

INSTALLATION & OPERATION MANUAL

# Single Duct Terminal Unit

## ESV, ESV-Q

## IMPORTANT! READ BEFORE PROCEEDING!

### GENERAL SAFETY GUIDELINES

This equipment is a relatively complicated apparatus. During installation, operation, maintenance or service, individuals may be exposed to certain components or conditions including, but not limited to: refrigerants, UV, materials under pressure, rotating components, and both high and low voltage. Each of these items has the potential, if misused or handled improperly, to cause bodily injury or death. It is the obligation and responsibility of operating/service personnel to identify and recognize these inherent hazards, protect themselves, and proceed safely in completing their tasks. Failure to comply with any of these requirements could result in serious damage to the equipment and the property in which it is situated, as well as severe personal injury or death to themselves and people at the site.

This document is intended for use by owner-authorized operating/ service personnel. It is expected that these individuals possess independent training that will enable them to perform their assigned tasks properly and safely. It is essential that, prior to performing any task on this equipment, this individual shall have read and understood this document and any referenced materials. This individual shall also be familiar with and comply with all applicable governmental standards and regulations pertaining to the task in question.

### Safety Symbols

The following symbols are used in this document to alert the reader to areas of potential hazard:



#### danger

indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



#### caution

identifies a hazard which could lead to damage to the machine, damage to other equipment and or environmental pollution. Usually an instruction will be given, together with a brief explanation.



#### warning

indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



#### note

is used to highlight additional information which may be helpful to you.

## Changeability of this Document

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In complying with Titus' policy for continuous product improvement, the information contained in this document is subject to change without notice. Titus makes no commitment to update or provide current information automatically to the manual owner. Updated manuals, if applicable, can be obtained by contacting the nearest Titus office or accessing the Titus website.

Operating/service personnel maintain responsibility for the applicability of these documents to the equipment. If there is any question regarding the applicability of these documents, the technician should verify whether the equipment has been modified and if current literature is available from the owner of the equipment prior to performing any work on the unit.

### CHANGE BARS

Revisions made to this document are indicated with a line along the left or right hand column in the area the revision was made. These revisions are to technical information and any other changes in spelling, grammar or formatting are not included.

# IOM SINGLE DUCT TERMINAL

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## Titus Terminal Unit Setup Guide

### PROJECT INFORMATION:

<b>Job Name</b>	
<b>Order Number</b>	

### UNIT INFORMATION:

<b>Model Number (M/N)</b>	
<b>Serial Number (S/N)</b>	
<b>Unit Size</b>	
<b>Unit ID</b>	
<b>Serving Area</b>	
<b>Control Type</b>	
<b>Thermostat ID/Location</b>	
<b>Accessories</b>	<input type="checkbox"/> Water Coil <input type="checkbox"/> Heat Kit <input type="checkbox"/> Sensor Package <input type="checkbox"/> Other:
<b>Hot Water Coil Rows</b>	

### ELECTRICAL INFORMATION:

<b>Power Supply (V/Ph/Hz)</b>	
<b>Nameplate Amps</b>	
<b>Measured Amps</b>	
<b>kW Rating of Heat Kit</b>	_____ kW

### INSTALLATION INFORMATION:

<b>Date Installed</b>	
<b>Date of Start-Up</b>	
<b>Technician Name/Initials</b>	

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## SINGLE DUCT TERMINAL

### GENERAL ASSEMBLY & INSTALLATION

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- Unit arrived in good condition, free of damage
- Remove all shipping materials and hardware
- Confirm all Components arrived and installed per manufacturer guidelines
- Accessories and controls properly configured
- Unit is securely mounted, level, and aligned
- Electrical supply matches unit specifications
- Access to unit and service panels is unobstructed
- Overcurrent protection verified (if applicable)
- Service disconnect switch installed and operational (if applicable)
- All components meet local code requirements
- Unit protected from debris and contaminants

### AIRFLOW & DUCTING

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- Duct connections are sealed and leak-free
- Static pressure at primary air inlet meets minimum required levels
- Downstream equipment is installed and calibrated
- Downstream duct pressure supports safe unit operation
- Return air path is clear and unobstructed (if applicable)
- Return air filter is clean and properly installed (if applicable)

### CONTROLS & CALIBRATION

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- Thermostat(s) are functional and accurately calibrated (if applicable)

### WATER COIL (IF APPLICABLE)

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- Coil fins are intact and undamaged
- No signs of leakage in the water system
- Fluid system is fully vented and free of air pockets

### ELECTRIC HEATING (IF APPLICABLE)

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- Coil surfaces are clean and free from debris
- Adequate space is available for door access
- Airflow meets or exceeds 70 cfm per kW

Notes

## Section 1

### RECEIVING INSPECTION

After unpacking the terminal, check it for shipping damage. If any shipping damage is found, report it immediately to the delivering carrier. Store units in a clean, dry location prior to installation.

Also, inspect damper rotation of the unit by rotating the damper by hand to check for free movement, and ensure there is no damage or binding of the damper. If controls are connected to the damper, release the manual clutch (most controls are equipped with this) and rotate the damper by hand. If there is any restriction to the rotation of the damper, contact your Titus rep and inform them of this issue.



Do not use the flow sensor, connecting tubing, or damper shaft linkage as a handle to lift or move assembly. Damage to the flow sensor or controls may result.

### SUPPORTING THE ASSEMBLY

Many basic single duct terminals are light enough to be supported by the duct work itself. Where heavier accessory modules, such as DDC controls, coils, attenuators, or multiple outlets are included, the terminal should be supported directly. Straps screwed directly into the side of the terminal, threaded rod through the optional hanger brackets (see Figure 1), or t for the rectangular duct on the job specifications may be used.

**Important:** If equipped with pneumatic controls, the terminal must be mounted right side up. It must be level within + or -10 degrees of horizontal, both parallel to the air flow and at the right angle of air flow. The control

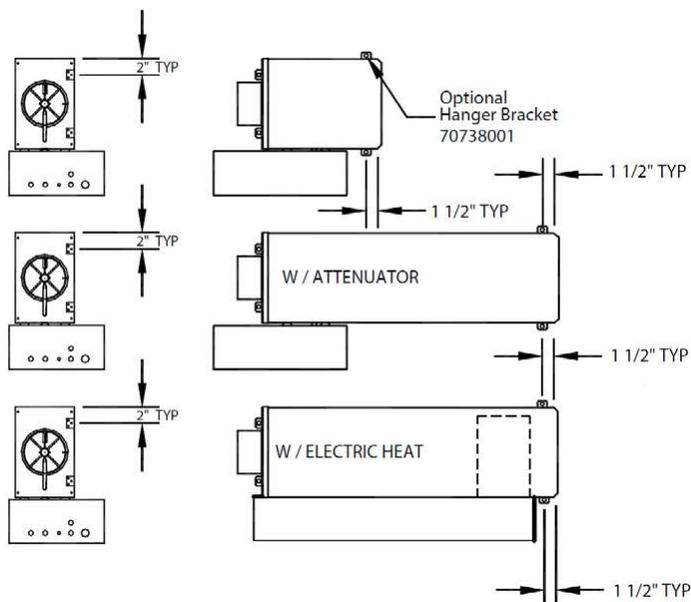


FIGURE 1 - SINGLE DUCT RECOMMENDED HANGER BRACKET LOCATIONS

side of the terminal is labeled with an arrow indicating UP. The first letter of the model number (P) indicates pneumatic controls. Most electronic units (A-analog controls and D-digital controls) can be installed in any orientation. Check with the local TITUS representative for verification.

### INSTALLATION OF SEISMIC MODELS

Terminal units that are used in buildings subject to seismic activity have been certified to be installed as outlined below. This will ensure the unit's structural integrity and functionality. Seismic installation makes use of threaded rods, cables for lateral bracing, and struts for added support. These and other installation parts are supplied by others.

**Install the seismic terminal unit as shown in Figure 2, as described in these details:**

- Suspend the unit with four 1/2" ASTM-A307 rods, with HRSA (VMC) Spring and Elastomeric Angularity Hangers.
- Use four SB-250 (VMC) 1/4" Seismic Cable Kits for lateral bracing and SRBC-1 (VMC) Rod Stiffening Clamps (three per rod).
  - Attach the SB-250's to structure using 5/8" hardware
  - Fasten the SRBC-1's to L1x1x1/4 ASTM-A36 angle
- Each rod should be double-nutted to 1-5/8" 12 ga strut fastened to the bottom of the unit with #12 screws at min 6" O.C. – and double-nutted to 1-5/8" 12 ga strut fastened to the top with the factory-mounted 2"x2"x10 ga A36 angle bracket attached to the side-top-corner of the unit with six #12 screws.
  - Use shims to fill the gap between the top bracket and the strut
  - Place brackets on common side for rectangular attachment pattern

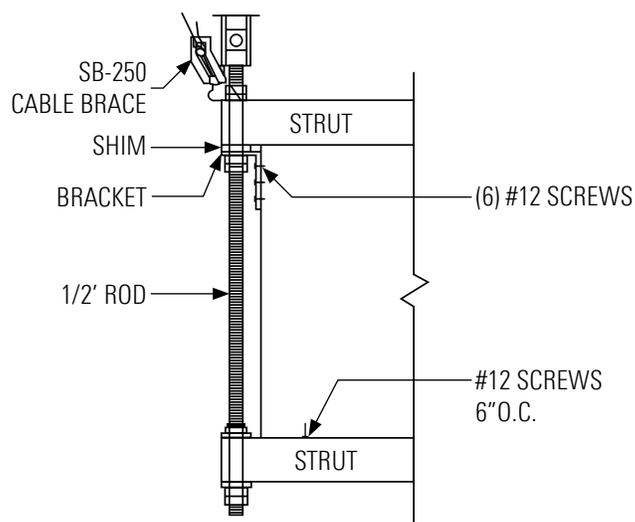


FIGURE 2

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## SINGLE DUCT TERMINAL

### DUCT CONNECTIONS

Slip each inlet duct over the inlet collar of the terminal. Fasten and seal the connection by the method prescribed by the job specification.

The diameter of the inlet duct "D" in inches must be equal to the listed size of the terminal; e.g. a duct that actually measures 8 inches must be fitted to a size 8 terminal. The inlet collar of the terminal is made 1/8 inch smaller than listed size in order to fit inside the duct (see Figure 1).



Do not insert duct work inside the inlet collar of the assembly. Inlet duct should be installed in accordance with SMACNA guidelines.

The outlet end of the terminal is designed for use with slip and drive duct connections. A rectangular duct the size of the terminal outlet should be attached.

Inspect the Aerocross inlet flow sensor for shipping damage, and ensure that the high (red) and low (green) tubes are attached. Provide at least 1½ times the inlet duct diameter of straight duct for optimum control accuracy. For more information on our Aerocross, see the Aerocross Flow Sensor Application Guide.

## Section 1 - General Information

### FIELD WIRING

All field wiring must comply with the local codes and with the National Electrical Code (ANSI/NFPA 70-1981). Electrical, control and piping diagrams are shown on the exterior labeling or on the diagram on the inside of control enclosure cover. All electric heaters if provided by TITUS are balanced by kW per stage. The installing electrician should rotate these heater stages by phase in order to help balance the building electric load.

### CONTROL START-UP, OPERATION

Detailed information regarding power, accessory and communications connections, start-up and operating procedures for the controls provided by TITUS are available from your local TITUS representative. For specific information on controls by other manufacturers, contact that manufacturer's local branch or dealer.

**Important:** Units with digital controllers may incorporate specific communication addresses based on Building Management Systems Architecture, and original engineering drawings. Installing the terminal in a different location than noted on unit label may result in excessive start-up labor.

### CALIBRATION INSTRUCTIONS

For Pneumatic Controls, see PNEU-IOM: Operations Manual for Pneumatic Controls.

For Analog Controls: Titus TA1, see ANA-IOM: Analog Controller Calibration.

For Digital Controls:  
See the control manufacturer's manual for replacement

### TABLE1 - REPLACEMENT PARTS

Description	Part Number
<b>Primary Damper Assembly</b>	
Size 4-5-6"	31171301
Size 7"	31171302
Size 8"	31171303
Size 9"	31171304
Size 10"	31171305
Size 12"	31171306
Size 14"	31171307
Size 16"	31171308
<b>Damper Shaft Extension</b>	
Short Stub all sizes	70300301
Long Ext. Sz. 4-6, 14, 16	70300302

Long Ext. Sz. 7-12	70300303
Shaft Bearing - All	70324901
<b>Control Tube</b>	
Red Stripe 1/4" O.D.	61510035
Green Stripe 1/4" O.D.	61510234
Red Stripe 3/8" O.D.	61510279
Green Stripe 3/8" O.D.	61510280
Yellow Stripe 1/4" O.D.	61510260
White Stripe 1/4" O.D.	61510261
Blue Stripe 1/4" O.D.	61510262
<b>Tees for sensor taps</b>	
Plastic 1/4"	42150011
Plastic 3/8"	42150020
<b>Plugs for tees</b>	
1/4"	42160081
3/8"	10015601
<b>AeroCross™ Multipoint Velocity Sensors</b>	
Size 4"	3151520001
Size 5"	3151520001
Size 6"	3151520002
Size 7"	3151520003
Size 8"	3151520004
Size 9"	3151520005
Size 10"	3151520006
Size 12"	3151520007
Size 14"	3151520008
Size 16"	3151520009
Size 24" x 16"	3151520009

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## SINGLE DUCT TERMINAL

### Limited Warranty

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Unless otherwise expressly stated in TITUS's published specifications for the Goods, TITUS warrants that Goods are free from defects in material and workmanship, except for services which are warranted to be performed in a competent and diligent manner in accordance with any mutually agreed specifications. The foregoing warranty shall apply for eighteen (18) months from the date of shipment from TITUS's facility, except for services for which the warranty shall apply for ninety (90) days from the date of performance (the "Warranty Period"). Provided Buyer informs TITUS in writing of any breach of warranty prior to the expiration of the applicable Warranty Period, TITUS shall, as its sole obligation and Buyer's sole and exclusive remedy for any breach of this warranty, repair or replace/re-perform the Goods which gave rise to the breach or, at TITUS' option, refund the amounts paid by Buyer for the Goods which gave rise to the breach. Any repair, replacement or re-performance by TITUS hereunder shall not extend the applicable Warranty Period. The parties shall mutually agree on the specifications of any test to determine the presence of a defect. Unless otherwise agreed upon by TITUS in writing, Buyer shall bear the costs of access,

de-installation, re-installation and transportation of Goods to TITUS and back to Buyer. These warranties and remedies are conditioned upon (a) the proper storage, installation, operation, and maintenance of the Goods and conformance with the proper operation instruction manuals provided by TITUS or its suppliers or subcontractors, (b) Buyer keeping proper records of operation and maintenance during the applicable Warranty Period and providing TITUS access to those records, and (c) modification or repair of the Goods only as authorized by TITUS. TITUS does not warrant the Goods or any repaired or replacement parts against normal wear and tear or damage caused by misuse, accident, or use against the instructions of TITUS. Any modification or repair of any of the Goods not authorized by TITUS shall render the warranty null and void. EXCEPT AS EXPRESSLY SET FORTH HEREIN, TITUS MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE WHICH ARE HEREBY DISCLAIMED TO THE EXTENT PERMITTED BY APPLICABLE LAW.

## Notes

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