

- DIRECT MOTOR AXIAL FANS "VHD": RANGE HCF-HCFX, JF, JFC, HMF-HMFX, HBF-HBFX, Y BOX HBF-BOX HBFX (inside hazardous area)
- BELT DRIVEN CENTRIFUGAL LOW PRESSURE FANS "VCBPT": RANGE BVFC (outside hazardous area)
- MEDIUM AND HIGH PRESSURE CENTRIFUGAL FAN DIRECT MOTOR "VCMAPT": RANGE BOX RLF-BOX RLFX (inside hazardous area)
- TRANSMISSION MEDIUM AND HIGH PRESSURE CENTRIFUGAL FAN "VCMAPT": RANGE BOX BSTB (inside hazardous area)
- ROOF FANS "VHCDE": CTH-2

DO NOT INSTALL THE FAN BEFORE READING THIS INSTRUCTIONS. KEEP THEM FOR FUTURE APPARATUS MAINTENANCE OR MANIPULATION.

IMPORTANT F400:

All F400 fans (400°C/2h) manufactured by LINDAB and described in this manual are homologated according to the UNE EN 12101-3/2002 standard in order to comply with the CTE.2006.D.C.B97106CEE directive (FORMER CPI196), and are therefore specially indicated for emergency services of smoke extraction in case of fire.

The selected model can either be installed inside the risk zone (IMMERSED DUTY MODELS with F400 motors), or be used to carry high temperature gases (EXTERIOR DUTY MODELS); in this case, they must be installed outside the risk zone. The exterior models are equipped with normal-serial motors and other elements which are not prepared to be immersed in the fire zone.

F400 FAN SERVICE MUST ALWAYS BE VERIFIED IN THE FAN LABEL F400- IMMERSED // F400 EXTERIOR DUTY.

ALL F400 LINDAB FANS ARE APT FOR DUAL SERVICE.

IMPORTANT F400 + ATEX CATEGORY 3

ATEX fans are designed to be used in potentially explosive atmospheres and according to the corresponding official standards. These fans must always be requested and specifically manufactured for every demand. LINDAB can supply the most suitable fan model for each risk zone, gas group function or dust: GROUP II G CATEGORY 3, and GROUP II D CATEGORY 3. In no case should these fans be manufactured or used in applications for GROUP I category. In no case should these fans be used in atmospheres with presence of gases from GROUP II C (such as Hydrogen). These fans can neither be used in IIG and IID category 2 applications.

GROUP, CATEGORY, AND TEMPERATURE MUST ALWAYS BE SPECIFIED IN THE FAN LABEL.

NOTE: THIS FAN HAS BEEN SPECIFICALLY MANUFACTURED TO COMPLY WITH THE F400 or F400 ATEX CATEGORY 3 SECURITY DEMANDS. DO NOT REPLACE OR MODIFY ANY OF ITS COMPONENTS WITHOUT LINDAB PREVIOUS AUTHORIZATION.

EC APPROVAL AND ADEQUATE USE OF THE FAN

All fans manufactured and supplied by LINDAB S.L. have been manufactured in accordance with the directives 2006/95/EC (Low Voltage), 2006/42/EC (Machinery), 2004/10/CE (Electromagnetic compatibility), 2009/125/EC* (Ecodesign). It is also extended for each particular range in compliance with the required specific standards.

Standards:

UNE-EN 1127-1	Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology.
UNE-EN13463 -1	Non-electrical equipments for potentially explosive atmospheres. - Part 1: Basic methods and requirements.
UNE-EN13463-2	Non-electrical equipments for potentially explosive atmospheres. Flow restricting protection with "fr" enclosure.
UNE-EN13463-5	Non-electrical equipments for potentially explosive atmospheres. - Part 5: Protection by constructional safety "c".
UNE-EN13463-6	Non-electrical equipment for potentially explosive atmospheres. - Part 6: Protection by control of ignition sources "b".
UNE-EN 60079-1	Electrical devices for explosive gas atmospheres-. Part 1: Flameproof enclosures "d".
UNE-EN 60079-10	Electrical devices for explosive gas atmospheres- Part 10: Classification of Hazardous Areas.
UNE-EN 60079-14	Electrical devices for explosive gas atmospheres- Part 14: Electrical installations in hazardous areas (other than mines).
UNE-EN 60079-15	Electrical devices for explosive gas atmospheres- Part 15: Type of protection "n".
ISO 13852	Machine safety. Safety distances to impede reach of dangerous zones with upper limbs.
UNE-EN 61241-10	Electrical devices for atmospheres with combustible dust - Part 10: Classification of areas where combustible dusts are or may be present.
UNE 100250 (ISO 12499)	Industrial fans. Fans mechanical safety.
UNE-EN ISO 12100-1	Machinery safety- Basic concepts, general principles for design-Part 1:Basic terminology , methodology.
UNE-EN ISO 12100-2	Machinery safety- Basic concepts, general principles for design-Part 2: Technical principles.
UNE-EN 294:1993	Machine safety. Safety distances to impede reach of dangerous zones with upper limbs.
UNE-EN1050	Machine safety. Risk evaluation principles.
UNE-EN ISO 3744	Acoustics. Risk assessment principles.
ISO 1940-1	Mechanical vibrations. Balancing quality.
ISO 10816-1	Mechanical vibrations. Machine vibrations evaluation.
prEN 14986	Design of fans working in potentially explosive atmospheres.

The electric components and the different types of motor used in the ATEX models comply with the necessary security requirements. Additional structural modifications have been made in order to avoid the sparks that may be produced by the rubbing between the static and the mobile components or either by the electrostatic discharges. Do not manipulate or modify none of these elements.

In general, all the fan applications where an electronic velocity regulation system is needed should previously be consulted and authorized by LINDAB, and comply with the electromagnetic compatibility 89/336/CEE standard. The not authorized use of any type of electronic controller with the FAN can be very dangerous and make all security devices useless, not fulfilling the F400 or F400 ATEX CATEGORY 3 requirements.

For a major safety in the fan maintenance, LINDAB recommends to install a SAFETY STOP/START SWITCH, appropriate to work in explosive atmospheres and in compliance with the ATEX 94/4/CE directive, with manual disconnection. These devices must be also accredited to F400.

IMPORTANT: THIS PARTICULAR fan MAY NOT BE ADEQUATE FOR THE SAFETY REQUIREMENTS OF YOUR INSTALLATION. PLEASE VERIFY THAT THE CHARACTERISTICS SPECIFIED IN THE APPARATUS COMPLY WITH THE APPLICATION REQUIREMENTS BEFORE ITS INSTALLATION. VERIFY THAT THE GROUP, CATEGORY, AND CLASS TEMPERATURE SPECIFIED IN THE CHARACTERICS PLATE ARE COMPATIBLE WITH THOSE REQUIRED BY THE INSTALLATION.

APPLICATIONS

The requirements and characteristics of each fan model are always conditioned by the general and local standards and regulations to which every application may be subject. Thus in some cases the selected standard units may not be adequate for certain applications and special characteristics should be incorporated. For example, units that will be installed in surroundings with fire or explosion risks should comply with the ATEX 94/9/CE standard and therefore be equipped with some of the established protection systems. Units that will be installed ventilation systems for emergency services in case of fire should be homologated according to UNE EN 12101-3/2002 standard and comply with the D.C.89/106CEE directive. Other characteristics such as elevated work temperature or corrosive surroundings may also require special models in order to guarantee a correct service. THE FAN LABEL WILL ALWAYS INDICATE THE APPARATUS COMPLIANCE WITH ANY SPECIFIC STANDARD. IN CASE OF DOUBT, PLEASE CONTACT US.

The selected fan model should never be used to convey gas of a different composition or temperature other than the specified by LINDAB, nor should it work in surrounding with different conditions to those indicated. IN THE ATEX RANGE OF FANS, THE TEMPERATURE REACHED BY ANY OF THE SURFACES HAS BEEN CALCULATED SO THE PRESENCE OF THE SPECIFIED GASES CAN NOT REPRESENT A RISK OF IGNITION. ANY UNSUITABLE USE OR OVERLOAD OF THE FAN CAN REPRESENT A SECURITY RISK.

FAN RECEPTION AND VERIFICATION

Fans are sent duly packed and their delivery is always carried out on the account and risk of the buyer. It is therefore recommended that upon receiving the merchandise, it is carefully examined to check that it has not suffered any damage or subtraction during the transport. Any claim should be immediately made by the buyer to the transport company responsible of the delivery or to the insurance company.

TRANSPORT AND STORING

Transport companies and intermediate suppliers who have participated in the transport and the fan storing until its final delivery will be responsible of any damage caused to the apparatus during this period, be it for inadequate transport or storing. They are also responsible of the necessary procedures to attend and solve, with the end client, those damages not covered by the manufacturer's guarantee.

Through blows or jerks damage may be caused to the more sensitive components of the fan such as roller bearings and motors, transmission components (only VHT, VCBPT, VCMAPT, VCBPT groups and BVF-BVFC ranges), or the rotating parts "turbines or propellers" (elements that can even become stuck or deformed and thus unbalanced).

During the storing of the apparatus until the moment of its installation, its protection against external agents should be guaranteed. These may be dust, rain, ultraviolet radiation (direct exposure to the sun) high humidity and the brusque changes of temperature. These noxious agents are the principal causes of precipitated deterioration of the fan, whereby it can be seriously damaged through oxidation of the components or deterioration of its paint.

Careful and adequate manipulation of the fan in accordance with the detailed graphic orientations is recommended. Every fan, depending on its weight and constructive characteristics, will be delivered in individual cardboard boxes or pallets. They may also be provided with bracing points placed adequately to anchor them and make displacement with a crane or a pulley.

QUALITY CONTROL

OPERATION: Before delivery, all fans are submitted to electrical safety and operating tests. Thus if the apparatus has not suffered any damage during transport and it is correctly installed as indicated in this instructions, the device will operate correctly.

BALANCING: The rotating element "propeller or turbine" of the fan has been dynamically balanced with a residual lack of equilibrium to not surpass the tolerances according to the ISO1940-1 and ISO10816-1 standard, quality Q 2,5 or Q 6,3 depending on the models.

Still, a verification before installation is recommended, whereby you should make the element rotate with the hand and check that it does not scrape or present any blow or deformation due to possible damage suffered during transport. Do not install or turn the fan on if you appreciate any damage; contact our technical service.

OUR PRODUCTS' GUARANTEE

LINDAB will always deliver the requested fan and in accordance with the service or installation requirements. Thus all the components used in the requested model will only be adequate for the flow to be conveyed and the operating conditions indicated by the customer.

IMPORTANT: LINDAB will not be responsible of accidents caused by incorrect manipulation of the fan and omission or non-compliance of any of the recommendations and safety norms exposed in this manual.

WARRANTY PERIOD: LINDAB fans have a 1-year guarantee period as of its purchasing date (always keep the apparatus' invoice). The mentioned warranty period will extinguish after a year even if the fan is not installed or used immediately after its purchase at LINDAB. This guarantee excludes any imperfection, damage or breakdown caused to the fan itself or to third parties affected due to the incorrect or undue use of the apparatus, normal wear, overload or manipulation by persons not pertaining to LINDAB or to its technical service. The obligation assumed through this guarantee is limited to the replacement of parts considered defective after examination by our specialists.

Maintenance, possible adjustment modifications and repairs of the fan should always be carried out by duly trained specialists. During the warranty period of the apparatus, repairs may only be carried out with previous authorization on behalf of LINDAB and by authorized workshops and personnel. LINDAB WILL ALWAYS DECIDE WHERE THE REPAIRS OF THE APPARATUS UNDER WARRANTY WILL BE CARRIED OUT AND THE TRANSPORT COMPANIES TO BE USED FOR THEIR DISPLACEMENT, SHOULD THIS BE NECESSARY. THIS GUARANTEE DOES NOT COVER THE COST OF TRANSPORT OF SMALL APPARATUS TO THE RECOMMENDED TECHNICAL SERVICE.

DEVOLUTION OF NON CONFORMITY MATERIAL: only devolutions of non conformity articles will be accepted with the client's request, be them due to any type of delivery confusion, change or error and previously accorded with our COMMERCIAL DEPARTMENT or our BRANCH OFFICES, and accompanied by the duly filled out devolution blank. The transport used should be arranged and agreed with LINDAB. No devolution will be accepted without the mentioned devolution permission.

DEVOLUTIONS OF NEW MATERIAL: a charge of 25% of the total cost in concept of reception and adjusting will be made for devolutions of new material due to an error on behalf of the client. The client will be responsible of the transport expenses.

FAN INSTALLATION AND OPERATION

VERIFY: In fans due to be installed directly on a wall or a roof, even though a support system or an additional structure is used, correct horizontal and vertical leveling of the apparatus must be assured. On horizontal bases, these will have to be perfectly plain and leveled and must perfectly set in the case of a concrete base. Adequate supports and with sufficient resistance and rigidity to support the fan weight should also be verified, as well as its inertia during the starting phase. In VHCDDTE roof fans group, special attention should be paid to conveniently reinforcing the loading point of the fan and ensuring that the roof water tightness is not affected by possible vibrations of the apparatus.

Normal vibrations of the apparatus during its operating depend mainly on the rigidity degree of the structural element where the fan will be installed.

The use of rubber dampers in IMMERSSED fans is not recommended. If dampers are indispensable to avoid the vibrations and noise propagation, only metal springs should be used. F400 - F400 ATEX Category 3 homologated elastic joints should be used both at inlet and outlet to effectively isolate the fan from the ducting. With this system, an effective isolation can be achieved. It is important that these isolation elements do not alter the correct fulfillment of the security demands of the installation.

In rigid installations on cement bases or walls which are not correctly aligned, never force the fan structure upon tightening the screws. Before installation, lacking spaces should be completed by using small strips of plates or washers, or by filling them with quick drying cement so that a correct support of the fan is guaranteed.

ONLY FOR VHT, VCBPT, VCMAPT and VCBPT TRANSMISSION FANS GROUPS, BVF and BVFC ranges: The respective motor and transmission axles of the rotating propeller or turbine element should always be completely parallel. The pulleys should also be aligned in a way that one does not stand out more than the other obliging the belts to work in a forced manner. This verification may be made by simply using a metal ruler to measure the minimum length of the center of the axles and by resting one end of the front part of one of the pulleys and at the same time comparing this position with the other pulley. Several apparatus to carry out this alignment are available on the market. The voltage of the pulleys should be correct, but never excessive; otherwise the rolling bearings may be harmed due to a load excess.

NOTE: pay special attention to the non sparking parts used on the fan and the accomplishment of the ATEX characteristics.

ELECTRICAL CONNECTION AND INSTALLATION: each fan's wiring diagrams are available inside the connection box of the motor. IN ALL ATEX CATEGORY 3 MODELS THE CONNECTION SCHEME MUST BE DONE ONLY INSIDE THE MOTOR'S TERMINAL BOX. IN INTERMEDIATE CONNECTIONS, APPROPRIATE CONNECTION BOXES THAT COMPLY WITH THE ATEX CATEGORY 3 REQUIREMENTS OF THE RISK ZONES MUST BE USED. PLEASE READ THE INSTRUCTION MANUAL FOR F400 OR F400 ATEX CATEGORY 3 CAREFULLY. IT IS IMPORTANT THAT POWER SUPPLY LINES AND OTHER COMPONENTS USED IN THE INSTALLATION COMPLY WITH THE ATEX CATEGORY 3 DIRECTIVE AS WELL AS WITH THE REGULATIONS ON INDUSTRIAL INSTALLATIONS ("Low voltage electrical regulation") and therefore protection systems adequate to the voltage of the apparatus should be used (motor protection system, differential protection, line limiter and grounding). For motors superior to 7,5 CV (5,5 Kw) timed or electrically controlled start-ups are recommended in order to avoid excessive consumption points and to obtain more gentle start-ups. Some of the fan models equipped with very heavy turbines (groups VCMAPD), and specially the largest models of MBRF and BOX RLF groups, require prolonged start-up times. VCMSPD and VCMAPT groups, for example, and specially AA and MB P/R ranges, require prolonged start-up times. In these cases, the use of a controlled start-up is obligatory. In other models pertaining to the same groups of middle and high voltage centrifugal fans, a regulation shutter or valve completely closed during the fan's start-up to reduce consumption will be enough.

The electric junction in IMMERSSED FANS should be performed directly to the motor's terminal box avoiding interruptions that can not guarantee resistance and reliability during a service at 400°C for 2 hours. The cable or cables used should be properly protected to avoid any damage by the remainder fan's structural components or their backups, and must comply with the pertinent F400 homologation. IN INTERMEDIATE CONNECTIONS, BOXES THAT COMPLY WITH THE F400 OR F400 ATEX CATEGORY 3 DEMANDS MUST BE USED (READ THOROUGHLY THE F400 OR F400 ATEX CATEGORY 3 MOTOR MANUAL INSTRUCTIONS). CABLES CATALOGUED AS "FLAME RESISTANT " WHICH DON'T GUARANTEE A F400 SERVICE ARE NOT APT FOR THIS FUNCTION. LINDAB RECOMMENDS VS OMERIN BRAND CABLES WHICH HAVE BEEN PROPERLY TESTED WITH OUR FANS.

EVERY FAN WIRING ELEMENT AND COMPONENT SHOULD BE CORRECTLY SELECTED AND INSTALLED TO COMPLY WITH THE F400 AND F400 ATEX CATEGORY 3 STANDARDS. SPECIAL ATTENTION MUST BE PAID TO ALL METAL STRUCTURAL PARTS, WHICH MUST REMAIN CORRECTLY CONNECTED TO GROUND TO PREVENT ANY ELEMENT FROM GETTING ELECTRICALLY LOADED AND TO AVOID ELECTROSTATIC DISCHARGES.

In the indicated models, connection should always be done by using the thermal protection incorporated in the motor (SEE THE FAN MAINTENANCE SECTION)

VOLTAGE AND FREQUENCY: Read thoroughly the F400 OR F400 ATEX CATEGORY 3 motor manual instructions. The motor power supply should be made in accordance with the voltage and frequency indicated on the fan plate. Variations of $\pm 5\%$ in the electrical network with regard to the nominal voltage indicated are permitted. If the connection used can not support this level, there exist a danger of burning out the motor. Thus make sure the selected Y-? disposition in the motor corresponds to the network voltage and frequency through a tester.

CONSUMPTION: Once the fan is installed in the foreseen working conditions that do not surpass those indicated on the plate, control the consumption in (A). The fan's capacity and the installation load should be correctly adjusted (SEE THE OPERATING SECTION). In case of non compliance, consult the manufacturer.

GROUNDING: Since the fan is a Class I machine according to the current standard, it is obligatory to correctly carry out the connection of the grounding through the socket, which can be found inside the motor or the fan's terminal casing. Once this connection has been carried out, it is recommended that the resistance between the exterior conductor and the fan casing should not be superior to 0,1 Ω .

ENVIRONMENTAL CONDITIONS: Very important: for normal service (not emergency), never exceed the specified maximum gases continuous temperature specified in every model. This is specially important in the ATEX CATEGORY 3 MODELS. Temperature of the fluid itself should never exceed the 60°C. In high pressure fans, heating of the gas inside the fan due to compression shall also be considered and verified by calculation. Verify first that the fan is labeled with the correct temperature class "T1 to T6". Make sure that the same, or a higher temperature class is specified in the motor plate. All motors for external F400 fans supplied by LINDAB are generally CLASS F. For IMMERSSED F400 the motor is generally CLASS H. However, there may be exceptions. In the EXTERNAL and IMMERSSED models (during normal service of DUAL application), but independently of the motor's thermal class, it is recommended not to surpass an air temperature of 40°C and to keep the humidity inferior to 60% in the cooling surroundings of the motor so as to guarantee a correct refrigeration of the motor and, at the same time, prolong its duration. The maximum air temperature to be conveyed working on a continuous service basis is from 40°C to 55°C in models with the motor inside the air flow and about 110°C in models with the motor outside the air flow (some models equipped with refrigeration head runners in the motor axes may also work at higher temperatures). In ATEX applications, consult the carried gases temperature's limit in order to avoid ignition risk. In each case it is recommended to consult the information in the technical catalog where the particular characteristics of each fan range and model in a detailed manner. For other more severe applications, some special characteristics may be applied. Always consult the technical sheet for each particular fan and for more information contact the manufacturer.

ROTATION DIRECTION: Same as indicated by the arrow situated on the fan's casing. To invert the three-phase rotation of a one or two velocity motor, interchange the two phases among themselves. In mono-phase motors, this can be changed only by some of the models. Consult the diagrams in each case.

SOUND LEVEL: Depending on the fan model, its voltage, size and revolutions, this may oscillate between 37 and 100 dB (A). The sound level corresponding to each concrete model is specified in its technical sheet. If the requested fan does not comply with the allowed local limitations of maximum noise level, other alternative solutions should be considered in order to reduce this sound level through the application of silencers, barriers or soundproofing cases.

CONNECTION TO DUCT INSTALLATIONS: In cases where the fan is connected to a duct network for air distribution, the suction and impulsion ducts should be connected to the corresponding fan nozzle using the adaptation flanges recommended by the manufacturer. Together with the flanges, elastic gaskets should be used whenever possible (both accessories should be requested separately from the fan, and should also be F400 homologated and comply with ATEX specifications). Furthermore, in centrifugal fans, VCMAPD and VCMAPT groups, it is also recommended to use the adequate elastic dampers (SEE THE INSTALLATION AND FAN OPERATION SECTION). Should they be connected directly, they should always be situated correctly so that no harmful forcing or tension appears for the fan. In no case should the duct network lean its weight on the fan. These should dispose of their own means of support. It is also recommended to leave a duct element that can be dismantled on both sides in order to make an access to the fan's nozzles so that there is enough space; once the adaptation flanges are taken off this allows to accede the inside part of the apparatus without difficulties. In VHD and VHT axial fans, reductions in the conducts should not be applied, whereby at least the nominal diameter of the fan should be maintained.

PROTECTION AGAINST INVOLUNTARY ACCIDENTS: LINDAB has protection for the rotating body (propeller or turbine), according to the UNE EN 294, for every fan model. The installer or final user should request and install the necessary protection elements in order to protect the accesses to the inside part of the fan that remains open and accessible because it is not connected to a duct. **IMPORTANT:** The turbine or propeller may not be visible when it is rotating in deficient illuminative conditions.

IP20 PROTECTION FOR AIR INLETS AND OULETS OF THE FAN: In ATEX applications an IP20 protection is requested. In ducted installations, the installer is responsible of assuring such protection. In a free inlet or outlet installation, the final user has to assure that the suitable protection guard (accessory) for the fan is mounted.

START UP: Once all the previous verifications have been done, the start up of the fan can be carried out. Before proceeding with the first start-ups, it is recommended to make sure once more, either directly

or through inspection registrations of the apparatus, that there is no friction on any of the rotating elements, because some installation element might have forced or deformed the fan. Also check that neither foreign bodies nor material proceeding from the installation of the fan are present in the ducts.

The first start-up should be of a short duration and only to verify that the rotating direction is correct according to the indications, and in order to check whether any strange or friction noises are present in the inside part. In case of an incorrect rotation, you should carry out the connection changes according to what is previously indicated. During the second start-up, the fan should be allowed to reach its nominal velocity completely once the controlled start-up is finished. If regulation shutters are used, these should be open so that the fan adapts itself to the required installation conditions.

IMPORTANT: AT THIS MOMENT A STRICT REAL CONSUMPTION CONTROL OF THE APPARATUS SHOULD BE CARRIED OUT THROUGH THE AMPEROMETRIC CLIP AND BY MAKING SURE THE USED NOMINAL CONSUMPTION "In" DOES NOT EXCEED THAT INDICATED ON THE VOLTAGE PLATE. IN CASE OF EXCEEDING THIS CONSUMPTION, STOP THE APPARATUS IMMEDIATELY.

An excessive consumption may be due to a motor failure, to the friction of some element or to an error in the electrical connection. In most of the cases, however, it is due to a deficient adaptation of the installation, with an excessive or defective load. In axial fans, VHD and VHT groups, it is very likely that an element excessively impeding the air flow has been installed. On the contrary, if the problem appears in a centrifugal fan, VCBPD, VCBPT, VCMAPD and VCMAPT groups, the air flow should be intentionally reduced, either through the regulation shutter, or by adding some kind of metal strip that closes part of the discharge or suction duct of the fan. **IMPORTANT: do not mount any part directly on the fan, it could alter the fan's non sparking characteristics. In this case, you make no badly anchored elements are used; they could be sucked into the fan once it is turned on. Once the installation has been readjusted, make sure the consumption is adequate. Once this adjustment has been settled, the fan can operate properly.**

FAN MAINTENANCE. GENERAL CARE

A complete revision of the fan and its installation after its first 24h of operation is recommended. Disconnect it from the electrical network to avoid any possible accident. F400 HOMOLOGATED/ F400 + ATEX CATEGORY 3 SAFETY SWITCHES ARE RECOMMENDED for this service. Make sure no element has come loose, specially in VHT transmission groups and VCBPT completely retightening all of the elements: pulleys, belt tensors, motor supports and axles, etc. Verify also the motor or transmission bearings condition by turning the propeller or the turbine with your hands. Should any abnormality or noise be noticed, consult the manufacturer.

WIn installations where the fan is generally switched off, carry out inspections at least every 6 months. An inspection of the fan's components condition will maintain its correct initial state, as long as no signs of bearings sticking or making noise are noticed. It is also recommended to carry out a complete start-up, allowing the fan to operate for one hour.

WIn dual and only emergency applications: In BVF and BVFC fans group bearings should be replaced every 16.000h of operation. For other EXTERNAL models with direct motor it is recommended to replace the motor every 16.000h of operation.

WIn dual and only emergency applications where IMMERSED models equipped with F400 motors are used, bearings should be replaced at most every 8.500 h of operation. However, it is recommended to replace the motor completely (READ THOROUGHLY THE MOTOR MANUFACTURER INSTRUCTIONS). Never use radial tolerance bearings or conventional greases not specified by the motor manufacturer.

W F400 OR F400 ATEX CATEGORY 3 MOTORS USED FOR REPLACEMENT IN HOMOLOGATED FANS MUST BE AUTHORIZED BY LINDAB. EVEN IF THE REPLACED MOTOR HAS ITS OWN HOMOLOGATION, IT MAY HAVE NO VALIDITY WITH THIS PARTICULAR FAN HOMOLOGATION.

W FANS SUBMITTED TO AN EMERGENCY SERVICE IN CASE OF FIRE CANNOT BE REPAIRED. THEY MUST BE REPLACED BY A COMPLETELY NEW UNIT WITH THE SAME CHARACTERISTICS AND HOMOLOGATED AT F400 OR F400 ATEX CATEGORY 3.

IMPORTANT: Some models have a thermal protector incorporated which can temporarily stop the motor operation. Thus never manipulate the apparatus before disconnecting it from the electrical network. In three-phase models, this protection activates the maneuver circuit on an electrical installation contactor.

CONSIDERATIONS DURING THE REVISION: Points to be taken into account during the revision in order to guarantee a correct operation of the fan:

1.- The operation of the fan has to be gentle and free of vibrations.

2.- Consumption in amperes "Ia(A)" measured through an ammeter or a multimeter should never exceed the nominal consumption "In(A)" specified on the motor plate.

3.- Make sure all of the elements joined through screws are not untightened. In transmission fans, VHT, VCBPT and VCMAPT groups, check the pulleys, the tension and condition of the belts. The belts should operate with regularity and without jolts; they usually dilate with time, specially during the first weeks of operation, due to which it is of absolutely necessity to readjust them by making sure the gear shifts maintain their alignment once the operation has finished. In transmissions with more than one belt, the entire set must always be replaced. Never mix new belts with already used belts. **ALWAYS USE ANTISTATIC BELTS IN ATEX MODELS.**

4.- In applications where fans convey gases with a high content of dust or grease, these may become adhered to the propellers leading to a lack of equilibrium of the turbine or propeller with the consequent deterioration of the bearings. **AVOID THE ACCUMULATION OF DUST ON THE MOTOR SURFACE TO AVOID UNADEQUATE REFRIGERATION AND OPERATION.** Thus frequent cleaning of the rotating body should be done when the installation pauses take place, and every time the fan presents light vibration signs and incorrect operating. Never leave loose dust inside the fan.

5.- In other applications with abrasive dust accumulations there may exist a wear of the propeller, as well as in centrifugal fans used for material transport, VCMAPD or VCMAPT groups (turbines with straight blades). These should be replaced in case of lack of equilibrium due to the wear.

6.- In fans which have been switched off or stored for two or more years, a complete revision of the ball bearings is recommended. Before starting up the fan, the replacement of the ball bearings should take place if you notice that they have been affected by oxidation or by dried out grease in a bad condition.

CLEANING: Attention, maintenance and correct cleaning of all the installation's components will be carried out periodically by the personnel responsible of the installation. Whenever possible, the accumulation of dirt, dust, grease, etc. should be avoided, since this is the main cause of fire and its propagations.

GREASING: The greasing instructions for different elements of the fan should be clearly distinguished:

1.- Generally, the electric motor bearings do not need maintenance; however, it is recommended to not exceed the number of hours established and indicated in the manufacturer's manual of the motor (15.000 to 20.000h according to the brand; in this case, replacement should be carried out).

2.- Transmission groups of the axial ranges HH and HHP and the bearings used in the centrifugal range BV do not need greasing, but they should be replaced every 10.000 a 15.000h depending on the temperate and humidity conditions of the air to be conveyed.

3.- Self-aligning bearing supports type NP used in the VCBPT and VCMAPT groups ?specially in more reinforced models? have external greasers, or otherwise are prepared for their installation. In these cases the bearings need neither maintenance since they are sealed bearings. However, if the operating conditions are extreme, their duration can be prolonged by greasing them every 500 to 1000 hours of operation. It is very important to never mix greases of different viscosities and chemical compositions.