

BC 14



BETEC CAD.

Duct Heaters



DH-GB-11

Selected Products of the company have been Classified / Listed / Tested by various international testing authorities.



Table Of Contents

Description	Page No
General Information	3
Product Description	4
Duct Heater Models	5
Engineering and performance data	6
Installation Details	8
Advantage of Finned Heating Elements	9
Standard Components	10
Optional Components	11
Special Construction	12
Duct Heater Specification	13

Selected Products of the company have been Classified / Listed / Tested by various international testing authorities.



Duct Heaters - DH B - 10 Series**Models B 11 / 12****Introduction**

BETEC CAD engineers and technicians have contributed their knowledge, skills and expertise towards the design and manufacture of truly fine heaters.

Our goal was to reach a standard of duct heaters liable to match, if not surpass, the quality of the most reputed brands and to withstand the severe climatic conditions of the United Arab Emirates

BETEC CAD duct heaters are approved by the private authorities together with an increasing number of consultants in the area. We are proud of what we have achieved and we are looking forward in sharing the success with you-

Recommend

All heaters should be installed and electrically connected as per given instructions and wiring diagram supplied with each heater. Misapplication of heaters may result in on the job failure or malfunctions.

Heaters For Air Handling Units

We are capable to manufacture built-in heaters for air handling units. For more details. Please refer to us.

Guarantee

BETEC CAD Duct Heaters are guaranteed to the original purchaser to be defect free in materials and workmanship for a period of 12 months from the date of Delivery. Guarantee terms are not applicable on heaters which are not installed and serviced as recommended.

Dimensional Drawings

Once requested, we will supply a shop drawing showing the actual physical dimensions of the heater and arrangement of elements.



DH B 11



DH B 12

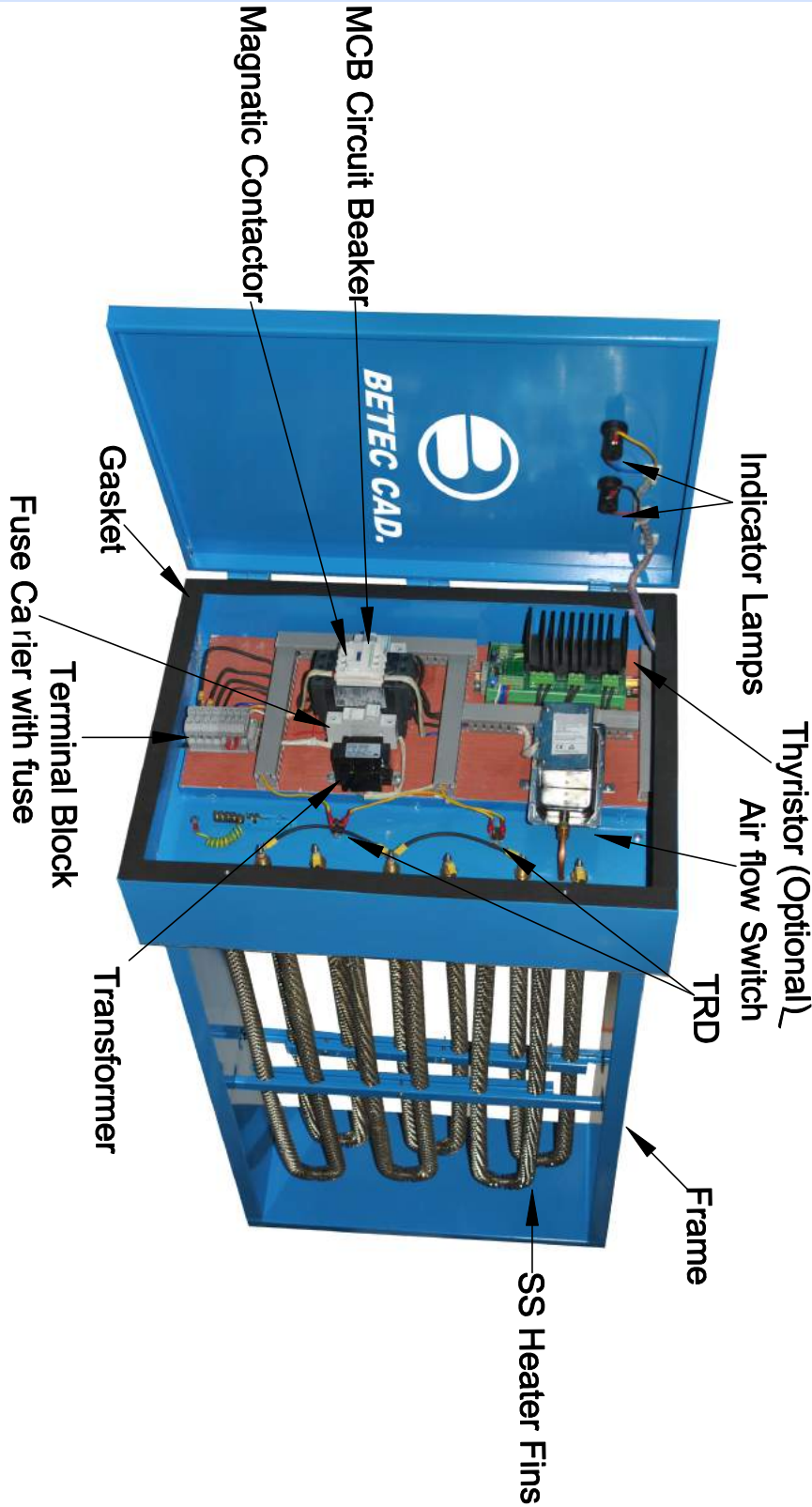
Selected Products of the company have been Classified / Listed / Tested by various international testing authorities.



Intertek

CertAire
The INDEPENDENT
Testing Laboratory

Product Description



Selected Products of the company have been Classified / Listed / Tested by various international testing authorities.



Duct Heaters - DH B - 10 Series

Models B 11 / 12

Models

Slip In Heater

It is designed so that the frame dimensions are slightly smaller than duct dimensions. The entire heater except the terminal box slides through a rectangular opening in the side of the duct with 1/4" clearance all around. When installed, the face area of the heater is at right angle to the air stream. Slip in heater is widely used because it allows duct work to be installed before the heaters are available, simplifies on changes in heater location and it is easily installed into existing duct systems. Furthermore, small slip-in heaters may be installed without any special arrangements for their support.



DH B 11

Flanged Heater

(With Removable Heater Section)

Consists of a slip-in heater mounted in a flanged duct section. Frame dimensions are made to match exactly duct dimensions. The frame is then attached directly to external flanges of the duct where the slip-in portion could be pulled out without removing flanges from duct. All controls are mounted in the terminal box of the slip-in portion.



DH B 12

Selected Products of the company have been Classified / Listed / Tested by various international testing authorities.



Duct Heaters - DH B - 10 Series

Models B 11 / 12

Technical Data

Calculation Requirement

To determine the total heater capacity, the following formula can be used

KW =	CFM X ΔT
	3193

Where : ΔT is required air temperature rise (F)
 For Guidance, table shows required ΔT based on heater's application as shown:

Desired Heat Control	ΔF / Stage
Fine	5 F or Less
Average	6 F - 14 F
Coarse	15 F and up

Calculation Of Line Current

Single Phase	
Line Current: AMP =	WATT
	VOLT

Three Phase	
Line Current: AMP =	WATT
	VOLT x 1.73

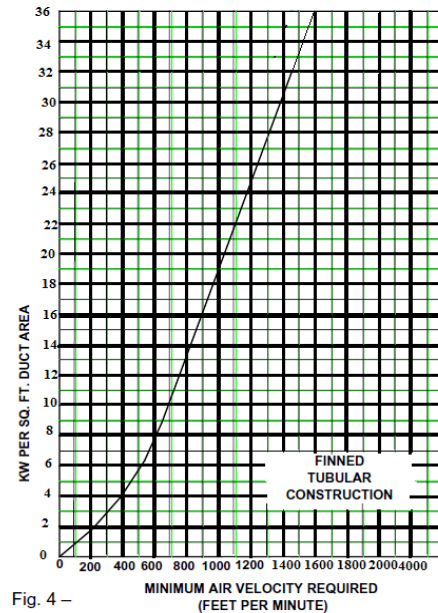
Duct Size Limitations

Minimum duct dimensions are governed by the physical size of the heating elements.

Minimum Duct Size Inch (mm)	Width Inch	Height Inch
	10 (250)	4 (100)

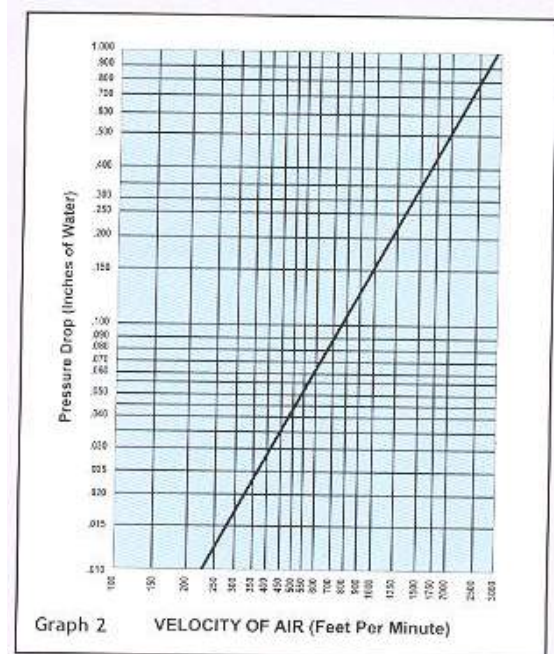
Minimum Velocity

To prevent overheating and tripping of thermal cutouts, a sufficient uniform air flow should be maintained. Graph 1 is used to determine minimum velocity required on the basis of KW per square foot of duct area.



Pressure Drop

Air static pressure drop as function of air velocity (in feet per minute) is given in Graph2.



Selected Products of the company have been Classified / Listed / Tested by various international testing authorities.

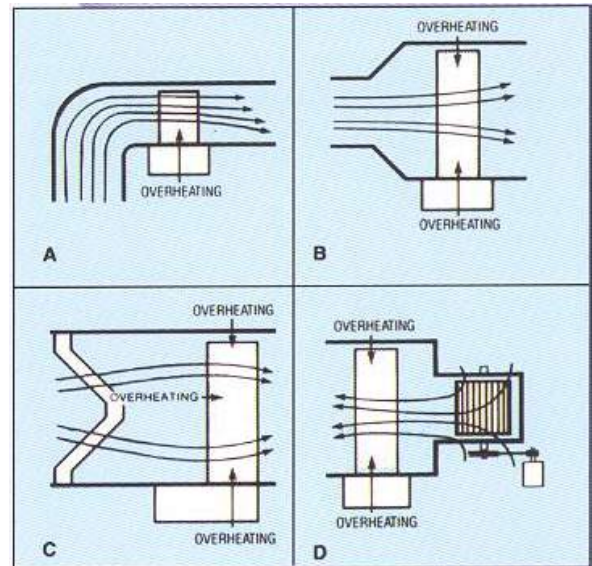


Duct Heaters - DH B - 10 Series

Models B 11 / 12

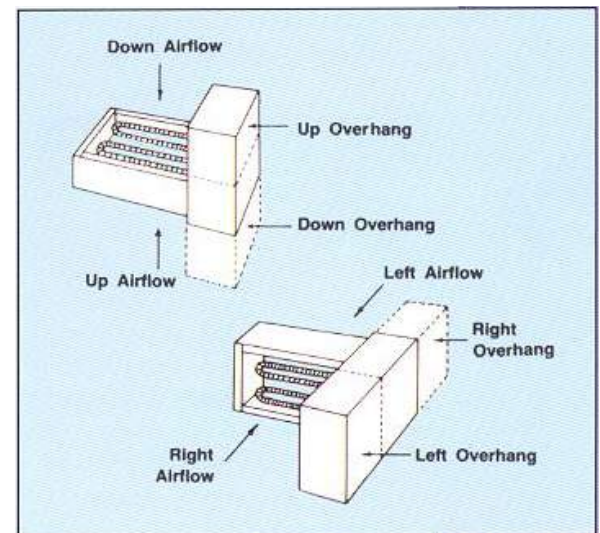
Mounting

To ensure an even distribution of air across the heater surface. It is recommended to place the heater a minimum of 48" away from: (A) Elbow (B) Transition (C) Filter or Frame (D) Fan, as shown



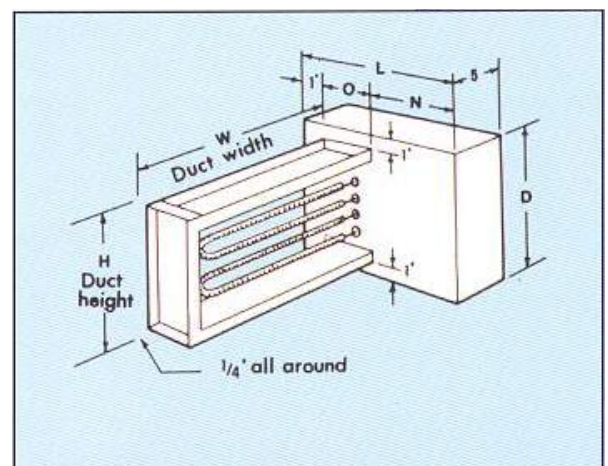
Airflow Terminology

All heaters are suitable for any airflow direction, horizontally, (right or left) and vertically (up or down) as shown. The term "Overhang" is referred to the extended portion of the terminal box of the heater.



Detailed Dimensions

When requesting dimensional shop drawings, dimensions given in will be clearly detailed. All dimensions shown in numbers are standard and will be used while manufacturing unless otherwise requested by customer. Other dimensions may vary depending on duct size, arrangement and size of elements, etc.



Selected Products of the company have been Classified / Listed / Tested by various international testing authorities.



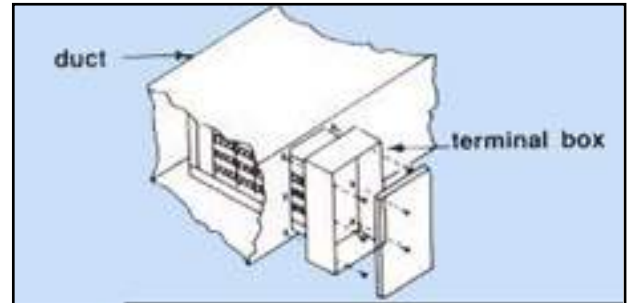
Duct Heaters - DH B - 10 Series

Models B 11 / 12

INSTALLATION

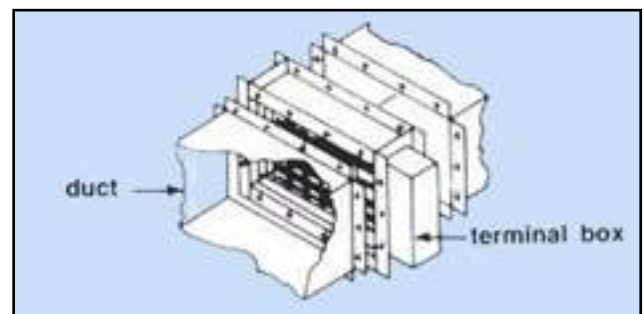
Slip In Heater

- Cut an opening of required size in the side Of duct.
- Insert heater until terminal box covers opening.
- Use terminal box to align the screwholes.
- Remove unit and drill holes.
- Secure heater in place with sheet metal Screw.



Flanged Heater Type

- Provide flanges on ends to ends of duct to match the size of heater flanges.
- Secure heater in place with sheet metal screws.



Rating and Standard Sizes

BETEC CAD heaters are custom built to match your exact requirements, with respect to duct dimensions, wattage, voltage, phase and number of stages. Tabled here under is our standard range for ready use and quick reference.

Single Phage Heaters		
KW	Stage	Duct Size (Inch)
1	1	15 x 10
1.25	1	17 x 10
1.5	1	20 x 10
2	1	25 x 10
3	1	32 x 10

Three Phase Heaters		
KW	Stage	Duct Size (Inch)
3	1	15 x 14
4.5	1	22 x 14
6	1	25 x 14
7.5	1	30 x 14
9	1	34 x 14
9	2	34 x 14
12	1	35 x 14
12	2	35 x 14
15	2	40 x 14
15	3	40 x 14
18	2	46 x 16
18	3	46 x 16
21	3	46 x 16
24	3	46 x 16
27	3	40 x 18
30	3	40 x 18
33	3	40 x 18

Selected Products of the company have been Classified / Listed / Tested by various international testing authorities.



Finned Heating Elements

Advantages of finned tubular heating elements.

- **Elimination of electric shock**

Accomplished by encasing the heating coil in a grounded metal sheath.

- **Easy Maintenance**

Incase of element failure it is easier to replace individually mounted finned tubular elements than open coil elements.

- **Continuous Operation**

Finned tubular elements will not short circuit due to dust or dirt built-up as it may possibly happen with open coil elements.

- **High Humidity**

Finned tubular element are designed not to short out due to water droplets carried by the air stream in the duct.

- **Rugged Structure**

Finned tubular elements are designated to withstand more physical and mechanical abuse.

- **Air Flow Uniformity**

Heat conducted along the finned tubular element reduces or virtually eliminates hot spots resulting from non-uniform air flow through the duct.

- **Controllability**

Outlet air temperatures are controlled more precisely when using finned tubular elements. Their greater thermal inertia increases the Life of the control components by reducing the rate at which they cycle.

- **Dimensions**

U-shaped elements come in two standards. Sheath diameter 8 mm and 11 mm. The physical dimensions of each type are common for all sizes with the exception of the vertical length which is dependent on the designated wattages of the element.

- **Application**

Suitable for any air heating process up to 400 C sheath temperature for mild steel elements and 800 C for stainless steel elements.

- **Construction**

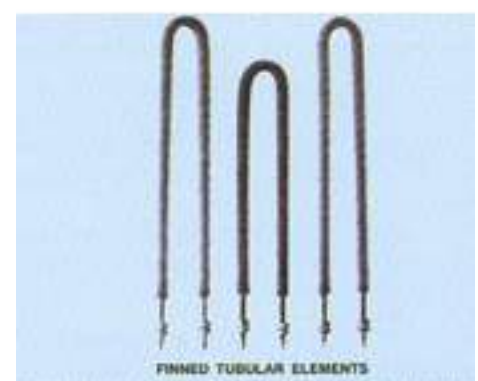
Copper plated steel fins brazed to steel tubular sheath which includes an 80/20 nickel chrome resistance wire connected to terminal pins.

The tubular sheath is filled with high quality magnesium oxide compressed to ensure a rapid and even heat transfer.

The terminal pins form a non-heated section of the element . They are insulated from the sheath by ceramic bushes.

High temperature aluminium coating protects element surfaces from corrosion.

Element Sizes	
Watts	Approx. Length (Inches) 'c'
500	(9)
750	(9)
1000	(11)
1250	(14)
1500	(15)
1750	(19)
2000	(24)
2500	(29)
3000	(32)
4000	(33)
5000	(44)
6000	(44)



Selected Products of the company have been Classified / Listed / Tested by various international testing authorities.



Standard Components

Manual Reset Thermal Cut - Out

Designed to protect against failure of the primary cut-out where it opens at a higher temperature. Once the problem is resolved, it must be manually reset to re-energize the heater.

It serves as the secondary cut-out and it is usually wired in series with the primary, (see wiring diagrams).



Automatic Thermal Cut - Out

A disc type device which de-energize the heater at a pre-selected temperature and protect against overheating . Its bimetal disc is fully protected against moisture, dust or dirt. It automatically resets when temperature drops to a safe level. It serves as the primary safety cut-out.



Air Flow Switch

A device which prevents the heater from operating unless the air is flowing. Its internal diaphragm senses the pressure difference between the inside and the outside of the duct which will close the circuit allowing the heater to startup.

It also has an extended copper tube in the air stream, making it sensitive to velocity, pressure as well as static pressure. To ensure proper operation there must be at least 0.07" WG pressure difference between inside and the outside of the duct. The air flow switch has the advantage of detecting fan belt failure. Field wiring can be readily used with a built-in safety disconnect.



Magnetic Contactors

Once installed in the duct heater, they function as a device to energize heating circuit or to break all power lines. One operating contactor is required per stage provided that the line current for each stage does not exceed 48 Amps.



Selected Products of the company have been Classified / Listed / Tested by various international testing authorities.



Duct Heaters - DH B - 10 Series

Models B 11 / 12

Optional Components

Fuses

Their main function is to protect against faults in contactor and heating elements, where they are recommended if the total load of the heater exceeds 48 amps. one set of built in fuses can be supplied per stage or for several stages to be combined upon request.



Transformers

Required when the control voltage differs from the line voltage and separate control source is not available. They are supplied built-in the heater terminal box for the ease of field installation. Normally, the primary of the transformer is supplied by the line voltage where the secondary is furnished with the control voltage.



Automatic Circuit Breaker

Can be used instead of fuses for overcurrent protection or to disconnect the entire heater load as a replacement for disconnect switches.

In case of overcurrent or short circuit, circuit breakers trip automatically and they are resetable once the problem is resolved.



Disconnect Switches

A safety device which will be interlocked so that when the terminal box is opened the power voltage is automatically broken.

NOTE; When a separate source is connected to the duct heater for a function as fan interlock, the built-in disconnect switch will not turn off this source.



Thermostats

Shown hereunder are various types of thermostats which can be supplied with the heater to meet your specification and special applications.

(Please contact for suitable selection of models)



Selected Products of the company have been Classified / Listed / Tested by various international testing authorities.



Duct Heaters - DH B - 10 Series

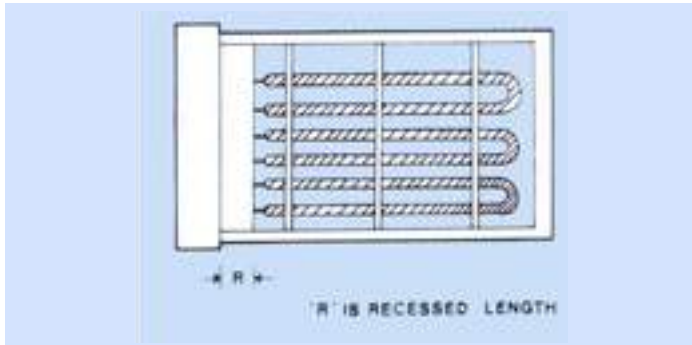
Models B 11 / 12

Special Constructions

Recessed Terminal Box

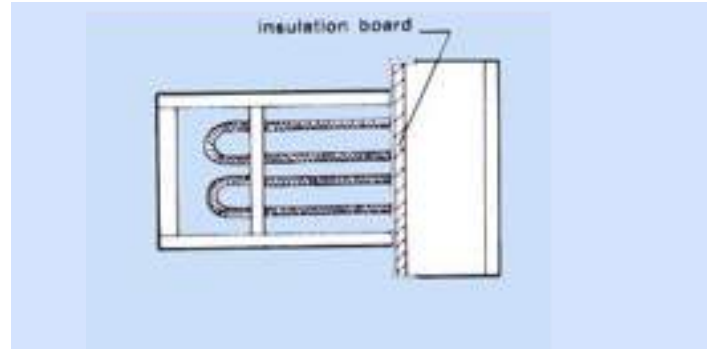
It allows the terminal elements and thermal cut-out for a wider contact with the air stream. Applicable where terminal elements are blocked by an obstruction of one inch or more.

When ordering, indicate recessed length as shown



Insulated Terminal Box

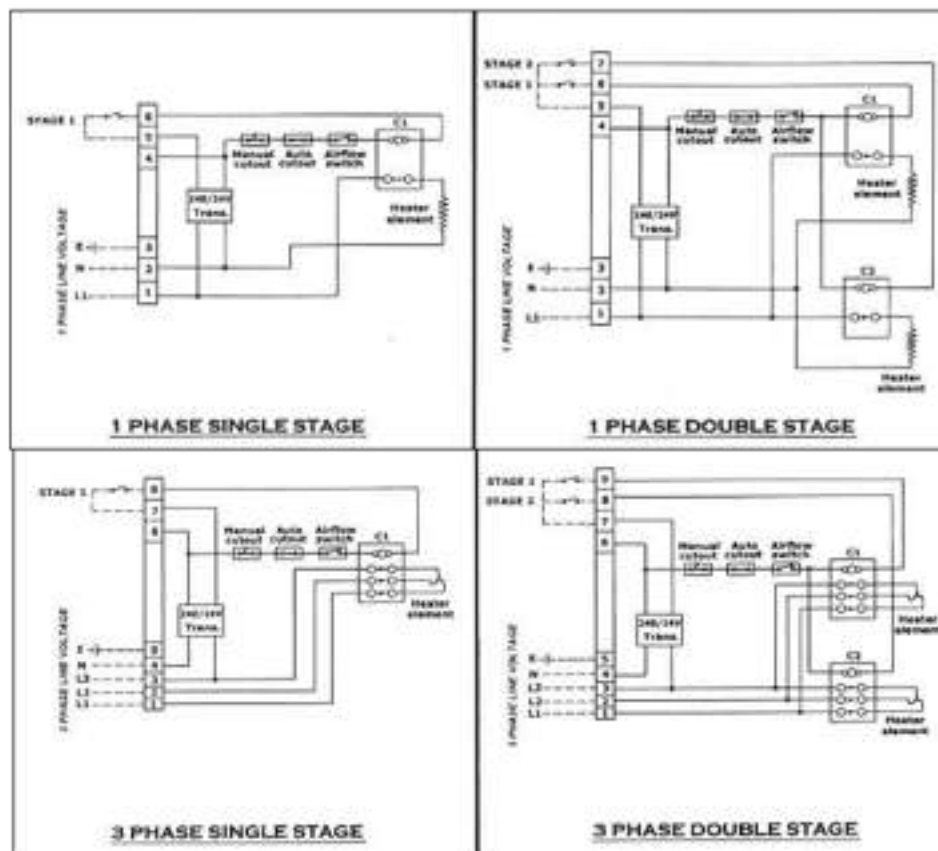
Recommended for use in areas with high relative humidity (i.e. buildings close to the coast or indoor swimming pools). In this case, an insulating board is placed between the terminal box and the duct.



Wiring Diagrams

All wiring diagrams shown are for standard heaters up to 2 stages. However, a special wiring diagram for heaters above 2 stages or containing optional components is furnished with each heater.

Standard heater wiring is with star connection applied to systems 380 - 415 V / 3 Phase. For systems 220 V / 3 Phase heater, wiring is with Delta connection.



Selected Products of the company have been Classified / Listed / Tested by various international testing authorities.



Duct Heaters - DH B - 10 Series

Models B 11 / 12

Duct Heater Specifications

Duct heater shall be **BETEC CAD** standard, slip or flanged typo. Size, KW, Control Voltage and Stages shall be shown on the drawing and schedule. Heating element shall be stainless steel finned tubular type, not open coil type. Includes an 80/20 nickel chrome resistance wire, connected to terminal pins. It shall be filled with high quality magnesium oxide compressed to ensure a rapid and even heat transfer.

Heater frames and control box shall be corrosion-resistant steel coated / ALL heaters shall be furnished with disc type automatic reset thermal cutout for primary over temperature protection. Heater shall also be furnished with disc type. Load-carrying manual reset thermal cut out factory wired in series with heater stages for secondary protection. Alt three-phase heaters shall have equal, balanced, three phase stages. All internal wiring

shall be standard copper for high temperature application (heat resistant silicon wires).

Heater shall be furnished either with standard control component like thermal cutouts, airflow switch, fuses (if more than 48 Amp.), control transformer or with options like:

- Step Controller (Sequences) + Room thermostat
- Thyristor solid state controller to modulate the entire heater load directly, (varying the heater output from 0 to 100% of total heater KW).
- Backup magnetic contactor.
- Disconnect switch.
- Pilot light.
- Toggle switch.

Item	KW	Duct Dimension Inside		Supply Line Voltage	No. of Stage	Control Circuit Voltage	No. of Stage	Options	Remarks
		Width (H)	Hight (H)						

Safety devices and wiring in duct heater's should be checked and tested by the user at site while commissioning Incase of any malfunctioning, report immediately to our factory.

Selected Products of the company have been Classified / Listed / Tested by various international testing authorities.





beteccad.com



© Copyright reserved for *BETEC CAD*.

"Due to continuous progress and product improvement, *BETEC CAD*. reserves the right to make changes without notice"