

**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 deliver 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.

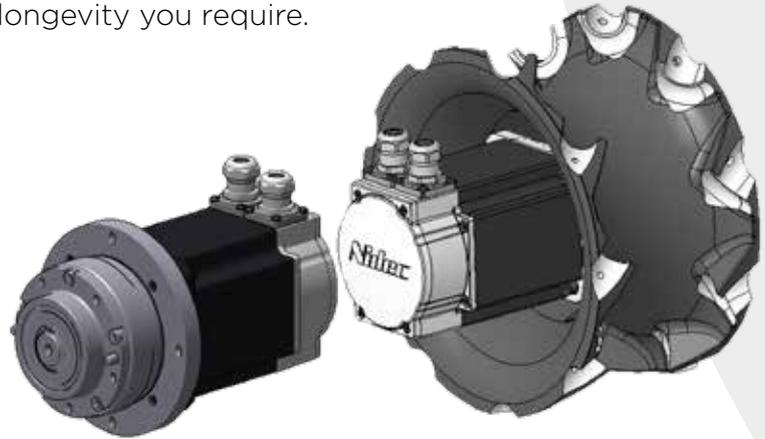
Complete AGV Solutions

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.

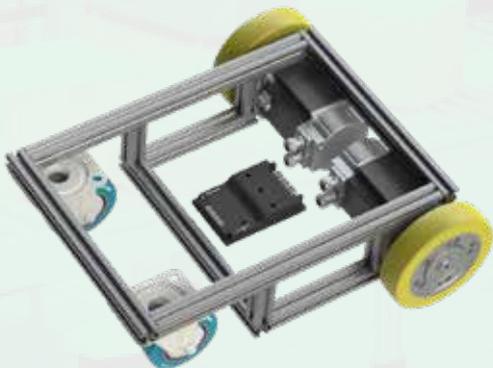
We will be happy to develop a solution for you that is tailored to your application requirements, e.g. wheel and motor resembling one part, which gives the AGV designer much more flexibility in terms of space usage.

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:-

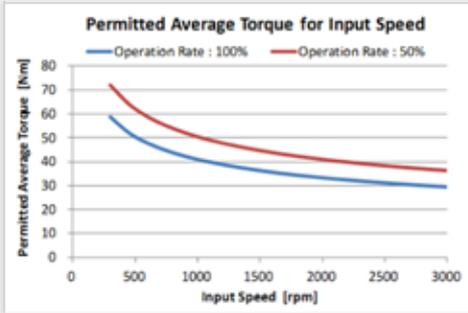
- AGV's
- Small Electric Vehicles, Electric Bikes
- Terrestrial and Underwater Robotic Vehicles
- Hazardous Material Handling Robots
- Balancing Robots



ORDERING CODES

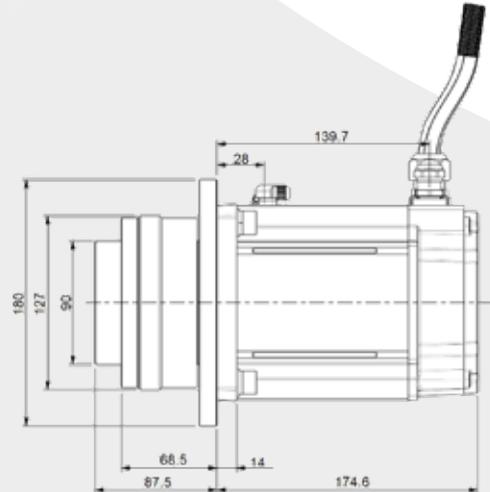
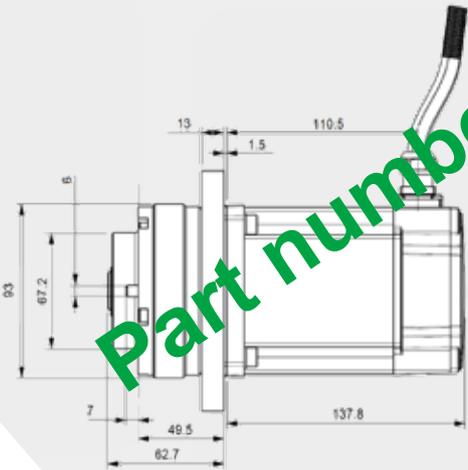
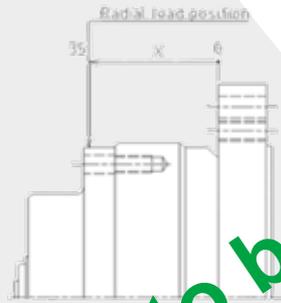
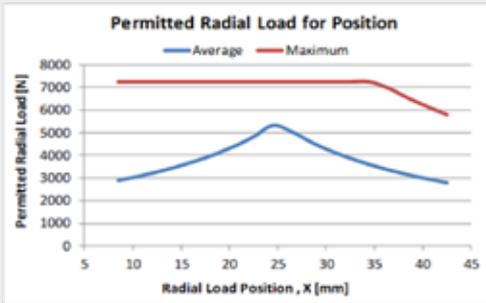
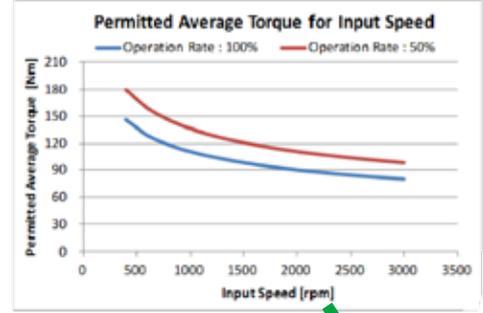
- 1 **AGV089A01** Designed for applications with a loads upto 600kg*
- AGV142A01** Designed for applications with a loads upto 1,200kg*

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. 067LDA200FACAC080220-GSAI		
PCD / SHAFT	Type	Ordering Code
VRLZ-090	VRLZ-090 (9:1)	GSFK Compatible for 067, 089 and 115 frames
100620		
VRLZ-120	VRLZ-120 (9:1)	GSFL Compatible for 089, 115 and 142 frames
165900		
VRL-090	VRL-090 (10:1)	GSAI Compatible for 067, 089 and 115 frames
080220		
VRL-120	VRL-120 (10:1)	GSAO Compatible for 089, 115 and 142 frames
108320		
VRL-155	VRL-155 (10:1)	GSAU Compatible for 115 and 142 frames
140400		

*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	CFSS0	



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.cm ²) 0	0.2	0.3	0.5	0.8	1.0	2.4	2.5	3.0	4.0	15.0	20.0			

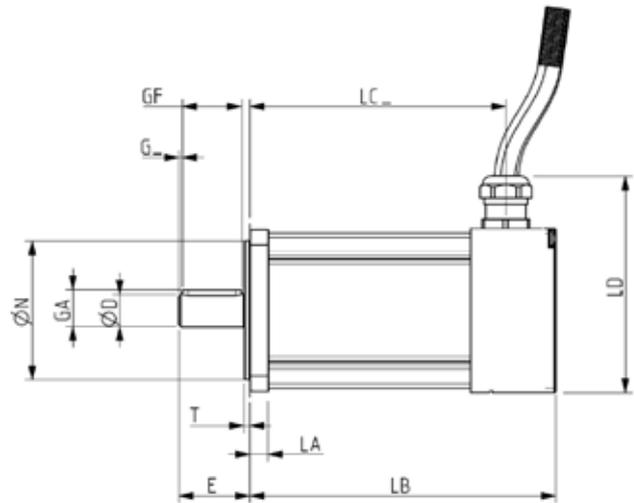
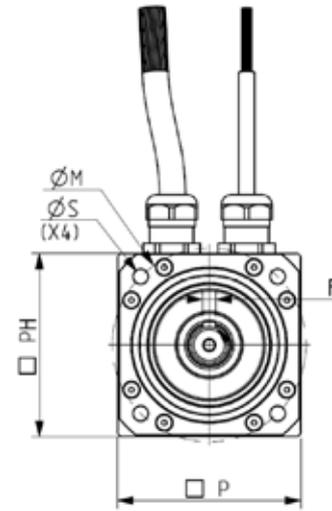
Conformance and standards



SERVO MOTOR SERIES

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 (kgcm ²)		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		
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		
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

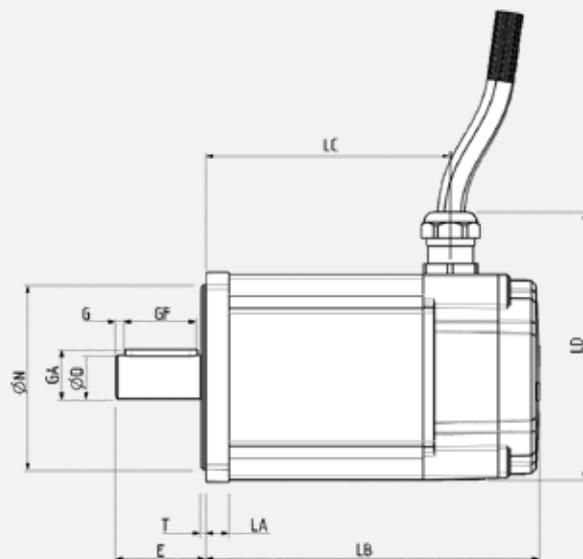
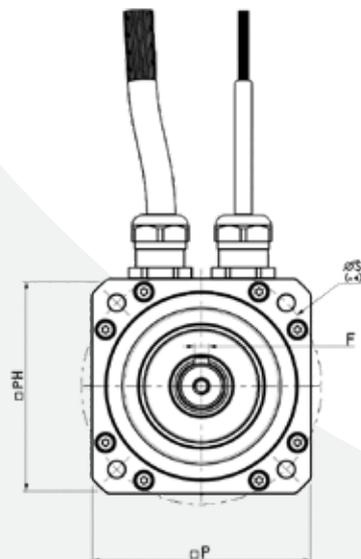
	Feedback CR				Flange thickness	Register length	Register diameter	Overall height	Flange square	Fixing hole diameter	Fixing hole PCD	Motor housing	Mounting bolts
	Unbraked length		Braked length										
	LB (± 0.9)	LC (± 1.0)	LB (± 0.9)	LC (± 1.0)	LA (± 0.5)	T (± 0.1)	N (j6)	LD (± 0.3)	P (± 0.3)	S (H14)	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 (kgcm ²)		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		
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		
Optional power conn' size		n/a	n/a	n/a



At= 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									

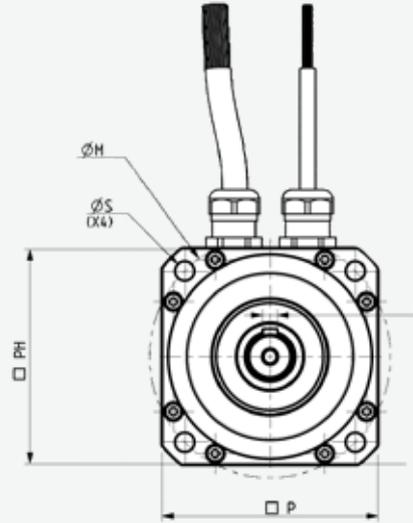
Shaft dimensions (mm)

	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

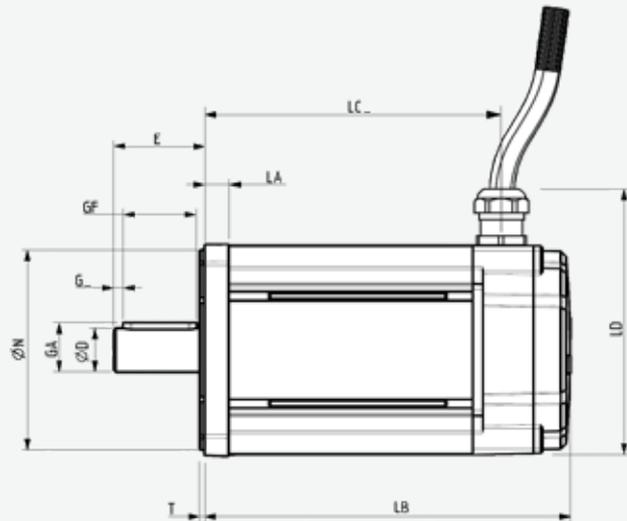
SERVO MOTOR SERIES

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 (kgcm ²)		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
 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

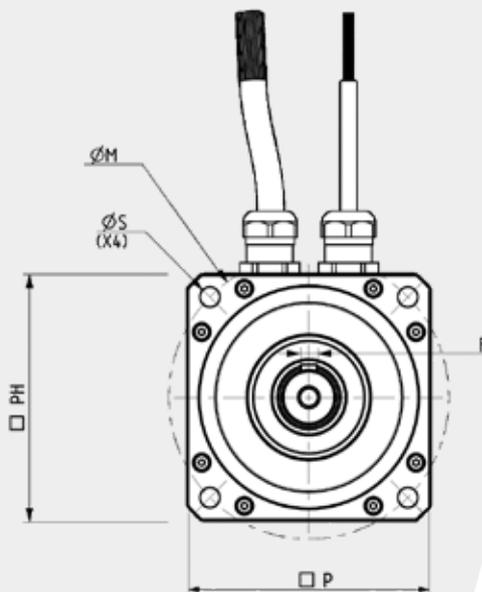
	Feedback CA				Flange thickness	Register length	Register diameter	Overall height	Flange square	Fixing hole diameter	Fixing hole PCD	Motor housing	Mounting bolts
	Unbraked length		Braked length										
	LB (± 0.9)	LC (± 1.0)	LB (± 0.9)	LC (± 1.0)	LA (± 0.5)	T (± 0.1)	N (j6)	LD (± 0.3)	P (± 0.3)	S (H14)	M (± 0.5)	PH (±0.5)	
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)

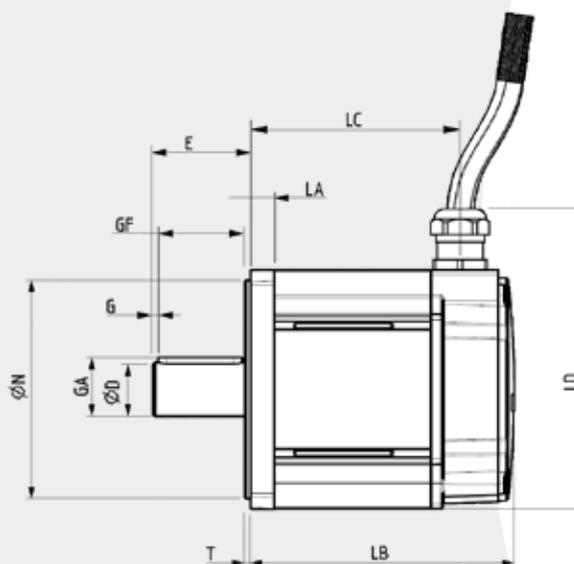
	Shaft diameter	Shaft length	Key height	Key length	Key to shaft end	Key width	Tapped hole thread size	Tapped hole depth
	D (j6)	E	GA	GF	G	F (h9)	I	J (± 1.0)
24.0 (Std)	24.0	50.0	27.0	40.0	5.3	8.0	M8 x 1.25	20.0

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 (kgcm ²)	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



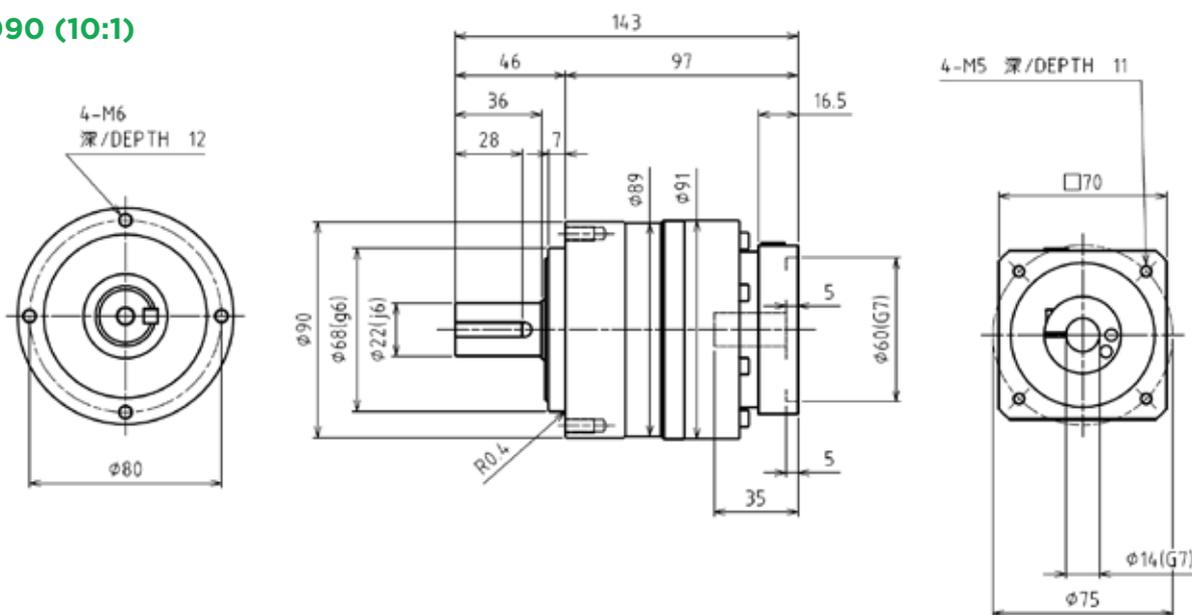
Motor dimensions (mm) Note all dimensions shown are at nominal

	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		Flange thickness									
	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

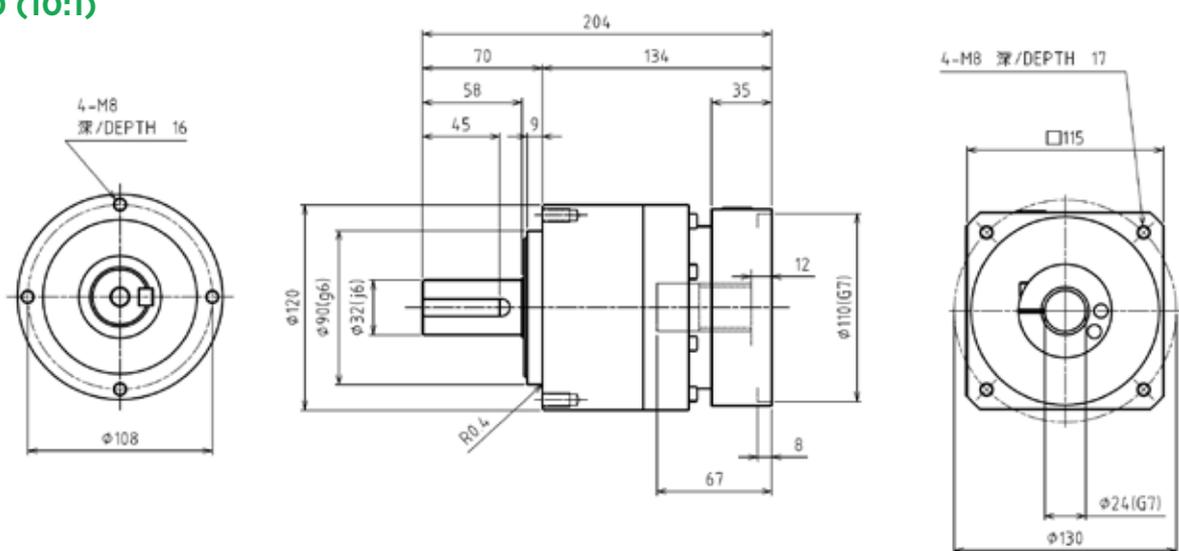
Shaft dimensions (mm)

	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

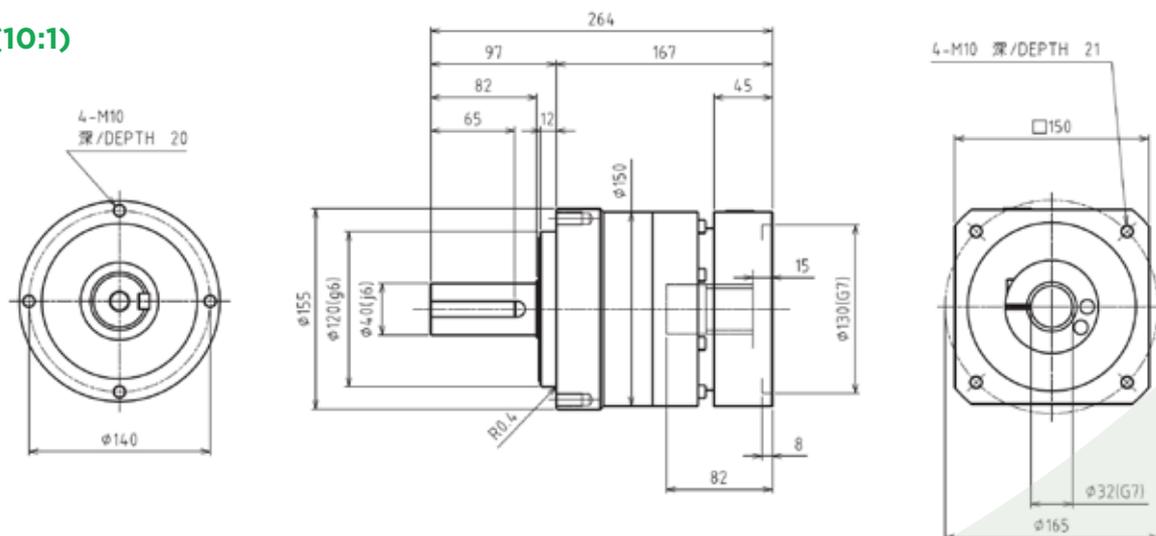
VRL-090 (10:1)
GSAI



VRL-120 (10:1)
GSAO



VRL-155 (10:1)
GSAU



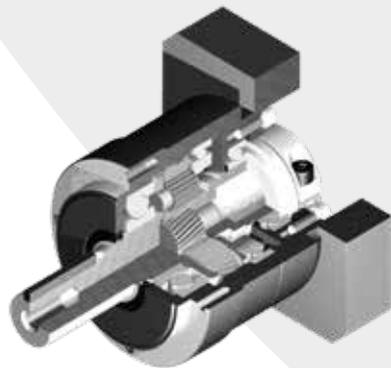
SERVO MOTOR SERIES

GEARBOX CHARACTERISTICS

	VRLZ - 090	VRLZ - 120	VRL - 090	VRL - 120	VRL - 155
Ordering Code	GSFK	GSFL	GSAI	GSAO	GSAU
Type	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

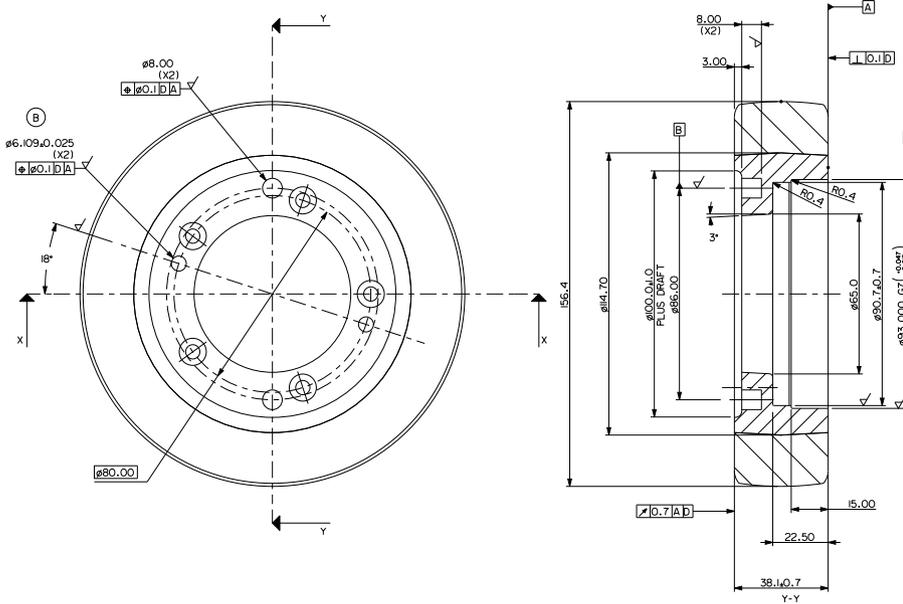


BRAKE CHARACTERISTICS - spring applied

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



**CONTROL TECHNIQUES
DYNAMICS** A NIDEC BRAND

© 2019 Control Techniques Dynamics Limited. The information contained in this brochure is for guidance only and does not form part of any contract. The accuracy cannot be guaranteed as Control Techniques Dynamics Ltd have an ongoing process of development and reserve the right to change the specification of their products without notice.

P.N. BROCH_CTD_LOWVOL_ISS02_EN - 0781-0080-01