

## 4" ENCAPSULATED MOTOR - PSC DESIGN

High-quality encapsulated motor with hermetically-sealed windings

### FEATURES & BENEFITS

PSC = Permanent Split Capacitor motor

- NEMA mounting design with metric studs [M8]
- Stainless steel splined shaft
- StatorShield™ - Franklin encapsulation system: Franklin Electric encapsulated motors are equipped with hermetically-sealed windings. The stator resin mechanically supports the winding and provides fast heat dissipation.
- Hydrodynamic liquid lubricated radial bearings and High capacity Kingsbury type thrust bearing for 100 % maintenance free operation
- Field replaceable round plug lead using Franklin's exclusive Water Bloc technology with extended jam nut in Stainless steel
- Stator shell in 316SS as standard (suitable for use in water with increased salinity) 
- Factory filled with FES Franklin's non-toxic water soluble fill solution
- Drinking water approvals

### STANDARD SPECIFICATION

- Ratings: 0.25 - 2.2 kW
- Thrust load: 4 kN
- Standard voltage: 1- 220-230 V / 230-240 V - 50 Hz
- Max. storage temperature: -15 °C to +60 °C
- Nominal ambient temperature: 30 °C (with 0.08 m/s cooling flow)
- Voltage tolerance  $U_N$ : -10 % / +6 % (50 Hz)
- protection IP68
- insulation class B
- Frequency of starts: 20 starts/ hour (with min. 3 minutes resting time), equally distributed
- All motors with factory installed leads
- Vertical and horizontal operation, shaftend heightend
- Rotation counter clock wise facing shaft end (1 phase motors CW upon request)
- Optimized performance and protection with Franklin SubStart/ SubTronic control boxes

### OPTIONS

- Built in lightning arrestors
- Special lead lengths

### Pollution Recovery version

- Fluorelastomere (Viton®) rubber parts
- Special Polyurethane (PUR) lead assemblies
- 304SS (316SS stator) graded Stainless Steel as Standard

### StatorShield™ - Franklin encapsulation system

Franklin Electric encapsulated motors are equipped with hermetically-sealed windings. The stator resin mechanically supports the winding and provides fast heat dissipation.

### Hydrodynamic liquid lubricated radial bearings

100% maintenance free operation



4" encapsulated motors



### Kingsbury type thrust bearing

High capacity 4 kN Kingsbury type thrust bearing for 100 % maintenance free operation.

### Pressure-equalizing diaphragm



## 4" ENCAPSULATED MOTOR - PSC DESIGN

### 4CT PSC MOTOR - MOTOR MODEL NO. | 50 HZ

| $P_N$<br>[kW] | $U_N$<br>[V] | Digit 1 - 6 | Digit 7 - 10           |                                     |                                                     |
|---------------|--------------|-------------|------------------------|-------------------------------------|-----------------------------------------------------|
|               |              |             | single pack, with lead | motors in 40 motors<br>packing unit | Pollution Recovery motors<br>single pack, with lead |
| 0.25          | 220-230      | 254 803     | 6721L                  | 6721                                | 6723L                                               |
|               | 230-240      | 254 813     | 6721L                  | 6721                                | 6723L                                               |
| 0.37          | 220-230      | 254 805     | 6721L                  | 6721                                | 6723L                                               |
|               | 230-240      | 254 815     | 6721L                  | 6721                                | 6723L                                               |
| 0.55          | 220-230      | 254 807     | 6721L                  | 6721                                | 6723L                                               |
|               | 230-240      | 254 817     | 6721L                  | 6721                                | 6723L                                               |
| 0.75          | 220-230      | 254 808     | 6721L                  | 6721                                | 6723L                                               |
|               | 230-240      | 254 818     | 6721L                  | 6721                                | 6723L                                               |
| 1.1           | 220-230      | 254 809     | 6721L                  | 6721                                | 6723L                                               |
|               | 230-240      | 254 819     | 6721L                  | 6721                                | 6723L                                               |
| 1.5           | 220-230      | 254 810     | 6721L                  | 6721                                | 6723L                                               |
|               | 230-240      | 254 820     | 6721L                  | 6721                                | 6723L                                               |
| 2.2           | 220-230      | 254 811     | 6721L                  | 6721                                | 6723L                                               |
|               | 230-240      | 254 821     | 6721L                  | 6721                                | 6723L                                               |

### 4CT PSC MOTOR - MOTOR PERFORMANCE DATA | 220-230 V | 50 HZ

| $P_N$<br>[kW] | Thrust F<br>[N] | $U_N$<br>[V] | $n_N$<br>[min <sup>-1</sup> ] | $I_N$<br>[A] | $I_A$<br>[A] | $\eta$ (Eff.) at % load |    |     | $\cos \phi$ (Pf.)<br>at % load |      |      | $T_N$<br>[Nm] | $T_A$<br>[Nm] | Capacitor $\mu F$<br>[ $U_c=450$ V] |
|---------------|-----------------|--------------|-------------------------------|--------------|--------------|-------------------------|----|-----|--------------------------------|------|------|---------------|---------------|-------------------------------------|
|               |                 |              |                               |              |              | 50                      | 75 | 100 | 50                             | 75   | 100  |               |               |                                     |
| 0.25          | 4000            | 220          | 2865                          | 2.3          | 9            | 33                      | 45 | 51  | 0.91                           | 0.93 | 0.96 | 0.82          | 0.73          | 12.5                                |
|               |                 | 230          | 2875                          | 2.4          | 9.4          | 28                      | 42 | 50  | 0.8                            | 0.88 | 0.92 | 0.83          | 0.8           |                                     |
| 0.37          | 4000            | 220          | 2850                          | 3.2          | 12.1         | 36                      | 47 | 54  | 0.86                           | 0.92 | 0.97 | 1.21          | 1.07          | 16                                  |
|               |                 | 230          | 2860                          | 3.3          | 12.6         | 35                      | 46 | 54  | 0.78                           | 0.85 | 0.91 | 1.24          | 1.17          |                                     |
| 0.55          | 4000            | 220          | 2840                          | 4.2          | 16.9         | 46                      | 57 | 63  | 0.94                           | 0.97 | 0.98 | 1.85          | 1.5           | 20                                  |
|               |                 | 230          | 2850                          | 4.3          | 17.7         | 45                      | 57 | 63  | 0.86                           | 0.91 | 0.94 | 1.9           | 1.63          |                                     |
| 0.75          | 4000            | 220          | 2825                          | 5.7          | 21.7         | 44                      | 54 | 61  | 0.97                           | 0.99 | 0.99 | 2.5           | 2.3           | 35                                  |
|               |                 | 230          | 2845                          | 5.7          | 22.7         | 41                      | 52 | 59  | 0.92                           | 0.96 | 0.98 | 2.5           | 2.5           |                                     |
| 1.1           | 4000            | 220          | 2830                          | 8.1          | 32.5         | 47                      | 59 | 65  | 0.86                           | 0.94 | 0.97 | 3.7           | 2.9           | 40                                  |
|               |                 | 230          | 2845                          | 8.4          | 33.9         | 43                      | 56 | 63  | 0.77                           | 0.86 | 0.92 | 3.7           | 3.1           |                                     |
| 1.5           | 4000            | 220          | 2820                          | 10.4         | 39.9         | 52                      | 63 | 68  | 0.9                            | 0.95 | 0.98 | 5.1           | 3.6           | 50                                  |
|               |                 | 230          | 2830                          | 10.7         | 41.7         | 48                      | 59 | 66  | 0.82                           | 0.9  | 0.95 | 5.1           | 3.9           |                                     |
| 2.2           | 4000            | 220          | 2825                          | 14.7         | 59.2         | 55                      | 65 | 70  | 0.93                           | 0.98 | 0.99 | 7.4           | 5             | 70                                  |
|               |                 | 230          | 2840                          | 14.7         | 61.8         | 51                      | 62 | 68  | 0.86                           | 0.93 | 0.97 | 7.4           | 5.5           |                                     |

## 4" ENCAPSULATED MOTOR - PSC DESIGN

### 4CT PSC MOTOR - MOTOR PERFORMANCE DATA | 230-240 V | 50 HZ

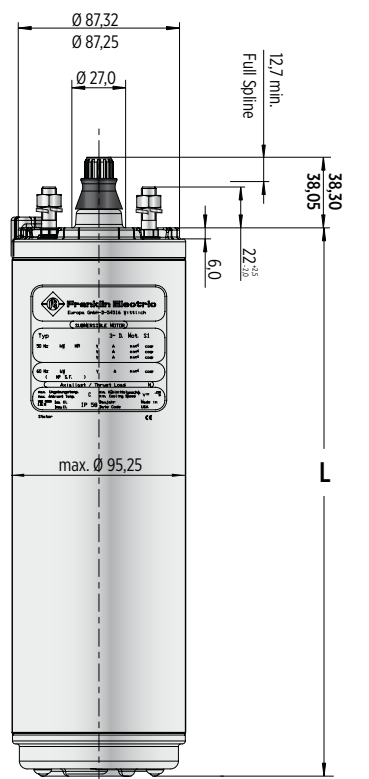
| P <sub>N</sub><br>[kW] | Thrust F<br>[N] | U <sub>N</sub><br>[V] | n <sub>N</sub><br>[min <sup>-1</sup> ] | I <sub>N</sub><br>[A] | I <sub>A</sub><br>[A] | η (Eff.) at % load |    |     | cos φ (Pf.)<br>at % load |      |      | T <sub>N</sub><br>[Nm] | T <sub>A</sub><br>[Nm] | Capacitor μF<br>[U <sub>c</sub> =450 V] |
|------------------------|-----------------|-----------------------|----------------------------------------|-----------------------|-----------------------|--------------------|----|-----|--------------------------|------|------|------------------------|------------------------|-----------------------------------------|
|                        |                 |                       |                                        |                       |                       | 50                 | 75 | 100 | 50                       | 75   | 100  |                        |                        |                                         |
| 0.25                   | 4000            | 230                   | 2865                                   | 2.2                   | 8.6                   | 33                 | 45 | 51  | 0.91                     | 0.93 | 0.96 | 0.82                   | 0.73                   | 12.5                                    |
|                        |                 | 240                   | 2875                                   | 2.3                   | 9                     | 28                 | 42 | 50  | 0.8                      | 0.88 | 0.92 | 0.83                   | 0.8                    |                                         |
| 0.37                   | 4000            | 230                   | 2850                                   | 3.1                   | 11.6                  | 36                 | 47 | 54  | 0.86                     | 0.92 | 0.97 | 1.21                   | 1.07                   | 16                                      |
|                        |                 | 240                   | 2860                                   | 3.2                   | 12.1                  | 35                 | 46 | 54  | 0.78                     | 0.85 | 0.91 | 1.24                   | 1.17                   |                                         |
| 0.55                   | 4000            | 230                   | 2840                                   | 4                     | 16.2                  | 46                 | 57 | 63  | 0.94                     | 0.97 | 0.98 | 1.85                   | 1.5                    | 20                                      |
|                        |                 | 240                   | 2850                                   | 4.1                   | 16.9                  | 45                 | 57 | 63  | 0.86                     | 0.91 | 0.94 | 1.9                    | 1.63                   |                                         |
| 0.75                   | 4000            | 230                   | 2825                                   | 5.5                   | 20.8                  | 44                 | 54 | 61  | 0.97                     | 0.99 | 0.99 | 2.5                    | 2.3                    | 35                                      |
|                        |                 | 240                   | 2845                                   | 5.5                   | 21.8                  | 41                 | 52 | 59  | 0.92                     | 0.96 | 0.98 | 2.5                    | 2.5                    |                                         |
| 1.1                    | 4000            | 230                   | 2830                                   | 7.8                   | 31.1                  | 47                 | 59 | 65  | 0.86                     | 0.94 | 0.97 | 3.7                    | 2.9                    | 40                                      |
|                        |                 | 240                   | 2845                                   | 8.1                   | 32.5                  | 43                 | 56 | 63  | 0.77                     | 0.86 | 0.92 | 3.7                    | 3.1                    |                                         |
| 1.5                    | 4000            | 230                   | 2820                                   | 10                    | 38.3                  | 52                 | 63 | 68  | 0.9                      | 0.95 | 0.98 | 5.1                    | 3.6                    | 50                                      |
|                        |                 | 240                   | 2830                                   | 10.2                  | 40                    | 48                 | 59 | 66  | 0.82                     | 0.9  | 0.95 | 5.1                    | 3.9                    |                                         |
| 2.2                    | 4000            | 230                   | 2825                                   | 14                    | 56.7                  | 55                 | 65 | 70  | 0.93                     | 0.98 | 0.99 | 7.4                    | 5                      | 70                                      |
|                        |                 | 240                   | 2840                                   | 14.1                  | 59.3                  | 51                 | 62 | 68  | 0.86                     | 0.93 | 0.97 | 7.4                    | 5.5                    |                                         |

### 4CT PSC MOTOR - WINDING RESISTANCE DATA

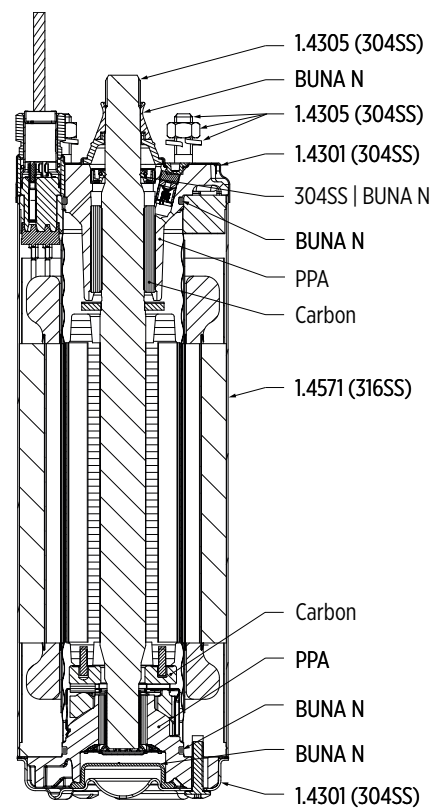
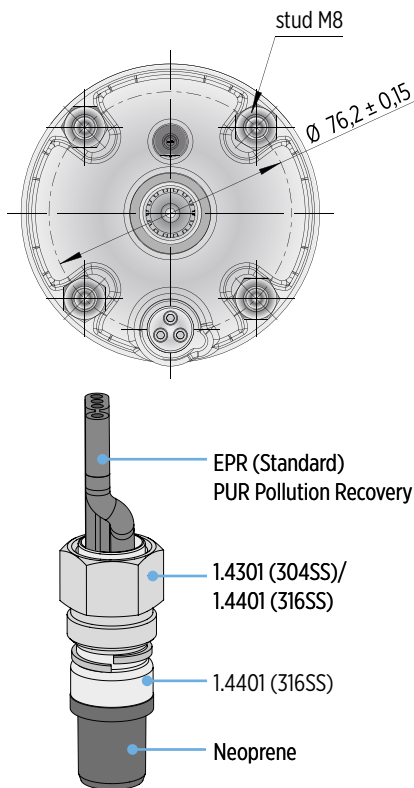
| P <sub>N</sub><br>[kW] | U <sub>N</sub><br>[V] | stator reference no. | main phase<br>[Ohm] | start phase<br>[Ohm] |
|------------------------|-----------------------|----------------------|---------------------|----------------------|
| 0.25                   | 220 - 230             | 326 738 ***          | 8,2 - 10,0          | 31,1 - 38,1          |
|                        | 230 - 240             | 326 800 ***          | 8,9 - 10,9          | 26,7 - 32,6          |
| 0.37                   | 220 - 230             | 326 739 ***          | 6,7 - 8,1           | 21,7 - 26,5          |
|                        | 230 - 240             | 326 801 ***          | 7,2 - 8,8           | 20,8 - 25,4          |
| 0.55                   | 220 - 230             | 326 740 ***          | 4,4 - 5,4           | 13,6 - 16,6          |
|                        | 230 - 240             | 326 802 ***          | 4,8 - 5,8           | 13,1 - 16,0          |
| 0.75                   | 220 - 230             | 326 741 ***          | 3,3 - 4,1           | 8,1 - 9,9            |
|                        | 230 - 240             | 326 803 ***          | 3,7 - 4,6           | 7,7 - 9,4            |
| 1.1                    | 220 - 230             | 326 742 ***          | 2,3 - 2,8           | 6,8 - 8,3            |
|                        | 230 - 240             | 326 804 ***          | 2,5 - 3,0           | 6,5 - 7,9            |
| 1.5                    | 220 - 230             | 326 743 ***          | 1,8 - 2,2           | 4,7 - 5,7            |
|                        | 230 - 240             | 326 805 ***          | 1,9 - 2,4           | 4,4 - 5,4            |
| 2.2                    | 220 - 230             | 326 744 ***          | 1,2 - 1,5           | 3,2 - 3,9            |
|                        | 230 - 240             | 326 806 ***          | 1,3 - 1,6           | 3,0 - 3,6            |

# 4" ENCAPSULATED MOTOR - PSC DESIGN

## 4CT PSC MOTOR - MOTOR DESIGN

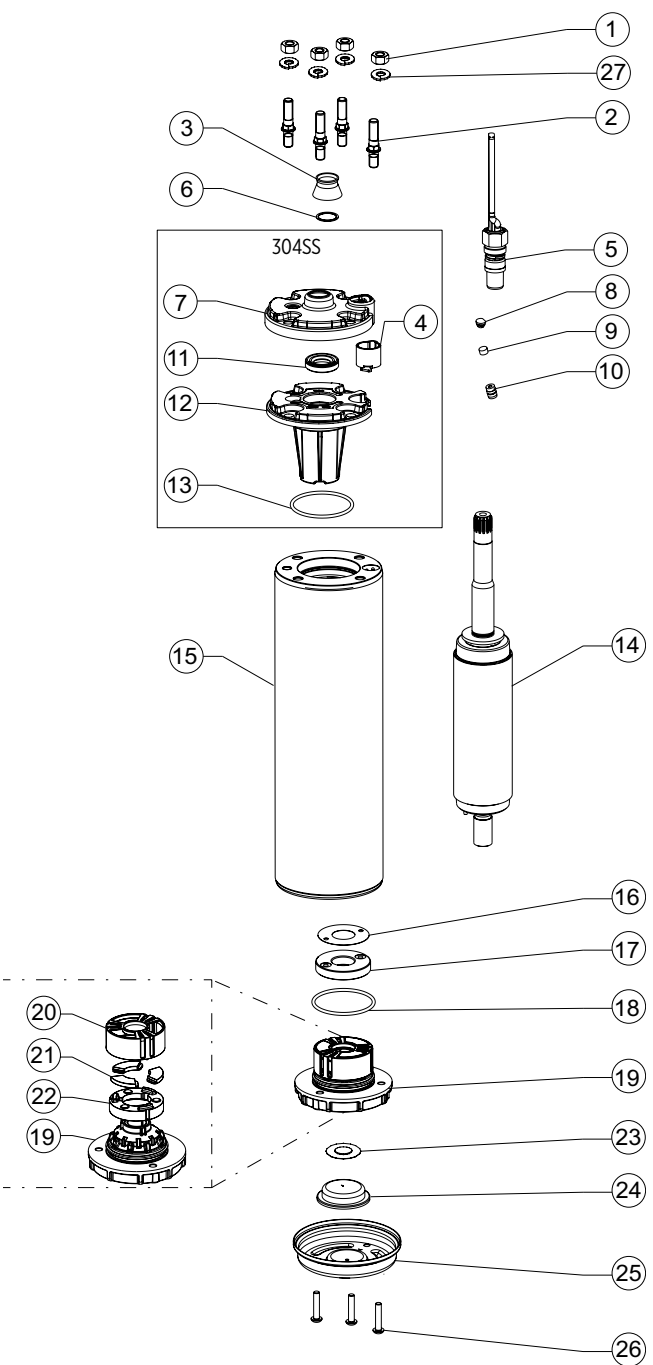


Tolerances according to NEMA MG 1-18.388



# 4" ENCAPSULATED MOTOR - PSC DESIGN

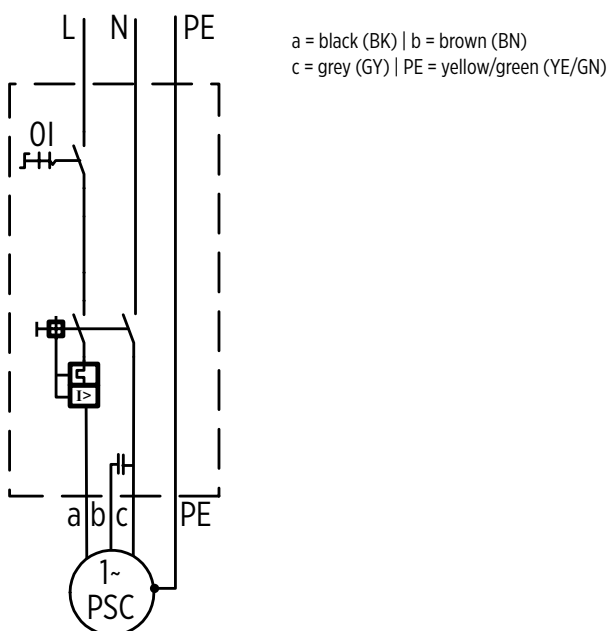
## 4CT PSC MOTOR - MOTOR PART DESCRIPTION



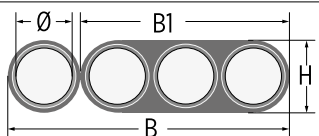
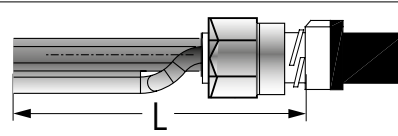
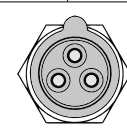
| Pos. | part description           | qty. | part no.             |
|------|----------------------------|------|----------------------|
| 1    | nut                        | 4    | Kit C                |
| 2    | stud                       | 4    | Kit C                |
| 3    | protector (spline)         | 1    | Kit B                |
| 4    | connector boss             | 1    | 151 820 103          |
| 5    | motor lead                 | 1    | <i>cf. section</i>   |
| 6    | washer                     | 1    | Kit B                |
| 7    | top endbell, cover 304SS   | 1    | 150 262 151          |
| 8    | filter plug                | 1    | Kit                  |
| 9    | filter                     | 1    | Kit                  |
| 10   | valve                      | 1    | Kit                  |
| 11   | shaft seal                 | 1    | Kit B                |
| 12   | top endbell                | 1    | Kit                  |
| 13   | O-ring                     | 1    | Kit B                |
| 14   | rotor                      | 1    | <i>cf. section</i>   |
| 15   | stator                     | 1    | <i>cf. section</i>   |
| 16   | level washer               | 1    | Kit A2               |
| 17   | thrust disc assy           | 1    | Kit A2               |
| 18   | O-ring                     | 1    | Kit B / Kit A2       |
| 19   | bottom endbell             | 1    | Kit A2               |
| 20   | bearing cage               | 1    | Kit A2               |
| 21   | segments                   | 3    | Kit A2               |
| 22   | gasket                     | 1    | Kit A2               |
| 23   | diaphragm washer           | 1    | 151 314 101 / Kit A2 |
| 24   | diaphragm                  | 1    | Kit B / Kit A2       |
| 25   | bottom endbell cover 304SS | 1    | 156 414 201 / Kit A2 |
| 26   | screw, cover               | 3    | Kit C                |
| 27   | lock washer                | 4    | Kit C                |

# 4" ENCAPSULATED MOTOR - PSC DESIGN

## 4CT PSC MOTOR - CONNECTIONS



## 4CT PSC MOTOR - MOTOR LEADS

| Ø [mm²]                                                                                                                                                                                                                                                       | B [mm]      | B1 [mm]     | H [mm] |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|--------|
| 3X1,5 + 1G1,5                                                                                                                                                                                                                                                 | 16.8        | 10.7        | 5      |
|    |             |             |        |
| length L [m]                                                                                                                                                                                                                                                  | model no.   |             |        |
|                                                                                                                                                                                                                                                               | 304SS       | 316SS       |        |
| 1.5                                                                                                                                                                                                                                                           | 310 113 401 | 310 113 501 |        |
| 2.5                                                                                                                                                                                                                                                           | 310 113 402 | 310 113 502 |        |
| 5                                                                                                                                                                                                                                                             | 310 113 405 | 310 113 505 |        |
| 10                                                                                                                                                                                                                                                            | 310 113 410 | 310 113 510 |        |
| 15                                                                                                                                                                                                                                                            | 310 113 415 | 310 113 515 |        |
| 20                                                                                                                                                                                                                                                            | 310 113 420 | 310 113 520 |        |
| 30                                                                                                                                                                                                                                                            | 310 113 430 | 310 113 530 |        |
| 40                                                                                                                                                                                                                                                            | 310 113 440 | 310 113 540 |        |
| 50                                                                                                                                                                                                                                                            | 310 113 450 | 310 113 550 |        |

## 4CT PSC MOTOR - DIMENSIONS AND WEIGHTS

| P <sub>N</sub> |      | motor       |             | motor with lead in single pack |             |
|----------------|------|-------------|-------------|--------------------------------|-------------|
| [kW]           | [HP] | length [mm] | weight [kg] | dimensions [mm]                | weight [kg] |
| 0.25           | 0.33 | 237.2       | 6.55        | 400 x 100 x 110                | 7.25        |
| 0.37           | 0.5  | 251.1       | 7.2         | 400 x 100 x 110                | 7.9         |
| 0.55           | 0.75 | 276.2       | 8.35        | 530 x 100 x 110                | 9.05        |
| 0.75           | 1    | 297.2       | 9.3         | 530 x 100 x 110                | 10          |
| 1.1            | 1.5  | 321.2       | 10.45       | 530 x 100 x 110                | 11.15       |
| 1.5            | 2    | 353.2       | 11.9        | 796 x 100 x 110                | 12.6        |
| 2.2            | 3    | 451.2       | 16.65       | 796 x 100 x 110                | 17.35       |

## 4" ENCAPSULATED MOTOR - PSC DESIGN

### 4CT PSC MOTOR - SPARE PARTS - KITS

| Kit    | description                                         | included positions             | part no.    |
|--------|-----------------------------------------------------|--------------------------------|-------------|
| Kit A2 | Top endbell 304SS                                   | 4, 7, 8, 9, 10, 11, 12, 13     | 308 462 902 |
|        | Top endbell 316SS                                   |                                | 308 462 952 |
| Kit A2 | bottom endbell 304SS incl. thrust bearing kit 4000N | 16 - 22                        | 308 464 911 |
| Kit B  | Seal kit Standard 304SS                             | 3, 6, 8, 9, 11, 13, 18, 23, 24 | 308 650 201 |
|        | Seal kit Pollution Recovery 304SS                   |                                | 308 650 202 |
| Kit C  | fastener kit 304SS                                  | 1, 2, 26, 27                   | 308 656 202 |

### 4CT PSC MOTOR - STATOR AND ROTOR

| P <sub>N</sub><br>[kW] | U <sub>N</sub><br>[V] | model no.<br>stator 304SS   316SS | model no.<br>rotor 304SS | model no.<br>rotor 316SS |
|------------------------|-----------------------|-----------------------------------|--------------------------|--------------------------|
| 0.25                   | 220 / 230             | 305 491 801                       | 178 165 901K             | 178 164 921K             |
|                        | 230 / 240             | 305 491 821                       |                          |                          |
| 0.37                   | 220 / 230             | 305 491 802                       | 178 165 902K             | 178 164 922K             |
|                        | 230 / 240             | 305 491 822                       |                          |                          |
| 0.55                   | 220 / 230             | 305 491 803                       | 178 165 903K             | 178 164 923K             |
|                        | 230 / 240             | 305 491 823                       |                          |                          |
| 0.75                   | 220 / 230             | 305 491 804                       | 178 165 904K             | 178 164 925K             |
|                        | 230 / 240             | 305 491 824                       |                          |                          |
| 1.1                    | 220 / 230             | 305 491 805                       | 178 165 905K             | 178 164 928K             |
|                        | 230 / 240             | 305 491 825                       |                          |                          |
| 1.5                    | 220 / 230             | 305 491 806                       | 178 165 906K             | 178 164 929K             |
|                        | 230 / 240             | 305 491 826                       |                          |                          |
| 2.2                    | 220 / 230             | 305 491 807                       | 178 165 907K             | 178 164 931K             |
|                        | 230 / 240             | 305 491 827                       |                          |                          |