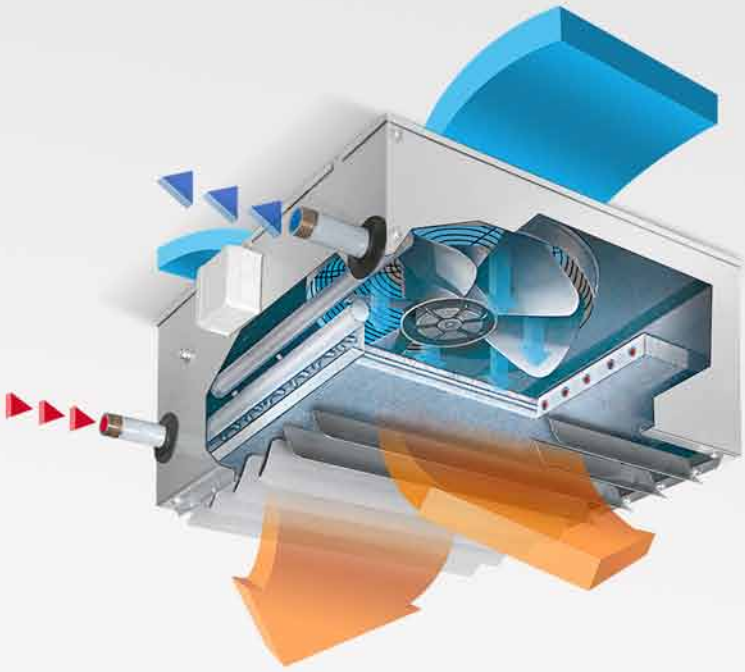
Heizung - Lüftung - Klimatechnik
Heating - Ventilation - Air Conditioning

Operation & Maintenance



Air Heater

WD-A, WD-U: For Recirculating Air, Mixed Air, Outside Air for Wall and Ceiling Installation

CE

WOLF
GEISENFELD

Quality Assurance

QZV

Verein zur Qualitätssicherung und Zertifizierung
für den Mittelstand e.V.

QZV DIN EN ISO 9001:2008

CERTIFICATE

The Verein zur Qualitätssicherung und Zertifizierung für den Mittelstand e.V.
certifies that the company

WOLF Anlagen-Technik GmbH & Co. KG
Heizung-Lüftung-Klimatechnik
Oberflächen- und Landtechnik
Münchener Str. 54
85290 Geisenfeld

has established and maintains a Quality Management System according to DIN EN ISO 9001:2008.
Proved in an audit.

Audit-no.: **01261192**

Conducted by: _____
Prof. Dr. rer. nat. F. Schreiber, Professor an der Hochschule München

This certificate was issued the: 27.01.2012 and is valid until: 26.01.2015
Certificate registration no.: **01161192**

For the QZV _____
Prof. Dr.-Ing. Deublein, Professor an der Hochschule München

QZV e.V. Schlierseestr. 46, 81539 München
Accreditation no. 33050109 (AACI e.V.)

AACI

Contents

02 Proper Use

Decentral Air Heater for Ventilation and Air-Conditioning of

- Offices
- Meeting and Exhibition Rooms
- Lounges
- Industrial and Production Companies
- Greenhouses
- Sales Rooms, Supermarkets, Shopping Centres

WD-A Units are suitable for

- Supply of air which is
  - dust-free
  - without pollutants
  - non-aggressive
  - not developing corrosion
  - incombustible

- Preparation of Air for
  - Filtering
  - Heating

- As well as acc. to the operating parameters determined in the quotation and orders and on the identification plates, like
  - media temperatures, media pressure (air, water, refrigerant, vapour etc.)
  - air humidity

Any deviations must be agreed with and approved by the manufacturer.

RLT-machines for supplying combustible or explosive gases, vapours, mists or dusts must especially be rated. **Without respective remark in our technical ratings, standard air heaters must not be operated in these danger zones.**

03 Safety

The authorized specialized staff charged with

- assembly
- commissioning
- maintenance

must be informed about the observance of these operating instructions without starting work.

Non-observance of the operating instructions can endanger the persons charged with this work and can damage the machine.

Attention!
Work on air heaters must be started or done only when the following functions are fulfilled:

- Repair switches fixed at the machine are connected to the circuit
- Power supply is dead on all poles
- Power-operated, rotating parts are secured against re-starting (repair switch lockable)
- standstill of the rotating parts
- machine components have cooled down to normal ambient temperatures (room temperature)

Attention!
Only qualified, specialized staff must be charged with work on electric components.
The local EVU- and VDE-regulations have to be observed.

The RLT-machine must not be modified nor added, since otherwise the manufacturer's conformity declaration will expire!

Symbols:

Opposite symbol is indicated in the operating instructions at any place where in case of non-observance

- there is danger to life and limb of persons
- damages of the machine can occur.

Opposite symbol is indicated in the operating instructions at any place where there is danger from electric components.

Opposite symbol is indicated in the operating instructions at indications which must not be realized.

Opposite symbol in the operating instructions indicates guidelines or cross-references which are important for the operation of the RLT-plant.

Opposite symbol in the operating instructions indicates information or application tips.

04 Goods Acceptance

04.01 Transport Damages

Unpack the goods in the driver's presence and check them acc. to our delivery note regarding completeness and damage. Transport damages must be confirmed by forwarder (date and signature). Later complaints will be refused by forwarding insurances.

04.02 Indications to Packing (non-returnable)

The packing is a mere transport packing. Its quantity has been reduced to the indispensable minimum in order to be able to transport and unload the high-grade parts without damage.
The material can be completely recycled and thus can be given to reutilization. The elimination costs now as before have to be borne by the consignee of the goods.
As an alternative, it is possible to return the packing material to us. The transport costs have to be borne by the consignee of the goods. Please note that the packing material must not be contaminated and must be brought separated in groups.

05 Montage

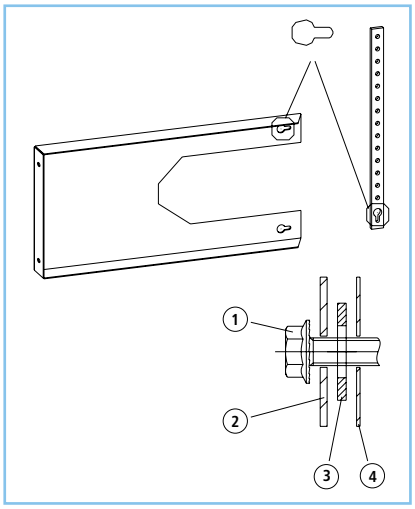
05.01 Fixing

The units have to be fixed at the wall (to be provided by customer) with fixing material approved by the Building Supervisory Board (dowels, screws) acc. to the wall construction. Weights of the respective unit combination cf. WD-A-catalogue.

Unit assembly with

- sheet bracket Order No. 650 (for wall and ceiling when using the motor protection louver => page 8)
- sheet brackets Order No. 651 (for wall and ceiling)
- ceiling suspension Order No. 6531 + D (ceiling).

The supplied suspension devices have got spezial sockets.



Bracket fixing at the unit:

1. Loosen hexagonal screws ① on one side ~3 mm.
2. Insert sheet bracket ② or ceiling suspension with large boring by hexagonal screws ① and pull it towards the back, so that screw ① is in the small slot.
3. Press washer ③ to the WD-A-housing ④.
4. Tighten firmly hexagonal screw ①.

Unit assembly with accessories without sheet brackets, ceiling suspension.
When using the following accessories, the unit can be fixed without sheet brackets or ceiling suspension.
511 - Mised air part
521 - Recirculating air part
530 - Außenluftteil
541 - Filter part

Connection of Unit Parts (Accessories) Glue one sealing strip 12 x 6 mm to one frame profile of each connection flange.
① = sheet screw 6,3 x 13
② = hexagonal screw M 6 x 16,
with washer, spring washer and nut.

Attention:
When using accessories, outside air operation is possible, so:

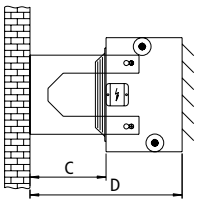
- Provide an anti-frost thermostat at the heat exchanger.
- All ducts transporting outside air must be insulated inside the building on the outside in order to avoid deposit of moisture.

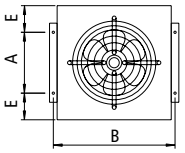
05.02 Roof Safeguarding

The roof safeguarding for accessories led through the roof – rain hood or ducts – must be provided by customer.
Roolf safeguardings are not included in the scope of supply

05.03 Wall and Ceiling Assembly

Type WD-A	100	200	300	400
A	240	2x185	2x210	3x183
B	480	610	760	890
D	620	620	620	620
E	105	105	155	155,5
C	320	320	320	320

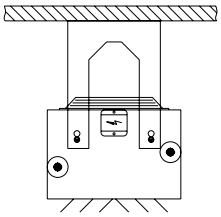




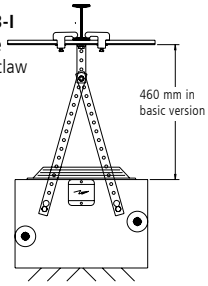
Order No. 651
2 sheet brackets short

Order No. 650
2 sheet brackets long

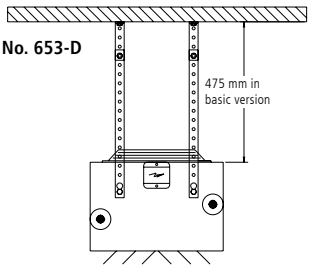
Order No. 651
2 sheet brackets short



Order No. 653-I
Clamping range
of the support claw
0 - 15 mm



Order No. 653-D



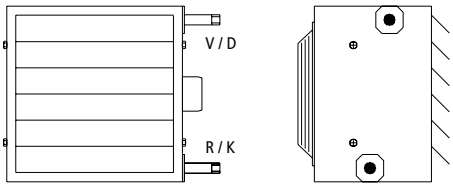
The static stressability of the wall or ceiling construction must be checked by customer.
Fixing at the wall or ceiling must be effected with fixing elements (dowels, screws) approved by the Building Supervisory Board.

For suspensions with larger distance, additional flat irons can be ordered.

05.04 Connection Pipes

Connection right-hand (standard design)
for pump warm water, pump hot water, thermal oil

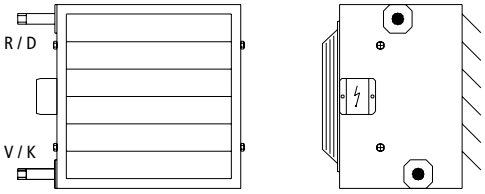
Connection right-hand (spezial design)
for vapour
Standard design cannot be used



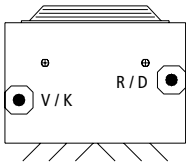
for pump warm water, pump hot water, thermal oil
V = advance R = return

for vapor
K = condensate discharge D = steam entrance

Connection left-hand (standard design)
for pump warm water, pump hot water, thermal oil

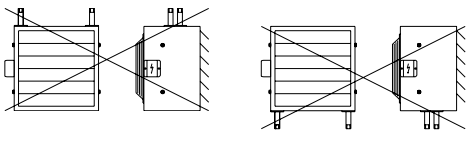


Connection Ceiling Unit
for pump warm water, pump hot water, thermal oil and steam

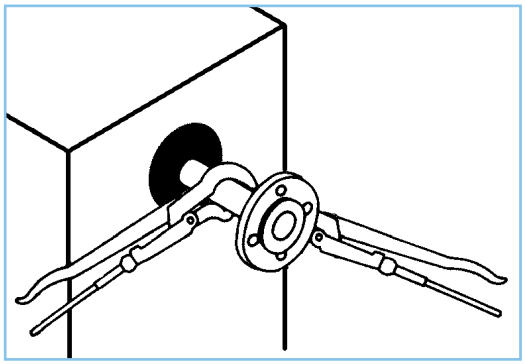


Important:
In case of steam, pay attention that the heat exchanger is installed absolutely horizontally or in steam direction with a slope of 1 % to condensate discharge, respectively. There must be no condensate acculumation in the heat exchanger.
An efficient ventilation has to be provided.
Pay attention to the condensate discharge manufacturer's assembly instructions.

Due to insufficient emptying and ventilation,
Connections towards above or below are not possible.



Do not twist connection piece!
(This will destroy the heat exchanger. No warranty).
When fixing screwed flanges at the advance and return of the heat exchanger, hold against with a suitable tool.
For later inspection work, it is purposeful to provide a slide valve in front ot the heat exchanger.



Remove the protection caps from the connecting pipes.
Important: Connect the machine acc. to the counterflow principle. Advance and return cf. 05.04.

Frost protection for heat exchanger:
In case of outside air operation, provide anti-frost thermostat on the air exit side of the heat exchanger!

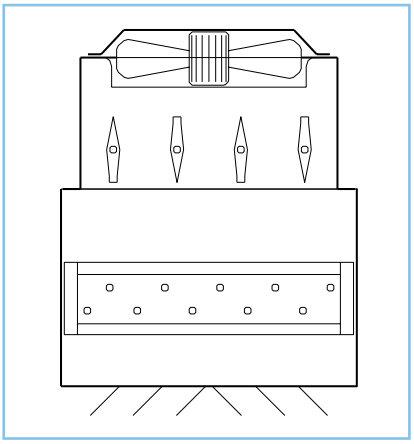
05.05 Ventilation Valve and Emptying Cock

Pay attention that the ventilation valve is installed at the highest point. Arrange the emptying cock at the lowest point, so that a complete emptying of the heat exchanger is possible. As a precaution, blow through the heat exchanger with compressed air in order to achieve a complete emptying (**frost protection**).

05.06 Motor Protection Louver

The installation of the motor protection louver is necessary in case of higher heating media in order to protect the fan motor from overheating when it stands still. The thermo-contacts integrated in the motor would react and stop the motor. Therefore use motor protection louver in case of high advance temperature of the heating medium. Without motor protection louver, WD-A-machines may be operated up to an advance temperature of the heating medium of:

	Wall Machine	**Ceiling Machine**
without accessories (free suction- extraction)	130 °C	120 °C
with accessories (at the suction)	120 °C	120 °C

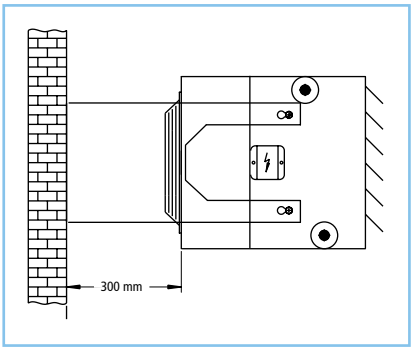


In case of higher heating media from pump hot water 130 /100 on, from vapour 4 bar on, the motor protection louver (order No. 595) must be installed between heat exchanger and motor.

Attention: When using the motor protection louver, the sheet bracket long (order No. 650) is required for wall and ceiling assembly.

Additional measures / replacement measures:

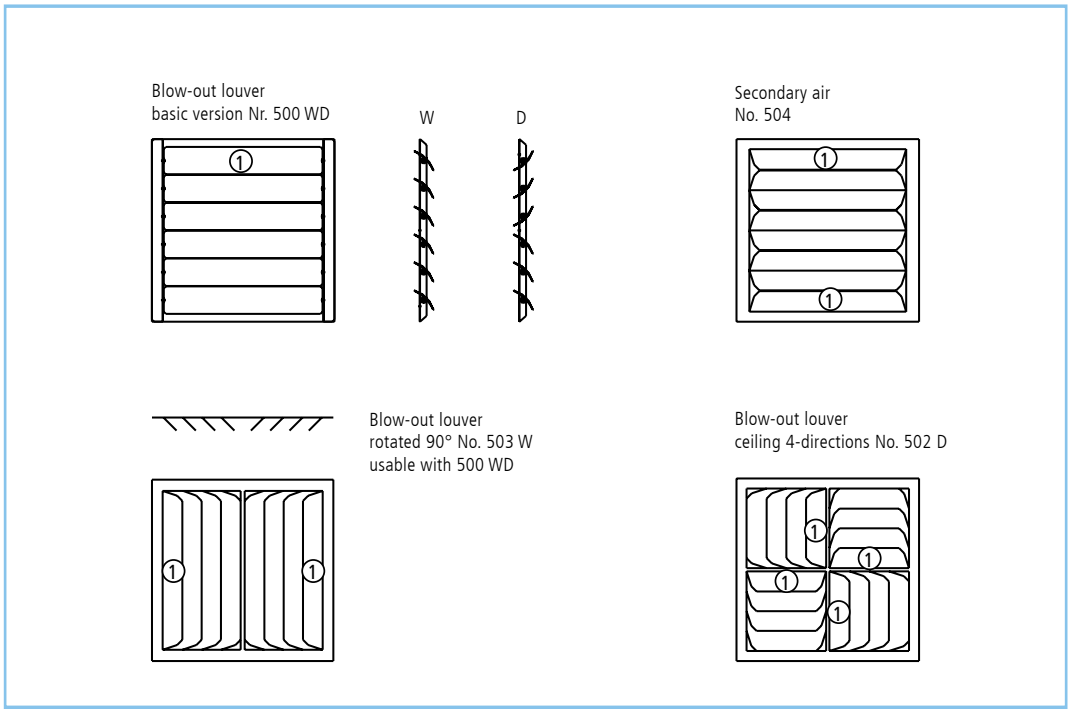
- If the operation is unregulated by the heating medium, install motor protection louver.
- If the operation is regulated by the heating medium, provide fan disconnection, when the regulation valve is closed. Especially in case of an advance temperature of the heating medium of more than 180 °C, to be provided by all means.



Apart from the motor protection function, the motor protection louver can also be used as frost protection flap at machines with pure outside air operation.

Function: Fan off - motor protection louver (frost protection flap) closed.

05.07 Lamellae Adjustment, manual

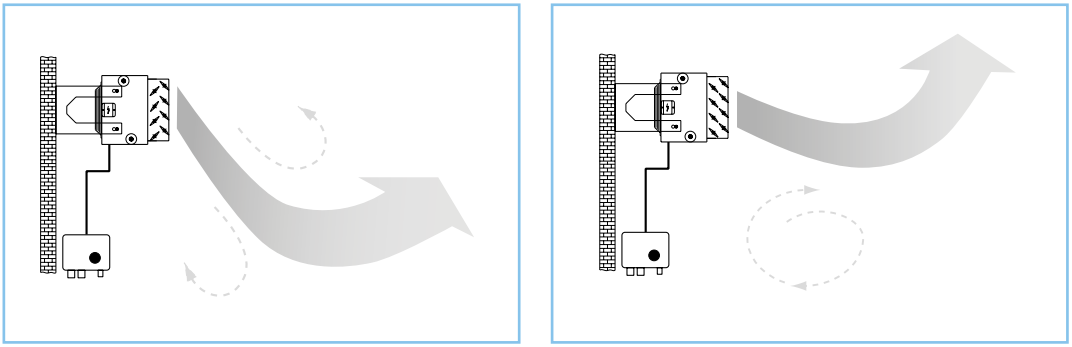


1. First bend lamella ① manually into the requested position.
2. Adjust remaining lamellae manually.

In case of corrections of the adjustment angle, the lamellae can be bent several times without problems.

Attention!
Blow-out louver 503-W is installed behind the blow-out louvers 500-W, 501-D.
Firstly adjust lamellae 500-W, 501-D, then proceed with 503-W as described above.

05.08 Lamellae Adjustment, automatic



Energy-saving louver 505-W/506-D-S, with switching device 678, prevents drifting of the primary air stream by high temperature difference between primary air and room air.
By using the energy-saving louver, the drifting (thermal lift) of the primary air stream, especially during the heating-up period, can be opposed. In choke position, there are single air jets, so that secondary air (room air) is mixed to the primary air stream. Thus, the air inlet - primary air stream is increased and cooled in the core.

By the control device (order No. 678), the temperature difference between nominal and real value of the room temperature is permanently determined.

Acc. to the determined difference as well as the adjustment at the control device (steepness of the control curve), the servo-motor for the choke louver is activated.

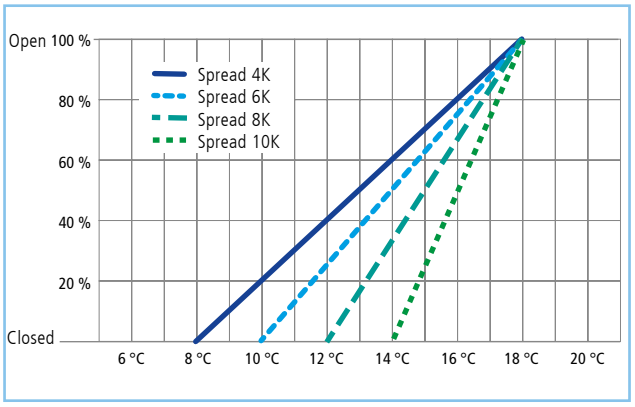
> high temperature difference = choke position
< low or no temperature difference (heating-up finished) = unchoked position.

05.09 Lamellae Adjustment, automatic – Adjustment, Function

Function:
The nominal temperature (5 - 40 °C) is adjusted at the outside scale. The steepness of the control curve (spread) can be adjusted inside the housing.

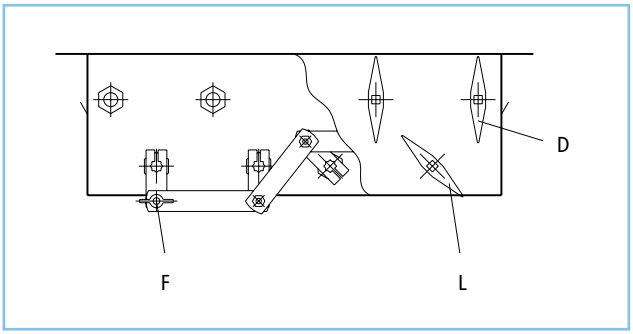
According to the determined temperature difference between nominal and real value of the room temperature as well as adjusted spread of the control curve, the servo-motor for the choke louver is activated.

When the room temperature exceeds the adjusted nominal value, the flap is completely open.



Example:
Hall temperature (nominal value adjustment)
18 °C / Spread 10 K
Flap choked up to ... 8 K
Flap opened > 8 °C
Flap completely opened at 18 °C

05.10 Adjustment Choke Louver with Servo-Motor



In order to achieve a low resistance with opened choke louver, the choke louver should stand parallel to the adjustment louver.

1. Adjustment of Steering Louver
Adjust steering louver L to the requested blow-out direction of the primary air stream and fix it with clamping device F.

2. Adjustment of Choke Louver
Open the box.
Adjust Nominal Value Potentiometer to left, to 5 °C.

Adjust the requested spread 1 - 10 by the internal knob (Spread = Spreizung).
Now the servo-motor opens the choke louver **D**.

After about 2 - 3 minutes, the position of the choke louver can be adjusted parallel to the steering louver by the knob (max. opening angle of Flap).

Adjust the knob (min. opening angle of Flap) to left stop.
Close the box.

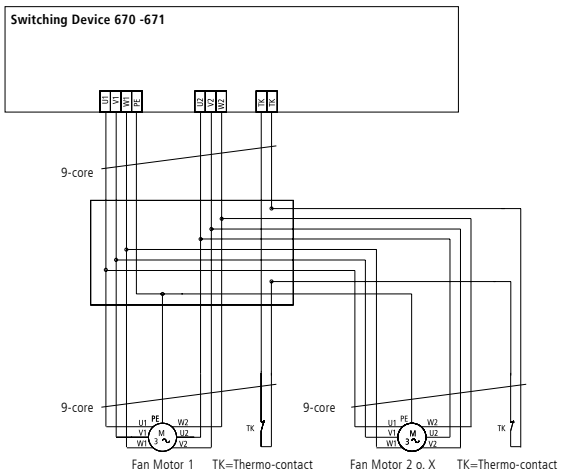
Now the room temperature can be adjusted at the Nominal Value Potentiometer, the system is ready for operation.

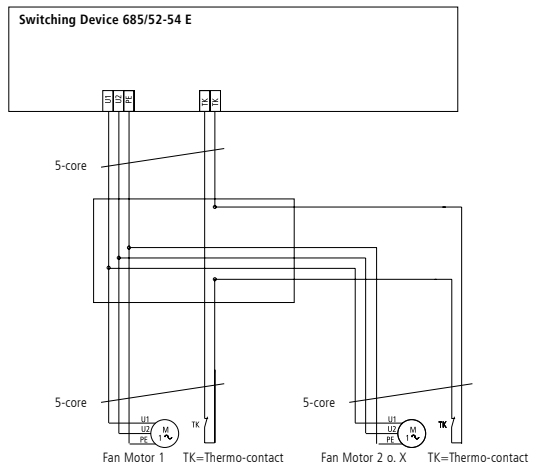
Operating Elements:
Adjusting Knob Nominal Temperature (adjustable outside and inside)
Adjusting Knob Spread (adjustable in opened box, only)
Adjusting Knob Min. Opening Angle (adjustable in opened box, only)
Adjusting Knob Max. Opening Angle (adjustable in opened box, only)

For detailed information see the instruction sheet enclosed with the control box.

06 Switching Devices

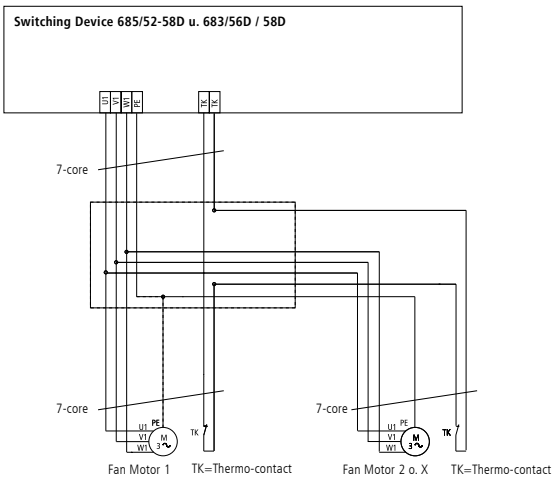
06.01 Max. Number of WD-A Machines on one Switching Device





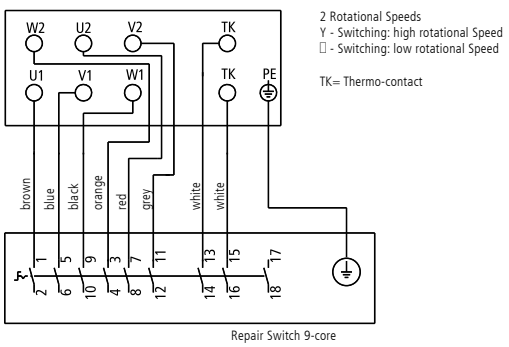
Switching Device	Type WD															
	101	201	301	401	102	202	302	402	103	203	303	403	106	206	306	406
670	50	20	14	6									50	20	14	6
671	50	20	14	6									50	20	14	6
676	50	20	14	6												
677																
685/52 E									7	1	1					
685/53 E									15	3	3	1				
685/54 E									24	6	5	3				
685/55 D	5	2	1													
685/56 D	10	4	2	1												
685/57 D	20	8	5	2												
685/58 D	35	14	10	4												
685/57ExD					2	2	2	2								

Clip box and wiring to be provided by customer!
Attention! Max. number of fan motors on one switching device: cf. table in these operating and maintenance instructions.
The cable cross-sections are guidance values and must be adjusted to the valid VDE-regulations VDE 0100 and the TAB.



06.02 Repair Switch

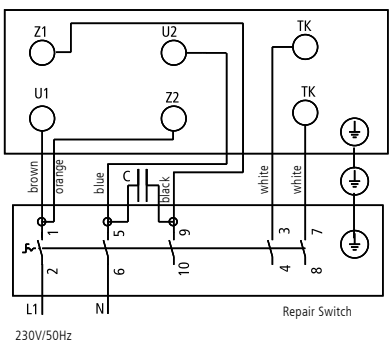
Motor 001



2 Rotational Speeds
Y - Switching: high rotational Speed
□ - Switching: low rotational Speed

TK= Thermo-contact

Motor 003

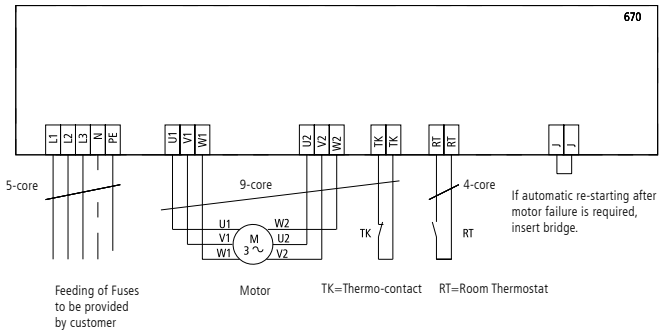


1 Rotational Speed running to the left

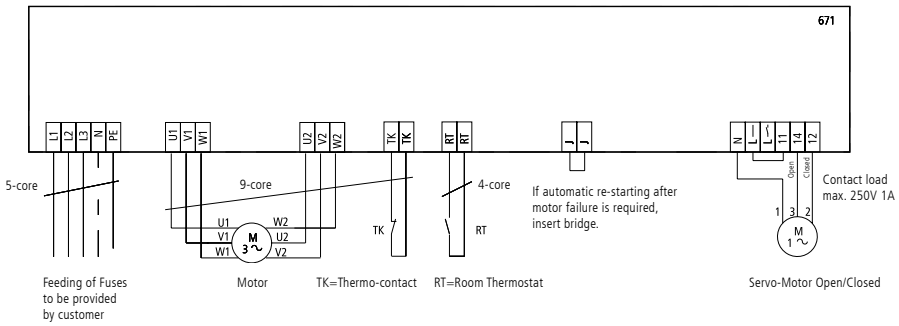
TK= Thermo-contact

06.03 Switching Device, 2 Rotational Speeds 400 V (Motor 001)

Order No. 670

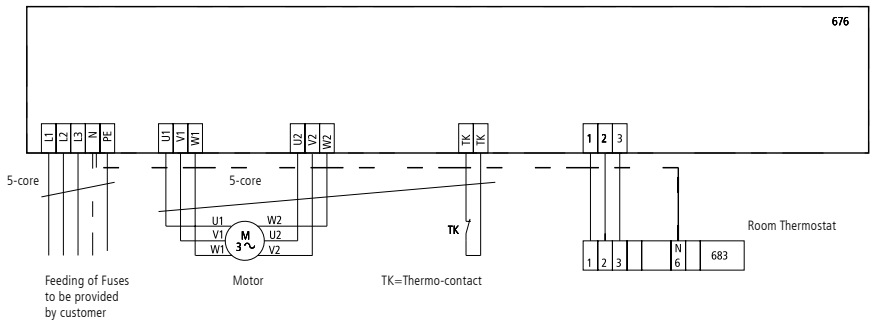


Order No. 671



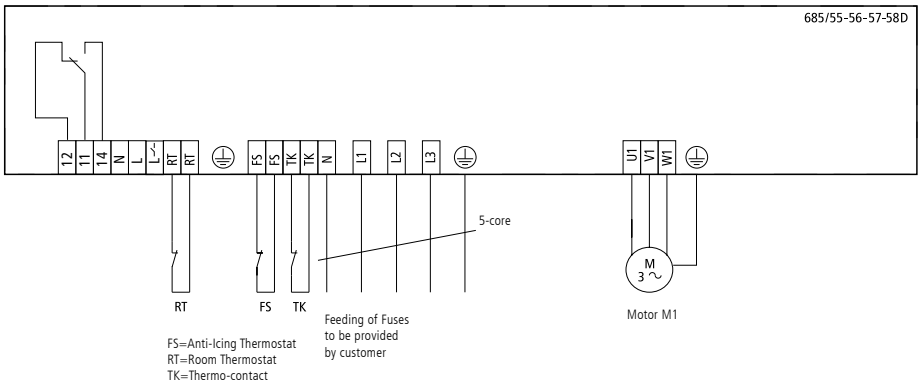
06.04 Automatic Switching Device, 2 Rotational Speeds 400V (Motor 001)

Order No. 676



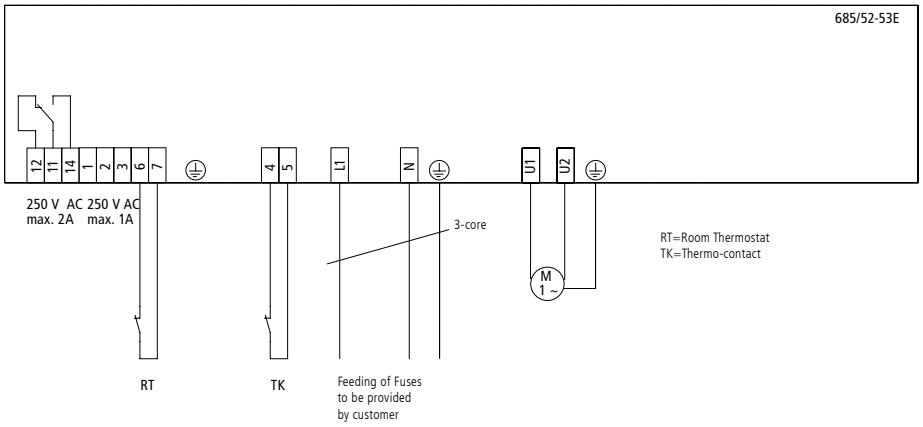
06.05 5-Step-Switching Device, 5 Rotational Speeds 400 V (Motor 001)

Order No. 685 / 55-56-57-58 D

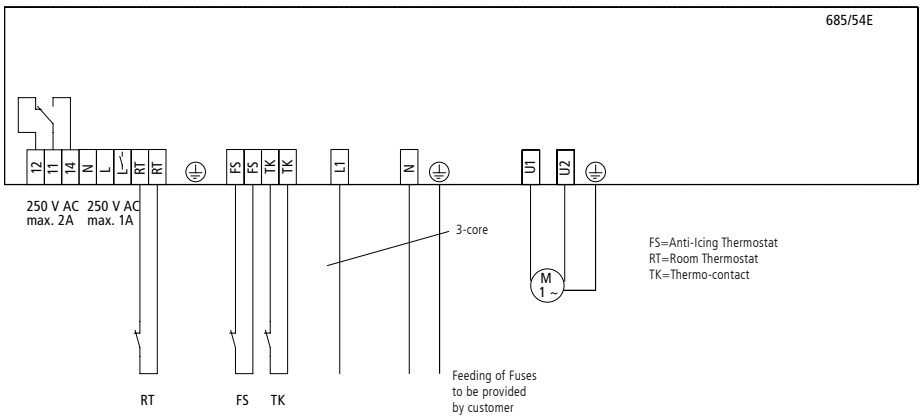


06.06 5-Step-Switching Device, 5 Rotational Speeds 230 V (Motor 003)

Order No. 685 / 52-53 E-FK

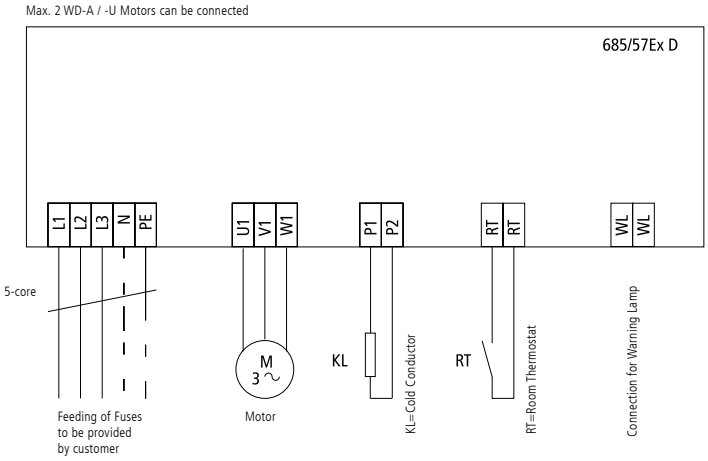


Order No. 685 / 54 E-FK



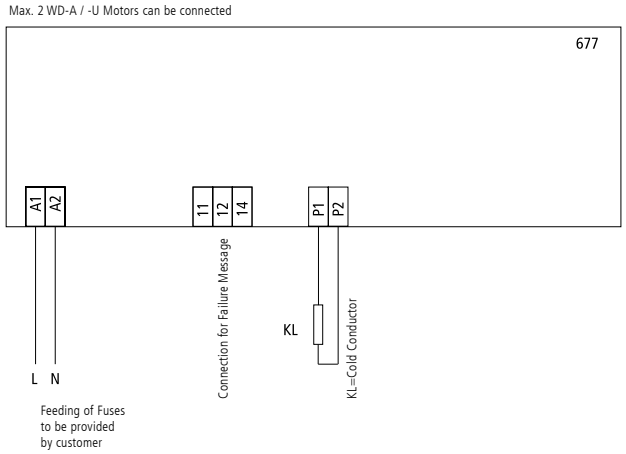
06.07 5-Step-Switching Device, 5 Rotational Speeds and Additional Device for Motor 002, 400 V (Motor 002)

Order No. 685 / 57 Ex



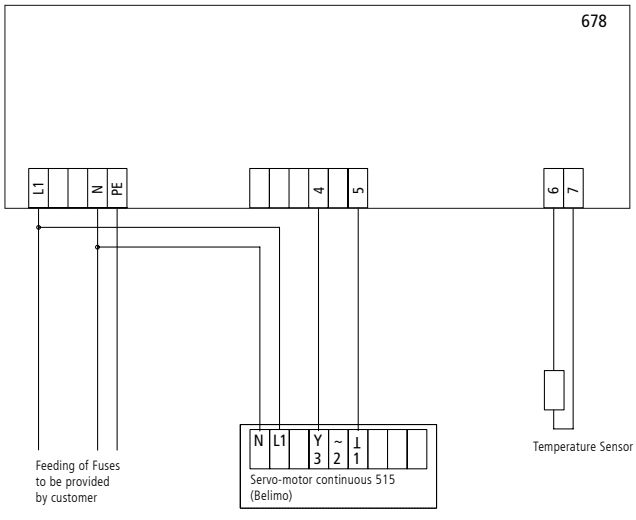
06.08 Cold Conductor Release

Order No. 677



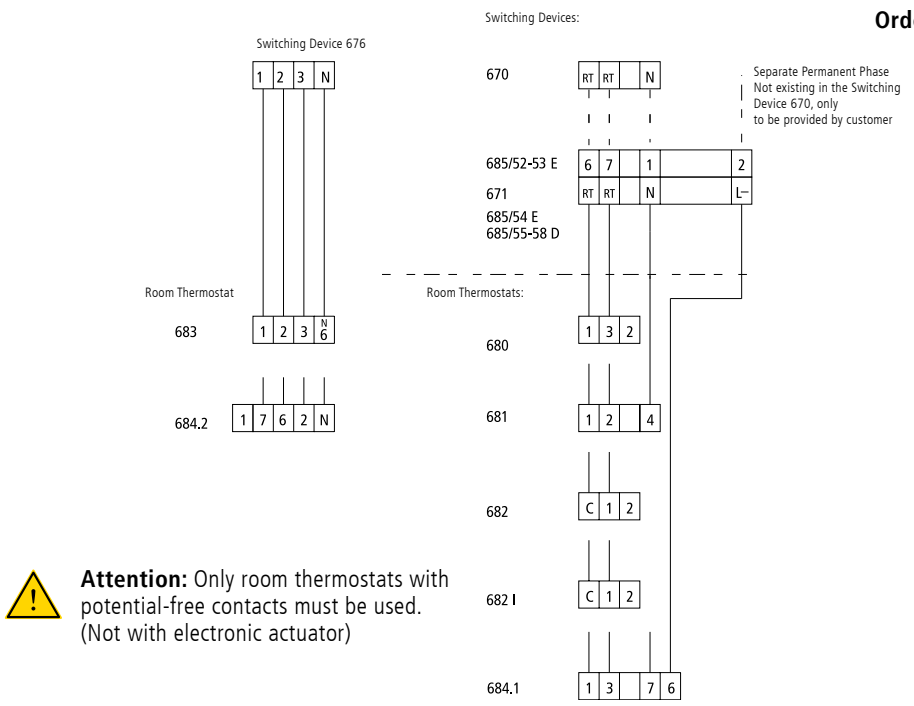
06.09 Control Device for Energy-Saving Louver and Air Distributor 400 V

Order No. 678



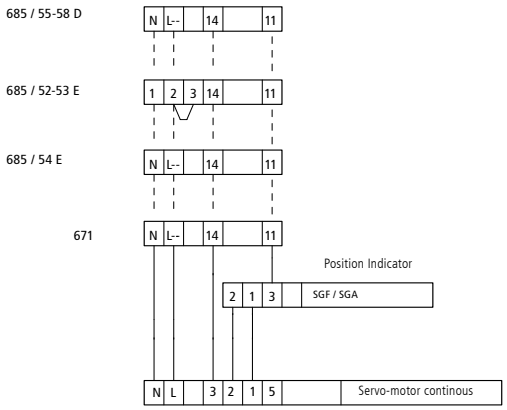
06.10 Switching Devices with Room Thermostat Connection

Order No. 678

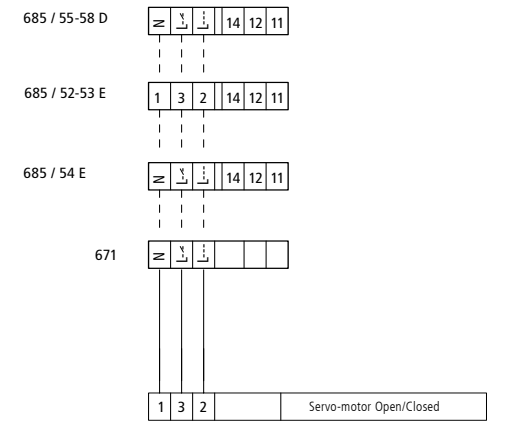


Attention: Only room thermostats with potential-free contacts must be used. (Not with electronic actuator)

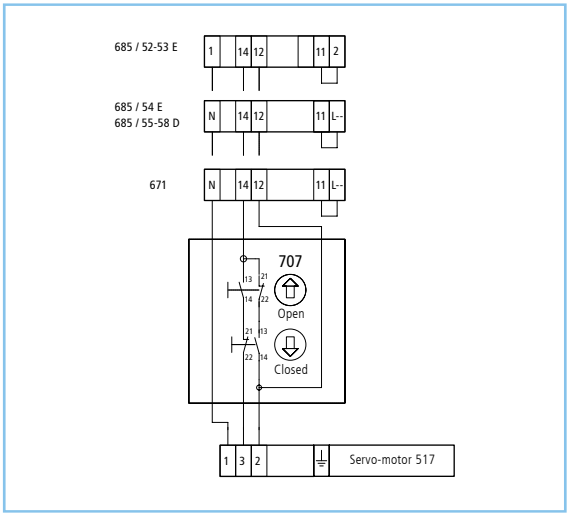
06.11 Switching Devices Servo-Motor continuous 515



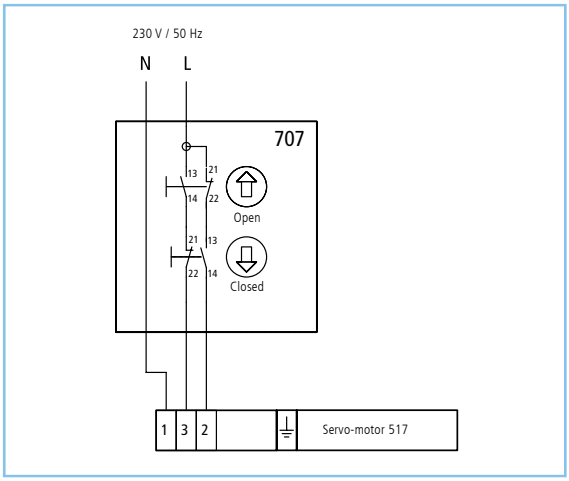
06.12 Switching Devices with Servo-Motor Open/Closed 517



06.13 Switching Devices with Control Device 707 and Servo Motor Open/Closed 517



06.14 Energy-saving Louver with Control Device 707 and Servo-Motor Open/Closed 517



07 Commissioning

07.01 Motor Connection

The nominal voltage indicated on the identification plate is valid. Three-phase motors which are rated for a nominal voltage of 400 V can be used acc. to DIN/IEC 38 in the range 400 V +6 / -10 %, single-phase alternating-current motors 230 V in the range 230 V +6 / -10 %.

Connection cables made of EVA-ethylene-vinyl acetate - hose line 4 GJ1 acc. to VDE (Association of German Electricians) 0208/3.69. This line is approved for operation voltages up to 500 V, the thermal resistance is max. 120 °C. The line construction corresponds to VDE 0282, Part 804.

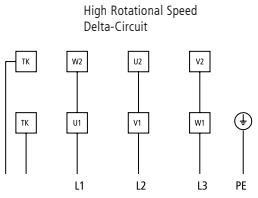
All motors have a complete motor protection by thermo-contacts. As soon as the admissible temperature limit of 135 °C is exceeded (for example by a too high ambient temperature, heating-up by high heating medium temperatures), the thermo-contacts react and switch off the motor.

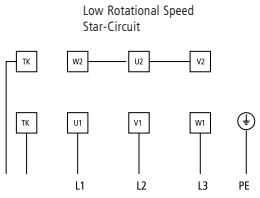
This complete motor protection is only achieved by WOLF - switching devices. When using other makes, no motor guarantee can be granted.

Important:	Switching Capacity:	10 A at cos φ = 1,0
		6 A at cos φ = 0,6
	Nominal Voltage:	250 V
	Voltage Strength:	2 000 V eff.

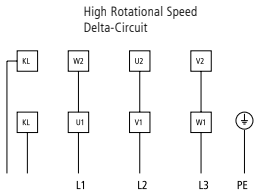
If the complete motor protection reacts, the motor has to be put into operation again only after cooling-down and reposition of the selector switch into position "zero" at the switching device (except switching device 670.1). After connection, check turning direction of the fan. The fans runs in the right direction, if air comes out of the louver frame.

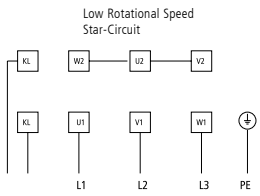
The turning direction can be changed by exchanging 2 phases.
When connecting the switching devices and motors, the local prescriptions have to be observed.



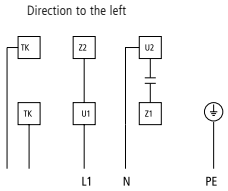


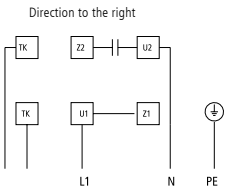
Motor 001 / 006
Motor with 2 Rotational Speeds by switching over with thermo-contakt, modification of turning direction by exchanging 2 phases. Without bridge when using a speed switch.





Motor 002
Motor with 2 Rotational Speeds by Y /△ switching-over with cold conductor, modification of turning direction by exchanging 2 phases. Without bridge when using a speed switch.





Motor 003
Motor with 1 Rotational Spped and operating Capacitor with Thermo-contact, modification of turning direction cf. circuit.

The nominal voltage indicated on the identification plate is valid. Three-phase motors which are rated for a nominal voltage of 380 V can be used in the range of 400 V + 6 / - 10 %, one-phase alternating-current motors 220 V in the range of 230 V + 6 / - 10 % acc. to DIN / EC 38.

Connection cable made of EVA-aethylene-vinylacetate hose pipe 4 GJ1 acc. to VDE 0208 / 3.69. This pipe is approved for operational voltages up to 500 V, the thermal resistance is may. 120 °C. Pipe construction acc. to VDE 0282 part 804.

All motors have got a complete motor protection by thermo-contacts. When exceeding the admissible temperature limit of 135 °C (for example by too high ambient temperature, heating-up by high heating medium temperatures), these will react and switch off the motor.

Work on electric installations must be effected by qualified electricians, only.

- **A repair switch must be fixed at each machine, in order to be able to switch off the driving motor dead on all poles during maintenance work.**
- Put motors into operation only with opened blow-out louvers and motor protection louvers.
- The connection of the motors, switching devices and other electric accessories must be effected acc. to the relevant standards (VDE 0100; EMV-Law (Electromagnetic Compatibility); Regulations of EVU (Power Supply Company).
- For controlling the rotational speed, no frequency converters should be used, since this can lead to an increased heating of the motor in the lower rotational speed range. The voltage of the motors can be controlled, i.e. their rotational speed can be controlled by transforming control devices or phase-shifting control.
- Ambient air suction temperature max. 40 °C.

08 Maintenance

08.01 Warranty

Unsere Gewährleistung erlischt, wenn Schäden durch unsachgemäße Behandlung und Wartung entstehen. Außerdem treten erfahrungsgemäß mit zunehmendem Alter der Produkte, durch mangelnde Wartung größere Schäden auf.

The Workplace Regulation dd. 19.07.2010 (BGBl. I S. 960) §4 - Par.3 explicitly advises the regular function test and maintenance.

Safety equipment must only be checked by expert, competent staff!
Therefore, contact the competent service department.

Moreover, regular maintenance is for RLT-machines is prescribed by the legislator:

- VDI 6022 Hygienic Requirements to Technical Equipment for Room Air
- VDI 3801 Operation of Technical Equipment for Room Air
- VDMA 24186 Efficiency Programme for Maintenance of air-technical and further technical Equipment in Buildings, Air-technical Devices and Installations
- AMEV Recommendation – Maintenance 85

We refer to the check lists included in a/m regulations, where there are recommendations for maintenance intervals!
For maintenance work on RLT-machines, a training acc. to category B (hygiene training) is required acc. to VDI 6022.

Maintenance Intervals of Machine Parts
The maintenance intervals for following points cannot be prscribed. The regular maintenance and cleaning of the machine solely depends on the degree of contamination which is due to the dust content of the outside or recirculating air.

08.02 Motor

The motor is maintenance-free. Remove dust deposits from time to time.

08.03 Heat Exchanger

Blow out heat exchanger with compressed air or remove dust containing oil with light, oil-soluble detergent, if necessary. Remove persistent deposits by a steam cleaner.
Attention! Use low pressure and keep a distance of at least 300 mm between nozzle and heat exchanger.

08.04 Air Filter

When contaminated remove the pocket filter out of the filter part. Clean or replace the pocket filter then.
Remove normal dust by beating out. Do not use solvents like benzine, fuel oil etc.
Always provide a sufficient stock. When installing different makes, observe the suppliers's instructions!

Attention:
When exchanging filters, wear respirator with filter P3. Contaminated filters bear an increased health risk.

09 Stopping Procedure, Dismantling

09.01 Stopping Procedure

Rest machine by regulation / control system to minimum capacity.

- Switch louver flaps to recirculating air operation – close outside air flap in order to avoid cooling and frost danger.
- Close all regulating valves.
- Switch off recirculating pumps.
- Empty installation parts endangered by frost. Blow through heat exchanger and connecting pipes with compressed air until they are completely empty, fan afterrunning until all surfaces are dry.
- Switch off main switch and lock machine.

Re-starting
Check visually if there are any damages.

- Fill emptied components slowly again – ventilate carefully.
- Open all valves.
- Actuate main switch.
- Switch on regulation / control system.

09.02 Dismantling and Elimination

Dismantling
Before dismantling, the air heater and the consumers installed in it must be switched dead.
A qualified electrician must remove all alive connecting lines.

Moreover, all medium-bearing components must be completely emptied. This must be done by a specialized company providing a qualified elimination of water with freezing preventive.

Then, the air heater can be dismantled on site into ist single units or parts. This should also be done by a specialized company knowing the ecologically beneficial elimination of the single parts.

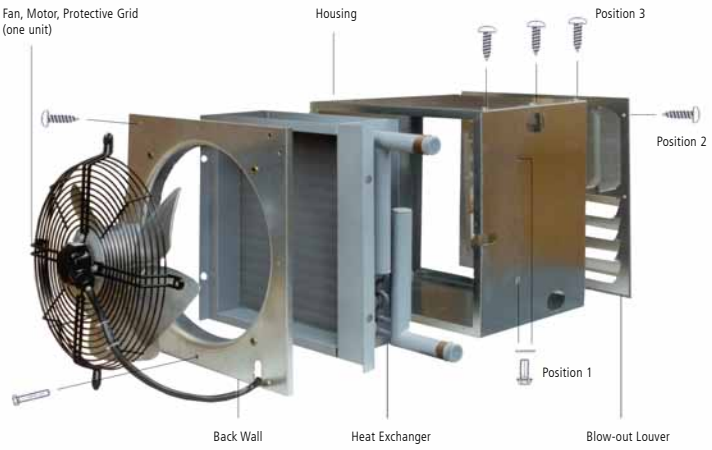
When handling dusty components (filters) or mineral wool products, wear suitable respirators.

Elimination
In our RLT-machines, the following materials are used:
Housing and built-in parts are made of

- hot-dip galvanized sheet steel
- aluminium AlMg

All materials can be returned to material cycle by separate waste disposal.

1. Switch off and block main switch.
2. Disconnect electric supply line and electric connection in the clamp box.
3. Stop and dismantle advance and return of warm water.
4. Remove the machine from the suspension. Loosen screws ① only about 3 mm and remove the machine.
5. Remove blow-out louver as well as back wall with fan by loosening the sheet screws ②.
6. Remove the lateral fitting screws M 8 ①.
7. Loosen the sheet screws ③ which are located diagonally at the lateral corners and remove the external cladding halves in lateral direction. Remove heat exchanger.
8. If necessary, remove motor with protection grid from the back wall by loosening the screw ④.



WOLF Anlagen-Technik GmbH & Co. KG
Business domain Heating - Ventilation - Air Conditioning
Münchener Str. 54
85290 Geisenfeld, GERMANY
Phone +49 (0)8452 99-0
Fax +49 (0)8452 99-250
E-mail info.hlk@wolf-geisenfeld.de
Internet www.wolf-geisenfeld.de

4M02ND1 Subject to changes in design.