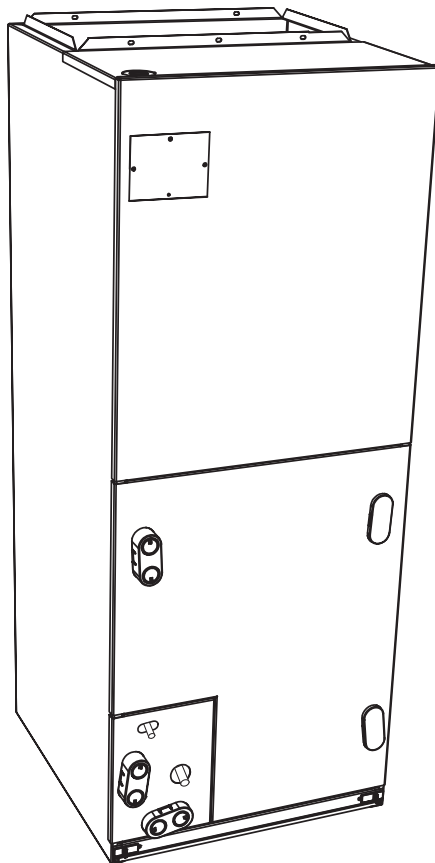




Product Data

40TCQ024-048 Vertical Ducted Fan Coil Unit for Variable Refrigerant Flow (VRF) Heat Pump or Heat Recovery System

24,000 to 48,000 Btuh



40TCQ VERTICAL DUCTED FAN COIL UNIT

The 40TCQ vertical ducted fan coil unit is a premium air handler that leverages the proven technology of Carrier fan coils with R-410A refrigerant. The 40TCQ unit grants an operational advantage when the ECM (electronically commutated motor) is combined with a Toshiba Carrier VRF (variable refrigerant flow) system of 72,000 to 240,000 Btuh nominal cooling and heating capacity.

The 40TCQ fan coil units offer:

- energy efficiency
- R-410A refrigerant
- multi-position installation
- low sound
- precision airflow delivery across a wide range of duct static pressures

Features/Benefits

The 40TCQ vertical ducted fan coil is an environmentally balanced, variable refrigerant flow unit that offers adaptive efficiency with quiet, comfortable operation for superior indoor comfort and control.

With the focus on quiet, efficient, and comfortable operation, the 40TCQ vertical ducted fan coil is a new benchmark for superior indoor comfort and control. For outstanding technology and unmatched comfort, turn to the environmentally balanced and efficient 40TCQ vertical ducted fan coil unit.

Features/Benefits (cont)



Energy efficient operation

Carrier’s command of ECM technology is the basis of the 40TCQ unit advantages. These motors are extremely efficient at all speeds, and enable the 40TCQ unit to operate at the correct speed to deliver precise airflow, ensuring proper performance across a wide range of duct static pressures while maximizing the cooling and heating efficiency of the VRF system. This adaptive efficiency also facilitates a quality installation for today’s knowledgeable VRF system owner. In addition, the ECM guarantees ultra-low power consumption during all operational modes including fan only.

Indoor comfort and control

Flexible operation setup provides the installing technician with alternatives to maximize comfort and efficiency. For true indoor comfort, the owner can achieve command of both temperature and humidity in cooling and heating modes.

Airflow and sound technology

The cabinets of 40TCQ fan coil units are specifically designed to meet current stringent low air leak requirements. When tested at 1.0 inch of static pressure, the cabinet meets the requirement of a leakage rate less than 2%. With high duct static capability, the 40TCQ vertical ducted fan coil also includes a diffuser air discharge section

for high airflow efficiency and quiet, smooth operation.

Ease of installation and service

All units are multi-position, ready for up-flow or horizontal applications. They include provisions for suspension from roof or ceiling joints.

The components are protected within a rugged, pre-painted metal cabinet lined with thick, high-density insulation designed to prevent cabinet sweating. For neat, high-quality installations the unit exterior features sweat refrigerant connections for simple leak-free installation and performance, and multiple electrical entries for both high and low voltage power.

Superior heat transfer technology

Grooved tubing, louvered aluminum fins, and the large face areas of the 40TCQ refrigerant coils provide superior efficiency for high IEER (integrated energy efficiency ratio) and SCHE (simultaneous cooling and heating efficiency) performance. In addition, 40TCQ fan coils feature discreet refined counter-flow refrigerant circuitry.

Condensate control and disposal

The 40TCQ unit is designed to minimize standing water, which means less microbial growth for improved indoor air quality and reduced condensate line

clogging and related condensate leakage.

Condensate fittings are located away from turbulent airflow patterns at the blower entrance for improved condensate control performance. Slab coil units offer an overflow feature that allows condensate to exit the unit without damage to the product under clogged primary and secondary condensate line conditions.

The 40TCQ units are tested for and meet condensate disposal requirements at conditions far more severe than those required by AHRI (Air-Conditioning, Heating and Refrigeration Institute). Primary and secondary drain connections comply with HUD (U.S. Department of Housing and Urban Development) standards.

All pans are constructed of an injection-molded, glass-filled polycarbonate engineered resin material, with brass drain connections. High-density, super thick cabinetry insulation with vapor barrier and pre-painted galvanized sheet metal cabinet also minimize condensate formation.

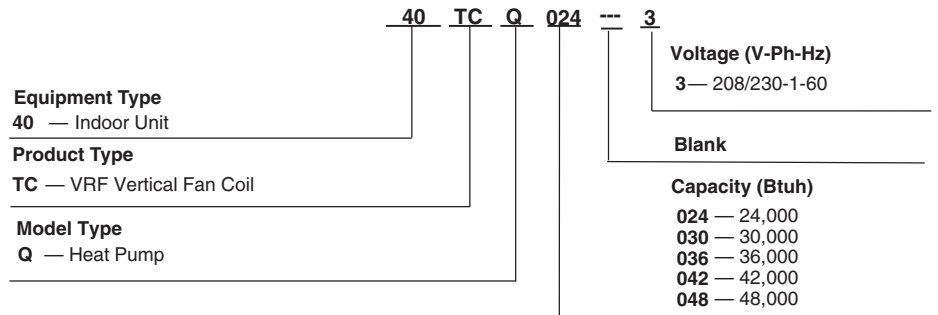
Electrical features

The 40TCQ vertical ducted fan coil units include a 40-va, 208/230-v transformer. A replaceable 5-amp blade-type auto fuse protects against transformer secondary short circuit.

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Model number nomenclature



LEGEND
VRF — Variable Refrigerant Flow



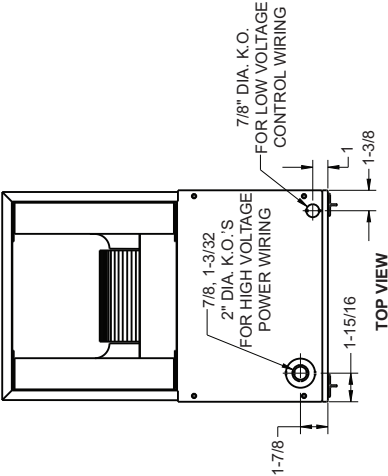
Physical data

40TCQ VERTICAL DUCTED FAN COIL UNITS

UNIT 40TCQ	024	030	036	042	048
CAPACITY (Btuh)	24,000	30,000	36,000	42,000	48,000
COIL					
Refrigerant Type	R-410A				
Refrigerant Modulating Device	Pulse Modulating Valve (PMV)				
Fin Spacing (fins/in.)	14.5				
Configuration	A		Slab		
BLOWER AND MOTOR					
Air Discharge	Vertical, Horizontal Left				
Airflow (CFM)					
Low	350	390	470	550	
Medium	505	630	755	880	
High	630	785	945	1100	
Motor (ECM) (hp)	0.5				
Filter Size (L x W x H, in.)	21 x 16 x 1		21 x 20 x 1		

ECM — Electronically Commutated Motor

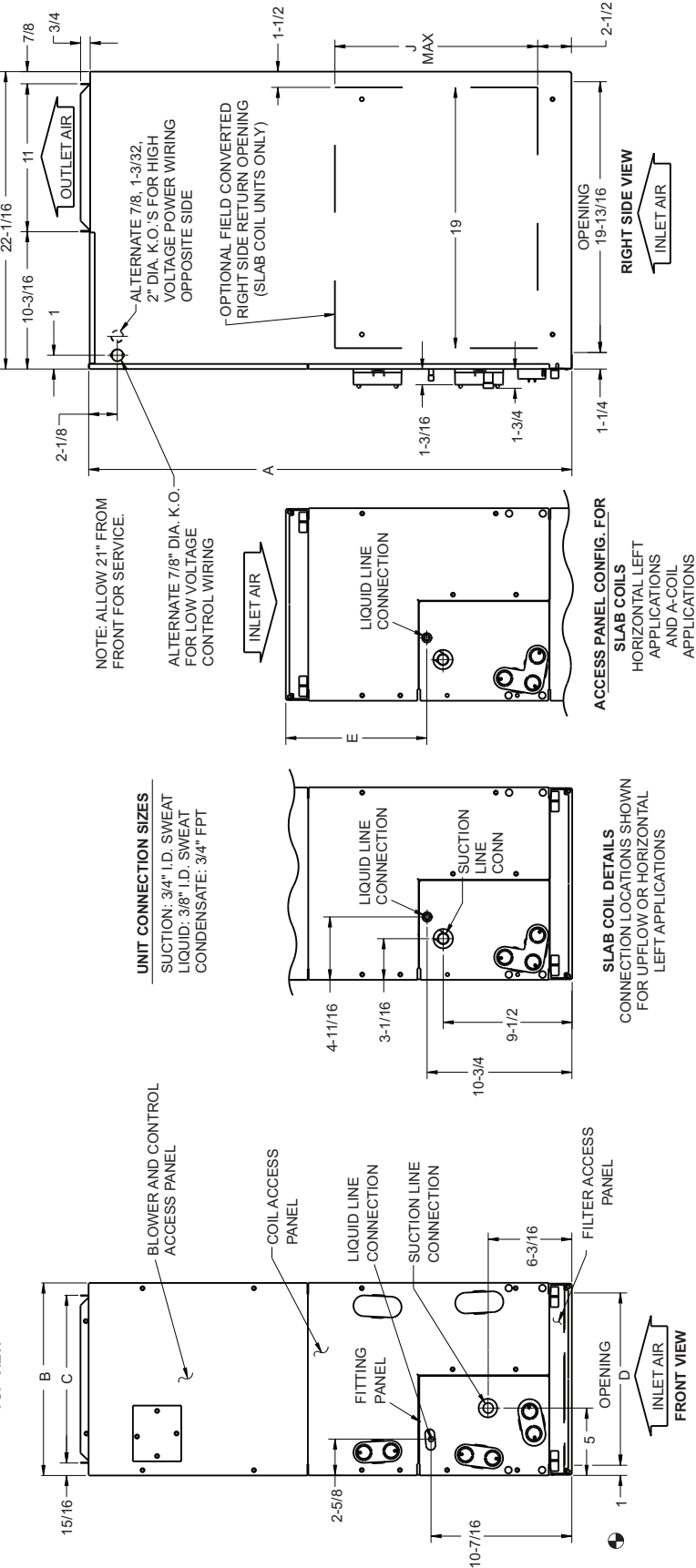
40TCQ VERTICAL DUCTED FAN COIL UNIT



UNIT	ELECTRICAL CHARACTERISTICS	A	B	C	D	E	J	COIL CONFIGURATION SLAB	SHIPPING WT (LBS)
40TCQ024-3	208/230-1-60	42-11/16	17-5/8	15-3/4	15-5/8	10-3/4	—	A	135
40TCQ030-3		42-11/16	17-5/8	15-3/4	15-5/8	10-3/4	—	X	135
40TCQ036-3		53-7/16	21-1/8	19-1/4	19-1/8	19-3/16	19	X	150
40TCQ042-3		53-7/16	21-1/8	19-1/4	19-1/8	19-3/16	19	X	150
40TCQ048-3		53-7/16	21-1/8	19-1/4	19-1/8	19-3/16	19	X	150

X - YES
— - NO

NOTE: ALL DIMENSIONS ARE IN INCHES UNLESS NOTED.



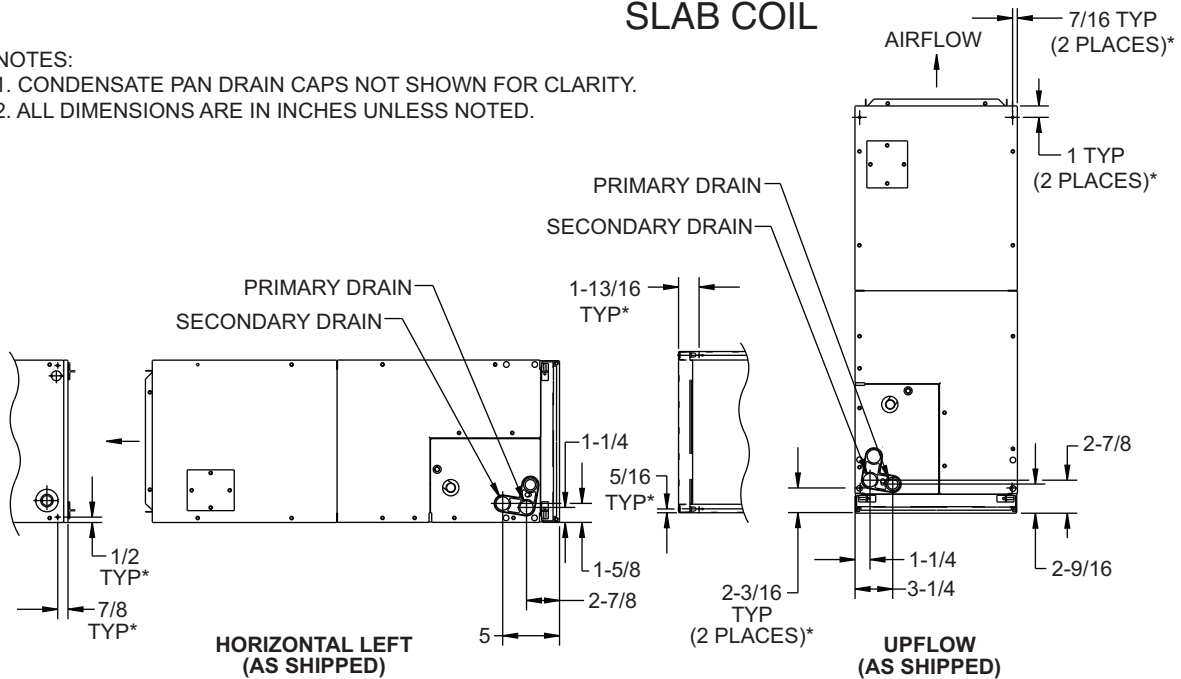
SHOWN WITH "A" COIL DETAILS CONNECTION LOCATIONS FOR UPFLOW OR HORIZONTAL APPLICATIONS

40TCQ COIL CONFIGURATION AND LAYOUT

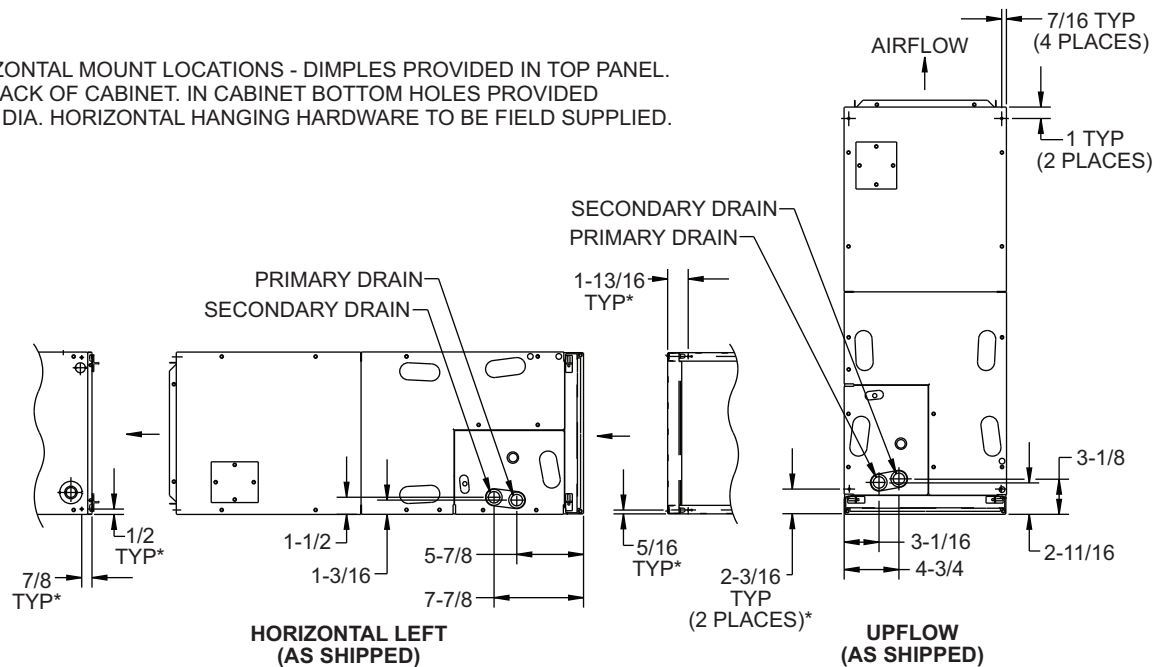
SLAB COIL

NOTES:

1. CONDENSATE PAN DRAIN CAPS NOT SHOWN FOR CLARITY.
2. ALL DIMENSIONS ARE IN INCHES UNLESS NOTED.



* HORIZONTAL MOUNT LOCATIONS - DIMPLES PROVIDED IN TOP PANEL AND BACK OF CABINET. IN CABINET BOTTOM HOLES PROVIDED 0.136" DIA. HORIZONTAL HANGING HARDWARE TO BE FIELD SUPPLIED.



A-COIL

Electrical data



40TCQ ELECTRICAL DATA

UNIT	VOLTAGE (V-Ph-Hz)	MOTOR HP	FLA	MCA	MOCP
40TCQ	208/230-1-60	0.5	4.3	5.4	7.5

LEGEND

FLA — Full Load Amps
MCA — Minimum Circuit Amps (1.25 x FLA)
MOCP — Maximum Overcurrent Protection

Application data

AIRFLOW DELIVERY

40TCQ UNIT SIZE	FAN ONLY (CFM)		
	LOW	MEDIUM	HIGH
024	350	505	630
030	390	630	785
036	470	755	945
042,048	550	880	1100

ESTIMATED SOUND POWER LEVEL (dBA)*

40TCQ UNIT SIZE	CONDITIONS		OCTAVE BAND CENTER FREQUENCY						
	ESP	CFM	63	125	250	500	1000	2000	4000
024 030	0.25	400	63.0	59.0	55.0	52.0	50.0	48.0	44.0
		600	64.7	60.7	56.7	53.7	51.7	49.7	45.7
		800	66.0	62.0	58.0	55.0	53.0	51.0	47.0
		1000	67.0	63.0	59.0	56.0	54.0	52.0	48.0
		1200	67.8	63.8	59.8	56.8	54.8	52.8	48.8
		1400	68.4	64.4	60.4	57.4	55.4	53.4	49.4
036 042 048	0.25	400	63.0	59.0	55.0	52.0	50.0	48.0	44.0
		600	64.7	60.7	56.7	53.7	51.7	49.7	45.7
		800	66.0	62.0	58.0	55.0	53.0	51.0	47.0
		1000	67.0	63.0	59.0	56.0	54.0	52.0	48.0
		1200	67.8	63.8	59.8	56.8	54.8	52.8	48.8
		1400	68.4	64.4	60.4	57.4	55.4	53.4	49.4

LEGEND

ESP — External Static Pressure (in. wg)

*Estimated sound power levels have been derived using the method described in the 1987 ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) System & Appliance Handbook, chapter 52, p. 52.7.

Application data (cont)



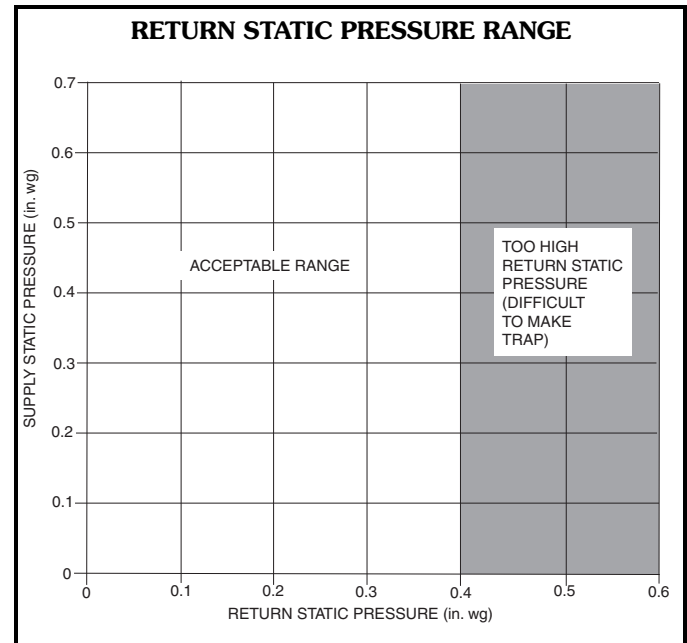
FACTORY-INSTALLED FILTER STATIC PRESSURE DROP (in. wg)

40TCQ UNIT SIZE	CFM					
	400	600	800	1000	1200	1400
024,030	0.020	0.044	0.048	0.072	0.100	—
036,042,048	—	0.020	0.035	0.051	0.070	0.092

Acceptable duct conditions

For satisfactory operation (specifically making dry secondary trap), the 40TCQ fan coils must be installed with duct systems which fall within the acceptable range illustrated in the Return Static Pressure Range figure.

The airflow performance charts for the 40TCQ fan coil units (pages 8 and 9) depict nominal airflow delivery for heating and cooling mode operation versus duct system static pressure drop. Cooling mode operation is shown as solid vertical lines for all 4 system size selections. Heating mode operation for the 4 system size selections are shown as dashed vertical lines. The dotted curved lines are static pressure drop characteristics for several fixed-duct systems. These lines can be used to predict the system static pressure drop at any airflow given the actual drop at one known point.

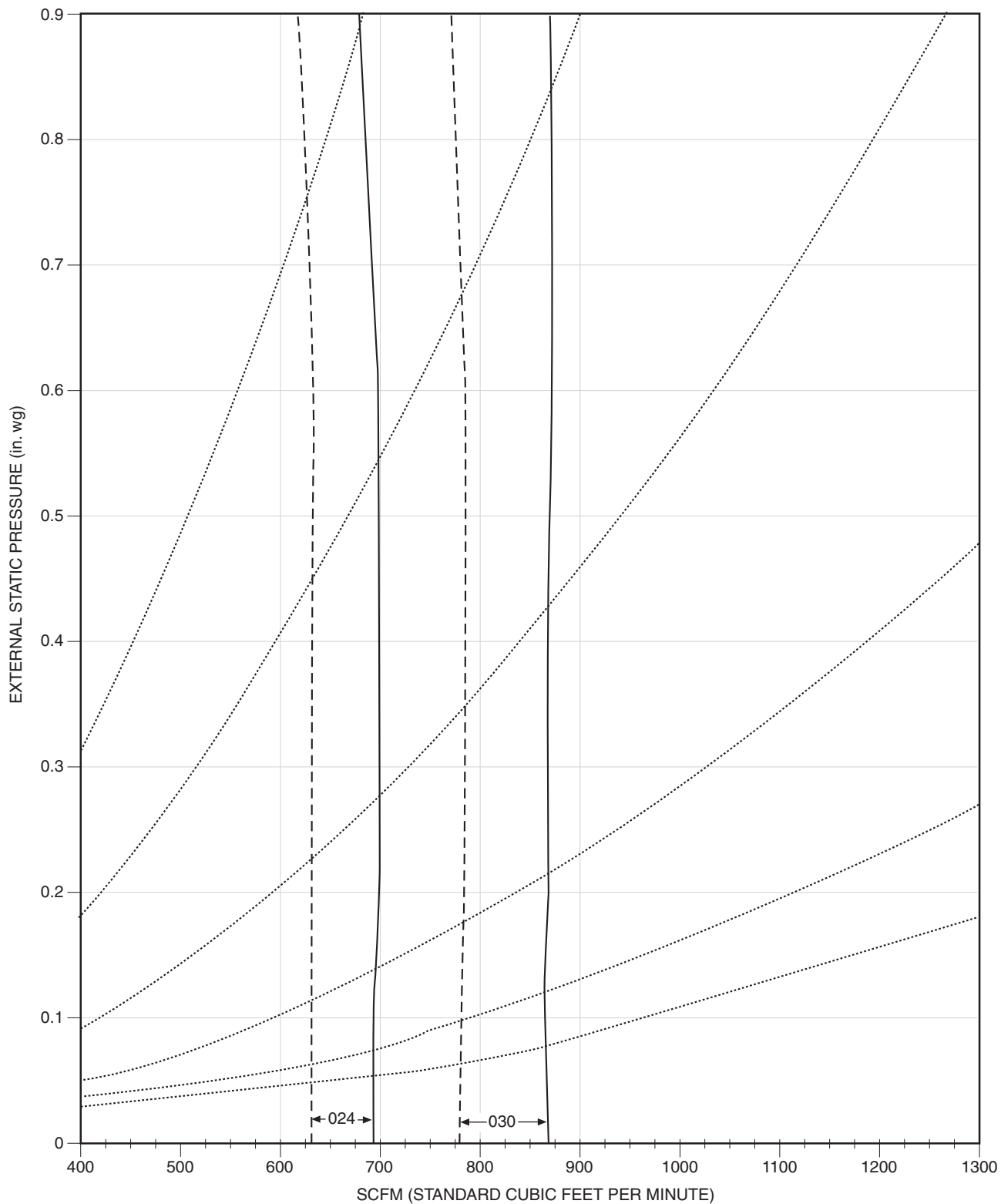


Application data (cont)



AIRFLOW PERFORMANCE CURVES

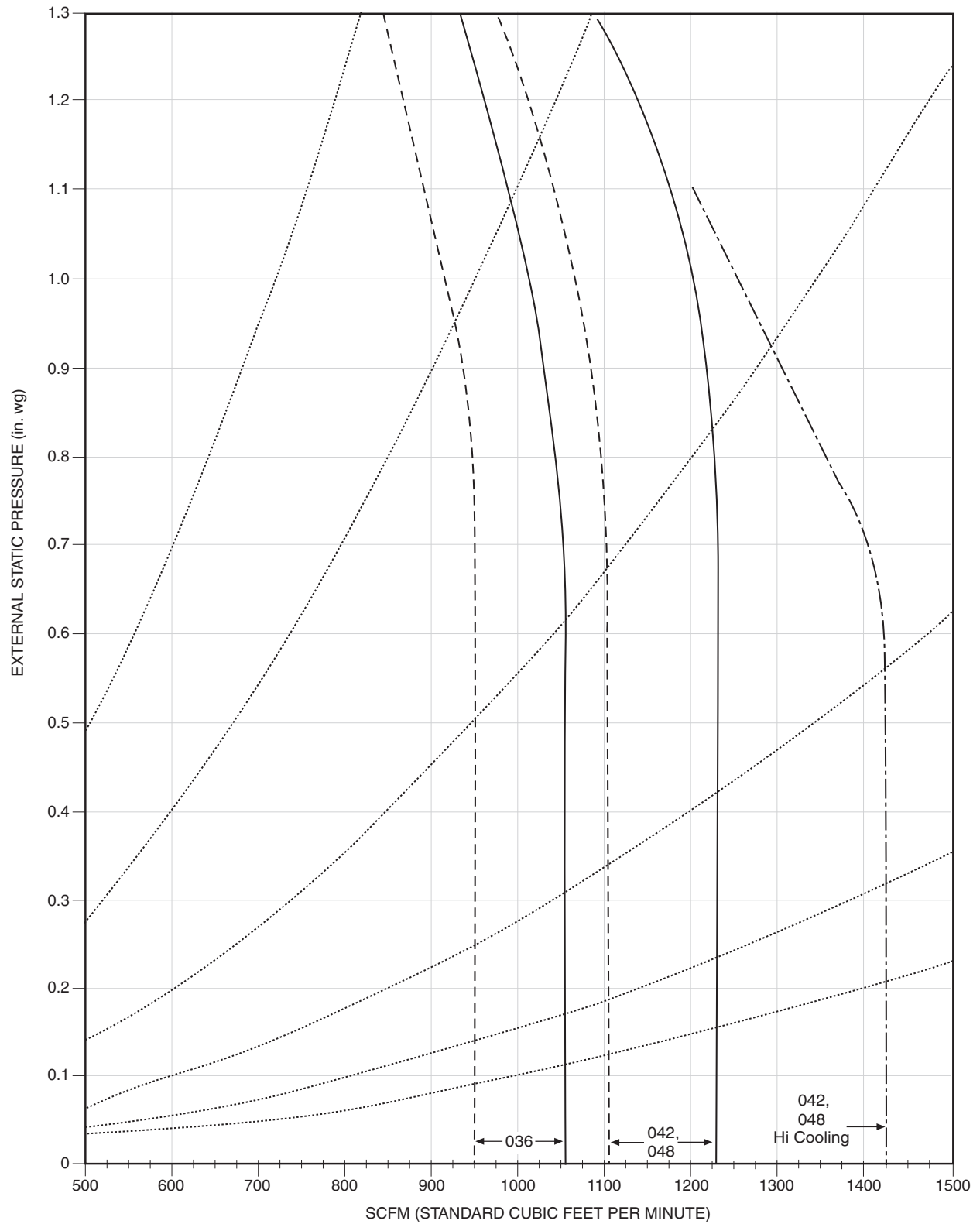
40TCQ024,030



- Nominal cooling and heat pump efficiency airflow for each size selection. Airflow can be adjusted +15% to -10%.
- - - Nominal heat pump comfort airflow for each size selection. Airflow can be adjusted +15% to -10%.
- Fixed duct system. (See Acceptable Duct Conditions section.)

AIRFLOW PERFORMANCE CURVES (cont)

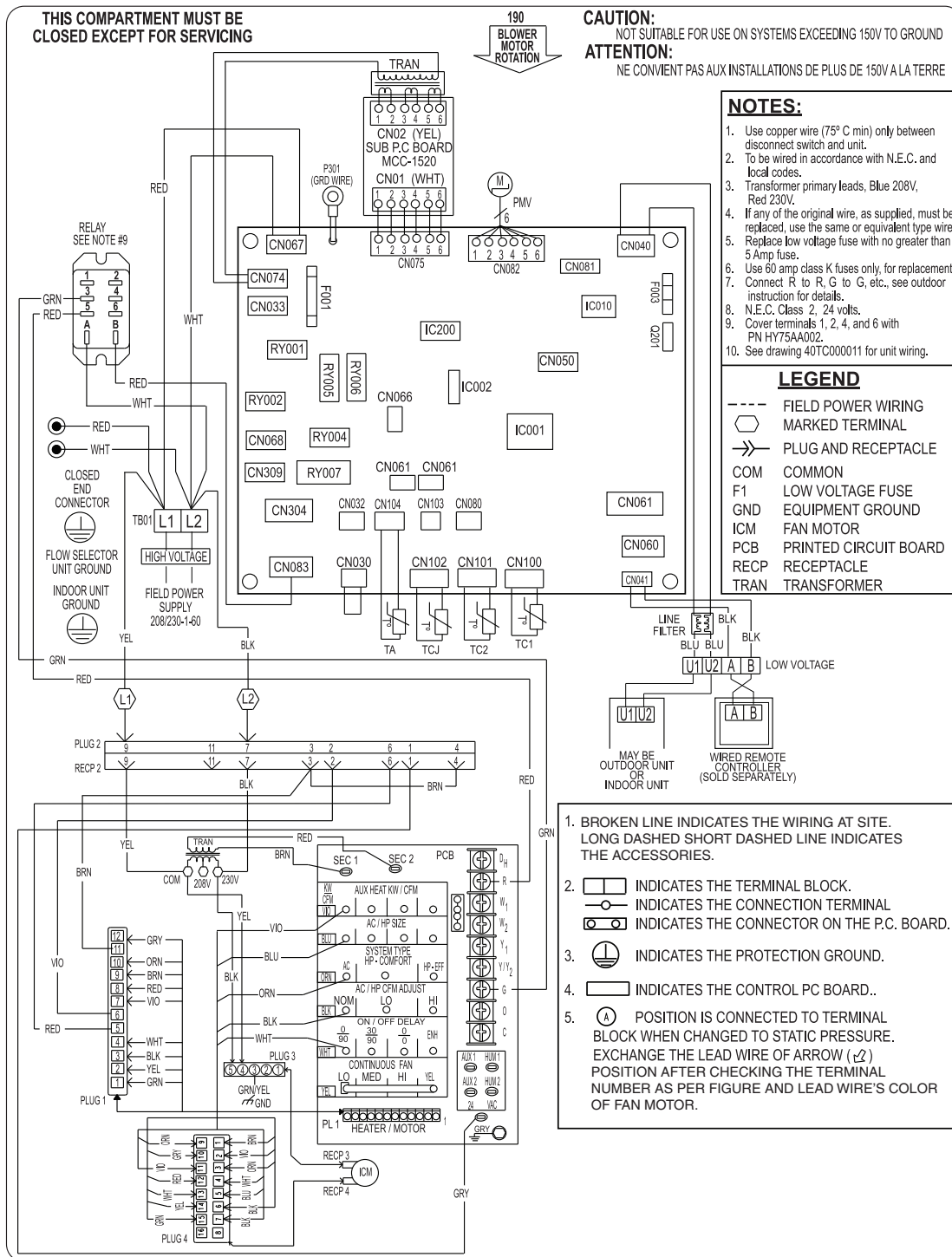
40TCQ0036-048



- Nominal cooling and heat pump efficiency airflow for each size selection. Airflow can be adjusted +15% to -10%.
- - - - - Nominal heat pump comfort airflow for each size selection. Airflow can be adjusted +15% to -10%.
- . - . - Maximum cooling airflow for largest size selection. Adjusted +15% from nominal.
- Fixed duct system. (See Acceptable Duct Conditions section.)

Typical wiring schematic

40TCQ WIRING



Vertical Ducted Fan Coil Unit

Size Range: **24,000 to 48,000 Btuh**

Carrier Model Number: 40TCQ

Part 1 — General

1.01 SYSTEM DESCRIPTION

Indoor, direct-expansion, vertical ducted fan coils are matched with a heat pump or heat recovery VRF (variable refrigerant flow) outdoor unit.

1.02 AGENCY LISTING

Unit shall be ETL listed and certified to UL (Underwriters Laboratories) 1995 4th edition and CSA (Canadian Standards Association) C22.2 standards.

1.03 DELIVERY, STORAGE AND HANDLING

Unit shall be stored and handled per unit manufacturer's recommendations.

1.04 WARRANTY

[For inclusion by Specifying Engineer]

Part 2 — Products

2.01 EQUIPMENT

A. General:

Indoor, direct-expansion vertical ducted fan coils. Unit shall be complete with a coil, fan, ECM (electronically commutated motor), PMV (pulse modulating valve), piping connections, electrical controls, microprocessor control system, integral temperature sensing, and hanging brackets.

B. Unit Cabinet:

Cabinet shall be constructed of pre-painted 20-gage galvanized steel. The unit shall be capable of being configured for either vertical or horizontal flow.

C. Fans:

The fan shall be of the multi-blade type with its performance designed to match the coil performance. The fan shall be statically and dynamically balanced to ensure low noise and vibration and capable of up to 0.8 in. wg external static pressure.

D. Coil:

Coil shall be aluminum tubes, fins, and tube sheets. Fins shall be bonded to the tubes by mechanical expansion. Sizes 024 and 030 have A coils. Sizes 036-048 have slab coils. A drain pan shall be constructed using injection molded glass-filled polycarbonate engineered resin material, with brass drain connection.

E. Motor:

Unit shall be provided with electronically commutated motor (ECM) which operates efficiently at all speeds with low power consumption compared to standard motors, maximizing cooling and heating efficiencies.

F. Controls:

The system shall be microprocessor-controlled to maintain precise room temperature and minimum power consumption. The controls system shall

employ a generic algorithm for temperature control, and shall have an accuracy of 0.9° F.

Any of the following user interface accessories shall be compatible with the unit:

1. Local Controller:

A wired controller can be used to control the system. The wired remote controller shall communicate over two-core shielded wire up to 1640 ft. It shall be capable of controlling groups of up to 8 indoor units. It shall be able to operate as a primary or secondary controller when two remote controllers are connected to a single indoor unit or group. The system shall be able to be configured so that the return air can be sensed at the unit, at the remote controller, or through a remote sensor. The local controller shall minimally be able to control On-OFF, set point, mode, and be able to display system generated error codes.

2. Central Controller:

Central controller shall communicate over two-core shielded wire up to 6562 ft and use existing Indoor-Outdoor communication protocol to communicate. A single central controller shall be capable of controlling up to 128 indoor units individually. It shall be able to create 4 zones without any extra wiring. The central controller shall be equipped with digital input points for Force-OFF. It shall provide operation monitoring, and generate a digital output signal in response to an alarm. It shall be capable of restricting Local Remote Control operation. It shall be able to facilitate indoor operation without local remote controller(s).

3. Advanced Central Controller:

The advanced central controller shall be capable of controlling up to 128 indoor units individually. It shall also be able to create up to 128 zones without any extra wiring. The controller shall be equipped with digital input points for Force-OFF and External ON-OFF. It shall provide operation monitoring, and generate a digital output signal in response to an alarm. It shall be able to restrict Local Remote Control operation and allow Set Back temperature. It shall provide a web interface for remote monitoring, control, and scheduling. It shall be able to create up to 10 programs per day. It shall facilitate indoor operation without local remote controller(s). It shall be capable of monitoring energy consumption for each tenant and generate monthly billing reports.

4. Building Management Systems:

a. The system shall be able to be controlled by BACnet* or LonWorks† either directly or through an external gateway.

*Sponsored by ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers).
†Registered trademark of Echelon Corporation.

Guide specifications (cont)



- b. BACnet and LonWorks shall be able to control: On / OFF, Operation Mode, Fan Speed, Louver, Set Temperature, Permit/Prohibit Local Operation.
 - c. BACnet and LonWorks shall be able to monitor: On/OFF, Operation Mode, Fan Speed, Louver, Set Temperature, Permit/Prohibit Local Operation, Room Temperature, Error Status, Error Code.
5. The unit shall have the following functions as a minimum:
- a. Selectable automatic restart. After power failure the system will restart at the same operating conditions as before the failure.
 - b. Temperature-sensing controls shall sense return air temperature at the unit, at the remote control, or at a remote sensor.
 - c. Indoor coil freeze protection in both cooling and heating (reversing valve failure) modes.
 - d. Dehumidification mode shall provide increased latent removal through total system modulation.
 - e. Fan-only operation to provide room air circulation when no cooling is required.
 - f. Indoor coil high temperature protection shall be provided to detect excessive indoor discharge temperature in heating.
 - g. Cold blow prevention in heating.
 - h. Adjustable compensation for air stratification in heating.
- G. Filters:
Unit shall be provided with 1-in. cleanable filters.
- H. Electrical Requirements:
Indoor units are 208/230-1-60 and are powered independently. Units include a 40-v, 208/230-v input, 24-v output step-down transformer.

