CONTROL TECHNIQUES
DYNAMICS

**SERVO MOTOR SERIES**

# UNIMOTOR HD ULTRA LOW VOLTAGE (48V)

COMPLETE AGV SOLUTIONS

067 to 142 Frames
1.45Nm to 10.2Nm

Nidec
All for dreams

# Unimotor hd Ultra Low Voltage (48v)

Unimotor hd - ultra low voltage 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 067 to 142.

## Innovation

CTD is renowned for its innovation and reliability in the industrial servo, aerospace and defence markets since 1962 and is a member of the Nidec group of companies, our range of low-voltage motors is no exception.

Our Research and Development team works closely with leading Universities and, using our own proprietary software, design innovative products for a wide range of demanding environments.

## Faster set-up

With our proven direct mounting design, we can reduce the need for mechanical parts and increase the speed for application commissioning.

## Features

Unimotor hd - ultra low voltage is suitable for many industrial applications, the extensive range of features include:

- Torque range from 1.45 Nm to 10.2 Nm
- Connector variants, flying leads and 90° rotatable
- Variety of flange possibilities (IEC/NEMA)
- Various shaft diameters; keyed or plain
- IP65 conformance, sealing against water spray and dust when mounted and connected with optional connectors.  This is reduced to IP50 when used with flying leads.
- Low winding voltages of 40 Vdc to 50 Vdc
- Rated speeds from 1,000 to 6,000 rpm and others available
- Thermal protection by a KTY84.130 sensor
- Flexible mounting
- All-in-one solution

## Wide range of accessories

In addition we offer a range of accessories to cover your system requirements:

- Feedback and power cables for static and dynamic applications
- Gearboxes
- AGV Wheels - *Ask for details*
- Integrated Drives - *Ask for details*

## Accuracy and resolution to suit Your application requirements

For performance, the right feedback device is critical. We have selected the incremental encoder for high accuracy and medium resolution.

## Custom built motors

We understand that each project is individual. For this reason we can develop application specific motors, removing constraints from your design process.

Whether it is shaft lengths or connector types, we can delivery the motor to your exact requirements.

### Key Advantages

* High efficiency across a range of speeds.
* Ultra-flexible technology delivering variable speed.
* Increased battery efficiency.
* Reduced setup times.
* Versatility in design, specifically for your needs.

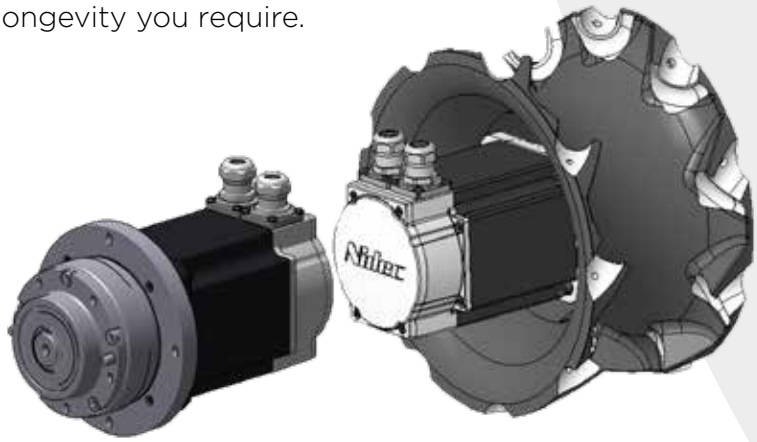
# Complete AGV Solutions

With the current demands for fully integrated, modular servo drive systems used in Automated Guided Vehicles, we at Control Techniques Dynamics have combined simplicity along with an innovative modular solution to meet with these demands.

Our Motion Control group excels at designing AGV motors and drive systems that offer innovative technology along with long-lasting quality. We have designed customised AGV solutions for some of the biggest names in retail distribution. You can depend on our products to provide the energy efficiency, dependability and longevity you require.

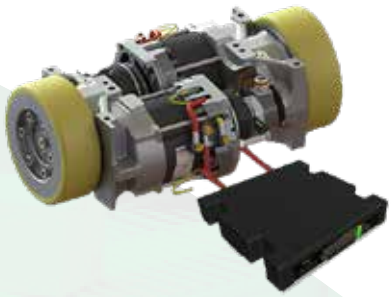
We will be happy to develop a solution for you that is tailored to your application requirements, e.g. wheel and motor resembling one part, which gives the AGV designer much more flexibility in terms of space usage.

You will benefit from our years of experience, our highly skilled staff and our comprehensive service catalogue.




*With our direct mounting design the need for other mechanical parts is reduced along with the setup time.*

# Take Complete Control



AGV's need two motors to move and steer. At Motion Control we can make this work with a single controller. Compared to the traditional One Motor/One Controller approach, the Dual Channel is simpler, cheaper, safer and easier to integrate and maintain. Two controllers can even team up to drive 4 motors with Mecanum wheels to move Omnidirectional Robots.

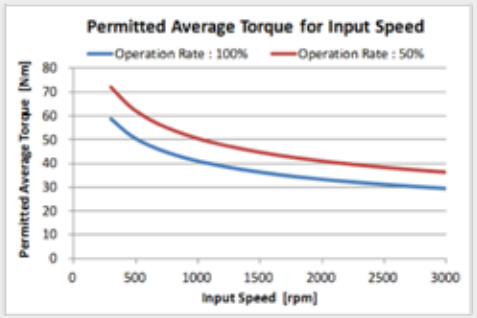
Ideal for applications such as:-

- AGV's
- Small Electric Vehicles, Electric Bikes
- Terrestrial and Underwater Robotic Vehicles
- Hazardous Material Handling Robots
- Balancing Robots

# ORDERING CODES

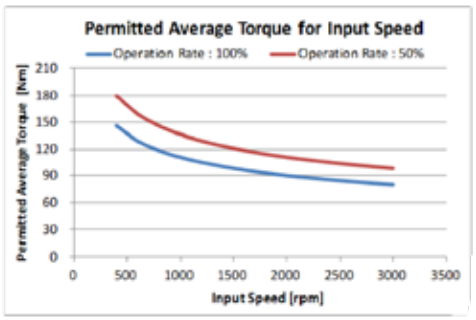
1. AGV089A01 **Designed for applications with a loads upto 600kg***
2. AGV142A01 **Designed for applications with a loads upto 1,200kg***

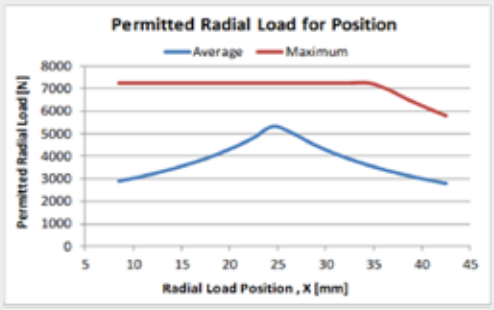
AGV089A01

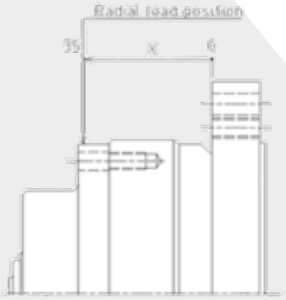


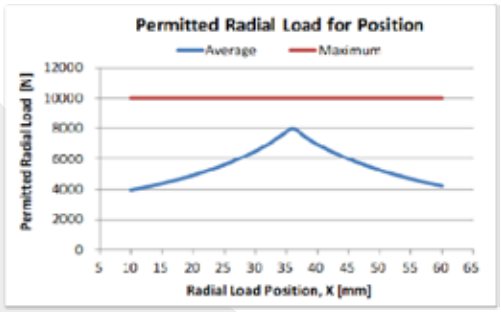

Both motors are fitted with a VRLZ type gearbox, 4096 incremental encoder and 0.5m flying leads.
*(089 - VRLZ090)*
*(142 - VRLZ120)*

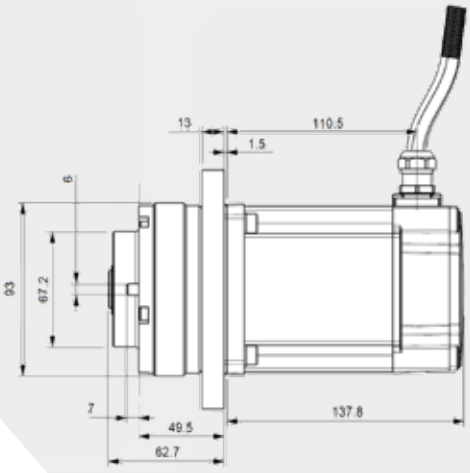
AGV142A01

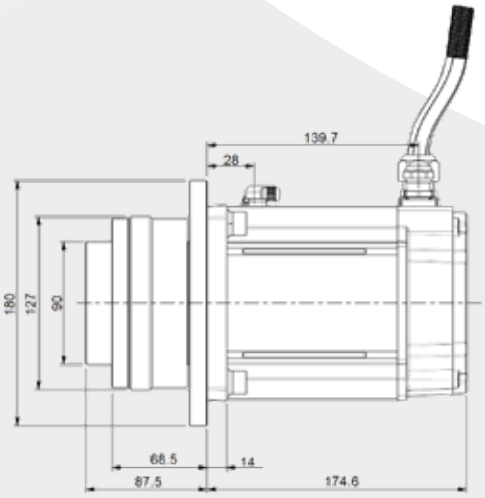


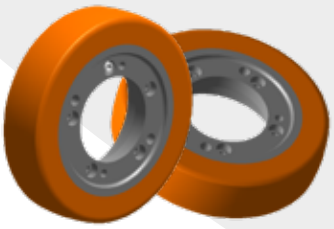




**AGV's fitted with 2 driving wheels.*

# ADDITIONAL OPTIONS

2. Motor fitted with AGV Wheel



3. Motor fitted with Brake

4. Motor fitted with AGV wheel and brake combined.

5. Motor supplied with Dual Drive

Please check with ctdsales@mail.nidec.com for more information.

# Standard Ordering information

Use the information below in the illustration to create an order code for a ultra low voltage motor.

| 067 | LD | B | 30 | 0 | F |
|---|---|---|---|---|---|
| Frame size | Motor voltage | Stator length | Rated speed | Brake | Connection type |
| | 067 - 142 frame | 067 frame | 067 frame | 067 - 142 frame | Size 1 |
| **067** | **LD** = 48V | **A / B / C** | **20** = 2000 rpm | **0** = Not fitted (Std) | **B** = Power and signal 90° rotatable (Optional) |
| **089** | | 089 frame | **30** = 3000 rpm | **6** = Parking Brake (Resin) | **F** = Flying leads (0.5m Standard) |
| **115** | | **A / B / C** | **60** = 6000 rpm | | |
| **142** | | 115 frame | 089 frame | | |
| | | **A / B** | **10** = 1000 rpm | | |
| | | 142 frame | **20** = 2000 rpm | | |
| | | **A** | **30** = 3000 rpm | | |
| | | | 115 frame | | |
| | | | **10** = 1000 rpm | | |
| | | | **20** = 2000 rpm | | |
| | | | 142 frame | | |
| | | | **10** = 1000 rpm | | |
| | | | **20** = 2000 rpm | | |

## GEARBOX SUFFIX*

Motors requiring gearboxes must have the pcd/shaft and a special code at the end of the part number as per definitions below:-

e.g. 067LDA200FACAC**080220-GSAI**

| PCD / SHAFT |
|---|
| VRLZ-090 |
| **100620** |
| VRLZ-120 |
| **165900** |
| VRL-090 |
| **080220** |
| VRL-120 |
| **108320** |
| VRL-155 |
| **140400** |

| Type | Ordering Code |
|---|---|
| **VRLZ-090** (9:1) | **GSFK** *Compatible for 067, 089 and 115 frames* |
| **VRLZ-120** (9:1) | **GSFL** *Compatible for 089, 115 and 142 frames* |
| **VRL-090** (10:1) | **GSAI** *Compatible for 067, 089 and 115 frames* |
| **VRL-120** (10:1) | **GSAO** *Compatible for 089, 115 and 142 frames* |
| **VRL-155** (10:1) | **GSAU** *Compatible for 115 and 142 frames* |

*Gearboxes are not to be sold separately

| A | CR | | C |
|---|---|---|---|
| **Output shaft** | **Feedback device** | | **Inertia** |
| **067 - 142 frame** | **067 frame** | | **067 - 142 frame** |
| **A** = Key | **CR** = Incremental Encoder | R35i | **C** = Standard + KTY thermistor (KTY84) |
| **F** = Key and half key supplied separately | **089 - 142 frame** | | |
| | **CA** = Incremental Encoder | CFS50 | |

## Quick reference table

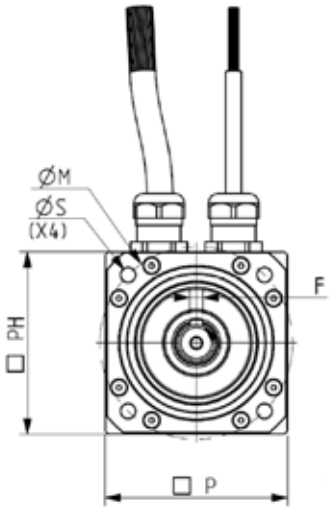
| Frame size | PCD (mm) | Low voltage | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 067 | 075 | | | 1.45 | 3.70 | | | | | | | |
| | | | | 0.30 | 0.75 | | | | | | | |
| 089 | 100 | | | | 3.20 | | | | | | 7.80 | |
| | | | | | | 0.87 | 2.34 | | | | | |
| 115 | 130 | | | | | | | | | 8.0 | 10.2 | |
| | | | | | | | | 2.42 | 4.41 | | | |
| 142 | 165 | | | | | | | | | | 9.2 | |
| | | | | | | | | | | | | 14.4 |
| Stall | (Nm) 0 | | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 | 11.0 |
| Inertia | (kg.cm2) 0 | | 0.2 | 0.3 | 0.5 | 0.8 | 1.0 | 2.4 | 2.5 | 3.0 | 4.0 | 15.0 | 20.0 |

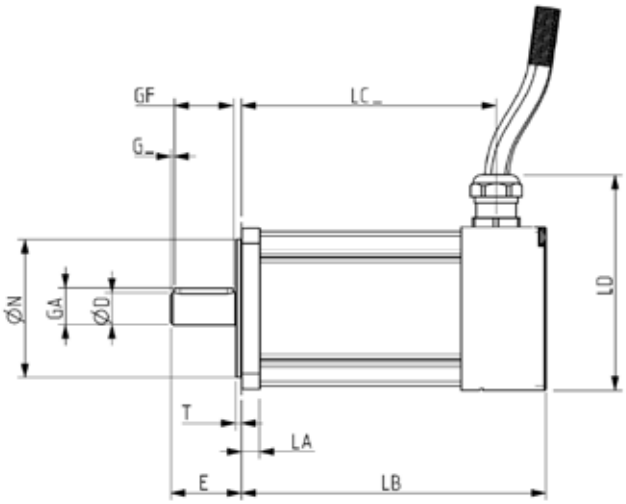
Conformance and standards

CE RoHS Compliant 2+ YEAR Worldwide Warranty DNV·GL

## Frame size 067

| Motor frame size (mm) | | 067LD | | |
|---|---|---|---|---|
| Voltage (Vrms) | | 40 - 50 | | |
| Frame length | | A | B | C |
| Continuous stall torque (Nm) | | 1.45 | 2.55 | 3.70 |
| Peak torque (Nm) | | 4.40 | 7.70 | 11.10 |
| Standard inertia (kgcm²) | | 0.30 | 0.50 | 0.75 |
| Winding thermal time constant (sec) | | 54.0 | 61.0 | 65.0 |
| Standard Motor weight (kg) | | 2.00 | 2.60 | 3.20 |
| Number of poles | | 10 | 10 | 10 |
| Speed 2,000 (rpm) | Kt (Nm/A) = | 0.21 | | |
| | Ke (V/krpm) = | 12.8 | | |
| Rated torque (Nm) | | 1.40 | 2.50 | 3.60 |
| Stall current (A) | | 6.90 | 12.20 | 17.70 |
| Rated power(kW) | | 0.30 | 0.52 | 0.80 |
| R (ph-ph) (Ohms) | | 0.59 | 0.22 | 0.14 |
| L (ph-ph) (mH) | | 1.70 | 0.80 | 0.60 |
| Standard Connection | | Flying Leads | | |
| Optional power conn' size | | 1 | 1 | 1 |
| Speed 3,000 (rpm) | Kt (Nm/A) = | 0.14 | | |
| | Ke (V/krpm) = | 8.5 | | |
| Rated torque (Nm) | | 1.40 | 2.50 | tba |
| Stall current (A) | | 10.40 | 18.30 | tba |
| Rated power(kW) | | 0.44 | 0.77 | tba |
| R (ph-ph) (Ohms) | | 0.27 | 0.11 | tba |
| L (ph-ph) (mH) | | 0.80 | 0.40 | tba |
| Standard Connection | | Flying Leads | | tba |
| Optional power conn' size | | 1 | n/a | n/a |
| Speed 6,000 (rpm) | Kt (Nm/A) = | 0.07 | | |
| | Ke (V/krpm) = | 4.3 | | |
| Rated torque (Nm) | | 1.30 | n/a | n/a |
| Stall current (A) | | 20.70 | n/a | n/a |
| Rated power(kW) | | 0.82 | n/a | n/a |
| R (ph-ph) (Ohms) | | 0.08 | n/a | n/a |
| L (ph-ph) (mH) | | 0.20 | n/a | n/a |
| Standard Connection | | Flying Leads | n/a | n/a |
| Optional power conn' size | | n/a | n/a | n/a |




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 **12 kHz drive switching frequency**
All other figures relate to a 20 °C motor temperature
Maximum Intermittent winding temperature is 140°C

### Motor dimensions (mm) Note all dimensions shown are at nominal

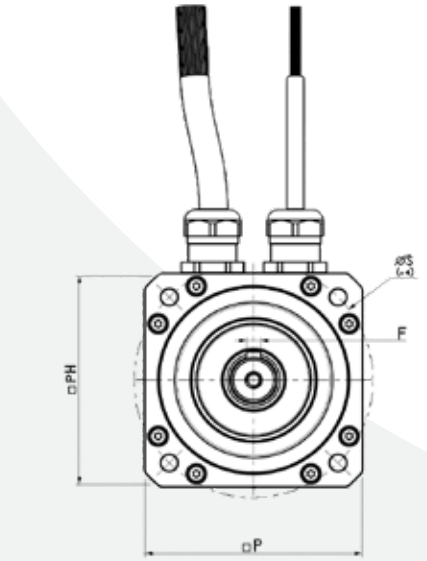
| | Feedback CR | | | | Flange thickness | Register length | Register diameter | Overall height | Flange square | Fixing hole diameter | Fixing hole PCD | Motor housing | Mounting bolts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Unbraked length | | Braked length | | | | | | | | | | |
| | LB (± 0.9) | LC (± 1.0) | 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) | |
| 067A | 142.9 | 109.0 | 177.9 | 144.0 | 7.7 | 2.5 | 60.0 | 111.5 | 70.0 | 5.8 | 75.0 | 67.0 | M5 |
| 067B | 172.9 | 139.0 | 207.9 | 174.0 | | | | | | | | | |
| 067C | 202.9 | 169.0 | 237.9 | 204.0 | | | | | | | | | |

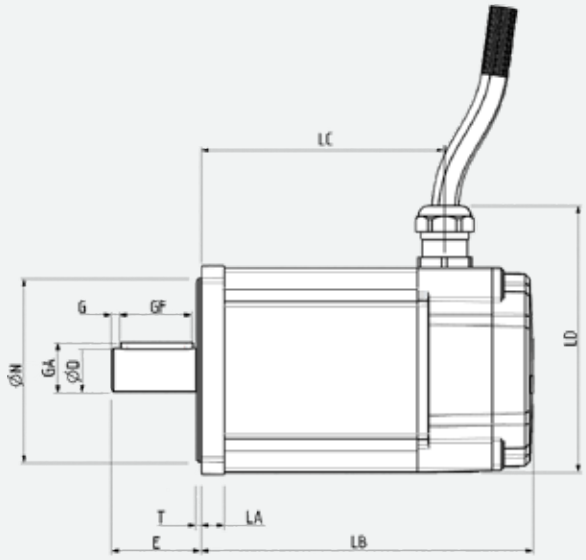
### Shaft dimensions (mm)

| | 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 ( ± 1.0) |
| 14.0 (Std) | 14.0 | 30.0 | 16.0 | 25.0 | 1.5 | 5.0 | M5 x 0.8 | 13.5 |

## Frame size 089

| Motor frame size (mm) | | 089LD | | |
|---|---|---|---|---|
| Voltage (Vrms) | | 40 - 50 | | |
| Frame length | | A | B | C |
| Continuous stall torque (Nm) | | 3.20 | 5.50 | 8.00 |
| Peak torque (Nm) | | 9.60 | 16.5 | 24.0 |
| Standard inertia (kgcm²) | | 0.87 | 1.61 | 2.34 |
| Winding thermal time constant (sec) | | 85.0 | 93.0 | 98.0 |
| Standard Motor weight (kg) | | 3.18 | 4.28 | 5.50 |
| Number of poles | | 10 | 10 | 10 |
| Speed 1,000 (rpm) | Kt (Nm/A) = | 0.42 | | |
| | Ke (V/krpm) = | 25.6 | | |
| Rated torque (Nm) | | 3.20 | 5.25 | 7.80 |
| Stall current (A) | | 7.62 | 13.10 | 19.0 |
| Rated power(kW) | | 0.33 | 0.55 | 0.82 |
| R (ph-ph) (Ohms) | | 0.56 | 0.22 | 0.14 |
| L (ph-ph) (mH) | | 3.70 | 1.70 | 1.10 |
| Standard Connection | | Flying Leads | | |
| Optional power conn' size | | 1 | 1 | n/a |
| Speed 2,000 (rpm) | Kt (Nm/A) = | 0.21 | | |
| | Ke (V/krpm) = | 12.8 | | |
| Rated torque (Nm) | | 3.10 | 5.00 | tba |
| Stall current (A) | | 15.3 | 26.3 | tba |
| Rated power(kW) | | 0.65 | 1.05 | tba |
| R (ph-ph) (Ohms) | | 0.14 | 0.06 | tba |
| L (ph-ph) (mH) | | 0.90 | 0.50 | tba |
| Standard Connection | | Flying Leads | | tba |
| Optional power conn' size | | 1 | n/a | n/a |
| Speed 3,000 (rpm) | Kt (Nm/A) = | 0.14 | | |
| | Ke (V/krpm) = | 8.5 | | |
| Rated torque (Nm) | | 3.00 | n/a | n/a |
| Stall current (A) | | 23.0 | n/a | n/a |
| Rated power(kW) | | 0.94 | n/a | n/a |
| R (ph-ph) (Ohms) | | 0.08 | n/a | n/a |
| L (ph-ph) (mH) | | 0.50 | n/a | n/a |
| Standard Connection | | Flying Leads | n/a | n/a |
| Optional power conn' size | | n/a | n/a | n/a |




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 **12 kHz drive switching frequency**
All other figures relate to a 20 °C motor temperature
Maximum Intermittent winding temperature is 140°C

### Motor dimensions (mm) Note all dimensions shown are at nominal

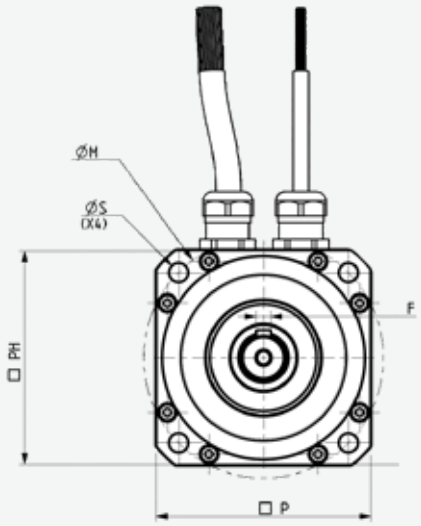
| | Feedback CA | | | | Flange thickness | Register length | Register diameter | Overall height | Flange square | Fixing hole diameter | Fixing hole PCD | Motor housing | Mounting bolts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Unbraked length | | Braked length | | | | | | | | | | |
| | LB (± 0.9) | LC (± 1.0) | 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) | |
| 089A | 160.8 | 123.5 | 200.9 | 163.6 | 10.3 | 2.2 | 80.0 | 130.5 | 91.0 | 7.0 | 100.0 | 89.0 | M6 |
| 089B | 190.8 | 153.5 | 230.9 | 193.6 | | | | | | | | | |
| 089C | 220.8 | 183.5 | 260.9 | 223.6 | | | | | | | | | |

### Shaft dimensions (mm)

| | 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 ( ± 1.0) |
| 19.0 (Std) | 19.0 | 40.0 | 21.5 | 32.0 | 3.7 | 6.0 | M6 x 1.0 | 17.0 |

## Frame size 115

| Motor frame size (mm) | | 115LD | |
|---|---|---|---|
| Voltage (Vrms) | | 40 - 50 | |
| Frame length | | A | B |
| Continuous stall torque (Nm) | | 8.00 | 10.2 |
| Peak torque (Nm) | | 24.0 | 30.6 |
| Standard inertia (kgcm²) | | 2.42 | 4.41 |
| Winding thermal time constant (sec) | | 160.0 | 164.0 |
| Standard Motor weight (kg) | | 5.13 | 7.00 |
| Number of poles | | 10 | 10 |
| Speed 1,000 (rpm) | Kt (Nm/A) = | 0.42 | |
| | Ke (V/krpm) = | 25.6 | |
| Rated torque (Nm) | | 7.50 | 9.40 |
| Stall current (A) | | 19.0 | 24.3 |
| Rated power(kW) | | 0.79 | 0.98 |
| R (ph-ph) (Ohms) | | 0.28 | 0.10 |
| L (ph-ph) (mH) | | 2.20 | 0.90 |
| Standard Connection | | Flying Leads | |
| Optional power conn' size | | n/a | n/a |




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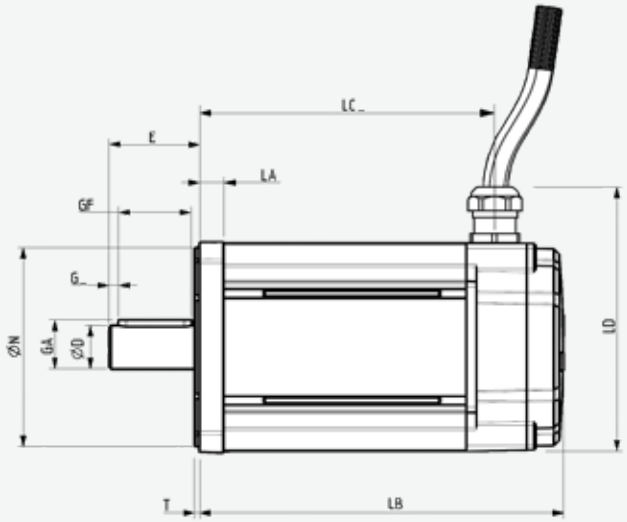



Motor dimensions (mm) Note all dimensions shown are at nominal

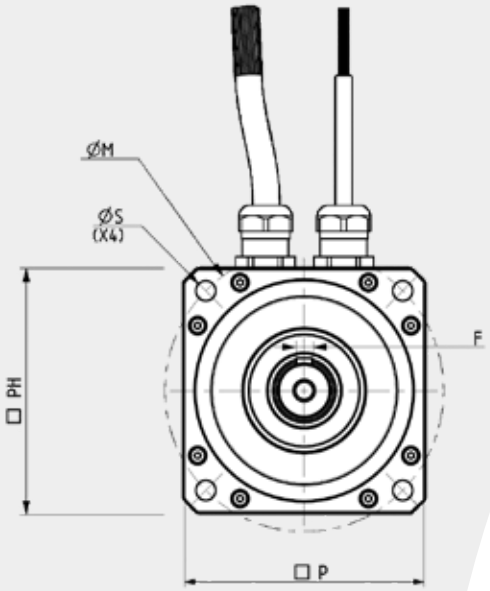
| | Feedback CA | | | | Flange thickness | Register length | Register diameter | Overall height | Flange square | Fixing hole diameter | Fixing hole PCD | Motor housing | Mounting bolts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Unbraked length | | Braked length | | | | | | | | | | |
| | LB (± 0.9) | LC (± 1.0) | 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) | |
| 115A | 176.8 | 137.0 | 213.9 | 174.1 | 13.2 | 2.7 | 110.0 | 156.5 | 116.0 | 10.0 | 130.0 | 115.0 | M8 |
| 115B | 206.8 | 167.0 | 243.9 | 204.1 | | | | | | | | | |

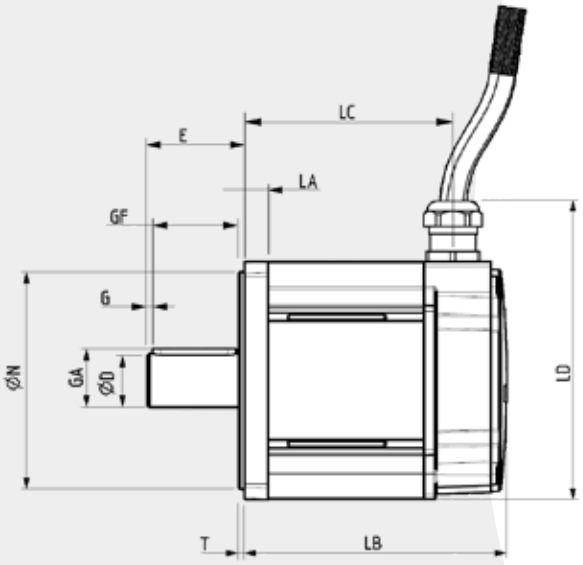
Shaft dimensions (mm)

| | 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 ( ± 1.0) |
| 24.0 (Std) | 24.0 | 50.0 | 27.0 | 40.0 | 5.3 | 8.0 | M8 x 1.25 | 20.0 |

## Frame size 142

| Motor frame size (mm) | | 142LD |
|---|---|---|
| Voltage (Vrms) | | 40 - 50 |
| Frame length | | A |
| Continuous stall torque (Nm) | | 9.20 |
| Peak torque (Nm) | | 27.6 |
| Standard inertia (kgcm²) | | 14.4 |
| Winding thermal time constant (sec) | | 235 |
| Standard Motor weight (kg) | | 7.44 |
| Number of poles | | 10 |
| Speed 2,000 (rpm) | Kt (Nm/A) = | 0.21 |
| | Ke (V/krpm) = | 12.8 |
| Rated torque (Nm) | | 8.60 |
| Stall current (A) | | 51.7 |
| Rated power(kW) | | 1.80 |
| R (ph-ph) (Ohms) | | 0.02 |
| L (ph-ph) (mH) | | 0.22 |
| Standard Connection | | Flying Leads |
| Optional power conn' size | | n/a |




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 **12 kHz drive switching frequency**
All other figures relate to a 20 °C motor temperature
Maximum Intermittent winding temperature is 140°C

### Motor dimensions (mm) Note all dimensions shown are at nominal

| | Feedback CA | | | | 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) | 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) | |
| 142A | 157.3 | 122.5 | 255.8 | 221.0 | 14.0 | 3.4 | 130.0 | 183.5 | 142.0 | 12.0 | 165.0 | 142.0 | M10 |

### Shaft dimensions (mm)

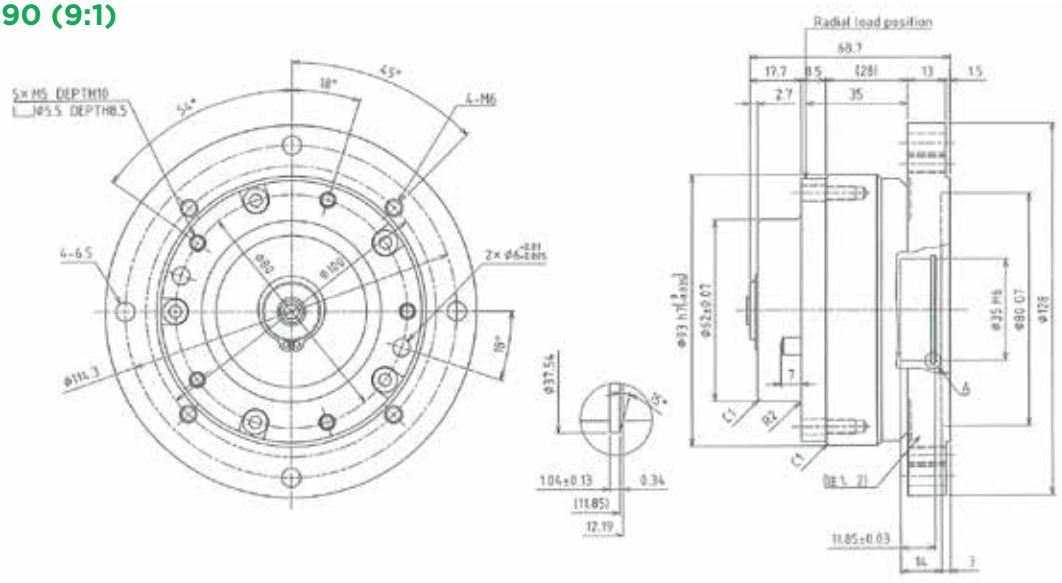
| | Shaft diameter | Shaft length | Key height | Key length | Key to shaft end | Key width | Tapped hole thread size | Tapped hole depth |
|---|---|---|---|---|---|---|---|---|
| | D (j6) | E | GA | GF | G | F (h9) | I | J ( ± 1.0) |
| 32.0 (std) | 32.0 | 58.0 | 35.0 | 50.0 | 3.0 | 10.0 | M12 x 1.75 | 29.0 |

# Gearboxes

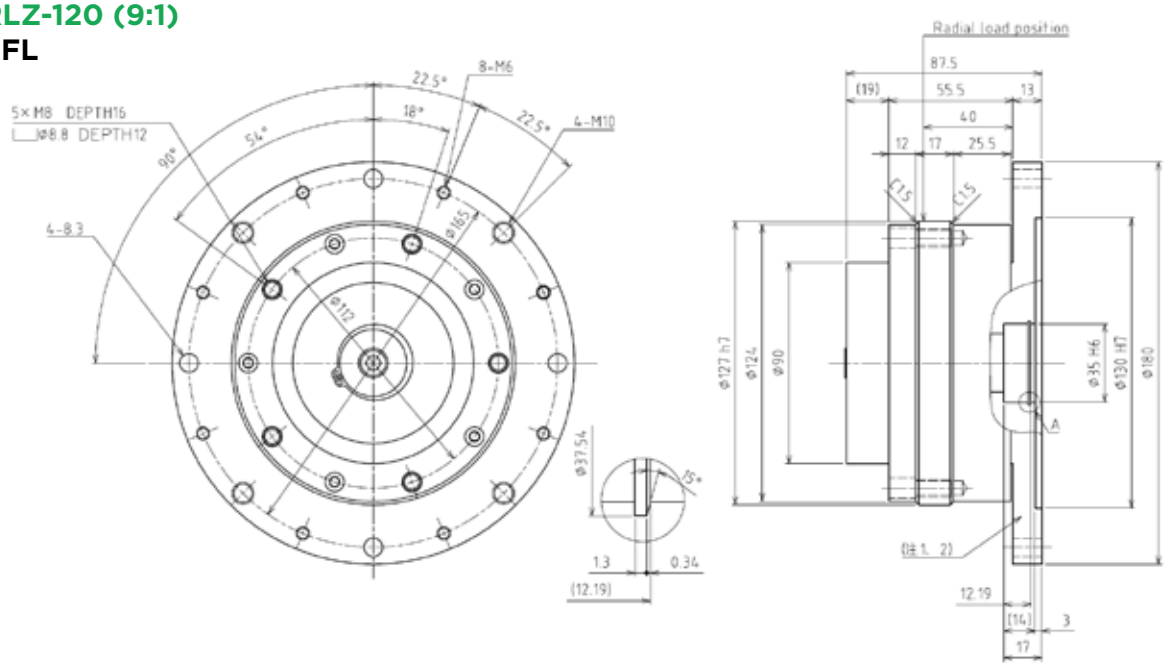
Along side our ultra low voltage motors we also offer a range of gearboxes*. These have been selected to compliment the motors in demanding environments for application requirements such as AGV's or Robotics.

## GEARBOX TYPES & DIMENSIONS

### VRLZ-090 (9:1)
**GSFK**

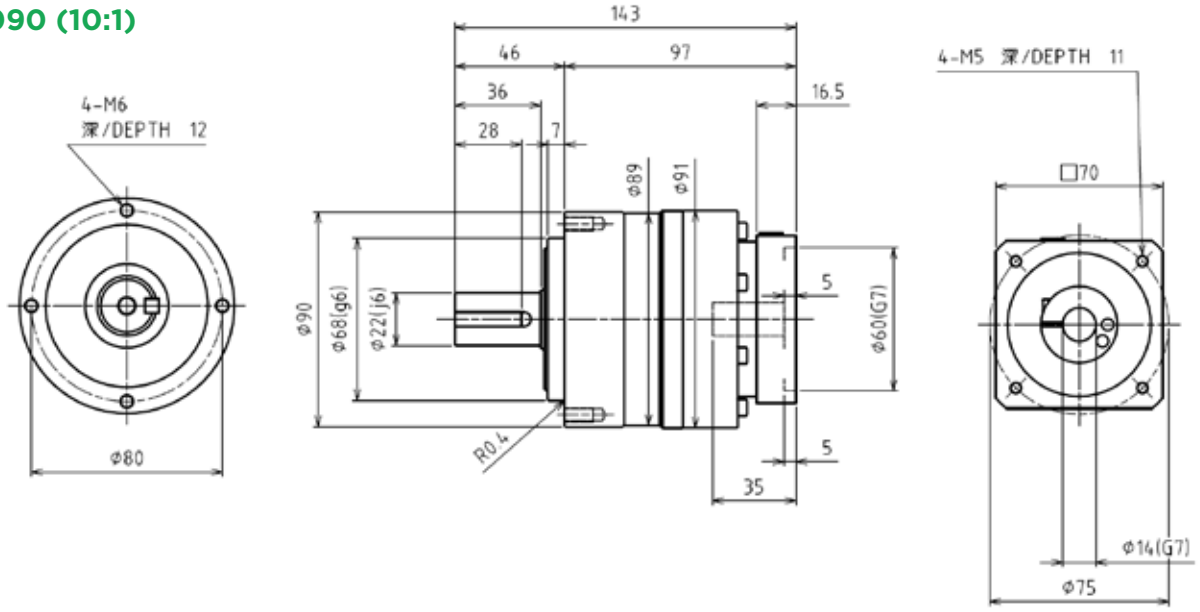



### VRLZ-120 (9:1)
**GSFL**

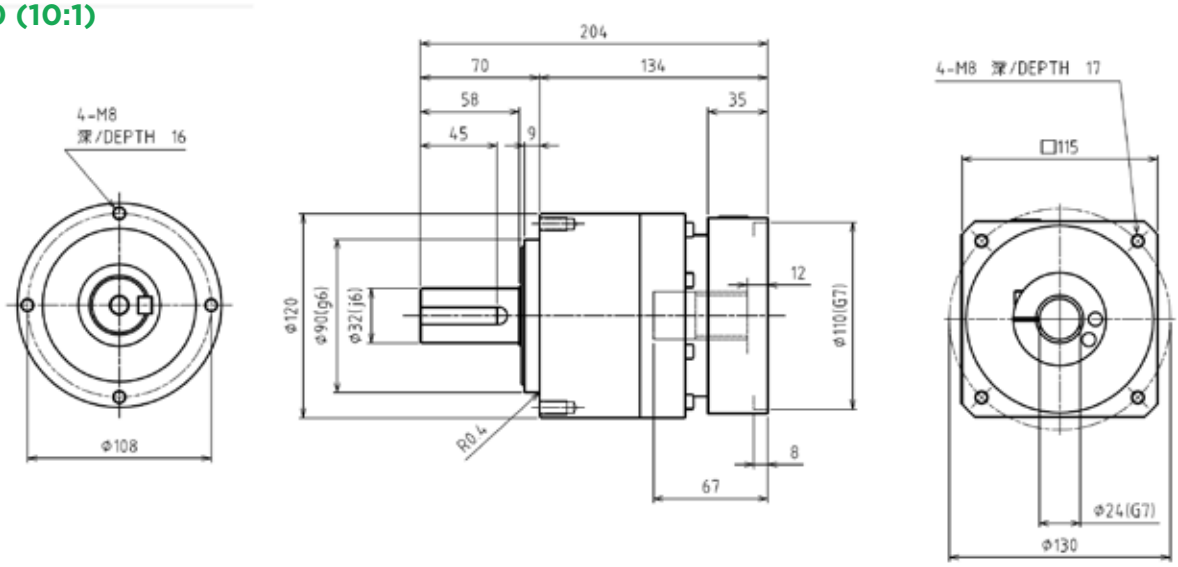



*not to be sold separately

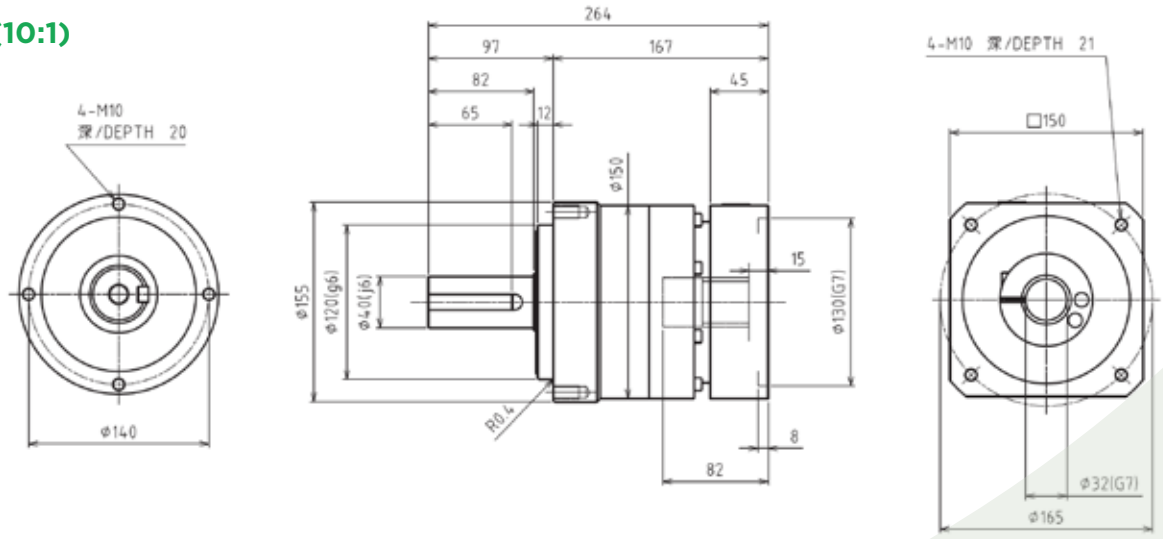
## VRL-090 (10:1)
**GSAI**




## VRL-120 (10:1)
**GSAO**




## VRL-155 (10:1)
**GSAU**

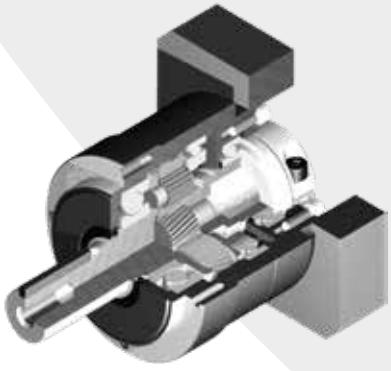


## GEARBOX CHARACTERISTICS

| | VRLZ - 090 | VRLZ - 120 | VRL - 090 | VRL - 120 | VRL - 155 |
|---|---|---|---|---|---|
| Ordering Code | GSFK | GSFL | GSAI | GSAO | GSAU |
| Type | In-Line Planetary | In-Line Planetary | In-Line Planetary | In-Line Planetary | In-Line Planetary |
| Ratio | 9:1 | 9:1 | 10:1 | 10:1 | 10:1 |
| Stages | 1 | 1 | 1 | 1 | 1 |
| Weight (kg) | 2.7 | 6.9 | 3.5 | 7.8 | 16.0 |
| Efficiency | 95% | 95% | 95% | 95% | 95% |
| Backlash (arc/min) | ≤7 | ≤8 | ≤5 | ≤5 | ≤5 |
| Radial Load Max (Fr, N) @ E/2 & Fa=0 | 7250 | 10000 | 1200 | 2000 | 4700 |
| Axial Load Max (Fa, N) @ Fr=0 | 2200 | 7000 | 1600 | 2500 | 4100 |
| Output Torque Nominal (Nm) | 36 | 88.6 | 50 | 120 | 240 |
| Output Torque Peak (Nm) | 72 | 225 | 80 | 225 | 470 |

There are many other gearbox types available on request including:-

- Right Angled Planetary
- Strain Wave
- Worm and Wheel
- Helical Bevel
- Cycloidal
- Different ratios
- 1 or 2 stage

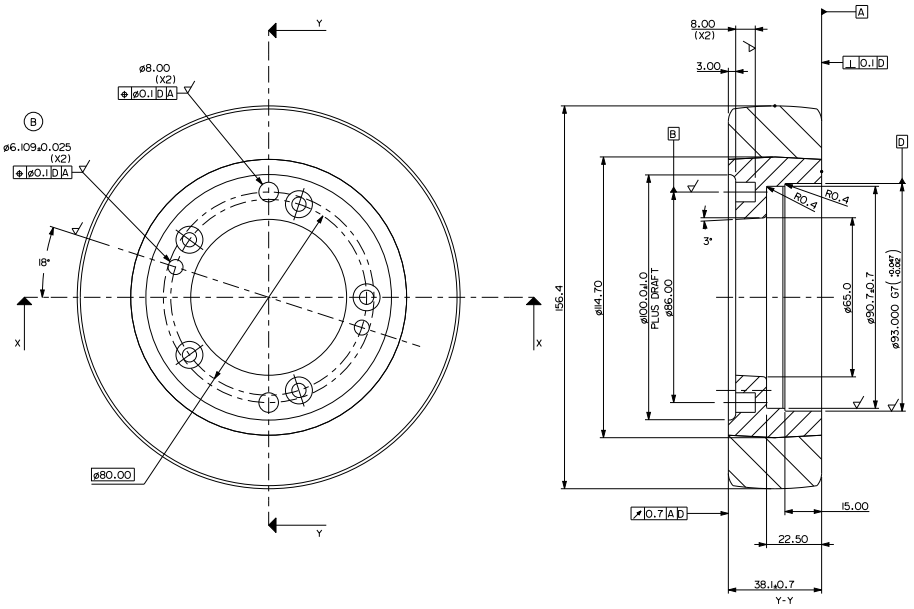


## BRAKE CHARACTERISTICS - spring applied

| Frame Size | Supply Voltage (V) | Power (W) | Torque (Nm) | Release Time (ms) | Maximum Backlash (°) |
|---|---|---|---|---|---|
| 089 | 24 | 15 | 4.0 | 30 | 3 |

For more information please contact us via:
ctdsales@mail.nidec.com
www.controltechniquesdynamics.com

## AGV WHEEL CHARACTERISTICS




The wheel dimensions can vary depending on the application requirements.

Material: HT200 Cast Iron / Rubber

Type: Thermoset Castable Polyester Based MDI Polyurethane.

Finish: Black, adhesion to meet ASTM D-3359 3B.

## DUAL DRIVE CHARACTERISTICS

Our Medium Power Dual Channel, Motor Controllers, have advanced core technology, multiple connectivity options and scripting support. Up to 2 x 60A. Conduction cooling plate with ABS plastic cover. Supports trapezoidal commutation and sinusoidal mode with field oriented control.

| CH | Amps / CH | Volts | Dig In | Ana In | Pulse In | Dig Out | FOC | Enc | STO | Ethernet |
|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 60 | 60 | 10 | 8 | 6 | 4 | Yes | Yes | No | No |
| 1 | 120 | 60 | 10 | 8 | 6 | 4 | | Yes | Yes | No |
| 1 | 120 | 60 | 10 | 8 | 6 | 4 | Yes | Yes | No | No |
| 2 | 60 | 60 | 10 | 8 | 6 | 4 | Yes | Yes | Yes | No |
| 1 | 120 | 60 | 10 | 8 | 6 | 4 | Yes | Yes | Yes | No |
| 2 | 60 | 60 | 10 | 8 | 6 | 4 | Yes | Yes | Yes | Yes |
| 1 | 120 | 60 | 10 | 8 | 6 | 4 | Yes | Yes | Yes | Yes |

**Control Techniques Dynamics is your servo motor specialist.**
With connections in over 70 countries, we're open for business wherever you are in the world.

For more information visit
**www.controltechniquesdynamics.com**

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