

Installation, Operation and Maintenance Manual

Please read and save these instructions for future reference. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with these instructions will result in voiding of the product warranty and may result in personal injury and/or property damage.



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General - Safety Information

Only qualified personnel should install this unit. Personnel should have a clear understanding of these instructions and should be aware of general safety precautions. Improper installation can result in electric shock, possible injury due to coming in contact with moving parts, as well as other potential hazards. If more information is needed, contact a licensed professional engineer before moving forward.

- 1. Follow all local electrical and safety codes, as well as the National Electrical Code (NEC), the National Fire Protection Association (NFPA), and the Canadian Electrical Code (CEC), where applicable.
- 2. Unit must be securely and adequately grounded.
- 3. Verify that the power source is compatible with the equipment.
- 4. Electrical equipment should be transported, stored, installed, and operated only in the environment for which it is designed.

DANGER

Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

WARNING

Always disconnect power before working on or near a unit. Use appropriate lockout tagout procedures to prevent accidental power up.

NOTICE: This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

Receiving Inspection and Hanging/Installation Requirements

Prior to removing the shipping materials, visually inspect the packing materials. There should be a black plastic strip wrapped in the clear plastic stretch wrap. If this black plastic strip is missing, the shipment may have been repacked by the shipper and you should make a note of this on the shipping documents and inform the delivering carrier. If any damage or other concerns are present, make a note of this on the shipping documents and inform the delivering carrier.

After unpacking the RA Retrofit Air Terminals, check for shipping damage. If any shipping damage is found, report it immediately to the delivering carrier.

Always store the product in a clean dry location prior to installation.

Units with controls are not recommended for use in ambient temperatures greater than 95°F. For protection of controls, do not store in temperatures above 135°F.

The unit maximum operating static pressure is 3.0 in. wg.

General - Model Number Code

The model number code provides basic identification of the unit. Example: XG-RA598F



Installation

CAUTION: HAZARD OF EQUIPMENT DAMAGE

Do not use the flow sensor, connecting tubing or damper shaft as a lift point. Damage to the components may result.

NOTICE: Unit is not recommended for installation above 2,000 m.

NOTICE: The Retrofit Terminal Units must be installed such that the bottom of the unit is at a height of 2.5 m or greater.

Round Retrofit Terminal Units are not designed nor suitable for outdoor use.

In advance of start-up, verify all electrical connections are tight and the correct voltage is supplied to the Round Retrofit Terminal Unit per the rated voltage listed on the unit label. If factory-supplied controls are present, review all wiring diagrams to ensure a complete working knowledge.

IMPORTANT

If equipped with pneumatic controls, the orientation of the RA Retrofit Air Terminal Unit is critical. The pneumatic controls must be mounted right side up. The Round Retrofit Terminal must be level within + or -10degrees of horizontal, both parallel to the airflow and at right angle of airflow. The control side of the Round Retrofit Terminal is labeled with an arrow indicating up. Unless otherwise noted, most electric, analog electronic and digital controls are not position sensitive and may be installed in any orientation.

RA Retrofit Assembly valves are intended for use as replacements for mechanical constant volume regulators in circa 1960-1970 single duct and dual duct air terminals.

RA valves are custom designed for each of several manufacturers' air terminals, i.e. Titus, Tuttle and Bailey, Anemostat, Buensod, Carnes, Krueger, Barber Colman, Connor and Trane.

For air terminals refer to the submittal sheets for arrangements of replacement RA air valves. All listed manufacturers of air terminals have access doors or panels near the mechanical regulators. Some of these terminals require multiple regulators. In such cases multiple RA valve assemblies are used to retrofit the existing mechanical regulators. For all manufacturers the following procedure must be followed while removing and reinstalling the new RA valves.

- 1. After opening the access to the interior of these old air terminals, it is best to use a small vacuum to remove years of dust and dirt that has collected on the old regulator.
- 2. Remove existing mechanical regulator(s) and vacuum any remaining dust and dirt. Clean old gasket material from seat where regulator has been secured to ensure a good seal for the new RA valve plate.
- 3. Secure new RA valve and plate to existing seat where old regulator was secured. Reuse existing studs, nuts or cap screws that were used to attach old mechanical regulator to seat.
- 4. Drill or punch holes inside of old casing for passage of the velocity pressure tubes (2). Drill another hole for pneumatic actuator(s) or wire if electric actuator is used on RA air valve. Tubing grommets require a 3/8" hole. Wire grommet requires one 9/16" hole.
- 5. If multiple valves and actuators are used header low pickup lines together, high pickup lines together, branch air lines or wires to actuators together, and extend to outside of existing casing.
- 6. Install control panel on side of existing casing and connect piping as per control diagram. After ensuring all lines are properly connected, close opening with access panel first removed.
- 7. Connect main air and branch line tubes to controller per control diagram. If additional relays are used in control sequence, be sure they are set and piped or wired correctly.

NOTICE: After retrofitting to the existing air terminal, central fan system modifications should be considered.

NOTICE: On larger air terminals, multiple regulators were used. Blank-off plates are used to cover excess holes where mechanical regulators were removed but spaces were not required for new RA valves due to higher capacity of each RA unit. A simple blank-off plate may be field fabricated or ordered from the factory.

NOTICE: On Tuttle and Bailey terminals, a central metal baffle runs horizontally across the air terminal. It must be notched to make room for the new RA air valve.

FIELD ELECTRICAL WIRING

DANGER

High voltage electrical supply is needed for this equipment. The control cabinet contains live electrical parts. Contacting these parts with power applied may cause serious injury or even death. This work should only be performed by a qualified electrician.

All field wiring must comply with local building codes and NEC. (ANSI/NFPA 70).

When applicable, electrical control and piping diagrams are attached to the inside of the control enclosure cover of the RA Retrofit Air Terminal.

Use copper only conductors with insulation rated 75°C.

The RA Retrofit Air Terminal must be properly grounded per NEC 424-14 and 250.

Always check product label for voltage and current data to determine the proper wire size and over current protection.

The control panel cover must be closed or in place before applying electric power to the Round Retrofit Air Terminal.

These recommendations are not meant to preclude NEC requirements or other applicable local building codes and are the sole responsibility of the installing contractor.

NOTICE: If the unit is not ordered with an internal disconnecting device then a disconnection device that shall disconnect all phases must be provided by the customer and incorporated in the fixed wiring.

CONTROLS

NOTICE: RA Retrofit Air Terminals with digital controls, if factory programmed, incorporate specific communication addresses. Installing the RA Retrofit Air Terminal in a different location than noted on the RA Retrofit Air Terminal label and building plans may result in excessive start-up labor and is the sole responsibility of the contractor.

For information on controls provided by other manufacturers and installed on the Air Terminals, contact the local branch or dealer.

INLET FLOW SENSOR

RA Retrofit Air Terminals are shipped with factoryinstalled (where applicable) pressure differential inlet flow sensors in the primary inlet. See **figure 1** for calibration curve and K factors.

MODEL	INLET SIZE	K FACTOR
XG-TH, XG-FCI, XG-FCQ XG-FVI, XG-DD XG-DH, XG-BP	04 Rnd	300
	05 Rnd	375
	06 Rnd	540
	07 Rnd	760
	08 Rnd	990
	09 Rnd	1250
XG-TI (/ to 10)	10 Rnd	1640
XG-FCI C2 (4 to 8) XG-FVL C2 (4 to 8)	12 Rnd	2350
	14 Rnd	3250
	16 Rnd	4100
XG-TL (12)	12 Flat Oval	2270
XG- TL (14) & XG-FVL C6	14 Flat Oval	2850
XG- TL (16)	16 Flat Oval	3550
XG-FVL C4	14x8 Rect	2450
XG-FCI C4	16x8 Rect	2770
XG-FCI, XG-FCQ, & XG-FVI C7	18x16 Rect	6200
XG-TH 20	20x16 Rect	6430
XG-TH 24	24x16 Rect	7270

Figure 1 - Multi-Quadrant Averaging Flow Sensor

Note: K-factor is the calibration flow constant at 1 in. wg delta P



How to tell which sensor you have: Multi-quadrant - two additional metal balancing taps directly out of the inlet tube.



Cfm = $\sqrt{\bigtriangleup p} \times K$ Factor



Center Averaging Flow Sensor



Note: K-factor is the calibration flow constant at 1 in. wg delta P



How to tell which sensor you have:

Center Averaging - only two tubes coming out of the inlet tube with a T in the middle of the tubing.







Our Commitment

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.

Product warranties can be found online at Greenheck.com, either on the specific product page or in the literature section of the website at Greenheck.com/Resources/Library/Literature.



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