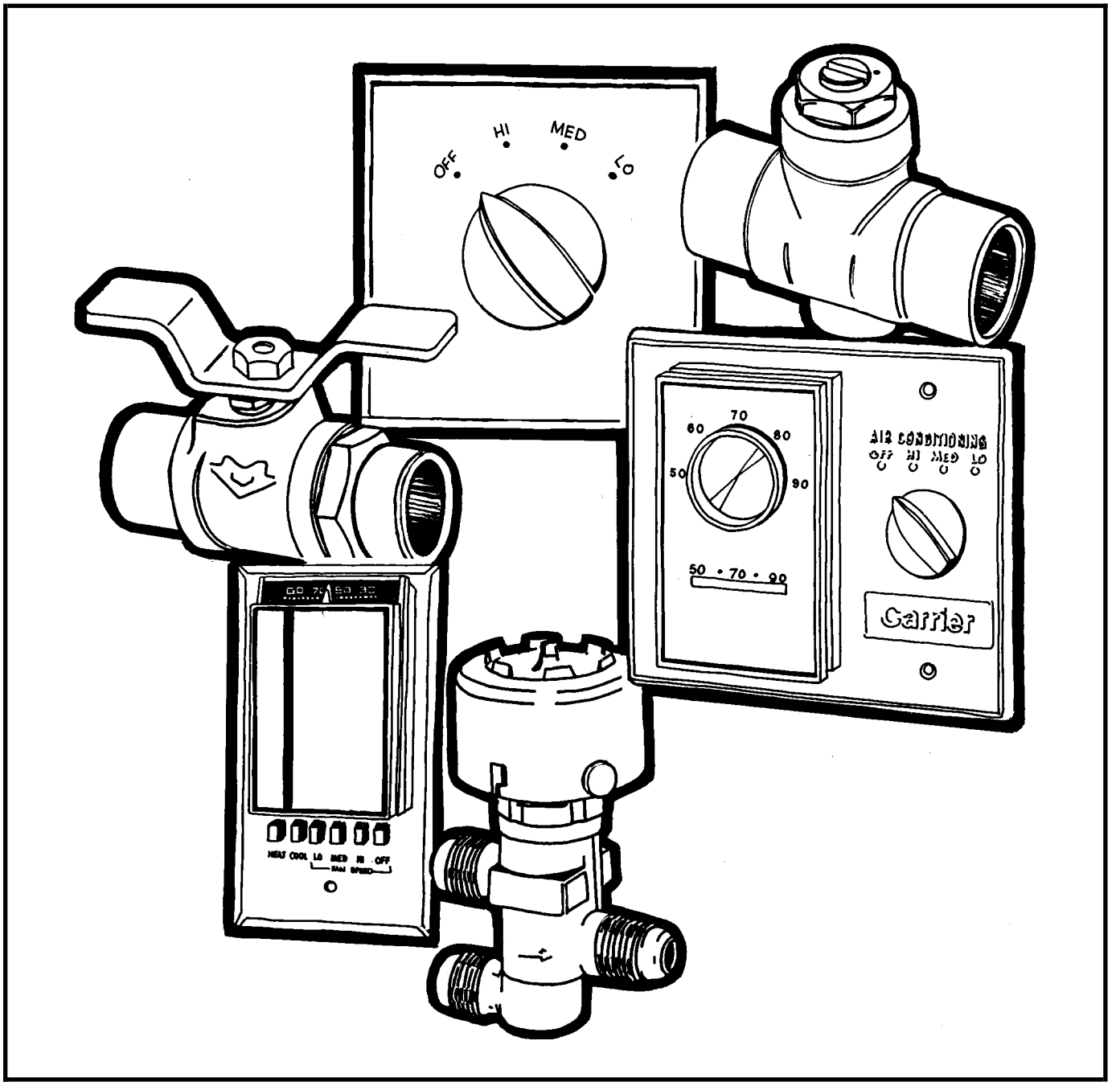
42 Series
Fan Coil Units

Application Data

Control Selection Guide
for Fan Coil Air Conditioners



CONTENTS

CONTROL SELECTION GUIDE

Use this guide to make sure that all necessary components are provided for and that the components are compatible with the required control system.

NOTE: When thermostatic fan control is selected or when unit outside air dampers are used, unit-mounted thermostats are not recommended as their use will result in poor room temperature sensing.

SYSTEM		DESCRIPTION	THERMOSTAT	CHANGEOVER ON SUPPLY PIPE	VALVE	FAN SWITCH (SW)	NOTES
2-PIPE HEATING-COOLING*	**Fan Control (2-Pipe)**	Fan manually cycled	None	None	None	Standard 3-Speed SW	Not recommended for high humidity application
		Thermostat cycles fan on-off from speed set with fan switch.	Wall mounted includes heat-cool switch.	None	None	Thermostat has integral 3-Speed SW	
		Thermostat cycles fan on-off from fan speed set with switch. Mode automatically switched by changeover sensing water temp.	Wall mounted. Heating/cooling Thermostat	Yes	None	Standard 3-Speed SW	Unit mounted thermostats provide very poor room temperature control
		Thermostat cycles fan from high to low on cooling and low to off on heating.	Wall or unit mounted	Yes	None	No Standard 3-Speed Switch, ON-OFF toggle SW only	Best fan cycle control for high humidity applications
	Two-position electric valves (2-pipe)	Thermostat cycles valve open or closed.	Wall mounted includes heat-cool switch.	None	Motorized (N.C.) 3-way or 2-way, no bypass required.	Thermostat has integral 3-Speed SW	Valve packages with belled end(s) for field soldering to coil.
		Thermostat cycles valve open or closed. Mode automatically switched by changeover sensing water temp.	Wall or unit mounted. Heating/cooling Thermostat	Yes	Motorized (N.C.) 3-way or 2-way	Standard 3-Speed SW. Others have thermostats with integral 3-Speed SW	
	Pneumatic modulating valves (2-pipe)	Thermostat modulates pneumatic control valve.	By others.	By others.	2- and 3-way furnished by others. Can be equipped with factory assembled valve package.	Standard 3-Speed SW	Factory assembled in valve package w/flare nuts. Valve packages with belled end(s) for field soldering to coil.
ELECTRIC HEAT	**Two-position electric valve with Auxiliary Electric Heat (2-pipe)**	Thermostat cycles valve open or closed. 2° F after valve closes, thermostat activates electric heater. Heater can't turn on if hot water is in coil.	Wall or unit mounted. Sequenced heating and cooling.	Yes. Two Required.	Motorized 3-way or 2-way	Standard 3-Speed SW Others have thermostats with integral 3-Speed SW	Valve packages with belled end(s) for field soldering to coil.
		Thermostat cycles valve open or closed. Manual changeover switch changes thermostat to heat to activate electric heater.	Wall mounted includes heat-cool switch.	None	Motorized 3-way or 2-way, no bypass required	Thermostat has integral 3-Speed SW	Valve packages with belled end(s) for field soldering to coil.
	Two-position electric valve with total electric heat (2-pipe)	Thermostat cycles valve open or closed. Manual changeover switch changes thermostat to heat to activate electric heater.	Wall mounted includes heat-cool switch.	None	Motorized (N.C.) 3-way or 2-way, no bypass required	Thermostat has integral 3-Speed SW	Valve packages with belled end(s) for field soldering to coil.
		Thermostat cycles valve open or closed. 2° F after valve closes, thermostat activates electric heater.	Wall or unit mounted. Sequenced heating and cooling	None	Motorized (N.C.) 3-way or 2-way, no bypass required	Standard 3-Speed SW	
	Pneumatic modulating valves (2-pipe)	Thermostat modulates pneumatic control valve. After changeover, thermostat activates electric heater.	By others.	By others.	2- and 3-way furnished by others. Can be equipped with factory assembled valve package.	Standard 3-Speed SW	Factory assembled in valve package w/flare nuts. Valve packages with belled end(s) for field soldering to coil.
4-PIPE	**Two-position electric valves (4-pipe)**	Thermostat cycles cooling and heating valves open or closed.	Wall mounted includes subbase with heat-cool switch.	None	Motorized (N.C.) 3-way or 2-way (requires 2 valves)	Thermostat has integral 3-Speed SW	Valve packages with belled end(s) for field soldering to coil.
		Thermostat cycles cooling valve open or closed. 2° F after valve closes, thermostat cycles heating valve open or closed.	Wall or unit mounted. Sequenced heating and cooling.	None	Motorized (N.C.) 3-way or 2-way (requires 2 valves)	Standard 3-Speed SW. Others have thermostats with integral 3-Speed SW	
	Pneumatic modulating valves (4-pipe)	Thermostat modulates cooling valve. After changeover, thermostat modulates heating valve.	By others.	By others.	2- or 3-way furnished by others. Can be equipped with factory assembled valve package.	Standard 3-Speed SW	Factory assembled in valve package w/flare nuts. Valve packages include unions for for field assembly to coil.

*If system is HEATING-ONLY or COOLING-ONLY, no changeover or bypass is required.

NOTE: Unit-mounted thermostats are not recommended with either fan-cycle control or applications with outside air dampers.

STANDARD WIRING PACKAGES

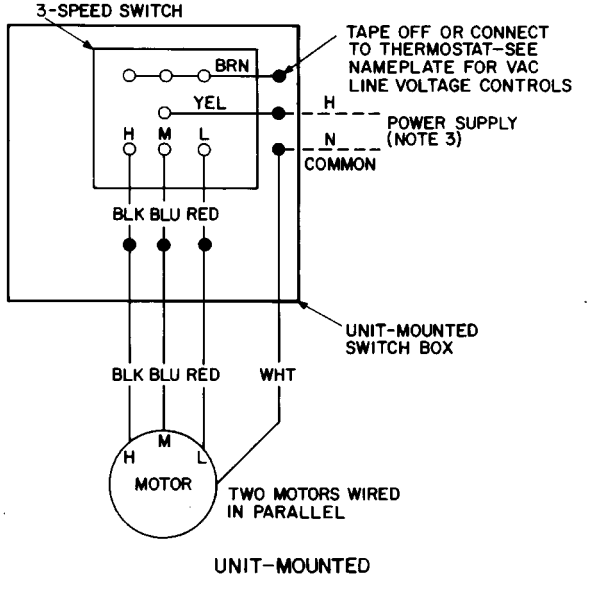
IMPORTANT: Wiring diagrams shown depict typical control functions. Refer to unit wiring label for specific functions.

Manual Fan Control — On all Vertical Cabinet units, the standard fan-speed switch is furnished unit-mounted and wired. On all Vertical Furred-In units and all Horizontal units, the switch is shipped separately on a decorative wall plate for field mounting and wiring.

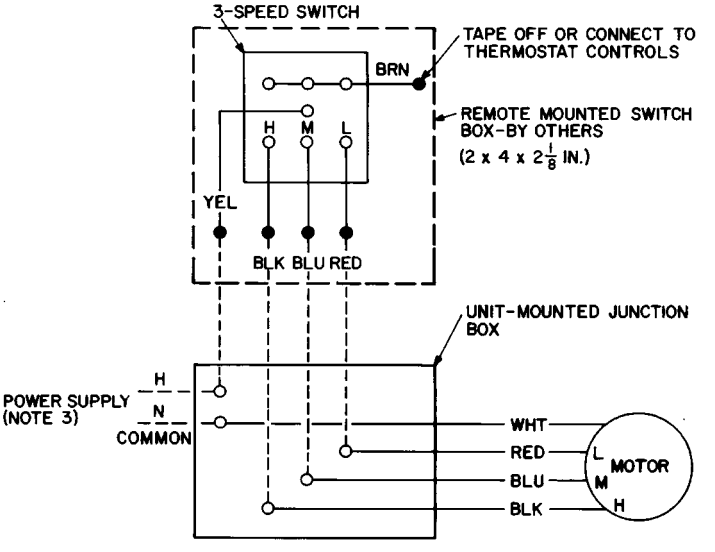
The standard switch has LOW, MEDIUM, HIGH and OFF positions plus an auxilliary contact to energize thermostats, valves, dampers, etc.

NOTE: Wiring diagrams are for 120-v power supply. If other voltages for heaters or controls are specified, wiring may differ from that shown.

The standard 3-speed switches are illustrated on page 12 (unit mounted) and on page 10 (wall mounted).



UNIT–MOUNTED



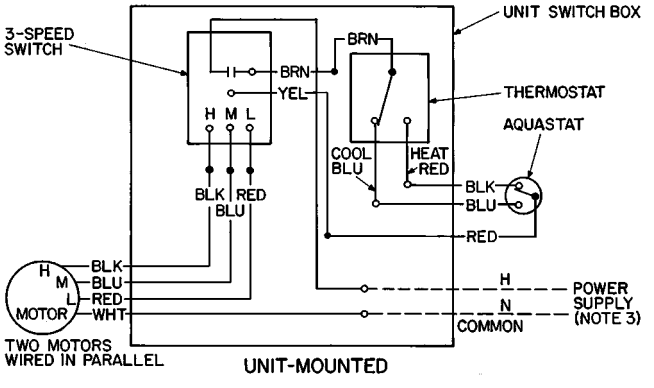
WALL–MOUNTED

For NOTES, see below.

Thermostatic Fan Control, 2-Pipe Systems —

The thermostat cycles the fan on and off from any selected speed setting to maintain selected room temperature. Controls can be wired for heating-only, cooling-only or for heating/cooling by the addition of an automatic changeover device that senses water temperature and changes the action of the thermostat as required.

For control package descriptions, see control components sections entitled Remote-Mounted Controls and Unit-Mounted Controls, pages 10-13.

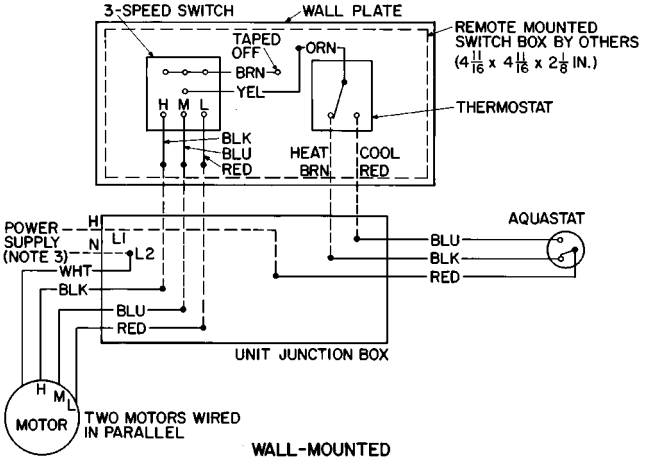


UNIT-MOUNTED

NOTES:
1. Motors are thermally protected.
2. Use copper conductors only.
3. See unit nameplate for power supply. Provide disconnect means and overload protection as required.
4. Unit-mounted thermostats are not recommended for fan control because of poor temperature sensing. Fan control not available on 42VC,VE Loboy units.

UNIT TYPE	LOCATION	THERMOSTAT OR WIRING PACKAGE*	
		Heating or Cooling Only	Heating and Cooling Plus Changeover†
Vertical	Unit Mounted	N/A	N/A
Vertical or Horizontal	Wall Mounted	22-C, 22-D 22-E, 22-F	22-A, 22-B

*Packages listed on current price pages. First 2 digits are item numbers.
†For alternate thermostat with manual changeover. Refer to current price pages.



WALL–MOUNTED

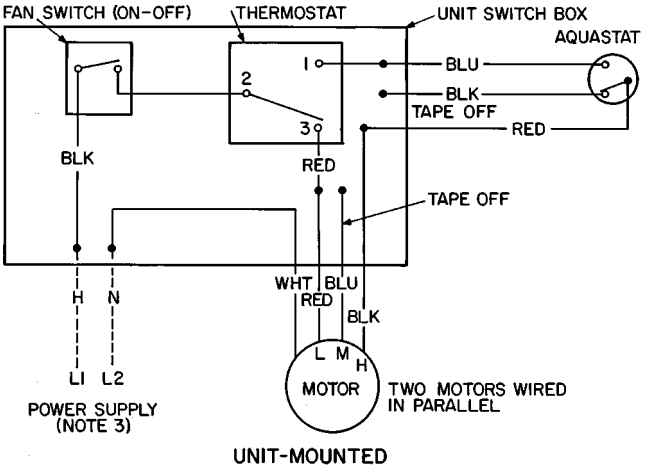
Thermostatic Fan Control, 2-Pipe System with Safety Cycle — This control is used for high humidity situations in which condensate problems can occur if fan is turned off while chilled water is still running through the coil.

The wiring provides fan cycling from HIGH to LOW on the cooling cycle and from LOW to OFF on the heating cycle. An ON-OFF toggle switch replaces the standard 3-speed fan switch. The toggle switch can be concealed to ensure that the unit runs on low speed when cooling. This action greatly reduces the chance of condensation problems that exist with other standard fan cycling controls.

For control package descriptions, see control components section entitled Remote-Mounted Controls and Unit-Mounted Controls.

UNIT TYPE	LOCATION	PACKAGE CODE*
		Heating and Cooling Plus Changeover
Vertical	Unit Mounted	24-R
Vertical or Horizontal	Wall Mounted	23-17

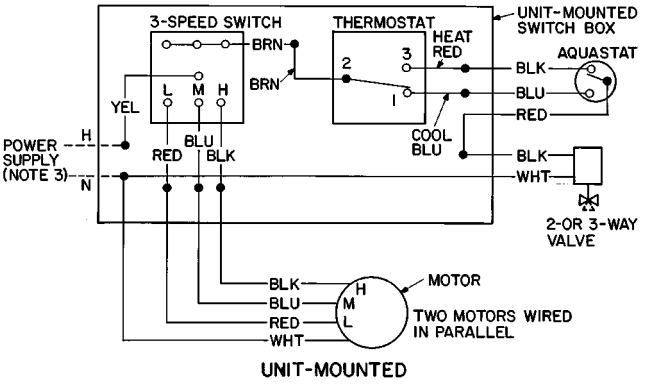
* Packages listed on current price pages.



For NOTES, see below.

Thermostatic Electric Valve Control, 2-Pipe — A thermostatically controlled 2-position valve provides superior control to fan cycling. With this control, the fan runs continuously unless it is manually switched to the OFF position. The fan must be on before the valve can be opened to supply water to the coil.

This system can be used for normal 2-pipe changeover systems and can also be furnished for cooling-only or heating-only applications by omitting the changeover and specifying which application is intended.

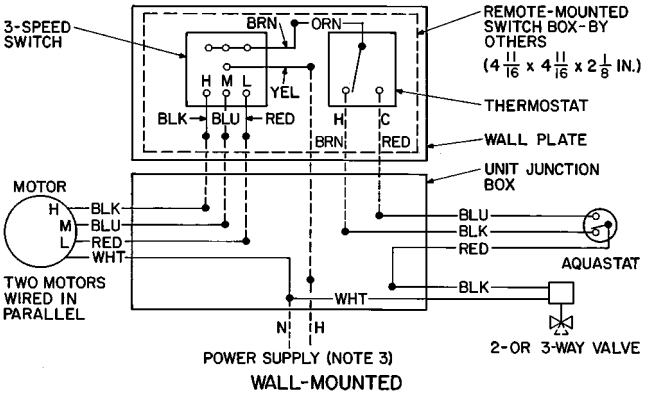


NOTES:
1. Motors are thermally protected.
2. Use copper conductors only.
3. See unit nameplate for power supply. Provide disconnect means and overload protection as required.

For control package descriptions, see control components sections entitled Remote-Mounted Controls and Unit-Mounted Controls.

UNIT TYPE	LOCATION	THERMOSTAT OR WIRING PACKAGE*		ELECTRIC VALVE
		Heating or Cooling Only	Heating and Cooling Plus Changeover†	
Vertical	Unit Mounted	24-M, 24-N	24-L	Any 2- or 3-way, 2-position valve package.
Vertical or Horizontal	Wall Mounted	22-C, 22-D, 22-E, 22-F	22-A, 22-B	

*Packages listed on current price pages. First 2 digits are item numbers.
†For alternate thermostat with manual changeover. Refer to current price pages.



STANDARD WIRING PACKAGES (cont)

Thermostatic 2-Pipe Auxiliary Electric Heat with Valve Control — This system, also called Twilight or Intermediate Season electric heat, goes a long way towards solving the spring and fall control problems of 2-pipe systems.

You can run chilled water late into the fall, turn it on early in the spring and still have heat available to all units whenever required.

In winter the system is switched over to hot water. Two changeover devices are required for this. One device switches the action of the thermostat and the other locks out the electric heat when hot water is in the coil.

With this system, the fan runs continuously unless manually switched to OFF position. Fan must be on before thermostat can send signal to open chilled water valve or turn on electric heater.

Two control methods are available:

1. Use the standard automatic changeover thermostat with a dead band between heating and cooling, or —
2. Use a manual changeover thermostat. With this method only one changeover is required.

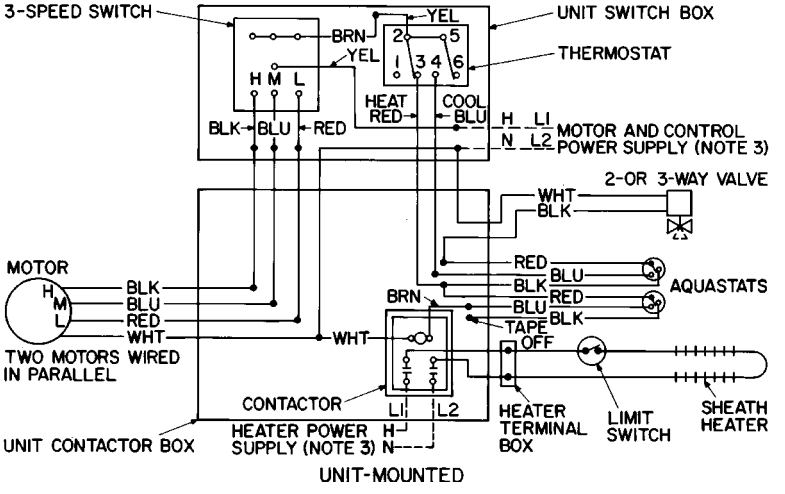
Be sure to include a 2-way or 3-way electric valve with this system.

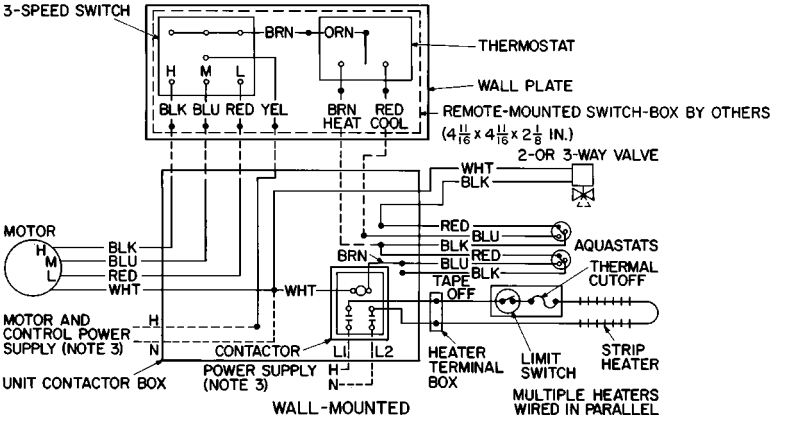
NOTE: Wiring diagrams are for 120-v power supply. If other voltages for heaters or controls are specified,wiring may differ from that shown.

For control package descriptions, see control components sections entitled Remote-Mounted Controls and Unit-Mounted Controls.

UNIT TYPE	LOCATION	WIRING PACKAGE*		ELECTRIC VALVE
		Automatic System	Manual System	
Vertical	Unit Mounted	24-Q	Available on Special Order.	Any 2- or 3-way, 2-position valve Package.
Vertical or Horizontal	Wall Mounted	22-J, 22-K, 23-09, 23-10	23-15, 23-16	

*Packages on current price pages.





NOTES:
1. Motors are thermally protected.
2. Use copper conductors only.
3. See unit nameplate for power supply. Provide disconnect means and overload protection as required.

Thermostatic 2-Pipe Total Electric Heat with-Valve Control — With this system, the complete heating requirement for the space is provided by the electric heater; the water system is never changed over for heating. It is therefore possible, just as with 4-pipe systems, to have heating or cooling at any time of the year.

The fan runs continuously unless it is manually switched to OFF position. Fan must be on before thermostat can send signal to open chilled water valve or turn on electric heater.

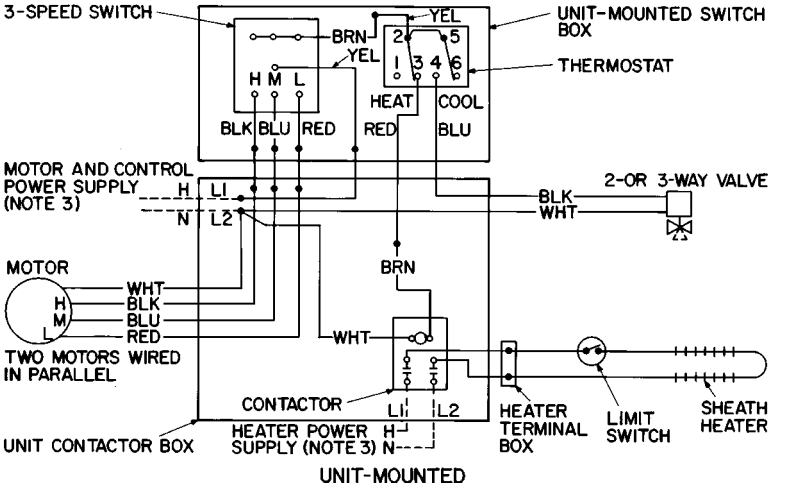
Normally, an automatic changeover thermostat with a dead band between heating and cooling is used, but a manual changeover thermostat is also suitable. A 2-way or 3-way valve must also be used so that the chilled water is off whenever the heater is on. No changeover device to sense water temperature is necessary.

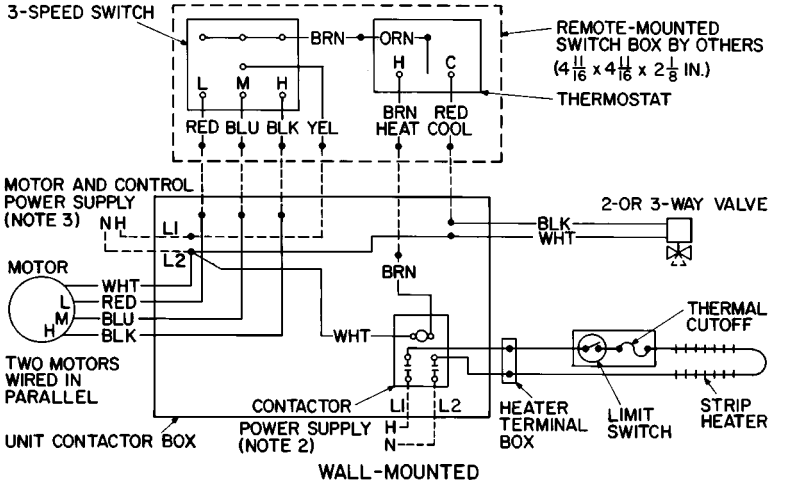
NOTE: Wiring diagrams are for 120-v power supply. If other voltages for heaters or controls are specified, wiring may differ from that shown.

For control package descriptions, see control components sections entitled Remote-Mounted Controls and Unit-Mounted Controls.

UNIT TYPE	LOCATION	WIRING PACKAGE*		ELECTRIC VALVE
		Automatic System	Manual System	
Vertical	Unit Mounted	24-Q	Available on Special Order.	Any 2- or 3-way, 2-position valve Package.
Vertical or Horizontal	Wall Mounted	22-J, 22-K, 23-09, 23-10	23-15, 23-16	

*Packages on current price pages.





NOTES:
1. Motors thermally protected.
2. Use copper conductors only.
3. See unit nameplate for power supply. Provide disconnect means and overload protection as required.

STANDARD WIRING PACKAGES (cont)

Thermostatic Valve Control, 4-Pipe — The 4-pipe system provides the ultimate in economy and room temperature control. Both hot water and chilled water are available at any time.

Normally an automatic changeover thermostat is used, but a manual changeover thermostat is also suitable. Two 2-way valves, two 3-way valves, or one 2-way plus one 3-way valve must be selected. An automatic changeover device to sense water temperature is not required.

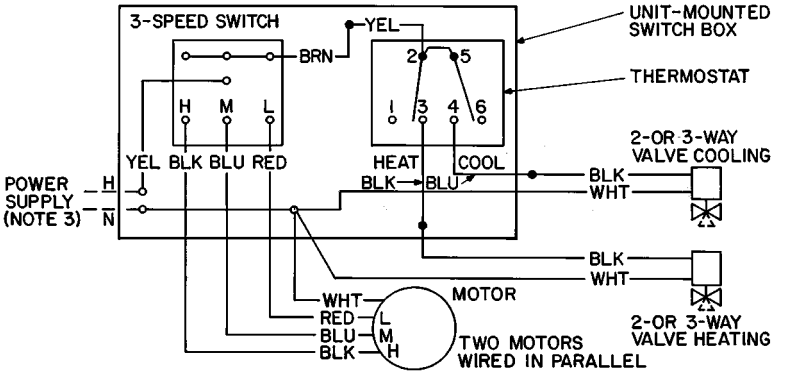
With this system, the fan runs continuously unless it is manually switched to OFF position. Fan must be on before thermostat can send signal to open the chilled water or hot water valve.

NOTE: Wiring diagrams are for 120-v power supply. If other voltages for heaters or controls are specified, wiring may differ from that shown.

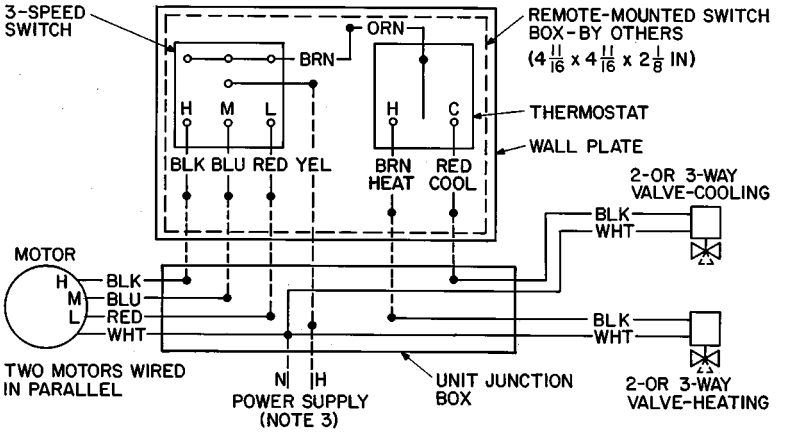
For control package descriptions, see control components sections entitled Remote-Mounted Controls and Unit-Mounted Controls.

UNIT TYPE	LOCATION	WIRING PACKAGE*		ELECTRIC VALVE
		Automatic System	Manual System	
Vertical	Unit Mounted	24-P	Available on Special Order.	Any 2- or 3-way, 2-position valve package.
Vertical or Horizontal	Wall Mounted	22-G, 22-H, 23-07, 23-08	23-13, 23-14	

*Packages on current price pages.



UNIT-MOUNTED



WALL-MOUNTED

NOTES:
1. Motors thermally protected.
2. Use copper conductors only.
3. See unit nameplate for power supply. Provide disconnect means and overload protection as required.

ELECTRIC HEAT

Application — Electric heaters are available for in-stallation on Carrier fan coil units in the following applications.

TOTAL ELECTRIC HEAT — This system provides complete heating during the heating season; no boiler is required. Heating and cooling are now available on an individual basis throughout the year with a 2-pipe system.

Chilled water is used for cooling and the electric heater is used for heating. Room controls can be supplied for either manual or automatic changeover.

AUXILIARY ELECTRIC HEAT — This system is used for heating between seasons or during the cooling season when chilled water is being circulated. Individual room controls are supplied to provide electric heat only when chilled water is being circulated through the system. Water flow through the unit is shut off when the heater is turned on.

During the winter heating season, heating is provided by hot water circulated through the system. A changeover device locks out the electric heat when the hot water is circulated.

Heater Construction

STRIP HEATERS — Used with Model 42C ceiling units, Model 42D ducted units and Model 42S stack units.

These heaters consist of coils of the highest grade resistance wire, insulated by ceramic insulators in aluminized brackets.

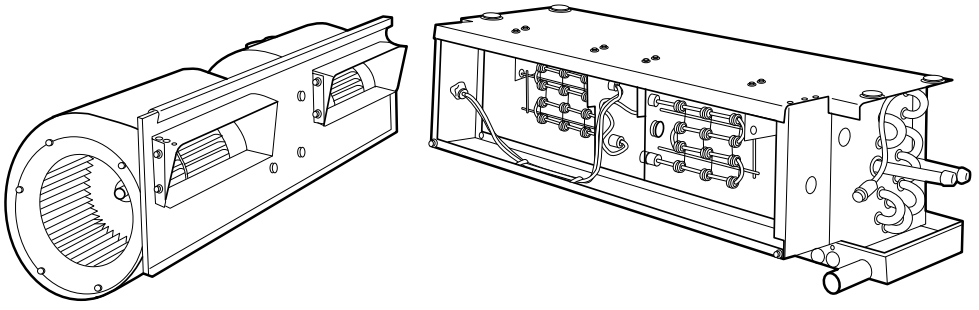
All heaters except those used in 42S stack units are positioned on the incoming (preheat) side of the unit coil. On 42S stack units, the strip heater is located in the fan discharge on the leaving side of the coil.

SHEATH HEATERS — Used with Model 42V vertical units. These heaters consist of the highest grade resistance wire, centered in a ½-in. diameter copper-plated steel sheath. The wire is insulated from the sheath by magnesium oxide powder packed around it. To increase the heater surface exposed to air, a 1¼-in. OD fin of copper-plated steel is wound around the sheath in a continuous spiral that makes 5 turns per lineal inch. Sheath and fin are permanently bonded together by copper brazing.

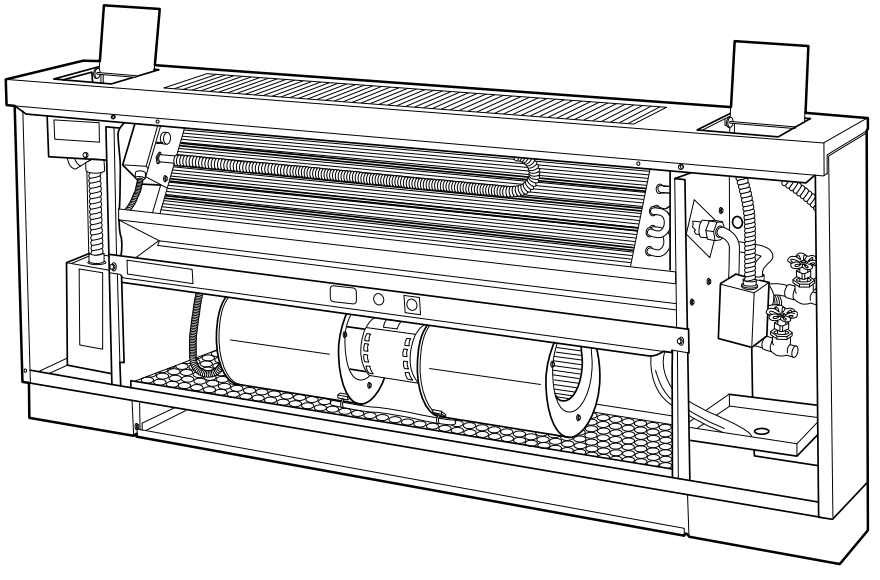
The heaters are positioned on the leaving (reheat) side of the unit coil. On special units with high efficiency motors, a strip heater will be installed in the fan discharge on the incoming (preheat) side of the unit coil.

Heater Electrical Data

1. Load voltage may be 120, 208, 240 or 277 volts. For unit size and kW limitations, refer to the specific unit catalogs.
2. All heaters are single stage and single phase.
3. Unless a single power-source option is selected, the electric heat units require 2 separate power sources. With the single power-source option, only one line circuit need be brought into the unit. Fuse protection is added to the motor/control circuit to protect these components. This is separate from the field-furnished total unit overcurrent protection.



MODEL 42C CEILING UNIT
WITH ELECTRIC STRIP HEATER



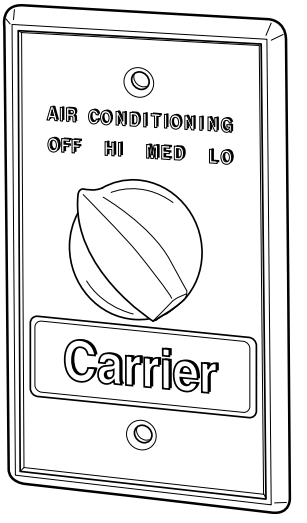
MODEL 42V VERTICAL UNIT
WITH ELECTRIC SHEATH HEATER

REMOTE-MOUNTED CONTROLS

Standard 3-Speed Switch — This standard switch has 4 positions: OFF, HIGH, MEDIUM, and LOW. Switch has auxiliary contact that is energized when switch is in HIGH, MEDIUM or LOW position.

Some of the options common with the 3-speed switch are:

1. Unit-mounted switch on Furred-In Vertical Model. (Available as special order on Horizontal Models)
2. Switch without OFF position.
3. Key-operated switch.



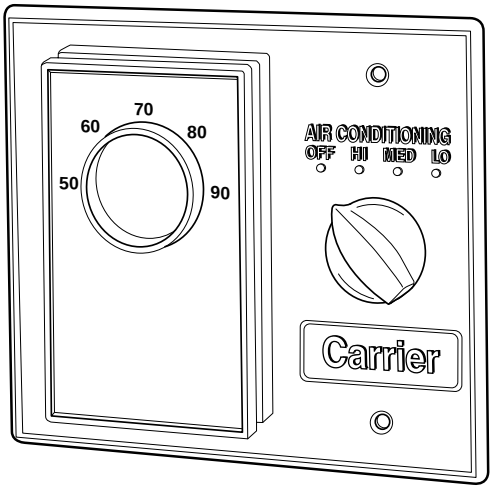
Combination Thermostat/3-Speed Switch (Packages 22-B, 22-D, 22-F, 22-H, 22-K*) — Thermostat and standard switch are mounted on a common decorative wall plate, suitable for installation in a 4 11/16-in. square junction box. Packages 22-A and 22-B include Model TC-126 2-pipe heating and cooling thermostat and automatic changeover switch (shipped separately for field wiring and mounting).

Packages 22-C and 22-D include Model TC-126 thermostat less automatic changeover switch wired for cooling only.

Packages 22-E and 22-F include Model TC-126 thermostat, less automatic changeover, wired for heating only.

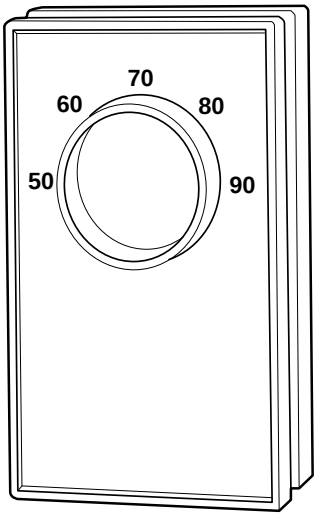
Package 22-G includes Model TH-126 4-pipe thermostat for sequenced heating and cooling, plus 3-speed switch. (For 4-pipe or total electric heat systems.)

Package 22-J is the same as 22-G except that 2 automatic changeover switches are shipped with package. (For auxiliary electric heat systems.)



Wall Thermostat, 2-Pipe (Packages 22-A through 22-F*) — Model TC-126 thermostat for heating and cooling, operates on line voltage. Action is SPDT. Temperature range is 50-90 F.

Packages 22-A and 22-B — Heating *and* cooling, includes one automatic changeover switch (shipped separately for field wiring and mounting).



Wall Thermostat, 4-Pipe (Packages 22-G through 22-K*) — Model TH-126 thermostat is also used on 2-pipe system with electric heat. Heating and cooling are sequenced (automatic changeover) with 6 degree separation between HEATING ON and COOLING ON. Temperature range is 50 - 90 F.

Packages 22-G and 22-H — For 4-pipe and total electric heat systems.

Packages 22-J and 22-K — For auxiliary electric heat systems, includes 2 automatic changeover switches (shipped separately for field wiring and mounting).

* Packages listed on current price pages.

Thermostat Electrical Data (Pilot Duty — 125 VA)

VOLTS	HEATING		COOLING	
	FLA	LRA	FLA	LRA
120	5.8	34.8	5.8	34.8
240	4.9	29.4	4.9	29.4
277	4.1	24.6	4.1	24.6

ALTERNATE WALL THERMOSTATS

Wall Thermostat (Honeywell Model T4039) with Manual 3-Speed Fan Switch and ON-OFF Switch

Temperature range is approximately 55 to 95 F in 10° F increments from 75 F midpoint. Scale is marked warmer-cooler. Thermostat mounts in 4-in. square junction box or 2-ganged outlet boxes.

SYSTEM	MODEL	PACKAGE
2-Pipe Cooling Only	T4039B*	23-05
2-Pipe Heating Only	T4039F*	23-03
2-Pipe Heating/Cooling†	T4039F*	23-01
2-Pipe w/Total Electric Heat	T4039M**	23-07
4-Pipe Heating/Cooling	T4039M**	23-07
2-Pipe w/Auxiliary Electric Heat††	T4039M**	23-09

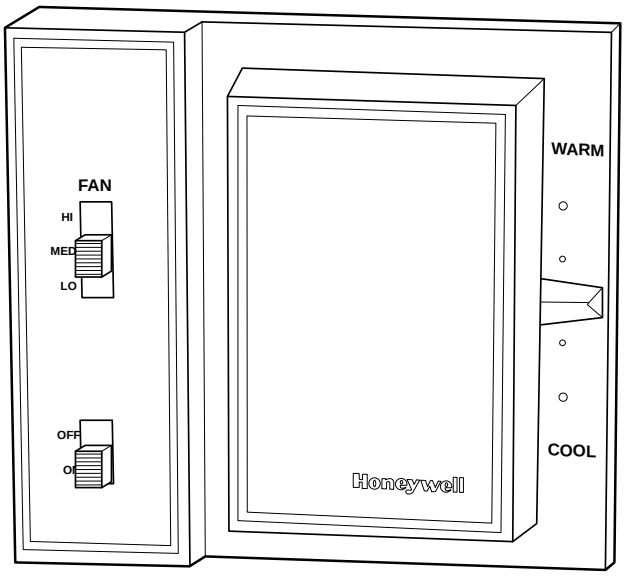
*Fan off breaks cooling circuit and fan.
†Includes one remote-mounted changeover on unit
**Fan off breaks both heating/cooling circuits and fan.
†† Includes 2 remote-mounted changeovers on unit.
NOTE: All above packages include thermostat, ON-OFF switch and HI-MED-LOW switch.

Thermostat Electrical Ratings (Amperes) Thermostat (Valve Load)

VOLTAGE	NORMAL	IN-RUSH
120V AC	0.32	1.00
240V AC	0.16	0.50
277V AC	0.14	0.43

Fan Switch

VOLTAGE	FULL LOAD	LOCKED ROTOR
120V AC	5.50	33.0
240V AC	2.75	16.5
277V AC	2.40	14.4



HONEYWELL MODEL T4039
THERMOSTAT

Wall Thermostat (Sunne Model 154) with Manual 3-Speed Fan Switch and ON-OFF Switch

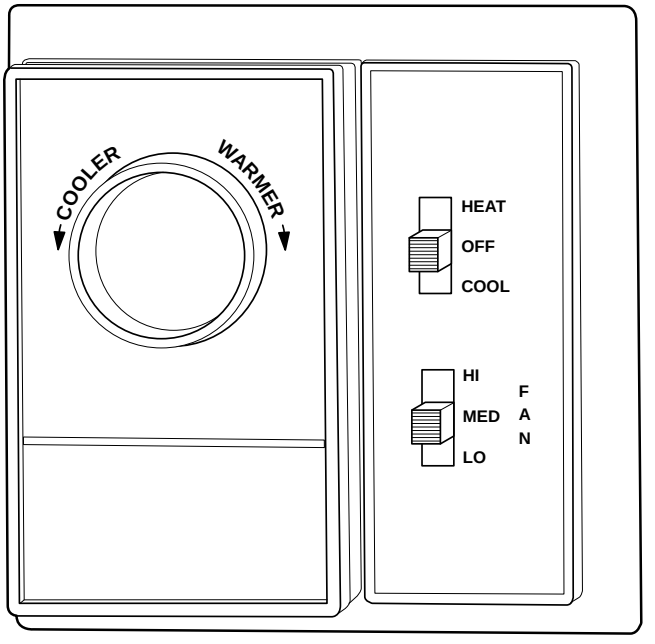
Temperature range is approximately 55 to 95 F in 10° F increments from 75 F midpoint. Scale is marked warmer-cooler. Thermostat mounts in 4-in. square junction box or 2-ganged outlet boxes.

SYSTEM	MODEL	PACKAGE
2-Pipe, Cooling Only	TC154-004	23-06
2-Pipe, Heating Only	TC154-004	23-04
2-Pipe, Heating/Cooling with Auto. Changeover*	TC154-004	23-02
2-Pipe, Heating/Cooling with Manual Changeover	TC154-014	23-12
2-Pipe, Cooling with Total Electric Heat and Auto. Changeover.	TC154-003	23-08
2-Pipe, Cooling with Total Electric Heat and Manual Changeover	TC154-014	23-14
2-Pipe, Heating/Cooling with Auxiliary Electric Heat and Auto. Changeover†	TC154-003	23-10
2-Pipe, Heating/Cooling with Auxiliary Electric Heat and Manual Changeover	TC154-014	23-16
4-Pipe, Heating/Cooling with Auto. Changeover	TC154-003	23-08
4-Pipe, Heating/Cooling with Manual Changeover	TC154-014	23-14

*Includes one remote mounted changeover on unit.
†Includes 2 remote mounted changeovers on unit.
NOTE: All of the above packages include thermostat, ON-OFF switch and HI-MED-LOW switch.

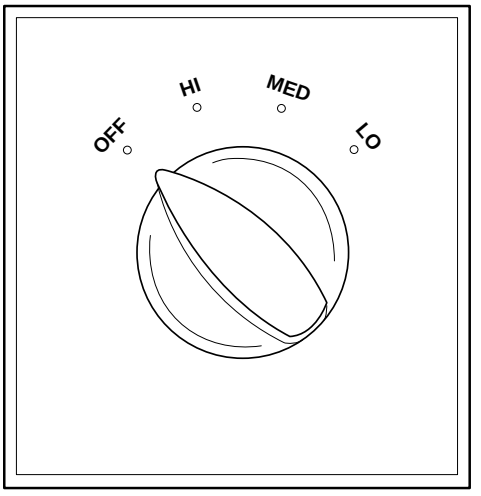
Thermostat and Fan Switch Electrical Ratings

VOLTAGE	INDUCTIVE		PILOT DUTY
	FLA	LRA	
125V AC	5.8	34.8	125 VA
240V AC	4.9	29.4	125 VA
277V AC	4.1	24.6	125 VA

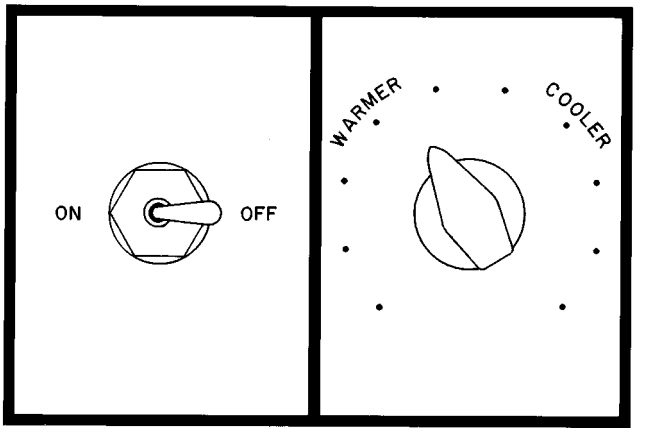


SUNNE MODEL 154
THERMOSTAT

UNIT-MOUNTED CONTROLS

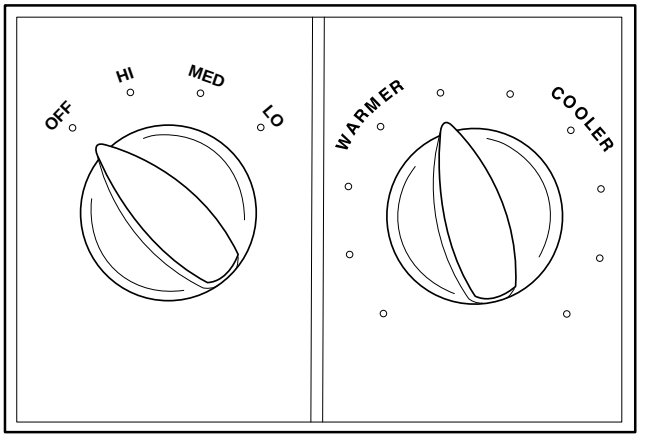


Standard 3-Speed Switch — Switch has OFF, HIGH, MED and LOW positions. Switch is also equipped with auxiliary connection energized when switch is in HIGH, MED or LOW position.



COMBINATION THERMOSTAT AND TOGGLE SWITCH

Combination Thermostat/ON-OFF Toggle Switch (Package 24-R*) — Includes Model TF103 2-pipe thermostat and toggle switch. Used as special fan control for cycling fan from HIGH to LOW on cooling; from LOW to OFF on heating.



Combination Thermostat/3-Speed Switch (Packages 24-L, M, N, P and Q*) — Thermostat and standard switch are unit mounted in a common electrical junction box.

Package 24-L includes Model TF103 2-pipe thermostat and standard 3-speed switch, plus automatic changeover for mounting on supply pipe.

Package 24-M and 24-N include Model TF103 2-pipe thermostat and standard 3-speed switch only.

Package 24-P includes Model TH104 4-pipe thermostat and standard 3-speed switch. May be used on 4-pipe systems with electric valves or on 2-pipe systems with total electric heat.

Package 24-Q includes Model TH104 4-pipe thermostat, standard 3-speed switch and 2 automatic changeover switches for 2-pipe systems with auxiliary electric heat.

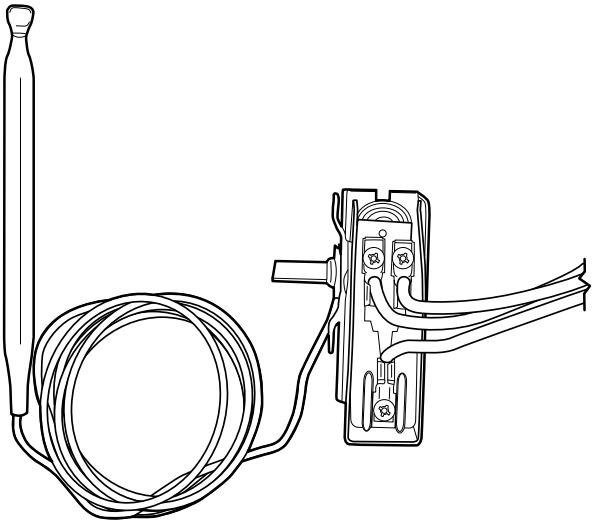
* Packages listed on current price pages.

Two-Pipe Thermostat, Model TF103 — This single-pole, double-throw (SPDT) thermostat has snap-action contacts. The standard temperature range is 60 - 90 F.

Four-Pipe Thermostat, Model TH104 — With this thermostat, heating and cooling are sequenced (automatic changeover) with 6 degree separation between HEATING ON and COOLING ON. The standard temperature range is 60 - 90 F.

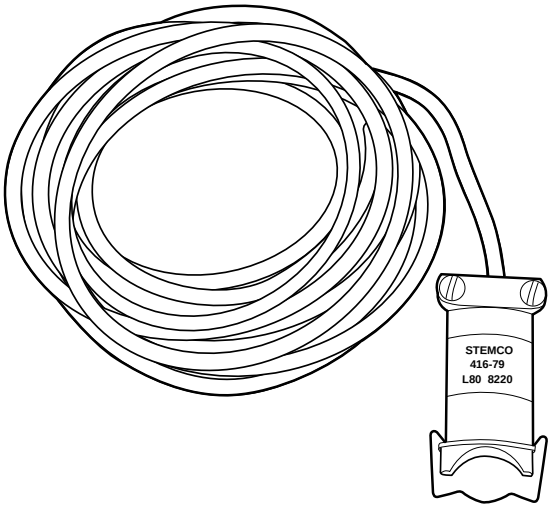
Thermostat Electrical Data (Pilot Duty — 125 VA at 120-277 v)

ITEM	VOLTS	FLA	LRA
TF103 and TH104	120	16	80
	240	12	60
	277	10	50



Automatic Changeover (Summer-Winter Switch) — The automatic-changeover thermostat is a single-pole double-throw (SPDT) thermal switch in a moistureproof and dustproof enclosure. Thermostat mechanism and lead ends are hermetically sealed in a polypropylene enclosure with epoxy resin. Device clamps on coil supply pipe with end snap-on clip.

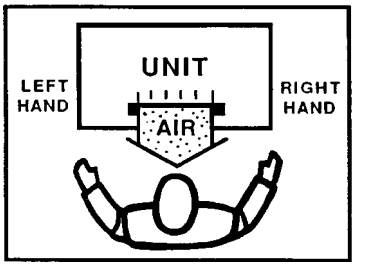
The set point temperatures are factory set. When water temperature rises above 80 F (approximately), the thermostat switches to the winter cycle. When water temperature drops below approximately 70 F, the thermostat switches to the summer cycle. Switch reset is automatic.



AUTOMATIC CHANGEOVER (Summer-Winter) SWITCH

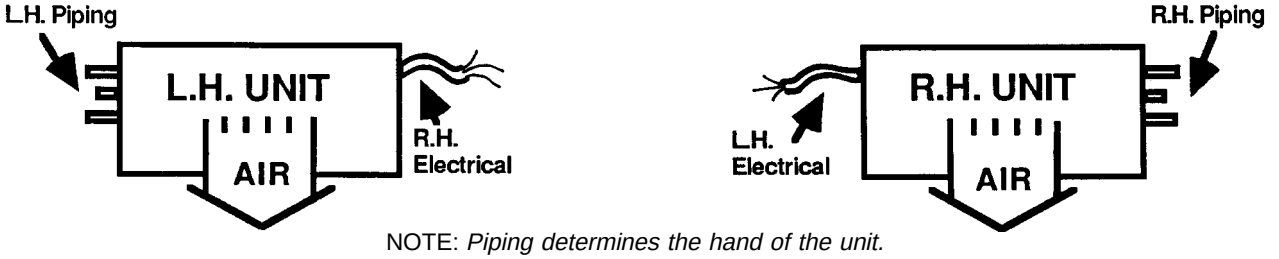
BASIC DEFINITIONS

Unit Hand — When facing the supply air outlet from the front of the unit (air blowing in your face), your right hand will be the right hand side of the unit and your left hand the left hand side of the unit.



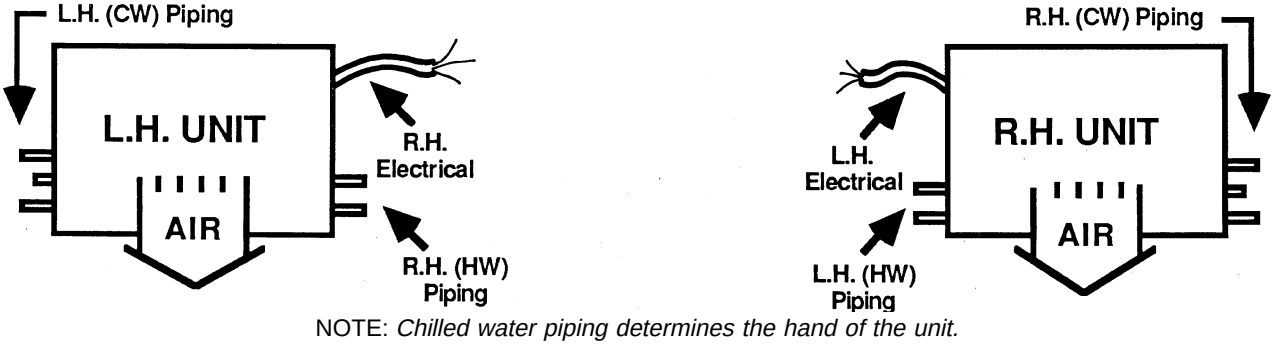
Same End Connection (2 Pipe or 4 Pipe) — All piping connections are on the same end (side) of the unit. Controls and electrical connection will be on the end (side) opposite the piping connection.

Standard 2-pipe units will be the same end connection.



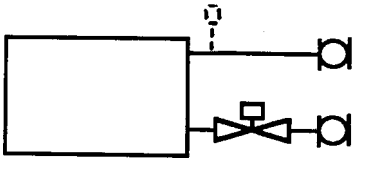
NOTE: *Piping determines the hand of the unit.*

Opposite End Connection (4-Pipe Option) — Hot water (HW) piping connections and electrical will be on the end (side) opposite the chilled water (CW) and drain connections.



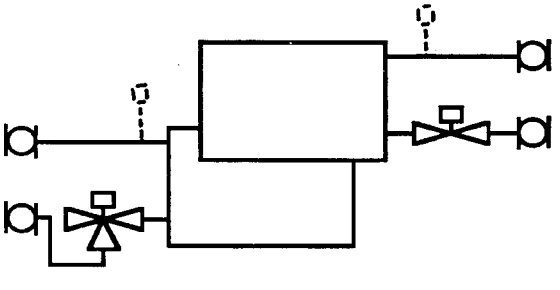
NOTE: *Chilled water piping determines the hand of the unit.*

Valve Packages For 2-Pipe Systems — Valve packages for standard 2-pipe units are piped for same end connection (L.H. or R.H.).

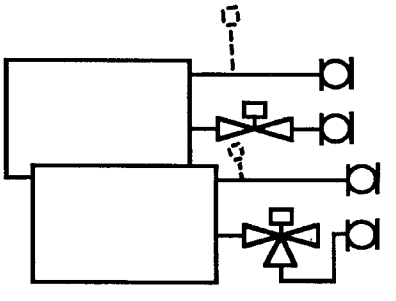


Valve Packages for 4-Pipe Systems - Select 2 valve packages per unit.

NOTE: *Hot water valve package requirements may not be the same as chilled water valve package!*

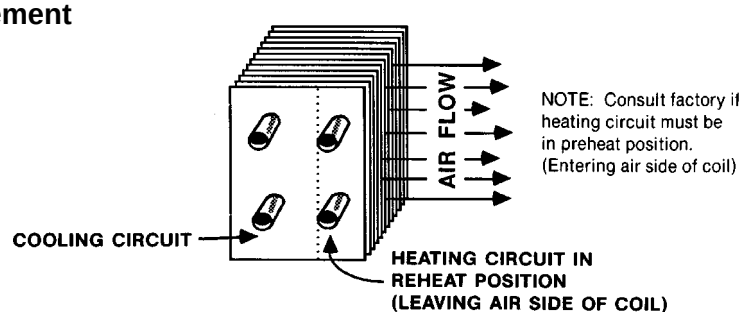


OPPOSITE END CONNECTION

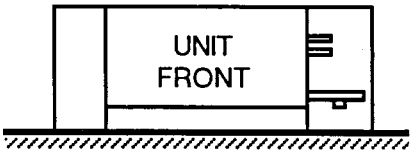


SAME END CONNECTION

Hydronic Coil Arrangement



FIELD PIPING CONNECTIONS*

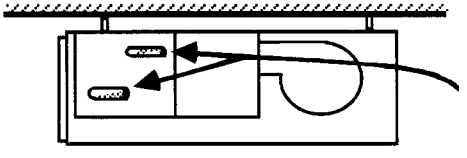


VERTICAL FLOOR UNITS — 42VB, VE, VF

Pipe into cabinet end compartment (opening in bottom and back).

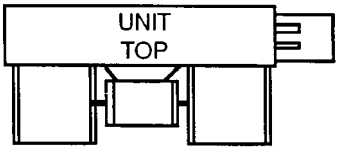
VERTICAL FLOOR UNITS — 42VA, VC

Pipe to external connections (no cabinet).



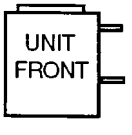
CEILING UNITS (EXPOSED) — 42CG, CK, DE, DF

Pipe through knock-outs in rear of cabinet to coil and valve package connections.



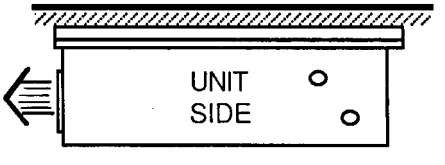
CEILING UNITS (CONCEALED) — 42CA, CE, CF, DA, DC

Pipe to connections extending from end of unit.



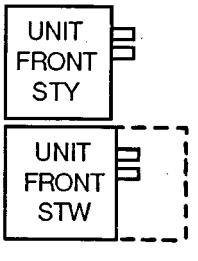
VERTICAL UNITS — 42DD

Pipe to stub connections extending from side of unit.



HORIZONTAL AIR HANDLERS (BELT DRIVE) — 42BH

Pipe to stub connections extending through side of unit.
Valve packages are not factory supplied with these units.



WALL UNITS, FURRED-IN

Pipe to stub connections at the side of unit.

or into optional piping compartment. Optional piping compartment is required if valves are factory installed. Factory installed valve package is limited to one 2-way or 3-way motorized valve and 2 hand valves.

*Location of field piping connections will vary depending on number of coil rows on factory-supplied coil or arrangement of factory-supplied valves.

VALVE PACKAGES

General — Table 1 lists acceptable pneumatic valves for installation on 42 series fan coil units. There are limitations on physical size of pneumatic valves, quantity and type of matching components, required control interface. See Fig. 1 for symbols and placement of valves.

Consult factory before ordering any special valve package components that are not covered in this book.

Valve packages are shipped with the units or in unit cartons. Valve packages include belled ends for field soldering to coil connections.

All factory-furnished cooling valve packages are arranged to position as much of the package as possible over an auxiliary drain pan or drip lip. This helps minimize field piping insulation requirements.

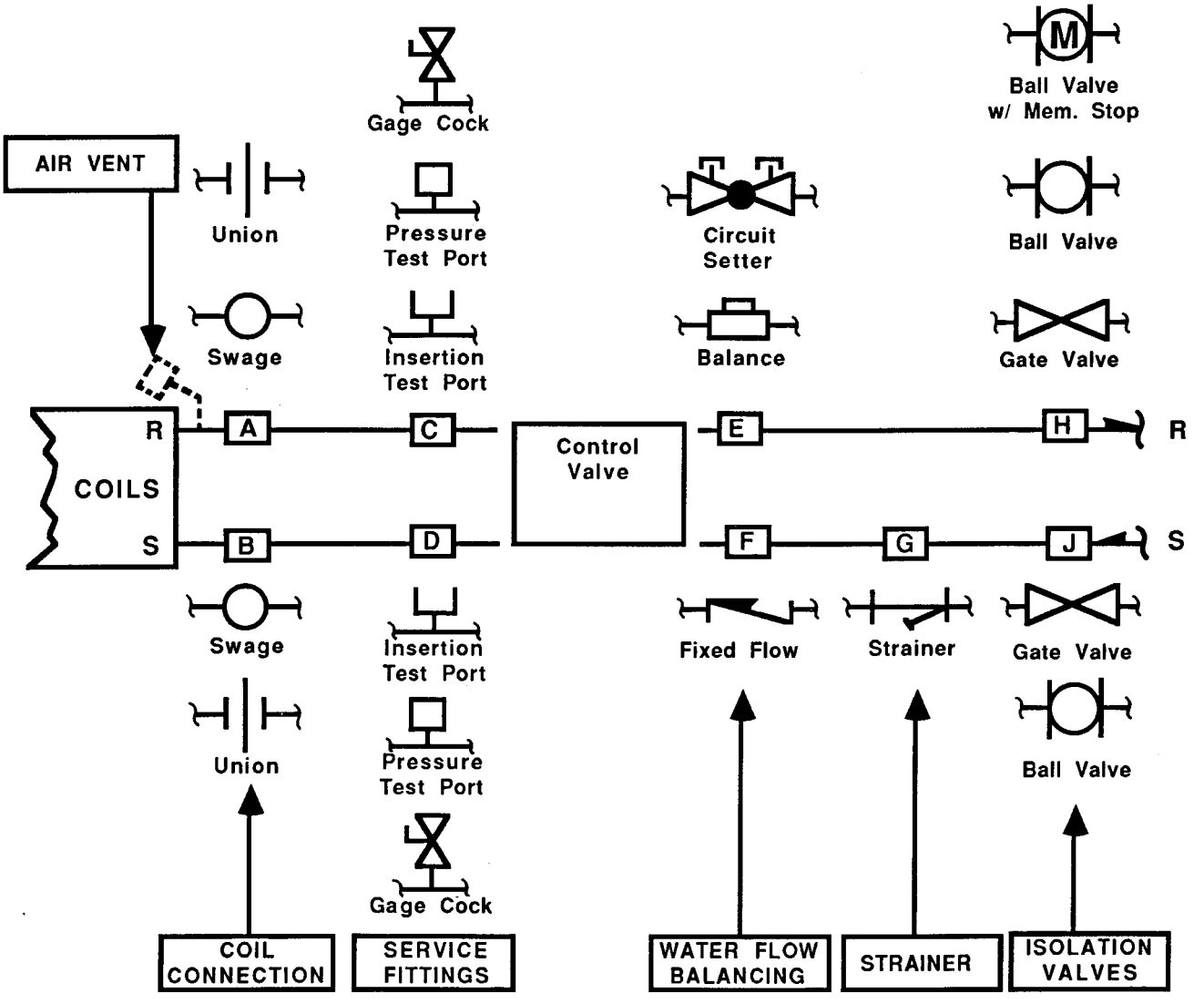


Fig. 1 — Symbol And Placement Of Valves

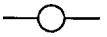
LEGEND For Fig. 1

Component Sizing — ½″ nominal (for ⅝″ OD copper tubing) or ¾″ nominal (for ⅞″ OD copper tubing).

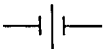
Manual Air Vent — Standard component - Brazed into high point of hydronic cooling and/or heating coil circuit.

Automatic Air Vent — Brazed into high point of coil circuit.

Coil Connections (Positions A & B) — When isolation valve only is added to supply or return line, the isolation valve will be factory brazed to the coil stub-out. Addition of any other component or connection to the supply or return line will change the respective coil connection(s) to one of the following:

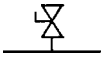


STANDARD: Swage fitting for field braze.

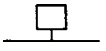


OPTION: Union(s) added by factory for field connection.

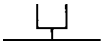
Service Fittings (Positions C & D) — Optional fittings for attaching pressure/temperature sensing devices to obtain pressure drop or temperature differential accross coil. Used with ball valve or balance valve where extremely accurate water flow balancing is required.



GAGE COCK: Pressure test only - In supply and return lines.



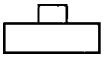
PRESSURE TEST PORT: Pressure test only - In supply and return lines.



INSERTION TEST PORT: Pressure/Temperature test - In supply and return lines.

Water Flow Balancing (Positions E, F, & H) — Only one device per total valve package to be used for balancing water flow through the coil. When isolation valve (ball valve or ball valve with memory stop at position **H**) is used for water flow balancing, do not specify additional balancing device at position **E** or **F**. When balancing device is specified at position **E** or **F**, isolation valve does not require balancing feature at position **H** (See exception, 3-way motorized valve).

CIRCUIT SETTER: May serve as a positive shut-off valve in lieu of isolation valve at position **H** (check service requirements).

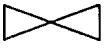


BALANCING VALVE: Check specifications for service fitting requirements.

FIXED FLOW: No balancing required - When there are more devices on the supply line of the valve package than on the return line, the factory may move this device to position **E** to fit valve package within allotted space. Consult your factory representative to match the available fixed flow valve to your job requirements.

Strainer (Position G) — Does not include blow down fitting and should not be used in lieu of main piping strainers.

Isolation Valves (Positions H & J) — Normally requires one each on supply and return line (see exception under circuit setter). When position **H** is used for balancing (ball vall or ball valve with memory stop), check specifications for service valve requirements.



GATE VALVE: Shut-off only - Do not use for balancing.

BALL VALVE: Shut-off/balance - No memory stop.

BALL VALVE WITH MEMORY STOP: Shut-off/balance - Memory stop allows re-opening to balance point after usage as a shut-off.

VALVE PACKAGES (cont)

Two-Way Motorized Control Valve

The 2-way motorized valve motor drives valve open and a spring returns valve to normally closed position (no water flow with unit OFF).

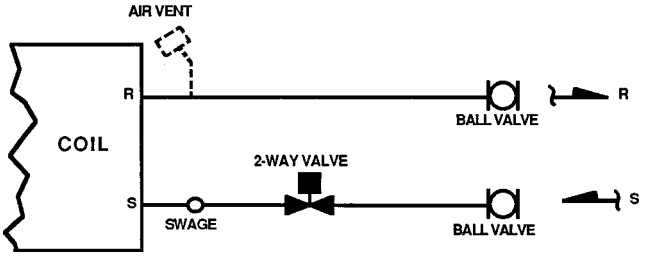
Supply connection at coil will be swage fit for field braze (standard) or union (option). Return connection at coil will be factory brazed if isolation valve only. Addition of any other component will require swage fit for field braze or optional union connection.

Check job specifications for system pressure, pressure drop limitations and flow rate prior to selecting valve package components or valve package size (½″, ¾″, etc.).

2-PIPE SYSTEM (One Valve Package) or 4-PIPE SYSTEM (Two Valve Packages) Application:

- 2 Pipe - Hydronic Heating Only
- 2 Pipe - Hydronic Cooling Only
- 2 Pipe - Hydronic Cooling with Total Electric Heat
- 4 Pipe - Hydronic Cooling and Heating

NOTE: A ¼-in. bypass line is included in the piping package when a 2-way valve is specified with a control package containing an automatic changeover device.



Two-Way Motorized Control Valve with Aquastat Bleed Bypass Line

The 2-way motorized valve motor drives valve open and a spring returns valve to normally closed position (no water flow through coil with unit OFF).

The aquastat bleed bypass bleeds a small amount of water from supply to return when control valve is closed (required for system water temperature sensing by aquastat). Aquastat (A) clips on supply line upstream from aquastat bleed bypass (as shown at right). It senses system water temperature to prevent cooling operation with hot water in system piping or heating operation with chilled water in system piping. Additional aquastat required to lock out the optional auxiliary electric heat when hot water in system.

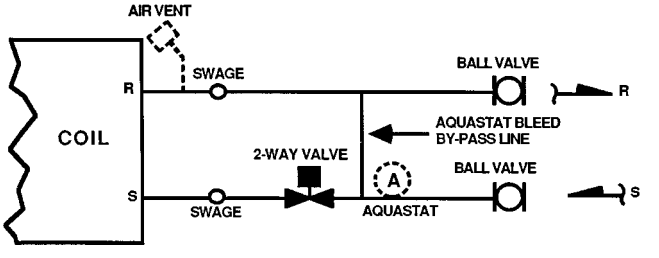
Supply and return connections at coil will be swage fit for field braze (standard) or unions (option).

Check job specifications for system pressure, pressure drop limitations and flow rate prior to selecting valve package components or valve package size (½″, ¾″, etc.).

2-PIPE SYSTEM (One Valve Package) Application:

- 2 Pipe - Hydronic Cooling and Heating
- 2 Pipe - Hydronic Cooling and Heating with Auxiliary Electric Heat

NOTES: Additional aquastat required as noted above.



Three-Way Motorized Control Valve

On the 3-way motorized valve flow is normally closed to coil and open to system return. Motor closes bypass flow to system return while opening flow through coil. Water bypasses coil and flows directly to system return when unit is OFF.

The aquastat (A) clips on supply line upstream from 3-way valve (as shown above). It senses system water temperature to prevent cooling operation with hot water in system piping or heating operation with chilled water in system piping. Aquastat(s) required for 2-pipe cooling and heating with automatic changeover control and/or auxiliary electric heat.

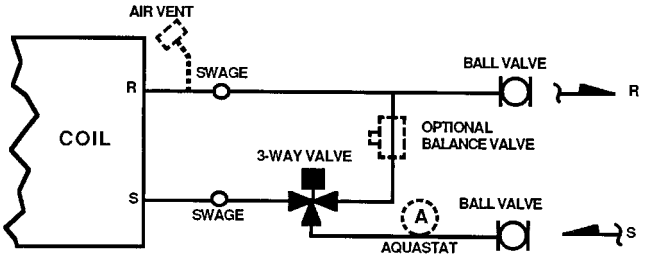
A bypass balancing valve may be specified in the bypass line to permit equal flow balancing.

Supply and return connections at coil will be swage fit for field braze (standard) or unions (option).

Check job specifications for system pressure, pressure drop limitations and flow rate prior to selecting valve package components or valve package size (½″, ¾″, etc.).

2-PIPE SYSTEM (One Valve Package) or 4-PIPE SYSTEM (Two Valve Packages) Application:

- 2 Pipe - Hydronic Heating Only
- 2 Pipe - Hydronic Cooling Only
- 2 Pipe - Hydronic Cooling with Total Electric Heat
- 2 Pipe - Hydronic Cooling and Heating
- 2 Pipe - Hydronic Cooling and Heating with Auxiliary Electric Heat
- 4 Pipe - Hydronic Cooling and Heating



No Motorized Control Valve

When isolation valves only are specified, they will be brazed to the coil stub-outs.

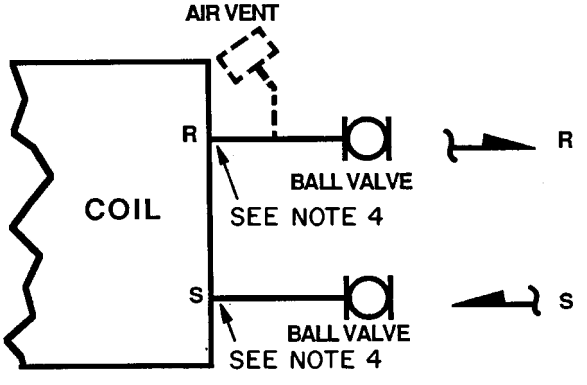
Check job specifications for system pressure, pressure drop limitations and flow rate prior to selecting specific components or valve package size (½″, ¾″, etc.).

2-PIPE SYSTEM ONLY (One Valve Package) Application:

- 2 Pipe - Hydronic Heating Only
- 2 Pipe - Hydronic Cooling Only

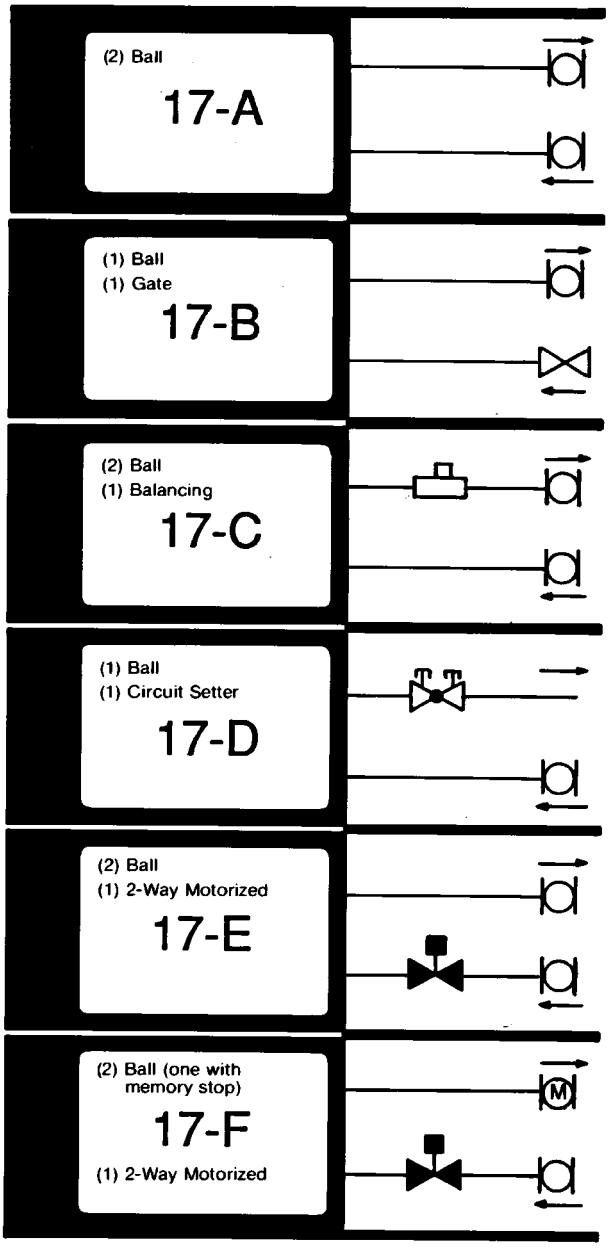
NOTES:

1. Continuous water flow, chilled water or hot water.
2. Not recommended for high humidity applications.
3. Not recommended with unit-mounted thermostat on vertical units (except package R).
4. The addition of any other component(s) will require swage fitting for field braze or optional union conection.

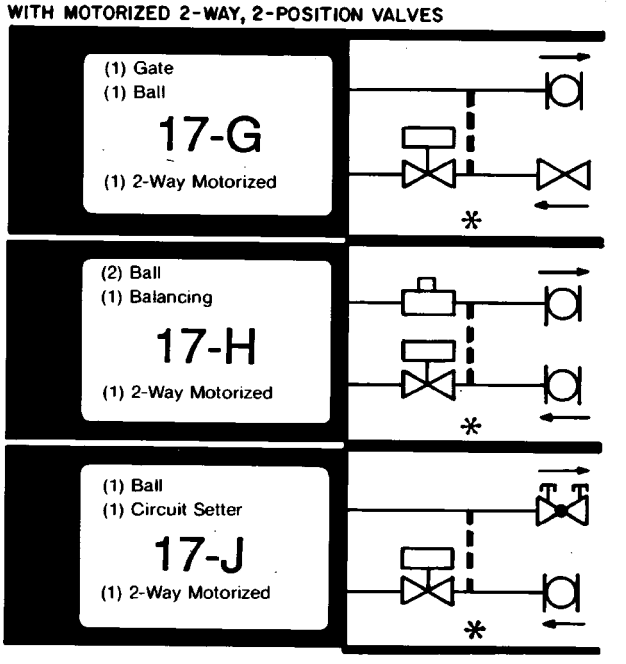


VALVE PACKAGE ARRANGEMENTS

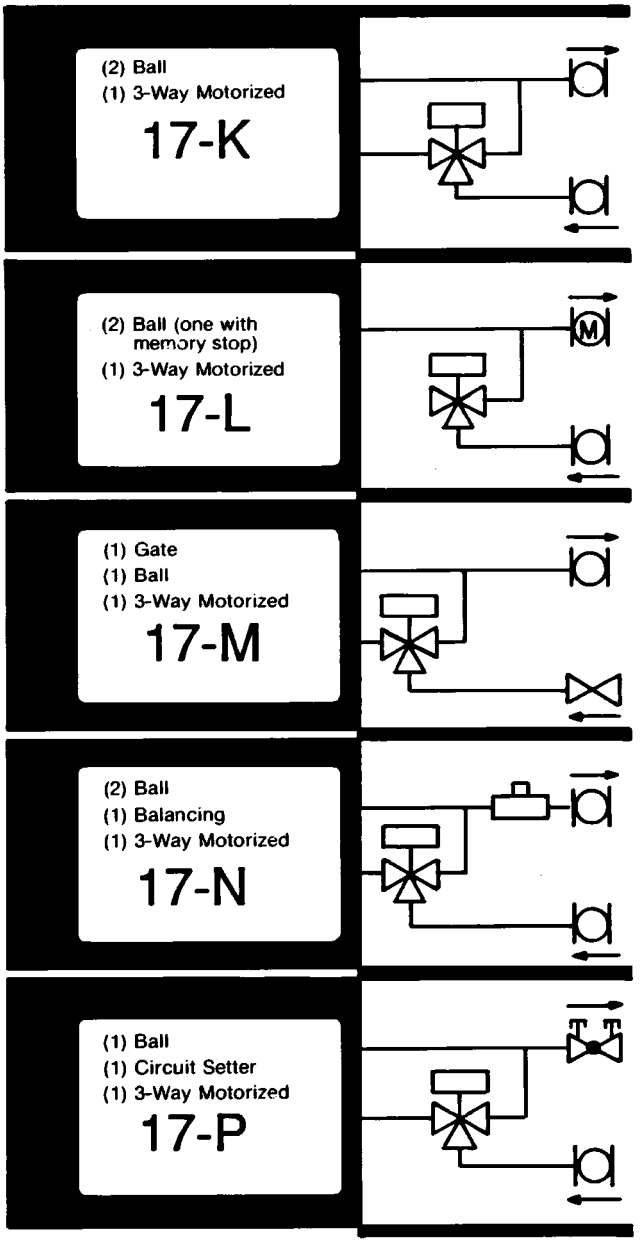
WITH HAND VALVES ONLY



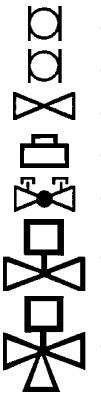
WITH MOTORIZED 2-WAY, 2-POSITION VALVES



WITH MOTORIZED 3-WAY 2-POSITION VALVES



LEGEND



— Ball Valve

— Ball Valve with Memory Stop

— Gate Shut Off Valve

— Balancing Valve

— Circuit Setter

— Motorized 2-Way Valve

— Motorized 3-Way Valve

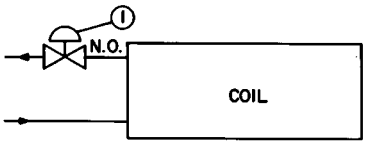
* When aquastat is used for automatic changeover, bypass is required as indicated by dashed line.

NOTES:
1. Packages factory furnished and installed.
2. Valves are ⅝-in. ODS unless otherwise specified.
3. If an automatic flow control valve is added, it will be located on supply line between shutoff valve and coil (or motorized control valve, if supplied).
4. Packages are listed on current price pages.

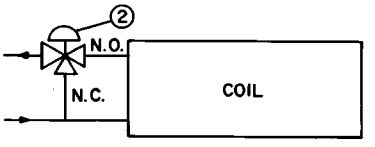
VALVE PACKAGE ARRANGEMENTS (cont)

ARRANGEMENT **PNEUMATIC VALVE PACKAGES**

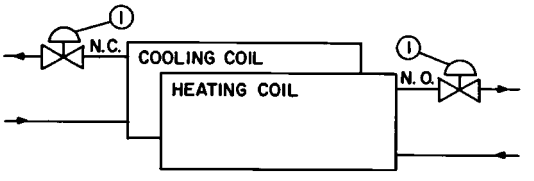
18-A



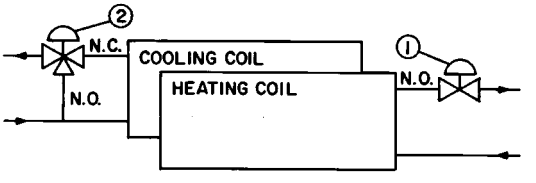
18-B



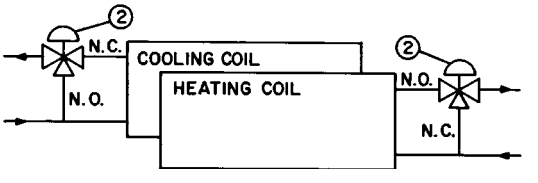
18-C



18-D



18-E



LEGEND

ITEM	DESCRIPTION
①	Pneumatic Control Valve, 2-Way Code 18(typical) -2* (½- or ⅝-in. ODF tubing conn) or Code 18(typical) -3* (⅞-in. ODF tubing conn)
②	Pneumatic Control Valve, 3-Way Code 18(typical) -14* (½- or ⅝-in. ODF tubing conn) or Code 18(typical) -5* (⅞-in. ODF tubing conn)

*Valve packages listed on current price pages.

NOTES:
1. Pneumatic valves are field furnished for factory installation.
2. To simplify valve installation and maintenance, cabinet units with 4-pipe coils must have opposite-end connections.
3. Alternate designations for the terms N.O., N.C. and RETURN on 3-way valves are as follows:

Manufacturer	N.O.	N.C.	Return
Barber-Coleman	B	A	AB
Honeywell	B	A	AB
Johnson Service	N.O.	N.C.	C
Powers	B	U	C

4. All orders entered must include a job specific piping diagram OR reference can be made to standard arrangements 18-A through 18-E as shown here.
5. Hand valves shown in Arrangements 17-A through 17-F may be included with pneumatic valves. These arrangements should also be shown on piping diagrams submitted.

Table 1 — Acceptable Field-Furnished Pneumatic Valves

MANUFACTURER	VALVE NUMBER	TYPE	MODE	SIZE (in.) (OD Male Flare)	CAPACITY (CV) RATING
HONEYWELL	VP517A	3-WAY	MIXING	7/8	3.0, 4.0, 6.3
	VP522A&B	3-WAY	SEQUENCING	5/8 or 7/8	1.6/2.5 or 2.5/3.5/4.0
	VP526A	3-WAY	MIXING	5/8	1.6, 2.5
	VP527A	2-WAY	N.O.	1/2	0.63, 1.0, 1.6
	VP513A	2-WAY	N.O.	5/8 or 7/8	2.5, 4.0
	VP513B	2-WAY	N.C.	5/8	1.0, 1.6, 2.5
	VP531A	2-WAY	N.O.	5/8 or 7/8 (ODS)	1.6, 2.6, 3.3
JOHNSON SERVICE	V4332	3-WAY	MIXING	1/2	1.2, 2.0
	V4334	3-WAY	MIXING	5/8	4.7
	V4440	3-WAY	SEQUENCING	1/2	1.4, 2.4
	V4440	3-WAY	SEQUENCING	5/8	4.1, 4.7
	V3766	2-WAY	N.O.	1/2	1.0, 1.7, 3.2
	V3966	2-WAY	N.C.	1/2	1.7, 3.2
BARBER-COLEMAN	VK9312	3-WAY	MIXING	5/8	2.0, 4.0
	VK9332	3-WAY	SEQUENCING	5/8	1.7, 2.4, 4.0
	VK9212	2-WAY	N.O.	5/8	0.4, 1.3, 2.2, 3.3
	VK9222	2-WAY	N.C.	5/8	0.4, 1.3, 2.2, 3.3
MCC POWERS	VP656-0011, 10, 09	3-WAY	MIXING	1/2	1.5, 2.5
	VP658-0004, 5	3-WAY	DIVERTING	1/2	2.5
	VP658-0050, 51	3-WAY	SEQUENCING	1/2	1.5, 2.5
	VP658-0004, 5	2-WAY	N.O.	1/2	1.0, 2.5
	VP656-0002, 4	2-WAY	N.O.	1/2	0.9, 2.1
	VP656-0012	2-WAY	N.C.	1/2	2.1
ROBERTSHAW	2582 (V8200)	2-WAY	N.O.	1/2	0.4, 0.6, 1.0, 1.6
	2583 (V8300)	3-WAY	MIXING	1/2	1.6
	2561 (V6101)	2-WAY	N.C.	1/2, 5/8	1.2, 2.2, 4.1
	2561 (V6102)	2-WAY	N.O.	1/2	1.0, 1.6
	2563 (V6300)	3-WAY	MIXING	1/2	1.6
	2563 (V6301)	3-WAY	MIXING	5/8	2.5
	2569 (V6900, 01)	3-WAY	SEQUENCING	1/2, 5/8, 7/8	.6, 1.0, 1.1, 1.6, 2.5, 3.2, 2.4, 4.0, 4.5

C_V — See Note 5.
N.C. — Normally Closed
N.O. — Normally Open
OD — Outside Diameter

NOTES:
1. This reference table lists valves that are acceptable because of capacity and piping connection type. Actual valve selection for specific mode (N.O. or N.C.) and capacity rating (C_V) to meet jobsite conditions must be made by field personnel.
2. Valve size (1/2-, 5/8-, and 7/8-in. OD) designates the matching tubing size.
   Use price page package 18-2 or 18-4 for selecting 1/2-in. or 5/8-in. OD valves. Use price page package 18-3 or 18-5 for 7/8-in. OD valves.
3. The 1/2-in. and 5/8-in. OD valves are used primarily on 42C (ceiling) and 42V (vertical) room fan coil units. The 7/8-in. OD valves are recommended for use on 42D (ducted) units.
4. Flare connections are 45° SAE flare with body threaded for standard flare nuts.
5. The C_V capacity rating is the gpm flow through a valve at 1.0 psi pressure drop.

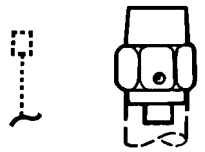
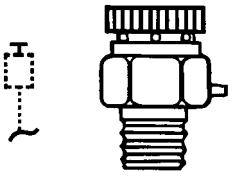
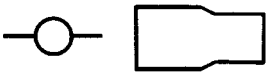
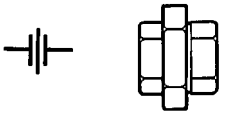
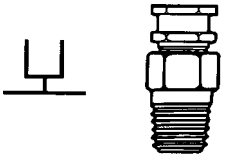
   EXAMPLE: A 2.5 C_V valve has a flow of 2.5 gpm at 1.0 psi pressure drop.

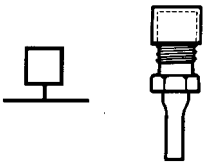
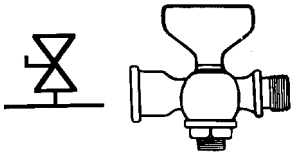
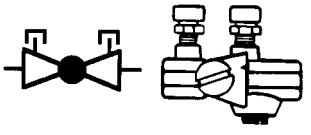
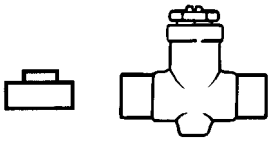
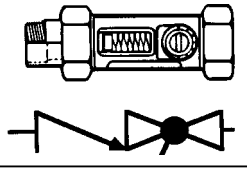
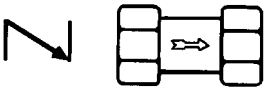
   As flow changes, pressure drop can be determined by the formula:

$$P = \frac{\text{Actual gpm}}{C_V}^2$$

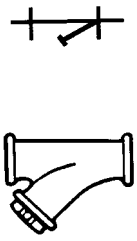
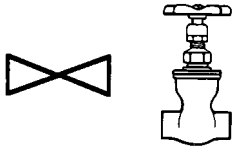
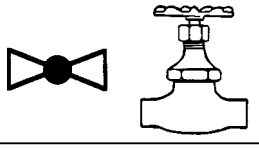
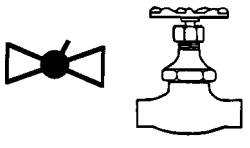
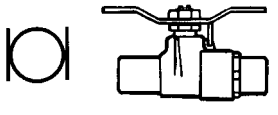
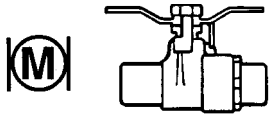
6. Restrictions imposed by limited piping enclosures often require that the valve manufacturer's recommendation for obstruction free service clearances be waived. Service/isolation valves normally specified will permit removal of the entire pneumatic valve for field service if necessary.
7. Certain combinations of piping accessories and control valves have proven unacceptable in the past, therefore the factory must reserve the right of review for final acceptance.
8. Consult factory on all applications involving valves with thermostatic actuators or built in pneumatic thermostats.

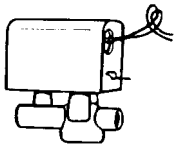
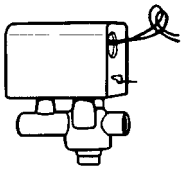
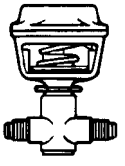
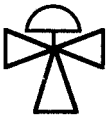
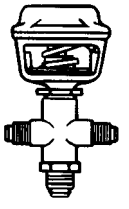
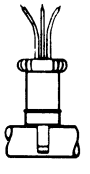
PIPING COMPONENTS

SYMBOL/SKETCH	DESCRIPTION	C_V FACTOR		RATING		STEAM USE
		½	¾	PSI	F	
	**MANUAL AIR VENT:** Threaded brass needle valve with screwdriver slot for adjustment. Application - Body brazed into high point of heating and cooling coils for bleeding air from coil. Standard item on all hydronic coils (not used on steam or DX coils). Should not be used in lieu of main system air vents.	N/A	N/A	400	100	NO
	**AUTOMATIC AIR VENT:** Nickel plated brass valve, fiber-disc type, with positive shut-off ballcheck and quick vent feature via knurled vent screw. Application - Optional replacement for manual air vent. Automatically passes minute quantities of air through the fiber discs which expand upon contact with water, completely sealing the valve. As air accumulates, the fiber discs dry and shrink, repeating the cycle. Not recommended for removing large quantities of air encountered during initial start-up or subsequent draining and refilling. Should not be used in lieu of main system air vents.	N/A	N/A	125	240	NO
	**SWAGE:** Copper tube end expanded to accept a copper tube of the same size for factory or field brazing. Application - Used where possible for all tubing joints for best joint integrity. (*) See page 30 for ratings of different joining materials and operating temperatures.	N/A	N/A	300 (*)	200 (*)	YES
	**UNION:** Combination wrought copper/cast brass union assembly, solder by solder. Application - Used for quick connect (and disconnect) of valve package components to minimize field labor and facilitate servicing of unit. (*) See page 30 for ratings of different joining materials and operating temperatures.	N/A	N/A	300 (*)	200 (*)	YES
	**INSERTION TEST PORT:** Brass body valve for acceptance of test probe (up to ⅛ in. diameter). Application - Installed on one (or both) sides of the coil to allow for temperature or pressure sensing. Used for close tolerance water balancing and service analysis.	N/A	N/A	250	250	NO

SYMBOL/SKETCH	DESCRIPTION	C_V FACTOR		RATING		STEAM USE
		½	¾	PSI	F	
	**PRESSURE TEST PORT:** Brass body ¼ service access fitting with removable depressor type core. Application - Installed on both sides of the coil to allow for pressure sensing. Attach pressure gages to facilitate close tolerance water balancing.	N/A	N/A	400	210	NO
	**GAGE COCK:** Brass shut-off valve with ¼ FPT fitting for attachment of pressure gages. Application - Installed on both sides of the coil to allow for pressure sensing. Attach pressure gages to facilitate close tolerance water balancing. May be used in bleed bypass line to regulate water flow.	N/A	N/A	200	250	N/A
B + G 	**CIRCUIT SETTER:** Variable water flow balancing valve with manual adjustment knob, pointer, percent-open scale, memory stop and integral pressure read-out ports. Application - Used for close tolerance water flow balancing. Positive shut-off ball valve feature allows usage as combination balancing and shut-off valve.	1.95	4.15	200	250	NO
	**BALANCE VALVE:** Variable water flow manual balancing valve with screwdriver slot adjustment screw. Application - Often used in conjunction with test port fittings for water flow balancing. Balance by temperature differential or coil pressure drop (check specifications for service fittings required if balancing by pressure drop). May be used in 3-way valve bypass line to permit equal flow balancing.	3.0	8.9	150	200	NO
	**FLOW SETTER:** Variable water flow manual balancing valve with screwdriver slot adjustment and direct gpm read-out sight glass. Application - Used for water flow balancing (8.0 gpm maximum).	2.2	5.4	125	210	NO
	**FIXED FLOW VALVE:** Spring and insert type (non-adjustable). Application - Used for water flow balancing. Valve automatically adjusts the flow to within 10% of set point. Not available for flow rates above 8 gpm.	Valve orifice size determines C_V factor. The orifice of these fixed flow valves changes as flow is regulated. As the water pressure increases, the orifice size decreases, thereby automatically limiting the flow rate to the specified gpm (+/−10%).		125	240	NO
HAYES 	**FIXED FLOW VALVE:** Flexible orifice type (non-adjustable). Application - Used for water flow balancing. Valve automatically adjusts the flow to within 10% of set point. Requires 15 psi (35 ft) of additional pump head for proper operation.			150	160	NO

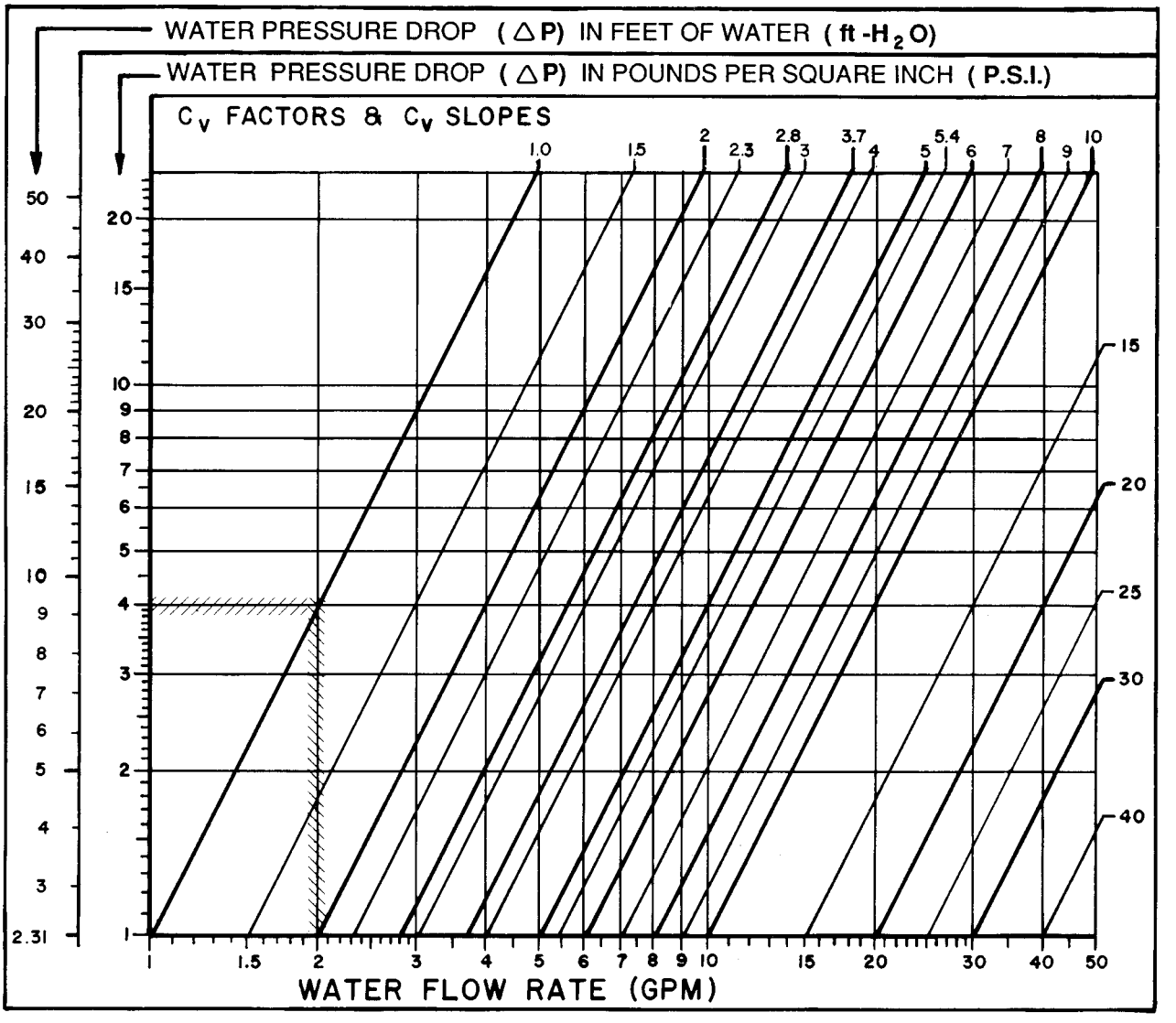
PIPING COMPONENTS (cont)

SYMBOL/SKETCH	DESCRIPTION	C_V FACTOR		RATING		STEAM USE
		½	¾	PSI	F	
	**STRAINER:** Y-type body with 50 mesh stainless steel screen. Application - Used for removal of small particles from system water during normal system operation. Should not be used in lieu of main system strainers. Strainer screen may have to be removed during initial high pressure system flushing during start-up. Screen should be removed and cleaned per normal maintenance schedule (provisions for strainer blow-down not provided).	9.0 Clean	19.0 Clean	400	250	N/A
	**GATE VALVE:** Manual shut-off valve. Application - Used for unit isolation during system flushing, servicing, etc. Do not use for water balancing.	19.8	36.0	200	200	NO
	**GLOBE VALVE:** Standard pattern, manual shut-off and throttling valve. Application - Used for unit isolation. Not recommended for high flow rates due to relatively high pressure drop.	1.8	3.9	200	200	NO
	**COMPRESSION STOP VALVE:** Manual shut-off valve. Application - Used for unit isolation during system flushing, servicing, etc. Not recommended for high flow rates due to relatively high pressure drop.	2.3	5.4	150	200	NO
	**BALL VALVE:** Manual balance and shut-off valve. Application - Used for unit isolation and water flow balancing. Without memory stop feature water balance point must be marked by installer (if necessary). Check specifications for service fittings required when used for water balancing.	4.0	7.5	400	200	YES
	**BALL VALVE WITH MEMORY STOP:** Manual balance and shut-off valve. Application - Used for unit isolation and water flow balancing. The adjustable memory stop feature allows return to the balance point after shut-off. Check specifications for service fittings required when used for water balancing.	4.0	7.5	400	200	N/A

SYMBOL/SKETCH	DESCRIPTION	C_V FACTOR		RATING		STEAM USE
		½	¾	PSI	F	
 	**2-WAY MOTORIZED VALVE:** Electric 2-position flow control valve (open/closed). Normally-closed body with manual override lever. Installed in supply line to unit. Application - All standard control and valve packages are based upon normally-closed valves (valve electrically powered open and closed by spring return when electric power removed). Manual override lever allows valve to be placed in the open position for secondary (unit) flushing, constant water flow prior to start-up, etc. Manual override is automatically disengaged when valve is electrically activated. **Consult factory for normally-open valve applications.**	2.3	2.3	300	200	YES 15 PSI MAX.
 	**3-WAY MOTORIZED VALVE:** Electric 2-position flow control valve (closed to coil/open to bypass or open to coil/ closed to bypass). Normally-closed with manual override lever. Installed in supply line to unit. Application - Same comments as 2-way motorized valve except with manual override lever engaged the valve is open to both ports and water flow will take the path of least resistance through the valve package (not necessarily 100% through the coil).	5.0 SERVICE 2.8 BYPASS	5.0 2.8 	300	200	N/A
 	**2-WAY PNEUMATIC VALVE:** Pneumatic operated 2-way control valve. Application - Specified and supplied by others when required as part of a factory-assembled valve package. See Table 1 for approved listing of pneumatic valves suitable for installation on various unit models.	SPECS VARY WITH SUPPLIER				
 	**3-WAY PNEUMATIC VALVE:** Pneumatically operated 3-way control valve. Application - Specified and supplied by others when required as a part of a factory-assembled valve package. See Table 1 for approved listing of pneumatic valves suitable for installation on various unit models.	SPECS VARY WITH SUPPLIER				
 	**AQUASTAT:** Water temperature sensing electrical switch. Application - Clips directly on nominal size ½″ or ¾″ copper tubing for water temperature sensing. Must be correctly located for proper control operation.					

NOTES:
1. Motorized 2-way valves have a maximum close-off differential of 25 psi.
2. Motorized 3-way valves have a maximum close-off differential of 10 psi.

C_V FACTOR vs WATER PRESSURE DROP



C_V FACTOR:

The flow rate in gallons per minute (gpm) through a piping component when the pressure drop (ΔP) in pounds per square inch (psi) across the component is 1.0 (psi).

Pressure drop (ft-H_2O) = 2.31 x psi (pressure drop)

GRAPH EXAMPLE:

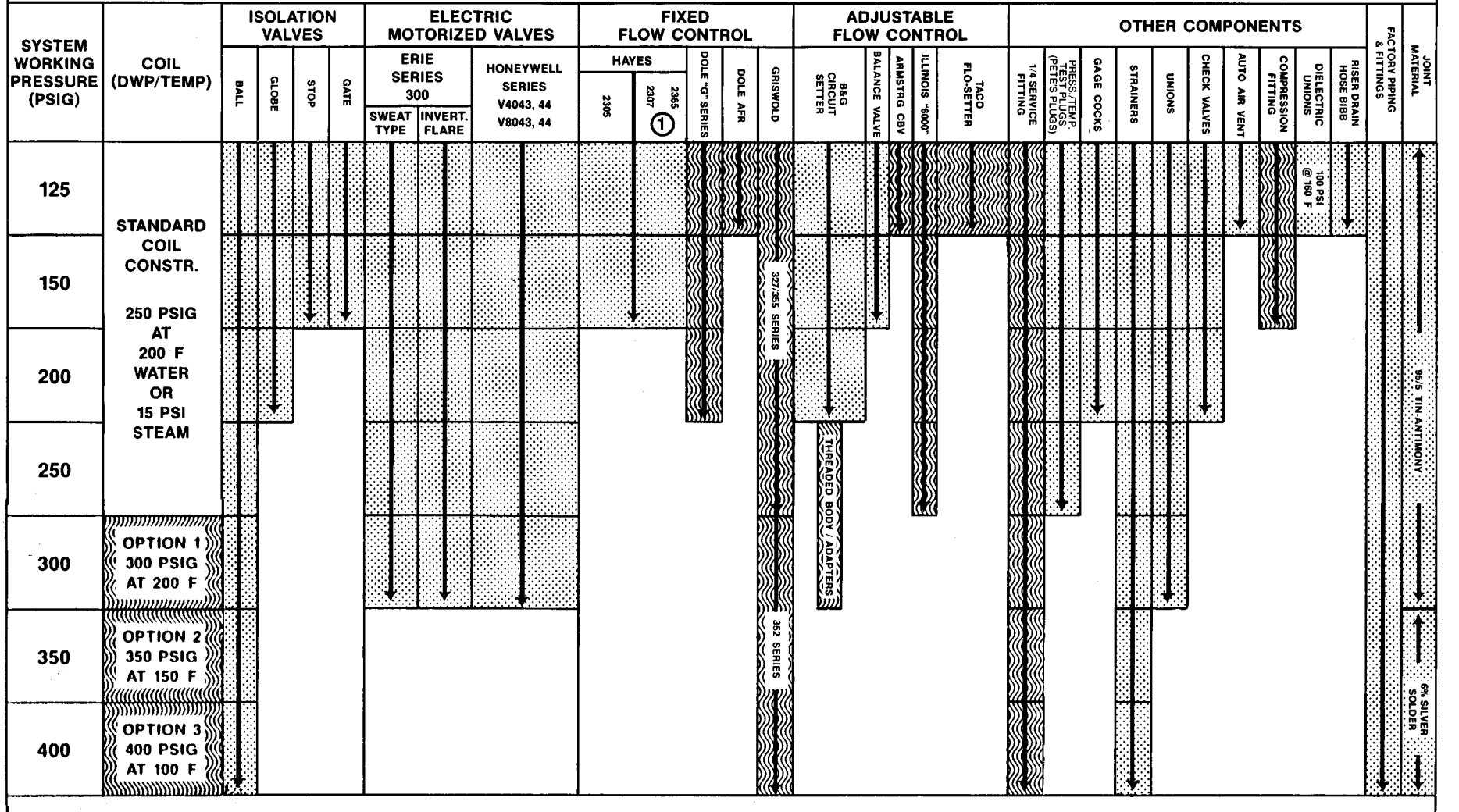
ΔP for 2.0 gpm through a component with a C_V of 1.0 is 4.0 psi x 2.31 = 9.24 ft-H_2O

FORMULA EXAMPLE:

$$\Delta P \text{ (ft-}H_2O) = \frac{(gpm)^2}{(C_v)^2} \times 2.31 = \frac{(2.0)^2}{(1.0)^2} \times 2.31 = 9.24 \text{ ft-}H_2O$$

TOTAL PRESSURE DROP is the **Sum** of the pressure drop of all piping and components in the water flow path.

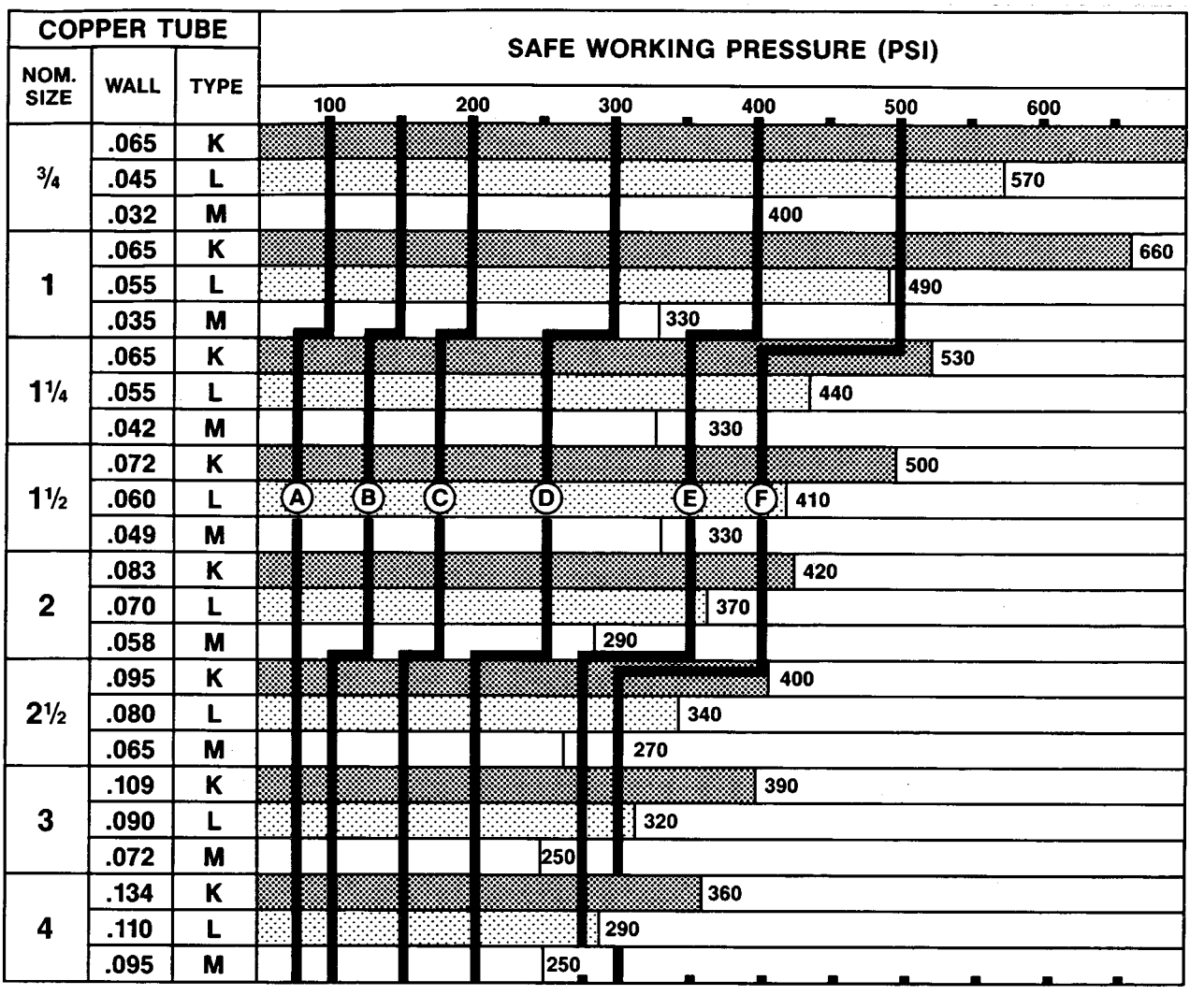
SYSTEM COMPONENT WORKING PRESSURE TABLE



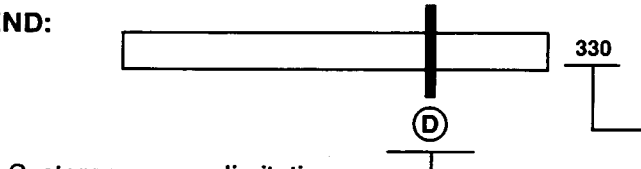
1 Substitutes for 2305, consult factory for higher flow rates

Special components, consult factory

COPPER WATER TUBE AND JOINT MATERIAL PRESSURE RATINGS



LEGEND:



Maximum safe working pressure (psi) for copper water tube alone at 200 F. Nominal size tube shown, add 1/8" to obtain actual tube OD

System pressure limitation due to joint material and water temperature

JOINT MATERIALS					
A	50-50 Lead-Tin at 200 F	*Note 1*	D	95-5 Tin-Antimony at 200 F	*Note 2*
B	50-50 Lead-Tin at 150 F		E	95-5 Tin-Antimony at 150 F	
C	50-50 Lead-Tin at 100 F		F	95-5 Tin-Antimony at 100 F	

1. Not recommended for high system water pressures.
2. Standard factory joint material.

THE ABOVE CHART IS FOR REFERENCE ONLY: Check all system component pressure ratings (coils, valves, pumps, etc.) and any applicable local or national piping codes prior to specifying system pressure rating.

CORRECTION FACTORS FOR GLYCOL
(Equivalent water flow method for all 42 Series Models)

This method allows you to calculate cooling and heating performance without adjusting capacities for glycol concentration.

After completing the standard selection procedure including water flow rates, use the correction multiplier shown below to determine new (equivalent) flow rates required for the specified glycol concentration.

EQUIVALENT FLOW MULTIPLIERS FOR WATER AND GLYCOL SOLUTION

APPLICATION	% GLYCOL IN SOLUTION (BY VOLUME)								
	10	15	20	25	30	35	40	45	50
COOLING (CHILLED WATER)									
FLOW RATE MULTIPLIER	1.06		1.10		1.14		1.18		1.22
PRESSURE DROP MULTIPLIER	1.09		1.18		1.27		1.36		1.45
HEATING (HOT WATER)									
FLOW RATE MULTIPLIER	1.03		1.06		1.09		1.12		1.15
PRESSURE DROP MULTIPLIER	0.98		0.97		0.96		0.95		0.94

Normal flow rate x multiplier shown above = equivalent (new) flow rate for specified water and glycol solution. This higher equivalent flow rate of water and glycol will deliver the same performance (Cooling MBtuh/Heating MBtuh) as the normal flow rate of 100% water.

EXAMPLE:

COOLING PERFORMANCE REQUIRES 3.0 gpm of 100% WATER.

What flow rate of 30% glycol by voume will be required to match the cooling performance? Referring to the chart above, you will note that the cooling flow rate multiplier for 30% glycol is 1.14.

100% WATER (3.0 gpm) x 1.14 = 3.42 gpm of 30% GLYCOL (EQUIVALENT FLOW RATE)

What will the new pressure drop be for 3.42 gpm of 30% glycol? Referring to the chart above, you will note that the cooling pressure drop multiplier for 30% glycol is 1.27.

(A) Obtain pressure drop for 3.42 gpm of 100% water.

(B) Multiply (A) times 1.27 to obtain pressure drop for 3.42 gpm of 30% glycol.

Table 2 — Standard Accessories and Options

STANDARD ACCESSORIES AND OPTIONS	UNIT SERIES — 42																		
	Ceiling — Horizontal					Floor — Vertical						Ducted — Horizontal					Belt Drive	Stack — Vertical		
	CA	CE	CG	CK	CF	VA	VB	VF	VC	VE	VG	DA	DC	DE	DF	DD	BH	SG	SH	SJ
CABINET CHANGES																				
Front Panel, 16 Gage							•	•												
Extended Cabinet when electric heat or valves are installed			•						•	•										
Valve Compartment Extension, 10 in.											•									
Stamped Toe Space Return Grille							•	•												
CLEANABLE FILTERS		•	•	•	•	•	•	•	•	•			•	•	•	•	•	•	•	•
COILS																				
3-Row (2-row cooling, 1-row heating)									•	•										
3-Row (high capacity)									•	•										
4-Row (3-row cooling, 1-row heating)	•	•	•	•	•	•	•	•										•	•	•
4-Row (high capacity)	•	•	•	•	Std	•	•	•				Std	Std	Std	Std	Std	Std	•	•	•
5-Row (4-row cooling, 1-row heating)	•	•	•	•	•	•	•	•				•	•	•	•	•	•	•	•	•
5-Row (3-row cooling, 2-row heating)	•	•	•	•	•	•	•	•										•	•	•
6-Row (4-row cooling, 2-row heating)												•	•	•	•	•	•			
6-Row (high capacity)												•	•	•	•	•	•			
7-Row (6-row cooling, 1-row heating)												•	•	•	•		•			
8-Row (6-row cooling, 2-row heating)																	•			
DAMPERS																				
Manual — Adjustable through return air opening						•	•	•												
Manual Adjustment, remote mounted						•	•	•												
Manual — Rear opening with sliding damper — not filtered									•	•										
Outdoor Air Connection (6 in.), with filter and with or without damper		•	•	•	•															
Damper, Linkage and Motor wired to auxiliary contact of 3-speed switch						•	•	•												
DECORATIVE COLORS (See Carrier Fan Coil Paint Selector Guide)			•	•			•	•		•					•				•	
DISCHARGE GRILLES																				
Stamped Front Discharge							•	•			Std									
Double Deflection, installed			•				•	•		•					•				•	
Double Deflection, shipped loose	•	•		•	•	•			•									•		•
Reverse stamped for vertical discharge								•												
DRAIN PANS																				
Auxiliary Drip Lip — Included with 2- or 3-way motorized valves	•	•	•	•	•							•	•	•	•					
Tell-Tale, with 2nd drain connection	•	•	•	•	•							•	•	•	•					
Sleeved Steel Extension						•	•	•	•	•										
ELECTRIC HEATERS																				
Nichrome Wire Strip Heater	•	•	•	•	•							•	•	•	•	•		•	•	•
Sheath Type Heater						•	•	•	•	•										
LEVELING LEGS (maximum adjustment, ¾ in.)						•	•	•	•	•										
MOTORS																				
115-1-60 PSC	Std	Std	Std	Std	Std	Std	Std	Std	Std	Std		Std	Std	Std	Std	Std		Std	Std	Std
208-1-60 PSC	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•		•	•	•
240-1-60 PSC	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•		•	•	•
277-1-60 PSC	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•		•	•	•
115/230-1-60																	•			
220/440-3-60																	•			
220-1-50 PSC	•	•	•	•		•	•	•	•	•		•	•	•	•	•		•	•	•
MOTOR QUICK-DISCONNECT PLUG	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•		•	•	•
OUTSIDE-AIR WALL BOX						•	•	•												
RETURN AIR GRILLE, shipped loose	•	•			•							•	•	•		•				
TAMPERPROOF LOCKS (Camloc)																				
Access Panels			•	•			•	•		•									•	
Access Doors							•	•											•	
VALVE PACKAGES	•	•	•	•	•	•	•	•	•	•	Limited	•	•	•	•	•		•	•	•
WALL PANELS (for recessed unit)						•														
WIRING PACKAGES	•	•	•	•	•	•	•	•	•	•	Limited	•	•	•	•	•		•	•	•