USE AND MAINTENANCE HANDBOOK

Centrifugal separator SE 02.0V

1. HANDBOOK USE

1.1 How to read the Handbook

This handbook give informations for the installation, use and maintenance of centrifugal separator, model SE 02.0, for milk and whey skimming, milk cleaning.
The machine must be used in accordance with the Handbook specification: it is recommended to read it with great attention before installing and setting at work the machine, without leaving out anyone of the prescriptions reported and paying particular attention to the messages in the "text squares". The respect of the reported rules and recommendations permit a safe use and appropriate service.
The use and maintenance Handbook is an integrant part of the machine: it's necessary to conserve it complete and in a safe place during all the machine life, also when changing the machine user.

1.2 How to bring up-to-date the Handbook

It is recommended to bring constantly up-to-date this Handbook, integrating with eventual other amendments, additions or modifications coming from the manufacturer.
It's better that eventual annotations and remarks are inserted only in the space intentionally predisposed at the end of this Handbook.

1.3 Handbook index

2. GENERAL INFORMATIONS

2.1 Manufacturer and machine data

Manufacturer: SEITAL S.r.l.
Via delle Prese, 14
36014 Santorso (VI) - ITALY
tel. (++39)/0445/540232
fax (++39)/0445/540214
Machine: Model SE 02.0
Description: Machine for milk and whey skimming, milk cleaning.
Manufacturing year: 2002
Machine Manufacturing N.: T00596
Bowl Manufacturing N.: T00318

2.2 Technical service

The routine and extraordinary maintenance must be performed in accordance with the instructions of this Handbook. For the cases not considered and for every kind of assistance, it's recommended to directly contact the manufacturer with reference to the data reported on the plate fixed on the machine frame:

- Machine model
- Manufacturing N.
- Manufacturing year

The correct reference guarantee fast and precise answers.
In case the machine maintenance has been made not in conformity with the provided instructions, with not original spare parts or without written authorization of the manufacturer, or in a manner that compromise the integrity or modify the characteristics of the machine, SEITAL will consider itself exempted from every responsability regarding people safety and the defective working of the machine. Every unauthorized intervention invalidate the guarantee contractually defined.

2.3 Global aspects of safety

This chapter describe the safety and prevention measures due to the user.

2.3.1 Installation

For the installation and environmental cautions refer to Chapter 5.

2.3.2 Warnings for the operators

The user has the responsability of the diffusion to every operator of this Handbook contents. Besides, it's to the user provide to the necessary training of the technicians employed in machine operation and maintenance, verifying their fitness to the required job.

2.3.3 Maintenance programs

For a machine correct working it's necessary to follow the use, cleaning and routine maintenance prescriptions, as well as the indications regarding preventive, corrective and scheduled maintenance reported at the § 10.2 of this Handbook.

2.3.4 Involved operators and technicians

List of the qualifications of employed personnel.

Simple operator

Perform the functions needed for the normal working of the machine:

- working efficiency control and adjusting by manual valves, good operation check;
- execution of cleaning cycle;
- interventions that involve small disassemblies, as gaskets replacements of external ducts, etc.;
- lubricant oil change and check.

Mechanical technician

He operate when relevant machine disassemblies are necessary or in case of an evident trouble. He perform every mechanical repair/regulation, but don't operate on electrical systems under voltage.

Electrician

He operate in every working conditions and at every protection level. He perform every repair/regulation of electrical systems, also when voltage is present, respecting the specific safety standards.

2.3.5 Main working modes

Normal operation

Prescribed state:	Mounted shields, all safety devices connected.
Forbidden state:	Safety devices disconnected, supplies sectioned.
Type and number of employers:	one, operator.
Residual risks:	none

Extraordinary maintenance (mechanical intervention)

Prescribed state:	electrical supply sectioned and blocked,
Forbidden state:	supplies not sectioned.
Type and number of employers:	max. two, qualified mechanical technician.
Residual risks:	none.

Extraordinary maintenance (electrical intervention)

Prescribed state:	supplies not sectioned
Forbidden state:	electrician not qualified, removed shields, two operators
Type and number of employers:	one, qualified electrician.
Residual risks:	danger of electrocution due to terminals voltage inside the electric panel.

2.3.6 Foreseeable errors and incorrect behaviours

To avoid eventual errors and/or mistakes, it's necessary that operating procedures and danger warnings reported in this Handbook, are well known from the whole personnel.

2.3.7 List of used symbols and warnings

The symbols used as stickers on the machine, to point out the dangers during use and maintenance are described at § 7.2.3.
In the following pages of the Handbook the relevants informations regarding safety are shown into suitable square with the notice "ATTENTION".

ATTENTION
This notice want to recall the attention of the reader on danger zones or movements.

2.3.8 Safety prescriptions

In the following pages are indicated the important safety precautions to observe in machine use.

General prescriptions:

a) Cure the operating space around the machine, which must be free from obstacles, clean and adequately lighted.
b) Every machine intervention must be performed by authorized personnel and with the prescribed operators number.
c) Eliminate every dangerous condition for safety before using the machine and always inform the maintenance responsible about any eventual working trouble.
d) It is forbidden productive operation with safety devices disconnected or fixed shields removed.
e) Do not let the machine with disassembled shields.
f) It is forbidden any modification for adjustment of objects/devices not provided by the manufacturer. Use only SEITAL spare parts.
g) Do not execute weldings and flame heating on the bowl parts.
h) Never use the machine if damaged.
i) To guarantee the safety and correct working of the separator, it must be connected only with power and control panel specifically supplied by SEITAL.
j) In case power and control panel has not been supplied with separator, and electrical connection has been made not in conformity with the instructions reported on enclosed wiring diagram, SEITAL will consider itself exempted from every responsability regarding people safety and the defective working of the machine.
k) The electric panel must always be closed.
l) The key to open electric panel must be entrusted to a specialized and learned person or to a responsible of the department in which the machine works.
m) Before initial start-up perform every check reported in § 7.6.
n) The maximum operating speed allowed for the bowl is 10.200 r.p.m.
o) Never transport or lift the separator with its bowl installed.
p) Never mount the machine.

q) Always carry out chemical cleaning at the working end and, in case of long dwell, clean bowl carefully (see § 5.5.1).
r) If unusual vibration occurs:
   - increase immediately the liquid feed (product or water) to a maximum;
   - switch off the motor, but leave the program control on;
   - apply the brake;
   - after the bowl has stopped completely, dismantle, clean and check all parts carefully;
   - evaluate all the possibiles causes of troubles reported in § 10.3.4;
   - do not operate until the cause of vibration has been located and eliminated.

ATTENTION

Do not disassemble any part of the separator or of the inlet-outlet flow unit before the bowl is completely standstill.
CHECK THE BOWL MOTION STATE LOOKING THROUGH THE CIRCULAR SIGHT GLASS OBTAINED ON THE FRAME (see fig 2.1).

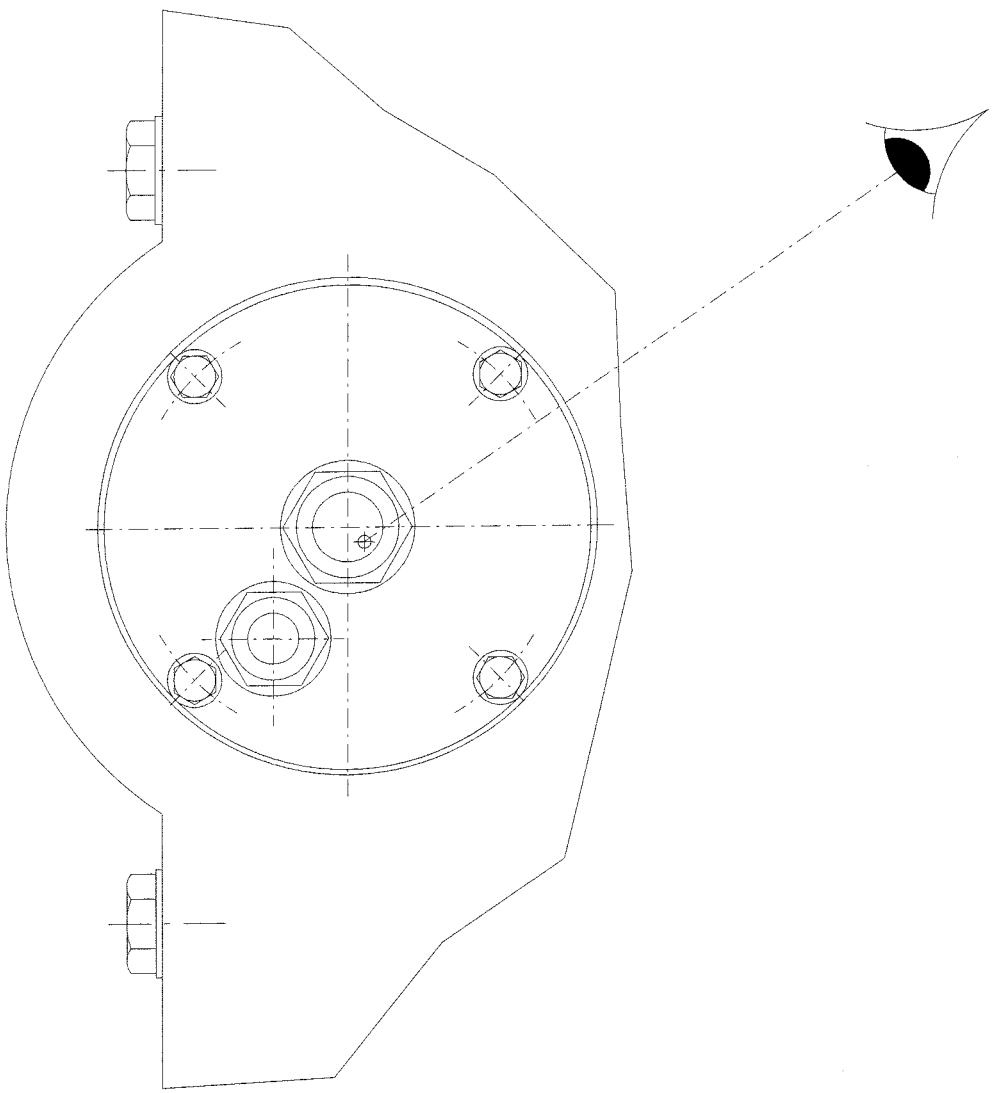


Figure 2.1

Safety prescriptions for mechanical technician

a) To prevent unbalances that can lead to serious damages, the user must follow the assembly with the most care and avoid shocks and stresses on the separator parts.
b) Do not allow to unauthorized personnel to work on the machine.
c) After every maintenance intervention or regulation be sure that tools or other extraneous bodies are not present in the machine moving parts, to avoid damages to the machine and/or troubles to the personnel.
d) Never insert the body, limbs or fingers in the articulated or sharp opening of machine parts without shields.
e) Do not use gasoline or inflammable solvents like detergent, but always use authorized, not inflammable and not toxic commercial solvents.
f) Periodically check the erosion/corrosion of the bowl.
Consult SEITAL SERVICE if one or more of the following observations are made after a deep check:

- the largest depth of the trace exceeds 1 mm,
- the bottom radius of the erosion trace is less than 1 mm in the narrowest point, or coarse scratches are present,
- defects presumably caused by corrosion are present.

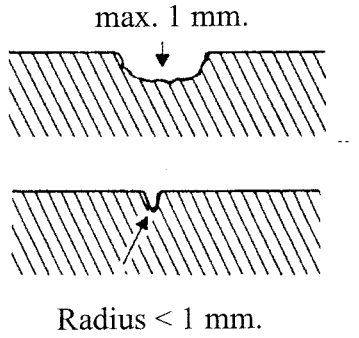


Figure 2.2

Safety prescriptions for the electrician

a) Check efficiency of earthing connections and be sure they are realized in accordance with local regulations.
b) Before every intervention on electrical components, verify the supply mains are disconnected.
c) In case of accident due to electric current immediately disjoin the injured (usually he lose consciousness) from the parts under voltage. Cut the supply to electric mains. If this need an excessive time, drive away the injured using insulating material as a wood or pvc stick, cloth. leather.

ATTENTION
Electrocution danger
This procedure is dangerous: touch the injured means to be struck by lightning.

2.4 Used terms and abbreviations

The measurement units adopted in this Handbook are in conformity with the International System of measurement units SI.
Terms not used currently and present in this Handbook.

- *Light phase*: liquid obtained in separation, having density lower than the inlet product. In this case the light phase is the *cream*.
- *Heavy phase*: liquid obtained in separation, having density higher than the inlet product. In this case the heavy phase are the *skim milk*.
- *Sludges*: solid residuals obtained from separation process. They accumulate in the external part of the bowl called sludge chamber.

2.5 Responsability

The non conformity to the instructions of this use and maintenance Handbook exempt the manufacturer from every responsability.
For every date not included or deducible from the following pages, it's recommended to directly consult the manufacturer.

3. MACHINE DESCRIPTION

3.1 General description

The SE 02.0 is a centrifugal separator for milk and whey skimming, milk cleaning.
The machine is constitued by a cast-iron frame, painted or coated by stainless steel, on which are installed the following components:

- two shafts with a couple of helicoidal gears with orthogonal axes, a centrifugal clutch, ball bearings, etc.
- motor
- manual brake
- sight glass to check the machine is standstill
- oil gauge glass to check the oil level
- bowl
- bowl protection cover
- inlet-outlet flow unit

The supply include also a set of special spanners for the bowl.

3.2 Operating principles

This machine consent the cream separation from milk to obtain skim milk. The separation takes place in the bowl of the separator, rotating at a speed of 10.200 r.p.m.
The product flows (fig 3.1) into the bowl through feed pipe (1) and into the distributor (2) it undergoes acceleration until it reaches the bowl rotating speed. The distributor (2) conveys the product to the disks stack (3) where the separation between cream and skim milk takes place. The great number of disks divide the internal space of the bowl into many thin layers which make more efficient the separation. The cream, that is lighter, flows towards the centre of the bowl and leaves the disk assembly via its inner edge. The skim milk is heavier and flows towards the bowl periphery. They rise in the disks stack and reach the two upper chambers of the bowl. Here two fixed centripetal pumps (4-5) convey them under pressure to the outlet pipe lines (6-7). The two pumps are surrounded by rotating liquids so, even if they are not rotating, they transfer the speed of the liquid into static pressure.
The solids impurities (9) eventually present in milk are collected in the periphery of the bowl body (8) where they must be removed manually.
On inlet-outlet pipe lines are inserted valves and instrumentation necessary to control and regulate the separator (micrometric adjusting valves, butterfly valves, sanitary pressure gauge, sample cocks, etc.).

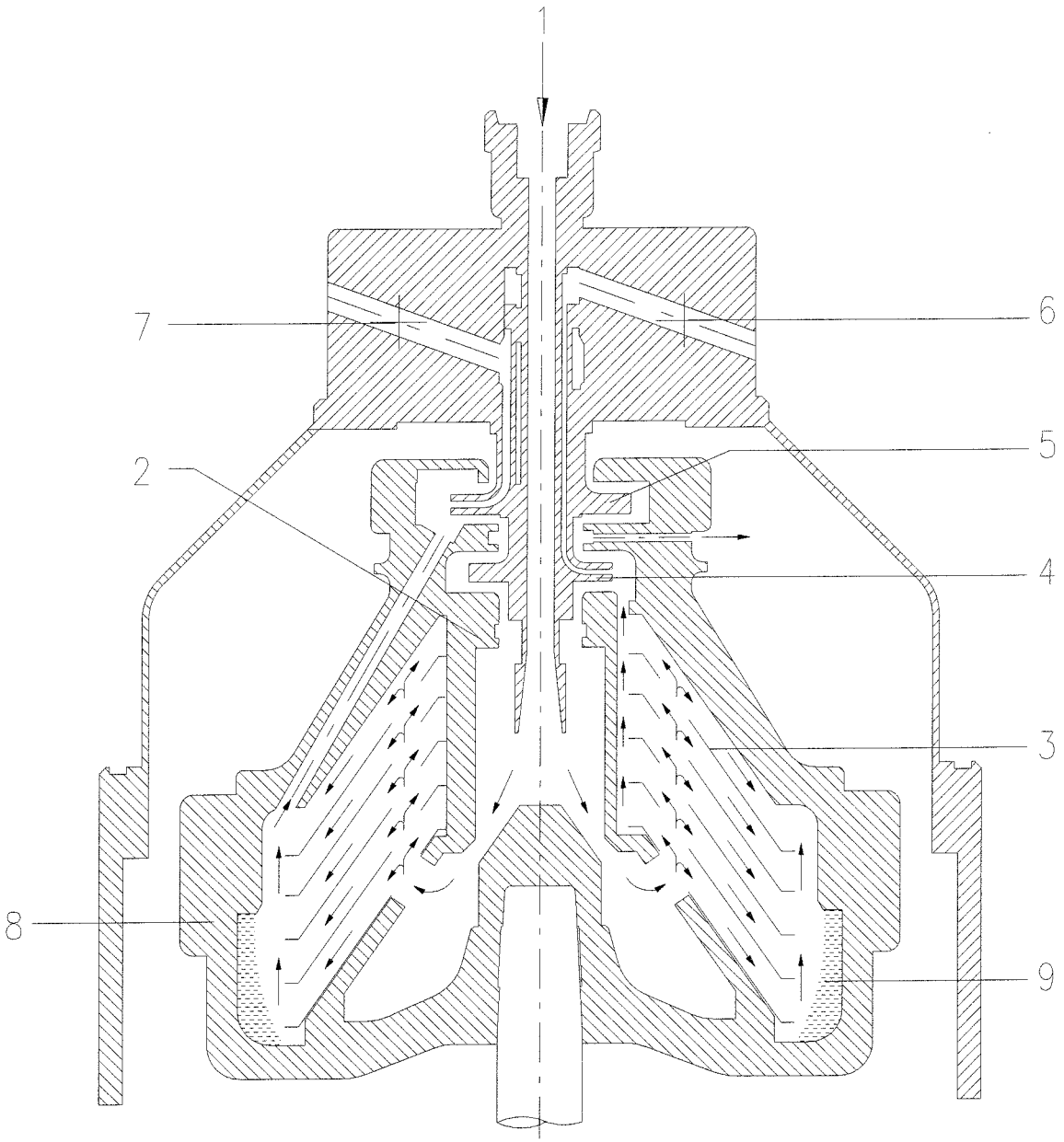


Figure 3.1

1 Feed
2 Distributor
3 Discs stack
4 Light phase centripetal pump
5 Heavy phase centripetal pump
6 Light phase outlet
7 Heavy phase outlet
8 Bowl body
9 Separated solids

3.3 Data sheet

Overall dimensions (ref. Tab. 03):		
Width:	455	mm.
Length:	530	mm.
Height:	685	mm.
Weights:		
Bowl weight:	17	kg.
Separator net weight:	90	kg.
Operating features:		
*Milk skimming capacity:	500	l/h
*Whey skimming, milk cleaning capacities:	750	l/h
Bowl capacity:	1,28	l
Solids chamber capacity:	0,5	l
Bowl speed:	10.200	r.p.m.
Motor speed:	1.450	r.p.m.
Product and process features:		
Maximum product density:	1,1	kg/dm^3
Maximum sludge density:	1,35	kg/dm^3
Maximum product temperature:	95	°C
Minimum product temperature:	3	°C
Process temperature	20 ÷ 60	°C
Electrical system features:		
Motor power:	1,1	kW
Voltage:	3 x 230/400	V
Frequency:	50	Hz
System:	three-phase+earth	
Motor protection level:	IP 55	
Operation:	electro-mechanical	
Hydraulic system features:		
*Required feeding pressure necessary for a machine working at maximum capacity:	0,5	bar
*Maximum outlet pressure (skim):	2	bar
*Maximum outlet pressure (cream):	1	bar
*Maximum outlet pressure during cleaning (skim + cream):	1	bar

Spacers of inlet-outlet flow unit (§ 6.3):

- n° 1 x thickness 3 mm.
- n° _____ x thickness _____ mm.
- n° _____ x thickness _____ mm.

Total thickness 3 mm.

(*) These data depend on the specific application (milk skimming, cleaning and whey skimming). The skimming capacities given above has been obtained with normal milk and whey at a temperature of 30÷50 °C with 0,03% maximum residual fat content (Gerber system). Milk cleaning can be made only in the conditions reported in § 8.2.4.

3.4 Noise level

The machine has been subjected to a noise emission test with reference to the noise test code included in Annexe A of the standard project prEN 12505.
The determination of noise emission values (sound pressure level) has been done with empty machine, rotating at the operating speed. Care has been taken to ensure that the any electrical conduits, piping or air ducts which are connected to the machine do not radiate significant amount of sound energy.
The measurement has been done at 1,0 m. in front of the machine and 1,6 m. above the floor.

A-weighted time-averaged emission sound pressure level: 72±2 dBA

3.5 Destination and foreseen place of use.

The machine must exclusively operate inside a closed place, which must possess features in conformity with the prescription of this Manual (see § 5.1).
The floor must be plane, without asperities, sufficiently solid to avoid sinkings.

3.6 Improper uses and contra-indications

- Never use the machine to separate liquids which have different characteristics (density, temperature, corrosion, etc.) from those specified.
- The bowl has not to rotate at a higher speed than the maximum operating speed (10.200 rpm).
- The bowl has not to rotate empty. It is allowed to put into rotation the empty bowl for a period of 15 min. only in starting phase.
- Never elude or disactivate the safety shields.
- Never use the machine if it is damaged.
- Use only SEITAL spare parts.

ATTENTION
Avoid water jets on the motor.

Every use different from the specified, not included o deducible from this manual, it is considered "NOT ALLOWED".

4. LIFTING, TRANSPORT, STORAGE

4.1 Machine delivery

The whole material is accurately checked from the manufacturer before the forwarding.
For transport and lifting operation the bowl is separated from the rest of the machine; this to preserve the integrity of the rotating parts of the machine.
When receiving the goods check the machine has not been damaged during transport or that the eventual package has not been tampered with subsequent removal of internal parts. Verify therefore that data desumed from the accompanying documents correspond to forwarding data.
When disassembling it is advised to accurately sieve the packing, to avoid that parts, missing at first sight, are not remained in the packing material.
If damages or missing parts are noticed, immediately inform the carrier and the manufacturer showing photographic documentation.

4.2 Packing and unpacking

The packing conditions are defined with the customer in relation with the distance and the chosen mean of transport. The machine can be transported without packing.
In case of packing this is constitued by a wood box.
The machine parts must be assured to the level ground (by brackets or other) to prevent every horizontal and vertical movement.
The sheets affixed outside the packing contain the following informations:

- Manufacturer
- Address
- Gross weight
- Case dimensions
- Means of lifting
- Lifting points

UNPACKING
Carry the packed machine closest the place selected for installation.
Remove the plastic protection to free the machine.
Conditions of packing elimination (if present):
Wood: not pollutant material, to correctly ricycle.
Plastic: pollutant material to not burn (toxic fumes) neither waste in the environment; eliminate in accordance with the law in force in the user country.

4.3 Lifting and transport of the packed machine

To lift the packing can be used the following means:

- lift truck;
- bridge crane, crane or hoist with sling.

LIFT TRUCK
Use a lift truck with:

- capacity higher than the weight of the machine+packing (reported outside the case);
- fork with length higher than 1500 mm.

Insert the forks under the level ground in central position, where signed by the suitable triangles on the case (fig. 4.1), and keep them at the maximum distance one from the other.

SLING
Must be used ropes or bands in good conditions (neither damaged nor deteriorated) having guaranteed capacity higher than the weight of the machine+packing (reported outside the case).
Pass the two ropes outside the "case feet" to avoid the sliding of the ropes towards the centre of the case (fig. 4.2).

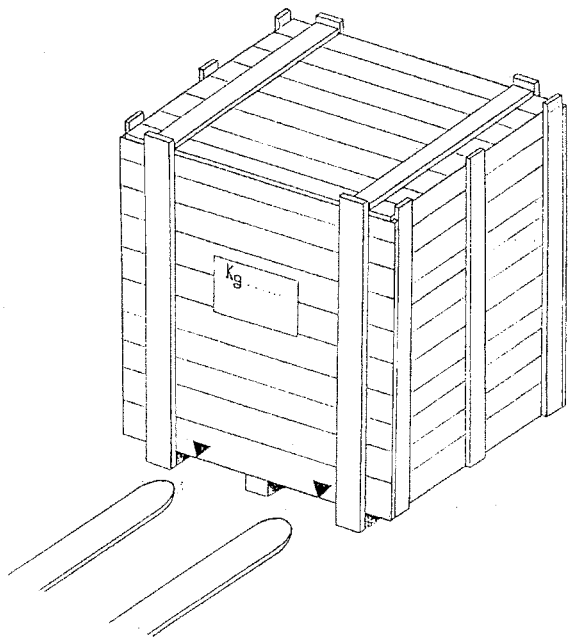


Figure 4.1

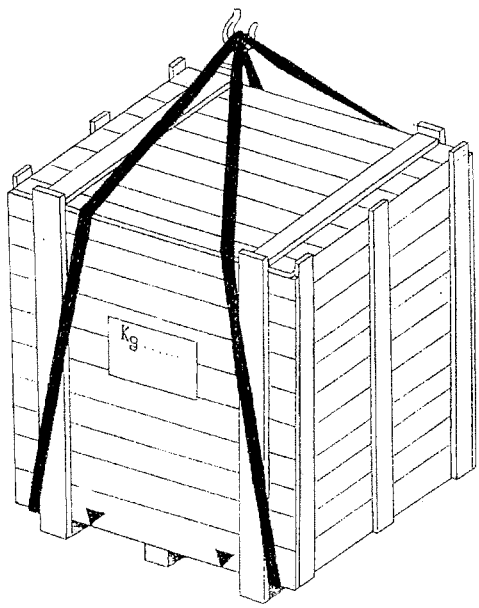


Figure 4.2

4.4 Lifting and transport of the machine without packing

ATTENTION
Danger of damaging the machine during transport
The machine transport on the road must be performed without the bowl to avoid damaging of the vertical shaft and/or ball bearings.

To lift the separator use two hemp ropes and a bridge crane, crane or hoist having guaranteed capacity higher than the weight of the machine (ab. 90 kg.).
Pass the two ropes under the frame, and adjust their length in order to have the lifting point on the centre-of-gravity vertical line (one rope must be placed inside the frame foot on motor side, the other one on the opposite side); then lift the whole.
To lift the bowl (fig. 4.3) a particular procedure must be followed:

- open the two ends of the spanner wide apart (part 1);
- insert the middle part of the spanner under the tooth placed at the end of the conical part of the bowl hood (part 2)
- apply on the spanner the lifting ropes having guaranteed capacity higher than the weight of the bowl (ab. 17 kg)
- lift the whole by hands, with a bridge crane, crane or hoist.

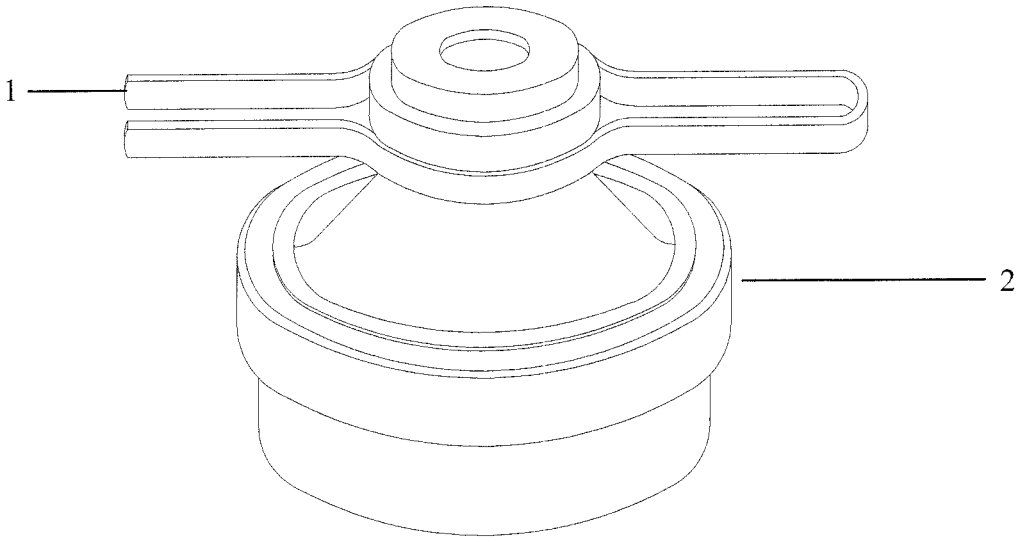


Figure 4.3

ATTENTION
Danger of machine turnover
Danger of impact and squashing for people
During lifting and transport must be used great caution to avoid injury to people and things.
This operation must be performed by expert personnel.
Verify that nobody is exposed to a risk in danger zone.
WHEN LIFTING ALL THE AREA SURROUNDING THE MACHINE MUST BE CONSIDERED DANGER ZONE.

Until the groups (bowl, separator) are not completely lifted it's better to verify the correct balancing of them. The lifting must be performed with continuity (without impulses).
Keep the load lower than possible during movements, both for a better load stability, and for a higher visibility.
The manufacturer do not answer about breakages due to the transport of the machine after the delivery.

All the elements that are potentially moveable or not resistent to his weight must be securely fixed to the machine to prevent dangerous disjunctions or unbalancings.
For the machine not packed is prescribed a covered transport.

4.5 Warehouse storage

The machine storage, with or without packing, must be done in a place which has the humidity and temperature conditions reported in § 5.1.
If the machine remain unused for a long time (more than 3 months), after it has already worked al least once, perform the following operations:

- accurately clean the separator;
- dry with clothes and greased all the bowl parts and the unpainted parts of the machine, to avoid corrosions;
- keep the bowl in a dry place;
- to avoid the gaskets become brittle, preserve them in a cool, dry, dark and dust-sheltered place;
- discharge lubricant oil and accurately clean the gear chamber;
- disconnect the inlet-outlet pipes of the product and plug them.

When starting the machine follow the instructions reported in § 7.

5. INSTALLATION/PREPARATION TO START

5.1 Environment

The machine work inside a covered factory, with steady temperature, limitedly esposed to dust and humidity.
Except for different specification in order established, the machine has been designed and tested to regularly work in the enviromental conditions reported below.
If the conditions are very unsteady, the means and characteristics of air-conditioning will have to be fixed.

ALTITUDE
The altitude of the place where the machine will be installed have not to be higher than 1000 m from sea level.

TEMPERATURE
Minimum room temperature: +10°C
Maximum room temperature: +40°C

ATMOSPHERIC CONDITIONS
The electric equipment can correctly work in atmospheric conditions with relative humidity not higher than 50% and temperature of 40°C, and at 90% with temperature not higher than 20°C (without condensate).

LIGHTING
The factory lighting system is considered very important for the safety of people and of work quality. It is for the customer to know the standards regarding accident prevention and work health in force in his country. These standards define the responsabilities of the work place manager, who must guarantee a good efficiency of plants and consequently of machines.
In Italy this argument is regulated by a ministerial decree which clearly fix the average level of prescribed lighting.
The lighting is measured in lux (1lux = 1lumen/mq).
Minimum necessary lighting: it has to guarantee the correct perception of symbols and marks (from 300 to 500 lux).
Maximum lighting: it has to avoid the operator dazzling.

ATMOSPHERE WITH EXPLOSION AND/OR FIRE RISK
The standard machine SE 02.0 is not arranged to work in environments with atmosphere with explosion and/or fire risk.
The customer/user must absolutely specify, during negotiation, if the risk is present.
An environment different from the prescribed one can cause dangerous situation for people.

5.2 Working necessary space

The choice of the place or space suitable for the laying of the machine is important for the quality of the work (maintenance, safety, etc.).
Fix the boundaries of the area for the operator, foreseing areas sufficient for normal operation, maintenance and release.
The free space will be the space indicated in Tab. 10.
This area must be good-lighted and ventilate.
The environment and operating conditions have not to be a hindrance for the access to the machine controls. The machine operation must be guaranteed, including also the maintenance activities.

5.3 Equipment

The machine normal equipment include:
- Set of special spanners for the bowl.
- Set of spare parts (gaskets, disks, etc.).

5.4 Location and assembly on place

Move the machine without bowl to avoid damaging vertical shaft and/or ball bearings.
To lift separator follow instructions reported § 4.4.
Fix the foundation plate to the floor with its four anchor bolts by means of a concrete casting, making sure that the plane (A) of the four supports is horizontal (fig. 5.1).
Put the four shock absorbers on the foundation plate supports. Lift the frame and put it over the shock absorbers. Check the correct resting of all shock absorbers.

1 - Anchor bolt
2 - Foundation plate
3 - Shock absorber
4 - Frame foot
5 - Nylon washer
6 - Washer
7 - Cap nut
A - Foundation plate plane

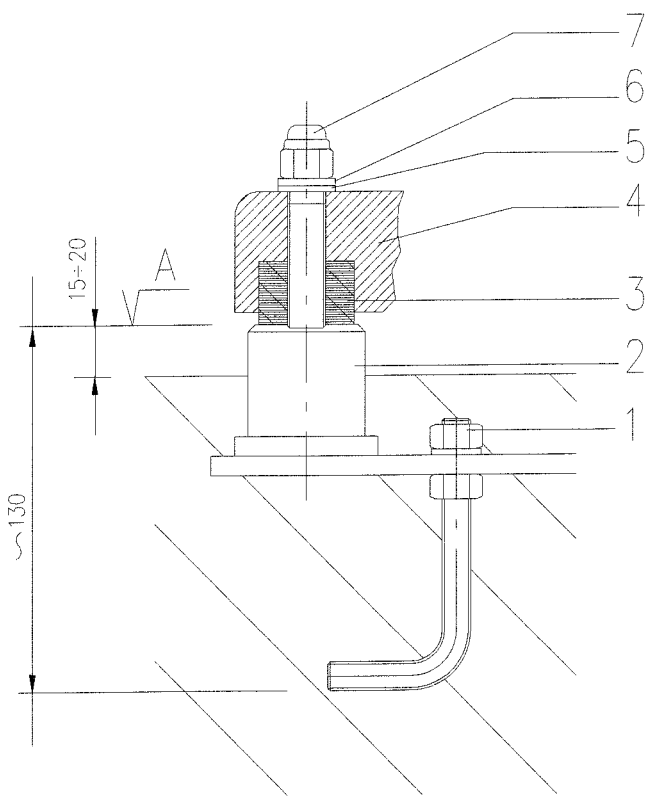


Figure 5.1

The frame plane (B) must be horizontal (fig. 5.2). In order to obtain this, adjust the screwing of cap nuts (7), which must be screwed without tightening, to have always a good working of the shock absorbers.

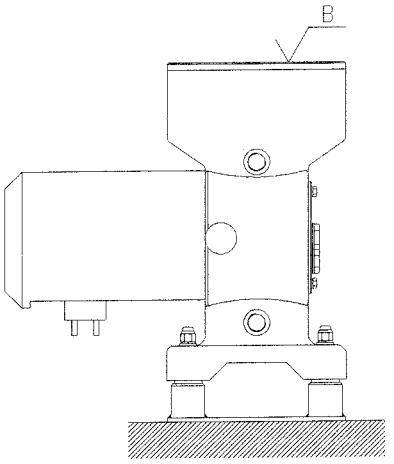


Figure 5.2

5.5 Lubrication

5.5.1 Bearings and gears lubrication

All the separator bearings and gears are splash lubricated.

OIL LEVEL
The separator is delivered without lubricating oil. Before the first starting it is necessary to fill the gear housing with the lubricant of separator equipment. After the filling, the oil must be at a level just over the mark on the sight glass (fig. 5.3). During operation, the oil level has never to fall below the mark.
Check the oil level every day before the starting up and check presence of water from time to time loosening oil drain plug and drawing a sample. If this is "white-coffee coloured" (emulsion symptom), change immediately the oil.

1 - Oil supply plug
2 - Oil drain plug
3 - Oil gauge glass
A - Oil level - standstill machine

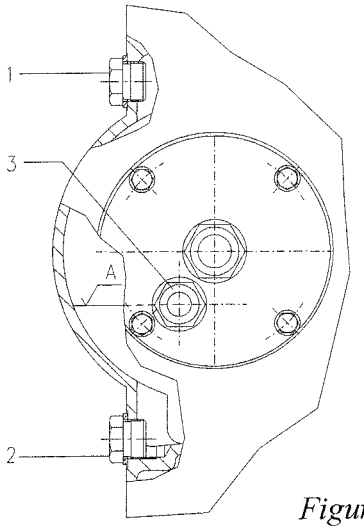


Figure 5.3

ATTENTION
Danger of injury or burning
It is peremptorily forbidden to perform the oil change or supply when the machine is still rotating.

TYPE OF OIL
Always use mineral, non-corrosive oil EP type with the following characteristics:
Viscosity: - 220 cSt at 40°C, corresponding to ISO VG 220.
- 18,7 cSt at 100°C.
Viscosity index: 95.
Density: 0.895 kg/l, at 15°C.

ATTENTION
Danger of gears and ball bearings damaging.
It is peremptorily forbidden the use of syntetic oil.

Oil satisfying the previous qualifications:

AGIP Blasia 220	IP Mellana oil 220
API DT-220	MOBIL Mobilgear 630
BP Energol GR-P 220	Q8 Goya 220
CASTROL Alpha SP 220	SHELL Omala oil 220
ELF Reductelf SP 220	TAMOIL Carter EP lubricant 220
ESSO Spartan EP 220	TEXACO Meropa 220
GULF EP Lubricant HD 220	TOTAL Carter EP 220

OIL CHANGE
The first time change the oil after 300 operating hours and then once every 1500 operating hours; however never let pass a period longer than six months. In seasonal operation the oil change must be performed before every operating period.
Whenever changing oil, accurately clean gear housing and remove all metal particles fouled in the internal walls and corners of gear chamber. Do not use downy rags or cotton waste. Clean sight glass.

AFTER LONG REST OF SEPARATOR
After visually checking the condition of gears inside gear housing, it is advisable to change oil and lubricate the upper ball bearing spraying some oil from below.

5.5.2 Lubrication of threads and contact surfaces of the bowl parts

When assembling the bowl it is advised to apply a thin lubricant layer on threads and contact surfaces of bowl components such as: bowl body, bowl hood, lock rings, etc.
It is recommended the use of the following lubricants:

for food industry
- Molykote D (white paste)
- Molykote DX (white paste)
- Kluber Grease KSB 8

for chemical industry
- Molykote G
- Molykote G Rapid

In addition, other pastes or greases with the same properties may be used.

5.6 Systems connection

5.6.1 Electrical system connection

ATTENTION
Electrocution danger
The electrical connection must be performed by the electrician (that is informed about the risks connected to the intervention and knows as avoid them).

The user have to predispose a suitable isolating switch of the electric line upstream the machine, in addition to effective protection advices against overcurrents/indirect contacts.
When connecting,:

- Verify that the supply mains is provided with suitable earth connecting system and correspond to the voltage and frequency indicated in the wiring diagram supplied with the machine;
- Perform the connection of separator to electric mains with great caution, according to the connection diagram on the next page (fig. 5.4), without voltage in the mains and respecting the safety prescriptions and local regulations. It's absolutely forbidden the mains connection without grounding.
- It is advisable to install the control panel near the machine, to assure a fast intervention in case of danger.
- Always use waterproof conduits on motor terminal board inlet.
- Before assembling the bowl, check direction of rotation by a "short" motor starting. The correct direction of rotation is indicated by the arrow on separator frame, corresponding to the clockwise rotation of vertical shaft (see from above).
- The electrical power supply of the separator motor must be designed relating to starting current (approximately 1,5 ÷ 2 times the nominal current of the motor).

ATTENTION
Generic danger
In case power and control panel has not been supplied with separator, the electrical connection has to be made in conformity with the instructions reported on enclosed wiring diagram and respecting the safety prescriptions and local regulations.

5.6.2 Separator hydraulic feeding

Inlets and outlets are indicated in Tab. 03.
To obtain a regular and efficient working of separator:

- feed the separator with constant flow of product;
- pre-filter the product to process, to prevent the entry of extraneous solids of large size (curdled residues).

It is advisable to connect the separator to the plant by pipes which length is not more than 1 m. to facilitate the disassembly of the connections when dismantling the bowl. Therefore, avoid connections (to another machine, to the wall, ecc.) that rigidly constrain the inlet-outlet unit of the machine; this could increase vibrations level.

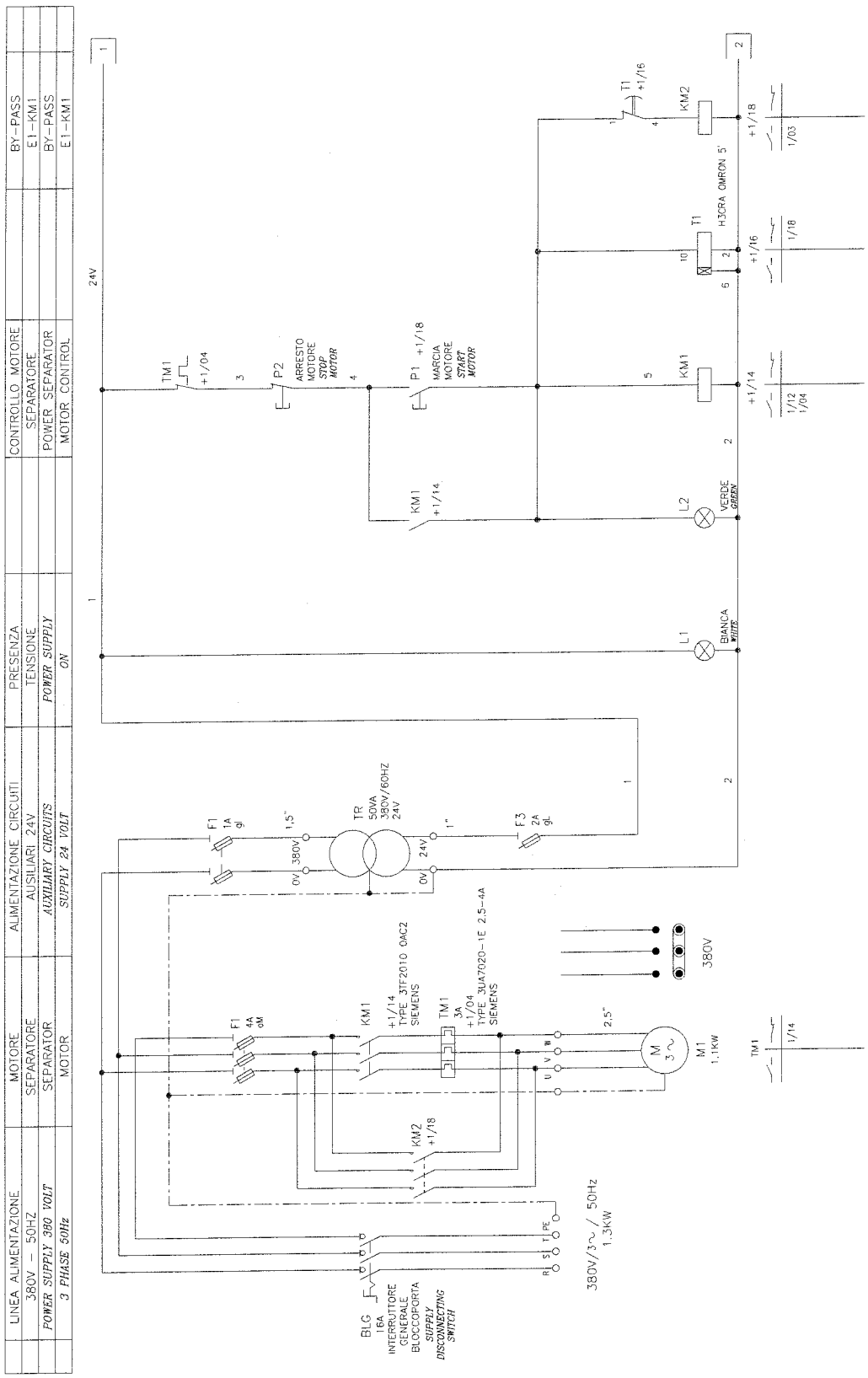

LINEA ALIMENTAZIONE
380V – 50HZ
POWER SUPPLY 380 VOLT
3 PHASE 50Hz
MOTORE
SEPARATORE
SEPARATOR
MOTOR
ALIMENTAZIONE CIRCUITI
AUSILIARI 24V
AUXILIARY CIRCUITS
SUPPLY 24 VOLT
PRESENZA
TENSIONE
POWER SUPPLY
ON
CONTROLLO MOTORE
SEPARATORE
POWER SEPARATOR
MOTOR CONTROL
BY-PASS
E1-KM1
BY-PASS
E1-KM1
24V
TM1
+1/04
P2
ARRESTO MOTORE
STOP MOTOR
P1 +1/18
MARCIA MOTORE
START MOTOR
KM1
+1/14
L2
VERDE
GREEN
L1
BIANCA
WHITE
T1
+1/16
KM2
H3CRA OMRON 5'
+1/18
1/03
+1/16
1/18
+1/14
1/12
1/04
F1
1A
gl
TR
50VA
380V/60HZ
24V
F3
2A
gl
F1
4A
aM
KM1
+1/14
TYPE 3TF2010 0AC2
SIEMENS
TM1
3A
+1/04
TYPE 3UA7020-1E 2.5-4A
SIEMENS
KM2
+1/18
380V
M
3~
M1
1.1KW
2.5"
TM1
1/14
BLG
16A
INTERRUTTORE GENERALE BLOCCOPORTA
SUPPLY DISCONNECTING SWITCH
380V/3~/50Hz
1.3KW

Figure 5.4

6. BOWL AND INLET-OUTLET FLOW UNIT

The bowl is supplied separately from the rest of the machine, so before setting at work the machine, it must be dismantled and assembled on vertical shaft in the frame. The bowl, rotating at high speed, is subjected at high stress that could compromise the operating safety of separator in case the bowl has been improperly assembled and cleaned. In *Figure 6.1* are shown all the main pieces of the bowl.

1 - Bowl body
2 - Bowl body nut
3 - Distributor
4 - Bottom disk
5 - Intermediate disk
6 - OR gasket - bowl hood
7 - Bowl hood
8 - Upper OR gasket - bowl hood
9 - Big lock ring
10 - Finned lock ring

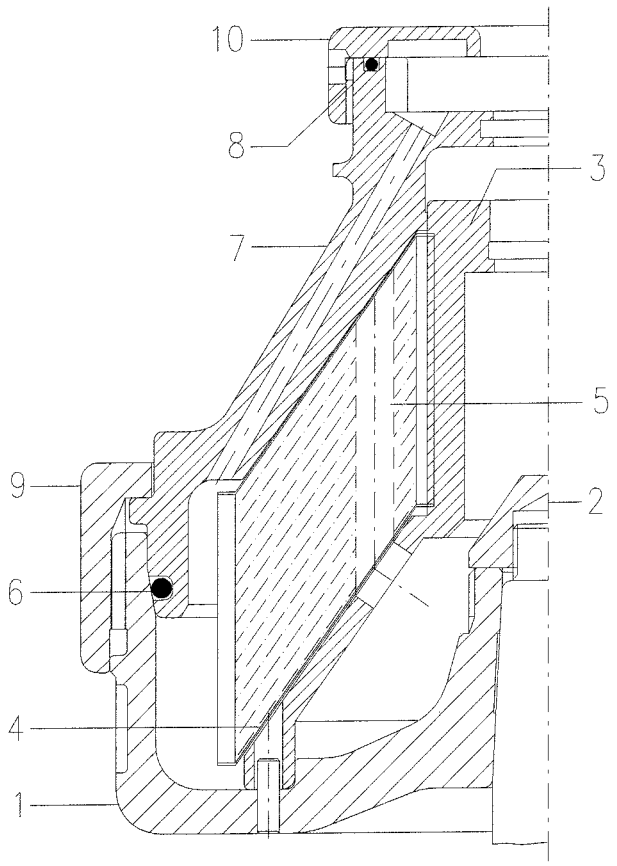


Figure 6.1

6.1 6.1. Bowl assembly

In bowl assembly follow in detail the procedure indicated below and pay particular attention to the following warnings:

ATTENTION
Generic danger
The bowl has not to be started before it has been completely assembled.

- Carefully clean coupling surfaces and gaskets groove.
- Smear antiscuff grease on threads and surfaces subject to rub.
- Check presence of all gaskets on new bowl too.
- Every part must be correctly positioned; almost all bowl parts have an angular position fixed by pins or feather keys - except for threaded parts and gaskets (Picture 6.1 - parts 2, 6, 8, 9,10).
- During assembly verify that shear rags are not present on various pieces and that foreign objects do not remain inside the bowl.
- Bowl body nut and bowl lock rings have left-handed threads.

- Always use our special spanners.

1) Clean and wipe dry the conical part of the vertical shaft and carefully clean also the inside of the bowl hub to assure proper fitting.
By the spanner (09.080.0) insert the **bowl body** (fig. 6.2). Follow these indications.
   - screw the spanner on the hub of the bowl body
   - lift the bowl body by hand or by hoist and place it down with caution on the conical part of the vertical shaft.

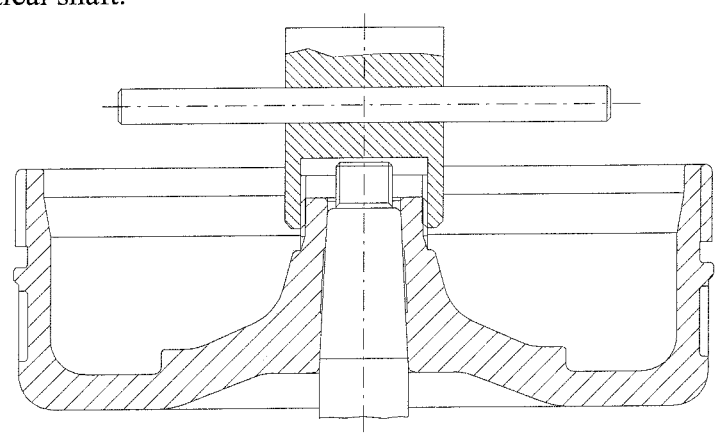


Figure 6.2

2) Screw the locking pins to prevent bowl rotation (fig. 6.3).
To do this:
   - Check the threaded rod with clamp (3,4) are in horizontal position.
   - Rotate the bowl body until the "0" mark is aligned with one of the two locking pins.
   - Screw the first locking pin (6), by turning clockwise the handwheel (2). It fit the circular groove on the bowl body. Do not force the locking.
   - Screw the second locking pin without fasten it too much.
   - Simultaneously fasten the two handwheel.

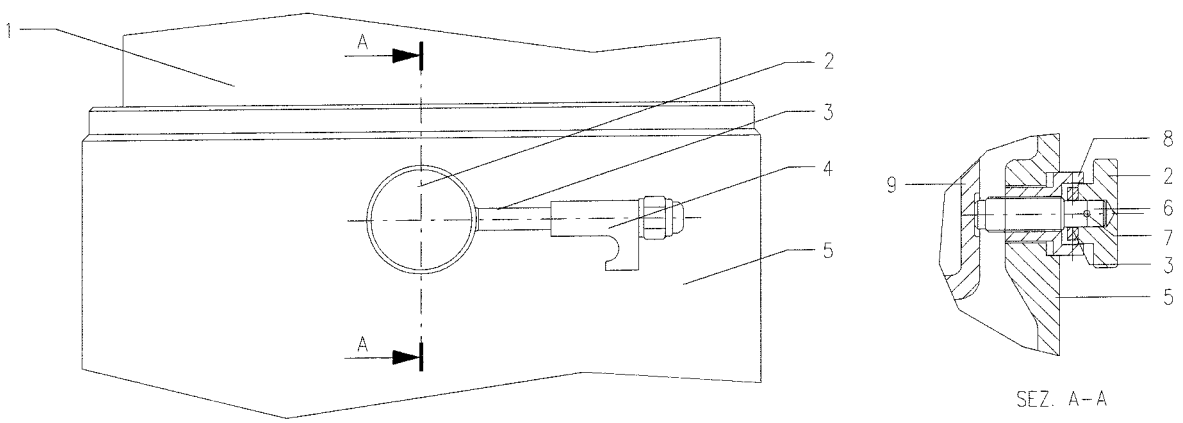


Figure 6.3

1 - Cover
2 - Handwheel
3 - Threaded rod
4 - Clamp
5 - Frame
6 - Locking pin
7 - Elastic pin
8 - Threaded bush
9 - Bowl

3) By the suitable spanner (09.040.0), screw tight the **bowl body nut** (part 2 in fig. 6.1). By the hammer (09.030.0) give some blows to the spanner to be sure that the nut is well fixed.

4) By hand place down the **distributor,** so that the guide pin of the bowl body enter correctly into the corresponding hole in the distributor (fig. 6.4 part 1).

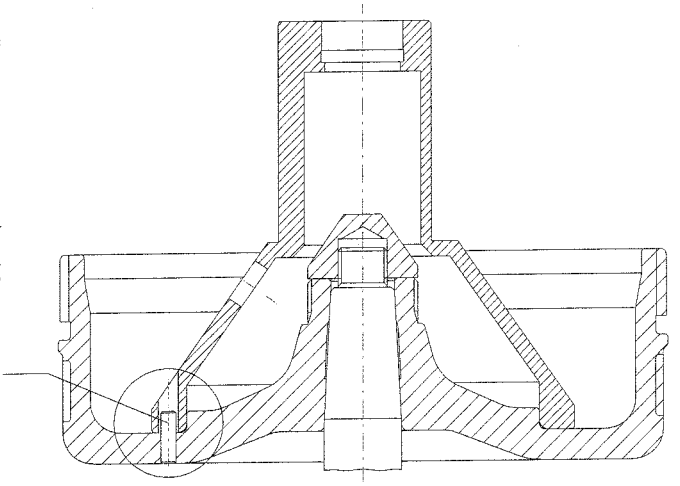


Figure 6.4

5) Insert the **disks**. The disks can be inserted in the distributor only in one way. As shown in Fig. 6.5, over the distributor is marked a big "0" that must be aligned with "0" marks of the bowl body. To insert disks, rotate them until the small slot (1- fig. 6.5) made on the internal upper edge is in front of the distributor groove (2); then make them glide on the distributor fins. Insert at first the **bottom disk** (Fig. 6.1, part 4) that distinguishes itself by having spacers on both surfaces. Then insert the intermediate disks (Fig 6.1, part 5). Take care to not change the sequence of the disks.

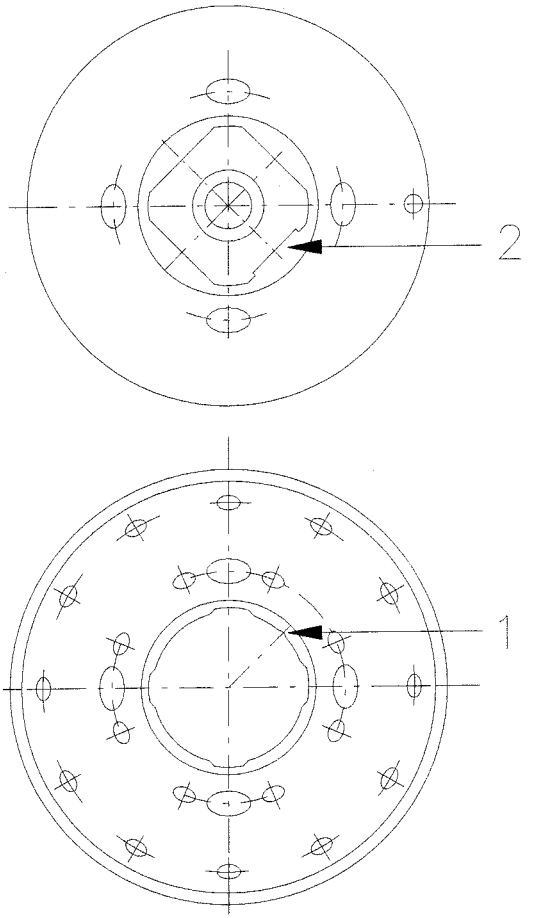
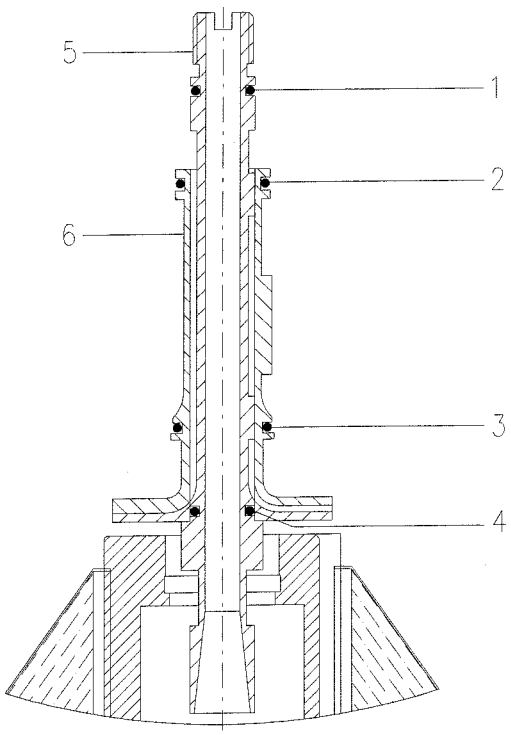


Figure 6.5

6) Insert the gaskets on the feeding pipe and the centripetal pump light phase (fig. 6.6 - parts 1, 2, 3, 4). Then insert the **feeding pipe** and the **centripetal pump - light phase** (fig.. 6.6 - parts 5,6).



1 OR gasket - pipe
2 OR gasket - pump
3 OR gasket - pump
4 OR gasket - pipe
5 Feeding pipe
6 Light phase pump

Figure 6.6

7) After carefully cleaning the groove, insert the OR gaskets on bowl hood (fig 6.1, part 6).

8) Carefully clean the conical coupling surfaces of bowl body and bowl hood (1 - fig 6.7); then smear on them a thin film of antiscuff grease (alimentary type).

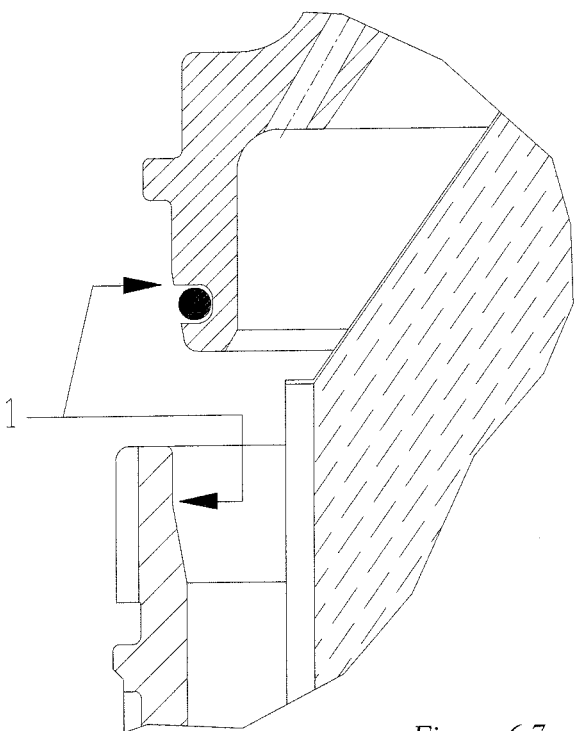


Figure 6.7

9) By the spanner (09.010.0), place down the **bowl hood** (fig 6.8). Proceed as follows:

- open the two ends of the spanner wide apart;
- insert the middle part of the spanner under the tooth placed at the end of the conical part of the bowl hood
- gripping by hands the two ends of the spanner, lift the piece and fit it with caution on the bowl body.

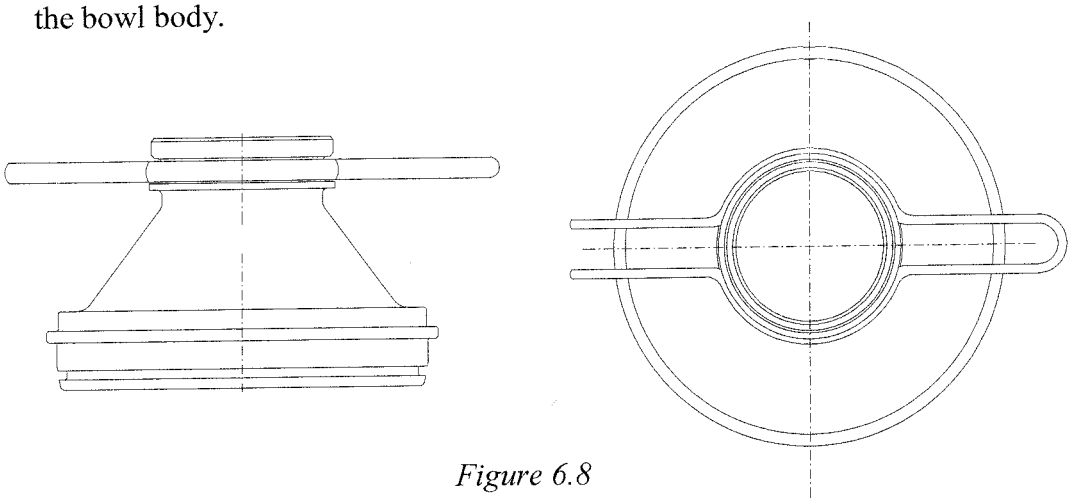


Figure 6.8

10) Smear antiscuff grease on threads of bowl body and big lock ring (fig. 6.9 - part 1) and on contact surfaces between bowl hood and big lock ring (fig. 6.9 - part 2).

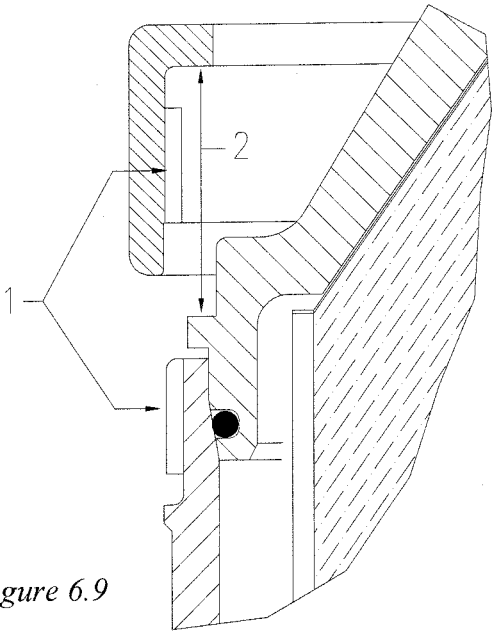


Figure 6.9

11) By the spanner (09.020.0) screw the **big lock ring** (fig 6.1 - part 9) that has left-handed thread. It must be possible screw by hands the ring until the "0" mark is at least 1 cm. before the "0" mark of the bowl body (if this does not happen, it means that the assembly is not correct or the number of disks is wrong). Then fasten it down as much as possible by striking with mallet (09.030.0) the spanner handle. Now the "0" marks must be aligned. In case the bowl is not new and the parts start being worn, the "0" mark of the ring will go beyond the "0" mark of the bowl body. The distance between the two references must not exceed 3 cm.

12) Insert the gaskets on the centripetal pump - heavy phase and on the bowl hood (fig. 6.10 parts 1 and 2).

13) Insert the **centripetal pump - heavy phase** (fig. 6.10 - part 3).

14) Using the spanner (09.060.0) and the mallet (09.030.0), screw (left-hand thread) the **finned lock ring** (fig. 6.10 - part 4).

15) Unscrew the locking pins (part 6 - fig. 6.11), by turning anticlockwise the handwheel (5).

16) Verify that the bowl is free to rotate, before assembling the cover.

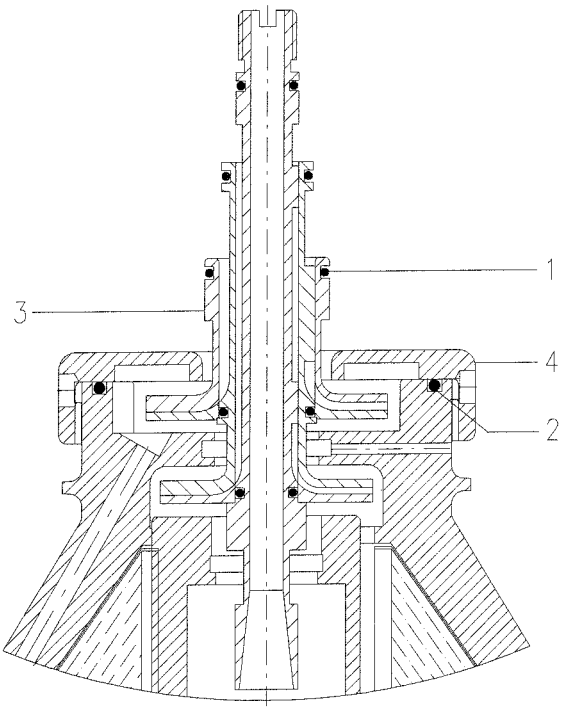
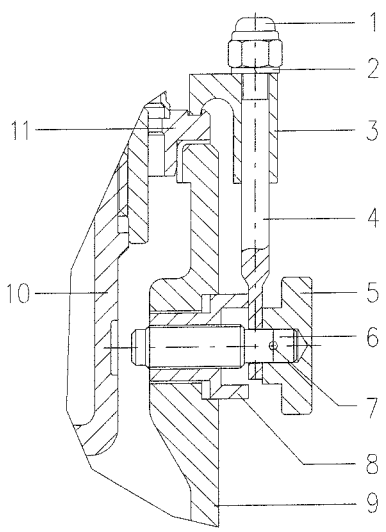


Figure 6.10

17) Place the cover on the frame, paying attention to not damage threaded parts on the feeding pipe, and fix it down tightly by suitable blockings (fig. 6.11).
Proceed as follows:

- Place down the cover. It can be positioned in every angular position.
- Swing the blocking unit (1 to 4), until it assumes a vertical position.
- Lay the clamp (3) to the cover (11) and fix it down by screwing the cap nut (1).



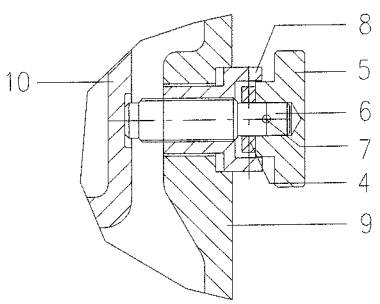


Figure 6.11

1 - Cap nut
2 - Washer
3 - Clamp
4 - Threaded rod
5 - Handwheel
6 - Locking pin
7 - Elastic pin
8 - Threaded bush
9 - Frame
10 - Bowl
11 - Cover

6.2 Inlet-outlet flow unit assembly

Before assembling, check all gaskets and grooves: they must be in good conditions and accurately cleaned.
The spanners necessary for assembly are reported in Tab. 09. Do not use other tools or use them with caution.

The feeding pipe and the two centripetal pumps must be assembled in sequence with the last parts of the bowl (see § 6.1), then fix the cover on cyclone and finally the remainings parts of inlet-outlet flow unit.

Proceed according with the following procedure:

1) Assemble spacers (7) on body (8).
2) Insert body on the feeding pipe (1), adapting it on centripetal pump (5) and on the correspondent seat on the cover.
3) Screw hardly the two screws (10) into the holes of cover.
4) Insert washer (11) and screw nut (12) - left-handed thread - using the spanners (09.050.0). Insert spanner (09.070.0) into the split of the feeding pipe to avoid pipe rotation when fastening the nut.
5) Install manometer (14) with appropriate gasket (13).
6) Install light phase micrometric valve (16) with gasket (15), heavy phase micrometric valve (18) with gasket (17).

Always check:
- spacers thickness and number is the prescribed one (see § 3.3 and 6.3).
- locking nut of feeding pipe (left hand thread), fixing screws of cover to frame (Tab 0.8) and of inlet-outlet flow unit to cover are hardly screwed.

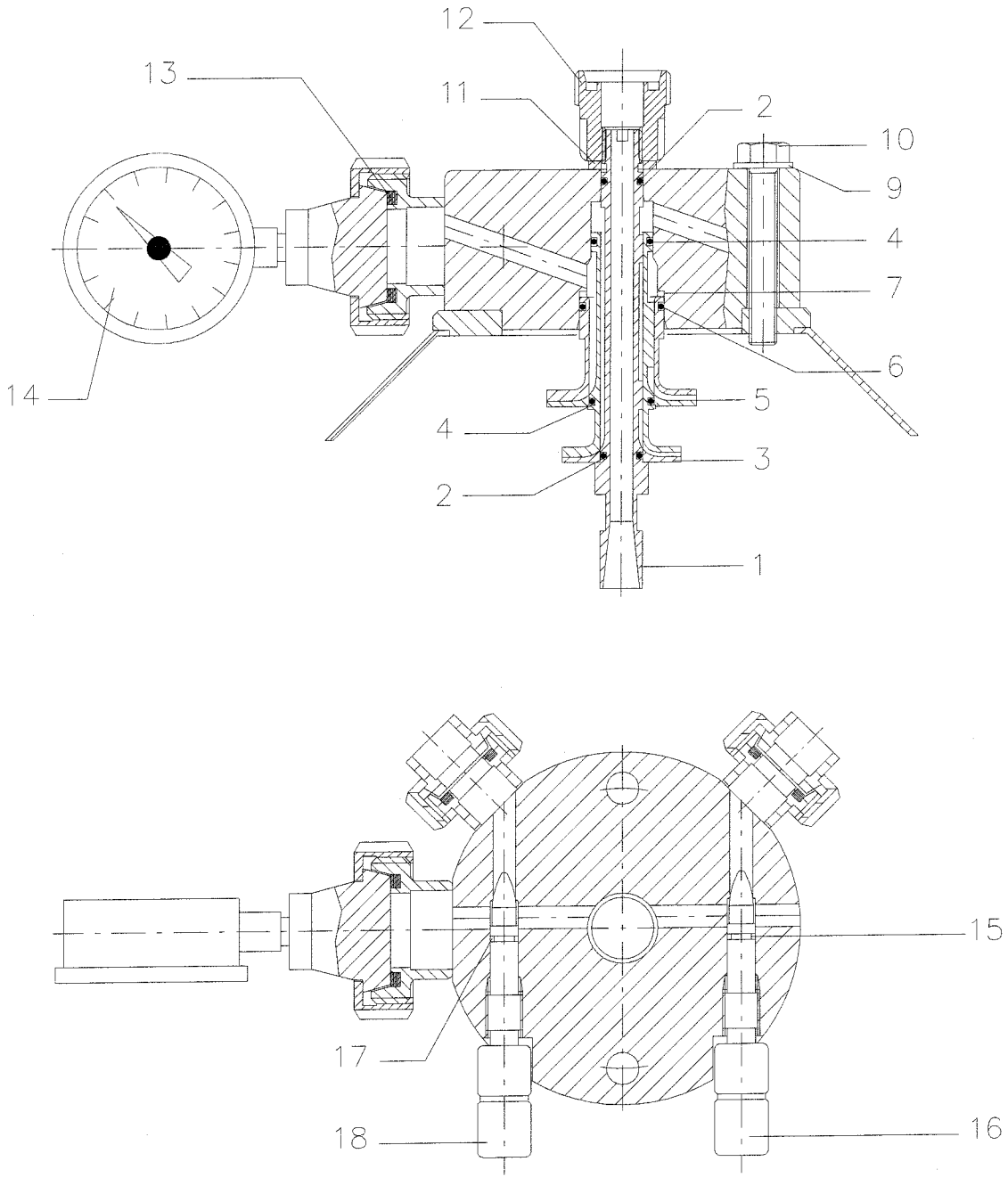


Figure 6.12

1 - Feeding pipe
2 - OR gasket
3 - Centripetal pump - light phase
4 - OR gasket
5 - Centripetal pump - heavy phase
6 - OR gasket
7 - Spacer
8 - Flow unit body
9 - Washer
10 - Screw
11 - Nylon washer
12 - Feeding pipe nut
13 - Manometer OR gasket
14 - Manometer
15 - OR gasket - light phase shutter
16 - Shutter - light phase
17 - OR gasket - heavy phase shutter
18 - Shutter - heavy phase

6.3 Adjustment of pumps position

The correct position of pumps is shown by fig. 6.10; the pumps are in the middle of the corresponding chamber of the bowl. This position is obtained by inserting a few spacers (7) - fig. 6.12 between the heavy phase pump (5) and the inlet-outlet flow unit body (8). The number and thickness of spacers may vary only after the replacement of some parts of the vertical shaft unit (Tab.06) and/or of the bowl (Tab.04) and/or of the inlet-outlet flow unit (Tab.05). In this case it is advisable to vary corresponding number and thickness of spacers indicated on technical card § 3.3. The total thickness of spacers is determined by the following relation:

Total thickness of spacers = 3,5 - A

To find "A" push down the heavy phase pump (5) to the bottom of the corresponding bowl chamber. The distance (measured in mm) between the cover upper edge and the pump give the value of "A" (fig. 6.13). Extract all existing spacers before doing this measure.

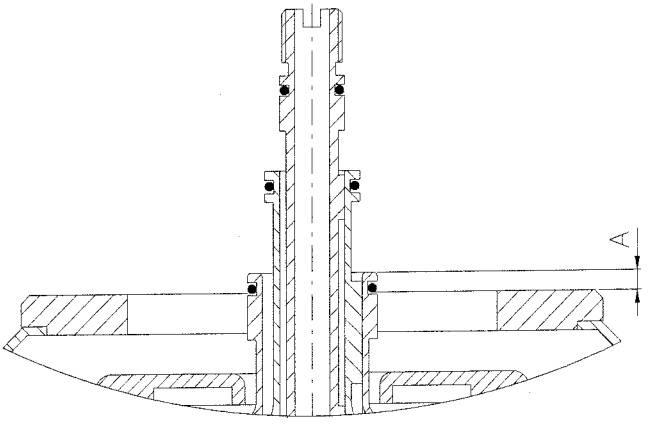


Figure 6.13

6.4 Inlet-outlet flow unit disassembly

ATTENTION
Generic danger
Only with bowl completely standstill is possible to start disassembly.

ATTENTION
Generic danger
Before disassembly, always perform machine chemical cleaning, that finish with cold water rinsing for about 5 minutes.
In case it is not possible to perform the cleaning, cool the bowl passing through it cold water or other cooling fluid, before starting disassembly.

ATTENTION
When disassembling is suggested to put in a suitable area the dismantled components to make easier finding them out and to verify the completeness of the assembly at the end of it.

Proceed in inverse order than assembly (see Fig. 6.12).

1) Remove light phase micrometric valve (16) with gasket (15).
2) Remove heavy phase micrometric valve (18) with gasket (17).
3) Disconnect feeding pipe and outlet pipes.
4) Insert spanner (09.070.0 - Tab. 09) into the split of the feeding pipe and unscrew nut (12) - left-handed thread - using spanner (09.050.0).

5) Extract the nylon washer (11).

6) Unscrew the two screws (10), that fix the inlet-outlet flow unit to the cover.

7) Lift up the flow unit body (8).

6.5 Bowl disassembly

1) Disassemble the **cover** proceeding as follows:
   - loosen the cap nuts (fig. 6.11 - part 1) of the blocking elements;
   - remove the clamp (fig. 6.11 - part 3). This allow the threaded rod to rotate and assume the horizontal position;
   - take out the cover (fig. 6.11 - part 5).

2) Screw the locking pins to prevent bowl rotation (fig. 6.3). To do this:
   - Rotate the bowl body until the "0" mark is aligned with one of the two locking pins.
   - Screw the first locking pin (1), by turning clockwise. It fit the circular groove on the bowl body (2). Do not force the locking.
   - Screw the second locking pin without fasten it too much.

3) By the spanner (09.060.0) and the mallet (09.030.0), unscrew the **finned lock ring** (fig. 6.10 - part 4).

4) Take out the **heavy phase pump** (fig. 6.10 - part 3).

5) By the spanner (09.010.0), extract the **bowl hood** (fig. 6.8). Proceed as follows:
   - open the two ends of the spanner wide apart;
   - insert the middle part of the spanner under the tooth placed at the end of the conical part of the bowl hood;
   - gripping by hands the two ends of the spanner lift the piece to a complete releasing.

6) Take out the **feeding pipe** with the **light phase pump** (fig. 6.6 - parts 5,6).

7) By striking with mallet (09.030.0) the handle of the spanner (09.020.0) and then turning it by hand, unscrew and take out the **big lock ring** (fig. 6.1 - part 9).

8) Extract the **disks**. Take care to not change the succession of the disks.

9) By hand take out the **distributor** (fig. 6.4 - part 1). Proceed as follows

10) By the suitable spanner (09.040.0) and using the mallet, unscrew the **bowl body nut** (fig. 6.1 - part 2).

11) Unscrew the locking pins (fig. 6.3), by turning them anticlockwise.

12) By the spanner (09.080.0), extract the **bowl body** (fig. 6.2). Proceed as follows
   - screw the spanner on the hub of the bowl body;
   - lift up the bowl body by hand or hoist.

7. MACHINE START

7.1 Warnings

Before machine starting, be sure to have understood the contents of this Handbook. For explanations and deepenings contact the manufacturer.
The normal operation and maintenance personnel have to own the specific expertise required by this Handbook, as well as the psychophysics requisits necessary and sufficient to make an intervention on the machine.

ATTENTION
Generic danger
Only qualified and authorized personnel may perform regulations and interventions that are not assigned to the simple operator.

7.2 Safety sistems description

ATTENTION
Generic danger
Never tamper safety devices. Before setting at work the machine check their correct positioning and always verify their efficiency.
In case of bad working inform the maintenance responsible.

7.2.1 Project devices

To reduce the risks, it has been realized an opening on the frame closed by a sight glass, which permits to check if bowl is rotating or not.

7.2.2 Shields

The following shields are presents:
- A series of steel shields are fixed with screws that totally prevent the access to the moving internal parts of the machine:
  - n°.1 bowl protection cover;
- - n° 1 motor protection cover.

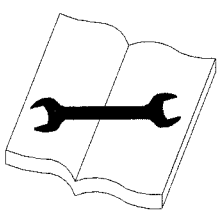
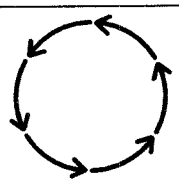
7.2.3 Warning bill-stickings

In accordance with EEC 89/392 directives and his amendments, the following notice bill-stickings has been predisposed (Tab. 10):

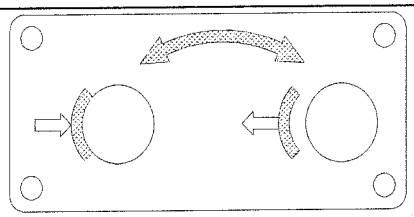
- **On the motor connection box:**

	**GENERIC ALERT** MOTOR TERMINAL BOARD IS PREDISPOSED TO BE CONNECTED TO A "380 V" LINE

- **On the bowl protection cover:**

	**SAFETY ALERT** • CONSULT TECHNICAL MANUAL FOR PROPER SERVICE PROCEDURE
 	• WAIT UNTIL ALL ROTATING PARTS HAVE COMPLETELY STOPPED BEFORE PERFORMING MAINTENANCE (Check the bowl motion state as indicated in Fig. 2.1).

- **Up the brake handwheel:**

	**TO BRAKE**: TURN THE HANDWHEEL ANTICLOCKWISE **TO DISACTIVATE THE BRAKE**: TURN THE HANDWHEEL CLOCKWISE

It's absolutely necessary to recognize the meaning of the warning bill-stickings and maintain the message readable. In case of deterioration, the stickings must be immediately substitued avoiding the use of the machine until it's unprovided with them.
It's recommended to comply with the remarks referred on the stickings.

7.3 Regulation and control devices

To adjust and control the machine operation, on product outlets are present the following devices:

- n° 2 shutters for cream and skim regulation on product outlet;
- n° 1 manometer to check skim pressure value;

7.4 Stop of separator

To stop the separator proceed as follows:

1) Feed the separator with water.
2) If necessary, close the heavy phase micrometric valve (shutters A and B - fig. 8.1), to extract the remaining light phase from the bowl.
3) Stop the separator feeding.
4) Cut out motor of separator and let bowl stop by itself. Work on brake only if necessary.

Before carrying out any dismantling wait for a full rest of the bowl.

ATTENTION
Generic danger
The BRAKE must be used ONLY after the MOTOR has been electrically CUT.

7.5 Energy sources disconnection

ELECTRIC ENERGY
The general interrupter on the electric panel (door interlock) permits disconnection of the electric feeding. The interrupter can be lock to be sure of more security.
This interrupter can be used like an emergency stop.

7.6 Preliminary checks

- The bowl must be correctly assembled: the locking rings must be screwed right down (left-hand threaded) and the marks "O" of the corrisponding parts must be aligned.
- All the fixed protections (cover, ports, ecc.) must be in right position.
- Verify that inlet-outlet flow unit and cover are well fixed.
- Verify that the feeding pipe nut is well screwed (left-hand threaded), in order to obtain a good fixing of the centripetal pumps.
- Check oil level (oil must be slightly above the mark on the sight glass).
- Brake must be released.
- Check that valves at the outlet of the product are closed.
- If separator doesn't work for a long time (more than 3 months), it is recommended to:
  - check the good conditions of bowl valves;
  - oily separator again following the instruction indicated at § 5.5.1;
  - start the machine without bowl for about 5 min.

ATTENTION
Generic danger
The machine OPERATOR MUST BE PRESENT at the starting-up phase.

7.7 Starting up instructions

ATTENTION
Generic danger
The machine OPERATOR MUST BE PRESENT at the starting-up phase.

- Refering to the recommended wiring diagram (fig. 5.4), at start, push start motor button (P1) so:
  - the green lamp light on;
  - contactors KM1 and KM2 are engaged and motor protection is by-passed;
  - timer T1 begin counting.

  When the setting time is elapsed:
  - contactor KM2 is switched off;
  - thermal protection TM1 is activated.
- Check the regular start of separator and wait for reaching nominal speed (after about 2 minutes).
- If the separator has not worked for a long time or it has undergone extraordinary maintenance operations that required cover and inlet-outlet flow unit removal, the chemical cleaning cycle must be performed as described in § 8.4.
- Feed separator with product. If necessary regulate the flowrate using micrometric valves of inlet-outlet unit.

ATTENTION
Generic danger
During starting-up the machine has not to rotate with empty bowl for a period up than 15 min.

8. MACHINE USE

8.1 Personnel tasks

Unmanned automatic machine, starting phase only.
Operator tasks:
- Normal operation control.
- Good operation testing (fluid level, capacity and temperature value, noisy, evident vibrations).
- Carry out cleaning cycle.
- Routine interventions on electric panel.
- Simple disassemblies.
- Lubricant oil change or topping up.

Mechanical technician tasks:
- Corrosion and wears testing.
- Repairs.
- Preventive maintenance with eventual cleaning and/or replacement of some parts.

Electrician tasks:
- Interventions on electric system.

8.2 Set-up and adjustments

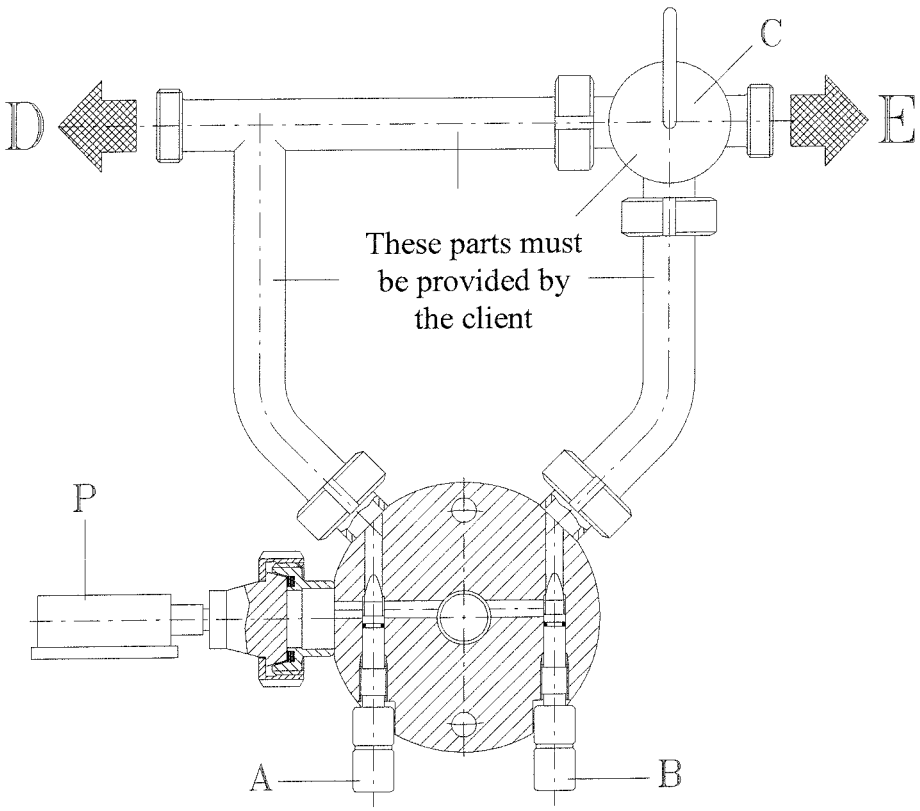
Regulate the separator capacity within the nominal value shown on § 3.3. To achieve this, it is necessary to insert a regulatory valve or a neck washer on the separator feeding line.
To guarantee the machine good operation, control and adjustment operations must be performed before starting phase (see § 7.6).
To obtain a regular and efficient working of separator, feed the separator with constant flow of product.
It's important to avoid air mixing with liquid, so it's necessary to immerse the centripetal pump into the rotating liquid and to have a counterpressure in outlet pipes. This is obtained by the regulating valves (A, B in figure 8.1) in the outlet of the separator.
As general behaviour remember that, by acting on outlet valves, it's possible to adjust the cream flow rate, while the skim milk flow rate cannot be varied.
One of the most important parametres in milk separation is the fat content of the cream, directly related to the cream flow rate. A small cream flow rate gives a cream of higher density, with more fat, while a large cream flow rate gives a thinner cream with lower fat content.
Valve (A in figure 8.1) regulate the outlet pressure of skimmed milk (the manometer P, shows the counter pressure at the outlet of the skim centripetal pump), while valve (B) permit to adjust the flow rate and pressure of the cream.

8.2.1 Warnings

- Always act slowly on valves and wait after each setting until the separation stabilizes before doing another change.
- When the desired regulation has been achieved, mark the position of each shutter.
- To avoid butter oil or foam formation it's necessary to work with higher pressures both in skim milk and in cream. Do not increase too much pressure values as this cause a reduction in regulation sensibility.

8.2.2 First setting

1) If present, turn the 3-way valve (C) in the way to avoid the cream remixing with skim milk.
2) Feed the separator with water.
3) Partially open shutter B.
4) Gradually close shutter A until some water flow out of cream outlet.
5) The pressure read from the manometer is the minimum working pressure (MWP).



A - Skim milk shutter
B - Cream shutter
C - 3-way valve
D - Skim outlet
E - Cream outlet
P - Manometer

Figure 8.1

8.2.3 Skimming milk or whey

1) If present, turn the 3-way valve (C) in the way to avoid the cream remixing with skim milk.
2) Partially open shutter B.
3) Regulate shutter A in order to bring the pressure on the manometer to approximately 0,2 ÷ 0,5 bar up the MWP.
4) Still open the shutter A to obtain a cream more liquid than desired.
5) Close shutter B to increase cream density.
6) If some foam is present in skim milk or cream, it's necessary to close shutters A or B respectively.

8.2.4 Milk cleaning

Milk cleaning can be made only if the machine is equipped with the small external remixing system shown in fig. 8.1. In this case:

1) Turn the 3-way valve (C) closing the cream outlet (E) and remixing it with the skim milk. The whole and cleaned milk will get out at the outlet D.
2) Verify that milk pressure at the outlet D (due to the counterpressure of the downstream plant) is lower or equal to 1 bar.
3) Completely open shutter B.
4) Regulate shutter A in order to bring the pressure on the manometer to approx. 1,5 ÷ 2 bar. This value must be considered only indicatively, because it depends on the process conditions (flow rate, fat content in inlet milk, milk temperature, etc.).
5) Verify that cream at separator outlet has not a fat content upper than 30 %. This check can be done opening the valve C just a moment and verifying its density.

8.3 Ordinary maintenance

To guarantee the machine functionality and long-life, the operator must perform cleaning and ordinary maintenance.

Ordinary maintenance
Before every shift
Oil level check
Brake disconnection check
Operating machine
General operation check
Control of capacity value and temperature
At the end of every shift
Machine chemical cleaning to remove working residuals.

8.4 Separator chemical cleaning

At the end of every working the separator must be chemically cleaned. This allow to mantain at a high level the efficiency of the separator and to assure the hygiene of the parts in contact with the product.

ATTENTION
Generic danger
Cleaning solutions must NOT contain CHLORINE

The bowl unit must be cleaned, if necessary, using alkaline detersives (they must not contain acid components).
Rinse all the cleaned parts with abundant water.
Clean with a sponge the top chamber of the frame, where is placed the bowl, and the drain hole of it.
Do not use jets of water.

Cleaning procedure:

1) Disassemble the bowl as explained in § 6.5. When extracting the disks insert them in sequence in a metallic tube or in a wooden stick. In this way the sequence of the disks is maintained and the bowl balancing does not change whenever disassembling the bowl to clean it.
2) Put the disassembled parts of the bowl and the disks in a tank with water and caustic soda heated to 75°C for 30 minutes.
3) Rinse all the cleaned parts with abundant water.
4) If scales remain in the peripheral part of the bowl body, clean them manually by the brush
5) After rinsing the disks with water, insert them in the distributor one at a time manteining the sequence (only if necessary clean with the sponge).
6) Clean with a sponge the top chamber of the frame, where is placed the bowl, and the drain hole of it.

9. GEAR

Handle with care every components of the transmission gear in the disassembly/assembly phase. Avoid impacts and injurys to components; utilize suitable equipment only.

9.1 Disassembly of vertical shaft (Tab 06)

ATTENTION
When disassembling is suggested to put in a suitable area the dismantled components to make easier finding them out and to verify the completeness of the assembly at the end of it.

In order to disassemble the vertical shaft, it is necessary to first disassemble the horizontal shaft unit (see § 9.3).
Then proceed carrying out the following steps:

1) Remove from the shaft the labyrinth (06.190.0) with its OR (06.180.0);

2) Remove the screws (06.170.0);

3) Remove the elastic support assembly: collar cage (06.150.0) with all its parts;

4) Remove the spacer (06.090.0);

5) Extract the vertical shaft (06.070.0) together with its bearings;

6) Remove the spheric support (06.020.0) by screwing a screw M8 into its threaded hole and then extract the lower spring (06.010.0).

9.2 Assembly of vertical shaft (Tab 06)

Before assembly vertical shaft accurately clean and control all parts, paying particular attention to gaskets and ball bearings.

1) Insert the lower spring (06.010.0) and the spheric support (06.020.0) in their place into the frame.

2) Preassemble the parts from (06.030.0) to (06.080.0) on the vertical shaft (06.070.0). The thrust ball bearing (06.030.0) must be set as shown in figure 9.1.

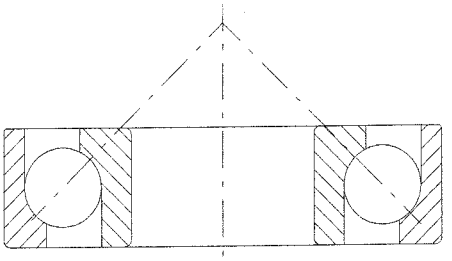


Figure 9.1

3) Insert the vertical shaft into the frame: guide the lower ball bearing (06.030.0) into its housing by hand.

4) Set the spacer ring (06.090.0) on the vertical shaft.

5) Set the elastic support assembly (parts from 06.100.0 to 06.150.0). Fasten the whole to the frame by screws (06.170.0).

6) Fit the labyrinth (06.190.0) with its OR (06.180.0) on the vertical shaft and push it downwards.

9.3 Disassembly of horizontal shaft (Tab 07)

ATTENTION
When disassembling is suggested to put in a suitable area the dismantled components to make easier finding them out and to verify the completeness of the assembly at the end of it.

To dismantle the horizontal shaft, it is necessary to first disassemble the brake unit and the motor cover (unscrew 08.010.0 and 08.070.0 - Tab. 08) and to drain off the lubricant oil.
Proceed as follows:

1) Remove the motor with shoe-holder and clutch shoes (parts from 07.010.0 to 07.060.0) after having unscrewed the screws (07.020.0).

2) Extract from the frame the support - clutch side, together with the horizontal shaft (parts from 07.070.0 to 07.160.0) by screwing screws (07.020.0) in the extraction threaded holes of the flange of the support (07.100.0).

3) After unscrewing the screws (07.250.0,) extract the support - oil gauge glass side (parts from 07.170.0 to 07.230.0). This operation is performed giving some slight hammer blow against the support internal surface (07.190.0); use a plastic or wooden hammer.

4) Remove the circlip (07.160.0), the expanding pin (07.140.0) and then extract the horizontal shaft striking its end by a hammer with the interposition of a copper rod.

9.4 Assembly of horizontal shaft (Tab 07)

Before assembly clean and check all parts carefully, with particular attention to gasket and ball bearings.
During assembly, take care that the two supports are correctly positioned: the hole for brake assembly must be in front side and the threaded hole for the oil gauge glass on bottom side.

1) Pre-assemble the support - clutch side (parts from 07.090.0 to 07.120.0), then insert therein the horizontal shaft (07.070.0) fixing it with the expanding pin (07.140.0) (if necessary fix the ball bearing on the support by the LOCTITE-BEARING FIT 641).

2) Mount the helical gear wheel and the ball bearing - oil gauge glass side (parts 07.130.0 to 07.160.0) onto the horizontal shaft.

3) After placing the spacers and the ball bearing, insert the assembly thus obtained into the frame, taking care that the holes of the flange on support (07.100.0) must be aligned with the corresponding ones on the frame.

4) Insert the support - oil gauge glass side (parts 07.170.0 - 07.230.0) in the frame and into the ball bearing of horizontal shaft. Measure the free space between the bearing mounted on the horizontal shaft and the support; then insert on the support the suitable number of spacers. Fasten the support to frame by screws (07.250.0).

5) Pre-assemble the clutch shoe-holders and shoes (parts 07.040.0 to 07.060.0) on the motor shaft (07.010.0) and then insert the whole into clutch pulley (horizontal shaft). Fasten all to the frame with the screws (07.020.0). Clutch shoe must be set as indicate in tab 07 (with reference to motor direction of rotation) and insert on shoe holder in symmetrical position. Before carrying out this step of the assembly, carefully clean the clutch pulley and shoes with abrasive cloth.

6) Remount the brake assembly and the motor cover (Tab. 08).

7) Fill gear chamber with recomended lubricant oil (see § 5.5.1).

10. MAINTENANCE

10.1 Remarks

ATTENTION
Generic danger
All the preventive and extraordinary maintenance operations must be performed with machine not operating and with electric, hydraulic and pneumatic feeding disconnected.

ATTENTION
Danger of electrocution
Before performing interventions be sure the tension is disconnected.
Every electric intervention must be performed by electrician (qualified and competent person).

Extraordinary maintenance

Oil change and accurately cleaning of gear chamber.
Bowl disassembly and accurately cleaning of each part.
Lubrication of bowl big lock ring and guides and sliding surfaces.
Lubrication of motor ball bearings according to manufacturer instructions.
Check of bowl gaskets.
Check of springs and buffers (eventual replacement).
Check of brake lining height.
Check the presence of water in lubrication oil.
Control of clutch shoes wear.
Remove the gear sight glass and check helical toothing of crown gear.
Check erosion and corrosion of threads of lock rings.
Replace ball bearings.
Repairs after accidental broken.

10.2 Corrective and preventive maintenance

Periodical maintenance and correct use are indispensable elements to warrant functionality, safe operation and long life of machine. Extraordinary maintenance interventions, at prescribed intervals, must be performed by mechanical technician who must operate in accordance with safety prescriptions reported in this Handbook.

Preventive maintenance Plan

Operating hours						Maintenance	Frequency				
300	750	1500	2500	5000	10000		every day	1/4 year	1/2 year	1 year	2 years
●						First oil change after initial start-up and thorough cleaning of gear chamber.					
						Check oil level.	●				
		●				Oil change and thorough cleaning of gear chamber.					
whenever disassembling						Grease bowl big lock ring and guide and sliding surfaces.	whenever disassembling				
					●	Grease motor ball bearings according to manufacturer's instructions.					
			●			Remove bowl and clean interior of frame.			●		
		●				Check bowl gaskets.					
		●				Check disks stakck compression.					
		●				Check starting time and rated speed.					
		●				Check buffer springs and buffers of vertical shaft support. Check brake shoes.					
			●			Check gearing of helical wheel gear.					
						Check the presence of water in lubrication oil.		●			
						Bowl inspection. Check erosion and corrosion on threads of lock rings.				●	
				●		Replace ball bearings on vertical shaft.					
					●	Replace ball bearings on horizontal shaft.					
					●	Replace ball bearings on motor shaft.					
					●	Replace buffer springs of vertical shaft support.					

10.3 Troubleshooting

The following table shows the main problems that may happen during operation.

n°	TROUBLE	CAUSE	REMEDY
1	Revolving speed of bowl inferior to the rated one or starting time being too long (more than 4-5 min).	Wrong electrical connection.	Check voltage of mains and make electric connection again.
		Brake applied.	Release brake by screwing the hand-wheel.
		Clutch shoes oily.	Clean shoes and clutch pulley with emery cloth.
		Clutch shoes worn.	Replace the shoes.
		Some dirty slow down the bowl.	Disassembly cover and bowl and accurately clean them.
2	Bowl speed slows down during working.	Clutch shoes oily.	Clean shoes and clutch pulley with emery cloth.
		Clutch shoes worn.	Replace the shoes.
		Voltage drop.	Check voltage.
		Motor slows down during working.	Check motor.
3	Starting time too short (starting current too high).	Rust connect shoes and clutch pulley.	Clean shoes and clutch pulley with emery cloth.
		Wrong number of shoes.	Check number of shoes: they can't be more than three.
4	Anomalous vibration and excess of noise during working.	Bowl out of balance due to:	
		- incorrect assembly or with parts from other bowls.	Assemble bowl correctly.
		- disks column has not adequate compression.	Add some disks (§ 6.1).
		- bowl parts damaged during disassembly or assembly.	Bowl must be inspected by one of our technicians.
		- clutch shoes not disposed correctly.	Check shoes are simmetrically disposed.
⇓		- big lock ring badly tightened.	Disassemble and tighten lock ring.

n°	TROUBLE	CAUSE	REMEDY
⇑		Inefficient support of vertical shaft owing to:	
		- broken or fatigued springs	Replace whole set of springs.
		- buffers seized.	Replace all buffers.
		- worn-out ball bearings	Replace all ball bearings and use the prescribed ones.
		Gears are in bad conditions owing to normal wear or:	Replace worn out part as well as helical wheel and pinion; carefully clean gear housing and change oil using the prescribed one. Eventually change oil more frequently.
		- lack of oil or oil is too fluid (gears become bluish);	
		- sludge in gear chamber;	
		- delayed oil change;	
		- non contemporary replacement of helical wheel and pinion.	
5	Insufficient product separation	Excessively high capacity.	Reduce the capacity to within the permissible values.
		Solids chamber filled.	Stop the separator, disassemble the bowl and clean it.
		Disks column obstructed.	Disassemble and clean: attention to the cleaning cycle.
		Non suitable product temperature.	Preheat product at the process temperature.
		Unsuitable pretreatment of product: foam-emulsion.	Check the treatment of product before the separator. Check that each union is fitted correctly. Check the pump.
6	Leakage of liquid (heavy phase) from the frame.	The bowl hood gasket (6) - fig. 6.1 - is damaged or not correctly positioned.	Replace or correctly apply the gasket.

n°	TROUBLE	CAUSE	REMEDY
7	Air on the product outlet.	Insufficient pressure.	Screw the shutters of the micrometric valves on outlet of separator.
		Air infiltration in the product on the separator feeding line.	Check that every pipe union has its gasket, is closed and correctly expanded. Check that pump suck under water head. Pump must not suck air from its mechanical seal.

11. DESACTIVATION/RESALE

11.1 Disassembly/Scrapping

The user, in accordance with EEC directives or in accordance with laws in force on own nation, is responsible about dismantling and elimination of every part of the machine.
Before unbilding the machine, the user must communicate to the manufacturer all the data reported on the identification plate.

11.2 Components and materials elimination

In case of scrapping, the user, in accordance with local laws in force, must pay particular attention about elimination of materials which cause problems to the environment, as:

Insulated cables,
Rubber gaskets.

Toxics or corrosives substances are not present.

11.3 Resale

In case of resale as "used machine" the client/user must communicate all installation indications to the buyer, transferring him the responsability concerning the above mentioned information.

12. SPARE PARTS

How to order spare parts
Machine is marked with a manufacturing number and a model that are evident on the identification plate.

IMPORTANT

To have a fast delivery of spare parts it is necessary that the following data are ever indicated:

- Model of the machine
- Manufacturing number
- Component reference, code and description
- Quantity of parts required

The information about the spare parts are presents in the Tables of chapter 13.
In a different way, spare parts could be requested using the forms found at the end of chapter 13, where spare parts, which substitution is more probable and frequent, are reported (gaskets, clutch shoes, etc.). In this forms it's sufficient to indicate:

- The model of the centrifugal separator where the parts must be installed;
- The manufacturing n° of the separator;
- The selected spare parts (filling with a X the suitable box);
- The requested quantity.

13. DRAWINGS AND DIAGRAMS

Sections and Diagrams

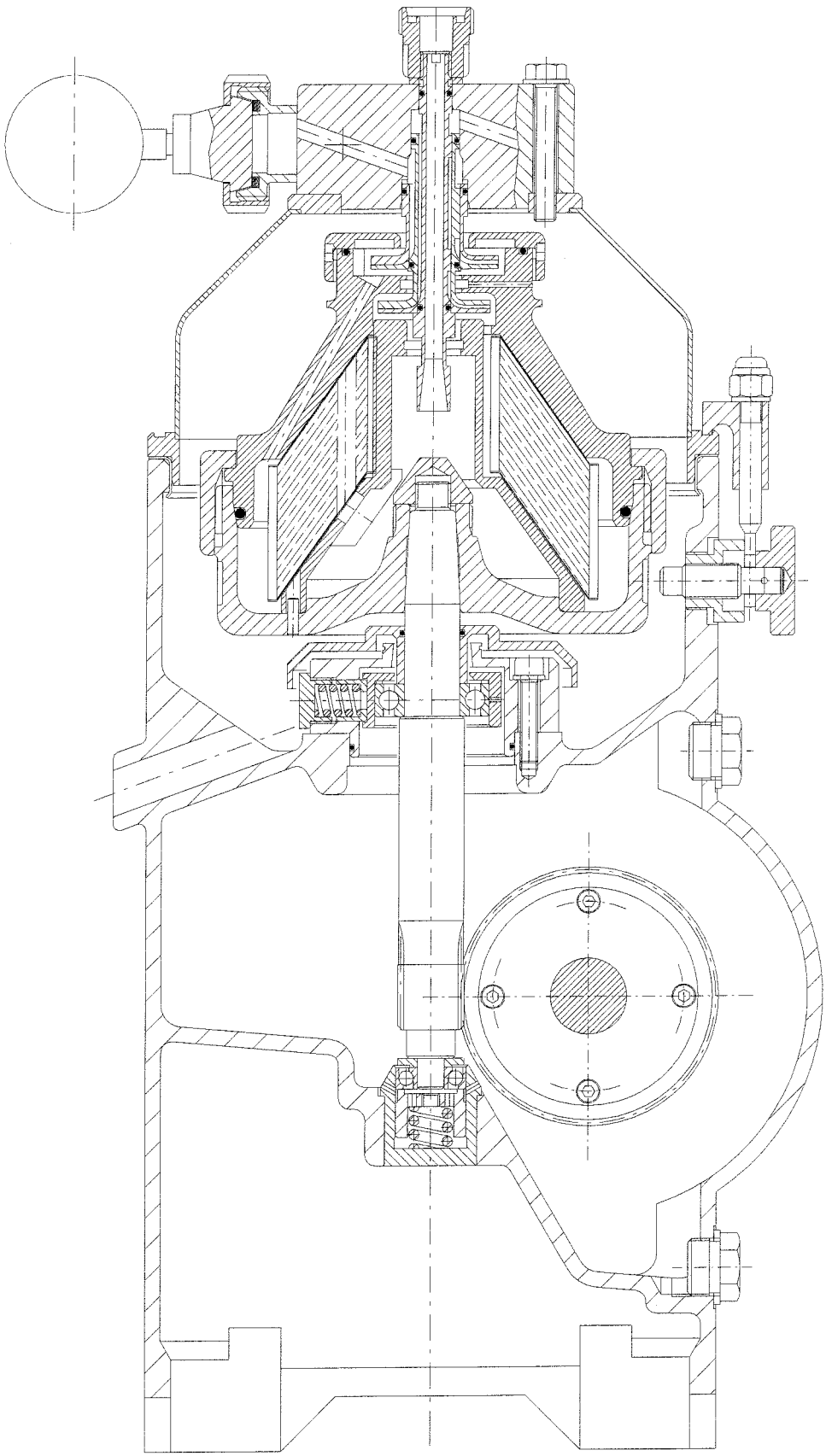
Tab. 01 Vertical section
Tab. 02 Horizontal section
Tab. 03 Overall dimensions and installation plan

Spare parts Tables

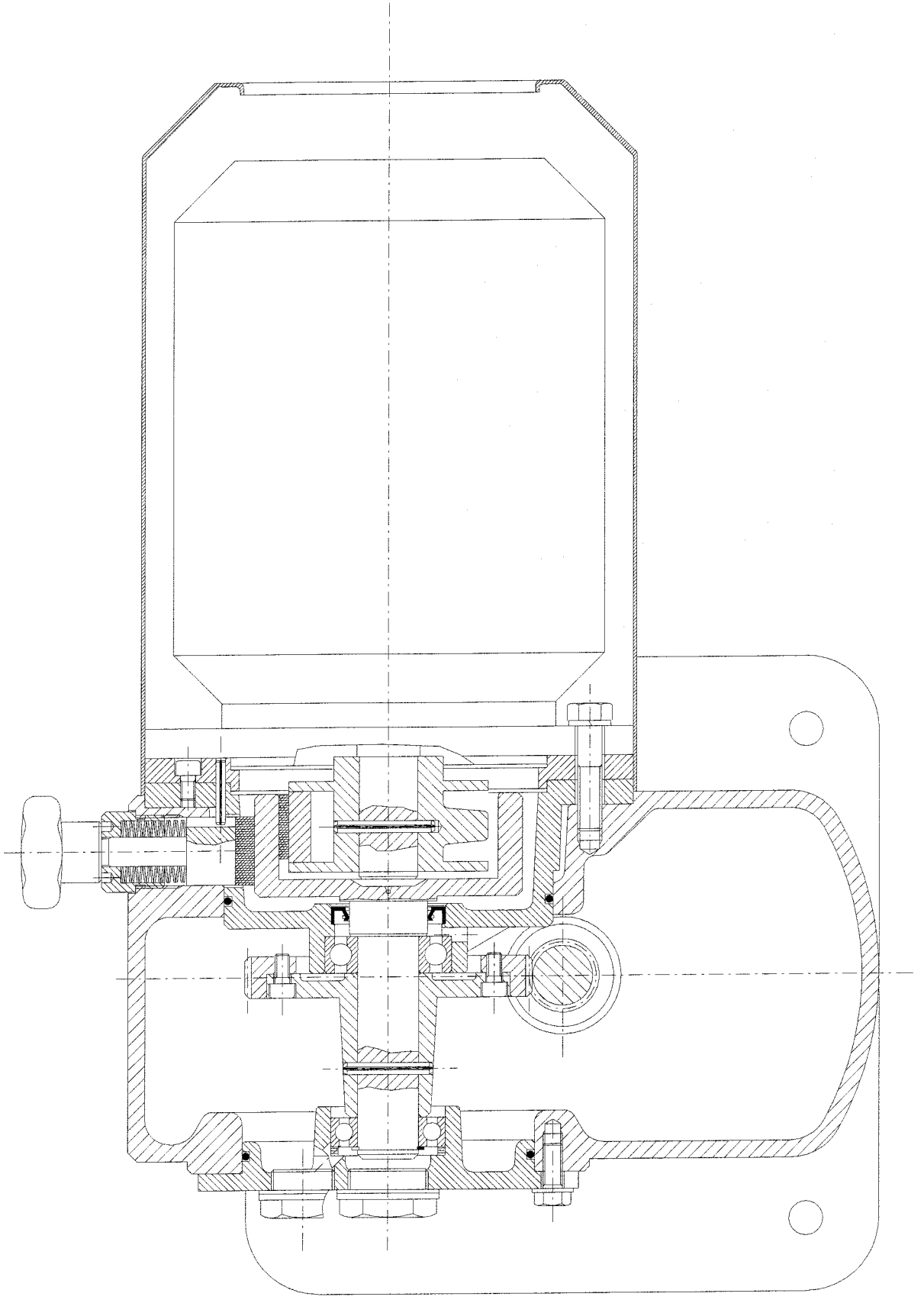
Tab. 04 Bowl
Tab. 05 Inlet-Outlet flow unit
Tab. 06 Vertical shaft unit
Tab. 07 Horizontal shaft unit
Tab. 08 Frame
Tab. 09 Special spanners

Tab. 10 Identification plates and alert stickers

VERTICAL SECTION - TAB. 01



HORIZONTAL SECTION - TAB. 02



OVERALL DIMENSIONS AND INSTALLATION PLAN - TAB. 03

A Product inlet (DN15 DIN11851)
B Heavy phase outlet -skim milk (DN15 DIN11851)
C Light phase outlet -cream (DN15 DIN11851)
E Drain outlet

Shields and removable parts for maintenance operations

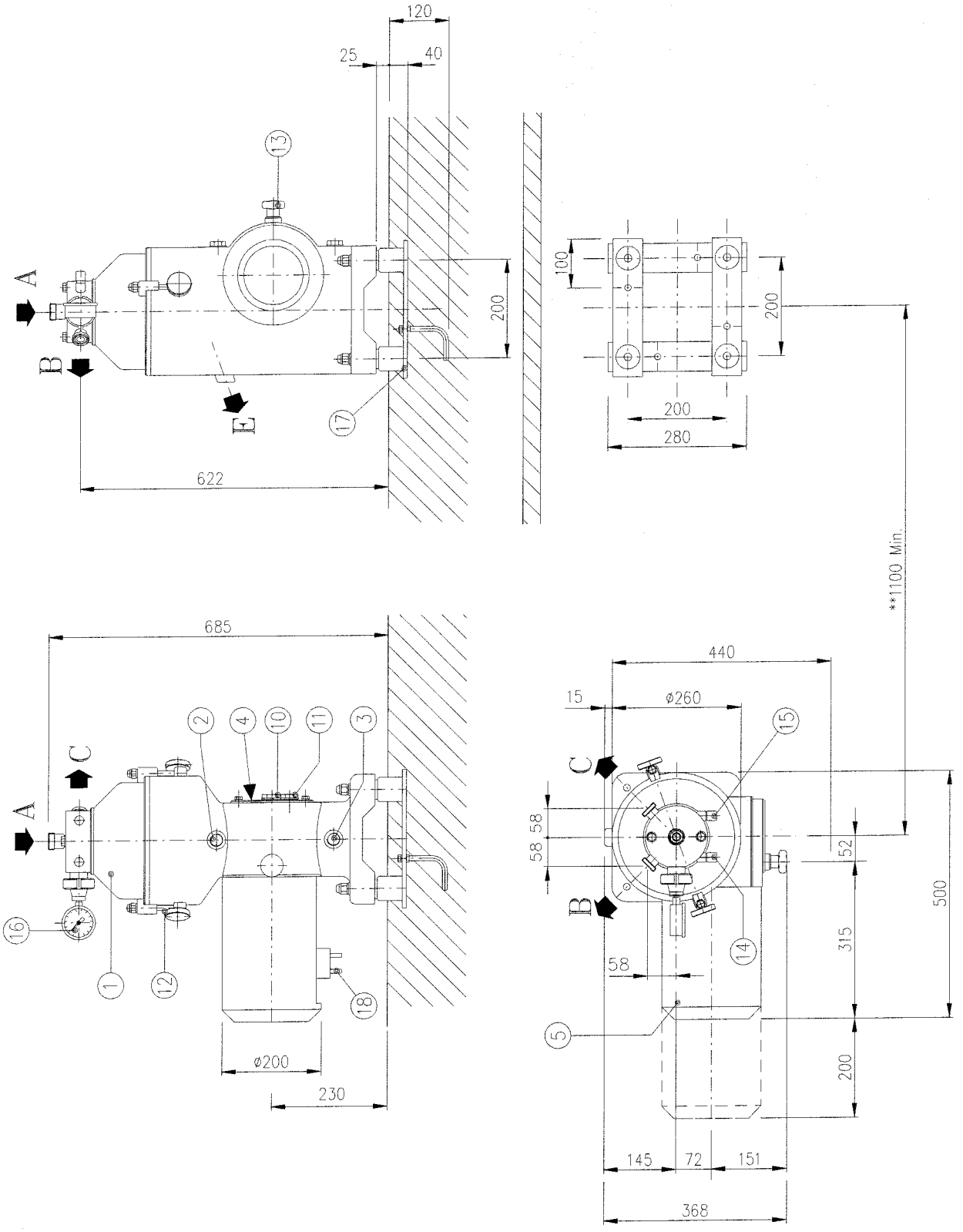
1 Cover
2 Oil supply plug
3 Oil drain plug
4 Flange - sight glass side support
5 Carter - motor

Components and equipments

10 Sight glass - check standstill machine
11 Oil gauge glass
12 Cover clamp
13 Brake handwheel
14 Micrometric valve - heavy phase (skim milk)
15 Micrometric valve - light phase (cream)
16 Manometer
17 Foundation plate
18 Pipes for motor cables

** Minimum distance between two separators

TAB. 03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72
151
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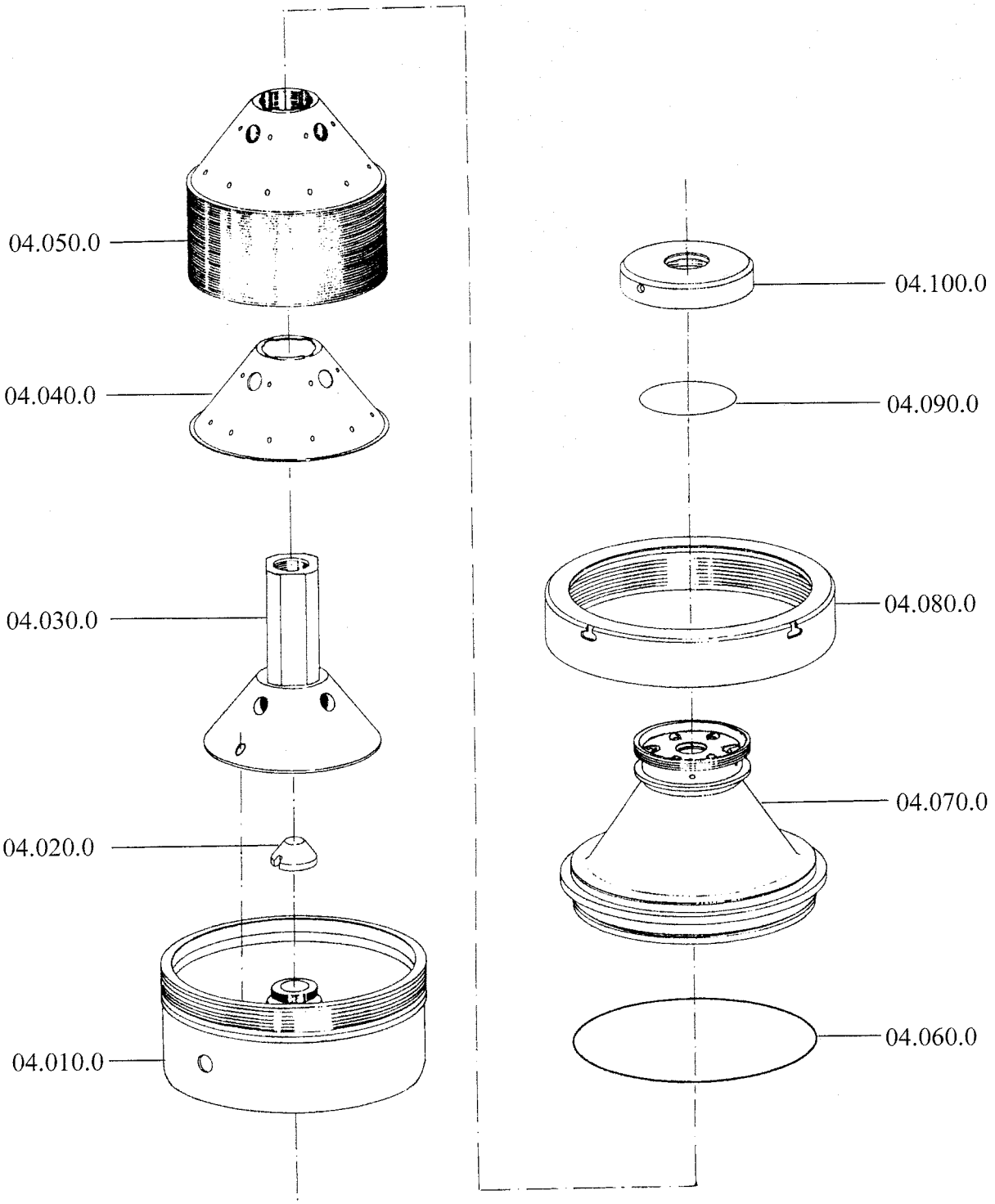
BOWL - TAB. 04

Reference	Code	Quantity	Description
04.010.0	300145700	1	Bowl body
04.020.0	400095300	1	Bowl body nut
04.030.0	200310000	1	Distributor
04.040.0	300109100	1	Bottom disk
04.050.0	300107900	~ 50	Intermediate disk
04.060.0 *	400304100	1	OR gasket - bowl hood
04.070.0	200041600	1	Bowl hood
04.080.0	300025700	1	Big lock ring
04.090.0 *	528020420	1	OR gasket - finned cover
04.100.0	400026400	1	Finned lock ring
04.510.0	832000000	1	Set of bowl gaskets (2 pieces *)

TAB. 04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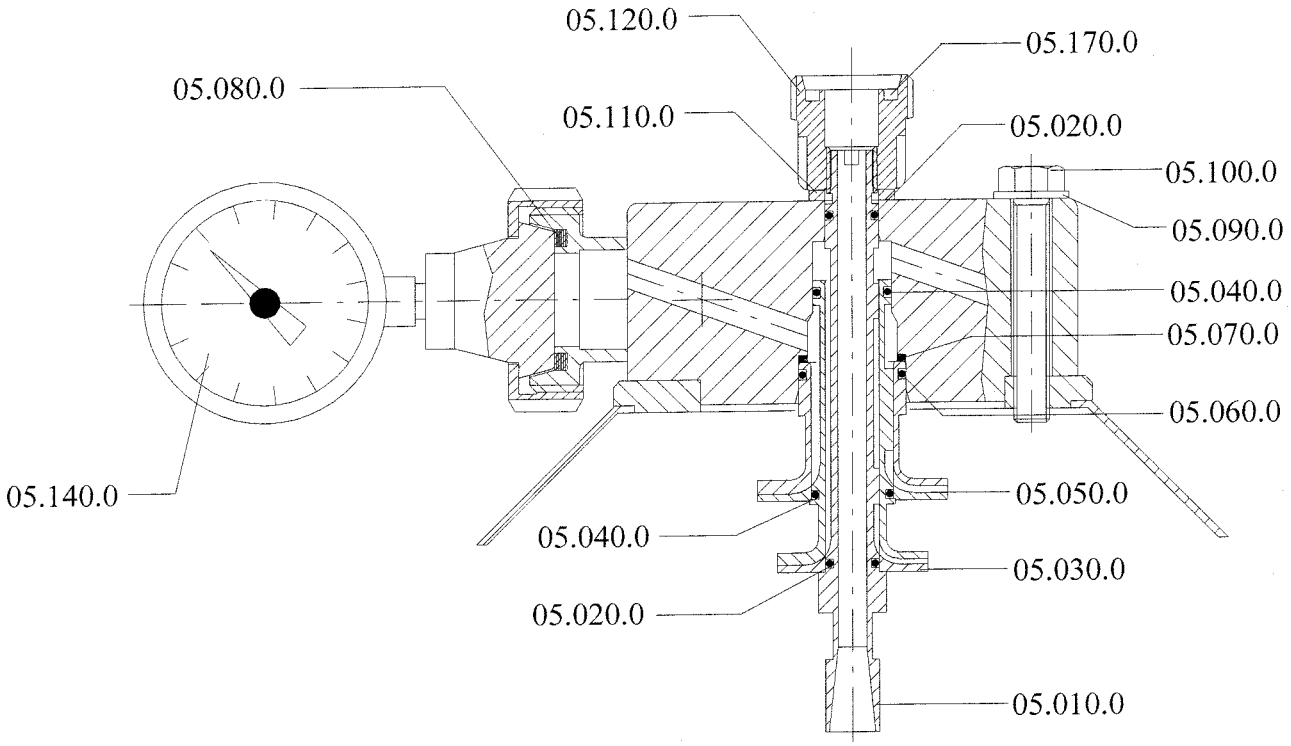
04.060.0

INLET-OUTLET FLOW UNIT - TAB. 05

Reference	Code	Quantity	Description
05.010.0	400256900	1	Feeding pipe
05.020.0 *	528020113	2	OR gasket - feeding pipe
05.030.0	400196500	1	Pump - light fase
05.040.0 *	528020143	2	OR gasket - light fase pump
05.050.0	400196200	1	Pump - heavy fase
05.060.0 *	528020170	1	OR gasket - heavy fase pump
05.070.0	40002130/X	0÷4	Spacer
05.080.0	400085800	1	Inlet-outlet body
05.090.0	529056010	2	Washer
05.100.0	529006166	2	Screw
05.110.0 *	400213000	1	Nylon washer
05.120.0	400199800	1	Nut- fedding pipe
05.130.0 *	528151020	1	OR gasket - manometer
05.140.0	520060210	1	Manometer
05.150.0	400179100	2	Shutter - heavy and light phase
05.160.0 *	528020032	2	OR gasket - shutters
05.170.0 *	528151010	3	Gaskets DN25
05.510.0	832000001	1	Set of inlet-outlet flow unit gaskets (12 pieces)
05.520.0	832004023	1	Set of spacers (3 pieces 05.070.0, Thickness = 1, 2, 3 mm.)

TAB. 05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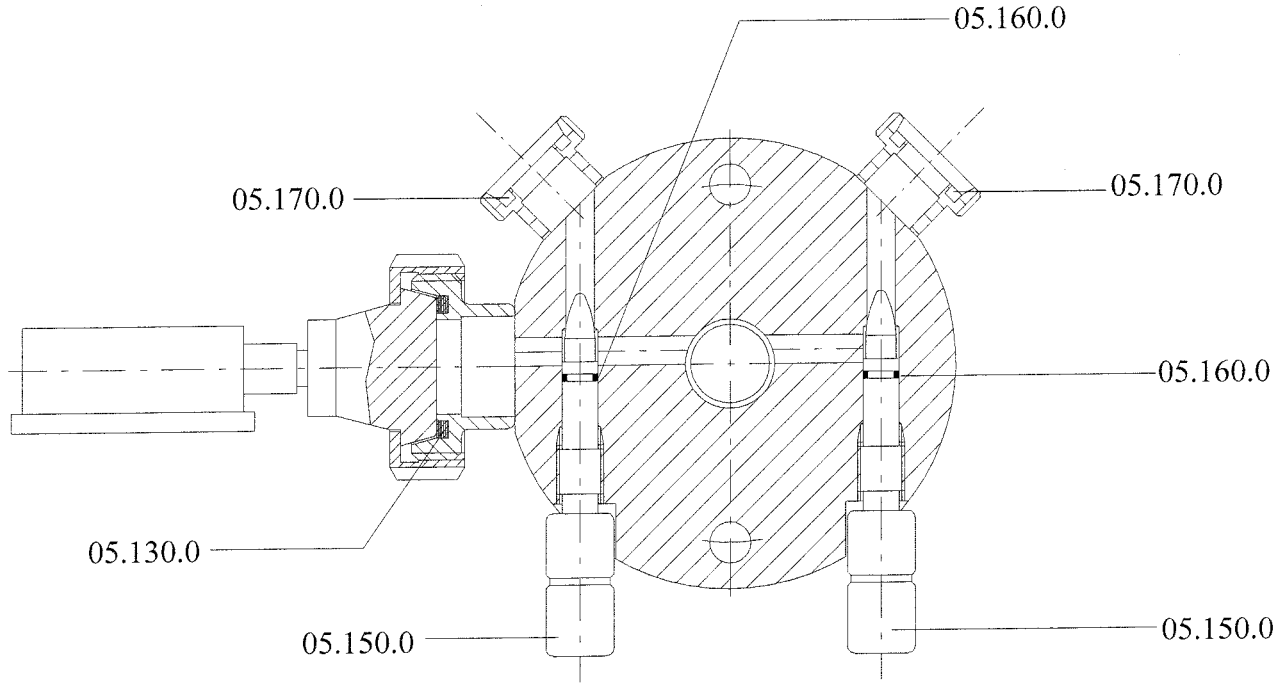
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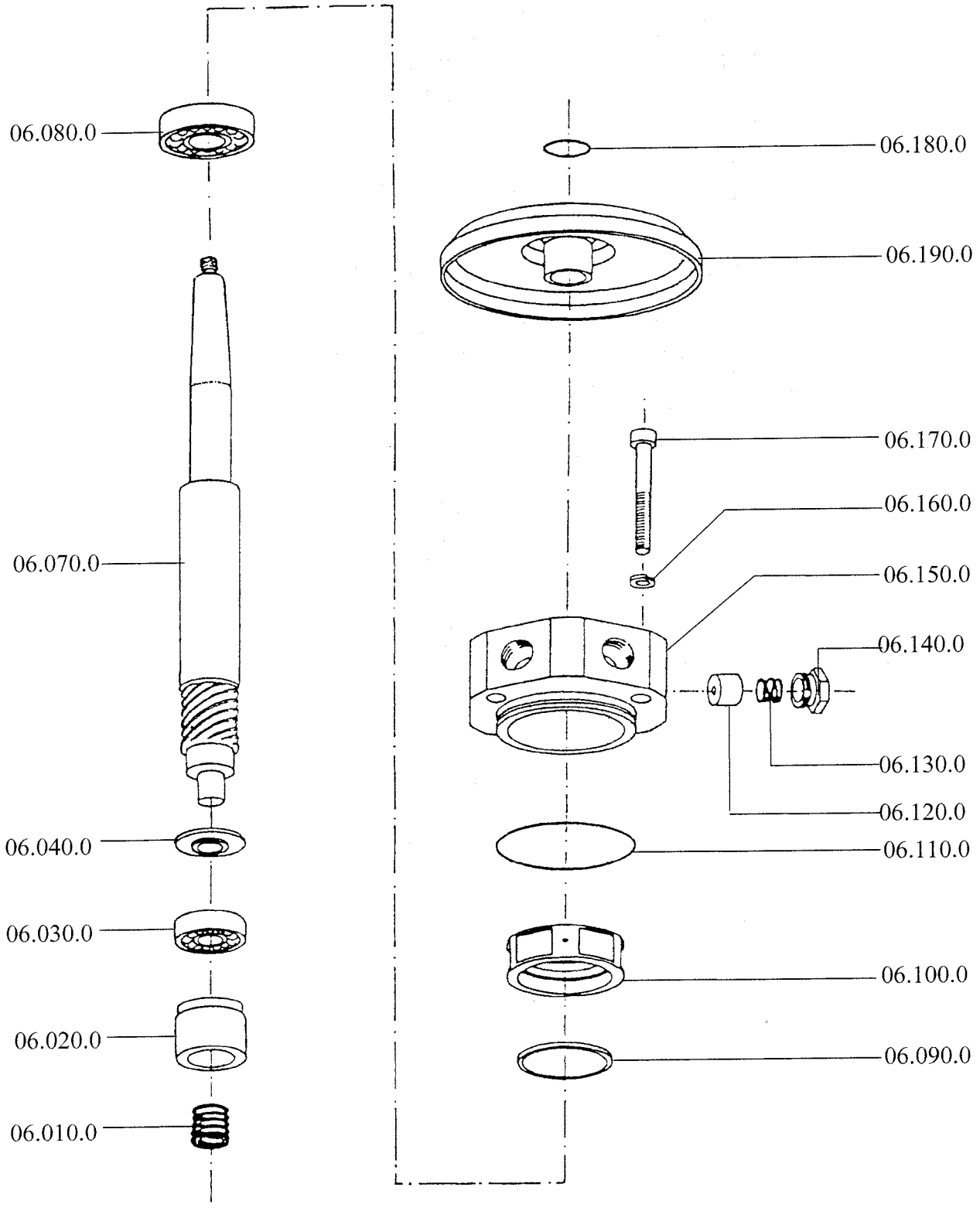
VERTICAL SHAFT UNIT - TAB. 06

Reference	Code	Quantity	Description
06.010.0	400175500	1	Lower spring
06.020.0	400232700	1	Spheric support
06.030.0 *	521070230	1	Thrust ball bearing
06.040.0 *	400207100	1	Washer - thrust bearing
06.070.0 ***	300000700	1	Vertical shaft ***(10.200 rpm/ 50Hz.)***
06.080.0 *	521040250	1	Upper ball bearing
06.090.0	400021200	1	Spacer - upper ball bearing
06.100.0	400018900	1	Collar
06.110.0 **	528020254	1	OR gasket - collar cage
06.120.0	400031900	6	Buffer
06.130.0	400175300	6	Buffer spring
06.140.0	400092200	6	Buffer screw
06.150.0	300146900	1	Collar cage
06.160.0	529056508	3	Washer - collar cage
06.170.0	529011216	3	Screw - collar cage
06.180.0 **	528020170	1	OR gasket - labyrinth
06.190.0	400170600	1	Labyrinth
06.510.0	832005010	1	Set of vertical shaft ball bearings and washers (3 pieces,*)
06.520.0	832001011	1	Set of vertical shaft gaskets (2 pieces,**)
06.530.0	832007008	1	Set of vertical shaft + gear wheel (06.070.0 *** + 07.130.0 *** +07.140.0 ***)
06.540.0	832012006	1	Set of buffers (6 pieces, 06.120.0)
06.550.0	832012007	1	Set of buffer springs (6 pieces, 06.130.0)
06.560.0	832012008	1	Set of buffer screw (6 pieces, 06.140.0)

TAB. 06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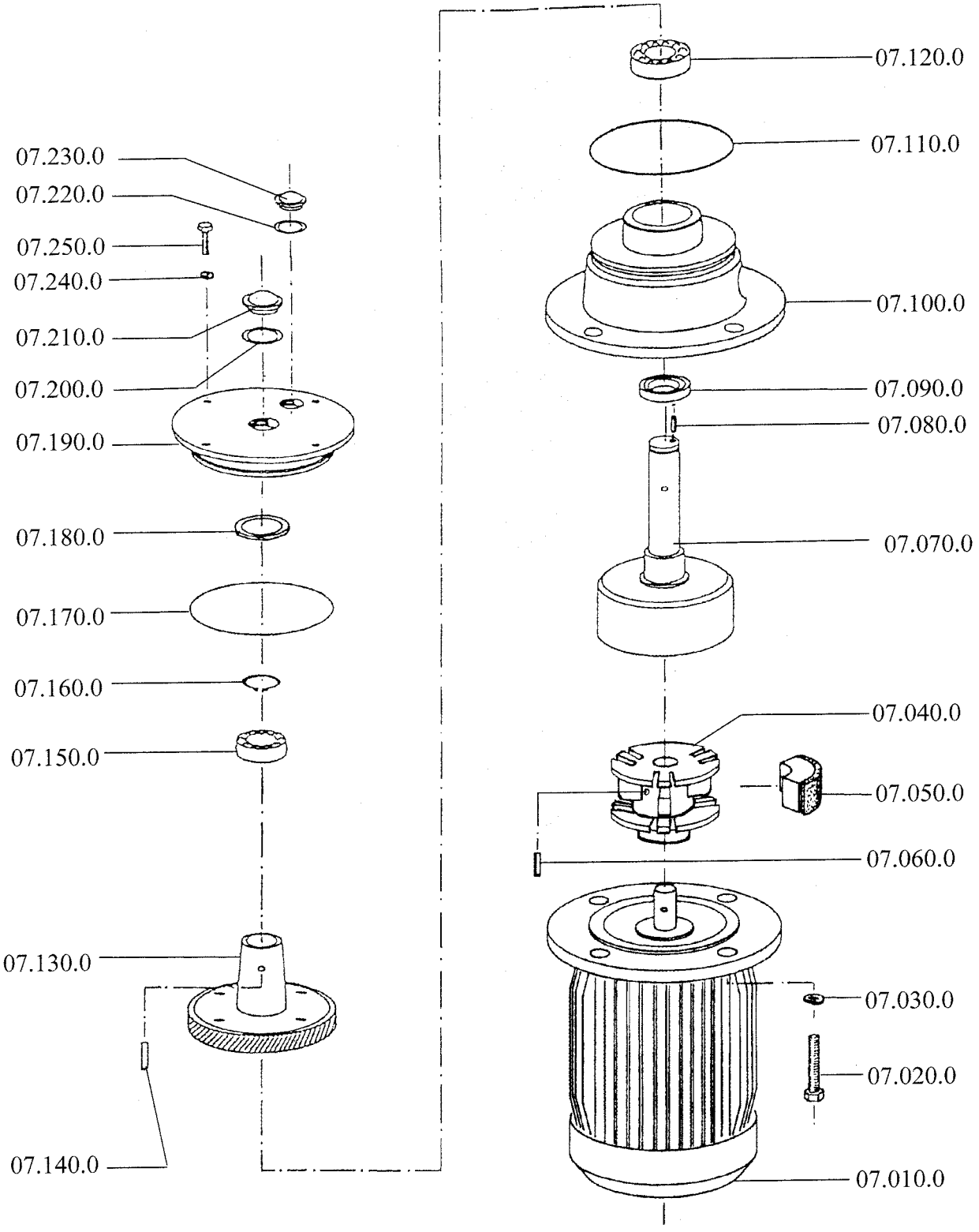
06.040.0
06.110.0
06.030.0
06.100.0
06.020.0
06.090.0
06.010.0

HORIZONTAL SHAFT UNIT - TAB. 07

Reference	Code	Quantity	Description
07.010.0	526015180	1	Motor
07.020.0	529006160	4	Motor screw
07.030.0	529056010	4	Washer
07.040.0	400197600	1	Shoe holder
07.050.0	400046500	3	Clutch-shoe
07.060.0	529070329	1	Expanding pin - shoe holder
07.070.0	400234000	1	Horizontal shaft
07.080.0	529021156	1	Drive pin
07.090.0 **	528000376	1	Seal ring
07.100.0	300144200	1	Support - clutch side
07.110.0 **	528020468	1	OR gasket - support clutch side
07.120.0 *	521000250	1	Ball bearing - clutch side
07.130.0 ***	400310100	1	Helicoidal gear wheel
07.140.0 ***	529070325	1	Expanding pin - helicoidal wheel
07.150.0 *	521000050	1	Ball bearing - motor opposite side
07.160.0 *	529090025	1	Circlip
07.170.0 **	528020453	1	OR gasket - support
07.180.0	40002140/X	1	Spacer
07.190.0	300324803	1	Support
07.200.0	/	1	Gasket - sight glass
07.210.0	523879012	1	Sight glass (1"G)
07.220.0	/	1	Gasket - oil gauge glass
07.230.0	523879010	1	Oil gauge glass (3/4"G)
07.240.0	529056008	4	Washer
07.250.0	529006110	4	Support fixing screw
07.510.0	832005011	1	Set of horizontal shaft ball bearings and circlip (3 pieces,*)
07.520.0	832001012	1	Set of horizontal shaft gaskets (3 pieces,**)
06.530.0	832007008	1	Set of vertical shaft + gear wheel (*** 06.070.0 + *** 07.130 + ***07.140.0)
06.540.0	832011001	1	Set of clutch-shoes (3 pieces, 07.050.0)

TAB. 07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07.030.0
07.020.0
07.010.0
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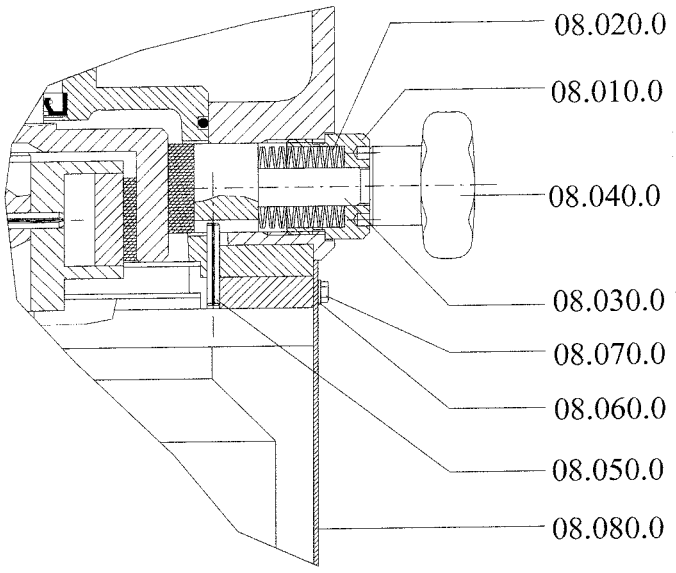
07.220.0
07.250.0
07.240.0
07.210.0
07.200.0
07.190.0
07.180.0
07.170.0
07.160.0
07.150.0
07.130.0
07.140.0

FRAME - TAB. 08

Reference	Code	Quantity	Description
08.010.0	400092100	1	Brake plug
08.020.0	529099169	26	Brake spring
08.030.0	400046700	1	Brake shoe with pin
08.040.0	521580010	1	Brake hand wheel
08.050.0	529070239	1	Brake expanding pin
08.060.0	529056006	3	Washer
08.070.0	529006068	3	Motor cover screw
08.080.0	300044801	1	Motor cover
08.090.0	529061110	2	Cap nut
08.100.0	529056010	2	Washer
08.110.0	400174400	2	Clamp
08.120.0	400242400	2	Threaded rod
08.130.0	400165600	2	Handwheel
08.140.0	400172500	2	Locking pin
08.150.0	529071148	2	Pin
08.160.0	400037100	2	Threaded bush
08.170.0	529061112	4	Cap nut
08.180.0	529056012	4	Washer
08.190.0	400212800	4	Nylon washer
08.200.0	400121200	4	Shock absorber
08.210.0	808011006	1	Foundation plate
08.220.0	400211200	2	Plug gasket
08.230.0	400234300	2	Oil supply/drain plug
08.240.0	832016501	1	Set of shock absorbers (4 pieces, 08.200.0)

TAB. 08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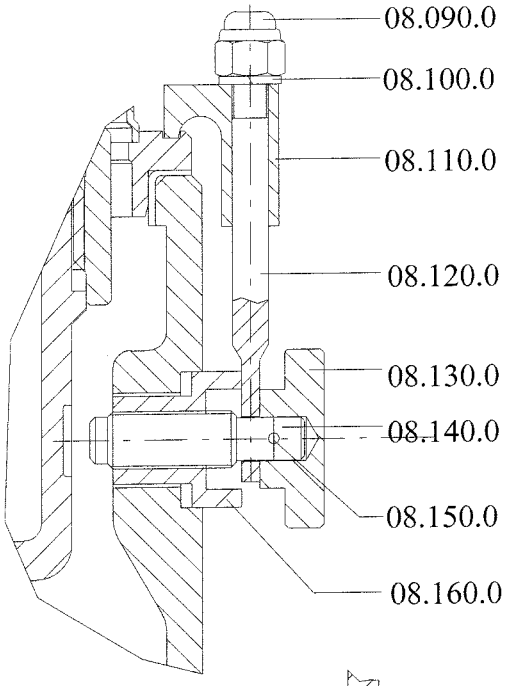
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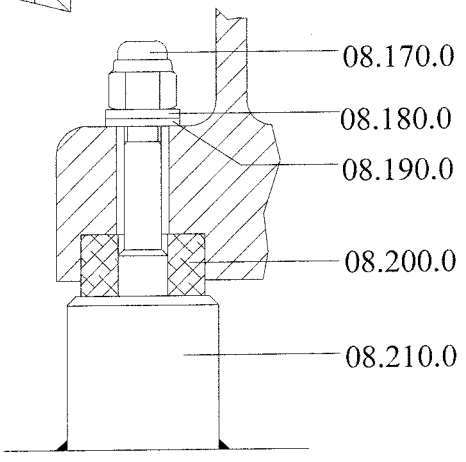
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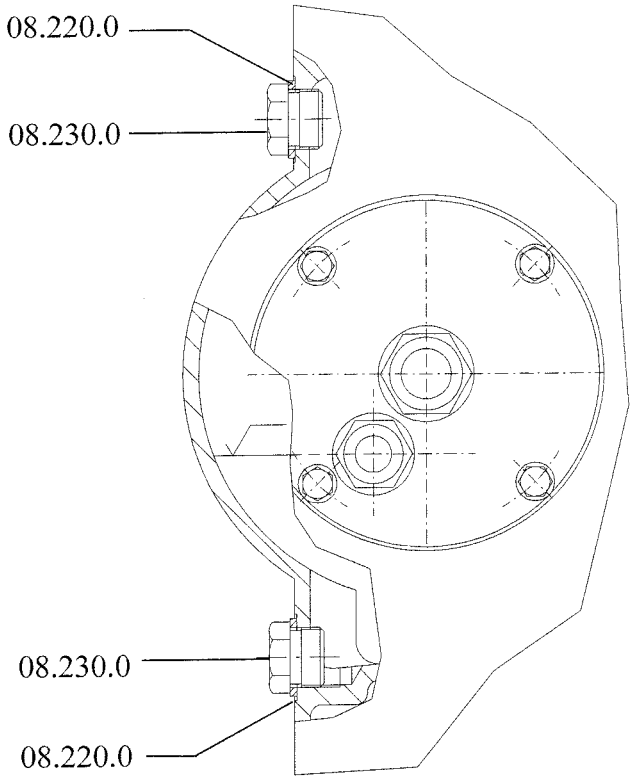
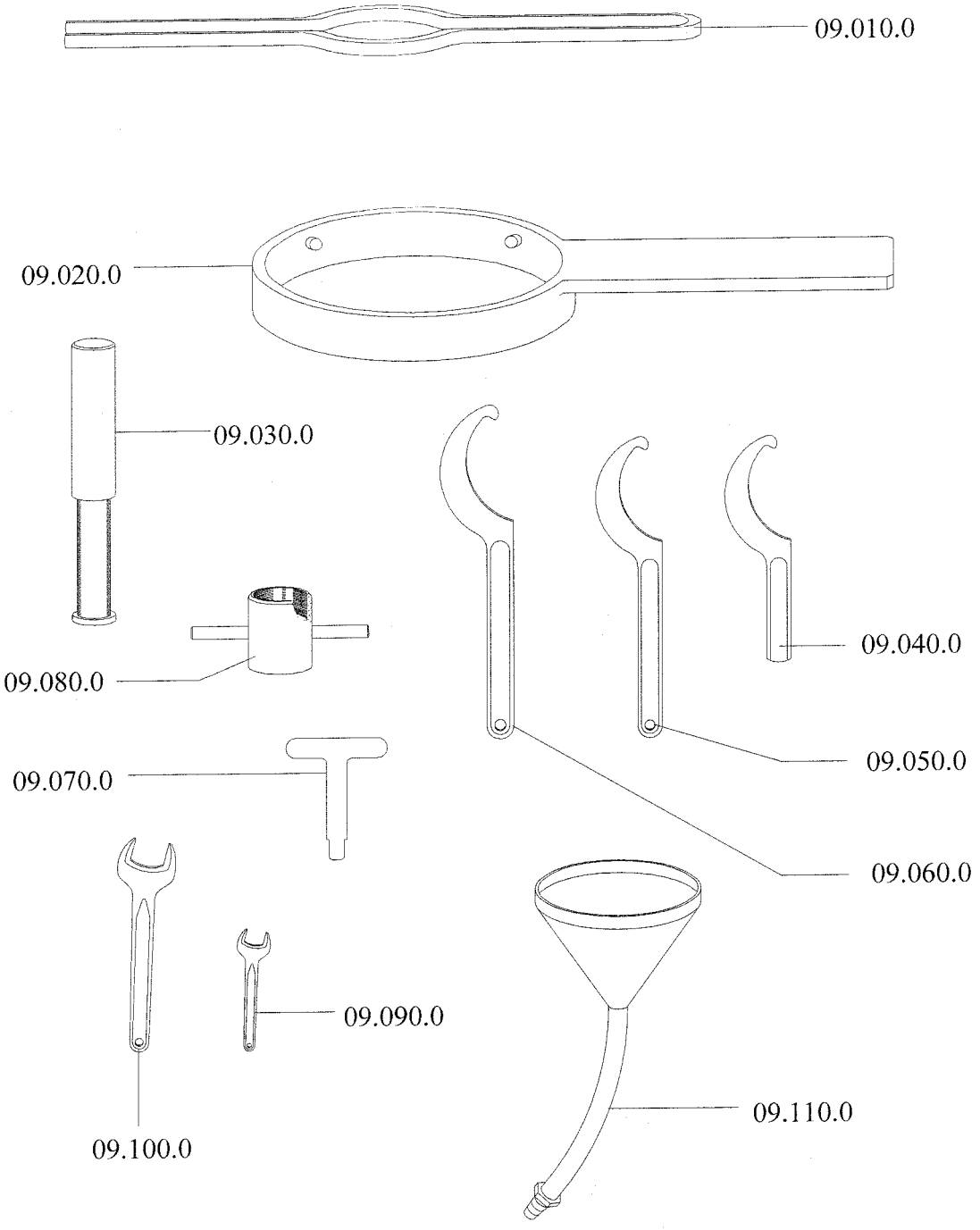

08.220.0
08.230.0
08.230.0
08.220.0

SPECIAL SPANNERS - TAB. 09

Reference	Code	Quantity	Description
09.010.0	400051300	1	Spanner for lifting of bowl hood
09.020.0	300048700	1	Spanner for big lock ring
09.030.0	400056000	1	Mallet
09.040.0	400349000	1	Pin spanner (30/32)
09.050.0	560040540	1	Pin spanner (40/42)
09.060.0	560040095	1	Pin spanner for small ring (95/100)
09.070.0	400217400	1	Spanner for feeding pipe blocking
09.080.0	400050700	1	Spanner for lifting bowl body and distributor
09.090.0	560000017	1	Spanner 17 - lid lock nuts, screws of inlet-outlet flow unit
09.100.0	560000032	1	Spanner 32 - plugs supply / drain oil
09.110.0	564900080	1	Oil funnel

TAB. 09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09.080.0
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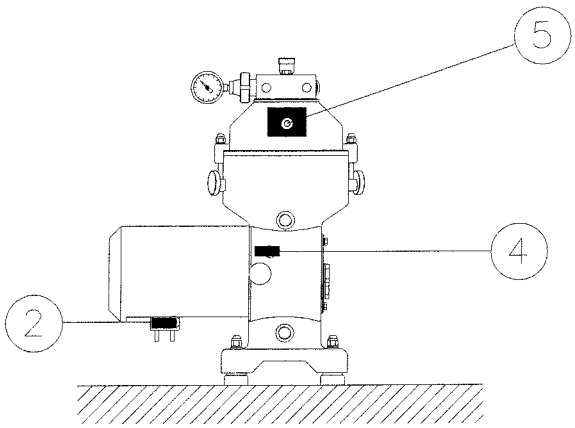
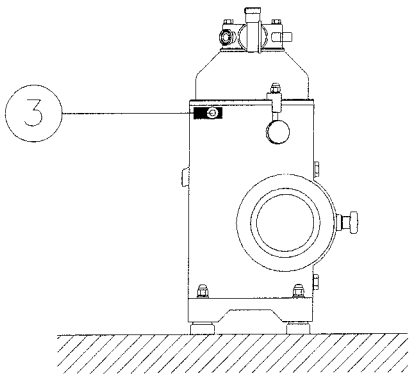
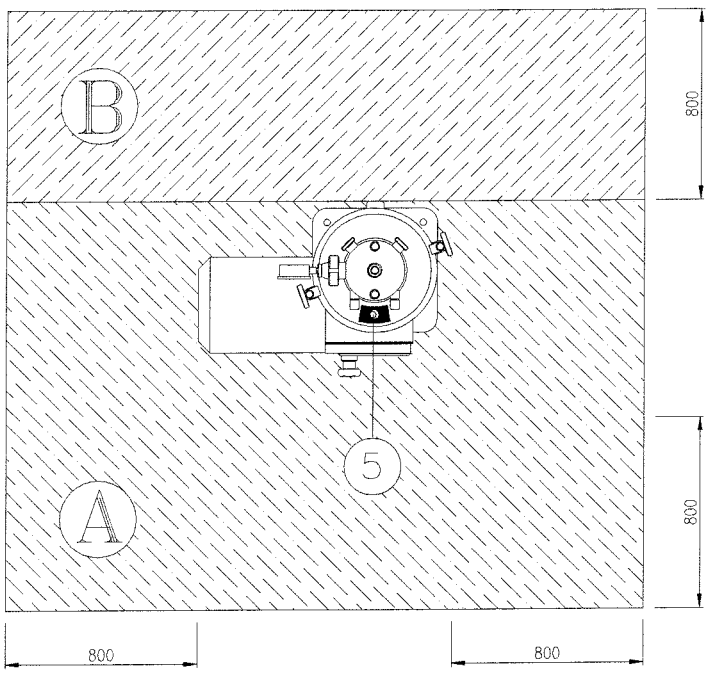
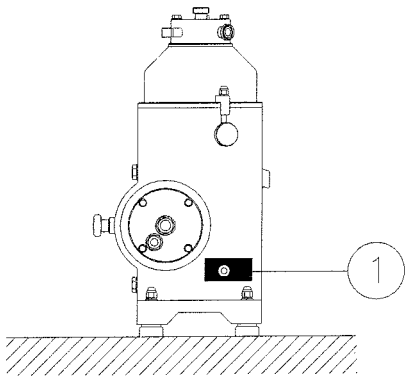
09.060.0
09.090.0
09.110.0
09.100.0

IDENTIFICATION PLATES AND ALERT STICKERS
TAB. 10









1 Plate with technical and identification data of separator
2 Sticker - motor connection voltage
3 Plate with bowl direction of rotation
4 Plate with brake direction of activation
5 Sticker - safety alert

A Free necessary area for normal operation
A+B Free necessary area for maintenance

SPARE PARTS REQUEST FORM

Centrifugal separator mod.: SE 02.0..... Manufacturing N°: .....

Mark with a X the requested spare parts and indicate the selected quantity.

	Ref.	Code	Quantity	Description
Bowl (Tab. 04)				
☐	04.510.0	832000000	.....	Set of bowl gaskets (2 pieces)
☐	.....	.....	.....	.....
Inlet-outlet flow unit (Tab. 05)				
☐	05.010.0	400256900	.....	Feeding pipe
☐	05.510.0	832000001	.....	Set of gaskets with gaskets for fittings DIN (12 pieces)
☐	05.520.0	832004023	.....	Set of spacers (2 pieces)
☐	.....	.....	.....	.....
Vertical shaft (Tab. 06)				
☐	06.510.0	832005010	.....	Set of vertical shaft bearings and washers (3 pieces)
☐	06.520.0	832001011	.....	Set of vertical shaft gaskets (2 pieces)
☐	06.530.0	832007008	.....	Set of gears (3 pieces)
☐	.....	.....	.....	.....
Horizontal shaft (Tab. 07)				
☐	07.050.0	832011001	.....	Set of clutch-shoes (3 pieces)
☐	07.510.0	832005011	.....	Set of horizontal shaft bearings and circlips (3 pieces)
☐	07.520.0	832001012	.....	Set of horizontal shaft gaskets (3 pieces)
☐	07.530.0	523879012	.....	Sight glass (1"G) with gaskets (2 pieces)
☐	07.540.0	523879010	.....	Sight glass (3/4"G) with gaskets (2 pieces)
☐	.....	.....	.....	.....
Frame (Tab. 08)				
☐	08.030.0	400046700	.....	Brake shoe with pin
☐	08.050.0	529070239	.....	Elstic pin
☐	.....	.....	.....	.....

SPARE PARTS REQUEST FORM

Centrifugal separator mod.: SE 02.0..... Manufacturing N°: .....

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	Ref.	Code	Quantity	Description
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☐	.....	.....	.....	.....
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☐	05.510.0	832000001	.....	Set of gaskets with gaskets for fittings DIN (12 pieces)
☐	05.520.0	832004023	.....	Set of spacers (2 pieces)
☐	.....	.....	.....	.....
Vertical shaft (Tab. 06)				
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☐	06.520.0	832001011	.....	Set of vertical shaft gaskets (2 pieces)
☐	06.530.0	832007008	.....	Set of gears (3 pieces)
☐	.....	.....	.....	.....
Horizontal shaft (Tab. 07)				
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☐	07.540.0	523879010	.....	Sight glass (3/4"G) with gaskets (2 pieces)
☐	.....	.....	.....	.....
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☐	08.050.0	529070239	.....	Elstic pin
☐	.....	.....	.....	.....

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Inlet-outlet flow unit (Tab. 05)				
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☐	.....	.....	.....	.....
Frame (Tab. 08)				
☐	08.030.0	400046700	.....	Brake shoe with pin
☐	08.050.0	529070239	.....	Elstic pin
☐	.....	.....	.....	.....

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Centrifugal separator mod.: SE 02.0..... Manufacturing N°: .....

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☐	.....	.....	.....	.....