

# Scroll Compressors

**Helium-Refrigerating  
For Ultra-low Temperature Applications**



## Johnson Controls - Hitachi Air Conditioning

### HEAD QUARTER

New Pier Takeshiba South Tower  
1-16-1, Kaigan Minato-ku, Tokyo 105-0022, JAPAN  
[www.jci-hitachi.com](https://www.jci-hitachi.com)

### Product Web Address

<https://www.jci-hitachi.com/products/compressors>



### Catalogue Page

<https://www.jci-hitachi.com/products/catalog>



### Contact Address

<https://www.jci-hitachi.com/products/contact/>



### CERTIFICATION



ISO 9000 series  
Shimizu Air Conditioning Headquarters, Professional-Use Air Conditioning  
Business Division, Johnson Controls – Hitachi Air Conditioning  
JQA-1084 obtained in November 1995



ISO 14000 series  
Shimizu Business Office, Johnson Controls – Hitachi Air Conditioning  
EC97J1107 obtained in October 1997

# World's First Scroll Compressors for Ultra-low Temperature Applications Since 1985

Exclusive design for  
Helium Gas compressor  
Thanks to long experience  
and a wealth of know-how.



## FEATURE

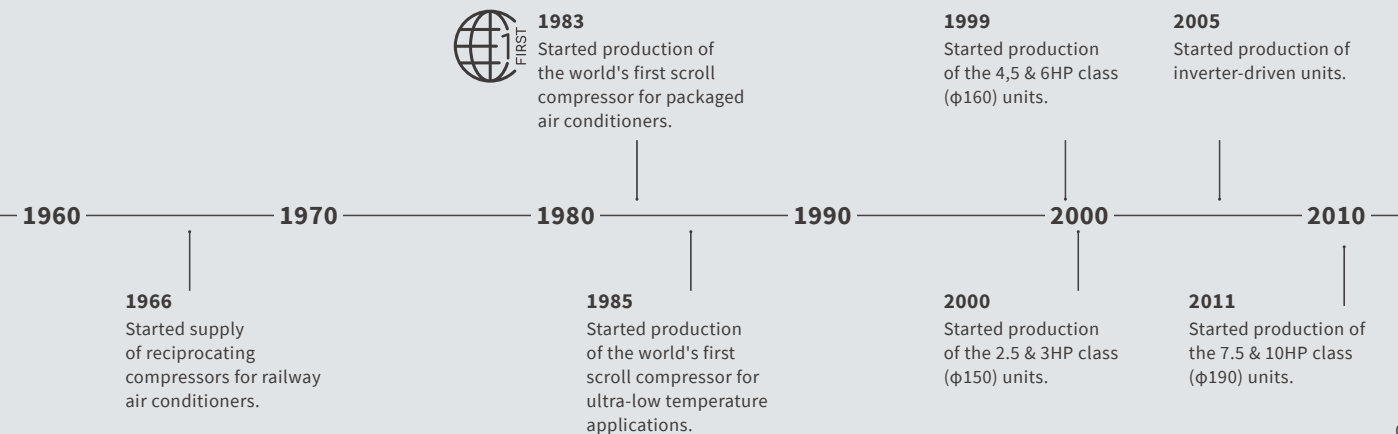
- 👍 **High Reliability**
- 📐 **Wide Operating Range**
- 💖 **Lower vibration & Noise**
- 💰 **High Efficiency**



SCROLL COMPRESSORS FOR ULTRA-LOW TEMPERATURE APPLICATIONS

MESSAGE

## HISTORY





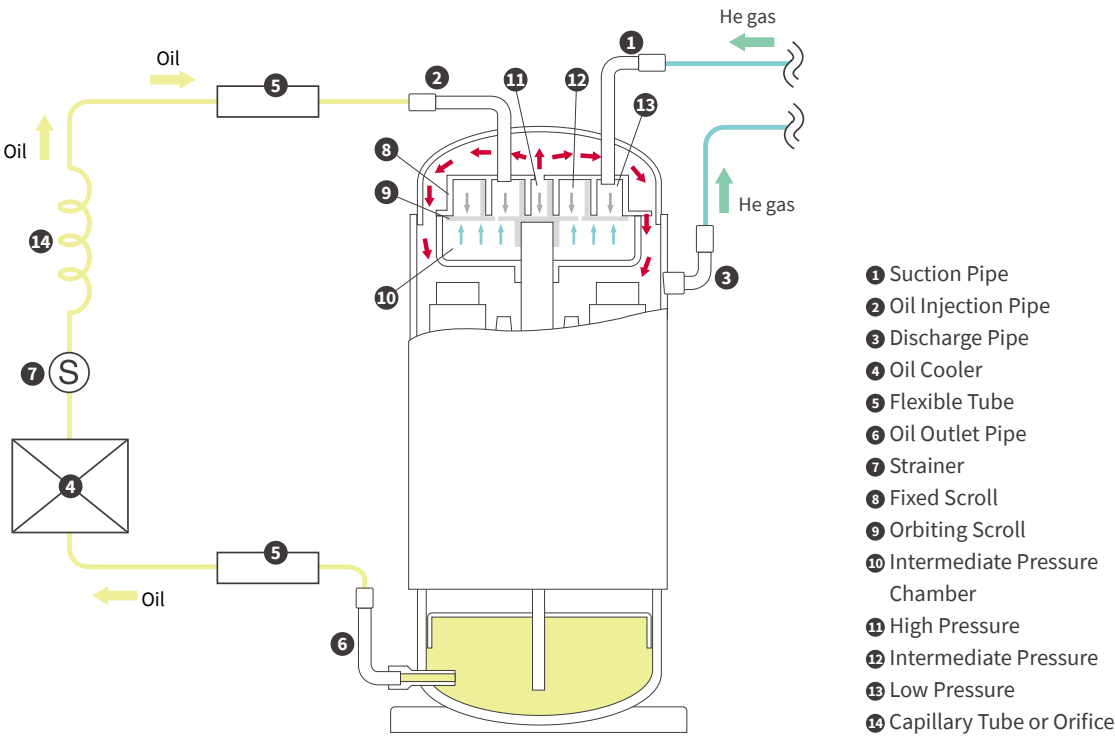
# ADVANTAGES

## HIGH PRESSURE CHAMBER

This structure simplified construction (without the tip-seal and thrust bearing) assures stable operation and long life. The mechanical loss is minimized by these optimized forces thus ensuring improved performance.

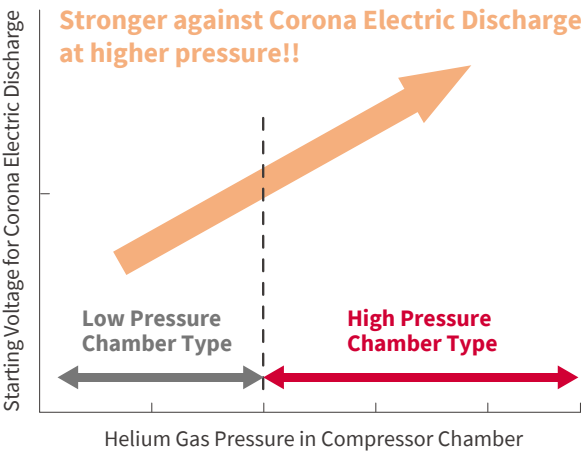
## OIL INJECTION COOLING SYSTEM

This system maintains discharge gas and motor temperature at low levels, achieving simultaneously high reliability and high efficiency.



## STRONGER AGAINST CORONA ELECTRIC DISCHARGE

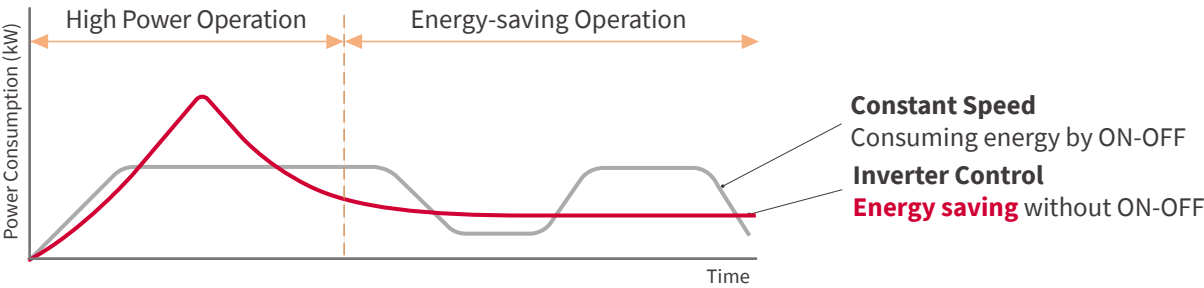
Since Corona Electric Discharge is easy to occur under Helium gas ambience, Hitachi apply "High Pressure Chamber" structure & exclusive motor. Which is especially suitable for inverter control because higher surge voltage is generated from inverter. Therefore, Hitach "High Pressure Chamber" structure has advantage on life time of motor and reliability of compressor. [Under patent application]



## ADVANTAGE WITH INVERTER CONTROL

### Saving Energy for Idling Mode

#### • Energy Saving at Low Load Conditions



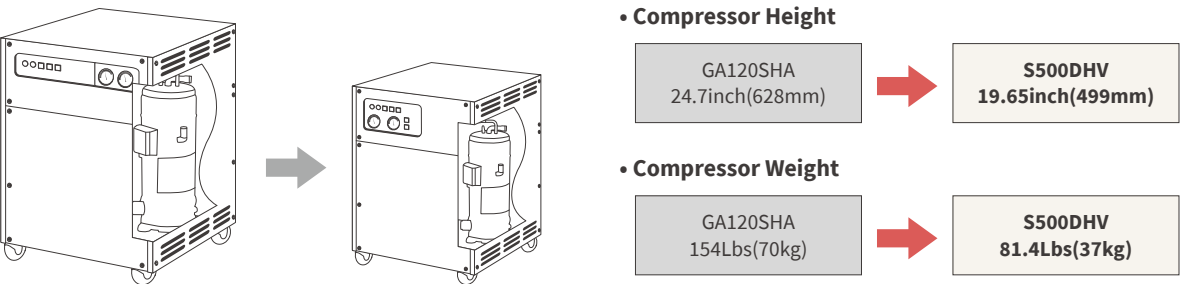
### Wide Operating Range & Standardization for Compressor Unit

5HP class ineverter model (S500DHV, S501DHV) can cover range of 4-7.5HP class.

\* The flow rate is based on the condition show in general data

|                  |         | Gas flow rate range (Nm <sup>3</sup> /h) |             |           |           |           |
|------------------|---------|--|-------------|-----------|-----------|-----------|
|                  |         | 0  | 50          | 100       | 150       |           |
| Inverter Control | 30~78Hz |  |             |           |           |           |
| Constant Speed   | 50Hz    |  | 2.5HP Class | 4HP Class | 5HP Class | 6HP Class |
|                  | 60Hz    |  | 2.5HP Class | 4HP Class | 5HP Class | 6HP Class |

### Down Sizing of Compressor Unit by High Speed Operation





GENERAL DATA

| Motor Type               | Constant Speed       |               |               |               |               |               |               |         |         |         |         |         |         |         |
|--------------------------|----------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------|---------|---------|---------|---------|---------|---------|
| Model                    | S251AH-38A2          | S250AH-38P2UC | S403DH-64A2UC | S403DH-64D2UC | S503DH-80A2UC | S503DH-80D2UC | S603DH-90A2UC |         |         |         |         |         |         |         |
| Nominal HP class Rating  | Phase                | 3             | 1             | 1             | 3             | 3             | 3             | 3       | 3       | 3       | 3       | 3       | 3       | 3       |
|                          | Voltage              | 200           | 200-230       | 200-220       | 208-230       | 200           | 200-230       | 380-415 | 440-480 | 200     | 200-230 | 380-415 | 440-480 | 200     |
|                          | Frequency            | 50            | 60            | 50            | 60            | 50            | 60            | 50      | 60      | 50      | 60      | 50      | 60      | 50      |
| Displacement             | cm <sup>3</sup> /rev | 37.5          | 37.5          | 37.5          | 37.5          | 64.2          | 64.2          | 64.2    | 64.2    | 80      |         | 80      |         | 90      |
|                          | cfm                  | 3.81          | 4.60          | 3.81          | 4.60          | 6.53          | 7.87          | 6.53    | 7.87    | 8.14    | 9.80    | 8.14    | 9.80    | 9.15    |
| Gas Flow Rate            | Nm <sup>3</sup> /h   | 35            | 42            | 33            | 39.5          | 60            | 72            | 60      | 72      | 75      | 90      | 75      | 90      | 84      |
| Pressure Ratio Range     |                      | 1.8-7.5       | 1.8-7.5       | 1.8-7.5       | 1.8-7.5       | 1.9-7.5       | 1.9-7.5       | 1.9-7.5 | 1.9-7.5 | 1.9-7.5 | 1.9-7.5 | 1.9-7.5 | 1.9-7.5 | 1.9-7.5 |
| Net Weight (2)           | kg                   | 28            | 28            | 30            | 30            | 35            | 35            | 35      | 35      | 36      | 36      | 36      | 36      | 37      |
|                          | Lbs.                 | 61.7          | 61.7          | 66.1          | 66.1          | 77.2          | 77.2          | 77.2    | 77.2    | 79.4    | 79.4    | 79.4    | 79.4    | 81.6    |
| Applicable Specification | CE                   | -             | -             | ●             | ●             | ●             | ●             | ●       | ●       | ●       | ●       | ●       | ●       | ●       |
|                          | UL                   | -             | -             | ●             | ●             | ●             | ●             | ●       | ●       | ●       | ●       | ●       | ●       | ●       |

| Motor Type               | Constant Speed |         |                |         |                |         |                |         | Inverter     |               |               |
|--------------------------|----------------|---------|----------------|---------|----------------|---------|----------------|---------|--------------|---------------|---------------|
| Model                    | S603DH-90D2UC  |         | GA120SHA-A1SM5 |         | GA120SHA-D1SM5 |         | GA150SHA-D1SM5 |         | S500DHV-77A1 | S501DHV-77D1  |               |
| Nominal HP class Rating  | 6.0            | 6.0     | 7.5            | 7.5     | 7.5            | 7.5     | 10.0           | 10.0    | 5.0          | 5.0           |               |
| Power Supply             | Phase          | 3       | 3              | 3       | 3              | 3       | 3              | 3       | 3            | 3             |               |
|                          | Voltage        | 380-415 | 440-480        | 200     | 200-230        | 380-415 | 440-480        | 380-415 | 440-480      | 200-230       | 380-480       |
|                          | Frequency      | 50      | 60             | 50      | 60             | 50      | 60             | 50      | 60           | 30-78         | 30-78         |
| Displacement             | cm³/rev        | 90      | 90             | 120     | 120            | 120     | 120            | 150     | 150          | 77            | 77            |
|                          | cfm            | 9.15    | 11.03          | 12.20   | 14.71          | 12.20   | 14.71          | 15.26   | 18.38        | 9.11(at 58Hz) | 9.11(at 58Hz) |
| Gas Flow Rate            | Nm³/h          | 84      | 101            | 126     | 152            | 126     | 152            | 158     | 190          | 100(at 58Hz)  | 100(at 58Hz)  |
| Pressure Ratio Range     |                | 1.9-7.5 | 1.9-7.5        | 1.9-5.9 | 1.9-5.9        | 1.9-5.9 | 1.9-5.9        | 1.9-5.9 | 1.9-5.9      | 1.8-5.5       | 1.8-5.5       |
| Net Weight (2)           | kg             | 37      | 37             | 70      | 70             | 70      | 70             | 70      | 70           | 37            | 37            |
|                          | Lbs.           | 81.6    | 81.6           | 154     | 154            | 154     | 154            | 154     | 154          | 81.6          | 81.6          |
| Applicable Specification | CE             | ●       | ●              | ●       | ●              | ●       | ●              | ●       | ●            | -             | -             |
|                          | UL             | ●       | ●              | ●       | ●              | ●       | ●              | ●       | ●            | -             | -             |

- : Available
- (1) The compressor is cooled by injected oil.
- (2) Net weight include oil, but oil is not charged at time of shipment. Because of hydrosopic property, it should be charged by customer side.
- (3) The gas flow rate is converted into values at atmospheric pressure (32.0°F=0°C).  
The flow rate is based on the condition shown in below table.
- (4) S251AH, S250AH, S403DH, S503DH, S603DH, GA120SHA and GA150SHA are with oil sight glass.
- (5) cfm values are calculated with below conditions.  
50Hz: 2,880rpm    60Hz: 3,470rpm  
58Hz: 3,352rpm

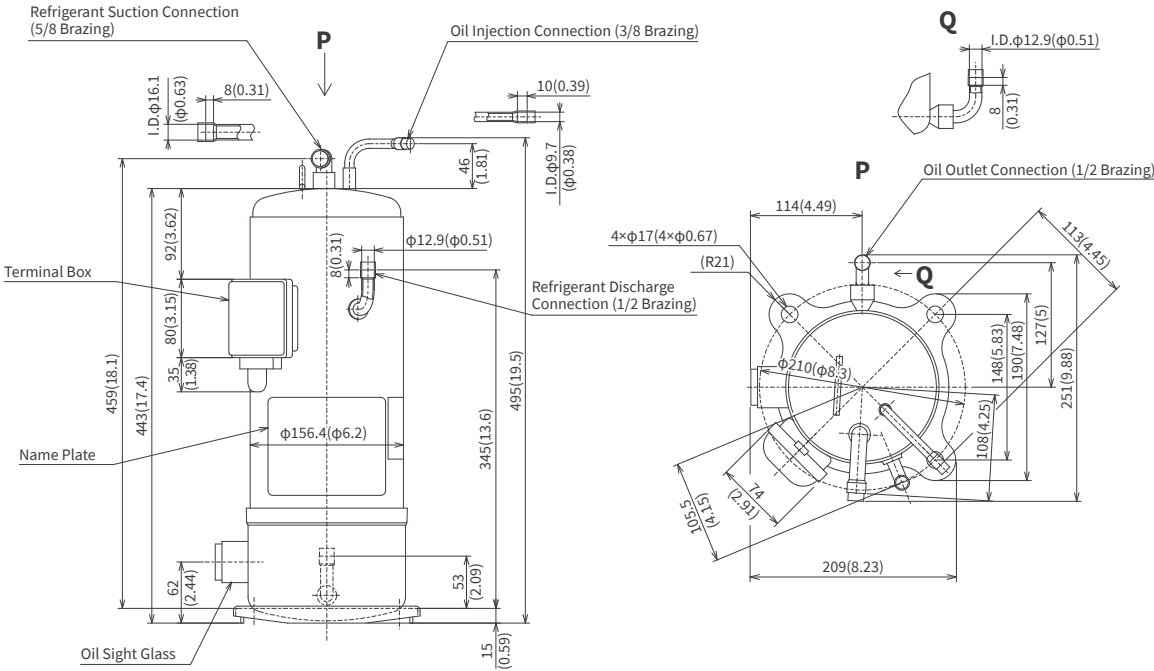
| Model                     |             | S250AH<br>S251AH | S403DH      | S503DH      | S603DH      | GA120SHA    | GA150SHA    | S500DHV<br>S501DHV |
|---------------------------|-------------|------------------|-------------|-------------|-------------|-------------|-------------|--------------------|
| Suction Gas Pressure      | psig (MPaG) | 83.7(0.58)       | 83.7(0.58)  | 83.7(0.58)  | 83.7(0.58)  | 100(0.69)   | 100(0.69)   | 107(0.74)          |
| Discharge Gas Pressure    | psig (MPaG) | 250(1.73)        | 250(1.73)   | 250(1.73)   | 250(1.73)   | 300(2.07)   | 300(2.07)   | 250(1.73)          |
| Sustion Gas Temperature   | °F (°C)     | 95.0(35.0)       | 95.0(35.0)  | 95.0(35.0)  | 95.0(35.0)  | 95.0(35.0)  | 95.0(35.0)  | 95.0(35.0)         |
| Injection Oil Flow Rate   | L/m         | 3.0              | 4.8         | 6.0         | 6.8         | 8.5         | 10.0        | 5.0                |
| Injection Oil Temperature | °F (°C)     | 113.0(45.0)      | 113.0(45.0) | 113.0(45.0) | 113.0(45.0) | 113.0(45.0) | 113.0(45.0) | 113.0(45.0)        |
| Ambient Temperature       | °F (°C)     | 77.0(25.0)       | 77.0(25.0)  | 77.0(25.0)  | 77.0(25.0)  | 77.0(25.0)  | 77.0(25.0)  | 77.0(25.0)         |



DIMENSIONAL DATA

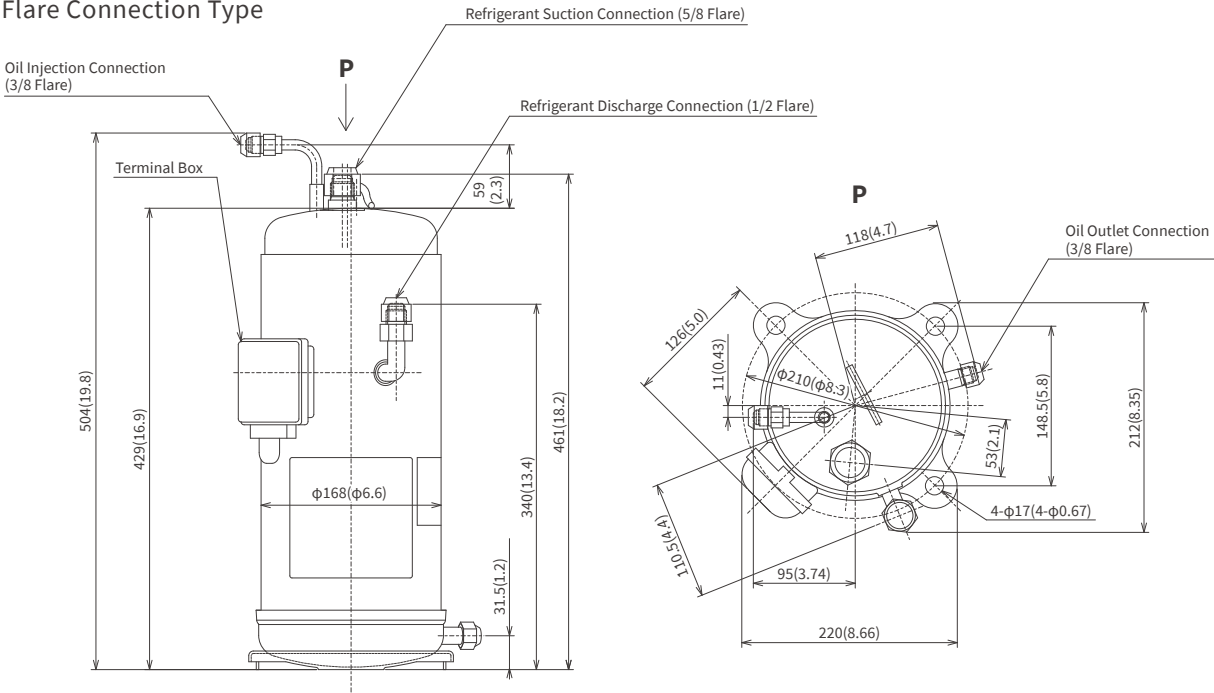
Unit: mm(inch)

S251AH-38A2 and S250AH-38P2UC

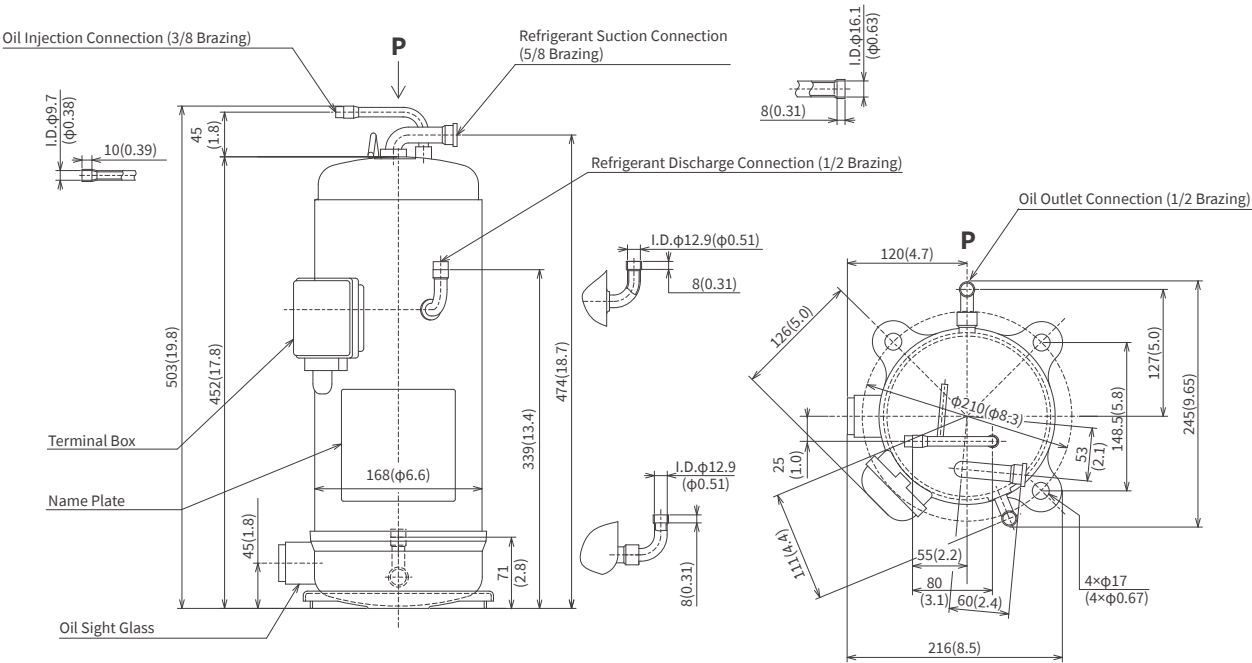


S500DHF and S501DHF

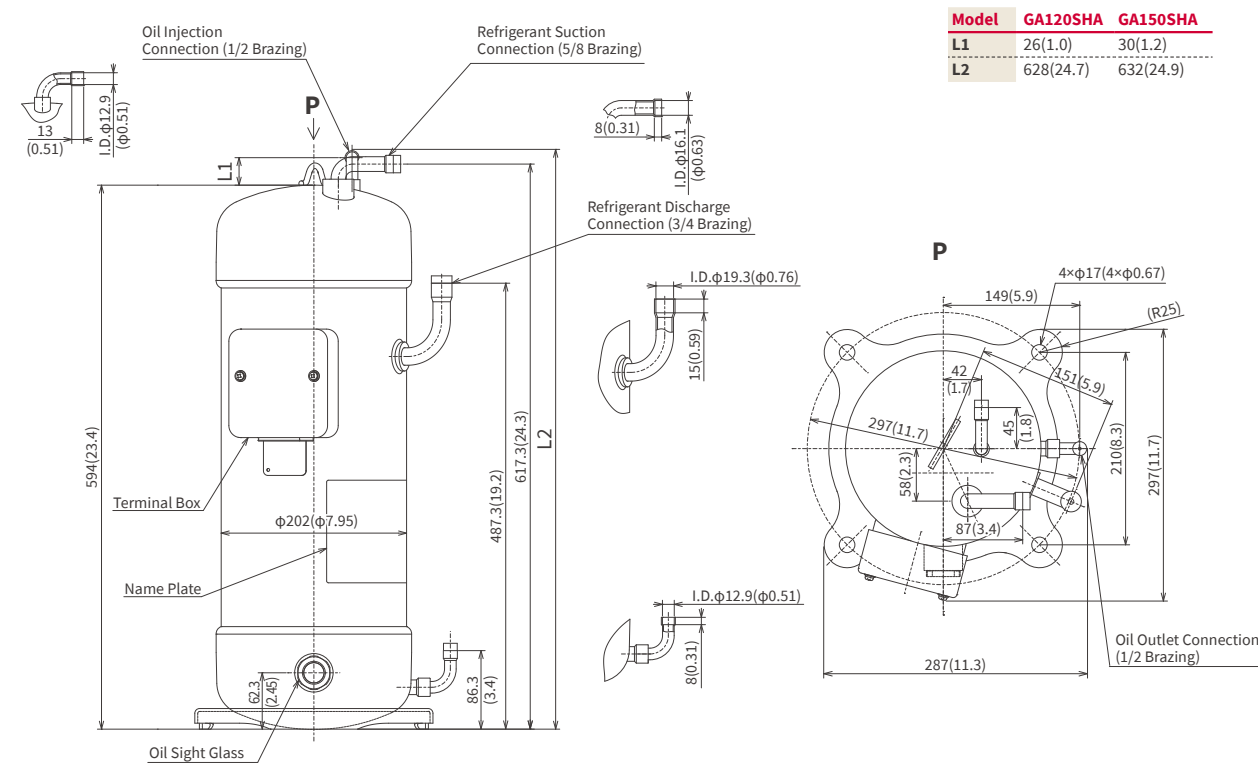
Flare Connection Type



S403DH, S503DH and S603DH



GA120SHA and GA150SHA

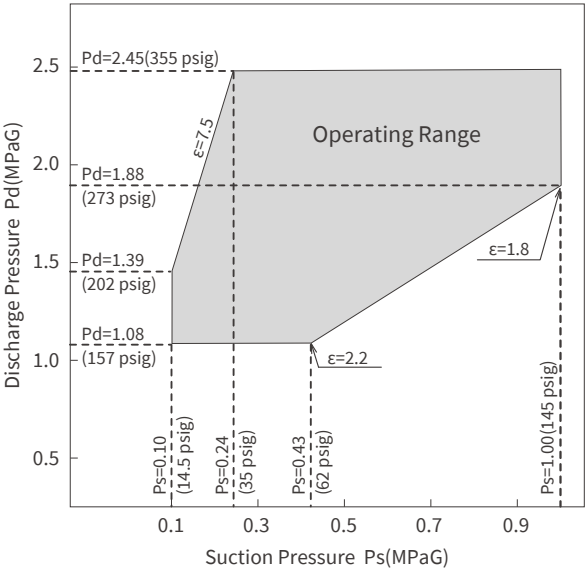


| Model | GA120SHA  | GA150SHA  |
|-------|-----------|-----------|
| L1    | 26(1.0)   | 30(1.2)   |
| L2    | 628(24.7) | 632(24.9) |

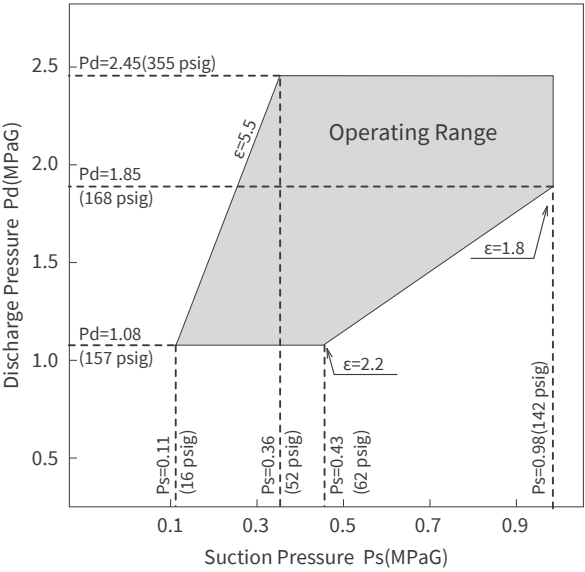


OPERATING RANGE

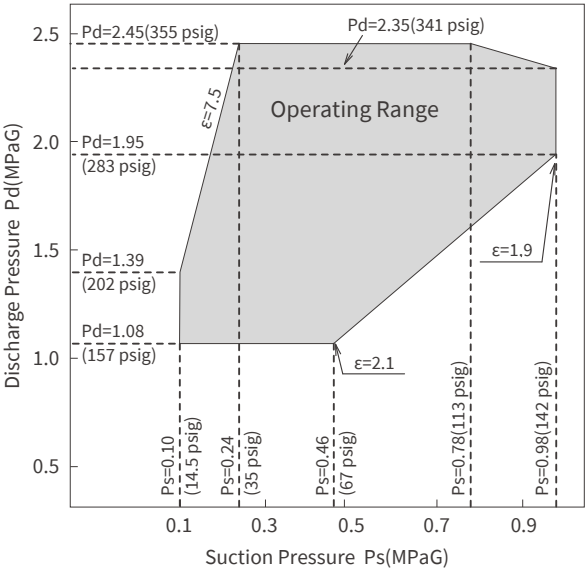
S250AH and S251AH



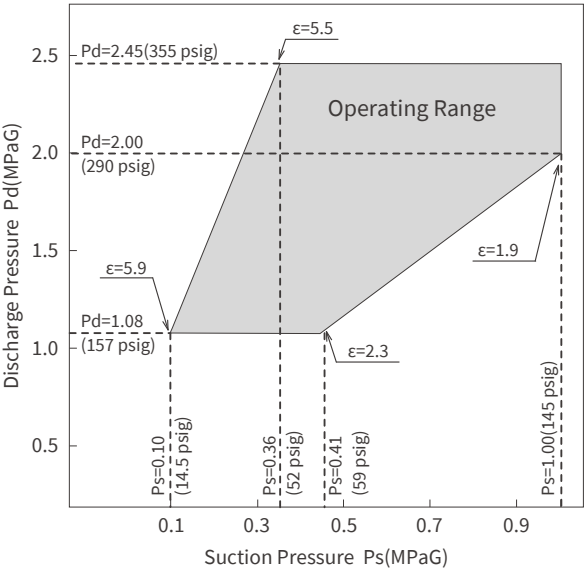
S500DHV and S501DHV



S403DH, S503DH and S603DH



GA120SHA and GA150SHA



Notes:  
 $\epsilon$ ; Compression Ratio=  $\frac{\text{Absolute Discharge Pressure}}{\text{Absolute Suction Pressure}}$