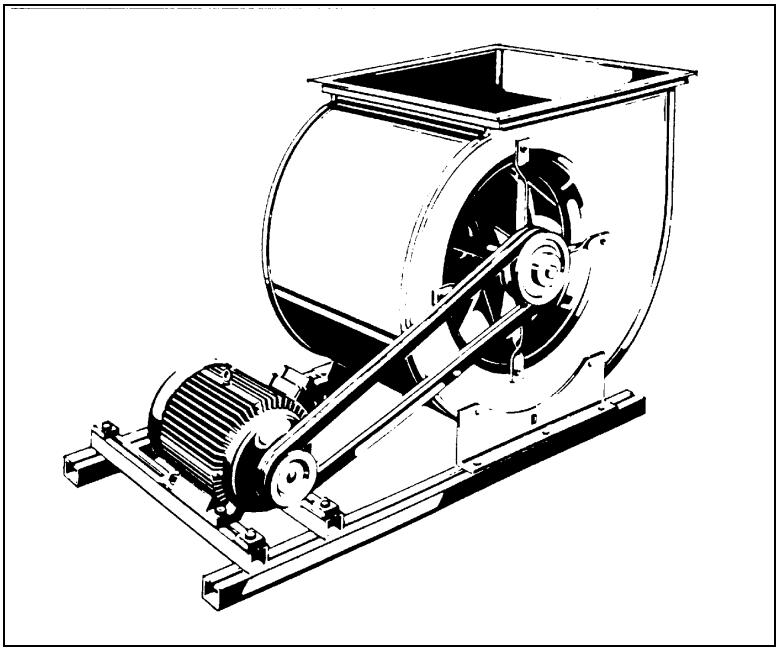
Betriebsanleitung

Operating instructions

Air in Motion. **Wolter Fans.**

Radialventilatoren mit Riemenantrieb
Centrifugal fans for belt drive

TRE / TRZ / HRE / HRZ / ARE / ARZ
TYE / TYZ / HYE / HYZ / AYE / AYZ



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Diese Betriebsanleitung enthält wichtige technische und sicherheitstechnische Hinweise. Lesen Sie daher diese Anleitung vor dem Auspacken, der Montage und jeder Arbeit an oder mit dem Ventilator aufmerksam durch!

This operation instruction contains important technical advice and information about safety. Therefore please pay attention to this operation instruction before unpacking, installation or any other work is undertaken on this fan!

1. SICHERHEIT / *SAFETY*

Arbeitssicherheits-Symbole / *Industrial safety symbols*

Folgende Symbole weisen Sie auf bestimmte Gefährdungen hin oder geben Ihnen Hinweise zum sicheren Betrieb.

The following symbols refer to particular dangers or give advice for save operation.

	Achtung! Gefahrenstelle! Sicherheitshinweis! ***Attention! Danger! Safety advice!***
	Gefahr durch elektrischen Strom oder hohe Spannung! ***Danger from electric current or high voltage!***
	Quetschgefahr! ***Crush danger!***
	Lebensgefahr! Nicht unter schwebende Last treten! ***Danger! Do not step under hanging load!***
	Wichtige Hinweise, Informationen ***Important, information***

Sicherheitshinweise / *Safety advice*

Riemengetriebene Wolter-Radialventilatoren sind nach dem Stand der Technik zum Zeitpunkt der Auslieferung hergestellt! Umfangreiche Material-, Funktions- und Qualitätsprüfungen sichern Ihnen einen hohen Nutzen und lange Lebensdauer! Trotzdem können von diesen Maschinen Gefahren ausgehen, wenn sie von unausgebildetem Personal unsachgemäß oder nicht zum bestimmungsgemäßen Gebrauch eingesetzt werden.

Wolter centrifugal fans for belt drive are produced in accordance with the latest technical standards and our quality assurance programme which includes material and function tests ensures that the final product is of a high quality and durability. Never the less these fans can be dangerous if they are not used and installed correctly, according to the instructions.

Lesen Sie vor Inbetriebnahme der Radialventilatoren diese Betriebsanleitung aufmerksam durch!

Before installing and operating this fan please read this instructions carefully!

- Betreiben Sie den Ventilator ausschließlich im eingebautem Zustand oder mit ordnungsgemäß montiertem Eingreifschutz oder Schutzgitter sowie Riemenschutz (Passende, geprüfte Schutzgitter liefern wir auf Anforderung mit!).
- Montage, elektrischer Anschluß, Wartung und Instandsetzung nur durch ausgebildetes Fachpersonal!
- Betreiben Sie den Ventilator nur bestimmungsgemäß in den angegebenen Leistungsgrenzen (☞ Typenschild) und mit genehmigten Fördermedien!
- ***Put the fan and other components to use only after they have been securely mounted and fitted with protection guards to unit application (suitable guards can be supplied upon request).***
- ***Installation, electrical wiring, maintanance only by qualified engineers.***
- ***The fan must be operated only in accordance with the performance data (☞ Data plate) and the approved medium passing through.***

2. BESCHREIBUNG / DESCRIPTION

Riemengetriebene Hochleistungs-Radialventilatoren wurden speziell für den Einsatz in modernen Lüftungs- und Klimaanlagen entwickelt. Durch den Riementrieb können höhere Drehzahlen des Laufrades und somit bei kleiner Baugröße höhere Volumenströme erreicht werden. Alle Ventilatoren werden im Werk statisch und dynamisch ausgewuchtet.

High-performance centrifugal fans for belt drives were developed specifically for applications in state-of-the-art ventilation and air conditioning systems. The belt drive allows for higher RPMs of the impeller and thus higher volumetric flows with a compact design size. All fans are statically and dynamically balanced at the factory.

3. EINSATZBEDINGUNGEN / CONDITIONS OF USE

Riemengetriebene Radialventilatoren eignen sich zur Förderung von:

- sauberer Luft
- wenig staub- und fetthaltiger Luft
- leicht aggressiven Gasen und Dämpfen
- Medien bis zur max. Luftdichte von 1,3 kg/m^3
- Fördermitteln mit einer Temperatur von - 30 °C bis + 60 °C
- Medien bis zur max. Feuchte von 95 %
- Kühlmitteltemperatur des Antriebsmotors min - 30°C und max + 40°C!

Angaben des Motorherstellers beachten!

Centrifugal fans with standard motor are suitable for ventilation of

- ***clean air***
- ***slightly dusty and greasy air***
- ***slightly aggressive gases and vapour***
- ***mediums up to an atmospheric density of 1.3 kg/m3***
- ***mediums with a temperature of -30°C up to +60°C***
- ***mediums up to a max. humidity of 95%***
- ***The ambient temperature of the motor must be between -30°C and +40°C***

Make sure and adhere to the specifications of the motor manufacturer.

4. LAGERUNG, TRANSPORT / STORAGE, TRANSPORT

- Lagern Sie den Ventilator in seiner Originalverpackung trocken und wettergeschützt.
  - Decken Sie offene Paletten mit Planen ab und schützen Sie die Ventilatoren vor Schmutzeinwirkung (z.B. Späne, Steine, Draht usw.).
- Halten Sie Lagertemperaturen zwischen - 30 °C und + 40 °C ein.

- Bei Lagerzeiträumen von über 1 Jahr prüfen Sie vor der Montage die Leichtgängigkeit der Lager (☞ Drehen mit der Hand).
- Transportieren Sie den Ventilator mit den geeigneten Lastaufnahmemitteln
  - Vermeiden Sie ein Verwinden des Grundrahmens und des Gehäuses oder andere Beschädigungen.
- Verwenden Sie geeignete Montagehilfen wie z.B. vorschriftsmäßige Gerüste

- ***Store the fan in a dry and weather protected place in its original packing***
  - ***cover open pallets with a tarpaulin and protect the fan against dirt (i.e. chips, stones, wires etc.)***
- ***Storage temperature between -30°C and +40°C***
- ***With storage times of more than 1 year please check the bearings for free running before installation.***
  - ☞ ***turn by hand***
- ***Transport the fan with suitable loading means***
  - ***avoid distortion of the casing or other damages.***
- ***Use suitable assembling means as e.g. scaffolds conforming to specifications***

Lebensgefahr! Nicht unter schwebende Last treten!

Danger ! Do not step under hanging loads!

5. MONTAGE / INSTALLATION

Montage und Elektroarbeiten nur durch ausgebildetes und eingewiesenes Fachpersonal und nach den jeweils zutreffenden Vorschriften!

Installation and electric works only by skilled and qualified personnel and in accordance to health and safety regulations!

- Montage der Ventilatoren an den Füßen, Rechteckrahmen oder Grundrahmen auf dem Unterbau oder Schwingungsdämpfern.
  - ☞ Ventilatoren nicht verspannen!
- Einbaulage nur mit horizontaler Welle.
- Zur Befestigung nur selbstsichernde Schrauben verwenden!
- Bei Ventilatoren mit Volumenstrommeßeinrichtung Datenblatt beachten !!
- Elektroanschluß nach technischen Anschlußbedingungen und den einschlägigen Vorschriften des Motorherstellers
  - Kabel ordnungsgemäß in Anschlußkasten einführen und abdichten (evtl. “Wassersack”)
  - Die Elektro-Anschlußleitungen müssen innerhalb des Bauteils so lang sein, daß eine Verschiebung des Motors zum Keilriemenwechsel oder zum Nachspannen der Keilriemen ohne Schwierigkeiten möglich ist.
- Motorschutz entweder über
  - Bimetallrelais: Bimetallrelais für Motorschutz (handelsüblich) auf den Motornennstrom (☞ Typenschild) einstellen
  - oder Kaltleiter: Bei Ausführung mit Kaltleiter für Motorschutz (Motoren über 3 kW Nennleistung) Kaltleiter ordnungsgemäß an ein Auslösegerät anschließen.

- ***Installation of the fans on mounting feet, rectangular frames or base frames either on the base assembly or on vibration dampers.***
  - ☞ ***do not distort the fans during installation***
- ***Mounting position with shaft in a horizontal position only***
- ***Use self-locking screws only.***
- ***for fans with volumetric flow measuring equipment, make sure and adhere to the data sheet!***
- ***Electric wiring must be in accordance with local technical specifications and ordinances of the motor manufacturer.***
  - ***Take care when fitting the cable into the terminal box that it is properly sealed and watertight.***

  - ***ensure that the length of the electrical connections within the component is sufficient to allow for a shifting of the motor without any difficulties whenever the drive belt has to be replaced or tightened.***

- ***Motor protection by***
  - ***Bi-metallic relay: Bi-metallic relais for motor protection to be adjusted to the nominal motor current (☞Data plate)***
  - ***thermistor: with thermistor type for motor protection (motors with more than 3 kW nominal rating) install thermistor to a tripping device in accordance with instructions.***

Keine Metall-Stopfbuchsenverschraubungen bei Kunststoff-Anschlußkästen verwenden!

Do not use metal compression gland fittings with plastic terminal boxes.

- Vor der Kontrolle der Drehrichtung:
  - Fremdkörper aus dem Ventilatorraum entfernen
  - Lüfterrad per Hand einige Umdrehungen durchdrehen und Leichtgängigkeit prüfen
    ☞ wenn das Laufrad an der Düse schleift, die Düse am Gehäuseseitenboden lösen und so versetzen, daß ein gleichmäßiger Spalt zwischen Düse und Rad entsteht. (Besonders wichtig bei Typ HYZ / HYE).
  - Eingreifschutz, Schutzgitter und Riemenschutz (☞ Zubehör) montieren oder Ventilator und Riementrieb abschranken

- ***Before control of direction of rotation***
  - ***Remove any foreign matter from the fan.***
  - ***Rotate impeller by hand to check free running.***
    ☞If the impeller contacts the inlet cone, loosen the inlet cone at the side / bottom of the housing and reposition it to where a uniform gap is achieved between the inlet cone and the impeller (particularly important for HYZ / HYE type fans).
  - ***Install protection guard / finger protection (☞accessories) or give no access to impeller.***

- Drehrichtung lt. Drehrichtungspfeil auf Gehäuse durch <u>kurzes</u> (impulsartiges) Einschalten kontrollieren
  ☞ Bei Drehstrommotor
  - Drehrichtung evtl. durch Vertauschen von 2 Phasen umkehren!

  ☞ Bei Einphasenmotor
  - Drehrichtung, wenn nötig, durch Vertauschen von Z1 mit Z2 umkehren
    (→ geänderte Stromrichtung in der Hilfswicklung)
- ***Check direction of rotation as per direction arrow on the casing by short turning on.***

- ☞ ***with 3-phase-motor***
  - to change direction of rotation transpose two of the phases!
- ☞ ***with 1-phase-motor***
  - to change direction of rotation transpose the position of leads Z1 (black) and Z2 (orange) (→ change of current direction in secondary winding)

6. BETRIEB / OPERATION

- Ventilator zur Erstinbetriebnahme vorbereiten
  - ordnungsgemäße mechanische Montage
  - richtige Spannung des Riementriebes (☞ Wartung)
  - vorschriftsmäßige elektrische Installation
  - Fremdkörper in Ansaug- und Ausblasbereich und in Ventilatorraum entfernt
  - Eingreifschutz, Schutzgitter und Riemenschutz (☞ Zubehör) montiert, Ventilator und Riementrieb abgeschrankt oder außerhalb des Greifbereiches montiert
- ***Prepare fan for first operation***
  - ***correct mechanical installation***
  - ***proper tension of the drive belt (☞ Maintenance)***
  - ***electrical installation in accordance with regulations***
  - ***remove foreign matters from inlet and outlet area and from inside of fan***
  - ***protection guard (☞accessories) installed, no entry to fan or fan being installed out of arm sweep***

Nehmen Sie den Ventilator erst nach vorschriftsmäßiger Montage in Betrieb!

☞ Müssen große Luftmengen bei wenig Gegendruck (Kanalsystem noch nicht komplett montiert) bewegt werden, kann die Stromaufnahme überschritten werden (verbotener Bereich der Kennlinie)!
→ Thermischer Motorschutz kann ansprechen!

Only commence operation when fan is installed in accordance with ordinances !

☞ ***If the fan is started under free blow conditions, i.e. prior to connecting to duct system, the current consumption may exceed the rated current (forbidden area of the fan curve)!***

® ***Thermal protection of motor may activate!***

- Ventilator in Betrieb nehmen
  - korrekte Funktion überwachen (Laufruhe, Vibration, Unwucht, Stromaufnahme, evtl. Steuerbarkeit, Riementrieb)
- ***Taking fan in operation***
  - ***observe correct function (smoothness of running, vibration, unbalance current consumption, possibly controlability, belt drive)***

Ansaugöffnungen immer freihalten! Schutzgitter oder Eingreifschutz rechtzeitig auf Verschmutzung kontrollieren und wenn nötig reinigen!!

Bei längerem Stillstand, Riemen zur Lagerentlastung entspannen!!

By regular inspection of the fan inlet make sure debris has not collected on the guard and clean if necessary !

In case of extended periods of standstill, loosen the tension of the drive belt in order to release the load on the bearing!

7. WARTUNG / MAINTENANCE

Vor allen Wartungsarbeiten:

- Ventilatoren ordnungsgemäß stillsetzen und allpolig vom Netz trennen!
- Stillstand des Laufrades abwarten!
- gegen Wiedereinschalten sichern!

Before any maintenance work is undertaken:

- ***Stop fan in accordance to regulations and disconnect all poles from mains supply.***
- ***Wait until impeller is stationary!***
- ***Make sure that a restart is not possible!***

- Verwenden Sie nur von uns geprüfte und freigegebene Original-Ersatzteile
- Motor-Kugellager austauschen nach Beendigung der Fettgebrauchsdauer entsprechend der Wartungsanleitung des Motorenherstellers.
  Ventilatorteil:
  Bei Ausführung 07 ab Baugröße 710: Kugellager in ca. 3- bis 6- monatigen Intervallen nachschmieren. Verwenden Sie nur Lithiumseifenfett nach DIN 51825 - K 3 N (Grundölviskosität ISO VG 68 / DIN 51519)
  Bei allen weiteren Baugrößen haben die Kugellager eine Lebensdauerschmierung. Nach Beendigung der Fettgebrauchsdauer ist ein Austausch erforderlich.
  Die Fettgebrauchsdauer beträgt bei Standardanwendung und einer Drehzahl von 900 min^{-1} ca. 40000 Betriebsstunden, bei 1400 min^{-1} ca. 30000 Betriebsstunden und bei 2800 min^{-1} ca. 15000 Betriebsstunden.
  Unabhängig von den Betriebsstunden sollten die Kugellager wegen der Alterung des Fettes alle 5 Jahre ausgetauscht werden.
- Verwenden Sie zum Reinigen nur handelsübliche Reinigungsmittel unter Beachtung der vorgeschriebenen Sicherheitsmaßnahmen und verwenden Sie keine kratzenden und schabenden Werkzeuge (Oberflächenschutz wird zerstört!)
- ***Use only original spare parts tested and approved by the manufacturer.***
- ***Replace the ball bearings of the motor whenever the grease utilization period has elapsed in accordance with the maintenance instructions of the manufacturer.***
  Fan section:
  For version 07 from design size 710 on: relubricate the ball bearings in intervals of approx. 3 – 6 months. Use only lithium soap grease in accordance with the DIN 51825 – K 3 N standard (base oil viscosity ISO VG 68 / DIN 51519).For all other design sizes, the ball bearings feature a lifetime lubrication. Replacement will be required after the grease utilization period has elapsed.
  When operating the fan at its limit maintenance work could be necessary. The ball bearings have been lubricated for life. After the life time lubricant inside the bearings is used up the bearings must be exchanged.
  The grease life time of the bearings is:
  for normal use at 900 min-1 40000 hours,
  at 1400 min-1 30000 hours,
  at 2800 min-1 15000 hours,
  Independent of the working hours bearings should be changed every 5 years.
- ***Only use usual commercial cleaning material paying attention to the prescribed safety measures and do not use any abrasive tools (surface protection will be destroyed!)***

The following safety notes must be observed when maintaining the machine – life-threatening injuries to personnel, damage to the machine and other material damage, as well as environmental damage, can be avoided.

- Cleaning, lubrication and maintenance work may only be carried out by authorized operating personnel – operating instructions are to be observed.
- Repair work may only be carried out by authorized craftsmen – accident prevention regulations are to be observed.
- Secure the operational area over a large area prior to the commencement of maintenance work.
- The specified sequence of the working stages is to be observed exactly.
- Only Trained electricians can carry out electrical work on the machine‘s electrical equipment
- Self-locking screws and nuts are always to be renewed.
- All specified screw torque settings are to be observed precisely.
- Read the chapter, "General Safety Notes ".

All impellers have been carefully balanced at the factory premises itself. Imbalance can occur due to dust, wear, abrasion and accumulation of material on the impeller leading to vibrations and damage of bearings. Therefore an operation free of vibrations must be ensured.

7.1 Surface protection

The surface protection of a component must be regularly checked and maintained if necessary. In particular, mechanical damage to the surface due to dust or chemical impact must be identified. Even stainless steel materials can be subjected to surface corrosion, e.g when it is operating under a very moist and salty environment or aggressive gases are present.

In order to ensure that surface corrosion neither affects the general properties of the fan nor result in a situation whereby maintenance activities are urgently required, regular and suitable maintenance tasks within the period of warranty should be carried out. Corrosion can be prevented typically by cleaning the surface and by using a suitable surface conservation technique.

7.2 Monitoring Vibrations

Increased vibrations are always a danger signal (VDI 2056 or ISO 2372). Changes in the vibration level can be best be monitored by measuring the mechanical vibrations on the bearings and the motors. Variations can be best detected by comparing the measured values over a prolonged period. If significant changes are observed, the cause must be examined, e.g. dirt accumulation or wear on the impeller. Cleaning and/or rebalancing of the impeller may be necessary.

7.3 Bearings

7.3.1 Monitoring of bearings

Every bearing has to be checked regularly. Dirt particles, contaminants and moisture must not enter the bearing as they may cause premature failure. While re-lubricating or replacing bearings, utmost cleanliness must be observed.

While monitoring bearings it is a great advantage to use electronic shock pulse measurement (e.g SPM-method). Measure should be made directly at the bearing unit. The special instructions of the test equipment manufacturer must be adhered to. Not only the momentary values but also the comparison of the data over a prolonged period is important since this best allows the changes in the bearing to become apparent. In rare cases SPM-measurements can lead to wrong interpretations. Bearing noise and temperature too should be recorded especially for machines that

are critical. Increases in values are always a sign of danger.

The re-lubrication intervals are valid for stationary machines under normal conditions for non-ageing lithium soap lubricants, as long as the temperature on the external bearing ring remains below +70°C. For higher temperatures every increase by 15°C the greasing interval is halved. The maximum temperature limit of the grease is not to be exceeded.

The life expectancy of bearings is largely dependent on the operating conditions and the conditions at the site of installation. We strongly recommend regular bearing checks. The frequency depends on the importance of the fan. For machines of high importance we recommend annual bearing replacement even if the running time is very low and the run is satisfactory. Bearings for less important machines should be replaced less often or when a breakdown is imminent.

7.3.2 Additional instructions for various fan bearing types

The types of grease to be used and applicable re-lubricating intervals are specified in 7.3.3. Necessary re-lubrication should if possible be done while the machine is running with necessary safety precautions. If this is not possible, turn the shaft by hand. It is important that the inside of the bearings remain absolutely clean from moisture, dirt and dust. Bearings that located in the path of the airflow are provided with double-lip seals. High performance grease as mentioned in 7.3.3 must be used. At our factory all the bearings are lubricated with heavy-duty long life grease. The lubricant must be changed only after the long life of the lubricant has terminated.

Bearings with permanent lubrication
Bearings with permanent lubrication can be recognized by the absence of grease nipples and do not need re-greasing.

Pedestal block bearing with re-greasing device and grease control disc
During re-lubrication, control discs remove old grease and press it out through the openings into the bearing casing. During re-lubrication the temperature may temporarily rise due to excess grease. The temperature falls to its normal steady state level once the control disc ejects the excess grease. The re-lubrication is best done by taking the necessary precautions to avoid coming in contact with mobile parts-especially for a running machine, so that the surplus old grease that comes out can be immediately removed and not be carried away by the air stream (for fans in which the bearing lies in the path of the air stream, such as axial fans and centrifugal fans with double inlets).

Pedestal block bearing with re-greasing device and without grease control disc
Initially up to 2/3rd of the bearing is filled with grease. Re-lubrication of smaller quantities must be done at specified intervals. The correct quantity of grease should be applied, because over greasing may lead to an increase in temperature. The installed overpressure valve helps in compensating the pressure between the internal area and the atmosphere. After several re-lubricatios if the casing is filled with grease, then the grease must be changed.

For this the upper part of the housing is taken off and the old grease is removed without damaging the bearing. New grease has to be squeezed by hand into the bearing. Please use clean grease and take care that no impurities come into the grease.

Pedestal block bearing with permanent lubrication and without grease nipple
For this the upper part of the housing is taken off and the old grease is removed without damaging the bearing. New grease is squeezed carefully by hand into the bearing. Please use clean grease and take care that no impurities come into the grease. The space between the lip seals too must be filled with grease so that the friction between the lips and shaft are reduced.

7.3.3 Grease quality, quantity and lubrication intervals

Except for special cases - where this is clearly indicated -the motor bearings are lubricated with lithium soap grease of different brands that are mutually compatible. The motor manufacturer supplies the brand and the nameplate on the motor may be referred.

For the grease data and re-lubrication intervals for the fan bearings, please refer the separate labels provided on the fan or refer to the documentation supplied with the fan.

The following has to be noted: If the fan is equipped with re-lubrication tubes (nipples located on the fan casing and not at the fan bearing), then the quantity of grease for the first re-greasing is calculated as follows (as the empty tubes need to be fully filled):

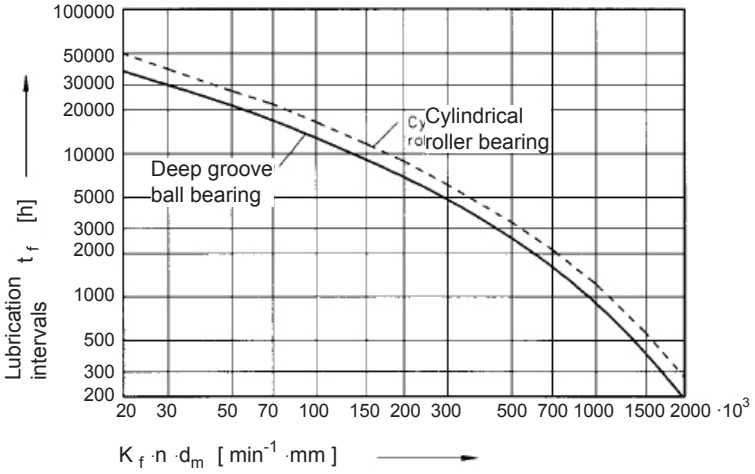
1) Regreasing quantity (1st time) = quantity shown on label + 20ml per meter greasing-tube

2) Aternative – if the length of the greasing-tube is unknown – please calculate:
Regreasing quantity (1st time) = quantity shown on label + 20ml * fan diameter in m

After the first greasing interval you have to use the quantity given on the label or on the documentation supplied.

The re-lubrication intervals can be seen from the following curve or can be provided separately.

Bearing type
Deep-groove ball bearing single-row
kf = 1.1
Cylindrical roller bearing single row
kf = 3.5
dm = average bearing diameter [mm]
=(d+D)/2
n = speed (min-1)



Lubrication intervals at normal conditions
according to DIN 51 825 -10 bis +70°C
Room temperature with the above mentioned grease types

3) Empirical Lubrication Intervals

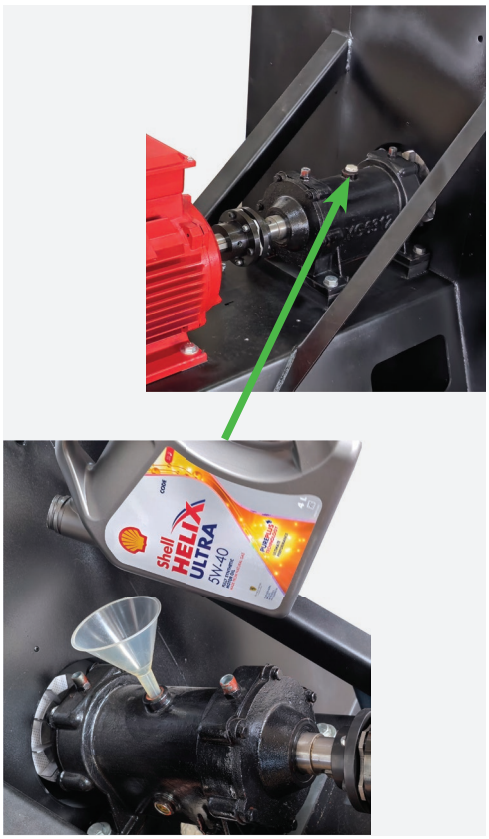
Nr	Oper. Temp. (°C)	Lubrication Intervals			Bearing used	Grease No.
		Quite clean	Dusty	Dusty & Humid		
1	< 50	1 year	6 months	3 months	Normal Bearings	ALVANIA RL2(NSK. FYH); Mobil Polyrex EM (PEER. FSB) Gadhus S2V1002 (box bearing)
2	50 - 60	8 months	4 months	2 months		
3	60 - 70	6 months	3 months	30 days		
4	70 - 85	5 months	2 months	20 days		
5	85 - 100	4 months	30 days	15 days		
6	100 - 120	30 days	15 days	5 days	High Temp Bearings	SH44M...etc High Temp. grease
7	120 - 150	15 days	5 days	2 days		
8	150 - 180	7 days	2 days	1 days		

The lubricating grease replenishment interval indicated in the table is based on 8-10 hours of operation per day. When the operation time varies, the interval should be calculated proportionally from this table. During on-site engineering applications, reliable intervals should be determined based on practical experience and experimental data. During maintenance, if old grease is found to be blackened, severely oxidized, or lacking in oil, the refilling cycle should be halved; if the old

grease does not exhibit any abnormalities, the refilling cycle can be appropriately extended. Once the refilling cycle is determined, do not adjust it arbitrarily to avoid unnecessary damage.
It is important to note that if a user selects a specific brand of grease for re-greasing, they should consistently use that brand. Changing the brand of grease can easily lead to bearing failure. If other lubricating grease must be used, it should at least be of the same type (thickener) as the initially filled grease, and the old grease should be completely drained during refilling.

7.3.4 Instructions for use of Bearing Box

- Must first add oil before operating.
- Fill with Shell 5W40 lubricating oil.
- Fill the lubricating oil to the red dot position in the middle of the oil sight glass.
- Replace the lubricating oil after 15 days of first use. Subsequently, replace the lubricating oil every 6 months.
- Regularly inspect the usage condition of the bearing box every month. Check the appearance of each part for cracks, looseness of bolts, excessive temperature, abnormal noise during operation, oil leakage, and other conditions. Any abnormalities found should be promptly addressed and resolved.
- If it is not used for a long period, clean it and refill with new lubricating oil. Regularly rotate the shaft to prevent the upper half of the bearing from lacking oil.
- In addition to the above-mentioned conventional measures, when using a water-cooled bearing housing, it is also necessary to pay attention to whether the water system is unobstructed and functioning properly. The water pressure applied to the water-cooled bearing housing should not exceed 0.2 MPa. The cooling water should preferably be filtered soft water and changed regularly.



- Ventilator reinigen
  - Ansaugöffnungen reinigen
  - Lüfterrad reinigen (wenn nötig Eingreifschutz demontieren)
    - ☞ Motor nicht überfluten!
    - ☞ Lüfterrad-, Schaufeln nicht verbiegen!
  - Eingreifschutz montieren

- ***Clean fan***
  - ***clean inlet cones***
  - ***clean impeller (if necessary dismount protection guards)***
    - ☞ ***Do not flood motor!***
    - ☞ ***Do not bend impeller, blades!***
  - ***Install protection guard***

- Kontrolle des Riementriebes

  Der Riementrieb ist während den ersten Betriebsstunden regelmäßig zu beobachten. Nach einer Laufzeit von 0,5 bis 4 Stunden unter Vollast und danach nach ca. 24 Betriebsstunden und ist der Antrieb erneut zu kontrollieren und ggf. nachzuspannen.

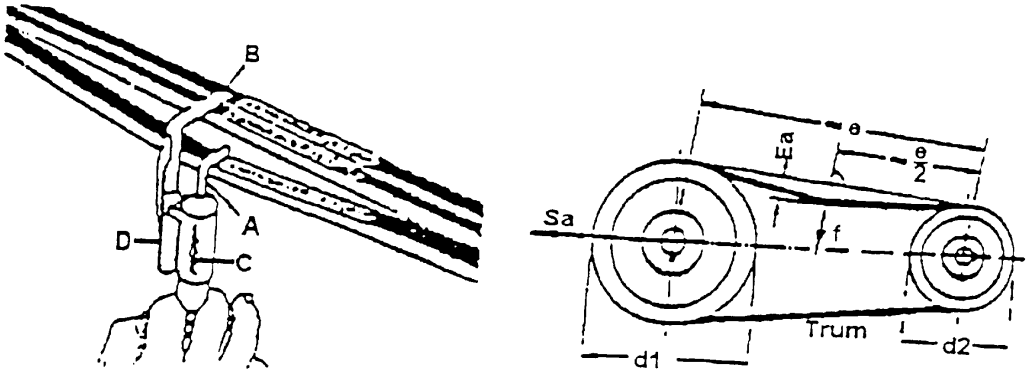
  - Riemenschutz abschrauben
  - Keilriemen nach Abbildung 1 überprüfen
    - ☞ Gegebenenfalls Keilriemen nachspannen:
      1. Klemmschrauben seitlich am Motorschlitten lösen
      2. Riemen durch Verstellen der Spannschrauben nach Bedarf spannen
      3. Klemmschrauben am Motorschlitten festziehen
  - Riemenschutz anbringen

  Ist ein Wechseln des Riemens notwendig, unbedingt zum Wechseln den Riementrieb entspannen! Bei mehreren Riemen immer nur kompletten Satz auswechseln!

- ***Inspection of the belt drive***
  Make sure to regularly inspect the belt drive during the initial operating hours. The drive belt will have to be inspected and retightened – if necessary - after an operating period of between 0.5 and 4 hours under full load and thereafter in intervals of about 24 operating hours.
  - ***Unscrew the protective cover of the belt***
  - ***Inspect the drive belt as shown in figure 1***
    - ☞ ***if necessary, retighten the drive belt:***
      1. ***loosen the clamping screws on the side of the motor carriage***
      2. ***tighten the belt as required by adjusting the tension screws***
      3. ***tighten the clamping screws on the motor carriage***
  - ***reinstall the protective cover of the belt***

If a replacement of the belt is required, make sure to release the tension of the entire belt drive before removing the belt! If the system is equipped with several belts, always make sure to replace the complete set!

Abbildung / ***figure 1***



Meßgerät mit Lasthaken A in Trummitte auflegen. Schleppzeiger B in Position bringen. Profilabhängige Prüfkraft nach Skala C aufbringen. Dazu Meßgerät rechtwinklig zum Trum ziehen. An Skala D des Schleppzeigers Eindrücktiefe ablesen. Vorspannung ggf. korrigieren, bis die vorgegebene Eindrücktiefe E_a erreicht ist.

Position the measuring gauge with the load hook A in the center of the belt run. Zero the trailing pointer. Apply the test force in accordance with scale C. For this, pull the measuring gauge at a 90 degrees angle away from the belt run. Read the depth of impression on scale D of the trailing pointer. If necessary, properly set the belt pretension until the specified depth of impression E_a is reached.

Falsche Riemenvorspannung gewährleistet keine einwandfreie Leistungsübertragung und führt zum vorzeitigen Ausfall der Keilriemen. Zu hohe Vorspannung führt außerdem zu Lagerschäden. Beim Spannen der Riemen ist darauf zu achten, daß die seitliche Flucht der Riemen nicht mehr als 1° abweicht.

If the drive belt is not properly tightened, the result will be an inadequate transmission of power and a premature failure of the drive belt. A too high pretension will additionally be the cause of bearing damages. When tightening the belt, make sure that the lateral alignment of the belts does not deviate by more than 1 degree.

- Allgemeine Kontrollen

- Lagerspiel zu groß?
- Schmiermittel an Lager ausgetreten?
- Oberflächenschutz angegriffen (☞ Fördermedium zu aggressiv!)?
- ungewöhnliche Betriebsgeräusche?
- Ventilatorleistung für evtl. erweitertes Kanalsystem noch genügend (☞ Überlastung!)?

- ***General controls***
  - ***bearing play too large?***
  - ***grease leaking on bearings?***
  - ***surface protection affected (☞ medium to be ventilated too aggressive!)?***
  - ***unusual operation noise?***
  - ***fan capacity for possibly exceeded duct system still sufficient (☞ overloading!)?***

8. INSTANDSETZUNG / *REPAIR*

Vor allen Instandsetzungsarbeiten:

- Ventilatoren ordnungsgemäß stillsetzen und allpolig vom Netz trennen!
- Stillstand des Laufrades abwarten!
- gegen Wiedereinschalten sichern!

Before any repairs are undertaken please:

- ***Stop fan in accordance to regulations and disconnect all poles from mains supply.***
- ***Wait until impeller is stationary!***
- ***Make sure that a restart is not possible!***

Verwenden Sie nur von uns geprüfte und freigegebene Original-Ersatzteile!

Only use original spare parts manufactured and supplied by Wolter!

- Laufrad wechseln
  - Saugseitiges Schutzgitter, Eingreifschutz demontieren
  - Riemenschutz demontieren
  - Riementrieb entspannen
  - Keilriemen abnehmen
  - Auf der dem Antrieb gegenüberliegenden Seite Klemmschrauben für Kugellager lösen

- Düsen-Befestigungsschrauben auf der Antriebsseite lösen
- Laufrad mit Welle von der Antriebsseite her herausnehmen
- Klemmschraube für den dem Antrieb gegenüberliegenden Stellring lösen und Stellring von der Welle abnehmen
- Kugellager von der Welle abziehen
- Klemmschraube für Stellring am Laufrad lösen und Stellring abnehmen
- Laufrad abziehen
- neues Laufrad aufziehen
- Zusammenbau in umgekehrter Reihenfolge
- Saugseitiges Schutzgitter, Eingreifschutz sowie Riemenschutz montieren

- ***Replacing the impeller***
  - ***remove the intake side protective grid and the tamper protection***
  - ***remove the protective cover of the belt***
  - ***loosen the tension of the belt drive***
  - ***remove the drive belt***
  - ***on the side opposite of the drive, loosen the clamping screws of the ball bearings***
  - ***loosen the inlet cone mounting screws on the drive side***
  - ***remove the impeller together with the shaft from the drive side***
  - ***loosen the clamping screw for the setting collar on the opposite side of the drive and remove the setting collar from the shaft***
  - ***pull the ball bearing off the shaft***
  - ***loosen the clamping screw for the setting collar on the impeller and remove the setting collar***
  - ***pull off the impeller***
  - ***install the new impeller***
  - ***reverse the order for the installation***
  - ***install the intake side protective grid, the tamper protection and the protective cover of the belt***

- Motor wechseln
  - Elektroanschluß des Motors abklemmen
  - Riemenschutz entfernen
  - Klemmschrauben am Motorschlitten lösen
  - Riementrieb entspannen
  - Keilriemenscheibe von Motorwelle abnehmen (dazu Innensechskantschrauben auf der Keilriemenscheibe lösen und in die freien Löcher eindrehen. Dadurch wird der feste Sitz der konischen Nabe gelöst. Keinesfalls die Scheibe mit Schlagwerkzeugen demontieren!)

- Befestigungsschrauben am Motorflansch lösen (wenn nötig, Motor unterbauen!) und Motor abnehmen
- neuen Motor einbauen
- Keilriemenscheibe auf Motorwelle montieren (Scheiben müssen fluchten!). Konische Nabe durch Festziehen der Innensechskantschrauben verspannen
- Keilriemen spannen (→ ”Wartung”)
- Riemenschutz montieren
- Elektroanschluß (→ ”Montage”)

- Korrekten Einbau kontrollieren
  - ☞ Laufrad muß sich frei drehen! (→ ”Montage”)
  - ☞ Korrekte Drehrichtung kontrollieren (→ ”Montage”)

- ***Replacing the motor***
  - ***disconnect the wiring of the motor***
  - ***remove the protective cover of the belt***
  - ***loosen the clamping screws on the motor carriage***
  - ***release the tension of the belt drive***
  - ***remove the pulley from the motor shaft (for this, loosen the Allen screws on the pulley and screw into the vacant holes. This will loosen the fit of the pulley on the conical hub. Under no circumstances try to remove the pulley using a hammer or similar tools!)***
  - ***loosen the mounting screws at the motor flange (if necessary, steady the motor) and remove the motor.***
  - ***install the new motor***
  - ***install the pulley on the motor shaft (the pulleys must be aligned properly!) Clamp the conical hub by tightening the Allen screws***
  - ***tighten the drive belt (→ Maintenance)***
  - ***install the protective cover of the belt***
  - ***reconnect the wiring (→ Installation)***

- ***Verifying the correct installation***
  - ☞ ***the impeller must turn freely! (→ Installation)***
  - ☞ ***verify the correct direction of rotation (→ Installation)***

9. KUNDENDIENST, HERSTELLERADRESSE / *SERVICE, ADDRESS OF PRODUCER*

Wolter-Produkte unterliegen einer ständigen Qualitätskontrolle und entsprechen den geltenden Vorschriften.

Für alle Fragen, die Sie im Zusammenhang mit unseren Produkten haben, wenden Sie sich bitte an den Ersteller Ihrer lufttechnischen Anlage, an eine unserer Niederlassungen oder direkt an:

Wolter-products are subject to steady quality controls and are in accordance with valid regulations.
In case you have any questions with regard to our products please contact either your constructor of your air handling unit or directly to one of our distributors:

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Tel. +(852) 2456 0198; Fax +(852) 2456 0290
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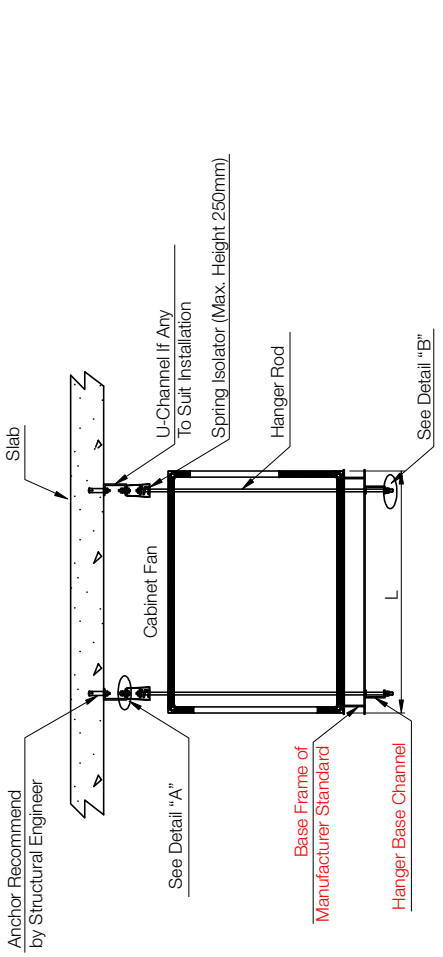
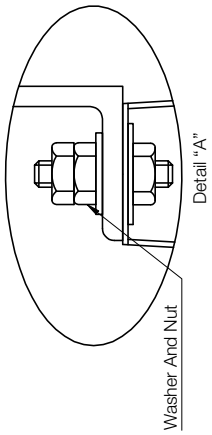
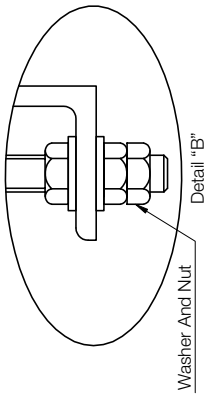
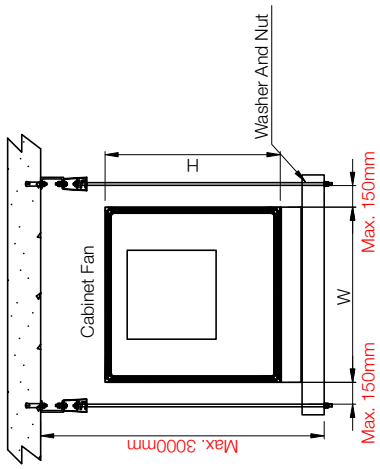
Guangdong Wolter Chemco Ventilation Ltd.
Jigongkeng Administrative Zone, Futian, Boluo,
Huizhou, Guangdong, P.R.China
www.wolter.com.hk; info@wolter.com.hk

Appendix 1-1 - Structural Detail for Suspended Centrifugal Cabinet Fan





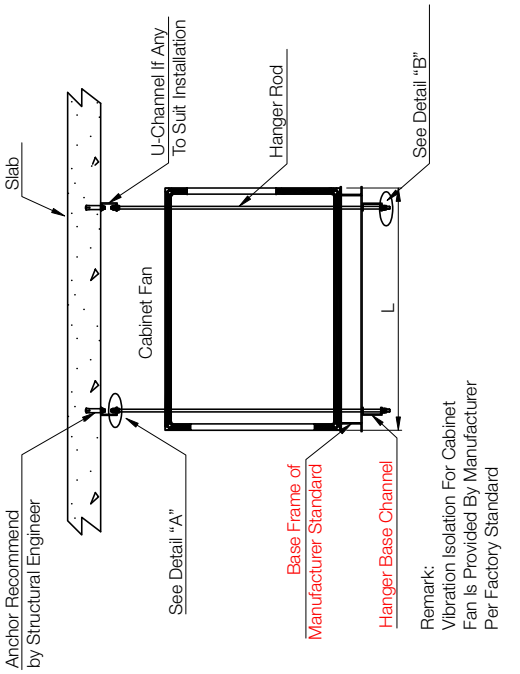


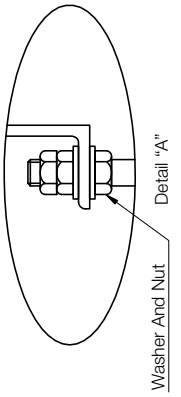


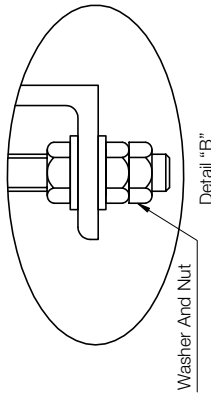
Hanger Schedule

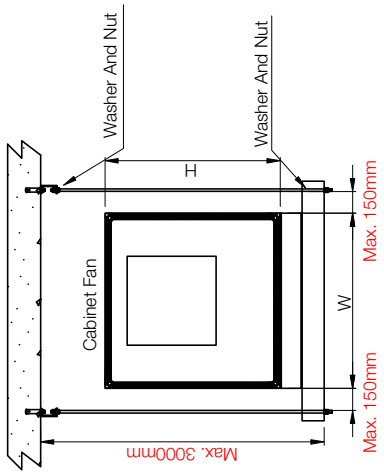
Air Flow Reference	Approx. Cabinet Fan Size (LxWxH mm)	Fan Weight	Hanger Rod Qty	Approx. Point Load	Hanger Threaded Rod Size	Anchor Size	Min. Anchor Load	U-Channel Size	Hanger Base Channel Size
1 m^3/s	900 x 800 x 800	200 kg	4	50 kg	M8	M8	2.0 kN	76 X 38 X 6.7 kg/m Length 100mm	76 X 38 X 6.7 kg/m
2 m^3/s	900 x 800 x 800	300 kg	4	75 kg	M10	M10	2.5 kN	76 X 38 X 6.7 kg/m Length 100mm	76 X 38 X 6.7 kg/m
4 m^3/s	1200 x 1600 x 800	350 kg	4	90 kg	M10	M10	2.5 kN	76 X 38 X 6.7 kg/m Length 100mm	76 X 38 X 6.7 kg/m
6 m^3/s	1200 x 1600 x 1600	450 kg	4	115 kg	M12	M12	3.0 kN	76 X 38 X 6.7 kg/m Length 100mm	102 X 51 X 10.4 kg/m
8 m^3/s	1200 x 1600 x 1600	570 kg	4	145 kg	M12	M12	3.0 kN	76 X 38 X 6.7 kg/m Length 100mm	102 X 51 X 10.4 kg/m
10 m^3/s	1200 x 2300 x 1600	700 kg	4	175 kg	M16	M12 X 2	3.0 kN X 2	102 X 51 X 10.4 kg/m Length 200mm	102 X 51 X 10.4 kg/m
12 m^3/s	1200 x 2300 x 1600	1000 kg	4	250 kg	M16	M12 X 2	3.0 kN X 2	102 X 51 X 10.4 kg/m Length 200mm	102 X 51 X 10.4 kg/m

Appendix 1-1 - Structural Detail for Suspended Centrifugal Cabinet Fan









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4 m^3/s	1200 x 1600 x 800	350 kg	4	90 kg	M10	M10	2.5 kN	76 X 38 X 6.7 kg/m Length 100mm	76 X 38 X 6.7 kg/m
6 m^3/s	1200 x 1600 x 1600	450 kg	4	115 kg	M12	M12	3.0 kN	76 X 38 X 6.7 kg/m Length 100mm	102 X 51 X 10.4 kg/m
8 m^3/s	1200 x 1600 x 1600	570 kg	4	145 kg	M12	M12	3.0 kN	76 X 38 X 6.7 kg/m Length 100mm	102 X 51 X 10.4 kg/m
10 m^3/s	1200 x 2300 x 1600	700 kg	4	175 kg	M16	M12 X 2	3.0 kN X 2	102 X 51 X 10.4 kg/m Length 200mm	102 X 51 X 10.4 kg/m
12 m^3/s	1200 x 2300 x 1600	1000 kg	4	250 kg	M16	M12 X 2	3.0 kN X 2	102 X 51 X 10.4 kg/m Length 200mm	102 X 51 X 10.4 kg/m

Appendix 2 - Commissioning checklist

Name of Project / Machine Number:	**Maintenance No.**	
JOB STEPS	**EXAMINER**	**DATE**
First inspection		
- Inspection of transport damages		
- Inspection of completeness		
Inspection after mounting		
- flexible connection not damaged		
- Vibration damper correctly adjusted		
- Align belt disk		
- Align coupling halves		
- Secure erection guaranteed		
- All damages to paint rectified		
- All basic safety instructions considered		
Inspection during commissioning		
- All basic safety instructions considered		
- Functioning of bearing status analysis checked		
- Functioning of fluctuation monitoring checked		
- Direction of rotation checked		
- Vibration values of bearing or motor measured. acc. to ISO 14694/ ISO 10816-3 horizontal / vertical / axial .....mm/s mm/s mm/s		
- Sound pressure level measured (1 - 3m / 45° removed from suction) .....dB(A)		
- Operation on frequency converter (yes / no / TYPE of FC)		
- Electrical values measured Voltage / Frequency .....V / ..... Hz Current Phase U / V / W ..... A / ..... A / ..... A		

Appendix 3 - Status- and maintenance protocol

Name of Project / Machine Number:	**Maintenance No.**	
WORKING STEPS	**EXAMINER**	**DATE**
Maintenance (at least every 6 months)		
- Bearing status checked/ re-greased		
- Shaft seal checked/ re-greased		
- Condensation plug at the motor opened, possibly existing condensate drained and then closed again		
- Belt tension checked		
- Flexible connections checked for leakage		
- Start-up coupling checked		
- Coupling checked (Alignment/ rubber elements)		
- Vane controller- movement of blades checked		
- Vibration values of motor B-bearing measured acc. to ISO 14694/ ISO 10816-3 horizontal / vertical / axial .....mm/s mm/s mm/s		
- Vibration values of casing measured acc. to ISO 14694/ ISO 10816-3 horizontal / vertical / axial .....mm/s mm/s mm/s		
- Sound pressure level measured (3 m / 45° removed from suction) .....dB(A)		
- Electrical values measured voltage / Frequency.....V / ..... Hz Current Phase U / V / W ..... A / ..... A / ..... A		
- Visual check for corrosion (possible rectification of paint damages) - Blower - Vibration damper - Impeller		
- Visual check for corrosion - Motor		
damages checked - Blower - Vibration damper - Impeller		
- Check drain opening silencers (open)		
- Insulation measurement at wrm motor (Resistance winding - mass with 500 V DC voltage) ..... MegaOhm		
- In case stainless steel-blower / -silencer -> All deposits of corroded particles on the surface removed		
- Functioning of fluctuation observation checked Read-off values horizontal / vertical / axial ..... mm/s .....mm/s .....mm/s		
E-Kit of tear-off - safety checked		