Installation, Operation and Maintenance

DLSC-IOM-1.0
4-23-20

Low Profile, Series FanPowered Terminal Unit with Sensible Cooling Coil

SAFETY WARNING

Model: DLSC Rev A

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

This IOM is meant to demonstrate general dimensions and information of this product. The drawings are not meant to detail every aspect of the product. Drawings are not to scale.

Titus reserves the right to make changes without written notice.

Warnings, Cautions and Notices

Warnings, Cautions and Notices. Note that warnings, cautions and notices appear at appropriate intervals throughout this manual. Warnings are provide to alert installing contractors to potential hazards that could result in death or personal injury. Cautions are designed to alert personnel to hazardous situations that could result in personal injury, while notices indicate a situation that could result in equipment or property-damage-only accidents. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions. Read this manual thoroughly before operating or servicing this unit.

ATTENTION: Warnings, Cautions and Notices appear at appropriate sections throughout this literature. Read these carefully:
WARNING Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.
NOTICE: Indicates a situation that could result in equipment or property-damage only

WARNING

Personal Protective Equipment (PPE) Required!

Installing/servicing this unit could result in exposure to electrical, mechanical and chemical hazards.

- **Before installing/servicing this unit, technicians MUST put on all Personal Protective Equipment (PPE) recommended for the work being undertaken. ALWAYS refer to appropriate MSDS sheets and OSHA guidelines for proper PPE.**
- **When working with or around hazardous chemicals, ALWAYS refer to the appropriate MSDS sheets and OSHA guidelines for information on allowable personal exposure levels, proper respiratory protection and handling recommendations.**
- **If there is a risk of arc or flash, technicians MUST put on all Personal Protective Equipment (PPE) in accordance with NFPA 70E or other country-specific requirements for arc flash protection, PRIOR to servicing the unit.**

Failure to follow recommendations could result in death or serious injury.

WARNING

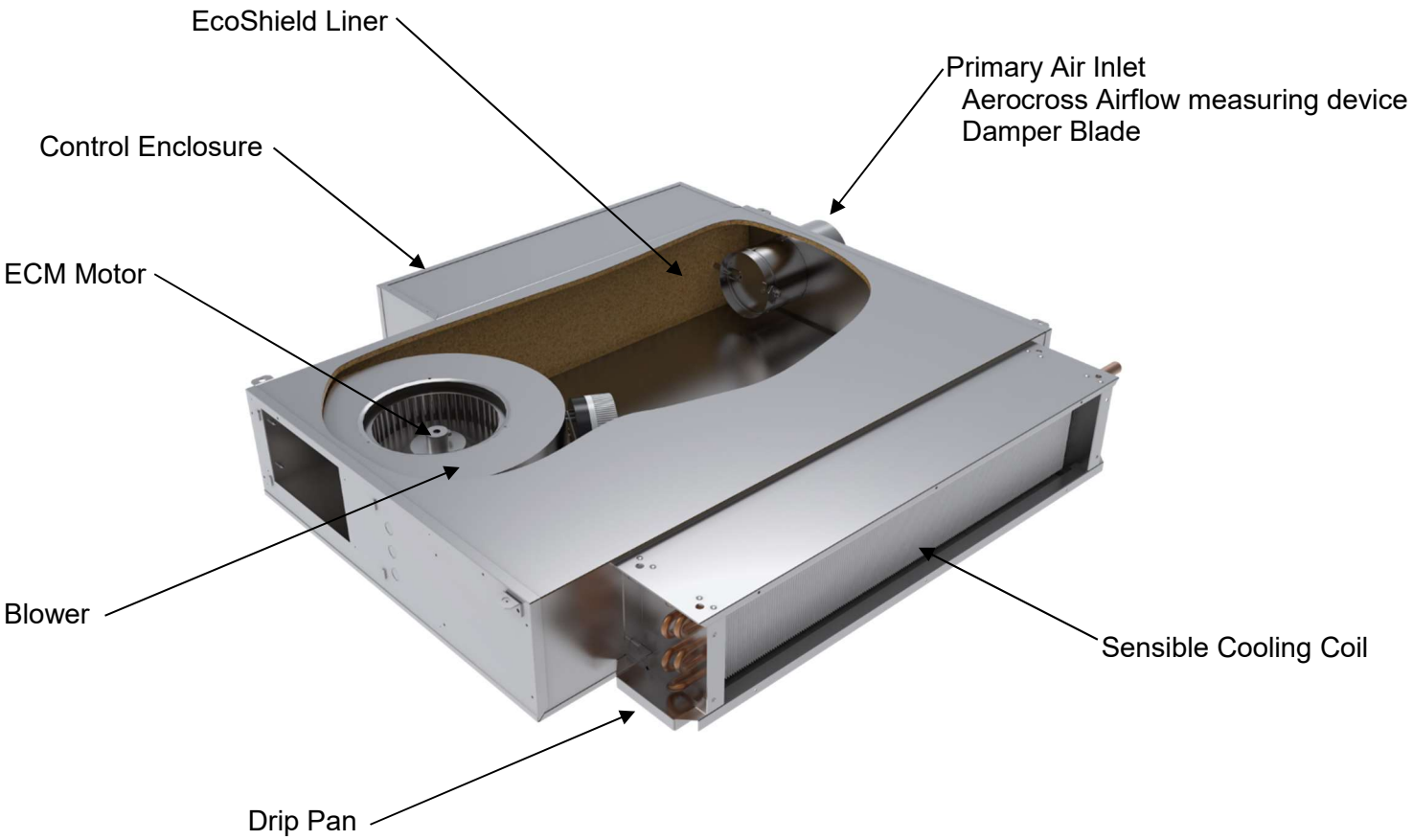
Proper Field Wiring and Grounding Required!

All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/state electrical codes. Failure to follow code could result in death or serious injury.

General Information

The DLSC units are intended for single or multi zone applications with an airflow range of 400 to 1850 CFM. The DLSC units incorporate as standard a Primary Air damper which receives air from a Dedicated Outside Air system (DOAS), high efficiency ECM motor(s) and are available as two-pipe systems with or without electric heat (one hydronic circuit), four-pipe system (two hydronic circuits) or four-pipe with standby electric heating. The unit mounted low voltage 24 VAC, 50VA Class II transformer provides low voltage to the ECM motor controls and connections field mounted controller/damper actuator. See Figure 1 for unit components.

FIGURE 1: LSC Unit Major Components



Pre - Installation

WARNING

Hazardous Voltage!
Disconnect all electric power, including remote disconnects and discharge all motor start/run capacitors before servicing. Follow proper lockout/ tagout procedures to ensure the power cannot be inadvertently energized. For variable frequency drives or other energy storing components provided by Titus or others, refer to the appropriate manufacturer's literature for allowable waiting periods for discharge of capacitors. Verify with an appropriate voltmeter that all capacitors have discharged. Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

Receiving and Handling

Upon delivery, inspect all components for possible shipping damage. See "Receiving Checklist" (below) for detailed instructions. Titus recommends leaving units and accessories in their shipping packages/skids for protection and ease of handling until installation.

Shipping Package

The LSC units are multi packed and ship in pallets for handling and storage ease. Each Unit has tagging information such as the model number, sales order number, serial number, unit size, piping connections, and unit style to help properly locate the unit in the floor plan. If specified, the unit will ship with tagging designated by the customer.

Receiving Checklist

Complete the following checklist immediately after receiving unit shipment to detect possible shipping damage.

Inspect individual pallets before accepting. Check for rattles, bent corners, or other visible indications of shipping damage.

If a unit appears damaged, inspect it immediately before accepting the shipment. Manually rotate the fan wheel to ensure it turns freely. Make specific notations concerning the damage on the freight bill. Do not refuse delivery.

Inspect the unit for concealed damage before it is stored and as soon as possible after delivery. Report concealed damage to the freight line within the allotted time after delivery. Check with the carrier for their allotted time to submit a claim.

Do not move damaged material from the receiving location. It is the receiver's responsibility to provide reasonable evidence that concealed damage did not occur after delivery.

Do not continue unpacking the shipment if it appears damaged. Retain all internal packing, cartons, and crate. Take photos of damaged material.

Notify the carrier's terminal of the damage immediately by phone and mail. Request an immediate joint inspection of the damage by the carrier and consignee.

Notify your Titus representative of the damage and arrange for repair. Have the carrier inspect the damage before making any repairs to the unit.

Compare the electrical data on the unit nameplate with the ordering and shipping information to verify the correct unit is received.

Jobsite Storage

This unit is intended for indoor use only. Store the unit indoors to protect the unit from damage due to the elements. If indoor storage is not possible, make the following provisions for outdoor storage:

1. Place the unit(s) on a dry surface or raised off the ground to assure adequate air circulation beneath unit and to assure that no portion of the unit contacts standing water at any time.

2.Cover the entire unit with a canvas tarp only. Do not use clear, black or plastic tarps as they may cause excessive moisture condensation and equipment damage.

Installation Preparation

Before installing the unit, consider the following unit location recommendations to ensure proper unit operation.

1. Clearances: Allow adequate service and code clearances as recommended in "Service Access" (the next section). Position the unit and skid assembly in its final location.

2.Structural support: Ensure the structural support is strong enough to adequately support the unit. The installer is responsible for supply support rods for installation of ceiling units.

3.Level: To ensure proper unit operation, install the unit level (zero tolerance) in both horizontal axes.

Pre – Installation (Cont.)

4. Wall & ceiling openings: concealed units require wall/ ceiling openings. Refer to submittal for specific dimensions before attempting to install. Concealed units must meet the requirements of the National Fire Protection Association (NFPA) Standard 90A or 90B concerning the use of concealed ceiling spaces as return air plenums. Refer to the submittal for specific dimensions of ceiling openings.

Service Access

Service access is available from the bottom and sides of the units. Units have removable bottom and side panels to allow access into the unit. See Figure 2 for recommended service and operating clearances. Units have front or back piping connections. Reference piping locations by facing the front of the unit (airflow discharges from the front). The control panel is always on the opposite the piping.

Pre-Installation Checklist

Complete the following checklist before beginning unit installation.

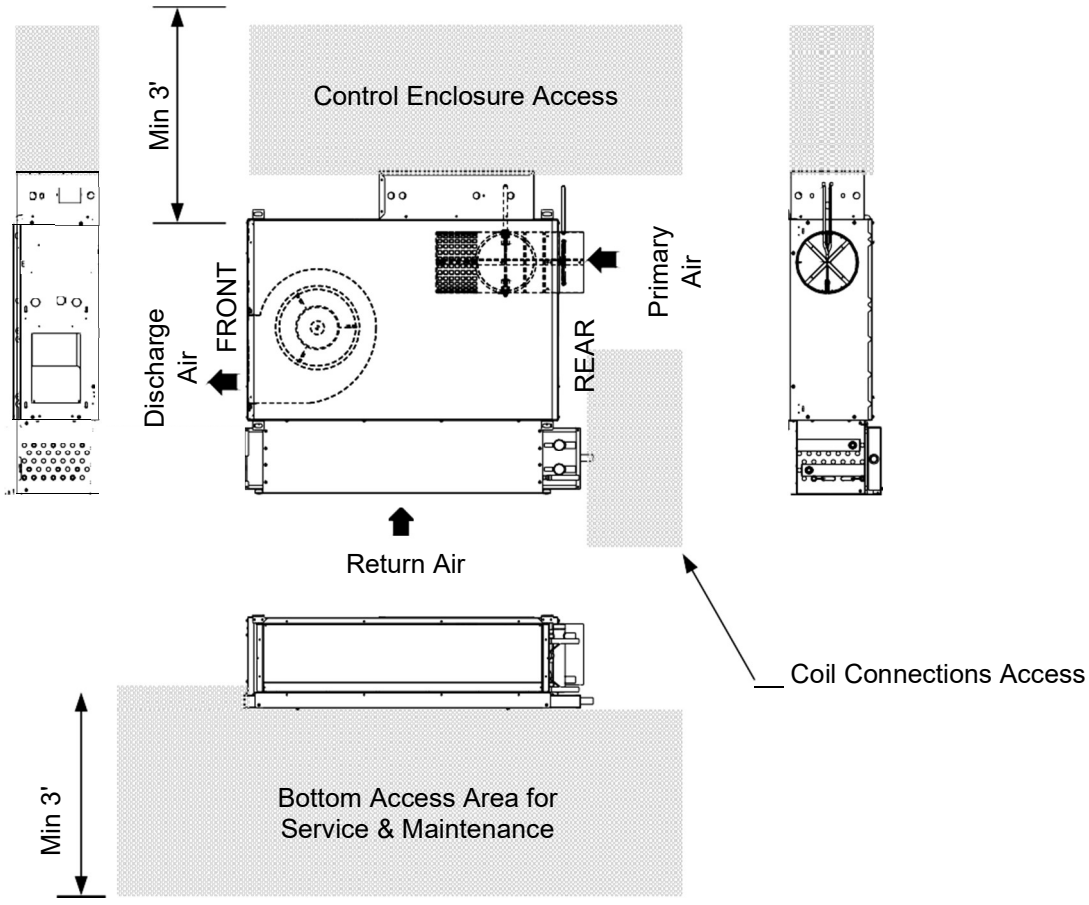
Verify the unit size and tagging with the unit nameplate.

Make certain the ceiling is solid, and sufficient to support the unit and accessory weights.

Allow minimum recommended clearances for routine maintenance and service. Refer to unit submittals for dimensions.

Allow 4' of straight duct before the first takeoff or before the discharge ductwork makes any turns.

Figure 2.



Notes:
1. Right Hand unit shown. Control enclosure dictates the handing of the unit.
2. All DLSC units are installed with removable bottom access panels.

Unit Labels

Each unit will have two main labels attached to the casing.

The FAN UNIT label lists:
- Model Number
- Model Number Description
- Unit Power Supply requirements
- Motor Horsepower
  - Full Load Amps
- Electric Heater Power Supply requirements
  - Power – KW
  - Amperage consumption
- Minimum Circuit Amps
- Max Recommended Fuse

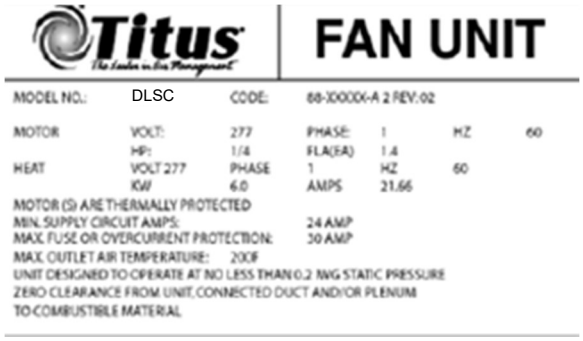
The AIR FLOW label lists:
- Model Number
- Unit Size
- Factory Order Number
- TAG / Location - indicates the engineer's planned location for the unit to be installed.

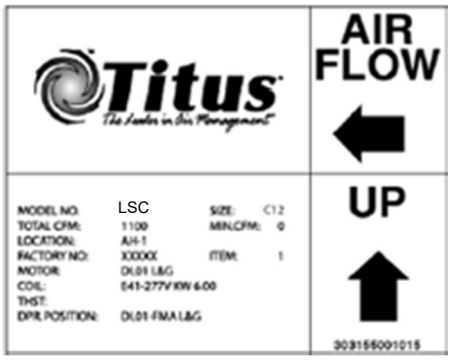
There may be other labels attached to the unit, as options or codes may require.

If you have any questions, please contact the local TITUS Representative for clarification. Have the key points from the Air Flow label available for reference before calling.

NOTICE

Unit Labels
Read all labels on a typical unit, before beginning installation.





Installation - Mechanical

Duct Connections

Install all air ducts according to National Fire Protection Association standards for the Installation of Air Conditioning and Ventilating Systems (NFPA 90A and 90B). Install all air ducts according to the National Fire Protection Association standards for the “Installation of Air Conditioning and Ventilation Systems other than Residence Type (NFPA 90A) and Residence Type Warm Air Heating and Air Conditioning Systems (NFPA 90B).

WARNING

Hazardous Voltage!
Disconnect all electric power, including remote disconnects and discharge all motor start/run capacitors before servicing. Follow proper lockout/ tagout procedures to ensure the power cannot be inadvertently energized. For variable frequency drives or other energy storing components provided by Titus or others, refer to the appropriate manufacturer’s literature for allowable waiting periods for discharge of capacitors. Verify with an appropriate voltmeter that all capacitors have discharged. Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

The unit’s duct connections varies dependent on options ordered. Titus recommends using galvanized sheet metal ductwork with the DLSC units. All duct connections should be sealed and fasten with sheet metal screws.
Note: *Do not run screws through the removable front panels.*

Ductwork Recommendations

Follow the general recommendations listed below when installing ductwork for the unit.

1. Discharge ductwork should run in a straight line, unchanged in size or direction, for a minimum of 4'.

2. When making duct turns, placing takeoffs and transitions avoid sharp turns and use proportional splits, turning vanes, and air scoops when necessary.

3. When possible, construct, and orient supply ductwork turns in the same direction as the fan rotation.

Piping Considerations Hydronic Coil Piping

Before installing field piping to the coil, consider the following:

- Coil connections can be 5/8-inch O.D. (or 1/2-inch nominal) or 7/8-inch O.D. (or ¾-inch nominal) sweat copper connections.

- The supply and return piping should not interfere with the drip pan.

- Supply connection should always be at the bottom of the coil and return at the top.

- An Air Vent valve must be installed at the highest point of the water coil to allow removal of “air pockets” inside the coil.

- The installer must provide adequate piping system filtration and water treatment.

- Solder the joints using bridgit lead-free solder (ASTM B32-89) to provide a watertight connection. Avoid overheating factory soldered joints when soldering field connections to the coil to prevent leakage from occurring.

- Insulate all piping to coil connections as necessary after connections and pressure test are complete.

External Insulating Requirements

Insulate and vapor seal surfaces colder than surrounding air dew-point to prevent unplanned condensation. Titus recommends field-insulation of the following areas to prevent potential condensate problems:

1. Supply and return water piping connections
2. Fresh air intake duct connections
3. Discharge duct connections

Installation – General

Installing the Unit

Follow the procedures below to install the unit properly. Refer to submittal for specific unit dimensions and mounting hole locations.

NOTICE

Electrical Wiring!
Do not allow electrical wire to fall between the unit and installation surface. Failure to comply may result in electrical shorts or difficulty accessing wires.

NOTICE

Motor Overload!
All unit panels and filters must be in place prior to unit startup. Failure to have panels and filters in place may cause motor overload.

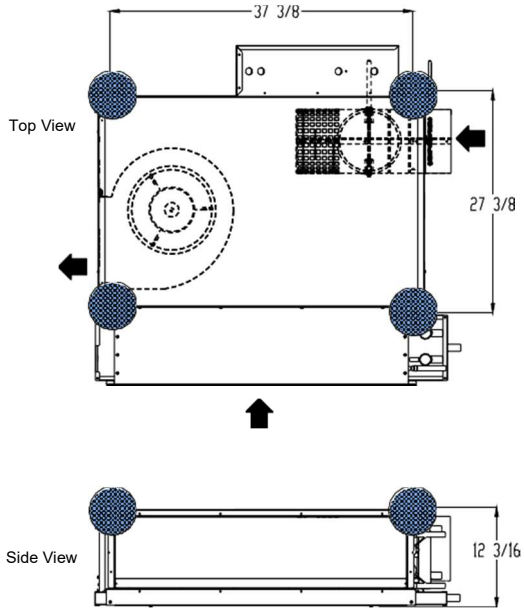
Install horizontal units suspended from the ceiling using metal straps or the optional Hanging Brackets located on the top of the unit. The hanger holes allow a maximum shank size of 1/2-inch diameter threaded rods or lag screws (installer provided).

Note: *Follow the requirements of National Fire Protection Association (NFPA) Standard 90A or 90B, concerning the use of concealed ceiling spaces as return air plenums.*

Follow the installation procedure below.

1. Prepare the ceiling opening for recessed units. Reference the unit submittals for dimensions.
2. Position and install the suspension rods or a suspension device (supplied by installer) according to the unit model and size in submittal
4. Level the unit by referencing the chassis end panels. Adjust the suspension device.
5. Complete piping and wiring connections, in addition to any necessary ductwork as instructed in the following sections.
6. Install the bottom panel before starting the unit.

Hanger Brackets



Installation Checklist

WARNING

Hazardous Voltage w/Capacitors!

Disconnect all electric power, including remote disconnects and discharge all motor start/run capacitors before servicing. Follow proper lockout/ tagout procedures to ensure the power cannot be inadvertently energized. For variable frequency drives or other energy storing components provided by Trane or others, refer to the appropriate manufacturer's literature for allowable waiting periods for discharge of capacitors. Verify with an appropriate voltmeter that all capacitors have discharged. Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury

NOTICE

Unit Leveling!

The unit must be installed level (zero tolerance) in both horizontal axis for proper operation.

The following checklist is only an abbreviated guide to the detailed installation procedures given in this manual. Use this list to ensure all necessary procedures are complete. For more detailed information, refer to the appropriate sections in this manual.

1. Inspect the unit for shipping damage.

2. Level installation location to support the unit weight adequately. Make all necessary ceiling openings to allow adequate air flow and service clearances.

3. Ensure the unit chassis is installed level.

4. Verify that wall and ceiling openings are properly cut per the unit submittals.

5. Verify that installation of units meets the national Fire Protection Association (N.F.P.A.) Standard 90A or 90B concerning the use of concealed ceiling spaces as return air plenums. Verify correct ceiling opening dimensions on unit submittals. Secure the unit and any accessory items properly to the ceiling support rods.

6. Complete all piping connections correctly.

7. Check field sweat connections for leaks and tighten the valve stem packing, and piping package unions if necessary.

8. Complete all necessary duct connections.

9. Install the filed supplied controls.

10. Complete all interconnection wiring.

11. Connect electrical supply power according to the NEC and unit wiring diagrams.

12. Remove any miscellaneous debris, such as sheetrock dust, that may have infiltrated the unit during construction.

13. Replace the air filter (if installed) as required.

Installation - Electrical

Unit Wiring Diagrams

Specific unit wiring diagrams, based on unit options ordered, are provided inside each unit and can be easily removed for reference. Use these diagrams for connections or trouble analysis. Wiring diagrams are attached on the inside of the Control enclosure

Supply Power Wiring

Refer to the unit nameplate to obtain the minimum circuit ampacity (MCA) and maximum fuse size (MFS) or maximum circuit breaker (MCB) to properly size field supply wiring and fuses or circuit breakers.

Refer to the unit operating voltage listed on the unit wiring schematic, submittal, or nameplate. Reference the wiring schematic for specific wiring connections.

Note: *All field wiring should conform to NEC and all applicable state and local code requirements. The control enclosure is always on the end opposite the piping connections. Access the control box by removing the two screws that secure the front cover. This will allow thepanel to be removed, to provide access to the electrical components.*

NOTICE

Use Copper Conductors Only!

Unit terminals are not designed to accept other types of conductors. Failure to use copper conductors may result in equipment damage.

If the unit does not have a disconnect switch, the power leads and ground terminal are situated inside the high voltage compartment in the control enclosure. If the unit has a disconnect switch, power connections are done directly to the disconnect switch located in the control enclosure.

NOTICE

Equipment Damage!

Unit transformer provides power to the LSC unit only. Field connections directly to the transformer may create immediate or premature unit component failure.

Recommendation: Do not bundle or run interconnection wiring in parallel with or in the same conduit with any high-voltage wires (110 V or greater). Exposure of interconnection wiring to high voltage wiring, inductive loads, or RF transmitters may cause radio frequency interference (RFI). In addition, improper separation may cause electrical noise problems. Therefore, use shielded wire (Belden 83559/83562 or equivalent) in applications that require a high degree of noise immunity. Connect the shield to the chassis ground and tape at the other end.

Note: *Do not connect any sensor or input circuit to an external ground connection.*

Table 4. Electrically commutated motors Full Load Amps

Unit Size	Motor hp	277/1/60 FLA	240/1/60 FLA	208/1/60 FLA	120/1/60 FLA
1	1/3	2.6	2.8	3.3	5.0
2	1/3	2.6	2.8	3.3	5.0
3	1/2	4.1	4.3	5.0	7.7
5	3/4	5.5	6.8	7.9	9.6

All fan motors are single phase, same voltage as electric coil (when supplied), with exception that 277 V motors are used with 480V, 3 phase coils (4 wire wye).

FLA = Full Load Amperage, as tested in accordance with UL 1995

Minimum Circuit Ampacity (MCA) and Maximum Fuse Size (MFS) Calculations for Fan-Coils with Single Phase Electric Heat

Heater amps = (heater kW x 1000)/heater voltage

MCA = 1.25 x (heater amps + all motor FLAs)

MFS type circuit breaker = (2.25 x largest motor FLA) + second motor FLA + heater amps (if applicable)

Select a standard fuse size or circuit breaker equal to the MCA. Use the next larger standard size if the MCA does not equal a standard size.

Standard fuse sizes are: 15, 20, 25, 30, 35, 40, 45, 50, 60 amps.

DLSC Unit electric heat MBh = (heater kW)*(3.413)

ECM Overview and Setup

Overview

This section addresses the Titus ECM motor which is standard on all LSC units. The ECM motor provides outstanding comfort, safety, and performance with greatly reduced energy consumption compared to traditional units with permanent split capacitance AC motors and with proper installation and operation the units will provide a long service life . The ECM motor provides a high degree of flexibility and configurability, with the simplicity of customized factory configurations appropriate to most installations. Very little intervention is needed by service and installation personnel in most applications; however, installers must read through this entire section before beginning installation of the new equipment. This literature focuses on unit motors and associated controls.

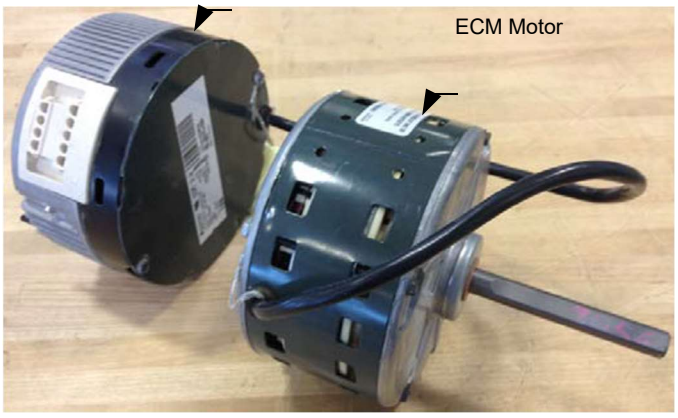
General Information

There are four primary components that enable the ECM technology on the LSC units:

1. Titus ECM Motor
2. ECM Engine Board
3. PWM Controllers
4. Inductors

The motors and modules are combined as a system, and cannot work without each other.

ECM Engine Board



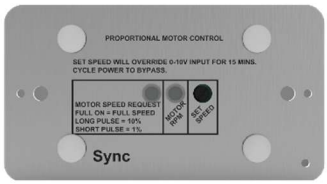
ECM Motor Fan Flow Adjustment

NOTICE

Before starting the fan motor, follow steps 1 and 2

1. Discharge ductwork should be connected. The minimum recommended discharge static pressure is 0.2" wg. Be sure that any fan packing is removed from units prior!
2. All foreign materials should be removed from duct system. Filters should be installed where required.
3. The LSC unit is equipped with either a manual control or a remote control PWM fan speed controller, mounted on the side of the line voltage control enclosure.

A - Remote Signal PWM Controller



ECM motors shipped with remote PWM controller require a signal from the DDC controller to control fan speed.

B- Manual/Unit PWM Controller

ECM motors with manual PWM controllers are shipped from the factory at design CFM when provided. Otherwise motors are shipped at motor full speed setting.

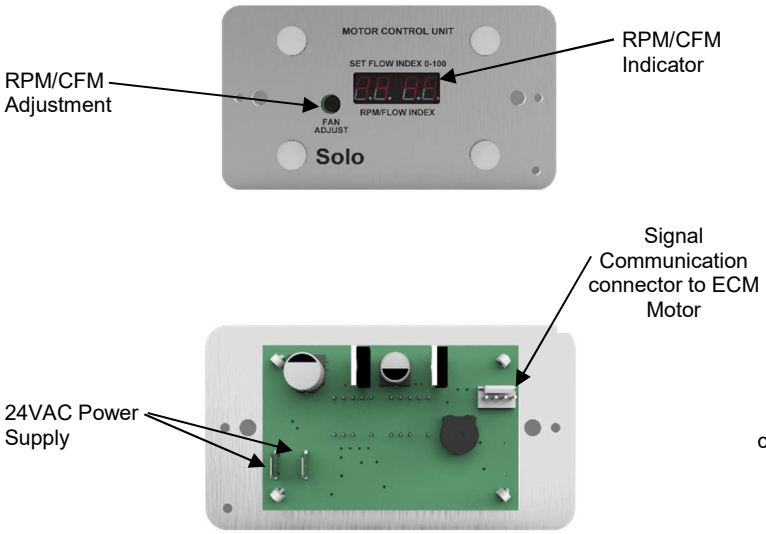
4. Allow motor to run-in at least 15 minutes before adjusting speed. During initial run-in, check ductwork connections for leaks and repair if necessary. (Do not adjust fan speed down if ductwork is not connected).

5. Set the unit to full heating (maximum induction). Adjust and set remote balancing dampers, if present. Adjust the speed control to deliver the required CFM by measuring air quantity at the room outlets.

6. Proceed to primary air adjustment procedure, detailed in control installation information. Fan should be re-adjusted with primary air and ventilation air at maximum setpoint, to insure that no supply air is discharged at the induction port

ECM Overview and Setup

Manual / Unit PWM Signal Interface Board

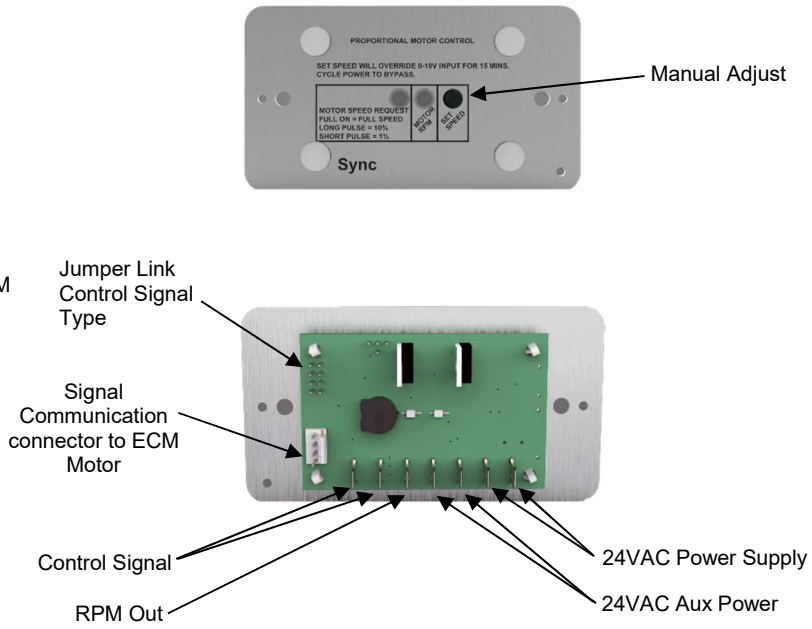


The Manual PWM interface board allows accurate manual adjustment and monitor of fan with the GE Electric ECM Motor.
The Manual interface board features a 4 digit LED numerical display to allow easy reading in dark spaces. Watch the display and set the flow index with a screwdriver adjust. Twenty seconds later, the display shows the motor RPM. Then, the display periodically alternates between the flow index and motor RPM.

Operation

GE ECM™ motors configured for Vspd operation are factory configured for external torque or airflow adjustment. A numerical flow index accurately adjusts the fan to the desired torque or airflow. The flow index is a number from 0-100 having a linear relationship to the minimum to maximum torque or airflow range specified by Titus. Refer to the fan specifications, data and charts to convert the flow index to torque or mass airflow.
The Manual PWM interface board allows local on/off and fan airflow adjustment. Rotating a single screwdriver adjuster changes the variable output signal to the motor from off to full output. While rotating the adjuster, a numerical flow index is locked on the illuminated numerical display. After adjustment, the display shows fan RPM.

Remote PWM Signal Interface Board Details



The remote interface allows industry standard 0-10Vdc automation signals to adjust and monitor General Electric's ECM Motor.
The interface board provides remote adjustment of the ECM output from 0% to 100% of the programmed control range. A signal lamp on the control continuously flashes out the flow index$_2$. Instruments are not required to read the flow index. A 0-10Vdc signal connects RPM to the automation control. Jumpers allow the Interface to be configured for 0-10Vdc automation signal, 2-10Vdc automation signal, and manual/override control. The interface can also be used for stand-alone manual control.

The green lamp continuously indicates the flow index. After a pause, the lamp flashes out the tens digit, then the units digit of a number between 1 and 99. Long flashes represent the tens digit, and short flashes represent the units digit. For example, a flow index of 23 flashes two longs, then three shorts.
Two extra long flashes indicate a flow index of 0. An extra long flash and ten short flashes indicates a flow index of 100. The lamp flashes the signal that was present when the flash sequence started.
Turning Adjust controls the ECM motor to the manually adjusted setting. The manual setting has authority for 15 minutes. Set the unit to full heating (maximum induction). Adjust and set remote balancing dampers, if present.
Adjust the speed control to deliver the required CFM by measuring air quantity at the room outlets.

ECM Overview and Setup

Remote PWM Signal Interface Board Details

Jumpers

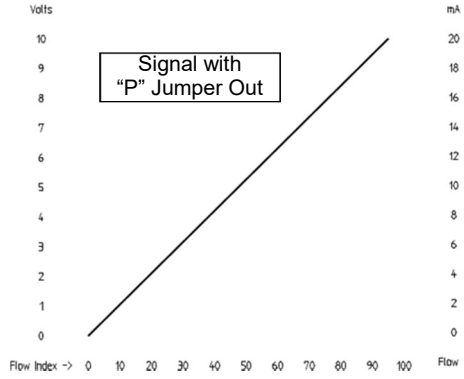
M – Enables SET SPEED potentiometer manual override (bypassed when automation SIGNAL exceeds 0.2VDC).

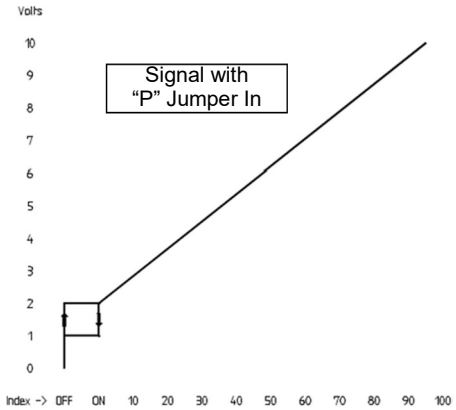
S – Enables SET SPEED potentiometer reversal (used when the set speed potentiometer is going to be adjusted from the component side of the board).

P – Enables hysteresis option

With P Jumper: Configures the SIGNAL input to a 2-10v range; corresponding to 0-100% motor speed request.

Without P Jumper: Configures the SIGNAL input to a 0-10v range; corresponding to 0-100% motor speed request.





Input / Outputs

Input

Power Supply: 18-30 VAC, 60Hz
SIGNAL & COMMON: 0-10VDC = 0-100% PWM request
ECM supplied feedback: 5VDC (motor at rest or not connected)

Output

PWM supplied to ECM: 18VDC (10mA max)
ON/OFF supplied to ECM: 18VDC (10mA max)
RPM & COMMON: 0-10VDC (5mA max) = 0-2000 RPM (10 RPM increments)

DDC Control – Air Balance

If the DDC Controller signal is already installed, air balance can be achieved using the DDC Controller software tools. Please notice that a control signal less than 0.2Vdc may put the interface board into manual override. Avoid setting the DDC signal to less than 0.2Vdc.

WARNING
Turning Adjust potentiometer locks out the BAS signal for 15 minutes

Cycle Power ON/OFF for faster lockout Removal

Manual Air Balance

The interface board can be manually adjusted before the DDC Controller signal is available. The balancer's manual adjustment has authority until automation is connected.

Air Balancer

1. Use adjust to set the air flow. This adjustment will have authority for at least 15 minutes

2. Read the flashing green light and record the flow index on the air balance report.

DDC Integrator

1. Set the Signal to 0Vdc to invoke manual override.
2. Record the RPM on the air balance report.
3. Enter the flow index the air balancer entered on the air balance report.
4. Observe the RPM is at or near the RPM observed in step 2.
5. Cycle the motor on/off 5 times. This clears the manual override function unless the "M" jumper is in place.

Pre Start-Up

Pre-Startup Checklist

Complete this checklist after installing the unit to verify all recommended installation procedures are complete before unit startup. This does not replace the detailed instructions in the appropriate sections of this manual. Disconnect electrical power before performing this checklist. Always read the entire section carefully to become familiar with the procedures.

WARNING

Hazardous Voltage w/Capacitors! Disconnect all electric power, including remote disconnects and discharge all motor start/run capacitors before servicing. Follow proper lockout/ tagout procedures to ensure the power cannot be inadvertently energized. For variable frequency drives or other energy storing components provided by Trane or others, refer to the appropriate manufacturer's literature for allowable waiting periods for discharge of capacitors. Verify with an appropriate voltmeter that all capacitors have discharged. Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

Receiving

Inspect unit and components for shipping damage. File damage claims immediately with the delivering carrier.

Check unit for missing material. Look for ship-with options and sensors that may be packaged separately from the main unit.

Check nameplate unit data so that it matches the sales order requirements.

Unit Location

1. Ensure the unit location is adequate for unit dimensions, ductwork, piping, and electrical connections.

2. Ensure access and maintenance clearances around the unit are adequate.

Unit Mounting

1. Ensure unit is installed level.

Component Overview

1. Ensure the fan rotates freely in the correct direction.

2. Ensure all unit access panels are in

place.

3. Verify that a clean air filter is in place.

Unit Piping

1. Properly vent the hydronic coil to allow water flow through the unit.

2. Tighten all pipe connections adequately.

3. Set water flow to the unit properly if unit piping has the circuit setter valve (installed by others).

4. Check strainers (if installed by others) for debris after apply system water.

5. Ensure the drip pan is not obstructed. Remove any foreign matter that may have fallen into the drip pan during installation.

Electrical

Check all electrical connections for tightness.

Electrical *Note:* *Some circumstances may require the unit to run before building construction is complete. These operating conditions may be beyond the design parameters of the unit and may adversely affect the unit.*

Maintenance

Maintenance Procedures

Perform the following maintenance procedures to ensure proper unit operation.

WARNING

Live Electrical Components! During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

WARNING

Disconnect all electric power, including remote disconnects and discharge all motor start/run capacitors before servicing. Follow proper lockout/ tagout procedures to ensure the power cannot be inadvertently energized. For variable frequency drives or other energy storing components provided by Trane or others, refer to the appropriate manufacturer's literature for allowable waiting periods for discharge of capacitors. Verify with an appropriate voltmeter that all capacitors have discharged. Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

Air Filters

Change or clean air filters at least twice a year. Filters require more frequent care under high load or dirty air conditions since a clogged filter reduces airflow. Pleated media filters are available for all units.

Depending on the Filter Removal Option installed in the unit, filters can be removed from the unit in two ways:

1 - Side removal – from the either side of the coil
2 - Bottom removal – from the bottom of the coil side

Replace All Panels and Filters Properly! All unit panels and filters must be in place prior to unit startup. Failure to have panels and filters in place could result in equipment damage.

Coil Maintenance

Keep coils clean to maintain maximum performance. For operation at its highest efficiency, clean the coil often during periods of high demand or when dirty conditions prevail. Clean the coil a minimum of once a year to prevent dirt buildup in the coil fins, where it may not be visible. Remove large debris from the coils and straighten fins before cleaning. Remove filters before cleaning. Clean the coil fins using steam with detergent, hot water spray and detergent, or a commercially available chemical coil cleaner. Be sure to rinse coils thoroughly after cleaning.

WARNING

Hazardous Chemicals! Coil cleaning agents can be either acidic or highly alkaline. Handle chemical carefully. Proper handling should include goggles or face shield, chemical resistant gloves, boots, apron or suit as required. For personal safety refer to the cleaning agent manufacturer's Materials Safety Data Sheet and follow all recommended safe handling practices. Failure to follow all safety instructions could result in death or serious injury.

Inspecting and Cleaning Coils

Coils become externally fouled as a result of normal operation. Dirt on the coil surface reduces its ability to transfer heat that can result in comfort problems, increased airflow resistance and thus increased operating energy costs. If the coil surface dirt becomes wet, which commonly occurs with cooling coils, microbial growth (mold) may result, causing unpleasant odors and serious health-related indoor air quality problems. Inspect coils at least every six months or more frequently as dictated by operating experience. Cleaning frequently is dependent upon system operating hours, filter maintenance, and efficiency and dirt load. Follow the suggested methods in the following paragraphs.

Maintenance (Cont)

Hydronic Coil Cleaning Procedure

1. Disconnect all electrical power to the unit.
2. Don the appropriate personal protective equipment (PPE).
3. Access both sides of the coil.
4. Use a soft brush to remove loose debris from both sides of the coil.
5. Use a steam cleaning machine, starting from the top of the coil and working downward. Clean the leaving air side of the coil first, then the entering air side. Use a block-off to prevent steam from blowing through the coil and into a dry section of the unit.
6. Repeat step five as necessary.
7. Allow the unit to dry thoroughly before putting the system back into service.
8. Straighten any coil fins that may be damaged with a fin rake.
9. Replace all panels and parts and restore electrical power to the unit.

Winterizing the Coil

Make provisions to drain coils that are not in use, especially when subjected to freezing temperatures. To drain the coil, blow the coil out with compressed air. Next, fill and drain the tubes with full-strength ethylene glycol several times. Drain the coil as completely as possible.

NOTICE

Coil Freeze-up Damage!
Failure to properly drain and vent coils when not in use during freezing temperatures may result in coil freeze-up damage.

Replacing Motors

Motors are attached to the fan Blower with screws at the rear of the motors. Fan wheels are attached with Allen screws on the fan hubs. In most applications, it is necessary to remove the fan blower to change out the motor. The fan blower is easily removable, with screws on the top and bottom edges of fan blower.

NOTICE

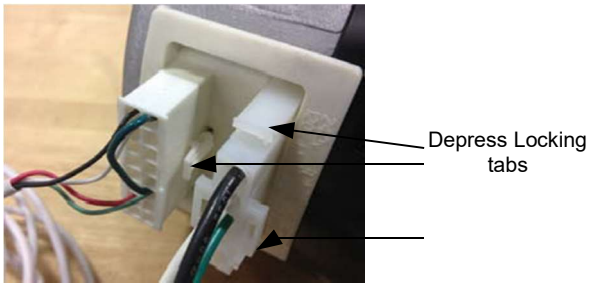
Heavy Object!
Support the Fan Blower when removing it from the unit. Failure to properly support Fan Blower may result in minor to moderate personal injury.

Work Instruction Steps

In general, replacement of a motor needs to be carried out as follows:

1. Remove front panels of unit.

2. Free the motor and crossover harnesses from the fan board, by unplugging the two electric multi plugs from the motor.



3. Remove the fan housing with the motor and loosen fan Allen screw on the shaft.

4. Unscrew the motor from the fan housing and

remove. 5. Insert the replacement motor.

Periodic Maintenance Checklists

The following check list provides the recommended maintenance schedule to keep the unit running efficiently.

Monthly Maintenance
1. Inspect unit air filters. Clean or replace if airflow is blocked or if filters are dirty.

2. Check the drip pans to be sure the pans are clean.

Annual Maintenance
Check and tighten all set screws, bolts, locking collars and sheaves.

1. Inspect the unit liner clean or repair to provide unit protection.
2. Inspect the fan wheel and housing for damage. Rotate the fan wheel manually to be sure movement is not blocked by obstructions.
3. Inspect the coil fins for excessive dirt or damage. Remove dirt and straighten fins.
4. Clean and tighten all electrical connections.
5. Inspect the primary air damper and ensure that itrotates freely from o to 100% open