

## Application Guidelines

## Technical specifications

### 50 Hz data

| Model        |          | Nominal<br>Cap. 60 Hz | Nominal cooling capacity |         | Power input | COP  | E.E.R.   | Swept<br>volume | Displacement<br>① | Oil<br>charge | Net<br>weight ② |
|--------------|----------|-----------------------|--------------------------|---------|-------------|------|----------|-----------------|-------------------|---------------|-----------------|
|              |          | TR                    | W                        | Btu/h   | kW          | W/W  | Btu/h /W | cm3/rev         | m3/h              | dm3           | kg              |
| R22 SINGLE   | SM084    | 7                     | 20 400                   | 69 600  | 6.12        | 3.33 | 11.4     | 114.5           | 19.9              | 3.25          | 64              |
|              | SM090    | 7.5                   | 21 800                   | 74 400  | 6.54        | 3.33 | 11.4     | 120.5           | 21.0              | 3.25          | 65              |
|              | SM100    | 8                     | 23 100                   | 78 800  | 6.96        | 3.33 | 11.4     | 127.2           | 22.1              | 3.25          | 65              |
|              | SM110    | 9                     | 25 900                   | 88 400  | 7.82        | 3.32 | 11.3     | 144.2           | 25.1              | 3.25          | 73              |
|              | SM112    | 9.5                   | 27 600                   | 94 200  | 7.92        | 3.49 | 11.9     | 151.5           | 26.4              | 3.30          | 64              |
|              | SM120    | 10                    | 30 100                   | 102 700 | 8.96        | 3.36 | 11.5     | 166.6           | 29.0              | 3.25          | 73              |
|              | SM124    | 10                    | 31 200                   | 106 500 | 8.75        | 3.56 | 12.2     | 169.5           | 29.5              | 3.30          | 64              |
|              | SM147    | 12                    | 36 000                   | 122 900 | 10.08       | 3.57 | 12.2     | 193.5           | 33.7              | 3.30          | 67              |
|              | SM148    | 12                    | 36 100                   | 123 200 | 10.8        | 3.34 | 11.4     | 199.0           | 34.6              | 3.60          | 88              |
|              | SM161    | 13                    | 39 000                   | 133 100 | 11.59       | 3.37 | 11.5     | 216.6           | 37.7              | 3.60          | 88              |
|              | SM175    | 14                    | 42 000                   | 143 300 | 12.47       | 3.37 | 11.5     | 233.0           | 40.5              | 6.20          | 100             |
|              | SM/SY185 | 15                    | 45 500                   | 155 300 | 13.62       | 3.34 | 11.4     | 249.9           | 43.5              | 6.20          | 100             |
|              | SY240    | 20                    | 61 200                   | 208 900 | 18.2        | 3.36 | 11.5     | 347.8           | 60.5              | 8.00          | 150             |
|              | SY300    | 25                    | 78 200                   | 266 900 | 22.83       | 3.43 | 11.7     | 437.5           | 76.1              | 8.00          | 157             |
|              | SY380    | 30                    | 94 500                   | 322 500 | 27.33       | 3.46 | 11.8     | 531.2           | 92.4              | 8.40          | 158             |
| R407C SINGLE | SZ084    | 7                     | 19 300                   | 65 900  | 6.13        | 3.15 | 10.8     | 114.5           | 19.9              | 3.25          | 64              |
|              | SZ090    | 7.5                   | 20 400                   | 69 600  | 6.45        | 3.16 | 10.8     | 120.5           | 21.0              | 3.25          | 65              |
|              | SZ100    | 8                     | 21 600                   | 73 700  | 6.84        | 3.15 | 10.8     | 127.2           | 22.1              | 3.25          | 65              |
|              | SZ110    | 9                     | 24 600                   | 84 000  | 7.76        | 3.17 | 10.8     | 144.2           | 25.1              | 3.25          | 73              |
|              | SZ120    | 10                    | 28 600                   | 97 600  | 8.99        | 3.17 | 10.8     | 166.6           | 29.0              | 3.25          | 73              |
|              | SZ147    | 12                    | 34 900                   | 119 079 | 9.92        | 3.52 | 12.0     | 193.5           | 33.7              | 3.30          | 67              |
|              | SZ148    | 12                    | 35 100                   | 119 800 | 10.99       | 3.19 | 10.9     | 199.0           | 34.6              | 3.60          | 88              |
|              | SZ161    | 13                    | 38 000                   | 129 700 | 11.84       | 3.21 | 11.0     | 216.6           | 37.7              | 3.60          | 88              |
|              | SZ175    | 14                    | 40 100                   | 136 900 | 12.67       | 3.17 | 10.8     | 233.0           | 40.5              | 6.20          | 100             |
|              | SZ185    | 15                    | 43 100                   | 147 100 | 13.62       | 3.16 | 10.8     | 249.9           | 43.5              | 6.20          | 100             |
|              | SY240    | 20                    | 59 100                   | 201 700 | 18.55       | 3.19 | 10.9     | 347.8           | 60.5              | 8.00          | 150             |
|              | SY300    | 25                    | 72 700                   | 248 100 | 22.73       | 3.20 | 10.9     | 437.5           | 76.1              | 8.00          | 157             |
|              | SY380    | 30                    | 89 600                   | 305 800 | 27.59       | 3.25 | 11.1     | 531.2           | 92.4              | 8.40          | 158             |

TR = Ton of Refrigeration  
 COP = Coefficient Of Performance  
 EER = Energy Efficiency Ratio

① Displacement at nominal speed: 2900 rpm at 50 Hz, 3500 rpm at 60Hz  
 ② Net weight with oil charge

### Rating conditions

|                            | SM/SY compressors       | SZ compressors      |
|----------------------------|-------------------------|---------------------|
| Refrigerant                | R22                     | R407C               |
| Frequency                  | 50 Hz                   | 50 Hz               |
| Standard rating conditions | ARI standard conditions | -                   |
| Evaporating temperature    | 7.2 °C                  | 7.2 °C (dew point)  |
| Condensing temperature     | 54.4 °C                 | 54.4 °C (dew point) |
| Sub-cooling                | 8.3 K                   | 8.3 K               |
| Superheat                  | 11.1 K                  | 11.1 K              |

Application Guidelines

Technical specifications

60 Hz data

| Model        |          | Nominal<br>Cap. 60 Hz | Nominal cooling<br>capacity |         | Power input | COP  | E.E.R.   | Swept<br>volume | Displace-<br>ment ① | Oil<br>charge | Net<br>weight ② |
|--------------|----------|-----------------------|-----------------------------|---------|-------------|------|----------|-----------------|---------------------|---------------|-----------------|
|              |          | TR                    | W                           | Btu/h   | kW          | W/W  | Btu/h /W | cm³/rev         | m³/h                | dm³           | kg              |
| R22 SINGLE   | SM084    | 7                     | 24 600                      | 84 000  | 7.40        | 3.34 | 11.4     | 114.5           | 24.1                | 3.25          | 64              |
|              | SM090    | 7.5                   | 26 400                      | 90 100  | 7.80        | 3.37 | 11.5     | 120.5           | 25.3                | 3.25          | 65              |
|              | SM100    | 8                     | 27 500                      | 93 900  | 8.10        | 3.38 | 11.5     | 127.2           | 26.7                | 3.25          | 65              |
|              | SM110    | 9                     | 31 600                      | 107 800 | 9.30        | 3.38 | 11.5     | 144.2           | 30.3                | 3.25          | 73              |
|              | SM112    | 9.5                   | 34 000                      | 116 000 | 9.60        | 3.53 | 12.1     | 151.5           | 31.8                | 3.30          | 64              |
|              | SM120    | 10                    | 36 700                      | 125 300 | 10.80       | 3.40 | 11.6     | 166.6           | 35.0                | 3.25          | 73              |
|              | SM124    | 10.5                  | 37 700                      | 128 700 | 10.60       | 3.56 | 12.2     | 169.5           | 35.6                | 3.30          | 64              |
|              | SM147    | 12                    | 43 600                      | 148 800 | 12.20       | 3.58 | 12.2     | 193.5           | 40.6                | 3.30          | 67              |
|              | SM148    | 12                    | 43 800                      | 149 500 | 13.00       | 3.37 | 11.5     | 199.0           | 41.8                | 3.60          | 88              |
|              | SM161    | 13                    | 47 600                      | 162 500 | 14.10       | 3.39 | 11.6     | 216.6           | 45.5                | 3.60          | 88              |
|              | SM175    | 14                    | 51 100                      | 174 400 | 15.30       | 3.34 | 11.4     | 233.0           | 48.9                | 6.20          | 100             |
|              | SM/SY185 | 15                    | 55 300                      | 188 700 | 16.30       | 3.39 | 11.6     | 249.9           | 52.5                | 6.20          | 100             |
|              | SY240    | 20                    | 74 100                      | 252 900 | 22.10       | 3.35 | 11.4     | 347.8           | 73.0                | 8.00          | 150             |
|              | SY300    | 25                    | 94 500                      | 322 500 | 27.50       | 3.43 | 11.7     | 437.5           | 91.9                | 8.00          | 157             |
|              | SY380    | 30                    | 115 300                     | 393 500 | 33.40       | 3.46 | 11.8     | 531.2           | 111.6               | 8.40          | 158             |
| R407C SINGLE | SZ084    | 7                     | 22 500                      | 76 800  | 7.10        | 3.19 | 10.9     | 114.5           | 24.1                | 3.25          | 64              |
|              | SZ090    | 7.5                   | 24 400                      | 83 300  | 7.60        | 3.20 | 10.9     | 120.5           | 25.3                | 3.25          | 65              |
|              | SZ100    | 8                     | 26 500                      | 90 400  | 8.20        | 3.24 | 11.1     | 127.2           | 26.7                | 3.25          | 65              |
|              | SZ110    | 9                     | 30 100                      | 102 700 | 9.30        | 3.24 | 11.1     | 144.2           | 30.3                | 3.25          | 73              |
|              | SZ120    | 10                    | 34 800                      | 118 800 | 10.70       | 3.24 | 11.1     | 166.6           | 35.0                | 3.25          | 73              |
|              | SZ147    | 12                    | 42 300                      | 144 328 | 12.03       | 3.52 | 12.0     | 193.5           | 40.6                | 3.30          | 67              |
|              | SZ148    | 12                    | 42 600                      | 145 400 | 13.30       | 3.19 | 10.9     | 199.0           | 41.8                | 3.60          | 88              |
|              | SZ161    | 13                    | 46 000                      | 157 000 | 14.30       | 3.21 | 11.0     | 216.6           | 45.5                | 3.60          | 88              |
|              | SZ175    | 14                    | 48 700                      | 166 200 | 15.30       | 3.19 | 10.9     | 233.0           | 48.9                | 6.20          | 100             |
|              | SZ185    | 15                    | 51 800                      | 176 800 | 16.40       | 3.15 | 10.8     | 249.9           | 52.5                | 6.20          | 100             |
|              | SY240    | 20                    | 71 100                      | 242 700 | 22.70       | 3.14 | 10.7     | 347.8           | 73.0                | 8.00          | 150             |
|              | SY300    | 25                    | 87 900                      | 300 000 | 27.50       | 3.20 | 10.9     | 437.5           | 91.9                | 8.00          | 157             |
|              | SY380    | 30                    | 107 300                     | 366 200 | 33.50       | 3.20 | 10.9     | 531.2           | 111.6               | 8.40          | 158             |

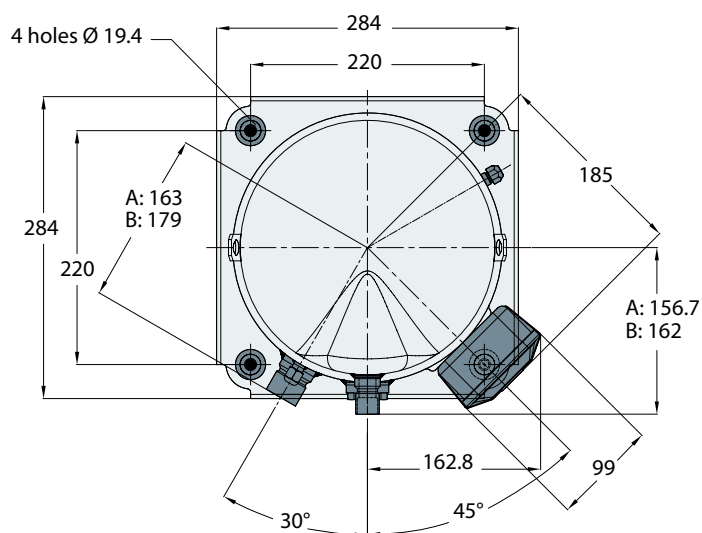
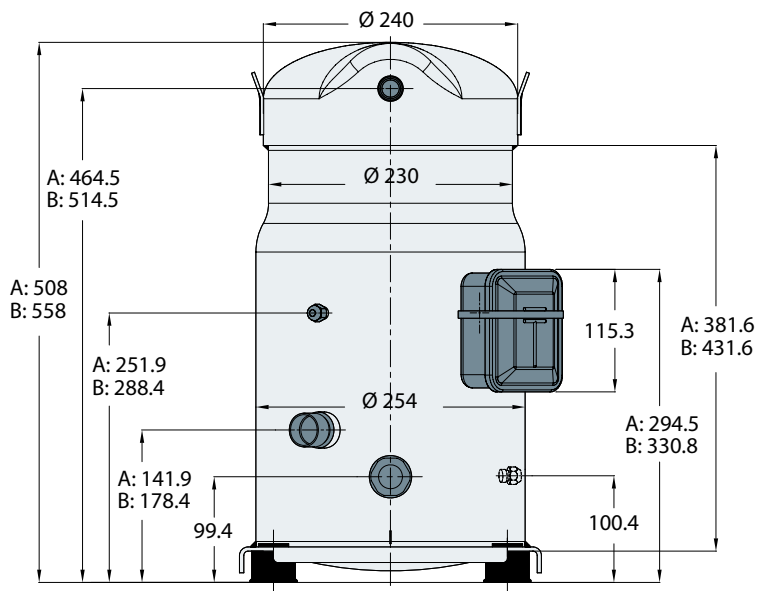
TR = Ton of Refrigeration  
COP = Coefficient Of Performance  
EER = Energy Efficiency Ratio

① Displacement at nominal speed: 2900 rpm at 50 Hz, 3500 rpm at 60Hz  
② Net weight with oil charge

Rating conditions

|                            | SM/SY compressors       | SZ compressors      |
|----------------------------|-------------------------|---------------------|
| Refrigerant                | R22                     | R407C               |
| Frequency                  | 60 Hz                   | 60 Hz               |
| Standard rating conditions | ARI standard conditions | -                   |
| Evaporating temperature    | 7.2 °C                  | 7.2 °C (dew point)  |
| Condensing temperature     | 54.4 °C                 | 54.4 °C (dew point) |
| Sub-cooling                | 8.3 K                   | 8.3 K               |
| Superheat                  | 11.1 K                  | 11.1 K              |

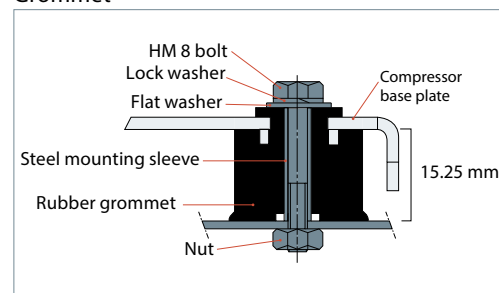
SM/SZ 084-090-100-110-120



A: SM/SZ 084-090-100  
 B: SM/SZ 110-120

All dimensions in mm

Grommet



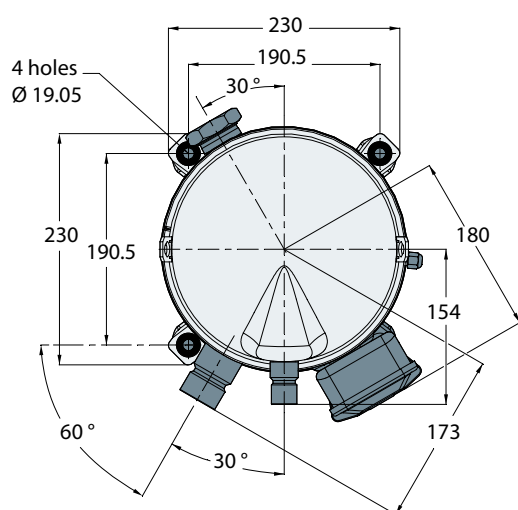
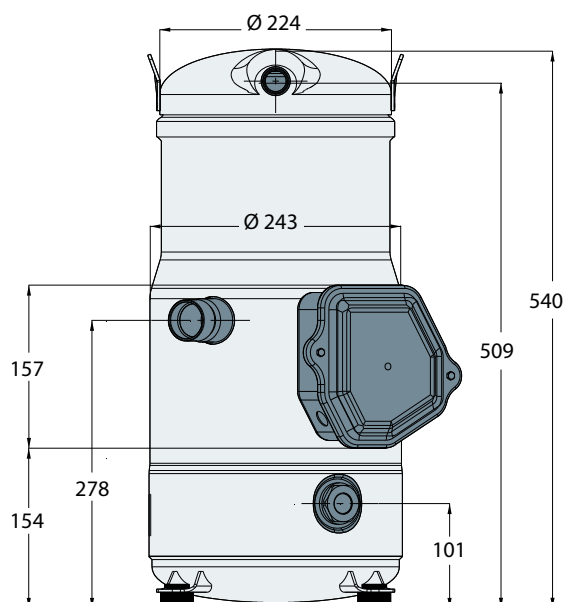
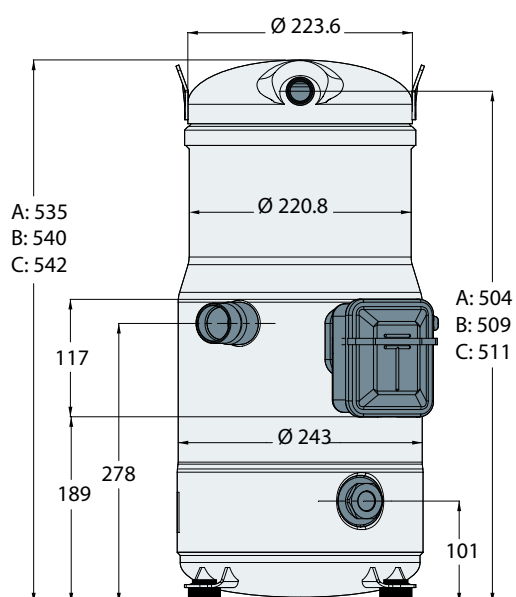
## Application Guidelines

## Dimensions

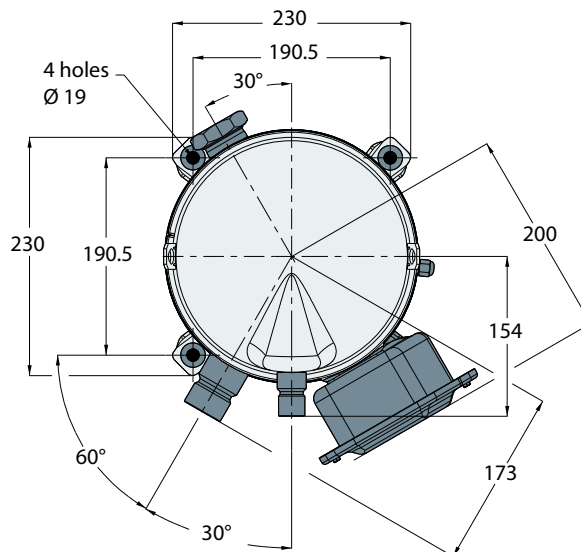
### SM 112-124-SM/SZ147\*

\* except code 3

### SM/SZ 147 code 3

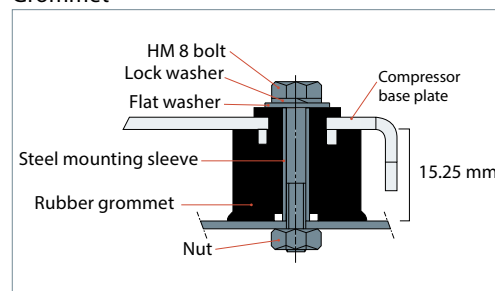


A: SM112  
B: SM124  
C: SM/SZ147

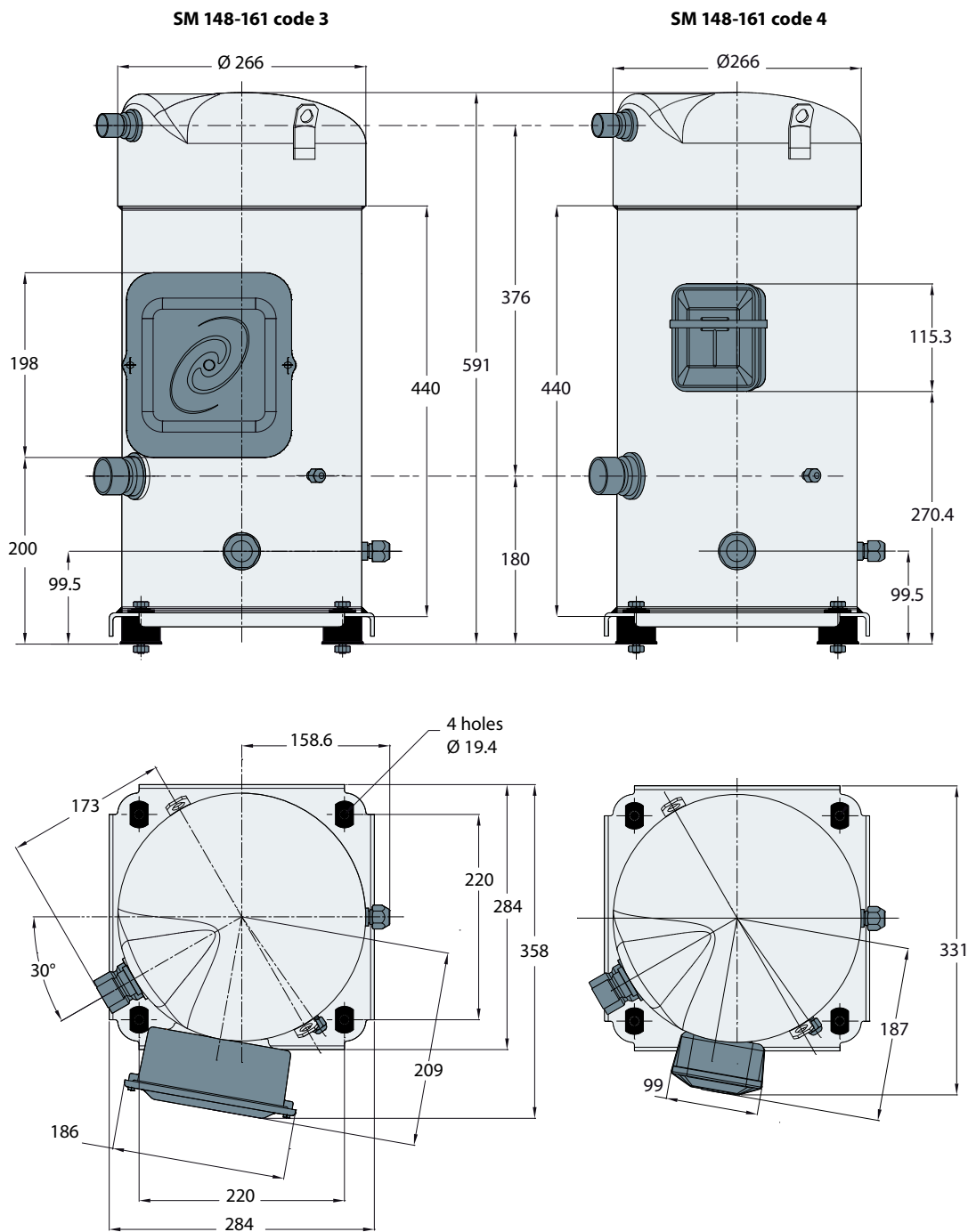


All dimensions in mm

### Grommet

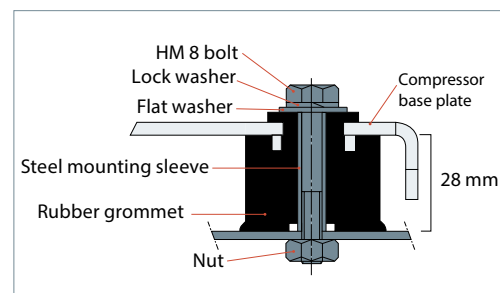


SM/SZ 148-161



All dimensions in mm

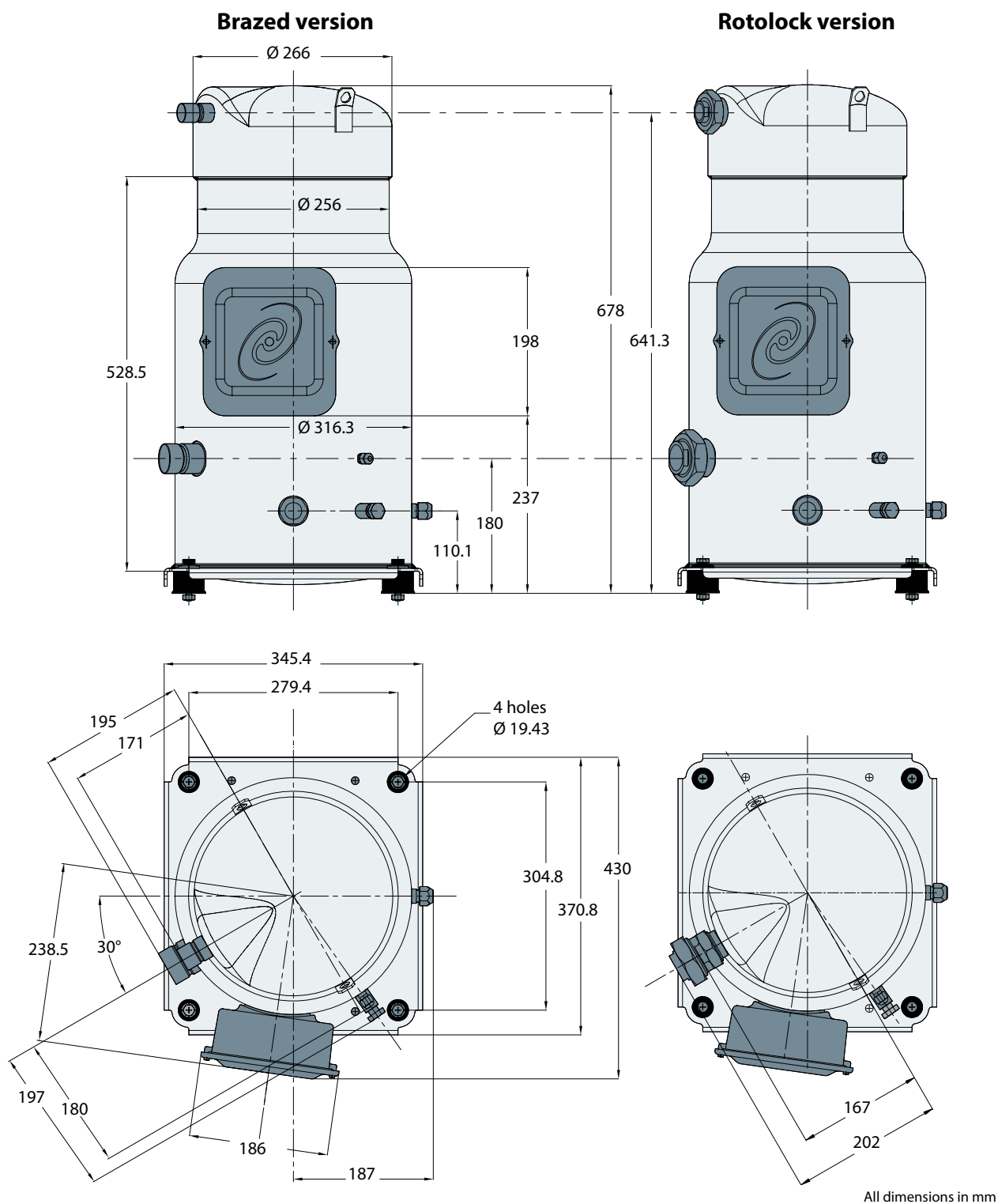
Grommet



## Application Guidelines

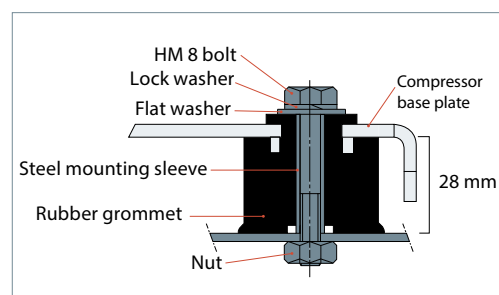
## Dimensions

### SM/SZ 175-185 & SY185 R and C version



All dimensions in mm

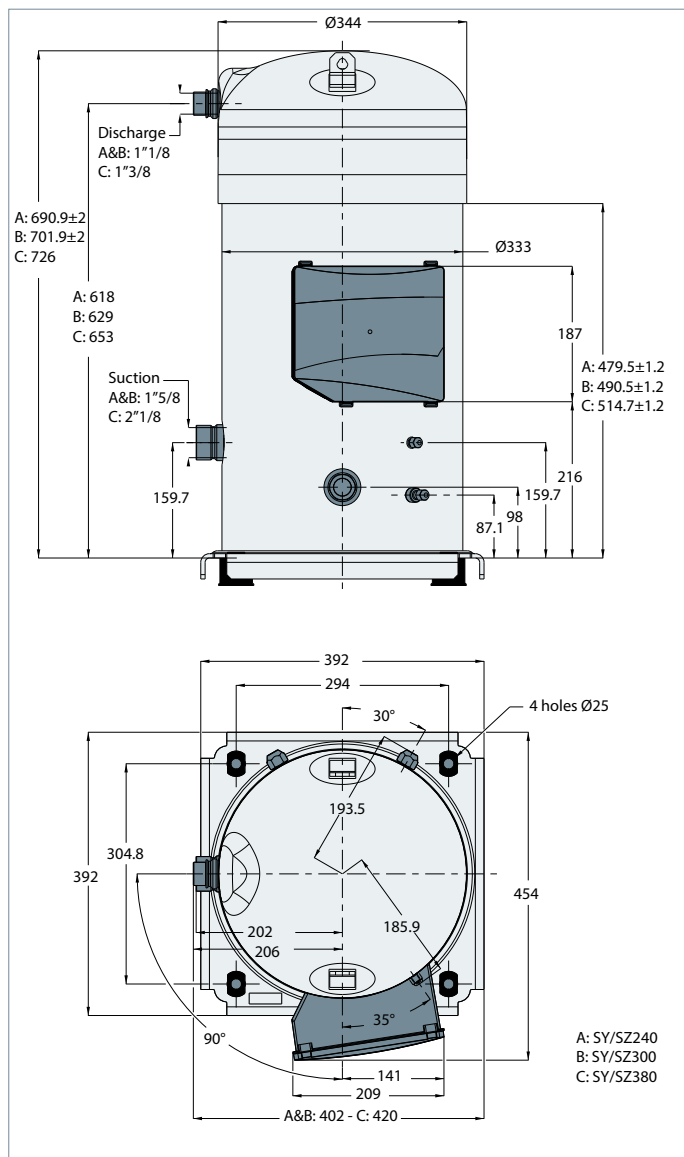
### Grommet



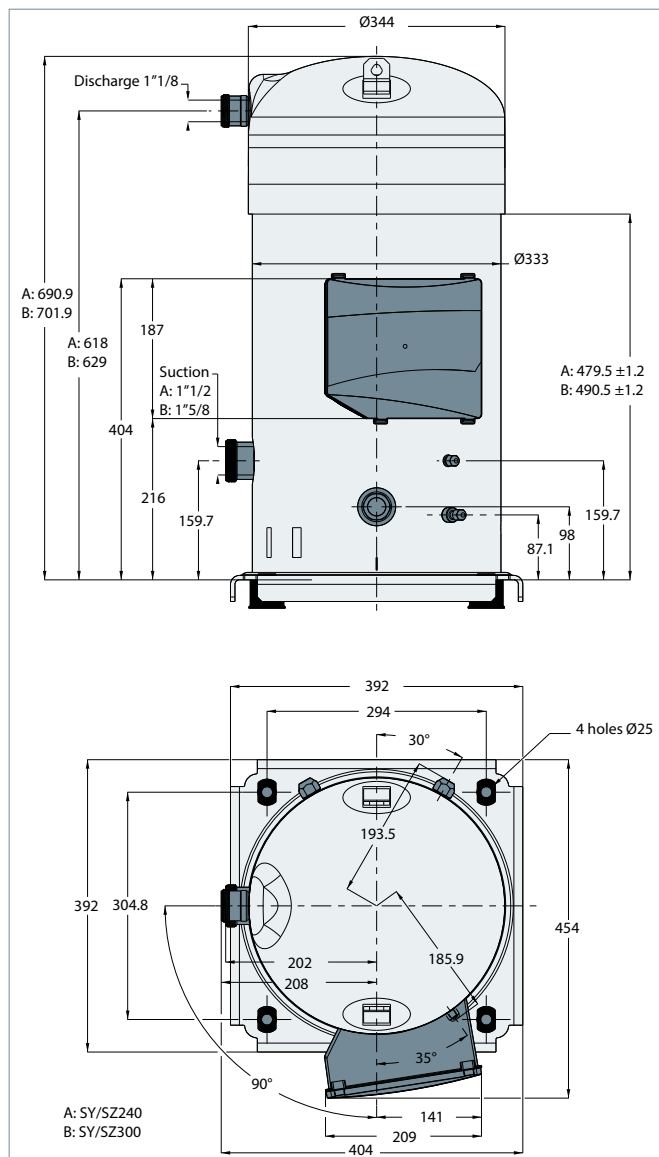


### SY 240-300-380

#### Brazed version

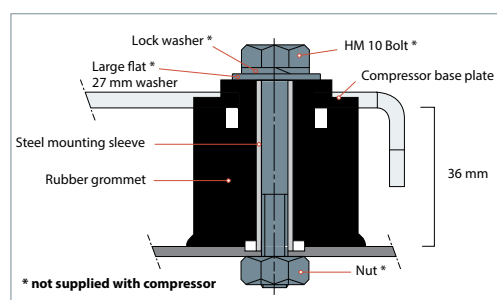


#### Rotolock version



All dimensions in mm

#### Grommet



## Application Guidelines

## Operating conditions

### Motor supply

SM / SY / SZ scroll compressors can be operated at nominal voltages as indicated on "Motor voltage code" section. Under-voltage and over-voltage operation is allowed within the indicated

voltage ranges. In case of risk of under-voltage operation, special attention must be paid to current draw.

### Compressor ambient temperature

SM / SY / SZ compressors can be applied from -35°C to +63°C (for SM/SZ084 to 185) and +53°C (for SY/SZ 240 to 380) ambient temperature. The compressors are designed as 100 % suction gas

cooled without need for additional fan cooling. Ambient temperature has very little effect on the compressor performance.

### High ambient temperature

In case of enclosed fitting and high ambient temperature it's recommend to check the temperature of power wires and conformity to their insulation specification.

In case of safe tripping by the compressor overload protection the compressor must cool down to about 60°C before the overload will reset. A high ambient temperature can strongly delay this cool-down process.

### Low ambient temperature

Although the compressor itself can withstand low ambient temperature, the system may require specific design features to ensure safe

and reliable operation. See section 'Specific application recommendations'.

### Application envelope at dew temperatures

The operating envelopes for SM / SY / SZ scroll compressors are given in the figures below, where the condensing and evaporating temperatures represent the range for steady-state operation. Under transient conditions, such as start-up and defrost, the compressor may operate outside this envelope for short periods.

The figures below show the operating envelopes for SM / SY compressors with refrigerants R22 and for SZ compressors with R407C, R134a, R404A and R507C.

The operating limits serve to define the envelope within which reliable operations of the compressor are guaranteed:

- Maximum discharge gas temperature: +135°C
- A suction superheat below 5 K (10 K for R407C) is not recommended due to the risk of liquid flood back
- Maximum superheat of 30K
- Minimum and maximum evaporating and condensing temperatures as per the operating envelopes.

### SM084 to 185 SY185 to 380 R22

