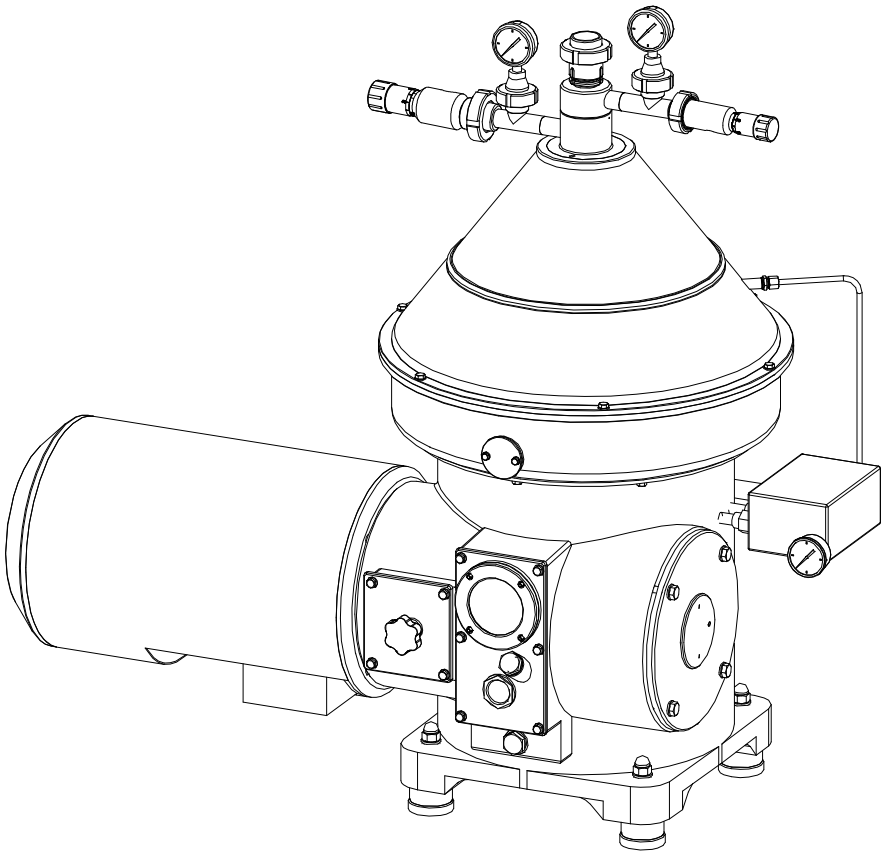
INSTRUCTION MANUAL
English

SELF-CLEANING CENTRIFUGAL SEPARATOR

Type: SE 20X-P2

FORM NO.: 00-00000
REVISION: 0

READ AND UNDERSTAND THIS MANUAL PRIOR TO OPERATING OR SERVICING THIS PRODUCT.



Seital™ Separation Technology

USE AND MAINTENANCE MANUAL

Self-cleaning Centrifugal Separator SE 20SX

1. MANUAL USE

1.1. How to read the Manual

This manual gives information for the installation, use and maintenance of centrifugal separator, model SE 20S, for milk skimming, standardization, cleaning and whey skimming.
The machine must be used in accordance with the Manual 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 Manual 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 Manual

It is recommended to bring constantly up-to-date this Manual, 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 Manual.

1.3. Manual index

2. GENERAL INFORMATION

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 20S
Description:	Machine for milk skimming, standardization, cleaning and whey skimming.
Machine type:	Self-cleaning
Manufacturing year:	_____
Machine manufacturing N°:	_____
Bowl manufacturing N°:	_____

2.2. Technical service

The routine and extraordinary maintenance must be performed in accordance with the instructions of this Manual. 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 responsibility 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 describes 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 responsibility of the diffusion to every operator of this Manual 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 and corrective maintenance reported at the § 10.2 of this Manual.

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, with detergent fluid inlet;
- routine interventions on electric panel;
- interventions that involve small disassemblies, as filter change, gaskets replacements of external ducts, etc.;
- lubricant oil change and check.

Mechanical technician

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

Electrician

He operates in every working condition and at every protection level. He performs 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, hydraulic and pneumatic supply sectioned.
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 Manual, 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 Manual the relevant information 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) The separator must be only connected with power and control panel specifically delivered by SEITAL for the separator.
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 responsibility 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 § 7.7.
n) The maximum operating speed allowed for the bowl is 8.000 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 possible causes of troubles reported in § 10.3.6;
   - 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).

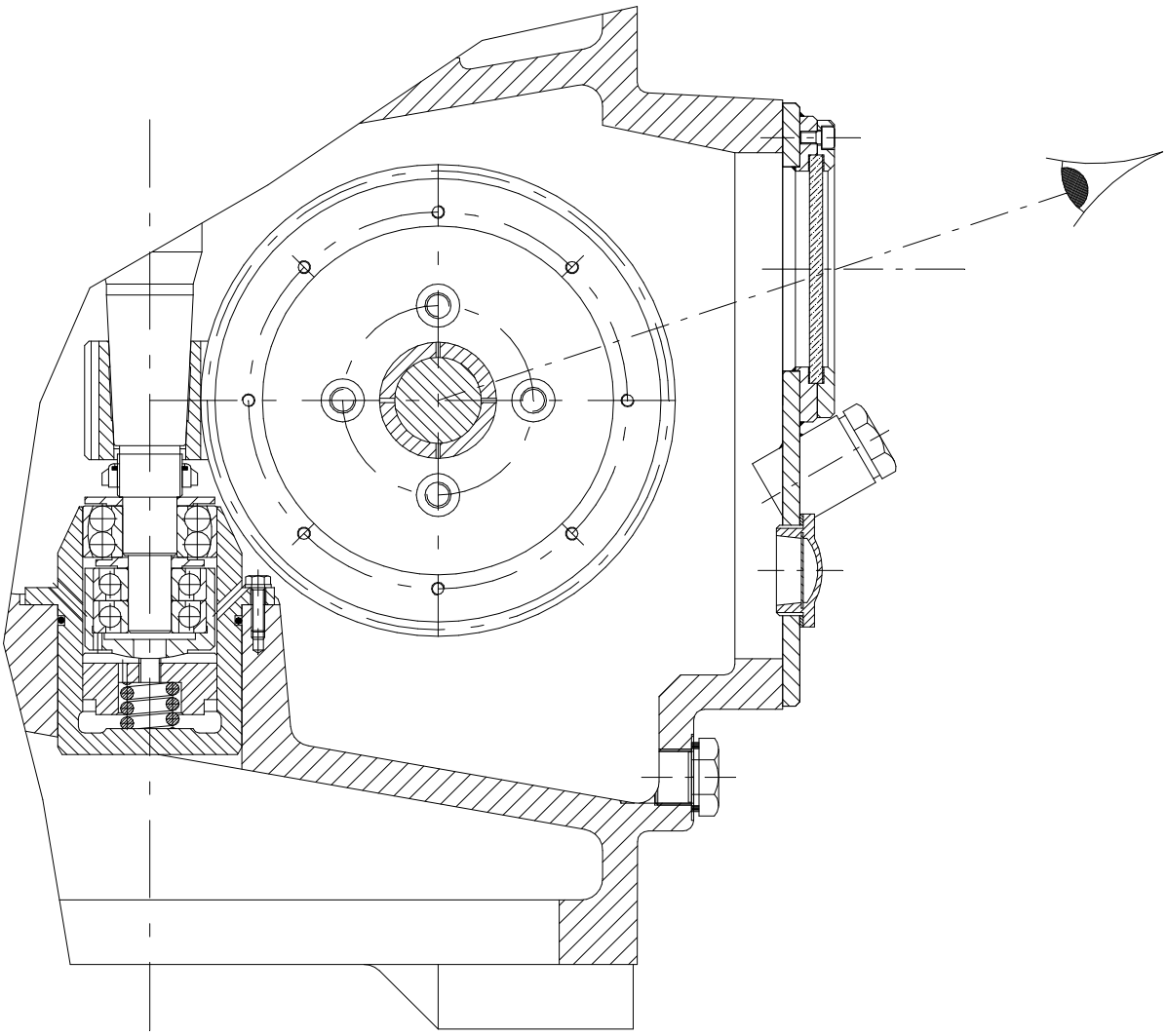


Figure 2.1

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) 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.
c) Do not allow to unauthorized personnel to work on the machine.
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 and particularly of the following parts:
   - upper edge of moving ram,
   - nylon gasket in the bowl hood,
   - bowl wall portions near the product discharge holes in the bowl body.

   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.

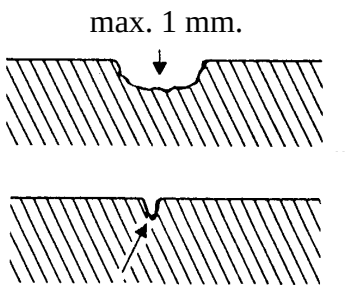


Figure 2.2

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) After every intervention on electric panel, close and block it with the door lock of the main switch, before connecting the mains supply and start the machine.
d) In case of accident due to electric current immediately cut the supply to electric mains then disjoin the injured (usually he lose consciousness) from the parts under voltage. If this needs 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 Manual are in conformity with the International System of measurement units SI.
Terms not used currently and present in this Manual.

- *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 is the *skim-milk*.
- *Sludges*: solid residuals obtained from separation process. They accumulate in the external part of the bowl called sludge chamber.
- *Operating water*: water that fulfill the chamber under the moving ram and that, appropriately discharged by valves placed in the bowl body, permit the opening of the bowl and the sludge discharge.

2.5. Responsibility

The non conformity to the instructions of this use and maintenance Manual exempt the manufacturer from every responsibility.
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 20S is a self-cleaning centrifugal separator for milk skimming, standardization, cleaning and whey skimming.
The machine is constituted 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
- tachometer
- sight glass to check the movement of the gear (bowl) and oil gauge glass
- bowl
- anular cyclone collecting the sludge discharge and the bowl protection cover
- inlet-outlet flow unit
- device for operating water injection in the bowl.

The supply includes also the electric panel, the operating water system (surge tank, filter, pressure reducer and pressure switch) and a set of special spanners for the bowl.

3.2. Operating principles

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 light and heavy phase takes place. Light clarified phase flows to the centre of the bowl and heavy phase flows to the bowl outer diameter. They rise in the disks stack and reach the two upper chambers of the bowl. Here two fixed centripetal pumps (4) and (5) convey them under pressure to the outlet pipe lines (6) and (7).
The separated solids are collected in the peripheral part of the bowl (8) and they are periodically and automatically discharged through the discharge holes (9) to maintain the required separation efficiency. The sliding piston (10) is kept in the closed position by the pressure produced by the water in the chamber (11). Injecting the water (13) into the opening valve (12) the chamber (11) is emptied, the piston goes down and the solids are immediately ejected. By interrupting the water (13) and injecting the closing water (14) into the chamber (11), the sliding piston goes back to the closed position.
The periodical solids discharge is carried out automatically by means of a cycle timing unit which controls the opening and closing water solenoid valves (12) and (13).
The periodical solids discharge is carried out automatically by means of a programmer unit regulate by a PLC controlling the operating water solenoid valves. Various automatic, independent working cycles may be selected to perform partial and/or total discharges during separation and cleaning in place. By setting the PLC it is possible to regulate the discharge quantity, the time between two following discharges and the combination between partial and total discharges. The programmer unit can also realize the following functions: automatic bowl closing during the starting-up phase; stop feeding during total discharges; rinsing of the

bowl external surface and of the protection cover internal surface, before and after the discharge; semiautomatic realization of partial and total discharges and of bowl overflow (during cleaning in place).
The discharge of solids collected in the bowl by mean of *partial discharge* does not involve the stopping of the separating process; actually it takes place at the rated revolving speed and without interrupting the product feeding. On *total discharge,* before the discharge takes place, there is the closure of feeding valve with interruption of the product feeding (controlled by the PLC) and the stop of feeding pump.
Bowl feeding is carried out through a closed pipe line with outlets of the product under pressure, by means of two centripetal pumps and without seal gaskets between fixed parts and rotating parts. 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.).

1 Feed
2 Distributor
3 Disks stack
4 Light phase centripetal pump
5 Heavy phase centripetal pump
6 Light phase outlet
7 Heavy phase outlet
8 Solids chamber
9 Discharge holes
10 Sliding piston
11 Closing chamber
12 Opening valve
13 Opening water
14 Closing water

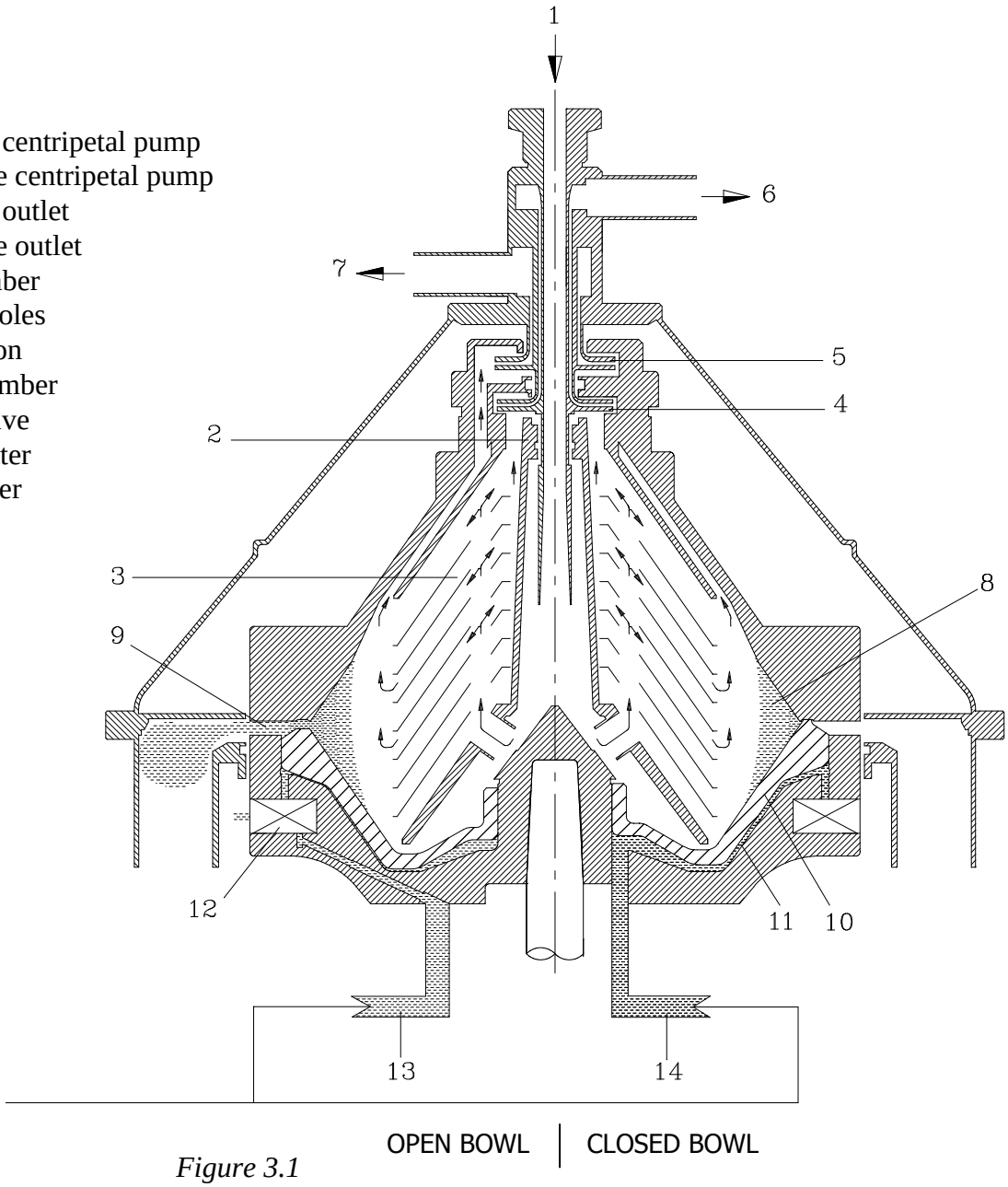


Figure 3.1

3.3. Technical card

Overall dimensions (ref. Tab. 20):		
Width:	1.160	mm.
Length:	1.820	mm.
Height:	1.520	mm.
Weights:		
Bowl weight:	200	kg.
Separator net weight:	640	kg.
Weight of unit on platform:	800	kg.
Operating features:		
* Milk skimming capacity:	5.500	l/h
* Whey skimming, standardization, milk cleaning capacities:	8.000	l/h
Solids chamber capacity:	4,8	l
Bowl speed:	8.000	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:	11	kW
Voltage:	3 x 400/690	V
Auxiliary components voltage:	24	Ac
Frequency:	50	Hz
System:	three-phase+earth	
Motor protection level:	IP 55	
Electric panel protection level:	IP 65	
Operation:	electro-mechanical controlled by PLC	
Hydraulic system features:		
* Required feeding pressure necessary for a machine working at maximum capacity:	0,5	bar
* Maximum outlet pressure (cream and skim):	5,5	bar
Minimum feeding pressure for operating water:	2	bar
Operating water consumption for each discharge:	approx. 10	l
Pneumatic system features:		
Maximum outlet pressure:	10	bar
Minimum working pressure:	6 ÷ 8	bar
Minimum pressure:	4	bar

For the environmental condition refer to the paragraph 5.1

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

- n° _____ x thickness _____mm.
- n° _____ x thickness _____mm.

Total thickness _____mm.

(*) These data depend on the specific application (milk skimming, standardization, 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).

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:_____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 (8.000 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.
- Do not connect the machine to an electric panel that is not spefically supplied by SEITAL.
- Use only SEITAL spare parts.

ATTENTION
Avoid water jets on control panel and 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 constituted 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 information:

- 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 recycle.
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).

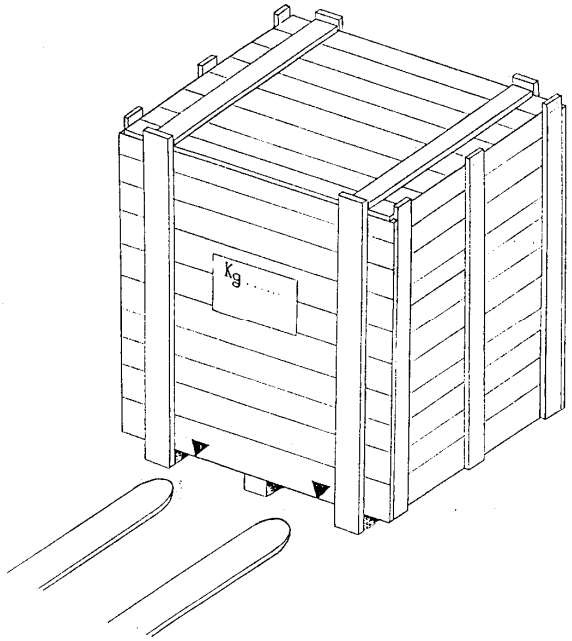


Figure 4.1

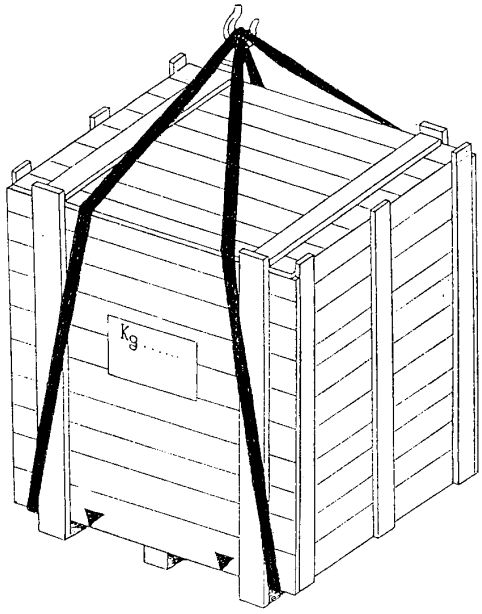


Figure 4.2

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 preassembled unit on base frame (fig. 4.3), use a lift truck having guaranteed:

- capacity higher than the weight of the machine.
- fork with length higher than 1.500 mm.

Insert the two forks (fig. 4.3) from the side A of the base frame in such a way that they reach the edge of the opposite side, or insert them from the side B (motor side) with the caution of insert them as much as possible overall dimensions permitting. If the forks are inserted from the side B, check they can lift both the transverse beam of the base frame in which the machine is fixed.

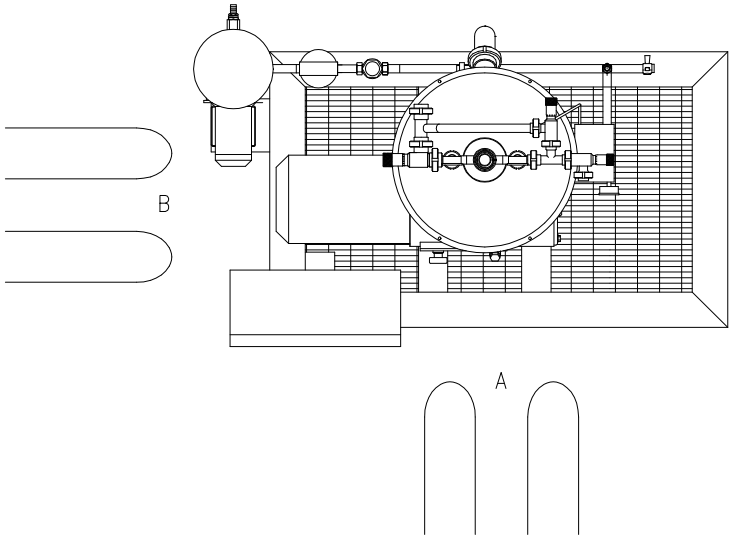


Figure 4.3

To lift the bowl (fig. 4.4) a particular procedure must be followed:
- screw on the bowl (2) the threaded rod with nut (1), used for disks compression;
- apply on the nut (provided with handles) the lifting ropes having guaranteed capacity higher than the weight of the bowl (ab. 200 kg);
- lift the whole with a bridge crane, crane or hoist.

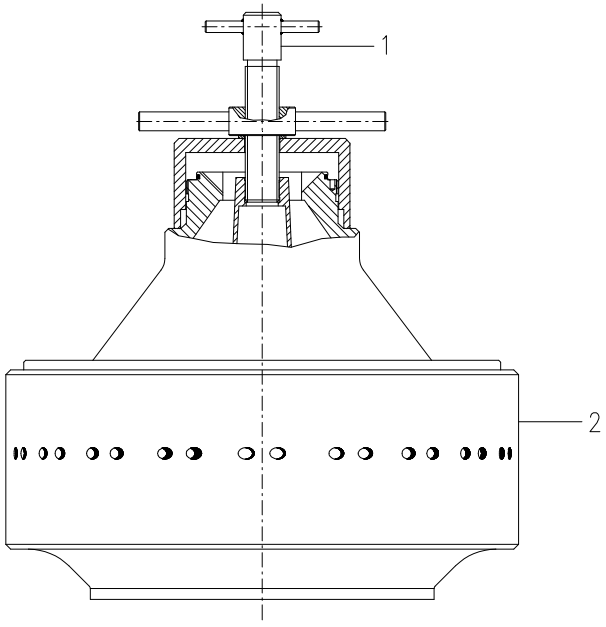


Figure 4.4

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 does not answer about breakages due to the transport of the machine after the delivery.
All the elements that are potentially moveable or not resistant 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 remains unused for a long time (more than 3 months), 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;
- close the operating water cocks and check that losses are not present.

When starting the machine follow the instructions reported in § 7 and in § 5.5.1.

5. INSTALLATION/PREPARATION TO START

5.1. Environment

The machine works inside a covered factory, with steady temperature, limitedly exposed to dust and humidity.
Except for different specification in order established, the machine has been designed and tested to regularly work in the environmental 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 responsibilities 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
When machinery used in atmosphere with explosion and/or fire risk are is requested, the necessary procedures must be previously agreed between the parties, in compliance with regulations (CEI 62.2, CEE n° 89/392 + subsequent amendments).
The standard machine SE 20S 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. 22.
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 includes:
- Set of special spanners for the bowl.
- Set of spare parts (gaskets, disks, cartridge filter, etc.).
- Operating water system, constituted of:
  - ball and solenoid valves
  - surge tank, filter, pressure reducer

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.
The machine is delivered on a platform, and so it isn't necessary a floor anchorage. When the platform with the machine is on the wanted position, you have to verify that the A plane is horizontal (Figure 5.1). You have to screw or unscrew the threaded foots (2 – figure 5.2) in order to achieve the right level of the machine, before this you have to slacken the nuts (1- figure 5.2). To be sure of the contact to the ground on every support, check that fastening the threaded foot must be made the same effort.
When you have achieve the correct level of the machine you have to screw the nuts (1 – figure 5.2) in order to block the threaded foots (2 – figure 5.2).

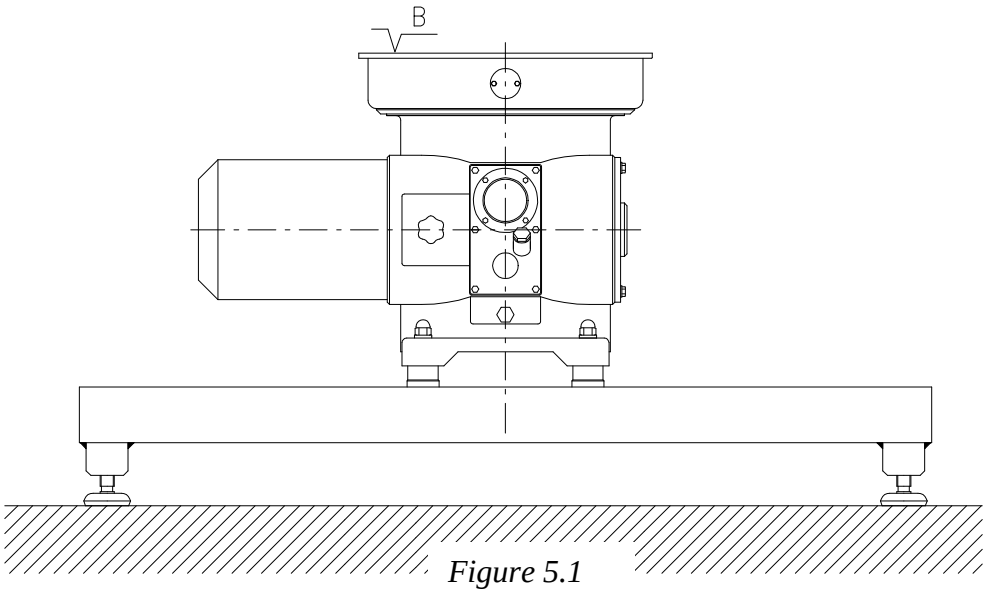


Figure 5.1

1 - Nut
2 - Threaded foots
3 - Base in rubber

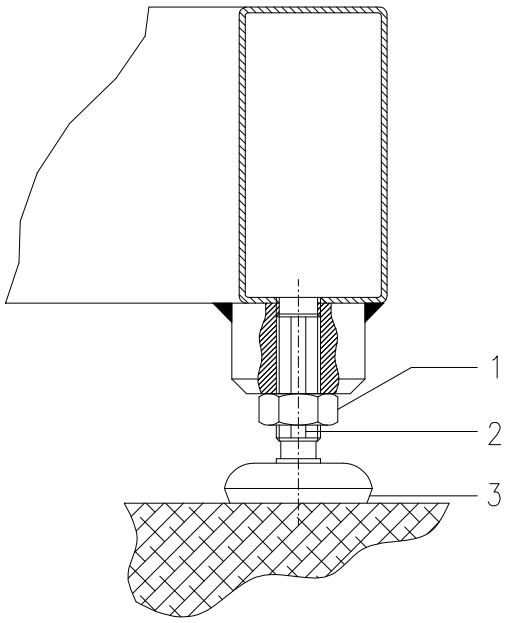


Figure 5.2

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 - Sight glass
A - Oil level with standstill machine

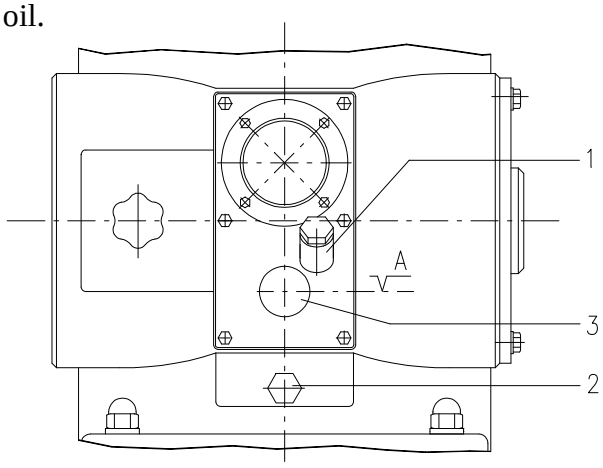


Figure 5.3

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
The oil used on the machine is the BLASIA220 added with 4% of AGIP ROCOL ASO/R.

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 750 operating hours; however never let pass a period longer than one year (check the effective working time of the machine, reading the value reported in the hour counter placed inside the electric panel). In seasonal operation the oil change must be performed before every operating period. The used oil must be collected in a suitable tank and eliminate as specified by the local regulations.
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	*for chemical industry*
- Molykote D (white paste)	- Molykote G
- Molykote DX (white paste)	- Molykote G Rapid
- Kluber Grease KSB 8	

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 wiring diagram is put inside the electric panel. If this is not, immediately contact the manufacturer.
The user has 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 correspond to the voltage and frequency indicated in the wiring diagram supplied with the machine; a wrong voltage supply could damage the electric panel equipment;
- the supply mains is provided with suitable earth connecting system;
- the electrical power supply of the separator motor is designed relating to starting current (approximately 1,5 ÷ 2 times the nominal current of the motor).

Instructions for electrical system connection:

- Perform the connection to the electric mains with great caution, without voltage in the mains and respecting the safety prescription and local regulations.
- It is advisable to install the control panel near the machine, to assure a fast intervention in case of danger.
- When connecting the phases to the isolating switch terminals, inside the electric panel, put in the suitable seat the yellow-coloured protection cover.
- Always use waterproof conduits on motor terminal board inlet.
- It's absolutely forbidden the mains connection without grounding.

Before assembling the bowl, check direction of rotation by a "short" motor starting. The correct direction of motor rotation is indicated by the arrow on separator frame, corresponding to the clockwise rotation of vertical shaft (see from above).

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. Hydraulic connection for operating water

Place a cock upstream the hydraulic connection for operating water. The opening/closing of the bowl requires clean, low hardness water (see below) at a pressure ranging between 2,5 and 6 bar, and with a minimum flow rate of 15 ÷ 20 l/min.

WATER QUALITY REQUIREMENTS

Cleaned water
Hardness ≤ 6 dH
Chlorine ions ≤ 100 mg/l
pH = 6,5 ÷ 7,5

The connection must be carried out according to Fig. 5.4 and Tab. 05.
The pressure reducer, separated from the machine, must be 2 metres from solenoid valve set at most. It reduces and stabilizes pressure of operating water to ensure evenness of partial discharges. Pressure reducer must be regulated at 2 ÷ 2,5.
Before assembling bowl, check correct electrohydraulic connection by simulating a discharge. First of all, turn on the opening/closing ball valves until having a regular water flow from the holes of the operating water injector (06.300.0 - Tab. 06). Then turn them off and press the discharge button on electric panel. A spray of water gets out from the upper part of the operating water injector and after a few seconds a short splash of water get out from the lower part of it. After 10 ÷ 15 seconds the upper spray of water stops. Repeat this procedure two or three times and if this doesn't happen, check electrical connection.
During discharge the minimum pressure must be higher than 1,5 bar.

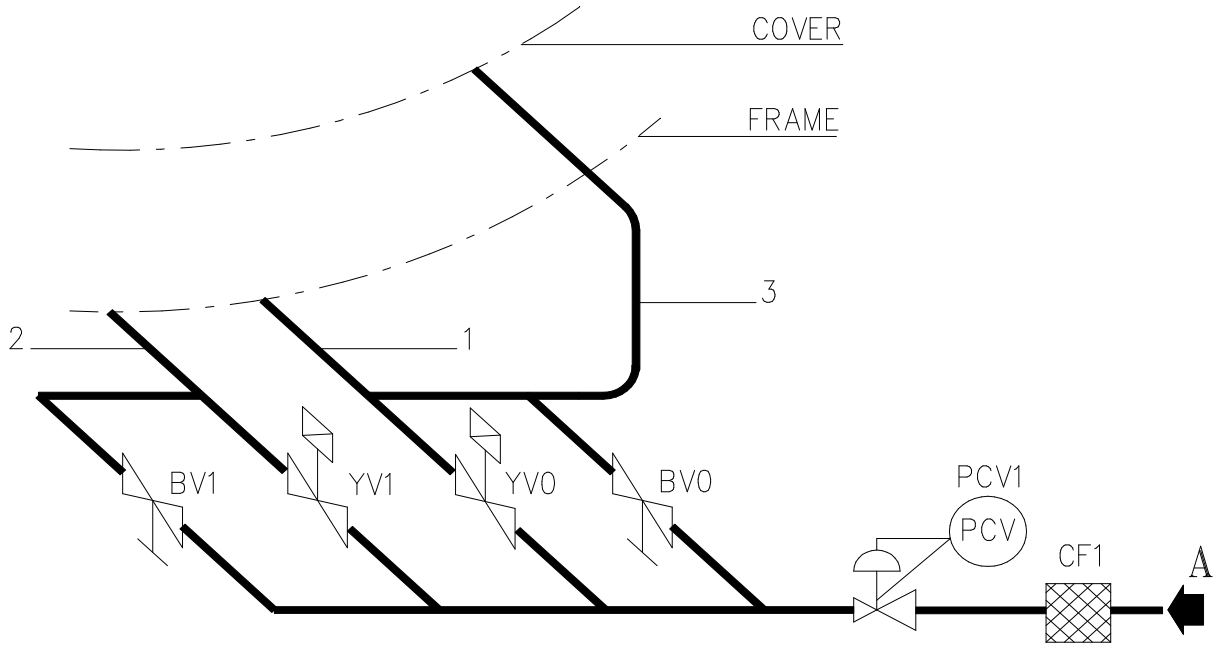


Figura 5.4

1 - Closing water
2 - Opening water
3 - Rinsing water
PCV1 - Pressure reducer
CF1 - Cartridge filter
A - Water from surge tank
YV0 - Closing water solenoid valve
YV1 - Opening water solenoid valve (bowl discharge)
BV0 - Closing water ball valve (emergency)
BV1 - Opening water ball valve (emergency)

5.6.3. Separator hydraulic connection

The separator must be connected to the plant predisposed by the user following the indications of the scheme of Tab. 21. All the pipe unions must be well fastened. It is advisible 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, etc.) that rigidly constrain the inlet-outlet unit of the machine; this could increase vibrations level. In figure 5.5 is shown an example of wrong connection; point A and point B or C have not to be rigid constraint in pipes axial direction.

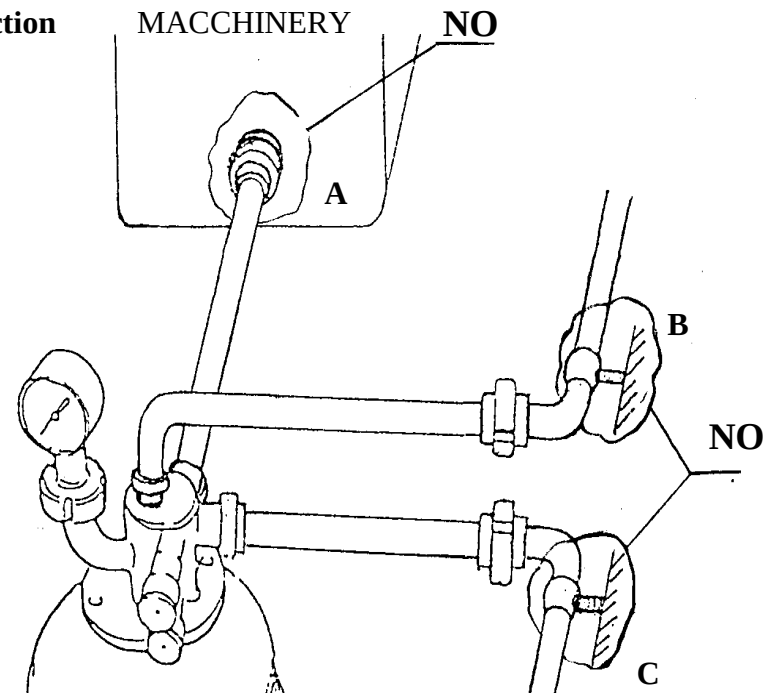


Figure 5.5

The solids discharge, if totally connected by a pipe, must have a sight glass that allow to see eventual leakages. The sludge elimination plant must be realized in such a way that a counterpressure is avoided inside it, preventing the sludge draining (fig. 5.6). These are the features that it must have:

1) sufficiently large pipes without sharp bends and shrinkages;
2) horizontal length absence;
3) sludges must be able to freely drain into the collecting tank.

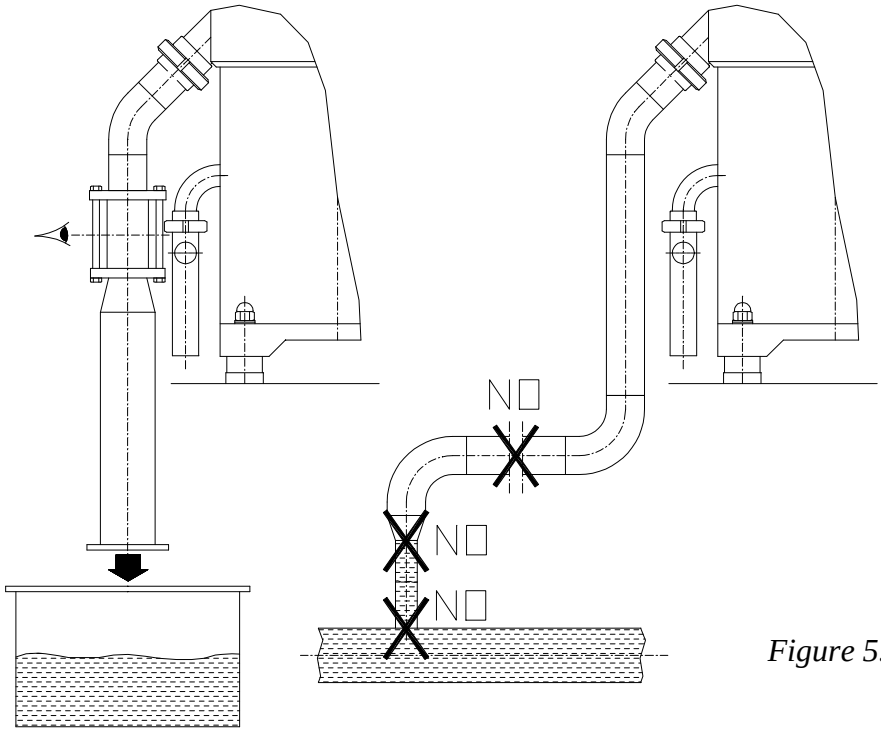


Figure 5.6

The eventually present drain traps (cover discharge, operating water discharge, etc.) have not to be totally connected by pipes, to check eventual leakages (fig. 5.7). These precautions must be adopted to avoid that some liquid (water, product or sludges) could flow in the upper part of the frame braking the rotating bowl and/or drain in the gear chamber damaging the bearings.

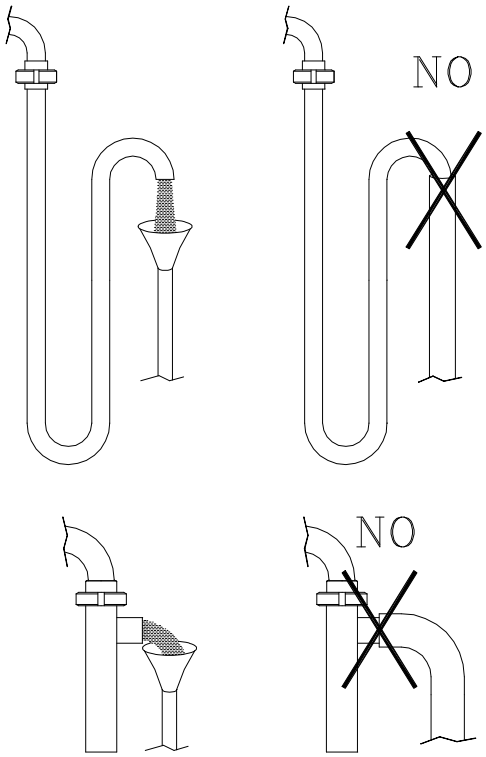


Figure 5.7

5.6.4. Pneumatic system connection

If the machine has pneumatic components the connection to the pneumatic system must be predisposed. The system features are reported in § 3.3 and Tab. 23.
The user has to predispose a suitable cock upstream the machine pneumatic system, that guarantee the cut out of the compressed air in case of emergency.
When connecting, verify that:

- air pressure is in the limits reported in § 3.3;
- connecting pipes are constrained to supports near the pipe unions; this to avoid injuries due to unexpected disjunction of the pipe from the union.

6. BOWL AND INLET-OUTLET FLOW UNIT

The bowl is supplied separately from the rest of the machine, so before setting at work 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 clarifier 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 - OR gasket - bowl body
3 - Bowl body nut
4 - Gasket - moving ram
5 - Moving ram
6 - Distributor
7 - Bottom disk
8abc - Intermediate disk
9 - Finned upper disk
10 - OR gasket - finned upper disk
11 - Nylon gasket - bowl hood
12 - OR gasket - bowl hood
13 - Bowl hood
14 - Big lock ring
15 - Drilled gasket - dividing disk
16 - Dividing disk
17 - Finned cover
18 - Small lock ring
19 - Screw

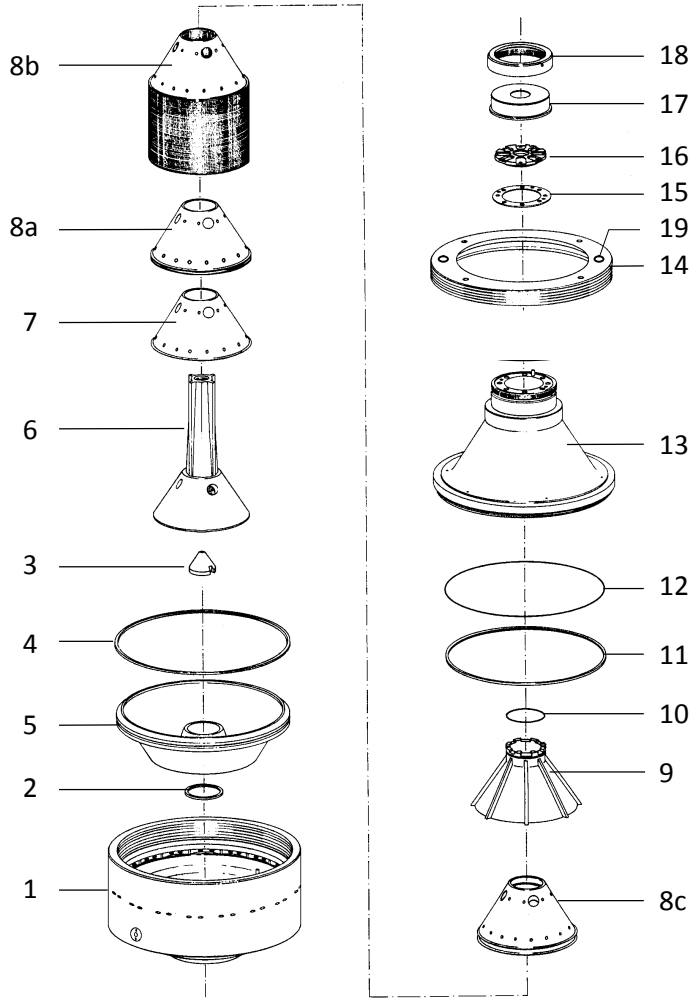


Figure 6.1

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 (Figure 6.1 - parts 2, 3, 4, 10, 11, 12, 14, 18).

- 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 and particularly the spanner for disks compression.
- After screwing big lock ring, check the disks compression.
  It's possible that disk set is insufficiently compressed and this may cause anomalous vibration of the bowl. In this case add some disks.

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 (09.100.0), insert the **bowl body** (Fig. 6.2). Follow these indications.

   - Fasten the spanner body (2) on the bowl body.
   - Screw the eyebolt (1) on spanner body (2). Acting on the eyebolt (2), lift the bowl body by hoist and slowly place it down on the conical part of the vertical shaft. Use great caution to not damage the coupling surfaces.

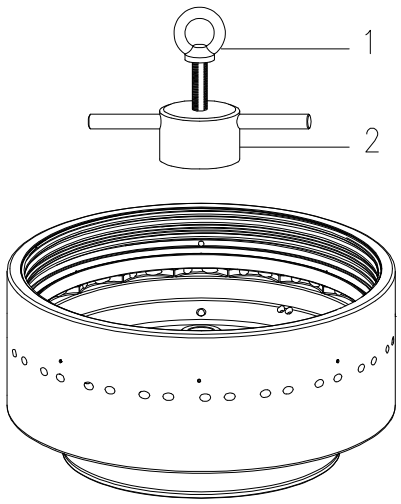


Figure 6.2

2) Carefully clean the groove of bowl hub and insert the OR gasket (Fig. 6.3).

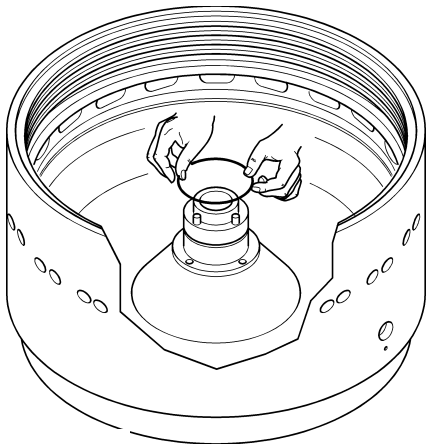


Figure 6.3

3) With the suitable spanner (09.190.0) screw as more as possible the **bowl body nut** (left handed thread). By the hammer (09.030.0) give some blows to the spanner to be sure that the nut is well fixed (fig. 6.4).

Figure 6.4

4) Carefully clean the groove on the moving ram and apply the rubber gasket (fig.6.5 and fig. 6.6 - particular 1) using a plastic hammer. Inserting the gasket, pay attention that the surface in contact with bowl body has not shear rags. Be sure that the external surface of the gasket does not protrude from the groove.

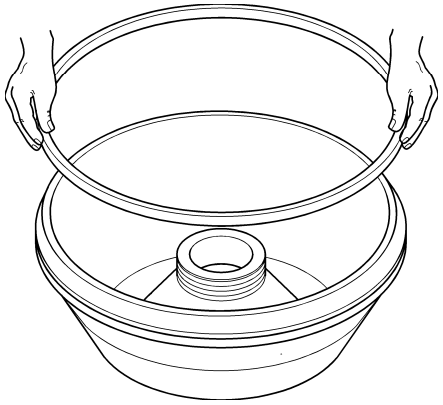


Figure 6.5

5) Smear antiscuff grease on the coupling surfaces of the bowl hub and the moving ram (Fig. 6.6 - particular 2).

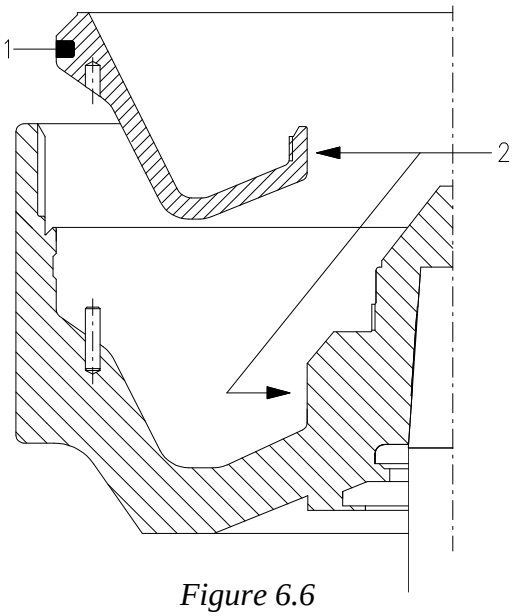


Figure 6.6

6) By the spanner (09.120.0), insert the **moving ram.** Proceed as explained below.

   - Fasten spanner body (l) on the moving ram.
   - Slightly screw threaded rod (2) until the threaded part length outside the spanner body is 4 ÷ 5 mm.
   - Lift the moving ram by hand or by hoist and place it down on the bowl body (fig. 6.7).
   - Take care that the “0” marks of the two pieces are aligned, so that the three guide pins of the bowl body enter correctly into the

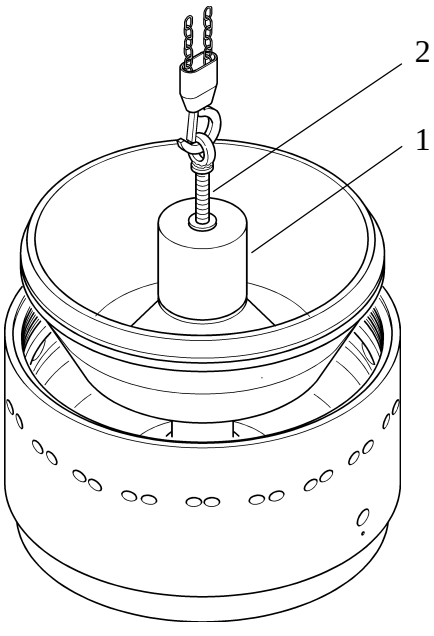


Figure 6.7

corresponding holes in the moving ram.

- Slightly unscrew the threaded rod until the ram is completely placed on his seat. Could be necessary give some plastic hammer blows on the upper edge of the threaded rod and/or on the upper edge of the ram to make swinging the piece.
- The moving ram should be now resting on the internal edge of the bowl body. The most internal part of the ram must be at about 6 mm. under the hub of bowl body. This position will be easily reached if the steps from 3) to 6) have been correctly made.

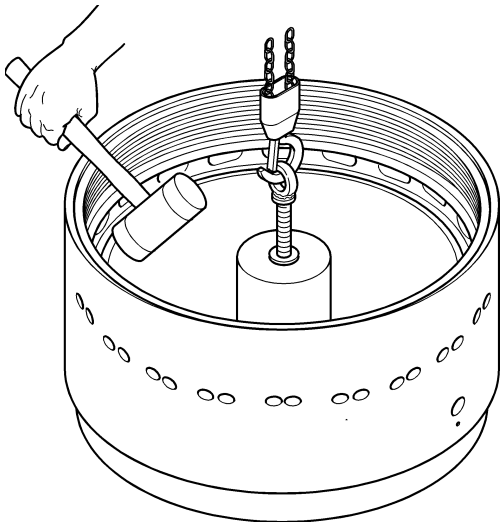


Figure 6.8

7) By the spanner (09.060.0), screwed in the threaded hole present on the upper edge of the **distributor**, lift the piece and place it down on his seat (fig. 6.9). Over the distributor is marked a big “0” that must be aligned with “0” marks of the bowl body and moving ram. Check the guide pins on the bowl body correctly rest on the suitable seat under the distributor so that the whole piece is uniformly resting on the bowl body.

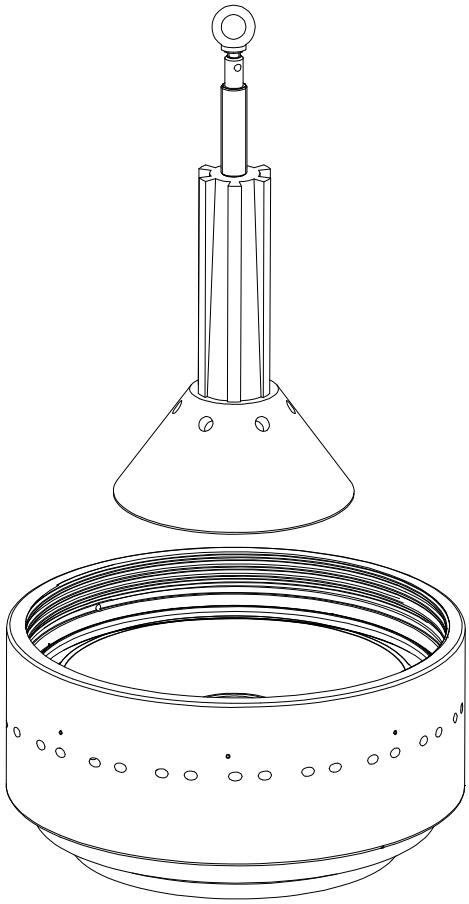


Figure 6.9

8) Insert the **disks** (fig. 6.10). The disks can be inserted in the distributor only in one way. Over the distributor is marked a big “O” that must be aligned with “O” marks of the bowl body and moving ram, and a small “o” which indicates the angular position of disks insertion. The disk must be inserted in such a way that the small slot made on the internal upper edge glides on the distributor fin marked with the small “o”.
   Then insert:
   - bottom disk (7 - fig. 6.1) that distinguishes itself by having spacers on both surfaces.
   - the three intermediate disks (8a - fig. 6.1) with higher spacers;
   - the intermediate disks (8b - fig. 6.1);
   - the four top disks (8c - fig. 6.1) with higher spacers.

   Take care to not change the sequence of the disks.

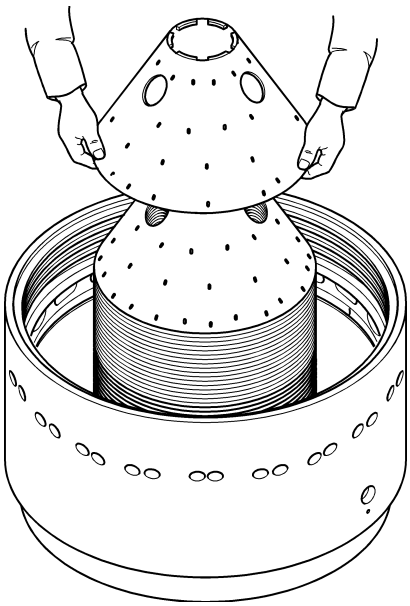


Figure 6.10

9) After carefully cleaning the groove, insert the **OR gasket** on the finned upper disk (fig. 6.11).

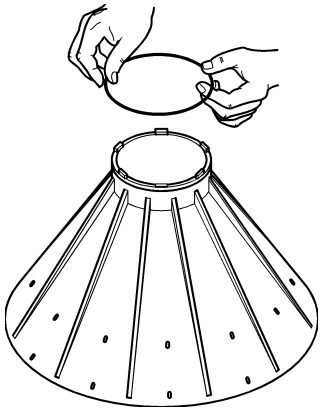


Figure 6.11

10) Insert the **finned upper disk** (fig. 6.12), that distinguishes itself from the other disks for the higher thickness and for the shimming fins.

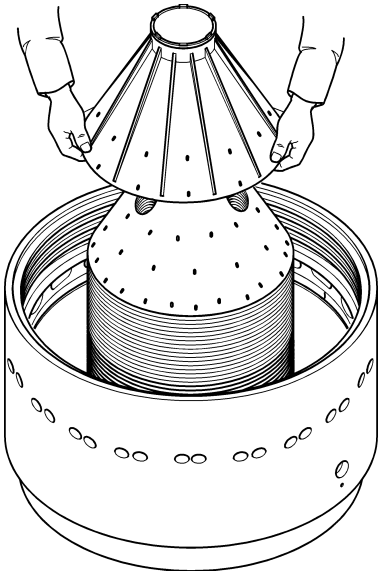


Figure 6.12

11) After carefully cleaning the grooves, insert the **nylon gasket** (11 - fig.6.1) and the OR gaskets (12 and 20 - fig.6.1) on the bowl hood (Fig. 6.13 and 6.14). To apply the nylon gasket, turn the bowl hood upside down and fit the gasket over the groove; then start inserting it slightly giving blows with a plastic hammer. This operation must be made striking, uniformly on the circumference, the gasket in one point and after in the opposite one (180°). When gasket has been uniformly inserted, take a small piece of the older gasket and, after placing it over the new one, give on it some plastic hammer blows until it enter of about 1 mm. under the bowl hood surface (see Fig. 6.15).

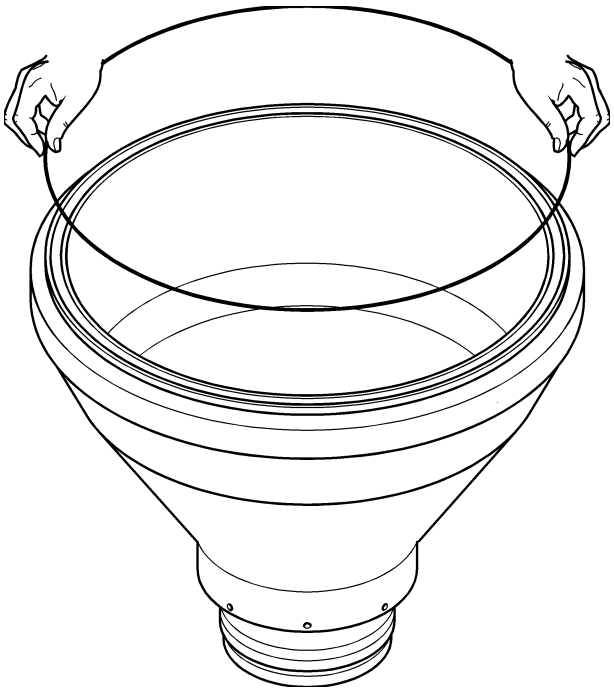


Figure 6.13

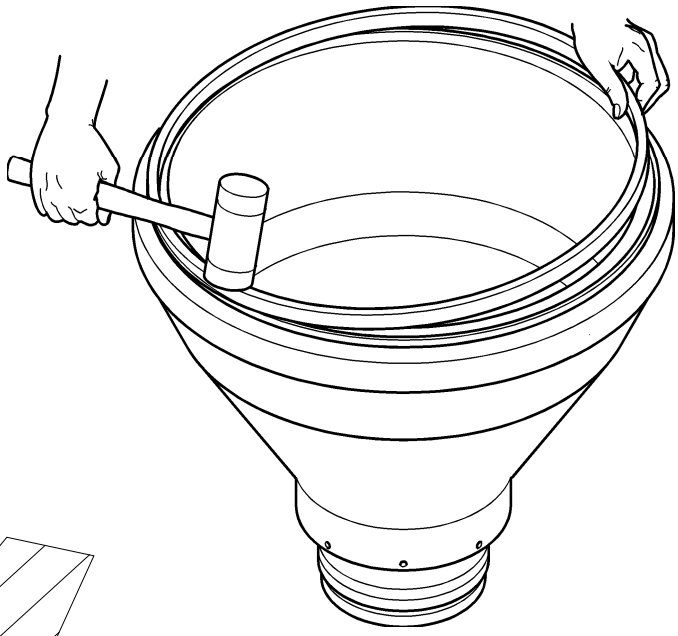


Figure 6.14

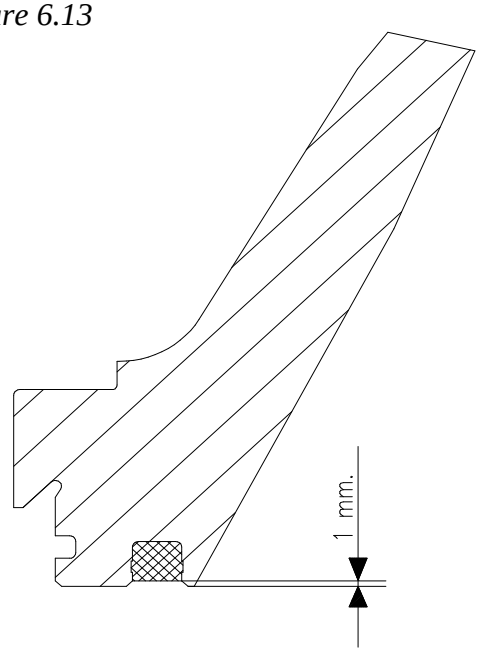


Figure 6.15

12) Carefully clean the conical coupling surfaces of bowl body and bowl hood.

13) By the spanner (09.110.0), place down the **bowl hood**. Proceed as explained below.

- Fasten spanner body (l) on the bowl hood (fig. 6.16).
- Slightly screw threaded rod.
- Lift the piece by hoist and place it down into the bowl body (fig. 6.17); take care that the "0"marks of the two pieces are aligned; in this way the key forced in the bowl body glides in the corresponding groove of the bowl hood (fig. 6.18).
- At the edge of the threaded rod is fixed a disk, that will rest on the distributor.
- If necessary, unscrew the threaded rod until the bowl hood is in contact with the disks.

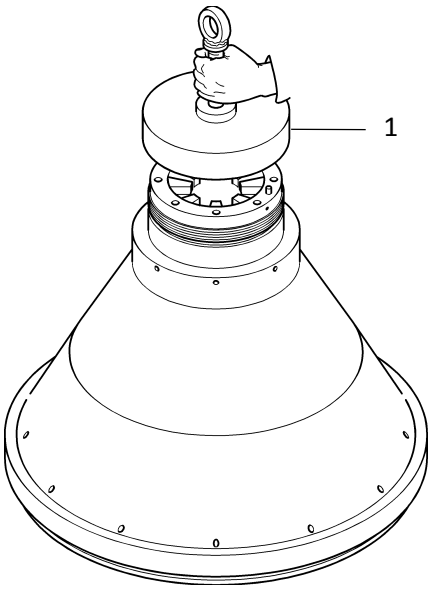


Figure 6.16

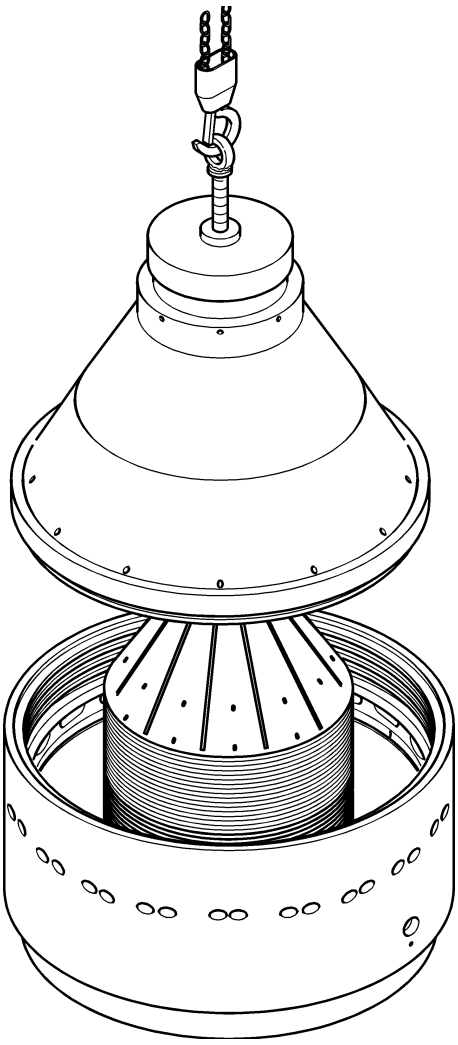


Figure 6.17

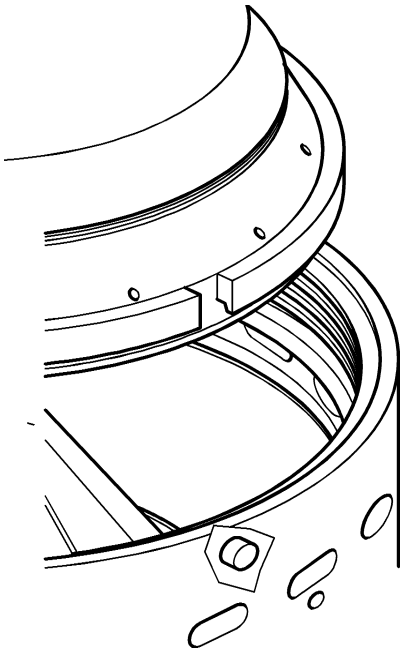


Figure 6.18

14) By the spanner (09.060.0 ÷ 09.090.0), compress the **disks stack** (fig. 6.19). To make this, perform the above mentioned operations.

    - Lay bell (1) on bowl hood.

    - Screw tight threaded rod (4) on the distributor. Do not forget bronze washer (2) under nut with handles (3).

    - By using extension pipe (09.020.0) screw nut (3) as much as possible and anyhow until the bowl hood completely lay on the corresponding seat of the bowl body (fig. 6.20).

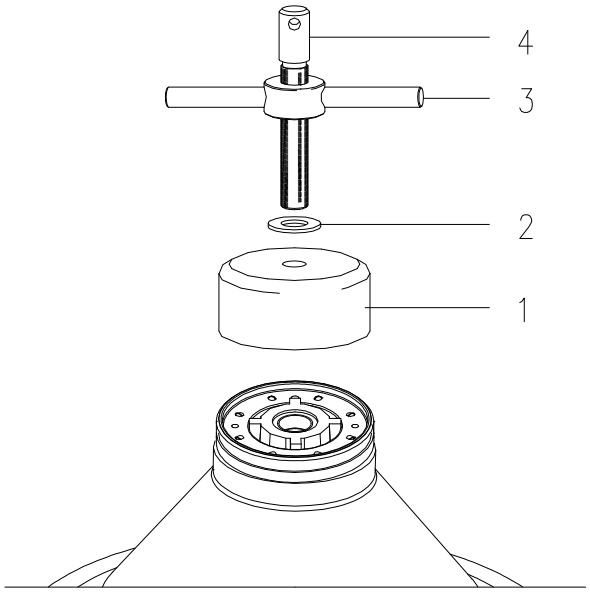


Figure 6.19

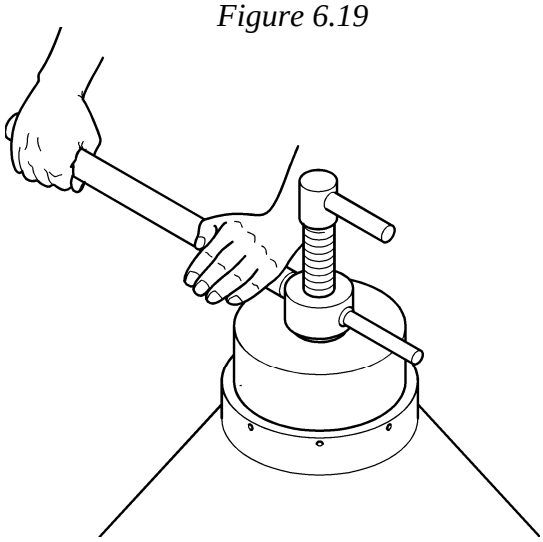


Figure 6.20

15) Smear antiscuff grease on threads of bowl body and big lock ring (fig. 6.21 - part 1) and on contact surfaces between bowl hood and big lock ring (fig. 6.21 - part 2).

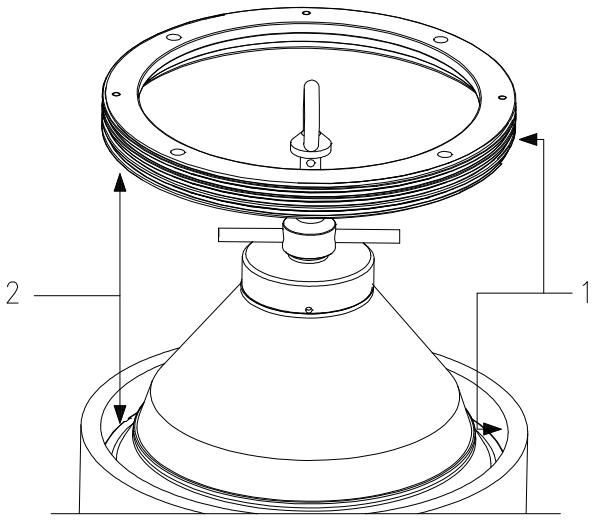


Figure 6.21

16) By the spanner (09.180.0) screw the **big lock ring** (Fig. 6.22) that has left-handed thread. This operation must be performed with the disks stack compressed by the suitable spanner. 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.

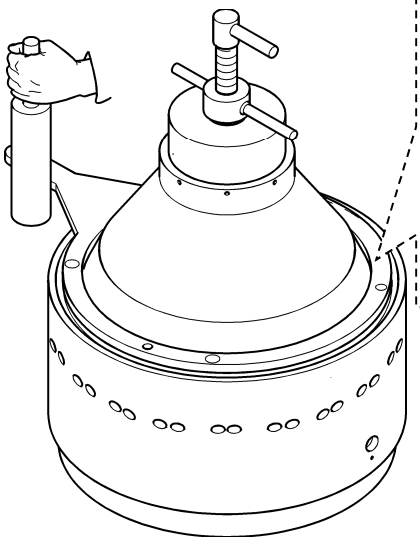


Figure 6.22

17) Remove the spanner for disks set compression. This spanner also allows to check if disks compression is correct. Infact one manual turn of nut (3 - fig. 6.19), by means of extension pipe, must cause a "sensation of toil". If after one turn it is still hard to loosen the spanner it means that one or two more disks are still necessary.

18) After carefully cleaning the grooves, insert the **OR gaskets** on feeding pipe and on the centripetal pumps (see fig. 6.28).

19) Insert the **feeding pipe** of product and the **cream centripetal pump** (fig. 6.23).

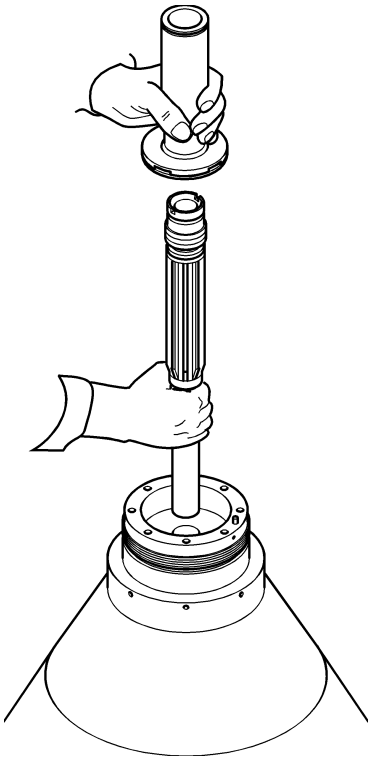


Figure 6.23

20) Apply the **drilled gasket of dividing disk** on the bowl hood (fig. 6.24) checking that the pin on the bowl hood correctly enter in the suitable hole on the gasket.

21) Apply the **dividing disk** (fig. 6.24) aligning the "0" with the "0" of the bowl hood.

22) Insert the **skim centripetal pump** (fig. 6.25).

23) Place the **finned cover** (fig. 6.26), and take care that the "0" marks of the two pieces are aligned.

24) By the spanner (09.210.0), screw (left-handed thread) the **small lock ring** (fig. 6.27).

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

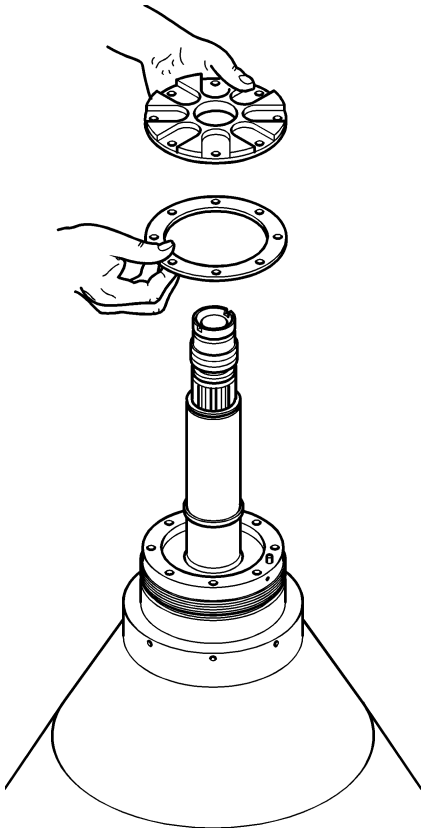


Figure 6.24

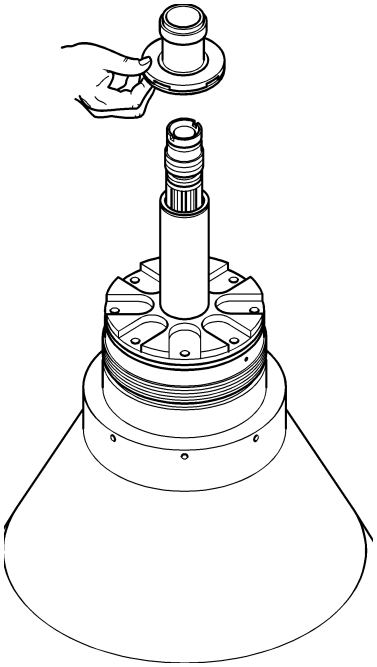


Figure 6.25

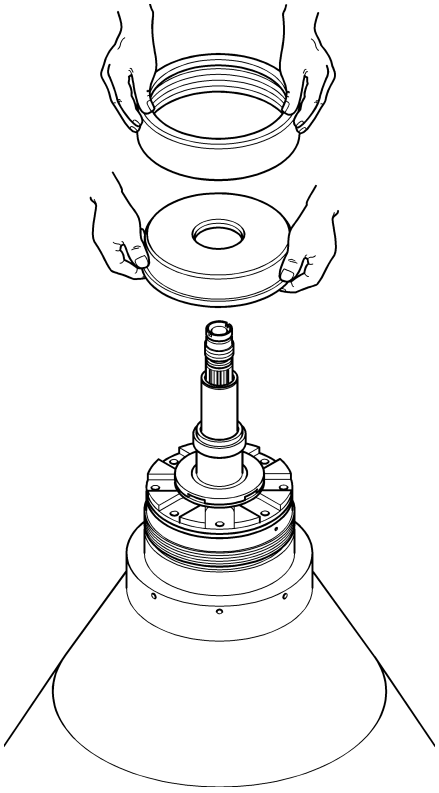


Figure 6.26

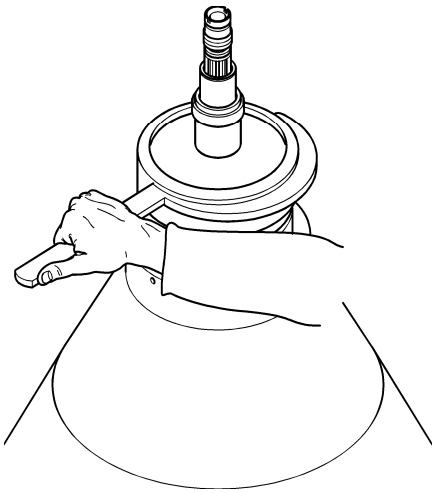


Figure 6.27

6.2. Inlet-outlet flow unit assembly

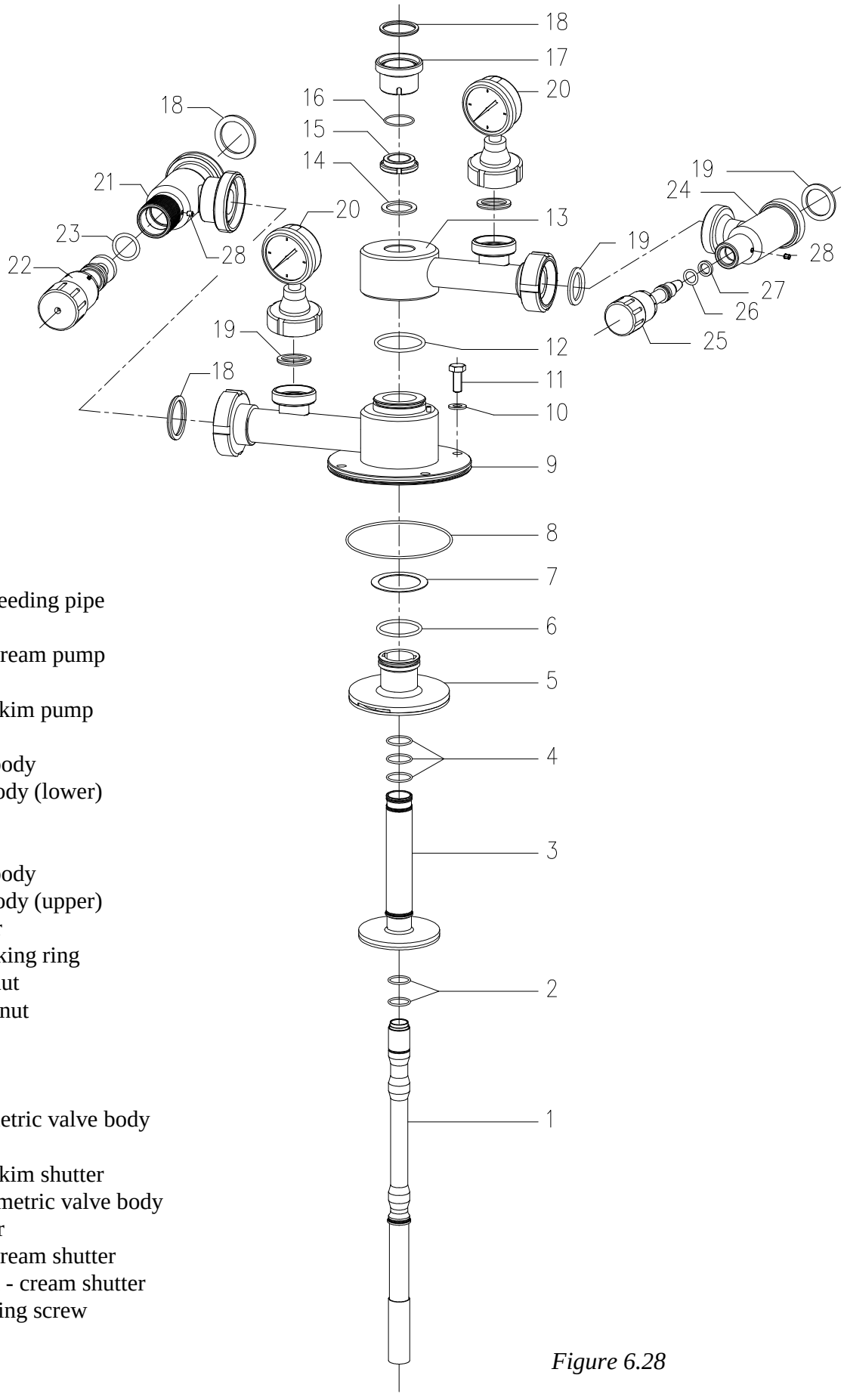
Before assembling, check all gaskets and grooves: they must be in good conditions and accurately cleaned. The spanners necessary for assembly are reported in Tab. 09. Do not use other tools or use them with caution.
The feeding pipe and the two centripetal pumps must be assembled in sequence with the last parts of the bowl (see § 6.1), then fix the cover on cyclone and finally the remaining parts of inlet-outlet flow unit.

Proceed according with the following procedure (see fig. 6.28):

1) Lift up the bowl protection cover and put it on cyclone, making attention to not damage the thread of the feeding pipe.
2) Screw the 6 screws M8x22 (08.040.0 - Tab. 08) on cyclone.
3) Insert in the inlet-outlet body the OR gaskets (8, 12).
4) Assemble spacers (7) on body (9).
5) Insert body (9 and 13) on the feeding pipe (1), adapting it on skim pump (5) and on the correspondent seat on the cover.
6) Screw hardly the two screws (04.100.0 - Tav. 04) into the holes of the cover.
7) Insert nylon washer (14) and screw the threaded locking ring (15) - left-handed thread - using the spanners (09.200.0). To avoid pipe rotation when fastening the ring nut, use the spanner (09.010.0).
8) Apply on the nut (17) the OR gasket (16), then screw it on the feeding pipe - left-handed thread - using the spanners (09.200.0).
9) Apply on the fittings the appropriate gaskets (18, 19).
10) Apply on the shutters (22, 25) the OR gaskets (23, 26) and the Teflon gasket (27).
11) Mount on the valve body (21, 24) the shutters (22, 25).
12) Mount on the inlet-outlet body the assembled micrometric valves (21, 24).
13) Install manometer (20) with its gasket (19).

ATTENTION
Block the shutters screwing the screw (28 fig. 6.28) into the appropriate holes of the valve body.

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



1 - Feeding pipe
2 - OR gasket - feeding pipe
3 - Cream pump
4 - OR gasket - cream pump
5 - Skim pump
6 - OR gasket - skim pump
7 - Spacer
8 - OR gasket - body
9 - Inlet-outlet body (lower)
10 - Washer
11 - Screw
12 - OR gasket - body
13 - Inlet-outlet body (upper)
14 - Nylon washer
15 - Threaded locking ring
16 - OR gasket - nut
17 - Feeding pipe nut
18 - Gasket DN40
19 - Gasket DN25
20 - Manometer
21 - Skim micrometric valve body
22 - Skim shutter
23 - OR gasket - skim shutter
24 - Cream micrometric valve body
25 - Cream shutter
26 - OR gasket - cream shutter
27 - Teflon gasket - cream shutter
28 - Shutter blocking screw

Figure 6.28

6.3. Adjustment of pumps position

The correct position of the pumps (fig. 6.29) is in the middle of the corresponding chambers of the bowl. This position id obtained by inserting a few spacers (7) - fig. 6.28 - between the skim pump (5) and the inlet-outlet flow unit body (9). 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.03) and/or of the inlet-outlet flow unit (Tab.04). In this case it is advisable to vary corresponding number and thickness of spacers indicated on data sheet § 3.3. The total thickness of spacers is determined by the following relation:

Total thickness of spacers = 64,5 - A

To find "A" push down the centripetal pump to the bottom of the corresponding bowl chamber. The distance (measured in mm) between the light pump upper edge and the cover give the value of "A" (Fig. 6.30).

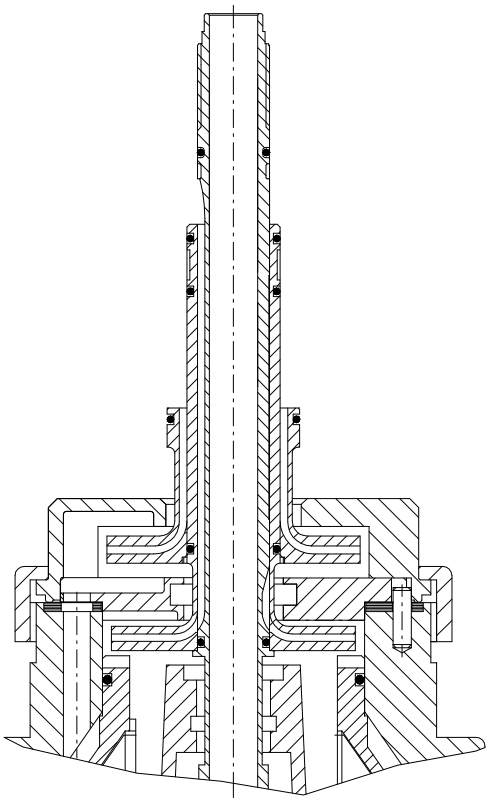


Figure 6.29

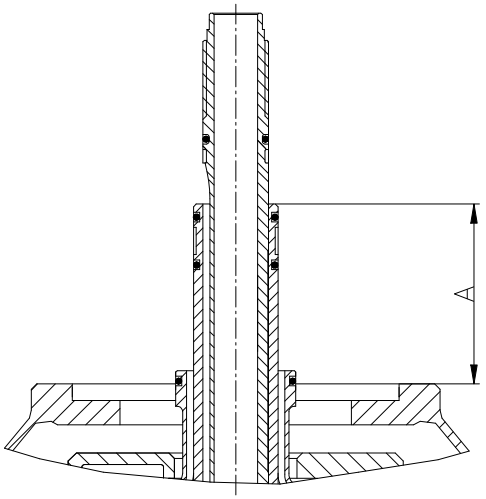


Figure 6.30

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. 6.28).

1) Disconnect feeding pipe and outlet pipes.
2) Using the spanner (09.200.0 - Tab. 09) unscrew the nut (17) - left-handed thread.
3) Using the spanner (09.010.0 - Tab. 09) block the feeding pipe and unscrew the ring nut (15) - left-handed thread - using spanner (09.200.0).
4) Extract the nylon washer (14).
5) Unscrew the two screws (04.100.0 - Tab. 04), that fix the inlet-outlet flow unit to the cover.
6) Lift up the inlet-outlet body (9 and 13).
7) Unscrew the 6 screws M8x22 (08.040.0 - Tab. 08).
8) Lift up cover by hands, paying attention to not damage the thread of feeding pipe.

6.5. Bowl disassembly

1) By the spanner (09.210.0), unscrew (left-handed thread) the **small lock ring**.
2) Remove the **finned cover.**
3) Take out the **skim pump.**
4) Remove the **dividing disk.**
5) Extract the **feeding pipe** and the **cream pump**.
6) Take out the **drilled gasket of the dividing disk.**
7) By the spanners (09.060.0 - 09.090.0), compress the **disks stack** (Fig. 6.19). To make this, perform the above mentioned operations.
   - Lay bell (1) on bowl hood.
   - Screw tight threaded rod (4) on the distributor. Do not forget bronze washer (2) under nut with handles (3).
   - By using extension pipe (09.020.0) screw nut (3) as much as possible and anyhow until the bowl hood completely lay on the corresponding seat of the bowl body.
   - When the nut (3) lay on the flange (1), one turn is enough to slightly lift the distributor from bowl body.

The spanner for compression disks stack also allows to check if disks compression is correct. Infact one manual turn of nut (3), by means of extension pipe, must cause a "sensation of toil". If after one turn it is still hard to loosen the spanner it means that one or two more disks are still necessary.

8) Strike with the mallet (09.030.0) the spanner handle (09.180.0), to unscrew the **big lock ring** (fig. 6.22), until loosen it (left-handed thread). Then take it out.

9) Remove the spanner for disks set compression.

10) By the spanner (09.110.0), extract the **bowl hood** (fig. 6.16). Proceed in this way:

- Fasten spanner body (l) on the bowl hood.
- Slightly screw threaded rod.
- The piece start lifting until a complete release.
- Lift the piece by hand or by hoist. Use great caution when extracting it because sometimes the finned upper disk remains attached to it and so it could fall down.

11) If the **finned upper disk** is not get out with the bowl hood remove it by hands.

12) Extract the **disks** and take care to not change the sequence of them.

13) By the spanner (09.060.0), screwed in the threaded hole present on the upper edge of the **distributor**, lift the piece.

14) By the spanner (09.120.0), take out the **moving ram** (fig. 6.7). Proceed in this way:

- Fasten spanner body (l) on the moving ram.
- Slightly screw threaded rod (2).
- If the ram raises with difficulty and the threaded rod is hard to screw, loosen it a little bit.
- Give some blows with plastic hammer (not rubber) on the conical part of the moving ram (fig. 6.8) and at the same time start again screwing the rod until a complete release of the piece.
- Lift the moving ram by hand or by hoist

15) With the suitable spanner (09.190.0) and using the mallet (09.030.0), unscrew the **bowl body nut** (left handed thread).

16) By the spanner (09.100.0), extract the **bowl body** (fig. 6.2).

- Fasten the spanner body (2) on the bowl body.
- Screw the eyebolt (1) on spanner body (2).
- If the bowl raises with difficulty and the threaded rod is hard to screw, give some blows with plastic hammer on the eyebolt of the threaded rod.
- Start again screwing the rod until a complete release of the piece.
- Lift the bowl body by hand or by hoist.

6.6. Bowl valves

On the bowl there are two valves (fig. 6.31), placed at 180° one from the other.
The assembly/disassembly of bowl valves can be carried out without dismantling cover and bowl. To reach valves (with our special spanners), there is an opening, usually bunged, on the front of cyclone.

1 - Valve body
2 - Valve ram
3 - OR gaskets - internal - of valve body
4 - OR gasket - external - of valve body
5 - OR gasket of valve ram
6 - Nylon gasket

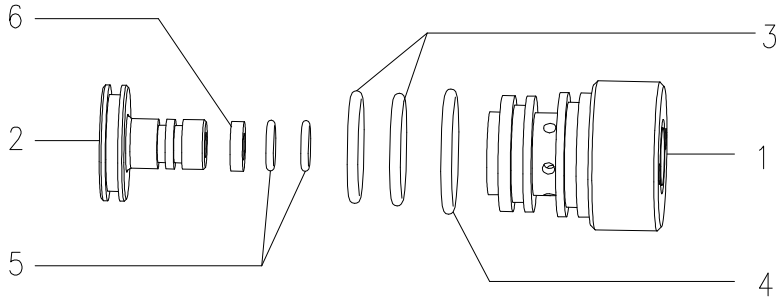


Figure 6.31

Disassembly

- Remove the port plug for bowl valve (08.060.0 - Tab. 08)
- By using a screwdriver, make turning the bowl until the valve doesn't appear at your sight.
- Insert spanner body (09.050.0) so that the two fore pins fit the corresponding holes of valve body.
- Tighten screw in valve body and then tighten nut to fasten spanner to valve body.
- By wheeling spanner body, the valve is unscrewed (right-handed thread) from bowl body.
- The small ram will probably get out with the valve body; if this not, extract it (fig. 6.33) by pulling spanner (09.040.0) after screwing its threaded end on small ram.

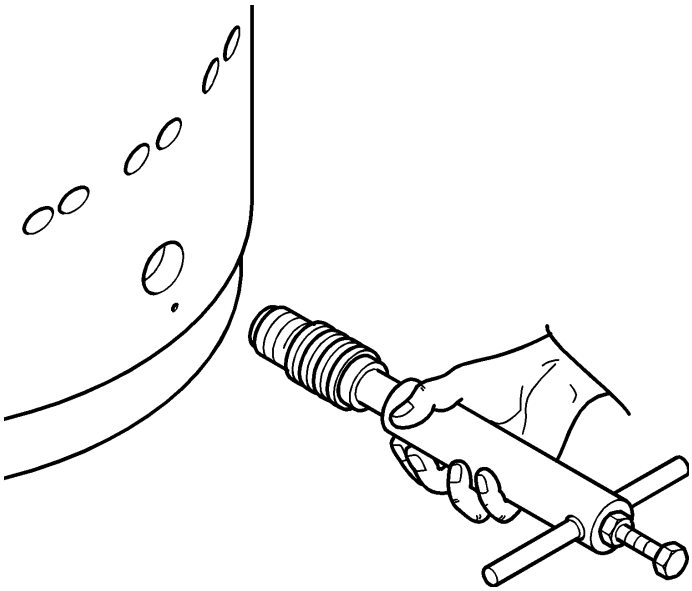


Figure 6.32

Assembly

Before assembly verify the gaskets are in good conditions.

- Insert the small ram into the valve body.
- Apply the valve body on the spanner body, so that the two fore pins fit the corresponding holes on the valve.
- Tighten screw in valve body and then tighten nut to fasten spanner to valve.
- Add by finger a little bit of grease on the external valve gaskets, to avoid tearings when inserting.
- Insert with caution the spanner with valve into the hole on the bowl. Then, slowly screw the valve (to avoid damaging the OR gaskets with the thread), screwing for half a round and unscrewing a little bit until the valve is completely inserted.

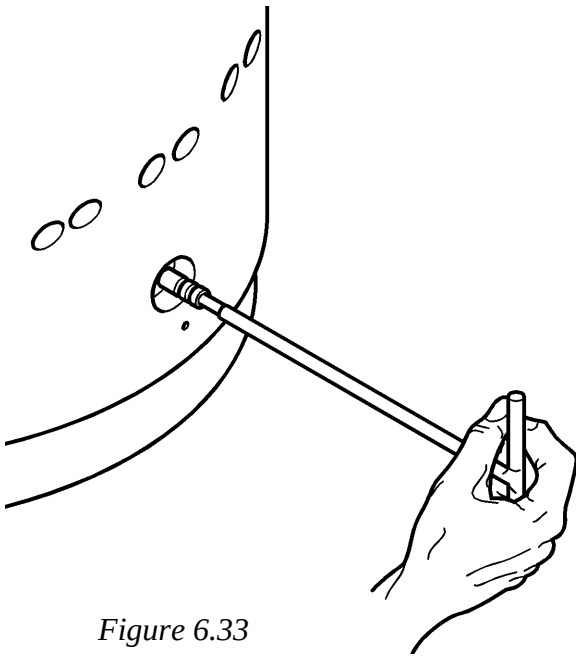


Figure 6.33

6.7. Hydraulic system for opening-closing the bowl.

The bowl (fig. 6.34) is provided with a ram (1) which periodically opens discharge holes (3) on the periphery of bowl, draining off the solids (2) accumulated during the separation. This ram is driven downward by the pressure of processed product and upward by operating water. When chamber (4) is filled with water, the ram is in closed position (up); when chamber is partly empty, the ram goes to position of opening (down). The filling and emptying of chamber (4) is obtained through two water pipes intercepted by solenoid valves:

- pipe (5) (solenoid valve YV0) for closing water, through which water fills up moving ram chamber (4);
- pipe (6) (solenoid valve YV1) for opening water, through which the partial emptying of chamber (4) takes place. Opening water acts on bowl valve (7) causing the opening of drain hole of chamber (4).

The solenoid valves are controlled by the PLC that permit to realize the desired working cycle. Both closing and opening water pipes are provided with manual emergency control consisting in a ball valve in parallel with the corresponding solenoid valve.
To obtain a discharge by acting manually on ball valves proceed as follows:

1) open BV0 (pre-rinsing) and wait 5 seconds approx.;
2) open/close BV1 (discharge); a partial discharge requires ab. 0,1 - 0,2 seconds of valve opening time;
3) wait ab. 10 - 15 seconds (after-rinsing) and then close BV0.

For the assembly/dismantly of "solenoid valve set" refer to Tab. 05.

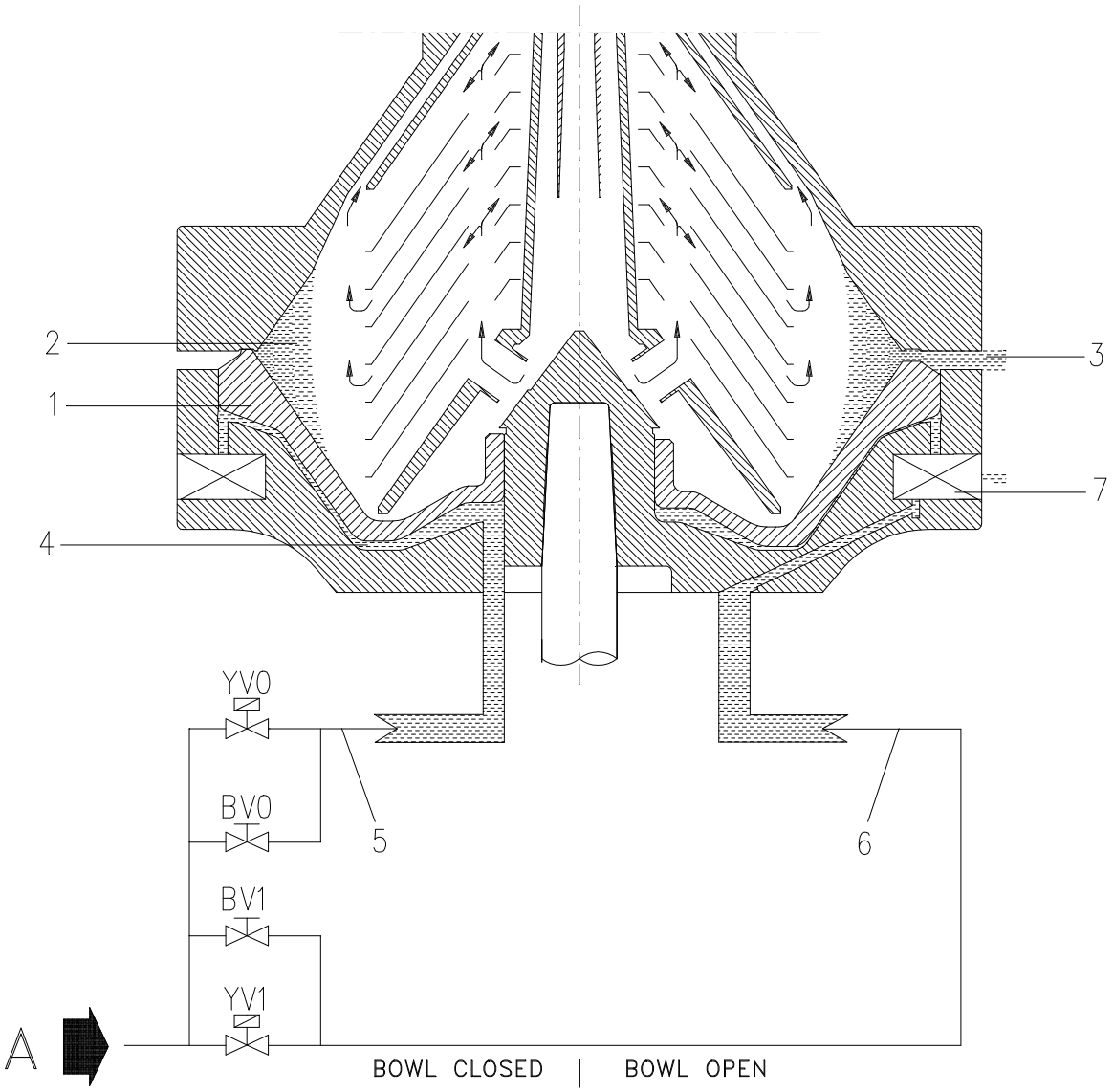


Figure 6.34

1 - Sliding piston
2 - Separated solids
3 - Bowl discharge holes
4 - Moving ram chamber
5 - Closing water
6 - Opening water
7 - Bowl valve

YV0 - Closing and rinsing water solenoid valve
YV1 - Opening water solenoid valve (partial discharge)
BV0 - Closing water ball valve (emergency)
BV1 - Opening water ball valve (emergency)

A Water from surge tank

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.

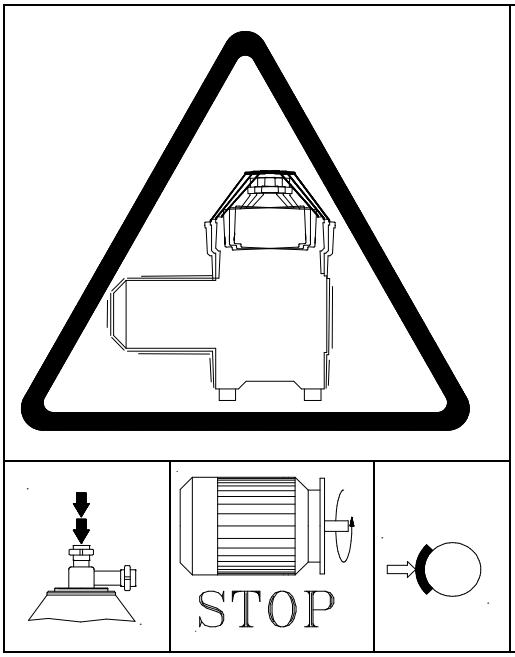
7.2.2. Shields

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 port of gear chamber;
  - n°.1 plug to mount/remove the bowl valves;
- A 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. 22):

- **On the bowl protection cover:**



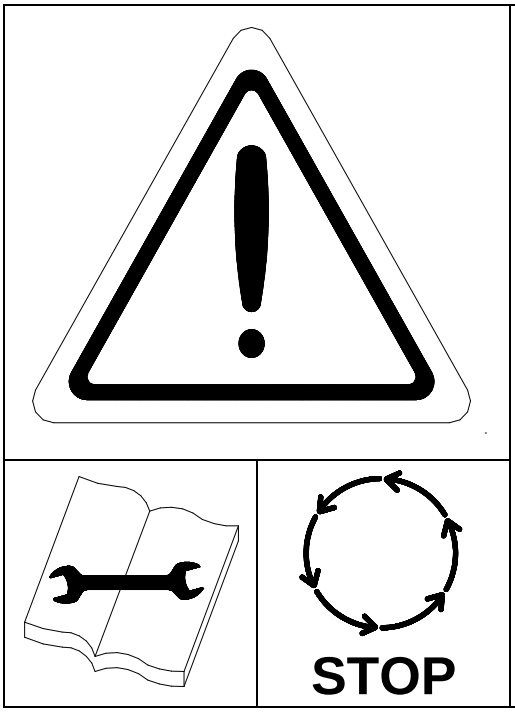
IF **UNUSUAL VIBRATION** OCCURS:

1) INCREASE IMMEDIATELY TO A MAXIMUM THE LIQUID FEED (PRODUCT OR WATER) ACTING ON CAPACITY REGULATING SISTEM;

2) SWITCH OFF THE MOTOR

3) APPLY THE BRAKE

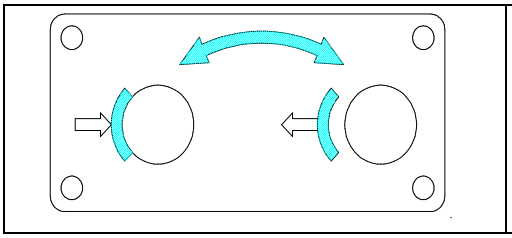
- **On the bowl protection cover:**



SAFETY ALERT

- CONSULT TECHNICAL MANUAL FOR PROPER SERVICE PROCEDURE
- WAIT UNTIL ALL ROTATING PARTS HAVE COMPLETELY STOPPED BEFORE REMOVING SAFETY SHIELDS
  (check gears 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

- **On the electric panel door:**

	**DANGER OF ELECTROCUTION**

- **On the motor connection box (if electric panel is not present) or under the padlockly block-door command of electric panel:**

	**GENERIC ALERT** MOTOR TERMINAL BOARD IS PREDISPOSED TO BE CONNECTED TO A “400 V” LINE

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.

ATTENTION
The following paragraphs refer to a machine equipped with a standard electric panel. If this is not supplied with the separator, make electrical connection according to wiring diagram and the following instructions. The operating procedures, reported below, must be respected too.

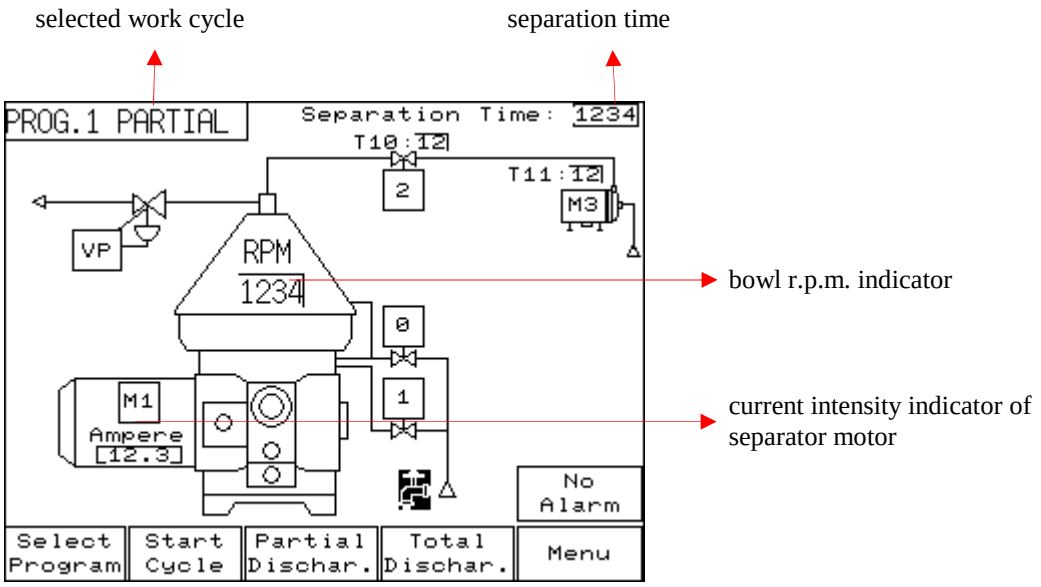
7.3. Control, regulation and signaling devices

7.3.1. Controls and signals

ATTENTION
For detailed instructions on touch screen operation consult its own instructions manual and the document enclosed in Electrical System Manual.

*On **control panel**, there are the following commands (Fig. 7.1):*
- padlockly block-door command (QS1) 0-1 black-red coloured;
- ammeter (A) - current intensity indicator of separator motor;
- (SB0) red-yellow mushroom head emergency button to emergency stop.
- (SB1) push button (with green guard HL1) to start separator motor.
- (SB2) black push button to stop the separator motor.
- (SB4) push button (with green guard HL4) to start pump motor.
- (SB3) black push button to stop pump motor.
- ***terminal board*** with:

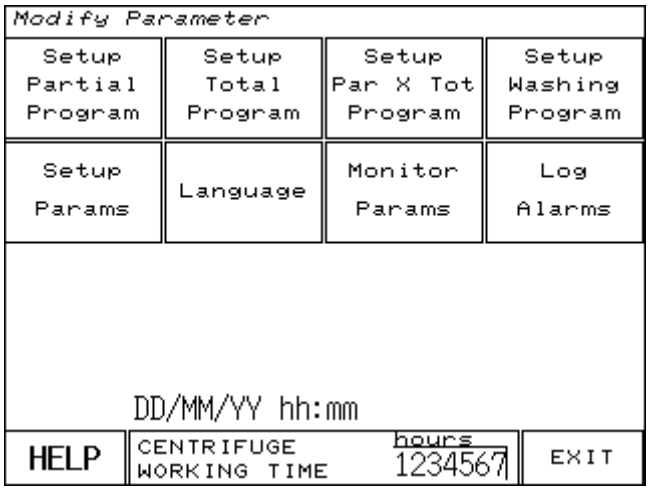
1st page (it provides information about machine condition, work program and separation time):



ITEM	DESCRIPTION
M1	Separator motor (lighted symbol: motor on)
M3	Feeding pump motor (lighted symbol: motor on)
2	Pneumatic valve at product inlet (lighted symbol: opened valve)
0	Operating water solenoid valve - bowl closing
1	Operating water solenoid valve - bowl opening, partial discharge
VP	Constant pressure valve

KEY	DESCRIPTION
Select Program	Key to show the page in which you can choose the working cycle (4 working cycle are set)
Start cycle / Stop cycle	Key to start / stop the discharge cycle controlled by separation time (seconds)
Partial Discharge	Key to make a partial discharge (confirm)
Total Discharge	Key to make a total discharge (confirm)
No / see alarm	Key to show the alarm page
Menu	Key to show the following page where is possible check and modify the operating parameters

2nd page (to control and modify the working parameters and to choose the language):



KEY	DESCRIPTION
Setup Partial Program	Key to show the page in which you can set the working program with partial discharge
Setup Total Program	Key to show the page in which you can set the working program with total discharge
Setup Par x Tot Program	Key to show the page in which you can set the working program with mixed discharge (partial and total)
Setup Washing Program	Key to show the page in which you can set the washing program
Setup Param.	Key to show the page in which you can modify the protected operating parameters (password necessary – contact SEITAL)
Language	Key to show the page in which you can choose the language
Monitor Paramet.	Key to show the page in which you can control the set up operating parameters
Log Alarms	Key to show the page in which you can see all the alarms that have occurred on the separator
EXIT	Key to show the first page of the operating terminal (synoptic)

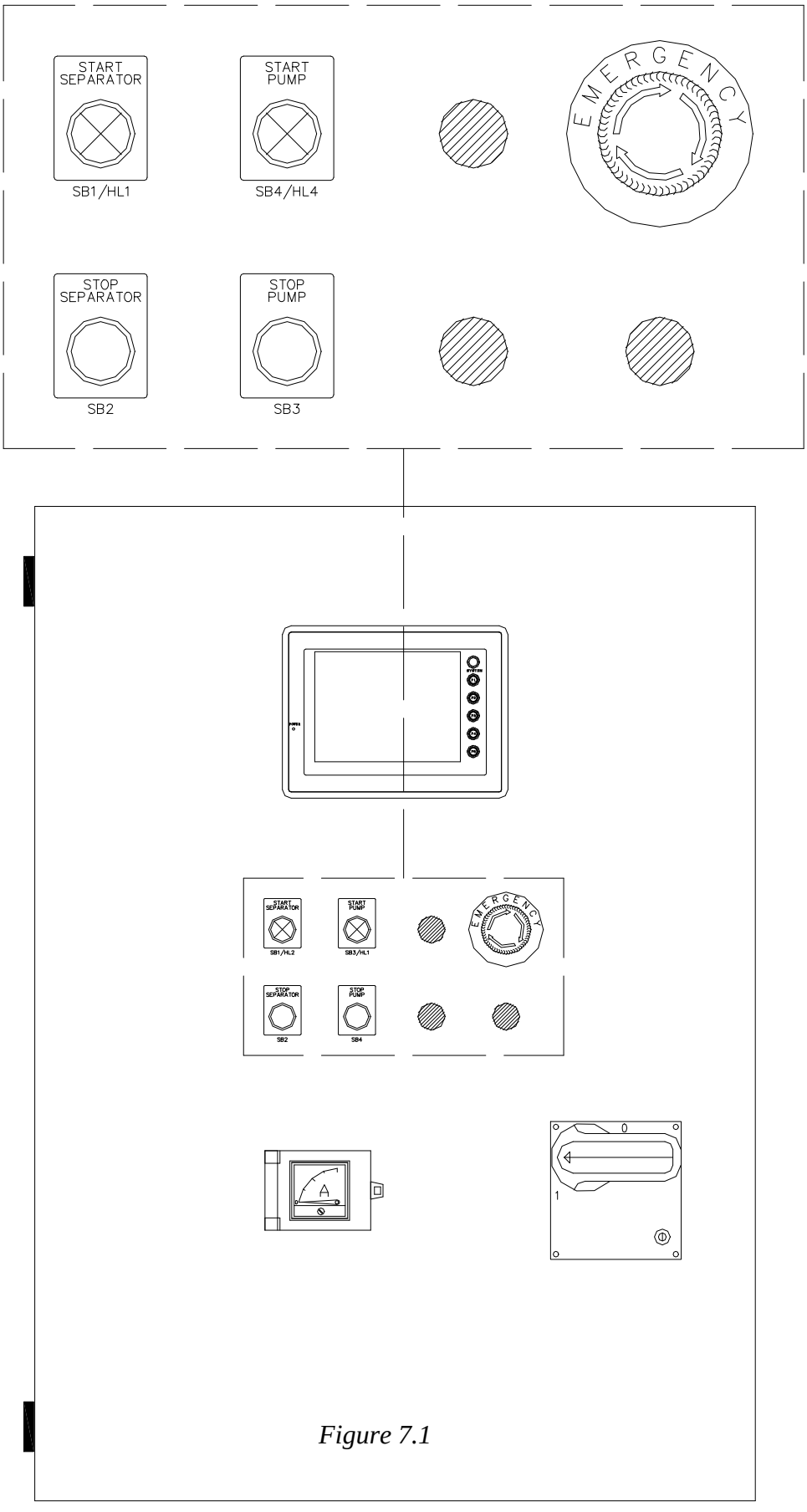

START SEPARATOR
SB1/HL1
START PUMP
SB4/HL4
EMERGENCY
STOP SEPARATOR
SB2
STOP PUMP
SB3
A
1

Figure 7.1

7.3.2. Regulation devices

The machine is equipped with many regulation devices

On operating water line:

- n° 1 pressure reducer to settle the water pressure;
- n° 1 pressure switch to check the water pressure value and activate surge tank pump when this is too low;
- n° 2 emergency ball valves in replacement of the solenoid valves that control the opening/closing of the bowl.

On compressed air line:

- n°1 compressed air pressure reducer.

On product outlet:

- n° 2 micrometric valves for cream and skim regulation on product outlet;
- n° 1 micrometric valve for standardization [optional];
- n° 2 manometers to check skim and cream pressure value;

On electric panel:

- terminal operator to control and set working programs.

Optional:

- no. 1 constant pressure valve, to maintain constant the counter-pressure at the outlet of the heavy phase. The regulation is performed by acting on pressure regulators (RPL, RPT - fig. 7.2);

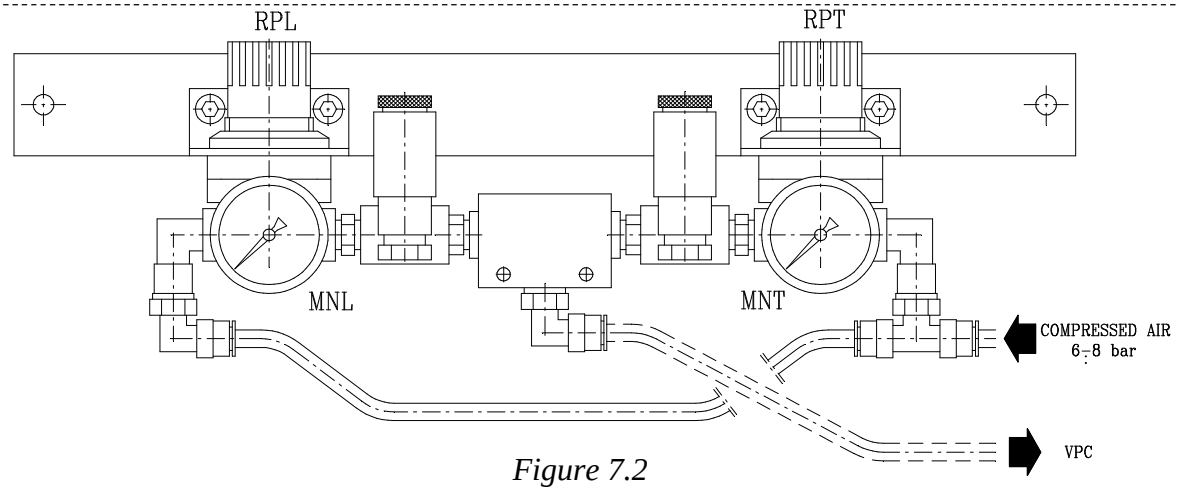


Figure 7.2

Separator equipped with constant pressure valve

The supply is complete of the following pneumatic components (fig. 7.2):

- working pressure regulator (RPL)
- overflow pressure regulator (RPT)
- working pressure manometer (MNL)
- overflow pressure manometer (MNT)

Optional

7.3.3. Alarms

The PLC can intervent during separator working giving, in the touch screen, some alarm messages:

- **RPM OK - SEPARATOR IS READY TO PRODUCT**
  This is only a warning message and informs you that the separator has reached the nominal speed and now can be fed with product (default 7.900 r.p.m.).
  Help: Cycle and product pump and can be started. Reset the alarm to delete the warning message.
- **LOW SPEED PREALARM ON**
  This is only a warning message to make you know that bowl speed is descended to a value lower than the nominal one (default 7.500 r.p.m.). This usually can happen during total discharge.
  Help: Reset the alarm to delete the warning message.
- **LOW SPEED ALARM ON**
  This message informs you that bowl speed is descended to an unacceptable value (default 7.300 r.p.m.) and some trouble is present. When the bowl reaches this low speed, the cycle is automatically stopped.
  Help: Wait till bowl reaches nominal speed then reset the alarm. Start cycle and product pump.
- **EMERGENCY ALARM - PUSH BUTTON ON <SB0>**
  This message informs you that the emergency button has been pushed and this caused the cutting of electrical feeding to separator motor.
  Help: Turn the mushroom head button anticlockwise and push alarms reset.
- **WATER ALARM - LOW PRESSURE <SP1> [OPTIONAL]**
  This is only a warning message to make you know that water line feeding is wrong. It's necessary to check the right working of surge tank unit (surge tank pump, pump pressure switch, filter, pressure reducer) and that no leakages are present. Check also the right working of pressure switch and the minimum pressure limit that must be set to 1,0 ÷ 1,2 bar, not more.
  Help: Check: 1) water pressure, 2) surge tank operation, 3) clean filter cartridge, 4) push alarms reset button.
- **AIR ALARM - LOW PRESSURE <SP3> [OPTIONAL]**
  This is only a warning message to make you know that air line feeding is wrong. It's necessary to check that compressed air is fed and that no leakages are present. Check also the right working of pressure switch and the minimum pressure limit, that must be set to 4,0 ÷ 4,5 bar, not less.
  Help: Check air pressure reading the manometer, then push alarms reset button.
- **SEPARATOR MOTOR ALARM - CURRENT OVERLOAD <QM1>**
  This message informs you that the separator motor has been surcharged and thermal protection has cut the electrical feeding to the motor and stop of the cycle. Check electrical connection and current absorption.
  Help: Check: 1) lever QF1, 2) motor absorption, 3) thermistor circuit continuity QM1, 4) push alarms reset button and start motor M1.

- **PRODUCT'S PUMP MOTOR ALARM - CURRENT OVERLOAD <QM5> [OPTIONAL]**
  This message informs you that the product's pump motor has been surcharged and thermal protection has cut the electrical feeding to the motor. Check electrical connection and current absorption.
  Help: Open electrical box and restore thermal protection QM5 by suitable lever. Push alarms reset button and start motor.
- **SURGE TANK MOTOR ALARM - CURRENT OVERLOAD <QM4>**
  This message informs you that the surge tank pump motor has been surcharged and thermal protection has cut the electrical feeding to the motor. Check electrical connection and current absorption.
  Help: Open electrical box and restore thermal protection QM4 by suitable lever. Push alarms reset button and check surge tank motor operation.

To see and reset the alarms push on terminal operator the keys:

1- push SEE ALARM on first page of touch screen.
2- push ALARM RESET on alarm page of touch screen.

7.4. Functional stop of separator

Follow this procedure:

- Perform "chemical cleaning" of the separator (§ 8.6).

1) Push the PUMP STOP black button (SB3) on the electric panel (this button take electric energy off to product feeding pump) and stop the work cycle pushing the appropriate key on terminal operator.
2) Push the separator MOTOR STOP black button (SB2) on command panel (this button cut out the electric power to the motor but leaves tension in power circuit).
3) Let that the bowl stops gradually itself (stop time 25 ÷ 30 min.) then cut out electric power to control panel turning the MAIN SWITCH (QS1).
4) To reduce the machine stop time, use the brake (stop time = 7 ÷ 10 min). Use the brake only if it is absolutely necessary.

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

7.5. Emergency stop

On electric panel (fig. 7.1) there is the typical red-yellow mushroom head emergency button (SB0); pushing it the electrical feeding to separator motor is cutting out; this assure the machine stop in every operating condition (PLC independent).

7.6. Energy sources disconnection

ELECTRIC ENERGY
The main switch (QS1) on the electric panel (door interlock) permits disconnection of the electrical supply. The switch can be lock to be sure of more security.

PNEUMATIC ENERGY
The user must predispose before the plant an on-off valve and must allow the compressed air cutting.
HYDRAULIC ENERGY
The user must predispose before the plant an on-off valve and must allow the operating water cutting.

7.7. 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 protection (cover, port plug for bowl valves, ports, etc.) must be in right position.
- Verify that inlet-oulet flow unit and cover are well fixed.
- Verify that the threaded locking ring of inlet-outlet unit 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.
- Open the operating water cock and regulate pressure at 2 bar. Check pressure carring out a discharge (push the proper botton on electrical panel). During discharge the pressure can not fall below 1,5 ÷ 1,7 bar approx.
- Check that valves of product-outlet and cleaning-water 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
Before start always verify the efficiency of the security devices and of the stop command.

7.8. Starting up instructions

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

ATTENTION
Danger of clutch overheating
MUST NOT BE MAKE STARTING UP IN SUCCESSION
After two starting up in succession before doing the third starting up wait so that the clutch shoes cool down.

Starting up of machine:

1) Rotate the MAIN SWITCH (QS1) in position "1", (light up of terminal operator means that tension is present in line.
2) Start motor of separator using the start button (SB1).

3) Check the regular start of separator and wait for reaching nominal speed (after about 7 min. on display should be seen the speed value of about 8.000 r.p.m.). When the separator reach the speed of 7.900 r.p.m. the alarm message "SEPARATOR READY TO PRODUCT" appears, the separator is ready to work; you can reset the alarm.
4) Check the regular closure of the bowl (the bowl close automatically before reaching nominal speed).
5) Start the separator work cycle pushing the appropriate key on terminal operator; automatically the inlet valve YV2 is opened
6) If the inlet product valve is open proceed to the point 7 otherwise open the valve pushing the symbol.
   Note:
   - The valve state (opened or closed) stay memorized also in case of tension lack.
   - The pump starts pushing the relative button, only if the valve has been opened before.
   - If the valve is closed until the pump is turned on, automatically the pump is switched off.
7) Feed separator with water (about the process temperature) plugging the feeding pump start button (SB4).
8) 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.
9) Feed separator with product. If necessary regulate the flowrate using adjusting valve of inlet unit. Completely leak the pre-filter (if present).

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, with inlet of detergent fluid.
- 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.
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 acting on the regulating valves (A, B, C in figure 8.1) and on the regulator (RPL in figure 7.2) of the constant pressure valve (if present).
As general behaviour remembers 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) regulates the outlet pressure of skimmed milk (the manometer P1, 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 (the manometer P2, shows the counter pressure at the outlet of the cream centripetal pump). Valve C regulate the fat content of the milk (standardization). By opening this valve, some of the separated cream can be added to the skimmed milk before it leaves the separator. The remixing circuit with micrometric valve (C) is optional.

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.

Separator equipped with constant pressure valve

- Rotate the pressure regulator of the bowl overflow RPT (fig. 7.2) until on MNT (fig. 7.2) could be read a pressure of about 6 bar.
- The regulation of counter-pressure at skim outlet could be performed acting both on shutter A and on regulator RPL. For the best regulation:
  - act on regulator RPL in such a way that the pressure fall to zero;
  - rotate shutter A until a pressure of 2,5 ÷ 3 bar could be read;
  - perform subsequent adjustings acting only on regulator RPL.
- For a correct understanding of the regulation procedure reported below, at the words "shutter A" should be substitued "regulator RPL".

8.2.2. First setting

1) Feed the separator with water.
2) Completely close shutter C.
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).

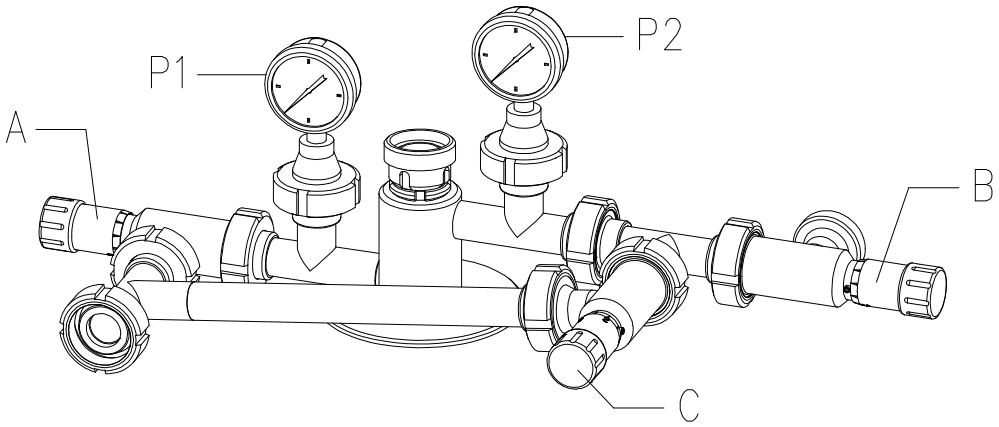


Figure 8.1

A - Skim milk shutter
B - Cream shutter
C - Remixing shutter [OPTIONAL]
P1 - Manometer heavy phase
P2 - Manometer light phase

8.2.3. Skimming milk or whey

1) Completely close shutter C
2) Partially open shutter B
3) Regulate shutter A in order to bring the pressure on the manometer to approximately 0,1 ÷ 0,2 bar up the MWP.
4) Still close 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 milk or cream, it's necessary to close shutters A and B.

8.2.4. Partial milk skimming (standardization)

Bear in mind that shutter C regulates the quantity of cream that is re-blended with the skimmed milk.

1) Partially open shutters B and C
2) Regulate shutter A in order to bring the pressure on the manometer to approx. 0,5 bar up the MWP.
3) Regulate shutter B to vary the cream flow rate. The opening of shutter B increases the quantity of produced cream, but with a lower density (closing has the opposite effect).
4) The opening of shutter C causes an increase in the fat content of the skimmed milk and therefore also a decrease in the quantity of cream produced.

Cream too liquid

- Close shutters B and C. If this is not sufficient open a little bit shutter A.

Cream too thick

- Increase skim milk pressure by closing shutter A and open a little bit shutter B.

8.2.5. Milk cleaning

For a good cleaning most of liquid must flow through skim milk outlet.

1) Completely close shutter B.
2) Partially open shutter C.
3) Act on shutter A increasing the pressure until the bowl start overflow and a product leakage can be seen from draining pipe of solids.
4) Reduce the pressure until the liquid stop flowing off from the draining pipe.
5) The pressure read on the manometer (P1) is the maximum working pressure - approx. 4,5 ÷ 5,5 bar.
6) Regulate shutter A in order to bring the pressure on the manometer to approx. 0,5 bar down the maximum working pressure.
7) In these conditions the best working of the machine is guaranteed.

8.3. Discharge cycle

In the PLC four different operating cycles are set, which are selectable by the touch screen on the electric panel (see § 7.1):

- Program n° 1 - separation cycle with partial discharges;
- Program n° 2 - separation cycle with total discharges;
- Program n° 3 - separation cycle with partial discharges and total discharges;
- Program n° 4 - washing cycle with partial discharges.

ATTENTION

The choice of the operating cycle and the setting of the functional parameters depend upon the product's characteristics, the physical parameters of the process and the degree of separation required. Always CONTACT the MANUFACTURER for a suitable choice.

The ejection of the sludges accumulated in the bowl through the partial discharge does not involve the interruption of the separation process because the opening time of the bowl is very short (lower than 0.1 sec.); infact, it is made at the nominal speed and without the interruption of the product's feeding. The total discharge causes the total emptying of the bowl because the opening time of the bowl is higher (ab. 2 sec.) and therefore, before the discharge, product feeding is interrupted (by the PLC) closing the inlet valve and stopping the feeding pump.

ATTENTION

The following instructions have an orientative meaning because the adjust of the working cycle is extremely conditioned by the characteristics of the products and the physical parameters of the process (capacity, temperature, viscosity, density, etc.).

a) For a product with a high content of solids (greater than 1 ÷ 2 % approx.) we recommend a separation cycle with total discharges (Prog n°2). The separation time may be calculated in a first rate by following the procedure indicated here below:

Example

Process data	Capacity	2.500 l/h
	Content of solids in the inlet	7 %
	Content of solids desired in the output	2 %

The reduction of the solids content required to the machine is provided by:

Percentage of solids reduction = % solids in the inlet - % solids in the outlet = 7 - 2 = 5 %

The quantity of separated solids in one hour is worth:

Separated solids = Capacity x Percentage of solids reduction = 2.500 x 5/100 = 125 l/h

The useful volume of the solids chamber (which collects the separated solids) is calculated by introducing a safety factor being equal to 0,8. If the total volume of the solids chamber is V = 10 l, then:

Useful volume = Total volume x Coeff. of safety = 10 x 0,8 = 8 l

Now it must be calculated how many times the solids chamber is filled up in one hour:

n = Separated solids / admittable capacity = 125 / 8 = 15,625 ≈ 16 times *
** always rounded up by excess.*

The separation time (time between a discharge and the other) must be then:

Time of separ. = Second in one hour / N° fillings in one hour = 3600 / 16 = 225 sec.

ATTENTION

Danger of motor overheating.
The separation time must never be lower than 3 minutes.

b) For a product with a medium-low solids content (lower than 1 % apx) we recommend a separation cycle with partial discharges (Prog n°1) or with partial discharges and total discharges (Prog. n° 3). The separation time may be calculated in first approximation by following the procedure indicated below, keeping into consideration the fact that with partial discharges you only have a partial emptying of the bowl. For this reason a correct setting of the discharge time (opening time of the bowl) which consider the volume of solids actually discharged must be performed.

ATTENTION
The following instructions have an orientative meaning because the adjust of the working cycle is extremely conditioned by the characteristics of the products and the physical parameters of the process (capacity, temperature, viscosity, density, etc.).

Example

Process data	Capacity	2.500 l/h
	Content of solids in the inlet	0,5 %
	Content of solids desired in the output	0 %

The reduction of the solids content required to the machine is 0,5 %.

The quantity of separated solids in one hour is:

Separated solids = Capacity x Percentage of solids reduction = 2.500 x 0,5/100 = 12,5 l/h

The useful volume of the solids chamber (which collects the separated solids) is calculated by introducing a safety factor being equal to 0,8. If the total volume of the solids chamber is V = 10 l, then:

Useful volume = Total volume x Coeff. of safety = 10 x 0,8 = 8 l

Now it must be calculated how many times the solids chamber is filled up in one hour:

n = Separated solids / admittable capacity = 12,5 / 8 = 1,5625 ≈ 2 times *
** always rounded up by excess.*

The separation time (time between a discharge and the other) must be then:

Time of separ. = Seconds in one hour / N° fillings in one hour = 3600 / 2 = 1800 sec.

The quantity of solids evacuated at each discharge is:

Volume of evacuated solids = Separated solids / N° of discharges = 12,5 / 2 = 6,25 l

The volume of the evacuated liquid must be 2 ÷ 3 l more than the volume of the evacuated solids.

Volume of evacuated liquid = Volume of evacuated solids + 2 ÷ 3 = 6,25 + 2 ÷ 3 ≈ 8 ÷ 9 l

Now a discharge time must be set. At the beginning try with:

Discharge time = 0,07 sec = 7 c.sec.

Perform a partial discharge, collect in a container all the liquid actually discharged and verify that the volume corresponds to the calculated one.
If the actual volume is lower than the calculated one, the dicharge time must be increased (8 ÷ 9 c.sec); while if the discharged volume is higher than the calculated one the discharge time must be reduced (5 ÷ 6 c.sec.).

ATTENTION
The choice of program N° 3 (separation cycle with partial discharges and total discharges) by setting the various times is a consequence of the special features of the process and it must then be evaluated with the manufacturer.

In presence of external solids of a great size the product to be treated must be prefiltered (we recommend the use of a static filter or a rotating filter by brushes).
In case of a consistant presence of abrasive solids of a small size (sand) it may be necessary to treat the product with an hydrocyclone.

ATTENTION
Generic danger
The presence of abrasive solids (sand) in the product may cause an abnormal wear of the parts of the bowl exposed to the discharge of solids.

8.4. Discharge cycle times

The times to set in PLC on electrical panel are scheduled in annexed document. Here is explained their function:

T0) PREFILLING METERING DEVICE [seconds]
This time is fixed and couldn't be changed by the client. It's a precaution in case the water filling time of the metering device is not set as it should be. It avoids a wrong discharge and a damaging of the metering device.

T1) SEPARATION TIME [seconds]
It's the time between two following discharges. At the end of this time the discharge cycle starts. It has not to be lower than 180 seconds.

T2) PRERINSE TIME [seconds]
During this time the solenoid valve for bowl rinsing and closing (YV0) is opened. Water is passing through the small pipe connecting solenoid valves unit and bowl cover. This water wets the external surface of the bowl and the internal one of cover and cyclone to avoid the sedimentation of crusts and deposits.

T3) SLUDGES DISCHARGE TIME [1/100 seconds]
During this time the solenoid valve for bowl opening (YV1) is opened. Changing this time it's possible to regulate the sludges discharge quantity.

T4) BOWL CLOSING TIME [seconds]
During this time the solenoid valve for bowl rinsing and closing (YV0) is opened. Water starts filling the chamber between sliding piston and bowl body, lifting the piston and closing the bowl. This time have not to be lower than 8 sec.

T5) DELAY OF FILLING METERING DEVICE [seconds]
During this time the solenoid valve in compressed air line (YV31) is opened and the metering device air chamber is filled.

T6) DELAY OF AIR DISCHARGE METERING DEVICE [seconds]
During this time both the solenoid valve in compressed air line (YV31) and the solenoid valve in closing water line (YV32) are opened, so the metering device air and water chambers are filled at the same time.

T7) TIME OF FILLING METERING DEVICE [seconds]
During this time the solenoid valve in closing water line (YV32) is opened and the metering device water chamber is filled.

T10) STOP TIME OF INLET PRODUCT [seconds]
This time is usually set for total discharges. During this time the separator is not filled with product and the pneumatic butterfly valve, at the separator inlet, is closed.

T11) STOP TIME OF PRODUCT PUMP [seconds]
This time is usually set for total discharges. During this time the product feeding pump is off because of the cutting of product feeding line. This time is generally 2 seconds more than T10.

T18) WATER INJECTION DELAY [seconds]
It's the time between two subsequent injections of closing and rinsing water.

T19) WATER INJECTION TIME [seconds]
During this time the solenoid valve for bowl rinsing and closing (YV0) is opened. This action is necessary to maintain the closing of the bowl and the rinsing of the area between the bowl and the cover.

T20) START IMPULSE OF PRODUCT TIME [seconds]
This time must be set to be sure that the contact that switch on the product pump is maintained. In fact, if electrical impulse is too short, it could happen that the contact get detached.

8.5. Ordinary maintenance

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

Ordinary maintenance
Before every shift
Check that shields are undamaged
Check hydraulic, electric and pneumatic connections
Oil level check
Brake disconnection check
Operating water pressure control
Pneumatic system pressure control
Operating machine
General operation check
Control of capacity value and temperature
Control of separation efficiency and regulation by manual valves
Check alarms presence on terminal board
At the end of every shift
Machine chemical cleaning to remove working residuals.

8.6. Separator chemical cleaning

The separator must be chemically cleaned to maintain a high efficiency level and to assure the hygiene of parts in contact with the product.
The treated product affect the cleaning cycle frequency, that however must be performed at the end of every working cycle.
The bowl can be cleaned with a solution of caustic soda and/or of nitric acid.

ATTENTION
Generic danger
Cleaning solutions must NOT contain CHLORINE

The frequency of **cleaning cycle with caustic soda** depends on the characteristics of treated product. The following operations are recommended:

- Rinse the bowl with cold water for about 5 ÷ 10 min.
- Fill with 2% solution of caustic soda heated up to 75 ÷ 90 °C for about 30 minutes (for an efficient cleaning the solution temperature must never fall below 75°C).
- Rinse the bowl with cold water for about 5 ÷ 10 min.

If there are a lot of limestone deposits, it's necessary to make a **nitric acid cleaning cycle**. In this case proceed as follows:

- Rinse the bowl with cold water for about 5 ÷ 10 min.
- Fill with 0,5% solution of nitric acid heated up to 75 ÷ 90 °C for about 20 minutes (for an efficient cleaning the solution temperature must never fall below 75°C).
- Rinse the bowl with cold water for about 5 ÷ 10 min.

It is suitable to make two bowl discharges (at least) during each phase of cleaning cycle.

During every cleaning phase the bowl should overflow for about 5 ÷ 10 seconds, (close the micrometric valve shutter A - fig. 8.1 - or push button SB7 if this is provided) to wash the external surfaces of the bowl and the internal surfaces of cover and cyclone.
If you use the cleaning water line, before every discharge it is necessary to close the inlet valve to interrupt the separator feeding. The valve must be opened when separator has reached the nominal speed again.
Every cleaning cycle phase must finish by a total discharge (push button on electric panel).
If separator is connected with a heat exchanger, clean it too, according to its schedule.

ATTENTION
Burning danger
When cleaning takes place, a solution heated up to 75 °C flows in pipes, so DO NOT TOUCH the connection pipes, the inlet-outlet flow unit and the bowl cover.

9. GEAR

During the dismantling-assembly handle every component carefully, avoiding shocks and damages; use a suitable equipment.

9.1. Disassembly of the 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.

To dismantle vertical shaft, first of all move the helical gear wheel (parts from 07.170.0 to 07.210.0) to the right side sliding it along the horizontal shaft (Tab. 07). Then proceed as follows:

1) Remove screws (06.320.0) and cage cover (06.300.0) with its lip seal (06.290.0).

2) Take out the tubes of operating water (06.270.0) with its OR gasket (06.280.0).

3) Lift labyrinth (06.250.0) with its gasket (06.260.0).

4) Remove elastic support assembly (06.240.0 ÷ 06.190.0).

5) Remove the spacer ring (06.180.0) and the frame ring (06.170.0).

6) Extract vertical shaft (06.140.0) together with its ball bearings.

7) Extract spheric support with all its parts (06.060.0) by screwing a M10 screw into its threaded hole.

8) Remove the three screws (06.040.0) and then screw two of them on threaded holes of bush (06.020.0).

9.2. Assembly of the vertical shaft (Tab. 06)

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

1) Fix bush (06.020.0) with its OR (06.010.0) to frame.

2) Insert spheric support with all its parts (06.060.0) into bush (06.020.0).

3) Assemble all parts from (06.070.0) to (06.160.0) on vertical shaft (06.140.0). The two thrust ball bearings (06.080.0) must be set as shown in the figure below:

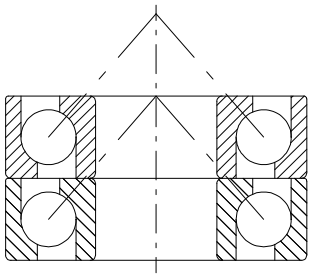


Figure 9.1

4) Insert vertical shaft into frame guiding self-aligning ball bearing (06.100.0) into bush (06.020.0).

5) Fit the frame ring (06.170.0) and the spacer (06.180.0) on the vertical shaft.

6) Set the elastic support assembly (parts from 06.190.0 to 06.240.0).

7) Insert the labyrinth (06.250.0, 06.260.0), operating water tubes (06.270.0), and cage cover with its OR gasket (06.290.0, 06.300.0) fixing the whole by the screws (06.320.0).

9.3. Disassembly of the 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 dismantle the motor cover, the brake assembly and the gear chamber flange, unscrewing the appropriate screws (Tab. 08). Then proceed as follows:

1) Remove the motor with shoe-holder and clutch shoes (07.010.0 ÷ 07.060.0) after having unscrewed the screws (07.010.0). Do not dismantle the circlips of the shoe-holder to avoid unbalances.

2) Unscrew the screws (07.310.0) and take out the flange (07.290.0). Take out the phonic wheel (07.340.0) after unscrewing the screws (07.360.0).

3) Unloose the screws (07.210.0) and release the flanges (07.190.0 and 07.170.0), then move wheel (07.180.0) to the right side.

4) Extract tachometer side support (07.220.0 ÷ 07.260.0) unscrewing the screws (07.280.0). The extraction of unit is effected by screwing two screws (07.280.0) into two threaded holes of the flange of the support.

5) Remove screws (07.110.0) (through the holes of the clutch pulley) and extract the horizontal shaft (07.070.0) from the frame together with the clutch side support (parts from 07.090.0 to 07.160.0) sliding at the same time the helical wheel (07.180.0) off the horizontal shaft. The operation is made by screwing two screws (07.110.0) into the two threaded holes of the flange (07.120.0). Pay attention to avoid shocks on helical gears**.** Then extract the helical gear wheel from the frame.

9.4. Assembly of the horizontal shaft (Tab. 07)

Before assembly clean and check all parts carefully, with particular attention to gaskets and ball bearings.
When assembling the horizontal shaft, place the two supports (clutch side and tachometer side) so that the groove on the ball bearing housing of the support 07.120.0 and the oblique hole on the ball bearing housing of the support 07.230.0 are at the bottom side.
1) Assemble clutch side support (parts from 07.090.0 to 07.160.0) on horizontal shaft
1) Assemble clutch side support (parts from 07.090.0 to 07.160.0) on horizontal shaft
(07.070.0).

2) Insert the whole thus assembled into the frame and string the helical gear wheel with its flanges (parts 07.170.0 to 07.210.0) onto the horizontal shaft fixing the flange of the support (07.120.0) by the screws (07.110.0).

3) Mount the support of the tachometer side (parts 07.220.0 ÷ 07.260.0) and insert it on the shaft and in the frame housing. Fix the support to the frame with the screws (07.280.0).

4) Place the helical gear wheel aligned with vertical shaft and lock it with its flanges (parts 07.170.0 to 07.190.0) onto the horizontal shaft, fixing them with the screws (07.210.0).

5) Then mount on horizontal shaft the phonic wheel (07.340.0) fixing it by the screws (07.360.0). Fix the flange (07.290.0) on the frame by the screws (07.310.0) and screw the ring nut (07.370.0).

6) Preassemble the clutch shoe-holders and shoes (parts 07.040.0 to 07.060.0) on the motor shaft (07.030.0) and then fasten all to the frame with the screws (07.010.0). The shoes must be placed as shown on fig 9.2 and inserted into the shoe-holder in symmetrical position. Before carrying out this step of the assembly, carefully clean the clutch pulley and shoes with abrasive cloth.

7) Remount the motor cover, the brake assembly and the gear chamber flange, fastening them with their screws (Tab. 08).

8) Fill gear chamber with recommended oil (see § 5.5.1).

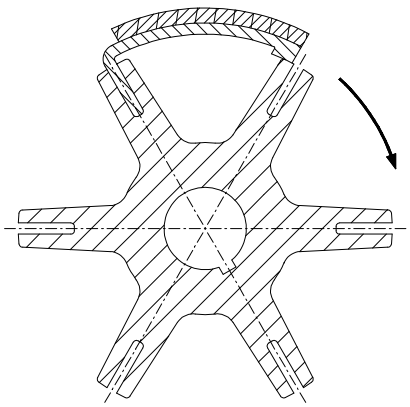


Figure 9.2

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.
It is not sufficient open the general interrupter to completely disconnect the tension on the control panel because current is still present in the terminals of the block-door interrupter.
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, holes and valves.
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. Check the effective working time of the machine, reading the value reported in the hour counter placed inside the electric panel.

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.					
	when necessary					Clean filter in operating-water line.		when necessary			
						Clean discharge holes in operating-water feeding system.			●		
			●			Remove bowl and clean interior of frame and cyclone.			●		
	depends on product					Dismantle the bowl and clean thoroughly bores and chambers of the hydraulic system.		depends on product			
		●				Check bowl gaskets.					
		●				Check disks stack compression.		1st check			
		●				Check starting time and rated speed.					
		●				Check buffer springs and buffers of vertical shaft support. Check brake shoes.					
			●			Check the wear of clutch shoes.					
						Check the presence of water in lubrication oil.		●			
			●			After removing the gear sight glass, check gearing of helical wheel gear.					
depends on product						Check spaces between solids ejection holes.	depends on product				
						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. The probable causes and the remedies to adopt are still mentioned.

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.	Chek voltage of mains and make electric connection again.
		Brake applied.	Release brakes by screwing hand-wheel.
		Motor operating in star-mode.	Check the electrical equipment.
		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	Display gives “zero” r.p.m. while bowl is running.	Wrong electrical connection of r.p.m. pickup.	Check electrical connection and if necessary do it again.
		Wrong distance between pickup and gear wheel.	Adjust distance at 1 mm.
		Faulty pickup.	Replace faulty component.
		Faulty component on control panel.	Check cause and replace faulty component.
3	Standstill bowl while tachometer reads rated speed.	Helical gear wheel unclamped on horizontal shaft.	Tighten locking screws of helical gear wheel.
4	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.
		Dripping from bowl.	See at trouble n° 7), check solenoid valves.
		Motor slows down during working.	Check motor.
5	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 six.

n°	TROUBLE	CAUSE	REMEDY
6	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).
		- bad bowl desludging (vibration is higher with empty bowl).	Carefully clean the bowl and increase discharge time (T2) or reduce time between two following discharges (T1).
		- 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.
		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 conditios owing to normal wear or:	Replace worn out part as well as helical wheel and pinion; carefully clean gear housing and
		- lack of oil or oil is too fluid (gears become bluish)	change oil using the prescribed one. Eventually change oil more
		- water in oil, (frame drain obstructed cleaning of inner upper surface of frame by water jet - solenoid valve YV0 locked in open position).	frequently. Clean or replace solenoid valve and check electric connection and component, if necessary.
		- sludge in gear housing.	
		- delayed oil change.	
		- not contemporary replacement of helical wheel and pinion.	

n°	TROUBLE	CAUSE	REMEDY
7	The bowl does not close	Shortage of water due to:	
		- feeding line cock turned off.	Turn it on
		- filter cartridge obstructed (CF4 – Tab.21).	Replace cartridge
		- pressure reducer out of calibration (PCV4 – Tab.21).	Regulate pressure at 1,8 ÷ 2 bar.
		- water pressure switch (part PSC4 - Tab. 21) out of use.	Check correct working of surge tank.
		- holes of distributing cover obstructed by limestone.	Clear holes and check hardness of water.
		Non opening or inadequate opening of solenoid valve YV0 (Tab.21) due to:	
		- solenoid valve broken or obstructed by limestone.	Clean or replace solenoid valve and check hardness of water.
		- wrong electrical connection to the solenoid valve	Check the connection.
		- the PLC has a problem	Check the PLC exit Y0. If the corresponding warning light is lighted contact our technician.
		Worn-out gaskets of bowl valves (Tab. 03).	Replace gaskets.
		Worn-out gasket (4) fig. 6.1 of moving ram.	Replace gasket.
8	The bowl does not close correctly.	Gasket of nylon (11) fig. 6.1 damaged.	Replace gasket.
		Worn-out gasket (4) fig. 6.1 of moving ram.	Replace gasket.
		Sludges prevent moving ram from fully adhere on nylon gasket of bowl hood.	Clean bowl.
		Worn-out gaskets of bowl valve (Tab. 03).	Replace gaskets.
9	The bowl does not open, even operating by hand on emergency ball valve BV1 (Tab. 21), which substitue solenoid valve YV1.	Shortage of water: see at trouble 7) - shortage water line.	See at trouble 7). Enlarge water line inserting a large diameter pipe and/or installing a surge tank.
		Worn-out gaskets of bowl valves.	Clean bowl valves and replace gaskets.

n°	TROUBLE	CAUSE	REMEDY
10	The bowl does not open, opening takes place only operating by hand on energency valve BV1 (Tab.21), which substitue solenoid valve YV1.	Non opening of solenoid valve YV1 due to:	
		- cycle disconnected;	Activate cycle.
		- not correct calibration of timers T2, T3, T4.	Regulate timers.
		- wrong electrical connection to the solenoid valve	Check the connection.
		- the PLC has a problem	Check the PLC exit Y1. If the corresponding warning light is lighted contact our technician.
		- solenoid valve broken or obstructed by limestone.	Clean or replace solenoid valve and check hardness of water.
		Worn-out gaskets of bowl valves (Tab. 03).	Replace gaskets.
11	The bowl does not open correctly.	Not correct calibration of timer T2.	Regulate timer.
		Insufficient pressure and/or capacity of water line.	Check and provide: pressure must be higher than 2 bar. Enlarge water line inserting a large diameter pipe and/or installing a surge tank.
		Pressure reducer (PCV4 - Tab. 21) out of calibration.	Regulate pressure at 1,8 ÷ 2 bar.
		Filter cartridge (CF4 - Tab. 21) obstructed.	Replace cartridge.
		Water pressure switch (PSC4 - Tab. 21) out of use.	Check correct working of surge tank.
		Worn-out gaskets of bowl valves (Tab. 03).	Replace gaskets.
12	Leakage of product from solids discharge pipe.	Excessive pressure.	Increase pressure value at skim outlet, unscrewing the shutter A or regulator RPL (fig. 7.2), if present.
		It is worn one of the following gaskets:	
		- upper finned disk gasket (10) fig. 6.1.	Replace gasket.
		- nylon gasket (11) fig. 6.1.	Replace gasket.
		- drilled gasket of dividing disk (15) fig. 6.1.	Replace gasket.

n°	TROUBLE	CAUSE	REMEDY
13	Leakage of cream from solids discharge pipe.	Excessive cream pressure.	Unscrew cream shutter (B - fig. 8.1) and reduce skim pressure if the same cream density is required.
14	Insufficient skimming	Capacity too high.	Reduce the capacity.
		Solids chamber filled.	Reduce time between two consecutive discharges.
		Disks column obstructed.	Disassemble and clean. Check the cleaning cycle.
		Product temperature not suitable.	Preheat product at the process temperature.
		Incorrect regulation.	See chapter 8.1
		Dividing disk is not correctly placed.	Check it is placed in the right way.
		Shutter C (fig. 8.1) is not completely closed.	Close shutter C.
		It is worn one of the following gaskets:	
		- upper finned disk OR gasket (10) fig. 6.1.	Replace gasket.
		- drilled gasket of dividing disk (15) fig. 6.1.	Replace gasket.
		- OR gasket (4) fig. 6.28 of cream pump.	Replace gasket.
		The holes on dividing disk (16 - fig. 6.1) or the corresponding holes on upper edge of bowl hood (13 - fig. 6.1) are obstructed.	Open the holes.
15	Foam in the skim or cream outlet.	Insufficient skim or cream pressure.	Screw the shutter A and B, to increase pressure value and mantain costant the cream density.
		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.

n°	TROUBLE	CAUSE	REMEDY
16	Foam in clear milk.	Insufficient pressure.	Screw the shutter A to increase pressure.
		Air infiltration in the product	See at trouble 15).

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:

Plastic of pneumatic pipelines,
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 informations above mentioned.

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

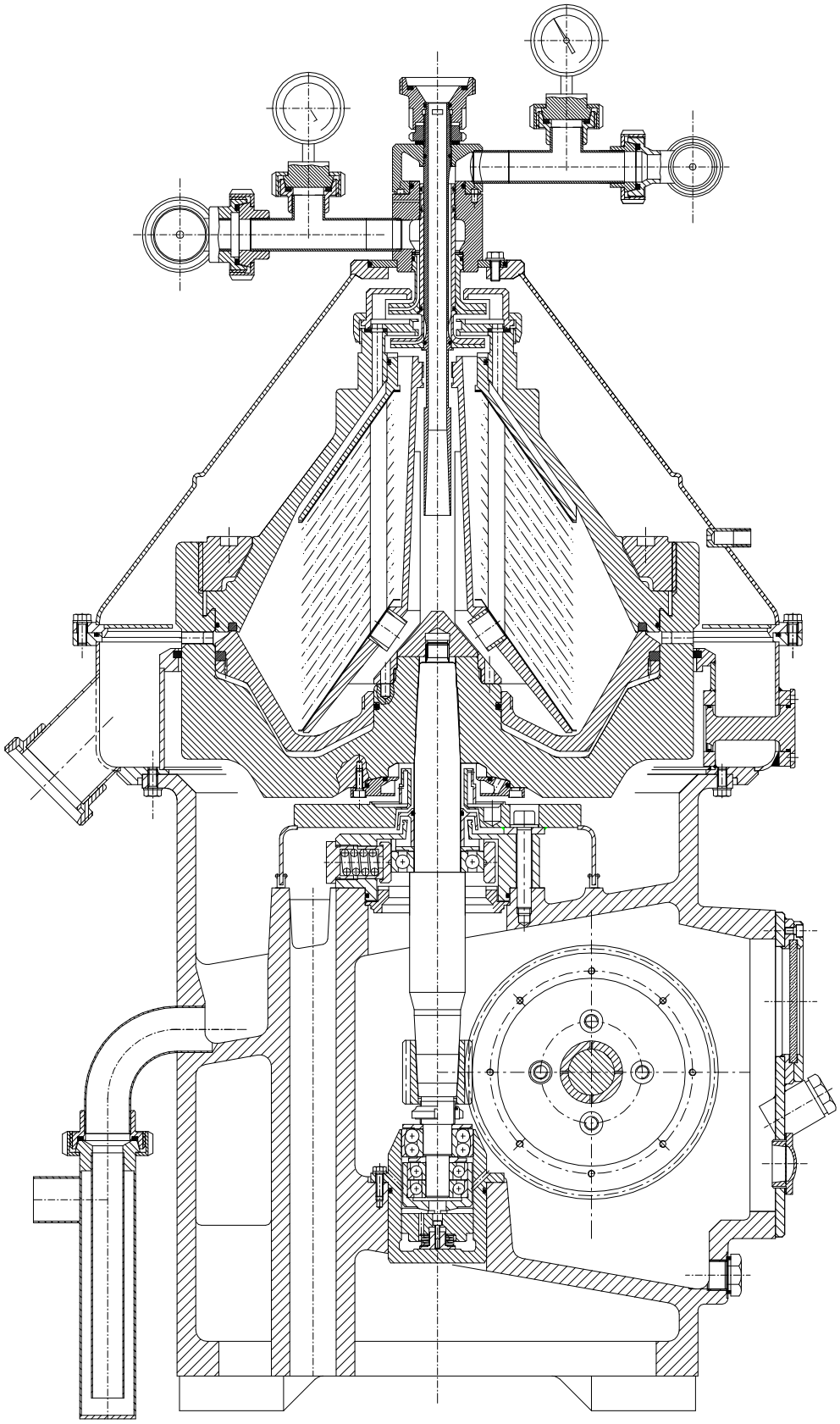
Sections and spare parts Tables

Tab. 01 Vertical section
Tab. 02 Horizontal section
Tab. 03 Bowl
Tab. 04 Inlet-Outlet flow unit
Tab. 05/A Operating water unit - Solenoid valves unit
Tab. 05/B Operating water unit - Solenoid valve
Tab. 05/C Operating water unit - Cartridge filter
Tab. 05/D Operating water unit - Pressure reducer
Tab 05/E Operating water unit - Surge tank pump
Tab. 06 Vertical shaft unit
Tab. 07 Horizontal shaft unit
Tab. 08/A Frame
Tab. 08/B Frame
Tab. 09 Special spanners

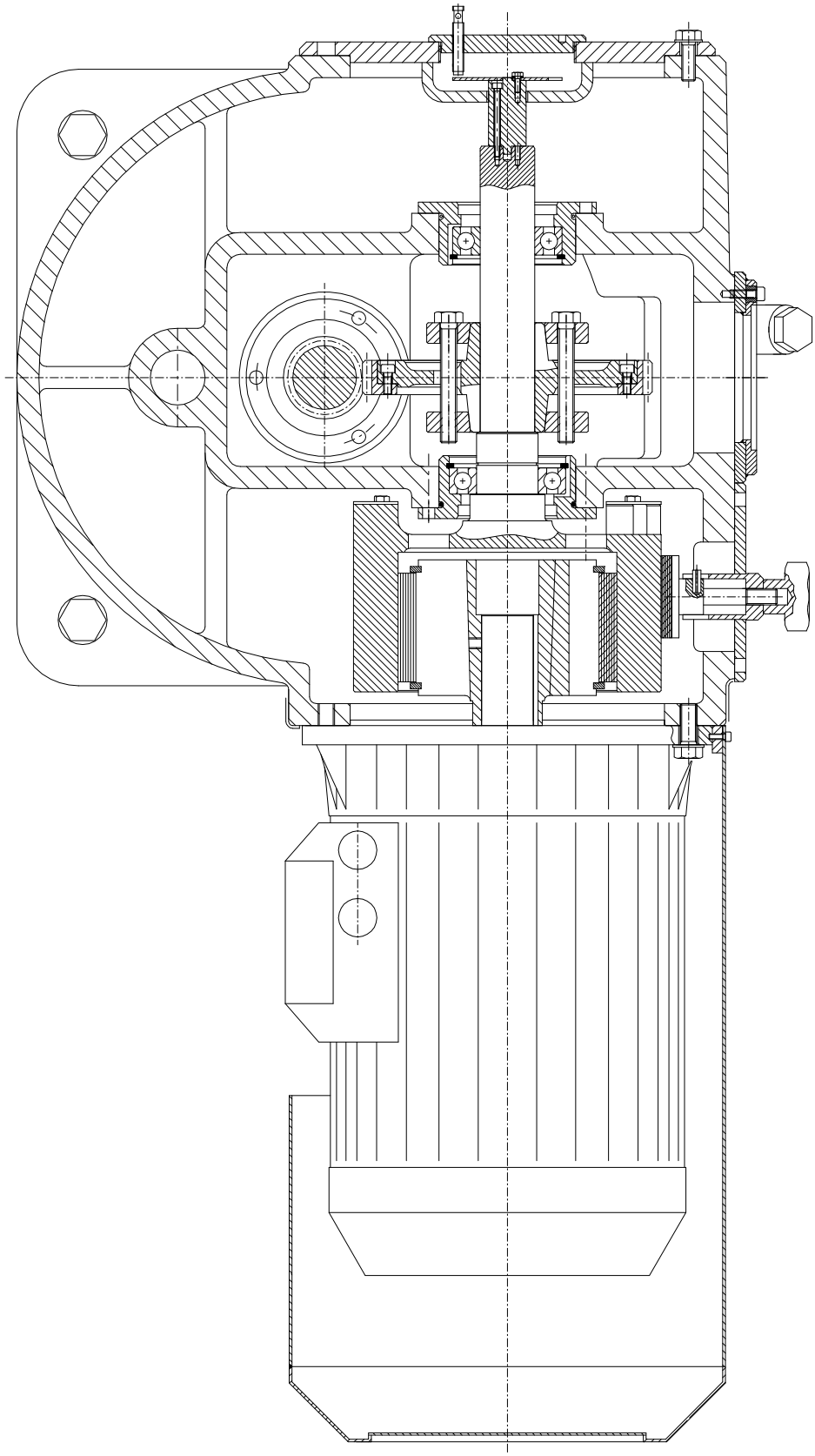
Diagrams

Tab. 20 Overall dimensions and installation plan
Tab. 21 Hydraulic system diagram
Tab. 22 Identification plates and alert stickers

VERTICAL SECTION - TAB. 01



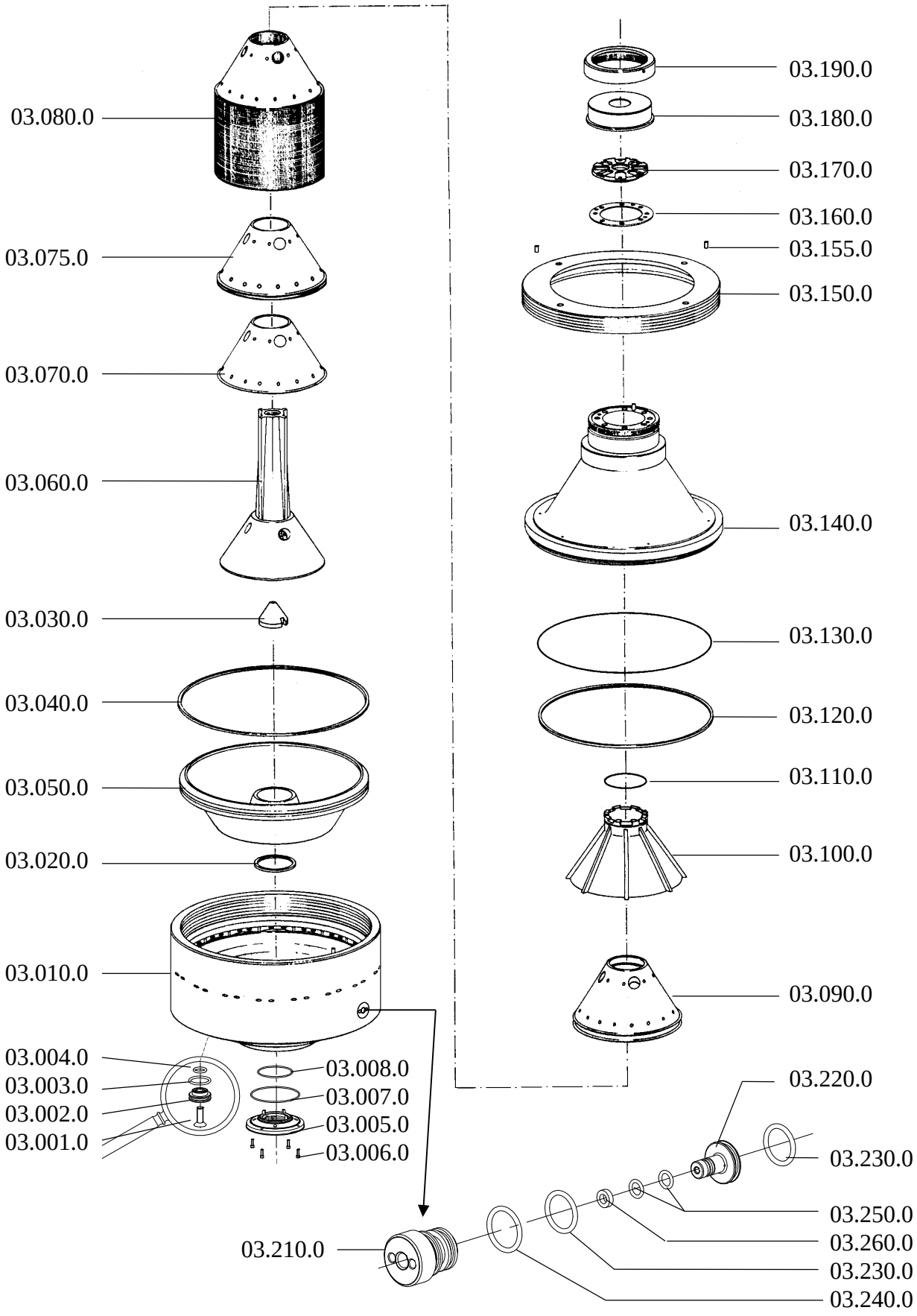
HORIZONTAL SECTION - TAB. 02



BOWL - TAB. 03

Reference	Code	Quantity	Description
03.001.0	400092900	2	Operating water plug
03.002.0	528020164	2	External OR gasket - operating water plug
03.003.0	528020125	2	Internal OR gasket - operating water plug
03.004.0	529013138	4	Screw M8x20– operating water plug
03.005.0	300020000	1	Distributor ring (**DO NOT REMOVE**)
03.006.0	529011146	4	Screw M 6x16
03.007.0	528020459	1	External OR gasket - distributor ring
03.008.0	528020429	1	Internal OR gasket - distributor ring
03.010.0	100584100	1	Bowl body
03.020.0 *	528020636	1	OR gasket - bowl body
03.030.0	400094400	1	Nut - bowl body
03.040.0 *	400153400	1	Gasket - moving ram
03.050.0	200189200	1	Moving ram
03.060.0	100445700	1	Distributor
03.070.0	300441100	1	Bottom disk (spacer on both surfaces)
03.075.0	300439600	3	Intermediate disk (larger spacer)
03.080.0	300447500	~	Intermediate disk
03.090.0	300439600	4	Upper disk (larger spacer)
03.100.0	200447000	1	Upper finned disk
03.110.0 *	528020423	1	OR gasket - finned disk
03.120.0 *	400151100	1	Nylon gasket - bowl hood
03.130.0 *	400303422	1	OR gasket - bowl hood
03.140.0	200042000	1	Bowl hood
03.150.0	300370200	1	Big lock ring
03.155.0	529021324	2	Screw M12x20
03.160.0 *	400152300	1	Gasket - dividing disk
03.170.0	300096900	1	Dividing disk
03.180.0	300574700	1	Finned cover
03.190.0	400345500	1	Small lock ring
03.210.0	400258300	2	Valve body
03.220.0	400257900	2	Valve ram
03.230.0 **	528020152	2	OR gasket - external - valve body
03.240.0 **	528020149	4	OR gasket - internal - valve body
03.250.0 **	528020029	4	OR gasket - valve ram
03.260.0 **	400211900	2	Nylon gasket
03.510.0	832000129	1	Set of bowl gaskets (6 pieces,*)
03.520.0	832000046	1	Set of bowl valves gaskets (12 pieces, **)
03.530.0	832004017	1	Set of bowl valves with gaskets (16 pieces, 03.210.0÷03.260.0)

TAB. 03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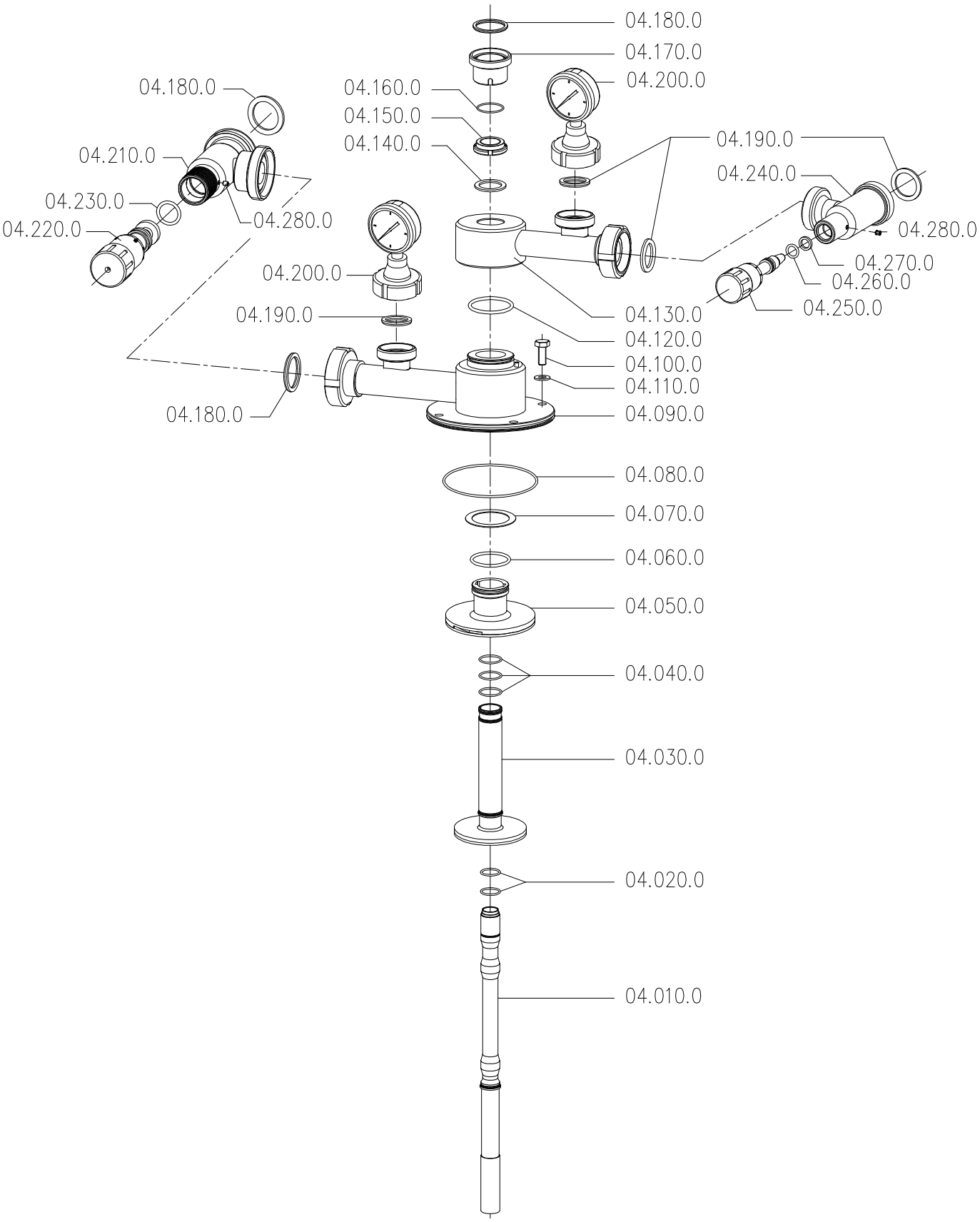
03.100.0
03.090.0
03.220.0
03.230.0
03.250.0
03.260.0
03.230.0
03.240.0
03.210.0

INLET-OUTLET FLOW UNIT - TAB. 04

Reference	Code	Quantity	Description
04.010.0	300703800	1	Feeding pipe
04.020.0 *	528020149	2	OR gasket - feeding pipe
04.030.0	400494000	1	Lower pump - cream
04.040.0 *	528020170	3	OR gasket - cream pump
04.050.0	400575000	1	Upper pump - skim
04.060.0 *	528020194	1	OR gasket - skim pump
04.070.0 #	40002320/X	0÷4	Spacer
04.080.0 *	528020453	1	Lower OR gasket - inlet-outlet body
04.090.0	400703400	1	Lower inlet-outlet body
04.100.0	529006110	2	Screw TE M8x16
04.110.0	529056008	2	Washer Ø8
04.120.0 *	528020317	1	Upper OR gasket - inlet-outlet body
04.130.0	400703500	1	Upper inlet-outlet body
04.140.0 *	400212000	1	Nylon washer
04.150.0	400703600	1	Threaded locking ring
04.160.0 *	528020149	1	OR gasket - nut
04.170.0	400703700	1	Nut - feeding pipe
04.180.0 *	528151030	3	Gasket DN40
04.190.0 *	528151020	4	Gasket DN25
04.200.0	520060210	2	Manometer
04.210.0	300089700	1	Micrometric valve body - skim milk
04.220.0	400178600	1	Shutter - skim milk
04.230.0 **	528020284	1	OR gasket - skim shutter
04.240.0	400230700	1	Micrometric valve body - cream
04.250.0	400616500	1	Shutter - cream
04.260.0 ***	528020125	1	OR gasket - cream shutter
04.270.0 ***	400211100	1	Teflon gasket - cream valve
04.280.0	529021076	2	Screw M 5x6 - blocking shutter
04.510.0	832000314	1	Set of inlet-outlet flow unit gaskets for fittings DIN11851 (17 pieces,*)
04.520.0	832004006	1	Set of spacers (3 pieces **, Thickness = 1, 2, 3 mm.)
04.530.0	832010004	1	Set of gaskets for cream micrometric valve (2 pieces, ***)
04.540.0	832010007	1	Set of gaskets for skim milk micrometric valve (1 piece, **)

TAB. 04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04.010.0
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04.210.0
04.230.0
04.220.0
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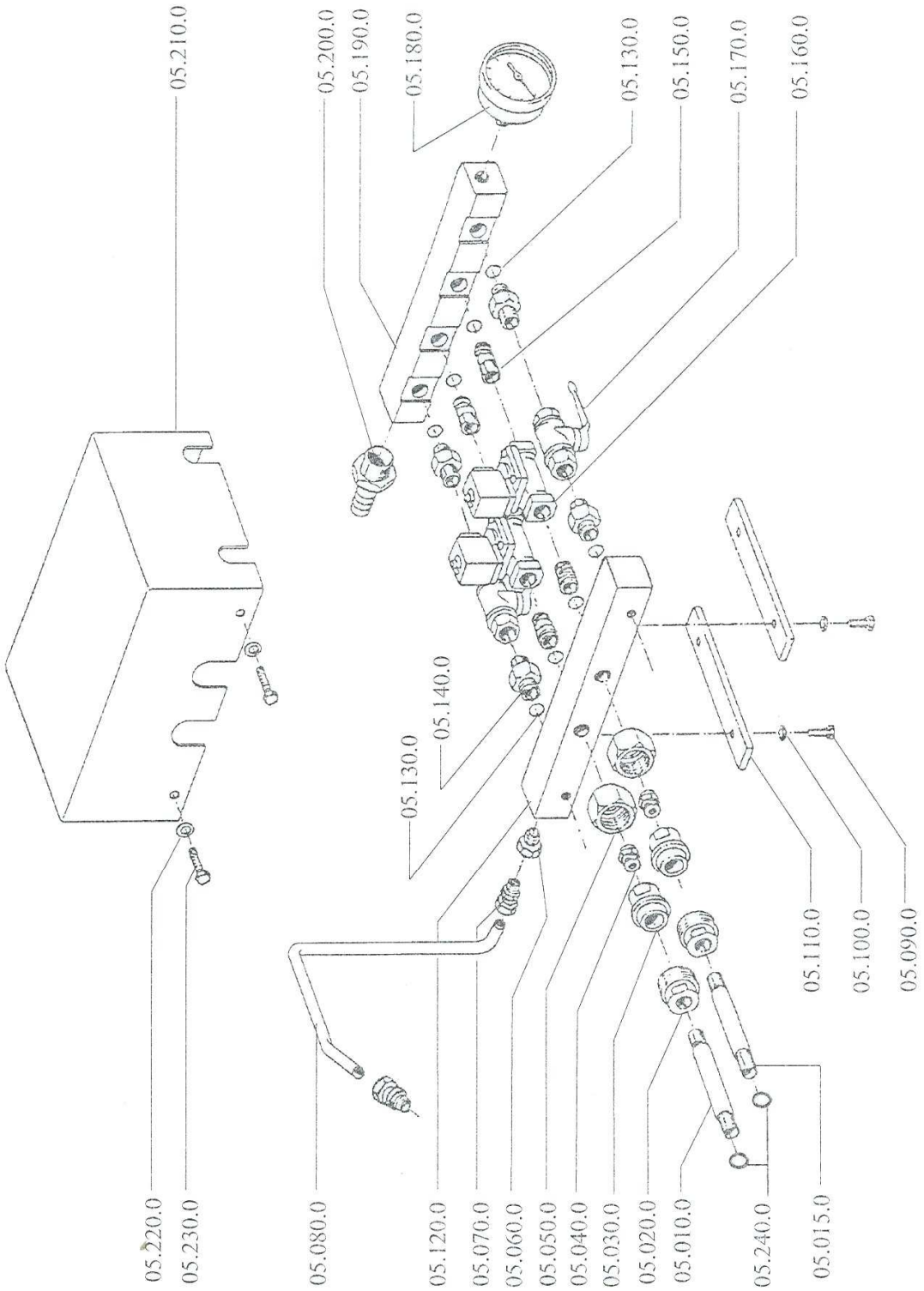
04.200.0
04.190.0
04.180.0

OPERATING WATER UNIT - SOLENOID VALVES UNIT
TAB. 05/A

Reference	Code	Quantity	Description
05.010.0	400249102	1	Threaded pipe
05.015.0	400249101	1	Threaded pipe
05.020.0	523901020	2	Pipe fitting - female (3/8”)
05.030.0	523901020	2	Pipe fitting - male (3/8”)
05.040.0	523901174	2	Nipple (3/8”)
05.050.0	523901020	2	Nut
05.060.0	523901330	1	Reduction M/F (3/8” - 1/4”)
05.070.0	523922023	2	Pipe union DIN5353 (∅10 - 1/4”)
05.080.0	/	1	Rinsing cover tube
05.090.0	529006064	4	Screw
05.100.0	529056506	4	Washer
05.110.0	400184900	2	Body fixing plate
05.120.0	400060001	1	Outlet body
05.130.0 *	528020119	8	OR gaskets for special nipples
05.140.0	400204901	4	Special nipple for ball valve
05.150.0	400205001	4	Special nipple for solenoid valve
05.160.0	523508157	2	Solenoid valve
05.170.0	523012020	2	Ball valve
05.180.0	520060070	1	Manometer
05.190.0	400060101	1	Inlet body
05.200.0	523903618	1	Male hose nipple (1/2” - ∅20)
05.210.0	300045400	1	Carter
05.220.0	529056006	2	Washer
05.230.0	529006064	2	Screw
05.240.0	528020125	2	OR gasket
05.250.0	524100005	2	Connector 122-800 solenoid valve
05.260.0	832000128	1	Set of OR gaskets for special nipples (8 pieces,*)

TAB. 05/A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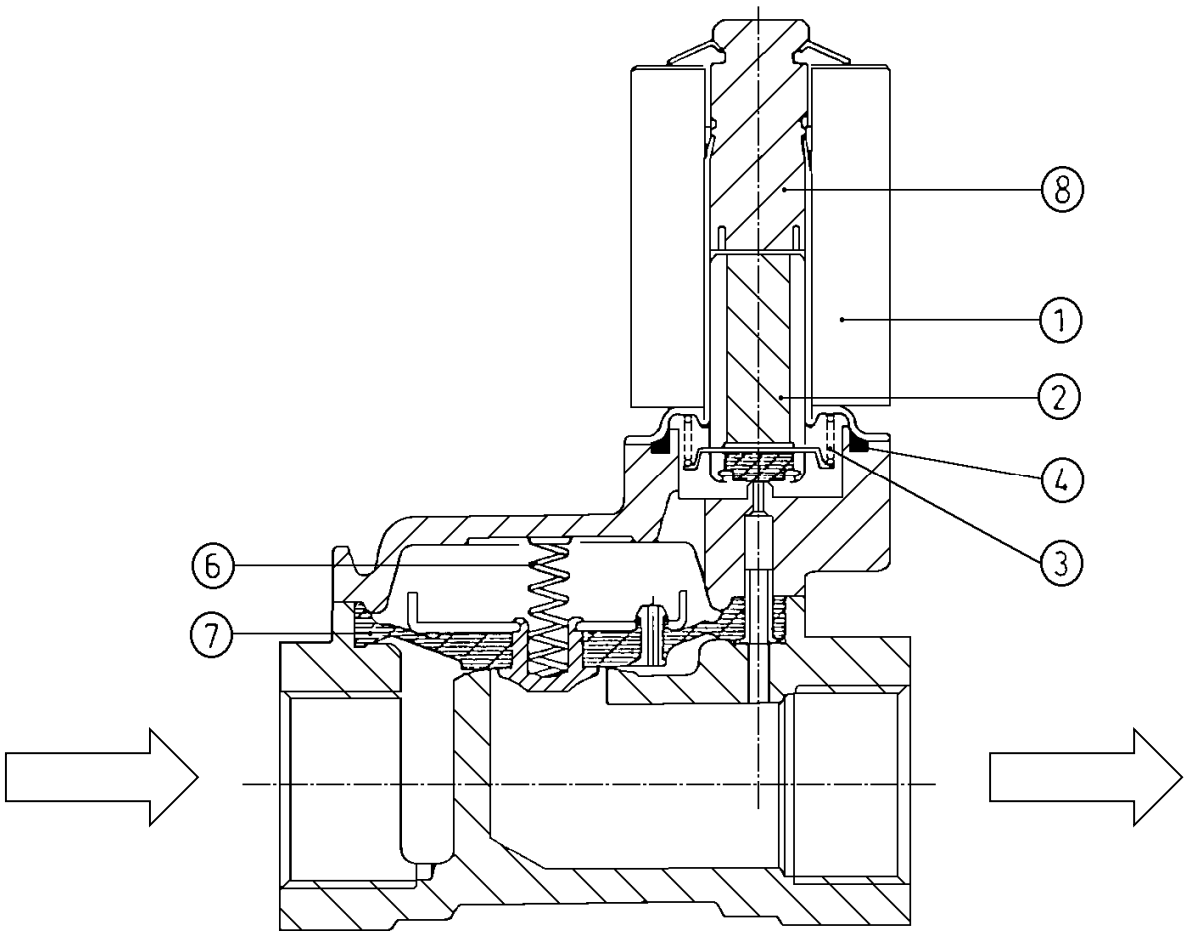
05.070.0
05.060.0
05.050.0
05.040.0
05.030.0
05.020.0
05.010.0
05.240.0
05.015.0

OPERATING WATER UNIT - SOLENOID VALVE
TAB. 05/B

Part.	Refrence	Code	Quantity	Description
1	/	/	1	Electromagnet
2	/	/	1	Core unit
3	/	/	1	Core transmission spring
4	/	/	1	OR gasket - guide unit
6	/	/	1	Spring - membrane
7	/	/	1	Membrane Unit
8	/	/	1	Guide unit
9	05.160.0	523508157	1	Solenoid valve

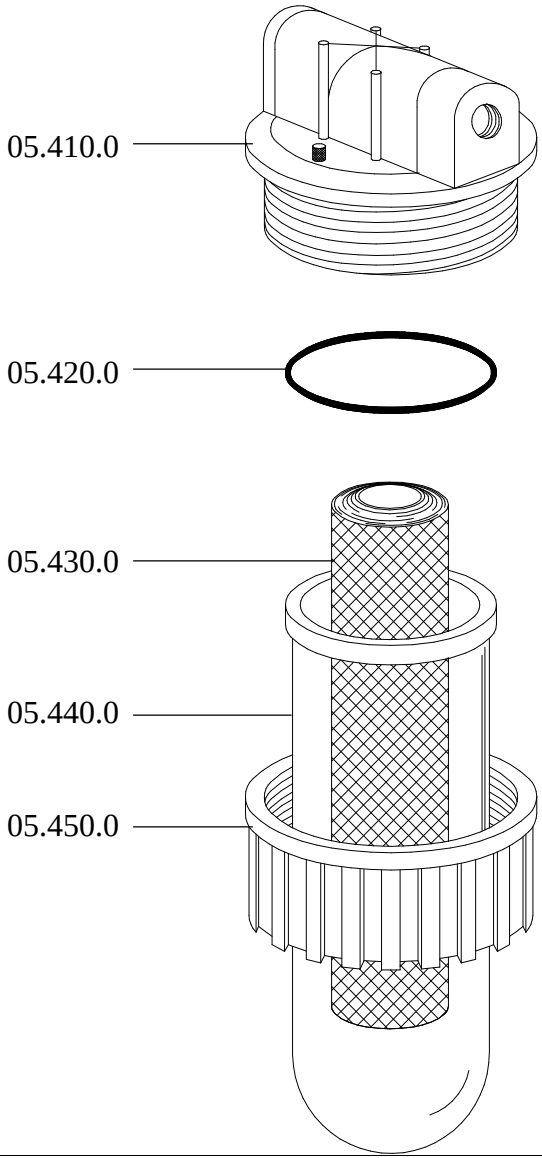
ATTENTION
Only the whole solenoid valve (05.160.0) is supplied as spare part.



OPERATING WATER UNIT - CARTRIDGE FILTER
TAB. 05/C

Reference	Code	Quantity	Description
05.410.0 *	/	1	Head
05.420.0	/	1	OR gasket
05.430.0	523996510	1	Cartridge
05.440.0	/	1	Glass
05.450.0 *	/	1	Ring nut
05.460.0	523996010	1	Filtering tank (05.410.0 + 05.420.0 + 05.440.0 + 05.450.0)

* The pieces 05.410.0 and 05.450.0 are supplied together.

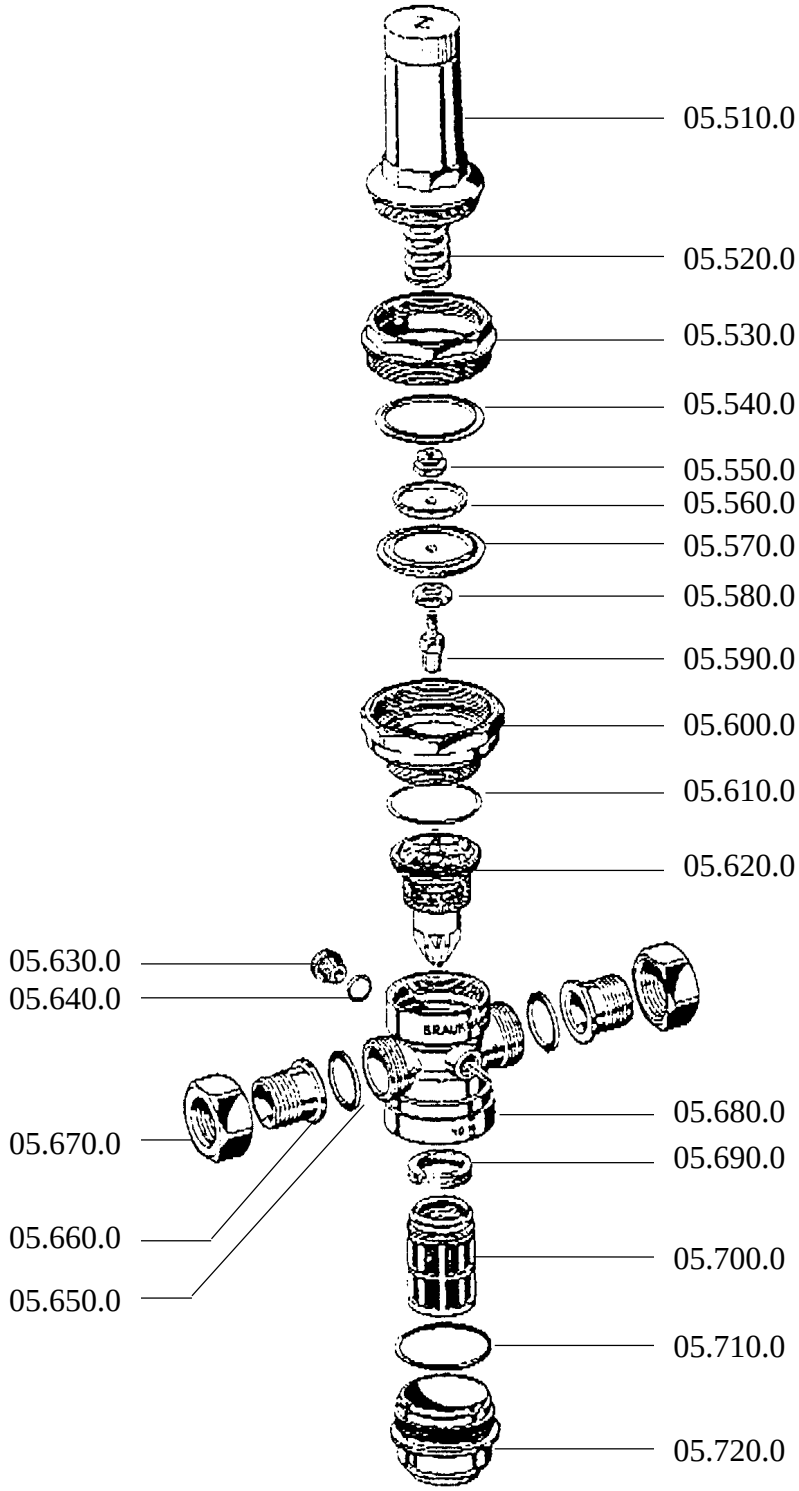


OPERATING WATER UNIT - PRESSURE REDUCER TAB. 05/D

Reference	Code	Quantity	Description
05.510.0	/	1	Spring cover
05.520.0	/	1	Spring
05.530.0	/	1	Cover ring
05.540.0	/	1	Guide ring
05.550.0	/	1	Nut
05.560.0	/	1	Diaphragm
05.570.0	/	1	Diaphragm
05.580.0	/	1	Disk diaphragm
05.590.0	/	1	Regulating rod
05.600.0	/	1	Ring
05.610.0	/	1	OR gasket
05.620.0	/	1	Shutter
05.630.0	/	1	Screw
05.640.0	/	1	OR gasket
05.650.0	/	1	Seal ring
05.660.0	/	2	Nipple
05.670.0	/	2	Nut
05.680.0	/	2	Body
05.690.0	/	1	Splined ring
05.700.0	/	1	Filter
05.710.0	/	1	OR gasket
05.720.0	/	1	Brass filter chamber
05.730.0	523800020	1	Pressure reducer

ATTENTION
Only the whole pressure reducer (05.730.0) is supplied as spare part.

TAB. 05/D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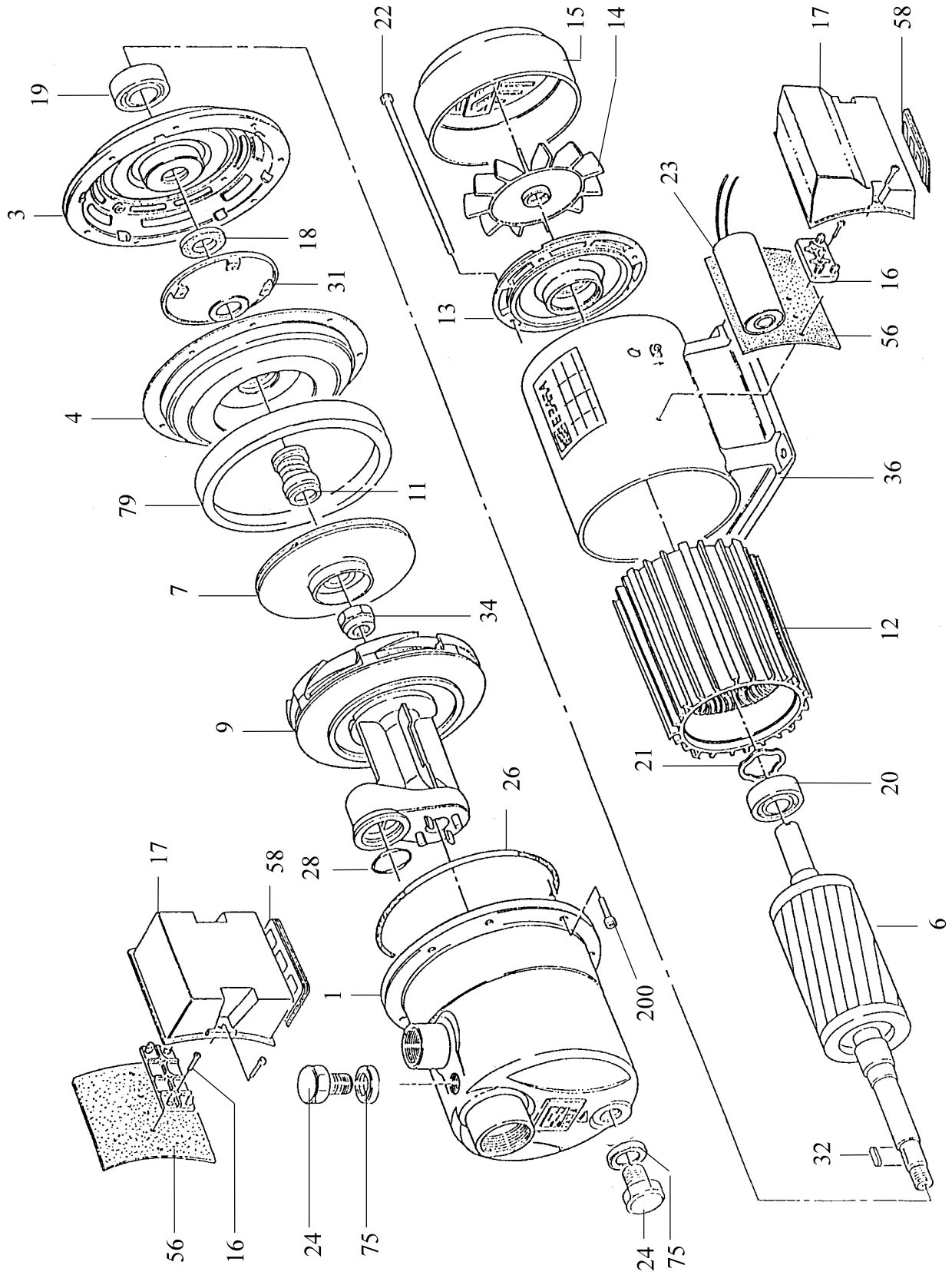
05.620.0
05.630.0
05.640.0
05.680.0
05.670.0
05.690.0
05.660.0
05.700.0
05.650.0
05.710.0
05.720.0

OPERATING WATER UNIT - SURGE TANK PUMP
TAB. 05/E

Part.	Code	Quantity	Description
1	/	1	Casing
3	/	1	Motor bracket
4	/	1	Casing cover
6	/	1	Shaft with rotor
7	/	1	Impeller
9	/	1	Diffuser + Venturi tube
11	/	1	Mechanical seal
12	/	1	Motor frame with stator
13	/	1	Motor cover
14	/	1	Fan
15	/	1	Fan cover
16	/	1	Terminal box
17	/	1	Terminal box cover
18	/	1	Splash ring
19	/	1	Pump side ball bearing
20	/	1	Fan side ball bearing
21	/	1	Adjusting ring
22	/	4	Tie road
23	/	1	Capacitor priming
24	/	1	Priming plug / drain plug
26	/	1	OR gasket
28	/	1	OR gasket
31	/	1	Thrust flange
32	/	1	Key
34	/	1	Impeller nut
36	/	1	External motor casing
56	/	1	Box gasket
58	/	1	Cable entry
75	/	1	Washer
79	/	1	Space diffuser
200	/	8	Screw
05.750.0	526502051	1	Surge tank pump

ATTENTION
Only the whole surge tank pump (05.750.0) is supplied as spare part.

TAB. 05/E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6
1
200
56
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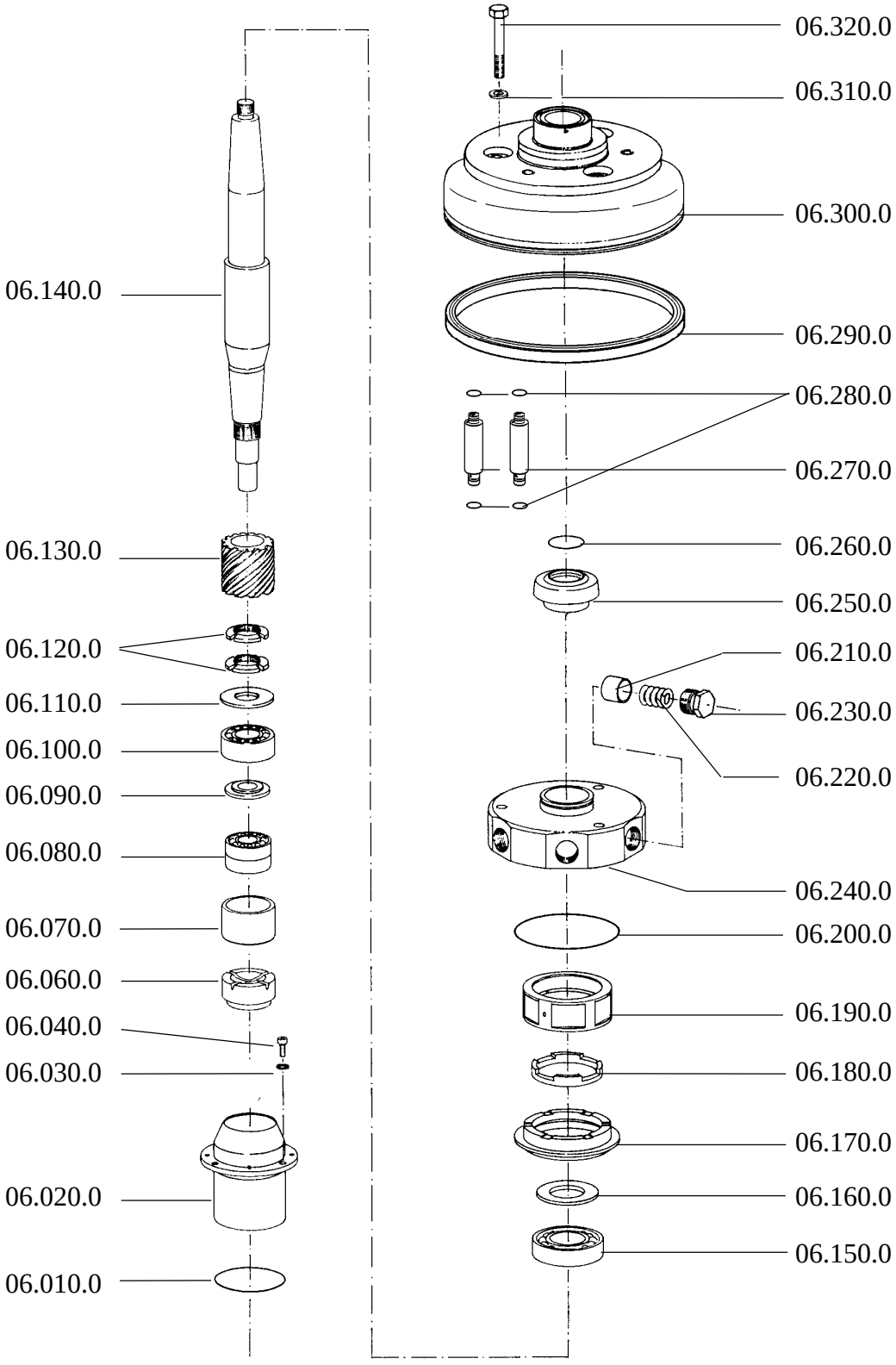
75
24
75
32

VERTICAL SHAFT - TAB. 06

Reference	Code	Quantity	Description
06.010.0 **	528020420	1	OR gasket - bush
06.020.0	300092000	1	Bush
06.030.0	529056506	3	Washer
06.040.0	529010150	3	Screw
06.060.0	400889500	1	Spheric support with springs
06.070.0	400040700	1	Spheric bush
06.080.0 *	521075445	1	Couple of thrust ball bearings (2 pieces)
06.090.0 *	400210900	1	Washer - thrust ball bearings
06.100.0 *	521050450	1	Self-aligning ball bearing
06.110.0 *	400210800	1	Washer - self-aligning ball bearing
06.120.0	529066006	2	Ring nut
06.130.0 #	300643300	1	Helical pinion ***(50 Hz. - 8.000 rpm)***
06.140.0	300000600	1	Vertical shaft
06.150.0 *	521040265	1	Upper ball bearing
06.160.0 *	400207500	1	Washer - upper ball bearing
06.170.0	300020400	1	Frame ring
06.180.0	400023100	1	Spacer ring
06.190.0	300019200	1	Ball bearing housing
06.200.0 **	528020459	1	OR gasket - collar cage
06.210.0	400031700	6	Buffer
06.220.0	400294600	6	Buffer spring
06.230.0	400092300	6	Buffer screw
06.240.0	200146500	1	Collar cage
06.250.0	400441600	1	Labyrinth
06.260.0 **	528020197	1	OR gasket - labyrinth
06.270.0	400033200	2	Operating water pipe
06.280.0 **	528020125	4	OR gasket - operating water pipe
06.290.0 **	528150010	1	Gasket - cage cover
06.300.0	200771100	1	Cage cover
06.310.0	529056512	3	Washer
06.320.0	529011350	3	Cage cover screw
06.510.0	832005004	1	Set of vertical shaft ball bearings and washers (6 pieces,*)
06.520.0	832001005	1	Set of vertical shaft gaskets (8 pieces,**)
06.530.0	832007021	1	Set of gears, flanges, screws and washers (12 pieces, #)
06.540.0	832012000	1	Set of buffers (6 pieces, 06.210.0)
06.550.0	832012001	1	Set of buffer springs (6 pieces, 06.220.0)
06.560.0	832012002	1	Set of buffer screws (6 pieces, 06.230.0)

TAB. 06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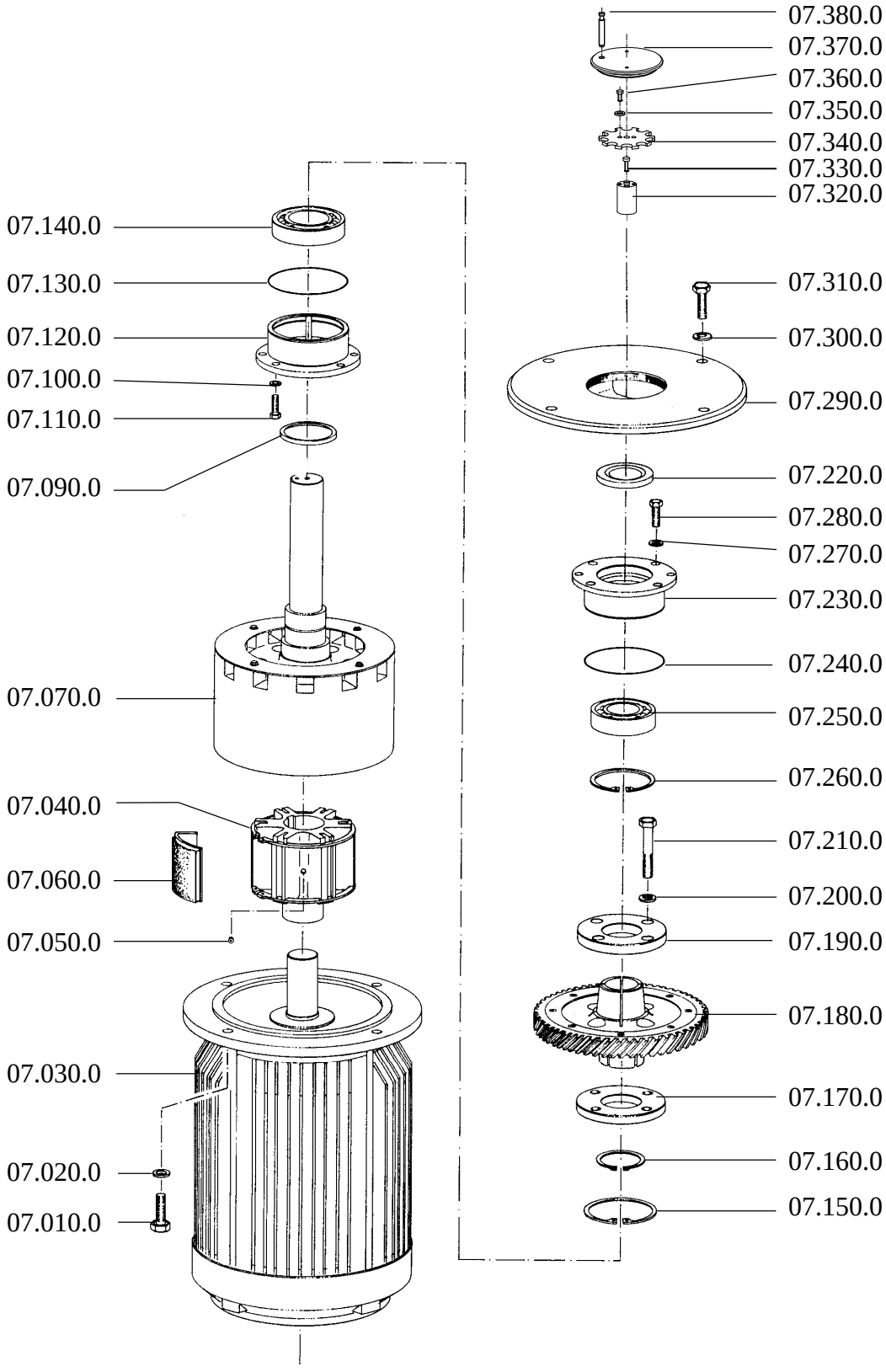
06.300.0
06.290.0
06.280.0
06.270.0
06.260.0
06.250.0
06.210.0
06.230.0
06.220.0
06.240.0
06.200.0
06.190.0
06.180.0
06.170.0
06.160.0
06.150.0
06.140.0
06.130.0
06.120.0
06.110.0
06.100.0
06.090.0
06.080.0
06.070.0
06.060.0
06.040.0
06.030.0
06.020.0
06.010.0

HORIZONTAL SHAFT UNIT - TAB. 07

Reference	Code	Quantity	Description
07.010.0	529006190	4	Motor screw TE M12x30
07.020.0	529056512	4	Washer Ø12
07.030.0	526006560	1	Motor
07.040.0	400197500	1	Shoe holder
07.050.0	529023202	1	Expanding pin M8x16 - shoe holder
07.060.0	400838200	6	Clutch shoe
07.070.0	300280500	1	Horizontal shaft
07.090.0 **	528003561	1	Seal ring
07.100.0	529056508	4	Washer Ø8
07.110.0	529005114	4	Screw TE M8x25 - clutch side
07.120.0	300143300	1	Support - clutch side
07.130.0 **	528020435	1	OR gasket - clutch side support
07.140.0 *	521000270	1	Ball bearing - clutch side
07.150.0 *	529090585	1	Circlip - outer
07.160.0 *	529090045	1	Circlip - inner
07.170.0 #	400125200	1	Locking flange - gear wheel (threaded holes)
07.180.0 #	300653300	1	Helical gear wheel ***(50 Hz. - 8.000 rpm)***
07.190.0 #	400125500	1	Locking flange - gear wheel
07.200.0 #	529055012	4	Washer Ø12
07.210.0 #	529000158	4	Locking screw TE M12x80 - gear wheel
07.220.0 **	528003461	1	Seal ring
07.230.0	300142900	1	Support - tachometer side
07.240.0 **	528020435	2	OR gasket - tachometer side support
07.250.0 *	521000265	1	Ball bearing - tachometer side
07.260.0 *	529090580	1	Circlip
07.270.0	529056508	4	Washer Ø8
07.280.0	529005114	4	Screw TE M8x25 - support
07.290.0	300143000	1	Carter - tachometer side
07.300.0	529056012	4	Washer Ø12
07.310.0	529006190	4	Screw TE M12x30 - carter
07.320.0	400940700	1	Bush
07.330.0	529011062	2	Screw M4x50
07.340.0	400847900	1	Phonic gear wheel
07.350.0	529056504	2	Washer
07.360.0	529006008	2	Screw M4x12
07.370.0	400849300	1	Blind ring nut
07.380.0	525185030	1	Rpm sensor
07.710.0	832005005	1	Set of horizontal shaft ball bearings and circlips (5 pieces,*)
07.720.0	832001006	1	Set of horizontal shaft gaskets (5 pieces,**)
07.730.0	832011012	1	Set of clutch shoes (6 pieces, 07.060.0)
06.530.0	832007021	1	Set of gears, flanges, screws and washers (12 pieces, #)

TAB. 07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07.220.0
07.280.0
07.270.0
07.230.0
07.240.0
07.070.0
07.250.0
07.260.0
07.040.0
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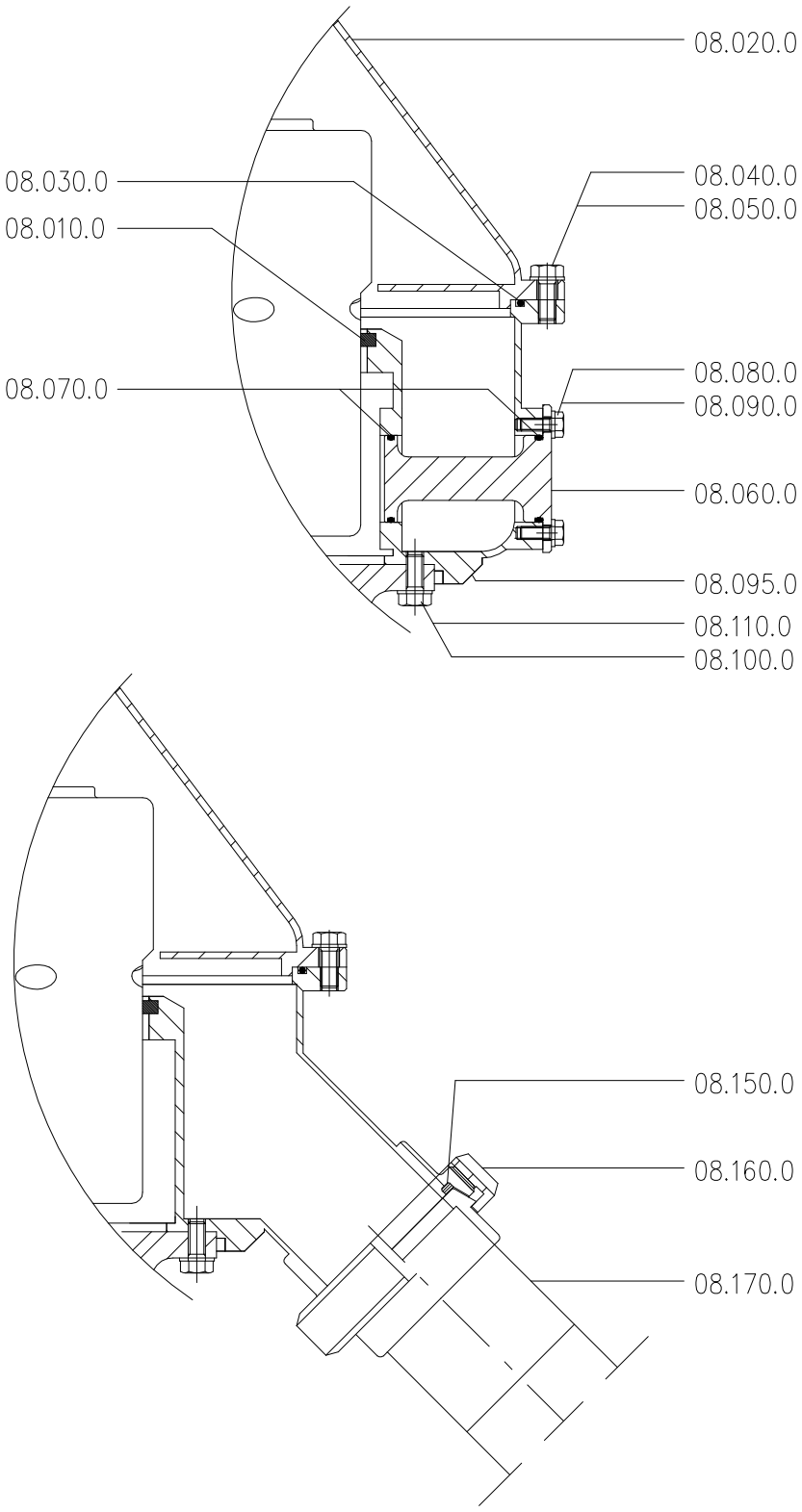
07.050.0
07.190.0
07.180.0
07.030.0
07.170.0
07.160.0
07.020.0
07.150.0
07.010.0

FRAME - TAB. 08/A

Reference	Code	Quantity	Description
08.010.0 #	400324000	1	Cyclone teflon gasket (2 pieces)
08.020.0	200252310	1	Cover
08.030.0 #	400303304	1	OR gasket - cover
08.040.0	529006112	8	Cover clamping screw TE M8x22
08.050.0	529056508	8	Washer Ø8
08.060.0	400681500	1	Port plug for bowl valve
08.070.0 #	528020188	2	Plug gasket
08.080.0	529006068	2	Washer TE M6x16 - plug screw
08.090.0	529056006	2	Plug screw Ø6
08.095.0	200386210	1	Cyclone
08.100.0	529056508	8	Washer Ø8 - cyclone clamping screw
08.110.0	529006112	8	Cyclone clamping screw TE M8x22
08.150.0 #	528151040	1	Gasket DN65 - cyclone drain
08.160.0	523906081	1	Nut DN65 - cyclone drain
08.170.0	400347310	1	Cyclone drain pipe

TAB. 08/A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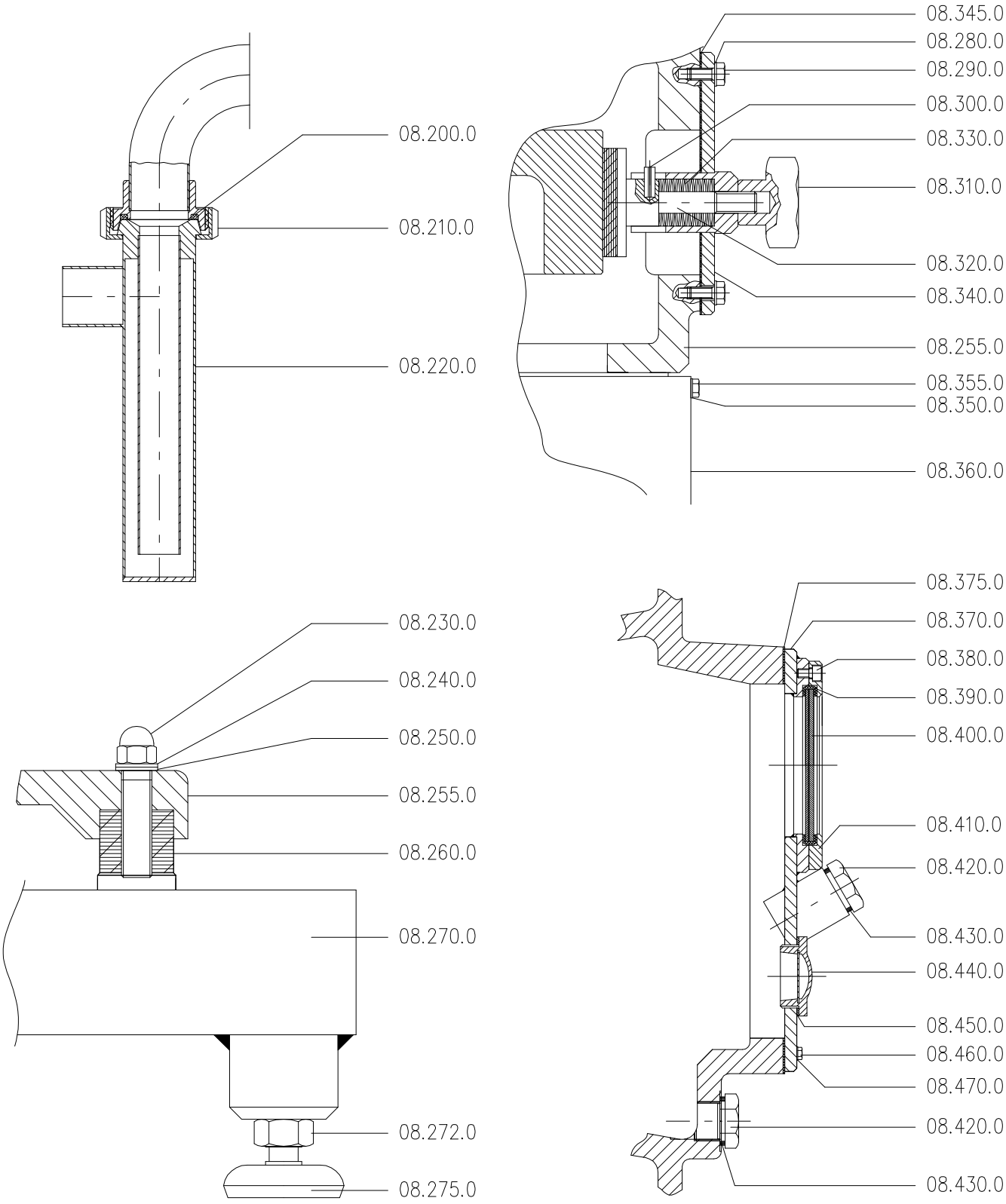
08.010.0
08.070.0
08.080.0
08.090.0
08.060.0
08.095.0
08.110.0
08.100.0
08.150.0
08.160.0
08.170.0

FRAME - TAB. 08/B

Reference	Code	Quantity	Description
08.200.0 #	528151030	1	Gasket DN40
08.210.0	523906075	1	Nut
08.220.0	400734500	1	Drain trap
08.230.0	529061116	4	Cap nut M16
08.240.0	529056016	4	Washer Ø16
08.250.0	400213800	4	Nylon washer
08.255.0	300291300	1	Frame
08.260.0	400121100	4	Shock absorber
08.270.0	808011008	1	Platform
08.272.0	529061030	4	Nut M30
08.275.0	521650131	4	Adjustable foot
08.280.0	529056508	4	Washer Ø8
08.290.0	529006114	4	Screw TE M8x25 - brake flange
08.300.0	529070355	1	Elastic pin - brake
08.310.0	521580020	1	Brake hand wheel
08.320.0	400046400	1	Brake shoe with pin
08.330.0	529099169	30	Brake spring
08.340.0	300426400	1	Brake flange
08.345.0 #	400152700	1	Gasket - brake flange
08.350.0	529011146	3	Screw TCCEI M6x16 - motor cover
08.355.0	529056006	3	Washer Ø6 - motor cover
08.360.0	200815700	1	Motor cover
08.370.0	200426300	1	Flange - gear chamber
08.375.0 #	400152800	1	Gasket - gear chamber
08.380.0	529011140	4	Screw TCCEI M6x10 - sight glass
08.390.0 *#	400831900	1	Gasket - sight glass
08.400.0 *	400833600	1	Sight glass
08.410.0	400856400	1	Flange - sight glass
08.420.0	400234300	2	Oil supply / Drain plug
08.430.0 #	400211200	2	Gasket - plug
08.440.0 **	/	1	Oil gauge glass
08.450.0 **	/	1	Gasket - oil gauge glass
08.460.0	529006114	6	Screw TE M8x25 - gear chamber flange
08.470.0	529056508	6	Washer Ø8 - gear chamber flange
08.710.0	400046400	1	Brake shoe with pin and elastic pin (2 pieces)
08.720.0	832020019	1	Sight glass with gasket (2 pieces,*)
08.730.0	523879014	1	Oil gauge glass with gasket (2 pieces,**)
08.740.0	832016500	1	Set of shock absorbers (4 pieces, 08.260.0)
08.750.0	832001062	1	Set of base gaskets (12 pieces, #)

TAB. 08/B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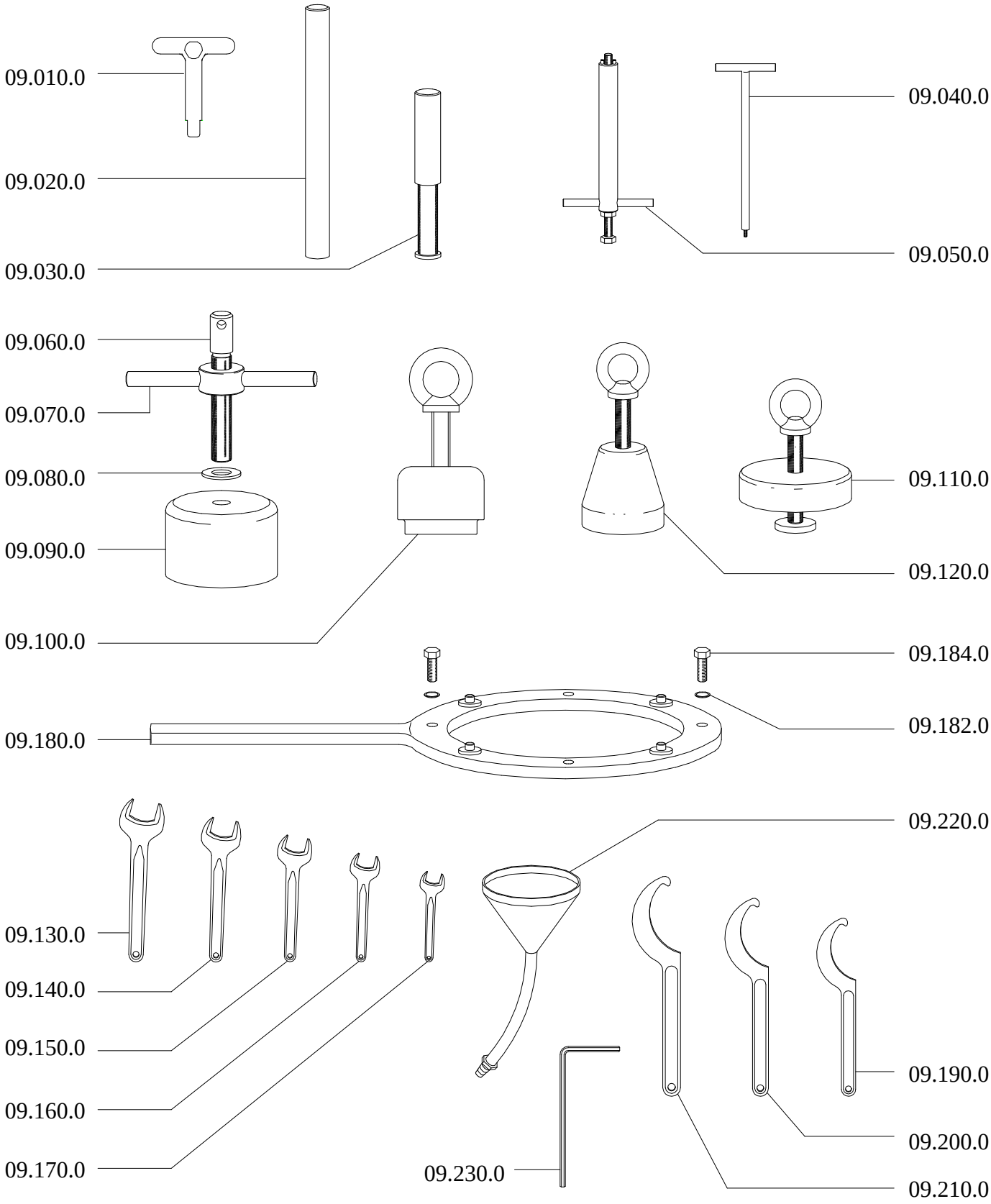
08.430.0
08.440.0
08.450.0
08.460.0
08.470.0
08.420.0
08.430.0

SPECIAL SPANNERS - TAB. 09

Reference	Code	Quantity	Description
09.010.0	400217700	1	Spanner for feeding pipe locking
09.020.0	400309900	1	Extension pipe
09.030.0	400057600	1	Mallet
09.040.0	400055800	1	Spanner for valve ram extraction
09.050.0	400055900	1	Spanner for valve body extraction
09.060.0 *	400181400	1	Threaded pin for disk compression
09.070.0 *	400093700	1	Nut of disk compression spanner
09.080.0 *	400210700	1	Washer of disk compression spanner
09.090.0 *	400053300	1	Bell of disk compression spanner
09.100.0	400423600	1	Spanner for extracting bowl body
09.110.0	400418900	1	Spanner for extracting bowl hood
09.120.0	400423700	1	Spanner for extracting moving ram
09.130.0	560000010	1	Spanner AC 10
09.140.0	560000013	1	Spanner AC 13
09.150.0	560000017	1	Spanner AC 17
09.160.0	560000019	1	Spanner AC 19
09.170.0	560000032	1	Spanner AC 32
09.180.0	200595800	1	Spanner for big lock ring
09.182.0	529055012	1	Washer Ø12
09.184.0	529005192	1	Screw TE M12x35
09.190.0	560040545	1	Union pipe spanner 45/50
09.200.0	560040570	1	Union pipe spanner 68/75
09.210.0	560040135	1	Spanner for small ring 135/145
09.220.0	564900080	1	Oil supply funnel
09.230.0	560060006	1	Wrench spanner 6mm.
09.310.0	400423800	1	Spanner for compression disks (4 pieces, *)

TAB. 09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09.190.0
09.200.0
09.210.0

OVERALL DIMENSIONS AND INSTALLATION PLAN - TAB. 20

A Product inlet DN40 DIN11851
B Heavy phase outlet (skim-milk) DN40 DIN11851
C Light phase outlet (cream) DN25 DIN11851
D Operating water inlet G 3/4”
E Operating water outlet DN40 DIN11851
F Solids outlet DN65

Shields and removable parts for maintenance operations

1 Bowl protection cover
2 Bowl valves plug
3 Oil supply plug
4 Oil drain plug
5 Flange - gear chamber
6 Flange - brake side support
7 Flange - tachometer side support
8 Carter - motor

Components and equipments

10 Sight glass - check standstill machine
11 Sight glass - check oil level
12 Brake handwheel
13 Platform
14 Platform foot
16 Solids discharge pipe
17 Drain trap

Skim milk outlet

19 Micrometric valve
20 Manometer

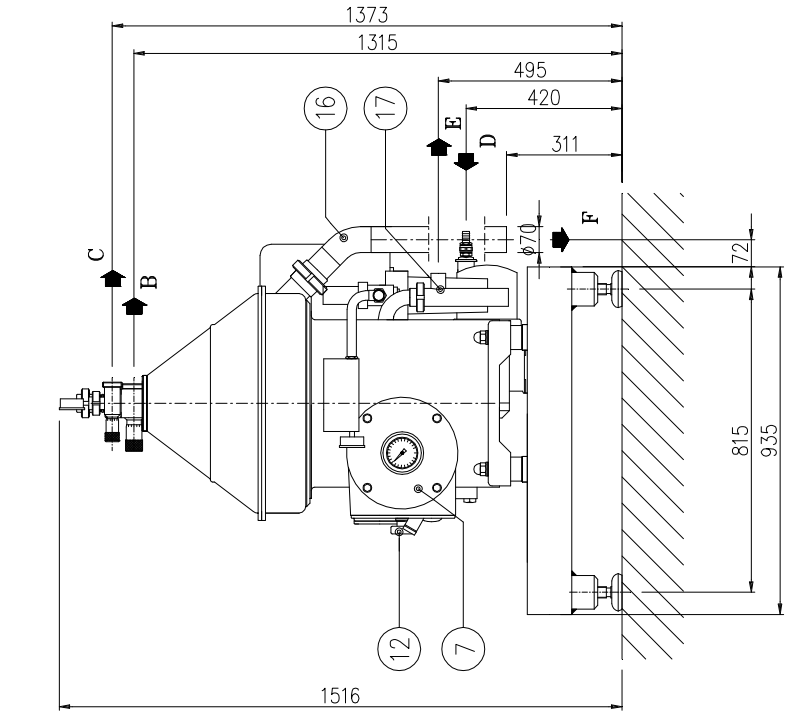
Cream outlet

21 Micrometric valve
22 Manometer

Operating water unit

23 Check valve
24 Surge tank
25 Surge tank pump
26 Operating water filter
27 Pressure reducer
28 Flexible pipe
29 Solenoid valves set
30 Manometer
31 Rinsing pipe

TAB. 20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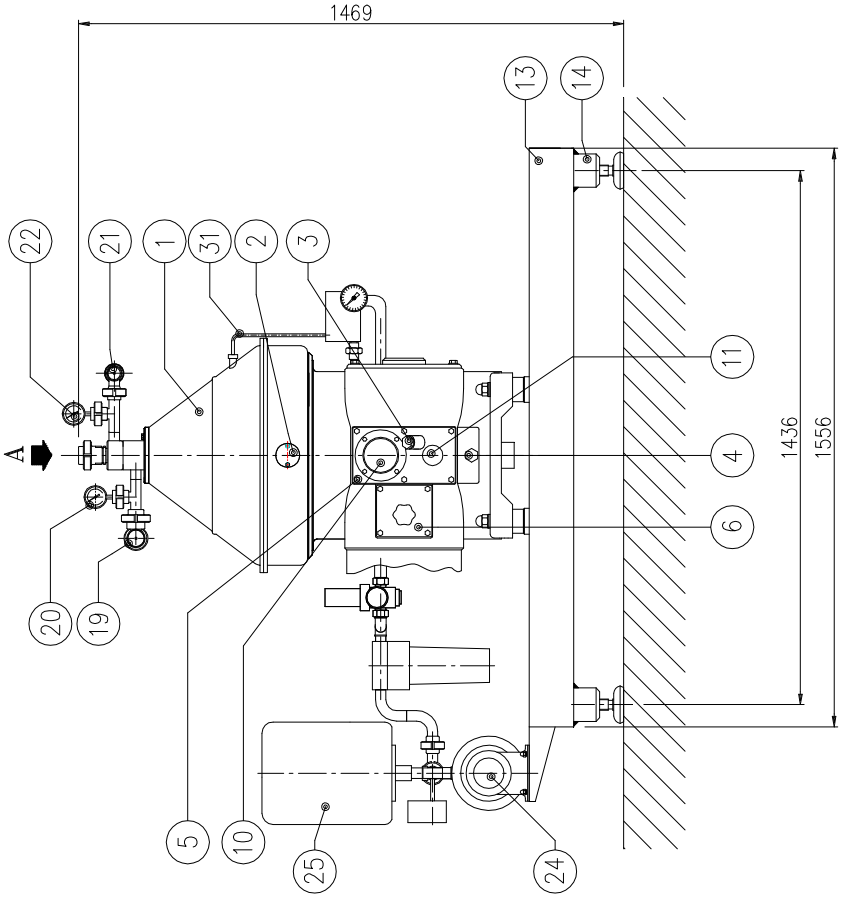
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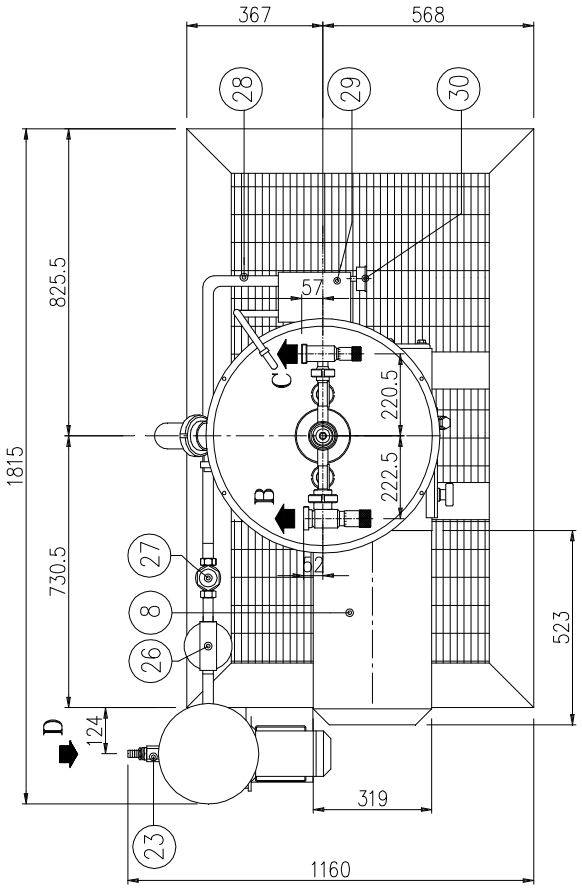
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568
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C
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222.5
B
1815
730.5
27
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8
26
523
D
124
319
23
1160

HYDRAULIC SYSTEM DIAGRAM - TAB. 21

A Product inlet DN40 DIN11851
B Heavy phase outlet (skim milk) DN40 DIN11851
C Light phase outlet (cream) DN25 DIN11851
D Operating water inlet G 3/4”
E Operating water outlet DN40 DIN11851
F Solids outlet DN65

Operating water unit

CV4 Check valve
CP4 Surge tank pump
SK4 Surge tank
PSC4 Pressure switch
MN4 Manometer
CF4 Operating water filter
PCV4 Pressure reducer
YV1 Operating water solenoid valve (bowl opening)
BV1 Ball valve (emergency)
BV0 Ball valve (emergency)
YV0 Operating water solenoid valve (bowl closing)
MN0 Manometer

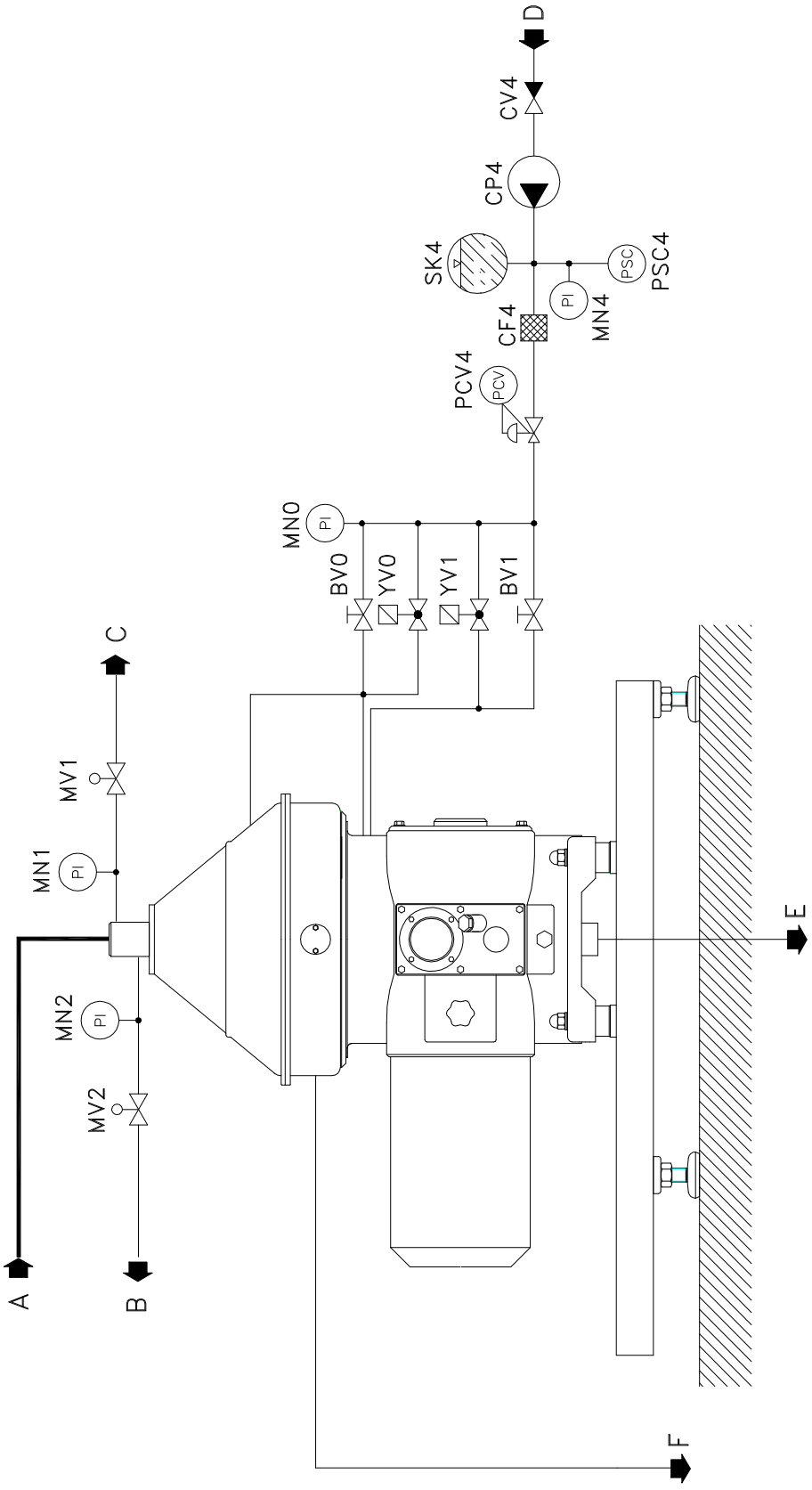
Cream outlet

MV1 Micrometric valve
MN1 Manometer

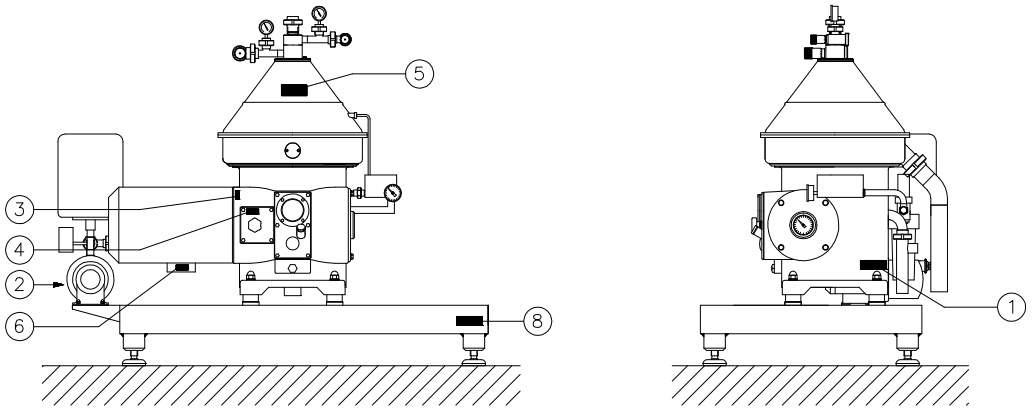
Skim milk outlet

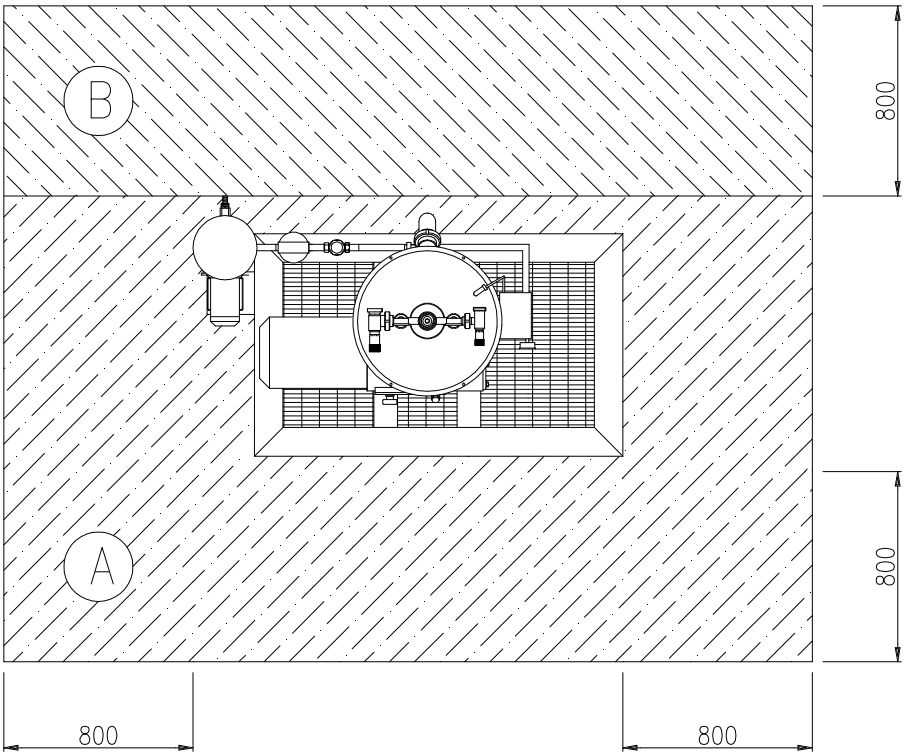
MN2 Manometer
MV2 Micrometric valve

TAB. 21


D
CV4
CP4
SK4
PSC
PSC4
PI
MN4
CF4
PCV4
PCV
MN0
BV0
YV0
YV1
BV1
C
MV1
MN1
E
MN2
MV2
A
B
F

IDENTIFICATION PLATES AND ALERT STICKERS
FREE NECESSARY AREA - TAB. 22





1 Plate with technical and identification data of separator.
2 Plate with technical and identification data of surge tank pump.
3 Plate with bowl direction of rotation.
4 Plate with brake direction of activation.
5 Sticker - safety alert.
6 Sticker - motor connection voltage.
8 Plate with technical and identification data of unit on platform.

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

SPARE PARTS REQUEST FORM

Centrifugal separator mod.: **SE 20S**..... **Manufacturing N°:** .....

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

	Ref.	Code	Quantity	Description
Bowl (Tab. 03)				
☐	03.510.0	832000129	.....	Set of bowl gaskets (6 pieces)
☐	03.520.0	832000046	.....	Set of bowl valves gaskets (12 pieces)
☐	.....	.....	.....	.....
Inlet-outlet flow unit (Tab. 04)				
☐	04.010.0	300703800	.....	Feeding pipe
☐	04.030.0	400494000	.....	Lower pump - cream
☐	04.050.0	400575000	.....	Upper pump - skim
☐	04.200.0	520060210	.....	Manometer
☐	04.510.0	832000314	.....	Set of flow-unit gaskets with gaskets for fittings DIN (17 pieces)
☐	04.520.0	832004006	.....	Set of spacer (3 pieces)
☐	04.530.0	832010004	.....	Set of cream micrometric valve gaskets (2 pieces)
☐	04.540.0	832010007	.....	Set of skim micrometric valve gasket (1 piece)
☐	.....	.....	.....	.....
Solenoid valves unit (Tab. 05)				
☐	05.160.0	523508157	.....	Solenoid valve 3/8”
☐	05.260.0	832000128	.....	Set of OR gaskets for special nipples (8 pieces)
☐	05.430.0	523996510	.....	Filter cartridge
☐	05.460.0	523996010	.....	Filtering tank (4 pieces)
☐	.....	.....	.....	.....
Vertical shaft (Tab. 06)				
☐	06.510.0	832005004	.....	Set of vertical shaft bearings and washers (6 pieces)
☐	06.520.0	832001005	.....	Set of vertical shaft gaskets (8 pieces)
☐	06.530.0	832007021	.....	Set of gears, flanges, screw and washer (12 pieces)
☐	.....	.....	.....	.....
Horizontal shaft (Tab. 07)				
☐	07.710.0	832005005	.....	Set of horizontal shaft bearings and circlips (5 pieces)
☐	07.720.0	832001006	.....	Set of horizontal shaft gaskets (5 pieces)
☐	07.730.0	832011012	.....	Set of clutch-shoes (6 pieces)
☐	.....	.....	.....	.....
Frame (Tab. 08)				
☐	08.710.0	400046400	.....	Brake shoe with pin and elastic pin (2 pieces)
☐	08.720.0	832020019	.....	Sight glass with gasket (2 pieces)
☐	08.730.0	523879014	.....	Sight glass oil level with gaskets (2 pieces)
☐	08.750.0	832001062	.....	Set of frame gaskets (11 pieces)
☐	.....	.....	.....	.....

SPARE PARTS REQUEST FORM

Centrifugal separator mod.: **SE 20S**..... **Manufacturing N°:** .....

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

	Ref.	Code	Quantity	Description
Bowl (Tab. 03)				
☐	03.510.0	832000129	.....	Set of bowl gaskets (6 pieces)
☐	03.520.0	832000046	.....	Set of bowl valves gaskets (12 pieces)
☐	.....	.....	.....	.....
Inlet-outlet flow unit (Tab. 04)				
☐	04.010.0	300703800	.....	Feeding pipe
☐	04.030.0	400494000	.....	Lower pump - cream
☐	04.050.0	400575000	.....	Upper pump - skim
☐	04.200.0	520060210	.....	Manometer
☐	04.510.0	832000314	.....	Set of flow-unit gaskets with gaskets for fittings DIN (17 pieces)
☐	04.520.0	832004006	.....	Set of spacer (3 pieces)
☐	04.530.0	832010004	.....	Set of cream micrometric valve gaskets (2 pieces)
☐	04.540.0	832010007	.....	Set of skim micrometric valve gasket (1 piece)
☐	.....	.....	.....	.....
Solenoid valves unit (Tab. 05)				
☐	05.160.0	523508157	.....	Solenoid valve 3/8”
☐	05.260.0	832000128	.....	Set of OR gaskets for special nipples (8 pieces)
☐	05.430.0	523996510	.....	Filter cartridge
☐	05.460.0	523996010	.....	Filtering tank (4 pieces)
☐	.....	.....	.....	.....
Vertical shaft (Tab. 06)				
☐	06.510.0	832005004	.....	Set of vertical shaft bearings and washers (6 pieces)
☐	06.520.0	832001005	.....	Set of vertical shaft gaskets (8 pieces)
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☐	08.730.0	523879014	.....	Sight glass oil level with gaskets (2 pieces)
☐	08.750.0	832001062	.....	Set of frame gaskets (11 pieces)
☐	.....	.....	.....	.....

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