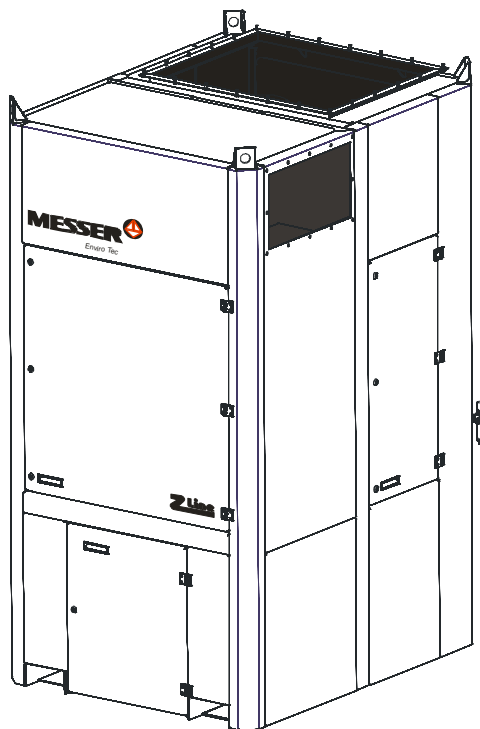


INSTRUCTIONS FOR OPERATION AND MAINTENANCE

FOR DUST COLLECTORS Z - LINE RANGE


Versions:

*Without pre-separator, (ZDC) with horizontal cyclone pre-separator,
(LJ) with spark trap, (ZBH) with spark trap pre-separator with reflective
metal sheet, (ZVP) with in-line cyclone pre-separator*



**PLEASE READ CAREFULLY THIS MANUAL BEFORE INSTALLATION OR STARTING-UP THIS DEVICE
INCLUDING OPERATING AND MAINTENANCE INSTRUCTIONS FOR ELECTRIC PART AND CONTROL**

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RECOMMENDATIONS TO WORK AND HEALTH SAFETY AND OPTIMUM APPLICATION

This manual contains information, data and instructions to health and work safety of persons in motion in the immediate vicinity of the equipment. Please read and apply carefully these instructions.






Please read first the following instructions and information to secure and adjust optimal performance of the device and safe and trouble-free functioning.

Only qualified, authorized and trained personnel are allowed to operate this device. Everybody carrying any work on this device has to familiarize with the corresponding part of this operational manual and further manuals and understand them. Owner is further obliged to inform the personnel about possible danger. Owner must make sure the personnel have understood the manual. One copy of the corresponding operating manual must always be available in its place close to the machine.


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Symbols used in this manual

	These data refer to concrete information and topics in this manual.
	These data refer to measures preventing from damages on the device and device application effectivity.
	These data draw attention to a possible danger or threat to persons, possibly material damages.



GENERAL SAFETY PRECAUTIONS:

- a) As it is not possible to enumerate all the possible danger sources originating from the dust exhaust devices and systems it is therefore necessary to read carefully the following instructions and consult the device operation with the MESSER EnviroTec representatives.
- b) Persons responsible for the device or system operation have to be properly instructed concerning their safety.
- c) Despite the Z- Product Line separators are designed and manufactured according to applicable standards in force and respected safety standards, non observing these instructions and warnings presented in this manual, poss. operating the devices in other way than recommended can cause threat to health of persons or material damages.
- d) Utilizing the Z- Product Line separators is allowed only in perfect shape and only for applications presented in this manual poss. application presented in description of delivery, technical drawings of delivery or data sheet of the device.
- e) Personnel operating the Z-Line must be properly and conclusively trained before the device startup.
-  To document the training and instructing with this manual and its annexes a sheet annexed at the end of this manual can be used.
- f) Any malfunction or deviation from instructions of this manual must be immediately eliminated.
- g) Separating device Z-Line is not designed for separation of combustible matters and easily flammable dusts (e.g. wool, paper, wood, aluminum, magnesium etc.) which can easily cause explosion.
- h) In the course of device using it is necessary to prevent from mixing of combustible materials as e.g. dust from grinding of paper, wood, aluminum or magnesium with dust from grinding of ferrous metals where sparks could be generated with consequent fire.
- i) It is forbidden to use the Z- Product Line separators for separation of foodstuff which shall be utilized later on; it is also forbidden to separate fog/aerosols from liquids and acids.
- j) Fiery cigarettes or other burning or smouldering objects (see also the par. g) cannot under any circumstances be introduced inside the intake pipe or other parts of the device.
- k) Exhaust device Z-Line is not in standard way equipped against explosion. For these cases a

- special version marked Z-Line ... EX is available. Special operational and maintenance manuals are prepared for these versions.
- l) The Z-Line device user should look up information about national and regional fire regulations and/or further applicable regulations and arrange for appropriate measures to determine place of installation and operation of the separating device.
 - m) Regular maintenance is inevitable for trouble-free operation of the device.
 - n) To ensure safe maintenance of the device the integrated filter switchboard is equipped by a main switch and the device is equipped by a breakdown switch NOT-AUS (please see operational manual of the electric part and control).
 - o) Power supply to the switchboard must be equipped by a mains power switch acc. to *CSN EN 60204-1* (not part of delivery).
 - p) Disconnection from mains must be made in case of any maintenance works.
 - q) Any device user must arrange for observation of fire regulations and all regulations and standards applicable for installation place selection as well as all operational standards and regulations acc. to EN 60204-1 .
 - r) To prevent from accidents during devices operation a mechanical barrier to a fan runner wheel is mounted (EN ISO 13857) and it is forbidden to remove this mechanical barrier during operation of the fan.
 - s) All loose lines and parts are connected to unified protective safety circuit (EN 60204-1).
 - t) Before any measures are taken switch off the compressed air supply and release residual pressure from the device.
 - u) The whole device is designed to be installed in an environment with normal extraneous effects acc. to IEC 364-3 and IEC 60364-5-51.
 - v) In the case of the device disposal because of irreparability or end of lifetime period proceed according to regulations in force in the time of disposal.



The manufacturer can not be held responsible for any defects when the Z-Line separators are not used in compliance with these terms and for purposes for which are not designed. Hazards arising from incorrect using are solely born by the user.

INTRODUCTION

INFORMATION ABOUT THE DEVICE

Your decision to choose equipment by Messer Enviro Tec. was correct and wise. This up-to-date product line of separators was designed with respect to:

- optimum efficiency level in dust exhaust
- secure safe and healthy work environment
- optimization of electric input

and with respect to the device compactness of the exhaust and separating system and low build over space requirements.

Z-Line device is a compact filtering unit with integrated fan with electromotor, switchboard ensuring unit control of all necessary functions and protection, control board to operate the device.

Dust separators of Z- Product Line are manufactured solely for purposes introduced in the delivery specification, in technical drawings and parameters.

Separation is performed regardless if for environmental protection or as a part of technological or manufacturing process.



The device is designated for separation of wide scale dust types, always in compliance with specification indicated in the delivery.

Ultra fine woven filtering cartridges form the principle part of the separating device of Z-Product Line, ensuring that only purified air is discharged to the device environs.

DEVICE MARKING

According to a dust character and application specified in description to a delivery, technical drawings of the delivery, possibly by the device datasheet, Z-Line separators are supplied with integrated pre-separators or without pre-separator.

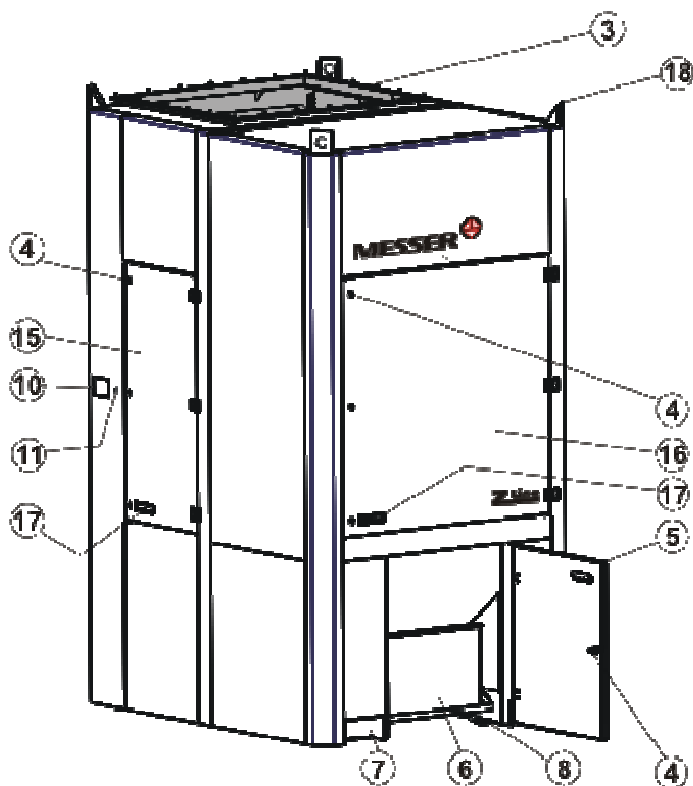
These versions are specified in the device markings:

- without pre-separator (marking **Z-Line x**)
- with horizontal cyclone pre-separator (marking **Z-Line x ZDC**)
- with sparks trap (marking **Z-Line x LJ**)
- with pre-separator with reflective metal sheet (marking **Z-Line x ZBH**)
- with rotary pre-separator (marking **Z-Line x ZVP**)

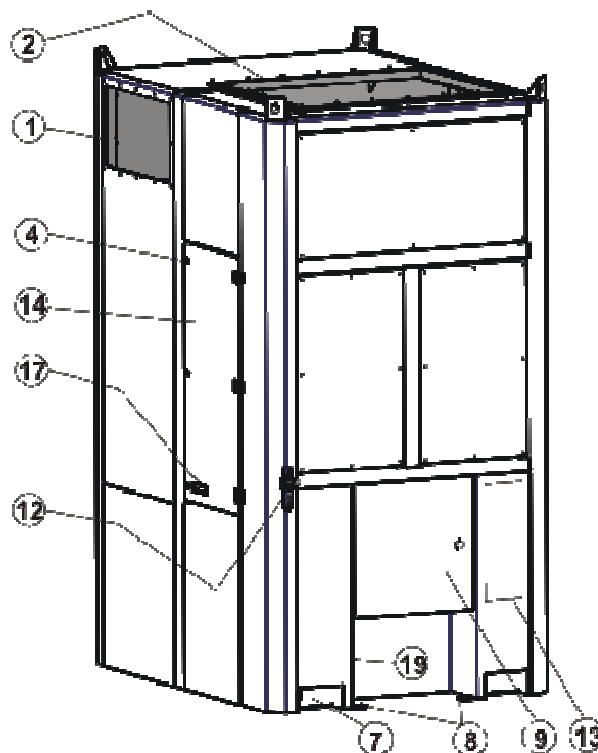
INSTRUCTIONS TO DESIGN AND APPLICATIONS

- Pressure loss of Z-Line separators amounts in average to 900 Pa.
 - Separability of compact filtering Z-Line unit amounts to 99.9 %. This value was determined on a basis of authorized air measurements carried out during the filtering unit operation.
 - The fan output and filtering unit type is determined in relation to a pressure loss of the separator, external pressure loss (pipe line, incorporated resistances). We always recommend to consult the fan output with the manufacturer.
 - Make sure before installation that your hall or installation space of suction adapter to the filter is balanced concerning the pressure or slightly over pressurized, poss.
- there is equipment securing this condition (important to prevent back flow of dust by influence of under pressure).
- In the case of pre-separators of **ZVP** type there must be kept installation condition - straight pipeline of a length amounting to 4-5 multiple of the pipe nominal diameter.

DESCRIPTION OF MAIN PARTS



FRONT VIEW



REAL VIEW

FIG. 1 DESCRIPTION OF THE DEVICE BASIC PARTS (DRAWING OF Z-LINE 9 TYPE)

- | | |
|-----------------------------------|--|
| 1. Air intake | 12. Pressure air cleaning unit |
| 2. Main exhaust of purified air | 13. Area for informative and serial labels |
| 3. Electromotor with fan | 14. Monitoring and inspection door (Magnetic valves) |
| 4. Door lock | 15. Monitoring and inspection door (Magnetic valves) |
| 5. Door to dust collection vessel | 16. Monitoring and inspection door (Filtering cartridges fixing) |
| 6. Dust vessel with wheels | 17. Handle |
| 7. Openings for forklift lifting | 18. Crane lifting lug |
| 8. Anchoring attachments | 19. Earthing connection bolt |
| 9. Switchboard | |
| 10. Control panel | |
| 11. Central Stop (Not Aus) | |



Description of pre-separator main parts - please see further on in the chapter Pre-separator.

PRINCIPLE OF OPERATION

Polluted air or air containing airborne dust is under normal conditions sucked through the inlet opening situated in the lateral side of the filtering unit, in the case of pre-separator in the lateral or back side of the pre-separator (see Fig. 3,4,6,7,8) and from this into filtering cartridges.

During the separation process dust cumulates on the outer side of filtering cartridges. Purified air is conducted through the central space of the filtering cartridge and then over the filtering cartridge outlet to a „clean zone“ of the filter. From this the air is conducted through an integrated fan and blown outside from exhaust filter opening into environment or into outlet piping.

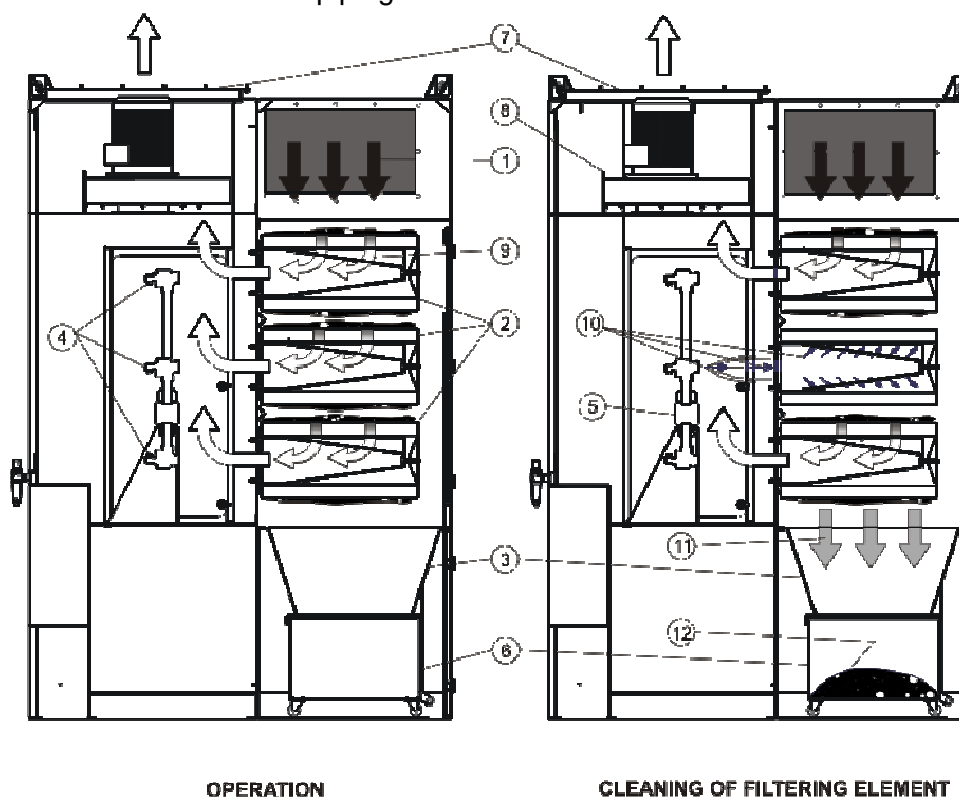


FIG. 2 FUNCTIONING PRINCIPLE AND FILTERING CARTRIDGES CLEANING

- | | |
|-------------------------------|--|
| 1. Inlet of polluted air | 8. Fan |
| 2. Filtering cartridges | 9. Air flow and cleaning by filtering cartridges |
| 3. Discharging chute | 10. Cleaning impact |
| 4. Membrane valves | 11. Falling dust |
| 5. Air accumulator | 12. Deposited dust |
| 6. Vessel for separated waste | |
| 7. Exhaust of purified air | |

FILTERING CARTRIDGES CLEANING

Filtering cartridges are permanently automatically or semi-automatically cleaned (dynamic or static cleaning process). One cartridge which is cleaned is always temporarily out-of-operation.

Cartridges cleaning is performed by „blowing-through“ pulse of compressed air, actuated by an electromagnetically controlled membrane valve. The pulse stream is directed inside the filtering cartridge opening and by blowing through a filtering cloth blows away dust deposited on the outer cartridge side. The blown-away dust falls consequently into the chute and then into the collecting vessel.

BEFORE THE DEVICE INSTALLING

SELECTION OF INSTALLATION POSITION

When choosing a place for installation it is necessary to follow the following instructions:

- Install the device with regard to possibly shortest intake and exhaust pipes with a minimum of shaped pieces (elbows, branches etc.)
- Elbows supplied should be of the largest possible diameter
- Installation place should have easily accessible power and compressed air supply at disposal.
- Installation place must dimensionally respect access to inspection openings and safety elements.



Z- Product Line filters are generally installed on a concrete bed but installation on the other beds is possible.

When calculating the foundation bed suitability and load capacity it is necessary to respect the following:

- separator weight according the technical data
- weight of separated dust in the collecting vessels
- other auxiliary loads from possible superstructures
- other loads e.g. in the external installation it is necessary to respect possible weight of snow, effects of wind, bed vibrations and other natural effects.

NECESSARY EQUIPMENT AND TOOLS

- crane/forklift
- lifting ropes with hooks having sufficient load capacity
- standard tools (screwdrivers, wrenches etc.)
- electric drill
- sealing material for pipe flanges, compressed air lines
- basic tools for electric appliance connection

DELIVERY AND ACCEPTANCE

Z- Product Line separators are completed in the manufacturing plant as one unit.
In case of pre-separator utilization it depends on a transport size :

- a) pre-assembled into one unit with pre-separator
- b) delivered separately in one delivery

During transport are all parts fixed onto pallets, poss. wrapped in an appropriate packing to prevent from possible damages.
Respective transport packing is indicated in the dispatch document.



In the case of missing parts or delivery inconsistency please inform the forwarding company, possibly contact Messer EnviroTec.

The following parts can be loaded loosely (depends on the delivery extent and specification):

- c) Piping parts (inlet, exhaust reducer)
- d) Exhaust filter box
- e) Control/regulation flap
- f) Noise silencer
- g) Box with spare parts, anchoring elements, bolts, sealing material
- h) Pre-separator (if not mounted to a separator)

INSTALLATION

UNPACKING AND TRANSPORT TO THE ASSEMBLY PLACE



Remove packing material before unloading (if used) and all upper strengthening transport elements.



Unloading must be done by means of lifting device with corresponding lifting capacity corresponding to the transported parts weights (crane or forklift).



In the case of installation of already used device it is necessary to empty the waste vessel(s).



To prevent from damaging the device during unloading, from health injuries, it is necessary to observe applicable manipulation rules and further regulations for fixing of loads applicable in the place of assembly.

Devices of Z-Product Line are equipped for manipulation by lifting lugs on the steel structure (marked by label) for lifting ropes gripping and by openings to transport by means of forklifts (see Fig. 1, pos. 7 and 18).



INSTALLATION AND ASSEMBLY

Not to loose time prepare concrete bed in the place of installation beforehand. Pay attention especially to places for anchoring bolts. The bed height should be min. 120 mm and the bed should be leveled in tolerance +/- 5 mm.



Z-Line separators are anchored into the foundation bed.



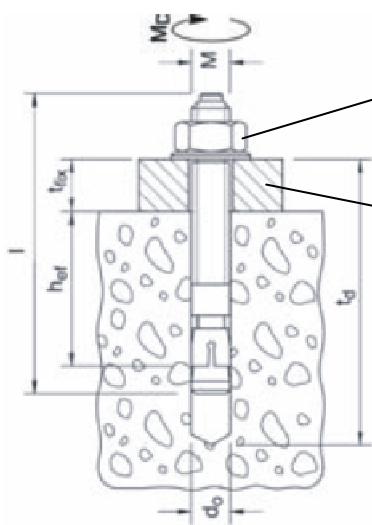
Foundation dimensions and anchoring bolts spacing are detailed in the device data sheets.

ANCHORING AND RECOMMENDED ANCHOR:

Anchors are part of the delivery and are packed in an enclosed box.



Bolt anchor FBN (Fischer)
For devices of sizes 3 - 16
M12- 100
($h^{ef}=70/50$ mm)
($t_d = 190$ mm)
For devices of sizes 18 - 24
M16-100
($h^{ef}=84/64$ mm)



Anchoring footing of
separating device
(see Fig.1, pos.8)

PRE-SEPARATOR



All pre-separators, if necessary and recommended, must be ordered together with separator. Connecting dimensions for pipelines can be found in data sheet of the device.



In order specify the version by marking (see page 7. Marking of device and following figures no. 3,4,6,7,8).



The unit can not be extended additionally by this part.

Version:

without pre-separator
(marking Z-Line x),

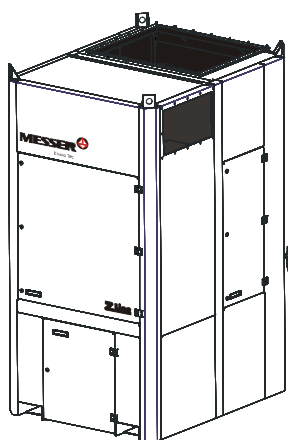
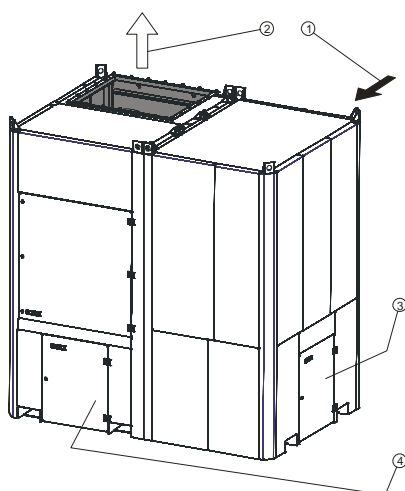


FIG. 3 Z-LINE 9

**with horizontal cyclone
pre-separator**
(marking Z-Line x ZDC)

- a) Pre-separator ZDC **is integrated** into the separator box. In this case no further assembly works are necessary.



1. Inlet
2. Exhaust
3. Space for waste vessel of pre-separator (removing please see chap. Discharging of waste vessels)
4. Space for waste vessel of the pre-separator

FIG. 4 Z-LINE 9 ZDC
(WITH INTEGRATED PRE-SEPARATOR)

- b)** Pre-separator is supplied separately from the box of separator device. (Only in cases when transport dimensions do not allow integration).
This way delivered pre-separator must be assembled in the place of installation (always depends on technical basis, delivery drawings) with separation device into one unit.
In the case of separate delivery and arrangement according to this point proceed in assembly according to the following picture and consequently described steps:

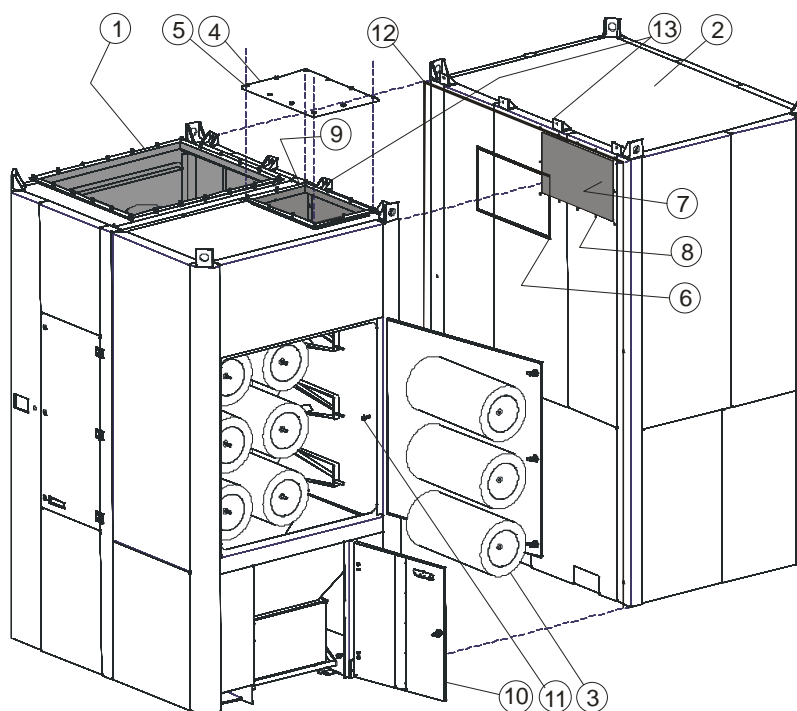

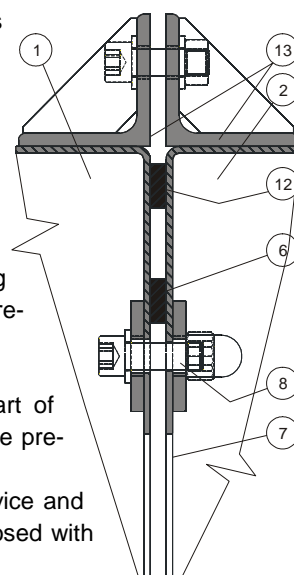


FIG. 5 Z-LINE 9 ZDC (PRE-SEPARATOR NOT INTEGRATED)

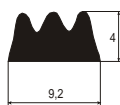
- | | |
|---------------------------------------|--|
| 1. Separating device | 8. Opening threaded M12 |
| 2. Detached pre-separator | 9. Assembly hole |
| 3. Filtering cartridge | 10. Door to access the discharge chute |
| 4. Covering lid of assembly hole | 11. 18 x bolt M12 x 35 |
| 5. 10 x nuts M8 with washers | 12. Sealing |
| 6. Sealing | 13. Fixing elements |
| 7. Exhaust opening from pre-separator | |

A brief assembly method for connection:

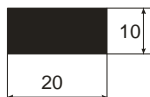
- 1) Transport the separating device and pre-separator to the assembly area
- 2) Dismantle the covering lid from assembly hole (Pos.4.) by loosening nuts (Pos. 5.)
- 3) Open the door to discharging chute part (Pos. 10) 
- 4) Glue a sealing onto (Pos.7) the pre-separator exhaust opening (Pos. 6 - in delivery among small material as yardage). During sticking of sealing pay attention to a wave placement.
- 5) Stick on the sealing along the periphery of the pre-separator on connection side with the separating device (Pos. 12 - in delivery among small material as yardage) – do not stick on the bottom edge of the pre-separator.
- 6) Put together both units.
- 7) Screw parts together with bolts M 12 with washers (Pos. 11.) – part of delivery, (on edges - 6 pc) and in the position of exhaust opening of the pre-separator (Pos. 7.) 12 pc.
- 8) Screw together fixing elements on the upper side of the separating device and pre-separator (Pos.13) by means of bolts M 12x35 and nuts M 12 enclosed with small parts to delivery.
- 9) Tighten properly all connections to prevent leakages during the device operation.
- 10) Fit back the assembly hole lid (Pos.4.) and tighten properly.
- 11) We recommend to seal additionally the joints by silicone binder.



To connect parts of air installations utilize always only original sealing material enclosed to the delivery. In case you are using your own sealing material use only material of EPDM type !



Sealing to connect flange joints (Pos. 6)



Sealing to connect partial parts of the device (Pos. 12)

- c) Pre-separator is supplied separately from the box of the separating device. (In cases the pre-separator and filtering part is intended by technical documentation for separate placing and these parts are to be connected together by interconnecting piping).

This way supplied pre-separator must be assembled on the place of installation (always depends on technical basis, delivery drawings) with the separating device into one complex.

In the case of separate delivery and arrangement according to this point, proceed in assembly according to the following picture and consequently described steps:

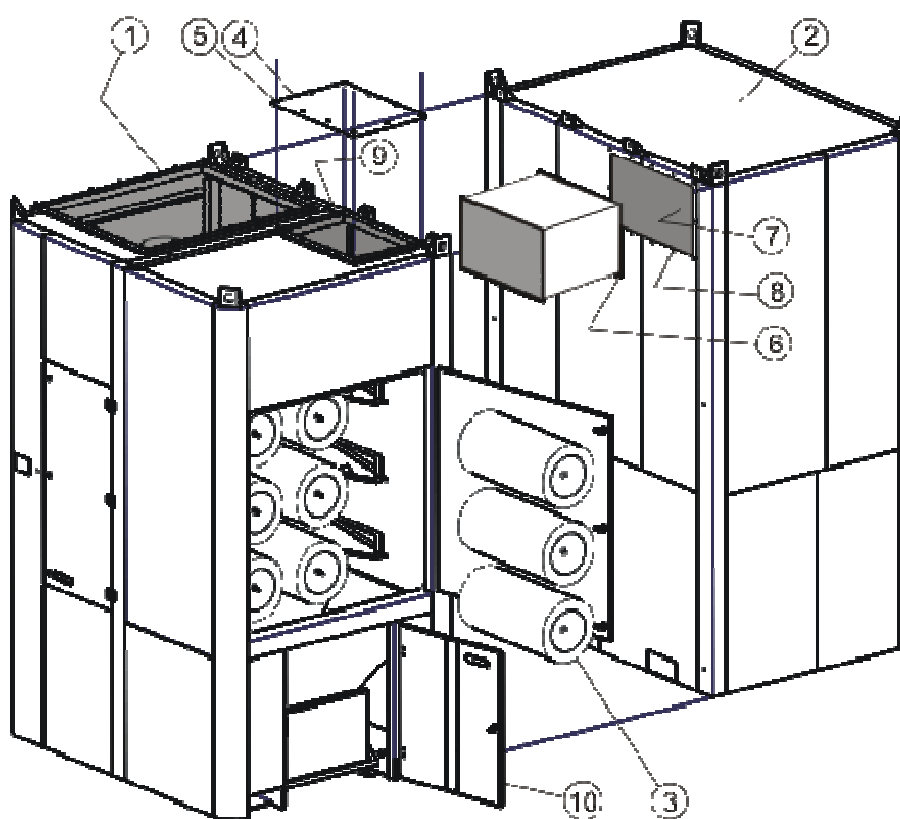


Fig. 6 Z-LINE 9 ZDC (NOT INTEGRATED PRE-SEPARATOR CONNECTED WITH FILTERING PART BY INTERCONNECTING PIPING)

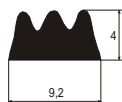
- | | |
|----------------------------------|--|
| 1. Separating device | 7. Exhaust opening from the pre-separator |
| 2. Detached pre-separator | 8. Opening threaded M12 |
| 3. Filtering cartridge | 9. Assembly opening |
| 4. Covering lid of assembly hole | 10. Door to access the discharge chute par |
| 5. 10 x nut M8 with washers | |
| 6. Sealing | |

A brief assembly connection method:

- 1) Transport the separating device and pre-separator to the assembly area
- 2) Dismantle the covering lid of assembly hole (Pos.4.) by loosening nuts (Pos. 5).
- 3) Stick on sealing on the exhaust opening of the pre-separator (Pos.7) and suction opening of the filtering part (Pos. 6 - as yardage among small parts of delivery). During sticking of sealing pay attention to a wave placement.
- 4) Screw together the parts by bolts with washers enclosed in the delivery (Pos. 11.).
- 5) Tighten the joints properly to prevent from leakages during operation of the device
- 6) Fit back the assembly hole lid (Pos.4.) and tighten properly.
- 7) We recommend to seal additionally the joints by silicone binder.



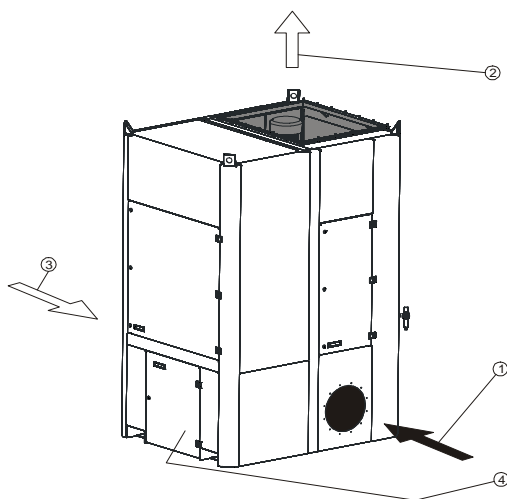
To connect parts of air installations utilize always only original sealing material enclosed to the delivery. In case you are using your own sealing material use only material of EPDM type !



Sealing to connect flange joints (Pos. 6)

with sparks trap pre-separator (marking Z-Line x LJ)

This sparks trap is always integrated in the separator and further assembly works are not necessary. This pre-separator is not equipped by a vessel for separated dust. Removing the deposited dust is performed by cleaning of the sedimentation chamber space through an inspection hole located on the opposite side to the intake opening. Inspection hole can be opened after loosening the fixing bolts.



1. Inlet
2. Exhaust
3. Place for inspection hole for cleaning the sedimentation chamber
4. Space of waste vessel of separating device

FIG. 7 Z-LINE 9 LJ

with spark trap pre-separator with reflective metal sheet

(marking Z-Line x ZBH)

Pre-separator ZBH is standardly integrated to the box of separator and no other assembly works are necessary. In the case of separate delivery and separate placing (acc. to technical data to the project) proceed in the same way as for ZDC type, point b.2.

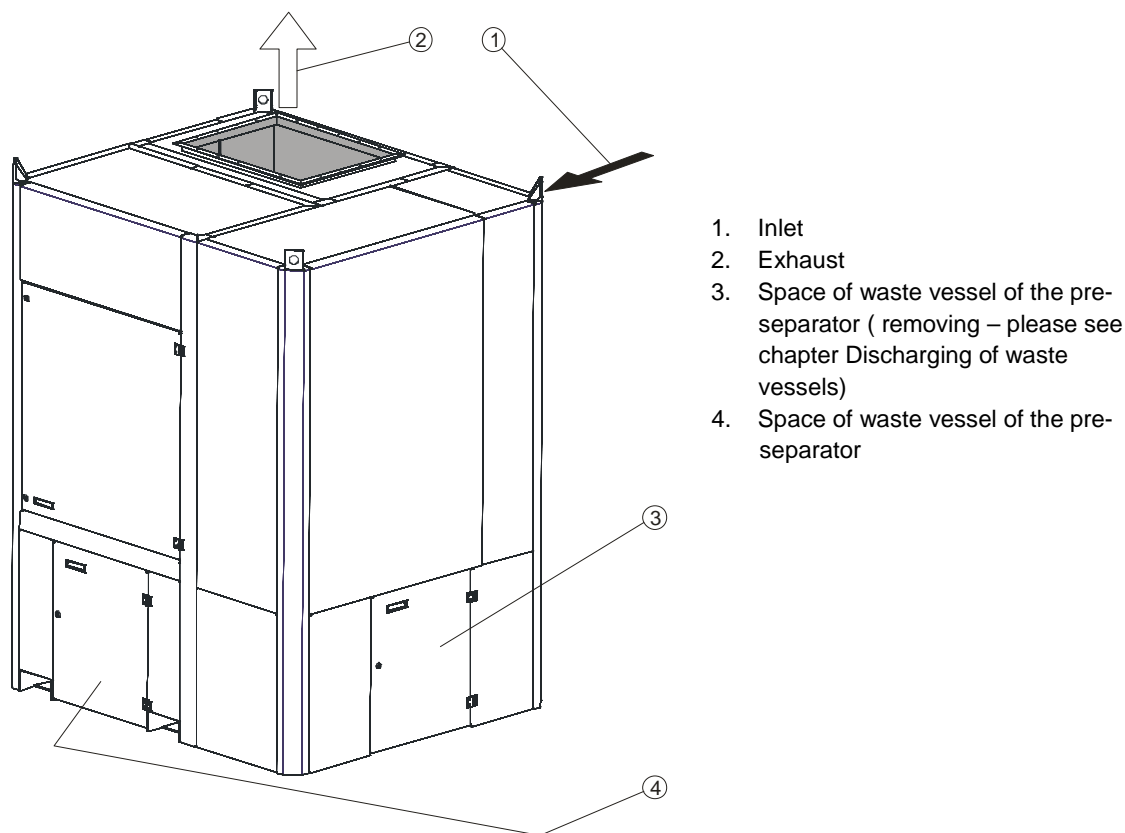


FIG. 8 Z-LINE 9 ZBH

with in-line cyclone pre-separator

(marking **Z-Line x ZVP**)

This pre-separator is always supplied separately. It is arbitrarily inserted into the sucking line and is fixed by means of flange joints on pipes. Connecting bolts with corresponding nuts and washers including necessary sealing tape are enclosed to the delivery.

The pipeline height is limited by the intake elbow to the separating device, poss. by inlet opening. Height of the pre-separator corresponds to the height of the inlet opening. Fine additional adjustment of the height and inclination is made possible by means of adjusting footing in legs of the pre-separator (see Fig.8 – Pos.5).



It is necessary to maintain air flow direction through the pre-separator within assembly. This direction is highlighted by an arrow on the pre-separator body (see Fig.8 – Pos. 7).

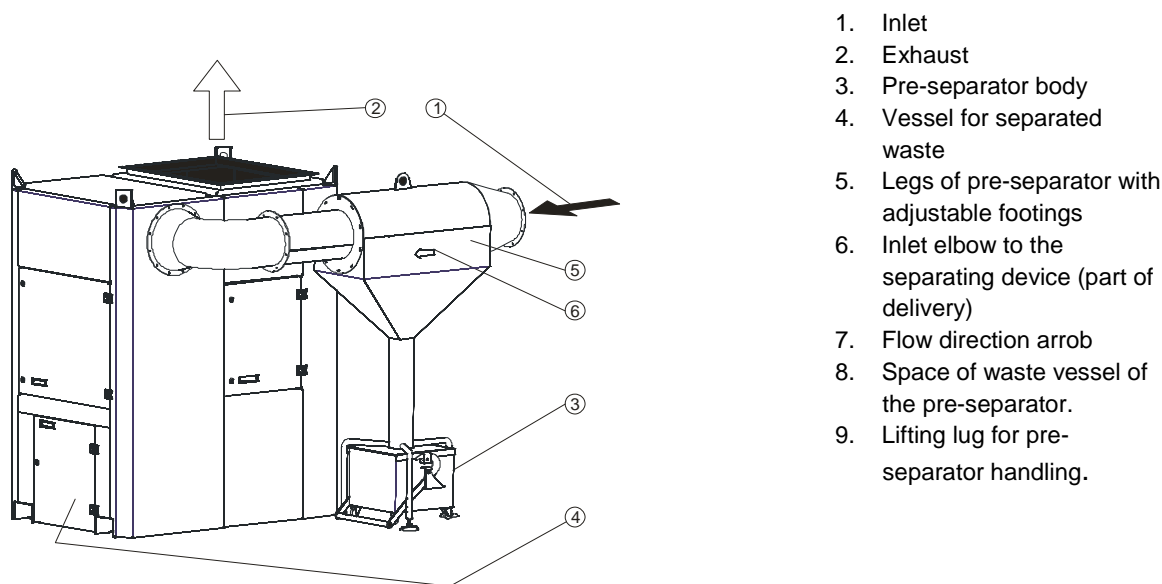


FIG. 9 Z-LINE 4 ZVP

FAN

Fan is always integrated in the Z-product Line and is fixed from manufacturing plant including electric connection.

Fans and their connection are carefully tested during assembly in the manufacturing plant. Namely fixing, electric connections, easy running and correct rotation direction of the fan propeller. Because plug terminals connection, poss. connection to switchboard terminals is performed by the customer, check the fan runner rotation direction after terminals connection. This can easily be found according to rotation of electromotor cooling fan.



Cooling fan propeller of electromotor and of the fan have the same rotation direction according to the arrow placed on the electromotor cover (see Fig. 9). Check this before fixing the exhaust box.



Correct rotation direction is crucial for the device output. If the fan rotates in an opposite direction, only about 40 % of nominal air flow is delivered.

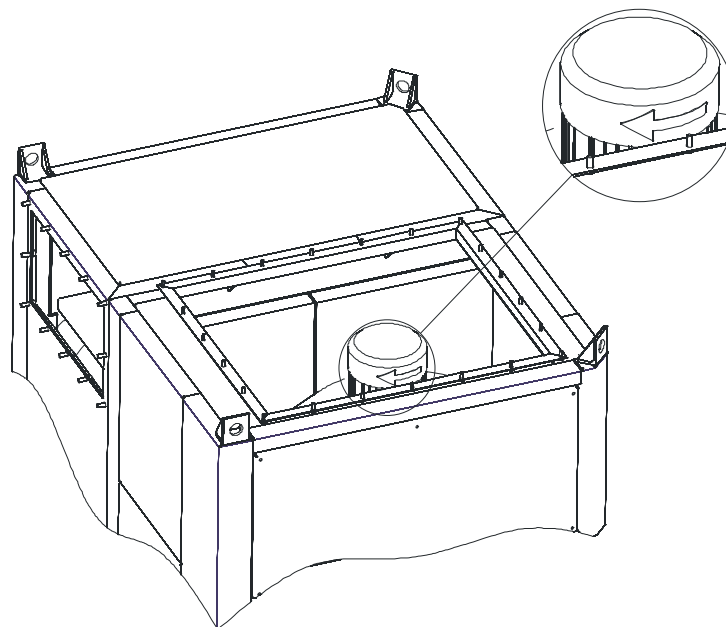


FIG. 10 ELECTROMOTOR PLACING AND ROTATION DIRECTION ARROWS



Never dismantle cover of the motor cooling fan during checking the rotation direction. Rotation direction is evident through the fan protective grill.



When you start the fan to find the rotation direction it is recommended to have the filter exhaust and inspection openings closed or it is necessary to stay outside the reach of the fan exhaust because solid particles flying out from the fan could cause injury ! Determine the rotation direction after the motor is switched off and its rotor runs down just in the moment before it stops.

EXHAUST BOX OF THE SEPARATING DEVICE



Exhaust box enables to direct flow of purified air from separating device into adjustable directions for cases when direct upwards exhaust without exhaust piping is not required or with exhaust piping. Exhaust box of the fan is delivered as not assembled. In the case its using is required, it must be fixed in the place of installation to the flange of pure air exhaust acc. to Fig. 10.



Before assembly remove the pure air exhaust protective screen if supplied, or transport cover.



Before assembly of the exhaust box it is necessary to inspect rotation direction of the fan runner.



In the case of requirement to conduct exhaust by piping terminated by head dismantle outgoing beveled piece and connect the pipeline according to the chapter Intake and exhaust and data sheet of the device.

Direction of the purified air outflow from the separator can be changed by rotating of the box Pos. 1 (0°; 180°), or by relocating of the beveled exhaust piece with grill (270°; 90°). In the case of relocation of the beveled exhaust piece with grill do not forget to blind the new opening by blind flange taken from the previous position.

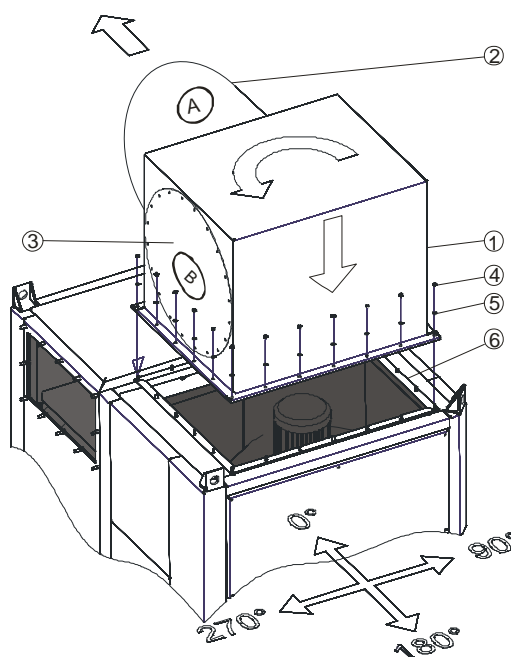


FIG. 11 EXHAUST BOX

- | | |
|--|---|
| 1. Exhaust box | 5. Washer (part of delivery) |
| 2. Beveled exhaust piece with grill | 6. Flange of pure air exhaust, assembly and dismantling opening for electromotor and fan runner |
| 3. Blind flange of alternative opening | |
| 4. Nuts M 8 (part of delivery) | |

INTAKE AND EXHAUST

Assemble intake and exhaust piping according to technical drawings or data sheets delivered to the separator or application. Piping must be rated min. to under pressure 4000 Pa.

Connection principle, conduct and assembly of intake and exhaust piping is evident from the Fig.11.

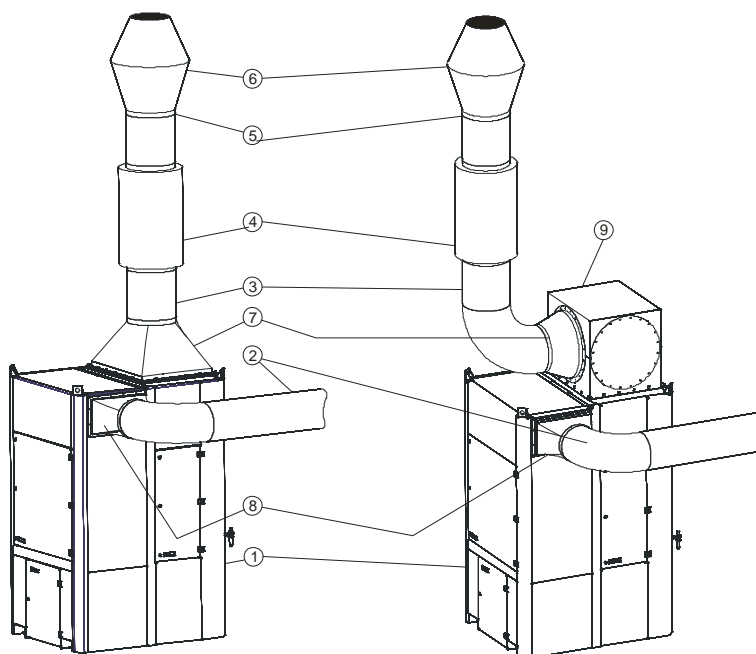


FIG. 12 Z-LINE 9 - CONNECTION OF INTAKE AND EXHAUST PIPING

- | | |
|---|--|
| 1. Separating device | 6. Exhaust head |
| 2. Intake piping | 7. Transitional part of outflow |
| 3. Exhaust pipeline | 8. Transitional part of intake (necessary
for versions Z-Line xx) |
| 4. Noise silences | 9. Exhaust box |
| 5. Alternative place for positioning the
overpressure flap | |



For installation of the separating device outside buildings in non heated areas insulate the pipelines outside buildings to prevent from water condensing and damages to the device.

CONTROL PANEL



Switchboard including functional control of the separating device is always mounted and integrated into the separator. All regulations and control instructions can be found in the manual on operation and maintenance of electric part and control which is enclosed.

CABLE DISTRIBUTION SYSTEM



Is shown in drawing documentation which is part of the manual on operation and maintenance of electric part and control.

DUST ARREST AND REMOVAL OF SEPARATED DUST



Vessels positioned below the discharge chute of separators and pre-separators (acc. to the pre-separator type) serve to arrest, accumulate and for removal the separated dust, there is also version without these vessels. (Fig.no.3,4,6,7,8). Separating device is always equipped by vessel for collection of separated dust.

Wheeled vessels for separated dust, with quick-clamp mechanism serving also as a handle for pulling the vessels are connected and fixed onto the separator and pre-separator structure in the manufacturing plant.

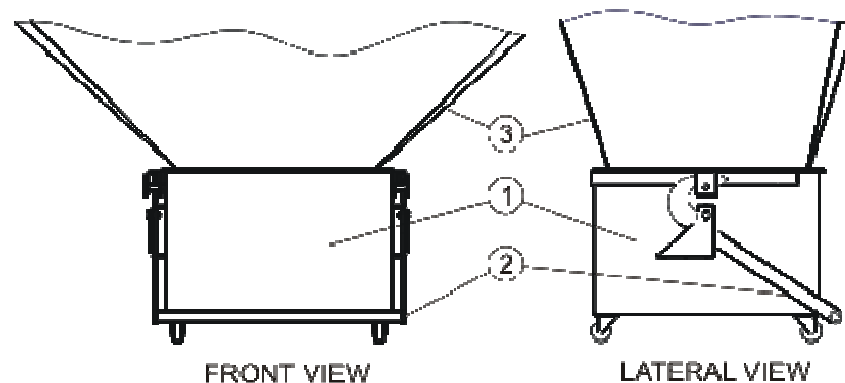


FIG. 13 VESSEL FOR ARRESTMENT OF SEPARATED DUST

1. Wheeled vessel
2. Quick-clamp mechanism - handle
3. Chute

OTHER SYSTEMS OF ARRESTING AND SEPARATED DUST REMOVAL

Separating device of Z-Product Line enable connection of further systems for collection and removal of waste:

- Big Bag with automatic discharging
- Connection of screw transporter
- Inserting the plastic bags into existing vessels

In these cases contact the device manufacturer with question on the connection possibilities. There is always enclosed manual on operation and maintenance specially composed for the chosen system for the above mentioned modalities.

COMPRESSED AIR CONNECTION TO THE SEPARATING DEVICE



Before any intervention to already connected device switch off supply of compressed air and release the residual air pressure. Valve Pos.7 Fig.13 is designed for this purpose.



Compressed air distribution system must never be filled by oil.



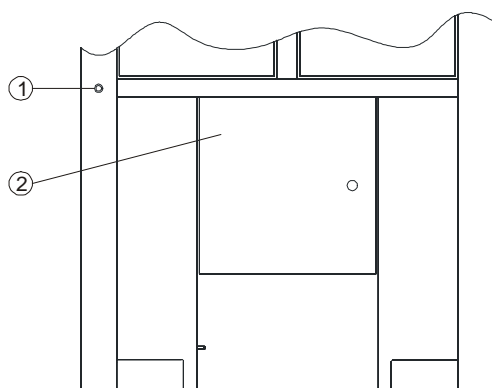
Compressed air must have pressure 6 – 7 bar with properties corresponding to **ISO85731**. These requirements on purity are to be kept with air purity class 5 , oil contents class 3 and without water (class of purity chosen acc. to a table of the above mentioned standard - usually class 3 up to 5). If the situation calls for, lower classes of air purity must be used and air must be purified from water by freeze out. Compressed air consumption: 45 Normolitres per one cleaning pulse @ pressure 7 bar).



Clean the pressure piping from corrosion nad other impurities before connection of the pressure air to the separator. Attach the cleaning and pressure air regulation unit to the separator (connecting size ½“ inner) see Fig. 13,14. This unit including water separator and manometer is enclosed to the delivery including all necessary parts (see Fig. 13) in a special box with small material.



When installing the cleaning and regulation unit for compressed air maintain the proper air flow direction (arrow direction).



1. Coupling to connect pressure air (integrated in the device construction)
2. Distributor

FIG. 14 PLACING OF COMPRESSED AIR CONNECTION (BACK VIEW TO THE SEPARATING DEVICE)

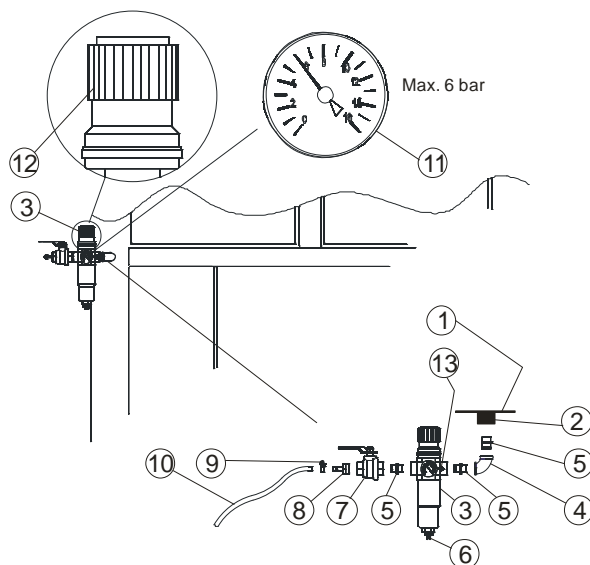


FIG. 15 CONNECTION, ADJUSTMENT OF COMPRESSED AIR PARTS

- | | |
|--|---|
| 1. Separating device body | 8. Hose ending 1" |
| 2. Compressed air coupling | 9. Hose clip |
| 3. Pressure air processing unit with water separation 1" with automated condensate discharging | 10. Hose 1" (15 m enclosed with small parts in delivery) |
| 4. Elbow 90 – 1" inner | 11. Manometer |
| 5. Nipple 1" – 1" outer | 12. Regulating screw to adjust pressure to device |
| 6. Outlet screw for separated water – manual | 13. Air flow direction arrow |
| 7. Switch-off valve | |



Use Teflon tape or other suitable sealing material for all connections made on the pressure air lines.

Compressed air line must have inserted switch-off valve.

Install all armatures in such a way to be easily inspected.

MAINS CONNECTION



Check output data of the fan electromotor on the device label with completion documentation, to connection documentation and circuit's protection data and to manual on operation and maintenance of electric part and control that is enclosed.

After mains connection check rotation direction of the fan runner (engine cooling propeller) according to arrow placed on the motor cover. Check this before assembly of the exhaust box.



During starting the fan it is recommended to close the filter inspection hole or keep yourself outside the reach of the fan exhaust as solid particles flying out could cause injury !



In case the fan rotates in an opposite direction than the arrow on the motor cooling cover shows (see Chap. Fan, Fig.9), disconnect the device from power supply and change cable connection in terminals (only third phase) box. This way you can change the rotation direction.

ATTACHMENT OF THE CONTROL/REGULATING FLAP



Control flap is important to be used within the first starting of fan or during the device startup with new filtering cartridges. By means of this regulating flap you can change suction parameters (sucked amount and fan pressure in a range of the fan output).

Separating device has no integrated regulating flap and therefore it is necessary to install it into the suction system. Flap is a standard part of delivery and is enclosed on extra pallet.



Regulating flap is to be installed on a suction pipeline and concerning size is designed to fit the intake opening of the separating device. Concerning pressure it is designed to a maximum under pressure with sufficient pressure margin.

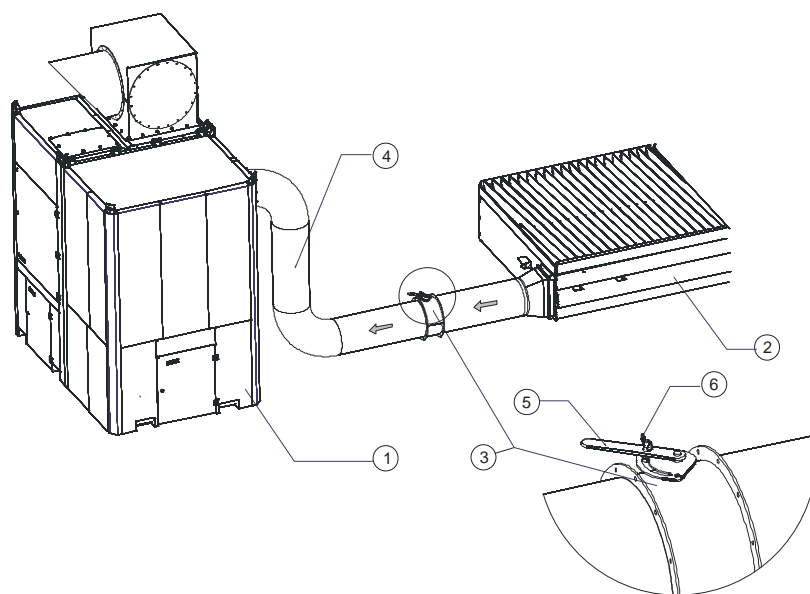


FIG. 16 PLACING THE CONTROL/REGULATING FLAP TO THE EXHAUST SYSTEM

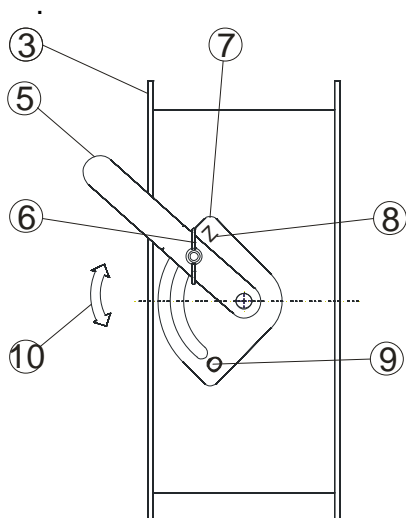
- | | |
|--|---|
| 1. Separating device (drawing of Z Line 9 ZDC) | 4. Exhaust piping |
| 2. Intake piece (drawing of exhaust table) | 5. Lever to control the regulating flap |
| 3. Regulating flap RK | 6. Fixing and lock nuts |



Within the first startup or during startups with new filtering cartridges close first the regulating flap by 45° or by half (regulating flap control lever - Fig.16. Pos 5. is oriented parallel with the piping axe) and tighten slightly the nut (Fig.16 Pos. 6) and then switch on the fan.



After the motor is on full operation rev you can regulate the sucked air amount by the flap.



- 3. Regulating flap RK
- 5. Lever to manipulate the regulating flap
- 6. Fixing and lock nuts
- 7. Angle range segment and blocking
- 8. Marking of maximum flap closing
- 9. Marking of maximum flap opening
- 10. Regulation range

FIG. 17 REGULATING FLAP TYPE RK



All air connections must be carefully sealed after completion.

Regulating flap which is part of delivery makes possible individual adjustment by releasing the lock nut (Pos. 6, Fig.16), by rotation of lever (Pos. 5, Fig. 16) into required position and then again fasten the lock nut. The lever position against the angle range segment (Pos. 7, Fig.16) shows the inner position of regulating blade then.

INSPECTION BEFORE OPERATION STARTUP

Before the first startup or after a long operation break please perform inspection according to the following points:

EVERYDAY INSPECTION BEFORE OPERATION STARTUP :

1. Make sure that there are no strange objects in the exhaust piping or fan ! Solid particles flying out of the fan could cause injury!
2. Make sure the vessels for separated dust are installed and properly fixed to discharge chutes.
3. All inspection doors and holes must be tightly closed

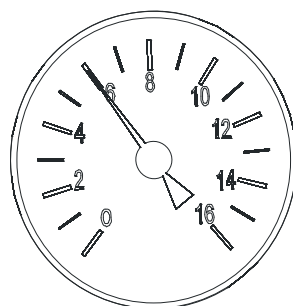


If you do not respect this it can cause strong increase of sucked air amount with consequent overloading of the fan or shortening the lifetime of filtering cartridges.



Check operation of cleaning valves switching without fan on (listen in the number of electromagnetic coils switches which must correspond to the number of filtering cartridges with preset intervals. (From production plant preset switching interval in static mode of switching range to 20 sec.)

4. Close regulating flap by 50%.
5. By means of main switch open the compressed air inlet into the system and by means of regulator set the pressure to 6.0 bar. This pressure represents optimum setting for pulse cleaning. Lower values cause lower efficiency and quick clogging of filtering elements.



Max. 6 bar

FIG. 18 MANOMETER DIAL ON THE COMPRESSED AIR UNIT



Do not set the air pressure more than to 6 bar, pressure system could be damaged in case of higher pressure.



Do not lower or prolong the air impacts (blow-through time). Longer or shorter blow-through time does not ensure better cartridge cleaning, only compressed air will be wasted and filtering cartridge lifetime will be shortened.

Switch on the main switch on the switchboard door.



Within fan startup all inspection filter holes must be closed and keep yourself outside the reach of the fan exhaust.

STARTUP

Startup the device according to the manual on operation and maintenance of electric part and control which is enclosed.



After the fan is in operation check operation of electromagnetic valves. The valves should smoothly open and close in preset interval 20 sec between two pulses (in case of static cleaning). If cleaning on basis of differential pressure loss is chosen the cleaning starts when preset limit value 900 Pa is exceeded.

Maintain there is no air leakage inside/outside the device except for intake and exhaust. Not expected flow change could result in not sufficient filtering efficiency or possibly shorter lifetime of some filter parts.

Verify the exhausted air amount on the inlet piping by means of Pitot pipe and micro manometer and potentially set the values by means of regulating flap.

OPERATION AND INSPECTIONS SCHEME



Inspect the device according the below mentioned points in regular intervals to ensure trouble-free functioning of your device.

Regular maintenance:

- 1) Regular maintenance consists of revisions applied according to the Tab.1.
- 2) Further in 6 month intervals check visually condition of electric appliances, fastening of electric cable terminals and tightness of switchboards. Possible faults have to be repaired immediately.
- 3) Check regularly components of compressed air distribution system, change filtering cartridges in the compressed air unit and in the case of water accumulation in the water separator release it by loosening the outlet screw, Pos.6, Fig.14.
- 4) Check electromagnetic valves and their attachment to the compressed air pipeline. In case of leakages repair is necessary.
- 5) Replace all parts where the compressed air can leak.
- 6) Check presence of oil and/or in the compressed air unit. If necessary clean the unit and remove water.
- 7) Air at the outlet from the separation device (purified air) should not contain visible pollution. If some leakage occurs the air blown out immediately contains impurities and control panel shall report alarm. Because of this it is necessary to check change of differential pressure on the control panel screen.
- 8) (Values of the differential manometer must range in normal problem free operation from 5 to 10.)

P.č.	Revised part	Inspected function	Correct value	Daily	E a c h			
					2	4	8	26
					w e e k			
1.	Control	Screen reports	Revision of alarm situations and their rectification	x				
2.	Vessels for waste	Dust contents in vessels	Empty when filled to $\frac{3}{4}$	x				
3.	Fan	Noise	See table of stand. problems	x				
4.	Zone of purified air	Emissions – dust residues	See table of stand. problems		x			
5.	Cleaning adjustment	Cleaning (pulses) to requirements	-					
6.	Compressed air unit	Oil or water in vessel	Without water and oil		x			
7.	Membrane valves	Noise of air leakage	See table of stand. problems			x		
8.	Electromagnetic membrane valves	Number of pulses	Number of pulses = number of filtering cartridges	x				
9.	Inspection door	Inspection of sealing	Change sealing in case of leakage			x		
10.	Air piping	Tightness inspection	Complete sealing				x	
11.	Device	Painting inspection	Repair paintings in case of corrosion				x	
12.	Filtering cartridges	Stage of differential manometer	Change cartridges when pressure loss 900 Pa does not fall down *	x				

TAB. 1 BRIEF TABLE OF INSPECTION SCHEME

*In case there is no problem in pressure loss during 3600 working hours

SERVICE AND MAINTENANCE



Before any maintenance is performed disconnect the device from power supply and wait till the fan runner stops.



Before any intervention close the compressed air supply and release the residual pressure.



It is forbidden to carry out any welding on the device structure without fire precautions (risk of fire or explosion).





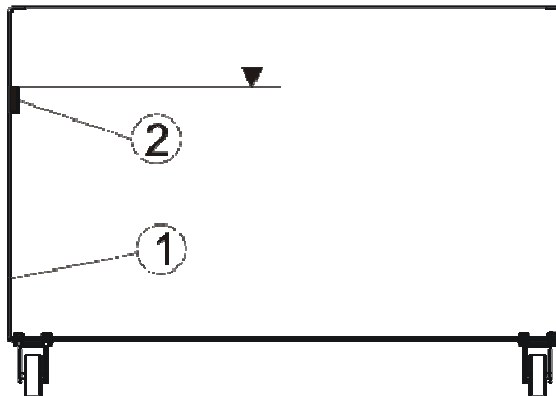
Avoid contact with dust and observe all safety regulations.



The switchboard contain electronic components (see documentation), it is necessary to respect this and adapt method of insulation stages measurement.

DISCHARGING THE VESSELS FOR RETAINING OF SEPARATED WASTE

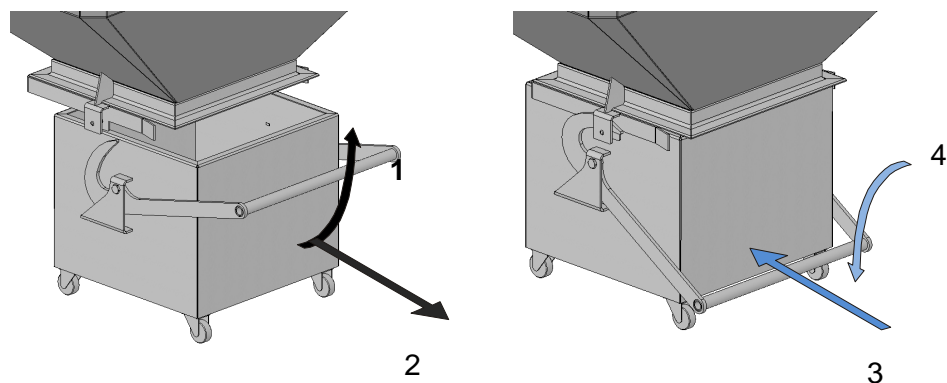
	<p>Prevent from overfilling the vessels for separated dust. All dust separating systems must be regularly discharged. Take care the maximum filling of the vessels does not exceed $\frac{3}{4}$ of volume (vessel is filled by dust up to $\frac{3}{4}$ height or to the upper edge of bar showing maximum dust level, located horizontally inside the vessel – see Fig.19). Exceeding this could result in the separator efficiency decrease and further cartridges cleaning. Concurrently you prevent from explosion possibility caused by airborne dust particles mixed with air into explosive mixture.</p>
	<p>Keep in mind that at certain concentration every dust shows explosive properties.</p>
	<p>Do not take out the waste vessel immediately after the fan is switched off, wait till the cleaning pulses are stopped and the fan runner stops.</p>



1. Vessel for waste
2. Bar showing max. dust level in the vessel

FIG. 19 MAXIMUM DUST LEVEL IN THE VESSEL

This vessel can be removed and returned according to the following picture and description:



TAKING AWAY AND RETURNING THE WASTE DUST VESSEL

Vessel taking away (in the separating device and in pre-separator) see Fig. 20 (1,2):

1. Switch off the device
2. Let the cleaning process finished enabling release of residual dust to the vessel.
3. Lift up the handle
4. Take off the container by its handle and discharge it

Vessel returning (to the separating device and in pre-separator) see Fig. 20 (3,4):

5. Return the container to its original position
6. Press down the handle completely

FILTERING CARTRIDGES REPLACEMENT



Cartridges fully clogged by dust or cartridges at the end of lifetime are heavy and not easily manipulative. Use therefore the following recommendation and ensure good access to the area of filtering cartridges.



It is always necessary to replace the whole set of cartridges (not single elements).

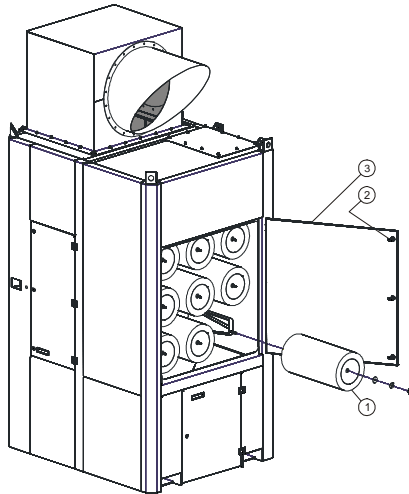


FIG. 20 FILTERING CARTRIDGES REPLACEMENT

– FOR Z-LINE SIZES 4,6,8,9,12

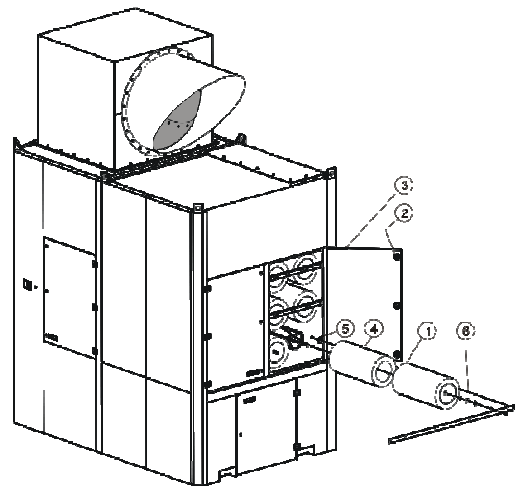


FIG. 21 FILTERING CARTRIDGES REPLACEMENT

– FOR Z-LINE SIZES 16,18,24

1. Filtering cartridge unilaterally closed
2. Inspection door screw
3. Inspection door
4. Filtering cartridge opened from both sides
5. Holder
6. M 10x25 screw, M10 nut

Disassembly procedure:

- a) Release the inspection door screws (Pos. 2, Fig. 20,21) and open the inspection door (Pos. 3, Fig. 20,21) to space with filtering cartridges of the separator.
- b) For separators of sizes Z-Line 16,18,24 unscrew the cartridge position holder (Pos. 9, Fig. 23) from the holder (Pos. 5, Fig. 21).
- c) After removing a butterfly nut (Pos. 7, Fig. 22,23) and washers (Pos. 5 and 6 Fig. 22,23) move with filtering cartridge to release sealing from partition wall of the device (Pos. 3, Fig. 22,23), onto which the cartridges are sealed.
- d) Carefully rotate with cartridge by 1/2 revolution to enable falling out dust sedimented on the upper side of the cartridge.
- e) Shift the filtering cartridge on the cartridge holder (Pos. 2, Fig. 22,23) towards yourself and pull it outside through the inspection hole.
- f) Repeat the procedure from point b) for the other cartridges of the whole set.



Maximum output of the device can only be reached with original filtering cartridges Messer Enviro Tec. Original filtering cartridge is the only cartridge ensuring high efficiency level you are expecting from dust separators by Messer Enviro Tec .



Before inserting a new filtering cartridge clean impurities from the cartridge holder and around a hole in partition wall of the device.

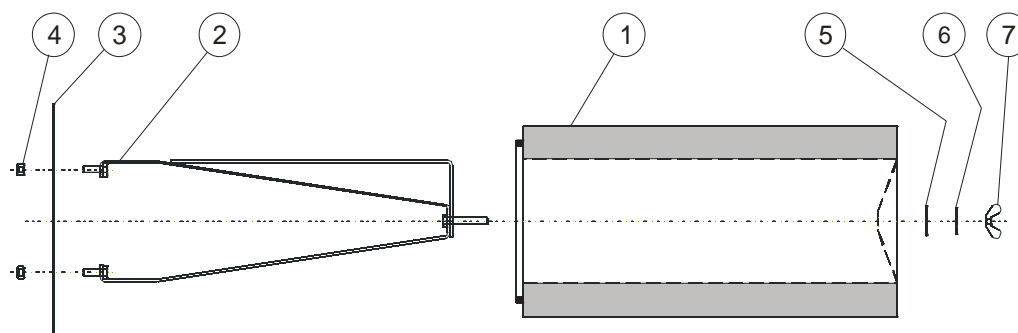


FIG. 22 SCHEME OF FILTERING CARTRIDGES FIXING FOR SIZES Z-LINE 4,6,8,9,12

- | | |
|---|--------------------------|
| 1) Filtering cartridge | 5) Rubber sealing washer |
| 2) Filtering cartridge holder | 6) Large steel washer |
| 3) Device partition wall | 7) Butterfly nut |
| 4) Nut and washer to fix the cartridge holder | |

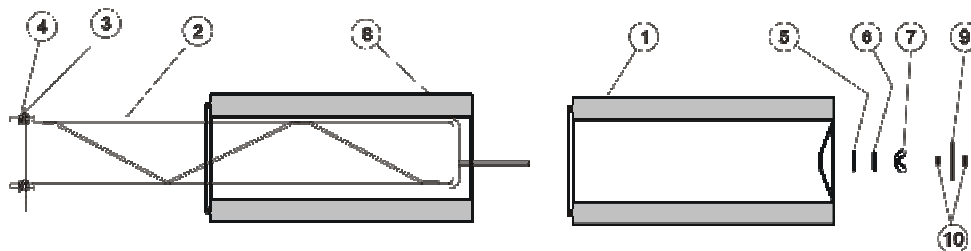


FIG. 23 SCHEME OF FILTERING CARTRIDGES FIXING FOR SIZES Z-LINE 16,18,24

- | | |
|---|---|
| 1) Filtering cartridge unilaterally closed | 6) Large steel washer |
| 2) Filtering cartridge holder | 7) Butterfly nut |
| 3) Device partition wall | 8) Filtering cartridge bilaterally opened |
| 4) Nut and washer to fix the cartridge holder | 9) Filtering cartridge position holder |
| 5) Rubber sealing washer | 10) Nut M10 |



To ensure tightness the sides of cartridges with sealing rubber must be positioned to the partition wall of the device. Butterfly nuts must be firmly tightened otherwise leakages can occur.



Check perpendicularity of cartridges.

Assembly procedure:

- Push the new cartridge onto the holder so deep the cartridge is supported by partition wall of the device (pos. 3, Fig. 22,23).
- Holder thread shall protrude from the cartridge hole.
- Put rubber sealing ring on the holder thread (pos. 5, Fig. 22,23), metal washer (pos. 6, Fig. 22,23) and nut at the end (pos. 7, Fig. 22,23) and tighten firmly.
- Make sure that the filtering cartridges are tighten and absolute tightness is ensured.
- Put on the other filtering cartridges of the set in the same way as mentioned previously.
- Close the inspection door after tightness and correct position control of the filtering elements (for sizes 4,6,8,9,12), for sizes 16,18,24 fix the cartridges position holder before the door closing.



In case of rubber rings damage it is necessary to replace them by new ones to ensure absolute tightness and proper function of the device. Always pay attention to absolute tightness of fastened parts.

Do not let the new cartridge come down on floor or other solid place. It could damage it with consequent leakage and not complete separation.



Utilization of other filtering cartridges is not allowed and manufacturer do not in this case bear responsibility for the device function and warranty.



Within every new device startup with new set of cartridges close first the regulating flap by 45° or one half and then start the fan. Check the fan running.



After the fan in on full rev you can regulate sucked amount by the regulating flap.

SOLENOID VALVES

Each Z-Product Line separator is equipped by electromagnetic membrane valves controlling flow of pressure air into filtering cartridges during cleaning. Electromagnetic coils actuating the valves are attached directly on the membrane valves (see Fig. 24). Electric connection to the control module is installed from the manufacturing plant.

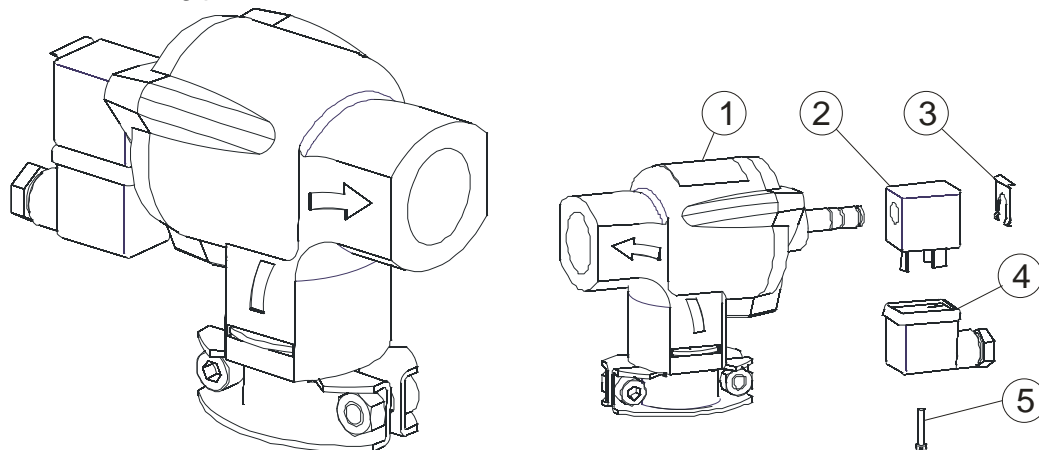


FIG. 24 SOLENOID VALVE

- | | |
|-------------------------|------------------------------|
| 1. Solenoid valve | 4. Connector with protection |
| 2. Electromagnetic coil | 5. Screw |
| 3. Securing clip | |

REPLACEMENT OF MEMBRANE VALVE (ACC. TO THE FOLLOWING PICTURE AND RESPECTIVE POINTS):

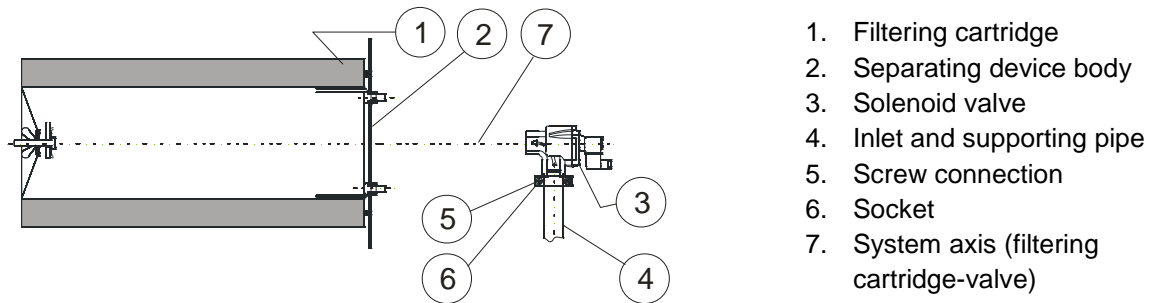


FIG. 25 REPLACEMENT OF MEMBRANE VALVE

- 1) Disconnect the device from power supply
- 2) Switch off the compressed air supply and release the residual pressure from piping
- 3) Disconnect cable from the valve coil
- 4) Loosen the screw joint pos. 5 of clip pos.6
- 5) By fine rotation loosen the valve and take it away



It is recommended to lower friction by using of suitable spray, paste.

For reverse assembly of the valve apply the above described procedure in a reverse sequence. Especially pay attention to keeping of alignment of valve exhaust socket and filtering cartridge.

TROUBLESHOOTING



Please use and read over also the other enclosed booklets (e.g. Manual on operation and maintenance of electric part and control, enclosed drawings and data sheets).



Before any maintenance, any part replacement disconnect the whole device from power supply, switch off compressed air supply and release the residual pressure in pipeline.



Welding is forbidden inside the already operated device or can only be performed with special precautions.

TROUBLESHOOTING TABLE

FAULT	POSSIBLE CAUSE	REMEDY
Fan runner does not start to rotate	<i>Electric connection</i>	<i>See also Manual on operation and maintenance of electric part and control.</i>
	a) Cables with not suitable cross section were used for electromotor	New connection acc. to standards in force with corresponding cross section
	b) Unprofessional connection	Check internal connection of switchboard to power supply acc. to diagram.
	Device not connected to appropriate voltage	Adapt connection to comply with supply voltage.
	Input switching circuit drops out	Check all phases of power supply voltage for motor switching
	c) Power supply drops out	Check power supply voltage, fuses and circuit breakers. Replace when necessary.
Fan runner starts to rotate and stops working again	<i>Electric connection</i>	<i>See also Manual on operation and maintenance of electric part and control.</i>

	a) Device drops out before full speed is reached.	Check overloading protection, probably not installed overloading protection of sufficient capacity. Set on proper value or replace it.
	b) Leaking or opened inspection door or openings, loose waste vessel, not correctly set regulating flap	Check closing by locks, screws tightening of inspection and blinding openings, fastening waste vessels to chutes and regulating flap setting.
	c) Circuit breaking drops out	Check if mains connection has sufficient capacity acc. to regulation in diagrams and ensure this.
Strange noise/vibrations caused by fan	<i>Imbalance of fan runner (rotor)</i>	<i>Immediately put in balanced shape according to the following points a),b) or balance the runner.</i>
	a) Dust deposited on blades of the fan runner	Clean the fan runner blades.
	b) Worn out blades of fan runner	Replace the fan runner
Dust leakage to the valves space from exhaust opening	a) Unprofessional assembly of filtering cartridges	Check if there is sealing on filtering bodies (see Chap. Replacement of filtering cartridges, Fig. 20).
	b) Damaged filtering cartridges	Replace the filtering cartridges. Use only original cartridges (see chap. Spare parts). Install filtering cartridges according to instructions in this manual.
	c) Inspection openings – loose locks, screws or damaged sealing	Lock, tighten screws or repair or replace sealing .
Not sufficient air delivery	a) Exhaust from the fan or separating device is clogged	Check the fan delivery. Remove strange objects blocking delivery or verify the regulating flap adjustment.
	b) Filtering cartridges are clogged by strange objects.	Remove strange objects from filtering cartridges surface.
	c) Lifetime end of filtering cartridges	Check pressure difference. Increase the blow through pulses by shortening of gap (at static cleaning). If improvement is not evident replace filtering cartridges for original ones.(see Chap. Replacement of filtering cartridges and List of spare parts).
	d) Not sufficient delivery	Check compressed air delivery and

	of compressed air	pressure is set to value 6 bar (Switch on supply and set the pressure according to the Chap. Connection of compressed air to the device).
e)	Cleaning cycles were not started	Check connection of electromagnetic membrane valves (<i>See also Manual on operation and maintenance of electric part and control.</i>)
f)	Place for dust sedimentation is overloaded or clogged	Clean according to instructions in Chap. Discharging vessels for retaining of separated dust.
g)	Membrane valves of pulse cleaning are not functional	Check by listening function of coils at disconnected pressure air and switched off fan – see Chap. Everyday inspection before startup. Replace not functional coils (see Table of spare parts).
h)	Leakage of compressed air from membrane valves	Disconnect all power connections and compressed air supply, release the residual pressure in the pressure system. Clean compressed air pipeline by blowing through. Check for presence of chips, strange objects, whether the valves are not worn out or the membranes are not damaged. Check if there are no strange objects between valve membrane and valve seat. Check electromagnetic membrane valves for leakages and/or damages. Replace them in case damages (see Table of spare parts).
i)	Circuit switching blow through suddenly cut off	Check supply of pressure air and function of membrane valves
j)	Sudden change of preset cleaning parameters	Pre-adjustment of switching (<i>See also Manual on operation and maintenance of electric part and control.</i>)

TAB. 2 TROUBLESHOOTING TABLE

SPARE PARTS

TAB. 3 SPARE PARTS

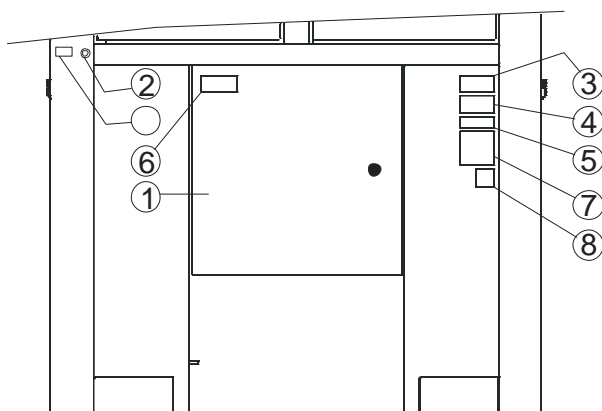
Pos.	Fig.no.	Part code	Name / code	Remark
-	21	SCS 353A821		Always quote model and serial number of separating device
2,3,4,5	21	SCS 353A821 Solenoid valve	Replacement parts	
1	21		TVSC 353A821	Valve body
2	21		400125642	Coil for valve 24 VDC
3	21		ZSC353A821	Securing clip of coil
4	21		8812240524	Connector with protection and signaling 24 VDC
1	20	-	Filtering cartridge	Always quote model and serial number of separating device
2	20	3149127793 01	Filtering cartridge holder for sizes 4 to 12)	Always quote model and serial number of separating device
2	20	310966163 01	Filtering cartridge holder (for sizes 16 to 24)	Always quote model and serial number of separating device
5	20	0293100835	Rubber washer 8/35/2,5	Always quote model and serial number of separating device
6	20	0217271134Z	Washer	Always quote model and serial number of separating device
1	12	3921149723 01	Vessel 100 l	Always quote model and serial number of separating device
1	12	3921145193 01	Vessel 180 l	Always quote model and serial number of separating device
1	12	KO05020PRP	Vessel wheel	Always quote model and serial number of separating device
-	-	E58052EXC2	Eccentric lock	Always quote model and serial number of separating device
3	14	17412BBDS	Compressed air unit with water separator	Always quote model and serial number of separating device
-	-	E381	Key of lock	Always quote model and serial number of separating device



When ordering spare parts please quote always device name, serial number, code of part, part name and quantity.

MAIN DATA LABELS FOR IDENTIFICATION

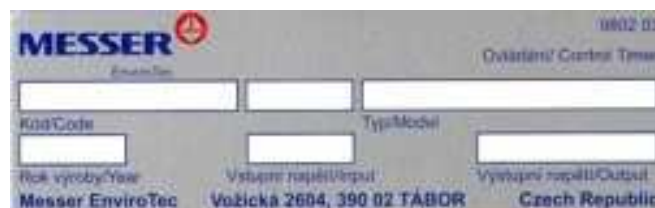
Each device is marked by all necessary warning, informative and data labels.



1. Switchboard
2. Compressed air connection
3. Separator label
4. Fan label
5. Control unit label
6. Switchboard label
7. Warning before the device start-up
8. CE
9. Warning against max. pressure



Separator label



Control unit label



Fan label

CONTACT ADDRESSES

Messer EnviroTec Ltd.

Vozicka Str. 2604

CZ-390 02 Tabor

Czech Republic

TRAINING OF OPERATOR

These workers were trained and acquainted with this manual:
