Maximum energy optimization from production to product.

- R134a
- R290
ABOUT EMBRACO

Embraco specializes in cooling solutions and is the global market leader in hermetic compressors. Our mission is to offer innovative solutions for a better quality of life, as we work to achieve excellence with sustainability.

Technology leadership, operational excellence and sustainability are some of the pillars that define Embraco in the global market. Our products are preferred by the leading manufacturers of refrigeration equipment.

With global operations and production capacity exceeding 38 million units per year, we offer solutions that are differentiated for their innovation and low energy consumption. Close to 11,500 people are employed in our factories and offices located in Brazil (headquarters), United States, Mexico, China, Italy, Slovakia and Russia.

Energy efficiency is the base for all our product developments. We are a reference on this subject, since our products meet the most stringent international standards with relation to energy consumption.

Fulfilling our role as the global leader, we anticipate market changes and, in doing so, keep ourselves in permanent transformation. We’re continuously reviewing our processes, promoting growth aligned with our organization’s pillars.
Applications & Test conditions

**LBP**  (Low Back Pressure)
- Low evaporating temperatures (lower than -20 °C)
- Applications: refrigerators, frozen food cabinets, frozen food display cases, display windows, etc.

**MBP**  (Medium Back Pressure)
- Medium evaporating temperatures (higher than -20 °C)
- Applications: fresh food cabinets, drink coolers, ice makers etc.

**M/HBP**  (Medium / High Back Pressure)
- Evaporating temperatures between -20°C and +10°C
- Applications: coolers, merchandisers, etc.

**HBP**  (High Back Pressure)
- High evaporating temperatures (higher than -15 °C)
- Applications: fresh food cabinets, ice makers, dehumidifiers, dryers, etc.

Electrical components available

<table>
<thead>
<tr>
<th>Type of motor</th>
<th>Thermal protector (*)</th>
<th>Starting Device</th>
<th>Capacitors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Current Relay</td>
<td>PTC Relay</td>
</tr>
<tr>
<td>RSIR</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
</tr>
<tr>
<td>RSCR</td>
<td>✓</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>CSIR</td>
<td>✓</td>
<td></td>
<td>×</td>
</tr>
<tr>
<td>CSR</td>
<td>✓</td>
<td></td>
<td>×</td>
</tr>
<tr>
<td>PSC</td>
<td>✓</td>
<td></td>
<td>×</td>
</tr>
</tbody>
</table>

(*) Can be internal in some of the Europe line compressors.
(**) Available for some specific Europe line products.

Electrical motor starting torque

**LST**  (Low Starting Torque)
- Compressors with RSIR-RSCR-PSC electrical motors for systems with capillary tube and with balanced pressures at start up.

**HST**  (High Starting Torque)
- Compressors with CSR-CSIR and 3ph electrical motors for systems with balanced or unbalanced pressures at start up.

Cooling type

**Static (S)**
- Compressors approved for static cooling are those that don’t allow operation of a fan motor associated with the condenser.

**Forced (F)**
- Compressors approved for forced cooling are those that require the operation of a fan motor associated with the condenser.

**Static/Forced (S/F)**
- Compressors approved for static and forced cooling are those which may or may not be used with a fan motor associated with the condenser.

Electrical motor types

**RSIR**  (Resistance Start – Inductive Run)
- This motor type, used in the compressor of small power, has a low starting torque (LST) and must be applied only to capillary tube systems where the pressures equalize. The motor is characterized by a start winding with high ohmic resistance and must be disconnected when it reaches the stabilized rotational speed. An electromagnetic relay, calibrated for the motor current, disconnects the start winding at the end of the start up. An alternative to the electromagnetic relay is, for some models, a PTC solid state-starting device.

**RSCR**  (Resistance Start – Capacitive Run)
- Similar to RSIR motor version but uses a PTC solid state starting device and a permanent connected run capacitor to improve its efficiency.

**CSIR**  (Capacitive Start – Inductive Run)
- Same as RSIR motor version but with a different start winding in series with a start capacitor of suitable capacitance to get a high starting torque.

**CSR**  (Capacitive Start & Run)
- Same CSR version with capacitive run start windings. A potential starting relay, calibrated for each motor, disconnects the start capacitor at the end of the start. The motor is characterized by a high starting torque (HST) and high efficiency.

**PSC**  (Permanent Split Capacitor)
- PSC version with capacitive run winding. This motor is characterized by the run capacitor permanently connected in series with the start winding; both remain connected even after the motor starts. The starting torque is enough to guarantee that the compressor starts only with balanced pressures in capillary tube systems or with a pressure equalizer.

**3Ø**  (Three Phase)
- Three-phase windings with star connections.

Packaging and containers loading

<table>
<thead>
<tr>
<th>SERIES</th>
<th>Single pack</th>
<th>Multiple pack</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pallet</td>
<td>Container</td>
</tr>
<tr>
<td>EM</td>
<td>100</td>
<td>2400</td>
</tr>
<tr>
<td>EG/F</td>
<td>72</td>
<td>1738</td>
</tr>
</tbody>
</table>
**NOMENCLATURE**

**EM**  
(BRAZIL LINE)

**EM**  
I   S   30   H   H   R

**TECHNOLOGY**  
**GENERATION**

- Or A – Standard
- I – 1st generation
- U – 2nd generation
- Y – 3rd generation
- Z – 4th generation
- X – 6th generation

**MECHANICAL KIT**  
(EMBRACO INTERNAL USE)

- S – Standard
- □ – Not standard

**COMPRESSOR CAPACITY**

In Btu/h – 60 Hz – ASHRAE: check point divided by 10

**STARTING DEVICE**

- P – PTC + Run capacitor (optional)
- R – Current relay
- C – PTC + Run capacitor (mandatory)
- X – Relay + Start capacitor (mandatory)
- S – PTC + Run capacitor + Start capacitor
- V – PTC + Run capacitor + Start capacitor (optional)

**EFFICIENCY LEVEL / APPLICATION**

- N – standard efficiency (LBP)
- J – intermediate efficiency (LBP)
- E – improved efficiency 1st generation (LBP)
- S – improved efficiency 2nd generation (LBP)
- H – standard efficiency (L/M/HBP)
- D – standard efficiency (HBP)
- B – standard efficiency (m/HBP)

**REFRIGERANT FLUID**

- H – R-134a
- C – R-600a
- □ – Blends

**EG**  
(BRAZIL LINE)

**EG**  
A   S   100   H   L   R

**TECHNOLOGY**  
**GENERATION**

- Or A – Standard
- S – 1st generation
- T – 2nd generation
- U – 3rd generation
- Y – 4th generation
- Z – 5th generation
- X – 6th generation

**MECHANICAL KIT**  
(EMBRACO INTERNAL USE)

- S – Standard
- □ – Not standard

**COMPRESSOR CAPACITY**

In Btu/h – 60 Hz – ASHRAE: check point divided by 10

**STARTING DEVICE**

- R – Relay
- P – PTC + Run capacitor (optional)
- C – PTC + Run capacitor (mandatory)
- X – Relay + Start capacitor

**APPLICATION**

- L – LBP

**REFRIGERANT FLUID**

- H – R-134a
- C – R-600a
- □ – Blends
Approximate compressor displacement in cm³ (for FF and FFI compressors)

- **Approximate capacity in Btu/h – 60 Hz – ASHRAE: check point divided by 10**
  - For FG, FFU and FFc compressors

- **Refregerant Fluid**
  - H = R-134a
  - C = R-600a
  - U = R-290
  - G = R-404A
  - □ = Blends

- **Starting Torque**
  - □ – LST (low starting torque)
  - K – LST (low starting torque)
  - X – HST (high starting torque)

- **Starting Device**
  - F – Current relay
  - G – PTC relay

- **Technology Generation**
  - C – Standard
  - I – 1st generation
  - C – 2nd generation
  - V – 3rd generation
  - S – 4th generation
  - U – 5th generation

- **Application**
  - A – L/MBP
  - B – L/M/MBP
  - H – HBP

- **Compressor Displacement/Capacity**
  - F (BRAZIL LINE)
# HOW TO READ YOUR CATALOGUE

1. Frequency
2. Refrigerant gas
3. Application
4. Model selection
5. Performance
6. Additional information

<table>
<thead>
<tr>
<th>SERIES</th>
<th>VOLT.Req</th>
<th>HP</th>
<th>OIL</th>
<th>MOTOR Type</th>
<th>23/13 Y</th>
<th>18/12</th>
<th>15/12</th>
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</thead>
</table>

- 50 Hz
- 60 Hz
- R-134a
- R-290
- L/MBP
- M/HBP

- Refrigerant gas
- Performance
- Additional information
### R-134a

#### L-MBP 60Hz

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<th>VOLTAGE</th>
<th>HP</th>
<th>RPM</th>
<th>MOTOR TYPE</th>
<th>TORQUE</th>
<th>COOLING TYPE</th>
<th>OIL</th>
<th>EXP. TYPE</th>
<th>EST. VIEW</th>
<th>WINING Diagram</th>
<th>PERFORMANCE DATA</th>
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<tbody>
<tr>
<td>PFR12X10D</td>
<td>220V / 60Hz</td>
<td>1/20</td>
<td>1,27</td>
<td>RSB/CSR</td>
<td>105</td>
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<td>GTE20</td>
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### R-290

#### L-MBP 50Hz

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**Set Conditions:** ASHRAE32 LBP, ASHRAE46 M/HBP
### External views & wiring diagrams

#### EXTERNAL VIEWS

#### EM/EMI

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<thead>
<tr>
<th>Ø mm</th>
<th>Material</th>
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<tbody>
<tr>
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<tr>
<td>8</td>
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#### EG/F

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</tbody>
</table>

#### EM2X

1. Section
2. Process
3. Discharge

---

Φ mm material

Suction: 8.2 copper
Process: 6.5 copper
Discharge: 6.5 copper

---

Φ mm material

Suction: 6.5 copper
Process: 6.5 copper
Discharge: 4.9 copper

---

Φ mm material

Suction: 8.2 copper
Process: 6.5 copper
Discharge: 6.5 copper

---

Φ mm material

Suction: 6.5 copper
Process: 6.5 copper
Discharge: 4.9 copper
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