

Hot water circulating pumps

TÜV-approved



Automation products available:

- Hyamaster
- hyatronic

Fields of Application

HPH pumps are suitable for handling hot water in high-pressure hot water generating plants.

They are used as feed and circulating pumps.

HPH has been type-tested to TRD (German Steam Boiler Regulations) by TÜV (Technical Control Board). Type test certificates can be offered and supplied on request.

Design

Horizontal, radially split volute casing pumps in back pull-out design, with radial impeller, single-flow, single-stage. Centreline pump feet.

Designation

HPH 80 - 200

Type series _____
Discharge nozzle DN _____
Nominal impeller diameter in mm _____

Operating Data

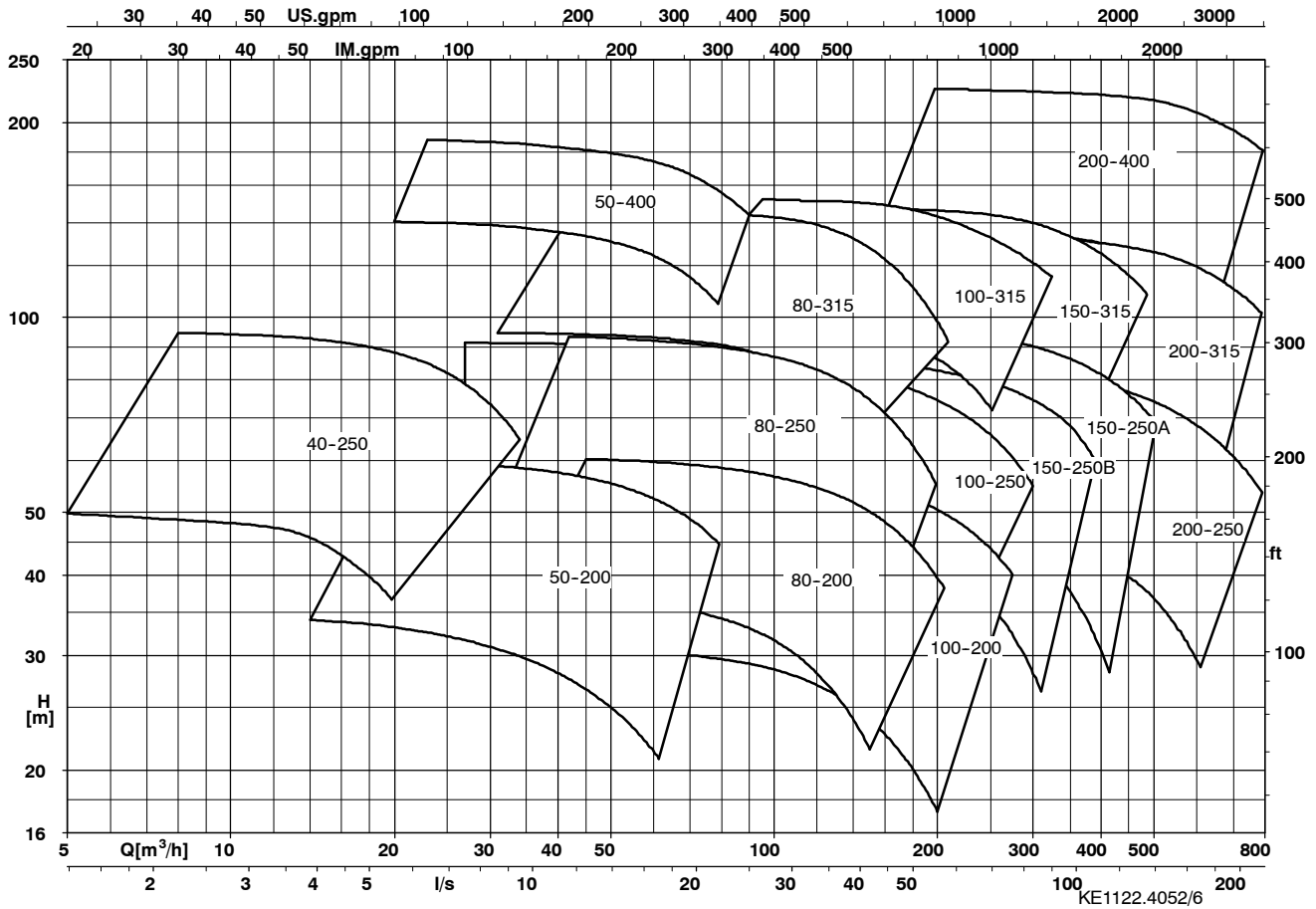
| | | |
|------------------------|----|------------------------------|
| Pump sizes | DN | 40 to 300 |
| Capacities | Q | up to 1800 m ³ /h |
| Heads | H | up to 225 m |
| Operating pressures | p | up to 110 bar |
| Operating temperatures | t | up to +320 °C |

Certification

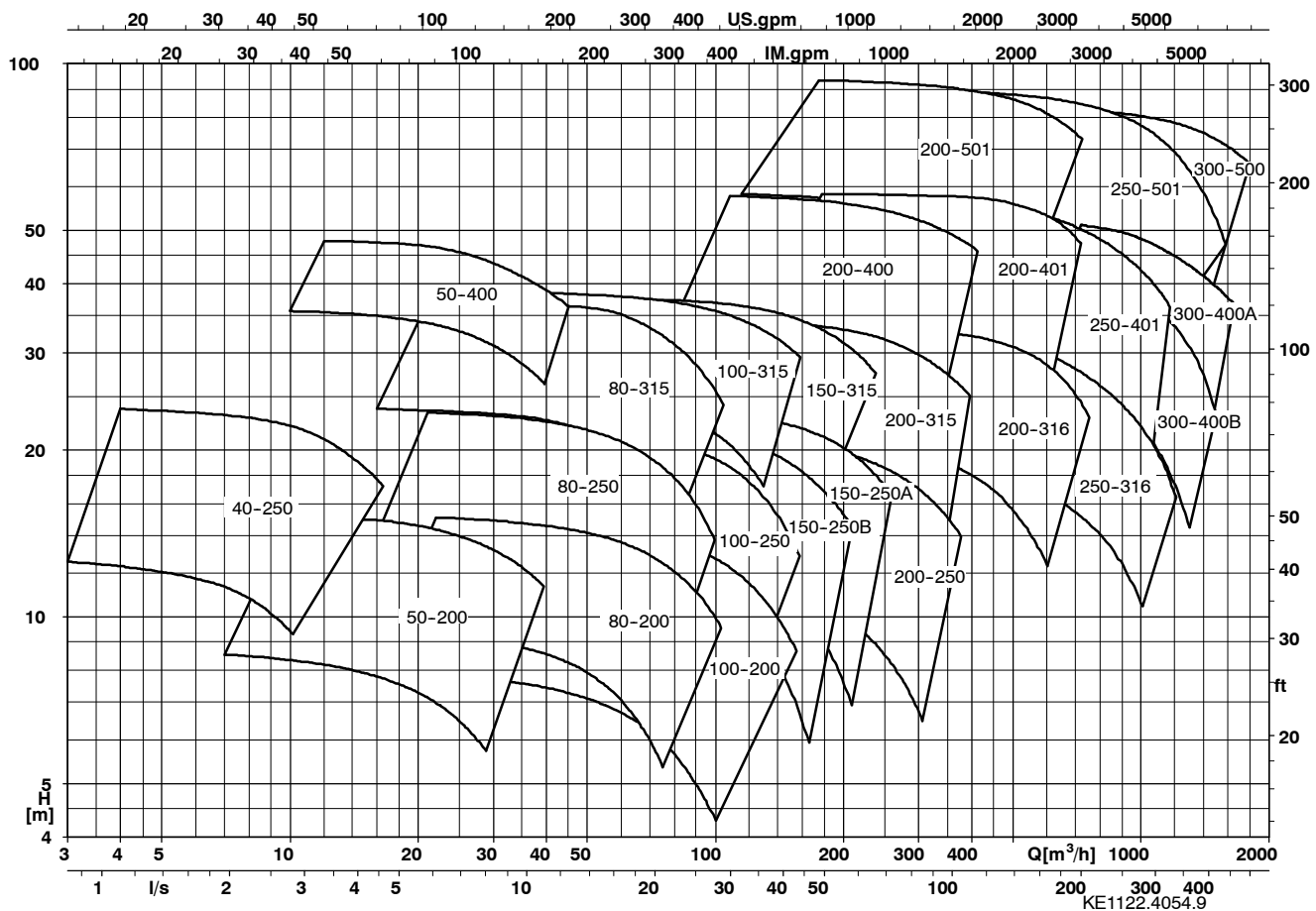
Certified quality management ISO 9001.

Selection Charts

n = 2900 1/min

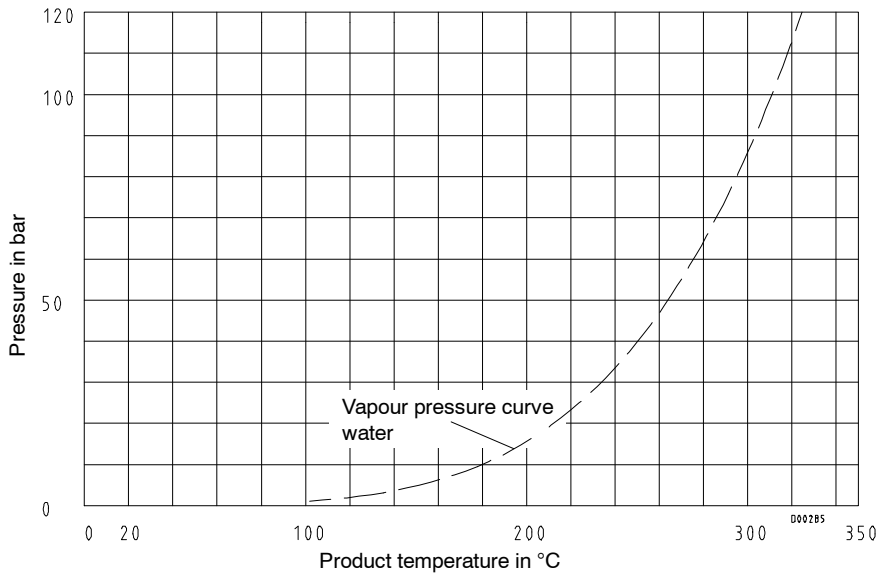


n = 1450 1/min



Pressure and Temperature Limits

Vapour pressure curve of water



Max. permissible operating pressures in bar, max. 110 bar (Observe vapour pressure curve of water!)

| Pump size HPH | with acceptance test to TRD | | | | | | | | | | | | without acceptance test to TRD | | | | | | | | | | | |
|------------------|-----------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|------|--------------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|--|--|
| | GP240GH+N | | | 1.7706 | | | | 1.4931 | | | | | GP240GH+N | | | 1.7706 | | | | 1.4931 | | | | |
| | 20°C | 200°C | 300°C | 20°C | 200°C | 300°C | 350°C | 20°C | 200°C | 300°C | 350°C | 20°C | 200°C | 300°C | 20°C | 200°C | 300°C | 350°C | 20°C | 200°C | 300°C | 350°C | | |
| 40-250 | 59.2 | 51.8 | 42.9 | 108.5 | 102.6 | 97.2 | 93.2 | 110.0 | 110.0 | 110.0 | 109.2 | 72.6 | 51.9 | 43.0 | 110.0 | 110.0 | 108.1 | 103.6 | 110.0 | 110.0 | 110.0 | 110.0 | | |
| 50-200 | 70.2 | 61.4 | 50.9 | 97.7 | 97.7 | 97.7 | 97.7 | 110.0 | 110.0 | 110.0 | 110.0 | 86.1 | 61.5 | 51.0 | 108.6 | 108.6 | 108.6 | 108.6 | 110.0 | 110.0 | 110.0 | 110.0 | | |
| 50-400 | 53.9 | 47.2 | 39.1 | 98.9 | 93.5 | 88.6 | 85.0 | 110.0 | 109.3 | 104.4 | 99.6 | 66.1 | 47.2 | 39.1 | 110.0 | 104.0 | 98.6 | 94.5 | 110.0 | 110.0 | 110.0 | 110.0 | | |
| 80-200 | 48.9 | 42.7 | 35.4 | 89.6 | 84.6 | 80.2 | 76.9 | 110.0 | 98.9 | 95.5 | 90.1 | 59.9 | 42.8 | 35.5 | 107.6 | 94.2 | 89.3 | 85.6 | 110.0 | 110.0 | 105.1 | 100.2 | | |
| 80-250 | 47.8 | 39.8 | 33.0 | 87.6 | 78.9 | 74.8 | 71.7 | 107.5 | 92.2 | 88.1 | 84.0 | 55.8 | 39.9 | 33.0 | 100.2 | 87.7 | 83.1 | 79.7 | 110.0 | 102.5 | 97.9 | 93.4 | | |
| 80-315 | 45.2 | 32.9 | 27.3 | 74.6 | 65.3 | 61.9 | 59.3 | 91.5 | 76.3 | 72.9 | 69.5 | 46.2 | 33.0 | 27.3 | 82.9 | 72.5 | 68.8 | 65.9 | 101.8 | 84.8 | 81.1 | 77.3 | | |
| 100-200 | 46.9 | 41.0 | 34.0 | 86.0 | 81.2 | 77.0 | 73.8 | 105.5 | 94.9 | 90.7 | 86.5 | 57.5 | 41.1 | 34.0 | 103.2 | 90.3 | 85.6 | 82.1 | 110.0 | 105.6 | 100.9 | 96.2 | | |
| 100-250 | 69.0 | 50.3 | 41.7 | 110.0 | 99.7 | 94.5 | 90.6 | 110.0 | 110.0 | 110.0 | 106.1 | 70.5 | 50.4 | 41.7 | 110.0 | 110.0 | 105.0 | 100.7 | 110.0 | 110.0 | 110.0 | 110.0 | | |
| 100-315 | 45.2 | 33.0 | 27.3 | 74.7 | 65.3 | 61.9 | 59.4 | 91.7 | 76.4 | 73.0 | 69.6 | 46.2 | 33.0 | 27.3 | 83.0 | 72.6 | 68.9 | 66.0 | 101.9 | 84.9 | 81.1 | 77.4 | | |
| 150-250 | 59.6 | 52.1 | 43.2 | 109.3 | 103.2 | 97.3 | 93.9 | 110.0 | 110.0 | 110.0 | 110.0 | 73.0 | 52.1 | 43.2 | 110.0 | 110.0 | 108.8 | 104.4 | 110.0 | 110.0 | 110.0 | 110.0 | | |
| 150-315 | 54.4 | 40.1 | 33.2 | 90.7 | 79.4 | 75.3 | 72.2 | 110.0 | 92.8 | 88.7 | 84.6 | 56.2 | 40.1 | 33.3 | 100.9 | 88.3 | 83.7 | 80.3 | 110.0 | 103.2 | 98.6 | 94.0 | | |
| 200-250 | 61.5 | 52.5 | 43.5 | 110.0 | 104.0 | 98.6 | 94.6 | 110.0 | 110.0 | 110.0 | 110.0 | 73.6 | 52.6 | 43.6 | 110.0 | 110.0 | 109.7 | 105.2 | 110.0 | 110.0 | 110.0 | 110.0 | | |
| 200-315 | 58.4 | 51.1 | 42.3 | 107.1 | 101.2 | 96.0 | 92.0 | 110.0 | 110.0 | 110.0 | 107.8 | 71.6 | 51.1 | 42.4 | 110.0 | 110.0 | 106.7 | 102.3 | 110.0 | 110.0 | 110.0 | 110.0 | | |
| 200-316 | 68.1 | 49.7 | 41.2 | 110.0 | 98.4 | 93.3 | 89.5 | 110.0 | 110.0 | 109.9 | 104.8 | 69.6 | 49.7 | 41.2 | 110.0 | 109.4 | 103.7 | 99.4 | 110.0 | 110.0 | 110.0 | 110.0 | | |
| 200-400 | 45.5 | 39.8 | 33.0 | 83.5 | 78.9 | 74.8 | 71.8 | 102.5 | 92.3 | 88.2 | 84.1 | 55.8 | 39.9 | 33.0 | 100.3 | 87.8 | 83.2 | 79.8 | 110.0 | 102.6 | 98.0 | 93.5 | | |
| 200-401 | 47.0 | 34.2 | 28.4 | 77.5 | 67.8 | 64.3 | 61.7 | 95.1 | 79.3 | 75.8 | 72.2 | 48.0 | 34.3 | 28.4 | 86.2 | 75.4 | 71.5 | 68.6 | 105.8 | 88.2 | 84.2 | 80.3 | | |
| 200-501 | 62.3 | 45.9 | 38.0 | 103.8 | 90.9 | 86.1 | 82.6 | 110.0 | 106.2 | 101.5 | 96.8 | 64.3 | 45.9 | 38.1 | 110.0 | 101.0 | 95.7 | 91.8 | 110.0 | 110.0 | 110.0 | 107.5 | | |
| 250-316 | 79.9 | 61.5 | 51.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 | 86.2 | 61.6 | 51.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 | | |
| 250-401 | 64.0 | 46.7 | 38.7 | 105.7 | 92.5 | 87.7 | 84.1 | 110.0 | 108.1 | 103.8 | 98.5 | 65.4 | 46.7 | 38.7 | 110.0 | 102.8 | 97.5 | 93.5 | 110.0 | 110.0 | 110.0 | 109.5 | | |
| 250-501 | 47.0 | 41.1 | 34.1 | 86.2 | 81.5 | 77.2 | 74.0 | 105.8 | 95.2 | 91.0 | 86.7 | 57.6 | 41.1 | 34.1 | 103.5 | 90.6 | 85.9 | 82.3 | 110.0 | 105.8 | 101.1 | 96.4 | | |
| 300-400 | 62.4 | 54.6 | 45.2 | 110.0 | 108.1 | 102.5 | 98.3 | 110.0 | 110.0 | 110.0 | 110.0 | 76.5 | 54.6 | 45.3 | 110.0 | 110.0 | 110.0 | 109.3 | 110.0 | 110.0 | 110.0 | 110.0 | | |
| 300-500 | | | | | | | | | | | | 46.8 | 33.5 | 27.7 | 84.1 | 73.6 | 69.8 | 66.9 | 103.2 | 86.0 | 82.2 | 78.4 | | |

Material variants

| Description | Material | | |
|----------------------------|----------------------------------|----------------------------------|----------------------------------|
| Volute casing | GP240GH+N | 1.7706 | 1.4931 |
| Support foot | JS1025 ⁶⁾ | JS1025 ⁶⁾ | JS1025 ⁶⁾ |
| Shaft | 1.7709+QT+RS | 1.7709+QT+RS | 1.7709+QT+RS |
| Impeller | JL1040 ^{1) 5)} / 1.4408 | JL1040 ^{1) 5)} / 1.4408 | JL1040 ^{1) 5)} / 1.4408 |
| Bearing bracket | JL1040 ⁵⁾ | JL1040 ⁵⁾ | JL1040 ⁵⁾ |
| Bearing bracket lantern | 1.7706 | 1.7706 | 1.7706 ²⁾ |
| Casing bolts ³⁾ | 1.6772 | 1.6772 | 1.6772 |
| Casing wear ring | JL1040 ^{4) 5)} | JL1040 ^{4) 5)} | JL1040 ^{4) 5)} |
| Impeller wear ring | 1.4027 | 1.4027 | 1.4027 |
| Shaft protecting sleeve | 1.4122 | 1.4122 | 1.4122 |
| Impeller nut | 1.4571 | 1.4571 | 1.4571 |

1) JS1025 for impeller diam. 315 and above or $u > 40$ m/s or $t > 250$ °C

2) 1.4931 required for size 50-400

3) > 80 bar: reduced shank bolts to DIN 2510

4) optionally VG 434

5) to EN 1561 = GJL-250

6) to EN 1563 = GJS-400-18-LT

Design Features

Flanges
up to PN 160 to DIN,
other flange designs
possible

Shaft seal
balanced, single-acting
mechanical seal with
pumping device

Forcing screws
facilitate dismantling

Rotor and bearings
dimensioned to ensure
a shaft deflection below
0.05 mm at the
mechanical seal and a
bearing life of more
than 17,500 operating
hours

Fixed bearing
angular contact ball
bearing in
"O"-arrangement,
generously dimensioned,
little axial movement of the
rotor. Reinforced bearing
assembly available for
high inlet pressures

Hydraulic system
nominal data and
dimensions to
ISO 2858 / DIN 24 256

**Pressure-retaining
parts**
safe design due to
computerized
strength analysis and
quality casting

Impeller
closed radial impeller
with multiply curved
vanes, hydraulically
balanced

**Casing and impeller
wear rings**
replaceable

Shaft
not in contact with the fluid
handled (dry shaft,
therefore no special
materials required)

Modular design
ensures small stock of
spare parts and fast
delivery

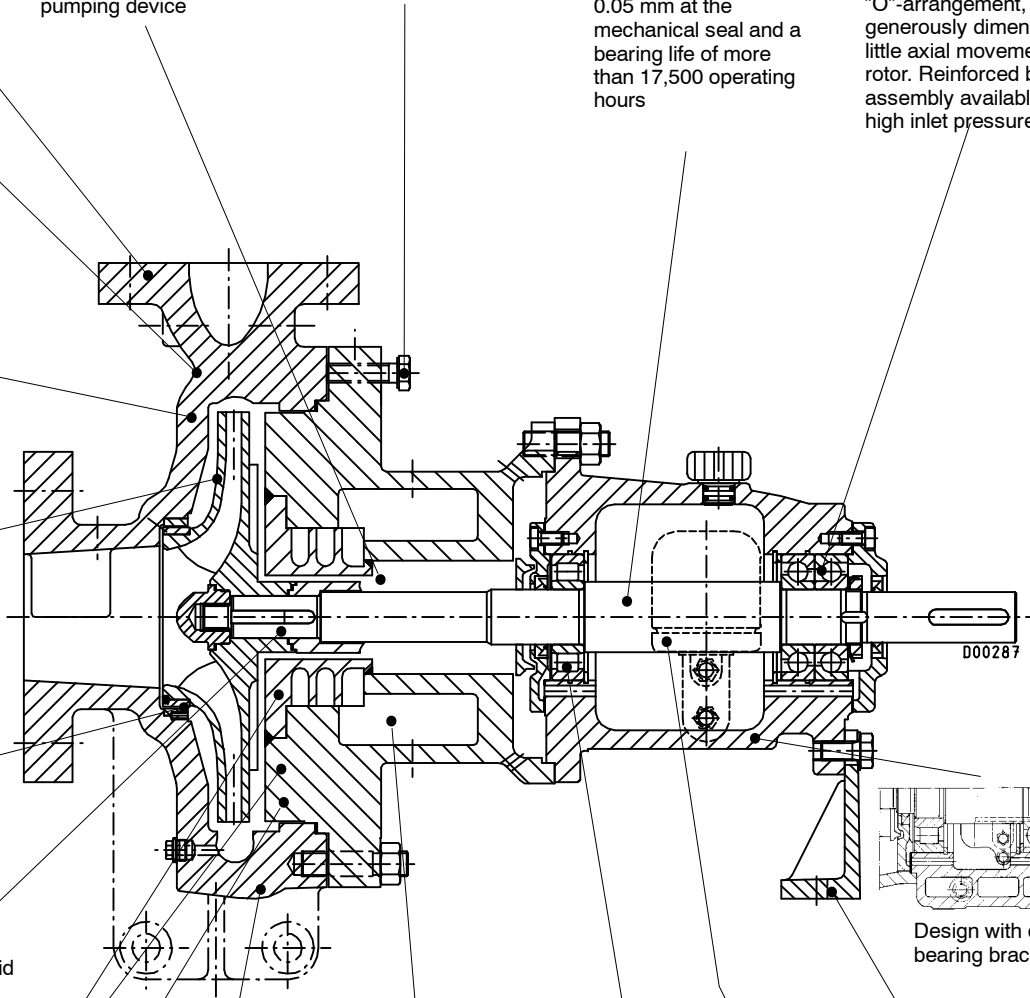
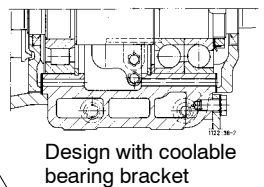
Back pull-out design
when the pump is
dismantled, the casing
may remain in the piping

Volute
with low radial forces (double
volute depending on pump size)

Cooling chamber

Radial bearing
permits easy
assembly and
compensates possible
thermal expansion of
the shaft

Constant-level oiler
ensures constant
lubrication of the
bearings and oil level
monitoring



Technical Data

| | Unit | Pump sizes | | | | | | | | | | | | | | | | | | | | | |
|--|------|------------|-------------|-----|------------|-----|-----|------------|-------------|------|----------------------|-----|------|------------------|-----|-----|-----|-----|-----|----------------|-----|---------|-----|
| | | P02as | | | P03s/P03as | | | P04s/P04as | | | P06as/P06at (hub 05) | | | P06s/P06as/P06at | | | | | | | | | |
| Bearing bracket | | | | | | | | | | | | | | | | | | | | | | | |
| Impeller outlet width | mm | 12 | 14 | 22 | 18 | 30 | 8 | 14 | 28 | 19.5 | 32 | 26 | 46 | 50 | 73 | 34 | 26 | 40 | 32 | 63 | 43 | 68/59 | 58 |
| inlet diam. | mm | 82 | 57.5 | 114 | 118 | 146 | 100 | 129 | 135 | 135 | 154 | 165 | 192 | 222 | 270 | 200 | 200 | 222 | 222 | 294 | 280 | 294/272 | 320 |
| max. impeller diam. | mm | 209 | 260 | 209 | 260 | 209 | 360 | 320 | 260 | 324 | 260 | 324 | 260 | 320 | 324 | 324 | 408 | 408 | 504 | 404 | 504 | 404 | 504 |
| min. impeller diam. | mm | 165 | 200 | 170 | 200 | 170 | 320 | 260 | 200 | 260 | 200 | 260 | 200 | 260 | 260 | 260 | 320 | 320 | 400 | 320 | 400 | 320/340 | 400 |
| Shaft diameter in the mech. seal chamber | mm | 25 | 32 | | | | | | 42 | | | | 63 | | | | | | | 65 | | | |
| standard pump side | mm | -- | 35 | | | | | | 55 | | | | -- | | | | | | | 65 | | | -- |
| motor side | mm | -- | 35 | | | | | | 55 | | | | -- | | | | | | | 75 | | | -- |
| reinforced pump side | mm | 35 | 55 | | | | | | 65 | | | | | | | | | | | 80 | | | |
| motor side | mm | 35 | 55 | | | | | | 65 | | | | | | | | | | | 95 | | | |
| at the coupling | mm | 24 | 32 | | | | | | 42 | | | | | | | | | | | 60 | | | |
| Shaft prot. sleeve | mm | | | | | | | | | | | | | | | | | | | | | | |
| mechanical seal | | | | | | | | | | | | | | | | | | | | | | | |
| depending on seal make | | | | | | | | | | | | | | | | | | | | | | | |
| Bearings standard pump side | No. | -- | NU307 | | | | | | NU 311 | | | | -- | | | | | | | NU 413 | | | -- |
| motor side | No. | -- | 2 x 7307 BG | | | | | | 2 x 7311 BG | | | | -- | | | | | | | 2 x 7315 BG | | | -- |
| reinforced pump side | No. | NU307 | NU 311 | | | | | | NU 313 | | | | | | | | | | | NU 416 | | | |
| motor side | No. | 2x7307BG | 2 x 7311 BG | | | | | | 2 x 7313 BG | | | | | | | | | | | 2 x 7319 BG | | | |
| tandem pump side | No. | -- | -- | | | | | | -- | | | | | | | | | | | NU 416 | | | |
| motor side | No. | -- | -- | | | | | | -- | | | | | | | | | | | 3 x 7319 B-MUA | | | |
| Pressure limit max. operating pressure | bar | | | | | | | | | | | | | | | | | | | | | | |
| max. test pressure | bar | | | | | | | | | | | | | | | | | | | | | | |
| Temp. limit max. temp. of fluid handled | °C | | | | | | | | | | | | | | | | | | | | | | |
| Drive max. P/n values | | 0.009 | 0.021 | | | | | | 0.05 | | | | 0.11 | | | | | | | 0.2 | | | |

Pump Size / Bearing Bracket Combinations

| DN Dis-charge nozzle | Nom. impeller diameter | | | | | | | | Bearing bracket |
|----------------------------|------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|---------------------|
| | 200 | 250 | 315 | 316 | 400 | 401 | 500 | 501 | |
| | | | | | | | | | P02as |
| 40 | | x | | | | | | | P03s/03as |
| 50 | x | | | | x ²⁾ | | | | |
| 80 | x ¹⁾ | x ¹⁾ | x ¹⁾ | | | | | | |
| 100 | x ¹⁾ | x ¹⁾ | x ¹⁾ | | | | | | P04s/04as |
| 150 | | x ¹⁾ | x ¹⁾ | | | | | | P06s/06as/ P06at |
| 200 | | x ¹⁾ | x ¹⁾ | x ¹⁾ | x ¹⁾ | x ¹⁾ | | x ¹⁾ | |
| 250 | | | | x ¹⁾ | | x ¹⁾ | | x ¹⁾ | |
| 300 | | | | | x ¹⁾ | | x ¹⁾ | | |

1) Casing with double volute

2) Casing with inducer

Casing

Radially split volute casing with replaceable casing wear ring and integrally cast centreline pump feet.

The pressure-retaining pump chamber is closed off towards the motor side by means of a bearing bracket lantern with integrated cooling chamber.

Balancing

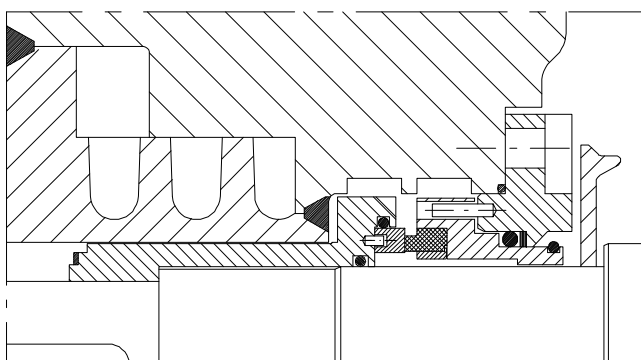
If required, hydraulic balancing is effected by back vanes.

Shaft seal

Standard version with balanced, single-acting mechanical seals of various makes.

All mechanical seals are supplied with cooled lubricating liquid by means of product circulation (from the seal chamber via the heat exchanger and back into the seal chamber). Circulation is supported by a pumping device (pumping ring).

The pump design allows to use a so-called cartridge-type mechanical seal in the shaft seal chamber, which facilitates quick and careful removal of the seal unit for overhauls and repairs.



000286

Single-acting mechanical seal, balanced

Mechanical Seals Used

| Design | Make | Type |
|---------------|----------|-----------------|
| single-acting | Crane | ... 8 BVS |
| | Burgmann | SH 10 PV 10/... |

Acceptance Tests / Guarantees

Each pump is subjected to a performance test run, and its duty point is guaranteed according to ISO 9906/2A.

The following acceptance tests may be performed and certified **at extra charge**:

Test run ISO 9906/2A 1 measuring point / 5 measuring points

Test run ISO 9906/1 5 measuring points

(observe individual curve)

NPSH test

1 measuring point / 5 measuring points

Hot water circulating pumps are subjected to a type test and a hydrostatic pressure test in accordance with TRD 501 by the German TÜV.

Pumps which - as an integral component of the boiler - have to meet the acceptance test requirements of VdTÜV (Union of German Associations of Technical Supervision) are, in addition, subjected to a material and product test in accordance with TRD 401 and 402.

Warranties are given within the scope of the valid delivery conditions.

Coating and Preservation

(acc. to works standard AN 1865)

< 150°C N 1 1 1 W
 ≥ 150°C N 7 7 7 W

Treatment of unmachined parts

Coating - pump

Coating - baseplate and bearing bracket

Coating - motor

Preservation

N = treatment of unmachined parts

1 = synthetic enamel RAL 5002, ultramarine blue

7 = heat-resistant enamel RAL 9007 - aluminium grey

W = rinsed with water repellent agent; blank parts liable to rust with protective coating

Recommended Spare Parts Stock for Two Years' Operation to DIN 24296

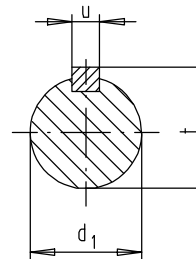
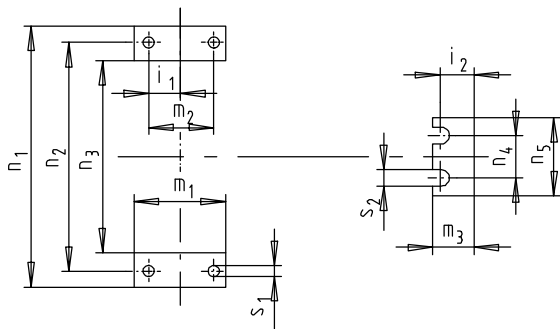
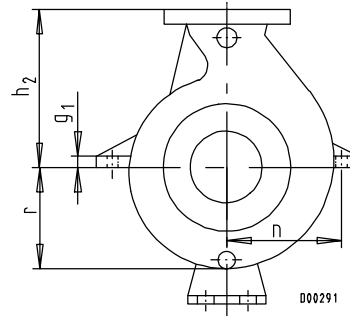
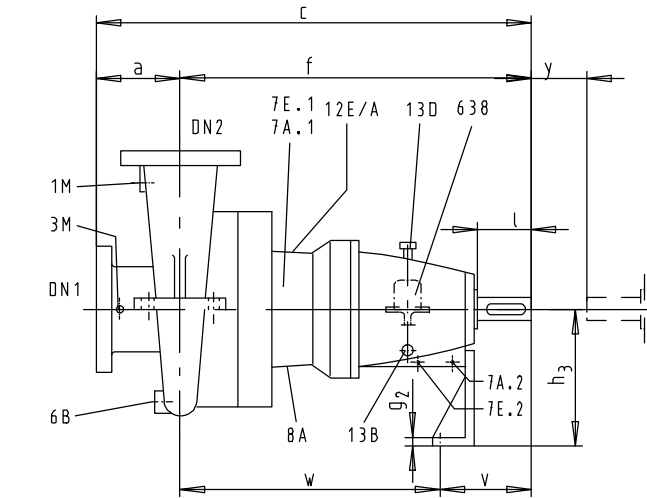
| Part No. | Description | Number of pumps (incl. standby pumps) | | | | | | | |
|----------|---|---------------------------------------|---|---|---|-----|-----|-------------|--|
| | | 2 | 3 | 4 | 5 | 6+7 | 8+9 | 10 and more | |
| | | Quantity of spare parts | | | | | | | |
| 210 | Shaft | 1 | 1 | 1 | 2 | 2 | 2 | 20 % | |
| 230 | Impeller | 1 | 1 | 1 | 2 | 2 | 2 | 20 % | |
| 320.02 | Angular contact ball bearing (set) | 1 | 1 | 2 | 2 | 2 | 3 | 25 % | |
| 322.01 | Cylindrical roller bearing | 1 | 1 | 2 | 2 | 2 | 3 | 25 % | |
| 433 | Mechanical seal, complete or spring-loaded ring seat ring secondary seal at spring-loaded ring secondary seal at seat ring spring (set) | 1 | 1 | 2 | 2 | 2 | 3 | 25 % | |
| | | 2 | 3 | 4 | 5 | 6 | 7 | 90 % | |
| | | 2 | 3 | 4 | 5 | 6 | 7 | 90 % | |
| | | 2 | 3 | 4 | 5 | 7 | 9 | 100 % | |
| | | 2 | 3 | 4 | 5 | 7 | 9 | 100 % | |
| | | 1 | 1 | 1 | 1 | 2 | 2 | 20 % | |
| 502.01 | Casing wear ring | 2 | 2 | 2 | 3 | 3 | 4 | 50 % | |
| 503.01 | Impeller wear ring | 1 | 1 | 1 | 2 | 2 | 3 | 30 % | |
| 524.01 | Shaft protecting sleeve | 2 | 2 | 2 | 3 | 3 | 4 | 50 % | |
| --- | Gaskets for pump casing (set) | 4 | 6 | 8 | 8 | 9 | 12 | 150 % | |
| --- | Torque transmission elements (coupling, set) | 1 | 1 | 2 | 2 | 3 | 4 | 30 % | |

Dimensions

Flange version PN 63, EN 1092-1
PN 100, EN 1092-1 ²⁾

Flanges

| | |
|-----------|---------------------------------------|
| GP240GH+N | EN 1092-1, PN 63 |
| 1.7706 | EN 1092-1, PN 63 EN 1092-1, PN 100 |
| 1.4931 | EN 1092-1, PN 100 |



Shaft end key in acc. with DIN 6885/Sh. 1

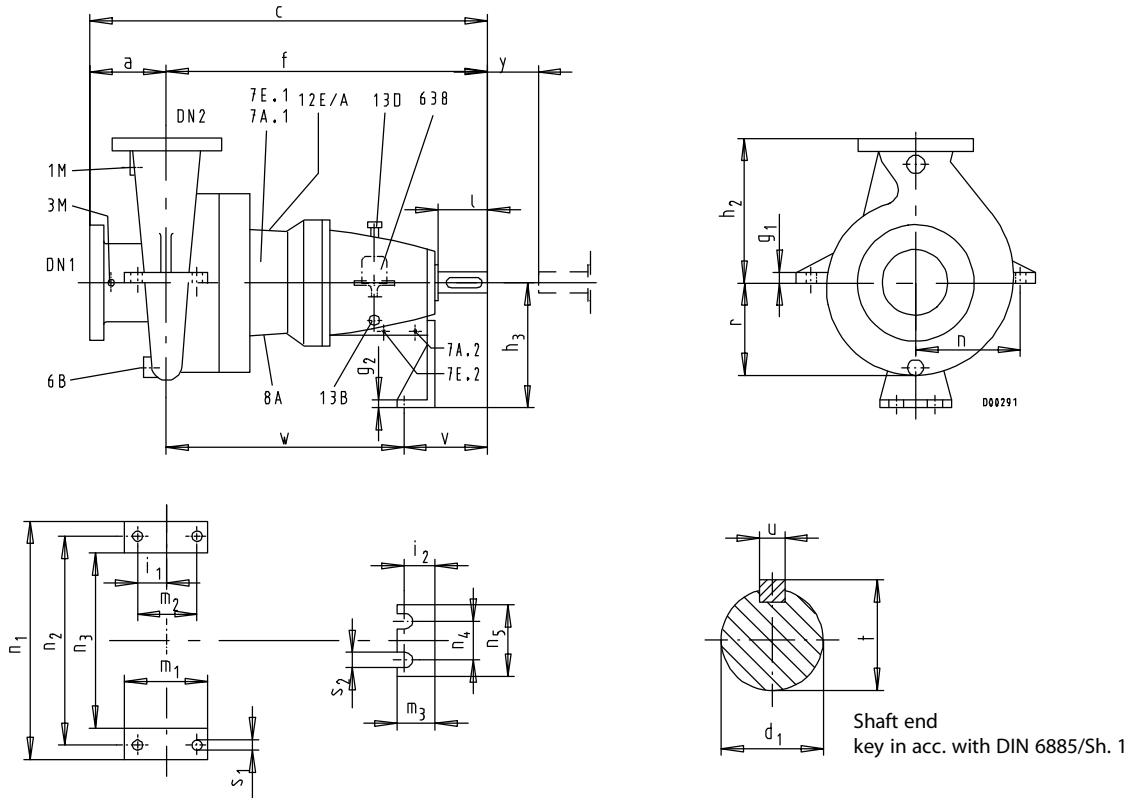
Auxiliary connections see page 9

| Pump size | Bearing bracket | Pump dimensions ³⁾ | | | | | | | | | | | | | | | | Shaft end | | | | Foot bolts | | | | | | | | | |
|-----------------------|-----------------|-------------------------------|-----------------|-----------------|-----------------|-----|----------------|----------------|------------------------------|----------------|----------------|----------------|-----|----------------|----------------|----------------|-----|-----------|-----------------------------------|-----|------|------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|-----|
| | | DN ₁ | DN ₂ | a ²⁾ | c ²⁾ | f | g ₁ | g ₂ | h ₂ ²⁾ | h ₃ | m ₁ | m ₃ | n | n ₁ | n ₃ | n ₅ | ~ r | y | d ₁₀ k ₆ | l | t | u | i ₁ | i ₂ | m ₂ | n ₂ | n ₄ | s ₁ | s ₂ | v | w |
| 40-250 | P03s/as | 50 | 40 | 115 | 615 | 500 | 20 | 8 | 230 | 180 | 130 | 47 | - | 460 | 360 | 160 | 175 | 140 | 32 | 80 | 35,3 | 10 | 52,5 | 30 | 90 | 420 | 110 | 18 | 14 | 130 | 370 |
| 50-200 | P02as | 80 | 50 | 105 | 490 | 387 | 16 | 8 | 200 | 180 | 90 | 45 | - | 425 | 345 | 160 | 160 | 100 | 24 | 50 | 26,9 | 8 | 28,5 | 28 | 54 | 390 | 110 | 14 | 14 | 100 | 285 |
| 50-400 | P04s/as | 80 | 50 | 190 | 720 | 530 | 25 | 12 | 340 | 360 | 150 | 52 | - | 690 | 590 | 160 | 285 | 140 | 42 | 110 | 45,1 | 12 | 72 | 33 | 110 | 650 | 110 | 18 | 14 | 160 | 370 |
| 80-200 | P03s/as | 100 | 80 | 135 | 635 | 500 | 20 | 8 | 255 | 225 | 130 | 47 | - | 500 | 400 | 160 | 210 | 140 | 32 | 80 | 35,3 | 10 | 58,5 | 30 | 90 | 460 | 110 | 18 | 14 | 130 | 370 |
| 80-250 | P03s/as | 100 | 80 | 135 | 635 | 500 | 20 | 8 | 285 | 280 | 130 | 47 | - | 580 | 480 | 160 | 240 | 140 | 32 | 80 | 35,3 | 10 | 52 | 30 | 90 | 540 | 110 | 18 | 14 | 130 | 370 |
| 80-315 | P04s/as | 100 | 80 | 140 | 670 | 530 | 22 | 12 | 320 | 305 | 130 | 52 | - | 640 | 540 | 160 | 260 | 140 | 42 | 110 | 45,1 | 12 | 51 | 33 | 90 | 600 | 110 | 18 | 14 | 160 | 370 |
| 100-200 ⁵⁾ | P03s/as | 150 | 100 | 155 | 635 | 500 | 20 | 8 | 290 | 280 | 130 | 47 | - | 540 | 440 | 160 | 245 | 140 | 32 | 80 | 35,3 | 10 | 58,5 | 30 | 90 | 500 | 110 | 18 | 14 | 130 | 370 |
| 100-250 | P04s/as | 150 | 100 | 150 | 680 | 530 | 20 | 12 | 290 | 305 | 130 | 52 | - | 580 | 480 | 160 | 270 | 140 | 42 | 110 | 45,1 | 12 | 52,5 | 33 | 90 | 540 | 110 | 18 | 14 | 160 | 370 |
| 100-315 | P04s/as | 150 | 100 | 150 | 680 | 530 | 22 | 12 | 325 | 360 | 130 | 52 | - | 640 | 540 | 160 | 285 | 140 | 42 | 110 | 45,1 | 12 | 52 | 33 | 90 | 600 | 110 | 18 | 14 | 160 | 370 |
| 150-250 ⁵⁾ | P04s/as | 200 | 150 | 170 | 700 | 530 | 20 | 12 | 385 | 360 | 150 | 52 | - | 690 | 590 | 160 | 310 | 140 | 42 | 110 | 45,1 | 12 | 72 | 33 | 110 | 650 | 110 | 18 | 14 | 160 | 370 |
| 150-315 | P06as | 200 | 150 | 170 | 877 | 707 | 25 | 12 | 410 | 360 | 150 | 60 | - | 690 | 590 | 200 | 305 | 180 | 60 ¹⁾ | 140 | 64,2 | 18 | 55 | 39 | 110 | 650 | 140 | 18 | 18 | 205 | 502 |
| 200-250 | P06as | 250 | 200 | ⁴⁾ | ⁴⁾ | 717 | 25 | 12 | ⁴⁾ | 360 | 150 | 60 | - | 690 | 590 | 200 | 320 | 180 | 60 ¹⁾ | 140 | 64,2 | 18 | 55 | 39 | 110 | 650 | 140 | 18 | 18 | 205 | 512 |
| 200-315 | P06s/as | 250 | 200 | 210 | 930 | 720 | 30 | 12 | 460 | 365 | 180 | 60 | - | 790 | 650 | 200 | 335 | 180 | 60 ¹⁾ | 140 | 64,2 | 18 | 65 | 39 | 130 | 740 | 140 | 22 | 18 | 205 | 515 |
| 200-316 | P06as | 250 | 200 | ⁴⁾ | ⁴⁾ | 710 | 30 | 12 | ⁴⁾ | 335 | 180 | 60 | - | 900 | 760 | 200 | 325 | 230 | 60 ¹⁾ | 140 | 64,2 | 18 | 65 | 39 | 130 | 850 | 140 | 22 | 18 | 205 | 505 |
| 200-400 | P06s/as | 250 | 200 | 190 | 910 | 720 | 30 | 12 | 510 | 365 | 180 | 60 | - | 900 | 760 | 200 | 340 | 180 | 60 ¹⁾ | 140 | 64,2 | 18 | 65 | 39 | 130 | 850 | 140 | 22 | 18 | 205 | 515 |
| 200-401 | P06s/as | 250 | 200 | 190 | 910 | 720 | 30 | 12 | 510 | 425 | 180 | 60 | - | 960 | 820 | 200 | 390 | 180 | 60 ¹⁾ | 140 | 64,2 | 18 | 65 | 39 | 130 | 910 | 140 | 22 | 18 | 205 | 515 |
| 200-501 | P06s/as | 250 | 200 | 200 | 906 | 706 | 30 | 12 | 560 | 425 | 180 | 60 | - | 1060 | 920 | 200 | 420 | 180 | 60 ¹⁾ | 140 | 64,2 | 18 | 65 | 39 | 130 | 1010 | 140 | 22 | 18 | 205 | 501 |
| 250-316 | P06as | 300 | 250 | ⁴⁾ | ⁴⁾ | 707 | 30 | 12 | ⁴⁾ | 425 | 210 | 60 | 505 | 955 | 795 | 200 | 400 | 25 | 60 ¹⁾ | 140 | 64,2 | 18 | 75 | 39 | 150 | 875 | 140 | 26 | 18 | 205 | 502 |
| 250-401 | P06s/as | 300 | 250 | 240 | 960 | 720 | 30 | 12 | 600 | 425 | 210 | 60 | - | 1160 | 1000 | 200 | 425 | 18 | 60 ¹⁾ | 140 | 64,2 | 18 | 75 | 39 | 150 | 1080 | 140 | 28 | 18 | 205 | 515 |
| 250-501 | P06s/as | 300 | 250 | 200 | 920 | 720 | 30 | 12 | 670 | 475 | 210 | 60 | - | 1200 | 1040 | 200 | 472 | 180 | 60 ¹⁾ | 140 | 64,2 | 18 | 75 | 39 | 150 | 1120 | 140 | 28 | 18 | 205 | 515 |
| 300-400 | P06s/as | 350 | 300 | ⁴⁾ | ⁴⁾ | 710 | 30 | 12 | ⁴⁾ | 500 | 310 | 60 | - | 1200 | 1020 | 200 | 460 | 250 | 60 ¹⁾ | 140 | 64,2 | 18 | 130 | 39 | 210 | 1120 | 140 | 28 | 20 | 205 | 505 |
| 300-500 | P06as | 350 | 300 | ⁴⁾ | ⁴⁾ | 715 | 30 | 12 | ⁴⁾ | 560 | 310 | 60 | - | 1380 | 1180 | 200 | 510 | 240 | 60 ¹⁾ | 140 | 64,2 | 18 | 130 | 39 | 210 | 1280 | 140 | 26 | 20 | 205 | 510 |

1) Ø d₁ n₆
2) Flanges to PN 100/ANSI 400: dimension given + 10 mm (not applicable to size 150-250)
3) Pumps with bearing brackets P06s/P06as are fitted with special bearing bracket P06af if inlet pressure > 50 bar; dimensions on request
4) Dimensions on request
5) Dimensions for PN 100 see table for PN 160 (page 9)

Dimensions

Flange version PN 160, DIN 2548



| Pump size | Bearing/bracket* | Pump dimensions | | | | | | | | | | | | | | Shaft end | | | | | Foot bolts | | | | | | | | | | | |
|-----------|------------------|-----------------|-----|-----|-----|------|-----|----|----|-----|-----|-----|----|-------|------|-----------|-----|-----|-----|----|------------|------|----|------|----|-----|------|-----|----|----|-----|-----|
| | | DN1 | DN2 | a | c | f | g1 | g2 | h2 | h3 | m1 | m3 | n | n1 | n3 | n5 | r | y | d1 | l | t | u | i1 | i2 | m2 | n2 | n4 | s1 | s2 | v | w | |
| 40-250 | P03s/as | 2) | 50 | 40 | 123 | 623 | 500 | 30 | 8 | 237 | 180 | 130 | 47 | 210 | 460 | 360 | 160 | 190 | 140 | 32 | 80 | 35.3 | 10 | 52.5 | 30 | 90 | 420 | 110 | 18 | 14 | 130 | 370 |
| 50-200 | P02as | 2) | 80 | 50 | 115 | 502 | 387 | 16 | 8 | 210 | 180 | 90 | 45 | 195 | 425 | 345 | 160 | 160 | 100 | 24 | 50 | 26.9 | 8 | 28.5 | 28 | 54 | 390 | 110 | 14 | 14 | 100 | 287 |
| 50-200 | P02as | 1) 6) | 80 | 50 | 115 | 504 | 389 | 16 | 8 | 230 | 180 | 90 | 45 | 207.5 | 450 | 370 | 160 | 175 | 100 | 24 | 50 | 26.9 | 8 | 28.5 | 28 | 54 | 415 | 110 | 14 | 14 | 100 | 289 |
| 50-400 | P04s/as | 1) 7) | 80 | 50 | 200 | 730 | 530 | 25 | 12 | 350 | 360 | 150 | 52 | 325 | 690 | 590 | 160 | 285 | 140 | 42 | 110 | 45.1 | 12 | 72 | 33 | 110 | 650 | 110 | 18 | 14 | 160 | 370 |
| 80-200 | P03s/as | 2) | 100 | 80 | 145 | 645 | 500 | 20 | 8 | 265 | 225 | 130 | 47 | 230 | 500 | 400 | 160 | 210 | 140 | 32 | 80 | 35.3 | 10 | 58.5 | 30 | 90 | 460 | 110 | 18 | 14 | 130 | 370 |
| 80-200 | P03s/as | 3) | 100 | 80 | 165 | 665 | 500 | 20 | 8 | 280 | 225 | 130 | 47 | 230 | 500 | 400 | 160 | 210 | 140 | 32 | 80 | 35.3 | 10 | 58.5 | 30 | 90 | 460 | 110 | 18 | 14 | 130 | 370 |
| 80-250 | P03s/as | 2) | 100 | 80 | 145 | 645 | 500 | 20 | 8 | 295 | 280 | 130 | 47 | 270 | 580 | 480 | 160 | 240 | 140 | 32 | 80 | 35.3 | 10 | 52.0 | 30 | 90 | 540 | 110 | 18 | 14 | 130 | 370 |
| 80-315 | P04s/as | 2) | 100 | 80 | 150 | 680 | 530 | 22 | 12 | 330 | 305 | 130 | 52 | 300 | 640 | 540 | 160 | 260 | 140 | 42 | 110 | 45.1 | 12 | 51 | 33 | 90 | 600 | 110 | 18 | 14 | 160 | 370 |
| 100-200 | P03s/as | 2) | 150 | 100 | 170 | 655 | 500 | 20 | 8 | 300 | 280 | 130 | 47 | 250 | 540 | 440 | 160 | 245 | 140 | 32 | 80 | 35.3 | 10 | 58.5 | 30 | 90 | 300 | 110 | 18 | 14 | 130 | 370 |
| 100-250 | P04s/as | 2) | 150 | 100 | 170 | 705 | 535 | 35 | 12 | 330 | 305 | 146 | 52 | 300 | 640 | 540 | 160 | 270 | 140 | 42 | 110 | 45.1 | 12 | 52.5 | 33 | 90 | 600 | 110 | 18 | 14 | 160 | 375 |
| 100-250 | P04s/as | 3) | 150 | 100 | 190 | 725 | 535 | 35 | 12 | 340 | 305 | 146 | 52 | 300 | 640 | 540 | 160 | 270 | 140 | 42 | 110 | 45.1 | 12 | 52.5 | 33 | 90 | 600 | 110 | 18 | 14 | 160 | 375 |
| 100-315 | P04s/as | 2) | 150 | 100 | 165 | 695 | 530 | 22 | 12 | 335 | 360 | 130 | 52 | 300 | 640 | 540 | 160 | 285 | 140 | 42 | 110 | 45.1 | 12 | 52 | 33 | 90 | 600 | 110 | 18 | 14 | 160 | 370 |
| 150-250 | P04s/as | 2) | 200 | 150 | 196 | 727 | 531 | 20 | 12 | 400 | 360 | 150 | 52 | 325 | 690 | 590 | 160 | 310 | 140 | 42 | 110 | 45.1 | 12 | 72 | 33 | 110 | 650 | 110 | 18 | 14 | 160 | 371 |
| 150-315 | P06at | 2) | 200 | 150 | 190 | 967 | 777 | 25 | 12 | 425 | 360 | 160 | 60 | 325 | 700 | 590 | 200 | 305 | 180 | 60 | 140 | 64.2 | 18 | 55 | 39 | 110 | 650 | 140 | 18 | 18 | 205 | 572 |
| 200-250 | P06at | 2) | 250 | 200 | 270 | 1062 | 792 | 25 | 12 | 450 | 360 | 150 | 60 | 325 | 690 | 590 | 200 | 320 | 180 | 60 | 140 | 64.2 | 18 | 55 | 39 | 110 | 650 | 140 | 18 | 18 | 205 | 587 |
| 200-315 | P06at | 2) | 250 | 200 | 235 | 1028 | 793 | 30 | 12 | 480 | 365 | 180 | 60 | 370 | 790 | 650 | 200 | 335 | 180 | 60 | 140 | 64.2 | 18 | 65 | 39 | 130 | 740 | 140 | 22 | 18 | 205 | 588 |
| 200-316 | P06at | 2) 3) | 250 | 200 | 280 | 1060 | 780 | 30 | 12 | 500 | 335 | 180 | 60 | 425 | 900 | 760 | 200 | 325 | 230 | 60 | 140 | 64.2 | 18 | 65 | 39 | 130 | 850 | 140 | 22 | 18 | 205 | 575 |
| 200-400 | P06at | 2) 3) | 250 | 200 | 220 | 1011 | 791 | 30 | 12 | 530 | 365 | 180 | 60 | 425 | 900 | 760 | 200 | 340 | 180 | 60 | 140 | 64.2 | 18 | 65 | 39 | 130 | 850 | 140 | 22 | 18 | 205 | 586 |
| 200-401 | P06at | 2) | 250 | 200 | 215 | 1006 | 791 | 30 | 12 | 530 | 425 | 180 | 60 | 455 | 960 | 820 | 200 | 390 | 180 | 60 | 140 | 64.2 | 18 | 65 | 39 | 130 | 910 | 140 | 22 | 18 | 205 | 586 |
| 200-501 | P06at | 2) | 250 | 200 | 230 | 1007 | 777 | 30 | 12 | 595 | 425 | 180 | 60 | 505 | 1060 | 920 | 200 | 420 | 180 | 60 | 140 | 64.2 | 18 | 65 | 39 | 130 | 1010 | 140 | 22 | 18 | 205 | 572 |
| 250-316 | P06at | 2) | 300 | 250 | 295 | 1079 | 784 | 30 | 12 | 600 | 425 | 210 | 60 | 505 | 955 | 795 | 200 | 400 | 250 | 60 | 140 | 64.2 | 18 | 75 | 39 | 150 | 875 | 140 | 26 | 18 | 205 | 579 |
| 250-401 | P06at | 2) | 300 | 250 | 261 | 1051 | 790 | 30 | 12 | 620 | 425 | 210 | 60 | 540 | 1160 | 1000 | 200 | 425 | 180 | 60 | 140 | 64.2 | 18 | 75 | 39 | 150 | 1080 | 140 | 28 | 18 | 205 | 585 |
| 250-501 | P06at | 2) | 300 | 250 | 221 | 1013 | 792 | 30 | 12 | 690 | 475 | 210 | 60 | 560 | 1200 | 1040 | 200 | 475 | 180 | 60 | 140 | 64.2 | 18 | 75 | 39 | 150 | 1120 | 140 | 28 | 20 | 205 | 587 |
| 250-501 | P06at | 3) | 300 | 250 | 230 | 1022 | 792 | 30 | 12 | 700 | 475 | 210 | 60 | 560 | 1200 | 1040 | 200 | 475 | 180 | 60 | 140 | 64.2 | 18 | 75 | 39 | 150 | 1120 | 140 | 28 | 20 | 205 | 587 |
| 300-400 | P06at | 2) 3) | 350 | 300 | 355 | 1135 | 780 | 30 | 12 | 680 | 500 | 310 | 60 | 560 | 1200 | 1020 | 200 | 460 | 250 | 60 | 140 | 64.2 | 18 | 130 | 39 | 210 | 1120 | 140 | 28 | 20 | 205 | 575 |
| 300-400 | P06at | 5) | 350 | 300 | 415 | 1195 | 780 | 30 | 12 | 735 | 500 | 310 | 60 | 560 | 1200 | 1020 | 200 | 460 | 250 | 60 | 140 | 64.2 | 18 | 130 | 39 | 210 | 1120 | 140 | 28 | 20 | 205 | 575 |
| 300-500 | P06at | 3) 4) | 350 | 300 | 350 | 1135 | 785 | 30 | 12 | 785 | 560 | 310 | 60 | 640 | 1360 | 1180 | 200 | 510 | 240 | 60 | 140 | 64.2 | 18 | 130 | 39 | 210 | 1280 | 140 | 26 | 20 | 205 | 580 |

1) PN 160 DIN 2548

2) PN 160 DIN 2548 / ASME 600

3) ASME 900

4) ASME 900 RJ

5) ASME 1500 RJ

6) Reinforced casing

7) PN 250 DIN 2549

 8) Ø d₁ n₆

Auxiliary c connections

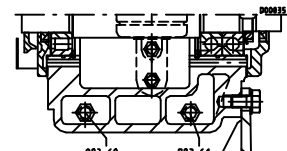
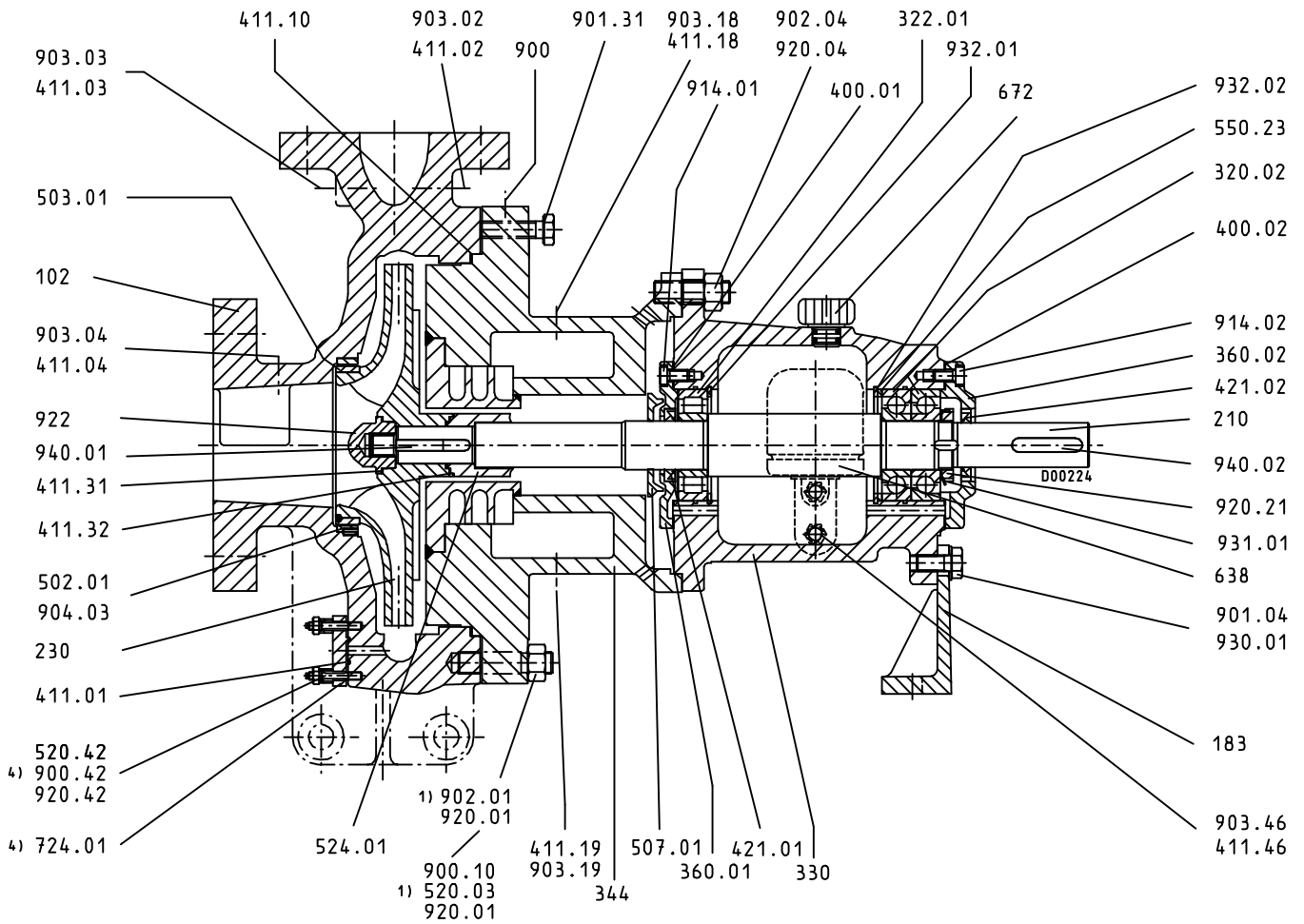
| Connection | Description |
|------------|---|
| 1 M | G 3/8 Pressure gauge |
| 3 M | G 3/8 Pressure vacuum gauge |
| 6 B 1) | G 3/4 Casing drain |
| 7 A.1/E.1 | G 1/2 Cooling, bearing bracket lantern IN/OUT |
| 7 A.2/E.2 | G 1/2 Cooling liquid IN/OUT |
| 8 A 2) | G 3/4 Cooling liquid drain |
| 12 E/A 3) | G 3/4 Circulation IN/OUT |
| 13 B | G 1/4 Oil drain |
| 13 D | Ø 20 Vent |
| 638 | G 1/4 Constant-level oiler |

1) For pump size 40-250 and 50-200: G 1/2; if p > 80 bar: flange DN 15/PN 160

2) Bearing bracket P04 and above: G 1

3) On bearing bracket P 02: G 1/2

General Assembly Drawing with List of Components



Coolable bearing bracket

When ordering spare parts please always specify the type series/pump size, works No. (stamped on the name plate and on the suction nozzle flange), motor No. (serial No.), year of construction, quantity required, part No., description, material, fluid handled, general assembly drawing No. and mode of dispatch.

| Part No. | Description | Scope of supply |
|-----------------|------------------------------|--|
| 102 | Volute casing | with joint rings 411.01/.10, casing wear ring 502.01, studs 902.01 ¹⁾ , grub screws 904.03, hex. nuts 920.01 and casing drain ⁴⁾ |
| 183 | Support foot | with hex. head bolt 901.04, spring washer 930.01 |
| 210 | Shaft | with keywayed nut 920.21, lockwasher 931.01, keys 940.01/.02 |
| 230 | Impeller | with joint ring 411.32, impeller wear ring 503.01 |
| 320.02 | Angular contact ball bearing | |
| 322.01 | Cylindrical roller bearing | |
| 330 | Bearing bracket | |
| 330 | Bearing bracket (complete) | with support foot 183, gaskets 400.01/.02, joint rings 411.46/.60 ²⁾ /.61 ²⁾ , bearing covers 360.01/.02, radial shaft seal rings 421.01 ³⁾ /.02 ³⁾ , supporting disc 550.23, constant-level oiler 638, vent plug 672, hex. head bolts 901.04, screwed plugs 903.46/.60 ²⁾ /.61 ²⁾ , hex. socket head cap screws 914.01/.02, circlips 932.01/.02, spring washer 930.01 |
| 344 | Bearing bracket lantern | with joint rings 411.10/.18/.19, studs 902.04, hex. nuts 920.04, hex. head bolts 901.31, screwed plugs 903.18/.19 |
| 360.01 | Bearing cover (pump side) | with gasket 400.01, hex. socket head cap screws 914.01 |
| 360.02 | Bearing cover (motor side) | with gasket 400.02, hex. socket head cap screws 914.02 |
| 411.77/.78 | V-ring | (for pumps with labyrinth seal at the bearing bracket) |
| 421.01/.02 | Radial shaft seal rings | (for pumps with radial shaft seal rings at the bearing bracket) |
| 502.01 | Casing wear ring | with grub screws 904.03 |
| 503.01 | Impeller wear ring | |
| 507.01 | Thrower | |
| 524.01 | Shaft protecting sleeve | (mechanical seal component) |
| 638 | Constant-level oiler | |
| 922 | Impeller nut | with joint ring 411.31 |

1) For higher pressures, stud 902.01 is replaced by reduced shank bolt 900.10 and expanding sleeve 520.03.

2) Only for coolable bearing bracket

3) Replaced by throwers 507.11/.12, O-ring 412.36 and V-rings 411.77/.78 if pump is fitted with labyrinth seal

4) For low-pressure design, blind flange 724.01, reduced shank bolt 900.42, expanding sleeve 520.42 and nut 920.42 are replaced by screwed plug 903.01.



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