BSR series
Synchronous Reluctance Motors
The Synchronous Reluctance Motor is an electric motor that combines a conventional three phase induction motor stator with an innovative rotor. The peculiarity of this rotor is the magnetic anisotropy obtained by means of suitably shaped holes. Thanks to the anisotropy, it is possible to exploit the reluctance principle for the electromagnetic energy conversion without using permanent magnets or rotor windings. The rotor design, thanks to the holes in the lamination, yields a lower inertia and better dynamics with respect to a same-size induction motor.

The lack of rotor Joule losses allows an increase of motor ratings with respect to an induction motor in terms of both efficiency and power density. Taking the advantage of this essential feature, Bonfiglioli is able to offer two distinctive versions in their BSR Synchronous Reluctance motor series. The High Efficiency (E) version is characterized by a Super Premium IE4 Efficiency Class level at the rated operating point, but also especially in the partial load range. The High Output (O) version allows to reduce the motor size with respect to a same-size induction motor, maintaining an efficiency level equal or higher than the IE2 Efficiency Class. When compared to high efficiency induction motors, the dynamic is up to two times higher, thanks to the significantly lower rotor inertia.

When comparing the Synchronous Reluctance motor technology and the Induction Motor technology, the main advantages, for variable speed converter fed applications, according to the two packages proposed by Bonfiglioli are:

- **High Efficiency Package**: better efficiency class, up to IE4, for same power and frame size of IM

  - BSR 90L E 15 - 1.5 kW IE4 Efficiency Class
  - BE 90LA 4 - 1.5 kW IE2 Efficiency Class

  - Same size
  - -24% Rotor inertia
  - +5.4% Efficiency

- **High Output Package**: smaller frame for same output power and efficiency class of IM

  - BSR 80C O 15 - 1.5 kW IE2 Efficiency Class
  - BE 90LA 4 - 1.5 kW IE2 Efficiency Class

  - 1 Size less
  - -35% Rotor inertia
  - Same efficiency

This is why when efficiency or having one or two size less are a must, or ensuring the same output power is something relevant for your application, Bonfiglioli Synchronous Reluctance Motor is the best choice.
## Designation

<table>
<thead>
<tr>
<th>Designation</th>
<th>Motor type</th>
<th>Motor size</th>
<th>Motor rating</th>
<th>Nominal speed</th>
<th>Nominal line voltage</th>
<th>Degree of protection</th>
<th>Insulation class</th>
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<td>BSR</td>
<td>IEC 3-Phase Synchronous Reluctance Motor</td>
<td>71C ... 132MB (IEC Motor)</td>
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<td>15 = 1500 min⁻¹</td>
<td>40 = 400V (Y connection)</td>
<td>55 = IP 55</td>
<td>F = Class F</td>
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<td>E3</td>
<td>Silicon sensor KTY 84-130</td>
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<td>P1</td>
<td>Thermistor PTC 150</td>
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<td>Platinum sensor PT1000</td>
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<td>U1</td>
<td>Forced ventilation</td>
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<td>Power supply 1–230V (71-100), 3–400V Y (112-132)</td>
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<td>Anti-condensate heaters</td>
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<td>Double-extended shaft</td>
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<td>TC</td>
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<td>RV</td>
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### Motor mounting

- **B3**: IM B3, IM B6, IM B7, IM B8, IM V5, IM V6
- **B5**: IM B5, IM V1, IM V3
- **B14**: IM B14, IM V18, IM V19

### Notes

- (1) Not available with nominal speed 3000 min⁻¹
- (2) Default value
## Performance

### Operation with ACU410 converter - rated voltage 400V - 1.5xMn overload at nominal speed (Mn) - 3xMn Peak overload (Mp)

- 4-pole 50 Hz  1500rpm  Y Connection

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<th>Mn</th>
<th>ln</th>
<th>lp</th>
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<th>Jm</th>
<th>m_Mn</th>
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<td>A</td>
<td>A</td>
<td>A</td>
<td>kgm²</td>
<td>x10⁻⁴ kg</td>
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### High Efficiency (E) - S1 duty cycle

| kW | % | Nm | A  | A  | A | A | kgm² | x10⁻⁴ kg |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 0.55 BSR 71C O 15 | 77.1 | 3.5 | 1.7 | 2.3 | 4.5 | 2250 | 10 | 7.1 |
| 0.75 BSR 80A O 15 | 79.6 | 4.8 | 2.2 | 3.2 | 5.9 | 2250 | 13 | 8.0 |
| 1.1 BSR 80B O 15 | 81.4 | 7.0 | 3.0 | 4.1 | 8.5 | 2250 | 17 | 9.5 |
| 1.5 BSR 80C O 15 | 82.8 | 9.5 | 4.0 | 6.1 | 11.3 | 2250 | 22 | 12.2 |
| 2.2 BSR 90S O 15 | 84.3 | 14.0 | 5.5 | 7.4 | 16.8 | 2250 | 22 | 13.1 |
| 3 BSR 90L O 15 | 85.5 | 19.1 | 7.5 | 11.4 | 24.0 | 2250 | 26 | 14.5 |
| 4 BSR 100LB O 15 | 88.6 | 25 | 10.4 | 14.9 | 30 | 2250 | 50 | 24 |
| 5.5 BSR 112M O 15 | 89.6 | 35 | 13.5 | 19.5 | 42 | 2250 | 82 | 31 |
| 7.5 BSR 132S O 15 | 90.4 | 48 | 18.4 | 25.3 | 52 | 2250 | 220 | 51 |
| 9.2 BSR 132MA O 15 | 91.0 | 59 | 22.0 | 33 | 66 | 2250 | 255 | 57 |
| 11 BSR 132MB O 15 | 91.4 | 70 | 24.7 | 32 | 77 | 2250 | 280 | 67 |

### High Output (O) - S1 duty cycle

| kW | % | Nm | A  | A  | A | A | kgm² | x10⁻⁴ kg |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 0.55 BSR 71C O 15 | 82.7 | 3.5 | 3.2 | 4.8 | 8.7 | 4500 | 10 | 7.1 |
| 0.75 BSR 80A O 15 | 84.2 | 4.8 | 3.9 | 5.5 | 11.2 | 4500 | 13 | 8.0 |
| 1.1 BSR 80B O 15 | 85.9 | 7.0 | 5.6 | 7.8 | 16.0 | 4500 | 17 | 9.5 |
| 1.5 BSR 80C O 15 | 87.1 | 9.5 | 7.7 | 11.6 | 21.5 | 4500 | 22 | 12.2 |
| 2.2 BSR 90S O 15 | 88.1 | 12.7 | 9.8 | 14.0 | 30 | 4500 | 22 | 13.1 |
| 3 BSR 90L O 15 | 89.2 | 17.5 | 13.5 | 19.5 | 43 | 4500 | 26 | 14.5 |
| 5.5 BSR 112M O 15 | 90.1 | 24 | 19.3 | 27.8 | 56 | 4500 | 50 | 24 |
| 7.5 BSR 100LB O 15 | 91.2 | 35 | 24.5 | 36 | 77 | 4500 | 82 | 31 |
| 11 BSR 112M O 15 | 91.9 | 48 | 36 | 53 | 107 | 4500 | 220 | 51 |
| 15 BSR 132S O 15 | 92.4 | 59 | 43 | 62 | 126 | 4500 | 255 | 57 |
| 18.5 BSR 132MA O 15 | 92.4 | 59 | 43 | 62 | 126 | 4500 | 255 | 57 | ACU 410 150 |
## Dimensions

### Flange B5

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<th>P</th>
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### Motor

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Bonfiglioli worldwide presence

Bonfiglioli is located in regions and countries around the world that enable us to provide faster sales and service to customers. We are around the world, and around the corner.
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