



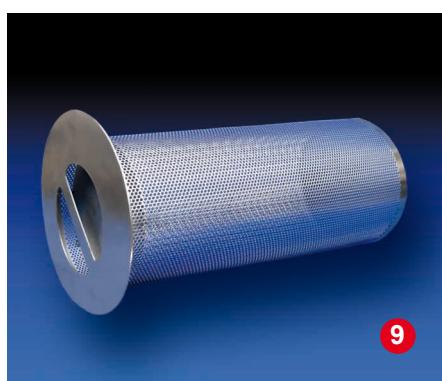
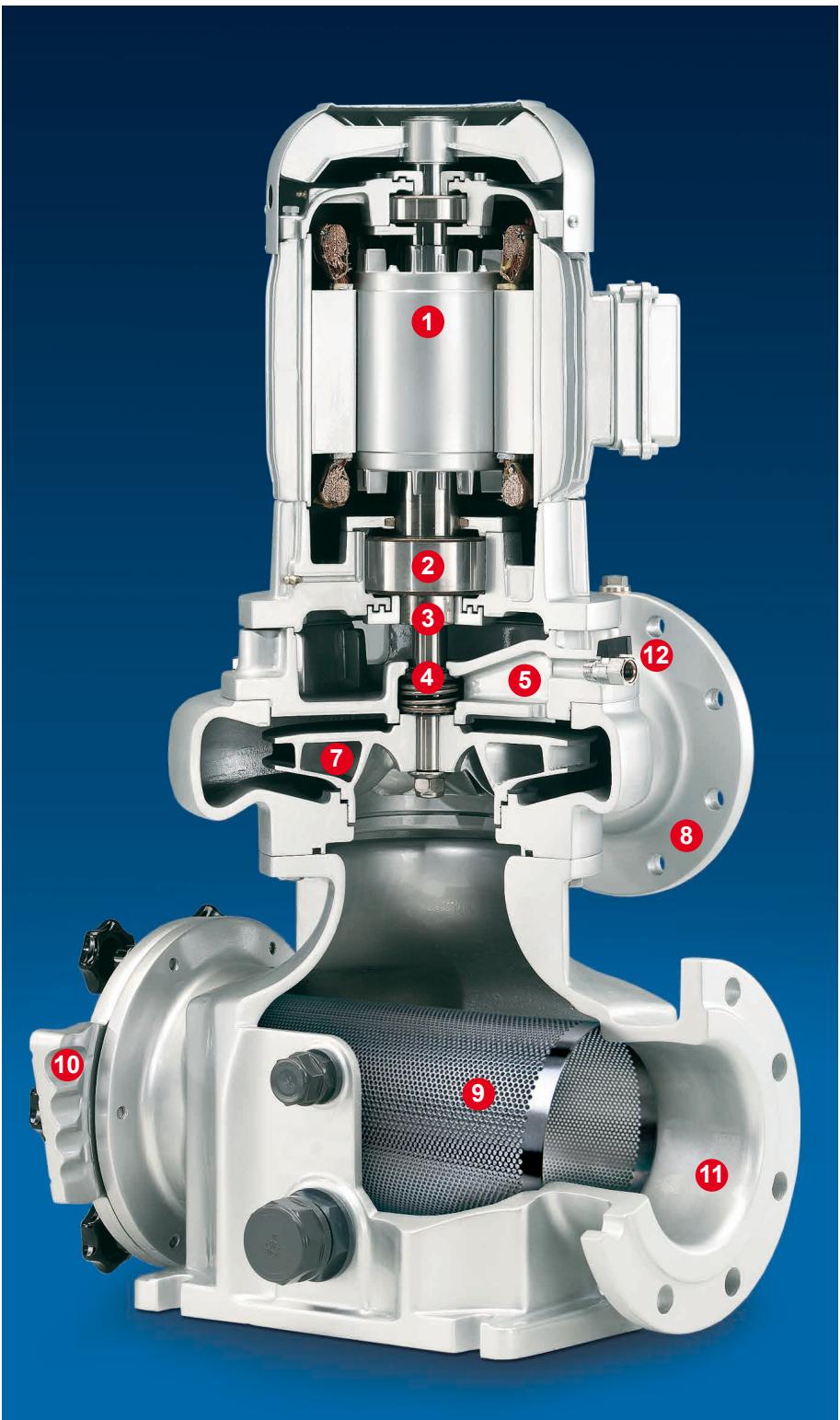
HERBORNER
PUMPE **TECHNIK**

UNIBAD

Bath water circulating pump



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UNIBAD benefits that ensure operational safety and cost-effectiveness in continuous operation.

1 Motor

Overload-safe motors designed for continuous operation
Comes with a frequency converter for direct installation (up to 30/36 kW) or wall installation.

2 Cost-effectiveness

An extended lifetime is achieved through liberally dimensioned shafts and bearings.

3 Motor shaft

Rigid motor shafts made from high-alloy stainless steel for minimal deflection.

4 Shaft sealing

Bellows-type mechanical seal with wear-resistant silicon carbide.
Monitoring of mechanical seal possible using an ETS X4 to protect against dry running.

5 By-pass channel

For optimal flushing of mechanical seal by means of the pumped medium.

6 Pressure sensor

Digital capture of filter strainer contamination possible.

7 Pump power output

Steep characteristic curves for treatment plants with efficiency-optimised impellers.

8 Construction

Low height for optimal use of the splash water container.
Rotation of the pressure flange possible in 45° steps.

9 Filter strainer

High degree of filtration thanks to large filtration area with small mesh size of Ø 3 mm.

10 Filter cover

Long-life filter cover thanks to medium-side rubber lining.

11 Filter casing

Flow-optimised filter casing with large drain plug.
Resistant inner rubber lining with W3 material.

12 Venting

Simple ventilation of pump by means of a ball valve.

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Technical descriptions

Use

The bath water circulating pump UNIBAD with integrated hair and fibre filter is the core piece of modern circulating systems for the delivery and filtering of bath water, fresh water, thermal salt baths, sea water, service water, and other liquids contaminated by coarse materials.

It is used in indoor, outdoor, and adventure swimming baths, water parks, and ice sports, recreation, and hotel facilities for water slides, attractions, water treatment systems, fountains, heat recovery systems, and industrial facilities.



Construction

High circulation rates are achieved thanks to minimum space requirements and an easy-to-install and readily serviceable compact design. Variable flange positions offer specialist consultants and construction firms optimal design possibilities. It is possible to disassemble the interchangeable module of the pump without loosening the intake connection and pressure flange from the pipework. The interchangeable module consists of a block motor, intermediate casing, impeller and mechanical seal.

The filter strainer with mesh size of \varnothing 3 mm specially designed for hair and fibre enables a high degree of filtration. It can be removed easily without the need for any tools. The filter surface is optimised with respect to long cleaning intervals and reduced flow loss. The pressure-and-vacuum gauge provided as an accessory indicates the filter's degree of contamination. A digital pressure sensor can also be used for this.

Installation

The pumps can be delivered in vertical installation with the motor at the top:



Vertical installation of the pump

Impellers

Dynamically balanced impellers ensure vibration-free running and contribute significantly to the long lifetime of the pump. All multi vane impellers can reach every duty point within the set of performance curves by correcting the diameter.



Open and closed multi vane impellers and screw propellers (SP) for clean to slightly soiled pumped media are used.

Range of performance

A consistent range of performance with steep pump characteristic curves guarantees a uniform pump power output, even when the filter is dirty. In parallel operation, they ensure a minimum change in delivery rate with high filter resistance and friction loss.

| | Q [m ³ /h] | H [m] |
|--------------------------------|-----------------------|-------|
| 1500 min ⁻¹ (50 Hz) | 620 | 40 |
| 1800 min ⁻¹ (60 Hz) | 620 | 44 |

Shaft sealing

The shaft sealing on the pump side is effected in all models via a maintenance-free mechanical seal, which is independent of the direction of rotation and made from wear-resistant silicon carbide (SiC). All motors are equipped with a special seal for splash-proofing on the pump side. Monitoring of mechanical seal possible using an ETS X4 to protect against dry running.

Bearing

The pump and motor have a common shaft, which is taken up in a strengthened bearing. The 4-pole drives are also equipped with a relubrication unit from 1.1 kW. In contrast to the standard motor, the pump-side rigid bearing is designed as a reinforced bearing for long life under extreme operating conditions. The high level of running accuracy of the motor shaft is achieved through the high flexural rigidity and short shaft length. This ensures vibration-free running of the mechanical shaft sealing.



Noise

The noise emission is determined by complex influencing factors such as size, materials, operating and installation conditions. Noise emission was contained using hydraulic measures and solid construction methods as early as in the development stage. The maximum sound pressure level is generally determined by the drive motors, being caused by air, magnetic and bearing noises. Noise levels are below the permissible limit curves specified for electrical motors as defined by DIN EN 60034-9. Minimum noise emission when operated in the region of Q_{optimal} (best efficiency).

Motor data

Surface-cooled three-phase motor with squirrel-cage.

| | |
|---------------------------|-------------------------------|
| Design | IM B5 |
| Motor connection | Manufacturer-specific |
| Protection type | IP 55 |
| Speed | 1500 (1800) min ⁻¹ |
| Frequency | 50 (60) Hz |
| Connection ≤ 2.2 kW | 230 Δ / 400 Λ (460 Λ) V |
| Connection ≥ 3.0 kW | 400 Δ / 690 Λ (460 Δ) V |
| Insulation class VDE 0530 | F |

Motors from 5.5 kW have a PTC thermistor as standard.

General data

- Pump colour RAL 5010 (standard)
- Media temperature range from - 5 to + 60 °C
- Ambient temperature range from - 5 to + 40 °C
- Density of the pumped medium max. 1000 kg/m³
- Viscosity of the pumped medium max. 1 mm²/s (1 cST)
- Frequency regulation of pumps depending on the operating conditions
 - from 30 to 50 Hz (400 V) and from 30 to 60 Hz (460 V)
- Performance verification according to DIN EN ISO 9906, Class 2.

Special configurations

- Different voltages and/or frequencies
- Different insulation class
- Elevated ambient temperature
- Elevated protection type
- Enhanced tropical and moisture protection
- Special materials (high-alloy cast steel, bronze) for parts coming into contact with the product
- Special paint finish
- Energy-saving pump with water-cooled motor (UNIBAD-XC)
- Energy-saving motor IE2 (eff1)
- Customer-specific solutions

Accessories

- Frequency converter for direct installation (up to 30/36 kW) or wall installation
- Pressure-and-vacuum gauge
- Digital pressure sensor
- Dry running protection for mechanical seal (ETS X4)

Model designation

Example:

150-270/0304SPX-W2-V

Nominal diameter pressure flange DN [mm]

Design dimensions

Hydraulic version

Motor rating [kW]

E.g.: 030 = 3.0 kW

Number of poles of the motor

4-pole = 1500 (60 Hz: 1800) min⁻¹

Impeller version

Model

Materials

Flange position

V = front

VL = centred between the front and left

L = left

HL = centred between the rear and left

H = rear

HR = centred between the rear and right

R = right

VR = centred between the front and right

Flange position ¹⁾

Figure V



Figure VL

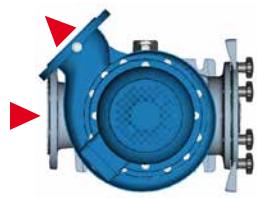


Figure L

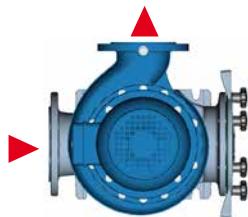


Figure HL

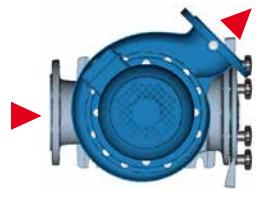


Figure H

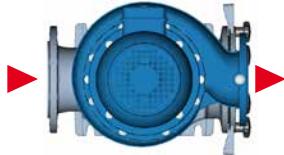


Figure HR

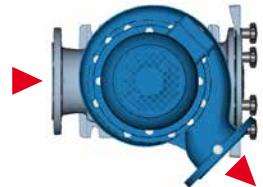


Figure R

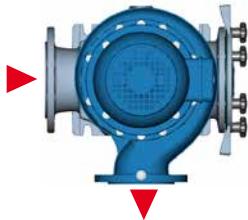
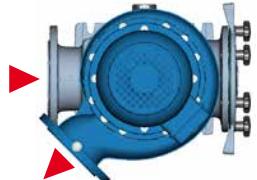


Figure VR



¹⁾ The terminal box alignment may vary in the case of the design with frequency converter for direct installation.

Technical descriptions

Materials⁴⁾

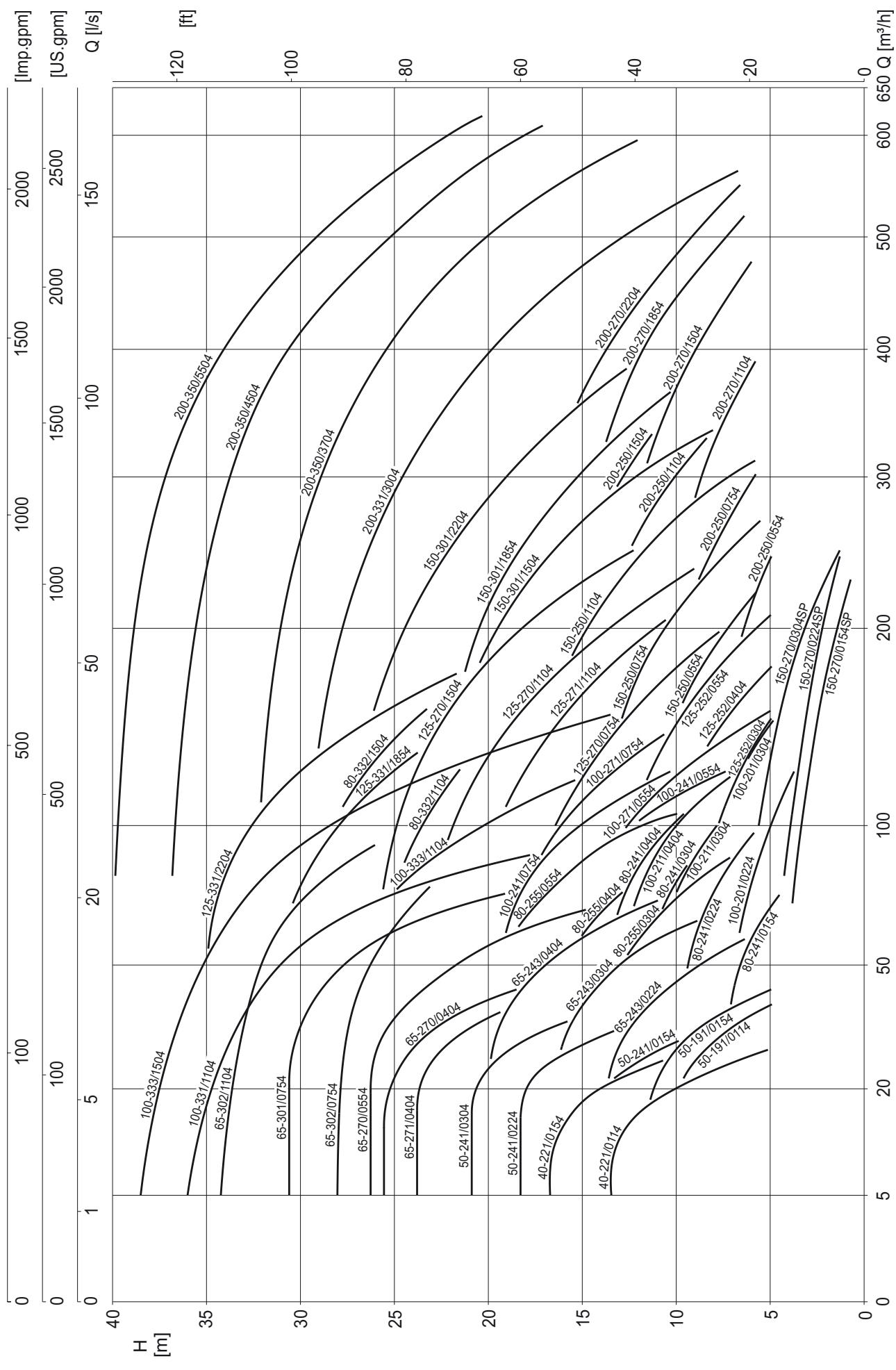
| ¹⁾ | Individual components | W2 | W3 |
|---------------|------------------------------|---|---|
| 001 | Filter casing | EN-GJL-250 ²⁾ (EN-JL1040) | EN-GJL-250 ³⁾ (EN-JL1040) |
| 002 | Filter strainer | X6CrNiMoTi17-12-2 (1.4571) | X6CrNiMoTi17-12-2 (1.4571) |
| 003 | Filter cover | EN-GJL-250 ³⁾ (EN-JL1040) | EN-GJL-250 ³⁾ (EN-JL1040) |
| 101 | Pump casing | EN-GJL-250 (EN-JL1040) | CuSn10-C (CC480K) |
| 113 | Intermediate casing | EN-GJL-250 (EN-JL1040) | CuSn10-C (CC480K) |
| 230 | Impeller | CuAl10Fe5Ni5-C (CC333G) | CuAl10Fe5Ni5-C (CC333G) |
| 433 | Mechanical seal | SiC/SiC | SiC/SiC |
| 502 | Casing wear ring | – | CuSn7Pb15-C (CC496K) |
| 819 | Motor shaft | X6CrNiMoTi17-12-2 (1.4571) | X6CrNiMoTi17-12-2 (1.4571) |

¹⁾ See exploded view (page 18)

²⁾ Interior epoxy resin hot powder coating

³⁾ Medium-side rubber lining

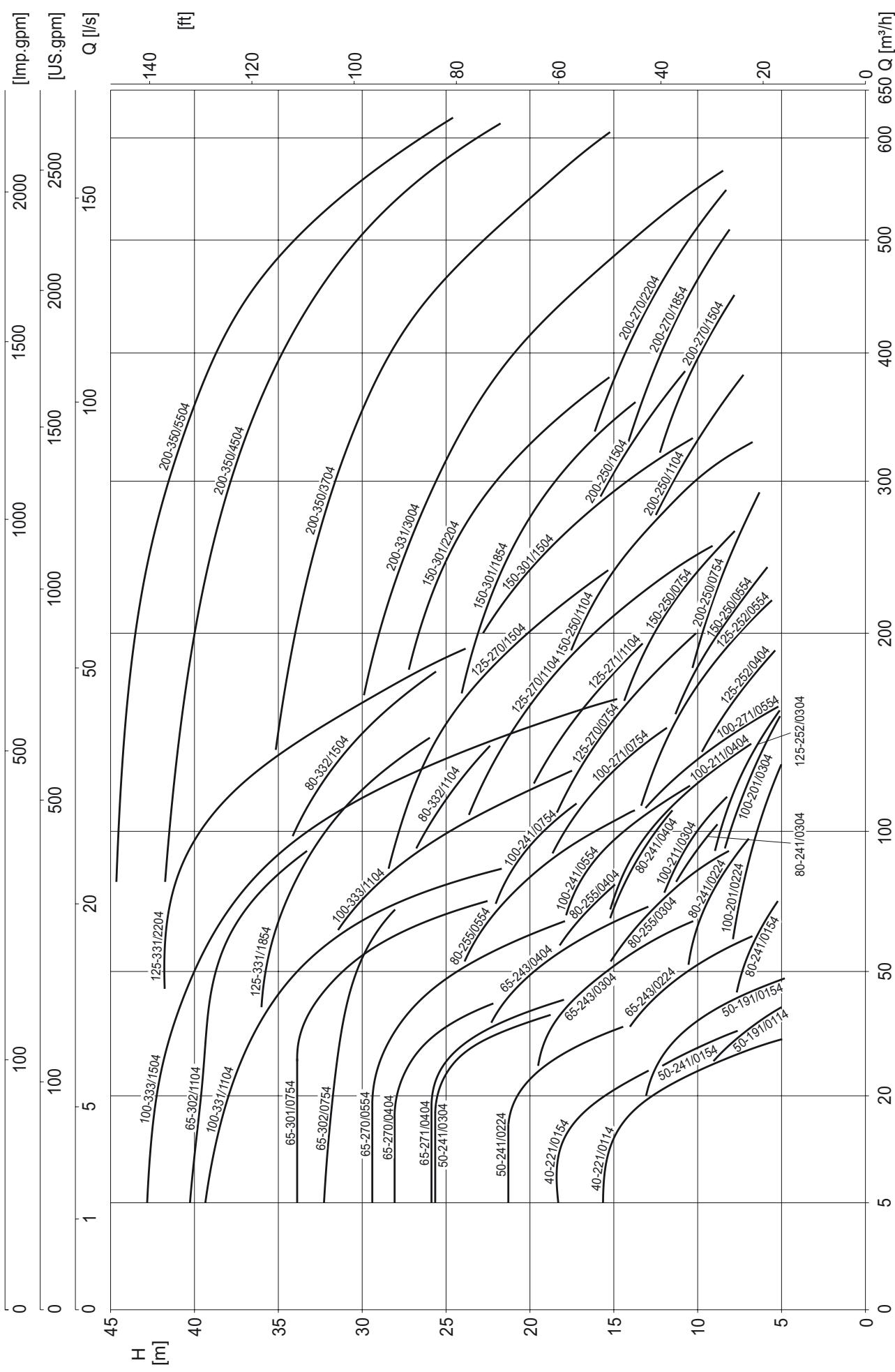
⁴⁾ Other material combinations depending on operating conditions, e.g. special bronzes and stainless steels.



Technical information on the parallel connection of centrifugal pumps on request.

Overview

60 Hz

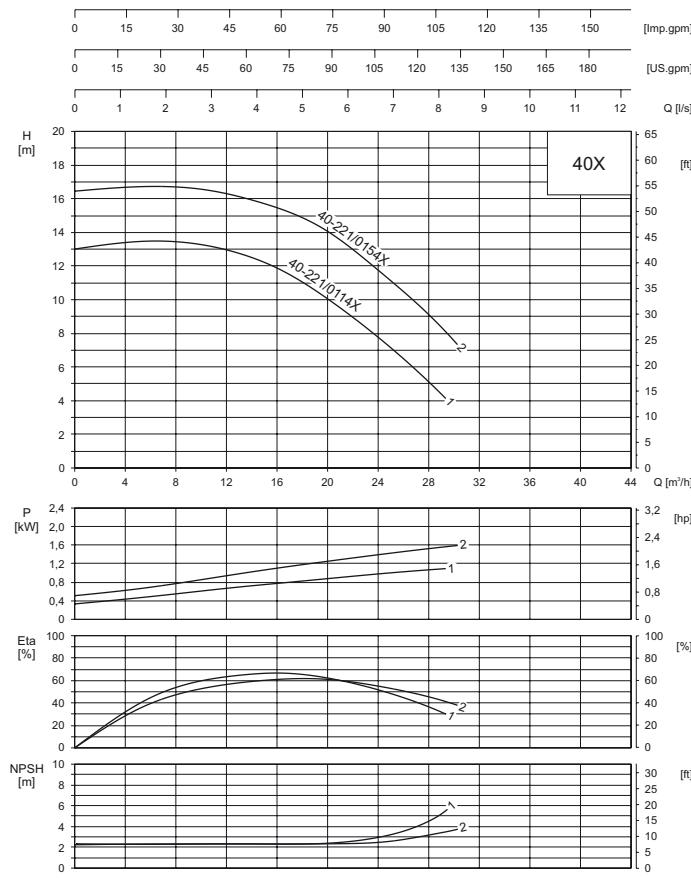


Technical information on the parallel connection of centrifugal pumps on request.

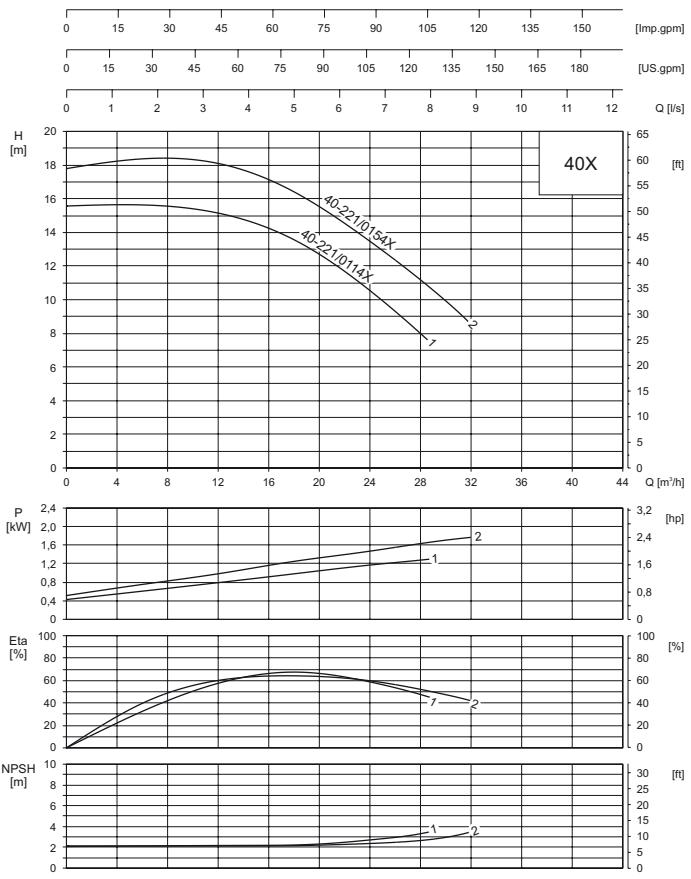
DN 40
DN 50

Characteristic curves

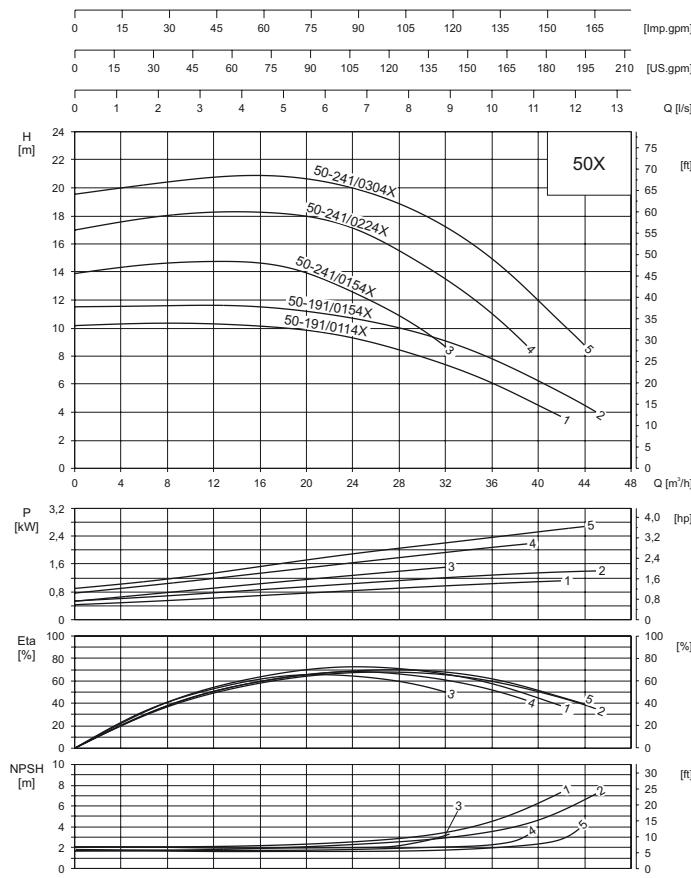
1500 min⁻¹ (400 V - 50 Hz)



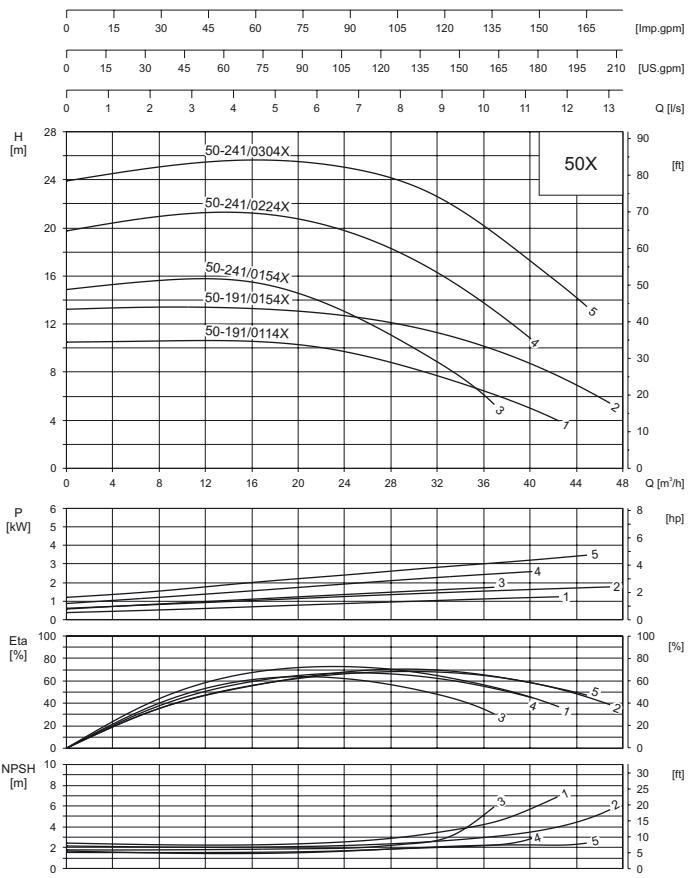
1800 min⁻¹ (460 V - 60 Hz)



1500 min⁻¹ (400 V - 50 Hz)



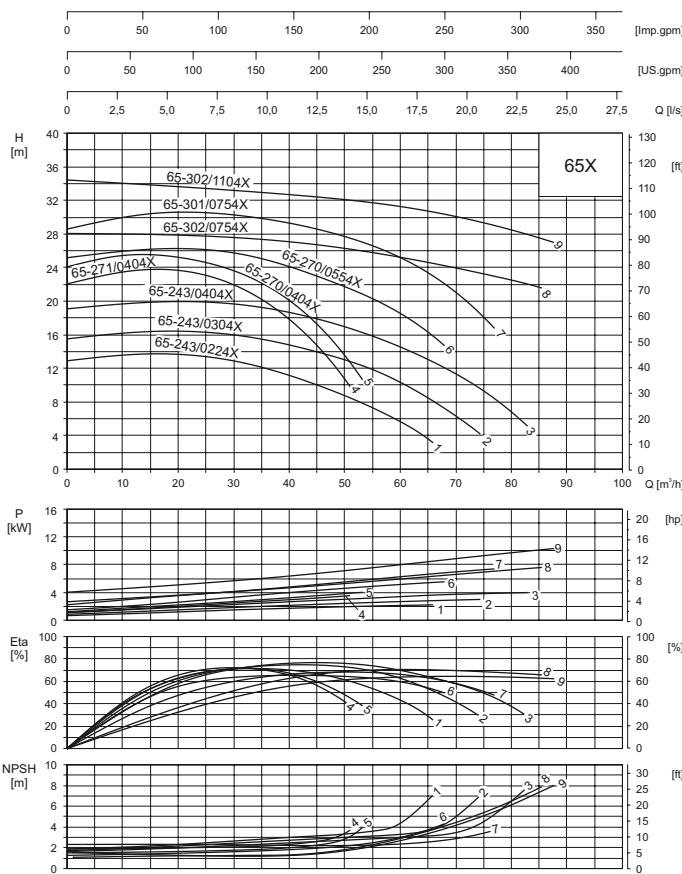
1800 min⁻¹ (460 V - 60 Hz)



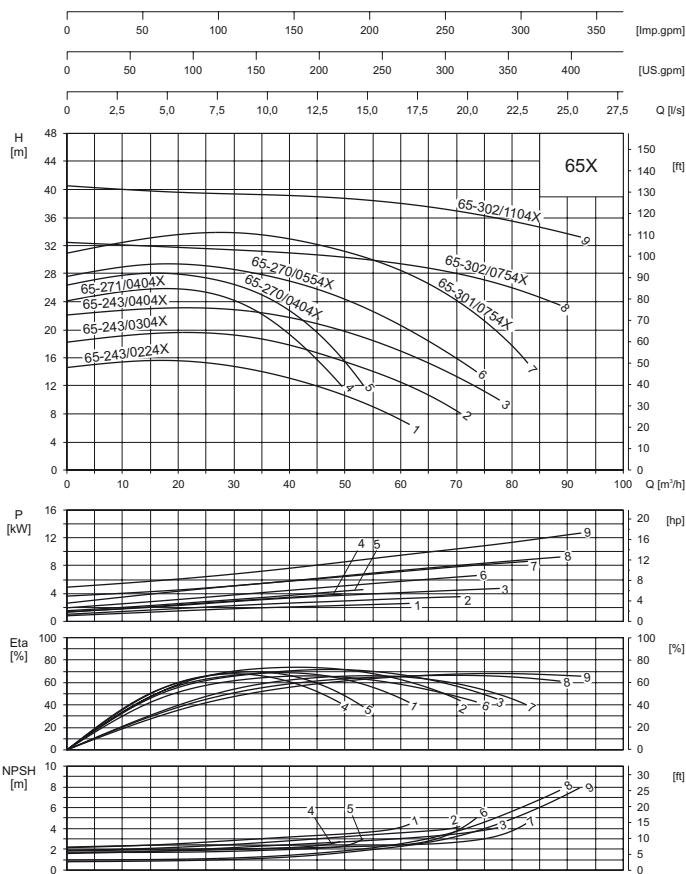
Characteristic curves

DN 65
DN 80

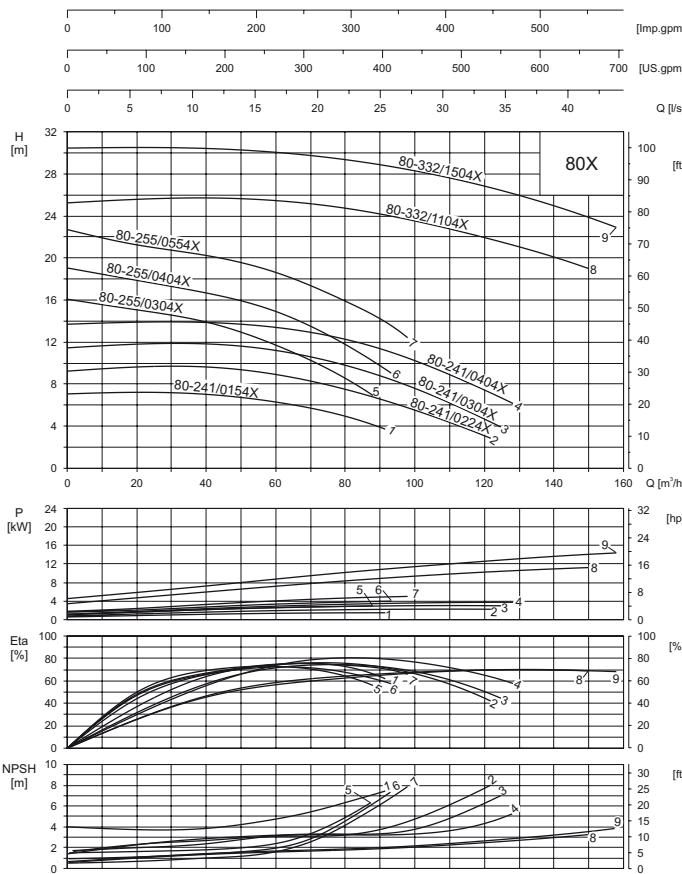
1500 min⁻¹ (400 V - 50 Hz)



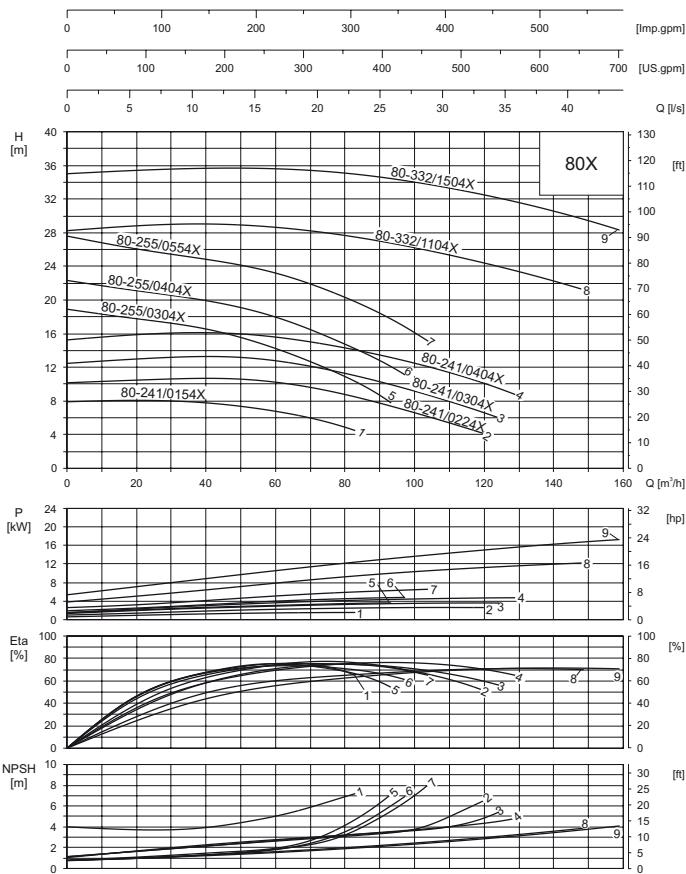
1800 min⁻¹ (460 V - 60 Hz)

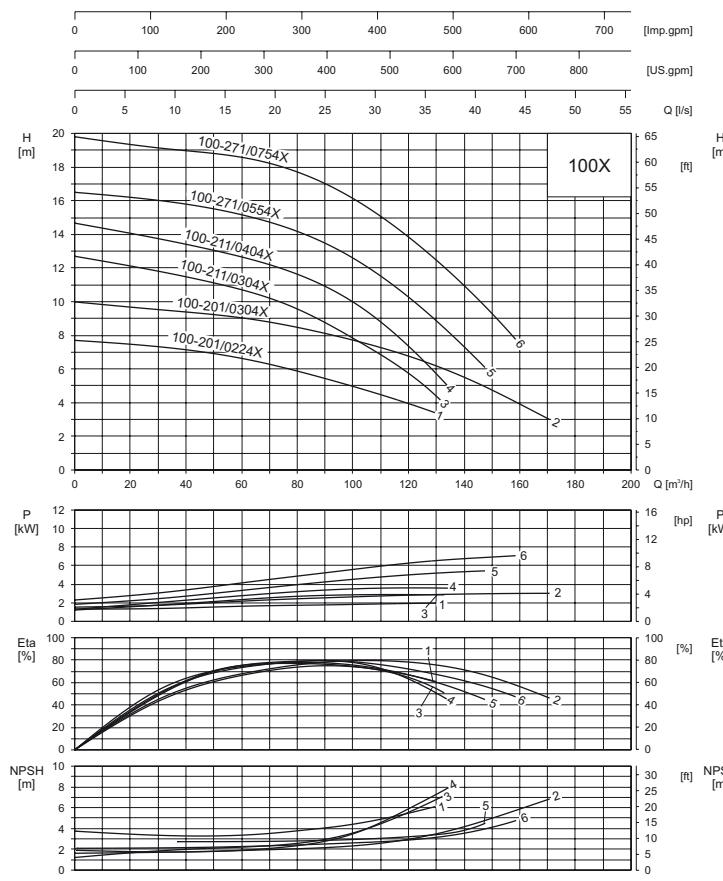
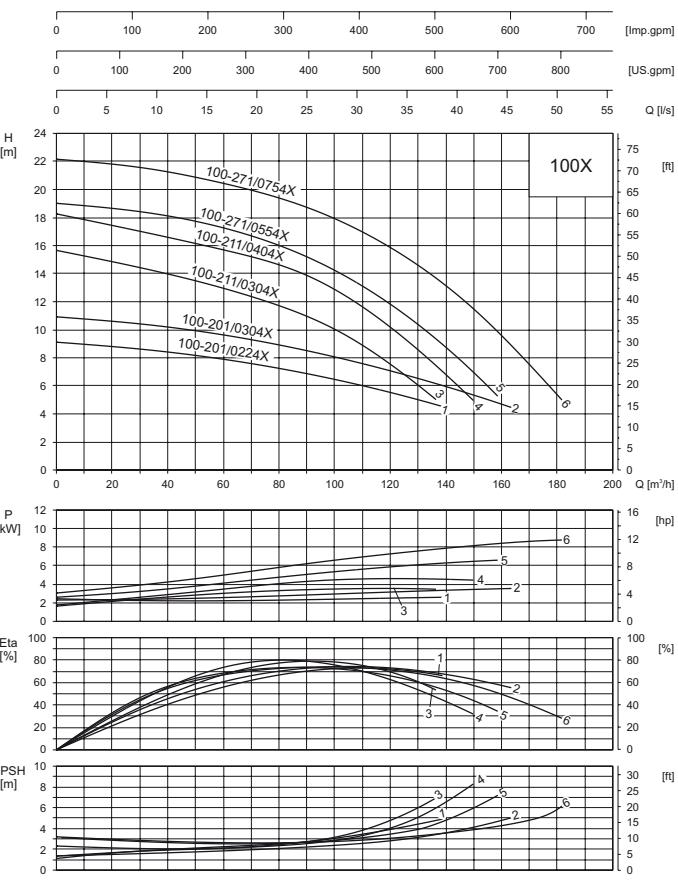
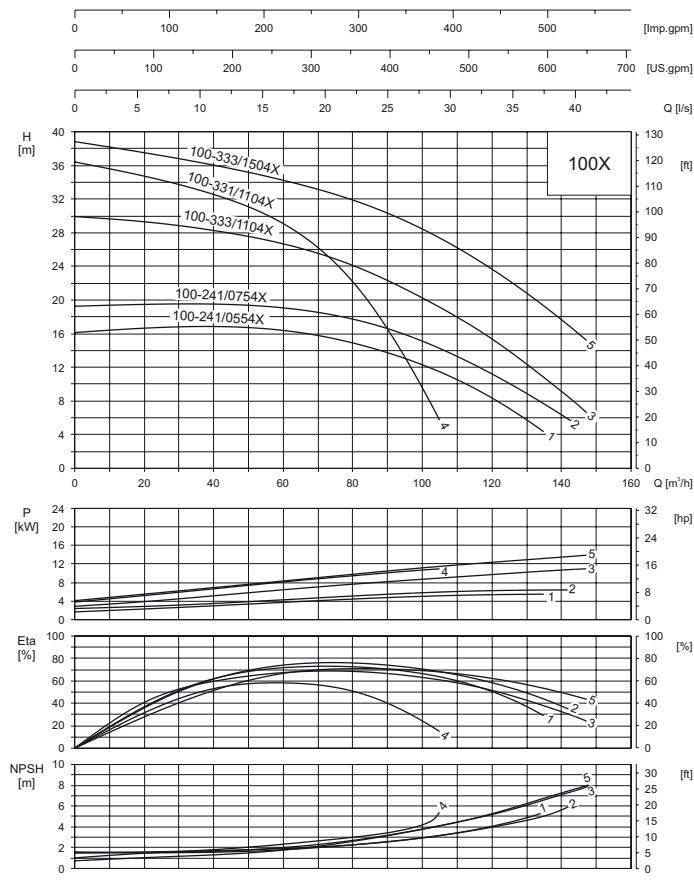
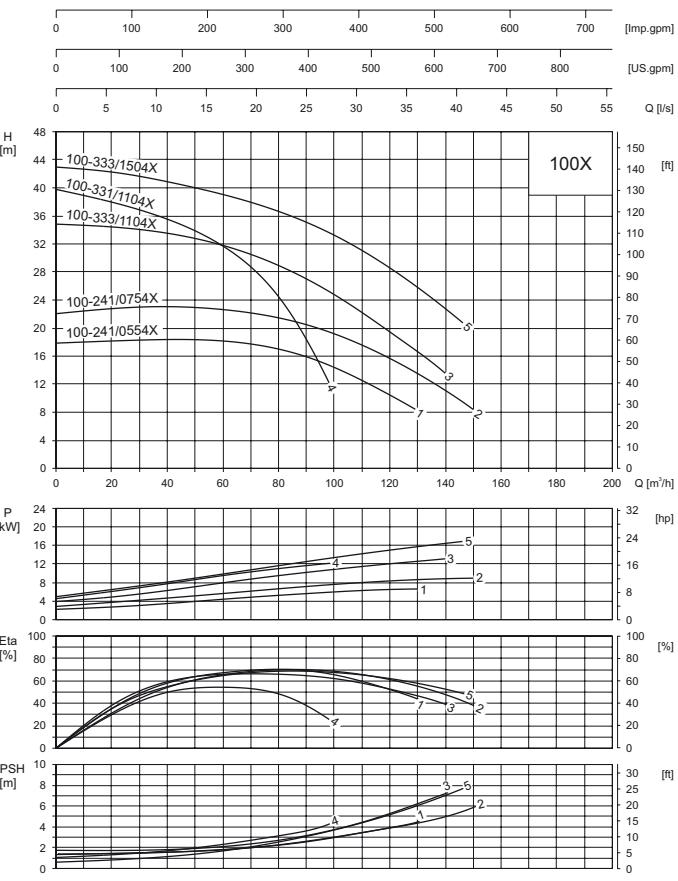


1500 min⁻¹ (400 V - 50 Hz)



1800 min⁻¹ (460 V - 60 Hz)

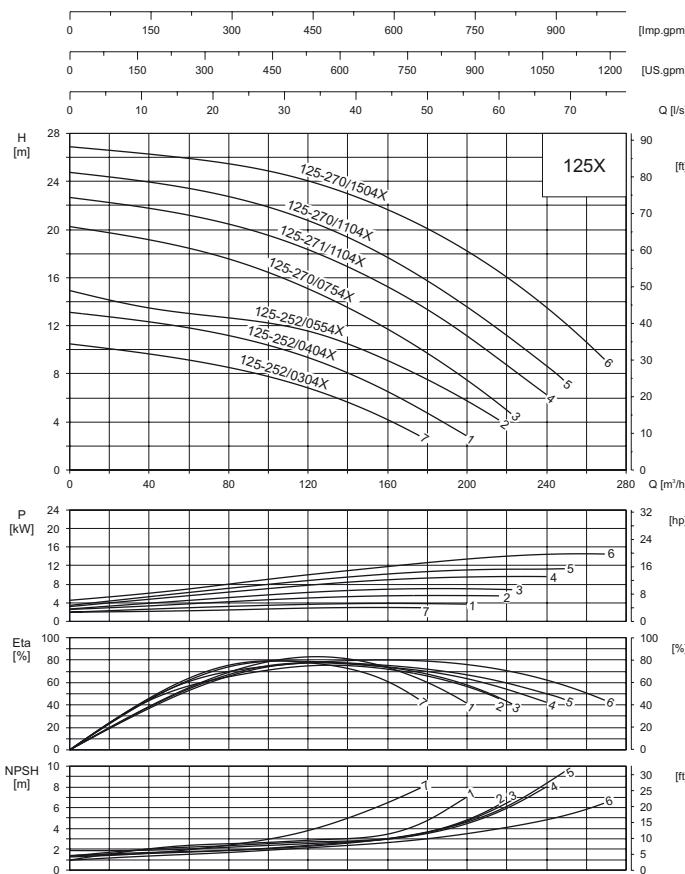


1500 min⁻¹ (400 V - 50 Hz)**1800 min⁻¹ (460 V - 60 Hz)****1500 min⁻¹ (400 V - 50 Hz)****1800 min⁻¹ (460 V - 60 Hz)**

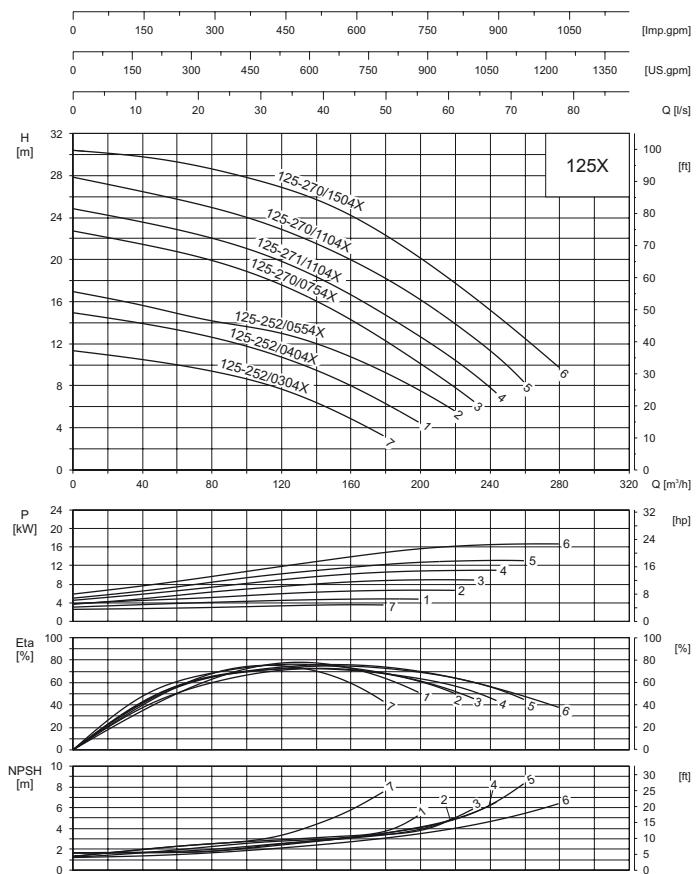
Characteristic curves

DN 125

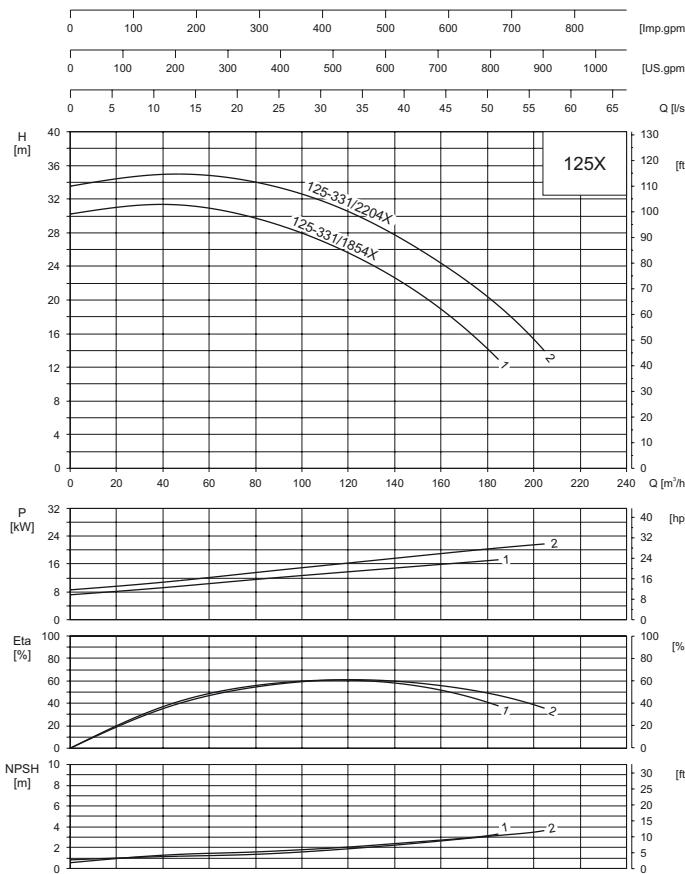
1500 min⁻¹ (400 V - 50 Hz)



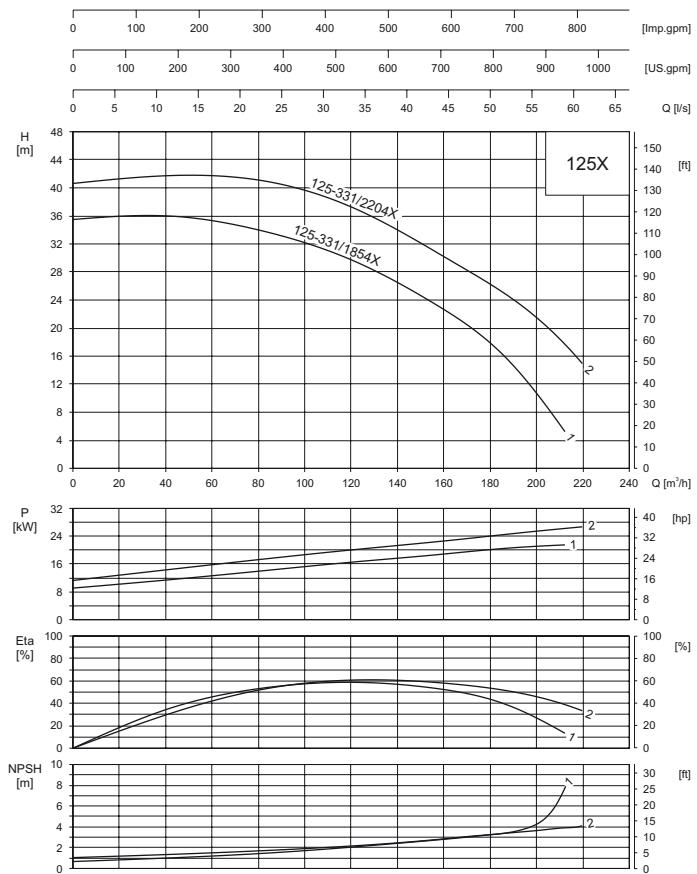
1800 min⁻¹ (460 V - 60 Hz)

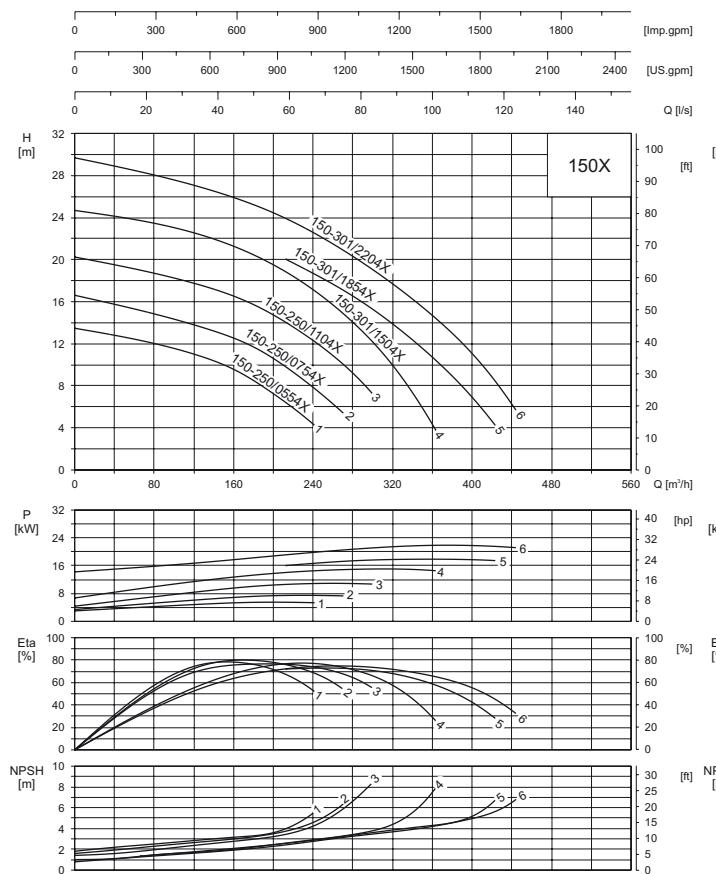
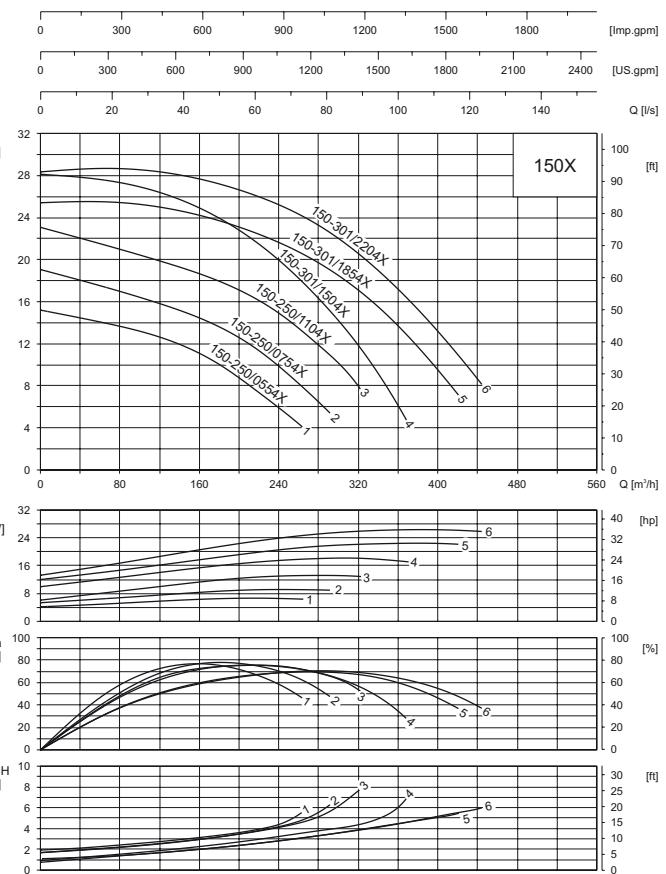
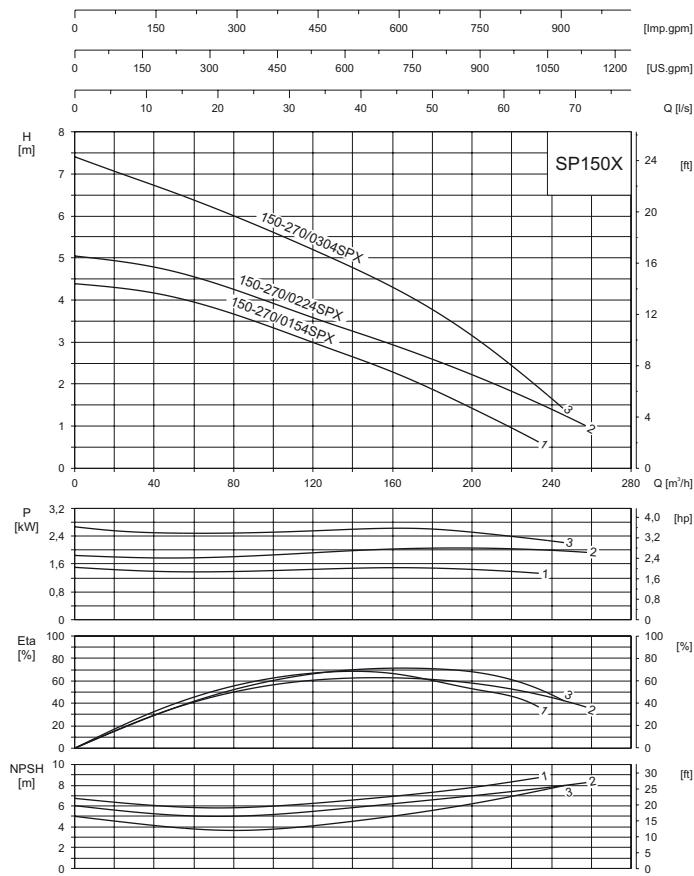


1500 min⁻¹ (400 V - 50 Hz)



1800 min⁻¹ (460 V - 60 Hz)

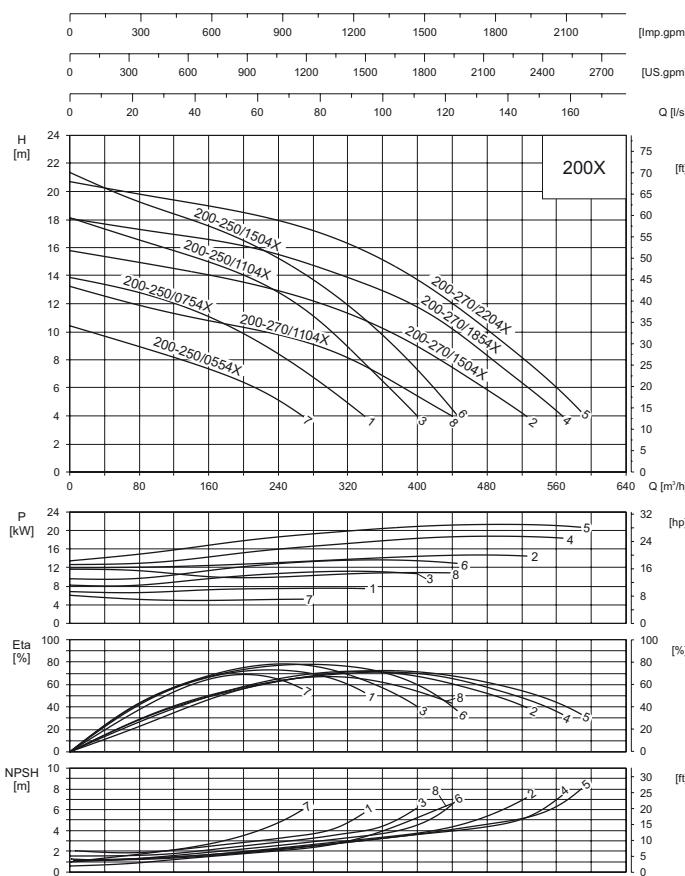


1500 min⁻¹ (400 V - 50 Hz)1800 min⁻¹ (460 V - 60 Hz)1500 min⁻¹ (400 V - 50 Hz)

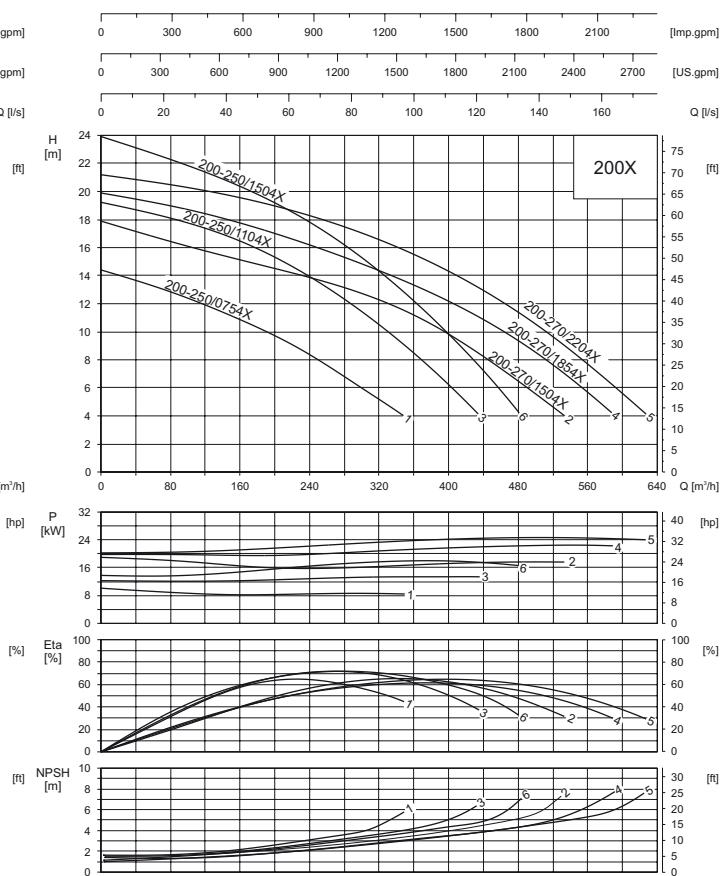
Characteristic curves

DN 200

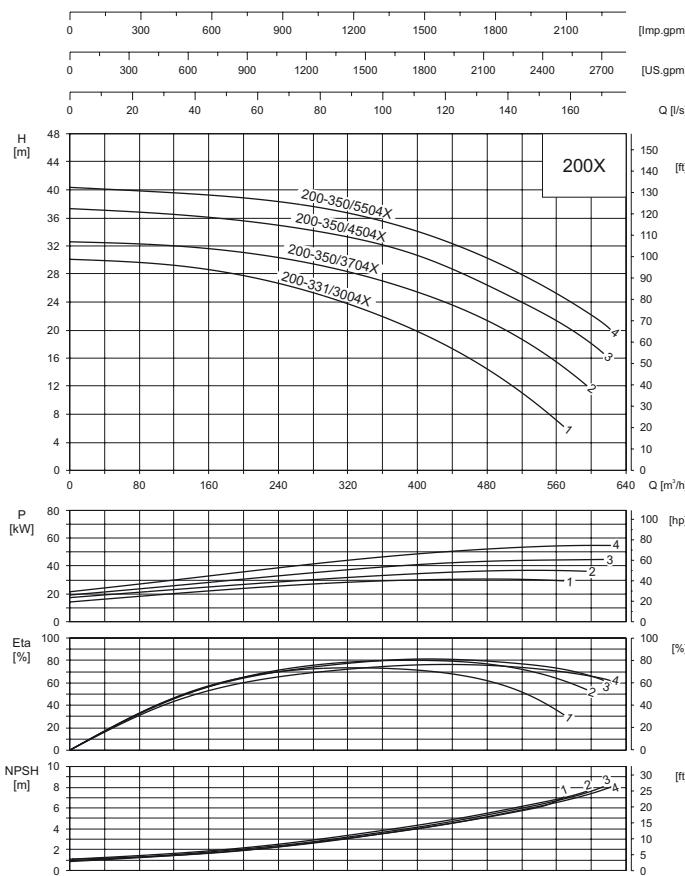
1500 min⁻¹ (400 V - 50 Hz)



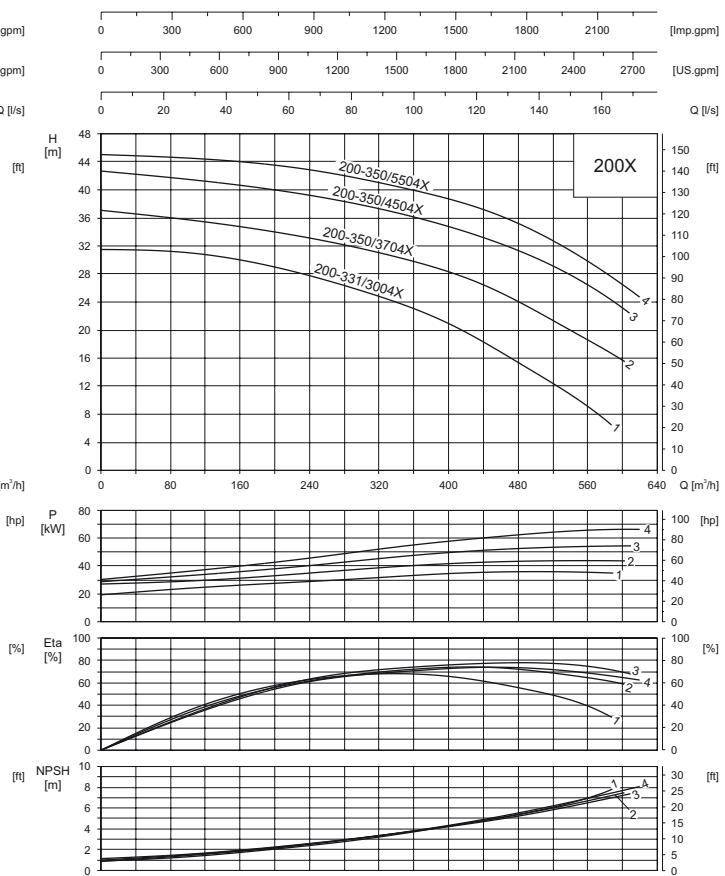
1800 min⁻¹ (460 V - 60 Hz)

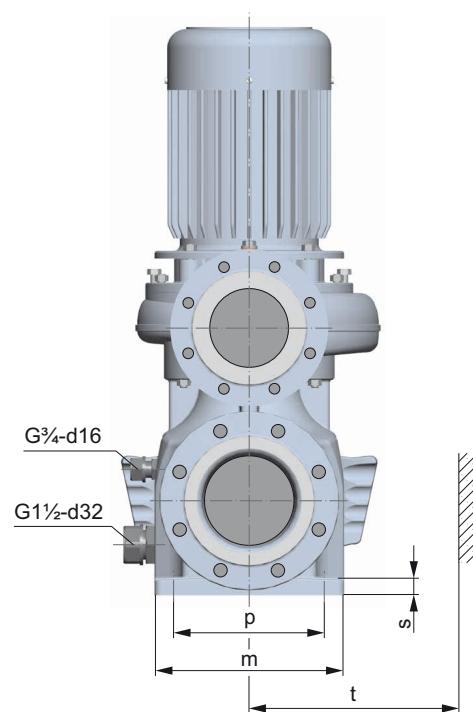
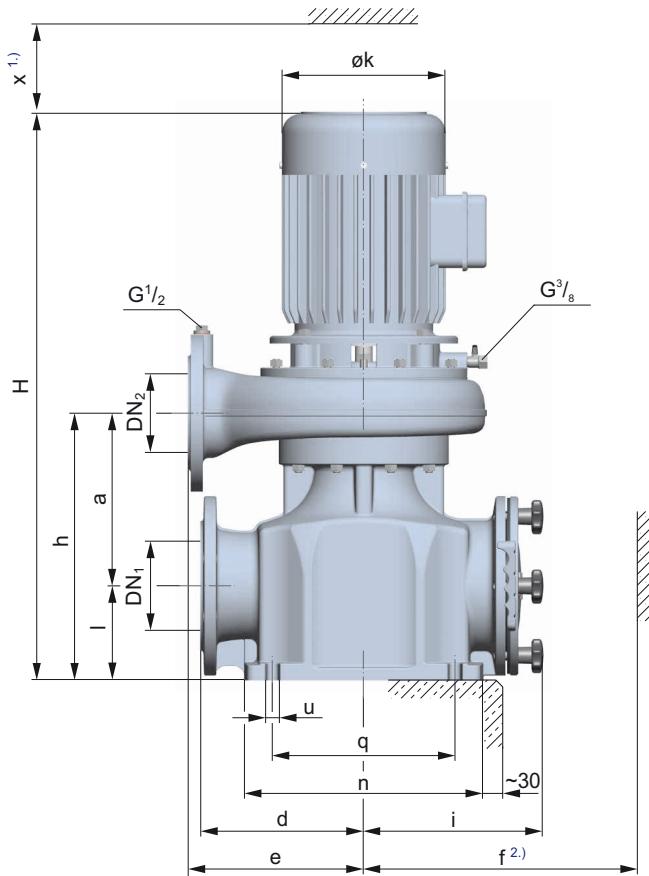


1500 min⁻¹ (400 V - 50 Hz)



1800 min⁻¹ (460 V - 60 Hz)





50 Hz: 1500 min⁻¹ (400V)

| P ₂ [kW] | I [A] | I _A /I _N | ʌ/Δ | dB(A) |
|-----------------------|---------|--------------------------------|-----|-------|
| 1.1 | 2.8 | 5.2 | ʌ | 55 |
| 1.5 | 3.8 | 5.6 | ʌ | 55 |
| 2.2 | 5.3 | 5.9 | ʌ | 59 |
| 3.0 | 7.0 | 6.2 | Δ | 59 |
| 4.0 | 9.0 | 6.8 | Δ | 59 |
| 5.5 | 11.4 | 6.6 | Δ | 63 |
| 7.5 | 15.4 | 6.8 | Δ | 63 |
| 11.0 | 22.0 | 6.9 | Δ | 65 |
| 15.0 | 30.0 | 7.3 | Δ | 65 |
| 18.5 | 37.0 | 7.0 | Δ | 65 |
| 22.0 | 44.0 | 6.9 | Δ | 67 |
| 30.0 | 54.5 | 7.0 | Δ | 68 |
| 37.0 | 66.0 | 6.8 | Δ | 70 |
| 45.0 | 82.0 | 7.0 | Δ | 70 |
| 55.0 | 95.0 | 7.0 | Δ | 71 |

60 Hz: 1800 min⁻¹ (460V)

| P ₂ [kW] | I [A] | I _A /I _N | ʌ/Δ | dB(A) |
|-----------------------|---------|--------------------------------|-----|-------|
| 1.3 | 2.9 | 5.3 | ʌ | 59 |
| 1.8 | 3.7 | 5.4 | ʌ | 59 |
| 2.6 | 5.5 | 6.1 | ʌ | 63 |
| 3.6 | 7.2 | 6.6 | Δ | 63 |
| 4.8 | 9.1 | 7.0 | Δ | 63 |
| 6.6 | 11.9 | 6.3 | Δ | 67 |
| 9.0 | 16.1 | 6.5 | Δ | 67 |
| 13.2 | 23.0 | 6.6 | Δ | 69 |
| 18.0 | 30.3 | 7.3 | Δ | 69 |
| 22.2 | 38.6 | 6.7 | Δ | 69 |
| 26.4 | 44.9 | 6.6 | Δ | 71 |
| 36.0 | 58.4 | 6.7 | Δ | 72 |
| 44.4 | 68.9 | 6.5 | Δ | 74 |
| 54.0 | 85.6 | 6.7 | Δ | 74 |
| 66.0 | 99.1 | 6.7 | Δ | 75 |

Legend:

P₂: Nominal output

I_N: Nominal current

I_A: Starting current

dB(A): Sound pressure level (complete pump)

¹⁾ When dismantling the motor ensure there is sufficient room for the lifting device.

²⁾ Main controlling dimensions of filter strainer

Flange connection dimensions according to DIN 2501 PN 10

Dimensions with frequency converter for direct installation on request.

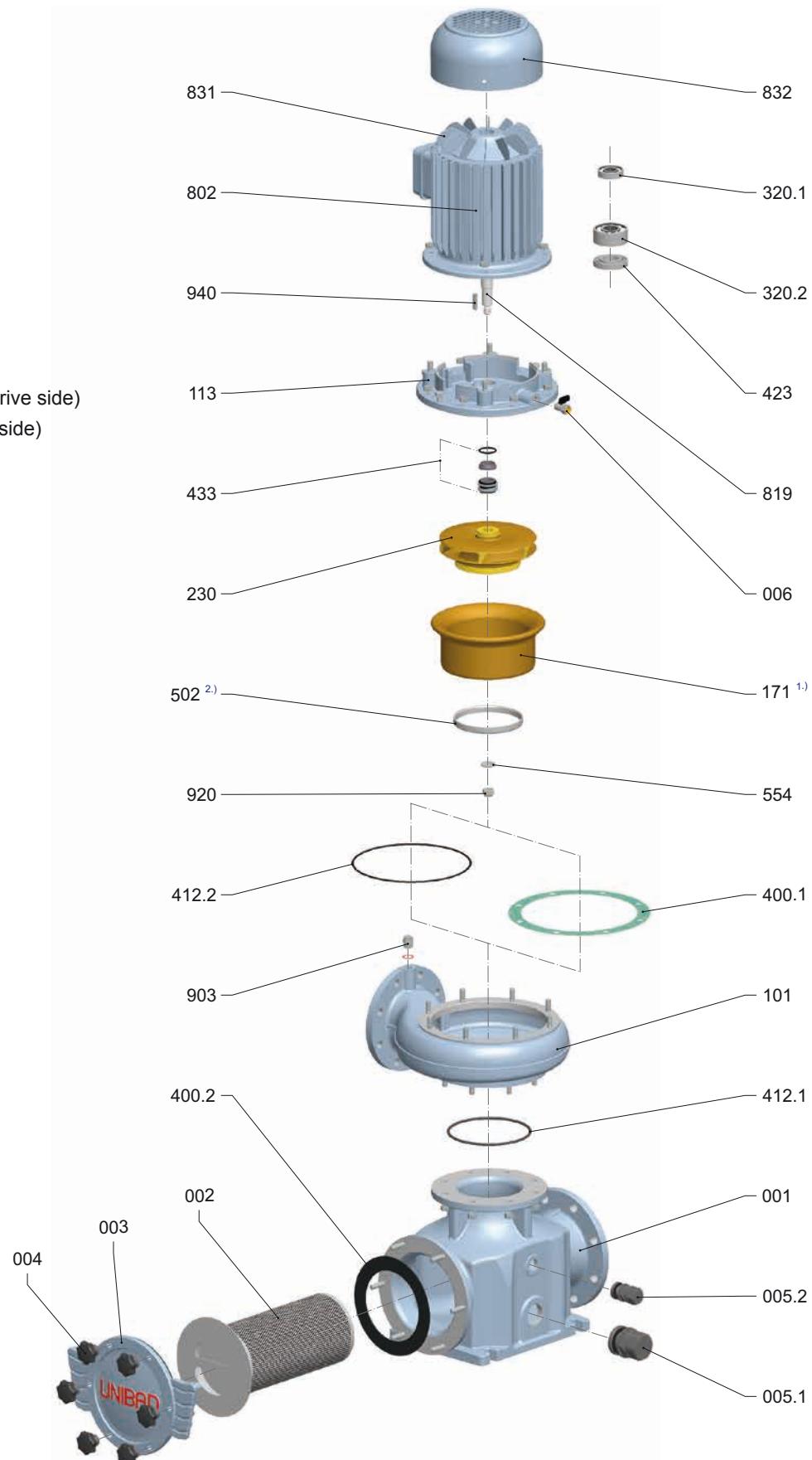
Dimensions · Technical specifications

| Model | DN ₂ | DN ₁ | H | a | d | e | f | h | i | ø k | I | m | n | p | q | s | t _{min.} | u | w | x _{min.} | 2) [kg] |
|-----------------|-----------------|-----------------|------|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-------|-----|----|-------------------|----|-----|-------------------|------------|
| 40-221/0114X | 40 | 100 | 715 | 225 | 200 | 200 | 660 | 345 | 240 | 176 | 120 | 234 | 297 | 205 | 225 | 21 | 260 | 17 | 439 | 300 | 88 |
| 40-221/0154X | 40 | 100 | 740 | 225 | 200 | 200 | 660 | 345 | 240 | 176 | 120 | 234 | 297 | 205 | 225 | 21 | 260 | 17 | 439 | 300 | 91 |
| 50-191/0114X | 50 | 100 | 720 | 225 | 200 | 200 | 660 | 345 | 240 | 176 | 120 | 234 | 297 | 205 | 225 | 21 | 260 | 17 | 445 | 300 | 86 |
| 50-191/0154X | 50 | 100 | 745 | 225 | 200 | 200 | 660 | 345 | 240 | 176 | 120 | 234 | 297 | 205 | 225 | 21 | 260 | 17 | 445 | 300 | 89 |
| 50-241/0154X | 50 | 100 | 735 | 225 | 200 | 220 | 660 | 345 | 240 | 176 | 120 | 234 | 297 | 205 | 225 | 21 | 260 | 17 | 433 | 300 | 94 |
| 50-241/0224X | 50 | 100 | 745 | 225 | 200 | 220 | 660 | 345 | 240 | 198 | 120 | 234 | 297 | 205 | 225 | 21 | 260 | 17 | 433 | 300 | 101 |
| 50-241/0304X | 50 | 100 | 785 | 225 | 200 | 220 | 660 | 345 | 240 | 198 | 120 | 234 | 297 | 205 | 225 | 21 | 260 | 17 | 443 | 300 | 111 |
| 65-243/0224X | 65 | 100 | 750 | 225 | 200 | 230 | 660 | 345 | 240 | 198 | 120 | 234 | 297 | 205 | 225 | 21 | 260 | 17 | 435 | 300 | 104 |
| 65-243/0304X | 65 | 100 | 790 | 225 | 200 | 230 | 660 | 345 | 240 | 198 | 120 | 234 | 297 | 205 | 225 | 21 | 260 | 17 | 445 | 300 | 113 |
| 65-243/0404X | 65 | 100 | 825 | 225 | 200 | 230 | 660 | 345 | 240 | 220 | 120 | 234 | 297 | 205 | 225 | 21 | 260 | 17 | 445 | 300 | 120 |
| 65-270/0404X | 65 | 100 | 820 | 225 | 200 | 240 | 660 | 345 | 240 | 220 | 120 | 234 | 297 | 205 | 225 | 21 | 260 | 17 | 443 | 300 | 121 |
| 65-271/0404X | 65 | 100 | 820 | 225 | 200 | 240 | 660 | 345 | 240 | 220 | 120 | 234 | 297 | 205 | 225 | 21 | 260 | 17 | 443 | 300 | 121 |
| 65-270/0554X | 65 | 100 | 875 | 225 | 200 | 230 | 660 | 345 | 240 | 260 | 120 | 234 | 297 | 205 | 225 | 21 | 260 | 17 | 443 | 300 | 147 |
| 65-301/0754X | 65 | 100 | 895 | 245 | 200 | 270 | 660 | 365 | 240 | 260 | 120 | 234 | 297 | 205 | 225 | 21 | 260 | 17 | 446 | 300 | 174 |
| 65-302/0754X | 65 | 100 | 915 | 230 | 200 | 270 | 660 | 350 | 240 | 260 | 120 | 234 | 297 | 205 | 225 | 21 | 260 | 17 | 466 | 300 | 186 |
| 65-302/1104X | 65 | 100 | 975 | 230 | 200 | 270 | 660 | 350 | 240 | 315 | 120 | 234 | 297 | 205 | 225 | 21 | 260 | 17 | 462 | 300 | 232 |
| 80-241/0154X | 80 | 150 | 815 | 270 | 260 | 250 | 800 | 420 | 291 | 176 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 512 | 300 | 136 |
| 80-241/0224X | 80 | 150 | 825 | 270 | 260 | 250 | 800 | 420 | 291 | 198 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 511 | 300 | 143 |
| 80-241/0304X | 80 | 150 | 860 | 270 | 260 | 250 | 800 | 420 | 291 | 198 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 516 | 300 | 150 |
| 80-241/0404X | 80 | 150 | 895 | 270 | 260 | 250 | 800 | 420 | 291 | 220 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 516 | 300 | 157 |
| 80-255/0304X | 80 | 150 | 870 | 276 | 260 | 271 | 800 | 426 | 291 | 198 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 524 | 300 | 156 |
| 80-255/0404X | 80 | 150 | 900 | 276 | 260 | 271 | 800 | 426 | 291 | 220 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 524 | 300 | 163 |
| 80-255/0554X | 80 | 150 | 955 | 276 | 260 | 271 | 800 | 426 | 291 | 260 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 524 | 300 | 188 |
| 80-332/1104X | 80 | 150 | 1060 | 275 | 260 | 315 | 800 | 425 | 291 | 315 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 547 | 1) | 266 |
| 80-332/1504X | 80 | 150 | 1095 | 275 | 260 | 315 | 800 | 425 | 291 | 315 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 547 | 1) | 287 |
| 100-201/0224X | 100 | 150 | 850 | 300 | 260 | 280 | 800 | 450 | 291 | 198 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 536 | 300 | 133 |
| 100-201/0304X | 100 | 150 | 885 | 300 | 260 | 280 | 800 | 450 | 291 | 198 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 541 | 300 | 143 |
| 100-211/0304X | 100 | 150 | 860 | 270 | 260 | 270 | 800 | 420 | 291 | 198 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 515 | 300 | 154 |
| 100-211/0404X | 100 | 150 | 895 | 270 | 260 | 270 | 800 | 420 | 291 | 220 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 515 | 300 | 162 |
| 100-241/0554X | 100 | 150 | 975 | 270 | 260 | 270 | 800 | 420 | 291 | 260 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 543 | 300 | 195 |
| 100-241/0754X | 100 | 150 | 990 | 270 | 260 | 270 | 800 | 420 | 291 | 260 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 543 | 300 | 213 |
| 100-271/0554X | 100 | 150 | 950 | 275 | 260 | 270 | 800 | 425 | 291 | 260 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 519 | 300 | 188 |
| 100-271/0754X | 100 | 150 | 965 | 275 | 260 | 270 | 800 | 425 | 291 | 260 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 519 | 300 | 207 |
| 100-331/1104X | 100 | 150 | 1060 | 290 | 260 | 270 | 800 | 440 | 291 | 315 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 550 | 1) | 275 |
| 100-333/1104X | 100 | 150 | 1060 | 290 | 260 | 290 | 800 | 440 | 291 | 315 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 550 | 1) | 275 |
| 100-333/1504X | 100 | 150 | 1100 | 290 | 260 | 290 | 800 | 440 | 291 | 315 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 550 | 1) | 295 |
| 125-252/0304X | 125 | 150 | 880 | 290 | 260 | 300 | 800 | 440 | 291 | 198 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 538 | 300 | 167 |
| 125-252/0404X | 125 | 150 | 915 | 290 | 260 | 300 | 800 | 440 | 291 | 220 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 538 | 300 | 174 |
| 125-252/0554X | 125 | 150 | 970 | 290 | 260 | 300 | 800 | 440 | 291 | 260 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 538 | 300 | 202 |
| 125-270/0754X | 125 | 150 | 985 | 275 | 260 | 280 | 800 | 425 | 291 | 260 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 536 | 300 | 211 |
| 125-270/1104X | 125 | 150 | 1060 | 275 | 260 | 280 | 800 | 425 | 291 | 315 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 549 | 1) | 260 |
| 125-271/1104X | 125 | 150 | 1060 | 275 | 260 | 280 | 800 | 425 | 291 | 315 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 549 | 1) | 260 |
| 125-270/1504X | 125 | 150 | 1100 | 275 | 260 | 280 | 800 | 425 | 291 | 315 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 549 | 1) | 281 |
| 125-331/1854X | 125 | 150 | 1215 | 325 | 260 | 370 | 800 | 475 | 291 | 350 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 625 | 1) | 351 |
| 125-331/2204X | 125 | 150 | 1250 | 325 | 260 | 370 | 800 | 475 | 291 | 350 | 150 | 300 | 380 | 260 | 290 | 27 | 340 | 18 | 625 | 1) | 354 |
| 150-250/0554X | 150 | 200 | 1045 | 335 | 310 | 330 | 920 | 515 | 340 | 260 | 180 | 360 | 457 | 320 | 350 | 32 | 340 | 20 | 615 | 300 | 249 |
| 150-250/0754X | 150 | 200 | 1065 | 335 | 310 | 330 | 920 | 515 | 340 | 260 | 180 | 360 | 457 | 320 | 350 | 32 | 340 | 20 | 615 | 300 | 268 |
| 150-250/1104X | 150 | 200 | 1140 | 335 | 310 | 330 | 920 | 515 | 340 | 315 | 180 | 360 | 457 | 320 | 350 | 32 | 340 | 20 | 628 | 1) | 322 |
| 150-270/0154SPX | 150 | 200 | 1015 | 426 | 310 | 300 | 920 | 606 | 340 | 176 | 180 | 360 | 457 | 320 | 350 | 32 | 340 | 20 | 711 | 300 | 198 |
| 150-270/0224SPX | 150 | 200 | 1025 | 426 | 310 | 300 | 920 | 606 | 340 | 198 | 180 | 360 | 457 | 320 | 350 | 32 | 340 | 20 | 711 | 300 | 203 |
| 150-270/0304SPX | 150 | 200 | 1060 | 426 | 310 | 300 | 920 | 606 | 340 | 198 | 180 | 360 | 457 | 320 | 350 | 32 | 340 | 20 | 716 | 300 | 213 |
| 150-301/1504X | 150 | 200 | 1185 | 350 | 310 | 330 | 920 | 530 | 340 | 315 | 180 | 360 | 457 | 320 | 350 | 32 | 340 | 20 | 637 | 1) | 345 |
| 150-301/1854X | 150 | 200 | 1275 | 350 | 310 | 370 | 920 | 530 | 340 | 350 | 180 | 360 | 457 | 320 | 350 | 32 | 340 | 20 | 685 | 1) | 392 |
| 150-301/2204X | 150 | 200 | 1310 | 350 | 310 | 370 | 920 | 530 | 340 | 350 | 180 | 360 | 457 | 320 | 350 | 32 | 340 | 20 | 685 | 1) | 404 |
| 200-250/0554X | 200 | 250 | 1155 | 394 | 350 | 350 | 1030 | 609 | 383 | 260 | 215 | 430 | 535 | 380 | 410 | 32 | 360 | 20 | 724 | 300 | 321 |
| 200-250/0754X | 200 | 250 | 1170 | 394 | 350 | 350 | 1030 | 609 | 383 | 260 | 215 | 430 | 535 | 380 | 410 | 32 | 360 | 20 | 724 | 300 | 340 |
| 200-250/1104X | 200 | 250 | 1250 | 394 | 350 | 350 | 1030 | 609 | 383 | 315 | 215 | 430 | 535 | 380</ | | | | | | | |

Exploded view

Individual components

| | |
|-------------------|--|
| 001 | Filter casing |
| 002 | Filter strainer |
| 003 | Filter cover |
| 004 | Star handle |
| 005.1 | Screwed connection |
| 005.2 | Screwed connection |
| 006 | Ball valve |
| 101 | Pump casing |
| 113 | Intermediate casing |
| 171 ¹⁾ | Guiding ring |
| 230 | Impeller |
| 320.1 | Anti-friction bearing (non drive side) |
| 320.2 | Anti-friction bearing (drive side) |
| 400.1 | Gasket |
| 400.2 | Gasket |
| 412.1 | O-ring |
| 412.2 | O-ring |
| 423 | Labyrinth ring |
| 433 | Mechanical seal |
| 502 ²⁾ | Casing wear ring |
| 554 | Washer |
| 802 | Block motor |
| 819 | Motor shaft |
| 831 | Fan |
| 832 | Fan hood |
| 903 | Screwed plug |
| 920 | Nut |
| 940 | Key |



¹⁾ Only exists in case of design with screw propeller.

²⁾ Only exists in case of design with closed multi vane impeller in material design W3, but not for 200-250/... and 200-270/....

Frequency regulation of pumps

The basic concept behind the frequency regulation of pumps is speed adjustment. This gives rise to:

1. energy savings if there is a change in duty points and / or
2. a reduction of flow rate and/or adjustment to the system requirements.

Point 2 is an alternative to the possibility of adapting pumps to meet changing operating conditions. Choke regulation has mainly been used up until now for this, which exerts an influence on the resistance parabola of the system by means of slide valves or diaphragms. In this case, the resistance parabola 1, for example, changes into the altered resistance parabola 2 (see diagram). The energy loss associated with this is accepted.

By way of comparison, when actuating the pumps by frequency converters, the duty point of the pump under frequency regulation migrates along the original resistance parabola 1. The resulting energy savings are shown in the performance diagram (Q-P set of performance curves) in the difference between Point II and Point III.

Frequency regulation is used predominantly, however, for saving energy with changing duty points (generally two). By applying the example mentioned earlier, the power input for the pump is reduced from Point I to Point III in the Q-P- set of performance curves.

If the speed falls below a value at which no acceptable establishment of the flow can take place, the laws can no longer be applied. While it is true that the values Q, H, P and Eta are in line with one another, turbulence and air in the medium lead to imprecise measurement. For this reason, there are limits imposed on frequency regulation.

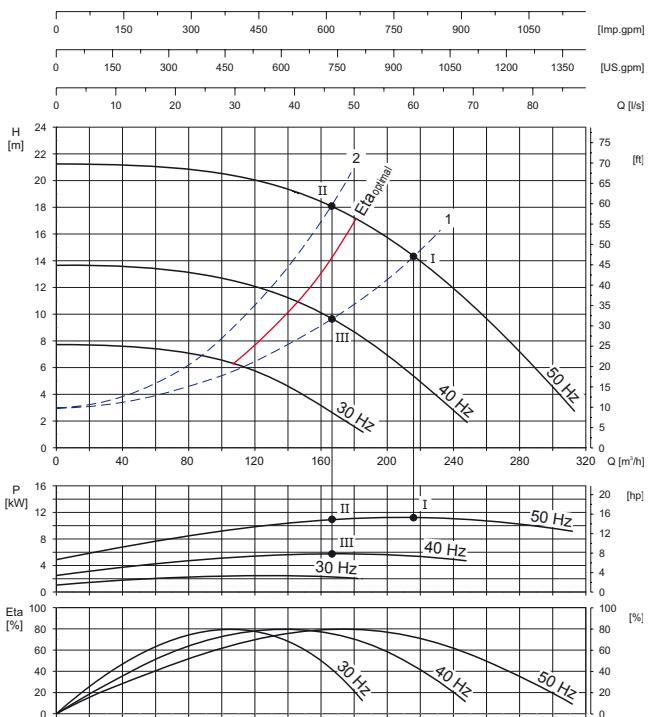
It is ultimately important when looking at system optimisation to take optimal efficiency into account also ($\eta_{optimal}$). This also has an influence on matching the best possible pump to the system.

The energy savings generated from frequency regulation can be calculated using the similarity rules for centrifugal pumps.

$$\frac{Q_1}{Q_2} = \frac{n_1}{n_2} \quad \text{The flow rate (Q) changes in a linear manner in relation to the speed:}$$

$$\frac{H_1}{H_2} = \left(\frac{n_1}{n_2} \right)^2 \quad \text{The head (H) changes with the 2nd power of the speed:}$$

$$\frac{P_1}{P_2} = \left(\frac{n_1}{n_2} \right)^3 \quad \text{The drive output (P) changes with the 3rd power of the speed:}$$



Typical example of the use of the frequency converter:

Night-time energy reduction

| | |
|---|--------------------------------|
| Duty point: | $Q=215 \text{ m}^3/\text{h}$ |
| | $H=14 \text{ m}$ |
| | $P=11.5 \text{ kW}$ |
| Night-time reduction by switching off one pump: | $Q=170 \text{ m}^3/\text{h}$ |
| | $H=11 \text{ m}$ |
| | $P=5.5 \text{ kW}$ |
| Frequency regulation of two pumps: | $Q=107.5 \text{ m}^3/\text{h}$ |
| | $H=6 \text{ m}$ |
| | $P=4.5 \text{ kW}$ |
| Energy savings by night-time energy reduction: | $\Delta P=1.0 \text{ kW}$ |
| Operating hours per year in night-time reduction: | 3000 h |

Savings: 3000 kWh



We reserve the right to make changes in line with technical further developments!