
EBARA

## CONTENTS

50Hz

Rev. A

## SPECIFICATION 50Hz

Rev. A

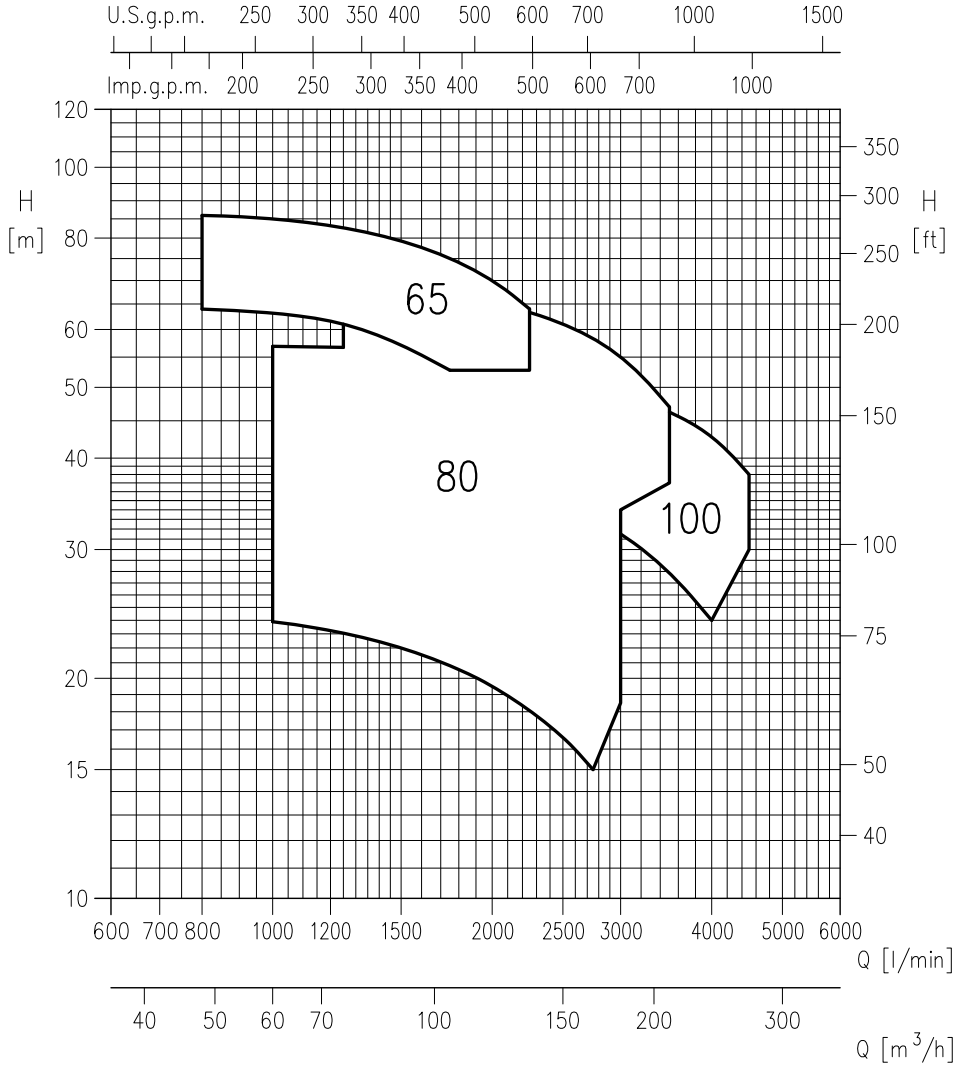
| PUMP | | | |
|---|---|---|---|
| Liquid Handled | Type of liquid | | Clean water |
| | Temperature | [°C] | min. -10<br>max +130 |
| Maximum working pressure | | [MPa] | 1 |
| Flange | | | UNI 2236 |
| Counterflange (On request) | | | UNI 2247 |
| Construction | Impeller | | Closed centrifugal type |
| | Shaft seal type | | Mechanical seal |
| | Bearing | | On the motor |
| Pipe Connection | Suction | | PN16 - UNI 2223-29 |
| | Discharge | | PN16 - UNI 2223-29 |
| Material | Casing | | CAST IRON |
| | Impeller | | CAST IRON |
| | Shaft seal | | Sic/Sic/NBR |
| | Shaft | | AISI |
| | Bracket | | CAST IRON |
| Applicable standard of test | | | ISO 9906 – Annex A |

| MOTOR | | |
|---|---|---|
| Type | | Electric - TEFC |
| | | Three Phase |
| Efficiency level (Reg. 640/2009) | | IE2 |
| No. of Poles | | 2 |
| Rotation speed | [$min^{-1}$] | ≈2900 |
| Insulation Class | | F |
| Protection degree (CEI EN 60034-5) | | IP 55 |
| Power rating | [kW] | 11 ÷ 37 |
| | [HP] | 15 ÷ 55 |
| Frequency | [Hz] | 50 |
| Voltage | [V] | 400/690 ±10% |
| Over load protection | | Provided by the user |
| Casing material | | Alluminum (up to MEC 132) |

## SELECTION CHART

50Hz

Rev. A



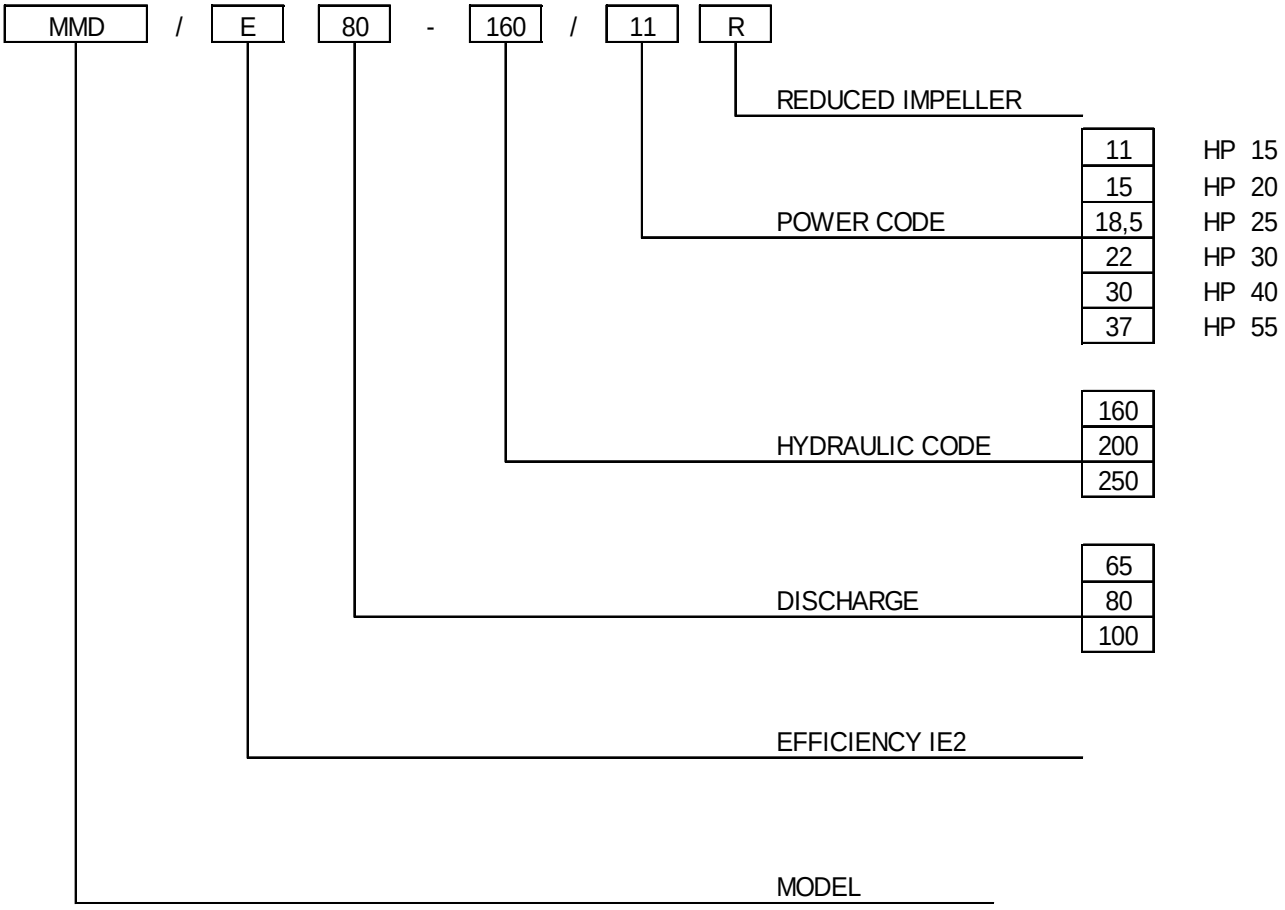

**MMD 2 Poles: 65, 80, 100 Version**

| Pump type MMD | Power | | Capacity l/min | 0 | 800 | 1000 | 1250 | 1500 | 1750 | 2000 | 2250 | 2500 | 2750 | 3000 | 3500 | 4000 | 4500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Three Phase | [kW] | [HP] | m³/h | 0 | 48 | 60 | 75 | 90 | 105 | 120 | 135 | 150 | 165 | 180 | 210 | 240 | 270 |
| | | | H=Total manometric head in meters | | | | | | | | | | | | | | |
| MMD 65-250/22 | 22 | 30 | 65 | 64 | 63 | 61 | 57 | 53 | - | - | - | - | - | - | - | - | |
| MMD 65-250/30 | 30 | 40 | 78 | 77 | 76 | 74 | 70 | 66 | 60 | 53 | - | - | - | - | - | - | |
| MMD 65-250/37 | 37 | 55 | 86,5 | 86 | 85 | 83 | 79 | 75 | 70 | 64 | - | - | - | - | - | - | |
| MMD 80-160/11 | 11 | 15 | 24,8 | - | 24 | 23 | 22 | 21 | 19,5 | 18 | 16,5 | 15 | - | - | - | - | |
| MMD 80-160/15R | 15 | 20 | 29,5 | - | 28,5 | 28,0 | 27,0 | 26,0 | 24,5 | 23,0 | 21,5 | 20,0 | 18,5 | - | - | - | |
| MMD 80-160/15 | 15 | 20 | 35 | - | 34 | 33,3 | 32,5 | 31,8 | 31 | 29 | 27,5 | 26 | 24,3 | - | - | - | |
| MMD 80-200/18,5 | 18,5 | 25 | 42 | - | 42 | 41 | 40 | 38,5 | 37 | 35 | 33 | 30,5 | 28 | - | - | - | |
| MMD 80-200/22 | 22 | 30 | 47 | - | 47 | 46,5 | 45,5 | 44,5 | 43 | 41 | 39 | 37 | 34 | - | - | - | |
| MMD 80-200/30 | 30 | 40 | 55,5 | - | 55 | 54 | 53 | 52 | 51 | 49 | 47 | 45 | 43 | 37 | - | - | |
| MMD 80-200/37 | 37 | 55 | 57,5 | - | 57 | 57 | 56,5 | 56 | 55 | 54 | 52,5 | 51 | 48 | 42 | - | - | |
| MMD 80-250/37 | 37 | 55 | 68,5 | - | - | 67,5 | 67,0 | 66,2 | 65,0 | 63,3 | 61,0 | 58,3 | 55,0 | 47,0 | - | - | |
| MMD 100-200/22 | 22 | 30 | 40 | - | - | - | 38,5 | 38 | 37 | 36 | 34,5 | 33 | 31,5 | 28 | 24 | - | |
| MMD 100-200/30 | 30 | 40 | 48 | - | - | - | 47,0 | 46,3 | 45,6 | 44,8 | 43,7 | 42,4 | 41,0 | 38,0 | 34,6 | 30 | |
| MMD 100-200/37 | 37 | 55 | 54 | - | - | - | 53,5 | 53,5 | 53 | 52 | 51 | 50 | 49 | 46 | 43 | 38 | |

## TYPE KEY AND CURVE SPECIFICATIONS 50Hz

Rev. A

**TYPE KEY:**



## PERFORMANCE CURVE SPECIFICATIONS

The specifications below qualify the curves shown on the following pages.

Tolerances according to ISO 9906 Annex A
The curves refer to effective speed of asynchronous motors at 50 Hz
Measurements were carried out with clean water at 20°C of temperature and with a kinematic viscosity of $\nu = 1\ mm^2/s$ (1 cSt)

The NPSH curve is an average curve obtained in the same conditions of performance curves.
The continuous curves indicate the recommended working range. The dotted curve is only a guide.
In order to avoid the risk of over-heating, the pumps should not be used at a flow rate below 10% of best efficiency point.

Symbols explanation:

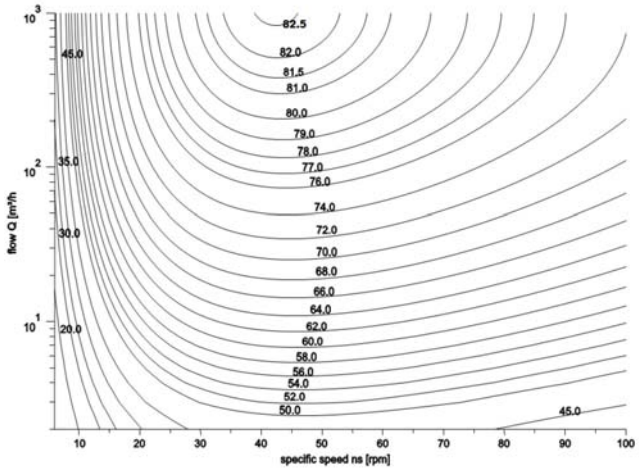
| | | |
|---|---|---|
| Q | = | volume flow rate |
| H | = | total head |
| $P_2$ | = | pump power input (shaft power) |
| $\eta$ | = | pump efficiency |
| NPSH | = | net positive suction head required by the pump |
| MEI | = | minimum efficiency index |

The minimun efficiency index (MEI) is a measure of the quality of a pump size in respect to its mean efficiency. The minimum efficiency index is based on the hydraulic efficiency and on the head at the best efficiency point.

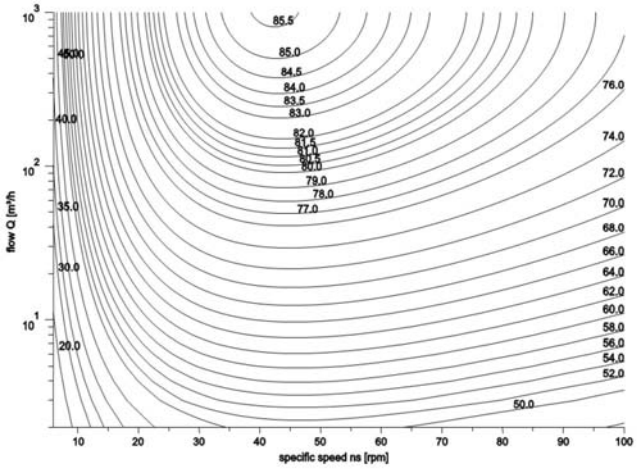
The efficiency of a pump with trimmed impeller is usually lower than that of a pump with the full impeller diameter. The trimming of the impeller will adapt the pump to a fixed duty point, leading to reduced energy consumption. The minimum efficiency index (MEI) is based on the full impeller diameter.

The operation of these water pumps with variabile duty points may be more efficient end economic when controlled, for example, by the use of a variable speed drive that matches the pump duty to the system.

**MEI = 0.4 for ESCC 2900 rpm**




**MEI = 0.7 for ESCC 2900rpm**

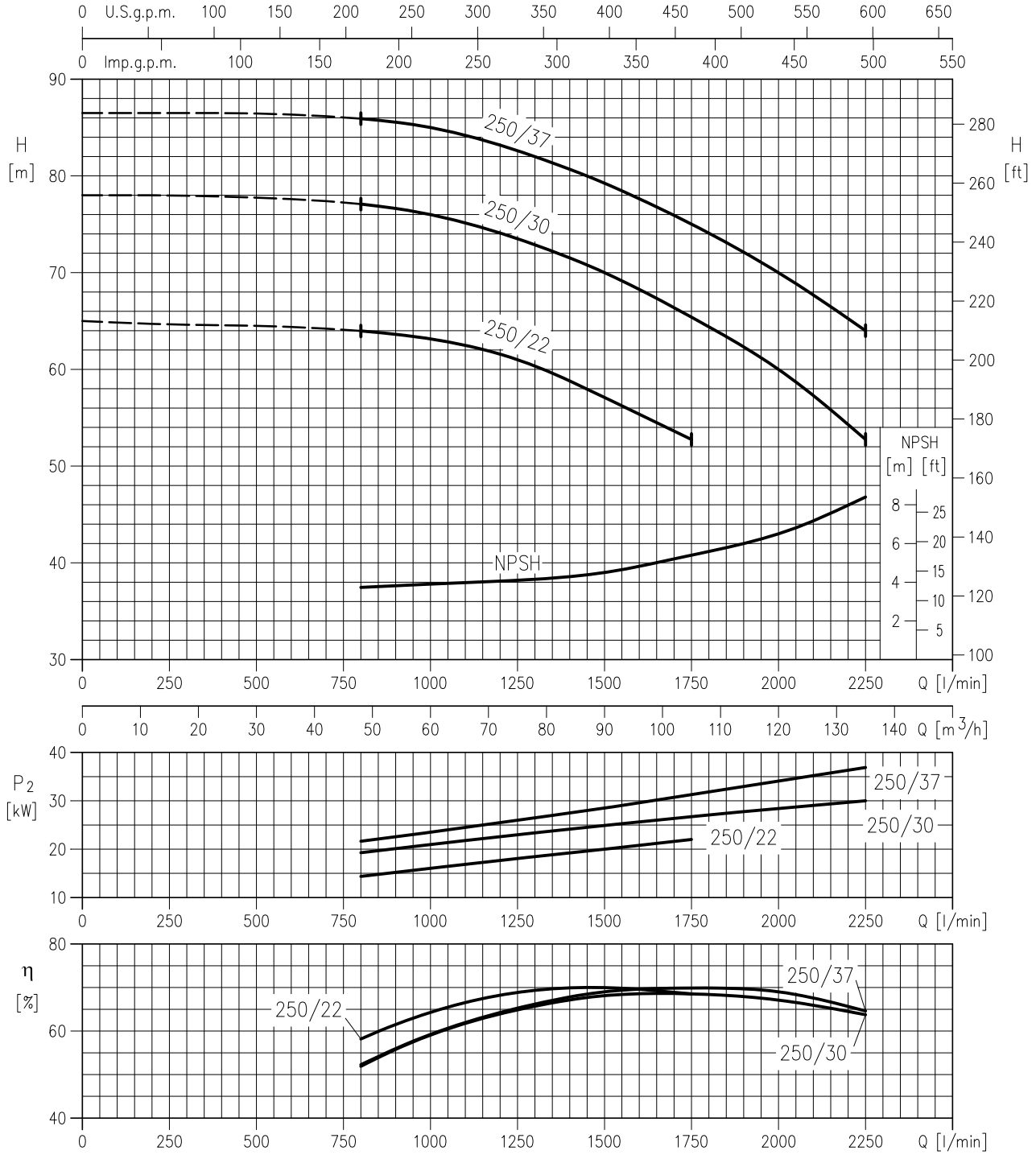


## PERFORMANCE CURVE

50Hz

Rev. A

**MMD 65-250/22 (22 kW) MEI > 0.30 - Impeller diameter = 250 mm**
**MMD 65-250/30 (30 kW) MEI > 0.30 - Impeller diameter = 250 mm**
**MMD 65-250/37 (37 kW) MEI > 0.30 – Impeller diameter = 250 mm**



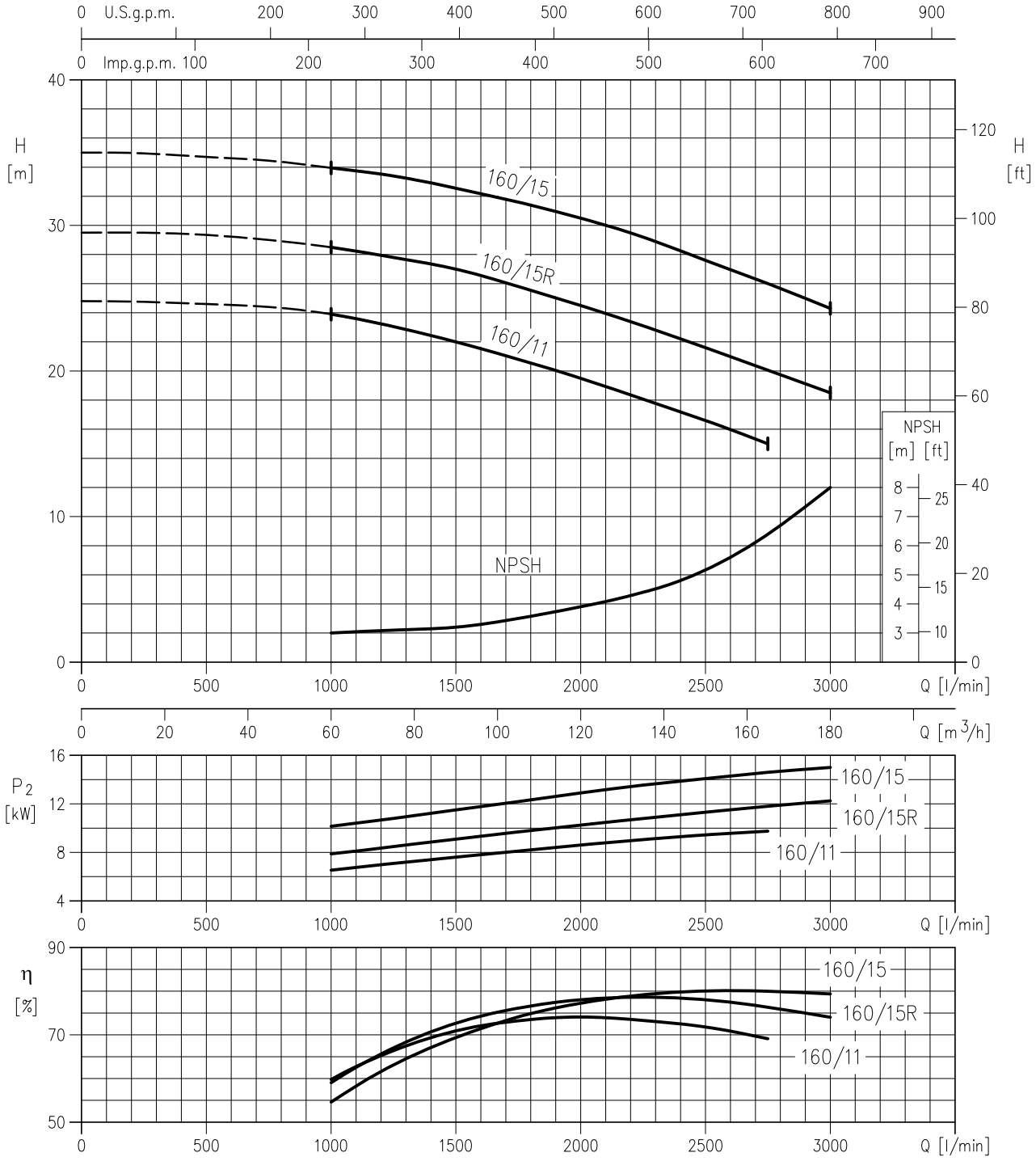

Rotation speed ≈ 2900 $min^{-1}$
Test standard: ISO 9906 – Annex A

## PERFORMANCE CURVE

50Hz

Rev. A

**MMD 80-160/11 (11 kW) MEI > 0.50 - Impeller diameter = 160 mm**
**MMD 80-160/15R (15 kW) MEI > 0.50 - Impeller diameter = 160 mm**
**MMD 80-160/15 (15 kW) MEI > 0.50 - Impeller diameter = 160 mm**



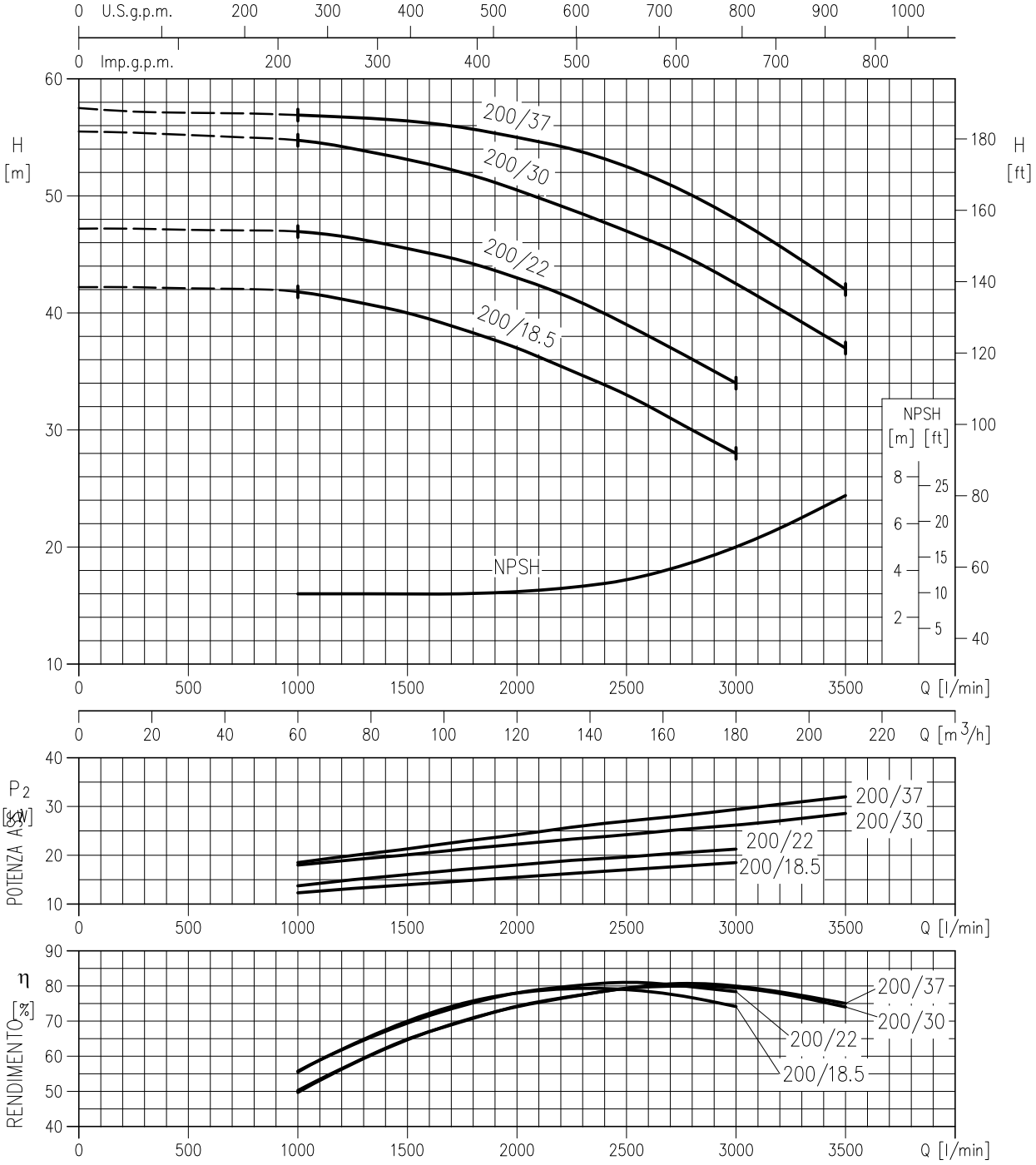

Rotation speed ≈ 2900 min$^{-1}$
Test standard: ISO 9906 – Annex A

## PERFORMANCE CURVE

50Hz

Rev. A

**MMD 80-200/18,5 (18.5 kW) MEI > 0.50 - Impeller diameter = 200 mm**
**MMD 80-200/22 (22 kW) MEI > 0.50 - Impeller diameter = 200 mm**
**MMD 80-200/30 (30 kW) MEI > 0.50 - Impeller diameter = 200 mm**
**MMD 80-200/37 (37 kW) MEI > 0.50 - Impeller diameter = 200 mm**



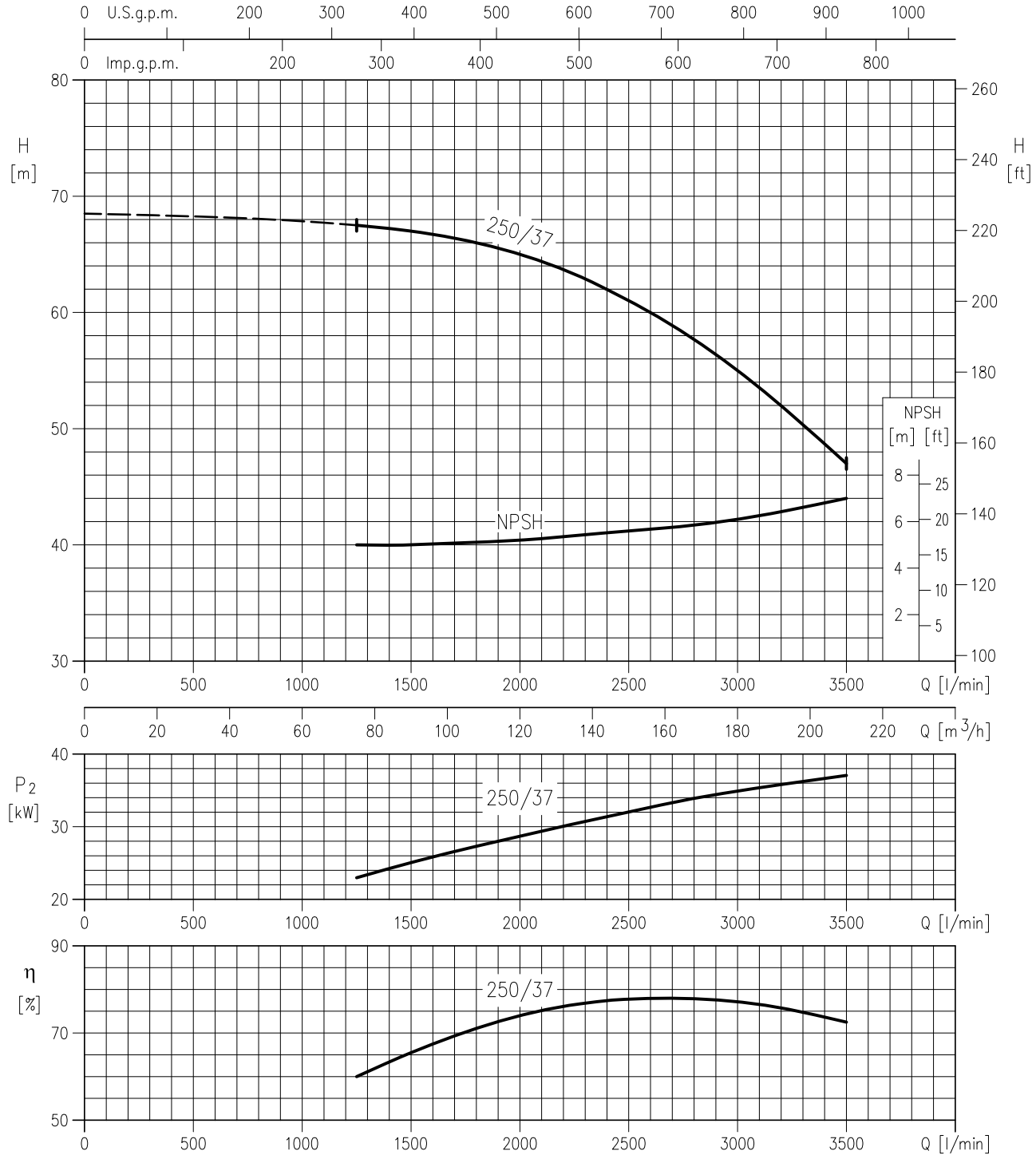

Rotation speed ≈ 2900 $min^{-1}$
Test standard: ISO 9906 – Annex A

## PERFORMANCE CURVE

50Hz

Rev. A

**MMD 80-250/37 (37 kW) MEI > 0.40 - Impeller diameter = 250 mm**



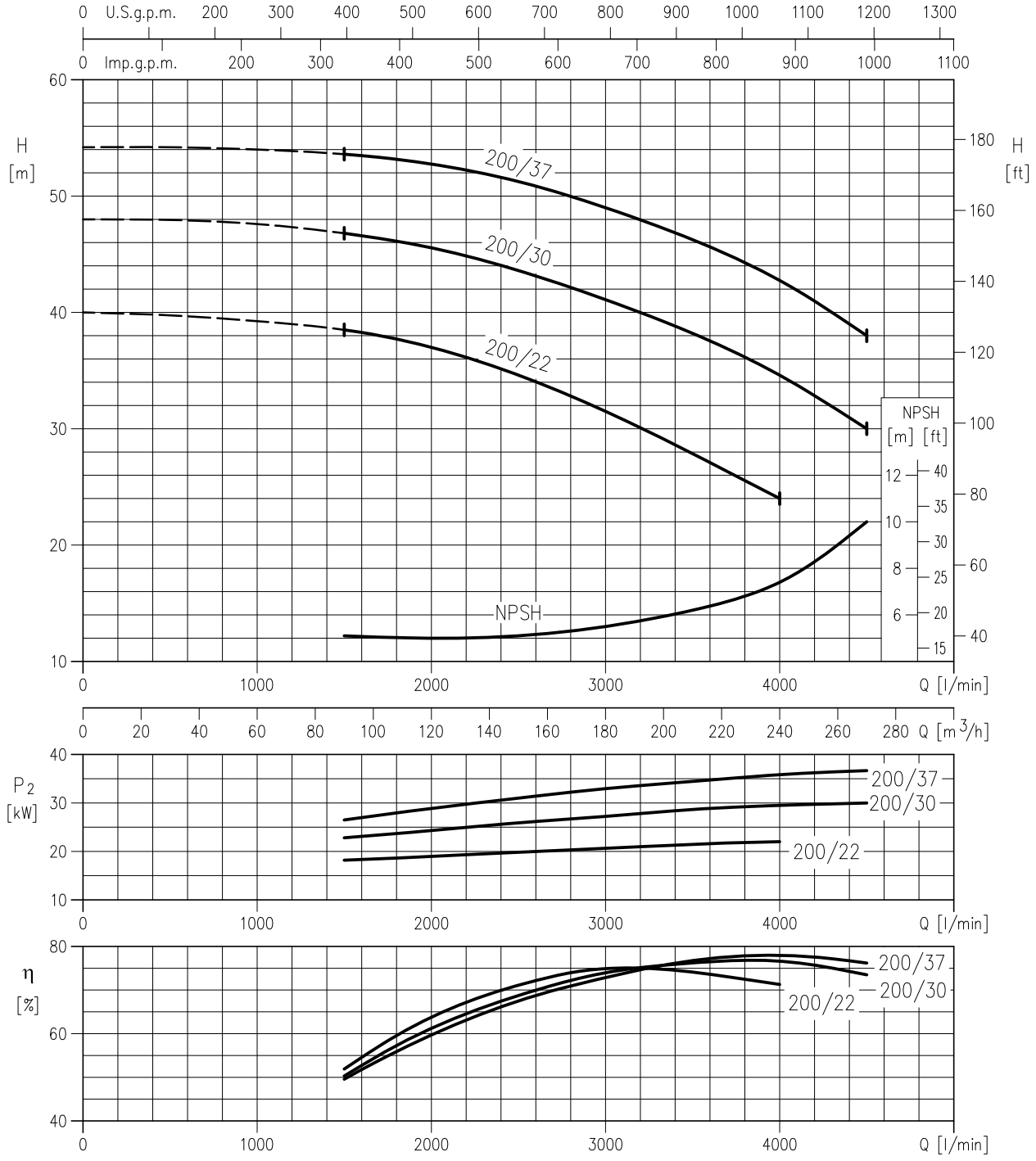

Rotation speed ≈ 2900 $min^{-1}$
Test standard: ISO 9906 – Annex A

## PERFORMANCE CURVE

50Hz

Rev. A

**MMD 100-200/22 (22 kW) MEI > 0.20 - Impeller diameter = 200 mm**
**MMD 100-200/30 (30 kW) MEI > 0.20 - Impeller diameter = 200 mm**
**MMD 100-200/37 (37 kW) MEI > 0.20 - Impeller diameter = 200 mm**




Rotation speed ≈ 2900 min
Test standard: ISO 9906 – Annex A

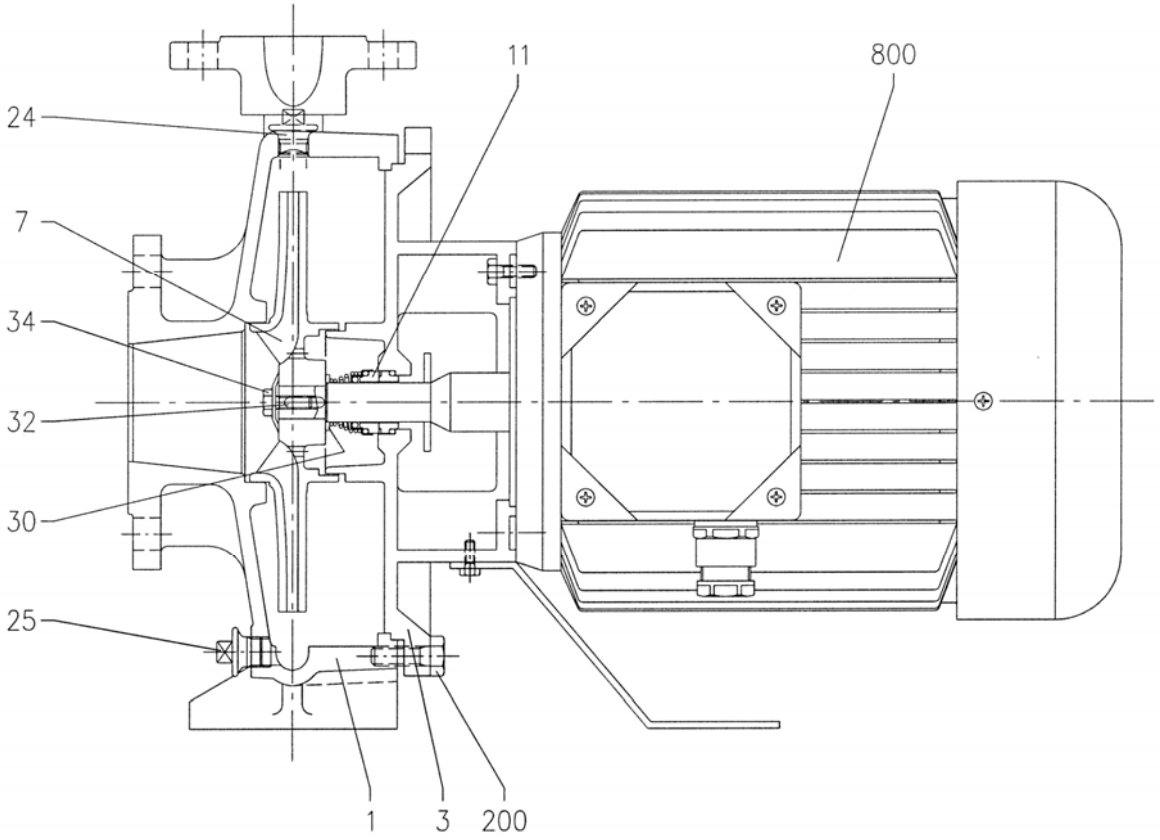
## CONSTRUCTIONS

50Hz

Rev. A

### SECTIONAL VIEW DRAWING

UP TO MEC 132




| N° | PART NAME | MATERIAL |
|---|---|---|
| 1 | Casing | Cast iron |
| 3 | Motor bracket | Cast iron |
| 7 | Impeller | Cast iron |
| 11 | Mechanical seal | SiC/SiC/NBR |
| 24 | Priming plug | Stainless Steel |
| 25 | Drain plug | Stainless Steel |
| 30 | Spacer | Stainless Steel |
| 32 | Key | Stainless Steel |
| 34 | Impeller nut | Stainless Steel |
| 200 | Screw | Stainless Steel |
| 800 | Motor | aluminum (up to MEC 132) |

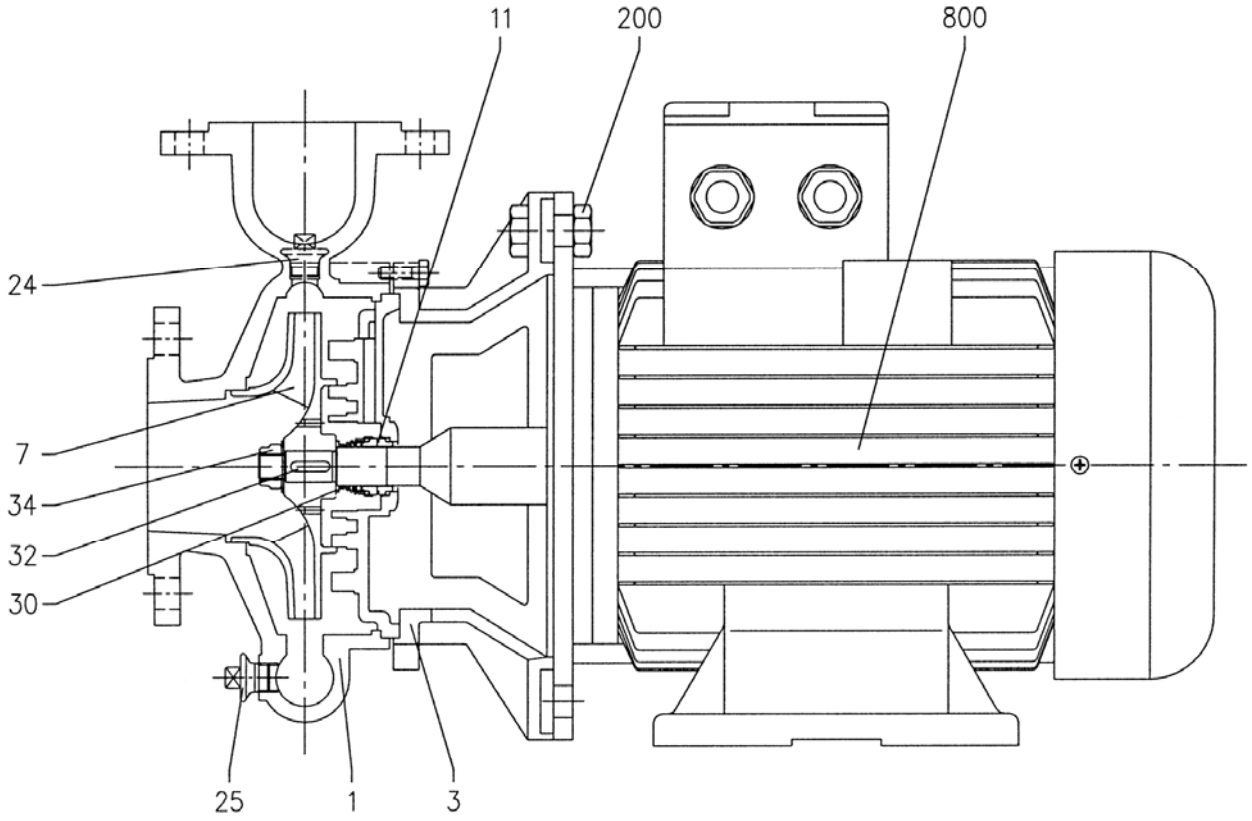
## CONSTRUCTIONS

50Hz

Rev. A

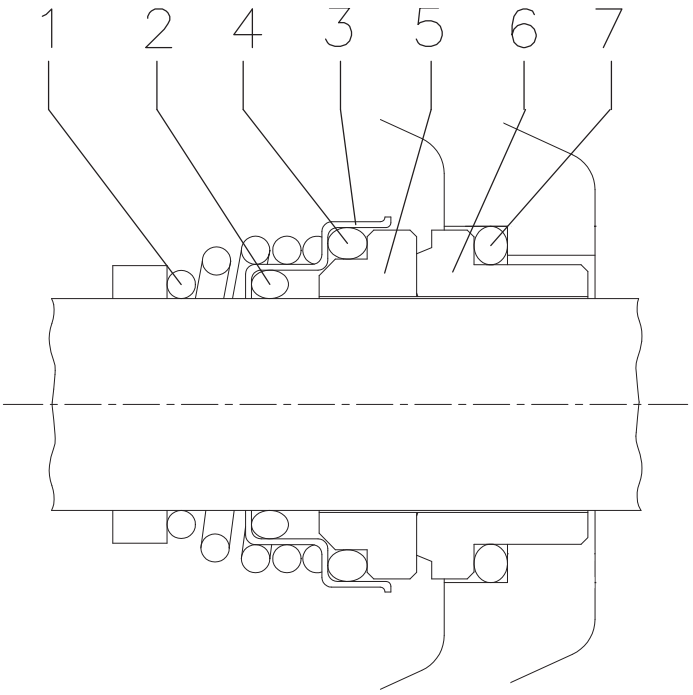
### SECTIONAL VIEW DRAWING

MEC 160 AND MORE POWERFUL




| N° | PART NAME | MATERIAL |
|---|---|---|
| 1 | Casing | Cast iron |
| 3 | Motor bracket | Cast iron |
| 7 | Impeller | Cast iron |
| 11 | Mechanical seal | SiC/SiC/NBR |
| 24 | Priming plug | Stainless Steel |
| 25 | Drain plug | Stainless Steel |
| 30 | Spacer | Stainless Steel |
| 32 | Key | Stainless Steel |
| 34 | Impeller nut | Stainless Steel |
| 200 | Screw | Stainless Steel |
| 800 | Motor | aluminum (MEC 160 and above) |

## MECHANICAL SEAL



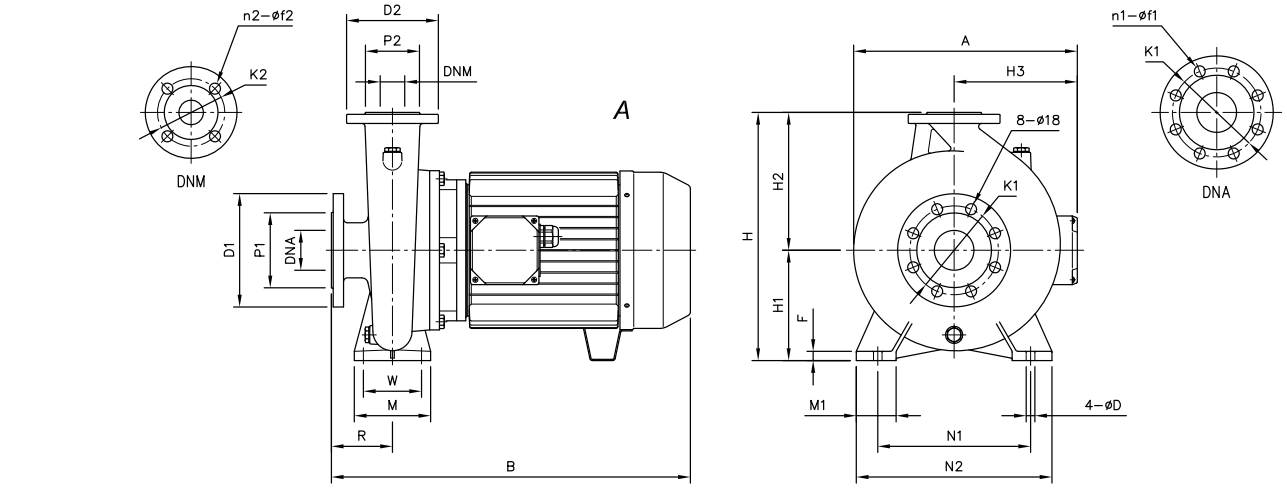

| REF | PART NAME | MATERIAL |
|---|---|---|
| 1 | Self driving spring | AISI 316 |
| 2 | O Ring | NBR |
| 3 | Frame | AISI 316 |
| 4 | O Ring | NBR |
| 5 | Rotary seal ring | SiC |
| 6 | Stationary sealing | SiC |
| 7 | O Ring | NBR |

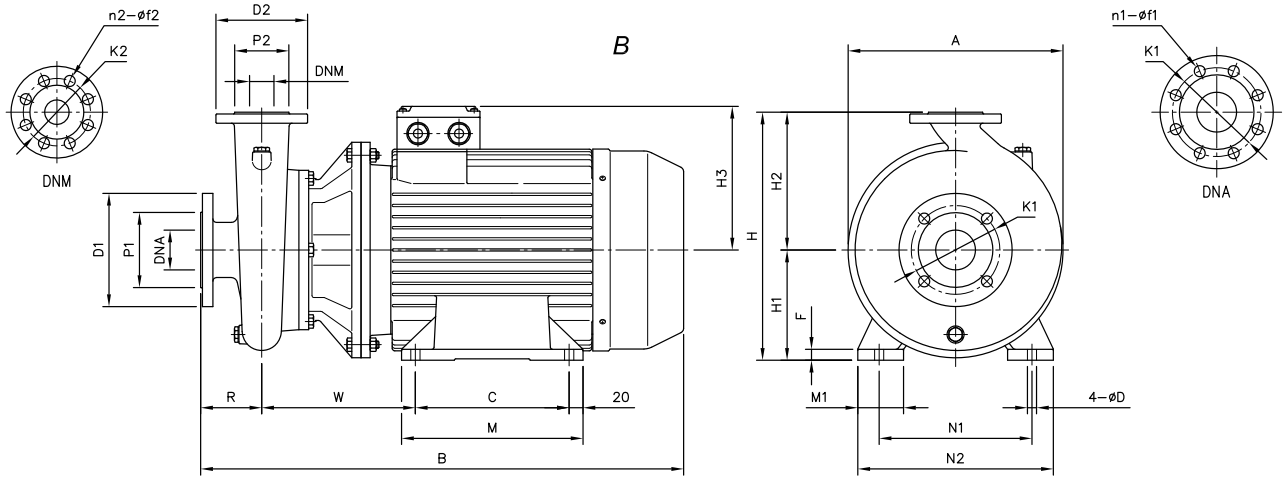
## DIMENSIONS AND WEIGHT

50Hz

Rev. A

### PUMP MMD




| Model | Pitc. | Dimension (mm) | | | | | | | | | | | | | | | | | | | | | | | | | | Weight (kgf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | DNA | n1 | f1 | P1 | K1 | D1 | DNM | n2 | f2 | P2 | K2 | D2 | H | H1 | H2 | H3 | R | W | N1 | M | N2 | M1 | F | A | B | C | D | |
| MMD 65-250/22 | B | 80 | 4 | 18 | 138 | 160 | 200 | 65 | 4 | 18 | 122 | 145 | 185 | 430 | 180 | 250 | 238 | 100 | 280 | 254 | 420 | 320 | 60 | 20 | 365 | 862 | 370 | 14 | 157 |
| MMD 65-250/30 | B | 80 | 4 | 18 | 138 | 160 | 200 | 65 | 4 | 18 | 122 | 145 | 185 | 450 | 200 | 250 | 330 | 100 | 325 | 318 | 345 | 380 | 60 | 24 | 365 | 961 | 305 | 18 | 288 |
| MMD 65-250/37 | B | 80 | 4 | 18 | 138 | 160 | 200 | 65 | 4 | 18 | 122 | 145 | 185 | 450 | 200 | 250 | 330 | 100 | 325 | 318 | 345 | 380 | 60 | 24 | 365 | 961 | 305 | 18 | 340 |
| MMD 80-160/11 | A | 100 | 8 | 18 | 188 | 180 | 220 | 80 | 4 | 18 | 138 | 160 | 200 | 405 | 180 | 225 | 194 | 125 | 95 | 250 | 125 | 320 | 65 | 14 | 315 | 774 | - | 14 | 125 |
| MMD 80-160/15R | A | 100 | 8 | 18 | 188 | 180 | 220 | 80 | 4 | 18 | 138 | 160 | 200 | 405 | 180 | 225 | 194 | 125 | 95 | 250 | 125 | 320 | 65 | 14 | 315 | 774 | - | 14 | 135 |
| MMD 80-160/15 | A | 100 | 8 | 18 | 188 | 180 | 220 | 80 | 4 | 18 | 138 | 160 | 200 | 405 | 180 | 225 | 194 | 125 | 95 | 250 | 125 | 320 | 65 | 14 | 315 | 774 | - | 14 | 134 |
| MMD 80-200/18,5 | B | 100 | 8 | 18 | 188 | 180 | 220 | 80 | 4 | 18 | 138 | 160 | 200 | 430 | 180 | 250 | 238 | 125 | 280 | 254 | 420 | 320 | 60 | 20 | 360 | 857 | 370 | 14 | 154 |
| MMD 80-200/22 | B | 100 | 8 | 18 | 188 | 180 | 220 | 80 | 4 | 18 | 138 | 160 | 200 | 430 | 180 | 250 | 238 | 125 | 280 | 254 | 420 | 320 | 60 | 20 | 360 | 887 | 370 | 14 | 163 |
| MMD 80-200/30 | B | 100 | 8 | 18 | 188 | 180 | 220 | 80 | 4 | 18 | 138 | 160 | 200 | 450 | 200 | 250 | 330 | 125 | 325 | 318 | 345 | 380 | 60 | 24 | 400 | 986 | 305 | 18 | 308 |
| MMD 80-200/37 | B | 100 | 8 | 18 | 188 | 180 | 220 | 80 | 4 | 18 | 138 | 160 | 200 | 450 | 200 | 250 | 330 | 125 | 325 | 318 | 345 | 380 | 60 | 24 | 400 | 986 | 305 | 18 | 360 |
| MMD 80-250/37 | B | 100 | 8 | 18 | 188 | 180 | 220 | 80 | 4 | 18 | 138 | 160 | 200 | 480 | 200 | 280 | 330 | 125 | 325 | 318 | 345 | 380 | 60 | 24 | 400 | 986 | 305 | 18 | 346 |
| MMD 100-200/22 | B | 125 | 8 | 18 | 188 | 210 | 250 | 100 | 8 | 18 | 188 | 180 | 220 | 460 | 180 | 280 | 238 | 125 | 280 | 254 | 420 | 320 | 60 | 20 | 380 | 887 | 370 | 14 | 173 |
| MMD 100-200/30 | B | 125 | 8 | 18 | 188 | 210 | 250 | 100 | 8 | 18 | 188 | 180 | 220 | 480 | 200 | 280 | 330 | 125 | 325 | 318 | 345 | 380 | 60 | 24 | 400 | 986 | 305 | 18 | 318 |
| MMD 100-200/37 | B | 125 | 8 | 18 | 188 | 210 | 250 | 100 | 8 | 18 | 188 | 180 | 220 | 480 | 200 | 280 | 330 | 125 | 325 | 318 | 345 | 380 | 60 | 24 | 400 | 986 | 305 | 18 | 370 |

## MOTOR DATA

| Pump type Three Phase | Power [kW] | Power [HP] | Efficiency Three Phase | Efficiency (% load) Three phase η % 50% | 75% | 100% | Input [kW] | Full load current [A] 400 V | 690 V | Locked rotor current [A] 400 V | 690 V |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MMD 65-250/22 | 22 | 30 | IE2 | 90,9 | 91,8 | 91,4 | 24,07 | 39,0 | 22,5 | 292,8 | 169,0 |
| MMD 65-250/30 | 30 | 40 | IE2 | 91,3 | 92,3 | 92,4 | 32,49 | 53,3 | 30,8 | 357,1 | 206,2 |
| MMD 65-250/37 | 37 | 50 | IE2 | 91,6 | 92,9 | 92,8 | 39,91 | 64,0 | 36,9 | 403,2 | 232,8 |
| MMD 80-160/11 | 11 | 15 | IE2 | 88,9 | 90,2 | 90,0 | 12,29 | 20,4 | 11,8 | 189,7 | 109,5 |
| MMD 80-160/15R | 15 | 20 | IE2 | 90,0 | 91,0 | 90,8 | 16,58 | 27,2 | 15,7 | 261,1 | 150,7 |
| MMD 80-160/15 | 15 | 20 | IE2 | 90,0 | 91,0 | 90,8 | 16,58 | 27,2 | 15,7 | 261,1 | 150,7 |
| MMD 80-200/18,5 | 18,5 | 25 | IE2 | 90,3 | 91,6 | 91,2 | 20,3 | 33,3 | 19,2 | 319,7 | 184,6 |
| MMD 80-200/22 | 22 | 30 | IE2 | 90,9 | 91,8 | 91,4 | 24,07 | 39,0 | 22,5 | 292,8 | 169,0 |
| MMD 80-200/30 | 30 | 40 | IE2 | 91,3 | 92,3 | 92,4 | 32,49 | 53,3 | 30,8 | 357,1 | 206,2 |
| MMD 80-200/37 | 37 | 50 | IE2 | 91,6 | 92,9 | 92,8 | 39,91 | 64,0 | 36,9 | 403,2 | 232,8 |
| MMD 80-250/37 | 37 | 50 | IE2 | 91,6 | 92,9 | 92,8 | 39,91 | 64,0 | 36,9 | 403,2 | 232,8 |
| MMD 100-200/22 | 22 | 30 | IE2 | 90,9 | 91,8 | 91,4 | 24,07 | 39,0 | 22,5 | 292,8 | 169,0 |
| MMD 100-200/30 | 30 | 40 | IE2 | 91,3 | 92,3 | 92,4 | 32,49 | 53,3 | 30,8 | 357,1 | 206,2 |
| MMD 100-200/37 | 37 | 50 | IE2 | 91,6 | 92,9 | 92,8 | 39,91 | 64,0 | 36,9 | 403,2 | 232,8 |

## NOISE DATA

| Pump type Three Phase | Power [kW] | Power [HP] | $L_{pA}$ - dB(A) * |
|---|---|---|---|
| MMD 65-250/22 | 22 | 30 | 81 |
| MMD 65-250/30 | 30 | 41 | 83 |
| MMD 65-250/37 | 37 | 50 | |
| MMD 80-160/11 | 11 | 15 | 80 |
| MMD 80-160/15R | 15 | 20 | |
| MMD 80-160/15 | 15 | 230 | |
| MMD 80-200/18,5 | 19 | 25 | 81 |
| MMD 80-200/22 | 22 | 30 | |
| MMD 80-200/30 | 30 | 41 | 83 |
| MMD 80-200/37 | 37 | 50 | |
| MMD 80-250/37 | 37 | 50 | |
| MMD 100-200/22 | 22 | 30 | 81 |
| MMD 100-200/30 | 30 | 41 | 83 |
| MMD 100-200/37 | 37 | 50 | |

* Mean value of several measures at 1m distance around the Tollerance ± 2.5 dB.