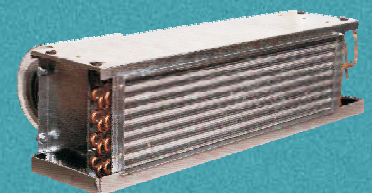


# Fan Coil Unit

Chilled Water / Direct Expansion



Universal Type  
Duct Type Unit  
Special Exposed  
Decorative and Innovative  
Ceiling Suspended  
Floor Standing



Provides Turnkey Projects

## Conceptual Planning

to Commissioning of HVACR Projects



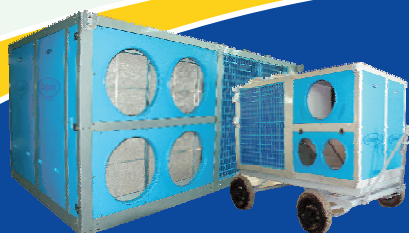
# THE LARGEST MANUFACTURER OF AIR CONDITIONING EQUIPMENT

Equipment is manufactured on latest CNC machines with prompt deliveries

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**Provides Turnkey Projects, Starting from conceptual planning till the commissioning of HVACR projects**

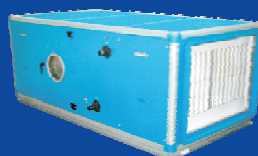
- Heat Load Calculation
- HVAC System Concept & Design
- Supply of HVAC Equipment
- Installation
- Testing & Commissioning
- Operation & Maintenance



Package Mobile AC Plant



Package Type Unit



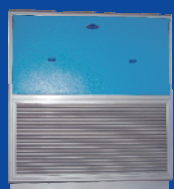
Double Skinned AHU



Concealed Type AHU



Floor Standing Split AC



Vertical Type AHU



Air Cooled Water Chiller



Floor Standing Cabinet (DX/CW)



Universal Type Split AC



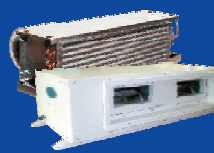
Cassette Type Split AC



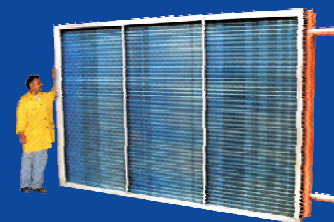
Cold Rooms & Reefer Containers



Air Handling Units



Duct Type Split AC Unit



Tube Size 3/8"OD, 1/2"OC, 5/8"OD

*COOL POINT (Pvt.) Ltd. Introduces new phenomenon of Water Cooled Air Conditioning System in small capacity units (1-Ton, 1.5-Ton, 2-Ton and 2.5-Ton)*

## Contents

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## Legend

The following legends are used throughout this manual:

AFR	Air Flow Rate
BEP	Baked Enamel Paint
Cfm	Cubic feet per minute
dB	Decibels
EADB	Entering Air Dry Bulb
EAWB	Entering Air Wet Bulb
ET	Evaporating Temperature
EWT	Entering Water Temperature
ESP	External Static Pressure
Ft	Total Capacity Factor
Ftwg	Feet to Water Gauge
Fs	Sensible Capacity Factor
GPM	Gallons per minute
Hz	Hertz
inwg	Inch of Water Gauge
kW	Kilowatts
kg	Kilograms
kPa	Kilo Pascals
LADB	Leaving Air Dry Bulb
LAWB	Leaving Air Wet Bulb
lbs	Pounds weight (British units)
l/s	Liters per second
MBh	1000 Btuh
NC	Noise Criteria
OD	Outside Diameter
Ph	Phase
Pa	Pascals
SC	Sensible Capacity
SCCF	Sensible Capacity Correction Factor
SPL	Sound Pressure Level
TC	Total Capacity
TCCF	Total Capacity Correction Factor
TR	Tons of refrigeration = 12 MBH
USgpm	US Gallons per minute
V	Volts
WFR	Water Flow Rate
WTR	Water Temperature Rise
WPD	Water Pressure Drop

## General Features

COOL POINT fan coil units have been designed with the requirement of the Pakistani market foremost in consideration.

Fan coil units are ideally suited for installation in chilled water or DX applications to meet air conditioning requirements of individual rooms throughout the year. Increasingly, architects require a hidden indoor unit with custom enclosure to match the aesthetic requirements of the space. The cooling medium can be refrigerant for DX applications in :

- small residences
- apartment houses
- small commercial establishments
- mosques



For individual room temperature control in chilled water applications, Hi - Static fan coils can be an ideal solution on major projects involving :

- Apartment Complexes
- Office Blocks
- Hospitals & Clinics
- Shopping Malls & Centers
- Airports
- Hi-rise Buildings
- Hotels & Motels
- Commercial Developments
- Schools & Colleges
- Libraries





Fan coil units provide flexibility of architectural design, economy of operation and space usage, individual room control with privacy, quietness, versatility of location and installation, and multiplicity of control system. All these reasons make the fan coils the first choice as Fan Coil units from COOL POINT are: Built in the Gulf...for the world.

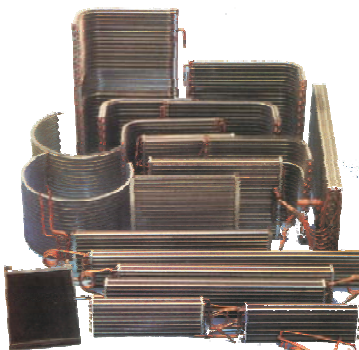
#### Features:

- High efficiency coil with high efficiency wavy corrugated fins.
- Hi-efficiency, low power consumption PSC electric motor.
- Hi-efficiency forward curved fan for quiet operation.
- Manual air vent.
- Heavy gauge galvanised casing & fan housing. Hot dip is standard.
- Insulated heavy gauge drain pan.
- Isolating grommet for additional vibration isolation.
- Quick electrical connections.

## Component Features

### Coils

Cooling & heating coils are manufactured from 3/8" (9.5mm) OD seamless copper tubes mechanically bonded to high efficiency wavy corrugated aluminium fins. Copper fins are available as an option.



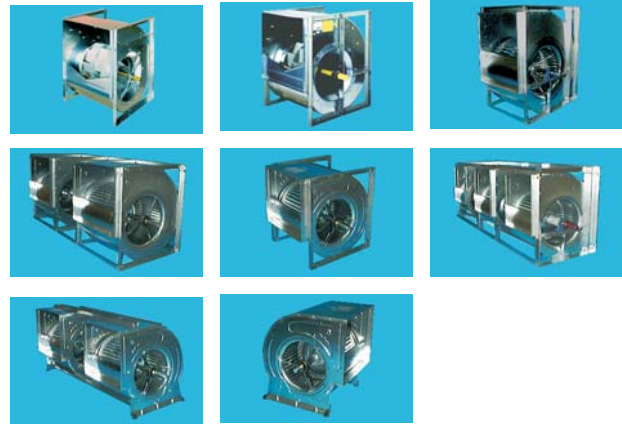
Coils are factory leak tested by air pressure at 300 psig (2068 kPa) under water. Air vent is standard. Chilled water cooling coils are available in 3, 4 and 6 rows. Heating coils are available in 1, 2, 3, 4 & 6 rows. DX coils are available in 3, 4 & 6 rows. Coil connections are plain tube extensions supplied LH or RH as required for chilled water and DX units.

Distributor for DX type fan coils is provided as standard with correct sizes and quantity of outlet pipes. Coils are rated in accordance with ARI - 410/2001. fan coil units can be supplied with a maximum total of 6 rows/coil as follows :

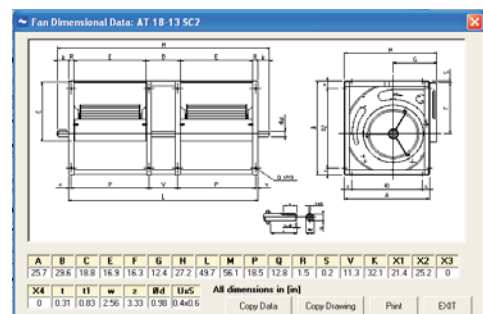
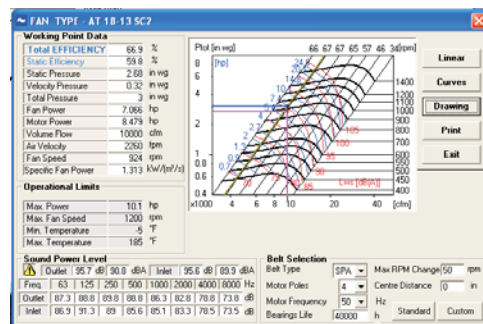
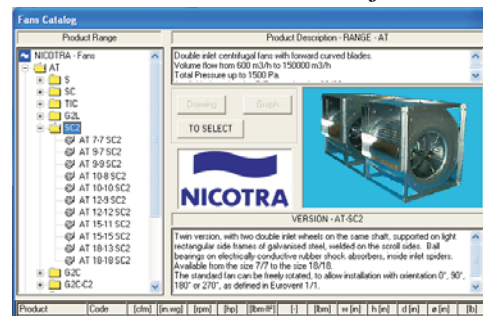
- Cooling and heating with 4 and 2 pipe system combination upto a total of 6 rows only.
- Maximum 6 row cooling coil and electric heater battery.
- Maximum 6 row DX cooling coil and electric heater battery.

## Fan / Motor

Hi - Static fan coil units use centrifugal double inlet double width low noise fans direct driven by single phase, 3-speed permanent split capacitor motor. These motors have integral thermal protection, low temperature rise, are highly efficient, have high power factor and operate almost noiselessly with permanent lubricated sleeve bearings.



### Fan/Blower Selection Software



## Casing

Units are constructed from high gauge galvanised steel sheet complying with ASTM-A525 and JSIG-3302 for maximum protection against corrosion. On request, as option, electrostatic polyester powder coating on zinc coated galvanized and phosphatised sheets are available. Other colors available as a further option, on request, at additional charge.

## Drain Pan

Fabricated from heavy gauge zinc coated steel sheets, painted irrespective of the type of finish for unit casing and insulated from outside by 4 mm thick polyethylene foam insulation for maximum protection against sweating and corrosion. Drain pan is extended to include coil, headers and U - bends. Drain connection 3/4" (19mm) O.D. is provided for removal of condensation.

## Options

The standard options available for Hi - Static Fan Coil Units include:

**Automatic Air Vent**  
(specify option AAV)

**Electric Heater Battery**  
(specify option FEH):

For heating during cooler months. Available for DX or chilled water on all Hi - Static fan coil unit models. Order should specify FEH1 for Variant 1 and FEH2 for Variant 2. Thermostat must be ordered separately.

Unit Size	Number of heater element	
	Variant 1	Variant 2
6	1 x 1.0	2 x 1.0
8	1 x 1.5	2 x 1.5
10	1 x 1.0+1 x 1.5	3 x 1.5
12	1 x 3.0	2 x 3.0
15	1 x 3.0	2 x 3.0
18	1 x 4.0	2 x 4.0
21	1 x 4.0	2 x 4.0
24	1 x 4.0	2 x 4.0

**Thermostats**  
(wall mounted decorative type)

Cooling only or Cooling/Heating thermostats available with sub-bases. Details on pages 20 - 22.

**Double Skin Units**  
(specify option DSU)

Recommended for all units installed in locations having a high temperature difference between supply air temperature and surrounding environment of the Hi - Static fan coil units.

This option is available for DDP models only. Additional sound attenuation is achieved with double skinning. Cold bridges are avoided fully in the sandwich construction.

## Controls

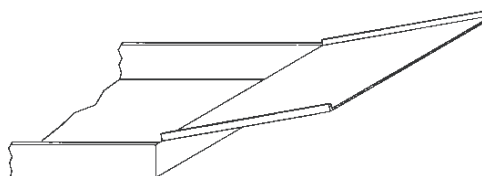
Various options on valve packages and control systems are available. 8 different valve packages are available factory installed or loose for field mounting along with 3 options on control packages. Full details of options available see full write-up on pages 20 - 22.

## Auxillary and/or Double Insulated Drain Pans

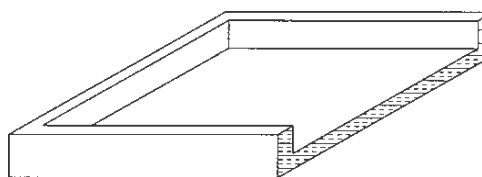
Available for models DDC and DDP only to provide extended and additional protection against condensation below valve packages.

### Options available:

1. Auxiliary drip lip. supplied loose to be fitted on the edge of the drain pan under the valves. Specify option ADP.



2. Double skin drain pan with heavy gauge galvanised steel internal & external skin. The inner and outer skins are filled with fibre glass insulation. Internal skin additionally protected with painted finish. Specify option PDI.



3. Stainless steel drain pan insulated from outside with 4mm thick polyethylene foam insulation. Specify option PSD.
4. Double skin drain pan with stainless steel internal skin and heavy gauge galvanized steel outer skin sandwiched between a fibre glass insulation. Specify option PSID.

## Powder Coated Decorative Finish

(specify option BEP)

Available for models DDF only where required for exposed installation. Model DDE comes standard with this option. Colors available ivory white (RAL 7032) or light grey (RAL 8019). Specify with option code BEP. Optionally other RAL colors may be available. Specify color with code BEP.

### Supply and Return Air Grille

Powder coated discharge grille and/or return grille available for DDE & DDF. Double deflection discharge grille available under option code GDD. Single deflection discharge or return grille available under option code RAG.

Grills are powder coated to match color of unit, if option BEP ordered or in standard aluminium finish if option BEP not required or ordered.

### Discharge Plenum

(Specify option GDP)

A discharge plenum for free standing DDF models only is available. Option BEP must be ordered with this option. Option GDP includes, in addition, a double deflection supply grille and a single deflection return air grille, powder coated in matching color. Colors available ivory white (RAL 7032) or light grey (RAL 8019). Specify with option code.

## Application Flexibility

Hi - Static fan coil units are available in a capacity range of 600 - 2400 cfm (283-1133 l/s), in various models having 8 sizes each. Configurations available include ceiling suspended horizontal or vertical floor mounted.

#### 1. T1

Ceiling suspended, concealed application with DX or chilled water coils.

#### 2. T2

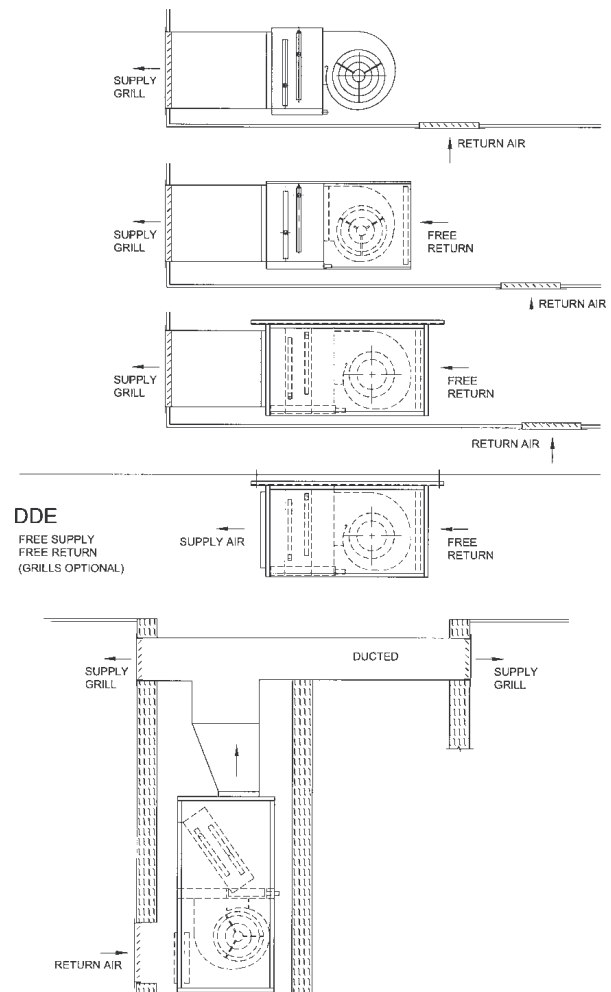
Ceiling suspended for concealed applications, includes a factory installed plenum. The plenum is lined with 1/2" glass fibre insulation. Units are supplied with 1" cleanable filter as standard.

#### 3. T3

Ceiling suspended, exposed type includes basic DDC, plus a cabinet with removable access panels lined with 1/2" fibre glass insulation. Units are supplied with 1" cleanable filter. Units are with electrostatically applied polyester powder coat and can be supplied with supply and return air grilles on request.

#### 4. T4

Floor mounted, vertical supply with 1" cleanable filter. Units can be supplied with supply and return grill on request with electrostatic polyester powder coat, oven-baked. Units have a removable access panel to provide complete access to coil and motor blower section. All units can be supplied for either free or ducted air delivery.



## Physical Data

Unit Size		06	08	10	12	15	18	21	24
Nominal Airflow Rate	cfm	600	800	1000	1200	1500	1800	2100	2400
	l/s	283	378	472	566	708	849	991	1133
Coil	Type	-	Copper tubes mechanically bonded to Hi-Efficiency wavy corrugated Aluminium Fins						
	Fin Height	inch	12	12	16	12	12	16	16
		mm	305	305	406	305	305	406	406
	Fin Length	inch	20	24	24	36	42	42	48
		mm	508	610	610	914	1067	1067	1219
	Face Area	ft <sup>2</sup>	1.7	2.0	2.7	3.0	3.5	4.7	5.3
		m <sup>2</sup>	0.15	0.19	0.25	0.28	0.33	0.43	0.50
Fan	Type	-	Double Inlet Double Width Centrifugal Forward Curve Direct Drive						
	Code	-	7-7	7-7	9-7	7-7	7-7	9-7	9-7
	Quantity	#	1	1	1	2	2	2	2
Motor	Type	-	220-240V/1Ph/50-60Hz, 3 Speed Electric Motor with Permanent Split Capacitor						
	Size	Watts	147	147	147	147	147	245	245
	Quantity	#	1	1	1	2	2	2	2
	Total Power Input	Watts	346	346	396	692	692	792	1100

## Nominal Capacity Ratings (for FCU of All Types)

Size	Nominal Airflow Rate	3 Rows				4 Rows				6 Rows			
		Total Capacity	Sensible Capacity	Water Flow Rate	Water Pressure Drop	Total Capacity	Sensible Capacity	Water Flow Rate	Water Pressure Drop	Total Capacity	Sensible Capacity	Water Flow Rate	Water Pressure Drop
	cfm l/s	MBh kW	MBh kW	USgpm l/s	ftwg kPa	MBh kW	MBh kW	USGpm l/s	ftwg kPa	MBh kW	MBh kW	USGpm l/s	ftwg kPa
06	600	12.8	10.1	2.6	0.9	17.5	12.6	3.5	1.9	23.8	15.9	4.8	4.2
	283	3.8	3.0	0.2	2.8	5.1	3.7	0.2	5.7	7.0	4.7	0.3	12.7
08	800	18.0	13.6	3.6	1.8	23.3	16.6	4.7	3.4	31.6	21.1	6.3	7.6
	378	5.3	4.0	0.2	5.5	6.8	4.9	0.3	10.3	9.2	6.2	0.4	22.8
10	1000	23.2	17.4	4.6	1.7	29.9	21.2	6.0	3.2	40.3	26.8	8.1	7.1
	472	6.8	5.1	0.3	5.2	8.8	6.2	0.4	9.6	11.8	7.9	0.5	21.1
12	1200	30.0	21.5	6.0	5.5	38.0	26.1	7.6	9.9	44.9	30.7	9.0	3.2
	566	8.8	6.3	0.4	16.3	11.1	7.6	0.5	29.5	13.1	9.0	0.6	9.5
15	1500	37.5	26.6	7.5	8.7	41.0	30.0	8.2	2.3	56.5	38.4	11.3	5.2
	708	11.0	7.8	0.5	26.1	12.0	8.8	0.5	6.9	16.6	11.2	0.7	15.5
18	1800	47.4	33.2	9.5	7.9	51.5	37.2	10.3	2.1	70.4	47.3	14.1	4.6
	849	13.9	9.7	0.6	23.7	15.1	10.9	0.7	6.2	20.6	13.9	0.9	13.7
21	2100	51.5	37.3	10.3	3.7	61.5	43.9	12.3	3.0	83.3	55.6	16.7	6.6
	991	15.1	10.9	0.6	11.1	18.0	12.9	0.8	9.1	24.4	16.3	1.1	19.7
24	2400	60.0	42.9	12.0	5.2	72.1	50.7	14.4	4.3	96.4	64.0	19.3	9.1
	1133	17.6	12.6	0.8	15.5	21.1	14.9	0.9	12.7	28.3	18.8	1.2	27.2

### Notes

Chilled water capacity ratings are based on nominal air flow rate; air entering temperature DB/WB80/67°F (26.5/19.4°C), 45°F (7.2°C) entering chilled water temperature and 10°F (5.5°C) water temperature rise.

## Nominal Capacity Ratings (for All Type of FCU)

## Direct Expansion Coil

Size	Nominal Airflow Rate	3 Rows		4 Rows		6 Rows	
		Total Capacity	Sensible Capacity	Total Capacity	Sensible Capacity	Total Capacity	Sensible Capacity
		MBh kW	MBh kW	MBh kW	MBh kW	MBh kW	MBh kW
06	600	21.2	13.2	24.9	15.5	29.3	18.2
	283	6.2	3.9	7.3	4.5	8.6	5.3
08	800	26.7	16.8	31.8	19.9	37.8	23.7
	378	7.8	4.9	9.3	5.8	11.1	6.9
10	1000	34.6	21.6	40.8	25.4	48.2	30.1
	472	10.1	6.3	12.0	7.5	14.1	8.8
12	1200	40.1	25.2	47.7	29.9	56.7	35.5
	566	11.8	7.4	14.0	8.8	16.6	10.4
15	1500	48.3	30.6	57.9	36.4	69.4	43.6
	708	14.2	9.0	17.0	10.7	20.3	12.8
18	1800	61.3	38.4	72.7	45.3	86.1	53.7
	849	18.0	11.3	21.3	13.3	25.2	15.7
21	2100	70.8	44.4	84.1	52.5	99.8	62.3
	991	20.8	13.0	24.6	15.4	29.2	18.3
24	2400	80.2	50.4	95.5	59.7	113.4	71.0
	1133	23.5	14.8	28.0	17.5	33.3	20.8

### Notes:

- Direct expansion capacity ratings based on nominal air flow rate, air entering temperature, 80/67 °F (26.5/19.4°C) DB/WB, 40°F (4.4°C) evaporating temperature.
- For different entering air conditions and/or evaporating temperature, use correction factors as in Charts 2 & 3.

## Nominal Capacity Rating (For all Types of FCU)

## Hot Water Coils

Size	Nominal Airflow Rate	1 Row			2 Rows			3 Rows		
		Total Capacity	Water Flow Rate	Water Pressure Drop	Total Capacity	Water Flow Rate	Water Pressure Drop	Total Capacity	Water Flow Rate	Water Pressure Drop
		MBh kW	USGpm l/s	ftwg kPa	MBh kW	USGpm l/s	ftwg kPa	MBh kW	USGpm l/s	ftwg kPa
06	600	16.5	1.7	1.1	33.3	3.3	5.5	44.4	4.4	11.3
	283	4.8	0.1	3.4	9.8	0.2	16.4	13.0	0.3	33.8
08	800	22.1	2.2	2.0	43.3	4.3	9.4	53.6	5.4	3.4
	378	6.5	0.1	6.1	12.7	0.3	28.1	15.7	0.3	10.1
10	1000	28.6	2.9	1.9	55.6	5.6	8.8	68.6	6.9	3.1
	472	8.4	0.2	5.8	16.3	0.4	26.2	20.1	0.4	9.4
12	1200	36.7	3.7	5.9	62.2	6.2	4.3	84.9	8.5	9.0
	566	10.8	0.2	17.6	18.2	0.4	12.8	24.9	0.5	26.9
15	1500	38.5	3.8	1.4	77.3	7.7	6.7	100.3	10.0	5.1
	708	11.3	0.2	4.3	22.7	0.5	20.1	29.4	0.6	15.2
18	1800	48.9	4.9	1.3	97.5	9.8	6.1	125.2	12.5	4.5
	849	14.3	0.3	3.9	28.6	0.6	18.1	36.7	0.8	13.5
21	2100	58.5	5.8	1.9	114.4	11.4	8.5	147.8	14.8	6.4
	991	17.1	0.4	5.7	33.5	0.7	25.4	43.3	0.9	19.1
24	2400	68.7	6.9	2.7	132.0	13.2	11.6	169.8	17.0	8.6
	1133	20.1	0.4	7.9	38.7	0.8	34.5	49.8	1.1	25.8

### Notes

Table 7 data based on Nominal Air Flow, 70 °F (21.1°C) entering air temperature, 180/160°F (82.2/71.1°C) entering/leaving hot water temperature. For other conditions refer to correction factor Chart 4.

Air temp. rise =  $\frac{\text{Capacity (Btuh)}}{1.1 \times \text{cfm}}$   
[°F]

or  $\frac{\text{Capacity (kW)}}{1.232 \times \text{l/s}}$   
[°C]



## Electric Heaters

### Application

Electric heaters are available on all Models of Hi - Static FCUs for:

1. Heating during winter without the need for a central boiler or hot water source. The chilled water is a two pipe system allowing year round temperature control. Thermostat is suitable for heating/cooling (see Page 22) with or without manual or automatic changeover.
2. Incremental heat during peak heating season when cooling coil is circulating hot water in a two pipe system and is unable to meet full heating requirements of the space.

FCUs with factory built heating elements as shown in Table 1 on Page 4 are available in two variants. Each variant is provided with one high limit safety cut-out (Auto Reset) and arranged for 1 stage operation at 220 -240V 1 PH 50/60Hz.

For any other special requirements like no. of heater stages, controls, power supply, etc. please contact COOL POINT.

### Capacity

Maximum capacity of the electric heater is determined by the air capacity of the particular model. Table 1 shows the 2 variations available for each model in the Hi - Static fan coil units.

### Contactors and Controls

Contactors are not included as standard and must be field supplied and installed.

### Heater Elements

"U" shape finned tubular heating element constructed from high quality 80/20 nickel chrome resistance wire connected to terminal pins and centered in a metal tube with galvanized steel fin.

The elements are isolated from the casing. Separate power source is required for the heaters.

## Electrical Data

Unit Size	Nominal Airflow Rate		Motor		Maximum Amperes					
					220-240 V / 1 Ph / 50 Hz			220-240 V / 1 Ph / 60 Hz		
	cfm	L/s	Size	Qty.	Speed					
					High	Medium	Low	High	Medium	Low
06	600	283	147	1	1.6	1.2	1.0	1.8	1.3	1.0
08	800	378	147	1	1.7	1.1	1.0	2.1	1.4	1.0
10	1000	472	147	1	1.4	0.8	0.6	1.7	0.9	0.7
12	1200	566	147	2	3.2	2.4	2.0	3.6	2.6	2.0
15	1500	708	147	2	3.4	2.2	2.0	4.2	2.8	2.0
18	1800	849	147	2	2.6	1.4	1.2	3.4	1.8	1.4
21	2100	991	245	2	3.8	3.4	3.0	4.8	3.6	2.4
24	2400	1133	245	2	3.8	3.4	3.0	4.8	3.6	2.4

### Notes :

1. The low speed setting is factory disabled for units with direct expansion coils.
2. The max amps as tabulated above are max. total amps per unit.
3. A separate power feeder is required for units supplied with optional factory installed electric heaters.
4. Maximum allowable fuse rating for any unit size must not exceed 15 amps/250 volts AC.
5. Full load inductive current (amps.) rating of 3-speed switch must be greater than the maximum amps. (at appropriate voltage) as listed above.
6. The units are suitable for electrical system where voltage supplied to the terminals is not below or above 10% of the listed voltage.

## Motor Technical Data

### Thermal overload protector

All motors used in Hi - Static fan coil units are inherently protected by means of thermal cut-out embedded in the winding. This thermal cut-out is calibrated to trip out when the winding reaches a pre determined temperature. The thermal cut out will automatically reset when the temperature returns to a safe limit.

### Efficiency and Power Factor

COOL POINT fan coil units are equipped with permanent split capacitor motors because of their high efficiency and higher power factor than that of shaded pole motors being used by many other manufacturers of fan coil units.

The efficiency range of permanent split capacitor motors varies between 50 & 60 % as compared to 30 to 40 % for shaded pole motors with power factor

0.6 to 0.7 while the power factor of a permanent split capacitor motor approaches 1.0.

COOL POINT chooses permanent split capacitor motor on the basis of their higher efficiency and power factor in order to maintain the total power factor of the installation above a set minimum value.

## Sound Power Levels

dB RE 10<sup>-12</sup> Watts at 1/8" Wg (32 Pa) ESP

Speed	Size	Octave Band & Center Frequency							
		63	125	250	500	1000	2000	4000	8000
High	6	58	60	61	60	58	54	48	44
	8	59	61	62	61	59	55	49	45
	10	64	66	67	66	64	60	54	50
	12	60	62	63	62	60	56	50	46
	15	61	63	64	63	61	57	51	47
	18	62	64	65	64	62	58	52	48
	21	65	68	69	68	66	62	56	52
	24	66	69	70	69	67	63	57	53
Medium	6	56	58	59	58	56	52	46	42
	8	57	59	60	59	57	53	47	43
	10	58	60	61	60	58	54	48	44
	12	58	60	61	60	58	54	48	44
	15	59	61	62	61	59	55	49	45
	18	60	62	63	62	60	56	50	46
	21	60	62	63	62	60	56	50	46
	24	60	62	63	62	60	56	50	46
Low	6	50	52	53	52	50	46	40	36
	8	51	53	54	53	51	47	41	37
	10	52	54	55	54	52	48	42	38
	12	52	54	55	54	52	48	42	38
	15	53	55	56	55	53	49	43	39
	18	53	55	56	55	53	49	43	39
	21	54	56	57	56	54	50	44	40
	24	54	56	57	56	54	50	44	40

The Sound Power Data tabulated in Table 9 is the sound power level data for Hi - Static Fan Coil Units. Subtract the corresponding values given in Table 10 from the values in Table 9 to get sound power levels for desired unit type.

Using this data, the sound pressure level resulting from the fan coil units in an occupied space can be determined in accordance with procedures established in ASHRAE standard 36 - 72 by subtracting the room absorption effect from sound power level.

Plot of the resulting sound pressure values on an octave band NC curve Chart 5 determines the NC value for specified usage. The NC level rating corresponds to the highest NC curve touched by the noise spectrum.

To arrive at a final sound level in dBA of the unit in the conditioned space, factors other than room absorption effect should be taken into consideration like duct work, insulation, grilles, etc.

### Casing Attenuation

	63	125	250	500	1000	2000	4000	8000
DDP, DDE, DDF	0	0	1	2	3	5	4	4
DDC	0	0	0	0	0	0	0	0

### Room Absorption Effect (Typical)

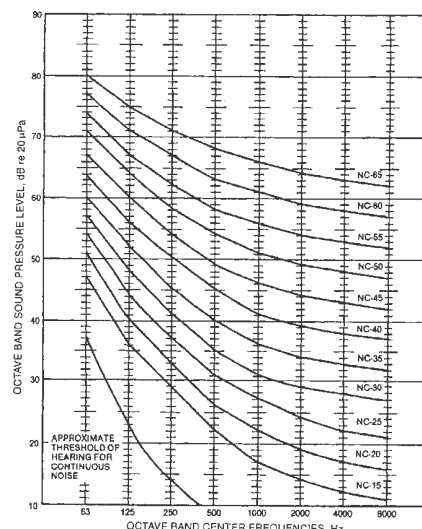
Room Type	Octave Band & Center Frequency							
	63	125	250	500	1000	2000	4000	8000
Soft	14	15	19	22	23	22	22	22
Medium	13	14	18	19	20	20	20	20
Hard	11	11	12	14	15	15	16	17

### Octave Band Analysis for Sample Calculation

		Octave Band & Center Frequency							
		63	125	250	500	1000	2000	4000	8000
Sound Power Level	Table 9	57	59	60	59	57	53	47	43
Casing Attenuation	Table 10	-0	-0	-1	-2	-3	-5	-4	-4
Room Absorption	Table 11	-14	-15	-19	-22	-23	-22	-22	-22
Sound Pressure Level		43	44	40	35	31	26	21	17

Note : Occupant must be atleast 1m (3.28feet) from the source

## Noise Criteria



NC (Noise Criteria) curves for specifying the Design Level in Terms of the Maximum Permissible Sound Pressure Level for each Frequency Band Sample Calculation :

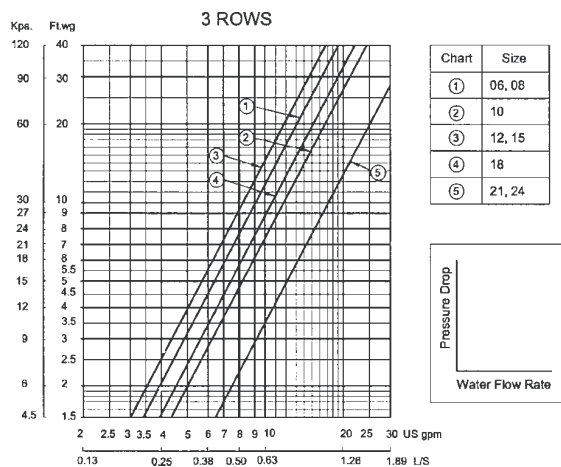
The calculation of the NC level for a sample application is as follows:

1. Refer to sound power level data and tabulate sound power data by octave band for the selected size and unit speed.
2. Subtract casing attenuation.
3. Select proper room absorption effect by octave band and subtract from item 2 above.
4. Plot the resulting values of sound pressure of an octave band noise criterion chart
5. Find the highest NC rating corresponding to the plotted curve

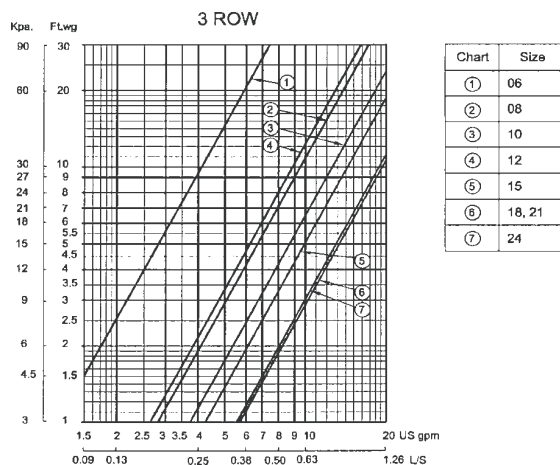
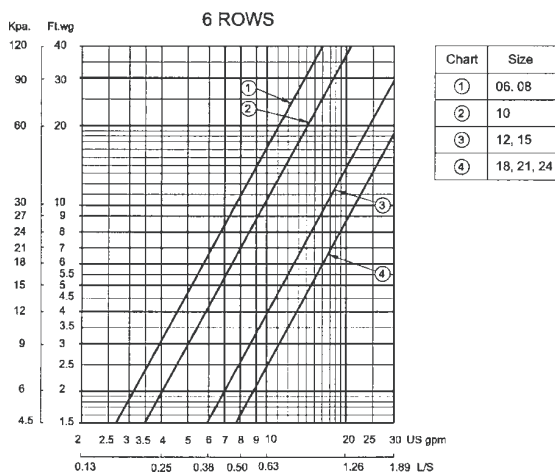
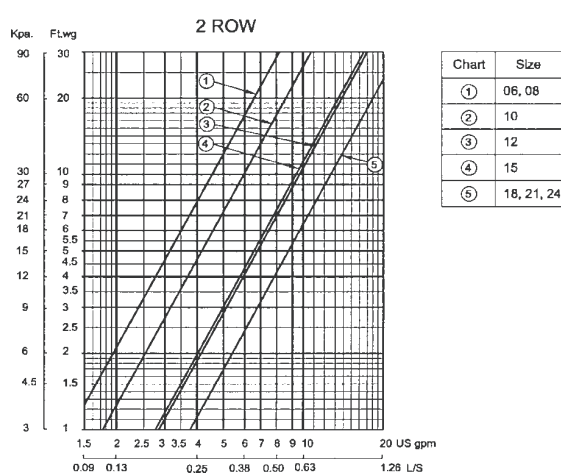
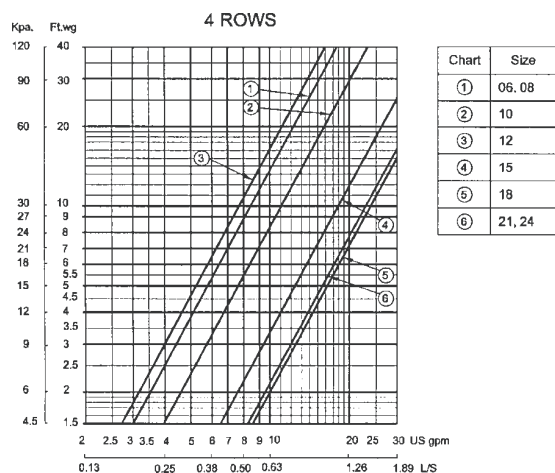
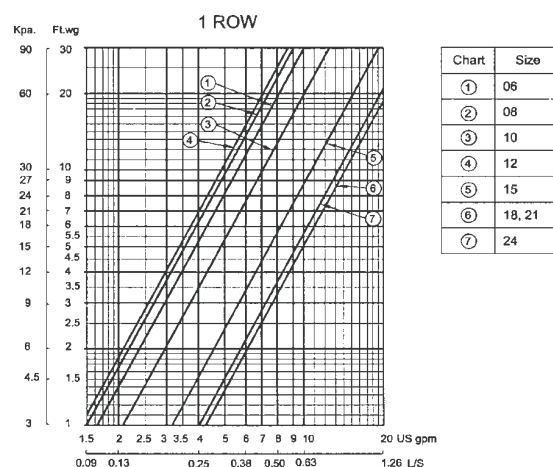
### Example:

Find NC rating for unit size DDE-8 operating at medium speed in executive office (soft). A plot on NC Chart 5 shows that NC-30 is touched by the highest value on the fifth octave band, the SPL on all other bands is below NC-30.

## Water Pressure Drop Through Cooling Coil



## Water Pressure Drop Through Hot Water Coil





## Air Delivery (50 Hz)

	Size	06	08	10	12	15	18	21	24
Nom	cfm	600	800	1000	1200	1500	1800	2100	2400
AFR	L/s	283	378	472	566	708	849	991	1133

Speed	FCU		3 Rows				4 Rows				6 Rows			
			External Static Pressure											
		inw g	0.1	0.2	0.3	0.4	0.1	0.2	0.3	0.4	0.1	0.2	0.3	0.4
		Pa	25	50	75	100	25	50	75	100	25	50	75	100
High	06	cfm	666	648	629	604	658	640	619	592	642	624	599	567
		l/s	314	306	297	285	310	302	292	279	303	294	283	267
	08	cfm	829	803	781	756	817	793	771	744	795	774	749	717
		l/s	391	379	369	357	385	374	364	351	375	365	354	339
	10	cfm	1019	970	901	816	1002	946	875	791	961	899	826	745
		l/s	481	458	425	385	473	447	413	373	454	424	390	352
	12	cfm	1301	1269	1231	1181	1285	1251	1210	1155	1252	1213	1163	1099
		l/s	614	599	581	558	606	590	571	545	591	572	549	519
15	cfm	1588	1553	1513	1464	1568	1532	1490	1436	1529	1489	1438	1373	
	l/s	749	733	714	691	740	723	703	677	722	703	679	648	
18	cfm	1959	1836	1687	1517	1904	1776	1628	1463	1796	1667	1523	1367	
	l/s	924	867	796	716	898	838	768	690	847	787	719	645	
21	cfm	2408	2230	2027	1801	2317	2139	1941	1725	2152	1981	1796	1598	
	l/s	1136	1052	956	850	1093	1009	916	814	1016	935	848	754	
24	cfm	2540	2376	2175	1944	2466	2295	2094	1870	2320	2146	1954	1742	
	l/s	1199	1121	1026	917	1164	1083	988	882	1095	1013	922	822	
Medium	06	cfm	483	467	448	419	479	463	442	412	471	454	431	397
		l/s	228	220	211	198	226	218	209	194	222	214	203	188
	08	cfm	657	641	623	597	652	636	616	589	642	625	602	571
		l/s	310	303	294	282	308	300	291	278	303	295	284	269
	10	cfm	691	703	689	650	696	702	683	640	702	697	668	620
		l/s	326	332	325	307	328	331	322	302	331	329	315	293
	12	cfm	963	931	891	832	953	921	878	814	934	899	849	778
		l/s	454	439	421	392	450	434	414	384	441	424	401	367
15	cfm	1304	1273	1236	1184	1292	1260	1219	1163	1268	1231	1183	1118	
	l/s	615	601	583	559	610	595	575	549	598	581	558	527	
18	cfm	1401	1398	1344	1249	1406	1388	1324	1223	1402	1359	1280	1173	
	l/s	661	660	634	589	663	655	625	577	662	641	604	553	
21	cfm	2177	2066	1908	1716	2133	2005	1843	1654	2028	1887	1726	1546	
	l/s	1027	975	900	810	1006	946	870	781	957	891	815	730	
24	cfm	2222	2150	2015	1830	2202	2108	1961	1773	2137	2013	1855	1669	
	l/s	1048	1015	951	864	1039	995	925	837	1008	950	875	788	
Low	06	cfm	380	362	332	296	378	358	327	292	373	349	319	283
		l/s	179	171	157	140	178	169	155	138	176	165	150	134
	08	cfm	503	481	457	429	499	477	452	424	490	468	443	415
		l/s	237	227	216	203	235	225	214	200	231	221	209	196
	10	cfm	454	459	464	432	453	460	463	427	452	463	459	415
		l/s	214	216	219	204	214	217	218	201	213	219	216	196
	12	cfm	757	718	655	580	752	707	644	570	737	687	623	551
		l/s	357	339	309	274	355	334	304	269	348	324	294	260
15	cfm	1001	957	906	849	990	946	895	837	969	924	872	814	
	l/s	472	451	428	401	467	446	422	395	457	436	412	384	
18	cfm	905	925	919	835	905	928	912	821	909	931	895	793	
	l/s	427	437	434	394	427	438	431	387	429	439	422	374	
21	cfm	1853	1828	1758	1649	1849	1809	1727	1612	1825	1760	1662	1539	
	l/s	874	862	830	778	872	854	815	761	861	830	785	726	
24	cfm	1851	1848	1803	1711	1853	1840	1782	1682	1850	1813	1735	1622	
	l/s	873	872	851	808	874	868	841	794	873	856	819	765	

## Selection

### Selection Considerations

In selecting Hi - Static Fan Coil units for a specific application the factors to be considered should include:

- Available space for the unit including floor to ceiling height
- Presence of high sensible or peripheral loads in space
- Functionality of intended space usage.
- Availability of access for pipes, drains & power.
- Compatibility with intended space finish.
- Fresh air and ventilation requirements
- Noise level desired at peak or part load operations

- Control system desired especially if winter heating is required.
- Economy of layout

Once a particular model or models in the Hi -Static series is selected after consideration of the above factors, it is necessary to select the unit and coil size to match. It is possible to obtain different unit size with or without different coil depths to meet given design parameters.

The correct unit with correct coil size is obtained only when required cfm at defined speed; i.e. High, Medium or Low to meet sensible load of the space is matched to the correct coil providing the required sensible cooling or outlet temperature at given flow rate and design temperature rise with the unit operating at functional sound levels. To achieve this the engineer or designer must not only check aesthetic needs but

also space limitations, psychrometric feasibility, circulation and ventilation, room acoustical effect, control system, piping accesses including overall chilled water circuits and effect of diversity on same.

### Selection Procedure

1. Select unit that delivers approximately air flow required at desired speed and external static pressure from air flow rate tables. Select unit with air flow equal or more than that required.
2. Apply correction factors to selected unit and find out the actual total and sensible cooling capacity.
3. Repeat step 1 if required parameter is not met with actual values obtained from initially selected unit.

## Selection for Specified Total Cooling Capacity

### Example 1

#### Specified Performance

Air flow	680 cfm, 0.2 inwg ESP, medium speed
Total capacity	18.8 MBh,
Sensible Capacity	14.4 MBh
Entering air temp. deg. F	86/69 DB/WB
Entering water temp. deg. F	44
Power supply	220V/1PH/50Hz

Unit to be installed concealed for a small shop. Unit required with plenum and suitable for ducted return connection.

1. From Table 13, unit model FCU - DDC - 10/3R gives 703 cfm at 0.2 inwg and medium speed.
2. The air flow correction factor from Table 5 on page 9 using actual air flow/nom.  
 $\text{air flow} = 703/1000 = 70.3\%$   
 $F_t = 0.78 \quad F_s = 0.76$
3. Find nominal capacity for selected unit at 80/67 oF DB/WB EWT = 45 oF and 10 oF WTR from Table 3 and applying correction factor obtained from Step 2.  
 $\text{Total capacity} = 23.2 \text{ MBh} \times 0.78 = 18.1 \text{ MBh}$   
 $\text{Sensible capacity} = 17.4 \text{ MBh} \times 0.76 = 13.2 \text{ MBh}$
4. Find TCCF by dividing specified capacity by total capacity in Step 3;  $18.8/18.1 = 1.04$
5. Enter chart 1 on Page 7 at TCCF = 1.04 and draw a horizontal line until the intersection with entering air wet bulb temperature and then draw a vertical line. From the point of intersection with entering water temperature read WTR = 13°F and from the point of intersection with entering air dry bulb temperature read SCCF = 1.18.
6. Multiply sensible cooling capacity in Step 3 by SCCF (step 5)  
 $13.2 \times 1.18 = 15.6 \text{ MBh}$
7. Find water flow rate (GPM)  

$$\text{GPM} = \frac{\text{Actual total cooling capacity (MBh)}}{0.5 \times \text{WTR}}$$

$$= \frac{18.8}{0.5 \times 13.0}$$

$$= 2.89 \text{ USgpm}$$

Refer to water pressure drop and read water pressure drop through coil = 1.5 ft. wg.

Using Tables 9 & 10 with Chart 5 find NC is the highest value in the octave band.

## Selection for Specified Sensible Capacity

### Example 2 (SI System)

#### Specified Performance

Air flow	543 l/s, 75Pa ESP, high speed
Sensible Capacity	7 kW
Entering air temp. deg. C	25.56 / 17.22 DB/WB
Entering water temp. deg. C	6.11 °C
Power supply	220V/1PH/50Hz

Unit to be installed concealed for a small shop. Unit required with plenum and suitable for ducted return connection.

1. From air delivery Table 14 select model size DDP-12/4R giving air flow 556 l/s at 75Pa ESP.
2. The air flow correction factor =  $556/566 = 98\%$  using Table 5 on page 9.  
 $F_t = 0.99 \quad F_s = 0.99$
3. Find nominal capacity for model size 12/4R from Table 3 and apply correction factor obtained from Step 2.  
 $\text{Total capacity} = 11.14 \times 0.99 = 11.03 \text{ kW}$   
 $\text{Sensible capacity} = 7.65 \times 0.99 = 7.57 \text{ kW}$
4. Find SCCF by dividing the specified sensible capacity by sensible capacity in Step 3;  $7/7.57 = 0.93$
5. Enter Chart 1 at SCCF = 0.93 and draw a horizontal line and from the point of intersection with entering air dry bulb temperature, draw a vertical line. From the point of intersection with entering water temperature read WTR = 6.7°C. The point of intersection with entering air wet bulb read TCCF = 0.72.
6. Find the actual total cooling capacity  
 $0.72 \times 11.03 = 7.94 \text{ kW}$
7. Calculate the actual water flow rate WFR(l/s) =  $7.94 \times 0.239 / 6.7 = 0.283$  from the water pressure drop Chart at 0.283 l/s read water pressure drop 12 kPa.

## Unit Capacity Rating at Specified Water Temperature Rise

### Example 3

#### Specified Performance

Unit Model	DDP 10/6R 0.2inwg ESP high speed
Entering air temp. deg. F	88/71 DB/WB
Entering water temp. deg. F	8
Water temperature rise deg. F	8
Power Supply	220V / 1Ph / 50Hz

- From air flow rate Table 14 specified model gives 866 cfm  
 $866/1000 = 86.6\%$  air flow correction factor. (Table 5)  
 $F_t = 0.92$   $F_s = 0.91$
- Enter the chart at specified WTR and draw a horizontal line.
- From the point of intersection with entering water temp. draw a vertical line till the intersection with entering air wet bulb temp reads TCCF = 1.23 and from the point of intersection with air entering dry bulb read SCCF = 1.26
- Apply factors from Step 1 and Step 3 and multiply by nominal total and sensible cooling capacities.  
 Actual total capacity =  $40.3 \times 0.92 \times 1.23 = 45.6$  MBh  
 Actual sensible capacity =  $26.8 \times 0.91 \times 1.26 = 30.7$  MBh
- Calculate actual water flow and read WPD from chart.  
 $WFR = 45.6 / 0.5 \times 8 = 11.4$  USgpm  
 $WPD = 13.0$  ft. wg.

$$= \frac{1.085 \times \text{cfm}}{85 - 20350} = 63.1^\circ\text{F}$$

## Selection Procedure for Chilled Water Coil

### Example 4

Select FCU suitable for ceiling suspension and for duct connection to have the following duty:

- |                             |          |                     |
|-----------------------------|----------|---------------------|
| 1. Air flow rate            | cfm      | 920 (at high speed) |
| 2. Sensible capacity        | Btuh     | 19,500              |
| 3. Total capacity           | Btuh     | 25,000              |
| 4. Entering Air temp        | °F db/wb | 82 / 66             |
| 5. Entering water temp      | °F       | 43                  |
| 6. Water Entering temp.     | °F       | 8                   |
| 7. External Static Pressure | wg       | 0.1                 |
| 8. Power Supply             | V/Ph/Hz  | 220/1/50            |
- Selection from Table 14 air delivery select unit size. FCU-DDP-10/3R air delivery for the same at 0.2 in. wg. external static pressure and 3 rows cooling coil is 993 cfm.
  - Air flow correction factor  $(993/1000) = 99.3\%$  ( $F_t = 1.00$ ,  $F_s = 1.00$ )
  - Tabulated nom. cooling capacity for selected unit at 10.0o water temperature rise is from chilled water capacity ratings.
    - Total cooling capacity (TC) ..... 23.2 MBh
    - Sensible cooling (SC) ..... 17.4 MBh

Applying correction factors from chilled water chart:

$$\begin{aligned} \text{Actual total cooling capacity} &= 23.2 \times 1.12 \times 1.00 = 25.98 \text{ MBh} \\ \text{Actual sensible capacity} &= 17.4 \times 1.17 \times 1.00 = 20.35 \text{ MBh} \end{aligned}$$

In case the capacities for the selected unit are not meeting the required capacity, select unit with next number of rows (note that air flow rate will be less).

$$\begin{aligned} \text{Required Water Flow Rate (gpm)} &= \frac{\text{Actual Total cooling capacity (MBH)}}{0.5 \times \text{WTR (}^\circ\text{F)}} \\ &= \frac{25.98}{0.5 \times 8} = 6.5 \text{ USgpm} \end{aligned}$$

Refer to WPD chart and find water pressure drop at 6.5 gpm, 3 rows and read 3.25 ft.wg. Calculate Leaving Air Temperature.

$$\text{Leaving air dry bulb} = \text{EDB} - \text{SC (Btuh)}$$



## Valves & Controls

### Valve Packages

COOL POINT offers a wide variety of optional valve packages (Type 1 to Type 8 shown on Page 21) that can suit practically any application. Any one of the following options may be chosen, considering application requirements:

1. Factory furnished and installed as a complete package. Specify Type number
2. Furnished by the factory and field installed by the customer. Add prefix C to the valve package type; eg. Type C1.

Specify your valve package requirements from the full line of accessories as follows:

- Gate or stop valve
- Globe or balancing valve
- 3-way motorized valve, electric
- 2-way motorized valve, electric

The type nos. are as corresponding to those shown in Fig.3. Combinations available can be selected as standard.

Combinations and/or requirements not covered in Figure 3, Types 1 to 8 may be available and should be referred to factory for selection.

### Control Packages

COOL POINT provides a variety of control options, a few of which are mentioned below. Please consult factory sales department for other control applications. Aquastat for Heat-Cool auto changeover must be field supplied and field installed by others, if necessary.

#### Control System

The control systems for COOL POINT Hi - Static FCUs can be selected provided the application is identified for:

- Cooling/Heating
- Cooling or Heating

The control system can be:

- 2-pipe with valve cycled
- 2-pipe with total electric heat
- 4-pipe with valve cycled

Control valves in the control system are available in 2-way and 3-way motorized versions with compression ends for easy field installation and replacement.

The location of the Thermostat and/or fan speed regulating switch determines the need for a remote or unit mounted control.

For remote mounting the options available are:

1. Combination wall mounting Cooling thermostat with 3-speed switch.
2. Combination wall mounting Cooling/ Heating thermostat with 3-speed switch and Manual H/C change-over switch.
3. Cooling/Heating wall mounted thermostat with sub base for Manual switching Auto-Off.
4. Heating/Cooling wall mounted thermostat with sub base for Manual switching Heat-Off-Cool.
5. 3-speed Fan switch for mounting in a std. 2 x 4 junction box (Off-Hi-Med-Lo) plus an additional aux. circuit for energizing electric valve.

For unit mounting the options available are:

1. 3-speed Fan switch (Off-Hi-Med-Lo) plus an additional aux. circuit for energizing electric valve.
2. Cooling thermostat only.
3. Cooling/Heating thermostat without manual change-over switch.

#### Ordering & Selection Procedure

To correctly order the desired valve package and/or control package as a complete integrated control system, the following procedure should be adopted.

1. Select desired valve package. Type 1 to Type 8.
2. Decide to have same factory installed. Add prefix C to Type

(eg. Type C1) if to be supplied only by COOL POINT for field installation.

3. Select desired control package Code CP1 to CP3.
4. Select thermostat and fan switch from options listed.
5. Complete ordering code option 3CP2RTH3 shall provide a factory installed valve package with a 2 way electric motorized valve plus a stop valve or the supply and return lines as shown in Type 3, Figure 3.

The control system is for a 2 pipe installation total electric heating (option FEH1 or FEH2 should have been ordered as from Table 1 Page 4).

The control system is complete with a cooling/heating thermostat with sub-base for manual switchover for heating to cooling plus an auto-off switch.

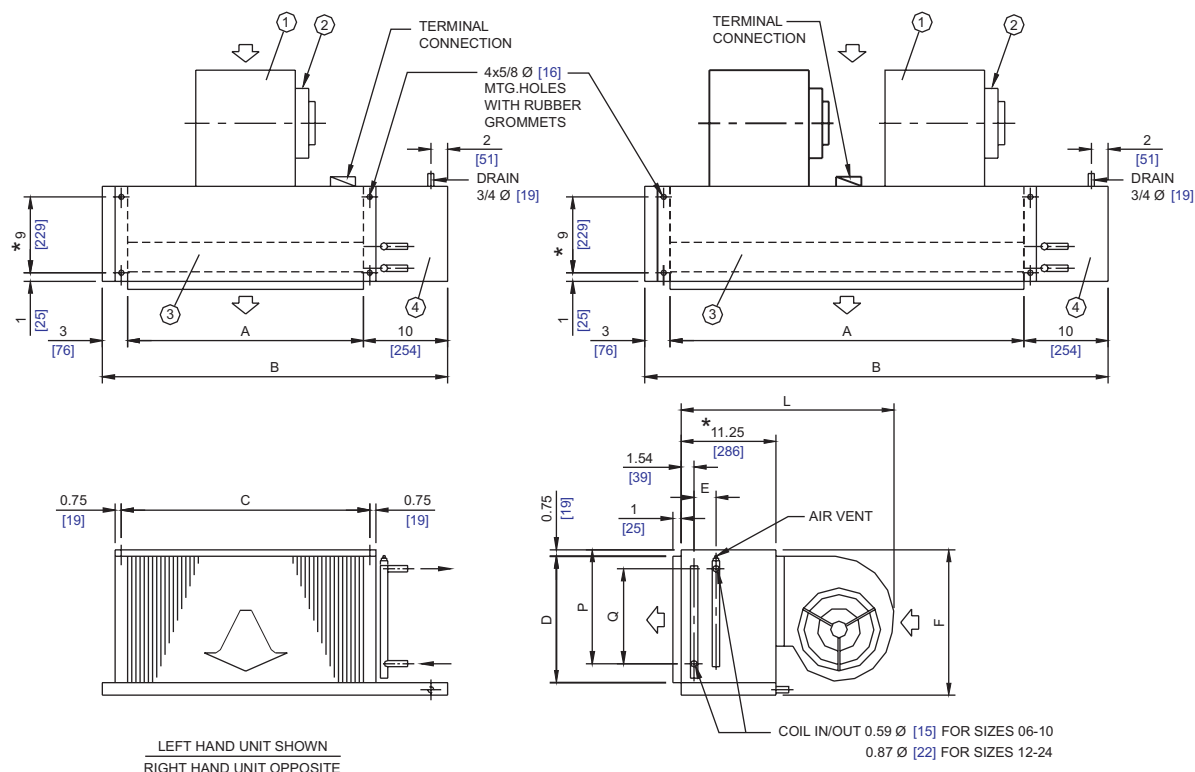
## Connection Sizes for DX Coils

Unit Size	Liquid ø						Suction ø					
	3R		4R		6R		3R		4R		6R	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
06	3/8	10	3/8	10	3/8	10	5/8	16	5/8	16	5/8	16
08	3/8	10	3/8	10	3/8	10	5/8	16	5/8	16	5/8	16
10	3/8	10	3/8	10	1/2	13	5/8	16	5/8	16	7/8	22
12	3/8	10	3/8	10	1/2	13	5/8	16	7/8	22	7/8	22
15	1/2	13	1/2	13	1/2	13	7/8	22	7/8	22	1 1/8	29
18	1/2	13	1/2	13	5/8	16	1 1/8	29	1 1/8	29	1 1/8	29
21	1/2	13	1/2	13	5/8	16	1 1/8	29	1 1/8	29	1 1/8	29
24	1/2	13	1/2	13	5/8	16	1 1/8	29	1 1/8	29	1 1/8	29

## Dimensional Data

UNIT SIZE 06 - 10

UNIT SIZE 12 - 24

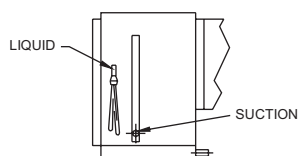


### LEGEND

- ① SUPPLY FAN
- ② FAN MOTOR
- ③ COOLING COIL
- ④ DRAIN PAN

E = 1.73" [44] FOR 3R  
2.60" [66] FOR 4R  
4.33" [110] FOR 6R

\* ADD 1.75 [45] FOR 6 ROW



DX COIL

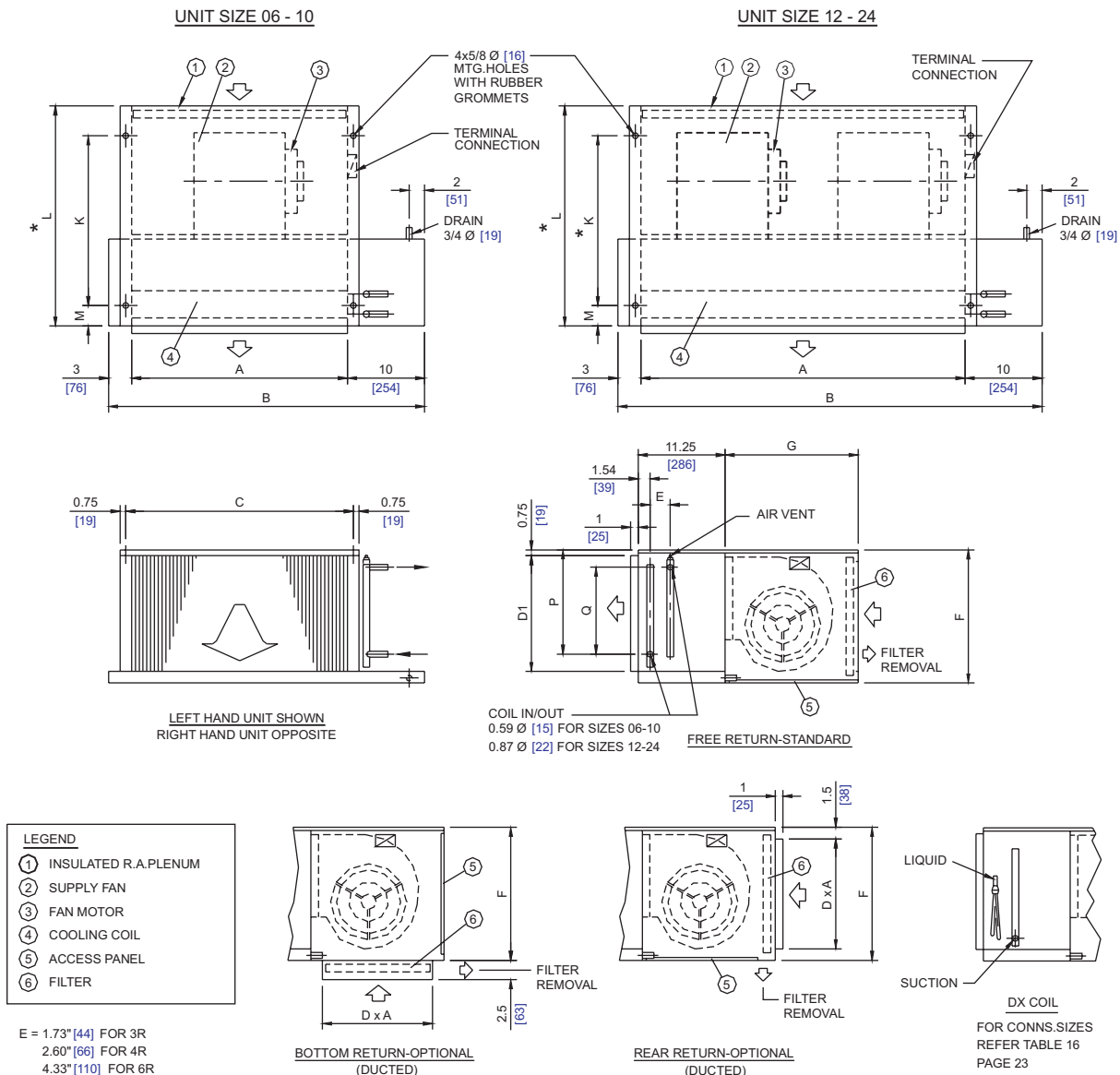
FOR CONNS. SIZES  
REFER TABLE 16  
PAGE 23

ALL DIMENSIONS ARE IN INCHES [MM]

DDC UNIT SIZE	A		B		C		D		F		L		P		Q	
	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM
06	20	508	33	838	21.5	546	12	305	15	381	26.75	679	12	305	9.6	244
08	24	610	37	940	25.5	648	12	305	15	381	26.75	679	12	305	9.6	244
10	24	610	37	940	25.5	648	15	381	17.25	438	29	737	13.5	343	11.25	286
12	36	914	49	1245	37.5	952	12	305	15	381	26.75	679	12	305	9.6	244
15	42	1067	55	1397	43.5	1105	12	305	15	381	26.75	679	12	305	9.6	244
18	42	1067	55	1397	43.5	1105	15	381	17.25	438	29	737	13.5	343	11.25	286
21	48	1219	61	1549	49.5	1257	15	381	17.25	438	29	737	13.5	343	11.25	286
24	54	1372	67	1702	55.5	1410	15	381	17.25	438	29	737	13.5	343	11.25	286



## Dimensional Data

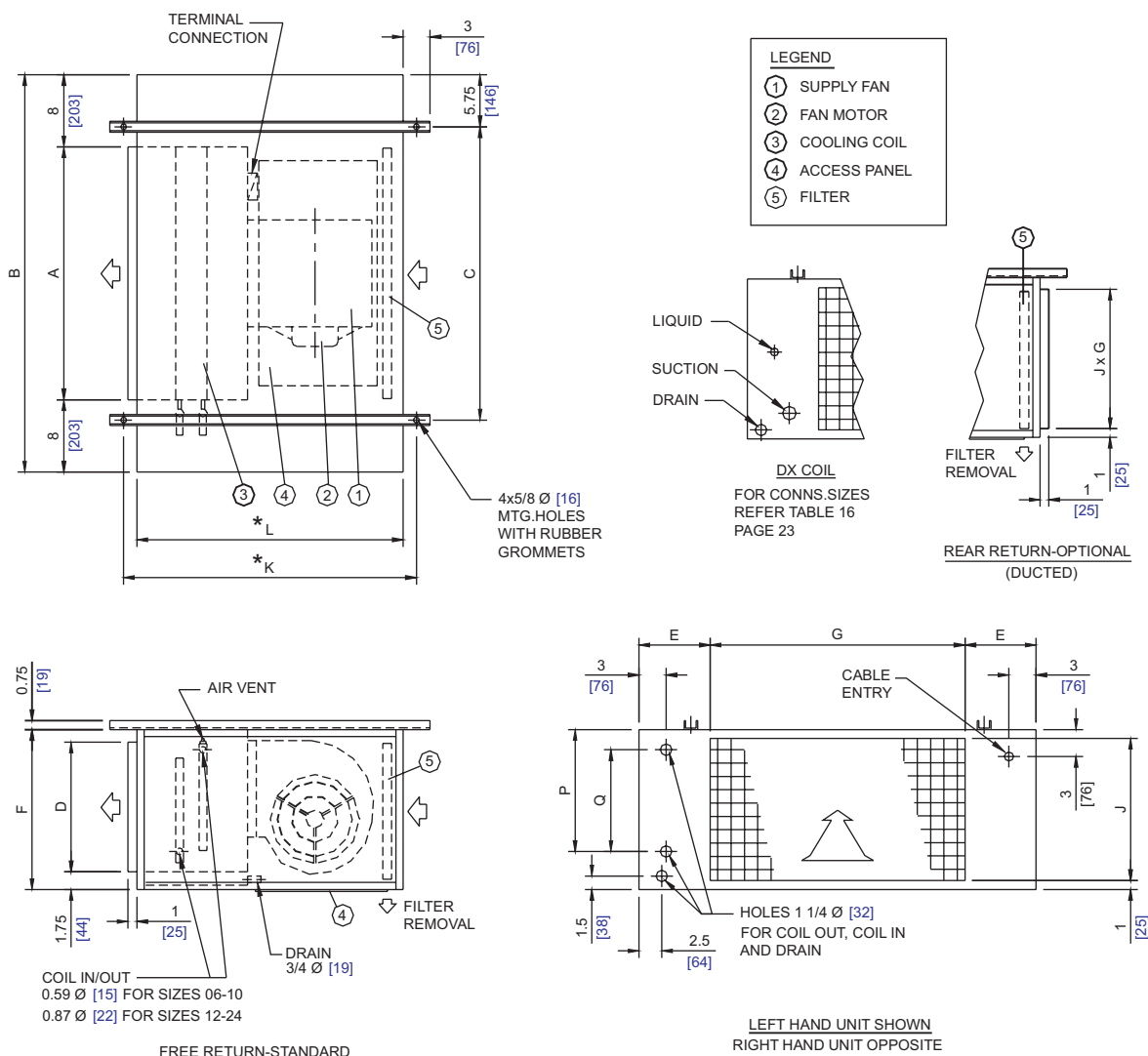


\* ADD 1.75 [45] FOR 6 ROW

ALL DIMENSIONS ARE IN INCHES [MM]

DDP UNIT SIZE	A		B		C		D		D1		F		G		K *		L *		M		P		Q	
	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM
06	20	508	33	838	21.5	546	12	305	12	305	15	381	16.5	419	22	559	27.75	705	2.62	67	12	305	9.6	244
08	24	610	37	940	25.5	648	12	305	12	305	15	381	16.5	419	22	559	27.75	705	2.62	67	12	305	9.6	244
10	24	610	37	940	25.5	648	14.5	368	15	381	17.25	438	18.75	476	26.10	663	30	762	0.79	20	13.5	343	11.25	286
12	36	914	49	1245	37.5	952	12	305	12	305	15	381	16.5	419	22	559	27.75	705	2.62	67	12	305	9.6	244
15	42	1067	55	1397	43.5	1105	12	305	12	305	15	381	16.5	419	22	559	27.75	705	2.62	67	12	305	9.6	244
18	42	1067	55	1397	43.5	1105	14.5	368	15	381	17.25	438	18.75	476	26.10	663	30	762	0.79	20	13.5	343	11.25	286
21	48	1219	61	1549	49.5	1257	14.5	368	15	381	17.25	438	18.75	476	26.10	663	30	762	0.79	20	13.5	343	11.25	286
24	54	1372	67	1702	55.5	1410	14.5	368	15	381	17.25	438	18.75	476	26.10	663	30	762	0.79	20	13.5	343	11.25	286

## Dimensional Data

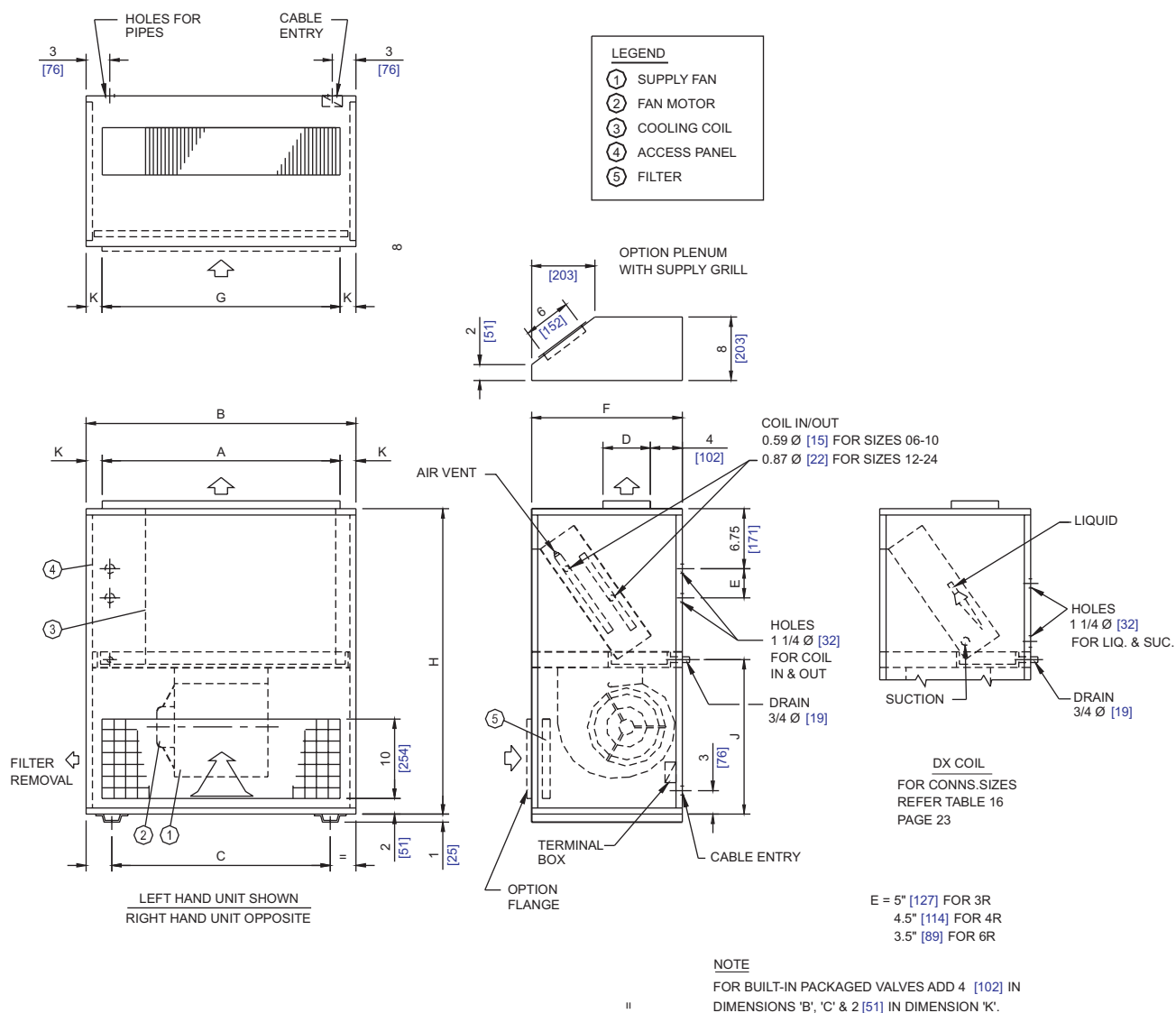


\* ADD 1.75 [45] FOR 6 ROW

ALL DIMENSIONS ARE IN INCHES [MM]

DDE UNIT SIZE	A		B		C		D		E		F		G		J		*K		*L		P		Q	
	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM
06	20	508	36	914	24.5	622	12	305	7.5	190	15	381	21	533	12	305	31.75	806	28.75	730	12	305	9.6	244
08	24	610	40	1016	28.5	724	12	305	7.5	190	15	381	25	635	12	305	31.75	806	28.75	730	12	305	9.6	244
10	24	610	40	1016	28.5	724	15	381	7.5	190	18.5	470	25	635	16	406	34	864	31	787	13.5	343	11.25	286
12	36	914	52	1321	40.5	1029	12	305	7.5	190	15	381	37	940	12	305	31.75	806	28.75	730	12	305	9.6	244
15	42	1067	58	1473	46.5	1181	12	305	7.5	190	15	381	43	1092	12	305	31.75	806	28.75	730	12	305	9.6	244
18	42	1067	58	1473	46.5	1181	15	381	7.5	190	18.5	470	43	1092	16	406	34	864	31	787	13.5	343	11.25	286
21	48	1219	64	1626	52.5	1333	15	381	7.5	190	18.5	470	49	1245	16	406	34	864	31	787	13.5	343	11.25	286
24	54	1372	70	1778	58.5	1486	15	381	7.5	190	18.5	470	55	1397	16	406	34	864	31	787	13.5	343	11.25	286

## Dimensional Data



ALL DIMENSIONS ARE IN INCHES [MM]

DDF UNIT SIZE	A		B		C		D		F		G		H		J		K	
	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM
06	26	660	30	762	23.5	597	6	152	18	457	26	660	30	762	16	406	2	51
08	30	762	34	864	27.5	698	6	152	18	457	30	762	30	762	16	406	2	51
10	30	762	34	864	27.5	698	6	152	21	533	30	762	38.5	978	19.5	495	2	51
12	42	1067	46	1168	39.5	1003	6	152	18	457	42	1067	30	762	16	406	2	51
15	48	1219	52	1321	45.5	1156	6	152	18	457	48	1219	30	762	16	406	2	51
18	48	1219	52	1321	45.5	1156	6	152	21	533	48	1219	38.5	978	19.5	495	2	51
21	54	1372	58	1473	51.5	1308	6	152	21	533	54	1372	38.5	978	19.5	495	2	51
24	60	1524	64	1626	57.5	1460	6	152	21	533	60	1524	38.5	978	19.5	495	2	51

## Guide Specifications

Fan Coil Units type and size shall be as indicated on the equipment schedule. Units shall be blow-thru arrangement. Units configurations shall be horizontal (suitable for ceiling suspended) or vertical (floor mounted), suitable for concealed or exposed applications with or without inlet plenum. Units shall be able to handle external static pressure up to 0.4 in W.G. Units shall be installed at site as per Installation, Operation & Maintenance Manual.

### Basic Unit and Cabinet

Fan Coil Units shall include casing, fan/s, motor/s, coil, drain pan, inlet plenum and air filter (with exception of DDC units for inlet plenum and air filter). Units casing shall be in galvanized or painted finish as indicated on the equipment schedule. Galvanized finish is standard for all models with exception of exposed units which are with painted finish as standard.

Galvanized casing shall be made of hot-dip galvanized steel sheets. Painted casing shall be made of hot-dip galvanized steel sheets, fabricated steel shall be thoroughly de-greased and then phosphatized before application of an average 60 micron baked electrostatic polyester dry powder coating in RAL 7032 color scheme. This finish can pass 1000-hour, 5% salt spray test at 95 °F (35 °C) and 95% relative humidity (ASTM B 117/95). Units casing shall be made of stainless steel or aluminum if so specified. Units casing shall be thermally and acoustically insulated with ½" thick fiberglass insulation.

Units shall be supplied with removable panels for easy access to internal components. For easy installation, ceiling suspended units shall be provided with mounting holes with rubber grommets. Units shall be supplied with free return and 1" supply air duct collar, 1" return air duct collar shall be provided if so specified.

### Fan

Fan shall be double inlet, double width, direct driven with centrifugal type wheel. Fan wheel shall be with multi forward curved blades. Fan shall be applicable for operation up to 0.4" W.G. external static pressure. Fan shall be statically & dynamically balanced. Fan housing and wheel shall be made of galvanized steel sheet.

### Motor

Motor shall be single phase, 3-speed permanent split capacitor type, 220-240V/ 1 Ph/50/60 Hz, highly efficient with integral

thermal protection (thermal cut-out embedded in the winding). Motor shall have high power factor. Motor shall be with permanent lubricated sleeve bearings.

### Coil

Coil shall be constructed of 3/8" O.D. seamless copper tubes arranged in a staggered form mechanically bonded to high efficiency wavy corrugated aluminum fins. Copper fins or Pre-Coated Aluminum fins shall be provided if so specified.

Fins spacing shall be 10 fpi. Chilled water, Hot water & DX coils shall be provided as indicated on the equipment schedule. All water coils shall be provided with manual air vent, automatic air vent shall be provided if so specified. DX coils shall be provided with distributor. Expansion valve shall be provided if so specified. Coil circuiting shall be counter flow. (Direction of coil water / refrigerant flow shall be counter to direction of unit airflow). Coil connections shall be sweat type. Optional MPT or FPT connections shall be provided if so specified. Coil shall be rated in accordance with ARI - 410 and tested by compressed air under water to the pressure of 300 psig. Unit shall be equipped with a maximum total 6 - row coil as follows

1. Cooling and heating with 4 and 2 pipe system combination up to a total of 6 row only.
2. Maximum 6-row cooling coil (chilled water or DX) and electric heater battery.

### Drain Pan

Drain pan shall be constructed from 1 mm thick zinc coated steel sheets, shall be painted, irrespective of the type of finish for unit casing, and insulated from outside with 4 mm thick polyethylene foam insulation. Drain pan shall be constructed from Stainless steel if so specified. Drain pan shall be extended to include coil, headers and U - bends. The bottom of drain pan shall be plane and drain connection shall be ¾" O.D. sweat copper pipe. Auxiliary drip lip shall be supplied loose for field installation if so specified.

### Filter

Air filter shall be 1" thick washable aluminum media with Average dust arrestance 62 % based on ASHRAE test # 52/76. 1" thick washable or disposable synthetic media shall be provided if so specified. Air filter is standard for all COOL POINT Hi Static Fan Coil Units with exception of the DDC units. Filter removal shall be as shown on attached drawings.

## Options

Following shall be provided if so specified :

- Single deflection return air grill and double deflection supply air grill for exposed units.
- Discharge plenum for free standing units (Floor mounted units).
- Double skin drain pan.
- Double skin casing for locations having a high temperature difference between supply air temperature and surrounding environment of the unit.

### Electric Heater Battery :

Electric heater capacity shall be as indicated on the equipment schedule. Electric heater element shall be constructed from 80/20 nickel chrome resistance wire, which is connected to terminal pins and centered in stainless steel grade 304L sheath metal tubes by compressed magnesium oxide. The terminal pins shall be insulated from metal tube by ceramic bushes. Helical fins mild steel galvanized shall be tightly wound around tabular heater elements. Stainless steel helical fins shall be provided if so specified. Electric heater batteries shall be provided with one safety cut-out (Auto Reset) and arranged for one stage operation at 220-240V/1 ph/ 50/60 Hz.

### Valve Packages:

Valve Packages shall be factory installed or field installed by customer if so specified. As indicated on the equipment schedule, Valve Packages shall consist of various combinations of gate or stop valves, globe or balancing valves, 2-way motorized valves and 3-way motorized valves.

### Thermostat

Thermostat shall be field installed by customer, wall mounted and decorative type. Cooling and / or heating thermostat with 3-speed switch, with or without manual H/C change over switch shall be provided as indicated on the equipment schedule



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We possess the latest machinery and technology required for production of high quality products. Our team of professional engineers and technical staff is capable of responding to the market's most expecting demands for that we are continuously struggling to improve our Manufacturing capability and quality to become the leader of the market.

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**Faisalabad:** Kotwali Road, Opp. Thana Kotwali. Ph: 041-601684

**Multan:** Mian Market, Hussain Agahi Road.

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