

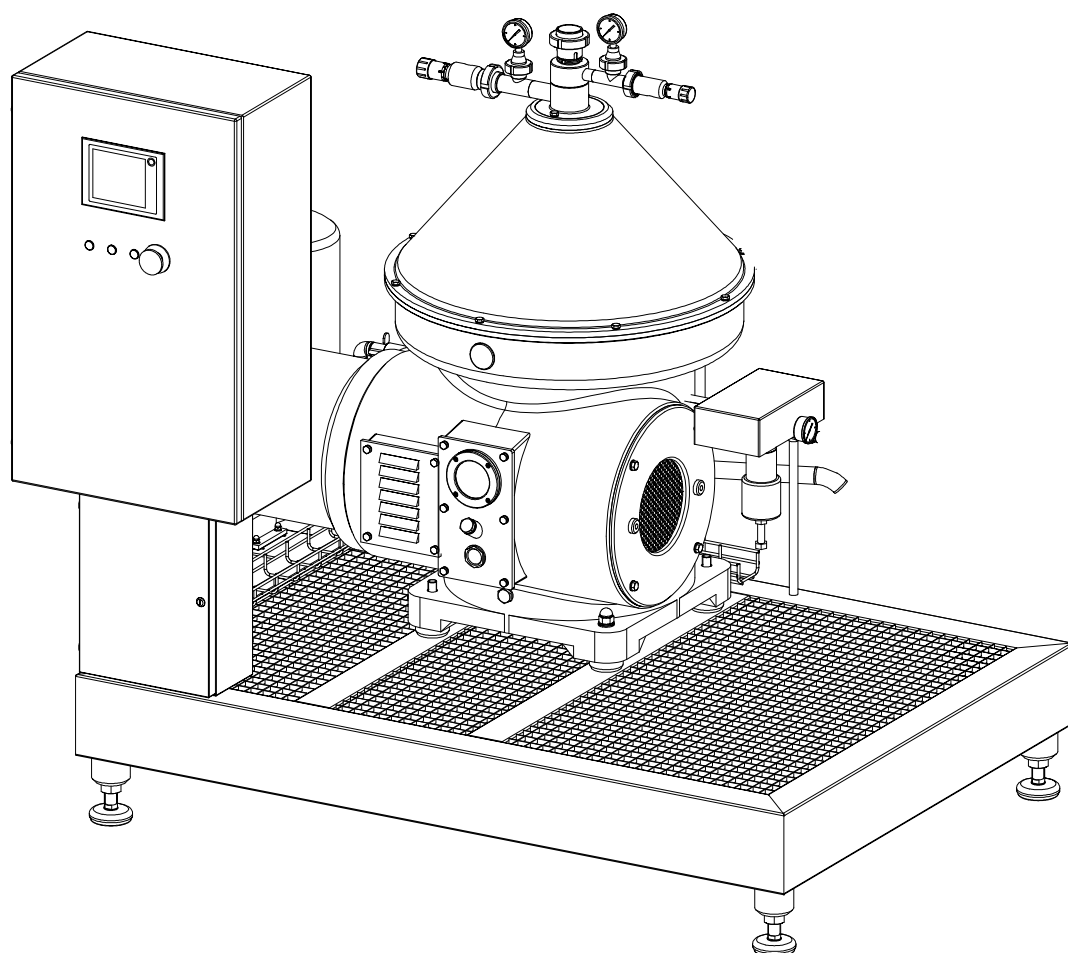
SELF-CLEANING CENTRIFUGAL SEPARATOR

Type: SE 40CX-Q2P2

FORM NO.: 00-00000

REVISION: 0

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



USE AND MAINTENANCE HANDBOOK

Self-Cleaning Centrifugal Separator SE 40CX

1. HANDBOOK USE

1.1. How to read the Handbook

This handbook gives information for the installation, use and maintenance of centrifugal separator, model SE 40, for cream concentration.

The machine must be used in accordance with the Handbook specification: it is recommended to read it with great attention before installing and setting at work the machine, without leaving out anyone of the prescriptions reported and paying particular attention to the messages in the “text squares”. The respect of the reported rules and recommendations permit a safe use and appropriate service.

The use and maintenance Handbook is an integrant part of the machine: it's necessary to conserve it complete and in a safe place during all the machine life, also when changing the machine user.

1.2. How to bring up-to-date the Handbook

It is recommended to bring constantly up-to-date this Handbook, integrating with eventual other amendments, additions or modifications coming from the manufacturer.

It's better that eventual annotations and remarks are inserted only in the space intentionally predisposed at the end of this Handbook.

1.3. Handbook index

1. HANDBOOK USE	1-1
1.1. HOW TO READ THE HANDBOOK.....	1-1
1.2. HOW TO BRING UP-TO-DATE THE HANDBOOK.....	1-1
1.3. HANDBOOK INDEX	1-2
2. GENERAL INFORMATION	2-1
2.1. MANUFACTURER AND MACHINE DATA.....	2-1
2.2. TECHNICAL SERVICE	2-1
2.3. GLOBAL ASPECTS OF SAFETY	2-1
2.3.1. INSTALLATION.....	2-1
2.3.2. WARNINGS FOR THE OPERATORS	2-1
2.3.3. MAINTENANCE PROGRAMS	2-2
2.3.4. INVOLVED OPERATORS AND TECHNICIANS	2-2
2.3.5. MAIN WORKING MODES	2-2
2.3.6. FORESEEABLE ERRORS AND INCORRECT BEHAVIOURS.....	2-3
2.3.7. LIST OF USED SYMBOLS AND WARNINGS	2-3
2.3.8. SAFETY PRESCRIPTIONS	2-3
2.4. USED TERMS AND ABBREVIATIONS.....	2-6
2.5. RESPONSIBILITY	2-6
3. MACHINE DESCRIPTION	3-1
3.1. GENERAL DESCRIPTION	3-1
3.2. OPERATING PRINCIPLES.....	3-1
3.3. TECHNICAL CARD	3-3
3.4. NOISE LEVEL	3-4
3.5. DESTINATION AND FORESEEN PLACE OF USE.....	3-4
3.6. IMPROPER USES AND CONTRA-INDICATIONS	3-4
4. LIFTING, TRANSPORT, STORAGE	4-1
4.1. MACHINE DELIVERY	4-1
4.2. PACKING AND UNPACKING	4-1
4.3. LIFTING AND TRANSPORT OF THE PACKED MACHINE	4-1
4.4. LIFTING AND TRANSPORT OF THE MACHINE WITHOUT PACKING	4-2
4.5. WAREHOUSE STORAGE.....	4-4
5. INSTALLATION/PREPARATION TO START	5-1
5.1. ENVIRONMENT.....	5-1
5.2. WORKING NECESSARY SPACE	5-2
5.3. EQUIPMENT	5-2
5.4. LOCATION AND ASSEMBLY ON PLACE	5-2
5.5. LUBRICATION.....	5-3
5.5.1. BEARINGS AND GEARS LUBRICATION	5-3
5.5.2. LUBRICATION OF THREADS AND CONTACT SURFACES OF THE BOWL PARTS	5-5
5.6. SYSTEMS CONNECTION.....	5-5
5.6.1. ELECTRICAL SYSTEM CONNECTION	5-5
5.6.2. HYDRAULIC CONNECTION FOR OPERATING WATER	5-6
5.6.3. SEPARATOR HYDRAULIC CONNECTION	5-7
5.6.4. PNEUMATIC SYSTEM CONNECTION	5-8
6. BOWL AND INLET-OUTLET FLOW UNIT	6-1
6.1. BOWL ASSEMBLY	6-1

6.2.	INLET-OUTLET FLOW UNIT ASSEMBLY	6-11
6.3.	ADJUSTMENT OF PUMPS POSITION	6-13
6.4.	INLET-OUTLET FLOW UNIT DISASSEMBLY	6-13
6.5.	BOWL DISASSEMBLY	6-14
6.6.	BOWL VALVES.....	6-15
6.7.	HYDRAULIC SYSTEM FOR OPENING-CLOSING THE BOWL.....	6-17
7.	MACHINE START	7-1
7.1.	WARNINGS	7-1
7.2.	SAFETY SYSTEMS DESCRIPTION.....	7-1
7.2.1.	PROJECT DEVICES	7-1
7.2.2.	SHIELDS	7-1
7.2.3.	WARNING BILL-STICKINGS	7-1
7.3.	CONTROL, REGULATION AND SIGNALING DEVICES.....	7-3
7.3.1.	CONTROLS AND SIGNALS	7-3
7.3.2.	REGULATION DEVICES	7-6
7.3.3.	ALARMS	7-7
7.4.	FUNCTIONAL STOP OF SEPARATOR	7-8
7.5.	EMERGENCY STOP	7-8
7.6.	ENERGY SOURCES DISCONNECTION	7-8
7.7.	PRELIMINARY CHECKS	7-8
7.8.	STARTING UP INSTRUCTIONS	7-9
8.	MACHINE USE	8-1
8.1.	PERSONNEL TASKS	8-1
8.2.	SET-UP AND ADJUSTMENTS.....	8-1
8.2.1.	WARNINGS.....	8-2
8.2.2.	FIRST SETTING	8-2
8.2.3.	CREAM CONCENTRATION.....	8-2
8.3.	DISCHARGE CYCLES	8-3
8.4.	DISCHARGE CYCLE TIMES	8-5
8.5.	ORDINARY MAINTENANCE	8-7
8.6.	SEPARATOR CHEMICAL CLEANING	8-7
9.	GEAR	9-1
9.1.	VERTICAL SHAFT DISASSEMBLY (TAB. 06).....	9-1
9.2.	VERTICAL SHAFT ASSEMBLY (TAB. 06)	9-1
9.3.	HORIZONTAL SHAFT DISASSEMBLY (TAB. 07).....	9-2
9.4.	HORIZONTAL SHAFT ASSEMBLY (TAB. 07)	9-3
9.5.	FLUID COUPLING	9-4
10.	MAINTENANCE	10-1
10.1.	REMARKS	10-1
10.2.	CORRECTIVE AND PREVENTIVE MAINTENANCE	10-1
10.3.	TROUBLESHOOTING: CAUSES AND REMEDIES	10-3
11.	DESACTIVATION/RESALE	11-1
11.1.	DISASSEMBLY/SCRAPPING.....	11-1
11.2.	COMPONENTS AND MATERIALS ELIMINATION	11-1
11.3.	RESALE	11-1
12.	SPARE PARTS	12-1
13.	DRAWINGS AND DIAGRAMS	13-1

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 40C
Description: Machine for cream concentration.
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 Handbook. For the cases not considered and for every kind of assistance, it's recommended to directly contact the manufacturer with reference to the data reported on the plate fixed on the machine frame:

- Machine model
- Manufacturing N.
- Manufacturing year

The correct reference guarantee fast and precise answers.

In case the machine maintenance has been made not in conformity with the provided instructions, with not original spare parts or without written authorization of the manufacturer, or in a manner that compromise the integrity or modify the characteristics of the machine, SEITAL will consider itself exempted from every 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 describe the safety and prevention measures due to the user.

2.3.1. Installation

For the installation and environmental cautions refer to Chapter 5.

2.3.2. Warnings for the operators

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

2.3.3. Maintenance programs

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

2.3.4. Involved operators and technicians

List of the qualifications of employed personnel.

Simple operator

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

- working efficiency control and adjusting by manual valves, good operation check;
- execution of cleaning cycle, 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 Handbook, are well known from the whole personnel.

2.3.7. List of used symbols and warnings

The symbols used as stickers on the machine, to point out the dangers during use and maintenance are described at § 7.2.3.

In the following pages of the Handbook the 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 6.500 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).

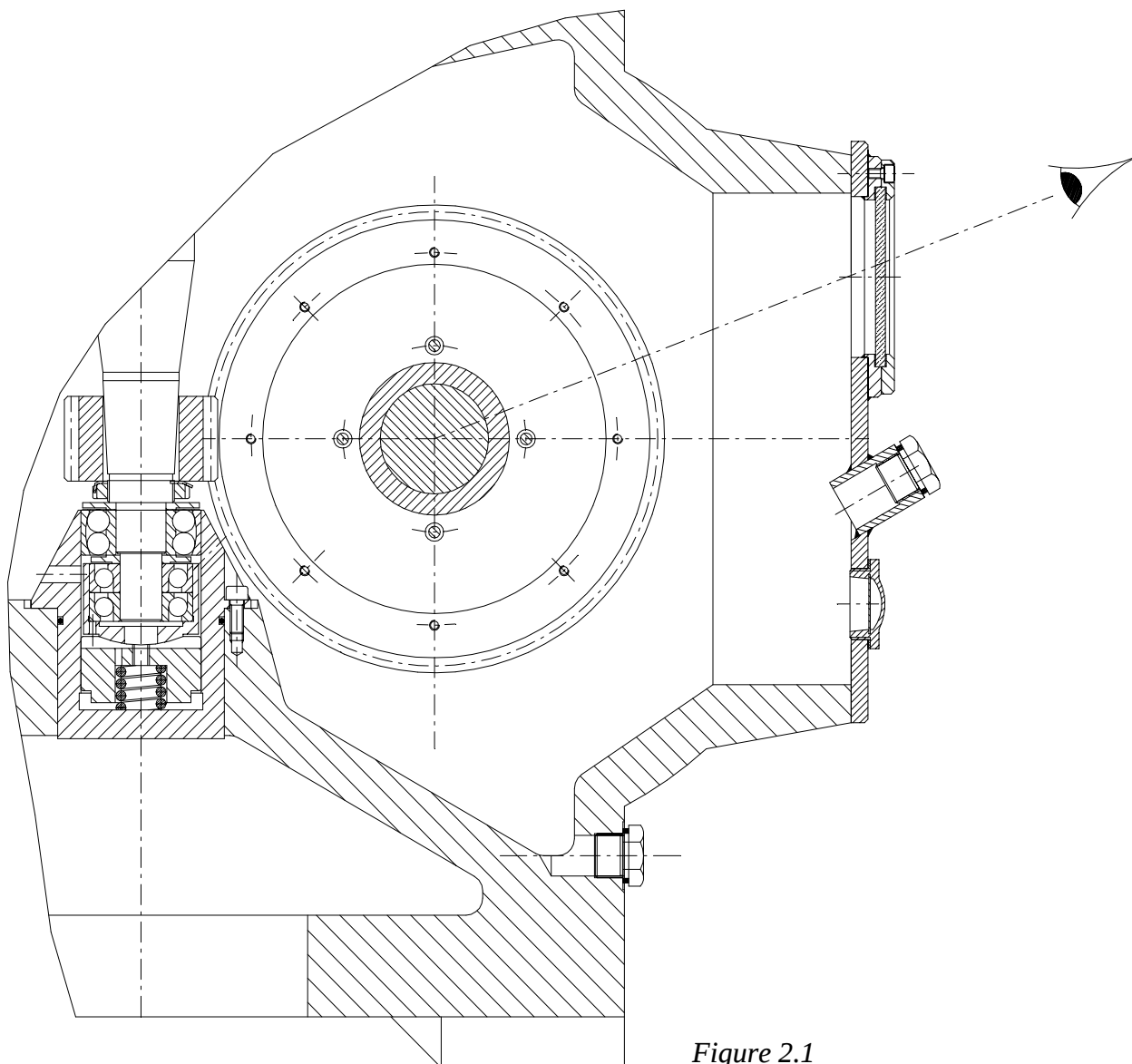


Figure 2.1

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.

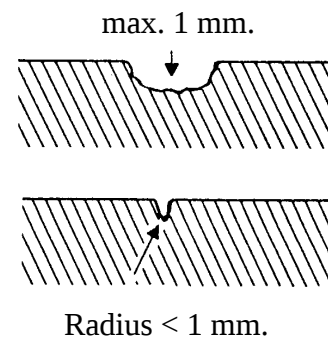


Figure 2.2

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 Handbook are in conformity with the International System of measurement units SI.

Terms not used currently and present in this Handbook.

- Light phase: liquid obtained in separation, having density lower than the inlet product. In this case the light phase is the cream.
- Heavy phase: liquid obtained in separation, having density higher than the inlet product. In this case the heavy phase is the buttermilk.
- Sludges: solid residuals obtained from separation process. They accumulate in the external part of the bowl called sludge chamber.
- Operating water: water that fulfil 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 Handbook 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 40C is a self-cleaning centrifugal separator for cream clarification.

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, an hydraulic coupling, ball bearings, etc.
- motor
- manual brake
- sight glass to check the movement of the gear (bowl) and oil gauge glass
- bowl
- annular 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 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, 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 programmer unit regulate by a PLC which controls the opening and closing water solenoid valves. Various automatic, independent working cycles may be selected to perform partial and/or total discharges during separation and washing. By setting the PLC it is possible to regulate the discharge quantity, the time between two following discharges and the sequence between partial and total discharges. The programmer unit can realize also 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); product ricirculation. 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.

The ejected sediments are collected into an outer anular chamber where they are drained away by gravity through a pipe.

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.).

The electric control panel is equipped with a mimic with optical signals of the separator working main phases and an ammeter which indicates motor current absorption.

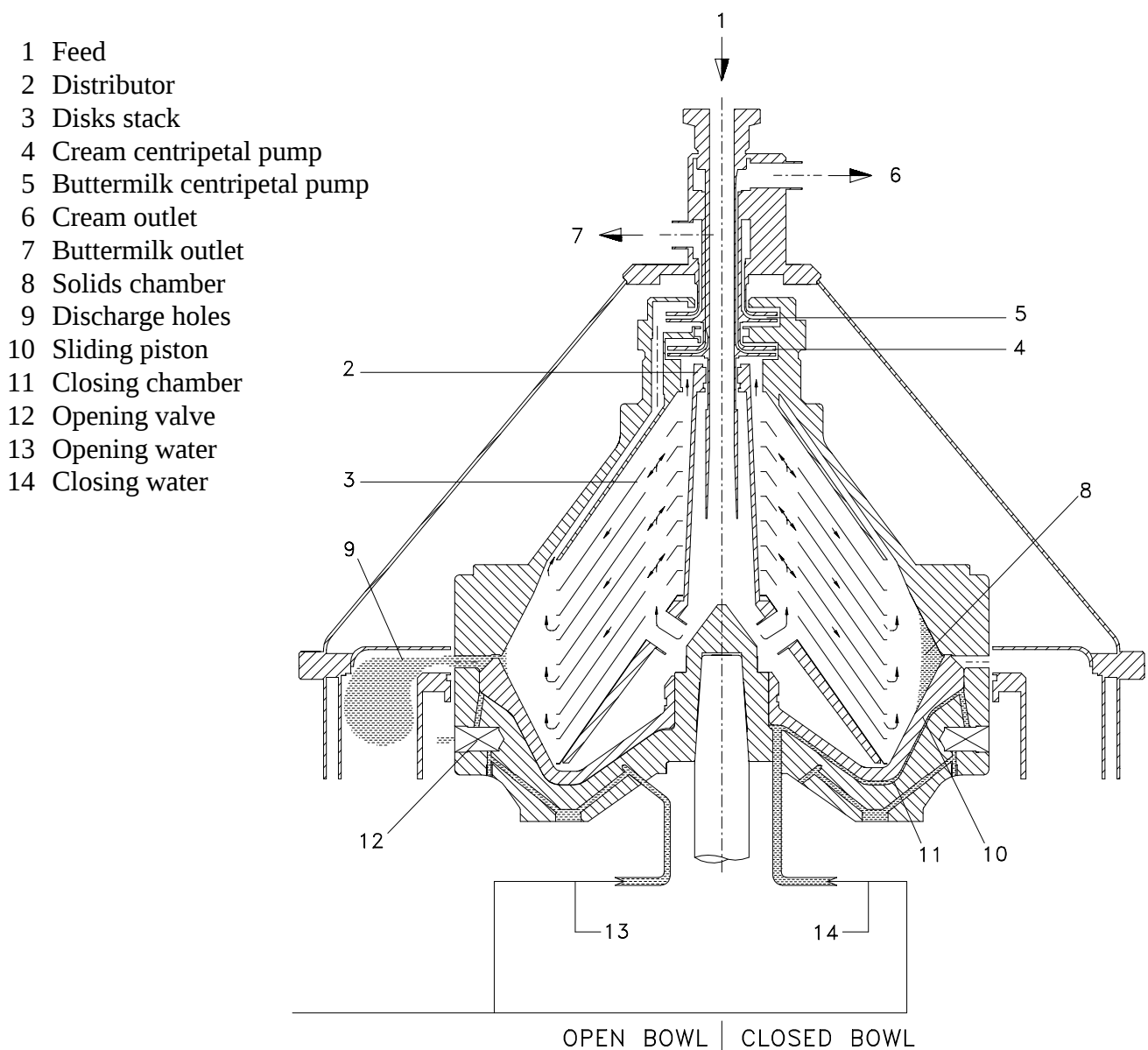


Figure 3.1

3.3. Technical card

Overall dimensions (ref. Tab. 20):

Width:	1.520 mm.
Length:	1.870 mm.
Height:	1.815 mm.

Weights:

Bowl weight:	310 kg.
Separator net weight:	1.400 kg.
Weight of the unit on platform:	1.770 kg.

Operating features:

* Hydraulic capacity:	18.000 l/h
* Cream concentration capacity:	5.000 l/h
Solids chamber capacity:	8 l
Bowl speed:	6.500 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
Temperature process:	70 ÷ 80 °C

Electrical system features:

Motor power:	18,5 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

Hydraulic system features:

* Required feeding pressure necessary for a machine working at maximum capacity:	0,8 bar
* Maximum outlet pressure (cream and buttermilk):	5 bar
Minimum feeding pressure for operating water:	2 bar
Operating water consumption for each discharge:	~ 10 l

Pneumatic system features:

Maximum feeding pressure:	10 bar
Operating pressure:	6 ÷ 8 bar
Minimum feeding 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, on the characteristics of the product and on physical parameters of the process.

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 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 (6.500 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 specifically 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);
- forks 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).

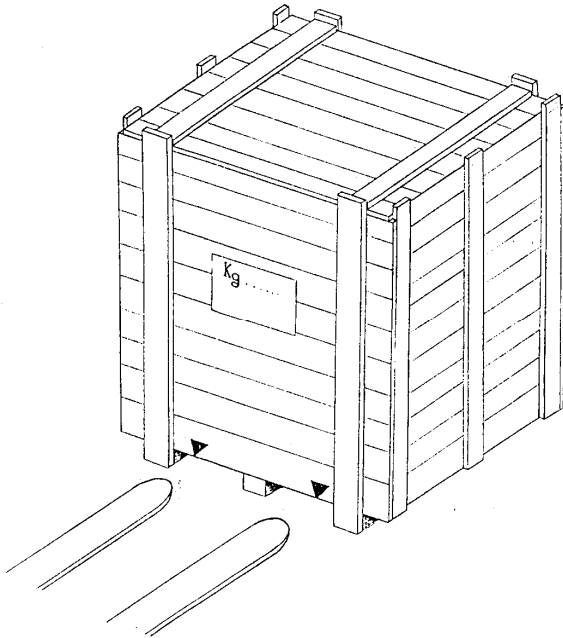


Figure 4.1

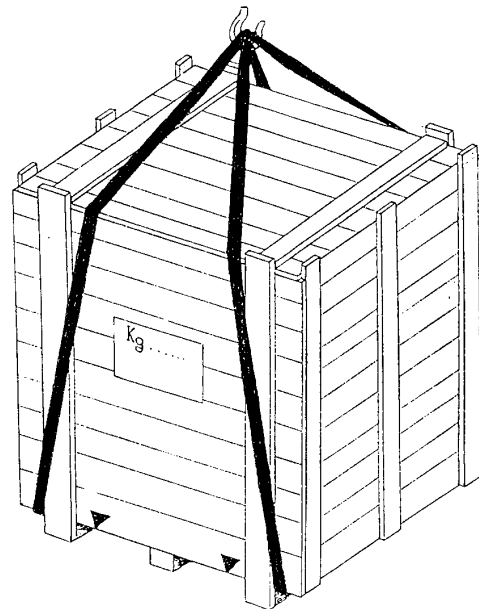


Figure 4.2

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 (ca. 1.700 kg.);
- 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.

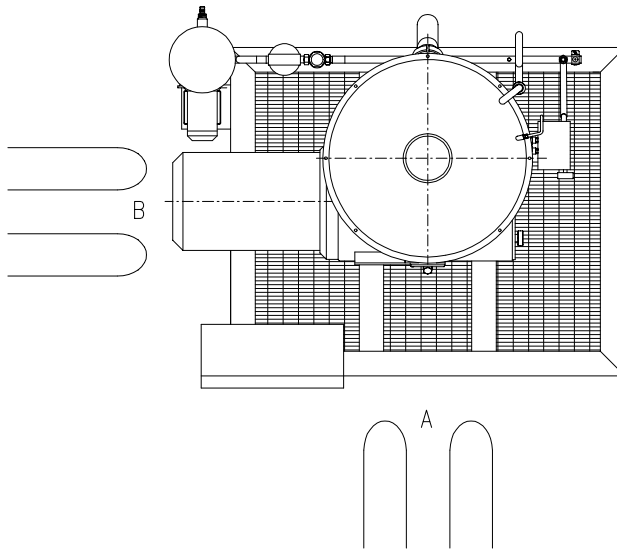


Figure 4.3

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. 310 kg);
- lift the whole with a bridge crane, crane or hoist.

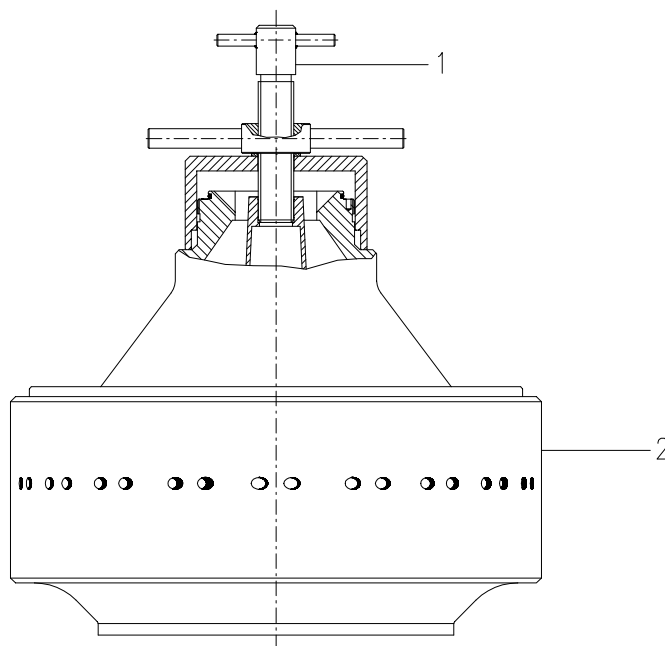


Figure 4.4

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), after it has already worked at least once, perform the following operations:

- accurately clean the separator;
- dry with clothes and greased all the bowl parts and the unpainted parts of the machine, to avoid corruptions;
- 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;
- close the operating water cocks and check that losses are not present.

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

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 40C 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, foreseeing 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 include:

- 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 unit, 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 B 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).

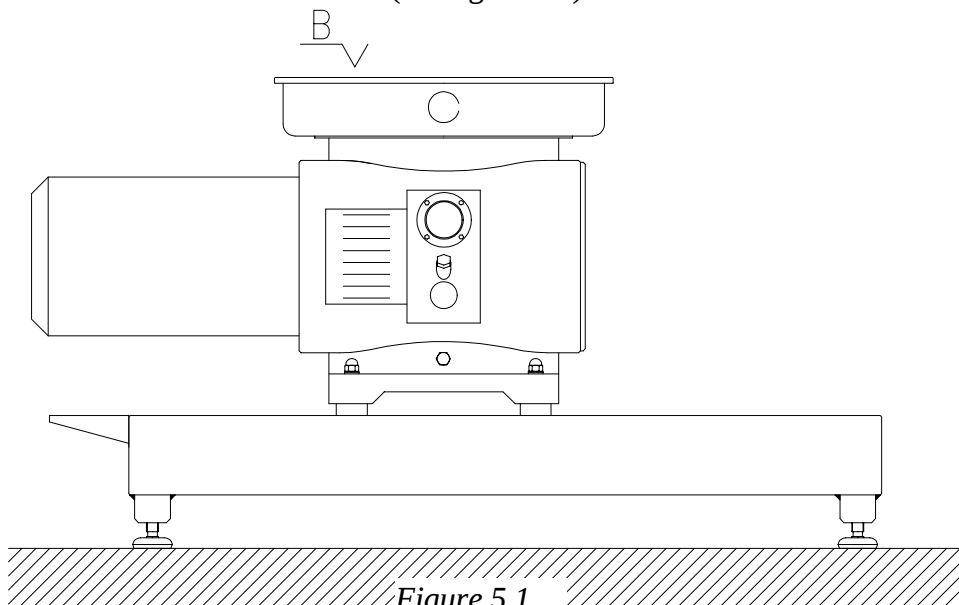


Figure 5.1

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

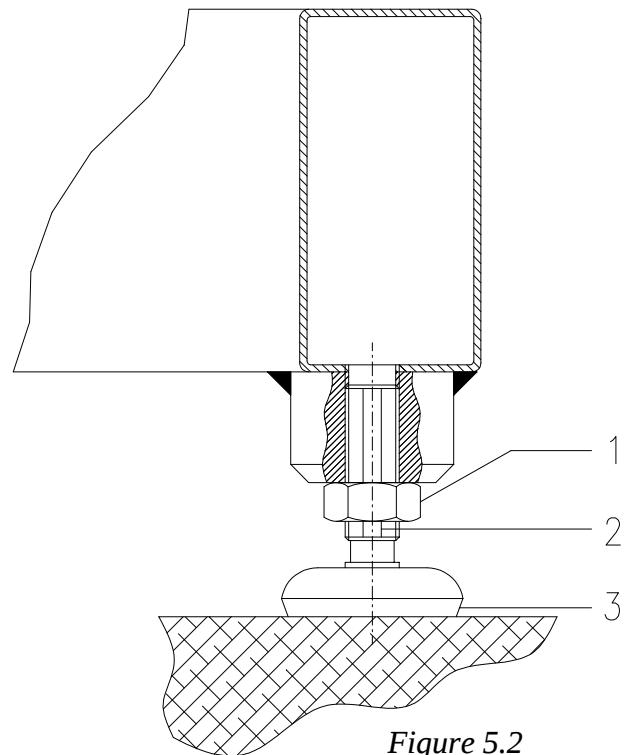


Figure 5.2

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

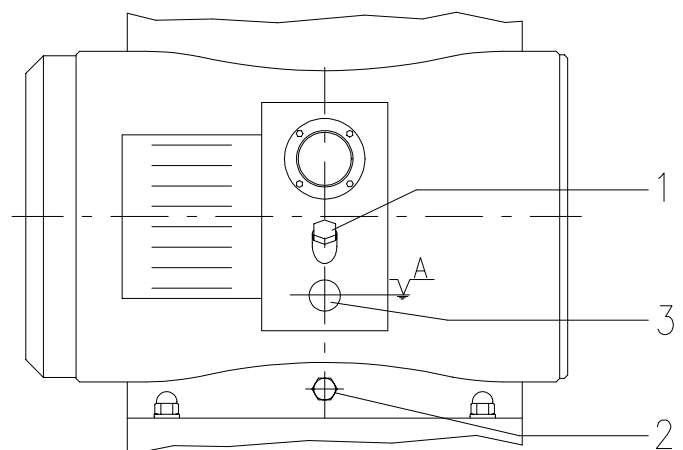


Figure 5.3

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

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 synthetic oil.

Oil satisfying the previous qualifications:**AGIP Blasia 220**

API DT-220

BP Energol GR-P 220

CASTROL Alpha SP 220

ELF Reductelf SP 220

ESSO Spartan EP 220

GULF EP Lubricant HD 220

IP Mellana oil 220

MOBIL Mobilgear 630

Q8 Goya 220

SHELL Omala oil 220

TAMOIL Carter EP lubricant 220

TEXACO Meropa 220

TOTAL Carter EP 220

OIL CHANGE

The first time change the oil after 300 operating hours and then once every 1500 operating hours; however never let pass a period longer than six months (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.

ATTENTION

The oil change in the fluid coupling must be performed following the instruction in the § 9.5 and in the use and maintenance handbook of fluid coupling

AFTER LONG REST OF SEPARATOR

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

5.5.2. Lubrication of threads and contact surfaces of the bowl parts

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

It is recommended the use of the following lubricants:

for food industry

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

for chemical industry

- Molykote G
- Molykote G Rapid

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

5.6. Systems connection

5.6.1. Electrical system connection

ATTENTION

Electrocution danger

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

The 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 $2 \div 2,5$ 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.

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 1,8 ÷ 2.

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 (06.280.0 - 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.

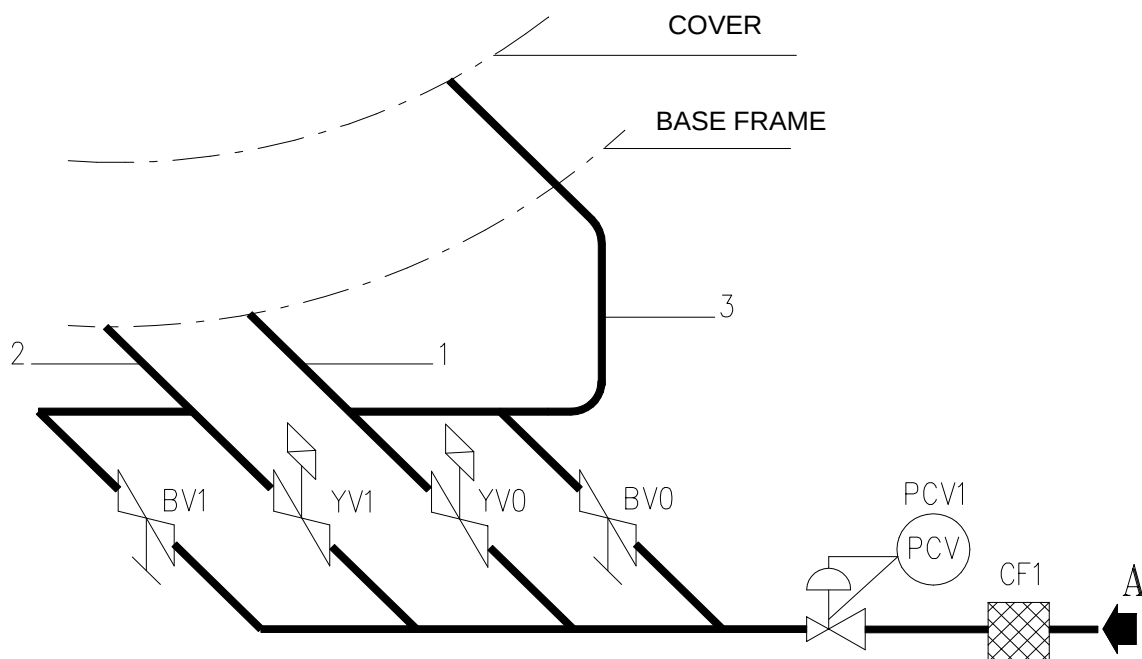


Figure 5.4

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

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

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. 5.5). 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.

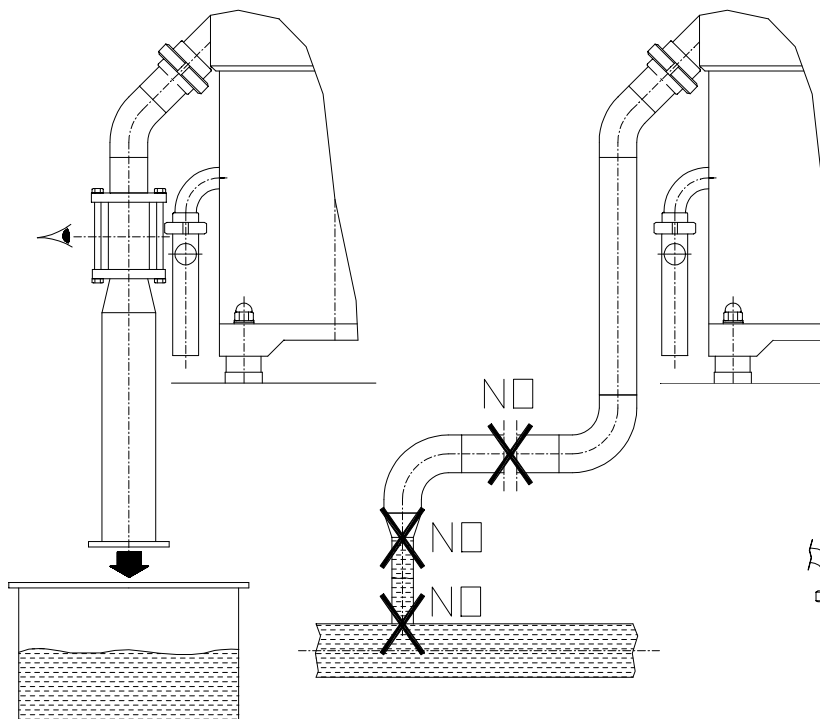


Figure 5.5

The eventually present drain traps (cover discharge, operating water discharge, etc.) have not to be totally connected by pipes, to check eventual leakages (fig. 5.6). 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.

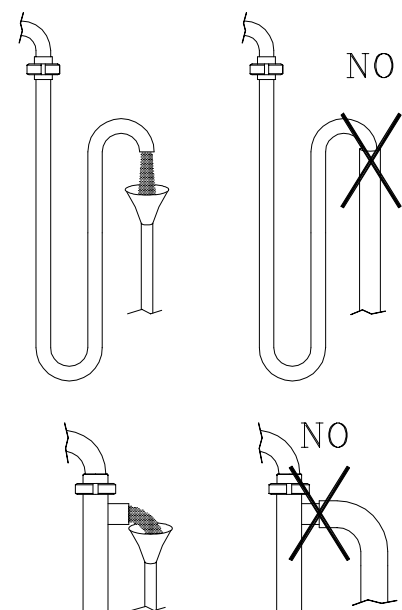


Figure 5.6

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
- 8 - 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 - OR gasket - distributor ring
- *20 - Distributor ring
- 21 - Screw

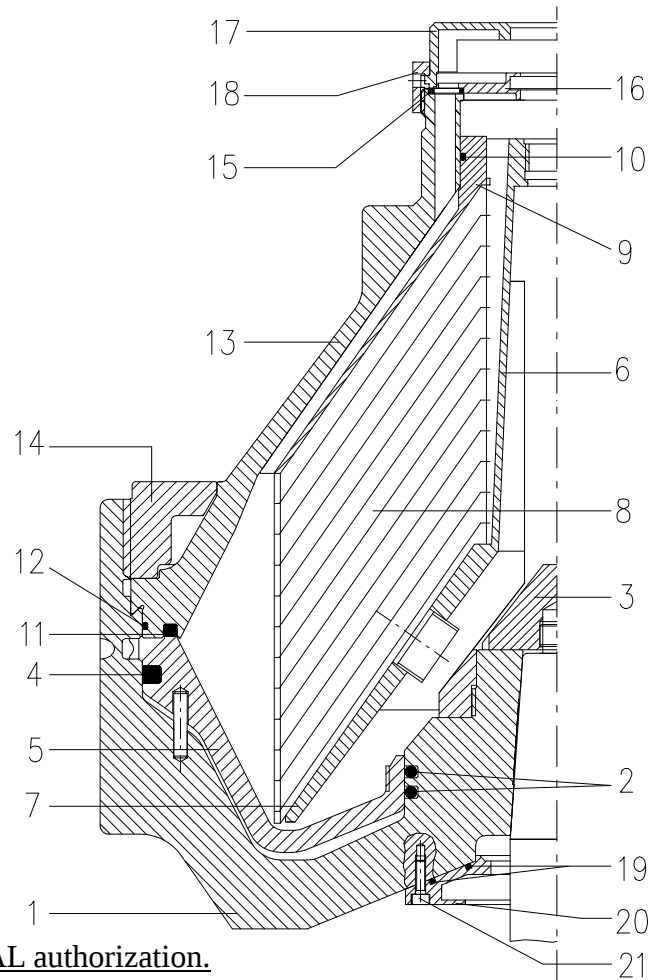


Figure 6.1

(*) Dismantle only according with SEITAL authorization.

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 (09.120.0), 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 (1), 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.

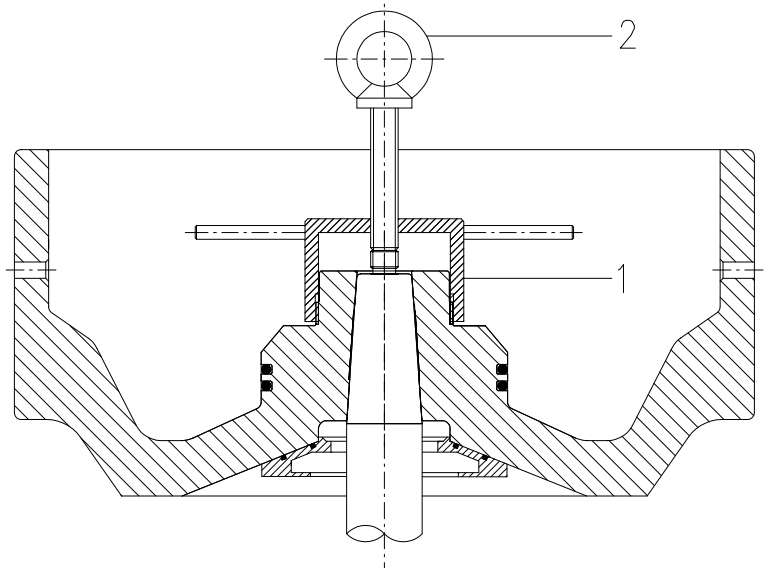


Figure 6.2

- 2) Carefully clean the grooves of bowl hub and insert the OR gaskets (Fig. 6.3).

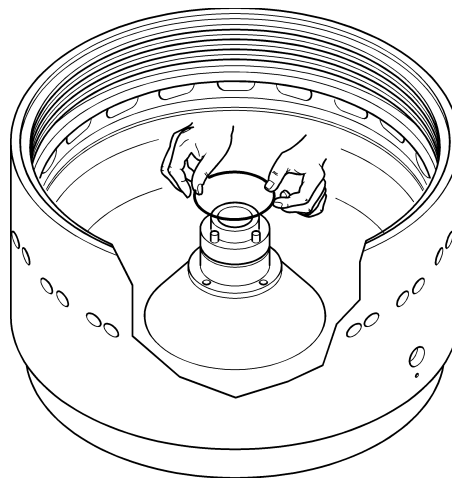


Figure 6.3

- 3) With the suitable spanner (09.170.0) 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 - part 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

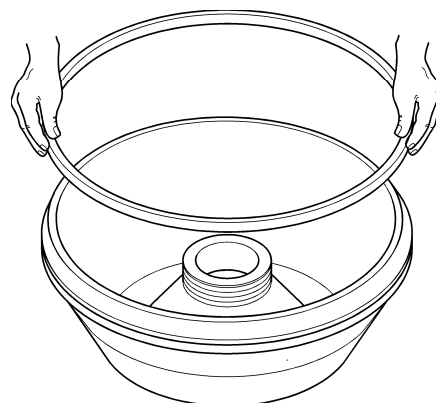


Figure 6.5

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

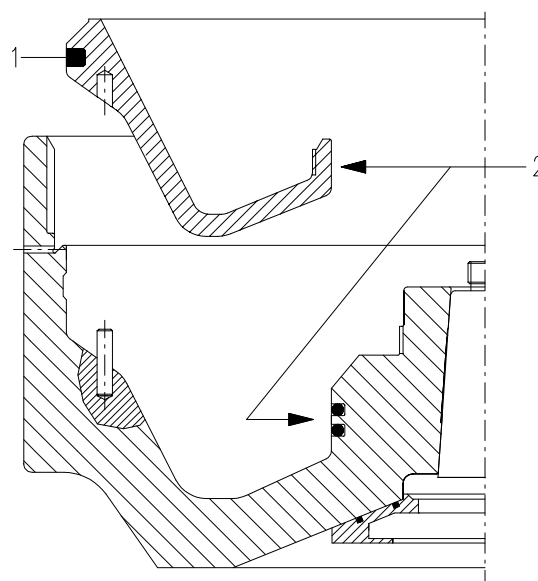


Figure 6.6

- 6) By the spanner (09.100.0), insert the **moving ram**. Proceed as explained below.

- Fasten spanner body (1) on the moving ram.
- Slightly screw threaded rod (2) until the threaded part length outside the spanner body is $4 \div 5$ 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 moving ram enter correctly into the corresponding holes in the bowl body.

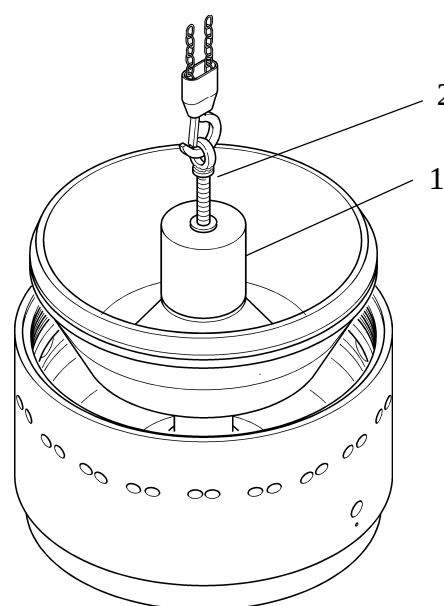


Figure 6.7

- 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 (fig. 6.8).
- 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 3 mm. under the hub of bowl body. This position will be easily reached if the steps from 3) to 6) have been correctly made.

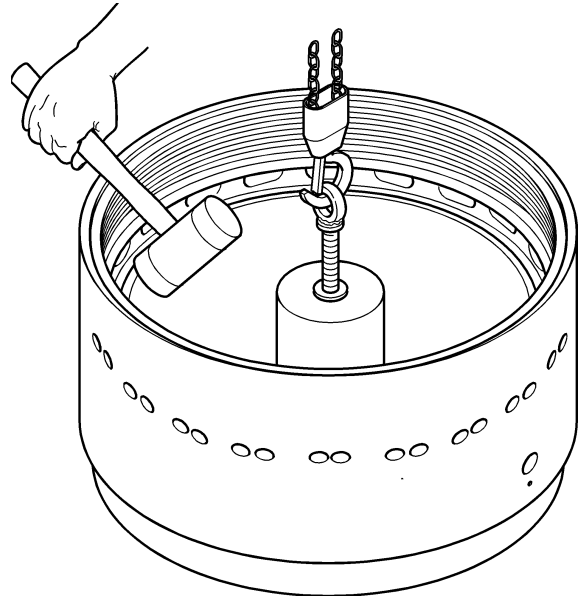


Figure 6.8

- 7) By the spanner (09.060.0 ÷ 09.070.0), screwed in the threaded hole present on the upper edge of the **distributor**, lift the piece and place it down on his seat (fig. 6.7). Check the guide pins of the bowl body correctly rest on the suitable seat of the distributor so that the whole piece is uniformly resting on the bowl body.

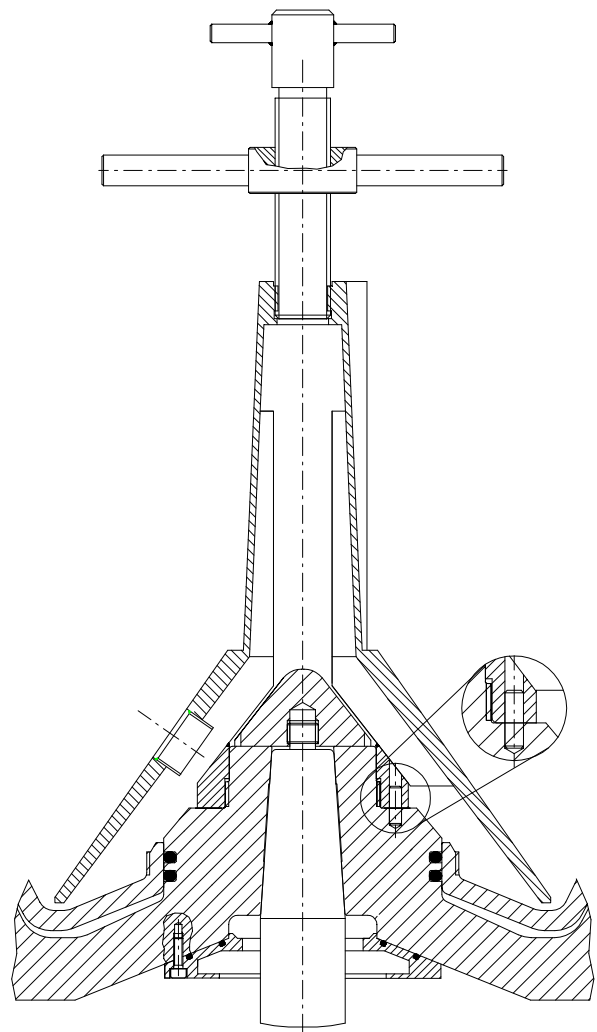


Figure 6.9

- 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 with higher spacers;
- the intermediate disks (8);
- the four top disks with higher spacers.

Take care to not change the sequence of the disks.

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

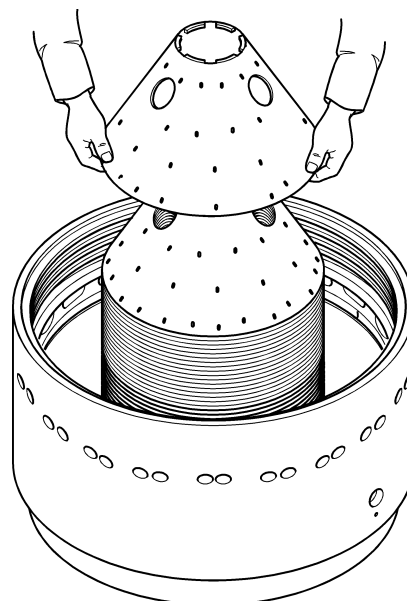


Figure 6.10

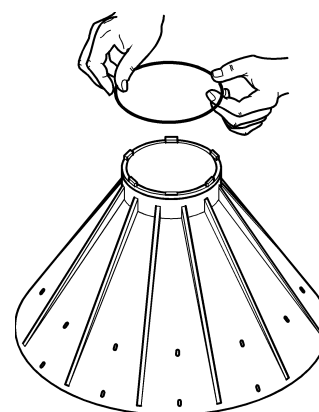


Figure 6.11

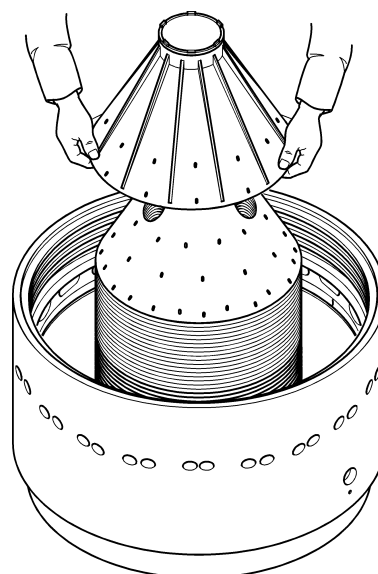


Figure 6.12

- 11) After carefully cleaning the grooves, insert the **nylon gasket** and the OR gasket 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).

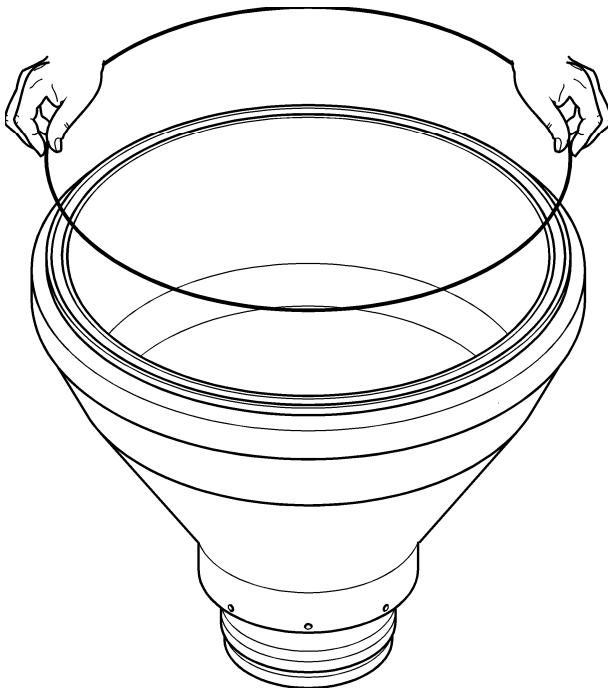


Figure 6.13

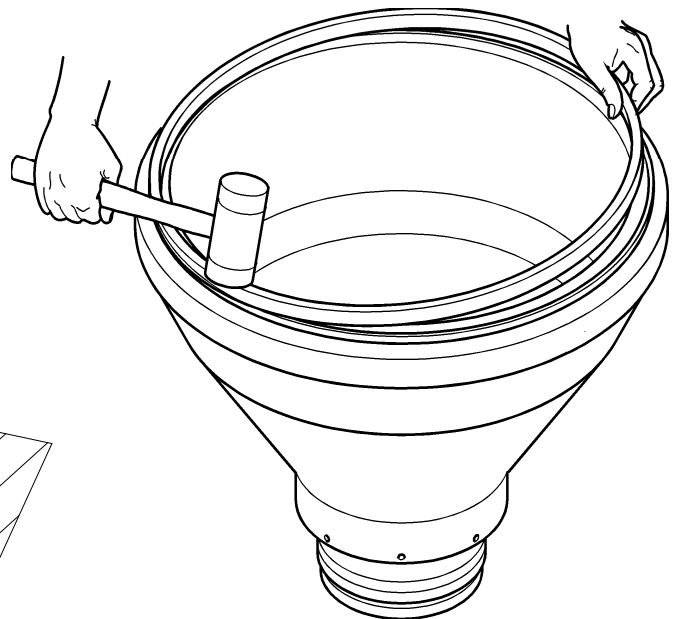


Figure 6.14

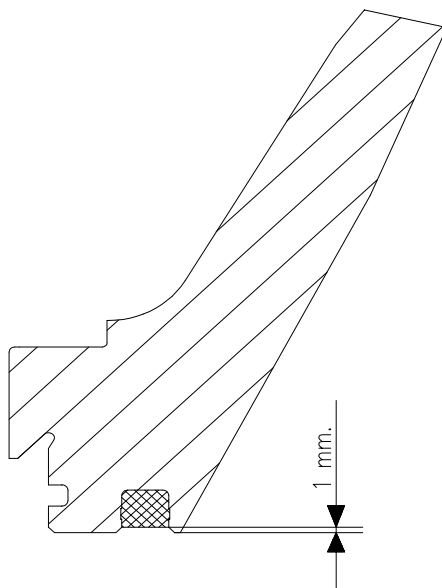


Figure 6.15

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 (1) on the bowl hood (fig. 6.16).
- Slightly screw threaded rod.
- Lift the piece by hand or by hoist and place it down into the bowl body; take care that the “0”marks of the two pieces are aligned (fig. 6.17).
- 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.

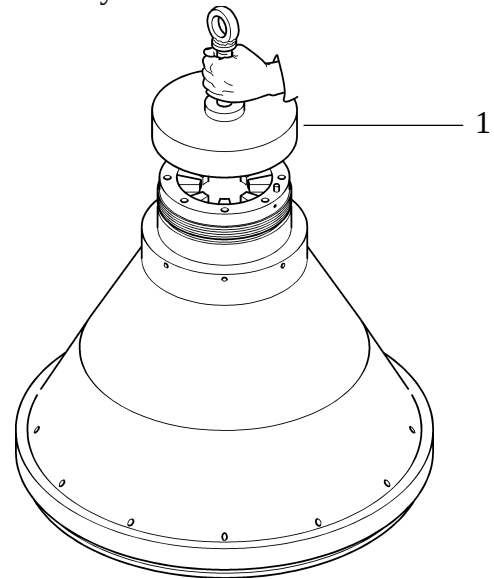


Figure 6.16

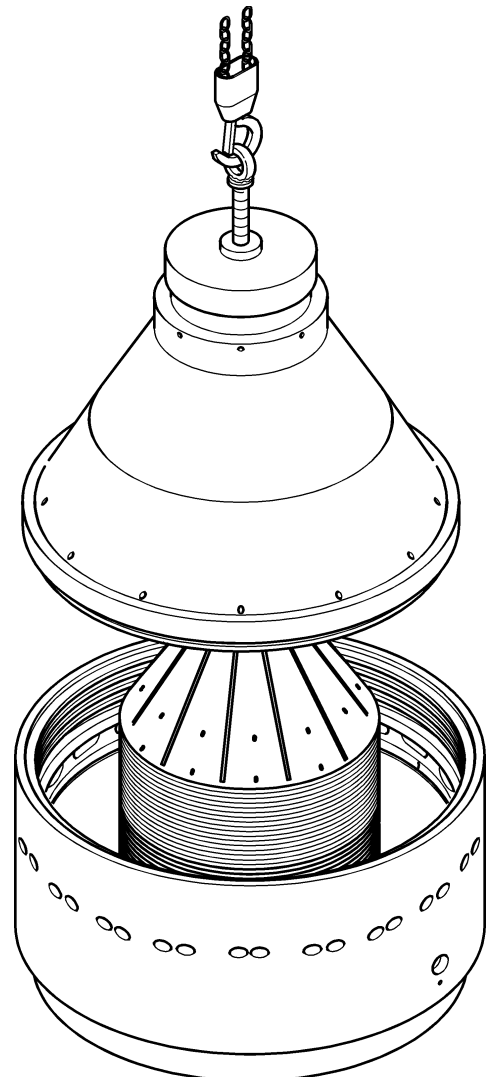


Figure 6.17

14) By the suitable spanner (09.060.0 ÷ 06.090.0), compress the **disks stack** (Fig. 6.18). To make this, perform the operations mentioned below.

- Lay bell (1) on bowl hood.
- Screw tight threaded rod (4) on the distributor.
- 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. 6.19).

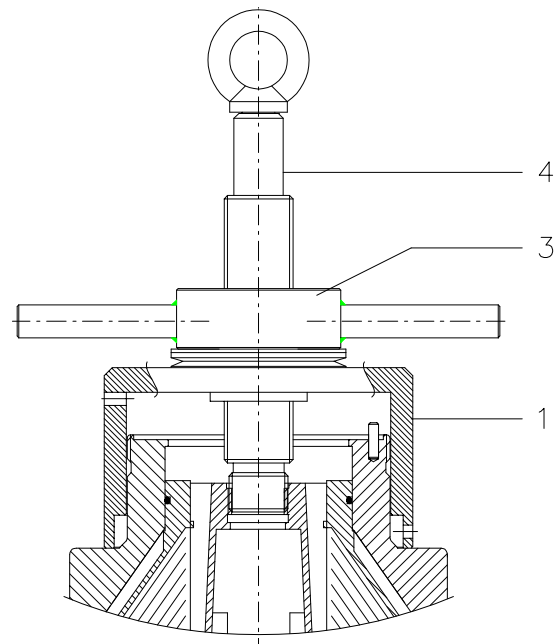


Figure 6.18

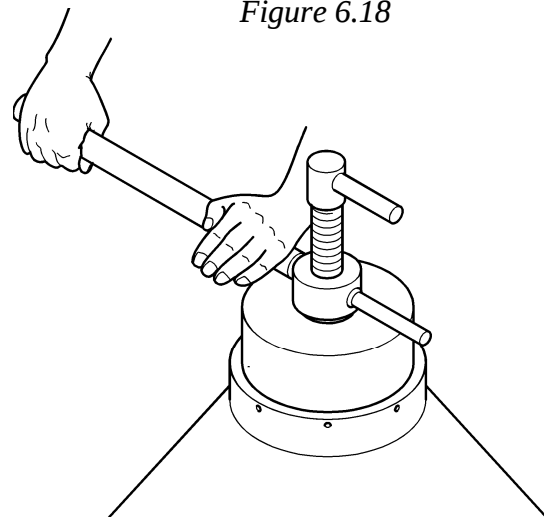


Figure 6.19

15) Smear antiscuff grease on threads of bowl body and big lock ring (Fig. 6.20 - part 1) and on contact surfaces between bowl hood and big lock ring (Fig. 6.20 - part 2).

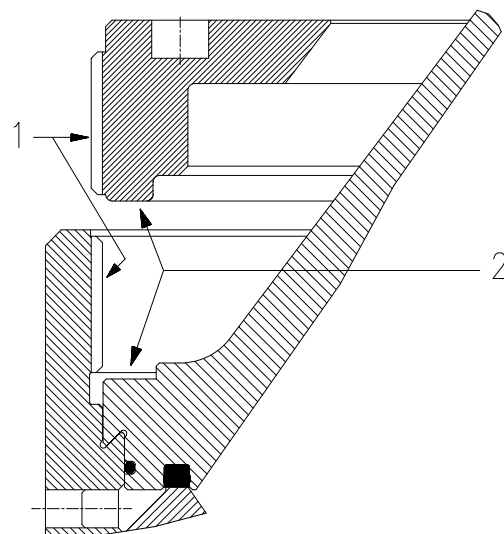


Figure 6.20

- 16) By the spanner (09.150.0) screw the **big lock ring** (Fig. 6.20) 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.

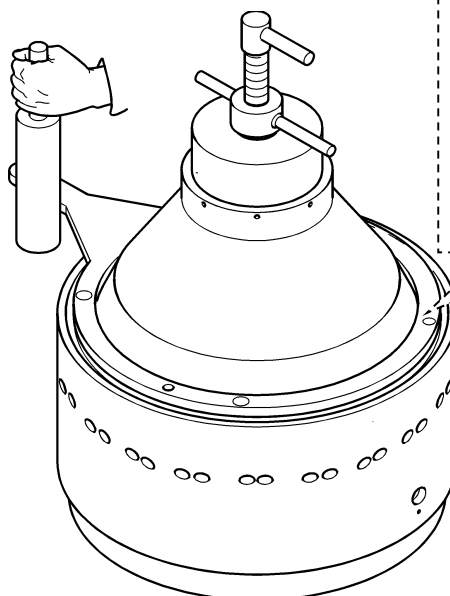


Figure 6.21

Before locking the big lock ring unscrew the 2 screws plug and locking the spanner (09.150.0) screwed the 2 screws TE M 12x 40 with washers Ø12 in the correspondent holes.

- 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. 6.18), 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. 6.27).

- 19) Insert the **feeding pipe** of product and the **cream centripetal pump** (Fig. 6.22).

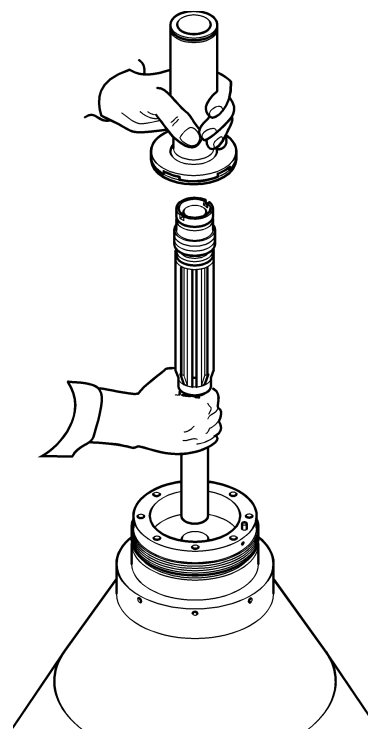
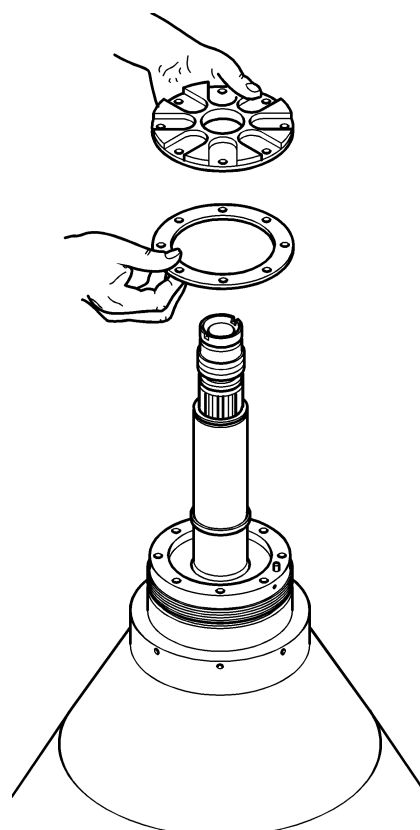
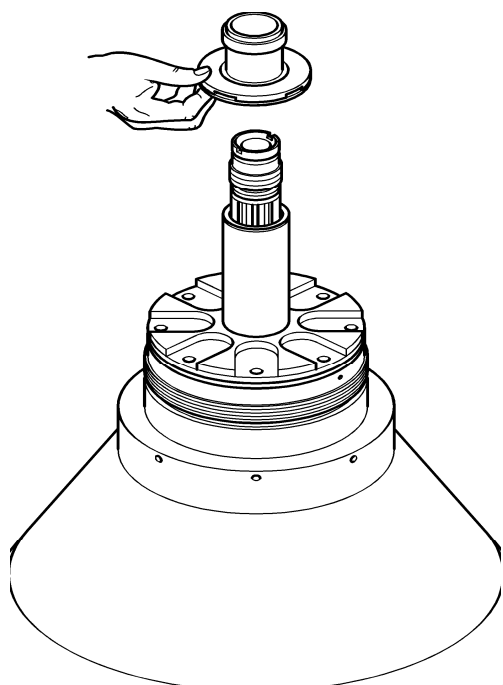
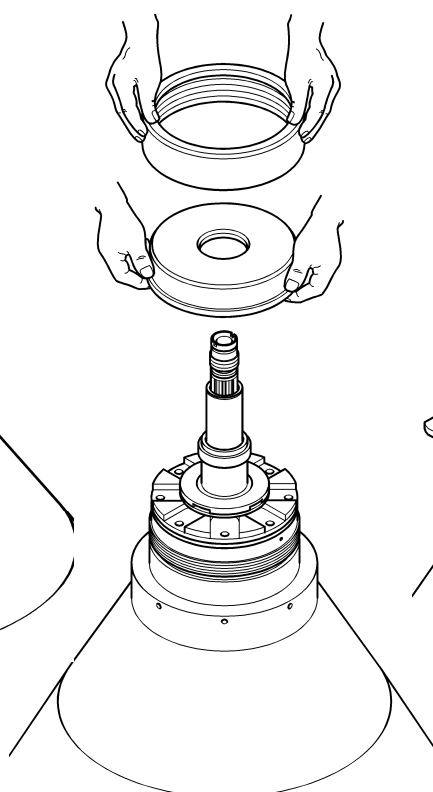
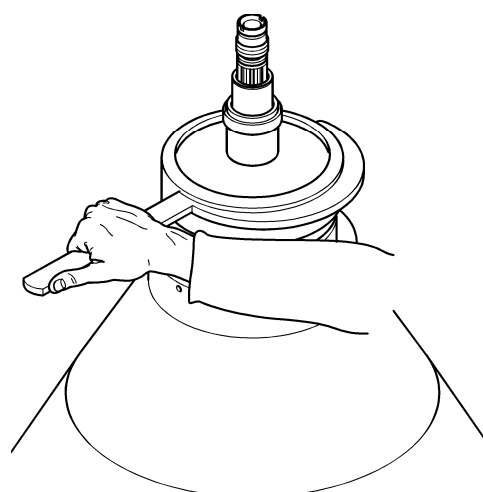


Figure 6.22

- 20) Apply the **drilled gasket of dividing disk** on the bowl hood (Fig. 6.23) checking that the pin on the bowl hood correctly enter in the suitable hole on the gasket.
- 21) Apply the **dividing disk** (Fig. 6.23) aligning the “0” with the “0” of the bowl hood.
- 22) Insert the **centripetal pump - buttermilk** (Fig. 6.24).
- 23) Place the **finned cover** (Fig. 6.25), and take care that the “0” marks of the two pieces are aligned.
- 24) By the spanner (09.190.0), screw (left-handed thread) the **small lock ring** (Fig. 6.26).
- 25) Verify that the bowl is free to rotate, before assembling the cover.

*Figure 6.23**Figure 6.24**Figure 6.25**Figure 6.26*

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. 6.27):

- 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 8 screws M10x30 (08.030.0 - Tab. 08) on cyclone.
- 3) Assemble spacers (7) on body (9).
- 4) Apply on inlet-outlet body the OR gaskets (8, 12).
- 5) Insert body (9 and 13) on the feeding pipe (1), adapting it on buttermilk pump (5) and on the correspondent seat on the cover.
- 6) Screw hardly the two screws (04.100.0 - Tab. 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 the OR gasket (16) then screw the nut (17) on the feeding pipe - left-handed thread - using the spanners (09.200.0).
- 9) Apply on the shutters (22 and 27) the OR gaskets (23 and 28).
- 10) Insert the shutters (22 and 27) in the micrometric valve body (25 and 29) and to lock the shutters, screw the screws (26 and 30) in the appropriate holes of the valve body.
- 11) Mount on the inlet-outlet body (9 and 13) the micrometric valves and the manometers (21) with appropriate gasket (18, 19, 20) on relative fittings.

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.

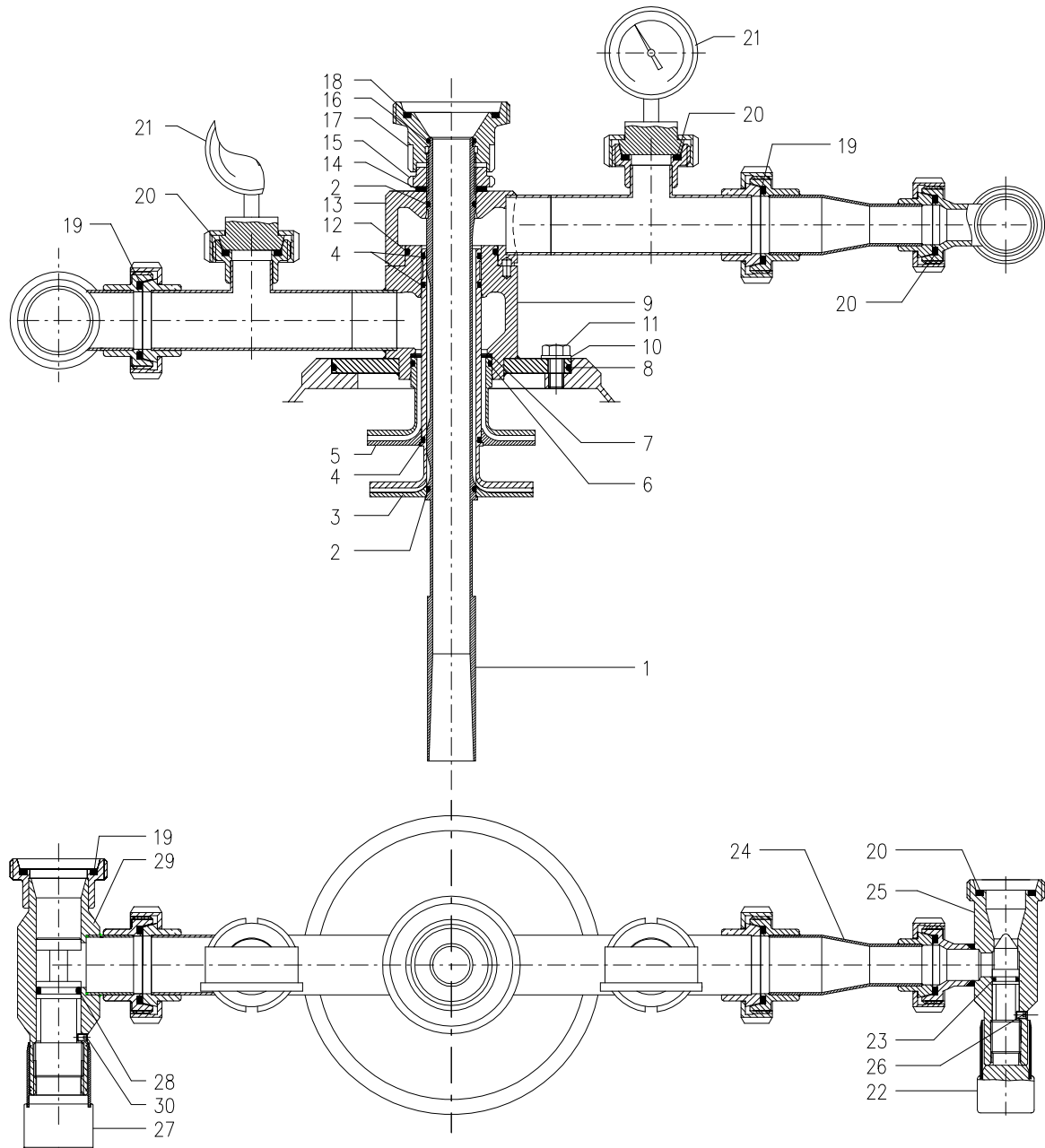


Figure 6.27

- | | |
|---------------------------------|--|
| 1 - Feeding pipe | 16 - OR gasket - nut |
| 2 - OR gasket - feeding pipe | 17 - Feeding pipe nut |
| 3 - Cream pump | 18 - Gasket DN50 |
| 4 - OR gasket - cream pump | 19 - Gasket DN40 |
| 5 - Buttermilk pump | 20 - Gasket DN25 |
| 6 - OR gasket - buttermilk pump | 21 - Manometer |
| 7 - Spacer | 22 - Cream shutter |
| 8 - OR gasket - body | 23 - OR gasket - cream shutter |
| 9 - Inlet-outlet body (lower) | 24 - Reduction DN40-DN25 |
| 10 - Washer | 25 - Cream micrometric valve body |
| 11 - Screw | 26 - Shutter blocking screw M5x 6 |
| 12 - OR gasket - body | 27 - Buttermilk shutter |
| 13 - Inlet-outlet body (upper) | 28 - OR gasket - buttermilk shutter |
| 14 - Nylon washer | 29 - Buttermilk micrometric valve body |
| 15 - Threaded locking ring | 30 - Shutter blocking screw M5x6 |

6.3. Adjustment of pumps position

The correct position of pumps is shown by Fig. 6.28; the pumps are in the middle of the corresponding chamber of the bowl. This position is obtained by inserting a few spacers (7 - Fig. 6.27) between the buttermilk 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 technical card § 3.3. The total thickness of spacers is determined by the following relation:

Total thickness of spacers = 9 - A

To find "A" push down the heavy phase pump to the bottom of the corresponding bowl chamber. The distance (measured in mm) between the cover upper edge and the pump give the value of "A" (fig. 6.29). Extract all existing spacers before doing this measure.

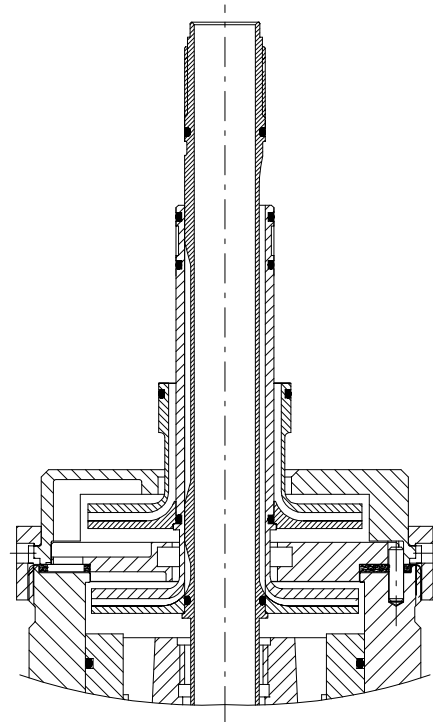


Figure 6.28

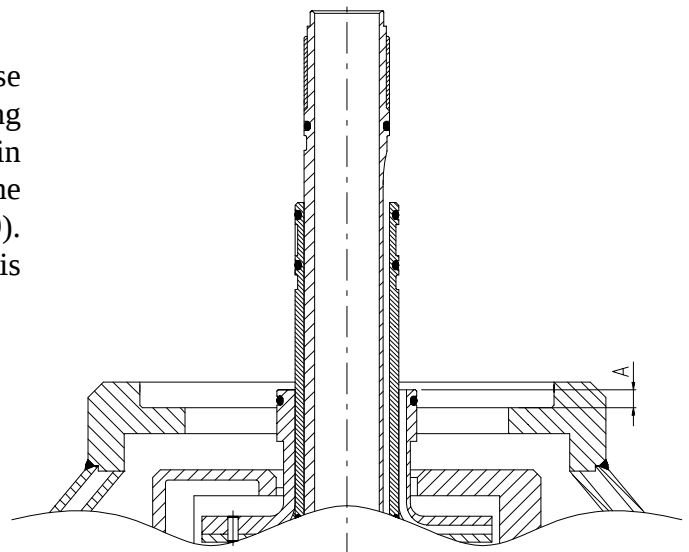


Figure 6.29

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. 6.27).

- 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 8 screws M10x30 (08.030.0 - Tab. 08).
- 8) Lift up cover by hands or hoist, paying attention to not damage the thread of feeding pipe.

6.5. Bowl disassembly

- 1) By the spanner (09.190.0), unscrew (left-handed thread) the **small lock ring**.
- 2) Remove the **finned cover**.
- 3) Take out the **buttermilk 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. 6.18). To make this, perform the above mentioned operations.
 - Lay bell (1) on bowl hood.
 - Screw tight threaded rod (4) on the distributor.
 - 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 - Fig. 6.18), 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 (09.150.0), to unscrew the **big lock ring** (Fig. 6.21), 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. 6.15). Proceed in this way:
 - Fasten spanner body (1) on the bowl hood.
 - Slightly screw threaded rod (4).
 - 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 ÷ 09.070.0), screwed in the threaded hole present on the upper edge of the **distributor**, lift the piece.
- 14) By the spanner (09.100.0), take out the **moving ram** (Fig. 6.7). Proceed in this way:
 - Fasten spanner body (1) 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 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 (09.170.0) and using the mallet (09.030.0), unscrew the **bowl body nut** (left handed thread).
- 16) By the spanner (09.120.0), extract the **bowl body** (Fig. 6.2).
 - Fasten spanner body (1) on the bowl body.
 - Screw the eyebolt (2).
 - If the piece raises with difficulty and the threaded rod is hard to screw, give some blows with plastic hammer (not rubber) on the eyebolt.
 - Start again screwing the rod until a complete release of the piece.
 - Acting on the eyebolt, lift the bowl body by hand or by hoist.

6.6. Bowl valves

On the bowl there are three valves (fig. 6.30), placed at 120° 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 - valve body
- 4 - OR gasket - external - valve body
- 5 - OR gasket of valve ram
- 6 - Nylon gasket

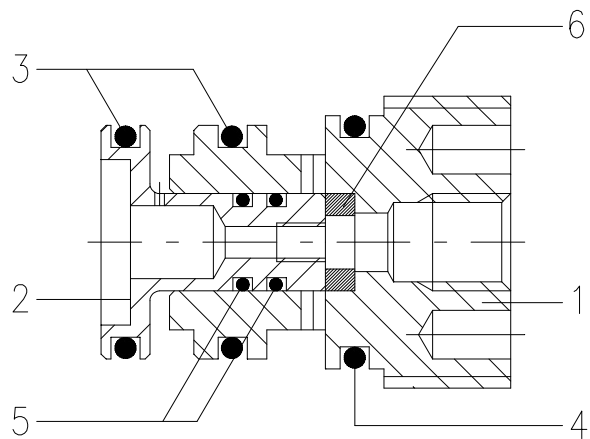


Figure 6.30

Disassembly

- Remove the port plug for bowl valve (08.050.0 - 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 (fig.6.31).
- 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. 6.32) by pulling spanner (09.040.0) after screwing its threaded end on small ram.

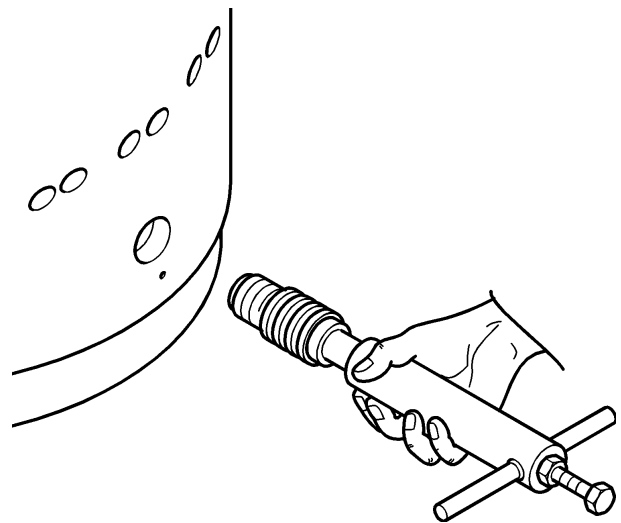


Figure 6.31

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.

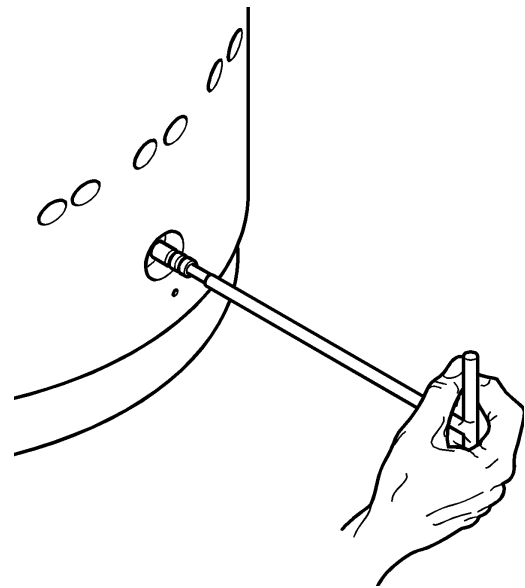


Figure 6.32

6.7. Hydraulic system for opening-closing the bowl.

The bowl (Fig. 6.33) 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.

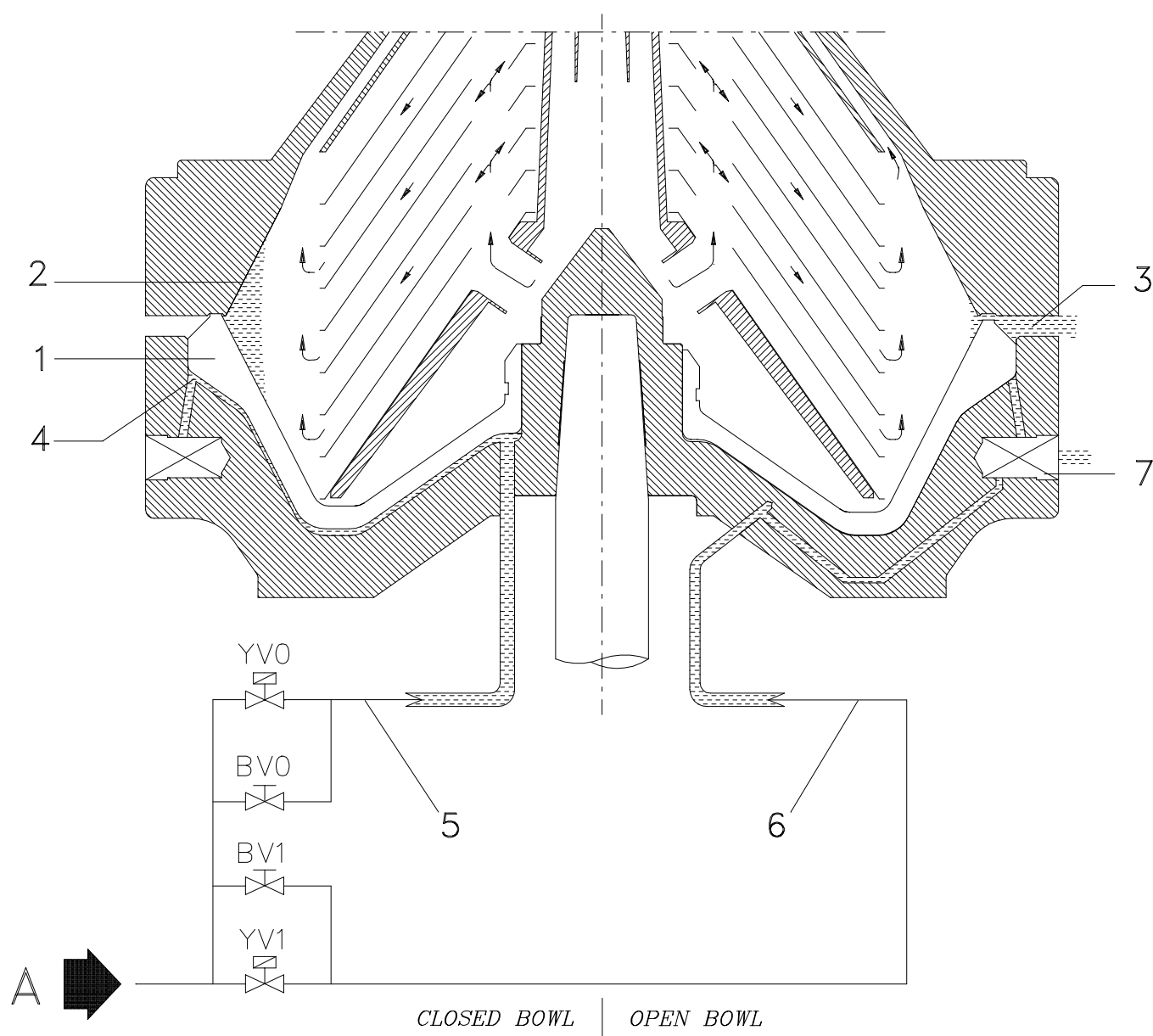


Figure 6.33

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

- YV0 - Closing water solenoid valve
- YV1 - Opening water solenoid valve
- 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 requisites 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 systems 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 permit to check if bowl is rotating or not.

7.2.2. Shields

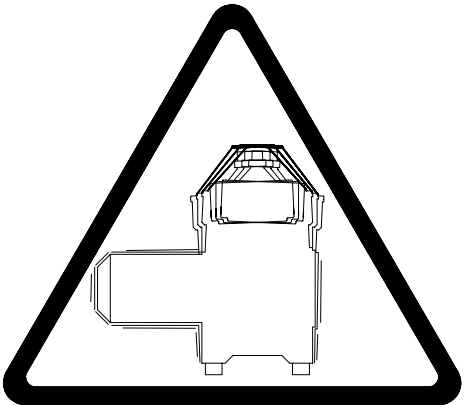
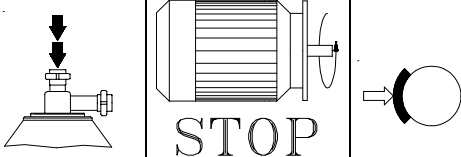
The following shields are presents:

- a series of steel shields are fixed with screws that totally prevent the access to the moving internal parts of the machine:
 - n° 1 port of hydraulic coupling;
 - n° 1 port of gear chamber;
 - n° 1 bowl protection cover;
 - n° 1 plug to mount/remove the bowl valves;
- a motor protection cover.

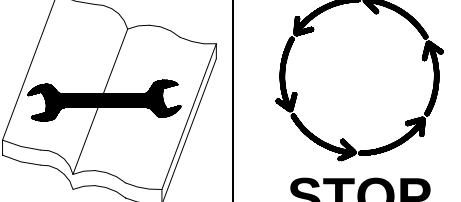
7.2.3. Warning bill-stickings

In accordance with EEC 89/392 directives and his amendments, the following notice bill-stickings has been predisposed (Tab. 22):

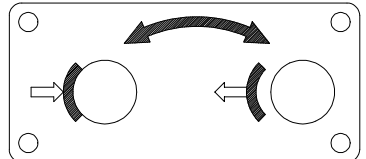
- On the bowl protection cover:

	IF <u>UNUSUAL VIBRATION</u> 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

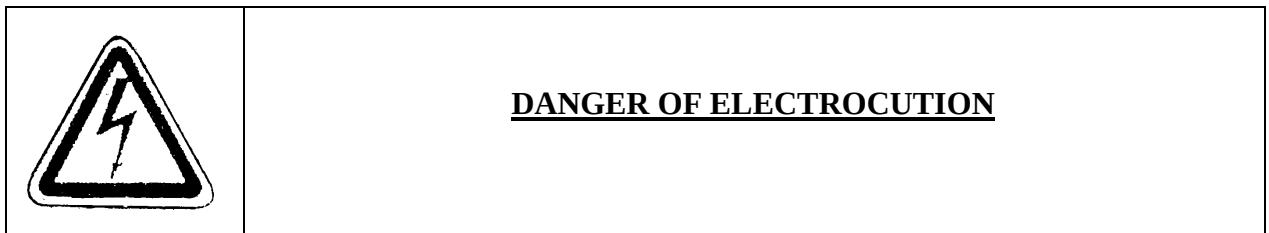
- On the bowl protection cover:

	<u>SAFETY ALERT</u> • 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).

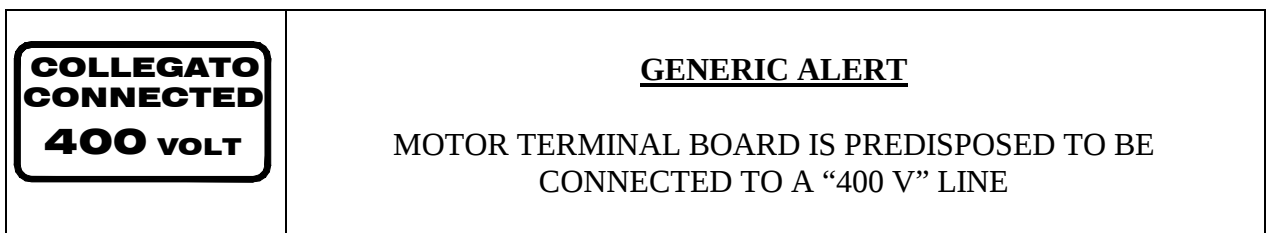
- Up the brake handwheel:

	<u>TO BRAKE:</u> TURN THE HANDWHEEL ANTICLOCKWISE <u>TO DISACTIVATE THE BRAKE:</u> TURN THE HANDWHEEL CLOCKWISE
---	---

- On the electric panel door:



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



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 substituted 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.

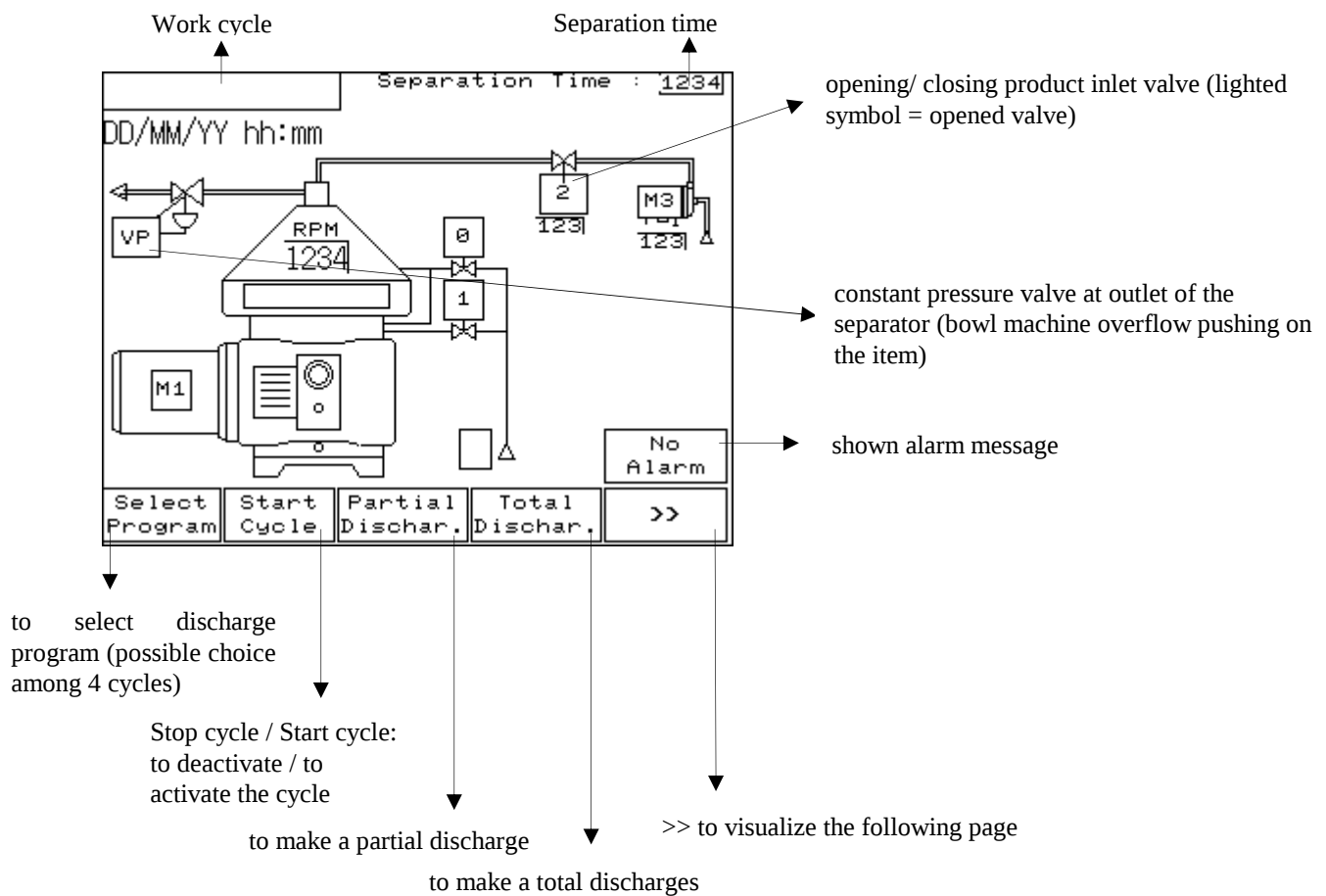
7.3. Control, regulation and signaling devices

7.3.1. Controls and signals

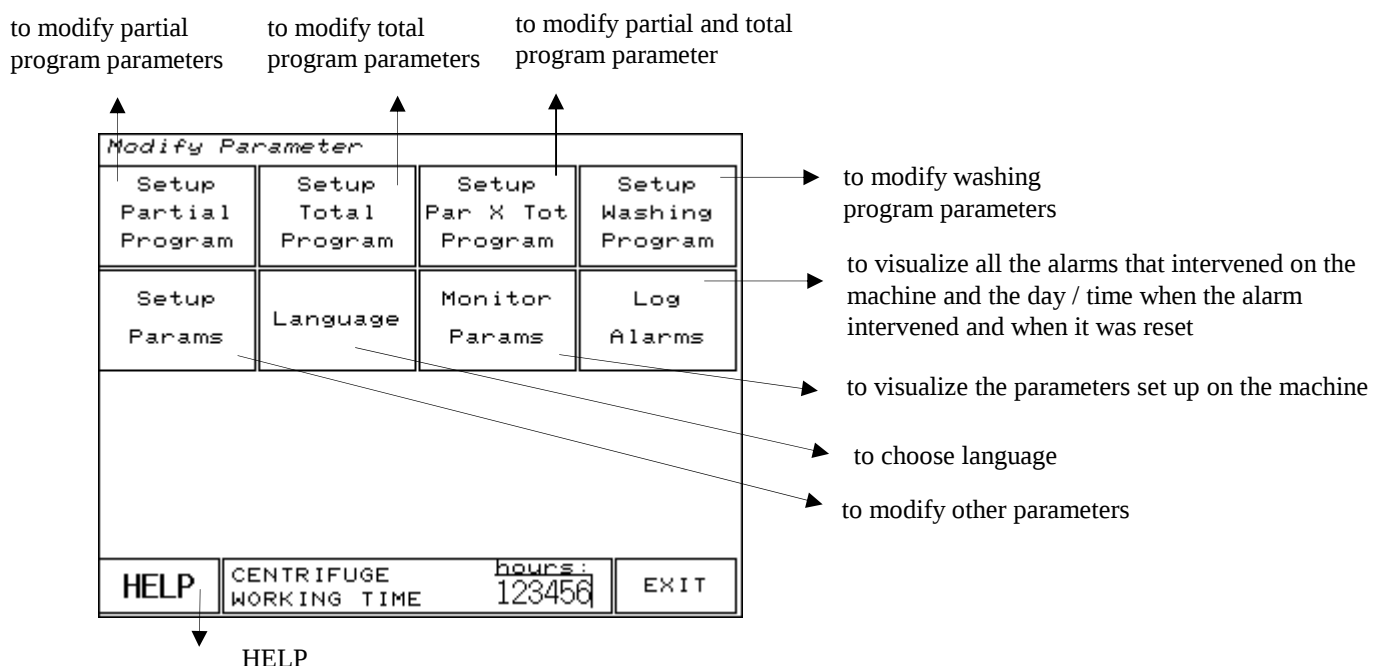
On control panel, there are the following commands (Fig. 7.1):

- 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):



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



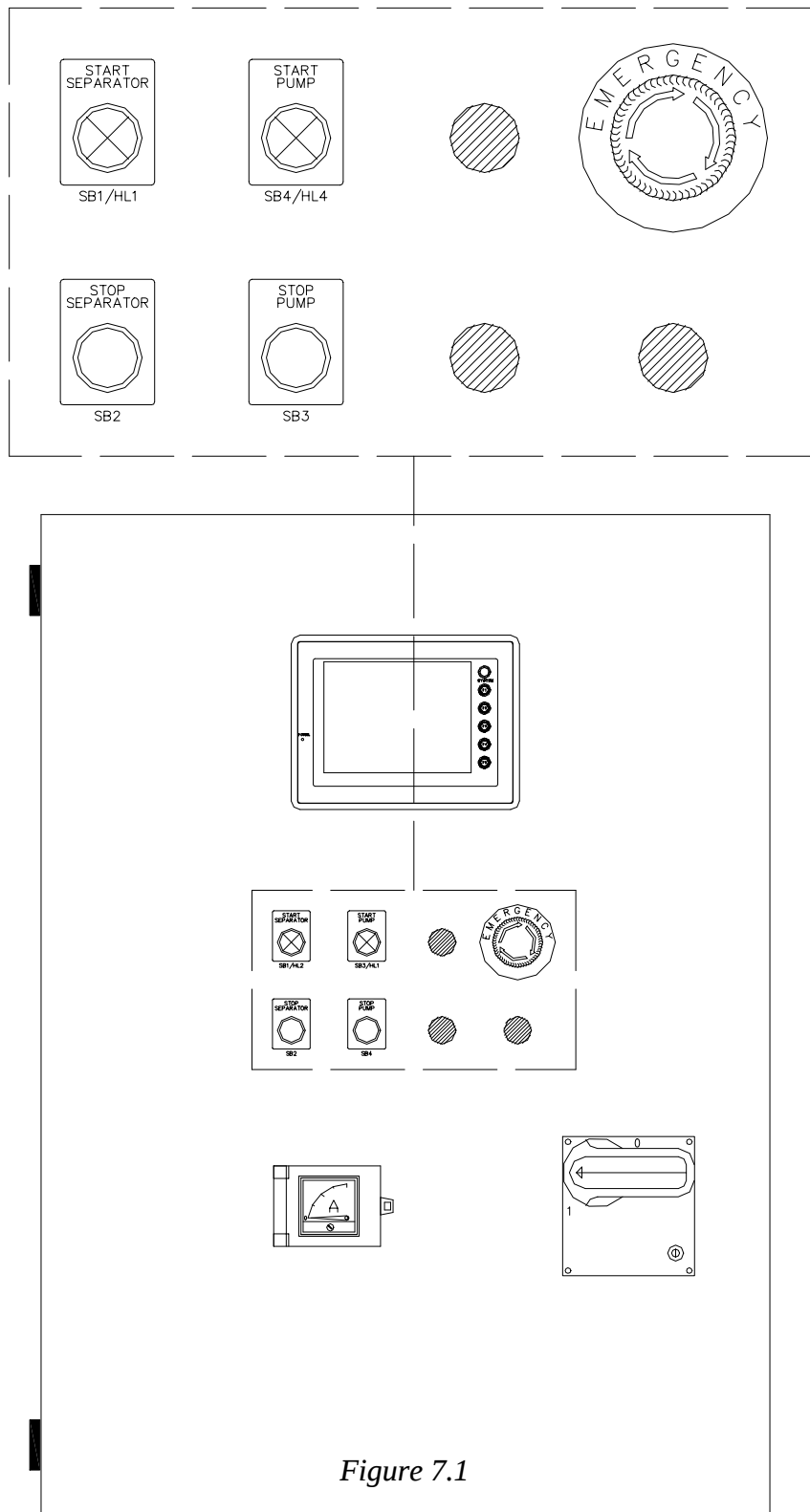


Figure 7.1

ATTENTION

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

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 to activate surge tank pump when this is too low;
- n° 2 emergency ball valves replacing the solenoid valves that control the opening/closing of the bowl.

On electric panel:

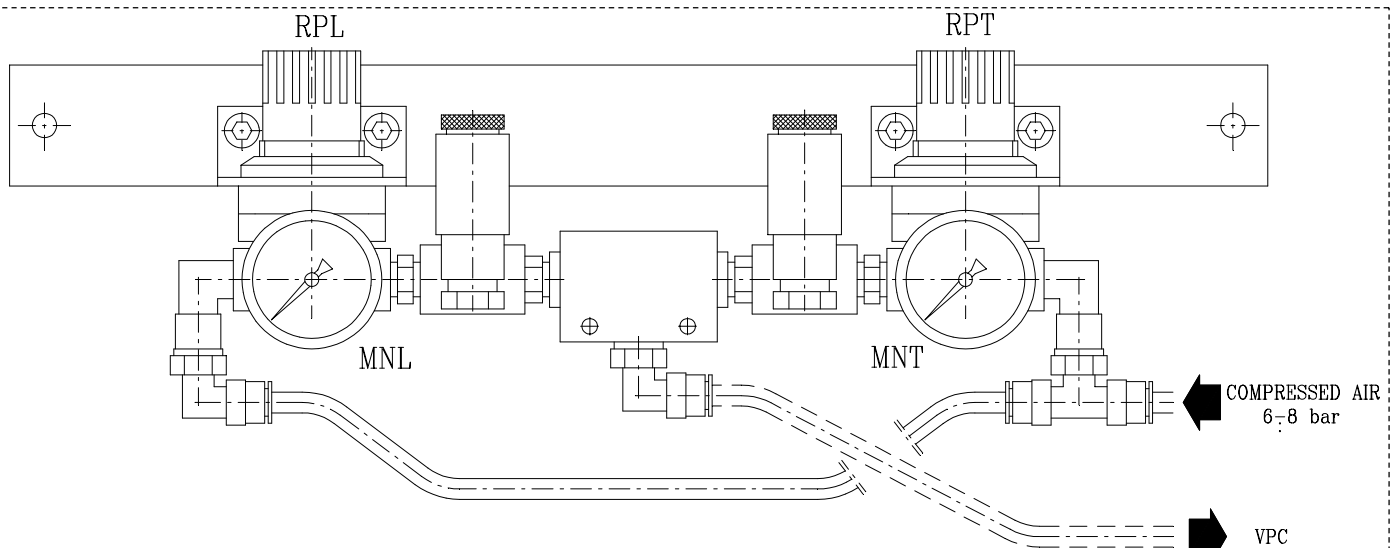
- PLC to control and set working programs.

On product outlet:

- n° 2 micrometric valves for cream and buttermilk regulation on product outlet;
- n° 2 manometers to check buttermilk and cream pressure value.

Optional:

- n°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);



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)

Figure 7.2

Optional

7.3.3. Alarms

The PLC can intervene during separator working giving, in display, 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 6.400 r.p.m.).
Help: Product pump can be started and start cycle. Push alarms reset.
- **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 6.000 r.p.m.). This usually happens during total discharge.
- **LOW SPEED ALARM ON**
This message informs you that bowl speed is descended to an unacceptable value (default 5.800 r.p.m.) and some trouble is present. When the bowl reach this low speed the feeding pump is automatically stopped.
Help: Wait till bowl reaches nominal speed.
- **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 and the activation of the brake (if automatic).
Help: Turn the mushroom head button anticlockwise and push alarms reset.
- **WATER ALARM - LOW PRESSURE <SP1>**
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 $1,0 \div 1,2$ bar, not more.
Help: Check: 1) water pressure, 2) surge tank operation, 3) clean filter cartridge, 4) 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. 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.
- **PUMP MOTOR ALARM - CURRENT OVERLOAD <QM5>**
This message informs you that the feeding 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 pump 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 reset the alarms push the button - ALARM RESET - on display.

7.4. Functional stop of separator

Follow this procedure:

- Close buttermilk shutter to take out of the bowl the residual cream.
- Perform “chemical cleaning” of the separator (§ 8.4).
- 1) Push the PUMP STOP button on the display (this button take electric energy off to product feeding pump).
- 2) Push the SEPARATOR MOTOR STOP black button (SB2) on electric panel (this button cut out the electric power to the motor but leaves tension in power circuit), and push start cycle, stop cycle will appear.
- 3) Cut out electric power to control panel turning the DISCONNECTION INTERRUPTER (QS1) and wait about $55 \div 60$ min for the bowl stop.
- 4) To reduce the machine stop time, use the brake and rotate counterclockwise the brake hand-wheel (stop time = $7 \div 10$ min).

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; pushing it the electrical feeding to separator motor and pump motor is cutting out; this assure the machine stop in every operating condition (independently from the PLC).

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 corresponding parts must be aligned.
- All the fixed protection (cover, ports, etc.) must be in right position.
- Verify that inlet-outlet 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 half of oil gauge glass).
- Brake must be released.
- Open the operating water cock and regulate pressure at 2 bar. Check pressure carrying out a discharge (push the proper button on electrical panel). During discharge the pressure can not fall below $1,5 \div 1,7$ 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
Risk of hydraulic coupling damaging

NEVER START-UP THE MACHINE MORE SUBSEQUENT TIMES

After starting the machine two subsequent times, wait at least two hours to make sure that the oil get cold before starting the machine again.

Starting up of machine:

- 1) Rotate the general interrupter (QS1) at "1" position.
- 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 4 min. on display can be seen the speed value of 6.500 r.p.m.). When the separator reach the speed of 6.400 r.p.m. appears the message "RPM OK". The separator is ready to work.
- 4) Check the regular closure of the bowl (the bowl close automatically before reaching nominal speed).
- 5) Push **stop cycle**, **start cycle** will appear; in this way the separator is working. Automatically the inlet valve YV2 in opened

Note:

- The valve YV2 state (opened or closed) stay memorized also in case of tension lack.
- The pump starts pushing the relative button, only if the valve YV2 has been opened before.

- If the valve YV2 is closed until the pump is turned on, automatically the pump is switched off.
- 8) Feed separator with water (about the process temperature) pushing the button that start the motor pump.
 - 9) 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.
 - 10) Feed separator with product. If necessary regulate the flowrate using micrometric valves of inlet-outlet unit.

ATTENTION
Generic danger

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

8. MACHINE USE

8.1. Personnel tasks

Unmanned automatic machine, starting phase only.

Operator tasks:

- Normal operation control.
- Good operation testing (fluid level, capacity and temperature value, noisy, evident vibrations).
- Carry out cleaning cycle, 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.

To guarantee the machine good operation, control and adjustment operations must be performed before starting phase (see § 7.7).

To obtain a regular and efficient working of separator it is necessary:

- 1) to feed the machine with a constant flow of product and following the indications of the following paragraphs (8.2.1, 8.2.2, 8.2.3);
- 2) to select in PLC the correct operating cycle (8.3);
- 3) to set a suitable value of the separation and draining times.

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 and B in figure 8.1) and on the regulator (RPL in figure 7.2) of the constant pressure valve (if present).

One of the most important parameters in cream concentration is the fat content achievable in the concentrated cream, directly related to the cream flow rate at the outlet. A small cream flow rate gives a cream of higher viscosity, with more fat, while a large cream flow rate gives a more liquid cream with lower fat content.

As general behaviour remembers that, by acting on outlet valves, it's possible to adjust the cream flow rate, while the buttermilk flow rate cannot be varied.

Valve (A in figure 8.1) regulates the outlet pressure of buttermilk (the manometer M1, shows the counter pressure at the outlet of the buttermilk centripetal pump), while valve (B) permit to adjust the flow rate and pressure of the cream (the manometer M2, shows the counter pressure at the outlet of the cream centripetal pump).

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 buttermilk 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 buttermilk 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 $2,5 \div 3$ 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 substituted "regulator RPL".

8.2.2. First setting

- 1) Feed the separator with water.
- 2) Partially open shutter B.
- 3) Gradually close shutter A until some water flow out of cream outlet.
- 4) The pressure read from the manometer is the minimum working pressure (MWP).

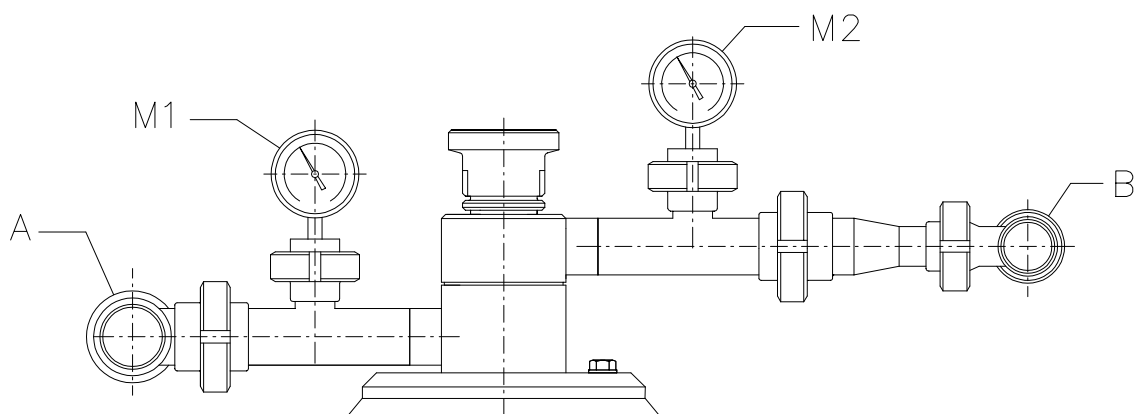


Figure 8.1

- A - Buttermilk shutter
- B - Cream shutter
- M1 - Buttermilk manometer
- M2 - Cream manometer

8.2.3. Cream concentration

- 1) Partially open shutter B

- 2) Regulate shutter A in order to bring the pressure on the manometer to approximately $0,1 \div 0,2$ bar up the MWP.
- 3) Still close the shutter A to obtain a cream more liquid than desired.
- 4) Close shutter B to increase cream concentration.
- 5) If some foam is present in buttermilk or cream, it's necessary to close shutters A and B.

Cream too liquid

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

Cream too thick

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

8.3. Discharge cycles

In the PLC four different operating cycles are set, which are selectable by pressing the suitable key in the display of 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 $1 \div 2$ % 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

<u>Process data</u>	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:

$$\text{Percentage of solids reduction} = \% \text{ solids in the inlet} - \% \text{ solids in the outlet} = 7 - 2 = 5 \%$$

The quantity of separated solids in one hour is worth:

$$\text{Separated solids} = \text{Capacity} \times \text{Percentage of solids reduction} = 2.500 \times 5/100 = 125 \text{ l/h}$$

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 $V = 10 \text{ l}$, then:

$$\text{Useful volume} = \text{Total volume} \times \text{Coeff. of safety} = 10 \times 0,8 = 8 \text{ l}$$

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

$$n = \text{Separated solids} / \text{admittable capacity} = 125 / 8 = 15,625 \approx 16 \text{ times} *$$

* *always rounded up by excess.*

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

$$\text{Time of separ.} = \text{Second in one hour} / \text{N° fillings in one hour} = 3600 / 16 = 225 \text{ sec.}$$



ATTENTION

Danger of motor and coupling 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

<u>Process data</u>	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:

$$\text{Separated solids} = \text{Capacity} \times \text{Percentage of solids reduction} = 2.500 \times 0,5/100 = 12,5 \text{ l/h}$$

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:

$$\text{Useful volume} = \text{Total volume} \times \text{Coeff. of safety} = 10 \times 0,8 = 8 \text{ l}$$

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

$$n = \text{Separated solids} / \text{admittable capacity} = 12,5 / 8 = 1,5625 \approx 2 \text{ times} *$$

** always rounded up by excess.*

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

$$\text{Time of separ.} = \text{Seconds in one hour} / \text{N}^\circ \text{ fillings in one hour} = 3600 / 2 = 1800 \text{ sec.}$$

The quantity of solids evacuated at each discharge is:

$$\text{Volume of evacuated solids} = \text{Separated solids} / \text{N}^\circ \text{ of discharges} = 12,5 / 2 = 6,25 \text{ l}$$

The volume of the evacuated liquid must be $2 \div 3$ l more than the volume of the evacuated solids.

$$\text{Volume of evacuated liquid} = \text{Volume of evacuated solids} + 2 \div 3 = 6,25 + 2 \div 3 \approx 8 \div 9 \text{ l}$$

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

$$\text{Discharge time} = 0,07 \text{ sec} = 7 \text{ c.sec.}$$

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 discharge time must be increased ($8 \div 9$ c.sec); while if the discharged volume is higher than the calculated one the discharge time must be reduced ($5 \div 6$ 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.

8.4. Discharge cycle times

The times to set in PLC on electrical panel are scheduled in annexe 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) POST-PRERINSE + 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.

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 (KM3) is maintained. Infact, if electrical impulse is too short, it could happen that the contact gets 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

Compressed air pressure value

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 $75 \div 90$ °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 $5 \div 10$ min.

It is suitable to make two bowl discharges (at least) during each phase of cleaning cycle.
Every cleaning cycle phase must finish by a total discharge.

During every cleaning phase the bowl should overflow for about $5 \div 10$ seconds, (close the micrometric valve shutters, at the separator outlets) 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.

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 suitable equipment.

9.1. Vertical shaft disassembly (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 07.220.0 to 07.260.0) to the right side sliding it along the horizontal shaft (Tab. 07). Then proceed as follows:

- 1) Remove screws (06.300.0) and cage cover (06.280.0) with its gasket (06.270.0).
- 2) Lift labyrinth (06.250.0) with its OR gasket (06.260.0).
- 3) Remove elastic support assembly (06.190.0 ÷ 06.240.0).
- 4) Remove the spacer ring (06.180.0) and the frame ring (06.170.0).
- 5) Extract vertical shaft (06.140.0) together with its ball bearings.
- 6) Extract spheric support with all its parts (06.042.0 ÷ 06.065.0) by screwing a M10 screw into its threaded hole.
- 7) Remove the three screws (06.040.0) and then screw two of them on threaded holes of bush (06.020.0).

9.2. Vertical shaft assembly (Tab. 06)

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

- 1) Insert spheric support with all its parts (06.042.0 ÷ 06.065.0) into bush (06.020.0).
- 2) Fix bush (06.020.0) with its OR gasket (06.010.0) to frame and fix it with the screw (06.040.0)
- 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:

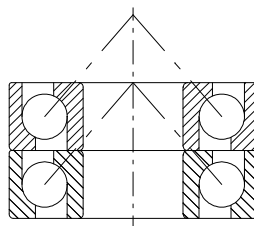


Figure 9.1

- 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) and cage cover (06.280.0, 06.270.0) fixing the whole by the screws (06.300.0).

9.3. Horizontal shaft disassembly (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 air gratings of hydraulic coupling, motor cover and the gear chamber flange, unscrewing the appropriate screws (Tab. 08). Then proceed as follows:

- 1) Remove the motor and motor adapter flange (07.030.0 ÷ 07.060.0) after having unscrewed screws (07.010.0) e (07.050.0).
- 2) Take out from this side the hydraulic coupling with flexible coupling (07.070.0 ÷ 07.110.0) by screwing a threaded rod in the hole of hydraulic coupling.
- 3) Unscrew the screws (07.480.0) and remove the brake assembly (07.420.0 ÷ 07.470.0).
- 4) After having unscrewed the screw (07.410.0), extract the brake disk (07.390.0).
- 5) Take out the two key (07.190.0, 07.210.0) from horizontal shaft.
- 6) Loosen the screws (07.260.0) levering on the flanges (07.240.0 and 07.220.0) to make the helical wheel free.
- 7) Extract the support - coupling side (07.120.0 ÷ 07.170.0) by unscrewing the screws (07.130.0), and screw two of them in the threaded holes of support.
- 8) Strike with mallet on horizontal shaft (07.200.0) from brake side.
- 9) Remove the horizontal shaft (07.180.0 ÷ 07.210.0) sliding at the same time from it the helical wheel (07.220.0 ÷ 07.260.0); handle gears carefully, avoiding shocks and damages. Then extract the helical gear wheel from the frame.
- 10) Extract the support - brake side (07.270.0 ÷ 07.310.0) by unscrewing the screws (07.330.0) and screwing two of them in threaded holes of every support.

9.4. Horizontal shaft assembly (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 (07.150.0) and (07.300.0) at the bottom side.

- 1) Assemble ball bearing and support - brake side (07.270.0 ÷ 07.310.0). Insert the whole thus assembled into the frame and onto the horizontal shaft. Fix the support (07.300.0) to the frame by the screws (07.330.0).
- 2) Insert ball bearing (07.180.0) on horizontal shaft (07.200.0).
- 3) Insert horizontal shaft and ball bearing at the same time on frame and in helical wheel unit (parts 07.220.0 to 07.260.0)
- 4) Verify that the space between the support (07.150.0) and ball bearing (07.180.0) is at least 2 mm.
- 5) Fix support (07.150.0) on frame with OR gasket (07.160.0) and spring (07.170.0) by screwing the screws (07.130.0).
- 6) Slide helical gear wheel in correct position and fix it on horizontal shaft fastening hardly the screws (07.260.0).
- 7) Check the pickup is in correct position (1 mm. from phonic wheel of brake disk).
- 8) Insert on the shaft the brake disk (07.390.0) and fix it with the screw (07.410.0), after having placed the washer (07.400.0).
- 9) Preassemble the brake unit (07.420.0 ÷ 07.460.0) and fix it to the frame by the screws (07.480.0).
- 10) Insert on the shaft the fluid coupling with flexible coupling (07.070.0 ÷ 07.110.0).
- 11) Fix the motor adapter flange (07.040.0) to the frame by the screws (07.050.0). Insert the motor (07.030.0) fixing by the screws (07.010.0).
- 12) Remount the gear chamber flange, air grating of hydraulic coupling and motor cover (Tab.08).
- 13) Fill gear chamber with recommended oil (see § 5.5.1).

9.5. Fluid coupling

For deepening information on fluid coupling, consult his installation and maintenance manual supplied with enclosed documentation.

Oil contents in fluid coupling is type AGIP OSO 32 (classification ISO-L-HM):

Viscosity: - 30 cSt a 40°C

- 5,3 cSt a 100°C.

Viscosity index: 110.

Density: 0.895 kg/l, a 15°C.

Anyway the oil advise in the installation and maintenance manual may be used.

For oil filling the following instructions must be performed (fig. 9.2):

- Remove air grating (08.280.0 - Tab. 08/B).
- Rotate the fluid coupling (1) until the mark stamped near the red fusible plug is at the same level of the mark (3) indicated on the frame (2).
- Unscrew the red fusible plug and with the suitable oil funnel fill the coupling with oil until it start overflow from the plug.
- Screw again the plug of the coupling and mount the air grating.

- 1 - Fluid coupling
- 2 - Frame
- 3 - Reference mark

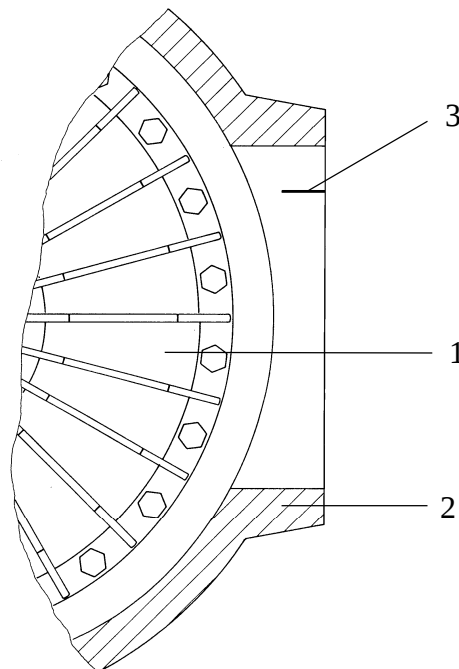


Figura 9.2

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.

Remove the gear sight glass and check helical toothing of crown gear.

Check erosion and corrosion of threads of lock rings.

Replace ball bearings.

Oil change in hydraulic coupling.

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 in 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.					
					●	Oil change in hydraulic coupling.					
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.		1 st check			
		●				Check starting time and rated speed.					
		●				Check buffer springs and buffers of vertical shaft support. Check brake 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: causes and remedies

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.	Check 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.
		Insufficient oil quantity into the hydraulic coupling.	Add oil (§ 10.1).
		Leakage of oil from hydraulic coupling.	Check hydraulic coupling: tighten oil plug and peripheral nuts. Replace hydraulic coupling, if necessary.
		Some dirty slow down the bowl.	Disassembly cover and bowl and accurately clean them.
2	Electronic tachometer reads “0” while bowl is running.	Wrong electrical connection to magnetic pickup.	Check electrical connection and make it again.
		Wrong distance between pickup and gear wheel.	Adjust distance at 1 mm.
		Faulty pickup.	Replace faulty component.
		Faulty tachometer 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.	Insufficient oil quantity into hydraulic coupling.	Add oil (§ 10.1).
		Voltage drop.	Check voltage.
		Dripping from bowl.	See at trouble n° 8), check solenoid valves.
		Motor slows down during working (one phase could be interrupted).	Check motor.

n°	TROUBLE	CAUSE	REMEDY
5	Starting time too short (starting current too high).	Too much oil into hydraulic coupling.	Check and adjust oil quantity (§ 10.1).
6	Anomalous vibration and excess of noise during working.	Bowl out of balance due to: - incorrect assembly or with parts from other bowls. - disks column has not adequate compression. - bad bowl desludging (vibration is higher with empty bowl). - bowl parts damaged during disassembly or assembly. - big lock ring badly tightened. Inefficient support of vertical shaft owing to: - broken or fatigued springs - buffers seized. Worn-out ball bearings Gears are in bad conditions owing to normal wear or: - lack of oil or oil is too fluid (gears become bluish) - water in oil, (frame drain obstructed cleaning of inner upper surface of frame by water jet - solenoid valve YV0 or YV1 locked in open position). - sludge in gear housing. - delayed oil change.	Assemble bowl correctly. Add some disks (§ 6.1). Carefully clean the bowl and increase discharge time (T2) or reduce time between two following discharges (T1). Bowl must be inspected by one of our technicians. Disassemble and tighten lock ring. Replace whole set of springs. Replace all buffers. Replace all ball bearings and use the prescribed ones. Replace worn out part as well as helical wheel and pinion; carefully clean gear housing and change oil using the prescribed one. Eventually change oil more frequently. Clean or replace valve YV0 or YV1 and check electric connection and component, if necessary.



n°	TROUBLE	CAUSE	REMEDY
↑		- non contemporary replacement of helical wheel and pinion.	
7	The bowl does not close	Shortage of water due to:	
		- feeding line cock turned off.	Turn it on
		- filter cartridge obstructed.	Replace cartridge
		- pressure reducer (PCV4 - Tab. 21) out of use or out of calibration.	Check the component and regulate pressure at 2 bar.
		- water pressure switch (PSC4 - Tab. 21) out of use.	Check correct working of surge tank.
		- holes of distributing cover obstructed by limestone.	Clean 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.
		Worn-out gaskets of bowl valve (Tab. 03).	Replace gaskets.
		Sludges prevent moving ram from fully adhere on nylon gasket of bowl hood.	Clean bowl.

n°	TROUBLE	CAUSE	REMEDY
9	The bowl does not open, even operating by hand on emergency ball valve BV1 (Tab.21), which substitute 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 (Tab. 03).	Clean bowl valves and replace gaskets.
10	The bowl does not open, opening takes place only operating by hand on emergency valve BV1 (Tab.21) which substitute solenoid valve YV1.	Non opening of solenoid valve YV1 due to:	
		- cycle disconnected;	Activate cycle.
		- 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.
		- not correct calibration of timers T2, T3, T4.	Regulate times.
		- the PLC has a problem	Check the PLC exit Y1. If the corresponding warning light is lighted contact our technician.
		Worn-out gaskets of bowl valves (Tab. 03).	Replace gaskets.
11	The bowl does not open correctly.	Not correct calibration of metering device (if present) due to:	
		- Insufficient quantity of water line.	Regulate the necessary water capacity screwing the regulation screw (see Tab. 05 - 05.340.0).
		- Low air pressure	Check (RPD and RPA) and the 3-way solenoid valve (YV31)
		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 out of calibration.	Regulate pressure at 2,5 bar.
⇓			

n°	TROUBLE	CAUSE	REMEDY
↑		Filter cartridge 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 buttermilk outlet, unscrewing the shutter A or regulator RPL (fig. 7.4), 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.
13	Leakage of cream from solids discharge pipe.	Excessive cream pressure.	Unscrew cream shutter (B - fig. 8.1) and reduce buttermilk pressure if the same cream density is required.
14	Insufficient cream concentration	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.
		Wrong regulation.	See chapter 8.1
		Dividing disk is not correctly placed.	Check it is placed in the right way.
		It is worn one of the following gaskets:	
		- upper finned disk OR gasket (10) fig. 6.1.	Replace gasket.
↓			

n°	TROUBLE	CAUSE	REMEDY
↑↑		- drilled gasket of dividing disk (15) fig. 6.1.	Replace gasket.
		- OR gasket (4) fig. 6.27 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 buttermilk or cream outlet.	Insufficient buttermilk or cream pressure.	Screw the shutters A and B, to increase pressure value and maintain constant 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.

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 unbiding 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 responsibility concerning the information 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 is 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

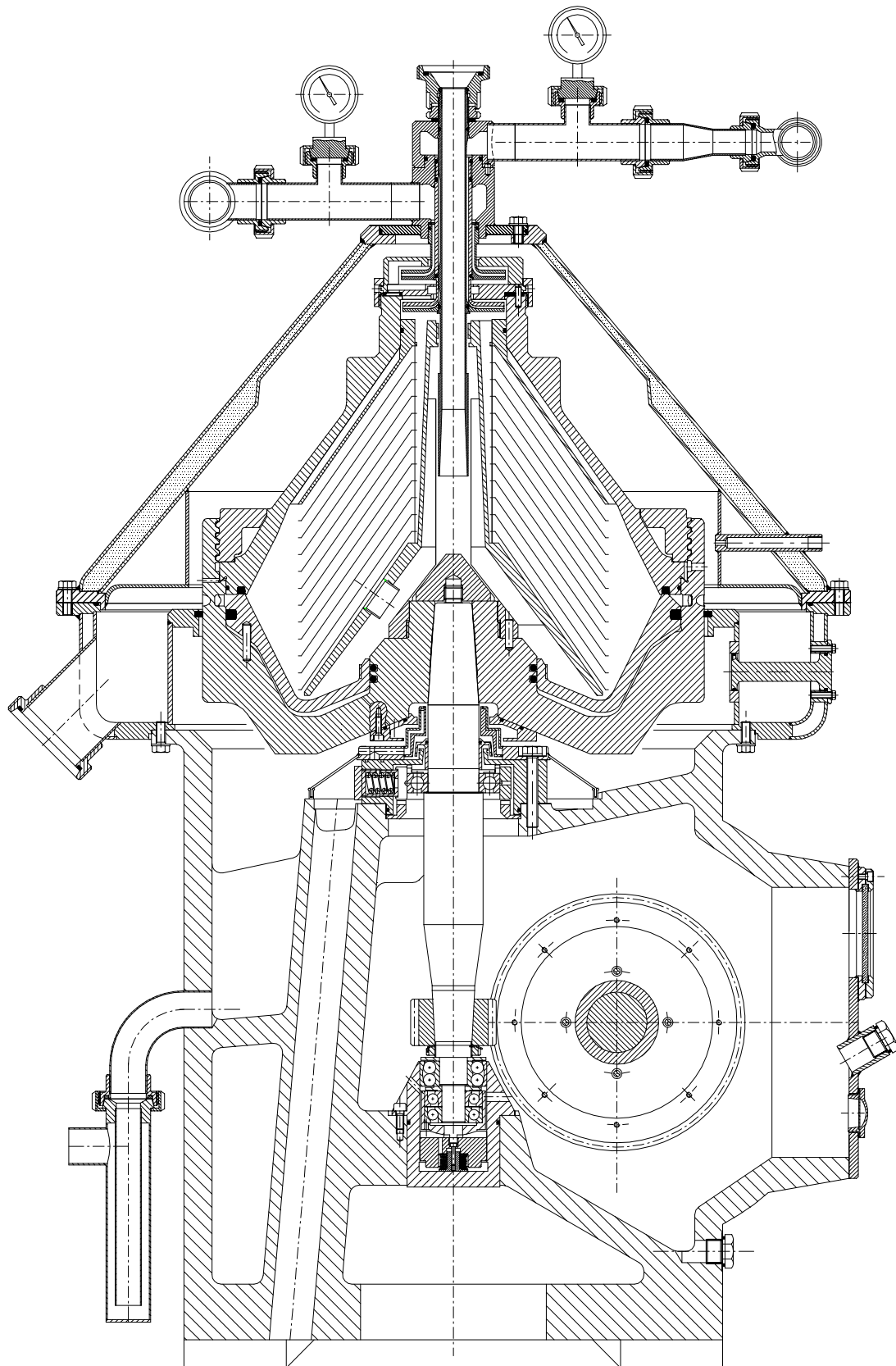
Sections and spare parts Tables

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/A	Horizontal shaft unit	
Tab. 07/B	Horizontal shaft unit - Motor	
Tab. 08/A	Frame	
Tab. 08/B	Frame	
Tab. 09	Special spanners	
Tab. 10	Flowmeter	()
Tab. 11	Constant pressure valve	()

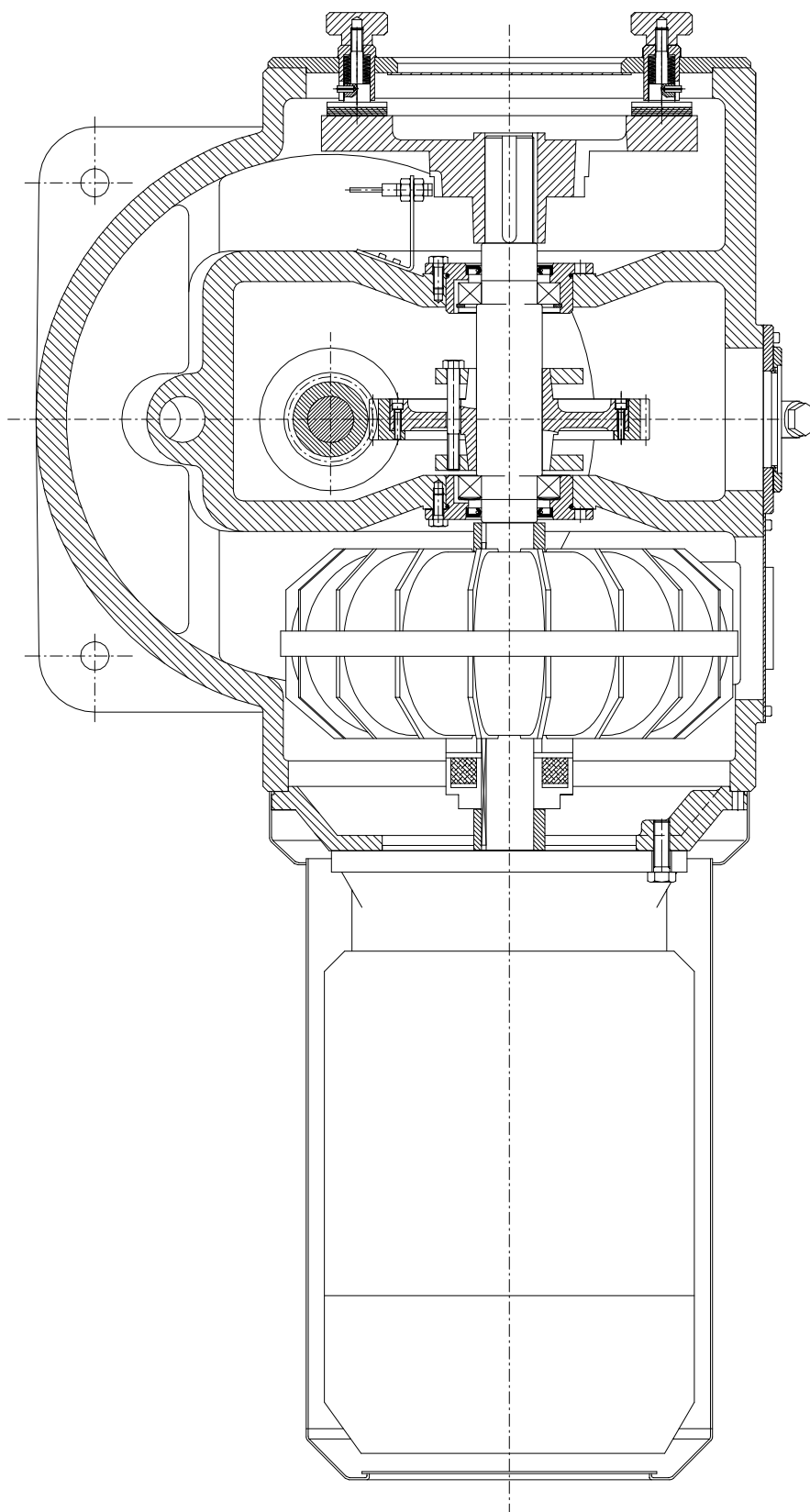
Diagrams

Tab. 20	Overall dimensions and installation plan	
Tab. 21	Hydraulic system diagram	
Tab. 22	Identification plates and alert stickers	
Tab. 23	Pneumatic system diagram	()

(X) IN EQUIPMENT

VERTICAL SECTION - TAB. 01

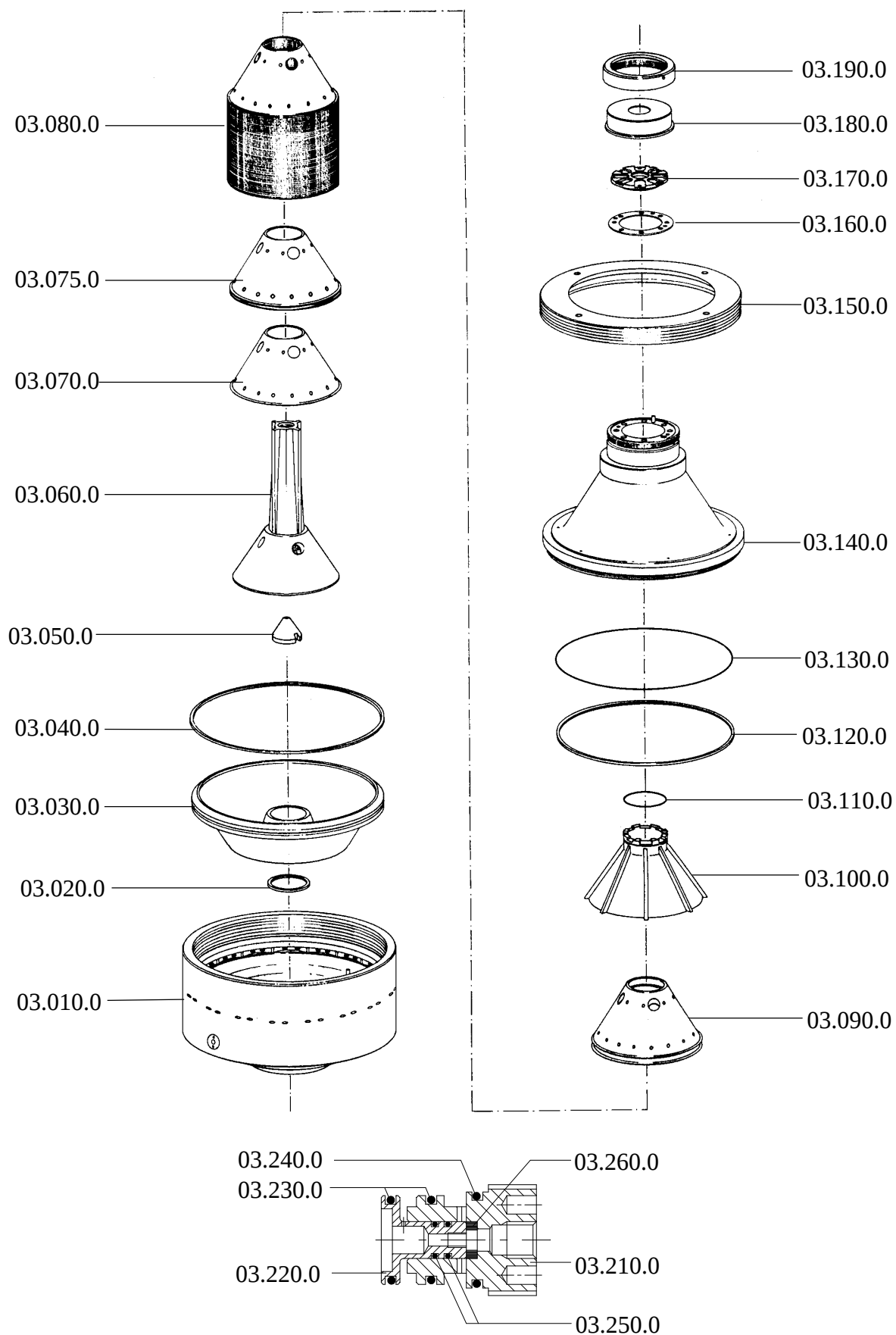
HORIZONTAL SECTION - TAB. 02



BOWL - TAB. 03

<u>Reference</u>	<u>Code</u>	<u>Quantity</u>	<u>Description</u>
03.010.0	000730800	1	Bowl body
03.020.0 *	528020767	2	OR gasket - bowl body
03.030.0	400396101	1	Nut - bowl body
03.040.0 *	400155100	1	Gasket - moving ram
03.050.0	200443600	1	Moving ram
03.060.0	100895300	1	Distributor
03.070.0	300891200	1	Bottom disk (spacer on both surfaces)
03.075.0	300891400	3	Intermediate disk (larger spacer)
03.080.0	300439700	~	Intermediate disk
03.090.0	300891400	4	Upper disk (larger spacer)
03.100.0	200279200	1	Upper finned disk
03.110.0 *	528020450	1	OR gasket - finned disk
03.120.0 *	400151200	1	Nylon gasket - bowl hood
03.130.0 *	400303423	1	OR gasket - bowl hood
03.140.0	100527600	1	Bowl hood
03.150.0	300374400	1	Big lock ring
03.160.0 *	400152600	1	Gasket - dividing disk
03.170.0	300095600	1	Dividing disk
03.180.0	300065900	1	Finned cover
03.190.0	400026700	1	Small lock ring
03.210.0	400258300	3	Valve body
03.220.0	400257900	3	Valve ram
03.230.0 **	528020149	6	OR gasket - valve body and ram
03.240.0 **	528020152	3	OR gasket - valve
03.250.0 **	528020029	6	OR gasket - valve ram
03.260.0 **	400211900	3	Nylon gasket - valve
03.510.0	832000074	1	Set of bowl gaskets (7 pieces, **)
03.520.0	832000073	1	Set of bowl valves gaskets (18 pieces, **)
03.530.0	832004004	1	Set of bowl valves with gaskets (03.210.0÷03.260.0)

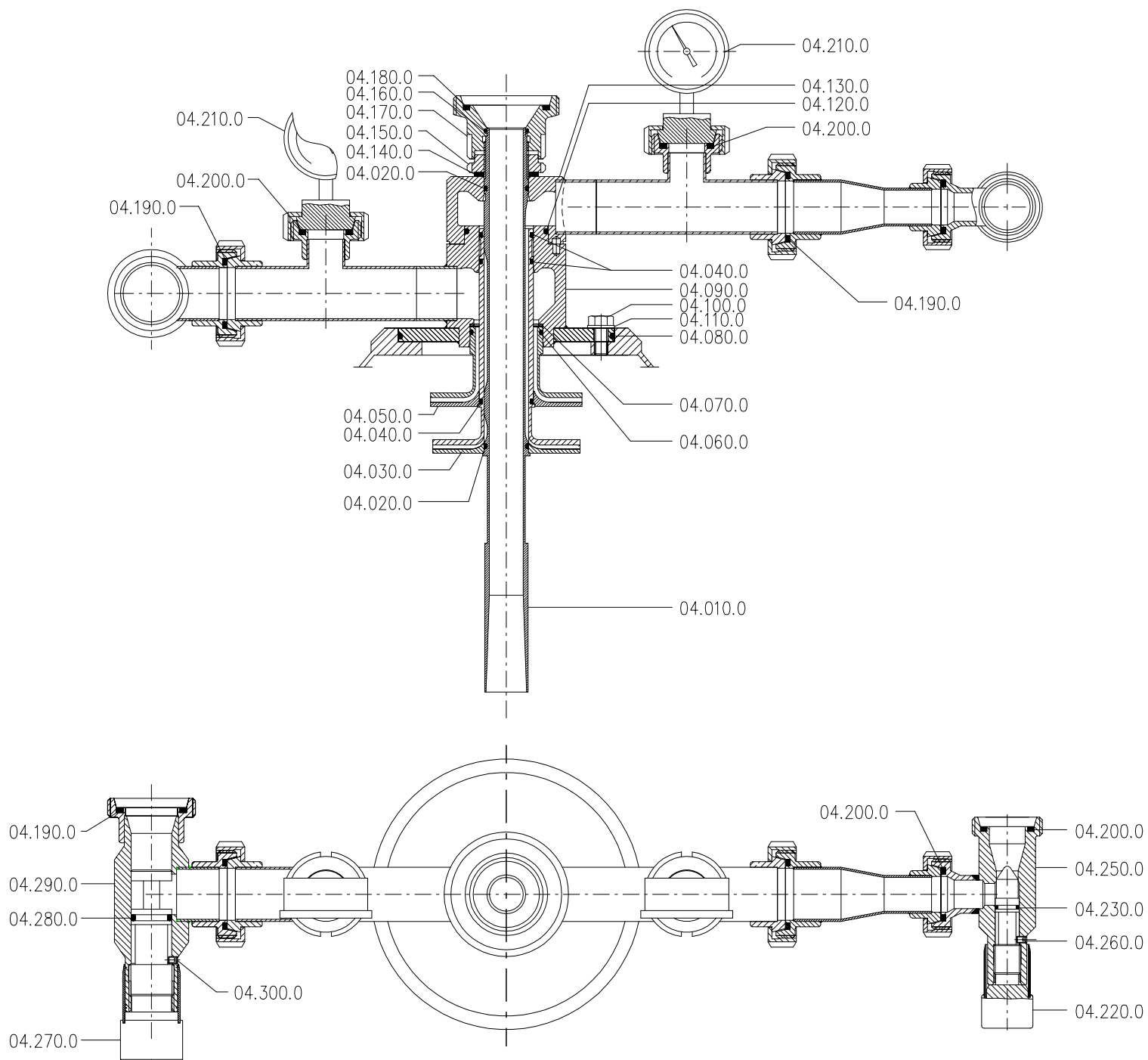
TAB. 03



INLET-OUTLET FLOW UNIT - TAB. 04

<u>Reference</u>	<u>Code</u>	<u>Quantity</u>	<u>Description</u>
04.010.0	200899200	1	Feeding pipe
04.020.0 *	528020176	2	OR gasket - feeding pipe
04.030.0	400472000	1	Lower pump - cream
04.040.0 *	528020188	3	OR gasket - cream pump
04.050.0	400309500	1	Upper pump - buttermilk
04.060.0 *	528020215	1	OR gasket - buttermilk pump
04.070.0	40002360X	0÷4	Spacer
04.080.0 *	528020492	1	OR gasket - inlet-outlet body
04.090.0	400709000	1	Lower inlet-outlet body
04.100.0	529006148	2	Screw TE M10x20
04.110.0	529056010	2	Washer
04.120.0 *	528020356	1	Upper OR gasket - inlet-outlet body
04.130.0	400889100	1	Upper inlet-outlet body
04.140.0 *	400213600	1	Nylon washer
04.150.0	400706500	1	Threaded locking ring
04.160.0*	528020176	1	OR gasket - nut
04.170.0	400706600	1	Nut - feeding pipe
04.180.0 *	528151035	1	Gasket DN50
04.190.0 *	528151030	3	Gasket DN40
04.200.0 *	528151020	4	Gasket DN25
04.210.0	520060210	2	Manometer
04.220.0	400616600	1	Shutter - cream
04.230.0 **	528020125	1	OR gasket - cream shutter
04.250.0	400342400	1	Micrometric valve body - cream
04.260.0	529021076	1	Screw STCEIEPS M5x 6
04.270.0	400178600	1	Shutter - buttermilk
04.280.0 #	528020284	1	OR gasket - buttermilk shutter
04.290.0	400091200	1	Micrometric valve body - buttermilk
04.300.0	529021076	1	Screw STCEIEPS M5x 6
04.510.0	832000435	1	Set of inlet-outlet flow unit gaskets for fittings DIN11851 (18 pieces, *)
04.520.0	832004033	1	Set of spacers (3 pieces, 04.070.0 - Thickness = 1, 2, 3 mm.)
04.530.0	832010005	1	Set of gaskets for cream micrometric valve (1 pieces, **)
04.540.0	832010000	1	Set of gaskets for buttermilk micrometric valve (1 piece, #)

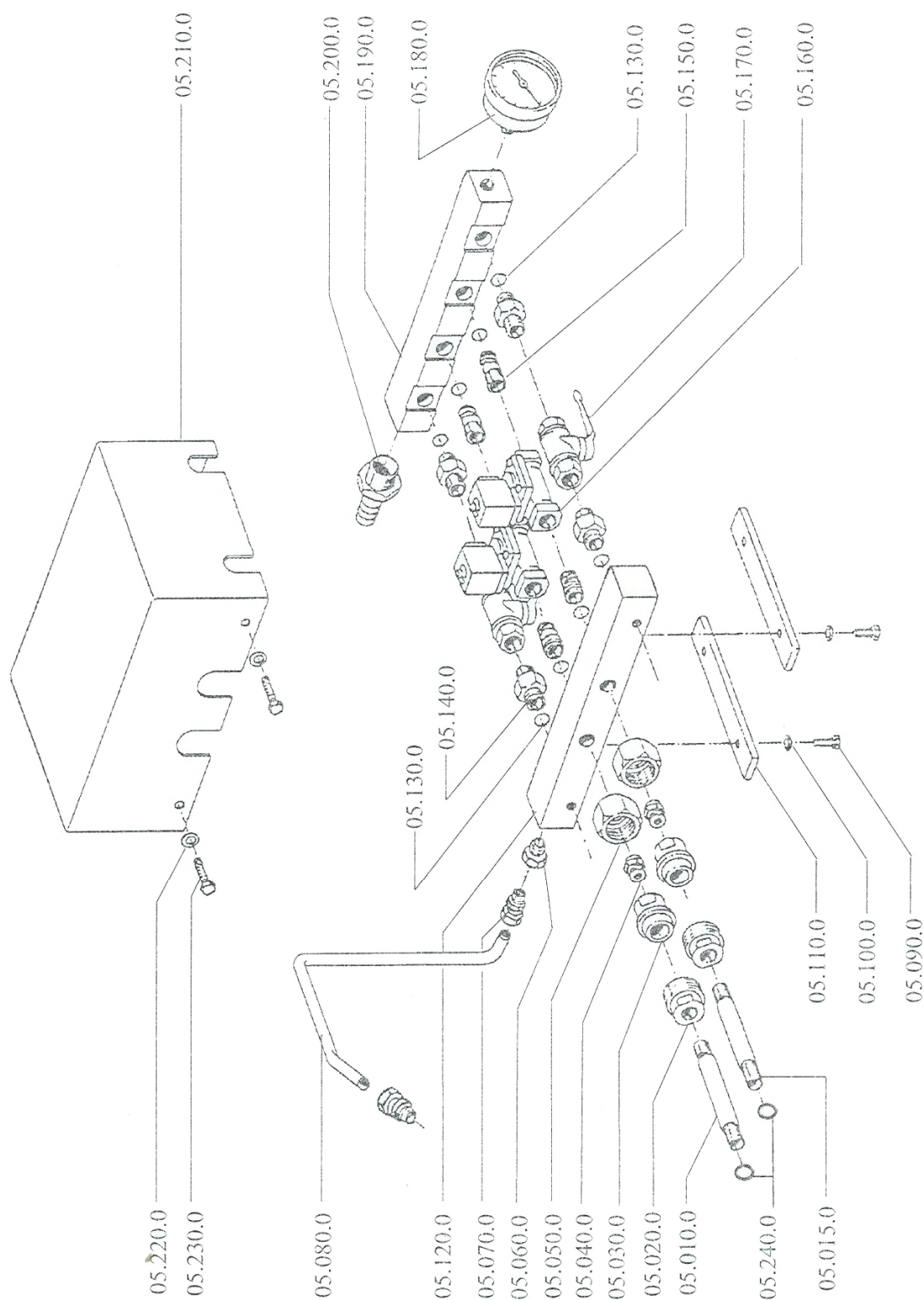
TAB. 04



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

<u>Reference</u>	<u>Code</u>	<u>Quantity</u>	<u>Description</u>
05.010.0	400248800	1	Threaded pipe (threaded)
05.015.0	400248700	1	Threaded pipe (threaded)
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	523922026	2	Pipe union DIN5353 (Ø10 - 1/4")
05.080.0	/	1	Rinsing cover tube
05.090.0	529006064	4	Screw TE M6x12
05.100.0	529056506	4	Washer grower
05.110.0	400184900	2	Body fixing plate
05.120.0	400060001	1	Outlet body
05.130.0 *	528020119	8	OR gaskets for nipples
05.140.0	400204901	4	Special nipple for ball valve
05.150.0	400205001	4	Special nipple for solenoid valve
05.160.0	523508150	2	Solenoid valve 3/8"
05.170.0	523012020	2	Ball valve F-F 3/8"
05.180.0	520060070	1	Manometer
05.190.0	400060101	1	Inlet body
05.200.0	523903618	1	Male hose nipple (1/2" - Ø20)
05.210.0	300045400	1	Carter
05.220.0	529056006	2	Washer
05.230.0	529006064	2	Screw TE M6x12
05.240.0	528020125	2	OR gasket
05.240.0	524100005	2	Connector 122-800 solenoid valve
05.250.0	832000128	1	Set of OR gaskets for nipples (8 pieces, *)

TAB. 05/A

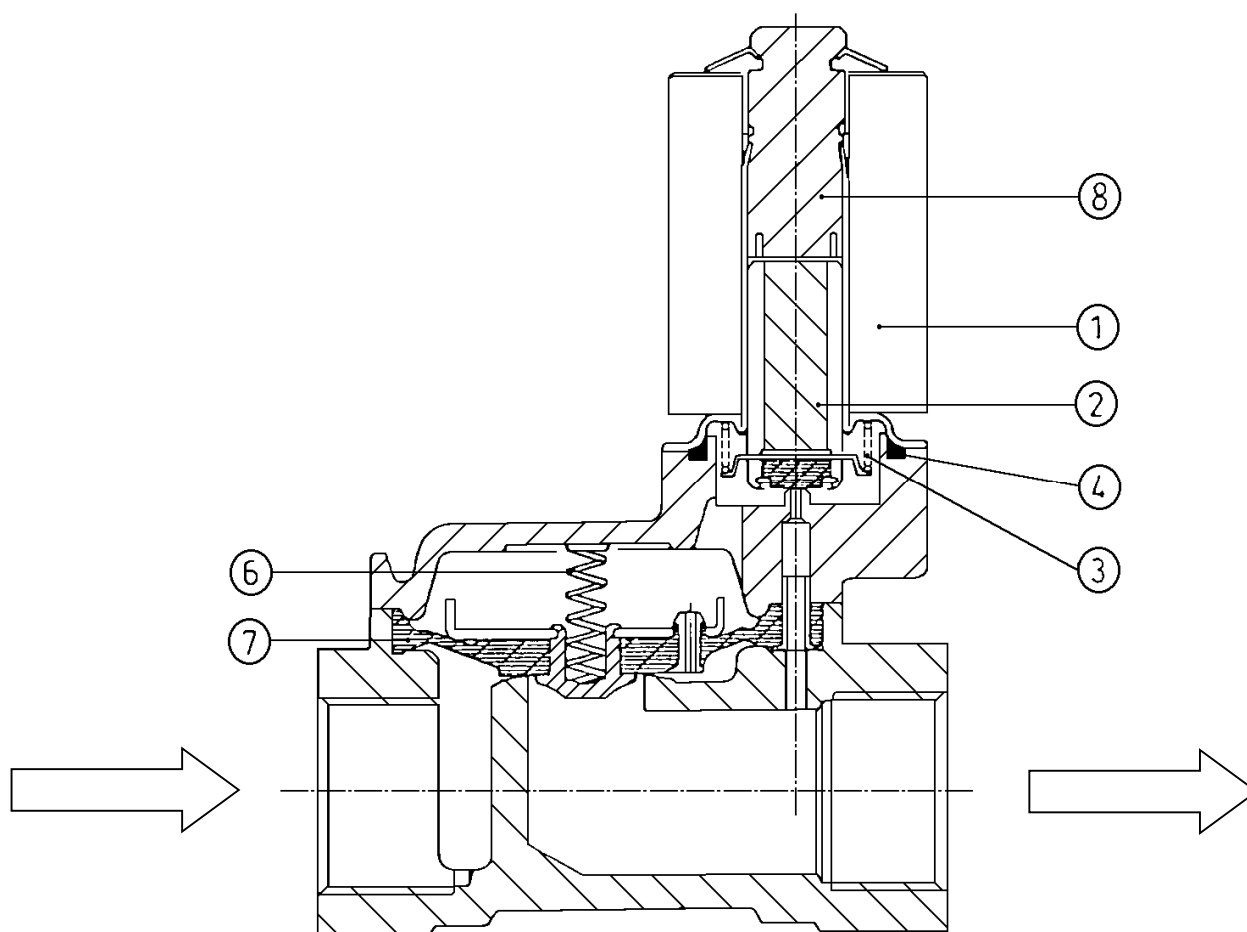


OPERATING WATER UNIT - SOLENOID VALVE
TAB. 05/B

<u>Part.</u>	<u>Reference</u>	<u>Code</u>	<u>Quantity</u>	<u>Description</u>
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	523508150	1	Solenoid valve complete

ATTENTION

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

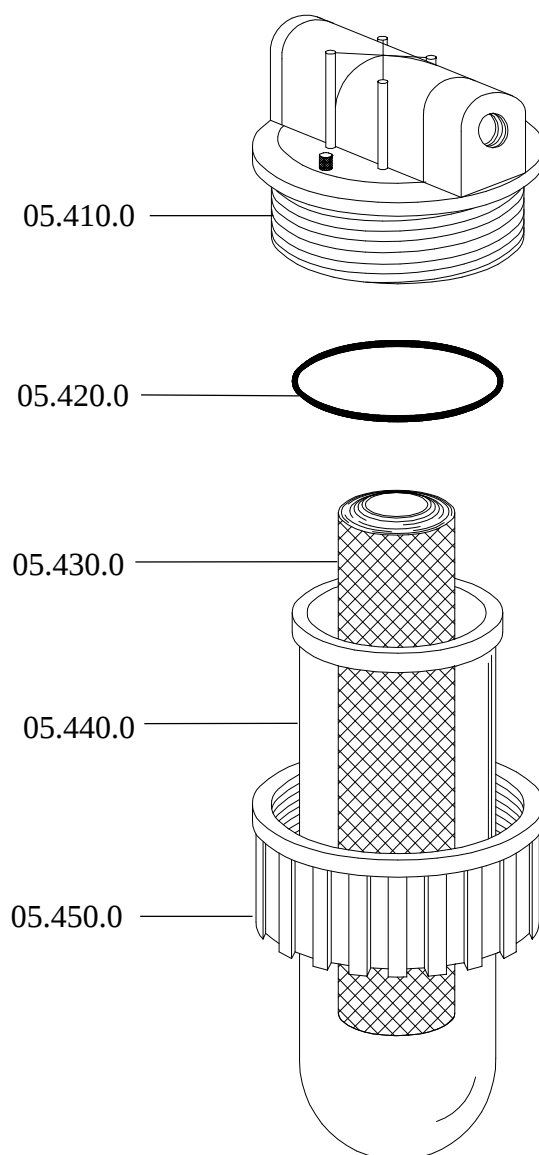


OPERATING WATER UNIT - CARTRIDGE FILTER

TAB. 05/C

<u>Reference</u>	<u>Code</u>	<u>Quantity</u>	<u>Description</u>
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.



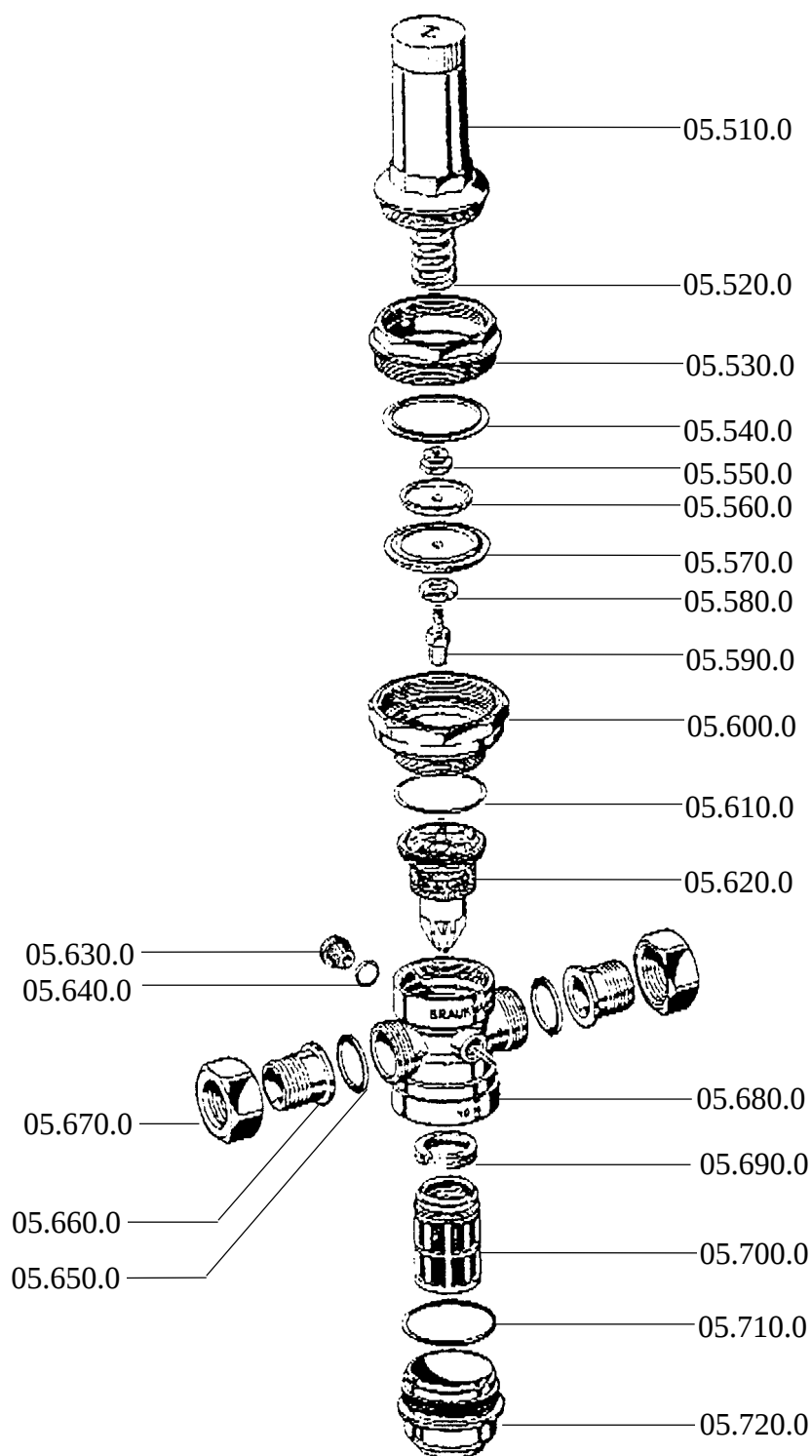
OPERATING WATER UNIT - PRESSURE REDUCER
TAB. 05/D

<u>Reference</u>	<u>Code</u>	<u>Quantity</u>	<u>Description</u>
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



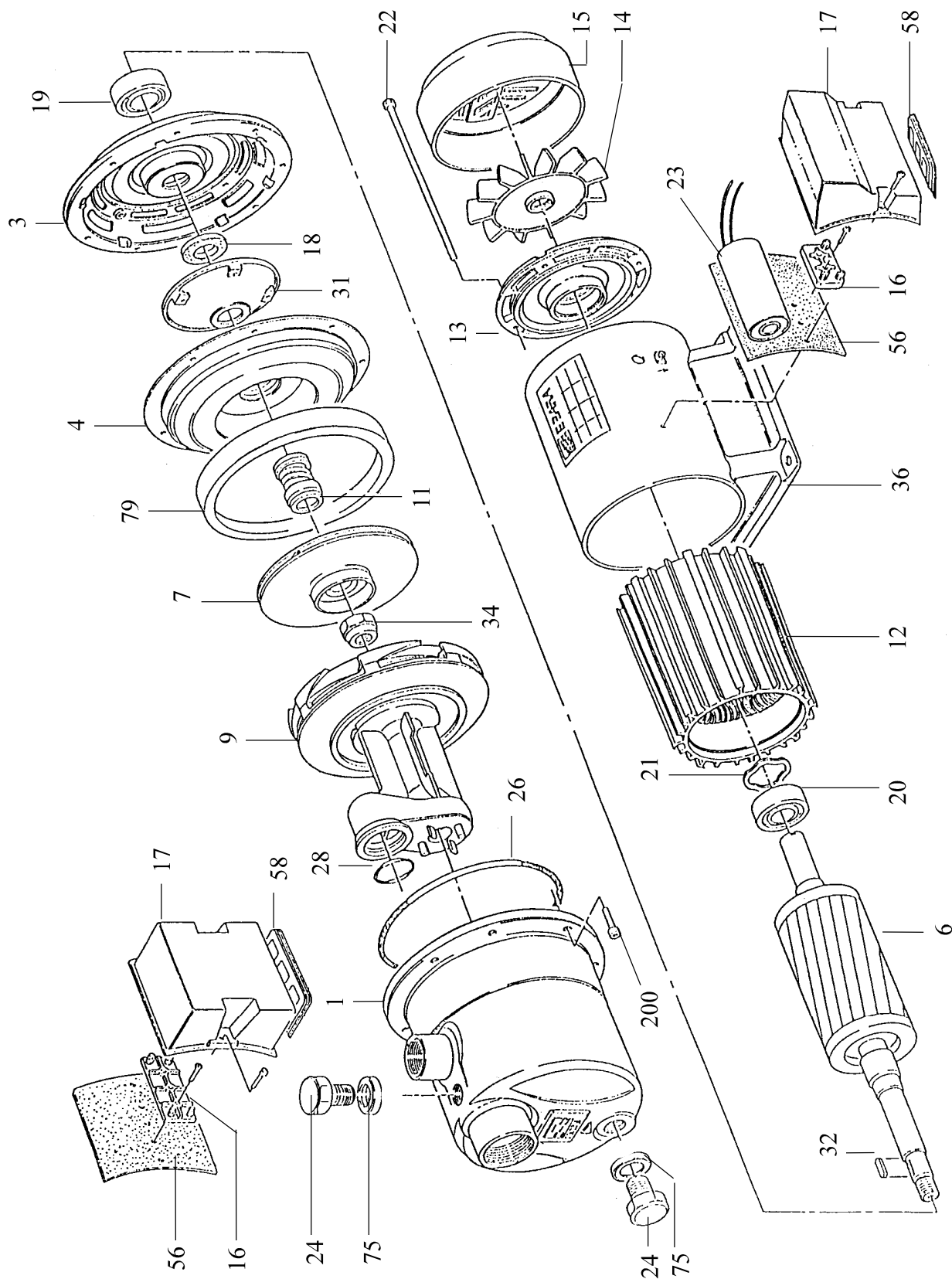
OPERATING WATER UNIT - SURGE TANK PUMP
TAB. 05/E

<u>Reference</u>	<u>Code</u>	<u>Quantity</u>	<u>Description</u>
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 rod
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.

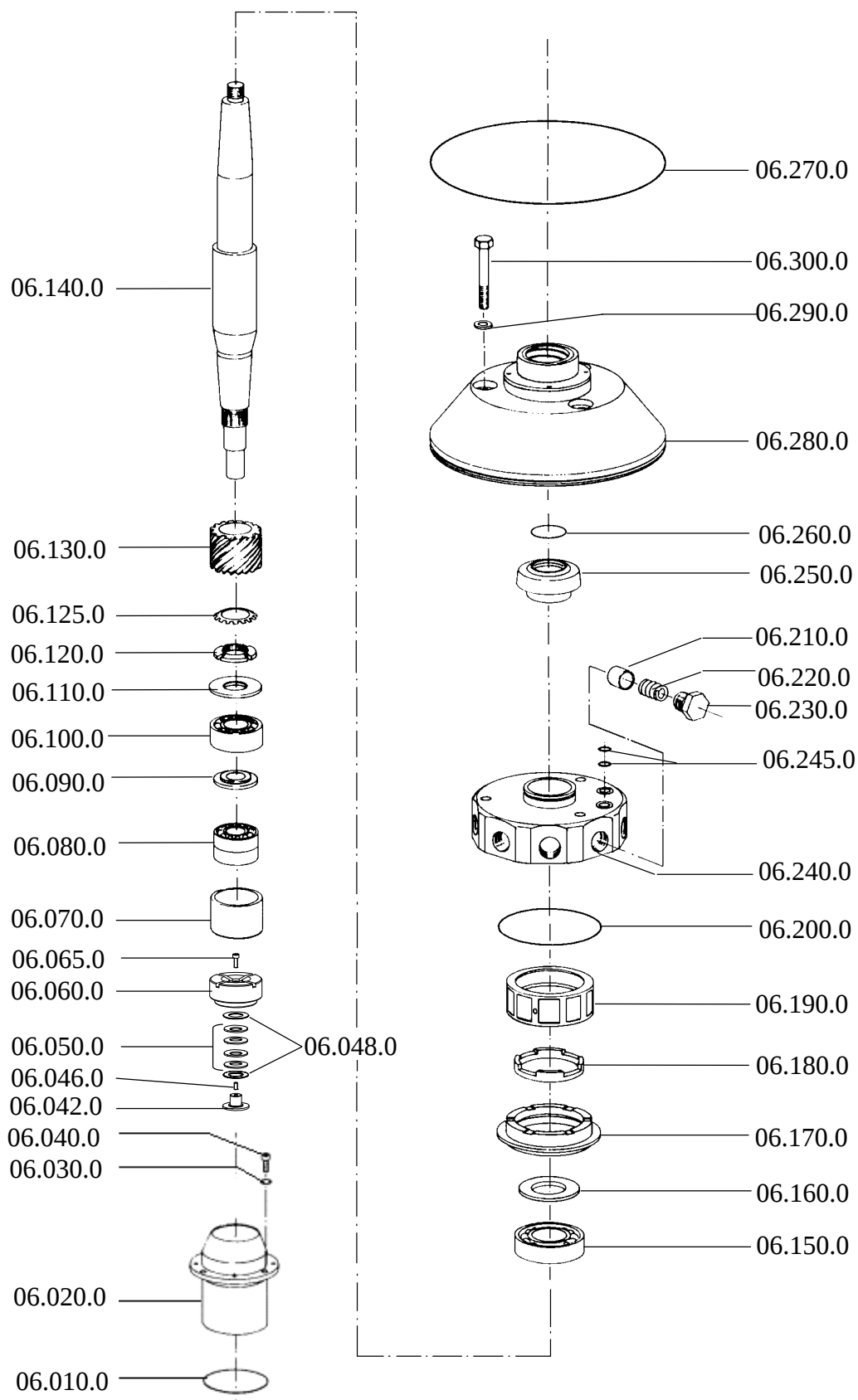
TAB. 05/E



VERTICAL SHAFT UNIT - TAB. 06

<u>Reference</u>	<u>Code</u>	<u>Quantity</u>	<u>Description</u>
06.010.0 **	528020435	1	OR gasket - bush
06.020.0	300040200	1	Bush
06.030.0	529055508	3	Washer
06.040.0	529010206	3	Screw TCCEI M8x20
06.042.0	400885000	1	Guide pin for spring
06.046.0	529021034	1	Dowel
06.048.0	521100230	2	Bearing washer
06.050.0	529099192	8	Lower springs
06.060.0	400885100	1	Spheric support
06.065.0	529010048	1	Screw M4x20
06.070.0	400040900	1	Spheric bush
06.080.0 *	521075450	1	Couple of thrust ball bearings
06.090.0 *	400209900	1	Washer - thrust ball bearings
06.100.0 *	521050455	1	Self-aligning ball bearing
06.110.0 *	400207400	1	Washer - self-aligning ball bearing
06.120.0	529066008	1	Ring nut
06.125.0	529065008	1	Lock washer
06.130.0 ***	300644000	1	Helical pinion (6.500 rpm - 50 Hz.)
06.140.0	200280000	1	Vertical shaft
06.150.0 *	521040280	1	Upper ball bearing
06.160.0 *	400210100	1	Washer - upper ball bearing
06.170.0	400020700	1	Frame ring
06.180.0	400023400	1	Spacer ring
06.190.0	300019300	1	Ball bearing housing
06.200.0 **	528020477	1	OR gasket - collar cage
06.210.0	400031700	9	Buffer
06.220.0	400294600	9	Buffer spring
06.230.0	400092300	9	Buffer screw
06.240.0	200280200	1	Collar cage
06.245.0 **	528020137	4	OR gasket collar cage
06.250.0	400170800	1	Labyrinth
06.260.0 **	528020227	1	OR gasket - labyrinth
06.270.0 **	528150010	1	Gasket - cage cover
06.280.0	200389100	1	Cage cover
06.290.0	529056512	3	Washer
06.300.0	529001158	3	Cage cover screw TE M12x80
06.510.0	832005002	1	Set of vertical shaft ball bearings and washers (6 pieces,*)
06.520.0	832001028	1	Set of vertical shaft gaskets (8 pieces,**)
06.530.0	832007024	1	Set of gears, flanges, screws and washers (12 pieces, Tav.06*** + Tav.07***)
06.540.0	832012003	1	Set of buffers (9 pieces, 06.210.0)
06.550.0	832012004	1	Set of buffer springs (9 pieces, 06.220.0)
06.560.0	832012005	1	Set of buffer screws (9 pieces, 06.230.0)

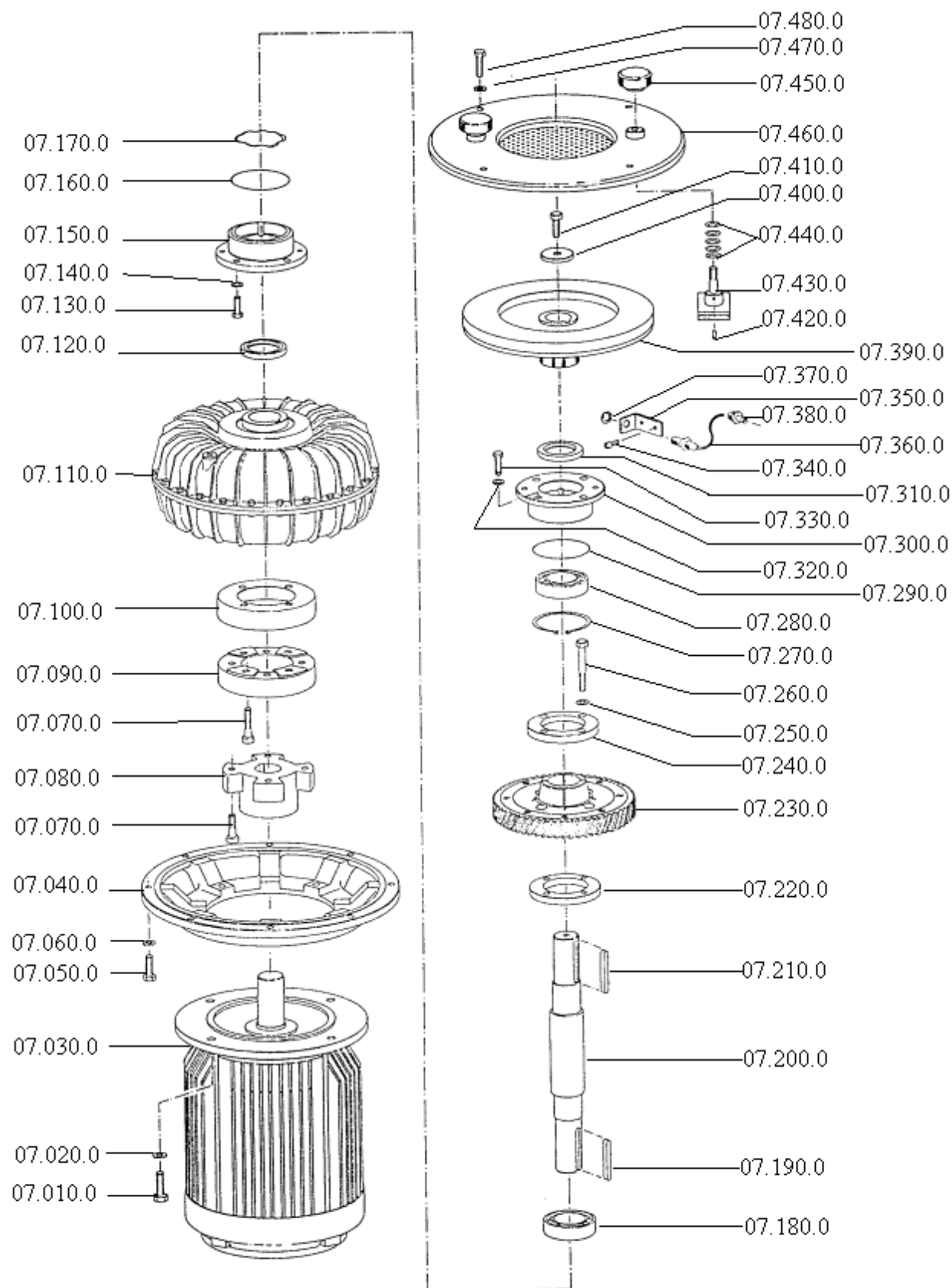
TAB. 06



HORIZONTAL SHAFT UNIT - TAB. 07/A

<u>Reference</u>	<u>Code</u>	<u>Quantity</u>	<u>Description</u>
07.010.0	529005270	4	Motor screw TE M16x40
07.020.0	529055516	4	Washer
07.030.0	526006620	1	Motor
07.040.0	200280100	1	Motor adapter
07.050.0	529010276	8	Motor adapter screw TCCEI M10x35
07.060.0	529055510	8	Washer
07.070.0 ****	/	8	Screw - flexible coupling
07.080.0 ****	/	1	Hub - flexible coupling
07.090.0 ****	/	1	Rub - flexible coupling
07.100.0 ****	/	1	Cover - flexible coupling
07.110.0 ****	/	1	Hydraulic coupling
07.120.0 **	528000571	1	Seal ring
07.130.0	529005154	4	Screw M10x30
07.140.0	529055510	4	Washer
07.150.0	300143200	1	Support - coupling side
07.160.0 **	528020459	1	OR gasket - support
07.170.0	529099546	1	Spring
07.180.0 *	521000280	1	Ball bearing - coupling side
07.190.0	529080429	1	Key - coupling side
07.200.0	300001800	1	Horizontal shaft
07.210.0	529080435	1	Key - brake side
07.220.0 ***	400129800	1	Locking flange of gear wheel (threaded holes)
07.230.0 ***	300654000	1	Helical gear wheel (6.500 rpm - 50 Hz.)
07.240.0 ***	400125300	1	Locking flange of gear wheel
07.250.0 ***	529055012	4	Washer
07.260.0 ***	529000164	4	Locking screw of gear wheel
07.270.0 *	529090600	1	Ball bearing circlip
07.280.0 *	521000280	1	Ball bearing - brake side
07.290.0 **	528020459	1	OR gasket - support
07.300.0	300143100	1	Support - brake side
07.310.0 **	528000571	1	Seal ring
07.320.0	529055510	4	Washer
07.330.0	529005154	4	Screw M10x30
07.340.0	529010146	2	Screw of pickup bracket
07.350.0	300182800	1	Pickup bracket
07.360.0	525185010	1	Magnetic pickup of tachometer
07.370.0	/	2	Pickup nut
07.380.0	525015802	1	Male hose nipple of pickup cable
07.390.0	300144800	1	Brake disk
07.400.0	400210000	1	Locking washer of brake disk
07.410.0	529006194	1	Locking screw of brake disk - TE M12x40
07.420.0	529070355	2	Spring pin of brake
07.430.0	400046600	2	Brake shoe (with pin 07.420.0)
07.440.0	529099169	56	Brake spring
07.450.0	400165400	2	Brake hand-wheel
07.460.0	300308200	1	Brakes flange
07.470.0	529056012	4	Washer
07.480.0	529006194	4	Brake flange screw - TE M12x40
07.910.0	832005003	1	Set of horizontal shaft ball bearings and circlips (3 pieces,*)
07.920.0	832001027	1	Set of horizontal shaft gaskets (4 pieces,**)
07.930.0	400150400	1	Hydraulic coupling (12 pieces,****)

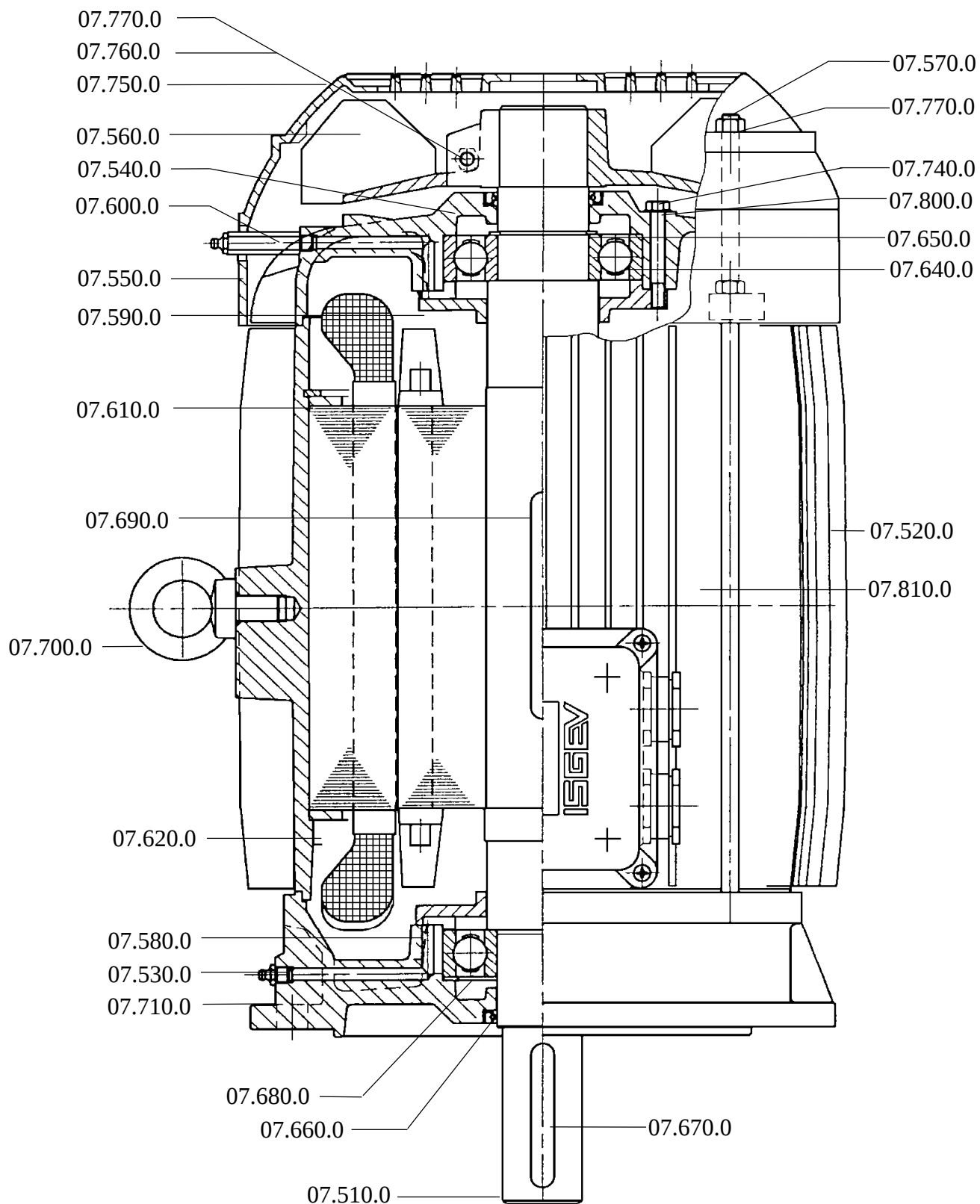
TAB. 07/A



HORIZONTAL SHAFT UNIT - MOTOR - TAB. 07/B

<u>Reference</u>	<u>Code</u>	<u>Quantity</u>	<u>Description</u>
07.510.0	/	1	Shaft with rotor
07.520.0	/	1	Tank B5 with wound stator
07.530.0	/	1	Cover D.S. - B5
07.540.0	/	1	Cover F.S. - B3
07.550.0	/	1	Fan cap
07.560.0	/	1	Fan
07.570.0	/	4	Stay bolt
07.580.0	/	1	Internal small cover D.S.
07.590.0	/	1	Internal small cover F.S.
07.600.0	/	1	Lubricator extension
07.610.0	/	1	Stopping stator ring
07.620.0	/	2	Fixing stator unit ring
07.640.0	521000480	2	Ball bearing 6311 J
07.650.0	/	1	Seeger ring
07.660.0	528000561	2	Seal ring DPSM 55 72 8
07.670.0	/	1	Feather key A
07.680.0	/	1	Shimming ring
07.690.0	/	2	Feather key A
07.700.0	/	1	Eyebolt
07.710.0	/	2	Ball lubricator
07.740.0	/	6	Screw M8x70
07.750.0	/	1	Screw M6x25
07.760.0	/	1	Nut M6
07.770.0	/	1	Washer
07.790.0	/	12	Nut M10
07.800.0	/	6	Copper plane washer
07.810.0	526006620	1	Electric motor 18,5 kW

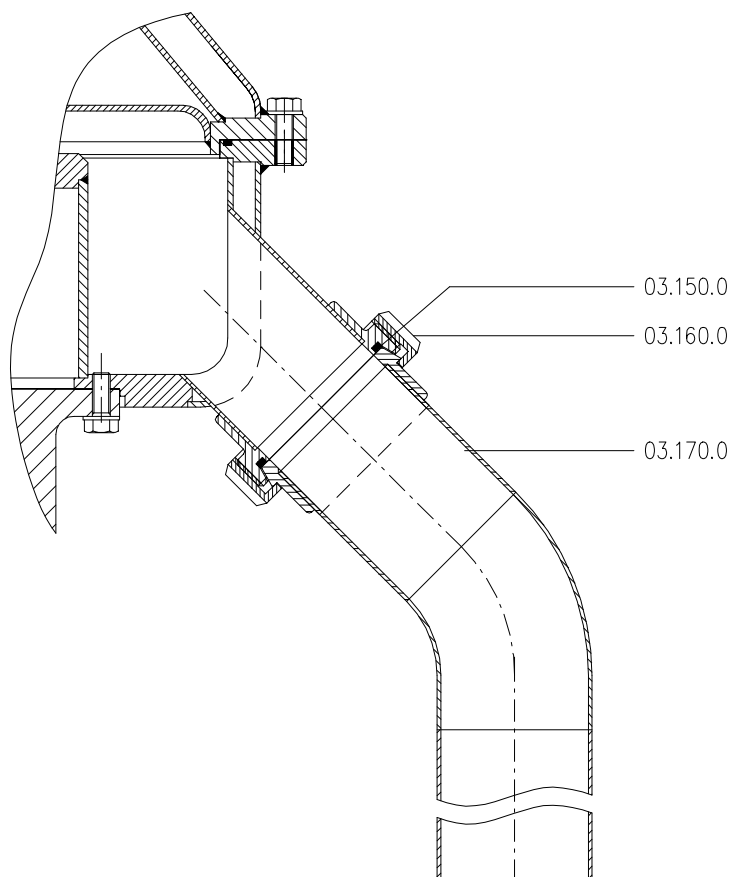
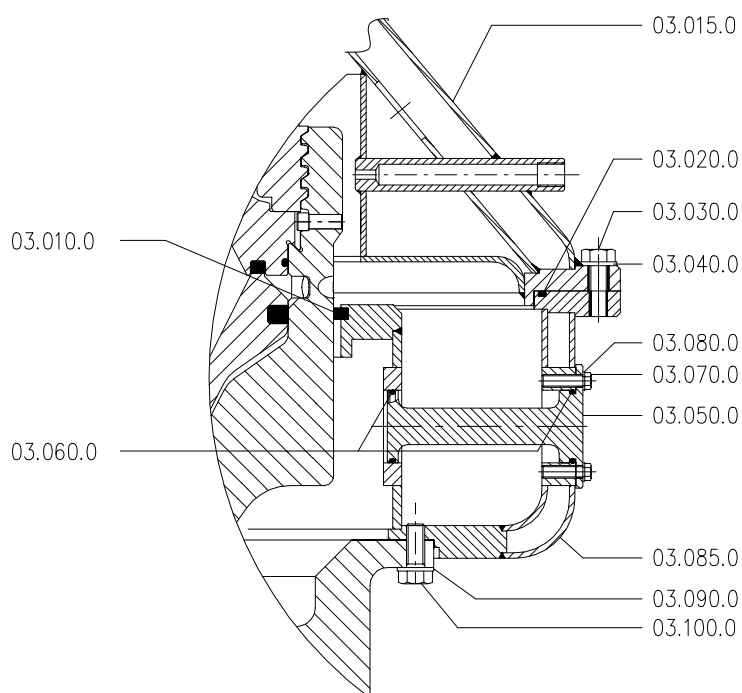
TAB. 07/B



FRAME - TAB. 08/A

<u>Reference</u>	<u>Code</u>	<u>Quantity</u>	<u>Description</u>
08.010.0 #	400324000	1	Cyclone teflon gasket
08.015.0	100546310	1	Cover
08.020.0 #	400303305	1	OR gasket - cover
08.030.0	529006154	8	Cover clamping screw
08.040.0	529056510	8	Washer
08.050.0	400684600	1	Port plug for bowl valve
08.060.0 #	528020188	2	Plug gasket
08.070.0	529006064	2	Plug screw
08.080.0	529056006	2	Washer - plug screw
08.085.0	100401510	1	Cyclone
08.090.0	529056510	8	Washer - cyclone clamping screw
08.100.0	529006156	8	Cyclone clamping screw
08.150.0 #	528151045	1	Gasket DN80
08.160.0	523906083	1	Nut - cyclone drain
08.170.0	400617910	1	Cyclone drain pipe

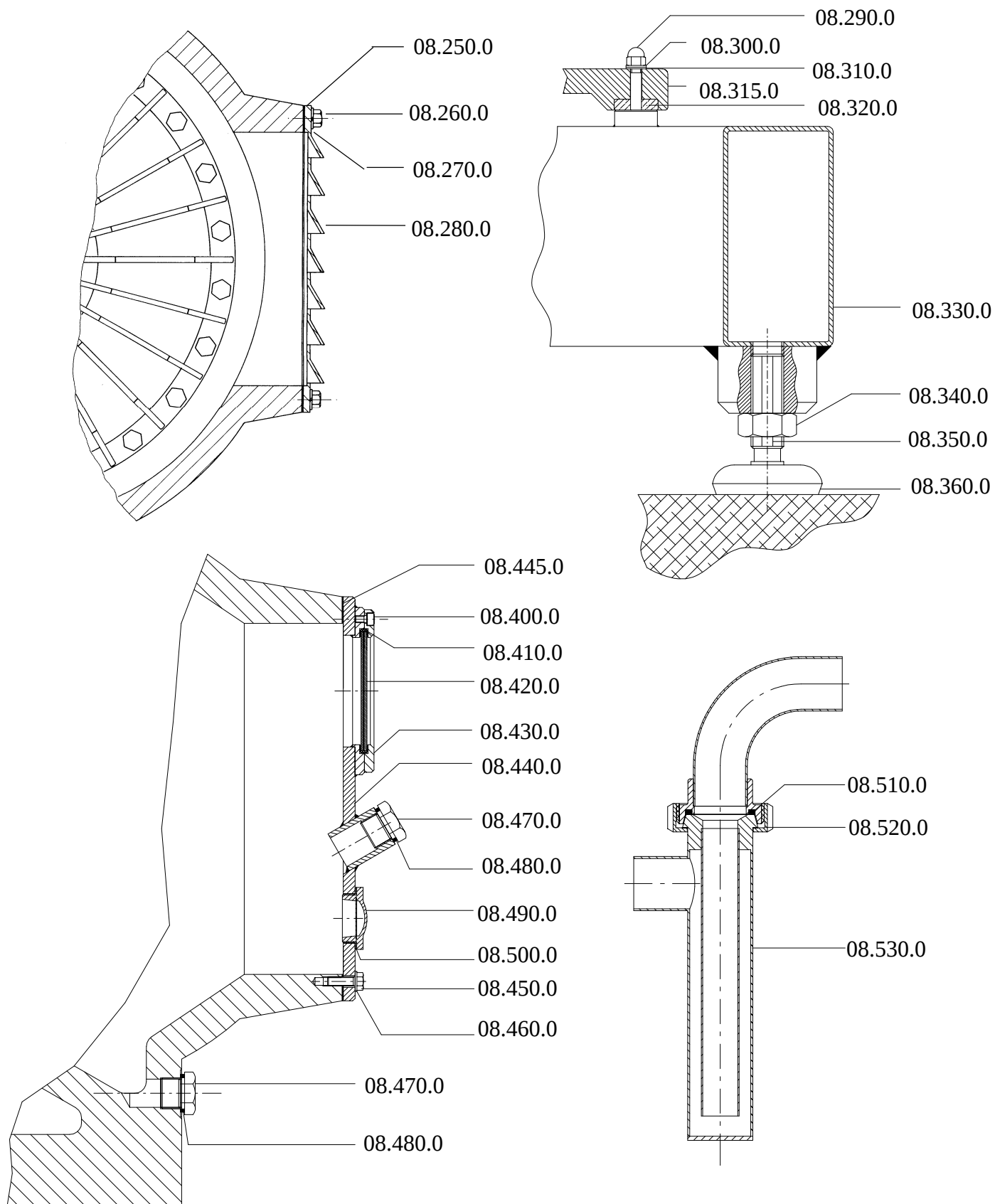
TAB. 08/A



FRAME - TAB. 08/B

<u>Reference</u>	<u>Code</u>	<u>Quantity</u>	<u>Description</u>
08.250.0 #	400153100	1	Gasket - air grating
08.260.0	529006114	4	Screw TE M8x25 - air grating
08.270.0	529056008	4	Washer
08.280.0	400416000	1	Air grating
08.290.0	529061120	4	Cap nut M20
08.300.0	529056020	4	Washer
08.310.0	400213700	4	Nylon washer
08.315.0	300308700	1	Frame
08.320.0	400120900	4	Shock absorber
08.330.0	808011021	1	Platform
08.340.0	529061680	4	Nut M30
08.350.0	400224800	4	Threaded pin
08.360.0	521650131	4	Platform foot with base in rubber
08.400.0	529011140	4	Screw TCCEI M6x10 - sight glass
08.410.0 **/#	400831900	1	Gasket - sight glass
08.420.0 **	400833600	1	Sight glass
08.430.0	400125700	1	Flange - sight glass
08.440.0	300328300	1	Flange - gear oil and chamber
08.445.0 #	400152900	1	Gear chamber flange gasket
08.450.0	529006114	6	Screw TE M8x25 - gear chamber flange
08.460.0	529056008	6	Washer Ø8 - gear chamber flange
08.470.0	400234300	2	Oil supply / Drain plug
08.480.0 #	400211200	2	Gasket - plug
08.490.0 ***	/	1	Oil gauge glass
08.500.0 ***	/	1	Gasket - oil gauge glass
08.510.0 #	528151030	1	Gasket
08.520.0	523906075	1	Nut
08.530.0	400734500	1	Drain trap
08.710.0	832020019	1	Sight glass with gasket (2 pieces, **)
08.720.0	523879014	1	Oil gauge glass with gasket (2 pieces, ***)
08.730.0	832001067	1	Set frame gasket (11 pieces, #)

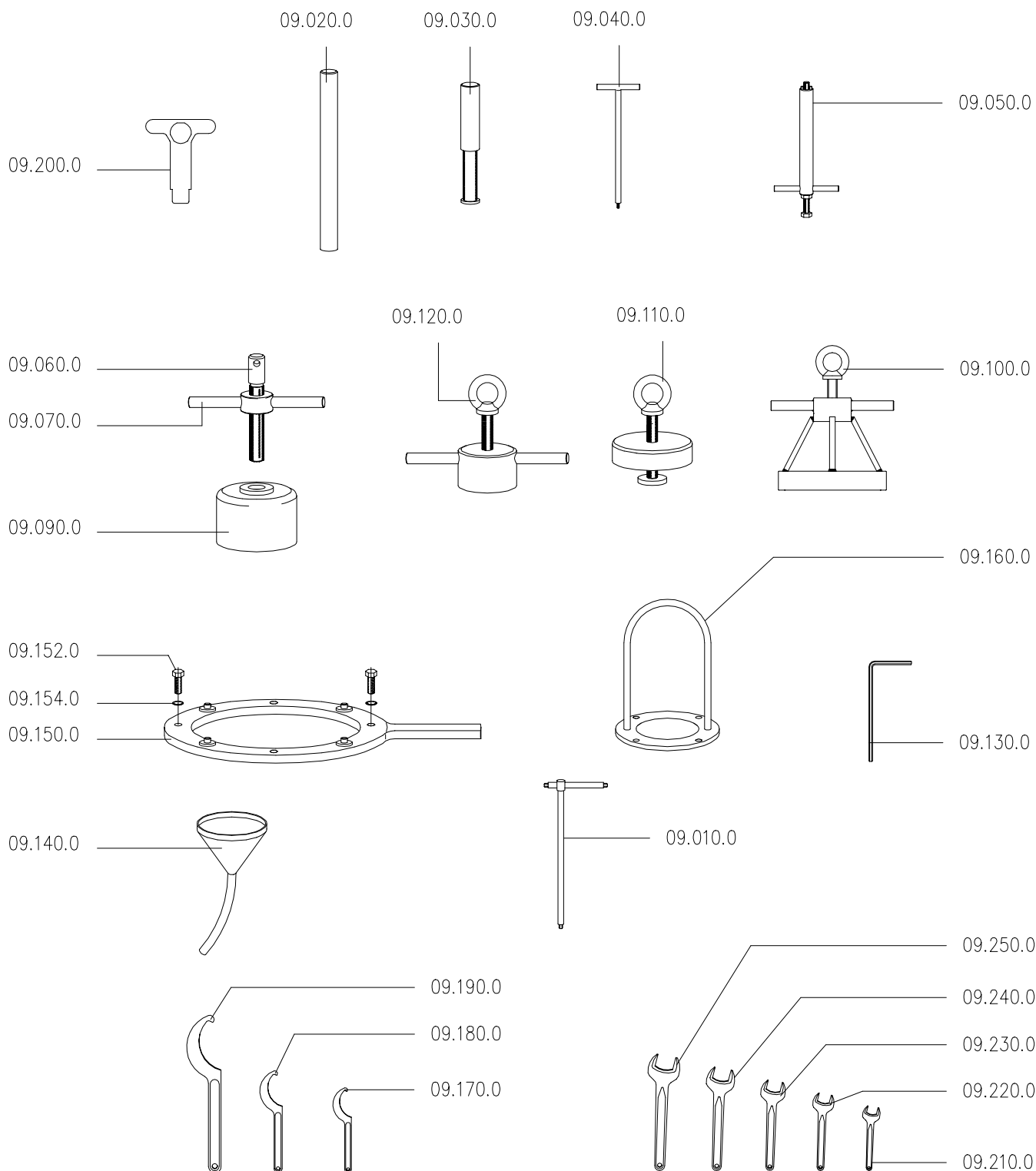
TAB. 08/B



SPECIAL SPANNERS - TAB. 09

<u>Reference</u>	<u>Code</u>	<u>Quantity</u>	<u>Description</u>
09.010.0	560060060	1	Spanner for oil plug of hydraulic coupling
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 *	400844500	1	Threaded pin for disk compression
09.070.0 *	400838500	1	Nut of disk compression spanner
09.090.0 *	400838300	1	Bell of disk compression spanner
09.100.0	400428100	1	Spanner for extracting moving ram
09.110.0	400452900	1	Spanner for extracting bowl hood
09.120.0	400442100	1	Spanner for extracting bowl body
09.130.0	560060006	1	Spanner S6
09.140.0	564900080	1	Oil supply funnel
09.150.0 **	300608500	1	Spanner for big lock ring
09.152.0 **	529055012	2	Screw TE M12x40
09.154.0 **	529005194	2	Washer Ø 12
09.160.0	400056200	1	Spanner for extracting bowl cover
09.170.0	560040545	1	Pin spanner 45/50
09.180.0	560040570	1	Pin spanner 68/75
09.190.0	560040180	1	Pin spanner for small ring 180/195
09.200.0	400217800	1	Spanner for feeding pipe locking
09.210.0	560000010	1	Spanner AC 10 mm.
09.220.0	560000017	1	Spanner AC 17 mm.
09.230.0	560000019	1	Spanner AC 19 mm.
09.240.0	560000038	1	Spanner AC 38 mm.
09.250.0	560000032	1	Spanner AC 32 mm.
09.310.0	400844400	1	Disk compression spanner (3 pieces, *)
09.320.0	300608400	1	Spanner for big lock ring (5 pieces, **)

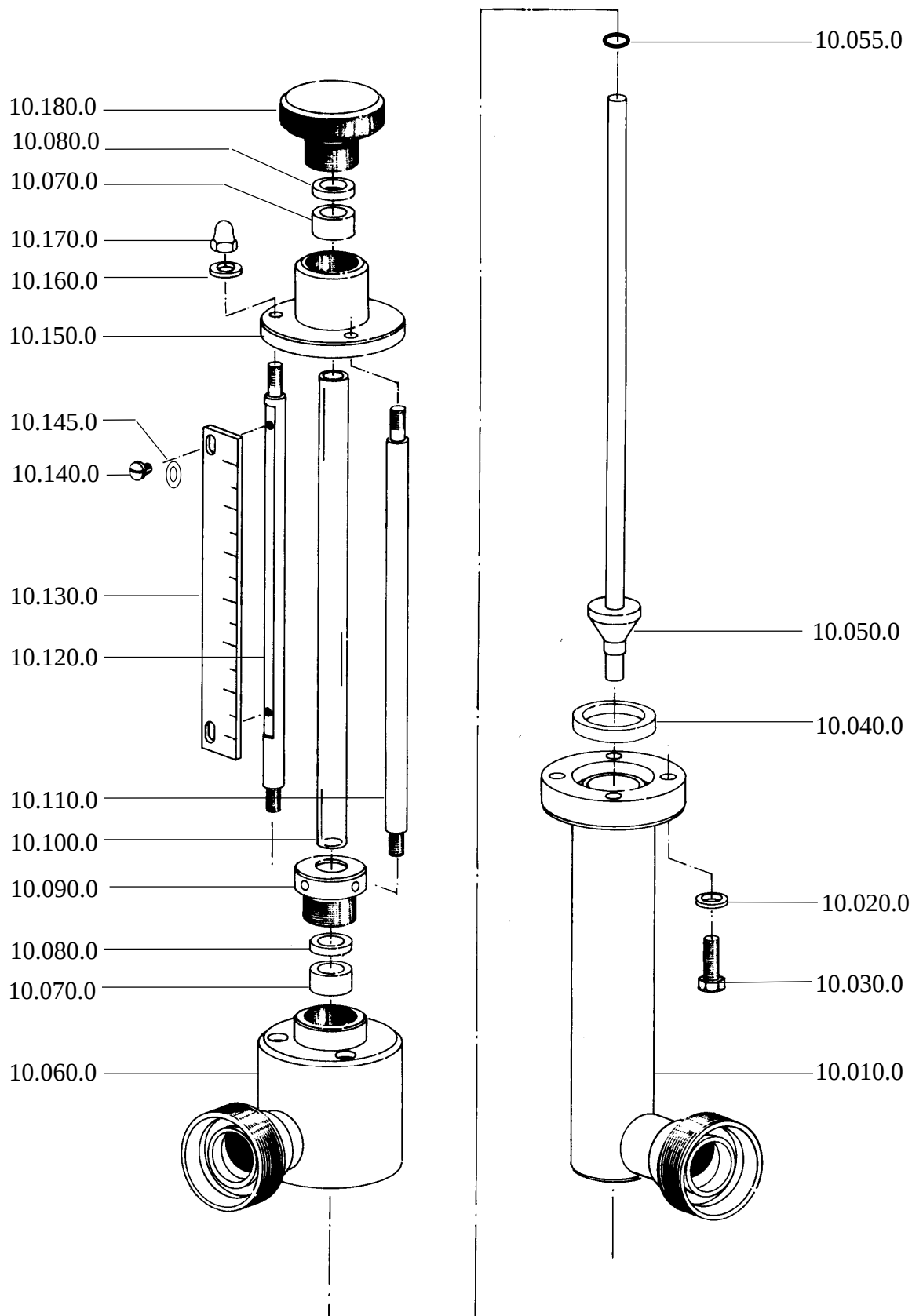
TAB. 09



FLOWMETER - TAB. 10

<u>Reference</u>	<u>Code</u>	<u>Quantity</u>	<u>Description</u>
10.010.0	400063701	1	Flowmeter lower body (fitting DN25 - DIN11851/M)
10.020.0	529056006	4	Washer Ø6
10.030.0	529006076	4	Screw TE M6x25
10.040.0	528151020	1	Flowmeter body gasket DN25 - DIN11851
10.050.0	400147001	1	Flow indicating rod
10.055.0 *	528020023	1	OR gasket
10.060.0	400089201	1	Flowmeter upper body (fitting DN25 - DIN11851/M)
10.070.0 *	400212300	2	Glass pipe gasket
10.080.0 *	400211800	2	Teflon washer
10.090.0	400093500	1	Threaded bush
10.100.0	400258602	1	Glass pipe
10.110.0	400241000	2	Spacer rod
10.120.0	400241300	1	Spacer rod scale side
10.130.0	400322800	1	Scale
10.140.0	529011038	2	Scale screw TCCEI M4x10
10.145.0	529056004	2	Washer Ø 4
10.150.0	400127000	1	Glass pipe upper support
10.160.0	529056006	3	Spacer rod washer
10.170.0	529061106	3	Spacer rod cap nut
10.180.0	400092700	1	Plug
10.200.0	832015000	1	Set of gasket for flowmeter glass pipe (5 pieces,*)

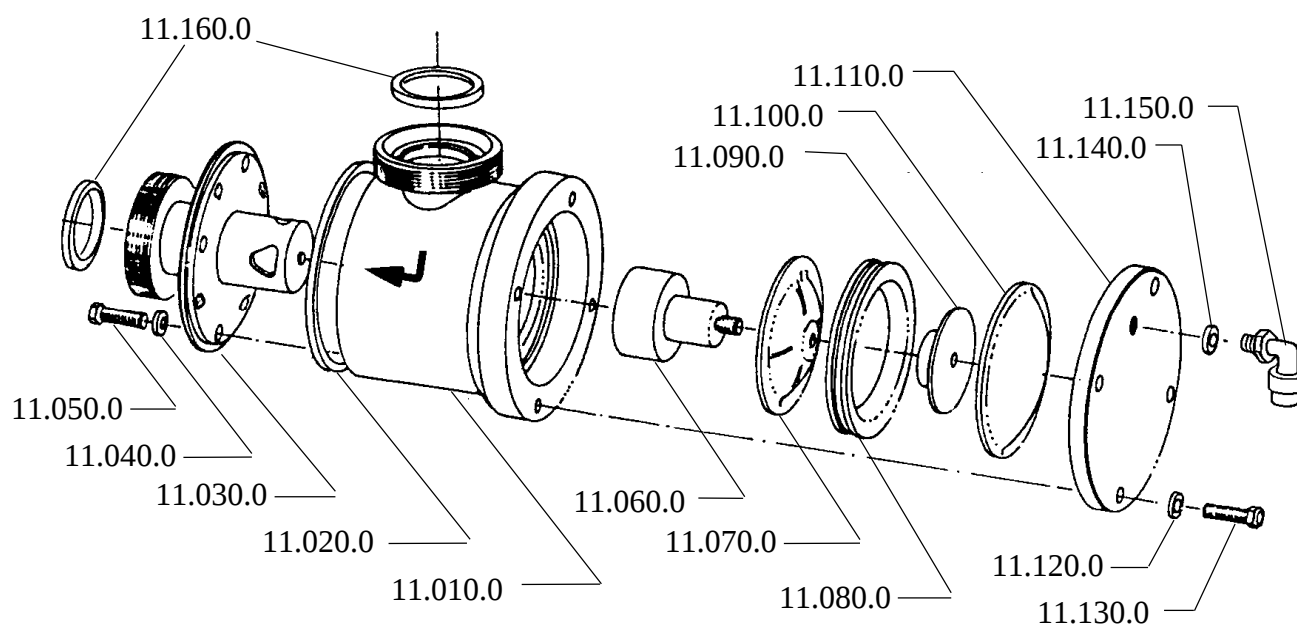
TAB. 10



CONSTANT PRESSURE VALVE - TAB. 11

<u>Reference</u>	<u>Code</u>	<u>Quantity</u>	<u>Description</u>
11.010.0	400372600	1	Valve body with union DN50 DIN11851/F
11.020.0	400154900	1	Body teflon gasket
11.030.0	300754300	1	Lower flange with union DN50 DIN11851/F
11.040.0	529056006	4	Washer
11.050.0	529006076	4	Screw
11.060.0	400753500	1	Valve shutter
11.070.0 *	400120800	1	Teflon membrane
11.080.0	400022300	1	Spacer ring
11.090.0	400129000	1	Shutter nut
11.100.0 *	400120700	1	Rubber membrane
11.110.0	400124900	1	Upper flange
11.120.0	529056006	4	Washer
11.130.0	529006076	4	Screw
11.140.0 **	/	1	Nylon washer
11.150.0	524901118	1	Compressed air union rotating elbow
11.160.0	528151035	2	Gasket DN50 DIN11851
11.200.0	832016000	1	Set membrane for constant pressure valve (2 pieces,*)

(**) The nylon washer 11.140.0 is not available such as spare part because it is included in the compressed air union rotating elbow 11.150.0.



OVERALL DIMENSIONS AND INSTALLATION PLAN**TAB. 20**

- A Product inlet DN50 DIN11851
- B Heavy phase outlet (buttermilk) 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 DN80

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 Carter - motor
- 8 Air grating

Components and equipments

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

Buttermilk outlet

- 18 Micrometric valve
- 19 Manometer

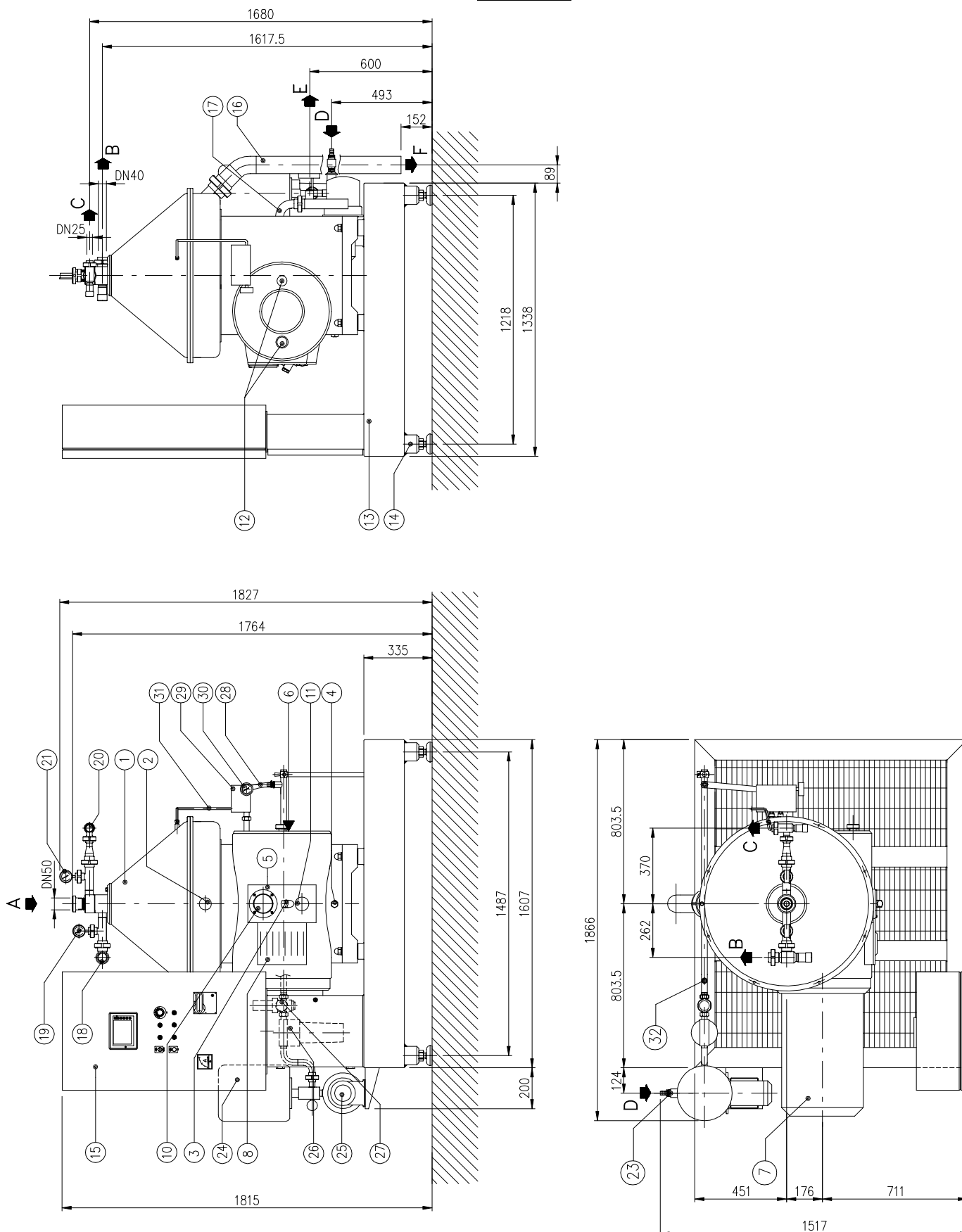
Cream outlet

- 20 Micrometric valve
- 21 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
- 32 Pressure switch - limiting the minimum water pressure

TAB. 20



HYDRAULIC SYSTEM DIAGRAM - TAB. 21

- A Product inlet DN50 DIN11851
- B Heavy phase outlet (buttermilk) 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 DN80

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
- PSC0 Pressure switch - limiting the minimum water pressure
- YV1 Operating water solenoid valve (bowl opening)
- BV1 Ball valve (emergency)
- BV0 Ball valve (emergency)
- YV0 Operating water solenoid valve (bowl closing)
- MN0 Manometer

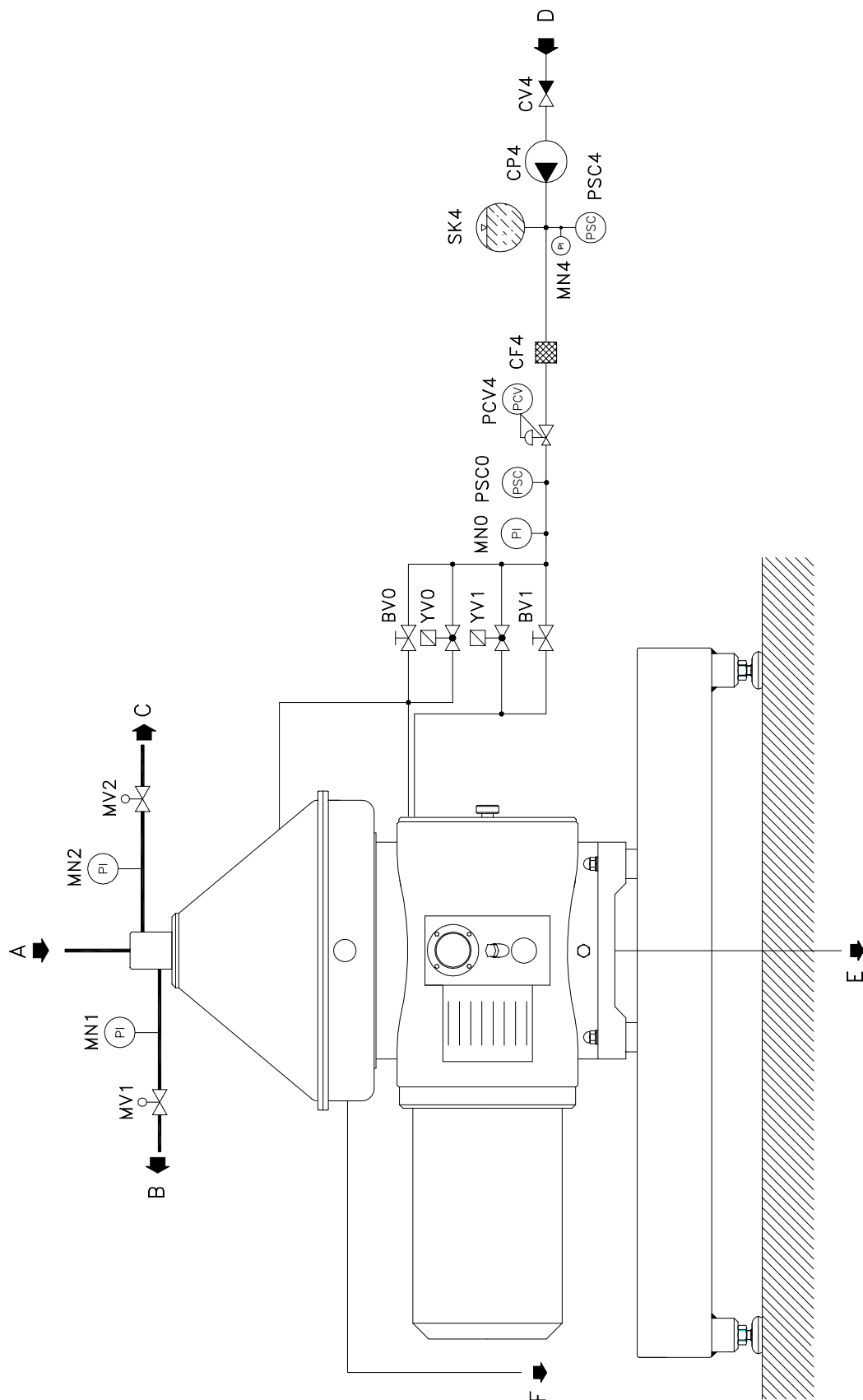
Buttermilk outlet

- MN1 Manometer
- MV1 Micrometric valve

Cream outlet

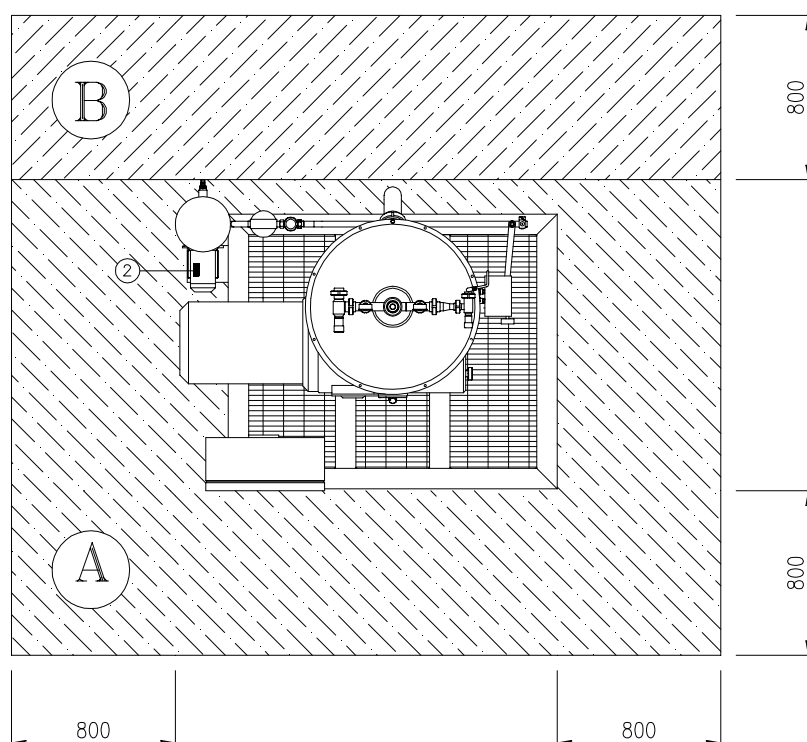
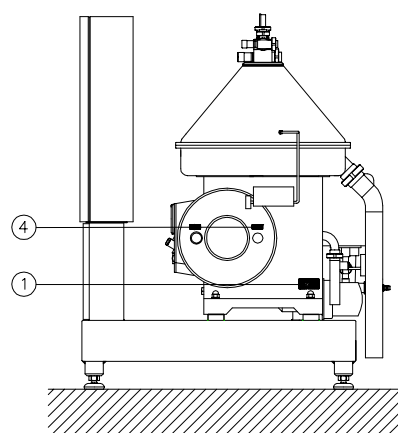
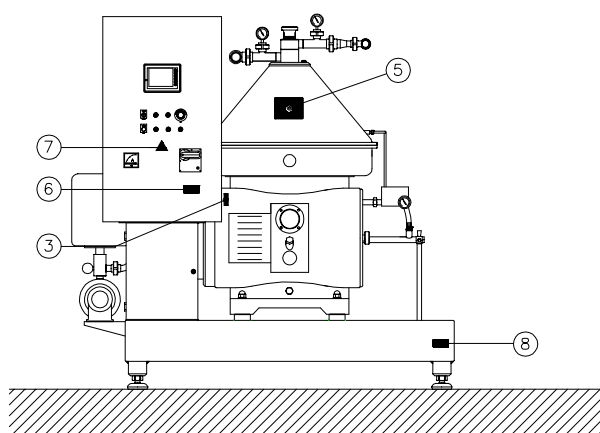
- MN2 Manometer
- MV2 Micrometric valve

TAB. 21



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.
- 7 Sticker - risk of electrocution.
- 8 Plate with technical and identification data of unit on platform.

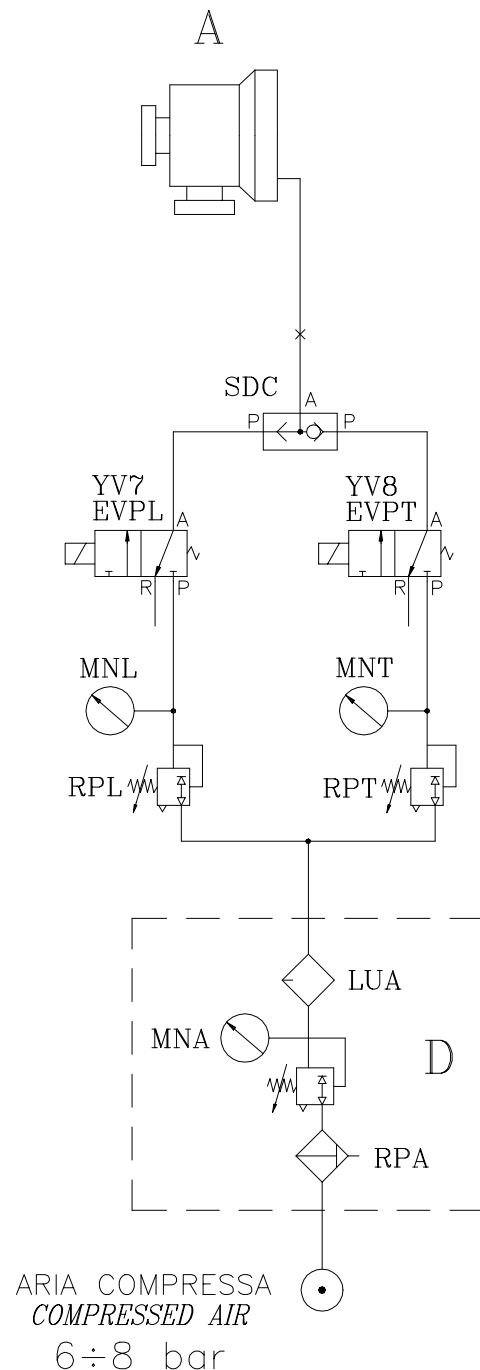
A Free necessary area for normal operation.

A+B Free necessary area for maintenance.

PNEUMATIC SYSTEM DIAGRAM - TAB. 23

- A Constant pressure valve
- D Compressed air treatment unit

- RPL Pressure regulator (0 ÷ 4 bar)
- RPT Pressure regulator (0,5 ÷ 10 bar)
- MNL Manometer (0 ÷ 12 bar)
- MNL Manometer (0 ÷ 12 bar)
- SDC Circuit selector
- YV7 3-way solenoid valve
- YV8 3-way solenoid valve
- MNA Manometer
- LUA Lubricator
- RPA Pressure regulator



SPARE PARTS REQUEST FORM

Centrifugal separator mod.: SE 40C..... Manufacturing N°:

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

<u>Ref.</u>	<u>Code</u>	<u>Quantity</u>	<u>Description</u>
<i>Bowl (Tab. 03)</i>			
☐	03.510.0	832000074	 Set of bowl gaskets (7 pieces)
☐	03.520.0	832000073	 Set of bowl valves gaskets (18 pieces)
☐	03.530.0	832004004	 Set of bowl valves with gaskets (3 + 18 pieces)
☐			
<i>Inlet-outlet flow unit (Tab. 04)</i>			
☐	04.010.0	200899200	 Feeding pipe
☐	04.030.0	400472000	 Lower pump - cream
☐	04.050.0	400309500	 Upper pump - buttermilk
☐	04.210.0	520060210	 Manometer
☐	04.510.0	832000435	 Set of flow-unit gaskets (18 pieces)
☐	04.520.0	832004033	 Set of spacer (3 pieces)
☐	04.530.0	832010005	 Set gaskets for micrometric valve (1 piece)
☐	04.540.0	832010000	 Set gaskets for micrometric valve (1 piece)
☐			
<i>Solenoid valves unit (Tab. 05)</i>			
☐	05.160.0	523508150	 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)
☐			
<i>Vertical shaft (Tab. 06)</i>			
☐	06.510.0	832005002	 Set of vertical shaft bearings and washers (6 pieces)
☐	06.520.0	832001028	 Set of vertical shaft gaskets (8 pieces)
☐	06.530.0	832007024	 Set of gears, flanges, screw and washer (12 pieces)
☐			
<i>Horizontal shaft (Tab. 07)</i>			
☐	07.430.0	400046600	 Brake shoe with pin and elastic pin (2 pieces)
☐	07.910.0	832005003	 Set of horizontal shaft bearings and circlips (3 pieces)
☐	07.920.0	832001027	 Set of horizontal shaft gaskets (4 pieces)
☐			
<i>Frame (Tab. 08)</i>			
☐	08.710.0	832020019	 Sight glass with gasket (2 pieces)
☐	08.720.0	523879014	 Sight glass oil level with gaskets (2 pieces)
☐	08.730.0	832001025	 Set of frame gaskets (11 pieces)
☐			
<i>Flowmeter (Tab. 10)</i>			
☐	10.100.0	400258602	 Flowmeter glass pipe
☐	10.200.0	832015000	 Set of flowmeter gaskets (5 pieces)
☐			
<i>Constant pressure valve (Tab. 11)</i>			
☐	11.200.0	832016000	 Set membrane for constant pressure valve (2 pieces)
☐			

SPARE PARTS REQUEST FORM

Centrifugal separator mod.: SE 40C..... Manufacturing N°:

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

<u>Ref.</u>	<u>Code</u>	<u>Quantity</u>	<u>Description</u>
<i>Bowl (Tab. 03)</i>			
☐	03.510.0	832000074	 Set of bowl gaskets (7 pieces)
☐	03.520.0	832000073	 Set of bowl valves gaskets (18 pieces)
☐	03.530.0	832004004	 Set of bowl valves with gaskets (3 + 18 pieces)
☐			
<i>Inlet-outlet flow unit (Tab. 04)</i>			
☐	04.010.0	200899200	 Feeding pipe
☐	04.030.0	400472000	 Lower pump - cream
☐	04.050.0	400309500	 Upper pump - buttermilk
☐	04.210.0	520060210	 Manometer
☐	04.510.0	832000435	 Set of flow-unit gaskets (18 pieces)
☐	04.520.0	832004033	 Set of spacer (3 pieces)
☐	04.530.0	832010005	 Set gaskets for micrometric valve (1 piece)
☐	04.540.0	832010000	 Set gaskets for micrometric valve (1 piece)
☐			
<i>Solenoid valves unit (Tab. 05)</i>			
☐	05.160.0	523508150	 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)
☐			
<i>Vertical shaft (Tab. 06)</i>			
☐	06.510.0	832005002	 Set of vertical shaft bearings and washers (6 pieces)
☐	06.520.0	832001028	 Set of vertical shaft gaskets (8 pieces)
☐	06.530.0	832007024	 Set of gears, flanges, screw and washer (12 pieces)
☐			
<i>Horizontal shaft (Tab. 07)</i>			
☐	07.430.0	400046600	 Brake shoe with pin and elastic pin (2 pieces)
☐	07.910.0	832005003	 Set of horizontal shaft bearings and circlips (3 pieces)
☐	07.920.0	832001027	 Set of horizontal shaft gaskets (4 pieces)
☐			
<i>Frame (Tab. 08)</i>			
☐	08.710.0	832020019	 Sight glass with gasket (2 pieces)
☐	08.720.0	523879014	 Sight glass oil level with gaskets (2 pieces)
☐	08.730.0	832001025	 Set of frame gaskets (11 pieces)
☐			
<i>Flowmeter (Tab. 10)</i>			
☐	10.100.0	400258602	 Flowmeter glass pipe
☐	10.200.0	832015000	 Set of flowmeter gaskets (5 pieces)
☐			
<i>Constant pressure valve (Tab. 11)</i>			
☐	11.200.0	832016000	 Set membrane for constant pressure valve (2 pieces)
☐			

SPARE PARTS REQUEST FORM

Centrifugal separator mod.: SE 40C..... Manufacturing N°:

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

<u>Ref.</u>	<u>Code</u>	<u>Quantity</u>	<u>Description</u>
<i>Bowl (Tab. 03)</i>			
☐	03.510.0	832000074	 Set of bowl gaskets (7 pieces)
☐	03.520.0	832000073	 Set of bowl valves gaskets (18 pieces)
☐	03.530.0	832004004	 Set of bowl valves with gaskets (3 + 18 pieces)
☐			
<i>Inlet-outlet flow unit (Tab. 04)</i>			
☐	04.010.0	200899200	 Feeding pipe
☐	04.030.0	400472000	 Lower pump - cream
☐	04.050.0	400309500	 Upper pump - buttermilk
☐	04.210.0	520060210	 Manometer
☐	04.510.0	832000435	 Set of flow-unit gaskets (18 pieces)
☐	04.520.0	832004033	 Set of spacer (3 pieces)
☐	04.530.0	832010005	 Set gaskets for micrometric valve (1 piece)
☐	04.540.0	832010000	 Set gaskets for micrometric valve (1 piece)
☐			
<i>Solenoid valves unit (Tab. 05)</i>			
☐	05.160.0	523508150	 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)
☐			
<i>Vertical shaft (Tab. 06)</i>			
☐	06.510.0	832005002	 Set of vertical shaft bearings and washers (6 pieces)
☐	06.520.0	832001028	 Set of vertical shaft gaskets (8 pieces)
☐	06.530.0	832007024	 Set of gears, flanges, screw and washer (12 pieces)
☐			
<i>Horizontal shaft (Tab. 07)</i>			
☐	07.430.0	400046600	 Brake shoe with pin and elastic pin (2 pieces)
☐	07.910.0	832005003	 Set of horizontal shaft bearings and circlips (3 pieces)
☐	07.920.0	832001027	 Set of horizontal shaft gaskets (4 pieces)
☐			
<i>Frame (Tab. 08)</i>			
☐	08.710.0	832020019	 Sight glass with gasket (2 pieces)
☐	08.720.0	523879014	 Sight glass oil level with gaskets (2 pieces)
☐	08.730.0	832001025	 Set of frame gaskets (11 pieces)
☐			
<i>Flowmeter (Tab. 10)</i>			
☐	10.100.0	400258602	 Flowmeter glass pipe
☐	10.200.0	832015000	 Set of flowmeter gaskets (5 pieces)
☐			
<i>Constant pressure valve (Tab. 11)</i>			
☐	11.200.0	832016000	 Set membrane for constant pressure valve (2 pieces)
☐			

Seital Separation®

SPX Flow Technology Santorso s.r.l.
36014 Santorso (VI) Via delle prese n. 14

T: (+39) 044 554 0232 r.a.
F: (+39) 044 554 0214

ft.seital@spxflow.com
www.seital.it
www.spxflow.com

SPX reserves the right to incorporate our latest design and material changes without notice or obligation.
Design features, materials of construction and dimensional data, as described in this bulletin, are provided for your information only and should not be relied upon unless confirmed in writing. Please contact your local sales representative for product availability in your region.
For more information visit www.spxflow.com.
COPYRIGHT © 2013 SPX Corporation