

AL-BL series Rotary valves

Dairy-EL I

DMN-WESTINGHOUSE

Operation instruction + Maintenance Safety instructions



Customer	:	
Purchase order no.	:	
DMN-WESTINGHOUSE order no.	:	
Type	:	Dairy-EL I
Serial no.	:	

General

- For the promotion of the life span and correct functioning of DMN WESTINGHOUSE valves we advise you to respect these operation instructions and to carry out maintenance work accordingly.
- Should there be any problems, please contact our technical sales department.
- No liability is accepted for damage and malfunction caused by non-observation of these operation instructions, modification of the rotary valve without written approval of DMN Machinefabriek Noordwykerhout B.V. (hereinafter called DMN). DMN does not accept any liability for damage or accidents resulting from improper use.

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APPENDIX

Declaration by the manufacturer

Technical specifications drive SEW

1. Safety instructions Rotary valves

1.1 General safety instructions

The safety instructions as described below should be followed by the user when:

- installing the valve;
- maintaining and repairing the valve.

The safety instructions should be read carefully both by management and maintenance personnel before carrying out the above operations.

Failure to follow these safety instructions, may result in one or more of the following:

- the safety of the maintenance personnel could be endangered;
- the valve may not function correctly;
- the system which contains the valve may be damaged.

Modifications and alterations to the product is not permitted other than by DMN-WESTINGHOUSE trained personnel, to ensure safe operation.



ATEX –Approval Equipment

IMPORTANT: Read before commissioning :

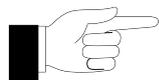
- **Operation instructions Explosion-Proof Rotary valves.**



Rotary valve EHEDG EL I

Validation is the responsibility of system integrator / end-user

1.2 Symbols



Remark.



Harmful situation.

Possible consequences: Damage to the Rotary valve and the environment.



Hazardous situation.

Possible consequences: Slight or minor injuries.

1.3 Responsibilities of the management and maintenance personnel

The management must take care that:

- the maintenance personnel maintains the safety instructions, as described in this document;
- all available means which are necessary for working according to the safety instructions are present;
- the maintenance personnel possess the necessary skills.

Maintenance personnel should follow these safety instructions when carrying out installation, repair and maintenance.

1.4 Applying the safety instructions when installing a valve

After removing the packaging material it is possible to reach the inlet and outlet of the valve. During this operation do not turn the rotor by hand.

Do not alter, remove or paint the type specification plates of the valve, drive unit or fitted switches.

1.5 Applying the safety instructions when the valve is in operation

Only operate the valve when it is fitted with the protective safety parts supplied by DMN-WESTINGHOUSE. These are:

- mechanical protection i.e. chain guard and end cover plates (104);
- electro-mechanical protection i.e. safety switches (if fitted).



While the valve is in operation no maintenance or repair work must be carried out.

1.6 Applying the safety instructions during maintenance and repair work

When product qualities necessitate supplementary safety instructions and wearing protective clothes, it is obligatory to follow the local safety instructions.

Before maintenance and repair work is carried out:

- electrical supply to the valve motor must be isolated.
- air pressure to shaft seals must be isolated;

After the maintenance and repair work has been carried out, all safety parts removed during the work should be re-assembled and their operation should be checked.

2. Rotary valves

2.1 Type designation

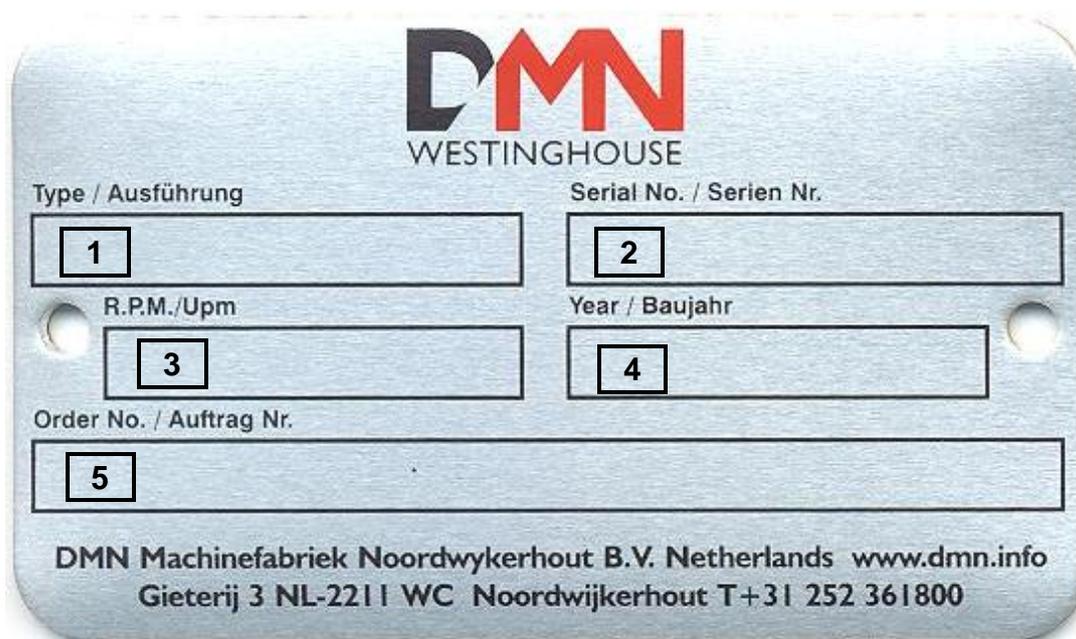
Example Rotary valve

Type	Size	Material of construction
AL	150	Dairy-EL I

Type	AL	Size	150
	AXL		175
	AML		200
	BL		250
	BXL		300
	BXXL		350

Material of construction	Dairy-EL I	Stainless steel
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2.2 Nameplate



Explanation

- 1 DMN-WESTINGHOUSE unit type
- 2 Serial number rotary valve
- 3 Rotor speed
- 4 Year of manufacture
- 5 Order number

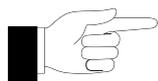
2.3 Noise

The noise generated by the valve is insignificant compared to the motor and gearbox under normal conditions.

The noise level can be influenced by the product to be handled (build up) and operating conditions.

Any significant noise generation, is an indication of product build up, trapped particles or mechanical failure.

2.4 Installing the valve in the system

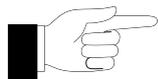


**Remove all packing material and preservatives.
Check for any transport damages.**



**Turning the rotor is prohibited.
Danger to fingers and hands.**

2.4.1 Drive



Please study the operation instructions supplied by the drive manufacturer.

- Before starting the valve, check the oil level in the gear box. It should be filled with the correct amount and type of oil according to the instructions (see 4.4).
- Remove the plug that is fitted for transportation purposes from the gear box, if applicable.
- Check the rotating direction of the valve rotor. It should rotate clockwise seen from the drive end (see direction of the arrow).

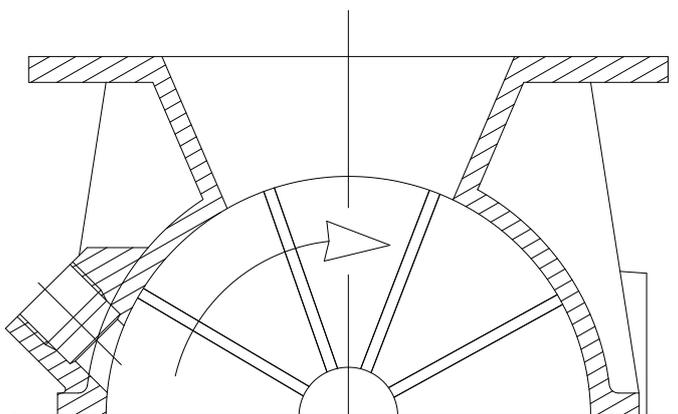


Fig. 2.1 Rotating direction of rotor.

- Electrical specifications for connection must correspond to the information stated on name plate of drive.
- Follow instructions of drive supplier (connection diagram is in junction box)

If delivery excludes drive

- On one side of the valve holes have been tapped for fitting the motor base plate (see drawing for dimensions).
- To fasten the chain guard, three holes have been tapped in the bearing housing of the valve (see drawing for dimensions).



The sprockets should be fitted on the rotor shaft as close as possible to the bearing housing.
The sprockets should not be hammered on to the shafts.
The sprockets on the shafts of the valve and the gear box should always be perfectly aligned.

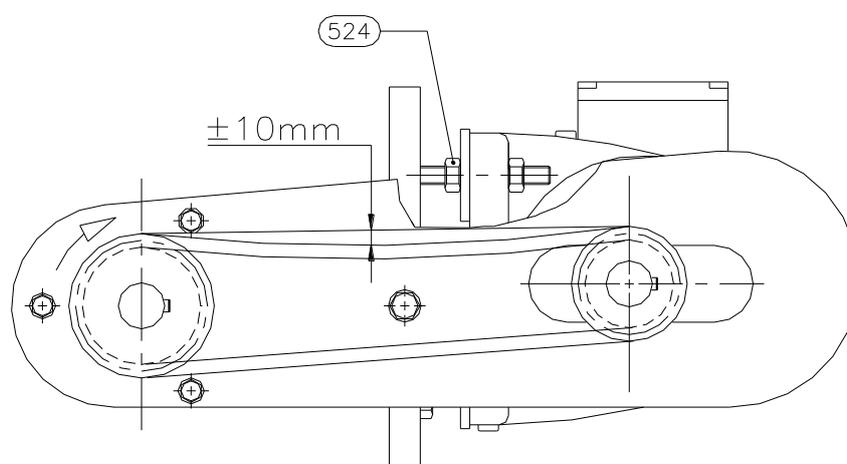


Fig. 2.2 Tighten chain.

Tightening drive chain

- Tighten chain by adjusting nuts (524) to give 10 mm slack at chain.
- Grease chain.

2.4.2 Mounting the valve in the system

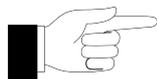


When installing the valve make sure it is not unevenly loaded by external forces or vibrations.



During operation or testing the inlet / outlet connections must not be open or unprotected

- If it is a blowing seal, the conveying pipe line to be connected to the blowing seal should ideally have the same diameter as the connections on the seal.
- If there is some difference between the inner diameters of the blowing channel and the conveying line, the transition from one diameter to the other should be as smooth as possible.



**Remove all packing material and preservatives.
Check for any transport damages.**

Installation procedure



Please respect safety instructions.

- Install the valve stress free
- Connect conveying pipes stress free
- Connect air purge supply and adjust pressure regulator
- Connect motor
- Check rotating direction (see fig. 2.1)

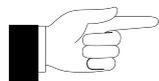


The rotary valves must not be put into service until the equipment into which they have been incorporated have been declared in conformity with the Machinery Directive.

Shaft sealing air purge.

When using an air purge oil-free dry air must be used. The diameter of the air pipe supply should be equal to or larger than the connection on the valve. The pressure of this purging air should be 0.5 bar higher than the pressure in the valve. The air pressure must be applied before product enters the valve and before conveying pressures are applied. The air supply must always be present when there is product in the valve, and especially after conveying ceases.

DMN-WESTINGHOUSE valves have been manufactured with great care. To reduce air leakage's, internal running clearances are kept extremely small during manufacture and assembly of the valve.



- **do not use heavy or rough tools;**
- **avoid damages like scratches and burrs;**
- **clean all parts thoroughly.**



In case of repair work to the valve, please follow safety instructions of chapter 1.

- Turn off the electrical supply, lock the switch and/or remove the fuses;
- If necessary, disengage the chain to ensure that the rotor does not turn.

3. Operation instructions

3.1 AL-BL series Dairy-EL I

3.1.1 General

The AI and BL Dairy-EL I valves have been specially developed for the metering and pneumatic transport of products in powder form in the food, chemical and pharmaceuticals industries where very high standards apply.

The construction of the valve conforms to the requirements necessary to avoid bacteriological contamination.



Rotary valve EHEDG EL I

Validation is the responsibility of system integrator / end-user

The limits stated in the technical specification 3.1.2 should not be exceeded. The user is responsible for any defects and/or risks or damages resulting from improper use.

3.1.2 Technical specifications

Dairy execution:

Operating pressure permitted	: -0,5 to +2 bar
Temperature permitted	: -10°C to +120°C

Materials:

housing & end covers			
Stainless steel	AISI 316		Din 17445/1.4408
Rotor			
Stainless steel	AISI 316		

Capacity: Rotor with 8/9 fixed blades.

AL-BL	150	175	200	250	300	350
AXL-BXL-AML	150	200	250	300	350	400
BXXL				350		
Ltr./Rev.	2,9	5,9	11,5	19,5	35,5	61,5

- Capacity per revolution at 100% filling

3.1.3 Construction Dairy-EL I

3.1.3.1 General assembly and parts list Dairy-EL I

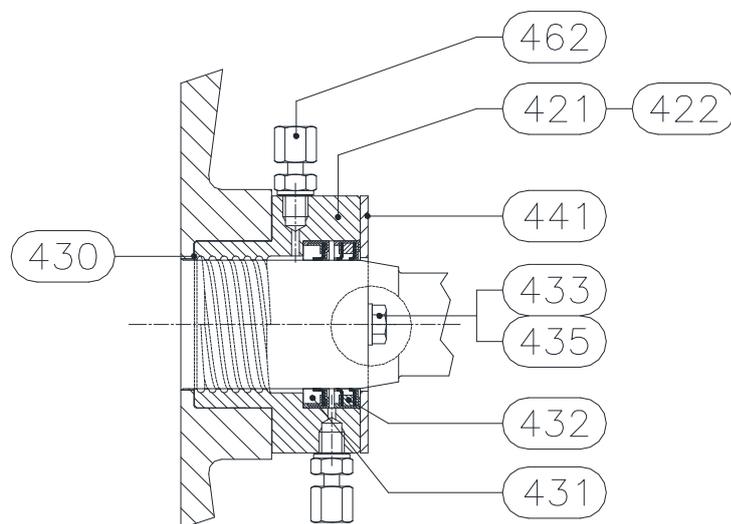
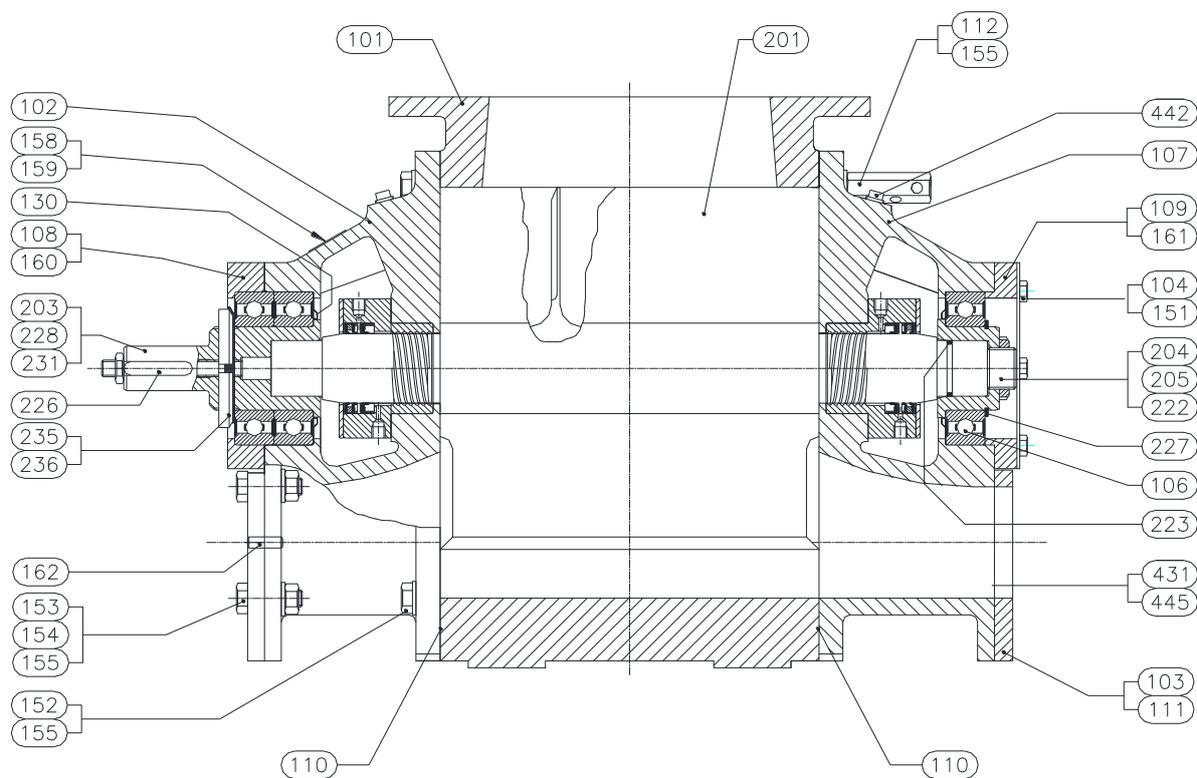
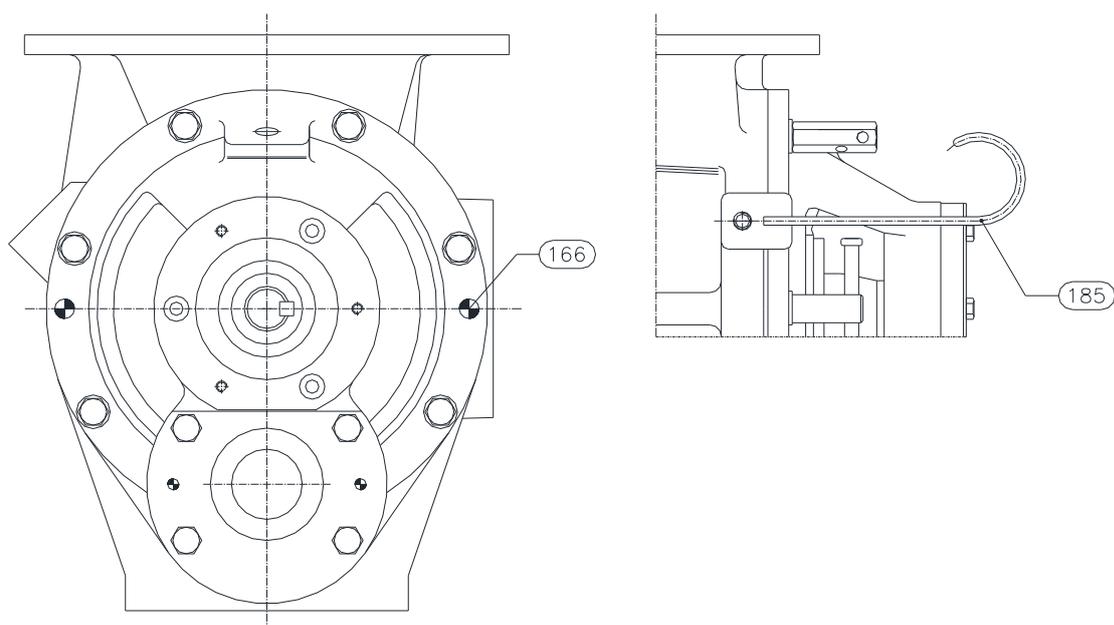


Fig. 3.1.3.1.2 Dairy-EL I execution BL-BXL-BXXL.

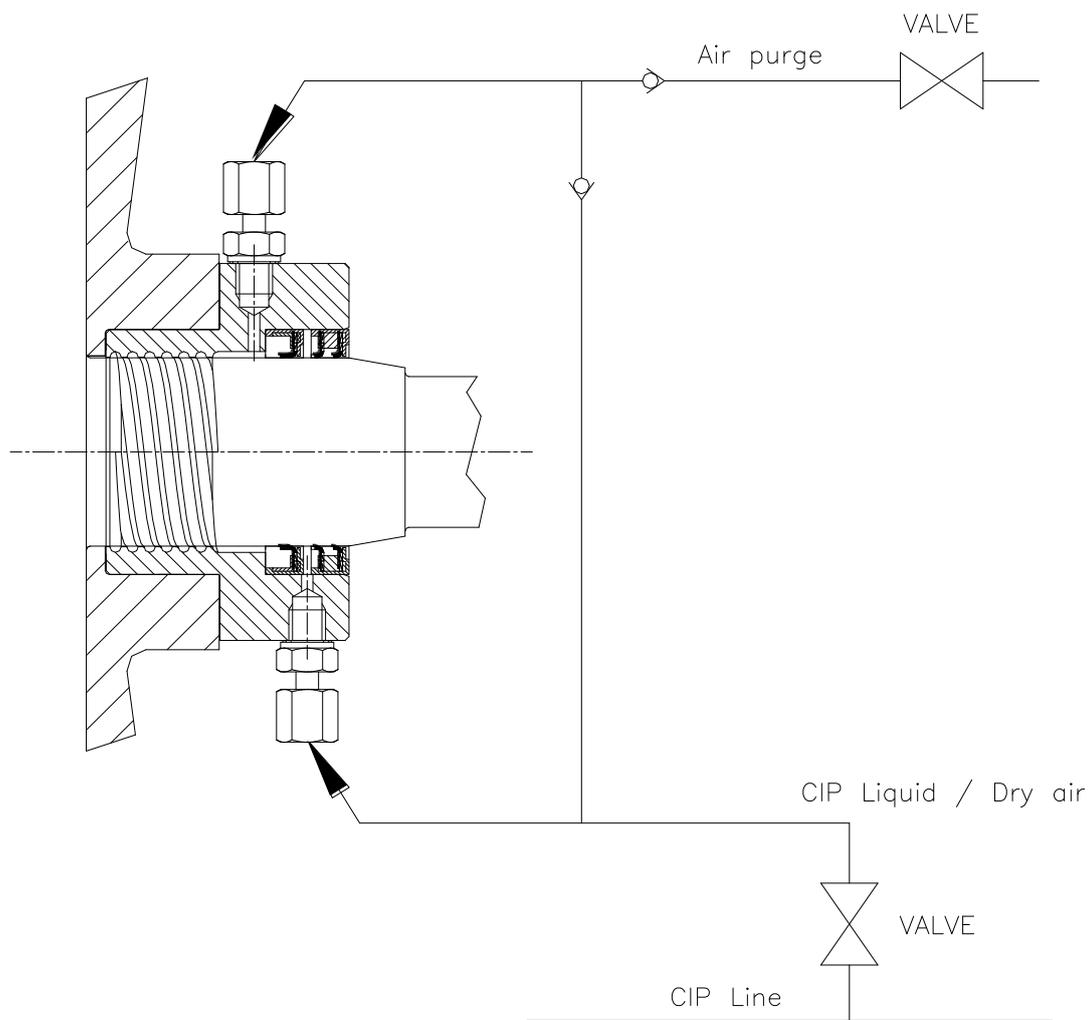


101	Body	160	Countersunk screw	421	Seal unit DS
102	End cover	161	Countersunk screw	422	Seal unit NDS
103	Pipe connection	162	Dowel	430	Gasket seal unit
104	Cover	166	Dowel	431	PS seal
106	Ball-bearing	185	Hexagon bolt holder	432	PS seal tandem
107	End cover			433	Bolt
108	Bearing house	201	Rotor	435	Washer
109	Bearing house	203	Driveshaft	441	Cover plate
110	Gasket	204	Bearing bushing	442	Plug
111	Gasket	205	Adjusting screw	462	Pipe coupling
112	Bolt	222	Locknut		
130	Nilos ring	223	"O"-ring		
151	Bolt	226	Key		
152	Bolt	227	Retainer ring		
153	Nut	228	Cyl. adjust. Screw		
154	Bolt	231	Nut		
155	Washer	235	Locknut		
158	Name plate	236	Safety ring		
159	Arrow				

3.1.3.2 Rotor shaft sealing Dairy-EL I



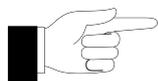
Access rotating part, mind your fingers.



Typical example seal layout.
 Seal configuration determent by user depending on process.

3.1.4 Dismantling, assembly and adjusting instructions

DMN-WESTINGHOUSE valves have been manufactured with great care. To reduce air leakage's, internal running clearances are kept extremely small during manufacture and assembly of the valve.



- do not use heavy or rough tools;
- avoid damages like scratches and burrs;
- clean all parts thoroughly.



In case of repair work to the valve, please follow safety instructions of chapter 1.

- Turn off the electrical supply, lock the switch and/or remove the fuses;
- If necessary, disengage the chain to ensure that the rotor does not turn.

3.1.4.1 Dismantling for internal cleaning

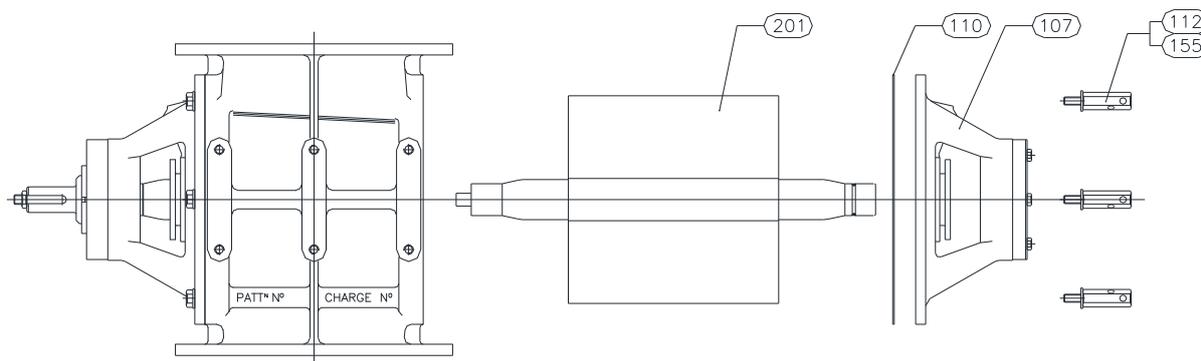
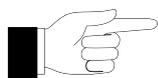


Fig. 3.1.4.1 Dismantling for cleaning.

Non-drive side

- Remove the bolts (112) of the end cover (107).
- To remove the end cover screw two of these bolts into the jacking holes in the end cover.
- Remove Gasket (110)
- Remove the rotor by pulling it axially from the body.



Support the rotor to keep it in line with the bore otherwise damage may be caused to the rotor blades and/or bore of the body. Place the rotor on a wooden surface to prevent the rotor blades from being damaged.

3.1.4.2 Reassembling

After cleaning, checking and if necessary replacing certain parts the valve can be reassembled as follows:

- Check the position of the flat insertion end of the rotor and make it correspond to the opening in the shaft bearing. Two marks have been applied one on the end of the shaft (drive side) and one on the side of the bearing bush.



Ensure that mating faces and drive dog of rotor are always thoroughly clean before re-assembly.

- Now slide the rotor axially in the body and make sure that the flat end of the drive shaft is entirely inside the bearing bush.



**Clean surfaces end covers (107) carefully.
Before assembly the jack screws (152) have to be removed.**



Replace gasket (110) between body and end cover.

- Place gasket (110) between body and end cover.
- Place this cover (107) in the body.
- Tighten the bolts (112) in a progressive diagonal manner. There should be zero clearance between the end cover and body contact faces.

3.1.4.3 Axial adjustment of the rotor clearances

Prior to the delivery the axial position of the rotor is set at the right clearance. This means that differences in clearance between the rotor and the end cover on both drive side and non-drive side have been equated as far as possible. Nevertheless, should it be necessary to readjust the axial position of the rotor, proceed as follows:

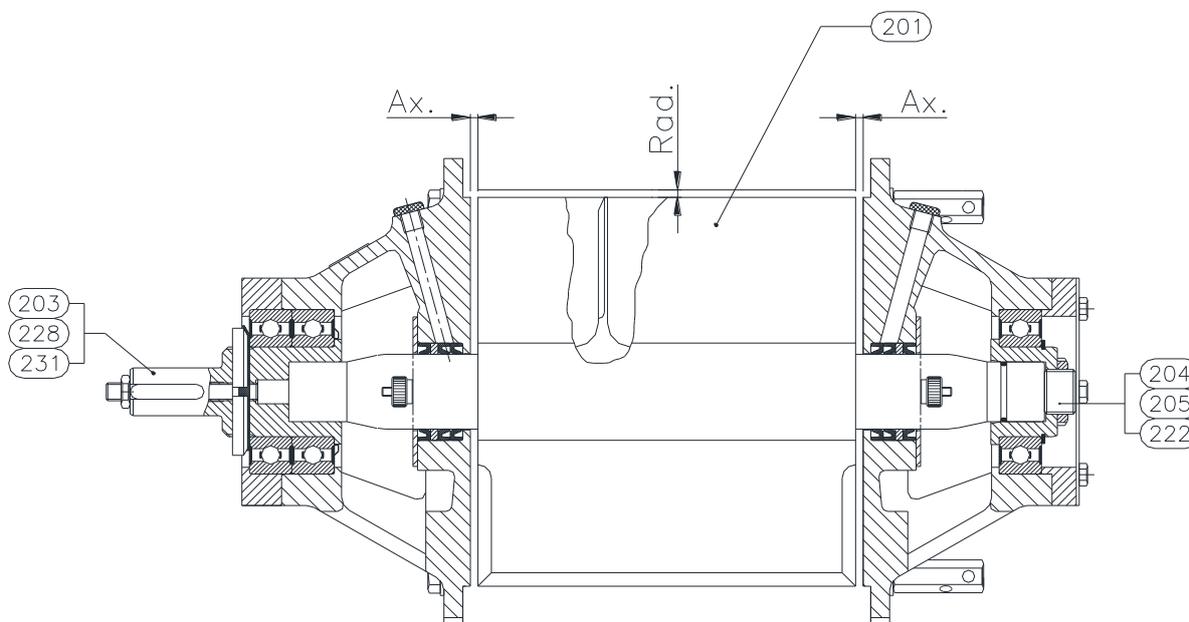


Fig. 3.1.4.3.1 Adjusting axial clearance.

- Determine the axial clearance with the use of feeler gauges.
- Remove the drive guard.
- The centre of the drive shaft contains a cylindrical adjusting screw (228), which can be turned with an allen key and a nut (231). Loosen the nut.
- Remove the cover (104) at the non-drive side and loosen the lock nut (222).
- Now the adjusting screw (205) can be loosened or tightened in conjunction with the cylindrical adjusting screw (228) in order to adjust the axial position of the rotor. To do this use a special pin key.



Both adjusting screws should only slightly press against the corresponding rotor end faces. Over tightening will place heavy axial load on the ball-bearings.

- Equalise the total axial clearance.
- Fix the lock nut (222) to the adjusting screw (205) non drive side, and on the drive side the nut (231).
- Once again check the axial clearances at both sides.
- Fit the cover (104) and the drive parts.

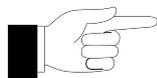
Rotor clearances for Dairy execution

The standard executions have the following axial and radial clearances.

Type	Body end covers material	Rotor material	Size valve	Clearance axial and radial
AL-BL	Stainless steel	Stainless steel	150 - 250	0,1 - 0,15 mm
			300 - 350	0,15 - 0,2 mm
AXL-AML BXL	Stainless steel	Stainless steel	150 - 300	0,1 - 0,15 mm
			350 - 400	0,15 - 0,2 mm
BXXL	Stainless steel	Stainless steel	350	0,1 - 0,15 mm



For the expansion correction between rotor and body the maximum clearances are set for a gradual temperature increase, based on a 30°C lower temperature of the body and end covers. If this is not possible, then bigger clearances are required, e.g. when the valve is cleaned in place (CIP).

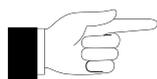


Special clearances are to be set with product temperatures of 50°C and higher, according to special instructions, depending on size and material of the valve.
Product characteristics may influence the clearance. In case of any doubts please contact sales department.

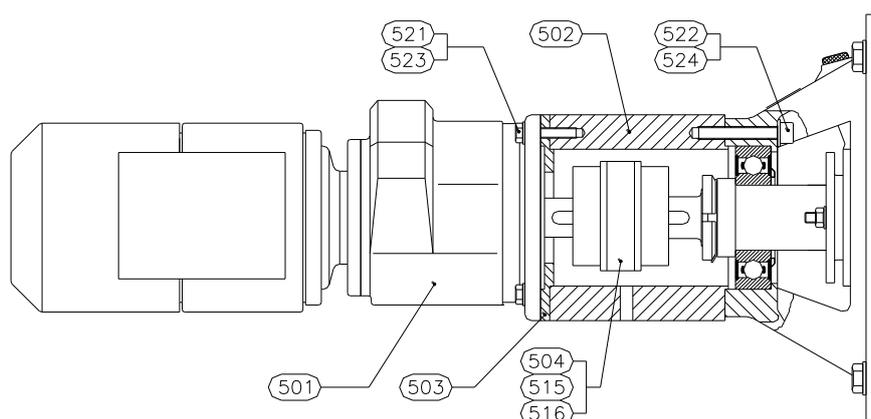


After adjustment of the rotor feeler gauges or copper shims must be removed. Never let them remain in the valve.

- Assemble cover.
- Mount drive parts (3.3).



After assembly test run the valve.

3.3.2 Direct drive**Fig. 3.3.2 Direct drive.**

501	Drive	521	Bolt
502	Connecting piece	522	Cylinder bolt
503	Flange 150/175	523	Washer
504	Coupling	524	Washer
515	Bush rotor		
516	Bush motor		

Dismantling

- Dismantle drive
- Remove connecting piece
- Remove coupling

Assembly

- Mount and secure coupling parts
- Mount connecting piece on end cover
- Mount drive on connecting piece

3.4 Accessories

- Safety switch

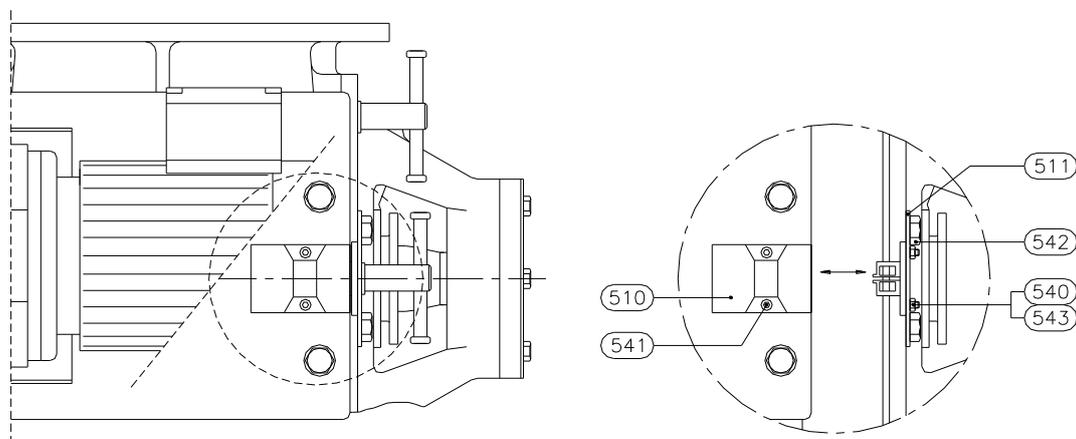


Fig. 3.4.1 Safety switch.

510	Safety switch	541	Cylinder bolt
511	Fastening plate	542	Bolt
540	Countersunk screw	543	Nut



The safety switch must be connected to the client safety circuit, which will stop or prevent the valve from operating.

Safety control module is not part of the DMN supply.

- **Zero speed indication**

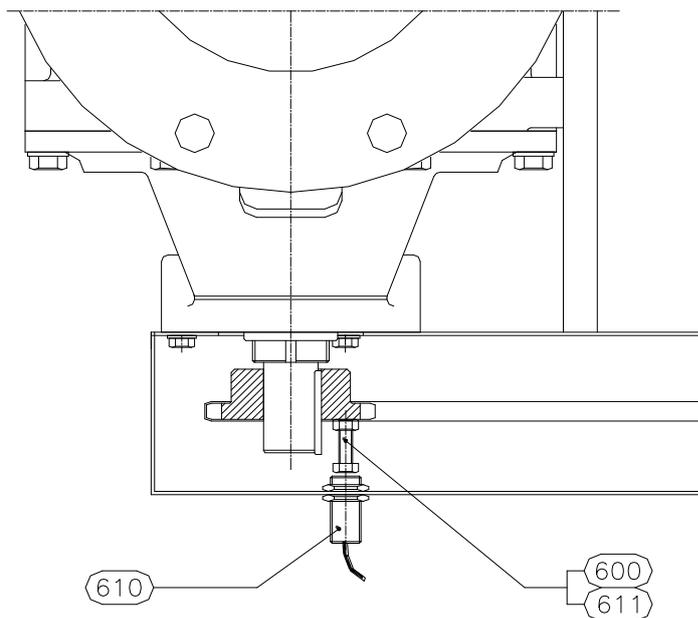


Fig. 3.4.2 Drive side.

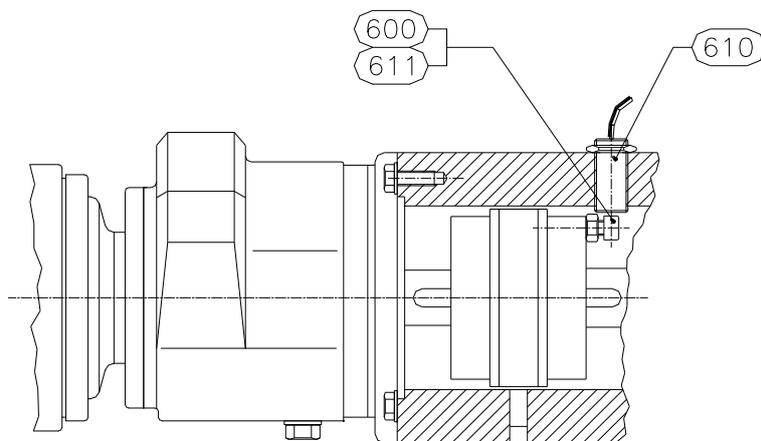


Fig. 3.4.3 Direct drive.

- 104 Bearing cover
- 151 Bolt
- 600 Impulssender
- 604 Cover plate
- 610 Proximity switch
- 611 Nut

4. Maintenance

4.1 General

The interval between overhauls will vary with the product being handled and should be based on total operating time. To a large degree the rate of wear for a particular application would be ascertained by practical experience.

Maintenance apart from planned overhaul should be adequately covered by regular and frequent attention to the rotor shaft glands, reduction gear lubrication and adjustment and lubrication of the motor drive chain and chain sprockets.

It is recommended that the complete rotary valve is dismantled for cleaning, inspection and overhaul as necessary at regular intervals.



Please read safety instructions (chapter 1) before carrying out routine overhauls on valves.

4.2 Maintenance every 3 months or after 2,500 operating hours

- Check if valve turns smoothly.
- Check adjustment and functioning purge air, if necessary re-adjust.
- Check chain, tighten and grease.

4.3 General maintenance every 12 months or after 10,000 operating hours

- Remove valve from system and clean it completely.
- Dismantle valve.
- Check PS seals for damages.
- Check drive shaft for wear or damages.
- Check rotor blades for wear or damages. Repair if possible, otherwise replace.
- Assemble the valve and adjust rotor.
- Connect air coupling and adjust.
- Check chain, tighten and grease.

4.4 Maintenance drive

Please study operation instructions supplier.

4.5 Cleaners

Do not use cleaner with solvent.
 If using a cleaner with solvent is necessary, make sure that solvent can not reach bearing and sealing.



In case of high-pressure cleaning, pay attention to the ball-bearing. Damaging the sealing of the ball-bearing may cause malfunctioning of the bearing.

4.5 Lubricants

Lubricant	Type	Supplier	Application
Bolt	Cassida RLS2	Shell	Food NSF H1
Chain	Retinax EP2		General

The bearings fitted in the rotary valve are dust-proof ball-bearings. These bearings are lubricated for life and do not require further maintenance.

5. Malfunction

5.1 Probable cause

Common disturbances and possible solutions are stated below.
 If you are not able to solve the problem, please contact our service department.

Problem	Cause	Solution
- Low capacity	- Insufficient product supply - Speed too low - Too much air leakage	- Check supply - Increase speed - Improve venting Check blades (adjust/replace)
- Rotor is not turning	- Broken chain - Rotor jammed - Working temperature too high - Malfunction drive	- Replace chain - Dismantle valve - Adjust rotor - Check drive
- Shaft sealing is leaking	- PS seal damaged	- Replace PS seal