Scroll Compressors

For Transport
Air Conditioning Application
**Exclusive Design For Transport Air Conditioning**

- Compact size & lightweight
- Low noise & low vibration
- High reliability & quality
- High efficiency thanks to advanced technology

**History**

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1966</td>
<td>Started supply of reciprocating compressors for railway air conditioners.</td>
</tr>
<tr>
<td>1968</td>
<td>Started production of the world’s first scroll compressor for railway air conditioners.</td>
</tr>
<tr>
<td>1983</td>
<td>Started production of the world’s first scroll compressor for packaged air conditioners.</td>
</tr>
<tr>
<td>1987</td>
<td>Started production of the world’s first scroll compressor for railway air conditioners.</td>
</tr>
<tr>
<td>2008</td>
<td>Started supply of scroll compressor for all-electric bus air conditioners.</td>
</tr>
</tbody>
</table>

**Used in more than 30 countries**

- Shinkansen (Bullet train) / High-speed train / Commuter / Metro / Tram / Monorail / All-electric bus / Local train
ADVANTAGES

COMPACT SIZE AND LIGHTWEIGHT

- Only 198mm*
- Only 35kg*

* C series

Downsizing of HVAC unit

Reduce HVAC height and weight!!

Cut by nearly 50%

HVAC with Hitachi horizontal compressor C series

HVAC with Hitachi vertical compressor equivalent capacity of C series

Low profile HVAC unit is optimum approach for rooftop application.

For railway air conditioning
Space-saving HVAC is suitable for Metro, LRT, and the bus.

For hybrid/all-electric bus air conditioning
Light weight HVAC can realize power saving of the bus itself.
ADVANTAGES

HIGH RELIABILITY & COMFORTABLE OPERATION

Merits of Hitachi Pioneering High-Side Pressure Design

- High reliability
- Low noise and low vibration
- High performance

(1) A simple structure leading to fewer superfluous parts

- Damage is abated, improving reliability
- Compressor efficiency is improved

(2) High-side pressure design

- Improved volumetric efficiency thanks to direct suction
- Less parts leading to superior reliability
- Keeping oil in the compressor resulting in superior reliability

Low-side pressure design (Thrust Bearing System)

- There are many sliding components, making for a complex structure.
- Damage occurs easily
- Gaps form easily, resulting in degradation of compression efficiency

Low-side pressure design

- After starting, pressure and temperature decreases and refrigerant bubbles come over from the oil.
- Oil pump is necessary
- Oil migration with gas
- Oil foaming
- Crank case heater necessary
**ADVANTAGES WITH INVERTER CONTROL**

**Comfort & energy-saving**

**Precise temperature control**
Inverter control can maintain a comfortable temperature without ON/OFF operation or step control.

**Energy-saving at low load conditions**
Inverter can achieve energy-saving without ON/OFF operation.

**Downsized HVAC by operating at high frequency**
Operation at high frequency enables large capacity to downsized HVAC.

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**Platform design**
Enables HVAC standardization by its capacity control.

**Nominal Rating**

<table>
<thead>
<tr>
<th>HP Class</th>
<th>Motor type</th>
<th>R407C</th>
<th>R410A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AC Inv</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horizontal</td>
<td>Fixed speed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical</td>
<td>AC Inv</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed speed</td>
<td>DC Inv</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Saving running cost by operating at high frequency**
Considering the future in which one can save energy??

**Constant speed**
Initial cost | Running cost
---|---
Constant speed | Inverter control
Initial cost | Running cost

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**Constant speed G750EL**
- 89kg
- 287mm

**Inverter G601DLV (Operate at 70Hz)**
- 38kg
- 185mm
- 102mm
- 51kg
### GENERAL DATA

#### Shimizu - Japan production (R407C)

<table>
<thead>
<tr>
<th>Model</th>
<th>CA1TTLA-03PE1</th>
<th>CA4TTLA-03PE1</th>
<th>CA4TTLA-03PE2</th>
<th>CA4TTLA-03PE3</th>
<th>G500DL-90HTC</th>
<th>G600DL-90HTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series</td>
<td>CA</td>
<td>GA</td>
<td>A</td>
<td>E</td>
<td>E</td>
<td>C</td>
</tr>
<tr>
<td>Chamber size</td>
<td>Horizontal / Vertical</td>
<td>Horizontally</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Displacement</td>
<td>cm³/min</td>
<td>2.2</td>
<td>2.7</td>
<td>3.1</td>
<td>3.2</td>
<td>4.2</td>
</tr>
<tr>
<td>Power</td>
<td>kW</td>
<td>2.9</td>
<td>3.0</td>
<td>3.1</td>
<td>3.1</td>
<td>3.2</td>
</tr>
<tr>
<td>Rated Capacity</td>
<td>kW</td>
<td>3.5</td>
<td>3.7</td>
<td>3.9</td>
<td>3.9</td>
<td>4.1</td>
</tr>
<tr>
<td>Testing Condition</td>
<td>CE/AC inv</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Weight (including oil)</td>
<td>kg</td>
<td>35</td>
<td>38</td>
<td>39</td>
<td>37</td>
<td>36</td>
</tr>
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</table>

#### Guangzhou - China production (R407C)

<table>
<thead>
<tr>
<th>Model</th>
<th>GA10DL-04HTG</th>
<th>GA15DL-04HTG</th>
<th>GA30DL-08HTG</th>
<th>GA35DL-08HTG</th>
<th>GA50DL-08HTG</th>
<th>GA65DL-08HTG</th>
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<tbody>
<tr>
<td>Series</td>
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<td>G</td>
<td>G</td>
<td>G</td>
<td>G</td>
<td>G</td>
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<tr>
<td>Chamber size</td>
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<td>Vertical</td>
<td>Vertical</td>
<td>Vertical</td>
<td>Vertical</td>
<td>Vertical</td>
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<tr>
<td>Displacement</td>
<td>cm³/min</td>
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<td>9.1</td>
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<td>12.1</td>
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<tr>
<td>Power</td>
<td>kW</td>
<td>3.9</td>
<td>4.2</td>
<td>5.0</td>
<td>5.0</td>
<td>5.8</td>
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<tr>
<td>Rated Capacity</td>
<td>kW</td>
<td>4.6</td>
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<td>6.8</td>
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<td>CE/AC inv</td>
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<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Weight (including oil)</td>
<td>kg</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
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</table>

#### Shimizu - Japan production (R134a)

<table>
<thead>
<tr>
<th>Model</th>
<th>CA1TTLA-03PE1</th>
<th>CA4TTLA-03PE1</th>
<th>CA4TTLA-03PE2</th>
<th>CA4TTLA-03PE3</th>
<th>GA12TTLA-02PE1</th>
<th>GT90GL-12CTP</th>
<th>GT95GL-12CTP</th>
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</thead>
<tbody>
<tr>
<td>Series</td>
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<td>CA</td>
<td>GA</td>
<td>GA</td>
<td>E</td>
<td>E</td>
<td>C</td>
</tr>
<tr>
<td>Chamber size</td>
<td>Horizontal / Vertical</td>
<td>Horizontally</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Displacement</td>
<td>cm³/min</td>
<td>2.2</td>
<td>2.7</td>
<td>3.1</td>
<td>3.2</td>
<td>4.2</td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>kW</td>
<td>2.9</td>
<td>3.0</td>
<td>3.1</td>
<td>3.1</td>
<td>3.2</td>
<td></td>
</tr>
<tr>
<td>Rated Capacity</td>
<td>kW</td>
<td>3.5</td>
<td>3.7</td>
<td>3.9</td>
<td>3.9</td>
<td>4.1</td>
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</tr>
<tr>
<td>Testing Condition</td>
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<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Weight (including oil)</td>
<td>kg</td>
<td>35</td>
<td>38</td>
<td>39</td>
<td>37</td>
<td>36</td>
<td></td>
</tr>
</tbody>
</table>

#### Guangzhou - China production (R410A)

<table>
<thead>
<tr>
<th>Model</th>
<th>DA1TTLG-02</th>
<th>DA1TTLG-02</th>
<th>DA2TTLG-02</th>
<th>DA3TTLG-02</th>
<th>DA4TTLG-02</th>
<th>DA5TTLG-02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series</td>
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<td>DA</td>
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<tr>
<td>Chamber size</td>
<td>Horizontal / Vertical</td>
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<td>Vertical</td>
<td>Vertical</td>
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<td>Vertical</td>
</tr>
<tr>
<td>Displacement</td>
<td>cm³/min</td>
<td>6.1</td>
<td>6.1</td>
<td>9.1</td>
<td>9.1</td>
<td>12.1</td>
</tr>
<tr>
<td>Power</td>
<td>kW</td>
<td>3.9</td>
<td>4.2</td>
<td>5.0</td>
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<td>5.8</td>
</tr>
<tr>
<td>Rated Capacity</td>
<td>kW</td>
<td>4.6</td>
<td>5.0</td>
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<td>6.8</td>
</tr>
<tr>
<td>Testing Condition</td>
<td>CE/AC inv</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Weight (including oil)</td>
<td>kg</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
</tbody>
</table>

*Source and/or model information is available on request.

*Heat pump model for cold district specification is available on request.
DIMENSIONAL DATA

SHIMIZU

**CA series**
MODELS:
- CA47TLA, CA56TLA, CA64TLA, CA80TLA

**GA series**
MODEL:
- G700GL, GA120TL

**C series**
MODELS:
- G500DL, G600DL, G501DLV

**GA series**
MODEL:
- G700GL, GA120TL

**E series**
MODEL:
- GT50EL
GUANGZHOU

G series
MODELS:
G500DL-80BTG,
G500DLV-800TG

DA series
MODELS:
DA80TLAG

MODELS:
G401DL-64DTG,
G501DL-80DTG,
G601DL(V)-90DTG

MODEL:
DA65TLAG,
DA65TLDG,
DA80TLDG

SCROLL COMPRESSORS FOR TRANSPORT AIR CONDITIONING APPLICATION

DIMENSIONAL DATA
G series
MODELS:
G303DH(V)-47DTG,
G353DH-56DTG,
G403DH(V)-64DTG,
G503DH(V)-80DTG,
G603DH-90DTG

DA series
MODELS:
G604DHV-90DTG

Tandem(multiple) use version

Oil balance piping

Tandem(multiple) use version

Discharge Accept
(I.D Welded Connection)

Suction Accept
(I.D Welded Connection)

Mounting Hole

Name Plate

DIMENSIONAL DATA
**GUANGZHOU, CHINA PRODUCTION**

**R407C / Fixed speed / G series**
\[G30*D*V/G40*D*V/G50*D*V/G60*D*V\]

**R407C / AC INV / G series**
\[G30*D*/G353DH/G40*D*/G50*D*/G60*D*\]

**R410A / Fixed speed / DA series**
\[DA65*LAG\]

**R410A / DC INV / DA series**
\[DA42*LDG\]

**DA65*LDG**

*Pressure is relative (gauge) pressure.
*Pressure Ratio \( \varepsilon \) (The absolute Pressure basis)
\[ \varepsilon = \frac{\text{Discharge Port Pressure}}{\text{Suction Port Pressure}} \]