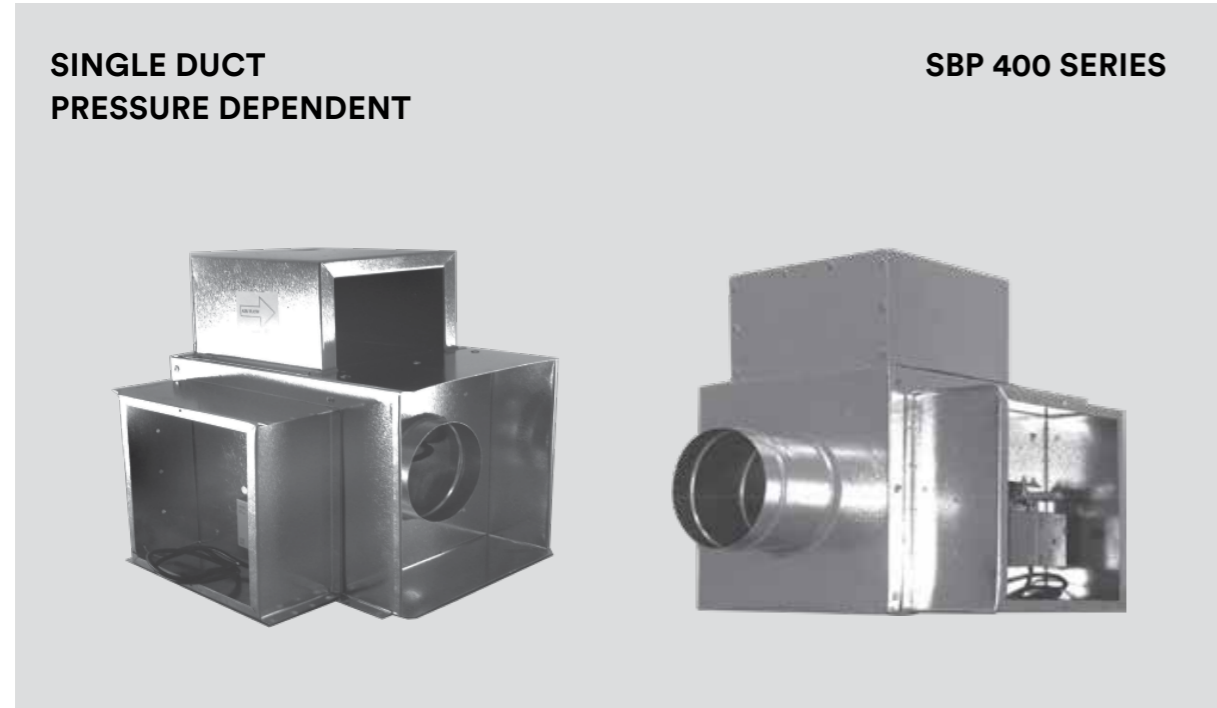




# **BYPASS AIR TERMINAL UNITS**





**Description**

SAFID SBP 400 Series bypass air terminals are designed for single duct constant air volume (CAV) systems in order to deliver variable air flows to occupied spaces. Variable air volume control is achieved by directing supply air flow either to the room or to the bypass port in direct response from the room thermostat. When the room temperature rises above the cooling set-point, the actuator will modulate the primary damper at fully open position while the air flow is at maximum. When the room temperature fall below the cooling set-point, the actuator will modulate or close the primary damper, then the bypass port damper will open to divert or dump the excess supply air into the return air ceiling plenum. Dumping supply air into return air ceiling plenum varies the zone supply air volume while the supply fan system remain at constant air volume.

The SBP air terminals are supplied with round or oval spigot inlet. They are available with a variety of accessories. They can be specified with sound attenuator, electric heater, hot water coil, multiple outlet plenum and other optional accessories. The accessories (except for the multiple outlet plenums) are shipped factory attached and have standard slip & drive outlet connections.

**Standard Construction**

**Casing:**  
Terminal casing, inlet plate & damper built of 22 gauge galvanized steel sheet, conform to ASTM A653, LFG, G90 zinc coating.

**Insulation:**  
25mm thick acoustic lining with a strong and dimensionally stable Woven Glass Fiber Fabric (WGF) facing, 48kg/M3 density, complies with the requirements of NFPA 90A.

**Height and Length:**

All basic terminals are 300 mm in height and 380 mm in over all length except unit with EH and HW at down stream will have 480 mm length.

**Controls:**

The SBP Air terminals can be specified with electric controls. Standard control are Belimo actuator modulating type.

**Standard Connections:** S-Slip and Drive Slip connection.

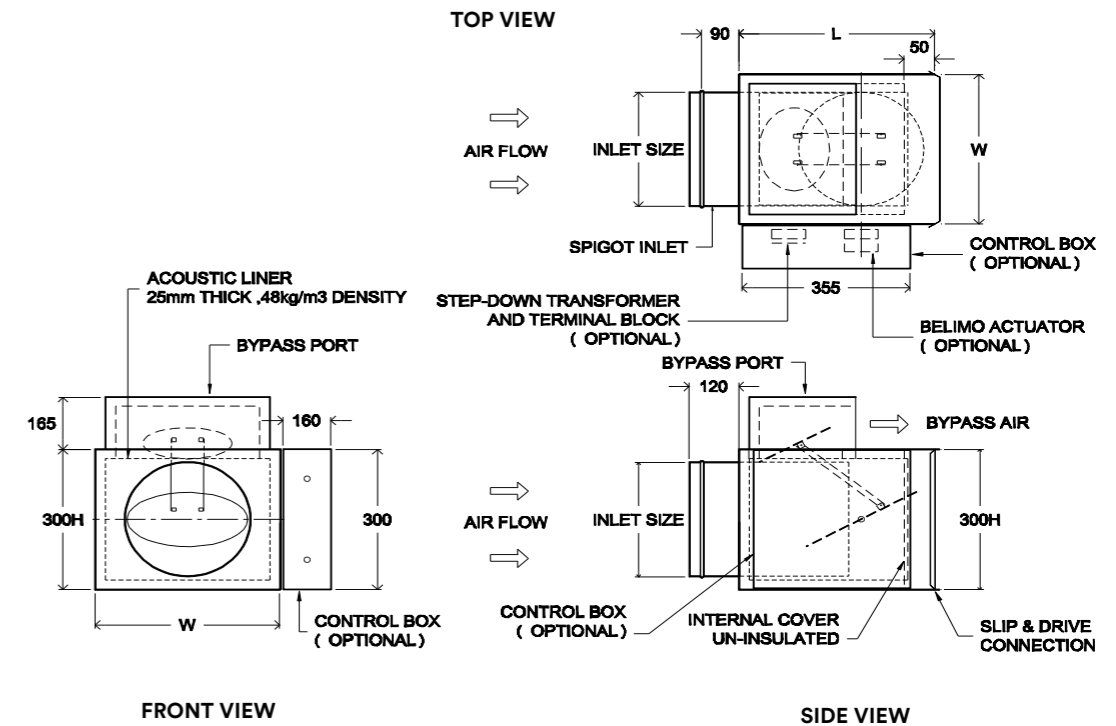
**Options**

- Option 1: Code SF**  
Slide on Flange connections for discharge side.
- Option 2: Code SA**  
Air Terminal with factory-mounted Sound Attenuator.
- Option 3: Code OP**  
Air Terminal with factory-made Multiple Outlet Plenum. Outlets extend 100mm beyond either side of the air terminal casing.
- Option 4: Code EH**  
Air Terminal with factory-made Multiple Outlet Plenum. Outlets extend 100mm beyond either side of the air terminal casing.
- Option 5: Code HW**  
Air Terminal with factory-mounted Hot Water Coil on the outlet of the Air Terminal casing.
- Option 6: Code FC**  
Air Terminal with mounted Flexible Connector on the inlet collar of the Air Terminal casing.
- Option 7: Code M**  
Air Terminal with Belimo Actuator (modulating type).
- Option 8: Code CB**  
Air Terminal with Control Box.
- Option 9: Code TC**  
Air Terminal with a Digital Room Temperature Controller.



**SBP 400: BASIC AIR TERMINALS**

**SBP 400: Dimensions**



| MODEL   | UNIT SIZE (in) | INLET SIZE |                | CASING SIZE |        |        |
|---------|----------------|------------|----------------|-------------|--------|--------|
|         |                | ROUND (mm) | FLAT OVAL (mm) | W (mm)      | H (mm) | L (mm) |
| SBP 406 | 6              | 152        | -              | 300         | 300    | 380    |
| SBP 408 | 8              | 200        | -              | 350         | 300    | 380    |
| SBP 410 | 10             | 250        | -              | 400         | 300    | 380    |
| SBP 412 | 12             | -          | 350 x 250      | 450         | 300    | 380    |
| SBP 414 | 14             | -          | 475 x 250      | 600         | 300    | 380    |
| SBP 416 | 16             | -          | 625 x 250      | 700         | 300    | 380    |

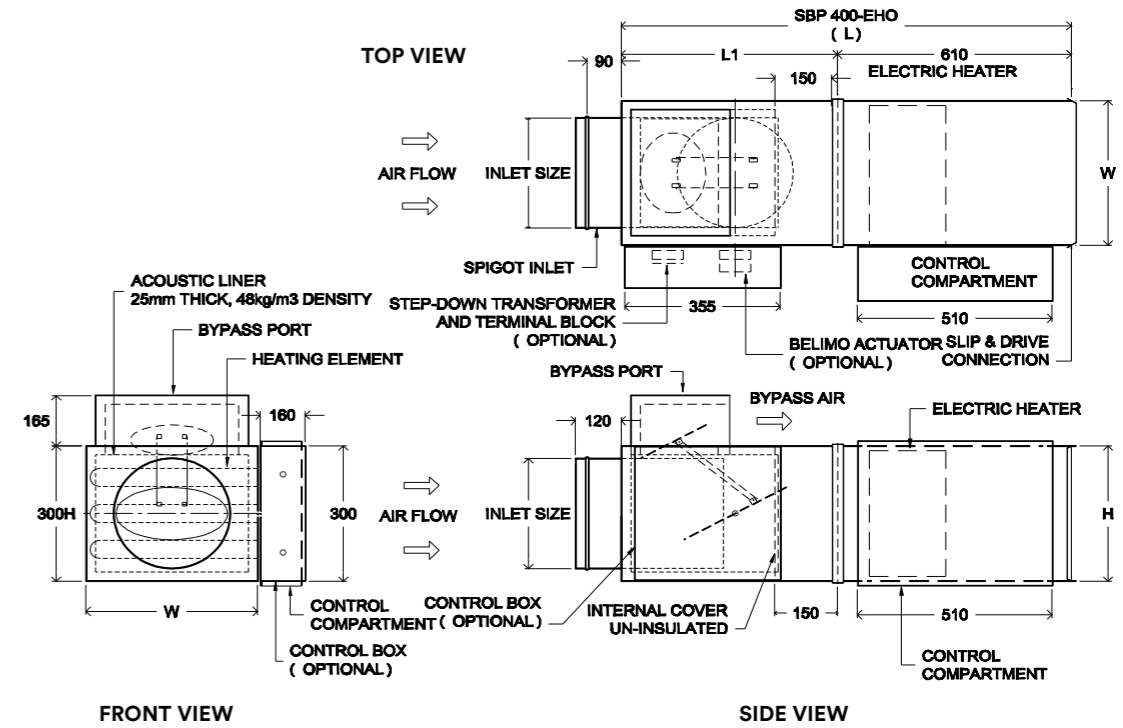
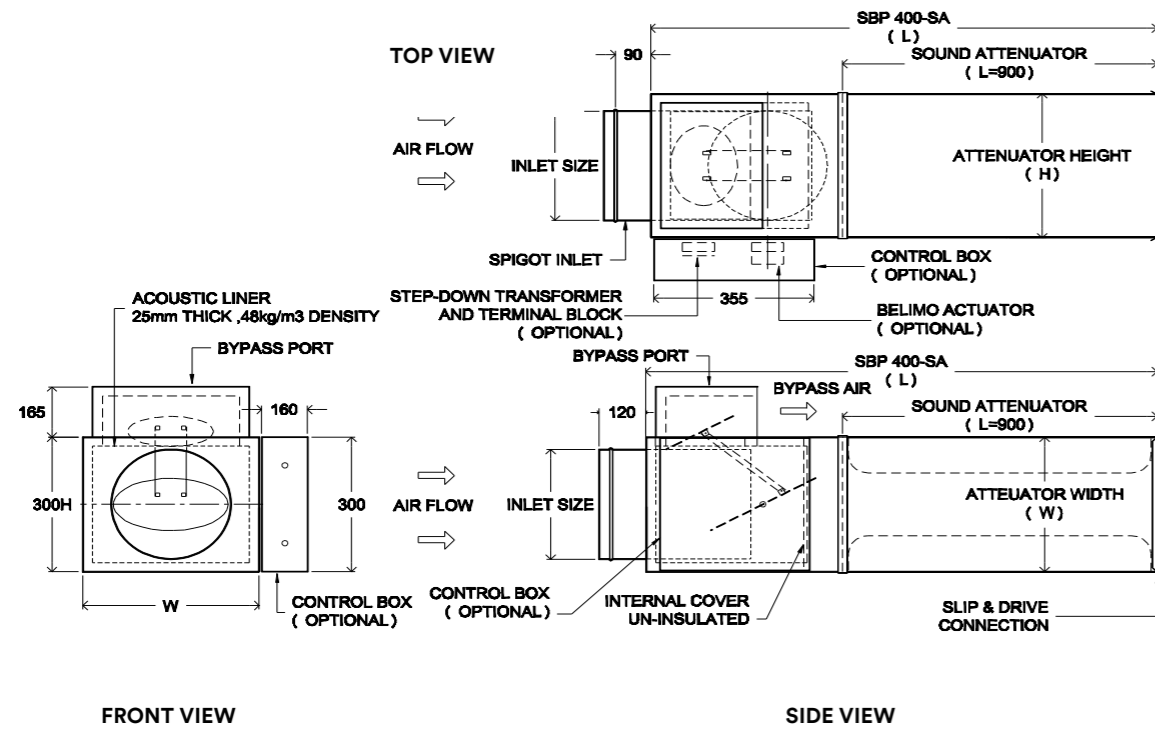


SBP 400 - SA: AIR TERMINALS WITH DOWNSTREAM SOUND ATTENUATOR

SBP 400 - EH: AIR TERMINALS WITH DOWNSTREAM ELECTRIC HEATER

SBP 400 - SA: Dimensions

SBP 400 - EHO, EHT, EHFT: Dimensions with Open, Tubular or Fin-Tubular Coil



BYPASS AIR TERMINAL UNITS

| MODEL        | UNIT SIZE (inches) | INLET SIZE |                | SBP 400 - SA |        |        | SOUND ATTENUATOR (SA) |        |        |
|--------------|--------------------|------------|----------------|--------------|--------|--------|-----------------------|--------|--------|
|              |                    | ROUND (mm) | FLAT OVAL (mm) | W (mm)       | H (mm) | L (mm) | W (mm)                | H (mm) | L (mm) |
| SBP 406 - SA | 6                  | 152        | -              | 300          | 300    | 1280   | 300                   | 300    | 900    |
| SBP 408 - SA | 8                  | 200        | -              | 350          | 300    | 1280   | 300                   | 350    | 900    |
| SBP 410 - SA | 10                 | 250        | -              | 400          | 300    | 1280   | 300                   | 400    | 900    |
| SBP 412 - SA | 12                 | -          | 350 x 250      | 450          | 300    | 1280   | 300                   | 450    | 900    |
| SBP 414 - SA | 14                 | -          | 475 x 250      | 600          | 300    | 1280   | 300                   | 600    | 900    |
| SBP 416 - SA | 16                 | -          | 625 x 250      | 700          | 300    | 1280   | 300                   | 700    | 900    |

BYPASS AIR TERMINAL UNITS

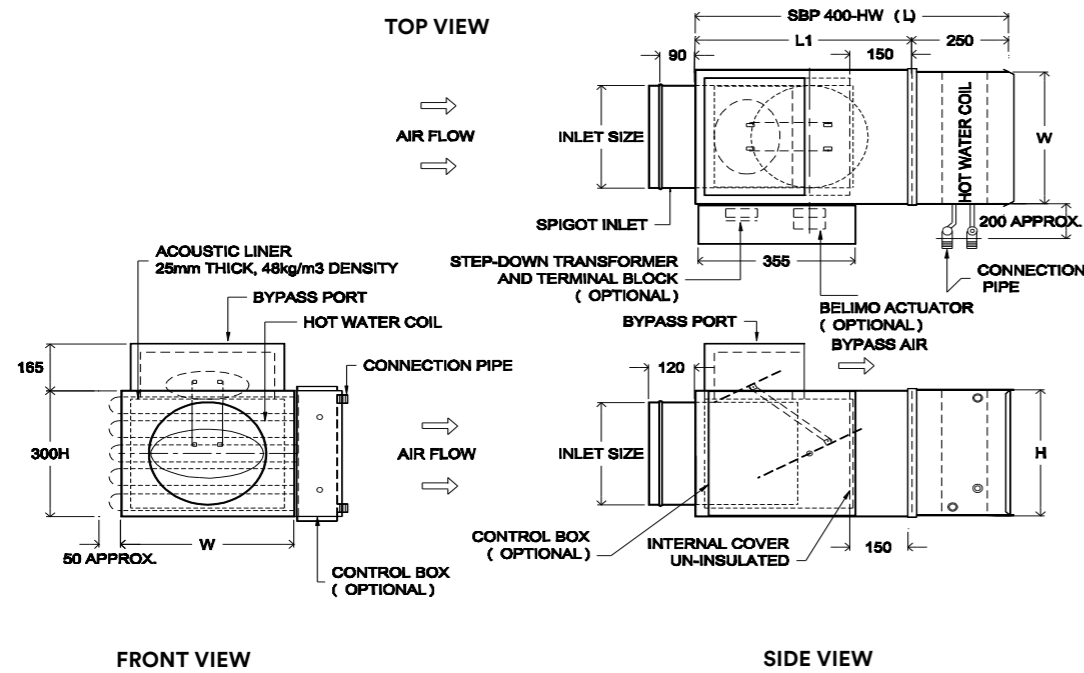
| MODEL        | UNIT SIZE (inches) | INLET SIZE |                | SBP 400 - EHO |        |        |         |
|--------------|--------------------|------------|----------------|---------------|--------|--------|---------|
|              |                    | ROUND (mm) | FLAT OVAL (mm) | W (mm)        | H (mm) | L (mm) | L1 (mm) |
| SBP 406 - EH | 6                  | 152        | -              | 300           | 300    | 1090   | 480     |
| SBP 408 - EH | 8                  | 200        | -              | 350           | 300    | 1090   | 480     |
| SBP 410 - EH | 10                 | 250        | -              | 400           | 300    | 1090   | 480     |
| SBP 412 - EH | 12                 | -          | 350 x 250      | 450           | 300    | 1090   | 480     |
| SBP 414 - EH | 14                 | -          | 475 x 250      | 600           | 300    | 1090   | 480     |
| SBP 416 - EH | 16                 | -          | 625 x 250      | 700           | 300    | 1090   | 480     |

**NOTE**

1. The minimum straight portion after the electric heater up to elbow or any fittings that will change the airflow's direction must be equal to minimum length of 610mm.
2. Contact SAFID for electric heater details.

SBP 400 - HW: AIR TERMINALS WITH DOWNSTREAM HOT WATER COIL

SBP 400 - HW: Dimensions



| MODEL        | UNIT SIZE (inches) | INLET SIZE |                | SBP 400 - HW |        |        |         |
|--------------|--------------------|------------|----------------|--------------|--------|--------|---------|
|              |                    | ROUND (mm) | FLAT OVAL (mm) | W (mm)       | H (mm) | L (mm) | L1 (mm) |
| SBP 406 - HW | 6                  | 152        | -              | 300          | 300    | 730    | 480     |
| SBP 408 - HW | 8                  | 200        | -              | 350          | 300    | 730    | 480     |
| SBP 410 - HW | 10                 | 250        | -              | 400          | 300    | 730    | 480     |
| SBP 412 - HW | 12                 | -          | 350 x 250      | 450          | 300    | 730    | 480     |
| SBP 414 - HW | 14                 | -          | 475 x 250      | 600          | 300    | 730    | 480     |
| SBP 416 - HW | 16                 | -          | 625 x 250      | 700          | 300    | 730    | 480     |

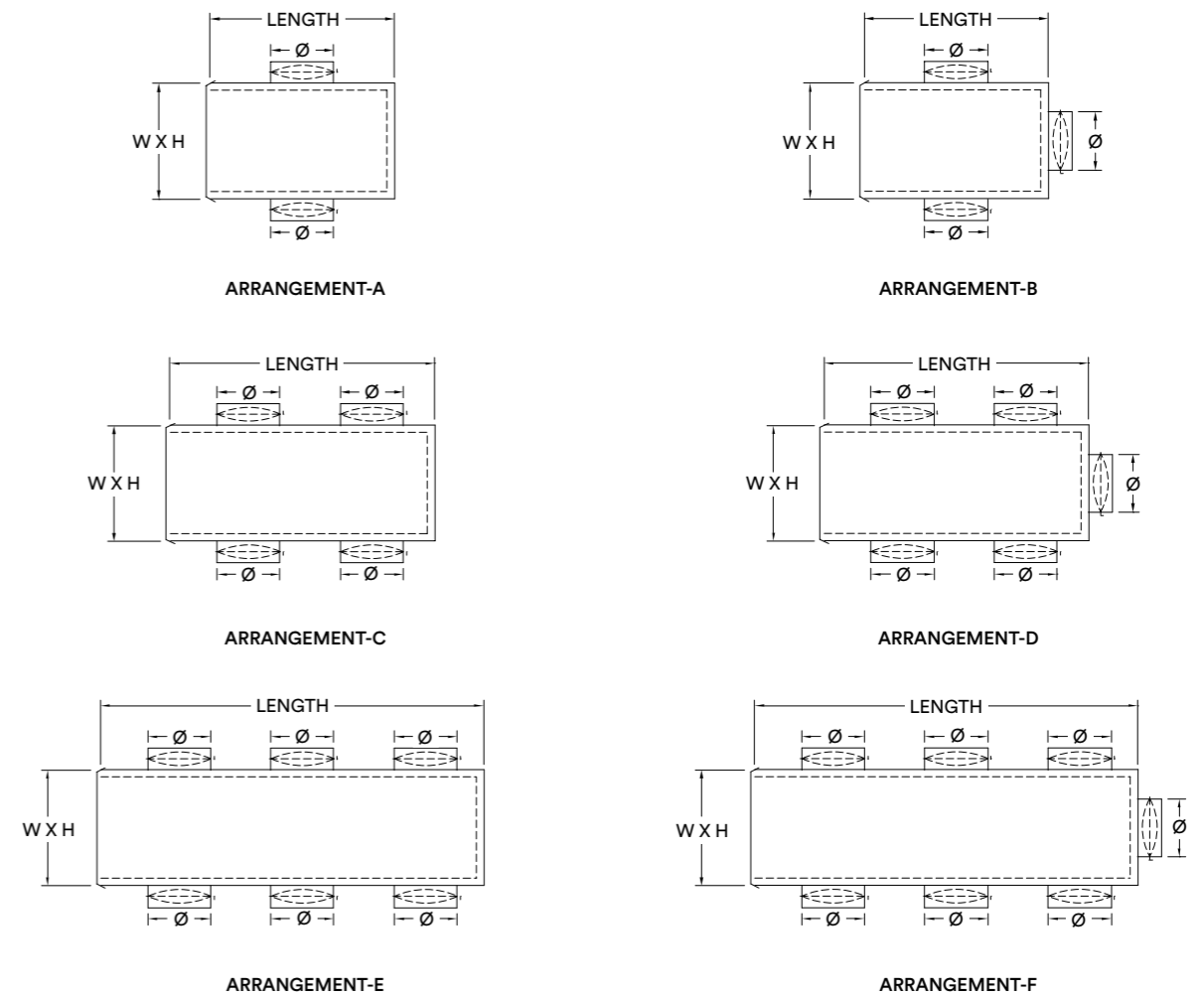
**NOTE**

1. The minimum straight portion after the hot water coil must be equal to the diagonal of the electric heater's internal dimension.
2. Contact SAFID for hot water coil details.

SBP 400 - OP: AIR TERMINALS WITH MULTIPLE OUTLET PLENUM

Plenum Arrangement

Multiple outlet plenums can be supplied in the following arrangement and the dimensions will be as per the customer's requirement.



**NOTE**

Plenum construction: 22 Ga. GI or as required, Lining: 25mm x 48 kg/m3 or as required. Lined and unlined plenums can be provided to required collar dia. As per above arrangements. All the collars to be provided with manual VCD (volume control damper) and hand quadrant.

Table 1: NC Levels if Lined Rectangular Duct is Fixed to the Downstream Side of Terminal box

| Terminal Size (in) | Air Flow |       | Inlet Static Pressure (in W.G.) | Inlet and Attenuator Static Pressure (in W.G.) | Discharge Sound Power Level       |     |     |      |      |      | NC  |
|--------------------|----------|-------|---------------------------------|--|-----------------------------------|-----|-----|------|------|------|-----|
|                    | CFM      | m³/s  |                                 |  | Octave Band Center Frequency (Hz) |     |     |      |      |      |     |
|                    |          |       |                                 |  | 125                               | 250 | 500 | 1kHz | 2kHz | 4kHz |     |
| 6                  | 200      | 0.094 | 0.04                            | 0.06   | 39                                | 36  | 31  | 18   | 15   | 15   | <20 |
|                    | 300      | 0.142 | 0.10                            | 0.14   | 48                                | 46  | 42  | 31   | 27   | 20   | <20 |
|                    | 400      | 0.189 | 0.16                            | 0.24   | 51                                | 51  | 49  | 38   | 36   | 31   | <20 |
|                    | 600      | 0.283 | 0.40                            | 0.56   | 57                                | 60  | 59  | 49   | 49   | 46   | 28  |
| 8                  | 400      | 0.189 | 0.04                            | 0.10   | 42                                | 37  | 28  | 28   | 16   | 14   | <20 |
|                    | 500      | 0.236 | 0.05                            | 0.13   | 45                                | 43  | 34  | 35   | 26   | 18   | <20 |
|                    | 700      | 0.330 | 0.10                            | 0.26   | 51                                | 51  | 43  | 43   | 37   | 31   | <20 |
|                    | 1000     | 0.472 | 0.20                            | 0.52   | 55                                | 59  | 53  | 53   | 47   | 43   | 27  |
| 10                 | 600      | 0.283 | 0.03                            | 0.13   | 40                                | 33  | 24  | 19   | 15   | 15   | <20 |
|                    | 800      | 0.378 | 0.04                            | 0.20   | 44                                | 40  | 32  | 28   | 22   | 17   | <20 |
|                    | 1000     | 0.472 | 0.08                            | 0.34   | 47                                | 46  | 38  | 37   | 32   | 24   | <20 |
|                    | 1600     | 0.755 | 0.20                            | 0.84   | 56                                | 57  | 52  | 49   | 45   | 43   | 24  |
| 12                 | 1100     | 0.519 | 0.04                            | 0.28   | 40                                | 36  | 33  | 34   | 23   | 17   | <20 |
|                    | 1200     | 0.566 | 0.05                            | 0.33   | 45                                | 39  | 36  | 37   | 28   | 18   | <20 |
|                    | 1700     | 0.802 | 0.10                            | 0.68   | 50                                | 47  | 45  | 47   | 40   | 34   | <20 |
|                    | 2200     | 1.038 | 0.16                            | 1.12   | 55                                | 53  | 53  | 53   | 47   | 42   | 21  |
| 14                 | 1500     | 0.708 | 0.04                            | 0.30   | 39                                | 40  | 40  | 34   | 27   | 17   | <20 |
|                    | 1800     | 0.849 | 0.05                            | 0.41   | 43                                | 43  | 44  | 38   | 33   | 31   | <20 |
|                    | 2400     | 1.133 | 0.08                            | 0.72   | 50                                | 50  | 52  | 46   | 42   | 36   | <20 |
|                    | 3000     | 1.416 | 0.10                            | 1.12   | 56                                | 58  | 58  | 52   | 48   | 43   | 25  |
| 16                 | 2000     | 0.944 | 0.02                            | 0.34   | 44                                | 39  | 43  | 32   | 25   | 18   | <20 |
|                    | 2800     | 1.321 | 0.03                            | 0.67   | 53                                | 47  | 52  | 43   | 39   | 29   | <20 |
|                    | 3200     | 1.510 | 0.04                            | 0.88   | 56                                | 51  | 56  | 47   | 44   | 35   | 20  |
|                    | 3600     | 1.699 | 0.05                            | 1.10   | 58                                | 54  | 59  | 52   | 48   | 39   | 23  |
|                    | 4000     | 1.888 | 0.06                            | 1.38   | 61                                | 58  | 62  | 55   | 51   | 43   | 26  |

NOTE

1. The performance data shown is based on tests conducted in accordance with AHRI Standard 880 and ASHRAE Standard 130.
2. Measurement of Sound Power Levels is in accordance with International Standard ISO 3741 comparison method.
3. Discharge NC levels on this table reflect a reduction of environmental affect, 5 feet of lined metal duct the same size as the air terminal discharge, 3 feet lined flexible duct, outlet reflection and space effect.

Table 2: NC Levels if Unlined Rectangular Duct is Fixed to the Downstream Side of Terminal

| Terminal Size (in) | Air Flow |       | Inlet Static Pressure (in W.G.) | Inlet and Attenuator Static Pressure (in W.G.) | Discharge Sound Power Level       |     |     |      |      |      | NC  |
|--------------------|----------|-------|---------------------------------|--|-----------------------------------|-----|-----|------|------|------|-----|
|                    | CFM      | m³/s  |                                 |  | Octave Band Center Frequency (Hz) |     |     |      |      |      |     |
|                    |          |       |                                 |  | 125                               | 250 | 500 | 1kHz | 2kHz | 4kHz |     |
| 6                  | 200      | 0.094 | 0.04                            | 0.06   | 39                                | 36  | 31  | 18   | 15   | 15   | <20 |
|                    | 300      | 0.142 | 0.10                            | 0.14   | 48                                | 46  | 42  | 31   | 27   | 20   | <20 |
|                    | 400      | 0.189 | 0.16                            | 0.24   | 51                                | 51  | 49  | 38   | 36   | 31   | 22  |
|                    | 600      | 0.283 | 0.40                            | 0.56   | 57                                | 60  | 59  | 49   | 49   | 46   | 33  |
| 8                  | 400      | 0.189 | 0.04                            | 0.10   | 42                                | 37  | 28  | 28   | 16   | 14   | <20 |
|                    | 500      | 0.236 | 0.05                            | 0.13   | 45                                | 43  | 34  | 35   | 26   | 18   | <20 |
|                    | 700      | 0.330 | 0.10                            | 0.26   | 51                                | 51  | 43  | 43   | 37   | 31   | 21  |
|                    | 1000     | 0.472 | 0.20                            | 0.52   | 55                                | 59  | 53  | 53   | 47   | 43   | 30  |
| 10                 | 600      | 0.283 | 0.03                            | 0.13   | 40                                | 33  | 24  | 19   | 15   | 15   | <20 |
|                    | 800      | 0.378 | 0.04                            | 0.20   | 44                                | 40  | 32  | 28   | 22   | 17   | <20 |
|                    | 1000     | 0.472 | 0.08                            | 0.34   | 47                                | 46  | 38  | 37   | 32   | 24   | <20 |
|                    | 1600     | 0.755 | 0.20                            | 0.84   | 56                                | 57  | 52  | 49   | 45   | 43   | 30  |
| 12                 | 1100     | 0.519 | 0.04                            | 0.28   | 40                                | 36  | 33  | 34   | 23   | 17   | <20 |
|                    | 1200     | 0.566 | 0.05                            | 0.33   | 45                                | 39  | 36  | 37   | 28   | 18   | <20 |
|                    | 1700     | 0.802 | 0.10                            | 0.68   | 50                                | 47  | 45  | 47   | 40   | 34   | 23  |
|                    | 2200     | 1.038 | 0.16                            | 1.12   | 55                                | 53  | 53  | 53   | 47   | 42   | 30  |
| 14                 | 1500     | 0.708 | 0.04                            | 0.30   | 39                                | 40  | 40  | 34   | 27   | 17   | <20 |
|                    | 1800     | 0.849 | 0.05                            | 0.41   | 43                                | 43  | 44  | 38   | 33   | 31   | <20 |
|                    | 2400     | 1.133 | 0.08                            | 0.72   | 50                                | 50  | 52  | 46   | 42   | 36   | 25  |
|                    | 3000     | 1.416 | 0.10                            | 1.12   | 56                                | 58  | 58  | 52   | 48   | 43   | 32  |
| 16                 | 2000     | 0.944 | 0.02                            | 0.34   | 44                                | 39  | 43  | 32   | 25   | 18   | <20 |
|                    | 2800     | 1.321 | 0.03                            | 0.67   | 53                                | 47  | 52  | 43   | 39   | 29   | 25  |
|                    | 3200     | 1.510 | 0.04                            | 0.88   | 56                                | 51  | 56  | 47   | 44   | 35   | 30  |
|                    | 3600     | 1.699 | 0.05                            | 1.10   | 58                                | 54  | 59  | 52   | 48   | 39   | 33  |
|                    | 4000     | 1.888 | 0.06                            | 1.38   | 61                                | 58  | 62  | 55   | 51   | 43   | 36  |

NOTE

1. The performance data shown is based on tests conducted in accordance with AHRI Standard 880 and ASHRAE Standard 130.
2. Measurement of Sound Power Levels is in accordance with International Standard ISO 3741 comparison method.
3. Discharge NC levels on this table reflect a reduction of environmental effect, 5 feet of lined metal duct the same size as the air terminal discharge, 3 feet lined flexible duct, outlet reflection and space effect.

## SBP 400 - EH : AIR TERMINAL WITH DOWNSTREAM ELECTRIC HEATER

## Optional Electric Heaters

**OPTION NO. 1 - Stainless Steel Tube Coil:****Construction:**

The heating element of electric heater is made from stainless steel tube, SS type 2337, EN 1.4541. The stainless steel tube heating element is not electrified and it will get hot (300-350°) but you will not get an electric shock if you should reach it. It has a density which will keep it warm for approximately 3 minutes after the power is switched off and therefore very good to control with a time proportional thyristor regulation or with European standards EN heaters are tested for electrical safety and approved for EMC by SEMKO and comply with European standards EN 50081-1 and EN 50082-1. It also comply with the requirements in the Low Voltage Directive, LVD 72/23 EEC.

The casing is made from steel sheet with aluminum zinc coating which is more corrosion resistive than the galvanized steel sheet.

**Basic Electric Heater - Code EHT:**

1. The basic electric heater have no built-in temperature regulation controller.
2. In case of thermal over load, it has two built-in over heating protections, one is automatic reset and other one is to be manually reset.
3. The basic electric heater have a built-in pressure switch to detect the presence of air flow passing through the electric heater. The power supply to the electric heater must be interrupted if the supply fan or air flow stopped. This function can be connected to the incoming power supply to the electric heater.
4. The number of kW steps is available from 1 to 3 steps.
5. The power supply is 230V/1PH/60HZ from 0.5 kW up to 10kW and 400V/3PH/60HZ from 3kw up to 86kw.

**Electric Heater with Built - In Temperature Regulation Controller - Code EHTR:**

1. The electric heater with built-in electronic temperature regulation controller called thyristor controls heating by means of so called time proportional regulation (Pulsi/Pause Technology). This gives a very precise continuous variable temperature regulation control of the heaters in response to the temperature requirements of the room sensor. The built-in controller is made for an external 0-10V control signal from BMS or similar.
2. It has also built-in automatic and manual reset over heating protection and a pressure switch to detect the presence of air flow passing through the electric heater.
3. The power supply is 230V/1PH/60HZ from 0.2kW up to 5.5kw and 400V/3PH/60HZ from 6kW up to 86kW.

**NOTE**

For more details, refer to the Electric Duct Heater section of this catalogue.

## SBP 400 - EH: AIR TERMINALS WITH DOWNSTREAM ELECTRIC HEATER

## Optional Electric Heaters

**OPTION NO. 2 - Open Coil:****Constructions:**

The open coil type heating element is made from a high grade resistance wire. Each heating coil element is designed to the customer's wattage specification. A gauge heavier than a normal gauge wire is used, giving a longer coil to maintain the required resistance for a given wattage.

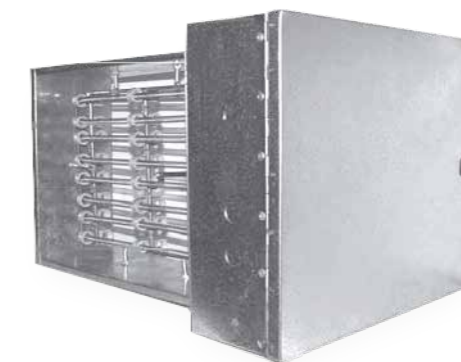
The casing is made from galvanized steel sheet as standard. Optional casing can be made from alumized or stainless steel.

**Basic Electric Heater - Code EHO:**

1. The basic electric heater have no built-in temperature regulation controller.
2. In case of thermal over load, it has two built-in over heating protections, one is automatic reset and the other one is to be manually reset.
3. The basic electric heater has a built-in air flow switch to detect the presence of air flow passing through the electric heater. The power supply to the electric heater must be interrupted if the supply fan or air flow stopped.
4. The number of kW steps is available from 1 to 3 steps.
5. The power supply available is 230V/1PH/60HZ or 440V/3PH/60HZ.
6. The maximum kW rating is 200kW.

**Electric Heater with Built-In solid state proportional controller - Code EHOS**

1. The heating element is controlled simultaneously with the built-in solid state controller. The built-in controller is made for an external 0-10 VDC control signal from BMS.
2. It has also a built-in automatic and manual reset over heating protection and air flow switch to detect the presence of air flow available is 230V/1PH/60HZ or 440V/3PH/60HZ.
4. The maximum kW rating is 200kW.

**NOTE**

For more details, refer to the Electric Duct Heater section of this catalogue.

Order Details

Order Code:

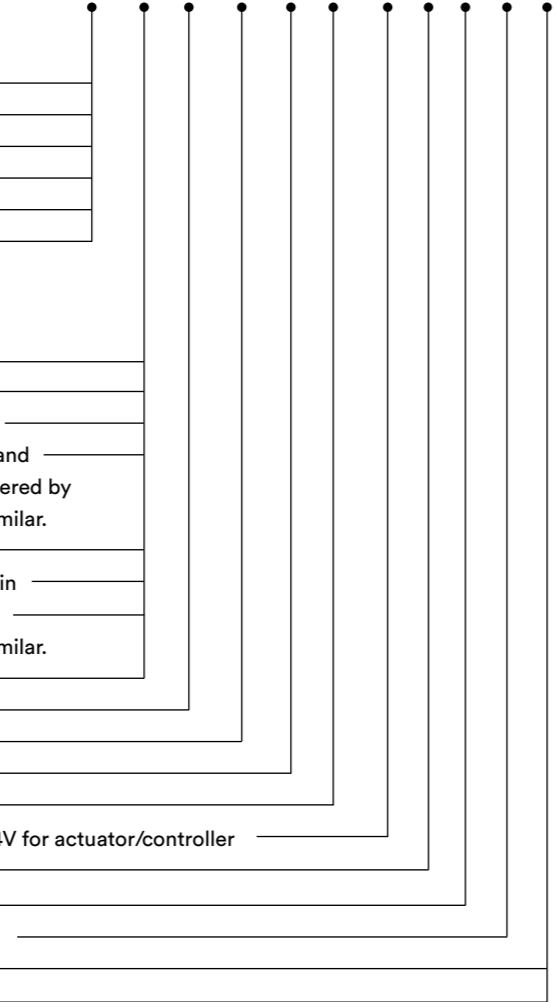
Model No:

- 406 =Inlet Size No.6
- 408 =Inlet Size No.8
- 410 =Inlet Size No.10
- 412 =Inlet Size No.12
- 414 =Inlet Size No.14
- 416 =Inlet Size No.16

Options:

- SA =With discharge sound attenuator
- OP =With multiple outlet plenum
- EHT =With stainless steel tube coil electric heater
- EHTR =With stainless steel tube coil electric heater and built-in temperature regulation controller powered by external 0...10V control signal from BMS or similar.
- EHO =With electric heater with open coil
- EHOS =With electric heater with open coil and built-in solid state proportional controller powered by external 0...10V control signal from BMS or similar.
- HW =With discharge hot water coil
- kW =Power rating of electric heater
- 1,2,3 =Required number of steps
- M =With Belimo actuator
- TC =With digital room temperature controller
- T =With step-down transformer from 220V to 24V for actuator/controller
- TB =With terminal block for transformer
- CB =With control box
- P =With perforated sheet behind acoustic lining
- SF =With slide on flange on discharge side
- FC =With flexible connector

SBP aaa- bb- cc- dd ee ff gg hh ii jj kk



NOTE

1. If the discharge side connection is not specified, slip & drive is the standard connection.
2. If the actuator, transformer, terminal block and control box is not specified, the standard supply is with extended shaft only for actuator connection.

Order Example

Example No. 1

Requirements:

Bypass Air Terminals are capable of delivering 1200 CFM at 0.05 in W.G. Inlet static pressure with maximum discharge NC 25. Air terminal should be with Belimo actuator and control box.

**Selected Model:** SBP 412 - Using Table1, SBP 412 will meet the required 0.05 in W.G. inlet static pressure and the discharge NC level is <NC 20.

Ordering:

Make :SAFID  
 Type :SBP 412-M-CB  
 Qty :1 pc

Example No. 2

Requirements:

Same as Example No. 1 but with discharge Sound Attenuator at Inlet & Attenuator pressure of 0.33 in W. G.

**Selected Model:** SBP 412

Ordering:

Make :SAFID  
 Type :SBP 412-SA-M-CB  
 Qty :1 pc

Example No. 3:

Requirements:

Same as Example No.1 but with open coil electric heater, 2.5kW, 1 step.

**Selected Model:** SBP 412

Ordering:

Make :SAFID  
 Type :SBP 412-EHO-2.5kW 1-M - CB  
 Qty :1 pc

Example No. 4

Requirements:

Same as Example No. 1 but with open coil electric heater, 5kW, 2 steps with digital room temperature controller.

**Selected Model:** SBP 412

Ordering:

Make :SAFID  
 Type :SBP 412-EHO - 5kW-2-M-TC-CB  
 Qty :1 pc