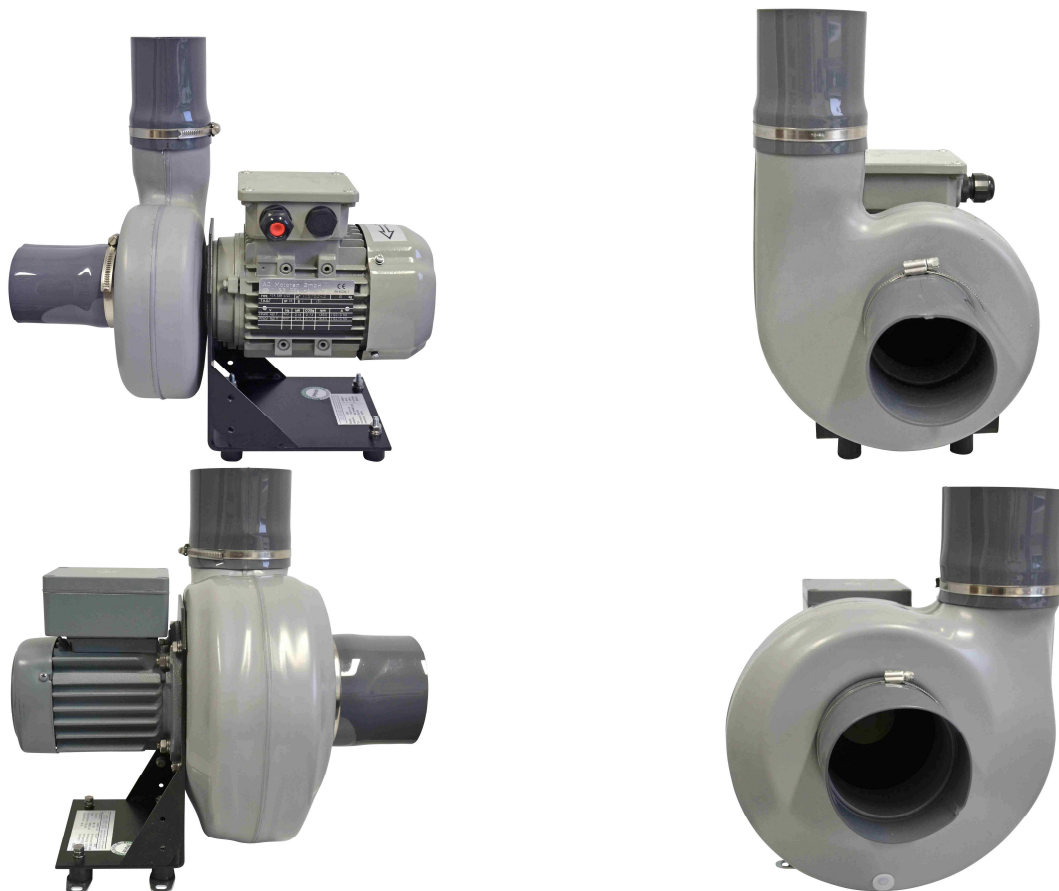


High performance radial fans Series ML/ MLF/ MLT 75 and 110



Operating Instructions 06/2013

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1 Introduction



These operating instructions

- Are to be considered part of the product.
 - Are to be read carefully and thoroughly by the operator/s of the fan/s before first use of same.
-
- The safety information contained herein must be adhered to.
 - The operating instructions are to be passed on to subsequent owners and operators of the equipment.
 - Please contact Joh. Mueller Kunststoff GmbH if you have any queries. Do not operate a fan if there is any doubt as to its proper condition or assembly.
 - This/these fan/s may only be assembled, installed and operated by properly qualified persons.
 - Note the symbols used drawing attention to specific risks and supplying information on same.
 - The enclosed operating instructions for the motor must also be adhered to and are a major part hereof.
 - No liability whatsoever can be accepted for damage due to disregarding the operating instructions.
 - The operating instructions for the motor installed can be downloaded from the Joh. Mueller Kunststoff GmbH web site as a pdf file. Same can be supplied by us in hardcopy form if desired.
-

2 Manufacturer and suppliers

2.1 Manufacturer

Joh. Mueller Kunststoff GmbH

Lescheider Weg 6-8

Tel. +49-2248-9173-0

53773 Hennef-Bierth

Fax. +49-2248-9173-79

Germany

Internet. www.kunststoff-mueller.de

2.2 Customer Service

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Germany

Internet. www.kunststoff-mueller.de

2.3 Suppliers

See the appendix on scope of delivery

3 Declaration of conformity

3.1 EU Declaration of Conformity within the meaning of the EU Machinery Directive (2006/42/EU), Low Voltage Directive 2006/95/EU and EMC Directive 2004/108/EU

Joh. Mueller Kunststoff GmbH, Lescheider Weg 6-8, D-53773 Hennef-Bierth, declare that the machine described below complies in its design and construction and in the version marketed by them with the applicable health and safety requirements of the EU Machinery Directive and the requirements of the EMC and Low Voltage Directives. This declaration becomes invalid should the machinery be modified without our consent.

Machine description Radial fan
Machine type Series ML-/ MLF-/ MLT- 75 and -110 Ex
Machine no. See Appendix A6

Relevant EU Directives

Directive / standard	Text
2006/42/EU	EU Machinery Directive - Directive of the European Parliament and Council on Machinery
2006/95/EU	Low Voltage Directive
2004/108/EU	Electromagnetic Compatibility Directive
Harmonised standards applied:	
DIN EN ISO 12100	Safety of Machinery - General Design Principles - Risk Evaluation and Risk Reduction
DIN EN ISO 13857:2008	Safety of Machinery - Safety Spacing to Prevent Proximity to Danger Areas of Upper and Lower Extremities
DIN EN 62079: 2001	Drafting instructions - classification, content and presentation
prEN 14461: 2002	Industrial fans - safety requirements
Applied national standards and technical specifications	
VDMA 24 167: 1994	Fans; safety requirements

Name and address of the person authorised to put together the technical documentation:
Thomas Scheffler, Joh. Mueller Kunststoff GmbH, Lescheider Weg 6-8, D-53773 Hennef-Bierth

Hennef-Bierth, 27 May 2013












Thomas Scheffler, Managing Director

4 Subject matter of the operating instructions

The operating instructions only apply to the fan/s supplied including assembly frame/s, flange/s and motor/s. The interfaces for the ML series are the sleeves and for the MLF and MLT series the flanges for connection to the piping system.

5 Symbols used

	Caution. Non-compliance may result in injury or damage.
	Note. Important information
	Prohibition!
	Danger due to electricity.
	Hot surface
	Risk of crushing
	Risk of ingestion
	General instruction (e.g. wear protective clothing)
	Release before performing any work

6 Safety instructions



As operator you're responsible for

- ensuring fans are only used if in technically problem-free condition, only for their intended purpose and in compliance with these operating instructions.
- Ensuring staff are aware that proper use includes adherence to the maintenance requirements.
- Ensuring technical and safety familiarisation of staff with the equipment. Staff knowing the operating instructions.
- Ensuring fan operation conditions are adhered to.



The fans can be operated up to a maximum ambient temperature of 40° C and in the temperature ranges in **table 4** with the pumping media. At operating temperatures exceeding the maximum permissible (see **table 4**) the operator must determine and then exclude additional risks.



Fan RPM can be safely limited (see scope of delivery in Appendix) – Maximum Permissible RPM).



Protective clothing must be worn when performing assembly, repair or maintenance work on a fan.



Electric power connection/s must be installed by a qualified electrician.



The motor must be electrically dead before work is carried out on a fan and also protected against unauthorised / unintentional switching on by a maintenance switch with lock.



The fan has no shaft bushing and cannot be considered leakproof; absolute leakproofing cannot be guaranteed and this includes flange connections.



Pumping media that may involve contamination make an upstream filter or mist eliminator essential.



The fans ought to be installed in separate rooms for noise abatement reasons.



People should stay away from the fans, particularly the housings.



The conformity declaration is rendered invalid if a fan is modified by e.g. adding a frequency converter or metrology equipment, and the operator must then declare conformity themselves after risk analysis.



Fan operating temperature may not fall below the lower melting point of the medium being pumped.



Fluid drainage in the spiral housing must be continuous. The atmosphere in the interior must not leak out, e.g. through immersion or use of a siphon.



Earth the fans using the earthing points provided.

7 Product Description

7.1 Fan design

7.1.1 ML 75 and ML 110

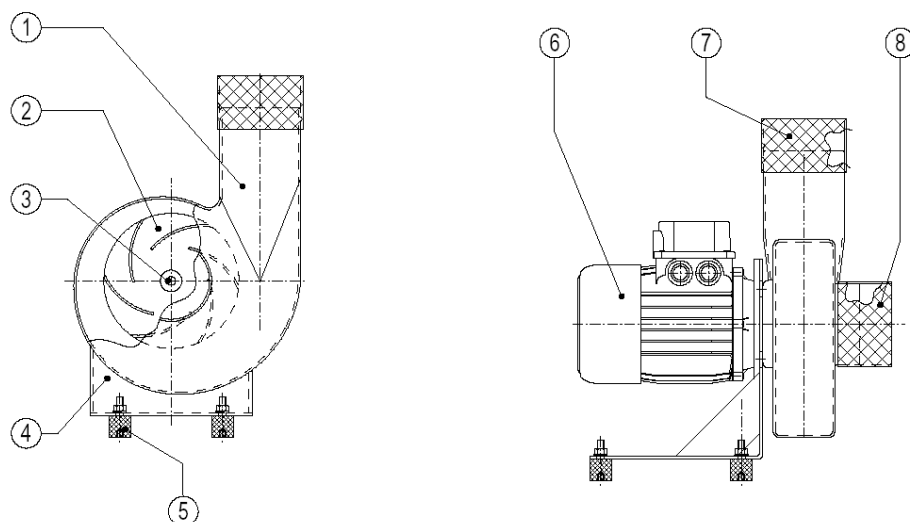


Illustration 1: Radial fans, series ML-75 and ML-110

Item	Description	Item	Description
1	Fan housing	5	Vibration dampers (4 pcs.)
2	Rotor	6	Motor
3	Clamping sleeve	7	Bushing, pressure side, with pipe clamp
4	Fan block	8	Bushing, suction side, with pipe clamp

Table 1: Details of ML 75 and ML110 Ex fan (illustration 1)

7.1.2 MLF / MLT 75 and MLF / MLT 110

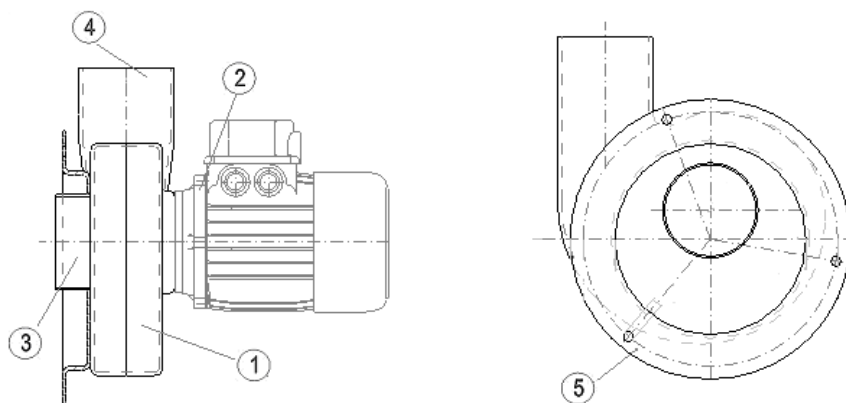


Illustration 2: Radial fan, series MLF 75

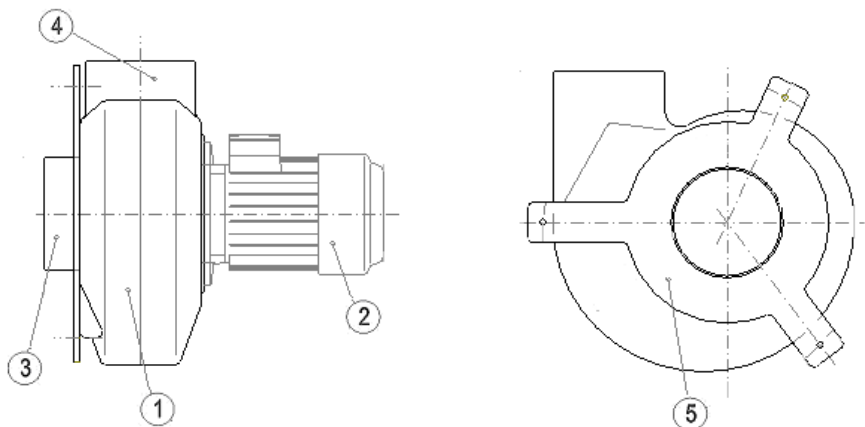


Illustration 3: Radial fan, series MLF 110

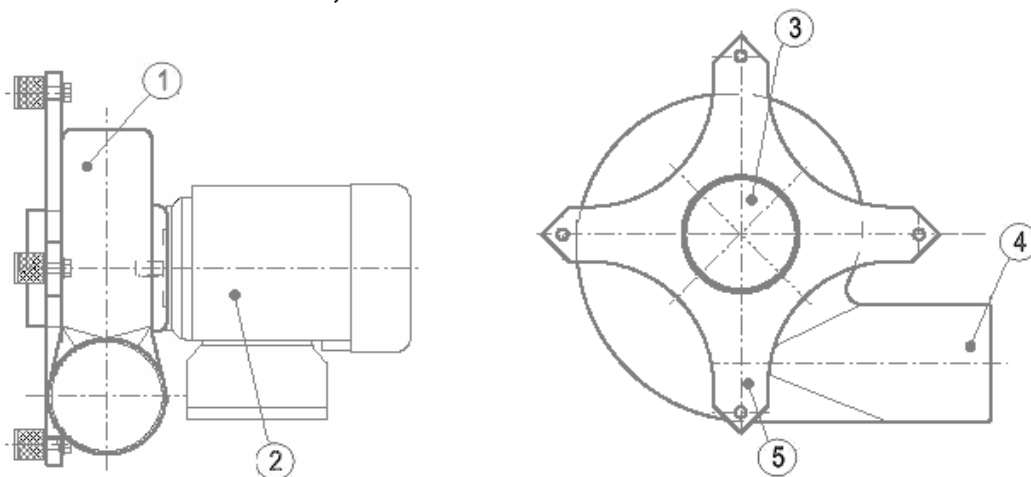


Illustration 4: Radial fan, series MLT 75 and MLT 110

Item	Description	Item	Description
1	Fan housing with rotor MLF: plastic rotor MLT: Stainless steel cylindrical rotor	4	Pressure brackets
2	Motor	5	Fastening flange
3	Intake fitting		

Table 2: Details of fan series MLF / MLT 75 and 110 Ex (illustrations 2, 3 and 4)

Joh. Mueller Radialventilatoren series ML-, MLF- and MLT are radial fans with suction on one side. Gaseous media are sucked in axially to the drive axle, redirected by rotor movement by 90 degrees and radially expelled.

The fans in series ML-, MLF- and MLT- 75/ - 110 consist of housing, rotor and drive motor. They are supplied with direct drive as standard (design D) with the rotor directly connected to the drive motor shaft. By contrast with the ML series with their assembly frames of sectional steel the MLF and MLT series are of flange design. The housings of the radial fans in the ML and MLF series are made of

thermoplastics using a deep draw process; those of the MLT series are made employing a press process and then welded. Possible housing settings are named per VDMA 24165.

The radial fan housings in the ML / MLF/ MLT 75/110 series must be equipped with safety grilles on both the pressure and suction sides. If same are not included in the scope of delivery then they must be installed by the operator.

The rotors in the ML and MLF 75/110 series are made of thermoplastics using the injection moulding process; those in the MLT series of 1.4301 stainless steel with a higher number of blades.

The fans in the ML/ MLF/ MLT75 and 110 series do not have shaft bushing as standard.

Data on radial fans supplied including drive motor/s is contained in Appendix A6.

7.2 Fan materials

The permissible total temperatures of the thermoplastics used are as below.

Plastic	Temperature range min. / max.	Plastic	Temperature range min. / max.
PVC	0 °C to +50 °C	PE	-20 °C to +60 °C
PP/ PPS	-20 °C to +70 °C	PVDF	-10 °C to +100 °C

Table 3: Temperature range of the plastics used

The total temperatures the plastics used can stand may not be exceeded or undercut. At temperatures below zero the risk of fracture increases if mechanically loaded.



The maximum ambient temperature for drive motors is 40 °C.

7.3 Proper use



The fans in series ML-, MLF- and MLT- 75/ - 110 are intended for use in pumping gaseous media free of dust.

Radial fans of the series ML-/ MLF-I/ MLT-75 and -110 are solely intended for use in piping systems. Before using them it must first be determined that the entire plant concerned complies with EU Machinery Directive RL2006/42/EU.

The operating conditions below must be adhered to.

		Fan vicinity	Pumped media
Temperature	min. Max.	> -20 °C < 40 °C	Plastic/s used PP/PPS/PVDF > 0 °C < 60 °C Plastic/s used PE > 0 °C < 50 °C Plastic/s used PVC > 0 °C < 40 °C
Min. /max. pressure			+/- 30 mbar overpressure

Table 4: Operating conditions



If gas inlet temperatures exceed those above the operator must check the explosion parameters of the explosive atmosphere and determine the risks involved in order to avoid or prevent same.

7.4 Improper use



The radial fans of the ML/ MLF/ MLT 75 and 110 Ex series may not be used in areas at risk of explosion classified as Zone 0 or 1 or 2 and may not be installed in said zones. They are not suitable for pumping dust, poisonous vapour or media that corrode the fan material.



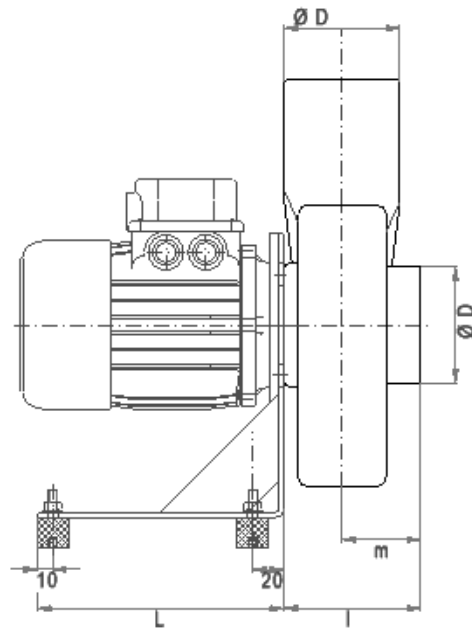
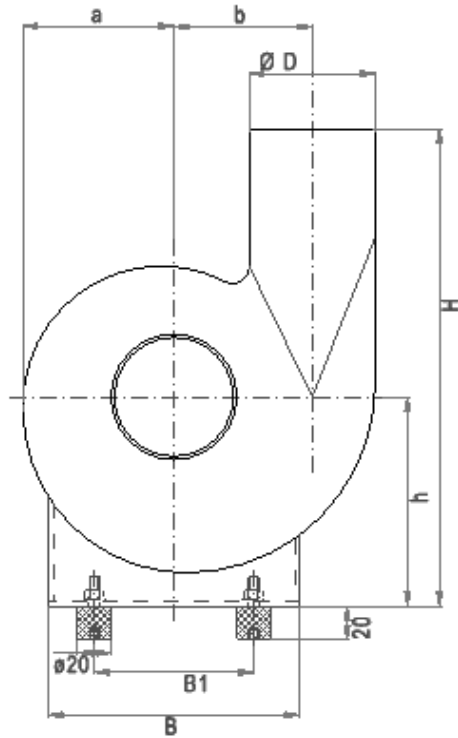
In areas where high dust contamination prevails cleaning intervals must be shortened appropriately.



Do not use improperly.

7.5 SPECIFICATIONS

7.5.1 ML 75 and ML 110



Type (ØD)	L	l	B	B ₁	H	h	a	b	m	Ød	Max. kg
ML-75	160	89	150	95	285	125	90	82	51	7	8
ML-110	120	150	160	120	300	150	125	116	114	7	11

The right to make changes is reserved.

Table 5: Technical data of ML75 and ML110 radial fans

7.5.2 MLF 75 and MLF 110

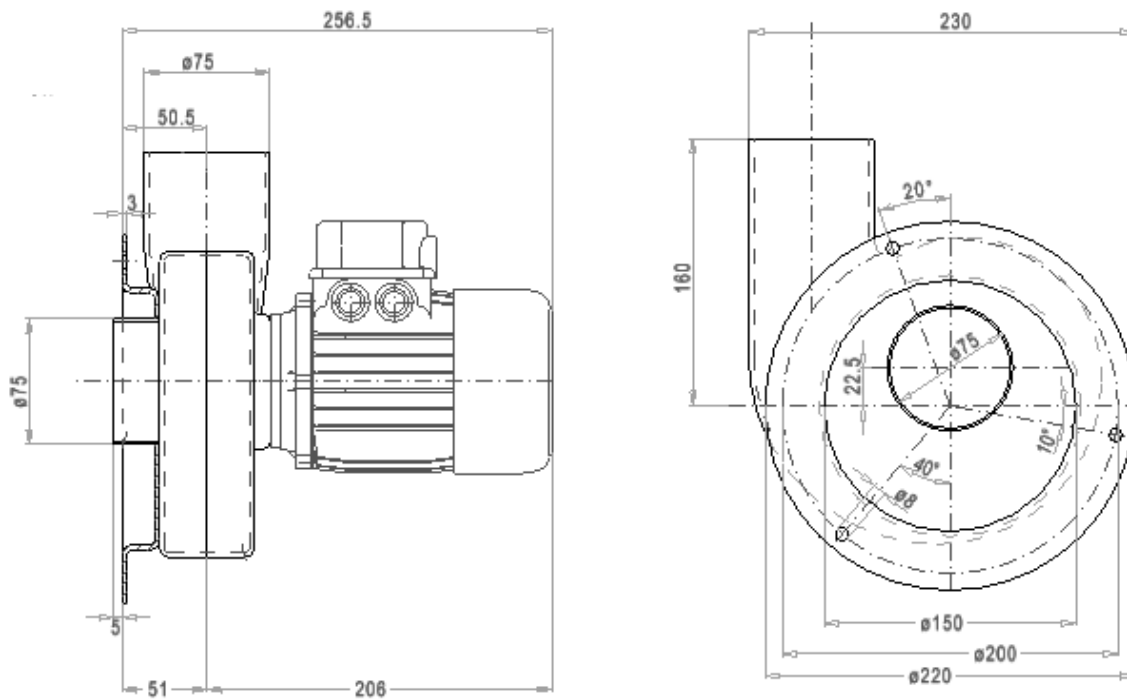


Illustration 5: Technical data of the MLF 75 series

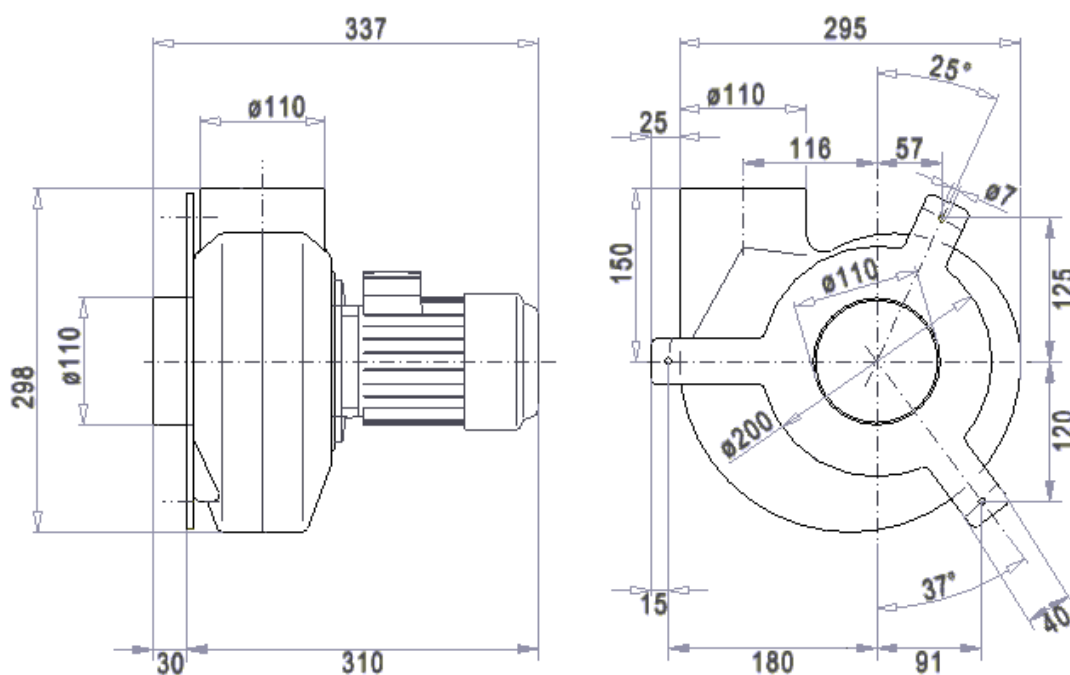


Illustration 6: Technical data of the MLF 110 series

7.5.3 MLT 75 and MLT 110

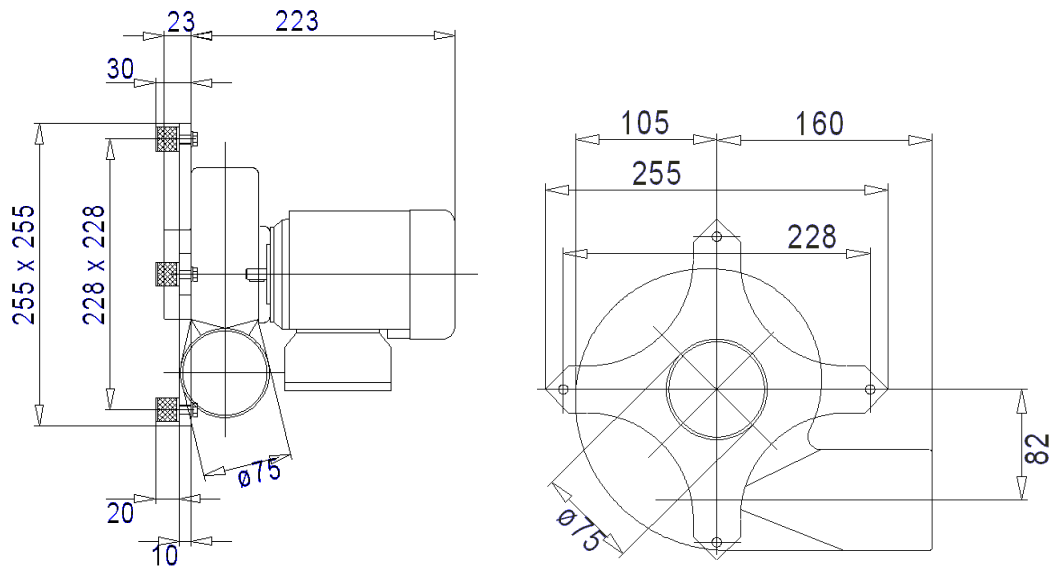


Illustration 7: Technical data of the MLF 75 series

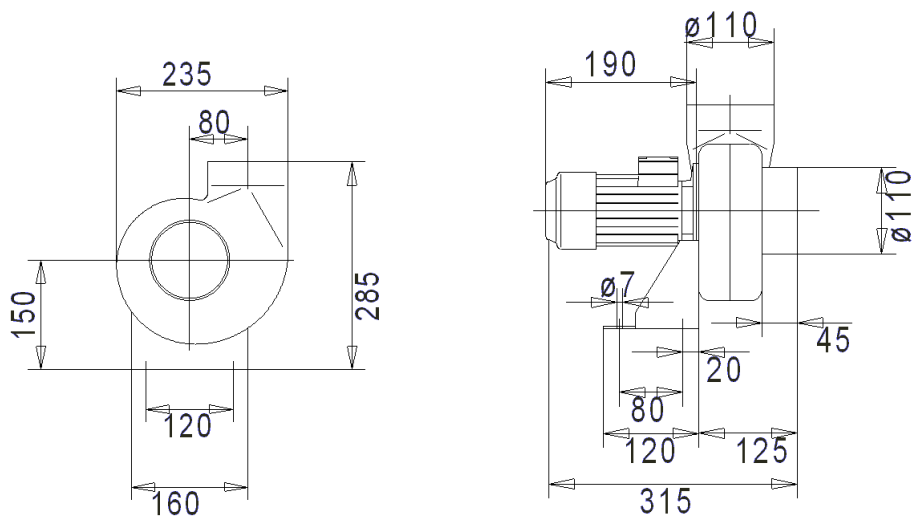


Illustration 8: Technical data of the MLF 110 series with standing console

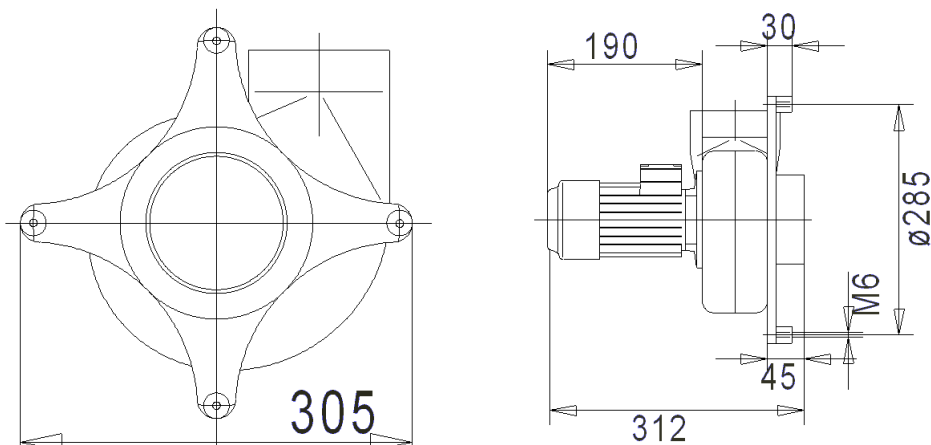
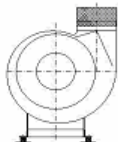


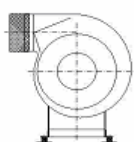
Illustration 9: Technical data of the MLT 110 model with special console for vertical installation

Possible alignments for fans of the ML series. The GR alignment is shown (GL is the mirrored design).

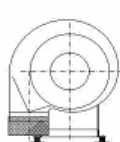
GR 360



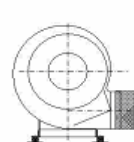
GR 90



GR 180



GR 270



7.6 Labelling

The following data characterise the fan type, performance and uses and hence the proper use.

Type plate data.

JOH. MÜLLER KUNSTSTOFF GMBH		Lescheider Weg 6-8 • 53773 Hennef Telefon 022 48-91 730 • Fax -91 73 79
Type:	ML-....	CE
Baujahr:		Motordrehzahl
Geräte Nr.:		Motorleistung
Teilenummer:		Nennspannung
Volumenstrom		Nennstrom A:
Gesamtdruck Pa:		max. Drehzahl
T innen °C:		Wirkungsgrad:
T außen °C:		
JOH. MÜLLER KUNSTSTOFF GMBH		Lescheider Weg 6-8 • 53773 Hennef Telefon 022 48-91 730 • Fax -91 73 79



Type plate and warnings must always be legible. If it is ascertained during maintenance that they are illegible or missing then they must be cleaned or replaced.

Type plate data for the radial fan supplied is given in Appendix A6.

7.7 Electricity supply

A terminal box or maintenance switch can be supplied to connect the fan to the electricity supply as desired. A maintenance switch can be provided to switch the fan electrically dead when carrying out maintenance and repair work (see scope of delivery in Appendix A6).

8 Planning use

8.1 Transport

Joh. Mueller radial fans are supplied pre-assembled in sealed foil packaging on a pallet ex works. Vibration dampeners are pre-installed if supplied.

Check on receipt of the goods whether the fan/s has/have suffered shipping damage as later complaint cannot be accepted. Pay close attention to motor installation and rotor shaft.



Move the fan with care as plastics are sensitive to shocks and impacts at low temperatures.



If transported on a lorry fans must be secured against tipping, falling over, moving etc.



Check lifting equipment beforehand.



Adhere to the weights in 7.5.

8.2 Storage

The fan/s must be stored in closed dry rooms where as even a temperature as possible prevails. This must be above 0 °C and below 40 °C. Avoid direct sunlight, high humidity and dusty, corrosive atmospheres and substances, vibrations and shocks.



If stored or turned off for a long time the shafts must be turned once a year to keep them rotatable. Adhere to the motor information given in the operating instructions.

Please also refer to the motor operating instructions.

8.3 Disposal

Please commission a disposal company to dispose of the equipment properly. Currently valid environmental law must be observed.

Before disposal clean the components to prevent their presenting any environmental risk or danger to persons.

Observe environmental rules during disposal.

9 Installation and assembly



Installation and assembly of the radial fans should only be carried out by properly qualified staff of Joh. Mueller Kunststoff GmbH or specialists commissioned by the client for the purpose.

Before the fan unit/s is/are installed the operator must ensure all due allowance has been made for ambient conditions of same (plastics, motor, electrical components).

The fans must be installed on a flat surface using vibration dampers and aligned horizontally.

The operator must make all due allowance for fan noise when siting them. They ought preferably to be installed in separate rooms for noise abatement reasons.

Before connecting them to the power supply turn the rotor to ensure it moves freely.

Install piping. If the scope of the commission doesn't include piping installation then this must be done by the operator.

Piping connections must be flexible. Suction inlets and pressure outlets may not be mechanically stressed by piping connections.



Fans may not be operated when uninstalled.

When installing fans make sure the motor ventilation apertures remain unobstructed and that no heated cooling air (e.g. from adjacent plant) is sucked in by the motor.

If the motor is installed in the open the information in the motor operating instructions must be adhered to.

9.1 Electrical connection



Electrical connection may only be carried out by properly qualified staff (electricians).

- In wiring the equipment make sure of the correct (star, delta) connection, voltage level and frequency. In motors with reversible polarity check whether separate windings or “dahlander” windings are used. Refer to the scope of delivery in Appendix A.6.
- A suitable motor protection switch (overcurrent protection) must be installed and wired to prevent overheating due to overload. If this is not included in the scope of delivery then the operator must install same.
- Fans are connected to the electricity supply via a terminal box. Electrical installation must adhere to the motor operating instructions (please refer to same).
- Fans can be switched electrically dead using a maintenance switch (optional) so that maintenance and repair work can be carried out. Refer to the scope of delivery in Appendix A.6.
- If the motor has a positive temperature coefficient thermistor (PTC) then same must be wired up and monitored by a suitable evaluation device.
- Earth fan and motor using the earthing points provided on the fan block.
- Data of the electric equipment installed including the drive motor is given in Appendix A.6.

10 Commissioning



Protective clothing must be worn when commissioning fans.



Check the direction the fan rotor turns. This must agree with the directional arrow on the fan housing.

- Check the motor data on the motor plate.
- Check that the motor is properly earthed.
- Check maximum permissible motor RPM. Compare the maximum motor RPM set with Appendix A6.
- Check that the piping is completely connected and whether the input and output safety grilles have been installed.
- Connect the fan to the electricity supply.



Let it run for about five hours and then check the bearing temperature, power consumption and smoothness of running. Check that the housing is leakproof after 24 hours.

11 Operation



The operator is responsible for fan operation. The operator should install a control panel and possibly an interface to a control system making all due allowance for the fan data.

- Only qualified staff may operate fans.
- The operator is responsible for training and familiarising their staff and drafting local operating instructions.

11.1 Troubleshooting

Troubleshooting may only be undertaken by properly qualified staff.

Fault	Possible causes	Remedial measures
Fan runs rough (oscillations and vibrations)	Changes in the foundation/s and hence major oscillation of the fan	Determine the cause/s of the change/s and remedy them if possible. Check foundation/s and fan and dampen vibrations.
	Rotor out of balance	Balance it. Advise Joh. Mueller Kunststoff GmbH.
	Deposits on the rotor	Remove gently.
	Rotor damage	Damage to the rotor must be remedied. Advise Joh. Mueller Kunststoff GmbH.
	Rotor turns the wrong way	Correct it.
	Axial/ radial oscillations of the motor	Check and adjust as needed. Advise Joh. Mueller Kunststoff GmbH.
Motor overheating	Motor turning the wrong way	Check and correct.
	Motor air supply reduced	Check. Clean motor.
	Damage to motor windings	Check motor and replace if necessary. Advise Joh. Mueller Kunststoff GmbH.
Bearing overheated	Lubricating intervals not adhered to	Lubricate or replace bearings
Fan or motor doesn't start or runs up roughly	Motor overload	Reduce load.
	Interruption of a phase in a motor electricity supply cable	Check switches and wiring.
	Mains voltage too low, frequency too high	Check mains.
	Motor stator winding incorrectly wired	Check motor stator winding.
Low fan performance	Rotor turns the wrong way	Correct rotor turn direction.
	Inlet and/or outlet not leakproof	Check both and remedy leaks.
	Motor stator winding incorrectly wired	Check motor stator winding.

Fault	Possible causes	Remedial measures
Fan makes a grinding noise	Foreign body between rotor and housing	Remove foreign body.
	Rotor deformed	Check rotor. Advise Joh. Mueller Kunststoff GmbH.
Overcurrent protection device (motor protection switch) turns the fan off	Overcurrent protection device (motor protection switch) incorrectly set.	Adjust overcurrent protection device (motor protection switch).
	Motor overload	Check power connection/s.
	Rotor blocked	Check rotor.
	Motor defective	Advise Joh. Mueller Kunststoff GmbH.
Loss of performance	Elastic sleeving torn, porous / leaky	Check for wear and replace if needed.
	Inlet and outlet piping leaky	Check piping.
Noisy when started or operating	Motor stator winding incorrectly wired	Check motor stator winding.
	Winding or phase fault in motor winding	Determine motor winding and insulation resistance, maintenance required. Advise Joh. Mueller Kunststoff GmbH.

12 Maintenance, cleaning and repair

12.1 Maintenance and cleaning



Maintenance, cleaning and repair work may only be carried out by properly qualified personnel. Said personnel must be properly trained for the job and familiar with handling electricity, electric plant and tools for use in atmospheres at risk of explosion.



The maintenance, cleaning and repair work must be documented in a "maintenance book" with the date and description of the work performed.



Fans may only be used if in technically problem-free condition, only for their intended purpose and only in compliance with these operating instructions.

- The operator may introduce additional cleaning and maintenance intervals due to fan use.
- If briefer intervals are evidently needed after visual inspection then the operator must introduce same.



Motor maintenance is to be carried out in compliance with the operating instructions provided (refer to motor operating instructions). Data of the electric equipment installed including the drive motor is given in Appendix A6.



We recommend specifying maintenance work in local work instructions. Maintenance is to be carried out and documented in compliance with the checklist in Appendix A6.



Make sure that switching the fan electrically dead does not involve any risk in or to the plant as a whole.



The motor must be electrically dead before work is carried out on a fan and also protected against unauthorised / unintentional switching on by a maintenance switch with lock.

- Before carrying out maintenance, cleaning or repair work the possible risks emanating from the fan/s or from the activities involved must be evaluated and appropriate measures taken (by the operator).

Possible risks here include those below.



Hot surfaces



Risk of crushing



Risk of ingestion



Danger due to electricity


- Identify the spare parts on the basis of the type plate or technical documentation. Consult the customer service department of Joh. Mueller Kunststoff GmbH on the subject.

12.2 Carrying out maintenance work

The maintenance and service work needed is detailed in the table below with the associated intervals. Note that the intervals must possibly be shortened if gasses contain dust or chemicals.

The motor roller bearings are lubricated for life in standard versions. The service life is calculated to be 10,000 to 20,000 operating hours. If the option with later manual lubrication is chosen then the motor performance plate data must be complied with (see motor operating instructions).

The intervals are based on constant fan operation. If it only runs occasionally the intervals can be lengthened accordingly. Note that the bearings are under load even when the fan is switched off.

Preparation	
1	The fan motor must be electrically dead.
2	The main switch must be secured against unauthorised use.
3	Wait until the fan rotor stops (at least 3 minutes after being switched off).
4	Wear protective clothing.
Visual check (weekly)	
5	Type and warning plates must be clearly legible. Clean them if necessary.
6	All other dirt (on housings and ventilation covers) must be removed.
7	On ML 110 - check the drain on the spiral housing for blockages.
8	 Check rotor for smooth running. If unusual vibration occurs or the rotor turn roughly then the fan must be stopped immediately and not used until the cause has been remedied. Such remedy may only be carried out by properly qualified Joh. Mueller Kunststoff GmbH staff.
Monthly check	
9	Check fan and motor are securely fixed and fastened in place. If necessary tighten fastenings and fixtures.
10	Check piping, housing and housing cover for leaks.
11	Check elastic elements such as vibration dampers and connection bushings for wear and tear. If they're damaged or have become porous replace them immediately. Check earthing for function.

Visual and basic checks (annual)	
12	Fan basic checks must be carried out by Joh. Mueller Kunststoff GmbH and this documented. After basic cleaning the fan must be recommissioned in compliance with Chapter .
13	Check earthing point conductivity.
Motor maintenance	
14	See motor operating instructions.

Table 6 : Maintenance and service work and intervals.

The operator can adjust these intervals to allow for the level of contamination.

12.3 Repair



For safety reasons the fan may only be repaired using original spare parts and in agreement with Joh. Mueller Kunststoff GmbH.

The spare parts can be identified on the basis of the type plate data or the technical documentation. Consult the customer service department of Joh. Mueller Kunststoff GmbH on the subject if necessary.

The fan must be recommissioned in compliance with Chapter 0 after repair.

13 Warranty

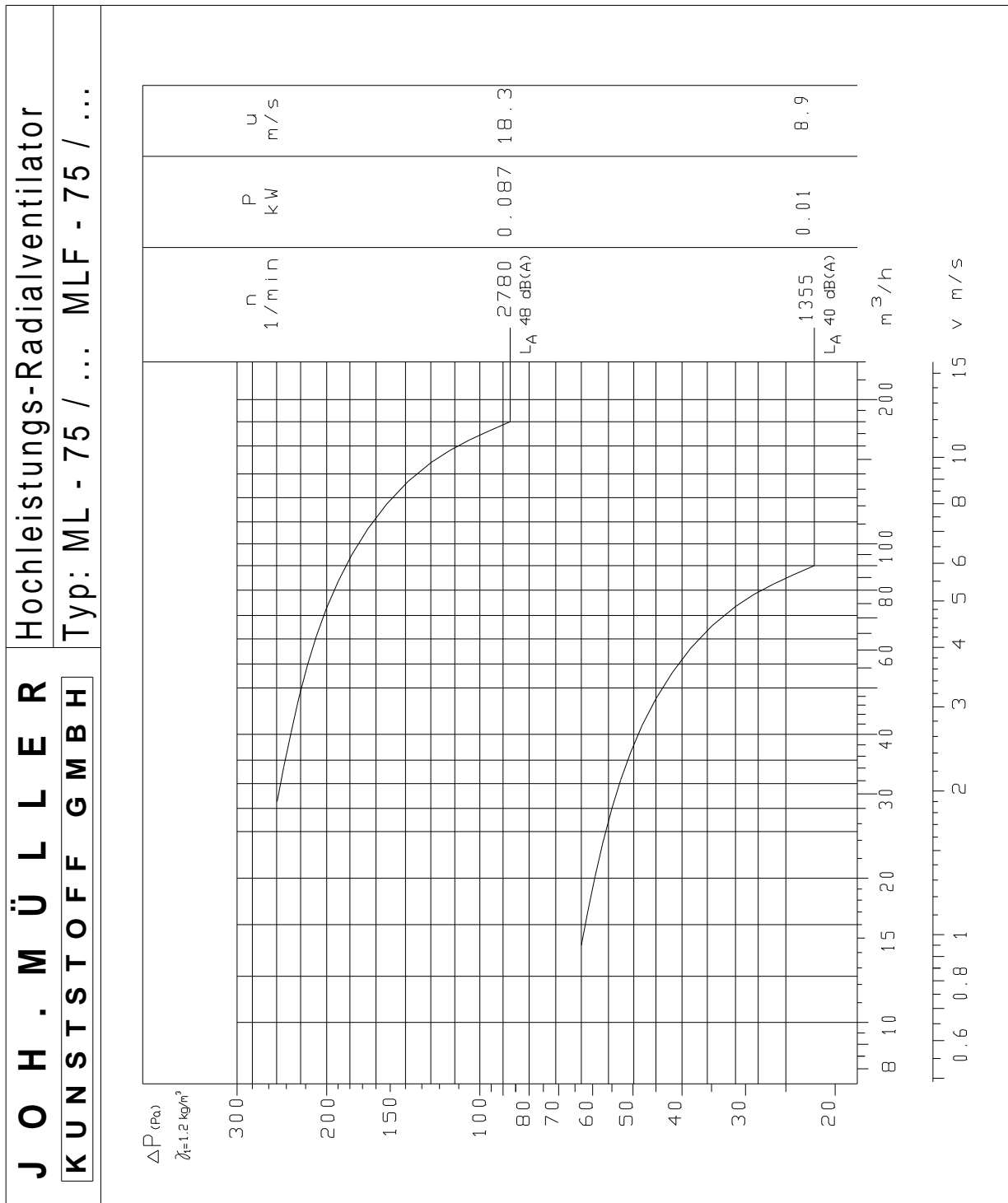
We cannot accept any liability whatsoever for damage due to not adhering to the foregoing instructions.

A.1 MAINTENANCE CHECKLIST

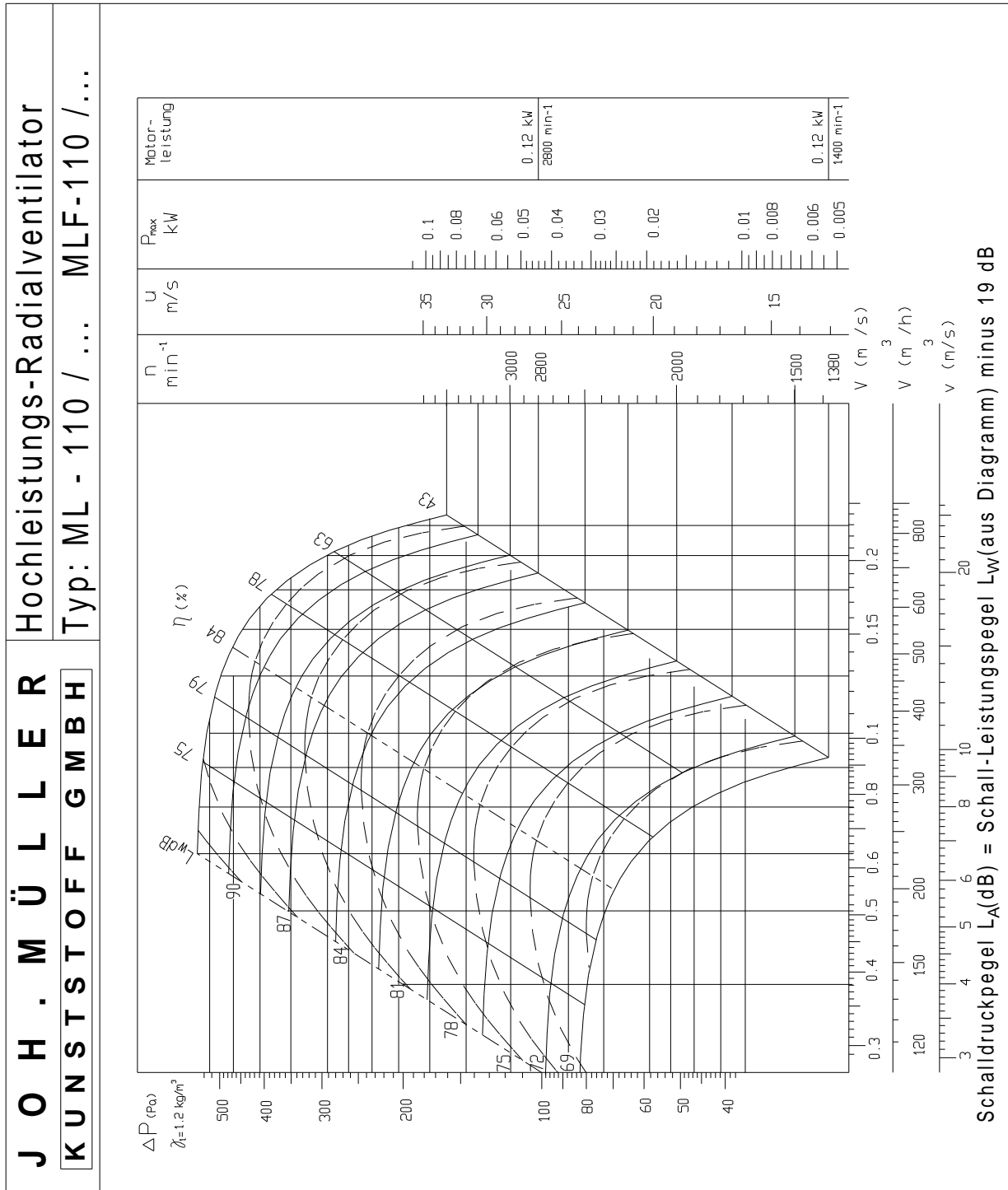
Preparation			
1	Switch the drive electrically dead.	<input type="checkbox"/>	
2	Secure the main switch against use.	<input type="checkbox"/>	
3	Wait for the rotor to stop - this takes about three minutes.	<input type="checkbox"/>	
4	Wear protective clothing.	<input type="checkbox"/>	
Visual check (weekly)			
		Yes	No
5	Type and warning plates clearly legible. No: Description and measures taken:	<input type="checkbox"/>	<input type="checkbox"/>
6	Other contamination (e.g. on housing) - clean (with which tool?) Yes: Description of contamination and cleaning	<input type="checkbox"/>	<input type="checkbox"/>
7	Check the liquid drain on the spiral housing for blockages (on the ML 110).	<input type="checkbox"/>	<input type="checkbox"/>
8	Check rotor for smooth running. Out of balance? Vibrations? Yes: Shut the fan off immediately (block). Consult Joh. Mueller Kunststoff on remedying the problem. If no describe further measures.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Monthly check			
9	Check fan and motor are securely fixed and fastened in place. If necessary tighten fastenings and fixtures.	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
10	Check leakproofing: Piping Casing / housing Housing cover	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
11	Check elastic elements for wear and tear. 11 a) Vibration dampers OK 11 b) Connecting bushings OK 11 c) Rotor OK If not: replace.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
12	Check earthing for function.	<input type="checkbox"/>	<input type="checkbox"/>

Visual check and basic cleaning (annual)			
13	Fan basic checks must be carried out by Joh. Mueller Kunststoff GmbH and this documented. Advise Joh. Mueller Kunststoff GmbH. After basic cleaning the fan must be recommissioned in compliance with Chapter 0.	<input type="checkbox"/>	<input type="checkbox"/>
14	Check earthing point conductivity.	<input type="checkbox"/>	<input type="checkbox"/>
Motor maintenance			
15	See motor operating instructions.		

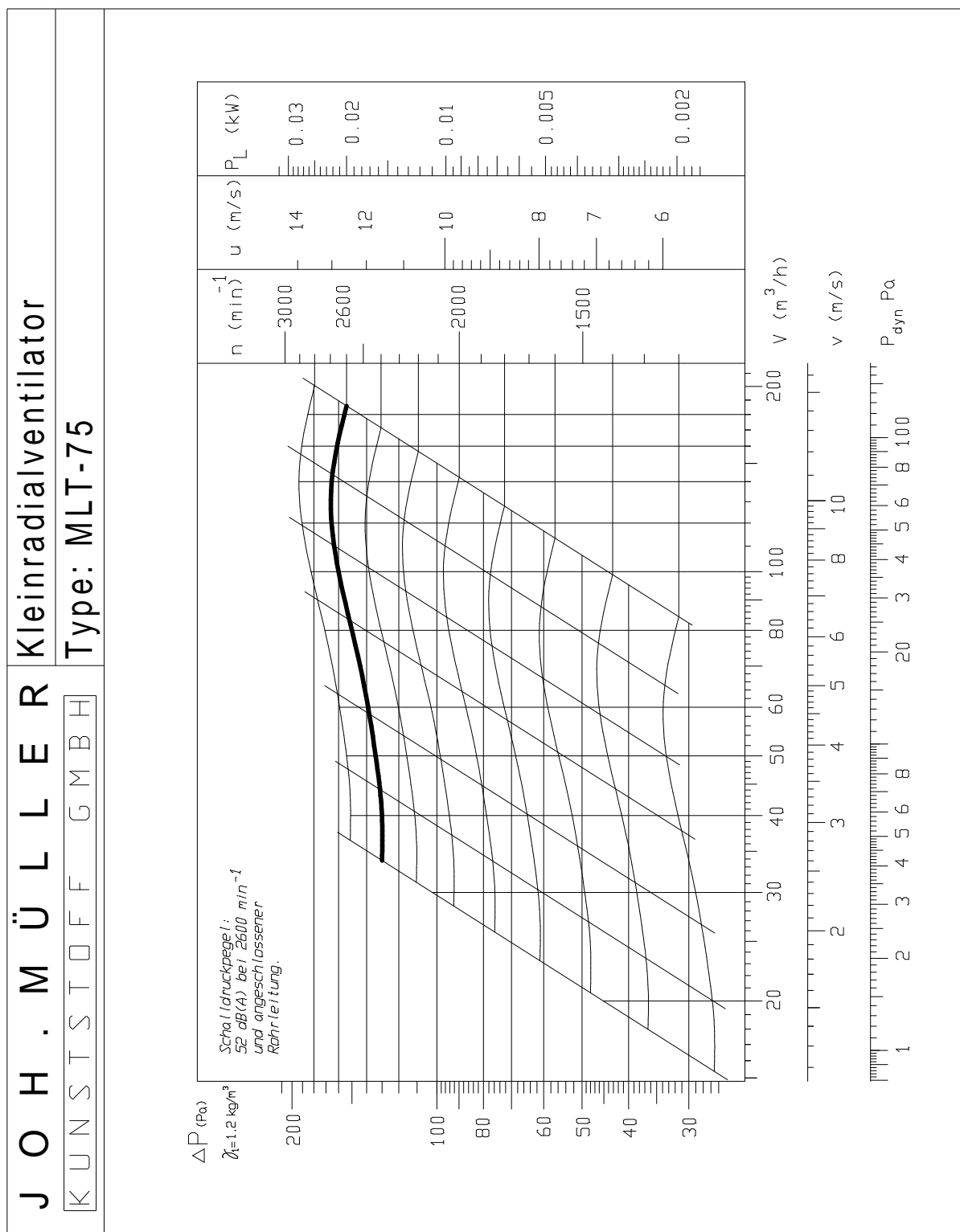
A.2 ML-/ MLF-75 Performance data



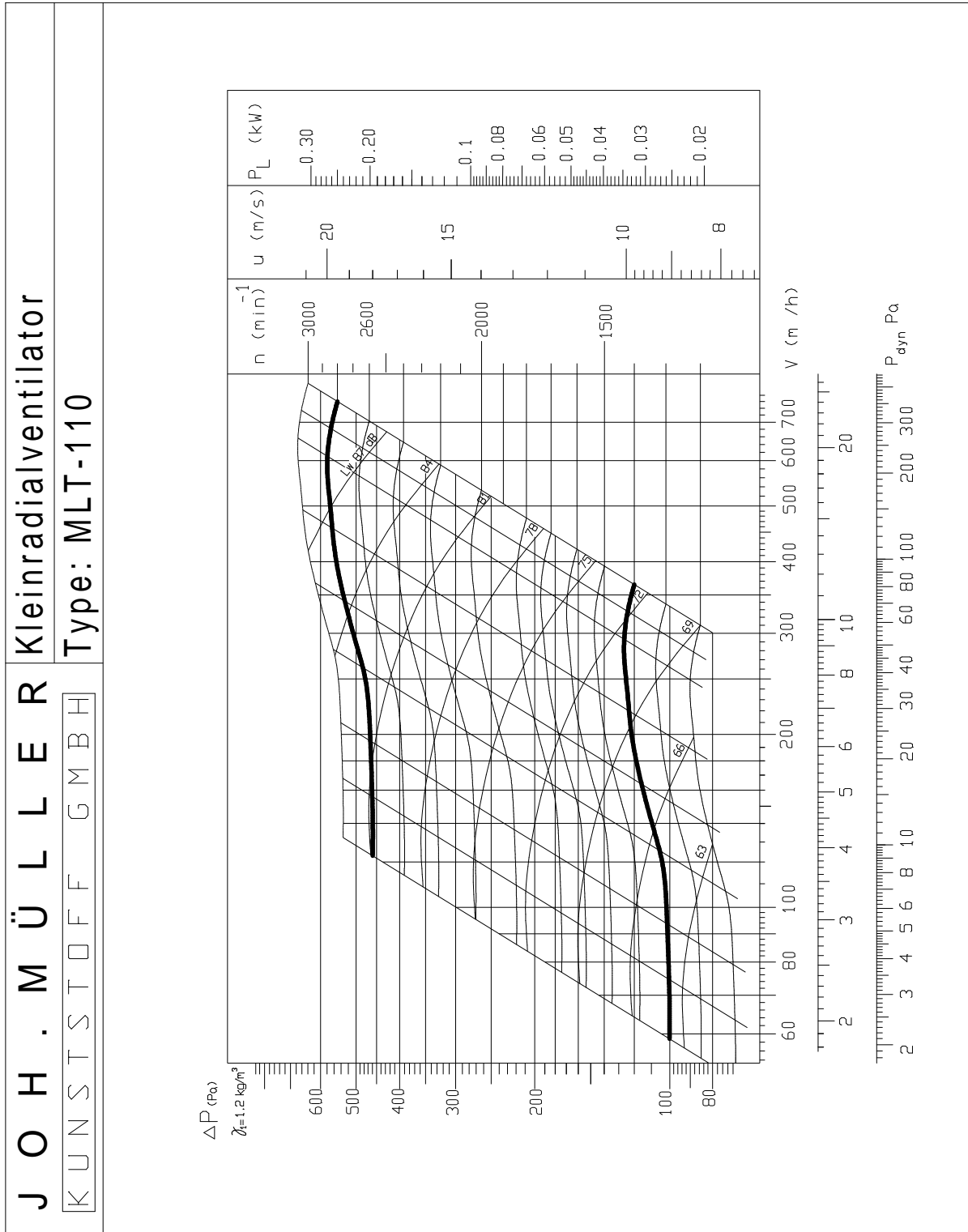
A.3 ML-/ MLF-110 Performance data



A.4 MLT-75 Performance data



A.5 MLT-110 Performance data



A.6 Scope of delivery

Notes

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