

CB 2, 4, 8, 12 CBI 2, 4 series  
HBI, HBN2, 4, 8, 12 series  
Horizontal Multistage Centrifugal Pumps 50, 60 Hz



# Contents

## CB, CBI

### General data

|   |                                |
|---|--------------------------------|
| 2 | Performance range 50 Hz, 60 Hz |
| 3 | Applications                   |
| 3 | Pump                           |
| 3 | Motor                          |
| 4 | Operating conditions           |
| 4 | Type key, Mechanical seals     |
| 5 | Material construction          |

### Technical data

|    |                                           |
|----|-------------------------------------------|
| 6  | Performance curves CB, CBI 2, 4 50 Hz     |
| 8  | Dimensions and weights CB, CBI 2, 4 50 Hz |
| 9  | Performance curves CB 8, 12 50 Hz         |
| 11 | Dimensions and weights CB 8, 12 50 Hz     |
| 12 | Performance curves CB, CBI 2, 4 60 Hz     |
| 14 | Dimensions and weights CB,CBI 2, 4 60 Hz  |
| 15 | Performance curves CB 8, 12 60 Hz         |
| 17 | Dimensions and weights CB 8, 12 60 Hz     |

## HBI, HBN

### General data

|    |                                   |
|----|-----------------------------------|
| 18 | Performance range 50 Hz, 60 Hz    |
| 19 | Applications                      |
| 19 | Pump, Motor, Operating conditions |
| 19 | Liquids to be pumped              |
| 20 | Type Key, Mechanical seals        |
| 20 | Material construction             |

### Technical data

|    |                                             |
|----|---------------------------------------------|
| 21 | Performance curves HBI, HBN 2, 4 50 Hz      |
| 23 | Dimensions and weights HBI, HBN 2, 4 50 Hz  |
| 24 | Performance curves HBI, HBN 8, 12 50 Hz     |
| 26 | Dimensions and weights HBI, HBN 8, 12 50 Hz |
| 27 | Performance curves HBI,HBN 2, 4 60 Hz       |
| 29 | Dimensions and weights HBI,HBN 2, 4 60 Hz   |
| 30 | Performance curves HBI,HBN 8, 12 60 Hz      |
| 32 | Dimensions and weights HBI,HBN 8, 12 60 Hz  |

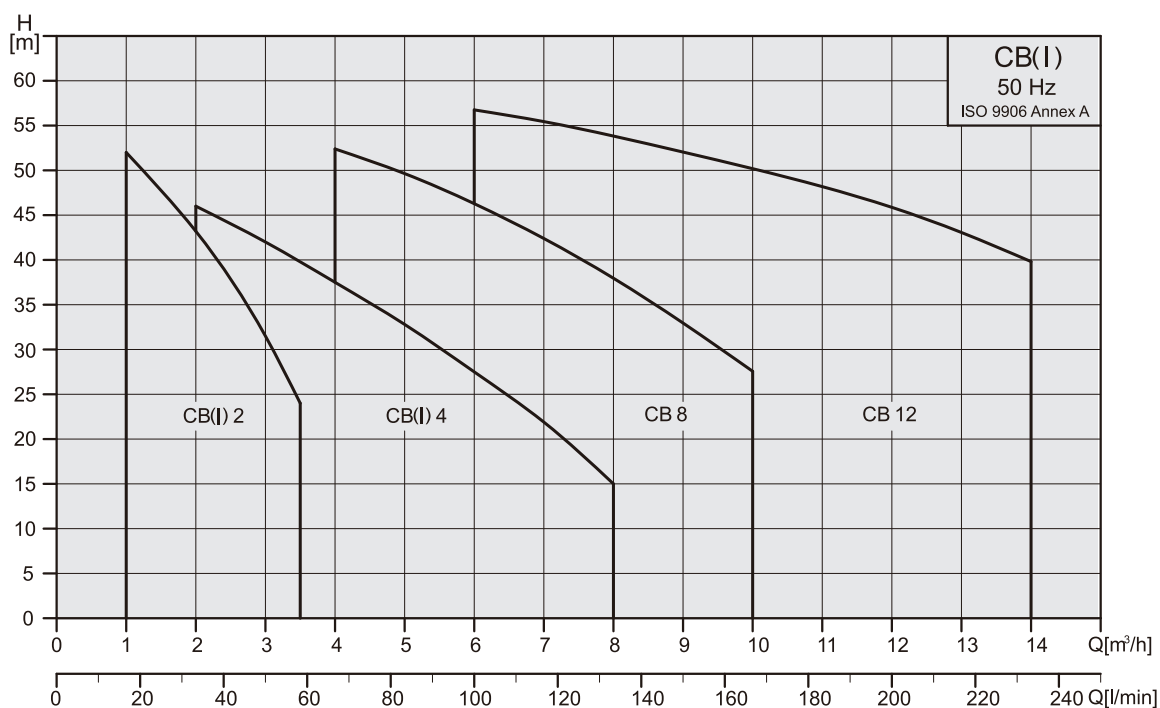


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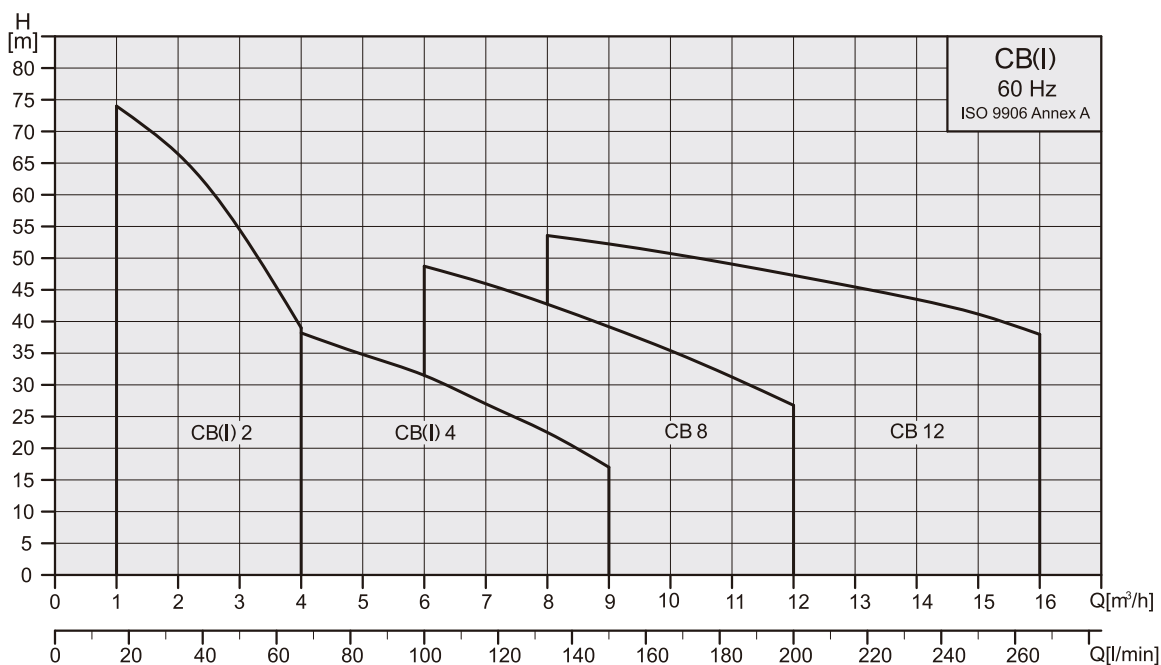
# General data

CB, CBI

## Performance range, 50Hz



## Performance range, 60Hz



### Applications

- \*Domestic
- \*Liquid transfer and circulation of liquids within light industry and farming
- \*Pressure boosting
- \*Air-conditioning systems
- \*Cooling systems or cooling machine
- \*Specialized OEM equipment

### Pump

The CB and CBI series are non-self priming, horizontal multistage centrifugal pumps. Pump is coupled with motor at the same shaft and mounted on a base-plate. The friendly design makes the pump suitable for installation in the small domestic or industrial water supply systems. The pump is fitted with a mechanical seal and through-going pump-motor shaft.

**CB:** The discharge and suction chamber are made of cast iron. The other parts of pump in contact with the liquid are made of stainless steel.

**CBI:** All parts of pump in contact with the liquid are made of stainless steel.  
EPDM or Viton O-rings are available as standard.

### Pipe connections:

| Connections              | CB, CBI 2 | CB, CBI 4 | CB8      | CB12     |
|--------------------------|-----------|-----------|----------|----------|
| Suction port             | Rp 1      | Rp 1 1/4  | Rp 1 1/2 | Rp 1 1/2 |
| Discharge port           | Rp 1      | Rp 1      | Rp 1 1/4 | Rp 1 1/2 |
| Drain hole, priming hole | Rc 3/8    | Rc 3/8    | Rp 1/2   | Rp 1/2   |

### Motor

The pump is fitted with a totally enclosed, fan-cooled, squirrel-cage motor.

Rated speed: 2850rpm(50Hz), 3450rpm(60Hz)

Enclosure class: IP 54

Insulation class: F

Standard voltages:

50HZ 1Ø

0.5HP~3.0HP 220-240V

60HZ 1Ø

0.5HP~1.0HP 110/220V

1.5HP~3.0HP 220-240V

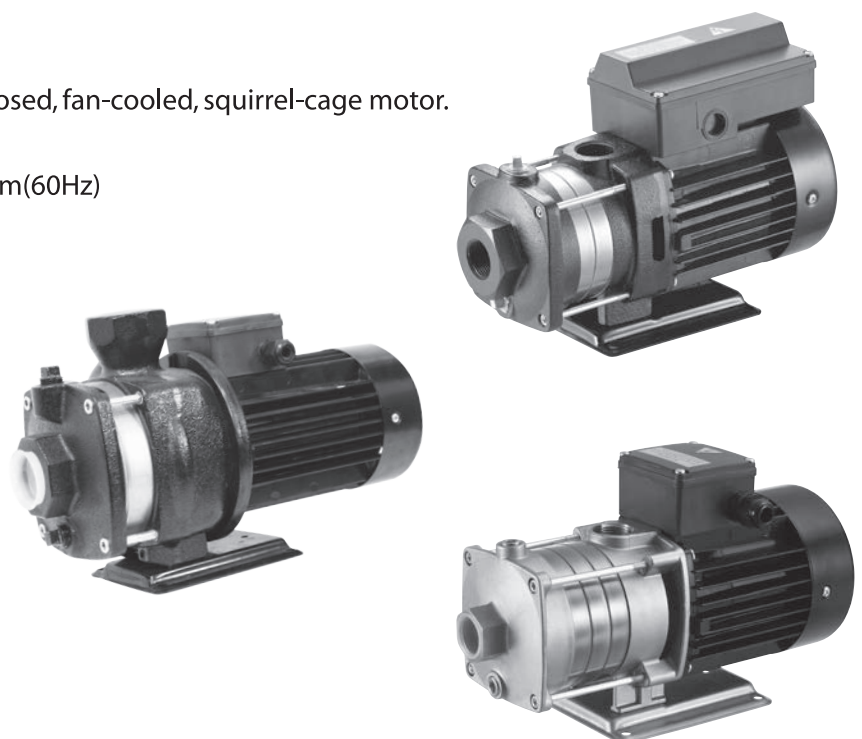
50HZ 3Ø

0.5HP~4.0HP 220-240V/380-415V

60HZ 3Ø

0.5HP~1.5HP 220-255V/380-440V

2.0HP~4.0HP 220-277V/380-480V



### Operating conditions

Liquid: Clean liquid without solid particles.

Liquid temperature range: 0°C ~ +90°C.

Maximum ambient temperature: +50°C.

The maximum operating pressure depends on the temperature of the pumped liquid, see table:

| Max. operating pressure | 10 kg/cm <sup>2</sup> | 6 kg/cm <sup>2</sup> |
|-------------------------|-----------------------|----------------------|
| CB(I)2, CB(I)4          | 0°C to + 40°C         | +41°C to + 90°C      |
| CB 8, CB12              | 0°C to + 55°C         | +56°C to + 90°C      |

Min. inlet pressure: According to the NPSH curve + a safety margin of 0.5m.

Max. inlet pressure: Limited by the max. operating pressure.

### Model

|         |           |                                       |   |                       |   |                  |
|---------|-----------|---------------------------------------|---|-----------------------|---|------------------|
| Example | CB(I)     | 4                                     | - | 30                    | - | CQBE             |
|         | Pump type | Nominal flow rate [m <sup>3</sup> /h] |   | Number of stages x 10 |   | Mechanical Seals |

### Mechanical seals

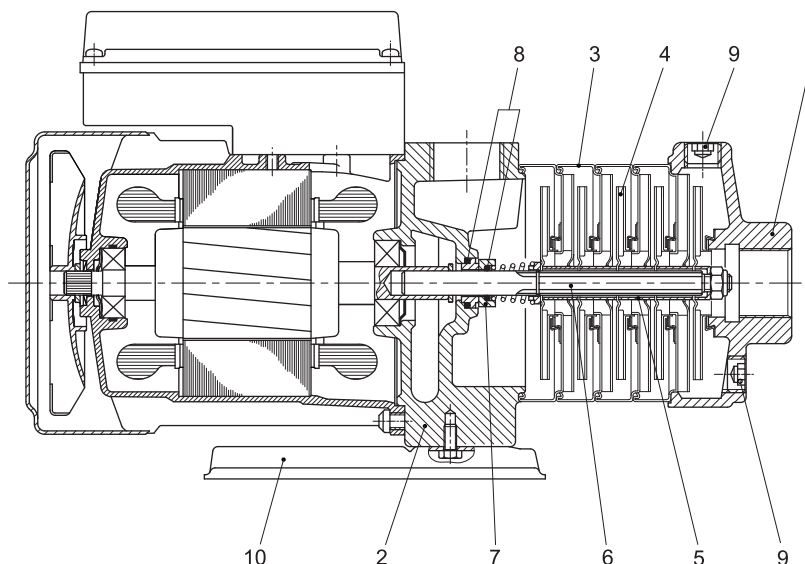
| List of Materials    |               |
|----------------------|---------------|
| Q : Silicon carbide  | E : EPDM      |
| U : Tungsten carbide | V : Viton     |
| B : Carbon           | C : Seal Type |
| H : Seal Type        |               |

| Mechanical Seals | CB, CBI 2/4 | CB 8,12  |
|------------------|-------------|----------|
| CQB              | ●           | ●        |
| CQQ              | Optional    | Optional |
| HUU              | Optional    | Optional |
| O-rings          |             |          |
| E                | ●           | ●        |
| V                | Optional    | Optional |

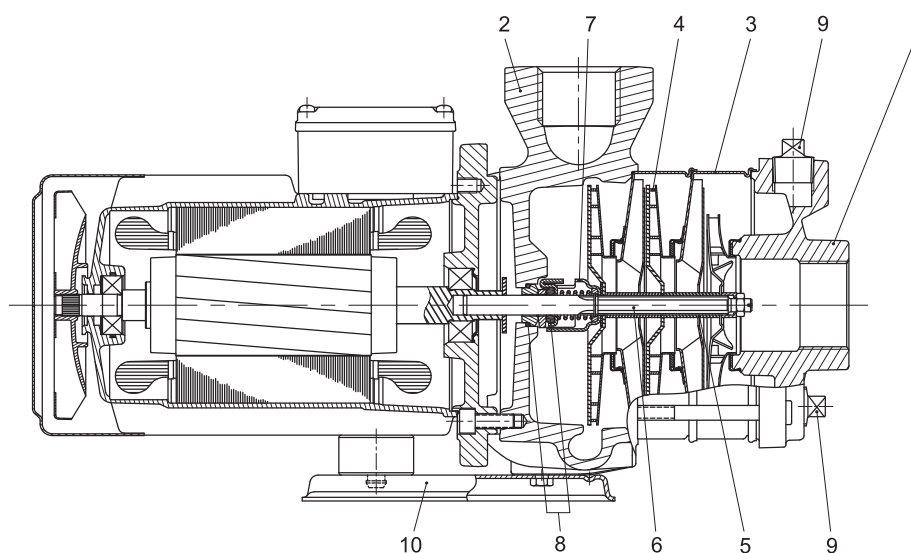
● Standard

### Material construction

#### CB(I) 2,4



#### CB 8,12



### Materials

| Pos. | Description            | Materials                |                          |
|------|------------------------|--------------------------|--------------------------|
|      |                        | CB                       | CBI                      |
| 1    | Suction chamber        | Cast iron                | SS304                    |
| 2    | Pump head              | Cast iron                | SS304                    |
| 3    | Intermediate chamber   | SS304                    | SS304                    |
| 4    | Impeller               | SS304                    | SS304                    |
| 5    | Spacing pipe           | SS304                    | SS304                    |
| 6    | Shaft                  | SS431                    | SS431                    |
| 7    | Mechanical seal        | Silicon carbide / Carbon | Silicon carbide / Carbon |
| 8    | O-ring                 | EPDM                     | EPDM                     |
| 9    | Drain and priming plug | Steel                    | SS304                    |
| 10   | Base plate             | Steel                    | SS304                    |

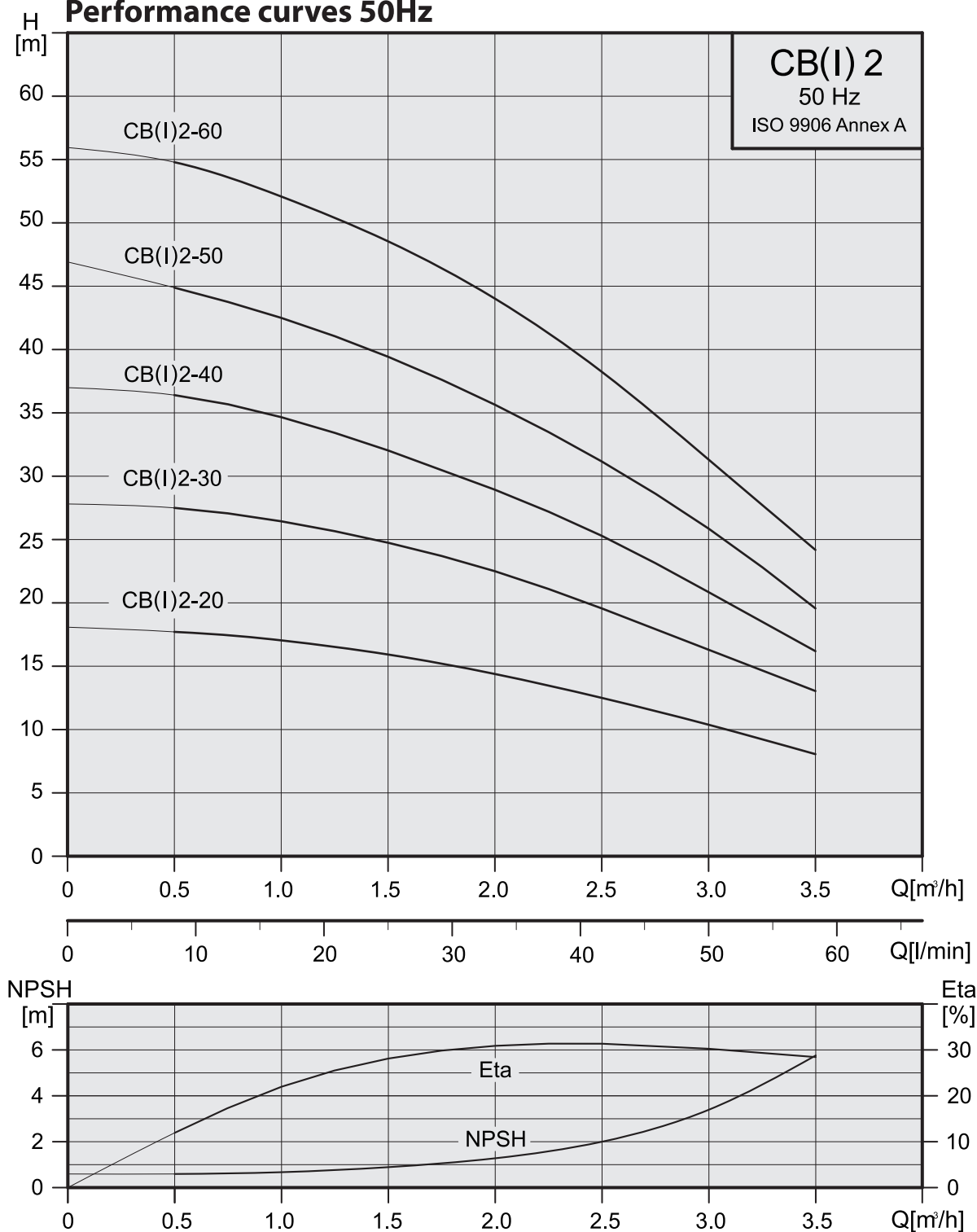


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# Technical data

**CB, CBI 2**

## Performance curves 50Hz



## Electrical data, 2850 min<sup>-1</sup>

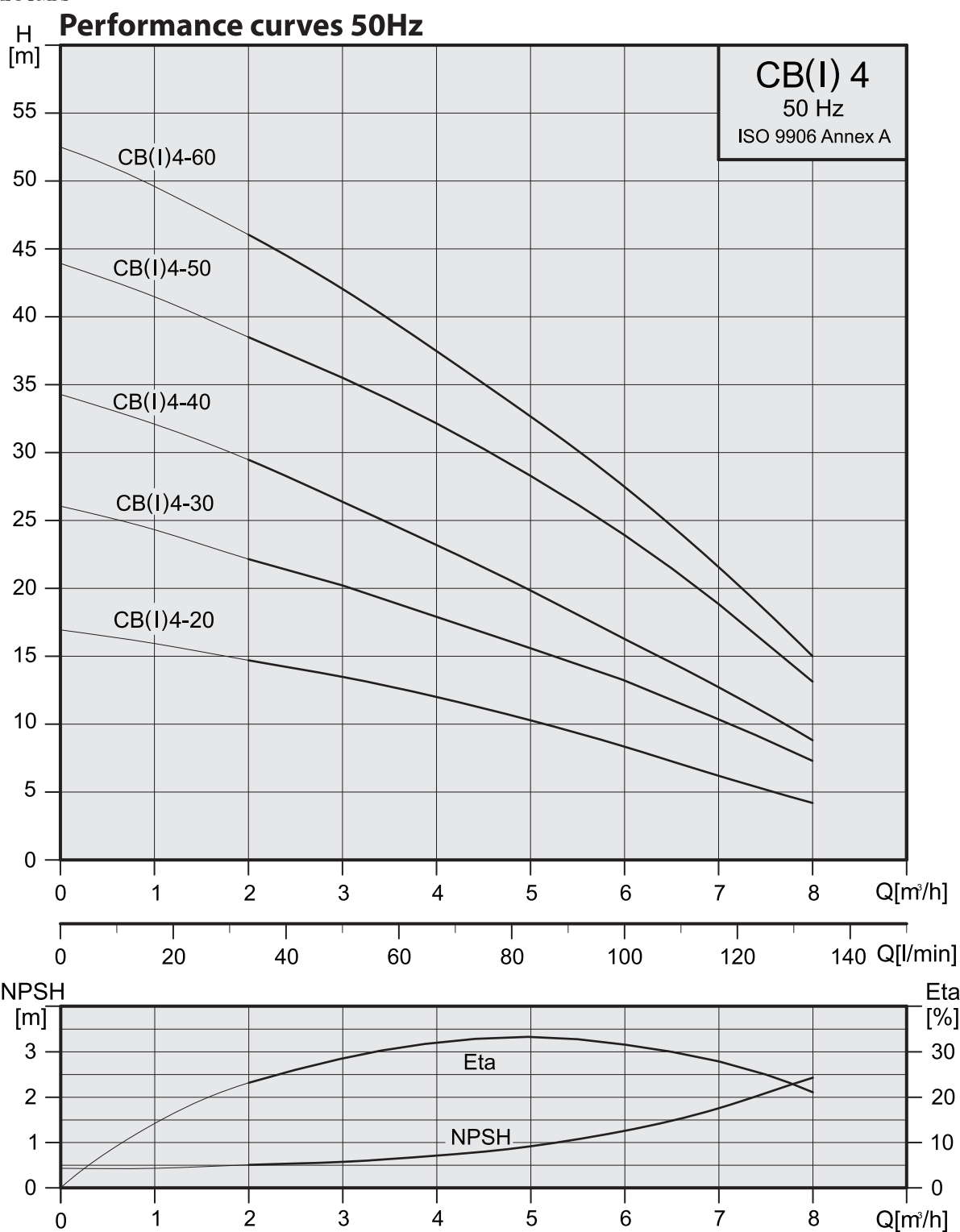
| pump type   | 1 x 220-240 V      |                      | 3 x 220-240 △/380-415 V V |                      |
|-------------|--------------------|----------------------|---------------------------|----------------------|
|             | P <sub>1</sub> [W] | I <sub>1/n</sub> [A] | P <sub>1</sub> [W]        | I <sub>1/n</sub> [A] |
| CB/CBI 2-20 | 380                | 1.7-2.0              | 430                       | 2.2-2.6 / 1.3-1.5    |
| CB/CBI 2-30 | 470                | 2.1-2.2              | 530                       | 2.2-2.5 / 1.3-1.45   |
| CB/CBI 2-40 | 620                | 2.7-2.8              | 660                       | 2.4-2.8 / 1.4-1.6    |
| CB/CBI 2-50 | 720                | 3.2-3.1              | 770                       | 2.5-2.9 / 1.45-1.7   |
| CB/CBI 2-60 | 830                | 3.7-3.6              | 860                       | 2.9-3.3 / 1.7-1.9    |



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# Technical data

CB, CBI 4



## Electrical data, 2850 min<sup>-1</sup>

| pump type   | 1 x 220-240 V      |                      | 3 x 220-240 $\Delta$ / 380-415 Y V |                      |
|-------------|--------------------|----------------------|------------------------------------|----------------------|
|             | P <sub>i</sub> [W] | I <sub>1/1</sub> [A] | P <sub>i</sub> [W]                 | I <sub>1/1</sub> [A] |
| CB/CBI 4-20 | 560                | 2.6-2.5              | 610                                | 2.4-2.9 / 1.4-1.7    |
| CB/CBI 4-30 | 770                | 3.6-3.5              | 790                                | 2.5-2.9 / 1.5-1.7    |
| CB/CBI 4-40 | 960                | 4.4-4.1              | 1010                               | 3.1-3.3 / 1.8-1.9    |
| CB/CBI 4-50 | 1160               | 5.3-5.0              | 1240                               | 4.2-4.5 / 2.4-2.6    |
| CB/CBI 4-60 | 1430               | 6.7-6.4              | 1460                               | 5.1-5.5 / 2.9-3.2    |



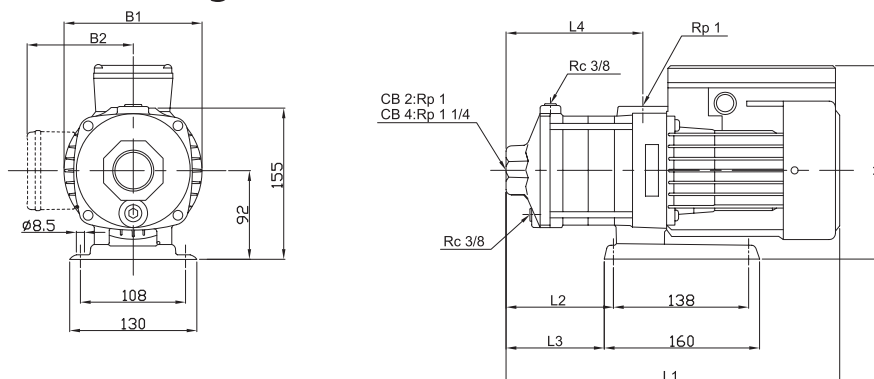
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# Technical data

CB, CBI

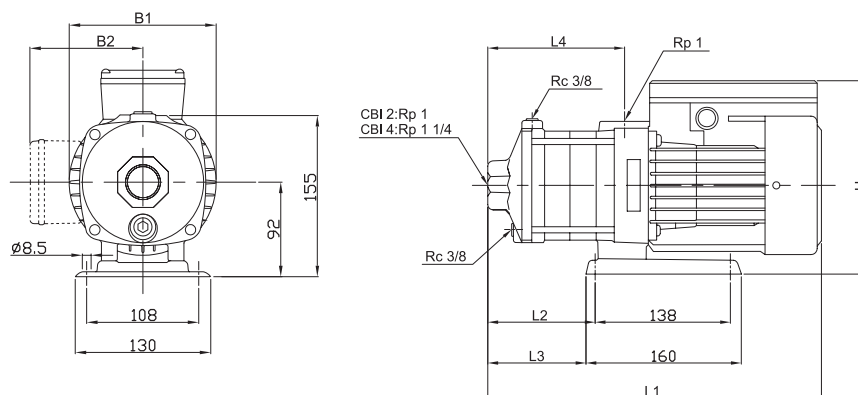
## Dimensions and weights 50 Hz

### CB-2, CB-4



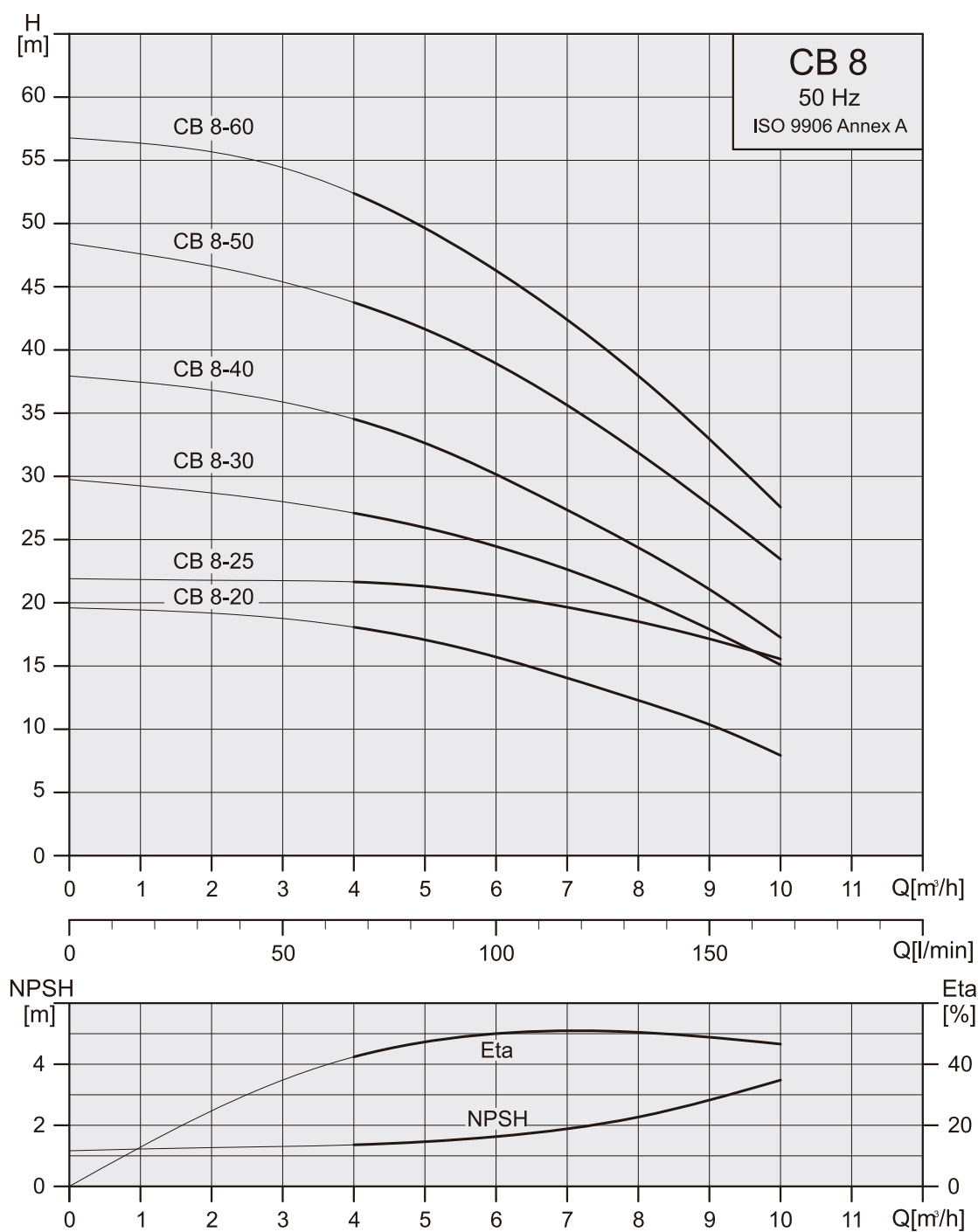
| pump type | mm  |     |     |     |     |        |        |        |        | Kg     |        |
|-----------|-----|-----|-----|-----|-----|--------|--------|--------|--------|--------|--------|
|           | L1  | L2  | L3  | L4  | B1  | B2     |        | H      |        |        |        |
|           |     |     |     |     |     | 1phase | 3phase | 1phase | 3phase | 1phase | 3phase |
| CB 2-20   | 309 | 75  | 63  | 101 | 141 | 127    | 115    | 228    | 207    | 10.3   | 10.0   |
| CB 2-30   | 327 | 93  | 81  | 119 | 141 | 127    | 115    | 228    | 207    | 10.5   | 10.3   |
| CB 2-40   | 345 | 111 | 99  | 137 | 141 | 127    | 115    | 228    | 207    | 10.8   | 10.5   |
| CB 2-50   | 363 | 129 | 117 | 155 | 141 | 127    | 115    | 228    | 207    | 11.6   | 11.2   |
| CB 2-60   | 381 | 147 | 135 | 173 | 141 | 127    | 115    | 228    | 207    | 11.8   | 11.5   |
| CB 4-20   | 318 | 84  | 72  | 110 | 141 | 127    | 115    | 228    | 207    | 10.4   | 10.1   |
| CB 4-30   | 344 | 111 | 99  | 137 | 141 | 127    | 115    | 228    | 207    | 10.8   | 10.5   |
| CB 4-40   | 372 | 138 | 126 | 164 | 141 | 127    | 115    | 228    | 207    | 11.6   | 11.2   |
| CB 4-50   | 438 | 165 | 153 | 191 | 141 | 127    | 115    | 228    | 207    | 13.4   | 13.1   |
| CB 4-60   | 465 | 192 | 180 | 218 | 141 | 127    | 115    | 228    | 207    | 14.8   | 14.5   |

### CBI-2, CBI-4



| pump type | mm  |     |     |     |     |        |        |        |        | Kg     |        |
|-----------|-----|-----|-----|-----|-----|--------|--------|--------|--------|--------|--------|
|           | L1  | L2  | L3  | L4  | B1  | B2     |        | H      |        |        |        |
|           |     |     |     |     |     | 1phase | 3phase | 1phase | 3phase | 1phase | 3phase |
| CBI 2-20  | 309 | 75  | 63  | 101 | 141 | 127    | 115    | 228    | 207    | 9.1    | 8.8    |
| CBI 2-30  | 327 | 93  | 81  | 119 | 141 | 127    | 115    | 228    | 207    | 9.4    | 9.1    |
| CBI 2-40  | 345 | 111 | 99  | 137 | 141 | 127    | 115    | 228    | 207    | 9.6    | 9.4    |
| CBI 2-50  | 363 | 129 | 117 | 155 | 141 | 127    | 115    | 228    | 207    | 10.4   | 10.1   |
| CBI 2-60  | 381 | 147 | 135 | 173 | 141 | 127    | 115    | 228    | 207    | 10.7   | 10.3   |
| CBI 4-20  | 318 | 84  | 72  | 110 | 141 | 127    | 115    | 228    | 207    | 9.2    | 9.0    |
| CBI 4-30  | 344 | 111 | 99  | 137 | 141 | 127    | 115    | 228    | 207    | 9.6    | 9.3    |
| CBI 4-40  | 372 | 138 | 126 | 164 | 141 | 127    | 115    | 228    | 207    | 10.4   | 10.1   |
| CBI 4-50  | 438 | 165 | 153 | 191 | 141 | 127    | 115    | 228    | 207    | 11.3   | 12.0   |
| CBI 4-60  | 465 | 192 | 180 | 218 | 141 | 127    | 115    | 228    | 207    | 13.6   | 13.4   |

### Performance curves 50Hz



### Electrical data, 2850min<sup>-1</sup>

| pump type | 1x220-240 V        |                      | 3x220-240/380-415 V |                      |
|-----------|--------------------|----------------------|---------------------|----------------------|
|           | P <sub>i</sub> [W] | I <sub>1/1</sub> [A] | P <sub>i</sub> [W]  | I <sub>1/1</sub> [A] |
| CB 8-20   | 595                | 3.3-3.2              | 810                 | 2.9-3.3 / 1.7-1.9    |
| CB 8-25   | -                  | -                    | 1060                | 3.5-3.8 / 2.0-2.2    |
| CB 8-30   | 1130               | 5.2-5.0              | 1260                | 4.3-4.8 / 2.5-2.8    |
| CB 8-40   | 1390               | 6.3-6.1              | 1520                | 5.7-6.3 / 3.3-3.7    |
| CB 8-50   | 1940               | 8.2-8.1              | 1860                | 5.7-6.3 / 3.4-3.7    |
| CB 8-60   | 2090               | 9.0-8.8              | 2110                | 6.5-7.0 / 3.8-4.1    |

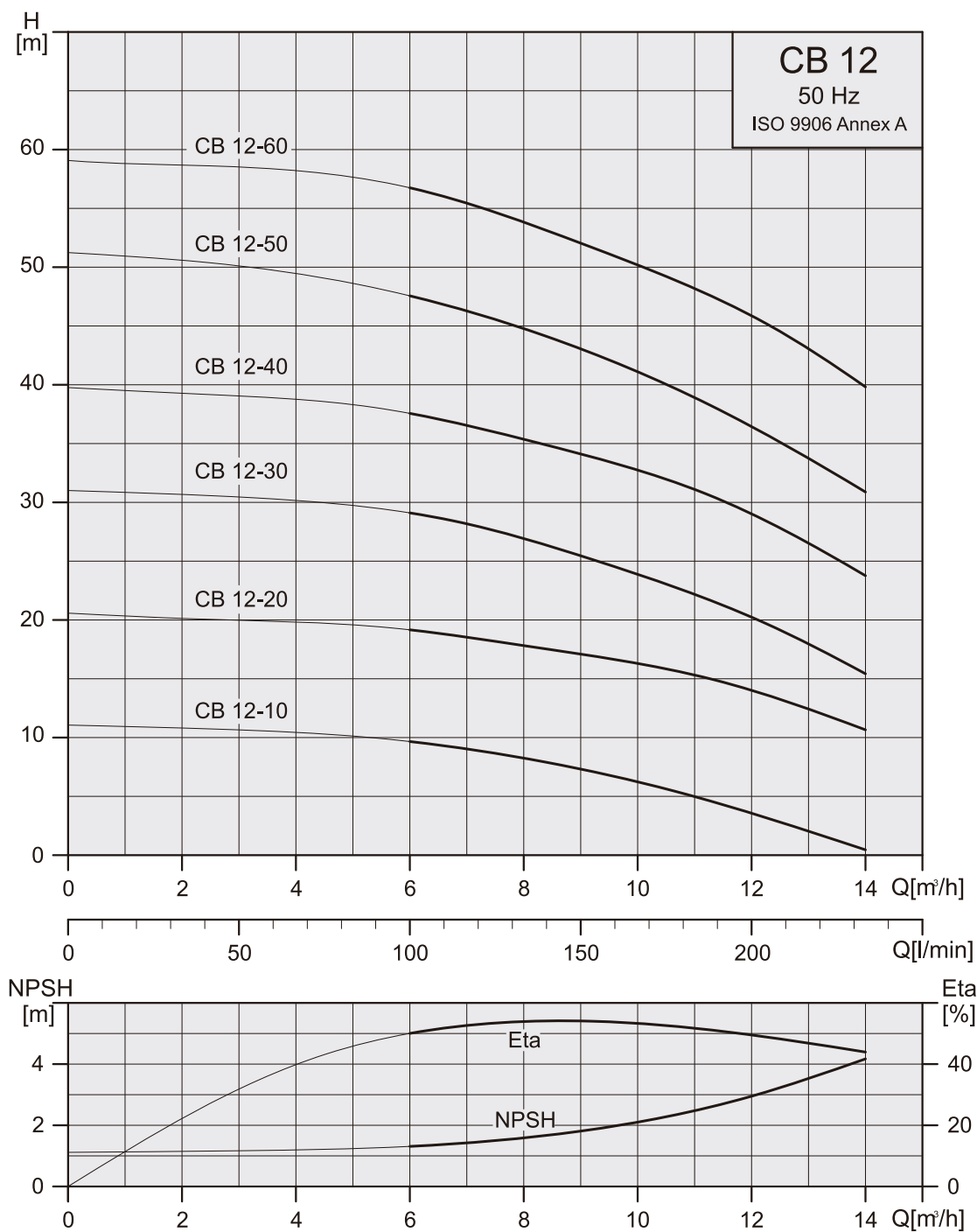


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# Technical data

CB 12

## Performance curves 50Hz



## Electrical data, 2850min<sup>-1</sup>

| pump type | 1x220-240 V        |                      | 3x220-240/380-415 V |                      |
|-----------|--------------------|----------------------|---------------------|----------------------|
|           | P <sub>i</sub> [W] | I <sub>1/1</sub> [A] | P <sub>i</sub> [W]  | I <sub>1/1</sub> [A] |
| CB 12-10  | -                  | -                    | 590                 | 2.8-3.1 / 1.6-1.8    |
| CB 12-20  | 1160               | 5.3-5.1              | 1170                | 3.8-4.0 / 2.2-2.3    |
| CB 12-30  | 1680               | 7.8-7.4              | 1690                | 5.7-6.5 / 3.3-3.8    |
| CB 12-40  | 2400               | 11.0-10.6            | 2350                | 7.3-7.6 / 4.2-4.4    |
| CB 12-50  | 2910               | 12.7-12.2            | 2820                | 8.8-9.0 / 5.1-5.2    |
| CB 12-60  | -                  | -                    | 3320                | 10.6-11.4 / 6.1-6.6  |



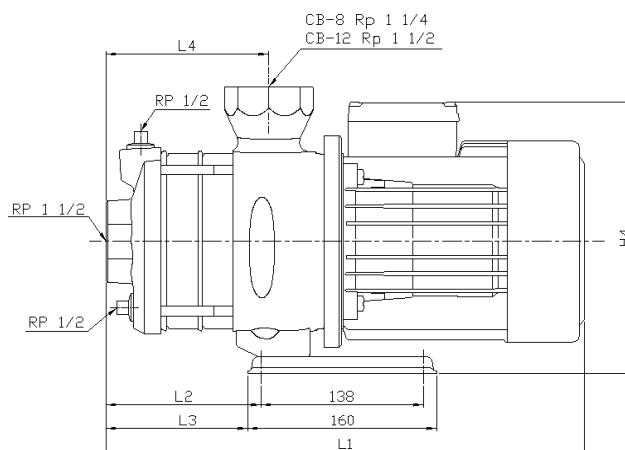
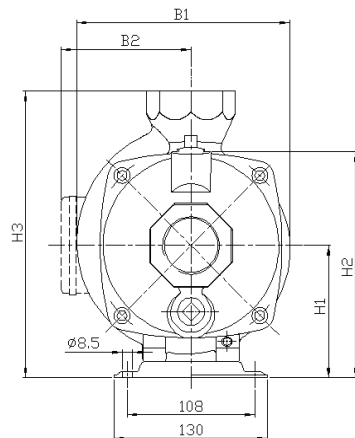
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# Technical data

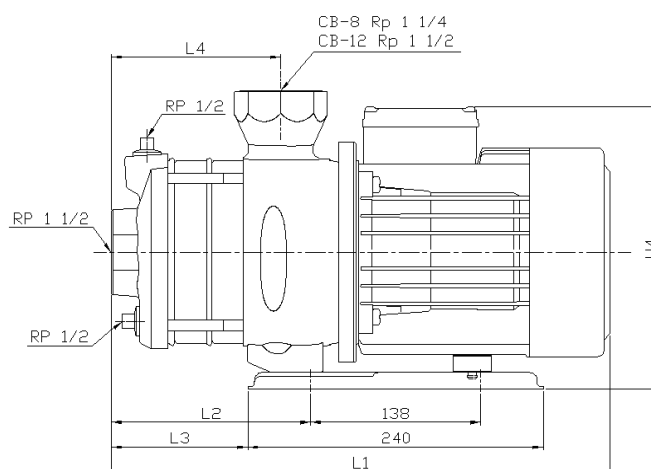
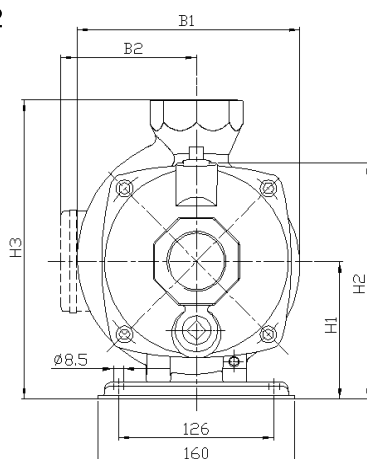
CB

## Dimensions and weights 50 Hz

CB-8



CB-12



CB-8

| pump type | mm     |        |        |        |        |        |     |        |        |        |        |     |     |     |        |        | Base(mm) |        | Kg     |        |
|-----------|--------|--------|--------|--------|--------|--------|-----|--------|--------|--------|--------|-----|-----|-----|--------|--------|----------|--------|--------|--------|
|           | L1     |        | L2     |        | L3     |        | L4  | B1     |        | B2     |        | H1  | H2  | H3  | H4     |        |          |        |        |        |
|           | 1phase | 3phase | 1phase | 3phase | 1phase | 3phase |     | 1phase | 3phase | 1phase | 3phase |     |     |     | 1phase | 3phase | 1phase   | 3phase | 1phase | 3phase |
| CB 8-20   | 320    | 320    | 54     | 54     | 41     | 41     | 77  | 181    | 181    | 135    | 114    | 110 | 187 | 239 | 245    | 224    | 160      | 160    | 17.2   | 17     |
| CB 8-25   | -      | 390    | -      | 84     | -      | 71     | 107 | -      | 181    | -      | 114    | 110 | 187 | 239 | -      | 224    | -        | 160    | -      | 19.1   |
| CB 8-30   | 390    | 390    | 84     | 84     | 71     | 71     | 107 | 181    | 181    | 135    | 114    | 110 | 187 | 239 | 245    | 224    | 160      | 160    | 19.5   | 19.2   |
| CB 8-40   | 390    | 390    | 84     | 84     | 71     | 71     | 107 | 181    | 181    | 135    | 114    | 110 | 187 | 239 | 245    | 224    | 160      | 160    | 20.7   | 20.5   |
| CB 8-50   | 480    | 420    | 162    | 114    | 111    | 101    | 137 | 185    | 181    | 152    | 114    | 110 | 187 | 239 | 262    | 224    | 240      | 160    | 28.5   | 21.4   |
| CB 8-60   | 480    | 480    | 162    | 162    | 111    | 111    | 137 | 185    | 185    | 152    | 139    | 110 | 187 | 239 | 262    | 249    | 240      | 240    | 28.7   | 27.6   |

CB-12

| pump type | mm     |        |        |        |        |        |     |        |        |        |        |     |     |     |        |        | Base(mm) |        | Kg     |        |
|-----------|--------|--------|--------|--------|--------|--------|-----|--------|--------|--------|--------|-----|-----|-----|--------|--------|----------|--------|--------|--------|
|           | L1     |        | L2     |        | L3     |        | L4  | B1     |        | B2     |        | H1  | H2  | H3  | H4     |        |          |        |        |        |
|           | 1phase | 3phase | 1phase | 3phase | 1phase | 3phase |     | 1phase | 3phase | 1phase | 3phase |     |     |     | 1phase | 3phase | 1phase   | 3phase | 1phase | 3phase |
| CB 12-10  | -      | 320    | -      | 54     | -      | 41     | 77  | -      | 181    | -      | 114    | 110 | 187 | 239 | -      | 224    | -        | 160    | -      | 17.9   |
| CB 12-20  | 360    | 360    | 54     | 54     | 41     | 41     | 77  | 181    | 181    | 135    | 114    | 110 | 187 | 239 | 245    | 224    | 160      | 160    | 18.4   | 18.2   |
| CB 12-30  | 390    | 390    | 84     | 84     | 71     | 71     | 107 | 181    | 181    | 135    | 114    | 110 | 187 | 239 | 245    | 224    | 160      | 160    | 20.6   | 20.4   |
| CB 12-40  | 450    | 450    | 132    | 132    | 81     | 81     | 107 | 185    | 185    | 152    | 139    | 110 | 187 | 239 | 262    | 249    | 240      | 240    | 27.7   | 26.7   |
| CB 12-50  | 480    | 480    | 162    | 162    | 111    | 111    | 137 | 185    | 185    | 152    | 139    | 110 | 187 | 239 | 262    | 249    | 240      | 240    | 29.8   | 29.9   |
| CB 12-60  | -      | 501    | -      | 162    | -      | 111    | 137 | -      | 196    | -      | 150    | 122 | 199 | 251 | -      | 272    | -        | 240    | -      | 35.2   |

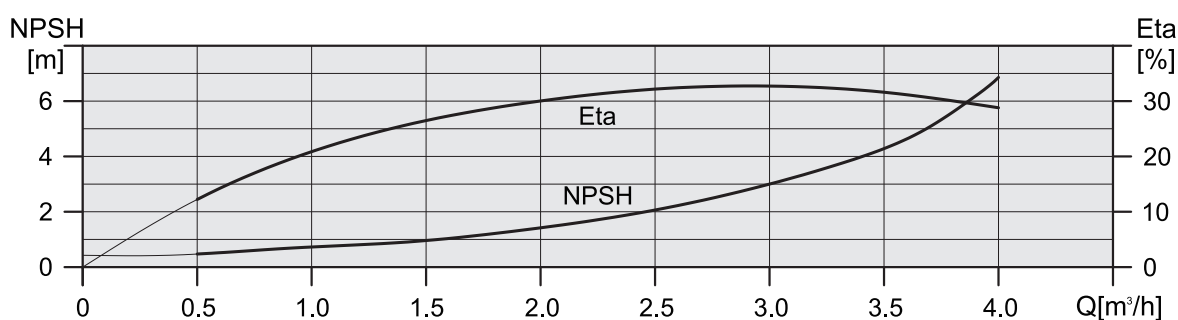
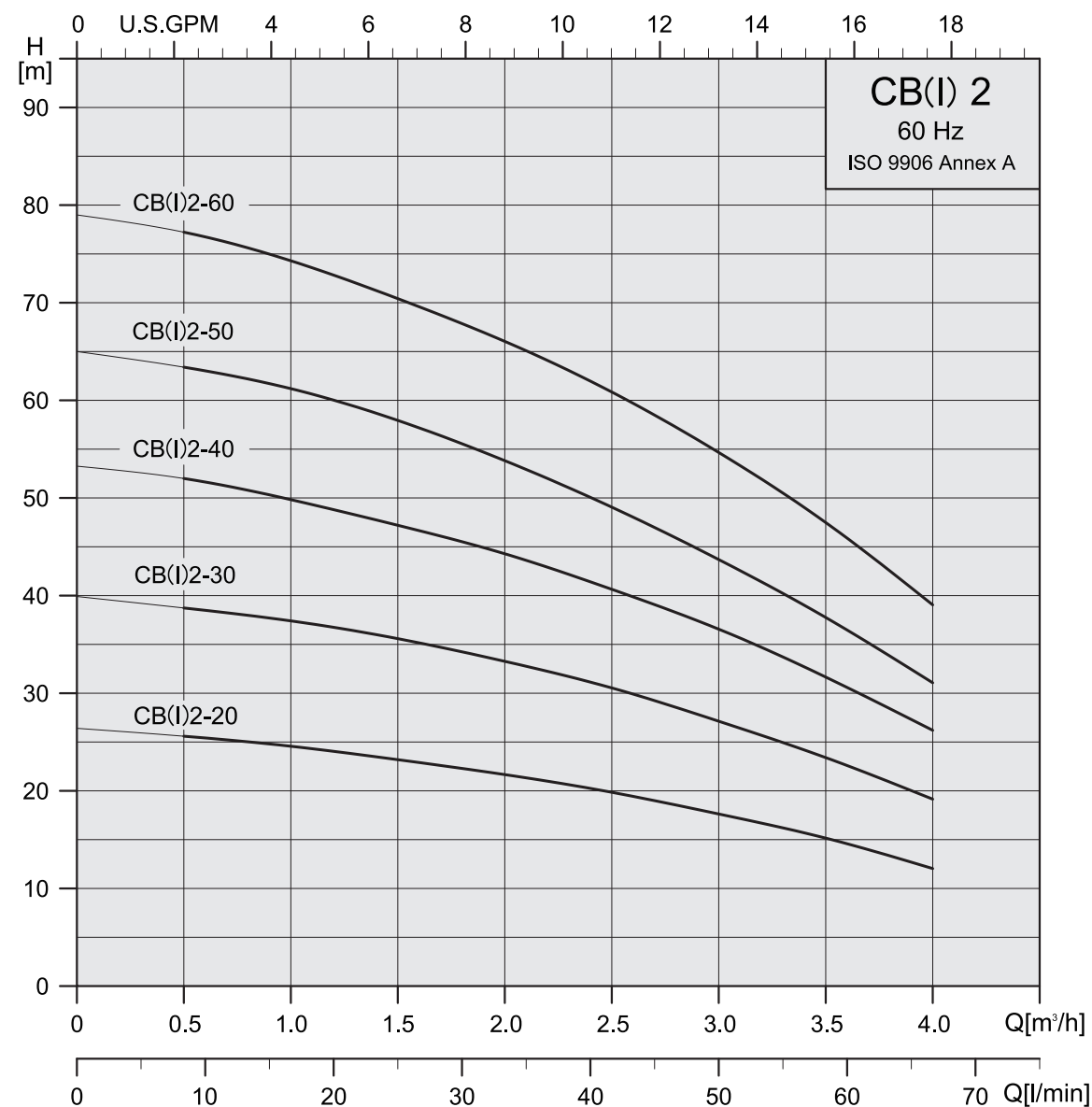


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# Technical data

CB, CBI 2

## Performance curves 60 Hz



## Electrical data, 3450 min<sup>-1</sup>

| pump type   | 1 x 110/220 V      |                      | 3x220-255/380-440 V |                      |
|-------------|--------------------|----------------------|---------------------|----------------------|
|             | P <sub>i</sub> [W] | I <sub>1/n</sub> [A] | P <sub>i</sub> [W]  | I <sub>1/n</sub> [A] |
| CB/CBI 2-20 | 570                | 6.3-3.2              | 550                 | 1.8-1.9 / 1.0-1.1    |
| CB/CBI 2-30 | 780                | 7.9-4.1              | 680                 | 3.5-3.3 / 2.0-1.9    |
| CB/CBI 2-40 | 870                | 8.8-4.4              | 950                 | 3.1-3.2 / 1.8-1.9    |
| CB/CBI 2-50 | 1190               | 11.7-5.9             | 1160                | 3.7-3.8 / 2.1-2.2    |
| CB/CBI 2-60 | 1410               | 13.7-6.9             | 1280                | 3.7-3.8 / 6.4-6.6    |

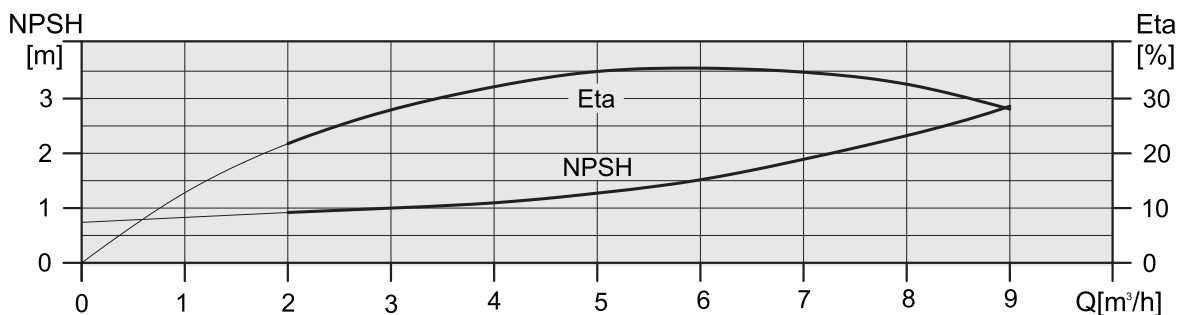
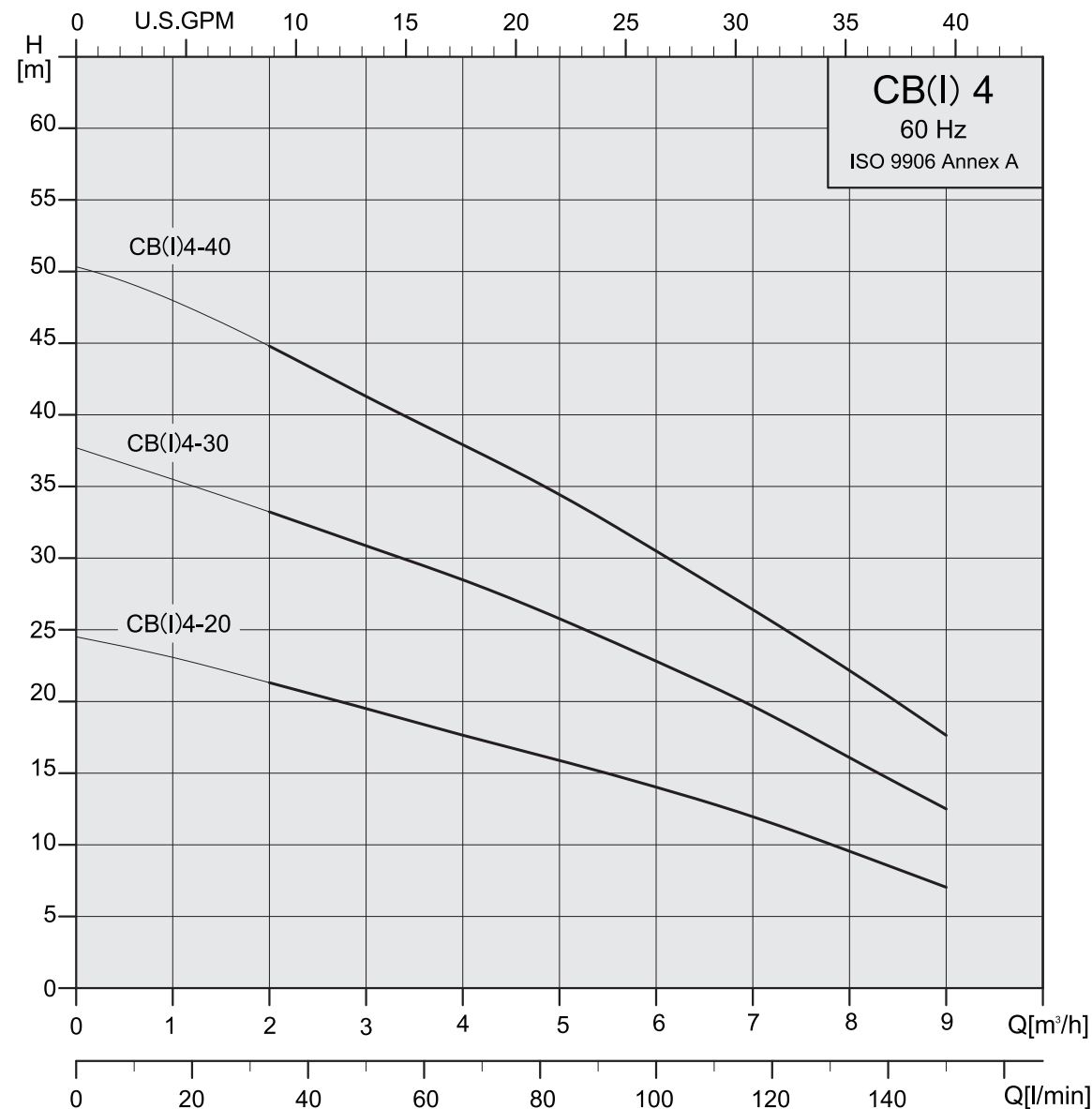


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# Technical data

CB, CBI 4

## Performance curves 60Hz

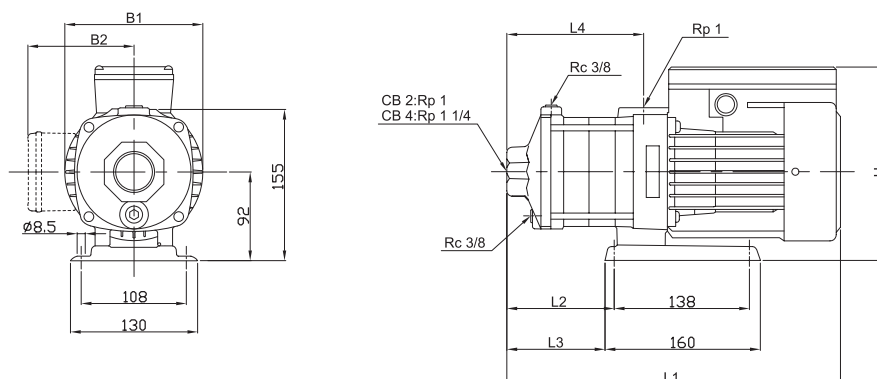


## Electrical data, 3450 min<sup>-1</sup>

| pump type   | 1 x 110/220 V      |                      | 3x220-255/380-440 V |                      |
|-------------|--------------------|----------------------|---------------------|----------------------|
|             | P <sub>i</sub> [W] | I <sub>1/1</sub> [A] | P <sub>i</sub> [W]  | I <sub>1/1</sub> [A] |
| CB/CBI 4-20 | 950                | 9.5 / 4.7            | 890                 | 2.85-3.0 / 1.65-1.8  |
| CB/CBI 4-30 | 1310               | 12.5 / 6.2           | 1250                | 3.9-4.0 / 2.3-2.4    |
| CB/CBI 4-40 | 1700               | 8.3(220V)            | 1630                | 5.1-5.3 / 2.9- 3.1   |

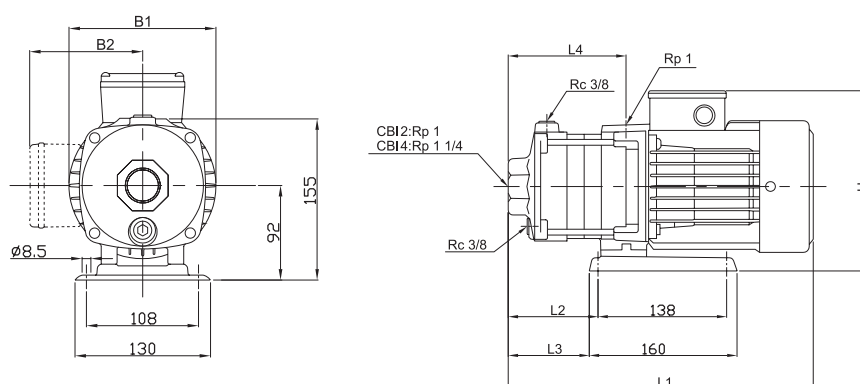
### Dimensions and weights 60 Hz

#### CB-2,CB-4



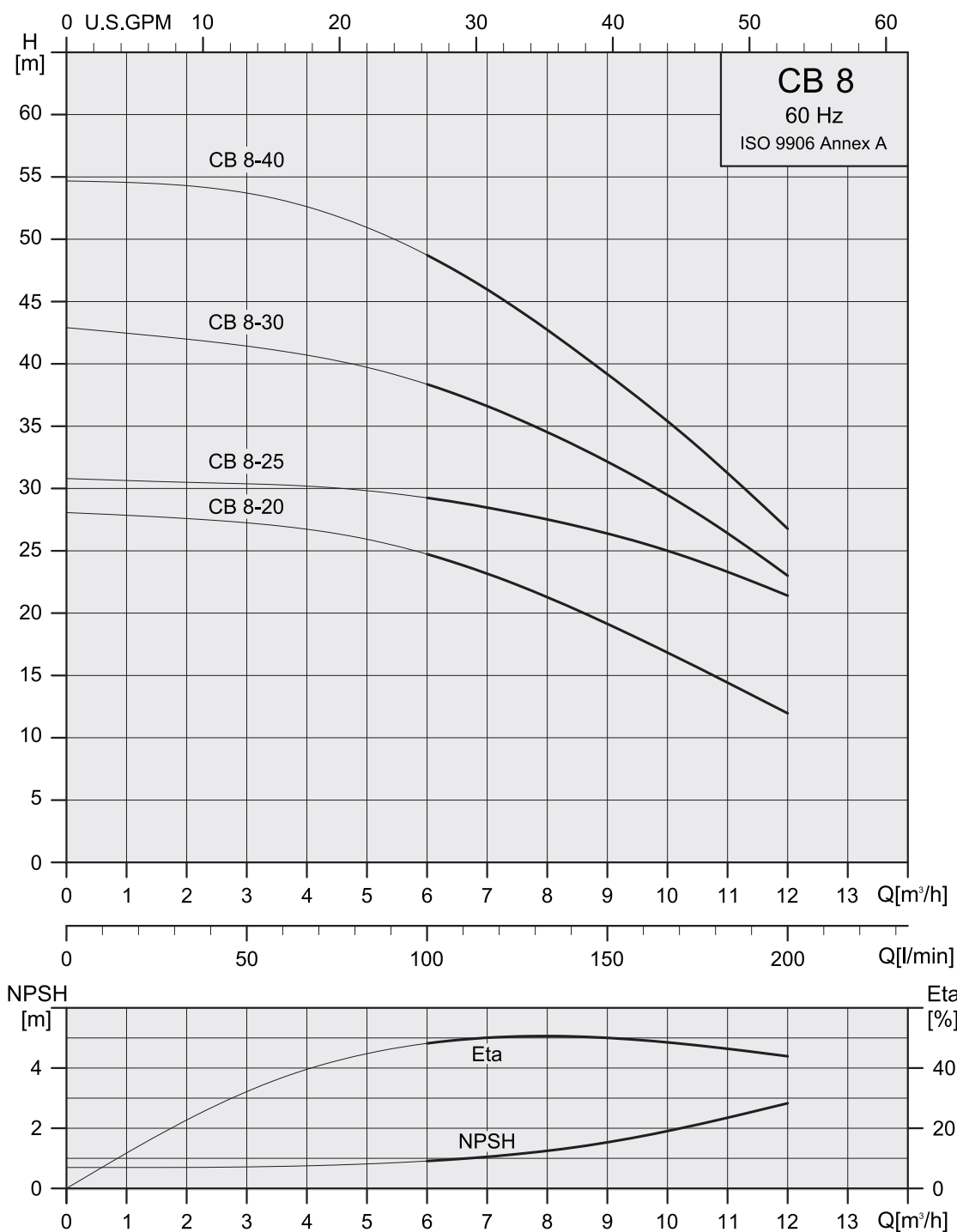
| pump type | mm  |     |     |     |     |        |        |        |        | Kg     |        |
|-----------|-----|-----|-----|-----|-----|--------|--------|--------|--------|--------|--------|
|           | L1  | L2  | L3  | L4  | B1  | B2     |        | H      |        |        |        |
|           |     |     |     |     |     | 1phase | 3phase | 1phase | 3phase | 1phase | 3phase |
| CB 2-20   | 309 | 75  | 63  | 101 | 141 | 127    | 115    | 228    | 207    | 10.3   | 10.0   |
| CB 2-30   | 327 | 93  | 81  | 119 | 141 | 127    | 115    | 228    | 207    | 11.1   | 10.8   |
| CB 2-40   | 345 | 111 | 99  | 137 | 141 | 127    | 115    | 228    | 207    | 11.3   | 11.1   |
| CB 2-50   | 403 | 129 | 117 | 155 | 141 | 127    | 115    | 228    | 207    | 13     | 12.4   |
| CB 2-60   | 421 | 147 | 135 | 173 | 141 | 127    | 115    | 228    | 207    | 13.2   | 12.7   |
| CB 4-20   | 318 | 84  | 72  | 110 | 141 | 127    | 115    | 228    | 207    | 12.2   | 10.7   |
| CB 4-30   | 384 | 111 | 99  | 137 | 141 | 127    | 115    | 228    | 207    | 12.7   | 12.3   |
| CB 4-40   | 412 | 138 | 126 | 164 | 141 | 127    | 115    | 228    | 207    | 14     | 13.7   |

#### CBI-2,CBI-4



| pump type | mm  |     |     |     |     |        |        |        |        | Kg     |        |
|-----------|-----|-----|-----|-----|-----|--------|--------|--------|--------|--------|--------|
|           | L1  | L2  | L3  | L4  | B1  | B2     |        | H      |        |        |        |
|           |     |     |     |     |     | 1phase | 3phase | 1phase | 3phase | 1phase | 3phase |
| CBI 2-20  | 309 | 75  | 63  | 101 | 141 | 127    | 115    | 228    | 207    | 9.1    | 8.8    |
| CBI 2-30  | 327 | 93  | 81  | 119 | 141 | 127    | 115    | 228    | 207    | 10.0   | 9.6    |
| CBI 2-40  | 345 | 111 | 99  | 137 | 141 | 127    | 115    | 228    | 207    | 10.2   | 10.0   |
| CBI 2-50  | 403 | 129 | 117 | 155 | 141 | 127    | 115    | 228    | 207    | 11.8   | 11.5   |
| CBI 2-60  | 421 | 147 | 135 | 173 | 141 | 127    | 115    | 228    | 207    | 12.1   | 11.7   |
| CBI 4-20  | 318 | 84  | 72  | 110 | 141 | 127    | 115    | 228    | 207    | 9.8    | 9.5    |
| CBI 4-30  | 384 | 111 | 99  | 137 | 141 | 127    | 115    | 228    | 207    | 11.5   | 11.1   |
| CBI 4-40  | 412 | 138 | 126 | 164 | 141 | 127    | 115    | 228    | 207    | 12.8   | 12.6   |

### Performance curves 60Hz



### Electrical data, 3450 min<sup>-1</sup>

| pump type | 1 x 110/220 V      |                      | 3x220-255/380-440 V |                      |
|-----------|--------------------|----------------------|---------------------|----------------------|
|           | P <sub>i</sub> [W] | I <sub>1/1</sub> [A] | P <sub>i</sub> [W]  | I <sub>1/1</sub> [A] |
| CB 8-20   | 1250               | 11.7 / 5.9           | 1220                | 3.7-3.8 / 2.2-2.3    |
| CB 8-25   | -                  | -                    | 1620                | 4.8-5.0 / 2.8-2.9    |
| CB 8-30   | 1830               | 8.9(220V)            | 1860                | 5.7-5.5 / 3.3-3.2    |
| CB 8-40   | 2080               | 10.4(220V)           | 3x220-277/380-480 V |                      |
|           |                    |                      | 2340                | 6.4-5.9 / 3.7-3.4    |

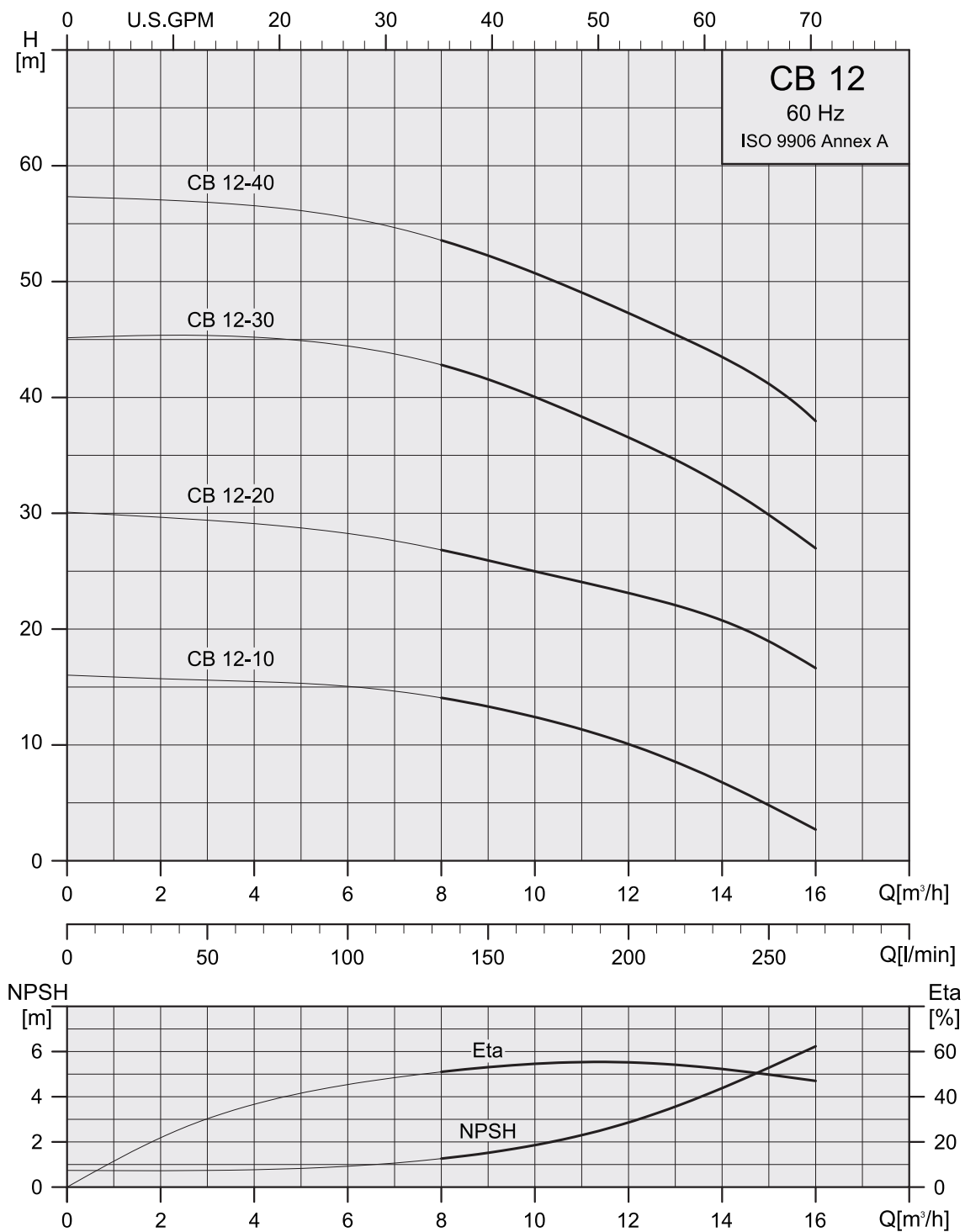


STAIRS PUMPS

# Technical data

CB12

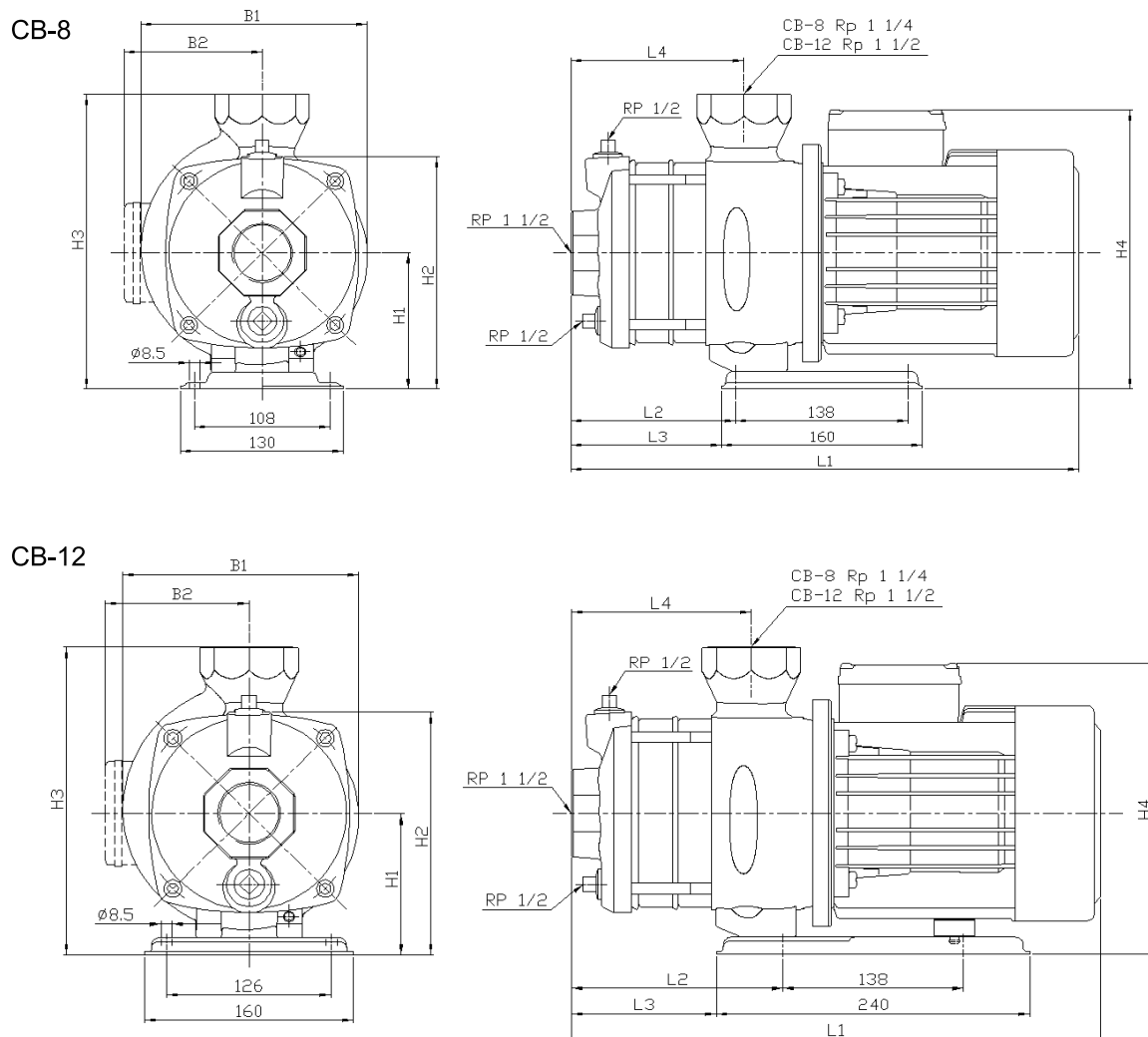
## Performance curves 60Hz



## Electrical data, 3450 min<sup>-1</sup>

| pump type | 1 x 110/220 V      |                      | 3x220-255/380-440 V |                      |
|-----------|--------------------|----------------------|---------------------|----------------------|
|           | P <sub>i</sub> [W] | I <sub>1/1</sub> [A] | P <sub>i</sub> [W]  | I <sub>1/1</sub> [A] |
| CB 12-10  | -                  | -                    | 910                 | 3.5-3.7 / 2.0-2.1    |
| CB 12-20  | 2120               | 9.4(220V)            | 1960                | 6.0-5.9 / 3.5-3.4    |
| CB 12-30  | -                  | -                    | 3x220-277/380-480 V |                      |
|           |                    |                      | 2940                | 8.8-10.2 / 5.1-5.9   |
| CB 12-40  | -                  | -                    | 3810                | 11.2-11.3 / 6.5-6.6  |

### Dimensions and Weights 60Hz



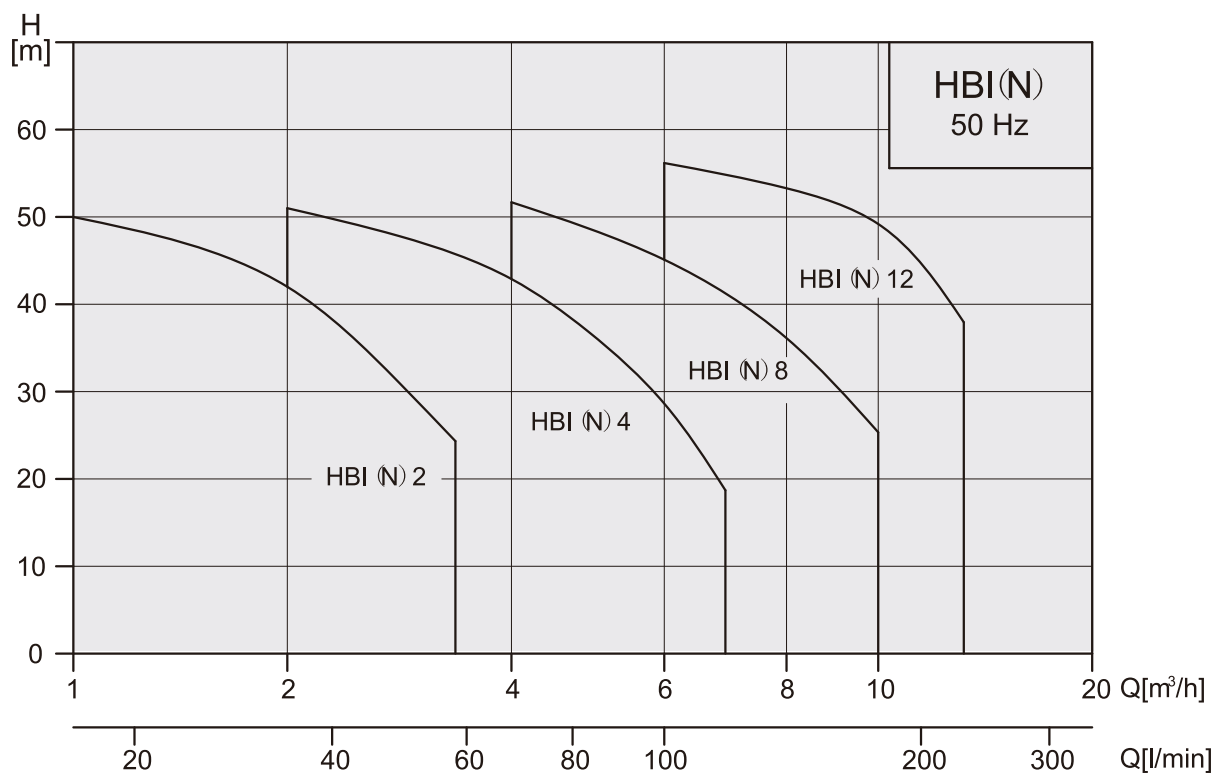
#### CB-8

| pump type | mm     |        |        |        |        |        |     |        |        |        |        |     |     |     |        |        | Base(mm) |        | Kg     |        |
|-----------|--------|--------|--------|--------|--------|--------|-----|--------|--------|--------|--------|-----|-----|-----|--------|--------|----------|--------|--------|--------|
|           | L1     |        | L2     |        | L3     |        | L4  | B1     |        | B2     |        | H1  | H2  | H3  | H4     |        |          |        |        |        |
|           | 1phase | 3phase | 1phase | 3phase | 1phase | 3phase |     | 1phase | 3phase | 1phase | 3phase |     |     |     | 1phase | 3phase | 1phase   | 3phase | 1phase | 3phase |
| CB 8-20   | 360    | 360    | 54     | 54     | 41     | 41     | 77  | 181    | 181    | 135    | 114    | 110 | 187 | 239 | 245    | 224    | 160      | 160    | 18.6   | 18.4   |
| CB 8-25   | -      | 390    | -      | 84     | -      | 71     | 107 | -      | 181    | -      | 114    | 110 | 187 | 239 | -      | 224    | -        | 160    | -      | 20.3   |
| CB 8-30   | 450    | 390    | 132    | 84     | 81     | 71     | 107 | 185    | 181    | 152    | 114    | 110 | 187 | 239 | 262    | 224    | 240      | 160    | 26.6   | 20.4   |
| CB 8-40   | 450    | 450    | 132    | 132    | 81     | 81     | 107 | 185    | 185    | 152    | 139    | 110 | 187 | 239 | 262    | 249    | 240      | 240    | 26.8   | 26.8   |

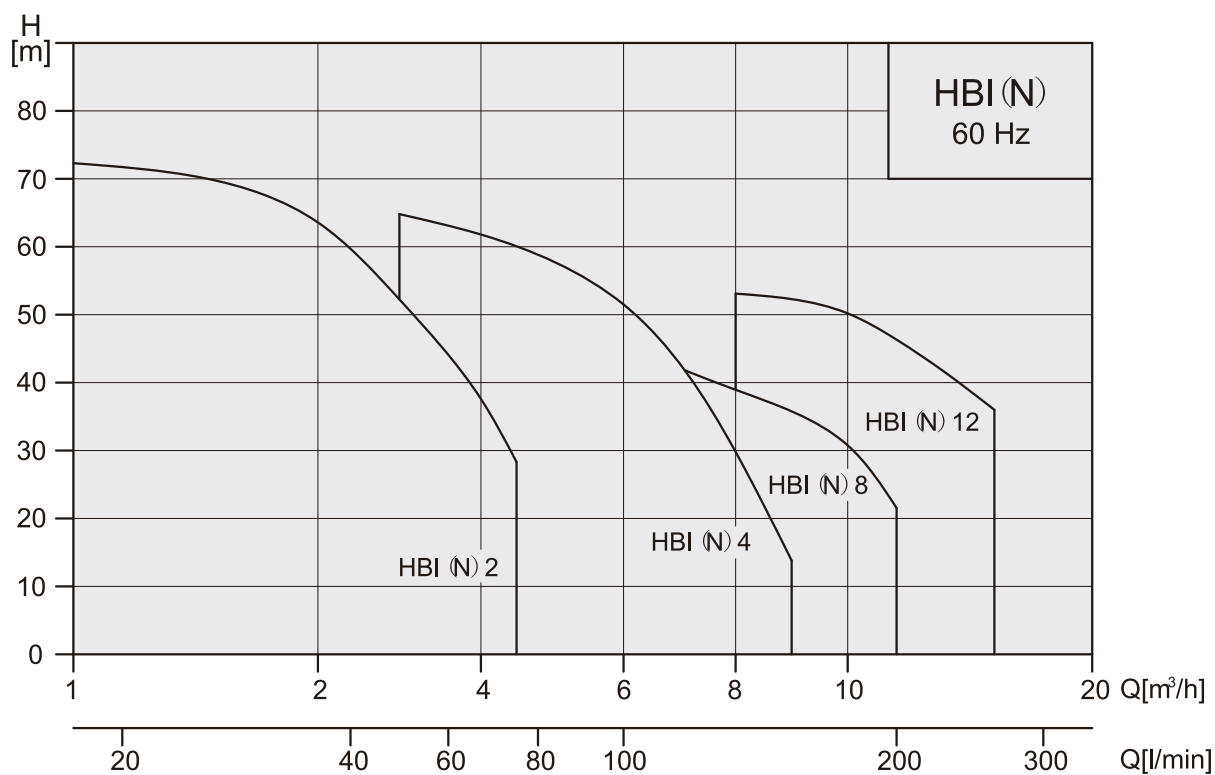
#### CB-12

| pump type | mm     |        |        |        |        |        |     |        |        |        |        |     |     |     |        |        | Base(mm) |        | Kg     |        |
|-----------|--------|--------|--------|--------|--------|--------|-----|--------|--------|--------|--------|-----|-----|-----|--------|--------|----------|--------|--------|--------|
|           | L1     |        | L2     |        | L3     |        | L4  | B1     |        | B2     |        | H1  | H2  | H3  | H4     |        |          |        |        |        |
|           | 1phase | 3phase | 1phase | 3phase | 1phase | 3phase |     | 1phase | 3phase | 1phase | 3phase |     |     |     | 1phase | 3phase | 1phase   | 3phase | 1phase | 3phase |
| CB 12-10  | -      | 360    | -      | 54     | -      | 41     | 77  | -      | 181    | -      | 114    | 110 | 187 | 239 | -      | 224    | -        | 160    | -      | 16.2   |
| CB 12-20  | 420    | 360    | 102    | 54     | 51     | 41     | 77  | 185    | 181    | 152    | 114    | 110 | 187 | 239 | 262    | 224    | 240      | 160    | 25.8   | 19.1   |
| CB 12-30  | -      | 450    | -      | 132    | -      | 81     | 107 | -      | 185    | -      | 139    | 110 | 187 | 239 | -      | 249    | -        | 240    | -      | 28.9   |
| CB 12-40  | -      | 471    | -      | 132    | -      | 81     | 107 | -      | 196    | -      | 150    | 122 | 199 | 251 | -      | 272    | -        | 240    | -      | 34.2   |

### Performance range, 50Hz



### Performance range, 60Hz





STAIRS PUMPS

# General data

**HBI, HBN**

## Applications

Water supply and pressure boosting  
 Air-conditioning  
 Water treatment  
 Heating and cooling in industrial processes  
 Industrial washing and dish-washing machines  
 softened water  
 Pressure boosting of process water  
 Fertilizer/dosing systems



## Pump

A horizontal, multistage centrifugal pump is made of stainless steel. The pump is a non-self priming type and fitted with a mechanical shaft seal.

| Connection \ Pump        | HBI(N) 2 | HBI(N) 4 | HBI(N) 8 | HBI(N) 12 |
|--------------------------|----------|----------|----------|-----------|
| Suction port             | Rp 1     | Rp1 1/4  | Rp 1 1/2 | Rp 1 1/2  |
| Discharge port           | Rp 1     | Rp1 1/4  | Rp 1 1/2 | Rp 1 1/2  |
| Drain hole, priming hole | G 3/8    | G 3/8    | G 3/8    | G 3/8     |

## Motor

Totally enclosed and fan-cooled standard motor.

|                     |             |          |             |                   |
|---------------------|-------------|----------|-------------|-------------------|
| Standard voltages:  | 50HZ 1Ø     |          | 50HZ 3Ø     |                   |
|                     | 0.5HP~3.0HP | 220~240V | 0.5HP~4.0HP | 220~240V/380~415V |
|                     | 60HZ 1Ø     |          | 60HZ 3Ø     |                   |
|                     | 0.5HP~1.0HP | 110/220V | 0.5HP~1.5HP | 220~255V/380~440V |
| Insulation class: F | 0.5HP~3.0HP | 220~240V | 2.0HP~4.0HP | 220~277V/380~480V |

Enclosure class: IP54

## Operating conditions

Liquid temperature range: 0°C ~+110°C

Maximum ambient temperature: +40°C

Maximum operating pressure: 10 kg./cm<sup>2</sup>.

Maximum inlet pressure is limited by maximum operating pressure.

## Liquids to be pumped

These pumps are designed for pumping freely flowing non-corrosive, non-explosive. and non-flammable liquids. The liquids to be pumped must also be free of solid matter, sands, fibers, and similar materials.

Most common non-highly corrosive watery liquids, oily liquids, hot and cold liquids can be pumped with these pumps.

The suitability of these pumps for pumping any particular liquid depends upon a number of factors, such as the ph value, contents of chemicals such as chlorides, oils, the temperature of the liquids, etc..

Please contact your distributor or the factory if there are any questions as to whether certain liquids are suitable for pumping with these pumps.

### Type key

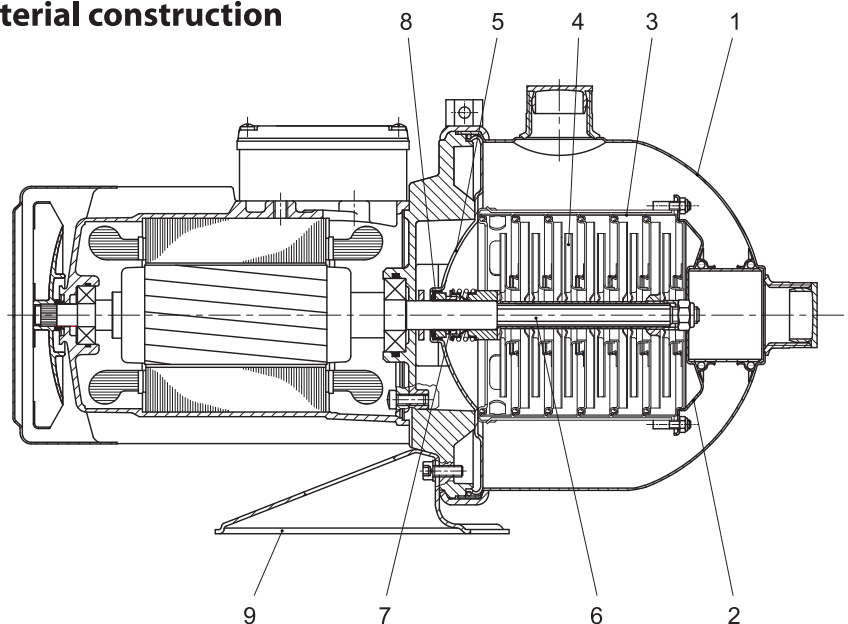
|              |                                       |   |                       |   |                  |
|--------------|---------------------------------------|---|-----------------------|---|------------------|
| Example: HBI | 4                                     | - | 30                    | - | HQBE             |
| HBN          | 4                                     | - | 30                    | - | HQQE             |
| Type         | Nominal flow rate (m <sup>3</sup> /h) |   | Number of stages x 10 |   | Mechanical Seals |

### Mechanical seals

| List of Materials   |           | Mechanical Seals | HBI 2/4  | HBI 8/12 | HBN 2/4  | HBN 8/12 |
|---------------------|-----------|------------------|----------|----------|----------|----------|
| Q : Silicon carbide | E : EPDM  | HQB              | ●        | ●        | Optional | Optional |
| B : Carbon          | V : Viton | HQQ              | Optional | Optional | ●        | ●        |
| H : Seal Type       |           | O-rings          |          |          |          |          |
|                     |           | E                | ●        | ●        | ●        | ●        |
|                     |           | V                | ●        | ●        | ●        | ●        |

● Standard

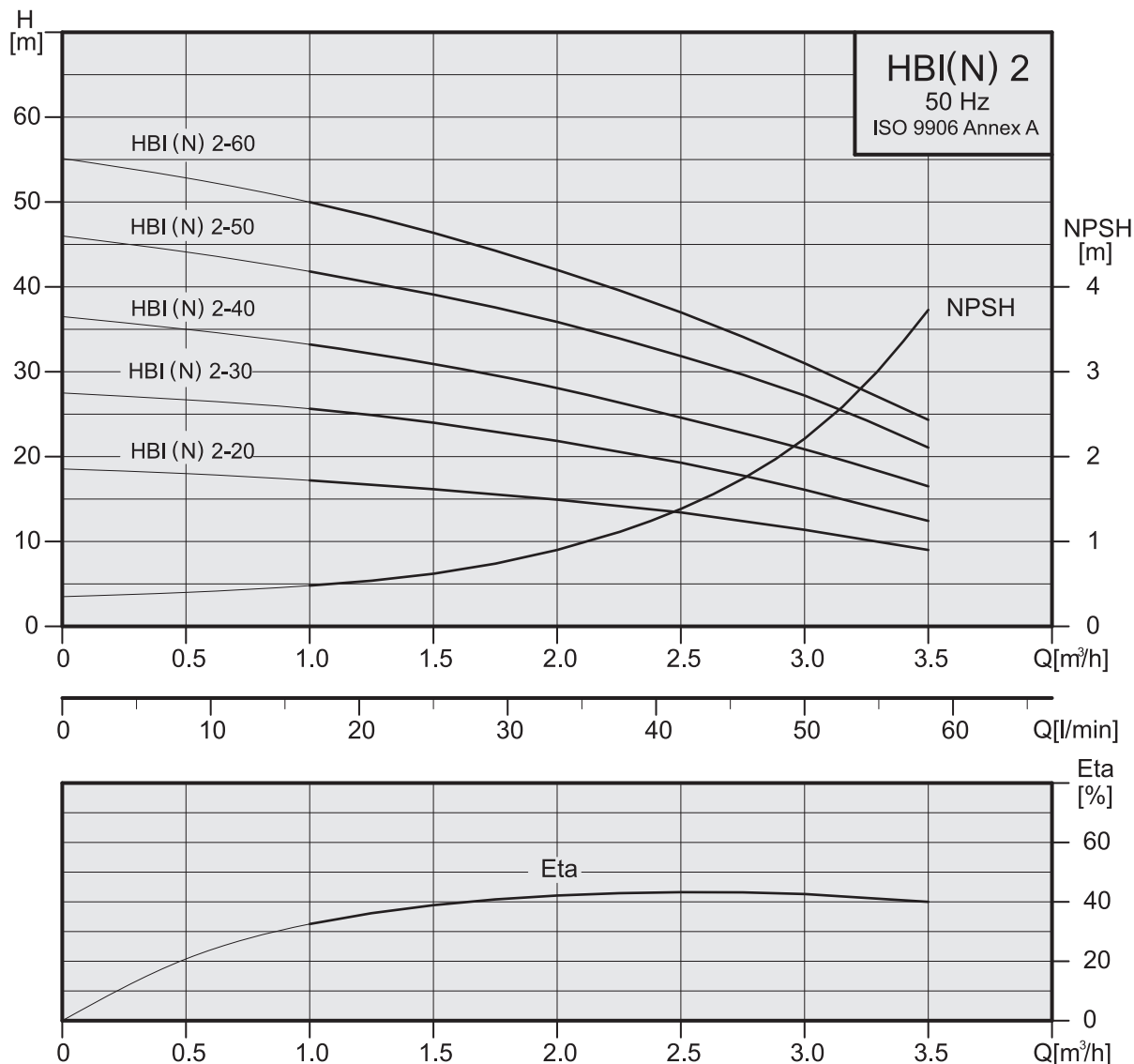
### Material construction



### Materials

| Pos. | Description             | Materials              |                       |
|------|-------------------------|------------------------|-----------------------|
|      |                         | HBI                    | HBN                   |
| 1    | Pump casing             | SS304                  | SS316                 |
| 2    | Suction inter-connector | SS304                  | SS316                 |
| 3    | Chamber                 | SS304                  | SS316                 |
| 4    | Impeller                | SS304                  | SS316                 |
| 5    | Cover plate             | SS304                  | SS316                 |
| 6    | Shaft                   | SS431                  | SS316                 |
| 7    | Mechanical seal         | Silicon carbide/Carbon | Silicon carbide/S i c |
| 8    | O-ring                  | EPDM or Viton          | EPDM or Viton         |
| 9    | Base plate              | Steel                  | Steel                 |

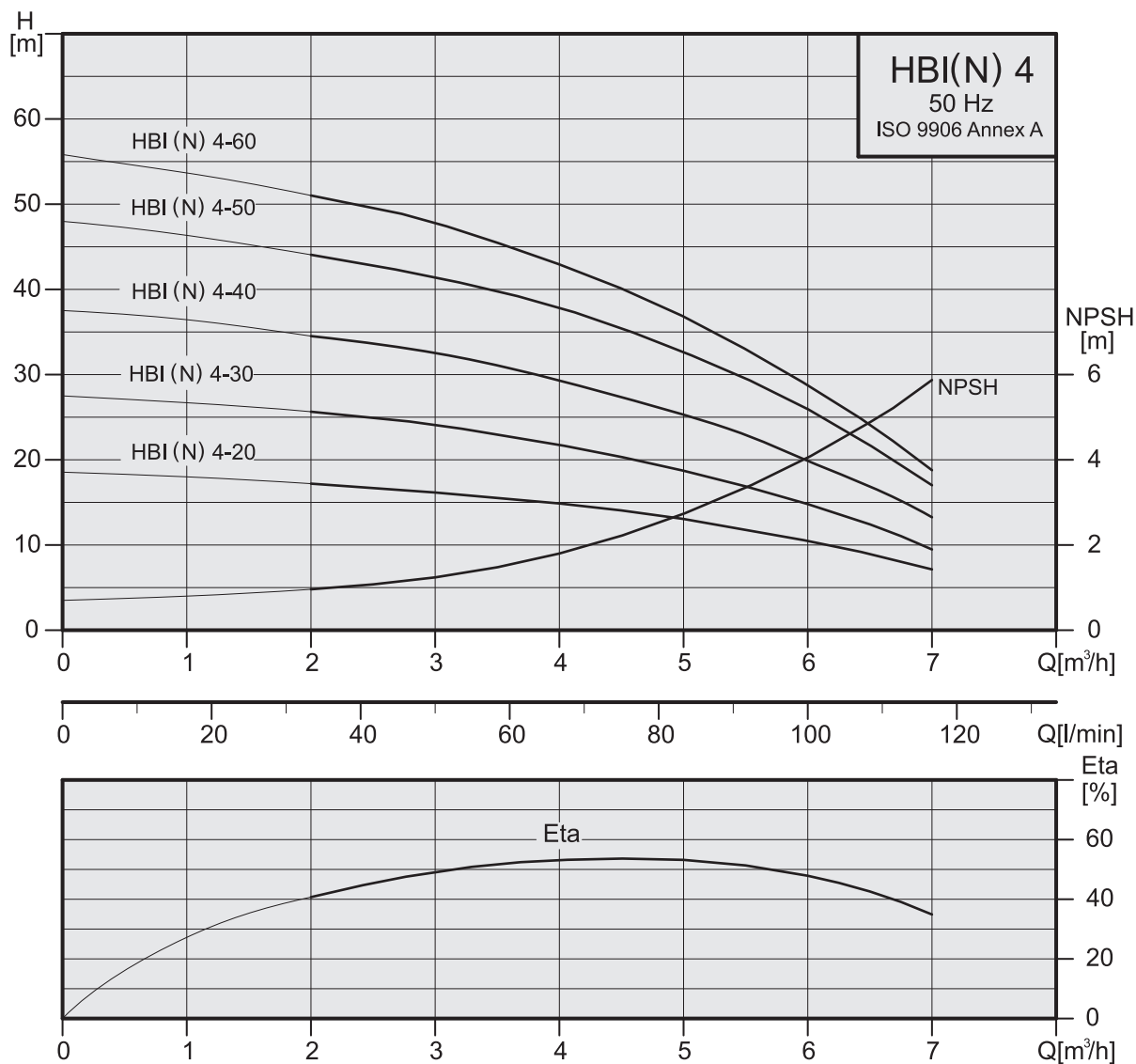
### Performance curves 50 Hz



### Electrical data, 2850 min<sup>-1</sup>

| pump type    | 1 x 220-240 V      |                      | 3 x 220-240 △/380-415 Y V |                      |
|--------------|--------------------|----------------------|---------------------------|----------------------|
|              | P <sub>i</sub> [W] | I <sub>1/1</sub> [A] | P <sub>i</sub> [W]        | I <sub>1/1</sub> [A] |
| HBI/HBN 2-20 | 360                | 1.7-1.9              | 370                       | 2.0-2.7 / 1.2-1.6    |
| HBI/HBN 2-30 | 470                | 2.3-2.2              | 550                       | 2.4-2.8 / 1.4-1.6    |
| HBI/HBN 2-40 | 580                | 2.7-2.6              | 650                       | 2.4-2.7 / 1.4-1.6    |
| HBI/HBN 2-50 | 720                | 3.2-3.3              | 810                       | 2.7-3.0 / 1.6-1.8    |
| HBI/HBN 2-60 | 830                | 3.8-3.6              | 910                       | 2.9 -3.3 / 1.7-1.9   |

### Performance curves 50 Hz

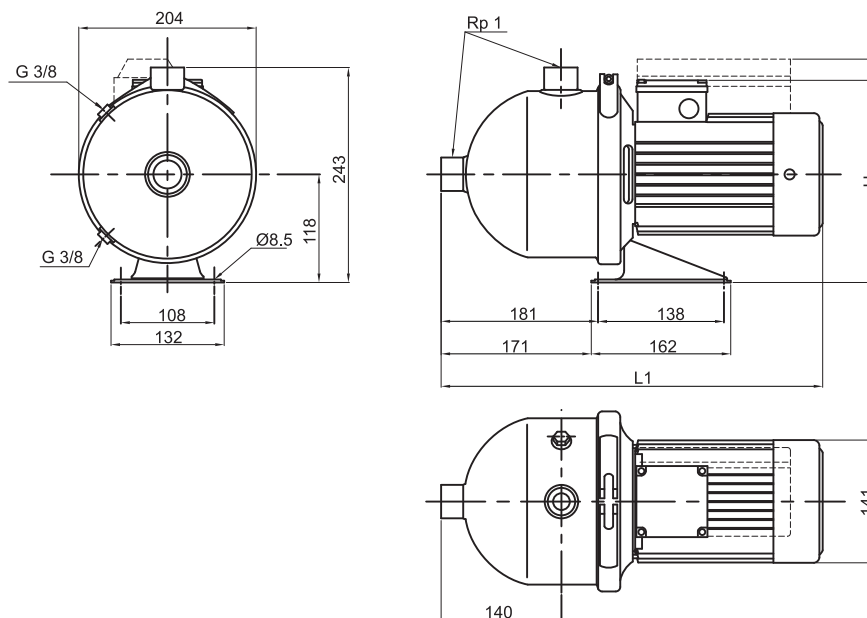


### Electrical data, 2850 min<sup>-1</sup>

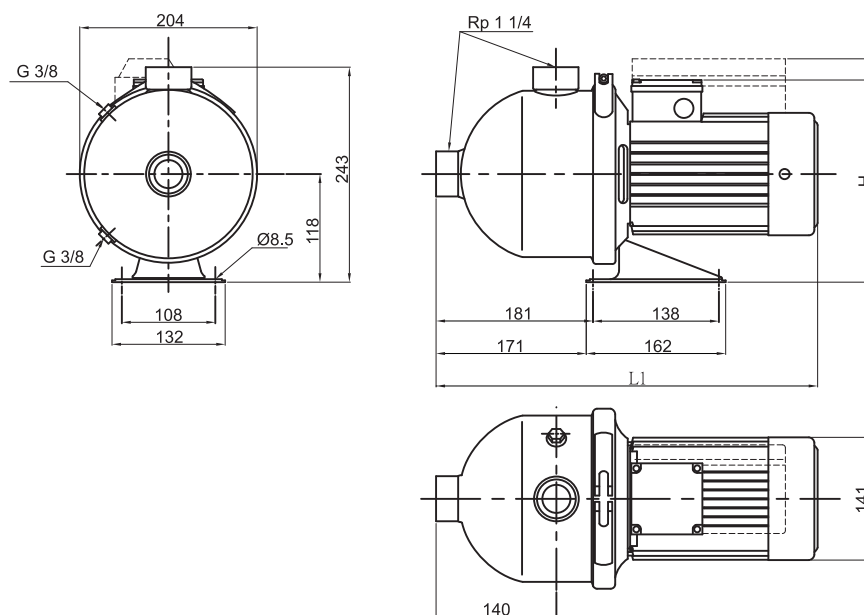
| pump type    | 1 x 220-240 V      |                      | 3 x 220-240 △/380-415 V V |                      |
|--------------|--------------------|----------------------|---------------------------|----------------------|
|              | P <sub>1</sub> [W] | I <sub>1/1</sub> [A] | P <sub>1</sub> [W]        | I <sub>1/1</sub> [A] |
| HBI/HBN 4-20 | 580                | 2.7-2.6              | 660                       | 2.5-2.9 / 1.5-1.7    |
| HBI/HBN 4-30 | 820                | 3.9-3.7              | 850                       | 2.8-3.0 / 1.6-1.7    |
| HBI/HBN 4-40 | 1000               | 4.6-4.4              | 1060                      | 3.3-3.5 / 1.9-2.0    |
| HBI/HBN 4-50 | 1240               | 5.8-5.5              | 1310                      | 4.2-4.5 / 2.4-2.6    |
| HBI/HBN 4-60 | 1510               | 7.1-6.9              | 1550                      | 5.2-5.6 / 3.0-3.3    |

### Dimensions and weights 50 Hz

#### HBI(N)-2

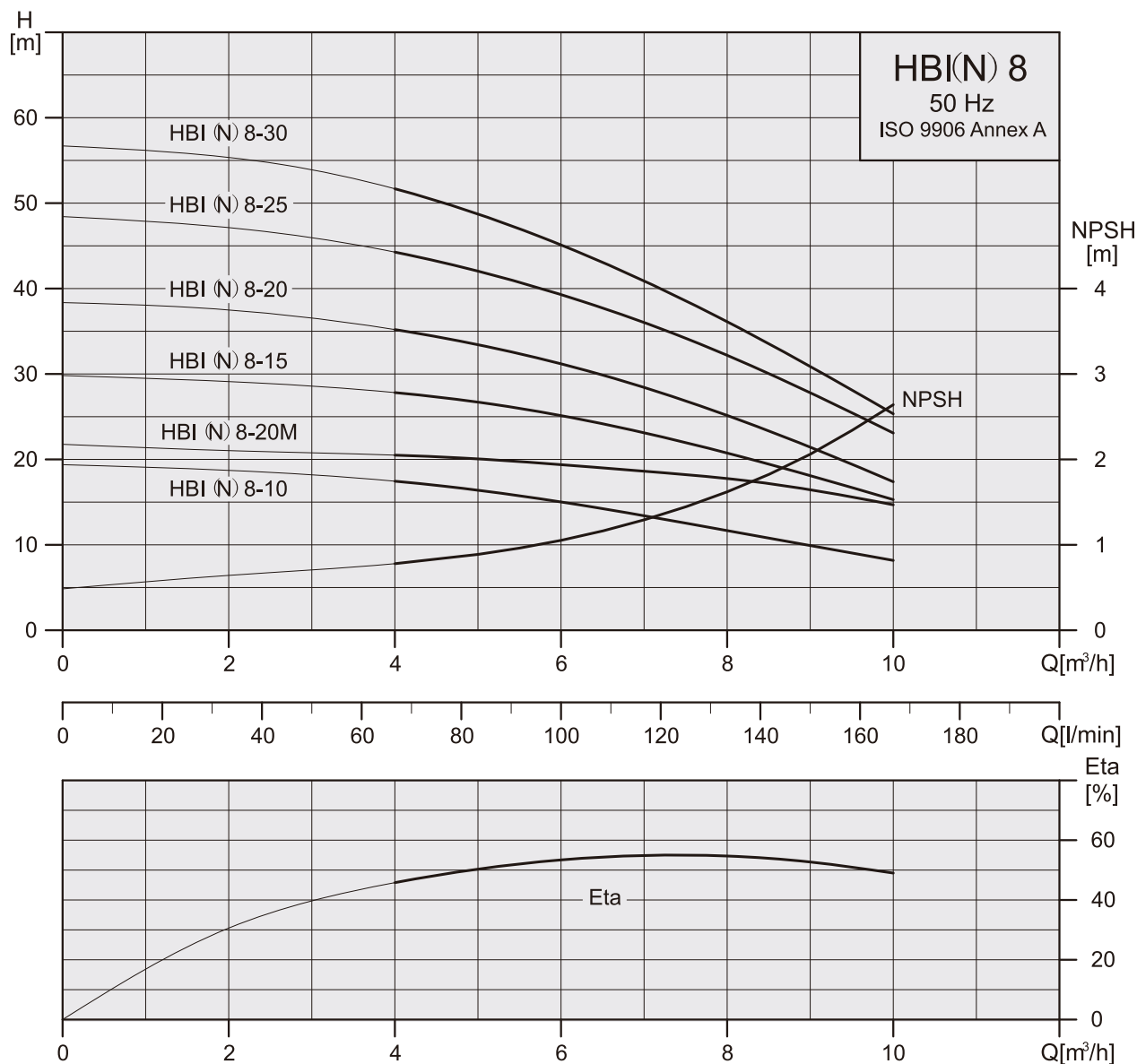


#### HBI(N)-4



| pump type    | Dimension (mm) |     |         |     |                 |
|--------------|----------------|-----|---------|-----|-----------------|
|              | 1-Phase        |     | 3-Phase |     | Net Weight (kg) |
|              | L1             | H   | L1      | H   |                 |
| HBI/HBN 2-20 | 403            | 255 | 403     | 233 | 9.6             |
| HBI/HBN 2-30 | 403            | 255 | 403     | 233 | 9.9             |
| HBI/HBN 2-40 | 403            | 255 | 403     | 233 | 10.1            |
| HBI/HBN 2-50 | 403            | 255 | 403     | 233 | 10.8            |
| HBI/HBN 2-60 | 403            | 255 | 403     | 233 | 11.0            |
| HBI/HBN 4-20 | 403            | 255 | 403     | 233 | 9.6             |
| HBI/HBN 4-30 | 403            | 255 | 403     | 233 | 9.9             |
| HBI/HBN 4-40 | 403            | 255 | 403     | 233 | 10.6            |
| HBI/HBN 4-50 | 441            | 255 | 441     | 233 | 12.1            |
| HBI/HBN 4-60 | 441            | 255 | 441     | 233 | 12.3            |

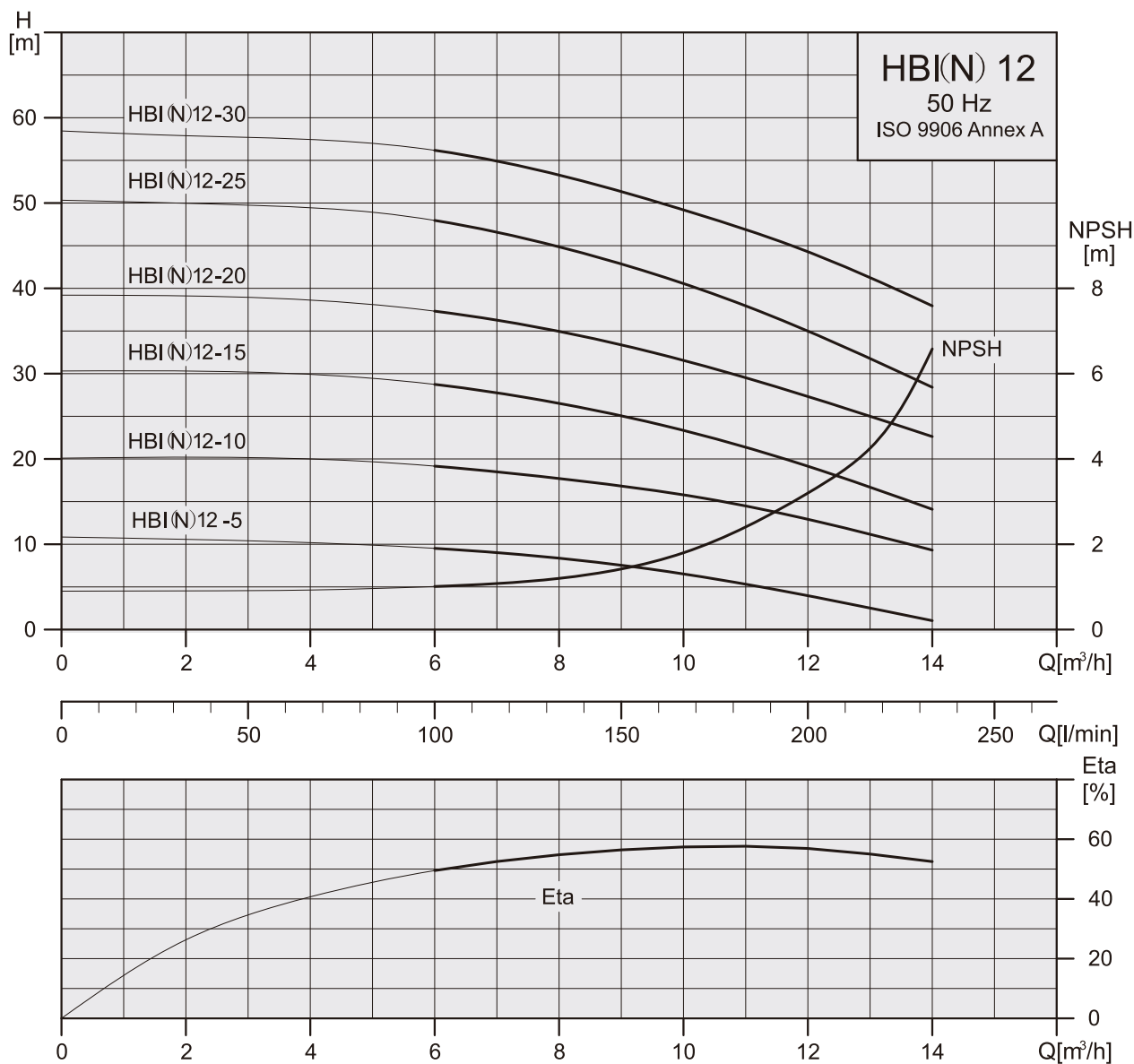
### Performance curves 50Hz



### Electrical data, 2850 min<sup>-1</sup>

| pump type     | 1x220-240 V        |                      | 3x220-240/380-415 V |                      |
|---------------|--------------------|----------------------|---------------------|----------------------|
|               | P <sub>i</sub> [W] | I <sub>1/1</sub> [A] | P <sub>i</sub> [W]  | I <sub>1/1</sub> [A] |
| HBI/HBN 8-10  | 760                | 3.3-3.1              | 810                 | 2.7-3.1 / 1.6-1.8    |
| HBI/HBN 8-20M | -                  | -                    | 1120                | 4.2-4.5 / 2.4-2.6    |
| HBI/HBN 8-15  | 1150               | 5.3-5.1              | 1190                | 3.9-4.4 / 2.3-2.6    |
| HBI/HBN 8-20  | 1420               | 6.8-6.6              | 1450                | 5.0-5.5 / 2.9-3.2    |
| HBI/HBN 8-25  | 1880               | 8.1-7.9              | 1840                | 5.8-6.5 / 3.4-3.8    |
| HBI/HBN 8-30  | 2100               | 9.1-9.0              | 2050                | 6.4-6.9 / 3.7-4.0    |

### Performance curves 50Hz

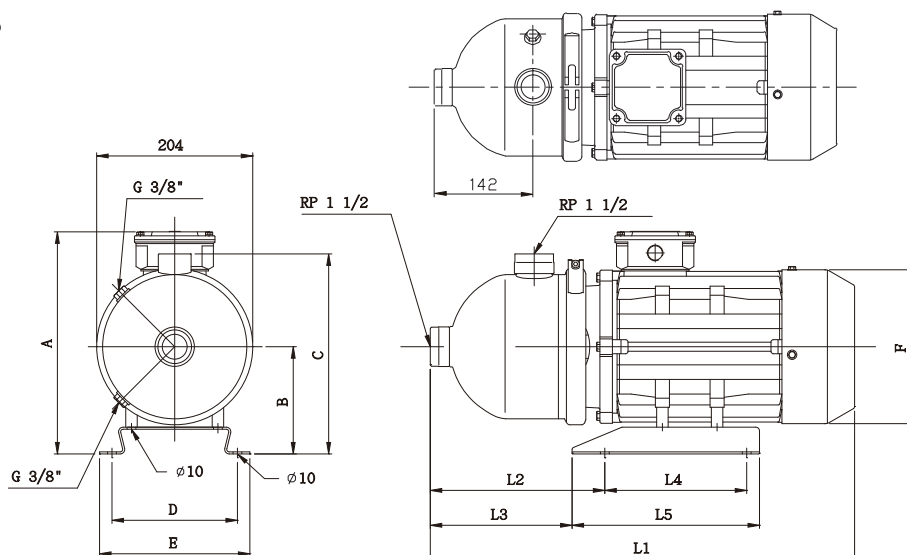


### Electrical data, 2850min<sup>-1</sup>

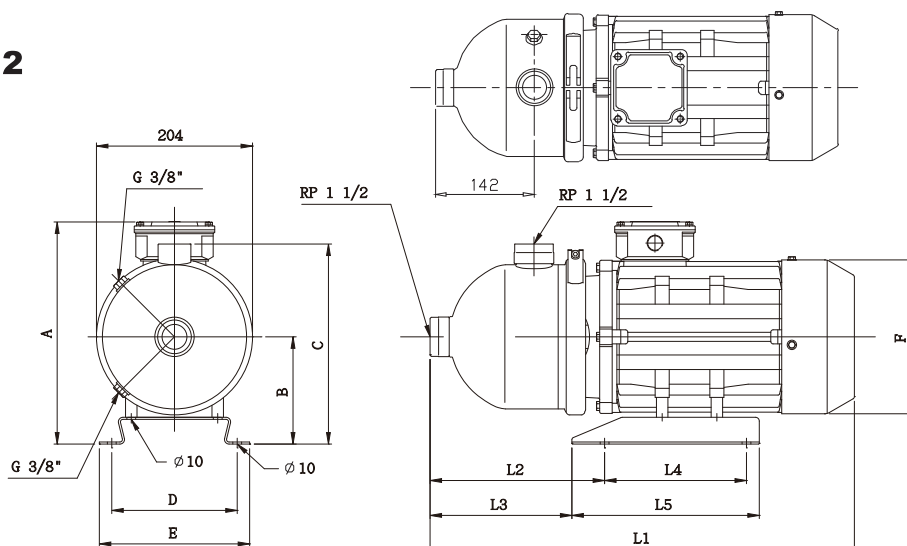
| pump type     | 1x220-240 V        |                      | 3x220-240/380-415 V |                      |
|---------------|--------------------|----------------------|---------------------|----------------------|
|               | P <sub>i</sub> [W] | I <sub>1/1</sub> [A] | P <sub>i</sub> [W]  | I <sub>1/1</sub> [A] |
| HBI/HBN 12-05 | -                  | -                    | 550                 | 2.4-2.8 / 1.4-1.6    |
| HBI/HBN 12-10 | 1170               | 5.3-5.1              | 1190                | 3.6-3.8 / 2.1-2.2    |
| HBI/HBN 12-15 | 1650               | 7.6-7.5              | 1690                | 5.5-6.0 / 3.2-3.5    |
| HBI/HBN 12-20 | 2310               | 10.6-10.4            | 2350                | 7.0-7.4 / 4.0-4.3    |
| HBI/HBN 12-25 | 2980               | 13.1-12.7            | 2880                | 9.0-9.3 / 5.2-5.4    |
| HBI/HBN 12-30 | -                  | -                    | 3610                | 11.7-12.1 / 6.8-7.0  |

### Dimensions and weights 50Hz

#### HBI(N)-8



#### HBI(N)-12



| pump type    | Dimension[mm] |        |     |     |     |     |        |        |     |     |     |     |     |                |        |
|--------------|---------------|--------|-----|-----|-----|-----|--------|--------|-----|-----|-----|-----|-----|----------------|--------|
|              | L1            |        | L2  | L3  | L4  | L5  | A      |        | B   | C   | D   | E   | F   | Net Weight(kg) |        |
|              | 1phase        | 3phase |     |     |     |     | 1phase | 3phase |     |     |     |     |     | 1phase         | 3phase |
| HBI(N) 8-10  | 403           | 403    | 181 | 171 | 138 | 162 | 255    | 233    | 118 | 243 | 108 | 132 | 141 | 10.20          | 10.02  |
| HBI(N) 8-15  | 441           | 441    | 181 | 171 | 138 | 162 | 255    | 233    | 118 | 243 | 108 | 132 | 141 | 12.28          | 12.08  |
| HBI(N) 8-20M | -             | 441    | 181 | 171 | 138 | 162 | -      | 233    | 118 | 243 | 108 | 132 | 141 | -              | 11.98  |
| HBI(N) 8-20  | 441           | 441    | 181 | 171 | 138 | 162 | 255    | 233    | 118 | 243 | 108 | 132 | 141 | 13.54          | 13.34  |
| HBI(N) 8-25  | 514           | -      | 200 | 180 | 195 | 235 | 267    | -      | 121 | 245 | 158 | 178 | 177 | 23.08          | -      |
|              | -             | 441    | 181 | 171 | 138 | 162 | -      | 233    | 118 | 243 | 108 | 132 | 141 | -              | 13.92  |
| HBI(N) 8-30  | 514           | 514    | 200 | 180 | 195 | 235 | 267    | 261    | 121 | 245 | 158 | 178 | 177 | 23.14          | 22.22  |
| HBI(N) 12-05 | -             | 403    | 181 | 171 | 138 | 162 | -      | 233    | 118 | 243 | 108 | 132 | 141 | -              | 9.41   |
| HBI(N) 12-10 | 441           | 441    | 181 | 171 | 138 | 162 | 255    | 233    | 118 | 243 | 108 | 132 | 141 | 11.72          | 11.52  |
| HBI(N) 12-15 | 441           | 441    | 181 | 171 | 138 | 162 | 255    | 233    | 118 | 243 | 108 | 132 | 141 | 13.38          | 13.18  |
| HBI(N) 12-20 | 514           | 514    | 200 | 180 | 195 | 235 | 267    | 261    | 121 | 245 | 158 | 178 | 177 | 22.52          | 21.48  |
| HBI(N) 12-25 | 514           | 514    | 200 | 180 | 195 | 235 | 267    | 261    | 121 | 245 | 158 | 178 | 177 | 25.74          | 24.36  |
| HBI(N) 12-30 | -             | 539    | 230 | 198 | 195 | 245 | -      | 284    | 133 | 259 | 174 | 198 | 197 | -              | 30.20  |

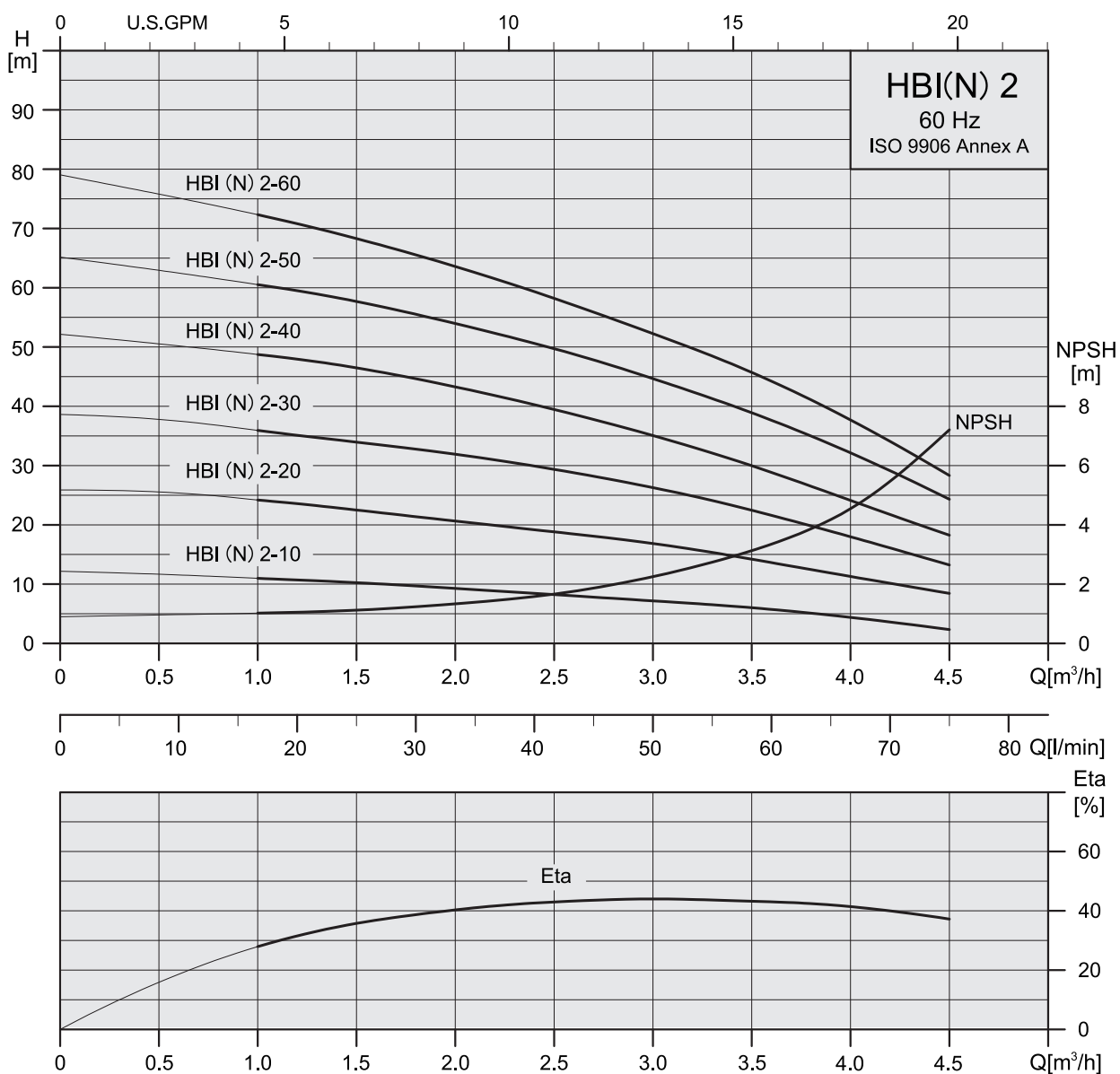


STAIRS PUMPS

# Technical data

HBI, HBN 2

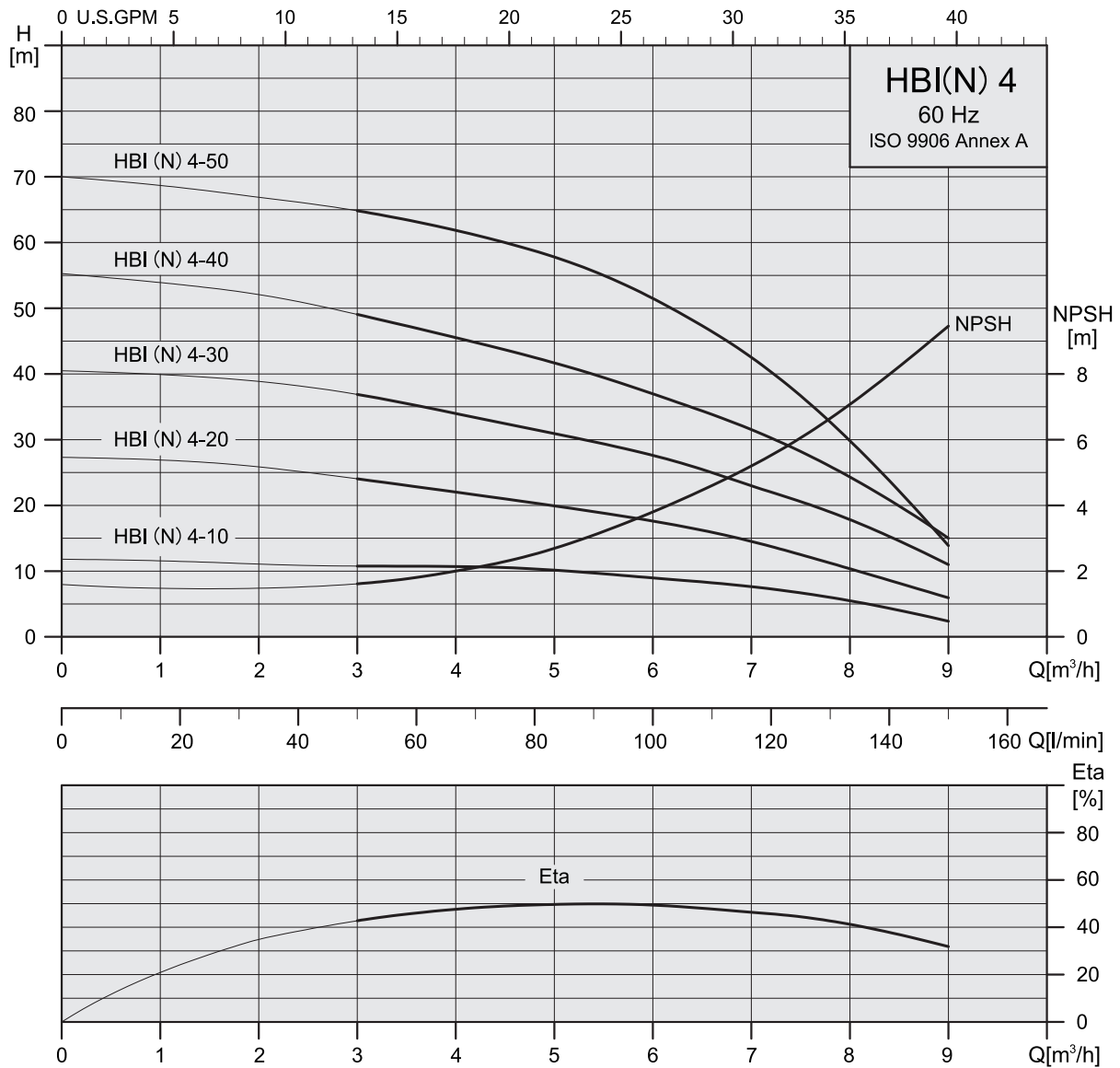
## Performance curves 60 Hz



## Electrical data, 3450 min<sup>-1</sup>

| pump type    | 1x110/220 V        |                      | 3x220-255/380-440 V |                      |
|--------------|--------------------|----------------------|---------------------|----------------------|
|              | P <sub>i</sub> [W] | I <sub>1/1</sub> [A] | P <sub>i</sub> [W]  | I <sub>1/1</sub> [A] |
| HBI/HBN 2-10 | 390                | 5.9/3.0              | 360                 | 1.5-1.6 / 0.9-1.0    |
| HBI/HBN 2-20 | 570                | 6.6/3.4              | 540                 | 1.7-1.8 / 1.0-1.1    |
| HBI/HBN 2-30 | 750                | 7.6/3.8              | 720                 | 2.2-2.3 / 1.3-1.4    |
| HBI/HBN 2-40 | 980                | 9.3/4.7              | 950                 | 3.0-3.2 / 1.75-1.9   |
| HBI/HBN 2-50 | 1160               | 10.7/5.4             | 1170                | 3.8-3.9 / 2.2-2.3    |
| HBI/HBN 2-60 | 1375               | 12.4/6.3             | 1330                | 4.1-4.2 / 2.35-2.45  |

### Performance curves 60 Hz



### Electrical data, 3450 min<sup>-1</sup>

| pump type    | 1x110/220 V        |                     | 3x220-255/380-440 V |                     |
|--------------|--------------------|---------------------|---------------------|---------------------|
|              | P <sub>1</sub> [W] | I <sub>L1</sub> [A] | P <sub>1</sub> [W]  | I <sub>L1</sub> [A] |
| HBI/HBN 4-10 | 530                | 5.9 / 3.1           | 560                 | 1.8-1.9 / 1.1-1.2   |
| HBI/HBN 4-20 | 970                | 9.3 / 4.7           | 910                 | 2.9-3.1 / 1.7-1.8   |
| HBI/HBN 4-30 | 1360               | 12.5 / 6.5          | 1280                | 4.1-4.2 / 2.4-2.5   |
| HBI/HBN 4-40 | 1730               | 8.5(220V)           | 1675                | 4.7-4.8 / 2.7-2.8   |
| HBI/HBN 4-50 | 2080               | 9.9(220V)           | 1995                | 5.7-6.0 / 3.3-3.5   |



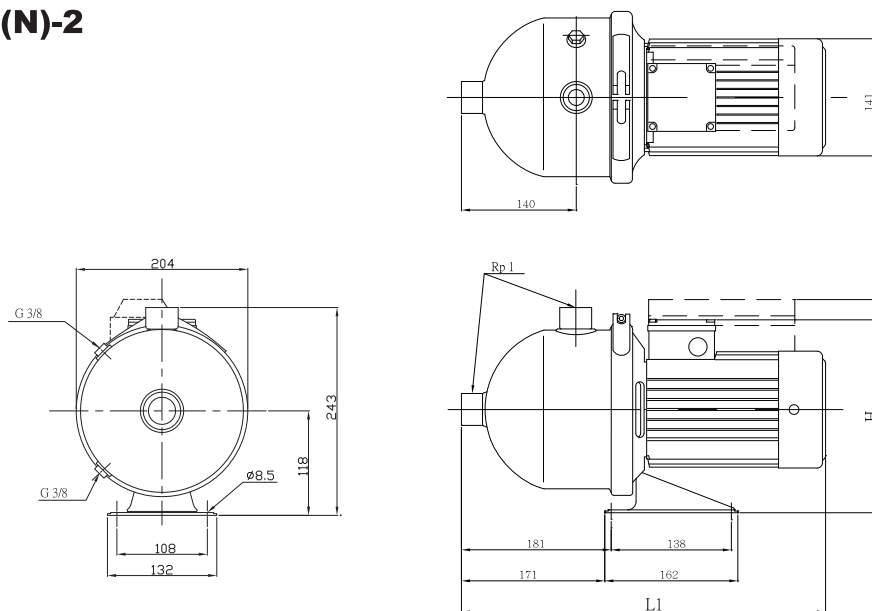
STAIRS PUMPS

# Technical data

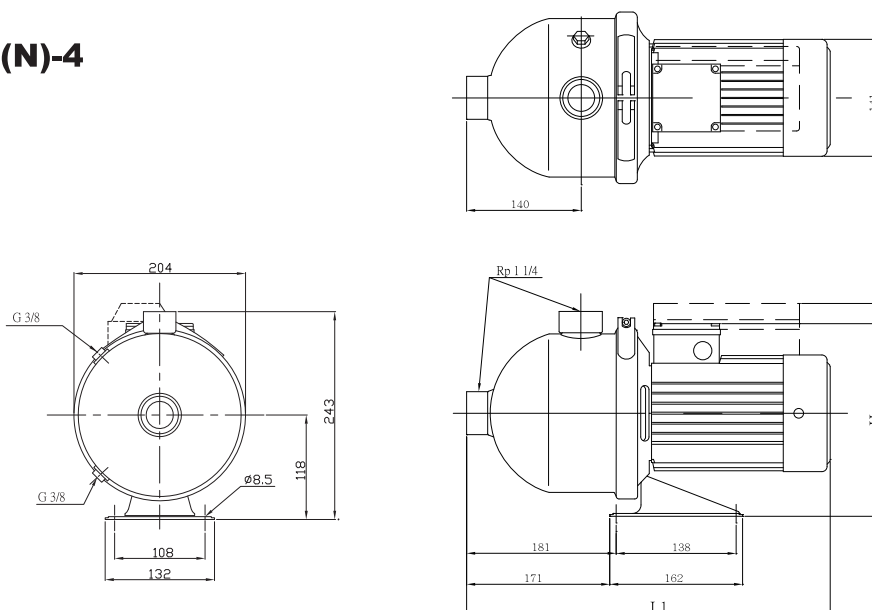
HBI, HBN

## Dimensions and weights 60 Hz

### HBI(N)-2

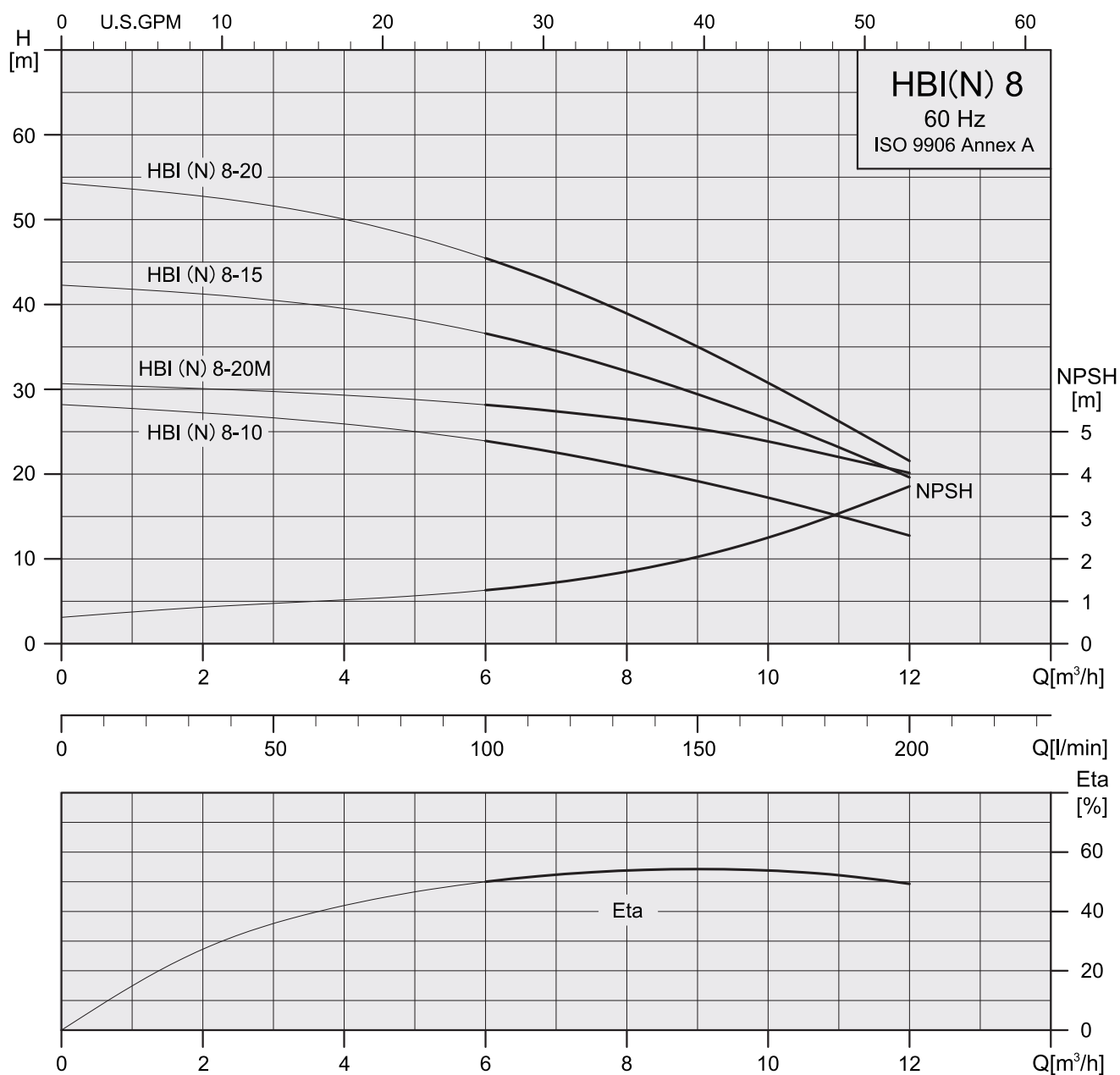


### HBI(N)-4



| pump type    | Dimension (mm) |     |         |     | Net Weight (kg) |
|--------------|----------------|-----|---------|-----|-----------------|
|              | 1-Phase        |     | 3-Phase |     |                 |
|              | L1             | H   | L1      | H   |                 |
| HBI/HBN 2-10 | 403            | 255 | 403     | 233 | 9.5             |
| HBI/HBN 2-20 | 403            | 255 | 403     | 233 | 9.5             |
| HBI/HBN 2-30 | 403            | 255 | 403     | 233 | 9.8             |
| HBI/HBN 2-40 | 403            | 255 | 403     | 233 | 10.3            |
| HBI/HBN 2-50 | 441            | 255 | 441     | 233 | 11.7            |
| HBI/HBN 2-60 | 441            | 255 | 441     | 233 | 12.0            |
| HBI/HBN 4-10 | 403            | 255 | 403     | 233 | 9.5             |
| HBI/HBN 4-20 | 403            | 255 | 403     | 233 | 9.5             |
| HBI/HBN 4-30 | 403            | 255 | 403     | 233 | 10.1            |
| HBI/HBN 4-40 | 441            | 255 | 441     | 233 | 11.5            |
| HBI/HBN 4-50 | 441            | 255 | 441     | 233 | 12.8            |

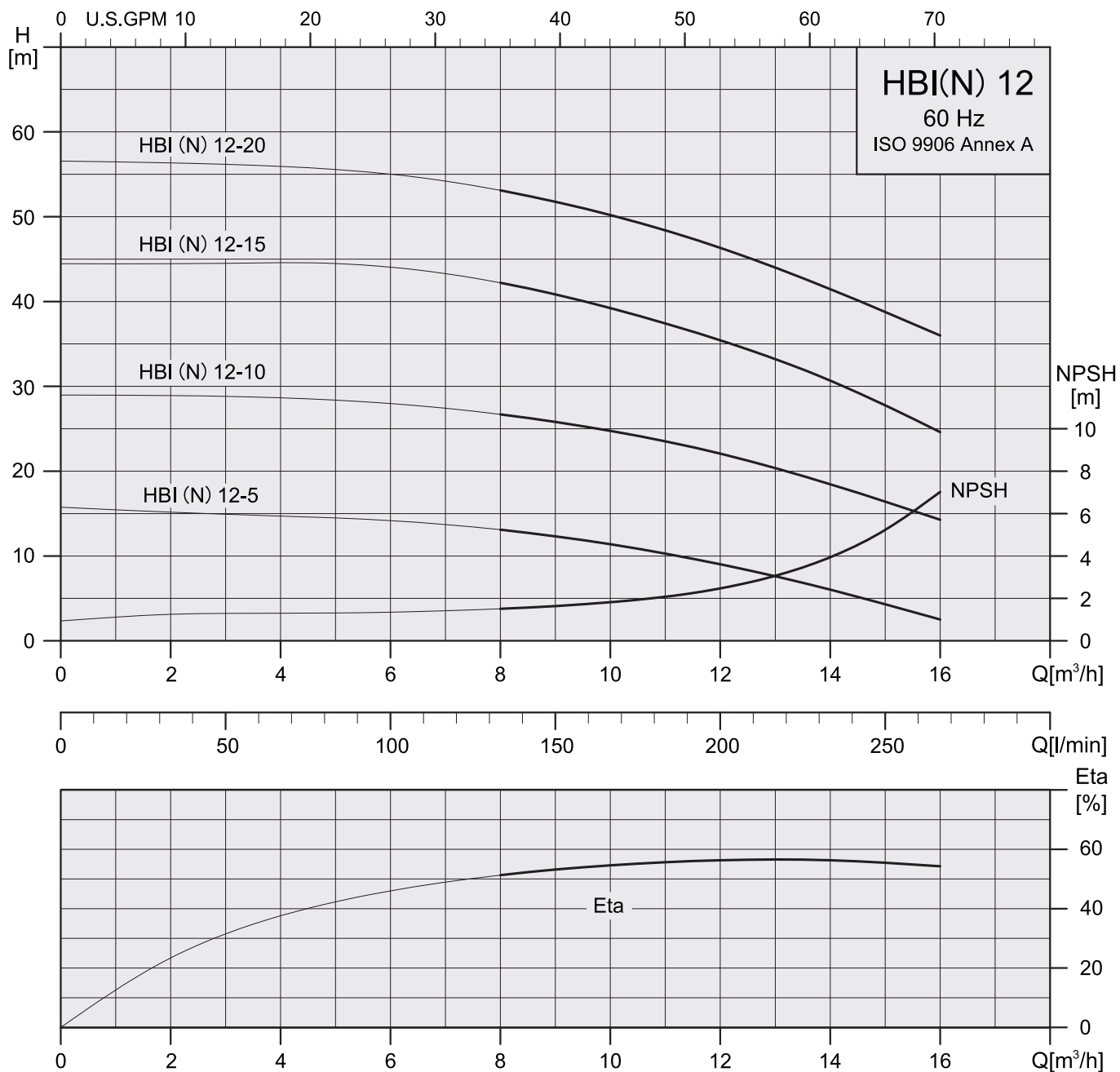
### Performance curves 60Hz



### Electrical data, 3450 min<sup>-1</sup>

| pump type     | 1x110/220 V        |                      | 3x220-255/380-440 V |                      |
|---------------|--------------------|----------------------|---------------------|----------------------|
|               | P <sub>i</sub> [W] | I <sub>1/n</sub> [A] | P <sub>i</sub> [W]  | I <sub>1/n</sub> [A] |
| HBI/HBN 8-10  | 1280               | 11.4 / 6.0           | 1210                | 3.9-4.1 / 2.3-2.4    |
| HBI/HBN 8-20M | 1730               | 8.3(220V)            | 1670                | 5.2-5.3 / 3.0-3.1    |
| HBI/HBN 8-15  | 2080               | 9.3(220V)            | 1890                | 5.6-5.7 / 3.2-3.3    |
| HBI/HBN 8-20  | 2460               | 10.9(220V)           | 3x220-277/380-480 V |                      |
|               |                    |                      | 2360                | 7.1-6.9 / 4.1-4.0    |

### Performance curves 60Hz



### Electrical data, 3450 min<sup>-1</sup>

| pump type     | 1x110/220 V        |                      | 3x220-255/380-440 V |                      |
|---------------|--------------------|----------------------|---------------------|----------------------|
|               | P <sub>i</sub> [W] | I <sub>1/1</sub> [A] | P <sub>i</sub> [W]  | I <sub>1/1</sub> [A] |
| HBI/HBN 12-05 | 940                | 8.5 / 4.5            | 850                 | 2.8-3.0 / 1.6-1.75   |
| HBI/HBN 12-10 | 2170               | 9.7(220V)            | 1930                | 5.7-5.9 / 3.3-3.4    |
| HBI/HBN 12-15 | -                  | -                    | 3x220-277/380-480 V |                      |
|               |                    |                      | 2860                | 9.2-8.9 / 5.3-5.1    |
| HBI/HBN 12-20 | -                  | -                    | 3950                | 11.2-11.8 / 6.5-6.8  |



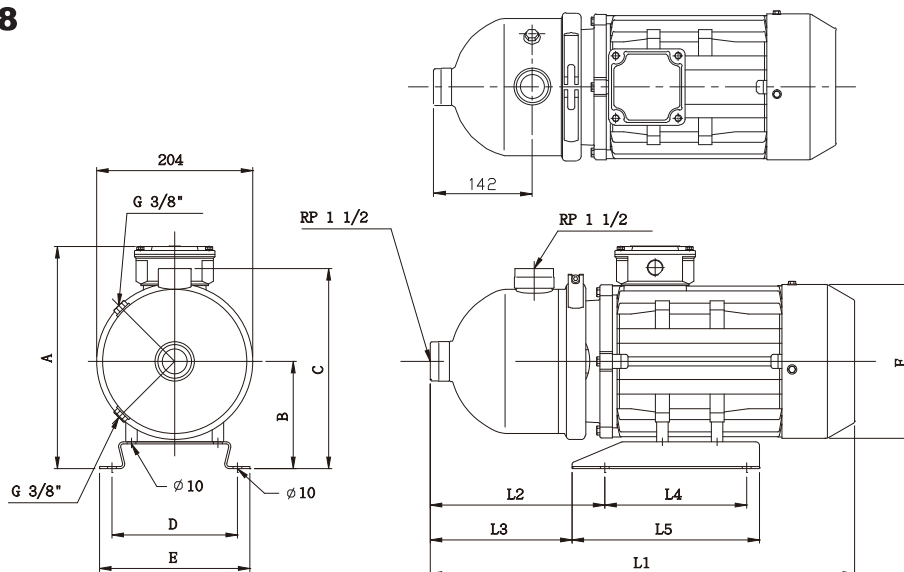
STAIRS PUMPS

# Technical data

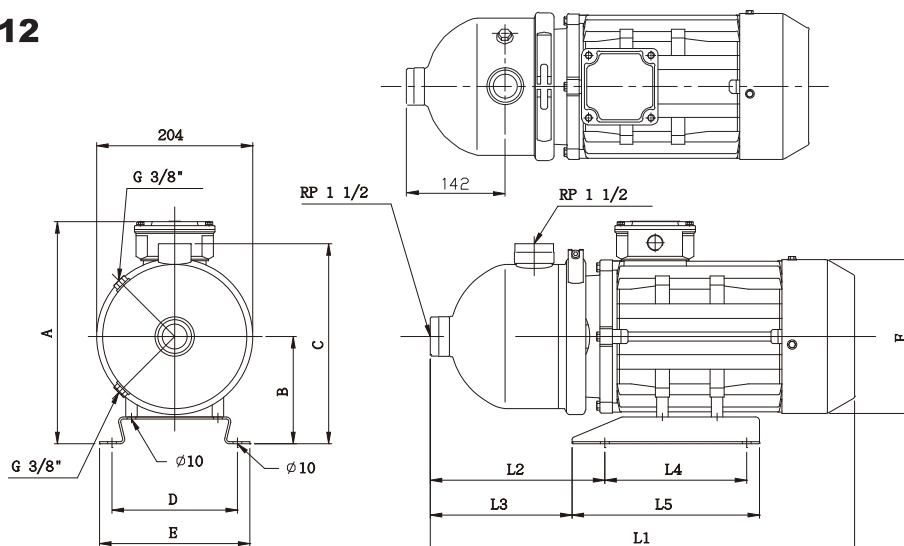
HBI, HBN

## Dimensions and weights 60 Hz

### HBI(N)-8



### HBI(N)-12



| pump type    | Dimension[mm] |        |     |     |     |     |        |        |     |     |     |     |     |                |        |
|--------------|---------------|--------|-----|-----|-----|-----|--------|--------|-----|-----|-----|-----|-----|----------------|--------|
|              | L1            |        | L2  | L3  | L4  | L5  | A      |        | B   | C   | D   | E   | F   | Net Weight(kg) |        |
|              | 1phase        | 3phase |     |     |     |     | 1phase | 3phase |     |     |     |     |     | 1phase         | 3phase |
| HBI(N) 8-10  | 441           | 441    | 181 | 171 | 138 | 162 | 255    | 233    | 118 | 243 | 108 | 132 | 141 | 11.70          | 11.50  |
| HBI(N) 8-15  | 514           | -      | 200 | 180 | 195 | 235 | 267    | -      | 121 | 245 | 158 | 178 | 177 | 21.42          | -      |
|              | -             | 441    | 181 | 171 | 138 | 162 | -      | 233    | 118 | 243 | 108 | 132 | 141 | -              | 13.18  |
| HBI(N) 8-20M | 441           | 441    | 181 | 171 | 138 | 162 | 255    | 233    | 118 | 243 | 108 | 132 | 141 | 13.24          | 13.05  |
| HBI(N) 8-20  | 514           | 514    | 200 | 180 | 195 | 235 | 267    | 261    | 121 | 245 | 158 | 178 | 177 | 21.50          | 21.60  |
| HBI(N) 12-05 | 403           | 403    | 181 | 171 | 138 | 162 | 255    | 233    | 118 | 243 | 108 | 132 | 141 | 10.26          | 10.06  |
| HBI(N) 12-10 | 514           | -      | 200 | 180 | 195 | 235 | 267    | -      | 121 | 245 | 158 | 178 | 177 | 20.64          | -      |
|              | -             | 441    | 181 | 171 | 138 | 162 | -      | 233    | 118 | 243 | 108 | 132 | 141 | -              | 12.64  |
| HBI(N) 12-15 | -             | 493    | 200 | 180 | 195 | 235 | -      | 261    | 121 | 245 | 158 | 178 | 177 | -              | 23.72  |
| HBI(N) 12-20 | -             | 514    | 230 | 198 | 195 | 245 | -      | 284    | 133 | 259 | 174 | 198 | 197 | -              | 29.40  |



## Note



## Note