

**TECHNICAL
MANUAL**

**Roof smoke exhaust fan
mcr Pasat**



Version: Pasat 23.07.15.1.

FIRE VENTILATION SYSTEMS

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Technical Manual designations

- – available option
- – unavailable option

CAUTION

All previous issues of this Technical Manual expire on the date of issue hereof. This Technical Manual does not apply to any fans manufactured prior to this Manual's date of issue.

1. FOREWORD

This Technical Manual is addressed to users/operators of type mcr Pasat roof smoke exhaust fans. This document is intended to provide guidelines on the application, design, commissioning and operation of the product.



Read this Technical Manual thoroughly before installing this equipment at its operating site and commissioning.



If the equipment is found malfunctioning or defective, contact the manufacturer or their Authorised Representative.



Due to the continuous product improvement policy, we reserve the right to change the product design in order to improve its performance and safety.

This equipment has been designed and manufactured according to the following standards:

PN-EN 12101-3:2004	Smoke and heat control systems. Part 3: Specification for powered smoke and heat exhaust fans.
PN-EN ISO 12100-1:2005	Safety of machinery. Basic concepts, general principles for design. Part 1: Basic terminology, methodology.
PN-EN ISO 12100-2:2005	Safety of machinery. Basic concepts, general principles for design. Part 2: Technical principles.
PN-EN 60204-1:2001	Safety of machinery. Electrical equipment of machines. Part 1: General requirements.

The smoke exhaust fan design also meets the state of the art in technology, while assuring health and safety protection.

2. MANUFACTURER'S DISCLAIMER

- The manufacturer shall not be liable for any consequences of non-intended use or misuse of the equipment.
- DO NOT install any components that are not included in the equipment composition or accessories.
- Unauthorised modifications or alteration of this equipment is strictly prohibited.
- Protect the equipment enclosure (casing) from mechanical damage.
- Before attempting to install this equipment, verify the load bearing capacity of the structural elements to which the equipment is to be fastened. Unreliable fastening may result in damage or failure of the equipment and/or be hazardous to all nearby personnel.
- This fan is not intended for forcing air with viscous pollutants that may settle on the equipment, and especially on its rotor.

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- This fan is not intended for forcing air with corrosive pollutants that may be detrimental to the equipment.
 - The maximum actual rotor RPM must never exceed the nominal (rated) RPM speed in operation.
 - The manufacturer shall not be liable for any injuries, trauma or other bodily harm caused by misuse of this equipment.

3. SUBJECT

The subject of this Technical Manual is:

- mcr Pasat F400 roof smoke exhaust radial fans
- mcr Pasat F300 roof smoke exhaust radial fans
- mcr Pasat F200 roof smoke exhaust radial fans
- mcr Pasat F600 roof smoke exhaust radial fans



4. INTENDED USE

4.1. Application

The type mcr Pasat roof smoke exhaust fans are intended to remove smoke and heat generated in indoor rooms on fire. The equipment facilitates evacuation of persons from the area on fire, protect the building structure and its furnishing from high temperature, facilitate fire fighting, and inhibit spreading of fire to adjacent fire zones.

The available versions include:

- single-functional with single-speed motors;
- two-functional, i.e. for general and fire ventilation and with two-speed motors.

The fans can be installed outdoors: on suitable consoles/roof ventilator bases with the motor in the vertical orientation.

The fan overall compression ratio makes them compatible with ventilation systems characterised by relatively high flow resistance.



The fan may force dry air only and with a maximum particulate content of 0.3 g/m³.



This fan is not intended for forcing air with viscous pollutants that may settle on the equipment, and especially on its rotor.



This fan is not intended for forcing air with corrosive pollutants that may be detrimental to the equipment.



The maximum actual rotor RPM must never exceed the nominal (rated) RPM speed in operation.



Following operation in actual fire conditions, the ventilator will not be fit for further use.

4.2. Fire resistance

- Class F400 – fire resistance at 400°C for 120 minutes
- Class F300 – fire resistance at 300°C for 60 minutes
- Class F200 – fire resistance at 200°C for 120 minutes
- Class F600 – fire resistance at 600°C for 60 minutes

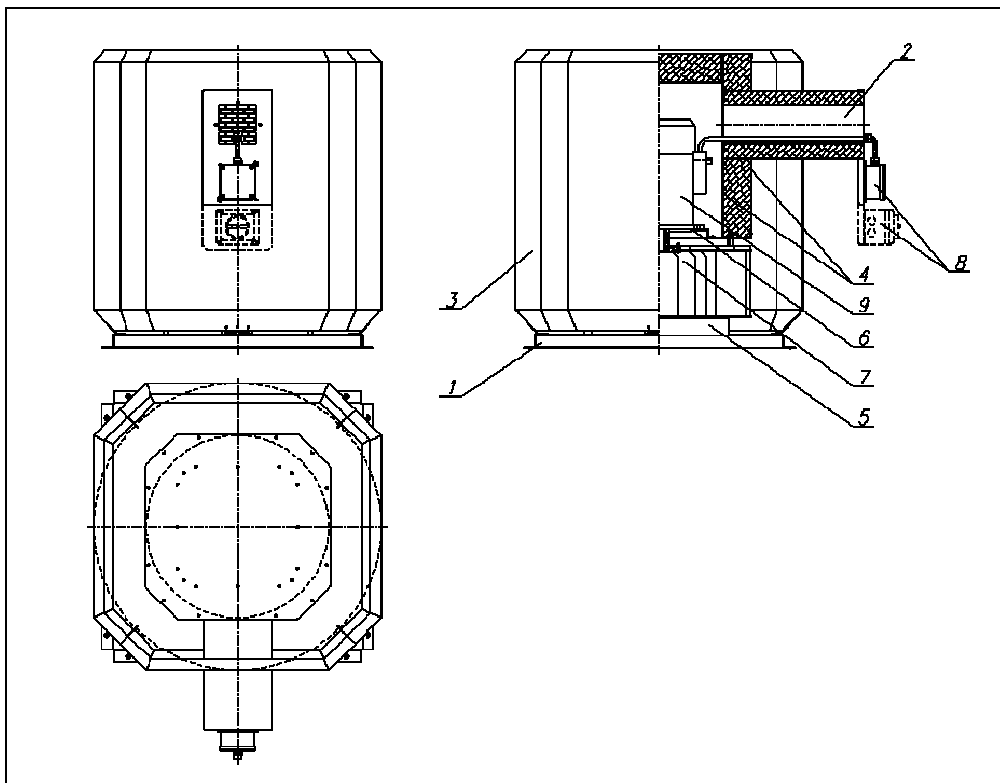


4.3. Versions

- Single-speed single-functional fans
- Two-speed two-functional fans

5. DESIGN AND OPERATING PRINCIPLE

5.1. Design



- 1 - Fan base
- 2 - Cooling duct
- 3 - External housing
- 4 - Motor housing
- 5 - Inlet port
- 6 - Motor base
- 7 - Radial rotor
- 8 - Electric box / service switch [option]
- 9 - Electric motor

The mcr Pasat roof smoke exhaust fan comprises an electrical motor with the insulation class F, a radial rotor and an external housing assembly.

The insulated housing encloses the electric motor, on the shaft neck of which the steel rotor is installed. The air intake to the rotor is guided by the inlet port.

The rotor is a single-sided suction rotor with swept-back blades. The rotor also features blades which generate vacuum in the motor chamber. This sucks ambient air through the cooling duct.

The fan design facilitates draining of water out of the casing. The water to be drained may originate from ingress of rain, melting snow or condensed water vapour from the sucked in air.

Each fan features an inspection hatch which permits verification of the rotor sense of rotation.

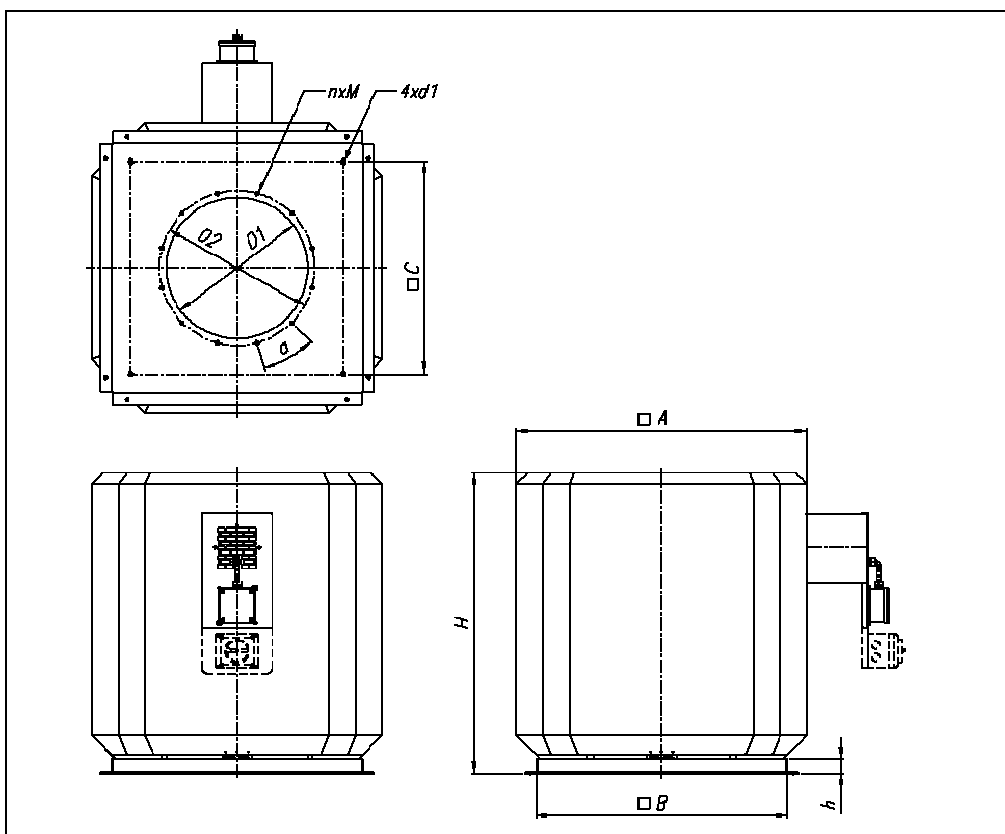
5.2. Function

The single-functional fans do not run in standby. When 3-phase voltage is present on the electric box terminals, the fan is started and running.

The two-functional fans run at low speed (RPM) to handle general ventilation under normal conditions. When the fan receives an alarm signal, it automatically starts running with the second speed, which is higher than the first one.

5.3. Dimensions

mcr Pasat smoke exhaust fans - Table of dimensions										
Fan - Type	A [mm]	B [mm]	H [mm]	h [mm]	C [mm]	D1 [mm]	D2 [mm]	d1 [mm]	nxM	a [°]
mcr Pasat 31	650	560	650	40	460	315	356	14	8xM8	45
mcr Pasat 35	840	710	750	40	600	355	395	14	8xM8	45
mcr Pasat 40	880	710	850	40	600	400	438	14	12xM8	30
mcr Pasat 50	1000	1000	900	40	880	500	541	18	12xM8	30
mcr Pasat 63	1350	1000	1350	40	880	630	674	18	16xM10	22.5
mcr Pasat 71	1400	1160	1350	40	1040	710	751	18	16xM10	22.5

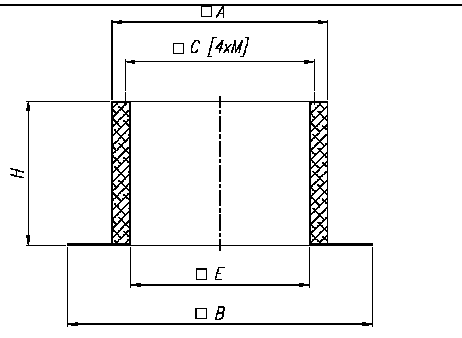


5.4. Accessories

➤ Type PD strap-on roof fan base

made of galvanized steel sheet. The product is intended for installing the smoke exhaust fan on flat or sloped roofs.

Type PD strap-on roof fan base							
Fan - Type	Type	A [mm]	B [mm]	C [mm]	E [mm]	H [mm]	nxM
mcr Pasat 31	PD-31	525	740	460	405	350	4xM10
mcr Pasat 35	PD-35	675	870	600	555	350	4xM10
mcr Pasat 40	PD-40	675	870	600	555	350	4xM10
mcr Pasat 50	PD-50	965	1150	880	845	350	4xM14
mcr Pasat 63	PD-63	965	1150	880	845	450	4xM14
mcr Pasat 71	PD-71	1125	1310	1040	1005	450	4xM16

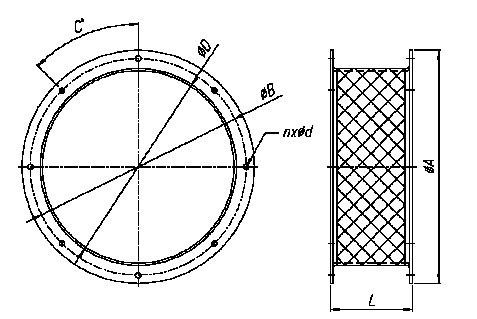


➤ Type KD flexible joint

features a laminar design; it is terminated with a flange with the holes sized and spaced as on the mating component flange. The special fibreglass silicate textile ensure durability at 400°C for 120 min or at 600°C for 60 min.

Type KD flexible joint is used to eliminate the vibrations transmitted from the fan to the ventilation system. It acts as a vibration damper. It is also used to compensate for thermal elongation. The fan integrated in a ventilation system should feature the flexible joint on the suction side.

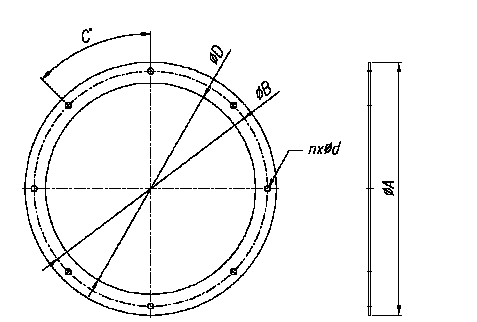
Type KD flexible joint								
Fan - Type	Type	D [mm]	-A [mm]	B [mm]	L [mm]	C	nx ϕ d [mm]	m [kg]
mcr Pasat 35	KD-31	315	385	356	150	45	8x9.6	1.0
mcr Pasat 35	KD-35	355	425	395	150	45	8x9.6	1.1
mcr Pasat 40	KD-40	400	470	438	150	30	12x9.6	1.3
mcr Pasat 50	KD-50	500	570	541	150	30	12x9.6	1.6
mcr Pasat 63	KD-63	630	710	674	200	22.5	16x10.5	2.0
mcr Pasat 71	KD-71	710	790	751	200	22.5	16x10.5	2.3



➤ Type PK counterflange

made of galvanized steel sheet. Powder-coated in standard, or galvanized on custom order. This fitting is first used for installation of type KD flexible joints on the ventilator and to connect the ventilation system to the ventilator.

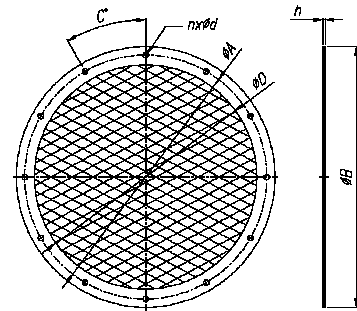
Type PK counterflange							
Ventilator - Type	Type	D [mm]	-A [mm]	B [mm]	C	nx ϕ d [mm]	m [kg]
mcr Pasat 31	PK-31	319	385	356	45	8x9.6	.8
mcr Pasat 35	PK-35	359	425	395	45	8x9.6	.9
mcr Pasat 40	PK-40	404	470	438	30	12x9.6	1.0
mcr Pasat 50	PK-50	504	570	541	30	12x9.6	1.3
mcr Pasat 63	PK-63	634	710	674	22.5	16x10.5	1.8
mcr Pasat 71	PK-71	716	790	751	22.5	16x10.5	2.0



➤ **Type SO safety mesh**

made of galvanized steel sheet and galvanized wire mesh. Powder-coated in standard, or galvanized on custom order. The fitting protects the fan from ingress of foreign bodies. Periodically check that the safety mesh is clean and clean it when necessary.

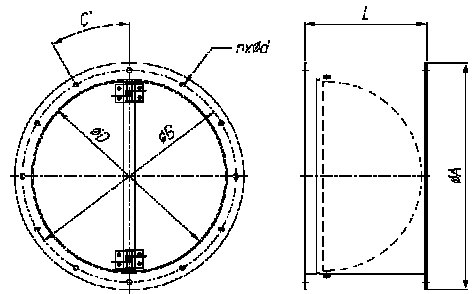
Type SO safety mesh								
Fan - Type	Type	D [mm]	A [mm]	~B [mm]	~h [mm]	C	nxd [mm]	m [kg]
mcr Pasat 31	SO-31	315	385	356	5	45	8x9.6	1.1
mcr Pasat 35	SO-35	355	395	425	5	45	8x9.6	1.2
mcr Pasat 40	SO-40	400	438	470	5	30	12x9.6	1.3
mcr Pasat 50	SO-50	500	541	570	5	30	12x9.6	1.7
mcr Pasat 63	SO-63	630	674	710	5	22.5	16x10.5	2.5
mcr Pasat 71	SO-71	710	751	790	5	22.5	16x10.5	2.9



➤ **Type KS-V automatic non-return damper**

the damper housing is made of galvanized steel sheet. Powder-coated in standard, or galvanized on custom order. The damper blade is made of aluminium sheet. Type KS-V automatic non-return dampers are installed to prevent air circulation and heat losses when the fan is in standstill. The automatic non-return damper is intended for vertical installation [with the damper blade axis is horizontal]. The damper needs precise levelling to operate correctly.

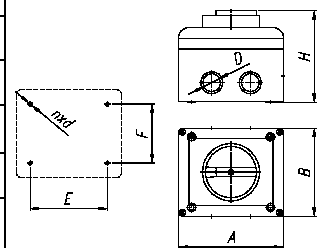
Type KS-V automatic non-return damper								
Fan - Type	Type	D [mm]	A [mm]	B [mm]	L [mm]	C	nxd [mm]	m [kg]
mcr Pasat 31	KS-V-31	315	385	356	220	45	8x9.6	5.7
mcr Pasat 35	KS-V-35	355	425	395	240	45	8x9.6	6.6
mcr Pasat 40	KS-V-40	400	470	438	250	30	12x9.6	7.6
mcr Pasat 50	KS-V-50	500	570	541	320	30	12x9.6	11.3
mcr Pasat 63	KS-V-63	630	710	674	360	22.5	16x10.5	16.2
mcr Pasat 71	KS-V-71	710	790	751	430	22.5	16x10.5	20.8

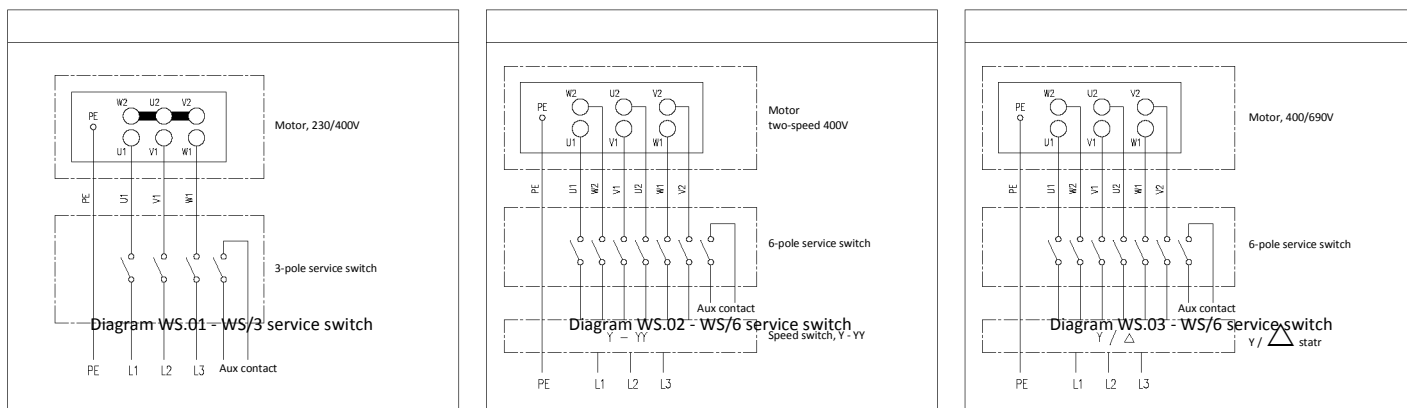


➤ **Type WS service switch**

Designed to cut-off electric power from the fan when inspection or maintenance work is necessary. Each service switch features an auxiliary contact which indicates the power off position.

Type WS service switch										
Type	A [mm]	B [mm]	E [mm]	F [mm]	H [mm]	nxd [mm]	U [V]	I [A]	Glands [D]	Comments
WS-16/3	90	90	67	48	95	4x4	690	16	M20[x4]	3-pole
WS-16/6	90	90	67	48	95	4x4	690	16	M20[x4]	6-pole
WS-32/6	116	100	90	52	108	4x4	690	32	M25[x4]	6-pole
WS-63/6	170	155	105	95	185	4x6	690	63	M25/M32[x4]	6-pole



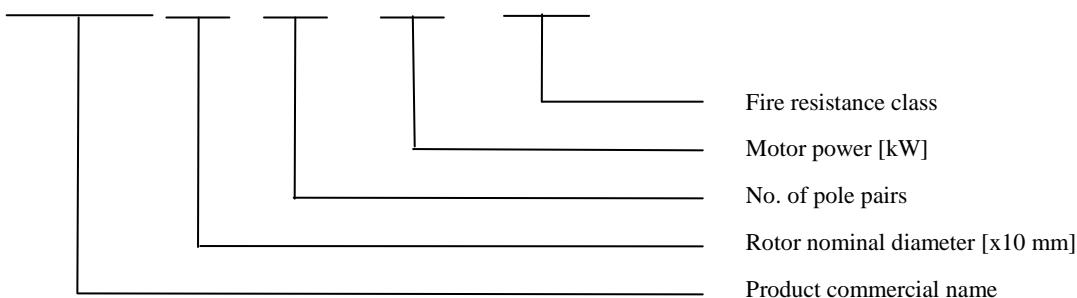


The 3-pole service switch is designed for motors rated at 230/400 V [single-speed versions].
 The 6-pole service switch is designed for single-speed motors rated at 400/690 V.

6. IDENTIFICATION MARKING

Example of smoke exhaust fan identification:

mcr Pasat 50 / 4 - 1.5 / F400



7. INSTALLATION

The mcr Pasat smoke exhaust fans are intended for rooftop installation outside of the fire zone it serves.

7.1. Pre-assembly inspection

Each smoke exhaust fan is factory inspected by the manufacturer prior to packing and shipping. Upon unpacking the delivered smoke exhaust fan, visually examine it for any damage in transport. The motor shaft should rotate with the rotor without evident resistance or scraping.

7.2. Location and assembly

Locate the mcr Pasat smoke exhaust fan outdoor and beyond the fire zone. The equipment installation orientation must be horizontal, i.e. with the motor axis in the vertical, at a minimum height of 250 mm above the roof plane.

Prior to installation, verify the load bearing capacity of the roof structure on which the equipment is to be located. Prepare and secure an opening in the roof slope at a diameter that fits the equipment. Set and level a special roof fan base over and aligned with the opening, and suitable for the roof type. Once it has been levelled, fasten the roof fan base to the slope with fixing anchors, seal off the base interface with the roof surface, and install the required roof flashing. Place the smoke exhaust fan on the roof fan

base with a gasket between the roof base and the smoke exhaust fan bottom. The equipment is fastened with 4 bolts at the fan bottom corners.

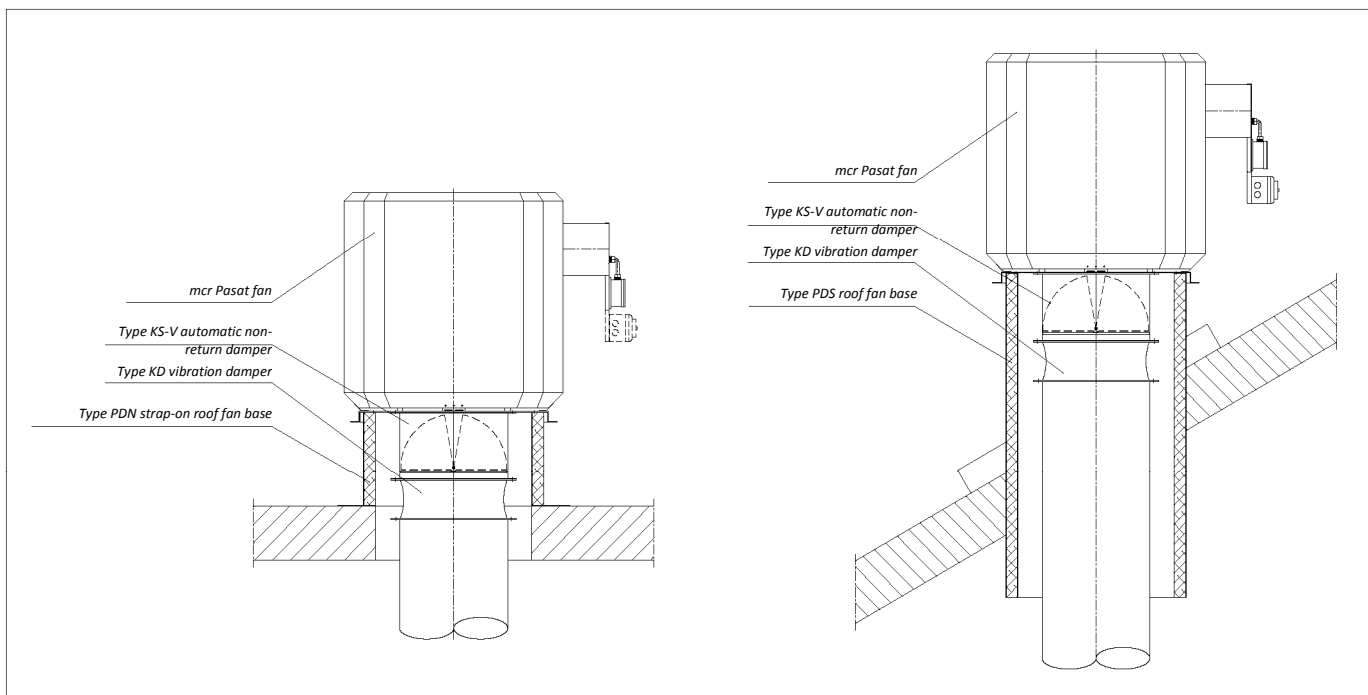
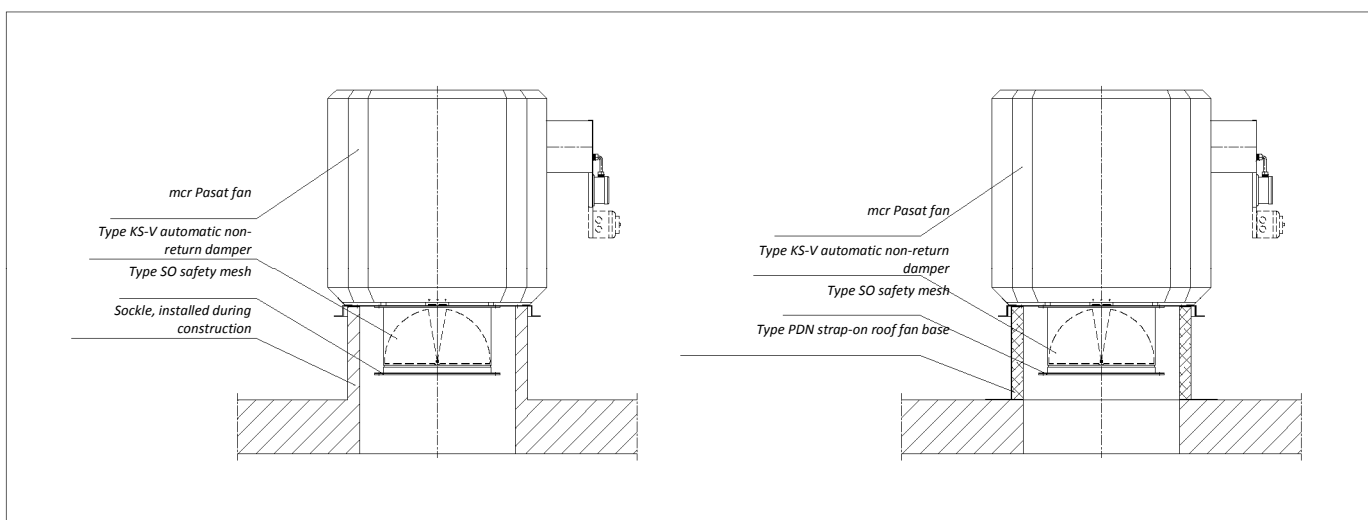
Connecting the smoke exhaust fan to the (smoke exhaust) ventilation system:

Use type KD flexible joints, which need to be fastened to the smoke exhaust fan to reduce the vibration transmission to the ducting.

This assembly is installed by sealing the joint interfaces [with high-temperature silicone] and tightening the two parts with the bolts sized according to the fan size. The ventilation duct must not exert loads on the smoke exhaust fan or other components of the assembly. The ventilation duct must be supported by independent bearing slings. Secure the smoke exhaust fan suction intake with type SO safety mesh.

When installing the smoke exhaust fan, secure the installation site and all involved structures, and prepare passage and access ways for all personnel not involved in the installation. The smoke exhaust fan must be assured to enable inspection and servicing.

Installation examples



7.3. Electrical connections

Having properly located, placed and fastened the smoke exhaust fan, connect the equipment to the relevant electrical system wiring. Lead the wiring through the gland and into the electric box on the fan casing; then connect the wiring to the terminals according to the diagram shown in the box.

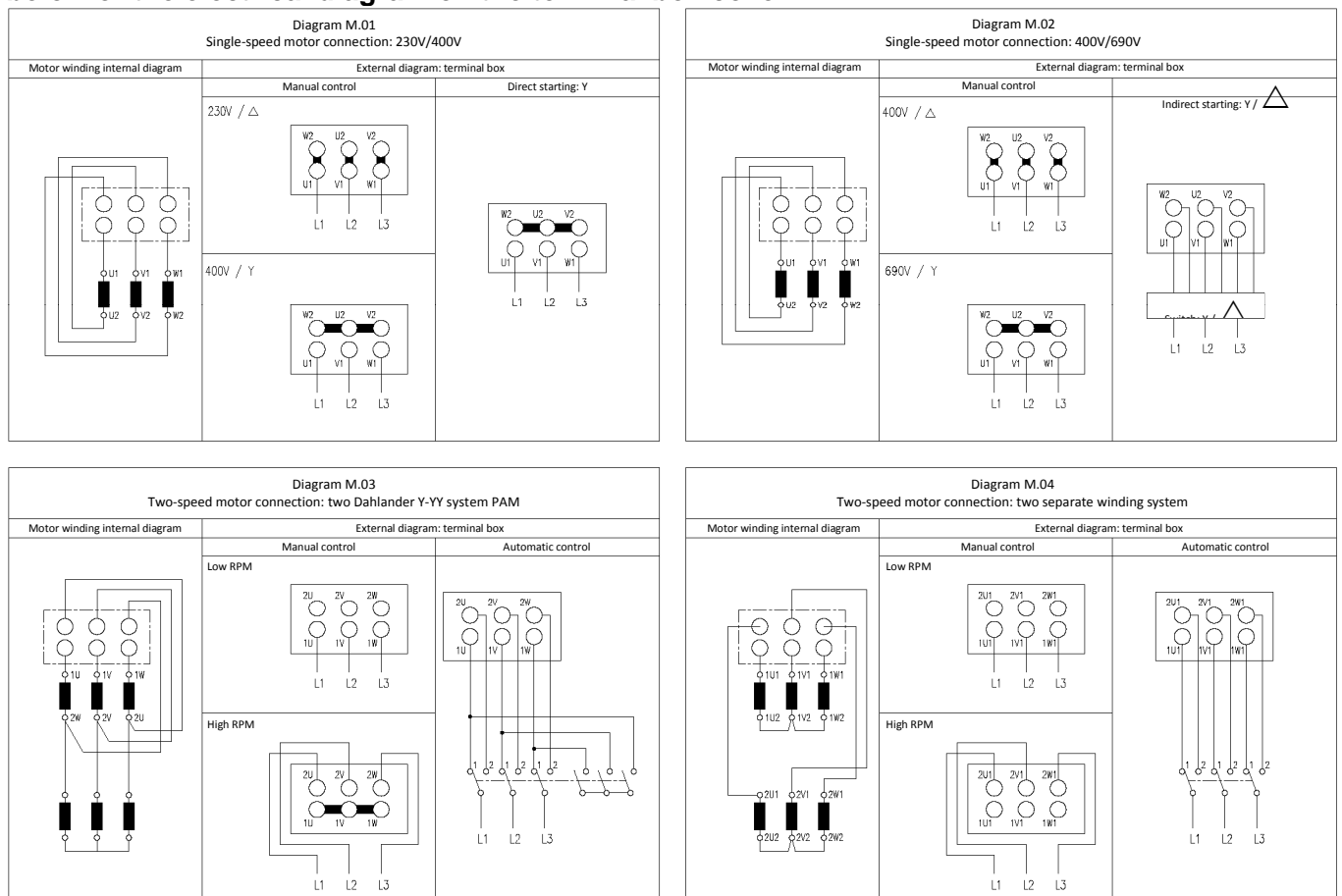
Each fan motor must be connected to the electrical power system over a safety switch. The safety level must be present according to the nominal current draw of the fan motor. The protective earth shall be made according to relevant electrical engineering standards.

Once the smoke exhaust fan has been commissioned as a part of the system, measure the current draw and verify that it meets the motor rating plate data. The smoke exhaust fan current draw in steady operation must not exceed 1.15 times the current ratings.

The electrical power supply from the control cabinet to the fan power junction box must guarantee uninterrupted operation in the case of a fire. This can be achieved with high temperature resistant wiring or with protective tubing and proper safe routing of the electrical power system. No external service/maintenance switches are to be used, which is to prevent inadvertent shutdown of the smoke exhaust fan (with the sole exception of the fan-dedicated service switch with remote indication of current circuit switching). The smoke exhaust fan control cabinets must be powered directly from main switchboards with guaranteed uninterrupted power supply, even if the entire building is cut off from the power grid. If a main fireman's switch is installed to isolate power from the entire building, the smoke exhaust fan power supply must be independent from that solution and assure normal operation in the case of a fire.

Electrical wiring connections must only be made by electricians with valid licenses.

Caution: Make the electrical connections and commission the motor according to the diagrams below or the electrical diagram on the terminal box cover.



7.4. Commissioning

Before commissioning your installed smoke exhaust fan, do the following:

- Check that the smoke exhaust fan is properly and firmly fastened.
- Check all seals for tightness.
- Check that all electrical wiring is properly and firmly connected.
- Check that the phase connection sequence and PE/neutral wiring is properly connected.
- Check that the smoke exhaust fan and its connected ducting are free of foreign bodies.
- Check that all protective/safety components have been installed.
- If the checks are positive, start the fan and do a functional test.
- When starting the smoke exhaust fan, verify the motor sense of rotation against the direction arrow on the enclosure.

8. TRANSPORT & STORAGE CONDITIONS

During transport and storage, the mcr Pasat smoke exhaust fans are placed on pallets. Do not topple or throw the packaging during loading and transport. The smoke exhaust fans can be handled and shipped on any means of transport, provided that they are secured against weather and elements. The smoke exhaust fans on transport vehicles must be secured against shifting. Visually inspect each piece of equipment following transport and handling.

Store in sheltered rooms, where:

- there is no exposure to dust particulates, gases, corrosive vapours and other aggressive chemical emissions detrimental to insulation parts and structural components of the fan and/or its motor;
- the maximum relative humidity is 80% at 20°C;
- the ambient temperature does not exceed the range of – 20°C to + 40 °C;
- no vibrations are present.

9. SAFETY MANUAL

Read and understand this Technical Manual before commissioning and servicing the product.

The smoke exhaust fan is not hazardous when firmly attached to a ventilation system and the ventilator support structure.

Make the electrical connections according to the enclosed electrical wiring diagram and the guidelines in Section 7.3. Electrical connections shall be made by personnel with relevant qualifications which have been certified as required by current laws.

Inspect the PE wire connection of the smoke exhaust fan during the operating life.

Disconnect the smoke exhaust fan from electrical power before any inspections or checks.

CAUTION:

1. Do not clean smoke exhaust fans of deposits with pressure or steam washers.
2. Loss of seal at the fan connections or flexible ends may result in hazards due to release of the forced medium and requires immediate replacement of leaking components.

If the equipment is malfunctioning (e.g. excessive noise, vibration and/or erratic operation is found), disconnect the fan from electrical power supply, and call the manufacturer's technical service or an inspection and repair contractor authorised by the manufacturer.

10. MAINTENANCE & SERVICING

The equipment from Mercor SA require periodic technical inspection and maintenance at least every 12 months throughout its operating life, i.e. during the warranty and post-warranty period. Inspection and maintenance may only be carried out by the manufacturer or contractors authorised by Mercor SA to service its products.

Regular service inspections of fire protection equipment is mandatory in Poland according to § 3 Section 3 of the Polish Regulation of the Ministry of the Interior and Administration of 7 June 2010 on the fire protection of buildings, other structures and areas (Polish Journal of Laws, Year 2010, No. 109 Item 719).

Do these recommended actions in the inspection intervals:

- Check the electrical connections, especially for all mechanical damage.
- Check the equipment casing, especially for all mechanical damage.
- Check for any obstructions to proper performance of the equipment.

To facilitate the activities under service inspection, servicing and warranty claim response, e.g. visual inspection or repairs, the equipment user/operator shall provide physical access to the equipment by removing thermal insulation, suspended ceiling, and other installations, as required and applicable to warrant unobstructed access.

In the case of roof mounted equipment, provide access to the area (via ladders or elevated platforms).

If the equipment is only operated for smoke exhaust during fire, test run it for ca. 10 minutes every 3 months.

Refer all matters related to technical inspection, maintenance and servicing of this equipment to the Mercor SA Service Department, serwis@mercors.com.pl, tel. +48 58 341 42 45 ext. 170, fax: +48 58 341 39 85, from 8 AM to 4 PM (Mo-Fri).

11. WARRANTY TERMS & CONDITIONS

1. MERCOR SA grants 12 months of warranty for the equipment quality from the date of purchase, unless the sales contract states otherwise.
2. If physical defects of equipment are discovered during the warranty period, MERCOR SA warrants and represents to remove them in 21 days from serving the written warranty claim with the proof of purchase or sales contract, subject to Item 6.
3. MERCOR SA has the right to extend the time of repair if the defect removal is complicated or requires purchase of custom components or spare parts.
4. The warranty liability only covers all defects arising from causes present in the equipment at the date of sale.
5. Defects caused by improper operation or otherwise as listed in Item 6 herein, the buyer / warranty beneficiary will be charged with the costs of their removal.
6. This warranty does not cover the following:
 - Any damage or failure of the equipment caused by improper operation, tampering, failure to conduct periodic technical inspection and/or maintenance established in the Technical Manual "Servicing and Maintenance".
 - Any damage beyond reasonable control of MERCOR SA, and specifically: caused by force majeure, such as torrential rainfall, flooding, hurricanes, inundation, lightning strike, power grid overvoltage, explosion, hail, collision with aircraft, fire, avalanche, landslide and indirect damage due to those causes. Torrential rainfall is understood as any rainfall with the effectiveness factor of 4 or higher according to the definition of the Polish Institute of Meteorology and Water Management - National Research Institute (IMGW-PIB). If the effectiveness factor value specified in the preceding sentence cannot be reasonably established, the actual condition and extent of damage shall be considered at the site of their origin as the action of torrential rain. Hurricane is understood as any wind with a minimum speed of 17.5 m/s (and damage shall be recognised as caused by hurricanes if the action of such weather phenomenon has been found in the direct vicinity of the damaged property).

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- Damage due to failure to immediately report any defect found.
 - Deterioration in the quality of coatings due to natural weathering/ageing.
 - Defects caused by abrasive or aggressive cleaning agents.
 - Damage caused by aggressive external influence, specifically chemical or biological in nature, or when the origin of which is related to the production processing or activity carried out within the facility protected by the equipment or in its direct vicinity.
 - Wearing parts and consumables (e.g. gaskets/seals), unless they have defects of workmanship and/or material.
 - Damage caused by improper transport, handling, unloading and/or storage of the equipment.
 - Damage caused by installation of the equipment in violation of this Technical Manual and/or good construction practice.
 - The equipment and/or parts thereof with removed or damaged nameplate (rating plate) and/or warranty seals.
7. Submit each warranty claim to MERCOR SA in 7 days from the date of discovery of a warranty eligible defect.
 8. Warranty claims may be submitted by calling at: tel. +48 58 341 42 45, by fax: +48 58 341 39 85, by e-mail: reklamacje@mercor.com.pl or by traditional mail: MERCOR SA, ul. Grzegorza z Sanoka 2, 80-408 Gdańsk, Poland.
 9. The buyer/warranty beneficiary is required to operate the equipment properly and carry out technical inspection and maintenance according to the Technical Manual "Servicing and Maintenance".
 10. This warranty shall be made immediately void and null if:
 - The buyer/warranty beneficiary modifies the product design without prior authorisation from MERCOR SA.
 - Periodic technical inspection and/or maintenance are not carried out per schedule and/or are carried out by unauthorised personnel or service providers not authorised to do so by MERCOR SA and/or the equipment has not been properly operated.
 - Unauthorised personnel attempts any intervention in the product outside of the normal operation and maintenance of this equipment.
 11. Any circumstances listed in Item 10 will relieve MERCOR SA from the obligation of surety.
 12. The defects may be removed if the warranty claimant provides free access to facilitate this, especially to the rooms where the equipment has been installed, and provides the necessary inspection access, removal of thermal insulation systems, suspended ceiling, and any other installations which obstruct access to the equipment, etc.

The relevant provisions of the Polish Civil Code shall apply to all matters not regulated in these Warranty Terms & Conditions.

FAN MEASUREMENT REPORT

FAN TYPE	
SERIAL NUMBER	
INSTALLATION SITE	
RATED CURRENT	

Once the fan has been installed at its intended operating site and all electrical connections have been made, immediately measure the current draw in steady-state operation of the equipment.

MEASUREMENT RESULTS [A]

U1	V1	W1	U2	V2	W2

NOTES:

Full name of the measuring technician	Date measured	Signature

Return this Report immediately after completion of measurements to:

MERCOR SA
Fire Ventilation Systems
Ul. Grzegorza z Sanoka 2
80-408 Gdańsk

and not later than in 8 weeks from the date of equipment purchase (equivalent to the date of the VAT sales invoice).

THE EQUIPMENT WARRANTY BECOMES ENFORCEABLE UPON RETURN OF THIS MEASUREMENT REPORT