

RVA & RVB Rotary valves

Maintenance manual (EN)

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1. Introduction

This manual cannot be reproduced, even partially, without prior written consent by Formula Air Group. Every step of the rotary valve all along its life cycle has been deeply analyzed by Formula Air Group in the expected area during the design, construction, and manual creation. However, it is understood that nothing can replace the experience, training and good sense of those professionals who work with the device.

Ignoring the cautions and warning from the present manual, using improperly parts or the whole device supplied, using unauthorized spare parts, manipulating the device by non-qualified personnel, violation of any safety norm regarding design, construction and use expected by the supplier, exempt Formula Air Group from all responsibility in case of damages to people or properties.

Formula Air Group does not take any responsibility for the non-observance of the user about the preventive safety measures presented in this manual.

The use implies compliance and knowledge of the Machine Directive 2006/42/EU.

Failure to comply with the requirements of the operating manual or incorrect use of the rotary valve during operation can lead to the damage of the rotary valve and the loss of the proper function performed by the rotary valve itself. This will result in termination of the warranty on the item and will release the manufacturer from any liability.

Warranty

Regarding to the device's warranty, see the Sales General Conditions with your local Sales Office.

Attention

Before proceeding with the installation of the RVA and RVB rotary valve, ensure that the markings on the product are compatible with the rating of the site of use. Failure to comply with this prescription can cause serious injury to persons including death and/or serious damage to property.

NOTE: All drawings and references contained within this manual are non-contractual and are subject to change without prior notice at the discretion of the Formula Air Group and its partners.

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The RVA and RVB rotary valves are not designed to prevent the transmission of fire or burning powder transported by the normal process flow.

The RVA and RVB rotary valves are built in 3 mm thick steel, powder coated RAL 5010 and neoprene rubber.

2. Product description

Formula Air RVA and RVB rotary valves fulfil all relevant requirement to be used under filters or cyclones. To accomplish this, several instructions are described in this manual and shall be following prior to and during operation.

Note that besides the RVA and RVB rotary valve, the complete installation needs to comply to :

2006/42/EU – Machine Directive

2014/35/EU – Low Voltage Equipment Directive

2014/30/EU – Electromagnetic Compatibility and Repealing Directive (EMC)

2014/68/EU – Pressure Equipment Directive

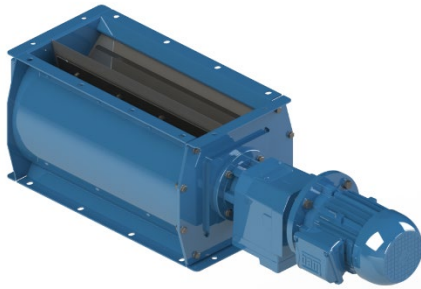


Figure 1. Formula Air RVA rotary valve



Figure 2. Formula Air RVB rotary valve

2.1 How it works

The RVA and RVB rotary valve is functionally built up of the following main components :

1. Rotary valve body
2. Rotor with rubber blades
3. Drive set (motor and gearbox)

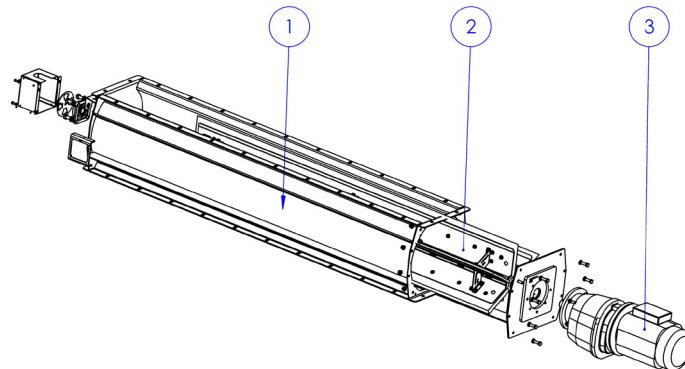


Figure 3. Structural design

2.1.1 Rotary valve body

The RVA and RVB rotary valve body is made of sheet steel. Inlet and outlet are foreseen with flange connection. The end plate positioned at the drive set can be dismantled in a way that provides access to the rotor. The rotary valve body is powder coated.

2.1.2 Rotor

The RVA rotor is built up of a rotor shaft mounted with 6 sets of chambers, while the RVB rotor is composed of 8 chambers. Neoprene rubber blades are mounted in the blade retainers in the chambers.

2.1.3 Motor and Gearbox

The rotor is driven by an electric motor. The connection between rotor and electric motor is established by a gearbox.

2.2 Overall dimensions

RVA model :

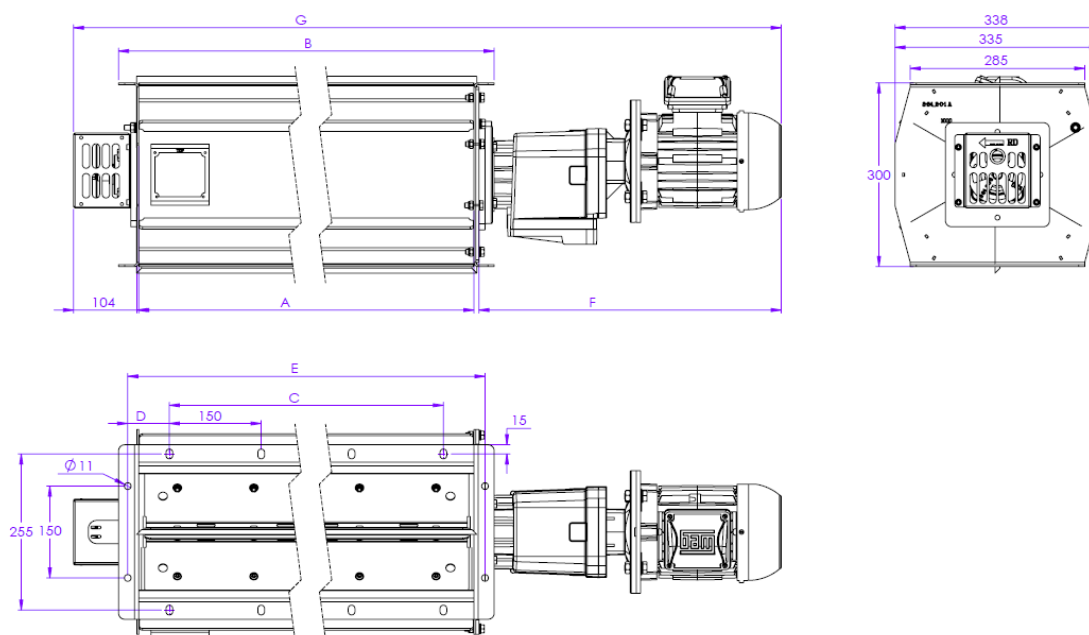


Figure 4. RVA dimensions

Type	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	Mass (kg)
RVA1-NX-06	250	316	150 (1x150)	68	286	418	782	48
RVA2-NX-06	500	566	450 (3x150)	43	536	494	1108	74
RVA3-NX-06	750	816	600 (4x150)	93	786	494	1359	91
RVA4-NX-06	1000	1066	900 (6x150)	68	1036	494	1609	107
RVA5-NX-06	1500	1566	1350 (9x150)	93	1536	494	2109	141

RVB model :

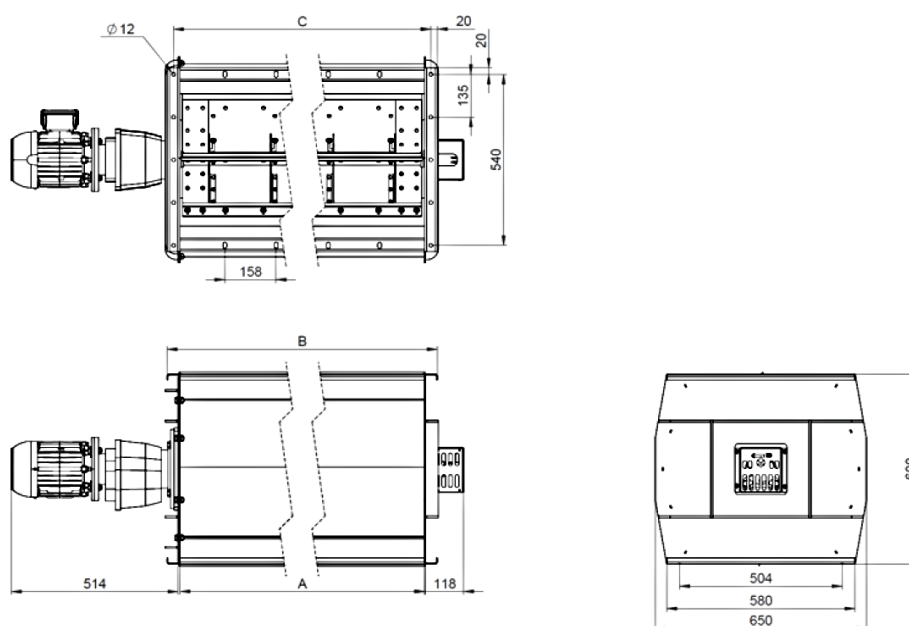


Figure 5. RVB dimensions

Type	A (mm)	B (mm)	C modular (mm)	Mass (kg)
RVB1-NX-08	800	580	4 x 135	140
RVB2-NX-08	750	830	5 x 158	185
RVB3-NX-08	1000	1080	8 x 130	260

2.3 Technical datasheet

Installation, operation, maintenance, and repair may only be carried out by qualified personnel.

Ensure that no tools or foreign objects remain in the machine during assembly or maintenance.

Selection and installation of the electrical parts shall be fulfilled according the EN60079-14 and the installation instructions of the specific equipment.

The airtightness of the rubber blade has to be controlled regularly according to the instructions in this user manual.

CAUTION!

The installation, connection, start-up and maintenance of the rotary valves have to be performed by qualified personnel. Use the appropriate equipment and clothing, apply the necessary safety measures and do not work alone.

The rotary valve must not be started until it has been mechanically connected on both sides to other ducting components by means of the built-in flanges.

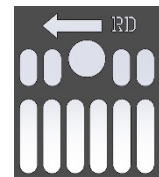
The rotary valve must be sealed on both sides of the hole series and bolted in the predrilled holes.

It is mandatory to make sure that the whole installation is stopped and cannot be started-up again before everything is connected and assembled.

2.4 Electrical connection

Electrical connection must only be carried out by a certified electrician. When making the electrical connection, check that the rotary valve rotor is turning in the correct direction. The rotation direction is indicated by an arrow on the rotation disk cover.

The electrical connection must be carried out in accordance with current local and national regulation.



2.5 Precautions for proper use

CAUTION!

It is strictly forbidden to open the rotary valve while the installation is running.

During functioning, the user has to ensure himself that there is no material stacking or material build-up inside the rotary valve in order to ensure the proper discharge of the material.

During maintenance keep the system disconnected and all the electrical equipment turned off.

Avoid dust removal by blowing while cleaning.

2.6 Gearbox & Motor

For information on the installation of the gearbox and drive motors, see relevant manuals from the original manufacturers (supplied separately).

Electrical parts shall be maintained according to manufacturer's instructions and inspected periodically according to local and national legislation (e.g. EN 60079-17).

IMPORTANT : Always wear the required safety equipment. The national safety rules in force must be observed.

3. Maintenance

3.1 Periodic maintenance

In order for the rotary valve to be guaranteed by the manufacturer, regular maintenance must be carried out by the installer, manufacturer or a distributor appointed by the manufacturer.

Maintenance must always be carried out according to the instructions in the manual.

3.2 Overhaul

For the manufacturer's guarantee to apply, the customer must have regular maintenance carried out by the installer, manufacturer or a distributor appointed by the manufacturer.

For distributors to be approved to carry out maintenance for the manufacturer, they must be trained by the manufacturer. The following must be checked: rubber blades, rotor, bearings, gearbox and motor.

NOTE : Rubber blades and sealing ring must be impermeable! Monitor wear regularly until service intervals can be determined. Overhaul must minimum take place every 6 months.

3.3 Motor, gearbox & bearings

3.3.1. Bearing Maintenance

The lifespan of the grease is influenced by many factors. The greasing intervals in our table thus can only be seen as very rough estimates.

Experience with comparable bearings or ones already used is therefore very important as not all operating conditions and influential factors that affect the service life of a lubricant – and hence also the bearing – are known or determinable in many cases.

3.3.2. Greasing interval

Operating temperature of bearing °C	Greasing interval		
	Environmental conditions		
	Clean	Dirty	Very dirty Heavily humid
50	3 years	6 months	3 months
70	1 year	2 months	1 month
100	3 months	2 weeks	1 week

For information on the maintenance of the gearbox and drive motors, see relevant manuals from the original manufacturers (supplied separately).

3.4 Replacing spare parts

If the rubber blades are not impermeable or worn, they must be replaced. Visual inspection is carried out.

3.4.1 Rubber wear out

Rubber blades are worn out and must be replaced when dimension A and B are below optimal measurements in the following table (See figure 6).

RVA size	A (mm)	B (mm)
RVA1	28	10
RVA2	28	10
RVA3	28	10
RVA4	28	10
RVA5	28	10

RVB size	A (mm)	B (mm)
RVB1	38	10
RVB2	38	10
RVB3	38	10

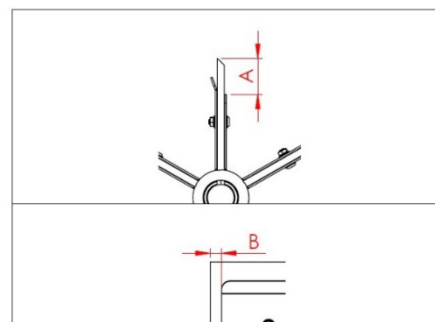


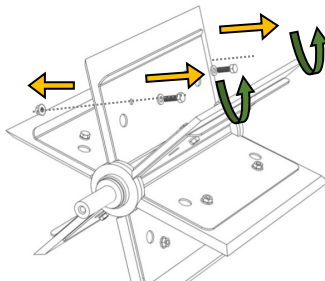
Figure 6. Rubber wear out

3.4.2 Replacing the rubber blades

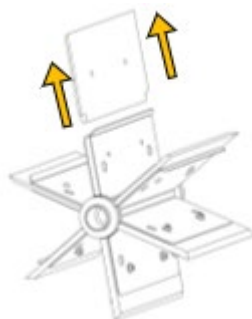
CAUTION! Before any manipulation to the rotary valve, make sure that the motor is stopped and that all electrical connections are disconnected.

NOTE : all electrical manipulations should be performed by qualified personnel only.

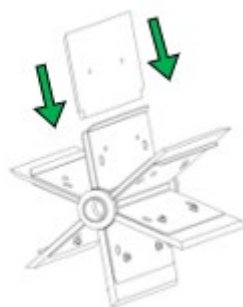
Step 1 : Unscrew the nuts and bolts holding the rubber blades.



Step 2 : Take the rubber blades out.



Step 3 : Introduce the new rubber blades into the metal retainer gap. Make sure that the holes are aligned, and the flap is in the right direction then bolt them back.



NOTE : The RVB model also has small rubber blades on the sides of the retainers which need to be replaced following the same procedure.

3.5 Noise level

The noise ratio of the component in our scope of supply in connected condition and without media is below 70 dB (A) measured at 1 meter from the component.

Noise from transported media is not included.

IMPORTANT!

A higher noise level may occur depending on local conditions, transported material and other components connected to the rotary valve. In this case separate measurements may be required.

If the total noise level in the area exceeds 85 dB (A), hearing protection must be used.

4. Components and spare parts

4.1 RVA models

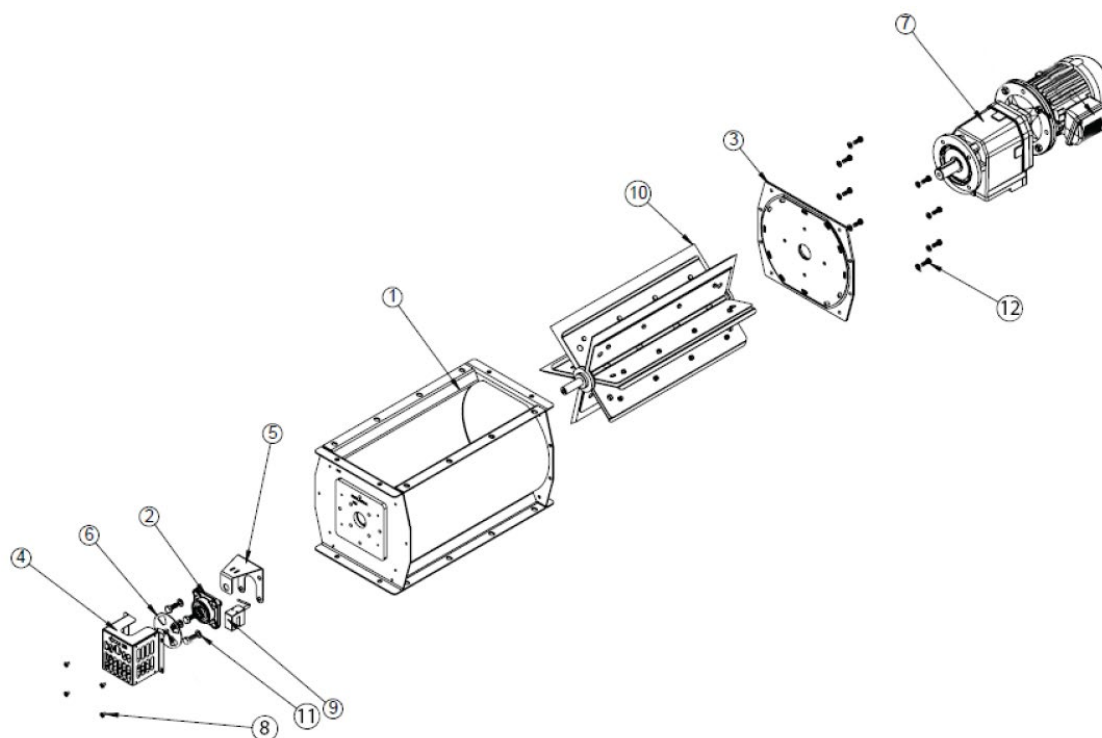


Figure 7. RVA Exploded view

Position	Description	Position	Description
1	Body	7	Motor and gear
2	Bearing housing	8	Bolt M5 x 10
3	Cover	9	Rotation detector
4	Rotation disc cover	10	Rotor and rubber blades
5	Detector holder	11	Bolts and washers M8
6	Rotation disc	12	Bolts, nuts & washers M8

Spare parts

Code	Description
JCAB000028	Bearing for RVA rotary valve (all models)
JCAB000001	Set of rubber blades (6 pcs) for RVA1
JCAB000002	Set of rubber blades (6 pcs) for RVA2
JCAB000003	Set of rubber blades (6 pcs) for RVA3
JCAB000004	Set of rubber blades (6 pcs) for RVA4
JCAB000005	Set of rubber blades (6 pcs) for RVA5
JCAB000027	Felt seals kit for all RVA rotary valve (2 seal rings)
JEBB000001	Gearbox for motor 0,37kW
JEBB000002	Gearbox for motor 0,55kW
JEAA000005	Motor - IE2 - 0,37kW - 4Pole - 230/400V - 50Hz
JEAA000006	Motor - IE2 - 0,55kW - 4Pole - 230/400V - 50Hz
JCAB000006	Rotor complete with rubber blades RVA1 - NX -06
JCAB000007	Rotor complete with rubber blades RVA2 - NX -06
JCAB000008	Rotor complete with rubber blades RVA3 - NX -06
JCAB000009	Rotor complete with rubber blades RVA4 - NX -06
JCAB000010	Rotor complete with rubber blades RVA5 - NX -06

4.2. RVB models

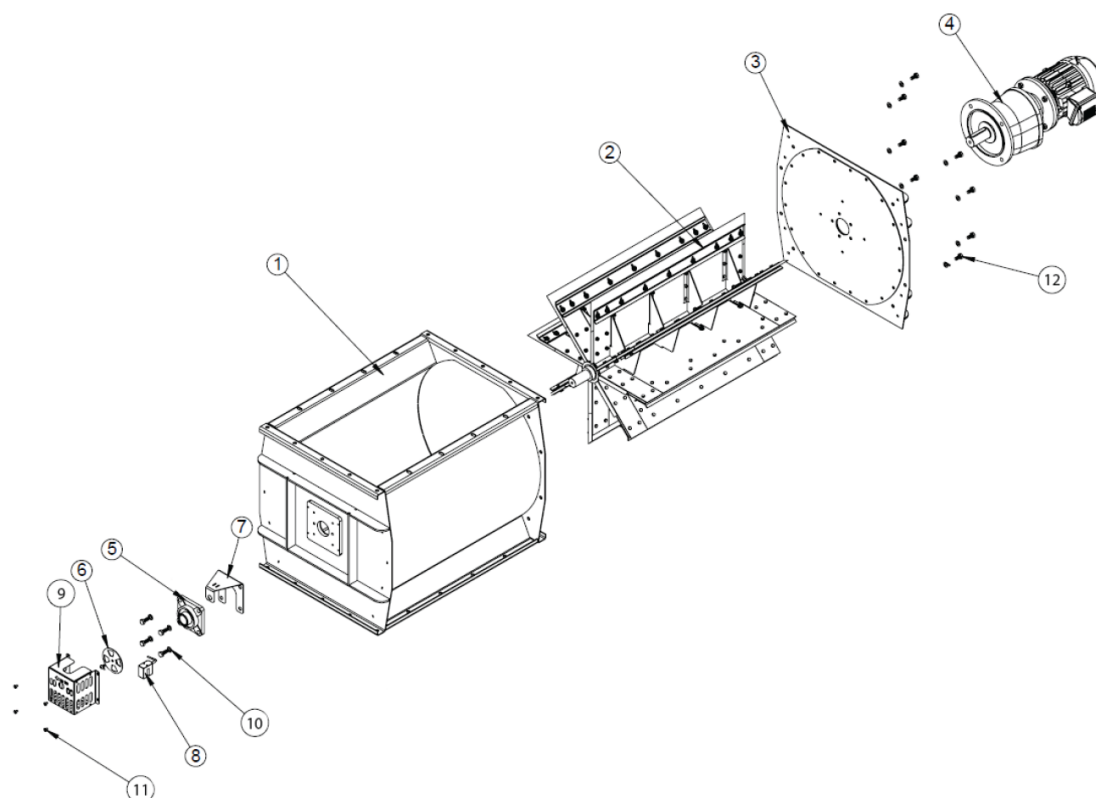


Figure 8. RVB Exploded view

Position	Description	Position	Description
1	Body	7	Detector holder
2	Rotor and rubber blades	8	Rotation detector
3	Cover	9	Rotation disc cover
4	Motor and gear	10	Bolts and washers M8
5	Bearing housing	11	Bolt M5 x 10
6	Rotation disc	12	Bolts, nuts & washers M8

Spare parts

Code	Description
JCAB000028	Bearing for RVB rotary valve (all models)
JCAD000001	Set of rubber blades (8 pcs) for RVB1
JCAD000002	Set of rubber blades (8 pcs) for RVB2
JCAD000003	Set of rubber blades (8 pcs) for RVB3
JCAB000030	Felt seals kit for RVB1/RVB2 rotary valve (2 seal rings)
JCAB000031	Felt seals kit for RVB3 rotary valve (2 seal rings)
JEBB000003	Gearbox for motor 1,1 kW
JEBB000004	Gearbox for motor 1,5 kW
JEAA000007	Motor – IE3 – 1,1 kW - 4Pole - 230/400V - 50Hz
JEAA000008	Motor – IE3 – 1,5 kW - 4Pole - 230/400V - 50Hz
JCAD000004	Rotor complete with rubber blades RVB1 – NX -08
JCAD000005	Rotor complete with rubber blades RVB2 – NX -08
JCAD000006	Rotor complete with rubber blades RVB3 – NX -08

5. Rotation detector (optional)

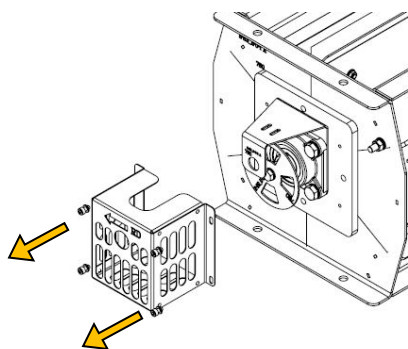
The optional rotation detector is a detection system that controls if the rotation disk is turning. In case of rotation failure, it sends a signal to a control panel.

CAUTION! Before any manipulation to the rotary valve, make sure that the motor is stopped and that all electrical connections are disconnected.

NOTE : all electrical manipulations should be performed by qualified personnel only.

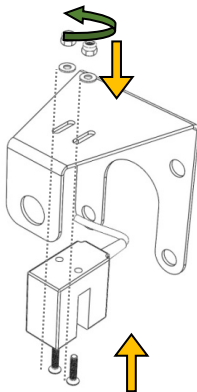
5.1 Placing the rotation detector

Remove the rotation disk protection cover by untightening the bolts holding it on the rotary valve body.



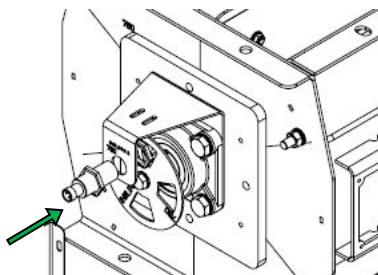
DU-6 detector ;

Attach the sensor through the inside of the sensor holder with the bolts and nuts delivered with the sensor.

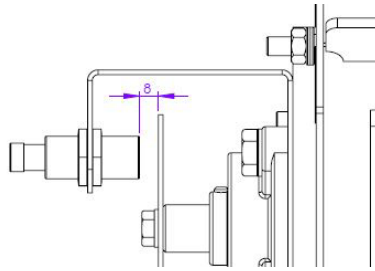


M18 optical sensor :

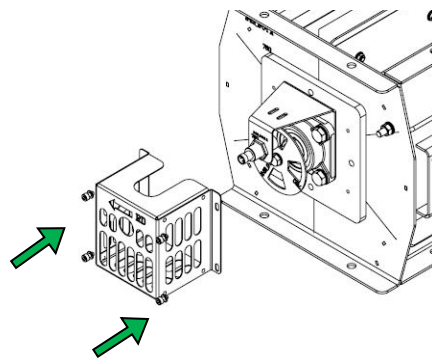
Introduce the sensor in the hole on the top of the front of the over and tighten it in place with the nuts supplied with the detector.



NOTE : make sure that the min/max distance between detector head and disk is respected as mentioned in the supplier detector guide.



Place the rotation disc cover back in place by tightening the bolts holding it on the ATEX rotary valve body.

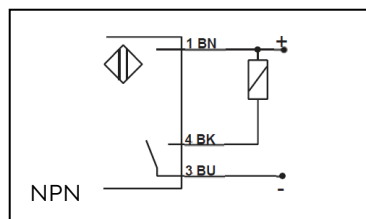
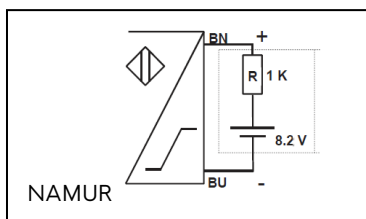


5.2 Connecting the detector

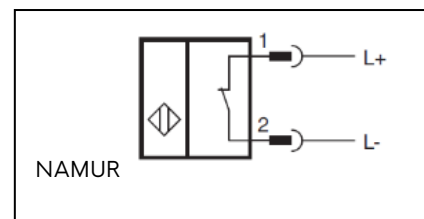
CAUTION! Before any manipulation to the rotary valve, make sure that the motor is stopped and that all electrical connections are disconnected.

NOTE : all electrical manipulations should be performed by qualified personnel only.

DU-6 connection :



M18 optical connection :



6. Troubleshooting

Failure	Possible causes	Proposed solutions
Rotary valve switches off thermally	Foreign body got stuck Rotor frozen Gear motor defective Rotor defective Motor protection set incorrectly Fuse defective Big voltage drop in power supply	Remove foreign body Thaw on the outside with hot air or water Replace motor, or gearbox Replace rotor Adjust the motor protection Replace fuse Insure voltage consistency
Rotary valve is not turning	Working switch is off Motor protection switched of thermally Conditions of operation are not met in the control system Fuse defective It might be that something is stuck in the rotary valve It might be that the motor or gearbox is broken It might be that the motor or gearbox shaft key is broken	Stop the installation, switch on the working switch See "Rotary valve switches off thermally" Investigate why conditions are not met Investigate that nothing is stuck in the rotor Investigate if a part is broken and needs to be replaced
Rotary valve makes "screaming" noise	Foreign body got stuck Rotor/rotary valve body is defective The rotor turns the wrong way	Remove foreign body Replace defective component Wire the motor correctly
The material will not pass the valve without accumulation	Volume of material per rotation is larger than planned Airflow opposite through the rotary valve presents proper material flow Settling velocity of material less than expected The material accumulates in lumps which cannot pass the rotary valve The material is not removed fast enough at the outlet of the rotary valve Transported material is too big/bulky Material agglutinates	Reduce the volume of material feed, or replace rotary valve More frequent regeneration Shorter step-interval of chain conveyor Adjust the production machine to change the flow of material Check the proper functioning of the emptying system Use the adequate rotary valve
Rotation disk doesn't turn but rotor does	Rotation disk and rotor axle are no longer consolidated	Tighten rotation disk on rotor axle
Rotation detector doesn't react	Cable is not connected Improperly connected cables Detection distance is too big or too short	Make sure cables are connected Insure proper cable connection Verify installation distance

If the problem persists, contact the installer or manufacturer.

7. Dismantling and recycling

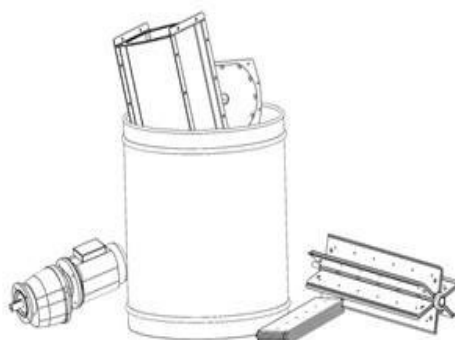
When dismantling a unit, be sure to keep in mind the following important information:

- As the unit is dismantled, set aside all still functioning parts to re-use them on another unit.
- You should always separate the different materials depending on their type: iron, rubber, oils, greases, etc...
- Recyclable parts must be disposed of in the appropriate containers or brought to a local recycling company.

The rubbish must be collected in special containers with appropriate labels and disposed of in compliance with the national laws and/or local legislations in force.

CAUTION!

It is strictly forbidden to dispose of toxic wastes in municipal sewerage and drain systems. This concerns all oils, greases, and other toxic materials in liquid or solid form.



8. Maintenance log

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