

User Manual

**Manure belt ventilation
[air mixer / radial fan]**

Code No. 99-97-1104

Edition: 09/2014 GB

These instructions are a translation of the original instructions!

Overview of changes / updates in the manual

Chapter name	Type of change / update	Product information / Editor's initials	Issue date	Page
Several chapters	Contents regarding the assembly of the air mixer/ radial fan removed and included in a separate manual.	<i>DLa</i>	09/2014	divers pages
6.2 "Cleaning"	Chapter on cleaning added	<i>DLa</i>	10/2013	50
Several chapters	Contents regarding free-wheeling radial impellers added	<i>DLa</i>	10/2013	divers pages



PRODUCT INFORMATION

New generation of centrifugal fans

The product range of centrifugal fans has been extended with a new fan.

This new version replaces, in particular, the centrifugal fan of the R3G series (see product information no. 1139).



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SIGNATORY RULES						
Regional product (only for one region) Name 1: Chief Engineer of BU (global) Name 2: Employee Customer Engineering (region)		International product (only more than one region) Name 1: Product Manager (global) Name 2: Employee Engineering (global or regional)		Products Central Technologies Name 1: Product Manager CT or 1-3 Product Manager(s) BU (global)* Name 2: Product Owner CT		
*only if there is no Product Manger CT in charge						

Centrifugal fans are often responsible for manure belt ventilation in alternative layer management systems. They are installed above the row under the ceiling of the house. This means that air is supplied centrally into the air duct to keep pressure losses low and to operate the fan in the most efficient way.

In traditional management systems, it might be more favourable to install local fans per row under specific circumstances instead of implementing a central solution.

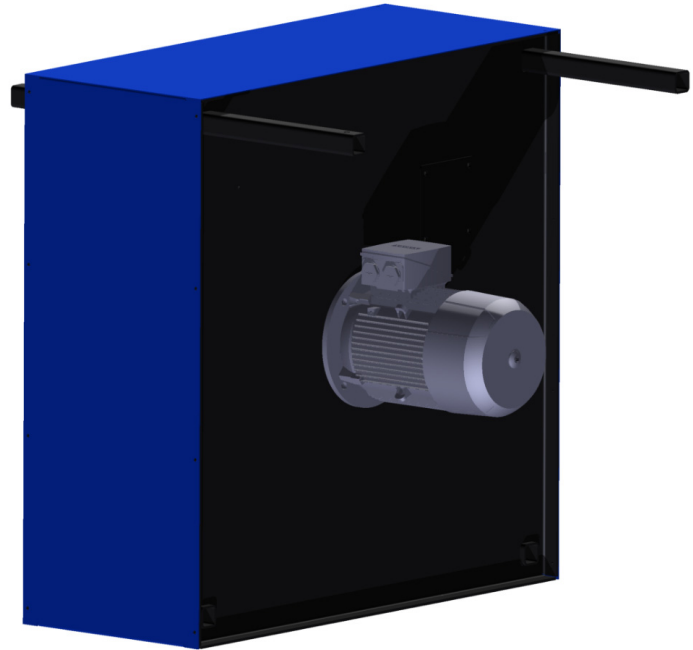
To keep up with this development, we have introduced a new series of centrifugal fans.

The main difference to the already known fans is the design of their housing.

The welded frame of the housing is made of metal plates and square tube profiles.

The very robust design allows flanging the motor directly to the housing, i.e. a complicated motor bracket is not required.

The housing is more insensitive to unwanted vibrations that can occur when dust and dirt collect on the propeller.



Like their predecessors, the fans of the new series must be cleaned at regular intervals to avoid reducing their service life. Big Dutchman recommends using the Vikon vibration control.

The fan suspension consists of four supports with integrated vibration damper, delivered with each fan as standard components.

If supplied from the factory, the fans are configured for blowing out air at the bottom side. The outlet duct for transfer to the round roller laminated tube must also be installed at the bottom of the housing.

Generally, the outlet position can be selected freely if conditions on site require this. The cover sheets of the housing are fastened by screws that easy to loosen so the sheets can be moved into the required position.

Coding

The centrifugal fans of the new type are available up to an output of 7,000 m³/h.

They have been coded under the following numbers:

Code no.	Description
60-54-4420	Centrifugal fan V17 1500 m ³ /h at 750 Pa 0.75 kW with outlet duct
60-54-4421	Centrifugal fan V17 2500 m ³ /h at 750 Pa 0.75 kW with outlet duct
60-54-4422	Centrifugal fan V17 3500 m ³ /h at 750 Pa 1.50 kW with outlet duct
60-54-4423	Centrifugal fan V17 5000 m ³ /h at 750 Pa 2.20 kW with outlet duct
60-54-4424	Centrifugal fan V17 7000 m ³ /h at 750 Pa 4.00 kW with outlet duct

The bill of materials comprises the centrifugal fan and the respective outlet duct.

Example:

Code no.	Quantity	Description
60-54-4420		Centrifugal fan V17 1500 m ³ /h at 750 Pa 0.75 kW with outlet duct
		consisting of:
60-54-4006	1	Centrifugal fan V17 1500 m ³ RH-25C.1R 0.75 kW without outlet duct
60-54-4450	1	Outlet duct 173x378mm sym onto ND300-250mm long galv. for centrifugal fan

Assembly

The new standard centrifugal fans are made for suspension from the ceiling or a respective construction. If conditions on site require installation on the floor, this is also possible. In this case, the fan must be turned and placed on the square tube profiles. In addition, vibration dampers are indispensable for floor installation.

Discontinuation of centrifugal fans type R3G

Centrifugal fans of type R3G will be closed down.

They are replaced by the centrifugal fans described in this product information if a local configuration of manure belt ventilation is planned.



Product information



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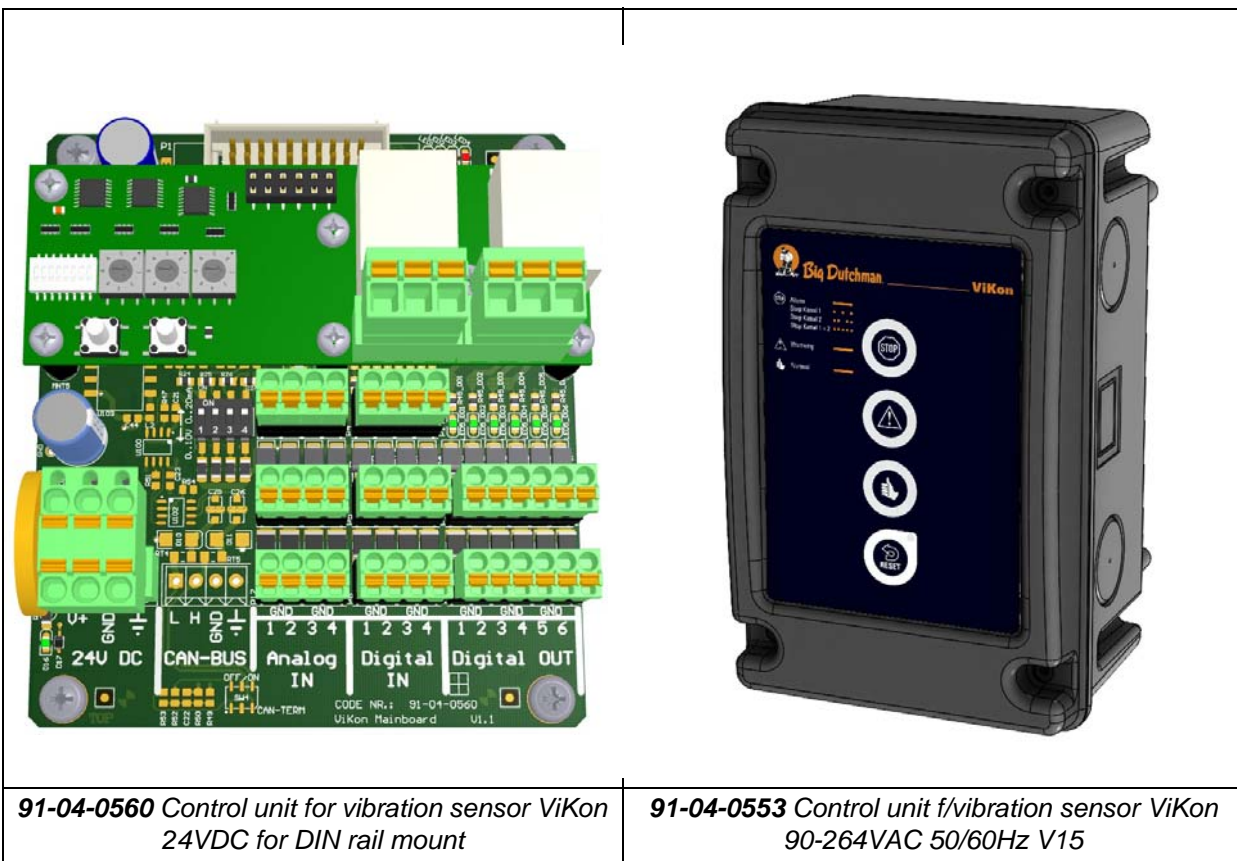
Control for Vikon V15 vibration sensor

With the vibration sensor and the adequate control unit it can be monitored whether the vibration velocity of the radial blower is within the tolerance or if the device has to be cleaned in order to prevent consequential damages.

For the reduction of such costs and to improve the product quality, the successor has been developed. It is characterized by a slightly lower unit price as well as a housing which is easier to service.

Furthermore, two sensor inputs are combined in one group where the respective higher measured value is proceeded by the control. This way, up to four motors can be monitored with one control unit.

The device will be available both in the DIN-rail mount for the installation in the control cabinet and as "stand-alone"-version in the plastic housing. The touch-sensor field as well as translucent LED-rings in the cover replace conventional keys and indicator lamps so that an even and easy-to-clean surface is given.



Available spare parts for 91-04-0553:

Code no.	Description
91-04-0560	Control unit for vibration sensor ViKon 24VDC for DIN rail mount
91-04-0561	Cover board for vibration sensor Vikon
91-00-2768	Power supply 24VDC 1.25A SPM 3-24/1

The following Passend für alle Steuerungen ist der Schwingungssensor:

Code no.	Description
91-04-0550	Vibration sensor 0-16mm/s 10-1000Hz 0-10V/4-20mA

The currently valid manual is available in the Infothek.

Code no.	Description
99-97-7281	Manual D: Control for vibration sensor ViKon / TM

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1 Basic instructions

**Important:**

Please take care of these documents and keep them close to the system **at all times for quick reference.**

All persons operating, maintaining and cleaning this system have to be familiar with the contents of these instructions.

Observe these security instructions whenever any work is carried out on this system!

Manuals can be reordered from **Big Dutchman** when necessary.

One of the following information is required to reorder a manual:

- the 8-digit code number of your language version [99-97-xxxx] as stated on your manual's cover;
- the complete title of the manual including information on the type of instruction;
- if stated, the 8-digit universal code number [99-94-xxxx] including information on the required language version.

1.1 EC declaration of conformity

We hereby declare that the system described in this manual corresponds to the relevant health and safety requirements according to the EC directive because of its design and construction as introduced to the market by us.

The declaration of conformity can be found at the beginning of the manual.

1.2 Purpose of the BD manuals

Depending on the intended use, **Big Dutchman** provides the following documentation:

1. Assembly manual
2. User manual
3. Operation manual (assembly and use of the system)
4. Spare parts lists
5. "Local add-on manuals": (for products which differ from those of the original manual in specific countries).

The type of instruction of your manual can be found on the cover above the title.

1.3 Basics

The **Big Dutchman** system has been built with state-of-the-art technology and meets the recognized technical safety requirements. The system is reliable. Upon operation, however, dangers to life and limb of the user or third persons or impairments of the system or other material property are still possible.

The system may only be operated, maintained and repaired

- in accordance with its designated use;
- in an excellent state from the safety and technical point of view;
- by persons who are familiar with the safety regulations.

Should specific problems occur which are not described in detail in these documents, we recommend you contact us for your own safety.


1.4 Explanation of the symbols and structure of these instructions

1.4.1 Structure of the safety instructions in this manual

Basic structure:


Pictograph	Type of danger
	Possible consequence(s) of non-compliance
Signal word	• Measure(s) against the danger

Meaning of the signal words:

Pictograph	Signal word	Meaning	Consequences of non-compliance
Possible personal injuries:			
possible safety symbols: see chapter 1.4.2	DANGER	directly dangerous situation	Will lead to death or severe injuries.
	WARNING	possibly dangerous situation	May lead to death or severe injuries.
	CAUTION	possibly dangerous situation	May lead to minor injuries.
Possible damage to property:			
	CAUTION		May lead to damage to property

1.4.2 Special safety symbols in the manual and on the system

These safety symbols (pictographs) illustrate remaining dangers when handling the system. They are used in the safety instructions of this manual (also refer to chapter 1.4.1) and on the system.

	Warning: general danger
---	-------------------------



Warning: dangerous electric tension



Warning against reaching into an automatically starting fan.



CAUTION

Safety symbols and instructions on the system must always be easily visible and undamaged.

- If they are soiled by dust, manure, feed remains, oil or grease, clean them with a water-detergent mixture.
- Damaged, lost, or unreadable safety symbols have to be replaced immediately.
- If a safety symbol or instruction is fixed to a part to be replaced, ensure that it will be fixed to the new part as well.

1.4.3 Structure of the general instructions in the manual




IMPORTANT!

This symbol indicates important information. There is no risk of personal injuries or damage to property.

1.5 Necessary qualifications of the persons working with the system

1.5.1 Employing external personnel

	<p>IMPORTANT: The supervisor is responsible for the safety of external personnel.</p>
---	--

Maintenance and repair works are frequently carried out by external personnel not familiar with the circumstances specific for the system and the inherent dangers.

You as operator are to survey the personnel and to define responsibilities and powers. Inform these people in detail on the dangers of their area of work. Check their method of working and intervene as soon as possible.

1.5.2 Operation of the system

The system may only be operated by persons who are competent and can guarantee proper handling due to special training or knowledge and practical experience with the system. The system operator or owner has the sole power of decision.

1.5.3 Maintenance and repairs

Maintenance and repair works may only be carried out by persons who are competent and can guarantee proper handling due to special training or knowledge and practical experience with the system. The system operator or owner has the sole power of decision.

1.5.4 Electrical installation

Work on the electric components may only be carried out by technically skilled personnel and according to German Industry Standards, VDE regulations, safety instructions and electro-technical regulations of the power supply industry (EVU) and the applicable national regulations.

1.6 Obligations

Closely adhere to the instructions in this manual.


A basic condition for safe operation and trouble-free handling of this system is the knowledge of the basic safety instructions and regulations.

This manual, particularly the safety instructions, must be observed by all persons working on this system. Moreover, the regulations and instructions for the prevention of accidents valid at the respective place of use have to be observed.

The manufacturer is not responsible for any damage to the system resulting from changes not authorized by **Big Dutchman**.

1.7 Ordering of spare parts

The exact description of the spare parts to be ordered can be found by means of the position no. in the spare parts list.

	Risk of injury and danger to life
	Operational safety is of paramount importance! Spare parts not released or recommended by Big Dutchman can cause severe injuries as their suitability for Big Dutchman systems cannot be assessed beforehand. <ul style="list-style-type: none"> • Only use spare parts released or recommended by Big Dutchman for your own safety.
WARNING	

Indicate the following when ordering spare parts:

- Code no. and description of the spare part or
Position no. including description and manual number in case of parts that are not encoded;
- Invoice number of the original delivery;
- Current supply, e.g. 230/400 V – 3 Ph – 50/60 Hz.

1.8 Warranty and liability

Warranty and liability claims regarding personal injury or property damage are excluded if they result from one or several of the following causes:

- non-designated use of the system;
- improper operation of the system;
- operating the system with defective safety equipment or not duly fixed or not functioning safety and protective devices;
- non-compliance with the instructions in this manual regarding maintenance and upgrading of the system;
- unauthorized modifications to the system;
- improper repairs;
- disasters caused by foreign matter or force majeure.

1.9 Faults and power failures

We recommend the installation of alarm systems for a better control of your production units or the use of an automatic emergency battery system for supplying the system with power in case of a power failure. This will protect your animals and thus your own economic health.

To ensure that the control unit completes all started process steps correctly and shuts down properly in case of a power failure, we recommend the use of a UPS (uninterruptible power supply).

1.10 First aid

In the case of an accident, a first-aid kit must always be available at the place of work, unless otherwise specified. Material taken out and used is to be replaced immediately.

If you need help, describe the accident as follows:

- where it happened
- what happened
- the number of persons injured
- what type of injury
- who is reporting the accident.

1.11 Notes for use

In the interest of further development, we reserve the right to modify design and technical data of this installation.

No claims can therefore be derived from any information, illustration or drawing and description contained herein. Errors and omissions excepted!

Inform yourself about adjusting, operating and maintenance requirements before putting the system into operation.

Apart from the safety information in this manual and the obligatory accident prevention regulations applicable in the user's country, please heed the accepted technical rules (safe and expert working in accordance with UVV, VBG, VDE etc.).

1.12 Pollution abatement regulations

All works on and with the installation have to be carried out in compliance with the legal requirements concerning waste prevention and proper recycling / disposal of waste.

Special care has to be taken when carrying out installation, repair and maintenance works, as water pollutants like lubricating grease and oils as well as solvent-containing cleaning solutions may not pollute the soil or reach the canalisation! These materials have to be kept, transported, collected and disposed of in appropriate containers!

1.13 Waste disposal

After repairing the system, dispose of the packing material and remains which cannot be used further according to the legal provisions for recycling.

The same applies to the component parts after putting the installation out of service.

1.14 Copyright

This manual is copyrighted. The information and drawings included in this manual shall not be copied without the manufacturer's consent, nor shall they be misused or be disclosed to third parties.

The contents of this manual can be altered without prior notice.

If you find mistakes or unclear information in this manual, please do not hesitate to let us know.

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2 Safety instructions

2.1 Instructions on accident prevention


Before operating, cleaning, maintaining or disassembling this system, the operator or person authorized by him is obliged to instruct any person carrying out any of these works on

- the remaining dangers when carrying out these tasks
- the applicable rules and regulations regarding accident prevention and to ensure they are complied with!

The basis for these are:

- the installation's technical documentation, specifically the included safety instructions,
- the applicable safety and health regulations applicable at the place of work.

2.2 General safety instructions

	Risk of injury
	<p>Children in the area of the system are at risk of injury as they can often not be supervised sufficiently and are not able to recognize hazards.</p> <ul style="list-style-type: none"> • Ensure that children do not use the system as a playground and are not left unsupervised in the vicinity of the system. Explain remaining dangers fully to the children.
WARNING	

The respective safety precautions and other generally accepted regulations regarding safety and operational health have to be observed.

Please check safety and function control devices to ensure safe and accurate operation

- before taking the system into operation
- in adequate intervals (confer maintenance intervals)
- after modifications or repairs.
- before re-starting the system

Check the proper functioning of the system after any kind of repair works. You may only put the device into operation when all protective systems have been put into place again.

Also observe the regulations of local water distribution and power supply companies.


2.3 Personal safety instructions

These safety instructions are intended to make you familiar with important information on the handling of the system. They are important for your safety and for the safety of the system.


The farm staff has to familiarize itself with the function and arrangement of the safety devices, in particular of the emergency stop button.

The farm staff has to regularly participate in health and safety briefings (according to the provisions e.g. by trade associations).


Maintenance works may only be carried out by specially trained personnel.

 WARNING	Risk of injury
	<p>Lack of knowledge about the structural design of the system can lead to injury.</p> <ul style="list-style-type: none"> • Make yourself familiar with the design and construction of the system under sufficient lighting! • Inform yourself as responsible person for the system and your employees about the remaining dangers in connection with this system!

Personal protective equipment and measures



 WARNING	Risk of injury
	<p>The following instructions apply to all works carried out on the system.</p> <ul style="list-style-type: none"> • Wear close-fitting protective clothing and protective footwear. • Use protective gloves where there is a risk of hand injuries and safety goggles where there is a risk of eye injuries. • Do not wear any rings, necklaces, watches, scarves, ties or other items which could get caught in parts of the system. • Make sure that long hair is always tied back. Hair can get caught in powered or rotating working units or parts of the installation, resulting in severe injuries. • When working underneath the installation always wear a hard hat!

2.4 Initial operation


	The following must be strictly observed for initial operation:
CAUTION	<ul style="list-style-type: none"> Initial operation must be carried out by a qualified technician with the respective proof of knowledge (service technician). The following protocols and minutes required by Big Dutchman must be filled out during initial operation and made available to the operator: confirmation minutes and, if necessary, the corresponding inspection minutes.

2.5 Use of electrical appliances

You as the person responsible for the system or his agent have to ensure that the system with its electrical appliances is operated and maintained according to the local electro-technical regulations.

	Risk of injury and danger to life
	Dangerous electric tension may be bare in the case of open control units and may cause severe injuries or lead to death!
WARNING	<ul style="list-style-type: none"> Be aware of the danger and keep workers of other professions away from the danger zone. Installations and works on electric components/building units may only be carried out by qualified persons according to electro-technical regulations (e.g. EN 60204, DIN VDE 0100/0113/0160).

- Immediately switch off the system in the event of malfunctions of the power supply units. Check that the electrical equipment is not alive.
- Check the electrical wiring and cables for recognisable damage before putting the system into operation again. Replace damaged wiring and cables before taking the system into operation.
- Only use the fuses indicated in the circuit diagram.


	Danger of short circuits
	<p>Never repair or shut defective fuses.</p> <ul style="list-style-type: none"> Defective fuses should be replaced by new ones immediately.
WARNING	

- Never cover an electrical motor. This can cause high temperatures resulting in fires and the destruction of the equipment.
- Always keep the control cabinet and all terminal and connection boxes of the system locked.
- Damaged or broken plugs should be immediately replaced by an electrician.
- Do not pull the plug from the socket at the flexible cable.
- For the respective connections please see the enclosed connecting plan of the system parts delivered.

2.6 Special safety instructions


2.6.1 Danger zones


The individual zones of the **Big Dutchman** system are constructed differently. There are several ejecting, rotating or sliding parts that might be a risk if you are not familiar with their type of construction.


	Risk of injury
	<p>Lack of knowledge regarding the system's type of construction increases the risk of injury.</p> <ul style="list-style-type: none"> Never reach into the running system. First stop the system and secure it against an inadvertent restart. Assure yourself before reaching into the system that the main switch is in the OFF position and cannot be put in the ON position without your knowledge.
WARNING	


The system has been equipped with all mechanisms that guarantee a safe operation. In places where the danger zone could not be safeguarded totally, in consideration of the operational reliability, safety signs have been placed. They indicate remaining technical dangers when handling the system and give information on how to avoid these dangers.

For your safety, the following safety symbols have been fixed to the system. Please make yourself familiar with the meaning of these systems. The following explanatory notes will provide you with detailed information.

	<p>GENERAL DANGER!</p> <p>System starts working automatically. Before starting any repair, maintenance or cleaning works, put main switch to "OFF"!</p>
---	--

	<p>DANGER OF CRUSHING due to rotating machine parts!</p> <p>Always lock and secure the safety devices before starting up the system. Protective devices may only be opened by authorized persons, when the system is idle.</p>
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	<p>GENERAL DANGER!</p> <p>Read the manual.</p>
---	---

 <p>CAUTION</p>	<p>Safety symbols and instructions on the system must always be easily visible and undamaged.</p> <ul style="list-style-type: none"> • If they are soiled by dust, manure, feed remains, oil or grease, clean them with a water-detergent mixture. • Damaged, lost, or unreadable safety symbols have to be replaced immediately. • If a safety symbol or instruction is fixed to a part to be replaced, ensure that it will be fixed to the new part as well.
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2.6.2 Entire system

Only use suitable tools and observe the local accident prevention regulations.

Ensure that the system is switched off before performing any service, repair or cleaning work or rectification of functional defects. Disconnect the system from the power supply and secure it against reactivation.


Protect the system by means of a sign fixed to the main switch reading "Do not put into operation!". Refer to maintenance works if necessary.

After any maintenance and repair works, check the proper functioning of the system.


	Risk of injury
	Parts lying about on the system and in its vicinity can cause persons to stumble and/or fall and thus risk injuring themselves by contact with system components.
WARNING	<p>Lack of knowledge about the structural design of the system can lead to injury.</p> <p>Party lying about in or on the components can lead to serious damage of the system.</p> <ul style="list-style-type: none"> • Never deposit objects (e.g. spare parts, replaced parts, tools, cleaning tools etc.) in the accessible areas of the system or in the surrounding areas have having carried out works on the system! • Make yourself familiar with the design and construction of the system under sufficient lighting! If this is not possible, inform yourself about any remaining dangers in connection with this system! • Before restarting the system, assure yourself that all loose or replaced parts have been removed from the system components! • The device may only be put into operation after all protective systems have been put into place again and are functioning.

2.6.3 Individual parts

2.6.3.1 Ventilation

	Risk of automatically starting fan
	<p>Fans might turn on suddenly and unexpectedly as they are controlled automatically. This can cause severe injuries!</p> <ul style="list-style-type: none"> • Never reach through the wire mesh guard or lamellar flaps into a fan, not even if it is not running. • Before performing any repair or maintenance work, turn the main switch to "Off" and display a sign warning that repair or maintenance work is in progress!
WARNING	

2.6.3.2 Electrical components

	Risk of electric shocks and short circuits
	<p>Live parts may be bare while different kinds of work are carried out. Touching live parts might lead to injuries caused by electric shock and short circuits.</p> <ul style="list-style-type: none"> • Before performing any repair or maintenance work, turn the main switch to "OFF" and display a sign warning that repair or maintenance work is in progress! • Never touch bare electrical components. Equipment with bare electrical components must not be used by the farm staff.
WARNING	

2.7 Dangers resulting from non-compliance with the safety instructions

Lack of compliance with these instructions can cause severe danger to personal life and limb and damage the environment or the installation and may lead to the forfeiture of any damage claims. The non-compliance with these instructions can specifically lead to:

- failure of vital functions of the system,
- failure of prescribed maintenance methods,
- risk of injury due to electrical, mechanical and chemical influences.

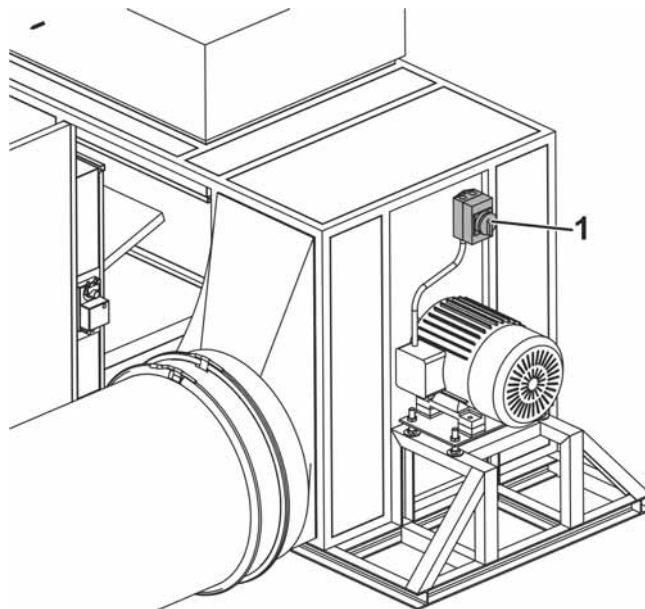
2.8 Overview of the safety components



The system described in this manual may only be operated if the listed safety component parts have been mounted and installed correctly and have been checked for correct functioning!

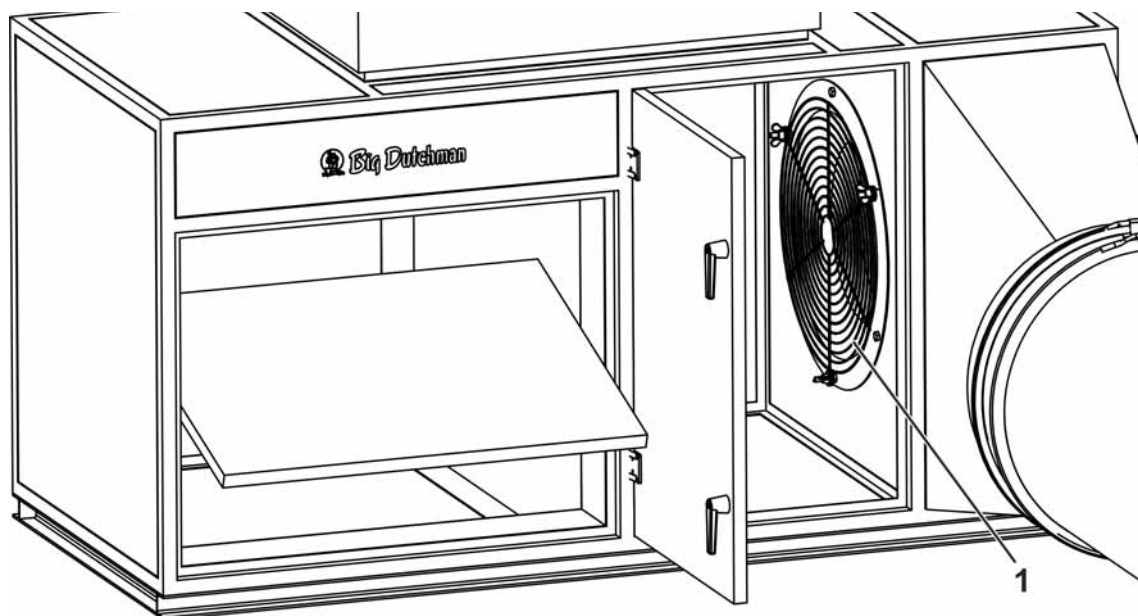
If safety component parts are missing or defective, the original part must be ordered from **Big Dutchman** and replaced immediately!

2.8.1 Repair switch



Pos.	Code no.	Description
1	91-00-2894	Switch repairing -4kW 3Ph T02-1/I1/SVB caparison IP 65
	91-00-2895	Switch repairing -11kW 6Ph T03-3-8342/I2/SVB caparison IP 65
	91-00-2896	Switch repairing -22kW 6Ph T5B-3-8342/I4/SVB caparison IP 65

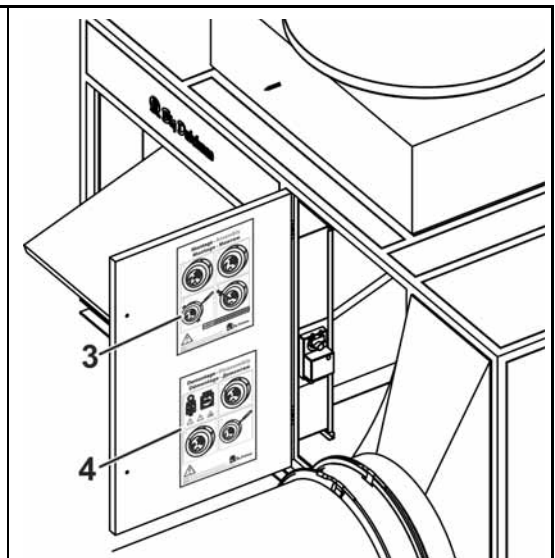
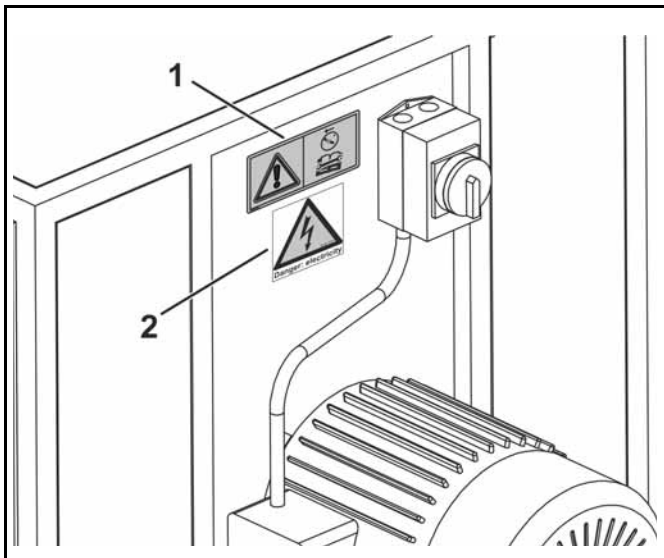
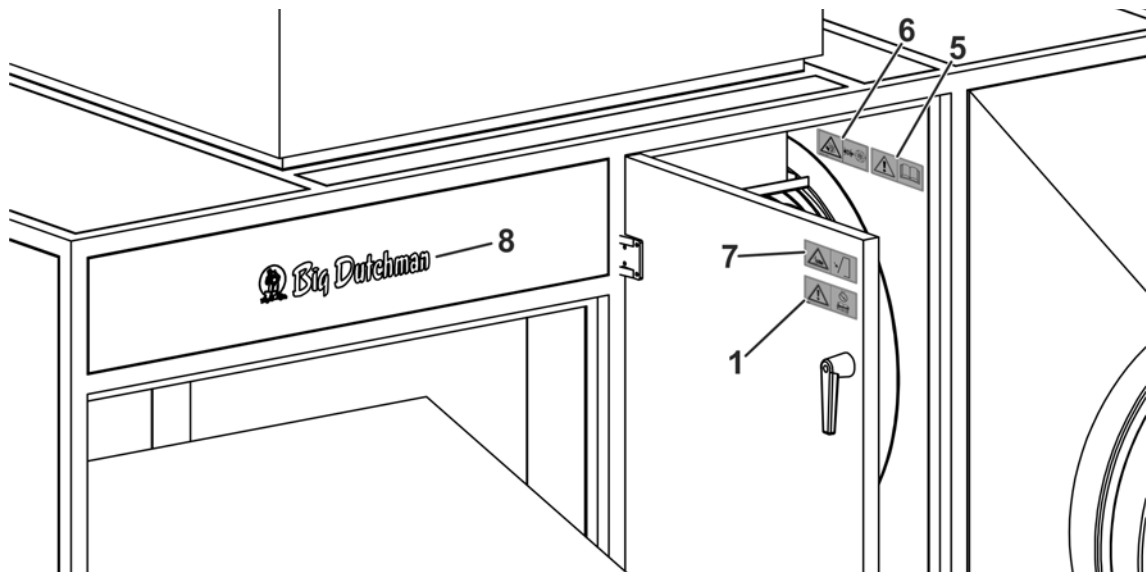
2.8.2 Wire mesh guard




Pos.	Code no.	Description
1	60-54-4040	Wire mesh guard RH71C.1R
	60-54-4043	Wire mesh guard RH71C.3R
	60-54-4046	Wire mesh guard RH63C.2R
	60-54-4049	Wire mesh guard RH63C.1R
	60-54-4052	Wire mesh guard RH50C.2R
	60-54-4055	Wire mesh guard RH56C.3R
	60-54-4058	Wire mesh guard RH56C.1R
	60-54-4061	Wire mesh guard RH56C.2R
	60-54-4064	Wire mesh guard RH63C.3R
	60-54-4173	Wire mesh guard RH22C
	60-54-4175	Wire mesh guard RH28C
	60-54-4176	Wire mesh guard RH31C
	60-54-4190	Wire mesh guard

2.9 Overview of safety symbols and hazard warnings on the system

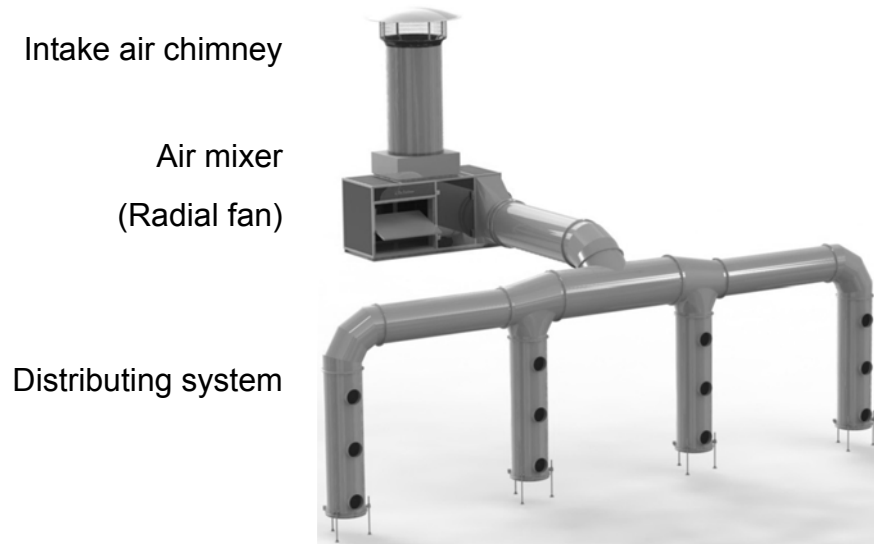
Pos.	Code no.	Description
1	00-00-1186	Pictograph: Before maintenance work main switch "OFF"
2	00-00-1323	Pictograph GB: Danger electricity
3	00-00-1325	Sticker D/GB/F/RUS: Assembly - free-wheeling impeller
4	00-00-1326	Sticker D/GB/F/RUS: Dismantling - free-wheeling impeller
5	00-00-1240	Pictograph: General danger W09 / Read the Manual
6	00-00-1497	Pictograph: Do not reach into fan
7	00-00-1225	Pictograph: Danger of injury of hand W23/door resp. flap
8	00-00-1208	Type plate: Big Dutchman 300 mm x 185 mm



 CAUTION	<p>Safety symbols and instructions on the system must always be easily visible and undamaged.</p> <ul style="list-style-type: none"> • If they are soiled by dust, manure, feed remains, oil or grease, clean them with a water-detergent mixture. • Damaged, lost, or unreadable safety symbols have to be replaced immediately. • If a safety symbol or instruction is fixed to a part to be replaced, ensure that it will be fixed to the new part as well.
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3 System description

3.1 Overview



With the manure belt ventilation, the manure can be dried quickly and efficiently and thus, the ammonia content in the house can be significantly reduced. Besides, the hens are supplied with fresh air via the air ducts.

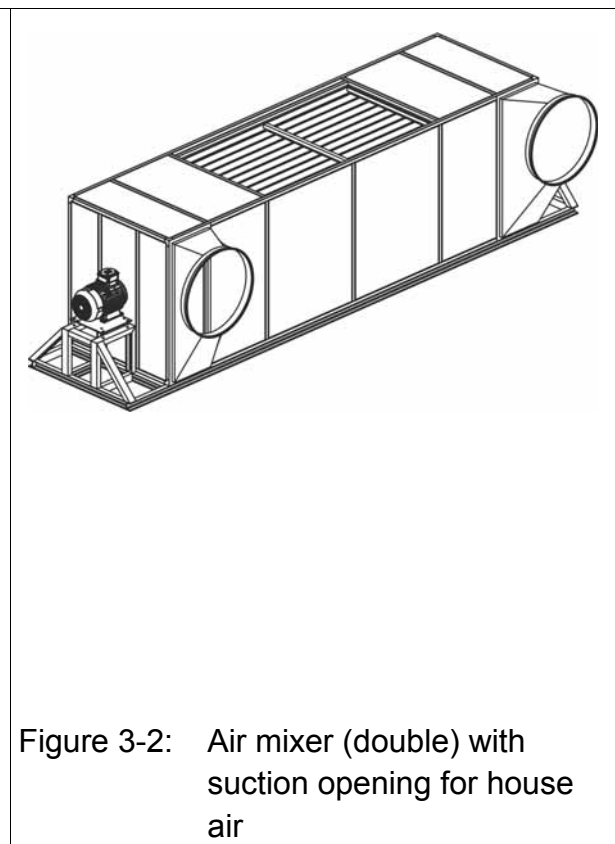
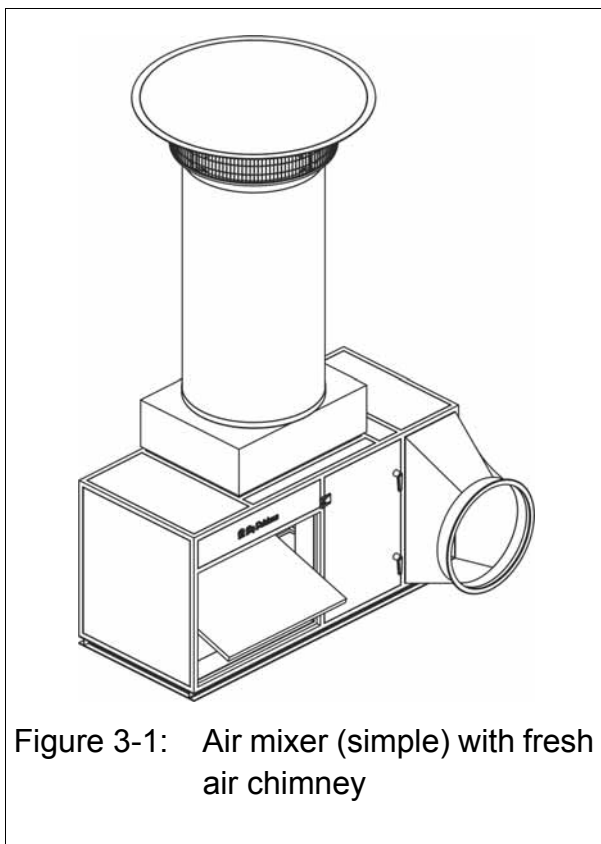
The distributing system leads the air from the air mixer or radial fan to the air ducts below the cage rows. A distributing system always consists of at least one starter set, a main distributor and vertical distributors.

3.1.1 Air mixer

The air mixer is an aggregate which can mix fresh air and house air. An integrated radial fan suck the fresh air and warm house air each through a shutter flap and blows in the two mixed air streams into the air ducts.

An air mixer permits the realisation of an ideal basic ventilation at any time of the year. Based on the temperature requirements the house is supplied with fresh air, mixed air or circulating air. Fresh air and house air are mixed in the mixing chamber of the air mixer according to the desired duct temperature.

A programmable minimum opening of the outside air flap guarantees that a certain part of fresh air is always contained in the intake air.



As option, an automatic filter can also be supplied for the air mixer.

3.1.1.1 Control unit

The standard version of the air mixer (without automatic filters) is controlled by the AMC computer. It can control up to two air mixers within one house.

The complete control unit comprises the transformers for the servomotors of shutter flaps, temperature probes and the computer with a supply voltage of 230V, 50Hz:

- 60-50-3004 Control box AMC for 1 air mixer
- 60-50-3005 Control box AMC for 2 air mixers

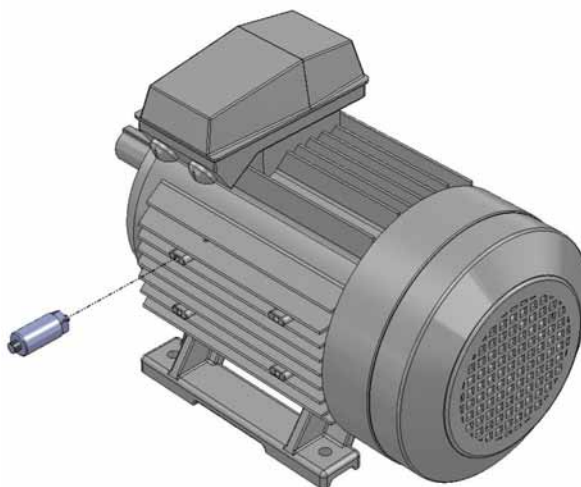
3.1.1.2 Monitoring air mixer

Severe and uneven contamination on the impeller of the radial fan can result in severe drive vibration. This can in turn cause damage to the bearings.

With the vibration sensor and the corresponding control unit it can be checked whether the vibration velocity of the radial fan is within a tolerance range or whether the device can be cleaned to avoid consequential damages.

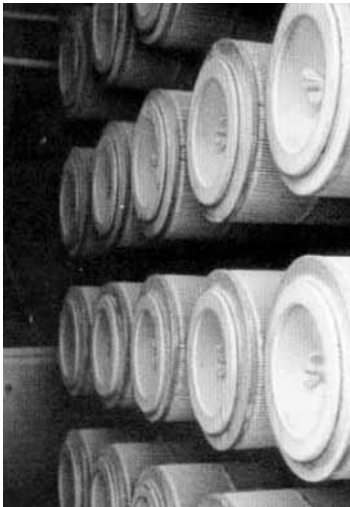
The monitoring consists of a control unit and a vibration sensor. The vibration sensor is screwed into a prefabricated thread on the motor. The following illustration shows the position of the sensor on the motor.

The following vibration sensor is appropriate for all control units:



- 91-04-0550 Vibration sensor 0-16 mm/s 10 - 1000 Hz 0-10V / 4-20mA

3.1.1.3 Automatic filter for air mixer (option)



The highly efficient filter cartridges are automatically cleaned when covered with dust. The cylindrical and conical cartridges are fixed by means of horizontal guiding rails, which are fastened to a vertical steel plate. On the back of this steel plate, one solenoid valve is located in the centre of each cartridge filter. During normal operation of the filter, the dirty air (untreated gas) flows through the cartridges into the clean gas space. Each filter cartridge is designed for a volume flow of up to 1,600 m³/h with a pressure difference of 150 to 300 Pa.

Figure 3-3: Filters in operation (untreated gas side => 9 "Glossary")



Dedusting by means of compressed air:

The filter cartridges are continuously charged with dust so that they have to be cleaned in certain intervals. These intervals are mainly depending on the dust concentration in the house air and can thus vary. Generally, we recommend cleaning twice a day for 10 minutes each.

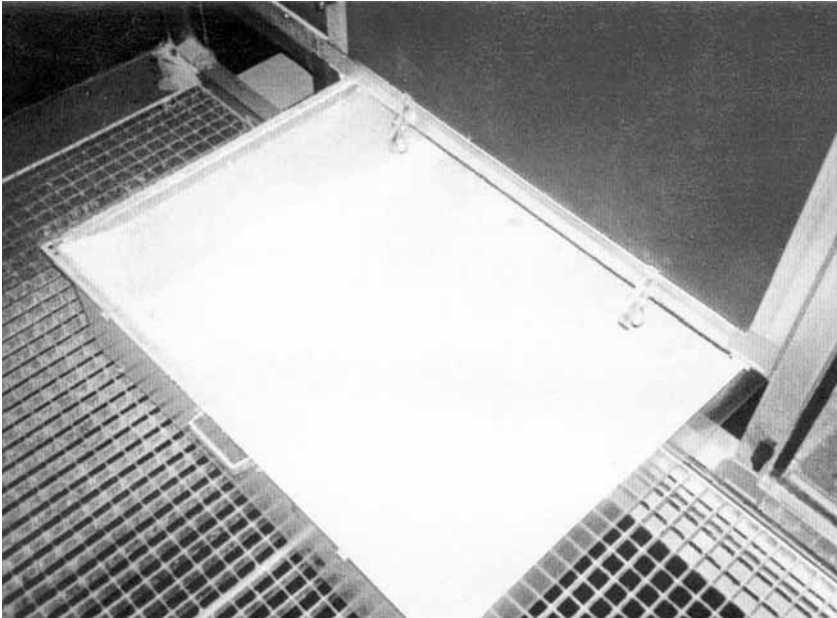
Figure 3-4: Positioning of the solenoid valves (clean gas side => 9 "Glossary")

In case of automatic filter dedusting, one diaphragm valve is opened after the other by means of blowing an air blast with a pressure of 6 bar into the cartridge. It is started in the upper row. The dust removed drops down on the filters located below. These are cleaned next. The dust collected on the cartridge is blown off with high energy.

The compressor has to transport approx. 60 litres of air per air pulse. There should be a break of approx. 30 seconds between the individual air pulses, in order to enable the compressor to recharge.

Efficiency:

At an air rate of 1,600 m³/h, the air speed through the filter means amounts to 0.016 m/s. Together with the ULTRAWEB filter means this created a pure surface filtration (=> 9 "Glossary"). The dust particles collected on the surface can thus be removed very easily by means of the compressed air pulses.



The larger dust particles drop down and can be collected for example in a drawer. If a drawer is used, this has to be emptied regularly.

Figure 3-5: Drawer for collecting removed dust particles

The service life of the filter cartridges depends on the kind of application and lies between four and ten years.

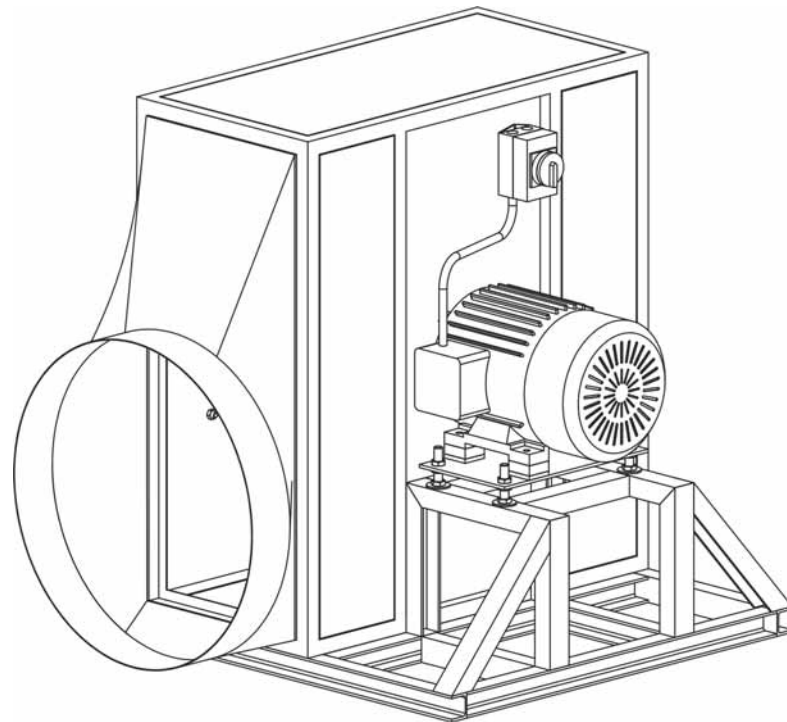
The separating capacity amounts to 99.97% with 0.3 µm according to ASHRAE RP 531 (=> 9 "Glossary").

Solenoid valves:

The impulse solenoid valves are specifically designed for use in dedusting systems. They have a high passage rate as well as a long service life and they open and close extremely fast. They are therefore reliable and economical during operation. Integrated sound absorbers ensure low-noise operation of the valves and prevent foreign matter from intruding into the valve.

3.1.2 Centrifugal fan

Alternatively, the radial fans can also be used without air mixer.



With the radial fan, house air is blown into the air ducts of the system either directly or through foil hoses.

Radial fans can be equipped with a fresh air chimney to mix fresh air and house air.

3.2 Technical data

3.2.1 Air mixer

During its operation, the Big Dutchman air mixer creates a sound level <80 dB (A).

Air capacity with 750Pa [m³/h]	Type of air mixer	Flap / Shutter	Number of fans	Outlet-Ø [mm]	P _{shaft} [kW]	U [V]	I [A]	L [mm]	W [mm]	H [mm]	Weight including chimney cowl [kg]	Impeller	Clamping bush	Electric motor	Actuator
2500	C	K	1	300	0.75	3~ 230/400	1.5	1078	520	570	130	RH28C 60-54-4175	1210/19	60-54-4183	SM24A-SR 60-48-3427
3000	D	J	1	400	1.10	3~ 230/400	2.22	1239	700	700	155	RH31C 60-54-4176	1210/19	60-54-4184	SM24A-SR 60-48-3427
5000	J	K	1	500	2.20	3~ 230/400	4.7	2152	800	850	420	RH50C1R 60-54-4051	2012/28	60-54-4066	SM24A-SR 60-48-3427
7000	K	K	1	500	3.00	3~ 230/400	6.4	2324	900	950	525	RH56C3R 60-54-4067	2012/28	60-54-4067	SM24A-SR 60-48-3427
9000	K	K	1	630	4.00	3~ 400/690	8.2	2500	1000	1050	500	RH56C1R 60-54-4057	2012/28	60-54-4068	SM24A-SR 60-48-3427
11000	K	K	1	630	5.50	3~ 400/690	11.4	2500	1000	1050	520	RH56C2R 60-54-4060	2012/38	60-54-4069	SM24A-SR 60-48-3427
13000	L	K	1	630	5.50	3~ 400/690	11.4	2500	1050	1050	417	RH63C3R 60-54-4063	2517/38	60-54-4069	SM24A-SR 60-48-3427
15000	L	K	1	630	7.50	3~ 400/690	15.2	2452	1050	1000	600	RH63C1R 60-54-4050	2517/38	60-54-4070	SM24A-SR 60-48-3427
18000	M	J	1	710	7.50	3~ 400/690	15.2	2382	1100	1110	520	RH63C2R 60-54-4047	2517/42	60-54-4070	SM24A-SR 60-48-3427
18000	M	K	2	630	4.00	3~ 400/690	8.2	4208	850	1050	925	RH56C1R 60-54-4057	2012/28	60-54-4068	SM24A-SR 60-48-3427
22000	M	J	1	710	11.00	3~ 400/690	21.5	2527	1200	1210	650	RH71C1R 60-54-4041	2517/42	60-54-4071	GM24A-SR 60-48-3432
22000	M	K	2	630	5.50	3~ 400/690	11.4	4208	850	1050	870	RH56C2R 60-54-4060	2012/38	60-54-4069	GM24A-SR 60-48-3432
26000	N	J	1	800	15.00	3~ 400/690	28.5	2627	1200	1160	671	RH71C2R 60-54-4038	2517/42	60-54-4072	GM24A-SR 60-48-3432
26000	N	K	2	630	5.50	3~ 400/690	11.4	4680	1050	1150	880	RH63C3R 60-54-4063	2517/38	60-54-4069	GM24A-SR 60-48-3432
31000	N	K	2	630	7.50	3~ 400/690	15.2	4806	1050	1200	938	RH63C1R 60-54-4050	2012/38	60-54-4070	GM24A-SR 60-48-3432
35000	O	J	2	710	7.50	3~ 400/690	15.2	4880	1100	1315	1350	RH63C2R 60-54-4047	2517/38	60-54-4070	GM24A-SR 60-48-3432
40000	O	J	2	710	11.00	3~ 400/690	21.5	5074	1200	1250	1110	RH71C3R 60-54-4044	2517/42	60-54-4071	GM24A-SR 60-48-3432
44000	P	J	2	710	11.00	3~ 400/690	21.5	4360	1270	1645	1400	RH71C1R 60-54-4041	2517/42	60-54-4071	GM24A-SR 60-48-3432
Identification				Technical data								Spare parts			

In case of special constructions, the technical data can be found on the respective type plate.

3.2.2 Centrifugal fan

	Technical data										Spare parts		Safety component parts				
Code no.																	
Air capacity	500	1500	2500	3500	5000	7000	9000	11000	13000	15000	18000	22000	26000	31000			
Outlet-Ø [mm]	300	300	300	400	500	500	500	630	630	630	630	710	800	800			
P _{shaft} [kW]	0.55	0.75	0.75	1.10	2.20	3.00	4.00	5.50	5.50	7.50	7.50	11.00	15.00	15.00			
U [V]	3~230/400	3~230/400	3~230/400	3~230/400	3~230/400	3~230/400	3~400/690	3~400/690	3~400/690	3~400/690	3~400/690	3~400/690	3~400/690	3~400/690			
I [A]	1.4	1.9	1.9	2.6	4.7	6.4	8.2	11.4	11.4	15.2	15.2	21.5	28.5	28.5			
L [mm]	206	223	239	259	282	1000	1000	1000	1000	1050	1050	1120	1120	1120			
W [mm]	350	500	500	500	600	800	800	800	800	912	910	1120	1120	1120			
H [mm]	356	500	500	500	600	1050	1050	1050	1050	1100	1100	1550	1550	1550			
Weight (kg)	35	60	60	60	80	240	240	240	240	252	268	500	500	500			
Impeller	60-54-4177	60-54-4179	60-54-4179	60-54-4180	60-54-4051	60-54-4054	60-54-4057	60-54-4060	60-54-4063	60-54-4050	60-54-4047	60-54-4188	60-54-4187	60-54-4189			
Clamping bush	1210/14	1210/14	1210/19	1210/19	2012/28	2012/28	2012/28	2012/38	2517/38	2517/38	2517/42	3020/42	3020/48	3020/48			
Electric motor	60-54-4182	60-54-4173	60-54-4183	60-54-4184	60-54-4186	60-54-4067	60-54-4068	60-54-4069	60-54-4069	60-54-4070	60-54-4070	60-54-4191	60-54-4192	60-54-4192			
Wire mesh guard	60-54-4173	60-54-4175	60-54-4175	60-54-4176	60-54-4052	60-54-4055	60-54-4058	60-54-4061	60-54-4064	60-54-4049	60-54-4046	60-54-4190	60-54-4190	60-54-4190			
Repair switch	91-00-2894	91-00-2894	91-00-2894	91-00-2894	91-00-2894	91-00-2894	91-00-2894	91-00-2895	91-00-2895	91-00-2895	91-00-2895	91-00-2895	91-00-2896	91-00-2896			

3.2.3 Control unit for air mixer (AMC)

Electrical

Electric power supply:	230 V AC $\pm 10\%$, 50/60 Hz
Power consumption:	12 VA maximum
Main fuse:	T 4 A (dim. 5 x 20 mm)
Control current fuse:	T 800 mA (dim. 5 x 20 mm)

Analogue inputs

Temperature sensor (PTC):	-25 °C to +95 °C, ± 0.5 °C
0....5 V:	0-5 V ($R_i = \infty$ W)

Digital inputs

Input cooling:	NPN sensor / maximum 10 Hz Open circuit voltage 5 V DC
----------------	---

Analogue outputs

0... 10 V DC:	0-10 V / maximum 1 mA
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Digital outputs

Relay output K1... K6, K11 and K12:	2 A, 250 V AC
Relay output K7... K10:	4 A, 250 V AC
Alarm relay:	0.5 A, 24 V AC/DC

Power supply 24 V DC

Voltage:	24 V DC / maximum 25 mA
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Mechanical

Temperature range:	0... 40 °C
Dimensions (H x W x D):	270 x 220 x 115 mm
Protection class housing:	IP 54 plastic
Weight:	approx. 3 kg

3.2.4 Automatic filter for air mixer (option)

Connection voltage	220 V AC
Special voltages	on request
Permissible tolerance	-15%....+10%
Frequency	50/60 Hz
Own consumption	~ 6 VA
Permissible switch-on time	100%
Mains transformer	according to VDE 0551 (2-chamber winding)
Mains check	LED green
Insulation	Air gap and leakage distance VDE 0110 Gr. C
Electrical connection	Terminal strips, lift system, conductor cross-section, fine-strand max. 2.5 mm ² , single-wired max. 4 mm ²
Number of valve outputs	VS 10-1: maximum 10, programmable VS 16-1: maximum 16, programmable
Output voltage	24 V AC
Output current	max. 1A, short-circuit proof
Checking valves	via key "Test"
Optical control	LEDs
Impulse time	adjustable 0.1 - 1 seconds
Pause time	adjustable 5 - 50 seconds
Dedusting command	via input contact or permanent
Permissible ambient temperature	-20 °C....+60 °C
Fitting position	any
Fastening	4 holes, 4 x M4
Dimensions	VS 10-1 : 100 x 160 x 43; 0.53 kg VS 16-1 : 175 x 250 x 75; 0.75 kg

3.2.5 Diaphragm valves

Technical features

Operating medium	Compressed air
Switching function	Normally closed
Flow direction	Determined
Fitting position	Optional, preferably magnet vertically upwards
Connection	G 3/4
Operating pressure	0.4 ... 8 bar
Raw gas temperature	-20 ... +84 °C
Purge gas temperature	-40 ... +85 °C
Ambient temperature	-20 ... +85 °C
Material	Housing: Aluminium
	Seat seal: TPE
	Relay valve sealing: TPU
Nominal width	20 mm
Overall length	95 mm
kv-Wert *1)	18 m ³ /h
Weight	0.5 kg
Type	8296300.8171.xxxxx
Thread form	ISO G

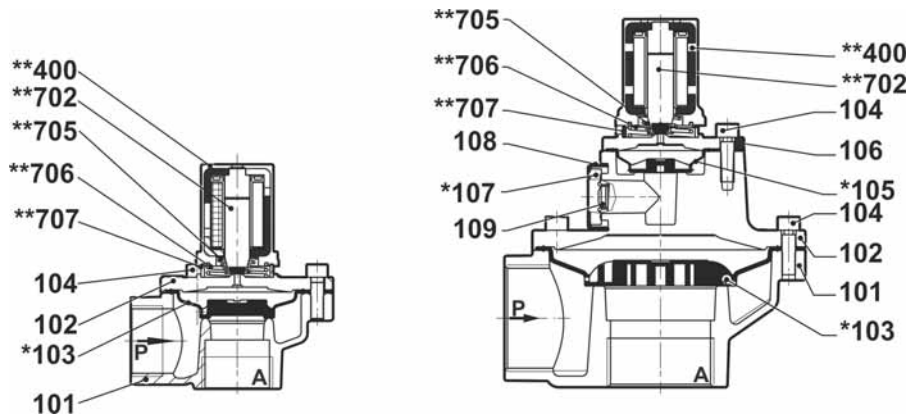
xxxxx = indicate voltage and frequency

1*) Cv-value (US) = kv-value x 1.2

Actuating magnets:

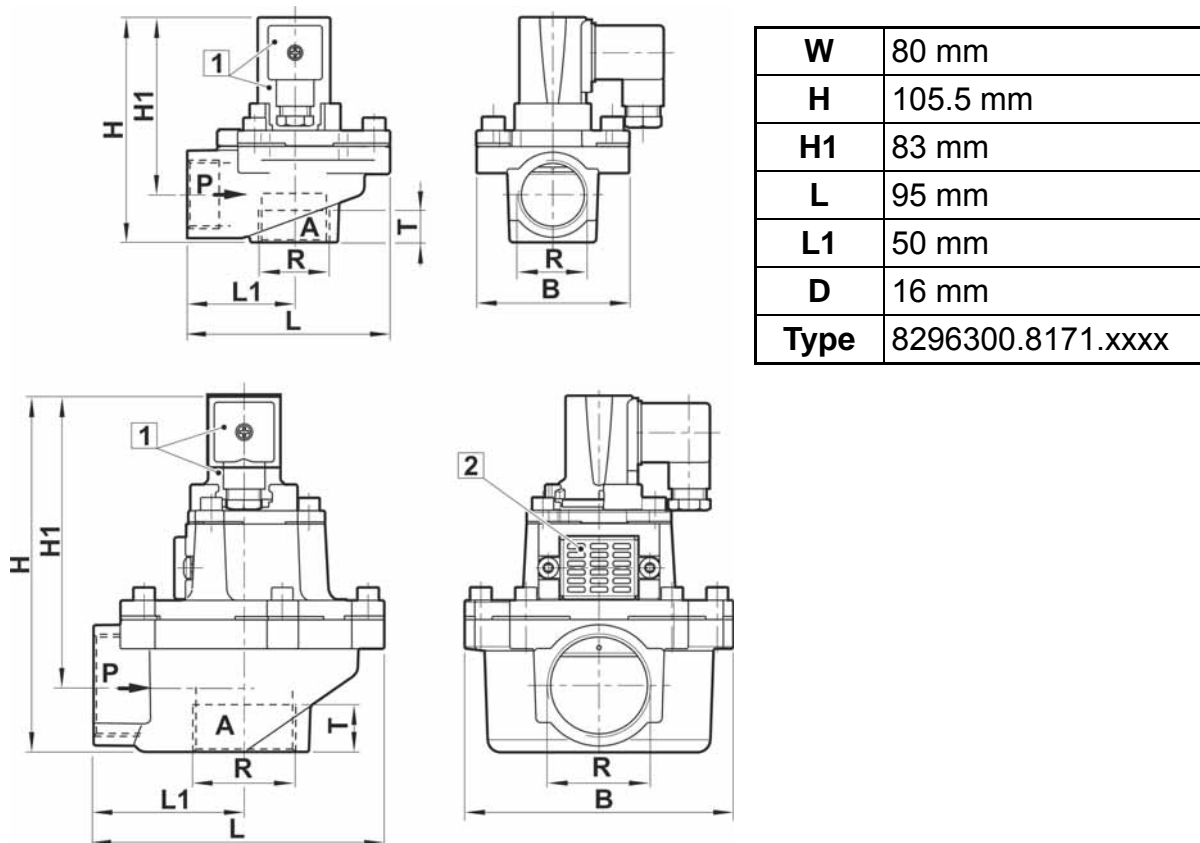
Code voltage	024	
Code frequency	00	
Voltage	24 V DC	
Frequency	-	
Power consumption	Pull-in power	12 W
	Holding power	12 W

Sectional drawing



Pos.	Description	Comment
101	Valve housing	<p>All parts marked with * are included in the respective wear part set.</p> <p>Please indicate the complete type number as well as the series number when ordering the spare parts.</p> <p>**Wear part set magnet complete; for example 8298000.8170.XXXXX for a magnet 8170.</p>
102	Valve housing cover	
*103	Diaphragm	
104	Socket head screw	
*105	Diaphragm	
106	Valve housing cover	
*107	Silencer	
108	Silencer housing	
109	Socket head screw	
**400	Magnet body	
**702	Armature	
**705	Compression spring	
**706	Compression spring	
**707	Silencer	

Dimensions



- 1** = Electromagnet pivotable by 3 x 120° connector 4 x 90° pluggable (connector in accessories package)
- 2** = Silencer

3.3 Designated use

The **Big Dutchman** air mixer serves for mixing house air and fresh air and to adjust it to a certain temperature level. The radial fan provides an air flow with sufficient static pressure. The free-wheeling radial impellers are designed for the transport of air or air-like mixtures.

The maximally allowed operating speed and the maximally allowed medium temperature must not be exceeded, according to the specifications on the fan or impeller type plate. The maximum permissible operating data on the type plate apply to an air density 1.2 kg/m³.

The **Big Dutchman** system may only be used according to its designated use.

Every other use is considered improper use. The manufacturer shall not be liable for any damage resulting from such use. The risk is to be borne exclusively by the user. The designated use also includes the exact adherence to the operating, maintenance and assembly requirements of the manufacturer.

3.4 Avoidance of foreseeable misuse

Following uses of the **Big Dutchman** air mixer are generally not allowed and are considered as misuse:

- The use outdoor, especially in areas that are susceptible to frost.
- The use of the system where the temperature inside the house is below 0°C.
- The treatment of the system with aggressive and/or corrosive as well as abrasive-acting agents to such an extent that it doesn't correspond to the code of best practice.
- Operation in case of open/missing service-/inspections hatches as well as protective devices.
- Operation of the system despite the admissible vibration velocity (6.5 mm/s see ISO 14694;2003)
- Operation with too high mains frequency
- Operation with inadmissible mains frequency.
- Use in explosive atmosphere.
- Use of the free-wheeling impellers in a hazardous area, for transporting gas, fog, vapours or their mixture.
- Transport of solid matters or solid contents in conveying medium by means of the free-wheeling impellers.

Improper use leads to an exclusion of warranty and liability through **Big Dutchman**.

The operator of the system exclusively bears the risk resulting from misuse!

4 Operation

4.1 Radial impellers

Before putting the system into operation, the following should be checked:

- Did you consider the notes of the motor producer regarding the initial operation?
- Did you finish the installation and electrical installation professionally?
- Did you remove possibly existing assembly residues and foreign matters from the impeller- and intake area?
- Did you adjust the motor protection correctly?

In case of activation Y/D, adjust to 58% of the nominal current if the string current flows via the motor protection device. Do not put the motor protection device in front of the switching device in the power supply cable but between the motor terminals U1, V1 and W1.

Check the fan for mechanical vibrations before the installation. If the vibration severity is greater than 2.3 mm/second (measured at the end shield of the motor bearings at the impeller side), the motor-/impeller unit has to be checked by experts and rebalanced, if necessary.

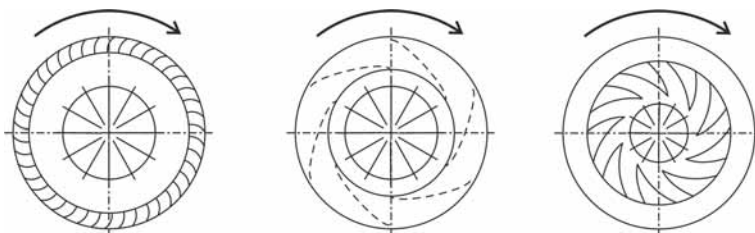


The initial operation may only be carried out when all safety instructions (DIN EN 50 110, IEC 364) have been checked, the fan is located outside the range (DIN EN ISO 13857) and hazard is excluded!

- Check the current consumption!

If the current consumption is higher than indicated on the motor rating plate, the fan must be switched off immediately!

- Check the direction of rotation (in clockwise direction, with view into the admission nozzle)



- Pay attention to a smooth, vibration-free running.
- Determine the resonance range of the impeller (=> 9 "Glossary").

If the resonance range is in the working area, the frequency converter has to be adjusted that way that the resonance range is passed through quickly. Strong vibrations due to uneven running (imbalance), for example due to transport damages, improper handling or operation within the resonance area can lead to failure.

- Do not operate the fan in a stall area. Operation in an unstable area leads to damages at the fan (danger of fatigue fracture).

4.2 Automatic filter for air mixer (option)

Filter control VS10-1, VS16-1

1. Connect the control unit according to the connecting plan (figure 4-1 and 4-2).
2. Connect the protective conductor PE to the filter housing.
3. Place coded plug on X3 depending on the number of valves connected.
4. Set time adjustment for impulse and pause to left limit stop (minimum).
5. Switch commutator "dp Dauer" to position "Dauer".
6. Switch on network, the green light-emitting diode "net" is lit
7. Diode "Operation" is lighting up.
8. The control starts with an impulse (valve 1), pilots the connected valves with the respective pauses one after the other. It starts again from valve 1, after the last valve was excited.

With the light-emitting diodes assigned to the valve outlets, it can be optically checked whether all valves have been controlled. With the "TEST" button, all valves can be clocked manually one after the other.

9. After the operation check switch commutator to position "dP" and adjust the desired impulse and pause times.
 - Impulse time: 0.4 seconds
 - Pause time: 30 seconds

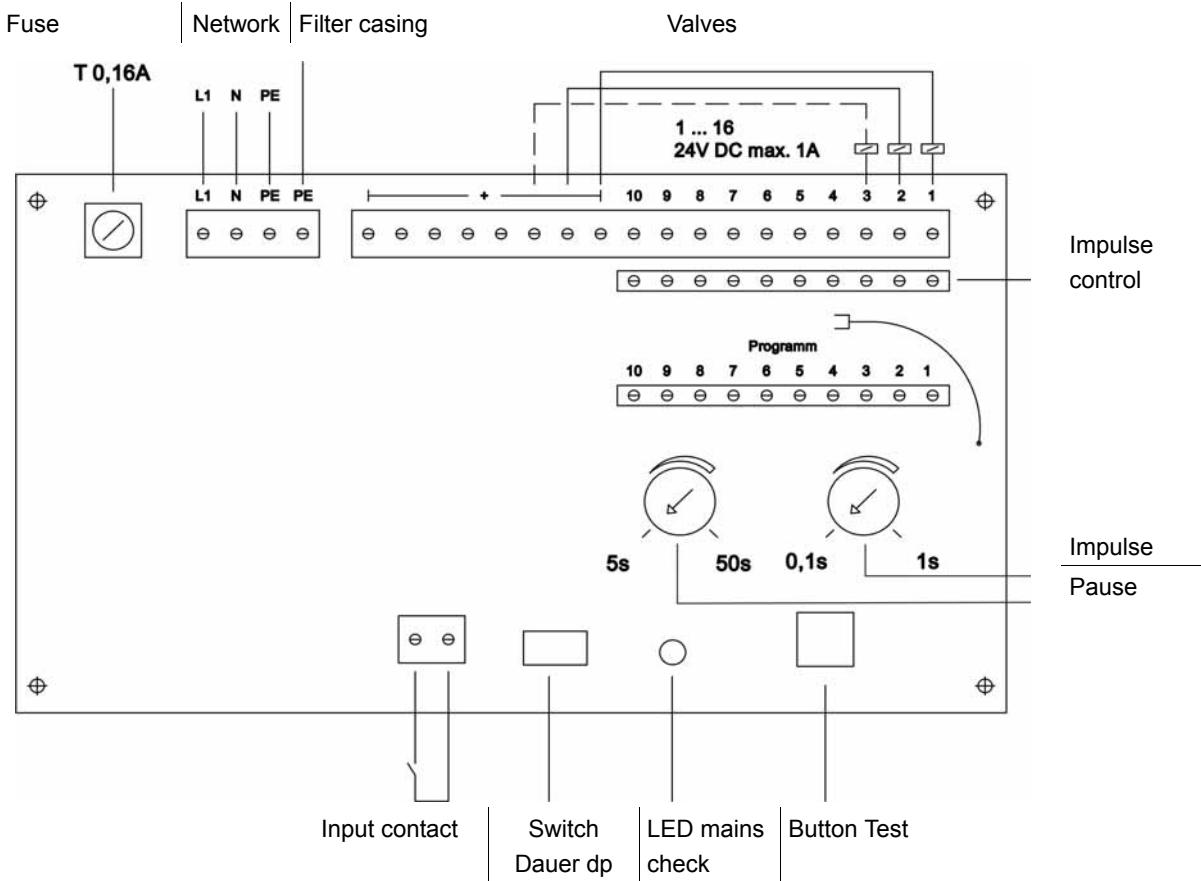


Figure 4-1: Connecting plan filter control VS 10-1

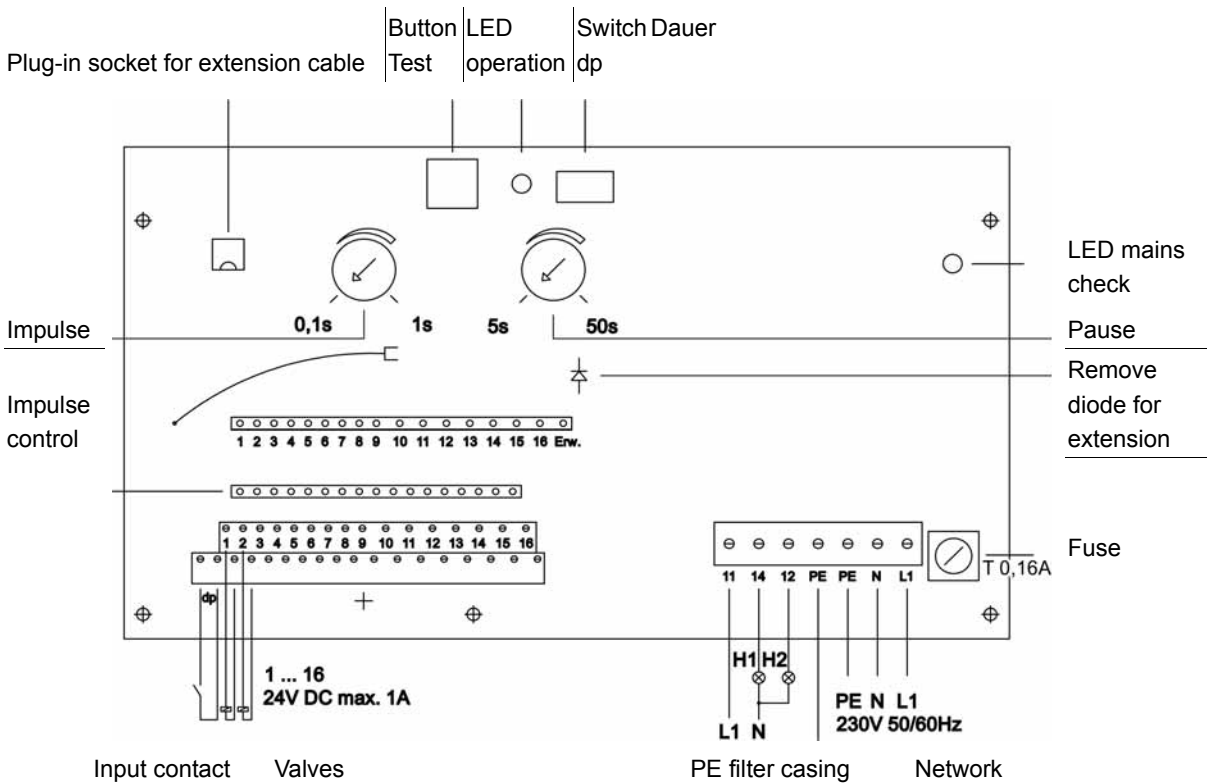


Figure 4-2: Connecting plan filter control VS 16-1

5 Operation

5.1 Air mixer

The results of the manure drying in ventilated manure belt batteries mainly depend on the temperature of the intake air. If the air is too cold, humidity is not sufficiently absorbed due to the dew point. Moreover, condensation water can be formed at the air ducts and through this, the bore holes at the air ducts can be soiled unnecessarily and become clogged.

On the other side, as high part of fresh outside air as possible is required:

The control of the air mixer is carried out via the AMC.

The control unit can be switched automatically by timers but also manually (e. g. to cleaning mode).

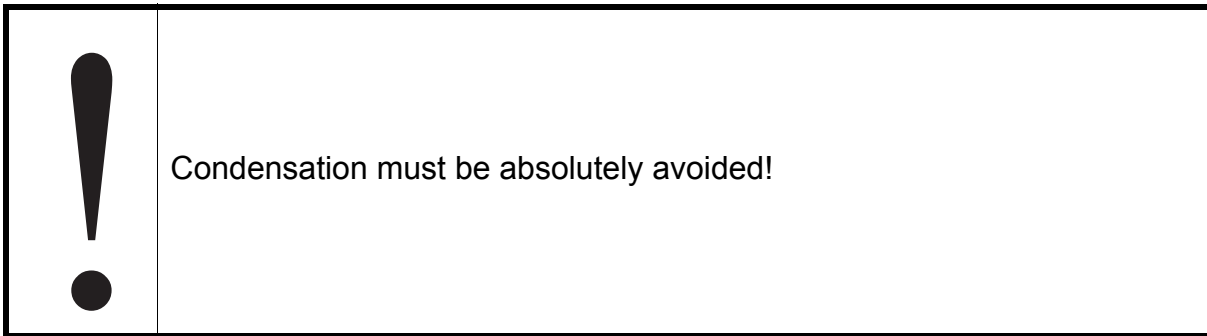


Please observe the user manual for AMC. If you do not have this manual, you can order this under the following number: 99-94-0208 (AMC).

The flap control of the air mixer functions independently of the actual climate control. The heat production of the birds in a well insulated house is so high that a heating system is normally not necessary even in case of minus temperatures (except for very cold regions).

For the manure belt ventilation, however, the fresh air must be heated additionally in case of cold outside temperatures.

- In case of too low intake air temperatures, the animals are in danger of hypothermia, since the air enters the house directly beneath the birds.
- The manure on the belts can only be sufficiently dried by warm dry air.
- If the temperature of the fresh air is below the dew point of the house air, large amounts of condensation water are formed at the air distribution system of the manure belt ventilation.



Condensation at the ventilation system has negative consequences:

- Wet corners in the house (unhygienic)
- Dirty air ducts
- The animals get in contact with condensation water
- The air holes get clogged
- The manure becomes wetter instead of drier

		Relative humidity										
		50 %	55 %	60 %	65 %	70 %	75 %	80 %	85 %	90 %	95 %	100%
House temperature	15 °C	4.5 °C	5.9 °C	7.2 °C	8.4 °C	9.5 °C	10.5 °C	11.5 °C	12.5 °C	13.3 °C	14.2 °C	15.0 °C
	16 °C	5.5 °C	6.9 °C	8.1 °C	9.3 °C	10.5 °C	11.5 °C	12.5 °C	13.4 °C	14.3 °C	15.2 °C	16.0 °C
	17 °C	6.4 °C	7.8 °C	9.1 °C	10.3 °C	11.4 °C	12.5 °C	13.5 °C	14.4 °C	15.3 °C	16.2 °C	17.0 °C
	18 °C	7.3 °C	8.7 °C	10.0 °C	11.2 °C	12.4 °C	13.4 °C	14.5 °C	15.4 °C	16.3 °C	17.2 °C	18.0 °C
	19 °C	8.2 °C	9.6 °C	11.0 °C	12.2 °C	13.3 °C	14.4 °C	15.4 °C	16.4 °C	17.3 °C	18.2 °C	19.0 °C
	20 °C	9.1 °C	10.6 °C	11.9 °C	13.2 °C	14.3 °C	15.4 °C	16.4 °C	17.4 °C	18.3 °C	19.2 °C	20.0 °C
	21 °C	10.1 °C	11.5 °C	12.9 °C	14.1 °C	15.3 °C	16.4 °C	17.4 °C	18.4 °C	19.3 °C	20.2 °C	21.0 °C
	22 °C	11.0 °C	12.5 °C	13.8 °C	15.1 °C	16.2 °C	17.3 °C	18.4 °C	19.4 °C	20.3 °C	21.2 °C	22.0 °C
	23 °C	11.9 °C	13.4 °C	14.8 °C	16.0 °C	17.2 °C	18.3 °C	19.4 °C	20.3 °C	21.3 °C	22.2 °C	22.3 °C
	24 °C	12.9 °C	14.4 °C	15.7 °C	17.0 °C	18.2 °C	19.3 °C	20.3 °C	21.3 °C	22.3 °C	23.2 °C	24.0 °C
	25 °C	13.8 °C	15.3 °C	16.7 °C	18.0 °C	19.2 °C	20.3 °C	21.3 °C	22.3 °C	23.3 °C	24.2 °C	25.0 °C
	26 °C	14.8 °C	16.3 °C	17.7 °C	18.9 °C	20.1 °C	21.3 °C	22.3 °C	23.3 °C	24.3 °C	25.1 °C	26.0 °C
	27 °C	15.7 °C	17.2 °C	18.6 °C	19.9 °C	21.1 °C	22.2 °C	23.3 °C	24.3 °C	25.2 °C	26.1 °C	27.0 °C
28 °C	16.7 °C	18.2 °C	19.6 °C	20.9 °C	22.1 °C	23.2 °C	24.3 °C	25.3 °C	26.2 °C	27.1 °C	28.0 °C	
29 °C	17.6 °C	19.1 °C	20.6 °C	21.9 °C	23.1 °C	24.2 °C	25.3 °C	26.3 °C	27.2 °C	28.1 °C	29.0 °C	
30 °C	18.6 °C	20.1 °C	21.5 °C	22.8 °C	24.1 °C	25.2 °C	26.3 °C	27.3 °C	28.2 °C	29.1 °C	30.0 °C	

Table 5-1: Dew point temperature

Example:

The house temperature is 22 °C and relative humidity of air is 70 %.

=> the dew point is 16.2 °C.

If the intake air temperature is below 16.2 °C, condensation water settles at the distributing system and at the air ducts. The lower the outside temperature is and the higher the set value of the intake air temperature is, the lower the percentage of fresh air will be.

Example:

The air mixer delivers 0.7 m³ per animal and hour, the outside temperature is 0 °C, the house temperature 22 °C and the set value of the intake air temperature is 16 °C.

The percentage of fresh air can be calculated from these temperatures.

$$\text{Percentage of fresh air} = \frac{\text{House temperature} - \text{desired temperature}}{\text{House temperature} - \text{outside temperature}} \times 100$$

$$\text{Percentage of fresh air} = \frac{22 \text{ °C} - 16 \text{ °C}}{22 \text{ °C} - 0 \text{ °C}} \times 100$$

$$\text{Percentage of fresh air} = 27 \%$$

This means:

- Flap opening fresh air: 27 %
(=> approx. 27% of the total cross-sectional area of the flap are opened)
- Flap opening house air 73 %
(=> approx. 73 % of the total cross-sectional area of the flap are opened)

Since the amount of fresh air is not large enough for a sufficient supply of oxygen for the birds, the additionally required amount of air has to be supplied by the house ventilation system. At the same time, the house has to be sufficiently ventilated to avoid that the relative humidity inside the house rises to more than 70%, thus also increasing the dew point of the house air.

In order to guarantee a minimum percentage of fresh air, a minimum position of the outside air flap is programmed so that the flap does not close more than this position. However, if the intake air temperature falls below the programmed minimum value, there are 2 possibilities:

- The heating system eventually installed is switched on
- The outside air flap is completely closed so that only house air circulates in the house.

In case of activated cooling system, the outside air flap is completely closed so that the air mixer only circulates house air. This prevents the penetration of too warm outside air.



If the air mixer is switched off by the control unit, the outside air flap is closed as well. This prevents the penetration of cold outside air.

5.2 Automatic filter for air mixer (option)

Filter control VS10-1, VS16-1

The filter controls VS 10-1 and VS 16-1 are used for cleaning dust filters. Precisely metered and repeated compressed air pulses free the filter element from dust deposits and thus allow continuous operation of the filter. The parameter "Impulse" determines the opening time of the individual valves and the parameter "Pause" determines the time span between the compressed air pulses.

After feeding line voltage, closing the input contact (with switch *dp-Dauer* to „dp“) starts cleaning with valve 1 always opened first. Closing the contact is mostly prompted by an external timer, i.e. the contact is closed for a programmed time (target value = 10 min.).

By switching the switch *dp-Dauer* to „Dauer“ the board is permanently controlled and thus, the valves are continuously activated. After piloting of the last valve, it is started again with the first valve.

5.3 Radial impellers

- Do not operate the radial impellers in explosive atmosphere

- risk of explosion through sparking!
- Observe the instructions of the motor manufacturer
- It is not allowed to exceed the maximum admissible operating speed (type plate fan/impeller). The maximum operating speed applies for a continuous operation S1. Increased switching frequency only in case of soft start via frequency converter respectively via Y/D-switch for operation without frequency converter. Do not operate fan in the resonance area of the impeller - due to fatigue fracture. In case of speed control, run quickly through the resonance area.
- A-weighted sound pressure level higher than 80 dB (A) possible.

6 Maintenance

6.1 Maintenance intervals

6.1.1 Air mixer

Daily:

- Check the function of the fresh air fan
- Check the function of the air flaps
- Check the vibration of the fan (limit values see ISO 14694; 2003)

Regularly:



The cleaning frequency depends on the dust concentration of the ambient air. Dust deposits must not negatively influence the heat release or running properties since will lead to damages at the machine (see also 3.1.1.2 "Monitoring air mixer")!

- Switch off the fan for cleaning the filter mats. Remove the filter mats and clean them by means of a vacuum cleaner or by means of compressed air.

Caution: Blow air out in the opposite direction of the air flow

- Clean the motor from dust deposits.
- Clean the fan from dust deposits.

Before moving the birds in or yearly:

- Clean the complete air mixer carefully (filter mats, flaps, fans, interior space).
- Check the function of the fan as well as the wear and voltage of the V-belts, if necessary, and grease the bearings.
- Check whether drillings in the air ducts are free and clean.
- Check the function of the air flaps.

6.1.2 Centrifugal fan

Daily:

- Check the function of the fresh air fan
- Check the function of the air flaps
- Check the vibration of the fan (limit values see ISO 14694; 2003)

Regularly:



The cleaning frequency depends on the dust concentration of the ambient air. Dust deposits must not negatively influence the heat release or running properties since will lead to damages at the machine (see also 3.1.1.2 "Monitoring air mixer")!

- Switch off the fan for cleaning the filter mats. Remove the filter mats and clean them by means of a vacuum cleaner or by means of compressed air.

Caution: Blow air out in the opposite direction of the air flow

- Clean the motor from dust deposits.
- Clean the motor from dust deposits.

Before moving the birds in or yearly:

- Clean the complete radial fan thoroughly (fan, interior space, drive, etc.).
- Clean foil hose and condensation water channel.
- Check the operation of the fans. Check wear and tension of V-belts. Grease bearings.
- Check whether drillings in the air ducts are free and clean.

6.1.2.1 Radial fan with direct drive

The air intake fan consists of fan housing, admission nozzle, impeller and motor. The impeller has been balanced carefully upon production, so as to avoid vibrations during operation.

Should imbalances still emerge, they are mostly caused by soiling of the impeller. Can the imbalance, however, not be eliminated by cleaning the impeller, the cause must be searched immediately. The imbalanced running of the fan reduces the durability of the bearings.

Clean the fan with a brush, cloth or a dry sponge. Cleaning with compressed air is not recommended since not all deposits can be removed through compressed air.

6.1.2.2 Radial fan with belt drive and flange bearings

The air intake fan consists of fan housing, admission nozzle, impeller, shaft, bearing, motor and V-belt drive.

The impeller has been balanced carefully upon production, so as to avoid vibrations during operation. Should imbalances still emerge, they are mostly caused by soiling of the impeller. Can the imbalance, however, not be eliminated by cleaning the impeller, the cause must be searched immediately, because imbalanced running of the blower reduces the durability of the bearings.

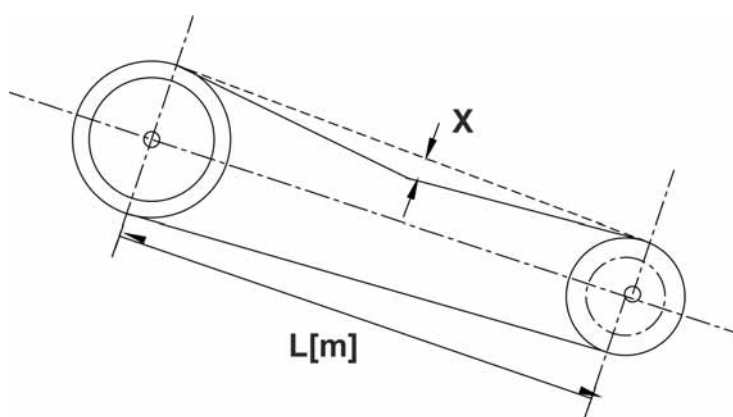
Grease the bearings at least four times a year with ball bearing grease of the penetration class 2: e.g. with SKF-65 or SKF Alfalub LGMT-2.

Monthly checking of tension and wear of the V-belts is required. On the one hand, increased wear of the belts results from V-belts hanging loose, and on the other hand, durability of the bearings may be reduced by V-belts being strained too much. Check the belt tension as per following instructions. When applying new V-belts, adjust the tension after ten or twelve hours of operation.

The V-belts must **not** be pulled over the edges of the V-belt pulleys and **no** belt wax or anything similar must be used.

Checking of the V-belt tension:

The distance between the shafts (= L) measured in METRES, must be multiplied by 1.5. The value thus determined gives the permissible sagging of the belts (= X) in CENTIMETRES.



6.1.3 Radial impellers

6.1.3.1 Maintenance intervals

Once a year Check the fan for mechanical vibrations according to DIN ISO 14694. The maximally allowed vibration severity is 2.8 mm/s (measured at the bearing shield of the motor bearing at impeller side or in accordance with the special agreements with the customer).

The impeller and housing are subject to natural wear **depending on the area of use and conveying medium**. Deposits at the impeller can lead to imbalance and thus to damages (danger of fatigue fracture).

- Impeller can burst - danger of life!
- Observe the instructions of the motor manufacturer for servicing and maintenance.

For all servicing and maintenance works:

- Observe the safety and work regulations (DIN EN 50 110 IEC 364).
- Make sure that the fan impeller stands still!
- Interrupt the electric circuit and secure it against unintentional switching on.
- In case of operation via frequency converter, a waiting time has to be observed after the release - see operating instructions of the manufacturer regarding the discharge time of the capacitors.
- Check whether the system is currentless.
- Do not carry out maintenance works while the fan is in operation!
- Keep the air passages of the fan free - danger due to ejected parts!
- Do not bend the blades - imbalance!
- Pay attention to untypical bearing noises!
- Bearing replacement according to the manufacturer's specifications. Demand the operation manual, if necessary.
- After the disassembly and reassembly of the impeller it is absolutely necessary to re-balance the entire unit according to DIN ISO 1940-1.

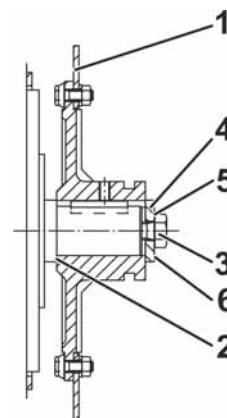
For all other damages (for example winding damages) please contact us.

Maintenance works should only be carried out by qualified personnel!

6.1.3.2 Disassemble the impeller

With fixed hub:

Loosen the axial screw lock (Pos. 3 - Pos. 6) and extract the impeller with hub by means of a special extractor (at a special weight you have to use hoisting equipment)



When reassembling the shaft, the tightening torques indicated in the table must absolutely be observed!

FK 8.8	M4	M5	M6	M8	M10	M12
MA	2.8 Nm	5.5 Nm	9.5 Nm	23 Nm	45 Nm	79 Nm

With Taperlock bush hub:

1. Disconnect the fan from power supply and protect it against unintentional restart.
2. Loosen all set screws (Pos. 3). Unscrew one or two set screws completely, depending on the size of the bush.
3. Grease one or both set screws and screw one set screw each into the defined holes for disassembly (Pos. 4) (see.
4. Tighten one or both set screws evenly until the clamping bush (Pos. 1) is released from the hub (Pos. 2). Now you can detach the impeller.

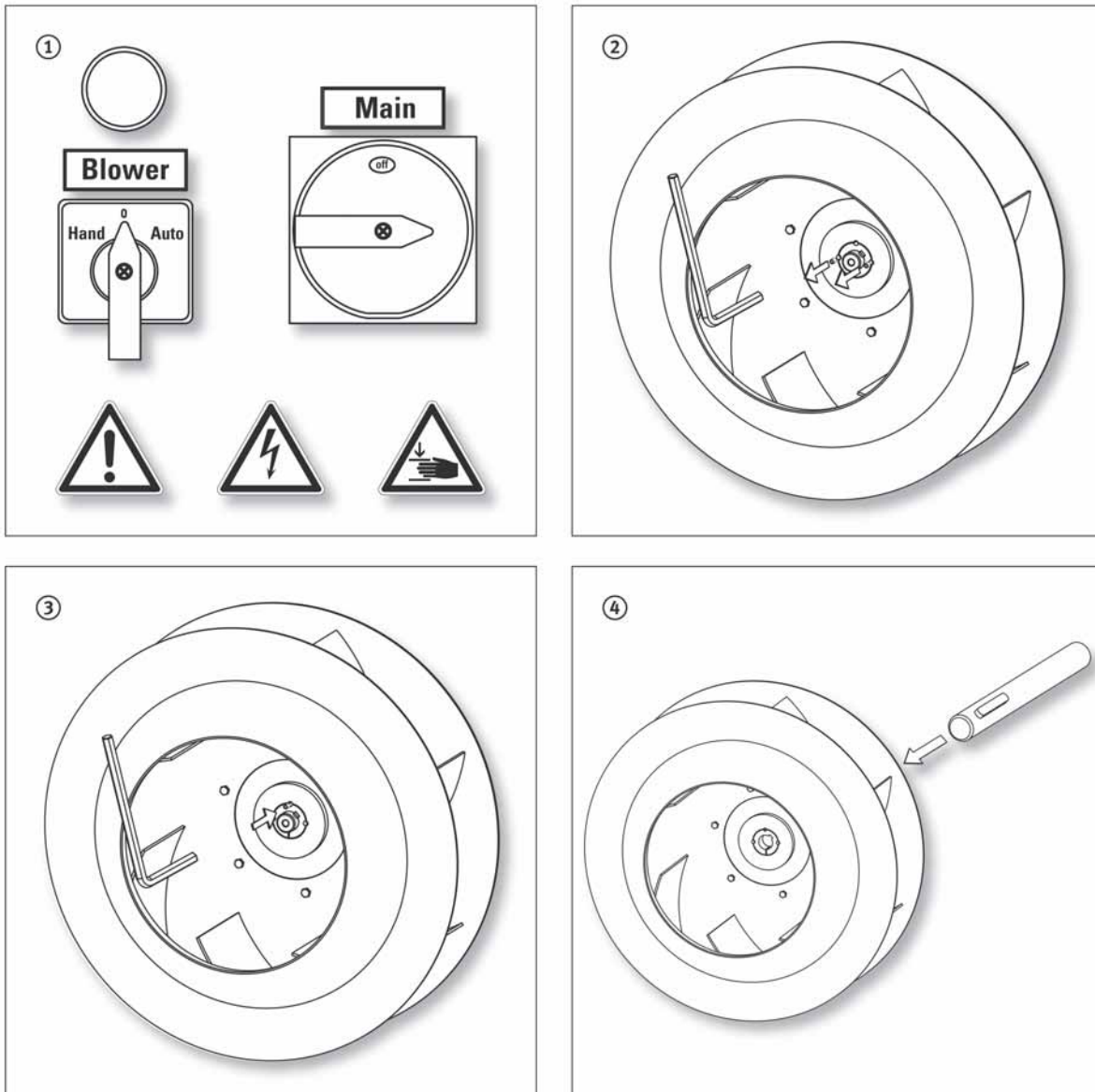


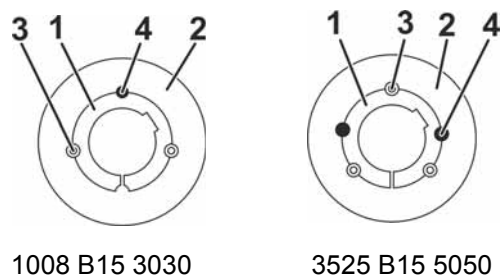


Figure 6-1: Holes for assembly and disassembly

-  = holes for assembly
-  = holes for disassembly



1008 B15 3030

3525 B15 5050


When reassembling the shaft, the tightening torques indicated in the table must absolutely be observed!

*1	1008	1108	1210	1610	1615	2012	2517	3020	3030	3525	3535	4030	4040	4535	4545	5040	5050
*2	5.6	5.6	20	20	20	30	50	90	90	115	115	170	170	190	190	270	270

*1 Taperlock; *2 tightening torque Nm

6.2 Cleaning


6.2.1 Pocket filter

	Risk of injury
	The cleaning nozzles in the filter are movable and can cause injuries. <ul style="list-style-type: none">• Make sure before each cleaning that the air mixer is switched off. Switch the main switch to OFF and deactivate the filter cleaning at the control cabinet.
WARNING	



The pocket filters are delivered in a pre-mounted frame. They should be cleaned every fortnight:

For this, the clamping devices are released so that the individual filter elements can be taken out of the frame. Beat the filter elements and vacuum or blow them out if necessary. Make sure that the blowing out is carried out against the flow direction. Never clean the filter elements with water!

	Important: Never use water for cleaning the pocket filters!
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6.2.2 Filter cartridges

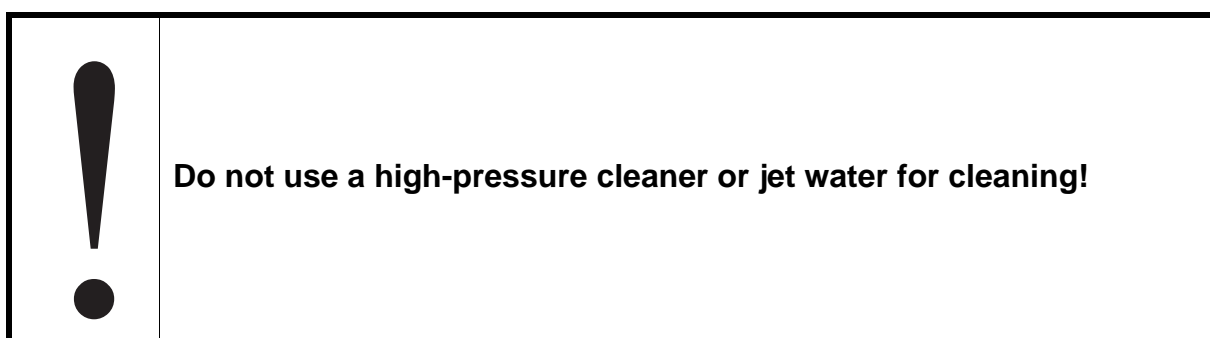
The highly efficient filter cartridges are automatically cleaned at certain intervals when covered with dust. These intervals are mainly depending on the dust concentration in the house air and can thus vary. Generally, we recommend cleaning twice a day for 10 minutes each.

In case of automatic filter dedusting, one diaphragm valve is opened after the other by means of blowing an air blast with a pressure of 6 bar into the cartridge. This is started in the upper row so that the dust removed can drop down on the filters located below which are cleaned afterwards. The dust collected on the cartridge is blown off with high energy.

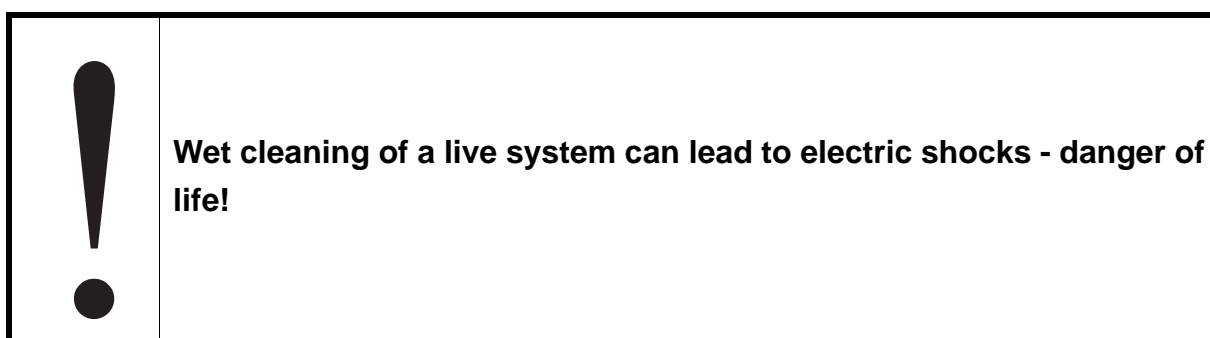
The compressor has to transport approx. 60 litres of air per air pulse. Therefore, there should be a break of approx. 30 seconds between the individual air pulses, in order to enable the compressor to recharge.

6.2.3 Radial impellers

- Regular inspection necessary, with cleaning if necessary, to avoid imbalance due to soiling.
 - Clean the flow area of the fan.
- Pay attention to a vibration-free running.
- Carry out the maintenance intervals depending on the degree of contamination of the impeller.
- The complete fan may be cleaned by means of a damp cloth.
- Do not use aggressive cleaning agents which could dissolve the lacquer.



- If water has penetrated in the motor:
 - Dry the windings of the motors before using it again.
 - Replace the ball bearings of the motor.



6.3 Re-starting the system

Please observe the notes indicated under 4 "Operation" for re-starting the system.

7 Fault Clearance

Malfunction	Cause	Remedies
Fan does not turn.	Motor does not turn.	Check electric connection and replace defective parts, check ON/OFF times at control computer.
Fan turns, no air is conveyed however	Flaps are closed.	Check operation of flaps and servomotors, replace defective parts.
High noise level.	Fan impeller is imbalanced.	Switch off fan, clean impeller thoroughly, replace bearings if necessary.
Blowing-in temperature is too low.	Flaps do not work correctly.	Check operation and sense of rotation of servomotors, replace defective parts.
	Set value of blowing-in temperature is too low at the control	Increase set value of the blowing-in temperature (refer to delivered manual: Control AMC).
Trouble at automatic filter system.	Electronic, air supply.	Descriptions of both causes and possible remedies of failures of the automatic filter system can be found in the documentation delivered with the system.
VIKON triggers	too high imbalance	Clean fan thoroughly

8 Spare parts

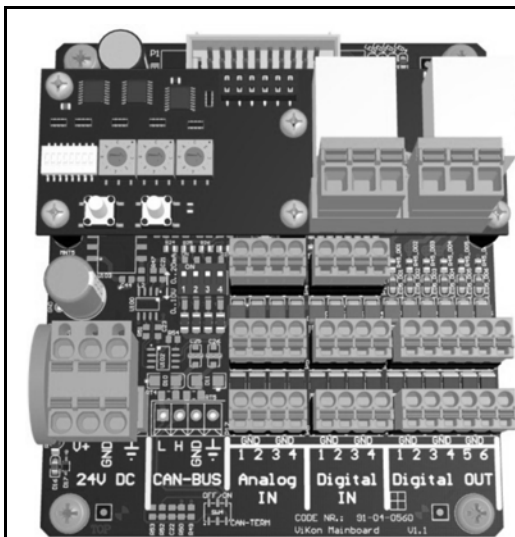
8.1 Air mixer

Spare parts for air mixers are generally supplied by Big Dutchman on request.



Please observe chapter 3.2 "Technical data" when ordering spare parts.

8.2 Monitoring air mixer



91-04-0560 Control unit for vibration sensor ViKon 24VDC for DIN rail mount



91-04-0552 Control unit for vibration sensor ViKon 90-264VAC 50/60Hz V13

Available spare parts for 91-04-0552:

- 91-04-0560 Control unit for vibration sensor ViKon 24VDC in Rail mount
- 91-04-0561 Cover board for vibration sensor ViKon
- 91-00-2768 Power supply 24VDC 1.25A SPM 3-24/1
- 91-04-0550 Vibration sensor 0-16 mm/s 10-1000Hz 0-10V/4-20mA

8.3 Automatic filter for air mixer (option)

8.3.1 Compressor

You can use any standard compressor, provided it fulfils the following requirements:

- Conveying capacity: at least 120 litres/minute
- Delivery pressure: 6 - 8 bar

Example:

- 20-50-3195 Compressor 350/10/2/50 D

8.4 Ventilation system

8.4.1 T-pieces - Feeding side

8.4.1.1 T-piece

Code no.	Description	D1 x d x D2	
60-51-3203	T-piece nominal diameter	300 x 300 x 300 without regulation flap	
60-51-3204	T-piece nominal diameter	400 x 400 x 400 without regulation flap	
60-51-3205	T-piece nominal diameter	500 x 500 x 500 without regulation flap	
60-51-3206	T-piece nominal diameter	630 x 630 x 630 without regulation flap	
60-51-3207	T-piece nominal diameter	710 x 710 x 710 without regulation flap	

Code no.	Description	D1 x d x D2	
60-51-3213	T-piece nominal diameter	300 x 200 x 300 without regulation flap	
60-51-3214	T-piece nominal diameter	400 x 300 x 400 without regulation flap	
60-51-3215	T-piece nominal diameter	500 x 400 x 500 without regulation flap	
60-51-3216	T-piece nominal diameter	630 x 500 x 630 without regulation flap	
60-51-3217	T-piece nominal diameter	710 x 630 x 710 without regulation flap	
60-51-3218	T-piece nominal diameter	800 x 710 x 800 without regulation flap	
60-51-3219	T-piece nominal diameter	900 x 710 x 900 without regulation flap	
60-51-3220	T-piece nominal diameter	800 x 630 x 800 without regulation flap	
60-51-3221	T-piece nominal diameter	900 x 800 x 900 without regulation flap	
60-51-3222	T-piece nominal diameter	900 x 630 x 900 without regulation flap	

8.4.1.2 T-piece asymmetric

Code no.	Description	D x d1 x d2	
60-51-3245	T-piece asymmetric	500 x 400 x 400 without regulation flap	
60-51-3246	T-piece asymmetric	630 x 500 x 500 without regulation flap	
60-51-3247	T-piece asymmetric	710 x 630 x 630 without regulation flap	
60-51-3244	T-piece asymmetric	400 x 300 x 300 without regulation flap	
60-51-3245	T-piece asymmetric	500 x 400 x 400 without regulation flap	
60-51-3246	T-piece asymmetric	630 x 500 x 500 without regulation flap	
60-51-3247	T-piece asymmetric	710 x 630 x 630 without regulation flap	
60-51-3248	T-piece asymmetric	800 x 710 x 710 without regulation flap	
83-13-1150	T-piece asymmetric	800 x 630 x 630 without regulation flap	
60-51-3249	T-piece asymmetric	900 x 710 x 710 without regulation flap	

8.4.1.3 T-piece type A

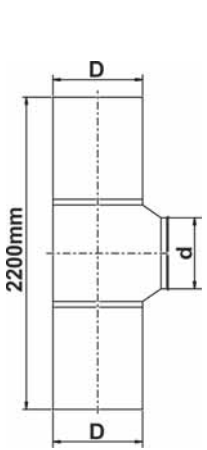
Code no.	Description	D1 x D2 x A	
60-51-3330	T-piece A nominal diameter	500 x 400 x 500 - 2730 without regulating flap	
60-51-3331	T-piece A nominal diam.	500 x 500 x 500 - 2730 without regulating flap	
60-51-3332	T-piece A nominal diam.	630 x 400 x 630 - 2730 without regulating flap	
60-51-3333	T-piece A nominal diam.	630 x 500 x 630 - 2730 without regulating flap	
60-51-3334	T-piece A nominal diam.	630 x 630 x 630 - 2730 without regulating flap	
60-51-3335	T-piece A nominal diam.	710 x 500 x 710 - 2730 without regulating flap	
60-51-3336	T-piece A nominal diam.	710 x 630 x 710 - 2730 without regulating flap	
60-51-3337	T-piece A nominal diam.	800 x 630 x 800 - 2730 without regulating flap	
60-51-3338	T-piece A nominal diam.	800 x 710 x 800 - 2730 without regulating flap	
60-51-3339	T-piece A nominal diam.	900 x 710 x 900 - 2730 without regulating flap	

8.4.1.4 T-piece type B

Code no.	Description	D1 x D2 x A	
60-51-3350	T-piece B nominal diameter	500 x 400 x 400 - 2730 without regulating flap	
60-51-3351	T-piece B nominal diam.	630 x 500 x 500 - 2730 without regulating flap	
60-51-3352	T-piece B nominal diam.	710 x 630 x 630 - 2730 without regulating flap	
60-51-3353	T-piece B nominal diam.	710 x 630 x 500 - 2730 without regulating flap	
60-51-3355	T-piece B nominal diam.	800 x 710 x 630 - 2730 without regulating flap	
60-51-3356	T-piece B nominal diam.	800 x 710 x 710 - 2730 without regulating flap	
60-51-3357	T-piece B nominal diam.	900 x 710 x 710 - 2730 without regulating flap	

8.4.1.5 T-piece extended

Code no.	Description	D x d x d
60-51-3255	T-piece nominal diameter	500 x 500 x 500 - 2200 without regulating flap
60-51-3256	T-piece nominal diam.	630 x 630 x 630 - 2200 without regulating flap
60-51-3261	T-piece nominal diam.	630 x 500 x 630 - 2200 without regulating flap
60-51-3257	T-piece nominal diam.	710 x 710 x 710 - 2200 without regulating flap
60-51-3259	T-piece nominal diam.	710 x 800 x 710 - 2200 without regulating flap
60-51-3262	T-piece nominal diam.	710 x 630 x 710 - 2200 without regulating flap
60-51-3263	T-piece nominal diam.	800 x 630 x 800 - 2200 without regulating flap
60-51-3264	T-piece nominal diam.	800 x 710 x 800 - 2200 without regulating flap
60-51-3267	T-piece nominal diam.	900 x 710 x 900 - 2200 without regulating flap

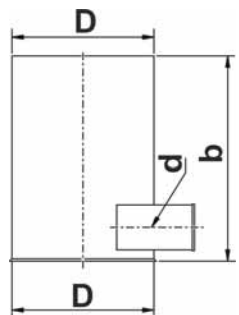


8.4.2 T-pieces and end pieces - Manure removal side

8.4.2.1 T-pieces with one flange

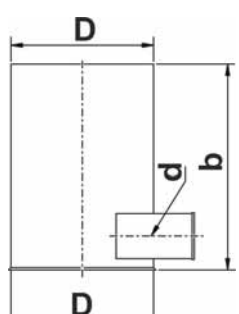
1-flange

Code no.	Description	D x d x d
60-51-4630	T-piece nominal diameter	500x400 / 200x500 920 mm with 1 flange
60-51-3296	T-piece nominal diam.	630x600 / 200x630 920 mm with 1 flange
60-51-3297	T-piece nominal diam.	710x600 / 200x710 920 mm with 1 flange
60-51-3299	T-piece nominal diam.	800x600 / 200x800 920 mm with 1 flange
60-51-3300	T-piece nominal diam.	900x600 / 200x900 920 mm with 1 flange



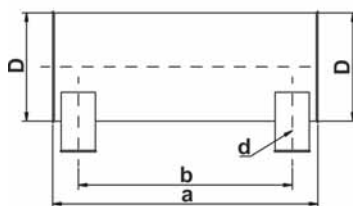
2 flanges

Code no.	Description	D x d x d
60-51-3291	T-piece nominal diameter	630x600 / 200x630 920 mm with 2 flanges
60-51-3292	T-piece nominal diam.	710x600 / 200x710 920 mm with 2 flanges



8.4.2.2 T-piece with two flanges

Code-No.	Description	D	d	a	b
60-51-3582	T-piece ND	630x2	600/200	1450mm	spacing 1150mm
60-51-3583	T-piece ND	710x2	600/200	1450mm	spacing 1150mm
60-51-3680	T-piece ND	800x2	600/200	1450mm	spacing 1150mm
60-51-3687	T-piece ND	900x2	600/200	1450mm	spacing 1150mm
60-51-3293	T-piece ND	630x2	600/200	1550mm	spacing 1250mm
60-51-3294	T-piece ND	710x2	600/200	1550mm	spacing 1250mm
60-51-3681	T-piece ND	800x2	600/200	1550mm	spacing 1250mm
60-51-3688	T-piece ND	900x2	600/200	1550mm	spacing 1250mm
60-51-3584	T-piece ND	630x2	600/200	1650mm	spacing 1350mm
60-51-3585	T-piece ND	710x2	600/200	1650mm	spacing 1350mm
60-51-3682	T-piece ND	800x2	600/200	1650mm	spacing 1350mm
60-51-3689	T-piece ND	900x2	600/200	1650mm	spacing 1350mm
60-51-3676	T-piece ND	630x2	600/200	1700mm	spacing 1400mm
60-51-3678	T-piece ND	710x2	600/200	1700mm	spacing 1400mm
60-51-3683	T-piece ND	800x2	600/200	1700mm	spacing 1400mm
60-51-3690	T-piece ND	900x2	600/200	1700mm	spacing 1400mm
60-51-3295	T-piece ND	630x2	600/200	1710mm	spacing 1410mm
60-51-3586	T-piece ND	710x2	600/200	1710mm	spacing 1410mm
60-51-3684	T-piece ND	800x2	600/200	1710mm	spacing 1410mm
60-51-3691	T-piece ND	900x2	600/200	1710mm	spacing 1410mm
60-51-3677	T-piece ND	630x2	600/200	1800mm	spacing 1500mm
60-51-3679	T-piece ND	710x2	600/200	1800mm	spacing 1500mm
60-51-3685	T-piece ND	800x2	600/200	1800mm	spacing 1500mm
60-51-3692	T-piece ND	900x2	600/200	1800mm	spacing 1500mm
60-51-3587	T-piece ND	630x2	600/200	1810mm	spacing 1510mm
60-51-3588	T-piece ND	710x2	600/200	1810mm	spacing 1510mm
60-51-3686	T-piece ND	800x2	600/200	1810mm	spacing 1510mm
60-51-3693	T-piece ND	900x2	600/200	1810mm	spacing 1510mm
60-51-3694	T-piece ND	630x2	600/200	1950mm	spacing 1650mm
60-51-3695	T-piece ND	710x2	600/200	1950mm	spacing 1650mm
60-51-3696	T-piece ND	800x2	600/200	1950mm	spacing 1650mm
60-51-3697	T-piece ND	900x2	600/200	1950mm	spacing 1650mm



Example:

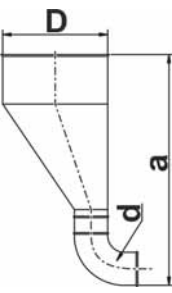
System type: UV600a => System width = 1540mm

$1540 - 190 = 1350$

spacing = 1350mm


8.4.2.3 End pieces reduced with one flange

Code no.	Description	D	d	b
60-51-3265	End piece reduced nominal diameter 630 x 600/200 without regulating flap			
60-51-3266	End piece reduced nominal diameter 710 x 600/200 without regulating flap			
60-51-3371	End piece reduced nominal diameter 630 x 600/200 without regulating flap length 850 mm			
60-51-3372	End piece reduced nominal diameter 710 x 600/200 without regulating flap length 850 mm			

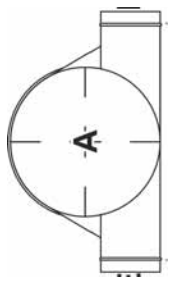


8.4.2.4 T-piece (oval) with flange (round) / below

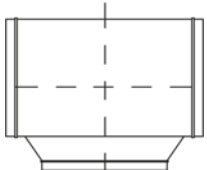
Code no.	Description E x D x A
83-13-1151	T-piece (E-D-A) ND 250/980 x 250/980 x ND 630 AF (VB980/630) -1000 with 2 plug-in couplings
83-13-1152	T-piece (E-D-A) ND 250/980 x 250/980 x ND 500 AF (VB 980/500) -1000 with 2 plug-in couplings
60-51-4708	T-piece (E-D-A) ND 200/600 x 200/600 x ND 500 AF (VB 600/500) -1000 with 2 plug-in couplings
60-51-4707	T-piece (E-D-A) ND 200/840 x 200/840 x ND 630 AF (VB 840/630) -1000 with 2 plug-in couplings
83-07-4887	T-piece (E-D-A) 200/600 x 200/600 x nominal diameter 710-1000 long
83-08-3741	T-piece (E-D-A) 200/600 x 200/600 x nominal diameter 800-1000 long
83-08-3744	T-piece (E-D-A) 200/600 x 200/600 x nominal diameter 900-1000 long
83-08-3745	T-piece (E-D-A) 200/600 x 200/600 x nominal diameter 1000 - 1000 long
83-08-5382	T-piece (E-D-A) 200/600 x 200/600 x nominal diameter 630-1000 long
83-12-0224	T-piece (E-D-A) 200/600 x 200/600 x nominal diameter 400-1000 long



8.4.2.5 T-piece (oval) with flange (round) / lateral

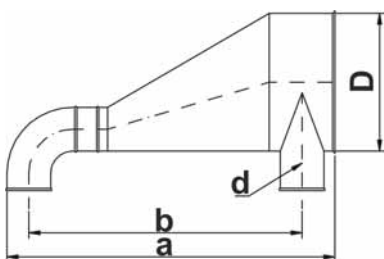
Code no.	Description E x D x A	
60-51-4634	T-piece (E-D-A) nominal diameter 250/980 x 250/980 x nominal diameter 630 AF (VB250/630 asymmetric) - 1000 with 2 plug-in couplings	
83-13-1154	T-piece (E-D-A) nominal diameter 200/840 x 200/840 x nominal diameter 500 AF (VB 200/500 asymmetric) -1000 with 2 plug-in couplings	
83-13-1161	T-piece (E-D-A) nominal diameter 200/600 x 200/600 x nominal diameter 500 AF (VB 200/500 asymmetric) -1000 with 2 plug-in couplings	

8.4.2.6 T-piece (oval) with flange (oval) / lateral

Code no.	Description E x D x A	
83-13-1163	T-piece (E-D-A) 840/200 x 840/200 x 840 x 200 (VB 200) - 1200 with 3 plug-in couplings	

8.4.2.7 End piece reduced with two flanges

Code-No.	Description	D	d	a	b
60-51-3592	End piece red ND	630x2	600/200	1400mm	spacing 1150mm
60-51-3593	End piece red ND	710x2	600/200	1400mm	spacing 1150mm
60-51-3604	End piece red ND	800x2	600/200	1400mm	spacing 1150mm
60-51-3611	End piece red ND	900x2	600/200	1400mm	spacing 1150mm
60-51-3369	End piece red ND	630x2	600/200	1500mm	spacing 1250mm
60-51-3370	End piece red ND	710x2	600/200	1500mm	spacing 1250mm
60-51-3605	End piece red ND	800x2	600/200	1500mm	spacing 1250mm
60-51-3612	End piece red ND	900x2	600/200	1500mm	spacing 1250mm
60-51-3594	End piece red ND	630x2	600/200	1600mm	spacing 1350mm
60-51-3595	End piece red ND	710x2	600/200	1600mm	spacing 1350mm
60-51-3606	End piece red ND	800x2	600/200	1600mm	spacing 1350mm
60-51-3613	End piece red ND	900x2	600/200	1600mm	spacing 1350mm
60-51-3600	End piece red ND	630x2	600/200	1650mm	spacing 1400mm
60-51-3602	End piece red ND	710x2	600/200	1650mm	spacing 1400mm
60-51-3607	End piece red ND	800x2	600/200	1650mm	spacing 1400mm
60-51-3614	End piece red ND	900x2	600/200	1650mm	spacing 1400mm
60-51-3375	End piece red ND	630x2	600/200	1660mm	spacing 1410mm
60-51-3596	End piece red ND	710x2	600/200	1660mm	spacing 1410mm
60-51-3608	End piece red ND	800x2	600/200	1660mm	spacing 1410mm
60-51-3615	End piece red ND	900x2	600/200	1660mm	spacing 1410mm
60-51-3601	End piece red ND	630x2	600/200	1750mm	spacing 1500mm
60-51-3603	End piece red ND	710x2	600/200	1750mm	spacing 1500mm
60-51-3609	End piece red ND	800x2	600/200	1750mm	spacing 1500mm
60-51-3616	End piece red ND	900x2	600/200	1750mm	spacing 1500mm
60-51-3597	End piece red ND	630x2	600/200	1760mm	spacing 1510mm
60-51-3598	End piece red ND	710x2	600/200	1760mm	spacing 1510mm
60-51-3610	End piece red ND	800x2	600/200	1760mm	spacing 1510mm
60-51-3617	End piece red ND	900x2	600/200	1760mm	spacing 1510mm
60-51-3618	End piece red ND	630x2	600/200	1900mm	spacing 1650mm
60-51-3619	End piece red ND	710x2	600/200	1900mm	spacing 1650mm
60-51-3620	End piece red ND	800x2	600/200	1900mm	spacing 1650mm
60-51-3621	End piece red ND	900x2	600/200	1900mm	spacing 1650mm



Example:


System type: UV600a => system width = 1540mm

$1540 - 190 = 1350$

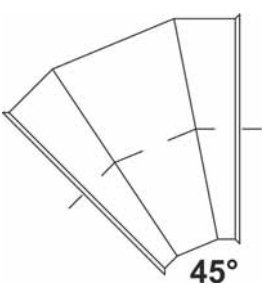
Spacing = 1350mm

8.4.3 Bends

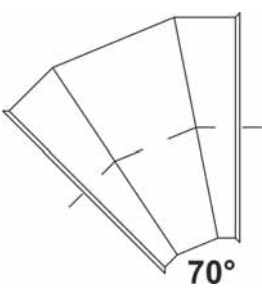
8.4.3.1 Bend 20 degree

Code no.	Description	 <p>20°</p>
60-51-3404	Bend 20° nominal diameter 400	
60-51-3405	Bend 20° nominal diameter 500	
60-51-3406	Bend 20° nominal diameter 630	
60-51-3407	Bend 20° nominal diameter 710	
60-51-3408	Bend 20° nominal diameter 800	

8.4.3.2 Bend 45 degree

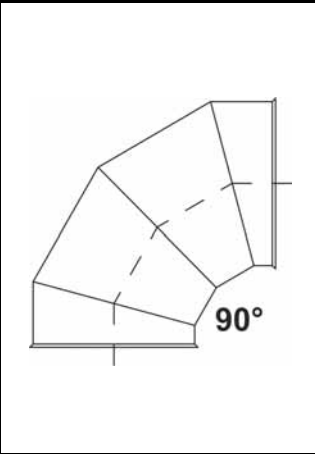
Code-No.	Description	 <p>45°</p>
60-51-3312	Bend 45deg ND200	
60-51-3313	Bend 45deg ND300	
60-51-3314	Bend 45deg ND400	
60-51-3315	Bend 45deg ND500	
60-51-3316	Bend 45deg ND630	
60-51-3317	Bend 45deg ND710	
60-51-3318	Bend 45deg ND800	
60-51-3319	Bend 45deg ND900	
60-51-3320	Bend 45deg ND1000	

8.4.3.3 Bend 70 degree

Code no.	Description	 <p>70°</p>
60-51-3414	Bend 70 ° nominal diameter 400	
60-51-3415	Bend 70 ° nominal diameter 500	
60-51-3416	Bend 70 ° nominal diameter 630	
60-51-3417	Bend 70 ° nominal diameter 710	
60-51-3418	Bend 70 ° nominal diameter 800	

8.4.3.4 Bend 90 degree

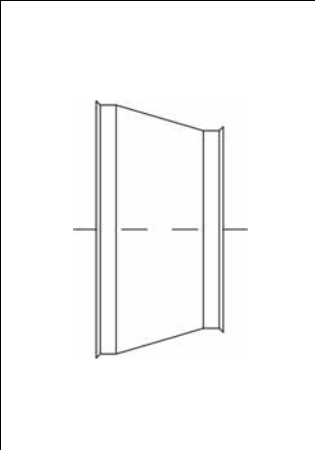
Code-No.	Description
60-51-3302	Bend 90deg ND200
60-51-3303	Bend 90deg ND300
60-51-3304	Bend 90deg ND400
60-51-3305	Bend 90deg ND500
60-51-3306	Bend 90deg ND630
60-51-3307	Bend 90deg ND710
60-51-3308	Bend 90deg ND800
60-51-3309	Bend 90deg ND900
60-51-3310	Bend 90deg ND1000



8.4.4 Connecting pieces

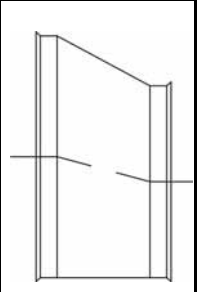
8.4.4.1 Round onto round (asymmetric)

Code-No.	Description
60-51-3379	Connect. piece 400/300 onto roller laminated tube
60-51-3380	Connect. piece 400/500 onto roller laminated tube
60-51-3381	Connect. piece 500/630 onto roller laminated tube
60-51-3382	Connect. piece 630/710 onto roller laminated tube
60-51-3383	Connect. piece 630/800 onto roller laminated tube
60-51-3384	Connect. piece 710/800 onto roller laminated tube
60-51-3385	Connect. piece 710/500 onto roller laminated tube
60-51-3386	Connect. piece 800/900 onto roller laminated tube
60-51-3387	Connect. piece 900/1000 onto roller laminated tube



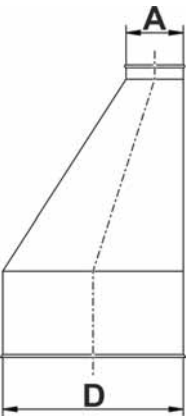
8.4.4.2 Round onto round (asymmetric)

Code no.	Description
83-13-0543	Transition piece asymmetric 800/900 onto tube 400 mm long
83-13-0544	Transition piece asymmetric 800/710 onto tube 400 mm long
83-13-0545	Transition piece asymmetric 710/630 onto tube 400 mm long
83-13-0547	Transition piece asymmetric 630/500 onto tube 400 mm long

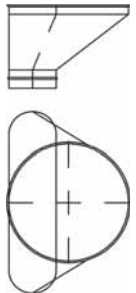


8.4.4.3 Oval onto round

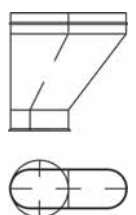
After 2

Code no.	Description	
60-51-4600	Transition piece with 1 flange from nominal diameter 400/200 to nominal diameter 400 - 1000 mm	
60-51-4602	Transition piece with 1 flange from nominal diameter 400/200 to nominal diameter 500 - 1000 mm	
60-51-4601	Transition piece with 1 flange from nominal diameter 600/200 to nominal diameter 630 - 1000 mm	
83-13-0618	Transition piece oval/round asymmetric nominal diameter 200/600 nominal diameter 500AF onto 2-400mm	

After 2

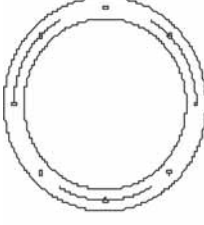
Code no.	Description	
83-13-0548	Transition piece oval/round asymmetric nominal diameter 250/980 nominal diameter 630AF onto 2-450 mm	
83-13-0551	Transition piece oval/round asymmetric nominal diameter 200/840 nominal diameter 200AF onto 2-400mm	
83-13-0549	Transition piece oval/round asymmetric nominal diameter 250/980 nominal diameter 710AF onto 2-450mm	
83-13-0614	Transition piece oval/round asymmetric nominal diameter 200/840 nominal diameter 500AF onto 2-400mm	
83-13-0617	Transition piece oval/round asymmetric nominal diameter 200/840 nominal diameter 630AF onto 2-400mm	

After 3

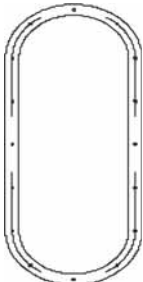
Code no.	Description	
83-13-0622	Transition piece oval/round asymmetric nominal diameter 200/400 nominal diameter 200AF onto 3-400mm	
83-13-0620	Transition piece oval/round asymmetric nominal diameter 200/600 nominal diameter 200AF onto 3-400mm	

8.4.4.4 Adapter

Round

Code no.	Description	
83-08-9423	Connection piece 90° nominal diameter 200 flange 60mm with collar 25 mm	
60-50-3896	Adapter (RH56C) nominal diameter 650 with collar 20 mm	

Oval

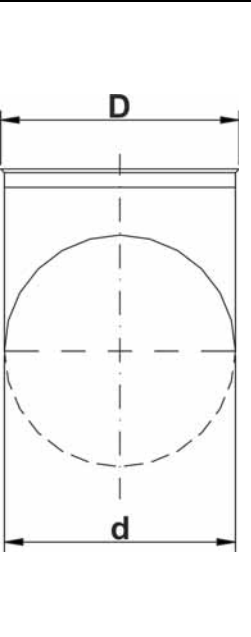
Code no.	Description	
60-51-4747	Connection piece nominal diameter 200/600 (pipe dim.) height 25 mm with 25mm collar and 16 holes 5 mm	
60-51-4748	Connection piece nominal diameter 200/400 (pipe dim.) height 25 mm with 25mm collar and 12 holes 5 mm	
83-11-0070	Adapter nominal diameter 440/80 with collar 13 mm	

8.4.4.5 Connection pieces

Connection piece complete:

The connection pieces cpl. comprise screws for the fastening at the main distributor and silicone for the sealing.

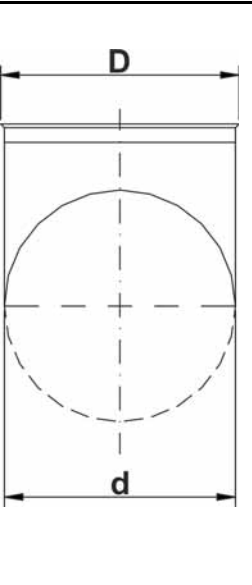
Code no.	Description	D	d
60-50-4020	Connection piece cpl nominal diameter 500 with flange onto 630		
60-50-4021	Connection piece cpl nominal diameter 630 with flange onto 630		
60-50-4022	Connection piece cpl nominal diameter 710 with flange onto 630		
60-50-4023	Connection piece cpl nominal diameter 800 with flange onto 630		
60-50-4024	Connection piece cpl nominal diameter 710 with flange onto 710		
60-50-4025	Connection piece cpl nominal diameter 800 with flange onto 710		
60-50-4026	Connection piece cpl nominal diameter 800 with flange onto 800		
60-50-4027	Connection piece cpl nominal diameter 710 with flange onto 800		
60-50-4029	Connection piece cpl nominal diameter 630 with flange onto 710		
60-50-4030	Connection piece cpl nominal diameter 630 with flange onto 500		
60-50-4031	Connection piece cpl nominal diameter 500 with flange onto 500		
60-50-4032	Connection piece cpl nominal diameter 630 with flange onto 800		
60-50-4033	Connection piece cpl nominal diameter 630 with flange onto 900		
60-50-4034	Connection piece cpl nominal diameter 710 with flange onto 900		



Further connection pieces can be obtained as single parts without fastening screws and silicone.

Connection piece single:

Code-No.	Description	D	d
60-50-3834	Connect. piece 90deg ND300 w/flange onto 200		
60-50-3835	Connect. piece 90deg ND300 w/flange onto 300		
60-50-3836	Connect. piece 90deg ND710 w/flange onto 630		
60-50-3837	Connect. piece 90deg ND800 w/flange onto 630		
60-50-3838	Connect. piece 90deg ND710 w/flange onto 710		
60-50-3839	Connect. piece 90deg ND800 w/flange onto 710		
60-50-4040	Connect. piece 90deg ND800 w/flange onto 800		
60-50-4041	Connect. piece 90deg ND710 w/flange onto 800		
60-50-4042	Connect. piece 90deg ND630 w/flange onto 710		
60-50-4043	Connect. piece 90deg ND630 w/flange onto 500		
60-50-4044	Connect. piece 90deg ND500 w/flange onto 500		
60-50-4045	Connect. piece 90deg ND630 w/flange onto 800		




The following has to be ordered separately for each connection piece:

2 pieces 99-50-4000 Silicone transparent universal cartridge 310 ml

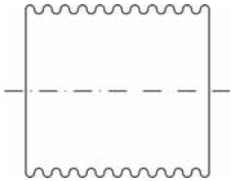
200 pieces 99-10-3882 Drilling screw 4.8 x 16 DIN 7504-K galvanized

8.4.5 Flexible neck fitting


8.4.5.1 Flexible neck fitting

Code-No.	Description	
60-50-3840	Flexible neck fitting NW500 L2 133mm bilateral AF flange	
60-50-3856	Flexible neck fitting ND630 L2 133mm bilateral AF flange	
60-50-3857	Flexible neck fitting ND710 L2 133mm bilateral AF flange	
60-50-3858	Flexible neck fitting ND800 L2 133mm bilateral AF flange	
60-50-3859	Flexible neck fitting ND710 L2 133mm bilateral AF flange	

8.4.5.2 Tube flexible


Code-No.	Description	
60-54-4602	Tube flexible BD dia 203mm (grey/blue) max. length 2m	
60-50-3919	Tube flexible dia 160mm	
60-50-3920	Tube flexible dia 203mm	
60-50-3930	Tube flexible dia 305mm	
60-50-3940	Tube flexible dia 406mm	
60-50-3950	Tube flexible dia 508mm	
60-50-3960	Tube flexible dia 635mm	
60-50-3970	Tube flexible dia 710mm	
60-50-3980	Tube flexible dia 810mm	

8.4.5.3 Pipe clamp


Code-No.	Description	
60-50-3988	Tube clamp 60-215mm	
60-50-3994	Tube clamp 60-525mm	
60-50-3995	Tube clamp 60-660mm	
60-50-3996	Tube clamp dia 710mm	
60-50-3997	Tube clamp dia 810mm	

8.4.6 Cover

8.4.6.1 Round

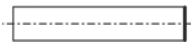
Code no.	Description	
60-51-3121	Cover with flange nominal diameter 200	
60-51-3130	Cover with flange nominal diameter 300	
60-51-3140	Cover with flange nominal diameter 400	
60-51-3150	Cover with flange nominal diameter 500	
60-51-3163	Cover with flange nominal diameter 630	
60-51-3171	Cover with flange nominal diameter 710	
60-51-3182	Cover with flange nominal diameter 800	
60-51-3190	Cover with flange nominal diameter 900	

8.4.6.2 Oval

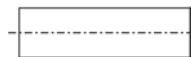
Code no.	Description	
60-51-4712	Cover without flange nominal diameter 460/100	
60-51-4692	Cover without flange nominal diameter 400/200	
60-51-3070	Cover without flange nominal diameter 600/200	
60-51-4711	Cover without flange nominal diameter 840/200	
	Cover without flange nominal diameter 250/980	

8.4.7 Roller laminated tubes


8.4.7.1 Nominal diameter 200mm

Code-No.	Description	
60-51-3142	Roller laminated tube ND200-1000 w/1flange	
60-51-3098	Roller laminated tube ND200-1500 w/1flange	
60-51-3112	Roller laminated tube ND200-2000 w/1flange	
60-51-3172	Roller laminated tube ND200-2500 w/1flange	
60-51-3122	Roller laminated tube ND200-3000 w/1flange	
60-51-3132	Roller laminated tube ND200-5000 w/1flange	


8.4.7.2 Nominal diameter 300mm

Code-No.	Description	
60-51-3143	Roller laminated tube ND300-1000 w/1flange	
60-51-3103	Roller laminated tube ND300-1500 w/1flange	
60-51-3113	Roller laminated tube ND300-2000 w/1flange	
60-51-3173	Roller laminated tube ND300-2500 w/1flange	
60-51-3123	Roller laminated tube ND300-3000 w/1flange	
60-51-3133	Roller laminated tube ND300-5000 w/1flange	


8.4.7.3 Nominal diameter 400mm

Code-No.	Description	
60-51-3144	Roller laminated tube ND400-1000 with 1 flange	
60-51-3104	Roller laminated tube ND400-1500 with 1 flange	
60-51-3114	Roller laminated tube ND400-2000 with 1 flange	
60-51-3174	Roller laminated tube ND400-2500 with 1 flange	
60-51-3124	Roller laminated tube ND400-3000 with 1 flange	
60-51-3134	Roller laminated tube ND400-5000 with 1 flange	


8.4.7.4 Nominal diameter 500mm

Code-No.	Description	
60-51-3145	Roller laminated tube ND500-1000 w/1flange	
60-51-3105	Roller laminated tube ND500-1500 w/1flange	
60-51-3115	Roller laminated tube ND500-2000 w/1flange	
60-51-3175	Roller laminated tube ND500-2500 w/1flange	
60-51-3125	Roller laminated tube ND500-3000 w/1flange	
60-51-3135	Roller laminated tube ND500-5000 w/1flange	


8.4.7.5 Nominal diameter 630mm

Code-No.	Description	
60-51-3146	Roller laminated tube ND630-1000 w/1flange	
60-51-3106	Roller laminated tube ND630-1500 w/1flange	
60-51-3116	Roller laminated tube ND630-2000 w/1flange	
60-51-3176	Roller laminated tube ND630-2500 w/1flange	
60-51-3126	Roller laminated tube ND630-3000 w/1flange	
60-51-3136	Roller laminated tube ND630-5000 w/1flange	


8.4.7.6 Nominal diameter 710mm

Code-No.	Description	
60-51-3147	Roller laminated tube ND710-1000 w/1flange	
60-51-3107	Roller laminated tube ND710-1500 w/1flange	
60-51-3117	Roller laminated tube ND710-2000 w/1flange	
60-51-3177	Roller laminated tube ND710-2500 w/1flange	
60-51-3127	Roller laminated tube ND710-3000 w/1flange	
60-51-3137	Roller laminated tube ND710-5000 w/1flange	


8.4.7.7 Nominal diameter 800mm

Code-No.	Description	
60-51-3148	Roller laminated tube ND800-1000 w/1flange	
60-51-3108	Roller laminated tube ND800-1500 w/1flange	
60-51-3118	Roller laminated tube ND800-2000 w/1flange	
60-51-3178	Roller laminated tube ND800-2500 w/1flange	
60-51-3128	Roller laminated tube ND800-3000 w/1flange	
60-51-3138	Roller laminated tube ND800-5000 w/1flange	


8.4.7.8 Nominal diameter 900mm

Code-No.	Description	
60-51-3149	Roller laminated tube ND900-1000 w/1flange	
60-51-3109	Roller laminated tube ND900-1500 w/1flange	
60-51-3119	Roller laminated tube ND900-2000 w/1flange	
60-51-3179	Roller laminated tube ND900-2500 w/1flange	
60-51-3129	Roller laminated tube ND900-3000 w/1flange	
60-51-3139	Roller laminated tube ND900-5000 w/1flange	

8.4.7.9 Nominal diameter 1000mm

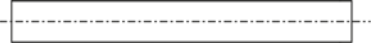
Code-Nr.	Description	
60-51-3151	Roller laminated tube ND1000-1000 w/1 flange	
60-51-3110	Roller laminated tube ND1000-1500 w/1 flange	
60-51-3120	Roller laminated tube ND1000-2000 w/1 flange	
60-51-3180	Roller laminated tube ND1000-2500 w/1 flange	
60-51-3131	Roller laminated tube ND1000-3000 w/1 flange	
60-51-3141	Roller laminated tube ND1000-5000 w/1 flange	

8.4.7.10 Nominal diameter 1120mm


Code no.	Description	
60-51-3181	Roller laminated tube 1120-2500 with 1 flange	
60-51-3158	Roller laminated tube 1120-5000 with 1 flange	

8.4.8 Oval tubes

8.4.8.1 Nominal diameter 200/400mm

Code-No.	Description	
60-51-4609	C-Tube ND400/200-1000	
60-51-4610	C-Tube ND200/400 - 1500	
60-51-4611	C-Tube ND200/400 - 2000	


8.4.8.2 Nominal diameter 200/600mm

Code-No.	Description	
60-51-3065	C-Tube ND200/600 - 1000	
60-51-3083	C-Tube ND200/600 - 1200	
60-51-3084	C-Tube ND200/600 - 1400	
60-51-3085	C-Tube ND200/600 - 1500	
60-51-3086	C-Tube ND200/600 - 1600	
60-51-3087	C-Tube ND200/600 - 1800	
60-51-3088	C-Tube ND200/600 - 2000	
60-51-3089	C-Tube ND200/600 - 2200	
60-51-3090	C-Tube ND200/600 - 2400	
60-51-3093	C-Tube ND200/600 - 2600	
60-51-3094	C-Tube ND200/600 - 2800	
60-51-3095	C-Tube ND200/600 - 3000	
60-51-3096	C-Tube ND200/600 - 3200	
60-51-3097	C-Tube ND200/600 - 3400	


8.4.8.3 Nominal diameter 200/840mm

Code-No.	Description	
60-51-4701	C-Tube ND200/840 - 2000	
60-51-4702	C-Tube ND200/840 - 3000	
60-51-4723	C-Tube ND200/840 - 3400	


8.4.8.4 Nominal diameter 320/80 mm

Code no.	Description	
60-51-4700	Connection tube nominal diameter 320 / 80-1000	
60-51-4724	Connection tube nominal diameter 320 / 80-500	


8.4.8.5 Nominal diameter 440/80 mm

Code no.	Description	
83-11-0065	Connection tube nominal diameter 440 / 80-1000	


8.4.8.6 Ceiling suspension for oval tube

Code no.	Description	
83-06-3691	Suspension air duct oval universal 1000	
99-50-0003	Ship chain hot-dip galvanized 5 mm DIN 766	
99-50-0011	S-hook 1" no. 40/4 x 35	
10-93-1629	Cup hook galvanized 80 x 22 x 7.8	

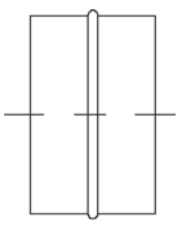
8.4.9 Flanged ring

Code-No.	Description	
60-51-3721	Flanged ring AF 20	
60-51-3731	Flanged ring AF30	
60-51-3741	Flanged ring AF40	
60-51-3751	Flanged ring AF50	
60-51-3764	Flanged ring AF63	
60-51-3772	Flanged ring AF71	
60-51-3781	Flanged ring AF80	
60-51-3791	Flanged ring AF90	
60-51-3792	Flanged ring AF100	
60-51-3813	Flanged ring AF112	

8.4.10 Tension rings

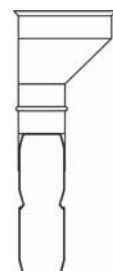
Code-No.	Description	
60-51-3720	Tension ring SR 20 w/packing ring	
60-51-3730	Tension ring SR 30 w/packing ring	
60-51-3740	Tension ring SR 40 w/packing ring	
60-51-3750	Tension ring SR 50 w/packing ring	
60-51-3763	Tension ring SR 63 w/packing ring	
60-51-3771	Tension ring SR 71 w/packing ring	
60-51-3780	Tension ring SR 80 w/packing ring	
60-51-3790	Tension ring SR 90 w/packing ring	
60-51-3800	Tension ring w/seal SR1000	
60-51-3812	Tension ring SR112 w/packing ring	

8.4.11 Plug-in couplings

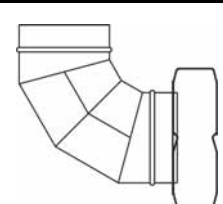
Code no.	Description	
60-51-4710	Plug-in coupling 100/460 - 130	
60-51-3077	Plug-in coupling 200/400 - 130	
60-51-3069	Plug-in coupling 200/600 - 130	
60-51-4709	Plug-in coupling 200/840 - 130	
	Plug-in coupling 250/980 - 130	

8.4.12 Connecting material for Natura systems 250 / 260 central


8.4.12.1 Connection from tube on air duct "A" from above/central

Code no.	Description	
60-51-4740	Connection piece air duct A-above on nominal diameter 600/200 Natura 250/260 central infeed	
60-51-4741	Connection piece air duct A-above on nominal diameter 400/200 Natura 250/260 central infeed	
60-51-4742	Connection piece air duct A-above on nominal diameter 200 Natura 250/260 central infeed	

8.4.12.2 Connection from tube on air duct "A" from the side/central


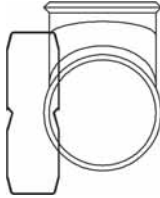
Code no.	Description	
60-51-4743	Connection piece air duct A-side on nominal diameter 600/200 Natura 250/260 / central infeed	
60-51-4744	Connection piece air duct A-side on nominal diameter 400/200 Natura 250/260 / central infeed	

8.4.12.3 Connection from tube on air duct "a" from the side/central

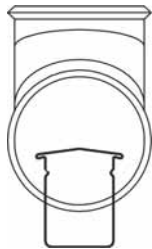
Code no.	Description	
60-51-4745	Connection piece air duct A-side on nominal diameter 600/200 Natura 250/260 / central infeed	
60-51-4746	Connection piece air duct A-side on nominal diameter 400/200 Natura 250/260 / central infeed	

8.4.13 Connecting material for Natura systems 250 / 260 in front

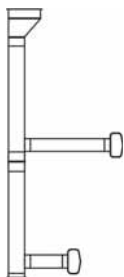
8.4.13.1 Connection from tube nominal diameter 200 on air duct "A" side/ front 45°

Code no.	Description	left	right
right			
60-54-4171	Air inlet 98 x 306 on tube nominal diameter 200 45° right-hand		
60-54-4172	Longitudinally folded tube (smooth) nominal diameter 200-200 with 1 flange		
60-54-3302	Bend 90 ° nominal diameter 200		
left-hand side			
60-54-4170	Air inlet 98 x 306 on tube nominal diameter 200 45° left-hand		
60-54-4172	Longitudinally folded tube (smooth) nominal diameter 200-200 with 1 flange		
60-51-3302	Bend 90 ° nominal diameter 200		

8.4.13.2 Connection from tube nominal diameter 200 to air duct "a" / front

Code no.	Description	
60-54-4172	Longitudinally folded tube (smooth) nominal diameter 200-200 with 1 flange	
60-51-3302	Bend 90 ° nominal diameter 200	
37-96-4519	Air duct 100 x 160 per tier in the end set 2nd end	

8.4.14 Connecting material 2t Natura 60/70 1 row ND460/100 -2000mm

Code no.	Description	
60-52-4715	Distribution tube 2 tiers Natura 60/70 1 row nominal diameter 460/100 -2000 mm	

9 Glossary

ASHRAE:

(Abbreviation for American Society of Heating, Refrigerating and Air-Conditioning Engineers) is a professional association of all engineers active in heating, refrigerating and air-conditioning in USA. The domicile of the association is Atlanta. The ASHRAE manual is a reference book consisting of four volumes for air-conditioning technology. A book is reissued every year. ASHRAE also publishes norms and guidelines in the area of climate technology to which reference is made in building regulations.

Clean gas:

describes a gas which has been cleaned through filtration.

Corrosion:

The reaction between a material and its environment which has a measurable effect on the material and can interfere with the function of a component or system.

Designated use:

is the designated use of product in accordance with its intended purpose.

Incorrect use:

is improper use of a product, not in accordance with its intended purpose.

Protection class:

designates the suitability for different environmental conditions. The abbreviation IP is for *International Protection*. The first code digit of the IP-code is for the protection against foreign substances, the second digit stands for the protection against water. The higher the number, the higher the existing protection.

Rated current:

designates the current of a protective switch specified by the manufacturer of an electric device for a given operating condition.

Resonance range:

Resonance (from the Latin word: resonare = "resound") describes the reinforced resonance of a vibratory system. The resonance range describes the range in which the system resonates increasingly.

Separation rate (for example dust):

describes the capacity of a filter (e. g. at a dedusting process) within a certain time.

State of the art:

represents the technical possibilities at a certain point in time, based on validated scientific and technical knowledge.

Supervisor:

is a reliable person who is familiar with the work and authorized to issue instructions. He ensures that the work is performed safely. He must have sufficient technical knowledge.

Surface filtration:

the particle-charged gas (untreated gas) normally flows from the outside inwards through the filter hoses, through this a dust layer (filter cake) is created on the surface of the filter medium which works as high effective filter with increasing thickness.

Untreated gas:

describes a gas which e. g. is contaminated with dust particles.



10 Checklist key points summary



Important! Please remember to cut this page and the following pages along the line from this manual and keep them save as **blank** master copies!

Date _____

Name _____

Key points before moving the birds in (or yearly):		
	Result	Comments
<input type="checkbox"/> Clean the complete air mixer / the complete radial fan thoroughly. Check whether all contaminations have been removed (filter, flaps, fan, interior space).		
<input type="checkbox"/> Check the function of the fan in the air mixer / radial fan, and the wear and tension of the V-Belts, if necessary, and grease the bearings.		
<input type="checkbox"/> Check whether drillings in the air ducts are free and clean.		
<input type="checkbox"/> Check the function of the air flaps of the air mixer.		
<input type="checkbox"/> Check the fan of the radial impellers for mechanical vibrations according to ISO 14694.		

Key points for daily control of the air mixers / radial fans		
	Result	Comments
<input type="checkbox"/> Check the function of the air intake fan.		
<input type="checkbox"/> Check the function of the air flaps.		
<input type="checkbox"/> Check the vibration of the fan (limit values see ISO 14694:2013).		



The cleaning frequency depends on the dust concentration of the ambient air. Dust deposits must not negatively influence the heat release or running properties since will lead to damages at the machine (see also 3.1.1.2 "Monitoring air mixer")!



Key points for the regular maintenance of the air mixers / radial fans		Result	Comments
<input type="checkbox"/>	Switch off the fan for cleaning the filter mats. Remove the filter mats and clean them by means of a vacuum cleaner or compressed air. Caution: Blow air out in the opposite direction of the air flow !!!		
<input type="checkbox"/>	Clean the motor from dust deposits.		
<input type="checkbox"/>	Clean the fan from dust deposits.		
<input type="checkbox"/>	Grease the bearings of the radial fan 4 times a year with ball bearing grease of penetration class 2 (for example with SKF-65 or SKF Alfalub LGMT-2).		

Key points for the monthly maintenance of the air mixers / radial fans		Result	Comments
<input type="checkbox"/>	Check the V-belt of the radial fan every month for tension and wear.		

For a detailed description of all steps of the procedure, please refer to chapter 6.1.2.2 "Radial fan with belt drive and flange bearings"