ThermAir SERVICES
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Annual Inspection Checklist

- ☐ As per manufacturer's recommendations vacuum and/or blow any dust & debris from heat sink, printed circuit board(s)
- ☐ Visually inspect all stranded power connections such as input power, motor and contactors when applicable for discoloration, oxidation
- ☐ Inspect & Torque if required all stranded power connections to manufacturer's specifications
- ☐ Testing of all output and motor leads including motor can be performed at this time if so desired
- ☐ Visually inspect for damage, corrosion all applicable controls connections
- ☐ Inspect & Torque if required all stranded controls connections to manufacturer's specifications
- ☐ Verify supply voltage is within acceptable limits and where applicable verify bypass phase sequence has not been changed
- ☐ Verify heat sink cooling fan operation, mechanical fan noise, bearing wear
- ☐ Verify input voltages are balanced; output voltages are balanced and output current is balanced
- ☐ Verify any and all potentially applicable interlocks, safety circuits, temperature switches; modules are correctly wired and correctly functioning
- ☐ Verify all external Start/Stop commands are correctly wired when applicable and correctly functioning
- ☐ Verify all external Speed commands are correctly wired when applicable and correctly functioning
- ☐ Review all fault histories for trending purposes and evaluate to determine any potential issues and clear faults once diagnostics are complete
- ☐ Replace all heat sink fans, NEMA 12 fans where applicable and cabinet fans where applicable after every 4-5 years depending on ambient conditions, loading and configurations
- ☐ Review, Modify, Fine Tune & Copy parameters and settings if so requested by the customer

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Preventative Maintenance Inspection and Procedures

Annual Inspection and Procedures to Be Performed With Power Removed

1. Vacuum dust and/or blow dust from printed circuit board(s) and heat sink section using keyboard dusting media, nitrogen, dried compressed air or the like. If the second method is chosen it is critical to do so in short bursts as to avoid creating a static charge that can cause potential damage to components. The heat sink portion of unit should be cleaned from the top down to the bottom as during normal operation, it moves cooling air in the reverse direction. As such, contaminants will become lodged in the bottom portion of the heat sink. If the unit has a bypass this area should be covered to avoid fouling of any potential contactor auxiliaries.
2. Visually inspect all stranded power connections such as input power, motor and contactors when applicable for discoloration. Discoloration is a good visual indicator of potentially loose connections requiring attention. A thermal scanner is a better method should such equipment be available to the technician.
3. Using the correct tools required, check all stranded power connections for tightness. This is a difficult practice to master should a torque wrench type tool not be available. A torque wrench type tool is a better method. It is imperative to not necessarily tighten connections unless they actually become loose. The reason is that any and all fasteners can only accept a specified amount of torque. Continually tightening such connections will damage the overall integrity of the fastener over time. Field experience has shown that ferruled connections generally will not require tightening. Large horsepower units (Above 75HP) IGBT's, power modules, DC Bus connections and the like can be checked during this procedure as well but ONLY by the Authorized Factory DSS(**D**rives **S**ervice Partner)
4. Testing all output and motor leads including motor can be performed at this time if so desired. Should this procedure be chosen, this test is to be performed ONLY with leads completely removed for the VFD output section. Damage can and will occur if this is not adhered to. This test should only be performed by qualified personnel or by the Authorized Factory DSS (**D**rives **S**ervice Partner) . A Megohm Meter/Meggar should be used at a level of at least 1000VDC to insure accurate testing/reading results. In order to avoid any erroneous Ground Fault Trips in the drive, a reading of at least 100Megohms to ground at 1000VDC should be observed.
5. Visually inspect for damage, corrosion all applicable controls connections.
6. Using the correct tools required, check all stranded controls connections for tightness.

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Annual Inspection and Procedures to Be Performed With Power Applied

1. Verify supply voltage is within acceptable limits and where applicable including a bypass, phase sequence has not been changed.
2. Verify heat sink cooling fan operation and absence of any mechanical fan noise, bearing wear. Verify NEMA 12 cooling fan operation and cabinet fan operation and absence of mechanical fan noise, bearing wear where and when applicable.
3. Start and run unit at full speed in "HAND" operating mode if and where possible. VAV (**V**ariable **A**ir **V**olume) type systems need to be fully open in AHU operation, valving or circuit setting devices can allow for full flow in pumping systems, etc.) Once this has been accomplished if and where possible, verify input voltages are balanced, output voltages are balanced and output current is balanced. Input current balance may in some case only be achieved at full base speed as load on rectifier circuits is non-linear by nature. If full voltage readings are desired at output section for procedural purposes during this test; Flux Optimization needs to be deactivated and V/HZ ratio needs to be linear. These parameter values can be offered upon specific request. This procedure should only be performed by qualified personnel or the Authorized Factory DSS (**D**esignated **S**ervice **S**tation) Personnel.
4. Verify any and all potentially applicable interlocks, safety circuits, temperature switches; modules are correctly wired and correctly functioning.
5. Verify all external Start/Stop commands are correctly wired when applicable and correctly functioning.
6. Verify all external Speed commands are correctly wired when applicable and correctly functioning.
7. Review all fault histories for trending purposes and evaluate to determine any potential issues and clear faults once diagnostics are complete
8. Verify parameter settings and associated requirements are met to satisfy any potential customer preferences, needs or requirements. Review modify and fine tune where necessary.
9. Replace all heat sink fans, NEMA 12 fans where applicable and cabinet fans where applicable after every 4-5 years depending on ambient conditions, loading and configurations.
10. Copy parameters and settings if so requested or required by the customer. This can be accomplished manually using an Excel Spreadsheet format that can be provided upon specific request. This can also be accomplished using Drive Window Light Commissioning and Maintenance Tool. Specific adapters may be required for different models and can be specified upon request. The files captured can be sent to the customer electronically only providing that the customer has access to the DWL program. If the customer does not have or have access to the DWL program, parameter values will need to be presented in printed format or hard copy. This procedure should only be performed by qualified personnel or the Authorized Factory DSP (**D**rives Service Partner)

All of the above mentioned services are provided by ThermAir Services L.L.C. for additional rates. Please see additional services offerings below

- Annual or Biannual Preventative Maintenance
- Simple Motor or Cable Fault Testing (Megohm Testing Using a Meggar)
- Harmonics calculations and Harmonics Testing
- Bearing Current Testing
- Thermal Scanning of VFDs for Purposes of Preventative Maintenance