BAUER KOMPRESSOREN

INSTRUCTION MANUAL AND SPARE PARTS CATALOGUE

HIGH PRESSURE COMPRESSORS FOR BREATHING AIR

KA 14–5,5; –7,5; –10
KAP 14–5,5; –7,5; –10

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ATTENTION

With this unit you are compressing

BREATHING AIR

Therefore, please observe this instruction manual in all its points.

In particular:

Maintenance of all filters
Installation in a place that guarantees the intake of pure air and no engine exhaust gas.

GENERAL 1

This manual contains operation and maintenance schedules for the high pressure breathing air compressor units **KA 14** and **KAP 14** manufactured by Bauer Kompressoren GmbH.

All instructions should be observed and carried out in the order laid down to prevent damage and premature wear to the equipment and the units served by it.

While every effort is made to ensure the accuracy of the particulars contained in this manual, the manufacturing company will not, in any circumstances, be held liable for any inaccuracies or the consequences thereof.

9/1 Edition October 1984

1 GENERAL

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* Acc. to order

GENERAL 1

1.1 TECHNICAL DATA

1.1.1 Compressor units with electric motor

Compressor unit		KA 14-5,5 E KAP 14-5,5 E	KA 14-5,5 E-H KAP 14-5,5 E-H
Delivery	l/min.	210**	210**
	cfm.	7.4	7.4
Operating pressure		PN 200	PN 300
Pressure setting, final pressure			
safety valve	max. bars (psi)	225 (3.200)	330 (4.700)
Pressure setting, pressure switch	bars	———	———
	psi	———	———
Compressor block		**K14**	**K14**
No. of stages		4	4
No. of cylinders		4	4
Cylinder bore 1st stage	mm	88	88
2nd stage	mm	45	45
3rd stage	mm	22	22
4th stage	mm	12	12
Piston stroke	mm	50	50
Speed	min^{-1}	900	900
Drive input	kW	4,0	4,0
Intermediate pressures			
1st stage	bars (psi)	3,5 (50)	4 (58)
2nd stage	bars (psi)	17 (250)	20 (290)
3rd stage	bars (psi)	58 (840)	65 (940)
Compressor block oil capacity	l	2,8	2,8
Oil type		see 2.2.	see 2.2.
Max. ambient temperature		40 °C	40 °C
Air discharge temperature		10 °C - 15 °C above ambient temp.	
Permissible inclination of compressor			
forwards/backwards		15°*	15°*
to right/left side		20°*	20°*
Drive motor		3 phase squirrel cage motor	
Operating voltage		380 V, 50 Hz	380 V, 50 Hz
Control voltage		220 V, 50 Hz	220 V, 50 Hz
Power	kW	4,0	4,0
Speed	min^{-1}	2850	2850
Size		112 M	112 M
Type of construction		B3	B3
Type of enclosure		IP54	IP54

* These values are valid only if the oil level of the compressor in normal position agrees with the upper mark of the oil dipstick and may not be exceeded.

** Free air delivered at tank filling from 0 to 200 bars ±5%

Subject to change w/o prior notice.

1 GENERAL

Compressor unit		KA 14-7,5 E KAP 14-7,5 E	KA 14-7,5 E-H KAP 14-7,5 E-H
Delivery	l/min.	260**	260**
	cfm.	9.1	9.1
Operating pressure		PN 200	PN 300
Pressure setting, final pressure			
safety valve	max. bars (psi)	225 (3.200)	330 (4.700)
Pressure setting, pressure switch	bars	____	____
	psi	____	____
Compressor block		**K14**	**K14**
No. of stages		4	4
No. of cylinders		4	4
Cylinder bore 1st stage	mm	88	88
2nd stage	mm	45	45
3rd stage	mm	22	22
4th stage	mm	12	12
Piston stroke	mm	50	50
Speed	min^{-1}	1200	1200
Drive input	kW	5,5	5,5
Intermediate pressures			
1st stage	bars (psi)	3,5 (50)	4 (58)
2nd stage	bars (psi)	17 (250)	20 (290)
3rd stage	bars (psi)	58 (840)	65 (940)
Compressor block oil capacity	l	2,8	2,8
Oil type		see 2.2.	see 2.2.
Max. ambient temperature		40 °C	40 °C
Air discharge temperature		10 °C - 15 °C above ambient temp.	
Permissible inclination of compressor			
forwards/backwards		15°*	15°*
to right/left side		20°*	20°*
Drive motor		3 phase squirrel cage motor	
Operating voltage		380 V, 50 Hz	380 V, 50 Hz
Control voltage		220 V, 50 Hz	220 V, 50 Hz
Power	kW	5,5	5,5
Speed	min^{-1}	2850	2850
Size		112 M	112 M
Type of construction		B3	B3
Type of enclosure		IP54	IP54

* These values are valid only if the oil level of the compressor in normal position agrees with the upper mark of the oil dipstick and may not be exceeded.

** Free air delivered at tank filling from 0 to 200 bars ±5%

Subject to change w/o prior notice.

GENERAL 1

Compressor unit		KA 14-10 E KAP 14-10 E	KA 14-10 E-H KAP 14-10 E-H
Delivery	l/min.	320**	320**
	cfm.	11.2	11.2
Operating pressure		PN 200	PN 300
Pressure setting, final pressure safety valve	max. bars (psi)	225 (3.200)	330 (4.700)
Pressure setting, pressure switch	bars	———	———
	psi	———	———
Compressor block		**K14**	**K14**
No. of stages		4	4
No. of cylinders		4	4
Cylinder bore 1st stage	mm	88	88
2nd stage	mm	45	45
3rd stage	mm	22	22
4th stage	mm	12	12
Piston stroke	mm	50	50
Speed	min^{-1}	1500	1500
Drive input	kW	7,5	7,5
Intermediate pressures			
1st stage	bars (psi)	3,5 (50)	4 (58)
2nd stage	bars (psi)	17 (250)	20 (290)
3rd stage	bars (psi)	58 (840)	65 (940)
Compressor block oil capacity	l	2,8	2,8
Oil type		see 2.2.	see 2.2.
Max. ambient temperature		40 °C	40 °C
Air discharge temperature		10 °C - 15 °C above ambient temp.	
Permissible inclination of compressor			
forwards/backwards		15°*	15°*
to right/left side		20°*	20°*
Drive motor		3 phase squirrel cage motor	
Operating voltage		380 V, 50 Hz	380 V, 50 Hz
Control voltage		220 V, 50 Hz	220 V, 50 Hz
Power	kW	7,5	7,5
Speed	min^{-1}	2850	2850
Size		132 S	132 S
Type of construction		B3	B3
Type of enclosure		IP54	IP54

* These values are valid only if the oil level of the compressor in normal position agrees with the upper mark of the oil dipstick and may not be exceeded.

** Free air delivered at tank filling from 0 to 200 bars ±5%

Subject to change w/o prior notice.

1 GENERAL

1.1.2 Gasoline engine driven units

Compressor unit		KA 14-5,5 B KA 14-5,5 B-H
Delivery, operating pressure, final pressure safety valve setting, pressure switch setting, and compressor block data see KA 14-5,5 E, /E-H		
Drive motor		Briggs & Stratton
Model, manual start		252412
Model, electric start		252417
Power	kW	5,7
at nom. speed	min^{-1}	2900

Compressor unit		KA 14-7,5 B KA 14-7,5 B-H
Delivery, operating pressure, final pressure safety valve setting, pressure switch setting, and compressor block data see KA 14-7,5 E, /E-H		
Drive motor		Briggs & Stratton
Model, manual start		252412
Model, electric start		252417
Power	kW	6,1
at nom. speed	min^{-1}	3100

Subject to change w/o prior notice.

1.1.3 Diesel engine driven units

Compressor unit		KA 14-5,5 D KA 14-5,5 D-H

Delivery, operating pressure, final pressure safety valve setting, pressure switch setting, and compressor block data see KA 14-5,5 E, /E-H

Drive motor		Hatz Diesel
Model, manual start		ES 780
Model, electric start		E 780
Power	kW	5,3
at nom. speed	min^{-1}	2100

Compressor unit		KA 14-7,5 D KA 14-7,5 D-H

Delivery, operating pressure, final pressure safety valve setting, pressure switch setting, and compressor block data see KA 14-7,5 E, /E-H

Drive motor		Hatz Diesel
Model, manual start		ES 780
Model, electric start		E 780
Power	kW	6,5
at nom. speed	min^{-1}	2800

Compressor unit		KA 14-10 D KA 14-10 D-H

Delivery, operating pressure, final pressure safety valve setting, pressure switch setting, and compressor block data see KA 14-10 E, /E-H

Drive motor		Deutz Diesel
Model		F1L 210 D
Power	kW	9,25
at nom. speed	min^{-1}	3000

Subject to change w/o prior notice.

1 GENERAL

1.2 PURPOSE AND SHORT DESCRIPTION

1.2.1 Compressor block

The heart of these units is formed by the high pressure compressor block K14 (fig. 1.1 and 1.2).

The K14 compressor block is a four stage, air-cooled reciprocating piston compressor. The 4th stage cylinder is lubricated by means of the forced-feed lubrication system, the other cylinders are splash-lubricated.

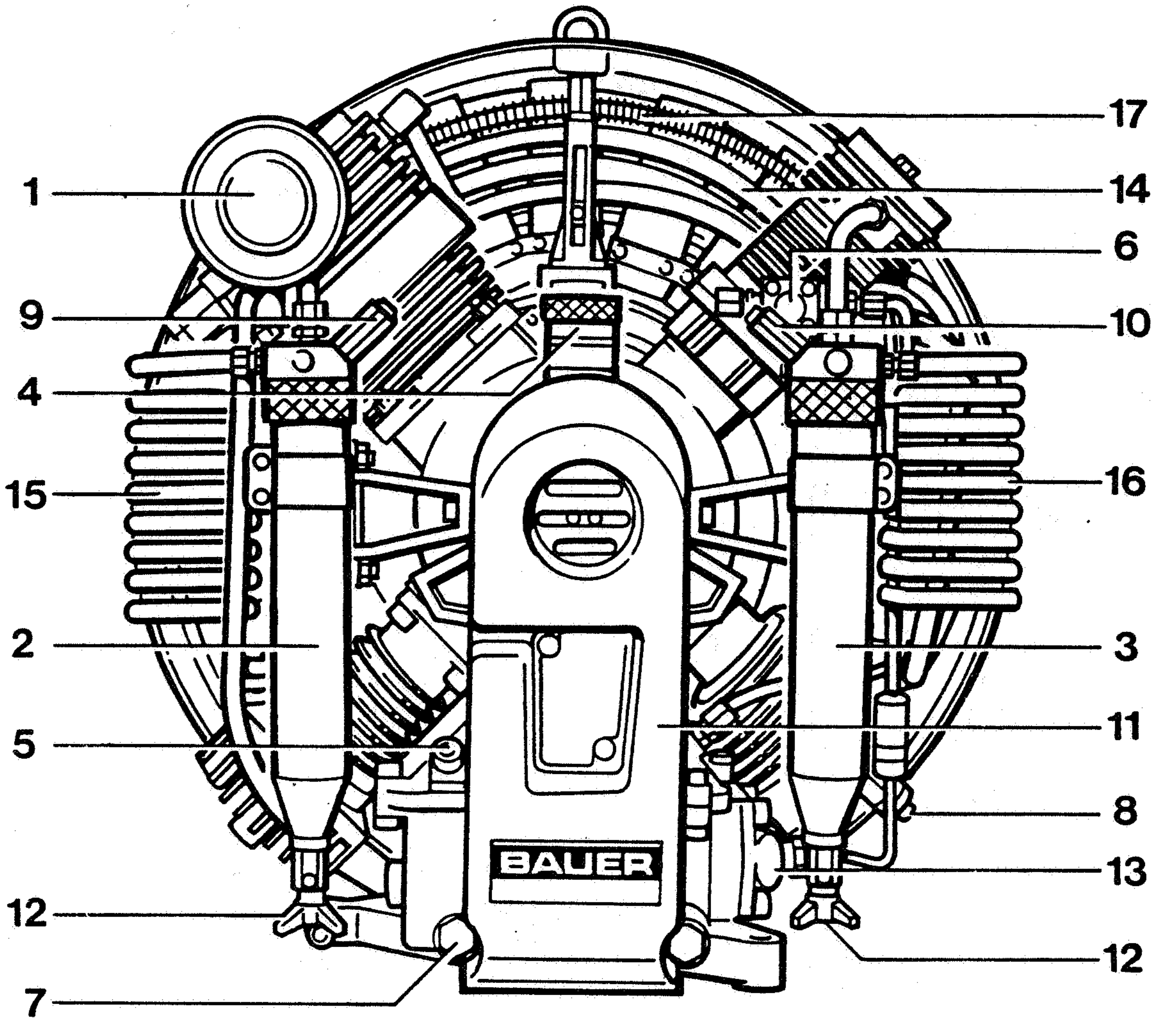

Fig. 1.1 K14 Compressor Block (Manual Condensate Drain)

1 Intake filter
2 Inter-filter, 2nd stage
3 Inter-filter, 3rd stage
4 Oil filler
5 Oil dipstick
6 Oil pressure regulating valve
7 Oil drain plug
8 Safety valve, interm. pressure, 1st/2nd stage
9 Safety valve, interm. pressure, 2nd/3rd stage
10 Safety valve, interm. pressure, 3rd/4th stage
11 V-belt cover
12 Condensate drain valve
13 Oil pump
14 Inter-cooler 1st/2nd stage
15 Inter-cooler 2nd/3rd stage
16 Inter-cooler 3rd/4th stage
17 After-cooler

1 GENERAL

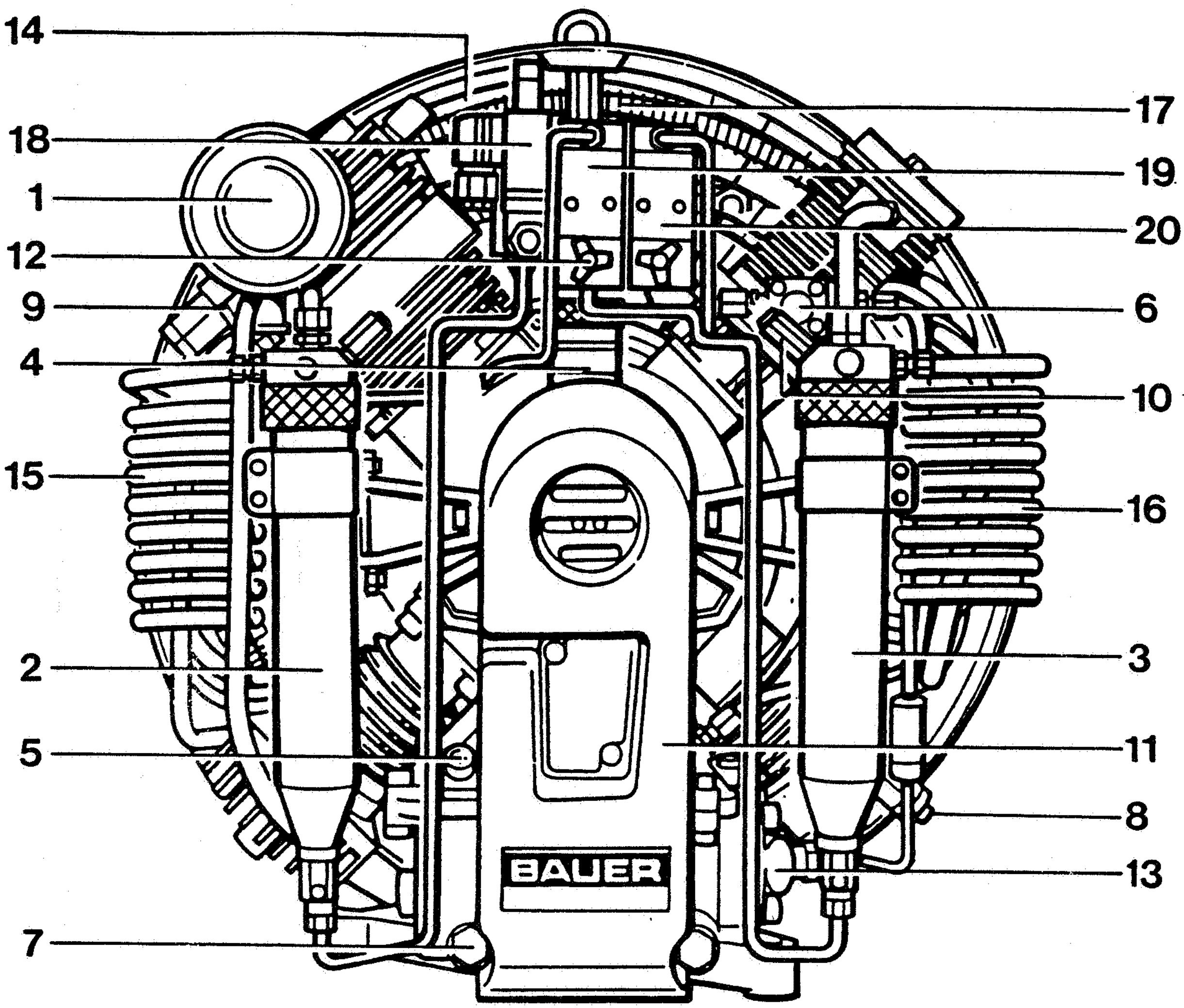

Fig. 1.2 K14 Compressor Block (Automatic Condensate Drain)

1 Intake filter
2 Inter-filter, 2nd stage
3 Inter-filter, 3rd stage
4 Oil filler
5 Oil dipstick
6 Oil pressure regulating valve
7 Oil drain plug
8 Safety valve, interm. pressure, 1st/2nd stage
9 Safety valve, interm. pressure, 2nd/3rd stage
10 Safety valve, interm. pressure, 3rd/4th stage
11 V-belt cover
12 Condensate drain valve
13 Oil pump
14 Inter-cooler 1st/2nd stage
15 Inter-cooler 2nd/3rd stage
16 Inter-cooler 3rd/4th stage
17 After-cooler
18 Solenoid valve, drain valve 2nd stage
19 Condensate drain valve 3rd stage
20 Condensate drain valve 4th stage

1.2.2 Compressor unit

The high pressure compressor units KA 14 and KAP 14 are complete units for filling tanks of the high pressure ranges 225 bars (3200 psi) and 330 bars (4700 psi).

The compressors are mainly used to compress air for breathing as required in diving and fire fighting applications, for instance.

The compressor units of the KA 14 series are manufactured in two optional frame designs:

KA 14 mounted on the standard, horizontally arranged open frame; Filter system F3.

KAP 14 mounted in a closed frame; Filter system P41 with optional **SECURUS** monitoring system.

All units are equipped as standard with instrument panel and filling panel. Model 14-HU is equipped with a switch-over device enabling the filling of both, 200 bars (2900 psi) and 300 bars (4350 psi) air bottles.

Optionally, the units can be delivered with automatic or semi-automatic compressor control, electronic monitoring unit, and automatic condensate drain, as described in the following.

1 GENERAL

1.3. DESIGN AND MODE OF OPERATION

1.3.1. Design

The compressor unit comprises the following major assemblies

- compressor block
- drive motor
- filter set
- base and frame assembly with instrument and filling panel
- automatic condensate drain*
- electric control system*
- electronic monitoring system*.

The design of the compressor system is shown in figures 1.2 to 1.7.
For special equipment according to order see figures and parts lists in the annex.

1.3.2 Mode of Operation; Air Flow Diagram

The path of the air through the compressor system is shown in the air flow diagram, fig. 1.8 and 1.9. For flow diagram and parts lists for special order units refer to the annex of this manual.

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* optional extra

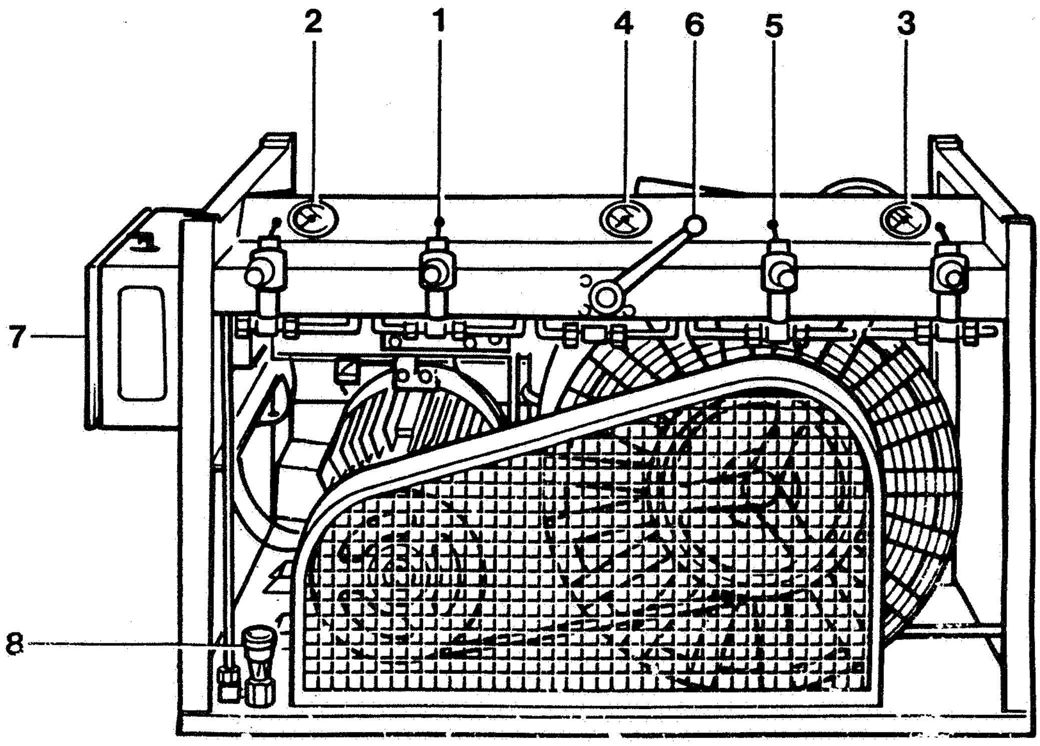

Fig. 1.3 Compressor Unit KA 14, Front View
Model shown: KA 14-5,5 E-HU

1 Filling valve, 200 bars**
2 Pressure gauge PN 200
3 Pressure gauge PN 300
4 Oil pressure gauge*
5 Filling valve, 300 bars
6 Switch-over valve, 200/300 bars
7 Switch box (compressor control*)
8 Safety valve, 200 bars

* optional extra
** standard = 3 filling valves; filling hoses, 1 m

1 GENERAL

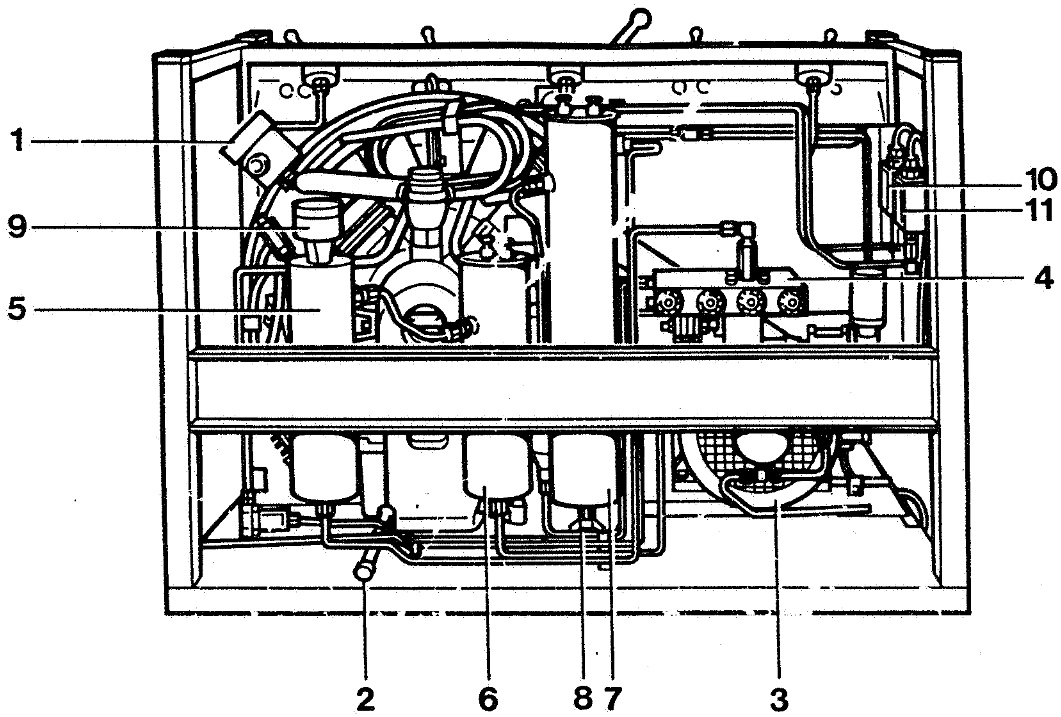

Fig. 1.4 Compressor Unit KA 14, Rear View
Model shown: KA 14-5,5 E-HU

1 Intake filter
2 Oil drain plug
3 Drive motor
4 Automatic condensate drain*
5 Oil and water separator
6 Purifier
7 Dryer*
8 Bleeding valve
9 Safety valve, 300 bars
10 Pressure switch, 200 bars*
11 Pressure switch, 300 bars*

* optional extra

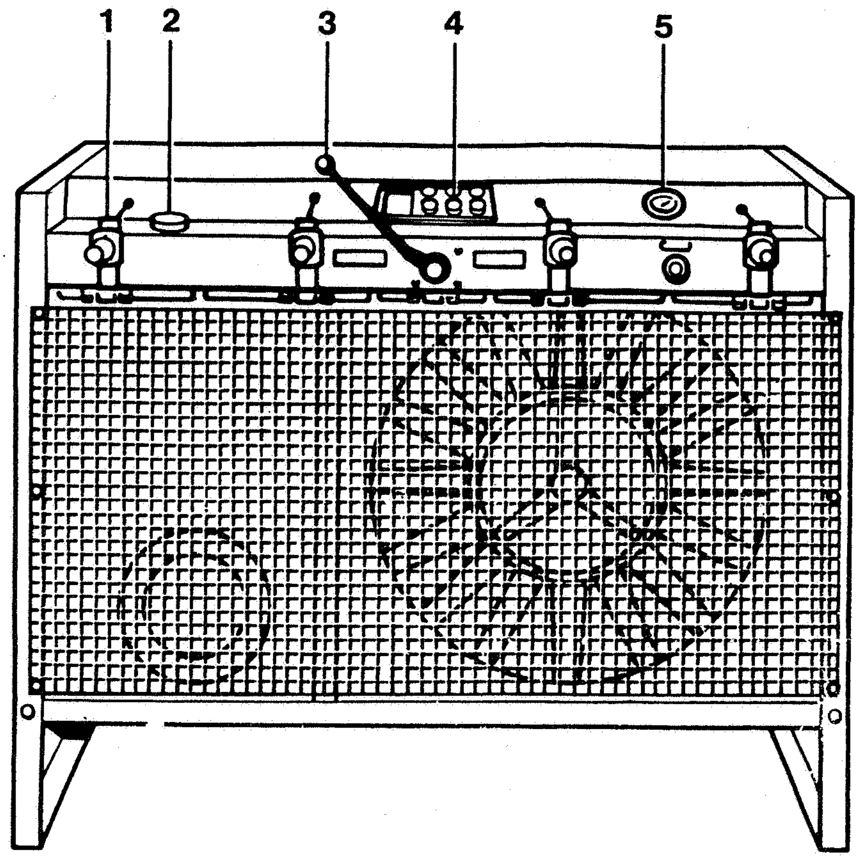

Fig. 1.5 Compressor Unit KAP 14, Front View
Model shown: KAP 14-5,5 E-HU

1 Filling valve**
2 Safety valve, 200 bars
3 Switch-over valve, 200/300 bars
4 Control and monitoring unit*
5 Pressure gauge, final pressure

* optional extra

** standard = 3 filling valves; filling hoses, 1 m

1 GENERAL

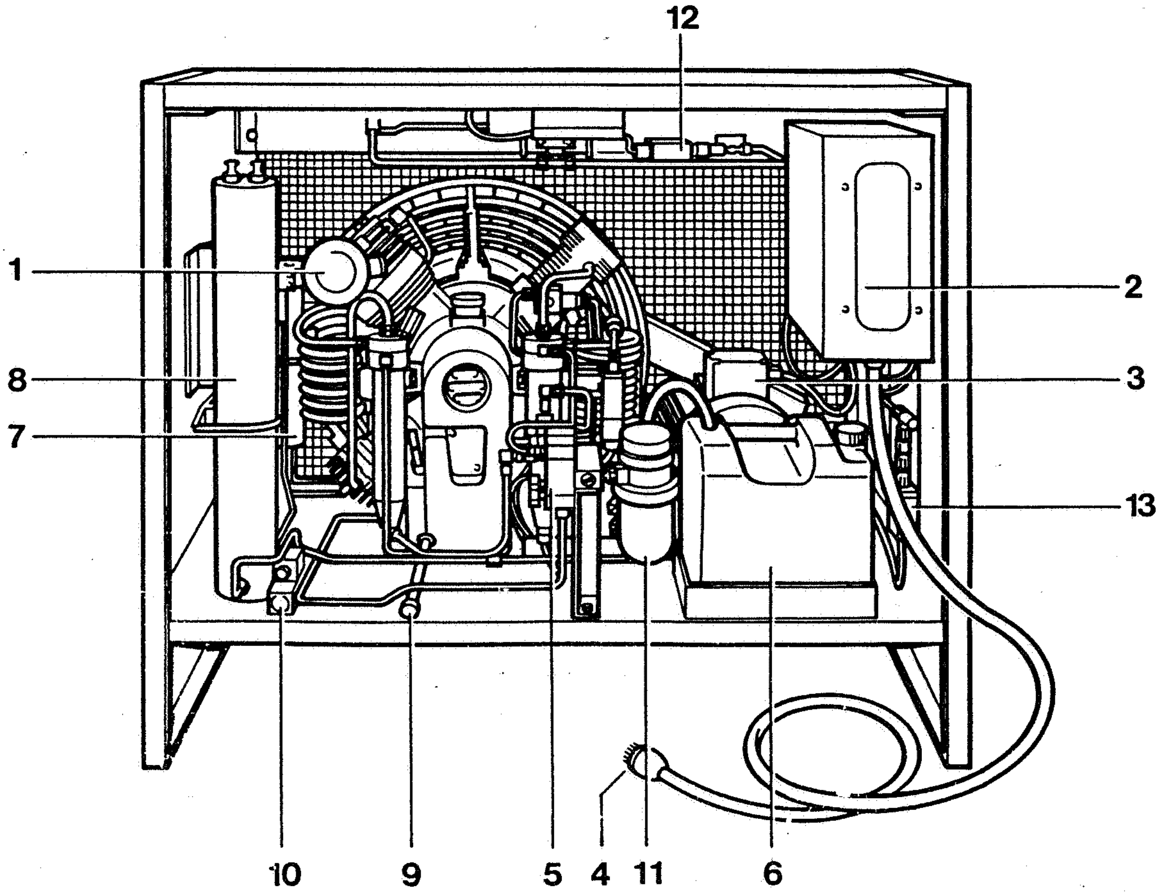

Fig. 1.6 Compressor Unit KAP 14, Rear View w/o panel
Model shown: KAP 14-5,5 E-HU

1 Intake filter
2 Compressor control*
3 Drive motor
4 Electrical connector
5 Automatic condensate drain*
6 Condensate tank*
7 Oil and water separator
8 Purifier
9 Oil drain plug
10 Pressure maintainig/non-return valve
11 Condensate separator/silencer
12 Pressure switch, 200 bars*
13 Pressure switch, 300 bars

* optional extra

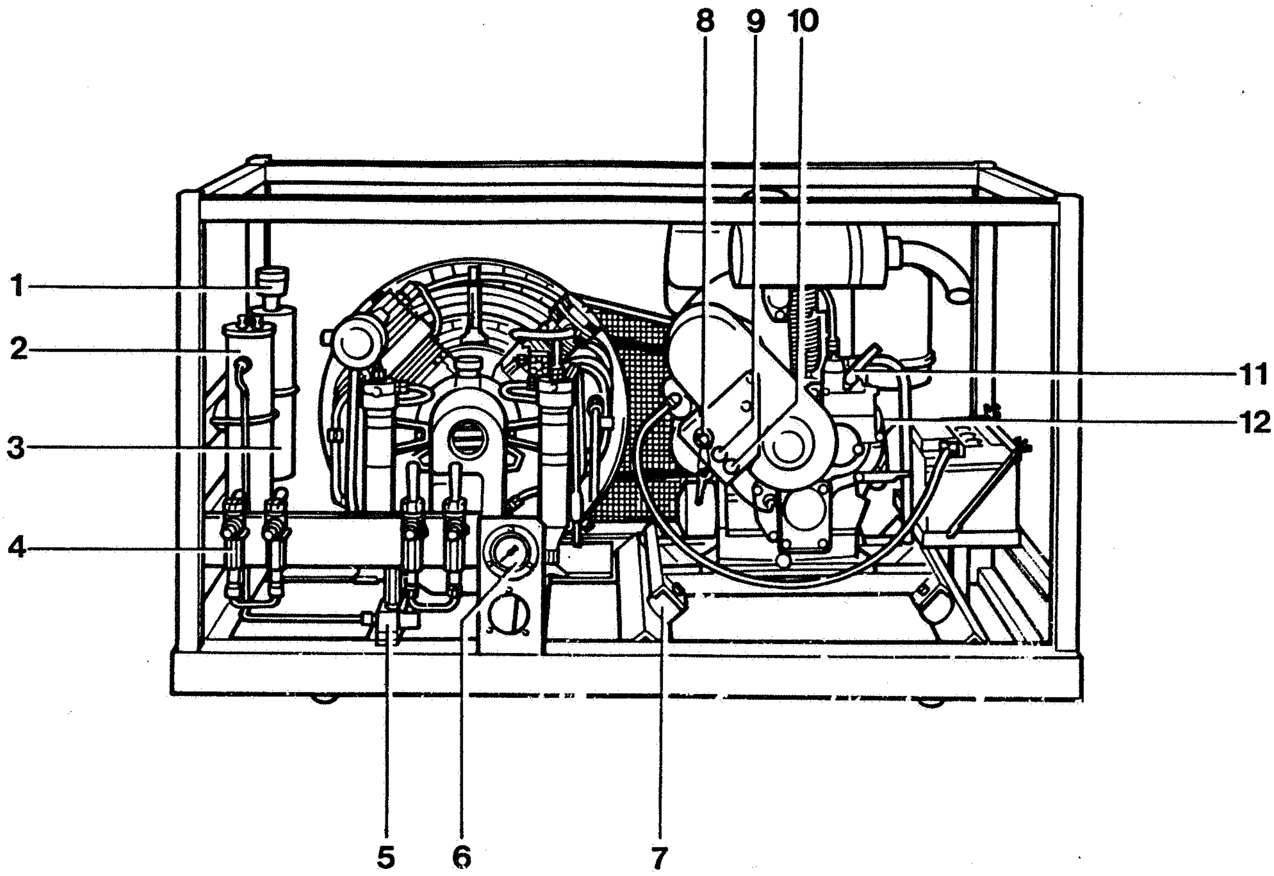

Fig. 1.7 Compressor Unit KA 14D, Front View
Model shown: KA 14-10 D-H

1 Safety valve, final pressure
2 Purifier
3 Oil and water separator
4 Filling valve*
5 Pressure maintaining/non-return valve
6 Pressure gauge, final pressure
7 Vibration isolator, drive motor
8 Starter key-lock
9 Charging indicator
10 Oil pressure warning light
11 Throttle
12 Shut-down lever

* standard = 3 filling valves; filling hoses, 1 m

1 GENERAL

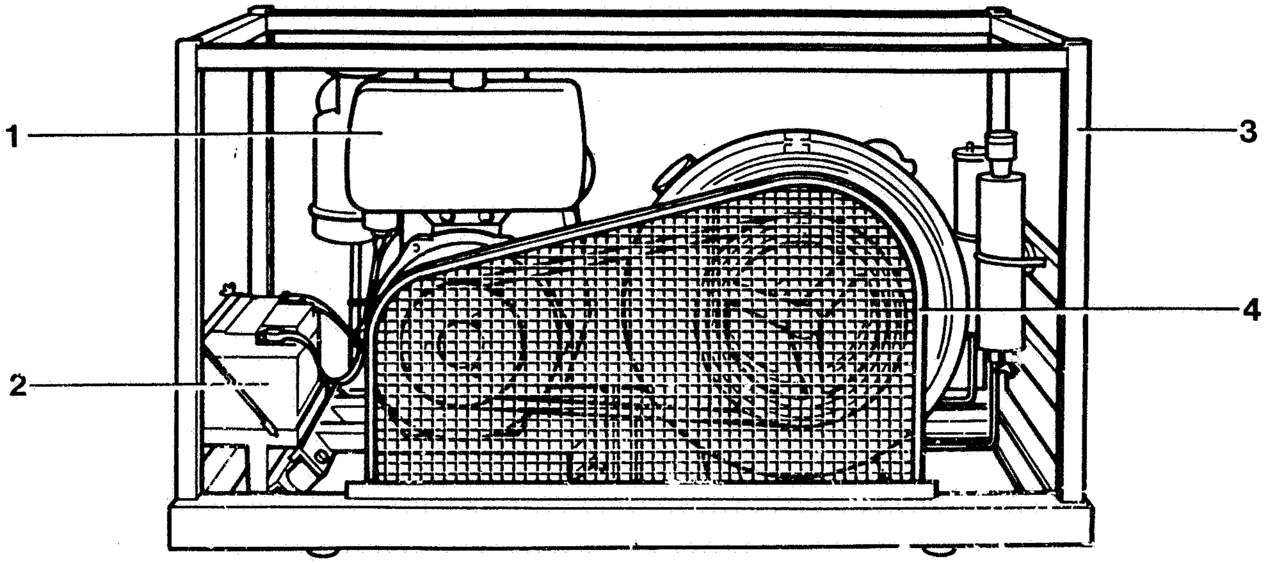

Fig. 1.8 Compressor Unit KA 14D, Rear View
Model shown: KA 14-10 D-H

1 Diesel tank
2 Starter battery
3 Frame
4 V-belt cover

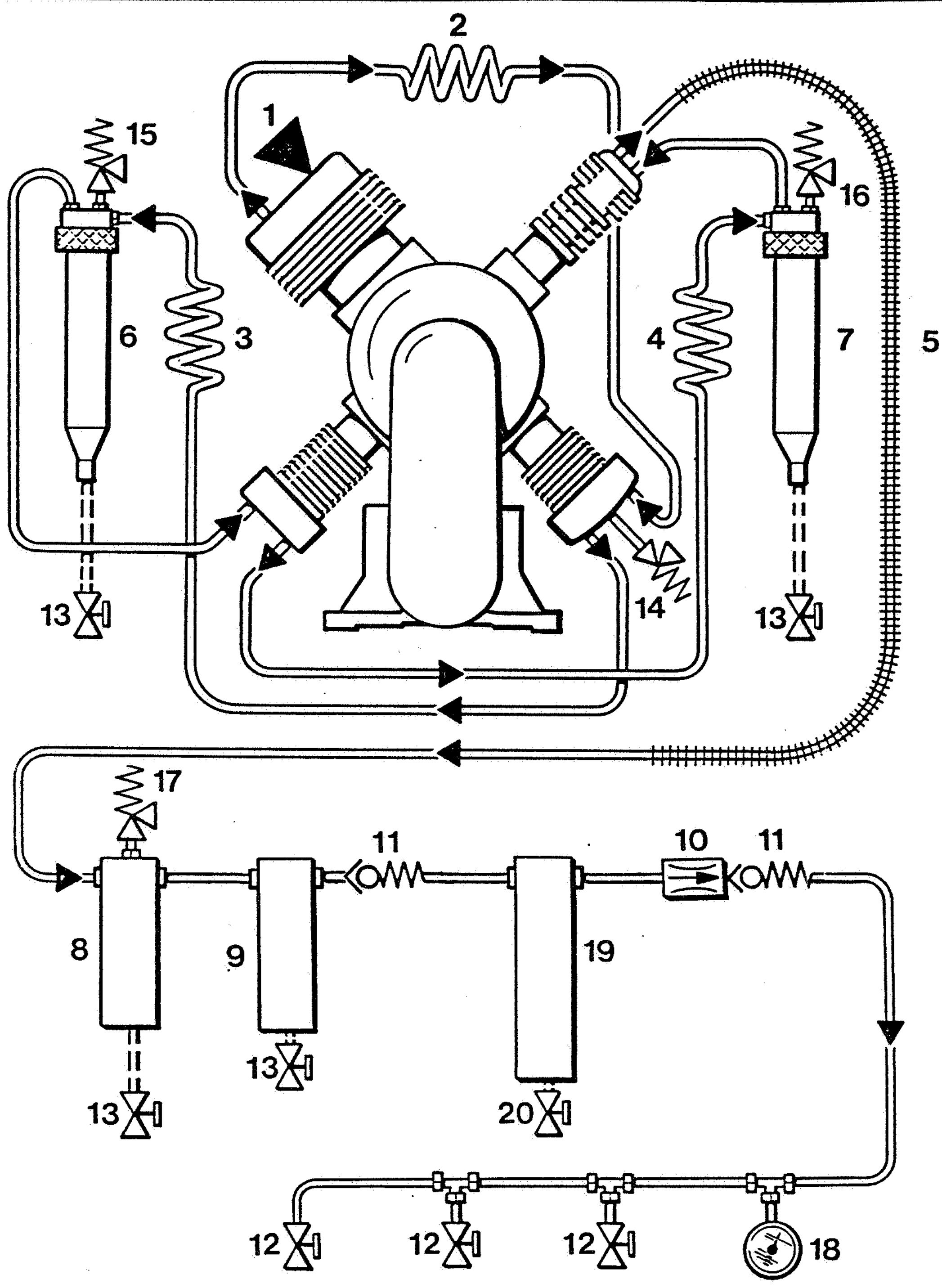

Fig. 1.9 Air flow diagram KA 14

1 Intake filter
2 Inter-cooler 1st/2nd stage
3 Inter-cooler 2nd/3rd stage
4 Inter-cooler 3rd/4th stage
5 After-cooler
6 Inter-filter 1st/2nd stage
7 Inter-filter 2nd/3rd stage
8 Oil and water separator
9 Purifier
10 Pressure maintaining valve
11 Non-return valve
12 Filling valve
13 Condensate drain valve
14 Safety valve, 1st/2nd stage
15 Safety valve, 2nd/3rd stage
16 Safety valve, 3rd/4th stage
17 Safety valve, final pressure
18 Pressure gauge, final pressure
19 Dryer
20 Bleed valve

1 GENERAL

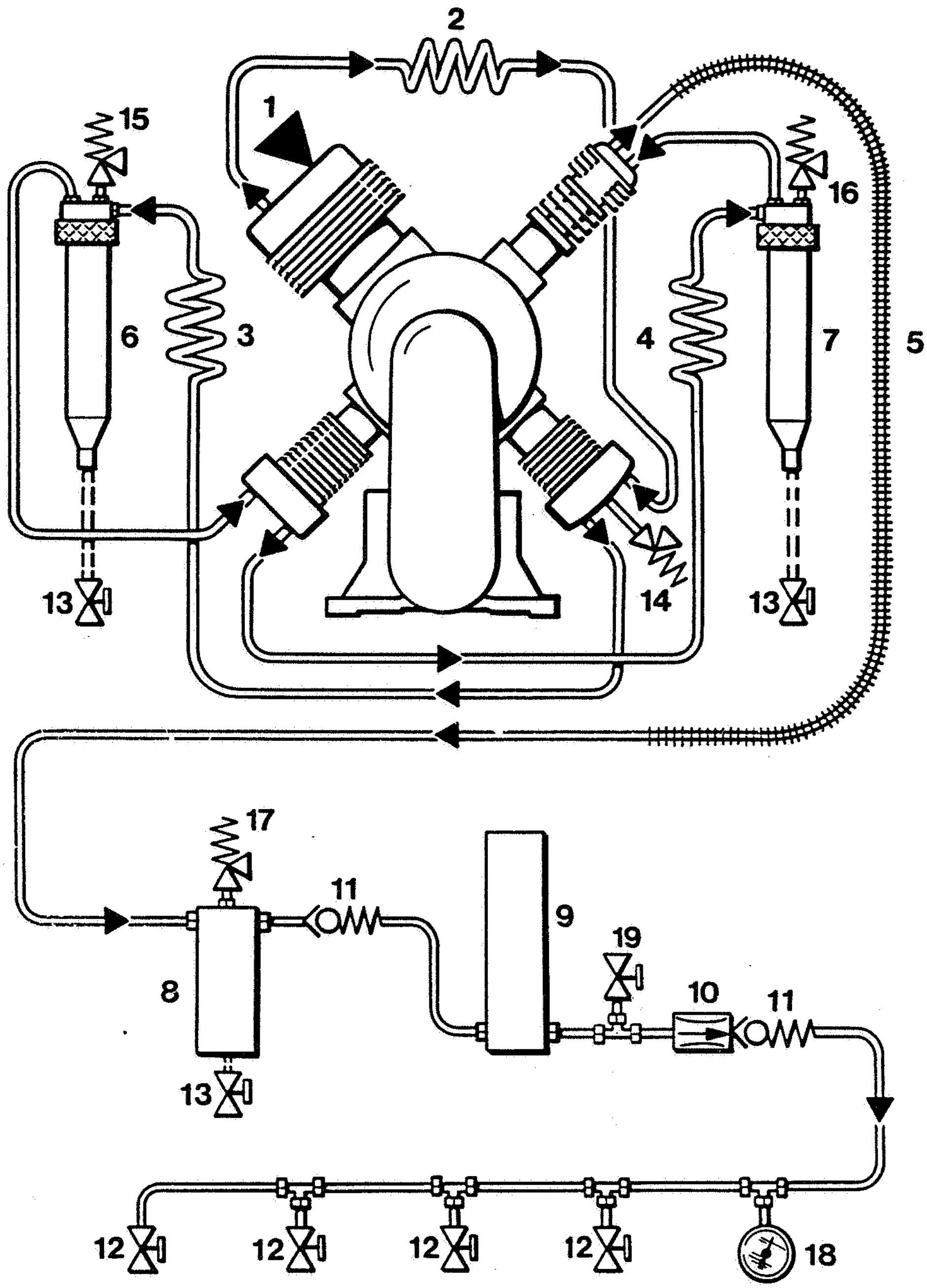

Fig. 1.10 Air flow diagram KAP 14

1 Intake filter
2 Inter-cooler 1st/2nd stage
3 Inter-cooler 2nd/3rd stage
4 Inter-cooler 3rd/4th stage
5 After-cooler
6 Inter-filter 1st/2nd stage
7 Inter-filter 2nd/3rd stage
8 Oil and water separator
9 Purifier
10 Pressure maintaining valve
11 Non-return valve
12 Filling valve
13 Condensate drain valve
14 Safety valve, 1st/2nd stage
15 Safety valve, 2nd/3rd stage
16 Safety valve, 3rd/4th stage
17 Safety valve, final pressure
18 Pressure gauge, final pressure
19 Bleed valve

LUBRICATION SYSTEM 2

2.1. FUNCTIONAL DESCRIPTION

The compressor is provided with force-feed lubrication for the fourth stage (Fig. 2.1). A Bosch injection pump (4) is driven by a camshaft via a V- belt. It pumps oil into the pressure regulator (2) at the 4th stage through an oilfilter. The oil pressure regulator (2) doses the oil quantity and is adjusted to the respective oil pressure. The oil not needed flows back to the crankcase through feedback tube (3) via 4th stage cylinder.

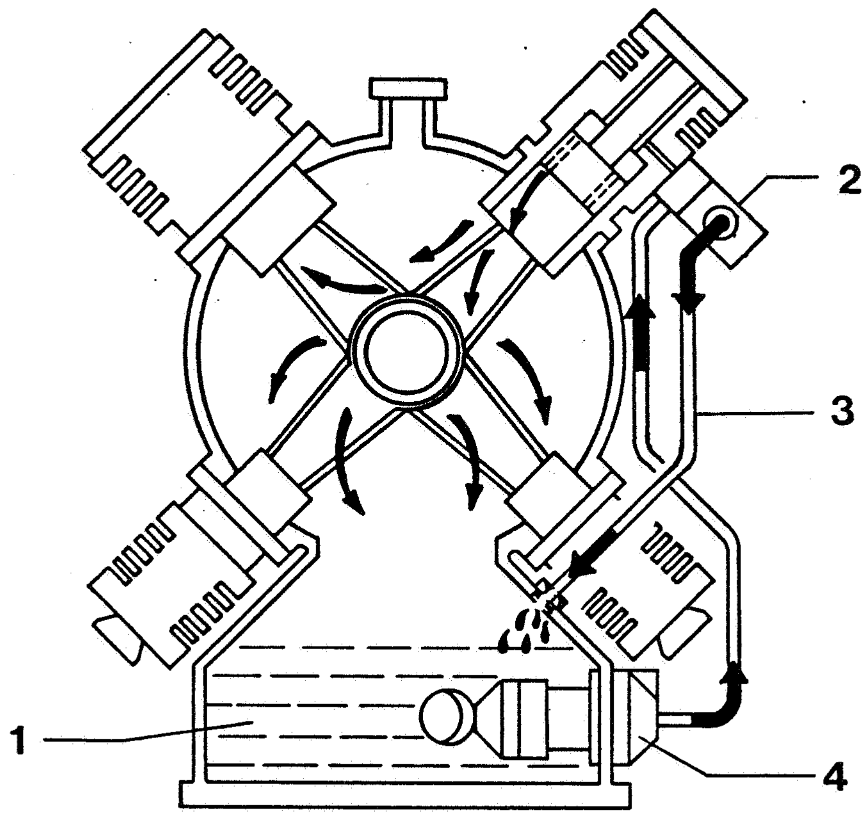

Fig. 2.1 Lube oil circuit

By the drive gear this oil is atomized and lubricates the other moving parts, such as crank-shaft, connecting rods, cylinders and pistons and returns into oil sump (1). Cylinder and piston of 1st stage are additionally lubricated by oil vapors from the cankcase vent feedback line.

2 LUBRICATION SYSTEM

2.2. TYPE OF OIL

For proper care and maintenance of the compressor using oil of the correct viscosity is of vital importance. Depending on the application of the compressor, the requirements placed on the lubricating oils are as follows:

- low deposits
- no carbonizing effect, especially in the valves
- good anti-corrosive properties
- emulsification of the condensate in the crankcase
- physiological and toxicological suitability

You are urgently recommended restricting oils to the following which have a proven record of success and are specified with the above characteristics.

- BAUER high pressure compressor oil
  Part No. N 2522/05 (0,5 l)
  Part No. N 2522/1 (1 l)
  Part No. N 2522/5 (5 l)
  Part No. N 2522/20 (20 l)
  (Specify viscosity acc. to table below)
- BP ENERGOL OE-M30 (SAE 30), OE-M20 (SAE 20)
- CASTROL MARINE MPX
- ESSO TRO-MAR T77
- Shell Ensis Engine Oil*
- Mobil Rarus** 827 (SAE 30)
- Tenneco Anderol 500** (SAE 30)
- Tenneco Anderol 497** (SAE 20)

Use these oils according to temperature follows:

Above +15 °C (40 °F)	SAE 30
Below +15 °C (40 °F)	SAE 20

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* Applicable for breathing air units, only:
No Shell Ensis Oil produced or distributed in the U.S.A.

** Synthetic oil

2.3 OIL CHANGE

First oil change	25 operating hours
Further oil changes, every	250 operating hours (normal oil)
	500 operating hours (synthetic oil)
Oil capacity	approx. 2.8 ltrs (3 US qts.).

If the operating hours indicated are not reached within 12 months, oil has to be changed after this period at the latest to avoid internal corrosion.

- Drain oil while still warm by means of oil drain plug. On units equipped with oil drain hose remove hose union nut from coupling at hose bracket.
- To fill up oil remove cap from oil filler neck. Pour oil in slowly, wait additional 5 minutes after having filled up, then put unit into operation.
- Check operation of oil pump. It is working properly if no air bubbles are visible in the oil pressure regulating valve sight glass. Vent pump if bubbles are visible, see para. 2.4.

2 LUBRICATION SYSTEM

2.4. VENTING OIL PUMP

Refer to Fig. 2.2. Loosen vent screw (1) by one or two turns until oil emerges free of air-bubbles. Then tighten vent screw (1).

Then loosen coupling (2) until bubble-free oil emerges. Unit must be in operation.

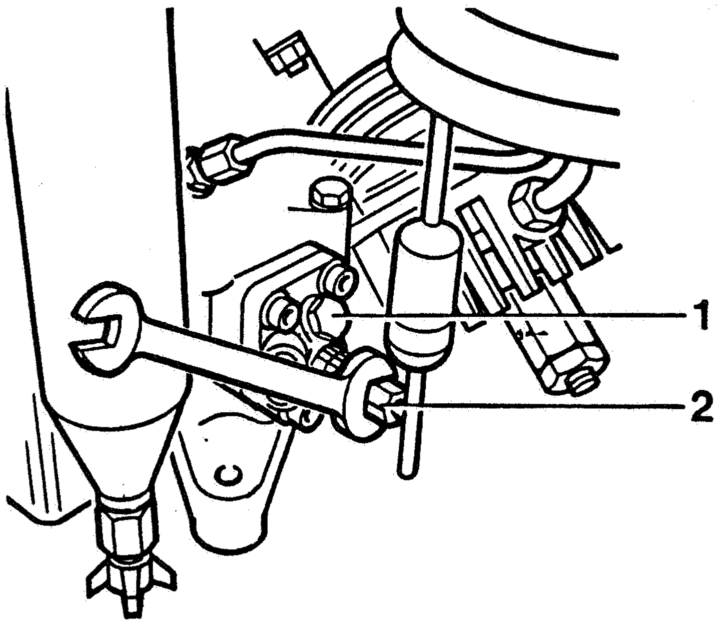


Fig. 2.2 Venting oil pump

2.5 OIL LEVEL CHECK

Check oil level every day prior to putting compressor into operation. Check using oil dip stick. Wipe off dip stick with lint-free cloth and note oil level must be between minimum and maximum dipstick notches. See Fig. 2.3.

Oil level must not exceed maximum as this will cause excessive lubrication of compressor and result in valves sooting up.

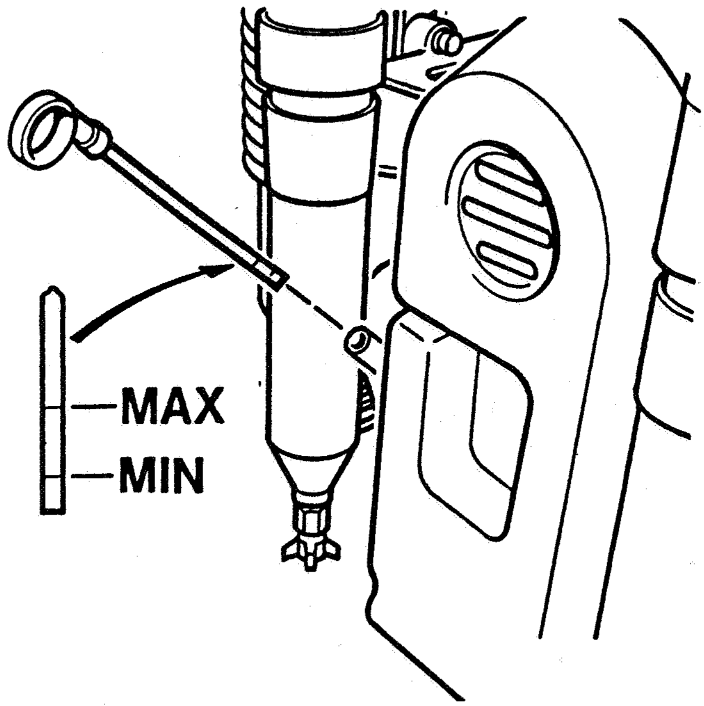


Fig. 2.3 Dipstick markings

2 LUBRICATION SYSTEM

2.6 OIL PRESSURE REGULATOR

The oil pressure regulator is mounted on the 4th stage cylinder and adjusted to **60 bars (870 psi).** Valve can be adjusted by removing cap nut (1) and turning the set screw (2) in the oil pressure regulator (3). See fig. 2.4.

Turning screw clockwise increases pressure

Turning screw counter-clockwise reduces pressure

Read oil pressure from an oil pressure gauge connected to oil pressure regulator

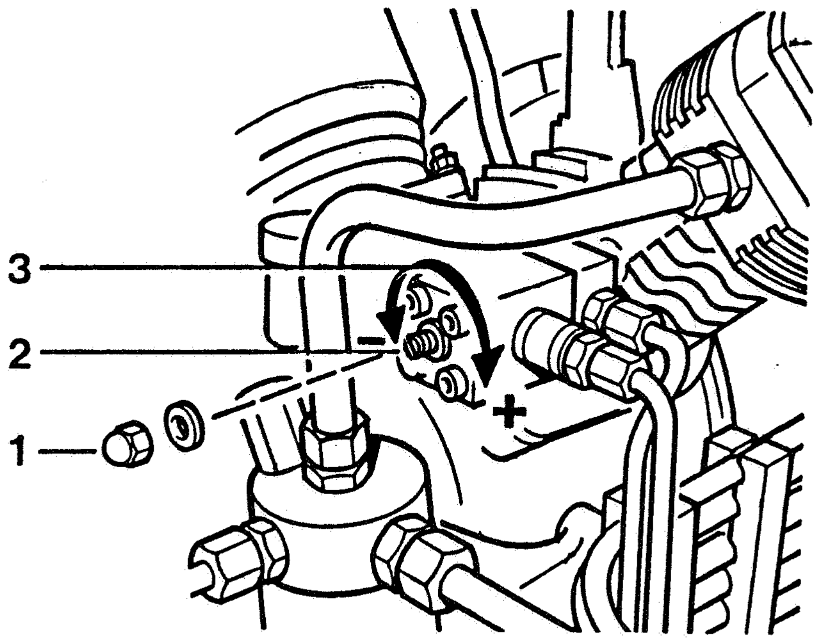


Fig. 2.4 Oil pressure regulator

INTAKE FILTER 3

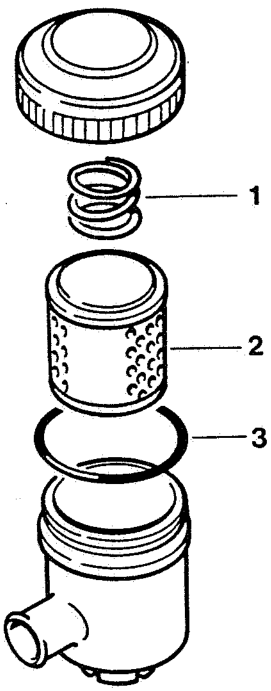
3.1 DESCRIPTION

A dry micronic filter is used to filter intake air (fig. 3.1).

3.2 INTAKE FILTER MAINTENANCE

Filter cartridge must be changed at least once a month or even weekly or daily depending on dust conditions.

- To clean remove filter cartridge (2) and clean with brush or by blowing air inside out.
- Turn cartridge through 90° when replacing. Replace dirty cartridge once it has been turned three times and thus made use at all sides.
- Clean filter housing inside with a damp cloth. Take care to prevent dust from entering intake pipe
- When changing cartridge make sure spring (1) on top cover is installed properly.



1 spring
2 filter insert
3 O-ring

Fig. 3.1 Intake filter

3 INTAKE FILTER

3.2 INTAKE HOSE AND PRE-FILTER

Gasoline or Diesel driven units must be fitted with an intake hose and a pre-filter (see fig. 3.2). This is also recommended for electric power driven compressor units.

Pre-filter is necessary to ensure clean, uncontaminated air free of exhaust fumes being compressed. The pre-filter eliminates any airborne contamination entering the intake hose.

Service the pre-filter the same way as the intake filter.

Do not use any cleaning fluids which are a hazard to respiration.

Clean in hot soapy water and blow dry with compressed air.

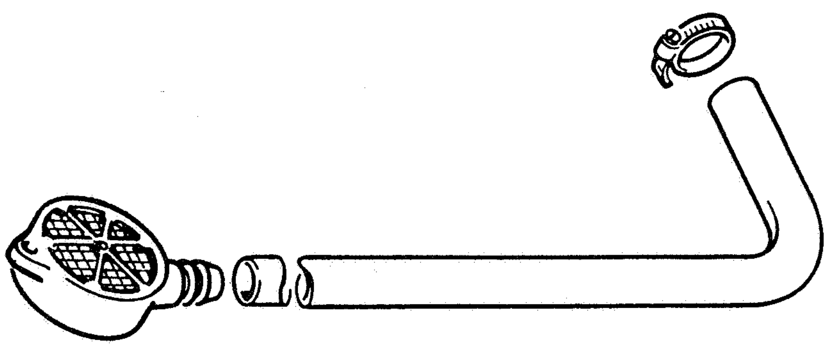


Fig. 3.2 Intake hose and pre-filter

INTER-FILTERS 4

4.1 FUNCTIONAL DESCRIPTION

Interfilters are mounted on the compressor between the 2nd and 3rd stage and between 3rd and 4th stage. The filters are designed to remove excess water and oil accumulating in the cooling coils from the compressed air. Separation is achieved by means of centrifugal action provided by a baffle (4). A sintered metal filter (1) is provided additionally for the inter-filter after the 3rd stage to remove dirt contamination, see fig. 4.1.

4.2 INTERMEDIATE FILTER MAINTENANCE

Proper operation of individual stages will rely on the intermediate filters being properly serviced.

Drain off condensate every 15 to 30 minutes from these filters or ensure that the automatic condensate drain unit drains regularly, respectively. See section 10.

Clean sintered filter element of 3rd stage inter-filter acc. to maintenance schedule, chapter 16, as follows:

- To remove sintered filter element, remove piping connected to filter head. Screw off union nut. Remove filter head (2) along with sintered filter element .
- Remove center screw (3), and separate sintered filter element (1) from the filter head.
- To clean filter element, best practice is to use hot soap suds and to blow dry with compressed air.

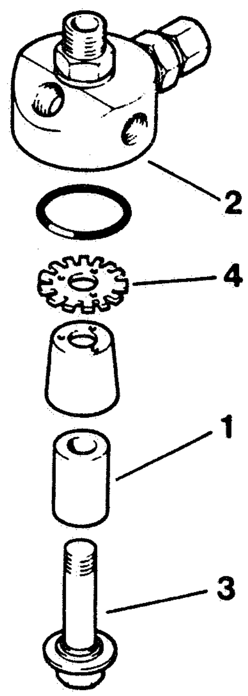


Fig. 4.1 Inter-filter

4 INTER-FILTERS

FILTER SYSTEM 5

BREATHING AIR
COMPRESSOR UNITS
WITH FILTER SYSTEM

F3

5 FILTER SYSTEM

5.1 GENERAL INSTRUCTIONS FOR FILTER MAINTENANCE

- Depressurize system before starting any maintenance work.

- Dry inside of filter housing before installing new cartridge with a clean cloth and check for corrosion.

- Lubricate threads and O-rings as well as threaded part of cartridge with white petrolatum. Apply sparingly.

- When changing cartridges record number of operating hours as indicated on hour meter to ensure exact attention to the maintenance intervals.

- Change cartridge before reactivating a compressor unit after out-of-service periods of more than 6 months.

- Leave cartridge in the filter as long as unit is out of service.

- Keep all condensate drain valves and shut-off valves closed. Keep a minimum pressure of approx. 50 to 80 bars (725 to 1160 psi) within the system to prevent moisture entering the compressor piping and filter system.

5.2. OIL AND WATER SEPARATOR DOWNSTREAM OF 4TH STAGE

Air leaving final stage is cooled in the after-cooler to approx. 10 - 15° C (18 - 27 °F) above ambient temperature and then enters the oil and water. The separator works on the nozzle principal, see fig. 5.1, liquid oil and water contamination being reliably separated from the compressed air.

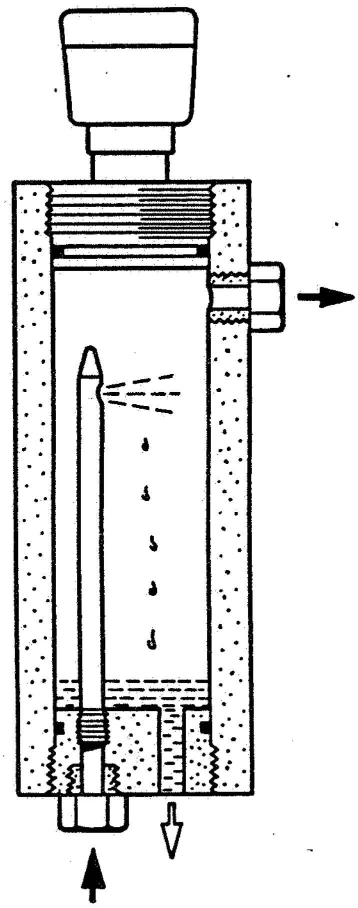


Fig. 5.1 Oil and Water Separator

5.2.1 Oil and water separator maintenance

The nozzle type oil and water separator is maintenance-free. The condensate drain is normally performed by the automatic condensate drain unit. See annex, if applicable.

5.2.2 Condensate drain

The condensate produced during the compression process must be drained regularly by means of the manual condensate drain valves

- at start-up of the compressor unit

- during operation every 30 minutes, at high humidity every 15 minutes.

For units equipped with automatic condensate drain see section 10.

5 FILTER SYSTEM

5.3 PURIFIER

Pre-cleaned air leaving oil and water separator is finally filtered in the purifier which removes all oil and water vapor from the compressed medium. Air is then ready for use or storage in the respective consuming devices.
The purifier is provided with one exchangeable cartridge (P/N 06961-410) filled with high-quality activated charcoal in granulated form. Felt pads in the cartridge eliminate any contamination of compressor lines. See fig. 5.2

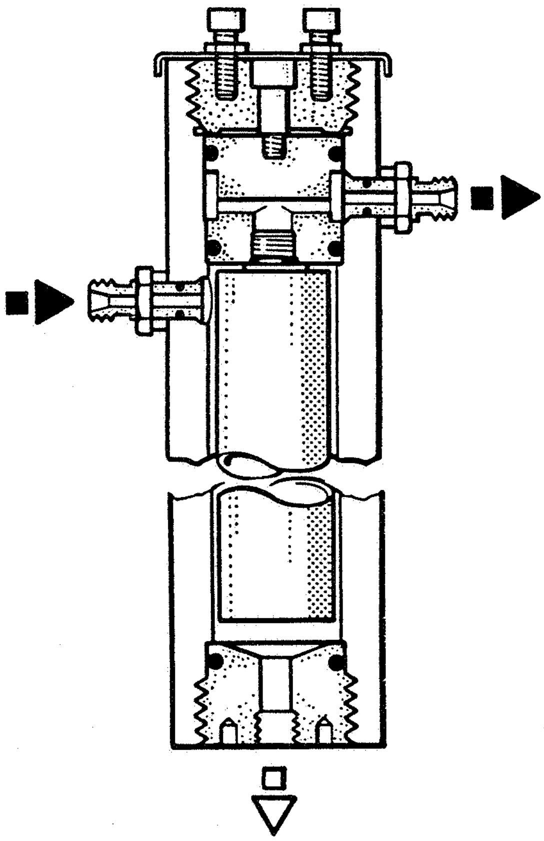


Fig. 5.2 Purifier

5.3.1 Purifier maintenance

The condition of the purifier filter cartridge is of major importance in determining quality of compressed air.
It is therefore most important to service the purifier regularly as follows:

Condensate drain:

See instructions for oil and water separator, section 5.2.

Change of cartridge:

Cartridge is major factor determining quality of air. Wrong maintenance will cause contamination of pipes and fittings and thus air will be contaminated with oil vapors.

Cartridge change intervals see section 5.5.

Change cartridge as follows:

- Depressurize purifier by opening condensate drain cock.

- Screw out filter head using a screwdriver or a pin (Fig. 5.3).

- Unscrew cartridges and replace by a new one.

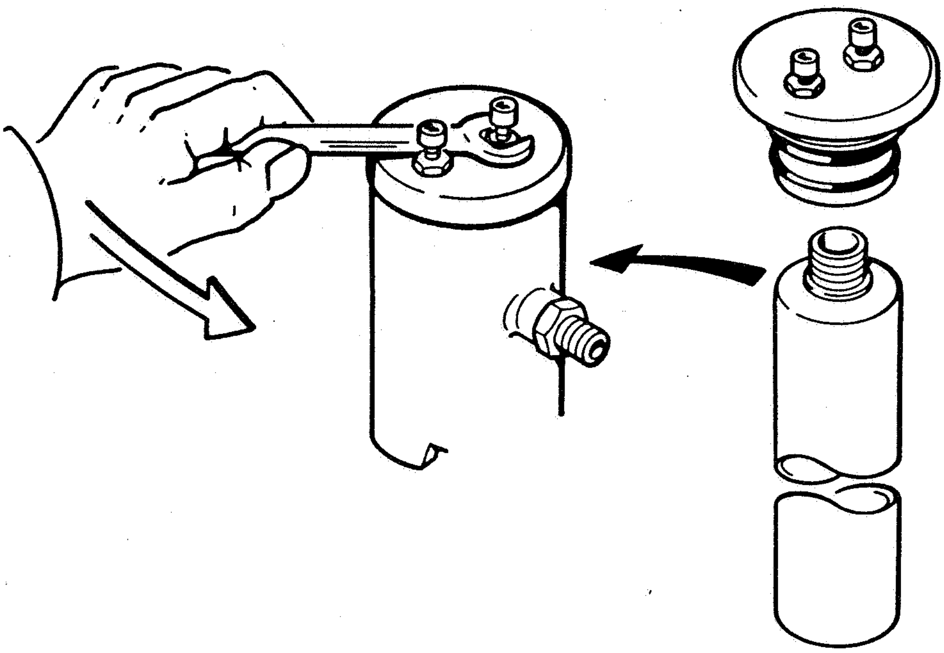


Fig. 5.3 Cartridge exchange

5 FILTER SYSTEM

5.4. DRYING FILTER

With respect to the German DIN standard DIN 3188, a drying filter can be mounted downstream of the purifier (refer to air flow diagram, fig. 1.9. It is equipped with two dryer cartridges.

As long as the drying cartridges (BAUER cartridge, P/N 012921-410) are changed regularly, the compressor unit will produce breathing air with water content meeting DIN standard 3188.

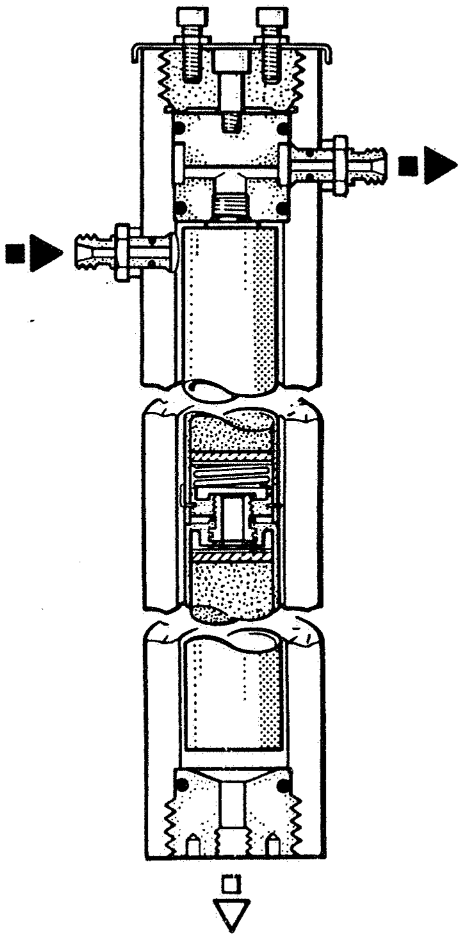


Fig. 5.4 Drying filter

5.4.1 Filter maintenance

Since the water vapor contents of the delivered compressed air and breathing air depends directly from this filter, its proper maintenance is of major importance. Maintenance is performed by changing the cartridge.

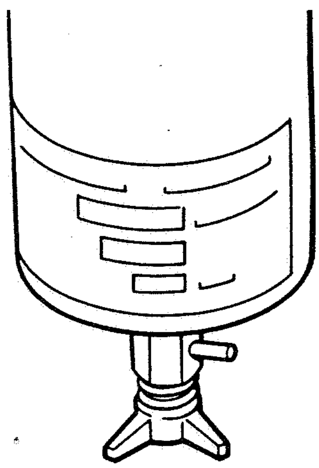


Fig. 5.5 Bleeding valve

Cartridge exchange

CAUTION

Never remove replacement cartridge from packaging prior to actual use. Otherwise the highly sensitive molecular sieve filter agent will adsorb water vapor from ambient air, saturate and render cartridge useless.

Change cartridge as follows:

- Depressurize drying filter by opening discharge valve (Fig. 5.5). Turn knob counterclockwise to open the valve.

- Screw out filter head using a screwdriver or a pin (Fig. 5.3).

- Unscrew cartridges and replace by new ones. Two cartridges are screwed in after each other (Fig. 5.6). On the bottom of each drying filter cartridge there is an adaptor with inner thread.

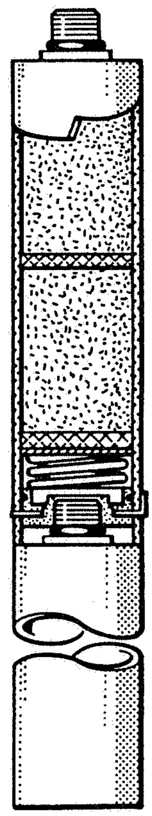


Fig. 5.6 Mounting cartridges

5 FILTER SYSTEM

5.5 CARTRIDGE EXCHANGE INTERVALS

Cange all cartridges in the filter system at least after the following operating hours or bottle fillings.

CAUTION

Filling data will be reduced by half when compressor unit is used under conditions of high humidity or high ambient temperatures.

Nominal filling pressure 200 bars (2900 psi)

After 140 to 150 fillings of 7 ltr. bottles
or 95 to 100 fillings of 10 ltr. bottles

Nominal filling pressure 300 bars (4350 psi)

After 95 to 100 fillings of 7-ltr. bottles
or 70 to 75 fillings of 10-ltr. bottles

Operating hours

Expressed in operating hours, the cartridges have to be exchanged as follows:

KA14-5,5	every 15 operating hours.
KA14-7,5	every 12 operating hours.
KA14-10	every 10 operating hours.

BREATHING AIR
COMPRESSOR UNITS
WITH FILTER SYSTEM

P41

5 FILTER SYSTEM

FILTER SYSTEM 5

5.1 APPLICATION AND SUMMARY DESCRIPTION

The filter system P41 (fig. 5.1) consists of:

- Separator (1) with final pressure safty valve (2),
- Non-return valve (3) between separator and purifier,
- High pressure purifier (4) (filter cartridge for CO removal used optionnally in the purifier),
- **SECURUS** indicator unit* (5),
- Venting valve (6) with pressure gauge,
- Pressure maintaining/non-return valve (7).

The system is integrated into the compressor unit, i.e. the filters and other components are mounted at the frame, the pressure gauges are situated at the filling panel.

If the **SECURUS** monitoring system is provided the breathing air regeneration process and the degree of dryness of the air are continously monitored during the regeneration process by measuring the catridge saturation within the filter cartridge.

The absence of moisture in the breathing air is the only assurance of the effectiveness of the filtering compounds used.

* optional extra acc. to order

5 FILTER SYSTEM

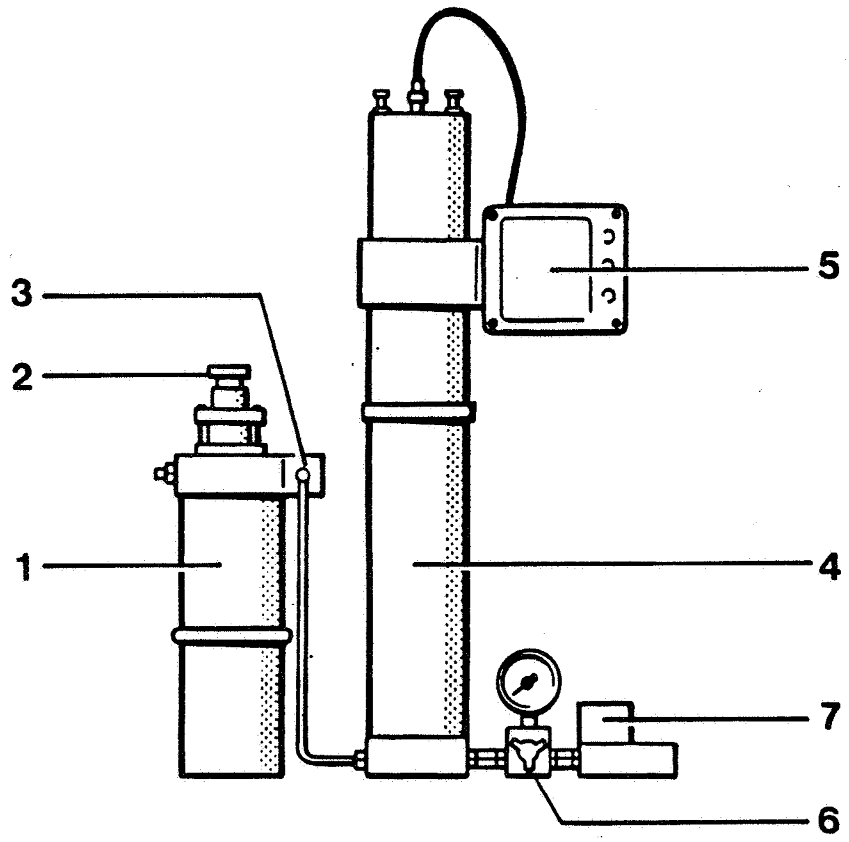


Fig. 5.1 · Filter system P41 with **SECURUS** monitoring unit

1 Oil and water separator
2 Final pressure safety valve
3 Non-return valve
4 Purifier
5 **SECURUS** indicator unit*
6 Bleeding valve with pressure gauge
7 Pressure maintaining valve

* optional extra

5.2. OIL AND WATER SEPARATOR DOWNSTREAM OF 4TH STAGE

The air leaving the final stage is cooled in the after-cooler to approx. 10 - 15 °C (18 - 27 °F) above ambient temperature and then enters the oil and water separator (fig. 5.2). The oil and water separator works by means of a sintered filter micro-cartridge (1) reliably separating liquid oil and water particles from the compressed air.

5.2.1 Oil and water separator maintenance

The sinter-filter micro cartridge requires periodic maintenance.

Maintenance intervals see section 16.

To remove sintered filter element proceed as follows:

- Remove tube connected to non-return valve (2).

- Screw off filter head (3) and remove.

- Unscrew micro-cartridge (1) from filter head (3).

- Remove center screw (4) to remove filter elements (see fig. 5.2).

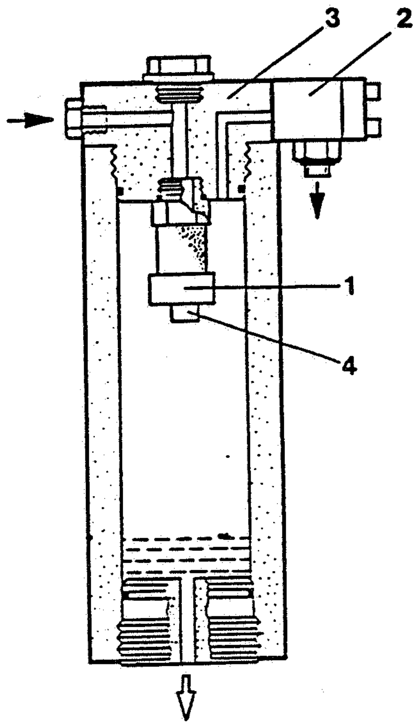


Fig. 5.2 Oil and water separator

- Clean sintered filter elements using hot soapy water and blow dry with compressed air.

5 FILTER SYSTEM

5.1.2 Condensate drain

The condensate produced during the compression process must be drained regularly by means of the manual condensate drain valves

- at start-up of the compressor unit
- during operation every 30 minutes, at high humidity every 15 minutes.

For units equipped with automatic condensate drain see section 10.

5.3 GENERAL INSTRUCTIONS FOR FILTER MAINTENANCE

- Depressurize system before starting any maintenance work.

- Dry inside of filter housing before installing new cartridge with a clean cloth and check for corrosion.

- Lubricate threads and O-rings as well as threaded part of cartridge with white petrolatum. Apply sparingly.

- When changing cartridges record number of operating hours as indicated on hour meter to ensure exact attention to the maintenance intervals.

- Change cartridge before reactivating a compressor unit after out-of-service periods of more than 6 months.

- Leave cartridge in the filter as long as unit is out of service.

- Keep all condensate drain valves and shut-off valves closed. Keep a minimum pressure of approx. 50 to 80 bars within the system to prevent moisture entering the compressor piping and filter system.

5 FILTER SYSTEM

5.4 SPECIFICATIONS

5.4.1 Filter specifications

a. General

Service pressure	225/330 bars (3200/4500 psi)
Flow rate	up to 450 l/min. (15 cfm)
Regenerated volume of air, referenced to 1 bar abs. at 20 °C. Flow rate 200 l/min. against 200 bars (2900 psig)	1500 m^3 (1000 m^3 with CO cartridge)
Operating temperature range	+5...+50 °C (41...122 °F)

b. High pressure filter assembly

External diameter	100 mm
Length	640mm
Water volume	2.1 dm^3)
Weight	80 N (18 lbs)
Piping connections:	
intake	R 1/4"
outlet	R 1/4"

c. Filter cartridges with sensor for filter system P41

Part No.	**061686-410**	**061687-410**
Length	503 mm (20")	503 mm (20")
Cartridge contents*	MS/AC/MS	MS/AC/MA/HP (CO-removal)
Regenerating capacity	1500 m^3**	1000 m^3**
Residual water contents	<25 mg/m^3	<25 mg/m^3
Residual oil vapor contents	< 1 mg/m^3	< 1 mg/m^3
Residual CO contents	---	400 to 500 ppm_V

All data measured against p = 200 bars and + 20 °C

* MS = Molecular sieve
AC = Activated charcoal
HP = Hopcalite
** Free air referenced to 1 bar abs.

5 FILTER SYSTEM

5.4.2 Electrical specifications (Filter systems with SECURUS monitoring, only)

Assemblies used	1 SECURUS indicator 1 Filter housing with pressure resistant conductor bushing 1 Sensor inside the SECURUS cartridge
Operating voltages of the SECURUS indicator unit	190 - 250 volts, 50/60 Hz, or 110 - 127 volts, 50/60 Hz, or 12-24 volts DC
Power consumption of the SECURUS indicator unit	AC version 3 VA DC version 2 W
Contact components	3 N/O contacts for preliminary warning and for compressor shut-off.
Contact switching current	250 volts/6 Amps
Protection class for SECURUS indicator unit	IP 65
Dimensions of the SECURUS indicator unit	120x120x55 mm (LxWxH)

Mains connections and switching outputs via terminals

5.5 OPERATING CHARACTERISTICS

Unlike other filter systems the **SECURUS** filter system assures a continuous monitoring of the breathing air purification parameters already during the regeneration process. The influences of

- ambient temperature
- ambient humidity
- temperatures of the compressor and regeneration system

are taken into consideration.

The adsorption type **SECURUS** cartridges are designed for

- drying of air
- adsorption of aromatic components (aerosols)
- conversion of CO into CO_2
- partial adsorption of CO_2

The quality the breathing air produced conforms to the national and international standards such as

DIN 3188
British Standard 4001
US CGA Spec. G.7.1.
Canada CSA standard Z 180.1
Australian Army Standard 5017.

It is impossible to exceed the cartridge utilization time since a preliminary warning signal indicates the approaching saturation of the cartridge. Depending on the size of compressor used, the prewarning signal will appear between 1 and 7 hours prior to cartridge saturation.

5 FILTER SYSTEM

If the catridge is not replaced after illumination of the preliminary warning signal the **SECURUS** filter system will automatically shut down the compressor as soon as the cartridge has been exhausted.

The compressor cannot be turned on as long as no cartridge has been inserted.

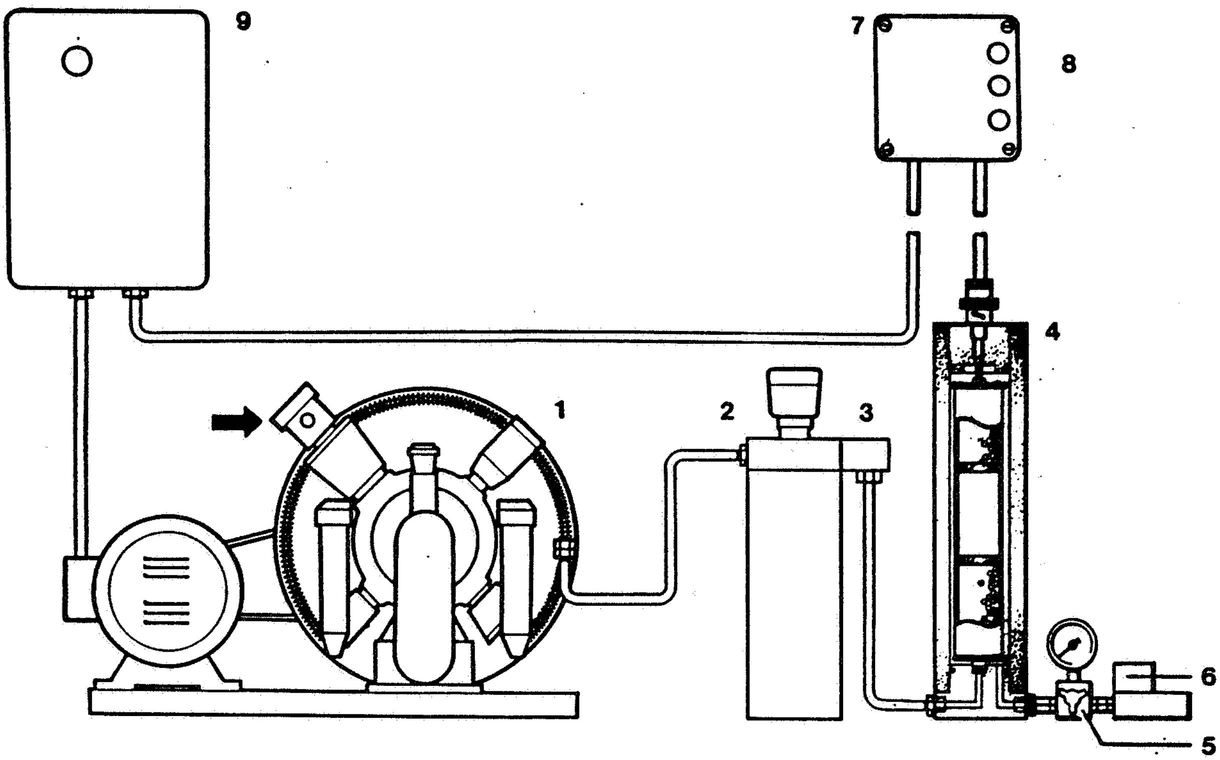
The **SECURUS** filter system operates in the FAIL-SAFE mode: The compressor will be shut down if the circuit between the control unit and the sensor is interrupted.

CAUTION As soon as the preliminary warning signal appears or, at the latest, after the **SECURUS** indicator unit has shut down the system, the purifier cartridge must be changed. See section 5.6.1

5.5.1 AIR FLOW DIAGRAM

Fig. 5.3 shows the air path through the **SECURUS** filter system.

The filter assembly with the pressure resistant bushing for the filter cartridge with sensor is installed as the last filter before the pressure maintaining/non-return valve.



1 Compressor
2 Separator
3 Stainless steel non-return valve
4 Purifier with **SECURUS** cartridge
5 Venting valve with pressure gauge
6 Pressure maintaining/non-return valve, air outlet
7 **SECURUS** control unit
8 Indicator lights
9 Switch for drive motor

Fig. 5.3 Typical air flow diagram

5 FILTER SYSTEM

5.6 FILTER ASSEMBLY

The compressed air assembly consists of an anodized aluminium alloy pipe with 100 mm external diameter. Both ends are provided with fine threads on the inside.

The screw-in filter bottom contains air intake and outlet.

Connector threads see specifications, 5.4.

The upper screw connection contains a pressure resistant brushing for the electrical connections. The coaxial cable witch leads from the sensor to the control unit is connected to the BNC connector located there.

Description of the electrical operation, see section 5.8.

5.6.1 Cartridge change (Fig. 5.4)

- Unlock BNC plug of the coaxial cable by applying light pressure and turning in a counter-clockwise direction and remove BNC plug.

- Unscrew the uppper screw top "A" with the aid of the special spanner (wrench) supplied (this tool has a recess to accomodate the BNC plug):

CAUTION Do not use any other tool to assure that the BNC coaxial plug will not be demaged

- Pull out spent cartridge by means of its clip and replace with a new cartridge.

- Replace screw top, screw in by hand and tighten with the special spanner (wrench) "B".

NOTE The special spanner (wrench) may also be used for changing the catridges inside the other filters.

The separator in the filter system contains a micro-cartridge. If this cartridge must be changed, remove the tubing at the top of the filter. First unscrew the filter top from the separator housing und then the micro cartridge from the filter top.

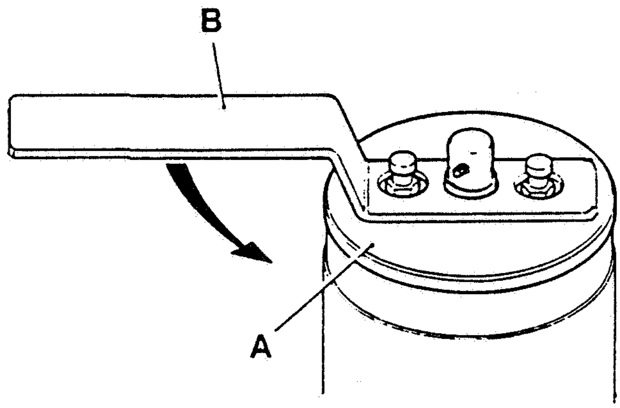


Fig. 5.4 Cartridge change

5 FILTER SYSTEM

5.7 FILTER CARTRIDGES

The cartridge tube is made of aluminium. Cover and bottom are consisting of pressure diecast aluminium. The cartridge cover contains the sensor for the monitoring function and the clip to facilitate cartridge changing.

Different cartridges are available depending on the required air quality. See specifications 1.1 and section 4.

Fig. 5.5 and the following table show the internal construction of the filter cartridges.

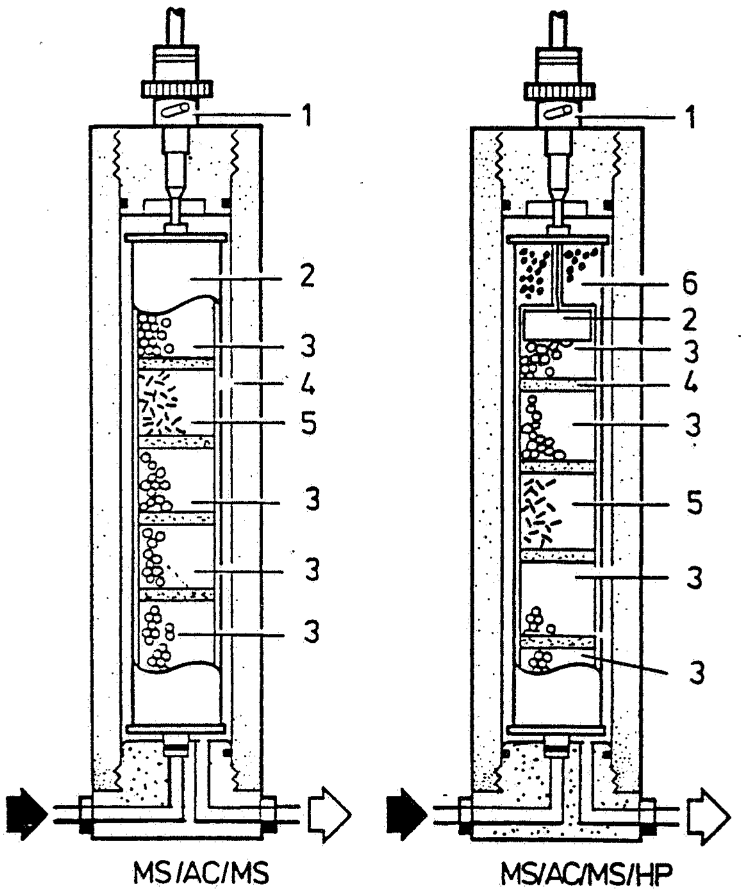


Fig. 5.5 Construction of the Filter Cartridges

Key to Fig. 5.5 Construction of Filter Cartridges

Pos.	Part Name	Purpose
1	Coaxial plug	Attachment of the signal cable, cartridge and **SECURUS** indicator unit.
2	Sensor	Indicates cartridge saturation to the **SECURUS** indicator unit
3	Molecular sieve	Drying by adsorption
4	Foam plastic disc	Separates filter agents
5	Activated charcoal	Adsorption of odor producing substances, oil vapors and aerosols
6	Hopcalite	Catalytic agent with excellent contact time characteristics for converting CO into CO_2

5 FILTER SYSTEM

5.7.2 SECURUS Filter Replacement Intervals

NOTE

The entities in the following table are based on estimated filter cartridge life time; on systems equipped with **SECURUS** monitoring unit, the actual saturation of the cartridge is reported by the electronic monitor.

CAUTION

The indicated change intervals are valid only at a temperature of 20 °C (68 °F).
For higher temperatures the change intervals will be reduced according to the table on the right.

°C	°F	Correction factor
50	122	0,2
40	104	0,34
30	86	0,57
20	68	1
10	50	1,85
5	41	2,6
0	32	3,8

Compressor model	Filter change after				
	Operating hours	Bottle fillings			
		200 bars		300 bars	
		7 l	10 l	7 l	10 l
MP3E	130/85*	1000/700*	750/500*	700/500*	500/350*
V-U	250/165*	1000/700*	750/500*	700/500*	500/350*
V-C	180/120*	1000/700*	750/500*	700/500*	500/350*
V-M	130/85*	1000/700*	750/500*	700/500*	500/350*
KAP 14-5,5	120/80*	1000/700*	750/500*	700/500*	500/350*
KAP 14-7,5	100/65*	1000/700*	750/500*	700/500*	500/350*
KAP 14-10	75/50*	1000/700*	750/500*	700/500*	500/350*
V-5,5	120/80*	1000/700*	750/500*	700/500*	500/350*
V-7,5	100/65*	1000/700*	750/500*	700/500*	500/350*
V-10	75/50*	1000/700*	750/500*	700/500*	500/350*
KAP 15-15	60/40*	1000/700*	750/500*	700/500*	500/350*
V-15	60/40*	1000/700*	750/500*	700/500*	500/350*

* With CO Filter cartridge

5.8 SECURUS INDICATOR UNIT

5.8.1 Operation

The **SECURUS** indicator unit receives signals concerning the condition of the drying agent inside the filter cartridge from the attached sensors and furnishes appropriate control signals whenever the preset threshold values have been reached.

The annular sensor inside the filter cartridge head senses changes in capacitance caused by the saturation within the surrounding drying agent. The signal path from the sensor leads through a spring pin contact, which forms the connection between cartridge and filter head, to the pressure-resistant bushing in the filter head and continues through the center conductor of the coaxial cable to the indicator unit. The signal return is effected through the cable shield to the cartridge housing.

The four operating conditions of the **SECURUS** system are reported by three relays (normally open contacts). Simultaneously with the closing of the relay contacts built-in luminescent diodes illuminate:

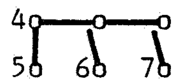
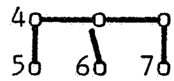
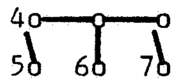
1. Continuous green:	Unit in operation
2. Blinking yellow:	Cartridge change pre-warning
3. Blinking red:	Compressor shut-down because of cartridge used up
4. Continuous red:	Compressor shut-down because of missing cartridge or cable failure

If yellow diode is blinking, the green diode will continue to illuminate because unit is still operational with the yellow light on.

5 FILTER SYSTEM

If no lamp is on which means that no relay contact is closed, the **SECURUS** indicator unit receives no operating voltage or the electronics within the unit failed.

After applying operating voltage to the unit it will take about 0.5 seconds to close the respective relay contact and to light the appicable diode. During this time interval the status of the cartridge is checked, an erroneous lighting or flickering of the lamps will not occur.

Mode of Operation	**System Status**	**Indicator Light**	**Contact position***
Normal	cartridge serviceable	green	
Pre-warning	cartridge approaching saturation	green + yellow blinking	
Shut-Off	cartridge saturated	red blinking	
Shut-Off	cartridge missing or cable failure	red continuous	

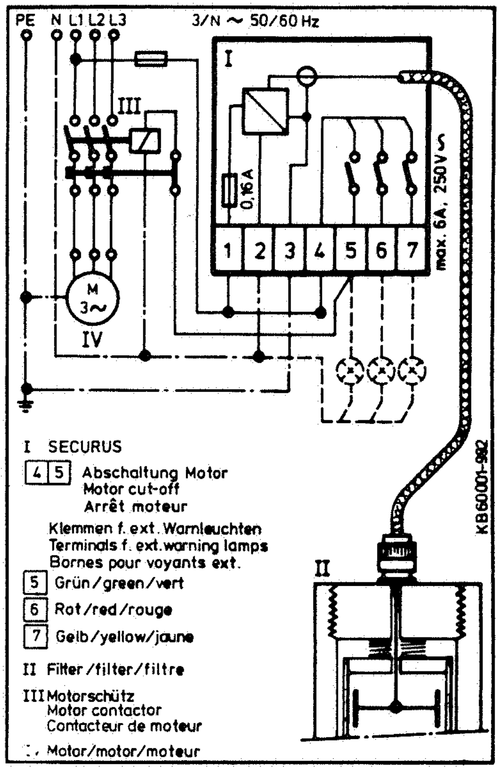
* Connection for external warning lamps

5.8.2 Electrical connections

Terminal Utilization (AC version)

Terminal 1: Mains connection - phase
Terminal 2: Mains connection - Mp
Terminal 3: System ground wire
Terminal 4: Common
Terminal 5: Contact, green light
Terminal 6: Contact, red light
Terminal 7: Contact, yellow light

Maximum permissible contact load is 250 VAC, 6 AMPS

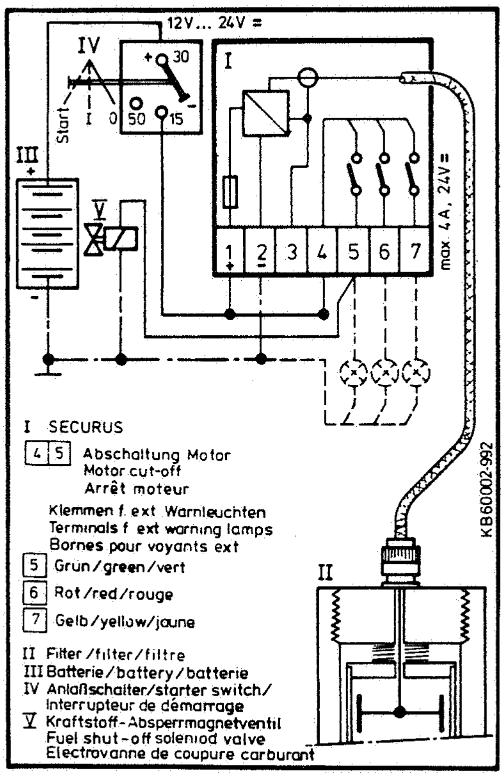


12 - 24 Volt Direct Current version

Terminal 1: Positive polarity, power supply

Terminal 2 or terminal 3:
Negative polarity, power supply.
(Terminal 2 and 3 are connected inside the unit).

Other terminal utilisation is the same as in the AC version. The cable shield is connected to terminal 3 inside the unit.



5 FILTER SYSTEM

PRESSURE MAINTAINING VALVE 6

6.1 FUNCTIONAL DESCRIPTION

A pressure maintaining valve and a non-return valve are provided downstream of the filter system.

The pressure maintaining valve ensures that pressure is built up in the filters even at the start of air delivery thus achieving constant, optimum filtering. It also ensures proper working conditions of final stage cylinder when filling a number of air tanks simultaneously. The non-return valve prevents compressed air from returning from the filled air cylinders or tanks as long as the compressor is shut down.

6.2 COMPRESSOR UNITS KA 14

On KA 14 units, the pressure maintaining valve and the non-return valve are mounted beneath the filling panel.

The pressure maintaining valve is adjusted to open at **120 bars (1740 psi).**
If additional drying filters are used, an additional non-return valve is built-in after the purifier. It prevents already dried air from flowing back from the drying filters to the purifier and escaping with the condensate when this is drained.

6.3 COMPRESSOR UNITS KAP 14

For KAP 14 breathing air compressor units, a combined pressure maintaining /non-return valve is used which is mounted downstrem of the filter mounted beneath the base frame panel.

The pressure maintaining valve is adjusted to open at **170 bars (2470 psi).**
An additional non-return valve is built-in after the oil and water separator. It prevents already dried air from flowing back from the purifier and escaping with the condensate when this is drained from the oil and water separator.

6 PRESSURE MAINTAINING VALVE

SAFETY VALVES 7

7.1 FUNCTIONAL DESCRIPTION

All compressor stages are protected by safety valves as follows:

Safety valve (fig. 1, pos. 8)
protects **1st stage** and is adjusted to **5.5 bars (80 psi)**

Safety valve (fig. 1, pos. 9)
protects **2nd stage** and is adjusted to **24 bars (350 psi)**

Safety valve (fig. 1, pos. 10)
protects **3rd stage** and is adjusted to **80 bars (1160 psi)**

The safety valve for protection of **4th stage** is adjusted to the operating pressure of the unit, but

to max. 330 bars (4.700 psi)

The pressure safety valves are sealed at the factory and adjusted to the corresponding pressure.

7.2 MAINTENANCE

If safety valves of the 1st, 2nd or 3rd stage blow off, valves in next higher stages are not closing properly, affording check of the valves in the next higher stage. The cause of trouble is usually the inlet valve of the next stage, see also 2.6.

The safety valve of the 4th stage which is the final pressure safety valve, must be checked for proper functioning from time to time. Pump unit to final pressure with shut-off valve closed until safety valve blows.

Check blow-off pressure of safety valve at pressure gauge.

7 SAFETY VALVES

PRESSURE GAUGES 8

8.1 FUNCTIONAL DESCRIPTION

The interstage pressures* and the final pressure are shown on the pressure gauges at the instrument panel.

During operation, these pressure gauges must indicate the proper intermediate pressure and final pressure values.

For K 14, the intermediate pressures are as follows:

Final pressure	**225 bars**	**330 bars**
1st/2nd stage:	**3,5 bars**	**4 bars**
2nd/3rd stage:	**17 bars**	**20 bars**
3rd/4th stage:	**58 bars**	**65 bars**

We recommend to check the pressure gauges from time to time. For this purpose we provide a special test pressure gauge with suitable adaptor to immediately recognize any deviations in indication.

Slight deviations can be ignored during operation. Excessive inaccuracy will require the pressure gauge be readjusted or sent back for repair.

* Intermediate pressure gauges are optional for all units.

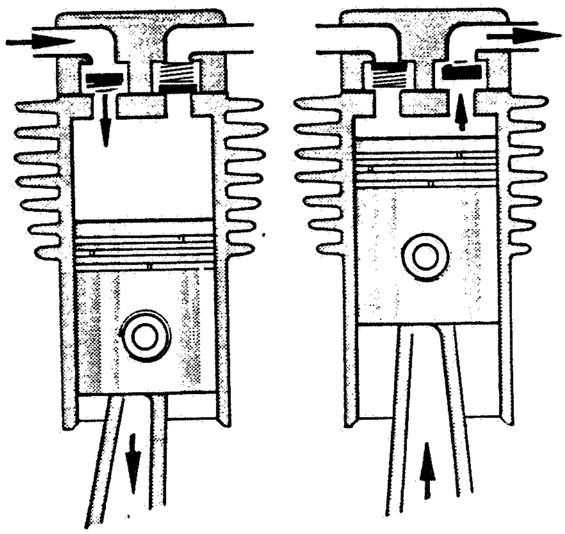
8 PRESSURE GAUGES

VALVE HEADS AND VALVES 9

9.1 FUNCTIONAL DESCRIPTION

Valve heads of the individual stages form the top part of the cylinders. Intake and pressure valves are provided inside the valve heads.

Note that valves are operated by air flow. On the suction stroke the intake valves open and air flows into the cylinders. At start of compression stroke intake valve closes and air opens pressure valve (see fig. 9.1).



Intake **Pressure**

Fig. 9.1 Valve operation

9.2 INITIAL OPERATIONAL CHECK OF VALVES

After roughly half an hour operation, valves should be checked. Note that intake line to valve heads should be hand warm and outlet piping should be hot. Valves are then operating properly.

Should the intake pipe to the valve head of second stage heat up excessively, and first stage safety valve blow off, this would be an indication that either intake or pressure valve of second stage are malfunctioning. It is, therefore, necessary to remove the valve head and to check and clean these valves, or to replace them if necessary.

9 VALVE HEADS AND VALVES

9.3 VALVE MAINTENANCE AND CLEANING

Normally, valves should be cleaned every 750 - 800 operating hours.

Should the valves exhibit excessive wear and the valve seats impaired, valves are to be replaced.

ATTENTION: To avoid fatigue failure, the valves must be replaced every 2000 operating hours.

Please observe the following general instructions in valve maintenance:

- The valves must always be replaced completely as a set.

- Carefully clean the dirty valves. Never use a sharp tool for this purpose. Soak the valves in diesel oil or petroleum and clean with a soft brush.

- Observe the correct sequence when fitting together again.

- Check individual components for excessive wear. If the valve seat and valve disks are dented, replace the valves.

- Check the valve space in the valve heads for dirt, and clean if necessary.

- Only use satisfactory gaskets and O-rings on reassambly.

- After finishing all maintenance work on the valves, turn the compressor manually using the flywheel and check whether all items have been correctly installed.

VALVE HEADS AND VALVES 9

9.4 CHANGING THE VALVES OF THE 1ST STAGE

Intake and pressure valves of the 1st stage are combined in one plate valve under the valve head.

Check that mark "TOP" is really at the top when installed.

9.5 CHANGING THE VALVES OF THE 2ND AND 3RD STAGES

Pressure valves can be serviced from outside. To check the intake valves, the valve head must be removed.

For removal and installation of the intake valves use special tool (part no. 4555-645) which is also part of the tools set delivered with the unit.

Removal 2nd and 3rd stage pressure valves:

- Remove cap nut
- Loosen allen set screw
- Remove the coupling.

Assemble in reverse sequence.

9.6 CHANGING THE VALVES OF THE 4TH STAGE

For removal and installation of the intake valve use special tool (part no. 4555-645) which is also part of the tools set delivered with the unit.

Pressure valve (5) is just inserted into valve head (7). It is sealed by o-ring (4) and fixed to the valve head by stud (3).

9 VALVE HEADS AND VALVES

Removing and reinstallation of 4th stage pressure valve.

Remove pressure valve, see fig. 9.2, as follows:

- Remove acorn nut (1), rewind stud (3) up to three or four turns.
- Remove internal hex. screws fixing valve head (7), take off valve head cover (8).
- Put two screwdrivers into the groove of outlet valve body, see Fig. 9.3.
- Lift out pressure valve (5) together with O-ring (4).

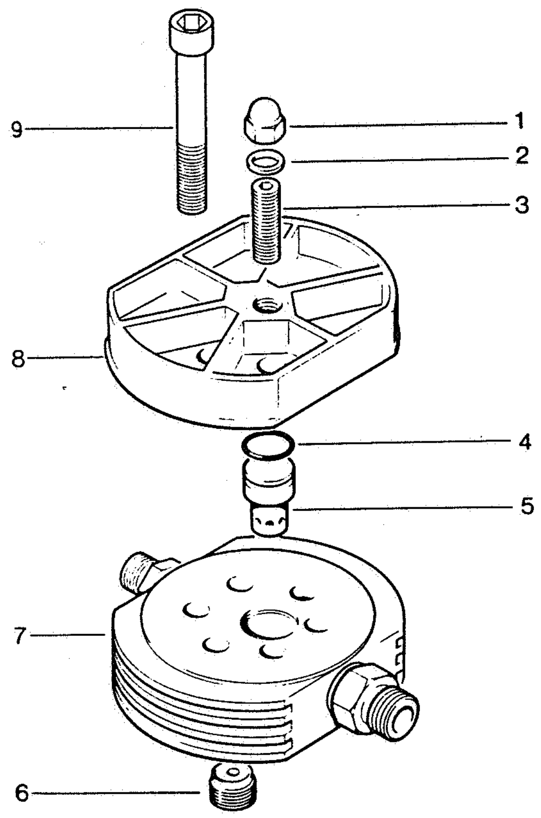


Fig. 9.2 Valve head 4th stage

1 Acorn nut
2 Gasket
3 Stud
4 O-ring
5 Pressure valve
6 Intake valve
7 Valve head
8 Valve head cover
9 Valve head screw

VALVE HEADS AND VALVES 9

Reinstall pressure valve (5) in reverse sequence:

- Put O-ring (4) into valve head (7). Check O-ring for abrasion.

- Insert pressure valve (5). Put on valve head cover (8).

- Fix valve head (7) with internal hex. screws.

- Screw in and fasten stud (3).

- Put on gasket (2).

- Screw on acorn nut (1).

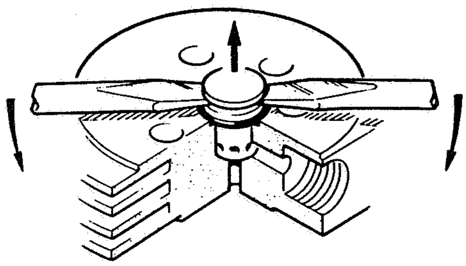


Fig. 9.3 Removing of 4th stage pressure valve

9 VALVE HEADS AND VALVES

HIGH PRESSURE
COMPRESSOR UNITS
WITH

AUTOMATIC CONDENSATE DRAIN
KB 012937a-342

10 CONDENSATE DRAIN

CONDENSATE DRAIN 10

10.1. PURPOSE AND SHORT DESCRIPTION

The automatic condensate drain unit (fig. 10.1) drains the inter-filters, the oil and water separator, and the purifier every 15 minutes during operation.

The unit is operated electro-pneumatically. It consists of the following major assemblies:

- drain valve assembly with attached solenoid valve
- electronic timer

For exploded view and parts list of condensate drain valve, see fig. KA 1b. in the parts list.

10 CONDENSATE DRAIN

10.2. FUNCTIONAL DESCRIPTION

The drain valve assembly is operated electro-pneumatically utilizing an electronic timer and a solenoid valve.

The required control air is tapped from the inter-filter after the second stage or, on units with four stages, after the third stage. From there, the control air flows to the solenoid valve mounted on the drain valve assembly. The solenoid is of the normally closed type.

Every 15 minutes it receives an electrical command from the electronic timer for a period of 6 seconds, and opens. The control air enters the drain valve assembly, the servo-piston is lifted, the four ball valves open. The condensate from the connected filters and separators is drained.

After 6 seconds the solenoid valve closes the control air line, the control air in the drain valve assembly passes through the control air nozzle and the silencer into the open air.

The servo-piston and the ball valves close.

CONDENSATE DRAIN 10

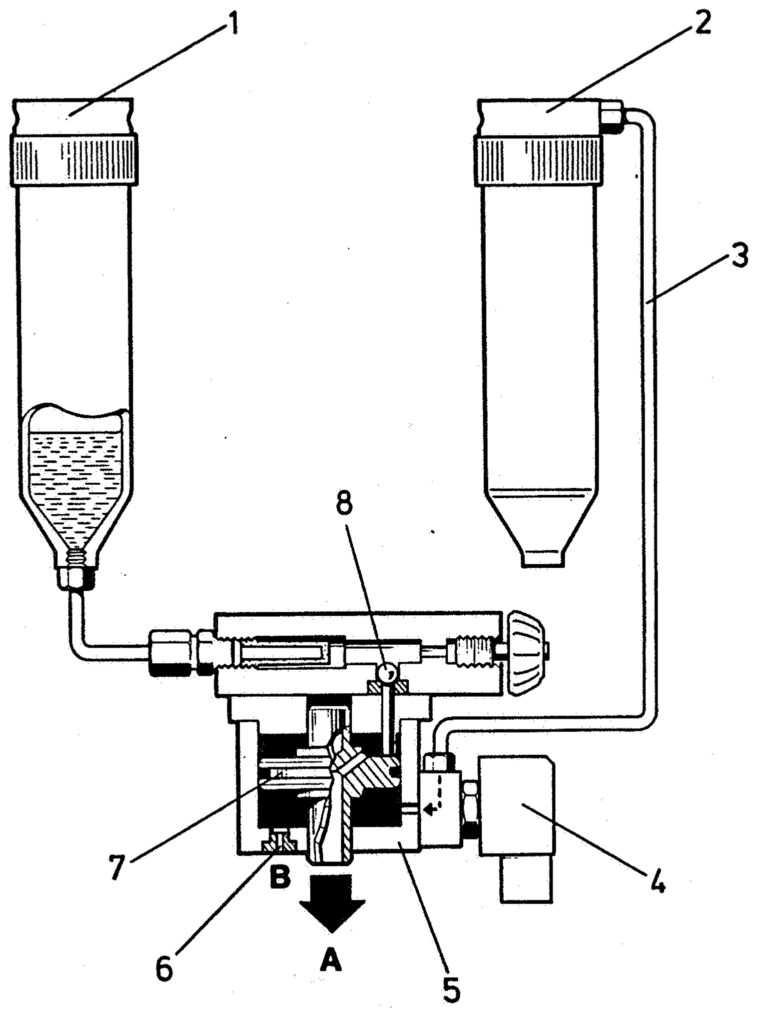


Fig. 10.1 Automatic Condensate Drain, Sectional View

1 Interfilter, purifier
2 Interfilter before last stage
3 Control air line
4 Solenoid valve
5 Condensate drain valve
6 Control air nozzle
7 Servo piston
8 Ball valve

A Condensate outlet
B Control air outlet

10 CONDENSATE DRAIN

10.3 MAINTENANCE

Maintain the automatic condensate drain as follows

- Open all inspection valves of the drain valve assembly once per week, immediately after the system has provided automatic drain.

- Note condensate drain at bottom. Should hardly any condensate emerge this is a good indication that the automatic system is working properly. If much condensate is drained, the system does not work correctly.

- Find and correct fault. See section 19.

- Once per year or if required exchange the sintered metal filter elements in each condensate pipe fitting. To gain access to the filter elements, remove pipe and fitting. Unscrew filter insert and replace.

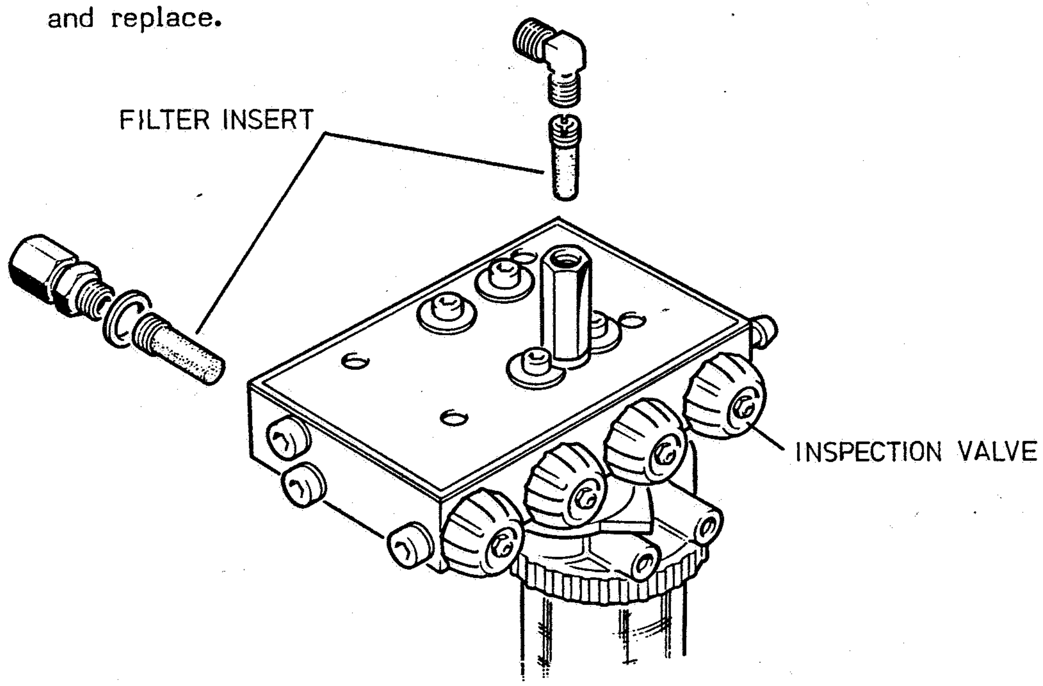


Fig. 10.2 Inspection valves and filter inserts

HIGH PRESSURE
COMPRESSOR UNITS
WITH

AUTOMATIC CONDENSATE DRAIN
KB 063876-342

10 CONDENSATE DRAIN

CONDENSATE DRAIN 10

10.1. PURPOSE AND SHORT DESCRIPTION

The automatic condensate drain unit (fig. 10.1) drains the intermediate filters after the second and third stage, and the oil and water separator after the 4th stage every 15 minutes during operation.

In addition, the automatic condensate drain is designed to drain these filters after shut-down of the compressor unit, and to unload the compressor during the starting phase, see section 10.4 and 10.5.

The automatic condensate drain system operates electro-pneumatically and comprises the following main items:

- One solenoid valve, normally open type, functioning as condensate drain valve for the 2nd stage.

- Two pneumatically operated condensate drain valves, normally open types, one for the intermediate filter after the 3rd stage, and one for the oil and water separator after the last stage.

- A condensate manifold.

- A condensate separator/silencer

- A condensate tank

- A bracket for mounting the drain unit on the compressor block or on the unit.

- An electrical timer (p/o compressor control assy).

10 CONDENSATE DRAIN

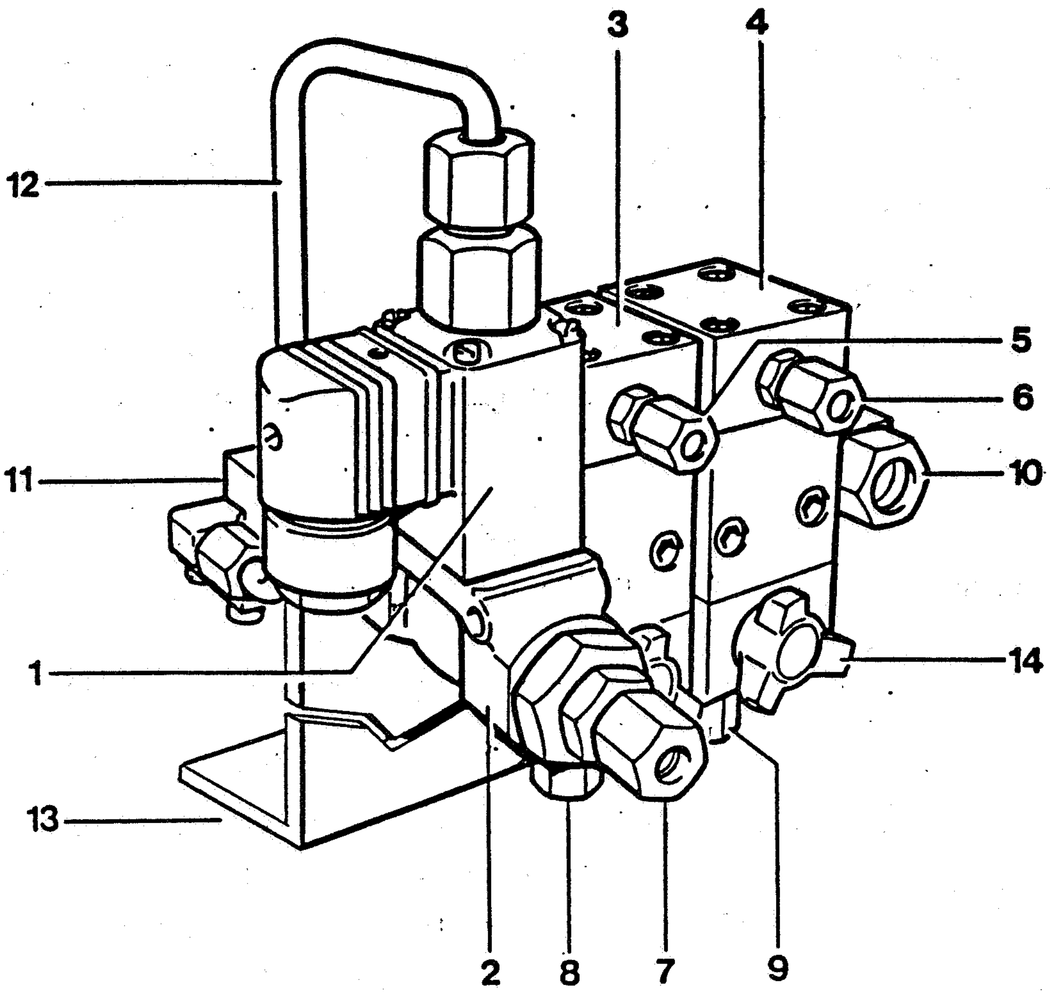


Fig. 10.1 Automatic condensate drain unit KB 063876-342

1 Solenoid valve coil
2 Solenoid valve, condensate drain 2nd stage inter-filter
3 Condensate drain valve inter-filter 3rd/4th stage
4 Condensate drain valve oil and water separator
5 Control air connection from 2nd stage
6 Control air connection from 3rd stage
7 Condensate connection from inter-filter 2nd/3rd stage
8 Condensate connection from inter-filter 3rd/4th stage
9 Condensate connection from oil and water separator
10 Condensate outlet (tube connector)
11 Condensate manifold
12 Vent line solenoid valve - manifold
13 Bracket
14 Manual condensate drain valve

10.2 OPERATION

All positions refer to fig. 10.2.

The normally open condensate drain valves are connected in cascade mode. The condensate from the inter-filter after the 2nd stage is applied to the solenoid valve.

The solenoid valve is normally open.

The condensate from the inter-filter after the 3rd stage and from the oil and water separator is applied to the respective pneumatically operated condensate drain valve.

The required control air for the 3rd/4th stage inter-filter drain valve is taken from the inter-filter after the 2nd stage. The control air for the oil and water separator drain valve is taken from the inter-filter after the 3rd stage.

At compressor start, the solenoid valve (4) is open and so are the condensate drain valves (5) and (6) because there is no control air available at this moment.

At start-up of the compressor, the solenoid valve is energized and closes: due to build-up of pressure by compressor operation, control air flows into condensate drain valves (5) and (6). The servo-pistons (7) are pressed onto valve seats (8) and the condensate drain valves close.

10 CONDENSATE DRAIN

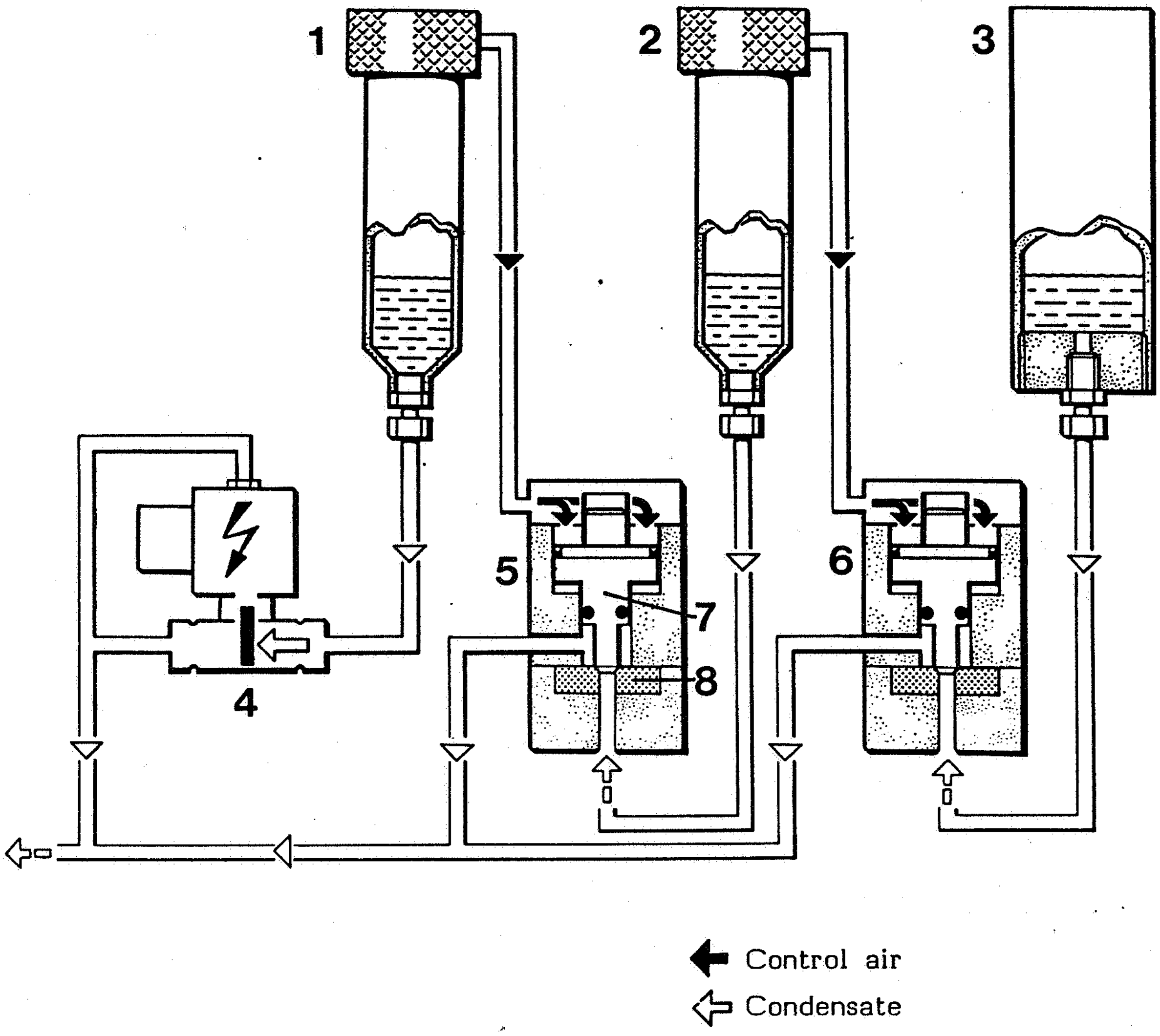


Fig. 10.2 Automatic condensate drain unit KB 63876-342 at normal operation

1 Inter-filter 2nd/3rd stage
2 Inter-filter 3rd/4th stage
3 Oil and water separator after 4th stage
4 Solenoid valve condensate drain 2nd stage
5 Condensate drain valve 3rd stage
6 Condensate drain valve 4th stage
7 Valve piston
8 Valve seat

10.3 CONDENSATE DRAIN

All positions refer to fig. 10.3.

Every 15 minutes, 3/2-way solenoid valve (4) is deenergized for approx. 10 seconds by the timer.

Solenoid valve (4) opens and drains the condensate from the 2nd stage inter-filter (1). Due to the pressure loss in inter-filter (1) also the control pressure for condensate drain valve (5) for inter-filter (2) is removed. The servo-piston (7) of the condensate drain valve for the inter-filter is unloaded, the control pressure vented through the relief port.

The piston (7) of the drain valve is raised by pressure from the inter-filter (2), the valve opens, and condensate is drained. Because of the resulting pressure loss within the inter-filter (2) at last the control pressure for the condensate drain valve (6) for the oil and water separator (3) is removed and the condensate drain valve (6) drains as described above.

10 CONDENSATE DRAIN

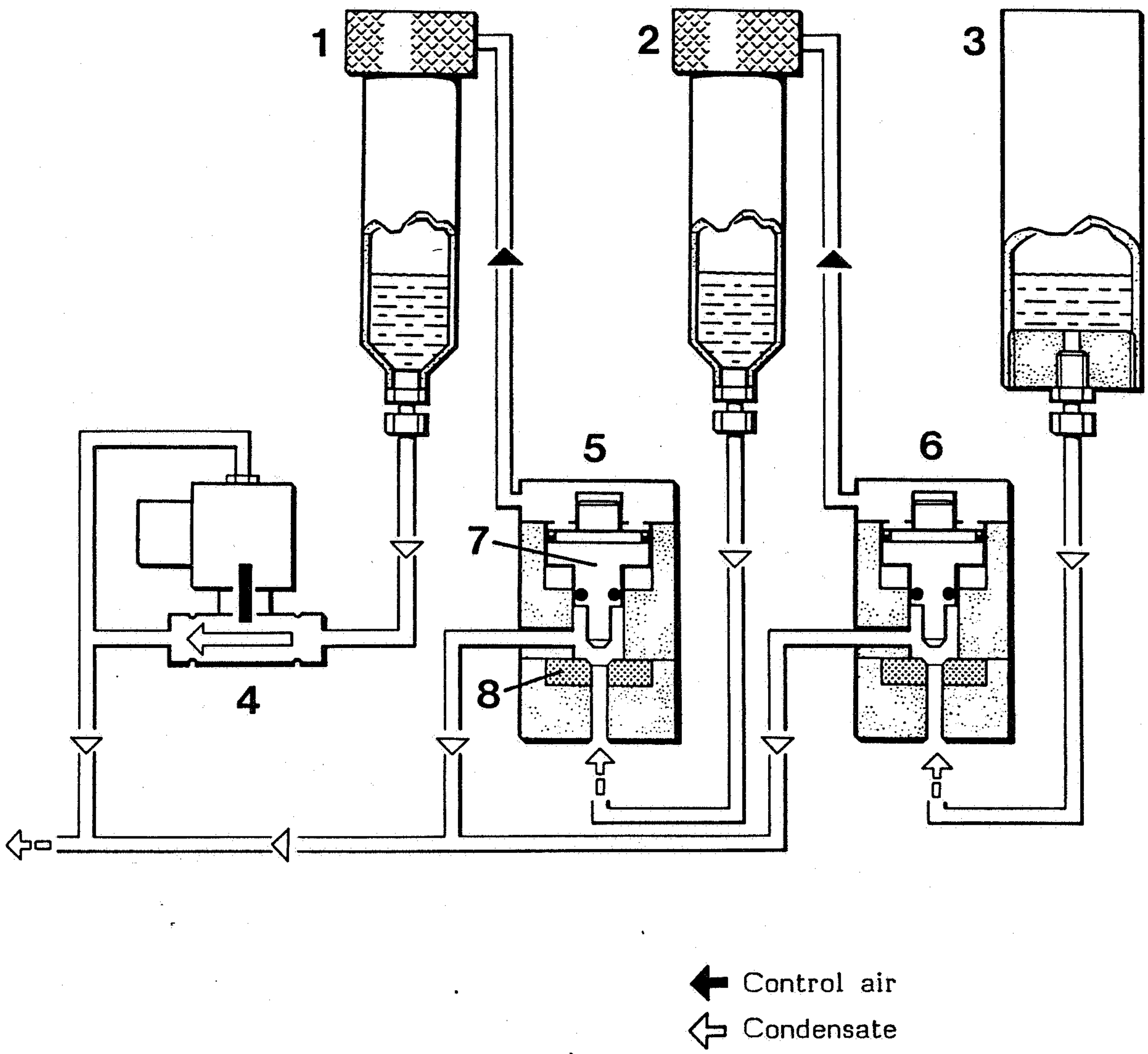


Fig. 10.2 Automatic condensate drain unit KB 63876-342 at condensate drain

1 Inter-filter 2nd/3rd stage
2 Inter-filter 3rd/4th stage
3 Oil and water separator after 4th stage
4 Solenoid valve condensate drain 2nd stage
5 Condensate drain valve 3rd stage
6 Condensate drain valve 4th stage
7 Valve piston
8 Valve seat

10.4 START UNLOADING

The unloading during the starting phase of the compressor is effected due to the lack of control air immediately after switching on the unit. After the compressor has attained nominal speed control air flows to the condensate drain valves which close and the compressor starts delivering to the consuming device.

10.5 STANDSTILL DRAINAGE

At compressor shut-down, solenoid valve (4) is deenergized and opens.

The valve pistons are raised by the residual pressure within the filters and separators. The valves open, and the filters are drained at standstill of the compressor unit.

10.6 CONDENSATE DRAIN PIPING

The outlet opening of the condensate drain manifold is equipped with a tube connector. Here a condensate drain pipe may be connected (Already provided on KAP units).

Due care must be taken to ensure that any oil which my be drained with the condensate will not detriment the environment.

As an example, the drain pipe can be directed into a collecting vessel or in drain facilities incorporating oil separators.

10 CONDENSATE DRAIN

10.7 MAINTENANCE OF THE AUTOMATIC CONDENSATE DRAIN

The condensate drain valves for the intermediate filter after 3rd stage and for the oil and water separator are provided with manual drain valves to check correct operation of the automatic system.

The automatic condensate drain system must be serviced as follows:

- Open all manual drain valves (14, fig. 10.1) one after the other, once a week.

- This must be carried out immediately after the automatic system has drained the condensate. Observe the drainage of condensate by opening the manual drain valves. If the system drains a lot of condensate this is a sign that the system or the corresponding condensate drain valves are not working properly. Find the fault an remedy accordingly .

If hardly any condensate emerges, the automatic system is operating properly.

For fault removal, see section 19 "Troubleshooting".

ELECTRICAL SYSTEM 11

11.1 GENERAL

NOTE: All schematics are contained in the annex to this instruction manual.

The electrical equipment of the compressor unit consists of:

- **Drive motor** M1
- **Final pressure switch*** S10
- **Switch box*** containing air break contactor K1 or star-delta contactor K1 to K4 for drive motor, timer(s) K10 for automatic condensate drain, service switch S3.
- **Control and monitoring box**** with ON-OFF push-button switches S1, hourmeter, electronic control warning lamp
- **Electronic monitoring unit BC2*** A1 incorporating the following standard monitoring positions:
  - Oil pressure switch
  - Temperature switch final stage (air outlet)

  or **Electronic Control BC6*** A4 incorporating the following standard monitoring positions:
  - Oil pressure switch
  - Intermediate pressure switch 1st stage
  - Intermediate pressure switch 2nd stage
  - Intermediate pressure switch 3rd stage
  - Temperature switch final stage (outlet temperature)

In order to start the electric motor and the functions of the electric controls as well as of the electronic monitors, the following components have to be supplied by the customer, if not already ordered with the contract and thus built-in:

- main switch Q1, and main fuse.

---

* optional extra

** KAP only.

11 ELECTRICAL SYSTEM

11.2. DRIVE MOTOR

The compressor unit is driven by an electric motor by means of v-belts. V-belt is to be checked regularly for tension and wear. See sections 12 and 16.

The drive motor requires no servicing but exterior cleaning. Depending on the built-in motor model, lubricating of the motor bearings may be necessary. Observe applicable remarks on the motor itself.

11.3. ELECTRICAL CONTROL

11.3.1 Semi-automatic compressor control

Unit is switched OFF automatically by pressure switch S10 if the preset final pressure is reached in the pressure system connected to the compressor.

To restart the unit is performed manually by momentarily turning operation switch S1 to position 1.

11.3.1 Fully automatic compressor control

Unit is switched ON and OFF automatically by pressure switch S10 if the preset final pressure is reached in the pressure system connected to the compressor or if the pressure decreases to the minimum pressure, respectively.

Switching on of the control circuit is effected with ON-OFF switch S1 at the switch box.

11.3.2 Pressure switch S10:

Switching ON and/or OFF of the compressor unit is performed by pressure switch S10. The upper threshold value is adjustable as follows:

OFF max. = 500 bars
OFF min. = 50 bars

11.3.2 Service switch S3:

Position 0: unit switched ON and OFF automatically by pressure switch S10.
Position 1: Pressure switch S10 is bypassed. Unit delivers compressed medium exceeding the preset shut-off pressure.

CAUTION: Use this switch position only for servicing purposes, e.g. checking the blow-off pressure of the safety valves.

11 ELECTRICAL SYSTEM

11.4. MONITORING UNITS BC2 AND BC6

The Electronic Control Units BC2 and BC6 are encapsulated electronic modules. When the compressor is started, the Electronic Control compensates for any fault signals for approx. 40 seconds to allow the compressor to establish operating conditions, e.g. oil pressure. If during this period the operational conditions at the monitored positions are not established, the Electronic Control will shut-down the drive motor/engine. During operation, shut-down of the compressor is accomplished immediately after the fault signal has been applied to the monitoring unit. After remedy of the fault, the operation switch must be placed first to 0, then to 1 again in order to restart the compressor unit.

11.4.1. Design

The BAUER monitor system comprises the following major assemblies.

- BAUER control unit BC 2/6 with
  power supply, time relay element, electronic conrol and interlocking circuit, power relay, fuse.
- Threshold transmitter probes with connecting leads
- Wiring

11.4.2. Technical data

Supply voltage

AC	110-127 V / 220-250 V / 40-60 Hz
DC	12 V, 24 V

Electronic circuit supply voltage	12 VDC
Relay type	single-pole, double throw
Contact rating	1100 VA
Service life	10^5 cycles
Power consumption	3.5 VA
Enclosure	IP 65
Ambiant temperature	-40 ° to +60 °C (-40 ° to + 140 °F)

11.4.3. General Information concerning the Monitoring and Control Facilities

The monitoring and control facilities of the compressor are designed to fail safe, i.e. any interruption of the control or monitoring circuit resultes in the system being disabled, thus protecting the monitoring and control system against wire breakage or loose terminals. When the system disables, therefore, it is good practice to check the wiring for continuity. The monitoring unit requires no servicing. In case of a fault in the control itself it must be replaced.

11 ELECTRICAL SYSTEM

11.4.4 Mode of operation

The BAUER Control Unit BC 2 monitors the operating conditions of the compressor. It receives signals from probes mounted directly at the inspection points. Faults are indicated by means of warning lamps.
A time delay of 40 seconds compensates for the absence of oil pressure, intake pressure etc. at start. If a trouble occurs in the compressor after this time delay has elapsed, it will be sensed by the respective threshold transmitter and reported to the Control Unit BC 2.

The Control Unit instantly stops the compressor unit, interlocks, and indicates the fault at the respective warning lamp.

ATTENTION

The BAUER Control Unit BC 2 must be connected to the compressor control cicuit **after** the controlling element, e.g. pressure switch, ON/OFF switch, ignition switch, etc. to ensure disconnection of the BC 2 electronic control circuit from the supply voltage after shut-down of the compressor unit. Otherwise, the control circuit would remain under voltage and cause false alarm after restarting.

For any fault detected by the BC2/6, the oil pressure lamp (lamp position 1) will also illuminate after a short time due to decreasing oil pressure after shut-down by the Electronic Control.

After remedy of the fault, the fault signal must be cancelled by switching the ON-OFF switch first to 0, then to 1 again. On units with push-button type switch, switching just from center position to 1 will **not** start the compressor unit again.

11.4.5 Monitoring positions

A. Oil-Pressure switch for Compressor (F13)*

The compressor oil pressure is monitored by pressure switch F13. At zero pressure, the pressure switch is open, i.e. operating position is closed when subject to oil pressure. Should no oil pressure build up within 40 seconds after start, or should the oil pressure drop to below 1.8 bars (26 psi) during operation, the pressure switch opens, warning lamp H2.1 illuminates, compressor unit is shut off

B. Final stage temperature switch (B1)*

This temperature switch is a ptc resistor which is closed at the correct temperature, i.e. in operating position.The temperature switch is located in the output pipe of the 4th stage cylinder.
The resistor increases its resistance (opens) when the temperature becomes excessive, as indicated by warning light H2.2 coming on, the system is shut down.

C. Intake pressure switches F12.1, F12.2

The minimum and maximum intake pressure is monitored by pressure switches F12.1 and F12.2 which are closed during operation. They open when the intake pressure rises above or sinks below the permissible intake pressure, warning lamp H2.2 illuminates, compressor unit is shut off.

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* Standard for BC2

11 ELECTRICAL SYSTEM

D. Intermediate pressure switch, collective monitoring (F11)

The intermediate pressure of the individual stages is monitored by safety valves whose blowoff lines lead to a common manifold where pressure switch F11 is mounted. In the case of a defect in one stage, the intermediate pressure rises and the safety valve of the corresponding stage blows off. The pressure rises in the manifold and pressure switch F11 opens, warning lamp H2.3 illuminates, compressor unit is shut off.

E. Intermediate pressure switches, individual monitoring (F11.1 to F11.3)

The pressures of the intermediate stages is monitored by pressure switches F11.1 to F11.3. In the case of a defect in one stage, the respective pressure switch opens, warning lamp H2.3, H2.4, or H2.5 illuminates, compressor unit is shut off.

The pressure switches are set as follows:
- F11.1 opens approx. at 4.5 bars
- F11.2 opens approx. at 20 bars
- F11.3 opens approx. at 70 bars

COMPRESSOR DRIVE SYSTEM 12

12.1 GENERAL

The compressor is driven by the drive motor through a v-belt. The electric motor is mounted on slide rails and requires adjustment for proper v-belt tension.

Diesel or gasoline engine driven compressor units use a pulley system for tensioning of the v-belts.

12.2 CHECKING THE DRIVE BELT

To give the v-belt maximum life it is of utmost importance that the v-belt tension is checked regularly. If the v-belt has been changed, this should be done twice a day during the first two days. Thereafter, the tension should be checked every 250 operating hours. The tension is correct when the belt deflects 5 - 10 mm if pressing with the thumb between the two pulleys.

12.3 V-BELT TENSION ADJUSTMENT (ELECTRIC MOTOR)

Adjust v-belts as follows:

- Slightly loosen the motor mounting nuts (1, fig. 12.1).

- Adjust motor by turning the square adjustment screw (2) until the belt tension is correct.

- Tighten the motor mounting nuts.

- Run the motor for approx. 5 minutes. Stop motor, check v-belt tension, and readjust if required.

12 COMPRESSOR DRIVE SYSTEM

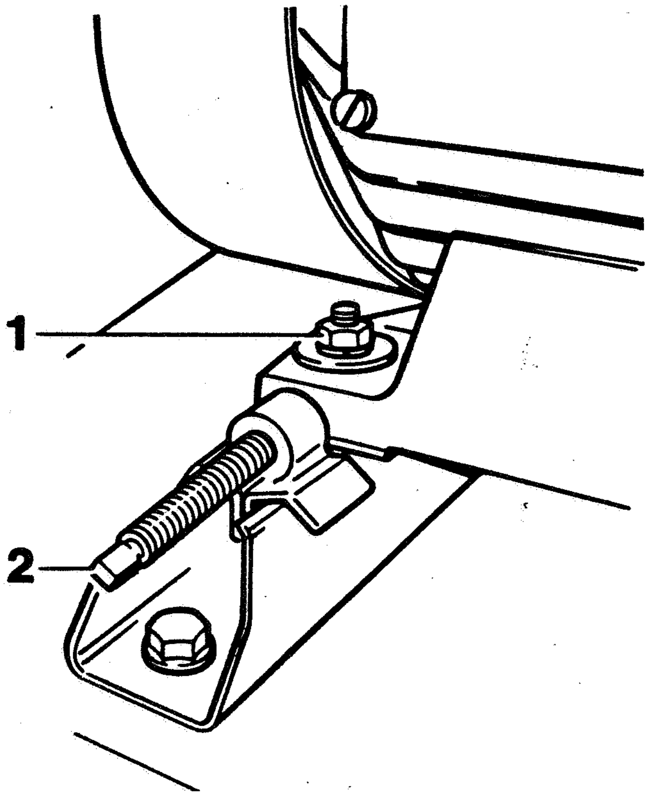

Fig. 12.1 Adjusting the v-belt tension

12.4 V-BELT TENSION ADJUSTMENT (GASOLINE AND DIESEL ENGINE)

Adjust v-belts as follows:

- Slightly loosen the pulley mounting screw.
- Adjust pulley until the belt tension is correct.
- Tighten the pulley mounting screw.
- Run the motor for approx. 5 minutes. Stop motor, check v-belt tension, and readjust if required.

COOLING SYSTEM 13

13.1 GENERAL

The cylinders of the compressor block, the intermediate coolers and the after-cooler are air-cooled.

For this purpose, the compressor is equipped with a fan-wheel which draws the cooling air through the fan-wheel cover from the surroundings.

The fan-wheel is driven by the v-belt and is also used as flywheel.

Refer to section 15 for proper installation and cooling air supply.

13 COOLING SYSTEM

SAFETY REGULATIONS 14

14.1 GENERAL

- Always ensure that the intake air is absolutely pure and free of exhaust fumes.

- Use intake hose and make sure that installation precluded intake of exhaust fumes.

- Filling hoses must be in satisfactory condition and threads undamaged. Pay particualar attention to damage on the interface from hose fitting to hose. If the rubber is scored, hose must be discarded otherwise water can enter and attack wire gauze causing it to rust and thus endangering pressure tightness.

- Never open filling valves when under pressure and not connected as highly compressed air emerging can cause serious accidents.

- Check for leakage of the complete system from time to time by brushing all fittings and couplings with soapy water. Remedy any leakage.

- Always shut down and decompress the system prior to carrying out any work on the compressor.

- Always disconnect the system prior to carrying out any work on compressor systems having an electric motor drive.

- Never resolder or reweld pressure lines.

- Avoid completely emptying air tanks but always ensure that some residual pressure remains to prevent entrance of moisture and surrounding air.

14 SAFETY REGULATIONS

14.2. REGULATIONS

A breathing air compressor is identified by German law as being a filling system, if pressure cylinders are filled by the system, especially when these cylinders are made available for third parties. The start-up and operation of compressor systems for use as filling stations is governed in the Federal Republic of Germany by the following regulations:

a. Pressure vessels regulations (DruckbehV) as of February 27th 1980, §§ 15, 21, 26, 27, 28, 30, 34, 39.

b. Technical regulations for pressure gases (TRG 400, 401,402, 730).

If a high pressure compressor is used as industrial plant for filling of pressure vessels or for supply of pneumatic systems, the following regulations apply:

c. Accident Prevention Regulations (UVV):
UVV compressors (VBG 16), UVV pressure vessels (VBG 17)

If an industrial unit is used as filling station, also a. and b. will apply.

On the part of the manufacturer all regulations concerning the manufacturer have been observed and the compressor is designed accordingly.

The above regulations are available through the usual outlets, e. g. in Germany from:

Carl Heymanns Verlag	Beuth Vertrieb GmbH
Gereonstrasse 18-32	Burggrafenstrasse 4-7
5000 Cologne 1	1000 Berlin 30

SAFETY REGULATIONS 14

In virtue of the regulations for prevention of accidents, all compressor units have to undergo an acceptance test at their location before bringing them into service. Consequently the containers have to be declared with the competent supervision authorities, presenting the receiver test certificates supplied with the unit. The test certificates have to be kept carefully, as they will be required for possible inspections by the supervising authorities.

No guarantees whatsoever can be assumed for damages caused or favoured by the non-consideration of these directions for use. The maintenance of our compressors ought to be carried out by qualified and reliable personnel only.

Excerpts from the above regulations are given in the following.

- **Regulation governing the handling of pressure vessels (DruckbehV).**

Paragraph 15 of this regulation (dating from february 27th, 1980) requires that a mobile pressurized gas tank - in this case a compressed air cylinder - shall only be filled with gases or air under pressure if

a) The cylinder is indentified with the mark and date of inspectorate approval together with the duration of approval.
b) When the duration of approval has not expired (duration of approval is governed by para 23 of the regulation).
c) The cylinder or tank in question exhibits no deficiencies which could result in a hazard to those concerned or third parties (e.g. faulty valve).

Only compressed air cylinders shall be filled with the system - never oxygen cylinders. The connecting screw thread (DIN 477) shall be designed to make direct connection of oxygen cylinders impossible.

The use of connecting unions is prohibited

14 SAFETY REGULATIONS

- **TRG 402, operating filling systems**

2. Personnel and personnels instructions

2.1 Filling systems shall only be operated and maintained by persons who
1. are more than 18 years of age
2. are skilled and trained in the use of the system
3. Can be expected to do their jobs satisfactorily.

2.2 Supervised operations can also be expected by persons who do not comply with requirements stated in 2.1. item 1. and 2.

2.3 Operating personnel is to be instructed prior to starting their job and periodically in reasonable intervals, hoever, at least once a year, regarding the following subjects:
1. the particular hazards involved in handling compressed gases
2. savety regulations, especially those of the TRG,
3. what to do in case of fault, damage and accident,
4. how to use fire extinguishers and other safeguarding equipment,
5. Operation and maintenance of the filling systems on the basis of the instruction manual[a] (see item 3.1).

2.4 A written record shall be maintained as regards instructions of 2.3 requiring the instruction by their signature.

2.5 Item 2.3 and 2.4 also apply to persons who are only temporarily involved.

3. Operation

3.1 An operating manual[a] has to be provided for each and every filling system which describes what has to be done to ensure proper operating and avoid hazards and accidents in plain, easy understandable language.
Copies of these instructions and translations thereof must be available to the operating and maintenance personnel at any moment.

3.2 High risk work (in conjuction with the maintenance of such systems) which cannot be governed according to item 3.1 in the Instruction manual shall only be carried out according to separate, written instructions of the contractor or his representative in which the responsability for supervision activities is clearly stated.

3.6 If pressurized gases can be isolated in sections of a filling system which can be closed so that the pressure can become hazardous under the effects of heat, measures must be aken to ensure that the pressure is relieved immediately after isolating the section. unless means are already provided for eliminating the occurrence of a hazardous pressure[c].

3.7 Empty cylinders or tanks must be filled as quickly as possible and filled cylinders or tanks shall be removed from the premisses as quickly as possible for use (see TRG 401 item 3.2, sentence 2, No. 2).Empty or filled cylinders and tanks shall not be located where they constitute an obstacle to an escape route, it thus being prohibited to locate tanks or cylinders in passage-ways and stairs of any kind.

5. Filling procedure

5.1 A pressurized gas tank or cylinder shall be only filled with the pressurized gas as identified on the tank or cylinder and only to that amount as stated on the tank resulting from the corresponding pressure, weight or volume (see para 15, section 2, DruckbehV).

6. Procedure after filling

6.3 Deficiencies on filling tanks and cylinders
Should a filled pressurized gas cylinder or tank prove to be leaky on inspection in a way which does not permit immediate remedy or should the filled cylinder or tank exhibit a deficiency of any kind which could result in a hazard to the handling personnel or third parties, said cylinders or tanks shall be immediately rendered harmless by discharge (see para 21, section 1, DruckbehV).

9. Testing and servicing filling systems

9.1 Testing filling system leakage

9.11 Filling systems and selection of such systems shall only be put into operation for the first time after a major modification or after repair when they have been checked for leakage by an accredited inspector or on order of the contractor by an inspector. Testing by the inspector shall only be carried out as witnessed by the contactor or his representative.

9.12 For the purpose of testing[d)] a pressurized gas shall be used which is available in gaseous form under the condition of testing. If the gas is flammable or highly toxic, it is mandetory that the necessary safty measures be taken. The test gas shall not be aggressive to the materials of the system being tested, resulting in hazardous reacting. Where there is a possibility of the test gas reacting with the pressurized gas of the system, the system must be adequately flushed. On systems intended for pressurized gases which are sensitive to moisture, the test gas must be free of water or the system must be suitable dried on completion of testing. On filling systems utilizing oxygen, the test gas must be free of oil.

14 SAFETY REGULATIONS

9.13 The pressure shall be elevated grudally in increments until the highest operating pressure of the system is attained.

9.14 Testing shall be documented and the documents duly held in safe place. The documentation shall identify:

1. date of testing
2. persons resposible for supervision
3. persons responsible for inspection
4. designation of the system or sub-system being tested
5. test gas
6. description of the method of testing
7. any deficiency established and how these deficiencies were remedied.

9.2 Testing flexible piping

9.21 Flexible piping (i.e. hose pipes and articulated pipes) must be tested prior to first-time operation at least once every six month (hose pipes) or at least once a year (articulated pipes) and according toactual requirements to ensure satisfactory condition (i.e. no wear and tear or leakage).
This shall be carried out by the manufacturer or the persons responsible for the filling operation.

9.22 Testing as per item 9.21 shall include the following individual tests:

1. visual inspection inside and outside to the extent possible to ascertain general conditions.
2. pressure testing to 1.5 times the highest service pressure.

9.23 Pressure testing hoses shall be carried out with water[e] or, if possible, with natural oil on articulated pipes, otherwise water. The test pressure shall be maintained for at least 10 minutes. Hoses shall be first tested in the elongated condition and then when rolled up (drum diameter approx. 30 times hose diameter).

9.24 The results of testing shall be certified by the manufacturer prior to first-time operation and later testing shall be documented by the filling inspector. These certificates shall be filed in a safe place. The certificate shall indentify:

1. date of testing
2. persons responsible for testing
3. nature and identification of the pipe tested
4. test medium
5. description of test method
6. any deficiencies established and how they were remedied.

In addition, the manufacturer's test certificate shall identify the material and rated pressure. The certificate relating to the hose pipes shall state that the hose is siutable for the pressurized gas.

9.3 Item coming into contact with oxidizing pressurized gases shall be inspected for signs of oil grease in suitable intervals and cleaned as may be required.

10. Shutting down the system, reporting accidents and damages

10.1 Should a filling system not be in proper condition, thus constituting a hazard for operating personnel or third parties, the system shall be shut down without delay (see para. 30, section 3, DruckbehV).

10.2 Any person operating a filling system is obliged to report any accident to do with the operation of the system in which a person has been killed or health detrimented and shall file the details with the supervising authorities, the responsible accident insurance without delay (see para. 34, DruckbehV).

10.3 Item 10.2 applies accordingly when pressurized gas container having a capacity in excess of 1 litre (1,05 quarts) is split open or explodes inside or outside of the filling system (see para. 34, DruckbehV).

---

a) See this Instruction Manual

b) The instructions for maintenance and repair are given in chapters 2 to 13 of this Instruction Manual

c) Does not apply to the compressor itself but to the filled compressed air cylinders

d) The only test medium to be used in conjunction with the compressor system is compressed air, i.e. the air produced by the compressor itself.

e) Filling hoses are to be dried throughly inside and outside after pressure testing.

14 SAFETY REGULATIONS

INSTALLATION, OPERATION 15

15.1 INSTALLATION OF THE COMPRESSOR UNIT

The compressor frame is equipped with anti-vibration mounts and thus a machine base or special means of securing the compressor are not necessary.

15.1.1 Outdoor location

For installation observe the following:

- The floor must be capable of taking the load of the system weight.

- Locate the unit level.

- On units employing gasoline or Diesel engine it is most important that only clean air be used, arrange compressor in direction of wind so that exhaust fumes are blown away from the unit. It is good practice to arrange intake hose with pre-filter of at least 3 m length on intake filter of compressor. Pre-filter to be located 2 meters above ground. See fig. 15.1. This arrangement will ensure necessary spacing between exhaust outlet and air inlet.

- Turn unit as soon as wind direction changes.

- On gasoline or Diesel engine operation unit must only be located outdoors, never indoors.

- Take care that no vehicles are in direct vicinity with engines running.

- Do not operate unit in the vicinity of open fire (flue gas!)

15 INSTALLATION, OPERATION

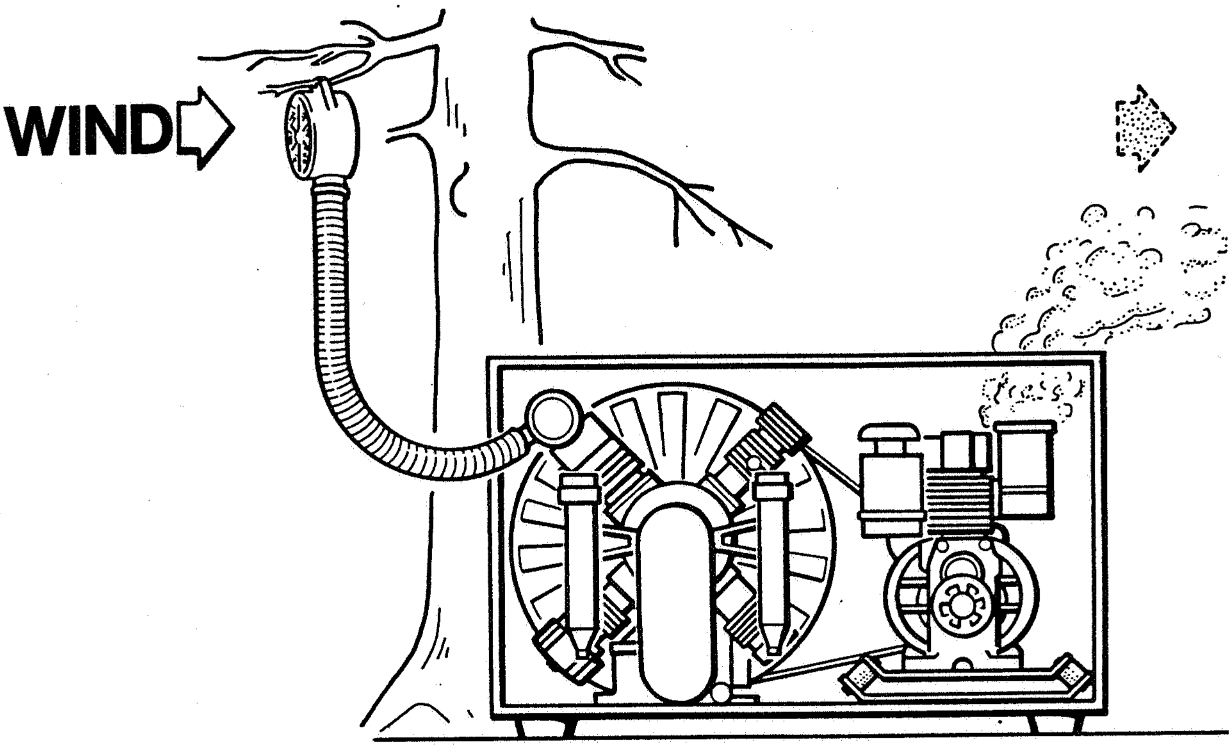

Fig. 15.1 Locating air intake hose

15.1.2 Indoor laocation

- Ensure adequate ventilation.

- If possible, locate the compressor so that its ventilator draws in fresh air for cooling e.g. through a wall opening.

- Here too, air must be free of exhaust fumes and hazardous vapors (e.g. smoke, solvent vapors, etc.)

- If possible install unit in such a manner that the compressor fan can get fresh air from outside, for instance through an opening in the wall.

- Ensure that an adequate exhaust air opening is provided (see fig. 15.2).

- When locating the compressor in rooms of less than 30 m^3 (39.2 cu yd) space where natural ventilation is not ensured, measures must be taken to provide forced ventilation (this also applying when other systems having high heat radiation are operating in the same room).

  Forced ventilation is effected by installation of a fan in the exhaust air opening.

15 INSTALLATION, OPERATION

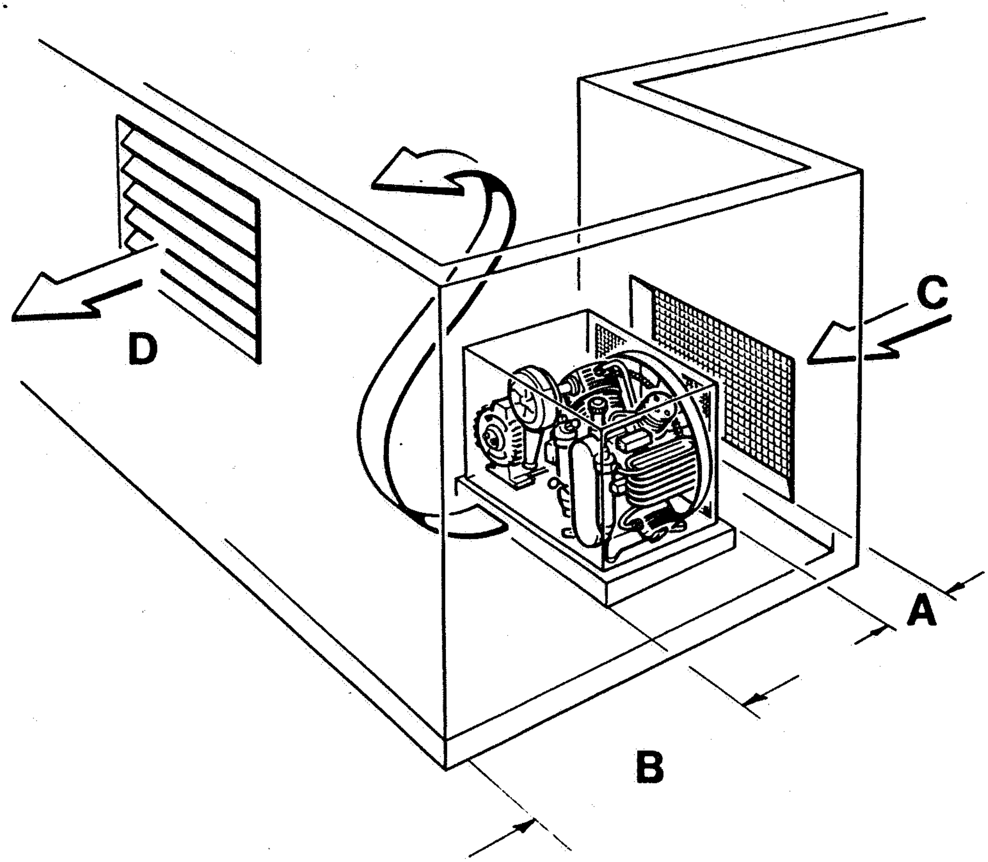

Fig. 15.2 Installation of the compressor unit (natural ventilation) (room $\geq$ 30 m^3)

A Minimum distance from wall, intake side: 0.5 m (may be ignored if locating the unit in front of an opening).

B Minimum distance from wall, exhaust side: 0.75 m (may be ignored if locating the unit in front of an opening).

C Intake opening: 1.0 m^2

D Exhaust opening: min 1.2 m^2

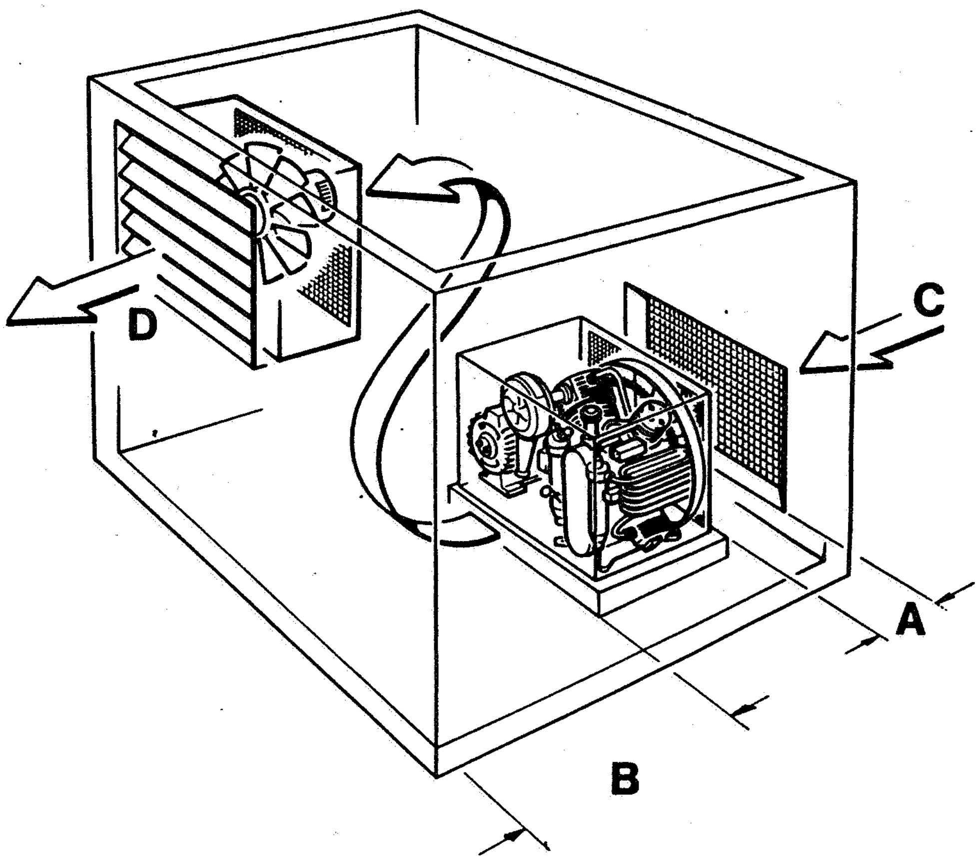

Fig. 15.3 Installation of the compressor unit (forced ventilation) (room $\leq 30m^3$).

A Minimum distance from wall, intake side: 0.5 m (may be ignored if locating the unit in front of an opening).

B Minimum distance from wall, exhaust side: 0.75 m (may be ignored if locating the unit in front of an opening).

C Intake opening: 0.6 m^2

D Exhaust opening: Fan capacity required at a resistance height of approx. 10 mm W.G.): 1500 m^3/h.

15 INSTALLATION, OPERATION

15.2. ELECTRICAL INSTALLATION

For installation of electric equipment attend to the following:

- Observe prescriptions of local electricity-supply company.
- If control devices are delivered by the factory attend to the respective wiring diagram.
- Take care of correct installation of protective conductor.
- Check conformity of motor and control device tension and frequency with those of electric network.
- Adjust motor protection, thermal overload relay.
  For start over contactor adjust to motor amperage rating.
  For start via star-delta contactor adjust to motor amperage rating x 0.58.

  For example: motor amperage rating = 10 A:
  Adjust relay to 10 x 0.58 = 5.8 A.
- Fuse motor correctly (See table on next page; use slow-blow fuses, only).
- Immediately after start-up check direction of rotation for agreement with arrow on unit.

Fuse (standard value) for 380 V threephase

Motor type	**Voltage** V	125	220	240	**380**	415	440	500	600	660
3-phase, 4 kW (Star-delta switch-on)	Current A	35	20	20	**10**	--	10	10	10	6
3-phase, 4 kW (Direct switch-on)	Current A	35	25	25	**16**	--	16	16	10	10
3-phase, 5.5 kW (Star-delta switch-on)	Current A	50	25	25	**16**	16	16	10	10	10
3-phase, 5.5 kW (Direct switch-on)	Current A	63	35	35	**20**	20	20	16	16	16
3-phase, 7.5 kW (Star-deita switch-on)	Current A	50	35	35	**20**	16	16	16	16	10
3-phase, 7.5 kW (Direct switch-on)	Current A	63	35	35	**25**	25	25	20	16	16

15 INSTALLATION, OPERATION

15.3. OPERATION

15.3.1 Preparation for operation

All units

- Read the Instruction Manual carefully.
- Check the oil level according to 2. 5 and establish whether maintenance is necessary in accordance with Section 16.
- Turn the compressor manually using the flywheel prior to first time operation or operation subsequent to maintenance work.

Units with gasoline or Diesel engine additionally:

- Check engine oil level according to manufacturer's instruction manual.
- Check fuel tank. Top up if necessary.
- Open fuel shut-off valve.

NOTE

Charge battery before taking unit into operation

15.4 FILLING PROCEDURE

- Connect air bottle to filling valve (fig. 15.4).

WARNING

On models of 300 bars rated filling pressure do not attach bottles unless rated for this pressure. (Note pressure stamped on tank neck).

- For air bottles with international filling connector use adaptor (PN 08487-635). This filling connector can be connected to the filling valve with an intermediate adaptor (PN 5951-635) and filling hose (PN N 221).

ATTENTION

The international connector is not permitted in the Federal Republic of Germany. In other countries it is allowed only for pressures up to 200 bars. This filling connector cannot be used on KA/KAP -H models due to constructive measures.

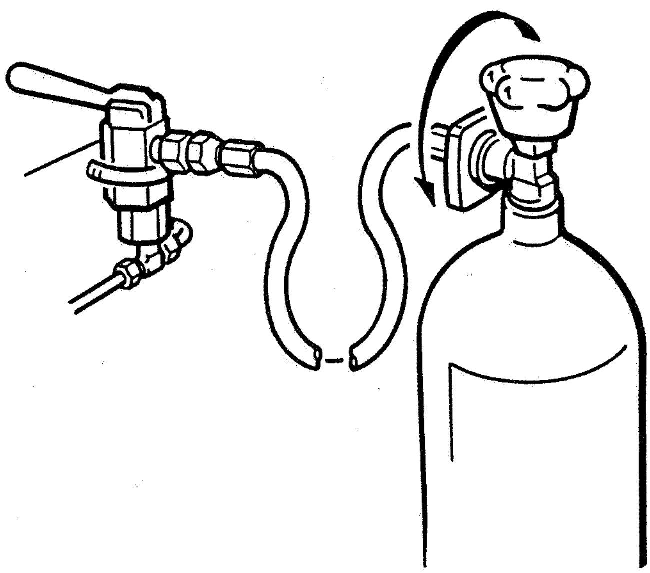

Fig. 15.4 Connecting air bottle

15 INSTALLATION, OPERATION

Filling the air bottles

- Set filling valve handle to filling position (fig. 15.5).
- Open bottle valve - bottle will be filled.
- Drain condensate regularly during filling. On units with automatic condensate drain check that condensate is drained regularly.

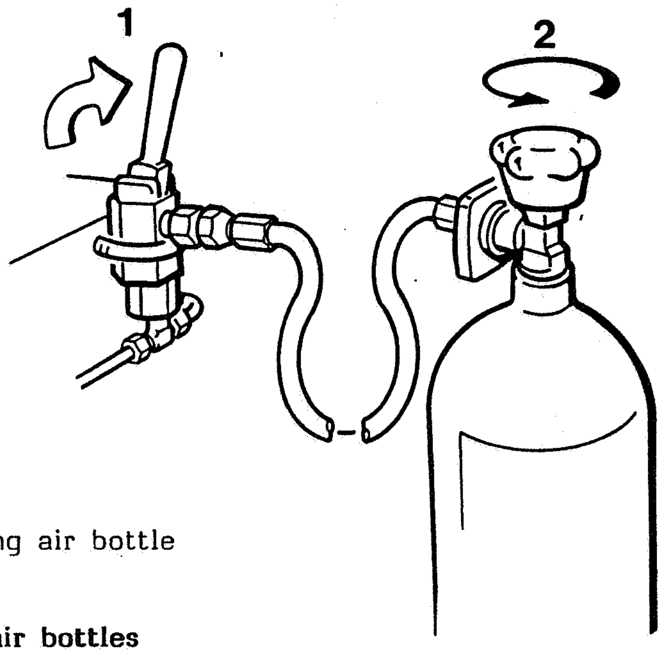

Fig. 15.5 Filling air bottle

Removing the air bottles

- Upon reaching final bottle pressure **close bottle valve first, then filling valve** by returning handle to closed position (fig. 15.6).
- Remove compressed air bottle.

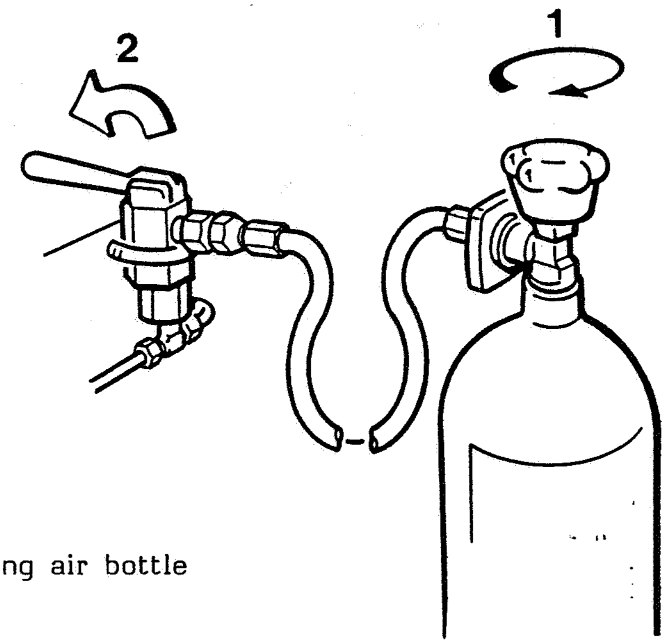

Fig. 15.6 Removing air bottle

15.3.2 Starting the Unit

NOTE:

Knocking, audible when starting, is due to fourth stage floating piston. This knocking disappears as soon as there is pressure between the stages and pistons are running synchronous to the other pistons. Therefore, this knocking can be ignored.

Units with electric drive motor:

- Master switch must be ON (to be furnished by customer).

- Set control switch at the switch box to position 1 (KA 14 units) or press I button at the control and monitoring unit (KAP 14).

- Give the compressor a brief trial to determine the sense of rotation which must be counter-clockwise when viewing at the flywheel.

CAUTION:

Interchange terminals at the feeder cable, only; never at the motor terminal board!

- If necessary interchange the terminals.

- (Units with electronic monitoring system only:)
  Start of the compressor is indicated by the pilot light illuminating on the Electronic Control which must extinguish once the specified operating conditions have been attained.

- Observe the pressure switch shut-off pressure on units with automatic compressor control.

15 INSTALLATION, OPERATION

- If final pressure is reached and pressure switch shuts off units properly, open condensate drain valves and drain condensate. Unit is then ready for operation.

Units with gasoline or Diesel engine

- Open condensate drain valves on the filters so that motor starts without load.

- Set choke to position START. Start engine with recoil starter or crank handle. As soon as motor runs smoothly retur choke to normal operating position.

- Close condensate drain valves and run unit to final pressure. Check final pressure safety valve and pressure gauge.

- As soon as final pressure is reached and final pressure safety valve blows off, open condensate drain valves and drain condensate - unit is ready for filling operation.

During filling procedure bottles will warm up due to recompression. After removing, allow bottles to cool down, bottle pressure will drop. Bottles may then be reconnected and topped up to the respective maximum filling pressure.

The filling valve connection is of the manual type and permits connection to air tanks without using tools. An o-ring is provided for self-sealing due to internal over-pressure.

Compressed air tank filling valves for a pressure in excess of 200 bars are standardized (DIN 477, sheet 5) and connectors for 200 and 300 bars are different and cannot be mixed-up.

To ensure safe air tank removal after filling the valve has an integral venting bore. Therefore always close tank valve first before closing filling valve.

15 INSTALLATION, OPERATION

15.5. SHUT-DOWN PROCEDURE

- Close filling valves.

Units with electric motor:

- Set the 0 - I switch on the switch box to position 0 (OFF). (KA 14 units).
  Press the 0 (OFF) button at the control and monitoring unit (KAP 14 units).
- Set the master switch to OFF when servicing the compressor or the Electronic Control.

Units with gasoline or Diesel engine:

Shut down gasoline or Diesel engine with stop button or stop lever, respectively.

- Place a warning sign
  "CAUTION! Compressor out of service, DO NOT switch on"

- Vent unit by means of filling valves to approx. 80 bars then decompress with drain valves to remove all moisture in filters and oil and water separator. Then close all valves.

- Check the oil level in the compressor and replenish, if necessary. Also check whether the compressor needs servicing in accordance with maintenance schedule - see Section 16.

MAINTENANCE SCHEDULE 16

ATTENTION: **For cartridge change intervals refer to section 5.**

- **Prior to taking into operation**

  Open condensate drain valves and discharge condensate at low pressure with shut-off valve closed. Then close condensate drain valves, operate unit to final pressure and check safety valve or pressure switch for operation prior to opening shut-off valve. Observe this sequence, see section 15.

- **After 30 minutes operating time**

  Check valve heads, note that intake lines to valve heads must be hand warm and delivery lines hot, see section 9.

- **Daily**

  Check oil level with dip stick - see section 2.

- **After 25 operating hours**

  First oil change - see section 2.
  Check all pipes for leakage

- **After 250 operating hours**

  Oil change, normal oil, see section 2.
  Check v-belt of oil pump drive - see workshop manual

- **After 500 operating hours**

  Oil change, synthetic oil - see section 2.

- **After 750 - 800 operating hours**

  Check valves - see section 9.

- **After 1000 operating hours**

  Check v-belts and tighten, if necessary, see section 12.
  Service intake filter - see section 3.

- **After 2000 operating hours**

  Clean sintered filter element of 3rd stage intermediate filter - see section 4, and of oil and water separator micro-cartridge (KAP unit, only) - see section 5.
  Valve overhaul - see section 9.

- **Annually or as required**

  Check safety valves - see section 7.
  Change oil if 250 or 500 operating hours have not been reached- see section 5.

16 MAINTENANCE SCHEDULE

STORAGE, CONSERVATION 17

17.1 GENERAL

If the compressor is to be out of service for a period longer than six months, it is good practice to preserve the unit in accordance with the following instructions:

Make sure that the compressor is kept indoors in a dry room free of dust. Only cover the compressor with plastic sheets as long as it is sure that no sweat water will form under the sheet. Remove the sheet from time to time and dry the system off on the outside.

If these means of preserving the compressor cannot be carried out and it is intended to take the compressor out of service for more than 2 or 3 years, you are kindly requested to get in touch with us for special instructions.

17.2. PREPARATORY WORK

- Prior to preserving the compressor unit, it must be run warm, i.e. up to the specified service pressure at which it is maintained for approx. 10 minutes.

Then carry out the following checks:

- Check all pipes, filters and valves (also safety valves) for leakage.

- Tighten all couplings, as required.

- After 10 minutes, open the filling valves and operate the compressor at adjusted minimum pressure (80 bars) using pressure maintaining valve for approx. 5 minutes.

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- After these 5 minutes, shut the system down and drain off all separators and filters completely. Reclose filling valves.

- Remove filter heads and lubricate threads with white vaseline, (DAB7).

- **Ensure that filter cartridges remain in filters!** This will prevent oil entering filling lines as a result of preservation procedures.

- Remove intake filter completely.

17.3. PRESERVING

- Operate compressor again and slowly drip 25 to 50 ccm (.9 to 1.8 cu.in.) Shell Ensis Engine Oil, SAE 30 or equivalent (see section 2) into the inlet port with the compressor running. Keep filling valves open and condensate drain valves closed.

- If the inlet port is arranged horizontally, use hose pipe to facilitate the job.

- After introducing the oil into the inlet port, operate the system for approx. 5 minutes and then shut down.

- Close filling valves.

- Use plug 63592-903 for filling valves with bottle connector R 5/8", see fig. 17.1.

- Use plug N 3546 for filling valves with hose connector M 16 x 1,5, see fig. 17.2.

- Place dust cap N 3540 on inlet port.

STORAGE, CONSERVATION 17

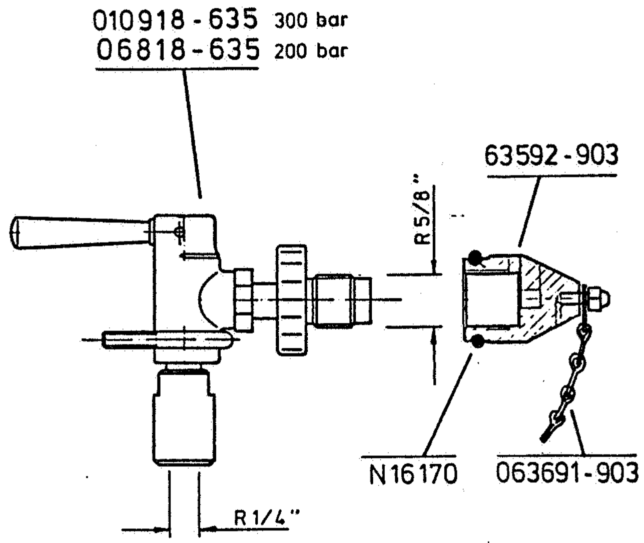


Fig. 17.1 Filling valve with cap plug

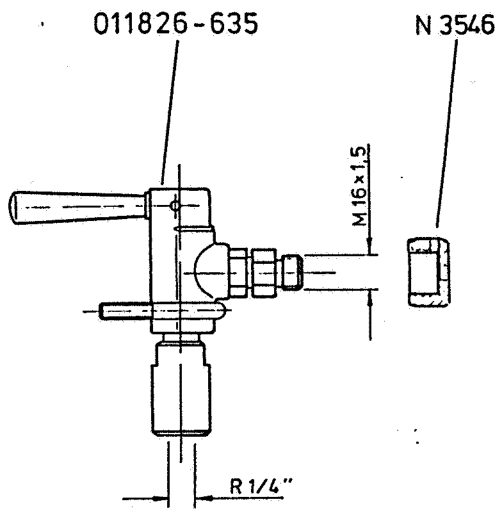


Fig. 17.2 Filling valve with cap plug

17.4. PRESERVING THE MOTOR/ENGINE

Preserve the motor/engine in accordance with the instructions of the motor/engine manufacturer.

17.5. PREVENTIVE MAINTENANCE DURING STORAGE

Operate the compressor once every three months as described in the following:

- Remove the dust cap from the inlet port and install intake filter.

- Open the filling valves.

- Allow the system to run approx. 5 minutes until air flows out of the filling valves.

- Shut down the compressor.

17 STORAGE, CONSERVATION

- Open condensate drain valves, decompress all stages, then close valve again.

- Replace the dust cap on the inlet port.

17.5.1 Lube Oils for Preserving

- After prolonged idle periods the oil will age in the compressor and engine and must be drained after 3 years at the latest and replaced by fresh oil.

- The stated period can only be attained when the crankcase is sealed during the preservation period in accordance with the preservation requirements.

- After changing the oil the compressor and the engine have to be turned or operated, for the prescribed period.

- Check the lubrication of the compressor in accordance with the Instruction Manual during the 3-monthly brief operation or when turning the compressor.

17.6. REACTIVATING THE COMPRESSOR UNIT

- Remove the dust cap from the inlet port.

- Check the oil level of the compressor.

- Check the motor/engine in accordance with the manufacturer's instructions.

- Change all filter cartridges.

- Run the compressor with open filling valves for approx. 5 minutes. Check for proper operation of the lubricating system.

- Close filling valves after 5 minutes and run system up to final pressure until the final pressure safety valve blows. On compressor units with compressor control system, place service switch S3 in switch box to pos. 1 to override pressure switch.

- Check the interpressure safety valves for leakage.

- Establish cause of any fault in general from the trouble-shooting table, section 19, and remedy.

- Stop the system when running properly, compressor is then ready for operation.

17 STORAGE, CONSERVATION

REPAIR INSTRUCTIONS 18

18.1 GENERAL

For all repair and overhaul instructions refer to applicable workshop manual.

18 REPAIR INSTRUCTIONS

TROUBLE-SHOOTING 19

Trouble	Cause	Remedy
Drive motor (electric) Motor does not start	Electric circuitry faulty	Before attempting to make any repairs, check all fuses, terminal connections, wire leads, make sure that motor data comply with mains supply.
Drive motor (electric) Motor (engine) does not start	See motor (engine) instructions	See motor (engine) instructions
Compressor block No oil pressure	Air trapped in oil pump	Vent pump and line see 2.4.
	Oil pump drive not correct	Check drive - see workshop manual
Sight glas exhibits air bubbles	Oil pressure regulator dirty	Clean and readjust oil pressure regulator
	4th stage piston worn	Operate compressor with final stage valve head removed. If oil flows continously out of cylinder, replace piston and liner.
	4th stage outlet valve defective.	Replace
Compressor does not attain final pressure	Condensate drain valves or fittings leaking.	Tighten and reseal
	Premature opening of final safety valve	Clean final safety valve and readjust.
	Piston rings worn	Replace
	Excessive piston clearance	Replace
Compressor output insufficient	Intake filter clogged	Replace filter element
	Pipes leaking	Re-tighten.

19 TROUBLE-SHOOTING

Trouble	Cause	Remedy
Safety valves between individual stages releasing pressure	Intermediate pressure too high	Check valves - see 9. Service and clean valves.
	Valves not closing properly.	
Compressor running too hot	Insufficient supply of fresh cooling air	Check location max. ambient temperature +40°C
	Intake or outlet valves not closing properly.	Check and clean valves, replace worn parts as necessary.
	Wrong direction of rotation	See arrow on compressor and remedy accordingly
Oil residue in delivered air	Improper maintenance of filters, filter cartridge saturated	Remedy filters, change filter cartridges
	Wrong oil type	Use right oil type and clean sooted valves.
Electric Control System Control does not switch on	No control voltage	Check feed line
	Control fuse defective	Replace fuse, eliminate cause
	Control current line cut off, line or terminal loose	Tighten terminal
	Thermal overload relay triggered	Clear faults as described in the following
Thermal overload relay for drive motor triggered	Current consumption too high Overload relay set too low	Check compressor drive Correct setting
Control does not switch off, final pressure safety valve blows off	Final pressure switch set too high	Correct setting
	Final pressure safety valve defective	Replace safety valve

TROUBLE-SHOOTING 19

Trouble	Cause	Remedy
Automatic Condensate Drain (KA 14)		
ACDU does not drain	No control air	Check control air line
	Sintered metal filters clogged.	Clean filter inserts.
Solenoid valve does not open	No voltage	Check control circuitry and timer
	Solenoid valve faulty	Check solenoid valve. Replace if necessary.
ACDU does not close	Control air nozzle clogged	Remove nozzle and clean.
ACDU leaking	Ball valves dirty	Remove ball valves and clean. Replace defective parts.
Automatic Condensate Drain (KAP 14)		
Drain valves do not close	No control air	Check control air line
	Drain valves leaking	Dismantle drain valve and clean
Drain valves do not open	Condensate drain valve piston jammed	Dismantle drain valve, clean or replace valve
Solenoid valve does not close	Solenoid valve faulty faulty	Check solenoid valve and replace if necessary
	No electrical signal	Check for voltage from timer
Solenoid valve does not open	Solenoid valve faulty faulty	Check solenoid valve and replace if necessary
	Continuous electrical signal	Check electrical control circuit and timer

19 TROUBLE-SHOOTING

TABLES 20

20.1. TIGHTENING TORQUE VALUES

NOTE Unless otherwise specified in text, following tightening torques should be used.
All valve head screws require torque wrench tightening.

Bolt or screw	**Thread**	**max. torque**
Hex and allen head	M 6	10 Nm (7 ft.lbs)
Hex and allen head	M 8	25 Nm (18 ft.lbs)
Hex and allen head	M 10	45 Nm (32 ft.lbs)
Hex and allen head	M 12	75 Nm (53 ft.lbs)
Hex and allen head	M 14	120 Nm (85 ft.lbs)

Pipe connections (swivel nuts): Finger-tight + 1/2 turn

20 TABLES

20.2 LUBRICATION CHART

If not stated elsewhere the lubricants should be used as follows:

O-rings, sealing rings	Dow Corning MS4
Metallic components	SHELL Alvania R3
Olive of pipe connector	Never-Seez NS-40
Threads of pipe connector	

20.3 CONVERSION TABLE PSI TO BARS

psi ~bar

psi	bar	psi	bar	psi	bar	psi	bar
1	,07	56	3,94	155	10,90	560	39,37
2	,14	57	4,01	160	11,25	570	40,07
3	,21	58	4,08	165	11,60	580	40,78
4	,28	59	4,15	170	11,95	590	41,48
5	,35	60	4,22	175	12,30	600	42,18
6	,42	61	4,29	180	12,66	610	42,89
7	,49	62	4,36	185	13,01	620	43,59
8	,56	63	4,43	190	13,36	630	44,29
9	,63	64	4,50	195	13,71	640	45,00
10	,70	65	4,57	200	14,06	650	45,70
11	,77	66	4,64	205	14,41	660	46,40
12	,84	67	4,71	210	14,76	670	47,11
13	,91	68	4,78	215	15,12	680	47,81
14	,98	69	4,85	220	15,47	690	48,51
15	1,05	70	4,92	225	15,82	700	49,21
16	1,12	71	4,99	230	16,17	710	49,92
17	1,20	72	5,06	235	16,52	720	50,62
18	1,27	73	5,13	240	16,87	730	51,32
19	1,34	74	5,20	245	17,23	740	52,03
20	1,41	75	5,27	250	17,58	750	52,73
21	1,48	76	5,34	255	17,93	760	53,43
22	1,55	77	5,41	260	18,28	770	54,14
23	1,62	78	5,48	265	18,63	780	54,84
24	1,69	79	5,55	270	18,98	790	55,54
25	1,76	80	5,62	275	19,33	800	56,25
26	1,83	81	5,69	280	19,69	810	56,95
27	1,90	82	5,77	285	20,04	820	57,65
28	1,97	83	5,84	290	20,39	830	58,35
29	2,11	84	5,91	295	20,74	840	59,06
30	2,11	85	5,98	300	21,09	850	59,76
31	2,18	86	6,05	310	21,80	860	60,46
32	2,25	87	6,12	320	22,50	870	61,17
33	2,32	88	6,19	330	23,20	880	61,87
34	2,39	89	6,26	340	23,90	890	62,57
35	2,46	90	6,33	350	24,61	900	63,28
36	2,53	91	6,40	360	25,31	910	63,98
37	2,60	92	6,47	370	26,01	920	64,68
38	2,67	93	6,54	380	26,72	930	65,39
39	2,74	94	6,61	390	27,42	940	66,09
40	2,81	95	6,68	400	28,12	950	66,79
41	2,88	96	6,75	410	28,83	960	67,49
42	2,95	97	6,82	420	29,53	970	68,20
43	3,02	98	6,89	430	30,23	980	68,90
44	3,09	99	6,96	440	30,93	990	69,60
45	3,16	100	7,03	450	31,64	1000	70,31
46	3,23	105	7,38	460	32,34	1010	71,01
47	3,30	110	7,73	470	33,04	1020	71,71
48	3,37	115	8,09	480	33,75	1030	72,42
49	3,45	120	8,44	490	34,45	1040	73,12
50	3,52	125	8,79	500	35,15	1050	73,82
51	3,59	130	9,14	510	35,86	1060	74,52
52	3,66	135	9,49	520	36,56	1070	75,23
53	3,73	140	9,84	530	37,26	1080	75,93
54	3,80	145	10,19	540	37,97	1090	76,63
55	3,87	150	10,55	550	38,67	1100	77,34

20 TABLES

20.4 CONVERSION TABLE °F TO °C

°C — °F

°C	°F	°C	°F	°C	°F	°C	°F	°C	°F
-100	-148	32	89.6	74	165.2	260	500	680	1256
- 90	-130	33	91.4	75	167.0	270	518	690	1274
- 80	-112	34	93.2	76	168.8	280	536	700	1292
- 70	- 94	35	95.0	77	170.6	290	554	710	1310
- 60	- 76	36	96.8	78	172.4	300	572	720	1328
- 50	- 58	37	98.6	79	174.2	310	590	730	1346
- 40	- 40	38	100.4	80	176.0	320	608	740	1364
- 30	- 22	39	102.2	81	177.8	330	626	750	1382
- 20	- 4	40	104.0	82	179.6	340	644	760	1400
- 10	14	41	105.8	83	181.4	350	662	770	1418
0	32	42	107.6	84	183.2	360	680	780	1436
1	33.8	43	109.4	85	185.0	370	698	790	1454
2	35.6	44	111.2	86	186.8	380	716	800	1472
3	37.4	45	113.0	87	188.6	390	734	810	1490
4	39.2	46	114.8	88	190.4	400	752	820	1508
5	41.0	47	116.6	89	192.2	410	770	830	1526
6	42.8	48	118.4	90	194.0	420	788	840	1544
7	44.6	49	120.2	91	195.8	430	806	850	1562
8	46.4	50	122.0	92	197.6	440	824	860	1580
9	48.2	51	123.8	93	199.4	450	842	870	1598
10	50.0	52	125.6	94	201.2	460	860	880	1616
11	51.8	53	127.4	95	203.0	470	878	890	1634
12	53.6	54	129.2	96	204.8	480	896	900	1652
13	55.4	55	131.0	97	206.6	490	914	910	1670
14	57.2	56	132.8	98	208.4	500	932	920	1688
15	59.0	57	134.6	99	210.2	510	950	930	1706
16	60.8	58	136.4	100	212	520	968	940	1724
17	62.6	59	138.2	110	230	530	986	950	1742
18	64.4	60	140.0	120	248	540	1004	960	1760
19	66.2	61	141.8	130	266	550	1022	970	1778
20	68.0	62	143.6	140	284	560	1040	980	1796
21	69.8	63	145.4	150	302	570	1058	990	1814
22	71.6	64	147.2	160	320	580	1076	1000	1832
23	73.4	65	149.0	170	338	590	1094	1020	1868
24	75.2	66	150.8	180	356	600	1112	1050	1922
25	77.0	67	152.6	190	374	610	1130	1100	2012
26	78.8	68	154.4	200	392	620	1148	1150	2102
27	80.6	69	156.2	210	410	630	1166	1200	2192
28	82.4	70	158.0	220	428	640	1184	1250	2282
29	84.2	71	159.8	230	446	650	1202	1300	2372
30	86.0	72	161.6	240	464	660	1220	1350	2462
31	87.8	73	163.4	250	482	670	1238	1400	2552

- Schematic diagrams, standard
- Drawings
- Air flow diagram, standard

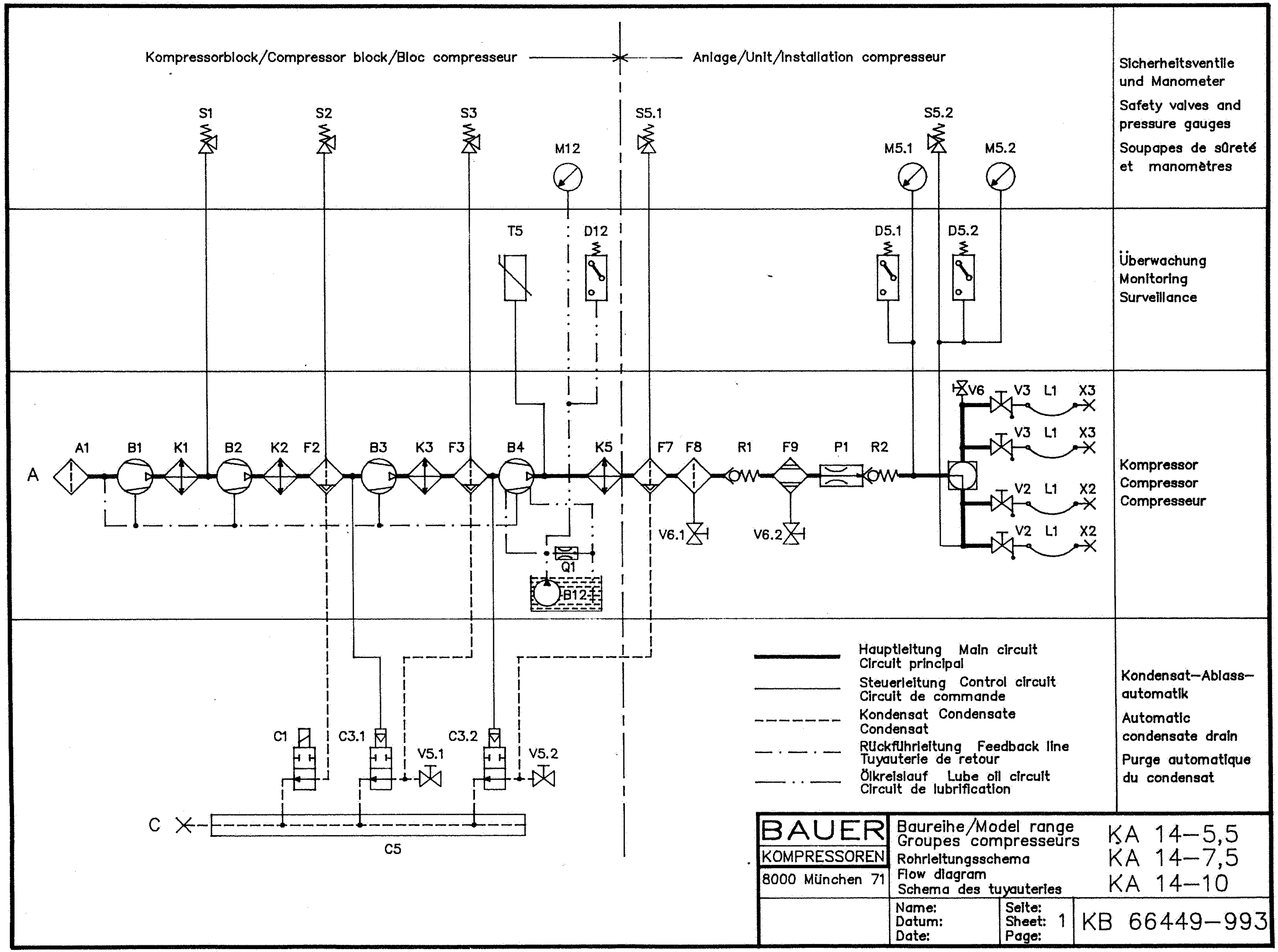
or, depending on order

- Special documentation

- schematic diagrams
- air flow diagrams
- illustrations
- parts lists

This special documentation supersedes and/or supplements the respective paragraphs/figures of the Instruction Manual

21 ANNEX


Kompressorblock/Compressor block/Bloc compresseur
Anlage/Unit/Installation compresseur
Sicherheitsventile und Manometer
Safety valves and pressure gauges
Soupapes de sûreté et manomètres
Überwachung
Monitoring
Surveillance
Kompressor
Compressor
Compresseur
Kondensat–Ablass–automatik
Automatic condensate drain
Purge automatique du condensat
S1
S2
S3
S5.1
S5.2
M12
M5.1
M5.2
T5
D12
D5.1
D5.2
A
A1
B1
K1
B2
K2
F2
B3
K3
F3
B4
K5
F7
F8
R1
F9
P1
R2
V6
V3
L1
X3
V2
X2
V6.1
V6.2
Q1
B12
C1
C3.1
C3.2
V5.1
V5.2
C
C5
Hauptleitung Main circuit
Circuit principal
Steuerleitung Control circuit
Circuit de commande
Kondensat Condensate
Condensat
Rückführleitung Feedback line
Tuyauterie de retour
Ölkreislauf Lube oil circuit
Circuit de lubrification
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KOMPRESSOREN
8000 München 71
Baureihe/Model range
Groupes compresseurs
Rohrleitungsschema
Flow diagram
Schema des tuyauteries
KA 14–5,5
KA 14–7,5
KA 14–10
Name:
Datum:
Date:
Seite:
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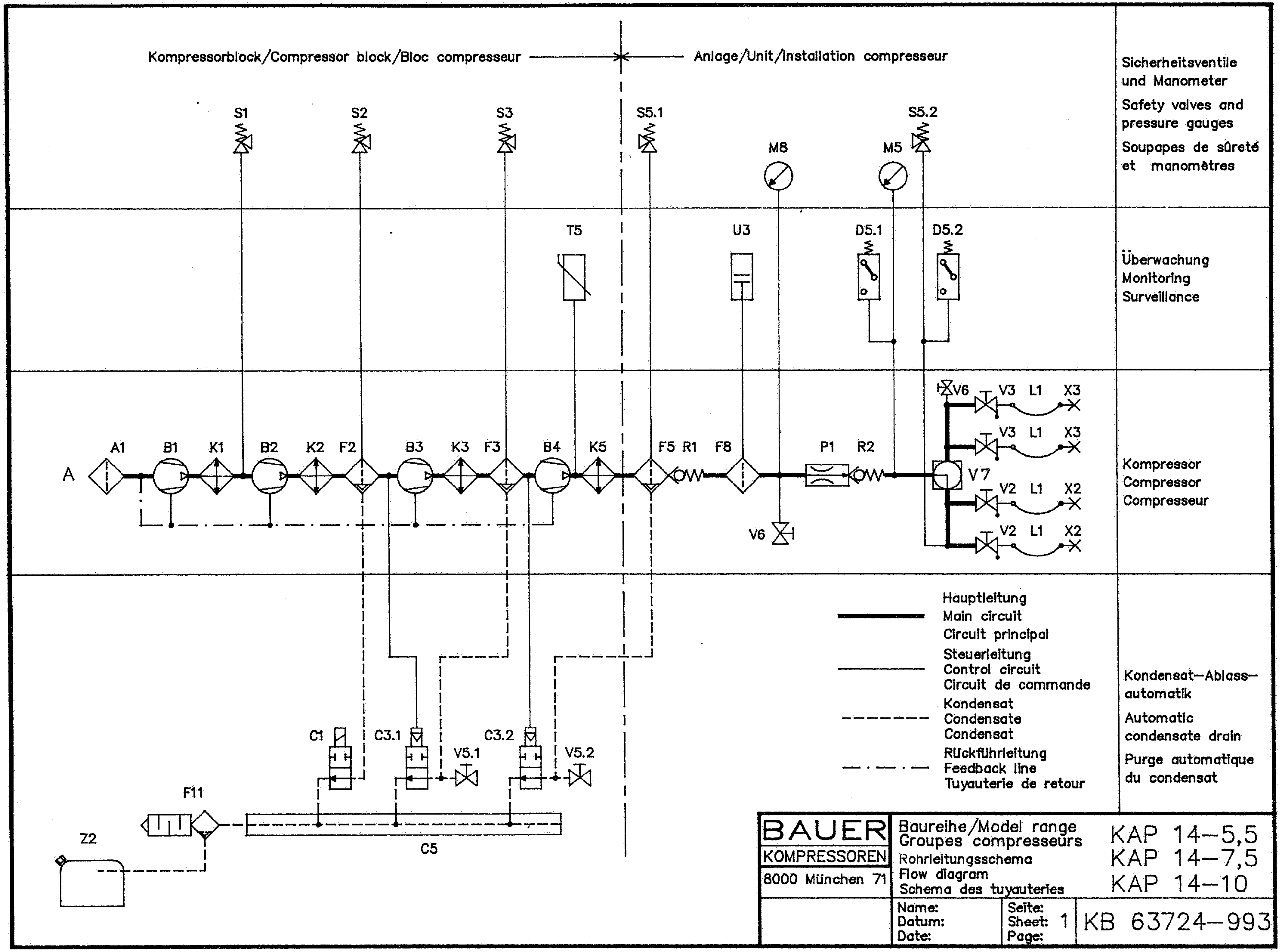
KB 66449–993


Kompressorblock/Compressor block/Bloc compresseur
Anlage/Unit/Installation compresseur
Sicherheitsventile und Manometer
Safety valves and pressure gauges
Soupapes de sûreté et manomètres
S1
S2
S3
S5.1
S5.2
M8
M5
T5
U3
D5.1
D5.2
Überwachung
Monitoring
Surveillance
A
A1
B1
K1
B2
K2
F2
B3
K3
F3
B4
K5
F5
R1
F8
P1
R2
V6
V7
V3
L1
X3
V2
X2
Kompressor
Compressor
Compresseur
Hauptleitung
Main circuit
Circuit principal
Steuerleitung
Control circuit
Circuit de commande
Kondensat
Condensate
Condensat
Rückführleitung
Feedback line
Tuyauterie de retour
Kondensat–Ablass–automatik
Automatic condensate drain
Purge automatique du condensat
C1
C3.1
C3.2
V5.1
V5.2
F11
Z2
C5
BAUER
KOMPRESSOREN
8000 München 71
Baureihe/Model range
Groupes compresseurs
Rohrleitungsschema
Flow diagram
Schema des tuyauteries
KAP 14–5,5
KAP 14–7,5
KAP 14–10
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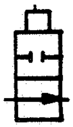
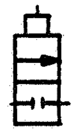
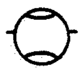
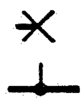
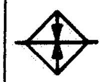
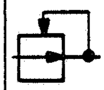
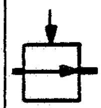
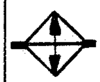
BAUER KOMPRESSOREN

SCHALTTEILLISTE PNEUMATIK / PNEUMATIC PARTS LIST / NOMENCLATURE DES COMPOSANTS PNEUMATIQUES

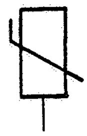
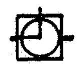
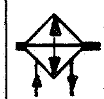
Pos.	Bezeichnung	Designation	Dénomination	Symbol
A	**Ansaugfilter, Ansaugdruckreduzierung**	**Intake filter, intake pressure reduction**	**Filtre d'aspiration, réduction de pression d'aspiration**	
A	Eingang, Kompressor	Intake, compressor	Entré, compresseur	
A1	Ansaugfilter, Mikronik	Intake filter, micronic	Filtre d'aspiration, micronique	
A2	Ansaugfilter, Mikronik, gasdicht	Intake filter, micronic, gas-tight	Filtre d'aspiration, micronique, étanche de gaz	
A3	Partikelfilter, Eingang	Particle separator, intake	Filtre particules, entrée	
B	**Kompressor-Block**	**Compressor block**	**Bloc compresseur**	
B	Ausgang, Kompressor	Outlet, compressor	Sortie, compresseur	
B1	Verdichtungsstufe 1	Stage 1	Etage de compression 1	
B2	Verdichtungsstufe 2	Stage 2	Etage de compression 2	
B3	Verdichtungsstufe 3	Stage 3	Etage de compression 3	
B4	Verdichtungsstufe 4	Stage 4	Etage de compression 4	
B5	Verdichtungsstufe 5	Stage 5	Etage de compression 5	
B12	Ölpumpe	Oil pump	Pompe à huile	
C	**Kondensat-Ablaßautomatik**	**Automatic condensate drain**	**Purge automatique de condensat**	
C	Ausgang, Kondensat	Outlet, condensate	Sortie, condensat	
C1	4fach Kondensat-Ablaßventil	Quadruple condensate drain valve	Soupape de purge quadruple	
C2	Kondensat-Ablaßmagnetventil	Condensate drain solenoid valve,	Soupape de purge, electrovanne	
C3	Kondensatablaßventil, steuerluftlos offen	Condensate drain valve, N/O	Soupape de purge, ouverte sans air de commande	
C4	Kondensatablaßventil, steuerluftlos geschlossen	Condensate drain valve, N/C	Soupape de purge, fermée sans air de commande	
C5	Kondensat-Sammelleiste	Condensate manifold	Listeau collecteur de condensats	
C6	Entlastungsventil	Discharge valve	Soupape d'évacuation	
D	**Druckwächter, Strömungswächter Pegelschalter**	**Pressure switches, flow switches Level switches**	**Interrupteurs de pression, controlleurs du débit et du niveau**	
D1	Druckwächter, Zwischendruck 1./2. Stufe	Pressure switch, intermediate pressure 1st/2nd stage	Interrupteur de pression intermédiaire 1er/2e étage	
D2	Druckwächter, Zwischendruck 2./3. Stufe	Pressure switch, intermediate pressure 2nd/3rd stage	Interrupteur de pression intermédiaire 2e/3e étage	
D3	Druckwächter, Zwischendruck 3./4. Stufe	Pressure switch, intermediate pressure 3rd/4th stage	Interrupteur de pression intermédiaire 3e/4e étage	
D4	Druckwächter, Zwischendruck 4./5. Stufe	Pressure switch, intermediate pressure 4th/5th stage	Interrupteur de pression intermédiaire 4e/5e étage	
D5	Druckschalter, Enddruck	Pressure switch, finale pressure	Interrupteur de pression finale	
D6	Druckwächter, Flaschendruck	Pressure switch, bottle pressure	Interr. de press. min. des bouteilles	
D7	Druckwächter, Ansaugdruck, min.	Pressure sw., min. intake press.	Interrupteur de pression min. d'asp.	
D8	Druckwächter, Ansaugdruck, max.	Pressure sw., max. intake press.	Interrupteur de pression max. d'asp.	
D9	Druckwächter, Eingangsdruck	Pressure switch, intake pressure	Interrupteur de pression d'aspiration	
D10	Druckwächter, Zwischendruck-Sammelüberwachung	Pressure switch, intermediate pressure, collective monitoring	Interrupteur des pression interm., surveillance centrale	
D11	Strömungswächter, Öldruck	Flow switch, oil pressure	Contr. de débit, pression d'huile	
D12	Druckwächter, Öldruck	Pressure switch, oil pressure	Interrupteur de pression d'huile	
D13	Druckwächter, Ausgangsdruck	Pressure switch, outlet pressure	Interrupteur de pression de sortie	
D14	Pegelschalter, Kondensat	Level switch, condensate	Interrupteur, niveau de condensat	
D15	Pegelschalter, Öl	Level switch, Oil	Interrupteur, niveau d'huile	
D16	Druckschalter, Umschaltung	Pressure switch, switch-over	Interrupteur sélecteur	
E	**Ermetos, Rohrverschraubungen (nur bei Bedarf)**	**Tube connectors (for special flow diagram, only)**	**Ermetos, raccords de tuyaux (selon besoin)**	
E1				
F	**Filter**	**Filters**	**Filtres**	
F1	Zwischenfilter 1./2. Stufe	Intermediate filter,1st/2nd stage	Filtre intermédiaire 1er/2e étage	
F2	Zwischenfilter 2./3. Stufe	Intermediate filter,2nd/3rd stage	Filtre intermédiaire 2e/3e étage	
F3	Zwischenfilter 3./4. Stufe	Intermediate filter,3rd/4th stage	Filtre intermédiaire 3e/4e étage	
F4	Zwischenfilter 4./5. Stufe	Intermediate filter,4th/5th stage	Filtre intermédiaire 4e/5e étage	
F5	Öl- und Wasserabscheider, Mikropatrone	Oil and water separator, micro-cartridge type	Séparateur d'huile et d'eau à micro-cartouche	
F6	Öl- und Wasserabscheider, Drall-	Oil and water separator, centrifugal type	Séparateur d'huile et d'eau centrifugal	
F7	Öl- und Wasserabscheider, Düse-	Oil and water separator, jet type	Séparateur d'huile et d'eau à buse	
F8	Feinnachreiniger, AC	Purifier, AC	Epurateur, AC	
F9	Trockner, MS	Dryer, MS	Desicateur, MS	
F10	Abscheider, Schmierölkreislauf	Separator, lube oil circuit	Séparateur, circuit de lubrification	
F11	Abscheider, Kondensat	Separator, condensate	Séparateur, condensat	
F12	CO-Abscheider	Filter for CO removal	Filtre à cartouche CO	
F13	Filter, MS-AC	Filter, MS-AC	Filtre, MS-AC	
F14	Partikelfilter	Particle separator	Fitre particules	

BAUER
KOMPRESSOREN

SCHALTTEILLISTE PNEUMATIK / PNEUMATIC PARTS LIST / NOMENCLATURE DES COMPOSANTS PNEUMATIQUES

Pos.	Bezeichnung	Designation	Dénomination	Symbol
G	**Druckgasbehälter (außer Filter)**	**Pressure vessels (except filters)**	**Réservoirs à gaz sous pression (hors de filtres)**	
G1	Speicherflasche	Storage tank, receiver	Réservoir d'accumulation	
G2	Pufferbehälter	Pneumatic working tank	Réservoir amortisseur d'aspiration	
H	**Heizung**	**Heaters**	**Radiateurs**	
H1	Heizstab, Filter	Heater, filter unit	Radiateur du filtre	
H2	Heizstab, Ölsumpf	Heater, oil sump	Radiateur du carter à huile	
J	**Druckminderer**	**Pressure reducers**	**Détendeurs**	
J1	Druckminderer, Ansaugdruck-reduzierung, 1. Stufe	Pressure reducer, intake pressure reduction, 1st stage	Détendeur pour réduire la pression d'aspiration, 1er étage	
J2	Druckminderer, Ansaugdruck-reduzierung, 2. Stufe	Pressure reducer, intake pressure reduction, 2nd stage	Détendeur pour réduire la pression d'aspiration, 2e étage	
J3	Steuerdruckminderer, 1. Stufe (Pilotdruckminderer)	Control pressure reducer, 1st stage (pilot pressure reducer)	Détendeur de contrôle, 1er étage (détendeur pilote)	
J4	Steuerdruckminderer, 2. Stufe (Pilotdruckminderer)	Control pressure reducer, 2nd stage (pilot pressure reducer)	Détendeur de contrôle, 2e étage (détendeur pilote)	
J5	Domdruckminderer, 1. Stufe	Dome pressure reducer, 1st stage	Détendeur dome, 1er étage	
J6	Domdruckminderer, 2. Stufe	Dome pressure reducer, 12nd stage	Détendeur dome, 2e étage	
J7	Druckminderer, Reduzierstation	Pressure reducer, pr. red. unit	Détendeur, unité de red. de pression	
K	**Kühler**	**Cooler**	**Refroidissement**	
K1	Zwischenkühler, 1./2. Stufe	Intercooler 1st/2nd stage	Refroidisseur 1er/2e étage	
K2	Zwischenkühler, 2./3. Stufe	Intercooler 2nd/3rd stage	Refroidisseur 2e/3e étage	
K3	Zwischenkühler, 3./4. Stufe	Intercooler 3rd/4th stage	Refroidisseur 3e/4e étage	
K4	Zwischenkühler, 4./5. Stufe	Intercooler 4th/5th stage	Refroidisseur 4e/5e étage	
K5	Nachkühler	After-cooler	Refroidisseur final	
L	**Verrohrung (nur bei Bedarf) und Schläuche**	**Tubing (special flow diagram, only) and Hoses**	**Tuyauterie (selon besoin)**	
L1	Füllschlauch	Filling hose	Tuyau flex. de remplissage	
L2	Verbindungsschlauch	Connecting hose	Tuyau flex. de connexion	
M	**Manometer**	**Pressure gauges**	**Manomètres**	
M1	Manometer, Zwischendruck 1./2. Stufe	Pressure gauge, interm. pressure 1st/2nd stage	Manomètre de pression intermédiaire 1er/2e étage	
M2	Manometer, Zwischendruck 2./3. Stufe	Pressure gauge, interm. pressure 2nd/3rd stage	Manomètre de pression intermédiaire 2e/3e étage	
M3	Manometer, Zwischendruck 3./4. Stufe	Pressure gauge, interm. pressure 3rd/4th stage	Manomètre de pression intermédiaire 3e/4e étage	
M4	Manometer, Zwischendruck 4./5. Stufe	Pressure gauge, interm. pressure 4th/5th stage	Manomètre de pression intermédiaire 4e/5e étage	
M5	Manometer, Enddruck	Pressure gauge, final pressure	Manomètre de pression finale	
M6	Manometer, Flaschendruck	Pressure gauge, bottle pressure	Manomètre de pression des réservoir	
M7	Manometer, Ansaugdruck	Pressure gauge, intake pressure	Manomètre de pression d'aspiration	
M8	Manometer, Filterstrecke	Pressure gauge, filter assy.	Manomètre du système des filtres	
M9	Manometer, Steuerdruck	Pressure gauge, control pressure	Manomètre, pression de commande	
M10	Manometer, Ansaug-Zwischendruck	Pressure gauge, intake inter-pressure	Manomètre, pression intermédiaire d'aspiration	
M11	Manometer, Eingangsdruck	Pressure gauge, inlet pressure	Manomètre, pression d'entré	
M12	Manometer, Öldruck	Pressure gauge, oil pressure	Manomètre, pression d'huile	
M13	Manometer, Ausgangsdruck	Pressure gauge, outlet pressure	Manomètre, pression de sortie	
M14	Manometer, Regenerationsdruck	Pressure gauge, regeneration pr.	Manomètre, pression regenerative	
N	**Düsen**	**Nozzles**	**Buses**	
N1	Düse, Steuermedium	Nozzle, control medium	Buse du médium de commande	
P	**Druckhalteventile**	**Pressure maintaining valves**	**Soupapes de maintien de pression**	
P1	Druckhalteventil	Pressure maintaining valves	Soupape de maintien de pression	
Q	**Regulierventile**	**Regulating valves**	**Soupapes régulatrices**	
Q1	Öldruck-Regulierventil	Oil pressure regulating valve	Soupape régulatrice de pr. d'huile	
Q2	Regulierventil	Regulating valve	Soupape régulatrice	

SCHALTTEILLISTE PNEUMATIK / PNEUMATIC PARTS LIST / NOMENCLATURE DES COMPOSANTS PNEUMATIQUES

Pos.	Bezeichnung	Designation	Dénomination	Symbol
R	**Rückschlagventile**	**Non-return valves**	**Clapets anti-retour**	
R1	Rückschlagventil	Non-return valve	Clapet anti-retour	
R2	Rückschlagventil nach Druckhaltventil	Non-return valve after pressure maintaining valve	Clapet anti-retour après la soupape de maintien de pression	
S	**Sicherheitsventile**	**Safety valves**	**Soupapes de sûreté**	
S1	Sicherheitsventil Zwischendruck 1./2. Stufe	Safety valve, interm. pressure 1st/2nd stage	Soupape de sûreté pression intermédiaire 1er/2e étage	
S2	Sicherheitsventil Zwischendruck 2./3. Stufe	Safety valve, interm. pressure 2nd/3rd stage	Soupape de sûreté pression intermédiaire 2e/3e étage	
S3	Sicherheitsventil Zwischendruck 3./4. Stufe	Safety valve, interm. pressure 3rd/4th stage	Soupape de sûreté pression intermédiaire 3e/4e étage	
S4	Sicherheitsventil Zwischendruck 4./5. Stufe	Safety valve, interm. pressure 4th/5th stage	Soupape de sûreté pression intermédiaire 4e/5e étage	
S5	Sicherheitsventil, Enddruck	Safety valve, final pressure	Soupape de sûreté pression finale	
S6	Sicherheitsventil, Ansaugdruck	Safety valve, intake pressure	Soupape de sûreté, press. d'asp.	
S7	Sicherheitsventil, Flaschendruck	Safety valve, bottle pressure	Soupape de sûreté, press. de reserv.	
S8	Sicherheitsventil, Druckminderer	Safety valve, pressure reducer	Soupape de sûreté du détendeur	
S9	Sicherheitsv., Kondensatbehälter	Safety v., condensate receiver	Soup. de s. du collecteur de condensats	
T	**Temperaturüberwachung**	**Temperature monitoring**	**Surveillance de température**	
T1	Temperaturwächter 1. Stufe	Temperature switch 1st stage	Contrôleur de température 1er étage	
T2	Temperaturwächter 2. Stufe	Temperature switch 2nd stage	Contrôleur de température 2e étage	
T3	Temperaturwächter 3. Stufe	Temperature switch 3rd stage	Contrôleur de température 3e étage	
T4	Temperaturwächter 4. Stufe	Temperature switch 4th stage	Contrôleur de température 4e étage	
T5	Temperaturwächter Enddruck	Temperature switch final stage	Contrôleur de température finale	
T6	Thermometer 1. Stufe	Temperature gauge 1st stage	Thermomètre 1er étage	
T7	Thermometer 2. Stufe	Temperature gauge 1st stage	Thermomètre 1er étage	
T8	Thermometer 3. Stufe	Temperature gauge 1st stage	Thermomètre 1er étage	
T9	Thermometer 4. Stufe	Temperature gauge 1st stage	Thermomètre 1er étage	
T10	Thermometer Endstufe	Temperature gauge final stage	Thermomètre étage final	
T11	Thermometer Eingangstemp.	Temperature gauge inlet temp.	Thermomètre temp. d'entré	
U	**Überwachungen**	**Monitoring**	**Surveillances**	
U1	BC2 Electronic Control	BC2 Electronic Control	BC2 Contrôle Electronique	
U2	BC6 Electronic Control	BC6 Electronic Control	BC6 Contrôle Electronique	
U3	SECURUS-Meldegerät	SECURUS indicator unit	SECURUS-Dispositif de surveillance	
V	**Ventile, Hähne**	**Valves and taps**	**Soupapes, robinets**	
V1	Füllventil, allgemein	Filling valve, generally	Robinet de remplissage en général	
V2	Füllventil, 200 bar	Filling valve, 200 bar	Robinet de remplissage, 200 bar	
V3	Füllventil, 300 bar	Filling valve, 300 bar	Robinet de remplissage, 300 bar	
V4	Abgangshahn	Outlet valve	Robinet de sortie	
V5	Handkondensatablaßhahn	Condensate drain valve	Robinet de condensat (manette)	
V6	Entlüftungsventil	Vent valve	Soupape d'évacuation	
V7	Umschalthahn	Switch-over valve	Robinet à billes à quatre voies	
V8	Absperrhahn	Shut-off valve	Robinet d'arrêt	
V9	Umschaltventil	Switch-over valve, manual	Valve sélecteur a main	
W	**Wasserkühlung**	**Water cooling**	**Refroidissement à l'eau**	
W1	Zwischenkühler, 1./2. Stufe wassergekühlt	Intercooler 1st/2nd stage water-cooled	Refroidisseur 1er/2e étage à l'eau	
W2	Zwischenkühler, 2./3. Stufe wassergekühlt	Intercooler 2nd/3rd stage water-cooled	Refroidisseur 2e/3e étage à l'eau	
W3	Zwischenkühler, 3./4. Stufe wassergekühlt	Intercooler 3rd/4th stage water-cooled	Refroidisseur 3e/4e étage à l'eau	
W4	Zwischenkühler, 4./5. Stufe wassergekühlt	Intercooler 4th/5th stage water-cooled	Refroidisseur 4e/5e étage à l'eau	
W5	Nachkühler, wassergekühlt	After-cooler, water-cooled	Refroidisseur final, à l'eau	
X	**Anschlüsse**	**Couplings**	**Connexions**	
X1	Schnellkupplung	Quick connector	Raccordement rapide	
X2	Flaschenanschluß 200 bar	Bottle connector, 200 bar	Raccord de remplissage, 200 bar	
X3	Flaschenanschluß 300 bar	Bottle connector, 200 bar	Raccord de remplissage, 200 bar	
X4	Prüfanschluß	Test connector	Raccord de test	
X5	Schlauchanschluß	Hose connector	Raccord à tuyau	
X5	Schlauchanschluß	Hose connector	Raccord à tuyau	
XP...	Druckgeber	Pressure transmitter	Transmetteur à pression	
XT...	Temperaturgeber	Temperature transmitter	Transmetteur à temperature	

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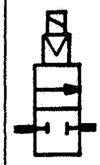
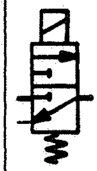
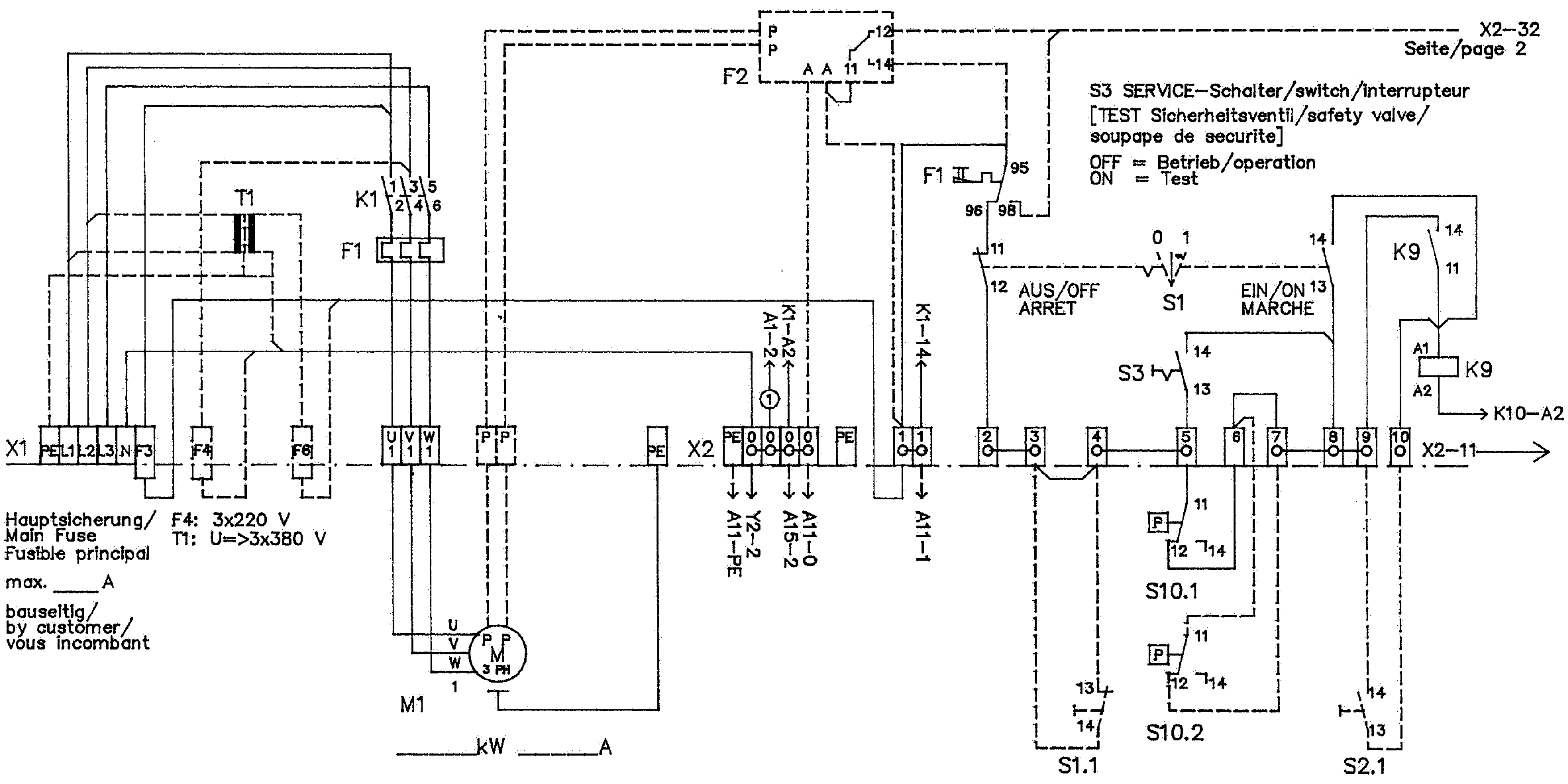
SCHALTTEILLISTE PNEUMATIK / PNEUMATIC PARTS LIST / NOMENCLATURE DES COMPOSANTS PNEUMATIQUES

Pos.	Bezeichnung	Designation	Dénomination	Symbol
Y	**Magnetventile**	**Solenoid valves**	**Electrovannes**	
Y1	Magnetventil, Anlaufentlastung	Solenoid valve, start unloading	Electrovanne, décharge au démarrage	
Y2	Magnetventil, KAA	Solenoid valve, ACDU	Electrovanne, PADC	
Y3	Magnetv., KAA Kondensatablaß	Solenoid v., ACDU condensate drain	Electrovanne, PADC purge de condensat	
Y4	Magnetv., Kondensatablaß	Solenoid v., condensate drain	Electrovanne, purge de condensat	
Y5	Magnetventil, Ansaugabsperrung	Solenoid valve, intake shut-off	Electrovanne, coupure d'aspiration	
Y6	Magnetv., Vergaserabsperrung	Solenoid v., carburettor shut-off	Electrovanne, coupure du carburateur	
Y7	Magnetventil, Zuschaltautomatik	Solenoid v., autom. selector unit	Electrovanne, sélecteur automatique	
Y8	Magnetv., Kraftstoffabsperrung	Solenoid valve, fuel shut-off	Electrovanne, coupure de carburant	
Y9	Hubmagnet, Dieselmotor-abstellung	Solenoid for diesel engine shut-down	Electro-aimant pour arrêt de moteur diesel	
Y10	Magnetv., Leerlaufregulierung	Solenoid v., idle speed control	Electrovanne, régulation de vitesse de vide	
Y11	Magnetventil, SECCANT, Umsteuerung	Solenoid valve, SECCANT, change-over	Electrovanne, SECCANT, commutation	
Y12	Magnetventil, SECCANT, Entlastung	Solenoid valve, SECCANT, unloading	Electrovanne, SECCANT, soulagement	
Y13	Magnetventil, Steuerleitung	Solenoid valve, control line	Electrovanne, pression de commande	
Y14	Magnetventil, Absperrung	Solenoid valve, shut-off	Electrovanne d'arrêt	
Z	**Zubehör**	**Accessories**	**Pièces accessoires**	
Z1	Kondensatbehälter, gasdicht	Condensate receiver, gas-tight	Collecteur de condensat,	
Z2	Kondensatbehälter	Condensate receiver	Collecteur de condensat,	
Z3	Schalldämpfer	Silencer	Silencieux	
Z4	Trockner SECCANT II	Adsorb. dryer SECCANT II	Dessicateur SECCANT II	
Z5	Trockner SECCANT III	Adsorb. dryer SECCANT III	Dessicateur SECCANT III	
Z6	Trockner SECCANT G	Adsorb. dryer SECCANT G	Dessicateur SECCANT G	
Z7	Trockner SECCANT G ex	Adsorb. dryer SECCANT G ex	Dessicateur SECCANT G ex	
Z8	Kältetrockner KT I	Refrig. dryer KT I	Dessicateur refrig. KT I	
Z9	Kältetrockner KT II	Refrig. dryer KT II	Dessicateur refrig. KT II	
Z10	Kältetrockner KT III	Refrig. dryer KT III	Dessicateur refrig. KT III	
Z11	Kältetrockner KT I plus	Refrig. dryer KT I plus	Dessicateur refrig. KT I plus	
Z12	Kältetrockner KT II plus	Refrig. dryer KT II plus	Dessicateur refrig. KT II plus	
Z13	Drehzahlregler	Speed controller	Controlleur de tour	
Z14	Pneumatischer Drehantrieb	Pneumatic rotary actuator	Commande tournant pneumatique	



○ Steuerkabel/control cable/cable de commande
○ = Ader–Nr./wire no./no. de fil

– – – – – = wahlweise/optional/optionnel

BAUER KOMPRESSOREN 8000 München 71	Baureihe/Model range Groupes compresseurs	KA
	Schaltplan Direkt–Einschaltung mit Taster Schematic diagram direct switch–on w. pushbutton Schema electrique encl. direct par touche	
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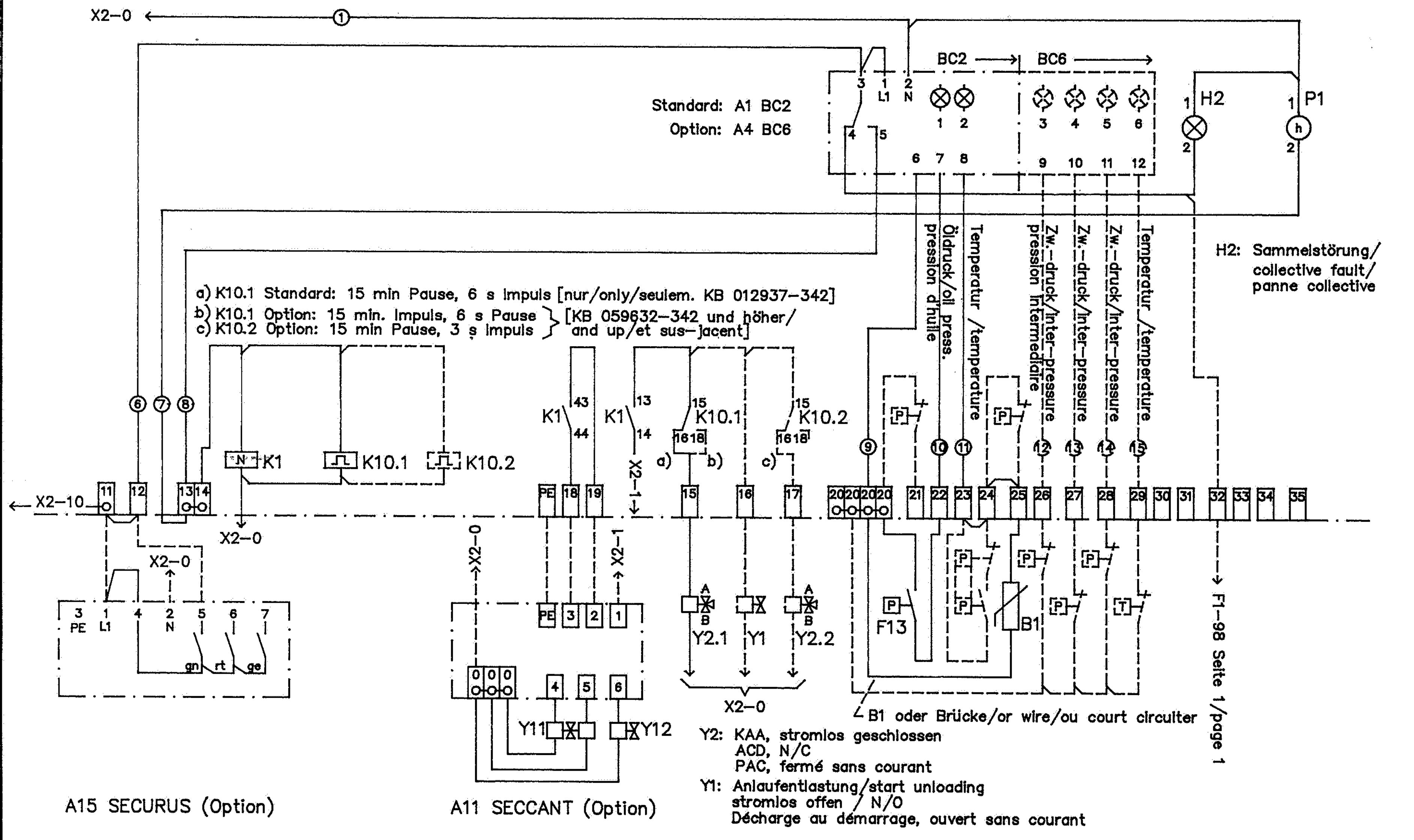

BAUER KOMPRESSOREN 8000 München 71	Baureihe/Model range Groupes compresseurs KA Schaltplan Direkt-Einschaltung mit Taster Schematic diagram direct switch-on w. pushbutton Schéma electrique encl. direct par touche	
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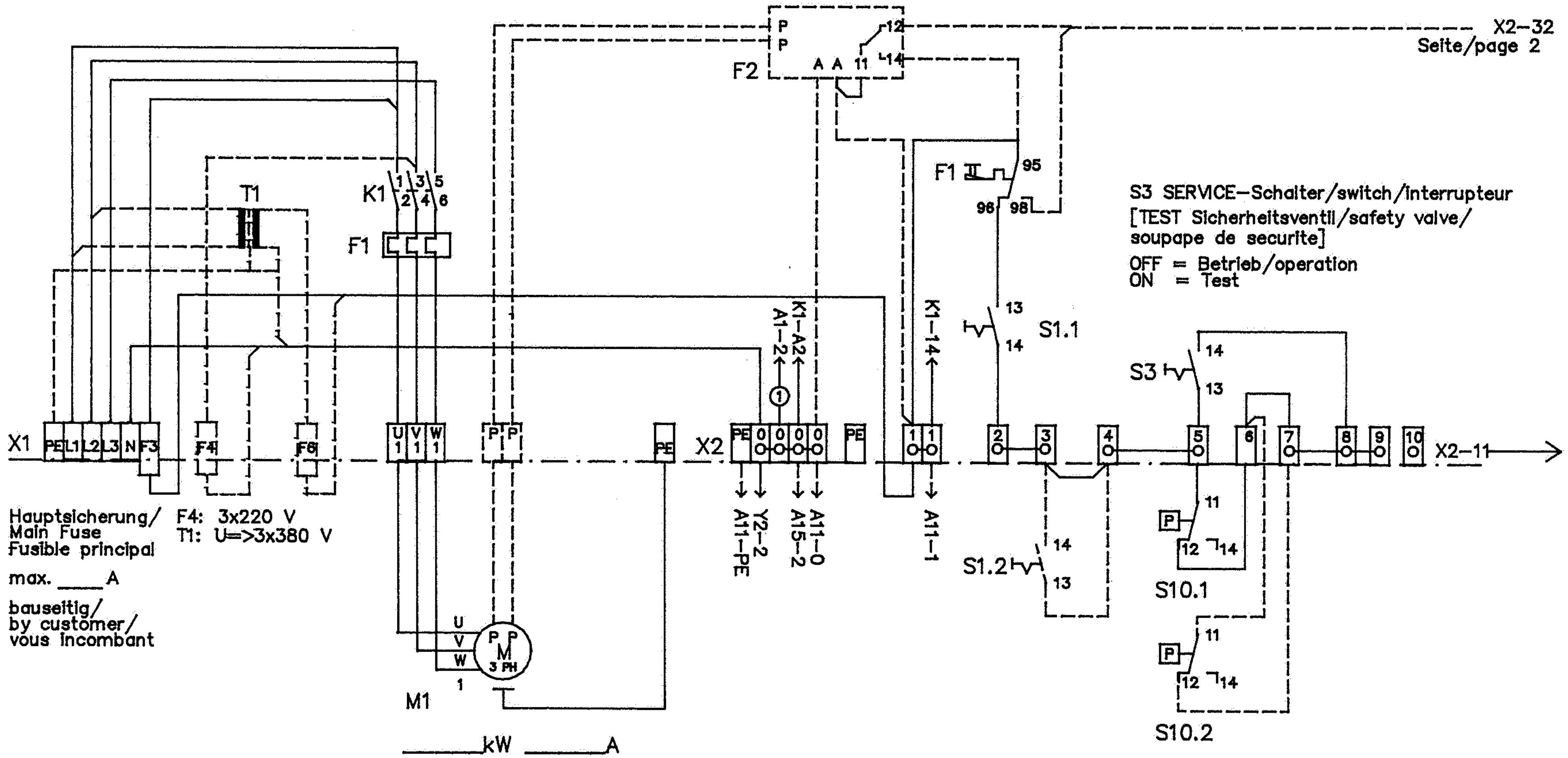

○ = Steuerkabel/control cable/cable de commande
Ader–Nr./wire no./no. de fil

– – – – – = wahlweise/optional/optionnel

BAUER KOMPRESSOREN 8000 München 71	Baureihe/Model range Groupes compresseurs KA Schaltplan Direkt–Einschaltung mit Schalter Schematic diagram direct switch–on w. contr. switch Schéma electrique encl. direct par interrupteur	
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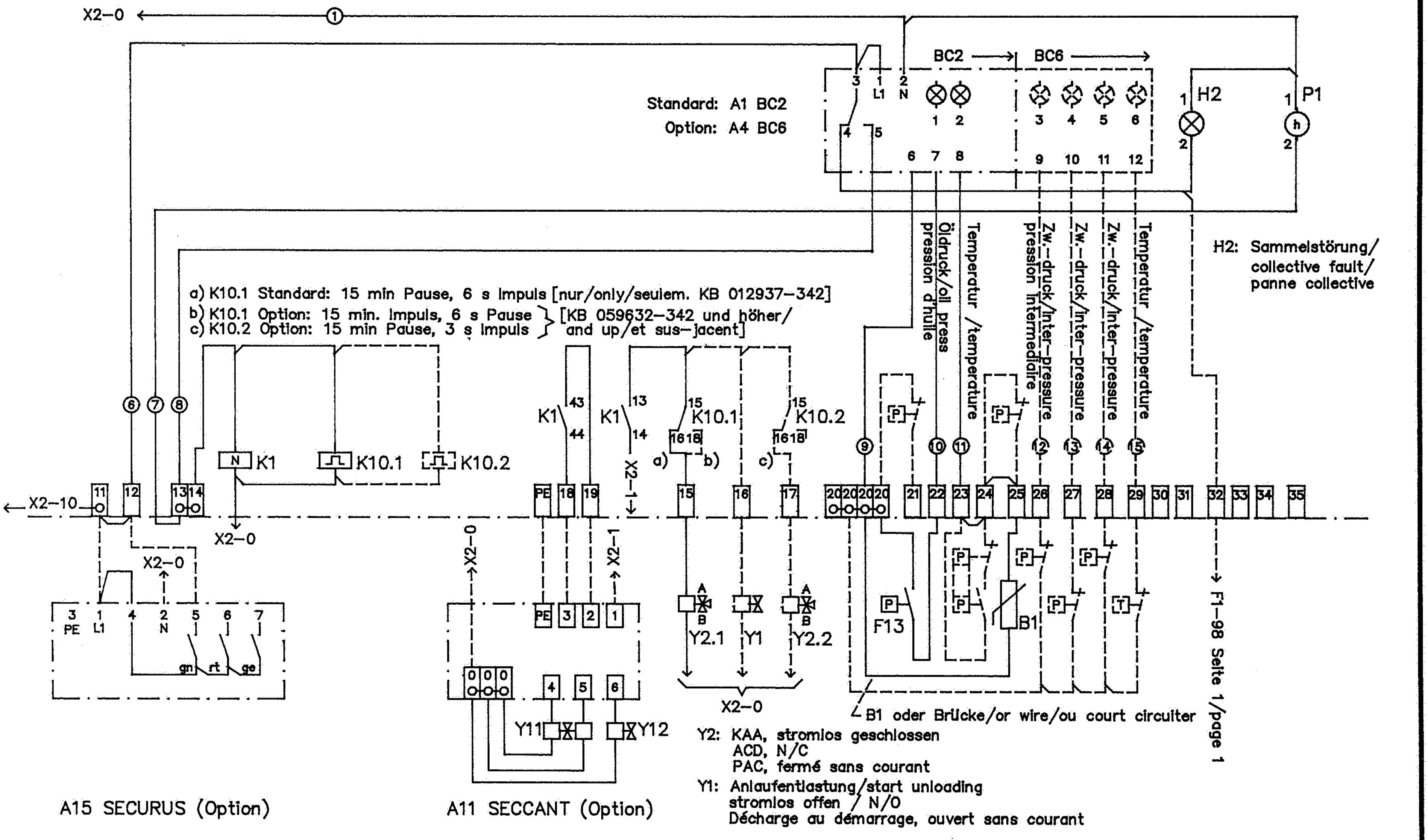

BAUER KOMPRESSOREN 8000 München 71	Baureihe/Model range Groupes compresseurs KA Schaltplan Direkt–Einschaltung mit Schalter Schematic diagram direct switch–on w. contr. switch Schéma electrique encl. direct par interrupteur	
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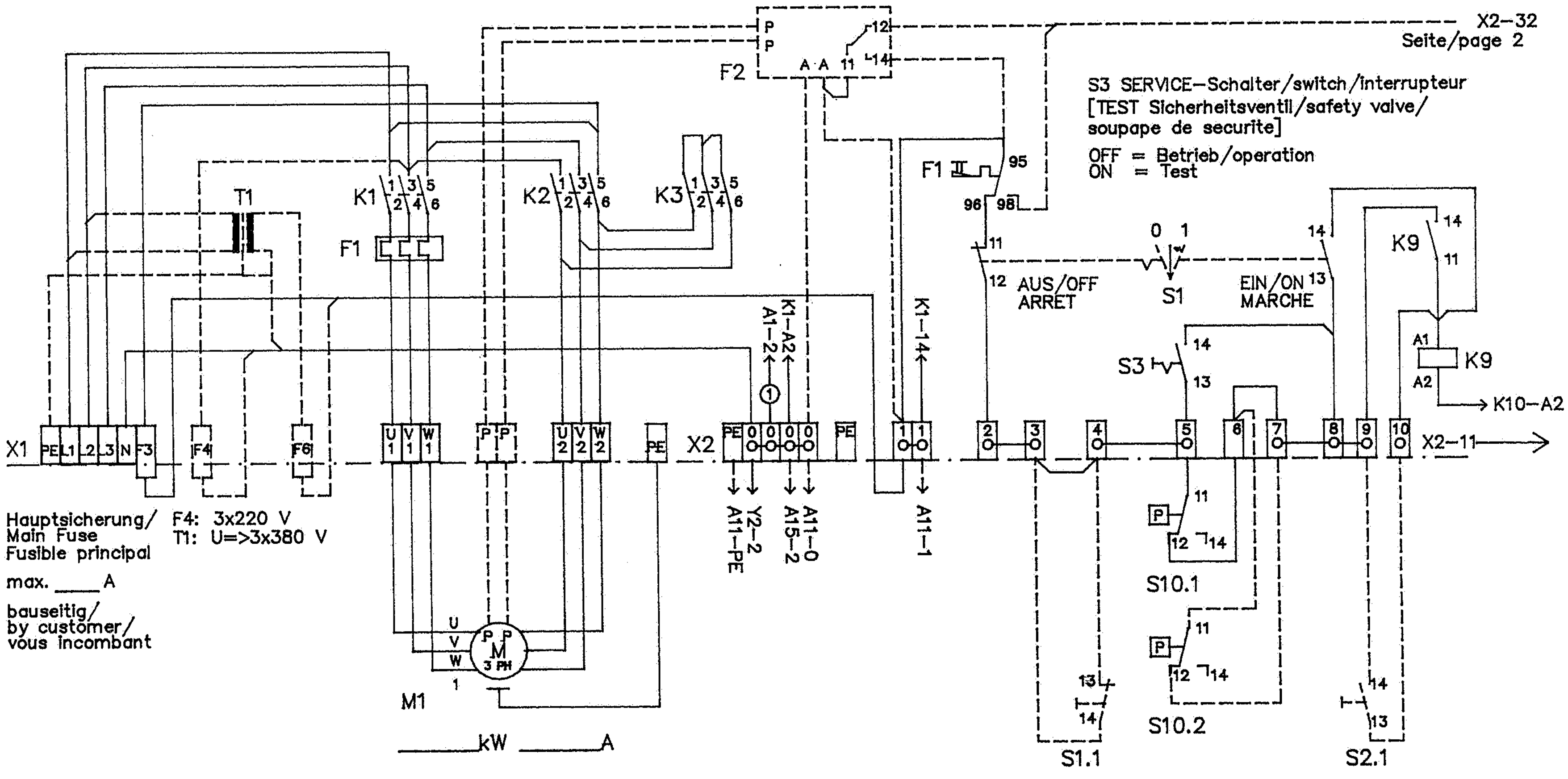

○ = Steuerkabel/control cable/cable de commande
Ader–Nr./wire no./no. de fil

------ = wahlweise/optional/optionnel

BAUER KOMPRESSOREN 8000 München 71	Baureihe/Model range Groupes compresseurs Schaltplan Stern–Dreieck–Einschaltung m. Taster Schematic diagram star–delta w. pushbutton Schema electrique etoile–triangle par touche	KA
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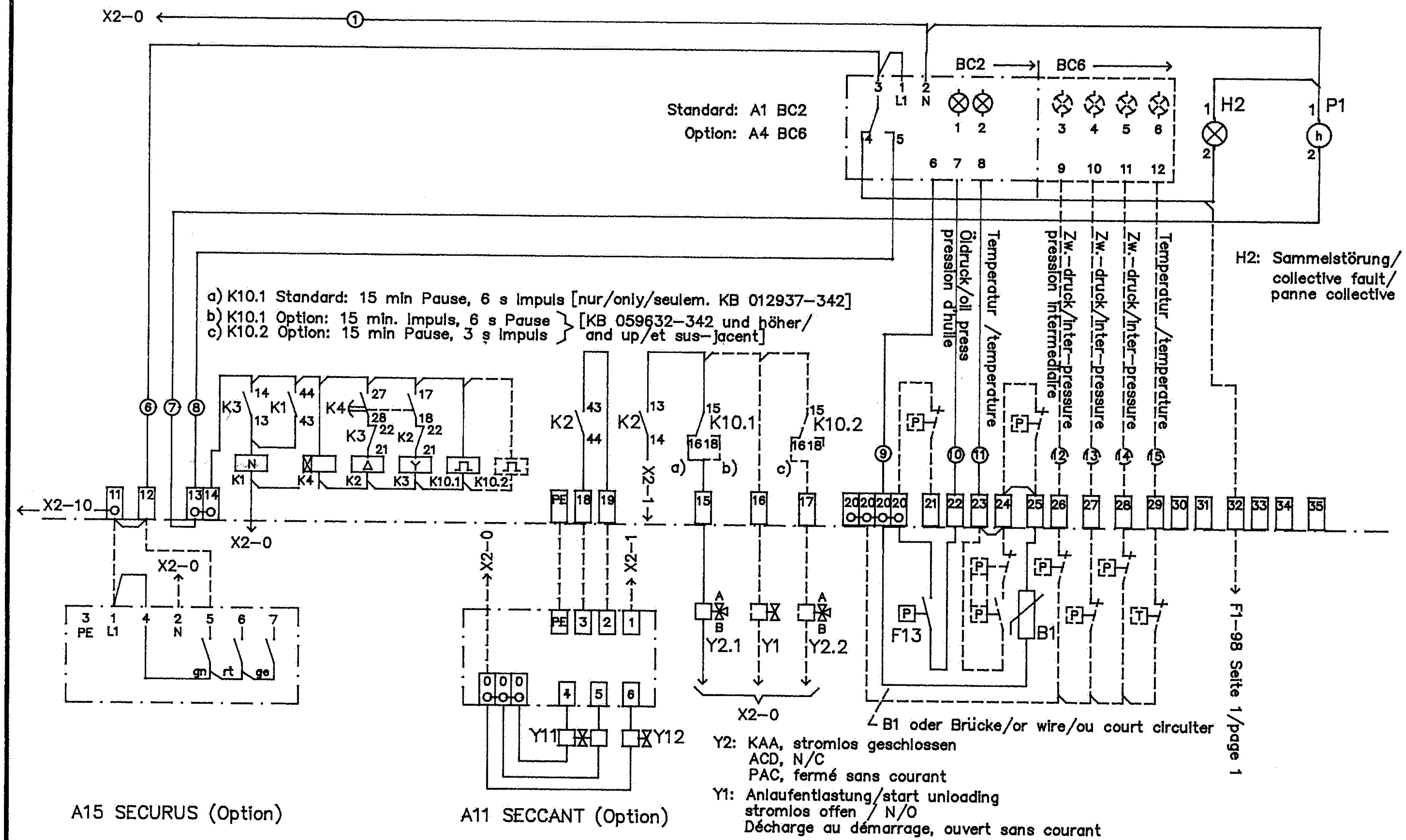
		KB 63758–992



BAUER KOMPRESSOREN
8000 München 71

Baureihe/Model range
Groupes compresseurs KA

Schaltplan Stern-Dreieck-Einschaltung mit Taster
Schematic diagram star-delta w. pushbutton
Schéma electrique etoile-triangle par touche

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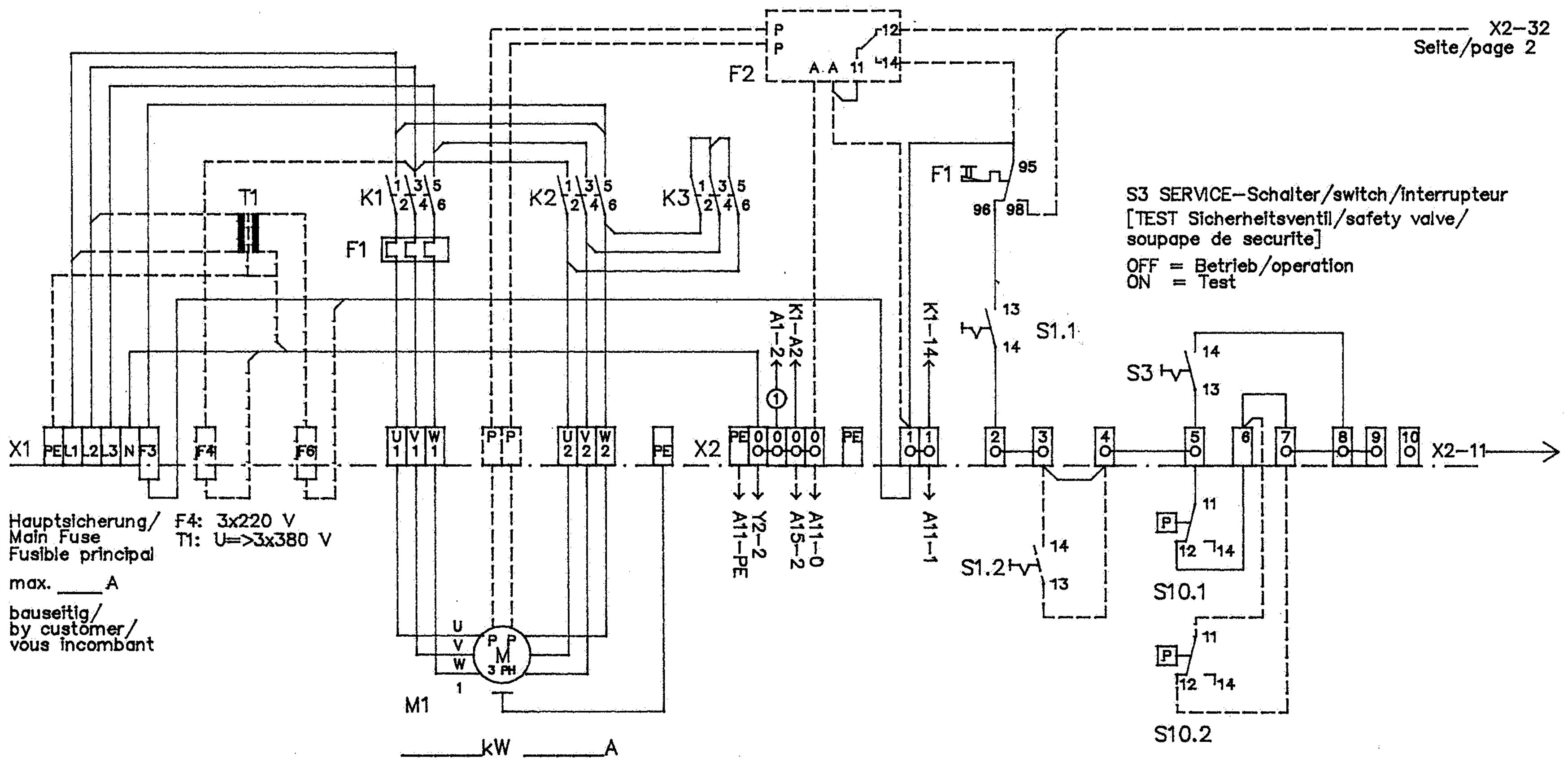
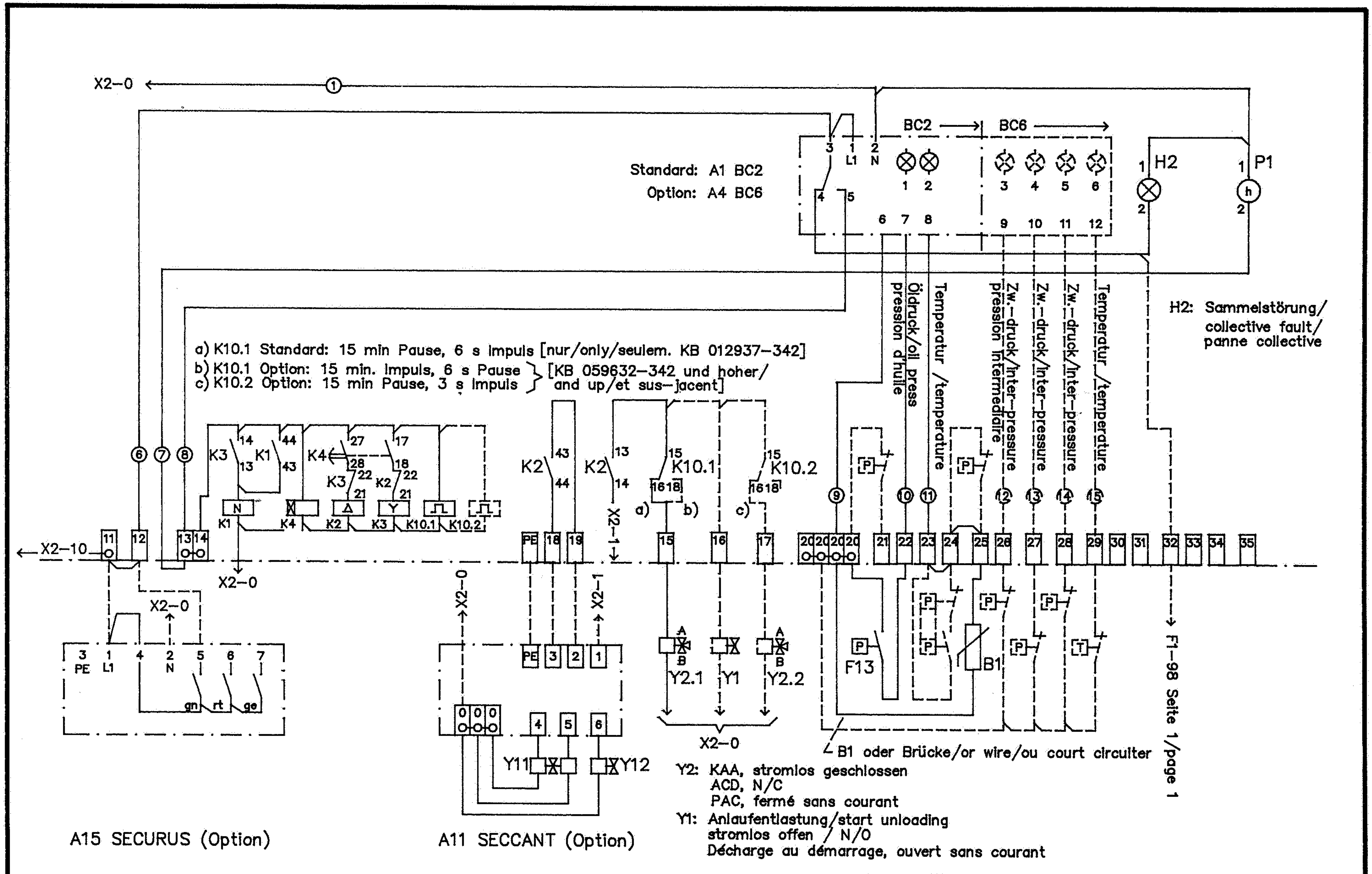


Steuerkabel/control cable/cable de commande
○ = Ader-Nr./wire no./no. de fil

------ = wahlweise/optional/optionnel

BAUER KOMPRESSOREN 8000 München 71	Baureihe/Model range Groupes compresseurs KA Schaltplan Stern-Dreieck-Einschaltung mit Schalter Schematic diagram star-delta with contr. switch Schema electrique etoile-triangle par interrupteur	
	Name: Datum: Date:	Seite: Sheet: Page: 1	KB 63759-992



BAUER KOMPRESSOREN
8000 München 71

Baureihe/Model range
Groupes compresseurs KA
Schaltplan Stern–Dreieck–Einschaltung mit Schalter
Schematic diagram star–delta w. pushbutton
Schéma electrique étoile–triangle par interrupteur

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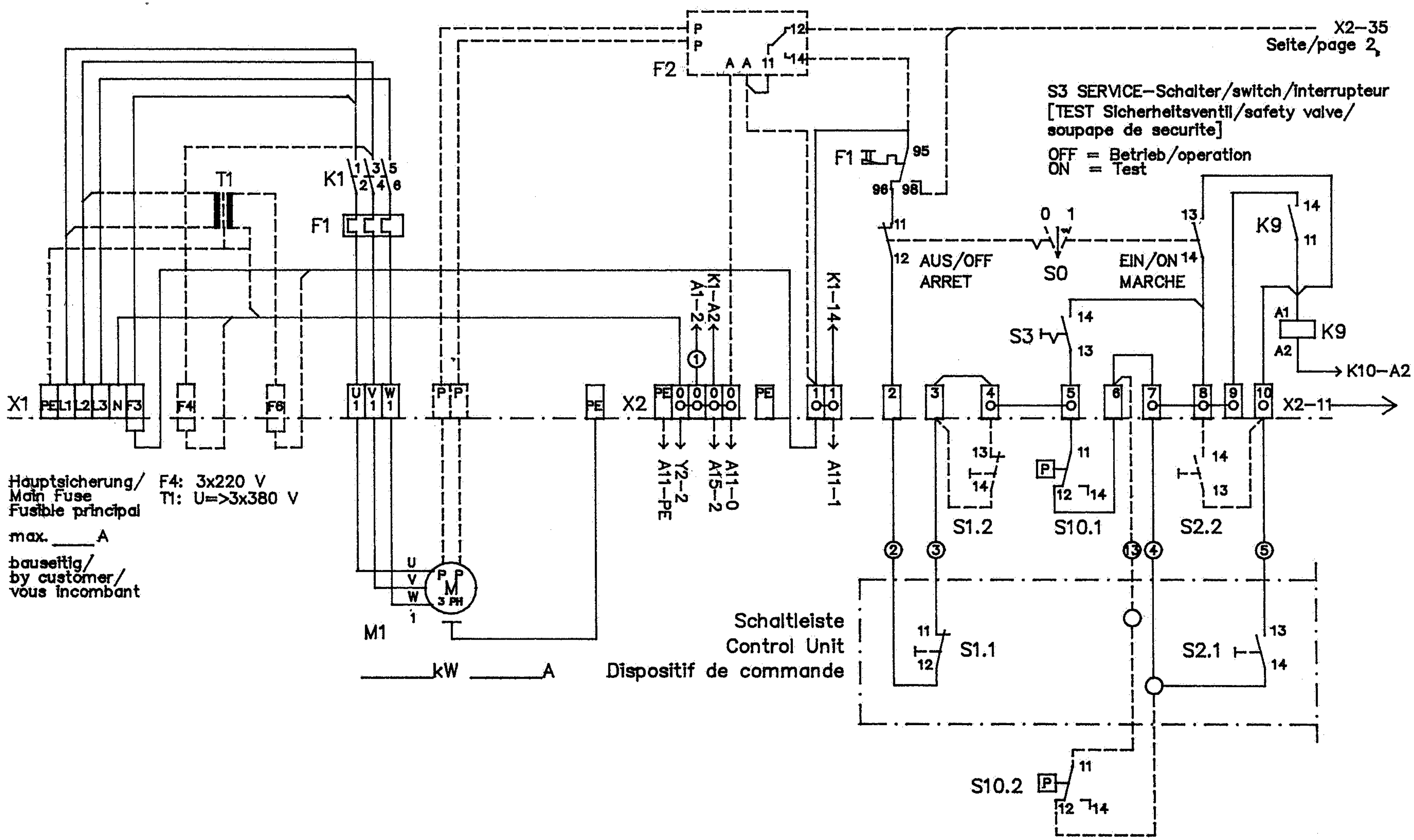

Steuerkabel/control cable/cable de commande
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BAUER KOMPRESSOREN 8000 München 71	Baureihe/Model range Groupes compresseurs KAP Schaltplan Direkteinschaltung mit Taster Schematic diagram direct switch–on w. pushbutton Schema electrique encl. direct par touche	
	Name: Datum: Date:	Seite: Sheet: 1 Page:

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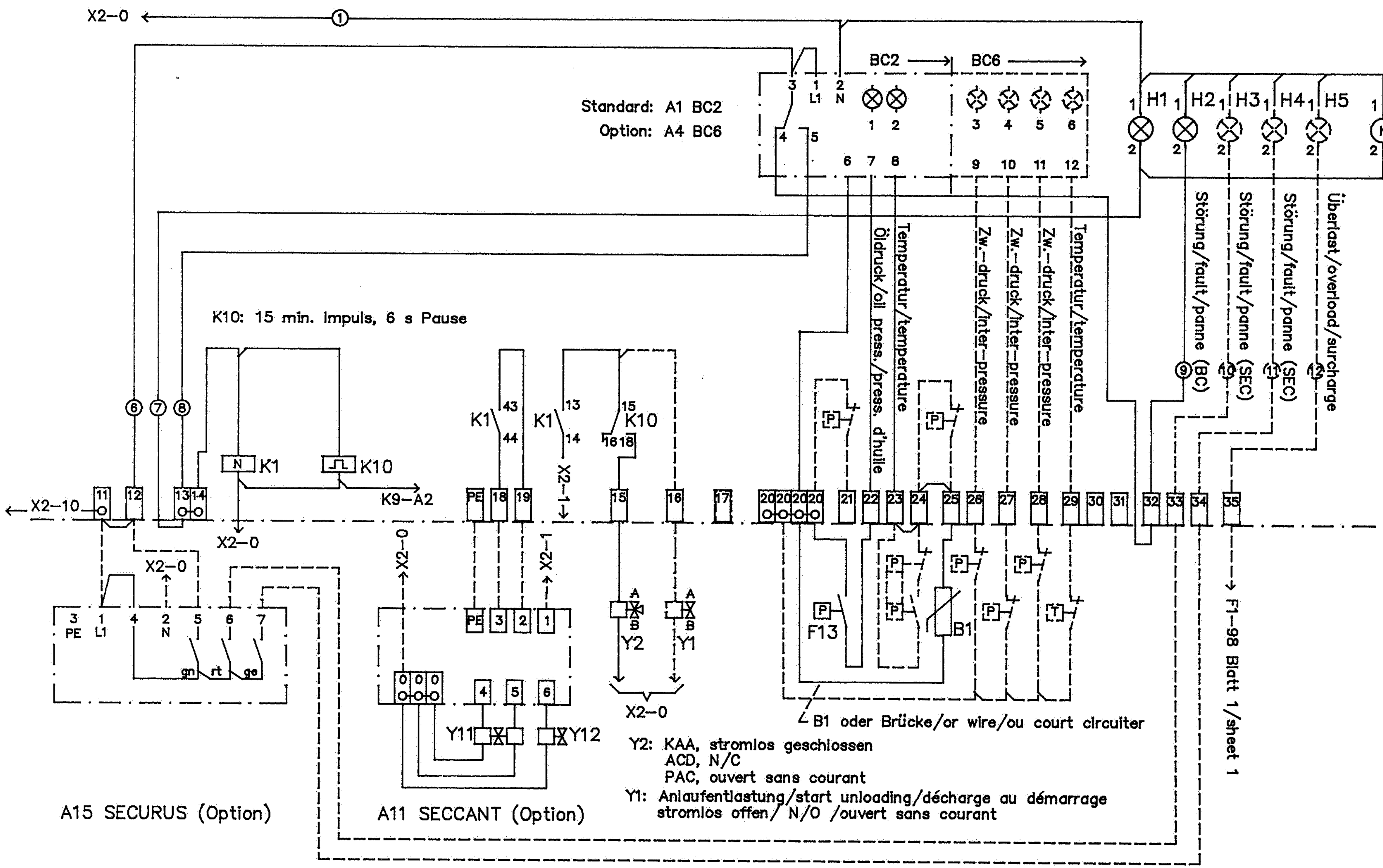

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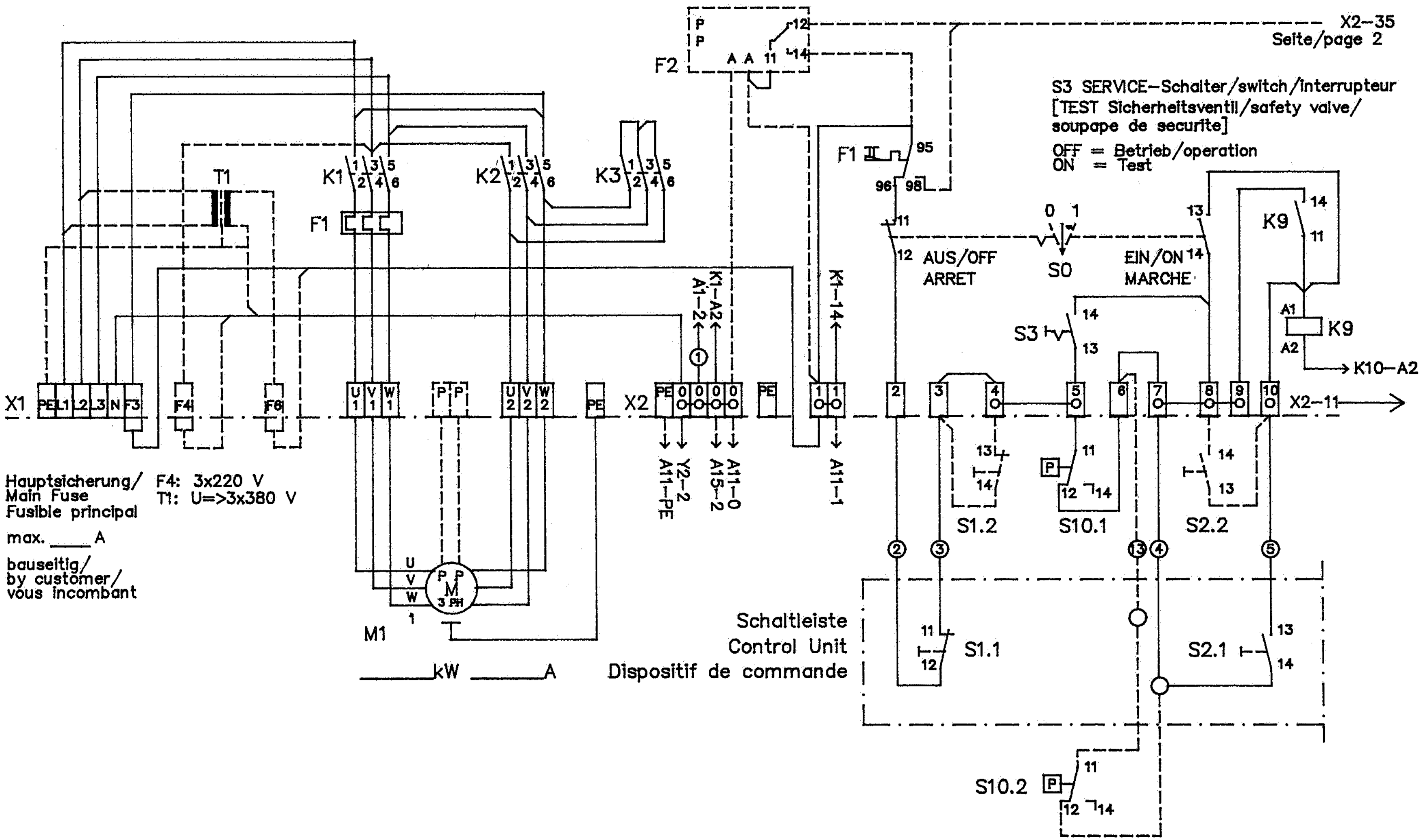

Steuerkabel/control cable/cable de commande
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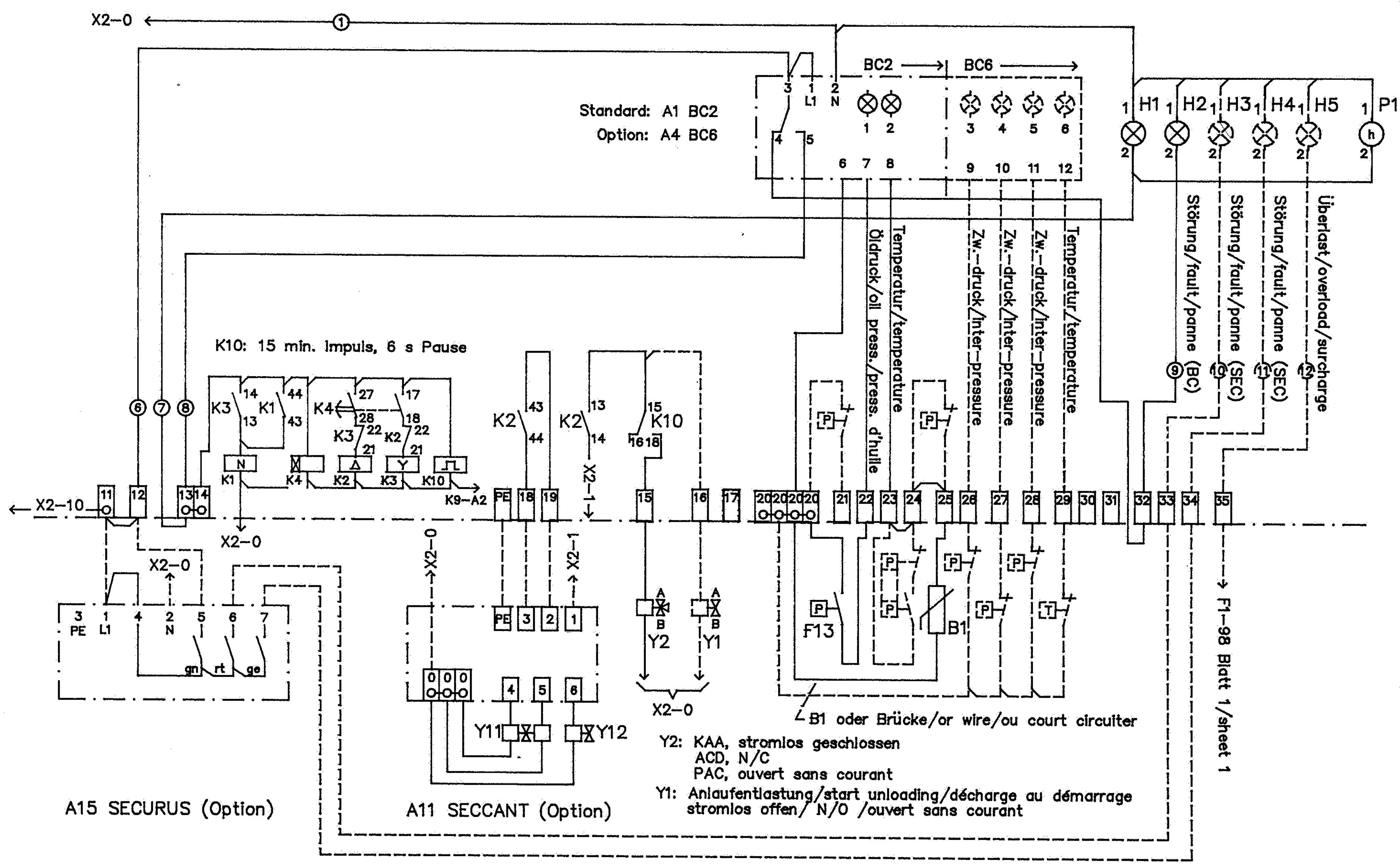
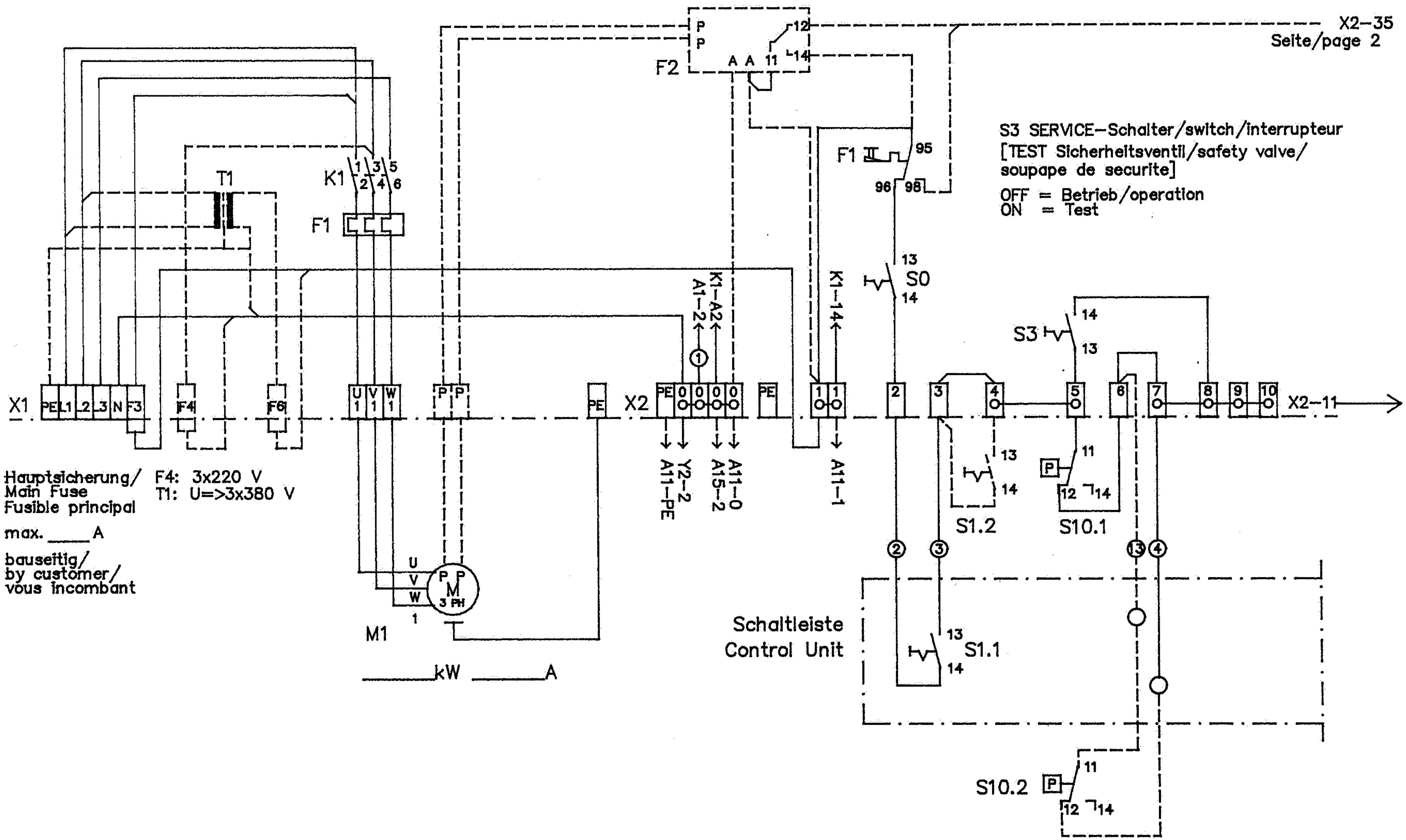
------ = wahlweise/optional/optionnel

BAUER KOMPRESSOREN	Baureihe/Model range Groupes compresseurs	KAP	
8000 München 71	Schaltplan Stern–Dreieck–Einschaltung m. Taster Schematic diagram star–delta w. pushbutton Schema electrique etoile–triangle par touche		
	Name: Datum: Date:	Seite: Sheet: 1 Page:	KB 63582–992



BAUER KOMPRESSOREN	Baureihe/Model range Groupes compresseurs KAP Schaltplan Stern-Dreieck-Einschaltung mit Taster Schematic diagram star-delta w. pushbutton Schéma electrique étoile-triangle par touche		
8000 München 71	Name: Datum: Date:	Seite: Sheet: 2 Page:	KB 63582-992



Steuerkabel/control cable/cable de commande
○ = Ader–Nr./wire no./no. de fil

------ = wahlweise/optional/optionnel

BAUER KOMPRESSOREN	Baureihe/Model range Groupes compresseurs KAP Schaltplan Direkt–Einschaltung mit Schalter Schematic diagram direct switch–on w. contr. switch Schema electrique encl. direct par interrupteur		
8000 München 71			
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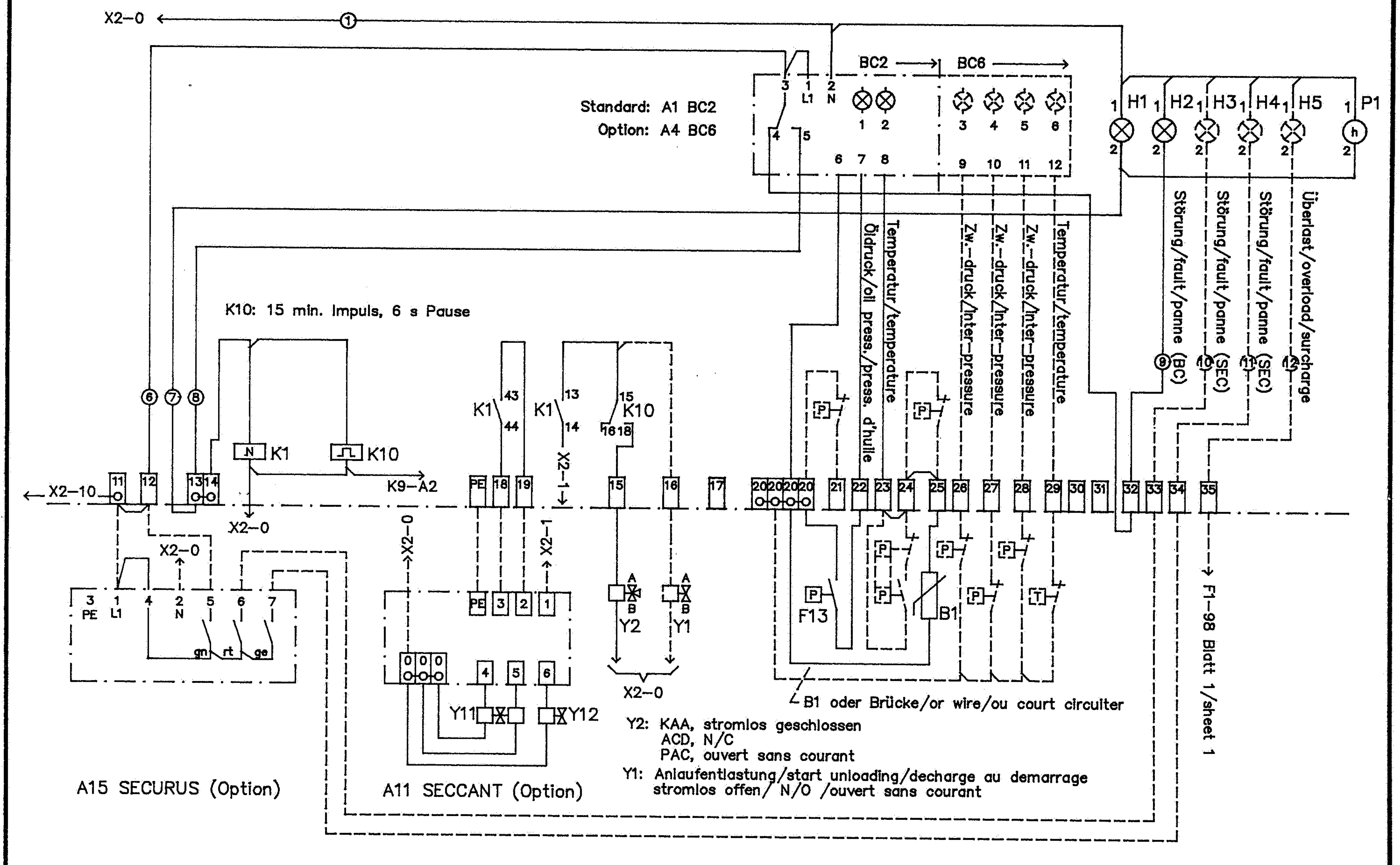

BAUER KOMPRESSOREN 8000 München 71	Baureihe/Model range Groupes compresseurs KAP Schaltplan Direkt-Einschaltung mit Schalter Schematic diagram direct switch-on w. contr. switch Schema electrique encl. direct par interrupteur		
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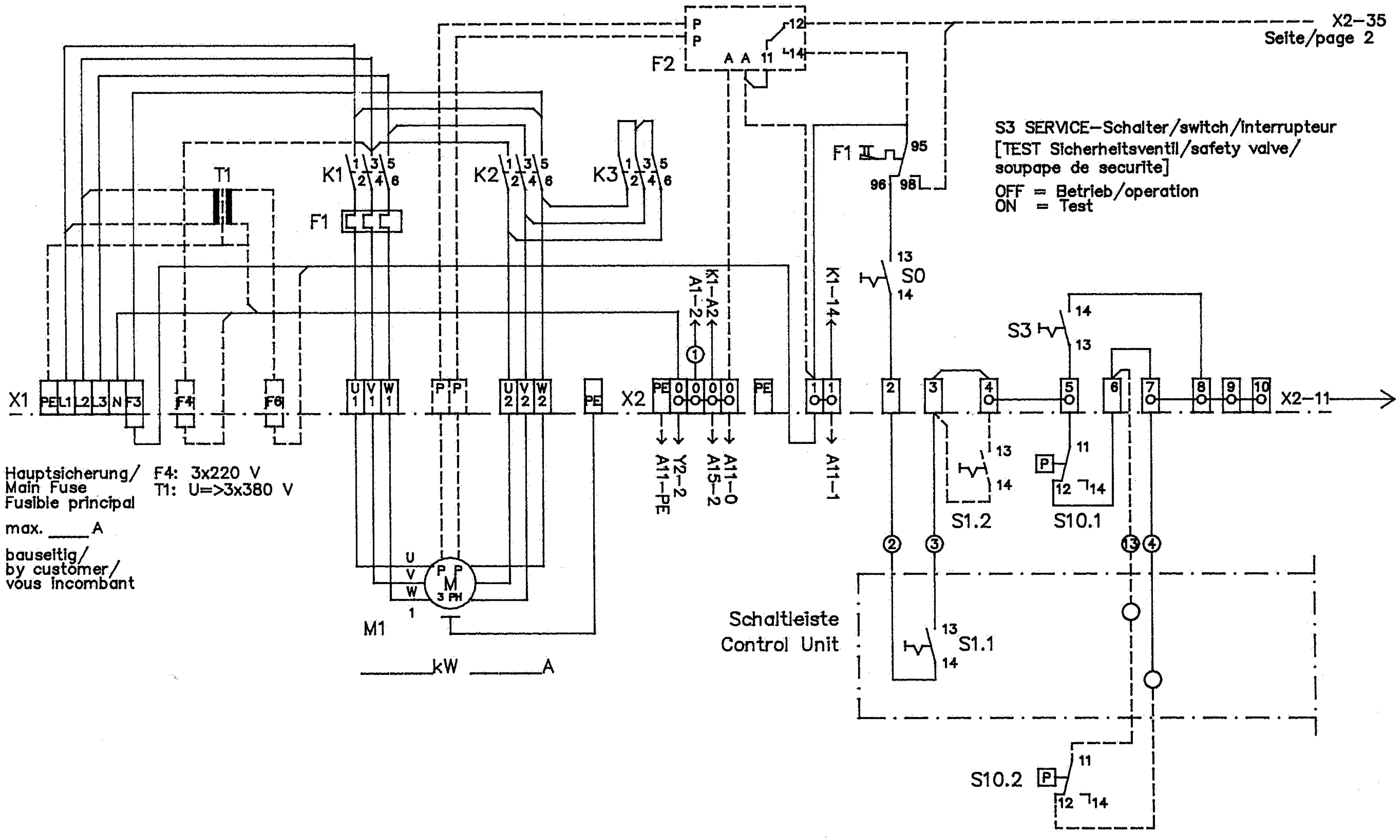

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8000 München 71

Baureihe/Model range
Groupes compresseurs KAP

Schaltplan Stern–Dreieck–Einschaltung mit Schalter
Schematic diagram star–delta w. contr. switch
Schema electrique etoile–triangle par interrupteur

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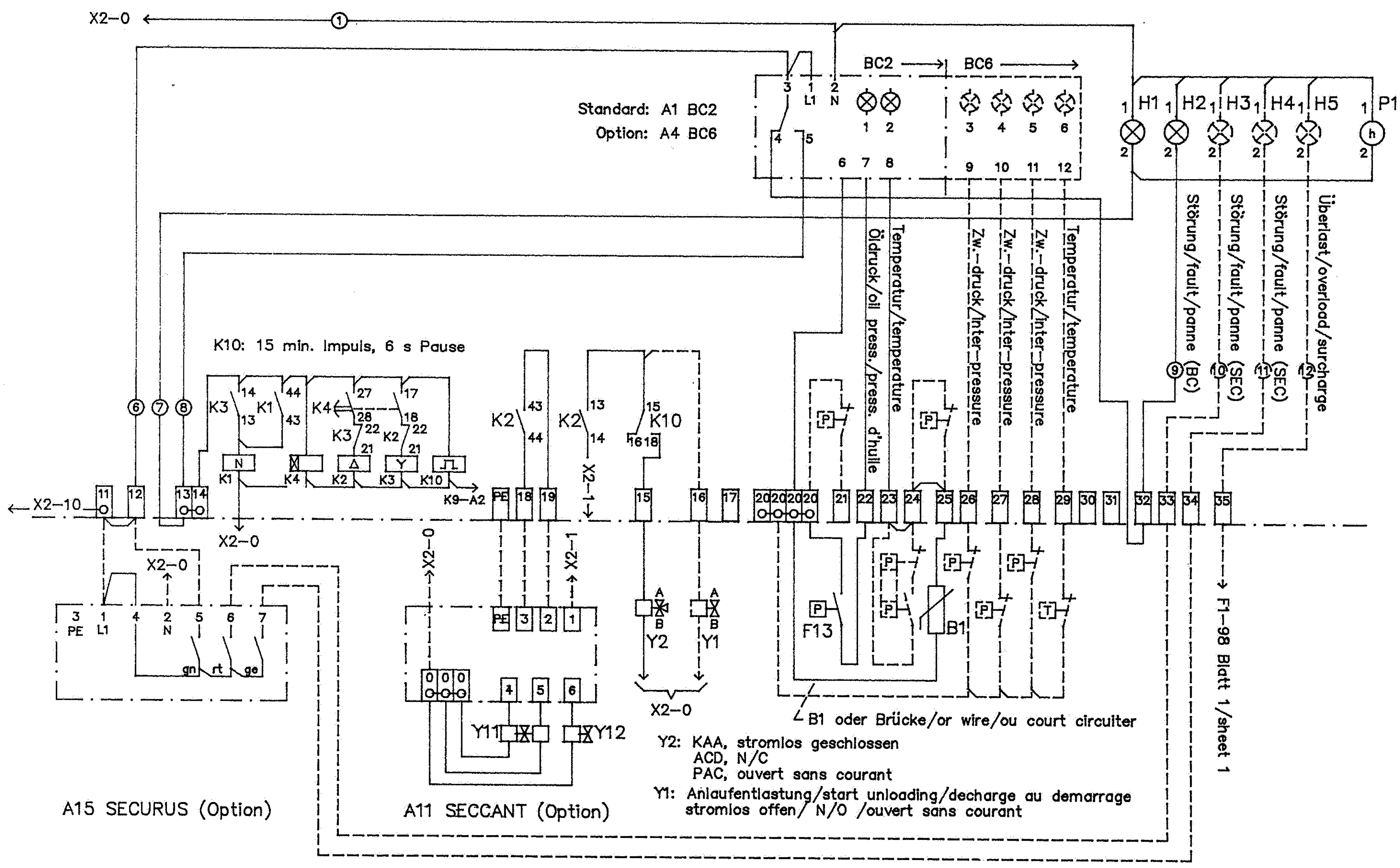

BAUER KOMPRESSOREN 8000 München 71	Baureihe/Model range Groupes compresseurs KAP	
	Schaltplan Stern–Dreieck–Einschaltung mit Schalter Schematic diagram star–delta w. contr. switch Schema electrique etoile–triangle par interrupteur	
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BAUER KOMPRESSOREN

SCHALTTEILLISTE/ELECTRIC PARTS LIST/NOMENCLATURE DES COMPOSANTS ELECTRIQUES

Bez.	Benennung	Designation	Dénomination
A1	Electronic Control BC 2	Electronic Control BC 2	Electronic Control BC 2
A2	Umsetzer f. eigensichere Stromkreise	Converter for inherent circuits	Convertisseur pour circuits auto-protégés
A4	Electronic Control BC 6	Electronic Control BC 6	Electronic Control BC 6
A6	Magnetzünder an Ottomotoren	Magneto	Magnéto sur moteur à expl.
A8	Spannungsregler f. Lichtmaschine G2	Voltage regulator	Régulateur de tension p. dynamo G2
A9	Niveau-Control, Ölstandsüberwachung	Oil Niveau Control	Contrôle de niveau d'huile
A11	Seccant (Komplettgerät)	Seccant (Dryer assy.)	Seccant (Dessicateur)
A15	Securus-Meldegerät	Securus indicator unit	Transmetteur SECCURUS
B1	Temperaturfühler für A1/A2/F16	Temperature sensor for A1/A4/F16	Sonde de température pour A1/A4/F16
B2	Geber für Tankanzeige P4	Fuel level transmitter for P4	Sonde pour indicateur de niveau de carburant
B3	Meßfühler für Niveau-Control A9	Sensor for Oil Niveau Control	Jauge pour Contrôle de niveau d'huile
E1	Beleuchtung (allgemein)	Lighting (general)	Eclairage (général)
E2	(Netz) Stecker	Mains plug	Prise réseau
E3	Heizung (allgemein)	Heater (general)	Chauffage (général)
E4	Zündkerze	Spark plug	Bougie d'allumage
F1	Bi-Relais für Motor M1	Bi-relay for motor M1	Bi-relais pour moteur M1
F2	Thermistorrelais für M1	Thermistor relay for M1	Relais thermique pour M1
F3	Steuersicherung in L1	Control fuse in L1	Fusible de commande dans L1
F4	Steuersicherung in L2	Control fuse in L2	Fusible de commande dans L2
F5	Steuersicherung in L3	Control fuse in L3	Fusible de commande dans L3
F6	Steuersicherung 1 nach Steuertrafo	Control fuse 1 after control transformer	Fussible de commande 1 après transfo de cde
F7	Steuersicherung 2 nach Steuertrafo	Control fuse 2 after control transformer	Fussible de commande 2 après transfo de cde
F10	Hauptsicherung (Netz)	Main fuse	Fussible principal (réseau)
F11	Druckwächter, Zwischendruck	Pressure switch, intermediate pressure	Manostat de pression intermédiaire
F12	Druckwächter, Ansaugdruck	Pressure switch, intake pressure	Manostat de pression d'aspiration
F13	Druckwächter, Öldruck	Pressure switch, oil pressure	Manocontact d'huile
F14	Strömungswächter, Öl im Kurbelgeh.	Flow meter, oil flow	Débitmètre d'huile dans carter
F15	Strömungswächter, Kühlwasser	Flow meter, cooling water	Débitmètre de l'eau de radiateur
F16	Temperaturwächter m.Kaltleiterfühler B1	Temperature switch with PTC sensor B1	Thermostat avec sonde soudure froide B1
G1	(Starter) Batterie	Battery	Batterie (démarreur)
G2	Lichtmaschine	Generator	Dynamo
H1	Meldeleuchte, "EIN"	Indicator light, "ON"	Voyant de service, marche
H2	Meldeleuchte, Störung BC 2/6	Indicator light, BC 2/6	Voyant de panne BC 2/6
H3	Meldeleuchte, Störung Securus	Fault indicator light, Securus	Voyant de panne SECURUS
H4	Meldeleuchte, Warnung	Indicator light, Warning	Voyant d'avertissement
H5	Meldeleuchte, Überlast	Indicator light, Overload	Voyant de surcharge
H6	Meldeleuchte	Indicator light	Voyant
H7	Meldeleuchte, Ladekontrolle	Indicator light, battery charging	Voyant de charge
K1	Motorschütz 1 (Netzschütz b. St./Dr.)	Main contactor 1	Contacteur de réseau 1
K2	Dreieck-Schütz 1	Delta contactor 1	Contacteur triangle 1
K3	Stern-Schütz 1	Star contactor 1	Contacteur étoile 1
K4	Stern/Dreieck - Zeitrelais 1	Star-delta switching relay	Relais commutateur étoile-triangle 1
K5	Motorschütz 2 (Netzsch.b.Stern/Dreieck)	Main contactor 2	Contacteur du réseau 2
K6	Dreieck-Schütz 2	Delta contactor 2	Contacteur triangle 2
K7	Stern-Schütz 2	Star contactor 2	Contacteur étoile 2
K8	Stern-Dreieck - Zeitrelais 2	Star-delta timer 2	Relais commutateur étoile-triangle 2
K9	Hilfsschütz (für Taster-Steuerung)	Aux. contactor (for push-button control)	Contacteur aux. (pour cde à bouton-poussoir)
K10	Taktgeber f. Kondensatautomatik	Timer for automatic condensate drain	Minuterie pour purge autom. des condensats
K11	Taktgeber für Seccant	Timer for Seccant unit	Minuterie pour SECCANT
K12	Stromstoßrelais für Seccant	Impulse relay for Seccant	Relais d'implusion pour SECANT
K13	Nachlaufrelais für Seccant	Time delay relay for Seccant	Relais à retardement pour SECCANT
K15	Nachlaufrelais für Kondensatablaß	Time delay relay for condensate drain	Relais à retardement pour purge condensats
K16	Hilfsschütz, allgemein	Aux. contactor, general	Contacteur auxiliaire général
K17	Hilfsschütz, allgemein	Aux. contactor, general	Contacteur auxiliaire général
K18	Hilfsschütz, allgemein	Aux. contactor, general	Contacteur auxiliaire général
K19	Hilfsschütz, allgemein	Aux. contactor, general	Contacteur auxiliaire général
K20	Zeitrelais, Freigabe Öldrucküberwachung	Timing relay, oil pressure monitor enable	Relais temporisé, libération de la surveillance pression huile
K21	Hilfsrelais f. potentialfreie Meldung 1	Aux. relay for potential-free message 1	Relais aux. pour message sans potentiel 1
K22	Hilfsrelais f. potentialfreie Meldung 2	Aux. relay for potential-free message 2	Relais aux. pour message sans potentiel 2
K23	Hilfsrelais f. potentialfreie Meldung 3	Aux. relay for potential-free message 3	Relais aux. pour message sans potentiel 3
K24	Hilfsrelais f. potentialfreie Meldung 4	Aux. relay for potential-free message 4	Relais aux. pour message sans potentiel 4
K25	Hilfsrelais f. potentialfreie Meldung 5	Aux. relay for potential-free message 5	Relais aux. pour message sans potentiel 5
K26	Hilfsrelais f. potentialfreie Meldung 6	Aux. relay for potential-free message 6	Relais aux. pour message sans potentiel 6
K27	Kontaktschutz - Hilfsrelais	Contact protection relay	Relais aux. de protection contacts
K28	Hilfsrelais, allgemein	Aux relay, general	Relais auxiliaire général

BAUER KOMPRESSOREN

SCHALTTEILLISTE/ELECTRIC PARTS LIST/NOMENCLATURE DES COMPOSANTS ELECTRIQUES

Bez.	Benennung	Designation	Dénomination
L1	Zündspule an Ottomotoren	Ignition coil	Bobine d'allumage
M1	Antriebsmotor 1	Drive motor 1	Moteur d'entrainement 1
M2	Antriebsmotor 2	Drive motor 2	Moteur d'entrainement 2
M3	Starter für Verbrennungsmotoren	Engine starter	Démarreur pour moteurs à expl.
P1	Betriebsstundenzähler, Kompressor	Hourmeter	Compteur horaire compresseur
P2	Spannungsmesser, Batterie	Voltmeter	Voltmètre batterie
P3	Strommesser, Batterie	Amperemeter	Ampèremètre batterie
P4	Tankanzeige	Fuel gauge	Jauge d'éssence
P5	Drehzahlanzeige	Tachometer	Tachymètre
P6	Betriebsstundenzähler, Filter	Hourmeter for filter exchange	Compteur horaire pour échange du filtre
P10	Kontaktmanometer, Enddruck	Contact pressure gauge, fuel pressure	Manomètre à contacts, pression finale
P11	Kontaktmanometer, Zwischendruck	Contact pressure gauge, interm. pressure	Manomètre à contacts, pression interm.
P12	Kontaktmanometer, Ansaugdruck	Contact pressure gauge, intake pressure	Manomètre à contacts, pression d'aspiration
Q1	Hauptschalter	Main switch	Interrupteur principal
R1	Widerstand, allgemein	Resistor, general	Résistance
S0	Hauptschalter, Steuerspannung	Main control switch	Interrupteur principal, tension de cde
S1	Steuertaster "0",bzw. "0-I"	Control push-button "0" or "0-I"	Bouton de cde bouton "0" ou "0-I"
S2	Steuertaster "I"	Control push-button "I"	Bouton de cde "I"
S3	Serviceschalter	Service switch	Bouton de fonctionnement
S4	Wahlschalter 1	Selector switch 1	Commutateur-sélecteur 1
S5	Wahlschalter 2	Selector switch 2	Commutateur-sélecteur 2
S6	Steuerschalter Seccant	Control switch Seccant	Bouton de cde SECCANT
S9	Zündverteiler an Ottomotoren	Distributor, ignition engine	Distributeur sur moteur à expl.
S10	Druckschalter, Enddruck	Pressure switch, final pressure	Manostat, pression finale
S13	Druckschalter, Flaschendruck	Pressure switch, bottle pressure	Manostat, pression bouteille
S14	Druckschalter	Pressure switch	Manostat
S15	Druckschalter	Pressure switch	Manostat
T1	Steuertrafo 1	Control transformer 1	Transfo de cde 1
T1	Steuertrafo 2	Control transformer 2	Transfo de cde 2
X1	Klemmenleiste 1, Leistungsteil (Schaltk.)	Terminal strip 1, power section	Barette à bornes 1, puissance
X2	Klemmenleiste 2, Steuerung	Terminal strip 2, control section	Barette à bornes 2, commande
X3	Klemmenleiste 3, Schaltleiste	Terminal strip 3, terminal box	Barette à bornes 3, boîtier de branchement
X4	Klemmenleiste 4, sonstige Leiste	Terminal strip 4, other	Barette à bornes 4, autres boîtiers
X5	Steckdose, allgemein	Receptacle, general	Prise à embase, générale
Y1	Magnetventil, Anlaufentlastung	Solenoid valve, start unloading	Electrovanne, décharge au démarrage
Y2	Magnetventil, KAA	Solenoid valve, ACDU	Electrovanne de purge autom. des condensats
Y3	Magnetventil, KAA Kondensatablaß	Solenoid valve, condensate drain	Electrovanne de purge des condensats
Y4	Magnetventil, Kondensatablaß	Solenoid valve, condensate drain	Electrovanne de purge des condensats
Y5	Magnetventil, Ansaugabsperrung	Solenoid valve for intake shut-off	Electrovanne pour coupure d'aspiration
Y6	Magnetventil, Vergaserabsperrung	Carburator shut-off solenoid valve	Electrovanne de coupure du carburateur
Y7	Magnetventil, Zuschaltautomatik	Solenoid valve, autom. selector unit	Electrovanne, sélecteur automatique
Y8	Magnetventil, Kraftstoffabsperrung	Fuel shut-off solenoid valve	Electrovanne de coupure de carburant
Y9	Hubmagnet, Dieselmotorabstellung	Solenoid for engine shutdown	Electro-aimant pour arrêt de moteur diesel
Y10	Magnetventil, Leerlaufstellung	Solenoid valve, idling speed contr.	Electrovanne, régulation de vitesse à vide
Y11	Magnetventil, Seccant, Umsteuerung	Solenoid valve, SECCANT change-over	Electrovanne de commutation SECCANT
Y12	Magnetventil, Seccant, Entlastung	Solenoid valve, SECCANT unloading	Electrovanne de soulagement SECCANT
Z1	Entstörfilter	Interference suppression filter	Filtre d'anti-parasitage