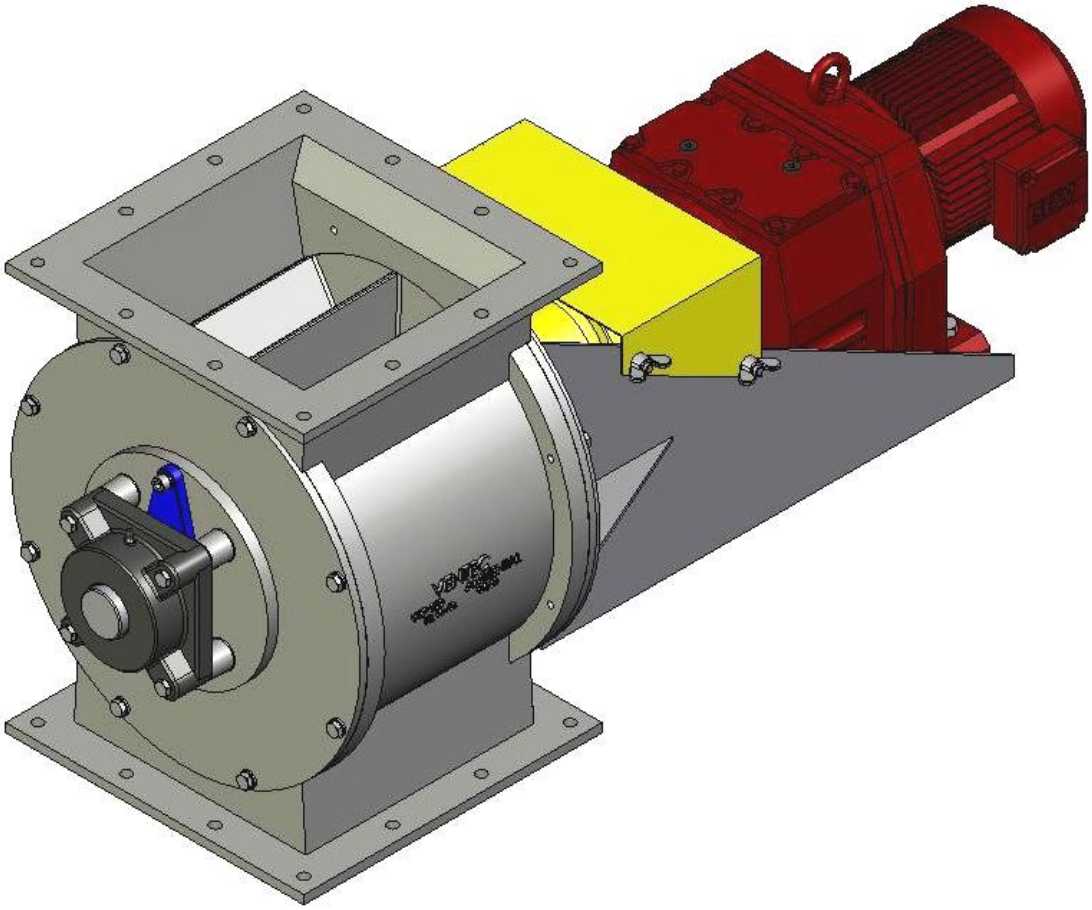
Technical Manual on Installation, Operation & Maintenance

Rotary Valve



Ventec ambiental
ISO 9001:2000

VENTEC AMBIENTAL EQUIPAMENTOS E INSTALAÇÕES LTDA
Rua André Adolfo Ferrari, nº 550 - Distrito Industrial Nova Era - Indaiatuba - São Paulo
CEP: 13.347.395 - C.Postal: 2086 - Fone: (19) 3801-8800 / Fax: (19) 3935-6906
e-mail: ventec@ventec.com.br - site: www.ventec.com.br

INDEX

1 – INTRODUCTION

The recommendations provided in this manual have been prepared based on the data of the project involved and experimental laboratory know-how that made it possible to apply the products supplied.

However, the user has additional information about hands-on operating conditions and about the workplace. Therefore, the user can join this know-how to the hands-on recommendations in this guide, information and more specific details on each component supplied by the manufacturer and prepare a good installation and operation scheme and a safe maintenance program.

Several data sheets specific to the sets and to key accessories are part of this Manual. They indicate the most relevant technical and construction characteristics.

Besides the recommendations in this manual, which must be considered as supplementary, we recommend not leaving aside the usual norms relating to good operation, maintenance and installation techniques.

It must be pointed out that the use of qualified personnel, both in operation and in maintenance of the equipment means eliminating countless problems.

2 – GENERAL CONCEPTS

A Rotary valve is robust-construction equipment designed to unload particulate or granulated material.

The material to be unloaded enters the valve body and is driven by a rotor to the outlet mouthpiece in a cyclic and continuous movement, thus providing a regular flow of material with maximum filling degree around 30%.

The rotor / axle set is actuated by the gear set.

3 – ASSEMBLY

3.1 – Assembly of the Rotary valve

a) Assemble sealing rubbers to rotor.
b) Assemble the rotor / axle set on body.
c) Fix side caps with sealing gaskets and with the “ROLMAX” bearing
d) Align the entire set to go on with the assembly.
e) Assemble the pulleys (driving and driven) with “IMETEX” fixing ring when valve construction requires this type of driving.
f) Assemble and align the reducer / pulley and belts on valve, when required.
g) Check if all components are fixed and aligned (Rotor/axle/bearings gear, etc)
h) Complete reducer oil level.

3.2 – Assembling the valve on equipment

The Rotary valve can be connected to other equipment the following way: the valve inlet and outlet have flanges where the valve can be connected to counter-flanges of other equipment by bolts.

Sealing compound must be applied between flanges to ensure perfect adjustment between flanges.

4 – OPERATION

4.1 – Checks before starting operation

Before shipment, the construction and finishing of all units of equipment is visually controlled. They are tested in operation to observe the work of all parts and accessories involved in manufacturing and assembly.

However, there is the risk of some damage in transportation. For this reason, the unit should be inspected by the customer upon arrival and any irregularities should be reported to the manufacturer. We also recommend the following procedures before starting operations:

a) Be sure that protections and accessories (when applicable) are duly tightened and installed.
b) Check tightness of assembling bolts of modules, motor fixing, reducers etc.
c) Check bearing lubrication and right level of reducer.
d) Be sure that there are no bolts, nuts or foreign parts inside body valve.
e) Check rotation direction (in case of flexible sealing edge)
f) Check alignment of the motor, reducer, pulleys and belts when applicable.

4.2 – Check when starting operation

After starting valve operation, the following procedure is recommended:

a) Check lubrication condition.
b) Make sure there is no noise or abnormal vibrations in rotating parts.
c) Check if there are any loose bolts or poorly tightened in the set.
d) Check general condition of seals between flanges.
e) Follow up temperature of bearings periodically: after the equipment reaches normal operating conditions, the temperature cannot exceed 80º C.
f) Check general wear of the set; particularly wear of sealing elements of the rotor.

5 – MAINTENANCE

5.1 – Rotor and Body

- The inlet mouthpiece must be tightly sealed. Any leaks should be fixed immediately.
- External painting must be renewed whenever possible, or according to possibilities, to avoid part corrosion.
- The Rotary valve must be continuously observed: make sure there is no dust build-up. If there is any dust, the blades must be cleaned carefully with:
    - Steam,
    - Water jet,
    - Compressed air, or
    - Metal brush.
- Under no circumstances cleaning should be mad by hitting on the valve body or rotor with heavy parts. Such procedure will cause deformations and leaks.
- These deformations will favour build-up or agglomeration of materials, which will cause increased resistance besides reducing the volume of dust to be unloaded.
- In case of wear of blades, of rotor, or of sealing elements, these should be replaced periodically.

5.2 – Start-up

Check the motor, reducer, fixing ring and bearings periodically.

5.3 – Vibration

Check if there are excess vibrations on supports, as well as on starting-up parts, to prevent premature wear of the equipment.

5.4 – Bearing lubrication

Bearings: Bearings are lubricated when assembled at “VENTEC” factory; however they should be checked before putting into operation. The specifications for a normal lubrication can be found in the following items.

Bearings: Clean bearings, eliminating all dirt and impurities before lubricating them. This can be done by washing them with a clean petroleum solvent, and then drying them carefully with air or a clean cloth.

5.4.1 - Greasing:

- Only good quality grease should be used, free from chemical and mechanical agents to lubricate the roller bearings or rollers. To obtain a good result use the same grease to re-lubricate.

Bearings (Suppliers)	Bearing type	American Grease	Grease Base	Similar (Domestic)
FAFNIR	Lak, Rak, LCJ, RCJ, LCJO RCJO LSAO, RSAO	Shell Alvania - 3	Lithium	Shell Alvania – 3
	SAOL	Mobil Mobilux - 2	Lithium	Mobil Grease MP
	SYR, FYR	Shell Alvania - 2	Lithium	Shell Alvania - 2
	SY, FY	Shell Alvania - 3	Lithium	Shell Alvania - 3
SKF	SAF-22500 SAF 2260 SAF 1500 SAF 22200 SAF 22300	Mobil Mobilux- 2	Lithium	Mobil Grease MP

- We do not recommend mixing different lubricants: If it is necessary to change to another brand, quality or different type of lubricant, clean the bearings thoroughly.
- The change of grease depends on the number of operating hours, temperature conditions and environment, varying from 3 months to 1 year.

5.4.2 - Lubrication periodicity:

- It is difficult to set re-lubrication frequency to avoid corrosion and to help eliminate any solid or liquid impurities as a fixed norm, because it can vary a lot with the different types of applications. The ideal thing would be to obtain the re-lubrication frequency using an experimental program for its components or particular type, or else obtain this value via field verification.
-
- The experimental phase can be followed by bearing re-lubrication in pre-established intervals, observing the condition of the grease that comes out of the seals; or periodical inspection on body. If the operation environment is clean and bearings work at normal ambient temperature, they can be lubricated every 3, 4 or up to 6 months field they work satisfactorily. On the other hand, if the bearings are exposed to polluted and dirty conditions under high temperatures, this will force lubrication in more frequent intervals. Guidance for operation is determined as follows:
- :

DUST CONDITIONS	OPERATING IN HUMIDITY	TEMPERATURE BEARING OPERATION	LUBRICATION PERIODICITY
Regularly Cleaned	No	0 to 49 º C 49 to 71 º C 71 to 93 º C	From 6 to 12 months From 1 to 12 months From 1 to 4 weeks
Moderate to extremely dirty.	No	0 to 71 º C 71 to 93 º C	From 1 to 4 weeks (Max.) 1 week.
Regularly clean	High humidity – up to - use water jet.	0 to 93 º C	(Max) 1 week.

- When adding grease, avoid penetration of any impurities inside the bearing.
- During the first period of operation, the bearing should be open to allow excess grease to come out (the grease will be expelled automatically). Afterwards replace outlet plug and use a gun to lubricate with low pressure grease.

IMPORTANT: Never lubricate bearings excessively.

5.5 – Reducer

Before being shipped, all reducers used in the **Ventec** equipment are submitted to a working test without load. Under normal transport and storage conditions, the lubrication used ensures protection during assembly.

When the equipment is assembled, provide for free access to reducer, particularly to the inspection plug and to the level of lubrication, as well as to the draining plug. The air flow to dissipate heat from the reducer must not be blocked by protection devices or others.

The couplings have been duly assembled at our factory according to guidance from the respective manufacturers. Before start-up, it is the duty of the customer to check for misalignments during transport and assembly, and to secure these elements so there is no axial displacement, when in operation.

a) Check before starting:

- Fixing and instructions above described,
- Supply of new lubricant (see suitable viscosity and lubricant type shown on reducer identification plate).
- Check level with reducer stopped according to indicated quantity.
- Start operating without load for some hours. Such procedure provides improved quality of gear surface and prolongs service life of reducer.
- If no anomalies are detected, operation can start at full load. Otherwise consult procedures in this manual or call **Ventec** or reducer manufacturer.
- Check temperature. In general, oil temperatures up to 80º C do not affect reducer operation. In certain cases, higher temperatures can be foreseen. See the manufacturer/type of lubricant.
- Reducers stopped for more than 3 months should get new service.

b) Lubrication / Maintenance:

- The reducers need minimum maintenance. It is limited to regular lubricant control and replacement. Periodicity of change depends on the type of oil and operating temperature (check with lubricant manufacturer). In case it has few hours of daily use, it is recommended to change:
- Mineral lubricants (CLP, HLP types), after 3 years maximum.
- Synthetic lubricants (PAO, PG), after 5 years maximum.
- Never mix mineral with synthetic lubricants.

5.5.1 – Motor

a) Lubrication:

- Motors with up to body 160 do not have grease nipples, whereas for motors with body 160 up to body 200, the nipple grease is optional. Above this body (225 to 355), it is normal to have nipple grease. The purpose of maintenance, in this case, is to increase service life of the bearing system as much as possible.
- Maintenance includes:
  a) Observation of general condition of bearings,
  b) Lubrication and cleaning,
  c) Careful bearing exam.
- Temperature control of a bearing is also part of routine maintenance, if the bearing is lubricated with appropriate grease, as recommended in item (Quality and quantity of grease) work temperature should not exceed 70º C.
- Bearings should be lubricated to avoid the metal contact between rolling parts and also to protect them against corrosion and wear.
- Lubricant properties deteriorate due to age and mechanical work. Moreover, all lubricants get contamination in service; that is why they should be levelled or changed periodically.

b) Lubricant periodicity:

- The correct amount of grease is, with no doubt, an important aspect for good lubrication.
- Re-lubrication must be made according to Lubricant Periodicity chart; however if the motor has an additional plate with lubricant instructions, these should be followed according to plate specifications.
- For an efficient initial lubrication, it is necessary to consult motor instruction manual or Lubrication chart of the bearing. If this information is not available, the bearing must be filled with grease up to half of its empty space (only free space between Rotary bodies).
- When doing these operations, it is recommended the maximum of care and cleaning, with the purpose to avoid any dirt penetration that can cause damage to the bearing.

c) Quality and quantity of grease:

- It is important to make a correct lubrication, i.e., apply the correct grease and in a suitable quantity, because both deficient lubrication and excess lubrication cause faults.
- Excess lubrication will cause temperature to rise due to the great resistance that it causes to movement of rotating parts. It ends up by losing its lubricating characteristics completely. This can cause leaks, and grease penetrates inside motor and deposits the coils or other motor parts.
- To lubricate bearings in electrical machines, lithium-based grease has been used in a generalized way, because it has mechanical stability and is insoluble in water.
- The grease must never be mixed with others that have a different base.

d) Grease to be used in normal motors:

TYPE	MANUFACTURER	MODEL
Unirex	Esso	225 s/m to 355 m/l
Alvania R3	Shell.	Other bodies.

e) Grease to be used in motors with special characteristics:

TYPE	TEMPERATURE (º C)
STABURAGS N12MF	(- 35 to 150)
CENTOPLEX 2 dl	(- 55 to 80)
MILYKOTE TTF 52	(- 52 to 100)
MOBILTEMP SHC 32	(- 54 to 177)
DOW CORNING 44	(- 40 to 200)
ISOFLEX NBU 15	(- 30 to 130)
STABURAGS NBU 12	(- 35 to 150)
UNISILKON L 50/2	(- 50 to 200)

f) Instructions for lubrication:

- Inject approximately half of total quantity of estimated grease and start motor. Turn it for approximately 1 minute full rotation, then turn off motor and put the rest of the grease.
- Injection of all grease with motor off can lead to penetration of lubricant inside the motor.
- It is important to maintain grease fittings clean before introducing grease to prevent foreign material into bearing.

Important: For Lubrication use only manual grease gun.

g) Lubrication steps for bearings:

- Clean with cotton cloth near the fitting grease holes.
- With motor working, add grease using a gun for fitting grease until the recommended amount of grease is introduced.
- Leave the motor running enough time to drain all excess grease.

5.6 – Repainting

Repainting internal and external parts of Rotary valve will increase its durability. Choose paintings that resist operation temperatures; for normal temperatures, use a good paint for machines. If there is excessive humidity, or if transporters are exposed to bad weather, bituminous paints are recommended.

The competent person or sector must be warned when there are corrosive gases.

5.7 – List of spare parts for 2 years operation

- 1 axle
- 2 bearings
- 2 bearings
- 1 elastic coupling

Note: See technical data on set drawing.