SEPARATOR

MRPX 318TGV-44C

In letters, telegrams, telex messages and calls, please state type and manufacturing No. of the machine.

Product No.: 4260-23
(SG4260-02:01)
Reg. 33436

Book No.: SV4260-23:01E 1/9306

ALFA-LAVAL SEPARATION AB - S-147 80 TUMBA - SWEDEN

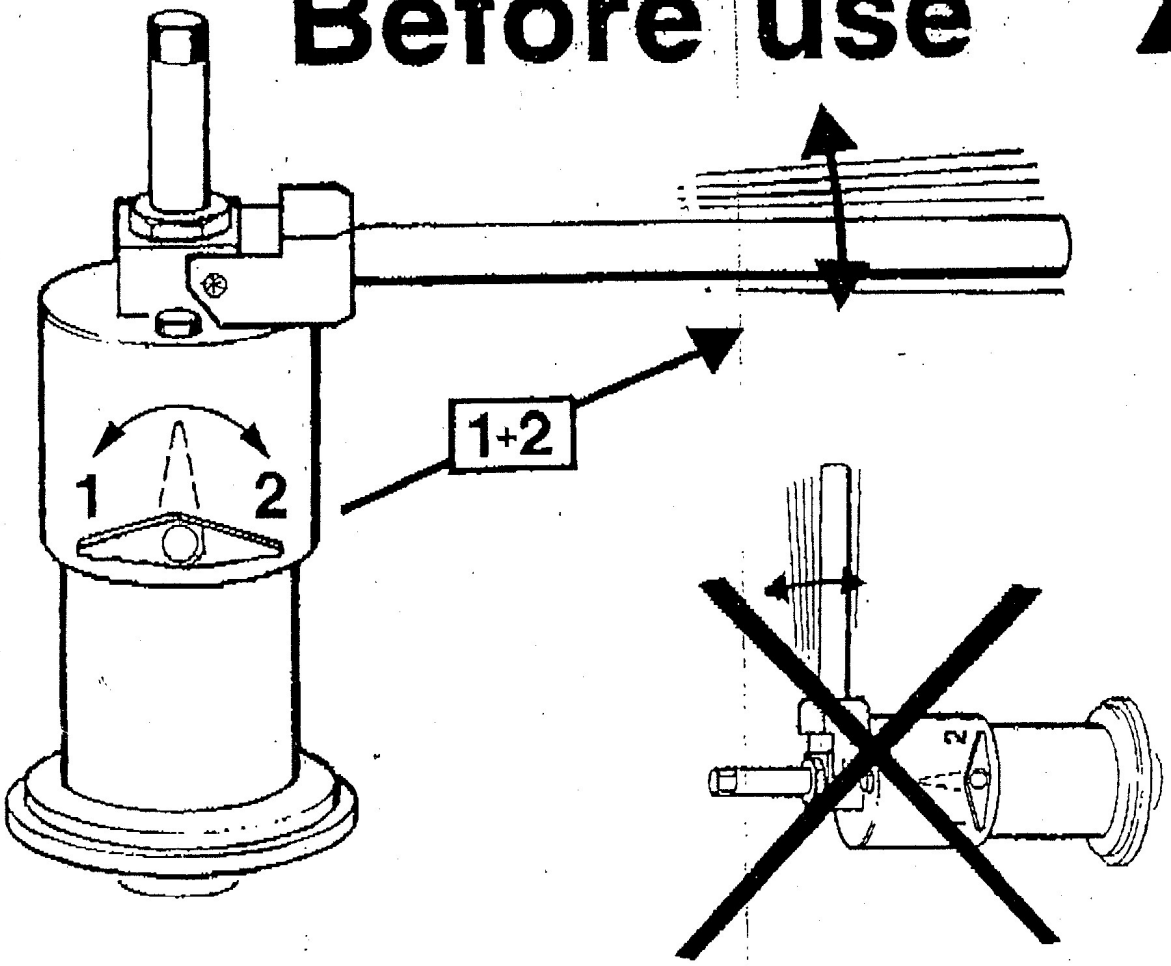
ALFA LAVAL (OLD) GMES 13/5/15.

Water	1800
Prod.	300
CIP/W	300
CIP/L	600
Stop	1800
DIS/LK	60
WFSH-DS	60
IN-DLY	3
V6-PROD	20
V6-DRN	20
V7-PROD	20
V7-DRN	20

(New)

Water	0
PROD	240
CIP/W	300
CIP/L	600
STOP	1800
DIS/LK	60
WFSH-DS	180
IN-DLY	3
V6-PROD	300
V6-DRN	5
V7-PROD	300
V7-DRN	5.

Before use

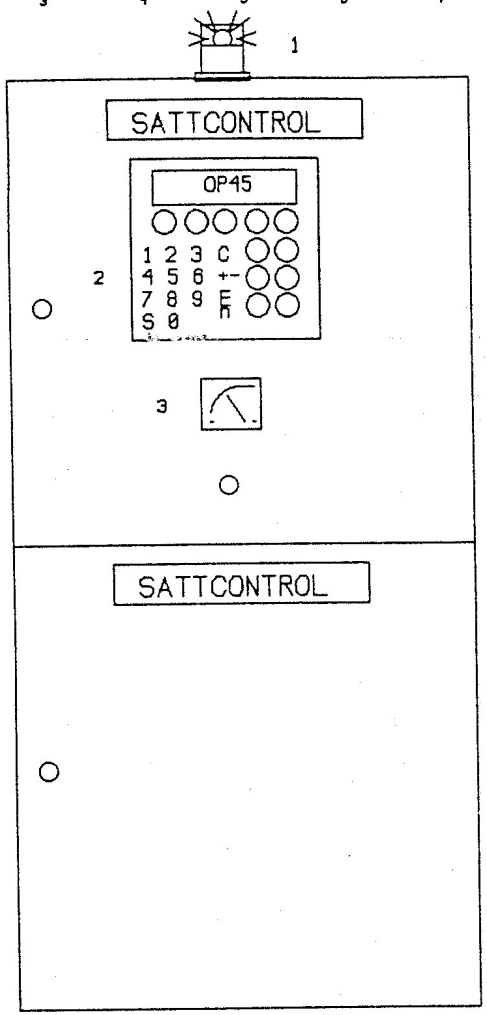


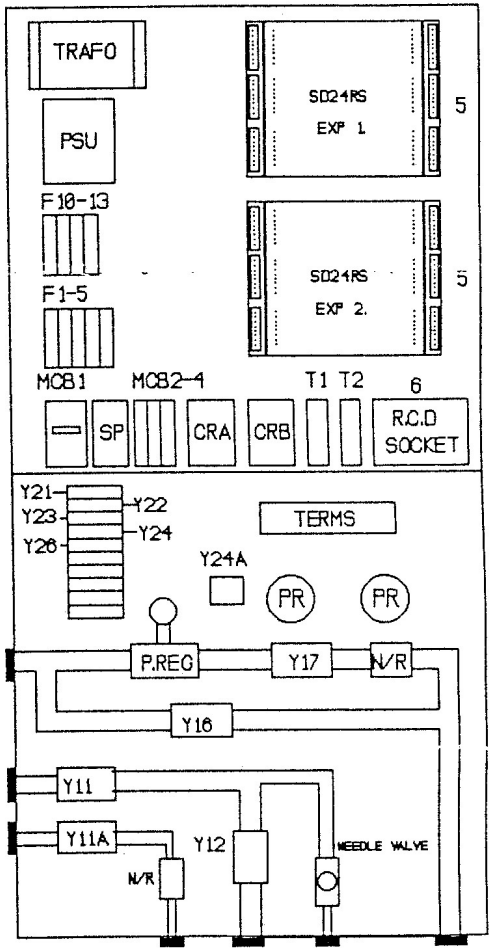
BEFORE USE

TOOL SHOULD BE PUMPED AS ABOVE

STORAGE OF TOOL

TOOL SHOULD BE STORED STANDING UP-RIGHT IN BOX





Revsn.	Date and Init.

EXPRESS FOODS MAGHERALIN

Separator (1 x TGV)

Type of doc. Circuit Drawing

Dept.	Drawn	Date	Filename
AUTO	J.Fitz	26-JUL-93	K7863001

No. of sheets	ALFA-LAVAL
18	DUBLIN IRELAND
Cont on sheet: 2	Project No. K7863
Sheet no: 1	Drawing No. -

PANEL EQUIPMENT LIST

Item	Quantity	Description	Part Number	Supplier
1	1	Electronic Beacon (Red)	233-761	F.E.C. (Irl) Ltd., Dublin, Ireland
2	1	P.L.C. / Operator Interface	SCOP45SB / 492-7055-02	SattControl, Malmo, Sweden
3	1	Ammeter, 100:1	Zurc, 0-100%, 1A F.S.D.	Demense Eng.Supplies, Dublin, Ireland
PSU	1	24Vdc Supply, 2Amp regulated	108-758	F.E.C. (Irl) Ltd., Dublin, Ireland
TRAFO	1	240Vac/48Vac Supply 500VA		Demense Eng. Supplies, Dublin, Ireland
TERMS		Terminals, DIN rail	SAK25mm	A.P. Haslam Ltd, Dublin, Ireland
MCB1	1	Main MCB, MCB1	Sursum, 10A, 380V, 2 Pole	A.P. Haslam Ltd, Dublin, Ireland
SP	1	Surge Suppressor	178-870	F.E.C. (Irl) Ltd., Dublin, Ireland
MCB2-4	3	MCB 2-4	Sursum, 6A,2A,4A, 380V, 2 Pole	A.P. Haslam Ltd, Dublin, Ireland
6	1	220Vac, 3 pin(square) Socket	Metal Clad RCD 13A Socket	Demense Eng. Supplies, Dublin, Ireland
F1-13	9	Control Fuses	Klippon ASK1	A.P. Haslam Ltd, Dublin, Ireland
CR-A,B	2	Current Relays	IH 1AA C4X2 OAP	Demense Eng. Supplies, Dublin, Ireland
T1,2	2	Timers	558-587-01	Alfa-Laval Separation, Tumba, Sweden
4	1	I/O Bus Cable + Bracket	IOCOP1M/492-6559-04	SattControl, Malmo, Sweden
5	2	I/O Unit	SD24RS / 492-6211-02	SattControl, Malmo, Sweden
	2	Stainless Steel Enclosure	600mmX800mmX210mm	Esta, Kilmeade, Athy, Co. Kildare

Revision	Date and Init.

EXPRESS FOODS MAGHERALIN

Separator (1 x TGV)

Type of doc. Circuit Drawing

Dept.	Drawn	Date	Filename
AUTO	J.Fitz	26-JUL-93	K7863C02

No. of sheets	ALFA-LAVAL
18	DUBLIN IRELAND
Cont on sheet: 3	Project No.: K7863
Sheet no: 2	Drawing No.: -

PANEL EQUIPMENT LIST

Item	Quantity	Description	Part Number	Supplier
	2	Pneumatic Regulators	AR20000-02BG SMC	Hall and Pyke, Dublin, Ireland

Revision	Date and Init.

EXPRESS FOODS MAGHERALIN

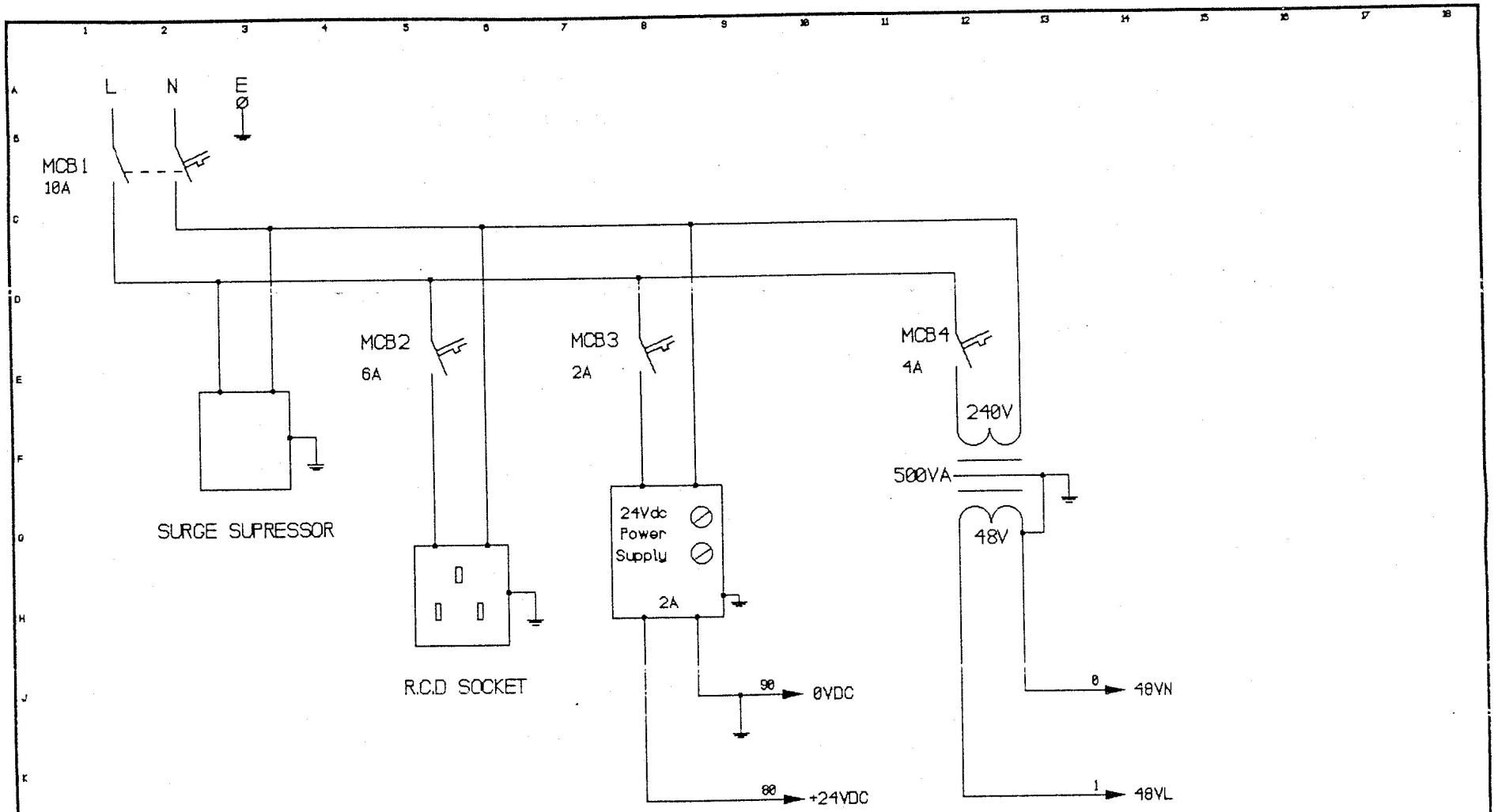
Separator (1 x TGV)

Type of doc. Circuit Drawing

Dept.	Drawn	Date	Filename
AUTO	J.Fitz	26-JUL-93	K7863C03

No. of sheets	Cont. on sheet	Sheet no	Project No.	Drawing No.
18	4	3	K7863	-

ALFA-LAVAL DUBLIN IRELAND



Revsio.	Date and Init.

EXPRESS FOODS MAGHERALIN

Separator (1 x TGV)

Type of doc. Circuit Drawing

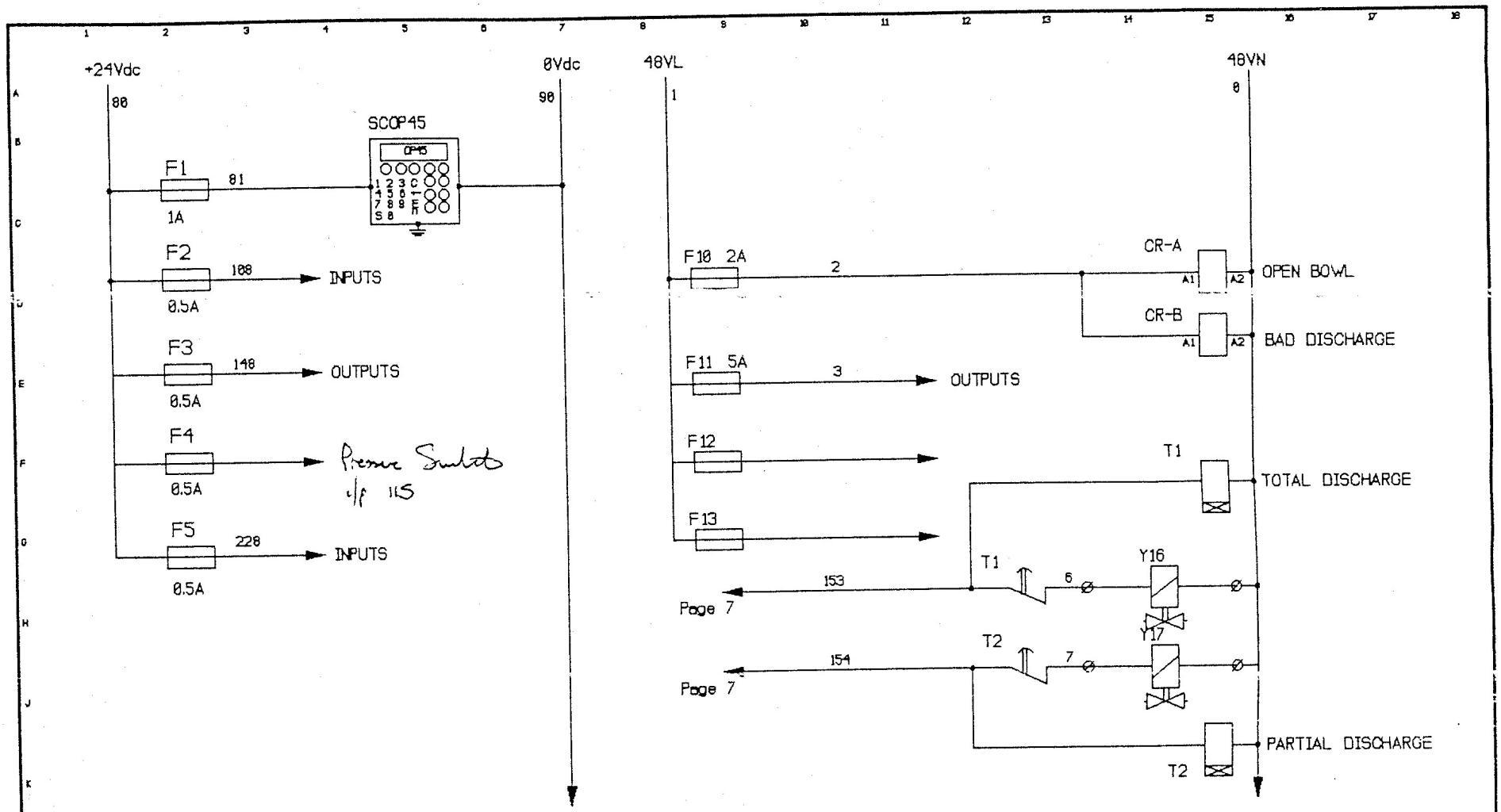
Dept.	Drawn	Date	Filename
AUTO	J.Fitz	26-JUL-93	K7863084

No. of sheets	Cont on sheet	Sheet no
18	5	4

ALFA-LAVAL
DUBLIN IRELAND

Project No. K7863

Drawing No. -



Rev.No.	Date and Init.

EXPRESS FOODS MACHERALIN

Separator (1 x TGV)

Type of doc. Circuit Drawing

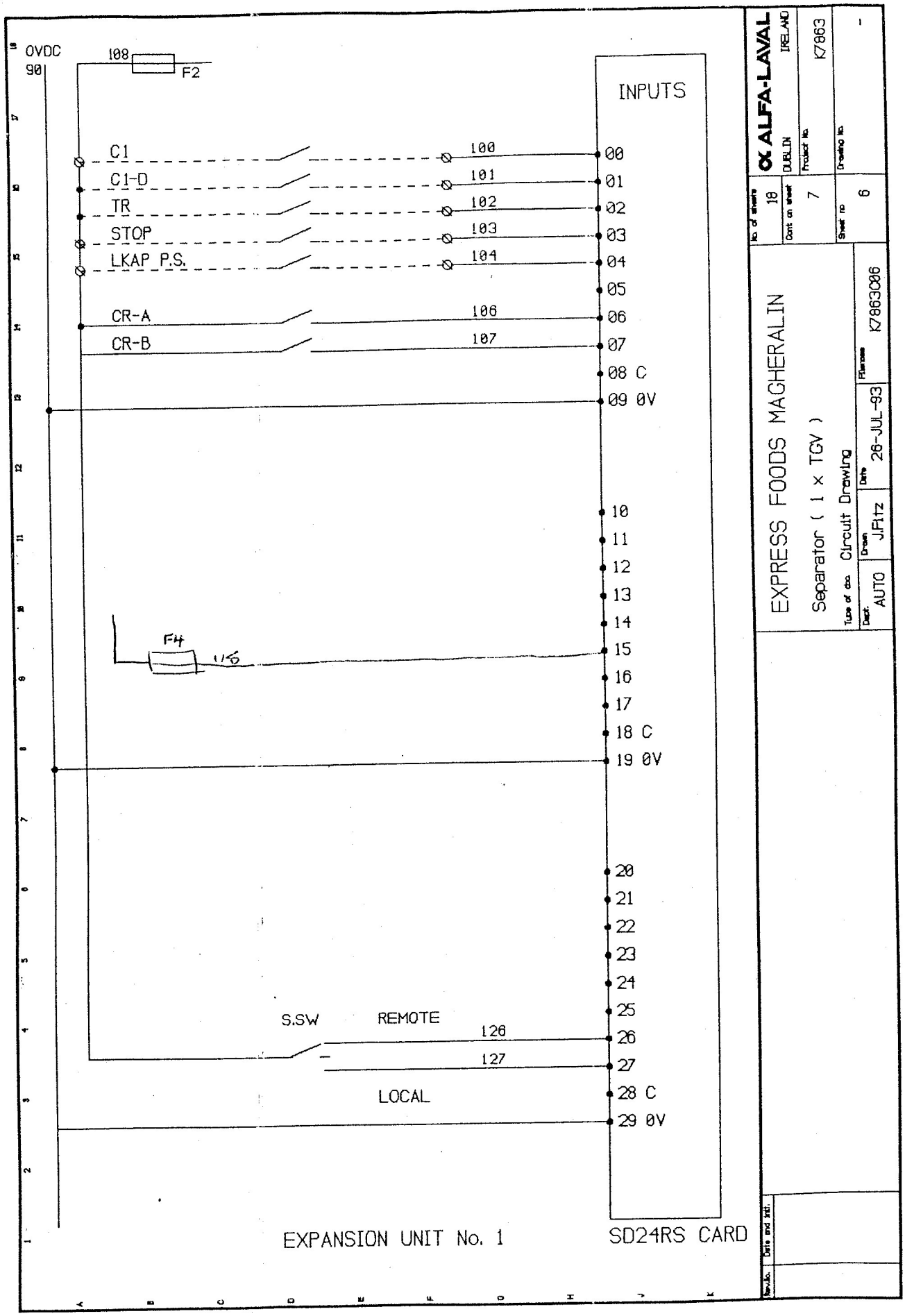
Dept.	Drawn	Date	Filename
AUTO	J.Fitz	26-JUL-93	K7863C05

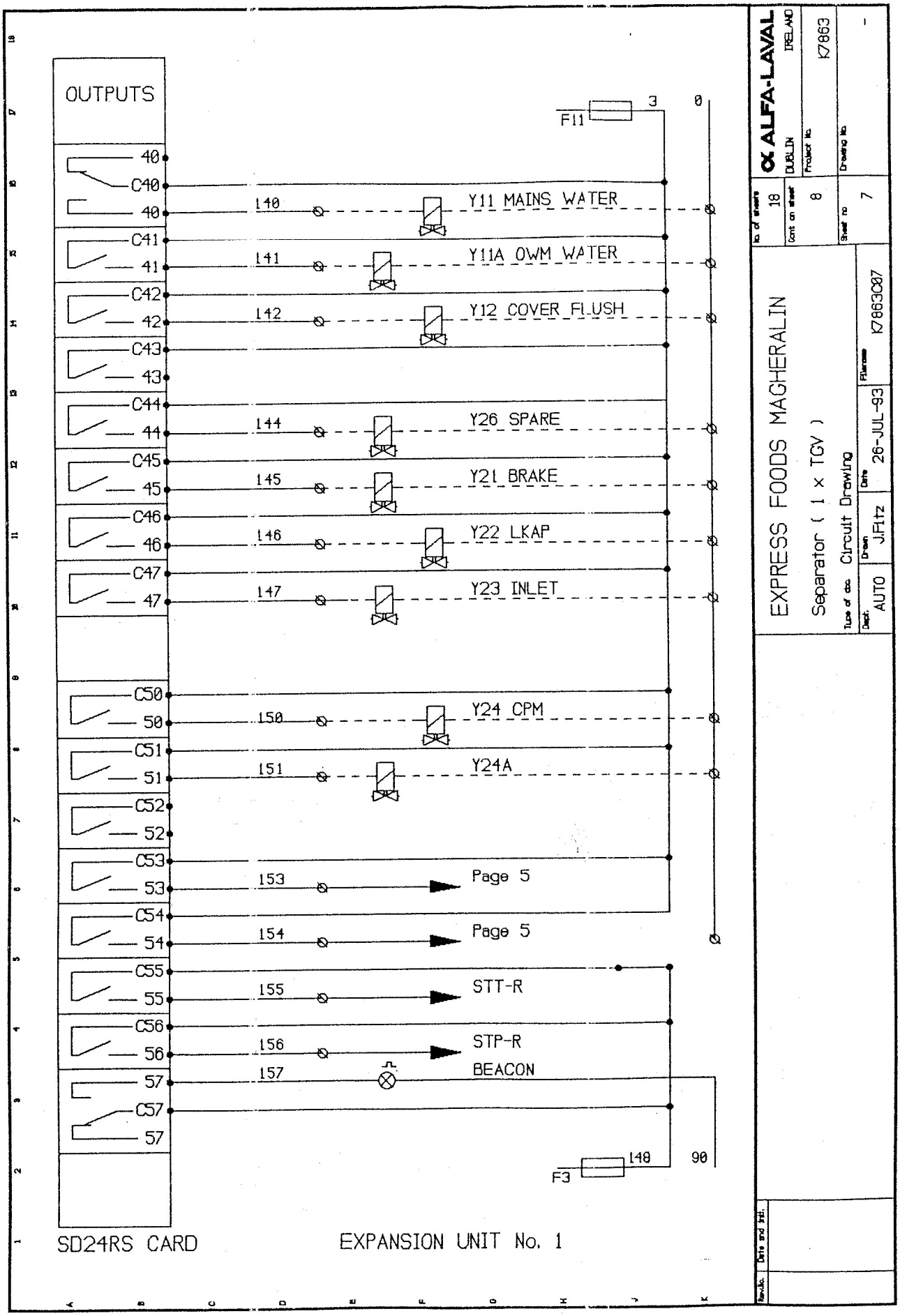
No. of sheets	Cont on sheet	Sheet no
18	6	5

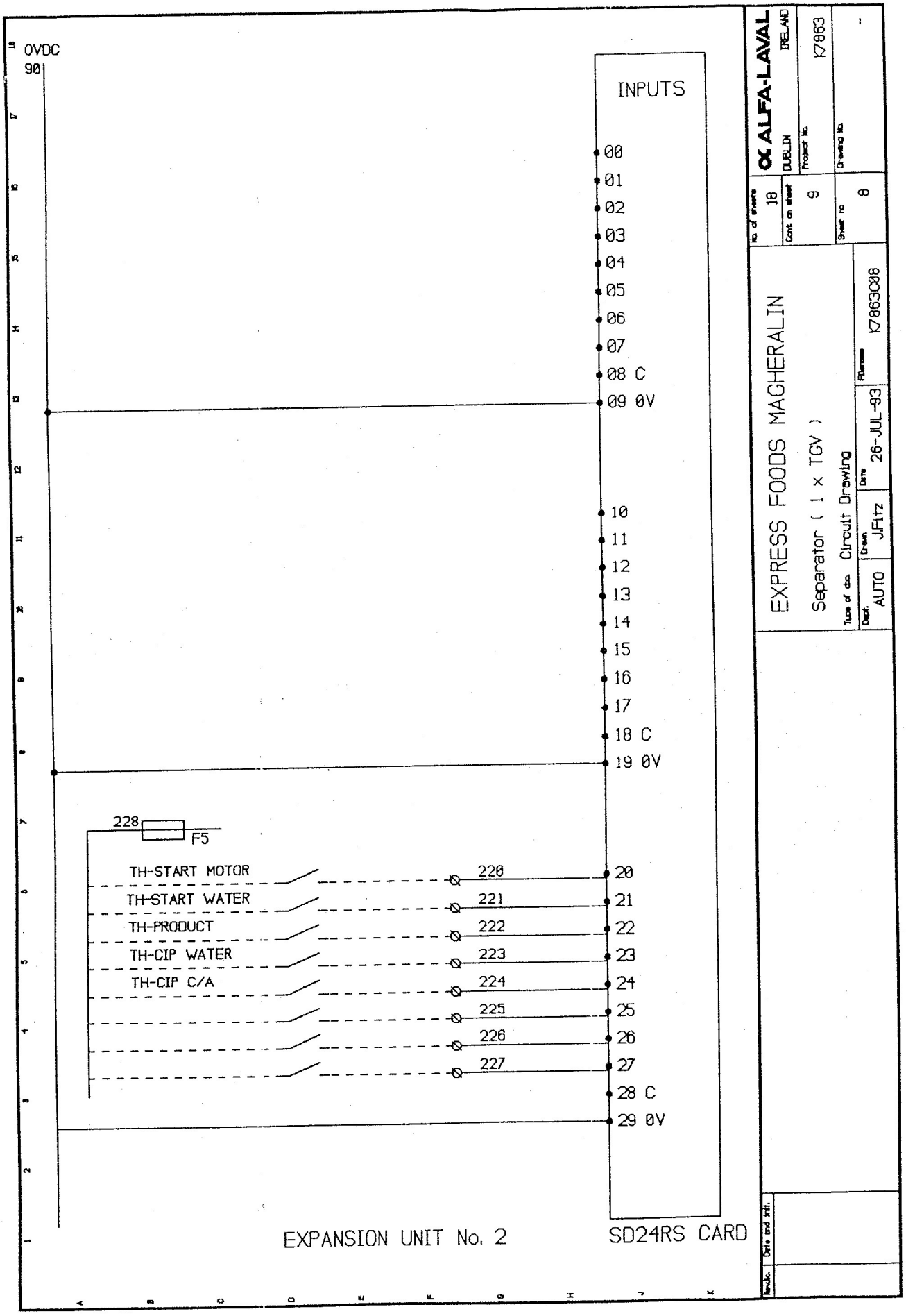
ALFA-LAVAL
DUBLIN IRELAND

Project No. K7863

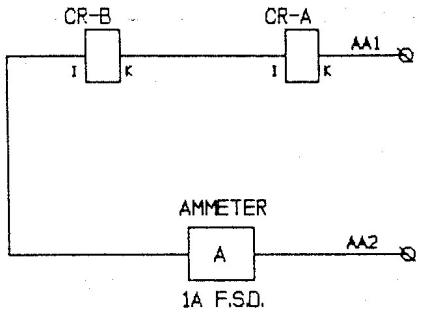
Drawing No. -


0VDC
90
108
F2
INPUTS
C1
C1-D
TR
STOP
LKAP P.S.
CR-A
CR-B
100
101
102
103
104
106
107
00
01
02
03
04
05
06
07
08 C
09 0V
10
11
12
13
14
15
16
17
18 C
19 0V
20
21
22
23
24
25
26
27
28 C
29 0V
F4
1/5
S.SW
REMOTE
126
127
LOCAL
EXPANSION UNIT No. 1
SD24RS CARD
ALFA-LAVAL
IRELAND
DUBLIN
K7863
18
7
6
EXPRESS FOODS MAGHERALIN
Separator (1 x TGV)
Type of doc Circuit Drawing
K7863006
26-JUL-93
J.Fitz
AUTO


OUTPUTS
F11
3
0
40
C40
40
140
Y11 MAINS WATER
C41
41
141
Y11A OWM WATER
C42
42
142
Y12 COVER FLUSH
C43
43
C44
44
144
Y26 SPARE
C45
45
145
Y21 BRAKE
C46
46
146
Y22 LKAP
C47
47
147
Y23 INLET
C50
50
150
Y24 CPM
C51
51
151
Y24A
C52
52
C53
53
153
Page 5
C54
54
154
Page 5
C55
55
155
STT-R
C56
56
156
STP-R
57
157
BEACON
C57
57
F3
148
90
SD24RS CARD
EXPANSION UNIT No. 1
ALFA-LAVAL
DUBLIN
IRELAND
K7863
-
18
8
7
EXPRESS FOODS MAGHERALIN
Separator (1 x TGV)
Type of doc Circuit Drawing
Drawn J.Fitz
Date 26-JUL-93
Filename K7863C07
Dept AUTO
Revis.
Date and init.


0VDC
90
INPUTS
00
01
02
03
04
05
06
07
08 C
09 0V
10
11
12
13
14
15
16
17
18 C
19 0V
228
F5
TH-START MOTOR
TH-START WATER
TH-PRODUCT
TH-CIP WATER
TH-CIP C/A
220
221
222
223
224
225
226
227
20
21
22
23
24
25
26
27
28 C
29 0V
EXPANSION UNIT No. 2
SD24RS CARD
ALFA-LAVAL
IRELAND
DUBLIN
K7863
18
9
8
EXPRESS FOODS MAGHERALIN
Separator (1 x TGV)
Circuit Drawing
AUTO
J.Fitz
26-JUL-93
K7863000

Rev.No.	
Date and Init.	
EXPRESS FOODS MACHERALIN	
Separator (1 × TGV)	
Type of doc. Circuit Drawing	
Check AUTO	
Drawn J.Fitz	
Date 26-JUL-93	
Filename K7863089	
Sheet no 9	
Cont on sheet 10	
No. of sheets 10	
ALFA-LAVAL DUBLIN IRELAND	
Project No. K7863	
Drawing No. -	



Revdn.	Date and Intl.

EXPRESS FOODS MAGHERALIN

Separator (1 x TGV)

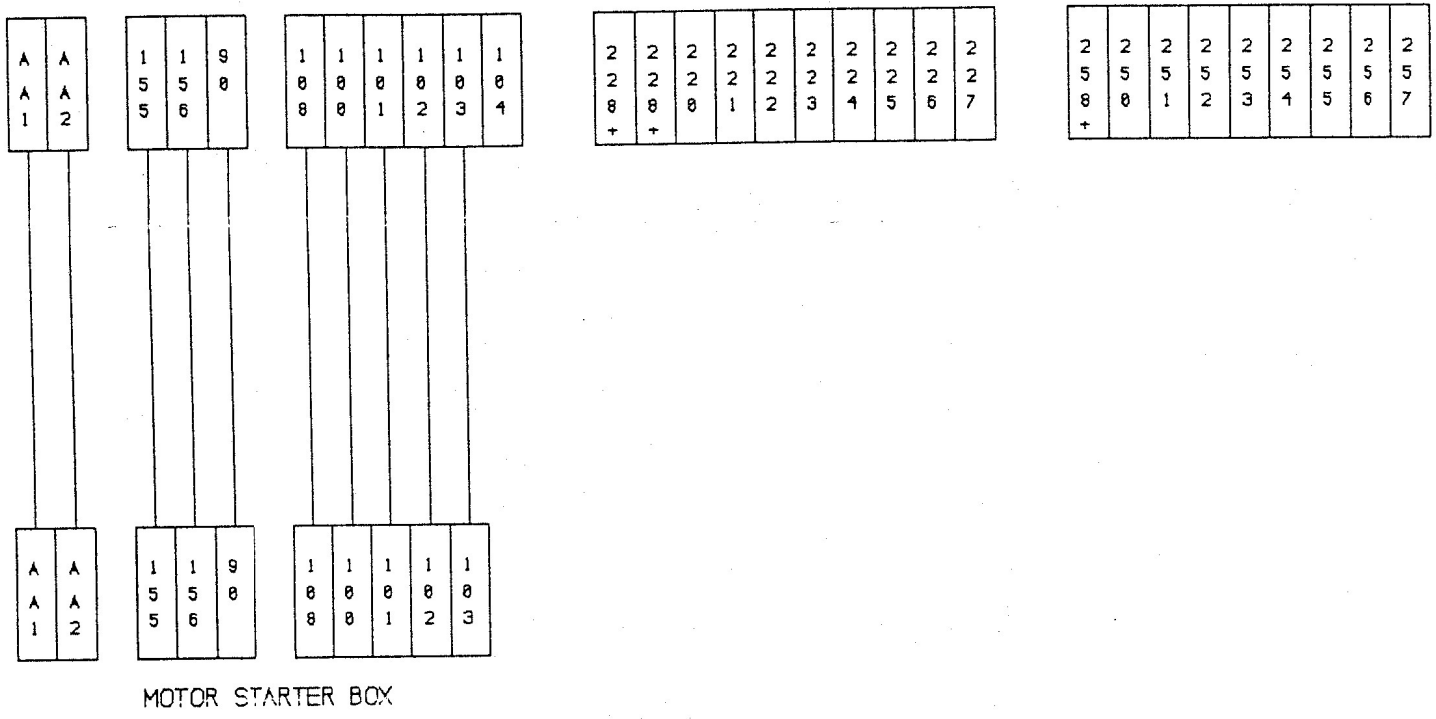
Type of doc. Circuit Drawing

Dept.	Drawn	Date	Filename
AUTO	J.Fitz	26-JUL-93	K7863C10

No. of sheets	Cont on sheet	Sheet no	Drawing No.
18	11	10	-

ALFA-LAVAL
DUBLIN IRELAND

Project No. K7863



Revision	Date and Init.

EXPRESS FOODS MACHERALIN

Separator (1 x TGV)

Type of doc. Circuit Drawing

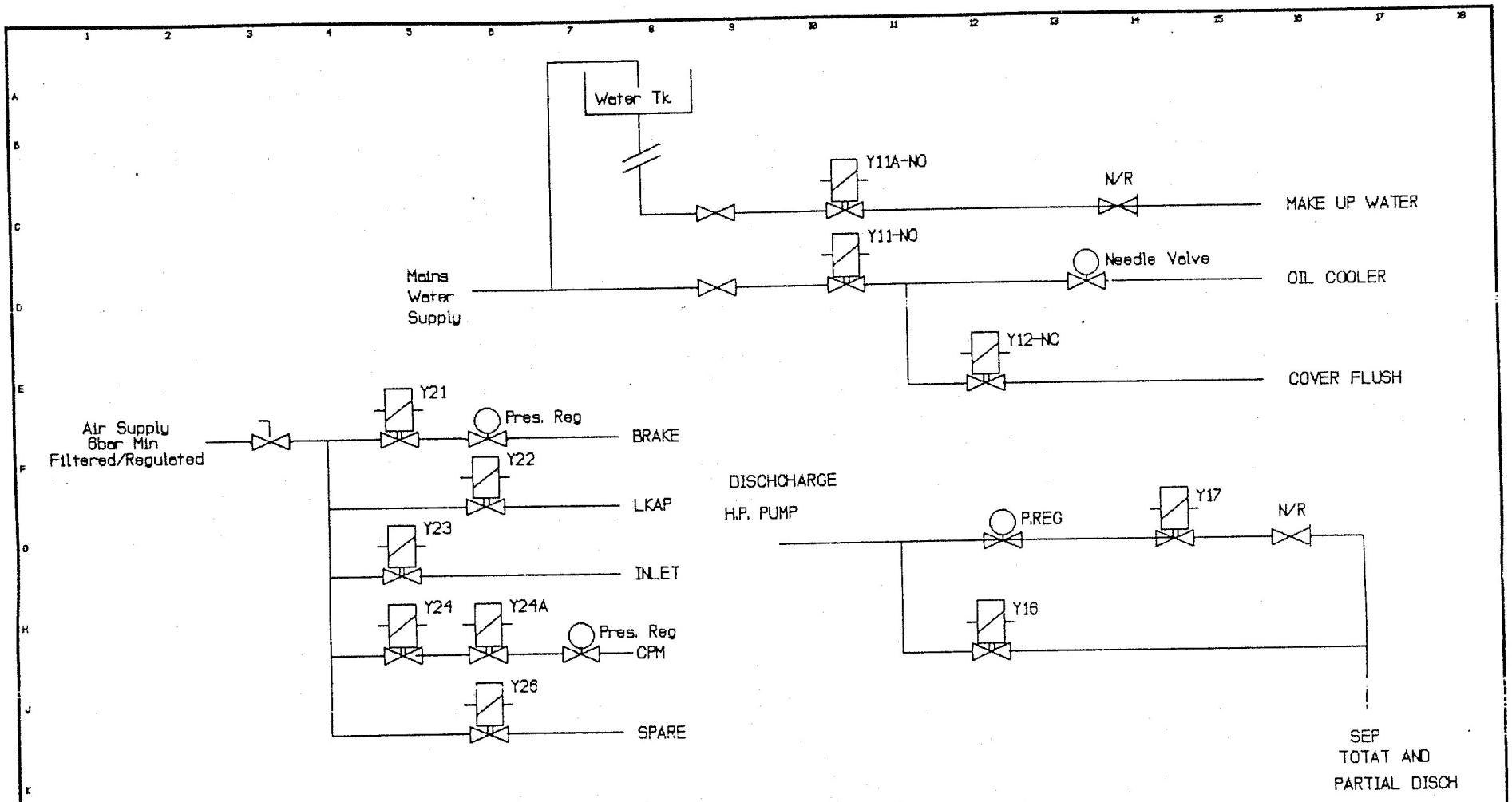
Dept.	Drawn	Date	Filename
AUTO	J.Fitz	26-JUL-93	K7863C11

No. of sheets	Cont on sheet	Sheet no
18	12	11

ALFA-LAVAL
DUBLIN IRELAND

Project No. K7863

Drawing No. -



Rev.No.	Date and Init.

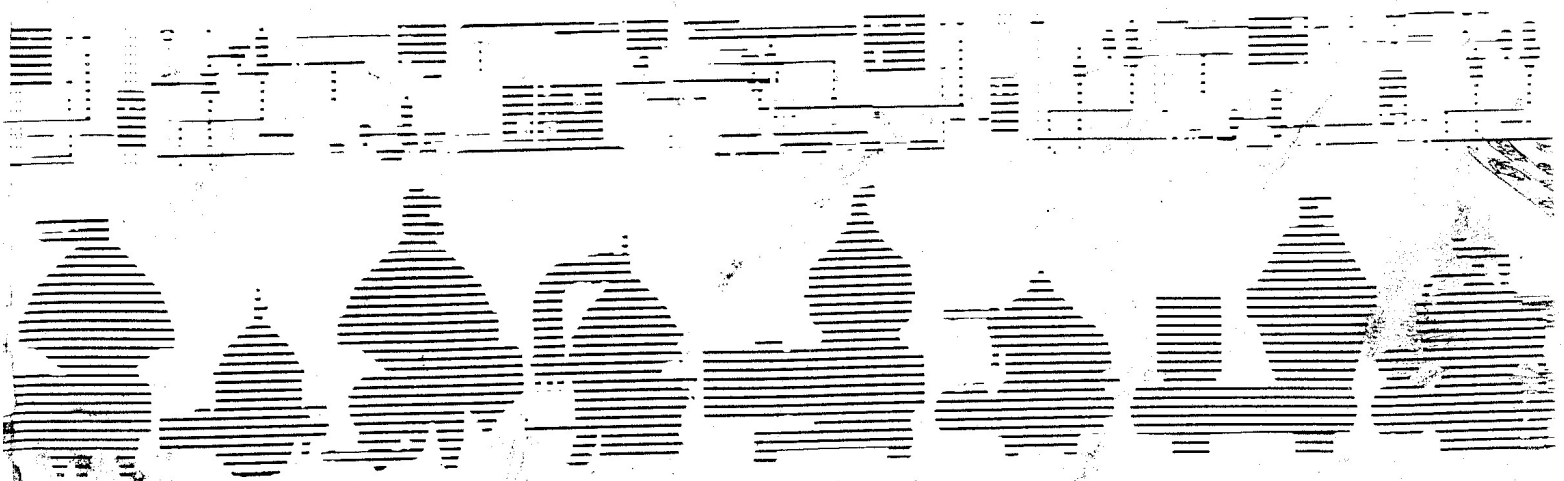
EXPRESS FOODS MACHERALIN

Separator (1 x TGV)

Type of doc. Circuit Drawing

Dept.	Drawn	Date	Filename
AUTO	J.Fitz	26-JUL-93	K7863C12

No. of sheets	ALFA-LAVAL
18	DUBLIN IRELAND
Cont on sheet 13	Project No. K7863
Sheet no 12	Drawing No. -



INSTRUCTION BOOK

Upgrade

SEPARATOR

MRPX 318TGV-44C

Alfa Laval

ALFA-LAVAL

PART 1

PART 2

Parts list
Dismantling
Assembly

S91028 E
(4226-1)

INTRODUCTION

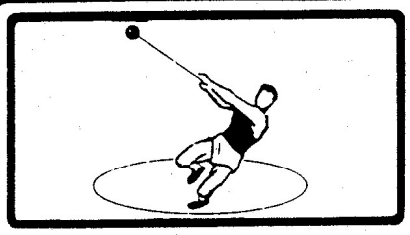
Correct installation, suitable treatment of the liquid before and after processing in the machine, correct servicing and handling of the machine according to the directions given in this book, cleanliness, carefulness and methodical overhaul are essential to achieve best machine functioning and wanted results.

In all centrifugal separators the bowl is running at high speed, and thus great forces are generated. It is necessary, therefore, to study the instruction book carefully and to follow strictly all safety regulations.
Observe that, as a rule, the book contains no safety stipulations which are commanded by special properties of the process liquid, e.g. inflammability, toxicity, corrosiveness.

The instruction book is intended for the machine whose manufacturing number is stamped on the title page of the book. The instructions, which are given under the assumption that no reconstructions or alterations have been made without manufacturer's knowledge, shall not imply any obligations on the part of the manufacturer beyond those stipulated in the delivery agreement.

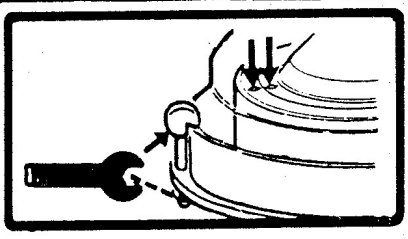
The manufacturer reserves the right to make changes in design or add any improvements on its products without any obligations to provide notice thereof or to install same on units previously delivered by it.

△ SAFETY PRECAUTIONS FOR CENTRIFUGAL SEPARATORS △

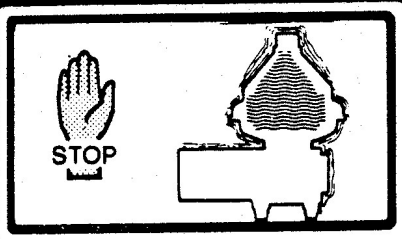


The bowl of a centrifugal separator rotates at a very high speed and great forces are generated.
To ensure your own safety, always carefully follow the instruction book(s) concerning installation, assembly of the components, operation and regular maintenance.
Always use Alfa-Laval spare parts and tools supplied with the machine.

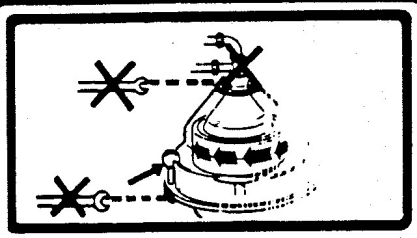
OPERATION



Never start the machine before the lock rings of the bowl inlet, outlet and other fastenings have been securely tightened. Note that the assembly marks Ø (arrowed) must be aligned or pass each other (due to thread wear) when the lock ring is fully tightened.

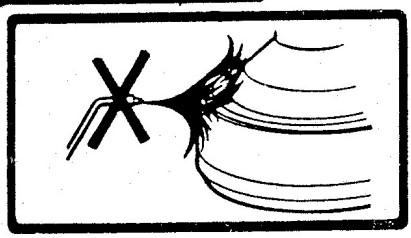


If excessive vibration occurs, IMMEDIATELY fill and keep the bowl full of liquid whilst stopping. Switch off and apply brakes, if fitted. After the bowl has stopped; dismantle, clean and check all parts carefully.



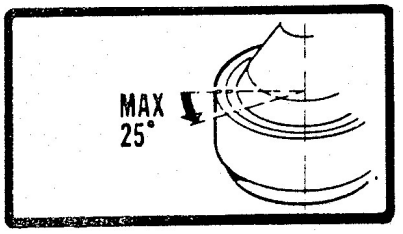
Never loosen any part of the machine until the bowl has completely stopped.

MAINTENANCE

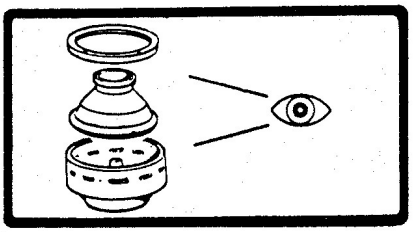


Never heat the bowl body, bowl hood or lock ring with a naked flame.

Never carry out any welding work on the components that rotate.



Never operate the machine when the Ø assembly mark on the lock ring can pass the corresponding mark on bowl body/bowl hood by more than 25 degrees. Consult your AL representative.



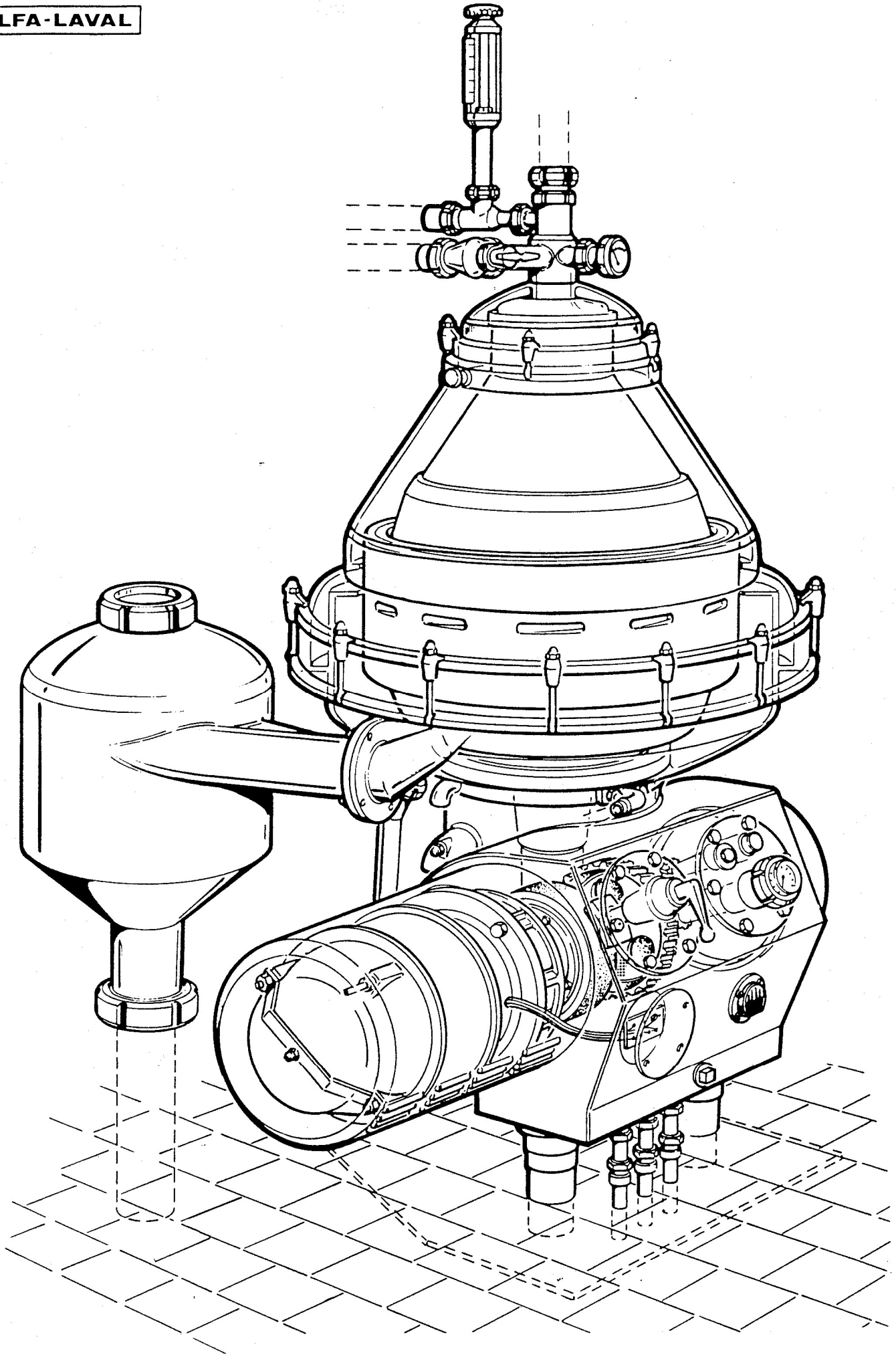
Check at regular intervals for damage due to corrosion and/or erosion. If in doubt, consult your AL representative.

- Switch off and disconnect the power supply to the machine before starting any dismantling work.
- Never use the machine for separating a liquid that is more corrosive or has a higher density, temperature, different characteristics of the solids, etc. than that for which the machine has been purchased.
  In case of doubt, consult your AL representative.
- A separator bowl is balanced as a complete unit. Do not interchange the components of a bowl with those of any other machine, even if it is the same type. Make sure that no parts are left out at assembly.
- Follow the safety instructions concerning inflammable, toxic or corrosive process media and cleaning agents. Affix information and warning notices in prominent places.

S 95300E

ALFA-LAVAL S 147 00 TUMBA SWEDEN

ALFA-LAVAL

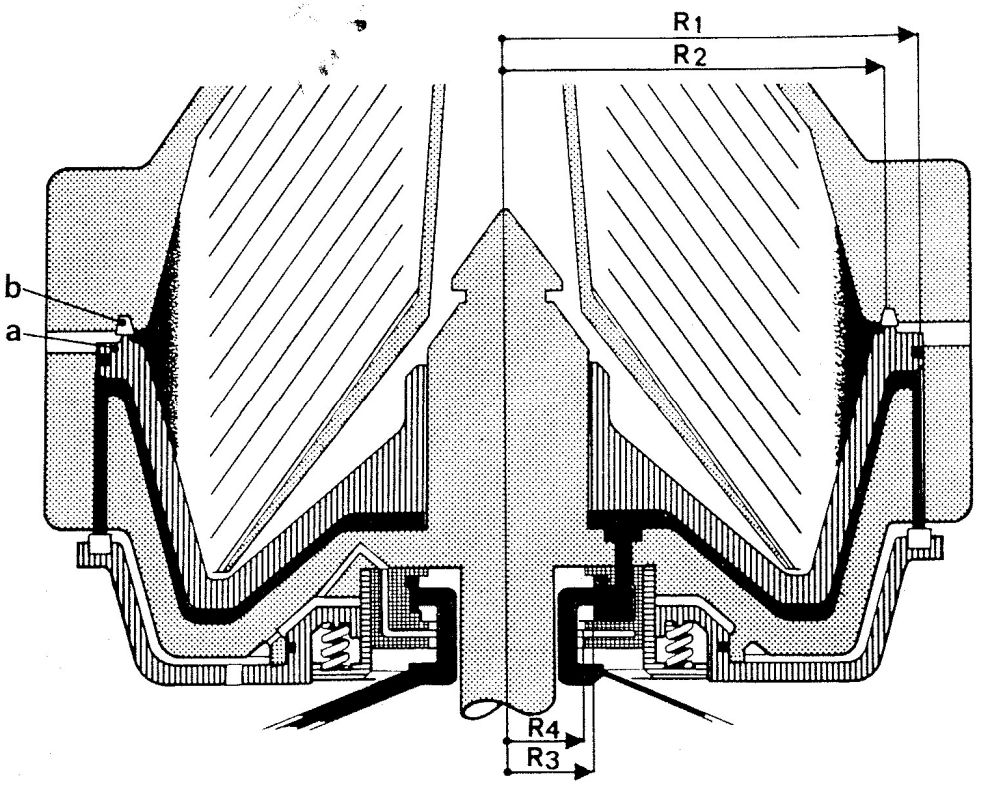


1230948
(4226-1)

GENERAL DEFINITIONS

Throughput	This means the quantity of liquid supplied per unit time. The throughput is given in m^3/h or l/h.
Solids ejection	Emptying of the bowl during operation by uncovering and closing slots in the bowl wall.
Total ejection	Total emptying of the bowl with the feed (as a rule) turned off.
Partial ejection	Total or partial emptying of the solids space in the bowl but without emptying the rest of the bowl. The feed need not be interrupted.
Combined programme	A combination of total and partial ejections in succession.

SLUDGE DISCHARGE



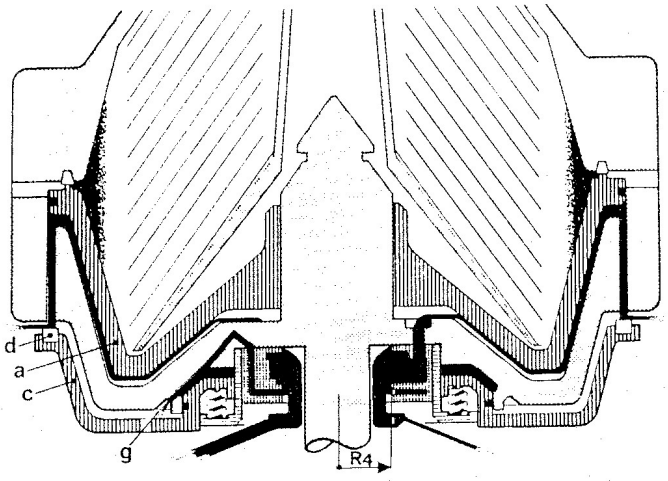
Total or partial discharge

The sludge discharge takes place through a number of sludge ports in the bowl wall. Between discharges theses ports are closed by a large valve slide (a), the sliding bowl bottom, which constitutes an inner, sliding bottom in the separating space. The sliding bowl bottom is forced upwards against a seal ring (b) by the liquid pressure acting on its underside. During rotation, this pressure increases with the distance from the axis of rotation because of the centrifugal force. The operating liquid exerts an upward pressure exceeding the counter-acting downward pressure from the process liquid, because the underside of the sliding bowl bottom has a larger pressure surface (radius R_1) than its upper side (radius R_2).

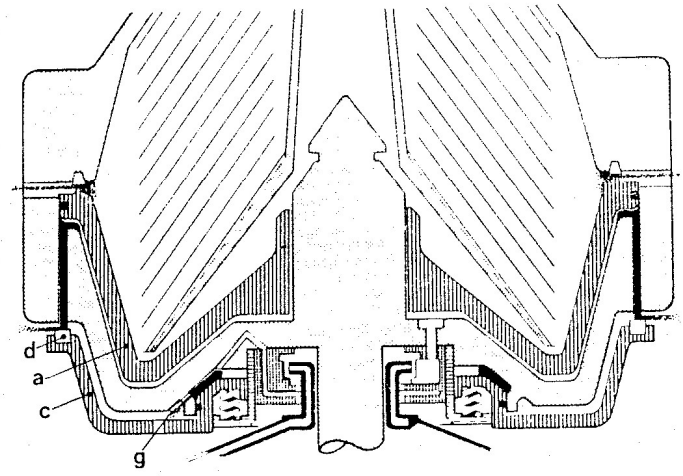
Operating liquid is supplied on the underside of the bowl through a paring disc device. Leakage or evaporation of operating liquid is made up for automatically by the paring disc, which maintains a constant horizontal operating liquid level (radius R3), as its pumping effect neutralizes the static pressure from the supply.

This feed of operating liquid which is of inferior size (low-pressure liquid) is going on also during the discharge cycle shown in the following illustrations but has not been indicated in the latter, as it is of minor effect in this connection.

(Sludge Discharge, page 2)

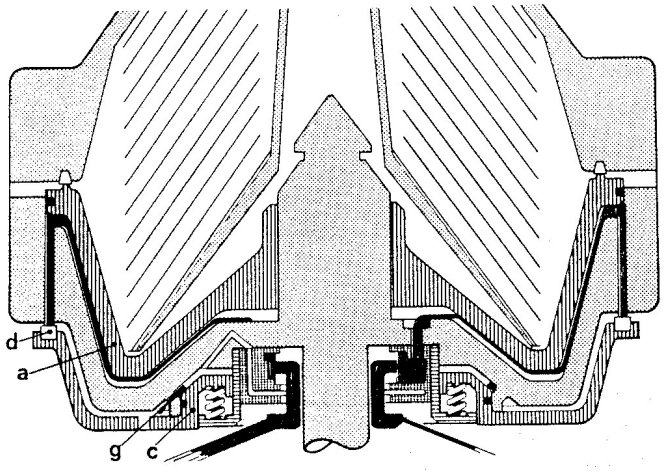


Operating liquid (high-pressure liquid) is now supplied in such quantites that it flows over the lower edge of the paring chamber (radius R4) and continues through a channel out to the space above an operating slide (c). Between discharges the operating slide is pressed upwards by coil springs. It is now forced downwards by the liquid pressure, thereby opening discharge valves (d) from the space below the sliding bowl bottom so that the operating liquid in this space flows out.

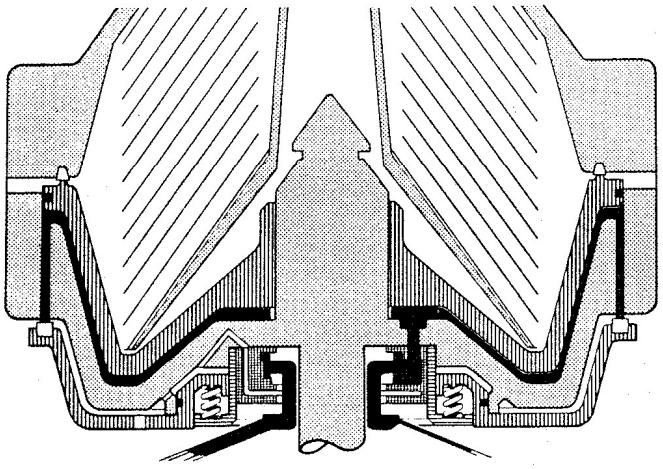


When the pressure exerted by the operating liquid against the underside of the sliding bowl bottom diminishes, the latter is forced downwards and opens so that the sludge is ejected from the bowl through the sludge ports in the bowl wall. The operating liquid on the upper side of the operating slide flows out through a nozzle (g). This nozzle is always open but so small that the outflow is negligible in view of the rapid inflow shown in the foregoing illustration.

(Sludge Discharge, page 3)

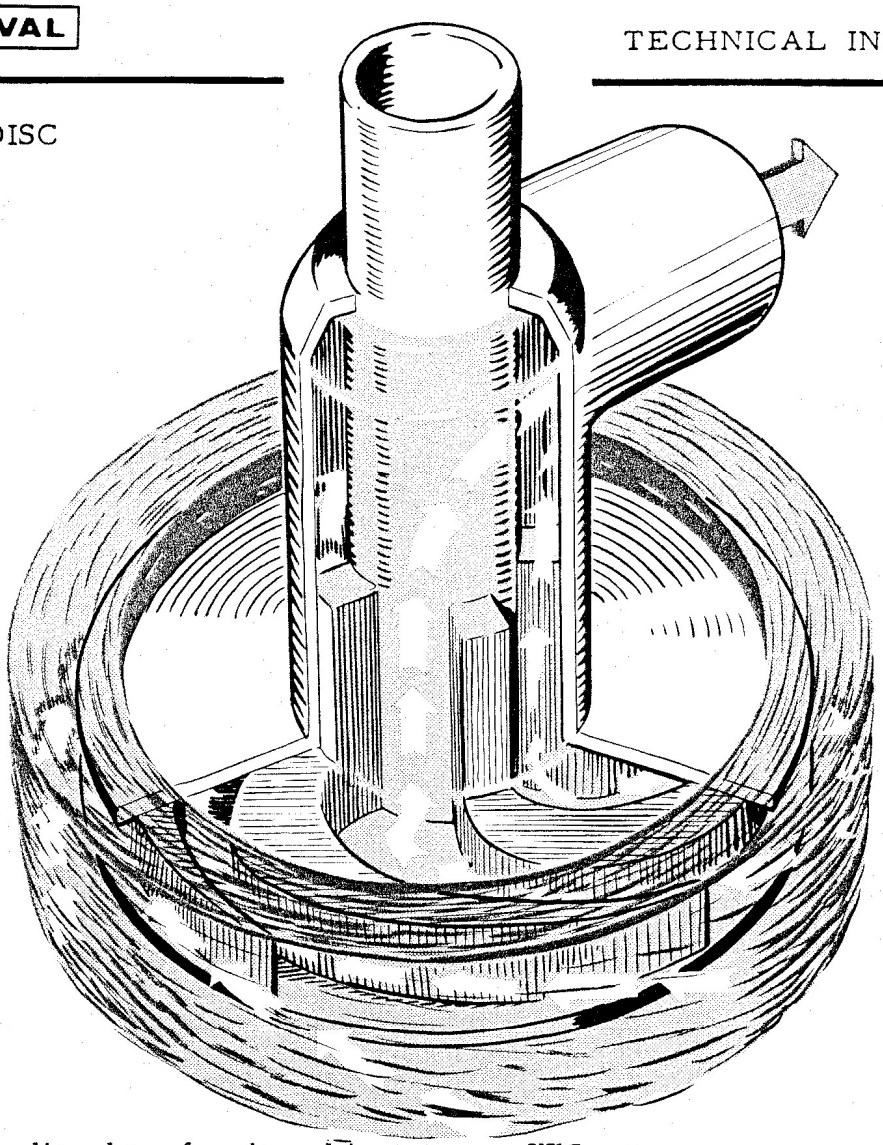


The coil springs force the operating slide (c) upwards again, which closes the discharge valves (d) from the space below the sliding bowl bottom (a). Operating liquid (low-pressure liquid) is supplied, flows to the space below the sliding bowl bottom (a) and forces the latter upwards so that the bowl is closed.



The paring disc device now counter-balances the static pressure from the operating liquid supply. The situation is identical with that shown in the first illustration of the series but for the difference that the sludge discharge cycle is now accomplished.

PARING DISC



The paring disc has for its object to discharge the liquid under pressure.

The liquid rotates, driven by the rotating paring chamber, in the form of a ring around the stationary paring disc. This dips radially, to a greater or smaller depth, into the rotating liquid ring, which exerts a pressure rising rapidly with increasing diameter. The pressure produced by the paring disc is composed partly of the "centrifugal pressure" prevailing at the periphery, partly of the kinetic energy of the rotating liquid ring which is converted more or less completely into pressure energy.

When the throughput is small and there is no back pressure in the discharge line, the inner diameter of the liquid ring will practically equal the outer diameter of the paring disc. If the liquid must overcome a back pressure, such as a high delivery head or pressure-absorbing apparatuses, the diameter of the liquid ring in the paring chamber will diminish until the back pressure is neutralized. Thus the paring disc will pump out all liquid fed to the paring chamber (nothwithstanding the back pressure) up to the highest pressure the paring disc can produce at this liquid quantity.

DATA

Supplementary particulars (such as weight data) are contained in the technical information supplied in connection with the purchase of the machine.

Abbreviations

h = hour

r.p.m. = revolutions per minute

c/s = Hz = cycles per second

Ø = diameter

SAE-class = indication of oil viscosity according to Society of Automotive Engineers, USA

SSU = Saybolt Seconds Universal: indication of oil viscosity

^{o}E = degree Engler: indication of oil viscosity

EP = Extreme Pressure: lubricants made capable of resisting high contact pressures through admixture of additives.

ASTM = American Society for Testing Materials.

NLGI-classes = classification of lubricating grease by means of penetration after processing according to National Lubricating Grease Institute, USA.

ISO = standards of processing according to International Organization for Standardizing.

POWER REQUIREMENT

Suitable motor power: 30 kW (40 HP);
OBS. Special motor required.
Starting current: approx. 1.5 times the rated current.
Working power (= motor output) at rated throughput: approx. 25 kW.

SPEED

The prescribed speed of the worm wheel shaft, which must be strictly maintained, is stamped on the type plate of the machine.
The speed table refers to r.p.m.

WORM WHEEL SHAFT	1420-1500	1700-1800
Drive (motor)	1420-1500	1700-1800
Tachometer	1420-1500	1700-1800
Revolution counter	118-125	142-150

RUN-UP TIME (Time relay setting)

Approx. 15 minutes.

BRAKING TIME

Approx. 21 minutes.

WORM GEAR OIL

For oil type and quantity see chapter H.

RATED THROUGHPUT

For whey separation: 20-25 m^3/h.

BACK PRESSURE (at rated throughput)

Suitable pressure (in whey outlet): 4.5 - 5 bar.
Overflow pressure: approx. 5.5 bar.

INTERVAL between SOLIDS EJECTIONS

For whey separation: approx. 15 minutes.

CREAM FLOW METER

Approximate flow through the flow meter at the various graduations — see Flow meter, chapter X.

OPERATING LIQUID

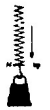
Operating liquid system and pressure — see chapter G.

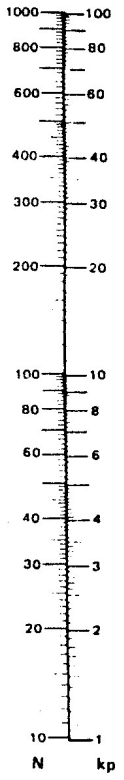
COOLING COIL for OIL BATH

Water quantity and temperature — see chapter G.

1 bar = 1.02 kg/cm^2; 14.5 psi

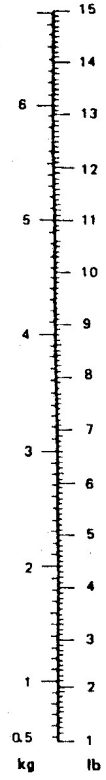
Force





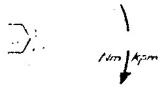
1 N = 0.102 kp

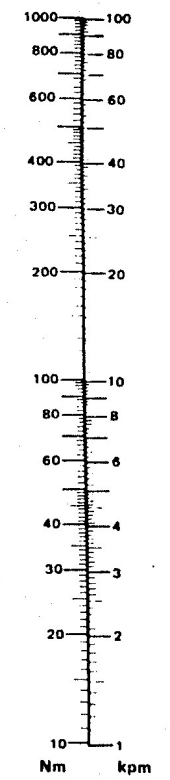
Mass



1 kg = 2.205 lb

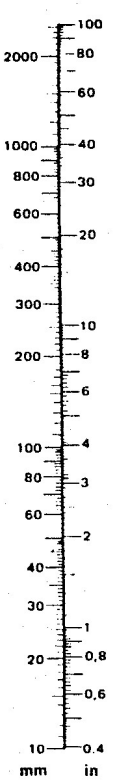
Moment of Force





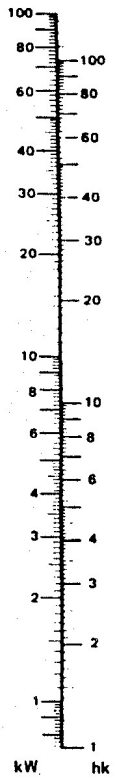
1 Nm = 0.102 kpm

Length



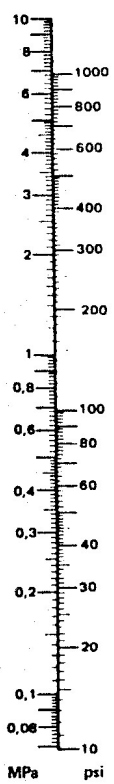
1 mm = 0.03937 in

Power



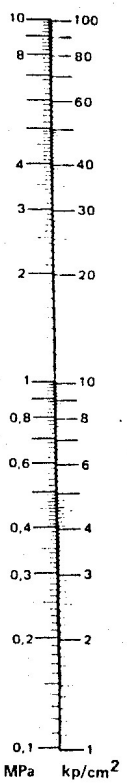
1 kW = 1.36 hk

Pressure



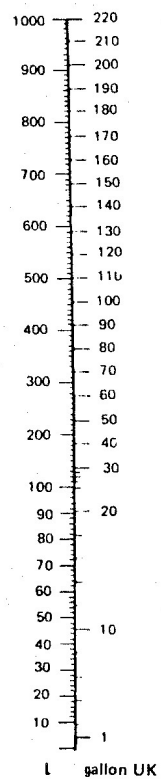
1 MPa = 145 psi

Pressure



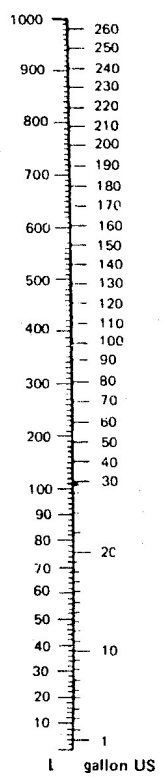
1 MPa = 10.20 kp/cm^2

Volume



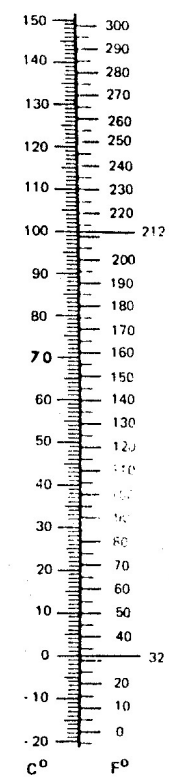
1 l = 0.220 gallon UK

Volume



1 l = 0.264 gallon US

Temperature



$^{o}C = 5/9 (^{o}F - 32)$

1231152-2

INSTALLATION

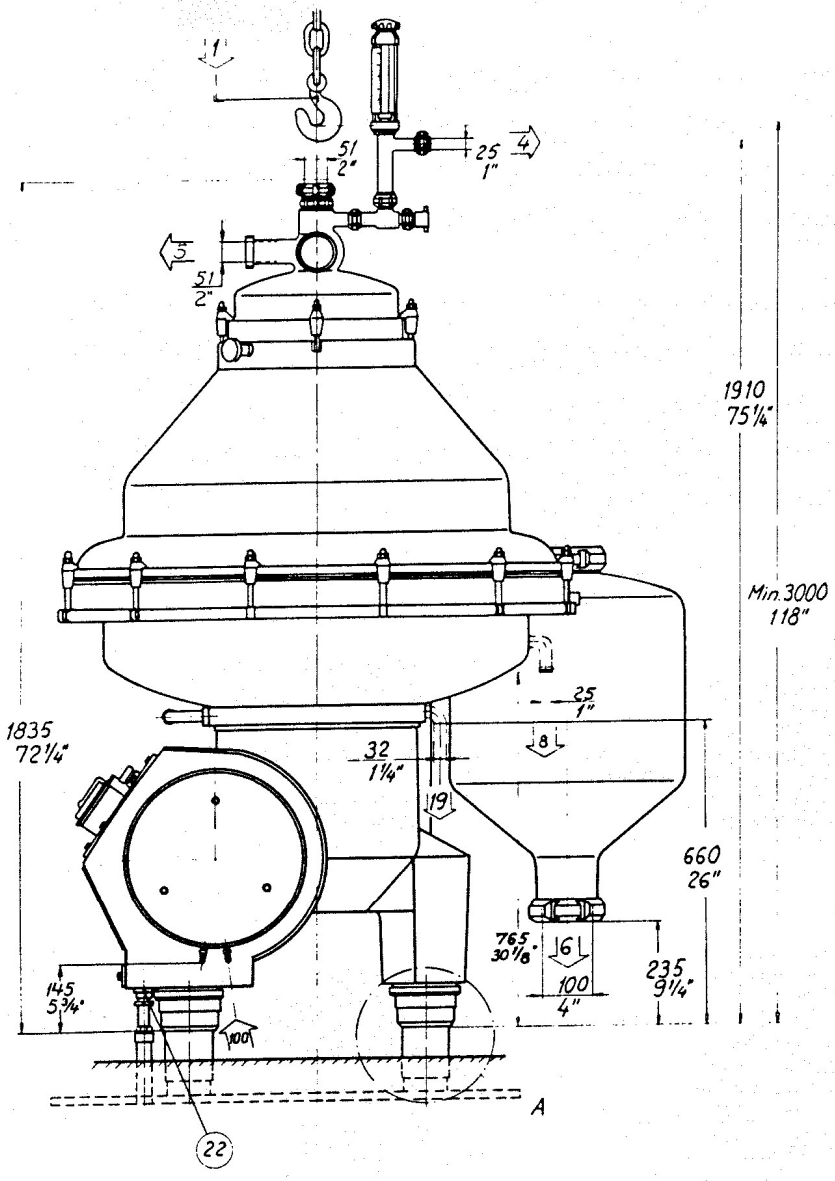
This chapter deals with the mounting of the machine and with the actions to be taken before the first start. The ALFA-LAVAL representative is always glad to provide further advice and information.

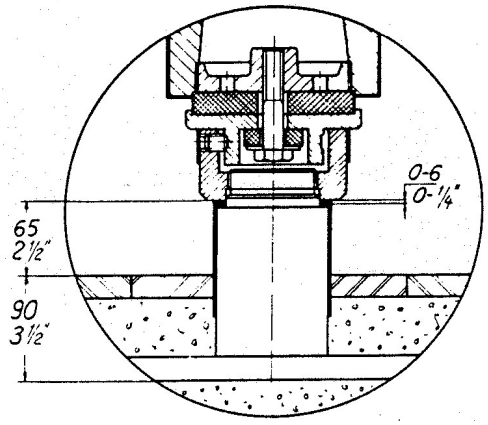
DIMENSIONED DRAWING

All measurements needed for the installation are given in the dimensioned drawing, the reference numbers of which are explained below. (The table applies to several types of separator and thus comprises more reference numbers than are found in the drawing.)

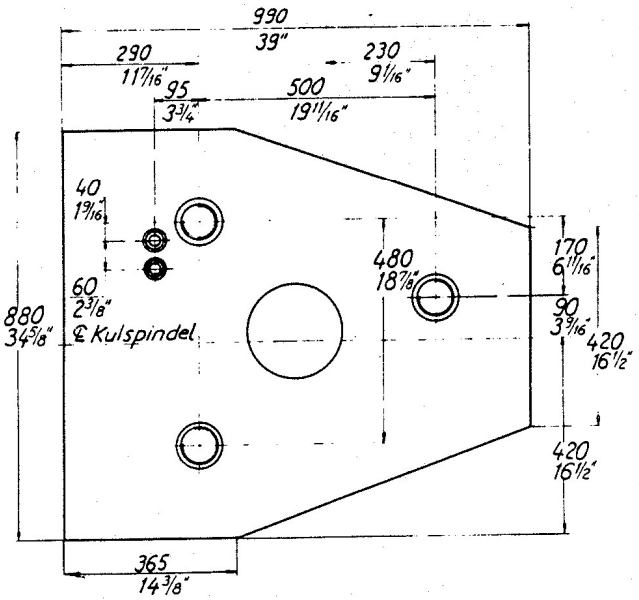
1 Feed
2 From heater
3 To heater
4 Light effluent
5 Heavy effluent
6 Solid effluent
7 Overflow liquid
8 Drain
9 Auxiliary liquid for liquid seal
10 Auxiliary liquid for liquid seal
11 Auxiliary liquid
12 Flushing liquid
13 Self-emptying
14 Air or other gas (except steam)
15 Operating liquid
16 Operating liquid
17 Cooling air
18 Cooling air
19 Ventilation
20 Ventilation
21 Return flow
22 Electric connection
23 Effluent
24 Raw material
25 Treated raw material
26 Steam
27 Waste liquid
28 Flushing liquid
29 Reagent
30 Flushing liquid
31 Barrier liquid
32 Barrier liquid
33 Barrier liquid
34 Barrier liquid
35 Waste liquid
36 Ventilation
37 Air or other gas (except steam)
38 Water feed
39 Outlet for bowl emptying
40 Inlet
41 Outlet
42 Concentrate
43 Operating liquid
44 Ventilation
45 Air or other gas (except steam)
46 Waste liquid
47 Constant pressure valve
48 Flow meter
49 Shut-off valve
50 Control valve
51 Flow indicator
52 Sight glass
53 Electric connection
54 Brake handle
55 Revolution counter
56 Oil filling screw
57 Oil gauge glass
58 Oil drain screw
59 Waste liquid
60 Shut-off valve
61 Feed pump
62 Strainer
63 Light liquid feed
64 Heavy liquid feed
65 Light effluent
66 Heavy effluent
67 Barrier liquid
68 Air or other gas (except steam)
69 Protective gas
70 Protective gas
71 Electric connection
72 Cream
73 Thermometer
74 Strainer
75 Steam preheater
76 Operating water tank
77 Sludge tank
78 Sludge pump
79 Softening filter
80 Condensation water
81 Interface control
82 Pump for feed and discharge
83 Discharge pump
84 Three-way valve
85 Plate heat exchanger
86 Skimmilk
87 Whey
88 Bowl emptying
89 Draw-off
90 Nozzle flow
91 Flow-control valve
92 Flushing liquid
93 Barrier liquid
94 Check valve
95 Pressure regulator
96 Pressure gauge
97 Fixed throttling
98 Pilot liquid
99 Indicator gas
100 Cooling liquid
101 Compressed air
102 Vibration switch
103 Oil level switch
104 Protective gas
105 Protective gas

ALFA-LAVAL





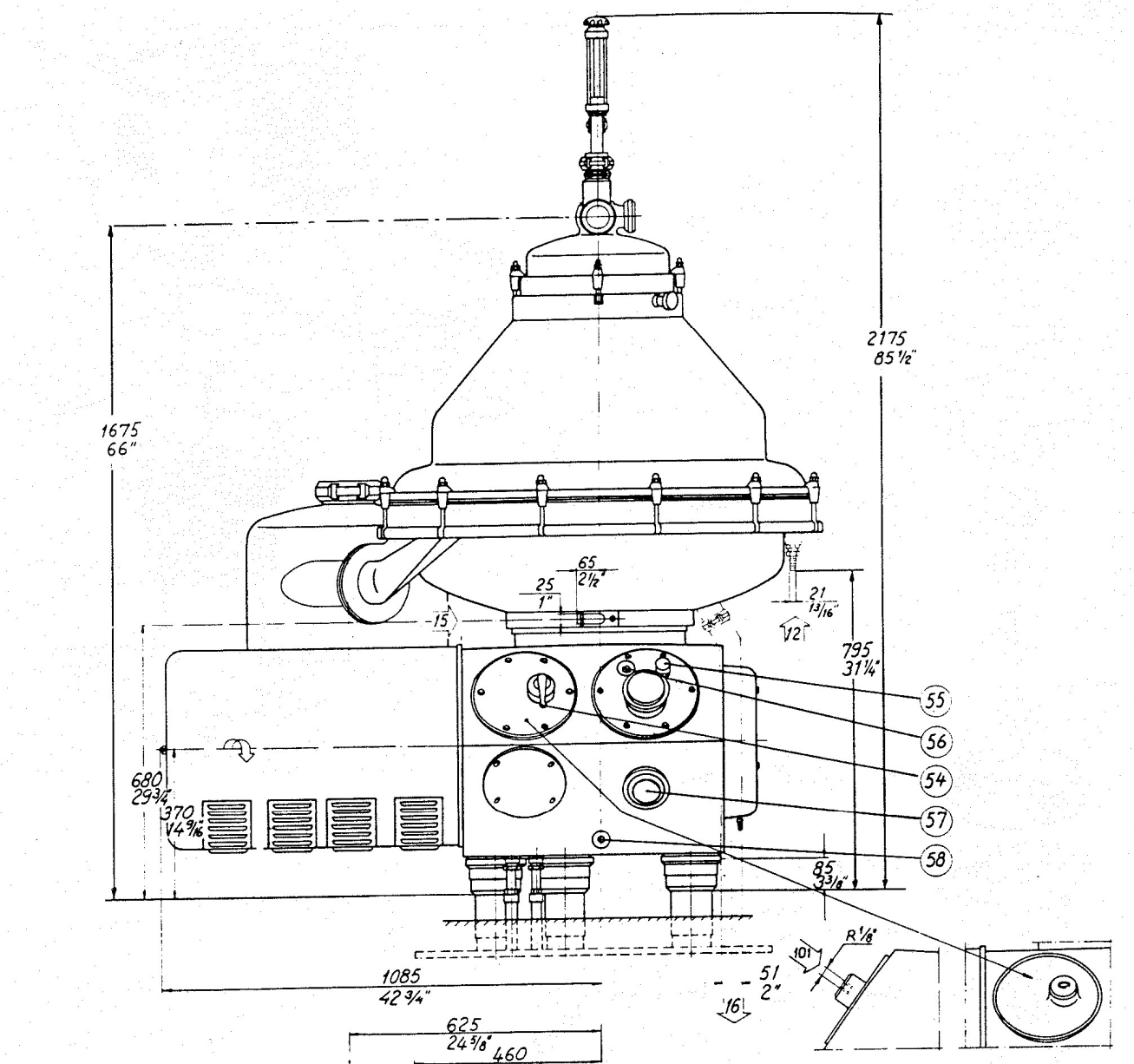
A
Skala 1:2

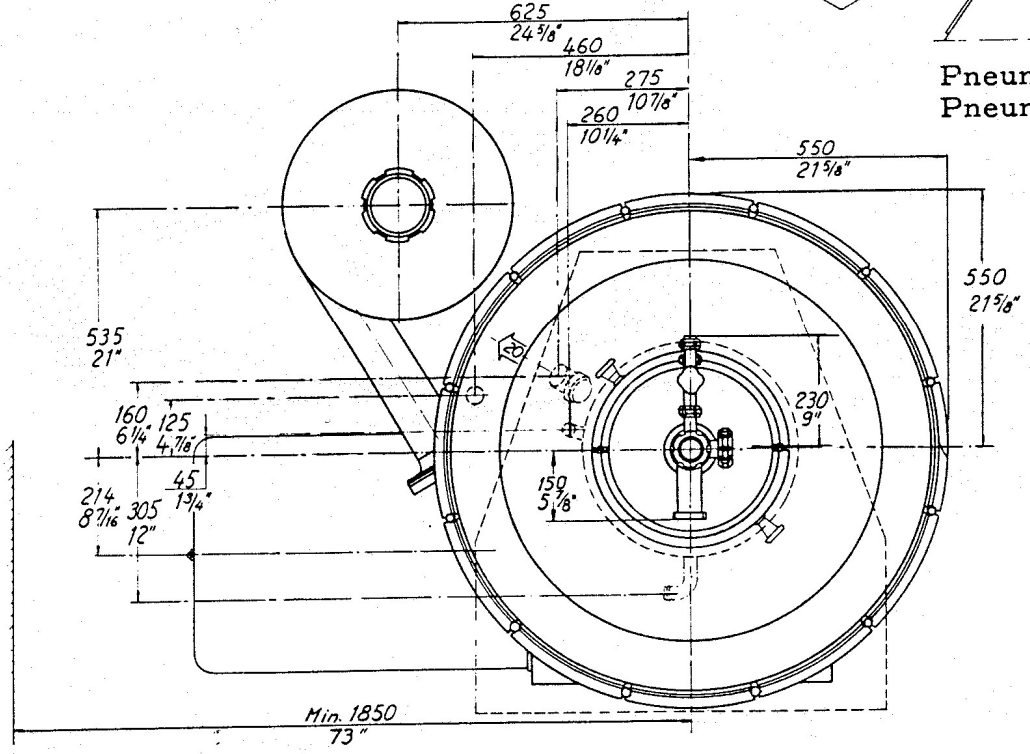


530148 (v.sid)
(9.11.71)

ALFA-LAVAL

G

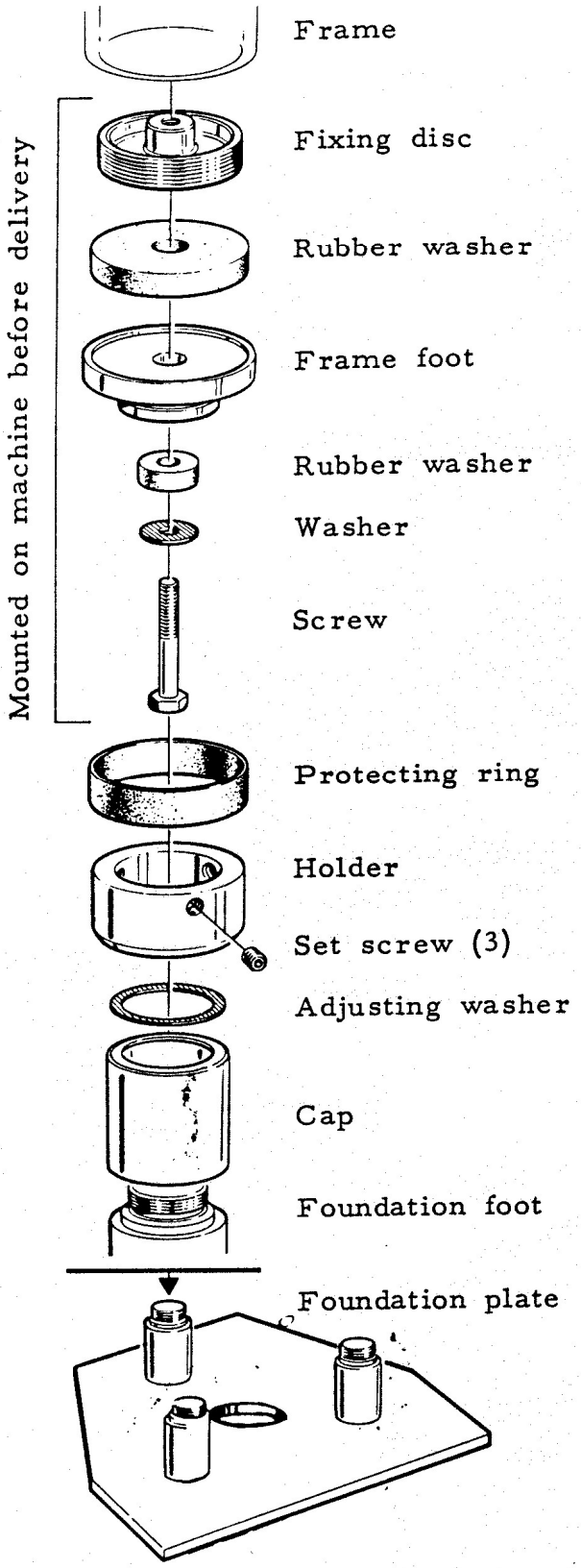


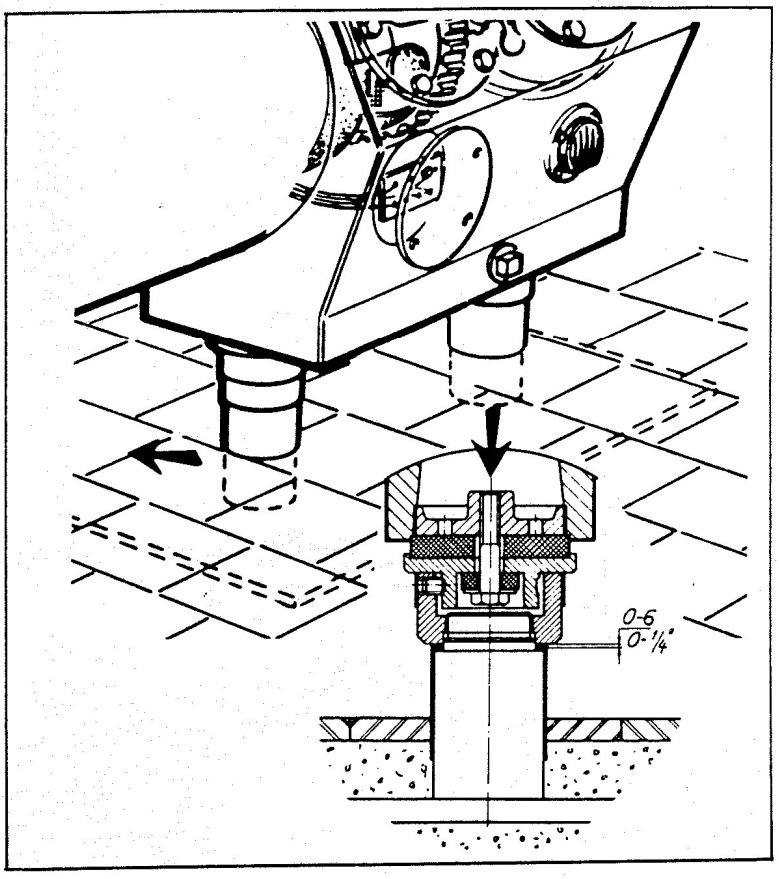


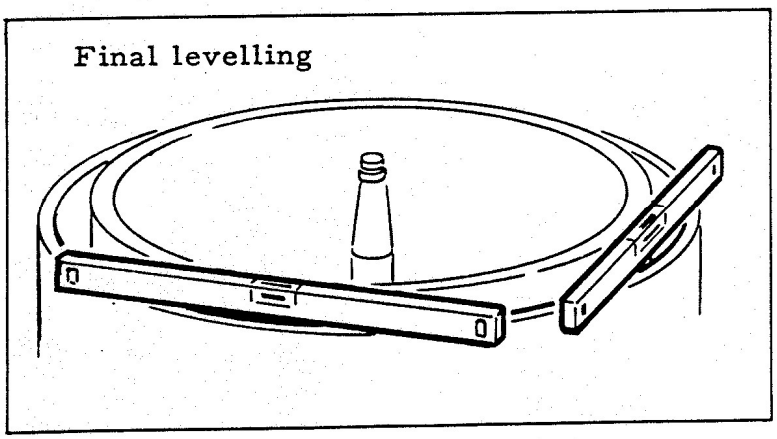
Pneumatic brake
Pneumatisk broms

530148 (h. sid)

VIBRATION DAMPER (3) and FOUNDATION PLATE







UNPACKING

When unpacking take care not to scratch metallic or painted surfaces.
Check by means of the packing list that all parts have been unpacked.

FOUNDATION

This must be plane, solid and vibrationless. The measurement to the nearest wall must not be smaller than the minimum stated in the dimensioned drawing. Make sure that pipes, pumps and other apparatuses are installed so as to be easily accessible for inspection.

FOUNDATION PLATE

The foundation plate of the machine must be embedded in a level and solid base. For measurements see dimensioned drawing.

Slip the caps over the foundation feet before embedding the plate in the base. Level out the plate properly.

ERECTION

Check that frame feet and rubber washers are attached to the frame. If they are loose, tighten the screws firmly, but not so much that the elasticity of the rubber washers is neutralized.
Lubricate the thread of the foundation feet. Screw down the holders until they rest rigidly against the foundation feet. Slip the protecting rings over the holders. Lift the frame, fit the frame feet carefully into the holders and lower the frame. Check the levelness of the frame by means of a spirit level placed on the outer frame rim. If the latter is horizontal, tighten the set screws of the holders and push up the protecting rings over the holders.
If the frame is not horizontal, lift it a trifle so that the holders can be screwed so as to compensate for the inclination. There will now be a gap between holder and frame foot, which must be filled with one or more washers, the frame must be lifted again and the holders unscrewed.

LUBRICATION

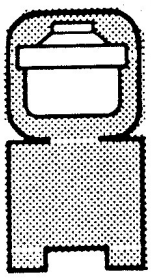
Pour oil into worm gear housing – see chapter H.

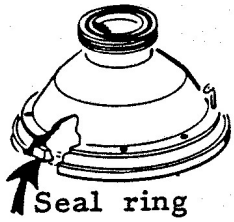
INLET. BOWL OUTLET

See chapter I.

The bowl is assembled but not mounted when delivered. It will be necessary to dismantle the bowl and to check, lubricate and reassemble it in the machine.

Make sure the O-rings are fitted (in some cases they are packed separately in the pack box).





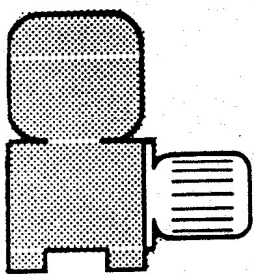
Place bowl parts on a soft base, such as wood or rubber. Be special careful of the seal ring in the lower edge of the bowl hood.

HEIGHT ADJUSTMENT

Check as described in chapter L.

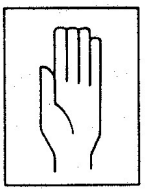
MOTOR MOUNTING

See chapter R.



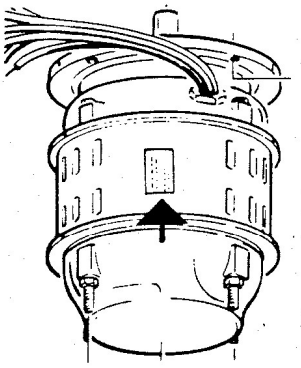
CONNECTION TO MAINS

Connect the motor to mains so that the bowl will rotate CLOCKWISE. For machine with fixed coupling – see special wiring diagram.

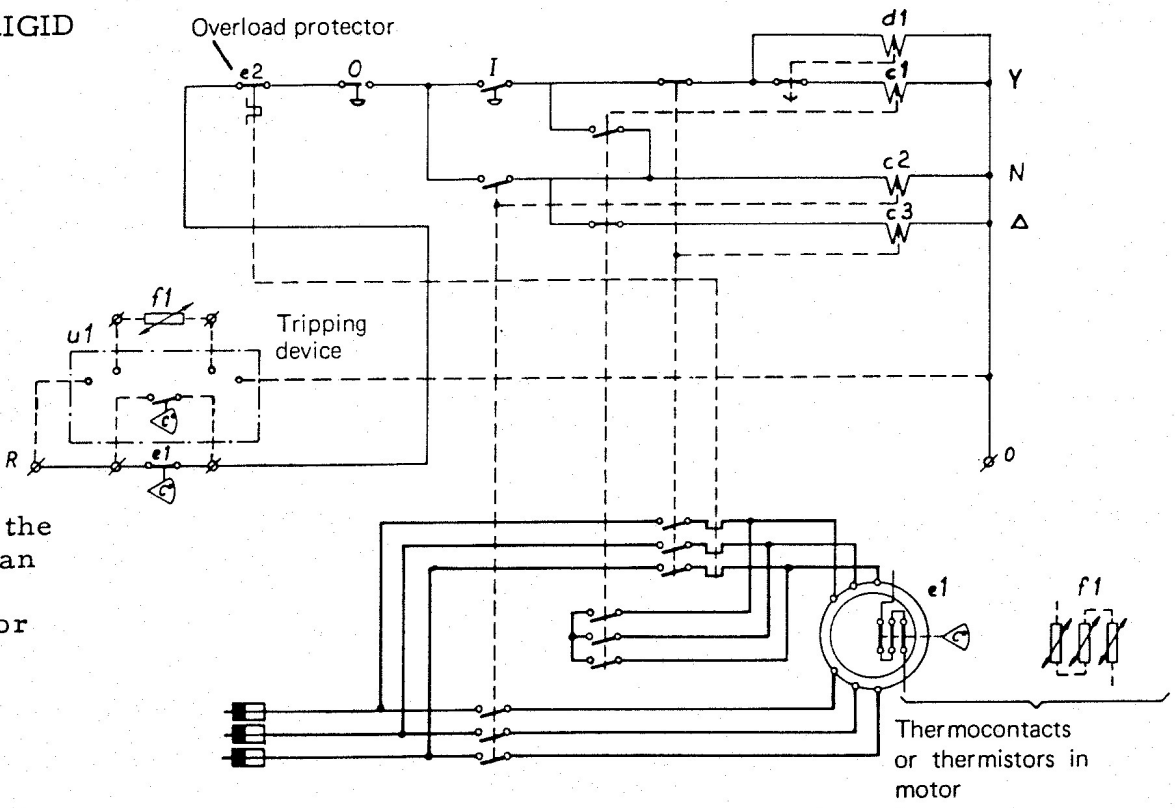


The machine must never be started unless the bowl is placed on the spindle and the worm gear housing contains lubricating oil in the precribed quantity and of the proper quality. If the machine is to be run up to full speed the covers must, besides, be fastened.

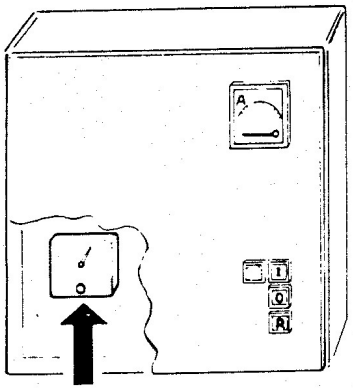
MACHINE with RIGID COUPLING (control-torque)



It appears from the rating plate (or an additional plate) whether the motor is provided with thermistors.



The machine has rigid coupling and is, therefore, equipped with a special motor provided with built-in thermocontacts (e 1) or thermistors (f 1), which are to be connected to the control circuit of the starter according to the above diagram. When thermistors are provided, they must be combined with a special tripping device (u 1). If connected in the same way as the thermocontacts, the thermistors will burn out.



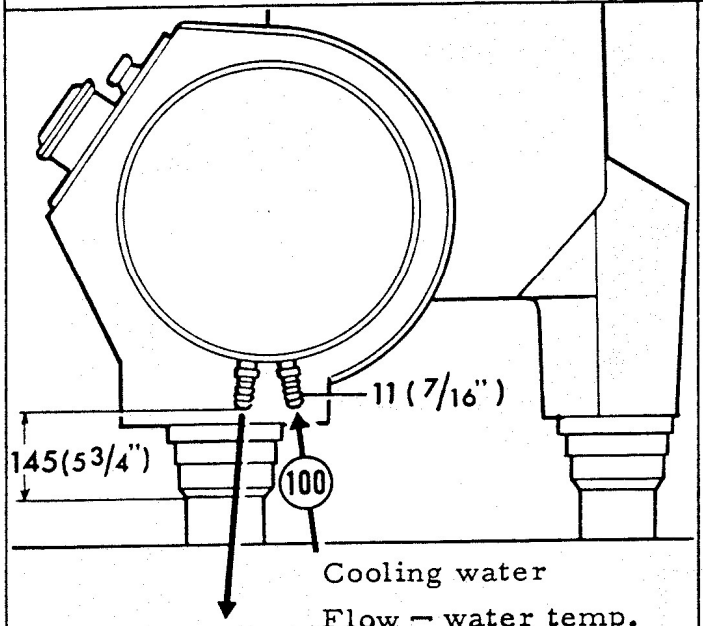
The motor must not be started direct but via an Y/D starter and should be Y-connected throughout the running-up time.

The time relay in the starter (for changing over from Y to D) should be set in the first place to the value stated in chapter C. In case of voltage variations (running-up time changes) it may become necessary to reset the time relay.

The overload protector in the starter is connected to the D-circuit. During running-up (with motor Y-connected) the protector is non-operative.

☆ Due to the great heat generation during running-up the thermal protectors will normally cut out the current when more than two subsequent (and accomplished) starts are performed. Prior to a third start the motor should, therefore, be left to rest for an hour.

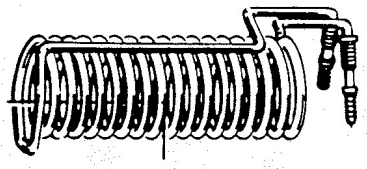
COOLING COIL for LUBRICATING OIL BATH



Cooling water

Flow – water temp.
(approximate values):

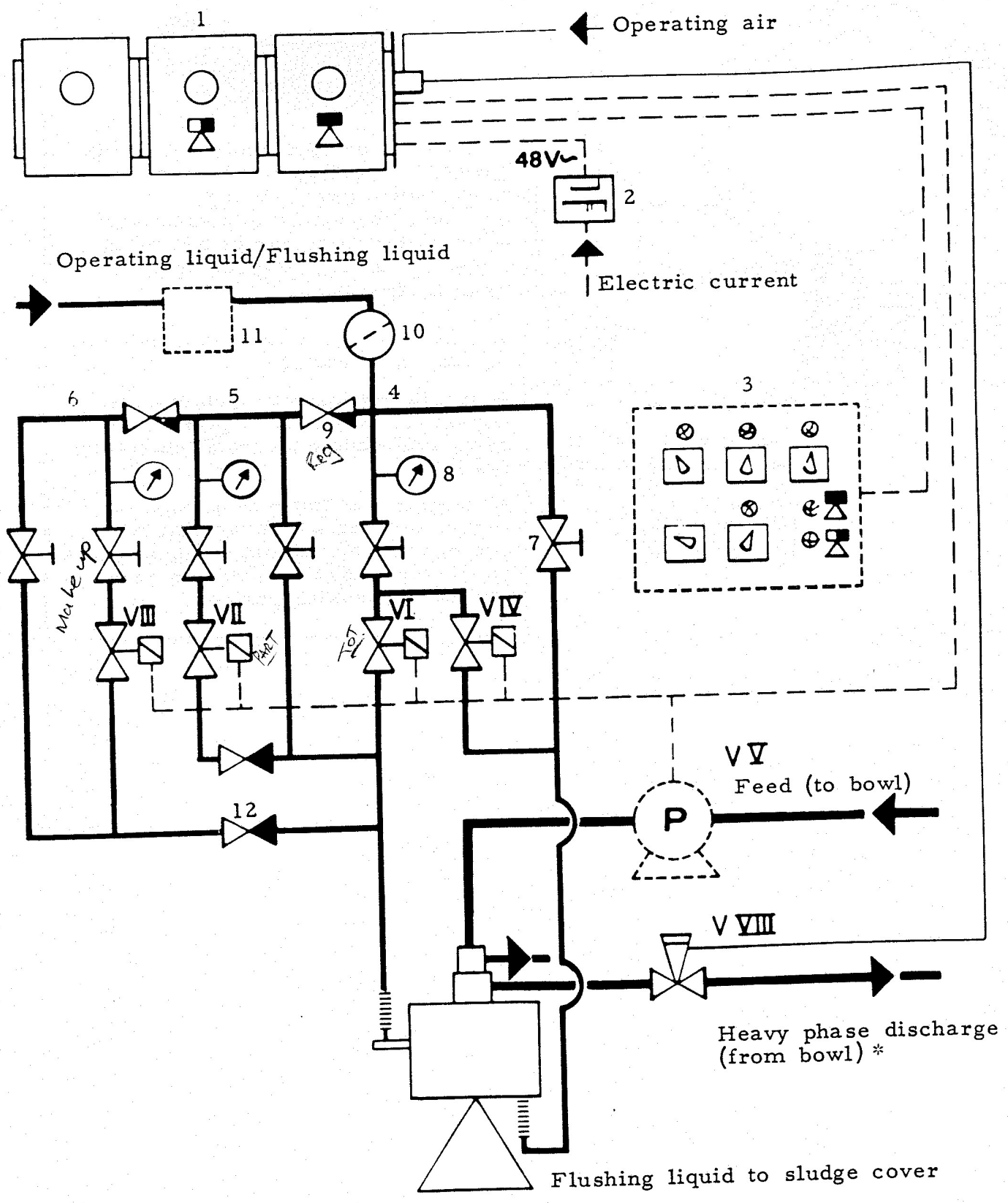
80 l/h at 10°C,
100 l/h at 20°C,
150 l/h at 30°C.



In order to bring down the oil temperature , a cooling coil is installed in the worm gear housing.
The distribution arrangement for the cooling water can be solved in a number of ways depending on the existing facilities.

- The feed flow should be measured on the outlet portion.
- If a throttling arrangement is necessary to maintain given feed data, that should be installed before the inlet.
- Ensure that there is an apparent flow of cooling water through the cooling coil by making frequent checks on the outlet during both the running-up and processing periods.

FLOW CHART; programmed operation



*) In MRPX 418SGV-34C (for bactofugation) = treated liquid

(Flow chart, page 2)

For parts incorporated in the discharge programme equipment (control equipment) see supplementary instruction book. Observe that this equipment may differ from the disclosure of the diagram.

A general programme for the discharges during separation as well as for those during cleaning appears from chapter K.

Legend

1 Timing unit (control unit). To be placed in electric centre or other suitable place.

2 Transformer

3 Switches, signal lamps etc. mounted in a panel near the machine (for remote control).

4* Opening liquid — total discharge. Flushing liquid to sludge cover. Pressure: approx. 2.6 bar; 37 psi (= the pressure indicated by the pressure gauge during the opening time of the solenoid valve item V I).

5* Opening and closing liquid — partial discharge. Pressure: approx. 1.8 bar; 26 psi (= the pressure indicated by the pressure gauge during the opening time of the solenoid valve item V II). This gives a discharge quantity of 15-20 lit (3.3 — 4.4 UK gal).

Note The size of the liquid flow and thus the degree of partial discharge can be regulated by means of the pressure regulator item 9.

6 Make-up liquid during operation. Closing liquid when starting and after a total discharge. Pressure: 0.15—0.25 bar; 2.2-3.6 psi.

7 Manual valve (shut-off valve, by-pass valve).

8 Pressure gauge

9 Pressure regulator

10 Strainer (filter)

11 Dehardening filter; not necessary when clean and soft water is used as operating liquid — see also below

12 Non-return valve (check valve)

V I up to and including V IV = Solenoid valves

V V Feed pump

V VIII Pneumatic valve. For suitable liquid and air pressure see instructions for the valve in question.

* Liquid consumption during a total scharge: opening liquid approx. 1.3 lit/sec. (0.28 UK gal/sec.) for about 4 seconds.

Consumption during a partial discharge: opening and closing liquid approx. 1.1 lit/sec. (0.24 UK gal/sec.) for about 1.5 second; flushing liquid to sludge cover approx 1.5 lit/sec. (0.33 UK gal/sec.) for about 25 seconds.

1 bar = 1.02 kg/cm^2; 14.5 psi

(Flow chart ..., page 3)

Operating liquid system

This system should be placed near the machine (preferably in a box of stainless material) in order to avoid pressure losses and to facilitate any adjustment of the pressure. If the system is placed elsewhere remember to check that the pressures have the prescribed values near the machine.
Install the pipe for opening liquid – total discharge (V I) – so that it is in straight connection with the inlet pipe on the machine. A straight pipe gives a more distinct discharge. Place the by-pass valves, which are intended for use in an emergency, e.g. when the automatic system is out of operation, so that they are readily accessible.

Operating liquid

Clean, soft water can be used as operating liquid. Hard water involves a risk of lime deposits which can obstruct the channels in the operating liquid system with operation trouble as a result.

The demands upon the softness of the water increase with rising operation temperature, since lime is easier precipitated at higher temperatures.

Lime deposition can be prevented by adding a desoftening agent or by providing a dehardening filter in the operating liquid line.

REMOTE SPEED INDICATION

See chapter T.

PIPINGS

Fit the pipes and hoses so that the inlet and outlet connections of the machine are not subjected to strain. Tightweld (hard-solder) internal pipe ends in connection sleeves so as to avoid dirtcollecting pockets. This is particularly important in plants on which high hygienic demands are made, such as in food industry.
Grind and polish all welding seams (hard-solderings) carefully.
All attachements should be made so as to allow variations in length and to prevent transmission of strains and vibrations.
Blow or flush out each section of the piping after mounting. Also flush out the whole pipe system after installation so that metallic ashes and other impurities are removed entirely and cannot get into the machine, pumps or other apparatuses.

CHECKING

Examine the installation before putting the machine into service. Check particularly:
o That the worm wheel shaft rotates at prescribed speed and that the bowl rotates clockwise
o That the directions given under the heading BEFORE STARTING in chapter K have been observed.

CLEANING PLACE

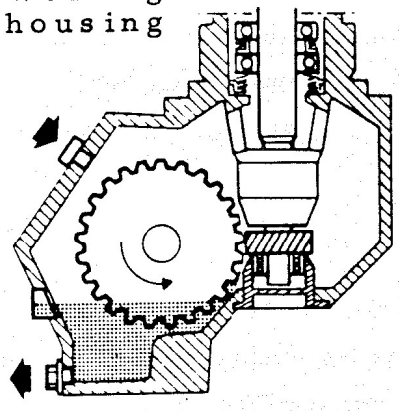
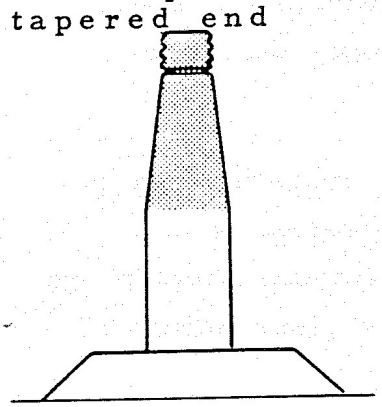
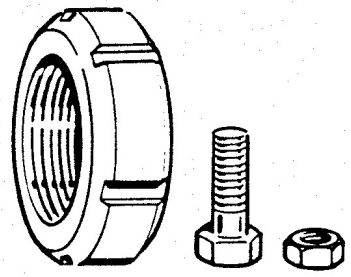
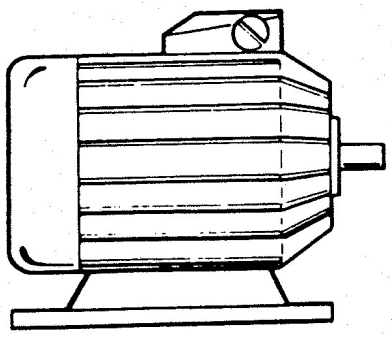
A table, a stand or the like affording sufficient place for the bowl and the special tools for the latter should be provided, preferably in the immediate proximity of the machine.

LUBRICATION

It should be understood that the mentioning of certain brands as examples of a suitable lubricant does not involve an exclusion of other brands with equivalent properties.

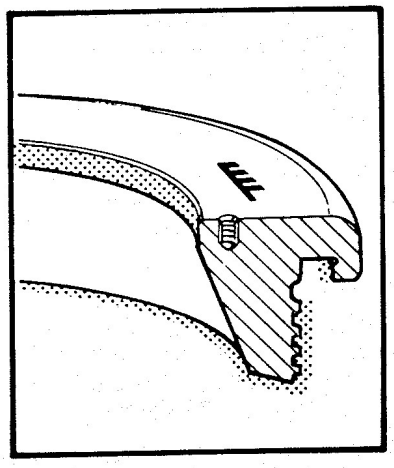
The machine is delivered without oil in the worm gear housing. It must NOT be started unless oil in the quantity and of the quality prescribed has been supplied. A change of the separating temperature can make it necessary to replace the oil by oil of a different type.

Lubricants, oil as well as grease, must be kept in clean, closed cans to prevent penetration of dust and moisture and to reduce the oxidizing effect of the air as far as possible. The storing place should be dry and cool.

LUBRICATION POINT	LUBRICANT	WHEN
Worm gear housing 	At separation temp. ± 0 to 100°C; ambient temp. minimum +5°C. SYNTHETIC OIL of POLYGLYCOL TYPE. Quality requirements — see LUBRICANTS in this chapter. OIL QUANTITY: approx. 13 lit.	Filling before first starting. First oil exchange after 300 hours´ operation, then after every period of 1500 hours´ operation. In seasonal operation before every operating period. Cleaning before exchange. Oil level in upper half of gauge glass.
Bowl spindle tapered end 	Oil Grease	Always before putting the bowl body on the spindle. Apply sparsely to avoid slipping but sufficiently to avoid seizing (lubricate the tapered end and wipe with a clean cloth).
Other machine parts 	Molybdenum disulfide grease or equivalent.	Before every mounting.
Motor 	Follow motor supplier´s recommendations.	Follow motor supplier´s recommendations.

Bowl

Before every assembly wipe clean the threads of lock rings, bowl body and bowl hood as well as the contact surfaces between these parts. If necessary, they should be cleaned with a clean cloth moistened with cleaning agent (see chapter L). After wiping, lubricate them according to one of the alternatives below.

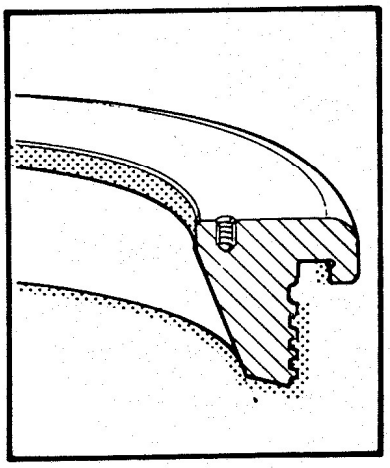


Alternative 1

When the bowl lock ring is made of stainless steel or monel metal and the bowl body and/or the bowl hood are of stainless steel, the lock ring carries the symbol shown in the adjoining drawing. The following lubrication procedure is recommended:

1. PRIMING with molybdenum disulfide paste. Rub or brush in the paste sparsely all over the surface — follow the directions printed on the wrapping, if any. Always prime new parts as well as parts which have lost their previously applied primer due to e.g. thorough cleaning or machining.

2. LUBRICATION with molybdenum disulfide grease after priming, and before assembly after routine dismantling as well. Polyethylene-castor oil paste, polytetrafluoroethylene-castor oil paste or some other equivalent lubricant can be used for machines emploied in the food industry or where dark-coloured lubricants are unsuitable.



Alternative 2

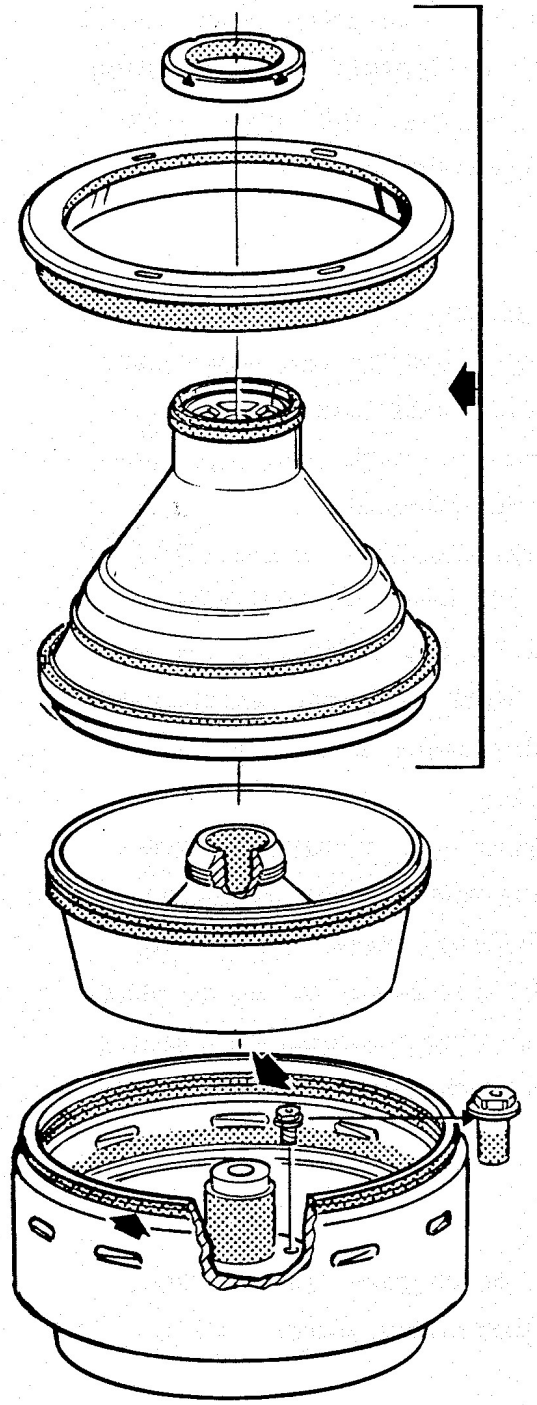
When the lock ring is made of carbon steel priming is normally unnecessary, lubrication alone will do — for lubricant see above.

If practical experience shows that no inconveniences occur, consistent grease, oil as prescribed for the worm gear housing, castor oil, tallow or liquid paraffin may be used as lubricant.

However, if a tendency to seizing is observed, alternative 1 must be applied.

(Lubrication Directions)

Bowl (cont.)



Lock ring

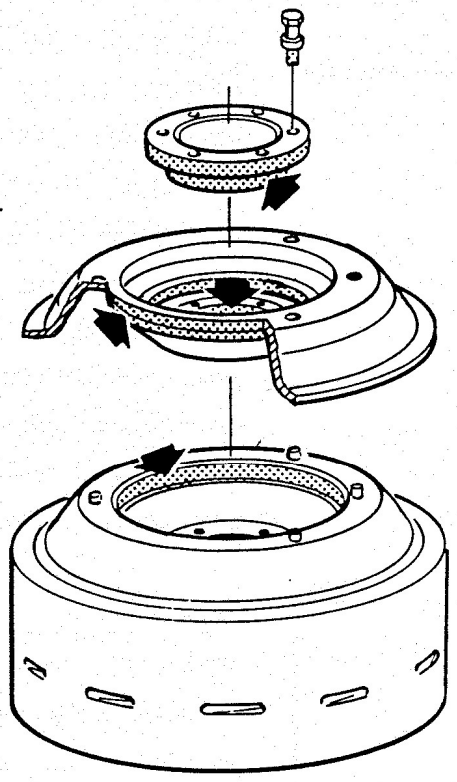
Lock ring

Bowl hood

Sliding bowl bottom

Screw/ nozzle

Bowl body



Screw

Spring support

Ope- rating slide

Bowl body

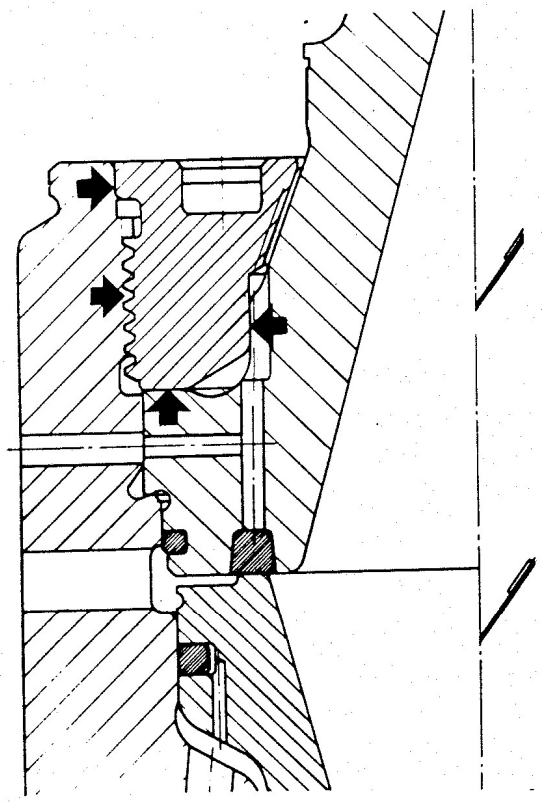
All surfaces marked ⁘ must be cleaned and lubricated before the parts are mounted. Such surfaces or parts indicated by ◗ are to be lubricated according to alternative 1 on the foregoing page, whereas those lacking such indication may be lubricated according to alternative 2.

SUPPLEMENT for BOWL BODY, BOWL HOOD and LARGE LOCK RING.

NACHTRAG für TROMMELKÖRPER, TROMMELDECKEL und GROSSEN VERSCHLUSSRING.

SUPPLEMENT pour FOND DE BOL, CHAPEAU DE BOL et GRAND ANNEAU DE SERRAGE.

TILLÄGG för KULKROPP, KULHUV samt STOR LÅSRING.



Bowl body, bowl hood and large lock ring differ somewhat from the drawings on the foregoing pages. Their actual design and lubrication points are shown in the adjoining illustration, in which the lubrication points are indicated by arrows.

Trommelkörper, Trommeldeckel und grosser Verschlussring unterscheiden sich etwas von den Zeichnungen auf den vorstehenden Seiten. Wirkliche Form und Schmierstellen sind aus dem nebenstehenden Bild ersichtlich, in welcher die Schmierstellen durch Pfeile angegeben sind.

Le fond et le chapeau du bol de même que le grand anneau de serrage diffèrent un peu des illustrations des pages antérieures. Leurs formes réelles et leurs points à lubrifier sont montrés par l´illustration en marge, où les points à lubrifier sont indiqués par des flèches.

Kulkropp, kulhuv samt stor låsring skiljer sig något från figurerna på föregående sidor. Deras verkliga utseende samt smörjställen framgår av vidstående bild, där smörjställena angivits med pilar.

Lubricating oil for worm gear housing

Synthetic polyglycol type oil with the following properties:

Viscosity at 100°C	20-25 cSt (2,9-3,5°E)
Viscosity at 0 °C	maximum 2000 cSt (260°E)
Viscosity index	minimum 140
Pour point	maximum -30°C
Heat resistance	must stand utilization for at least 1000 hours at 120°C

Suitable oils (examples)

BP ENERGOL GRS 260
SHELL TIVELA OIL 75

!! Synthetic oils of this type are not miscible with mineral lubricating oils.

Molybdenum disulfide paste

Examples:
Molykote Paste G
Rocol Anti-Scuffing Paste

Molybdenum disulfide grease

Examples:
Molykote BR-2
Molykote BR-3

Polyethylene-castor oil paste or polytetrafluoroethylene-castor oil paste is recommended for machines used in the food industry or where dark-coloured lubricants are unsuitable.

Ball bearing grease

Always use a high grade lithium-soap type ball bearing grease according to NLGI-class 2 or 3 and usable at temperatures above 100°C. Drop point about 180°C according to ASTM D 566-44.

Examples:
BP Energrease 2 or 3, Caltex Starfak Premium Grease 2 or 3, Castrol Spheerol AP Grease 2 or 3, Esso Beacon Grease 2 or 3, Gulfcrown Grease 2 or 3, Mobilux Grease 2 or 3, Shell Alvania Grease 2 or 3.

SAFETY REGULATIONS

In all centrifugal separators the bowl rotates at a very high speed, normally between 100 and 150 revolutions per SECOND. Thus, very great forces are released and it is essential, therefore, to follow strictly the directions given in the Instruction Book concerning assembly of parts, starting, stopping and overhaul.

In this connection remember particularly...

... to tighten the bowl lock ring (lock rings).

... to fasten carefully the frame hood as well as the inlet and outlet parts.

... to check the speed.

... that no machine part must be loosened until the bowl has stopped rotating.

... that bowl parts marked "*" in chapter I must never be exchanged without subsequent rebalancing of the bowl.

... that bowl body, bowl hood and lock ring must never be heated by means of a flame.

... that the machine must never be used for processing liquids with a higher density (temperature, solids nature etc.) than that for which it was originally intended. Thus, always consult an ALFA-LAVAL representative before using the machine beyond its proper range of separation.

Special recommendations

CREAM SEPARATION

Cream flow meter

The scale of the cream flow meter is neither graduated in percent nor in volume per hour. Such a graduation would – since the deviation is influenced by the viscosity – only apply to a certain fat content and temperature. The accurate values for the fat content or the fat contents must be determined by tests. To ensure that the fat content of the cream remains constant, the output, the fat content of the milk and temperature should of course be almost constant.

Regulating the cream fat content

The cream quantity and thus the cream fat content depend on the pressure in both outlets.

To facilitate regulation, which is effected by means of the regulating valve of the cream flow meter, the pressure in the skim milk outlet should be kept as constant as possible.

Variations in cream percentage

If the resistance in the skim milk outlet changes, e.g. the skim milk is conveyed to a tank placed at a higher level, this will involve a change of the cream percentage, i.e. the cream will get thinner with increasing resistance in the skim milk pipe and vice versa. In such cases the pressure in the skim milk outlet must be restored to the original value (by means of the skim milk valve). If required, a final adjustment can be made by means of the cream regulating valve.
If the change in cream percentage is caused by resistance variations in the cream outlet, adjust by means of the cream regulating valve.

Sampling

For checking the clean skimming, draw a skim milk sample from the pipe next to machine. It may happen that samples which are taken out simultaneously at the machine and in the skim milk tank show a different fat content. This can be due to the fact that whole milk or cream has leaked into the skim milk somewhere after the machine.

MILK CLEANING

Cleaning of kettle milk or consumption milk involves the use of a remixing device – see chapter X – which makes it possible to return all the cream to the skim milk.

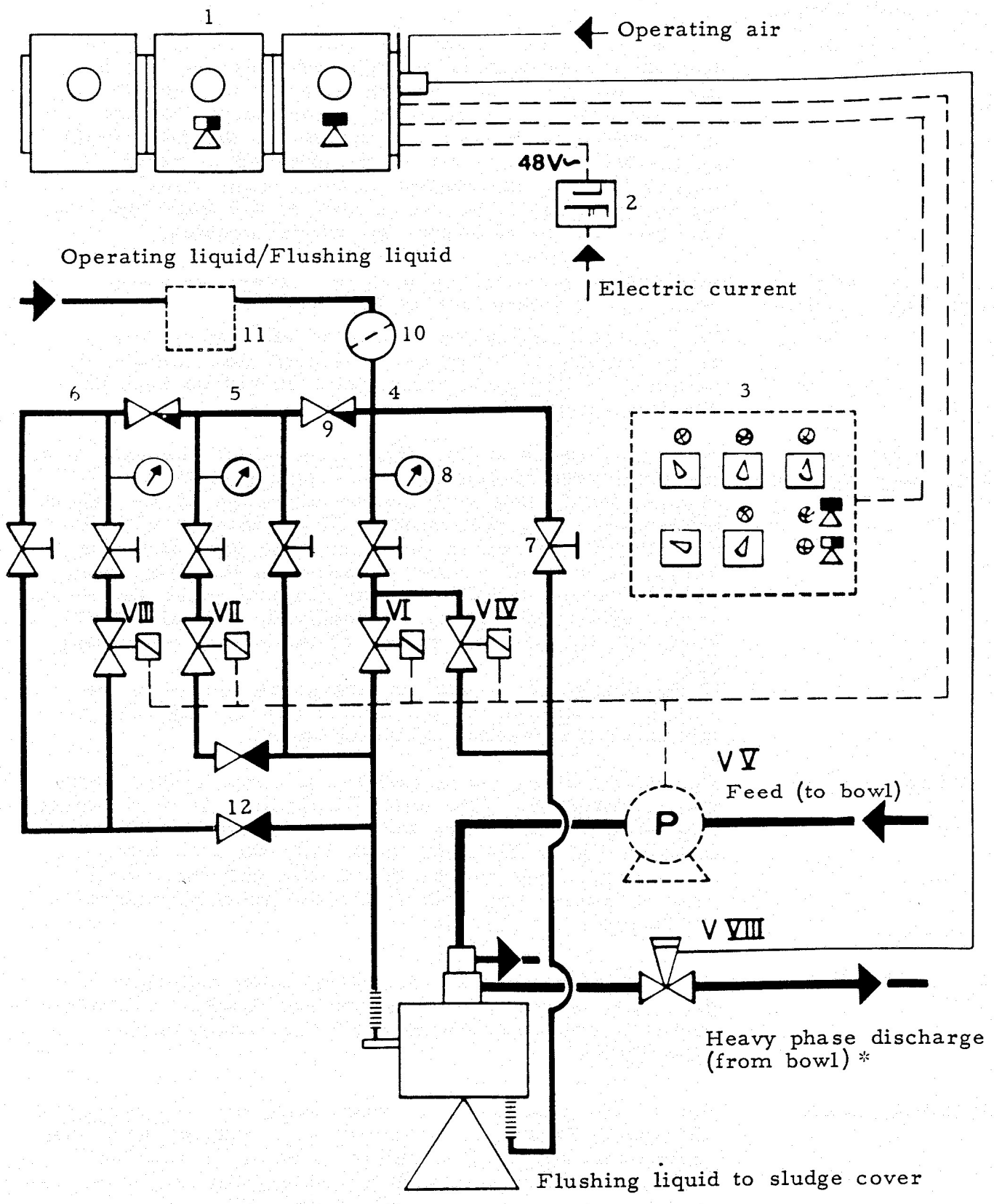
STANDARDIZATION

For standardization, i.e. when milk with a prescribed fat content is wanted, a device (see chapter X) is necessary that makes it possible to remix a suitable quantity of the cream with the skim milk while the rest of the cream is discharged separately.

Always check the fat content of the standardized milk.

Keep the throughput constant.

FLOW CHART; programmed operation



*) In MRPX 418SGV-34C (for bactofugation) = treated liquid

PROGRAMME EQUIPMENT – see supplementary instruction book. Observe that this book is finally decisive for the details of the equipment , programme etc.
For machine equipped for REMOTE SPEED INDICATION – see chapter T.

BEFORE STARTING

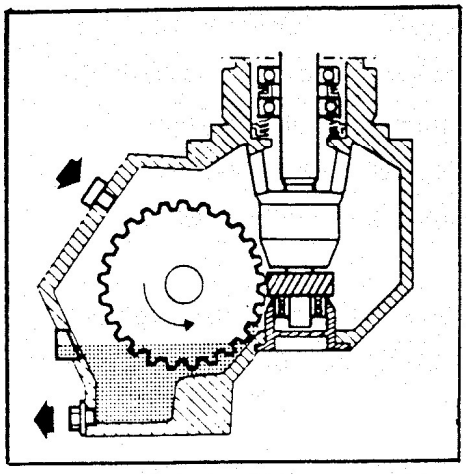
The bowl must be well cleaned and assembled according to directions given in chapter I.

Check particularly: that the brake is released– that the frame hood and discharge cover are clamped with the hinged bolts – that the oil level in the worm gear housing reaches somewhat above the middle of the oil gauge glass* – the operating liquid pressures – that the valves in the outlets are open.

* Note With idle machine the oil level must never be allowed to sink below the lower edge of the gauge glass; in operation the oil level will drop slightly.

If the glass is provided with corrugations they must be vertical. Keep the gauge glass clean, otherwise a line, which could be mistaken for the oil level, will in time build up on the inside of the glass.

If the machine has been idle for some time, screw out the drain screw some turns and drain off any water.



START and ACCELERATION TIME

Start the motor. Observe directions given in chapter G.

Shortly after starting it may occur that the bowl begins to vibrate more than normal. The general cause is lack of balance due to bad cleaning (washing). Stop the machine and clean the bowl by hand if the vibrations are very heavy.

During acceleration the power consumption is higher than in normal operation.

CLOSING the BOWL

The bowl is to be closed when it has attained full speed. Before starting the closing procedure compare the reading of the speed indicating means with the speed table in chapter C. The closing is performed by starting the timing unit (control unit), whereupon the solenoid valve V III will open and low pressure liquid (make-up liquid) is fed to the paring disc device of the bowl. The bowl will now close in 10-15 seconds.

If desired, the bowl can be closed (and be kept closed) by opening the by-pass valve in the low pressure liquid line.

When the timing unit (control unit) is started, also the pneumatic valve V VIII opens (provided it is of the pressure-opening type).

FILLING

When the bowl has closed, supply water in the same quantites as one will later supply process liquid, and adjust to suitable back pressure in the outlet for heavy phase. Then adjust to suitable throughput in the flow meter. If this affects the back pressure in the heavy phase outlet, readjust according to the above.

Shift to process liquid. Observe that the throughput must be suited to the separability of the process liquid.

SLUDGE DISCHARGE during OPERATION

The time relay in the timing unit (control unit) intended for partial discharges during operation initiates the discharges cycle. Generally, the following programme is performed: Discharge and closing of the bowl (V II) and flushing of the sludge cover (V IV).

CLEANING (CIP)

The bowl need not be dismantled after each operating period provided it can be cleaned satisfactorily by circulation washing before being stopped, i.e. by circulating various rinsing and cleaning liquids through the machine according to a fixed programme. During the various different washing stages the bowl must be emptied several times, either partially or totally – see below.

As the washing procedure can vary from case to case depending on the type of detergent, temperatures, and the sludge content in the process liquid, the washing programme cannot be determined in advance but must be found out through practical experiments in each particular case. A suitable sequence of the various stages appears from the following example of a programme, in which the indicated times can of course be shortened if considered suitable.

To save detergent, it may be preferable to execute only partial discharges during the washing stages proper, whereas only total discharges should, as a rule, be performed during the rinsing stages.

Example:

1. Flushing with warm water, approx. 50°C (122°F), for 15 minutes with a total discharge every 3rd minute – loose sludge is removed.
2. Washing with caustic soda, approx. 50°C (122°F), for 40 minutes with a partial discharge every 10th minute – fat and proteins are removed.
3. Rinsing with warm water – see paragraph 1.
4. Washing with acid solution, approx. 50°C (122°F), for 40 minutes with a partial discharge every 10th minute – any milkstone is removed.
5.*) Rinsing with cold water for 15 minutes with a total discharge every 3rd minute – this also cools down the machine.

*) In some cases preceded by sterilization with hot water, about 90°C (194°F).

(Cleaning, page 2)

Total discharge

The time relay in the timing unit (control unit) intended for total discharges during the washing period (water) initiates the discharge cycle. Generally, the following programme is performed:
1. Flushing of frame hood inside and bowl outside V VIII): the liquid flow in the discharge pipe is throttled so that liquid overflows at the bowl top (paring chamber). —2. Water flow shut-off (V V); the pump stops. — 3. Flushing according to point 1 ceases. — 4. Discharge and closing of bowl (V I, VIII). — 5 Water flow turned on (V V); the pump starts.

Partial discharge

The time relay intended for partial discharges during the washing period (acid — lye) initiates the discharge cycle. Generally, the following programme is performed: 1. Flushing of sludge cover (V IV). — 2. Flushing of frame hood inside and bowl outside (V VIII). — 3. Discharge and closing of bowl (V II). — 4. The flushing according to points 1 and 2 ceases.

MANUAL CLEANING

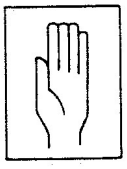
See chapter L.

MANUALLY OPERATED DISCHARGE

In an emergency, e.g. when the automatic system fails, the bowl can be discharged by opeaning the by-pass valve for the solenoid valve V II. After discharge close the valve. The bowl will now be closed automatically (and kept close) by the make-up liquid.
With the operating liquid pressures maintained unchanged (as in automatic operation) the above procedure will result in a partial discharge. If a total discharge is wanted, the pressure must be increased (with the pressure regulator item 9) to the recommended value. During discharge the bowl speed drops slightly. Do not repeat the discharge until correct speed is recovered.

Always shut off the feed to the bowl before a total discharge.

STOPPING



Keep the bowl closed and filled with liquid during the stopping period. This serves to prevent the bowl from getting out of balance in case residues of solids are still left in it.

:: Wait until the bowl has been filled with liquid after the last ejection. Stop the timing unit – the feed to the bowl is interrupted (the pump stops), valves V III and V VIII close.

:: Stop the motor, apply the brake and let the bowl run down to standstill. Release the brake (handle downward).

A small quantity of liquid will collect in the bottom of the bowl after the machine has stopped. To expel this liquid proceed as follows: Start the motor and let the bowl accelerate until the tachometer indicates about 10% of full speed – the liquid is now thrown out through the slots in the bowl body. Stop the motor and apply the brake. Release the brake when the bowl has stopped running.

Note. If the machine must be stopped temporarily during separation, it must at least be flushed out with water and emptied according to point 1 of the cleaning programme.

Indication	Cause	Remedy
CREAM SEPARATION Fat content in skim milk abnormally high.	:: Cleaning programme is unsatisfactory (bowl badly cleaned). :: Extracted cream is too thick. :: Unsuitable operating temperature. :: Sourish milk. :: Throughput too high. :: Fat globules split. :: Back pressure too low. :: Incorrect analysis. :: Whole milk or cream has leaked in after machine.	Find out a new cleaning programme. Open up the regulating valve of cream flow meter. The temperature should lie at approx. 50-55°C (122-130°F). – Reduce throughput. Check that the pump is regulated on delivery side. Suitable pressure – see chapter C. – Check any change-over connections and the setting of the valves.
Cream blockage.	Extracted cream is too thick.	Shut off the milk feed and shift to water. Readjust the cream flow meter.
Cream too thin.	–	Throttle with regulating valve of cream flow meter.
Cream too thick.	–	Open up the regulating valve of cream flow meter. Throttle the skim milk pipe if the regulating valve of the cream flow meter is already fully open.
Remixing fails when clarifying or standardizing.	Skim milk pressure higher than cream pressure in the outlets.	Skim milk pressure too high at the remixing point.

Indication	Cause	Remedy
BOWL DISCHARGE Bowl fails to close	1. Operating liquid lines wrongly connected to the control valve	Observe directions in chapter G.
	2. None or unsufficient operating liquid feed due to:	
	a. Obstructed strainers, closed or throttled valves, unsufficient pipe dimension, too low pressure	Observe directions in chapter G. Check pressure (with pressure gauge) at the inlet to the machine. Measure the quantity of outflowing liquid per unit time (undo connection at machine).
	b. Electrical or mechanical defects in solenoid valves or programming components. Wrongly set cam time (on cam shaft in programme timing unit)	Adjust the cam time. See Dicharge Programme Equipment.
	3. Control paring disc device obstructed or wrongly mounted	Check the flow according to directions in chapter L "Discharge mechanism". Dissolution of any deposits, see chapter L "Cleaning agents". Paring disc device – see chapter S.
	4. Leakage: at distributing cover (see "Control paring disc device"), valve plug (in operating slide) – sealing surface (in bowl body)	Check. Clean seals and sealing surfaces.
	5. Operating slide of bowl jams due to imperfect lubrication, defective seal ring, burrs or deformation	Check. Clean and lubricate carefully. Compare chapter I "Discharge mechanism".
	6. Operating slide springs are defective	Check and renew.
	7. Sliding bowl bottom jams – the seal ring defective	Renew the seal ring. Lubricate carefully.
	8. Nozzle in bowl body for draining the space between bowl body and operating slide is obstructed (only for closing after discharge)	Clean. Compare chapter I "Discharge mechanism".
	9. Obstructed channels to space under sliding bowl bottom (in screw/nozzle)	Clean. Compare chapter I "Discharge mechanism".
Bowl fails to open	1. See paragraphs 1-2, 5-7 under "Bowl fails to close"	See corresponding paragraphs.
	2. Leakage: at distributing cover, distributing ring – bowl body, operating slide – bowl body	Check. Clean seals and sealing surfaces.
	3. Nozzle in bowl body for draining the space between bowl body and operating slide not inserted	Check.
	4. Channels to space between bowl body and upper side of operating slide are obstructed	Clean. Compare chapter I "Discharge mechanism".

(cont.)

Indication	Cause	Remedy
(Bowl discharge, page 2) The bowl opens and closes but reopens ("double discharge")	The solenoid valve remains open too long (cam time too long)	Reduce the cam time for the relevant solenoid valve. See Discharge Programme Equipment .
The bowl opens unintentionally during operation	1. Liquid losses are not compensated. See paragraphs 2-4, 6, 9 under "Bowl fails to close" 2. Pressure in make-up liquid line is too high	See corresponding paragraphs. Reduce pressure.
Discharge quantity (at partial discharge) is too large/small	Pressure in partial discharge liquid line is too high/low	Reduce/increase pressure.

Indication	Cause	Remedy
Machine vibrates	:: Moderate vibrations normally occur at the critical number of revolutions during the running-up and retardation periods. :: Bowl out of balance due to: bad cleaning – wrong assembling – badly tightened lock ring – disc set insufficiently clamped – bowl asembled with parts from different machines. :: Vibration damping rubber washers have lost elasticity. :: Top bearing spring broken. :: Foundation too weak.	None Stop immediately and establish cause. Badly tightened lock ring involves fatal danger. Renew rubber washers every second year. Exchange all springs. Reinforce foundation.
Speed too high	:: Tachometer reading wrong. :: Wrong transmission. :: The motor speed is not appropriate.	Check by means of revolution counter. Stop immediately. Check that proper transmission is used in view of motor speed. Stop immediately and exchange motor.
Speed too low Running-up time too long	:: Brake applied. :: Voltage drop in mains. :: Ball bearing damage. :: Other machine defects. :: Motor defect.	Release the brake. Locate and exchange defective bearing. Stop immediately. Check that bowl can be rotated by hand. Exchange or repair motor.
Running-up time shorter than normal (starting current to high)	:: Overvoltage	
Retardation time too long	:: Brake lining worn or oily.	Exchange or clean lining.
Motor stops during running-up	:: Probably more than two successive (accomplished) starts have been performed, resulting in overheating of motor (thermo-contacts in motor have cut out the current).	Let motor rest 3-4 hours.
Water in worm gear housing	:: Condensation. :: Axial seals not tight or turned wrongly. :: Leakage at hood over top bearing.	Drain water. Exchange rings and turn correctly. Tighten the hood.
Noise from worm gear housing	:: Oil quantity wrong. :: Worm wheel or worm worn. :: Ball bearing worn or damaged.	Check quantity and quality. Exchange worn parts. Exchange of complete gear is generally advisable. Exchange bearing.
Noise from coupling	:: Wrong play between coupling pulley and elastic plate. :: Speed too low	Adjust – see chapter R. See – Speed too low.
Smell	:: Bearing running hot	Feel over machine and locate spot. Exchange bearing.
"Scraping" noise	Wrong height position	Stop and adjust – see chapter L.

CLEANING. OVERHAUL

It has proved very difficult in practice to prescribe how often cleaning should be carried out and how thorough the overhaul should be. However, aided by the directions given in this chapter it should not be difficult to make up a suitable working routine with regard paid to special local conditions.
The ALFA-LAVAL representative will always be glad to provide further advice and information.

When cleaning and overhauling always follow strictly the directions given in this book concerning the dismantling, lubrication and assembling.

Make it a habit to inspect and replenish the set of spare parts (and tools) once a year. It pays to keep the consuming parts in stock.

The time intervals stated below relate to continuous operation. If the mentioned number of operating hours is not obtained during the period, the latter can be extended, but a thorough overhaul at least once every third year is imperative.

OPERATING HOURS	Operation check	
Every 24th (every day*)	Machine run (speed). Power consumption. Oil level in worm gear housing. Observation of discharged liquids. Temperature	Throughput Sludge tank Pressure Automatic control device, if any (signal lamps).
Every 200th (every week*)	Worm gear housing Check and if necessary replenish oil.	Further actions Speed check Leakage tracing
Every 750th (every month*)	Bowl Dismantling of bowl and thorough cleaning of bowl inset parts. Thorough cleaning and lubrication of lock rings and oiling of bowl body nave bore. Check on seals.	Power transmission Cleaning and oiling of bowl spindle cone. Control system Check flow of operating liquid. Check sludge discharge interval of automatic control device. Strainers and filters Cleaning and checking.
Every 1500th (every second month*)	Worm gear housing Cleaning and oil change. (In case of new installation, however, after 300 operating hours and in seasonal operation before every working period).	Bowl Dismantle and clean sludge discharge mechanism of bowl. Check springs, seals and sludge ports. Check erosion. Frame Renew brake lining.
Every 9000th (every year*)	Thorough overhaul, cleaning and lubrication. Bowl check Pressure in set of discs. Lock ring joint. Corrosion and other material attacks. Power transmission Dismantle bowl spindle, coupling and worm wheel shaft. Check particularly ball bearings and gear as well as top bearing springs and buffers.	Control system Check pipes and valves. Height positions Check and adjust. Frame Check elasticity of vibration dampers and mounting of machine. Motor – see special manual for motor.

* In continuous operation.

CLEANING AGENTS

Metallic machine parts

Use Cleaning kerosene, White spirit, Mineral spirits or another solvent with equivalent properties.
If the cleaning agent is unsuitable in view of the product of the process, the bowl, inlet and outlet parts in contact with liquid can normally be cleaned with a soda or trisodiumphosphate solution, or with current technical defatting agent on an alkaline basis.
A certain care should be exercised when cleaning light metal parts, as these may be attacked by strong alkaline solutions.
Benzine or benzol may also be used for the metal parts, but if so, the cleaning should be done in the open air due to the risk of explosion, and because benzol vapours are dangerous to inhale.

Seal rings

Wipe seal rings with a cloth moistened with some of the above cleaning agents.

Coupling pads and brake lining

Trichlorethylene should be used for cleaning these parts and the corresponding friction surfaces. Note that it should be done under safe control (ventilation), and preferably in the open air.

Discharge mechanism

Any deposits on the parts of the control device are to advantage dissolved in an approx. 10 percent solution of acetic acid heated to about 80°C (175°F).

WASHING AGENTS for DAIRY MACHINES

Lye solution

1% alkaline solution, for instance of the following composition: 90% caustic soda (NaOH), 9% sodium tripolyphosphate ($Na_5P_3O_{10}$), 1% wetting agent (non-ionic ethylenediaminoacetate)

Acid solution

0,5-0,8% nitric acid solution.

MANUAL CLEANING of BOWL

During the first time the bowl should be dismantled and, when necessary, cleaned after every automatic washing until a suitable washing programme has been established. Thereafter the intervals between dismantlings can be extended successively. Observe that defective or wrongly fitted strainers letting through particles that are too large to pass between the bowl discs can cause sludge blockage. If this occurs, the bowl discs must be cleaned one by one.

Any tendency of the lock ring to stick to the bowl body must also be considered when determining the intervals between dismantlings. It is difficult to prescribe how often the lock ring threads must be lubricated, as this depends both on the lubricant used and on the care with which the lubrication is performed.

Discharge mechanism

The hardness of the water decides how often cleaning must be done. However, as a rule the parts should be cleaned every time the bowl body is removed from the spindle.
Clean all channels and nozzles in bowl body, operating slide and control paring disc.

Check on liquid flow

:: Turn on the feed of operating water.

:: Open the valve for high-pressure water. Water should now spurt out through th holes in the paring discs in powerfull jets.

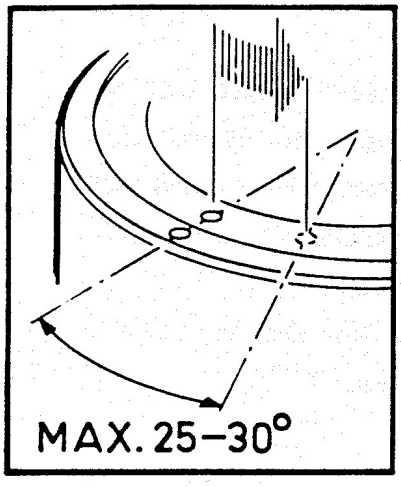
:: Open the valve for low pressure water. Water should now spurt out through the holes, but in weak jets.

BOWL OVERHAUL

Exchange of parts

Bowl parts marked "*" on the perspective drawing in chapter I can be exchanged only in an authorized ALFA-LAVAL/DE LAVAL workshop, as the exchange necessitates rebalancing – thus the COMPLETE bowl must be sent in. Other parts can be exchanged on the spot.

Thread check



Lock ring with external thread

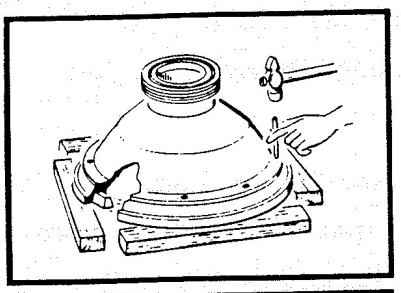
In a new bowl, the guide marks (ϕ) should be right in front of each other. In time, these marks can be drawn past each other due to wear of the threads. When the ϕ-mark of the lock ring can be drawn past the other ϕ-mark by more than 25-30°, an authorized ALFA-LAVAL/DE LAVAL representative should be consulted.

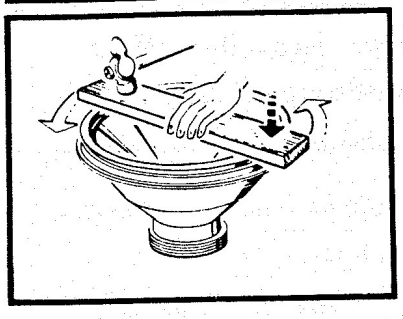
Thread checking should be done at least once a year. The checking is carried out as follows:
Unscrew the large lock ring, remove the distributor with disc set. Put on the hood and screw on the lock ring.
Tighten the large lock ring anti-clockwise till tight contact is obtained between the contact surfaces of bowl body and bowl hood.

Clamping of disc set

See chapter I, Bowl.

Seal ring of bowl hood





When exchanging the seal ring drive it out by means of the tool, which should be inserted alternately in the holes provided for this purpose.

The seal ring is pressed into the groove in the lower edge of the bowl hood by means of a planed board (1"x5"), which should be placed across the ring. Knock carefully on the board right above the ring, first on one side and then on the other. Turn the board around successively and drive the ring into the groove as evenly as possible.

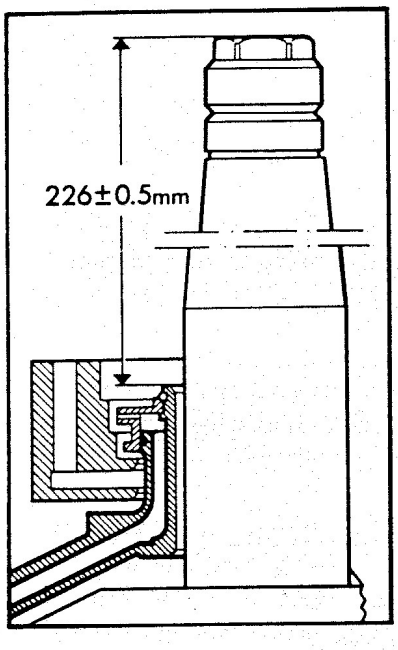
If a new seal ring of nylon (polyamide) turns out to be too wide when mounted, this is due to absorption of moisture – it will recover correct dimensions after drying for about 24 hours at a temperature of 175°-195°F (80°-90°C) in heating chamber.

If the ring is too narrow, put it in hot water, 160°-175°F (70°-80°C), for about 8 hours.

HEIGHT ADJUSTMENT

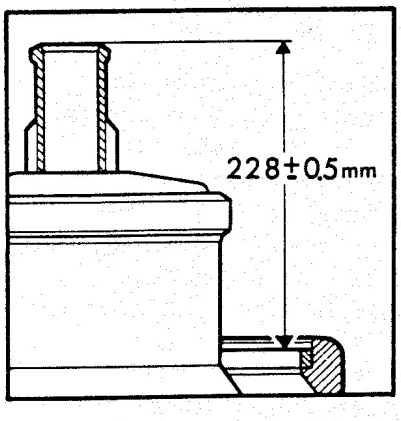
Checking should be done both in connection with the yearly overhaul and after exchange or mounting of parts which can affect the height position.
The tolerances are narrow and it is essential, therefore, that all parts are clean and free from burrs.

Control paring disc



The distance between the upper rim of the distributing cover and the spindle top should be as indicated in the figure. The height position of the paring disc is adjusted by means of height adjusting rings under the distributing cover. See also chapter S "Paring disc device".

Paring discs of bowl



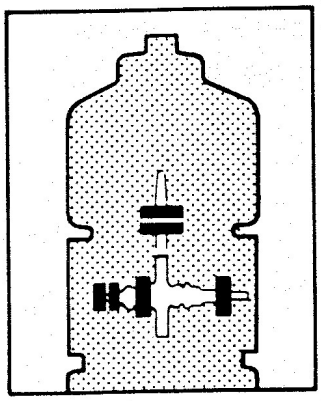
Assemble the bowl. Put on the frame hood and clamp it with the hinged bolts. Insert the height adjusting ring.
The distance between the height adjusting ring and the upper edge of the upper paring disc should be as indicated in the figure. If this is not the case, replace the inserted height adjusting ring by a ring with more suitable thickness. For height adjusting rings see chapter I "Inlet. Outlet".

Check

After every height adjustment of the control paring disc the bowl spindle should be revolved by hand (with bowl body put on the spindle). If scraping noise is audible, the adjustment is probably wrong – readjust.
If a scraping noise is audible in the inlet and outlet after the machine has been started, stop the machine at once and recheck the adjustment. The listening for scraping noise must be done as near the inlet and outlet as possible and in immediate connection with the start.

GENERAL HINTS

Bearing overhaul



How often the bearings should be overhauled depends chiefly on the working conditions. Where the load on the bearings is heavy it is advisable once a year to clean them thoroughly and examine their rings, cages, and rolling bodies. In many cases, however, a much longer interval than 12 months can safely be allowed between overhauls, especially if the condition of the bearings can be ascertained during operation for instance by listening, checking the bearing temperature, observing the lubricant colour or the like.

Storing

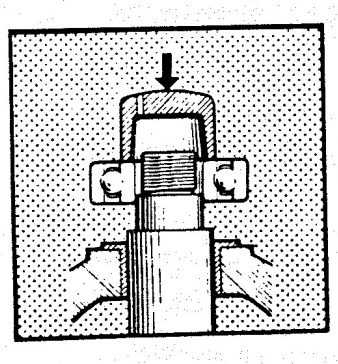
Always keep spare bearings in stock, storing them in a place where they are protected against moisture and dust. Never remove a bearing from its wrapping until it is to be mounted.

Dismantling and mounting

Never dismantle a bearing unless it is necessary. A dismantling always involves certain risks: the bearing could suffer damage, dirt might enter it, and it might be wrongly remounted.

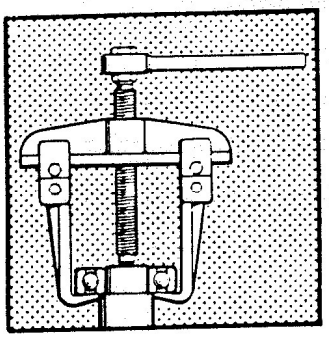
Before dismantling it should be found out, from a drawing or otherwise, how the bearing is fitted. To avoid mistakes, the dismantled parts should be so laid out or marked as to make completely clear how bearing, spacing sleeves, seal rings etc. were originally placed.

A satisfactory result of the bearing overhaul cannot be obtained unless the utmost cleanliness is exercised.



In dismantling and mounting it is essential to apply the force to the appropriate ring. Only seldom the two rings of a bearing have equally tight fits. In most cases one ring is mounted with a tight fit and the other one with a reasonably loose fit. When for dismantling of e.g. the tight-fit-ring the power is applied to the loose-fit-ring, the pressure must proceed through ball races and rolling bodies to the former ring. This can easily cause a denting of the ball races that will shorten the lifetime of the bearings. Particularly vulnerable in this respect are bearings of a type which is not constructed for axial loading.

When for instance the inner ring is to be removed from the shaft, the dismounting power should be applied to this ring.



On the other hand, if the outer ring is to be removed from the bearing housing or the bearing seat, this ring should be subjected to the dismantling power.

What is said above also goes for thrust bearing washers. Never fit or remove a shaft washer by exerting a pressure against a housing washer.

Blows are the least lenient form of dismantling and mounting power and should be avoided. A pressure or pull

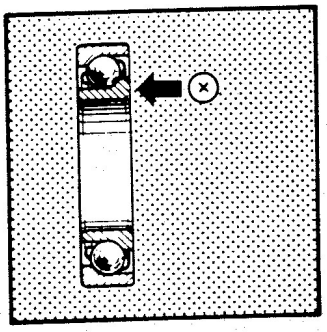
(cont.)

(Dismantling and mounting, page 2)

from a press or puller is preferable. If blows are the only possibility, never knock directly on the bearing. The rings are hardened and can burst, and the wrong ring or the cage could be hit with denting of the ball races or the cage as a result. To avoid this, place a mounting sleeve between the bearing and the hammer.

Angular-contact ball bearing

The single-row angular-contact ball bearing is capable of resisting an axial load in one direction only, and thus it is essential to mount it so that the axial load will act toward the stamped side of the inner ring.



Heating

Bearings with cylindrical bore which are to be mounted with tight inner-ring fit should be heated in oil. However, the temperature should not be so high or the heating be carried on for so long a time as to affect the properties of the steel. As only a short heating is needed for mounting purposes, the bearing can safely be heated to a temperature of maximum 120°C (248°F).

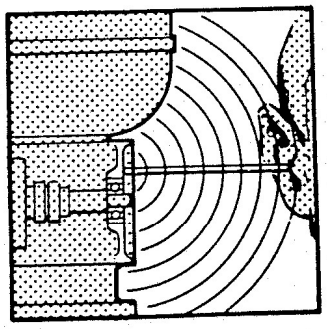
Cleaning

Used bearings which have been removed from the machine must be washed in clean kerosen. After washing, the bearings must be oiled or greased immediately to protect them against corrosion.

Never wash completely new bearings. The rust preventive with which they are coated has no detrimental effect on the lubricant and thus need not be removed.

Test run and final check

With the mounting accomplished test-run the bearings. Observe the sounds emitted by the bearing, and the temperature rise. The sound can be observed by placing one end of a wooden stick or a screw driver against the ear and its other end against the bearing housing. Normally the bearing should emit a regular, spinning sound. A whistling sound indicates insufficient lubrication. Irregular and noisy running sounds are mostly due to the presence of foreign matter in the bearing, or to damage done to it during mounting.



ALFA-LAVAL

PART 2

PARTS LIST
DISMANTLING
ASSEMBLY

S91028 E
(4226-1)

Instruction book

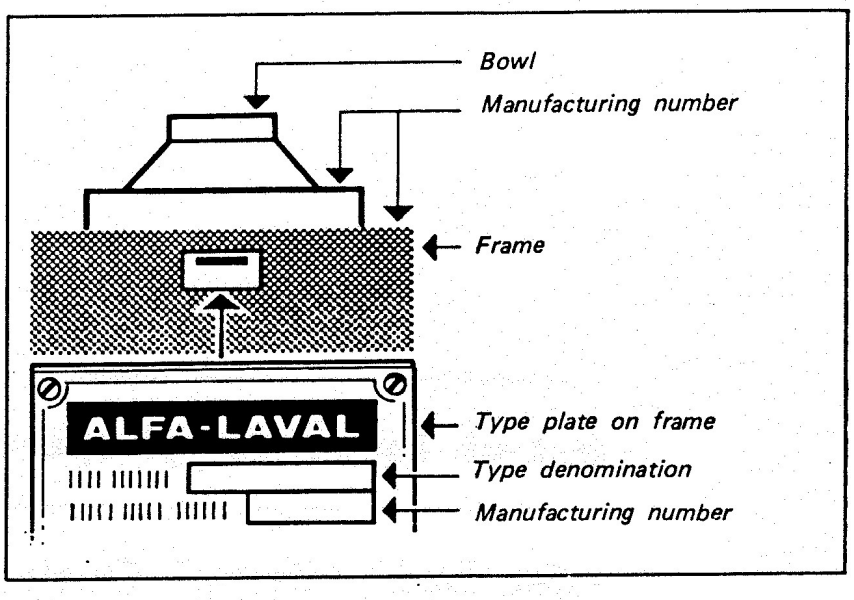
Each machine is accompanied by an instruction book carrying the type denomination and manufacturing number of the machine on its title page.

Type denomination and manufacturing number

Always base spare parts orders on the instruction book which is marked with the manufacturing number of the machine.
All machines are subjected to continuous constructional modification, and thus the type denomination alone is not enough for adequate identification of the book. To be usable as a spare parts catalogue for a given machine the instruction book must, besides, carry the manufacturing number of the machine in question. If not, this number must be quoted in the spare parts order.

Differing manufacturing numbers

If different manufacturing numbers are indicated on the bowl and the type plate, state both of them.



Rebuilds

If the machine has been rebuilt or completed after delivery, specify such modifications when ordering spares. Besides, full particulars as mentioned above are absolutely necessary in this case.

Example of spare parts order

Quantity	Part number	Part name
2	00000	Nmnmnmnmnmnmnmnmnmn
10	00000-00	Nmnmnmnmnmnmnmnmnmn

Ref.	Part No. Delnr.	Qty. Ant.	Part name	Benämning
			(Pressing and lifting tool)	(Press-och lyftverktyg)
1	221891-19	1	Lock nut	Låsmutter
2	223101-55	1	Washer	Bricka
3	226314-27	14	Cup spring	Tallriksfjäder
4	530035-80	1	Yoke	Bygel
5		1	Spindle with ball nut and thrust washer:	Spindel med kulmutter och tryckbricka:
	535728-82		for BRPX 217, 317 and MRPX 217, 317	för BRPX 217, 317 och MRPX 217, 317
	536242-83		for MRPX 218, 318 and 418	för MRPX 218, 318 och 418
6	535731-01	1	Seal ring	Tätningsring
7a	260189-01	2	Bearing	Lager
7b	260189-02	4	Washer	Bricka
8	535726-01	1	Thrust washer	Tryckbricka
9	535724-01	1	Washer	Bricka
10	223406-66	1	Seal ring	Tätningsring
11	530028-01	2	Round nut	Rundmutter
12		4	Lifting lugs:	Lyftklackar:
	530029-02		for BRPX 217, 317 and MRPX 217, 317	för BRPX 217, 317 och MRPX 217, 317
	536237-02		for MRPX 218, 318 and 418	för MRPX 218, 318 och 418
13		1	Coil ring:	Spiralring:
	536552-02		for BRPX 217, 317 and MRPX 217, 317	för BRPX 217, 317 och MRPX 217, 317
	536552-01		for MRPX 218, 318 and 418	för MRPX 218, 318 och 418
14	221581-12	1	Grub screw	Stoppskruv
15	226211-02	1	Spring	Fjäder
16	64416	1	Cylindrical pin	Cylindrisk pinne
17	221230-10	2	Screw	Skruv
18	530033-01	1	Lock plate	Låsbricka
19	536791-01	1	Roller	Rulle

BOWL (comp. chapter I)

515133-03	Nozzle
528165-02	Valve plug (3)
226214-74	Spring (6)
-	Bowl disc (5) — see Bowl

Seal rings for:

223412-55	operating slide (2)
223416-35	bowl body (3)
523116-04	sliding bowl bottom (2)
521863-02	bowl hood (2)
528086-01	bowl hood

Packings for:

528167-01	spring support (2)
528087-01	paring chamber cover (2)
516281-25	cyclone nut (2)
528220-2	lower paring disc
516281-24	upper paring disc (2)

INLET. OUTLET (comp. chapter I)

74384	Membrane for pressure gauge
522808-05	Sealing strip for frame hood
223324-04	Seal ring for inlet pipe
	Spare parts for regulating valve and flow meter — see chapter X

Packings:

71068	(4)
190608	for flow meter

COUPLING. WORM WHEEL SHAFT (comp. chapter P)

223408-09	Seal ring for seal washer
43626	Packing for bearing shield

BOWL SPINDLE (comp. chapter P)

72473	Washer for screw plug (12)

Ball bearings for:

233211-49	top bearing (2)
233215-03	top bearing
65187	worm
69850	worm (2)
69843	bottom bearing

Springs for:

70340	axial buffer (20)
66191	top bearing (12)

Seal rings for:

223412-42	cover for spring casing
223412-17	throw-off collar
223412-51	protecting cap

FRAME PARTS (comp. chapter S)

65227	Brake lining with 3 screws
38685	Oil gauge glass
223521-08	Lipseal ring for revolution counter and tachometer (2)
528746-01*	Protecting glass for tachometer

Seal rings for:

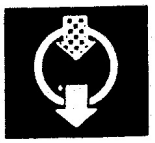
74067	inlet bend — operating liquid
38411	bottom bearing housing
74634	paring disc device (2)
223406-27**	for pneumatic brake (2)

Packings for:

516281-16	cyclone
71068	drain tube
516281-10	flushing nozzle
68937	flushing nozzle
223316-05	oil drain screw
528723-01	oil gauge glass
37167	oil gauge glass
71068	ventilation bend
223434-02	revolution counter
223316-05	oil filling screw — see Revolution counter
528732-01	protecting cap (2) — see Brake and Revolution counter

* Not for machine equipped for remote speed indication.

** Only for remotely controlled machine.



INLET. BOWL. OUTLET

Satisfactory functioning cannot be ensured unless the parts in contact with liquid are carefully cleaned before assembly. This applies particularly to seal rings, sliding surfaces, guiding and contact surfaces, and threads. Also take care that no burrs are knocked up on the metal parts when handling them.

Exchange of parts

Each bowl constitutes a balanced unit which will get out of balance if any parts having an "* or ▼" added to their name in the general drawing are exchanged without the bowl being rebalanced. To prevent confusion of parts, for instance when a plant consists of several machines of the same type, these main parts are stamped either with the complete manufacturing number or its three last digits.

Guides

When assembling make sure that the bowl parts are placed in the position defined by the guides. Be careful not to damage the guides when handling the parts.

Seal rings. Packings

Check seal rings and packings for defects and make sure that the corresponding grooves and sealing surfaces are well cleaned.

After mounting check...

... that the ring lies properly (not twisted) in the groove.

... that it fills the groove evenly all around.

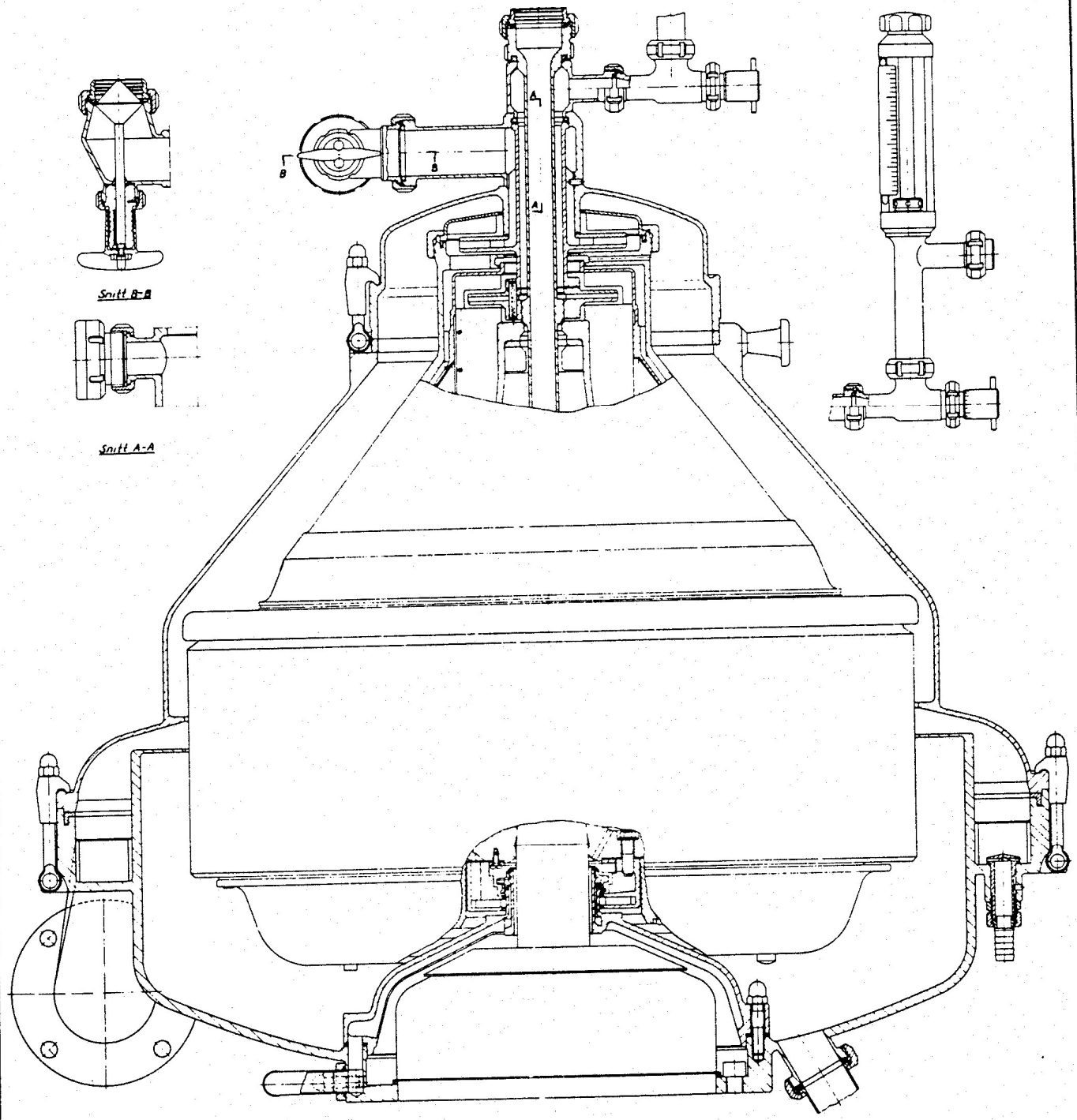
Threads. Pressure in disc set

Check the lock ring threads and the pressure in the disc set at regular intervals — see chapter L.

Corrosion. Erosion

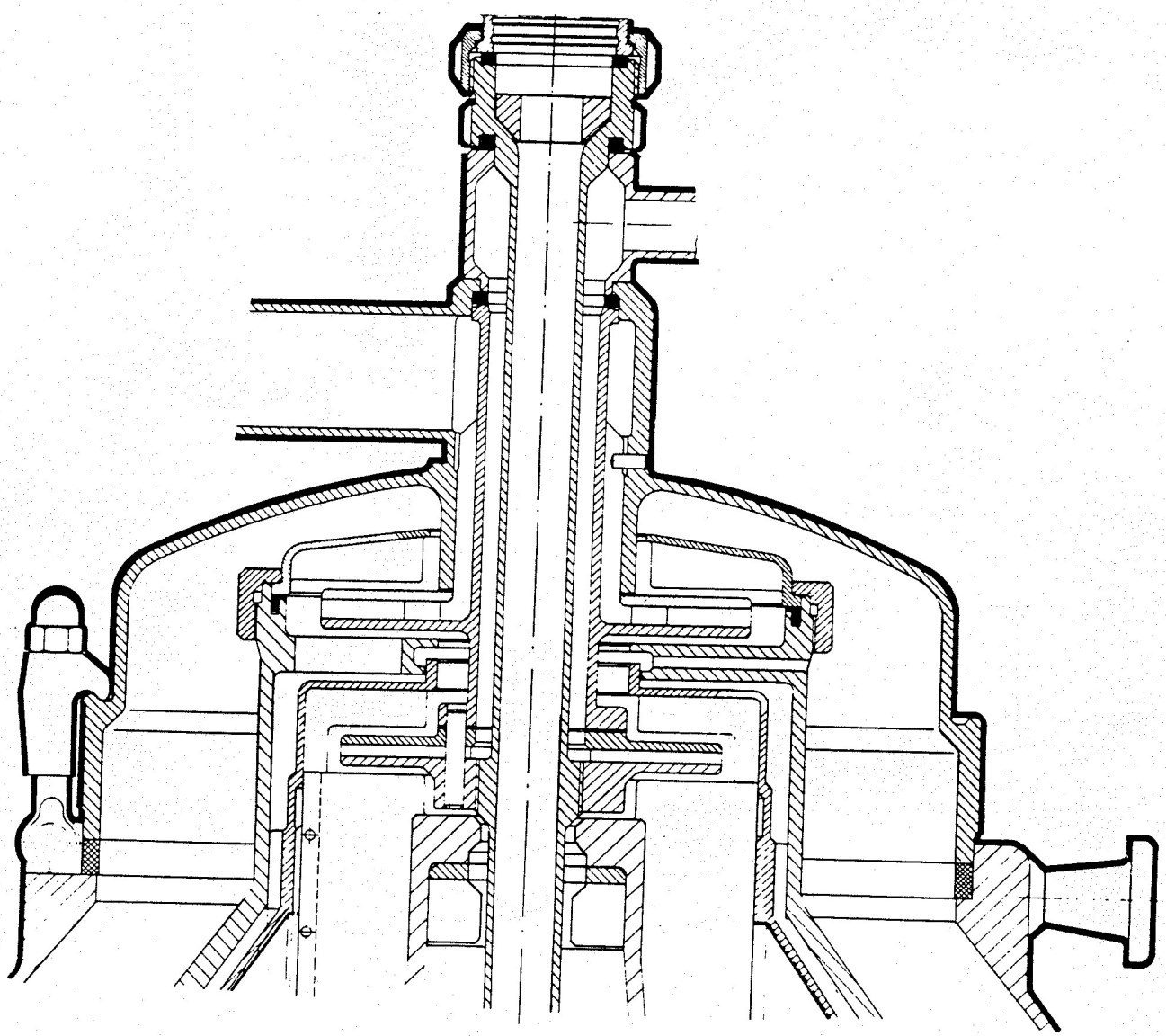
Aggressive liquids as well as liquids containing very hard particles may cause corrosion and erosion damage. If rapidly growing or advanced damage is noticed, consult an ALFA-LAVAL representative.

ALFA-LAVAL

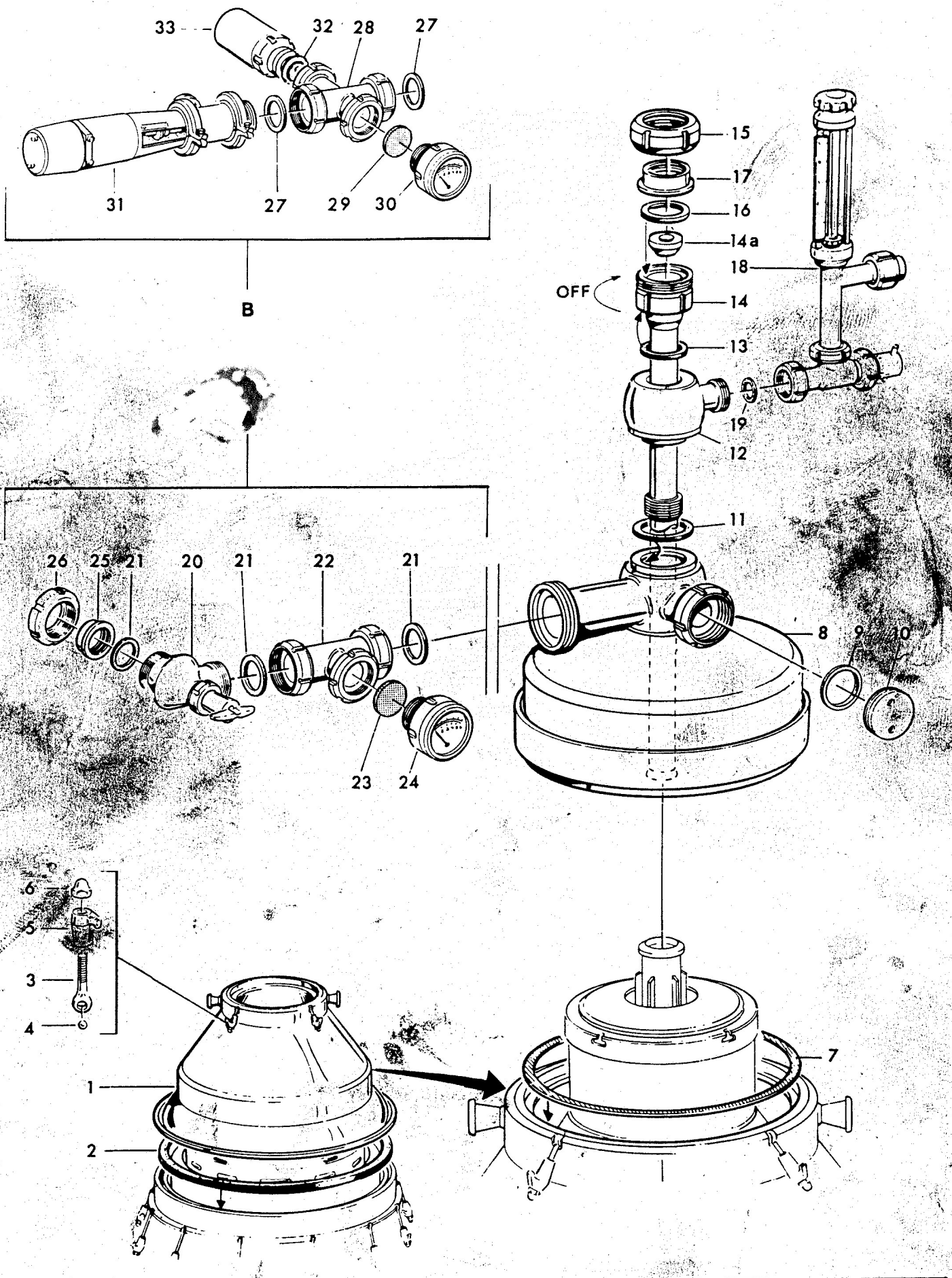


534233-Z
(4226-1)

ALFA-LAVAL



535550-Z

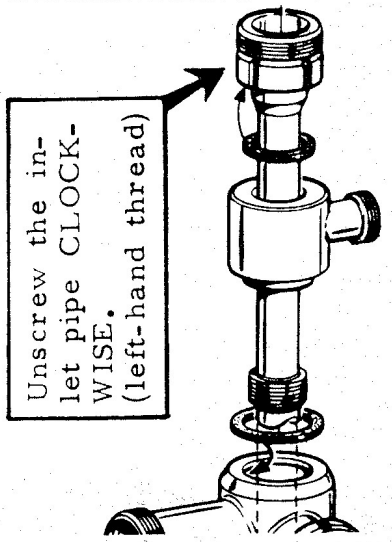

33
32
28
27
31
27
29
30
B
15
17
16
14a
18
OFF
14
13
19
12
11
26
25
21
20
21
22
21
8
9
10
23
24
6
5
3
4
1
2
7

Ref.	Part No. Delnr.	Qty. Ant.	Part name	Benämning
1	--	1	Frame hood	Stativhuv
2	522808-05	1	Sealing strip	Tätningslist
3	528104-02	4	Hinged bolt	Länkskruv
4	233281-01	4	Ball	Kula
5	785865-02	4	Clamping shoe	Låsklack
6	72956	4	Cap nut	Hattmutter
7	--	1-2*	Height adjusting ring	Höjdring
-	528191-01		12.0 mm	12,0 mm
-	528191-02		13.5 mm	13,5 mm
-	528191-03		15.0 mm	15,0 mm
-	528191-04		16.5 mm	16,5 mm
-	528191-05		18.0 mm	18,0 mm
8	530008-80	1	Discharge cover	Utloppslock
9	71066	1	Packing	Packning
10	74656	1	Sealing plug	Täckbr[illegible]
11	71068	1	Packing	Packn[illegible]
12	535288-82	1	Outlet piece	Utloppskr[illegible]
13	223324-04	1	Seal ring	Tätningsring
14	528188-01	1	Inlet pipe	Tilloppspip
14a	530384-01	1	Nozzle	Munstycke
15	190616	1	Coupling nut	Kopplingsmutter
16	71068	1	Packing	Packning
17	190630	1	Sleeve	Hylsa
18	533395-84	1	Cream flow meter ** (450 l/h)	Gräddmätare ** (450 l/h)
19	190608	1	Packing	Packning
A	--	-	Manual back-pressure regulation	Manuell mottrycks-reglering
20	517697-80	1	Regulating valve **	Regleringsventil **
21	71068	3	Packing	Packning
22	532345-80	1	T-piece	T-rör
23	74384	1	Membrane	Membran
24	74386	1	Pressure gauge(0-10bar)	Tryckmätare(0-10 bar)
25	190630	1	Sleeve	Hylsa
26	190616	1	Coupling nut	Kopplingsmutter
B	--	-	Automatic back-pressure regulation	Automatisk mottrycks-reglering
27	71068	2	Packing	Packning
28	31317-0870-1	1	Pipe cross	Korsrör
29	74384	1	Membrane	Membran
30	74386	1	Pressure gauge(0-10bar)	Tryckmätare (0-10bar)
31	SPCL-SMS-51-Kv 51	1	SPCL-valve	SPCL-ventil
32	71066	1	Packing	Packning
33	31801-1057-1	1	Pressure transmitter	Tryckgivare

* One ring is mounted before delivery, another one of the next smaller thickness is supplied unmounted.
** Included parts — see chapter X.

* En ring monteras vid leverans; en ring med tjockleken närmast under den monterade ringens, medföljer lös.
** Ingående delar — se kapitel X.

DISMANTLING



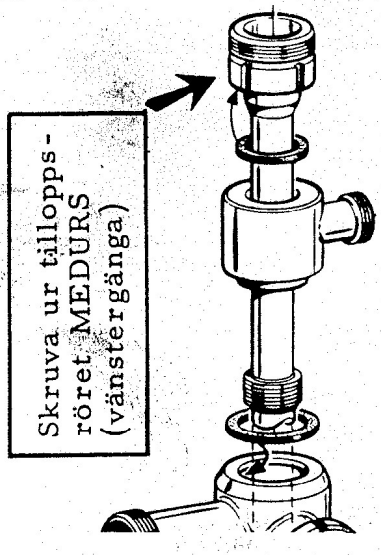
Note that the bowl must be at rest before starting the dismantling – check by means of the revolution counter.

Dismantle the parts in the sequence appearing from the illustration. Use a hook spanner for unscrewing the inlet pipe from the lower paring disc (see also vertical section).

ASSEMBLY

Clean all parts. Carefully lubricate threads and contact surfaces, and particularly the thread of the inlet pipe. Screw in the pipe firmly.
Check the height position of the paring discs before the first start and after exchange of parts that could affect the height position – see also chapter L " Height adjustment".

ISÄRTAGNING



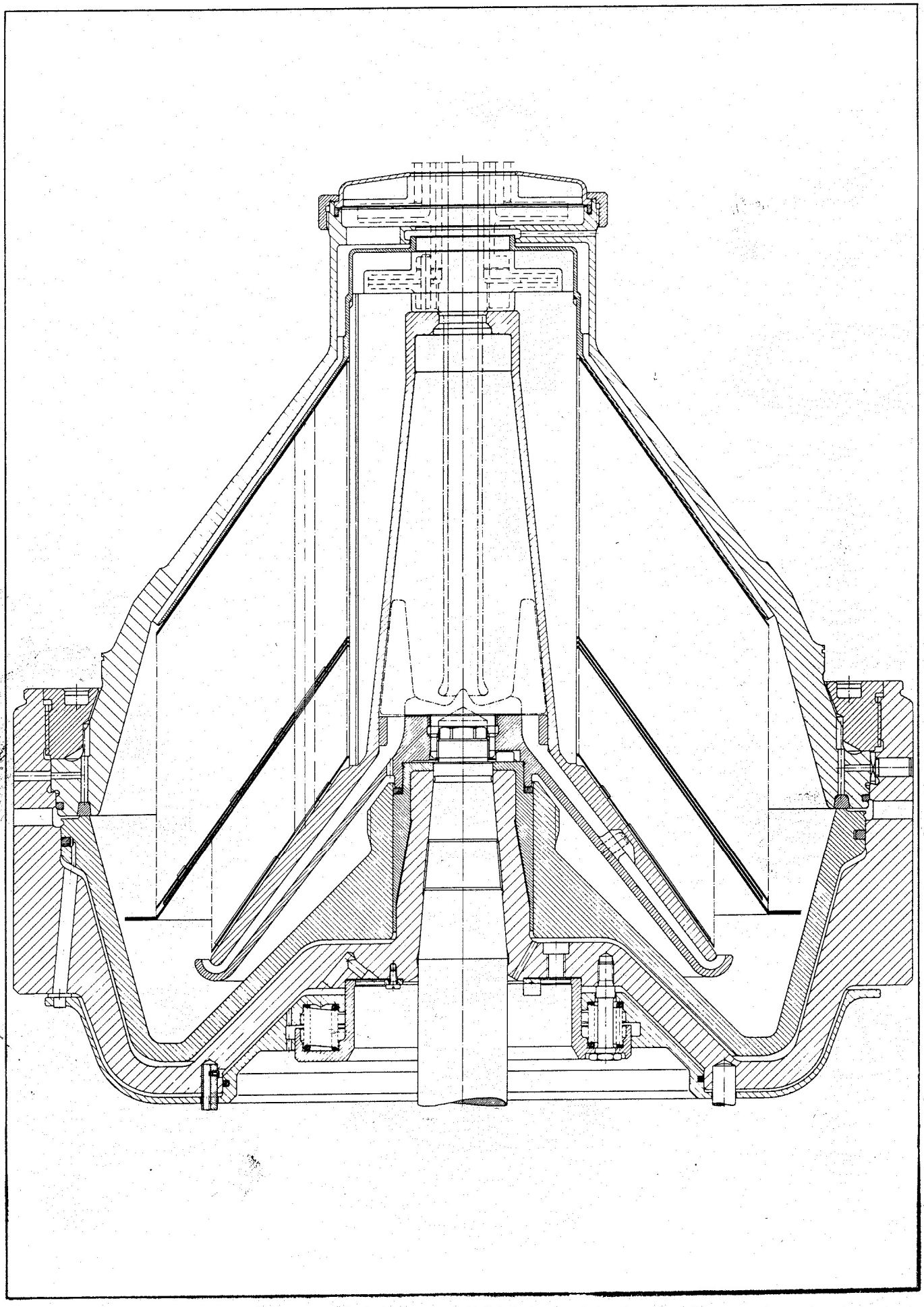
Observera att kulan måste stå stilla innan isärtagningen får påbörjas – kontrollera mot varvräknaren.

Tag isär delarna i den ordning som framgår av figuren. Använd haknyckel för att skruva loss tilloppsröret från den undre skalskivan (se även vertikalsnitt).

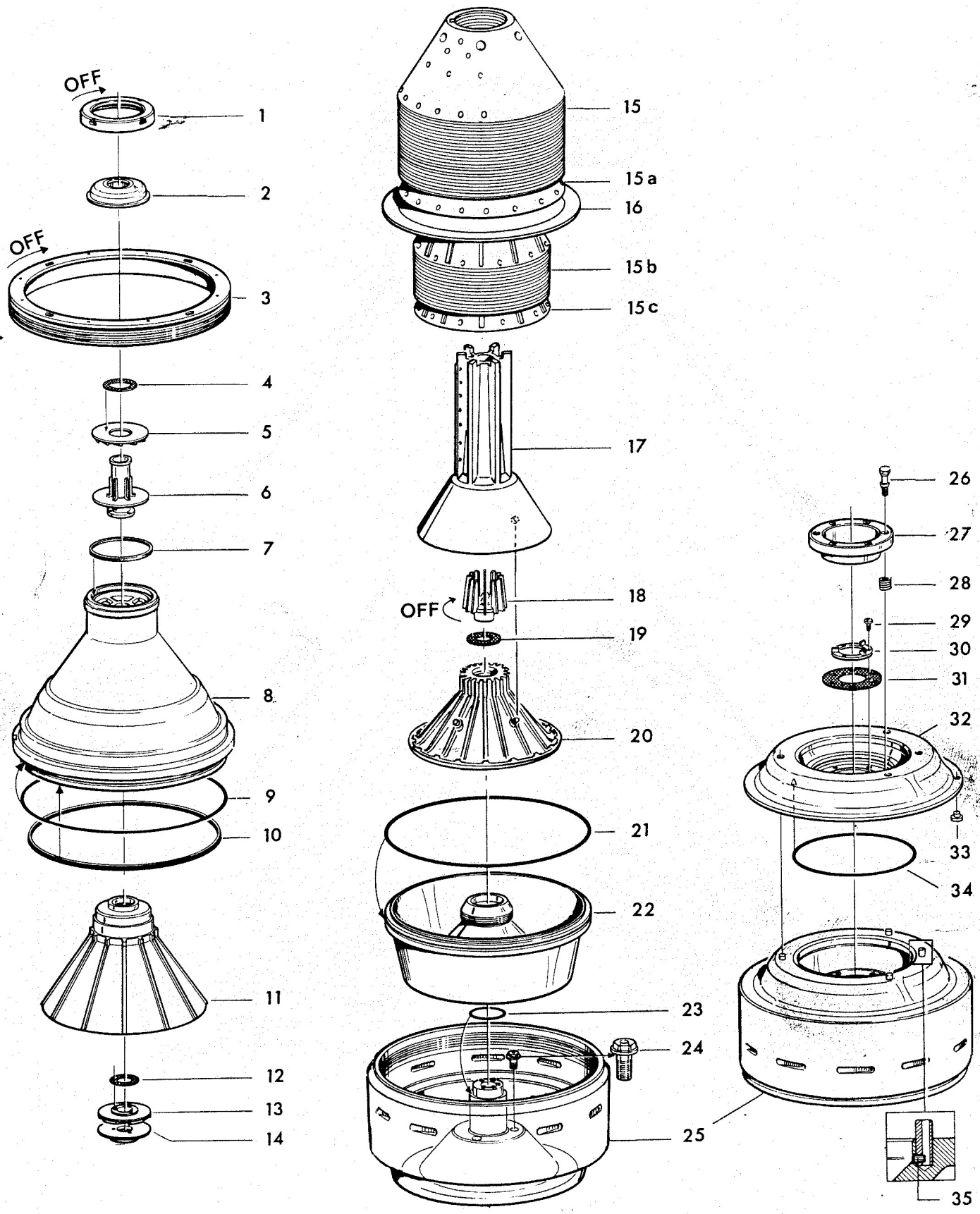
HOPSÄTTNING

Gör ren samtliga delar. Smörj noggrant gängor och anliggningsytor. Se särskilt till att tilloppsrörets gänga blir väl smord och att röret blir ordentligt draget.
Kontrollera skalskivornas läge före första start och efter utbyte av delar som kan påverka höjdläget – se vidare i kapitel L, "Höjdinställning".

ALFA-LAVAL



536618-Z
(4260-14)
P


OFF
1
2
OFF
3
4
5
6
7
8
9
10
11
12
13
14
15
15 a
16
15 b
15 c
17
OFF
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35

Ref.	Part No. Delnr.	Qty. Ant.	Part name	Benämning
1	528018-01	1	Lock ring, small (left-hand thread)	Låsring, liten (vänstergänga)
2	528016-02	1	Paring chamber cover	Skalkammarlock
3	536359-02*	1	Lock ring, large (left-hand thread	Låsring, stor (vänstergänga)
4	516281-24**	1	Packing	Packning
5	528221-01**	1	Paring disc, top part	Skalskiva, överdel
6	528229-01**	1	Paring disc, bottom part	Skalskiva, underdel
7	528087-01	1	Packing	Packning
8	536372-01*	1	Bowl hood	Kulhuv
9	521863-02	1	Seal ring	Tätningsring
10	528086-01	1	Seal ring	Tätningsring
11	530118-01*	1	Top disc	Överplåt
12	528220-01**	1	Packing	Packning
13	528218-80**	1	Paring disc, top part	Skalskiva, överdel
14	528217-01**	1	Paring disc, bottom part	Skalskiva, underdel
15	530091-05	152	Bowl disc	Insatsplåt
15a	530091-06	1	Bottom disc	Underplåt
15b	530114-02	36	Bowl disc	Insatsplåt
15c	530114-03	1	Bottom disc	Underplåt
16	530162-02	1	Distributing disc	Fördelningsplåt
17	530123-80*	1	Distributor	Fördelare
18	535258-01**	1	Cap nut (left hand thread)	Kapselmutter (vänstergänga)
19	516281-25	1	Packing	Packning
20	533283-80*	1	Distributing cone	Fördelningskona
21	523116-04	1	Seal ring	Tätningsring
22	528044-01	1	Sliding bowl bottom	Slidtallrik
23	223416-35	1	Seal ring	Tätningsring
24	526648-01**	3	Screw/nozzle	Skruv/munstycke
25	536252-80*	1	Bowl body	Kulkropp
26	528168-01	6	Screw	Skruv
27	528166-01*	1	Spring support	Fjäderhållare
28	226214-74	24	Spring	Fjäder
29	2211722-25	3	Screw	Skruv
30	528169-02	1	Wing rim	Vingkrans
31	528167-01	1	Packing	Packning
32	528164-01*	1	Operating slide	Manöverslid
33	528165-02	3	Valve plug	Ventilpropp
34	223412-55	1	Seal ring	Tätningsring
35	515133-03	1	Nozzle	Munstycke

* Exchange necessitates rebalancing — send the COMPLETE bowl to an authorized ALFA-LAVAL representative.

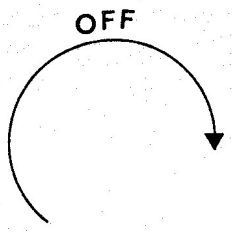
** Not included in the complete-unit number of the bowl.

* Utbyte nödvändiggör ombalansering — skicka in HELA kulan till en auktoriserad ALFA-LAVAL representant.

** Ingår ej i kulans komplettnummer.

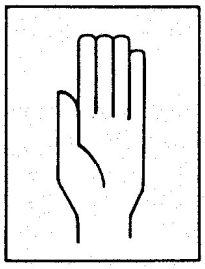
DISMANTLING. ASSEMBLY

Dismantle and assemble the bowl in the sequence appearing from the perspective drawing, observing any directions given in the following text. Use the special tools – see chapter F. Place the parts on a soft base (such as wood or rubber).
Observe that the bowl MUST be at rest before dismantling of inlet and outlet is commenced. After assembly check manually that the bowl rotates unimpeded.



Left-hand thread

The bowl rotates clockwise. For this reason, the threads of the rotating parts are left-handed. This is always mentioned in the text. Where right-hand threads are concerned, no special note is made.



Lubrication (see chapter H)

Clean and lubricate the threads of the lock rings and their contact surfaces with bowl hood and bowl body before every assembly. Seizing may be the result, especially in new machines, if this lubrication is neglected or an unsuitable lubricant is used. Careful lubrication of these surfaces will prevent unnecessary wear and severe seizing.

Small lock ring

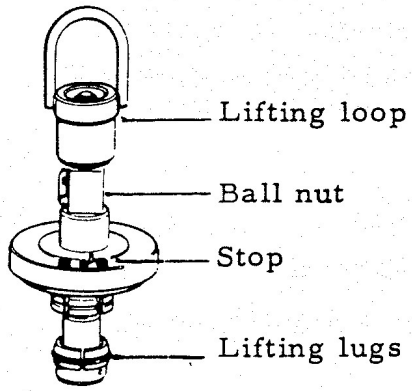
The lock ring is provided with left-hand thread and unscrews CLOCKWISE. It is loosened by hitting the spanner handle with a lead mallet or the like. When assembling screw it down firmly so that a tight joint is obtained at the paring chamber cover. Lubricate the thread before mounting.

Large bowl lock ring. Disc set pressure

The lock ring has left-hand thread and thus unscrews CLOCKWISE.

The ring must be tightened until tight contact is obtained between bowl hood and bowl body. The hood now should press the distributor against the bottom of the bowl body while FIRMLY clamping the disc set.

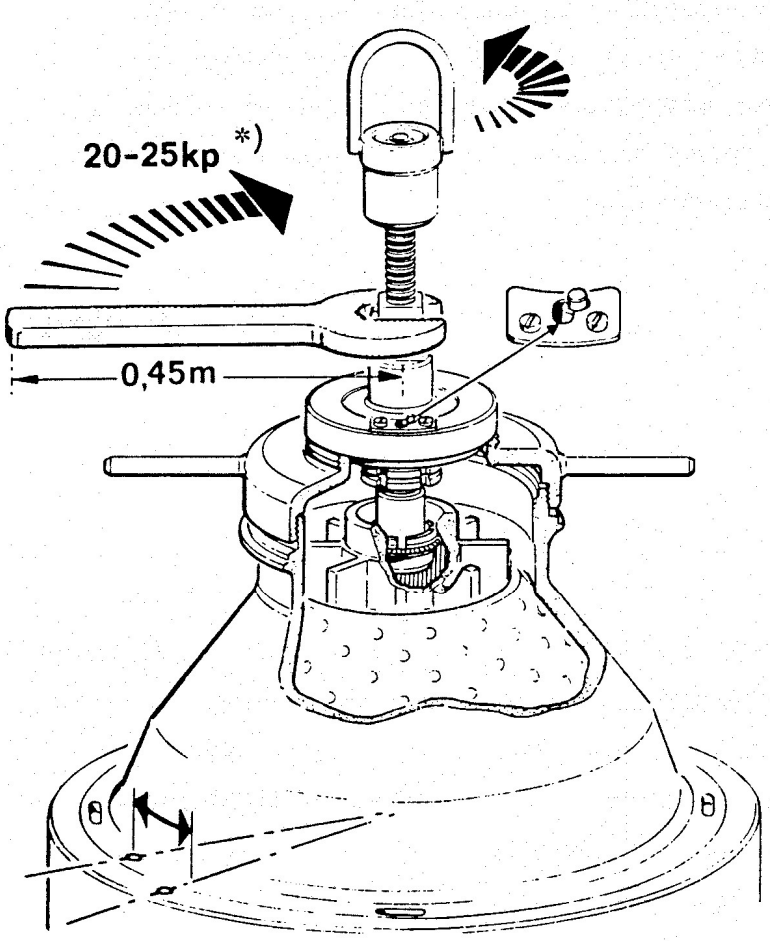
Insufficient disc set pressure may cause rough bowl running and even heavy vibration (danger).



Note that the lock ring must turn easily in the corresponding thread of the bowl body to ensure correct disc set pressure according to the method below. Check this by screwing on the lock ring with bowl hood placed on the bowl body but disc set removed.

Before fitting the pressing tool check that lifting loop and lugs are positioned as above.

To check and adjust the disc set pressure proceed as follows:



1 Add one or more extra discs to the top of the ordinary disc set. Fit the solids indication disc, if any, and the bowl hood.

2 Fit the tool as illustrated above.

3 Push stop into locking position.

4 Retain the ball nut and turn lifting loop ANTI-CLOCKWISE until lifting lugs are fully pressed out and well engaged.

5 Tighten ball nut CLOCKWISE with spanner until a force of 20-25 kp is obtained (this will give a pressing power of 6-7 tons).

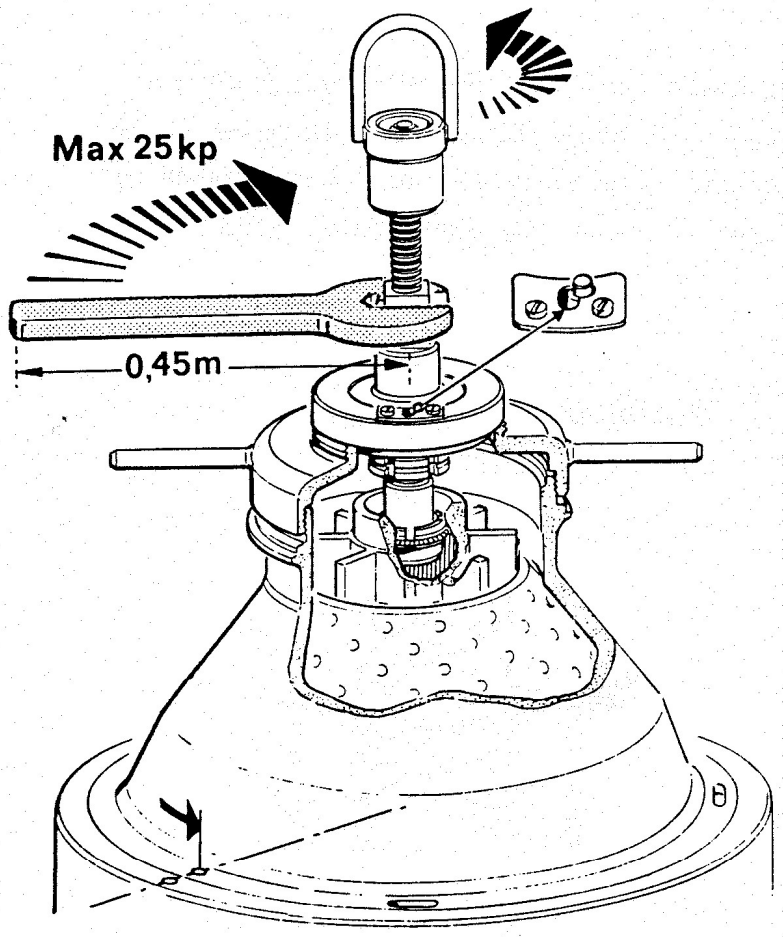
*) The force can be checked by means of a spring balance applied to outer end of spanner

(Lock ring..)

6 Lubricate the lock ring thread and tighten the ring as far as possible by hand, using the bowl spanner. The mark ϕ of the lock ring should now, as viewed in the direction of tightening, lie before the mark ϕ of the stationary part (the bowl body, and for lock ring with internal thread, the bowl hood respectively).

If the marks ϕ are aligned, a further disc or more must be added and the procedure 1-6 be repeated.

7 When the requirement according to paragraph 6 has been complied with, unscrew the lock ring. Relieve the disc set of pressure by screwing the ball nut slightly CLOCKWISE so that the stop can be released and the ball nut be turned ANTI-CLOCKWISE. Remove the tool as well as the bowl hood, and the top disc, if any.



8 Correct pressure is now obtained as follows: Remove the smallest number of discs that will allow the lock ring, with disc set compressed, to be tightened by hand with the bowl spanner until the marks ϕ are aligned. The force applied to the spanner of the pressing tool must not exceed 25 kp.

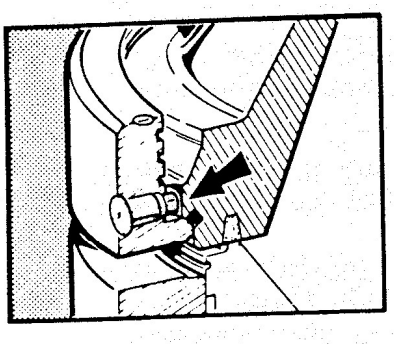
9 With marks ϕ aligned, hit the bowl spanner handle lightly a few times with the tin hammer.

Note

In a new bowl marks ϕ will thus line up. In time it may become possible to draw mark ϕ of the ring past the stationary mark due to wear of the threads. When thread wear has been established scribe stationary part at new position of the mark on the ring. For check on thread wear see chapter L.

(Dismantling. Assembly)

Bowl hood



The bowl hood lifting tool is screwed ANTI-CLOCK-WISE (left-hand thread) onto the bowl hood.

Put on the bowl hood so that the guide lug of the bowl body enters the recess in the hood. If the bowl hood does not drop properly into its seat when the disc set is compressed as described above check whether some part has been wrongly fitted.

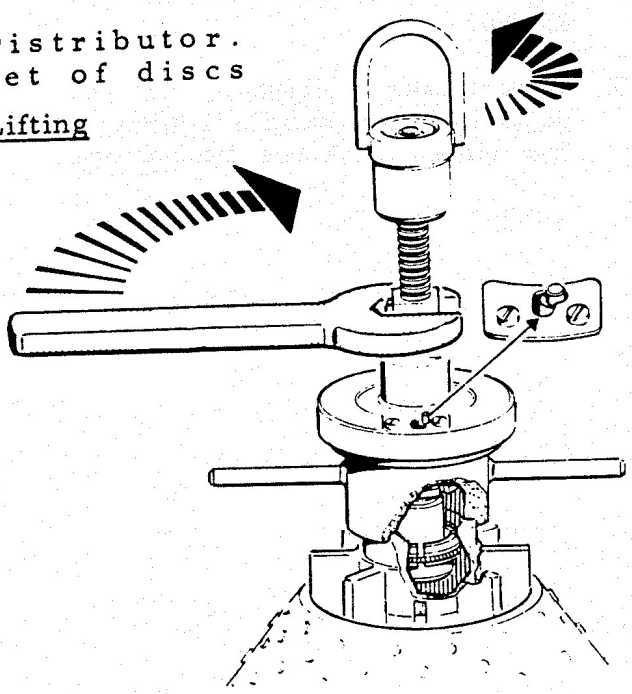
The seal ring in the lower edge of the hood should be removed for exchange only – see chapter L, Bowl Overhaul. Lubricate the thread and the surfaces in contact with the large lock ring before screwing on the latter.

Solids indi-cation disc

When mounting make sure that the bore mark on the solids indication disc neck comes right in front of the bowl body guide lug. The recesses in the underside of the disc will now fit over the distributor ribs.

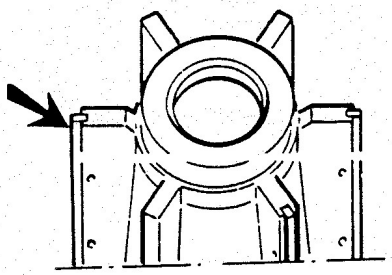
Distributor. Set of discs

Lifting



1. Fit the tool as appears from illustration.
2. Push stop into locking position.
3. Retain ball nut and turn lifting loop ANTI-CLOCKWISE until lugs are fully pressed out and well engaged.
4. Tighten ball nut lightly CLOCK-WISE using the spanner.
5. Lift distributor with disc set.

Mounting

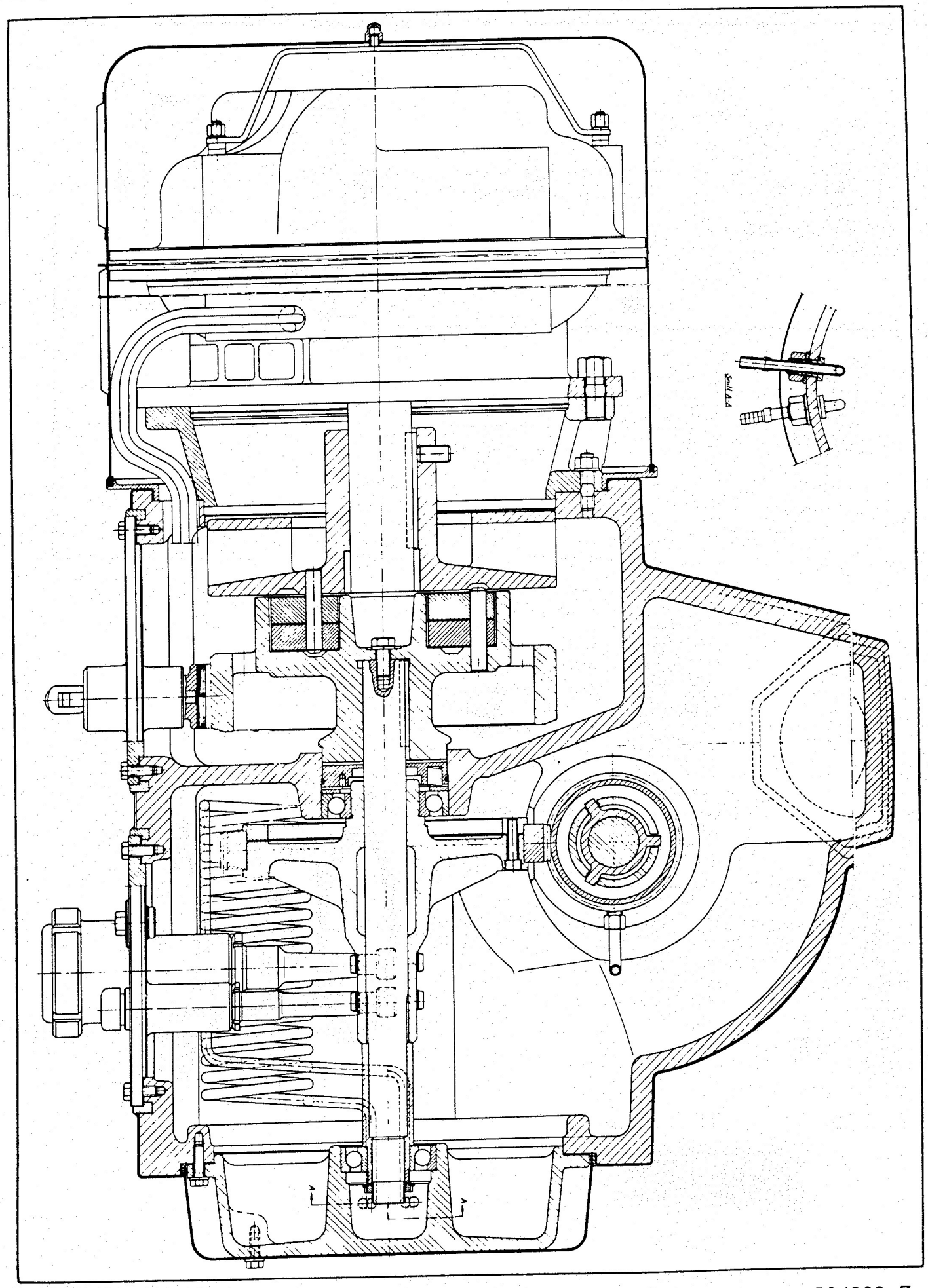


Three of the distributor wings are provided with guide ribs. When mounting, position the guide rib pointed out in illustration slightly to one side of the bowl body guide lug. Now turn the distributor until the recesses in its underside will fit over the guide pins of the distributing cone.

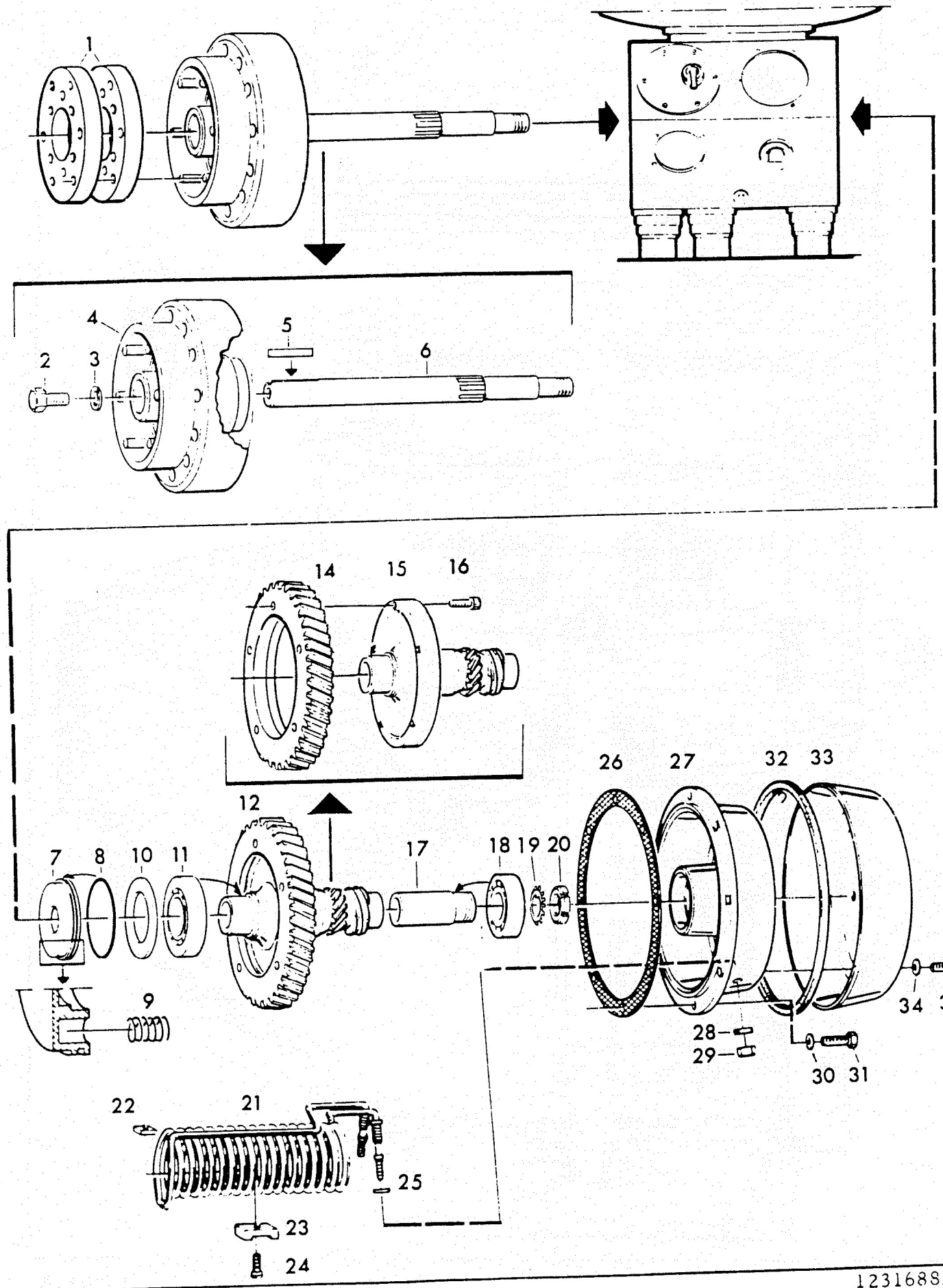
(Dismantling. Assembly)

Cap nut (cyclone nut)	The nut has left-hand thread and thus unscrews CLOCKWISE. Use a hook spanner. Lubricate the thread before mounting. Tighten the nut firmly.
Distributing cone	At assembly the recesses in the underside of the distributing cone must fit over the corresponding guides on the bowl body.
Sliding bowl bottom	When mounting make sure that the sliding bowl bottom drops into the proper position, i.e. with its upper rim approximately flush with the lower edge of the discharge openings in the bowl body. Before assembly lubricate the sliding surfaces of the sliding bowl bottom – nave bore and peripheral surface.
Bowl body	For dismantling screw the screws out of the bowl body bottom and mount the lifting tool. Detach the bowl body from the spindle by screwing down the eye nut. When mounting lubricate the three screws, place them in the holes in the bowl body bottom and rotate the bowl body slowly until the screws enter the holes in the distributing ring. Tighten the screws evenly and firmly. Distributing ring – see Paring Disc Device in chapter S. If the bowl body must be turned upside down use the special tool.
Discharge mechanism	The operating slide must be handled with great care. Oblique and uneven mounting or dismantling and use of force will in most cases result in deformation with operation trouble as a consequence. The valve plugs should be removed only for exchange. Nozzle and channels should be cleaned with soft iron wire. When assembling lubricate the sliding surface of the operating slide (facing the spring support) and the bowl body surface against which the slide glides. Tighten the spring support screws evenly and firmly.

ALFA-LAVAL



534202-Z
(4225-1, 4226-1)


1
2
3
4
5
6
7
8
9
10
11
12
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35

POWER TRANSMISSION

Dismantle and assemble the parts in the sequence shown in the illustrations on the following pages, using the special tools supplied.

In addition to the specific instructions, remember the following points at all times ...

... cleanliness and neatness are essential.

... make sure that all seal rings and gaskets are intact.

... exchange spring washers whenever necessary.

... avoid unnecessary dismantling of ball bearings.

... follow the directions given in chapter L for assembly of ball and roller bearings.

... round nuts should be tightened with a spanner and locked with lock washers.

.... the worm-gear housing should be cleaned and filled with clean oil after any work that may have introduced dirt.

... follow the directions for cleaning and overhaul in chapter L and the directions for lubrication in chapter H.

ALFA-LAVAL

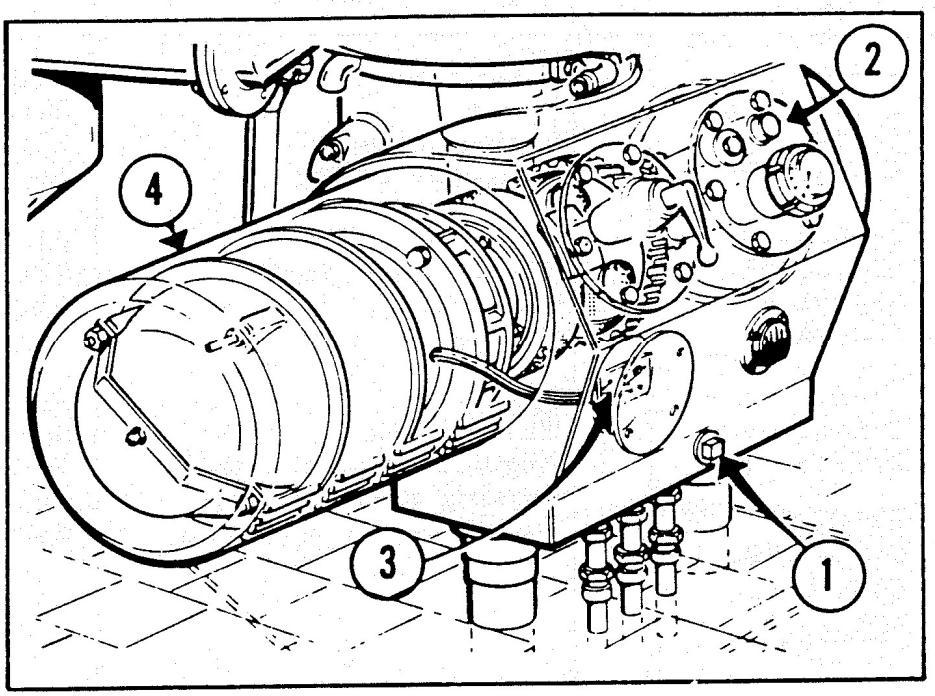
COUPLING. WORM WHEEL SHAFT
KOPPLING. SKRUVHJULSAXEL

P

Ref.	Part No. Delnr.	Qty. Ant.	Part name	Benämning
1	60571	2	Elastic plate	Ledskiva
2	2210947-16	1	Screw	Skruv
3	62094	1	Spring washer	Fjäderbricka
4	534181-80	1	Conveyor pulley	Medbringarskiva
5	223610-19	1	Key	Kil
6	534180-01	1	Worm wheel shaft	Skruvhjulsaxel
7	534191-01	1	Seal washer	Tätningsbricka
8	223408-09	1	O-ring	O-ring
9	74467	12	Spring	Fjäder
10	536666-01	1	Thrust disk	Spännbricka
11	233215-07	1	Angular contact ball bearing (SKF 7213B)*	Vinkelkontaktkullager (SKF 7213 B)*
12	50 Hz: 538049-80 60 Hz: 538049-81	1	Worm wheel, complete	Skruvhjul, komplett
14	50 Hz: 538051-02 60 Hz: 538051-03	1	Gear rim	Kuggkrans
15	--	1	Worm wheel nave	Skruvhjulsnav
16	2217759-07	5	Screw	Skruv
17	534193-01	1	Spacing sleeve	Distanshylsa
18	233215-08	1	Angular contact ball bearing (SKF 7308B)*	Vinkelkontaktkullager (SKF 7308B)*
19	37992	1	Lock washer (SKF MB 6)	Låsbricka (SKF MB 6)
20	67473	1	Round nut (SKF KM 6)	Rundmutter (SKF KM6)
21-24	534126-81	1	Cooling coil, complete	Kylslinga, komplett
22	534128-01	1	Washer	Bricka
23	534127-01	1	Magnet	Magnet
24	221226-33	1	Screw	Skruv
25	73665	2	Packing	Packning
26	43626	1	Packing	Packning
27	534111-01	1	Bearing shield	Lagersköld
28	223101-37	2	Washer	Bricka
29	2218043-10	2	Nut	Mutter
30	223101-34	8	Washer	Bricka
31	72530	8	Screw	Skruv
32	43630	1	Sealing strip	Tätningslist
33	528709-01	1	Protecting cap	Skyddskåpa
34	223101-34	3	Washer	Bricka
35	73373	3	Screw	Skruv
			* or equivalent bearing of other make	* eller likvärdigt lager av annat fabrikat

S91001E,S-3
(4226-1; 3720-3960 r/m)

DISMANTLING. ASSEMBLY



Exchange of worm wheel only

1. Drain off the oil.
2. Remove the tachometer cap.

Remove the protecting cap (if any), bearing shield etc. according to illustration on foregoing page. Observe any directions in the following text.

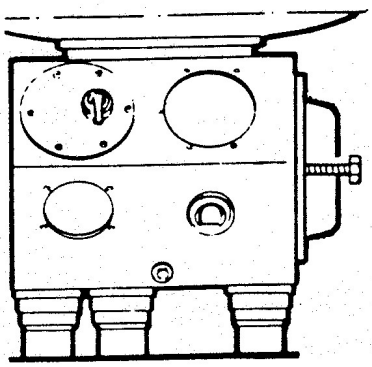
Note. The motor need not be removed.

Complete dismantling

1. Drain off the oil.
2. Remove the tachometer cap.
3. Disconnect the electric wires from the terminal block in the frame.
4. Remove the motor (together with the motor adapter).

Remove the protecting cap (if any), bearing shield etc. according to illustration on foregoing page. Observe any directions in the following text.

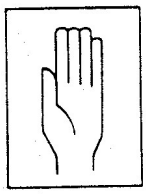
Bearing shield



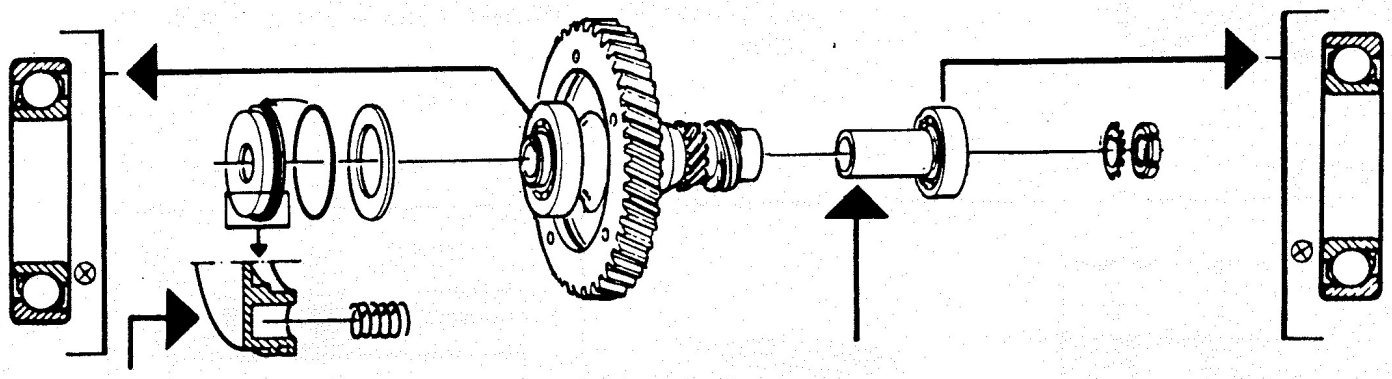
To detach the bearing shield from the frame use two of its screws , screwing them into the two threaded holes of the shield.

(Dismantling. Assembly)

Angular contact ball bearings



The bearings for worm wheel and spacing sleeve are single-row angular-contact ball bearings. When mounting them it is essential that they should be turned in the direction shown in the illustration below. The symbol ⊗ indicates the stamped side of the inner ring.
Heat the bearings in oil before fitting them on the worm wheel, and on the spacing sleeve respectively.



Seal washer

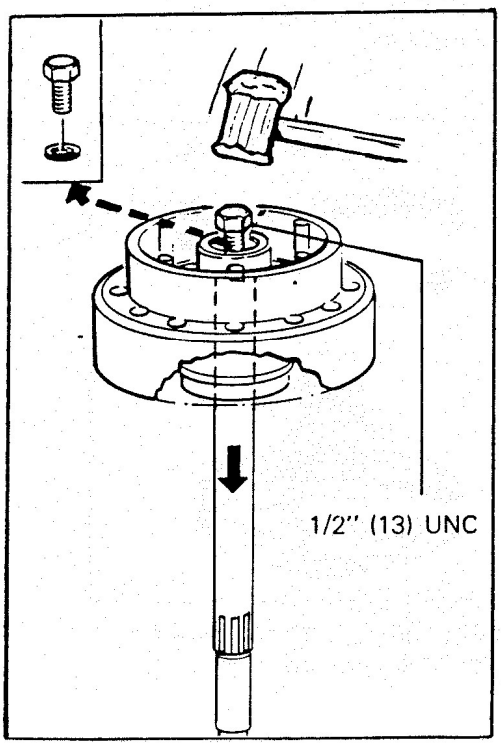
The seal washer is pulled out by means of two special screws included in the set of tools.

To retain the springs of the washer during mounting apply a little consistent grease to them.

Spacing sleeve

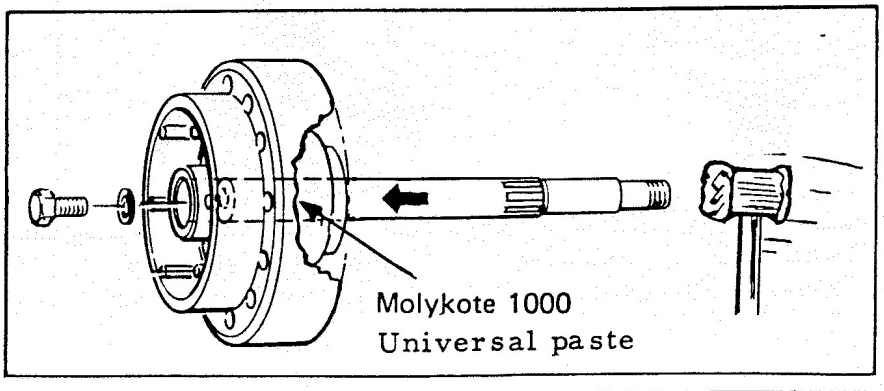
The spacing sleeve (with the bearing) is pulled off from the worm wheel shaft by means of a special screw included in the set of tools.

Exchange of conveyor pulley or worm wheel shaft



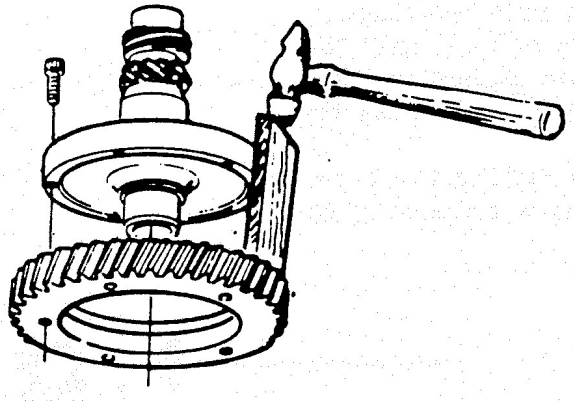
Dismantling

Assembly



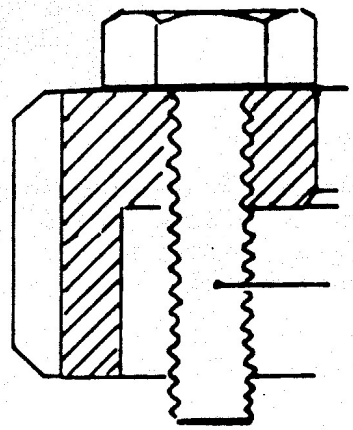
Exchanging the gear rim of worm wheel nave

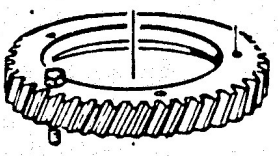
Dismantling



Put the worm wheel on a wooden base.
Remove the screws.
Using a piece of wood as an intermediary, knock the gear rim off the nave with powerful blows distributed evenly all around the rim.

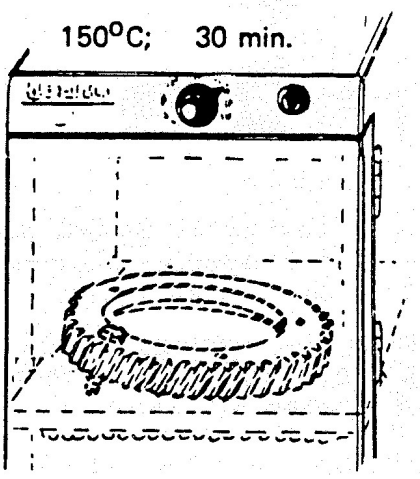
Assembly



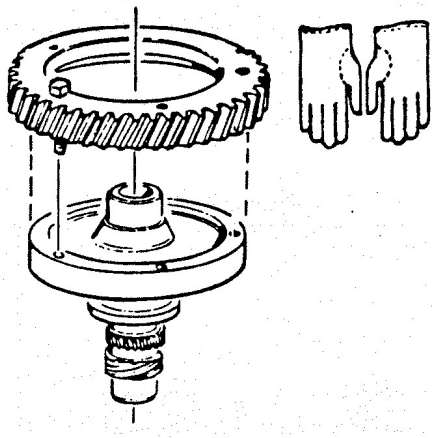


3/8" UNC; L = min. 45 mm
(= screw with part No. 2210941-03)

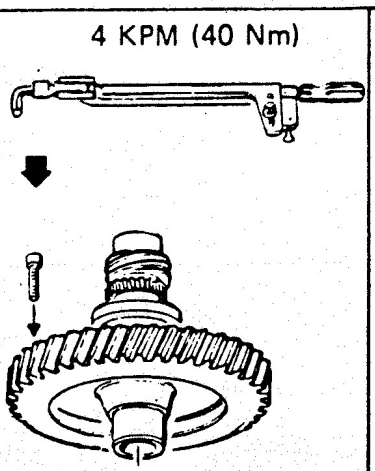
Fit one guiding screw as above.



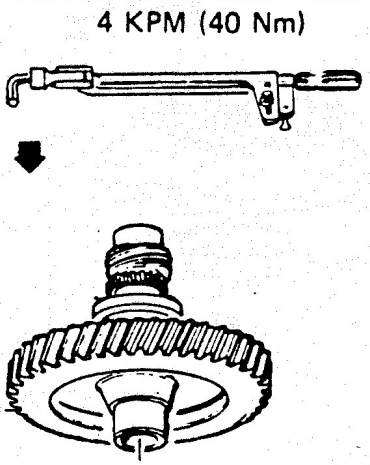
Heat the gear rim in a heating cabinet.



Fit the rim on the nave.
Remove the guiding screw.

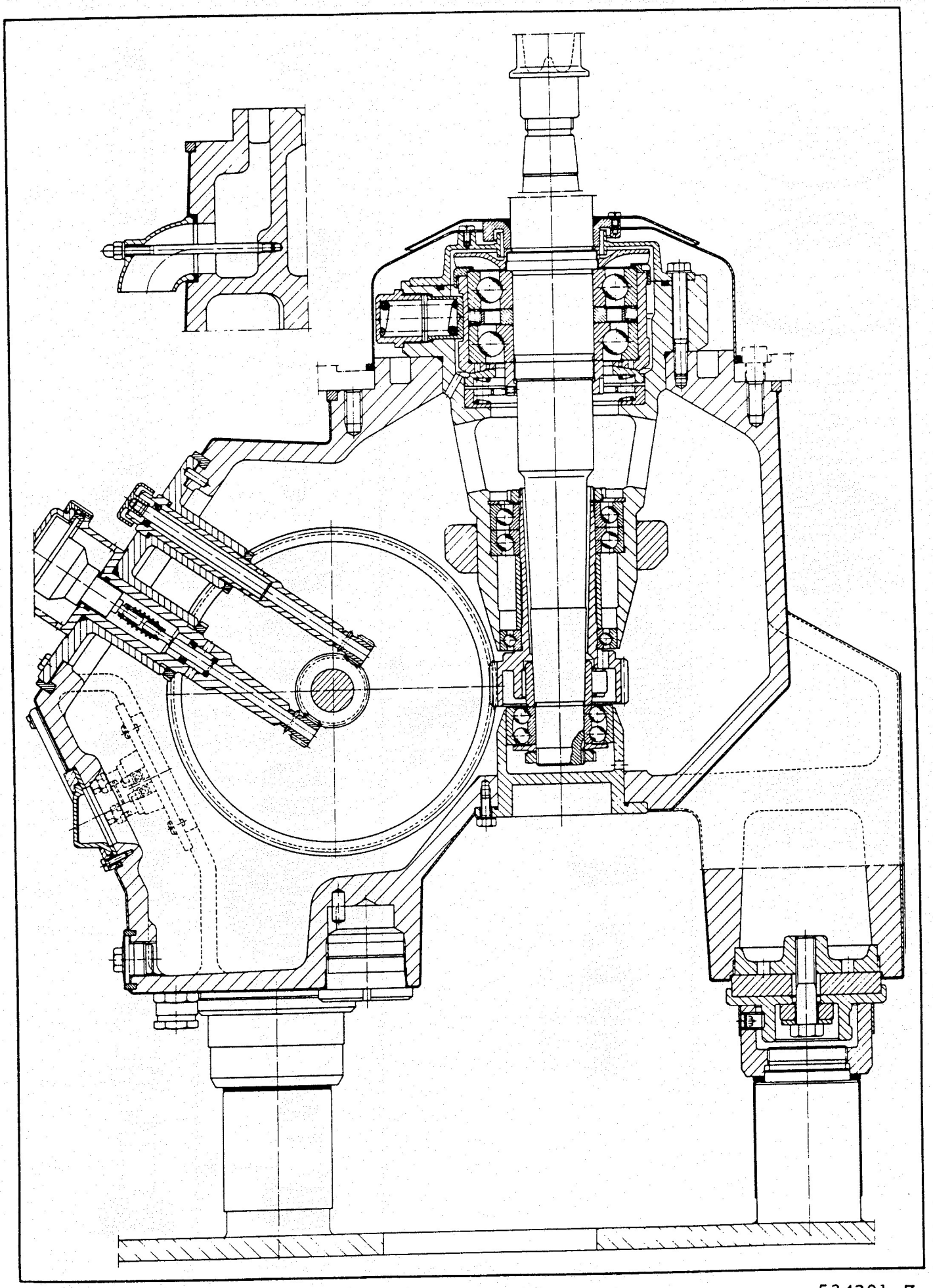


Tighten the screws while the rim is hot.

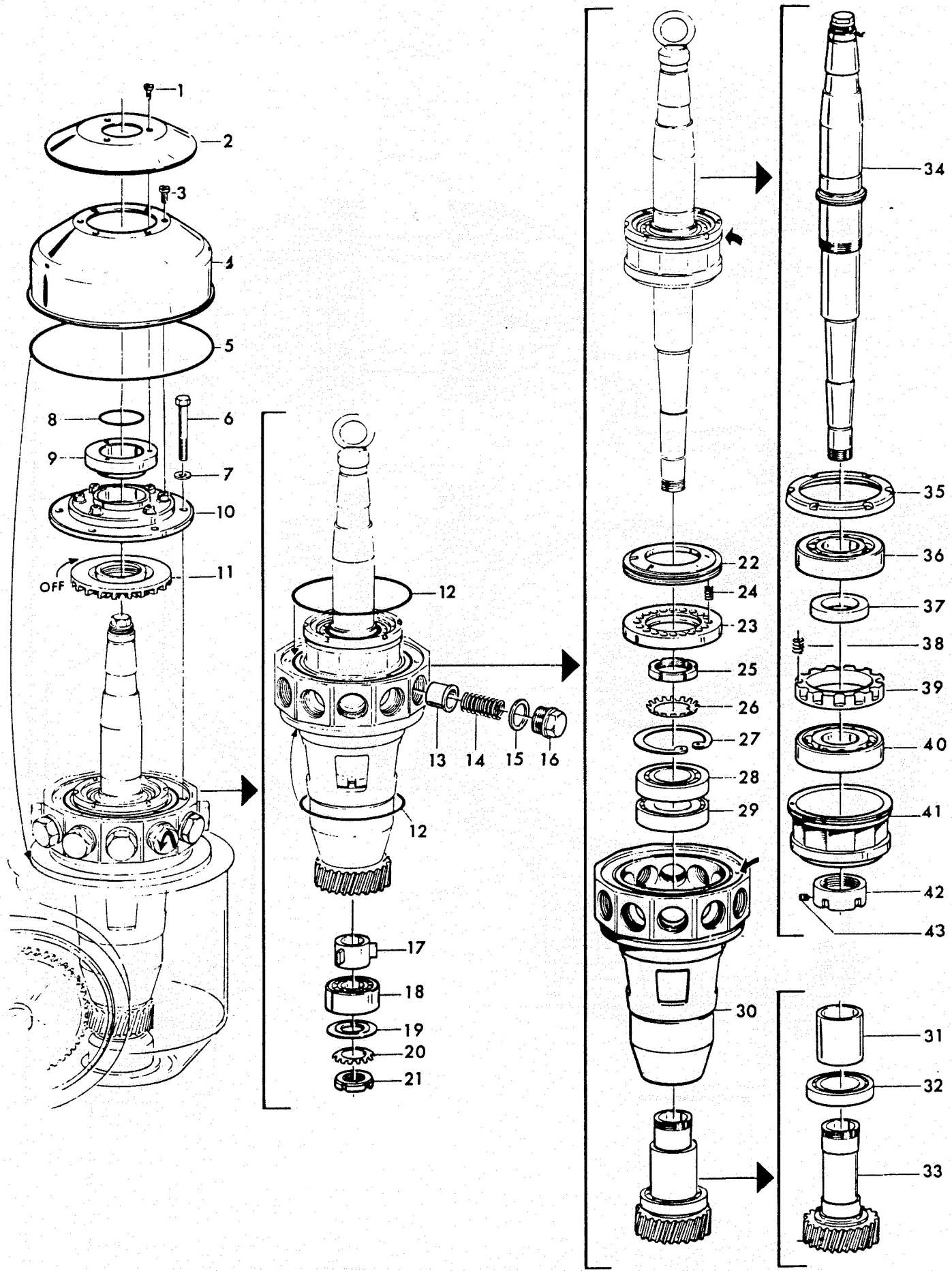


Test-tighten screws when rim has cooled down.

ALFA-LAVAL



534201-Z
(4225-1, 4226-1)


1
2
3
4
5
6
7
8
9
10
11
OFF
12
13
14
15
16
12
17
18
19
20
21
22
24
23
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43

ALFA-LAVAL

BOWL SPINDLE
KULSPINDEL

P

Ref.	Part No. Delnr.	Qty. Ant.	Part name	Benämning
1	2211722-24	3	Screw	Skruv
2	526198-03	1	Top shield	Skyddsplåt
3	2211724-22	6	Screw	Skruv
4	526196-02	1	Protecting cap	Skyddskåpa
5	223412-51	1	Seal ring	Tätningsring
6	2210947-23	6	Screw	Skruv
7	223101-50	6	Washer	Bricka
8	223412-17	1	Seal ring	Tätningsring
9	526197-03	1	Throw-off collar	Skyddskrage
10	533512-02	1	Cover	Lock
11	533414-02	1	Oil deflector (left-h.thr.)	Oljefläkt (vänstergänga)
12	223412-42	2	Seal ring	Tätningsring
13	70346	12	Buffer	Buffert
14	66191	12	Spring	Fjäder
15	72473	12	Washer	Bricka
16	528776-01	12	Plug	Propp
17	71973	1	Conveyor	Medbringare
18	69843	1	Self-aligning ball bearing (SKF 2309M)*	Sfäriskt kullager (SKF 2309M)*
19	73988	1	Intermediate washer	Mellanläggsbricka
20	66076	1	Lock washer (SKF MB9)	Låsbricka (SKF MB9)
21	67476	1	Round nut (SKF KM9)	Rundmutter (SKF KM9)
22	533417-01	1	Wear ring	Slitring
23	533418-01	1	Spring support	Fjäderhållare
24	70340	20	Spring	Fjäder
25	66312	1	Round nut (SKF KM14)	Rundmutter (SKF KM14)
26	66313	1	Lock washer (SKF MB 14)	Låsbricka (SKF MB 14)
27	223642-45	1	Snap ring	Spårring
28	69850	2	Angular contact ball bearing (SKF 7214BM)*	Vinkelkontaktkullager (SKF 7214BM)*
29				
30	534143-01	1	Spring casing	Fjäderhus
31	534276-01	1	Spacing sleeve	Distanshylsa
32	65187	1	Rigid ball bearing (SKF 6014M)*	Spårkullager (SKF 6014M)*
33	50 Hz: 534275-09 60 Hz: 534275-13	1	Worm	Snäcka
34	535556-01	1	Spindle	Spindel
			* or equivalent bearing of other make.	* eller likvärdigt lager av annat fabrikat.

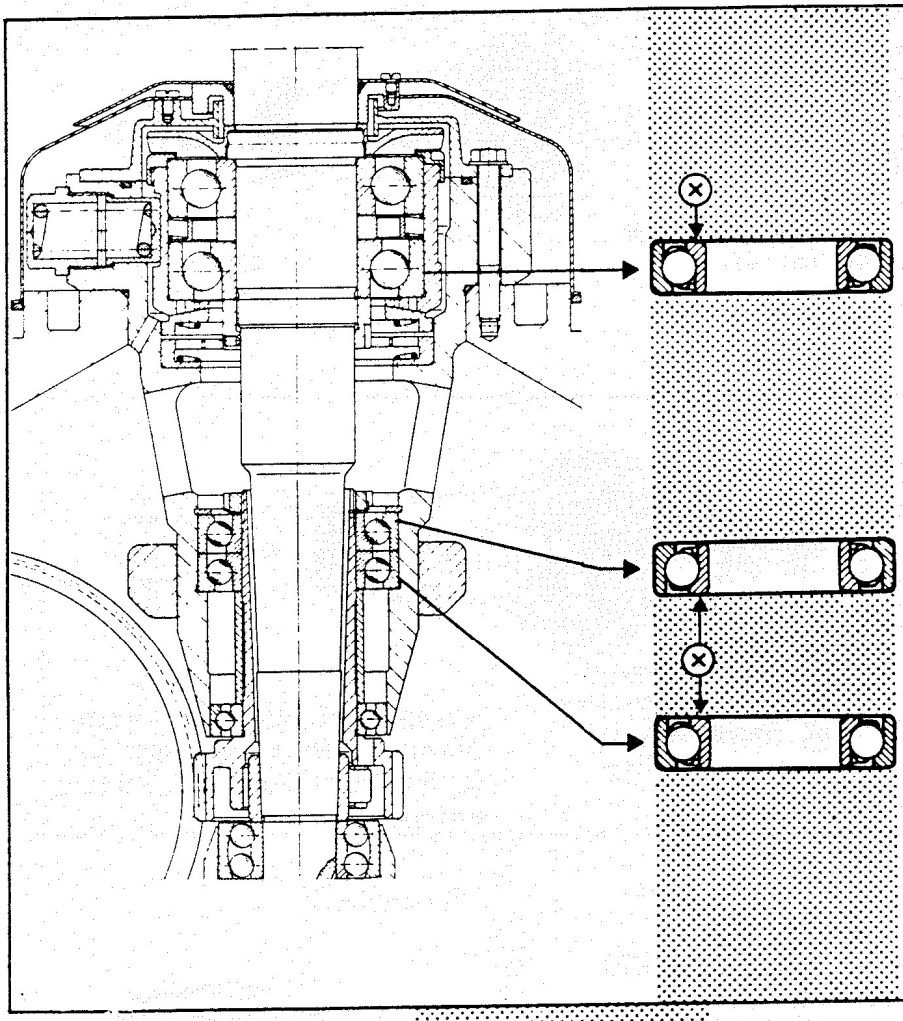
(1231678)

S91008E,S -2
(4226-1 ; 3720-3960 r/m)

Ref.	Part No. Delnr.	Qty. Ant.	Part name	Benämning
35	533413-01	1	Lock ring	Låsring
36	233211-49	1	Rigid ball bearing (SKF 6315M)*	Spårkullager (SKF 6315M)*
37	533415-01	1	Spacing sleeve	Distanshylsa
38	62763	12	Spring	Fjäder
39	533412-01	1	Spring support	Fjäderhållare
40	233215-03	1	Angular contact ball bearing (SKF 7315BM)*	Vinkelkontaktkullager (SKF 7315 BM)*
41	533411-01	1	Ball bearing housing	Kullagerhus
42	533416-01	1	Stop ring	Stoppring
43	221545-02	2	Set screw	Stoppskruv
			* or equivalent bearing of other make.	* eller likvärdigt lager av annat fabrikat.

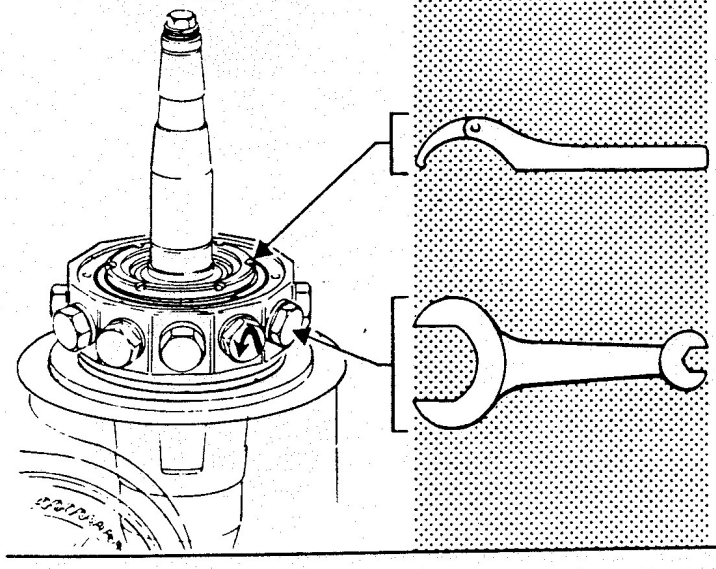
DISMANTLING
ASSEMBLY

Always dismantle and assemble the bowl spindle parts in the sequence shown in the preceding perspective drawing, observing any directions given below. Use the special tools.
After assembly check the height positions — see chapter L.



The bearings shown in the adjoining illustration are single-row angular-contact ball bearings. They must absolutely be mounted so as to face in direction shown in the figures.

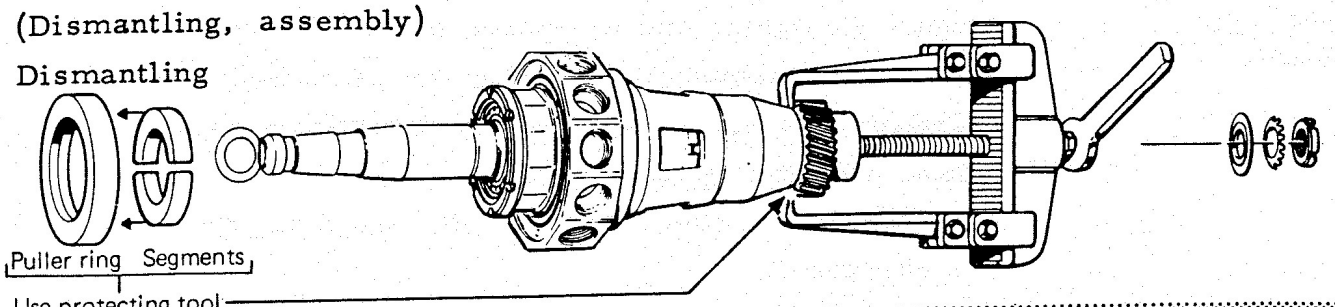
The symbol ⊗ in the illustration indicates the stamped side of the inner ring.



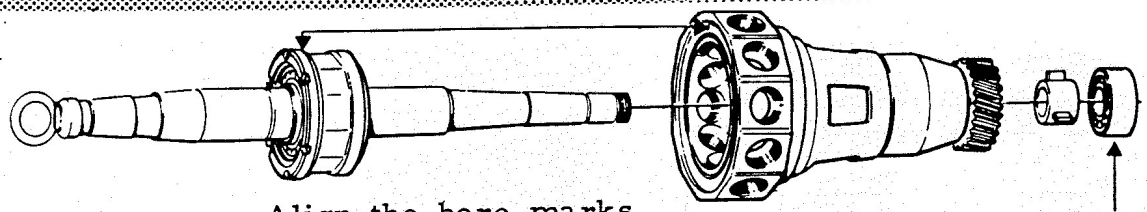
Before lifting the bowl spindle out of the frame, preferably loosen the plugs in the bearing housing as well as the bearing housing lock ring.
When mounting tighten the plugs and lock ring firmly.

(Dismantling, assembly)

Dismantling



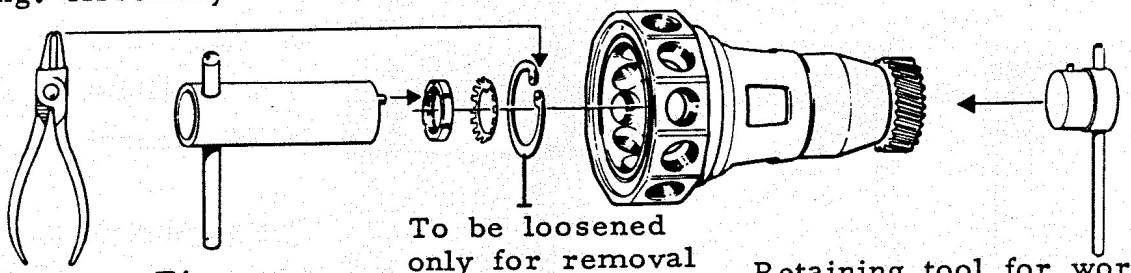
Assembly



Align the bore marks (at the arrows)

To be heated in oil

Dismantling. Assembly



Tongs

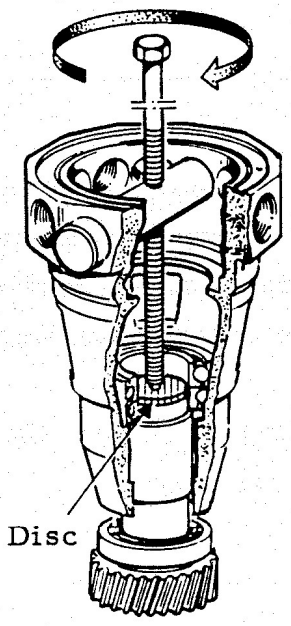
Pin spanner

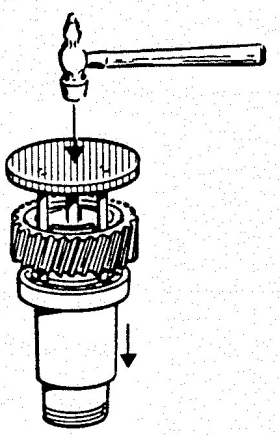
To be loosened only for removal of bearings in spring casing

Retaining tool for worm (used when round nut is to be tightened or loosened)

Worm

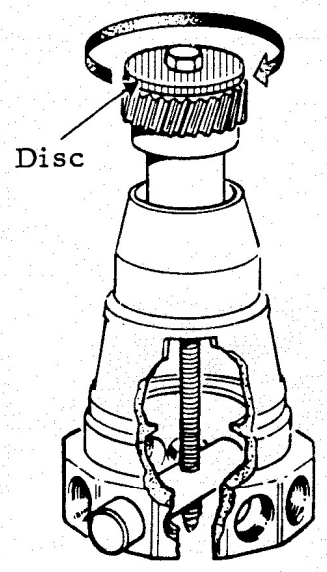
Dismantling





Heat the bearing in oil before mounting

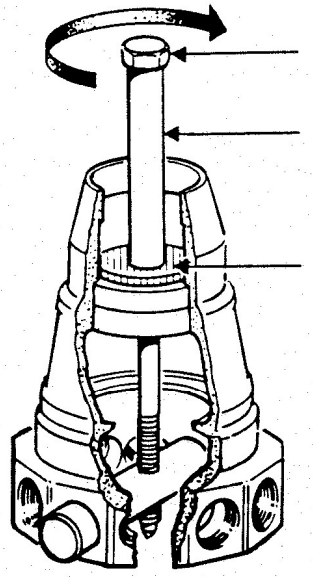
Assembly



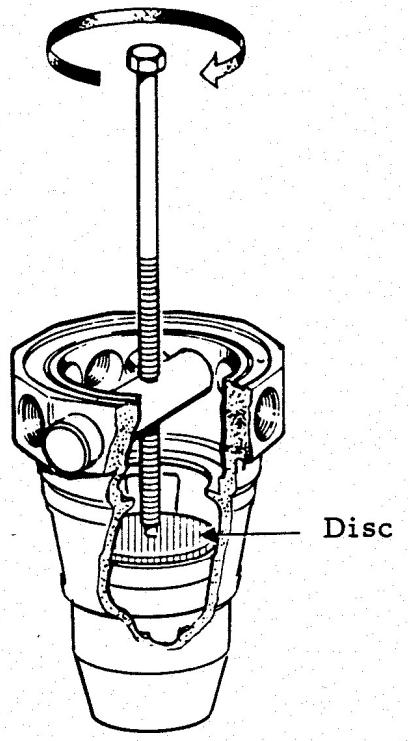
(Dismantling, assembly)

Bearings of spring casing

Dismantling

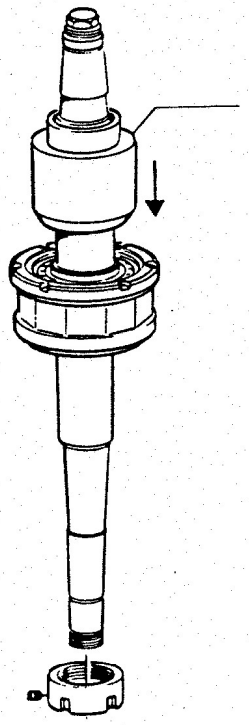


Assembly

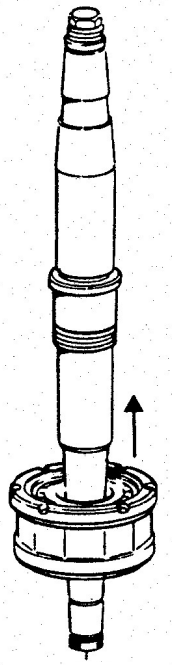


Top bearing

Dismantling



Assembly



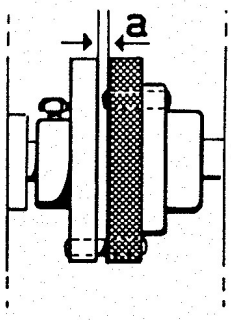
MOUNTING THE MOTOR

The speed prescribed for the ingoing shaft of the machine (the worm wheel shaft) and which must on no conditions be exceeded, is stamped on the type plate of the machine. The worm gear ratio is suited to this speed.

Check the number of revolutions by means of the revolution counter after installation and after exchange of motor.

For particulars concerning power requirement and speed see chapter C.

Coupling pulley



When the machine is delivered with motor, the pulley has been fastened in its correct position on the motor shaft. Score the position of the pulley before loosening it from the motor shaft. The axial play for the elastic plate – measurement "a" in illustration – should be about 2 mm (5/64").

When finishing a predrilled coupling pulley, the tolerance H7-J6 according to ISO should be applied.

Connection to mains

Connect the motor to mains so that the bowl will rotate CLOCKWISE:

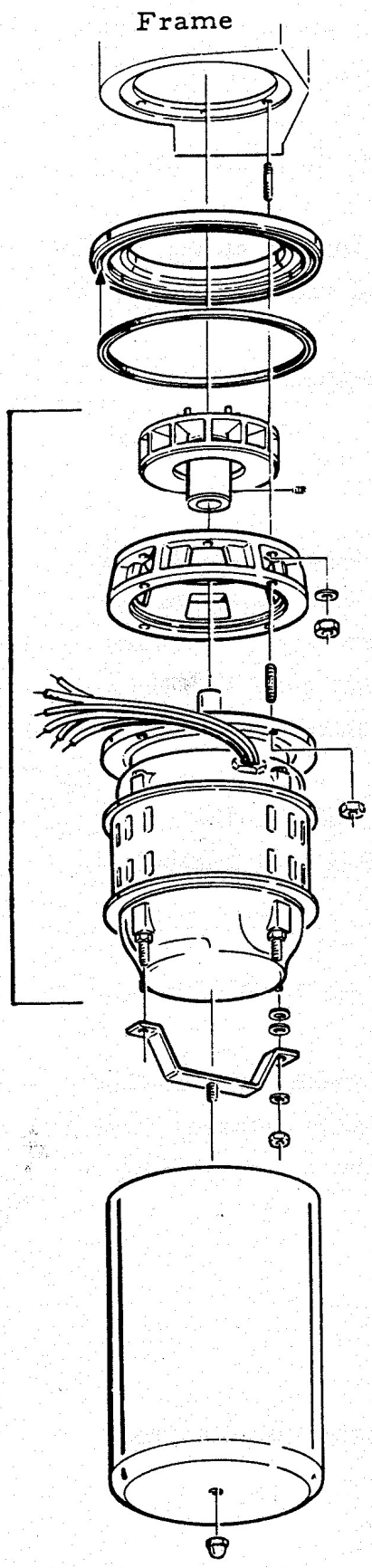
The machine must never be started unless the bowl is placed on the spindle and the worm gear housing contains the prescribed quantity and quality of lubricating oil.

MOTOR

See separate instruction book.

Wiring diagrams for machine with rigid coupling and special motor are shown in chapter G.

(Mounting the motor)



Stud bolt (6)
-- 2216261-02

Guide ring
-- 529531-02

Sealing strip
-- 532072-01

Coupling pulley*
-- 534184-80
/534183-01 *

Set screw
-- 221585-18

Motor adapter
-- 529522-02

Washer (6)
-- 223101-50

Nut (6)
-- 72946

Stud bolt (4)
-- 2216321-16

Nut (4)
-- 2218043-05

Motor (make Brook, type C365D, three-phase motor)**

Washer (4)
-- 223134-01

Attachment
-- 529532-80

Washer (2)

Nut (2)

Motor hood
-- 529529-80

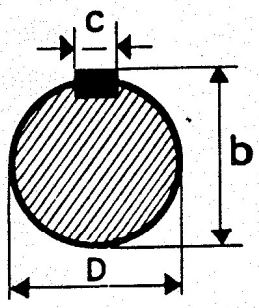
Cap nut
-- 72947

Dismantling. Assembly

When dismantling first disconnect the electric cables from the terminal block in the frame, then dismantle the parts according to the figure. If the coupling pulley should be loosened — see "Coupling pulley" in this chapter.

After assembly remove the brake cap and check that there is a play at the elastic plate.

*



The part No. refers to the solely prebored pulley. If a ready-bored pulley is wanted, state also, besides the above part No., the motor shaft measurements b, c and D.

**

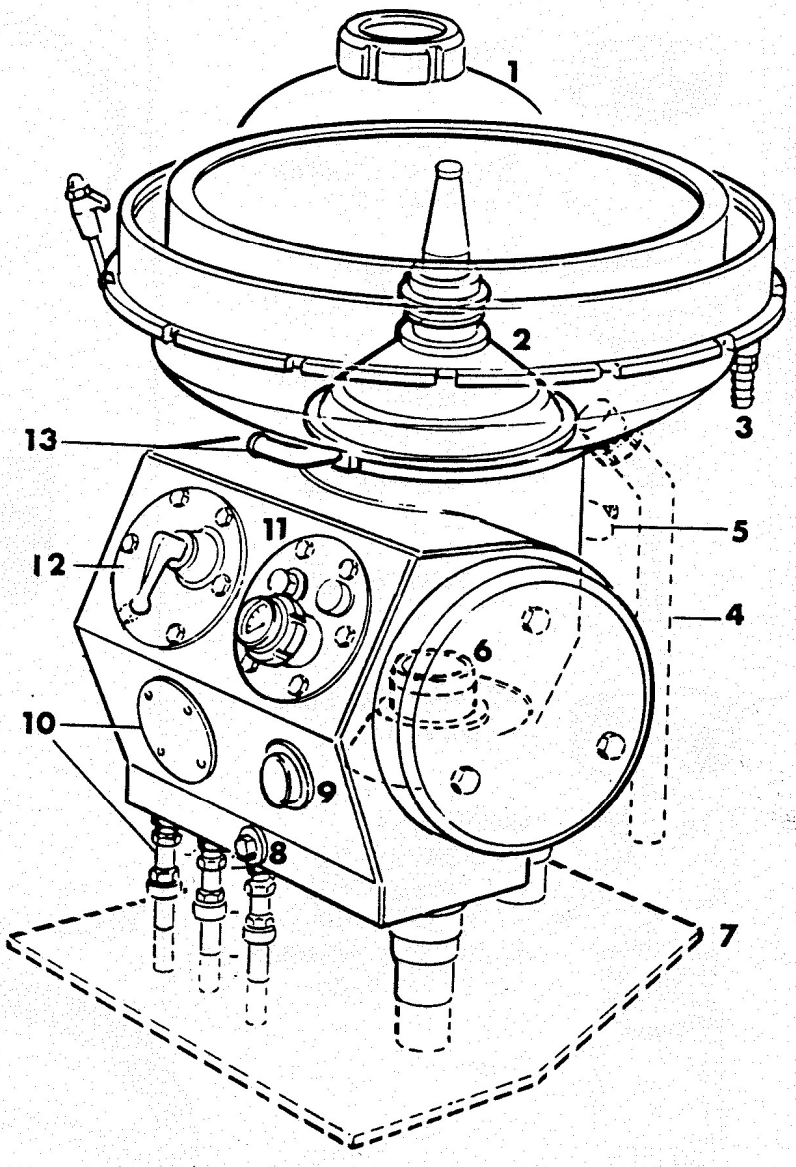
When ordering state also the output, frequency and voltage.

* For MRPX 418TGV

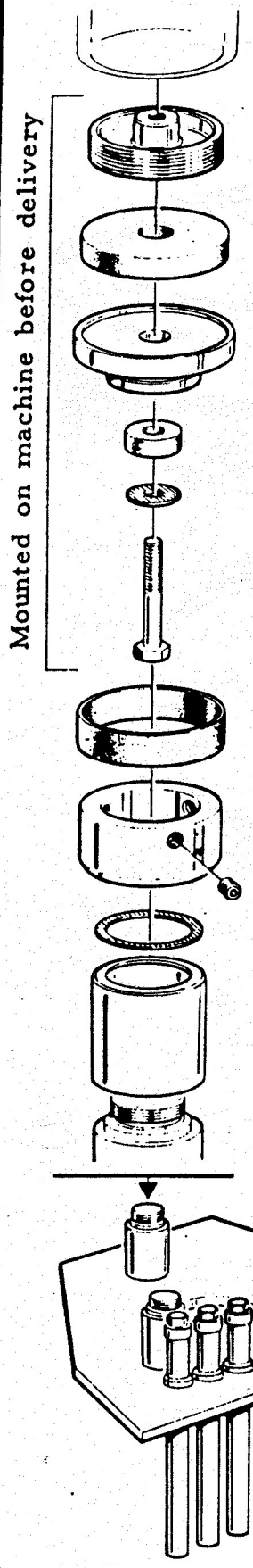
FRAME PARTS

1 Cyclone
2 Paring disc device for operating liquid
3 Flushing device for solids cover
4 Drain tube
5 Ventilation bend
6 Bottom bearing housing
7 Foundation plate and vibration dampers
8 Oil drain
9 Oil gauge glass
10 Electric connection
11 Revolution counter and tachometer*. Oil filling.
12 Brake
13 Inlet bend for operating liquid

* For machine equipped for remote speed indication: Revolution counter and speed sensor (pulse transmitter).



VIBRATION DAMPER (3) and FOUNDATION PLATE



Frame

Fixing disc

Rubber washer
-- 528738-1

Frame foot
-- 526186-02

Rubber washer
-- 65235

Washer
-- 223142-04

Screw
-- 2210953-21

Protecting ring
-- 528733-01

Holder
-- 528729-01
Set screw (3)
-- 539309-80
Adjusting washer (6)
-- 785332-2

Cap

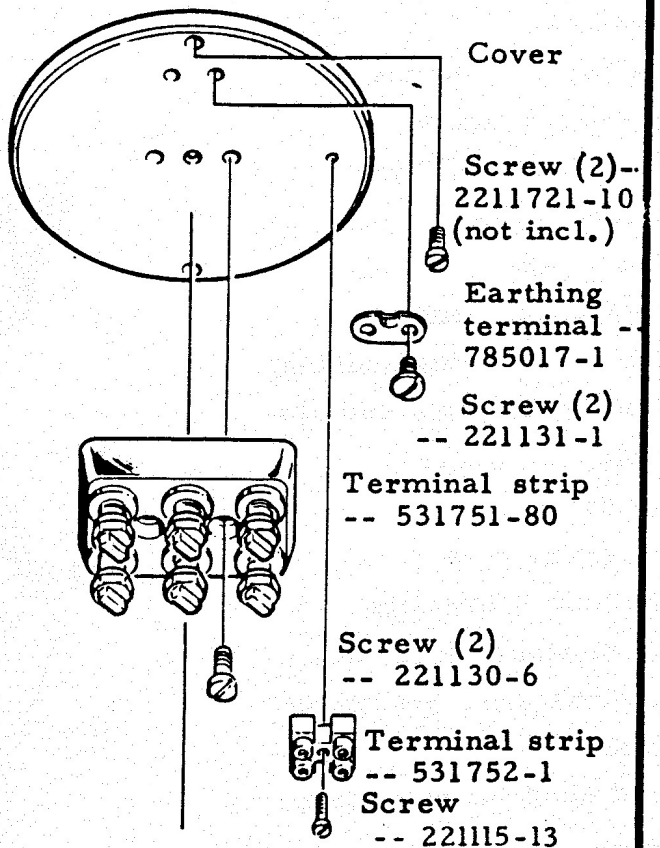
Foundation foot

Foundation plate

Cable holder, compl. (3)
-- 526472-81
Tubular screw (3)
-- 521139-2

ELECTRIC CONNECTION

Cover (with terminal strips)
-- 528702-80



Cover

Screw (2)--
2211721-10
(not incl.)

Earthing terminal --
785017-1

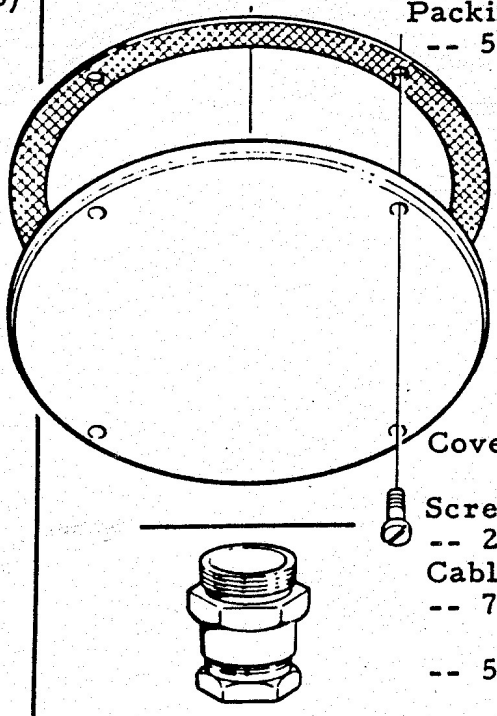
Screw (2)
-- 221131-1

Terminal strip
-- 531751-80

Screw (2)
-- 221130-6

Terminal strip
-- 531752-1
Screw
-- 221115-13

External cover, cable inlet



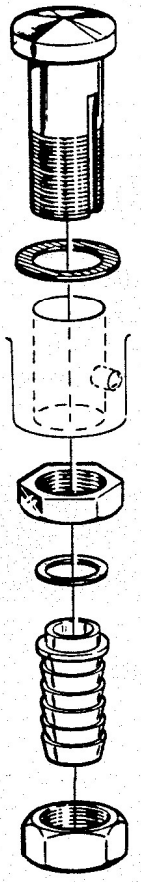
Packing
-- 528724-1

Cover

Screw (4)
-- 2211722-16
Cable bushing (2)
-- 785018-80

-- 529910-5

FLUSHING DEVICE for SLUDGE COVER



Nozzle
-- 785868-1

Packing
-- 516281-10

Frame ring

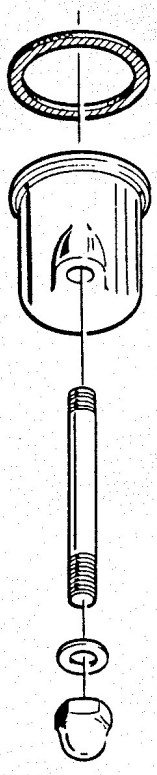
Nut
-- 785877-1

Packing
-- 68937

Hose nipple
-- 252613-12

Nut
-- 521136-1

VENTILATION BEND



Packing
-- 71068

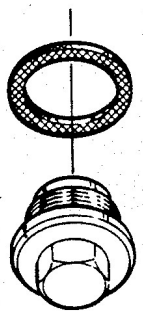
Bend

Stud bolt
--2216241-17

Washer
-- 223101-34

Cap nut
-- 72947

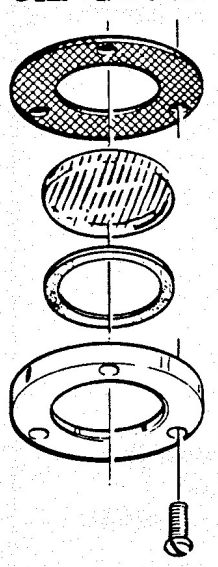
OIL DRAIN



Packing
-- 223316-5

Screw
-- 526189-1

OIL GAUGE GLASS



Packing
-- 528723-01

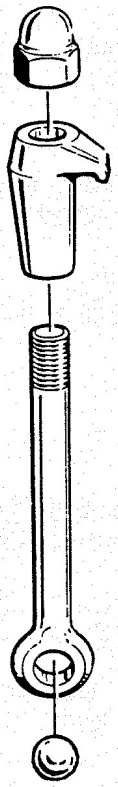
Glass
-- 38685

Packing
-- 37167

Fixing ring
-- 523215-02

Screw (3)
-- 2211722-28

HINGED BOLT (12)



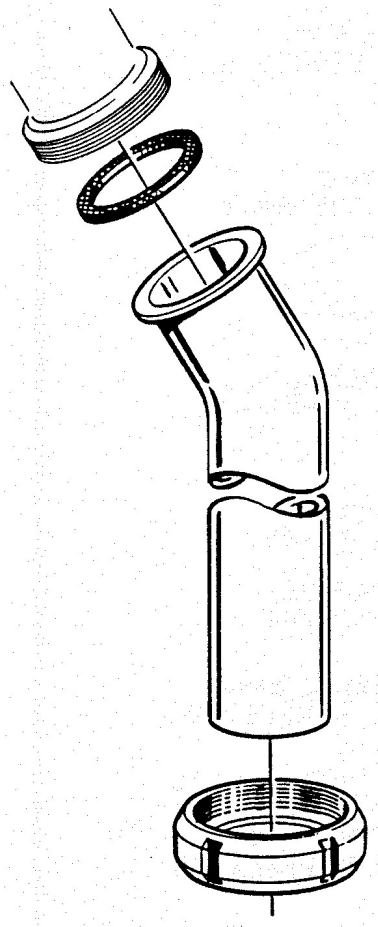
Cap nut
-- 72956

Clamping shoe
-- 785865-2

Hinged bolt
-- 528104-1

Ball
-- 233281-1

DRAIN TUBE

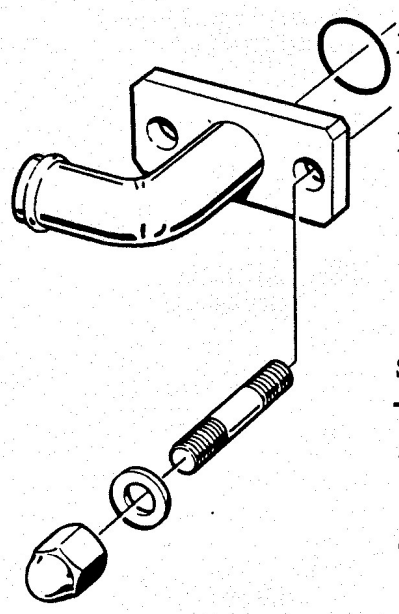


Packing
-- 71068

Tube
-- 528192-80

Coupling nut
-- 190616

INLET BEND for OPERATING LIQUID



Rubber ring
-- 74067

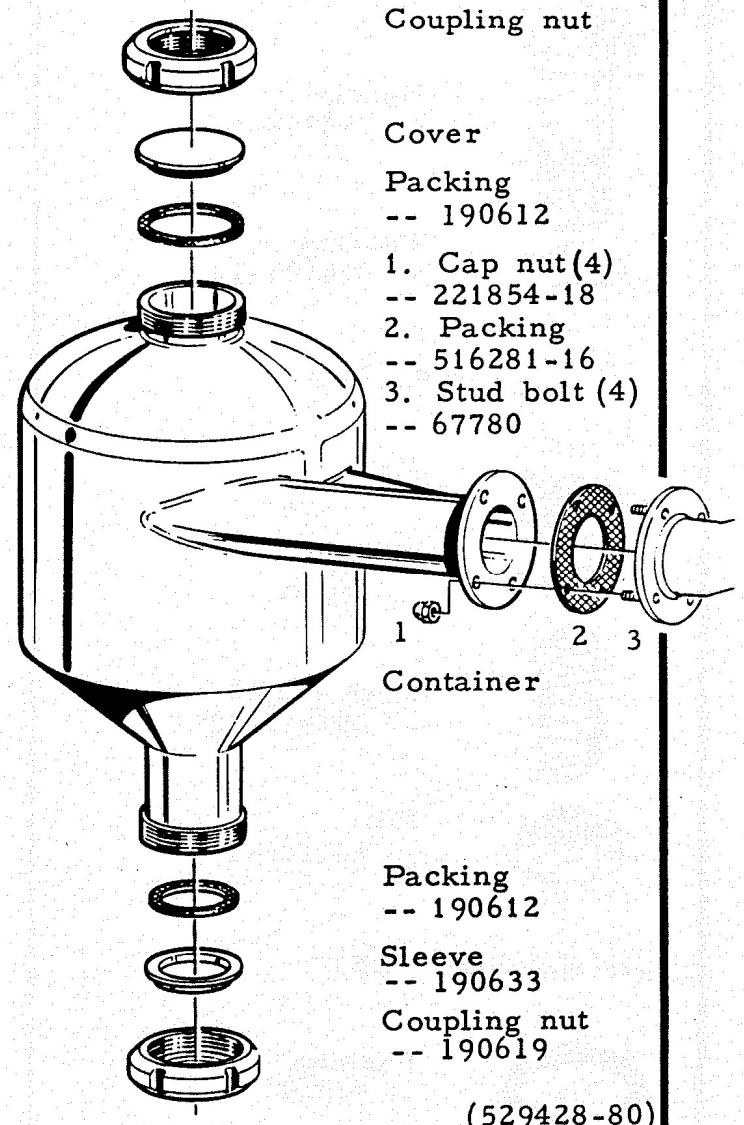
Bend
-- 528359-80

Stud bolt (2)
-- 2216261-25

Washer (2)
-- 223101-62

Cap nut (2)
-- 72956

CYCLONE



Coupling nut

Cover

Packing
-- 190612

1. Cap nut (4)
-- 221854-18
2. Packing
-- 516281-16
3. Stud bolt (4)
-- 67780

Container

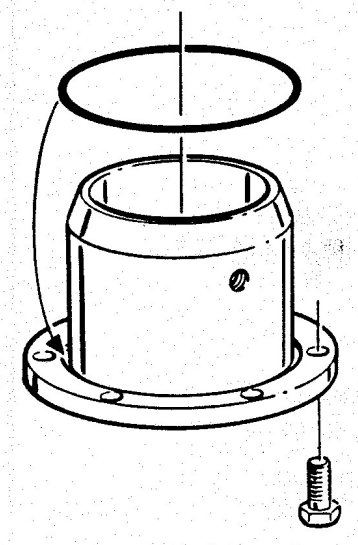
Packing
-- 190612

Sleeve
-- 190633

Coupling nut
-- 190619

(529428-80)

BOTTOM BEARING HOUSING

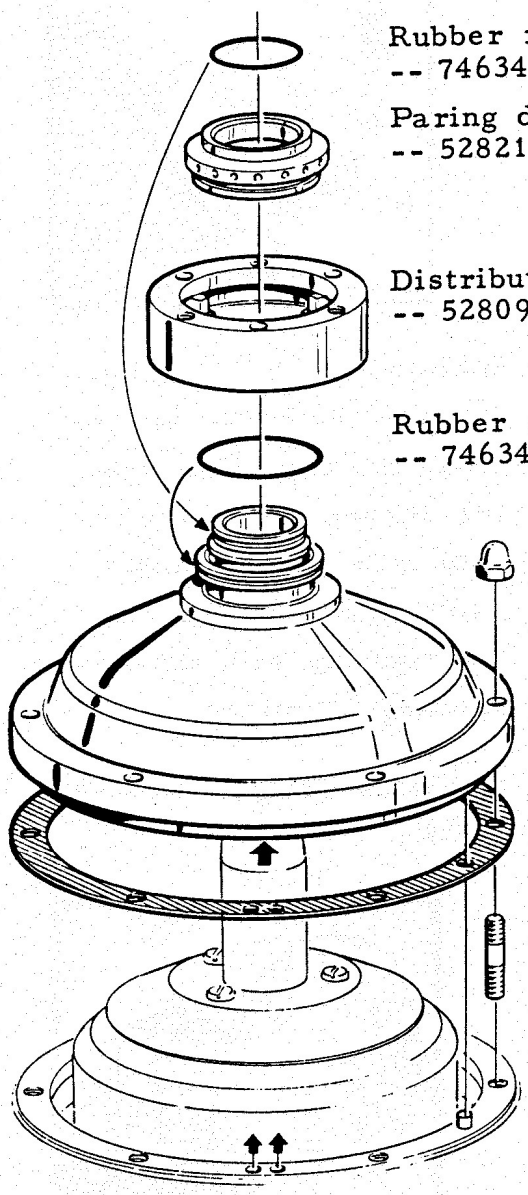


Rubber ring
-- 38411

Housing
-- 519330-02

Screw (6)
-- 72927

PARING DISC DEVICE for OPERATING LIQUID



⬆ = Holes for operating liquid

The distributing ring rotates, the other parts are non-moving.

Dismantling

For dismantling the bowl see chapter I. The distributing ring is fastened to the bowl body by screws. These screws must be removed before the bowl body can be lifted off from the spindle.

Take out the distributing cover and dismantle the parts in the sequence appearing from the illustration.

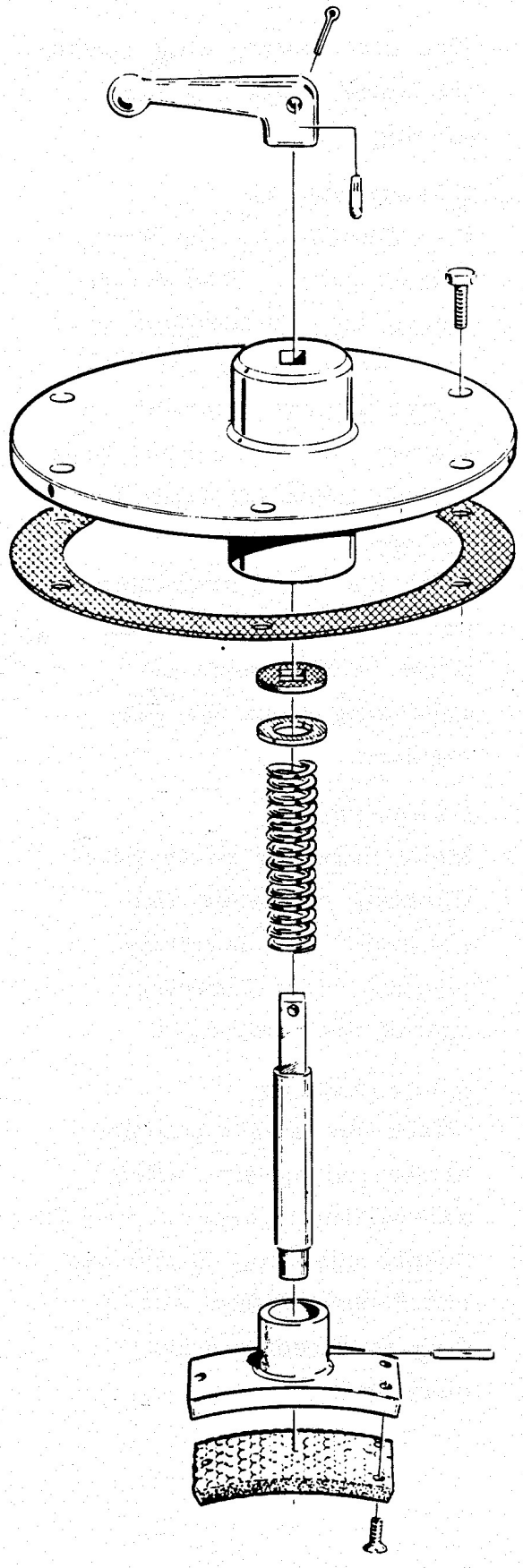
Cleaning

Make sure the parts (particularly all holes and channels) are carefully cleaned — for cleaning agents see chapter L.

Assembling

Check the height position of the paring disc after assembling — see chapter L.

Supply operating liquid and check throughflow according to directions in chapter L.



Split pin
-- 222210-19

Handle
-- 533513-01

Pivot
-- 222137-10

Screw (6)
-- 72927

Cap

Packing
-- 528732-01

Packing
-- 528720-1

Washer
-- 223101-37

Spring
-- 39096

Spindle
--65461

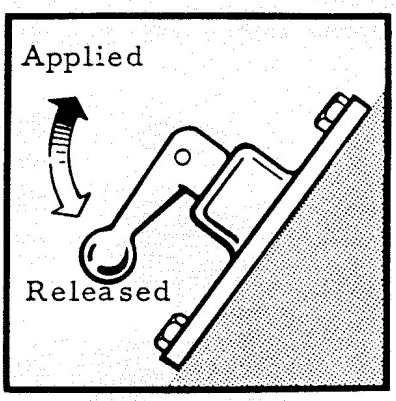
Brake shoe, compl.
-- 537602-80

Slotted pin
-- 67960

Brake shoe
--65226

Lining
--65227

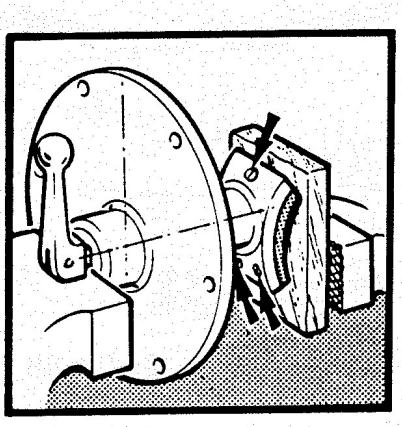
Screw (3)
--8341



Exchange of lining

Release the brake and remove the cap. Note that the screws are slotted at both ends (use an angle driver). Fasten the cap to the machine with the handle pointing downward.

Dismantling. Assembling

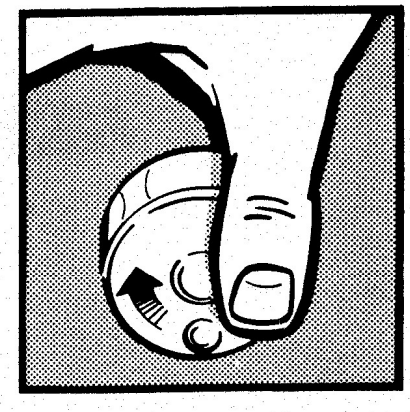


Clamp the cap in a screw vice, apply the brake, and remove the handle. See that cap, handle, and brake shoe are turned as shown by the arrows in the figure. Fasten the cap to the machine with the handle pointing downward.

(Revolution Counter and Tachometer, page 2)

REVOLUTION COUNTER

Speed checking



Speed particulars – see chapter C. Count the number of revolutions during one minute.

Assembling

When mounting lubricate shaft and gear wheel with oil of the type used in the gear housing. Direct the gear wheel correctly – pin an hole are tapered. In case of play ream the hole (conicity 1:50).
Make sure the lipseal ring is directed according to the illustration and knock it carefully into its seat.

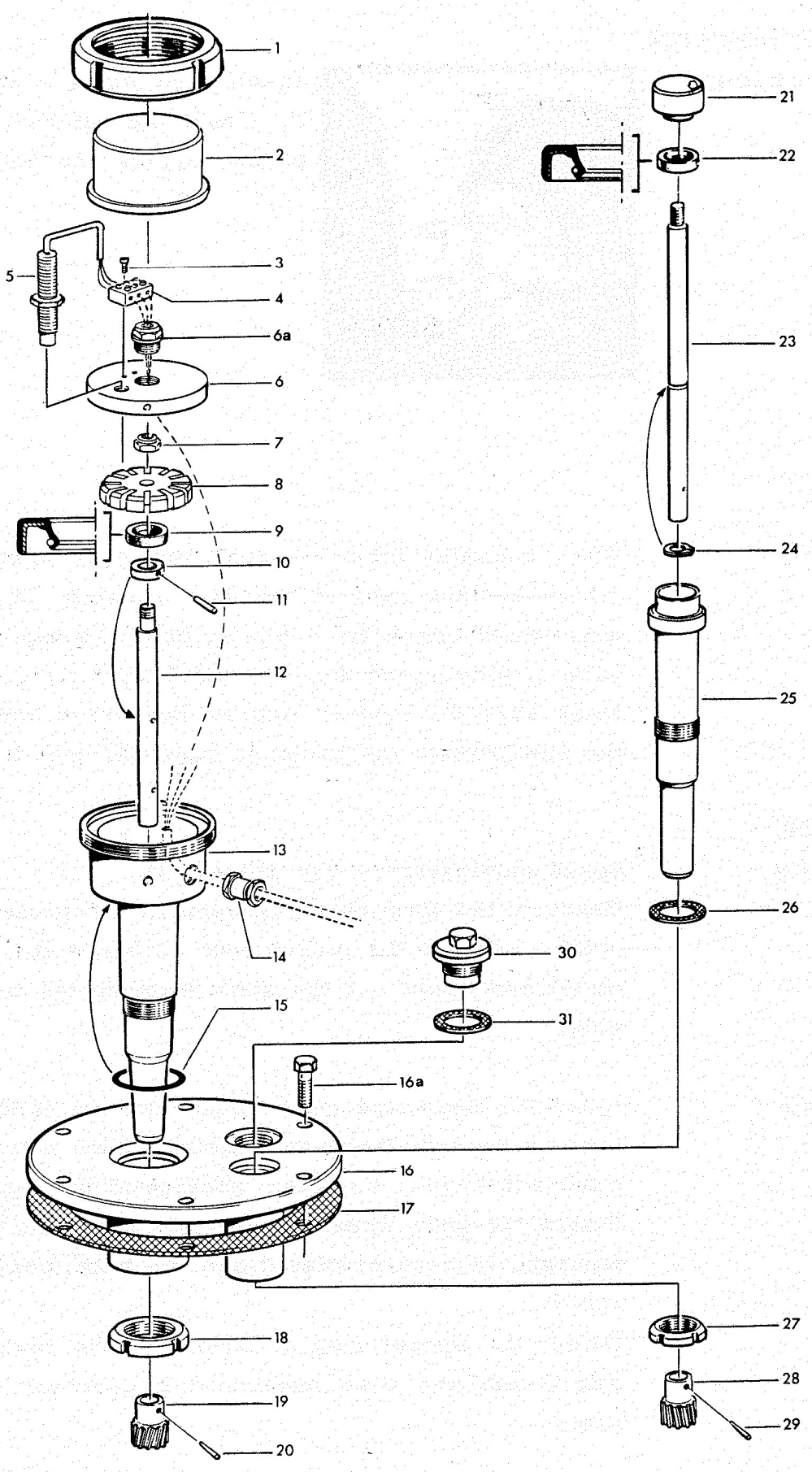
TACHOMETER

Dismantling

Speed particulars – see chapter C.
Unscrew the lock ring and remove the protecting glass. Lift out the tachometer. Remove the gear wheel and knock out the shaft towards the tachometer side.

Assembling

Lubricate shaft and gear wheel with oil of the same type as used in the gear housing. Push home the shaft and secure the gear wheel with the taper pin. Direct the gear wheel correctly – pin and hole are tapered. In case of play ream the hole (conicity 1:50).
Direct the lipseal ring according to the illustration, slip it onto the shaft and knock it carefully into its seat.

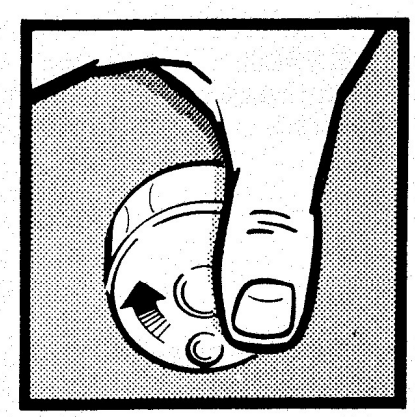

1
2
3
4
5
6a
6
7
8
9
10
11
12
13
14
15
16a
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31

Ref.	Part No. Delnr.	Qty. Ant.	Part name	Benämning
-	-	-	REVOLUTION COUNTER and SPEED SENSOR (for machine intended for remote indication)	VARVRÄKNARE och VARVTALSGIVARE (för maskin avsedd för fjärr-indikering)
1	528747-01	1	Lock ring	Låsring
2	536956-01	1	Cover	Lock
3	221115-12	2	Screw	Skruv
4	536961-02	1	Terminal strip	Kopplingssprint
5	536955-01	1	Sensor (with electric wire)	Givare (med elledning)
6	536954-01	1	Disc	Bricka
6a	980874-02	1	Sealing sleeve	Tätningshylsa
7	221893-01	1	Nut	Mutter
8	536953-01	1	Cog wheel	Tandhjul
9	223521-08	1	Lipseal ring	Läpptätningsring
10	518474-01	1	Stop ring	Stoppring
11	222116-07	1	Slotted pin	Räffelpinne
12	532119-01	1	Shaft	Axel
13	536952-01	1	Bushing	Bussning
14	18085	1	Sealing sleeve	Tätningshylsa
15	2234121-37	1	Seal ring	Tätningsring
16	-	1	Cap	Kåpa
16a	2210942-37	6	Screw	Skruv
17	528732-01	1	Packing	Packning
18	67476	1	Round nut (SKF KM9)	Rundmutter (SKF KM 9)
19	526698-01	1	Gear wheel	Kugghjul
20	69226	1	Taper pin	Konisk pinne
21	526694-03	1	Collar	Krage
22	223521-08	1	Lipseal ring	Läpptätningsring
23	526693-04	1	Shaft	Axel
24	67542	1	Snap ring	Spårring
25	528743-01	1	Bushing	Bussning
26	223434-02	1	Packing	Packning
27	67473	1	Round nut (SKF KM6)	Rundmutter (SKF KM6)
28	69214	1	Gear wheel	Kugghjul
29	69226	1	Taper pin	Konisk pinne
30	526189-01	1	Screw (oil supply)	Skruv (oljepåfyllning)
31	223316-05	1	Packing	Packning

(Revolution counter and speed sensor)

REVOLUTION COUNTER

Speed checking



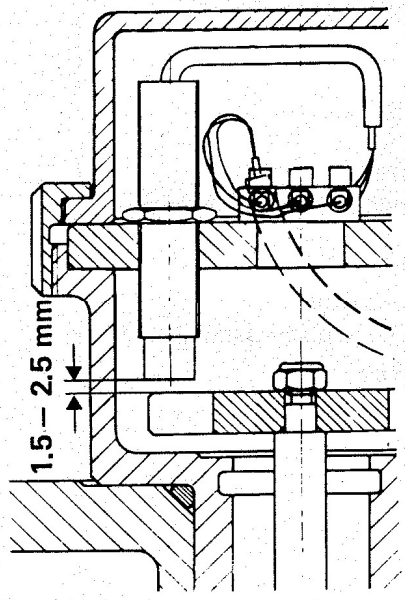
Speed particulars – see chapter C. Count the number of revolutions during one minute.

Assembling

When mounting lubricate shaft and gear wheel with oil of the type used in the gear housing. Direct the gear wheel correctly – pin an hole are tapered. In case of play ream the hole (conicity 1:50).
Make sure the lipseal ring is directed according to the illustration and knock it carefully into its seat.

SPEED SENSOR

Assembling



Lubricate shaft and gear wheel with oil of the same type as used in the gear housing. Push home the shaft and secure the gear wheel with the taper pin. Direct the gear wheel correctly – pin and hole are tapered. In case of play ream the hole (conicity 1:50).
Direct the lipseal ring according to the illustration, slip it onto the shaft and knock it carefully into its seat.

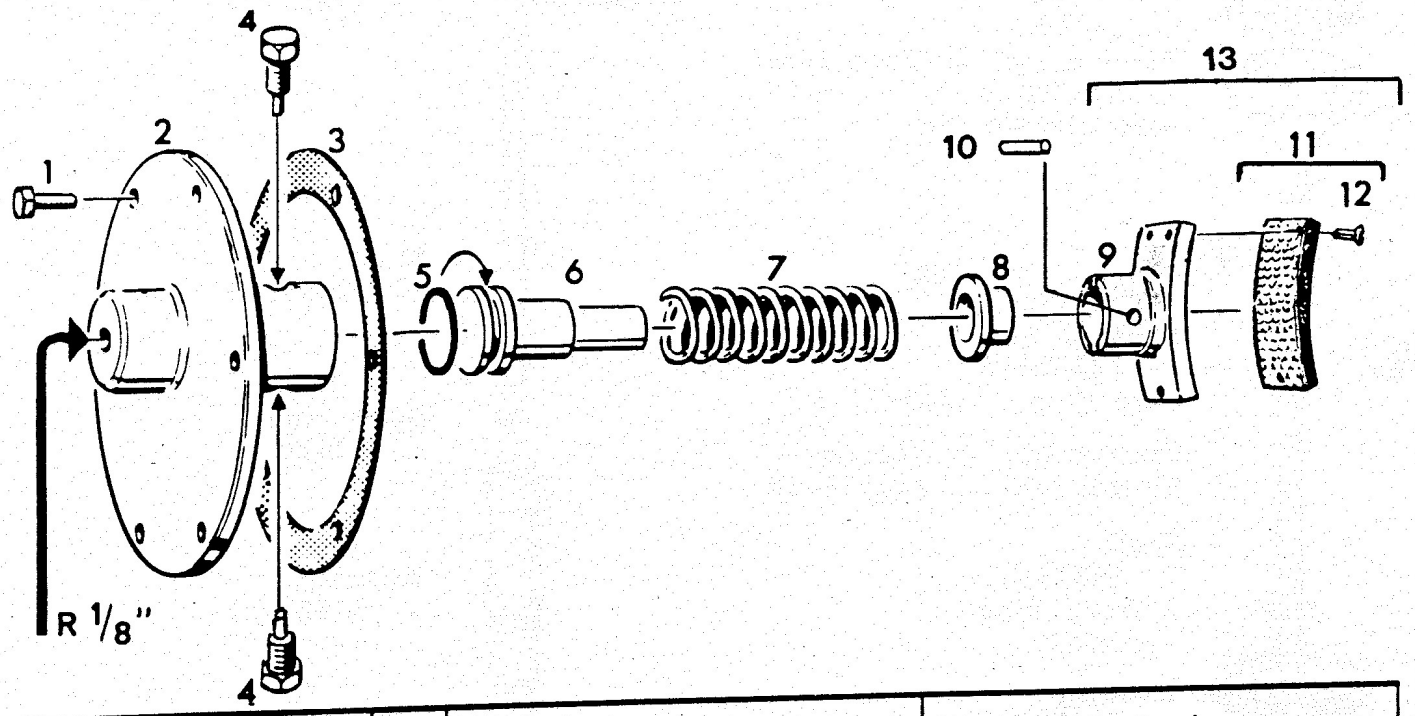
After any dismantling which can affect the play indicated in the figure, the play must be readjusted. An impression of the play can be made in modelling clay.

PNEUMATIC BRAKE (for machine designed for remote control).

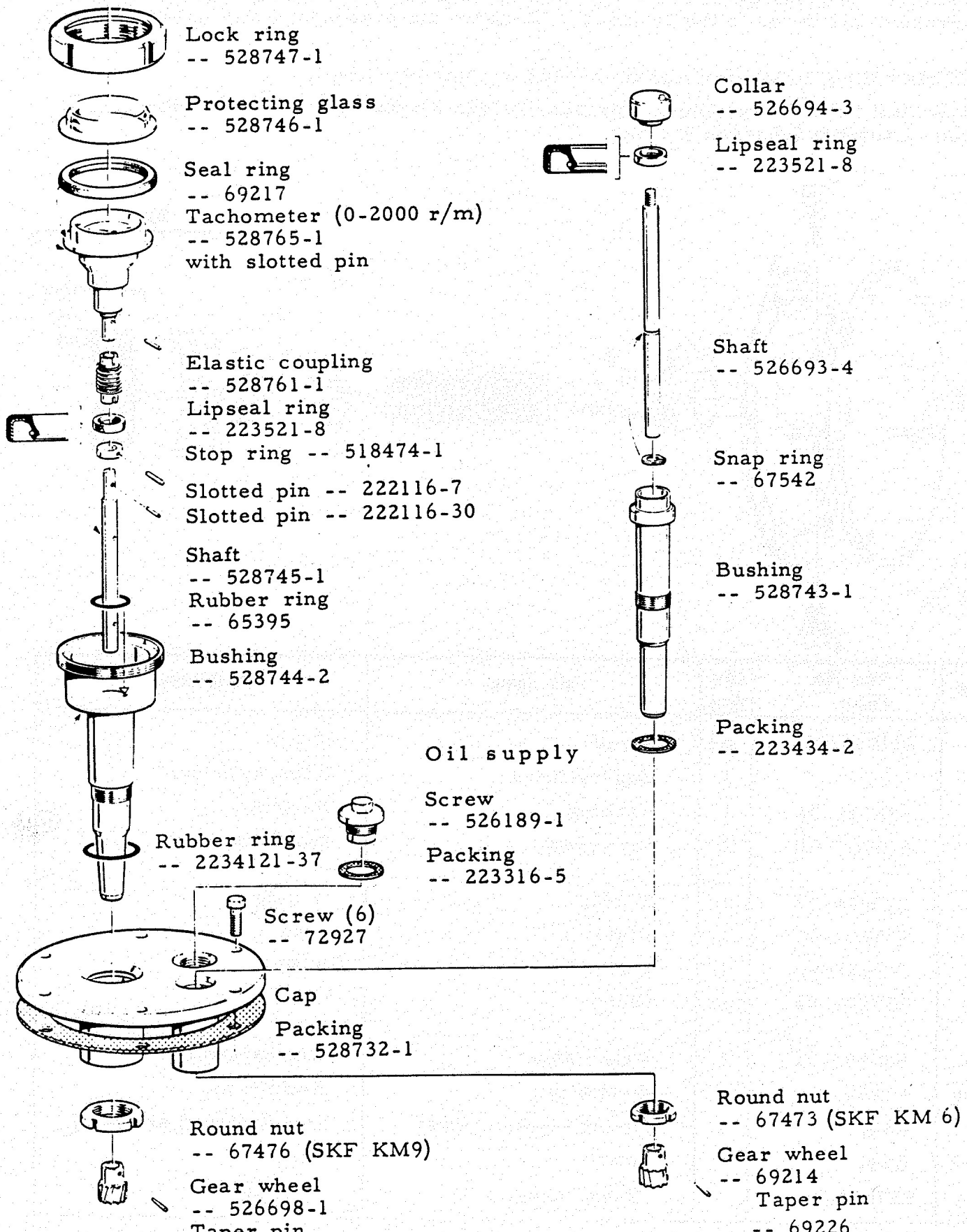
The piston 6 presses the brake shoe lining 11 against the coupling pulley when compressed air is fed to the cylinder 2. Suitable air pressure is 5-6 bar (72-87 psi).

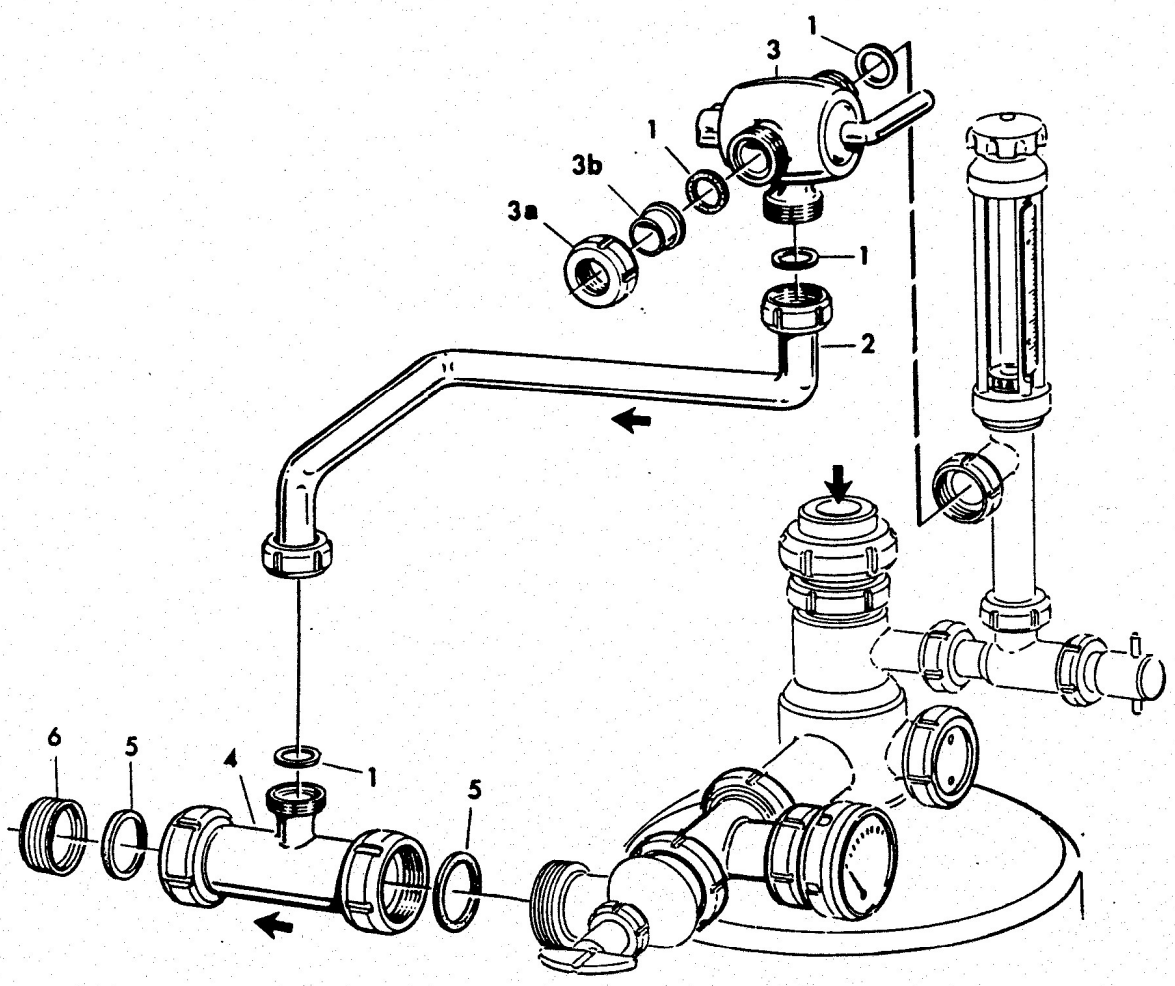
PNEUMATISK BROMS (för maskin avsedd för fjärrstyrning).

Då tryckluft tillföres cylindern 2 pressar kolven 6 skoningen 11 mot medbringar - skivan. Lämpligt lufttryck 5-6 bar.

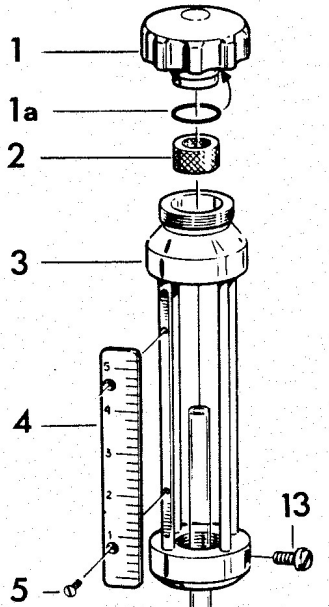


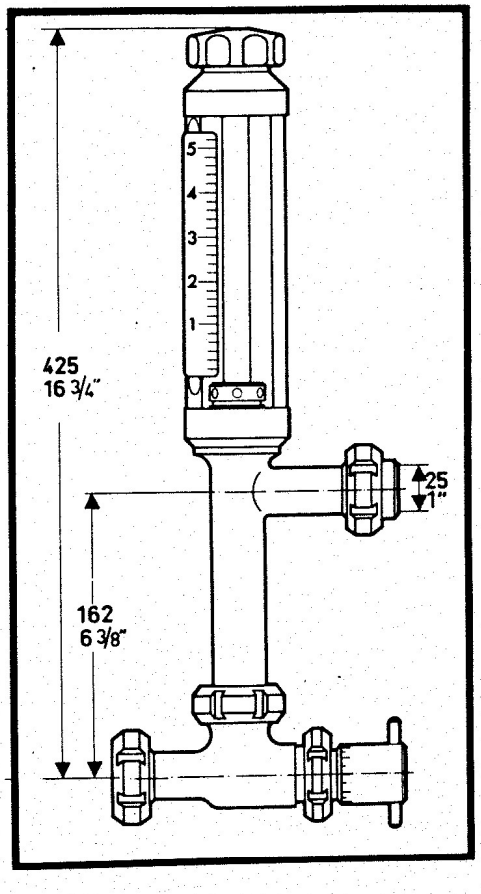
Ref.	Part No. Delnr.	Qty. Ant.	Part name	Benämning
1	2210942-37	6	Screw	Skruv
2	--	1	Cap/cylinder	Kåpa/cylinder
3	528732-01	1	Packing	Packning
4	535207-01	2	Set screw	Stoppskruv
5	223406-27	1	O-ring	O-ring
6	535202-01	1	Piston	Kolv
7	22614-83	1	Spring	Fjäder
8	535206-01	1	Gland	Gland
9	535204-01	1	Brake shoe	Bromsplatta
10	67960	1	Slotted pin	Räffelpinne
11	65227	1	Lining (with screws)	Skoning (med skruvar)
12	8341	2	Screw	Skruv
13	537602-81		Brake shoe	Bromsback


Lock ring
-- 528747-1
Protecting glass
-- 528746-1
Seal ring
-- 69217
Tachometer (0-2000 r/m)
-- 528765-1
with slotted pin
Elastic coupling
-- 528761-1
Lipseal ring
-- 223521-8
Stop ring -- 518474-1
Slotted pin -- 222116-7
Slotted pin -- 222116-30
Shaft
-- 528745-1
Rubber ring
-- 65395
Bushing
-- 528744-2
Rubber ring
-- 2234121-37
Oil supply
Screw
-- 526189-1
Packing
-- 223316-5
Screw (6)
-- 72927
Cap
Packing
-- 528732-1
Round nut
-- 67476 (SKF KM9)
Gear wheel
-- 526698-1
Taper pin
-- 69226
Collar
-- 526694-3
Lipseal ring
-- 223521-8
Shaft
-- 526693-4
Snap ring
-- 67542
Bushing
-- 528743-1
Packing
-- 223434-2
Round nut
-- 67473 (SKF KM 6)
Gear wheel
-- 69214
Taper pin
-- 69226



Ref.	Part No. Delnr.	Qty. Ant.	Part name	Benämning
-	532420-82	1	REMIXING DEVICE, complete	ÅTERBLANDNINGS-ANORDNING, komplett
1	190608	4	Packing	Packning
2	526749-81	1	Return pipe	Återledningsrör
3	191631	1	Three-way cock	Trevägskran
3a	190613	1	Coupling nut	Kopplingsmutter
3b	190627	1	Sleeve	Hylsa
4	31317-0869-1	1	T-piece	T-rör
5	71068	2	Packing	Packning
6	191011	1	Nipple	Nippel
			Spare parts	Reservdelar
1	190608	4	Packing	Packning
5	71068	2	Packing	Packning


1
1a
2
3
4
5
13
6
7
8
2
9
14
15
10
11
12
16
17
18
18a


425
16 3/4"
25
1"
162
6 3/8"

AVVERKNINGSMÄTARE
(För anslutning till släta rör)
FLOW METER
(For connection to unthreaded pipes)

533395-80	2000 l/h	(SMS)	✪
533395-81	300 l/h	(SMS)	
533395-82	6500 l/h	(SMS)	
533395-83	3000 l/h	(SMS)	
533395-84	450 l/h	(SMS)	
533395-85	2000 l/h	(IDF)	
533395-86	300 l/h	(IDF)	

Pos.	Part No. Detalj nr.	Description	Benämning	Qty. Ant.
1	--	Hand nut	Rattmutter	
1a	223406-16	Seal ring	Tätningsring	
2	11705	Rubber packing	Gummipackning	2
3	--	Scale holder	Skalhållare	
4	43402	Scale	Skala	
5	221121-48	Screw	Skruv	2
6	533407-01	Glass tube	Glasrör	
7	11707	Packing screw	Packningsskruv	
8	785933-01	Washer	Bricka	
9	--	Gland	Gland	
10	--	Outlet piece	Utloppsvinkel	
11	See table / Se tabell	Measuring rod	Mätstång	
12	516281-13	Packing	Packning	
13	2211722-13	Screw	Skruv	
14	See table	Packing	Packning	
15	Se tabell	Nipple	Nippel	
16	--	Inlet piece	Inloppsvinkel	
17	223537-02	Packing collar	Tätningsmanschett	
18	533546-80	Valve spindle	Ventilspindel	
18a	223404-04	Seal ring	Tätningsring	
		Spare parts	Reservdelar	
2	11705	Packing	Packning	2
6	533407-01	Glass tube	Glasrör	2
12	516281-13	Packing	Packning	
14		Packing	Packning	2
17	223537-02	Packing collar	Tätningsmanschett	2

Assembly No. Komplettnummer	Pos 11	Pos 14	Pos 15
533395-80	528345-80	190608	190641
533395-81	528345-81	190608	190641
533395-82	528345-82	190608	190641
533395-83	528345-83	190608	190641
533395-84	11823	190608	190641
533395-85	528345-80	31319-0031-1	31319-0007-1
533395-86	528345-81	31319-0031-1	31319-0007-1

✪ Replacements:

Meter, No. (mätare nr.)	Replaces meter No. (ersätter mätare nr)
533395-80, -81	526729-80, -81
533395-82	526729-82
533395-83, -84	526729-83, -84
533395-85, -86	785900-80, -81

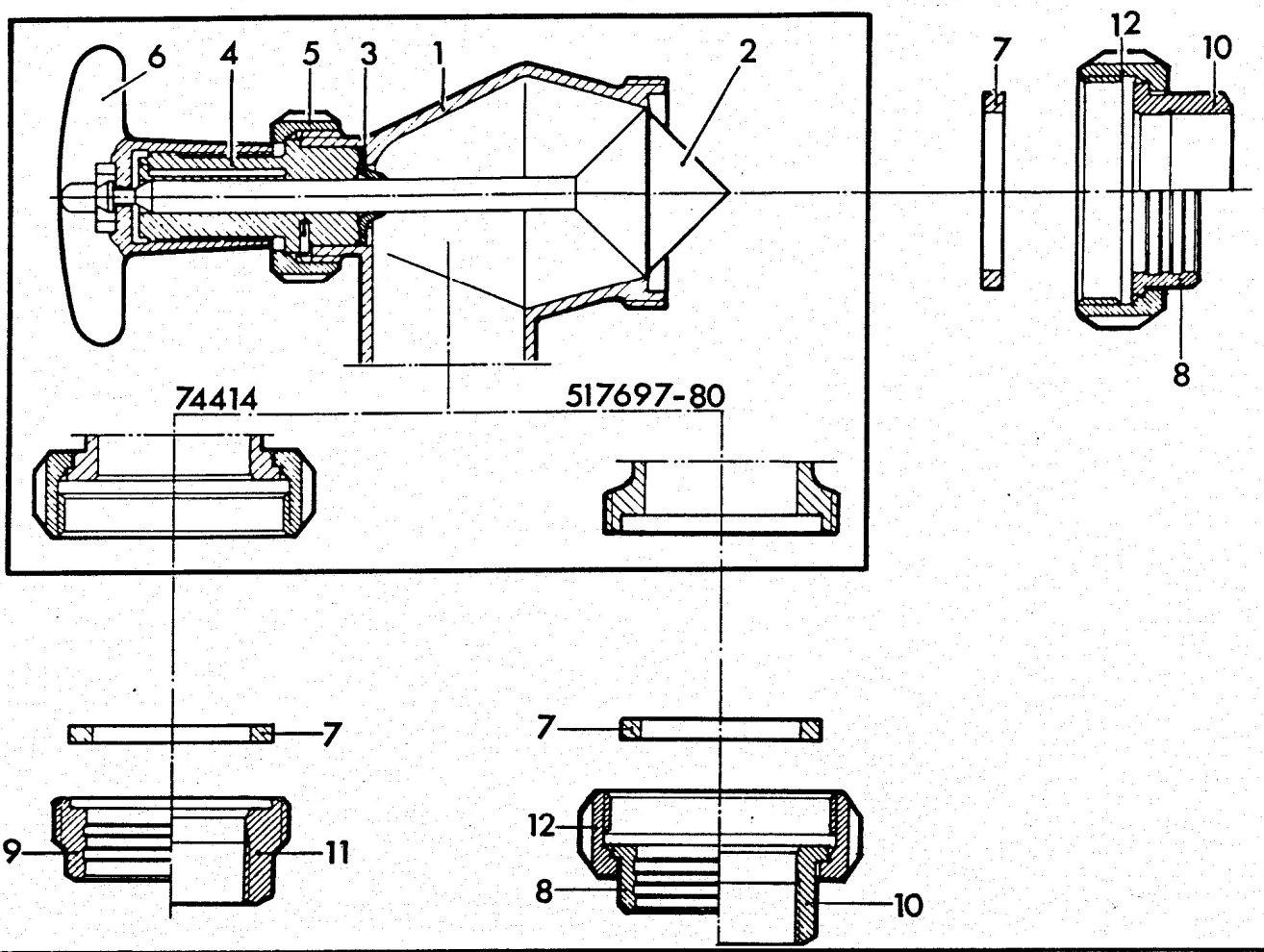
The table shows the approximate flow through the meter in tests with water. Values for the fat content or contents in question must be established on the spot.

Tabellen visar den ungefärliga volymströmmen genom mätaren vid försök med vatten. Värden för den eller de fetthalter som kommer i fråga, måste fastställas på platsen.

Meter Mätare	Graduation Gradering	Flow Flöde	
		liter/h	UK gal/h
533395-80	1	860	190
533395-85	2	1100	240
	3	1500	330
	4	1900	420
533395-81	1	100	22
533395-86	2	180	40
	3	280	62
	4	340	75
533395-83	1	1500	330
	2	2000	440
	3	2500	550
	4	2900	640
533395-84	1	200	44
	2	260	57
	3	330	73
	4	380	84

REGULATING VALVE without connecting parts 74414

REGLERINGSVENTIL utan kopplingsdelar 517697-80



Pos.	Part No. Detalj nr.	Description	Benämning	Qty. Ant.
1.		Valve housing	Ventilhus	
2.	74421	Valve cone	Ventilkägla	
3.	74494	Packing collar	Tätningsmanschett	
4.	74425	Valve bushing	Ventilbussning	
5.	190613	Coupling nut	Kopplingsmutter	
6.	518469-03	Hand wheel	Vred	
		Connecting parts	Anslutningsdelar	
7.	71068	Packing	Packning	2
8.	190630	Sleeve (even pipes) 51 mm, 2"	Hylsa (släta rör) 51 mm, 2"	
9.	190644	Nipple (even pipes) 51 mm, 2"	Nippel (släta rör) 51 mm, 2"	
10.	72234	Sleeve (threaded pipes) R 1 1/2"	Hylsa (gängade rör) R 1 1/2"	
11.	72226	Nipple (threaded pipes) R 1 1/2"	Nippel (gängade rör) R 1 1/2"	
12.	190616	Coupling nut	Kopplingsmutter	
		Spare part	Reservdel	
3.	74494	Packing collar	Tätningsmanschett	

ALFA-LAVAL

SUPPLEMENT

S91034E, F
(4226-1)

REMOTE SPEED INDICATION EQUIPMENT

Amplifier unit
-- 530640-80

1 Circuit card for indication
-- 530638-80

2 Circuit card for regulation*
-- 530639-80

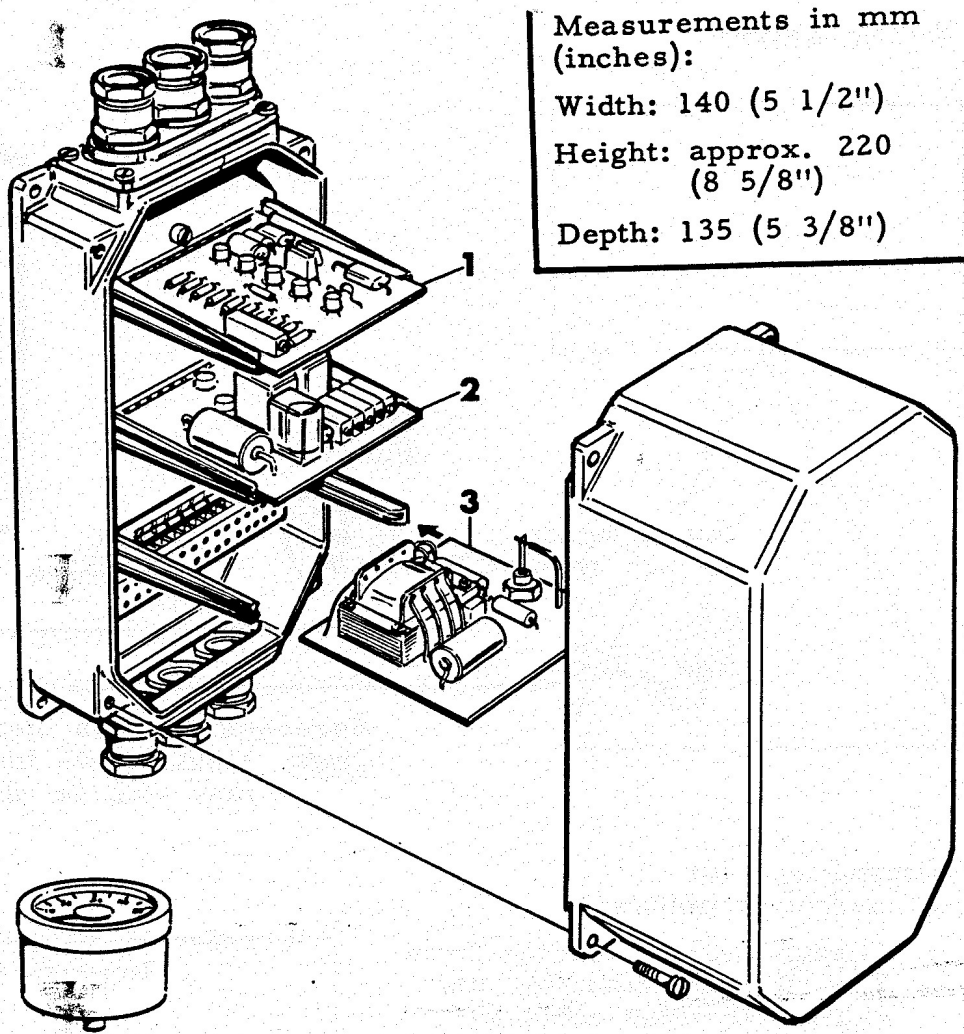
3 Circuit card for power unit
-- 530637-80

Measurements in mm (inches):

Width: 140 (5 1/2")

Height: approx. 220 (8 5/8")

Depth: 135 (5 3/8")



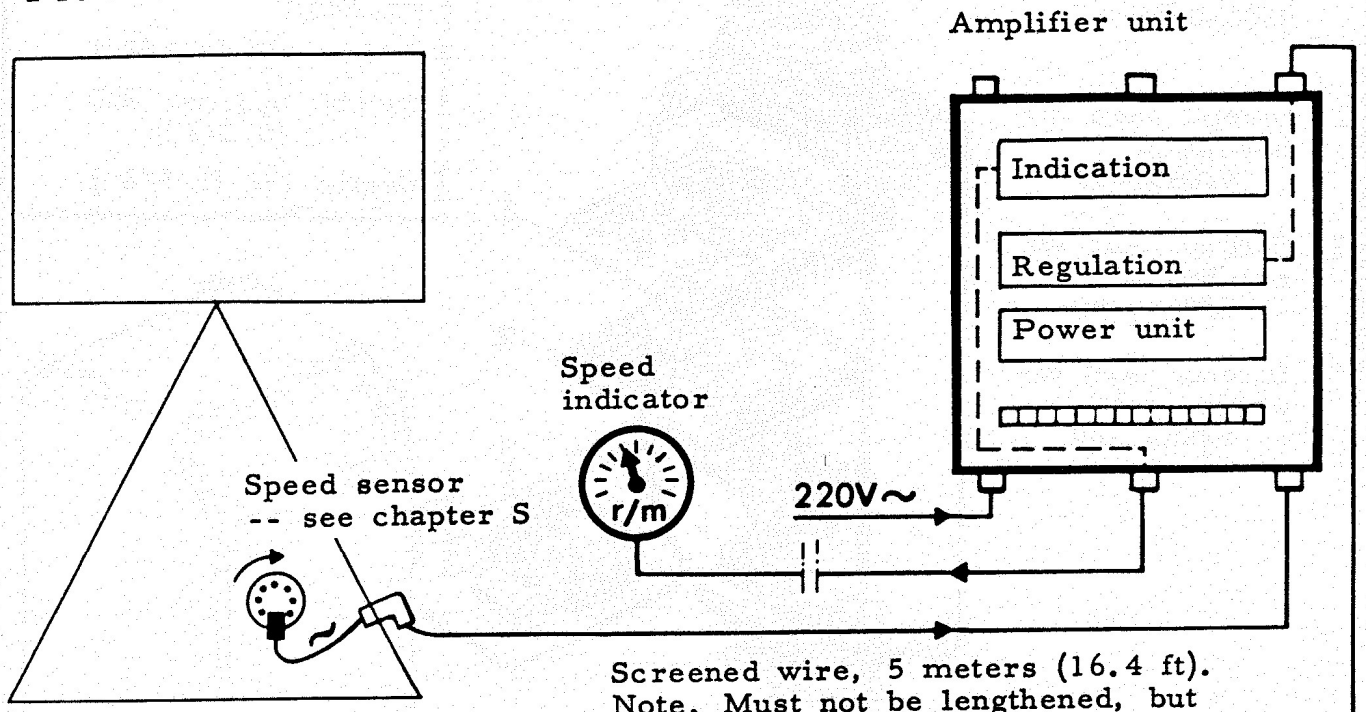
Speed indicator
(reading instrument)
-- 530841-01

Screened wire
(5 meters; 16.4 ft)
with steel spiral
(1.2 meter; 3.94 ft)
-- 531447-80

* Not delivered if visual indication only is wanted.

(Remote speed indication equipment, page 2)

Flow chart



Alternatives for utilization of impulse:

:: Change-over of starter from Y to D connection (for machine with fixed coupling; control-torque drive)

:: Release of start block for auxiliary apparatuses

:: Further alternatives

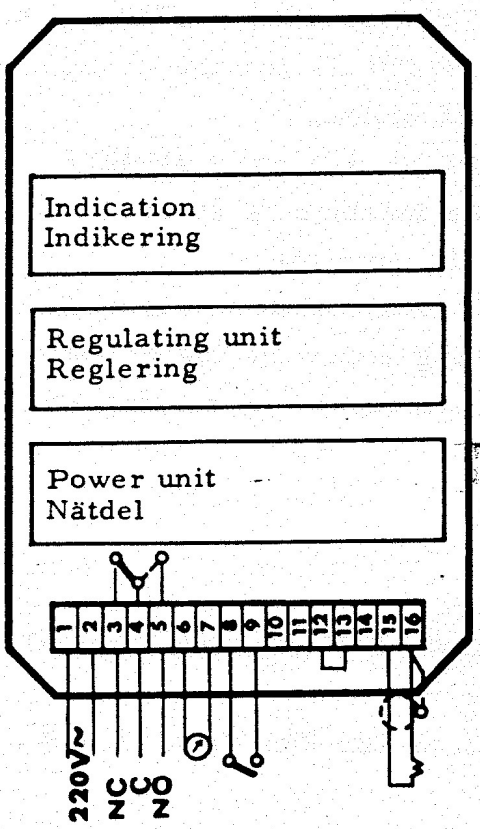
Impulse (at preset speed)

Installation

Mount the sensor on the machine or in its proximity. Observe that the screened wire between sensor and amplifier must be drawn in a steel tube with the steel spiral nearest to the sensor. Other wires must not be drawn through the same tube. Amplifier and wires must not be mounted near high current cables or other magnetic fields.

(Remote speed indication equipment, page 3)

Electric connection



Terminals	Connect to	Remarks
1-2	220V~ 50/60Hz	-
3-4-5	Starter of machine (by way of example	Change-over at preset speed.* Ratings: 100V~, 24V—, 1A or 30W
6-7	Speed indicator	Shows speed of worm wheel shaft
8-9	Starting contact	-
15-16	Speed sensor (pulse transmitter)	-
12-13	Outer contact	Switches in P4 to give an impulse at full speed e.g. for YD switch

* Change-over of the starter from star (Y) connection to delta (D) connection takes place by means of the terminals 4 and 5. The contact between the terminals is then broken.

Trimming

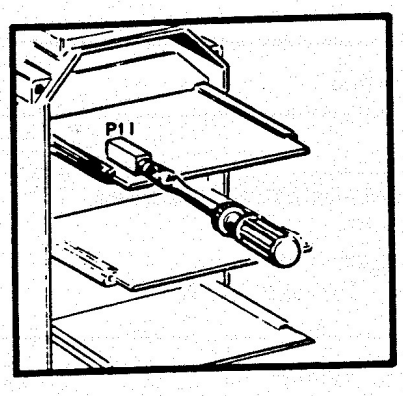
Amplifier unit

Connecting - up:

1. Voltage (220V) — terminals 1 and 2.
2. Speed indicator — terminals 6 and 7.
3. Sound generator — terminals 15 and 16.
4. If oscilloscope is provided, connect it over R4 — see diagram for circuit card 530639-80.
   Note. Output voltage from sound generator is 30-50 mV. Oscilloscope set to 5 V/cm.

(Remote speed indication equiment, page 4)

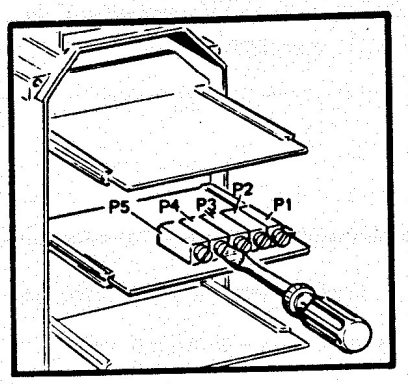
Speed indicator



Adjust the voltage by turning the screw for the potentiometer (P11) so that the speed indicator shows 1420 - 1460 r.p.m. (for 50 Hz) or 1700 - 1750 r.p.m. (for 60 Hz).at a frequency of 290 Hz for the sound generator — see type plate of motor.
Observe that the speed indicator will show slightly more than 0 r.p.m. when the machine is at rest, due to leakage current in the amplifier.

Note. The frequency of the local oscillator is reduced by turning the adjusting screw on the potentiometer clockwise and increased by turning the screw anti-clockwise.

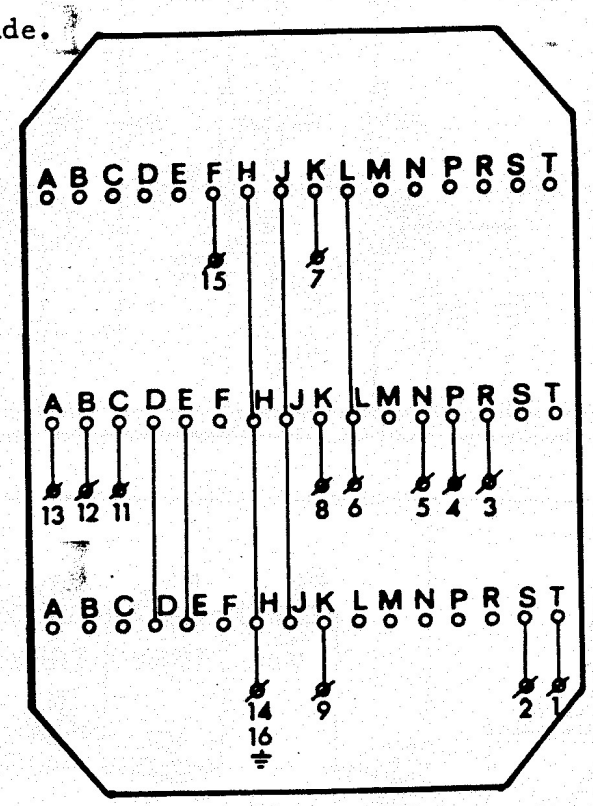
Impulse (e.g. for YD switch)



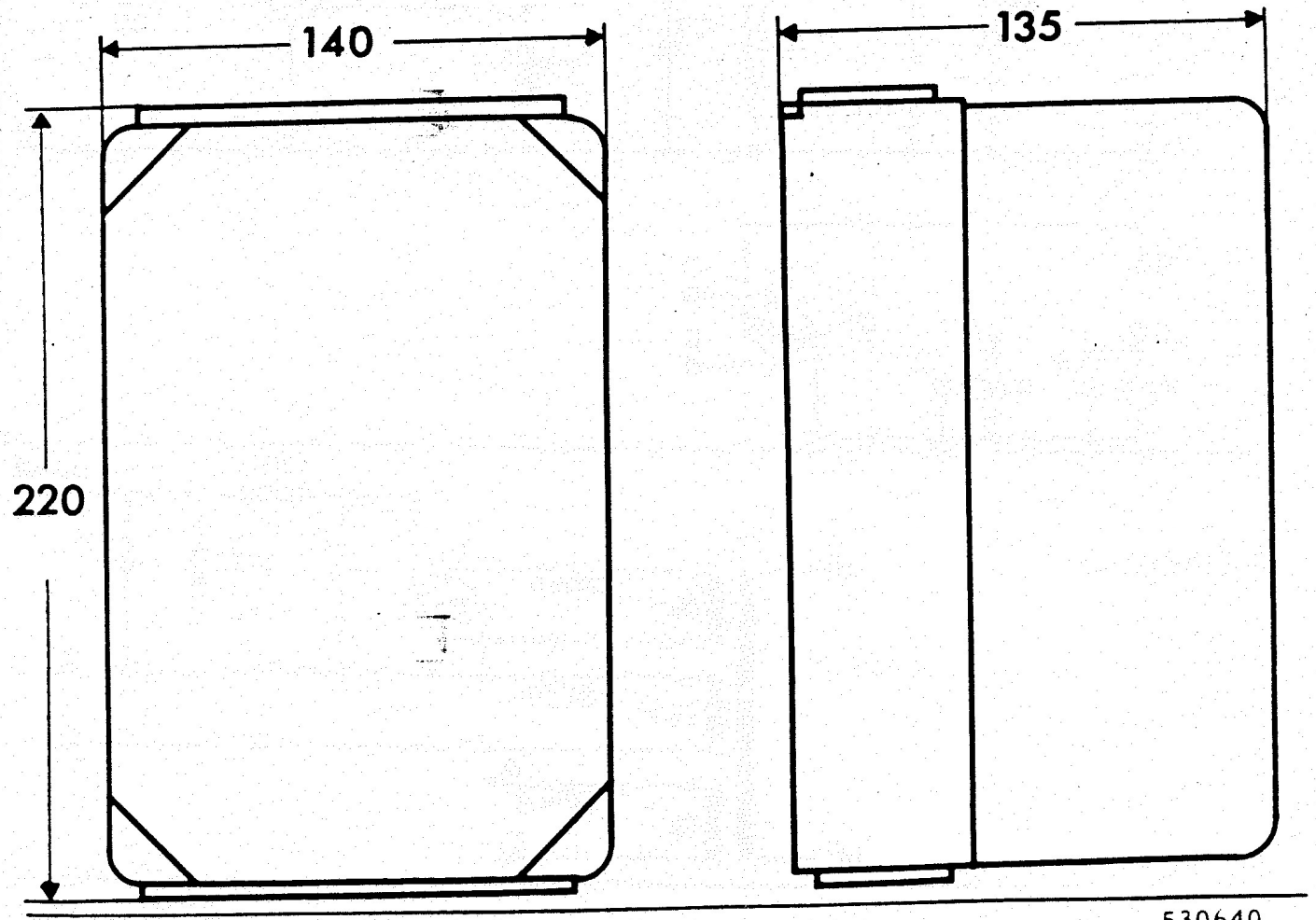
Action:

1. Short-circuit the terminals 8-9 (starting contact) and 12-13 (K3 is alive).
2. Set the sound generator to 280-285 Hz = 93-94% of full speed.
3. Adjust the local oscillator by turning the screw for potentiometer P4 until K1 is dead. If there is no reaction, screw P5 some turns anti-clockwise and repeat the adjustment with P4.

AMPLIFIER UNIT - Connection diagram for mounting plate. The illustration shows the soldering side.



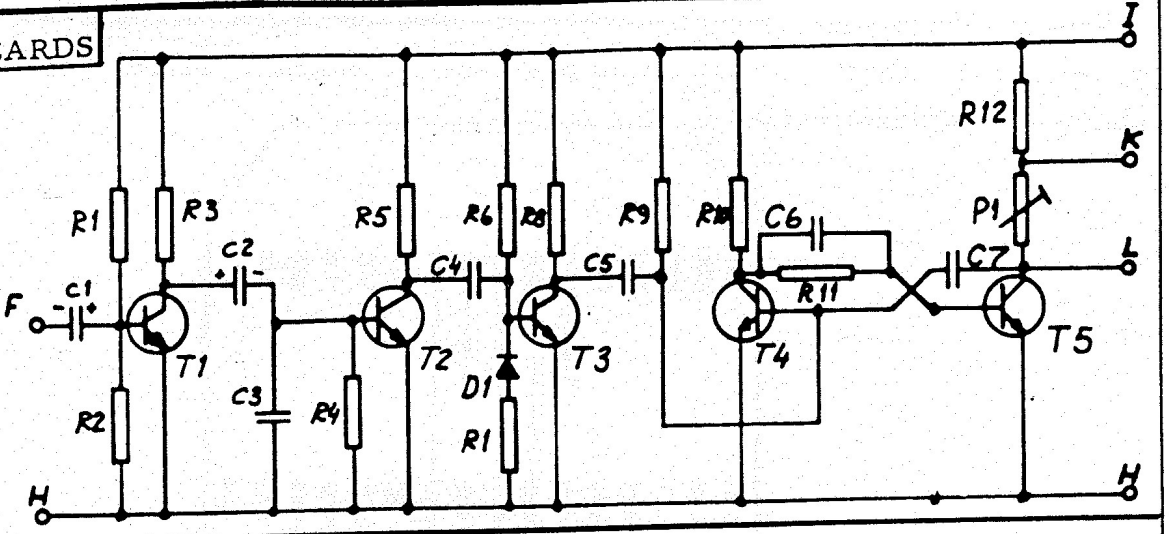
AMPLIFIER UNIT - Dimensioned sketch.



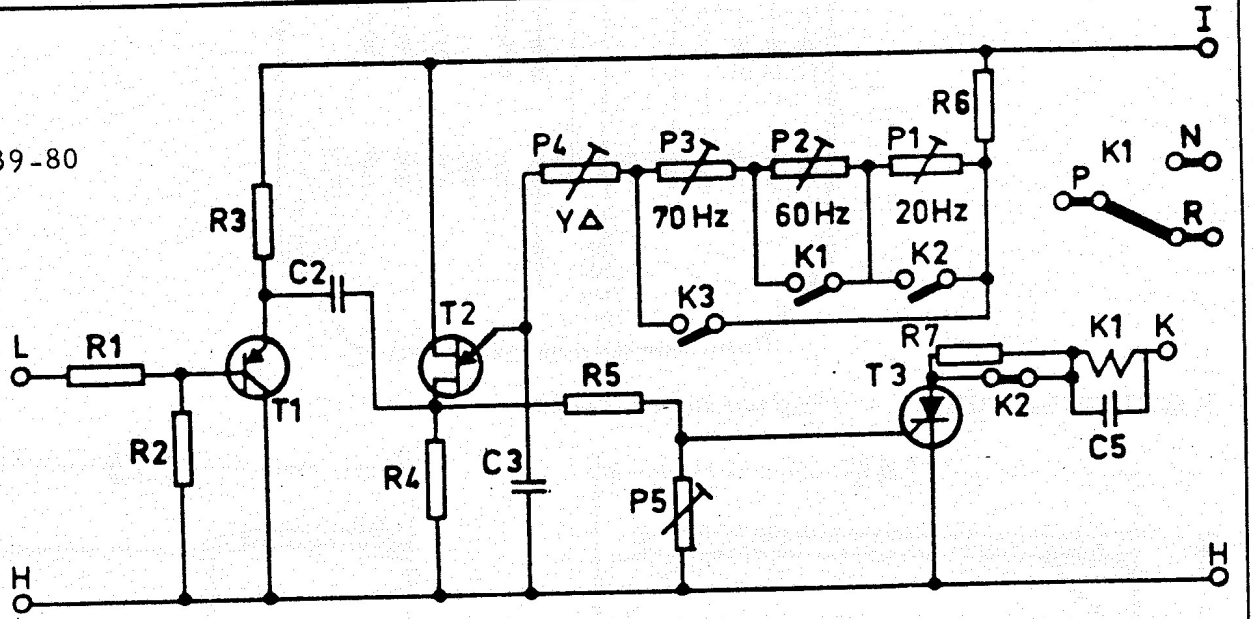
530640
530627

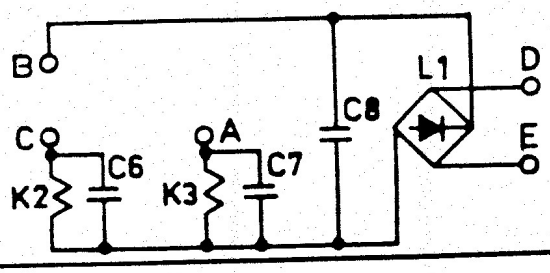
CIRCUIT CARDS

530638-80



530639-80





530637-80