

SERVICE and OPERATOR'S MANUAL

P.D. METER SBM 32 CF

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ISOIL IMPIANTI updates own products without condition of advance notice. ISOIL IMPIANTI doesn't take liabilities for use the dates that are modified

Enclosures

- SBM32 with strainer air separator dwg.5659/9
- SBM32 Measuring Chamber Assembly dwg. 6262
- Strainer air eliminator..... FIG.2
- Calibrating mechanism - exploded view dwg. 672/32

1 Introduction

1.1 Warranty

Each device comes with a 1-year warranty, starting from the delivering date.

Such warranty of good operating of the equipments includes our efforts of repairing or replacing, in the shortest time, the parts that fail for defective manufacturing or material during the warranty period, without rights to any refund for damages or other expenses.

If a device is going to be transferred in our laboratory for repair, the delivery expenses is at the customer's expense.

For any inspection of our qualified personnel related to what stated above, the labor is at our expenses, while the board, lodging and travel expenses are in charge at the customer.

The components furnished and installed, but not produced, by Isoil Impianti S.p.A. are covered by the guarantee released by the respective producers.

The warranty ceases if non-original spare parts are used; the warranty ceases too for an improper use or if the operational limits of the device are exceeded.

1.2 Introduction

ISOIL positive displacement meters are precision measuring instruments designed for use with a variety of petrochemical products and liquids. Each meter is fully tested and calibrated by factory before dispatch, and a regular service will maintain a high standard of performance and accuracy.

P.D. meters must be periodically tested by a calibrating tank, Prover, or Master Meter: if out of accuracy a service is necessary.

Experience has shown that mechanical defects are usually caused by the entry of foreign matters into the metering compartment due to inadequate straining facilities in the pipeline.

1.3 Working principles

Liquid enters the meter through the manifold and causes the rotor to revolve by pressure on the vanes. The proximity of the rotor to the front and rear of the casing forms an efficient seal while the profile of the casing guides the vanes on to the measuring crescent.

The seal between vane and body is assured by the combined effects of gravity and centrifugal forces of vanes and it is assured the self-balance of clearances generated by the use too.

The rotor spindle extends through a pressure tight seal in the meter front cover into the calibrating mechanism which transmits the rotor movement to the register. (fig.1)

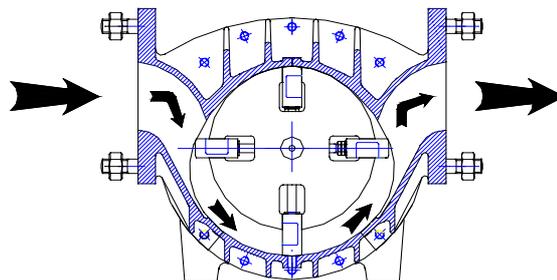


Fig.1



CAUTION



All parts under pressure must be released before disassembling the meter or its accessories for adjustment, inspection, servicing or substitution of its components.

Also make sure that all electric or electronic part, if present, are disconnected from its power supply.

2 General safety principles

This operator's manual contains basic safety instructions that must be followed during system installation, operation and maintenance. Failure to comply with these instructions may result in personal injury and can lead to personal, industrial or environmental accidents. Some examples of possible hazards caused by non-compliance with these instructions are:

- Failure of the system and/or some components.
- Hazards to people caused by the exposition to electrical, mechanical or chemical influences.
- Pollution of the environment through the leaking of hazardous substances

Therefore, follow the safety instructions described in this manual; in case of uncertainties, please contact the manufacturer.

2.1 General instructions

- Read carefully the operator's manual.
- Make sure that all the personnel assigned to the installation, operation and maintenance is properly trained.
- Make sure that the contents of the operator's manual are completely understood by all personnel assigned to the operations on the system.
- Inspect parts under pressure in compliance with national regulations before the initial operation of the system.
- Make sure that the operator's manual is readily available to personnel on site
- Follow national safety regulation in force in the location of the plant.
- Make sure that the system operates in compliance with the relevant operational limits.
- All pressure parts must be inspected and serviced in accordance with national laws in force.

2.2 Meter operation

- The meter must be operated only by trained and authorized personnel.
- The meter must not be operated in presence of foreign, unauthorized or not

adequately trained personnel.

- The meter must be used for the purpose it is made for; the manufacturer is not responsible for any damage deriving from uses outside of the original purposes.
- The meter must be operated inside the limits fixed by the manufacturer; the manufacturer is not responsible for any damage deriving from uses outside of the operational limits of the device.

2.3 Instructions for the operator

- The operator must adhere to safety and accident-prevention standards currently in force in the country where the device is installed.
- The operator must not, by his own initiative, carry out any operation that is outside his competence.
- The operator must carefully comply with hazard and/or prohibition instructions contained in this manual.
- Do not use petrol, solvents or other flammable substances to clean parts. Use only approved commercial solvents that are non-flammable and non-toxic.

2.4 Servicing instructions

- Never carry out any maintenance, servicing or regulation before having closed the root valve, discharged the pressure from the system and disconnected the power supply to any electrical device (if present), unless explicitly stated otherwise.
- Read carefully the rating plates on the individual equipment.
- All maintenance operations, either ordinary or extraordinary, must be done by authorised and trained personnel.
- The maintenance operator must wear clothes adequate to the working environment and to the situation; in particular, loose or voluminous clothes, chains, bracelets, rings, earrings or anything that might get caught in the mechanical parts of the system should be avoided.
- The maintenance operator must wear adequate protective devices in accordance with safety and accident-prevention regulations.
- In explosive environments use only antisparking equipment.
- If the meter is connected to any electric or electronic equipment, disconnect all of them from the power supply before doing any servicing or regulation operation, unless explicitly stated otherwise in the manual.

2.5 Operating precautions

- The meter must be calibrated following the instructions reported into the operator's manual and in what stated into the Manual of Petroleum Measurement Standards (API) with particular attention to the following chapters:
 - Chapter 4: proving systems
 - Chapter 5: metering
 - Chapter 6: metering assemblies
 - Chapter 11 section 2.3: water calibration of volumetric provers
 - Chapter 12 section 2: calculation of petroleum quantities
- The meter must always remain full of product; to achieve this, it is suggested to install the meter so that it remains below the main line.

- The line upstream the meter must be kept full of product to avoid that some air enters the meter.
- Each meter must be adjusted following the instructions supplied in the operator's manual.
- Follow the recommendations of the manufacturer when installing pumps. Pay particular attention to factors such as the use of foot valves, inlet pipes dimension and conformity with NPSH when there are suction pumps. Follow the recommendations of the manufacturer to minimize the problems due to air and vapors.
- For flashing liquids (quick gasification of the liquid) or easily vaporizing liquids at high environmental temperatures, e.g. light hydrocarbon, it is advisable the use of submerged aspirations and pipes larger than the nominal dimension of the pump.
- Thermal expansions that generate overpressures can easily damage the meters and the systems in general. Put safety valves for overpressure in every section that can be closed through regulation or isolation valves.



CAUTION



All parts under pressure must be released before disassembling the meter or its accessories for adjustment, inspection, servicing or substitution of its components.

Also make sure that all electric or electronic part, if present, are disconnected from its power supply.

3 Installation

3.1 Precautions

The installation of the meter counter does not require any special procedure; just pay attention to the following points:

- The meter counter must be installed horizontally, the rotor axis must be kept horizontal.
- All the meter's openings are protected with covers when shipped; those must not be removed until the meter is installed on the piping
- Before the installation of the meter, it's suggested to clean thoroughly the piping to remove dirt, crusts and other foreign particles.
- Piping should not exercise strain on the meter. The meter is designed for overhang and supports should be provided only on the adjacent pipes.
- Leave space enough around the meter to ease access for adjustment, servicing and disassembly. The counter, if present, must be easily readable.
- The meter must always remain full of product; it's suggested to install the meter so that it remains always under the main line.
- The line upstream the meter must always remain full of product to avoid that air enters the meter's measure chamber; if the pipe arrangement allows reversal flow, a non-return valve must be installed.
- Flow through the meter must be regular and uniform; pulsating and irregular flows must be avoided.
- It is recommended to install flow limiting valves downstream of the meter if the flow rate can reach values higher than the maximum allowed for the meter.
- If the line pressure can reach values higher than the maximum allowed, automatic safety valves must be installed in adequate places.
- To protect meter from damages due to foreign particles in the liquid, a suitable strainer with a correct mesh number (60 mesh for diesel oil, 100 mesh for gasoline) must be installed upstream the meter.
- In case the rate of flow through the installation exceeds the meter maximum rated capacity, it is advisable to use a flow limiting valve, which must be installed

downstream the same meter.

- Water must not flow through the meter.
- Meters must be installed in such a way that air or vapour do not enter through the liquid under measurement. It is always suggested to install an air separator just upstream the meter.
- To avoid hammer shocks which may strongly damages the meter, it is not advisable to install upstream or downstream the meter any quick closing valves.
- It is recommended to install root valves at the inlet and outlet to ease servicing operations and isolation of the meter

3.2 Start-up precautions

- Before proceeding with the start-up make sure that:
 - The meter is adequately fixed
 - All the connections are tightened
 - Air is bled from the pipes
- If a calibration mechanism is associated with the meter, before the start-up it must be filled with lubricating oil
- Vent out all the air eventually present in the line
- When the meter is operated for the first time, fill it slowly with the operating fluid by following this procedure:
 - Open slowly the upstream isolation meter or fill the meter by gravity
 - Open slowly the downstream isolation meter letting the flow rate rise smoothly to the operating value



CAUTION



Be very careful when starting up the meter: if the air enters the measuring chamber the rotor can easily reach high rotational speeds, leading to abnormal wear of the vanes and other components; this, in turn, will lead the meter to a major failure.



CAUTION



All parts under pressure must be released before disassembling the meter or its accessories for adjustment, inspection, servicing or substitution of its components.

Also make sure that all electric or electronic part, if present, are disconnected from its power supply.

4 Maintenance

Before removing the flow meter from the pipeline for repairs, it is recommended that the possible causes and corrective actions are noted with the help of Fault Diagnosis Chart given in this manual.

Note that certain components in the flow meter assembly are not interchangeable. Therefore, if more that one flow meter is dismantled, it is recommended that each flow meter is dismantled independently.

CAUTION: Be very careful when you start up the meter after maintenance: if the air enters the measuring chamber the rotor can easily reach high rotational speeds, leading to abnormal wear of the vanes and other components; this, in turn, will lead the meter to a major failure. See chap.3.2 for start-up procedures.

4.1 Disassembly

The flow meter may be considered as two main assemblies: the measuring chamber and the calibrating mechanism. To separate these two assemblies from each other, remove the screws securing the calibrating mechanism on the flow meter body.

CAUTION: Before dismantling the meter for maintenance release pressure from the line and drain all the fluid inside the meter through the draining hole below the meter.

Proceed then with the maintenance of the faulty part.

4.1.1 Main components disassembling

1. Remove Spring Dowel (30) fitted across the Rotor spindle.
2. Rest the flow meter body horizontally on bench.
3. Remove 6 Nuts (5) from the Front Cover (7).
4. Remove Front Cover and collect O'Ring Seal (9) and Shim (26) fitted inside.

Note : Do not remove Spindle Seal from the Front Cover, unless it is defective. The defective seal is indicated by product leakage between the Front Cover and the Calibrating Mechanism. If it is necessary to remove the seal, take out the Snap ring (1) and Backing Washer (2), which secure the Spindle Seal into the Front Cover, and then the seal can be withdrawn.

4.1.2 Rotor disassembling

Remove the rotor assembly in a smooth vertical lift. Collect washer (28) from the Rear cover

NOTE: Do not remove the vanes unless they are damaged; if their substitution is necessary:

- remove the split pins (11) fitted on the opposite side of the vane adjusting nuts; withdraw the vane blade (10) from the assembly and collect washers (13) and springs (12); withdraw the remaining vane blades with vane rods; remove screws (20) and collect gland clamps (19) and gland seal rings (17).

CAUTION: Don't remove or loosen the the vanes adjusting nuts(21-22), since that would vary the clearance between the vanes and the measuring chamber, causing loss of performance and/or meter failure.

4.2 Calibrating mechanism (only for mechanical counter)

The calibrating mechanism comprises a train of gears which transmit movement of the rotor to the counter. Operational failures of the mechanism are rare and they generally regard the breaking of tension pin, due to an excessive strain.

It is recommended to repair without varying the calibrating adjustment.

CAUTION: do not remove the shimming washers between the frame and the bearing of the mechanism box.

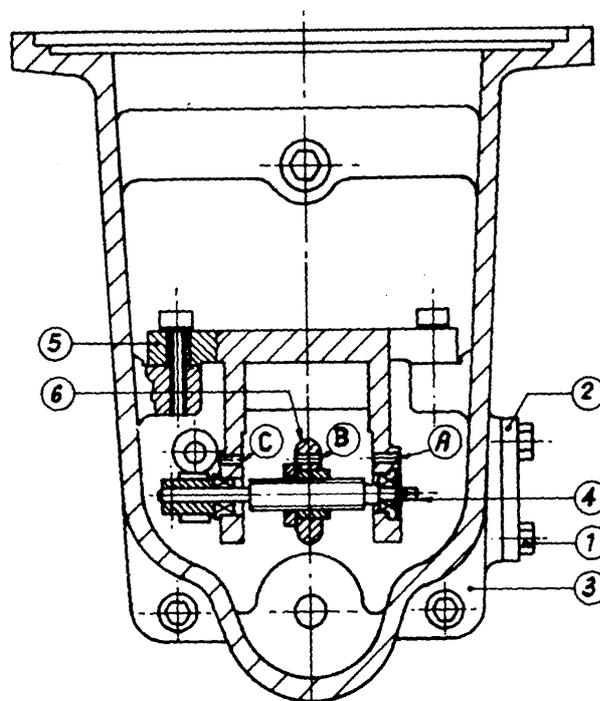


Fig. 1

This chapter only applies for mechanical counter; for the calibration of the meters with electronic counter please refer to the specific manual.

4.2.1 Calibration of flow meter

The calibrating mechanism comprises a train of gears which transmit movement of the rotor to the counter. Operational failures of the mechanism are rare and they generally regard the breaking of tension pin, due to an excessive strain. It is recommended to repair without varying the calibrating adjustment.

Attention: do not remove the shimming washers between the frame and the bearing of the mechanism box.

To carry out meter calibration follow next procedures:

- Break and remove seals.
- Remove the three screws (1) securing the cover (2) to the housing (3) in which calibrating mechanism is fitted.
- Remove cover (2)
- By using square key (4 mm) turn shaft (4) till A, B, C holes placed on the bracket (5) and on friction roller (6) will be properly aligned.
- Insert in these holes the stop pin (supplied with the meter, then using the square key operate on the shaft (4) as follow :
 - turning counter-clockwise direction, even if the quantity of fluid does not vary, on the counter is obtained an higher volume indication;
 - turning clockwise direction it is obtained a lesser indication.

NOTE: one complete turn of the screw varies the volume indicated on the meter by approximately 0,36% (per cent).

4.2.2 Suggested lubricating oils for calibrating mechanism

Company	Type	Temperature range
AGIP	OTE 32 SINT 2000	-10÷+60 °C
ESSO	NUTO 32	-20÷+65 °C
IP	HINDRUS HI 46	-10÷+60 °C
SHELL	AEROSHELL FLUID 31	-40÷+204°C
MOBIL	DTE 26 MOBIL 1	-10÷+80 °C -10÷+200 °C

NOTE: to avoid ice forming in wintertime, add two spoons of car antifreeze.

4.3 Tests after overhaul

After overhaul the p.d. meters must be tested with suitable proving systems. Error between the value stated by the p.d.meter counter and the value stated by the proving device is calculated as below:

Example:

Measured by the meter	Measured by the proving tank	Error (%)
1000 l	1003 l	-0,3%
1000 l	997 l	+0,3%

The formula is:

$$E\% = \frac{V - V_0}{V_0} \cdot 100$$

V = Measured by the meter

V₀ = Measured by the proving tank

4.4 Strainer/air eliminator (optional)

The strainer removes all solid impurities from the liquid before it reaches the meter and the Air eliminator removes entrapped air from the liquid.

The strainer is mounted on the upstream side of the meter.

The air eliminator is mounted centrally on the top of the top of the fabricated steel body of strainer.

4.4.1 Strainer(Fig.2)

A clean strainer is fundamental for the correct operation of the system; a dirt strainer would create an excessive pressure drop, leading to the failure of the basket and thus letting dirt, crusts and other harmful elements to flow into the fluid. If possible, check regularly the pressure drop between the inlet and the outlet of the strainer; the maximum allowed pressure drop is 130 kPa.

The basket (2) which is made of stainless steel wire mesh is positively clamped by the end cover and nut (5,23) a drain plug is provided for draining of liquids inside.

For a correct servicing of the strainer, follow the procedure described below:

- Discharge the pressure from the system and close the valves at the inlet and outlet
- Open the drain plug
- Remove the end cover (5) with o-ring seal (4)
- Remove and clean the basket; if possible, use a water cleaning machine
- Check accurately that the basket is intact; if it is found to be damaged, replace with another one with the same filtering grade:
 - For diesel oils: 60 mesh (247 micron)
 - For gasoline: 100 mesh (153 micron)
- Remove and inspect o-ring seal for visual damage, if the rubber sealing rings need replacement, remove the damaged rings and replace with a new o-ring
- Put again the basket in place, close the cover and the drain plug.

It's suggested to replace the o-rings between the strainer body and the cover each time the strainer is disassembled.

4.4.2 Air eliminator

The valve assembly (air vent valve) consists to stainless float connected to the main valve via multiple linkages (11,12,13). Main valve sits against rubber sealing ring (20) and seals the air eliminator chamber from atmosphere. Main valve slides in guide provided in bracket (10). Bracket is clamped to the cover plate (9) by socket head screw (27). An o-ring seal(21) is provided between body and cover plate.

Follow the instructions below for the servicing of the air eliminator:

- Discharge the pressure from the system and close the valves at the inlet and outlet
- Discharge the liquid through the drain plug
- Remove nuts (22) and lift the cover. Collect o-ring seal.
- Remove screws (27) and remove bracket from cover plate.

- Remove the main valve and the rubber seal ring.
- Inspect the air vent valve, checking that it works properly and its part aren't damaged
- Check rubber seal ring. If found damage or worn, replace with new one.
- Reassembly the valve assembly
- Close the drain plug and restore the operating conditions

4.5 Assembly

4.5.1 Measuring chamber assembly

Before assembly, clean and inspect all parts for any visual damage. Ensure that all o-ring grooves are clean and undamaged. Examine the O-Rings and ensure that they are not damaged or swollen, replace them if necessary. Examine graphite bushes on rotor assembly for free rotation and play, replace them if either is apparent. Examine each vane assembly for damage or wear, replace vane(s) if either is apparent. Examine gland seal rings in rotor assembly for damage or wear and replace if either is apparent.

The assembly procedure is the reversal of the dismantling procedure; only for installation of the internal body special precautions should be taken to match the centering cap of the external body's front cover.

1. Assemble Gland Seal Rings (18) and Gland Clamps (19) on Rotor.
2. Insert Vane assembly with Vane Rods (24) into the Rotor.
Note : Ensure that pocket on the Vane matches with the pocketed portion of the Rotor slot.
3. Place Washers (13) on Vane Rods and reassemble remaining Vane on the Vane Rod. Ensure position of slot as above.
4. While inserting Vane, reassemble Vane Rod Spring (12) in position.
5. Ensure that the Vane is seated on Washer by pressing it manually.
6. Compress Vane Rod Spring and insert Split Pin (11) in the Vane Rod.
7. Ensure that both Vane assemblies slide freely in the Rotor slots. Check by turning the Rotor by hand and allowing each vane assembly to fall under its own weight.
8. Clean and inspect Body and Rear Cover assembly.
9. Place Washer (28) in the Rear Cover (29).
10. Lower Rotor-Vanes assembly into the Body (18).
11. Ensure rear Ball Bearing (35) entering the Rear Cover properly. Check the rotation of Rotor.
12. Check clearance between the vane tip and body bore. It should be within the range 0.1 mm to 0.145 mm. If clearances are not correct, make the necessary adjustments with the help of 2 Lock Nuts (21-22) on the Vane Rod.
13. Assemble O'Ring (9) in the Body. Place Thickness (26) on the front Ball Bearing.

14. Assemble Front Cover (7) with Dowels (16) and Nuts (6).
15. If the Spindle Seal has been removed from the Front Cover, press the seal into the Cover with spring on the seal facing towards inside, place Backing Washer (2) and secure the Circlip (1).
16. Assemble Spring Dowel (30) on the Rotor spindle.
17. Check free rotation of the Rotor assembly.

4.5.2 Final Assembly

For assembling Calibrating Mechanism on the measuring chamber, follow the procedure below :

1. Align slot of the Rotor Gear to match with the Spring Dowel fitted across the Rotor spindle.
2. Assemble Calibrating Mechanism with the help of 3 screws.
3. Check free rotation of the Rotor by rotating it. (The Rotor can be rotated by inserting fingers through the inlet port).

4.6 Extraordinary maintenance

The user must define a maintenance scheduling table according to the fluid utilised, the operational conditions, the estimated/real workloads and the environmental conditions.

For all extraordinary maintenance needed after a failure and/or the rising of a fault that compromises the normal operation of the system, please contact Isoil Impianti SpA Customer Care.

4.7 Storing

- if after a working period it is foreseen to stop the meter for a long time, drain the meter and its accessories;
- If the meter or the equipment of the system are not immediately used, or if it is withdrawn from service and stored, it is important to follow next instructions :
 - fill the meter and its accessories with clean kerosene or lubricated oil and close its ends with blind flanges;
 - fill the carter containing the calibrating mechanism with oil till the sight glass is reached (see chap.4.4)
- adequately protect counters against rain and dust, with damp-proof caps

4.8 Spare parts

For a correct meter maintenance use only original spare parts from Isoil Impianti S.p.A. .

Isoil Impianti S.p.A. is not responsible for any problem that can result from the use of non original spare parts.

4.9 Maintenance schedule

Task	Monthly	6 Months	12 Months	24 Months
Visual inspection of manifold and meter body; check for leaks	X			
Inspection of the meter; check for internal part status: vanes, rotor, measure chamber, o-rings; check for wear or damage.				X

4.10 Fault diagnosis

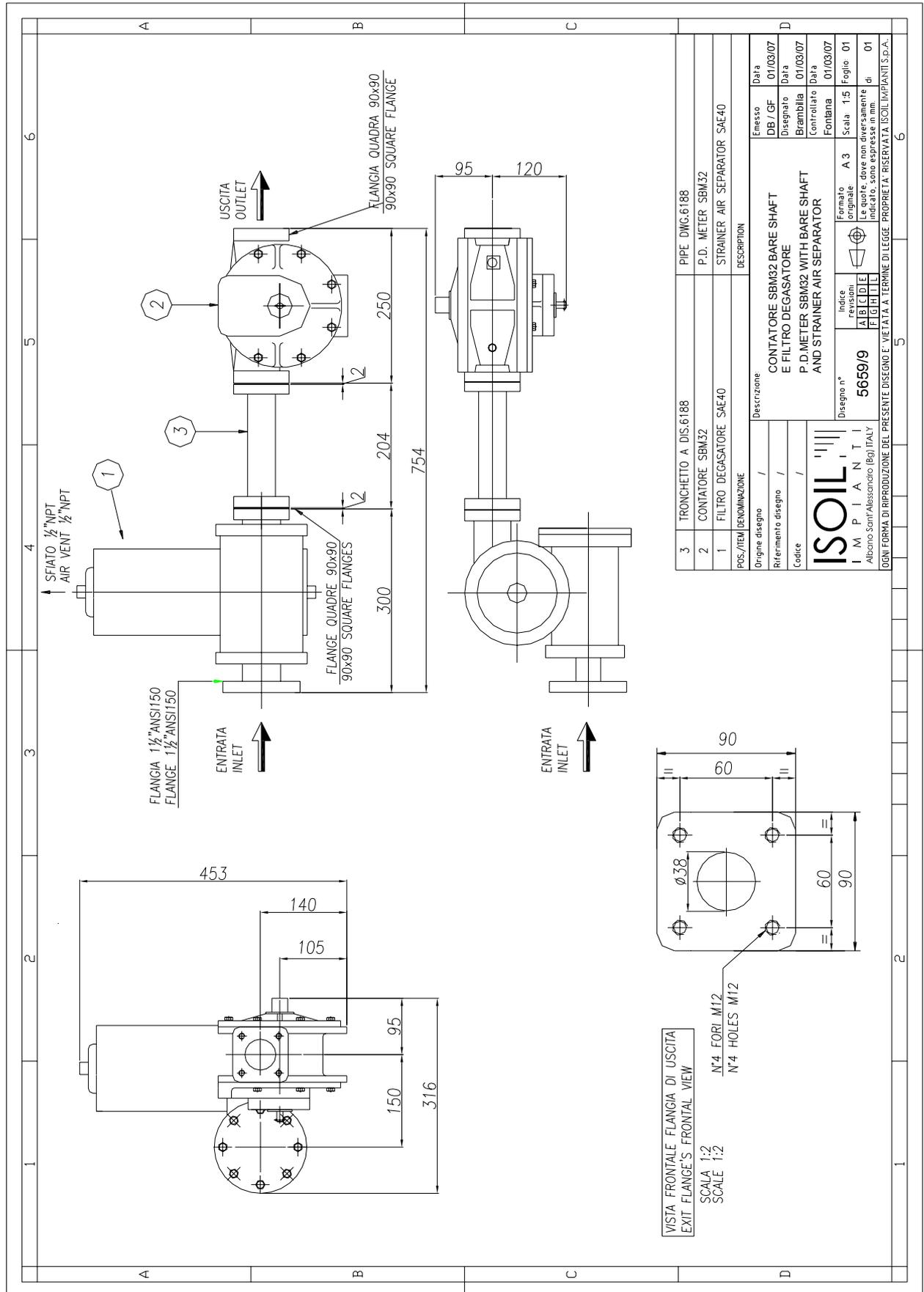
Fault	Possible Cause	Corrective Action
Liquid passing with normal flow rate but counter fails to register.	1. Defective counter.	Remove and check the counter by rotating bottom coupling. In case of any problem in the counter, contact the factory.
	2. Drive from the rotor fails to reach the counter, due to sheared pins in the calibrating mechanism.	Check cross pins fitted on all gears in the calibrating mechanism.
No liquid passing through.	1. Defective counter.	Remove and inspect the counter for free movement.
	2. Jammed calibrating mechanism.	Remove and inspect the calibrating mechanism. Identify the source of friction and replace relevant parts.
	3. Jammed rotor assembly.	Dismantle meter assembly. Inspect front & rear covers and rotor for scoring marks. Inspect vanes and bearings for damage.
	Causes of rotor jamming :	
	a. Solid particles trapped on rotor surface.	Clean the rotor surfaces.
	b. Incorrect adjustment of rotor end clearance due to loose or defective bearing adjuster.	Check setting of bearing adjuster. Clean and inspect the bearing adjuster.
	c. Rotor bearings jammed.	Clean bearings and cover, and inspect for any damage.
	d. Rotor bearings worn out.	Replace the bearings, if axial play is observed.
	e. Misalignment of front & rear	Ensure that both dowel pins are

	covers due to missing dowel pins.	used for locating the covers with the body.
	4. Clogged strainer basket.	Clean the strainer regularly.
Liquid is leaking from the joint at front cover and calibrating mechanism.	Spindle seal is damaged.	Replace the spindle seal. Inspect rotor spindle for wear or scratch marks.
Liquid is leaking from the joint at front cover and body or rear cover and body.	Damaged o'ring seals, unclean o'ring grooves, cover bolts loose.	Clean o'ring grooves, replace o'rings and secure cover bolts tightly.
Excess delivery beyond 1%.	1. Vane blades damaged.	Inspect and replace damaged vane blades.
	2. Jammed rotor or calibrating mechanism.	As described above.

5 Technical data

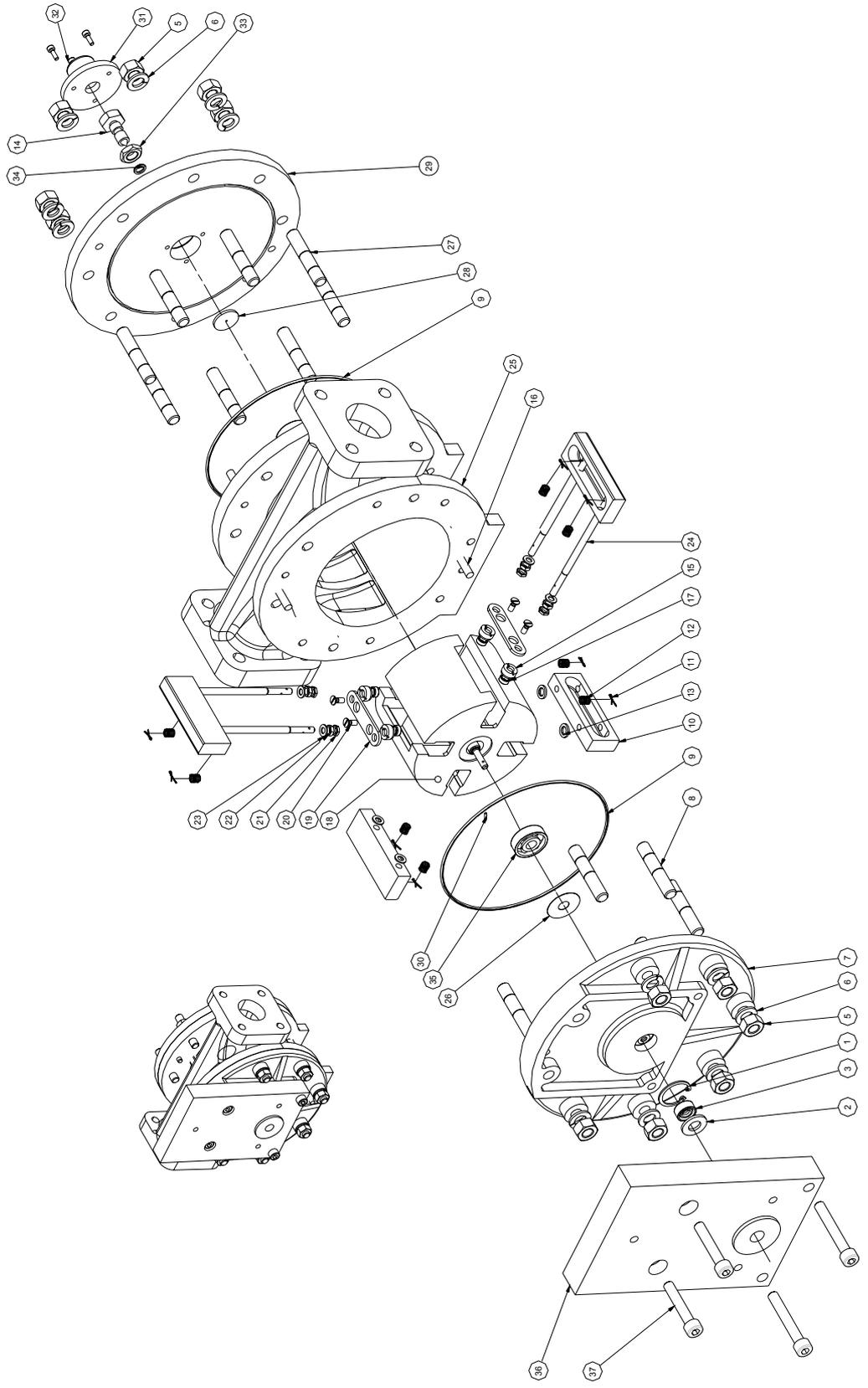
- Maximum working pressure 1000 kPa
- Working temperature..... -10°C ÷ +50°C
- Minimum flow rate 30 lpm
- Maximum flow rate 350 lpm

The value reproduced in label can change as regards to those shown in the manual



DIS 6262/M
FOGLIO DI 1

ASSIEME CAMERA DI MISURA SBM 32
SBM 32 MEASURING CHAMBER ASSEMBLY

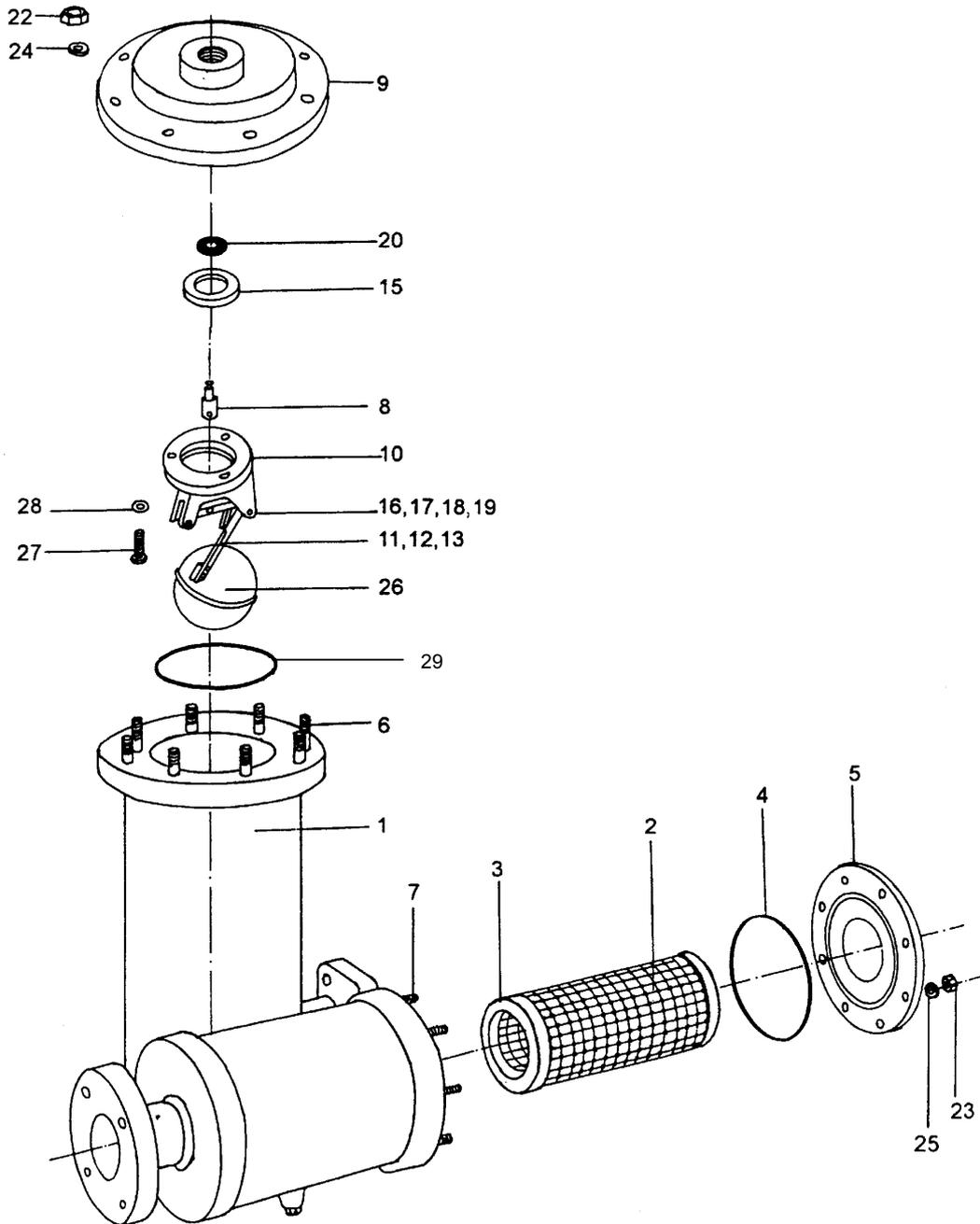


SBM32 Measuring Chamber Assembly							Dis 6262/M
Pos.	Description	Q.tà	Code	Pos.	Description	Q.tà	Code
1.	Snap ring			20.	Screw		
2.	Backing washer			21.	Check nut		
3.*	Spindle seal (VITON)	1	82GU0033	22.	Nut		
5.	Nut			23.	Washer		
6.	Spring washer			24.*	RH rod-vane assembly	1	80CON000
					LH rod-vane assembly	1	80CON001
7.	Front cover			25.	Body		
8.	Stud			26.	Shim		
9.*	O-Ring (VITON)	2	80GU1567	27.	Stud		
10.	Right-hand vane Left-hand vane			28.	Washer		
11.	Split pin			29.	Rear cover		
12.	Spring			30.	Spring dowel		
13.	Washer			31.	Bearing adjuster cap		
14.	Bearing adjuster			32.	Screw		
15.				33.	Nut		
16.	Cylindrical pin			34.*	O-Ring (VITON)	1	80GU1257
17.	Gland seal ring			35.*	Ball bearing	2	80CU1066
18.	Rotor			36	Fixing plate		
19.	Gland clamp			37	Screw		

**Suggested spare parts*

STRAINER AIRE ELIMINATOR

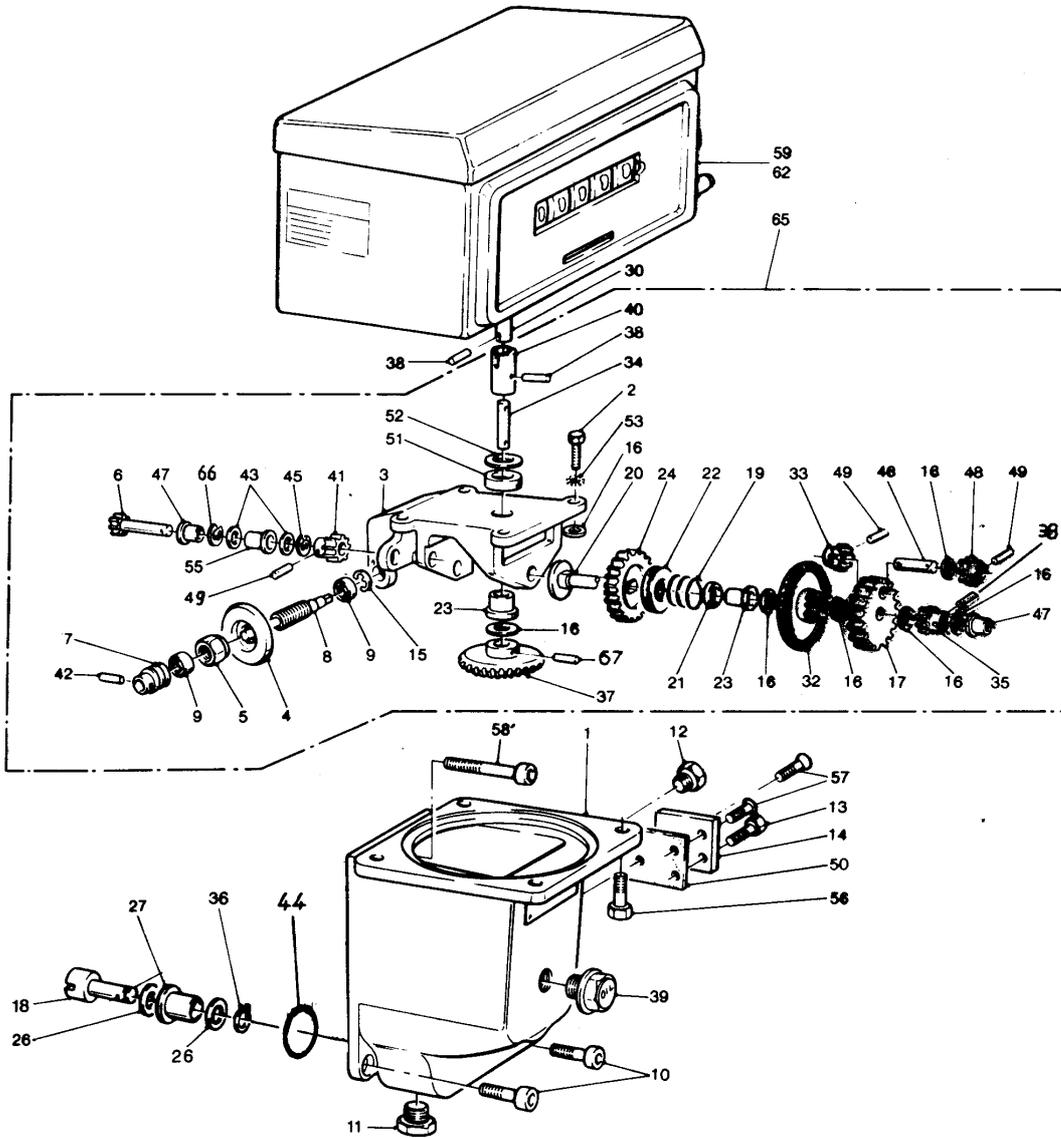
FIG.2



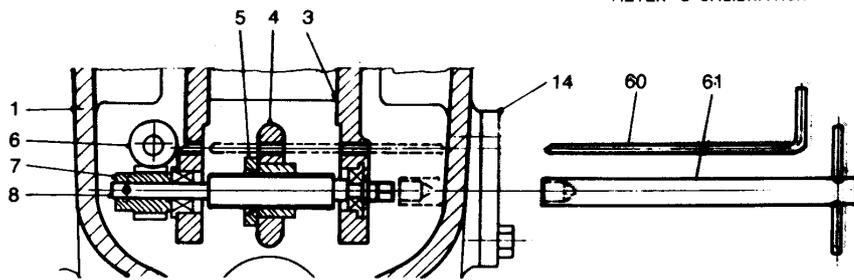
STRAINER AIR ELIMINATOR								FIG.2
Pos.	Description	Q.tà	Code	Pos.	Description	Q.tà	Code	
1.	Body			20.**	Sealing ring			
2.	Basket 60mesh Basket 100mesh		80CE3004 80CE3005	21.	O-ring seal		Parts not shown	
3.	Sealing Ring			22.	Nut			
4.*	O Ring Seal		80GU1519	23.	Nut			
5.	End Cover			24.	Spring washer			
6.	Stud			25.	Spring washer			
7.	Stud			26.**	Float		80SF0016	
8.	Pilot			27.	Screw			
9.	End Cover			28.	Spring washer			
10.	Bracket			29.*	O Ring Seal		80GU1525	
11.**								
12.**								
13.**								
14.**	Spacer		Parts not shown					
15.**	Main valve							
16.**								
17.**								
18.**								
19.**								

** Air vent valve assembly - Suggested spare parts

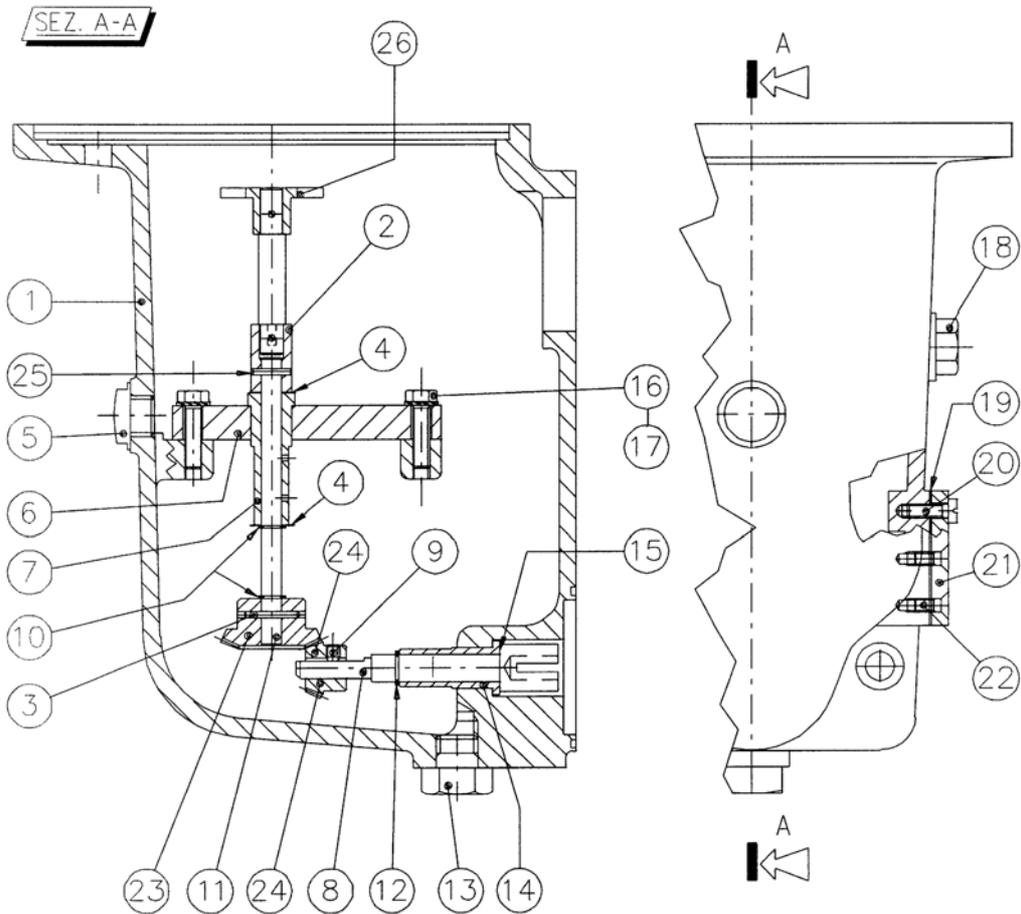
* Suggested spare parts



INTRODUZIONE CHIAVI PER
TARATURA CONTATORE
USE OF KEYS FOR
METER'S CALIBRATION



ISOIL 		MECCANISMO DI CALIBRAZIONE SBM 32						Dis. 672/32	
I M P I A N T I		CALIBRATION MECHANISM SBM 32						Foglio 1 di 2	
pos. item	N° CODICE N° CODE	DESCRIZIONE DESCRIPTION	Q.tà Q.ty	MATERIALE MATERIAL	pos. item	N° CODICE N° CODE	DESCRIZIONE DESCRIPTION	Q.tà Q.ty	MATERIALE MATERIAL
1	80SC2009	Scatola meccanismo Calibr.mechanism box	1	Alluminio Aluminium	24	80IN3144	Ingranaggio Gear	1	Acc.al carb. Carbon Steel
2	80VI2042	Vite fissaggio supporto Support screw	4	Acc.al carb. Carbon Steel	26	80RO1075	Rondella di rasamento Shim washer	2	Acc.al carb. Carbon Steel
3	80SV0012	Supporto disp.regolaz. Calibr.mech.support	1	Alluminio Aluminium	27	80BO1009	Boccola autolubrif. Self-lubric. bush	1	Bronzo Bronze
4	80AS0027	Ass.disco frizione Friction wheel	1	Acc.al carb. Carbon Steel	28*	80SP5009	Spina spirale Spirol pin	1	Acc.al carb. Carbon Steel
5		Fornito con pos.4 Supplied with item 4			30	80AL0270	Alberino prolunga Extension shaft	1	Acc.al carb. Carbon Steel
6*	80AS0129	Ass.albero con pign. Shaft with pinion	1	Acc.al carb. Carbon Steel	32	80PI5000	Pignone conico Bevel pinion	1	Acc.al carb. Carbon Steel
7	80AS0258	Ass. vite senza fine Worm screw	1	Acc.al carb. Carbon Steel	33		Viene forn. con pos.17 Supplied with item 17		
8*		Fornito con pos.7 Supplied with item 7	1		34	80AS0084	Ass. alberino/pignone Shaft/gear assembly	1	Acciaio inox St. steel
9*	80CU1081	Cuscinetti Bearings	2	Acciaio inox Stainless steel	35	80IN3162	Ingranaggio Gear	1	Acc.al carb. Carbon Steel
10	80VI4201	Viti Screws	2	Acc.al carb. Carbon Steel	36	80AN2024	Anello elastico Elastic ring	1	Acc.al carb. Carbon Steel
11	80TA1072	Tappo scarico Oil discharge plug	1		37		Fornito con pos.34 Supplied with item 34	1	
12	80TA1015	Tappo carico olio Oil charge plug	1		38	80SP5009	Spina spirale Spirol pin	3	Acc.al carb. Carbon Steel
13	80VI5117	Vite Screw	1	Acc.al carb. Carbon Steel	39	80IN0006	Indicatore livello olio Oil level indicator	1	
14	80COB069	Coperchio accesso Calibrating cap	1	Alluminio Aluminium	40	80MA1012	Manicotto per trasmis. Transmission sleeve	1	Acc.al carb. Carbon Steel
15	80AN2018	Anello elastico Bearing circlip stop	1	Acc.al carb. Carbon Steel	41		Fornito con pos.6 Supplied with item 6	1	
16	80RO1063	Rondella rasamento Shim washer	7	Acc.al carb. Carbon Steel	42	80SP5006	Spina spirale Spirol pin	1	Acc.al carb. Carbon Steel
17	80AS0123	Assieme ingranaggi Gears assembly	1	Acc.al carb. Carbon Steel	43	80RO1078	Rondella di rasamento Shim washer	2	Acc.al carb. Carbon Steel
18	80AL0132	Alberino Gear pin	1	Acc.al carb. Carbon Steel	44*	80GU1243	Guarnizione Gasket	1	Viton Viton
19	80MO0228	Molla spingi disco friz. Friction plate spring	1	Acciaio inox St. steel	45	80AN2006	Anello elastico Circlip	1	Acc.al carb. Carbon Steel
20	80PI1057	Piattello per frizione Friction plate	1	Acc.al carb. Carbon Steel	46		Fornito con pos.17 Supplied with item 17		
21	80RO1042	Rondella di centraggio Centering washer	1	Acc.al carb. Carbon Steel	47	80BO1000	Boccola Bush	2	Bronzo Bronze
22*	80CU1045	Cuscinetto reggispinta Axial bearing	1	Acc.al carb. Carbon Steel	48		Fornito con pos.17 Supplied with item 17		
23	80BO1000	Boccola Bush	2	Bronzo Bronze	* Parti di ricambio consigliate / Suggested spare parts				



T-3958.DOC

ISOIL IMPIANTI		SCATOLA DI TRASMISSIONE VEGA					Dis. 3958			
		TRANSMISSION BOX FOR VEGA					Foglio 1 di 1			
pos.	CODICE	DESCRIZIONE	Q.tà	MATERIALE	pos.	CODICE	DESCRIZIONE	Q.tà	MATERIALE	
item	CODE	DESCRIPTION	Q.ty	MATERIAL	item	CODE	DESCRIPTION	Q.ty	MATERIAL	
1	80SC2030	Scatola meccanismo <i>Mechanism box</i>	1	Alluminio <i>Aluminium</i>	16	80VI2042	Vite <i>Screw</i>	4	Acc. carbonio <i>Carbon steel</i>	
2	80MA1009	Manicotto di trasmissione <i>Transmission coupling</i>	1	Acc. carbonio <i>Carbon steel</i>	17	80RO1033	Rondella dent. esterna <i>External washer</i>	4	Acc. carbonio <i>Carbon steel</i>	
3	80SP5018	Spina spirale <i>Spirol pin</i>	1	Acc. carbonio <i>Carbon steel</i>	18	80TA1015	Tappo carico olio <i>Oil charge plug</i>	1		
4	80RO1078	Rondella di rasamento <i>Washer</i>	4	Acc. carbonio <i>Carbon steel</i>	19	80GU0207	Guarnizione <i>Gasket</i>	1		
5	80IN0006	Indicatore livello olio <i>Oil level indicator</i>	1		20	80VI5117	Vite <i>Screw</i>	1	Acc. carbonio <i>Carbon steel</i>	
6	80SU0072	Supporto mecc. per VEGA <i>Mech. support for VEGA</i>	1	Alluminio <i>Aluminium</i>	21	80COB069	Coperchio accesso tar. <i>Calib. access cover</i>	1	Alluminio <i>Aluminium</i>	
7	80BO1147	Boccola <i>Bush</i>	1	Bronzo <i>Bronze</i>	22	80VI5117	Vite <i>Screw</i>	2	Acc. carbonio <i>Carbon steel</i>	
8	80AL0243	Alberino <i>Shaft</i>	1	Acc. inox <i>St. steel</i>	23	80IN3279	Ingranaggio <i>Gear</i>	1	Acc. carbonio <i>Carbon steel</i>	
9	80GR1093	Grano <i>Grain</i>	1	Acc. inox <i>St. steel</i>	24	80IN3276	Ingranaggio <i>Gear</i>	1	Acc. carbonio <i>Carbon steel</i>	
10	80AN2006	Anello elastico <i>Retaining ring</i>	2	Acc. carbonio <i>Carbon steel</i>	25	80SP5009	Spina spirale <i>Spirol pin</i>	1	Acc. carbonio <i>Carbon steel</i>	
11	80AL0246	Alberino <i>Shaft</i>	1	Acc. inox <i>St. steel</i>	26	80AS0102	Trascinatore <i>Entrainer</i>	1	Acc. carbonio <i>Carbon steel</i>	
12	80AN2000	Anello elastico <i>Retaining ring</i>	1	Acc. carbonio <i>Carbon steel</i>						
13	80TA1072	Tappo scarico olio/guarn. <i>Oil discharge plug/gasket</i>	1							
14	80BO1099	Boccola <i>Bush</i>	1	Bronzo <i>Bronze</i>						
15	80RO1066	Rondella di rasamento <i>Washer</i>	2	Acc. carbonio <i>Carbon steel</i>						
(*) Parti di ricambio consigliate <i>Suggested spare parts</i>										