# CONTROL TECHNIQUES™

## SERVO DRIVE SERIES
# DIGITAX HD

**Minimum size,
maximum performance**

6.2 lb-in – 451 lb-in
(0.7 Nm – 51 Nm)
with 1,354 lb-in peak
(153 Nm)

1.5 A – 16 A
with 48 A peak

200 V | 400 V

0.25 kW – 7.5 kW

## Nidec
~All for dreams

# Nidec

## All for dreams

# #1 for advanced motor and drive technology

Nidec Corporation is a global manufacturer of electric motors and drives. Founded in 1973, Nidec has worldwide operations and a workforce of more than 110,000 who develop, manufacture and install motors, drives and control systems in industrial plants, automobiles, home appliances, office equipment and information technology.

**110,000** EMPLOYEES WORLDWIDE

**$14.8B** GROUP TURNOVER

**70+** COUNTRIES

**250+** COMPANIES

# CONTROL TECHNIQUES™

## DRIVE SPECIALISTS SINCE 1973

Industries which require the use of electric motors, and therefore drives, will form the backbone of the world's economy in the future. We will put great emphasis on research and development. As an R&D engineer myself, I know that it is technology which will ensure our businesses succeed.

Shigenobu Nagamori, Founder of Nidec

**1,000+** OEM CUSTOMERS

**5M+** INSTALLED DRIVES

**1,600+** EMPLOYEES WORLDWIDE

**70** COUNTRIES

CONTROL TECHNIQUES™

## Outstanding performance

The outstanding performance of our drives is the fruit of over 45 years of engineering experience in drive design.

## Technology you can rely on

Robust design and the highest build quality ensure the enduring reliability of the millions of drives installed around the world.

## Open design architecture

Based on open design architecture, our drives integrate with all primary communication protocols.

## Global reach, local support

Highly experienced, locally based Application Engineers design and support drive technology to provide maximum value, wherever you are in the world.

## Embedded intelligence

Precision motor control is combined with the highest embedded intelligence, ensuring maximum productivity and efficiency of your machinery.

# Servo solutions for continuous and pulse duty applications

Control Techniques' servo solutions provide ultimate performance and flexibility for machinery manufacturers: a range of fully integrated drives from 0.25 kW through to 2.8 MW, from open loop motor control through to maximum performance servo control. With integrated motion control and PLC technology, matched motors plus a wide range of options to extend functionality and real time communications, Unidrive M700 and Digitax HD offer extensive scalability in a comprehensive drive range.

### Unidrive M700

Unidrive M700, with high performance and an extensive power range, is the ideal option for continuous duty applications, where precise, continuous torque delivery is required.

### Digitax HD

The new Digitax HD range brings ultimate performance to high dynamic, pulse duty applications, where high peak torque is required for fast acceleration.

### Unimotor

Unimotor is a comprehensive family of high performance AC brushless servo motors.

With a wide torque range, from 6.2 lb-in (.72 Nm) up to 1203 lb-in (136 Nm), rated speeds from 1000 rpm to 6000 rpm, several inertia levels and a broad selection of feedback options, Unimotor offers the perfect fit for any application requirement.

Various mounting arrangements and a single cable option provide additional flexibility, while drive integration with electronic nameplate offers ultimate ease of use.

| Drive Model | | Unidrive M700 **0.75 KW – 2.8 MW** | | Digitax HD **0.25 KW – 7.5 KW** | |
|---|---|---|---|---|---|
| **Control Modes** | Induction | • V/F<br>• Open loop vector | • RFC-A sensorless<br>• RFC-A closed loop | • V/F<br>• Open loop vector | • RFC-A sensorless<br>• RFC-A closed loop |
| | Permanent Magnet Motors | • RFC-S sensorless | • RFC-S closed loop | • RFC-S sensorless | • RFC-S closed loop |
| | | **2.2 A – 464 A 200% OVERLOAD** | | **1.5 A – 16 A 300% OVERLOAD** | |

**Motor Compatibility**

**Induction**
(Optimized with the US Motors® ACCU-Torq® range)

**Permanent Magnet**
(Optimized with the Leroy-Somer Dyneo® range)

**Continuous Duty Servo Range Unimotor FM**
(Optimized with the Control Techniques continuous duty drive)

**Pulse Duty Servo Range Unimotor HD**
(Optimized with the Control Techniques pulse duty drive)

RFC: Rotar Flux Control

# Digitax HD

Digitax HD extends the Unidrive M range with maximum servo performance in a minimum size package. Optimized 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 motor and induction motor control across four functionality levels: EtherCAT, MCi machine control, Ethernet and the flexible Base drive.

# 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.

**Actual size**



**Just 1.6 in (40 mm)**

# Minimum size
# servo solutions

### Reduce cost and maximize floor space

Minimal footprint and exceptional power density make Digitax HD one of the **smallest servo drives** on the market today. This means that you can build the most compact cabinets possible.

### The market's narrowest servo drive

- Digitax HD is just 1.6 in (40mm) wide
- 25 drives, up to 16A per channel, can fit in just 40 inches (1 meter) of cabinet space
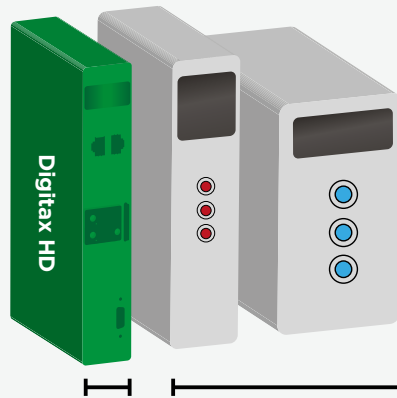


1.6 in (40mm)   Typical competitors

Install Digitax HD in a ← 8 inch → (200 mm) cabinet

### Drive dimensions at a glance

| Dimensions | Frame 1 | | Frame 2 | | Frame 3 | |
|---|---|---|---|---|---|---|
| | in | mm | in | mm | in | mm |
| Width | 1.6 | 40 | 1.6 | 40 | 1.6 | 40 |
| Depth | 6.9 | 174 | 6.9 | 174 | 6.9 | 174 |
| Height | 9.2 | 233 | 11.0 | 278 | 12.9 | 328 |
| Nominal current @ 400 V | 4.2 A | | 10.5 A | | 12.9 A | |
| Peak current @ 400 V | 12.6 A | | 31.5 A | | 48 A | |

# Reduce cabinet size
## with Ultraflow™ thermal management
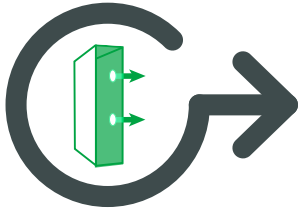
Reduce cabinet height by directly stacking rows of drives. Control Techniques' patented Ultraflow™ technology expels heat directly outside of the cabinet through the rear of the drive* and removes heat build-up in the cabinet.
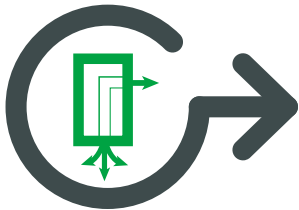
Combined with conformal coating, Ultraflow™ minimizes contamination risk as a result of guided internal airflow, which prevents ingress on drive circuits.
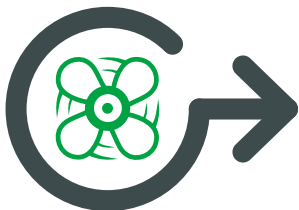
An intelligently controlled fan minimizes acoustic noise and optimizes fan lifetime, while contributing to the maximum thermal cooling by Ultraflow™.

Ultraflow™ requires only a 1.25 in (32 mm) hole in the cabinet meaning rapid, trouble-free installation**

*32mm*

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* Drive heat dissipation can also be achieved via vents on top of the drive, as standard.

** Frames 2 and 3 require 2 x 1.5 in ( 32 mm) holes

# From standalone...

## ...to a modular common dc bus system
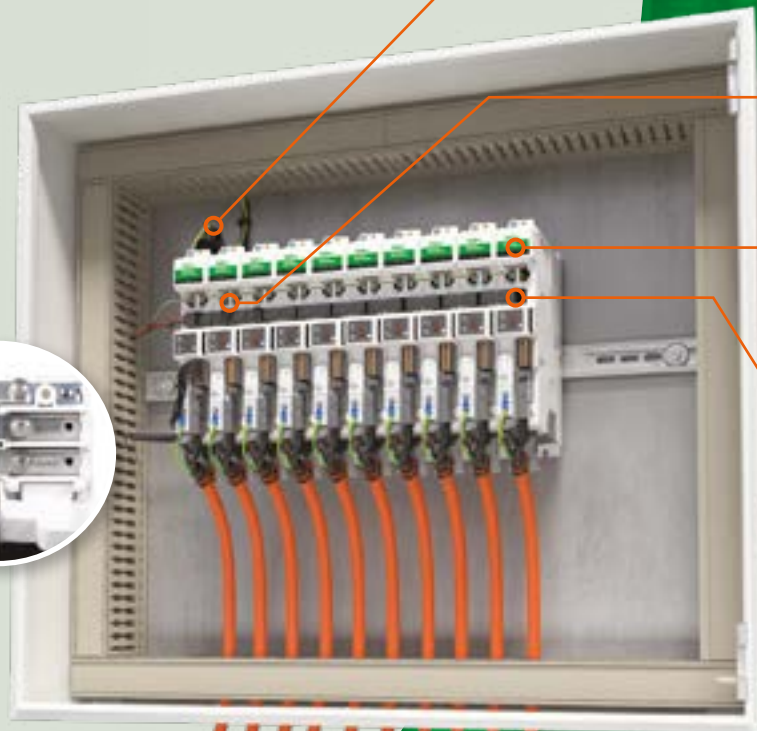
SINGLE AC INPUT

COMMUNICATION LINKS

COMMON DC BUS

24V LINKS
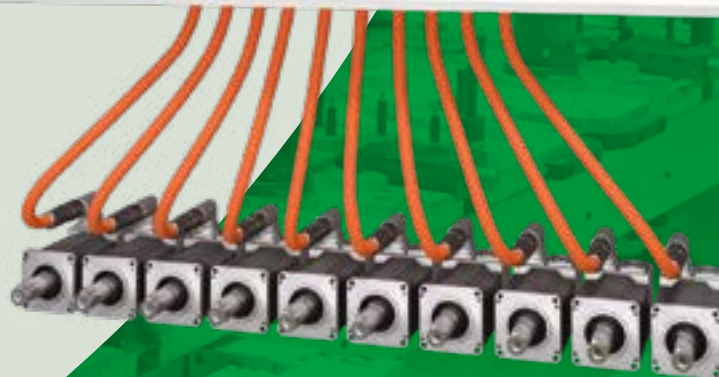
**PERFORMANCE**

**SPEED**
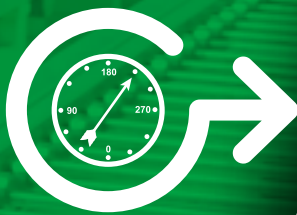
**PRECISION**

# Maximum performance
# servo solutions

## Boost throughput with maximum control

Optimized for high-dynamic applications and with high speed control loops, Digitax HD is one of the best performing servo drives on the market today. This means maximum throughput and product quality from your machines.

- 300 % peak current performance up to 250 ms
- Optimized control loops for high dynamic performance
  - 62.5 μs current loop
  - 250 μs position and speed loop
- Unique 'dead beat' current controller for maximum bandwidth
- Up to 16 kHz switching frequency (default ratings specified at 8 kHz)
- Notch filter for suppression of mechanical resonances

**Current**

**300 %**

**I rated**

**250 ms**

**Time**
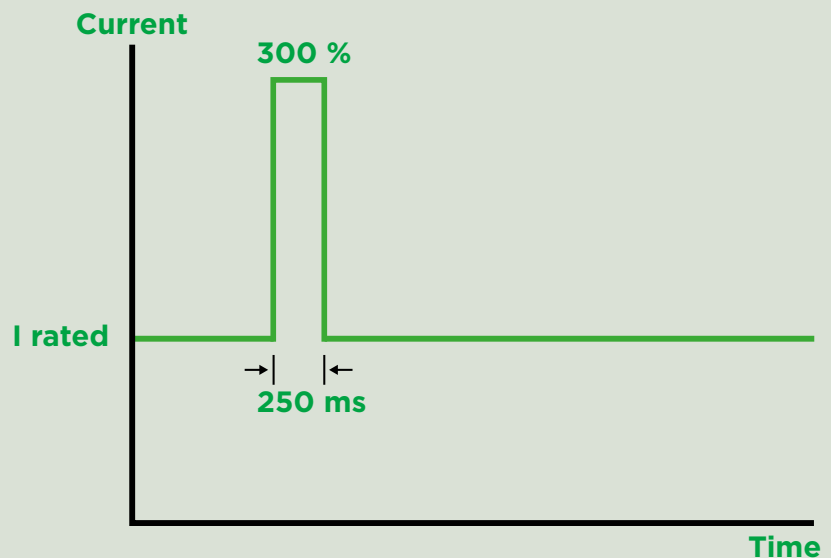
## Improving accuracy through precision encoder feedback

Flexible speed and position feedback interface supports a wide range of feedback technologies, from robust resolvers to high resolution encoders

- Up to three onboard encoder channels simultaneously e.g. 1 feedback encoder, 1 reference encoder and 1 simulated output
- Quadrature, SinCos (including absolute), SSI, BiSS, EnDat (up to 4 Mb with EnDat 2.2) and resolvers
- Simulated encoder output can provide position reference for CAMs, digital lock and electronic gearbox
- Up to 25 bit encoder resolution
- Feedback accuracy as low a ±20"

DIN rail alignment

Remote mountable, plain text, multi-language LCD keypad
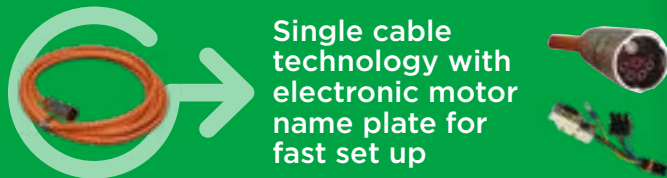
Single cable technology with electronic motor name plate for fast set up

Easy access pluggable connectors

Fast commissioning with PC tools or SD cards

Unimotor's electronic nameplate provides support for parameter set-up between motor and drive

# Rapid installation and commissioning

The multi-axis paralleling kit includes busbars for quick connection of DC bus and earth link, as well as Quick Links to distribute 24 V supply across drives.

- Reduces installation time and cost
- Improves energy efficiency and footprint

+ DC

- DC

24 V
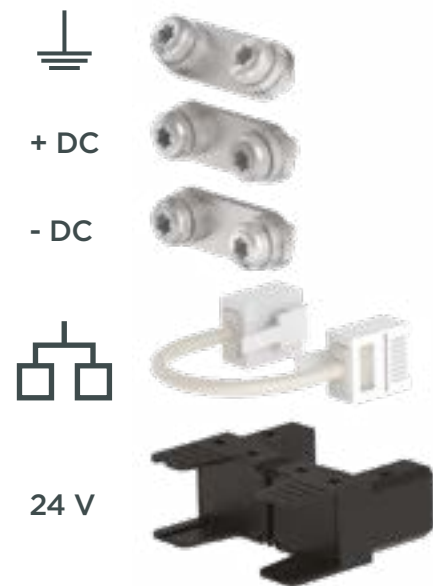
The display (built-in on M753, optional on M751) ensures access to drive diagnostics even in the absence of network connectivity.

Includes 2 rotary switches for hardware setting of the node address for faster commissioning of the motion network.

The 25 degree angle cutaway at the base of the drive ensures the same position for the motor power connector for all frame sizes, making cable routing easier and tidier.

Hook points for cable ties on the top, front and base of the drive for compact wire routing

External Brake Resistor Connector

AC input

Slotted holes to align drives if no DIN rail is used

DC Bus cover

UltraFlow™ Vent cover (optional)

Rear duct (optional) for Ultraflow™ thermal management technology

Screw slot allows a fixed hole pattern to fit any drive combination.

24 V Input

DIN rail alignment

Expandable SI-Option module slots

Communication ports

I/O

Easily replaceable fan

Dual Safe Torque Off (STO) inputs

SD card slot for local backup, quick drive replacement and repeat commissioning

Motor ground

Encoder input/output

Removable cable shield bracket for quick installation or replacement

● Easy access pluggable connectors

# Fast programming and commissioning

**SOFTWARE**

# Programming
# Machine Control Studio

Machine Control Studio, built using an IEC61131-3 programming environment, provides a flexible and intuitive environment for programming automation and motion control features.

## The software provides programming for:

- Onboard PLC
- Digitax M751 fitted with MCi200 or MCi210 integrated machine control modules
- Ethernet network data configurations

## IEC 61131-3 motion and automation programming

The programming environment is fully IEC 61131-3 compliant and therefore familiar, fast and easy to use for control engineers around the world.

The following IEC 61131-3 programming languages are supported:

- Structured Text (ST)
- Function Block Diagram (FBD)
- Structured Function Chart (SFC)
- Ladder Diagram (LD)
- Instruction List (IL)

## Also supported:

- Continuous Function Chart (CFC)
- Intuitive IntelliSense functionality helps to write consistent and robust programs speeding up software development
- Programmers have access to a vibrant Open-source community for function blocks
- Machine Control Studio also supports customers' own function block libraries

| Features | Digitax HD onboard PLC | MCi Option Module |
|---|---|---|
| Breakpoints | - | Yes |
| Source code upload/download | - | Yes |
| Online change | - | Yes |
| Trigonometric functions | - | Yes |
| 64 bit data types | - | Yes |
| Real-time task(s) | Yes (min 4ms) | Yes (min 250 µs) |
| Customizable drive menu | Yes | Yes |
| Variable tracing | - | Yes |
| Tasks available | 1 x Freewheeling task, 1 x Clock task | 1 x Freewheeling task, 1 x Position task, 1 x Initial task, 4 x Clock tasks, 1 x Error task, 4 x Event tasks |
| Centralized controller | - | Yes |
| Decentralized controller | Yes | Yes |

# Commissioning
# Connect

## The Connect PC tool is for rapid commissioning, plus optimizing and monitoring drive/system performance.

- Task-based drive operations are simplified with intuitive graphical tools in a familiar Windows environment
- Autotune ensures the best performance by measuring machine dynamics and automatically optimizing control loop gains
- CTScope – a realtime software oscilloscope – is supplied for tuning and monitoring
- Dynamic drive logic diagrams and enhanced searchable listings tool is scalable to match application requirements
- Multiple communications channels for a more complete overview of the system
- Drive discovery gives the ability to find drives on a network automatically without the user having to specify their addresses
- Offline configuration

## SD card

Standard SD cards can be used for quick and easy parameter and program storage.

## Drive Set-Up

Quickly find everything you need for quick and easy installation of your drives.

**Visit: www.drive-setup.com**

## Diagnostics tool

Quickly solve any error codes that the drive may show.

**You can download our Diagnostics Tool app at: www.controltechniques.com/ mobile-applications**
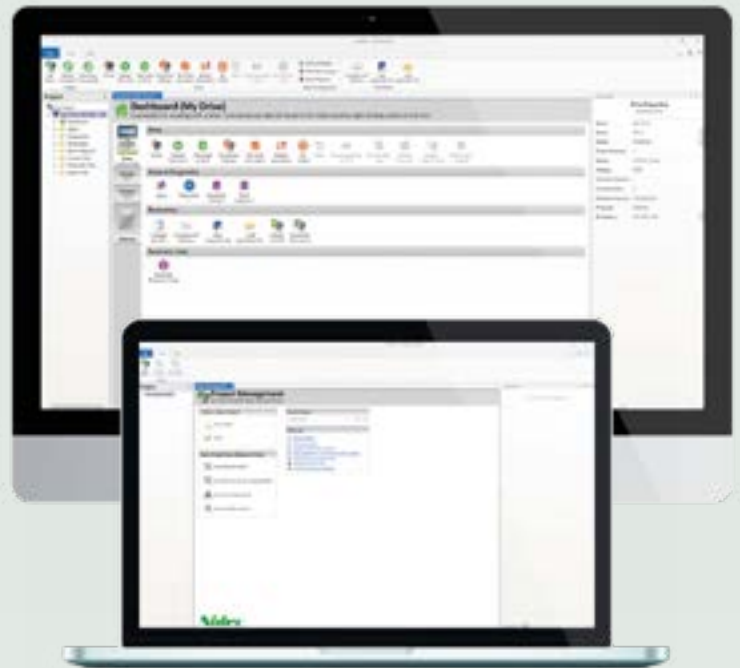
# M751 Base

## Base drive for configuration flexibility

### Digitax M751 flexibility

Two option slots for functionality extension and customization – refer to page 29 for the comprehensive option module list

Built-in RS485 communications

Onboard Advanced Motion Controller for distributed 1.5 axis motion control

Analog and pulse/direction control for centralized motion

Reduced downtime with machine safety
- Integrated Dual Safe Torque Off
- Meets SIL3 (Safety Integrity Level 3) and PLe (Performance Level e)

### Advanced Motion Controller onboard

Advanced 1.5 axes motion controller, key features include:
- Real-time tasks
- 250 µs cycle time
- Motion profile generator
- Electronic gearbox
- Interpolated CAM
- Homing functions
- High speed position freeze

Can be configured using the Connect PC tool or the remote keypad

SIL3
Safety Integrity Level

TÜV
SÜD
tuvsud.com/
ps-cert

# M751 + MCi210

## Intelligent drive for decentralized motion applications

### Digitax M751 plus MCi210 Machine Control

MCi210 Machine Control module for complete standalone capability, removing the need for an external controller

Provides a complete machine or sectional control solution

Faster throughput due to position loop @ 50 µs and use of Real Time Motion over Ethernet

Synchronized peer-to-peer communication over Ethernet

Single drive with MCi210 can control multiple axes using RTMoE (see page 18)

Programmable with IEC61131 standard languages using Machine Control Studio

Reduced downtime with machine safety
- Integrated Dual Safe Torque Off
- Meets SIL3 (Safety Integrity Level 3) and PLe (Performance Level e)

### MCi210 features

Two Ethernet ports with an internal switch

Support for standard Ethernet protocols, along with RTMoE for PTP (IEEE 1588) synchronization

Modbus TCP/IP master (up to 5 nodes)

Parallel interface with drive processor provides faster data exchange

# M751
## + SI-Ethernet

## Network drive for centralized and decentralized motion applications

### Digitax M751 plus SI-Ethernet

Support of real-time Ethernet (IEEE 1588 V2 Precision Time Protocol), HTTP, SMTP, EtherNet/IP and Modbus TCP/IP

Onboard advanced motion controller for distributed 1.5 axis motion control (see M751 Base, page 16, for more details)

Synchronized peer-to-peer communication over Ethernet

Reduced downtime with machine safety
- Integrated Dual Safe Torque Off
- Meets SIL3 (Safety Integrity Level 3) and PLe (Performance Level e)

### Open, efficient, synchronized Ethernet

Maximize machine productivity through high performance deterministic Ethernet

Access future developments in IT-based industries where billions of nodes are installed, future proofing your investments

Ethernet web pages hosted on the SI-Ethernet option module

### RTMoE

Digitax HD's standard Ethernet also supports RTMoE (Real-Time Motion over Ethernet) which provides synchronized communication between drives using the Precision Time Protocol as defined by IEEE1588 V2:

Distributed clocks are used to automatically synchronize the position, speed and current loops across all drives

1 ms cycle time for synchronous cyclic data

High speed network synchronization of less than 1 μs jitter (typically <200 ns) and 1 ms cycle time for synchronous cyclic data

I 4.0 READY

SIL3 Safety Integrity Level

TÜV SÜD
tuvsud.com/ps-cert

# M753
## EtherCAT

## EtherCAT device for centralized motion control applications

### Digitax M753 EtherCAT

Digitax M753 features an integrated 2-port EtherCAT switch for easy integration in centralized motion control applications

EoE (Ethernet over EtherCAT) support allows PC tool connection for commissioning and monitoring over the EtherCAT network

The station alias can be dynamically assigned by the EtherCAT master, or hardwired with the two rotary switches built in the display

An optional RS485 adaptor is available, providing a back-up PC tool connection in case of network failure

### High performance with flexibility

Operate with any automation product via EtherCAT

- Operate with motion controllers, motion PLCs and Industrial PCs via built-in EtherCAT
- Dual 100Mbps EtherCAT interfaces for use with in-line topologies
- Non-cyclic data communication using the CoE mailbox

Flexibility for all applications achieved through full access to drive functions

- CANopen over EtherCAT (CoE) including:
  - > CIA-402 profile
  - > Cyclic sync position mode
  - > Interpolated position mode
  - > Velocity mode
  - > Profile torque mode
  - > SDO access to all profile objects and drive parameters

Reduced downtime with machine safety

- Integrated Dual Safe Torque Off
- Meets SIL3 (Safety Integrity Level 3) and PLe (Performance Level e)

SIL3
Safety Integrity Level

TÜV SÜD
tuvsud.com/ps-cert

# Option module **flexibility**

Our innovative design means you only increase drive size when option modules are used, therefore **achieving significant space saving** in the overall configuration.

Adding the option mounting bracket **only adds an additional 0.86 in (22 mm) width**, providing a highly competitive maximum drive width of 2.44 in (62 mm).

# Option modules

**Digitax HD** supports a range of communications, I/O, feedback and machine control option modules.

## Feedback

**SI-Universal Encoder**
Encoder input and output interface supporting Quadrature, SinCos, EnDat and SSI encoders.

**SI-Encoder**
Quadrature encoder input interface module.

## I/O

**SI-I/O**
Extended I/O interface module to increase the number of I/O analog and digital points on a drive.

## Communications

**SI-EtherCAT**

**SI-PROFINET**

**SI-Ethernet\***

**SI-DeviceNet**

**SI-CANopen**

**SI-PROFIBUS**

## Applications with PLC or Motion Functionality

**MCi200**

Advanced machine control using industry standard IEC61131-3 programming languages

**MCi210**

Extended advanced machine control using industry standard IEC61131-3 programming languages and integrated Ethernet connectivity

**SI-Apps Compact**

Compatible module allows SyPTPro application programs to be re-compiled for use with Digitax HD

\* Support of RTMoE (Real-Time Ethernet over Ethernet), HTTP, SMTP, EtherNet/IP and Modbus TCP/IP

# Unimotor HD High dynamic servo motor for pulse duty applications

## Unimotor HD – high dynamic servo motor for pulse duty applications

6.2 lb-in to 752 lb-in (0.7 Nm to 85.0 Nm)
2257 lb-in peak (255.0 Nm)

Unimotor HD is a high dynamic brushless AC servo motor range designed for use in pulse duty applications where rapid acceleration and deceleration is required.

### High torque to inertia ratio

Unimotor HD has a high power to weight ratio, meaning that it can be easily integrated into the smallest, most demanding applications such as industrial robotics, pick & place and packaging.

- **Patented rotor technology – High torque to inertia ratio for high dynamic performance**

- Compact but powerful

- **Parking brake available**

- IP65 conformance: sealed against water spray and dust when mounted and connected

- **Segmented stator design for high power density and compactness**

- Supported by rigorous testing for performance and reliability

- **Windings to suit 400 V and 200 V class drives**

- Rated speeds include 1,000 rpm – 6,000 rpm depending on motor size

- **Customized motor build available**
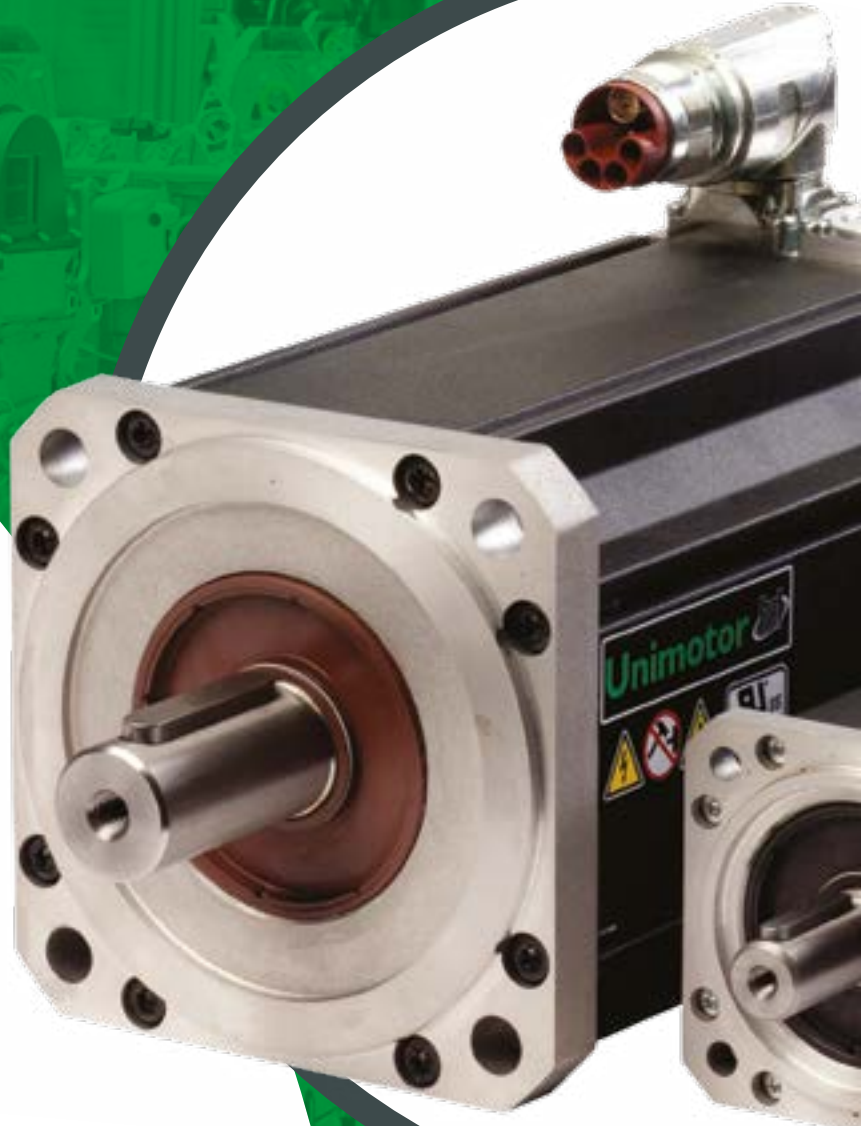
**DATA**

# Order information
# and technical data

# Digitax HD & Unimotor HD
# motor and drive combinations

400 V range – 6.2 lb-in to 451 lb-in (0.7 Nm to 51 Nm) stall
1354 lb-in (153 Nm) peak

200 V range – 6.2 lb-in to 398 lb-in (0.7 Nm to 45 Nm) stall
1186 lb-in (134 Nm) peak

Torque

| Torque axis | |
|---|---|
| 8850 lb-in | 1000.00 Nm |
| 885.0 lb-in | 100.00 Nm |
| 88.50 lb-in | 10.00 Nm |
| 8.85 lb-in | 1.00 Nm |
| 0.89 lb-in | 0.10 Nm |

**1000 rpm**
- 200 V: 1187.8 (134.2), 395.6 (44.7), 201.8 (22.8)
- 400 V: 1355 (153.1), 451.4 (51.0), 201.8 (22.8)

**1500 rpm** (400 V column shown above)

**2000 rpm**
- 200 V: 594.8 (67.2), 198.3 (22.4), 88.5 (10.0)
- 400 V: 917.8 (103.7), 306.2 (34.6), 88.5 (10.0)

**3000 rpm**
- 200 V: 394.7 (44.6), 131.9 (14.9), 6.2 (0.7)
- 400 V: 679.7 (76.8), 226.6 (25.6), 6.2 (0.7)

**4000 rpm**
- 200 V: 206.2 (23.3), 69.0 (7.8), 27.4 (3.1)
- 400 V: 206.2 (23.3), 69.0 (7.8), 27.4 (3.1)

**6000 rpm**
- 200 V: 200.0 (22.6), 66.4 (7.5), 6.2 (0.7)
- 400 V: 206.2 (23.3), 69.0 (7.8), 6.2 (0.7)

Legend:
- Stall torque 200 V
- Peak torque 200 V
- Stall torque 400 V
- Peak torque 400 V

Speed (rpm) and input voltage (V)

**200V Three phase**

| | | | Nominal speed 6000 rpm - 300% overload | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Motor | Drive | Hybrid Cable | Stall Torque | | Peak Torque | | Inertia | | Drive Capacitance [µF] | Cont. Power [kW] | Time to 6000 rpm [ms]* |
| | | | [lb-in] | [Nm] | [lb-in] | [Nm] | [lb-in-sec²] | [kg·cm²] | | | |
| HD055EDA60 | M75x-01200022 | HYBAxAxxx | 6.1 | 0.69 | 18.6 | 2.1 | 0.00012 | 0.14 | 580 | 0.05 | 8.5 |
| HD055EDB60 | M75x-01200040 | HYBAxAxxx | 9.7 | 1.1 | 30.1 | 3.4 | 0.00022 | 0.25 | 580 | 0.09 | 9.2 |
| HD055EDC60 | M75x-01200040 | HYBAxAxxx | 14.2 | 1.6 | 42.5 | 4.8 | 0.00032 | 0.36 | 580 | 0.12 | 9.5 |
| HD067EDA60 | M75x-01200040 | HYBAxAxxx | 12.4 | 1.4 | 38.1 | 4.3 | 0.00027 | 0.3 | 580 | 0.1 | 8.8 |
| HD067EDB60 | M75x-01200065 | HYBAxAxxx | 22.1 | 2.5 | 66.4 | 7.5 | 0.00047 | 0.53 | 580 | 1.4 | 8.9 |
| HD089EDA60 | M75x-02200090 | HYBAxAxxx | 27.4 | 3.1 | 82.3 | 9.3 | 0.00077 | 0.87 | 1160 | 1.7 | 11.7 |
| HD089EDB60 | M75x-02200120 | HYBAxAxxx | 46.9 | 5.3 | 141.6 | 16 | 0.00142 | 1.6 | 1160 | 2.4 | 12.6 |
| HD089EDC60 | M75x-03200160 | HYBBxAxxx | 66.4 | 7.5 | 200.0 | 22.6 | 0.00204 | 2.3 | 1880 | 3.1 | 13.0 |

| | | | Nominal speed 4000 rpm - 300% overload | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Motor | Drive | Hybrid Cable | Stall Torque | | Peak Torque | | Inertia | | Drive Capacitance [µF] | Cont. Power [kW] | Time to 4000 rpm [ms]* |
| | | | [lb-in] | [Nm] | [lb-in] | [Nm] | [lb-in-sec²] | [kg·cm²] | | | |
| HD089EDA40 | M75x-01200065 | HYBAxAxxx | 27.4 | 3.1 | 82.3 | 9.3 | 0.00077 | 0.87 | 580 | 1.2 | 7.8 |
| HD089EDB40 | M75x-02200090 | HYBAxAxxx | 46.9 | 5.3 | 141.6 | 16 | 0.00142 | 1.6 | 1160 | 1.9 | 8.4 |
| HD089EDC40 | M75x-02200120 | HYBAxAxxx | 69.0 | 7.8 | 206.2 | 23.3 | 0.00204 | 2.3 | 1160 | 2.7 | 8.4 |

| | | | Nominal speed 3000 rpm - 300% overload | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Motor | Drive | Hybrid Cable | Stall Torque | | Peak Torque | | Inertia | | Drive Capacitance [µF] | Cont. Power [kW] | Time to 3000 rpm [ms]* |
| | | | [lb-in] | [Nm] | [lb-in] | [Nm] | [lb-in-sec²] | [kg·cm²] | | | |
| HD055EDA30 | M75x-01200022 | HYBAxAxxx | 6.1 | 0.69 | 18.6 | 2.1 | 0.00012 | 0.14 | 580 | 0.05 | 4.2 |
| HD055EDB30 | M75x-01200022 | HYBAxAxxx | 9.7 | 1.1 | 30.1 | 3.4 | 0.00022 | 0.25 | 580 | 0.09 | 4.6 |
| HD067EDA30 | M75x-01200022 | HYBAxAxxx | 12.4 | 1.4 | 38.1 | 4.3 | 0.00027 | 0.3 | 580 | 0.1 | 4.4 |
| HD055EDC30 | M75x-01200022 | HYBAxAxxx | 14.2 | 1.6 | 42.5 | 4.8 | 0.00032 | 0.36 | 580 | 0.12 | 4.8 |
| HD067EDB30 | M75x-01200040 | HYBAxAxxx | 22.1 | 2.5 | 66.4 | 7.5 | 0.00047 | 0.53 | 580 | 0.18 | 4.4 |
| HD089EDA30 | M75x-01200065 | HYBAxAxxx | 27.4 | 3.1 | 82.3 | 9.3 | 0.00077 | 0.87 | 580 | 0.3 | 5.9 |
| HD067EDC30 | M75x-01200040 | HYBAxAxxx | 31.9 | 3.6 | 96.5 | 10.9 | 0.00066 | 0.75 | 580 | 1.1 | 4.3 |
| HD089EDB30 | M75x-01200065 | HYBAxAxxx | 46.9 | 5.3 | 141.6 | 16 | 0.00142 | 1.6 | 580 | 1.5 | 6.3 |
| HD089EDC30 | M75x-02200090 | HYBAxAxxx | 69.0 | 7.8 | 206.2 | 23.3 | 0.00204 | 2.3 | 1160 | 2.1 | 6.3 |
| HD115EDB30 | M75x-02200120 | HYBAxAxxx | 88.5 | 10 | 265.5 | 30 | 0.00389 | 4.4 | 1160 | 2.4 | 9.2 |
| HD115EDC30 | M75x-03200160 | HYBBxAxxx | 126.6 | 14.3 | 379.7 | 42.9 | 0.00566 | 6.4 | 1880 | 3.2 | 9.4 |
| HD142EDC30 | M75x-03200160 | HYBBxAxxx | 131.9 | 14.9 | 394.7 | 44.6 | 0.01505 | 17 | 1880 | 4.7 | 23.9 |

| | | | Nominal speed 2000 rpm - 300% overload | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Motor | Drive | Hybrid Cable | Stall Torque | | Peak Torque | | Inertia | | Drive Capacitance [µF] | Cont. Power [kW] | Time to 2000 rpm [ms]* |
| | | | [lb-in] | [Nm] | [lb-in] | [Nm] | [lb-in-sec²] | [kg·cm²] | | | |
| HD115EDB20 | M75x-02200090 | HYBAxAxxx | 88.5 | 10 | 265.5 | 30 | 0.00389 | 4.4 | 1160 | 1.8 | 6.2 |
| HD115EDC20 | M75x-02200120 | HYBAxAxxx | 126.6 | 14.3 | 379.7 | 42.9 | 0.00566 | 6.4 | 1160 | 2.4 | 6.2 |
| HD115EDD20 | M75x-03200160 | HYBBxAxxx | 162.9 | 18.4 | 489.4 | 55.3 | 0.00743 | 8.4 | 1880 | 3.2 | 6.4 |
| HD142EDC20 | M75x-03200160 | HYBBxAxxx | 198.3 | 22.4 | 594.8 | 67.2 | 0.01505 | 17 | 1880 | 4.1 | 10.6 |

| | | | Nominal speed 1000 rpm - 300% overload | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Motor | Drive | Hybrid Cable | Stall Torque | | Peak Torque | | Inertia | | Drive Capacitance [µF] | Cont. Power [kW] | Time to 1000 rpm [ms]* |
| | | | [lb-in] | [Nm] | [lb-in] | [Nm] | [lb-in-sec²] | [kg·cm²] | | | |
| HD142EDC10 | M75x-02200090 | HYBAxAxxx | 201.8 | 22.8 | 604.5 | 68.3 | 0.01505 | 17 | 1160 | 2.2 | 5.2 |
| HD142EDD10 | M75x-02200120 | HYBAxAxxx | 254.0 | 28.7 | 761.2 | 86 | 0.01956 | 22.1 | 1160 | 2.8 | 5.4 |
| HD142EDE10 | M75x-03200160 | HYBBxAxxx | 306.2 | 34.6 | 917.8 | 103.7 | 0.02407 | 27.2 | 1880 | 3.3 | 5.5 |
| HD190EDC10 | M75x-03200160 | HYBBxAxxx | 395.6 | 44.7 | 1187.8 | 134.2 | 0.04832 | 54.6 | 1880 | 4.7 | 8.5 |

For drive ratings, please see page 34 and motor ratings from page 38 to 43

* Acceleration time to nominal speed is based on 1:1 motor to load inertia ratio

**400V Three phase**

| Motor | Drive | Hybrid Cable | Stall Torque | | Peak Torque | | Inertia | | Drive Capacitance [µF] | Cont. Power [kW] | Time to 6000 rpm [ms]* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | [lb-in] | [Nm] | [lb-in] | [Nm] | [lb-in-sec²] | [kg·cm²] | | | |

**Nominal speed 6000 rpm - 300% overload**

| Motor | Drive | Hybrid Cable | [lb-in] | [Nm] | [lb-in] | [Nm] | [lb-in-sec²] | [kg·cm²] | Drive Capacitance [µF] | Cont. Power [kW] | Time to 6000 rpm [ms]* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HD055UDA60 | M75x-01400015 | HYBAxAxxx | 6.1 | 0.69 | 18.6 | 2.1 | 0.00012 | 0.14 | 110 | 0.05 | 8.5 |
| HD055UDB60 | M75x-01400015 | HYBAxAxxx | 9.7 | 1.1 | 30.1 | 3.4 | 0.00022 | 0.25 | 110 | 0.09 | 9.2 |
| HD055UDC60 | M75x-01400030 | HYBAxAxxx | 14.2 | 1.6 | 42.5 | 4.8 | 0.00032 | 0.36 | 110 | 0.12 | 9.5 |
| HD067UDA60 | M75x-01400030 | HYBAxAxxx | 12.4 | 1.4 | 38.1 | 4.3 | 0.00027 | 0.3 | 110 | 0.1 | 8.8 |
| HD067UDB60 | M75x-01400042 | HYBAxAxxx | 22.1 | 2.5 | 66.4 | 7.5 | 0.00047 | 0.53 | 110 | 1.4 | 8.9 |
| HD067UDC60 | M75x-02400060 | HYBAxAxxx | 31.9 | 3.6 | 96.5 | 10.9 | 0.00066 | 0.75 | 290 | 1.9 | 8.7 |
| HD089UDA60 | M75x-01400042 | HYBAxAxxx | 27.4 | 3.1 | 82.3 | 9.3 | 0.00077 | 0.87 | 110 | 1.7 | 11.7 |
| HD089UDB60 | M75x-02400080 | HYBAxAxxx | 46.9 | 5.3 | 141.6 | 16 | 0.00142 | 1.6 | 290 | 2.4 | 12.6 |
| HD089UDC60 | M75x-02400105 | HYBBxAxxx | 69.0 | 7.8 | 206.2 | 23.3 | 0.00204 | 2.3 | 290 | 3.1 | 12.6 |

**Nominal speed 4000 rpm - 300% overload**

| Motor | Drive | Hybrid Cable | [lb-in] | [Nm] | [lb-in] | [Nm] | [lb-in-sec²] | [kg·cm²] | Drive Capacitance [µF] | Cont. Power [kW] | Time to 4000 rpm [ms]* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HD089UDA40 | M75x-01400030 | HYBAxAxxx | 27.4 | 3.1 | 82.3 | 9.3 | 0.00077 | 0.87 | 110 | 1.2 | 7.8 |
| HD089UDB40 | M75x-02400060 | HYBAxAxxx | 46.9 | 5.3 | 141.6 | 16 | 0.00142 | 1.6 | 290 | 1.9 | 8.4 |
| HD089UDC40 | M75x-02400080 | HYBAxAxxx | 69.0 | 7.8 | 206.2 | 23.3 | 0.00204 | 2.3 | 290 | 2.7 | 8.4 |

**Nominal speed 3000 rpm - 300% overload**

| Motor | Drive | Hybrid Cable | [lb-in] | [Nm] | [lb-in] | [Nm] | [lb-in-sec²] | [kg·cm²] | Drive Capacitance [µF] | Cont. Power [kW] | Time to 3000 rpm [ms]* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HD055UDA30 | M75x-01400015 | HYBAxAxxx | 6.1 | 0.69 | 18.6 | 2.1 | 0.00012 | 0.14 | 110 | 0.05 | 4.2 |
| HD055UDB30 | M75x-01400015 | HYBAxAxxx | 9.7 | 1.1 | 30.1 | 3.4 | 0.00022 | 0.25 | 110 | 0.09 | 4.6 |
| HD055UDC30 | M75x-01400015 | HYBAxAxxx | 14.2 | 1.6 | 42.5 | 4.8 | 0.00032 | 0.36 | 110 | 0.12 | 4.8 |
| HD067UDA30 | M75x-01400030 | HYBAxAxxx | 12.4 | 1.4 | 38.1 | 4.3 | 0.00027 | 0.3 | 110 | 0.1 | 4.4 |
| HD067UDB30 | M75x-01400015 | HYBAxAxxx | 21.2 | 2.4 | 63.7 | 7.2 | 0.00047 | 0.53 | 110 | 0.18 | 4.6 |
| HD067UDC30 | M75x-01400030 | HYBAxAxxx | 31.9 | 3.6 | 96.5 | 10.9 | 0.00066 | 0.75 | 110 | 1.1 | 4.3 |
| HD089UDA30 | M75x-01400030 | HYBAxAxxx | 27.4 | 3.1 | 82.3 | 9.3 | 0.00077 | 0.87 | 110 | 0.3 | 5.9 |
| HD089UDB30 | M75x-01400042 | HYBAxAxxx | 46.9 | 5.3 | 141.6 | 16 | 0.00142 | 1.6 | 110 | 1.5 | 6.3 |
| HD089UDC30 | M75x-02400060 | HYBAxAxxx | 69.0 | 7.8 | 206.2 | 23.3 | 0.00204 | 2.3 | 290 | 2.1 | 6.3 |
| HD115UDB30 | M75x-02400080 | HYBAxAxxx | 88.5 | 10 | 265.5 | 30 | 0.00389 | 4.4 | 290 | 2.4 | 9.2 |
| HD115UDC30 | M75x-02400105 | HYBBxAxxx | 126.6 | 14.3 | 379.7 | 42.9 | 0.00566 | 6.4 | 290 | 3.2 | 9.4 |
| HD115UDD30 | M75x-03400135 | HYBBxAxxx | 162.9 | 18.4 | 489.4 | 55.3 | 0.00743 | 8.4 | 470 | 4.2 | 9.5 |
| HD142UDC30 | M75x-03400160 | HYBBxAxxx | 201.8 | 22.8 | 604.5 | 68.3 | 0.01505 | 17 | 470 | 5.3 | 15.7 |
| HD142UDD30 | M75x-03400160 | HYBBxAxxx | 226.6 | 25.6 | 679.7 | 76.8 | 0.01956 | 22.1 | 470 | 6 | 18.1 |

**Nominal speed 2000 rpm - 300% overload**

| Motor | Drive | Hybrid Cable | [lb-in] | [Nm] | [lb-in] | [Nm] | [lb-in-sec²] | [kg·cm²] | Drive Capacitance [µF] | Cont. Power [kW] | Time to 2000 rpm [ms]* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HD115UDB20 | M75x-01400042 | HYBAxAxxx | 88.5 | 10 | 265.5 | 30 | 0.00389 | 4.4 | 110 | 1.8 | 6.2 |
| HD115UDC20 | M75x-02400060 | HYBAxAxxx | 126.6 | 14.3 | 379.7 | 42.9 | 0.00566 | 6.4 | 290 | 2.4 | 6.2 |
| HD115UDD20 | M75x-02400080 | HYBAxAxxx | 162.9 | 18.4 | 489.4 | 55.3 | 0.00743 | 8.4 | 290 | 3.2 | 6.4 |
| HD142UDC20 | M75x-02400105 | HYBBxAxxx | 201.8 | 22.8 | 604.5 | 68.3 | 0.01505 | 17 | 290 | 4.1 | 10.4 |
| HD142UDD20 | M75x-03400135 | HYBBxAxxx | 254.0 | 28.7 | 761.2 | 86 | 0.01956 | 22.1 | 470 | 4.9 | 10.8 |
| HD142UDE20 | M75x-03400160 | HYBBxAxxx | 306.2 | 34.6 | 917.8 | 103.7 | 0.02407 | 27.2 | 470 | 5.6 | 11 |

**Nominal speed 1000 rpm - 300% overload**

| Motor | Drive | Hybrid Cable | [lb-in] | [Nm] | [lb-in] | [Nm] | [lb-in-sec²] | [kg·cm²] | Drive Capacitance [µF] | Cont. Power [kW] | Time to 1000 rpm [ms]* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HD142UDC15 | M75x-02400080 | HYBAxAxxx | 201.8 | 22.8 | 604.5 | 68.3 | 0.01505 | 17 | 290 | 3.2 | 7.8 |
| HD142UDD15 | M75x-02400105 | HYBBxAxxx | 254.0 | 28.7 | 761.2 | 86 | 0.01956 | 22.1 | 290 | 3.9 | 8.1 |
| HD142UDE15 | M75x-03400135 | HYBBxAxxx | 306.2 | 34.6 | 917.8 | 103.7 | 0.02407 | 27.2 | 470 | 4.5 | 8.2 |
| HD190UDC15 | M75x-03400160 | HYBBxAxxx | 451.4 | 51 | 1355.0 | 153.1 | 0.04832 | 54.6 | 470 | 7.3 | 11.2 |

For drive ratings, please see page 34 and motor ratings from page 38 to 43.

* Acceleration time to nominal speed is based on 1:1 motor to load inertia ratio

CONTROL TECHNIQUES™

# Modular multi-axis configuration
## Dimensioning the common DC bus
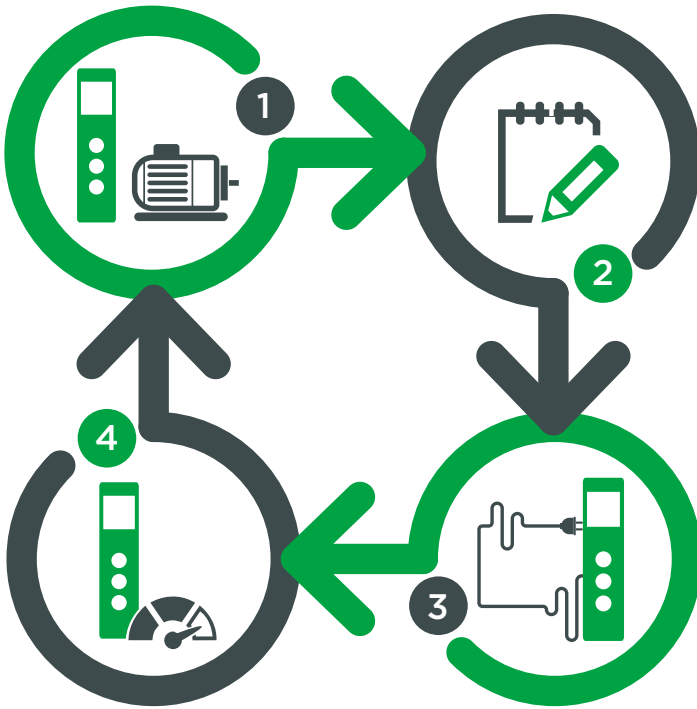


## 4 easy steps to accurately dimension your system

**1** Choose drive & motor combination Based on speed and torque requirements see pages 25 or 26

**2** Note nominal power & drive capacitance for each combination

**3** Choose the drive to act as power supply for the drive group Usually the largest drive

**4** Check that:

1. sum of drive capacitance <= maximum capacitance**

2. sum of nominal power <= maximum input power**

(Refer to tables below)

Digitax HD drives have a higher capacity input power stage, allowing for a group of drives on a common DC bus to be powered by a single AC connection.

Alternatively, for larger configurations an external DC source can be used, such as a larger frame Digitax HD.

NOTE: The number of drives that can be connected on a common DC bus group depends on the total installed capacitance, the power rating of the input stage and the power profile of each axis.

There is also a limit of 10 drives for the 24 V link.

### ADDITIONAL INFORMATION:

For optimized dimensioning please refer to the Installation and Technical Guide.

| **200V** | | Max Capacitance (µF) | Internal Capacitance (µF) | Max Input Power (kW) |
|---|---|---|---|---|
| Size 1 | M75x-01200022 M75x-01200040 M75x-01200065 | 5800 | 580 | 4 / 5.2* |
| Size 2 | M75x-02200090 M75x-02200012 | 4640 | 1160 | 5.3 / 6.9* |
| Size 3 | M75x-03200160 | 3760 | 1880 | 6.3 / 10* |

| **400V** | | Max Capacitance (µF) | Internal Capacitance (µF) | Max Input Power (kW) |
|---|---|---|---|---|
| Size 1 | M75x-01400015 M75x-01400030 M75x-01400042 | 1900 | 110 | 6.5 / 8.5* |
| Size 2 | M75x-02400060 M75x-02400080 M75x-02400105 | 2030 | 290 | 8.7 / 11.4* |
| Size 3 | M75x-03400135 M75x-03400160 | 2210 | 470 | 10 / 13* |

* External AC Line Reactor required. Please refer to the Installation and Technical Guide.

** If any of the values are exceeded, the system needs to be split in groups and the procedure repeated for each group.

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# Digitax HD
# kits and accessories

| Multi-axis Kit | |
| --- | --- |
| Description | Order code |
| Multi-axis Kit (standard – without SI-Option Mounting Kit fitted) | 9500-1047 |
| Multi-axis Kit (with SI-Option Mounting Kit fitted) | 9500-1048 |

| Description | Order code |
| --- | --- |
| External Cable Grommet Kit up to 6mm$^2$ | 3470-0145 |
| External DC Cable Connection Kit up to 16mm$^2$ | 9500-1050 |

| Description | Order code |
| --- | --- |
| USB / EIA485 Communications Converter Cable | 4500-0096 |

| Description | Order code |
| --- | --- |
| KI-Compact 485 Adaptor | 82700000020300 |

| Description | Order code |
| --- | --- |
| KI-Compact Display | 82700000020400 |

| Standard cables available | |
| --- | --- |
| Description | Order code |
| Refer to pages 31 and 32 | |

| Description | Order code |
|---|---|
| Input Line Choke | 4401-0236 |

| Description | Order code |
|---|---|
| Retrofit Kit – Epsilon 202-206 | 3470-0185 |
| Retrofit Kit – Epsilon 209-216 | 3470-0184 |
| Retrofit Kit – Digitax ST/SP0 | 3470-0182 |
| Retrofit Kit – M'Ax | 3470-0183 |

| Description | Order code |
|---|---|
| Frame 1 Rear Ultraflow™ Vent Kit | 3470-0158 |
| Frame 2/3 Rear Ultraflow™ Vent Kit | 3470-0181 |

| Description | Order code |
|---|---|
| SI-Option Mounting Kit | 9500-1055 |

| Drive – Mountable Brake Resistor | |
|---|---|
| Description | Order code |
| Compact Brake Resistor Kit – 50 W, 70 Ω | 9500-1049 |

| External Brake Resistor | |
|---|---|
| Description | Order code |
| External Brake Resistor – DBR 100 W, 20 Ω | 1220-2201 |
| External Brake Resistor – DBR 100 W, 40 Ω | 1220-2401 |
| External Brake Resistor – DBR 100 W, 80 Ω | 1220-2801 |

| Description | Order code |
|---|---|
| Fan Replacement Kit (frame 1 and 2) | 9500-1053 |
| Fan Replacement Kit (frame 3) | 9500-1054 |

| Description | Order code |
|---|---|
| Encoder breakout kit | 82700000020200 |

| Description | Order code |
|---|---|
| Remote Keypad RTC | 82400000019600 |

| EMC Filters | | | |
|---|---|---|---|
| Voltage | Model (M75X-...) | Phases | Order code |
| 200 V | 1200022 | 1 | 4200-3503 |
| | 1200040 | 1 | |
| | 1200065 | 1 | |
| | 2200090 | 1 | 4200-5033 |
| | 2200120 | 1 | |
| | 3200160 | 1 | 4200-6034 |
| | 1200022 | 3 | 4200-8744 |
| | 1200040 | 3 | 4200-6002 |
| | 1200065 | 3 | 4200-6001 |
| | 2200090 | 3 | 4200-5833 |
| | 2200120 | 3 | 4200-5833 |
| | 3200160 | 3 | 4200-5833 |
| 400 V | 01400015 to 01400042 | 3 | 4200-8744 |
| | 02400060 to 02400105 | 3 | 4200-1644 |
| | 03400135 to 03400160 | 3 | 4200-5833 |

| System Integration Option Modules | |
|---|---|
| Option | Order code |
| MCi200 | 82400000017000 |
| MCi210 | 82400000016700 |
| SI-Apps Compact | 82400000020700 |
| SI-Ethernet | 82400000017900 |
| SI-PROFINET RT | 82500000018200 |
| SI-PROFIBUS | 82400000017500 |
| SI-CANopen | 82400000017600 |
| SI-DeviceNet | 82400000017700 |
| SI-Universal Encoder | 82400000018300 |
| SI-Encoder | 82400000018100 |
| SI-I/O | 82400000017800 |

# Digitax HD ordering information

## Drive part number key:

| Derivative | Identification Label | | | Encoder Interface | Documentation | | Optional Build | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Electrical Specification | | Configuration* | | | | | | | | |
| M753 - | 01 | 2 | 00022 | A 1 | 0 | 1 | 01 | A | B | 1 1 | 0 |

**Digitax HD range Product Line**
M751 – Base
M753 – EtherCAT

**Frame Size:**
01 – frame 1
02 – frame 2
03 – frame 3

**Voltage Rating:**
2-200 V (200-240 ± 10%)
4-400 V (380-480 ± 10%)

**Current Rating:**
Nominal current rating x 10

**Safety:**
1 – Standard (2 x STO)

**Region:**
01 – 60 hz defaults

**Documentation:**
1 – Multilingual

**Encoder Interface:**
0 – Standard

**Display option:**
0 – KI-Compact Display not fitted
1 – KI-Compact Display fitted – M753 only

**Option module support:**
AB10 – Not fitted
AB11 – Fitted – M751 only

*For Ethernet and MCi versions, Option Modules are required separately. See page 29 for order codes.

# Unimotor HD ordering information

## Motor part number key:

| Frame size | Motor voltage | Stator length* | Rated speed | Brake | Connection type* | Output shaft | Feedback device | Inertia + thermistor type |
|---|---|---|---|---|---|---|---|---|
| 089 | UD | B | 30 | 0 | B | A | CA | A |

| Frame size | Motor voltage | Stator length | Brake | Connection type | Output shaft | Feedback device | Inertia + thermistor |
|---|---|---|---|---|---|---|---|

055
067
089
115
142
190

ED = 200V
UD = 400V

**055-067**
A
B
C
**089**
A
B
C
**115**
B
C
D
**142**
C
D
E
**190**
C
D
F

**055 Frame**
30 = 3000 rpm
60 = 6000 rpm
**067 Frame**
30 = 3000 rpm
60 = 6000 rpm
**089 Frame**
30 = 3000 rpm
40 = 4000 rpm
60 = 6000 rpm
**115 Frame**
20 = 2000 rpm
30 = 3000 rpm
**142 Frame**
10 = 1000 rpm
15 = 1500 rpm
20 = 2000 rpm
30 = 3000 rpm
**190 Frame**
10 = 1000 rpm
15 = 1500 rpm
20 = 2000 rpm

0 = Not fitted
5 = Parking Brake (fibre)
6 = Parking Brake (resin)

A = Key
B = Plain
E = Key with half key fitted
F = Key and half key supplied separately

A = Standard + PTC
C = Standard inertia + KTY84-130 Thermistor

**Size 1**
B = Power and signal 90° rotatable
D = Hybrid cable, power & Signal combined, 90° rotatable
**Size 1.5**
J = Power and signal 90° rotatable
E = Hybrid cable, power & signal combined, 90° rotatable
Hybrid cable only must be fitted with KTY thermistor and is only available with certain feedback options. Please check before ordering.

**055 and 067 frame sizes**

| Code | Type | Incremental resolution | Absolute resolution | Accuracy | Hybrid Cable |
|---|---|---|---|---|---|
| AR | Resolver | 14 bit | - | ±600" | no |
| EG | Absolute (Multi turn) | 19 bit | 12 bit | ±120" | yes |
| FG | Absolute (Single turn) | 19 bit | - | ±120" | yes |
| TL | Absolute (Multi turn) | 17 bit | 12 bit | ±52" | no |
| UL | Absolute (Single turn) | 17 bit | - | ±52" | no |

**089 to 190 frame sizes**

| Code | Type | Incremental resolution | Absolute resolution | Accuracy | Hybrid Cable |
|---|---|---|---|---|---|
| AE | Resolver | 14 bit | - | ±720" | no |
| EF | Absolute (Multi turn) | 19 bit | 12 bit | ±65" | yes |
| FF | Absolute (Single turn) | 19 bit | - | ±65" | yes |
| RA | Absolute (Multi turn) | 20 bit | 12 bit | ±52" | no |
| SA | Absolute (Single turn) | 20 bit | - | ±52" | no |

**Additional feedback options available on request.**

* For stator and connection length see page 38 – 43.

# Cables and connections

## Power cable codification

**FIELD NUMBER**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|----|----|----|
| M | B | B | A | A | A | O | O | 2 | 5 | S | S |

**Cable type (field No 1&2)**

MB = power braked
4 w + 2 w + screen

MS = power 4 w + screen

**Jacket type (field No 3)**

A = PVC fixed installation

B = PUR dynamic installation

**Phase & conductor size (field No 4)**

| MS = Power No brake | or | MB = power braked |
|---|---|---|
| A = 1 mm2 | or | 1 mm2 + 0.5 mm2 |
| B = 2.5 mm2 | or | 2.5 mm2 + 0.5 mm2 |
| C = 4 mm2 | or | 4 mm2 + 1 mm2 |

**Drive end connection * (field No 5)**

A = Ultrasonic welding

S = Special

X = Cut end

**Length meter * (field No 7, 8, 9 & 10)**

0010 = 1 meter

0025 = 2.5 meter

0500 = 50 meters max

**Motor end connection (field No 6)**

A = 6 way power size 1 from 1 to 4 mm2 (no speedtec conn.)

B = 6 way power size 1.5 53 Amps 4 mm2 (no speedtec conn.)

S = Special

X = Cut end

**Optional:**

**Progressive alphanumeric code for custom special requests (field No 11 & 12)**

(*Length meter / cable requiring (cm) lengths will be rounded up to the next highest half meter; Eg. 2.1 will be changed to a 2.5 meter cable

Maximum cable assembly length 50 meters

## Signal cable codification

**FIELD NUMBER**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|----|----|----|
| S | I | B | A | A | A | O | O | 2 | 5 | S | S |

**Cable type* (field No 1&2)**

SI = Incremental encoder & EnDat

SR = Resolver

SS = SinCos encoder

SE = Serial Endat only

**Jacket type (field No 3)**

A = PVC fixed installation

B = PUR dynamic installation

**Phase & conductor size (field No 4)**

A = [ (2 x 0.34) E (St) + 6 x 2 x 0.25 + 1 x 2 x 0.50 ] ST mm² (SI = Incremental encoder & EnDat)

B = [ 4 x (2 x 0.25) St mm² (SR = Resolver)

C = [ 4 x (2 x 0.15) St = 1 x 2 x 0.50) ST mm² (SS = SinCos encoder)

E = [ (2x2x01.4)St_(2x0.34)St+1x2x0.34)STmm² (SE=Endat only)

**Drive end connection (field No 5)**

B = Flying leads

F = Low profile 90 deg 15 way connector (inc. SC Endat)

T = Endat only low profile 90 Deg 15 way connector

S = Special

**Length meter *** (field No 7, 8, 9 & 10)**

0010 = 1 meter

0025 = 2.5 meter

0500 = 50 meters max

**Motor end connection (field No 6)**

A = Unimotor 17 way no speedtec connector**

B = Unimotor 12 way no speedtec connector**

C = Unimotor 90° 17 way no speedtec connector**

D = Unimotor 90° 12 way no speedtec connector**

S = Special

**Optional:**

**Progressive alphanumeric code for custom special requests (field No 11 & 12)**

* Based on feedback device (Unimotor HD order code): SR cable type for AE and AR feedback device, SE for EG and FG, SS for TL and UL, SI for EF and FF, and SS for RA and SA.

** Based on feedback device: 12 way for AE, AR, TL, UL; 17 way for EG, FG, EF, FF

*** Length meter / cable requiring (cm) lengths will be rounded up to the next highest half meter; Eg. 2.1 will be changed to a 2.5 meter cable

Maximum cable assembly length 50 meters

# Cables and connections

## Hybrid cable codification

**FIELD NUMBER**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|----|----|----|
| H | Y | B | A | A | A | O | O | 2 | 5 | S | S |

**Cable type (field No 1&2)**

HY = power standard

4 w + 2 brake + 6 signal + screen

**Jacket type (field No 3)**

B = PUR dynamic installation

Desina orange

**Phase & conductor size (field No 4)**

A = 1.5 mm² + 0.75 mm²

B = 2.5 mm² + 1 mm²

C = 4 mm² + 1 mm²

**Drive end connection (field No 5)**

A = ULTRASONIC WELDING and 15 way High Density D Sub for signal

D = Digitax HD Size 01, 02 & 03

E = Digitax HD Size 01 & 02 complete with EMC bracket and terminal block fitted

F = Digitax HD Size 03 complete with EMC bracket and terminal block fitted

**Length meter * (field No 7, 8, 9 & 10)**

0010 = 1 meter

0025 = 2.5 meter

0500 = 50 meters max

**Motor end connection (field No 6)**

A = Hybrid connector Size 1

B = Hybrid connector Size 1.5

**Optional:**

Progressive alphanumeric code for custom special requests (field No 11 & 12)

* Length meter / cable requiring (cm) lengths will be rounded up to the next highest half meter; Eg. 2.1 will be changed to a 2.5 meter cable

Maximum cable assembly length 50 meters.

# Digitax HD
## Servo series specification

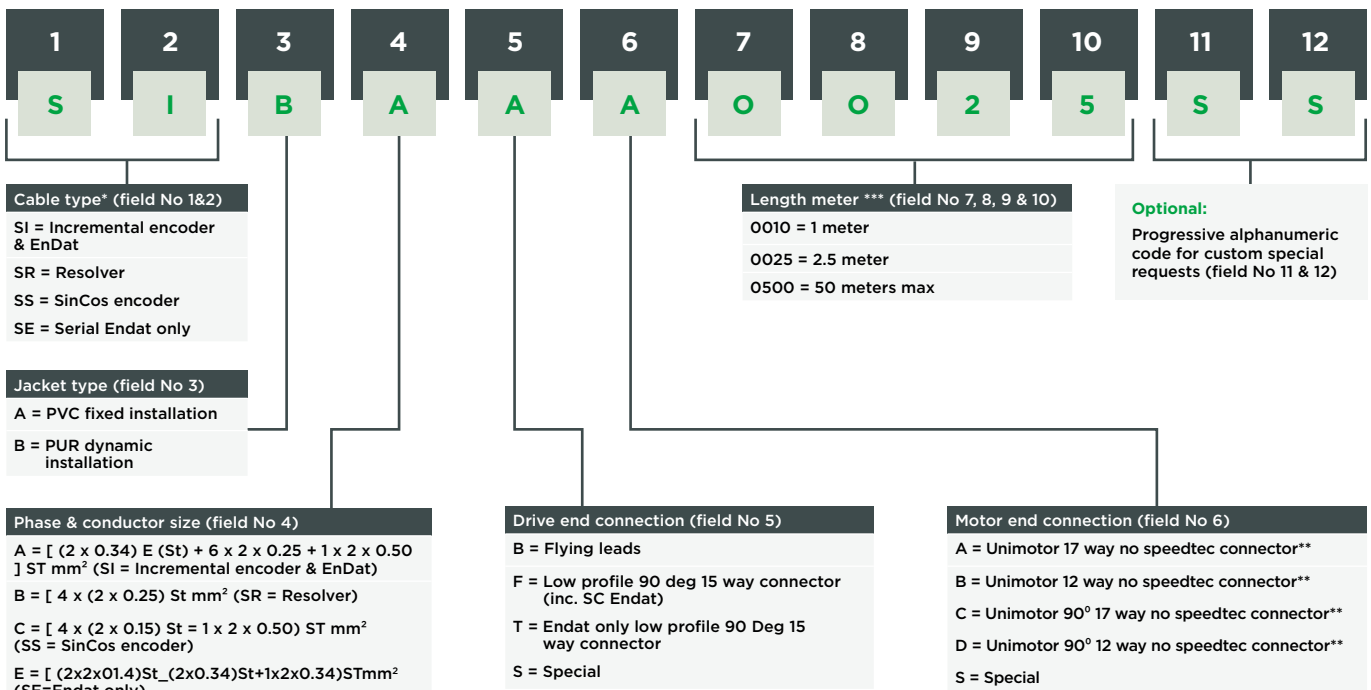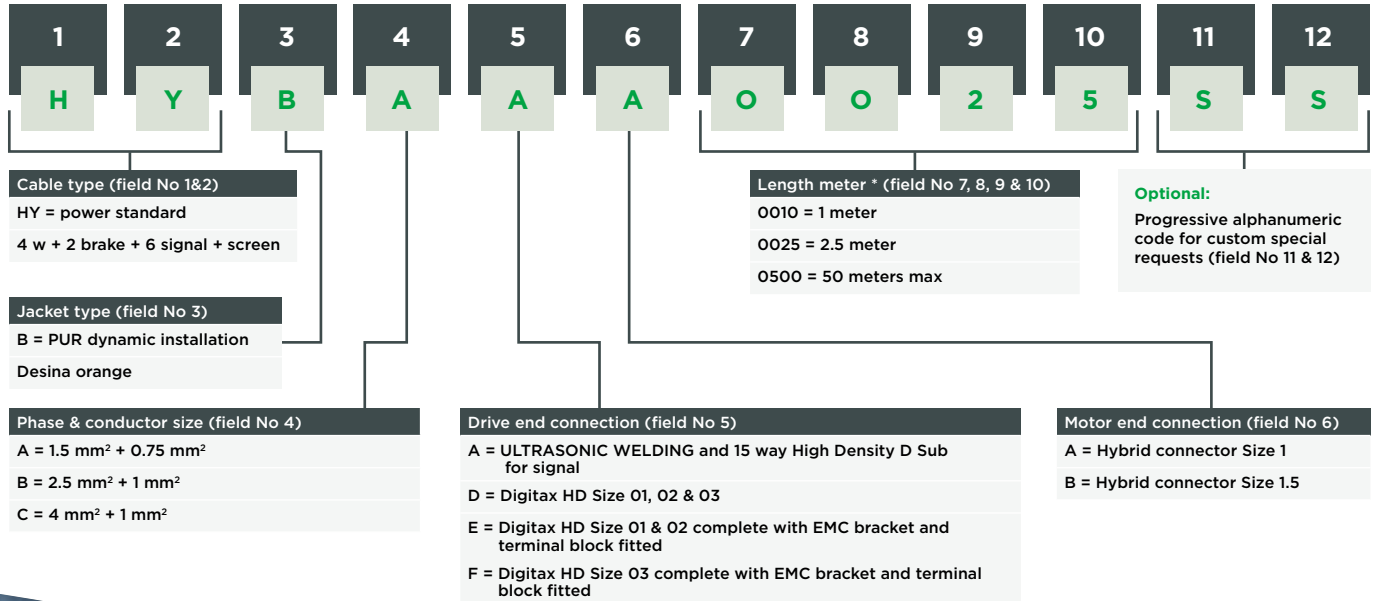| | | M753 EtherCAT | M751 Base | M751 + SI-Ethernet | M751 + MCi210 |
|---|---|---|---|---|---|
| **Performance** | Update Rates | Current Loop Update: 62 µs | | | |
| | | Speed Loop Update: 250 µs | | | |
| | | Position Loop Update: 250 µs | | | |
| | Overload | *Closed-loop Overload: Maximum closed loop peak current for 0.25 s (from cold: 300 % for 8 s or 200 % for 60 s) | | | |
| | | *Open-loop Overload: Maximum open loop peak current for 8 s (from cold: 150 % for 100 s) | | | |
| | Max Output Frequency | 599 Hz | | | |
| | Switching Frequency | Configurable range: 2, 3, 4, 6, 8, 12, 16 kHz | | | |
| | | Default: 8kHz | | | |
| **Ultraflow™ Technology** | Adjustable Venting | Top venting or rear venting (with optional kit) | | | |
| | Intelligent Fan Control | Temperature controlled fan operation with user adjustable speed limit | | | |
| | Managed Internal Airflow | Managed airflow for maximum ingress protection | | | |
| **Onboard Intelligence** | Motion | Advanced Motion Controller | | | MCi210 |
| | | Parameterised motion | | | Programmable motion |
| | | 1.5 Axes | | | Up to 5 Axes |
| | | Positioning digital lock control | | | Positioning digital lock control camming |
| | | Real-time tasks | | | |
| | PLC | Onboard PLC | | | Onboard Machine Controller |
| | | IEC61131-3 programming (IL, LD, FBD, SFC) | | | |
| **Control** | Motor Control Modes | V/F, Open Loop Vector, RFC-A (Sensorless or Closed Loop), RFC-S (Sensorless Or Closed Loop) | | | |
| | Control Modes | Position control, speed control, torque control | | | |
| | Control Features | Stationary autotune for permanent magnet motors | | | |
| | | Notch filter for suppression of mechanical resonances | | | |
| **Interface** | Onboard Communications | 2-port EtherCAT switch | 2-port RS485 | 2-port RS 485 2-port Ethernet switch | 2-port RS 485 2-port Ethernet switch |
| | Fieldbus | EtherCAT | Modbus RTU | Modbus RTU, Modbus TCP, EtherNet/IP | Modbus RTU, Modbus TCP, EtherNet/IP |
| | Real Time Motion | EtherCAT (CoE) | None | RTMoE | RTMoE |
| | Analog I/O | 1 Analog Input ± 10V, 12 bits (11 bits + sign) | | | |
| | Digital I/O | 2 DI, 2 DO (100 mA), 1 motor brake output (1 A, max 1.3 A) | | | |
| | Pulse Train Input | Frequency/Direction 5 V differential, 500 kHz | | | |
| | Encoder Feedback | 2 x Encoder input and 1 simulation encoder output | | | |
| | Supported Encoders | Resolver, Quadrature, AB Servo, SinCos, EnDat (2.2), SSI, BiSS, Hiperface | | | |
| | Safety | 2 x Safe Torque Off (STO) via terminal, PLe, SIL3 | | | |
| **Commissioning** | Interface | Ethernet over EtherCAT (EoE) | RS485 | Ethernet | Ethernet |
| | Commissioning Tool | Connect | | | |
| | Motion Programming Tool | – | Machine Control Studio | | |
| **General** | Mechanical Attributes | Removable cable screen | | | |
| | | User replaceable fan(s) | | | |
| | | Conformal coating | | | |
| | Backup | SD Card | | | |
| | | Electronic motor nameplate parameter storage (HIPERFACE, Endat 2.2) | | | |
| | Braking | Braking resistor: external / drive mountable | | | |
| | | Braking chopper: integrated | | | |
| | Multi-axis | Busbars for common DC bus and earthing | | | |
| | | Quick Links for 24 V distribution | | | |
| | | Common braking resistor | | | |
| | Display | Yes | Optional | Optional | Optional |

# Drive ratings

## 200 V Single Phase

| Frame Size W x D x H in (mm) | Frame Size 01 1.57 x 6.85 x 9.17 (40 x 174 x 233) | | | Frame Size 02 1.57 x 6.85 x 10.94 (40 x 174 x 278) | | Frame Size 03 1.57 x 6.85 x 12.91 (40 x 174 x 328) |
|---|---|---|---|---|---|---|
| Line Supply | Single Phase AC 200 V...240 V (± 10%) @ 45...66 Hz | | | | | |
| M75X-... | 01200022 | 01200040 | 01200065 | 02200090 | 02200120 | 03200160 |
| **Output Servo** | | | | | | |
| Rated Current (A) | 1.1 | 2.2 | 3.5 | 5.6 | 7.5 | 10.8 |
| Max Peak Current (A) | 6.6 | 12 | 19.5 | 27 | 36 | 48 |
| **Output AC Induction** | | | | | | |
| Max Continuous Current (A) | 1.1 | 2.2 | 3.5 | 5.6 | 7.5 | 10.8 |
| Open Loop Peak Current (A) | 3.3 | 6 | 9.8 | 13.5 | 18 | 24 |
| Closed Loop Peak Current (A) | 6.6 | 12 | 19.5 | 27 | 36 | 48 |
| Motor Power at 230 V (kW) | 0.18 | 0.37 | 0.75 | 1.1 | 1.5 | 2.2 |
| **Overload** | | | | | | |
| Closed-loop Overload | Maximum closed loop peak current for 0.25 s | | | | | |
| Open-loop Overload | Maximum open loop peak current for 8 s | | | | | |

## 200 V Three Phase

| Frame Size W x D x H in (mm) | Frame Size 01 1.57 x 6.85 x 9.17 (40 x 174 x 233) | | | Frame Size 02 1.57 x 6.85 x 10.94 (40 x 174 x 278) | | Frame Size 03 1.57 x 6.85 x 12.91 (40 x 174 x 328) |
|---|---|---|---|---|---|---|
| Line supply | Three Phase AC 200 V...240 V (± 10%) @ 45...66 Hz | | | | | |
| M75X-... | 01200022 | 01200040 | 01200065 | 02200090 | 02200120 | 03200160 |
| **Input** | | | | | | |
| Max Power (kW) | 4 | | | 5.3 | | 10* |
| **Output Servo** | | | | | | |
| Rated Current (A) | 2.2 | 4 | 6.5 | 9 | 12 | 16 |
| Max Peak Current (A) | 6.6 | 12 | 19.5 | 27 | 36 | 48 |
| **Output AC Induction** | | | | | | |
| Max Continuous Current (A) | 2.2 | 4 | 6.5 | 9 | 12 | 16 |
| Open Loop Peak Current (A) | 3.3 | 6 | 9.8 | 13.5 | 18 | 24 |
| Closed Loop Peak Current (A) | 6.6 | 12 | 19.5 | 27 | 36 | 48 |
| Motor Power at 230 V (kW) | 0.37 | 0.75 | 1.1 | 2.2 | 2.2 | 4.0 |
| **Overload** | | | | | | |
| Closed-loop Overload | 300 % for 0.25 s or 200 % for 4 s | | | | | |
| Open-loop Overload | 150 % for 8 s | | | | | |

## 400 V Three Phase

| Frame Size W x D x H in (mm) | Frame Size 01 1.57 x 6.85 x 9.17 (40 x 174 x 233) | | | Frame Size 02 1.57 x 6.85 x 10.94 (40 x 174 x 278) | | | Frame Size 03 1.57 x 6.85 x 12.91 (40 x 174 x 328) | |
|---|---|---|---|---|---|---|---|---|
| Line Supply | Three Phase AC 380 V...480 V (± 10%) @ 45...66 Hz | | | | | | | |
| M75X-... | 01400015 | 01400030 | 01400042 | 02400060 | 02400080 | 02400105 | 03400135 | 03400160 |
| **Input** | | | | | | | | |
| Max Power (kW) | 6.5 | | | 8.7 | | | 10/13* | |
| **Output Servo** | | | | | | | | |
| Rated Current (A) | 1.5 | 3 | 4.2 | 6 | 8 | 10.5 | 13.5 | 16 |
| Max Peak Current (A) | 4.5 | 9 | 12.6 | 18 | 24 | 31.5 | 40.5 | 48 |
| **Output AC Induction** | | | | | | | | |
| Max Continuous Current (A) | 1.5 | 3 | 4.2 | 6 | 8 | 10.5 | 13.5 | 16 |
| Open Loop Peak Current (A) | 2.3 | 4.5 | 6.3 | 9 | 12 | 15.8 | 20.3 | 24 |
| Closed Loop Peak Current (A) | 4.5 | 9 | 12.6 | 18 | 24 | 31.5 | 40.5 | 48 |
| Motor Power at 400 V (kW) | 0.37 | 0.75 | 1.5 | 2.2 | 3.0 | 4.0 | 5.5 | 5.5 |
| **Overload** | | | | | | | | |
| Closed-loop Overload | 300 % for 0.25 s or 200 % for 4 s | | | | | | | |
| Open-loop Overload | 150 % for 8 s | | | | | | | |

* External AC line reactor required.

CONTROL TECHNIQUES ™

# Environmental safety and electrical conformance

## Safety Testing

UL open class

Ambient temperature -20 °C to 40 °C as standard. Up to 55 °C with derating

Humidity 95 % maximum (non-condensing) at 40 °C

1,000 m to 3,000 m (3,300 ft to 9,900 ft) above sea level: de-rate the maximum output current from the specified figure by 1% per 100 m (330 ft) above 1,000 m (3,300 ft)

Storage temperature -40 °C to 70 °C

Mechanical Shock Tested in accordance with IEC 60068-2-27

Random Vibration: Tested in accordance with IEC 60068-2-64

Electromagnetic Immunity complies with EN 61800-3 and EN 61000-6-2

With onboard EMC filters, complies with EN 61800-3 (2nd environment)

EN 61000-6-3 and EN 61000-6-4 with optional EMC filter

IEC 60146-1-1 supply conditions

IEC 61800-5-1 (Electrical Safety)

IEC 61131-2 I/O

Safe Torque Off independently assessed by TÜV to IEC 61800-5-2

SIL 3 and EN ISO 13849-1 PLe

UL 61800-5-1 (Electrical Safety)

DRIVE SPECIALISTS SINCE 1973    35
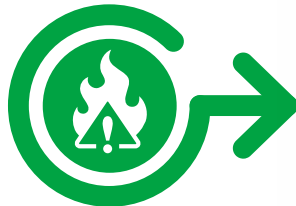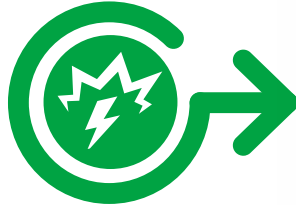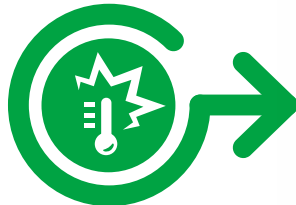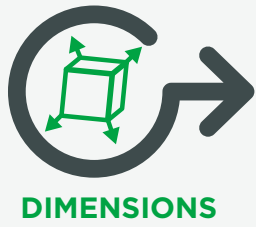
# Digitax HD
# & Unimotor HD
# dimensions

**DIMENSIONS**

## Frame 1

40 mm (1.58 in)

174 mm (6.85 in)

233 mm (9.17 in)

Ø 5.2 mm (0.21 in)

5 mm (0.20 in)

12 mm (0.47 in)

Ø 5.2 mm (0.21 in)

28 mm (1.10 in)

Ø 32 mm (1.26 in)*

222 mm (8.74 in)

Ø 5.2 mm (0.21 in)

6 mm (0.24 in)

40 mm (1.58 in)

## Frame 2

40 mm (1.58 in)

174 mm (6.85 in)

278 mm (10.95 in)

Ø 5.2 mm (0.21 in)

5 mm (0.20 in)

12 mm (0.47 in)

Ø 5.2 mm (0.21 in)

28 mm (1.10 in)

35 mm (1.38 in)

Ø 32 mm (1.26 in)*

267 mm (10.51 in)

Ø 5.2 mm (0.21 in)

6 mm (0.24 in)

40 mm (1.58 in)

# Frame 3



**40 mm (1.58 in)**

**174 mm (6.85 in)**

**328 mm (12.91 in)**

**Ø 5.2 mm (0.21 in)**

**5 mm (0.20 in)**

**12 mm (0.47 in)**

**28 mm (1.10 in)**

**35 mm (1.38 in)**

**Ø 32 mm (1.26 in)\***

**317 mm (12.48 in)**

**Ø 5.2 mm (0.21 in)**

**6 mm (0.24 in)**

**40 mm (1.58 in)**

\* Additional space above and below the drive may be required for cable routing.

\*\* Option module frame adds 22mm width.

\*\*\* Alternative screw mounting options available. Please refer to the Installation Guide.

## Frame size 055

| Motor frame size (mm) | 055ED | | | 055UD | | |
|---|---|---|---|---|---|---|
| Voltage (Vrms) | 200-240 | | | 380-480 | | |
| Frame length | A | B | C | A | B | C |
| Continuous stall torque (lb-in) | 6.11 | 10.00 | 13.98 | 6.11 | 10.00 | 13.98 |
| Continuous stall torque (Nm) | 0.69 | 1.13 | 1.58 | 0.69 | 1.13 | 1.58 |
| Peak torque (lb-in) | 18.32 | 30.09 | 42.04 | 18.32 | 30.09 | 42.04 |
| Peak torque (Nm) | 2.07 | 3.4 | 4.75 | 2.07 | 3.4 | 4.75 |
| Standard inertia (lb-in-sec²) | 0.00012 | 0.00022 | 0.00032 | 0.00012 | 0.00022 | 0.00032 |
| Standard inertia (kgcm²) | 0.14 | 0.25 | 0.36 | 0.14 | 0.25 | 0.36 |
| Winding thermal time constant (sec) | 34 | 38 | 42 | 34 | 38 | 42 |
| Motor weight unbraked (lb) | 4.41 | 5.73 | 7.05 | 4.32 | 5.64 | 6.97 |
| Motor weight unbraked (kg) | 2 | 2.6 | 3.2 | 1.96 | 2.56 | 3.16 |
| Motor weight braked (lb) | 5.73 | 7.05 | 8.38 | 5.64 | 6.97 | 8.29 |
| Motor weight braked (kg) | 2.6 | 3.2 | 3.8 | 2.56 | 3.16 | 3.76 |
| Number of poles | 8 | 8 | 8 | 8 | 8 | 8 |
| **Speed 3000 (rpm)** | | | | | | |
| Kt (lb-in/A) = | 6.55 | 7.70 | 8.05 | 6.55 | 13.19 | 14.60 |
| Kt (Nm/A) = | 0.74 | 0.87 | 0.91 | 0.74 | 1.49 | 1.65 |
| Ke (V/krpm) = | 45 | 52.5 | 55 | 45 | 90 | 100 |
| Rated torque (lb-in) | 5.93 | 8.94 | 12.57 | 5.93 | 8.94 | 12.57 |
| Rated torque (Nm) | 0.67 | 1.01 | 1.42 | 0.67 | 1.01 | 1.42 |
| Stall current (A) | 0.74 | 1.22 | 1.7 | 0.93 | 0.76 | 0.96 |
| Rated power (kW) | 0.21 | 0.32 | 0.45 | 0.21 | 0.32 | 0.45 |
| R (ph-ph) (Ohms) | 28 | 14.12 | 9.53 | 28 | 45 | 31 |
| L (ph-ph) (mH) | 50 | 32 | 23 | 50 | 100 | 75 |
| Recommended power conn' size | 1 | 1 | 1 | 1 | 1 | 1 |
| **Speed 6000 (rpm)** | | | | | | |
| Kt (lb-in/A) = | 3.98 | 3.81 | 4.25 | 6.55 | 6.99 | 7.35 |
| Kt (Nm/A) = | 0.45 | 0.43 | 0.48 | 0.74 | 0.79 | 0.83 |
| Ke (V/krpm) = | 27 | 26 | 29 | 45 | 47.5 | 50 |
| Rated torque (lb-in) | 6.02 | 7.97 | 10.62 | 6.02 | 7.97 | 10.62 |
| Rated torque (Nm) | 0.68 | 0.9 | 1.2 | 0.68 | 0.9 | 1.2 |
| Stall current (A) | 1.61 | 2.74 | 3.44 | 0.93 | 1.43 | 1.91 |
| Rated power (kW) | 0.43 | 0.57 | 0.75 | 0.43 | 0.57 | 0.75 |
| R (ph-ph) (Ohms) | 8.5 | 3.55 | 2.38 | 28 | 10.7 | 7.8 |
| L (ph-ph) (mH) | 16 | 8.2 | 6.3 | 50 | 25 | 20 |
| Recommended power conn' size | 1 | 1 | 1 | 1 | 1 | 1 |



- **Δt= 100°C winding 40°C maximum ambient
  All data subject to +/-10% tolerance**

- **Stall torque, rated torque and power relate to maximum continuous
  operation tested in a 20°C ambient at 8 k Hz drive switching frequency**

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

- **Maximum intermittent winding temperature is 140°C**

## Motor dimensions

Drawing number: GM496400

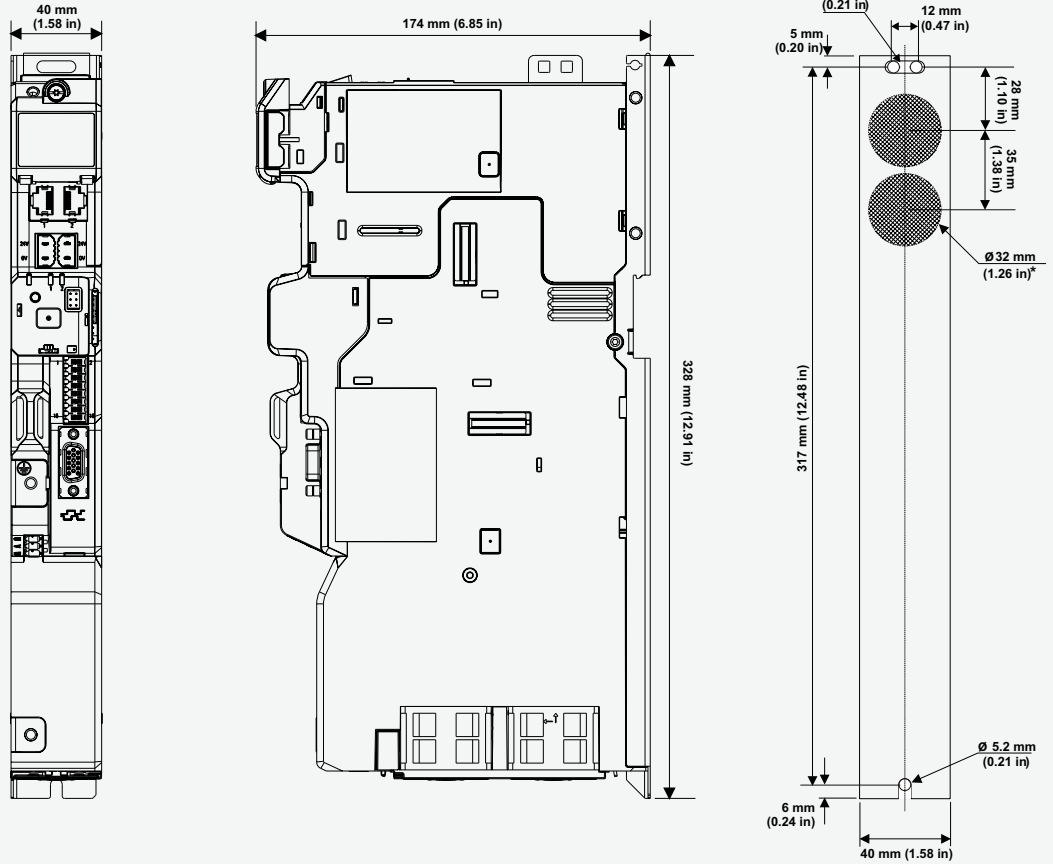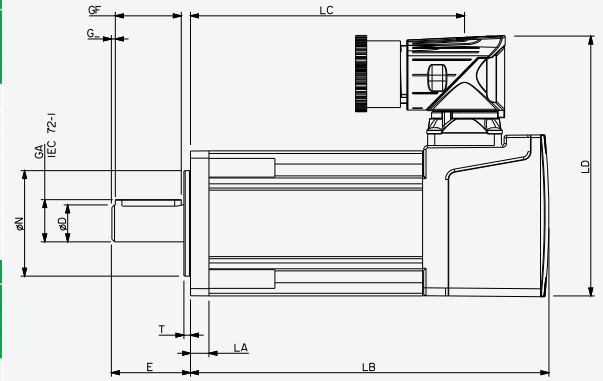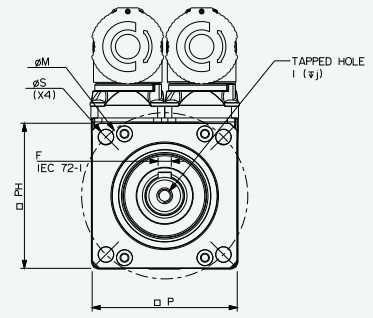| | Feedback AR, CR, EM/FM | | | | Flange thickness | | Register length | | Register diameter | | Overall height | | Flange square | | Fixing hole diameter | | Fixing hole PCD | | Motor housing | | Mounting bolts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Unbraked length | | Braked length | | | | | | | | | | | | | | | | | | | |
| | A | | B | | A | | B | | K | | L | | M (j6) | | N | | P | | R (H14) | | S | | T | | |
| | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | |
| 055A | 4.65 | 118 | 3.54 | 90 | 6.22 | 158 | 5.12 | 130 | | | | | | | | | | | | | | | | | |
| 055B | 5.59 | 142 | 4.49 | 114 | 7.17 | 182 | 6.06 | 154 | 0.28 | 7.0 | 0.10 | 2.5 | 1.57 | 40 | 3.90 | 99 | 2.17 | 55 | 0.23 | 5.8 | 2.48 | 63 | 2.17 | 55 | M5 |
| 055C | 6.54 | 166 | 5.43 | 138 | 8.11 | 206 | 7.01 | 178 | | | | | | | | | | | | | | | | | |

## Shaft dimensions

Drawing number: GM496400

| | Shaft diameter | | Shaft length | | Key height | | Key length | | Key to shaft end | | Key width | | Tapped hole thread size | Tapped hole depth | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | C (j6) | | D | | E | | F | | G | | H (h9) | | I | J | |
| | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | | in | mm |
| 9.0 Opt | 0.354 | 9 | 0.787 | 20 | 0.402 | 10.2 | 0.591 | 15 | 0.039 | 1 | 0.118 | 3 | M4x10 | 0.394 | 10 |
| 11.0 Std | 0.433 | 11 | 0.906 | 23 | 0.492 | 12.5 | 0.591 | 15 | 0.059 | 1.5 | 0.157 | 4 | M4x10 | 0.394 | 10 |
| 14.0 Std | 0.551 | 14 | 1.181 | 30 | 0.630 | 16 | 0.984 | 25 | 0.059 | 1.5 | 0.197 | 5 | M5x12.5 | 0.492 | 12.5 |

## Frame size 067

| Motor frame size (mm) | 067ED | | | 067UD | | |
|---|---|---|---|---|---|---|
| Voltage (Vrms) | 200-240 | | | 380-480 | | |
| Frame length | A | B | C | A | B | C |
| Continuous stall torque (lb-in) | 12.57 | 22.13 | 32.13 | 12.57 | 22.13 | 32.13 |
| Continuous stall torque (Nm) | 1.42 | 2.5 | 3.63 | 1.42 | 2.5 | 3.63 |
| Peak torque (lb-in) | 37.70 | 66.38 | 96.30 | 37.70 | 66.38 | 96.30 |
| Peak torque (Nm) | 4.26 | 7.5 | 10.88 | 4.26 | 7.5 | 10.88 |
| Standard inertia (lb-in-sec$^2$) | 0.00027 | 0.00047 | 0.00066 | 0.00027 | 0.00047 | 0.00066 |
| Standard inertia (kgcm$^2$) | 0.3 | 0.53 | 0.75 | 0.3 | 0.53 | 0.75 |
| Winding thermal time constant (sec) | 54 | 61 | 65 | 54 | 61 | 65 |
| Motor weight unbraked (lb) | 4.41 | 5.73 | 7.05 | 4.32 | 5.64 | 6.97 |
| Motor weight unbraked (kg) | 2 | 2.6 | 3.2 | 1.96 | 2.56 | 3.16 |
| Motor weight braked (lb) | 5.73 | 7.05 | 8.38 | 5.64 | 6.97 | 8.29 |
| Motor weight braked (kg) | 2.6 | 3.2 | 3.8 | 2.56 | 3.16 | 3.76 |
| Number of poles | 10 | 10 | 10 | 10 | 10 | 10 |
| **Speed 3000 (rpm)** | | | | | | |
| Kt (lb-in/A) = | | 8.23 | | 7.08 | 14.16 | 14.16 |
| Kt (Nm/A) = | | 0.93 | | 0.8 | 1.6 | 1.6 |
| Ke (V/krpm) = | | 57 | | 49 | 98 | 98 |
| Rated torque (lb-in) | 12.13 | 21.24 | 30.36 | 12.13 | 21.24 | 30.36 |
| Rated torque (Nm) | 1.37 | 2.4 | 3.43 | 1.37 | 2.4 | 3.43 |
| Stall current (A) | 1.53 | 2.69 | 3.9 | 1.78 | 1.56 | 2.27 |
| Rated power (kW) | 0.43 | 0.75 | 1.08 | 0.43 | 0.75 | 1.08 |
| R (ph-ph) (Ohms) | 14.92 | 4.88 | 3.33 | 11.69 | 15.2 | 10.7 |
| L (ph-ph) (mH) | 45.43 | 17.4 | 12.7 | 35.18 | 54.2 | 40.8 |
| Recommended power conn' size | 1 | 1 | 1 | 1 | 1 | 1 |
| **Speed 6000 (rpm)** | | | | | | |
| Kt (lb-in/A) = | | 4.16 | | | 7.08 | |
| Kt (Nm/A) = | | 0.47 | | | 0.8 | |
| Ke (V/krpm) = | | 28.5 | | | 49 | |
| Rated torque (lb-in) | 11.51 | 19.47 | | 11.51 | 19.47 | 27.44 |
| Rated torque (Nm) | 1.3 | 2.2 | | 1.3 | 2.2 | 3.1 |
| Stall current (A) | 3.02 | 5.32 | | 1.78 | 3.12 | 4.53 |
| Rated power (kW) | 0.82 | 1.38 | | 0.82 | 1.38 | 1.95 |
| R (ph-ph) (Ohms) | 3.86 | 1.22 | | 11.69 | 3.79 | 2.68 |
| L (ph-ph) (mH) | 11.06 | 4.35 | | 35.18 | 13.6 | 10.2 |
| Recommended power conn' size | 1 | 1 | | 1 | 1 | 1 |
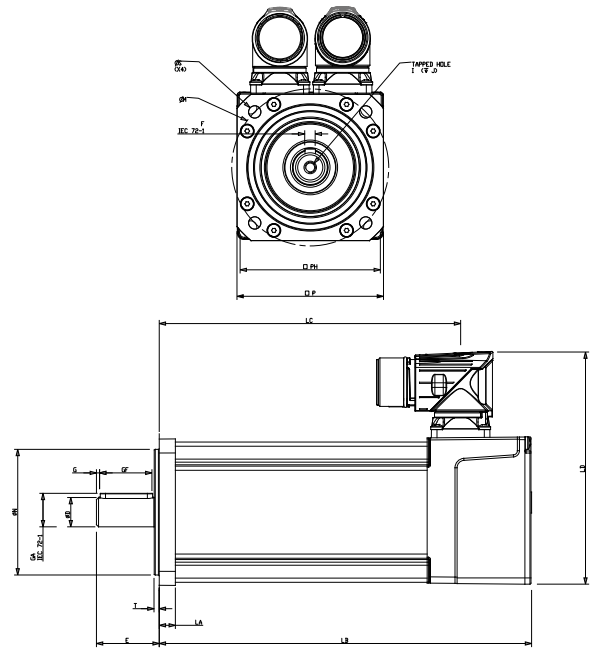


- Δt= 100°C winding 40°C maximum ambient
  All data subject to +/-10% tolerance

- Stall torque, rated torque and power relate to maximum continuous operation tested in a 20°C ambient at 8 kHz drive switching frequency

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

- Maximum intermittent winding temperature is 140°C

## Motor dimensions

**Drawing number: IM/0694/GA**

| | Feedback AR, CR, EM/FM, LM/NM | | | | | | | | Flange thickness | | Register length | | Register diameter | | Overall height | | Flange square | | Fixing hole diameter | | Fixing hole PCD | | Motor housing | | Mounting bolts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Unbraked length | | | | Braked length | | | | | | | | | | | | | | | | | | | | | |
| | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | |
| 067A | 5.626 | 142.9 | 4.291 | 109 | 7.004 | 177.9 | 5.669 | 144 | | | | | | | | | | | | | | | | | |
| 067B | 6.807 | 172.9 | 5.472 | 139 | 8.185 | 207.9 | 6.850 | 174 | 0.303 | 7.7 | 0.098 | 2.5 | 2.362 | 60 | 4.390 | 111.5 | 2.756 | 70 | 0.228 | 5.8 | 2.953 | 75 | 2.638 | 67 | M5 |
| 067C | 7.988 | 202.9 | 6.654 | 169 | 9.366 | 237.9 | 8.031 | 204 | | | | | | | | | | | | | | | | | |

| | Feedback TL/UL | | | |
|---|---|---|---|---|
| | Unbraked length | | Braked length | |
| | LB (± 0.9) | | LB (± 0.9) | |
| | in | mm | in | mm |
| 067A | 6.197 | 157.4 | 4.862 | 123.5 |
| 067B | 7.378 | 187.4 | 6.043 | 153.5 |
| 067C | 8.559 | 217.4 | 7.224 | 183.5 |

## 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) | |
| | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | | in | mm |
| 14.0 Std | 0.551 | 14 | 1.181 | 30 | 0.630 | 16 | 0.984 | 25 | 0.059 | 1.5 | 0.197 | 5 | M5 x 0.8 | 0.531 | 13.5 |

## Frame size 089

| Motor frame size (mm) | 089ED | | | 089UD | | |
|---|---|---|---|---|---|---|
| Voltage (Vrms) | 200-240 | | | 380-480 | | |
| Frame length | A | B | C | A | B | C |
| Continuous stall torque (lb-in) | 27.44 | 47.26 | 68.68 | 27.44 | 47.26 | 68.68 |
| Continuous stall torque (Nm) | 3.1 | 5.34 | 7.76 | 3.1 | 5.34 | 7.76 |
| Peak torque (lb-in) | 82.40 | 141.70 | 206.05 | 82.40 | 141.70 | 206.05 |
| Peak torque (Nm) | 9.31 | 16.01 | 23.28 | 9.31 | 16.01 | 23.28 |
| Standard inertia (lb-in-sec$^2$) | 0.00077 | 0.00142 | 0.00207 | 0.00077 | 0.00142 | 0.00207 |
| Standard inertia (kgcm$^2$) | 0.87 | 1.61 | 2.34 | 0.87 | 1.61 | 2.34 |
| Winding thermal time constant (sec) | 85 | 93 | 98 | 85 | 93 | 98 |
| Motor weight unbraked (lb) | 7.01 | 9.44 | 11.86 | 7.01 | 9.44 | 11.86 |
| Motor weight unbraked (kg) | 3.18 | 4.28 | 5.38 | 3.18 | 4.28 | 5.38 |
| Motor weight braked (lb) | 9.44 | 11.86 | 14.29 | 9.44 | 11.86 | 14.29 |
| Motor weight braked (kg) | 4.28 | 5.38 | 6.48 | 4.28 | 5.38 | 6.48 |
| Number of poles | 10 | 10 | 10 | 10 | 10 | 10 |
| **Speed 3000 (rpm)** | | | | | | |
| Kt (lb-in/A) = | | 8.23 | | | 14.16 | |
| Kt (Nm/A) = | | 0.93 | | | 1.6 | |
| Ke (V/krpm) = | | 57 | | | 98 | |
| Rated torque (lb-in) | 25.76 | 41.60 | 59.21 | 25.76 | 41.60 | 59.21 |
| Rated torque (Nm) | 2.91 | 4.7 | 6.69 | 2.91 | 4.7 | 6.69 |
| Stall current (A) | 3.34 | 5.74 | 8.34 | 1.94 | 3.33 | 4.85 |
| Rated power (kW) | 0.91 | 1.48 | 2.1 | 0.91 | 1.48 | 2.1 |
| R (ph-ph) (Ohms) | 3.28 | 1.57 | 0.89 | 10.1 | 5.05 | 2.68 |
| L (ph-ph) (mH) | 21.55 | 11.84 | 7.09 | 65.17 | 38.36 | 21.72 |
| Recommended power conn' size | 1 | 1 | 1 | 1 | 1 | 1 |
| **Speed 4000 (rpm)** | | | | | | |
| Kt (lb-in/A) = | | 6.20 | | | 10.62 | |
| Kt (Nm/A) = | | 0.7 | | | 1.2 | |
| Ke (V/krpm) = | | 42.75 | | | 73.5 | |
| Rated torque (lb-in) | 25.67 | 40.27 | 56.20 | 25.67 | 40.27 | 56.20 |
| Rated torque (Nm) | 2.9 | 4.55 | 6.35 | 2.9 | 4.55 | 6.35 |
| Stall current (A) | 4.43 | 7.62 | 11.09 | 2.59 | 4.45 | 6.47 |
| Rated power (kW) | 1.21 | 1.91 | 2.66 | 1.21 | 1.91 | 2.66 |
| R (ph-ph) (Ohms) | 2.04 | 0.79 | 0.54 | 6.16 | 2.47 | 1.75 |
| L (ph-ph) (mH) | 13.2 | 5.97 | 4.38 | 39.78 | 18.8 | 14.03 |
| Recommended power conn' size | 1 | 1 | 1 | 1 | 1 | 1 |
| **Speed 6000 (rpm)** | | | | | | |
| Kt (lb-in/A) = | | 4.16 | | | 7.08 | |
| Kt (Nm/A) = | | 0.47 | | | 0.8 | |
| Ke (V/krpm) = | | 28.5 | | | 49 | |
| Rated torque (lb-in) | 23.45 | 33.63 | 44.25 | 23.45 | 33.63 | 44.25 |
| Rated torque (Nm) | 2.65 | 3.8 | 5 | 2.65 | 3.8 | 5 |
| Stall current (A) | 6.6 | 11.35 | 16.51 | 3.88 | 6.67 | 9.7 |
| Rated power (kW) | 1.67 | 2.39 | 3.14 | 1.67 | 2.39 | 3.14 |
| R (ph-ph) (Ohms) | 0.98 | 0.39 | 0.23 | 2.52 | 1.27 | 0.83 |
| L (ph-ph) (mH) | 6.24 | 2.96 | 1.89 | 16.29 | 9.59 | 6.66 |
| Recommended power conn' size | 1 | 1 | 1 | 1 | 1 | 1 |



- Δt= 100°C winding 40°C maximum ambient

- All data subject to +/-10% tolerance

- Stall torque, rated torque and power relate to maximum continuous operation tested in a 20°C ambient at 8 kHz drive switching frequency

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

- Maximum intermittent winding temperature is 140°C

## Motor dimensions
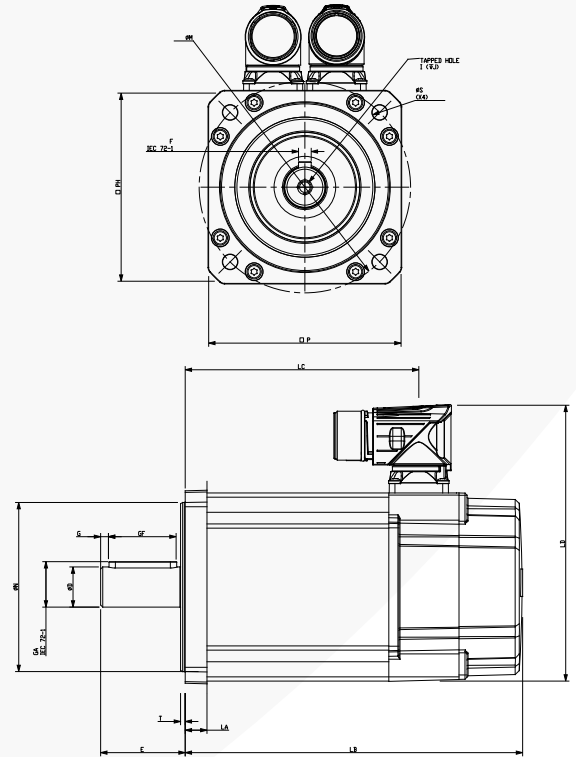
<span style="color:green">**Drawing number: IM/0688/GA**</span>

| | Feedback EC/FC, LC/NC | | | | Flange thickness | | Register length | | Register diameter | | Overall height | | Flange square | | Fixing hole diameter | | Fixing hole PCD | | Motor housing | | Mounting bolts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Unbraked length | | Braked length | | | | | | | | | | | | | | | | | | |
| | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | |
| 089A | 5.819 | 147.8 | 4.350 | 110.5 | 7.398 | 187.9 | 5.929 | 150.6 | | | | | | | | | | | | | |
| 089B | 7.000 | 177.8 | 5.531 | 140.5 | 8.579 | 217.9 | 7.110 | 180.6 | 0.406 | 10.3 | 0.087 | 2.2 | 3.150 | 80 | 5.138 | 130.5 | 3.583 | 91 | 0.276 | 7 | M6 |
| 099C | 8.181 | 207.8 | 6.713 | 170.5 | 9.760 | 247.9 | 8.291 | 210.6 | | | | | | | | | | | | | |

Note: additional columns for 089B row — 3.937 | 100 | 3.504 | 89 (Fixing hole PCD, Motor housing)

| | FB, EB/CA/SA, RA | | | | AE | | | |
|---|---|---|---|---|---|---|---|---|
| | Unbraked length | | Braked length | | Unbraked length | | Braked length | |
| | in | mm | in | mm | in | mm | in | mm |
| 089A | 6.331 | 160.8 | 7.909 | 200.9 | 5.425 | 137.8 | 7.004 | 177.9 |
| 089B | 7.512 | 190.8 | 9.091 | 230.9 | 6.606 | 167.8 | 8.185 | 207.9 |
| 089C | 8.693 | 220.8 | 10.272 | 260.9 | 7.787 | 197.8 | 9.366 | 237.9 |

## 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) | |
| | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | | in | mm |
| 19.0 Std | 0.748 | 19 | 1.575 | 40 | 0.846 | 21.5 | 1.260 | 32 | 0.146 | 3.7 | 0.236 | 6 | M6 x 1.0 | 0.669 | 17 |

## Frame size 115

| Motor frame size (mm) | 115ED | | | 115UD | | |
|---|---|---|---|---|---|---|
| Voltage (Vrms) | 200-240 | | | 380-480 | | |
| Frame length | B | C | D | B | C | D |
| Continuous stall torque (lb-in) | 88.51 | 126.65 | 163.03 | 88.51 | 126.65 | 163.03 |
| Continuous stall torque (Nm) | 10 | 14.31 | 18.42 | 10 | 14.31 | 18.42 |
| Peak torque (lb-in) | 265.43 | 379.87 | 489.18 | 265.43 | 379.87 | 489.18 |
| Peak torque (Nm) | 29.99 | 42.92 | 55.27 | 29.99 | 42.92 | 55.27 |
| Standard inertia (lb-in-sec$^2$) | 0.00390 | 0.00566 | 0.00742 | 0.00390 | 0.00566 | 0.00742 |
| Standard inertia (kgcm$^2$) | 4.41 | 6.39 | 8.38 | 4.41 | 6.39 | 8.38 |
| Winding thermal time constant (sec) | 164 | 168 | 175 | 164 | 168 | 175 |
| Motor weight unbraked (lb) | 15.32 | 19.22 | 23.13 | 15.32 | 19.22 | 23.13 |
| Motor weight unbraked (kg) | 6.95 | 8.72 | 10.49 | 6.95 | 8.72 | 10.49 |
| Motor weight braked (lb) | 18.63 | 22.53 | 26.43 | 18.63 | 22.53 | 26.43 |
| Motor weight braked (kg) | 8.45 | 10.22 | 11.99 | 8.45 | 10.22 | 11.99 |
| Number of poles | 10 | 10 | 10 | 10 | 10 | 10 |
| Speed 2000 (rpm) | | | | | | |
| Kt (lb-in/A) = | | 12.39 | | | 21.24 | |
| Kt (Nm/A) = | | 1.4 | | | 2.4 | |
| Ke (V/krpm) = | | 85.5 | | | 147 | |
| Rated torque (lb-in) | 74.61 | 103.20 | 135.33 | 74.61 | 103.20 | 135.33 |
| Rated torque (Nm) | 8.43 | 11.66 | 15.29 | 8.43 | 11.66 | 15.29 |
| Stall current (A) | 7.14 | 10.22 | 13.16 | 4.17 | 5.96 | 7.68 |
| Rated power (kW) | 1.76 | 2.39 | 3.14 | 1.77 | 2.44 | 3.2 |
| R (ph-ph) (Ohms) | 1.4 | 0.77 | 0.61 | 4.41 | 2.41 | 1.8 |
| L (ph-ph) (mH) | 12.84 | 7.87 | 6.62 | 40.6 | 24.69 | 19.45 |
| Recommended power conn' size | 1 | 1 | 1 | 1 | 1 | 1 |
| Speed 3000 (rpm) | | | | | | |
| Kt (lb-in/A) = | | 8.23 | | | 14.16 | |
| Kt (Nm/A) = | | 0.93 | | | 1.6 | |
| Ke (V/krpm) = | | 57 | | | 98 | |
| Rated torque (lb-in) | 66.82 | 91.07 | | 66.82 | 91.07 | 117.98 |
| Rated torque (Nm) | 7.55 | 10.29 | | 7.55 | 10.29 | 13.33 |
| Stall current (A) | 10.75 | 15.38 | | 6.25 | 8.94 | 11.52 |
| Rated power (kW) | 2.37 | 3.23 | | 2.37 | 3.23 | 4.19 |
| R (ph-ph) (Ohms) | 0.58 | 0.39 | | 1.83 | 1.21 | 0.78 |
| L (ph-ph) (mH) | 5.4 | 4.01 | | 16.93 | 12.72 | 8.65 |
| Recommended power conn' size | 1 | 1 | | 1 | 1 | 1 |



## Motor dimensions

**Drawing number: IM/0689/GA**

| | Feedback EC/FC, LC/NC | | | | | | | Flange thickness | | Register length | | Register diameter | | Overall height | | Flange square | | Fixing hole diameter | | Fixing hole PCD | | Motor housing | | Mounting bolts | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Unbraked length | | | | Braked length | | | | | | | | | | | | | | | | | | | | | |
| | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm |
| 115B | 7.630 | 193.8 | 6.063 | 154 | 9.091 | 230.9 | 7.524 | 191.1 | | | | | | | | | | | | | | | | | | |
| 115C | 8.811 | 223.8 | 7.244 | 184 | 10.272 | 260.9 | 8.705 | 221.1 | 0.520 | 13.2 | 0.106 | 2.7 | 4.331 | 110 | 6.161 | 156.5 | 4.567 | 116 | 0.394 | 10 | 5.118 | 130 | 4.528 | 115 | | M8 |
| 115D | 9.992 | 253.8 | 8.425 | 214 | 11.453 | 290.9 | 9.886 | 251.1 | | | | | | | | | | | | | | | | | | |

| | FB, EB/CA/SA, RA | | | | AE | | | |
|---|---|---|---|---|---|---|---|---|
| | Unbraked length | | Braked length | | Unbraked length | | Braked length | |
| | in | mm | in | mm | in | mm | in | mm |
| 115B | 8.142 | 206.8 | 9.602 | 243.9 | 7.236 | 183.8 | 8.697 | 220.9 |
| 115C | 9.323 | 236.8 | 10.783 | 273.9 | 8.417 | 213.8 | 9.878 | 250.9 |
| 115D | 10.504 | 266.8 | 11.965 | 303.9 | 9.598 | 243.8 | 11.059 | 280.9 |

- Δt= 100°C winding 40°C maximum ambient

- All data subject to +/-10% tolerance

- Stall torque, rated torque and power relate to maximum continuous operation tested in a 20°C ambient at 8 kHz drive switching frequency

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

- Maximum intermittent winding temperature is 140°C

## 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) | |
| | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | | in | mm |
| 24.0 Std | 0.945 | 24 | 1.969 | 50 | 1.063 | 27 | 1.575 | 40 | 0.209 | 5.3 | 0.315 | 8 | M8 x 1.25 | 0.787 | 20 |

## Frame size 142

| Motor frame size (mm) | 142ED | | | 142UD | | |
|---|---|---|---|---|---|---|
| Voltage (Vrms) | 200-240 | | | 380-480 | | |
| Frame length | C | D | E | C | D | E |
| Continuous stall torque (lb-in) | 201.35 | 253.75 | 306.06 | 201.35 | 253.75 | 306.06 |
| Continuous stall torque (Nm) | 22.75 | 28.67 | 34.58 | 22.75 | 28.67 | 34.58 |
| Peak torque (lb-in) | 604.06 | 761.16 | 918.18 | 604.06 | 761.16 | 918.18 |
| Peak torque (Nm) | 68.25 | 86 | 103.74 | 68.25 | 86 | 103.74 |
| Standard inertia (lb-in-sec$^2$) | 0.01505 | 0.01956 | 0.02407 | 0.01505 | 0.01956 | 0.02407 |
| Standard inertia (kgcm$^2$) | 17 | 22.1 | 27.2 | 17 | 22.1 | 27.2 |
| Winding thermal time constant (sec) | 245 | 251 | 256 | 245 | 251 | 256 |
| Motor weight unbraked (lb) | 28.09 | 33.93 | 39.77 | 28.09 | 33.93 | 39.77 |
| Motor weight unbraked (kg) | 12.74 | 15.39 | 18.04 | 12.74 | 15.39 | 18.04 |
| Motor weight braked (lb) | 32.67 | 38.51 | 44.36 | 32.67 | 38.45 | 44.36 |
| Motor weight braked (kg) | 14.82 | 17.47 | 20.12 | 14.82 | 17.44 | 20.12 |
| Number of poles | 10 | 10 | 10 | 10 | 10 | 10 |

### Speed 1000 (rpm)

| | 142ED | | | 142UD | | |
|---|---|---|---|---|---|---|
| Kt (lb-in/A) = | 24.78 | | | | | |
| Kt (Nm/A) = | 2.8 | | | | | |
| Ke (V/krpm) = | 171 | | | | | |
| Rated torque (lb-in) | 187.64 | 233.57 | 277.91 | | | |
| Rated torque (Nm) | 21.2 | 26.39 | 31.4 | | | |
| Stall current (A) | 8.1 | 10.19 | 12.38 | | | |
| Rated power (kW) | 2.22 | 2.77 | 3.29 | | | |
| R (ph-ph) (Ohms) | 1.36 | 0.94 | 0.72 | | | |
| L (ph-ph) (mH) | 21.34 | 15.17 | 12.3 | | | |
| Recommended power conn' size | 1 | 1 | 1 | | | |

### Speed 1500 (rpm)

| | 142ED | | | 142UD | | |
|---|---|---|---|---|---|---|
| Kt (lb-in/A) = | | | | 28.32 | | |
| Kt (Nm/A) = | | | | 3.2 | | |
| Ke (V/krpm) = | | | | 196 | | |
| Rated torque (lb-in) | | | | 179.58 | 217.46 | 255.34 |
| Rated torque (Nm) | | | | 20.29 | 24.57 | 28.85 |
| Stall current (A) | | | | 7.1 | 8.92 | 10.83 |
| Rated power (kW) | | | | 3.19 | 3.82 | 4.55 |
| R (ph-ph) (Ω) | | | | 1.36 | 0.94 | 0.72 |
| L (ph-ph) (mH) | | | | 21.34 | 15.17 | 12.3 |
| Connection type | | | | 1 | 1 | 1 |

### Speed 2000 (rpm)

| | 142ED | | | 142UD | | |
|---|---|---|---|---|---|---|
| Kt (lb-in/A) = | 12.39 | | | 21.24 | | |
| Kt (Nm/A) = | 1.4 | | | 2.4 | | |
| Ke (V/krpm) = | 85.5 | | | 147 | | |
| Rated torque (lb-in) | 172.32 | 207.02 | 238.44 | 172.32 | 207.02 | 238.44 |
| Rated torque (Nm) | 19.47 | 23.39 | 26.94 | 19.47 | 23.39 | 26.94 |
| Stall current (A) | 16.25 | 20.48 | 24.7 | 9.48 | 11.94 | 14.41 |
| Rated power (kW) | 4.08 | 4.9 | 5.64 | 4.08 | 4.9 | 5.64 |
| R (ph-ph) (Ohms) | 0.34 | 0.24 | 0.18 | 0.79 | 0.62 | 0.49 |
| L (ph-ph) (mH) | 5.33 | 3.79 | 3.07 | 12.15 | 9.66 | 8.34 |
| Recommended power conn' size | 1.5 | 1.5 | 1.5 | 1 | 1 | 1 |

### Speed 3000 (rpm)

| | 142ED | | | 142UD | | |
|---|---|---|---|---|---|---|
| Kt (lb-in/A) = | 8.23 | | | 14.16 | | |
| Kt (Nm/A) = | 0.93 | | | 1.6 | | |
| Ke (V/krpm) = | 57 | | | 98 | | |
| Rated torque (lb-in) | 148.16 | 168.34 | | 148.43 | 168.34 | 185.25 |
| Rated torque (Nm) | 16.74 | 19.02 | | 16.77 | 19.02 | 20.93 |
| Stall current (A) | 24.46 | 30.82 | | 14.22 | 17.92 | 21.61 |
| Rated power (kW) | 5.26 | 5.97 | | 5.27 | 5.97 | 6.58 |
| R (ph-ph) (Ohms) | 0.12 | 0.1 | | 0.34 | 0.24 | 0.18 |
| L (ph-ph) (mH) | 1.9 | 1.57 | | 5.33 | 3.79 | 3.07 |
| Recommended power conn' size | 1.5 | 1.5 | | 1 | 1.5 | 1.5 |
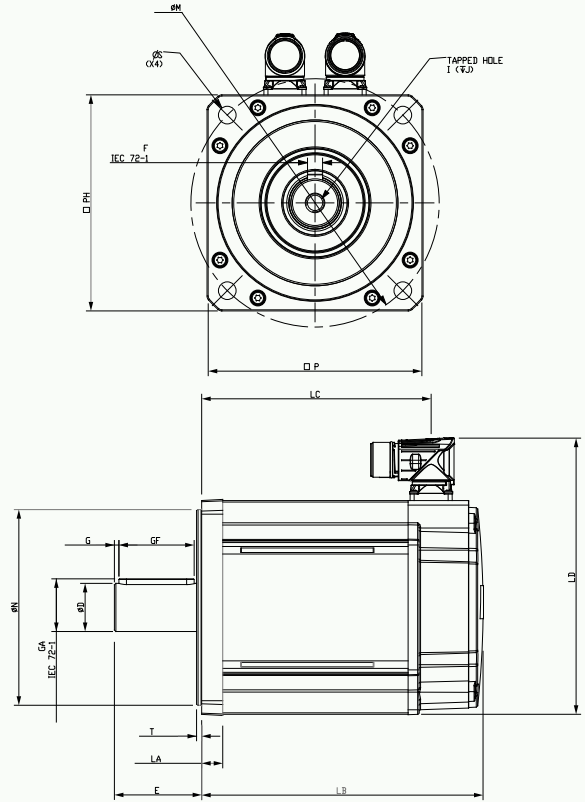


- Δt= 100°C winding 40°C maximum ambient
- All data subject to +/-10% tolerance
- Stall torque, rated torque and power relate to maximum continuous operation tested in a 20°C ambient at 8 kHz drive switching frequency
- All other figures relate to a 20°C motor temperature.
- Maximum intermittent winding temperature is 140°C

## Motor dimensions
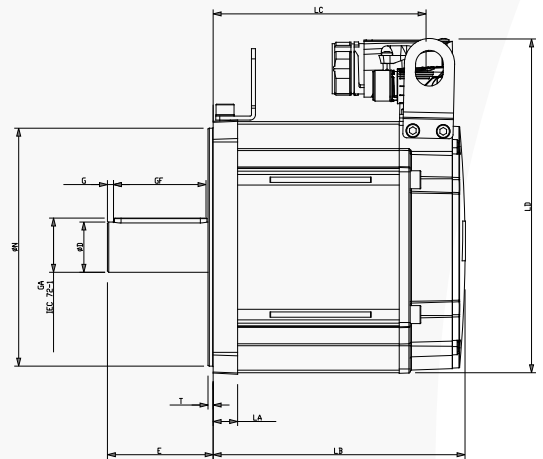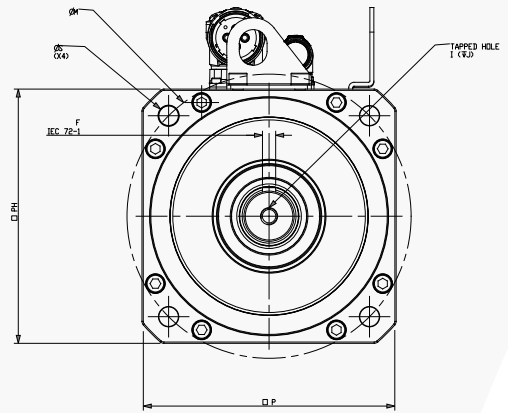
**Drawing number: IM/0709/GA**

| | Feedback AR, CR, EM/FM, LM/NM | | | | | | | | Flange thickness | | Register length | | Register diameter | | Overall height | | Flange square | | Fixing hole diameter | | Fixing hole PCD | | Motor housing | | Mounting bolts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Unbraked length | | | | Braked length | | | | | | | | | | | | | | | | | | | | | |
| | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | |
| 142C | 8.543 | 217 | 7.185 | 182.5 | 11.122 | 282.5 | 9.764 | 248 | | | | | | | 7.224 | 183.5 | | | | | | | | | |
| 142D | 9.724 | 247 | 8.366 | 212.5 | 12.303 | 312.5 | 10.945 | 278 | 0.551 | 14 | 0.134 | 3.4 | 5.118 | 130 | 7.224-8.051 | 183.5-204.5 | 5.591 | 142 | 0.472 | 12 | 6.496 | 165 | 5.591 | 142 | M10 |
| 142E | 10.906 | 277 | 9.547 | 242.5 | 13.484 | 342.5 | 12.126 | 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) | |
| | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | | in | mm |
| 32.0 Std | 1.260 | 32 | 2.283 | 58 | 1.378 | 35 | 1.969 | 50 | 0.118 | 3 | 0.394 | 10 | M12 x 1.75 | 1.142 | 29 |

## Frame size 190

| Motor frame size (mm) | 190ED | | | 190UD | | |
|---|---|---|---|---|---|---|
| Voltage (Vrms) | 200-240 | | | 380-480 | | |
| Frame length | C | D | F | C | D | F |
| Continuous stall torque (lb-in) | 460.24 | 548.75 | 752.31 | 460.24 | 548.75 | 752.31 |
| Continuous stall torque (Nm) | 52 | 62 | 85 | 52 | 62 | 85 |
| Peak torque (lb-in) | 1380.72 | 1646.24 | 2256.94 | 1380.72 | 1646.24 | 2256.94 |
| Peak torque (Nm) | 156 | 186 | 255 | 156 | 186 | 255 |
| Standard inertia (lb-in-sec$^2$) | 0.04832 | 0.06275 | 0.09161 | 0.04832 | 0.06275 | 0.09161 |
| Standard inertia (kgcm$^2$) | 54.6 | 70.9 | 103.5 | 54.6 | 70.9 | 103.5 |
| Winding thermal time constant (sec) | 311 | 316 | 324 | 311 | 316 | 324 |
| Motor weight unbraked (lb) | 61.16 | 75.62 | 104.54 | 61.16 | 75.62 | 104.54 |
| Motor weight unbraked (kg) | 27.74 | 34.3 | 47.42 | 27.74 | 34.3 | 47.42 |
| Motor weight braked (lb) | 69.18 | 83.64 | 125.09 | 69.18 | 83.64 | 125.09 |
| Motor weight braked (kg) | 31.38 | 37.94 | 56.74 | 31.38 | 37.94 | 56.74 |
| Number of poles | 10 | 10 | 10 | 10 | 10 | 10 |
| Speed 1000 (rpm) | | | | | | |
| Kt (lb-in/A) = | | 24.78 | | | | |
| Kt (Nm/A) = | | 2.8 | | | | |
| Ke (V/krpm) = | | 171 | | | | |
| Rated torque (lb-in) | 433.69 | 500.07 | 685.93 | | | |
| Rated torque (Nm) | 49 | 56.5 | 77.5 | | | |
| Stall current (A) | 18.6 | 22.1 | 30.4 | | | |
| Rated power (kW) | 5.13 | 5.92 | 8.12 | | | |
| R (ph-ph) (Ohms) | 0.47 | 0.4 | 0.23 | | | |
| L (ph-ph) (mH) | 12.3 | 10.4 | 6.79 | | | |
| Recommended power conn' size | 1.5 | 1.5 | 1.5 | | | |
| Speed 1500 (rpm) | | | | | | |
| Kt (lb-in/A) = | | | | | 28.32 | |
| Kt (Nm/A) = | | | | | 3.2 | |
| Ke (V/krpm) = | | | | | 196 | |
| Rated torque (lb-in) | | | | 408.90 | 462.01 | 606.28 |
| Rated torque (Nm) | | | | 46.2 | 52.2 | 68.5 |
| Stall current (A) | | | | 16.3 | 19.4 | 26.6 |
| Rated power (kW) | | | | 7.26 | 8.2 | 10.76 |
| R (ph-ph) ($\Omega$) | | | | 0.57 | 0.4 | 0.23 |
| L (ph-ph) (mH) | | | | 14.15 | 10.4 | 6.79 |
| Connection type | | | | 1.5 | 1.5 | 1.5 |
| Speed 2000 (rpm) | | | | | | |
| Kt (lb-in/A) = | | 12.39 | | | 21.24 | |
| Kt (Nm/A) = | | 1.4 | | | 2.4 | |
| Ke (V/krpm) = | | 85.5 | | | 147 | |
| Rated torque (lb-in) | 376.16 | | | 376.16 | | |
| Rated torque (Nm) | 42.5 | | | 42.5 | | |
| Stall current (A) | 37.14 | | | 21.7 | | |
| Rated power(kW) | 8.9 | | | 8.9 | | |
| R (ph-ph) (Ohms) | 0.12 | | | 0.34 | | |
| L (ph-ph) (mH) | 3.07 | | | 8.2 | | |
| Recommended power conn' size | 1.5 | | | 1.5 | | |



- $\Delta$t= 100°C winding 40°C maximum ambient

- All data subject to +/-10% tolerance

- Stall torque, rated torque and power relate to maximum continuous operation tested in a 20°C ambient at 8 kHz drive switching frequency

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

- Maximum intermittent winding temperature is 140°C

## Motor dimensions

**Drawing number: IM/0710/GA**

| Feedback AR, CR, EM/FM, LM/NM | | | | | | | | Flange thickness | | Register length | | Register diameter | | Overall height | | Flange square | | Fixing hole diameter | | Fixing hole PCD | | Motor housing | | Mounting bolts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unbraked length | | | | Braked length | | | | | | | | | | | | | | | | | | | | | |
| in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | |
| 190C | 8.685 | 220.6 | 7.524 | 191.1 | 12.563 | 319.1 | 11.402 | 289.6 | | | | | | | | | | | | | | | | | |
| 190D | 9.866 | 250.6 | 8.705 | 221.1 | 13.744 | 349.1 | 12.583 | 319.6 | 0.728 | 18.5 | 0.154 | 3.9 | 7.087 | 180 | 9.941 | 252.5 | 7.492 | 190.3 | 0.571 | 14.5 | 8.465 | 215 | 7.480 | 190 | M12 |
| 190F | 12.228 | 310.6 | 11.067 | 281.1 | 16.106 | 409.1 | 14.945 | 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) | |
| | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | | in | mm |
| 38.0 Std | 1.496 | 38 | 3.150 | 80 | 1.614 | 41 | 2.756 | 70 | 0.181 | 4.6 | 0.394 | 10 | M12 x 1.75 | 1.142 | 29 |

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