CE

KWS AUTOMATIC FLASK UNBEDDING AND CASTING CLEANING MACHINE

KG 100 S/N

KWS PFORZHEIM

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Important:

The original of this operation instruction and the additional documents have to be supplied to the end user of the machine without any modification or removing of pages. Non-observance of this advice will violate the CE and international regulations.

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This machine has been designed and constructed in accordance with the latest state of art with consideration given to the official regulations of safety. Nevertheless if installed inexpertly and/or operated in another way than intended for, risks and damage are likely to occur

Therefore prior to the installation and initiation of the machine it is absolutely necessary to study carefully these operations instructions and to observe them strictly.

1.1 Electric Supply

To prevent injuries upon persons or damage to the electric equipment of the machine only an expert is allowed to carry out the electric installations. In this connection, consideration must be given to the technical specifications. VDE/EVU regulations must be observed strictly including the prevailing local or regional rules. In case of failure or breakdown never take off the coverings of the electric equipment. Always consult an expert.

1.2 Sewage

Strictly observe the local prescriptions by the competent authorities. Though the rinsed embedding mass is not toxic at all, it might be necessary to use a cascade separator which is available as an accessory of the machine.

1.3 Risk of Injury

Please note to close the cover (3) before operating with the unbedding machine**.**

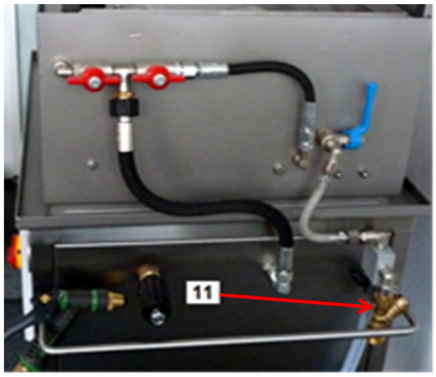
Incorporated units

Units supplied by subcontractors are incorporated in the machine as well. Attention must be given to the documentations on these items as to the present operating instructions.

2. Installation

2.1 Water supply / drains

Before operating the plant, branch the efflux (1) to a cascade separator. The water supply of the machine is effected by the supply of water (11). The required water volume amounts to minimum 18 liters/min. Lack of water produces a pressure drop at short intervals.



2.2 Electric supply

Before you branch the machine to the electric supply, verify the technical data on the type plate of the machine to avoid its connection to the false type of electric current. Attention must be given to the direction of rotation of the motors. To this end, look at the movement of the jet slide (12) which must move in direction of arrow (see page 6, fig. 2)

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Sequence of operations

1. The spherical cocks (6) and (7) for spray heads must be opened.
2. Remove the casting tree from the flask (fig. **1)** and clamp it with the chucking fixture (11). Push the jet slide (12) into the initial position and have the safety catch (13) snapping in the feed forward spindle (14).
3. Insert the flask in hot or cold condition depending on the type of casting to remove the casting tree (fig. 1).
4. Close the lid and with hot flasks open the cock for cooling water (8) immediately.
5. To switch on the machine, press the starting push button (1). It is possible to adjust the working pressure in accordance with the type of components using the rotary switch (5) (at max. 95 bar).
6. Having switched off the machine, remove the cleaned casting tree from the chucking fixture (11) and continue as described in point 1.

Adjustment of jets

After having peeled off the casting tree from the flask, it should be rather clean from gypsum. If not, adjust the high-pressure jet (14) (see fig. 1).

Without getting leakage of the cleaning jets (14,1) it is possible to adjust them slightly at the jet slide (12). Thus, you will obtain best cleaning results.

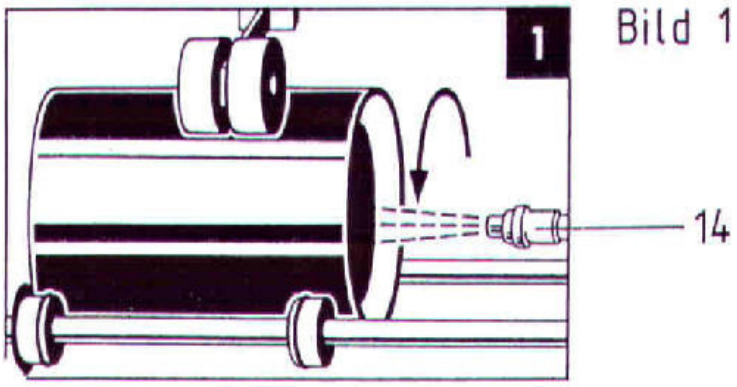
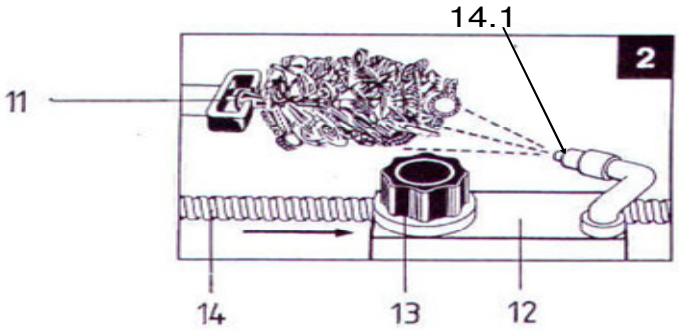


Bild 1

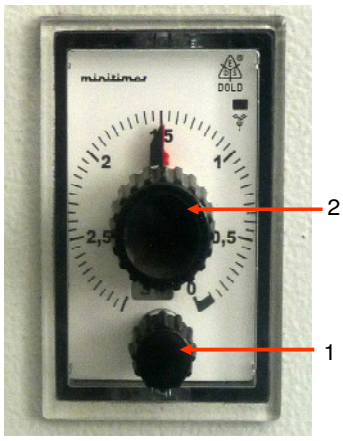


TIMER

The incorporated time switch clock (4), see page 10, allows to adapt best the cleaning time to casting trees of different lengths.

The push button (1) is used to carry out the primary adjustment (3 minutes).

'Hit push button (2) is provided to adjust the required cleaning time (ranging between 0 and 3min.)



Maintenance

Once a week grease the lubricator nipples mounted at the shaft ends in the container.

Tips in case of failure

Pressure decrease:

To reveal the reason for the decrease of pressure, please proceed in the following way:

1. Clean the dirt collector No. 9. A feed volume of minimum 20 litres/min must be ensured.

2. Close the high-pressure cocks No. 6 and No. 7. Adjust the regulating valve No. 5 in a way that 95 bar will be displayed at the manometer No. 2.
   If it is not possible to adjust up or down the pressure at the regulating valve No. 5, replace the valve. (The spindle has been turned by force).

3. If a pressure of 95 bar is available, open the valve No. 6. Once it has been opened, the pressure must not drop as otherwise this line is untight.

4. Open the cock No. 7, see page 10. In case of pressure decrease, inspect the hose and the lines.

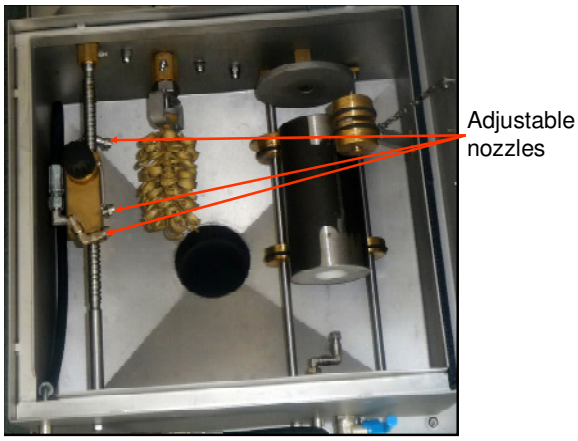
   The following reasons can be in case of pressure decrease:

   1. Nozzles (6) and (7), see page 22, through hole are too big (Replace into new nozzles)
   2. Hose and lines are damaged or leaking.
   3. High pressure pump (1) see page 14, is defect. Arrange for repair.

Bad cleaning results:

1. Bad jet angle of the jet adjustment (swivel it).

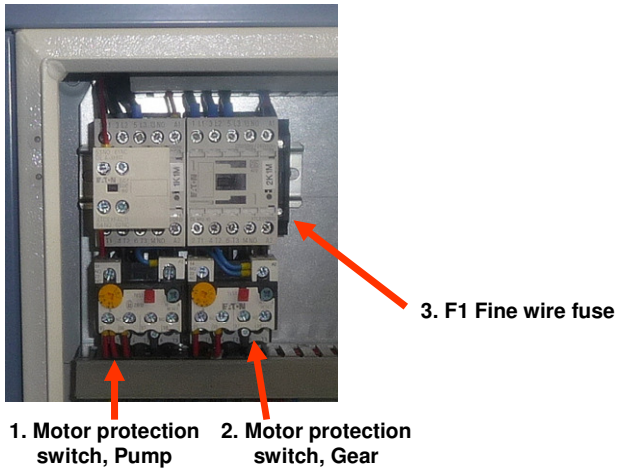
2. Partially the jets are clogged with small particles. Dismantle the jet and clean them with a 0,8 mm spiral drill.



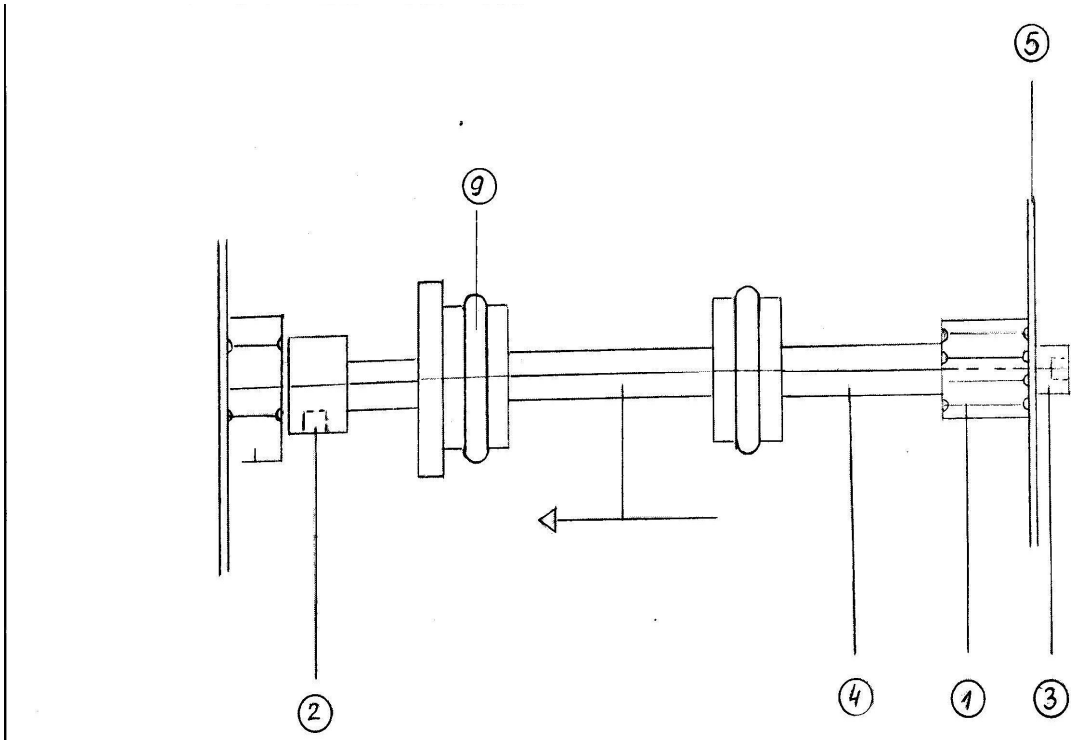
Motor stoppage:

In the switch box security is provided for the gear and pump motor with a protective motor switch. In case of failure, open the switch box and verify whether the protective motor switch has released.

Attention: Before you open the switch case, interrupt the current supply.



Dismantling of the O – ring

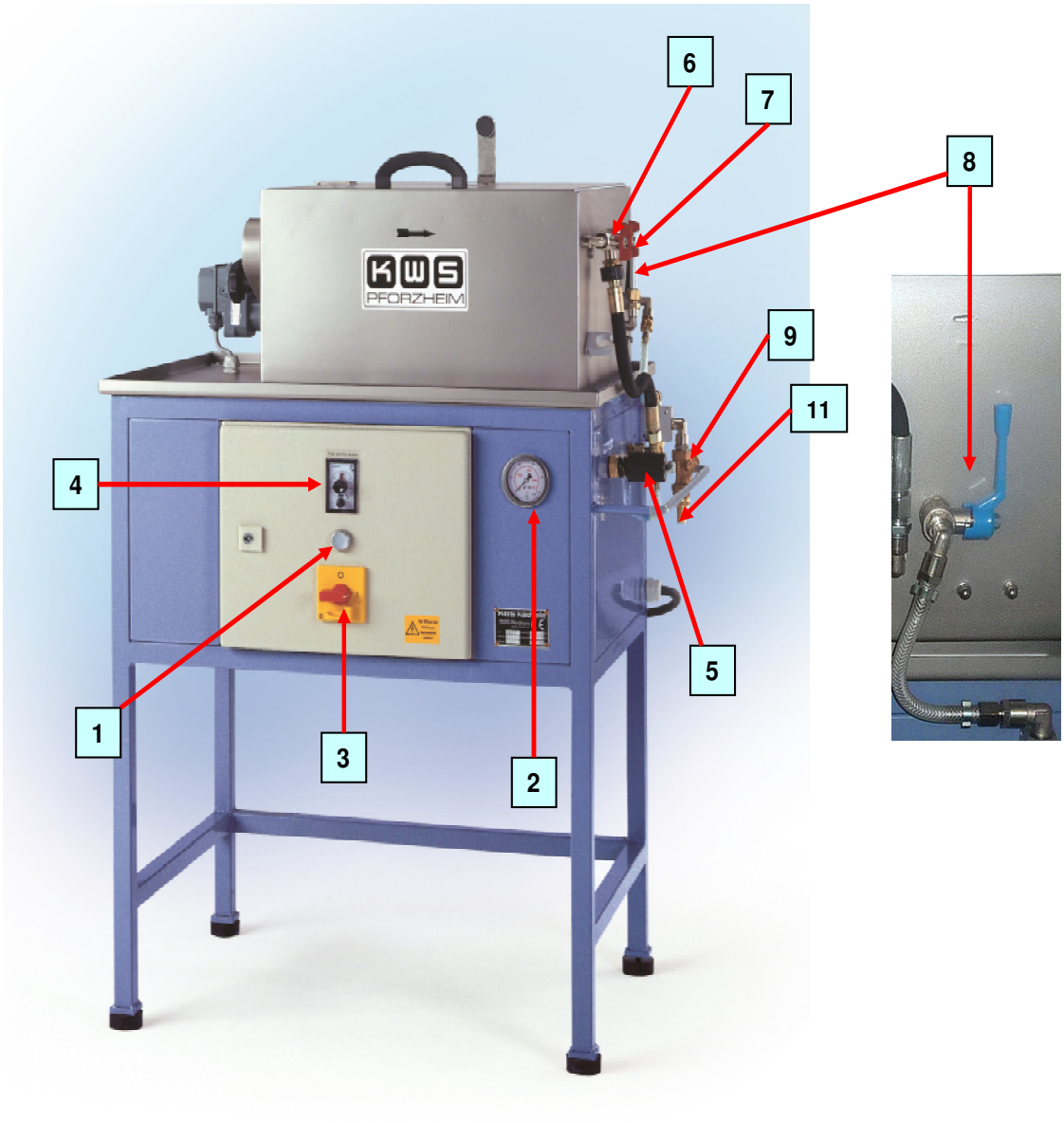


1. Detach the adjusting ring No.2 and separate the hexagon nut No.3

2. Push No.4 in direction of the arrow

3. Insert the 0-Ring between bearing No.1 and side No.5

4. Tighten the hexagon nut no.3 and bearing no.1 after replacing the O-rings.
   Push driver axle no.4 in another direction of the arrow. Tighten the adjusting ring no.2.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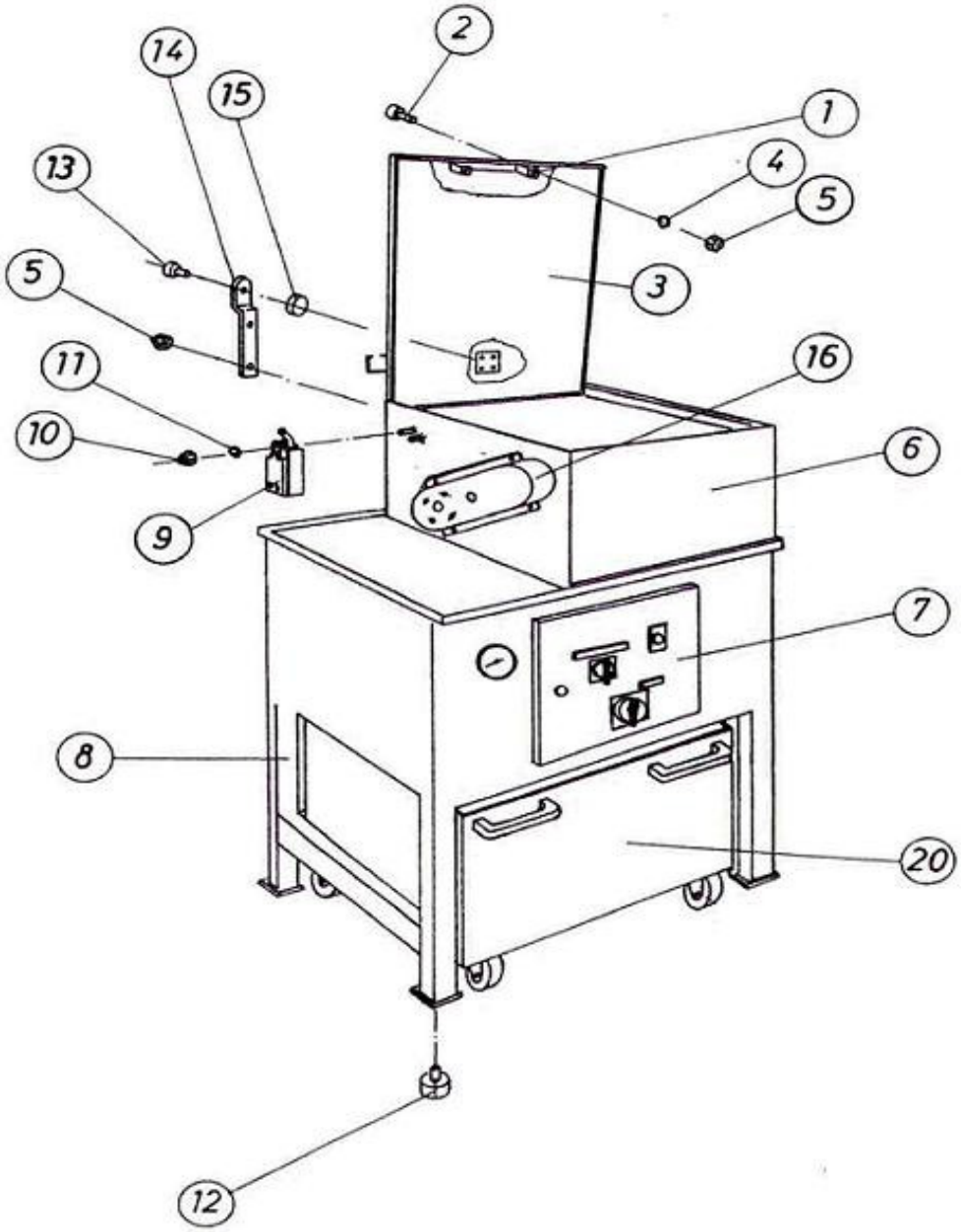
	TECHNISCHE DATEN - TECHNICAL DATA			
	Max. Ø Küvetten	MAX. DIA. OF FLASKS	mm	140
	Max. Höhe(Länge) Küvetten	MAX. HEIGHT(LENGTH) OF FLASKS	mm	280
	Max. Höhe(Länge) Gussbaum	MAX. HEIGHT(LENGTH) OF CAST TREE		280
	ARBEITSSTATIONEN	WORKING STATIONS		
	Ausbettstation	UNBEDDING STATION		1
	Reinigungsstation	CLEANING STATION		1
	Durchschn. Reinigungszeit	AVERAGE CLEANING TIME	min	1 - 2,5
	Stromart	CURRENT		3-PHASE
	Spannung	VOLTAGE	V	400
	Frequenz	CYCLES	Hz	50
	Leistungsaufnahme	POWER RATING	kW	5
	Wasseranschluss	WATER CONNECTION	"	3/4 "
	Wasserverbrauch	WATER CONSUMPTION	l/min	18
	Arbeitsdruck max.	WORKING PRESSURE MAX.	bar	95
A	Gesamthöhe	TOTAL HEIGHT	mm	1250
B	Gesamtbreite	TOTAL WIDTH	mm	850
C	Gesamttiefe	TOTAL DEPTHS	mm	650
	Gewicht	WEIGHT	kg	147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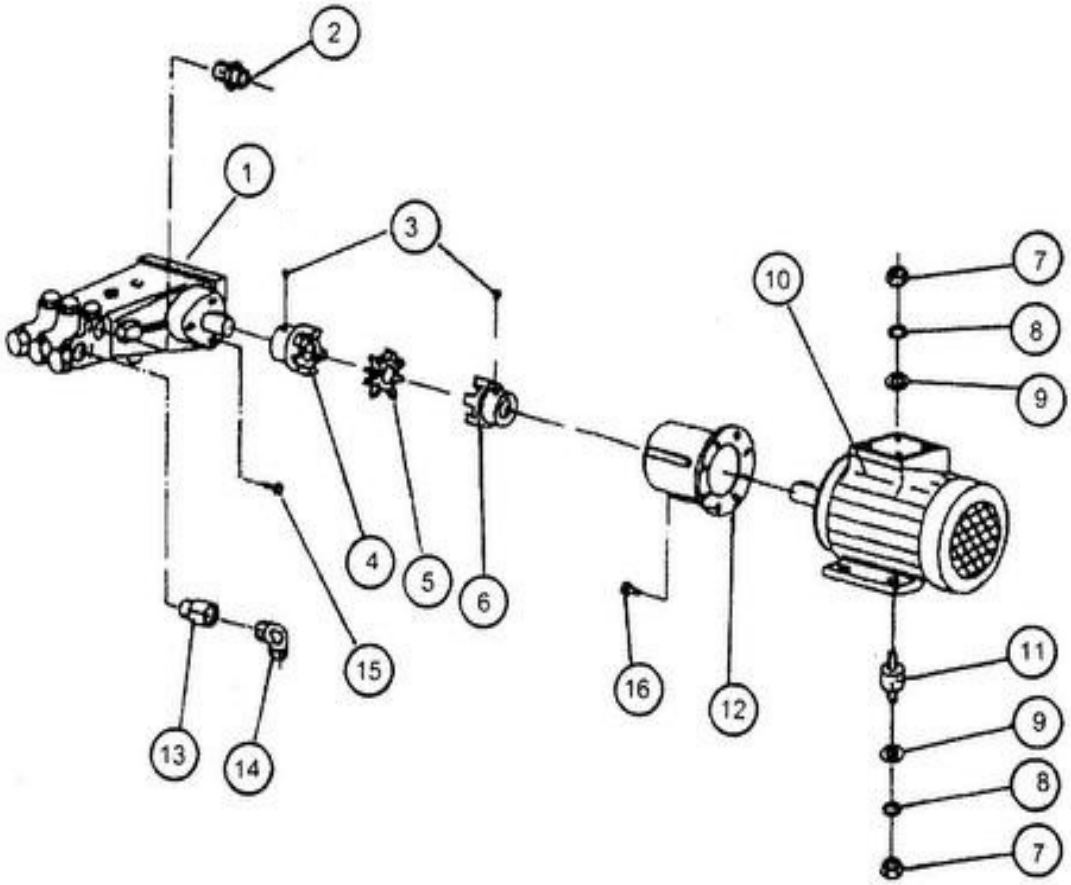
Position ITEM	Stück PCS.	Bezeichnung DESCRIPTION	Bestell-Nr. ART. NO.	Bemerkung REMARKS
1	1	Griff HANDLE	440-0062	
2	2	Innensechskantschraube HEXAGON SOCKET SCREW	440-0221	M6x16A2
3	1	Deckel LID	120-0264	
4	2	Kupferscheibe WASHER	432-0018	M6
5	4	Hutmutter CAP NUT	440-0010	M6A2
6	1	Spritzkabine WORK HOUSING	120-0263	
7	1	Schaltschrank SWITCH BOX	850-0017	
8	1	Gestell RACK	120-0262	
9	1	Endschalter LIMIT SWITCH	760-0079	
10	2	Hutmutter CAP NUT	440-0008	M4A2
11	2	Scheibe WASHER	440-0016	M4A2
12	4	Puffer RUBBER BUFFER	240-0015	50x20 M10
13	1	Innensechskantschraube HEXAGON SOCKET SCREW	440-0216	M4x8 A2
14	1	Anschlag DEAD STOP	120-0387	
15	1	Magnet MAGNET	525-0327	
16	1	Schutzhaube COVER	120-0277	
17	2	Federring SPRING RING	440-0041	Not showing in the manual M6 A2
18	2	Scheibe WASHER	440-0028	Not showing in the manual M6 A2, groR,
19	1	Scheibe WASHER	440-0026	Not showing in the manual M4 A2, qroli
20	1	Kaskadenabscheider CASCADE SEPARATOR	103-0616	Option
21	4	MLF-Schraube SCREW	440-0111	Not showing in the manual M8 x 16
22	4	Kunststoffscheibe WASHER	440-0172	Not showing in the manual M8
23	1	Kantenschutzprofil SEAL FOR LID	440.0172e	Not showing in the manual ; 2m
24	1	Ablaufrohr SINK PIPE	432-0008	Not showing in the manual 0 100 x 500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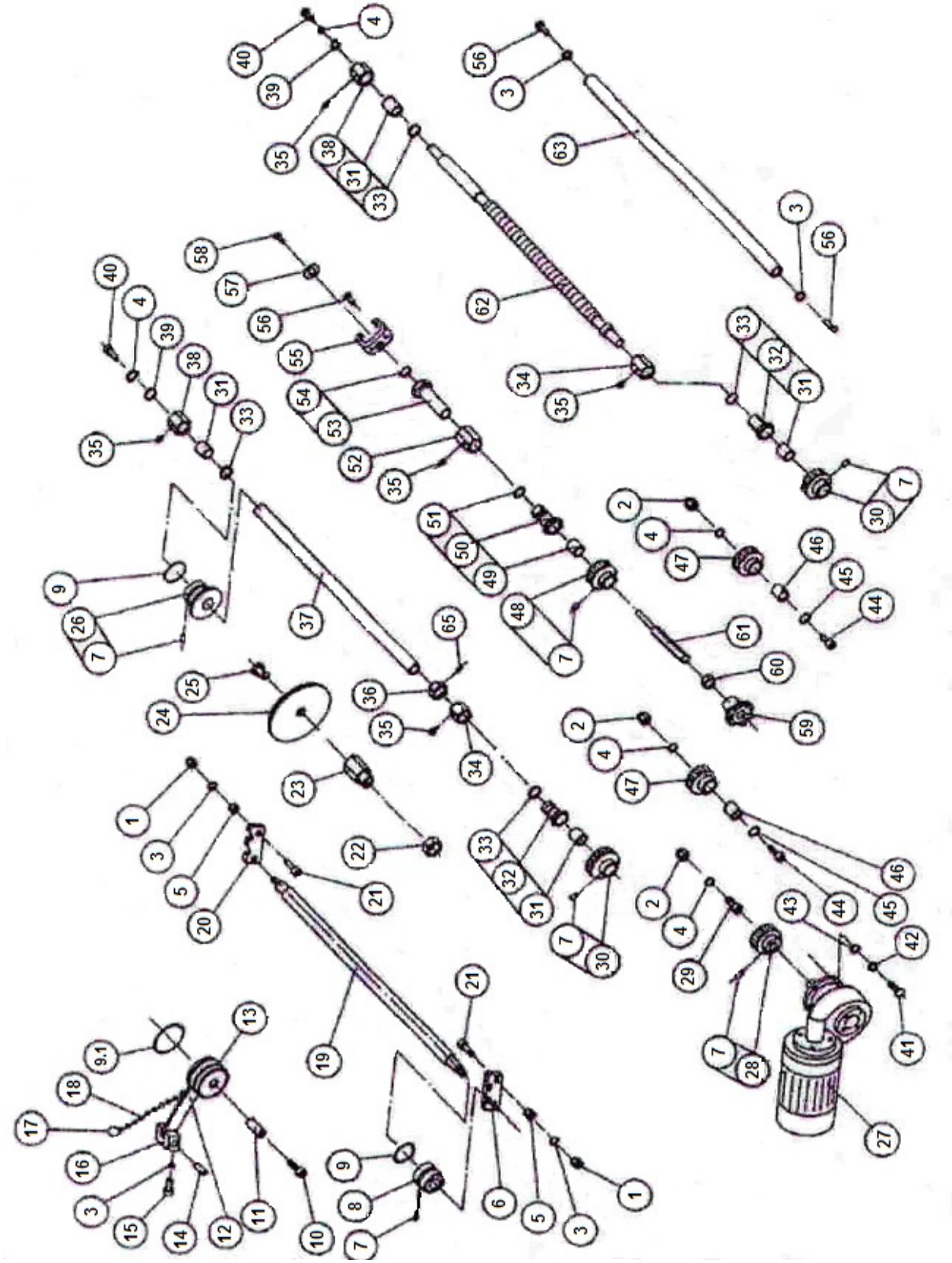
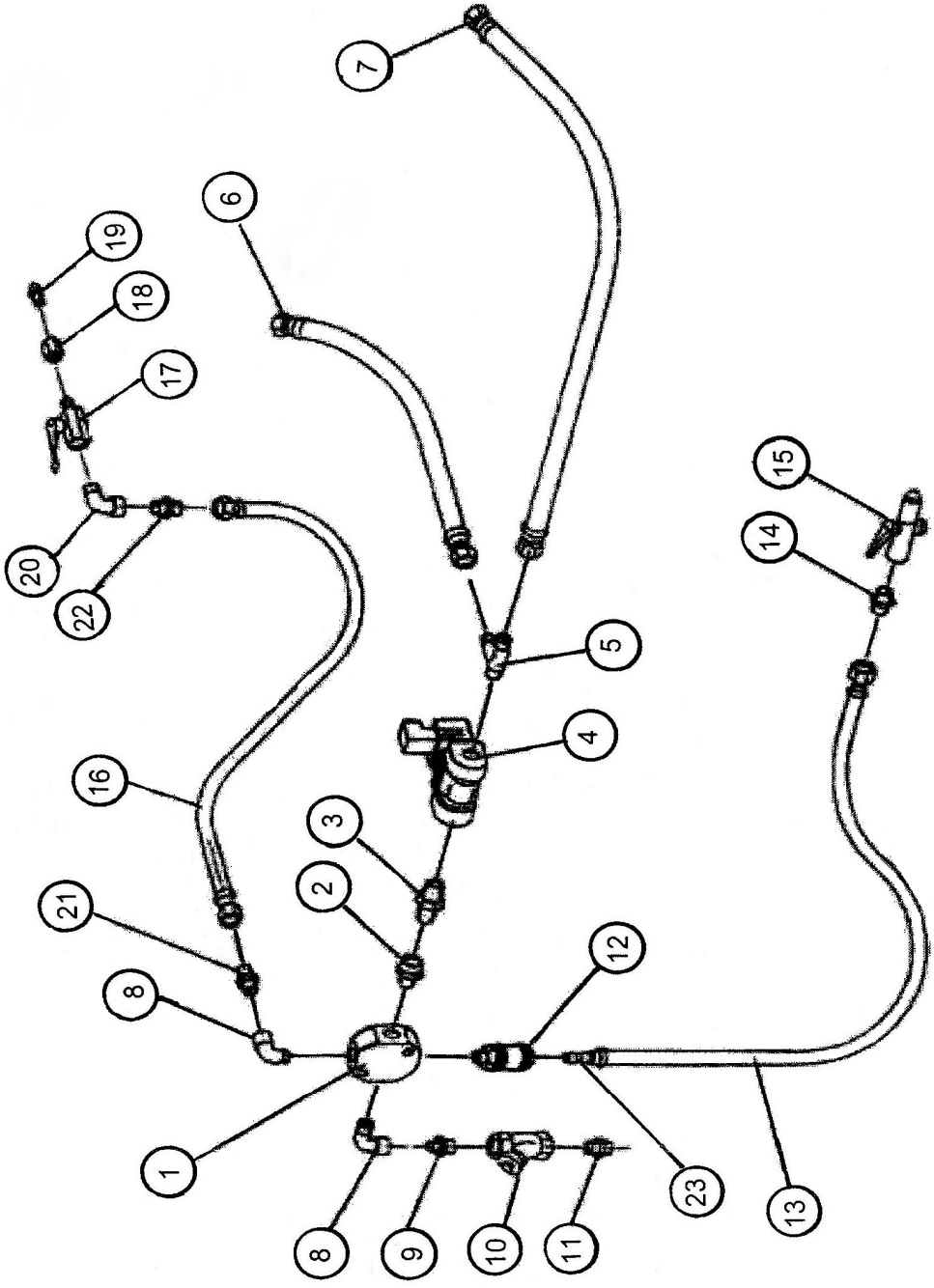
Position ITEM	Stück PCS.	Bezeichnung DESCRIPTION	Bestell-Nr. ART. NO.	Bemerkung REMARKS
1	1	Pumpe HIGH PRESSURE PUMP	130-0009	P21/18-130
2	1	GE Verschraubung SCREW JOINT	280-0028	GE 12 3/8"
3	2	Gewindestift WORM SCREW	200-0015	
4	1	Rotexkupplung COUPLING HALF	200-0016	
5	1	Zahnkranz GEAR RIM	200-0001	
6	1	Rotexkupplung COUPLING HALF	200-0017	
7	8	Mutter NUT	490-0003	MIO with zinc.
8	8	Federring SNAP RING	490-0027	MIO with zinc.
9	8	Scheibe WASHER	490-0011	MIO with zinc.
10	1	Motor MOTOR	150-0048	4KW B3B14/100
11	4	Puffer BUFFER	240-0020	
12	1	Laterne BELL FLANGE	190-0002	
13	1	Verlängerung EXTENSION	300-0048	^{1}/2"ia
14	1	Winkel ELLBOW FITTING	300-0133	^{1}/2"
15	3	Sechskantschraube HEXAGON SCREW	490-0067	M8 x 25 with zinc.
16	4	Sechskantschraube HEXAGON SCREW	490-0045	M8 x 25 with zinc.
17	4	Scheibe WASHER	490-00451	B 8,5, Not shown in the manual
18	4	Federring SNAP RING	490-00452	B 8,5, Not shown in the manual



Position ITEM	Stück PCS.	Bezeichnung DESCRIPTION	Bestell-Nr. ART. NO.	Bemerkung REMARKS
1	4	Hutmutter CAP NUT	440-0010	M6 A2 DIN 1587
2	3	Hutmutter CAP NUT	440-0011	M8 A2 DIN 1587
3	8	Kupferscheibe WASHER	432-0018	M6 x 10 x1 DIN 760
4	5	Kupferring WASHER	432-0007	M8
5	4	Mutter NUT	440-0002	M6 A2 DIN 934
6	1	Einhänger links HINGE LEFT	120-0024	
7	14	Gewindestift WORM SCREW	440-0167	M6 x 16 A2 DIN 916
8	4	Rolle ROLL	430-0287	
9	6	O-Ring Rolle O-RING UPPER ROLL	610-0036	38,0 x 5,0 EPDM
9.1	2	O-Ring Rolle Niederhalter O-RING UPPER ROLL	610-0037	40,0 x 5,0 EPDM
10	2	Innensechskantschraube HEXAGON SOCKET SCREW	440-0221	M6 x 16 A2 DIN 912
11	1	Gewindebüchse-Niederhalter. THREAD BUSH	430-0295	
12	1	Hebel-Niederhalter LEVER UPPER ROLL	120-0388	
13	1	Rolle – Niederhalter UPPER ROLL	430-0289	
14	1	Zylinderstift DOWEL PIN	440-0174	6 ø. x 32 A2 DIN 7
15	2	Sechskantschraube HEXAGON SCREW	440-0220	
16	1	Aufhängung - Niederhalter HINGE UPPER ROLL	430-0272	
17	2	Zylinderschraube HEAD SCREW	432-0011	
18	1	Kette CHAIN	432-0010	
19	1	Verstellachse SHAFT	430-0294	
20	1	Einhänger rechts HINGE RIGHT	120-0385	
21	4	Innensechskantschraube HEXAGON SOCKET SCREW	440-0222	M6 x 20 A2 DIN 912
22	1	Sechskantschraube HEXAGON SCREW	440-0134	
23	1	Halter Prallblech SOCKET BOUNCE DISC	430-0279	
24	1	Prallblech BOUNCE DISC	120-0389	

Position ITEM	Stück PCS.	Bezeichnung DESCRIPTION	Bestell-Nr. ART. NO.	Bemerkung REMARKS
25	1	Senkschraube für Prallblech SREW FOR BOUNCE DISC	440-0102	M10 x 30 A2 DIN 7991
26	2	Anschlagrolle STOP ROLL	430-0288	
27	1	Getriebemotor GEAR MOTOR	150-0043	B5
28	1	Zwischenrad INTERMEDIATE GEAR	430-0020	aus 430 - 0269 (and 2 x threaded fittings M6)
29	1	Innensechskantschraube , überdr. ALLEN SCREW , modified	430-0190	M8 x 12 overtightening
30	2	Stirnrad GEAR	430-0267	
31	2	DU - Buchse BUSHING	317-0012	
31	2	DU - Buchse BUSHING	317-0016	
32	2	Lager Küvettenantrieb +Transportspindel BEARING BUSH	430-0281	
33	4	Simmerring SEAL RING	610-0080	
34	2	Mutter mit Schmiernippel NUT WITH LUB NIPPLE	430-0283	
35	5	Schmiernippel LUB NIPPLE	432-0016	
35	2	Scheibe WASHER	440-0018	M6 A2 not shown in the manual DIN 125
36	1	Sicherung Mitnehmer FIXATION FOR LATCH	430-0285	
37	1	Mitnehmerachse CATCH SHAFT	430-0291	
38	2	Gegenlager Mitnehmer COUNTER BEARING	430-0250	
39	2	O-Ring O-RING	610-0074	9,25 x 1,78 EPDM
40	2	Sechskantschraube HEXAGON SCREW	440-0124	M8 x 12 A2 DIN 933
41	4	Scheibe WASHER	440-0016	M4 A2 DIN 12
42	4	Federring SPRING RING	440-0041	M6 A2 DIN 127
43	4	Scheibe WASHER	440-0018	M6 A2 not shown in the manual DIN 125
44	2	Sechskantschraube HEXAGON SCREW	440-0131	M8 x 45 A2 DIN 931

Position	Stück	Bezeichnung	Bestell-Nr.	Bemerkung
ITEM	**PCS.**	**DESCRIPTION**	**ART. NO.**	**REMARKS**
45	2	Scheibe WASHER	440-0019	M8 A2 DIN 125 A
46	2	Distanzbuchse Zwischenrad SPACER BUSH	430-0277	
47	2	Zwischenrad INTERMEDIATE GEAR	430-0269	
48	1	Stirnrad mit Gew.-Stif GEAR WITH WORM SCREW	430-0268	
49	1	DU-Buchse Gleitlager BUSHING	317-0009	WSM 1618 - 20
49.1	1	DU-Buchse BUSHING	317-0010	WSM 1618 - 25
50	1	Lager Spannschraube GUIDE BUSH	430-0284	
51	1	Manschette GASKET	610-0078	16 x 20,9 x 3 PU
52	1	Mutter Lager Spannschraube NUT WITH GREASE NIPPLE	430-0282	
53	1	Drehbuchse BUSH	430-0290	
54	1	O-Ring EPDM O-RING	610-0051	9,20 x 2,62 EPDM
55	1	Klammer BRACKET	120-0386	
56	2	Sechskantschraube HEXAGON SCREW	440-0115	M 6 x 12 A2 DIN 933
57	1	Scheibe Spannschraube DISC FOR CLAMP SCREW	430-0212	
58	1	Senkschraube SCREW	440-0100	M6 x 12 A2 DIN 7991
59	1	Sterngriff HANDLE	440-0163	
60	1	Mutter NUT	440-0005	M12 A2 DIN 934
61	1	Spannschraube CLAMP SCREW	430-0276	
62	1	Transportspindel ACME THREAD SPINDLE	430-0278	
63	1	Stabilisator STABILISATOR	430-0293	
64	1	Scheibe WASHER	440-0030	not shown in the manual
65	1	Gewindestift WORM SCREW	440-0168	M6x10 A2 DIN 916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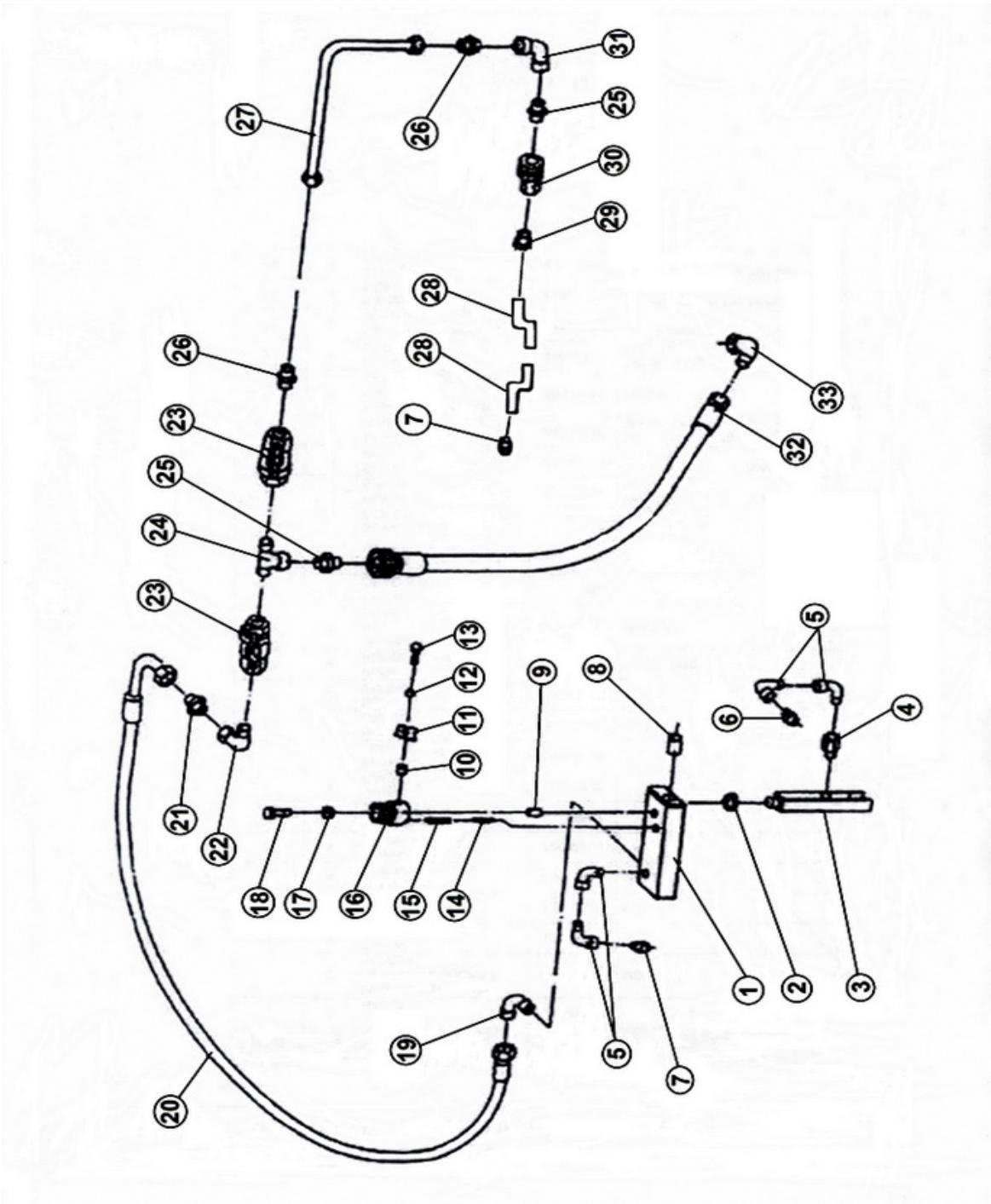
Position	Stuck	Bezeichnung	Bestell-Nr.	Bemerkung
ITEM	**PCS.**	**DESCRIPTION**	**ART. NO.**	**REMARKS**
1	1	Verteilerblock BRANCH	191-0082	3/8" Alu
2	1	Doppelnippel DOUBLE NIPPLE	300-0055	MS 3/8" a x 1/2"i
3	1	Doppelnippel lösbar DOUBLE NIPPLE	300-0059	1/2" MS
4	1	Magnetventil SOLENOID VALVE	380-0011	1/2" 2/2 Wege - SFS
5	1	T-Stück T-FITTING	300-0132	1/2" a MS
6	1	Verbindungsschlauch HOSE	170-0071	
7	1	Verbindungsschlauch HOSE	170-0005	
8	2	Winkel ELBOW FITTING	300-0150	3/8" ia MS
9	1	Reduziernippel NIPPLE	300-0115	3/8" x 1/2" a MS
10	1	Schmutzfänger DIRT PROTECTOR	580-0010	1/2"
11	1	Doppelnippel DOUBLE NIPPLE	300-0029	1/2" x 3/4" MS outside
12	1	Kugelhahn BALL VALVE	191-0011	3/8" a
13	1	Spritzschlauch HOSE	170-0072	PVC / GE 6 x 1500 DKL 3/8"
14	1	Stoppkupplung STOP COUPLING	300-0026	
15	1	Reinigungspistole CLEANING GUN	191-0046	
16	1	Verbindungsschlauch HOSE	170-0073	
17	1	Kugelhahn BALL VALVE	540-0032	
18	1	Muffe JET SOCKET	300-0178	
19	1	Düse WATER JET	630-0201	
20	1	Winkel ELBOW FITTING	300-0149	MS 1/4"
21	1	Doppelnippel DOUBLE NIPPLE	300-0037	
22	1	Schlauchtülle HOSE SOCKET	300-0137	M9 ¼“ – 6 mm
23	1	Schlauchtülle HOSE SOCKET	300-0138	M9 3/8“ – 11 mm



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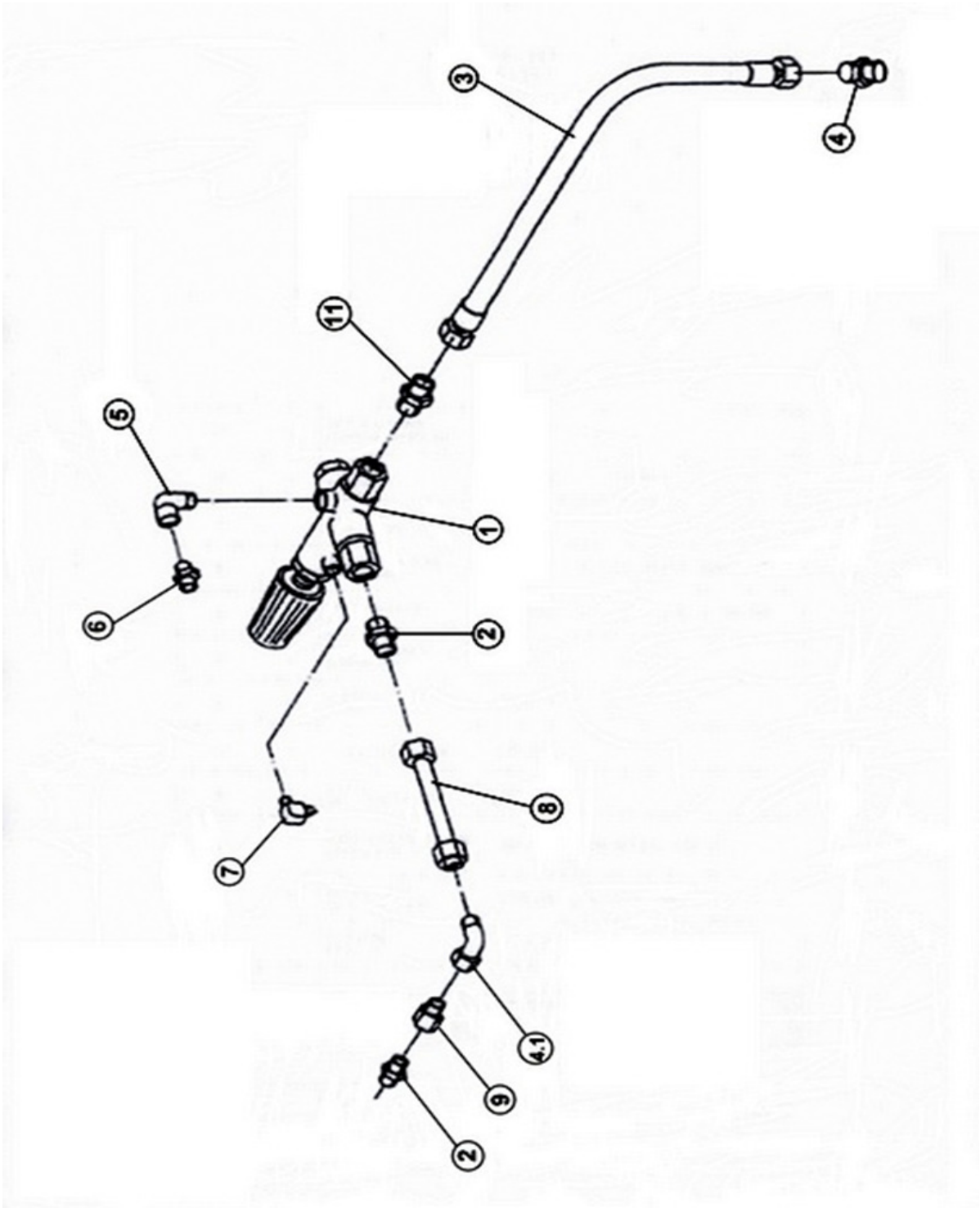
Position	Stück	Bezeichnung	Bestell-Nr.	Bemerkung
ITEM	PCS.	DESCRIPTION	ART. NO.	REMARKS
1	1	Düsenschlitten mit Buchsen NOZZLE SLIDE WITH BUSHES	430-0270	
2	1	Mutter NUT	300-0092	
3	1	Stabilisator STABILISATOR	430-0271	
4	5	Doppelnippel DOUBLE NIPPLE	300-0002	
5	6	Winkel ELBOW FITTING	300-0148	
6	2	Düse flach BROAD JET NOZZLE	630-0195	
7	2	Düse Punkt SPOT JET NOZZL	630-0192	
8	4	DU-Buchse BUSHING	317-0010	WSM 1618 - 25
9	1	Distanzbuchse - Rasterkern SPACER BUSH	430-0274	
10	1	Distanzbuchse - Mitnehmer SPACER BUSH	430-0275	
11	1	Mitnehmer - Düsenschlitten LATCH FOR JET SLIDE	120-0384	
12	1	Federring SPRING RING	440-0041	M6 A2 DIN 127
13	1	Sechskantschraube HEXAGON SCREW	440-0116	
14	1	Zylinderschraube mit Schlitz SCREW	440-0165	
15	1	Zugfeder TENSION SPRING	440-0166	
16	1	Rasterkern SNAP BODY	430-0286	
16	1	Überwurfmutter SCREW CAP	432-0001	
17	1	Scheibe WASHER	440-0019	M8 A2 DIN 125 A
18	1	Sechskantschraube HEXAGON SCREW	440-0129	
19	1	Winkel ELBOW FITTING	270-0071	
20	1	HD - Schlauch HIGH PRESSURE HOSE	340-0115	
21	1	ger. Einschraubverschraubung FITTING	270-0070	
22	1	Winkel ELBOW FITTING	300-0149	

Position ITEM	Stück PCS.	Bezeichnung DESCRIPTION	Bestell-Nr. ART. NO.	Bemerkung REMARKS
23	2	Kugelhahn BALL VALVE	540-0030	
24	1	T-Stück T-PIECE	300-0129	
25	2	Nippel NIPPLE	350-0020	
26	2	ger. Einschraubverschraubung FITTING	280-0011	
27	1	HD - Schlauch HIGH PRESSURE HOSE	430-0292	
28	2	Winkel ELBOW FITTING	270-0055	
29	1	Reduziermutter REDUCTION NUT	615-0455	
30	1	Verschraubung SCREW JOINT	350-0041	
31	1	Winkel ELBOW FITTING	300-0164	
32	1	HD - Schlauch HIGH PRESSURE HOSE	340-0116	
33	1	Verschraubung FITTING	280-0035	x ev W 12 with zinc


3
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11
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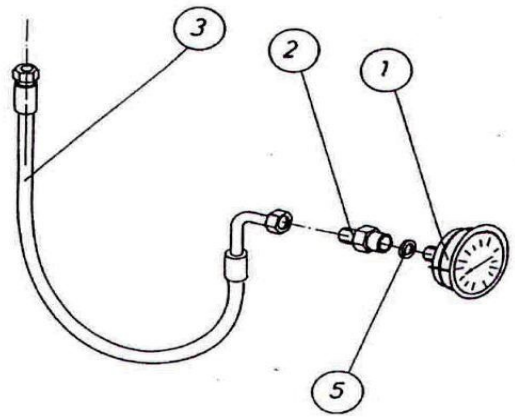
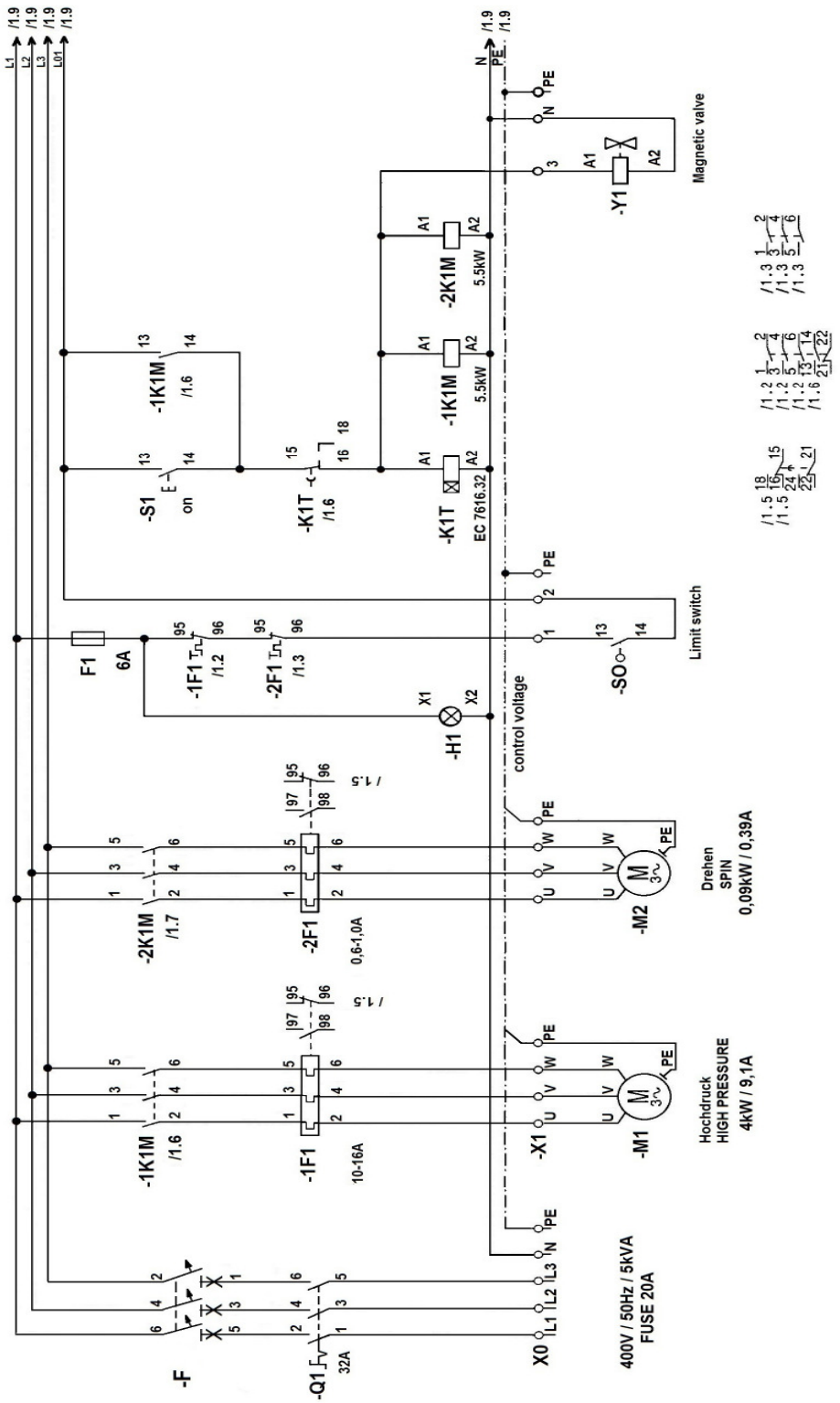
4.1
9
2

Position ITEM	Stück PCS.	Bezeichnung DESCRIPTION	Bestell-Nr. ART. NO.	Bemerkung REMARKS
1	1	UL-Ventil UL VALVE	230-0020	
2	2	GE Verschraubung SCREW JOINT	280-0028	GE 12 3/8" with zinc.
3	1	HD-Schlauch HIGH PRESSURE HOSE	340-0018	2SN 10 x 500 DKOL 12
4	2	GE Verschraubung FITTING	280-0035	
4.1	1	Winkelverschraubung ANGLE FITTING	280-0036	
5	1	Winkel ELBOW FITTING	300-0149	MS 1/4"
6	1	Doppelnippel DOUBLE NIPPLE	300-0027	
7	1	Winkel ELBOW FITTING	280-0006	WE 6 1/4" WE 06 1/4" with zinc
8	1	Zwischenrohr INTERMEDIATE PIPE	621-0009	ø 12 x 1,5 verzinkt 97mm long
9	1	Geradeverschraubung STRAIGHT FITTING	280-0037	
11	1	Winkelverschraubung ANGLE FITTING	550-0088	



Position ITEM	Stück PCS.	Bezeichnung DESCRIPTION	Bestell-Nr. ART. NO.	Bemerkung REMARKS
1	1	Manometer PRESSURE GAUGE	410-0012	250 bar
2	1	Manometerverschraubung FITTING, PRESSURE GAUGE	280-0002	
3	1	Manometerschlauch HOSE FOR PRESSURE GAUGE	340-0005	
5	1	Manometer Schneidring CUTTING RING	270-0150	


L1
L2
L3
L01
N
PE
-F
-Q1
32A
X0
400V / 50Hz / 5kVA
FUSE 20A
-1K1M
/1.6
-1F1
10-16A
-2K1M
/1.7
-2F1
0,6-1,0A
-M1
Hochdruck
HIGH PRESSURE
4kW / 9,1A
-M2
Drehen
SPIN
0,09kW / 0,39A
-X1
-H1
control voltage
F1
6A
-1F1
/1.2
-2F1
/1.3
-SO
Limit switch
-S1
on
-K1T
EC 7616.32
-1K1M
5.5kW
-2K1M
5.5kW
-Y1
Magnetic valve

Type	Best.-Nr.	Leistungs-aufnahme	Oberdruck max.	Drehzahl max.	Förder-menge max.	Wasser temp. max.	Plunger -0	Hub	Gewicht ca.	NPSHR
	Code No.	Power Consump.	Pressure max.	RPM max.	Output max.	Water-Temp. max.	Plunger dia.	Stroke	Weight approx.	NPSH Required
		kW	bar	$_{min}$-1	l/min	°C	mm	mm	kg	mWs
P21/16-200	00.0866	5.9	200	1450	15.1	70	16.0	18.0	7.8	7.0
P21/15-160	00.0543	4.6	160	1420	14.7	70	18.0	14.1	7.8	5.5
P21/18-130	00.0555	4.6	130	1420	18.1	70	20.0	14.1	7.8	6.0
P21/23-130	00.0579	. 5.9	130	1420	23.1	70	20.0	18.0	7.8	7.4

Required NPSH refers to water: Specific weight 1kg/dm^3, viscosity 1°E at max. permissible revolutions.

Operation and Maintenance

Check oil level prior to starting and ensure trouble-free water supply. Oil: Use only 0.37 litres of ISO VG 220 GL4 (e.g. Aral Degol BG220) or SAE 90 GL4 gear oil.

Initial change after 50 operating hours and then every 500 operating hours, after 6 months operation in any case.Caution when operating in damp places or with high temperature fluctuations. Oil must be changed immediately, should condensate (frothy oil) occur in the gear box.

Keep NPSH under control.

Max. input pressure 10 bar, max. suction head -0.3 bar.

Safety Rules

Pump operation without safety valve as well as any excess in temperature or speed limits automatically voids the warranty. The safety valve must be regulated in accordance with the guidelines for liquid spraying units so that the admissible operating pressure can not be exceeded by more than 10%.

When the pump is in operation, the open shaft end must be covered up by shaft protector (17), the driven shaft side and coupling by a contact- protector.

To cover the exposed crankshaft end with the shaft guard, position the guard directly over the groove in the middle of the bearing cover and gently tap it in to the groove using a plastic hammer.

Pressure in discharge line and in pump must be at zero before any maintenance to the pump takes place. Close up suction line. Disconnect fuses to ensure that the driving motor does not get switched on accidently. Make sure that all parts on the pressure side of the unit are vented and refilled, with pressure at zero, before starting the pump.

In order to prevent air, or an air/water-mixture being absorbed and to prevent cavitation occurring, the pump-NPSHR, positive suction head and water temperature must be kept under control.

Cavitation and/or compression of gases lead to uncontrollable pressure-kicks which can ruin pump and unit parts and also be dangerous to the operator or anyone standing nearby.

SPECK TRIPLEX Plunger Pumps are suitable for pumping clean water and other non-agressive or abrasive media with a specific weight similar to water.

Before pumping other liquids - especially inflammable, explosive and toxic media - the pump manufacturer must under all circumstances be consulted with regard to the resistance of the pump material. It is the responsibility of the equipment manufacture and/or operator to ensure that all pertinent safety regulations are adhered to.

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Maintenance

To Check Valves. Suction Valve: Screw out plugs (41). Take out suction valve adaptor (39) together with suction valve. Push valve parts out of suction valve adaptor using a soft tool. Check and replace worn parts.
Check 0-rings (38,40,42) and replace as necessary.

Discharge Valve: Screw out plugs (43). Remove spring tension cap (34), valve spring (35) and valve plate (36) underneath. Take out valve seat (37) with a dia. 15mm (dia. 12mm P21/16) pull-out device. Check and replace worn parts.
Check 0-rings (38,44) and replace as necessary.
Tighten plugs (41,43) to 70NM.

To Check Seals and Plunger Pipe. Screw out plugs (41). Unscrew nuts (46) and remove valve casing from plungers, pulling it out to the front. Take out suction valve adaptor (39), tension spring (33) and seal-unit (30,31,32). Check surfaces of plunger pipes as damaged surfaces cause fast wear to the seals.
When replacing V-sleeves (31), grease new seals with special grease from pump manufacturer before installing.
Check 0-rings (40,42) and replace as necessary.
If plunger pipe (24A) has to be replaced, loosen tension screw (24B) and remove it together with the plunger pipe. Check and clean plunger (22) surfaces and install new plunger pipe.
Cover thread of tension screw (24B) with a fine film of liquid glue and tighten carefully to 22,5NM.

Important!' Care must be taken that no glue gets between the plunger pipe (24A) and centring on plunger (22). The plunger pipe should not be strained by eccentric tightening of tension screw nor through dirt or damage to the front surface of the plunger as this could cause the plunger pipe to break.
Install tension spring (33) and suction valve adaptor (39), then tighten plug (41) to 70Nm.Fix valve case by tightening nuts (46) evenly to 47,5NM.

To Check Drip Return

After removing the valve casing, the V-sleeves (50) in the intermediate casing (48) can be examined and replaced if necessary. Particular care must be taken that the two bores in the valve casing are free of lime deposits so as not to block the drip return.

To Dismantle Gear

Drain oil after dismantling the valve casing (29) and intermediate casing (48), then screw off crankcase cover (3) and bearing cover (12).The plunger pipes (24A) have also to be taken off on models P21/18 and P21/23.Loosen con rod screws (20) and push stem of con rod halves as far as possible into the crosshead guides.
The radial shaft seal (26) on P21/16 and P21/23 models has to be pushed out with the crosshead (22), so that the crankshaft can be pushed past the top con rod halves.

Important! Connecting rods are marked for identification. Do not twist con rod halves. Con rod is to be reinstalled in the same position on shaft journals.

Whilst turning slightly, hit out the crankshaft to one side with a rubber hammer. If necessary, either press out second bearing in crankcase or hit it out carefully with a soft tool.

Important! Do not bend the con rod shanks. Check shaft and con rod surfaces, shaft seals (26) and ball bearings.

To Reassemble. Using a soft tool, press one ball bearing in till it reaches the edge of the bearing hole.Press shaft with the other bearing in carefully through the opposite bearing hole. Screw on bearing cover with shaft seal and O- ring.

Important! After assembly has been completed, the shaft should `15NM. On P21/16 and P21/23 models, put the radial shaft seal (26) turn easily with very little clearance. Tighten con rod screws (20) to into the crankcase (1) afterwards.

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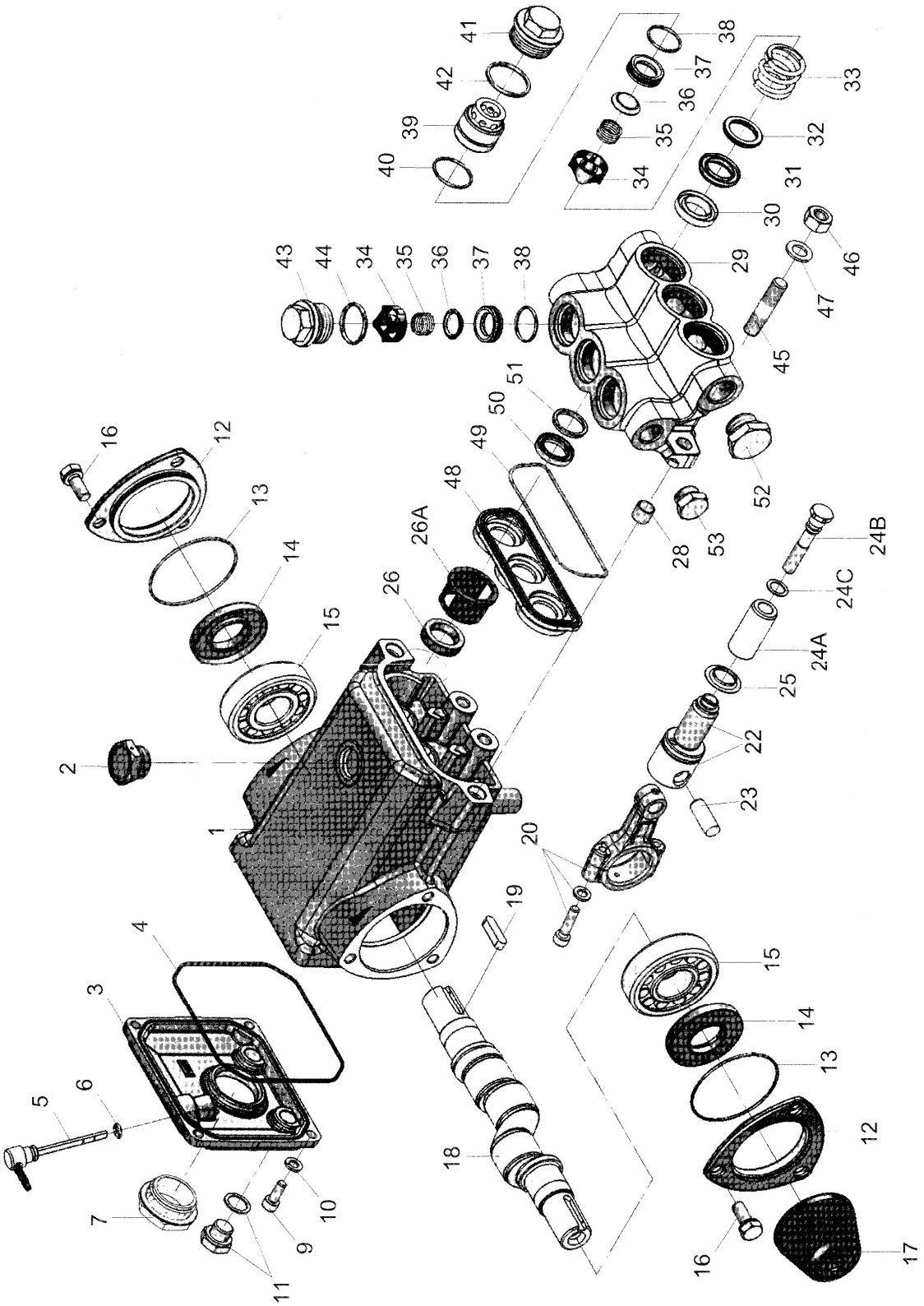

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Lfd. Nr. Item No.	Stückzahl No. Off	Best.-Nr. Code No.	Benennung	Description
1	1	01.0258	Antriebsgehäuse	Crankcase
2	1	00.2373	Entl- Füllstopfen m. Dichtung G1/2	Vent/Filler Plug w/Seal G1/2
3	1	03.0154	Getriebedeckel	Crankcase Cover
4	1	06.0248	O-Ring zu 3	O-Ring for 3
5	1	00.0556	Ölmeßstab	Oil Dipstick
6	1	06.0053	O-Ring zu 5	O-Ring for 5
7	1	00.2416	Ölschauglas kpl. G1	Oil Sight Glass Assy G1
9	4	21.0069	Innensechskantschraube	Hexagon Socket Screw
10	4	07.3052	Federring	Spring Ring
11	2	00.2372	Ölablaßstopfen m. Dicht. G1/4	Oil Drain Plug w/Seal G1/4
12	2	03.0157	Lagerdeckel	Bearing Cover
13	2	06.0249	O-Ring zu 12	O-Ring for 12
14	2	06.0057	Radialwellendichtring	Radial Shaft Seal
15	2	05.0078	Rillenkugellager	Grooved Ball Bearing
16	6	21.0034	Sechskantschraube	Hexagon Screw
17	1	07.4599	Wellenschutz	Shaft Protector
18	1	11.0249	Kurbelwelle P21/15; P21/18	Crankshaft P21/15; P21/18
18	1	11.0267	Kurbelwelle P21/16; P21/23	Crankshaft P21/16; P21/23
19	1	07.5300	Paßfeder	Fitting Key
20	3	00.3287	Gleitlagerpleuel kpl.	Connecting Rod Assy
22	3	00.0597	Kreuzkopf mit Plunger	Crosshead w/Plunger
23	3	11.0066	Kreuzkopfbolzen	Crosshead Pin
24A	3	11.0280	Plungerrohr P21/16	Plunger Pipe P21/16
24A	3	11.0115	Plungerrohr P21/15	Plunger Pipe P21/15
24A	3	11.0124	Plungerrohr P21/18; P21/23	Plunger Pipe P21/18; P21/23
24B	3	21.0351	Spannschraube	Tension Screw
24C	3	06.0306	Cu-Dichtring	Copper Gasket
25	3	07.3918	Ölabstreifer	Oil Scraper
26	3	06.0064	Radialwellendichtring	Radial Shaft Seal
26A	3	07.2962	Distanzhülse	Spacer Sleeve
28	2	07.0558	Zentrierhülse	Centring Sleeve
29	1	01.0447	Ventilgehäuse P21/16	Valve Casing P21/16
29	1	01.0405	Ventilgehäuse P21/15; P21/18; P21/23	Valve Casing P21/15; P21/18; P21/23
30	3	07.1676	Druckring P21/16	Pressure Ring P21/16
30	3	07.0836	Druckring P21/15	Pressure Ring P21/15
30	3	07.0995	Druckring P21/18; P21/23	Pressure Ring P21/18; P21/23
+31	3	06.0458	Dachmanschette P21/16	V-Sleeve P21/16
•31	3	06.0283	Dachmanschette P21/15	V-Sleeve P21/15
o31	3	06.0308	Dachmanschette P21/18; P21/23	V-Sleeve P21/18; P21/23
32	3	07.1675	Manschettenstützring P21/16	Sleeve Support Ring P21/16
32	3	07.0837	Manschettenstützring P21/15	Sleeve Support Ring P21/15
32	3	07.0903	Manschettenstützring P21/18; P21/23	Sleeve Support Ring P21/18; P21/23
33	3	07.2708	Druckfeder P21/16	Pressure Spring P21/16
33	3	07.0838	Druckfeder P21/15; P21/18; P21/23	Pressure Spring P21/15; P21/18; P21/23
++34	6	07.2172	Federspannschale P21/16	Spring Tension Cap P21/16
••34	6	07.0956	Federspannschale P21/15; P21/18; P21/23	Spring Tension Cap P21/15; P21/18; P21/23
++35	6	07.4453	Ventilfeder P21/16	Valve Spring P21/16
••35	6	07.1941	Ventilfeder P21/15; P21/18; P21/23	Valve Spring P21/15; P21/18; P21/23
++36	6	07.2173	Ventilplatte P21/16	Valve Plate P21/16
••36	6	07.1004	Ventilplatte P21/15; P21/18; P21/23	Valve Plate P21/15; P21/18; P21/23
++37	6	07.1650	Ventilsitz P21/16	Valve Seat P21/16
••37	6	07.0292	Ventilsitz P21/15; P21/18; P21/23	Valve Seat P21/15; P21/18; P21/23
++38	6	06.0078	O-Ring zu 37 P21/16	O-Ring for 37 P21/16
••38	6	06.0067	O-Ring zu 37 P21/15; P21/18; P21/23	O-Ring for 37 P21/15; P21/18; P21/23
39	3	07.1661	Saugventilaufnahme P21/16	Suction Valve Adaptor P21/16
39	3	07.0815	Saugventilaufnahme P21/15; P21/18; P21/23	Suction Valve Adaptor P21/15; P21/18; P21/23
o+•40	3	06.0250	O-Ring zu 39	O-Ring for 39
41	3	07.1674	Stopfen M30x1.5, P21/16	Plug M30x1.5, P21/16
41	3	07.0814	Stopfen M30x1.5, P21/15; P21/18; P21/23	Plug M30x1.5, P21/15; P21/18; P21/23
o+•42	3	06.0251	O-Ring zu 41	O-Ring for 41
43	3	07.1660	Stopfen G 3/4 P21/16	Plug G 3/4 P21/16
43	3	07.1514	Stopfen G 3/4 P21/15; P21/18; P21/23	Plug G 3/4 P21/15; P21/18; P21/23
o+•44	3	06.0496	O-Ring zu 43	O-Ring for 43
45	4	21.0078	Stiftschraube	Stud Bolt
46	4	07.2398	Sechskantmutter	Hexagon Nut
47	4	07.2706	Scheibe	Disc
48	1	01.0451	Zwischengehäuse P21/16	Intermediate Casing P21/16
48	1	01.0439	Zwischengehäuse P21/15	Intermediate Casing P21/15
48	1	01.0440	Zwischengehäuse P21/18; P21/23	Intermediate Casing P21/18; P21/23
o+•49	1	06.0252	Form O-Ring zu 48	O-Ring for 48
+50	3	06.0310	Manschette P21/16;	Sleeve P21/16;
•50	3	06.1298	Nutring P21/15	Seal RingP21/15
o50	3	06.1436	Nutring P21/18; P21/23	Seal RingP21/18; P21/23
51	3	07.1020	Manschettenstützring P21/16	Sleeve Support Ring P21/16
•51	3	07.3383	Manschettenstützring P21/15	Sleeve Support Ring P21/15
o51	3	07.3384	Manschettenstützring P21/18; P21/23	Sleeve Support Ring P21/18; P21/23
52	1	07.0705	Stopfen G1/2	Plug G1/2
53	1	07.0608	Stopfen G3/8	Plug G3/8
	1	00.1307	Pumpenkopf kpl. P21/16 (29-44/52/53)	Pump Head Assy P21/16 (29-44/52/53)
	1	00.0788	Pumpenkopf kpl. P21/15 (29-44/52/53)	Pump Head Assy P21/15 (29-44/52/53)
	1	00.0789	Pumpenkopf kpl. P21/18; P21/23 (29-44/52/53)	Pump Head Assy P21/18; P21/23 (29-44/52/53)
	1	00.1965	Antrieb kpl. P21/16 (1-28/45-47)	Gear Assy P21/16 (1-28/45-47)
	1	00.1964	Antrieb kpl. P21/15 (1-28/45-47)	Gear Assy P21/15 (1-28/45-47)
	1	00.1966	Antrieb kpl. P21/18 (1-28/45-47)	Gear Assy P21/18 (1-28/45-47)
	1	00.1967	Antrieb kpl. P21/23 (1-28/45-47)	Gear Assy P21/23 (1-28/45-47)
•	1	14.0498	Rep. Satz Dichtungen P21/15	Seal Repair Kit P21/15
+	1	14.0305	Rep. Satz Dichtungen P21/16	Seal Repair Kit P21/16
o	1	14.0500	Rep. Satz Dichtungen P21/18; P21/23	Seal Repair Kit P21/18; P21/23
••	1	14.0496	Rep. Satz Ventile P21/15; P21/18; P21/23	Valve Repair Kit P21/15; P21/18; P21/23
++	1	14.0335	Rep. Satz Ventile P21/16	Valve Repair Kit P21/16

Bei Bestellung von Ersatzteilen bitte Bestell-Nr., Pumpen-Nr. und -type angeben
When ordering please state Code No., Pump Model and Pump Serial No.

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CE CERTIFICATE OF CONFORMITY
DECLARATION BY THE MANUFACTURER

In accordance with the EC Machinery Directive 2006/42/EG, appendix II A

We : KWS Kaechele GmbH, Parkstrasse 18, 75175 Pforzheim

hereby declare that the machine described below, on the basis of this design and construction, as well as the version that we have put into circulation, corresponds with basic health and safety requirements in compliance with the EC Machinery Directive 2006/42/EG.
In the event of modifications of the machine not approved by us this certificate looses its validity.

CONSTRUCTION OF MACHINE: **UNBEDDING MACHINE**

MANUFACTURER: **KWS KÄCHELE GMBH**

MODEL: **KG 100**

MACHINE SERIAL NO.:

The above mentioned described machine is developed, designed and manufactured in accordance with the following European directives under the sole responsibility of **Mr. Norbert Kotulla – technical director**.

- EC Machinery Directive 2006/42/EG
- "Electrical equipment designed for use within certain voltage limits" (EC low voltage directive), 2006/95/EG,

The following harmonized norms are applied:

Norm	Title of the norm
DIN EN 12100-1	Safety of machinery: Basic concepts, general principles for design; Part1 and 2
DIN EN 12100-2	Risk assessment, Part 1 and2
DIN EN 60204-1	Safety of machinery: Electrical equipment of machines Part 1: General requirements
DIN EN ISO 13849-1	Safety of machinery: Safety-related parts of control systems

The operating instructions and a technical documentation are available.

Pforzheim, 2018 **KWS KAECHELE GMBH**

KWS PFORZHEIM

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