FLOWSERVE

TECHNICAL BULLETIN

# Byron Jackson® H2O+ Premium
## Water-Filled Submersible Motors

*Experience In Motion*

# Highly reliable and long-lasting deep well performance

Byron Jackson H2O+ Premium water-filled, wet-wound motors from Flowserve are environmentally friendly, provide high efficiency, and offer outstanding reliability. They're available in 6 in. (MS6), 8 in. (MS8) and 10 in. (MS10) sizes.

Water-tight insulated windings ensure easy service, improve cooling, and extend motor life.

Each unit is pre-filled with food-grade, NSF-approved glycol for freeze and rust protection and lubrication, making them suitable for potable water applications.

The Byron Jackson H2O+ Premium water-filled submersible motors are stocked regionally with a 304 stainless steel stator and coated cast iron end bells. The heavy-duty thrust bearing design, a 100% pressure compensation system, asynchronous three-phase rewindable stators and a squirrel cage rotor make Byron Jackson H2O+ Premium water-filled submersible motors an exceptional value. Other materials suited for specific applications are available with longer lead times. Consult your Flowserve sales representative for details.

## Applications

- Cooling water
- Dewatering
- Groundwater development
- Water supply and distribution
  - Water wells (agricultural, domestic, municipal)
  - Fountains
  - Mining and industrial
  - Potable water applications

## Certifications and standards

Byron Jackson H2O+ Premium water-filled motors are certified to NSF/ANSI Standards 61 and 372.

## Features and benefits

- **Winding:** Electrolytic solid copper wire wrapped in BOPP insulation rated for temperatures over 100°C (212°F) that allows more copper in the stator slots. This technology enables the motor to run much cooler and achieve higher than normal horsepower ratings in standard frame sizes.
- **Stator:** All motors include an increased stator stack length and combined M800 low-loss electrical magnetic laminations for a cooler-running motor.
- **Rotor:** Increased stack length with M800 low-loss electrical magnetic laminations assembled and designed with newest technology and high-grade copper bars
- **Spline shaft:** AISI 420 stainless steel induction hardened and ground shaft (6 in. and 8 in. splined shafts; 10 in. keyed shaft) to operate in severe conditions; dimensions according to international NEMA standards
- **Shaft bearings:** Dual water-lubricated guide bearings made of high-grade carbon are fixed in upper and lower brackets for optimal operation in sandy wells and pump vibration control.
- **Thrust bearings:** All Flowserve submersible motors have Kingsbury-type thrust bearing. The thrust assembly consists of a high-quality carbon disc with hardened stainless steel shoes to handle necessary pump thrust loads. Available with an axial load capacity of 2,722 to 8,165 kg (6,000 to 18,000 lbs).
- **Seal configuration:** Flowserve offers a triple-seal configuration that consists of two outer back-to-back lip seals in nitrile butadiene rubber (NBR) with an inner silicon tungsten carbide seal for optimum protection in sandy wells.
- **Pressure-equalizing system:** Pressure compensation is managed by using a suitably sized NBR bellow to allow for expansion of the internal water as it heats up or from external pressure due to the depth of submergence.
- **Bearing housings:** High-resistance, cast iron upper and lower bearing housings with NSF-certified epoxy coating
- **Filler fluid:** Water mixed with NSF-compliant mono propylene glycol (MPG) for optimal cooling, lubrication and corrosion resistance

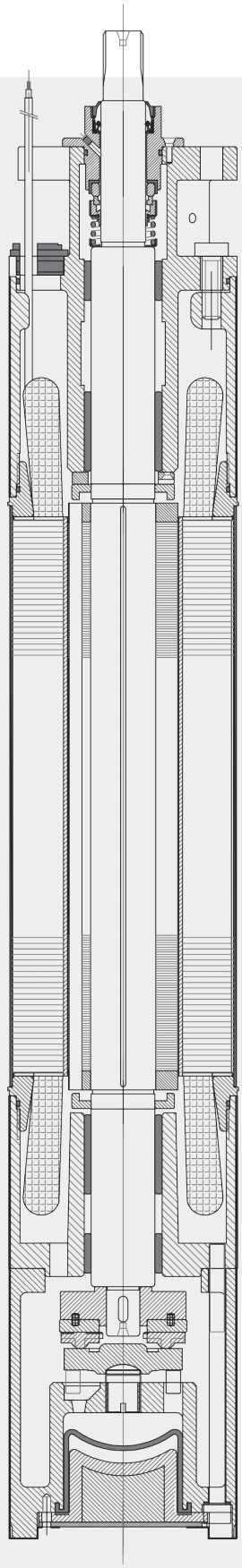
## Specifications

| | |
|---|---|
| • Degree of protection | IP68 |
| • Insulation class | Y; higher class available |
| • Working temperature | 50ºC (122ºF) |
| • Voltage tolerance | +6%/-10% |
| • Mounting position | Vertical/horizontal |
| • Minimum-maximum flow rate | 0.15 to ~3.7 m/s (0.5 to ~12 ft/s) |
| • Maximum immersion depth | 650 ft |
| • Maximum starts per hour | 6 in.: 20 starts; 8 and 10 in.: 10 starts |

## Trusted supplier of choice for water resources

For more than 150 years, Flowserve has been in the forefront of virtually every significant advancement in pumping technology to meet water-handling challenges.

Today, Flowserve offers the world's most complete line of submersible pumps with water-filled motors and systems for water applications. In addition, customers benefit from our global network of Quick Response Centers (QRCs), which provide technical and service support.



# MS6

## 6 in. H2O+ Premium water-filled submersible electric motor

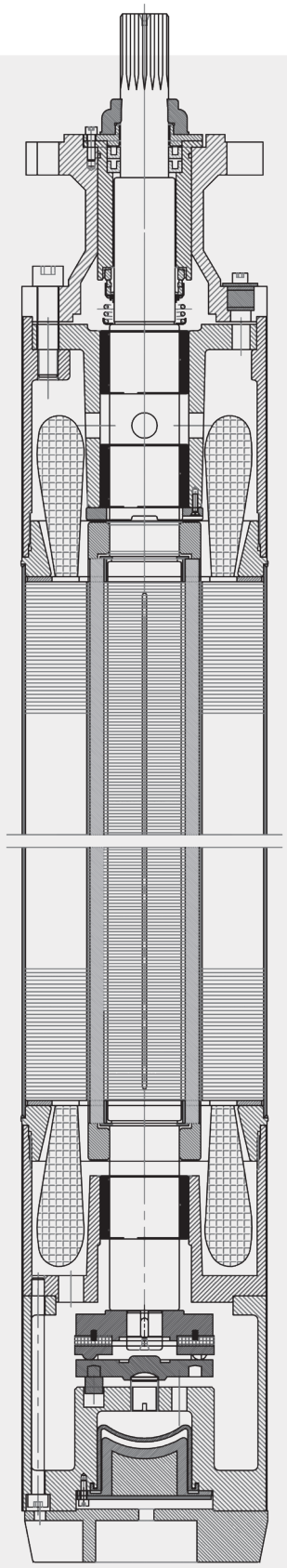
### Specifications

- **Horsepower:** 5.5 to 70 hp (4 to 52 kW)
- **Voltages:**
  - 415 V (50 Hz)
  - 460 V (60 Hz)
- **Speed:** Two-pole
- **Insulation class:** Y (standard)
- **Materials of construction:** 304 stainless steel body with NSF-coated cast iron end bells

### Features and benefits

- **13-ft motor leads**
  - **Lead cable** coming out of the lower flange with a braided stainless protection sleeve minimizes the chance of damage during assembly and installation.
  - **Fully independent and robust cable sealing** ensures safe and reliable operation owing to a rubber gasket sandwiched in nylon plates and secured by steel plate.
- **High-grade, spring-loaded mechanical seal** made of tungsten carbide
  - Ensures perfect sealing in extreme conditions
  - Highly resistive to fine and coarse sand particles
  - Ensures safe operation in sandy wells
- **Double-carbon bearings** in upper and lower portions are water-lubricated and provide greater stability and vibration-free motor operation.
  - Provide maximum rotor stability
  - Tapered design of balancing ring in lower radial bearing assembly helps guide fluid into the carbon bearings, ensuring water passage for better lubrication and heat dissipation.
- **Stator and rotor** include increased stack length and combined M800 low-loss electrical magnetic laminations for a cooler-running motor.
  - Stator design provides low core losses, higher efficiency, and lower ampere consumption and heat generation.
  - Rotor produced with high-grade copper bars

- **Robust, Kingsbury-type thrust bearings** made of high-grade 400 Series stainless steel shoes and a high-quality carbon disc to handle necessary pump thrust loads
  - Water-lubricated to reduce friction and provide high durability
  - Axial load capacities of 6,000 lbs (up to 50 hp) and 13,849 lbs (60 to 70 hp)
- **Superior triple-mechanical seal configuration** for optimum protection in sandy wells
  - Two outer back-to-back lip seals made with NBR
  - Inner silicon tungsten carbide seal
- **Two-flange top case design** per NEMA standards
  - Tapped holes
  - Provides a more secure pump connection
  - Enables greater service flexibility versus stud-type design
- **Provision for installation of PT100 temperature sensor** for real-time motor monitoring and control
  - Adds protection in special application conditions
- **Upper bearing housing** made of grade GG25 cast iron with 8 mm wall thickness and covered with SS304 sheet to provide strength and surface protection
  - 100% leak-proof and explosion-proof
  - Resists corrosion
  - Better structural integrity
- **High-grade AISI 420 stainless steel rotor shaft** induction hardened to 40 HRC and ground to operate in severe conditions
  - Integral single-piece design ensures better stiffness and dimensional accuracy.
  - Fully machined and ground throughout length
  - Dimensions meet NEMA standards.
- **Pure copper winding wire** with BOPP Insulation for higher temperatures and better insulation compared to PE2/PA insulation
  - Mechanized coil insertion maintains quality and precision.
  - Over-sized wire gauge ensures longer service life and higher efficiency.
- **Lower bearing housing** made of grade GG25 cast iron with 8 mm wall thickness and covered with SS304 sheet to provide strength and surface protection
  - 100% leak-proof and explosion-proof
  - Better structural integrity
- **Robust and over-designed lower support** with 304 stainless steel cover provides a stable foundation for the motor and corrosion resistance.
  - Provides more space for more coolant water that contributes to better heat dissipation
- **Pressure-equalizing system** utilizes an NBR bellow to allow for expansion of the internal water as it heats up, or from external pressure due to the depth of submergence.



# MS8

## 8 in. H2O+ Premium water-filled submersible electric motor

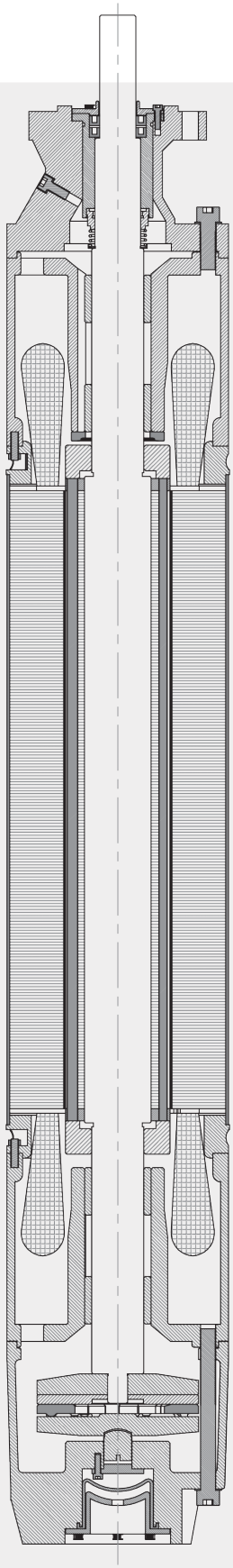
### Specifications

- **Horsepower:** 40 to 175 hp (30 to 130 kW)
- **Voltages:**
  - 415 V (50 Hz)
  - 460 V (60 Hz)
- **Speed:** Two-pole
- **Insulation class:** Y (standard)
- **Materials of construction:** 304 stainless steel body with NSF-coated cast iron end bells

### Features and benefits

- **16-ft motor leads**
  - **Lead cable** coming out of the lower flange with a braided stainless protection sleeve minimizes the chance of damage during assembly and installation.
  - **Fully independent and robust cable sealing** ensures safe and reliable operation owing to a rubber gasket sandwiched in nylon plates and secured by steel plate.
- **Slanted water-filling holes**
  - Easily accessible, even with a coupled pump
  - Optimum location along with slanted design ensures maximum fluid level inside the motor.
- **High-grade, spring-loaded mechanical seal** made of tungsten carbide
  - Ensures perfect sealing in extreme conditions
  - Highly resistive to fine and coarse sand particles
- **Double-carbon bearings** in upper and lower portions are water-lubricated and provide greater stability and vibration-free motor operation.
  - Provide maximum rotor stability
  - Tapered design of balancing ring in lower radial bearing assembly helps guide fluid into the carbon bearings, ensuring water passage for better lubrication and heat dissipation.

- **Stator and rotor** include increased stack length and combined M800 low-loss electrical magnetic laminations for a cooler-running motor.
  - Stator design provides low core losses, higher efficiency, and lower ampere consumption and heat generation.
  - Rotor produced with high-grade copper bars
- **Robust, Kingsbury-type thrust bearings** made of high-grade 400 Series stainless steel shoes and a high-quality carbon disc to handle necessary pump thrust loads
  - Water-lubricated to reduce friction and provide long lifecycle
  - Axial load capacity of 18,000 lbs
- **Superior triple-mechanical seal configuration** for optimum protection in sandy wells
  - Two outer back-to-back lip seals made with NBR
  - Inner silicon tungsten carbide seal
- **Provision for installation of PT100 temperature sensor** for real-time motor monitoring and control
  - Adds protection in special application conditions
- **High-grade AISI 420 stainless steel rotor shaft** induction hardened to 40 HRC and ground to operate in severe conditions
  - Integral single-piece design ensures better stiffness and dimensional accuracy.
  - Fully machined and ground throughout length
  - Dimensions meet NEMA standards.
- **Pure copper winding wire** with BOPP insulation for higher temperatures and better insulation compared to PE2/PA insulation
  - Mechanized coil insertion maintains quality and precision.
  - Over-sized wire gauge ensures longer service life and higher efficiency.
- **Robust and over-designed lower support** covered with stainless steel cover provides a stable foundation for the motor.
  - Design easily accommodates larger thrust bearings.
  - Provides more space for more coolant water that contributes to better heat dissipation
- **Pressure-equalizing system** utilizes an NBR bellow to allow for expansion of the internal water as it heats up, or from external pressure due to the depth of submergence.



# MS10

## 10 in. H2O+ Premium water-filled submersible electric motor

### Specifications

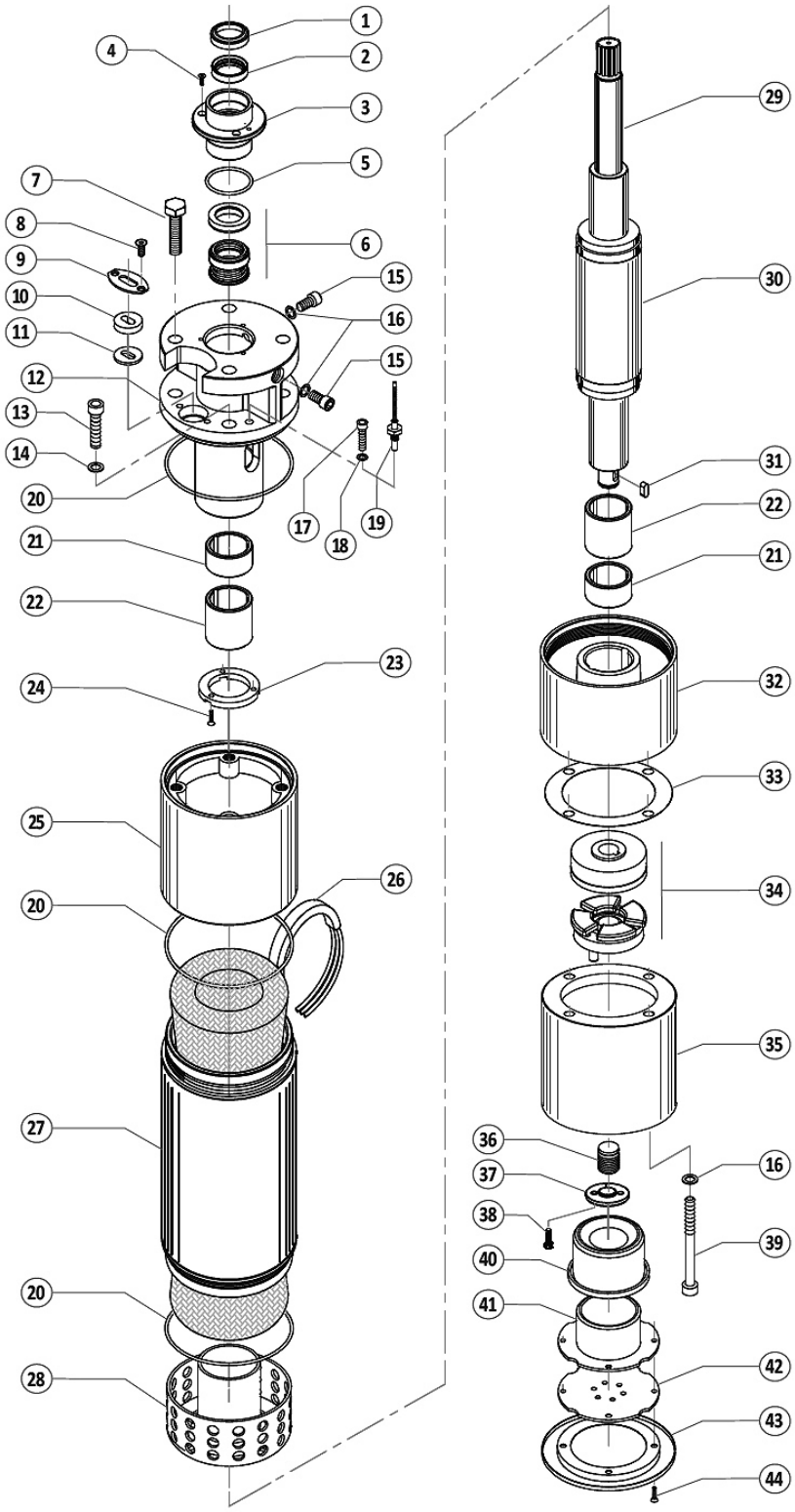
- **Horsepower:** 75 to 270 hp (55 to 200 kW)
- **Voltages:**
  - 415 V (50 Hz)
  - 460 V (60 Hz)
- **Speed:** Two-pole
- **Insulation class:** Y (standard)
- **Materials of construction:** 304 stainless steel body with NSF-coated cast iron end bells

### Features and benefits

- **16-ft motor leads**
  - **Lead cable** coming out of the lower flange with a braided stainless protection sleeve minimizes the chance of damage during assembly and installation.
  - **Fully independent and robust cable sealing** ensures safe and reliable operation owing to a rubber gasket sandwiched in nylon plates and secured by steel plate.
- **Slanted water-filling holes**
  - Easily accessible, even with a coupled pump
  - Optimum location along with slanted design ensures maximum fluid level inside the motor.
- **High-grade, spring-loaded mechanical seal** made of tungsten carbide
  - Ensures perfect sealing in extreme conditions
  - Highly resistive to fine and coarse sand particles
- **Double-carbon bearings** in upper and lower portions are water-lubricated and provide greater stability and vibration-free motor operation.
  - Avoid damage to motor internal parts, even in sandy wells
  - Tapered design of balancing ring helps guide fluid into the carbon bearings, ensuring water passage for better lubrication and heat dissipation.
  - Provides maximum rotor stability

- **Stator and rotor** include increased stack length and combined M800 low-loss electrical magnetic laminations for a cooler-running motor.
  - Stator design provides low core losses, higher efficiency, and lower ampere consumption and heat generation.
  - Rotor produced with high-grade copper bars
- **Robust, Kingsbury-type thrust bearings** made of high-grade 400 Series stainless steel shoes and a high-quality carbon disc to handle necessary pump thrust loads
  - Water-lubricated to reduce friction and provide a long lifecycle
  - Axial load capacity of 18,000 lbs
- **Superior triple-mechanical seal configuration** for optimum protection in sandy wells
  - Two outer back-to-back lip seals made with NBR
  - Inner silicon tungsten carbide seal
- **Provision for installation of PT100 temperature sensor** for real-time motor monitoring and control
  - Adds protection in special application conditions
- **High-grade AISI 420 stainless steel keyed shaft** induction hardened to 40 HRC and ground to operate in severe conditions
  - Integral single-piece design ensures better stiffness and dimensional accuracy.
  - Fully machined and ground throughout length
  - Dimensions meet NEMA standards.
- **Pure copper winding wire** with BOPP insulation for higher temperatures and better insulation compared to PE2/PA insulation
  - Mechanized coil insertion maintains quality and precision.
  - Over-sized wire gauge ensures longer service life and higher efficiency.
- **Robust and over-designed lower support** covered with stainless steel cover provides a stable foundation for the motor.
  - Design easily accommodates larger thrust bearings.
  - Provides more space for more coolant water that contributes to better heat dissipation
- **Pressure-equalizing system** utilizes an NBR bellow to allow for expansion of the internal water as it heats up, or from external pressure due to the depth of submergence.

# MS6 parts and materials of construction



## Table 1: MS6 parts list with materials and quantities

| Pos. | Item code | Part name | Material | Qty. |
|---|---|---|---|---|
| 1 | 60101480 | Wiper seal | NBR + stainless steel | 1 |
| 2 | 60101475 | Lip seal / oil seal | NBR + stainless steel | 1 |
| 3 | 60101090 | Seal support KM6 | Stainless steel | 1 |
| 4 | 60101075 | Allen bolt (seal support) | NBR + stainless steel | 3 |
| 5 | 60101095 | O-ring (seal support) | NBR | 1 |
| 6 | 60101080 | Mechanical seal | Silicon tungsten carbide (WC) + NBR + stainless steel | 1 |
| 7 | 60101110 | Hex bolt 0.5 x 1½ in. 20TPI | Sstainless steel | 4 |
| 8 | 60101077 | Screw (tail cable) | Stainless steel | 2 |
| 9 | 601011XX | Cable top plate (tail cable) | Stainless steel | 1 |
| 10 | 601011XX | Gasket rubber (tail cable) | NBR | 1 |
| 11 | 601011XX | Cable washer (tail cable) | Stainless steel | 1 |
| 12 | 60101005 | Upper support / top piece (double flange) | Cast iron | 1 |
| 13 | 60161245 | Allen bolt M12 X 45 | Stainless steel | 4 |
| 14 | 60101156 | Washer bonded / Dowty seal M12 | NBR + carbon steel | 4 |
| 15 | 60101068 | Allen bolt (top piece) | Stainless steel | 2 |
| 16 | 60101157 | Washer bonded / Dowty seal M10 | NBR + stainless steel | 6 |
| 17 | 60161250 | Allen bolt M8 X 20 | Stainless steel | 1 |
| 18 | 60161267 | Washer bonded / Dowty seal M8 | NBR/stainless steel | 1 |
| 19 | 60101485 | PT100 sensor (optional) | | 1 |
| 20 | 60101065 | O-ring 3500 | NBR | 3 |
| 21 | 60101058 | Carbon bush small (lower and upper) | Carbon | 2 |
| 22 | 60101055 | Carbon bush large (lower and upper) | Carbon | 2 |
| 23 | 60101087 | Upper thrust bearing | Brass | 1 |
| 24 | 60101142 | Screw (upper thrust) CSK M4X10 | Stainless steel | 3 |
| 25 | 60101010 | Upper bearing housing | Cast iron | 1 |
| 26 | 601011XX | Motor tail cable (03 core) | Copper + rubber | 13 |
| 27 | 60101305 | Stator stack (assembly) | Silicon steel (M800-50A) | 1 |
| 28 | 60101202 | Winding protection cover (lower) | LDPE | 1 |
| 29 | 601063XX | Rotor shaft | Stainless steel | 1 |
| 30 | 60101350 | Rotor lamination (assembly) | Silicon steel (M800-50A) | 1 |
| 31 | 60101145 | Key for rotor shaft | Stainless steel | 1 |
| 32 | 60101013 | Lower bearing housing | Cast iron | 1 |
| 33 | 60101212 | Gasket | TESNIT® | 1 |
| 34 | 601010XX | Thrust bearing | Stainless steel + carbon | 1 |
| 35 | 60101018 | Thrust support | Cast iron | 1 |
| 36 | 60101030 | Adjustment bolt (thrust bearing) | Stainless steel | 1 |
| 37 | 60161010 | Lock washer adj. bolt | Mild steel | 1 |
| 38 | 60161252 | Bolt allen M6 x 20 | Stainless steel | 2 |
| 39 | 60101071 | Bolt allen M10x170 | Carbon steel 12,9 | 4 |
| 40 | 60101045 | Diaphragm rubber | NBR | 1 |
| 41 | 60101216 | Diaphragm support | Polycarbonate | 1 |
| 42 | 60101050 | End cover of diaphragm | Stainless steel | 1 |
| 43 | 60101052 | Cover for thrust support | Stainless steel | 1 |
| 44 | 60101143 | Allen bolt (lower thrust plate) | Stainless steel | 4 |

# Motor data

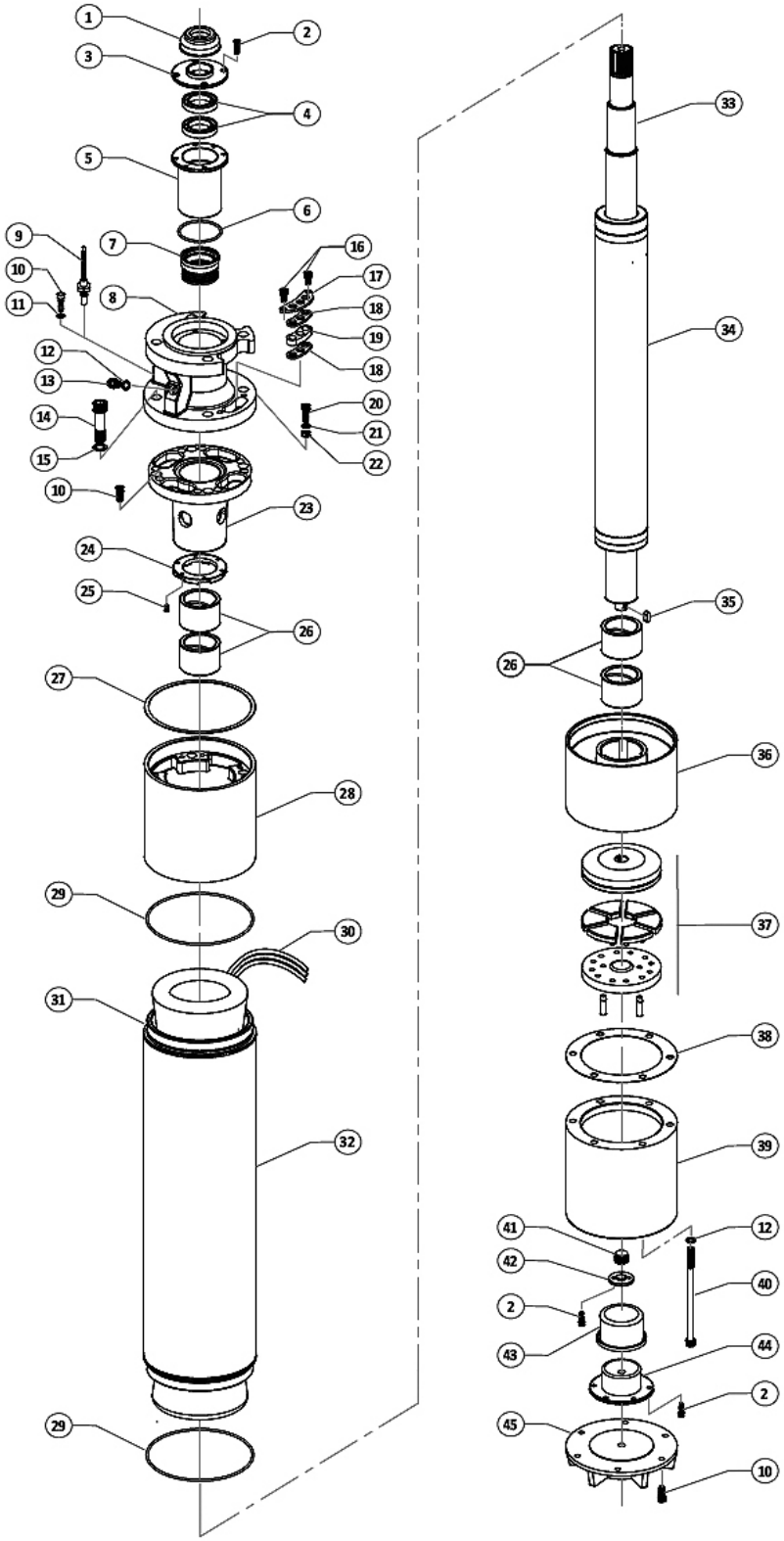
### Table 2: MS6 @ 50 Hz, three-phase, 415-volt, two-pole

| Model | Power | | Axial load, kN | Speed $n_N$, rpm | I N, A | I A, A | Motor efficiency at % load, % | | | Power factor (cos. Φ) at % load, % | | | Length, mm | Weight, kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | hp | kW | | | | | @50% | @75% | @100% | @50% | @75% | @100% | | |
| MS6-4k-2 | 5.5 | 4 | 6,000 | 2,850 | 10 | 47 | 70 | 76 | 75 | 60 | 72 | 79 | 711.96 | 55.34 |
| MS6-5.5k-2 | 7.5 | 5.5 | 6,000 | 2,850 | 13.1 | 48 | 71 | 77 | 76 | 68 | 77 | 81 | 711.96 | 55.34 |
| MS6-7.5k-2 | 10 | 7.5 | 6,000 | 2,850 | 17.2 | 56 | 72 | 77 | 77 | 70 | 78 | 82 | 762 | 60.33 |
| MS6-11k-2 | 15 | 11 | 6,000 | 2,855 | 24.8 | 90 | 77 | 81 | 80 | 68 | 77 | 81 | 847.09 | 70.31 |
| MS6-15k-2 | 20 | 15 | 6,000 | 2,850 | 32.7 | 135 | 79 | 82 | 81 | 71 | 78 | 82 | 937.01 | 79.38 |
| MS6-18.5k-2 | 25 | 18.5 | 6,000 | 2,855 | 40.2 | 165 | 79 | 83 | 82 | 70 | 78 | 82 | 1,026.92 | 89.36 |
| MS6-22k-2 | 30 | 22 | 6,000 | 2,855 | 48.2 | 218 | 79 | 83 | 82 | 70 | 78 | 82 | 1,112.01 | 98.43 |
| MS6-30k-2 | 40 | 30 | 6,000 | 2,860 | 65.2 | 322 | 80 | 83 | 82 | 68 | 77 | 81 | 1,246.89 | 112.49 |
| MS6-37k-2 | 50 | 37 | 6,000 | 2,845 | 80.6 | 408 | 80 | 83 | 82 | 69 | 78 | 82 | 1,246.89 | 112.49 |
| MS6-45k-2 | 60 | 45 | 13,849 | 2,850 | 97 | 531 | 77 | 83 | 82 | 71 | 78 | 82 | 1,315 | 117.48 |
| MS6-52k-2 | 70 | 52 | 13,849 | 2,850 | 114.2 | 631 | 78 | 82 | 81 | 71 | 79 | 82 | 1,374.90 | 125.19 |

## Table 3: MS6 @ 60 Hz, three-phase, 460-volt, two-pole

| Model | Power | | Axial load, kN | Speed $n_N$, rpm | I N, A | I A, A | Motor efficiency at % load, % | | | Power factor (cos. Φ) at % load, % | | | Length, in | Weight, lb |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | hp | kW | | | | | @50% | @75% | @100% | @50% | @75% | @100% | | |
| MS6-5.5H-2 | 5.5 | 4 | 6,000 | 3,460 | 8.6 | 51 | 70 | 75 | 76 | 60 | 72 | 78 | 28.03 | 122 |
| MS6-7.5H-2 | 7.5 | 5.5 | 6,000 | 3,470 | 11.6 | 54 | 71 | 76 | 76 | 71 | 77 | 79 | 28.03 | 122 |
| MS6-10H-2 | 10 | 7.5 | 6,000 | 3,460 | 15.3 | 66 | 72 | 78 | 77 | 68 | 76 | 80 | 30 | 133 |
| MS6-15H-2 | 15 | 11 | 6,000 | 3,460 | 21.5 | 98 | 78 | 81 | 80 | 68 | 77 | 81 | 33.35 | 155 |
| MS6-20H-2 | 20 | 15 | 6,000 | 3,460 | 28.4 | 154 | 80 | 82 | 81 | 71 | 78 | 82 | 36.89 | 175 |
| MS6-25H-2 | 25 | 18.5 | 6,000 | 3,460 | 34.9 | 184 | 79 | 83 | 82 | 70 | 78 | 82 | 40.43 | 197 |
| MS6-30H-2 | 30 | 22 | 6,000 | 3,460 | 42.5 | 246 | 80 | 83 | 82 | 69 | 77 | 81 | 43.78 | 217 |
| MS6-40H-2 | 40 | 30 | 6,000 | 3,470 | 56.8 | 351 | 81 | 83 | 82 | 68 | 77 | 81 | 49.09 | 248 |
| MS6-50H-2 | 50 | 37 | 6,000 | 3,460 | 71 | 450 | 80 | 83 | 82 | 70 | 77 | 81 | 49.09 | 248 |
| MS6-60H-2 | 60 | 45 | 13,849 | 3,470 | 84.3 | 533 | 77 | 83 | 82 | 70 | 77 | 81 | 51.77 | 259 |
| MS6-70H-2 | 70 | 52 | 13,849 | 3,460 | 99.3 | 633 | 78 | 82 | 81 | 71 | 79 | 82 | 54.13 | 276 |

# MS8 parts and materials of construction



## Table 4: MS8 parts list with materials and quantities

| Pos. | Item code | Part name | Material | Qty. |
|---|---|---|---|---|
| 1 | 60161050 | Sand guard | Rubber | 1 |
| 2 | 60161252 | Bolt allen M6 x 20 | Stainless steel | 14 |
| 3 | 60161085 | Mechanical seal cover | Stainless steel | 1 |
| 4 | 60161127 | Oil seal 38x60x10 | NBR | 2 |
| 5 | 60161125 | Bush seal support | Cast iron | 1 |
| 6 | 60161220 | O-ring 65x2,5 | NBR | 1 |
| 7 | 60161275 | Mechanical seal complete | Silicon tungsten carbide (WC) + NBR + stainless steel | 1 |
| 8 | 60161065 | Top piece / upper support double flange | Cast iron | 1 |
| 9 | 60101485 | PT 100 sensor | Stainless steel | 1 |
| 10 | 60161250 | Bolt allen M8x20 | Stainless steel | 14 |
| 11 | 60161267 | Washer bonded / Dowty seal M8 | NBR/stainless steel | 1 |
| 12 | 60101157 | Washer bonded / Dowty seal M10 | NBR/stainless steel | 8 |
| 13 | 60101068 | Bolt allen M10 x 16 | Stainless steel | 2 |
| 14 | 60161255 | Bolt allen M16 x 65 | Stainless steel | 4 |
| 15 | 60161272 | Washer bonded / Dowty seal M16 | NBR/stainless steel | 4 |
| 16 | 60161253 | Bolt allen M8 x 25 | Stainless steel | 2 |
| 17 | 60161150 | Cable top cover plate | Carbon steel | 2 |
| 18 | 60161092 | Washer nylon | Nylon | 2 |
| 19 | 60161095 | Gasket rubber | NBR | 1 |
| 20 | 60161254 | Bolt allen M8 x 35 | Stainless steel | 1 |
| 21 | 60161263 | Spring washer M8 | Stainless steel | 1 |
| 22 | 60161262 | Nut hex M8 | Stainless steel | 1 |
| 23 | 60161080 | Upper bearing housing | Cast iron | 1 |
| 24 | 60161105 | Upper thrust bearing | Brass | 1 |
| 25 | 60101142 | Screw CSK M4x10 | Stainless steel | 6 |
| 26 | 60161020 | Carbon bush | Carbon | 4 |
| 27 | 60161042 | Gasket top piece | Tesnit | 1 |
| 28 | 60161315 | Upper threaded socket | Cast iron | 1 |
| 29 | 60161215 | O-ring 165x2,5 | NBR | 2 |
| 30A | 601611XX | Cable tail (1x10 $mm^2$/16 $mm^2$/25 $mm^2$/35 $mm^2$) | PVC + copper | 48 |
| 30B | 60101197 | Cable for earth 1x10 $mm^2$ | PVC + copper | 16 |
| 31 | 60161594 | Flange (200-140-46) | Stainless steel | 2 |
| 32 | 601616XX | Stator stack (assembly) | Silicon steel (50C800) + (50C800) + stainless steel | 1 |
| 33 | 601063XX | Rotor shaft | Stainless steel | 1 |
| 34 | 60161660 | Rotor lamination (including shaft + copper bars + end ring) | Silicon steel (50C800) + stainless steel + copper | 1 |
| 35 | 60101145 | Key for end shaft | Stainless steel | 1 |
| 36 | 60161320 | Lower bearing housing | Cast iron | 1 |
| 37 | 60161280K | Thrust bearing | Stainless steel / carbon | 1 |
| 38 | 60161040 | Gasket thrust support | Tesnit | 1 |
| 39 | 60161070 | Thrust support | Cast iron | 1 |
| 40 | 60161260 | Bolt allen M10x190 | Carbon steel 12,9 | 6 |
| 41 | 60161000 | Adjustment bolt | Stainless steel | 1 |
| 42 | 60161010 | Lock washer adj. bolt | MS | 1 |
| 43 | 60101045 | Diaphragm rubber | NBR | 1 |
| 44 | 60161130 | Diaphragm support | Cast iron | 1 |
| 45 | 60161037 | Bottom plate | Cast iron | 1 |

# Motor data

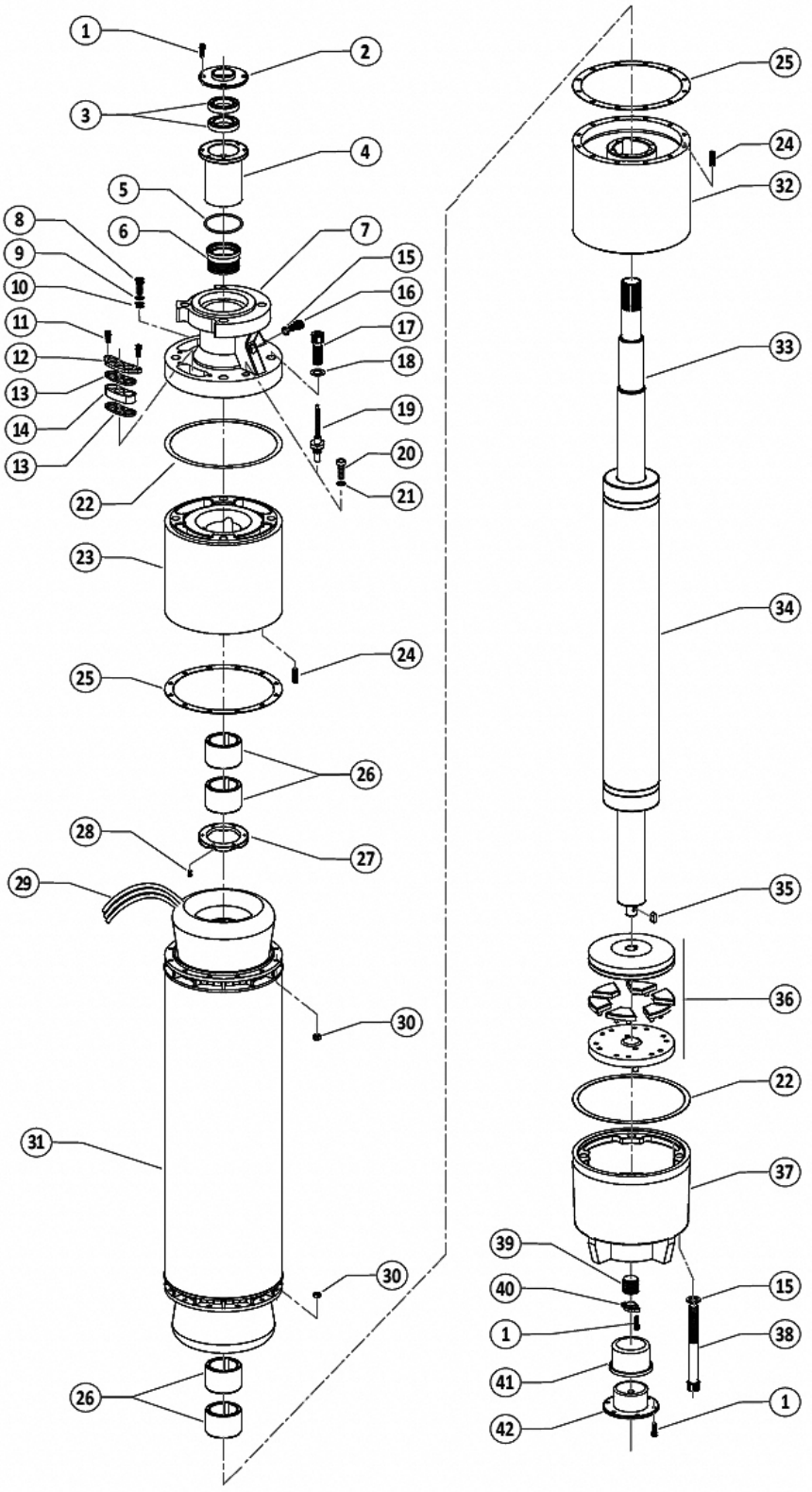
### Table 5: MS8 @ 50 Hz, three-phase, 415-volt, two-pole

| Model | Power | | Axial load, kN | Speed $n_N$, rpm | I N, A | I A, A | Motor efficiency at % load, % | | | Power factor (cos. Φ) at % load, % | | | Length, mm | Weight, kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | hp | kW | | | | | @50% | @75% | @100% | @50% | @75% | @100% | | |
| MS8-30K-2 | 40 | 30 | 18,000 | 2,880 | 61.9 | 293 | 80 | 84 | 84 | 71 | 79 | 83 | 1,239.52 | 180.08 |
| MS8-37K-2 | 50 | 37 | 18,000 | 2,900 | 76 | 363 | 83 | 86 | 84 | 70 | 79 | 84 | 1,338.58 | 198.67 |
| MS8-45K-2 | 60 | 45 | 18,000 | 2,895 | 89.6 | 470 | 82 | 86 | 85 | 70 | 80 | 85 | 1,419.86 | 208.65 |
| MS8-55K-2 | 75 | 55 | 18,000 | 2,885 | 110.7 | 613 | 83 | 87 | 86 | 71 | 80 | 84 | 1,638.30 | 247.21 |
| MS8-75K-2 | 100 | 75 | 18,000 | 2,900 | 149.1 | 859 | 82 | 87 | 86 | 70 | 79 | 84 | 1,828.80 | 279.87 |
| MS8-93K-2 | 125 | 93 | 18,000 | 2,890 | 183.4 | 1,154 | 81 | 87 | 87 | 72 | 80 | 84 | 1,927.86 | 302.09 |
| MS8-110K-2 | 150 | 110 | 18,000 | 2,900 | 217.6 | 1,432 | 83 | 87 | 87 | 72 | 81 | 85 | 2,029.46 | 327.95 |
| MS8-130K-2 | 175 | 130 | 18,000 | 2,895 | 259.8 | 1,713 | 83 | 87 | 86 | 72 | 80 | 84 | 2,138.68 | 346.55 |

## Table 6: MS8 @ 60 Hz, three-phase, 460-volt, two-pole

| Model | Power | | Axial load, kN | Speed $n_N$, rpm | I N, A | I A, A | Motor efficiency at % load, % | | | Power factor (cos. Φ) at % load, % | | | Length, in | Weight, lb |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | hp | kW | | | | | @50% | @75% | @100% | @50% | @75% | @100% | | |
| MS8-40H-2 | 40 | 30 | 18,000 | 3,460 | 56.2 | 346 | 80 | 83 | 83 | 69 | 77 | 81 | 48.8 | 397 |
| MS8-50H-2 | 50 | 37 | 18,000 | 3,460 | 66.4 | 413 | 84 | 86 | 84 | 69 | 79 | 84 | 52.7 | 438 |
| MS8-60H-2 | 60 | 55 | 18,000 | 3,480 | 81.1 | 551 | 84 | 86 | 84 | 69 | 78 | 83 | 55.9 | 460 |
| MS8-75H-2 | 75 | 56 | 18,000 | 3,465 | 97.6 | 676 | 84 | 88 | 87 | 70 | 79 | 83 | 64.5 | 545 |
| MS8-100H-2 | 100 | 75 | 18,000 | 3,470 | 129.9 | 969 | 82 | 87 | 86 | 70 | 79 | 84 | 72 | 617 |
| MS8-125H-2 | 125 | 93 | 18,000 | 3,70 | 162.6 | 1,296 | 80 | 85 | 86 | 72 | 80 | 84 | 75.9 | 666 |
| MS8-150H-2 | 150 | 112 | 18,000 | 3,460 | 197.4 | 1,595 | 83 | 87 | 86 | 71 | 79 | 83 | 79.9 | 723 |
| MS8-175H-2 | 175 | 130 | 18,000 | 3,460 | 226.7 | 1,866 | 84 | 88 | 87 | 71 | 79 | 83 | 84.2 | 764 |

# MS10 parts and materials of construction



## Table 7: MS10 parts list with materials and quantities

| Pos. | Item Code | Part Name | Material | Qty. |
|---|---|---|---|---|
| 1 | 60161252 | Bolt allen M6 x 20 | Stainless steel | 12 |
| 2 | 60161085 | Mechanical seal cover | Stainless steel | 1 |
| 3 | 60161127 | Oil seal 38x60x10 | NBR | 2 |
| 4 | 60161125 | Bush seal support | Cast iron | 1 |
| 5 | 60161115 | O-ring 65x2,5 | NBR | 1 |
| 6 | 60161275 | Mechanical seal complete | Silicon tungsten carbide (WC) + NBR + stainless steel | 1 |
| 7 | 60271000 | Top piece / upper support double flange | Cast iron | 1 |
| 8 | 60161254 | Bolt allen M8 x 35 | Stainless steel | 1 |
| 9 | 60161263 | Spring washer M8 | Stainless steel | 1 |
| 10 | 60161262 | Nut hex M8 | Stainless steel | 1 |
| 11 | 60161253 | Bolt allen M8 x 25 | Stainless steel | 2 |
| 12 | 60161150 | Cable top cover plate | Carbon steel | 2 |
| 13 | 60271165 | Washer nylon | nylon | 2 |
| 14 | 60271180 | Gasket rubber | NBR | 1 |
| 15 | 60101157 | Washer bonded / Dowty seal M10 | NBR/stainless steel | 2 |
| 16 | 60101068 | Bolt allen M10 x 16 | Stainless steel | 2 |
| 17 | 60161255 | Bolt allen M16 x 75 | Stainless steel | 4 |
| 18 | 60161272 | Washer bonded / Dowty seal M16 | NBR/Stainless steel | 8 |
| 19 | 60101485 | PT 100 sensor | Stainless steel | 1 |
| 20 | 60161250 | Bolt allen M8x20 | Stainless steel | 14 |
| 21 | 60161267 | Washer bonded / Dowty seal M8 | NBR/stainless steel | 1 |
| 22 | 60271150 | Gasket upper and lower | Tesnit | 2 |
| 23 | 60161080 | Upper bearing housing | Cast iron | 1 |
| 24 | 60271170 | Stud bolt M8x35 | | 24 |
| 25 | 60271152 | Gasket stator | Tesnit | 2 |
| 26 | 60271100 | Carbon bush | Carbon | 4 |
| 27 | 60271030 | Upper thrust bearing | Brass | 1 |
| 28 | 60101142 | Screw CSK M4x10 | Stainless steel | 6 |
| 29A | 601011XX | Cable tail (1x10 $mm^2$/16 $mm^2$/25 $mm^2$/35 $mm^2$) | PVC + copper | 48 |
| 29B | 60101185 | Cable tail 1x10 $mm^2$ (for earthing) | PVC + copper | 16 |
| 30 | 60161262 | Nut hex M8 | | 24 |
| 31 | 602712XX | Stator stack (assembly) | Silicon steel (50C800) + stainless steel | 1 |
| 32 | 60271040 | Lower bearing housing | Cast iron | 1 |
| 33 | 602713XX | Motor shaft | Stainless steel | 1 |
| 34 | 60271330 | Rotor lamination (including shaft + copper bars + end ring) | Silicon steel (50C800) + stainless steel + copper | 1 |
| 35 | 60101145 | Key for end shaft | Stainless steel | 1 |
| 36 | 60271050 | Thrust bearing complete | Stainless steel/carbon | 1 |
| 37 | 60271020 | Thrust support | Cast iron | 1 |
| 38 | 60271142 | Tolt allen M16x180 | Carbon steel | 4 |
| 39 | 60271140 | Adjustment bolt | Stainless steel | 1 |
| 40 | 60161010 | Lock washer adj. bolt | MS | 1 |
| 41 | 60271130 | Diaphragm rubber | NBR | 1 |
| 42 | 60271135 | Diaphragm support | Cast iron | 1 |

# Motor data

### Table 8: MS10 @ 50 Hz, three-phase, 415-volt, two-pole

| Model | Power | | Axial load, kN | Speed $n_N$, rpm | I N, A | I A, A | Motor efficiency at % load, % | | | Power factor (cos. Φ) at % load, % | | | Length, mm | Weight, kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | hp | kW | | | | | @50% | @75% | @100% | @50% | @75% | @100% | | |
| MS10-056K-2 | 75 | 56 | 18,000 | 2,900 | 114 | 524 | 83 | 86 | 86 | 73 | 82 | 86 | 1,183.64 | 180.08 |
| MS10-075K-2 | 100 | 75 | 18,000 | 2,890 | 150 | 696 | 84 | 86 | 86 | 74 | 82 | 86 | 1,432.56 | 249.93 |
| MS10-093K-2 | 125 | 93 | 18,000 | 2,895 | 185 | 908 | 84 | 86 | 86 | 73 | 82 | 86 | 1,432.56 | 309.8 |
| MS10-112K-2 | 150 | 112 | 18,000 | 2,905 | 221 | 1,105 | 85 | 87 | 87 | 73 | 81 | 86 | 1,531.62 | 370.13 |
| MS10-130K-2 | 175 | 130 | 18,000 | 2,910 | 259 | 1,362 | 86 | 87 | 87 | 70 | 80 | 84 | 1,732.28 | 469.92 |
| MS10-150K-2 | 200 | 150 | 18,000 | 2,910 | 301 | 1,586 | 86 | 87 | 87 | 70 | 80 | 85 | 1,732.28 | 469.92 |
| MS10-186K-2 | 250 | 186 | 18,000 | 2,905 | 371 | 2,080 | 86 | 87 | 86 | 75 | 82 | 85 | 1,932.94 | 579.69 |

## Table 9: MS10 @ 60 Hz, three-phase, 460-volt, two-pole

| Model | Power | | Axial load, kN | Speed $n_N$, rpm | I N, A | I A, A | Motor efficiency at % load, % | | | Power factor (cos. Φ) at % load, % | | | Length, in | Weight, lb |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | hp | kW | | | | | @50% | @75% | @100% | @50% | @75% | @100% | | |
| MS10-075H-2 | 75 | 56 | 18,000 | 3,485 | 97 | 504 | 84 | 86 | 86 | 71 | 80 | 84 | 46.6 | 397 |
| MS10-100H-2 | 100 | 75 | 18,000 | 3,492 | 128 | 681 | 85 | 86 | 87 | 72 | 81 | 85 | 56.4 | 551 |
| MS10-125H-2 | 125 | 93 | 18,000 | 3,500 | 162 | 890 | 85 | 87 | 86 | 71 | 80 | 84 | 56.4 | 683 |
| MS10-150H-2 | 150 | 112 | 18,000 | 3,505 | 194 | 1,153 | 85 | 87 | 87 | 70 | 80 | 84 | 60.3 | 816 |
| MS10-175H-2 | 175 | 130 | 18,000 | 3,505 | 219 | 1,312 | 85 | 87 | 87 | 69 | 78 | 83 | 68.2 | 1,036 |
| MS10-200H-2 | 200 | 150 | 18,000 | 3,505 | 253 | 1,544 | 85 | 87 | 87 | 69 | 79 | 83 | 68.2 | 1,036 |
| MS10-250H-2 | 250 | 186 | 18,000 | 3,500 | 312 | 2,046 | 85 | 87 | 87 | 74 | 81 | 84 | 76.1 | 1,278 |
| MS10-270H-2 | 270 | 200 | 18,000 | 3,505 | 333 | 2,232 | 85 | 87 | 87 | 74 | 82 | 85 | 80 | 1,388 |

# Power cable information

## Table 10: Direct on line (DOL)

| Rated ampere | Copper wire, 460-volt, at 60°C (140°F) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number of conductors x size in AWG | | | | | | | | | | | | | | |
| | 3x14 | 3x12 | 3x10 | 3x8 | 3x6 | 3x4 | 3x3 | 3x2 | 3x1 | 3x1/0 | 3x2/0 | 3x3/0 | 3x4/0 | 250 | 300 |
| 10 | 459 | 722 | 1,160 | 1,838 | 2,911 | 4,640 | | | | | | | | | |
| 15 | 306 | 481 | 773 | 1,225 | 1,940 | 3,093 | 3,881 | | | | | | | | |
| 20 | | 361 | 580 | 919 | 1,455 | 2,320 | 2,911 | 3,666 | | | | | | | |
| 25 | | | 464 | 735 | 1,164 | 1,856 | 2,329 | 2,933 | 3,694 | | | | | | |
| 30 | | | 386 | 612 | 970 | 1,546 | 1,940 | 2,444 | 3,079 | 3,903 | | | | | |
| 35 | | | | 525 | 831 | 1,325 | 1,663 | 2,095 | 2,639 | 3,345 | | | | | |
| 40 | | | | 458 | 727 | 1,160 | 1,455 | 1,833 | 2,309 | 2,927 | 3,688 | | | | |
| 45 | | | | 408 | 646 | 1,031 | 1,293 | 1,629 | 2,052 | 2,602 | 3,278 | | | | |
| 50 | | | | | 582 | 928 | 1,164 | 1,466 | 1,847 | 2,342 | 2,950 | 3,721 | | | |
| 55 | | | | | 529 | 843 | 1,058 | 1,333 | 1,679 | 2,129 | 2,682 | 3,381 | | | |
| 60 | | | | | 485 | 773 | 970 | 1,222 | 1,539 | 1,951 | 2,458 | 3,101 | 3,903 | | |
| 65 | | | | | 447 | 713 | 895 | 1,128 | 1,421 | 1,801 | 2,269 | 2,862 | 3,603 | | |
| 70 | | | | | | 662 | 831 | 1,047 | 1,319 | 1,672 | 2,107 | 2,658 | 3,345 | | |
| 75 | | | | | | 618 | 776 | 977 | 1,231 | 1,561 | 1,967 | 2,480 | 3,122 | | |
| 80 | | | | | | 580 | 727 | 916 | 1,154 | 1,463 | 1,844 | 2,325 | 2,927 | | |
| 85 | | | | | | 545 | 685 | 862 | 1,086 | 1,377 | 1,735 | 2,188 | 2,755 | | |
| 90 | | | | | | 515 | 646 | 814 | 1,026 | 1,301 | 1,639 | 2,067 | 2,602 | | |
| 95 | | | | | | | 612 | 771 | 972 | 1,232 | 1,553 | 1,958 | 2,465 | | |
| 100 | | | | | | | 582 | 733 | 923 | 1,171 | 1,475 | 1,860 | 2,342 | | |
| 105 | | | | | | | 554 | 698 | 879 | 1,115 | 1,405 | 1,772 | 2,230 | | |
| 110 | | | | | | | 529 | 666 | 839 | 1,064 | 1,341 | 1,691 | 2,129 | | |
| 120 | | | | | | | | 611 | 769 | 975 | 1,229 | 1,550 | 1,951 | 2,316 | 2,772 |
| 140 | | | | | | | | 523 | 659 | 836 | 1,053 | 1,329 | 1,672 | 1,985 | 2,376 |
| 160 | | | | | | | | | 577 | 731 | 922 | 1,162 | 1,463 | 1,737 | 2,079 |
| 180 | | | | | | | | | | 650 | 819 | 1,033 | 1,301 | 1,544 | 1,848 |
| 200 | | | | | | | | | | | 737 | 930 | 1,171 | 1,389 | 1,663 |
| 230 | | | | | | | | | | | 641 | 808 | 1,018 | 1,209 | 1,446 |
| 260 | | | | | | | | | | | | 715 | 900 | 1,069 | 1,279 |
| 290 | | | | | | | | | | | | | 807 | 958 | 1,147 |
| 320 | | | | | | | | | | | | | 731 | 868 | 1,039 |
| 350 | | | | | | | | | | | | | | 749 | 950 |
| 380 | | | | | | | | | | | | | | | 875 |
| 410 | | | | | | | | | | | | | | | 811 |

*Cable length calculations are based on voltage drop of 5% and above mentioned working temperature.

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