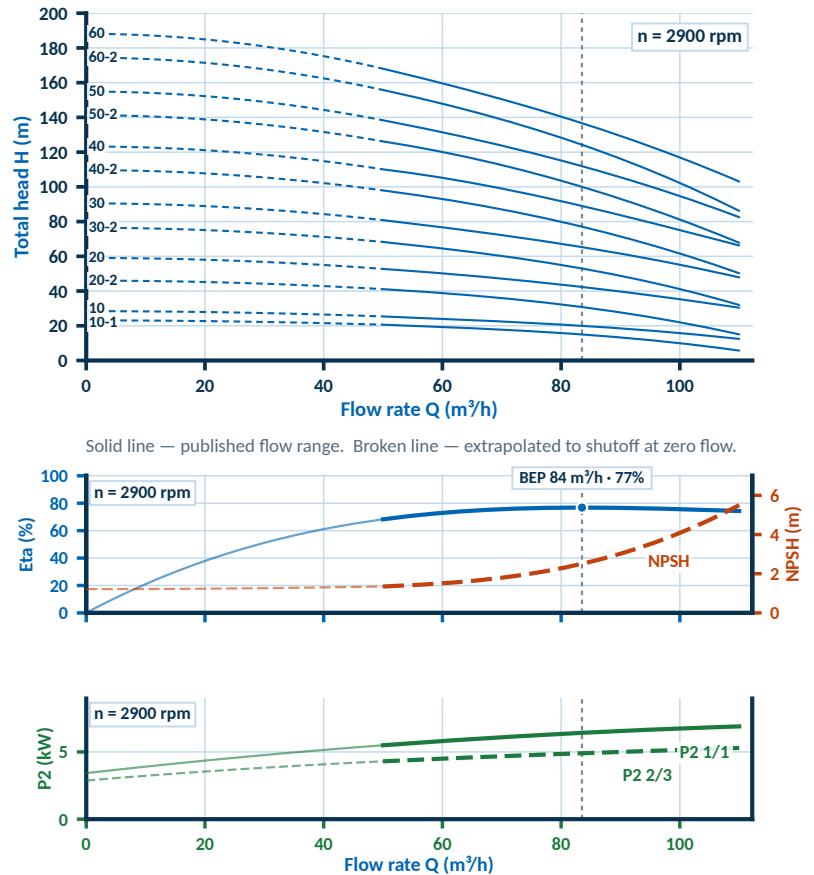


## SAR 90 Vertical Multistage Centrifugal Pump



PERFORMANCE CHART AT N=2900 RPM

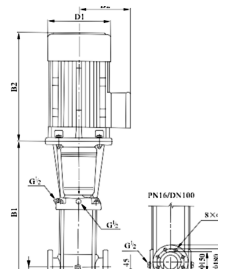


### Typical Applications

- Water supply: raw-water transfer, filtration and boosting duties in waterworks, district distribution, high-rise pressure boosting and packaged booster sets.
- Industrial pressure boosting: process water systems, washing and cleaning plant and high-pressure flushing systems.
- Industrial liquid transfer: cooling and air-conditioning circuits, boiler feed and condensate systems, machine-tool coolant supply, and mild acids and alkalis.
- Water treatment: ultra-filtration, reverse osmosis, distillation, separators and swimming-pool circulation.
- Irrigation: field and farm irrigation, sprinkler systems and drip irrigation.

### Operating Conditions

- Thin, clean, non-flammable and non-explosive liquids, free of solid particles or fibres.
- Liquid temperature: standard version -15 °C to +70 °C; hot-water version +70 °C to +120 °C.
- Maximum ambient temperature +40 °C; maximum installation altitude 1000 m.
- Maximum pressure generated ranges from 2.2 bar on SAR 90-10-1 to 16.5 bar on SAR 90-60, model by model — see Technical Data. Suction and discharge flanges to PN16 / DN100.
- Suction and discharge ports are in line and of equal bore, allowing the pump to be installed directly in a straight pipe run.
- Pump head and motor are coupled by a rigid spacer coupling, so the mechanical seal can be changed without disturbing the pipework.
- Non-self-priming: the pump must be fully primed and the required NPSH maintained at the inlet to avoid cavitation.
- Above +40 °C ambient or above 1000 m altitude the motor output is derated and a larger motor frame must be selected.
- Motor totally enclosed, fan-cooled, protection IP55, insulation class F.
- Optional intelligent controller protects against dry running, phase failure and overload.



### Technical Data

Technical data for all 12 models in the SAR 90 series is tabulated on page 2.



### SAR 90

#### Technical Data

| Model       | Motor P2 |     | Supply / voltage range | Current at 50 Hz (A) |               |                | Motor eff. (%) | Rated flow Q (m³/h) | Head at rated Q (m) | Max. head (m) | Max. flow (m³/h) | Speed (rpm) | Max. press. (bar) | DN    | Dimensions (mm) |     |       |     |     | Weight (kg) |
|-------------|----------|-----|------------------------|----------------------|---------------|----------------|----------------|---------------------|---------------------|---------------|------------------|-------------|-------------------|-------|-----------------|-----|-------|-----|-----|-------------|
|             | kW       | HP  |                        | Full load In         | Start DOL Ist | Soft start Iss |                |                     |                     |               |                  |             |                   |       | B1              | B2  | B1+B2 | D1  | D2  |             |
| SAR 90-10-1 | 5.5      | 7.5 | 3~ 380-415 V           | 11                   | 68            | 32             | 87.8           | 90                  | 13                  | 22            | 110              | 2900        | 2.2               | DN100 | 571             | 390 | 961   | 260 | 208 | 105         |
| SAR 90-10   | 7.5      | 10  | 3~ 380-415 V           | 14                   | 91            | 42             | 88.5           | 90                  | 19                  | 25            | 110              | 2900        | 2.5               | DN100 | 571             | 390 | 961   | 260 | 208 | 110         |
| SAR 90-20-2 | 11       | 15  | 3~ 380-415 V           | 20                   | 142           | 61             | 89.7           | 90                  | 28                  | 41            | 110              | 2900        | 4.0               | DN100 | 773             | 500 | 1273  | 330 | 255 | 181         |
| SAR 90-20   | 15       | 20  | 3~ 380-415 V           | 27                   | 190           | 82             | 90.5           | 90                  | 40                  | 53            | 110              | 2900        | 5.2               | DN100 | 773             | 500 | 1273  | 330 | 255 | 192         |
| SAR 90-30-2 | 18.5     | 25  | 3~ 380-415 V           | 33                   | 233           | 100            | 91.0           | 90                  | 49                  | 68            | 110              | 2900        | 6.7               | DN100 | 865             | 550 | 1415  | 330 | 255 | 215         |
| SAR 90-30   | 22       | 30  | 3~ 380-415 V           | 40                   | 277           | 119            | 91.3           | 90                  | 62                  | 81            | 110              | 2900        | 7.9               | DN100 | 865             | 575 | 1440  | 360 | 285 | 252         |
| SAR 90-40-2 | 30       | 40  | 3~ 380-415 V           | 53                   | 374           | 160            | 92.0           | 90                  | 72                  | 98            | 110              | 2900        | 9.6               | DN100 | 957             | 650 | 1607  | 400 | 310 | 312         |
| SAR 90-40   | 30       | 40  | 3~ 380-415 V           | 53                   | 374           | 160            | 92.0           | 90                  | 84                  | 110           | 110              | 2900        | 10.8              | DN100 | 957             | 650 | 1607  | 400 | 310 | 312         |
| SAR 90-50-2 | 37       | 50  | 3~ 380-415 V           | 66                   | 460           | 197            | 92.4           | 90                  | 93                  | 126           | 110              | 2900        | 12.4              | DN100 | 1049            | 650 | 1699  | 400 | 310 | 336         |
| SAR 90-50   | 37       | 50  | 3~ 380-415 V           | 66                   | 460           | 197            | 92.4           | 90                  | 106                 | 139           | 110              | 2900        | 13.6              | DN100 | 1049            | 650 | 1699  | 400 | 310 | 336         |
| SAR 90-60-2 | 45       | 60  | 3~ 380-415 V           | 80                   | 557           | 239            | 92.8           | 90                  | 117                 | 155           | 110              | 2900        | 15.2              | DN100 | 1141            | 685 | 1826  | 460 | 340 | 407         |
| SAR 90-60   | 45       | 60  | 3~ 380-415 V           | 80                   | 557           | 239            | 92.8           | 90                  | 130                 | 168           | 110              | 2900        | 16.5              | DN100 | 1141            | 685 | 1826  | 460 | 340 | 407         |

Maximum pressure is the pressure the pump itself generates at its maximum head; the sum of inlet pressure and pump pressure must not exceed the casing rating. Currents are calculated nominal values for a 2-pole IE3 motor (single phase at 230 V, three phase at 400 V); In is the full-load running current, Ist the direct-on-line starting current and Iss the current with a soft starter set to ramp at 3 x In (adjustable, typically 2 to 4 x In). A soft starter limits inrush and mechanical shock; it does not raise running efficiency, and adds about 0.1 to 0.5 % loss unless it is bypassed once up to speed. Motor efficiency is the nominal IE3 figure at full load, direct-on-line. **Confirm against the motor nameplate before sizing cable, starter or overload.**

Maximum head is the head at the lowest published flow; maximum flow is the highest published flow for the series. Motor totally enclosed, fan-cooled, IP55, insulation class F, 2-pole, 3 x 380-415 V / 50 Hz. HP figures are the nominal standard-frame equivalents of the kW ratings. Motors up to and including 2.2 kW are single-phase as standard, 3 kW and above three-phase; 3 x 200-220 V and other supply voltages are available to special order. Flanges to PN16 / DN100. Weights are for the pump with standard motor.

### Model Designation

**SAR F 90 - 30 - 2**

|            |                                                                                                                            |
|------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>SAR</b> | Light vertical multistage centrifugal pump                                                                                 |
| <b>F</b>   | Wetted parts in stainless steel AISI 304 or 316L. Omitted on the standard cast-iron construction, which is designated SAR. |
| <b>90</b>  | Rated flow in m³/h — identifies the series                                                                                 |
| <b>30</b>  | Number of chambers (stages) × 10 — 30 denotes 3 stages                                                                     |
| <b>2</b>   | Number of reduced-diameter impellers. Omitted when every impeller is full diameter.                                        |

### Reduced-Diameter Impellers

#### Reduced-Diameter Impellers

Stages come in whole numbers, so a plain stage count steps the head up in coarse jumps — often 15 to 30 m at a time on this range. A duty that falls between two steps would otherwise have to be met by taking the next size up and throttling the surplus away in a valve, which wastes energy for the life of the pump and loads the motor unnecessarily.

Fitting one or two impellers of reduced outside diameter trims the head between those steps. Head varies roughly with the square of impeller diameter and absorbed power with the cube, so a trimmed impeller lowers the curve while *reducing* shaft power — the duty is met on a smaller motor rather than by wasting head across a valve. The suffix gives how many impellers are trimmed: SAR 32-30-2 has two of its three impellers reduced and SAR 32-30-1 one, so the three build states SAR 32-30-2, SAR 32-30-1 and SAR 32-30 sit as a close-spaced group under the same casing, bearings and motor frame.

On the SAR 200 series two trims are used, A and B, which is why models carry suffixes such as 200-30-2A-B — two impellers on the A trim and one on the B. Hydraulic performance for every build state is tabulated separately; select directly from the tables rather than interpolating.



### SAR 90

#### Performance Table

Total head H (m) against flow rate Q (m<sup>3</sup>/h) at 2900 rpm, tested on clean water at 20 °C (kinematic viscosity 1 mm<sup>2</sup>/s, air-free). Tolerances to ISO 9906, Annex A. Motor power P2 is the standard motor rating for each model.

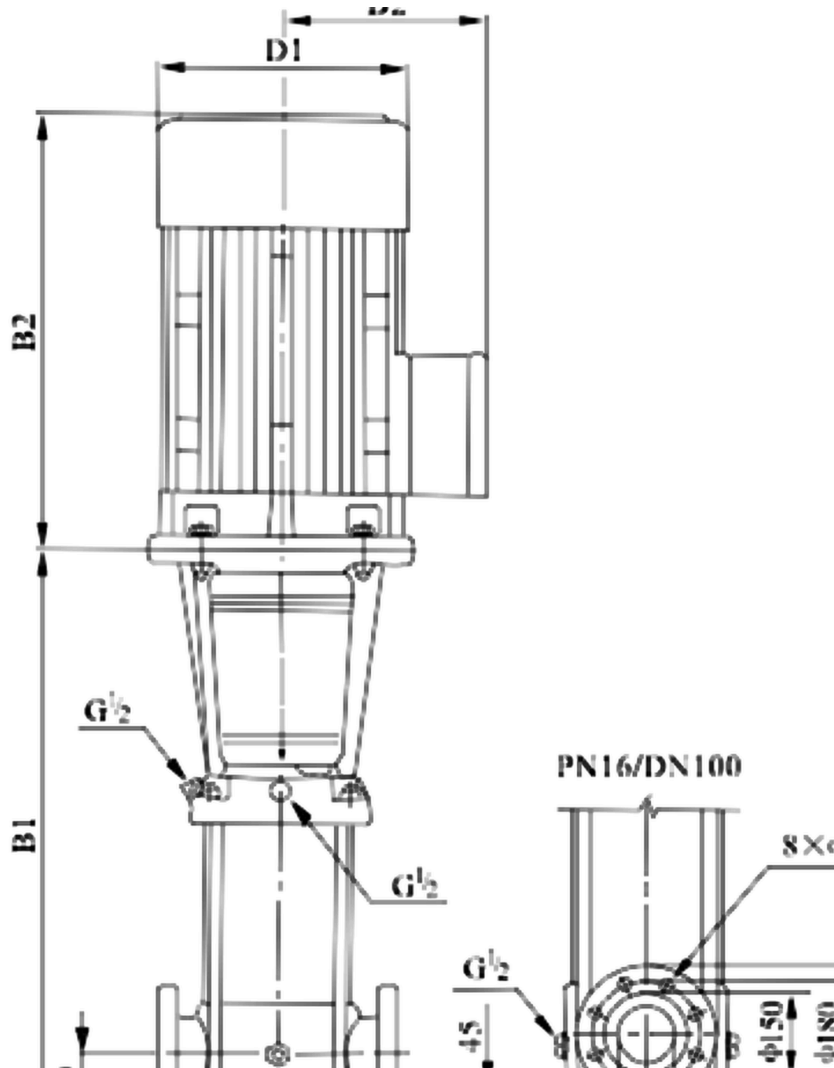
| Model       | Motor |     |                        | Q (m <sup>3</sup> /h) |     |     |     |     |     |     |     |
|-------------|-------|-----|------------------------|-----------------------|-----|-----|-----|-----|-----|-----|-----|
|             | kW    | HP  | Supply / voltage range | 50                    | 60  | 70  | 80  | 85  | 90  | 100 | 110 |
| SAR 90-10-1 | 5.5   | 7.5 | 3~ 380-415 V           | 22                    | 19  | 17  | 16  | 14  | 13  | 10  | 6   |
| SAR 90-10   | 7.5   | 10  | 3~ 380-415 V           | 25                    | 24  | 22  | 21  | 20  | 19  | 16  | 12  |
| SAR 90-20-2 | 11    | 15  | 3~ 380-415 V           | 41                    | 39  | 36  | 32  | 30  | 28  | 22  | 15  |
| SAR 90-20   | 15    | 20  | 3~ 380-415 V           | 53                    | 50  | 47  | 44  | 41  | 40  | 36  | 30  |
| SAR 90-30-2 | 18.5  | 25  | 3~ 380-415 V           | 68                    | 65  | 60  | 55  | 52  | 49  | 41  | 32  |
| SAR 90-30   | 22    | 30  | 3~ 380-415 V           | 81                    | 77  | 72  | 67  | 64  | 62  | 55  | 48  |
| SAR 90-40-2 | 30    | 40  | 3~ 380-415 V           | 98                    | 93  | 87  | 80  | 75  | 72  | 62  | 50  |
| SAR 90-40   | 30    | 40  | 3~ 380-415 V           | 110                   | 105 | 100 | 92  | 86  | 84  | 76  | 66  |
| SAR 90-50-2 | 37    | 50  | 3~ 380-415 V           | 126                   | 120 | 113 | 104 | 98  | 93  | 81  | 68  |
| SAR 90-50   | 37    | 50  | 3~ 380-415 V           | 139                   | 131 | 124 | 115 | 110 | 106 | 94  | 83  |
| SAR 90-60-2 | 45    | 60  | 3~ 380-415 V           | 155                   | 148 | 139 | 129 | 122 | 117 | 102 | 86  |
| SAR 90-60   | 45    | 60  | 3~ 380-415 V           | 168                   | 160 | 150 | 141 | 134 | 130 | 117 | 103 |

Select the duty point within the published flow range. Operating far to the right of the range overloads the motor; operating far to the left causes heat build-up in the pump. The stainless-steel construction is designated SARF and has identical hydraulic performance.



### SAR 90

#### Dimensions and Connections



B1 base to motor flange

B2 motor height

B1+B2 overall height

D1 across motor frame

D2 across base

All dimensions in mm. Suction and discharge are in line and of equal bore, DN100, flanges to PN16 / DN100.

Per-model dimensions and weights are tabulated in the Technical Data pages. Single-phase and flameproof motors alter the external dimensions.