

# **Metrico Belt Driven Single Fan Units Installation and Maintenance Instructions**

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## **1. GENERAL**

### **Inspection**

Each METRICO single fan unit (MCSB MODEL) is thoroughly inspected before leaving the factory and every care is taken to ensure their safe transit to site. Please inspect the units immediately on arrival for any signs of damage and indicate any defects on the accompanying delivery note. Confirm any defects in writing within 48 hours of their delivery. A copy of these installation and Maintenance Instructions and the units Declaration of Conformity is attached to each unit prior to despatch.

### **Offloading**

METRICO single fan units (MCSB MODEL) may be lifted using slings braced at the top in accordance with current safety regulations. Alternatively units may be lifted by fork lift however, should this method be adopted, please ensure that the load is evenly spread and that the forks where require. Where units are supplied with eyebolts they must be used for lifting as non-compliance shall result in damage to the unit. In all instances it is the receivers responsibility to ensure that the units are lifted and moved both correctively and safely.

### **Storage**

Units which are not for immediate use should be stored in a dry, temperate atmosphere protected from dirt and risk of mechanical damage. If units are to be stored outside they must be covered by strong waterproof sheeting with an air gap maintained between the unit and the sheeting. The accumulation of standing water on the unprotected unit should be prevented. This applies to both internal and external units that have not been permanently installed.

It should be noted that the bubble wrap protection used by Metrico is only intended as protection for the unit during transit and is not weatherproof.

### **Handling**

Units should be kept horizontal at all times to avoid damage to internal components. When moving units ensure that point loads are not applied to panels as this will result in damage that is expensive to repair.

### **Positioning**

Under normal conditions, i.e. where the unit is mounted on a solid concrete base, no special provision for absorbing vibration is required as the fan/motor assembly on the standard unit is provided with anti-vibration mountings and a flexible connection to the fan outlet. If the unit is to be mounted on some other form of support please contact the sales office for advice before processing with the installation.

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### **Service Access**

Adequate access should be provided to allow the unit to be properly maintained. This includes allowing sufficient clearance for the withdrawal of all major components of the unit in the event of replacements being required. The position of access panels is shown on the general arrangement drawing of the equipment and care should be taken not to restrict these with pipework, electrical, trunking etc.

METRICO cannot accept claims for replacement under warranty unless the above minimum requirements for service access have been provided.

## **2. PRE-COMMISSIONING CHECKS**

### **General**

It is important that fans, left in an immobile state for extended periods of time, are rotated manually each month to reduce the likelihood of damage to the fan bearings. It is also beneficial to slacken the drive belts during any lengthy immobile period to further reduce the possibility of damage to the bearings.

Unless the air system is complete with all ductwork, grilles etc. attached the fans should not be run for long periods as an overload condition may occur on the drive motor.

Although fan assemblies are run on test before leaving our works it is possible for damage to be caused during installation on site. We therefore recommend the following minimum, checks to be made before running the fans:

### **Fan Section**

Remove all packing and any foreign matter from all sections of the unit. If spare items have been supplied with the unit they may have been packed into unit sections for ease of transportation. These items should be removed and stored in a safe place for future use.

Check for free movement of fan skid on anti-vibration mountings removing any packing that may have been used during transportation.

Visually check fan casing, impeller and bearings for signs of damage. Manually spin impeller to ensure that it does not catch the fan casing.

Check that all fixing bolts holding components are secure and that drive pulleys are secure on their shafts and aligned correctly.

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When power supply is connected “flick” start the motor to check for correct rotation of the fan. Labels indicating the correct rotation are found on the fan casing.

### **Vee Belt Drives**

Drives are usually tensioned at works prior to despatch and as such do not normally require any attention for the first 24 hours running after which time they should be checked for correct tension. When properly tensioned there will be a slight bow on the slack side of the vee belts when they are running under load. See maintenance instructions for method of adjustment to belt tension.

### **3. COMMISSIONING**

#### **General**

During the commissioning of the twin fan unit/system it may become apparent that the units are not achieving design conditions. If this is the case, before contacting our Sales Office, please carry out the simple checks listed below and take the reading indicated:

#### **a) Insufficient Air**

- Check correct fan rotation.
- Check electrical supply live on all three phases.
- Check vee belt drive not slipping
- Measure fan and motor r.p.m.
- Measure motor full load current.
- Measure static pressure developed across fan.
- Measure static pressure developed at the inlet to the unit.

### **4. MAINTENANCE PERIODS**

The following are the minimum maintenance requirements for units in operation 12 hours per day. For different operating hours the maintenance periods may be adjusted accordingly.

#### **Monthly**

- a) Check and adjust vee belt tension. Inspect for wear.

#### **6 Month Period**

- a) As Monthly checks plus the following
- b) Manually rotate fan impeller to check for free running.
- c) Check for play in fan and motor bearings.
- d) Check pulleys for correct alignment and positive fixing to shaft.

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### **24 Months Period**

- a) As 6 Month inspection plus:
- b) Clean and repack fan and motor bearings.
- c) Check & clean forward curve fan blades for dirt build up.
- d) Check all fixing bolts and screws for tightness.
- e) Inspect anti-vibration mounts for signs of fatigue.
- f) Check motor electrical connections.

## **5. MAINTENANCE PROCEDURES**

### **Change of Drive Belts**

Reduce tension on belts using adjustable motor slide until belts may be eased gently from the pulley groove. Before fitting new belts check and clean pulley grooves. Also check pulleys for correct alignment and adjust as necessary. Ease new belts into pulley grooves and then increase belt tension using slide base as before until correct tension is achieved. This is established by either using a property tension indicator or by measuring belt deflection at the centre of the span when the correct force is applied – see table below. The deflection should not exceed 16mm per metre of span length.

Belt Type	Small Pulley Dia	Force Kgs.
SPA	100 – 132	2.0 – 2.7
SPA	140 – 200	2.8 – 3.5
SPZ	67 – 95	1.0 – 1.5
SPZ	250 – 400	1.5 – 2.0

New belts should be tensioned nearer the higher value as tension will normally drop during the running in period. Due to this initial stretch of the belts it may be necessary to re-tension a new drive after a few days to prevent belt slip.

### **Method For Checking Belt Tension**

Using a belt tension indicator, with metric calibrations:

1. Multiply the centre distance (in meters) by 16 this gives the deflection distances in mm.
2. Set the lower marking ring to the deflection distance required in mm on the lower scale.
3. Set the upper marker ring against the bottom edge of the top tube.
4. Place the tension indicator on top of the belt at the centre of span and apply a force at right angles to the belt deflecting it to the point where the lower marker ring is level with the top edge of the adjacent belt (For single belt drives a straight edge should be placed across the two pulleys to act as a datum for measuring the deflection)
5. Read off the force value indicated by the top edge of the upper marking ring.
6. Compare this value to the Kgf value shown in the table below

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Belt Section	Force required to deflect belt 16 mm per metre of span		
	Small pulley Dia. mm	Newton (N)	Kilogram force (Kgf)
SPZ	67 to 95	10 to 15	1.0 to 1.5
	100 to 140	15 to 20	1.5 to 2.0
SPA	100 to 132	20 to 27	2.0 to 2.7
	140 to 200	28 to 35	2.8 to 3.5

### Fan Bearings

Fan bearings are normally of the sealed type and should not require any attention for the life of the bearing. Where fans are supplied with heavy duty plummer block bearings these should be regularly maintained as follows. The bearings housing should be opened and the old grease should be cleaned out. The bearings should be thoroughly washed out with a good quality grease solvent, and light machine oil missed 8:1 respectively. Safety precautions should be followed strictly when using solvents. After washing, completely dry out the bearing and repack the housing using lithium based grease. (SKF ALFALUM LGMT3 or equivalent). When repacking the grease should only occupy one third to one half of the bearing housing. DO NOT overpack the housing as this will result in overheating, bursting of seals and eventual bearing failure.

Please ensure that the bearing is refitted in the correct order as failure to do so will result in permanent damage to the bearing and fan shaft. Check the bearing temperature after a few hours of running high temperature would indicate that the bearing has been fitted incorrectly.

### Motor Bearings

Motor bearings are packed with sufficient grease for at least 2 years continuous operation without attention under normal conditions. The recommended grease is shell Alvania RA, or equivalent. It is important that bearings are not overgreased as overheating and damage to bearings usually results. On some larger motor, frames 180L – 225M, greasing facilities are provided and should be recharged 2-3 times a year using a manual grease gun. Every 24 months the bearing housing should be opened and the old grease should be cleaned out. The bearing should be thoroughly washed out with a good quality grease solvent, and light machine oil mixed 8:1 respectively. Safety precautions should be followed strictly when using solvents. After washing, completely dry out the bearing and repack the housing using the recommended grease. When repacking the grease should only occupy one third to one half of the bearing housing. It should be noted that certain motors have sealed for life bearings and cannot be repacked.

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### **6. FAULT FINDING**

<u>FAULT</u>	<u>CAUSE</u>	<u>REMEDY</u>
1. Fan motor will not start	Electrical supply failure	Check electrical supply Check overloads
2. Motor running but not airflow	Drive belt failure	Replace drive belts/adjust Belt tension
3. Motor does not reach full speed	Overload tripped	Check overload rating adjust Or replace overload if overload Rating exceeds motor FLC Fit larger motor.
4. Motor overheating	Motor too small	Fit larger motor reset overloads
5. Low air volume	Incorrect fan rotation	Amend electrical wiring
6. Low air volume	Belt drives slipping	Adjust belt tension
7. Low air volume	Electrical supply down to Two phases	Check wiring/fuses
8. Low air volume	High system resistance	Check system
9. High air volume	Low system resistance	Check system