

**Nidec**

**Drives**

# Unimotor hd

High Dynamic AC  
brushless servo motor

0.64 to 86 NM



# Servo solutions series

# Unimotor hd



Unimotor hd is a high dynamic brushless AC servo motor range designed for use in pulse duty applications where rapid acceleration and deceleration are required. The motors are available in frame sizes from 060 to 190.

## Reliability and innovation

Unimotor hd is designed using a proven development process that prioritises innovation and reliability. This process has resulted in a market leading reputation for both performance and quality.

## Matched motor and drive combinations

Drives and motors from Nidec Drives are designed to function as an optimised system. Unimotor hd is the perfect partner for Digitax and Unidrive.

## Accuracy and resolution to suit your application requirements

Choosing the right feedback device for your application is critical in getting optimum performance. Unimotor hd has a range of feedback options that offer different levels of accuracy and resolution to suit most applications:

- Resolver: robust for extreme applications and conditions (low accuracy, medium resolution)
- Incremental encoder: for cost-sensitive applications (low accuracy, medium resolution)
- Absolute – Inductive/Optical, medium and high accuracy/resolution
- EnDat protocol supported
- Safety encoder – part number option code confirmed on factory request
- Electronic motor nameplate upload function standard for EnDat absolute encoder



## The ultimate motor and drive combination

Control Techniques offer drive and motor combinations that provide an optimised system in terms of ratings, performance, cost and ease of use. Unimotor hd motors fitted with high resolution EnDat encoders are pre-loaded with the motor “electronic nameplate” data during the manufacturing process. This data can be read by any of our servo drives and used to automatically optimise the drive settings. This feature simplifies commissioning and maintenance, ensures consistent performance and saves time.

## Features

Unimotor hd is suitable for a wide range of industrial applications, due to its extensive range of features:

- Torque range: from 0.64 Nm to 85 Nm
- High torque to inertia ratio for high dynamic performance
- Compact but powerful
- High energy dissipation parking brakes
- IP65 conformance; sealed against water spray and dust when mounted and connected
- Segmented stator design
- World class performance
- Supported by rigorous testing for performance and reliability
- Winding voltage for inverter supply of 400 V and 220 V
- Rated speeds from 1,000 to 6,000 rpm
- Larger shafts to increase torsional rigidity
- Thermal protection by PTC thermistor/ optional KTY84.130 sensor



# Drive and motor combinations



Conformance and standards



RoHS  
Compliant



| Quick reference table |          |            |      |                                           |       |                                        |
|-----------------------|----------|------------|------|-------------------------------------------|-------|----------------------------------------|
| Frame size            | PCD (mm) | Stall (Nm) |      | Inertia (kg.cm <sup>2</sup> )<br>Standard |       | Inertia (kg.cm <sup>2</sup> )<br>High* |
| 060                   | 070      | 0.64       | 1.92 | 0.18                                      | 0.48  | N/A                                    |
| 067                   | 075      | 1.44       | 4.72 | 0.3                                       | 0.94  | 1.15 1.96                              |
| 089                   | 100      | 3.2        | 10.3 | 0.87                                      | 3.2   | 3.2 6.25                               |
| 115                   | 130      | 5.8        | 18.5 | 2.4                                       | 8.38  | 7.8 16.6                               |
| 142                   | 165      | 10.1       | 38.0 | 5.6                                       | 27.2  | 23.4 56.8                              |
| 190                   | 215      | 18.8       | 85.0 | 22.0                                      | 103.5 | 89.6 227.9                             |

\*High inertia motor version available with -JSHJ option code refer to pages 24 - 25



# Ordering information

Use the information below in the illustration to create an order code for a Unimotor hd.

| 060        | UD              | B               | 60                             | 0                 | T                                                                 |
|------------|-----------------|-----------------|--------------------------------|-------------------|-------------------------------------------------------------------|
| Frame size | Motor voltage   | Stator length   | Rated speed*                   | Brake             | Connection type**                                                 |
|            | 060 - 190 frame | 060 frame       | 060 frame                      | 060 - 190 frame   | 060 frame                                                         |
| 060        | ED = 220V       | A to C          | 30 = 3000 rpm<br>60 = 6000 rpm | 0 = Not fitted    | S = Single cable, power & signal combined                         |
| 067        | UD = 400V       | 067 - 115 frame | 067 frame                      | 060 - 142B frame  | T = YTEC type connectors                                          |
| 089        |                 | A to D          | 30 = 3000 rpm                  | 6 = Parking brake | 067 - 190 frame                                                   |
| 115        |                 | 142 frame       | 60 = 6000 rpm                  | 142C - 190 frame  | Size 1 - M23 17A 2.5mm <sup>2</sup>                               |
| 142        |                 | A to E          | 089 frame                      | 5 = Parking brake | B = Power and signal 180° rotatable                               |
| 190        |                 | 190 frame       | 30 = 3000 rpm                  |                   | D = Single cable, power & signal combined, 180° rotatable         |
|            |                 | A to F          | 40 = 4000 rpm                  |                   | Size 1.5 - M40 39A 10mm <sup>2</sup>                              |
|            |                 |                 | 60 = 6000 rpm                  | -                 | J = Power and signal 180° rotatable                               |
|            |                 |                 | 115 - 142 frame                |                   | E = Single cable, power & signal combined, 180° rotatable         |
|            |                 |                 | 20 = 2000 rpm                  |                   | Max single cable size 4mm <sup>2</sup>                            |
|            |                 |                 | 30 = 3000 rpm                  |                   | Hybrid Box                                                        |
|            |                 |                 | 40 = 4000 rpm                  |                   | H = Hybrid box, power M6 studs, signal connector fixed horizontal |
|            |                 |                 | 60 = 6000 rpm                  |                   |                                                                   |
|            |                 |                 | 190 frame                      |                   |                                                                   |
|            |                 |                 | 10 = 1000 rpm                  |                   |                                                                   |
|            |                 |                 | 15 = 1500 rpm                  |                   |                                                                   |
|            |                 |                 | 20 = 2000 rpm                  |                   |                                                                   |
|            |                 |                 | 30 = 3000 rpm                  |                   |                                                                   |

Additional options are available upon request but may require a longer lead time to complete, please check with the Drive Centre.

\* Not all speeds are available on all motors. Please refer to performance pages 12-23.

\*\* Single cable option must be fitted with KTY thermistor

For recommended connector sizes please refer to performance pages 12-23.

| A                                        | CN                                                      | A                   | -JSHJ                                                |
|------------------------------------------|---------------------------------------------------------|---------------------|------------------------------------------------------|
| Output shaft                             | Feedback device                                         | Thermistor          | Inertia                                              |
| <b>060 frame</b>                         | <b>060 frame</b>                                        | <b>Single Cable</b> | <b>060 – 190 frame</b><br><b>067 – 190 frame</b>     |
| A = Full key fitted to shaft             | AR = Resolver                                           | No                  | A = PTC Thermistor (DIN44082)<br>JSHJ = High Inertia |
| F = Full key and half key supplied loose | CN = Incremental Encoder                                | No                  | C = KTY Thermistor (KTY84.130)                       |
| <b>067 – 190 frame</b>                   | EG = Inductive EnDat Multi-turn                         | Yes***              |                                                      |
| A = Key                                  | FG = Inductive EnDat Single-turn                        | Yes***              |                                                      |
| F = Key and half key supplied separately | <b>067 frame</b>                                        |                     |                                                      |
|                                          | AR = Resolver                                           | No                  |                                                      |
|                                          | CR = Incremental Encoder                                | No                  |                                                      |
|                                          | EG = Inductive EnDat Multi-turn                         | Yes***              |                                                      |
|                                          | FG = Inductive EnDat Single-turn                        | Yes***              |                                                      |
|                                          | <b>089 – 190 frame</b>                                  |                     |                                                      |
|                                          | AE = Resolver                                           | No                  |                                                      |
|                                          | CA**** = Incremental Encoder                            | No                  |                                                      |
|                                          | EF = Inductive EnDat Multi-turn                         | Yes***              |                                                      |
|                                          | FF = Inductive EnDat Single-turn                        | Yes***              |                                                      |
|                                          | GF = Optical EnDat Multi-turn high resolution/accuracy  | Yes***              |                                                      |
|                                          | HF = Optical EnDat Single-turn high resolution/accuracy | Yes***              |                                                      |

\*\*\* Encoder option also available with B or J connector

\*\*\*\* CR encoder available instead of CA for 089 frame and 115 frame up to length C

Functional safe encoder option available contact factory for confirmed part number and option code

# Unimotor hd range overview

## 3 Phase VPWM drives 200 - 240Vrms

$\Delta t = 100^{\circ}\text{C}$  winding  $40^{\circ}\text{C}$  maximum ambient.

All data subject to +/-10% tolerance

| Motor Frame Size (mm)              | 060ED |      |      | 067ED                                |      |       |       | 089ED |       |       |       | 115ED |       |       |       |
|------------------------------------|-------|------|------|--------------------------------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Frame length                       | A     | B    | C    | A                                    | B    | C     | D     | A     | B     | C     | D     | A     | B     | C     | D     |
| Continuous stall torque (Nm)       | 0.64  | 1.28 | 1.92 | 1.44                                 | 2.55 | 3.70  | 4.72  | 3.20  | 5.50  | 8.00  | 10.30 | 5.80  | 10.20 | 14.60 | 18.80 |
| Peak torque (Nm)                   | 2.24  | 4.48 | 6.72 | 4.35                                 | 7.65 | 11.10 | 14.60 | 9.60  | 16.50 | 24.00 | 31.50 | 17.40 | 30.60 | 43.80 | 56.40 |
| Standard inertia                   | 0.18  | 0.33 | 0.48 | 0.30                                 | 0.53 | 0.75  | 0.94  | 0.87  | 1.61  | 2.34  | 3.20  | 2.40  | 4.41  | 6.39  | 8.38  |
| Standard motor weight (kg)         | 1.6   | 2.0  | 2.2  | 1.96                                 | 2.56 | 3.16  | 3.80  | 3.18  | 4.28  | 5.38  | 6.48  | 5.20  | 6.95  | 8.72  | 10.49 |
| High inertia (kg cm <sup>2</sup> ) | -     | -    | -    | 1.15                                 | 1.42 | 1.69  | 1.96  | 3.23  | 4.24  | 5.24  | 6.25  | 7.84  | 10.78 | 13.70 | 16.63 |
| High inertia motor weight (kg)     | -     | -    | -    | 2.29                                 | 2.89 | 3.49  | 4.13  | 3.73  | 4.83  | 5.93  | 7.03  | 6.04  | 7.79  | 9.56  | 11.33 |
| Number of poles                    | 10    | 10   | 10   | 10                                   | 10   | 10    | 10    | 10    | 10    | 10    | 10    | 10    | 10    | 10    | 10    |
| Speed 2000 (rpm)                   |       |      |      | Kt(Nm/A) = 1.4<br>Ke(V/Krpm) = 85.5  |      |       |       |       |       |       |       |       |       |       |       |
| Rated torque (Nm)                  | -     | -    | -    | -                                    | -    | -     | -     | -     | -     | -     | -     | -     | 8.6   | 11.9  | 15.6  |
| Stall current (A)                  | -     | -    | -    | -                                    | -    | -     | -     | -     | -     | -     | -     | -     | 7     | 10.43 | 13.43 |
| Rated power (kW)                   | -     | -    | -    | -                                    | -    | -     | -     | -     | -     | -     | -     | -     | 1.8   | 2.49  | 3.27  |
| Recommended power conn' size       | -     | -    | -    | -                                    | -    | -     | -     | -     | -     | -     | -     | -     | 1     | 1     | 1     |
| Speed 3000 (rpm)                   |       |      |      | Kt(Nm/A) = 0.93<br>Ke(V/Krpm) = 57   |      |       |       |       |       |       |       |       |       |       |       |
| Rated Torque (Nm)                  | -     | -    | -    | 1.40                                 | 2.45 | 3.50  | 4.60  | 3.00  | 4.85  | 6.90  | -     | 4.80  | 7.70  | 10.50 | -     |
| Stall Current (A)                  | -     | -    | -    | 1.55                                 | 2.74 | 3.98  | 5.08  | 3.44  | 5.91  | 8.60  | -     | 6.24  | 10.97 | 15.70 | -     |
| Rated Power (kW)                   | -     | -    | -    | 0.44                                 | 0.77 | 1.10  | 2.50  | 0.94  | 1.52  | 2.17  | -     | 1.51  | 2.42  | 3.30  | -     |
| Recommended power conn' size       | -     | -    | -    | 1                                    | 1    | 1     | 1     | 1     | 1     | 1     | -     | 1     | 1     | 1     | -     |
| Speed 4000 (rpm)                   |       |      |      | Kt(Nm/A) = 0.7<br>Ke(V/Krpm) = 42.75 |      |       |       |       |       |       |       |       |       |       |       |
| Rated Torque (Nm)                  | -     | -    | -    | -                                    | -    | -     | -     | 2.9   | 4.55  | 6.35  | -     | -     | -     | -     | -     |
| Stall Current (A)                  | -     | -    | -    | -                                    | -    | -     | -     | 5     | 7.86  | 11.43 | -     | -     | -     | -     | -     |
| Rated Power (kW)                   | -     | -    | -    | -                                    | -    | -     | -     | 1.2   | 1.91  | 2.66  | -     | -     | -     | -     | -     |
| Recommended power conn' size       | -     | -    | -    | -                                    | -    | -     | -     | 1     | 1     | 1     | -     | -     | -     | -     | -     |
| Speed 6000 (rpm)                   |       |      |      | Kt(Nm/A) = 0.47<br>Ke(V/Krpm) = 28.5 |      |       |       |       |       |       |       |       |       |       |       |
| Rated Torque (Nm)                  | 0.64  | 1.28 | 1.92 | 1.3                                  | 2.2  | 3.1   | 4.0   | 2.65  | 3.80  | 5.00  | -     | -     | -     | -     | -     |
| Stall Current (A)                  | 1.36  | 2.72 | 4.09 | 3.06                                 | 5.43 | 7.87  | 10.04 | 6.81  | 11.70 | 17.02 | -     | -     | -     | -     | -     |
| Rated Power (kW)                   | 0.4   | 0.8  | 1.21 | 0.82                                 | 1.38 | 1.95  | 2.66  | 1.67  | 2.39  | 3.14  | -     | -     | -     | -     | -     |
| Recommended power conn' size       | Y-TEC |      |      | 1                                    | 1    | 1     | 1     | 1     | 1     | 1     | -     | -     | -     | -     | -     |



| 142ED |       |       |       |        | 190ED                                |        |        |        |        |        | Motor Frame Size (mm)              |
|-------|-------|-------|-------|--------|--------------------------------------|--------|--------|--------|--------|--------|------------------------------------|
| A     | B     | C     | D     | E      | A                                    | B      | C      | D      | E      | F      | Frame length                       |
| 10.10 | 17.40 | 25.00 | 31.50 | 38.00  | 18.50                                | 32.70  | 52.00  | 62.00  | 73.50  | 85.00  | Continuous stall torque (Nm)       |
| 30.30 | 55.30 | 74.90 | 94.50 | 114.00 | 55.50                                | 98.00  | 156.00 | 186.00 | 221.00 | 255.00 | Peak torque (Nm)                   |
| 5.60  | 11.00 | 17.00 | 22.10 | 27.20  | 22.00                                | 38.30  | 54.60  | 70.90  | 87.20  | 103.50 | Standard inertia                   |
| 7.40  | 10.10 | 12.74 | 15.39 | 18.04  | 14.60                                | 21.20  | 27.74  | 34.30  | 40.90  | 47.42  | Standard motor weight (kg)         |
| 23.40 | 31.75 | 40.11 | 48.46 | 56.80  | 89.63                                | 117.28 | 144.93 | 172.58 | 200.23 | 227.88 | High inertia (kg cm <sup>2</sup> ) |
| 8.92  | 11.62 | 14.26 | 16.91 | 19.56  | 17.27                                | 23.87  | 30.41  | 36.97  | 43.57  | 50.09  | High inertia motor weight (kg)     |
| 10    | 10    | 10    | 10    | 10     | 10                                   | 10     | 10     | 10     | 10     | 10     | Number of poles                    |
|       |       |       |       |        | Kt(Nm/A) = 2.8<br>Ke(V/Krpm) = 171   |        |        |        |        |        | Speed 1000 (rpm)                   |
| -     | -     | -     | -     | -      | -                                    | -      | 49.0   | 56.5   | -      | 77.5   | Rated torque (Nm)                  |
| -     | -     | -     | -     | -      | -                                    | -      | 18.57  | 22.14  | -      | 30.36  | Stall current (A)                  |
| -     | -     | -     | -     | -      | -                                    | -      | 5.13   | 5.92   | -      | 8.12   | Rated power (kW)                   |
| -     | -     | -     | -     | -      | -                                    | -      | 1.5    | 1.5    | -      | 1.5    | Recommended power conn' size       |
|       |       |       |       |        | Kt(Nm/A) = 1.7<br>Ke(V/Krpm) = 102   |        |        |        |        |        | Speed 1500 (rpm)                   |
| -     | -     | -     | -     | -      | -                                    | -      | 46.2   | -      | -      | -      | Rated Torque (Nm)                  |
| -     | -     | -     | -     | -      | -                                    | -      | 27.2   | -      | -      | -      | Stall Current (A)                  |
| -     | -     | -     | -     | -      | -                                    | -      | 7.3    | -      | -      | -      | Rated Power (kW)                   |
| -     | -     | -     | -     | -      | -                                    | -      | 1.5    | -      | -      | -      | Recommended power conn' size       |
|       |       |       |       |        | Kt(Nm/A) = 1.4<br>Ke(V/Krpm) = 85.5  |        |        |        |        |        | Speed 2000 (rpm)                   |
| 8.6   | 15.3  | 21.4  | 25.7  | 29.6   | -                                    | -      | 42.5   | -      | -      | -      | Rated Torque (Nm)                  |
| 7.21  | 12.43 | 17.86 | 22.5  | 27.14  | -                                    | -      | 37.14  | -      | -      | -      | Stall Current (A)                  |
| 1.80  | 3.2   | 4.48  | 5.38  | 6.2    | -                                    | -      | 8.9    | -      | -      | -      | Rated Power (kW)                   |
| 1     | 1     | 1.5   | 1.5   | 1.5    | -                                    | -      | 1.5    | -      | -      | -      | Recommended power conn' size       |
|       |       |       |       |        | Kt(Nm/A) = 0.93<br>Ke(V/Krpm) = 57   |        |        |        |        |        | Speed 3000 (rpm)                   |
| 8.2   | 14.0  | 18.4  | 20.9  | -      | 15.5                                 | 25.0   | -      | -      | -      | -      | Rated Torque (Nm)                  |
| 10.86 | 18.71 | 26.88 | 33.87 | -      | 19.89                                | 35.16  | -      | -      | -      | -      | Stall Current (A)                  |
| 2.58  | 4.4   | 5.78  | 6.57  | -      | 4.87                                 | 7.85   | -      | -      | -      | -      | Rated Power (kW)                   |
| 1     | 1.5   | 1.5   | 1.5   | -      | 1.5                                  | 1.5    | -      | -      | -      | -      | Recommended power conn' size       |
|       |       |       |       |        | Kt(Nm/A) = 0.7<br>Ke(V/Krpm) = 42.75 |        |        |        |        |        | Speed 4000 (rpm)                   |
| -     | 11.7  | -     | -     | -      | -                                    | -      | -      | -      | -      | -      | Rated Torque (Nm)                  |
| -     | 24.86 | -     | -     | -      | -                                    | -      | -      | -      | -      | -      | Stall Current (A)                  |
| -     | 4.9   | -     | -     | -      | -                                    | -      | -      | -      | -      | -      | Rated Power (kW)                   |
| -     | 1.5   | -     | -     | -      | -                                    | -      | -      | -      | -      | -      | Recommended power conn' size       |

Stall torque, rated torque and power relate to maximum continuous operation tested in a 20°C ambient at 12kHz drive switching frequency

All other figures relate to a 20°C motor temperature.  
Maximum intermittent winding temperature is 140°C

- Not available

\*H - hybrid terminal box required for connector code

# Unimotor hd range overview

## 3 Phase VPWM drives 380 - 480Vrms

$\Delta t = 100^{\circ}\text{C}$  winding  $40^{\circ}\text{C}$  maximum ambient.

All data subject to +/-10% tolerance

| Motor Frame Size (mm)              | 060UD |      |      | 067UD                              |      |       |       | 089UD |       |       |       | 115UD |       |       |       |
|------------------------------------|-------|------|------|------------------------------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Frame length                       | A     | B    | C    | A                                  | B    | C     | D     | A     | B     | C     | D     | A     | B     | C     | D     |
| Continuous stall torque (Nm)       | 0.64  | 1.28 | 1.92 | 1.44                               | 2.55 | 3.70  | 4.72  | 3.20  | 5.50  | 8.00  | 10.30 | 5.80  | 1.50  | 2.40  | 3.30  |
| Peak torque (Nm)                   | 2.24  | 4.48 | 6.72 | 4.35                               | 7.65 | 11.10 | 14.60 | 9.60  | 16.50 | 24.00 | 30.90 | 17.40 | 1.00  | 1.00  | 1.00  |
| Standard inertia                   | 0.18  | 0.33 | 0.48 | 0.30                               | 0.53 | 0.75  | 0.94  | 0.87  | 1.61  | 2.34  | 3.20  | 2.40  | 4.41  | 6.39  | 8.38  |
| Standard motor weight (kg)         | 1.6   | 2.0  | 2.2  | 1.96                               | 2.56 | 3.16  | 3.80  | 3.18  | 4.28  | 5.38  | 6.48  | 5.20  | 6.95  | 8.72  | 10.49 |
| High inertia (kg cm <sup>2</sup> ) | -     | -    | -    | 1.15                               | 1.42 | 1.69  | 1.96  | 3.23  | 4.24  | 5.24  | 6.25  | 7.84  | 10.78 | 13.70 | 16.63 |
| High inertia motor weight (kg)     | -     | -    | -    | 2.29                               | 2.89 | 3.49  | 4.13  | 3.73  | 4.83  | 5.93  | 7.03  | 6.04  | 7.79  | 9.56  | 11.33 |
| Number of poles                    | 10    | 10   | 10   | 10                                 | 10   | 10    | 10    | 10    | 10    | 10    | 10    | 10    | 10    | 10    | 10    |
| Speed 2000 (rpm)                   |       |      |      | Kt(Nm/A) = 2.4<br>Ke(V/Krpm) = 147 |      |       |       |       |       |       |       |       |       |       |       |
| Rated torque (Nm)                  | -     | -    | -    | -                                  | -    | -     | -     | -     | -     | -     | -     | -     | 8.6   | 11.9  | 15.6  |
| Stall current (A)                  | -     | -    | -    | -                                  | -    | -     | -     | -     | -     | -     | -     | -     | 4     | 6.08  | 7.83  |
| Rated power (kW)                   | -     | -    | -    | -                                  | -    | -     | -     | -     | -     | -     | -     | -     | 1.8   | 2.49  | 3.27  |
| Recommended power conn' size       | -     | -    | -    | -                                  | -    | -     | -     | -     | -     | -     | -     | -     | 1     | 1     | 1     |
| Speed 3000 (rpm)                   |       |      |      | Kt(Nm/A) = 1.6<br>Ke(V/Krpm) = 98  |      |       |       |       |       |       |       |       |       |       |       |
| Rated Torque (Nm)                  |       |      |      | 1.40                               | 2.45 | 3.50  | 4.60  | 3.00  | 4.85  | 6.90  | 8.50  | 4.80  | 7.70  | 10.50 | 13.60 |
| Stall Current (A)                  |       |      |      | 1.80                               | 1.59 | 2.31  | 2.95  | 2.00  | 3.44  | 5.00  | 6.44  | 3.63  | 6.38  | 9.13  | 11.75 |
| Rated Power (kW)                   |       |      |      | 0.44                               | 0.77 | 1.10  | 2.50  | 0.94  | 1.52  | 2.17  | 2.67  | 1.51  | 2.42  | 3.30  | 4.27  |
| Recommended power conn' size       |       |      |      | 1                                  | 1    | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     |
| Speed 4000 (rpm)                   |       |      |      | Kt(Nm/A) = 1.2<br>Ke(V/Krpm) = 74  |      |       |       |       |       |       |       |       |       |       |       |
| Rated Torque (Nm)                  | -     | -    | -    | -                                  | -    | -     | -     | 2.9   | 4.55  | 6.35  | -     | 4.5   | 6.7   | 8.70  | 10.5  |
| Stall Current (A)                  | -     | -    | -    | -                                  | -    | -     | -     | 3     | 4.58  | 6.67  | -     | 5     | 9     | 12.17 | 16    |
| Rated Power (kW)                   | -     | -    | -    | -                                  | -    | -     | -     | 1.2   | 1.91  | 2.66  | -     | 1.9   | 2.81  | 3.64  | 4.4   |
| Recommended power conn' size       | -     | -    | -    | -                                  | -    | -     | -     | 1     | 1     | 1     | -     | 1     | 1     | 1     | 1     |
| Speed 6000 (rpm)                   |       |      |      | Kt(Nm/A) = 0.8<br>Ke(V/Krpm) = 49  |      |       |       |       |       |       |       |       |       |       |       |
| Rated Torque (Nm)                  | 0.64  | 1.28 | 1.92 | 1.30                               | 2.20 | 3.10  | 4.00  | 2.65  | 3.80  | 5.00  | -     | 3.60  | 4.80  | -     | -     |
| Stall Current (A)                  | 0.8   | 1.6  | 2.4  | 1.80                               | 3.19 | 4.63  | 5.90  | 4.00  | 6.88  | 10.00 | -     | 7.25  | 12.75 | -     | -     |
| Rated Power (kW)                   | 0.4   | 0.8  | 1.2  | 0.82                               | 1.38 | 1.95  | 2.66  | 1.67  | 2.39  | 3.14  | -     | 2.27  | 3.02  | -     | -     |
| Recommended power conn' size       | Y-TEC |      |      | 1                                  | 1    | 1     | 1     | 1     | 1     | 1     | -     | 1     | 1     | -     | -     |

Stall torque, rated torque and power relate to maximum continuous operation tested in a 20°C ambient at 12kHz drive switching frequency.  
 All other figures relate to a 20°C motor temperature.  
 Maximum intermittent winding temperature is 140°C

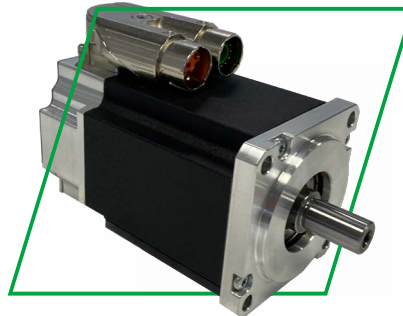
| 142UD                               |       |       |       |        | 190UD |        |        |        |        |        | Motor Frame Size (mm)              |
|-------------------------------------|-------|-------|-------|--------|-------|--------|--------|--------|--------|--------|------------------------------------|
| A                                   | B     | C     | D     | E      | A     | B      | C      | D      | E      | F      | Frame length                       |
| 10.10                               | 17.40 | 25.00 | 31.50 | 38.00  | 18.50 | 32.70  | 52.00  | 62.00  | 73.50  | 85.00  | Continuous stall torque (Nm)       |
| 30.30                               | 55.30 | 74.90 | 94.50 | 114.00 | 55.50 | 98.00  | 156.00 | 186.00 | 221.00 | 255.00 | Peak torque (Nm)                   |
| 5.60                                | 11.00 | 17.00 | 22.10 | 27.20  | 22.00 | 38.30  | 54.60  | 70.90  | 87.20  | 103.50 | Standard inertia                   |
| 7.40                                | 10.10 | 12.74 | 15.39 | 18.04  | 14.60 | 21.20  | 27.74  | 34.30  | 40.90  | 47.42  | Standard motor weight (kg)         |
| 23.40                               | 31.75 | 40.11 | 48.46 | 56.80  | 89.63 | 117.28 | 144.93 | 172.58 | 200.23 | 227.88 | High inertia (kg cm <sup>2</sup> ) |
| 8.92                                | 11.62 | 14.26 | 16.91 | 19.56  | 17.27 | 23.87  | 30.41  | 36.97  | 43.57  | 50.09  | High inertia motor weight (kg)     |
| 10                                  | 10    | 10    | 10    | 10     | 10    | 10     | 10     | 10     | 10     | 10     | Number of poles                    |
| Kt(Nm/A) = 4.8<br>Ke(V/Krpm) = 296  |       |       |       |        |       |        |        |        |        |        | Speed 1000 (rpm)                   |
| -                                   | -     | -     | -     | -      | -     | -      | 49.00  | 56.50  | -      | 78.3   | Rated torque (Nm)                  |
| -                                   | -     | -     | -     | -      | -     | -      | 10.90  | 13.00  | -      | 17.71  | Stall current (A)                  |
| -                                   | -     | -     | -     | -      | -     | -      | 5.13   | 5.92   | -      | 8.12   | Rated power (kW)                   |
| -                                   | -     | -     | -     | -      | -     | -      | 1      | 1      | -      | 1.5    | Recommended power conn' size       |
| Kt(Nm/A) = 3.2<br>Ke(V/Krpm) = 196  |       |       |       |        |       |        |        |        |        |        | Speed 1500 (rpm)                   |
| -                                   | 15.30 | 21.40 | 25.70 | 29.60  | -     | 30.00  | 46.20  | 52.20  | 60.00  | 68.50  | Rated Torque (Nm)                  |
| -                                   | 7.25  | 10.42 | 13.00 | 16.00  | -     | 10.20  | 16.25  | 19.40  | 22.90  | 26.56  | Stall Current (A)                  |
| -                                   | 3.20  | 4.48  | 5.40  | 6.20   | -     | 4.70   | 7.26   | 8.20   | 9.42   | 10.76  | Rated Power (kW)                   |
| -                                   | 1     | 1     | 1     | 1      | -     | 1.5    | 1.5    | 1.5    | 1.5    | 1.5    | Recommended power conn' size       |
| Kt(Nm/A) = 2.4<br>Ke(V/Krpm) = 147  |       |       |       |        |       |        |        |        |        |        | Speed 2000 (rpm)                   |
| 8.60                                | 15.30 | 21.40 | 25.70 | 29.60  | 16.50 | 28.00  | 42.50  | 45.30  | 52.90  | 56.00  | Rated Torque (Nm)                  |
| 4.21                                | 7.25  | 10.42 | 13.00 | 16.00  | 7.50  | 13.62  | 21.67  | 25.83  | 30.63  | 35.42  | Stall Current (A)                  |
| 1.80                                | 3.20  | 4.48  | 5.40  | 6.20   | 3.46  | 5.90   | 8.90   | 9.50   | 11.07  | 11.70  | Rated Power (kW)                   |
| 1                                   | 1     | 1     | 1     | 1      | 1     | 1.5    | 1.5    | 1.5    | 1.5    | 1.5    | Recommended power conn' size       |
| Kt(Nm/A) = 1.6<br>Ke(V/Krpm) = 98   |       |       |       |        |       |        |        |        |        |        | Speed 3000 (rpm)                   |
| 8.20                                | 14.00 | 18.40 | 20.90 | 23.00  | 15.50 | 25.00  | -      | -      | -      | -      | Rated Torque (Nm)                  |
| 6.31                                | 10.88 | 15.63 | 19.69 | 23.75  | 11.56 | 20.44  | -      | -      | -      | -      | Stall Current (A)                  |
| 2.58                                | 4.40  | 5.78  | 6.57  | 7.23   | 4.87  | 7.85   | -      | -      | -      | -      | Rated Power (kW)                   |
| 1                                   | 1     | 1     | 1.5   | 1.5    | 1.5   | 1.5    | -      | -      | -      | -      | Recommended power conn' size       |
| Kt(Nm/A) = 1.2<br>Ke(V/Krpm) = 73.5 |       |       |       |        |       |        |        |        |        |        | Speed 4000 (rpm)                   |
| -                                   | 11.70 | 14.20 | 14.90 | -      | -     | -      | -      | -      | -      | -      | Rated Torque (Nm)                  |
| -                                   | 14.50 | 20.83 | 26.25 | -      | -     | -      | -      | -      | -      | -      | Stall Current (A)                  |
| -                                   | 4.89  | 5.90  | 6.26  | -      | -     | -      | -      | -      | -      | -      | Rated Power (kW)                   |
| -                                   | 1     | 1.5   | 1.5   | -      | -     | -      | -      | -      | -      | -      | Recommended power conn' size       |
| Kt(Nm/A) = 0.8<br>Ke(V/Krpm) = 49.0 |       |       |       |        |       |        |        |        |        |        | Speed 6000 (rpm)                   |
| -                                   | 7.00  | -     | -     | -      | -     | -      | -      | -      | -      | -      | Rated Torque (Nm)                  |
| -                                   | 21.75 | -     | -     | -      | -     | -      | -      | -      | -      | -      | Stall Current (A)                  |
| -                                   | 4.40  | -     | -     | -      | -     | -      | -      | -      | -      | -      | Rated Power (kW)                   |
| -                                   | 1.50  | -     | -     | -      | -     | -      | -      | -      | -      | -      | Recommended power conn' size       |

- Not available

Unimotor hd

# Ratings and dimensions

## Frame size 060



| Motor frame size (mm)                      |  |  |  | Motor frame size (mm) |  |  |  |
|--------------------------------------------|--|--|--|-----------------------|--|--|--|
| 060ED                                      |  |  |  | 060UD                 |  |  |  |
| Voltage (Vrms)                             |  |  |  | 200-240               |  |  |  |
| Frame length                               |  |  |  | A B C                 |  |  |  |
| Continuous stall torque (Nm)               |  |  |  | 0.64 1.28 1.92        |  |  |  |
| Peak torque (Nm)                           |  |  |  | 2.24 4.48 6.72        |  |  |  |
| Standard inertia (kg cm <sup>2</sup> )     |  |  |  | 0.18 0.33 0.48        |  |  |  |
| Standard motor weight (kg)                 |  |  |  | 1.6 2.0 2.2           |  |  |  |
| Number of poles                            |  |  |  | 10 10 10              |  |  |  |
| Speed 3000 (rpm)                           |  |  |  | Speed 3000 (rpm)      |  |  |  |
| Rated Torque (Nm)                          |  |  |  | ♦ ♦ ♦                 |  |  |  |
| Stall current (A)                          |  |  |  | ♦ ♦ ♦                 |  |  |  |
| Rated power (kW)                           |  |  |  | ♦ ♦ ♦                 |  |  |  |
| R (ph-ph) (Ohms)                           |  |  |  | ♦ ♦ ♦                 |  |  |  |
| L (ph-ph) (mH)                             |  |  |  | ♦ ♦ ♦                 |  |  |  |
| Recommended power conn' size               |  |  |  | ♦                     |  |  |  |
| Speed 6000 (rpm) Kt (Nm/A) = Ke (V/krpm) = |  |  |  | 0.47 28.5             |  |  |  |
| Rated torque (Nm)                          |  |  |  | 0.64 1.28 1.92        |  |  |  |
| Stall current (A)                          |  |  |  | 1.36 2.72 4.09        |  |  |  |
| Rated power (kW)                           |  |  |  | 0.4 0.8 1.2           |  |  |  |
| R (ph-ph) (Ohms)                           |  |  |  | 5.15 1.90 1.15        |  |  |  |
| L (ph-ph) (mH)                             |  |  |  | 23.8 11.1 7.3         |  |  |  |
| Recommended power conn' size               |  |  |  | Y-TEC                 |  |  |  |
| Motor frame size (mm)                      |  |  |  | Motor frame size (mm) |  |  |  |
| 060UD                                      |  |  |  | 060UD                 |  |  |  |
| Voltage (Vrms)                             |  |  |  | 380-480               |  |  |  |
| Frame length                               |  |  |  | A B C                 |  |  |  |
| Continuous stall torque (Nm)               |  |  |  | 0.64 1.28 1.92        |  |  |  |
| Peak torque (Nm)                           |  |  |  | 2.24 4.48 6.72        |  |  |  |
| Standard inertia (kg cm <sup>2</sup> )     |  |  |  | 0.18 0.33 0.48        |  |  |  |
| Standard motor weight (kg)                 |  |  |  | 1.6 2.0 2.2           |  |  |  |
| Number of poles                            |  |  |  | 10 10 10              |  |  |  |
| Speed 3000 (rpm)                           |  |  |  | Speed 3000 (rpm)      |  |  |  |
| Rated Torque (Nm)                          |  |  |  | ♦ ♦ ♦                 |  |  |  |
| Stall current (A)                          |  |  |  | ♦ ♦ ♦                 |  |  |  |
| Rated power (kW)                           |  |  |  | ♦ ♦ ♦                 |  |  |  |
| R (ph-ph) (Ohms)                           |  |  |  | ♦ ♦ ♦                 |  |  |  |
| L (ph-ph) (mH)                             |  |  |  | ♦ ♦ ♦                 |  |  |  |
| Recommended power conn' size               |  |  |  | ♦                     |  |  |  |
| Speed 6000 (rpm) Kt (Nm/A) = Ke (V/krpm) = |  |  |  | 0.8 49                |  |  |  |
| Rated torque (Nm)                          |  |  |  | 0.64 1.28 1.92        |  |  |  |
| Stall current (A)                          |  |  |  | 0.8 1.6 2.4           |  |  |  |
| Rated power (kW)                           |  |  |  | 0.4 0.8 1.2           |  |  |  |
| R (ph-ph) (Ohms)                           |  |  |  | 24.00 10.10 5.90      |  |  |  |
| L (ph-ph) (mH)                             |  |  |  | 91.5 46.8 32.6        |  |  |  |
| Recommended power conn' size               |  |  |  | Y-TEC                 |  |  |  |

All data subject to +/-10% tolerance

Stall torque, rated torque and power relate to maximum continuous operation tested in a 20°C ambient at 12 kHz drive switching frequency

All other figures relate to a 20°C motor temperature.

Maximum intermittent winding temperature is 140°C

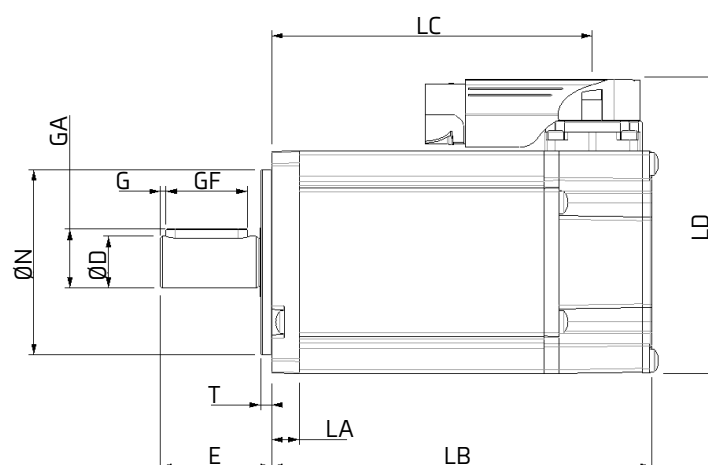
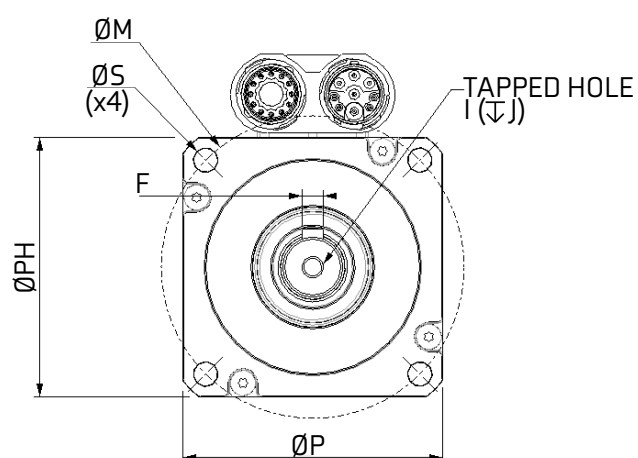




| Motor Dimensions |               |               |               |               |                  |                 |                   |                |               |                      |                 |               |                |    |
|------------------|---------------|---------------|---------------|---------------|------------------|-----------------|-------------------|----------------|---------------|----------------------|-----------------|---------------|----------------|----|
| Feedback CN      |               |               |               |               | Flange thickness | Register length | Register diameter | Overall height | Flange square | Fixing hole diameter | Fixing hole PCD | Motor housing | Mounting bolts |    |
| Unbraked length  |               | Braked length |               |               |                  |                 |                   |                |               |                      |                 |               |                |    |
|                  | LB<br>(± 0.9) | LC<br>(± 1.0) | LC<br>(± 1.0) | LC<br>(± 1.0) | LA (± 0.5)       | T (± 0.1)       | N (j6)            | LD (± 0.3)     | P (± 0.3)     | S (H14)              | M (± 0.5)       | PH (± 0.5)    |                |    |
| 060A             | 82.5          | 66.5          | 119.5         | 103.5         |                  |                 |                   |                |               |                      |                 |               |                |    |
| 060B             | 102.5         | 86.5          | 139.5         | 123.5         | 7.5              | 3               | 50                | 80             | 60            | 5.5                  | 70              | 60            | M5             | mm |
| 060C             | 122.5         | 106.5         | 159.5         | 143.5         |                  |                 |                   |                |               |                      |                 |               |                |    |

| Shaft Dimensions |                |              |            |            |                  |           |                         |                   |    |
|------------------|----------------|--------------|------------|------------|------------------|-----------|-------------------------|-------------------|----|
|                  | Shaft diameter | Shaft length | Key height | Key length | Key to shaft end | Key width | Tapped hole thread size | Tapped hole depth |    |
|                  | D(j6)          | E            | GA         | GF         | G                | F(h9)     | I                       | J(±1)             |    |
| 14.0 Std         | 14             | 30           | 16         | 22         | 1.5              | 5         | M5 x 0.8                | 10                | mm |

| Feedback - EG, FG |                 |               |
|-------------------|-----------------|---------------|
|                   | Unbraked length | Braked length |
|                   | LB (± 0.9)      | LB (± 0.9)    |
| 060A              | 100             | 137           |
| 060B              | 120             | 157           |
| 060C              | 140             | 177           |



# Frame size 067



| Motor frame size (mm)                  |                              | 067ED        |      |       |       |
|----------------------------------------|------------------------------|--------------|------|-------|-------|
| Voltage (Vrms)                         |                              | 200-240      |      |       |       |
| Frame length                           |                              | A            | B    | C     | D     |
| Continuous stall torque (Nm)           |                              | 1.44         | 2.55 | 3.70  | 4.72  |
| Peak torque (Nm)                       |                              | 4.35         | 7.65 | 11.10 | 14.60 |
| Standard inertia (kg cm <sup>2</sup> ) |                              | 0.30         | 0.53 | 0.75  | 0.94  |
| Winding thermal time constant (sec)    |                              | 54           | 61   | 65    | 68    |
| Standard motor weight (kg)             |                              | 1.96         | 2.56 | 3.16  | 3.80  |
| Number of poles                        |                              | 10           | 10   | 10    | 10    |
| Speed<br>3000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 0.93<br>57   |      |       |       |
| Rated torque (Nm)                      |                              | 1.40         | 2.45 | 3.50  | 4.60  |
| Stall current (A)                      |                              | 1.55         | 2.74 | 3.98  | 5.08  |
| Rated power (kW)                       |                              | 0.44         | 0.77 | 1.10  | 1.45  |
| R (ph-ph) (Ohms)                       |                              | 15.16        | 5.85 | 3.33  | 2.32  |
| L (ph-ph) (mH)                         |                              | 46.7         | 20.6 | 12.7  | 10.6  |
| Recommended power conn' size           |                              | 1            | 1    | 1     | 1     |
| Speed<br>6000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 0.47<br>28.5 |      |       |       |
| Rated torque (Nm)                      |                              | 1.3          | 2.2  | 3.1   | 4.0   |
| Stall current (A)                      |                              | 3.06         | 5.43 | 7.87  | 10.04 |
| Rated power (kW)                       |                              | 0.82         | 1.38 | 1.95  | 2.51  |
| R (ph-ph) (Ohms)                       |                              | 3.79         | 1.46 | 0.76  | 0.54  |
| L (ph-ph) (mH)                         |                              | 11.7         | 5.2  | 3.6   | 2.03  |
| Recommended power conn' size           |                              | 1            | 1    | 1     | 1     |

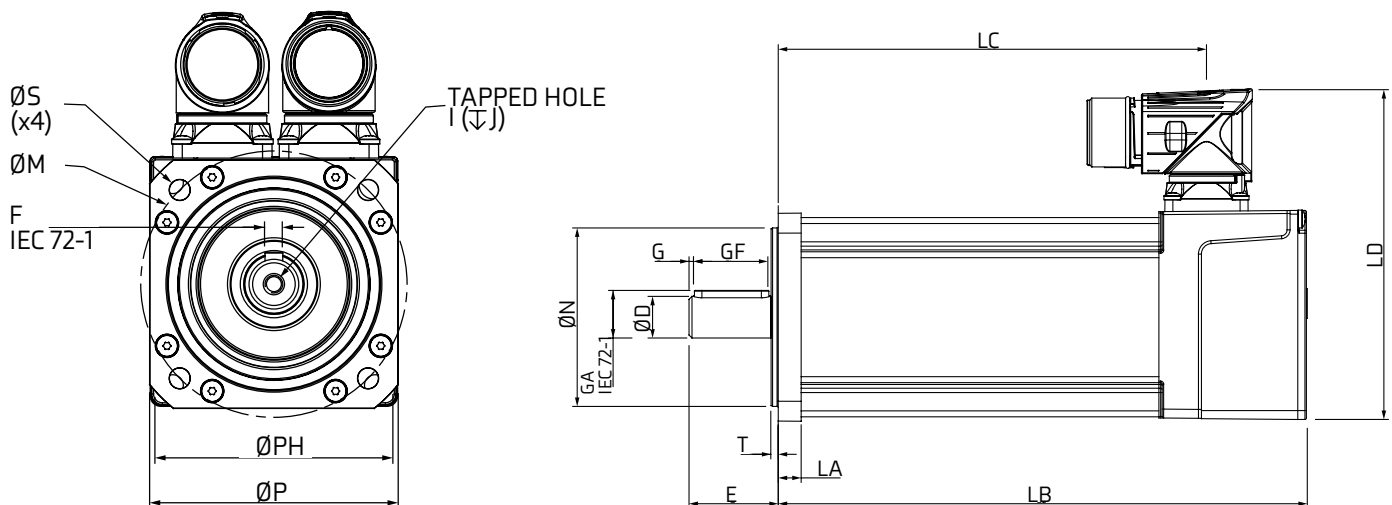
| Motor frame size (mm)                  |                              | 067UD     |       |       |       |
|----------------------------------------|------------------------------|-----------|-------|-------|-------|
| Voltage (Vrms)                         |                              | 380-480   |       |       |       |
| Frame length                           |                              | A         | B     | C     | D     |
| Continuous stall torque (Nm)           |                              | 1.44      | 2.55  | 3.70  | 4.72  |
| Peak torque (Nm)                       |                              | 4.35      | 7.65  | 11.10 | 14.60 |
| Standard inertia (kg cm <sup>2</sup> ) |                              | 0.30      | 0.53  | 0.75  | 0.94  |
| Winding thermal time constant (sec)    |                              | 54        | 61    | 65    | 68    |
| Standard motor weight (kg)             |                              | 1.96      | 2.56  | 3.16  | 3.80  |
| Number of poles                        |                              | 10        | 10    | 10    | 10    |
| Speed<br>3000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 0.8<br>49 |       |       |       |
| Rated torque (Nm)                      |                              | 1.40      | 2.45  | 3.50  | 4.60  |
| Stall current (A)                      |                              | 1.80      | 1.59  | 2.31  | 2.95  |
| Rated power (kW)                       |                              | 0.44      | 0.77  | 1.10  | 1.45  |
| R (ph-ph) (Ohms)                       |                              | 11.69     | 18.55 | 10.70 | 6.42  |
| L (ph-ph) (mH)                         |                              | 35.2      | 65.6  | 40.8  | 31.2  |
| Recommended power conn' size           |                              | 1         | 1     | 1     | 1     |
| Speed<br>6000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 0.8<br>49 |       |       |       |
| Rated torque (Nm)                      |                              | 1.3       | 2.2   | 3.1   | 4.0   |
| Stall current (A)                      |                              | 1.80      | 3.19  | 4.63  | 5.90  |
| Rated power (kW)                       |                              | 0.82      | 1.38  | 1.95  | 2.51  |
| R (ph-ph) (Ohms)                       |                              | 11.69     | 4.64  | 2.73  | 1.60  |
| L (ph-ph) (mH)                         |                              | 35.2      | 16.4  | 10.2  | 7.8   |
| Recommended power conn' size           |                              | 1         | 1     | 1     | 1     |

All data subject to +/-10% tolerance. Stall torque, rated torque and power relate to maximum continuous operation tested in a 20°C ambient at 12kHz drive switching frequency. All other figures relate to a 20°C motor temperature. Maximum intermittent winding temperature is 140°C



| Motor Dimensions        |            |               |            |            |                  |                 |                   |                |               |                      |                 |               |                |    |
|-------------------------|------------|---------------|------------|------------|------------------|-----------------|-------------------|----------------|---------------|----------------------|-----------------|---------------|----------------|----|
| Feedback AR, CR, EG, FG |            |               |            |            | Flange thickness | Register length | Register diameter | Overall height | Flange square | Fixing hole diameter | Fixing hole PCD | Motor housing | Mounting bolts |    |
| Unbraked length         |            | Braked length |            |            |                  |                 |                   |                |               |                      |                 |               |                |    |
|                         | LB (± 0.9) | LC (± 1.0)    | LC (± 1.0) | LC (± 1.0) | LA (± 0.5)       | T (± 0.1)       | N (j6)            | LD (± 0.3)     | P (± 0.3)     | S (H14)              | M (± 0.5)       | PH (± 0.5)    |                |    |
| 067A                    | 142.9      | 109           | 177.9      | 144        | 7.7              | 2.5             | 60                | 111.5          | 70            | 5.8                  | 75              | 67            | M5             | mm |
| 067B                    | 172.9      | 139           | 207.9      | 174        |                  |                 |                   |                |               |                      |                 |               |                |    |
| 067C                    | 202.9      | 169           | 237.9      | 204        |                  |                 |                   |                |               |                      |                 |               |                |    |
| 067D                    | 232.9      | 199           | 267.9      | 234        |                  |                 |                   |                |               |                      |                 |               |                |    |

| Shaft Dimensions |                |              |            |            |                  |           |                         |                   |    |
|------------------|----------------|--------------|------------|------------|------------------|-----------|-------------------------|-------------------|----|
|                  | Shaft diameter | Shaft length | Key height | Key length | Key to shaft end | Key width | Tapped hole thread size | Tapped hole depth |    |
|                  | D(j6)          | E            | GA         | GF         | G                | F(h9)     | I                       | J(±1)             |    |
| 14.0 Std         | 14             | 30           | 16         | 25         | 1.5              | 5         | M5 x 0.8                | 13.5              | mm |



# Frame size 089



| Motor frame size (mm)                  |                              | 089ED         |       |       |      |
|----------------------------------------|------------------------------|---------------|-------|-------|------|
| Voltage (Vrms)                         |                              | 200-240       |       |       |      |
| Frame length                           |                              | A             | B     | C     | D    |
| Continuous stall torque (Nm)           |                              | 3.2           | 5.5   | 8.0   | 10.3 |
| Peak torque (Nm)                       |                              | 9.6           | 16.5  | 24.0  | 30.9 |
| Standard inertia (kg cm <sup>2</sup> ) |                              | 0.87          | 1.61  | 2.34  | 3.20 |
| Winding thermal time constant (sec)    |                              | 85            | 93    | 98    | 103  |
| Standard motor weight (kg)             |                              | 3.18          | 4.28  | 5.38  | 6.48 |
| Number of poles                        |                              | 10            | 10    | 10    | 10   |
| Speed<br>3000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 0.93<br>57    |       |       |      |
| Rated torque (Nm)                      |                              | 3.00          | 4.85  | 6.90  | ◆    |
| Stall current (A)                      |                              | 3.44          | 5.91  | 8.60  | ◆    |
| Rated power (kW)                       |                              | 0.94          | 1.52  | 2.17  | ◆    |
| R (ph-ph) (Ohms)                       |                              | 4.1           | 1.64  | 0.93  | ◆    |
| L (ph-ph) (mH)                         |                              | 25.0          | 11.8  | 7.1   | ◆    |
| Recommended power conn' size           |                              | 1             | 1     | 1     | ◆    |
| Speed<br>4000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 0.47<br>42.75 |       |       |      |
| Rated torque (Nm)                      |                              | 2.9           | 4.55  | 6.35  | ◆    |
| Stall current (A)                      |                              | 5             | 7.86  | 11.43 | ◆    |
| Rated power (kW)                       |                              | 1.2           | 1.91  | 2.66  | ◆    |
| R (ph-ph) (Ohms)                       |                              | 2.1           | 0.82  | 0.56  | ◆    |
| L (ph-ph) (mH)                         |                              | 12.8          | 6     | 4.3   | ◆    |
| Recommended power conn' size           |                              | 1             | 1     | 1     | ◆    |
| Speed<br>6000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 0.47<br>28.5  |       |       |      |
| Rated torque (Nm)                      |                              | 2.65          | 3.80  | 5.00  | ◆    |
| Stall current (A)                      |                              | 6.93          | 11.70 | 17.02 | ◆    |
| Rated power (kW)                       |                              | 1.67          | 2.39  | 3.14  | ◆    |
| R (ph-ph) (Ohms)                       |                              | 1.03          | 0.41  | 0.24  | ◆    |
| L (ph-ph) (mH)                         |                              | 6.2           | 2.96  | 1.77  | ◆    |
| Recommended power conn' size           |                              | 1             | 1     | 1     | ◆    |

| Motor frame size (mm)                  |                              | 089UD       |      |       |      |
|----------------------------------------|------------------------------|-------------|------|-------|------|
| Voltage (Vrms)                         |                              | 380-480     |      |       |      |
| Frame length                           |                              | A           | B    | C     | D    |
| Continuous stall torque (Nm)           |                              | 3.2         | 5.5  | 8.0   | 10.3 |
| Peak torque (Nm)                       |                              | 9.6         | 16.5 | 24.0  | 31.5 |
| Standard inertia (kg cm <sup>2</sup> ) |                              | 0.87        | 1.61 | 2.34  | 3.20 |
| Winding thermal time constant (sec)    |                              | 85          | 93   | 98    | 103  |
| Standard motor weight (kg)             |                              | 3.18        | 4.28 | 5.38  | 6.48 |
| Number of poles                        |                              | 10          | 10   | 10    | 10   |
| Speed<br>3000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 1.6<br>98   |      |       |      |
| Rated torque (Nm)                      |                              | 3.00        | 4.85 | 6.90  | 8.50 |
| Stall current (A)                      |                              | 2.00        | 3.44 | 5.00  | 6.44 |
| Rated power (kW)                       |                              | 0.94        | 1.52 | 2.17  | 2.67 |
| R (ph-ph) (Ohms)                       |                              | 10.80       | 5.18 | 2.79  | 1.89 |
| L (ph-ph) (mH)                         |                              | 66.8        | 36.7 | 21.7  | 17.5 |
| Recommended power conn' size           |                              | 1           | 1    | 1     | 1    |
| Speed<br>4000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 1.2<br>73.5 |      |       |      |
| Rated torque (Nm)                      |                              | 2.9         | 4.55 | 6.35  | ◆    |
| Stall current (A)                      |                              | 3           | 4.58 | 6.67  | ◆    |
| Rated power (kW)                       |                              | 1.2         | 1.91 | 2.66  | ◆    |
| R (ph-ph) (Ohms)                       |                              | 6.5         | 2.60 | 1.80  | ◆    |
| L (ph-ph) (mH)                         |                              | 39.8        | 18.8 | 13.4  | ◆    |
| Recommended power conn' size           |                              | 1           | 1    | 1     | ◆    |
| Speed<br>6000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 0.8<br>49   |      |       |      |
| Rated torque (Nm)                      |                              | 2.65        | 3.80 | 5.00  | ◆    |
| Stall current (A)                      |                              | 4.00        | 6.88 | 10.00 | ◆    |
| Rated power (kW)                       |                              | 1.67        | 2.39 | 3.14  | ◆    |
| R (ph-ph) (Ohms)                       |                              | 2.70        | 1.30 | 0.67  | ◆    |
| L (ph-ph) (mH)                         |                              | 16.7        | 9.2  | 5.4   | ◆    |
| Recommended power conn' size           |                              | 1           | 1    | 1     | ◆    |

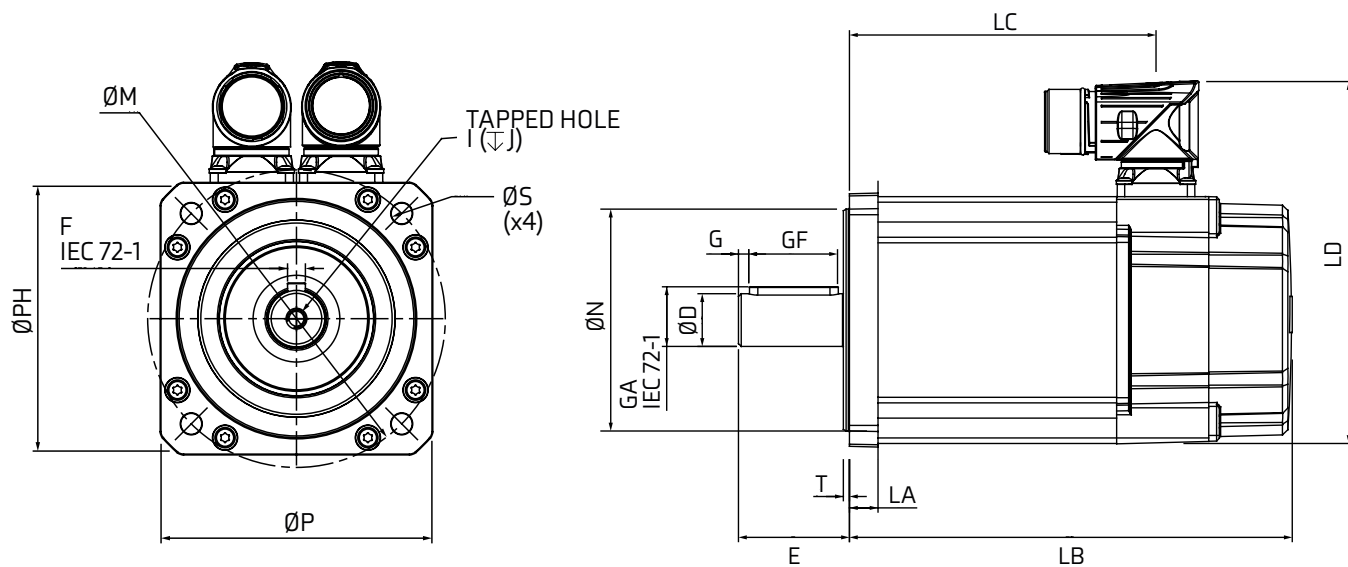
◆ Not available

All data subject to +/-10% tolerance. Stall torque, rated torque and power relate to maximum continuous operation tested in a 20°C ambient at 12kHz drive switching frequency. All other figures relate to a 20°C motor temperature. Maximum intermittent winding temperature is 140°C

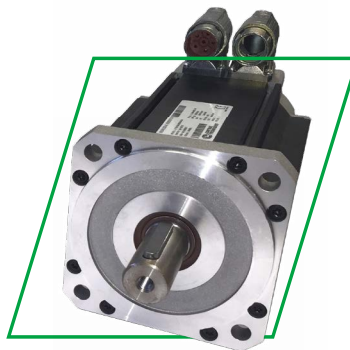
| Motor Dimensions |            |               |            |            |                  |                 |                   |                |               |                      |                 |               |                |    |
|------------------|------------|---------------|------------|------------|------------------|-----------------|-------------------|----------------|---------------|----------------------|-----------------|---------------|----------------|----|
| Feedback EF, FF  |            |               |            |            | Flange thickness | Register length | Register diameter | Overall height | Flange square | Fixing hole diameter | Fixing hole PCD | Motor housing | Mounting bolts |    |
| Unbraked length  |            | Braked length |            |            |                  |                 |                   |                |               |                      |                 |               |                |    |
|                  | LB (± 0.9) | LC (± 1.0)    | LC (± 1.0) | LC (± 1.0) | LA (± 0.5)       | T (± 0.1)       | N (j6)            | LD (± 0.3)     | P (± 0.3)     | S (H14)              | M (± 0.5)       | PH (± 0.5)    |                |    |
| 089A             | 147.8      | 110.5         | 187.9      | 150.6      | 10.3             | 2.2             | 80                | 130.5          | 91            | 7                    | 100             | 89            | M6             | mm |
| 089B             | 177.8      | 140.5         | 217.9      | 180.6      |                  |                 |                   |                |               |                      |                 |               |                |    |
| 089C             | 207.8      | 170.5         | 247.9      | 210.6      |                  |                 |                   |                |               |                      |                 |               |                |    |
| 089D             | 237.8      | 200.5         | 277.9      | 240.6      |                  |                 |                   |                |               |                      |                 |               |                |    |

| Feedback CA, GF, HF |               | Feedback AE     |               |       |    |
|---------------------|---------------|-----------------|---------------|-------|----|
| Unbraked length     | Braked length | Unbraked length | Braked length |       |    |
| LB (± 0.9)          | LB (± 0.9)    | LB (± 0.9)      | LB (± 0.9)    |       |    |
| 089A                | 160.8         | 200.9           | 137.8         | 177.9 | mm |
| 089B                | 190.8         | 230.9           | 167.8         | 207.9 |    |
| 089C                | 220.8         | 260.9           | 197.8         | 237.9 |    |
| 089D                | 250.8         | 290.9           | 227.8         | 267.9 |    |

| Shaft Dimensions |                |              |            |            |                  |           |                         |                   |    |
|------------------|----------------|--------------|------------|------------|------------------|-----------|-------------------------|-------------------|----|
|                  | Shaft diameter | Shaft length | Key height | Key length | Key to shaft end | Key width | Tapped hole thread size | Tapped hole depth |    |
|                  | D(j6)          | E            | GA         | GF         | G                | F(h9)     | I                       | J(±1)             |    |
| 19.0 Std         | 19             | 40           | 21.5       | 32         | 3.7              | 6         | M6 x 1                  | 17                | mm |



# Frame size 115



| Motor frame size (mm)                  |                              | 115ED        |       |       |       |
|----------------------------------------|------------------------------|--------------|-------|-------|-------|
| Voltage (Vrms)                         |                              | 200-240      |       |       |       |
| Frame Length                           |                              | A            | B     | C     | D     |
| Continuous stall torque (Nm)           |                              | 5.8          | 10.2  | 14.6  | 18.8  |
| Peak torque (Nm)                       |                              | 17.4         | 30.6  | 43.8  | 56.4  |
| Standard inertia (kg cm <sup>2</sup> ) |                              | 2.40         | 4.41  | 6.39  | 8.38  |
| Winding thermal time constant (sec)    |                              | 161          | 164   | 168   | 175   |
| Standard motor weight (kg)             |                              | 5.20         | 6.95  | 8.72  | 10.49 |
| Number of poles                        |                              | 10           | 10    | 10    | 10    |
| Speed<br>2000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 1.4<br>85.5  |       |       |       |
| Rated torque (Nm)                      | ◆                            | 8.6          | 11.9  | 15.6  |       |
| Stall current (A)                      | ◆                            | 7            | 10.43 | 13.43 |       |
| Rated power (kW)                       | ◆                            | 1.8          | 2.49  | 3.27  |       |
| R (ph-ph) (Ohms)                       | ◆                            | 1.2          | 0.77  | 0.61  |       |
| L (ph-ph) (mH)                         | ◆                            | 11           | 7.9   | 6.6   |       |
| Recommended power conn' size           | ◆                            | 1            | 1     | 1     |       |
| Speed<br>3000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 0.93<br>57   |       |       |       |
| Rated torque (Nm)                      | 4.8                          | 7.7          | 10.5  | ◆     |       |
| Stall current (A)                      | 6.24                         | 10.97        | 15.70 | ◆     |       |
| Rated power (kW)                       | 1.51                         | 2.42         | 3.30  | ◆     |       |
| R (ph-ph) (Ohms)                       | 1.59                         | 0.58         | 0.39  | ◆     |       |
| L (ph-ph) (mH)                         | 12.8                         | 5.4          | 4.0   | ◆     |       |
| Recommended power conn' size           | 1                            | 1            | 1     | ◆     |       |
| Speed<br>4000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 0.7<br>42.75 |       |       |       |
| Rated torque (Nm)                      | ◆                            | ◆            | ◆     | ◆     |       |
| Stall current (A)                      | ◆                            | ◆            | ◆     | ◆     |       |
| Rated power (kW)                       | ◆                            | ◆            | ◆     | ◆     |       |
| R (ph-ph) (Ohms)                       | ◆                            | ◆            | ◆     | ◆     |       |
| L (ph-ph) (mH)                         | ◆                            | ◆            | ◆     | ◆     |       |
| Recommended power conn' size           | ◆                            | ◆            | ◆     | ◆     |       |
| Speed<br>6000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 0.47<br>28.5 |       |       |       |
| Rated torque (Nm)                      | ◆                            | ◆            | ◆     | ◆     |       |
| Stall current (A)                      | ◆                            | ◆            | ◆     | ◆     |       |
| Rated power (kW)                       | ◆                            | ◆            | ◆     | ◆     |       |
| R (ph-ph) (Ohms)                       | ◆                            | ◆            | ◆     | ◆     |       |
| L (ph-ph) (mH)                         | ◆                            | ◆            | ◆     | ◆     |       |
| Recommended power conn' size           | ◆                            | ◆            | ◆     | ◆     |       |

| Motor frame size (mm)                  |                              | 115UD       |      |       |       |
|----------------------------------------|------------------------------|-------------|------|-------|-------|
| Voltage (Vrms)                         |                              | 380-480     |      |       |       |
| Frame length                           |                              | A           | B    | C     | D     |
| Continuous stall torque (Nm)           |                              | 5.8         | 10.2 | 14.6  | 18.8  |
| Peak torque (Nm)                       |                              | 17.4        | 30.6 | 43.8  | 56.4  |
| Standard inertia (kg cm <sup>2</sup> ) |                              | 2.40        | 4.41 | 6.39  | 8.38  |
| Winding thermal time constant (sec)    |                              | 161         | 164  | 168   | 175   |
| Standard motor weight (kg)             |                              | 5.20        | 6.95 | 8.72  | 10.49 |
| Number of poles                        |                              | 10          | 10   | 10    | 10    |
| Speed<br>2000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 2.4<br>147  |      |       |       |
| Rated torque (Nm)                      | ◆                            | 8.6         | 11.9 | 15.6  |       |
| Stall current (A)                      | ◆                            | 4           | 6.08 | 7.83  |       |
| Rated power (kW)                       | ◆                            | 1.8         | 2.49 | 3.27  |       |
| R (ph-ph) (Ohms)                       | ◆                            | 4.4         | 2.41 | 1.80  |       |
| L (ph-ph) (mH)                         | ◆                            | 40.6        | 24.7 | 19.5  |       |
| Recommended power conn' size           | ◆                            | 1           | 1    | 1     |       |
| Speed<br>3000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 1.6<br>98   |      |       |       |
| Rated torque (Nm)                      | 4.8                          | 7.7         | 10.5 | 13.6  |       |
| Stall current (A)                      | 3.03                         | 6.38        | 9.13 | 11.75 |       |
| Rated power (kW)                       | 1.51                         | 2.42        | 3.30 | 4.27  |       |
| R (ph-ph) (Ohms)                       | 5.00                         | 1.90        | 1.21 | 0.78  |       |
| L (ph-ph) (mH)                         | 40.3                         | 18.0        | 12.7 | 8.7   |       |
| Recommended power conn' size           | 1                            | 1           | 1    | 1     |       |
| Speed<br>4000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 1.2<br>73.5 |      |       |       |
| Rated torque (Nm)                      | 4.5                          | 6.7         | 8.7  | 10.5  |       |
| Stall current (A)                      | 5                            | 9           | 12.1 | 16    |       |
| Rated power (kW)                       | 1.9                          | 2.81        | 3.64 | 4.4   |       |
| R (ph-ph) (Ohms)                       | 2.8                          | 1.07        | 0.6  | 0.4   |       |
| L (ph-ph) (mH)                         | 23.1                         | 10.15       | 6.6  | 4.7   |       |
| Recommended power conn' size           | 1                            | 1           | 1    | 1     |       |
| Speed<br>6000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 0.8<br>49   |      |       |       |
| Rated torque (Nm)                      | 3.6                          | 4.8         | ◆    | ◆     |       |
| Stall current (A)                      | 7.25                         | 12.75       | ◆    | ◆     |       |
| Rated power (kW)                       | 2.26                         | 3.02        | ◆    | ◆     |       |
| R (ph-ph) (Ohms)                       | 1.25                         | 0.47        | ◆    | ◆     |       |
| L (ph-ph) (mH)                         | 10.1                         | 4.5         | ◆    | ◆     |       |
| Recommended power conn' size           | 1                            | 1           | ◆    | ◆     |       |

◆ Not available

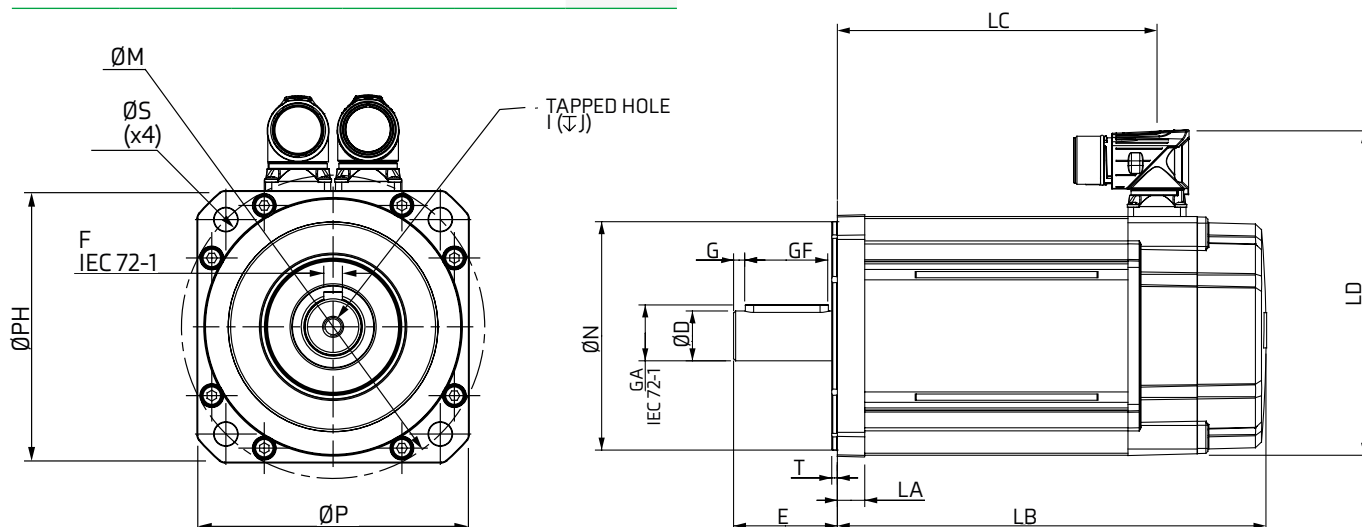
All data subject to +/-10% tolerance. Stall torque, rated torque and power relate to maximum continuous operation tested in a 20°C ambient at 12kHz drive switching frequency. All other figures relate to a 20°C motor temperature. Maximum intermittent winding temperature is 140°C



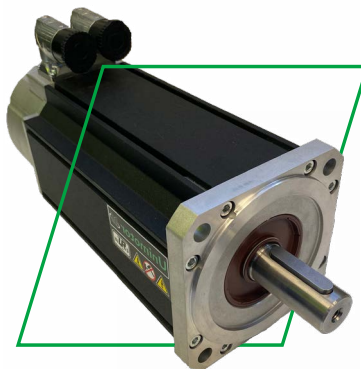
| Motor Dimensions |            |               |            |            |                  |                 |                   |                |               |                      |                 |               |                |    |
|------------------|------------|---------------|------------|------------|------------------|-----------------|-------------------|----------------|---------------|----------------------|-----------------|---------------|----------------|----|
| Feedback EF, FF  |            |               |            |            | Flange thickness | Register length | Register diameter | Overall height | Flange square | Fixing hole diameter | Fixing hole PCD | Motor housing | Mounting bolts |    |
| Unbraked length  |            | Braked length |            |            | LA (± 0.5)       | T (± 0.1)       | N (j6)            | LD (± 0.3)     | P (± 0.3)     | S (H14)              | M (± 0.5)       | PH (± 0.5)    | M8             | mm |
| LB (± 0.9)       | LC (± 1.0) | LC (± 1.0)    | LC (± 1.0) | LC (± 1.0) |                  |                 |                   |                |               |                      |                 |               |                |    |
| 115A             | 163.8      | 124           | 200.9      | 161.1      |                  |                 |                   |                |               |                      |                 |               |                |    |
| 115B             | 193.8      | 154           | 230.9      | 191.1      |                  |                 |                   |                |               |                      |                 |               |                |    |
| 115C             | 223.8      | 184           | 260.9      | 221.1      |                  |                 |                   |                |               |                      |                 |               |                |    |
| 115D             | 253.8      | 214           | 290.9      | 251.1      |                  |                 |                   |                |               |                      |                 |               |                |    |

| Shaft Dimensions |                |              |            |            |                  |           |                         |                   |    |
|------------------|----------------|--------------|------------|------------|------------------|-----------|-------------------------|-------------------|----|
|                  | Shaft diameter | Shaft length | Key height | Key length | Key to shaft end | Key width | Tapped hole thread size | Tapped hole depth |    |
|                  | D(j6)          | E            | GA         | GF         | G                | F(h9)     | I                       | J(±1)             |    |
| 24.0 Std         | 24             | 50           | 27         | 40         | 5.3              | 8         | M8 x 1.25               | 20                | mm |

|      | Feedback CA, GF, HF |               | Feedback AE     |               |    |
|------|---------------------|---------------|-----------------|---------------|----|
|      | Unbraked length     | Braked length | Unbraked length | Braked length |    |
|      | LB (± 0.9)          | LB (± 0.9)    | LB (± 0.9)      | LB (± 0.9)    |    |
| 115A | 176.8               | 213.9         | 153.8           | 190.9         | mm |
| 115B | 206.8               | 243.9         | 183.8           | 220.9         |    |
| 115C | 236.8               | 273.9         | 213.8           | 250.9         |    |
| 115D | 266.8               | 303.9         | 243.8           | 280.9         |    |



# Frame size 142



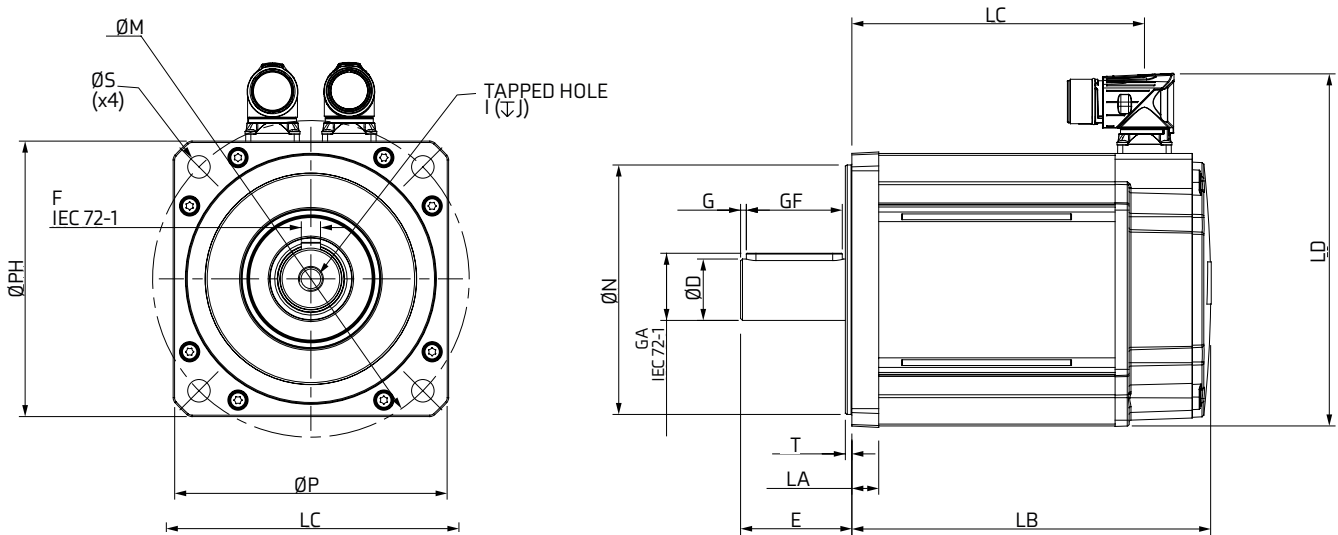
| Motor frame size (mm)                  |                              | 142ED        |       |       |       |       |
|----------------------------------------|------------------------------|--------------|-------|-------|-------|-------|
| Voltage (Vrms)                         |                              | 200-240      |       |       |       |       |
| Frame length                           |                              | A            | B     | C     | D     | E     |
| Continuous stall torque (Nm)           |                              | 10.1         | 17.4  | 25.0  | 31.5  | 38.0  |
| Peak torque (Nm)                       |                              | 30.3         | 52.2  | 75.0  | 94.5  | 114.0 |
| Standard inertia (kg cm <sup>2</sup> ) |                              | 5.6          | 11.0  | 17.0  | 22.1  | 27.2  |
| Winding thermal time constant (sec)    |                              | 235          | 240   | 245   | 251   | 256   |
| Standard motor weight (kg)             |                              | 7.40         | 10.10 | 12.74 | 15.39 | 18.04 |
| Number of poles                        |                              | 10           | 10    | 10    | 10    | 10    |
| Speed<br>2000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 1.4<br>85.5  |       |       |       |       |
| Rated torque (Nm)                      |                              | 8.6          | 15.3  | 21.4  | 25.7  | 29.6  |
| Stall current (A)                      |                              | 7.21         | 12.43 | 17.86 | 23    | 27.14 |
| Rated power (kW)                       |                              | 1.80         | 3.20  | 4.48  | 5.4   | 6.20  |
| R (ph-ph) (Ohms)                       |                              | 0.85         | 0.34  | 0.24  | 0.2   | 0.2   |
| L (ph-ph) (mH)                         |                              | 14.3         | 5.9   | 3.7   | 3.8   | 2.9   |
| Recommended power conn' size           |                              | 1            | 1     | 1.5   | 1.5   | 1.5   |
| Speed<br>3000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 0.93<br>57   |       |       |       |       |
| Rated torque (Nm)                      |                              | 8.2          | 14.0  | 18.4  | 20.9  | ♦     |
| Stall current (A)                      |                              | 10.86        | 18.71 | 26.88 | 33.87 | ♦     |
| Rated power (kW)                       |                              | 2.58         | 4.40  | 5.78  | 6.57  | ♦     |
| R (ph-ph) (Ohms)                       |                              | 0.38         | 0.22  | 0.12  | 0.09  | ♦     |
| L (ph-ph) (mH)                         |                              | 6.3          | 2.8   | 1.9   | 1.6   | ♦     |
| Recommended power conn' size           |                              | 1            | 1.5   | 1.5   | 1.5   | ♦     |
| Speed<br>4000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 0.7<br>42.75 |       |       |       |       |
| Rated torque (Nm)                      |                              | ♦            | 11.7  | ♦     | ♦     | ♦     |
| Stall current (A)                      |                              | ♦            | 24.86 | ♦     | ♦     | ♦     |
| Rated power (kW)                       |                              | ♦            | 4.90  | ♦     | ♦     | ♦     |
| R (ph-ph) (Ohms)                       |                              | ♦            | 0.08  | ♦     | ♦     | ♦     |
| L (ph-ph) (mH)                         |                              | ♦            | 4.5   | ♦     | ♦     | ♦     |
| Recommended power conn' size           |                              | ♦            | 1.5   | ♦     | ♦     | ♦     |
| Speed<br>6000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 0.47<br>28.5 |       |       |       |       |
| Rated torque (Nm)                      |                              | ♦            | ♦     | ♦     | ♦     | ♦     |
| Stall current (A)                      |                              | ♦            | ♦     | ♦     | ♦     | ♦     |
| Rated power (kW)                       |                              | ♦            | ♦     | ♦     | ♦     | ♦     |
| R (ph-ph) (Ohms)                       |                              | ♦            | ♦     | ♦     | ♦     | ♦     |
| L (ph-ph) (mH)                         |                              | ♦            | ♦     | ♦     | ♦     | ♦     |
| Recommended power conn' size           |                              | ♦            | ♦     | ♦     | ♦     | ♦     |

| Motor frame size (mm)                  |                              | 142UD      |       |       |       |       |
|----------------------------------------|------------------------------|------------|-------|-------|-------|-------|
| Voltage (Vrms)                         |                              | 380-480    |       |       |       |       |
| Frame length                           |                              | A          | B     | C     | D     | E     |
| Continuous stall torque (Nm)           |                              | 10.1       | 17.4  | 25.0  | 31.5  | 38.0  |
| Peak torque (Nm)                       |                              | 30.3       | 52.2  | 75.0  | 94.5  | 114.0 |
| Standard inertia (kg cm <sup>2</sup> ) |                              | 5.6        | 11.0  | 17.0  | 22.1  | 27.2  |
| Winding thermal time constant (sec)    |                              | 235        | 240   | 245   | 251   | 256   |
| Standard motor weight (kg)             |                              | 7.40       | 10.10 | 12.74 | 15.39 | 18.04 |
| Number of poles                        |                              | 10         | 10    | 10    | 10    | 10    |
| Speed<br>1500 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 3.2<br>196 |       |       |       |       |
| Rated torque (Nm)                      |                              | ♦          | 27    | 31.7  | 27.0  | 31.70 |
| Stall current (A)                      |                              | ♦          | 10    | 12    | 9.84  | 11.8  |
| Rated power (kW)                       |                              | ♦          | 4.2   | 5     | 4.24  | 4.98  |
| R (ph-ph) (Ohms)                       |                              | ♦          | 0.9   | 0.7   | 0.9   | 0.7   |
| L (ph-ph) (mH)                         |                              | ♦          | 15.2  | 12.3  | 15.2  | 12.3  |
| Recommended power conn' size           |                              | ♦          | 1     | 1     | 1     | 1     |
| Speed<br>2000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 2.4<br>147 |       |       |       |       |
| Rated torque (Nm)                      |                              | 8.6        | 15.3  | 21.4  | 25.7  | 29.6  |
| Stall current (A)                      |                              | 4.21       | 7.25  | 10.42 | 13    | 16    |
| Rated power (kW)                       |                              | 1.80       | 3.20  | 4.48  | 5.4   | 6.2   |
| R (ph-ph) (Ohms)                       |                              | 3.90       | 1.53  | 0.79  | 0.6   | 0.5   |
| L (ph-ph) (mH)                         |                              | 46.28      | 20.97 | 12.15 | 9.9   | 8.3   |
| Recommended power conn' size           |                              | 1          | 1     | 1     | 1     | 1     |
| Speed<br>3000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 1.6<br>98  |       |       |       |       |
| Rated torque (Nm)                      |                              | 8.2        | 14.0  | 18.4  | 20.9  | 23.0  |
| Stall current (A)                      |                              | 6.31       | 10.88 | 15.63 | 19.69 | 23.75 |
| Rated power (kW)                       |                              | 2.58       | 4.40  | 5.78  | 6.57  | 7.23  |
| R (ph-ph) (Ohms)                       |                              | 1.50       | 0.63  | 0.34  | 0.24  | 0.18  |
| L (ph-ph) (mH)                         |                              | 18.1       | 8.6   | 5.3   | 3.8   | 2.9   |
| Recommended power conn' size           |                              | 1          | 1     | 1     | 1.5   | 1.5   |
| Speed<br>4000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 1.2<br>74  |       |       |       |       |
| Rated torque (Nm)                      |                              | ♦          | 11.7  | 14.2  | 14.9  | ♦     |
| Stall current (A)                      |                              | ♦          | 14.50 | 21    | 26.25 | ♦     |
| Rated power (kW)                       |                              | ♦          | 4.90  | 5.9   | 6.24  | ♦     |
| R (ph-ph) (Ohms)                       |                              | ♦          | 0.36  | 0.2   | 0.16  | ♦     |
| L (ph-ph) (mH)                         |                              | ♦          | 7.1   | 3.0   | 2.4   | ♦     |
| Recommended power conn' size           |                              | ♦          | 1     | 1.5   | 1.5   | ♦     |
| Speed<br>6000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 0.8<br>49  |       |       |       |       |
| Rated torque (Nm)                      |                              | ♦          | 7     | ♦     | ♦     | ♦     |
| Stall current (A)                      |                              | ♦          | 21.75 | ♦     | ♦     | ♦     |
| Rated power (kW)                       |                              | ♦          | 4.4   | ♦     | ♦     | ♦     |
| R (ph-ph) (Ohms)                       |                              | ♦          | 0.17  | ♦     | ♦     | ♦     |
| L (ph-ph) (mH)                         |                              | ♦          | 3.2   | ♦     | ♦     | ♦     |
| Recommended power conn' size           |                              | ♦          | 1.5   | ♦     | ♦     | ♦     |

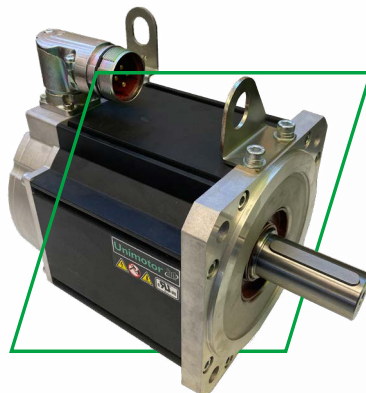
♦ Not available

| Motor Dimensions |                 |            |               |            |                  |                 |                   |                     |               |                      |                 |               |                |
|------------------|-----------------|------------|---------------|------------|------------------|-----------------|-------------------|---------------------|---------------|----------------------|-----------------|---------------|----------------|
|                  | Unbraked length |            | Braked length |            | Flange thickness | Register length | Register diameter | Overall height      | Flange square | Fixing hole diameter | Fixing hole PCD | Motor housing | Mounting bolts |
|                  | LB (± 0.9)      | LC (± 1.0) | LC (± 1.0)    | LC (± 1.0) | LA (± 0.5)       | T (± 0.1)       | N (j6)            | LD (± 0.3)          | P (± 0.3)     | S (H14)              | M (± 0.5)       | PH (± 0.5)    |                |
| 142A             | 157             | 122.5      | 222.5         | 188        |                  |                 |                   |                     |               |                      |                 |               |                |
| 142B             | 187             | 152.5      | 252.5         | 218        |                  |                 |                   | 183.5<br>(Size 1)   |               |                      |                 |               |                |
| 142C             | 217             | 182.5      | 282.5         | 248        | 14               | 3.4             | 130               |                     | 142           | 12                   | 165             | 142           | M10 mm         |
| 142D             | 247             | 212.5      | 312.5         | 278        |                  |                 |                   | 204.5<br>(Size 1.5) |               |                      |                 |               |                |
| 142E             | 277             | 242.5      | 342.5         | 308        |                  |                 |                   |                     |               |                      |                 |               |                |

| Shaft Dimensions |                |              |            |            |                  |           |                         |                   |
|------------------|----------------|--------------|------------|------------|------------------|-----------|-------------------------|-------------------|
|                  | Shaft diameter | Shaft length | Key height | Key length | Key to shaft end | Key width | Tapped hole thread size | Tapped hole depth |
|                  | D(j6)          | E            | GA         | GF         | G                | F(h9)     | I                       | J(±1)             |
| 32.0 Std         | 32             | 58           | 35         | 50         | 3                | 10        | M12 x 1.75              | 29 mm             |



# Frame size 190



| Motor frame size (mm)                  |                              | 190ED       |       |       |       |       |       |
|----------------------------------------|------------------------------|-------------|-------|-------|-------|-------|-------|
| Voltage (Vrms)                         |                              | 200-240     |       |       |       |       |       |
| Frame length                           |                              | A           | B     | C     | D     | E     | F     |
| Continuous stall torque (Nm)           |                              | 18.5        | 32.7  | 52.0  | 62.0  | 73.5  | 85.0  |
| Peak torque (Nm)                       |                              | 55.5        | 98.10 | 156   | 186   | 220.5 | 255   |
| Standard inertia (kg cm <sup>2</sup> ) |                              | 22.0        | 38.3  | 54.6  | 70.9  | 87.2  | 103.5 |
| Winding thermal time constant (sec)    |                              | 286         | 292   | 300   | 308   | 316   | 324   |
| Standard motor weight (kg)             |                              | 14.60       | 21.20 | 27.74 | 34.30 | 40.90 | 47.42 |
| Number of poles                        |                              | 10          | 10    | 10    | 10    | 10    | 10    |
| Speed<br>1000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 2.8<br>171  |       |       |       |       |       |
| Rated torque (Nm)                      |                              | ◆           | ◆     | 49.0  | 56.5  | ◆     | 77.5  |
| Stall current (A)                      |                              | ◆           | ◆     | 18.57 | 22.14 | ◆     | 30.36 |
| Rated power (kW)                       |                              | ◆           | ◆     | 5.13  | 5.92  | ◆     | 8.12  |
| R (ph-ph) (Ohms)                       |                              | ◆           | ◆     | 0.30  | 0.27  | ◆     | 0.15  |
| L (ph-ph) (mH)                         |                              | ◆           | ◆     | 10.0  | 7.1   | ◆     | 4.8   |
| Recommended power conn' size           |                              | ◆           | ◆     | 1.5   | 1.5   | ◆     | 1.5   |
| Speed<br>1500 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 1.86<br>114 |       |       |       |       |       |
| Rated torque (Nm)                      |                              | ◆           | ◆     | 46.2  | ◆     | ◆     | ◆     |
| Stall current (A)                      |                              | ◆           | ◆     | 25.97 | ◆     | ◆     | ◆     |
| Rated power (kW)                       |                              | ◆           | ◆     | 7.26  | ◆     | ◆     | ◆     |
| R (ph-ph) (Ohms)                       |                              | ◆           | ◆     | 0.11  | ◆     | ◆     | ◆     |
| L (ph-ph) (mH)                         |                              | ◆           | ◆     | 3.5   | ◆     | ◆     | ◆     |
| Recommended power conn' size           |                              | ◆           | ◆     | 1.5   | ◆     | ◆     | ◆     |
| Speed<br>2000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 1.4<br>85.5 |       |       |       |       |       |
| Rated torque (Nm)                      |                              | ◆           | ◆     | 42.5  | ◆     | ◆     | ◆     |
| Stall current (A)                      |                              | ◆           | ◆     | 37.14 | ◆     | ◆     | ◆     |
| Rated power (kW)                       |                              | ◆           | ◆     | 8.9   | ◆     | ◆     | ◆     |
| R (ph-ph) (Ohms)                       |                              | ◆           | ◆     | 0.09  | ◆     | ◆     | ◆     |
| L (ph-ph) (mH)                         |                              | ◆           | ◆     | 2.5   | ◆     | ◆     | ◆     |
| Recommended power conn' size           |                              | ◆           | ◆     | 1.5   | ◆     | ◆     | ◆     |
| Speed<br>3000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 0.93<br>57  |       |       |       |       |       |
| Rated torque (Nm)                      |                              | 15.5        | 25.0  | ◆     | ◆     | ◆     | ◆     |
| Stall current (A)                      |                              | 19.89       | 35.16 | ◆     | ◆     | ◆     | ◆     |
| Rated power (kW)                       |                              | 4.87        | 7.85  | ◆     | ◆     | ◆     | ◆     |
| R (ph-ph) (Ohms)                       |                              | 0.20        | 0.05  | ◆     | ◆     | ◆     | ◆     |
| L (ph-ph) (mH)                         |                              | 3.1         | 1.6   | ◆     | ◆     | ◆     | ◆     |
| Recommended power conn' size           |                              | 1.5         | 1.5   | ◆     | ◆     | ◆     | ◆     |

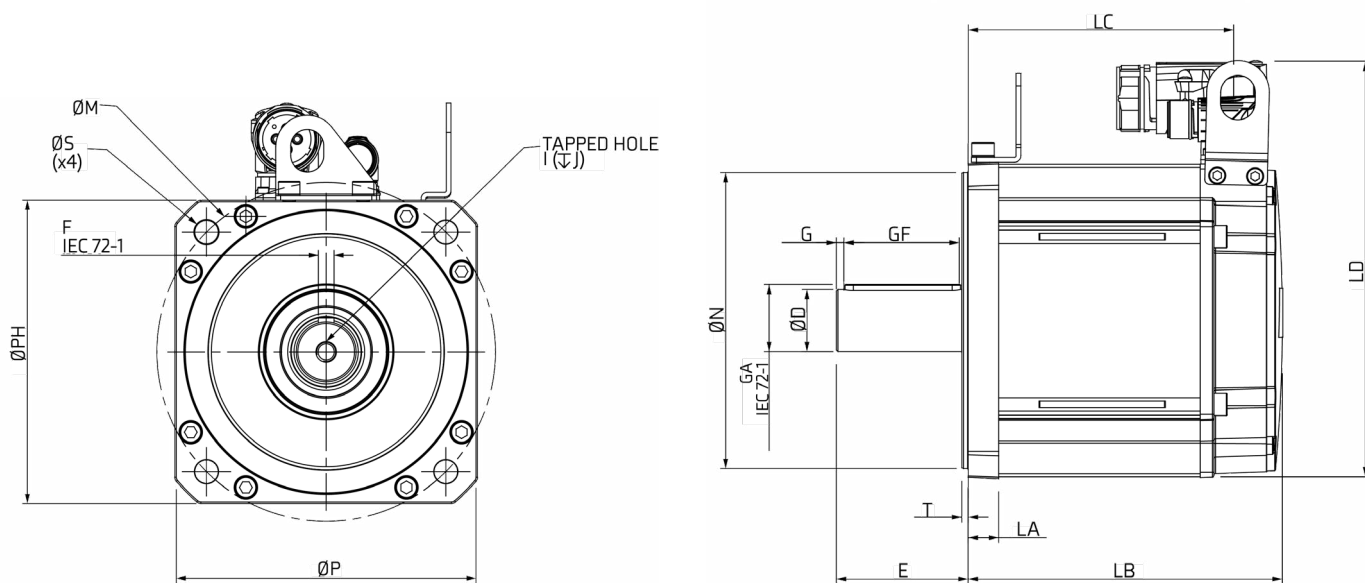
| Motor frame size (mm)                  |                              | 190UD      |       |       |       |       |       |
|----------------------------------------|------------------------------|------------|-------|-------|-------|-------|-------|
| Voltage (Vrms)                         |                              | 380-480    |       |       |       |       |       |
| Frame length                           |                              | A          | B     | C     | D     | E     | F     |
| Continuous stall torque (Nm)           |                              | 18.5       | 32.7  | 52.0  | 62.0  | 73.5  | 85.0  |
| Peak torque (Nm)                       |                              | 55.5       | 98.10 | 156   | 186   | 220.5 | 255   |
| Standard inertia (kg cm <sup>2</sup> ) |                              | 22.0       | 38.3  | 54.6  | 70.9  | 87.2  | 103.5 |
| Winding thermal time constant (sec)    |                              | 286        | 292   | 300   | 308   | 316   | 324   |
| Standard motor weight (kg)             |                              | 14.60      | 21.20 | 27.74 | 34.30 | 40.90 | 47.42 |
| Number of poles                        |                              | 10         | 10    | 10    | 10    | 10    | 10    |
| Speed<br>1000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 4.8<br>296 |       |       |       |       |       |
| Rated torque (Nm)                      |                              | ◆          | ◆     | ◆     | ◆     | ◆     | 78.3  |
| Stall current (A)                      |                              | ◆          | ◆     | ◆     | ◆     | ◆     | 17.61 |
| Rated power (kW)                       |                              | ◆          | ◆     | ◆     | ◆     | ◆     | 8.12  |
| R (ph-ph) (Ohms)                       |                              | ◆          | ◆     | ◆     | ◆     | ◆     | 0.53  |
| L (ph-ph) (mH)                         |                              | ◆          | ◆     | ◆     | ◆     | ◆     | 15.8  |
| Recommended power conn' size           |                              | ◆          | ◆     | ◆     | ◆     | ◆     | 1.5   |
| Speed<br>1500 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 3.2<br>196 |       |       |       |       |       |
| Rated torque (Nm)                      |                              | ◆          | 30    | 46.2  | 52.2  | ◆     | 68.5  |
| Stall current (A)                      |                              | ◆          | 10    | 16.25 | 19    | ◆     | 26.56 |
| Rated power (kW)                       |                              | ◆          | 4.7   | 7.26  | 8.2   | ◆     | 10.76 |
| R (ph-ph) (Ohms)                       |                              | ◆          | 1     | 0.55  | 0.4   | ◆     | 0.23  |
| L (ph-ph) (mH)                         |                              | ◆          | 22.8  | 14.2  | 10.4  | ◆     | 6.8   |
| Recommended power conn' size           |                              | ◆          | 1.5   | 1.5   | 1.5   | ◆     | 1.5   |
| Speed<br>2000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 2.4<br>147 |       |       |       |       |       |
| Rated torque (Nm)                      |                              | ◆          | 28    | 42.5  | 45.3  | 52.9  | 56    |
| Stall current (A)                      |                              | ◆          | 13    | 21.67 | 25.83 | 30.63 | 35.42 |
| Rated power (kW)                       |                              | ◆          | 5.9   | 8.90  | 9.49  | 11.08 | 11.73 |
| R (ph-ph) (Ohms)                       |                              | ◆          | 0.4   | 0.32  | 0.17  | 0.16  | 0.14  |
| L (ph-ph) (mH)                         |                              | ◆          | 10.7  | 8.2   | 5.1   | 4.6   | 4.3   |
| Recommended power conn' size           |                              | ◆          | 1.5   | 1.5   | 1.5   | 1.5   | 1.5   |
| Speed<br>3000 (rpm)                    | Kt (Nm/A) =<br>Ke (V/krpm) = | 1.6<br>98  |       |       |       |       |       |
| Rated torque (Nm)                      |                              | 15.5       | 25.0  | ◆     | ◆     | ◆     | ◆     |
| Stall current (A)                      |                              | 11.56      | 20.44 | ◆     | ◆     | ◆     | ◆     |
| Rated power (kW)                       |                              | 4.87       | 7.85  | ◆     | ◆     | ◆     | ◆     |
| R (ph-ph) (Ohms)                       |                              | 0.57       | 0.23  | ◆     | ◆     | ◆     | ◆     |
| L (ph-ph) (mH)                         |                              | 11.6       | 5.7   | ◆     | ◆     | ◆     | ◆     |
| Recommended power conn' size           |                              | 1.5        | 1.5   | ◆     | ◆     | ◆     | ◆     |

◆ Not available

All data subject to +/-10% tolerance. Stall torque, rated torque and power relate to maximum continuous operation tested in a 20°C ambient at 12kHz drive switching frequency. All other figures relate to a 20°C motor temperature. Maximum intermittent winding temperature is 140°C

| Motor Dimensions |                 |            |               |            |                  |                 |                   |                |               |                      |                 |               |                |    |
|------------------|-----------------|------------|---------------|------------|------------------|-----------------|-------------------|----------------|---------------|----------------------|-----------------|---------------|----------------|----|
|                  | Unbraked length |            | Braked length |            | Flange thickness | Register length | Register diameter | Overall height | Flange square | Fixing hole diameter | Fixing hole PCD | Motor housing | Mounting bolts |    |
|                  | LB (± 0.9)      | LC (± 1.0) | LC (± 1.0)    | LC (± 1.0) | LA (± 0.5)       | T (± 0.1)       | N (j6)            | LD (± 0.3)     | P (± 0.3)     | S (H14)              | M (± 0.5)       | PH (± 0.5)    |                |    |
| 190A             | 160.6           | 131.1      | 259.1         | 229.6      | 18.5             | 3.9             | 180               | 252.5          | 190.3         | 14.5                 | 215             | 190           | M12            | mm |
| 190B             | 190.6           | 161.1      | 289.1         | 259.6      |                  |                 |                   |                |               |                      |                 |               |                |    |
| 190C             | 220.6           | 191.1      | 319.1         | 289.6      |                  |                 |                   |                |               |                      |                 |               |                |    |
| 190D             | 250.6           | 221.1      | 349.1         | 319.6      |                  |                 |                   |                |               |                      |                 |               |                |    |
| 190E             | 280.6           | 251.1      | 379.1         | 349.6      |                  |                 |                   |                |               |                      |                 |               |                |    |
| 190F             | 310.6           | 281.1      | 409.1         | 379.6      |                  |                 |                   |                |               |                      |                 |               |                |    |

| Shaft Dimensions |                |              |            |            |                  |           |                         |                   |    |
|------------------|----------------|--------------|------------|------------|------------------|-----------|-------------------------|-------------------|----|
|                  | Shaft diameter | Shaft length | Key height | Key length | Key to shaft end | Key width | Tapped hole thread size | Tapped hole depth |    |
|                  | D(j6)          | E            | GA         | GF         | G                | F(h9)     | I                       | J(±1)             |    |
| 38.0 Std         | 38             | 80           | 41         | 70         | 4.6              | 10        | M12 x 1.75              | 29                | mm |

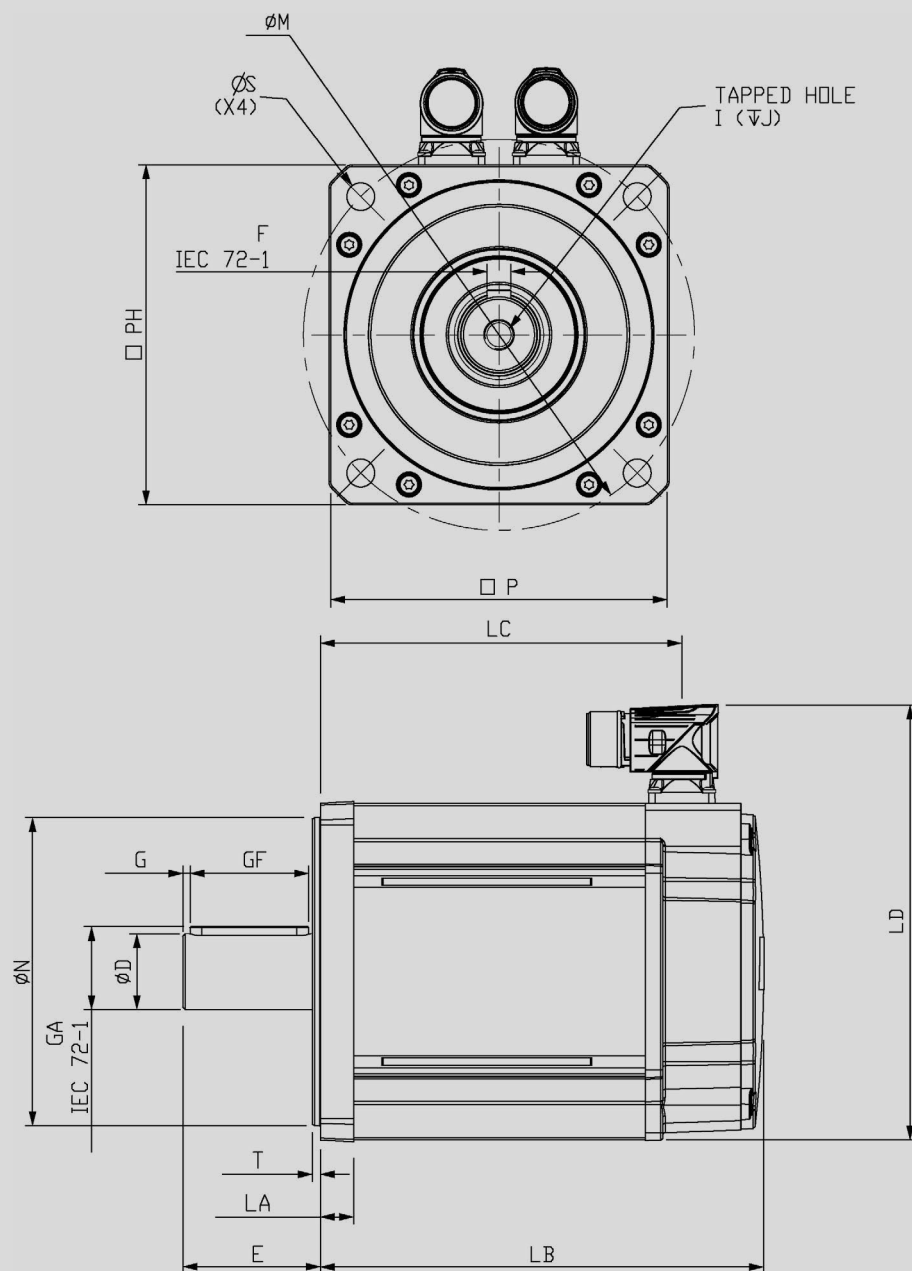


## Dimensions - high inertia versions

( all measurements shown are in mm )

| 067 | Unbraked length |               | Braked length |            | Flange thickness | Register length | Register diameter | Overall height                           | Flange square | Fixing hole diameter | Fixing hole PCD | Motor housing | Mounting bolts |
|-----|-----------------|---------------|---------------|------------|------------------|-----------------|-------------------|------------------------------------------|---------------|----------------------|-----------------|---------------|----------------|
|     | LB (± 0.9)      | LC (± 1.0)    | LB (± 0.9)    | LC (± 1.0) | LA (± 0.5)       | T (± 0.1)       | N (j6)            | LD (± 0.3)                               | P (± 0.3)     | S (H14)              | M (± 0.5)       | PH (± 0.5)    |                |
| A   | 172.9           | 139.0         | 207.9         | 174.0      | 7.7              | 2.5             | 60.0              | 111.5                                    | 70.0          | 5.8                  | 75.0            | 67.0          | M5             |
| B   | 202.9           | 169.0         | 237.9         | 204.0      |                  |                 |                   |                                          |               |                      |                 |               |                |
| C   | 232.9           | 199.0         | 267.9         | 234.0      |                  |                 |                   |                                          |               |                      |                 |               |                |
| D   | 262.9           | 229.0         | 297.9         | 264.0      |                  |                 |                   |                                          |               |                      |                 |               |                |
| 089 | Feedback EF, FF |               |               |            | Flange thickness | Register length | Register diameter | Overall height                           | Flange square | Fixing hole diameter | Fixing hole PCD | Motor housing | Mounting bolts |
|     | Unbraked length | Braked length |               |            | LA (± 0.5)       | T (± 0.1)       | N (j6)            | LD (± 0.3)                               | P (± 0.3)     | S (H14)              | M (± 0.5)       | PH (± 0.5)    |                |
| A   | 177.8           | 140.5         | 217.9         | 180.6      | 10.3             | 2.2             | 80.0              | 130.5                                    | 91.0          | 7.0                  | 100.0           | 89.0          | M6             |
| B   | 207.8           | 170.5         | 247.9         | 210.6      |                  |                 |                   |                                          |               |                      |                 |               |                |
| C   | 237.8           | 200.5         | 277.9         | 240.6      |                  |                 |                   |                                          |               |                      |                 |               |                |
| D   | 267.8           | 230.5         | 300.9         | 270.6      |                  |                 |                   |                                          |               |                      |                 |               |                |
|     | CA, GF, HF      |               | AE            |            | Flange thickness | Register length | Register diameter | Overall height                           | Flange square | Fixing hole diameter | Fixing hole PCD | Motor housing | Mounting bolts |
|     | Unbraked        | Braked        | Unbraked      | Braked     | LA (± 0.5)       | T (± 0.1)       | N (j6)            | LD (± 0.3)                               | P (± 0.3)     | S (H14)              | M (± 0.5)       | PH (± 0.5)    |                |
|     | LB (± 0.9)      | LB (± 0.9)    | LB (± 0.9)    | LB (± 0.9) |                  |                 |                   |                                          |               |                      |                 |               |                |
| A   | 190.8           | 230.9         | 167.8         | 207.9      | 10.3             | 2.2             | 80.0              | 130.5                                    | 91.0          | 7.0                  | 100.0           | 89.0          | M6             |
| B   | 220.8           | 260.9         | 197.8         | 237.9      |                  |                 |                   |                                          |               |                      |                 |               |                |
| C   | 250.8           | 290.9         | 227.8         | 267.9      |                  |                 |                   |                                          |               |                      |                 |               |                |
| D   | 280.8           | 320.9         | 257.8         | 297.9      |                  |                 |                   |                                          |               |                      |                 |               |                |
| 115 | Feedback EF, FF |               |               |            | Flange thickness | Register length | Register diameter | Overall height                           | Flange square | Fixing hole diameter | Fixing hole PCD | Motor housing | Mounting bolts |
|     | Unbraked length | Braked length |               |            | LA (± 0.5)       | T (± 0.1)       | N (j6)            | LD (± 0.3)                               | P (± 0.3)     | S (H14)              | M (± 0.5)       | PH (± 0.5)    |                |
| A   | 193.8           | 154.0         | 230.9         | 191.1      | 13.2             | 2.7             | 110.0             | 156.5                                    | 116.0         | 10.0                 | 130.0           | 115.0         | M8             |
| B   | 223.8           | 184.0         | 260.9         | 221.1      |                  |                 |                   |                                          |               |                      |                 |               |                |
| C   | 253.8           | 214.0         | 290.9         | 251.1      |                  |                 |                   |                                          |               |                      |                 |               |                |
| D   | 283.8           | 244.0         | 320.9         | 281.1      |                  |                 |                   |                                          |               |                      |                 |               |                |
|     | CA, GF, HF      |               | AE            |            | Flange thickness | Register length | Register diameter | Overall height                           | Flange square | Fixing hole diameter | Fixing hole PCD | Motor housing | Mounting bolts |
|     | Unbraked        | Braked        | Unbraked      | Braked     | LA (± 0.5)       | T (± 0.1)       | N (j6)            | LD (± 0.3)                               | P (± 0.3)     | S (H14)              | M (± 0.5)       | PH (± 0.5)    |                |
|     | LB (± 0.9)      | LB (± 0.9)    | LB (± 0.9)    | LB (± 0.9) |                  |                 |                   |                                          |               |                      |                 |               |                |
| A   | 206.8           | 243.9         | 183.8         | 220.9      | 13.2             | 2.7             | 110.0             | 156.5                                    | 116.0         | 10.0                 | 130.0           | 115.0         | M8             |
| B   | 236.8           | 273.9         | 213.8         | 250.9      |                  |                 |                   |                                          |               |                      |                 |               |                |
| C   | 266.8           | 303.9         | 243.8         | 280.9      |                  |                 |                   |                                          |               |                      |                 |               |                |
| D   | 296.8           | 333.9         | 273.8         | 310.9      |                  |                 |                   |                                          |               |                      |                 |               |                |
| 142 | Unbraked length |               | Braked length |            | Flange thickness | Register length | Register diameter | Overall height                           | Flange square | Fixing hole diameter | Fixing hole PCD | Motor housing | Mounting bolts |
|     | LB (± 0.9)      | LC (± 1.0)    | LB (± 0.9)    | LC (± 1.0) | LA (± 0.5)       | T (± 0.1)       | N (j6)            | LD (± 0.3)                               | P (± 0.3)     | S (H14)              | M (± 0.5)       | PH (± 0.5)    |                |
| A   | 187.0           | 152.5         | 252.5         | 218.0      | 14.0             | 3.4             | 130.0             | 183.5<br>(Size 1)<br>204.5<br>(Size 1.5) | 142.0         | 12.0                 | 165.0           | 142.0         | M10            |
| B   | 217.0           | 182.5         | 282.5         | 248.0      |                  |                 |                   |                                          |               |                      |                 |               |                |
| C   | 247.0           | 212.5         | 312.5         | 278.0      |                  |                 |                   |                                          |               |                      |                 |               |                |
| D   | 277.0           | 242.5         | 342.5         | 308.0      |                  |                 |                   |                                          |               |                      |                 |               |                |
| E   | 307.0           | 272.5         | 372.5         | 338.0      |                  |                 |                   |                                          |               |                      |                 |               |                |
| 190 | Unbraked length |               | Braked length |            | Flange thickness | Register length | Register diameter | Overall height                           | Flange square | Fixing hole diameter | Fixing hole PCD | Motor housing | Mounting bolts |
|     | LB (± 0.9)      | LC (± 1.0)    | LB (± 0.9)    | LC (± 1.0) | LA (± 0.5)       | T (± 0.1)       | N (j6)            | LD (± 0.3)                               | P (± 0.3)     | S (H14)              | M (± 0.5)       | PH (± 0.5)    |                |
| A   | 190.6           | 161.1         | 289.1         | 259.6      | 18.5             | 3.9             | 180.0             | 252.5                                    | 190.3         | 14.5                 | 215.0           | 190.0         | M12            |
| B   | 220.6           | 191.1         | 319.1         | 289.6      |                  |                 |                   |                                          |               |                      |                 |               |                |
| C   | 250.6           | 221.1         | 349.1         | 319.6      |                  |                 |                   |                                          |               |                      |                 |               |                |
| D   | 280.6           | 251.1         | 379.1         | 349.6      |                  |                 |                   |                                          |               |                      |                 |               |                |
| E   | 310.6           | 281.1         | 409.1         | 379.6      |                  |                 |                   |                                          |               |                      |                 |               |                |
| F   | 340.6           | 311.1         | 439.1         | 409.6      |                  |                 |                   |                                          |               |                      |                 |               |                |





|     | Shaft diameter | Shaft length | Key height | Key length | Key to shaft end | Key width | Tapped hole thread size | Tapped hole depth |
|-----|----------------|--------------|------------|------------|------------------|-----------|-------------------------|-------------------|
|     | D (j6)         | E            | GA         | GF         | G                | F (h9)    | I                       | J ( $\pm 1$ )     |
| 067 | 14.0           | 30.0         | 16.0       | 25.0       | 1.5              | 5.0       | M5 x 0.8                | 13.5              |
| 089 | 19.0           | 40.0         | 21.5       | 32.0       | 3.7              | 6.0       | M6 x 1.0                | 17.0              |
| 115 | 24.0           | 50.0         | 27.0       | 40.0       | 5.3              | 8.0       | M8 x 1.25               | 20.0              |
| 142 | 32.0           | 58.0         | 35.0       | 50.0       | 3.0              | 10.0      | M12 x 1.75              | 29.0              |
| 190 | 38.0           | 80.0         | 41.0       | 70.0       | 4.6              | 10.0      | M12 x 1.75              | 29.0              |

NOTE: motor drawing is for dimensional purposes only, motors will differ in appearance.

# Performance Definitions

## Stall torque

This is the maximum torque within the continuous zone at zero speed. Maximum continuous torque ratings may be intermittently exceeded for short periods provided that the winding  $\Delta t$  max temperature is not exceeded.

$\Delta t$  max = 100 °C over a maximum ambient of 40 °C for Unimotor hd.

## Stall current

Stall current = Stall torque /  $k_t$   
Motor label and performance tables quote stall current when motor is at full power in a maximum ambient of 40 °C.

## Rated speed

This is the maximum speed of the motor within the continuous zone. The motor speed can be controlled to any speed subject to the voltage limits and drive constraints as shown by the intermittent zone on a motor performance graph.

## Ke voltage constant

This is the phase to phase rms voltage generated at the stator when the shaft is back driven at 1,000 rpm with the rotor at 20 °C.

## Kt torque constant

A brushless motor delivers torque proportional to the current, such that torque =  $K_t \times$  current.

Where  $K_t = 0.0165 \times K_e$  (at 20 °C).

Magnets used on all motors are affected by temperature such that  $K_e$  and  $K_t$  reduce with increasing temperatures of the magnets.

## Winding thermal time constant

The thermal time constant of the winding with respect to the stator temperature as a reference in the exponential temperature rise given by the formula:

Winding temperature at time  $t$  seconds =  $T_0 + T_1(1 - e^{-t/t_c})$

Where  $T_0$  is the initial temperature,  $T_1$  is the final winding temperature and  $t_c$  = thermal time constant (seconds)

Note that temperature = 63.2 % of  $T_1$  when  $t = t_c$ . A thermal protection trip is provided by the drive, based upon calculations using elapsed time, current measurement, and the parameter settings set by the user or directly from the motor map.

Unimotor hd windings are ultimately protected by thermistor devices in the winding overhangs. These must be connected to the appropriate drive inputs via the motor feedback signal connector.

## Rated power

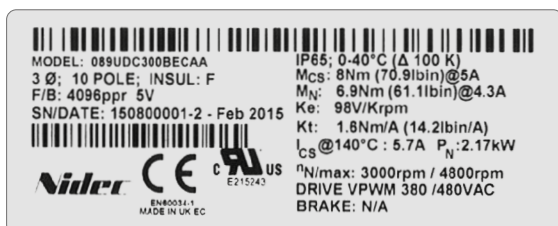
This is the product of the rated speed (radian/sec) and the rated torque (Nm) expressed in Watts (W)

## $\Delta t$ temperature

$\Delta t$  temperature is the temperature difference between the copper wires of the motor winding and the ambient air temperature surrounding the motor. The maximum  $\Delta t$  temperature permitted is 100 °C over a maximum ambient of 40 °C. (i.e. a maximum winding temperature of 140 °C)



# Nameplate definitions



**Model** Full part number of the motor

**3Ø** Indicates this is a 3 phase motor

**POLE** Number of poles:  
 060-190 – 10 poles – 5 pole pairs

**Insul** Windings are built to class F (155 °C)

**F/B** This gives the feedback device, count and working voltage or the feedback type

**S/N/DATE** The serial number and date the motor was manufactured

**IP** Ingress protection rating IP 65S

**M<sub>cs</sub>** The stall torque at stall current

**M<sub>N</sub>** The rated torque of the motor

**K<sub>t</sub>** This is the AC Volts per 1,000 rpm with the motor at 20 °C

**K<sub>t</sub>** Value shown is for the magnet's temperature at 20 °C

**I<sub>cs</sub>** The constant stall current at the maximum winding temperature of 140 °C

**P<sub>N</sub>** The rated power of the motor

• **n<sub>N</sub>/max** The rated speed/ this is the maximum speed allowed when taking into account these three factors:

- Max drive voltage
- Max encoder speed
- Max mechanical speed

**VPWM** This indicates that the motor is for use with a voltage pulse width modulated drive with the supply voltage shown

**Brake** The current, that rated torque and the operation voltage for the brake or N/A if the brake is not fitted

Electronic nameplate available.  
 Refer to factory for more information.

# Unimotor hd

# Motor derating

## Ambient temperatures

The ambient temperature around the motor must be taken into account. For ambient temperatures above 40 °C the torque must be derated using the following formula as a guideline. (Note: Only applies to 2,000/3,000 rpm motors and assumes copper losses dominate.)

**New derated torque = Specified torque x  $\sqrt{1 - ((\text{Ambient temperature} - 40^{\circ}\text{C}) / 100)}$**

For example with an ambient temperature of 76 °C the new derated torque will be 0.8 x specified value

## Thermal test conditions

The performance data shown has been recorded under the following conditions. Ambient temperature 20°C, with the motor mounted on a thermally isolated aluminium plate as shown below.

## Mounting arrangements

The motor torque must be derated if:

- The motor mounting surface is heated from an external source, such as a gearbox.
- The motor is connected to a poor thermal conductor.
- The motor is in a confined space with restricted air flow.

## Unimotor hd derate factors

| Switching frequency | 060  | 067  | 089  | 115  | 142  | 190  |
|---------------------|------|------|------|------|------|------|
| 3kHz                | n/a  | 0.93 | 0.89 | 0.89 | 0.83 | 0.9  |
| 4kHz                | n/a  | 0.94 | 0.91 | 0.92 | 0.85 | 0.95 |
| 6kHz                | n/a  | 0.95 | 0.95 | 0.96 | 0.88 | 1    |
| 8kHz                | 0.99 | 0.98 | 0.97 | 0.98 | 0.91 | 1    |
| 12/16kHz            | 1    | 1    | 1    | 1    | 1    | 1    |

**NOTE:** Only applies to motors up to 3,000 rpm (rms) or lower. Assumes copper losses dominate on all frame sizes. Derate factor is applied to stall torque, rated torque, stall current and rated power.

# Unimotor hd

## Brake specifications

Unimotor hd may be ordered with an internal rear mounted spring applied parking brake. The brake works on a failsafe principle. The brake is active when the supply voltage is switched off, and the brake is released when the supply voltage is switched on.

If a motor is fitted with a failsafe brake, take care not to subject the motor shaft to excessive torsional shocks or resonance when the brake is engaged or disengaged. Doing so can damage the brake.

### Safety note

The failsafe brake is for use as a holding brake with the motor shaft stationary. Do NOT use it as a dynamic brake. Using it in this manner will cause brake wear and eventual failure. Emergency Stop situations can contribute to brake wear and failure.



## Brake data

| Motor frame | Supply volts | Input power @ 20 °C | Static torque @120 °C<br>Parking Brake '6' | Release time | Moment of inertia  | Backlash * |
|-------------|--------------|---------------------|--------------------------------------------|--------------|--------------------|------------|
| Size        | Vdc          | Watts               | Nm                                         | ms nom.      | kg.cm <sup>2</sup> | Degrees *  |
| 060         | 24           | 7.2                 | 2                                          | 60           | 0.02               | 0.80°      |
| 067         | 24           | 15                  | 4                                          | 35.2         | 0.063              | 0.62°      |
| 089         | 24           | 18.5                | 10                                         | 72.8         | 0.259              | 0.45°      |
| 115         | 24           | 17.5                | 16                                         | 64           | 0.506              | 0.38°      |
| 142 (A-B)   | 24           | 17.5                | 16                                         | 64           | 0.506              | 0.38°      |

| Motor frame | Supply volts | Input power | Static torque @120 °C<br>Parking Brake '5' | Release time | Moment of inertia  | Backlash * |
|-------------|--------------|-------------|--------------------------------------------|--------------|--------------------|------------|
| Size        | Vdc          | Watts       | Nm                                         | ms nom.      | kg.cm <sup>2</sup> | Degrees *  |
| 142 (C-E)   | 24           | 25          | 38                                         | 95           | 1.85               | 0.77°      |
| 190 (A-D)   | 24           | 25          | 60                                         | 120          | 4.95               | 0.77°      |
| 190 (E-F)   | 24           | 54.5        | 90                                         | 250          | 7.72               | 0.75°      |

- \* Backlash figure will increase with time
- The brake is intended for parking duty and is not for dynamic or safety use.
- Refer to your Automation Center or Distributor if your application requires dynamic braking in emergency conditions.
- To provide protection to the brake control circuit it is recommended that a diode is connected across the output terminals of the solid state or relay contacts devices.
- Larger torque brakes are available as an option. Contact your Automation Center or Distributor for details.
- Unless otherwise stated, all figures are representative at 20 °C brake temperature.
- The brake will engage when power is removed.
- Multiply static torque value by 1.1x for minimum holding torque at 20-100°C

It is recommended to run extensive application validation testing and confirm the motor brake life span when the motor is mounted vertically and the motor runs through high acceleration and deceleration.

## Additional motor weights all figures are subject to a tolerance of (±10%)

| Motor frame size | 060     | 067     | 089    | 115     | 142     | 142    | 190    |
|------------------|---------|---------|--------|---------|---------|--------|--------|
| Frame length     | A to C  | A to D  | A to D | A to D  | A to B  | C to E | A to F |
| Braked '5' brake |         |         |        |         |         | +2.8kg | +4.0kg |
| Braked '6' brake | +0.28kg | +0.68kg | +1.4kg | +2.09kg | +2.29kg |        |        |
| Hybrid box       |         |         |        |         |         |        | +1.5kg |

## Feedback

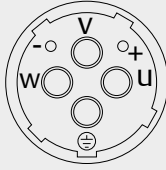
| Feedback device order code                                                                                            | Feedback type                              | Manufacturer | Encoder supply voltage   | SinCos cycle or incremental pulses per revolution | Resolution available to position loop <sup>2</sup> | Absolute multi-turn revolutions | Feedback accuracy <sup>1</sup> | Single cable connector available <sup>3</sup> | Serial communication protocol |
|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------|--------------------------|---------------------------------------------------|----------------------------------------------------|---------------------------------|--------------------------------|-----------------------------------------------|-------------------------------|
| 060 motors (refer to order codes page 7)                                                                              |                                            |              |                          |                                                   |                                                    |                                 |                                |                                               |                               |
| CN                                                                                                                    | Incremental Encoder                        | NMC          | 5 Vdc ± 10%              | 4096                                              | Medium 16384 (14 bits)                             | -                               | Low +/- 720"                   | -                                             | -                             |
| 060 - 067 motors (refer to order codes page 7)                                                                        |                                            |              |                          |                                                   |                                                    |                                 |                                |                                               |                               |
| AR                                                                                                                    | Resolver                                   | LTN RE – 15  | 7 Vdc<br>Excitation 5kHz | 1 Transformation ratio 0.5                        | Medium 16384 (14 bits)                             | -                               | Low +/- 600"                   | -                                             | -                             |
| EG<br>(Multi-turn)                                                                                                    | Inductive<br>EnDat Only                    | EQI 1131     | 3.6 - 14 Vdc             | N/A                                               | High<br>5.24 × 10 <sup>5</sup> (19 bits)           | 4096 (12 bits)                  | Medium +/- 120"                | 6 wire HMC6                                   | EnDat 2.2 / EnDat 22          |
| FG<br>(Single-turn)                                                                                                   |                                            | ECI 1119     |                          |                                                   |                                                    | -                               |                                |                                               |                               |
| Functional safety encoder option available on request from the factory – part number option code confirmed by factory |                                            |              |                          |                                                   |                                                    |                                 |                                |                                               |                               |
| 067 motors (refer to order codes page 7)                                                                              |                                            |              |                          |                                                   |                                                    |                                 |                                |                                               |                               |
| CR                                                                                                                    | Incremental Encoder                        | R35i         | 5 Vdc ± 10%              | 4096                                              | Medium 16384 (14 bits)                             | -                               | Medium +/- 150"                | -                                             | -                             |
| Not for 060 frame                                                                                                     |                                            |              |                          |                                                   |                                                    |                                 |                                |                                               |                               |
| 089 – 190 motors                                                                                                      |                                            |              |                          |                                                   |                                                    |                                 |                                |                                               |                               |
| AE                                                                                                                    | Resolver                                   | Size 52      | 6 Vdc<br>Excitation 6kHz | 1 Transformation ratio 0.31                       | Medium 16384 (14 bits)                             | -                               | Low +/- 720"                   | -                                             | -                             |
| CA                                                                                                                    | Incremental Encoder                        | CFS50        | 5 Vdc ± 10%              | 4096                                              | Medium 16384 (14 bits)                             | -                               | High +/- 60"                   | -                                             | -                             |
| EF<br>(Multi-turn)                                                                                                    | Inductive<br>EnDat<br>Functional<br>Safety | EQI 1331 FS  | 3.60 – 14 Vdc            | Serial<br>Only                                    | High<br>5.24 × 10 <sup>5</sup> (19 bits)           | 4096 (12 bits)                  | High +/- 65"                   | 6 wire HMC6                                   | EnDat 2.2 / EnDat 22          |
| FF<br>(Single-turn)                                                                                                   |                                            | ECI 1319 FS  |                          |                                                   |                                                    | -                               |                                |                                               |                               |
| GF<br>(Multi-turn)                                                                                                    |                                            | EQN 1337     |                          |                                                   |                                                    | 4096 (12 bits)                  |                                |                                               |                               |
| HF<br>(Single-turn)                                                                                                   | ECN 1325                                   | -            |                          |                                                   |                                                    |                                 |                                |                                               |                               |
| Functional safety encoder option available on request from the factory – part number option code confirmed by factory |                                            |              |                          |                                                   |                                                    |                                 |                                |                                               |                               |

<sup>1</sup> The information is supplied by the feedback device manufacturer and relates to it as a standalone device.

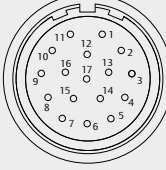
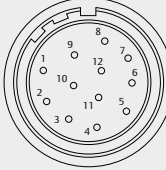
<sup>2</sup> The output from the resolver is an analogue output; the resolution is determined by the analogue to digital converter used.

<sup>3</sup> To be ordered with single cable connector, see connector options. 6 wire HMC6 must be ordered with KTY 84-130 thermistor, see inertia options.

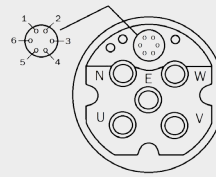
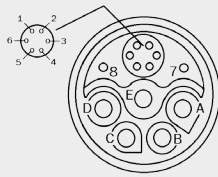
## Power Plug - Motor end

|  |             |               |  |             |               |
|-----------------------------------------------------------------------------------|-------------|---------------|------------------------------------------------------------------------------------|-------------|---------------|
| Size 1 - Type B                                                                   |             |               | Size 1.5 - Type J Connector                                                        |             |               |
| With brake                                                                        |             | Without brake | With brake                                                                         |             | Without brake |
| Pin                                                                               | Function    | Function      | Pin                                                                                | Function    | Function      |
| 1                                                                                 | Phase U (R) | Phase U (R)   | U                                                                                  | Phase U (R) | Phase U (R)   |
| 2                                                                                 | Phase V (S) | Phase V (S)   | V                                                                                  | Phase V (S) | Phase V (S)   |
| 3                                                                                 | Ground      | Ground        | ⊕                                                                                  | Ground      | Ground        |
| 4                                                                                 | Phase W (T) | Phase W (T)   | W                                                                                  | Phase W (T) | Phase W (T)   |
| 5                                                                                 | Brake       |               | +                                                                                  | Brake       |               |
| 6                                                                                 | Brake       |               | -                                                                                  | Brake       |               |
| Shell                                                                             | Screen      | Screen        | Shell                                                                              | Screen      | Screen        |

## Signal Plug - Motor end

|  |                   |  |                 |
|------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------|-----------------|
| SI                                                                                 |                   | SE                                                                                  | SR              |
| Incremental encoder (CA, CR)                                                       |                   | Heidenhain EnDat 2.2 only absolute encoders (EF, FF, EG, FG, GF, HF)                |                 |
| Pin                                                                                | Function          | Function                                                                            | Function        |
| 1                                                                                  | Thermistor        | Thermistor                                                                          | Excitation High |
| 2                                                                                  | Thermistor        | Thermistor                                                                          | Excitation Low  |
| 3                                                                                  |                   | Screen (Optical only)                                                               | Cos High        |
| 4                                                                                  | S1                |                                                                                     | Cos Low         |
| 5                                                                                  | S1 Inverse        |                                                                                     | Sin High        |
| 6                                                                                  | S2                |                                                                                     | Sin Low         |
| 7                                                                                  | S2 Inverse        |                                                                                     | Thermistor      |
| 8                                                                                  | S3                | + Clock                                                                             | Thermistor      |
| 9                                                                                  | S3 Inverse        | - Clock                                                                             |                 |
| 10                                                                                 | Channel A         |                                                                                     |                 |
| 11                                                                                 | Index             | + Data                                                                              |                 |
| 12                                                                                 | Index Inverse     | - Data                                                                              |                 |
| 13                                                                                 | Channel A Inverse |                                                                                     |                 |
| 14                                                                                 | Channel B         |                                                                                     |                 |
| 15                                                                                 | Channel B Inverse |                                                                                     |                 |
| 16                                                                                 | + V               | + V                                                                                 |                 |
| 17                                                                                 | 0 Volts           | 0 Volts                                                                             |                 |
| Body                                                                               | Screen            | Screen                                                                              |                 |

## Power & signal combined plug - Motor end



### Size 1 - Type D Connector & Type S Connector

Heidenhain EnDat 2.2 only absolute encoders  
(EF, FF, EG, FG, GF, HF)

### Size 1.5 - Type E Connector

Heidenhain EnDat 2.2 only absolute encoders  
(EF, FF, GF, HF)

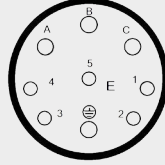
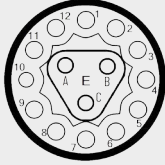
| Size 1 - Type D Connector & Type S Connector                            |                        |                           | Size 1.5 - Type E Connector                                     |                        |                           |
|-------------------------------------------------------------------------|------------------------|---------------------------|-----------------------------------------------------------------|------------------------|---------------------------|
| Heidenhain EnDat 2.2 only absolute encoders<br>(EF, FF, EG, FG, GF, HF) |                        |                           | Heidenhain EnDat 2.2 only absolute encoders<br>(EF, FF, GF, HF) |                        |                           |
| Pin                                                                     | With brake<br>Function | Without brake<br>Function | Pin                                                             | With brake<br>Function | Without brake<br>Function |
| 1                                                                       | + Volts                | + Volts                   | 1                                                               | + Volts                | + Volts                   |
| 2                                                                       | 0 Volts                | 0 Volts                   | 2                                                               | 0 Volts                | 0 Volts                   |
| 3                                                                       | + Data                 | + Data                    | 3                                                               | + Data                 | + Data                    |
| 4                                                                       | - Data                 | - Data                    | 4                                                               | - Data                 | - Data                    |
| 5                                                                       | + Clock                | + Clock                   | 5                                                               | + Clock                | + Clock                   |
| 6                                                                       | - Clock                | - Clock                   | 6                                                               | - Clock                | - Clock                   |
| 7                                                                       | - Brake                | -                         | N                                                               | -                      | -                         |
| 8                                                                       | + Brake                | -                         | U                                                               | Phase U (R)            | Phase U (R)               |
| A                                                                       | Phase U (R)            | Phase U (R)               | V                                                               | Phase V (S)            | Phase V (S)               |
| B                                                                       | Phase V (S)            | Phase V (S)               | PE                                                              | Ground                 | Ground                    |
| C                                                                       | Phase W (T)            | Phase W (T)               | W                                                               | Phase W (T)            | Phase W (T)               |
| D                                                                       | -                      | -                         | +                                                               | Brake                  | -                         |
| E                                                                       | Ground                 | Ground                    | -                                                               | Brake                  | -                         |

## 15 Way plug - drive end



| SI<br>Incremental encoders<br>(CA, CR) |                   | SE<br>EnDat 2.2 only absolute<br>encoders<br>(EF, FF, EG, FG, GF, HF) |            | SR<br>Resolvers<br>(AE, AR) |              |
|----------------------------------------|-------------------|-----------------------------------------------------------------------|------------|-----------------------------|--------------|
| Pin                                    | Function          | Pin                                                                   | Function   | Pin                         | Function     |
| 1                                      | Channel A         | 1                                                                     | + Data     | 1                           | + Cos        |
| 2                                      | Channel A Inverse | 2                                                                     | - Data     | 2                           | - Cos        |
| 3                                      | Channel B         | 3                                                                     | + Clock    | 3                           | + Sin        |
| 4                                      | Channel B Inverse | 4                                                                     | - Clock    | 4                           | - Sin        |
| 5                                      | Index             |                                                                       |            | 5                           | + Excitation |
| 6                                      | Index Inverse     |                                                                       |            | 6                           | - Excitation |
| 7                                      | S1                |                                                                       |            |                             |              |
| 8                                      | S1 Inverse        |                                                                       |            |                             |              |
| 9                                      | S2                |                                                                       |            |                             |              |
| 10                                     | S2 Inverse        |                                                                       |            |                             |              |
| 11                                     | S3                |                                                                       |            |                             |              |
| 12                                     | S3 Inverse        |                                                                       |            |                             |              |
| 13                                     | + V               | 13                                                                    | + V        |                             |              |
| 14                                     | 0 Volts           | 14                                                                    | 0 Volts    | 14                          | Thermistor   |
| 15                                     | Thermistor        | 15                                                                    | Thermistor | 15                          | Thermistor   |
| Body                                   | Screen            | Body                                                                  | Screen     | Body                        | Screen       |

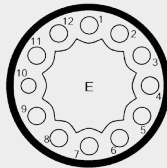
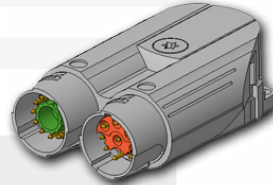
## Y-TEC Signal/Power plug- Motor end 060 frame



Signal - Type T Connector

Power - Type T connector

| (CN) |                   | With brake |              | Without brake |
|------|-------------------|------------|--------------|---------------|
| Pin  | Function          | Pin        | Function     | Function      |
| 1    | Ground            | A          | Phase U      | Phase U       |
| 2    | Channel A         | B          | Phase V      | Phase V       |
| 3    | Channel A Inverse | C          | Phase W      | Phase W       |
| 4    | Channel B         | 1          | Thermistor + | Thermistor +  |
| 5    | Channel B Inverse | 2          | Thermistor - | Thermistor -  |
| 6    | + V               | 3          | + V          |               |
| 7    | S1                | 4          | 0 Volts      |               |
| 8    | S2                | ⊕          | Ground       | Ground        |
| 9    | S3                |            |              |               |
| 10   | S1 Inverse        |            |              |               |
| 11   | S2 Inverse        |            |              |               |
| 12   | S3 Inverse        |            |              |               |
| A    | Index             |            |              |               |
| B    | Index Inverse     |            |              |               |
| C    | -                 |            |              |               |



Signal - Type T Connector

| (EG / FG) |          | Resolver        |
|-----------|----------|-----------------|
| Pin       | Function | Function        |
| 1         | + V      | -               |
| 2         | + Data   | -               |
| 3         | - Data   | -               |
| 4         | + Clock  | -               |
| 5         | - Clock  | -               |
| 6         | -        | Excitation Low  |
| 7         | 0 Volts  | -               |
| 8         | -        | Sin High        |
| 9         | -        | Sin Low         |
| 10        | -        | Cos High        |
| 11        | -        | Cos Low         |
| 12        | -        | Excitation High |

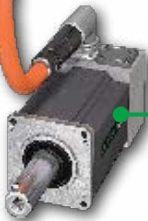
# Perfect combinations



## Digitax HD

Optimised for high-dynamic applications, Digitax HD provides the flexibility of both standalone and modular configurations. The drive offers full servo control plus open loop permanent magnet and induction motor control across four functionality levels: EtherCAT, MCI machine control, multiprotocol Ethernet and the flexible Base drive.

**For motors below 16A continuous stall current.**



## Unidrive M700

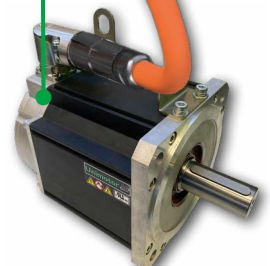
Unidrive M700 series provides high performance motor control and ultimate control flexibility in order to satisfy the requirements of machine builders and high specification industrial and hoisting applications.

**For motors 16A and above continuous stall current**



## Unimotor hd

Unimotor hd is Control Techniques' high dynamic brushless AC servo motor range. With high peak torque, low inertia and the most compact dimensions, Unimotor hd is optimized for applications requiring rapid acceleration and deceleration.



Please refer to the Digitax HD and Unidrive M brochures for more detailed information.







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...mental protection and  
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