooling water pressure								
	– min. [bar]	2	2	2	2	2	2	2	2
	– max. [bar]	10	10	10	10	10	10	10	10
Operating pressure sensor ¹⁾ (factory settings)									
– p _{max} = 8 bar:	Switch-off press. p _{max} [bar]	8	8	8	8	8	8	8	8
	Switch-on press. p _{min} [bar]	7	7	7	7	7	7	7	7
– p _{max} = 10 bar:	Switch-off press. p _{max} [bar]	10	10	10	10	10	10	10	10
	Switch-on press. p _{min} [bar]	9	9	9	9	9	9	9	9
– p _{max} = 13 bar:	Switch-off press. p _{max} [bar]	13	13	13	13	13	13	13	13
	Switch-on press. p _{min} [bar]	12	12	12	12	12	12	12	12
Safety valve									
Activation pressure at:									
– p _{max} = 8 bar	[bar]	11	11	11	11	11	11	11	11
– p _{max} = 10 bar	[bar]	11	11	11	11	11	11	11	11
– p _{max} = 13 bar	[bar]	14	14	14	14	14	14	14	14

¹⁾ Compressors for other operating pressures p_{min} = p_{max} – 1 bar.

Technical data for SF 60-2...SF 150 / SDF 60-2...SDF 150, part 1

Type		SF 60-2 SDF 60-2	SF100-2 SDF 100-2	SF 150 SDF 150
Dimensions				
– Height (silenced)	[mm]	1450	1450	1750
– Height (super silenced)	[mm]	1950	1950	2250
– Width (silenced / super silenced)	[mm]	1620	2000	2365
– Depth	[mm]	960	1065	1335
Weight				
– silenced	[kg]	840	1535	2040
– super silenced	[kg]	870	1585	2100
Air cooling	Max. sound pressure level accord. to DIN EN ISO 2151:2009			
	– silenced / super silenced	78/73	80/73	79/74
	Reference surface measure	15/16	16/17	17/18
	– silenced / super silenced	93/89	96/90	96/92
	Sound power level			
Water cooling	– silenced / super silenced	77/72	79/72	73/71
	Reference surface measure	15/16	16/17	17/18
	– silenced / super silenced	92/88	95/89	90/89
	Sound power level			
	– silenced / super silenced			
Compressor				
max. final compression temperature	[°C]	110	110	110
Volume flow according to ISO 1217 appendix C at:				
– $p_{\max} = 8$ bar	[m ³ /min]	1.75 – 7.00	3.0 – 12.10	4.60 – 18.4
– $p_{\max} = 10$ bar	[m ³ /min]	1.59 – 6.34	2.6 – 10.50	4.08 – 16.3
– $p_{\max} = 13$ bar	[m ³ /min]	1.35 – 5.36	2.3 – 9.20	3.55 – 14.2
Drive motor				
Rated power	[kW]	45	75	110
Nominal speed				
– 60 Hz	[min ⁻¹]	3600	3600	3600
Protection type	IP	55/23	55/23	55/23
Design	IMB	3	3	3
ISO class		F	F	F
Electrical connection				
Mains voltage ^{1) 2)}	[V]	400	400	400
Frequency ¹⁾	[Hz]	50	50	50
Min. fuse protection ^{3) 4)}	[A]	100	200	250
Recommended fuse protection ^{3) 4)}	[A]	125	200	250

¹⁾ Standard equipment. Mains voltages and frequencies are specified on a plate in the switch cabinet.

²⁾ Required for the refrigeration compressed air dryer 230 V / 50 Hz.

³⁾ Only for 400 V / 50 Hz. The fuse values change in the case of other mains voltages and frequencies.

⁴⁾ Use fuse gL – gG or circuit-breaker with C-characteristic only.

Technical data for SF 60-2...SF 150 / SDF 60-2...SDF 150, part 2

Type		SF 60-2 SDF 60-2	SF 100-2 SDF 100-2	SF 150 SDF 150
Oil filling quantity				
Oil receiver volume	[l]	46	71	120
Total oil filling quantity	[l]	28	42	65
Oil topping up quantity between min. + max.	[l]	6	8	10
Intake air temperature				
– min.	[°C]	+ 5	+ 5	+ 5
– max.	[°C]	+ 40	+ 40	+ 40
Air cooling	Cooling air requirement			
	– free-standing installation [m³/h]	13000	18400	32000
	– with supply and exhaust [m³/h]	6500	9200	16000
	– free ventilator pressure [Pa]	60	60	60
Water cooling	– free ventilator pressure [mm WCcolumn]	6	6	6
	Cooling air requirement			
	– free-standing installation [m³/h]	2000	2000	3400
	– with supply and exhaust [m³/h]	1000	1000	1700
	Required cooling water quantity			
	– delta t = 15 K [m³/h]	2.450	4.090	6.000
	– delta t = 30 K [m³/h]	1.225	2.045	3.000
	Max. cooling water quantity [m³/h]	3.5	4.2	9.0
	Cooling water inlet temperature			
	– min. [°C]	+ 5	+ 5	+ 5
	– max. [°C]	+ 30	+ 30	+ 30
	Cooling water outlet temperature			
	– max. [°C]	+ 45	+ 45	+ 45
	Cooling water pressure			
	– min. [bar]	2	2	2
	– max. [bar]	10	10	10
Operating pressure transmitter ¹⁾ (factory settings)				
– p _{max} = 8 bar:	Switch-off press. p _{max} [bar]	8	8	8
	Switch-on press. p _{min} [bar]	7.5	7.5	7.5
– p _{max} = 10 bar:	Switch-off press. p _{max} [bar]	10	10	10
	Switch-on press. p _{min} [bar]	9.5	9.5	9.5
– p _{max} = 13 bar:	Switch-off press. p _{max} [bar]	13	13	13
	Switch-on press. p _{min} [bar]	12.5	12.5	12.5
Safety valve				
Activation pressure at:				
– p _{max} = 8 bar	[bar]	11	11	11
– p _{max} = 10 bar	[bar]	11	11	11
– p _{max} = 13 bar	[bar]	14	14	14

¹⁾ Compressors for other operating pressures p_{min} = p_{max} – 0.5 bar.

Technical data for S 40-2 BLUEKAT...S 50-2 BLUEKAT, part 1

Type		S 40-2 BLUEKAT	S 50-2 BLUEKAT
Dimensions			
– Height (super silenced)	[mm]	1950	1950
– Width (silenced / super silenced)	[mm]	2270	2270
– Depth	[mm]	960	960
Weight		1100	1320
Air cooling	Max. sound pressure level accord. to DIN EN ISO 2151:2009	71	72
	– super silenced		
	Reference surface measure – super silenced	17.4	17.4
	Sound power level – super silenced	88.4	89.4
Water cooling	Max. sound pressure level accord. to DIN EN ISO 2151:2009	70	71
	– super silenced		
	Reference surface measure – super silenced	17.4	17.4
	Sound power level – super silenced	88.4	89.4
Compressor			
max. final compression temperature	[°C]	110	110
Volume flow according to ISO 1217 appendix C at:			
– $p_{\max} = 8$ bar	[m ³ /min]	5.01	6.16
– $p_{\max} = 10$ bar	[m ³ /min]	4.49	5.61
– $p_{\max} = 13$ bar	[m ³ /min]	3.71	4.80
Drive motor			
Rated power	[kW]	30	37
Nominal speed			
– 50 Hz	[min ⁻¹]	3000	3000
– 60 Hz	[min ⁻¹]	3600	3600
Protection type	IP	55	55
Design	IMB	3	3
ISO class		F	F
Electrical connection			
Mains voltage ^{1) 2)}	[V]	400	400
Frequency ¹⁾	[Hz]	50	50
Min. fuse protection ^{3) 4)}	[A]	100	100
Recommended fuse protection ^{3) 4)}	[A]	100	125

¹⁾ Standard equipment. Mains voltages and frequencies are specified on a plate in the switch cabinet.

²⁾ Required for the refrigeration compressed air dryer 230 V / 50 Hz.

³⁾ Only for 400 V / 50 Hz. The fuse values change in the case of other mains voltages and frequencies.

⁴⁾ Use fuse gL – gG or circuit-breaker with C-characteristic only.

Technical data for S 40-2 BLUEKAT...S 50-2 BLUEKAT, part 2

Type		S 40-2 BLUEKAT	S 50-2 BLUEKAT
Oil filling quantity			
Oil receiver volume	[l]	46	46
Total oil filling quantity	[l]	28	28
Oil topping up quantity between min. + max.	[l]	6	6
Intake air temperature			
– min.	[°C]	+ 5	+ 5
– max.	[°C]	+ 40	+ 40
Air cooling	Cooling air requirement		
	– free-standing installation [m³/h]	11000	13000
	– with supply and exhaust [m³/h]	5500	6500
	– free ventilator pressure [Pa]	60	60
	– free ventilator pressure [mm WCcolumn]	6	6
Water cooling	Cooling air requirement		
	– free-standing installation [m³/h]	2000	2000
	– with supply and exhaust [m³/h]	1000	1000
	Required cooling water quantity		
	– delta t = 15 K [m³/h]	1.630	2.010
	– delta t = 30 K [m³/h]	0.815	1.005
	Max. cooling water quantity [m³/h]	4.2	4.2
	Cooling water inlet temperature		
	– min. [°C]	+ 5	+ 5
	– max. [°C]	+ 30	+ 30
	Cooling water outlet temperature		
	– max. [°C]	+ 45	+ 45
	Cooling water pressure		
	– min. [bar]	2	2
	– max. [bar]	10	10
Operating pressure sensor ¹⁾ (factory settings)			
– p _{max} = 8 bar:	Switch-off press. p _{max} [bar]	8	8
	Switch-on press. p _{min} [bar]	7	7
– p _{max} = 10 bar:	Switch-off press. p _{max} [bar]	10	10
	Switch-on press. p _{min} [bar]	9	9
– p _{max} = 13 bar:	Switch-off press. p _{max} [bar]	13	13
	Switch-on press. p _{min} [bar]	12	12
Safety valve			
Activation pressure at:			
– p _{max} = 8 bar	[bar]	11	11
– p _{max} = 10 bar	[bar]	11	11
– p _{max} = 13 bar	[bar]	14	14

¹⁾ Compressors for other operating pressures p_{min} = p_{max} – 1 bar.

2.2 Compressor operation principle

Function principle of the air end

The air end operates according to the displacement principle. In the housing, the main and secondary screws are driven by means of an electric motor and V-belts.

Both screws have screw-shaped profiles, intermeshing without contact. Together with the housing wall, these screws form chambers which gradually reduce in size, seen in air flow direction.

Rotation of the rotors causes the air taken in to be compressed to the final pressure in the chambers.

During compression oil is continuously injected into the air end. This having a cooling, sealing and lubricating function.

Air circuit

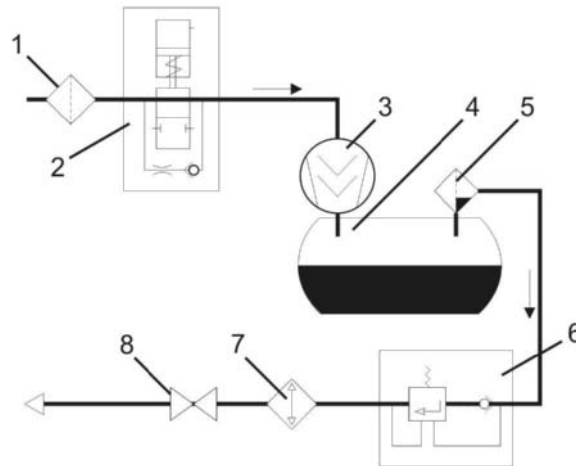


Fig. 2.1: Components of the air circuit

1 Intake filter

The intake filter cleans the air suctioned by the air end.

2 Intake regulator

The intake regulator opens (load operation) or closes (idling operation or standstill) the suction line depending on the operating condition of the compressor.

3 Air end

The air end compresses the sucked in air.

4 Compressed air/oil vessel

The compressed air separates from the oil under the force of gravity in the compressed air/oil vessel.

5 Oil separator

The oil separator separates the residual oil contained in the compressed air.

6 Minimum pressure check valve

The minimum pressure check valve does not open until the system pressure has increased to 3.5 bar. This causes a rapid build-up of the system pressure and ensures lubrication in the starting phase. Once the compressor has been switched off, the check valve prevents the compressed air from flowing back out of the mains line.

7 Compressed air after-cooler (air cooled or water cooled)

The compressed air is cooled in the compressed air after-cooler, causing the water contained in the air to condensate.

8 Stop valve

The screw compressor may be isolated from the mains by means of the stop valve.

Oil circuit

The oil injected into the air end has the following function:

- It dissipates the compression heat (cooling).
- It seals the gaps between the screws and between the screws and housing.
- It lubricates the bearings.

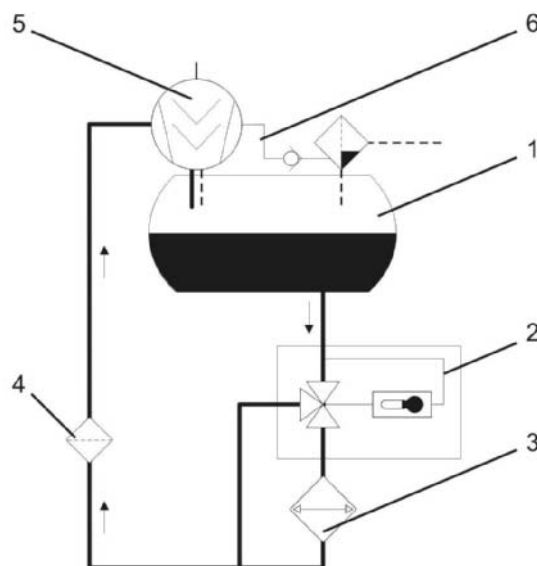


Fig. 2.2: Components of the oil circuit

1 Compressed air/oil vessel

The oil separated from the compressed air through the force of gravity collects in the compressed air/oil vessel. The system pressure forces it out of the vessel into the air end.

2 Thermostatic oil control valve

Depending on the oil temperature, the thermostatic oil control valve either allows the oil to pass through the oil cooler or through a bypass (e.g. in the starting phase).

Thus the oil constantly maintains its optimum operating temperature.

3 Oil cooler (air or water cooled)

The oil cooler cools down the hot oil to operating temperature.

4 Oil filter

The oil filter traps impurities in the oil.

5 Air end

The injected oil returns to the compressed air/oil vessel together with the compressed air.

6 Drainage line

The air end suctions the residual oil which collects in the oil separator back into the oil circuit via a drainage line.

2.3 BLUEKAT operation principle

The screw compressors of the BLUEKAT series (S 40-2 BLUEKAT and S 50-2 BLUEKAT) are equipped with an integrated converter for catalytic separation of oil residues contained in the compressed air. During the oxidation process, the converter serves to break up residual oil particles from the air compressed by the compressor into carbon dioxide and water. The treated compressed air is classified as oil-free (class 0) according to DIN ISO 8573-1.



Fig. 2.3: Overview BLUEKAT: compressor (gray section) with integrated converter

As for the screw compressors of the BLUEKAT series, the converter is installed downstream of the compressor. Prior to the oil separation process the compressed produced by compressor (1) is first heated up in plate heat exchanger (2) (see figure below).

After escaping from the plate heat exchanger the heated compressed air is fed into converter (3) which is filled with catalytic material. The catalytic material is kept at operating temperature (200 °C) by means of an electrically powered heating. At the same time the heating also heats up the incoming compressed air. Due to the heat build-up the oil particles in the compressed air are able to react with the catalytic material. When impacting on the catalyst surface the oil particles (hydrocarbons) are completely burnt (oxidized).

The heated oil free compressed air is fed back to plate heat exchanger (2) after the treatment process. While being in the plate heat exchanger it releases part of its heat energy to the compressed air (still to be treated) flowing from the compressor into the plate heat exchanger which is now able to heat up prior to the oxidation process while the already treated compressed air cools off at the same time. In order to further cool off it is then fed into aftercooler (4). The compressed air escapes at a temperature of 30 – 35°C and can be fed into a compressed air receiver for further use. The condensate which is built up in the compressed air receiver conforms to industrial water quality and may be discharged accordingly.

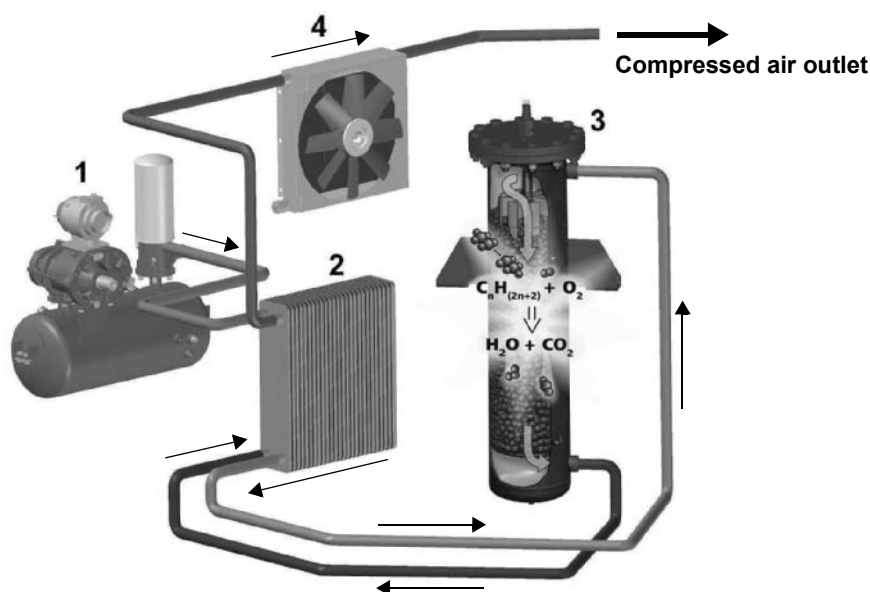


Fig. 2.4: BLUEKAT functional diagram including compressed air flow direction

2.4 Compressor control

Network pressure

For the compressor, the pressure downstream of the check valve is termed network pressure. The control system switches the compressor on and off during operation depending on the network pressure.

Operating states

All screw compressor controls are based on three basic operating states:

1. Load operation

- The compressor delivers its maximum amount of compressed air.
- It consumes its maximum energy.

2. Idling operation

- The compressor runs but does not deliver any compressed air.
- It consumes approx. 75% less energy than in load operation.
- When compressed air is required, it switches to load operation with out delay.
- Idling operation reduces switching frequencies which can damage the drive motor, and reduces wear of the system.

3. Standstill ready for operation

- The compressor is standing still but ready for operation.
- When compressed air is required, it switches automatically to load operation.

Operating modes

The two most important operating modes are achieved by combining the three operating states:

1. Intermittent operation

In intermittent operation the energy balance is perfect.

- The compressor operates in load operation.
- Upon reaching the switch-off pressure p_{\max} the compressor switches to standstill. It does not consume any energy.
- Once the pressure has dropped to the switch-on pressure p_{\min} the compressor switches back to load operation.

2. Continuous operation

Continuous operation limits the drive motor switching cycles and reduces wear to the system.

- The compressor operates in load operation.
- Upon reaching the switch-off pressure p_{\max} the compressor switches to idling operation.
- Once the pressure has dropped to the switch-on pressure p_{\min} the compressor switches from idling operation back to load operation.

Compressed air production control (BLUEKAT series)

As for compressors of the BLUEKAT series (S 40-2 BLUEKAT and S 50-2 BLUEKAT) the compressed air production depends on the operating state of the integrated converter.

After connection of the compressor to the power supply the integrated converter will start the **preheating phase** in order to reach its operating temperature (approx. 200 °C).

As long as the converter has not reached its operating temperature, the control system of the compressor will block compressed air production since the oil separation process in the converter is unable to start as yet meaning that no oil free compressed air would be available. The compressor is in the **"operational availability standby mode"** (see "Operating modes" on page 25.).

As soon as the integrated converter has reached its operating temperature (approx. 200°C), it switches from the preheating phase into the "operation" mode while automatically transmitting this information onto the control system of the compressor. As soon as the switch-on pressure is achieved, the control system allows the compressor to switch to load operation. (see "Operating modes" on page 25.). The compressor will now start to produce compressed air while the converter is ready for treatment of the compressed air.

If the integrated converter exceeds its operating temperature ("overtemperature") the heating of the converter switches off automatically. This information is transmitted to the compressor control system which blocks the compressor's release for compressed air production and puts it back into the **"operational availability standby mode"**.



Note!

Automatic switching of the compressor availability state when reaching the switch-off pressure is effected irrespectively of the operating state of the converter (as with compressors without integrated converter).

The compressor either switches into the **operational availability standby mode** or back into the **idle mode** and stops producing compressed air.

Controlled operation (frequency control)

If the pressure has dropped below the switch-on pressure p_{\min} the compressor starts and operates in load operation.

Once the operation pressure p_{target} has been exceeded the control is activated and reduces the speed.

If the pressure has dropped below the operating pressure p_{target} the control is activated and increases the speed.

Upon reaching the switch-off pressure p_{\max} the compressor switches to idling operation.

The settings for p_{\min} and p_{\max} are effected by the parameterization of the BASIC/ FOCUS.

For the BASIC control the setting for p_{target} is effected at the potentiometer R3 in the compressor switch cabinet.

For the FOCUS control the setting for p_{target} is effected via parameterization of the control.

Short operating times



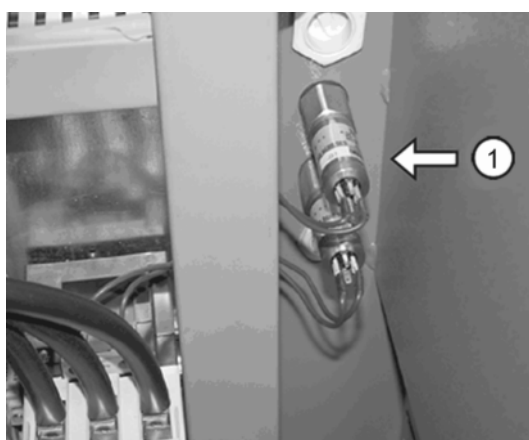
Attention!

During short operating times, the compressor does not reach its operating temperature. It operates below the dew point. The generated condensate mixes with the oil. The lubricating ability of the oil is reduced. This leads to damage to the air end and to the integrated converter (BLUEKAT series). It is of utmost importance to consult BOGE, if you operate your system with short operating times.

2.5 Control devices

Operating pressure transmitter

The operating pressure transmitter (1) controls the operation of the compressor within the set switching limits.



Switch-on pressure p_{\min}

If the network pressure drops to the set switch-on pressure p_{\min} , the compressor switches on.

Switch-off pressure p_{\max}

If the network pressure increases to the switch-off pressure p_{\max} , the compressor either switches off (intermittent operation) or switches to idling operation (continuous operation).

Fig. 2.5: Operating pressure transmitter

**Proportional controller
(option for S series)**

The proportional controller is an additional control device intervening in the sequences of the intake regulator.

The intake regulator only opens as far as necessary to supply the current compressed air requirement. Thus the compressor saves compression energy.

A compressor with proportional controller is able to supply its 'delivered quantity variable between 0% and 100%. However, the energy consumption does not reduce accordingly. Therefore, a control is only practical between 50% and 100% of the delivered quantity.

The proportional controller is factory set to a delivered quantity between 50% and 100% of the compressor capacity.

The proportional controller closes when the desired delivered quantity has dropped below 50% of the compressor capacity. The compressor then operates in idling operation (continuous operation) or switches off (intermittent operation).

2.6 Safety and monitoring devices

General

The safety devices guarantee a high degree of operational safety, in connection with the BOGE monitoring system.

When one of the safety devices responds, the control system reacts as follows:

- The compressor is immediately switched off.
- A flashing fault number in the left field of the display indicates the cause of the fault.

**Caution: Risk of injury!**

Do not operate the compressor without built-in safety devices!

Do not dismantle the safety devices or put them out of operation!

The following monitoring devices are standard for BOGE control systems:

**Safety temperature
limiting device**

The safety temperature limiting device switches the compressor off as soon as the max. permissible final compression temperature has been reached. A dropping below the minimum temperature prevents the compressor from starting.

- Switch off the compressor (OFF button). Fault is acknowledged.
- Rectify the fault.
- Switch on the compressor (ON-button).

Safety temperature limiter on the integrated converter (BLUEKAT series)

The safety temperature limiter on the integrated converter (S 40-2 BLUEKAT and S 50-2 BLUEKAT) serves to switch off the heating when the temperature in the converter runs too high (limit value 250°C). In such a case, the compressor's release for compressed air production is automatically blocked.

The temperature inside the converter starts dropping. Both heating and compressor do not automatically restart operation due to temperature failure. Use converter temperature control to restart. Also see "Converter failures (BLUEKAT series)" on page 53.



Caution!

Restart of compressor station only after consultation with your local BOGE distribution partner or BOGE service personnel. It is imperative to determine the cause of the failure prior to restarting the compressor station.

Additional Monitoring Devices

Additional monitoring devices are located on the switch cabinet of the integrated converter (S 40-2 BLUEKAT and S 50-2 BLUEKAT). These include a temperature control unit with display serving to retrieve temperature information on the converter. In addition, there are three indicator lights on the switch cabinet serving to indicate the operating state of the converter:

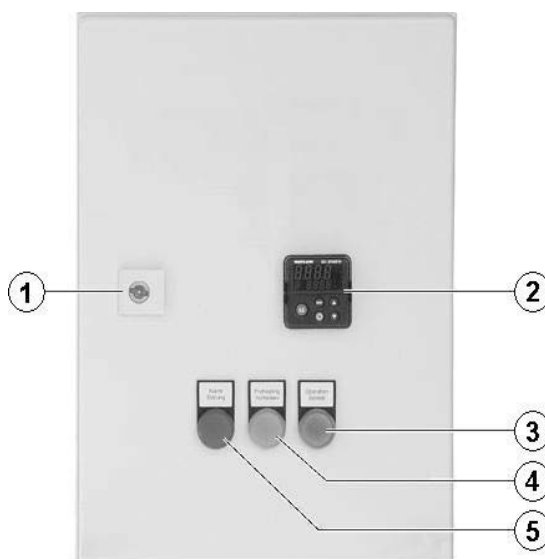


Fig. 2.6: Switch cabinet with monitoring devices

- 1 Switch cabinet lock
- 2 Temperature control
- 3 Indicator lamp „Operation“ (Betrieb), green
- 4 Indicator lamp „Preheating“ (Aufheizen), yellow
- 5 Indicator lamp „Alarm“ (Störung), red

The display of the **temperature control** unit allows you to recall the following temperature information:

- The actual value (top) and the target value (below) of the temperature (in °C) inside the converter are shown in the display as standard.
- Pressing the green button once causes the container bed temperature (in °C) to be displayed.
- Pressing the green button twice causes the current control mode to be displayed.
- Pressing the green button three times causes the heating performance (in %) to be displayed.
- Pressing the green button four times causes the state of the self-optimization to be displayed.
- Pressing the green button five times causes the idle target value (in °C) to be displayed.
- Pressing the green button again enables you to return to the standard display.
- Pressing the reset button enables you to immediately return to the standard display.



Caution!

The settings of the temperature control are completely programmed at the factory.

Any changes to the presettings for the temperature and other parameters may only be carried out by BOGE or, after consultation with BOGE, by BOGE authorized service personnel.

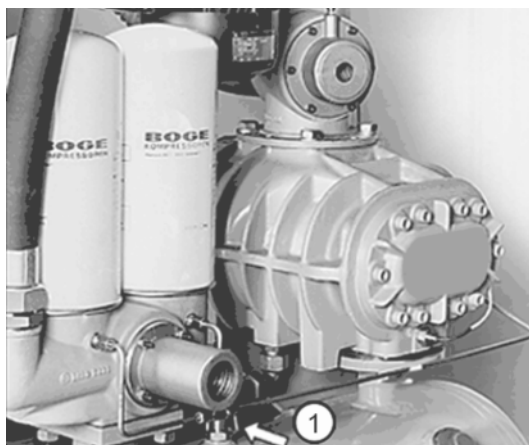
Any unauthorized changes to the parameters may cause damage to the compressor station or result in reduction of the compressed air quality.

Lighting of the indicator lamps serves to indicate:

Indicator lamp	Meaning
Preheating (Aufheizen) (yellow)	The temperature inside the converter is below the temperature which is needed to release compressed air production. The indicator lamp does not indicate whether or not the heating is properly functioning or in the process of heating.
Operation (Betrieb) (green)	As soon as the temperature inside the converter is reached for release of compressed air production, the yellow indicator lamp extinguishes before the green lamp lights up. At the same time, the compressor initializes compressed air production.
Alarm (Störung) (red)	The indicator lamp „Alarm“ (Störung) lights up in case of – over-temperature inside the converter.

Table 2.1: Indicator lamps / Meanings

Safety valve



Safety valve (1) on the compressed air/oil vessel prevents the maximum admissible pressure being exceeded.

Fig. 2.7: Safety valve



Caution: Risk of injury!

When the maximum pressure is exceeded (e.g. incorrect setting of the operating pressure switch), the entire delivery volume of the compressor is ejected!

Monitoring the drive and fan motor

The drive motor is monitored by PTC resistors.

The fan motor is monitored by overcurrent/overload release units.

Rotational direction monitoring (option)

The pressure switch checks the rotational direction of the drive motor each time the system starts up.

System pressure build-up (option)

The system pressure build-up unit monitors the system pressure build-up when the compressor starts up.

2.7 Water cooling

Water cooling

BOGE screw compressors are available in water or air-cooled design.

In the standard version, the oil and compressed air aftercoolers are connected in series on the water side. A parallel connection is possible as an option.

Serial connection

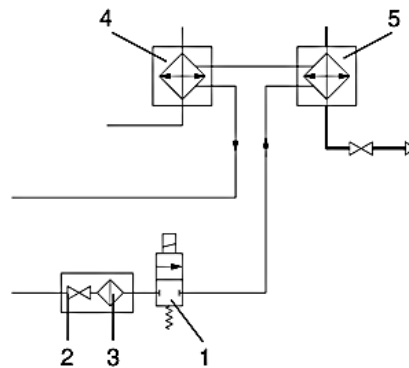


Fig. 2.8: Serial connection

Parallel connection

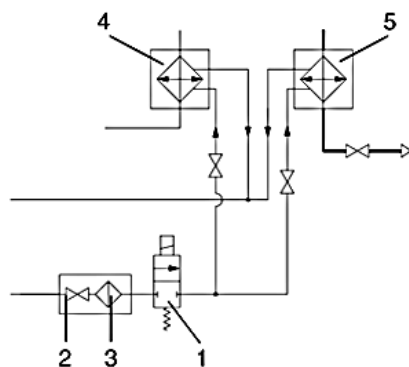


Fig. 2.9: Parallel connection

1 Cooling water solenoid valve

The cooling water solenoid valve closed the cooling water supply when the compressor switches off.

2 Cooling water stop valve

The compressor may be separated from the cooling water supply by means of the stop valve (e.g. for maintenance or repair work).

3 Dirt trap (provided by customer)

The dirt trap protects the cooling unit against sedimenting.
Pore size: max. 0.6 mm

4 Oil cooling unit

5 Compressed air after-cooler

The water cooling units are designed for specific standard cooling water quantities, temperatures and pressures (see "Technical data"). For individually fluctuating values, they are designed according to the specified order data.

2.8 Cooling water

Water connection (for water cooling)

The cooling water must have the following properties:

Electrical conductivity	– > 50 $\mu\text{S}/\text{cm}$ at pH-value 7 – 9
Carbonate hardness (CaCO_3)	– < 16° dH
Cooling water pressure	– max. 10.0 bar
	– min. 2.0 bar
Cooling water inlet temperature	– max. + 5 °C
	– min. + 30 °C

Max. cooling water quantity see "Technical data".

Cooling water quality

The cooling units are fitted with nonferrous heat exchangers, as standard. To avoid damage to these components and to guarantee a long term function, ensure that the substances contained in the cooling water used do not exceed the following values.

Substances	Symbol	max. admissible concentration [mg/l]
Ammonia	HNH_3	2
Chloride < 70°C	Cl	100
Free chlorine	Cl	5
Iron	Fe	2
Free carbon dioxide	CO_2	20
Manganese	Mn	1
Nitrate	NO_3	100
Oxygen	O_2	2
Silicon oxide	SiO_2	8
Sulphate	SO_4	60
Totally diluted substances	TDS	600

Table 2.2: Maximum admissible concentration of the substances



Note!

If the specified limit values are exceeded, use cooling units made of other materials.

Please consult BOGE service.



Attention!

If the cooling water data changes, the cooling units may have to be redesigned. Incorrectly designed cooling units may cause malfunctions and the compressor to switch off!

Please consult BOGE.

3.1 Transport and storage

General

Please observe the generally accepted safety and accident prevention regulations when transporting the compressor. BOGE accepts no liability for damage caused by improper transport!



Attention!

The transport of the compressor may only be carried out by adequately instructed and authorized personnel!

The capacity of the lifting gear (lifting cart or forklift truck) must correspond at least to that of the compressor / the system (see Technical Data)!

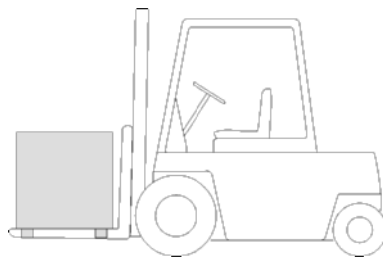
Mind the position of the mass centre prior to lifting the compressor! The position of the mass centre is specified both in the attached dimensioned drawing and on the packing of the compressor.

Any loose or pivoting parts are to be removed prior to lifting the unit.

The compressor is delivered filled with oil. Do not tilt during transport!

Transport possibilities

Forklift truck or lifting cart transport

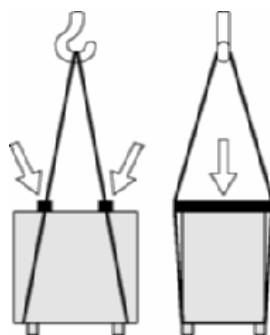


Ensure that the forks are underneath the base frame of the compressor (see illustration).

Fig. 3.1: Transport with forklift truck

Crane transport**Attention!**

Do not subject the safety cladding to force during transport. Protect the compressor using wooden spacers (see arrows in the following illustrations). Remove the transport timbers.



Ensure that the forks are underneath the base frame of the compressor (see illustration).

Fig. 3.2: Crane transport

Intermediate storage

In case the compressor is not installed immediately after delivery, it has to be stored at a sheltered location. It must be ensured that during the intermediate storage neither dust nor humidity can penetrate.

**Note!**

In case of an intermediate storage please observe the specifications and directions as to permissible environmental impacts (see chapter „3.2 Compressor room: Installation conditions and application for compressed air receivers arranged below or separately“).

In case of a careless storage we assume no liability for consequent damages!

In the event of an extended intermediate storage you should consult BOGE-Service.

Please observe the directions for commissioning after an extended standstill (see chapter „3.5 Commissioning“).

3.2 Compressor room

Installation conditions and application for compressed air receivers arranged below or separately

**Caution!**

- Protect compressed air receivers against damage through mechanical effects (e.g. falling objects).
- Operate the compressed air receiver and its equipment from a safe location.
- Adhere to safety areas and safety clearances.
- Ensure that the compressed air receiver stands securely. It must not shift or tilt due to external forces. This also includes the additional weight during a pressure test!
- The compressed air receiver **must not** be bolted to the base.
- Ensure that the compressed air receiver is easily accessible from all sides (for recurring tests). For the necessary operating and maintenance areas have a look at the attached dimensioned drawings.
- Ensure that the factory label is clearly visible.
- Ensure that compressed air receivers are adequately protected against corrosion.
- Only use the compressed air receiver for compressors operating with cut-in and cut-out mode if the pressure fluctuation range amounts to $\Delta p \leq 20\%$ of the maximum operating pressure.

Installation surface

A level industrial floor without foundation is adequate for the installation of the compressor. No special fastening elements are required.

**Attention!**

Make sure that no external vibrations or shock are able to impact on the compressor station (in particular with view to compressors of the BLUEKAT series with integrated converter).

Fire protection

The following applies to rooms in which compressors with oil injection cooling are to be installed:

**Caution!**

- For compressors with motor ratings **exceeding 40 kW** and for compressors of the BLUEKAT series, ensure that the compressor room is equipped with special fire protection.
- Install compressors with motor ratings **exceeding 100 kW** in a separate fire protected room.

Requirements of fire protected compressor rooms:

- Walls, ceilings, floor and doors must be designed in **fire protection class F30** or higher.
- Flammable liquids must never be stored in the compressor room.
- The floor around the compressor must be made of non-flammable material.
- Leaking oil must not spread out over the floor.
- No inflammable materials must be located within a radius of at least 3 metres around the compressor.
- No inflammable machine parts, such as cable ducts, may run overhead of the compressor.

Sound protection

Only install compressors in workrooms if the sound pressure level of their measuring surfaces does not exceed 85 dB (A).

Admissible ambient temperatures

The compressor room must be clean, dry, cool and free of dust.

Admissible ambient temperatures (see also „Technical data“).

Maximum ambient temperature (for air cooling): + 40°C / + 45°C

Maximum ambient temperature (S 40-2 / 50-2 BLUEKAT): + 40°C

Minimum ambient temperature: + 5°C

**Attention!**

Nonobservance of the admissible ambient temperature may lead to the following problems:

- The compressor will switch off when the admissible final compression temperature is exceeded or gone below.
- Pipe lines and valves will freeze up at low temperatures.
- Damage due to reduced lubricating ability of the compressor oil.

Measures to be taken to ensure that admissible ambient temperatures are observed:

- Avoid any pipe lines or units radiating heat in the vicinity of the compressor, or insulate them well.
- Never install the compressor in the cooling air flow of other machines.
- Provide the supply air openings with adjustable louvres to ensure that the minimum temperature is not gone below in winter.
- Use of anti-freeze function (only in mode: Ready for operation)

Frost protection

The compressor must be installed frost-protected. The BOGE anti-freeze device is a standard feature. It protects the safety devices from freezing up at ambient temperatures up to –10°C.

Ventilation

If the following instructions are not observed, the admissible final compression temperature may be exceeded. In this case, the compressor will switch off automatically.



Caution!

Arrange the compressor intake openings or ducts such, that dangerous admixtures (e.g. explosive or chemically unstable materials) cannot be drawn in.

Ventilation openings (free-standing installation)

- Arrange supply air openings close to the floor.
- Arrange exhaust air openings in the ceiling or at the top of the wall.
- The required cross sections for the supply openings (as well as for the flaps and weather protection grids) are indicated in the table.

Supply and exhaust air ducts

- Ensure that the flow rates in the ducts do not exceed 4 m/s.
- Never position cooling air ducts directly on the compressor. Always use a compensator to avoid distortion and the transfer of vibrations.

Ventilators

Ensure that the heated exhaust air is not taken in again. If necessary, the heated air must be extracted by ventilators.

To ensure perfect cooling even at higher temperatures in the summer, the ventilators must be designed as follows:

- The ventilator capacity must be rated approx. 10 – 15% higher than the sum of the cooling air quantity required for all machines operated in the room (VDMA Code of Practice sheet 4363 "Ventilation of compressor rooms").
- For free-standing installation, the cooling air requirement specified in the table corresponds to the required ventilator capacity.

Supply air filter

- Equip the compressor with supply air filter mats if the compressor room is contaminated with dust (option).

Cooling air requirement

Please refer to the following table for the cooling air requirement and size of the supply air openings for your compressor. Ensure that flaps and weather protection grids have the necessary free cross section. We generally recommend contacting a specialist company for performing the duct construction work and planning.

Type	Drive rating [kW]	Air cooling ¹⁾				Water cooling ²⁾	
		Cooling air requirement for free standing unit [m³/h]	Necessary inlet opening for free standing unit [m²]	Cooling air requirement for installation with ducting [m³/h]	Necessary free duct cross section [m²]	Cooling air requirement for free standing unit [m³/h]	Necessary inlet opening for free standing unit [m²]
S 31-2	22	9.000	1,10	4.500	0,35	2.000	0,25
S 40-2...SD 40-2	30	11.000	1,35	5.500	0,42	2.000	0,25
S 50-2...SD 50-2	37	13.000	1,60	6.500	0,48	2.000	0,25
S 60-2...SD 60-2	45	13.000	1,60	6.500	0,48	2.000	0,25
S 61-2...SD 61-2	45	13.000	1,60	6.500	0,48	2.000	0,25
S 75-2...SD 75-2	55	16.000	2,00	8.000	0,59	2.000	0,25
S 90-2...SD 90-2	65	17.200	2,15	8.600	0,64	2.000	0,25
S 100-2...SD 100-2	75	18.400	2,30	9.200	0,68	2.000	0,25
S 101	75	20.000	2,50	10.000	0,74	3.400	0,45
S 125	90	32.000	4,00	16.000	1,18	3.400	0,45
S 150 / S 151	110	32.000	4,00	16.000	1,18	3.400	0,45
S 180	132	48.800	6,10	24.400	1,74	10.000	1,25
S 220	160	48.800	6,10	24.400	2,11	10.000	1,25
S 271	200	56.000	7,00	28.000	2,50	10.000	1,25
S 341	250	64.000	8,30	33.000	2,50	10.000	1,25
SF 60-2...SDF 60-2	45	13.000	1,60	6.500	0,48	2.000	0,25
SF 100-2...SDF 100-2	75	18.400	2,30	9.200	0,68	2.000	0,25
SF 150...SDF 150	110	32.000	4,00	16.000	1,51	3.400	0,45
S 40-2 BLUEKAT	30	11.000	1,35	5.500	0,42	2.000	0,25
S 50-2 BLUEKAT	37	13.000	1,60	6.500	0,48	2.000	0,25

¹⁾ For the cooling air requirements the basis is a 4°C temperature difference between room and outside temperature.

²⁾ Only with S 31-2 – S 341 and SF 60-2 – SF 150

Table 3.1: Cooling air requirement, necessary cross sections for openings and ducts.

Ventilation possibilities

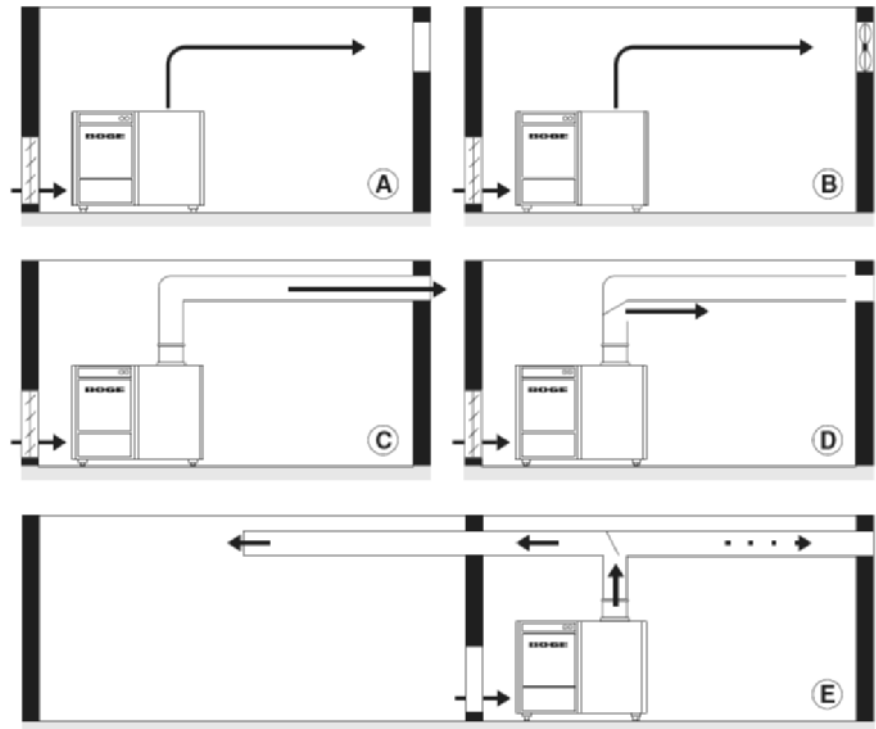


Fig. 3.3: Ventilation possibilities

- A Supply and exhaust air openings in the outside walls (free-standing installation)**
- B Supported by exhaust air ventilator**
- C Exhaust air duct into the open**
- D Exhaust air duct with recirculation flap**
Hot exhaust air is mixed with the cold ambient air, as required. Thus preventing the plant from freezing up at temperatures below freezing.
- E Using the hot exhaust air for heating**
In the winter, the hot exhaust air is used for room heating. In summer it is directed into the open.

Condensate disposal

The air taken in contains water in form of vapour, which turns into condensation during compression.



Attention!

The condensate contains oil. Never lead it into the public sewage system without prior treatment (Exception: The built-up condensate of compressors of the BLUEKAT series does not contain any residual oil. The condensate is to be treated as industrial water).

Strictly observe the effluent disposal laws of your local authorities.

Oil/water separator (not for compressors of the BLUEKAT series)

The **BOGE-oil/water separator** separates the oil from the condensate. The cleaned water may be fed directly into the public sewage system.

The oil is collected in a separate container. Dispose of the oil according to environmental regulations.

If, due to special operating conditions, the oil should emulsify, use an emulsion cracking plant.

3.3 Installation

General

BOGE compressor units are supplied ready for connection. Only the work described in the following paragraphs needs to be carried out during the installation.



Caution!

Any installation work may only be carried out by appropriately trained persons or specialists (BOGE service personnel).

Lay out all energy supply lines in a trip-proof and barrier-free manner so that potential accidents can be avoided!

Prior to delivery, each compressor is subjected to a trial run at the factory. It is carefully tested and set. However, possible transport damage cannot be excluded.

- Please inspect the compressor immediately after delivery and direct damage claims to the last haulier – even when the packing is not damaged! To safeguard claims against the haulier we recommend leaving the machine, devices and packing material in the same condition as they were in when the damage was detected.
- Prior to commissioning, check the compressor for external damage.
- Observe the compressor very closely during commissioning and the following trial run.
- If malfunctions occur, switch off the compressor immediately and inform the BOGE-Service.

Checking the delivery scope

The delivery scope depends on your order.
Prior to commissioning, please check whether all required parts have been provided. Please check the order confirmation for any possible accessory equipment.

The delivery scope includes the following component parts:

- Operating instructions
- Keys
- Electric circuit diagram (in the compartment of the switch cabinet)
- List of electrical equipment (in the compartment of the switch cabinet)
- Spare parts list

Installing the compressor

- Remove the packing material on and in the compressor.
- Install compressor and align horizontally. The compressor must stand firmly on the ground on all feet.

Connecting the compressor to the compressed air network

- Connect the compressor to the compressed air network or a compressed air receiver.
For this, use a BOGE high pressure hose.



Note!

Do not install a check valve in the pressure line.
The compressor is already equipped with a check valve.

Connecting the cooling water (option)



Caution: Risk of injury!

Risk of injury due to pressurized water when connecting the cooling water system!

Close external water mains prior to connection!

The connection may only be carried out by authorized qualified personnel!

The pipework for the cooling water circuit in the compressor is completely installed at the factory.

Only the following work must be performed during installation:

- Check, whether the water supply has the required data and whether the cooling water quality is adequate (see "Cooling water quality").
- Connect the cooling water supply and discharge line to the water supply (cf. dimensioned drawing).

The following component parts must be provided by the customer for cooling water installation:

- **Dirt traps**

The dirt trap at the cooling water inlet protects the cooling units against sediment collecting. Pore width: max. 0.6 mm

– Expansion vessel and safety valve



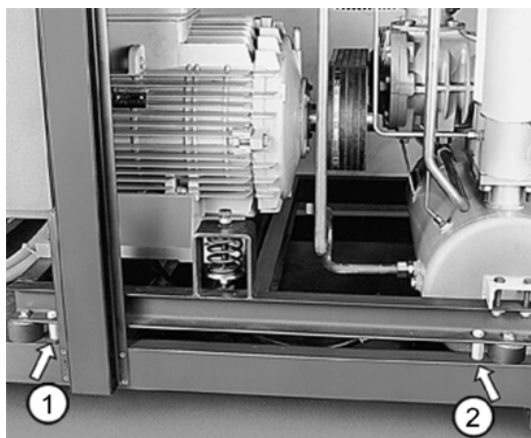
Attention!

If the stop valves in the supply and discharge lines are simultaneously closed in a closed cooling system, an enclosed room will result. If the water heats up in this room, it will expand and the pressure will increase.

Install an **expansion vessel** and a **safety valve** to prevent damage to the cooling units.

Removing the transport securing bolts

The frame of the drive unit is bolted to the basic frame for transport.



Remove the four red marked screws (1) and (2) (two of each on the longitudinal side) together with the space collars.

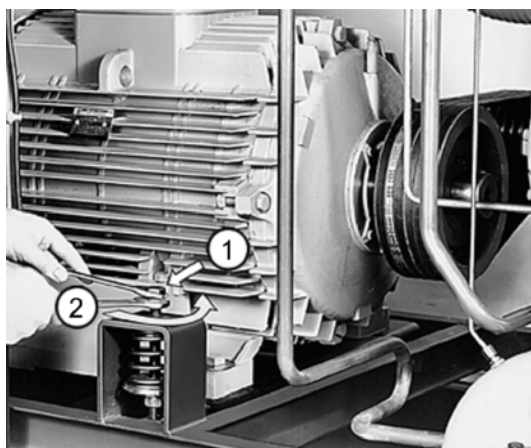
Ensure that the forks are underneath the base frame of the compressor (see illustration).

Fig. 3.4: Removing the transport securing bolts (S 60 air-cooled shown on this illustration)

Activating the belt tensioning device

The V-belts are slackened for transport.

Activate the GM belt tensioning device prior to commissioning by lowering the motor plate.



Secure bolt head (1) against turning by means of a spanner (NW 27).

Turn locknut (2) upwards by turning counterclockwise until it locks against the bolt head.

The belt tensioning device is activated. It automatically sets the correct V-belt tension in every operating mode.

Fig. 3.5: Activating the belt tension.

Checking the oil level

BOGE compressors are supplied with a complete oil filling.
Prior to commissioning/start up, check the oil level as described in chapter "Maintenance".

3.4 Electrical connection**Caution: High voltage!**

Ensure that work on the electrical equipment of the compressor is only carried out by authorized electricians.

When connecting to the power supply, observe the valid VDE, DIN and EVU regulations or the local safety regulations.

Also observe the regulations of your local power supply company regarding the load rating of your power supply.

Power disconnecting device

Each compressor plant has to be equipped with a power disconnecting device according to DIN EN 60204-1:2007.

Rated voltage

The data of your mains (operating voltage, control voltage, type of current, frequency, ...) must coincide with the data on the type plate on the switch cabinet. In the event of deviations, please contact the BOGE service or your supplier. Please see "Technical Data" for layout of mains fuse.

Connecting the leads

- Check to ensure that all terminals in the switch cabinet are firmly tightened. If necessary, retighten the screw connections.
- Guide the lead cable through the PG screw connection.
- Connect the leads L1, L2, L3, N, Pe (PEN) firmly to the power supply terminal. A clockwise rotational field must be created.
- Retighten the electrical connections after the first 50 operating hours.

**Note!**

As for the screw compressors S 40-2 BLUEKAT and S 50-2 BLUEKAT the power supply to the integrated converter is enabled by means of the electrical connection of the compressor.

Drive with frequency converter**Caution: High voltage!**

According to operational conditions electrical drive systems with frequency converter may have an earth leakage current above 10 mA.

Therefore the required precautions according to EN 60204-1:2007 and EN 50178:1998 have to be applied as soon as the compressor is electrically connected.

A permanently installed connection is required.

One or several of the following qualifications for the protective-conductor system have to be fulfilled:

1. The protective conductor must have a minimum cross section of 10 mm² Cu along its total length.
2. If the protective conductor has a minimum cross section of less than 10 mm² Cu hat, a second conductor with at least the same cross section has to be provided up to the point from where the protective conductor has a minimum cross section of more than 10 mm².
3. Automatic interruption of the supply if the continuity of the protective conductor is lost.

Please observe any additional national rules and regulations.

**Caution: Risk of injury!**

Prior to any work on the compressor:

- Press Emergency Stop button, open mains disconnection device and secure against unintentional switch on by means of a padlock.
- Check to ensure that all conducting machine parts are voltage free.
- Depressurize all areas under pressure.
- Allow converter to cool off (only screw compressors S 40-2 BLUEKAT and S 50-2 BLUEKAT).

Never omit a single safety step! Otherwise, you will risk injuries due to restarting, electric shock or self-releasing parts.

**Caution!**

With an activated automatic restart (Auto-Restart) the compressor may restart automatically after a voltage failure.

Prerequisite: The net pressure is lower than the set switch-on pressure.

3.5 Commissioning

**Note!**

We recommend the drawing up of a commissioning certificate in which the test results during the commissioning process can be listed up.

**Caution: Risk of injury!**

The commissioning may only be carried out by experienced and authorized qualified personnel!

Always wear protective gloves when working on the compressor to avoid bruising of fingers or hands while opening or closing components!

Check installation requirements

**Attention!**

Make sure that the compressor is installed according to the installation requirements!

Prior to starting the compressor for the first time, check if the transport securing device was duly removed and the GM the belt tensioning device was activated (see chapter „3.3 Installation“)!

List up the test results in the commissioning certificate.

Checking the rotational direction of drive and fan motor

**Attention!**

Always check the rotational direction of the drive and fan motor prior to commissioning/initial start up.

Even brief operation in the wrong direction of rotation (more than approx. 5 seconds) may cause total destruction of the air end!

List up the test results in the commissioning certificate.

**Caution!**

Ensure that the rotational direction coincides with the rotational direction arrow on the air end.

- Close mains disconnecting device.
- Switch the compressor on and immediately off again to check the rotational direction.

Changing the rotational direction

**Caution: Risk of injury!**

Emergency stop switch/button, open mains disconnection device and secure against unintentional switch on by means of a padlock.

Allow converter to cool off (only screw compressors S 40-2 BLUEKAT and S 50-2 BLUEKAT).

- Interchange two phases (L1, L2 or L3) in the power cable.

Check compressed air outlet for tightness

**Caution: Risk of injury!**

Work on the compressed air system may only be carried out by experienced and authorized qualified personnel!

Always wear protective clothing and goggles!

Immediately after having switched on the machine the connection of the compressed air outlet must be checked for tightness!

Make sure to observe an appropriate safety distance during the inspection!

- Close mains disconnecting device.
- To conduct the inspection switch on the compressor and check the compressed air outlet for tightness.
- Switch off compressor.

**Caution: Risk of injury!**

Emergency stop switch/button, open mains disconnection device and secure against unintentional switch on by means of a padlock.

Allow converter to cool off (only screw compressors S 40-2 BLUEKAT and S 50-2 BLUEKAT).

- If required: have any leakages remedied by experienced expert personnel.

List up the test results in the commissioning certificate.

Opening the stop valve

Open ball valve on the compressor delivery.

For water cooling: Open stop valve at the water supply.

Checking for leaks

**Caution: Risk of injury!**

In case of leakages in the cooling water and/or oil circuit there is a risk of slipping or falling due to cooling water or oil spills!

Have all connections of the oil or water cooling circuit checked for leakages by authorized qualified personnel!

During the inspection slip-resistant safety shoes and protective clothing are obligatory!

Undertake the following to prevent leaks:

- Check screw connection of the lines and retighten, if necessary.
- Check to ensure that the oil filter and oil separator are hand tight seated.

Conduct trial run

- Close mains disconnecting device.
- Use ON button on compressor control to switch on compressor. Compressor starts operating.
- When the factory-set switch-off pressure is reached, the compressor cuts off automatically.
- Check network pressure on control display.
- If necessary, reset operating pressure (pressure target value).
- The compressor is ready for operation.
- For control function see control display.
- Switch off compressor after several hours of trial operation under max. work load.

List up the test results in the commissioning certificate.

For S 40-2 BLUEKAT and S 50-2 BLUEKAT

- Close power disconnecting device.
- Use ON button on compressor control to switch on compressor.
- The integrated converter starts preheating. The yellow indicator lamp „Preheating Aufheizen“ on the switch cabinet of the converter lights up. The compressor remains in the **"operational availability standby mode"**.
- After approx. 15 to 45 minutes (depending on the residual heat inside the converter and the ambient temperature) the converter reaches its operating temperature / release temperature.
- The yellow indicator lamps extinguishes and the green indicator lamp ("operation (Betrieb)") lights up. As soon as the switch-on pressure is achieved, the control system allows the compressor to switch to load operation. The compressor will now start to produce compressed air while the converter is ready for treatment of the compressed air.
- Switch off compressor after several hours of trial operation under max. work load.

List up the test results in the commissioning certificate.

**Note!**

When using the compressor control to switch off the compressor, the heating of the converter remains in operation. This serves to avoid prolonged preheating phases before the next load operation.

Commissioning following extended stoppages

If an extended stoppage is scheduled, you should contact BOGE-Service beforehand.

Following an extended stoppage of more than 2 months, fill a small amount of oil in the suction controller prior to starting the compressor!

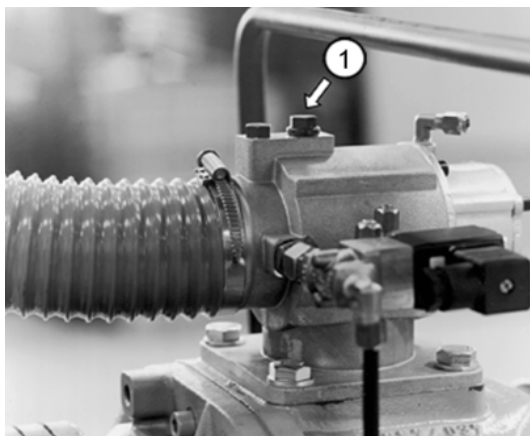
**Attention!**

Only fill the suction controller with the grade of oil used to operate the compressor.

Never mix different oil grades and brands.

**Caution: Risk of injury!**

Press Emergency Stop button, open mains disconnection device and secure against unintentional switch on by means of a padlock.



Unscrew plug from the suction controller (1).

Fig. 3.6: Suction controller

The following compressor oil quantities must be filled into the suction controller:

Model	Compressor oil quantity [l]
S 31-2...S 60-2, SF 60-2 + BLUEKAT models	approx. 0.5
S 61-2...S 100-2, SF 100-2	approx. 2.5
S 101...S 150, SF 150	approx. 5,0
S 151...S 220	approx. 8.0
S 271...S 341	approx. 10.0

Table 3.2: Compressor oil quantities

Screw in plug again.

Turn compressor stage at the pulley by hand 5- to 10 times to spread the oil evenly.

**Note!**

As for screw compressors of the BLUEKAT series please note that, in the event of prolonged operational shutdowns for several days during which the compressor station is disconnected from the power supply, restarting the compressor requires a preheating phase of 15 to 45 minutes since the converter has completely cooled down.

**Refrigeration
compressed air dryer**

Before commissioning the refrigeration compressed air dryer read attached operating instructions.

**Caution: Risk of injury!**

Observe all safety notes specified in the attached operating instructions when working with refrigerants!

3.6 Dismantling

**Note!**

To avoid dangers when dismantling the compressor please consult your BOGE Service:

Telephone: +49 5206 601-140

**Caution!**

Dismantling of the compressor may only be carried out by experienced and authorized qualified personnel!

Make also sure to observe all information in the attached operation instructions as to a safe dismantling of the refrigeration compressed air dryer and a secure disposal of the refrigerant!

**Caution: High voltage!**

All work on the electrical installation may only be carried out by authorized and skilled electricians!

Prior to starting the work the power cable to the switch cabinet must be disconnected from the mains and secured against unintentional switching on!

The converter needs to entirely cool down prior to restarting operation (only screw compressors S 40-2 BLUEKAT and S 50-2 BLUEKAT).

4.1 General

The tables on the following pages give information on the possible causes of operating faults and measures for their rectification (please also refer to operating instructions of the compressor control).



Caution!


Ensure that any work required to rectify faults is only carried out by qualified personnel or specialists.





Ensure that components which have a safety function be only set, repaired or exchanged by BOGE service personnel. This applies in particular to any work carried out on the integrated converter of screw compressors of the BLUEKAT series.

Please contact BOGE-Service at the following telephone number, if you have any questions.




Telephone: +49 5206 601-140

4.2 General faults

Fault	Possible cause	Rectification
No quantity delivered, no pressure build-up, max. pressure 0.5 bar	System components in the compressor are leaking	Check oil and compressed air lines inside the compressor; tighten and/or reseal screw connections, if necessary
	Minimum pressure valve is defective	Close ball valve and check whether pressure builds up; if so, open ball valve again immediately; replace minimum pressure valve
	Electromagnetic venting valve does not close	Check solenoid valve and replace, if necessary
	Suction controller does not open	Suction controller or solenoid valve is defective; check and replace, if necessary
	V-belts are torn	Fit new V-belts
Compressor system does not start up 	No electric power to compressor	Check electrical connection
	Fuses are defective	Check the mains and control fuses, replace if necessary
	Machine has not vented perfectly	Check venting valve and replace, if necessary
	Voltage fluctuations in the electrical mains power	Ensure constant voltage in accordance with IEC 38
	Compressor oil is very viscous due to low ambient temperature	Heat up the compressor system (additional heater available as an option)
	Converter failure	See "Converter failures (BLUEKAT series)" on page 53.

Fault	Possible cause	Rectification
Oil in suction filter 	Minimum pressure non-return valve is leaking	Check the minimum pressure check valve and replace, if necessary
	Suction controller is leaking	Check the suction controller and replace, if necessary
	Cut-out performed by emergency-off switch	Cut-out normally via O -key
Excessive oil consumption 	Drain line is blocked	Dismantle and clean drain line
	Defective oil separator element	Check oil separator and replace, if necessary
	Excessive oil filling	Drain off oil
Safety valve blows 	Operating pressure target value maladjusted	Set operating pressure to maximum permissible pressure of the screw compressor
	Defective safety valve	Replace safety valve
System pressure does not decrease when switching off 	Venting valve does not open	Check venting valve and replace, if necessary
	Check valve is leaking	Examine check valve and replace, if necessary

4.3 Converter failures (BLUEKAT series)

Fault	Possible cause	Rectification
Converter failure – compressor does not start 	Incorrect converter temperature settings	Settings of converter temperature control to be checked by BOGE service personnel and to be reparametrized if necessary
	No temperature build-up inside converter	Heating of converter to be checked by BOGE service personnel and to be repaired / replaced if necessary
	Converter defect	Converter to be checked by BOGE service personnel to be replaced if necessary
Converter failure – compressor unexpectedly discontinues compressed air production and fails to automatically restart 	Temperature inside converter too high ("overtemperature")	Converter / converter temperature control / heating to be checked by BOGE service personnel and to be repaired / replaced if necessary
	Temperature drop inside converter and prolonged undertemperature	Converter / heating to be checked by BOGE service personnel and to be repaired / replaced if necessary
Converter failure – time period until release for compressed air production excessively long 	Temperature build-up inside converter insufficient	Heating of converter to be checked by BOGE service personnel and to be repaired / replaced if necessary

5.1 BOGE-Duotherm BPT

Function

The heat recovery system **BOGE-Duotherm BPT** utilizes the heat energy released during compression to produce warm water free of charge (e.g. for production systems or to supply a heater).

The plate heat exchanger is connected in the main stream of the hot oil. It comprises of stainless steel plates which are soldered together. These form two separate duct systems. Compressor oil and water run through these ducts with opposing flow directions. The hot oil transfers its heat to the colder water via the plates.

Installation

As a rule, the plate heat exchanger is installed into the compressor at the factory and comes equipped with all necessary pipework. Only the following work is required during installation:

- Connect the supply and discharge water lines to the pipeline mains. Route the pipelines to prevent transmission of stresses/tension and vibrations to the heat exchanger.
- Provide venting and draining facilities.

The customer must provide the following components for installation:

- Stop valves
Stop valves in the water supply and discharge lines enable simple removal of the heat exchanger.
- Expansion vessel and safety valve.



Attention!

If the stop valves in the water supply and discharge lines are closed simultaneously, an enclosed space is created. If the water in this space is heated, it expands and the pressure increases.

Therefore, an expansion vessel and safety valve must be installed to avoid damage to the plate heat exchanger.

- Dirt trap (pore size: max. 0.6 mm)
The dirt trap at the water inlet protects the plate heat exchanger against dirt deposits in the event of a high degree of water contamination.
- Flushing connections
The flushing connections serve to clean the plate heat exchanger.

Separate installation

The plate heat exchanger may also be separately installed or retrofitted by the customer.

Normally, the plate heat exchanger is held in place by the pipelines. However, when installing larger types, the customer may have to provide a bracket.

Commissioning

Proceed as follows during commissioning:

- Check oil level in the oil circuit. If necessary, top up oil.
- Slowly open the stop valves in the water supply and discharge line.
Avoid pressure hammers!
- Vent the pipelines.

Maintenance

Lime, oxides as well as grease or oil will deposit in the ducts of the plate heat exchanger during operation.

Regular cleaning will prevent thick deposits clogging individual ducts of the plate heat exchanger.

Cleaning intervals

Excessively soiled and limy water: 6 months

Moderately soiled water, surface water: 1 year

Lightly soiled water: 3 years

Recommended cleaning agents

Grease or oil deposits: Paraffin

Oxide or lime deposits: formic acid, acetic acid or citric acid



Attention!

Always observe the instructions of the cleaning agent manufacturer!

Cleaning methods

Flushing:

- First close all stop valves in the supply lines.
- Close all stop valves in the discharge lines.
- Wait until the plate heat exchanger has cooled down.
- Open the flushing connections and drain the plate heat exchanger.
- Flush the plate heat exchangers.
For this purpose, pump one of the above mentioned cleaning agents through the plate heat exchangers for an extended period of time.
- After flushing, rinse the plate heat exchanger thoroughly with water (e.g. using a high pressure hose).

Enhance the cleaning action by the following measures:

- Use a larger mass flow rate than for standard operation.
- Flush the cleaning agent through the plate heat exchanger in opposite direction to standard operation.

Allow to react (tenacious soiling):

- Dismantle plate heat exchanger.
- Fill plate heat exchanger with one of the above mentioned cleaning agents.
- Allow the cleaning agent to act for at least six hours. Point the connection upward to allow gases to escape.
- After cleaning, rinse the plate heat exchanger thoroughly with water (e.g. using a high pressure hose).



Note!

If the cleaning measures specified above are not sufficient, you should have the exchanger cleaned by a service company. Boge service will recommend contracting firms on request.

5.2 BOGE-Duotherm BSW

Function

The safety heat exchanger BOGE Duotherm Plus BSW is approved for drinking water. It is connected in the main stream of the hot compressor oil. The additional safety feature in comparison to the plate heat exchanger is provided through the following measures:

- **Separation of the circuits**
For this heat exchanger, the oil and water circuits are completely separated by a barrier liquid.
The barrier liquid transmits the heat. In the event of heat exchanger damage it prevents oil and water from mixing. Thus, contamination of the drinking water is excluded.
- **Pressure monitor**
A pressure monitor responds immediately to a pipe rupture within the system, emitting a pulse which can be individually processed (e.g. alarm, switching off the system).

**Note!**

Set the pressure to a value at least 20% lower than the minimum pressure of the media used.

Operating conditions

Minimum water pressure:	0.5 bar
Maximum water pressure:	16 bar
Maximum oil pressure:	16 bar
Maximum pressure of the barrier liquid:	10 bar
Maximum temperature (oil and water):	100 °C

**Note!**

Exceeding the maximum temperature will lead to malfunctions. A fault alarm is triggered.

Commissioning

Proceed as follows during commissioning:

- Check the oil level in the oil circuit.
- Slowly open the valves on the water side.
- Prevent pressure hammers!
- Vent the pipelines.
- Any residual air contained in the heat exchanger will be carried along by the respective medium and escapes via the system.

Maintenance

The safety circuit including pressure monitor and compensation vessel forms an enclosed, maintenance-free system.

**Attention!**

Do not open the system under any circumstances.
Opening the system will put the operation and safety of the heat exchanger at risk!

If barrier liquid escapes due to damage, send the heat exchanger to BOGE for repair.

6.1 Safety instructions

**Caution!**

Ensure that maintenance work is only carried out by specialists or appropriately trained person.

- Prior to starting any maintenance work, always stop the compressor as described in these operating instructions before removing any safety cladding or safety devices. Refit the safety cladding or safety devices immediately upon completion of the maintenance work.
- Heavy components may only be lifted up by various persons in due consideration of the local industrial safety regulations.
- Only use original spare parts, compressor oils and operating materials released by BOGE for the maintenance work.
- With an activated automatic restart (Auto-Restart) the compressor may restart automatically after a voltage failure.
Prerequisite: The net pressure is lower than the set switch-on pressure.

**Caution: Risk of injury!**

Always adhere to the prescribed operating method described below for all maintenance work. Never omit a single safety step!

Otherwise you will risk injury from restarting, electric shock or parts which may fly off.

Prior to all maintenance work:

1. Switch off the compressor using the OFF button.
2. Press Emergency Stop button.
3. Open mains disconnection device and secure against unintentional switch on by means of a padlock.
4. Fix a warning label to the control and fill in the name of the person responsible who is authorized to switch on the machine again.
5. Check to ensure that all machine elements are definitely currentless.
6. Prior to starting work let cool down all hot components of the compressor to 50°C.
7. Allow converter to cool off for several hours (only screw compressors S 40-2 BLUEKAT and S 50-2 BLUEKAT).
8. Separate the compressor from the compressed air network by closing the ball valve at the compressed air outlet.
9. Vent the compressor.
To this effect open the safety valve on the combined compressed air-oil receiver as follows:
 - Turn the knurled nut counterclockwise until you can feel a resilient resistance.
 - Turn the knurled nut a little further.
Any possibly existing air will escape.
The system pressure gauge will indicate a pressure of 0 bar.
 - Once the residual air has completely escaped from the system, firmly retighten the knurled nut.
10. Remove all safety cladding necessary to perform the maintenance work.

Once the maintenance work has been concluded:

11. Reattach all removed safety cladding.
12. Open the ball valve at the compressed air outlet.
13. Prior to switching on again, check whether anyone else is working on the compressor.
14. Remove warning sign not until then and release mains disconnecting device.
15. Unlock Emergency Stop button.

6.2 General

Maintenance through BOGE customer service

Have BOGE service check your compressor every 3,000 operating hours or annually.

**Note!**

Maintenance agreement!

Enter into a maintenance agreement with BOGE.

BOGE service will carry out the proper maintenance on your compressor at regular intervals. This guarantees maximum safety and reliability of your compressed air supply.

Review of regular maintenance work

S 31-2...S 341

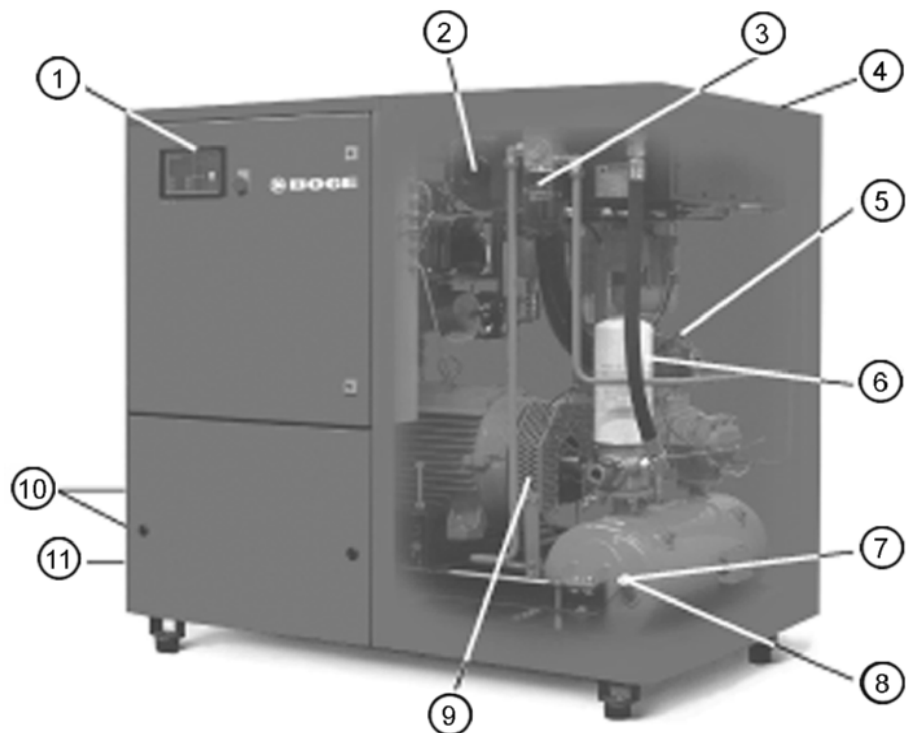


Fig. 6.1: Maintenance works S 31-2...S 341

- 1 Check/adjust pressure
- 2 Check suction filter
 - Clean filter and cartridge
 - Change filter cartridge
- 3 Change oil filter
- 4 Clean compressed air/oil cooler externally
- 5 Top up oil in the suction controller after an extended down time
- 6 Change oil separator

- 7 – Check oil level
- Top up oil
- 8 Change oil
- 9 Check V-belts
- 10 (Lubricate motor bearings)
- 11 Change supply air filter (option)

SD 40-2...SD 150

Fig. 6.2: Additional maintenance works SD 40-2...SD 150

- 1 Replace compressed air filter with differential pressure and filter element (see separate operating instructions)
- 2 Compressed air refrigeration dryer (see separate operating instructions)

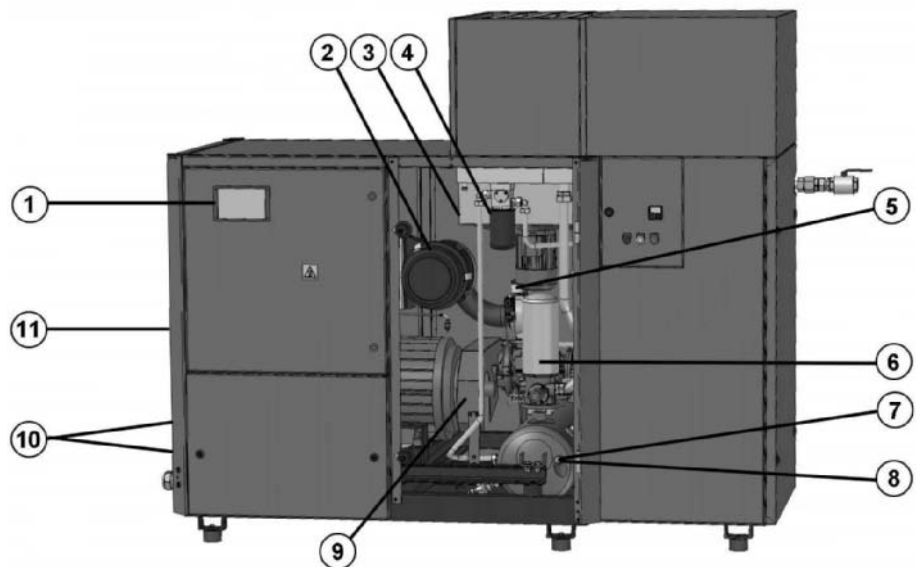
Maintenance work on compressor: S 40-2 / S 50-2 (BLUEKAT)

Fig. 6.3: Maintenance works S 40-2 BLUEKAT / S 50-2 BLUEKAT

- 1 Check / adjust pressure
- 2 Check suction filter
 - Clean filter and cartridge
 - Change filter cartridge
- 3 Clean compressed air/oil cooler externally
- 4 Change oil filter
- 5 Top up oil in the suction controller after an extended down time
- 6 Change oil separator
- 7 – Check oil level
 - Top up oil
- 8 Change oil
- 9 Check V-belt
- 10 (Lubricate motor bearings)
- 11 Change supply air filter (option)

Maintenance work on converter: S 40-2 / S 50-2 (BLUEKAT)**Attention!**

Maintenance and repair work on integrated converter of the S 40-2 BLUEKAT and S 50-2 BLUEKAT series may be carried out by specially trained BOGE service personnel only.

Non-observance may cause physical injuries and damage to the compressor station.

Maintenance intervals

The maintenance intervals specified in the table are based on average operating and ambient conditions.

Extreme conditions may require shorter maintenance intervals.

**Note!**

Note down any maintenance work in the table on the last page. This will facilitate trouble shooting for BOGE service.

**Attention!**

Check monthly if all screw connections on the compressor are fully tightened.

Oil change: Please change oil and replace oil filter and nozzle with dirt catch after the first 500 operating hours (nozzle with dirt catch only through to S 100-2 / SD 100-2, SF 100-2 / SDF 100-2 + BLUEKAT series)!

Maintenance work	Maintenance intervals in operating hours ¹⁾					Page
	weekly, monthly	1,000 annually	1,500 annually	3,000 annually	9,000 every 2 years	
General maintenance work						
Check final compression temperature (target value: 70...100°C)	w					Control
Check compressor for leaks				X		–
Check system relief at system pressure display (target value 0 – 1.5 bar)	w					Control
Check function of emergency stop button	m					Control
Check and if necessary change supply air filter (option)	w					69
Clean oil cooler			X			82
Check if electrical connections are tightened			X			–
Air circuit						
Check and if necessary clean suction filter	m					68
Change suction filter cartridge				X		69
Replace suction controller (wearing parts set)					X	–
Check / adjust operating pressure				X		Control
Replace minimum pressure valve (wearing parts set)				X		–
Replace solenoid valve					X	–
Check safety valve				X		84
Oil circuit						
Check oil level and top up as required ²⁾		X				74
Replace oil regulator (wearing parts set) ²⁾				X		–
Replace nozzle with dirt catch (only through to S 100-2 / SD 100-2, SF 100-2 / SDF 100-2 + BLUEKAT series)				X		–
Change oil separator ²⁾				X		77
Change oil filter ²⁾				X		76
Change oil ²⁾					X	79
Drive						
Check / change V-belt				X	X	72
Lubricate drive motor bearings	for details please see nameplate or enclosed operating instructions for drive motor from 45 kW and up					
Replace grease in motor bearings	Depending on mains frequency: 50 Hz 10.000 operating hours 60 Hz 8.000 operating hours					

¹⁾ If the compressor is not often used, undertake the maintenance according to the specified intervals (weekly/monthly/annually) depending on the number of operating hours.

²⁾ The specified intervals only apply when BOGE compressor oil Syprem 8000 S is used! The service life may differ depending on the ambient temperature. In this case have the oil analyzed by your BOGE service!

Table 6.1: Maintenance intervals

Converter maintenance intervals S 40-2 / S 50-2 (BLUEKAT)

Maintenance interval	Maintenance work
Annually (BOGE service personnel)	Check electric cable connection for tight fit and connection
	Check parameter settings on control
	Visual check of converter for damage or corrosion
	Complete functional check
	Replacement of inserts in VS module and particle filter after inspection and according to manufacturer specifications (if available)
After 20,000 operating hours, or 3 years at the very latest (BOGE service personnel)	Air quality check
After 5 years (BOGE service personnel)	Replacement of electrical component parts (electrical kit)
	Converter replacement

**Note!**

In case of converter replacement you are free to either return the old/used converter to BOGE or to dispose of it as scrap metal.

General information concerning the lubricants used

**Caution: Risk of injury!**

Oil presents a potential danger to health and environment due to their additives.

- Avoid contact with skin and eyes.
Wear protective gloves made of resistant synthetic material.
Wash yourself thoroughly after contact with oils.
- Do not inhale the fumes or mist.
- Protect your environment.
Ensure that no oil is spilt.
- Fire, naked flames and smoking is strictly prohibited when handling oil.

We recommend using only oil according to the following specification:

- Viscosity range of 55 mm²/s at 40°C.
- Minimum viscosity at 100°C of 8 mm²/s.
- Maximum viscosity at 0°C of 1,000 mm²/s.
- Comply to FZG test according to DIN 51 354 with failure load stage 10.
- (Test Method A/8,3/90 10).
- Excellent oxidation stability: Meets requirements of Pneurop oxidation test.
- Antifoam – additives.
- Additives to prevent residue formation.
- Compatibility with all used sealing materials like Neoprene, FPM, PTFE, FKM (Viton) and acrylic and epoxy resin paints.
- Flash point > 230°C.
- Additives for excellent demulsifying properties.
- Additives for corrosion protection of metallic surfaces.
- Excellent oxidation stability: Rotating bomb oxidation Test (ASTM D 2272) higher than 2,400 minutes.
- Meets VDL requirements DIN 51 506 for lube oils (including Pneurop test).
- Or you use BOGE compressor oil **Syprem 8000 S**. The stated maintenance intervals refer to the use of **Syprem 8000 S** only.
- **Syprem 8000 S** can be purchased from BOGE retailers.
- Never mix different oil types and brands. The additives may be incompatible. It may lead to foam formation, premature aging or loss of lubricating ability.

Disposal of used operating material



Attention!

The handling and disposal of mineral oils is subject to legal regulations. It is an offense not to ensure correct and safe disposal of old oil!

Please instruct one of the known service companies to dispose of used operating materials or deliver them to an authorized disposal point.

Observe the following points when disposing of old oil:

- Never mix the oil with other material or liquids.
- Used oil filters and oil separator cartridges require special waste treatment and must be kept separate from normal waste!

Pressure hoses

**Caution!**

Risk of injury and damage to compressor due to obsolete pressure hoses!

Never use pressure hoses beyond the prescribed service life!

Check hoses and connections regularly for leakages! Check the service life of the hoses and replace them in due time!

As replacement only use original spare parts released by BOGE!

Used pressure hoses are not permitted as a replacement!

Spare and wearing parts

**Caution!**

Only use original spare parts, compressor oils and operating materials released by BOGE for repair and maintenance work.

BOGE is not liable for any damage resulting from the use of other spare parts or operating materials.

**Attention!**

If the nozzle with dirt catch is soiled the oil consumption may increase significantly (only through to S 100-2 / SD 100-2, SF 100-2 / SDF 100-2 + BLUEKAT series)!

6.3 Regular maintenance work

Clean or change suction filter

Cleaning:

- 1x monthly, however, at least every 500 operating hours.
- Correspondingly earlier if the air taken in is heavily soiled.

Change:

- In the event of damage.
- After the second cleaning.

Switch off the compressor with the OFF button.

**Caution: Risk of injury!**

Press Emergency Stop button, open mains disconnection device and secure against unintentional switch on by means of a padlock.

Allow converter to cool off (only screw compressors S 40-2 BLUEKAT and S 50-2 BLUEKAT).

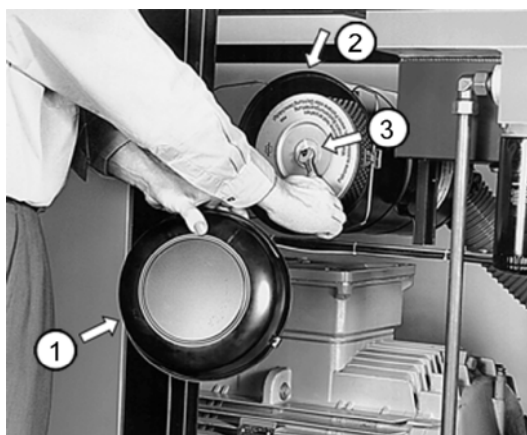


Fig. 6.4: Changing the suction filter

Removing the filter cartridge

- Remove cladding on the maintenance side.
- Remove lid (1) of the filter housing.
- Loosen nut (3) and remove filter cartridge (2).

Cleaning the filter cartridge



Attention!

Do not clean filter cartridges in liquids.

Do not use any hard objects when cleaning to avoid damaging the filter paper.

Refit a new filter cartridge in the event of damage or once it has been cleaned twice.

- Tap on the filter cartridge using the palm of your hand to knock out coarse dust.
- Blow out fine dust **from the inside to the outside** using dry compressed air (maximum pressure 5 bar).
- Clean the sealing surface of the filter cartridge.

Fitting a filter cartridge

- Insert filter cartridge into the filter housing.
- Tighten nut.
- Attach lid of the filter housing.
- Attach cladding on the maintenance side.

Changing the supply air filter mats (option)

Check:

- 1x weekly, however, at least every 500 operating hours.
- Correspondingly earlier if the air taken in is heavily soiled.

Change:

- When a crust of dirt has accumulated on the filter mat.
- When the final compression temperature has exceeded its set point value by 4 to 5°C.
The crust of dirt on the filter mat prevents an adequate cooling air supply.

Switch off the compressor with the OFF button.

**Caution: Risk of injury!**

Press Emergency Stop button, open mains disconnection device and secure against unintentional switch on by means of a padlock.



Pull filter mat (1) out of its holder from above.

Insert new filter mat into the holder.

Fig. 6.5: Changing the supply air filter

Drive motors with permanent lubrication

As a rule, the bearings of the drive motors are provided with a maintenance free permanent lubrication.

Under normal operating conditions (refrigerant temperature max. 40°C, continuous operation) the bearings are maintenance free for the service life.

The service life decreases or increases as thermal stress increases or decreases (due to increased or reduced refrigerant temperature).

**Attention!**

Have BOGE service dismantle the bearings and install new bearings once the specified service life has expired.

Drive motors with lubrication device

Motors with lubricating devices are easily recognised by the two grease nipples on the top of the cover. Additionally stickers on the compressor refer to the lubricating device. Please check which motor is installed in your compressor and service it according to the respective instructions. Lubricate the bearings of the drive motor at the prescribed intervals so as not to sustain damage due to lack of lubricant.

On motors with lubricating devices, regular greasing forms part of the scope of maintenance. The lubrication intervals, quantity and type of grease are given on the type plate or a separate plate. For lubrication, the required quantity is pressed through the nipple into the bearing with a grease gun while the compressor is running.

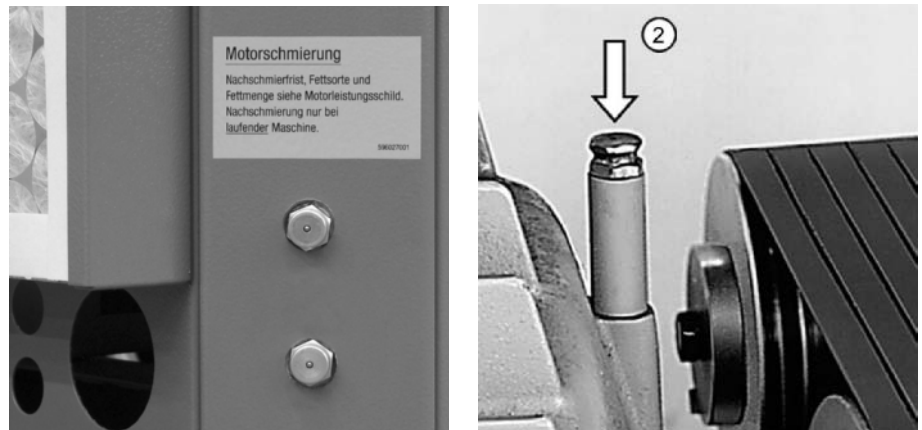


Fig. 6.6: Grease nipples of the lubricating device

Drive motors with automatic lubricating equipment

Read the attached operating instructions carefully before putting the automatic lubrication device into operation.



Caution: Risk of injury!

Always exercise great caution when lubricating the bearings with the compressor running and observe all safety precautions. Never put your hand in the area of the V-belt and the fan wheel. Fitted safety devices and cladding may not be removed.



Attention!

Always use the same type of grease for lubrication. The lubricating ability can be sharply reduced if different types of greases are mixed.

If you intend to use a different type of grease:

- Have the bearings removed and thoroughly cleaned prior to filling with new grease.

Please always observe the specified lubrication intervals and quantities of grease.

Over-greasing and an excess of lubricant can also destroy the bearings.

Changing the V-belt

Check:

- 1x per week for damage.

Change:

- If damage is visible.

Switch off the compressor with the OFF button.

**Caution: Risk of injury!**

Press Emergency Stop button, open mains disconnection device and secure against unintentional switch on by means of a padlock.

Allow converter to cool off (only screw compressors S 40-2 BLUEKAT and S 50-2 BLUEKAT).

Remove cladding on the maintenance side as well as the belt protection

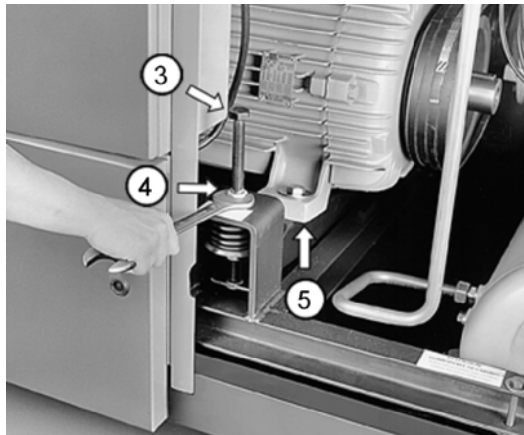


Fig. 6.7: The BOGE GM drive system

Slacken the V-belts:

Secure screw head (3) of the tensioning device with NW 27 spanner to prevent it from turning.

Turn locknut (4) clockwise. Raise the motor in arrow direction (5) until the V-belts are fully slackened.

Changing the V-belts:

- Remove the slackened belts from the belt pulleys.
- Fit new V-belts on the belt pulleys on the motor and compressor.

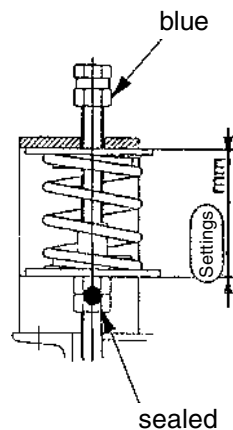
**Attention!**

The new V-belts must be of precisely the same length.
Only change the V-belts as a complete set!

Tensioning the V-belts:

- Lower the motor again. For this purpose, secure screw head (3) against turning, then turn locknut (4) counterclockwise and lock by means of the screw head. The V-belts are automatically correctly tensioned by the BOGE GM drive system.
- Fit belt protection.
- Reattach cladding on the maintenance side.

Settings of the GM-drive systems with standard motors



As to the setting value for the corresponding motor we refer to the table below.

Type	Pressure [bar]	Setting [mm]
S 31-2	8 / 10 / 13	84
S 40-2...S 60-2 SD 40-2...SD 60-2 S 40-2 BLUEKAT, S 50-2 BLUEKAT	8 / 10 / 13	112
S 61-2...S 75-2, S 100-2 SD 61-2...SD 75-2, SD 100-2	8 / 10 / 13 8 / 10 / 13	112 112
S 90-2, SD 90-2 S 90-2, SD 90-2	10 / 13 8	103 112
S 101, S 125, S 150, S 151	8 / 10 / 13	84 / 83 / 63
S 180	8 / 10 / 13	92 / 88 / 98
S 220	8 / 10 / 13	76 / 92 / 82
S 271	8 / 10 / 13	102 / 96 / 122
S 341	8 / 10 / 13	90 / 81 / 116
SF 60-2 SDF 60-2	8 / 10 / 13	112
SF 100-2 / SDF 100-2 SF 150 / SDF 150	8 / 10 / 13	112

Table 6.2: Settings with standard motors

The settings shown in the table are fixed by the manufacturer and may not be changed. Slight deviations are allowed and compensated by the GM drive system.

The current settings are also shown on the GM drive system. With special versions the settings on the sticker may deviate from the standard values.

**Checking the oil level,
topping up oil****Check:**

- Prior to commissioning/start-up of the compressor.
- Then every 1,000 operating hours, however at least once a year.

Topping up:

- When the oil level has dropped below the "min" mark (see sketch).

**Attention!**

Always use the same oil type when topping up. Never mix different oil types and brands.

- Switch off the compressor using the OFF button.

**Caution: Risk of injury!**

Press Emergency Stop button, open mains disconnection device and secure against unintentional switch on by means of a padlock.

- Allow converter to cool off (only screw compressors S 40-2 BLUEKAT and S 50-2 BLUEKAT).
- Close ball valve at the compressed air outlet.
- Open safety sound insulation hood.
- Vent the compressor (as described in the beginning of the chapter). The system pressure gauge must indicate a pressure of 0 bar.
- Wait approx. 3 minutes to permit the oil to settle.
- Remove cladding on the maintenance side.

Series S 31-2...S 220 / SF 60...SDF 150 / BLUEKAT series**Caution: Risk of injury!**

Danger of burning due to hot oil!

Always wear your compulsory personal protective equipment when working on the compressor!

- Open safety sound insulation hood.
- Remove plug (2) of oil filling socket (1) (see figure below).
- Check oil level.
- The oil level must not drop below the "min." mark.
- If necessary, top up with oil to the lower edge of the thread ("max." mark) on the oil filling socket.
- Screw plug (2) back in.
- Close safety sound insulation hood.
- Reattach cladding on the maintenance side.
- Open ball valve at the compressed air outlet.

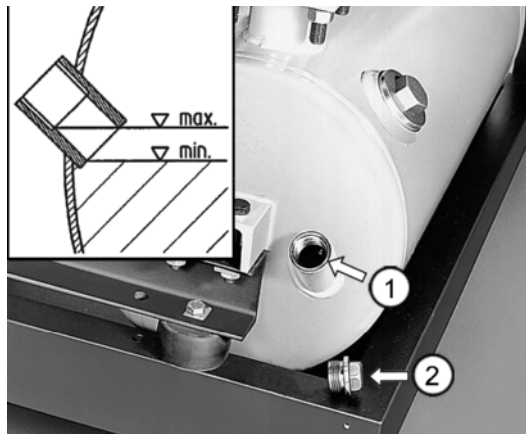


Fig. 6.8: Checking the oil level, topping up with oil

Series S 271 and S 341



Caution: Risk of injury!

Danger of burning due to hot oil!

Always wear protective gloves when working on the compressor!

- Open safety sound insulation hood.
- Remove plug (1) with sealing washer (4) from plug (2) (see figure below).
- You will find the dip stick (3) in the document pocket of the key ring (when delivered).
- Insert dip stick (3) and measure the oil level. The oil level must neither drop below the "min." mark nor rise above the "max." mark.
- Unscrew plug (2) with sealing washer (5) if necessary and top up with oil.
- Screw plug (2) with sealing washer (5) and plug (1) with sealing washer (4) back in.
- Close safety sound insulation hood.
- Reattach cladding on the maintenance side.
- Open ball valve at the compressed air outlet.

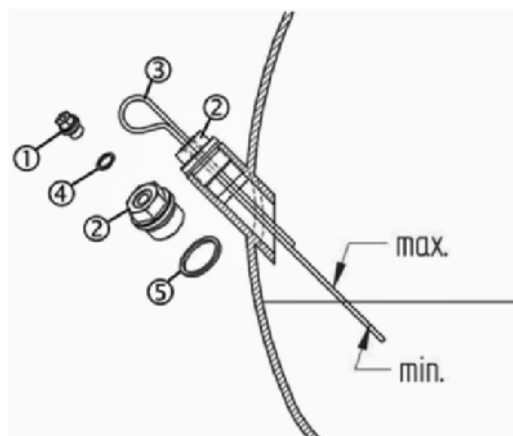


Fig. 6.9: Checking the oil level, topping up with oil

Changing the oil filter**Change:**

- After 3,000 operating hours, but no less than once a year.
- With each oil change!

Switch off the compressor using the OFF button.

**Caution: Risk of injury!**

Press Emergency Stop button, open mains disconnection device and secure against unintentional switch on by means of a padlock.

- Allow converter to cool off (only screw compressors S 40-2 BLUEKAT and S 50-2 BLUEKAT).
- Close ball valve at the compressed air outlet.
- Open safety sound insulation hood and take off safety warm air hood.
- Vent the compressor (as described in the beginning of the chapter).
- The system pressure gauge must indicate a pressure of 0 bar.
- Wait approx. 3 minutes to permit the oil to settle.
- Remove cladding on the maintenance side.

**Caution: Risk of injury!**

Danger of burning due to hot oil!

Always wear protective gloves when working on the compressor!

Unscrew soiled oil filter (3) by hand or use a strap wrench, turning counter-clockwise.

Catch the draining oil and dispose of properly according to environmental regulations.

Fill the new oil filter (3) with compressor oil.

Lightly oil the sealing ring of the new oil filter.

Screw in new oil filter by hand, turning clockwise.

Close safety sound insulation hood.

**Attention!**

Do not use tools to screw in the new oil filter!

You might damage the oil filter or its sealing ring.

A hand tight seating of the oil filter is sufficient.

Reattach cladding on the maintenance side and close safety sound insulation hood.

- Open ball valve at the compressed air outlet.
- Switch on the compressor and heat up to operating temperature.
- Subsequently, check the oil filter for leaks once again and tighten by hand, if necessary (procedure as described above).

**Caution: Risk of injury!**

Press Emergency Stop button, open mains disconnection device and secure against unintentional switch on by means of a padlock.

- Allow converter to cool off (only screw compressors S 40-2 BLUEKAT and S 50-2 BLUEKAT).
- Check the oil filter for leaks and tighten by hand, if necessary.
- Check oil level. Top up oil losses, if any.

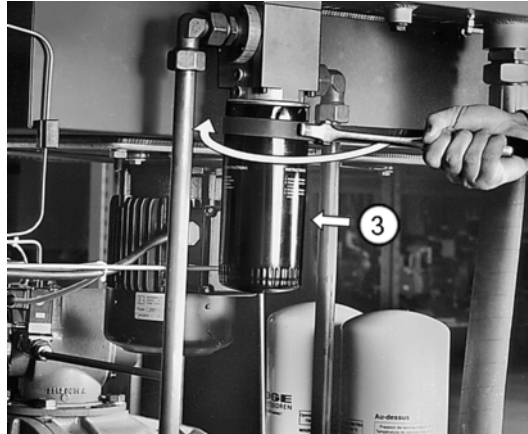


Fig. 6.10: Changing the oil filter

Changing the oil separator**Change:**

- When the difference between network and system pressure exceeds 0.8 bar.
- When warning message "8" appears on the control system display (if option is installed).
- After 3,000 operating hours, however, not later than after one year.

**Caution: Risk of injury!**

If the prescribed maintenance intervals are not observed, the oil separators might become blocked. In this case, the differential pressure will increase until the safety valve blows.

Switch off the compressor using the OFF button.

**Caution: Risk of injury!**

Press Emergency Stop button, open mains disconnection device and secure against unintentional switch on by means of a padlock.

- Allow converter to cool off (only screw compressors S 40-2 BLUEKAT and S 50-2 BLUEKAT).
- Close ball valve at the compressed air outlet.
- Open safety sound insulation hood.
- Vent the compressor (as described in the beginning of the chapter).
- The system pressure gauge must indicate a pressure of **0 bar**.
- Wait for approx. 3 minutes to permit the oil to settle.

**Caution: Risk of injury!**

Danger of burning due to hot oil!

Always wear protective gloves when working on the compressor!

- Remove cladding on the maintenance side.
- Unscrew soiled oil separators (4) by hand or use a strap wrench, turning counterclockwise.
- Catch the draining oil and dispose of properly according to environmental regulations.
- Lightly oil the sealing rings of the new oil separator.
- Screw in new oil separators by hand, turning clockwise.

**Attention!**

Do not use tools to screw in the new oil separators!

You might damage the oil separators or their sealing rings.

A hand tight seating of the oil separators is sufficient.

- Close safety sound insulation hood.
- Reattach cladding on the maintenance side.
- Open ball valve at the compressed air outlet.
- Switch on the compressor and heat up to operating temperature.
- Check the oil separator for leaks once again (procedure as described above).

**Caution: Risk of injury!**

Press Emergency Stop button, open mains disconnection device and secure against unintentional switch on by means of a padlock.

- Allow converter to cool off (only screw compressors S 40-2 BLUEKAT and S 50-2 BLUEKAT).
- Check the oil separators for leaks and tighten by hand, if necessary.

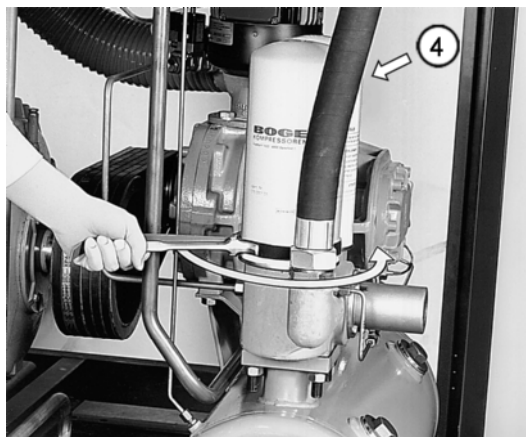


Fig. 6.11: Changing the oil separator

Oil change

Change:

- After 9,000 operating hours, however, at the latest after two years.
- For other types of oil the appropriate oil change intervals must be complied with.



Note!

The service life of the oil, the oil filter and oil separators is reduced under the following conditions:

- When the compressor is operated at extreme ambient temperatures.
- When the intake air is extremely soiled.

Building up a pressure cushion

The combined compressed air / oil receiver is located at the lowest point of the system. Therefore, a light pressure cushion (approx. 1.5 bar system pressure) must be applied to drain the oil. This pressure cushion forces the oil through the drain hose into a suitable collecting vessel.

- Switch off the compressor using the OFF button.



Attention!

Never use any tools to screw on the cap nut!

They might damage the solenoid valve.

Place oil drain hose into a suitable container (6) as described and take cap nut (5) out of the switch cabinet.

Press OFF button at the machine during output phase and then shut down the machine using the emergency stop button after 3 seconds or if a residual pressure of 2 bar is reached.

Screw cap nut on the bleed aperture of the solenoid valve.

Draining old oil



Caution: Risk of injury!

Danger of burning due to hot oil!

Always wear protective gloves when working on the compressor!

- Place the oil drain hose into a suitable container (6).
- Slowly open the stop valve.
The pressure cushion forces the oil into the container.
- Once the compressed air/oil receiver has been completely drained, close the stop valve.
- Remove the cap nut from the solenoid valve.
- Remove oil filler screw (7) on the compressed air/oil cooler and drain the residual oil (max. 5 litres) into a suitable container.
- Reinsert the oil filler screw together with a new copper sealing ring.
- Change oil filter (procedure as described above).
- Change oil separators (procedure as described above).

Filling with new oil:

- Fill up to the edge of the thread of the filling socket (max.) (procedure as described above).

**Attention!**

After each oil change you have to fill a small quantity of oil into the suction controller before starting the compressor.

For oil quantity and procedure see chapter „3.5 Commissioning: Commissioning following extended stoppages“.

**Attention!**

Always fill with the same oil type as previously used. Never mix different oil types and brands.

The oil circuit must be flushed prior to changing the oil type.

- Close safety sound insulation hood.
- Open ball valve at the compressed air outlet.
- Reattach cladding on the maintenance side.
- Conduct trial run.

**Caution: Risk of injury!**

Press Emergency Stop button, open mains disconnection device and secure against unintentional switch on by means of a padlock.

- Allow converter to cool off (only screw compressors S 40-2 BLUEKAT and S 50-2 BLUEKAT).
- Check the oil filters and oil separators for leaks and tighten by hand, if necessary (procedure as described above).
- Check oil level (procedure as described above).
Top up oil losses, if any.

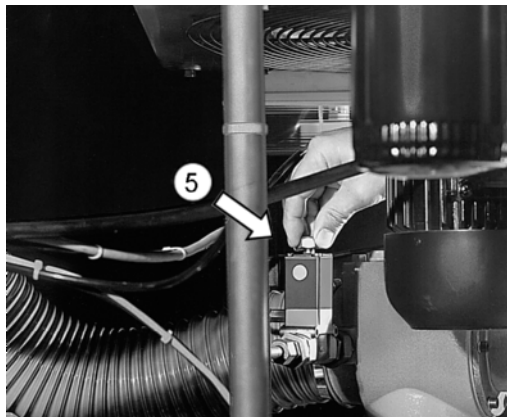


Fig. 6.12: Solenoid valve on the suction controller with the cap nut screwed on



Fig. 6.13: Drain off old oil from oil/compressed air receiver

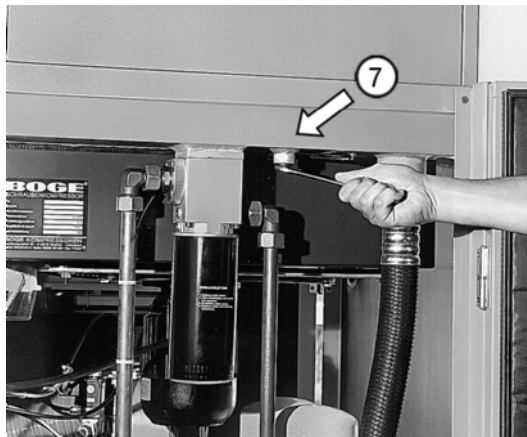


Fig. 6.14: Drain off residual oil from compressed air/oil cooler

Flushing the oil circuit

Flushing the oil circuit with clean oil becomes necessary:

- When the oil is excessively soiled.
- Prior to changing the oil type.



Attention!

Detailed information as to the flushing with BOGE oils you can obtain from the following service number:

Telephone: +49 5206 601-140

Cleaning the compressed air/oil cooling unit (air cooling)

Cleaning:

- After 1,500 operating hours, however, not later than after one year.



Note!

The service life of the compressed air/oil cooling unit depends on the degree of soiling (dust, oil vapour) of the suctioned cooling air. Extreme external soiling of the cooling unit leads to an increased temperature in the oil circuit.

- Switch off the compressor using the OFF button.



Caution: Risk of injury!

Press Emergency Stop button, open mains disconnection device and secure against unintentional switch on by means of a padlock.

- Allow converter to cool off (only screw compressors S 40-2 BLUEKAT and S 50-2 BLUEKAT).
- Remove the cladding from the service side.
- Unscrew the maintenance flap on the air guidance box.
- Remove accumulated soiling with a fibre brush.



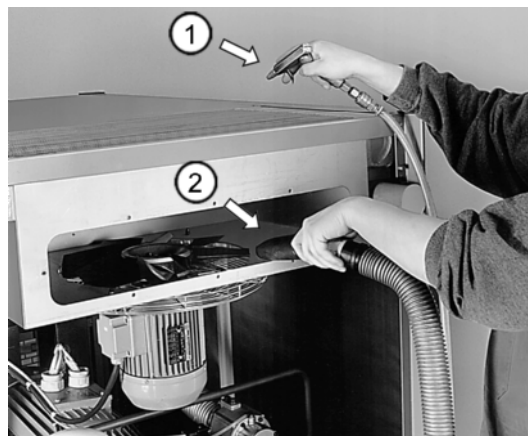
Attention!

Do not use any sharp objects for cleaning!

These could damage the cooling unit.

- Blow down the dirt with compressed air (1) in the opposite direction to the normal cooling air flow. Vacuum out the dirt using an industrial vacuum cleaner (2) (see Fig.).

If the cooling unit is excessively soiled (cleaning is no longer possible with compressed air), have it disassembled and cleaned by BOGE service.



No cleaning necessary in case of water cooling.

Fig. 6.15: Cleaning the compressed air/oil cooling unit

As for compressors of the BLUEKAT series, the maintenance flap of the air circulation box is located at the arrow marked in the following illustration:

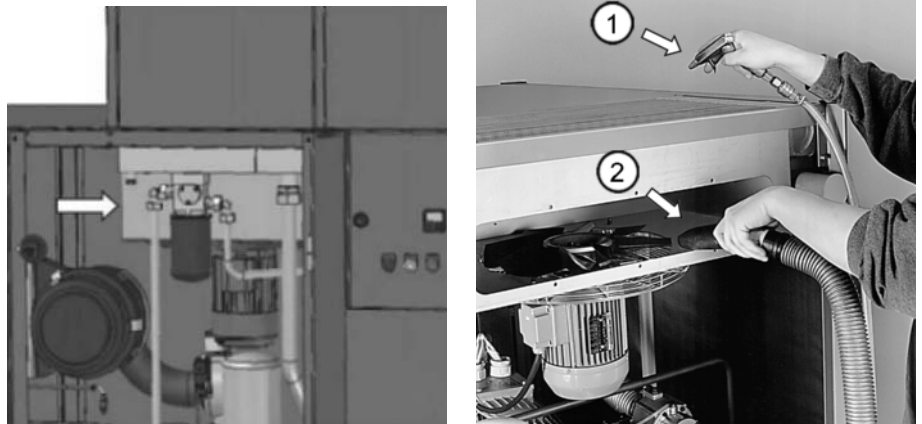


Fig. 6.16: Cleaning the compressed air/oil cooling unit: S 40-2 / S 50-2 (BLUEKAT)

Cleaning the oil cooling unit (water cooling)

Cleaning:

- After 1,500 operating hours, however, not later than after one year.
- In the event of excessive lime deposits and dirt.



Note!

The service life of the cooling unit depends on the degree of soiling and lime deposits in the cooling water. In the event of excessive soiling, check the cooling unit correspondingly earlier.

Carry out the cleaning as described for plate heat exchangers.

Proportional controller (option for S series)

Check:

- After approx. 3,000 operating hours, however, at least once a year.

1. Setting the operating pressure sensor

Switch-on pressure: p_{\min} = Final compression pressure – 1 bar.

Switch-off pressure: p_{\max} = Final compression pressure.

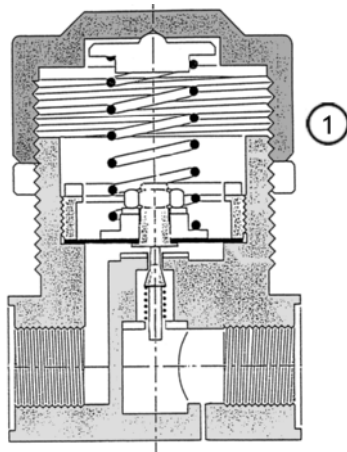


Fig. 6.17: Setting the proportional controller

2. Setting the proportional controller

Displace the control range of the proportional controller by turning cap (1).

- Increase pressure level: Turn cap clockwise.
- Reduce pressure level: Turn cap counterclockwise.



Note!

Always set the proportional controller higher than the bottom operating pressure value (p_{min})!

3. Pressure switch for infinitely variable capacity control

The low pressure switch for the infinitely variable capacity control limits the reduction of the delivered quantity and switches the compressor in the event of less than 50 % delivered quantity into idling operation or off.

Check safety valve

Check:

- After approx. 3,000 operating hours, however at least once a year.

Check safety valve by opening the screw plug (1).



Caution: Risk of injury!

Danger of scalding due to hot oil!

Always wear protective gloves when working on the compressor!

Take extreme care when checking the safety valve with the compressor running taking all safety measures into consideration.

A hot air-oil mixture escapes when opening!

- Open the threaded plug (1) counterclockwise. The compressed air escapes.
- Tighten the threaded plug by turning clockwise.



Fig. 6.18: Check safety valve

6.4 Spare parts and optional equipment

List of spare and wearing parts (for maintenance)

Designation
Filter mat for supply air filter (option)
BOGE Syprem 8000 S special lubricant for screw compressors
Set of V-belts
Lubrication for drive motor bearings
Maintenance package: oil filter, oil separator, suction filter cartridge, gaskets, nozzle with dirt catch (nozzle with dirt catch only through to S 100-2 / SD 100-2, SF 100-2 / SDF 100-2 + BLUEKAT series)
Wearing part kit: oil regulator, intake regulator, minimum pressure valve
Solenoid valve

Replacement parts for converter (BLUEKAT series)

**Note!**

Replacement parts management is being permanently updated by BOGE. If you need any replacement parts for the converter of the BLUEKAT series, please contact your local BOGE field representative and/or BOGE contract partner.

Or contact your BOGE replacement parts service:

Telephone: +49 5206 601-120

List of available optional equipment

Designation

Optional equipment for compressed air treatment

Oil/water separator

Frost protection device

Automatic condensate draining unit Bekomat

BOGE-DUOTHERM BPT
Plate heat exchanger

BOGE-DUOTHERM-PLUS BSW
Safety heat exchanger

**Attention!**

When ordering, please specify the data on the type plate:

- Type
- Year of manufacture
- Machine number

7.1 Guidelines and standards complied with

The compressor conforms to the following guidelines and standards:

Guidelines and directives

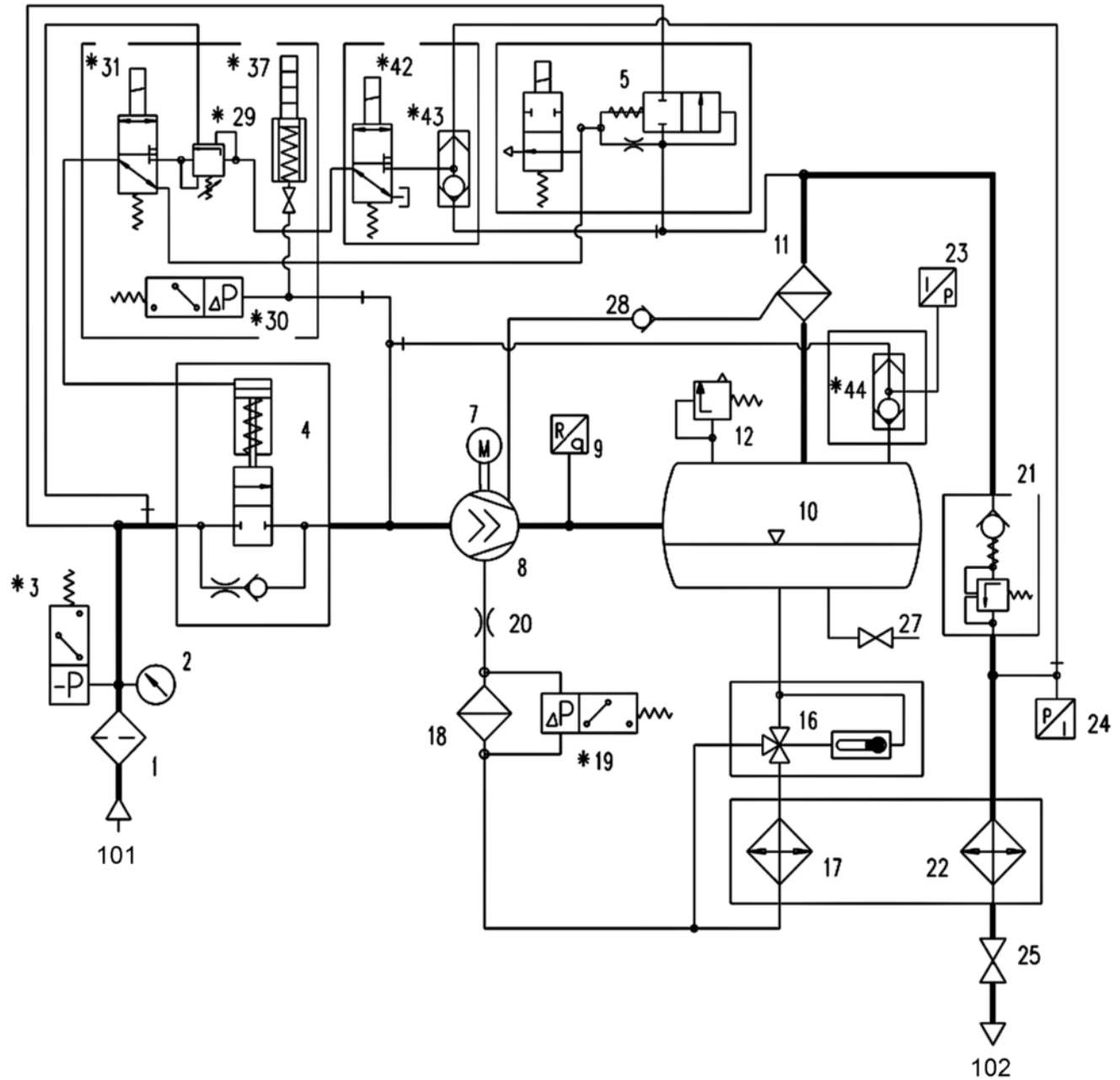
- Machinery Directive 2006/42/EC
- Pressure Equipment Directive 97/23/EC
- EMC Directive 2004/108/EC
- Low Voltage Directive 2006/95/EC
- Simple Pressure Vessels Directive 2009/105/EC

Applied harmonized standards

- DIN EN 1012-1:2011
- DIN EN ISO 12100:2011
- DIN EN 60204-1 / VDE 0113-1:2007
- DIN EN 61000-6-2 / VDE 0839-6-2:2006
- DIN EN 61000-6-4 / VDE 0839-6-4:2007

7.2 Flow chart

On the following pages you will find the individual flow charts for the different machine types and components.

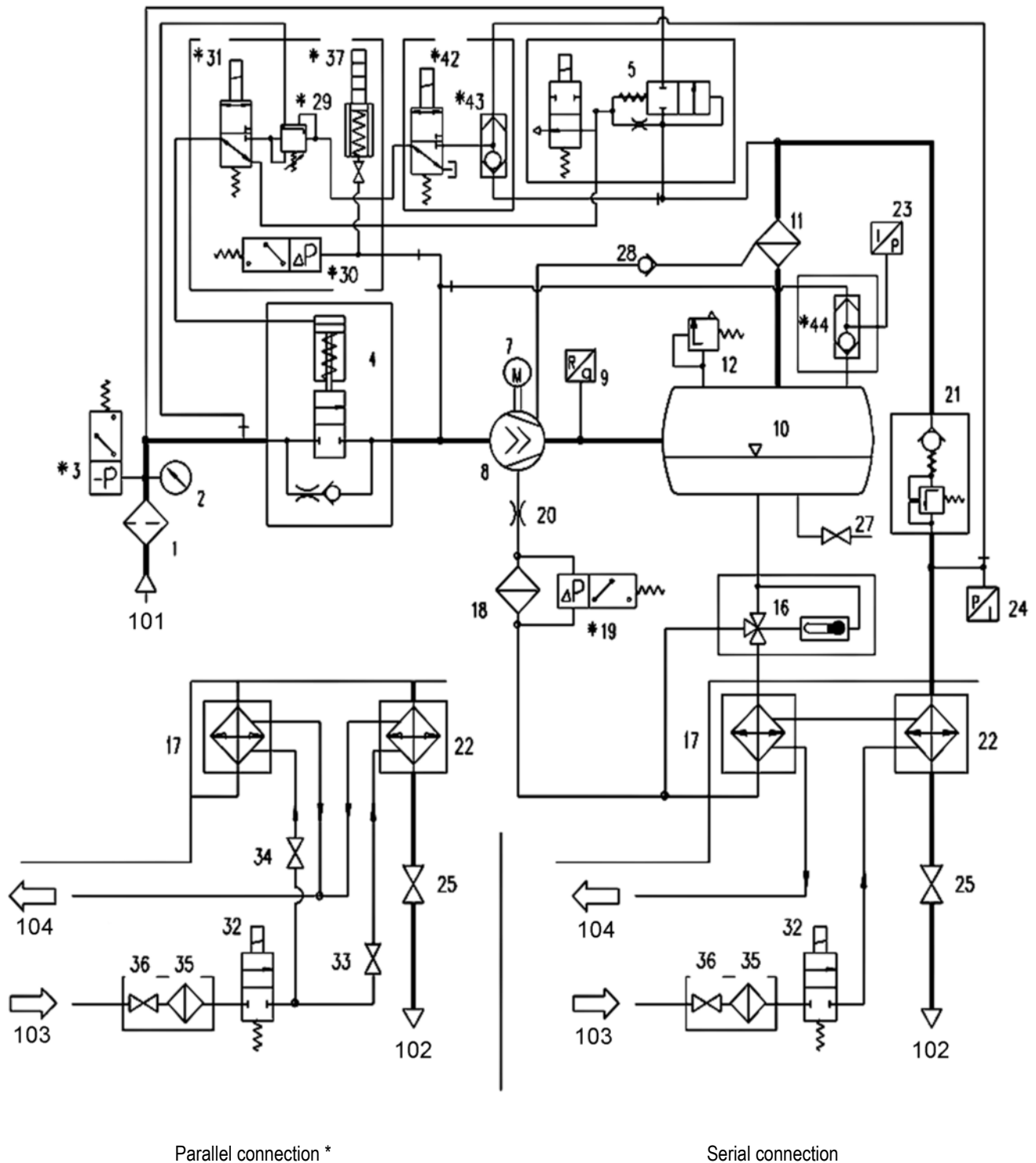
**Air cooled version,
standard**

- 101 Intake air INLET
- 102 Compressed air OUTLET

- 1 Suction filter
- 2 Maintenance display (from 30 kW)
- 3 Vacuum switch (for suction filter monitoring) *
- 4 Suction controller
- 5 Ventilation and regulation control valve
- 7 Drive motor
- 8 Compressor air end
- 9 Sensor for final compression temperature
- 10 Combined compressed air/oil receiver
- 11 Oil separator
- 12 Safety valve
- 16 Thermostatic oil control valve
- 17 Oil cooler
- 18 Oil filter
- 19 Differential pressure switch (for oil filter monitoring) *
- 20 Oil throttle
- 21 Minimum pressure check valve
- 22 Compressed air after-cooler
- 23 Pressure sensor system pressure
- 24 Pressure sensor network pressure
- 25 Stop valve, compressed air outlet
- 27 Stop valve, oil drainage
- 28 Check valve drainage line (up to 75 kW)
- 29 Proportional controller *
- 30 Diff. pressure switch for prop. controller *
- 31 3/2-way solenoid valve for prop. controller
(with standard control passage here) *
- 37 Display of F.a.d. for prop. controller *
- 42 3/2-way solenoid valve for suction control regulation *
- 43 Double check valve (Pos. 42 + 43 = rapid-start valve) *
- 44 Double check valve (Monitoring of rotational direction) *

* Option

**Water cooled version,
serial connection –
parallel connection**



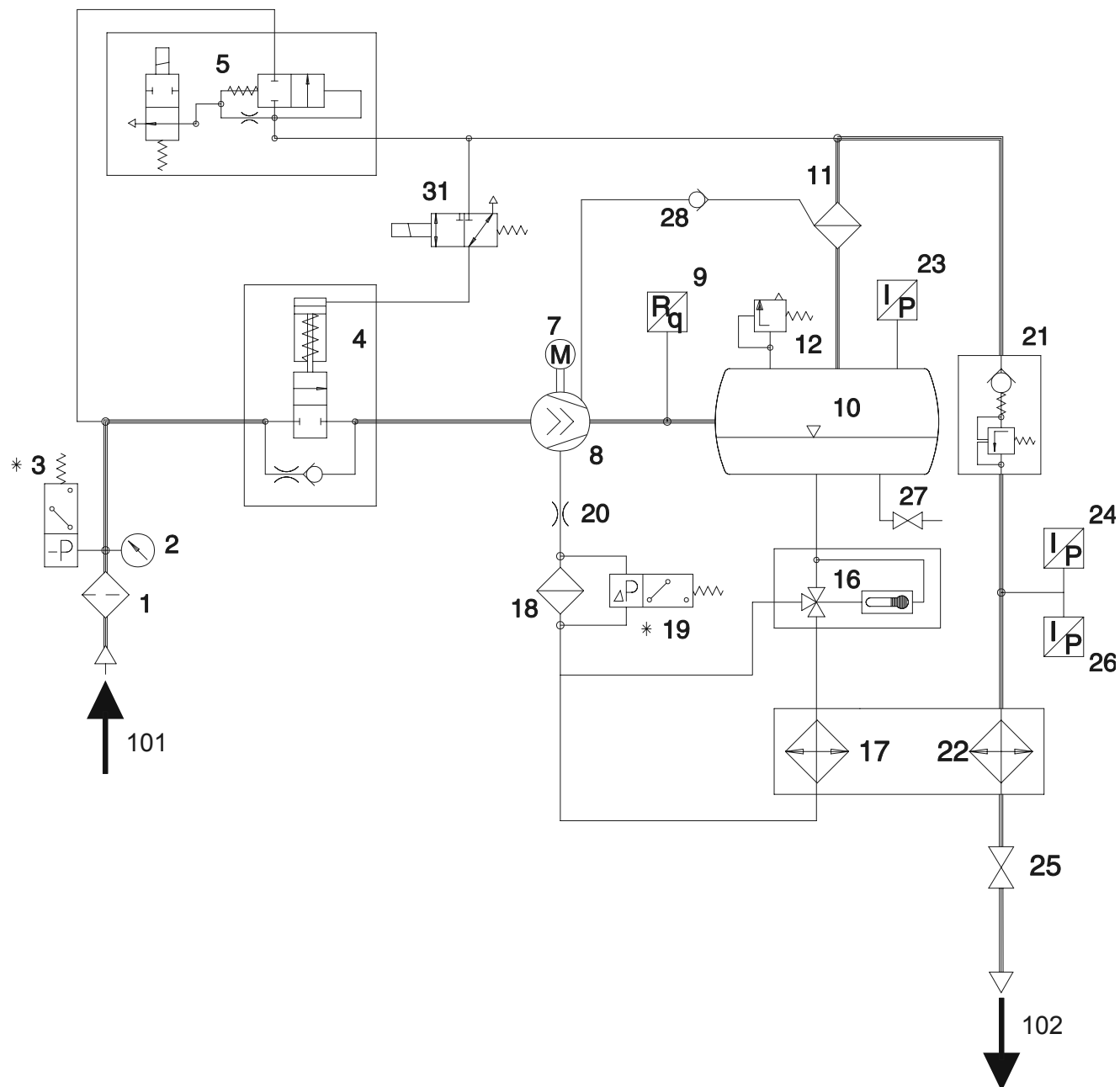
- 101 Intake air INLET
- 102 Compressed air OUTLET
- 103 Water INLET
- 104 Water OUTLET

- 1 Suction filter
- 2 Maintenance display (from 30 kW)
- 3 Vacuum switch (for suction filter monitoring) *
- 4 Suction controller
- 5 Air relief and regulation control valve
- 7 Drive motor
- 8 Air end
- 9 Sensor for final compression temperature
- 10 Combined compressed air/oil receiver
- 11 Oil separator
- 12 Safety valve
- 16 Thermostatic oil control valve
- 17 Oil cooler
- 18 Oil filter
- 19 Differential pressure switch (for oil filter monitoring) *
- 20 Oil throttle
- 21 Minimum pressure check valve
- 22 Compressed air after-cooler
- 23 Pressure sensor system pressure
- 24 Pressure sensor network pressure
- 25 Stop valve, compressed air outlet
- 27 Stop valve, oil drainage
- 28 Check valve drainage line (up to 75 kW)
- 29 Proportional controller *
- 30 Diff. pressure switch for prop. controller *
- 31 3/2-way solenoid valve for prop. controller
(with standard control passage here) *
- 32 2/2-way solenoid valve
- 33 Control valve water supply (preadjusted)
- 34 Control valve water supply (preadjusted)
- 37 Display of f.a.d. for prop. controller *
- 42 3/2-way solenoid valve for suction control regulation *
- 43 Double check valve (Pos. 42 + 43 = rapid-start valve) *
- 44 Double check valve (Monitoring of rotational direction) *

* Option

To be provided by customer:

- 35 Dirt trap
- 36 Stop valve

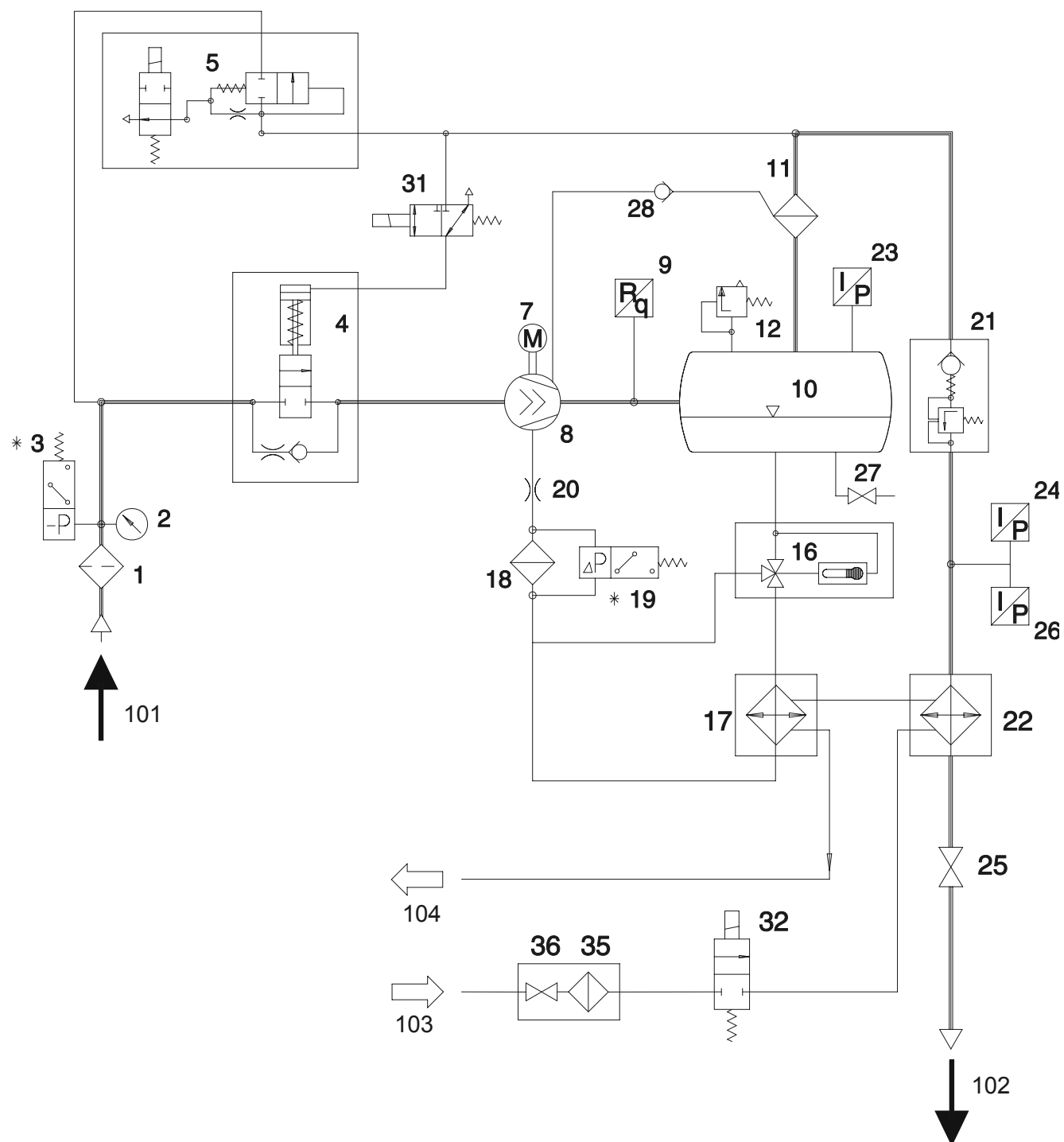
**Air cooled version,
frequency controlled**

- 101 Intake air INLET
- 102 Compressed air OUTLET

- 1 Suction filter
- 2 Maintenance display
- 3 Vacuum switch (for suction filter monitoring) *
- 4 Suction controller
- 5 Air relief and regulation control valve
- 6 Pressure switch (for rotational direction, system relief and V-belt monitoring)
- 7 Drive motor
- 8 Air end
- 9 Final compression temperature display and switch
- 10 Combined compressed air/oil receiver
- 11 Oil separator
- 12 Safety valve
- 13 Differential pressure switch (for oil separator monitoring) *
- 14 System pressure switch (for system pressure build-up and monitoring) *
- 15 Safety pressure switch (for pressure limitation) *
- 16 Thermostatic oil control valve
- 17 Oil cooler
- 18 Oil filter
- 19 Differential pressure switch (for oil filter monitoring) *
- 20 Oil throttle
- 21 Minimum pressure check valve
- 22 Compressed air after-cooler
- 23 Pressure sensor for system pressure
- 24 Network pressure compressor
- 24.1 Pressure gauge (system pressure)
- 25 Stop valve, compressed air outlet
- 26 Pressure sensor for network pressure (frequency converter)
- 27 Stop valve, oil drainage
- 27.1 Stop valve, oil drainage (oil cooler, 75 - 250 kW)
- 28 Rückschlagventil Drainageleitung (up to 75 kW)
- 31 3/2-way solenoid valve

* Option

**Water cooled version,
serial connection –
frequency controlled**



- 101 Intake air INLET
- 102 Compressed air OUTLET
- 103 Water INLET
- 104 Water OUTLET

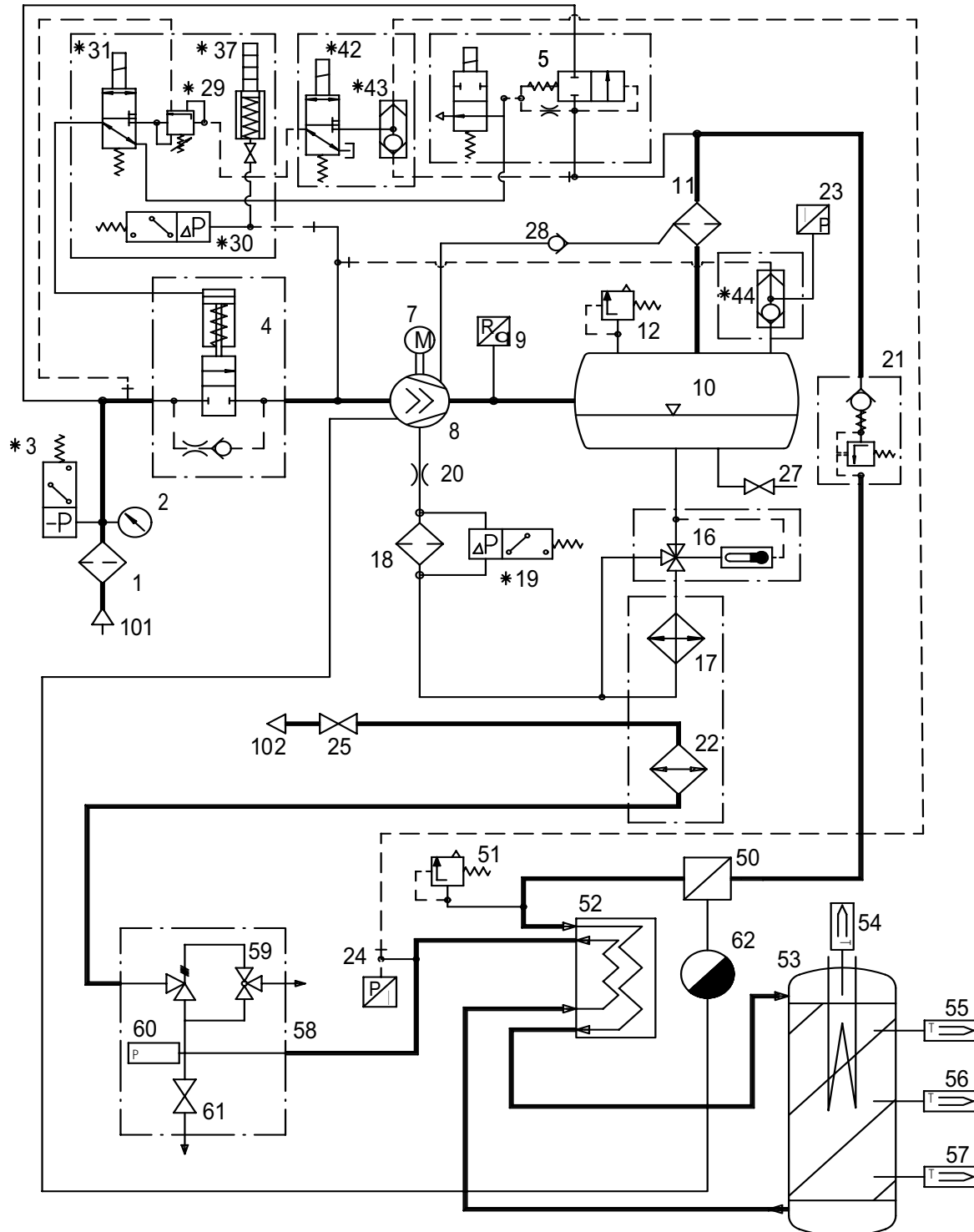
- 1 Suction filter
- 2 Maintenance display
- 3 Vacuum switch (for suction filter monitoring) *
- 4 Suction controller
- 5 Air relief and regulation control valve
- 6 Pressure switch (for rotational direction, system relief and V-belt monitoring) *
- 7 Drive motor
- 8 Air end
- 9 Final compression temperature display and switch
- 10 Combined compressed air/oil receiver
- 11 Oil separator
- 12 Safety valve
- 13 Differential pressure switch (for oil separator monitoring) *
- 14 System pressure switch (for system pressure build-up and monitoring) *
- 15 Safety pressure switch (for pressure limitation) *
- 16 Thermostatic oil control valve
- 17 Oil cooler
- 18 Oil filter
- 19 Differential pressure switch (for oil filter monitoring) *
- 20 Oil throttle
- 21 Minimum pressure check valve
- 22 Compressed air after-cooler
- 23 Operating pressure switch
- 24 Pressure gauge
- 25 Stop valve, compressed air outlet
- 26 Pressure sensor for network pressure (frequency converter)
- 27 Stop valve, oil drainage
- 28 Check valve drainage line (up to 75 kW)
- 31 3/2-way solenoid valve
- 32 2/2-way solenoid valve
- 34.1 Bypass valve *

* Option

To be provided by customer:

- 35 Dirt trap
- 36 Stop valve

BLUEKAT series, air cooled version

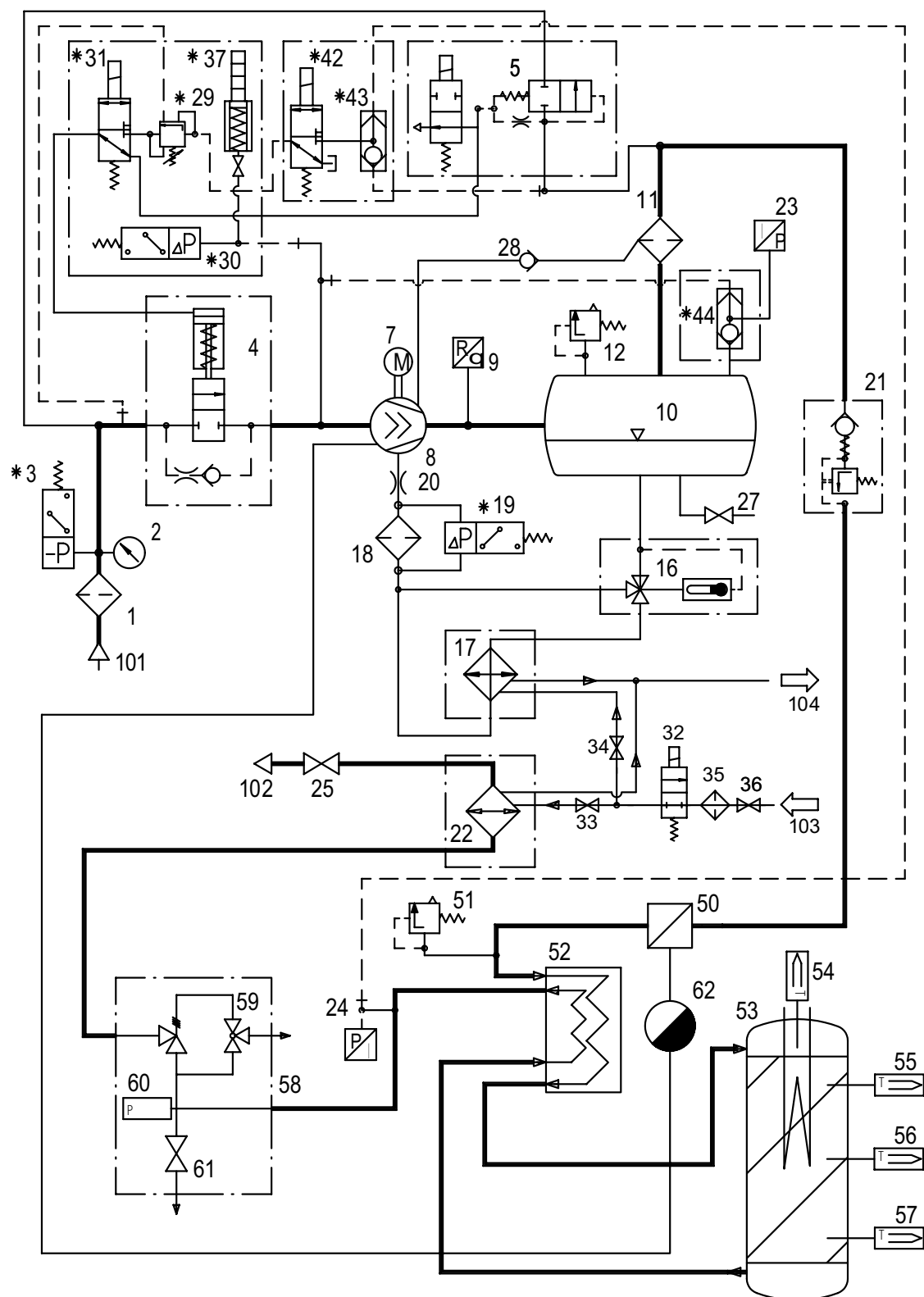


- 101 Intake air INLET
102 Compressed air OUTLET

- | | |
|--|---|
| 1 Suction filter | 29 Proportional controller * |
| 2 Maintenance display (from 30 kW) | 30 Diff. pressure switch for prop. controller * |
| 3 Vacuum switch
(for suction filter monitoring) * | 31 3/2-way solenoid valve for prop. controller (with standard control passage here) * |
| 4 Suction controller | 37 Display of f.a.d. for prop. controller * |
| 5 Air relief and regulation control valve | 42 3/2-way solenoid valve for suction control regulation * |
| 7 Drive motor | 43 Double check valve
(Pos. 42 + 43 = rapid-start valve) * |
| 8 Air end | 44 Double check valve
(Monitoring of rotational direction) * |
| 9 Sensor for final compression temperature | 50 Filter |
| 10 Combined compressed air/oil receiver | 51 Safety valve |
| 11 Oil separator | 52 Heat exchanger |
| 12 Safety valve | 53 Converter |
| 16 Thermostatic oil control valve | 54 Heating cartridge with thermocouple |
| 17 Oil cooler | 55 Heating cartridge „receiver top“ |
| 18 Oil filter | 56 Heating cartridge „receiver middle“ |
| 19 Differential pressure switch
(for oil filter monitoring) * | 57 Heating cartridge „bed temperature“ |
| 20 Oil throttle | 58 Pressure retaining shut-off valve
(DHSV) |
| 21 Minimum pressure check valve | 59 DHSV solenoid valve |
| 22 Compressed air after-cooler | 60 Gauge |
| 23 Pressure sensor for system pressure | 61 Relief ball valve |
| 24 Network pressure compressor | 62 Condensate discharge valve, automatic |
| 25 Stop valve, compressed air outlet | |
| 27 Stop valve, oil drainage | |
| 28 Check valve drainage line
(up to 75 kW) | |

* Option

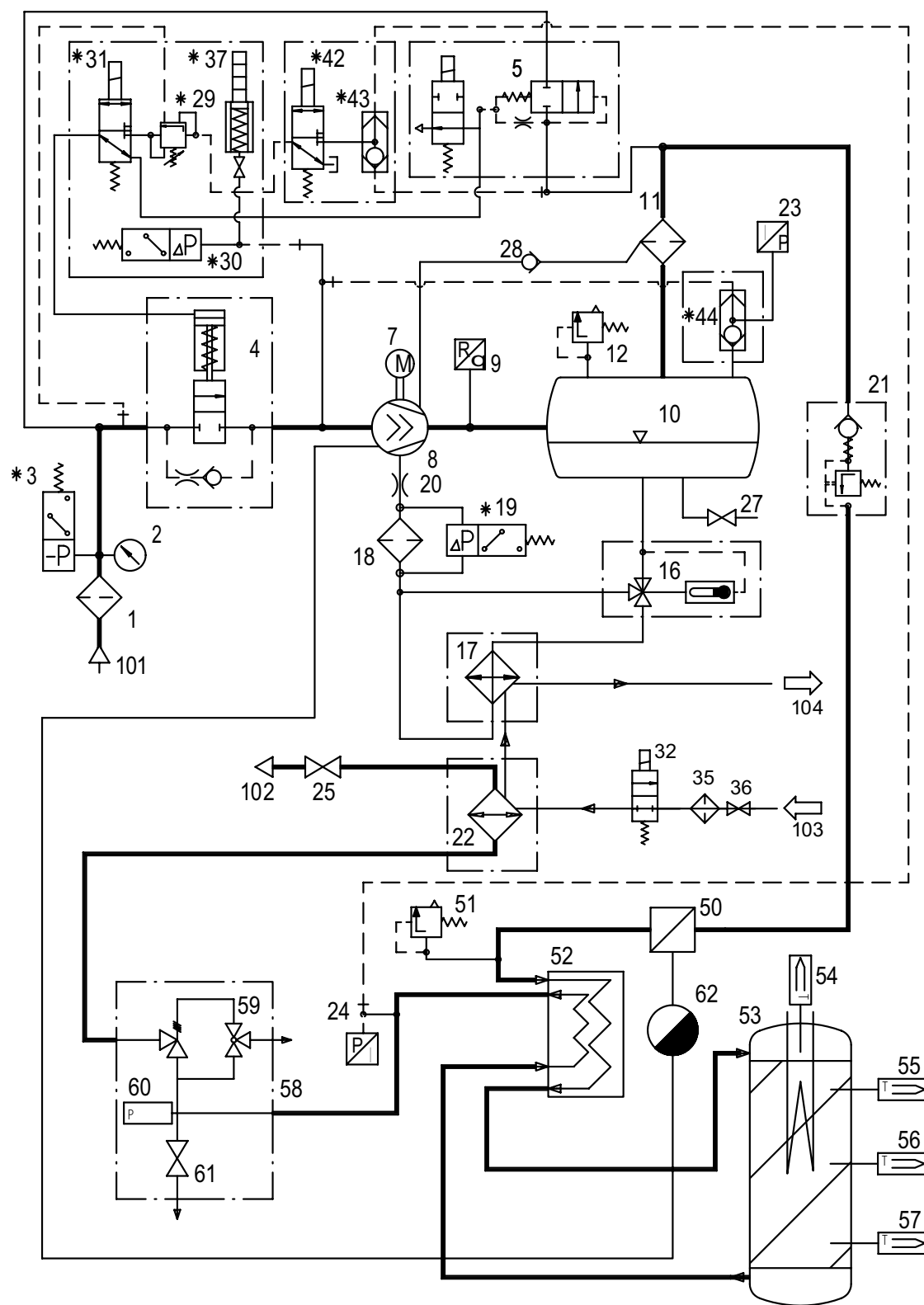
**BLUEKAT series,
water cooled version,
parallel connection**



- 101 Intake air INLET
- 102 Compressed air OUTLET
- 103 Water INLET
- 104 Water OUTLET

- | | |
|---|---|
| 1 Suction filter | 32 2/2-way solenoid valve |
| 2 Maintenance display (from 30 kW) | 33 Regulating valve water supply (preset) |
| 3 Vacuum switch
(for suction filter monitoring) * | 34 Regulating valve water supply (preset) |
| 4 Suction controller | 35 Dirt trap |
| 5 Air relief and regulation control valve | 36 Stop valve |
| 7 Drive motor | 37 Display of f.a.d. for prop. controller * |
| 8 Air end | 42 3/2-way solenoid valve for suction control regulation * |
| 9 Sensor for final compression temperature | 43 Double check valve
(Pos. 42 + 43 = rapid-start valve) * |
| 10 Combined compressed air/oil receiver | 44 Double check valve
(Monitoring of rotational direction) * |
| 11 Oil separator | 50 Filter |
| 12 Safety valve | 51 Safety valve |
| 16 Thermostatic oil control valve | 52 Heat exchanger |
| 17 Oil cooler | 53 Converter |
| 18 Oil filter | 54 Heating cartridge with thermocouple |
| 19 Differential pressure switch
(for oil filter monitoring) * | 55 Heating cartridge „receiver top“ |
| 20 Oil throttle | 56 Heating cartridge „receiver middle“ |
| 21 Minimum pressure check valve | 57 Heating cartridge „bed temperature“ |
| 22 Compressed air after-cooler | 58 Pressure retaining shut-off valve
(DHSV) |
| 23 Pressure sensor for system pressure | 59 DHSV solenoid valve |
| 24 Network pressure compressor | 60 Gauge |
| 25 Stop valve, compressed air outlet | 61 Relief ball valve |
| 27 Stop valve, oil drainage | 62 Condensate discharge valve, automatic |
| 28 Check valve drainage line
(up to 75 kW) | |
| 29 Proportional controller * | |
| 30 Diff. pressure switch for prop. controller * | * Option |
| 31 3/2-way solenoid valve for prop. controller (with standard control passage here) * | |

**BLUEKAT series,
Water cooled version,
serial connection**

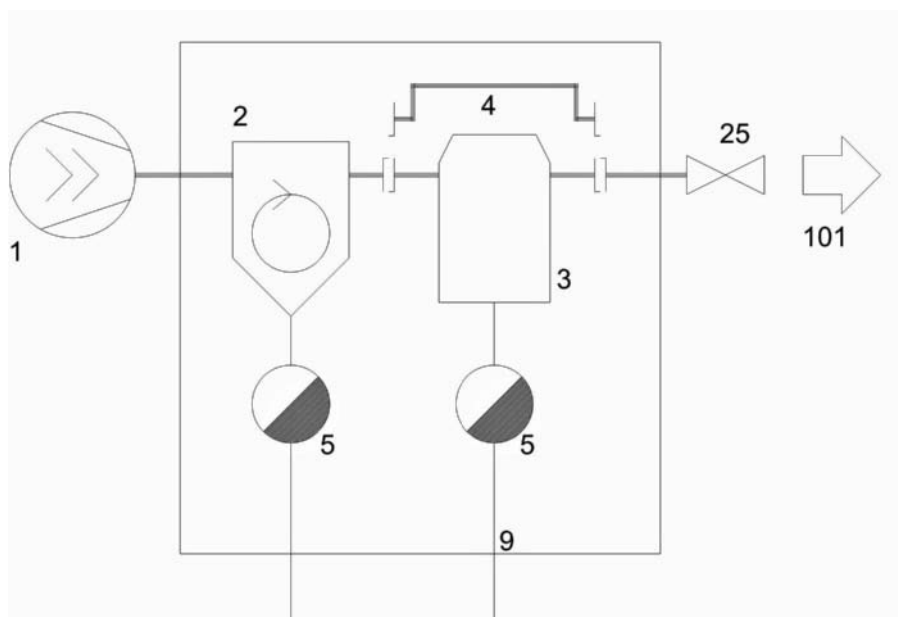


- 101 Intake air INLET
- 102 Compressed air OUTLET
- 103 Water INLET
- 104 Water OUTLET

- | | |
|--|---|
| 1 Suction filter | 31 3/2-way solenoid valve for prop. controller (with standard control passage here) * |
| 2 Maintenance display (from 30 kW) | 32 2/2-way solenoid valve |
| 3 Vacuum switch
(for suction filter monitoring) * | 35 Dirt trap |
| 4 Suction controller | 36 Stop valve |
| 5 Air relief and regulation control valve | 37 Display of f.a.d. for prop. controller * |
| 7 Drive motor | 42 3/2-way solenoid valve for suction control regulation * |
| 8 Air end | 43 Double check valve
(Pos. 42 + 43 = rapid-start valve) * |
| 9 Sensor for final compression temperature | 44 Double check valve
(Monitoring of rotational direction) * |
| 10 Combined compressed air/oil receiver | 50 Filter |
| 11 Oil separator | 51 Safety valve |
| 12 Safety valve | 52 Heat exchanger |
| 16 Thermostatic oil control valve | 53 Converter |
| 17 Oil cooler | 54 Heating cartridge with thermocouple |
| 18 Oil filter | 55 Heating cartridge „receiver top“ |
| 19 Differential pressure switch
(for oil filter monitoring) * | 56 Heating cartridge „receiver middle“ |
| 20 Oil throttle | 57 Heating cartridge „bed temperature“ |
| 21 Minimum pressure check valve | 58 Pressure retaining shut-off valve
(DHSV) |
| 22 Compressed air after-cooler | 59 DHSV solenoid valve |
| 23 Pressure sensor for system pressure | 60 Gauge |
| 24 Network pressure compressor | 61 Relief ball valve |
| 25 Stop valve, compressed air outlet | 62 Condensate discharge valve, automatic |
| 27 Stop valve, oil drainage | |
| 28 Check valve drainage line
(up to 75 kW) | |
| 29 Proportional controller * | |
| 30 Diff. pressure switch for prop. controller * | |

* Option

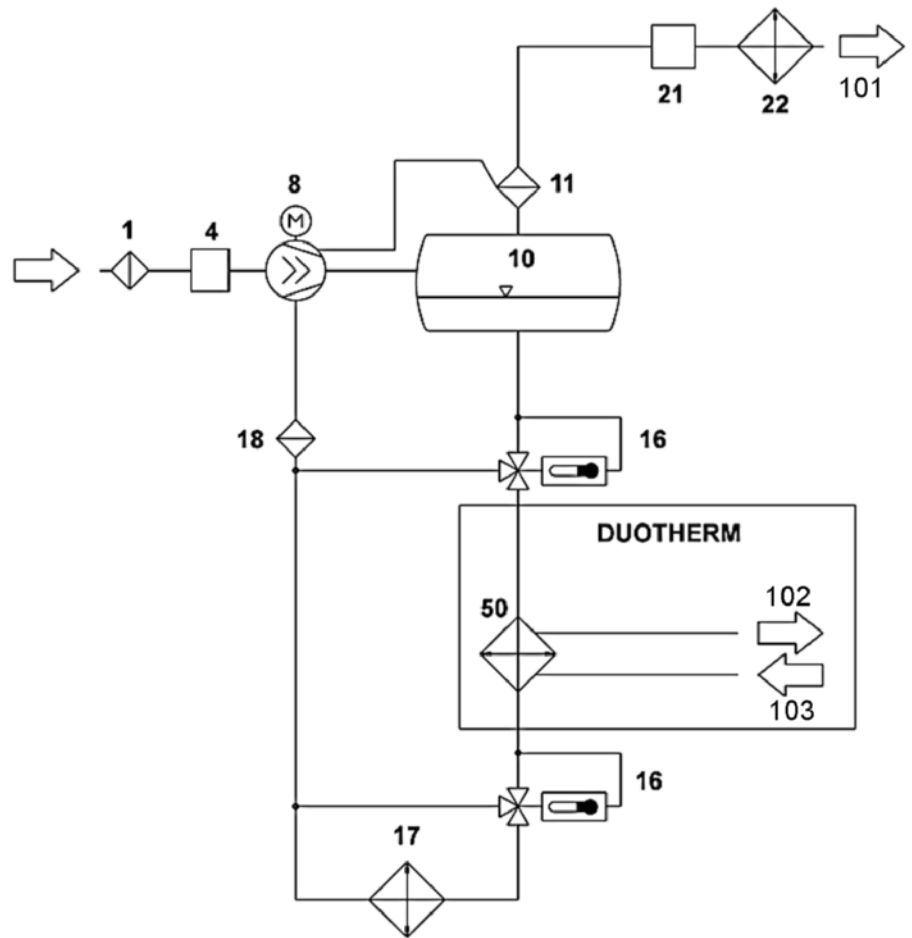
SD / SDF



101 Compressed air OUTLET

- 1 Screw compressor (see also flow diagram)
- 2 Cyclone separator
- 3 Compressed air refrigeration dryer
- 4 Bypass
- 5 Drain
- 9 Condensate
- 25 Non-return valve compressed air exhaust

BOGE-Duotherm BPT plate heat exchanger



101 Compressed air OUTLET

102 backwards

103 forwards

1 Suction filter

4 Intake regulator

8 Air end

10 Combined compressed air/oil receiver

11 Oil separator

16 Thermostatic oil control valve

17 Oil cooler

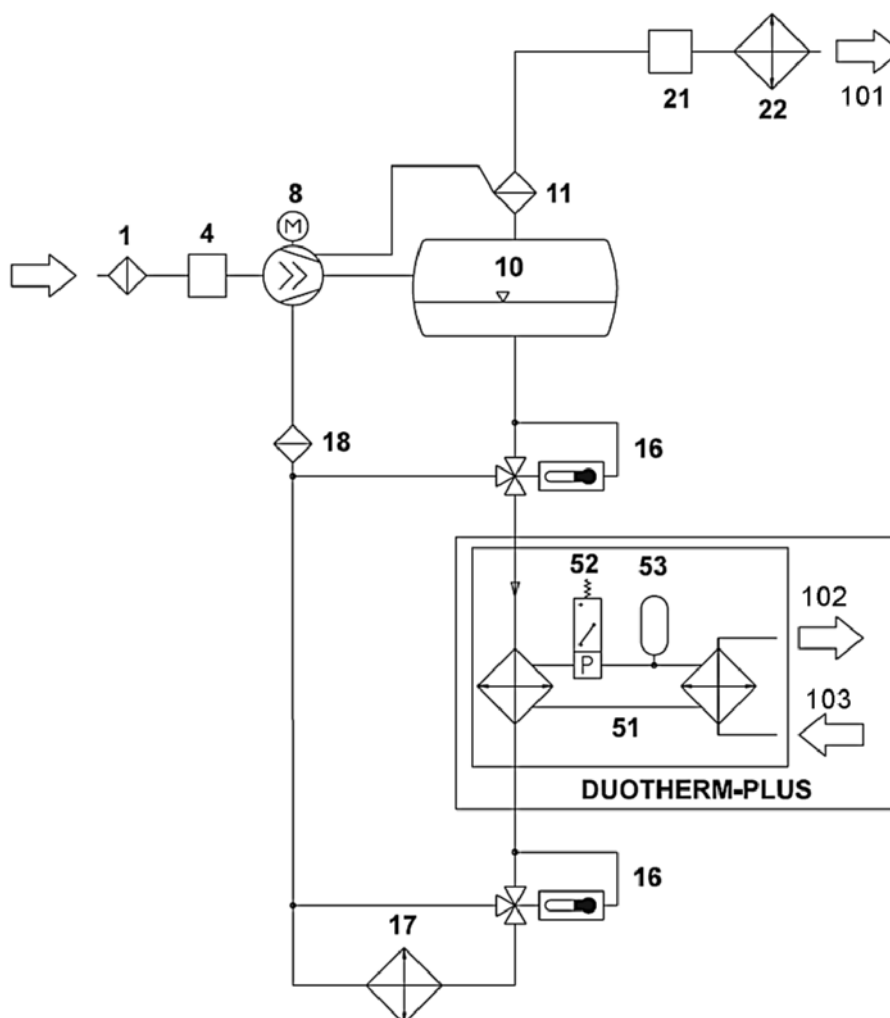
18 Oil filter

21 Minimum pressure check valve

22 Compressed air after-cooler

50 Heat exchanger

BOGE-Duotherm-Plus BSW safety heat exchanger



101 Compressed air OFF

102 backwards

103 forwards

1 Suction filter

4 Intake regulator

8 Air end

10 Combined compressed air/oil receiver

11 Oil separator

16 Thermostatic oil control valve

17 Oil cooler

18 Oil filter

21 Minimum pressure check valve

22 Compressed air after-cooler

51 Safety heat exchanger

52 Pressure monitor for rupture

53 Compensation vessel

7.3 List of maintenance and service work

Date	Operating hours	Network pressure	System pressure	Temperature	Intake filter *	Oil filter	Oil-level **	Oil separator	Cooling unit cleaning	Motor maintenance	C. air dryer Oil-water separator Filter Drain	Inverter-service	Remarks

* R = Cleaning
W = Change

** K = Check
W = Change

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Please note the completed maintenance work in the respective columns													
Date	Operating hours	Network pressure	System pressure	Temperature	Intake filter *	Oil filter	Oil-level **	Oil separator	Cooling unit cleaning	Motor maintenance	C.air dryer Oil-water separator Filter Drain	Converter-service	Remarks

* R = Cleaning
W = Change

** K = Check
W = Change

[illegible]