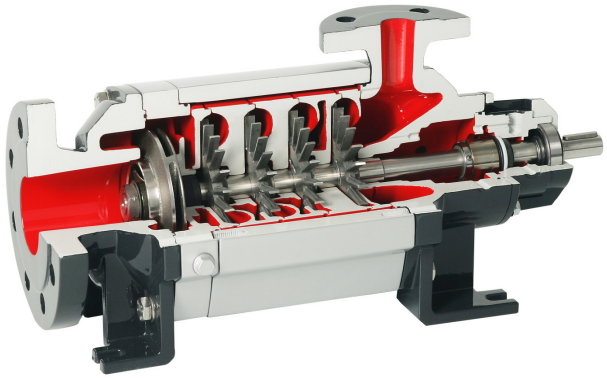
# SIHI*prime* - Side Channel Pumps

**Self-priming, segmental type with very low NPSH**

## CEH-X 1201 … 3608

### TECHICAL DATA

| | |
|---|---|
| Capacity: | from 0.4 up to 7.5 m³/h |
| Delivery head: | from 10 up to 322 m |
| Speed: | 1450 rpm (max. 1800 rpm) |
| Temperature: | max. 120 °C<br>max. 180 °C for high temperature design<br>(higher temperatures on request) |
| Casing pressure: | PN 40 |
| Shaft sealing: | mechanical seal |
| Flange connections: | DIN 2501 / PN 40 |
| Direction of rotation: | anti-clockwise<br>(when seen from the drive end) |
| Protection classification: | Ex II2 Gc T1-T5 |



### APPLICATION

The Sterling SIHI CEH-X pump is a self-priming side channel pump capable of handling gas along with the medium and operates at a low noise level.
The CEH-X pumps are used for problem-free pumping of clean liquids at unfavourable suction side conditions. They are also very suitable for positive suction heads below 0.5 m.

Different material possibilities with uniform dimensions and performance characteristics as well as the standard exchangeable components are used for the construction.
The CEH-X pumps are particularly recommendable for applications in the pharmaceutical, chemical or petrochemical market as well as in the plastic or oil industry. Because of its low NPSH and positive suction head the CEH-X is very suitable for the pumping of liquefied gases and liquids under vapour pressure like condensate, refrigerant, boiler feed or LPG.

The CEH-X pumps have a retaining stage, combined with the low NPSH stage, to avoid the dry running by controlling the liquid level in the pump. This design is especially developed for the handling of liquids under vapour pressure or when pumping from underground tanks. The CEH-X pumps are used for bottom off-loading of liquids under vapour pressure.

### DESIGN

The pumps of the SIHI*prime* range are side channel pumps having segmental type construction. The construction of the CEH-X pump is a centrifugal combined system. This combination pump is suited with a centrifugal stage in serial connection before the side channel stages to obtain a more favourable NPSH.

The program comprises, currently, 3 sizes (1200, 3100 and 3600) each with 1-8 stages. The existing material design allows an optimum rating for the respectively desired performance range and the pumping medium.

The applied hydraulic components are from our modular side channel system (interchangeability of parts).

### CONSTRUCTION

#### Casing pressure

Maximum 40 bar from -40 °C up to +120 °C. Maximum 32 bar from +120 °C up to +180 °C.
Pressure stages for temperature as per DIN EN 1333.
**Please observe**
Technical rules and safety regulations:
Casing pressure = inlet pressure + delivery head at minimum pump capacity.

#### Position of branches

Axial suction branch, discharge branch points radially upwards.

#### Flanges

Flanges in accordance with DIN EN 1092-2 / PN 40.
Flange design as per DIN 2512 with groove or drilled according to ANSI 150 or 300 lbs is basically possible.

#### Bearing

One grease lubricated, greased for life, ball bearing according to DIN 625 and one liquid surrounded sleeve bearing.

#### Rotation direction

Anti-clockwise, when looking from the drive end.

#### Shaft sealing

The shaft is sealed by a mechanical seal according to DIN EN 12756, with quench connection.
The shaft sealing is also available in a design suitable for heating or cooling of the mechanical seal and a double mechanical seal (back-to-back as well as tandem) design is possible on request.

# CEH-X

## Material design

| | | Material design | | |
|---|---|---|---|---|
| | | GS Cast Iron/ GL Cast Iron | | Stainless steel |
| Pos. | Components | TM | TN | 4B |
| 2350 | Vane wheel impeller | G-X 3 CrNiMoCuN 26 6 3 3 | CuZn40Al2 | G-X 3 CrNiMoCuN 26 6 3 3 |
| 1060 | Suction casing | EN-GJS-400-18-LT | | G-X5 CrNiMoNb 18 10 |
| 1070 | Discharge casing | | | |
| 1080 | Low NPSH stage | | | |
| 1510 | Shell casing | | | |
| 1090 | First suction intermediate | EN-GJL-250 | | |
| 1140 | Side channel intermediate | | | |
| 1141 | Last discharge intermediate | | | |
| 2310 | Centrifugal impeller | | | |
| 2100 | Shaft | X 20 Cr 13 | | X 5 CrNiMo 17 12 2 |
| 4410 | Mechanical seal casing | | | |
| 4420 | Cooling insert | | | |
| 3600 | Bearing cover | EN-GJS-400-18-LT | | |
| 0241 | Bearing bush | CY 10 C / Antimony Carbon* | | |

* Bearing bush in Antimony Carbon is only used in high temperature design

## Casing seal

The casing sealing is done by o-ring gaskets compatible with the handled medium.

## Drive

By electric motor, type of construction IM B3. According to the area of usage, we can supply motors of any kind of protection (EExe, EExd).

## General comments

Side Channel pumps with the same hydraulic construction are manufactured in series as:
**AOHA** Low duty pump with oval flanges, PN 10
**AKH-X** Medium duty pump, PN 25
**CEBA** Vertical pump, PN 25 with magnetic coupling
**AEH-X** High duty pump, PN 40

**CEH pumps are available in magnetic coupling design.**

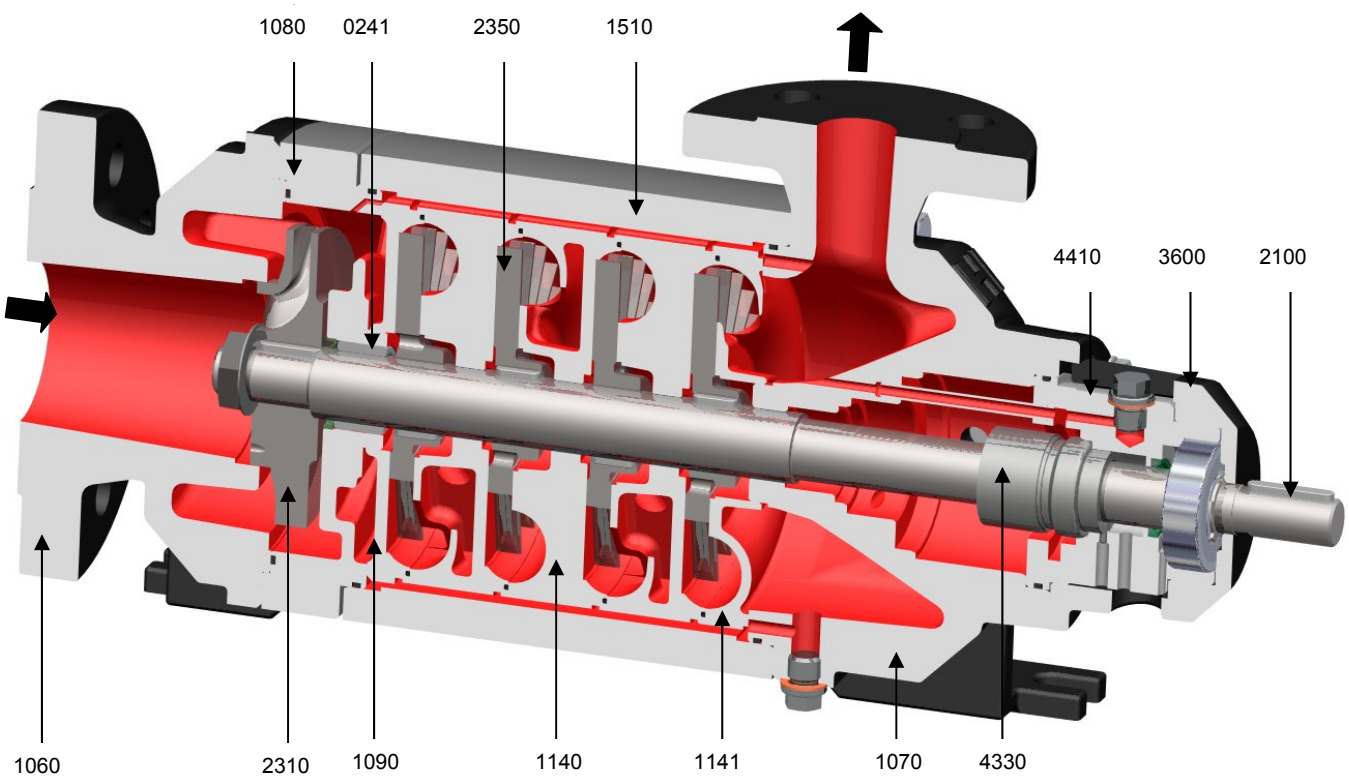
**Note:** For hydraulic sizes from 4101 to 6108 please see catalogue **CEH PIII/11** (133.51301.58.01 E).

Technical documents about these pumps will be readily supplied on request

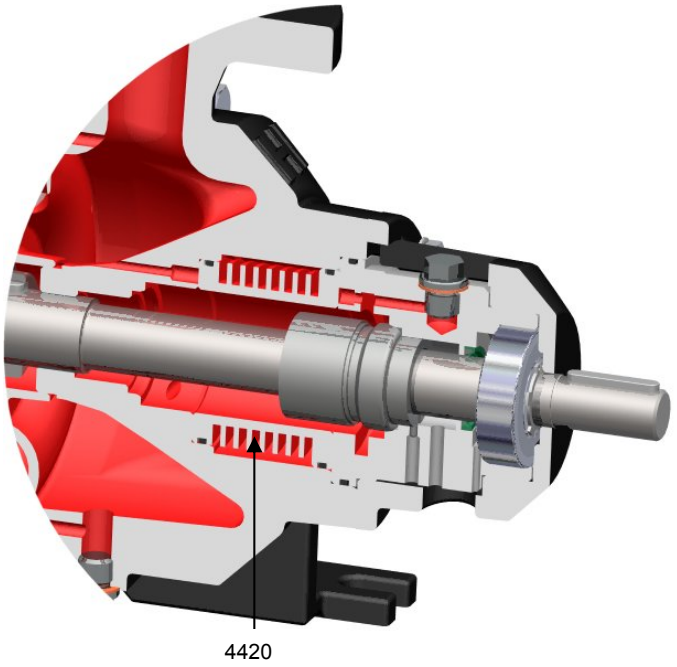
## Sensor for Condition Monitoring

The **SIHI*detect*** sensor is the ideal solution for **vibration velocity** measuring and for pump **condition monitoring** for example to detect bearing wear, unbalance, misalignment, unacceptable pipeline forces, cavitation, etc. This sensor is suitable for all liquid and vacuum pumps and the main features are:
- Simple to connect
- Universal use
- Visual check via LED display
- Easy Installation
- Also available as non Ex version

## Sectional drawing and parts list




| Pos. | Components |
|---|---|
| 0241 | Bearing bush |
| 1060 | Suction casing |
| 1070 | Discharge casing |
| 1080 | Low NPSH stage |
| 1090 | First suction intermediate |
| 1140 | Side channel intermediate |
| 1141 | Last discharge intermediate |
| 1510 | Shell casing |
| 2100 | Shaft |
| 2310 | Centrifugal impeller |
| 2350 | Vane wheel impeller |
| 3600 | Bearing cover |
| 4330 | Mechanical seal |
| 4410 | Mechanical seal casing |
| 4420 | Cooling insert |



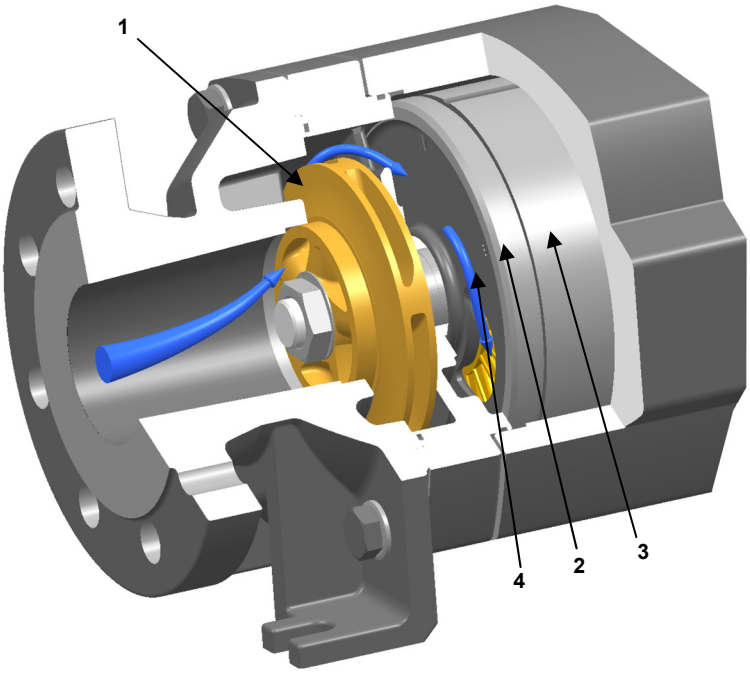
# CEH-X

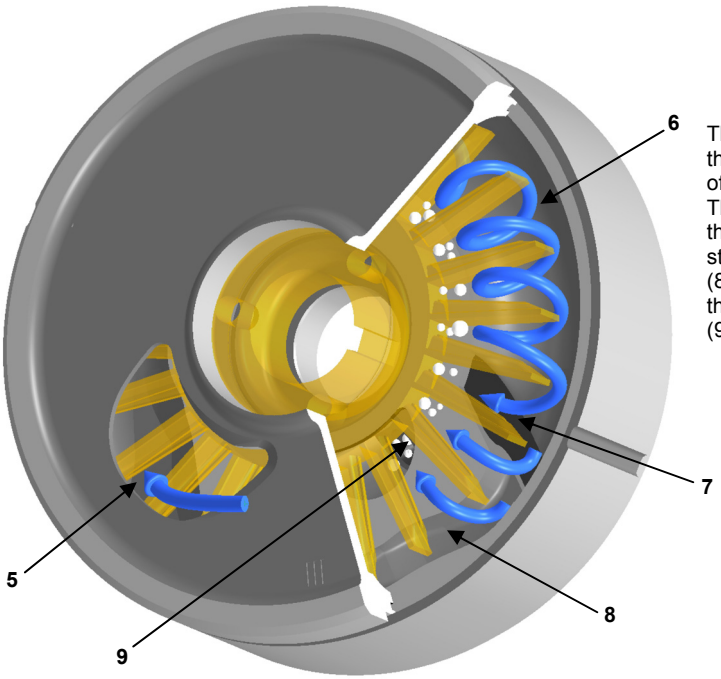
## Operating principle

The CEH-X pump is a combined system side channel pump. It is suited with a low NPSH centrifugal impeller (1) placed before the side channel stages. This NPSH inducer stage delivers enough pressure to overcome the entrance pressure loss of the first side channel stage or the required NPSH.

A side channel stage consists of:

- A suction intermediate (2),
- A discharge intermediate including the side channel (3),
- A vane wheel impeller located between the 2 intermediates (4).




The fluid entrance goes through the suction hole (5). The turning of the vane wheel impeller creates an under pressure at the beginning of the side channel and the liquid (with or without gas) is drawn in. The pressure generating is obtained by the repetitive re-entering of the liquid in the side channel (6). The liquid goes then to the next stage through the discharge hole (7). The air displacement channel (8) provokes a positive displacement effect so the gas remaining at the root of the vane wheel impeller is forced out through the gas slot (9).

A side channel pump can de-aerate and degas the suction line by itself and is thus very suitable for suction lift operation. A side channel pump can handle large quantities of (entrained) gas. Mixtures up to a gas share of 50% are possible. The ability for self-priming and the handling of large amounts of (entrained) gas will guarantee continuous operation even in case of evaporation and therefore contribute to a higher level of safety in industrial processes.

To avoid cavitation the distance between the liquid level and the entrance at the suction side of the pump is restricted. This distance is related to the NPSH or Net Positive Suction Head. The NPSH for CEH-X pumps is very low due to its special construction. The axial and large diameter entrance leads to less flow disturbance and lower friction losses. Together with the low NPSH of the centrifugal impeller the CEH-X can handle a positive suction head of less than 0.5 m.
This makes the CEH-X very suitable for pumping liquids near their boiling point at reasonable economic expenses and the low NPSH guarantees also full output capacity because of operation without cavitation

## Performance range

### General conditions

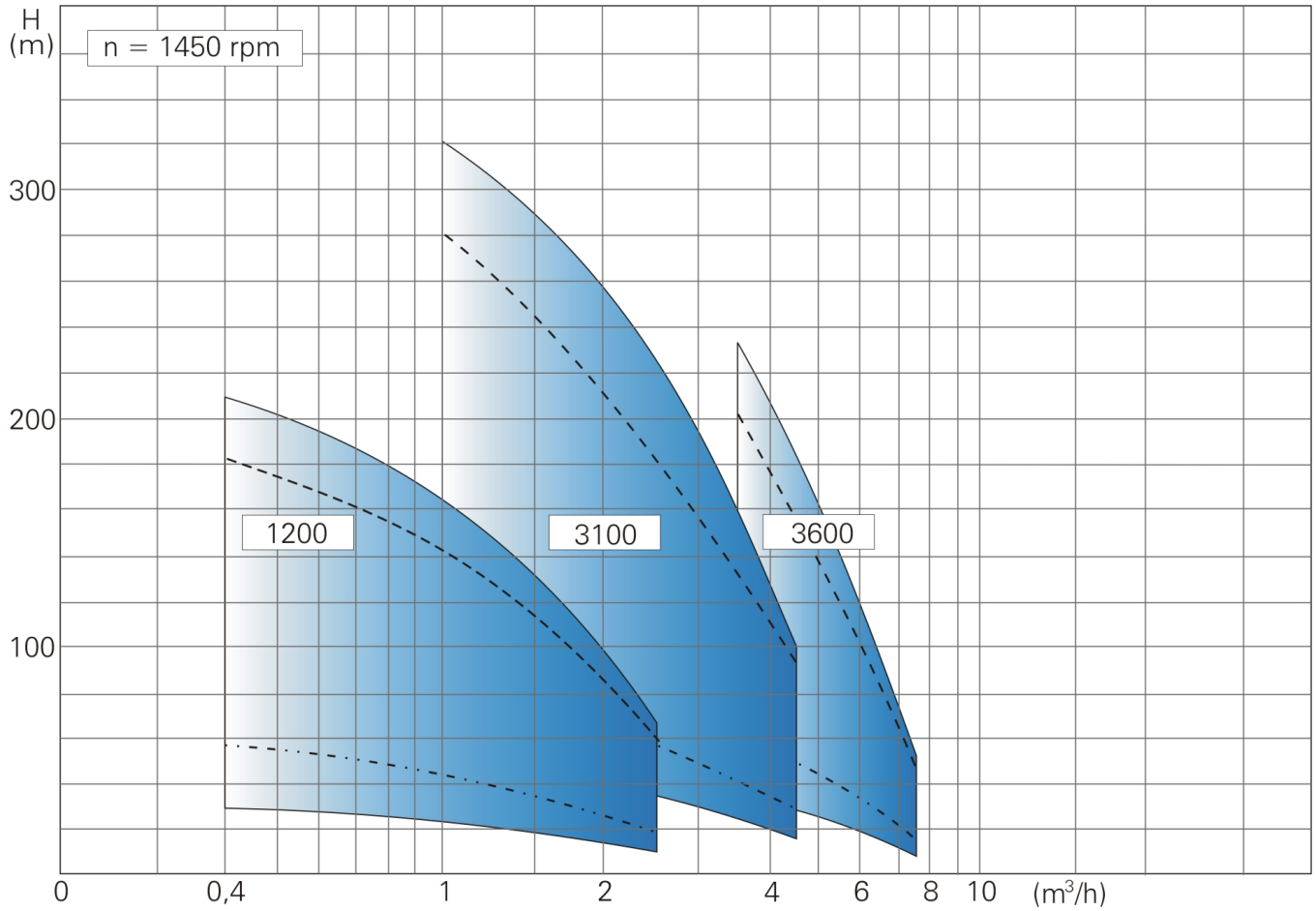
| | |
|---|---|
| Liquid: | Water |
| Density: | 1 kg/dm$^3$ |
| Viscosity: | 1 cSt |
| Temperature: | 20 °C |
| Atmospheric pressure: | 1013 mbar |

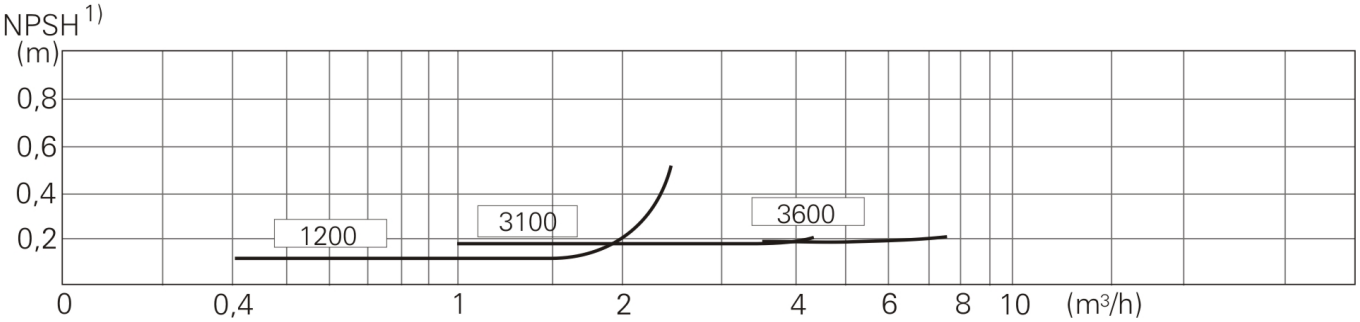
### Characteristic tolerances

The Side Channel pumps are not submitted to any normalized test tolerances. Here under are our acceptance values:
Capacity ± 9% - Delivery head ± 7% - Power + 10%.

### Measuring standard

According to ISO 5198.



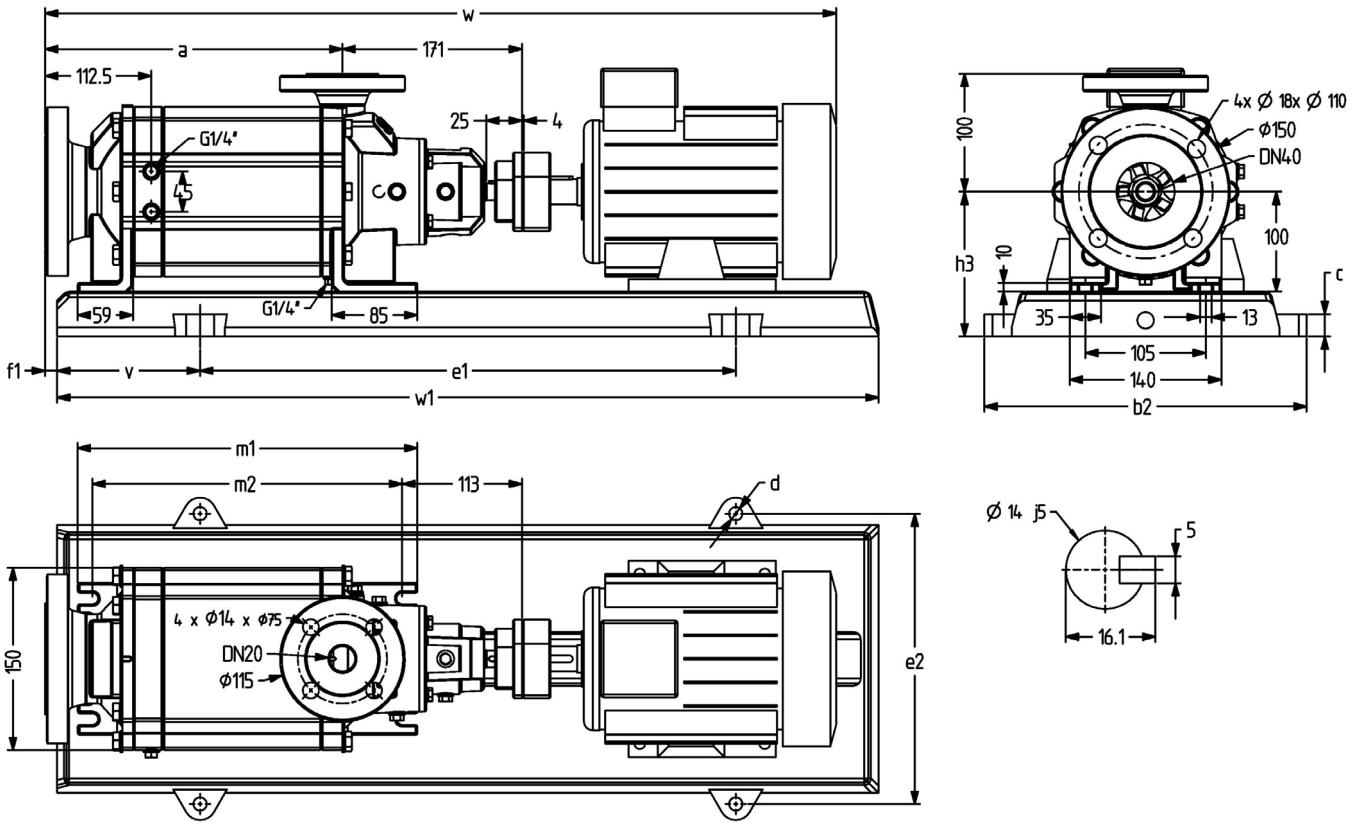




Note: [1)] When using a liquid containing gas, a safety margin has to be added.

# CEH-X

## Dimension chart and pump set drawing

### CEH-X 1201 … 1208



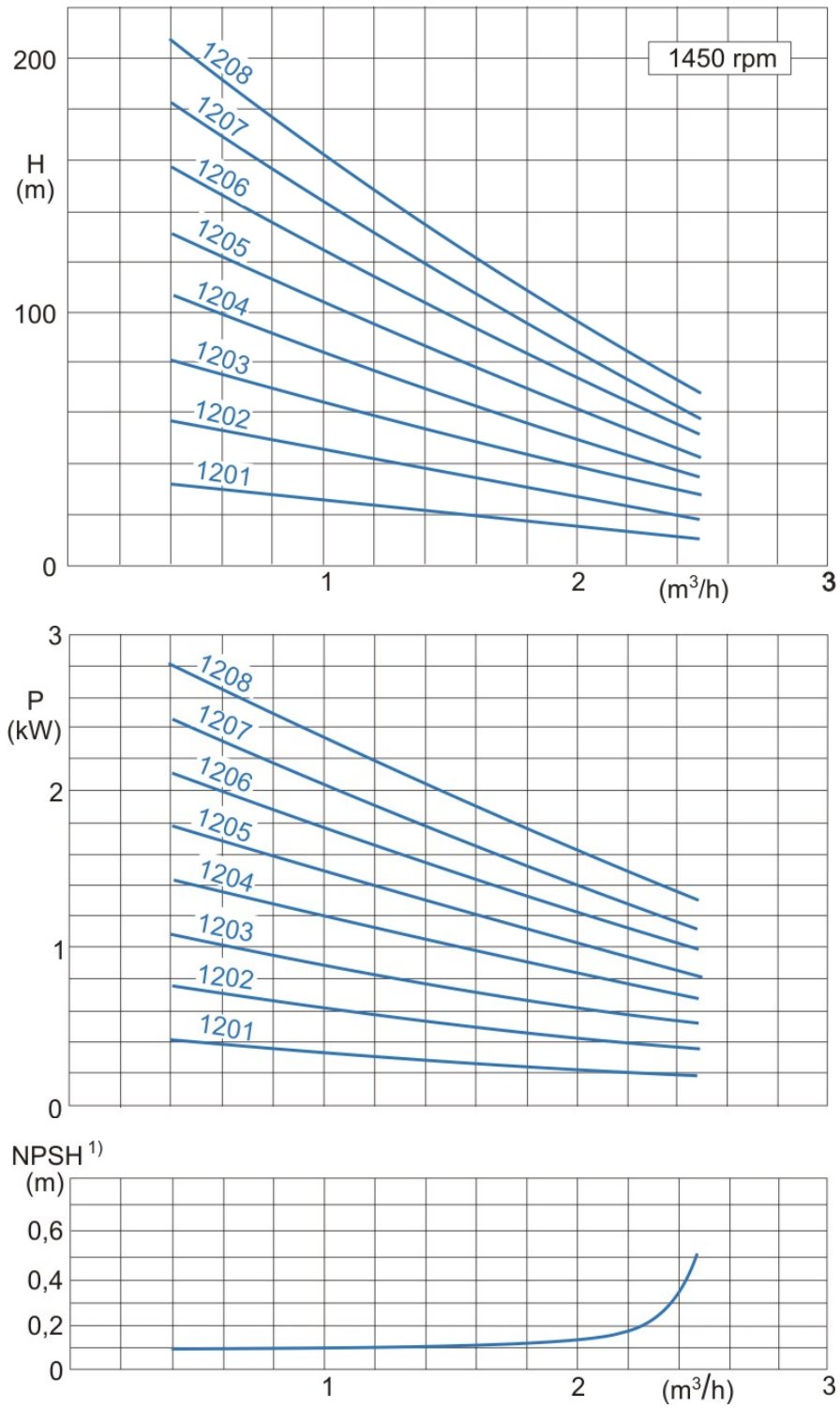

| Pump size | Motor | | | Base plate | Coupling | | Weight | | a | b2 | c | d | e1 | e2 | v | f1 | h3 | m1 | m2 | w[3] | w1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | kW | kW[1] | size | | B | BDS[2] | Pump | set | | | | | | | | | | | | | |
| 1201 | 0,37 | 0,37 | 71 | P007 | 68 | 76 | 18 | 39 | 195 | 317 | 20 | 15 | 350 | 285 | 110 | -9 | 135 | 238 | 204 | 609 | 570 |
| | 0,55 | 0,55 | 80 | P008 | | | | 45 | | 297 | | | 400 | 265 | 120 | | 140 | | | 643 | 640 |
| 1202 | 0,55 | 0,55 | 80 | P008 | 68 | 76 | 20 | 47 | 229 | 297 | 20 | 15 | 400 | 265 | 120 | -9 | 140 | 272 | 238 | 677 | 640 |
| | 0,75 | 0,75 | 80 | | | | | 48 | | | | | | | | | | | | | |
| | 1,1 | 1 | 90S | P241 | | | | 56 | | 330 | 25 | 19 | 480 | 290 | 125 | | 165 | | | 735 | 730 |
| 1203 | 0,75 | 0,75 | 80 | P210 | 68 | 76 | 22 | 52 | 263 | 300 | 25 | 19 | 420 | 260 | 115 | -9 | 165 | 306 | 272 | 711 | 650 |
| | 1,1 | 1 | 90S | P241 | | | | 58 | | 330 | | | 480 | 290 | 125 | | | | | 769 | 730 |
| | 1,5 | 1,35 | 90L | | | | | 62 | | | | | | | | | | | | | |
| 1204 | 1,1 | 1 | 90S | P241 | 68 | 76 | 24 | 60 | 297 | 330 | 25 | 19 | 480 | 290 | 125 | -9 | 165 | 340 | 306 | 803 | 730 |
| | 1,5 | 1,35 | 90L | | | | | 64 | | | | | | | | | | | | | |
| | 2,2 | 2 | 100L | P272 | 80 | 88 | | 75 | | 360 | | | 540 | 320 | 140 | | | | | 844 | 820 |
| 1205 | 1,1 | 1 | 90S | P272 | 68 | 76 | 26 | 66 | 331 | 360 | 25 | 19 | 540 | 320 | 140 | -9 | 165 | 374 | 340 | 837 | 820 |
| | 1,5 | 1,35 | 90L | | | | | 70 | | | | | | | | | | | | | |
| | 2,2 | 2 | 100L | | 80 | 88 | | 77 | | | | | | | | | | | | 878 | |
| 1206 | 1,5 | 1,35 | 90L | P272 | 68 | 76 | 28 | 72 | 365 | 360 | 25 | 19 | 540 | 320 | 140 | -9 | 165 | 408 | 374 | 871 | 820 |
| | 2,2 | 2 | 100L | P015 | 80 | 88 | | 84 | | 361 | | 15 | 600 | 325 | 160 | | 150 | | | 912 | 920 |
| | 3 | 2,5 | 100L | | | | | 85 | | | | | | | | | | | | 912 | |
| 1207 | 1,5 | 1,35 | 90L | P015 | 68 | 76 | 30 | 74 | 399 | 361 | 25 | 15 | 600 | 325 | 160 | -9 | 150 | 442 | 408 | 905 | 920 |
| | 2,2 | 2 | 100L | | 80 | 88 | | 86 | | | | | | | | | | | | 946 | |
| | 3 | 2,5 | 100L | | | | | 87 | | | | | | | | | | | | | |
| 1208 | 2,2 | 2 | 100L | P015 | 80 | 88 | 32 | 88 | 433 | 361 | 25 | 15 | 600 | 325 | 160 | -9 | 150 | 476 | 442 | 980 | 920 |
| | 3 | 2,5 | 100L | | | | | 89 | | | | | | | | | | | | | |

The weight of the pump will be approximately 6% higher when using stainless steel.

**General:** Values are valid for water ρ = 1 kg/dm$^3$ and υ = 1 cSt.
**Design tolerances:** Capacity± 9% - Delivery head ± 7% - Power + 10%.
**Notes:** [1] For EExe II T3 motors.
[2] For every pump set in ATEX area.
[3] Dimensions are depending on the used motor trade mark.

**Performance curves**

**CEH-X 1201 … 1208**

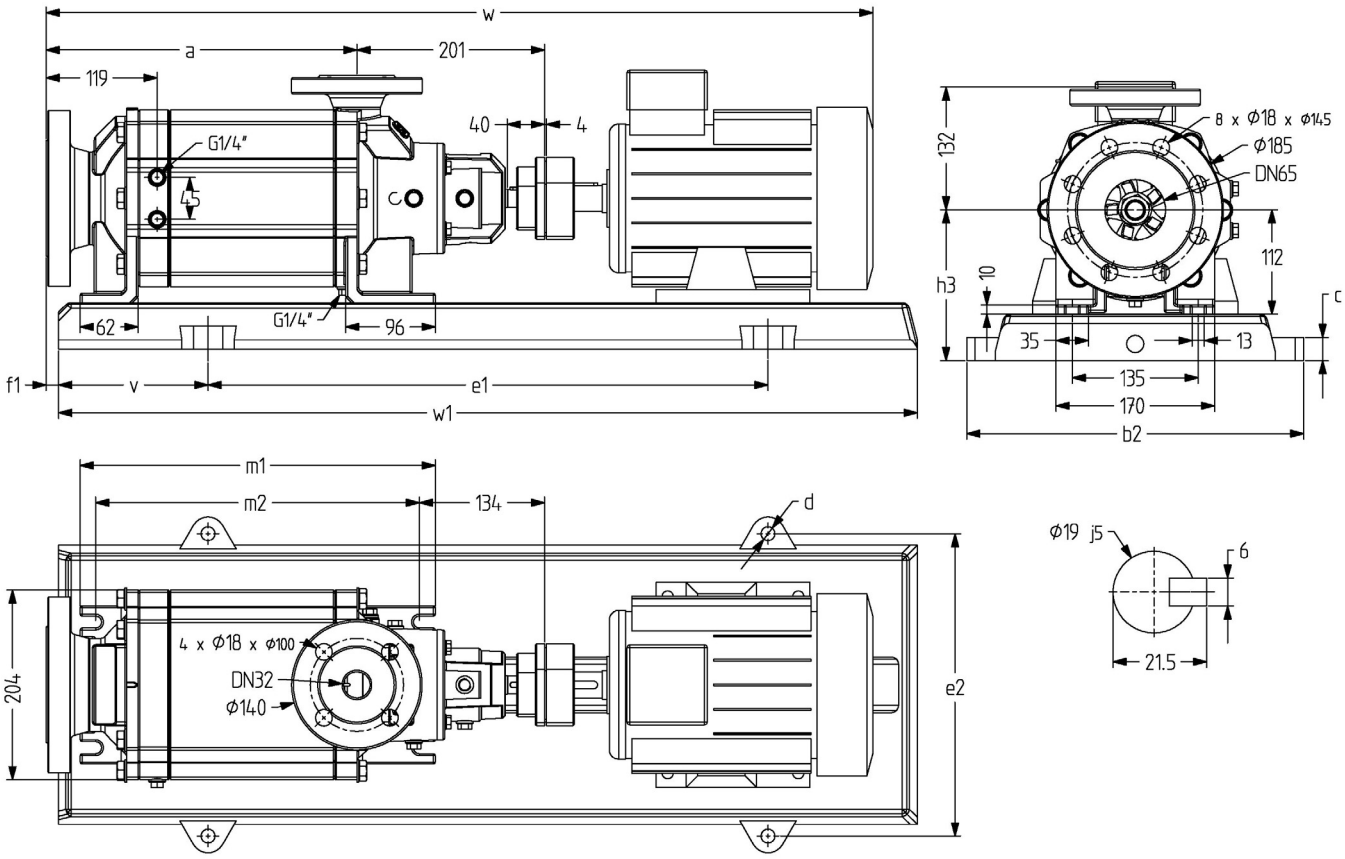



Note: [1)] An additional safety head must be added when handling a liquid containing gas.

# CEH-X

## Dimension chart and pump set drawing

### CEH-X 3101 … 3108



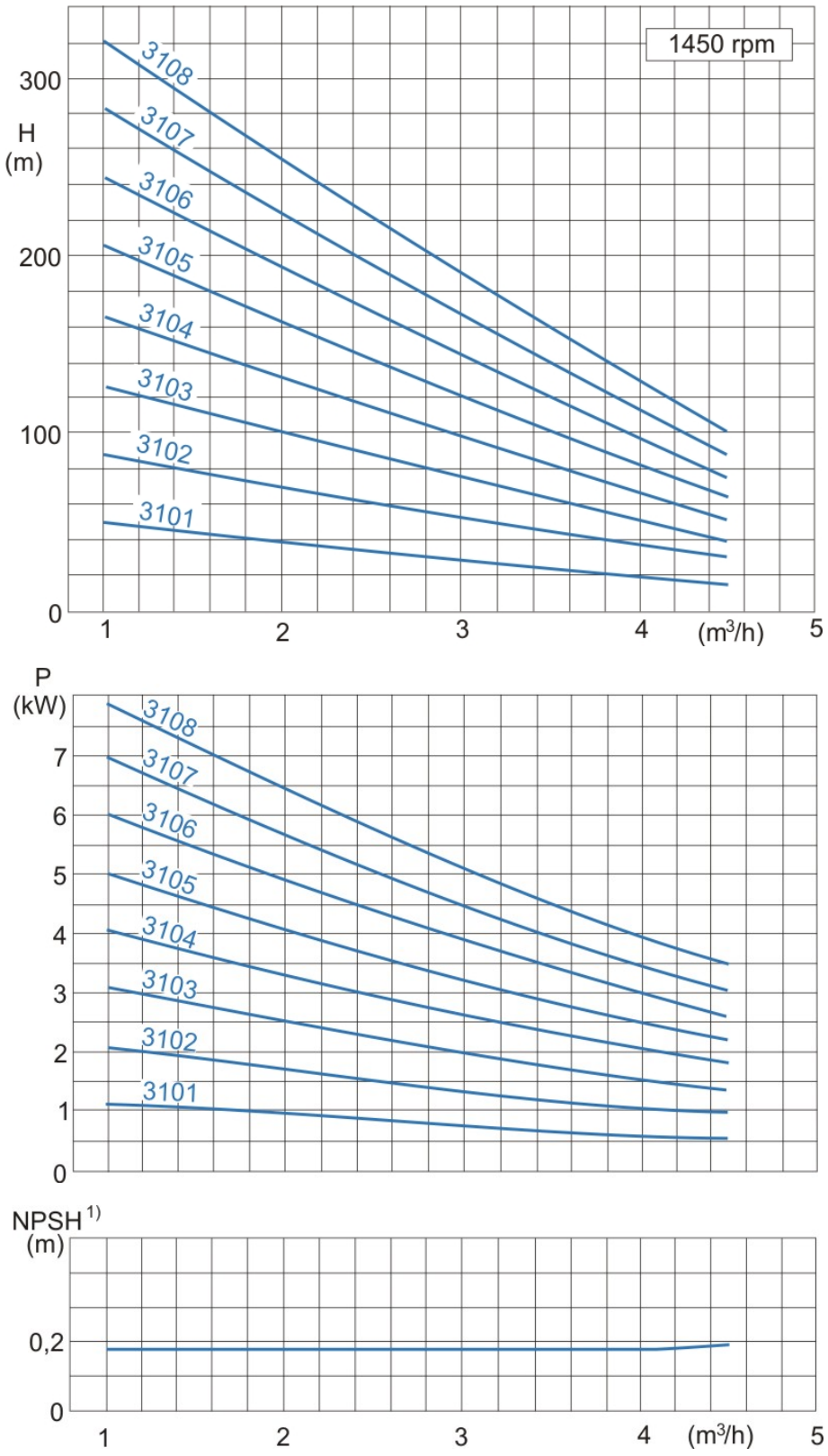

| Pump size | Motor kW | Motor kW[1)] | Motor size | Base plate | Coupling B | Coupling BDS[2)] | Weight Pump | Weight set | a | b2 | c | d | e1 | e2 | v | f1 | h3 | m1 | m2 | w[3)] | w1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3101 | 0,75 | 0,75 | 80 | P008 | 68 | 76 | 31 | 60 | 213 | 297 | 20 | 15 | 400 | 265 | 120 | -13 | 152 | 261 | 227 | 691 | 640 |
| | 1,1 | 1,1 | 90S | P241 | | | | 67 | | 330 | 25 | 19 | 480 | 290 | 125 | | 177 | | | 749 | 730 |
| 3102 | 1,1 | 1 | 90S | P241 | 68 | 76 | 34 | 72 | 253 | 330 | 25 | 19 | 480 | 290 | 125 | -13 | 177 | 301 | 267 | 789 | 730 |
| | 1,5 | 1,35 | 90L | | | | | 74 | | | | | | | | | | | | | |
| | 2,2 | 2 | 100L | P272 | 80 | 88 | | 81 | | 360 | | | 540 | 320 | 140 | | | | | 830 | 820 |
| 3103 | 2,2 | 2 | 100L | P272 | 80 | 88 | 38 | 89 | 293 | 360 | 25 | 19 | 540 | 320 | 140 | -13 | 177 | 341 | 307 | 870 | 820 |
| | 3 | 2,5 | 100L | | | | | 90 | | | | | | | | | | | | | |
| 3104 | 2,2 | 2 | 100L | P272 | 80 | 88 | 42 | 93 | 333 | 360 | 25 | 19 | 540 | 320 | 140 | -13 | 177 | 381 | 347 | 910 | 820 |
| | 3 | 2,5 | 100L | | | | | 94 | | | | | | | | | | | | | |
| | 4 | 3,6 | 112M | P015 | | | | 117 | | 361 | | 15 | 600 | 325 | 160 | | 162 | | | 931 | 920 |
| 3105 | 3 | 2,5 | 100L | P015 | 80 | 88 | 45 | 102 | 373 | 361 | 25 | 15 | 600 | 325 | 160 | -13 | 162 | 421 | 387 | 950 | 920 |
| | 4 | 3,6 | 112M | | | | | 120 | | | | | | | | | | | | 971 | |
| | 5,5 | 5 | 132S | P017 | 95 | 103 | | 158 | | | | | 700 | | 200 | | 192 | | | 1047 | 1100 |
| 3106 | 4 | 3,6 | 112M | P015 | 80 | 88 | 48 | 123 | 413 | 361 | 25 | 15 | 600 | 325 | 160 | -13 | 162 | 461 | 427 | 1011 | 920 |
| | 5,5 | 5 | 132S | P017 | 95 | 103 | | 161 | | | | | 700 | | 200 | | 192 | | | 1087 | 1100 |
| | 7,5 | 6,8 | 132M | | | | | 171 | | | | | | | | | | | | 1113 | |
| 3107 | 4 | 3,6 | 112M | P017 | 80 | 88 | 52 | 143 | 453 | 361 | 25 | 15 | 700 | 325 | 200 | -13 | 172 | 501 | 467 | 1051 | 1100 |
| | 5,5 | 5 | 132S | | 95 | 103 | | 165 | | | | | | | | | 192 | | | 1127 | |
| | 7,5 | 6,8 | 132M | | | | | 205 | | | | | | | | | | | | 1153 | |
| 3108 | 5,5 | 5 | 132S | P017 | 95 | 103 | 55 | 198 | 493 | 361 | 25 | 15 | 700 | 325 | 200 | -13 | 192 | 541 | 507 | 1167 | 1100 |
| | 7,5 | 6,8 | 132M | | | | | 208 | | | | | | | | | | | | 1193 | |
| | 11 | 10 | 160M | P436 | | | | 253 | | 540 | 30 | 24 | 840 | 490 | 215 | | 240 | | | 1285 | 1270 |

The weight of the pump will be approximately 6% higher when using stainless steel.

**General:** Values are valid for water ρ = 1 kg/dm$^3$ and υ = 1 cSt.
**Design tolerances:** Capacity± 9% - Delivery head ± 7% - Power + 10%.
**Notes:** [1)] For EExe II T3 motors.
[2)] For every pump set in ATEX area.
[3)] Dimensions are depending on the used motor trade mark.

**Performance curves**

**CEH-X 3101 … 3108**

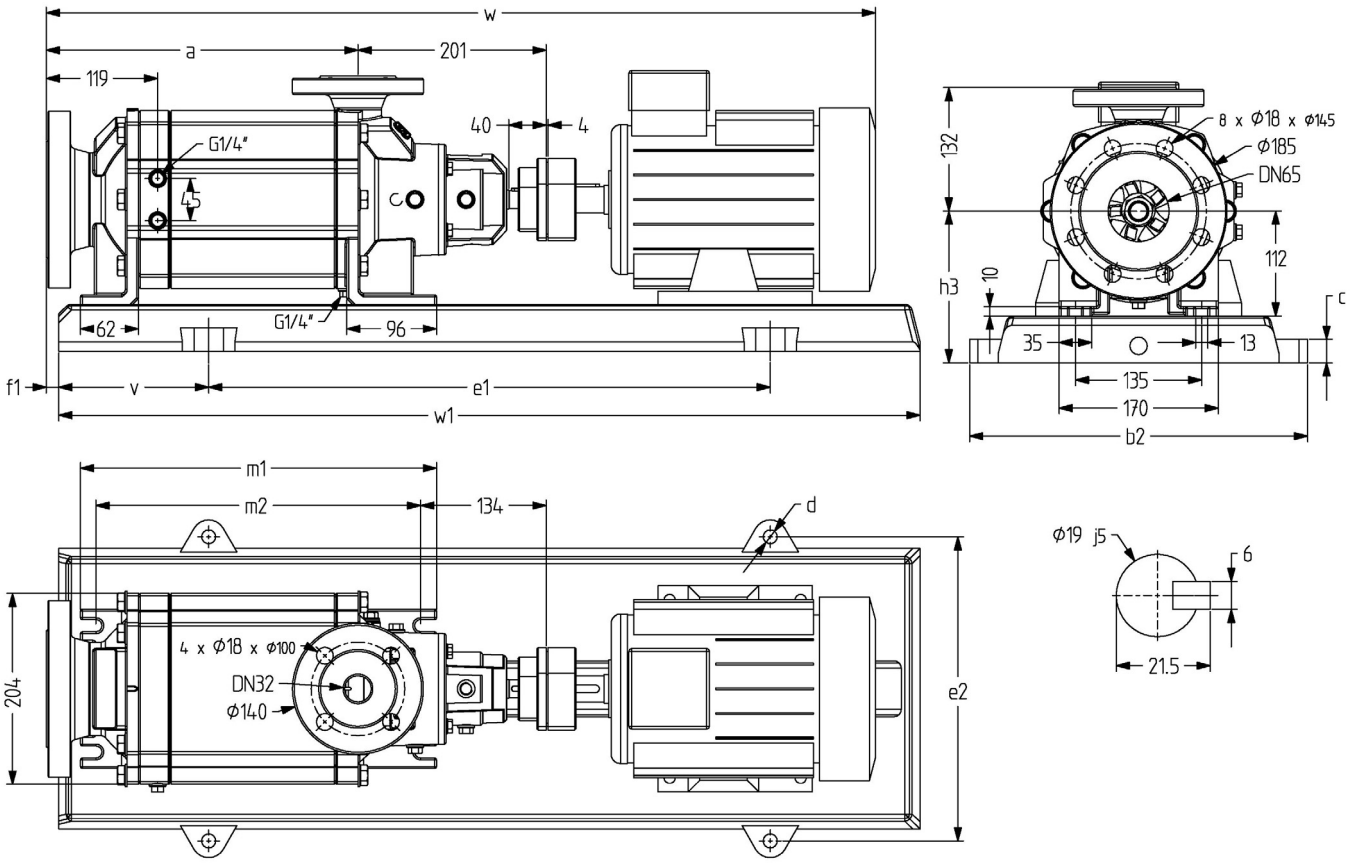



Note: [1] A safety margin has to be added when using a liquid containing gas.

# CEH-X

## Dimension chart and pump set drawing

### CEH-X 3601 … 3608




| Pump size | Motor kW | Motor kW[1)] | Motor size | Base plate | Coupling B | Coupling BDS[2)] | Weight Pump | Weight set | a | b2 | c | d | e1 | e2 | v | f1 | h3 | m1 | m2 | w[3)] | w1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3601 | 0,75 | 0,75 | 80 | P008 | 68 | 76 | 31 | 55 | 213 | 297 | 20 | 15 | 400 | 265 | 120 | -13 | 152 | 261 | 227 | 691 | 640 |
| | 1,1 | 1,1 | 90S | P241 | | | | 67 | | 330 | 25 | 19 | 480 | 290 | 125 | | 177 | | | 749 | 730 |
| | 1,5 | 1,5 | 90L | | | | | 74 | | | | | | | | | | | | | |
| 3602 | 1,5 | 1,35 | 90L | P241 | 68 | 76 | 34 | 74 | 253 | 330 | 25 | 19 | 480 | 290 | 125 | -13 | 177 | 301 | 267 | 789 | 730 |
| | 2,2 | 2 | 100L | P272 | 80 | 88 | | 89 | | 360 | | | 540 | 320 | 140 | | | | | 830 | 820 |
| 3603 | 2,2 | 2 | 100L | P272 | 80 | 88 | 38 | 89 | 293 | 360 | 25 | 19 | 540 | 320 | 140 | -13 | 177 | 341 | 307 | 870 | 820 |
| | 3 | 2,5 | | | | | | 101 | | | | | | | | | | | | | |
| | 4 | 3,6 | 112M | | | | | 119 | | | | | | | | | | | | 891 | |
| 3604 | 3 | 2,5 | 100L | P272 | 80 | 88 | 42 | 105 | 333 | 360 | 25 | 19 | 540 | 320 | 140 | -13 | 177 | 381 | 347 | 910 | 820 |
| | 4 | 3,6 | 112M | P015 | | | | 117 | | 361 | | 15 | 600 | 325 | 160 | | 162 | | | 931 | 920 |
| | 5,5 | 5 | 132S | | 95 | 103 | | 152 | | | | | | | | | 182 | | | 1007 | |
| 3605 | 3 | 2,5 | 100L | P015 | 80 | 88 | 45 | 102 | 373 | 361 | 25 | 15 | 600 | 325 | 160 | -13 | 162 | 421 | 387 | 950 | 920 |
| | 4 | 3,6 | 112M | | | | | 120 | | | | | | | | | | | | 971 | |
| | 5,5 | 5 | 132S | P017 | 95 | 103 | | 171 | | | | | 700 | | 200 | | 192 | | | 1047 | 1100 |
| 3606 | 4 | 3,6 | 112M | P015 | 80 | 88 | 48 | 123 | 413 | 361 | 25 | 15 | 600 | 325 | 160 | -13 | 162 | 461 | 427 | 1011 | 920 |
| | 5,5 | 5 | 132S | P017 | 95 | 103 | | 161 | | | | | 700 | | 200 | | 192 | | | 1087 | 1100 |
| | 7,5 | 6,8 | 132M | | | | | 171 | | | | | | | | | | | | 1113 | |
| 3607 | 5,5 | 5 | 132S | P017 | 95 | 103 | 52 | 165 | 453 | 361 | 25 | 15 | 700 | 325 | 200 | -13 | 192 | 501 | 467 | 1127 | 1100 |
| | 7,5 | 6,8 | 132M | | | | | 168 | | | | | | | | | | | | 1153 | |
| 3608 | 5,5 | 5 | 132S | P017 | 95 | 103 | 55 | 161 | 493 | 361 | 25 | 15 | 700 | 325 | 200 | -13 | 192 | 541 | 507 | 1167 | 1100 |
| | 7,5 | 6,8 | 132M | | | | | 171 | | | | | | | | | | | | 1193 | |
| | 11 | 10 | 160M | P436 | | | | 254 | | 540 | 30 | 24 | 840 | 490 | 215 | | 240 | | | 1285 | 1270 |

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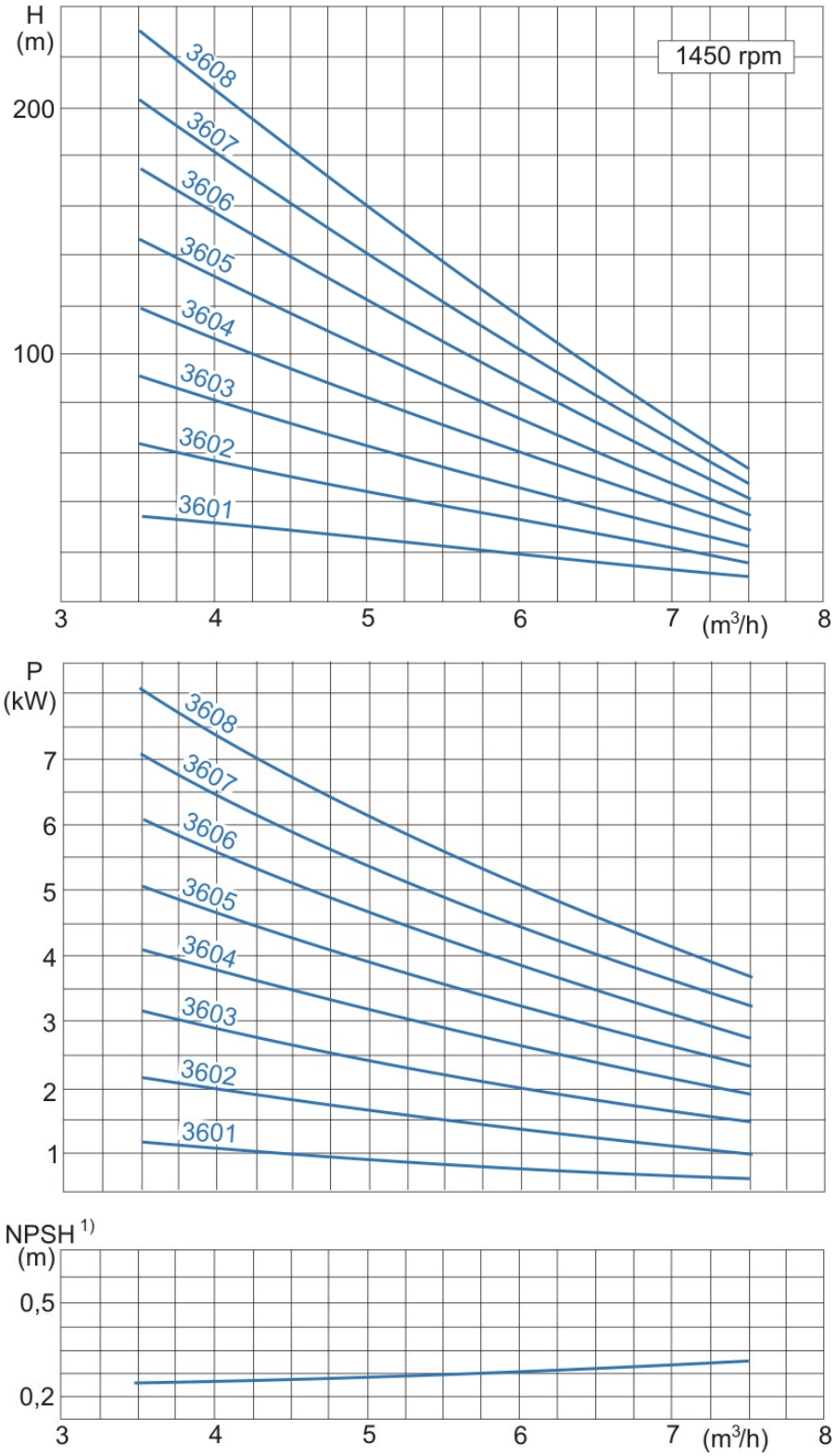
**Performance curves**

**CEH-X 3601 … 3608**

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# CEH-X

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