ELTA

TROUBLESHOOTING

Find it and Fix it: A Guide

TROUBLESHOOTING

General

Problem	Possible Cause	Recommended Action
Motor Noise	Firstly determine if the noise is electrical or mechanical.	If the noise doesn't stop instantly, but runs down with the motor, the problem is more likely to be mechanical, generally the bearings; see Mechanical section below:
		If the motor is switched off and the noise stops instantly the problem is more likely to be electrical; see Electrical section.
General Fan Noise	The fan could be running in stall.	Check the actual fan performance against the fan curve to determine where on the curve it is operating. If it is to the left of the peak pressure point the fan is generally in stall. If in stall see if the ductwork can be modified to eliminate high pressure loss sections. Low amps could indicate the fan is in stall. Reduce the pitch angle, axial fans.
Bearing noise varying from a 'dry' rumble to a squeal	Improper greasing.	Check the bearings are packed with the correct grade and amount of grease. If the bearings are of the sealed-for-life type replace them.
Rough lumpy sound	The bearings may have brinelled. Brinelling occurs when the fan is vibrated during transit or through ground vibration when stored. This causes the bearing to vibrate at a single point and therefore indenting the bearing race. Problems with brinelling usually occur shortly after a fan is installed.	Replace the bearings. To avoid brinelling the fan impeller should be rotated frequently, at least daily.
Shaft seal squeal	The seals may have dried out.	The seals may require lubrication or may be misaligned.
Air noise	Air noise can be generated from a number of sources such as grilles, bends, badly designed duct fittings, excessive duct velocities etc.	Check the duct design is such that it does not generate turbulence and therefore noise. An attenuator may be needed to resolve the problem.
Vibration	The impeller may be out of balance.	Site balancing may be practical but, if not, remove the impeller and balance.
	The shaft may be bent.	The shaft / motor will have to be replaced.
	Impeller may be worn as a result of handling abrasive or corrosive materials.	The impeller will have to be replaced.
	Material such as dust or grease could be sticking to the fan blades.	Clean the impeller blades. This should be done on a regular basis if dust and / or grease are constantly present in the air being handled.
	The impeller may have been damaged by loose material in the duct system.	Depending on the level of damage the impeller may have to be replaced.
	Vibration being transmitted through the building structure.	Check vibration isolators have been fitted and, if fitted, check they are correctly positioned. Vibration isolators are fitted but not strong enough. If bottoming, adjust if possible or replace with more suitable mounts. Fit flexible connectors between the fan and ductwork.

Impellers

NOTE: If there is any doubt about the impeller contact the supplier, do not run the fan.

Problem	Possible Cause	Recommended Action
Impeller excessively noisy	The impeller may be striking the fan casing or inlet cone, check for the following causes:-	-
	Impeller may be loose on the motor or drive shaft.	Tighten the fixings.
	Impeller incorrectly mounted onto the shaft.	Re-install the impeller onto the shaft with the key installed correctly.
	Impeller not centred in the casing.	Adjust to the correct position.
	Casing inlet cone may be damaged.	Repair the damage.
	Bent motor or drive shaft.	Replace the shaft / motor.
	Impeller not centred on the inlet cone.	Check and re-align as required.
	The inlet cone has been damaged.	Repair or replace.
Damaged Impeller	Impeller bulging. This could be caused by the impeller being built from lighter than specified materials or the fan is running above its recommended speed.	Replace the impeller but also check the fan speed. Advise supplier of the problem.

Axial Flow

Problem	Possible Cause	Recommended Action
Disintegrated Impeller	Possibly caused by the blades being struck by loose material in the duct system.	Ensure the ducts are clear of all debris. Replace the impeller.
	Excessive impeller speed.	Check the motor speed. Replace the impeller.

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Electrical

Problem	Possible Cause	Recommended Action
Fan running the wrong way	Incorrect wiring.	To reverse the rotation of a three-phase motor interchange any two supply leads. To reverse the rotation of a single-phase motor interchange leads on the start winding. This note applies to single-speed motors only. For 2-speed motors refer to the supplier.
Fan won't run	Wrong electrical supply.	Check the electrical supply matches the motor nameplate.
	Electrical connections in the motor terminal box or starter are not tight.	Check and tighten as necessary.
	For single-phase motors the capacitor is not wired in or is faulty.	If a capacitor is fitted, check with a multimeter or replace.
	Fuses are blown.	Before replacing fuses check the motor circuit for any faults.
	Overloads have tripped out.	Check the motor before resetting the overloads.
	If a variable speed drive (VSD) has been fitted incorrect installation can cause an electrical 'spike' causing the motor windings to fail.	Check the motor windings and if failed replace the motor. Check the installation is in accordance with the VSD supplier's recommendations.
Fan runs in alternate direction	The capacitor is not in circuit or it could be faulty.	Check with multimeter or replace.
	Alternatively, the connections could be poor or incorrect.	Check all connections and ensure there are no loose terminals.
Electrical hum	Electronic speed-controllers can generate an electrical hum.	If the electronic controller is not faulty explore using a transformer controller.
	If a variable speed drive (VSD) is fitted incorrectly it can cause a high level of harmonics in the supply.	Check the installation conforms to the VSD supplier's recommendations.
	Phase imbalance on three-phase motor.	Check and correct the supply.
	Motor is not designed for the electric supply i.e.. wrong voltage or frequency.	Check the electrical supply matches the motor nameplate.
	Motor is overloaded and drawing greater than the nameplate amps.	Check the correct motor is fitted. If correct check the pitch-angle if an axial fan. If these are correct contact the supplier.
	Motor has excessive clearance between stator and rotor. In this situation the motor will run slower than the normal speed. i.e.. have excessive slip.	Check motor speed, if slow contact the supplier.
Motor overheating or high current draw	Faulty instruments.	Ensure all instruments are accurate and calibrated where necessary.
	Incorrect power supply.	Check the electrical supply matches the motor nameplate.
	Three-phase motor running with one phase disconnected. This is called single-phasing. When single-phasing, the motor will draw uneven current on each phase and will generally not start from standstill.	If single-phasing, check if it is the power supply or the motor windings. If a winding has failed the motor may need to be replaced. Fitting correct overloads or phase protection will prevent this problem.
	Impeller has too much inertia for the motor power and does not achieve full speed.	Check the inertia of the load and reduce as necessary. Alternatively, fit a larger motor.
	Excessive dirt on the motor cooling fins so the heat is not able to dissipate.	Remove the dirt and dust on the motor body and between the cooling fins. Increase the maintenance frequency.
	If the motor is out of the airstream either the cooling fan is not fitted or the air inlet to the motor cooling fan is obstructed.	Fit the motor cooling fan if not fitted and remove any obstructions from the air inlet to the motor.
	Excessive stopping or starting - 10 starts / hour is generally acceptable.	Check the control system and reduce the number of starts / hour as recommended.
	A conventional three-phase motor is connected in Delta when it should be in Star, or vice-versa.	Check the motor nameplate and re-wire correctly.
	The fan impeller is jammed resulting in a locked rotor situation. The motor will draw 6-10 times the rated current in this situation.	Check to ensure the impeller can rotate freely.
Motor overheating or high current draw	A 2-speed motor, when switching from high to low speed, can generate heat if the supply is not switched off.	Switch off the power first and allow the motor to run down before engaging low speed. Alternatively, use a time delay interlock.
	Backward-curved centrifugal impellers may be running in the wrong direction. When running in the wrong direction they will tend to overload the motor. Airflow capacity will be down to approximately 30-40% of full flow.	Check and correct the direction of rotation of the impeller if necessary.
	If the fan is a forward-curved centrifugal there may be insufficient system resistance.	Ensure the duct system is installed correctly and, if necessary, lower the fan speed. Alternatively, increase the system resistance by fitting perforated metal on the fan inlet but note that this is inefficient.
	Axial fan impeller overpitched.	Re-pitch to the correct angle.
	Error in the motor selection for the required duty.	Check the motor nameplate and change as necessary.
	Gas density greater than design.	Increase the motor size to suit.

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Dual & Tap Wound Motors

Problem	Possible Cause	Recommended Action
Motor overheating or high current draw	Tap-wound motors can create problems if the 'star point' contactor is not connected. The motor will be fine in low speed but in high speed will have a high current draw and a severe electrical noise that sounds like noisy bearings. The motor will not last long when run in this condition. Dual-wound motors are rarely a problem.	Faulty wiring in the switchboard, check the correct contactor is connected.

Performance

Problem	Possible Cause	Recommended Action
Low airflow	Faulty instruments.	Ensure instruments are accurate and calibrated where necessary.
	The wrong size fan has been installed.	Check the fan specifications are correct for the particular system.
	The fan is running backwards.	Check rotation of the impeller. If the rotation is wrong refer to the 'Electrical' section above.
	Pitch-angle of an axial fan may be wrong.	Check the pitch-angle against the schedule, if wrong contact the supplier. Site adjustment may be practical.
	Fan speed is too slow.	Check the motor speed. If wrong change to suit.
	The ductwork is undersized.	Check the ductwork and grilles are the correct size. If smaller than design this will increase the system resistance.
	Bad installation.	Check the entry and discharge conditions to the fan are of a good design. If the fan is mounted close to bends on the intake or discharge this will impact on the fans' performance. Check there are no duct obstructions on the intake or discharge of the fan. Internal duct lining may have come loose, check and repair.
	The ductwork is undersized.	Check the ductwork and grilles are the correct size. If smaller than design this will increase the system resistance.
	Fan speed is too low.	Check the motor speed. If wrong change to suit.
High airflow	Faulty instruments.	Ensure instruments are accurate and calibrated where necessary.
	The wrong size fan has been installed.	Check the fan specifications are correct for the particular system. If an axial fan check the pitch angle and, if wrong, adjust.
	The ductwork is oversized.	Check the ductwork and grilles are the correct size. If larger than design this will decrease the system resistance.
	Fan speed is too high.	Check the motor speed. If wrong change to suit.
System resistance is greater than estimated	The ducting and / or the grilles, coils etc. may be smaller than design, which will increase the system resistance.	Check that the ductwork and system components are the correct size. Check that all dampers are open. Check that all registers and grilles are open. Check the ducting is clear of rubbish. Check flexible connectors are installed correctly. Check if filters are dirty, clean or replace as necessary. Check if coils are dirty and clean them if necessary. Check duct take-offs and general duct fittings are correctly installed and of good design.
System resistance is lower than estimated	If the duct system and associated components are larger than design this will reduce the system resistance.	Check the ductwork and associated components are the correct size. Check for leaks around flexible connections.
	There may be leakage from the ductwork.	Check the ductwork for leakage and rectify as necessary.
	Leakage around the base of Roof Ventilators.	Ensure there is a proper seal between the unit base and the up-stand. If there is no seal then install one.

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Eltadrive Variable Speed Drives

Fault No.	Description	Suggested Remedy
0	No Fault	Not required.
1	Brake channel over current	Check external brake resistor condition and connection wiring.
2	Brake resistor overload	The drive has tripped to prevent damage to the brake resistor.
3	Output Over Current	Instantaneous Over current on the drive output. Excess load or shock load on the motor. NOTE Following a trip, the drive cannot be immediately reset. A delay time is inbuilt, which allows the power components of the drive time to recover to avoid damage.
4	Motor Thermal Overload (I2t)	The drive has tripped after delivering >100% of value in P-08 for a period of time to prevent damage to the motor.
5	Power stage trip	Check for short circuits on the motor and connection cable.
6	Over voltage on DC bus	Check the supply voltage is within the allowed tolerance for the drive. If the fault occurs on deceleration or stopping, increase the deceleration time in P-04 or install a suitable brake resistor and activate the dynamic braking function with P-34.
7	Under voltage on DC bus	The incoming supply voltage is too low. This trip occurs routinely when power is removed from the drive. If it occurs during running, check the incoming power supply voltage and all components in the power feed line to the drive.
8	Heatsink over temperature	The drive is too hot. Check the ambient temperature around the drive is within the drive specification. Ensure sufficient cooling air is free to circulate around the drive.
9	Under temperature	Trip occurs when ambient temperature is less than -10°C. Temperature must be raised over -10°C in order to start the drive.
10	Factory Default parameters loaded	-
11	External trip	E-trip requested on digital input 3. Normally closed contact has opened for some reason. If motor thermistor is connected check if the motor is too hot.
12	Optibus comms loss	Check communication link between drive and external devices. Make sure each drive in the network has its unique address.
13	DC bus ripple too high	Check incoming supply phases are all present and balanced.
14	Input phase loss trip	Check incoming power supply phases are present and balanced
15	Output Over Current	Check for short circuits on the motor and connection cable. Note: Following a trip, the drive cannot be immediately reset. A delay time is inbuilt, which allows the power components of the drive time to recover to avoid damage.
16	Faulty thermistor on heatsink	-
17	Internal memory fault (IO)	Press the stop key. If the fault persists, consult you supplier.
18	4-20mA Signal Los	Check the analog input connection(s).
19	9 Internal memory fault (DSP)	Press the stop key. If the fault persists, consult you supplier. 21 Motor PTC thermistor trip Connected motor thermistor over temperature, check wiring.
21	Motor PTC thermistor trip	Connected motor thermistor over temperature, check wiring connections and motor.
22	Cooling Fan Fault (IP66 only)	Check / replace the cooling fan.
23	Drive internal temperature too high	Drive ambient temperature too high, check adequate cooling air is provided.
26	Output Fault	Indicates a fault on the output of the drive, such as one phase missing, motor phase currents not balanced. Check the motor and connections.
40	Autotune Fault	The motor parameters measured through the autotune are not correct. Check the motor cable and connections for continuity. Check all three phases of the motor are present and balanced.
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50	Modbus comms loss fault	Check the incoming Modbus RTU connection cable. Check that at least one register is being polled cyclically within the timeout limit set in P-36 Index 3.
51	CAN comms loss trip	Check the incoming CAN connection cable. Check that cyclic communications take place within the timeout limit set in P-36 Index 3.

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