Nanotec®
PLUG & DRIVE

PRODUCT CATALOG 2014/2015

STEPPER MOTORS
IP STEPPER MOTORS
HOLLOW SHAFT MOTORS
BRUSHLESS DC MOTORS
BRUSHLESS DC MOTORS IP65
LINEAR ACTUATORS
PLUG & DRIVE MOTORS
MOTOR CONTROLLERS
ENCODERS / GEARS / BRAKES

www.nanotec.com

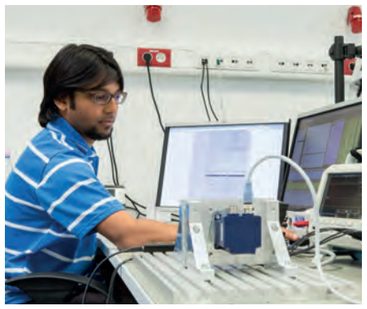
The company

Nanotec Electronic GmbH & Co. KG, headquartered in Feldkirchen near Munich, is among the world's leading manufacturers of motors and motor controllers for high-quality drive solutions. The company has been developing and marketing a broad range of products since 1991. Nanotec technology is primarily used in automation systems, automatic laboratory equipment, medical devices and semi-conductor production.

Early on, company founder Benno Wimmer recognized that power electronics are at the heart of efficient and effective drives and pushed the development of motor controllers. In 1996, Nanotec came out with the first Plug & Drive motor with an integrated controller, thereby setting a cornerstone that would ultimately be central to the company's growth.

Still today, Nanotec focuses heavily on research and development to create drive solutions that closely meet the needs and requirements of our customers. The hardware and software used in motor controllers, sensors, and customized applications are developed at the Feldkirchen headquarters, while innovations for our next product generation emerge from the R&D center in Pegnitz.

Together with subsidiaries in Changzhou, China, and Medford (Massachusetts), USA, and more than 20 sales partners, we provide Nanotec drive solutions and expert technical support to customers all over the world.



Standard and custom solutions for optimum drives

When drive systems with high precision, reliability and extensive functionality are required to fit in small spaces, Nanotec supplies the necessary technology – either as standard solutions or individualized designs. With prototype construction and the production of customized assemblies still located in Germany, and due to our policy of extensive warehousing, we are able to respond quickly and flexibly to customer needs.

Our stepper and BLDC motors, linear actuators and linear positioning drives, in sizes beginning at 10 mm, together with a variety of gears and encoders, are combine into a modular system with over 4000 possible combinations. In addition, you can choose from a range of shaft, flange and connector types that rapidly and reliably connect to existing device architecture.

Finally, the performance and resonance behavior of Nanotec motors is optimized by intelligent motor controllers that meet the latest technology standards.

Our products are manufactured at two Nanotec plants in China. Fully trained employees and high-quality machinery ensure stable processes and a high in-house production depth. Both production facilities in China operate according to German quality standards and are ISO-certified.

By controlling and monitoring all stages of manufacture – from prototype construction to pre-series and final production – Nanotec is able to quickly and efficiently produce customized solutions in series production.

Our integrated management system

Nanotec relies on an integrated management system that takes effect in the areas of quality, environment, occupational health and safety, risk management and data protection.

This system is designed to secure the continuing success of the company by guaranteeing our ability to promptly and efficiently meet customer needs and expectations while keeping our environmental impact to a minimum. By doing so, it lays the foundation for high quality standards and continuous improvement.

Nanotec quality assurance and environmental protection policies are in line with ISO 9001:2008 and ISO 14001:2004. Our occupational health and safety standards are designed according to the OHRIS concept and have been certified since 2014.

As part of our corporate policies and guidelines, we consider it our duty to ensure the viability of our company over the long term. Well-trained and responsible employees, a forward-looking personnel policy and a positive corporate culture all contribute to this aim. We adhere to pertinent national and international quality standards, integrate suppliers and customers in decision-making processes, detect and assess errors and risks at an early stage, and regularly reevaluate and update our goals.


CERTIFICATE

The Certification Body of TÜV SÜD Management Service GmbH certifies that

Nanotec Electronic GmbH & Co. KG
Kapellenstraße 6, 85622 Feldkirchen
Germany

has established and applies a Quality and Environmental Management System for the following scope of application:

Development, manufacturing and sales of motion control components

Performance of audits (Report-No. 70063386) has furnished proof that the requirements under

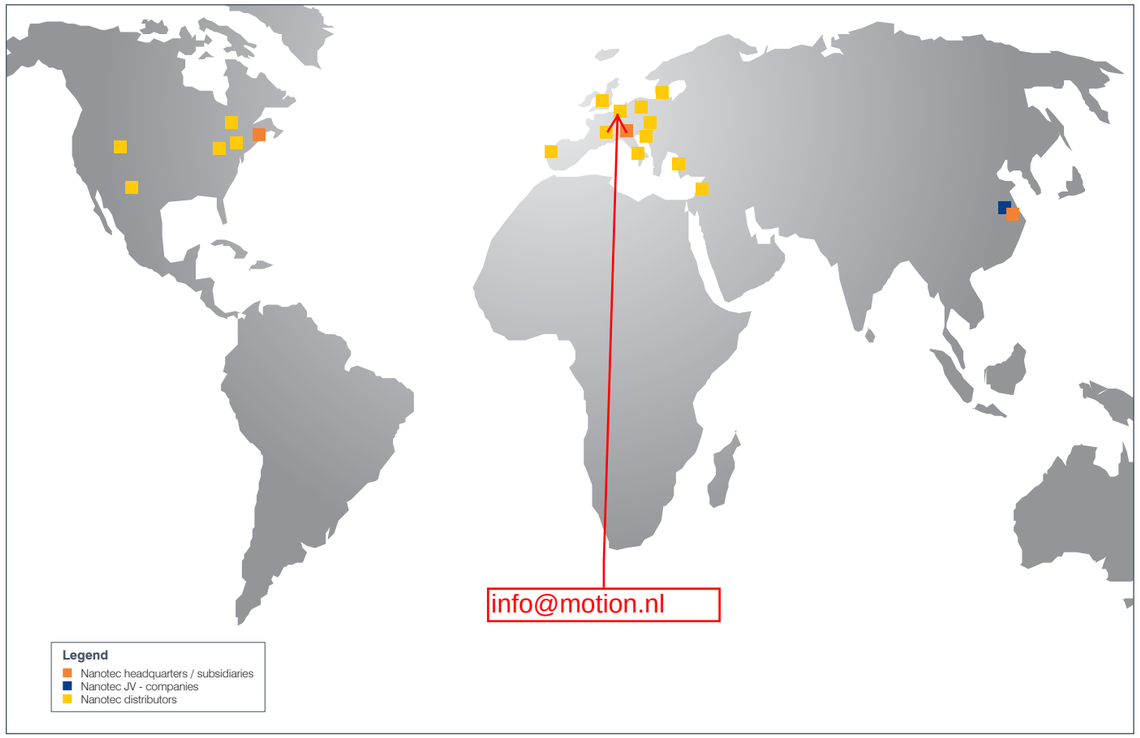
ISO 9001:2008
ISO 14001:2004

are fulfilled. The certificate is valid from 2013-06-30 until 2016-06-09.

Certificate Registration No. 12 100104 22658 TMS

DAkkS

Worldwide sales network



Nanotec products are available both directly from us and via a worldwide network of sales partners.
A list of our sales partners can be found on our website.

Our complete range of products can be found at www.nanotec.com

Quick and easy online shopping for the right product:

- Order quantities of up to 25 pieces directly on our website
- Our motor wizard will help you find a suitable motor
- Product configurator: Just a few clicks to configure your individual motor combination with encoder, brake and gear
- Free access to datasheets and 3D-data
- Torque curves of all motors at different operating voltages and control modes

Notes

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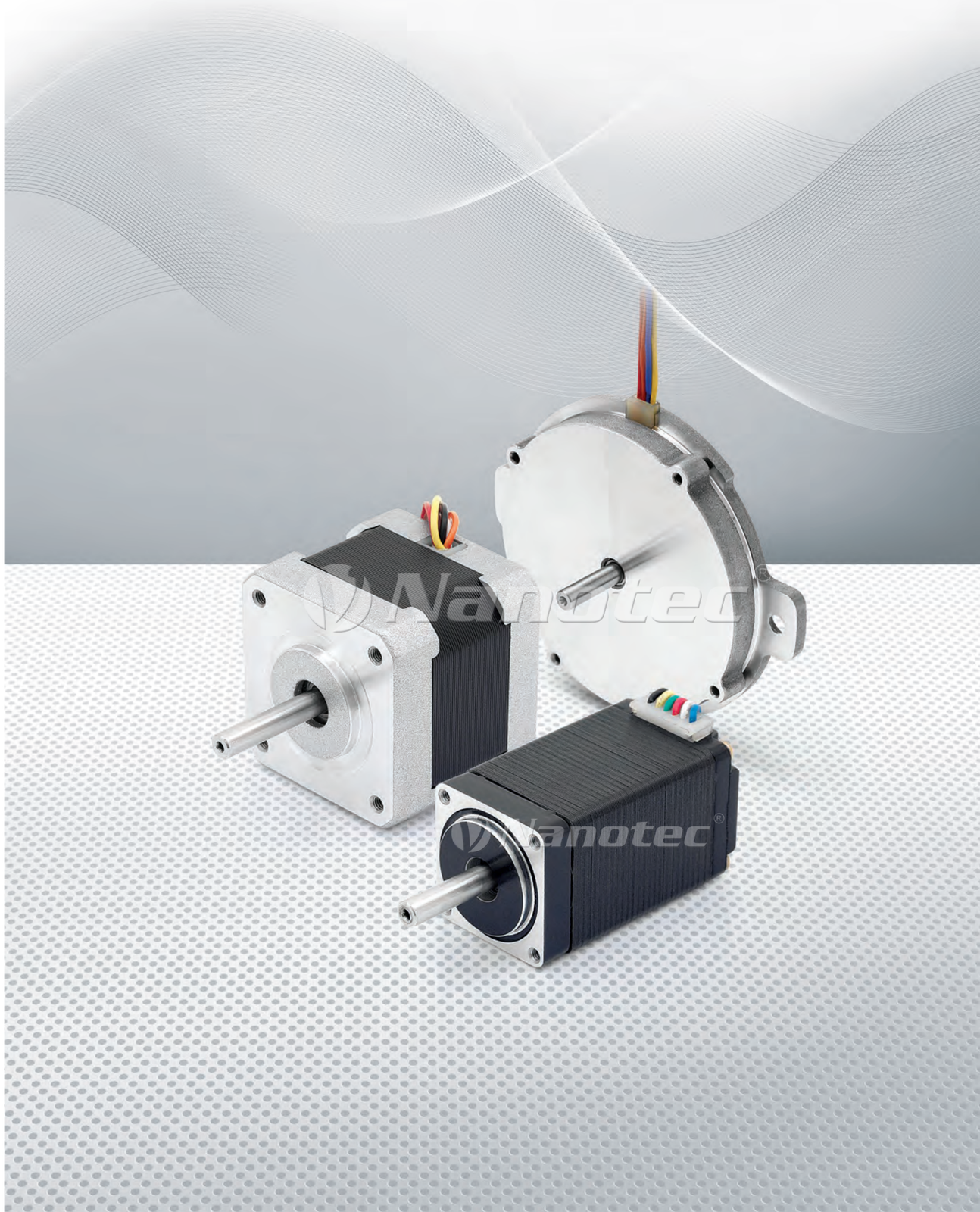
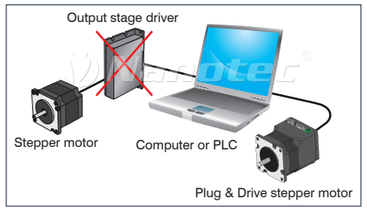
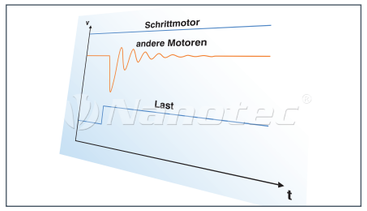
STEPPER MOTORS



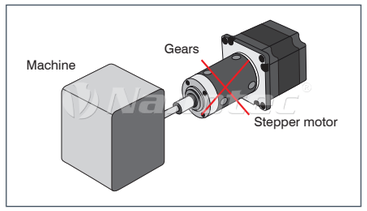
APPLICATION BENEFITS



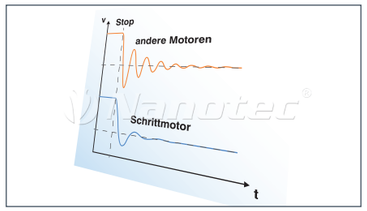
a) PC+PLC-capable (directly controllable via PC, PLC and microprocessor)
Plug & Drive motors have the highest productivity increase due to the use of PCs even at the lowest, decentralized machine level. Not only do these motors drastically reduce the development, wiring and installation effort for a complete drive unit and increase EMC compatibility and machine availability, but they also greatly simplify setup, installation and servicing.



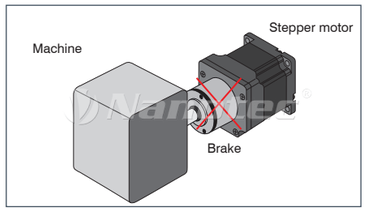
b) Turning speed stability
"No drop in speed when load changes" - the stepper motor meets this requirement like no other motor, without additional effort. Especially when using controls for precise speed, synchronicity or ratios (such as for precise metering pumps), the stepper motor can achieve higher or finer resolutions thanks to digital processing. The improved control, process and surface quality are further advantages.



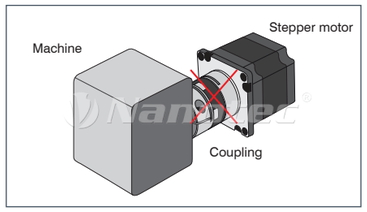
c) Direct drive
Stepper motors have their maximum torque in the lower speed range and the Nanotec micro stepper drivers still achieve concentricity properties up to approx. 2 rpm. Other motors often need gears in order to fulfill the speed and force requirements. Direct drives reduce system costs while increasing operating safety and service life. Gears are certainly indispensable for adjusting performance and power if space is limited or when the external inertia torque is high.



d) Positioning accuracy
As a result of the small step angle, stepper motors also have, in addition to the lowest over run, the smallest transient response. Even without external path or angle sensors, stepper motors fulfill outstanding speed and positioning tasks. The precision or resolution can even be increased further without additional effort using Nanotec motor controllers thanks to microstep switching. All Nanotec stepper motors are also available with encoders for detecting blockages and closed-loop applications.



e) High stiffness without brake
Stepper motors have the highest holding torque when idle and thus offer a high degree of system rigidity. Therefore an external brake can be omitted unless a safety brake is necessary for the Z-axis.



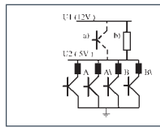
f) Avoiding damage to machines and injuries
The disadvantage of "falling out of step" when a motor is blocked, an issue that is sometimes brought up in connection with stepper motors, can actually be of an advantage in some cases in view of increasingly stringent safety requirements. Slip and overload couplings are not normally required in statutory safety requirements in conjunction with stepper motors.

Stepper Motors
General information on stepper motors

CONTROLLERS AND SWITCHING FEATURES

Almost all stepper motors can be provided with 4, 6 or 8 connection lines/leads. 4 leads are suited solely for bipolar operation, 6 leads for unipolar and limited bipolar operation and 8 leads for unipolar and bipolar operation. Even though unipolar operation is extremely simple using just 4 switches, it is rarely used today due to the availability of highly integrated constant current bipolar driver ICs with an approximately 30 % higher torque. This is also true for constant voltage operation where the power losses are high.

UNIPOLAR CONNECTION



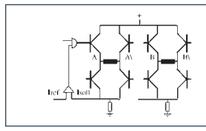
e.g. Constant voltage operation

a) Bilevel
b) Series resistor

Unipolar switching sequences

Mode		winding			
1/1	1/2	A	A\	B	B\
1	1	+	0	0	+
	2	+	0	0	0
2	3	+	0	+	0
	4	0	0	+	0
3	5	0	+	+	0
	6	0	+	0	0
4	7	0	+	0	+
	8	0	0	0	+
1	1	+	0	0	+

BIPOLAR SWITCHING SEQUENCES



e.g. constant current operation

Unipolar switching sequences

Mode		winding	
1/1	1/2	A	B
1	1	+	+
	2	+	0
2	3	+	-
	4	0	-
3	5	-	-
	6	-	0
4	7	-	+
	8	0	+
1	1	+	+

STEPPER MOTOR ANIMATION

Stepper motor animation at www.nanotec.com

Connection arrangement of stepper motors
Stepper motors offered by Nanotec can be operated using various connection arrangements that each lend the motor different characteristics. The 4-lead design is already connected internally; there is only one connection options. Motors with 6 leads can be operated with one winding half or in series, those with 8 wires can be operated in all of the listed connection arrangements. Only bipolar activation, which is used almost exclusively today, is taken into consideration here.

1. One half winding: Only half of the motor's windings are used in this case. Therefore, the holding torque that can be achieved is less than in the other circuits. This circuit only provides benefits at the high speed range of 6-lead motors, which can be seen clearly in the respective motor curves.

2. Parallel: The highest motor output is achieved in this circuit. Due to the low inductance, the motor continues to keep the torque constant even at high speeds, however, a high phase current is also required.

3. Series: This circuit is well-suited for the low speed range where high torque is achieved with low current. Due to the high inductance, the torque quickly drops off at high speeds, however.

The values specified in the data sheet always refer to one half winding. The rule for converting to series or parallel circuits for individual parameters is shown in the following table. This function can also be carried out online on the overview page for the individual stepper motor series (under the controller type).

Value	1 winding half as in data sheet	Series	Parallel
Resistance	R	2 * R	R / 2
Inductance	L	4 * L	L
Phase current	I	I / √2	I * √2
Holding torque	M	M * √2	M * √2

The holding torque is achieved at the respective nominal current. If the current deviates, then the value can be calculated accordingly from the proportionality between phase current and holding torque. Thus, half the current results in half of the holding torque (for the same circuit).

CAUTION

This context only applies to holding torque and to the low speed range (where torque does not yet drop off), but not to the entire motor curve. At high speeds, the configured current can no longer achieve its maximum value since the switching processes at the winding are then too fast. This (real) current reduction leads to a decrease in the motor curve as speed increases.

It is also possible to operate the motor briefly with higher current. In that case, however, care must be taken not to exceed a housing temperature of 80 °. Saturation occurs at 1.5-2 times the value of the nominal current in the process depending on the motor, after which the moment no longer increases.

SP10-SP55

Permanent-Magnet Stepper Motors

OPTIONS

Gear

Controller

DESCRIPTION

Permanent magnet stepper motors offer an economical alternative for use in simple device applications with large step angles.

Features

- Cost-effective
- High-quality plain bearings on both sides
- Large torque relative to size

The SPG motors integrate a gear with a reduction of 50 or 102.

VERSIONS

Type	Step Resolution ° (full step)	Current per Winding A/Winding	Voltage per Winding V/Winding	Holding Torque Ncm	Resistance per Winding Ohm	Inductance per Winding mH	Rotor Inertia gcm²	Weight kg	Size mm
SP1018M0204-A	18	0.22	3.3	0.16	15	3	0.01	0.004	10
SP1518M0104-A	18	0.065	12.4	0.2	190	50	1	0.012	15
SP1518M0204-A	18	0.24	12	0.2	50	9.2	1	0.012	15
SPG1518M0504-50	0.36	0.5	5	13.5	10	2.3	1	0.012	15
SPG1518M0504-102	0.176	0.5	5	20	10	2.3	1	0.012	15
SP2018M0506-A	18	0.35	5	0.71	10	1.85	1	0.026	20
SP2515M0406-A	15	0.3	5	1.41	11.5	2.3	1	0.036	25
SP2575M0206-A	7.5	0.17	12	1.56	50	12	1	0.036	25
SP2575M0506-A	7.5	0.35	5	1.98	10	2	1	0.036	25
SP2575M0704-A	7.5	0.76	3.8	1	5	3	1	0.036	25
SP3575S0506-A	7.5	0.35	5	5.66	10	3.8	5	0.09	35
SP3575M0906-A	7.5	0.61	5	7.78	5.8	3.2	7.5	0.09	35
SP4275S0606-A	7.5	0.42	5	7.07	8.6	4.5	9.6	0.011	42
SP4275M0806-A	7.5	0.57	5	8.49	6.2	5.5	9.6	0.13	42
SP5575M0106-A	7.5	0.08	12	21.21	100	107	12.5	0.27	57
SP5575M0604-A	7.5	0.625	5.6	12	9	19.9	12.5	0.27	57

The current and holding torque values refer to bipolar serial wiring. The resistance and inductance values refer to unipolar wiring.

SP10-SP55

Permanent-Magnet Stepper Motors

ORDER IDENTIFIER

SP(G) 3575 S 05056 -

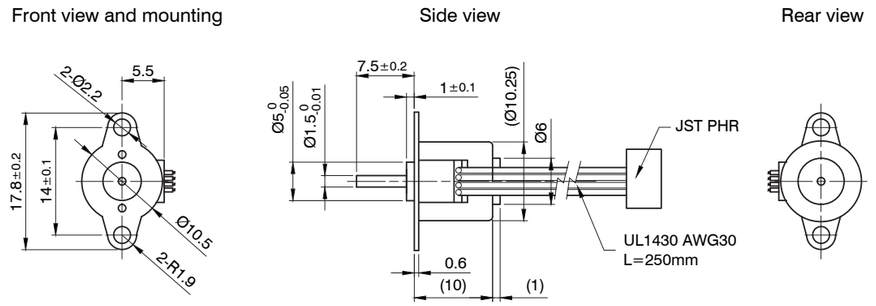
A = single shaft

ACCESSORIES

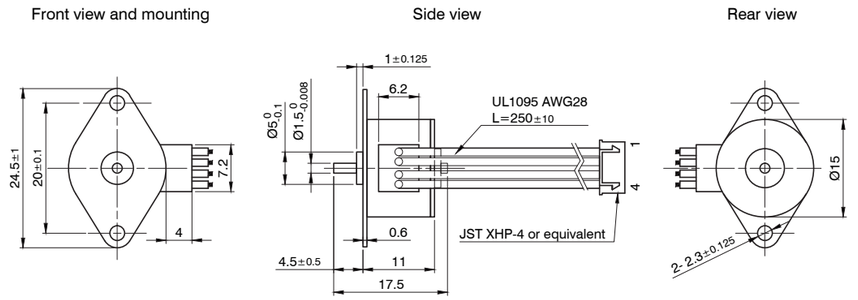
ZK-JST-VL-4	Cable for XHP4 Plug
ZK-JST-VL-6	Cable for XHP6 Plug

DIMENSIONS (IN MM)

SP1018M

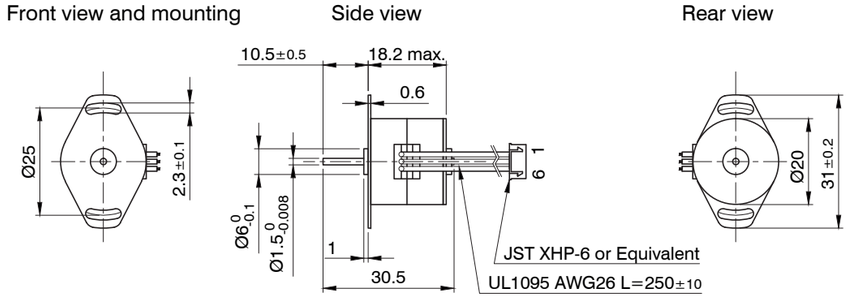


SP1518M



DIMENSIONS (IN MM)

SP2018



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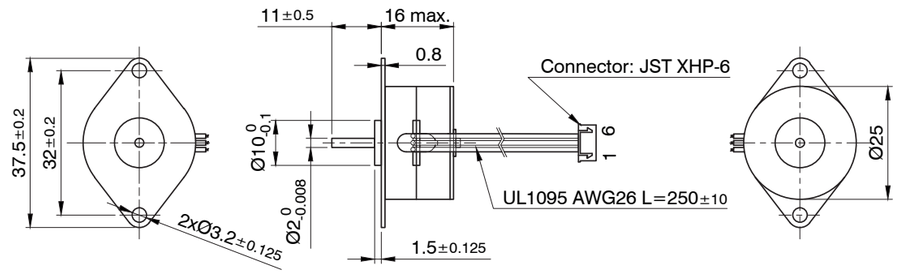

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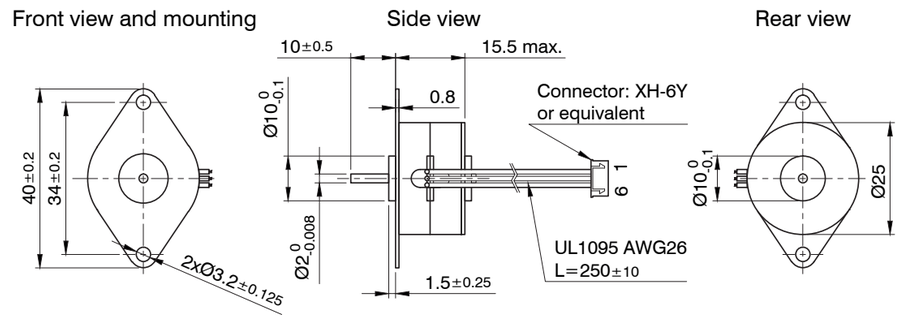
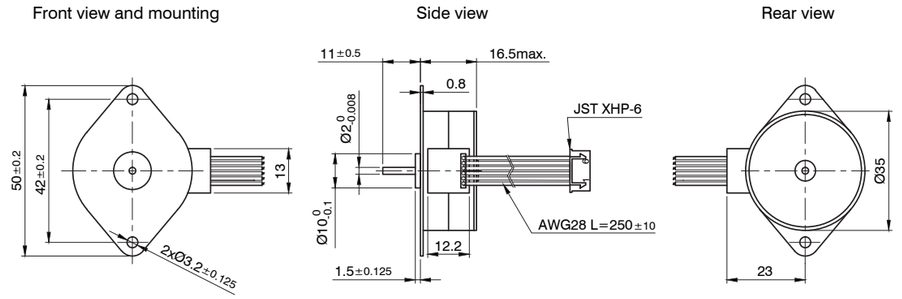


SP10-SP55
Permanent-Magnet Stepper Motors

DIMENSIONS (IN MM)

SP3575



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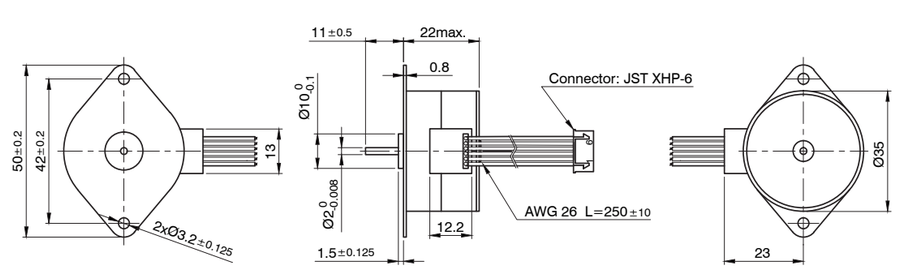

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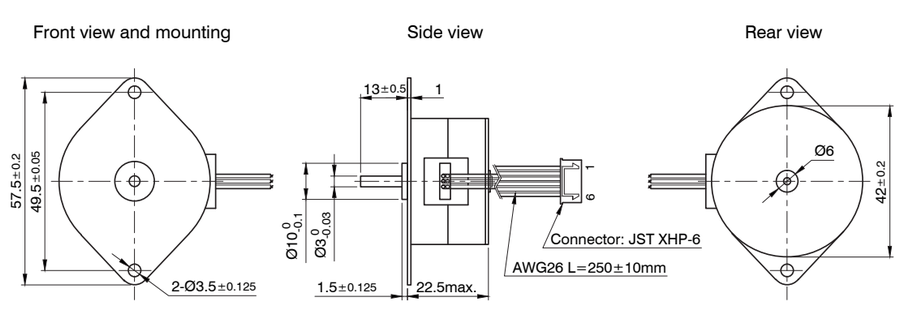
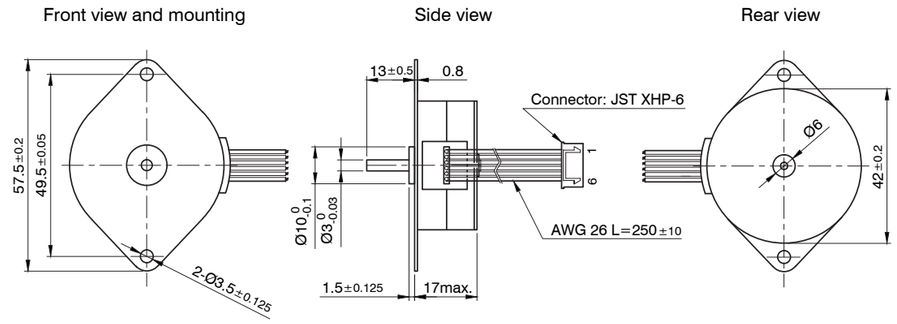


DIMENSIONS (IN MM)

SP4275S



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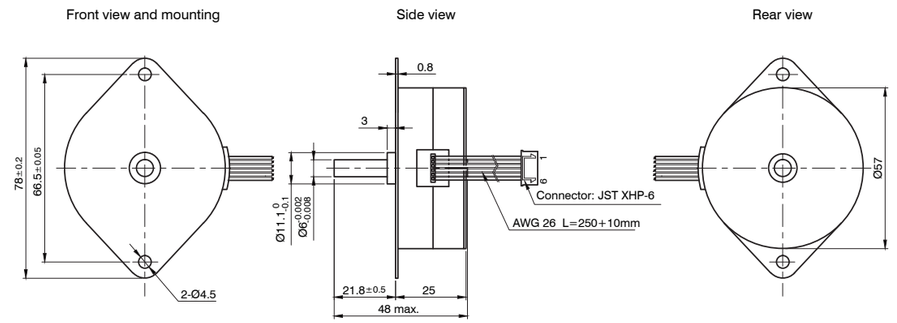

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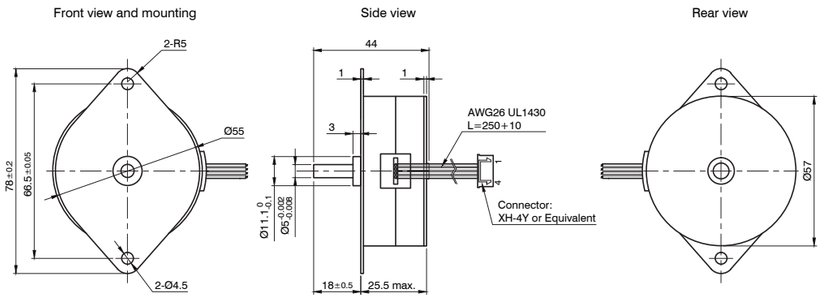
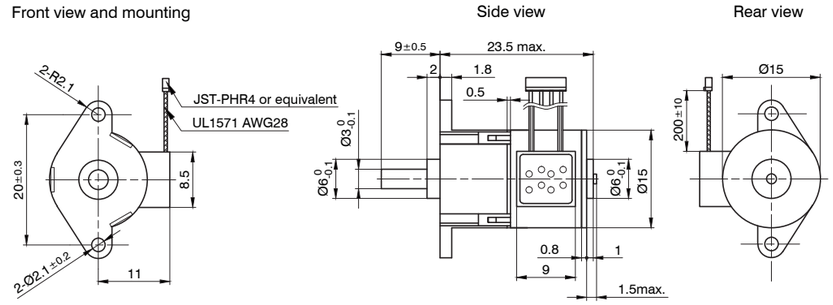


SP10-SP55
Permanent-Magnet Stepper Motors

DIMENSIONS (IN MM)

SPG1518M



TORQUE CURVES

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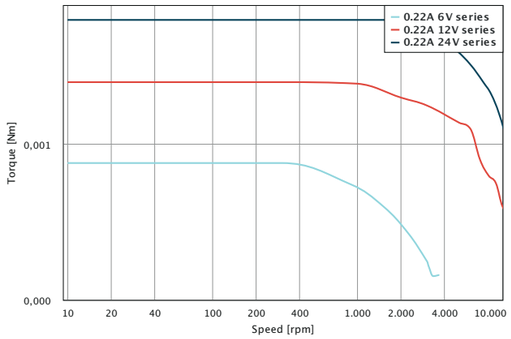

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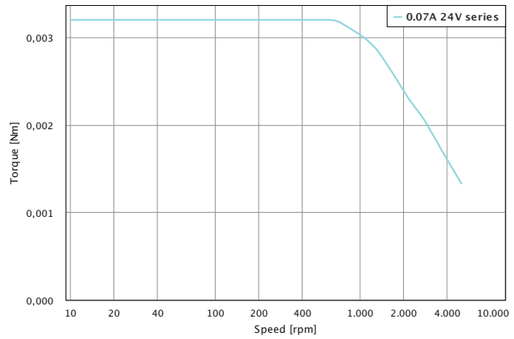

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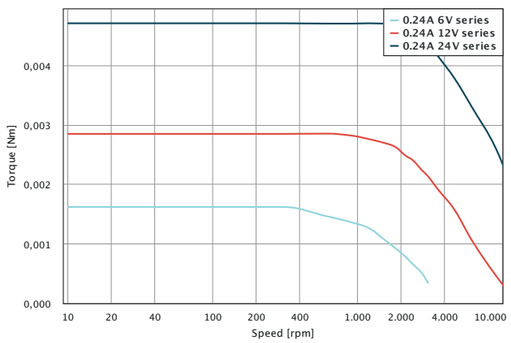

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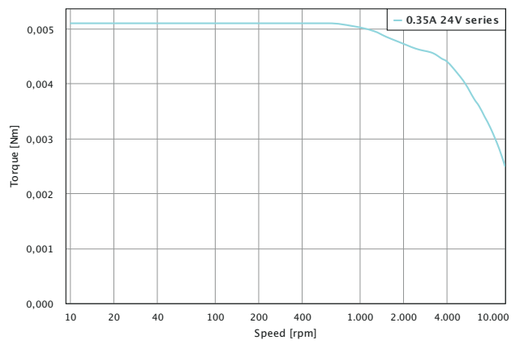

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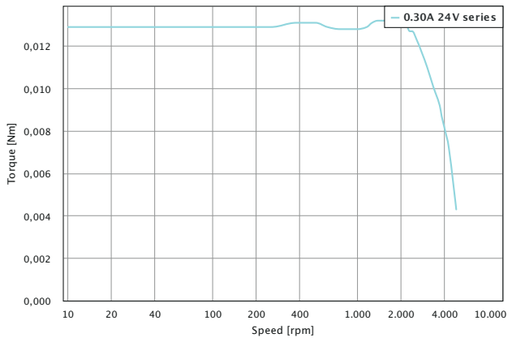

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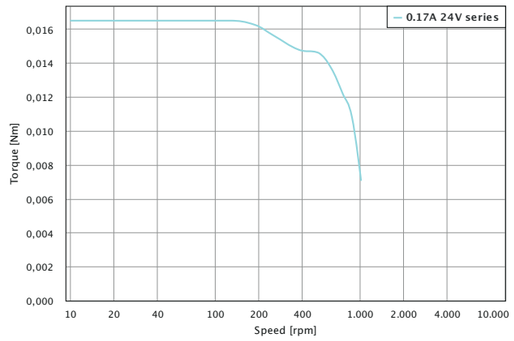

SP10-SP55
Permanent-Magnet Stepper Motors

TORQUE CURVES

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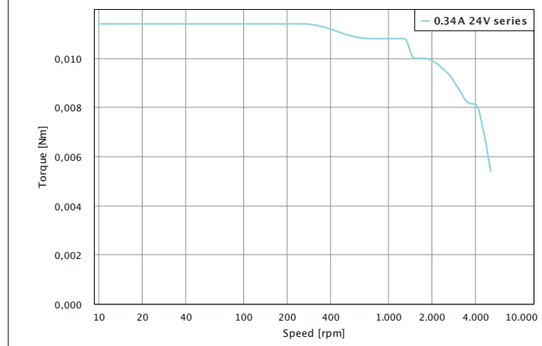

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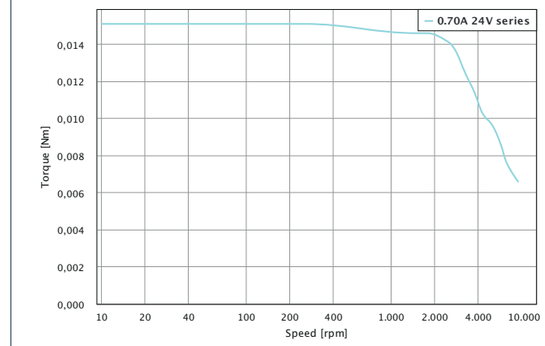

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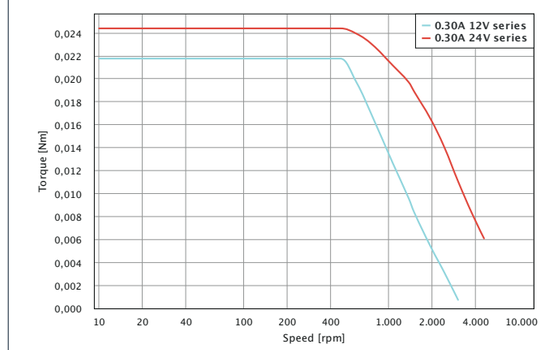

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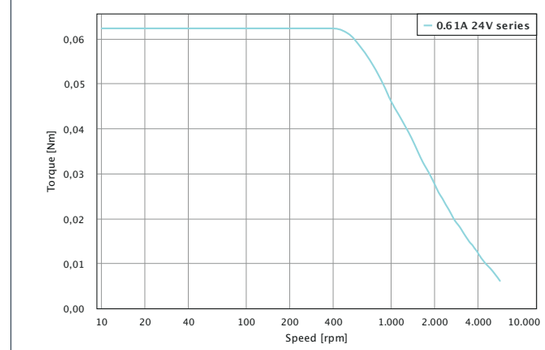
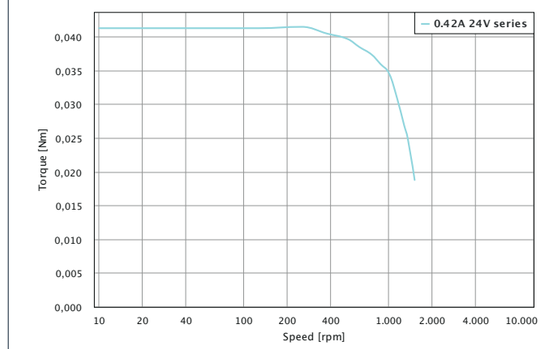


SP4275S0606-A



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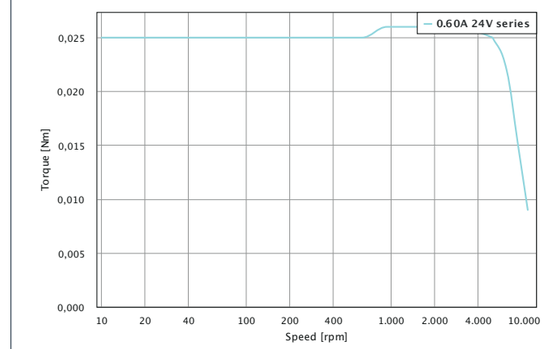
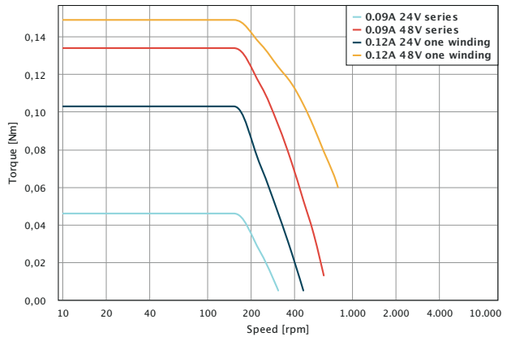


SP10-SP55

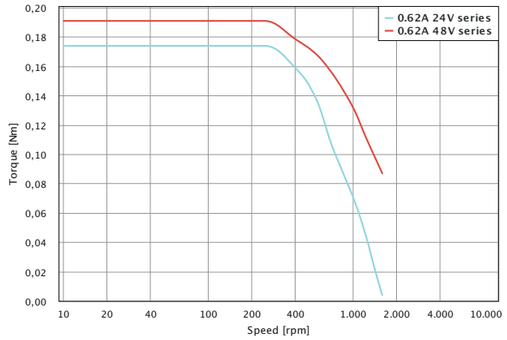
Permanent-Magnet Stepper Motors

TORQUE CURVES

SP5575M0106-A



SP5575M0604-A



Notes

ST2018

Stepper Motor - NEMA 8

OPTIONS

Gear | Controller | Encoder

VERSIONS

Type	Current per Winding A/Winding	Holding Torque Ncm	Resistance per Winding Ohm	Inductance per Winding mH	Rotor Inertia gcm²	Weight kg	Length „A“ mm
ST2018S0604	0.6	1.8	6.5	1.7	2	0.06	33
ST2018M0804	0.8	3	5.4	1.5	3.6	0.08	42
ST2018L0804	0.8	3.6	6	2.2	4.3	0.09	48

ORDER IDENTIFIER

ST2018S0604-

A = single shaft

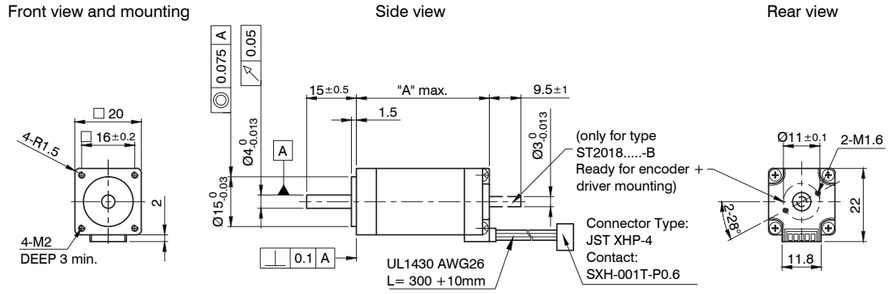
B = double shaft

ACCESSORIES

ZK-JST-VL-4 Cable for XHP4 Plug

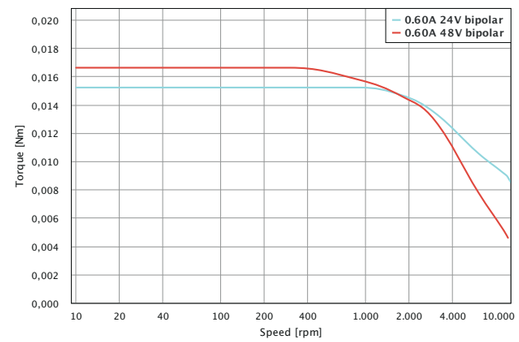
DIMENSIONS (IN MM)

ST2018

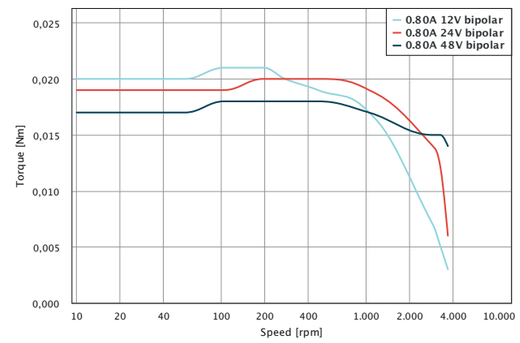


TORQUE CURVES

ST2018S0604



ST2018M0804



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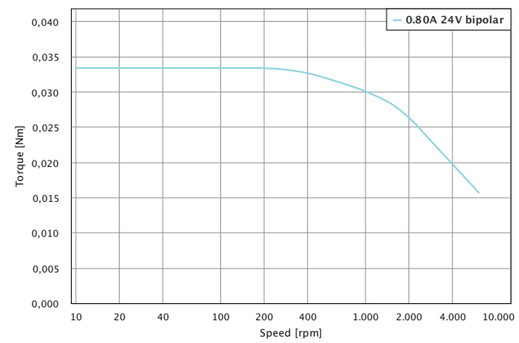


ST2818

Stepper Motor - NEMA 11

OPTIONS

Gear | Brake | Controller | Encoder

VERSIONS

Type	Current per Winding A/Winding	Holding Torque Ncm	Resistance per Winding Ohm	Inductance per Winding mH	Rotor Inertia gcm²	Weight kg	Length „A“ mm
ST2818S1006	0.67	6.08	2.8	1	9	0.11	32
ST2818M1006	0.67	10.61	3.4	1.2	12	0.176	45
ST2818L1006	0.67	12.73	4.6	1.4	18	0.25	51
ST2818L1404	1.4	11.7	2.3	1.8	18	0.25	51

The current and holding torque values refer to bipolar serial wiring. The resistance and inductance values refer to unipolar wiring.

ORDER IDENTIFIER

ST2818S1006-
A = single shaft
B = double shaft

ACCESSORIES

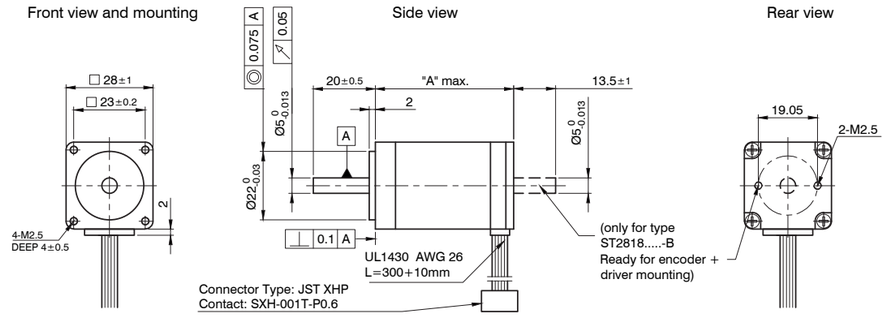
ZD-D28	Damper
ZK-JST-VL-4	Cable for XHP4 Plug
ZK-JST-VL-6	Cable for XHP6 Plug

ST2818

Stepper Motor - NEMA 11

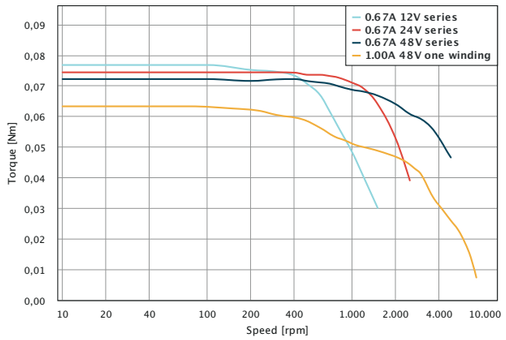
DIMENSIONS (IN MM)

ST2818

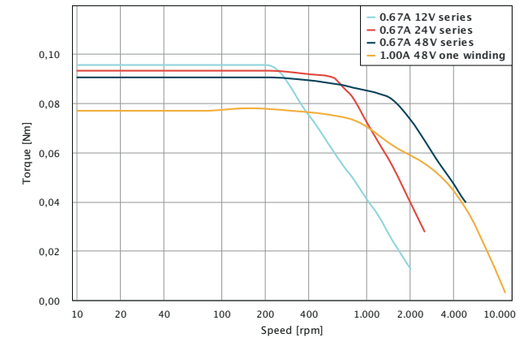


TORQUE CURVES

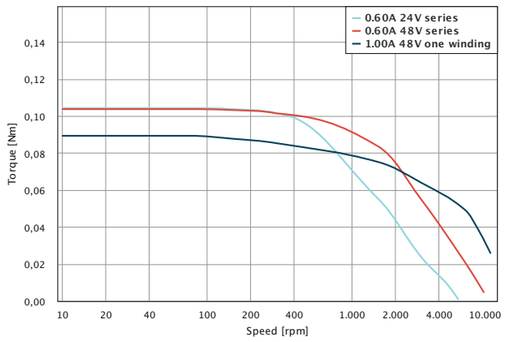
ST2818S1006



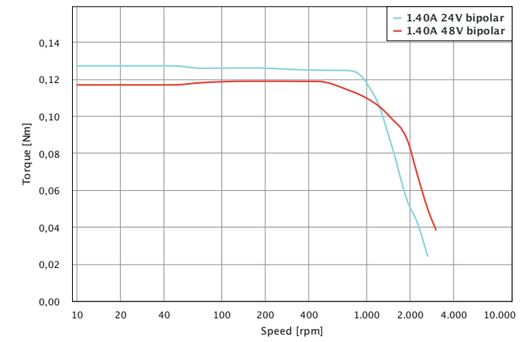
ST2818M1006



ST2818L1006



ST2818L1404



STF2818

Ultraflat Stepper Motor

OPTIONS

Controller

VERSIONS

Type	Current per Winding A/Winding	Holding Torque Ncm	Resistance per Winding Ohm	Inductance per Winding mH	Rotor Inertia gcm²	Weight kg	Length „A“ mm
STF2818X0504-A	0.5	0.98	3.7	0.88	1.7	0.028	9.4

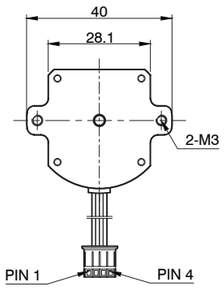
ORDER IDENTIFIER

STF2818X0504-A

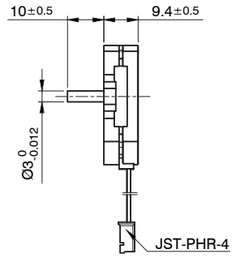
DIMENSIONS (IN MM)

STF2818

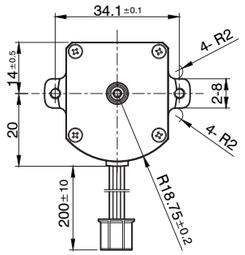
Front view and mounting



Side view



Rear view

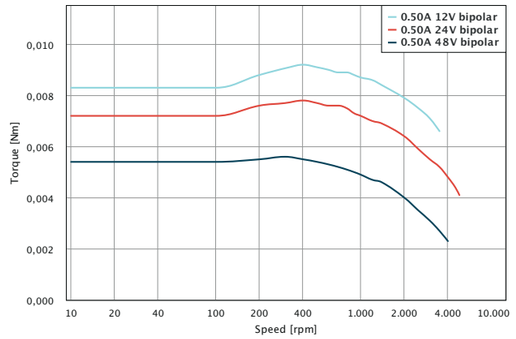


STF2818

Ultraflat Stepper Motor

TORQUE CURVES

STF2818X0504-A



ST3518

Stepper Motor - NEMA 14

OPTIONS

Controller

Encoder

VERSIONS

Type	Current per Winding A/Winding	Holding Torque Ncm	Resistance per Winding Ohm	Inductance per Winding mH	Rotor Inertia gcm²	Weight kg	Length „A“ mm
ST3518S0804	0.8	5	4	2.3	10	0.15	26
ST3518M1004	1	14	2.7	4.3	14	0.18	36
ST3518L1204	1.2	23	3.4	4.5	43	0.3	52

ORDER IDENTIFIER

ST3518S0804-

A = single shaft

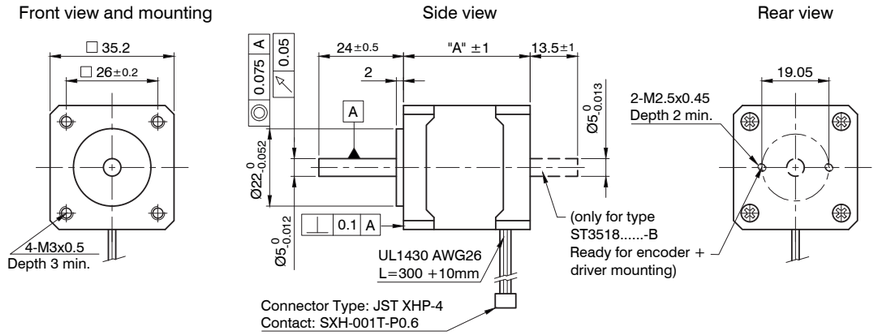
B = double shaft

ACCESSORIES

ZD-D28	Damper
ZK-JST-VL-4	Cable for XHP4 Plug

DIMENSIONS (IN MM)

ST3518

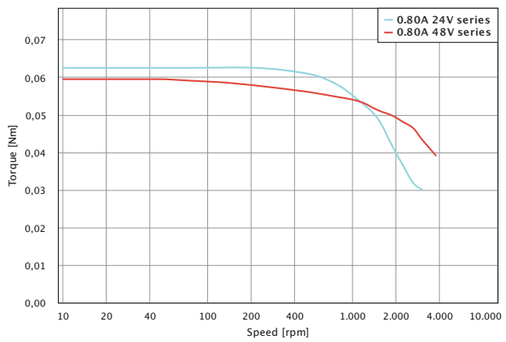


ST3518

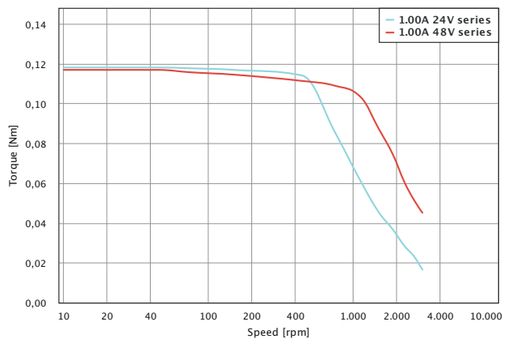
Stepper Motor - NEMA 14

TORQUE CURVES

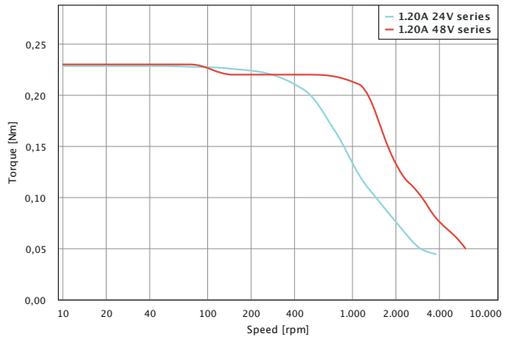
ST3518S0804



ST3518M1004

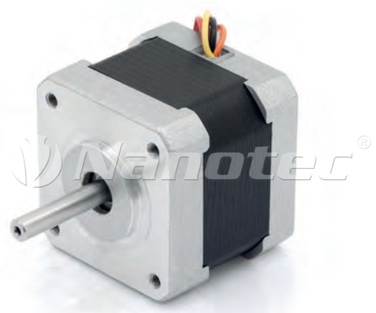


ST3518L1204



ST4118

Stepper Motor - NEMA 17



OPTIONS

Gear | Brake | Controller | Encoder

VERSIONS

Type	Current per Winding A/Winding	Holding Torque Ncm	Resistance per Winding Ohm	Inductance per Winding mH	Rotor Inertia gcm²	Weight kg	Length „A“ mm
ST4118X0404	0.4	17	24	36	20	0.15	26
ST4118X1404	1.4	9	2	1.6	20	0.15	26
ST4118S0206	0.16	21.21	75	53	38	0.2	31
ST4118S0406	0.25	22.63	30	21.7	38	0.2	31
ST4118S0706	0.49	22.63	7.6	6.8	38	0.2	31
ST4118S1006	0.67	21.21	3.9	2.8	38	0.2	31
ST4118S1404	1.4	20	2	3.6	38	0.2	31
ST4118M0406	0.28	39.6	30	25	57	0.24	38
ST4118M0706	0.49	39.6	9.5	8	57	0.24	38
ST4118M0906	0.64	39.6	5.7	5	57	0.24	38
ST4118M1206	0.85	39.6	3.1	2.9	57	0.24	38
ST4118M1404	1.4	24	1.2	1.7	57	0.24	38
ST4118M1804	1.8	28	1.1	1.85	57	0.24	38
ST4118L0804	0.8	50	9.3	17	83	0.34	49
ST4118L1206	0.85	49.5	3.3	3.4	82	0.34	49
ST4118L1804	1.8	50	1.75	3.3	83	0.34	49
ST4118L3004	3	50	0.63	1.03	82	0.34	49
ST4118D1804	1.8	80	3	7	102	0.5	60
ST4118D3004	3	80	1.1	2.7	102	0.5	60

The current and holding torque values refer to bipolar serial wiring. The resistance and inductance values refer to unipolar wiring.

ST4118

Stepper Motor - NEMA 17

ORDER IDENTIFIER

ST4118X1404-

A = single shaft

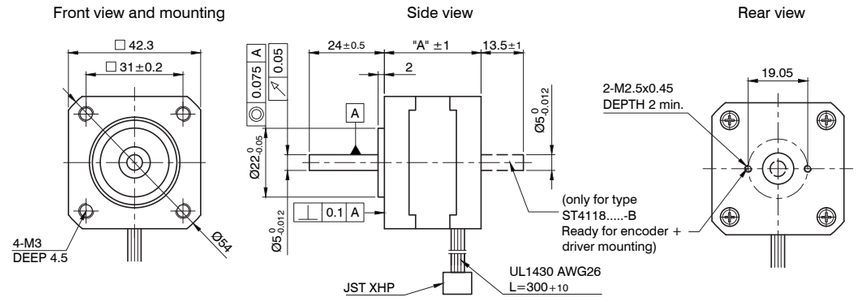
B = double shaft

ACCESSORIES

ZD-D40	Damper
ZD-DF40	Damper
ZK-JST-VL-4	Cable for XHP4 Plug
ZK-JST-VL-6	Cable for XHP6 Plug

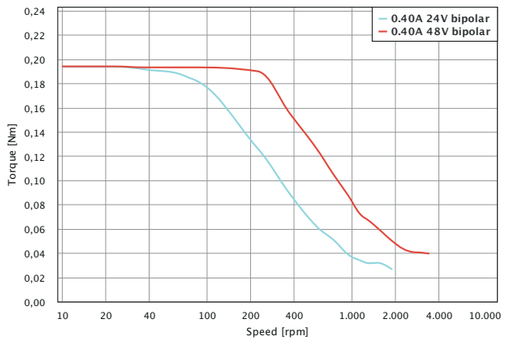
DIMENSIONS (IN MM)

ST4118

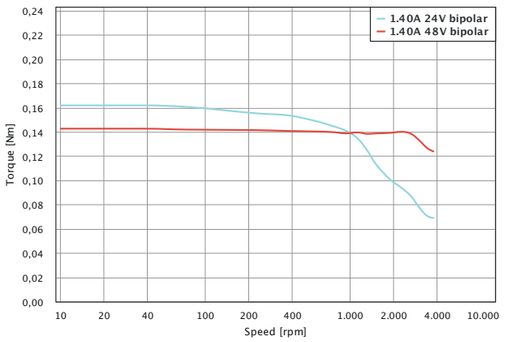


TORQUE CURVES

ST4118X0404



ST4118X1404

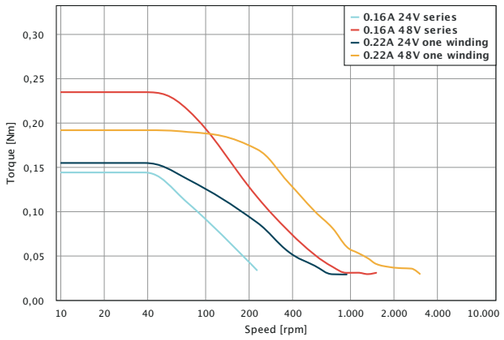


ST4118

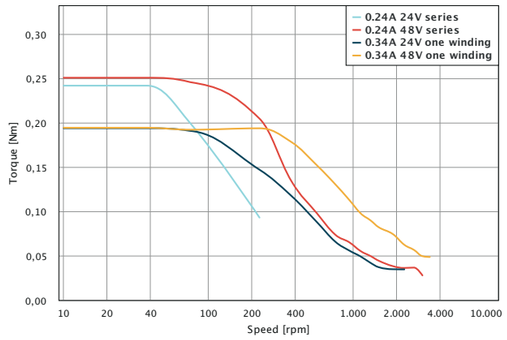
Stepper Motor - NEMA 17

TORQUE CURVES

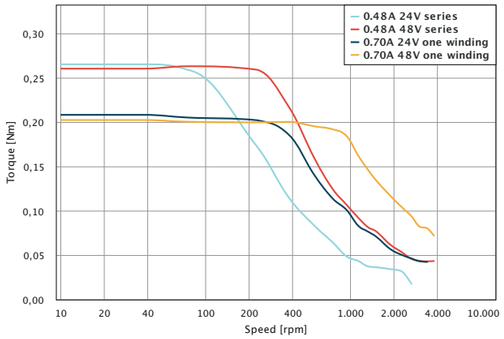
ST4118S0206



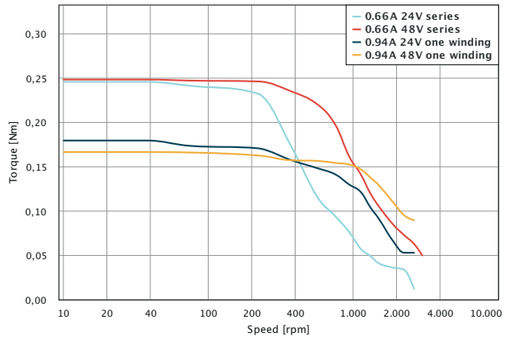
ST4118S0406



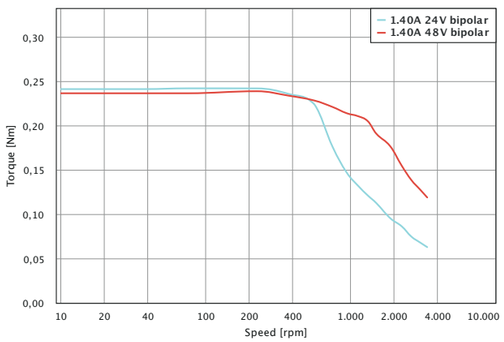
ST4118S0706



ST4118S1006



ST4118S1404



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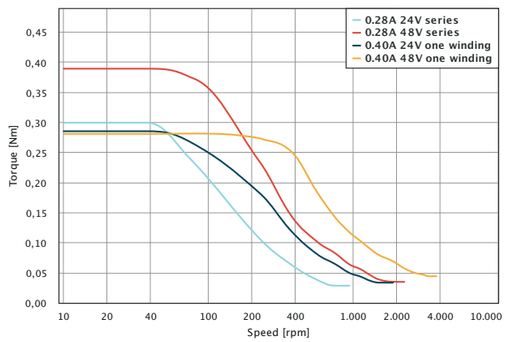
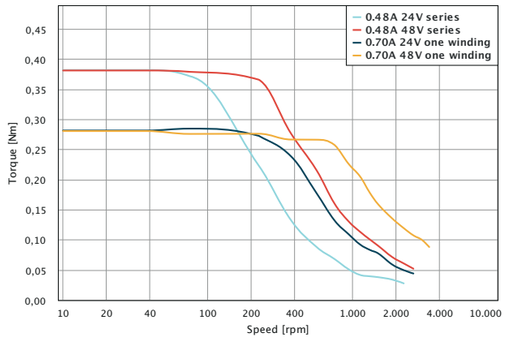


ST4118

Stepper Motor - NEMA 17

TORQUE CURVES

ST4118M0706



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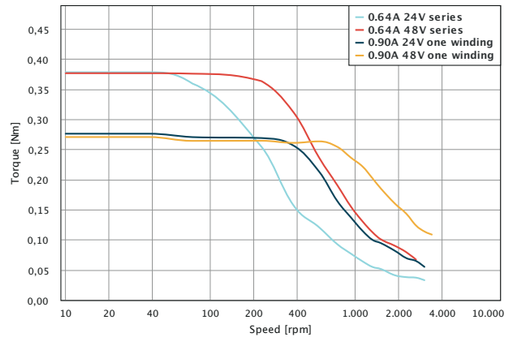

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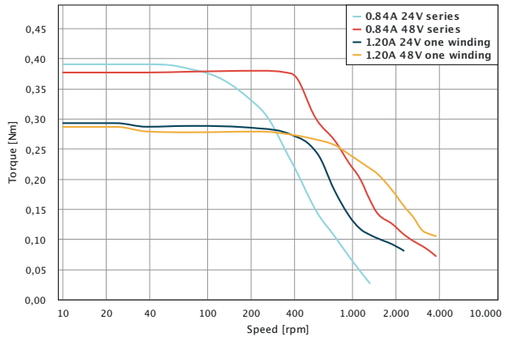

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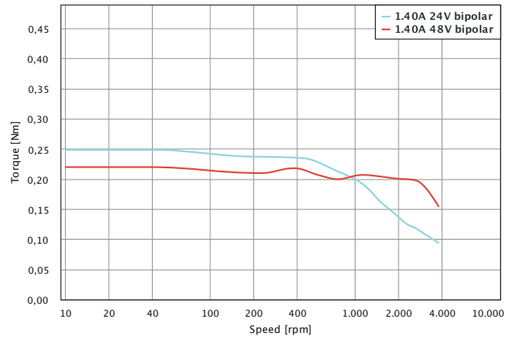

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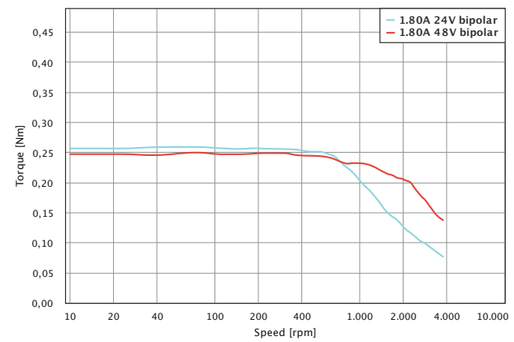
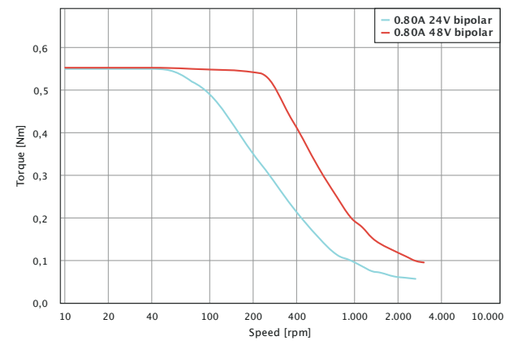


ST4118L0804

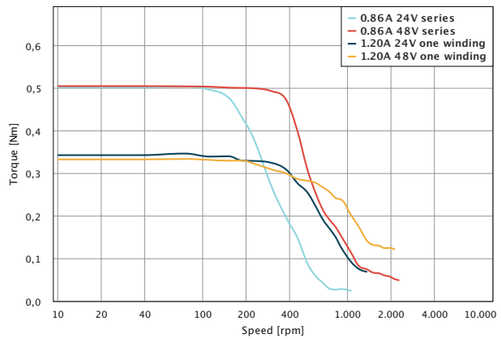


ST4118

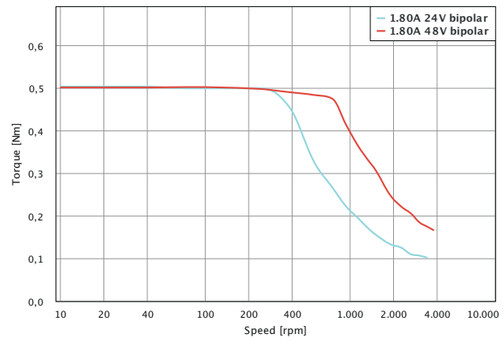
Stepper Motor - NEMA 17

TORQUE CURVES

ST4118L1206



ST4118L1804



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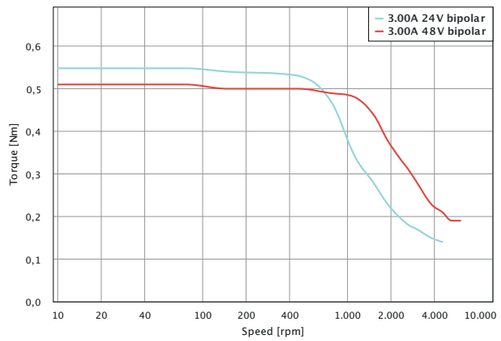

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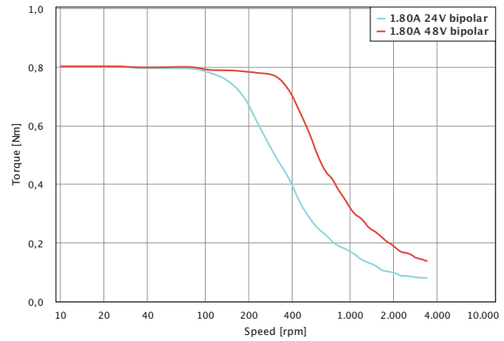

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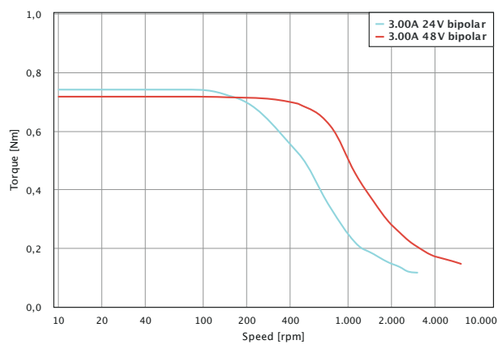


Notes

ST4209

High-Resolution Stepper Motor - NEMA 17

OPTIONS

Gear · Brake · Controller · Encoder

VERSIONS

Type	Current per Winding A/Winding	Holding Torque Ncm	Resistance per Winding Ohm	Inductance per Winding mH	Rotor Inertia gcm²	Weight kg	Length „A“ mm
ST4209X1004	1	17	8.7	18	20	0.15	22
ST4209S0404	0.42	17.6	13	7.5	35	0.22	34
ST4209S1006	0.67	21.21	4.2	4	35	0.22	34
ST4209S1404	1.33	22	2.1	5.2	35	0.22	34
ST4209M1206	0.85	35.36	3.3	4	54	0.28	40
ST4209M1704	1.68	36	1.65	4	54	0.28	40
ST4209L1206	0.85	43.84	3.3	4.8	68	0.35	48
ST4209L1704	1.68	44	1.65	5	68	0.35	47

The current and holding torque values refer to bipolar serial wiring. The resistance and inductance values refer to unipolar wiring.

ORDER IDENTIFIER

ST4209X1004-
A = single shaft
B = double shaft

ACCESSORIES

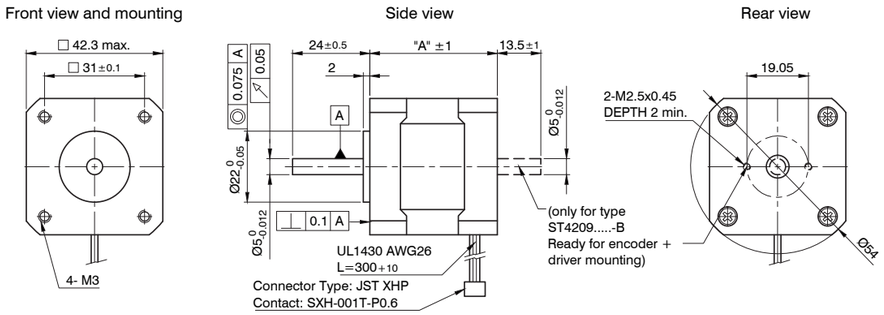
ZD-D40	Damper
ZD-DF40	Damper
ZK-JST-VL-4	Cable for XHP4 Plug
ZK-JST-VL-6	Cable for XHP6 Plug

ST4209

High-Resolution Stepper Motor - NEMA 17

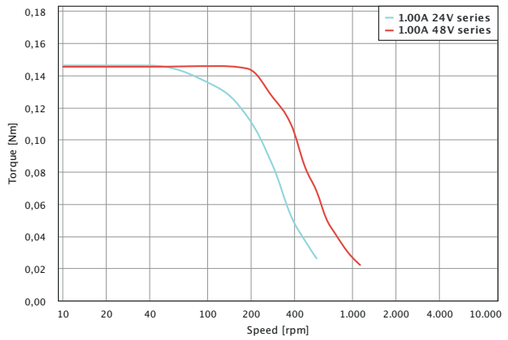
DIMENSIONS (IN MM)

ST4209

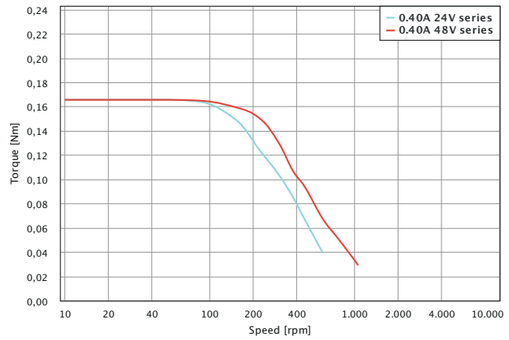


TORQUE CURVES

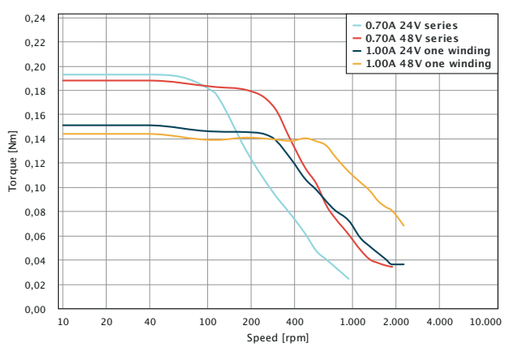
ST4209X1004



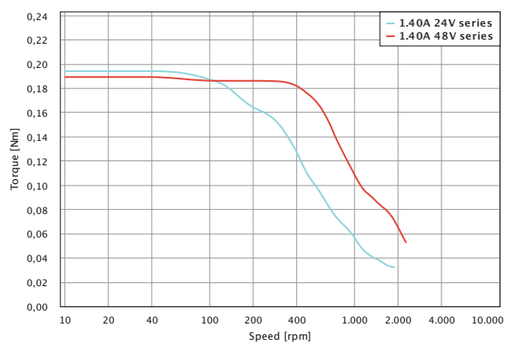
ST4209S0404



ST4209S1006



ST4209S1404

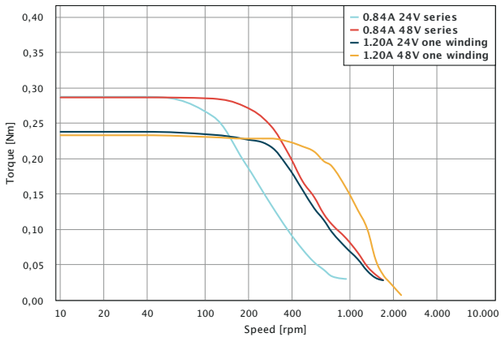


ST4209

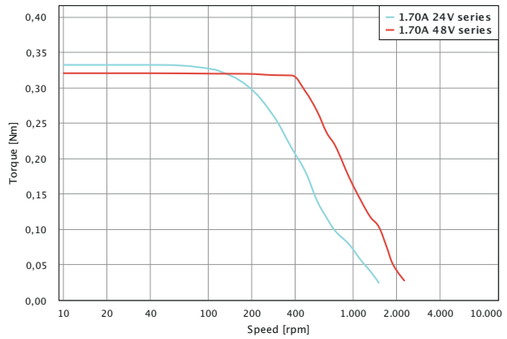
High-Resolution Stepper Motor - NEMA 17

TORQUE CURVES

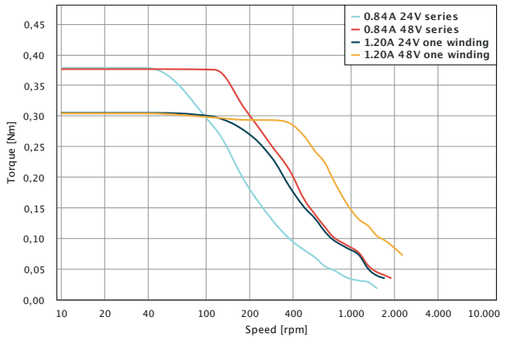
ST4209M1206



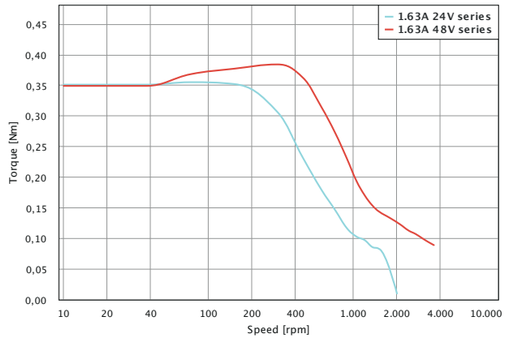
ST4209M1704



ST4209L1206



ST4209L1704



Notes

ST5909

High-Resolution Stepper Motor - NEMA 23

OPTIONS

Gear · Brake · Controller · Encoder

VERSIONS

Type	Current per Winding A/Winding	Holding Torque Ncm	Resistance per Winding Ohm	Inductance per Winding mH	Rotor Inertia gcm²	Weight kg	Length „A“ mm
ST5909X2508	1.77	60.81	0.85	1.6	120	0.45	41
ST5909S1008	0.71	101.82	6.6	13	275	0.65	51
ST5909M2008	1.41	104.65	1.8	4.5	300	0.7	56
ST5909L1008	0.71	179.61	8.6	23	480	1	76
ST5909L2008	1.41	179.61	2.4	6.7	480	1	76
ST5909L3008	2.12	179.61	1	2.6	480	1	76

The current and holding torque values refer to bipolar serial wiring. The resistance and inductance values refer to unipolar wiring.

ORDER IDENTIFIER

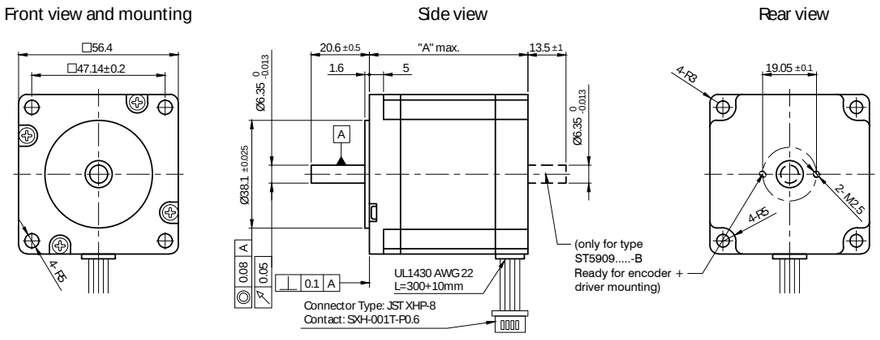
ST5909X2508-
A = single shaft
B = double shaft

ACCESSORIES

ZD-D56	Damper
ZD-DF56	Damper

DIMENSIONS (IN MM)

ST5909

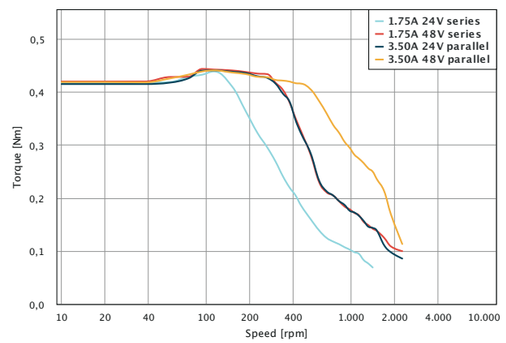


ST5909

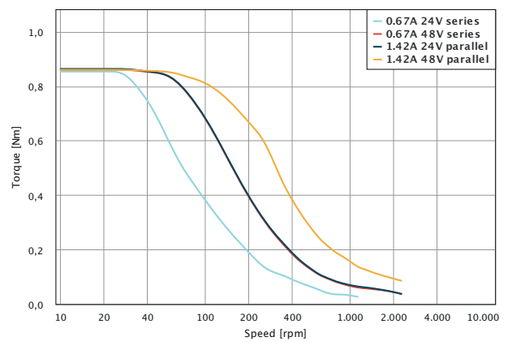
High-Resolution Stepper Motor - NEMA 23

TORQUE CURVES

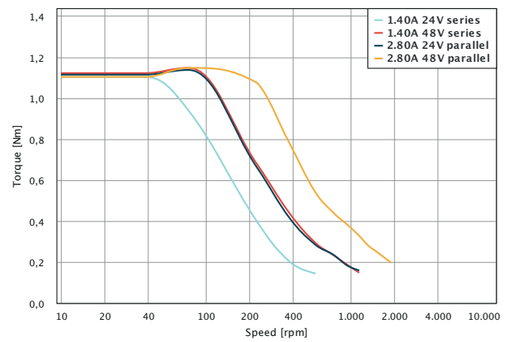
ST5909X2508



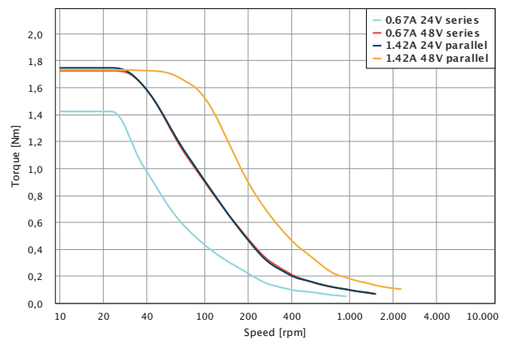
ST5909S1008



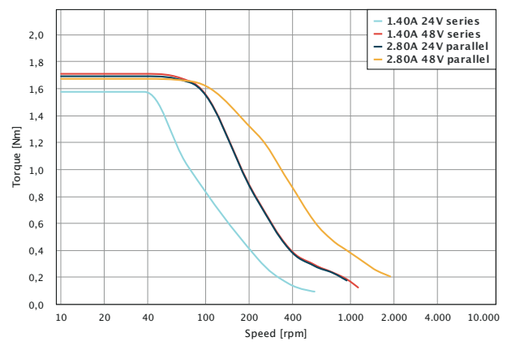
ST5909M2008



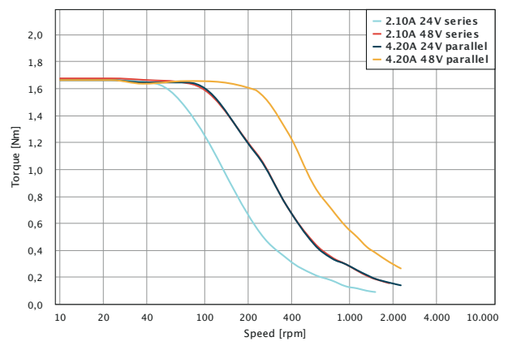
ST5909L1008



ST5909L2008



ST5909L3008



ST5918

Stepper Motor - NEMA 23

OPTIONS

Gear · Brake · Controller · Encoder

VERSIONS

Type	Current per Winding A/Winding	Holding Torque Ncm	Resistance per Winding Ohm	Inductance per Winding mH	Rotor Inertia gcm²	Weight kg	Length „A“ mm
ST5918X1008	0.71	53.74	5	5.4	135	0.49	41
ST5918X2008	1.41	53.74	1.2	1.3	135	0.49	41
ST5918X3008	2.12	53.74	0.5	0.54	135	0.49	41
ST5918S1008	0.71	98.99	6.2	7.5	275	0.65	51
ST5918S2008	1.41	98.99	1.5	2.6	275	0.65	51
ST5918S3008	2.12	98.99	0.72	0.9	275	0.65	51
ST5918M1008	0.71	124.45	6.9	14	300	0.7	56
ST5918M2008	1.41	124.45	1.7	2.5	300	0.7	56
ST5918M3008	2.12	124.45	0.7	1.3	300	0.7	56
ST5918L1008	0.71	186.68	8.8	19	480	1	76
ST5918L2008	1.41	186.68	2.4	5.1	480	1	76
ST5918L3008	2.12	186.68	1	2.2	480	1	76
ST5918L4508	3.18	186.68	0.5	0.95	480	1	76

The current and holding torque values refer to bipolar serial wiring. The resistance and inductance values refer to unipolar wiring.

ORDER IDENTIFIER

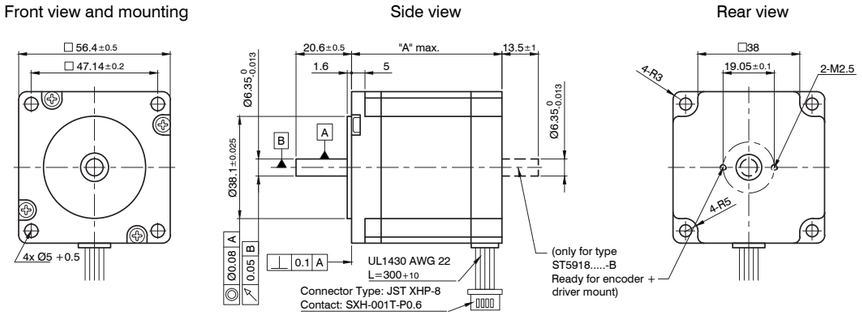
ST5918X1008-
A = single shaft
B = double shaft

ACCESSORIES

ZD-D56	Damper
ZD-DF56	Damper

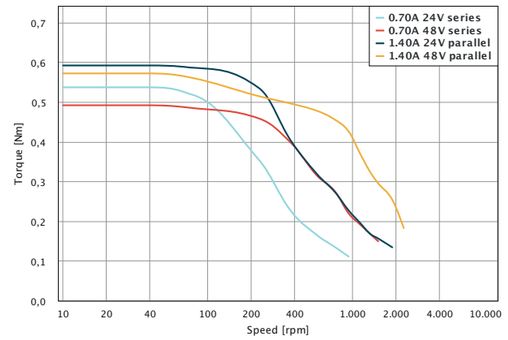
DIMENSIONS (IN MM)

ST5918

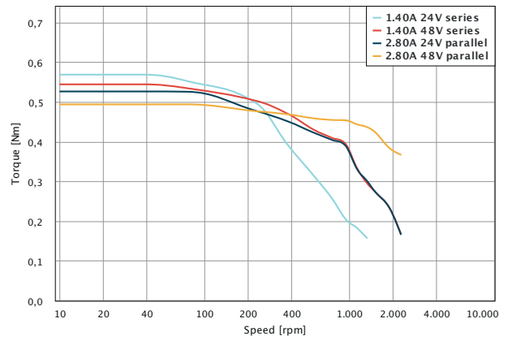


TORQUE CURVES

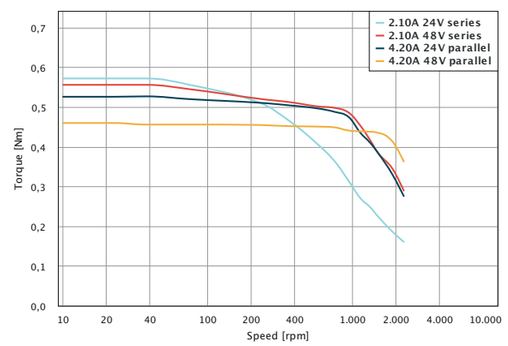
ST5918X1008



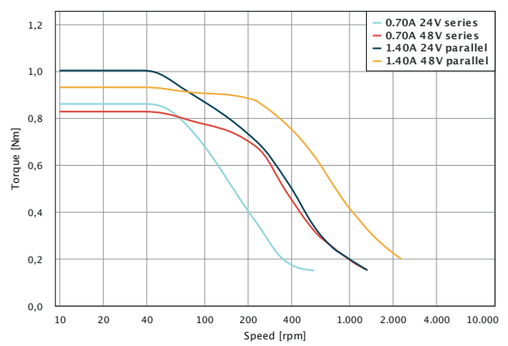
ST5918X2008



ST5918X3008



ST5918S1008

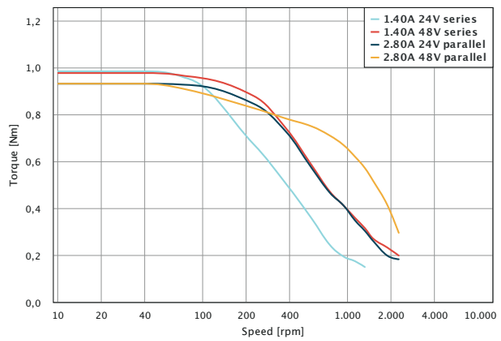


ST5918

Stepper Motor - NEMA 23

TORQUE CURVES

ST5918S2008



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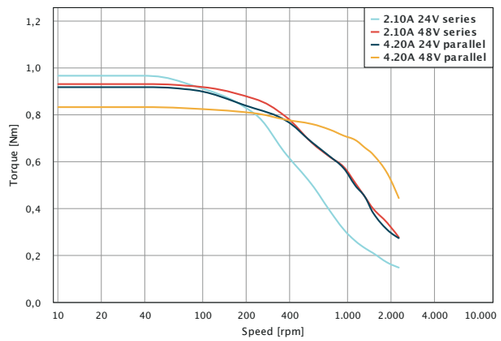
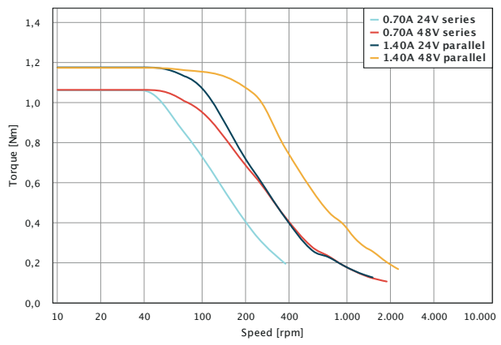


ST5918M1008



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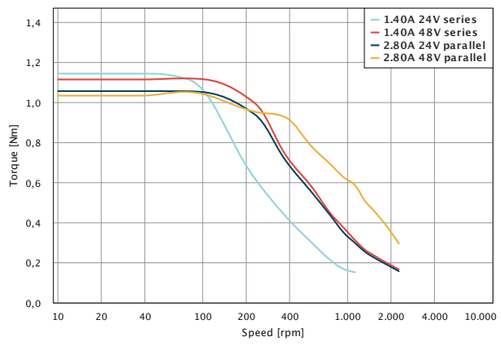
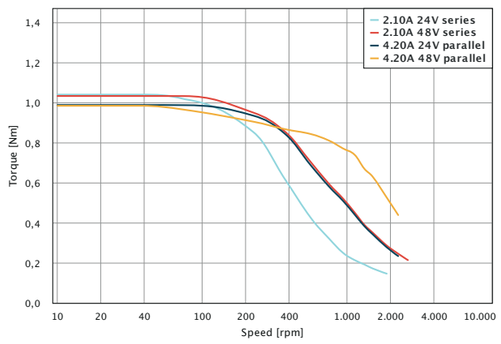
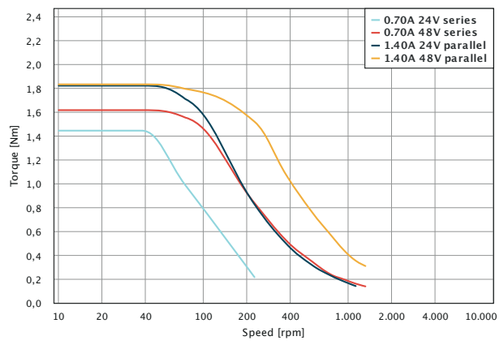


ST5918M3008



ST5918L1008

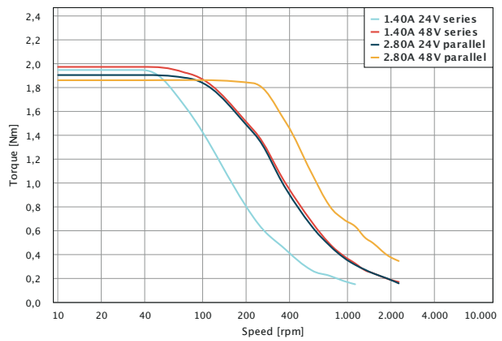


ST5918

Stepper Motor - NEMA 23

TORQUE CURVES

ST5918L2008



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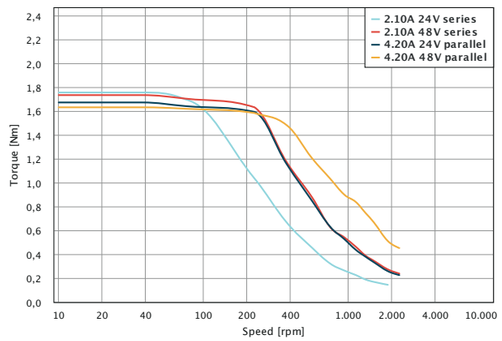
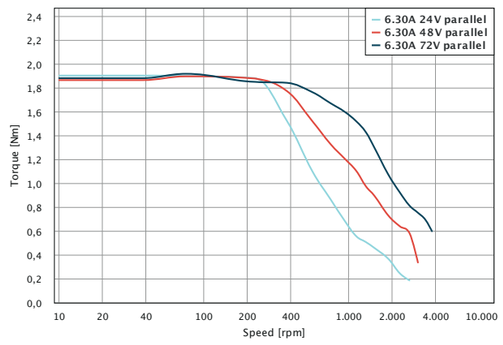


ST5918L4508



ST6018

Stepper Motor - NEMA 24

OPTIONS

Gear | Brake | Controller | Encoder

VERSIONS

Type	Current per Winding A/Winding	Holding Torque Ncm	Resistance per Winding Ohm	Inductance per Winding mH	Rotor Inertia gcm²	Weight kg	Length „A“ mm
ST6018X2008	1.41	106.07	1.46	2.2	275	0.6	47
ST6018X3008	2.12	110.31	0.68	0.8	275	0.6	47
ST6018M2008	1.41	195.16	2	4.6	400	0.77	56
ST6018M3008	2.12	165.46	0.8	1.38	400	0.77	56
ST6018K2008	1.41	212.13	2.4	4.6	570	1.2	67
ST6018L3008	2.12	353.55	1.3	3.2	840	1.45	88
ST6018D4508	3.18	400.22	0.75	1.4	1100	1.9	111

The current and holding torque values refer to bipolar serial wiring. The resistance and inductance values refer to unipolar wiring.

ORDER IDENTIFIER

ST6018X2008-

A = single shaft

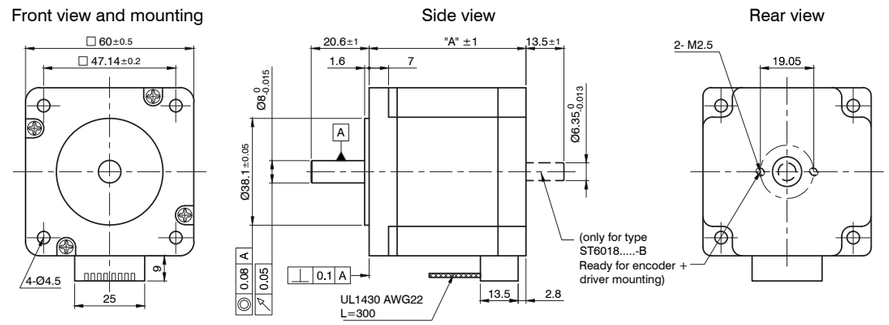
B = double shaft

ST6018

Stepper Motor - NEMA 24

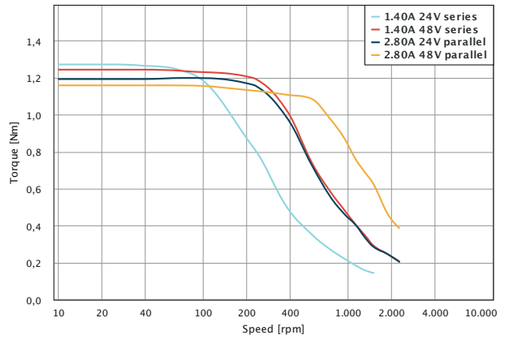
DIMENSIONS (IN MM)

ST6018

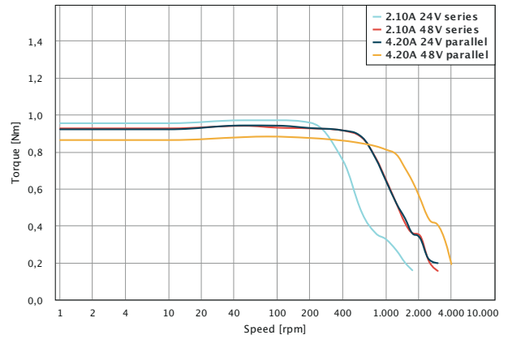


TORQUE CURVES

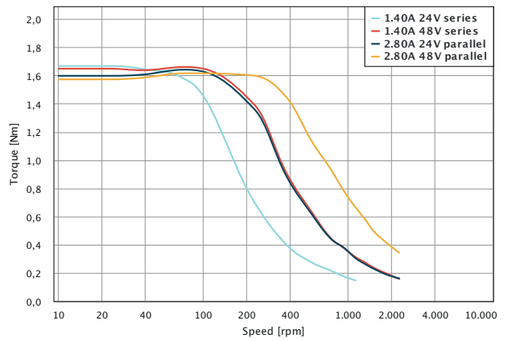
ST6018X2008



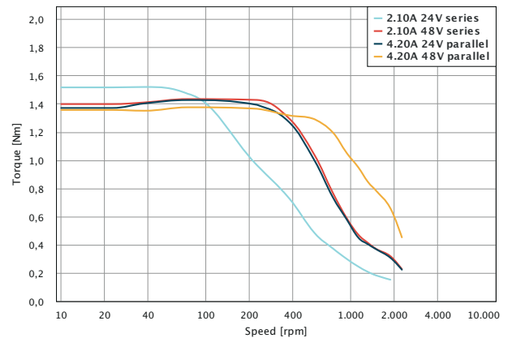
ST6018X3008



ST6018M2008



ST6018M3008

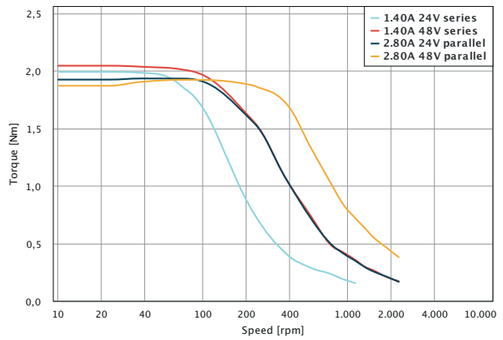


ST6018

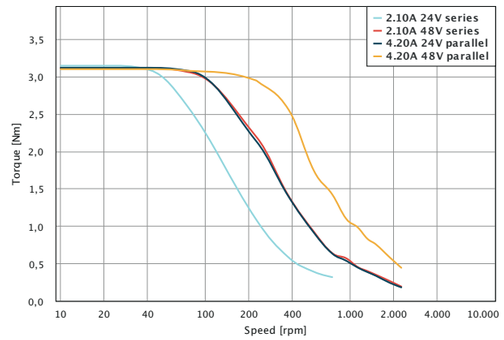
Stepper Motor - NEMA 24

TORQUE CURVES

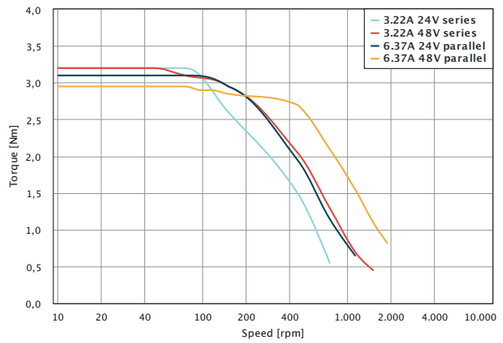
ST6018K2008



ST6018L3008



ST6018D4508



Notes

ST6318

Ultraflat Stepper Motor

OPTIONS

Controller

VERSIONS

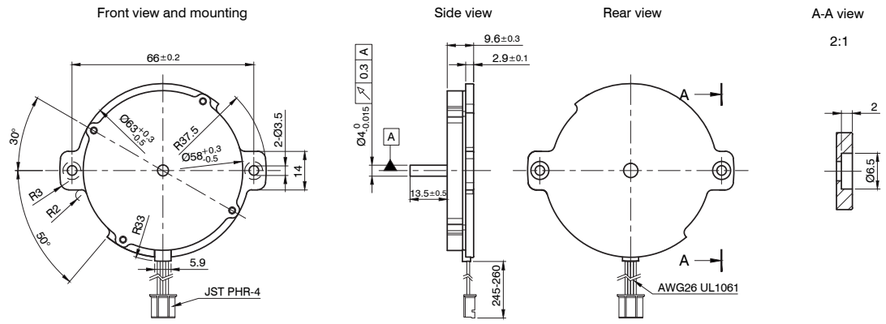
Type	Current per Winding A/Winding	Holding Torque Ncm	Resistance per Winding Ohm	Inductance per Winding mH	Rotor Inertia gcm²	Weight kg	Length „A“ mm
ST6318F1004-A	1	6	3.8	2	16	0.095	9.6

ORDER IDENTIFIER

ST6318F1004-A

DIMENSIONS (IN MM)

ST6318

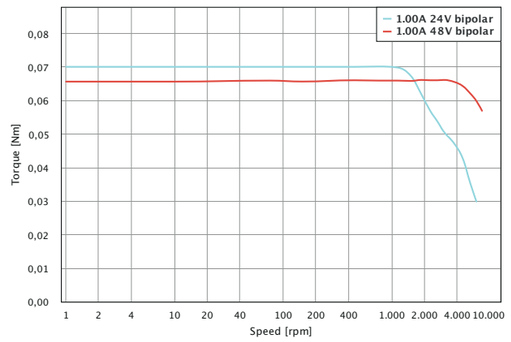


ST6318

Ultraflat Stepper Motor

TORQUE CURVES

ST6318F1004-A



ST8918

Stepper Motor - NEMA 34

OPTIONS

Gear | Brake | Controller | Encoder

VERSIONS

Type	Current per Winding A/Winding	Holding Torque Ncm	Resistance per Winding Ohm	Inductance per Winding mH	Rotor Inertia gcm²	Weight kg	Length „A“ mm
ST8918S4508	3.18	353.55	0.6	1.9	1000	1.7	65
ST8918M4508	3.18	593.97	0.66	3	1900	2.8	96
ST8918M6708	4.74	593.97	0.45	2.6	1900	2.8	96
ST8918L4508	3.18	933.38	1.1	6.3	3000	3.95	126
ST8918L6708	4.74	933.38	0.54	2.7	3000	3.95	126
ST8918D6708	4.74	1343.5	0.75	4.9	4000	5.4	156

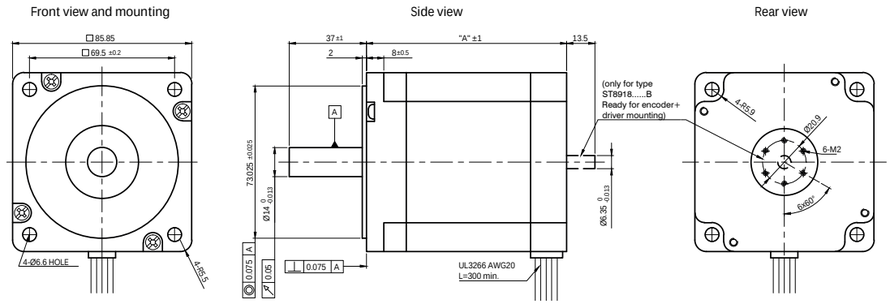
The current and holding torque values refer to bipolar serial wiring. The resistance and inductance values refer to unipolar wiring.

ORDER IDENTIFIER

ST8918S4508-
A = single shaft
B = double shaft

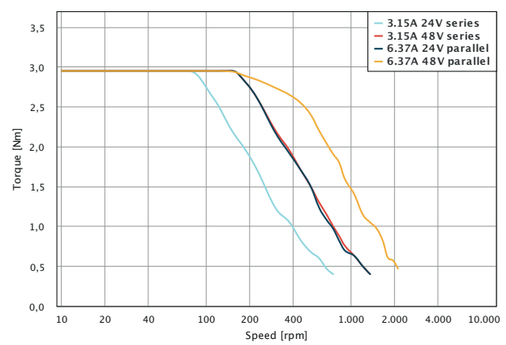
DIMENSIONS (IN MM)

ST8918

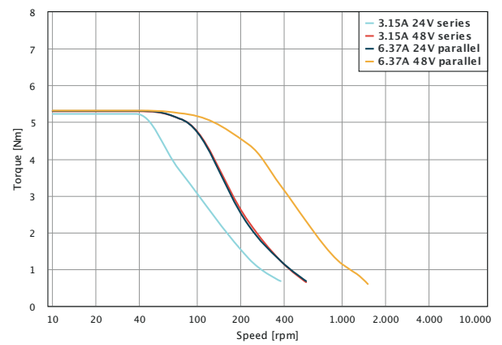


TORQUE CURVES

ST8918S4508



ST8918M4508



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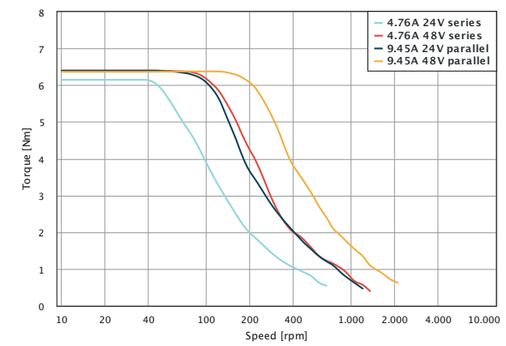
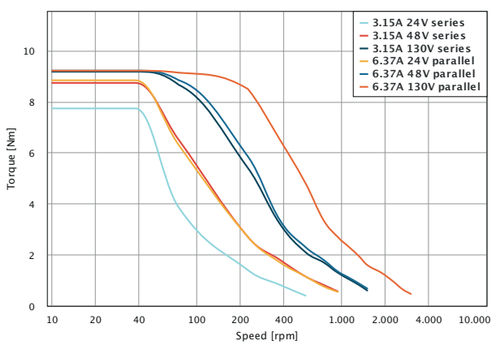


ST8918L4508



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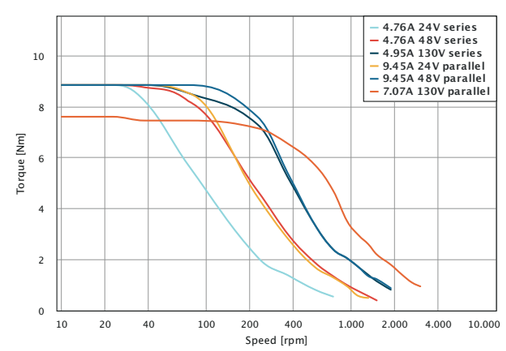
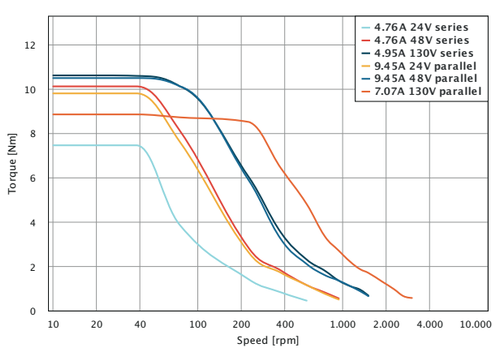


ST8918D6708



ST11018

Stepper Motor - NEMA 42

OPTIONS

Brake

Controller

Encoder

VERSIONS

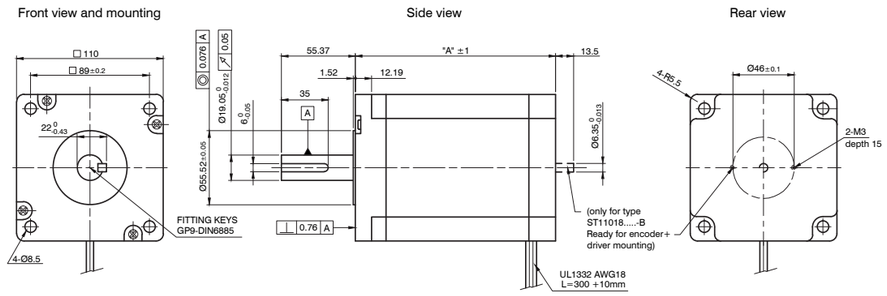
Type	Current per Winding A/Winding	Holding Torque Ncm	Resistance per Winding Ohm	Inductance per Winding mH	Rotor Inertia gcm²	Weight kg	Length „A“ mm
ST11018S5504	4.5	1170	0.7	9.8	5500	5	99
ST11018M6504	4.5	2100	1.15	15.2	10900	8.4	150
ST11018L8004	8	2500	1	17.1	16200	11.7	201

ORDER IDENTIFIER

ST11018S5504-
A = single shaft
B = double shaft

DIMENSIONS (IN MM)

ST11018

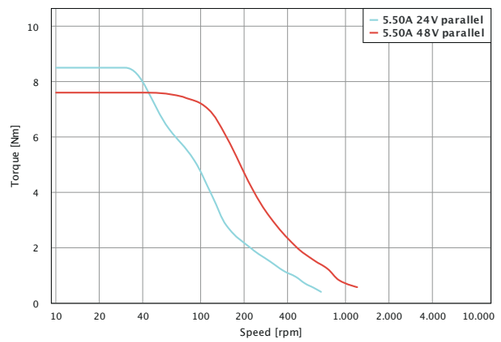


ST11018

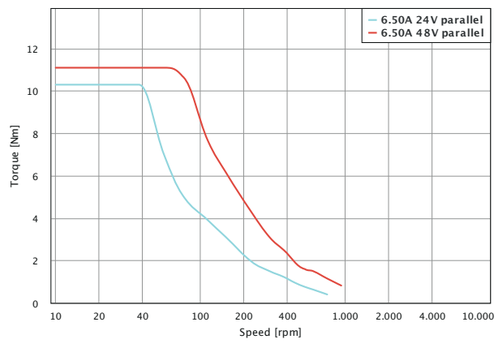
Stepper Motor - NEMA 42

TORQUE CURVES

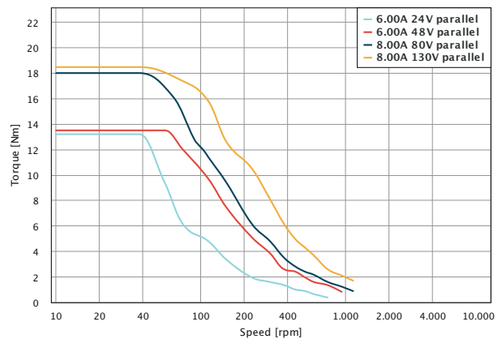
ST11018S5504



ST11018M6504



ST11018L8004



SC4118

Stepper Motor with Integrated Connector - NEMA 17

OPTIONS

Gear

Controller

VERSIONS

Type	Current per Winding A/Winding	Holding Torque Ncm	Resistance per Winding Ohm	Inductance per Winding mH	Rotor Inertia gcm²	Weight kg	Length „A“ mm
SC4118L1804	1.8	50	1.75	3.3	82	0.34	59

ORDER IDENTIFIER

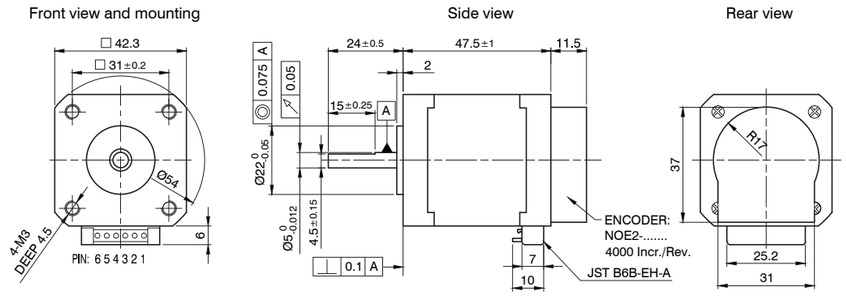
SC4118L1804-
ENO05K = 5 V Encoder Type
ENO24K = 24 V Encoder Type

ACCESSORIES

ZK-NOE1-10-500-S	Encoder Cable
ZK-JST-EHR-6-0.5M-S	Connection cable
ZK-JST-EHR-6-2M-S	Connection cable

DIMENSIONS (IN MM)

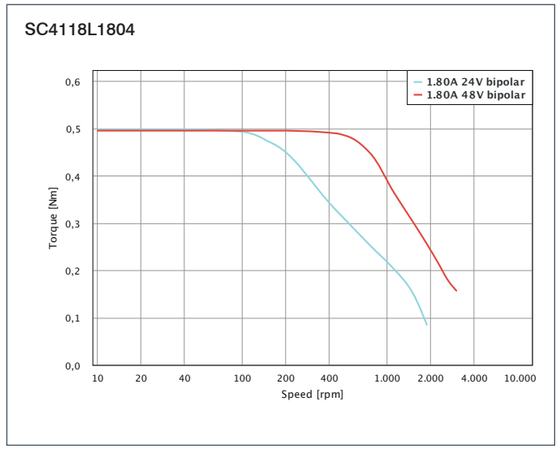
SC4118L1804-EN



SC4118

Stepper Motor with Integrated Connector - NEMA 17

TORQUE CURVES



SC6018

Stepper Motor with integrated Plug - NEMA 24

OPTIONS

Gear

Controller

VERSIONS

Type	Current per Winding A/Winding	Holding Torque Ncm	Resistance per Winding Ohm	Inductance per Winding mH	Rotor Inertia gcm²	Weight kg	Length „A“ mm
SC6018L4204	4.2	354	0.65	3.2	840	1.4	100

ORDER IDENTIFIER

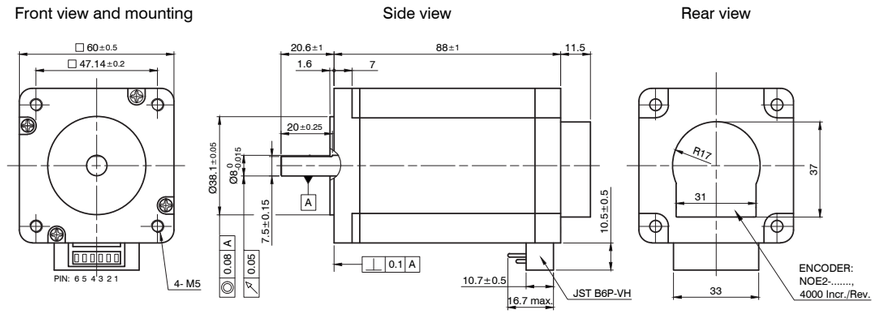
SC6018L4204-
ENO05K = 5 V Encoder Type
ENO24K = 24 V Encoder Type

ACCESSORIES

ZK-NOE1-10-500-S	Encoder Cable
ZK-JST-VHR-6N-0.5M-S	Connection cable
ZK-JST-VHR-6N-2M-S	Connection cable

DIMENSIONS (IN MM)

SC6018L4204-EN

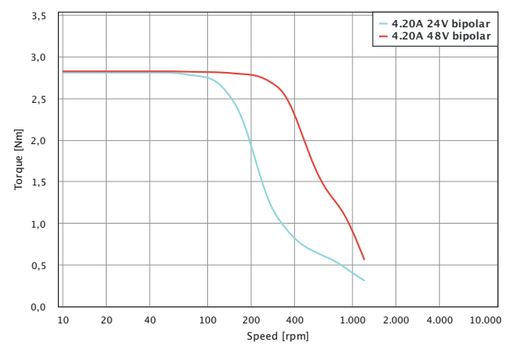


SC6018

Stepper Motor with integrated Plug - NEMA 24

TORQUE CURVES

SC6018L4204



Notes

AS2818

Stepper Motor with M12 Connector in Protection Class IP65

OPTIONS

Gear

DESCRIPTION

2-phase, high-torque stepper motor in size NEMA 11 (28 mm) and with a step angle (full step) of 1.8° in protection class IP65 (exept for shaft outlet). This motor will work as a replacement for the standard motor ST2818 as they have the same flange size.

VERSIONS

Type	**Current per Winding** A/Winding	**Holding Torque** Ncm	**Resistance per Winding** Ohm	**Inductance per Winding** mH	**Rotor Inertia** gcm²	**Weight** kg	**Length „A“** mm
AS2818S0604	0.67	7.1	5.6	4	9	0.13	51
AS2818L0604	0.67	12.7	9.2	7.2	18	0.22	70

ORDER IDENTIFIER

AS2818S0604

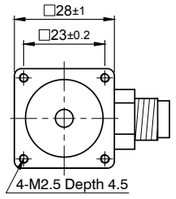
ACCESSORIES

ZK-M12-5-2M-1-PUR-S	M12 Cable
ZK-M12-5-2M-2-PUR-S	M12 Cable
ZK-M12-5-5M-1-PUR-S	M12 Cable
ZK-M12-5-5M-2-PUR-S	M12 Cable
ZK-M12-8-2M-1-PUR-S	M12 Cable
ZK-M12-8-2M-2-PUR-S	M12 Cable
ZK-M12-8-5M-1-PUR-S	M12 Cable
ZK-M12-8-5M-2-PUR-S	M12 Cable

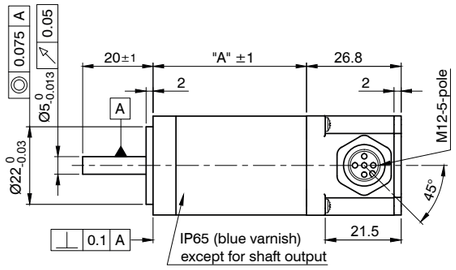
DIMENSIONS (IN MM)

AS2818

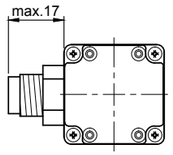
Front view and mounting



Side view



Rear view

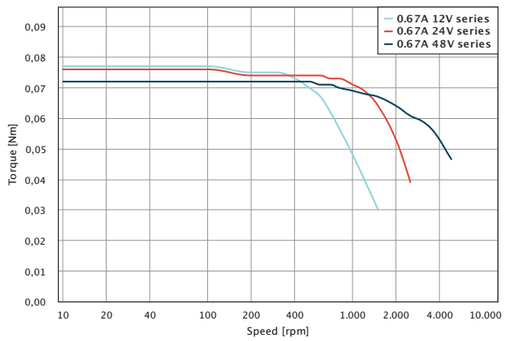


AS2818

Stepper Motor with M12 Connector in Protection Class IP65

TORQUE CURVES

AS2818S0604



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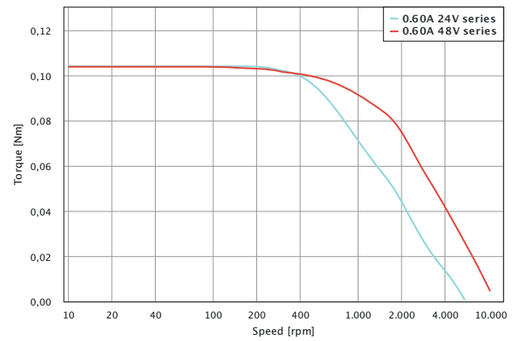


AS4118

Stepper Motor with M12 Connector in Protection Class IP65

OPTIONS

Gear | Brake | Controller | Encoder

DESCRIPTION

2-phase, high-torque stepper motor in size NEMA 17 (42 mm) and with a step angle (full step) of 1.8° in protection class IP65 (exept for shaft outlet). This motor will work as a replacement for the standard motor ST4118 as they have the same flange size.

VERSIONS

Type	Current per Winding A/Winding	Holding Torque Ncm	Resistance per Winding Ohm	Inductance per Winding mH	Rotor Inertia gcm²	Weight kg	Length „A“ mm	Encoder Type V	Brake Torque Nm
AS4118L1804	1.8	50	1.75	3.3	82	0.34	70.4		
AS4118L1804-E	1.8	50	1.75	3.3	82	0.34	70.4	5	
AS4118L1804-EB	1.8	50	1.75	3.3	82	0.42	106.4	5	0.4
AS4118L1804-ENM24	1.8	50	1.75	3.3	82	0.34	70.4	24	

ORDER IDENTIFIER

AS4118L1804-

E = with Encoder

EB = with Encoder and Bremse

ENM24 = with 24V Encoder

ACCESSORIES

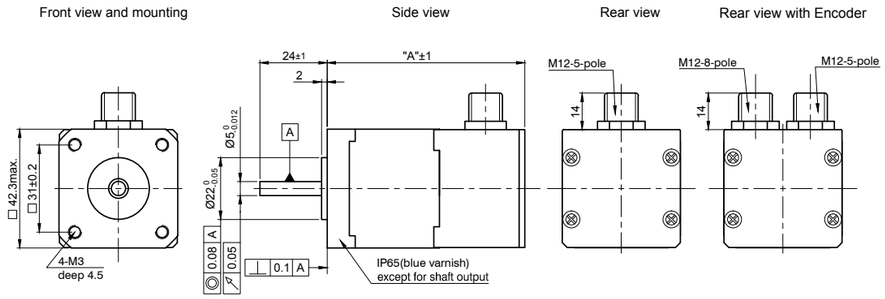
ZK-M12-5-2M-1-PUR-S M12 Cable
ZK-M12-5-2M-2-PUR-S M12 Cable
ZK-M12-5-5M-1-PUR-S M12 Cable
ZK-M12-5-5M-2-PUR-S M12 Cable
ZK-M12-8-2M-1-PUR-S M12 Cable
ZK-M12-8-2M-2-PUR-S M12 Cable
ZK-M12-8-5M-1-PUR-S M12 Cable
ZK-M12-8-5M-2-PUR-S M12 Cable

AS4118

Stepper Motor with M12 Connector in Protection Class IP65

DIMENSIONS (IN MM)

AS4118L... / AS4118L...-E/ENM24



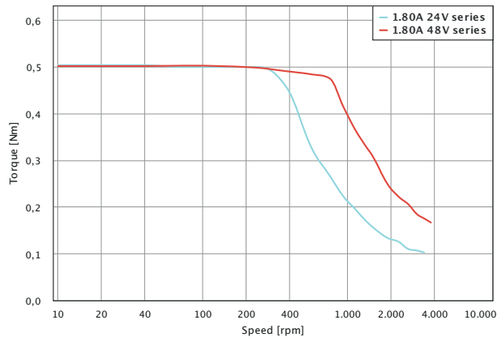
AS4118L...-EB/-ENM24B

AS4118

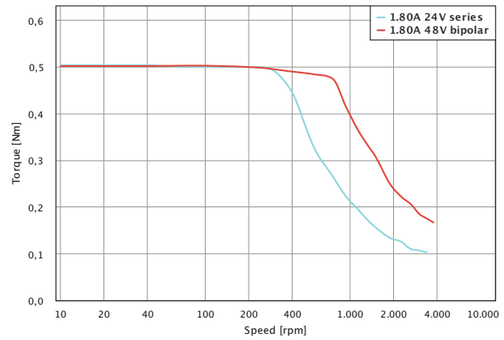
Stepper Motor with M12 Connector in Protection Class IP65

TORQUE CURVES

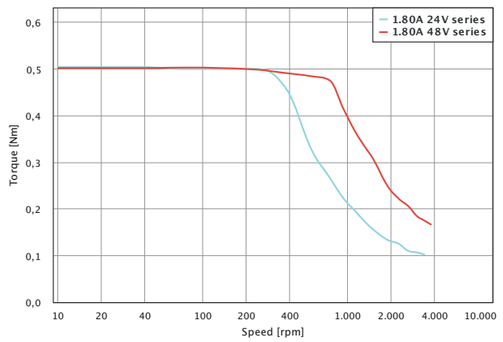
AS4118L1804



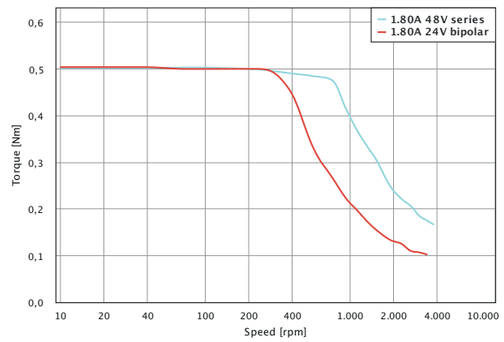
AS4118L1804-E



AS4118L1804-EB



AS4118L1804-ENM24



Notes

AS5918

Stepper Motor with M12 Connector in Protection Class IP65

OPTIONS

Gear | Brake | Controller

DESCRIPTION

2-phase, high-torque stepper motor in size NEMA 23 (56 mm) and with a step angle (full step) of 1.8° in protection class IP65 (exept for shaft outlet). This motor will work as a replacement for the standard motor ST5918 as they have the same flange size.

VERSIONS

Type	Current per Winding A/Winding	Holding Torque Ncm	Resistance per Winding Ohm	Inductance per Winding mH	Rotor Inertia gcm²	Weight kg	Length „A“ mm	Encoder Type V	Brake Torque Nm
AS5918S2804	2.83	85	0.75	2.6	230	0.8	73		
AS5918S2804-E	2.83	85	0.75	2.6	230	0.8	73	5	
AS5918M2804	2.83	105	0.85	3.6	300	0.85	77		
AS5918M2804-E	2.83	105	0.85	3.6	300	0.85	77	5	
AS5918L4204	4.2	198	0.5	1.9	480	1.14	98		
AS5918L4204-E	4.2	198	0.5	1.9	480	1.14	98	5	
AS5918L4204-EB	4.2	198	0.5	1.9	480	1.33	138	5	1
AS5918L4204-ENM24	4.2	198	0.5	1.9	480	1	98	24	
AS5918L4204-ENM24B	4.2	198	0.5	1.9	480	1	138	24	1

ORDER IDENTIFIER

AS5918S2804-

E = with Encoder

EB = with Encoder and Brake

ENM24 = with 24V Encoder

ENM24B = with 24V Encoder and Brake

ACCESSORIES

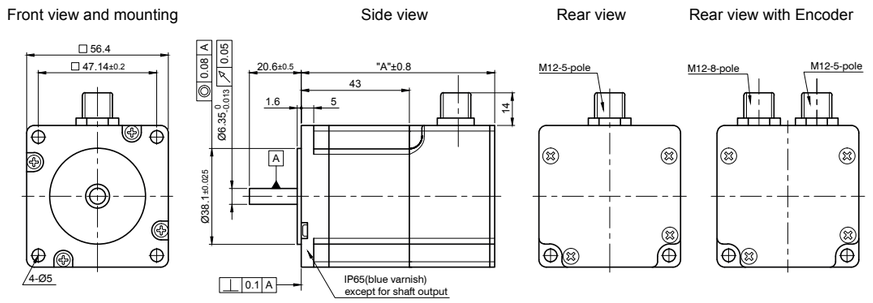
ZK-M12-5-2M-1-PUR-S	M12 Cable
ZK-M12-5-2M-2-PUR-S	M12 Cable
ZK-M12-5-5M-1-PUR-S	M12 Cable
ZK-M12-5-5M-2-PUR-S	M12 Cable
ZK-M12-8-2M-1-PUR-S	M12 Cable
ZK-M12-8-2M-2-PUR-S	M12 Cable
ZK-M12-8-5M-1-PUR-S	M12 Cable
ZK-M12-8-5M-2-PUR-S	M12 Cable

AS5918

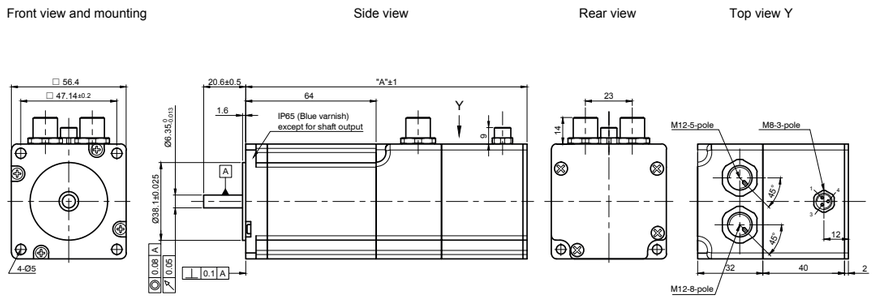
Stepper Motor with M12 Connector in Protection Class IP65

DIMENSIONS (IN MM)

AS5918 / AS5918...E/ENM24

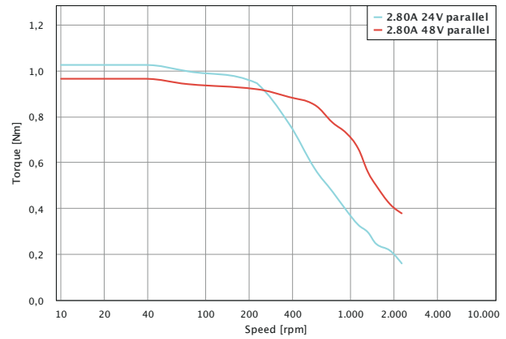


AS5918L...EB/ENM24B

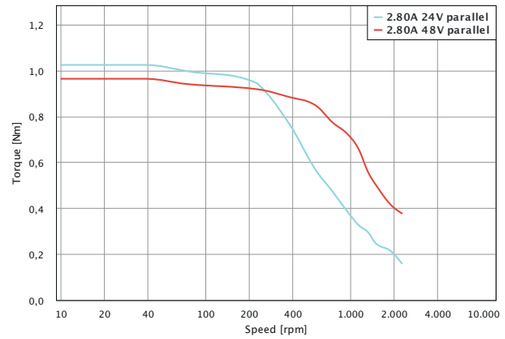


TORQUE CURVES

AS5918S2804



AS5918S2804-E

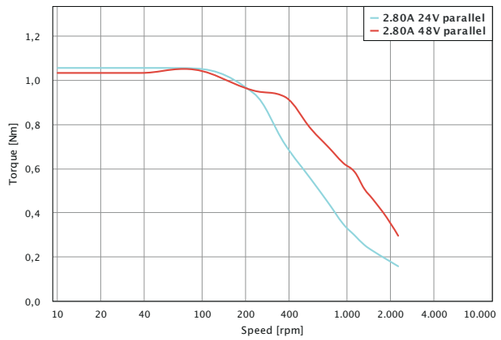


AS5918

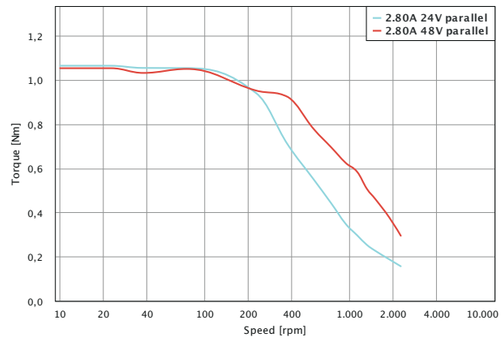
Stepper Motor with M12 Connector in Protection Class IP65

TORQUE CURVES

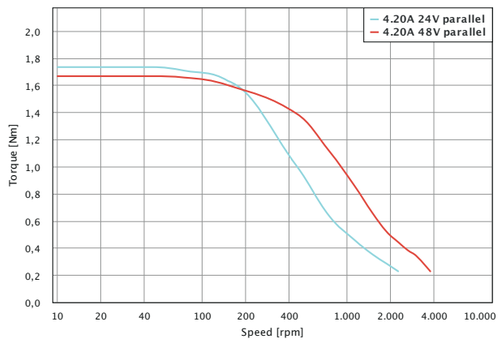
AS5918M2804



AS5918M2804-E



AS5918L4204



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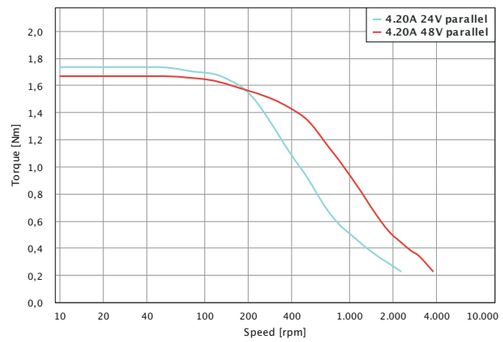

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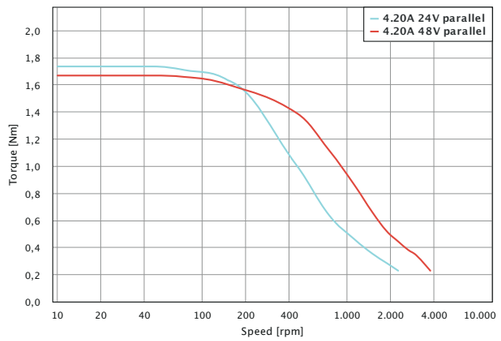
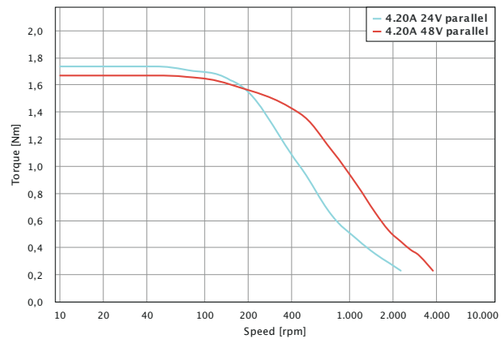


AS5918L4204-ENM24

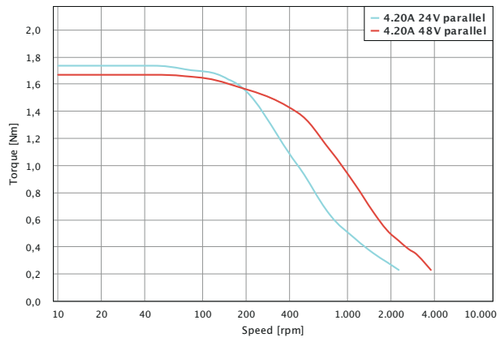


AS5918

Stepper Motor with M12 Connector in Protection Class IP65

TORQUE CURVES

AS5918L4204-ENM24B



AS8918

Stepper Motor with M12/M16 Connector in Protection Class IP65

OPTIONS

Gear

DESCRIPTION

2-phase, high-torque stepper motor in size NEMA 34 (86 mm) and with a step angle (full step) of 1.8° in protection class IP65. This motor will work as a replacement for the standard motor ST8918 as they have the same flange size.

VERSIONS

Type	Current per Winding A/Winding	Holding Torque Ncm	Resistance per Winding Ohm	Inductance per Winding mH	Rotor Inertia gcm²	Weight kg	Length „A“ mm	Encoder Type V	Brake Torque Nm
AS8918L9504-E24	9.5	933	0.26	2.7	300	4.35	148	24	
AS8918L9504-E24B	9.5	933	0.26	2.7	300	5	218	24	4

ORDER IDENTIFIER

AS8918L9504-

E24 = with 24V Encoder

E24B = with 24V Encoder and Brake

ACCESSORIES

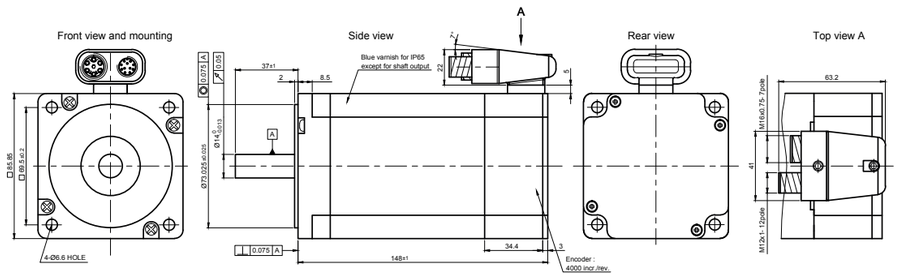
ZK-TW-7-2M M16 (TW) Cable

ZK-M12-12-2M-1-PUR-S M12 Cable

ZK-M12-12-2M-2-PUR-S M12 Cable

DIMENSIONS (IN MM)

AS8918L9504-E24

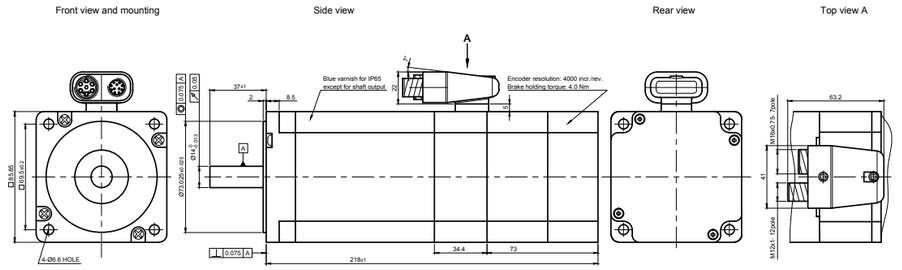


AS8918

Stepper Motor with M12/M16 Connector in Protection Class IP65

DIMENSIONS (IN MM)

AS8918L9504-E24B



TORQUE CURVES

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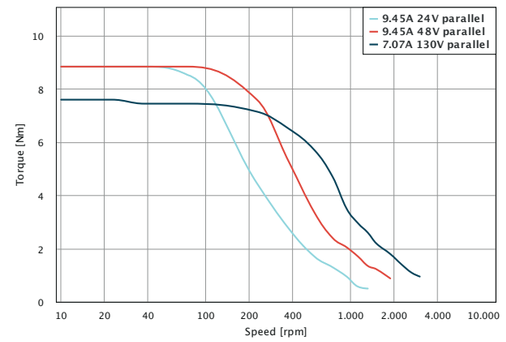

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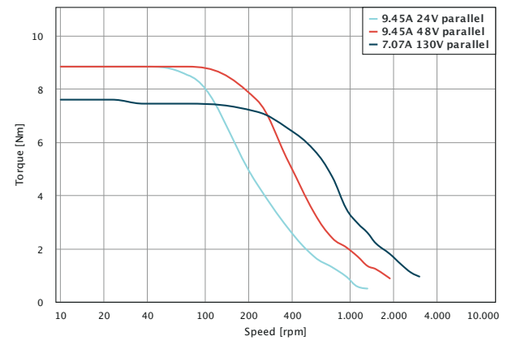


AP8918

Stepper Motor with PG Gland in Protection Class IP65

OPTIONS

Gear | Controller | Encoder

DESCRIPTION

2-phase, high-torque stepper motor in size NEMA 34 (89 mm) and with a step angle (full step) of 1.8° in protection class IP65 (exept for shaft outlet). This motor will work as a replacement for the standard motor ST8918 as they have the same flange size.

VERSIONS

Type	Current per Winding A/Winding	Holding Torque Ncm	Resistance per Winding Ohm	Inductance per Winding mH	Rotor Inertia gcm²	Weight kg	Length „A“ mm	Encoder Type V
AP8918M6404	6.4	594	0.33	3	2700	3.4	118	
AP8918M6404-E	6.4	594	0.33	3	3000	3.5	118	5
AP8918L9504	9.5	933	0.26	2.7	3000	4.6	148	
AP8918L9504-E	9.5	933	0.26	2.7	3000	4.7	148	5

ORDER IDENTIFIER

AP8918M6404-

E = with Encoder

ACCESSORIES

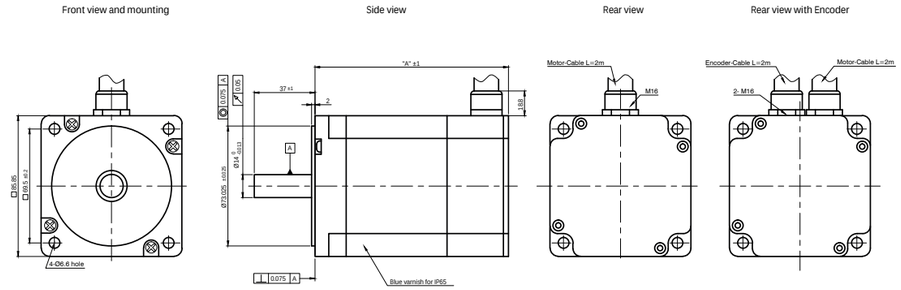
ZK-M12-5-2M-1-PUR-S	M12 Cable
ZK-M12-5-2M-2-PUR-S	M12 Cable
ZK-M12-5-5M-1-PUR-S	M12 Cable
ZK-M12-5-5M-2-PUR-S	M12 Cable
ZK-M12-8-2M-1-PUR-S	M12 Cable
ZK-M12-8-2M-2-PUR-S	M12 Cable
ZK-M12-8-5M-1-PUR-S	M12 Cable
ZK-M12-8-5M-2-PUR-S	M12 Cable

AP8918

Stepper Motor with PG Gland in Protection Class IP65

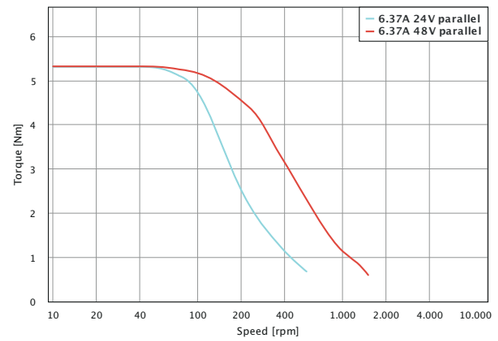
DIMENSIONS (IN MM)

AP8918

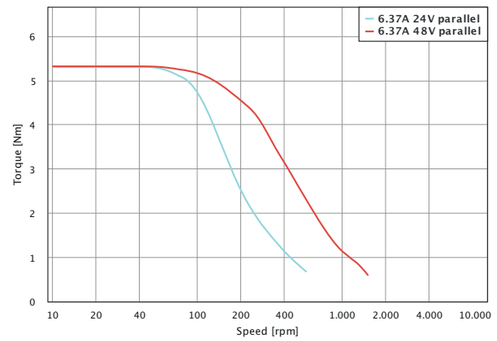


TORQUE CURVES

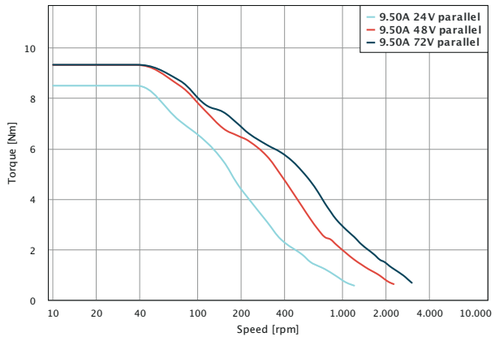
AP8918M6404



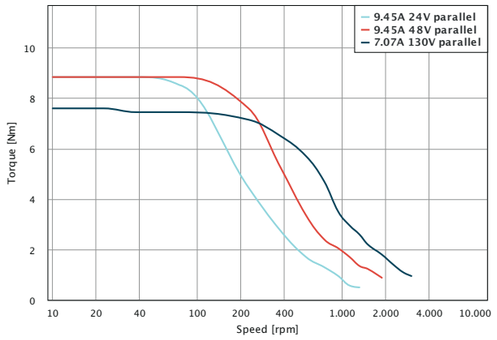
AP8918M6404-E



AP8918L9504



AP8918L9504-E



Notes

HOLLOW SHAFT MOTORS

ST4118

Stepper Motor with Hollow Shaft - NEMA 17

OPTION

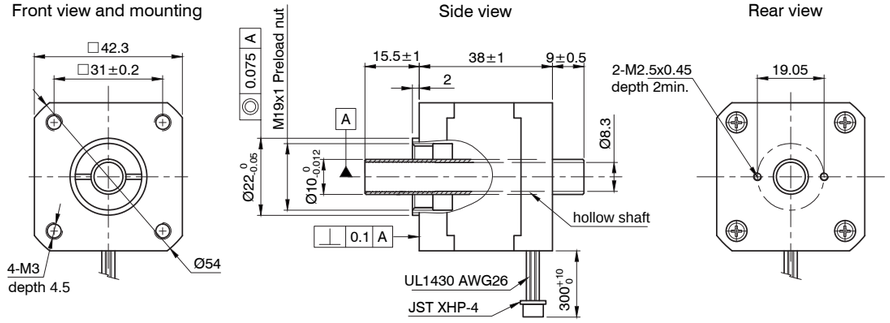
Encoder

VERSIONS

Type	Step Resolution ° (full step)	Current per Winding A/Winding	Holding Torque Ncm	Resistance per Winding Ohm	Inductance per Winding mH	Rotor Inertia gcm²	Weight kg	Length „A“ mm
ST4118M1804-L	1.8	1.8	28	1.1	1.85	570	0.24	38

DIMENSIONS (IN MM)

ST4118



ST5918

Stepper Motor with Hollow Shaft - NEMA 23

OPTION

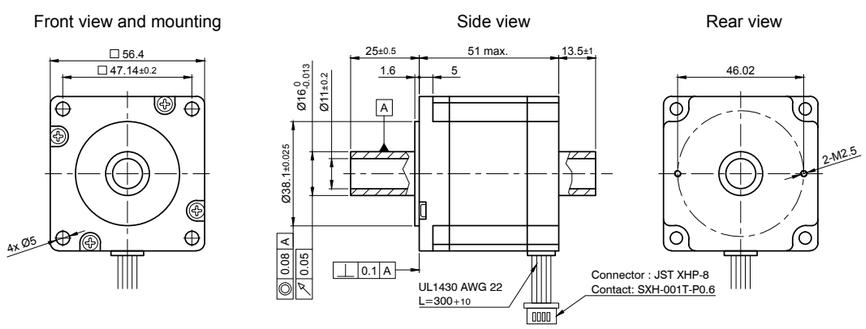
Encoder

VERSIONS

Type	Step Resolution ° (full step)	Current per Winding A/Winding	Holding Torque Ncm	Resistance per Winding Ohm	Inductance per Winding mH	Rotor Inertia gcm²	Weight kg	Length „A“ mm
ST5918S3008-L2	1.8	2.1	91.9	1.44	4.4	275	0.65	51

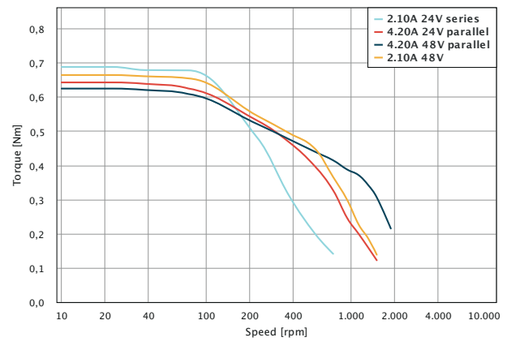
DIMENSIONS (IN MM)

ST5918



KENNLINIEN

ST5918S3008-L2



Notes

BRUSHLESS DC MOTORS

Brushless DC-Motor

General information on brushless DC motors

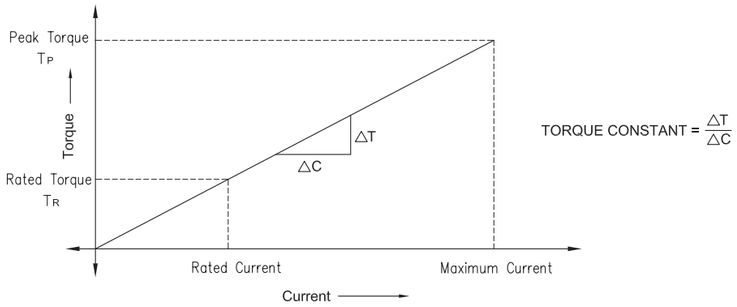
ADVANTAGES

- Significantly higher efficiency and power density than induction motors (with approx. 35% less volume and weight at the same output)
- Very high expected service life and smooth running in brushless technology with precision ball race
- Thanks to the linear torque curve, an exceptionally large speed range at full motor output and therefore improved matching to the required load conditions
- Reduced electrical interference emission along with excellent thermal properties
- Mechanically interchangeable with stepper motors, and hence less construction expense and greater parts variety

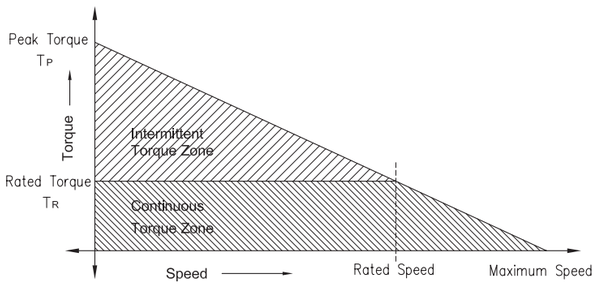
Electronically commutated 3-phase brushless motors (EC motors) are particularly well suited for applications that need smooth running and long service life. The high-energy permanent magnets allow high acceleration and speeds of up to 14,000 rpm with exceptional efficiency. The rotor position is reported electronically using three hall sensors offset by 60 and 120°. Optional encoders with up to 2000 CPR allow high-resolution position controlling.

PROPERTIES

TORQUE/CURRENT CHARACTERISTICS



TORQUE/SPEED CHARACTERISTICS



DB22

Brushless DC Motor

OPTION

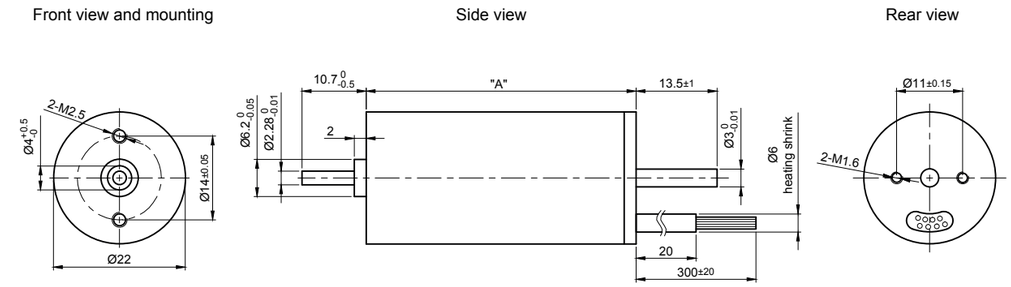
Gear Controller Encoder

VERSIONS

Type	Nominal Output W	Nominal Torque Ncm	Nominal Current A	Nominal Voltage V	Nominal Speed rpm	Torque Constant Ncm/A	Rotor Inertia gcm²	Weight kg	Length „A“ mm
DB22M01	3.8	0.8	0.265	24	4800	3.02	0.66	0.07	45
DB22L01	7.7	2.2	0.62	24	3500	3.55	1.32	0.12	68

DIMENSIONS (IN MM)

DB22



DB28

Brushless DC Motor

OPTION

Gear · Controller · Encoder

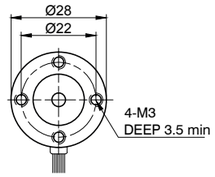
VERSIONS

Type	Nominal Output W	Nominal Torque Ncm	Nominal Current A	Nominal Voltage V	Nominal Speed rpm	Torque Constant Ncm/A	Rotor Inertia gcm²	Weight kg	Length „A“ mm
DB28S01	6	0.7	0.51	15	8000	1.37	1.23	0.06	26
DB28M01	14	1.4	0.88	24	10000	1.6	2.12	0.082	38
DB28L01	16	5	1	24	3700	5	5.98	0.28	77

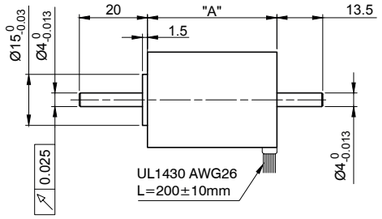
DIMENSIONS (IN MM)

DB28

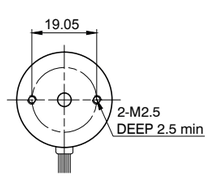
Front view and mounting



Side view



Rear view



DB33

Brushless DC Motor

OPTION

Gear · Controller · Encoder

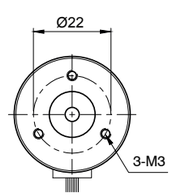
VERSIONS

Type	Nominal Output W	Nominal Torque Ncm	Nominal Current A	Nominal Voltage V	Nominal Speed rpm	Torque Constant Ncm/A	Rotor Inertia gcm²	Weight kg	Length „A“ mm
DB33S01	7	2.2	0.56	24	3000	4.6	2.94	0.115	38

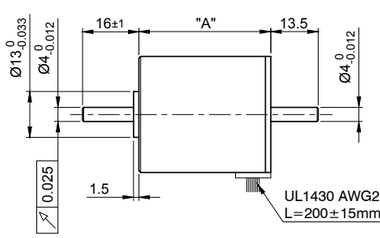
DIMENSIONS (IN MM)

DB33

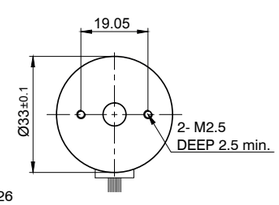
Front view and mounting



Side view



Rear view



DB42

Brushless DC Motor

OPTION

Gear | Brake | Controller | Encoder

VERSIONS

Type	Nominal Output W	Nominal Torque Ncm	Nominal Current A	Nominal Voltage V	Nominal Speed rpm	Torque Constant Ncm/A	Rotor Inertia gcm²	Weight kg	Length „A“ mm
DB42S01	40	5	0.88	48	6000	5.7	24	0.25	41
DB42S02	40	5	3.57	17	8000	1.4	24	0.25	41
DB42S03	26	6.25	1.79	24	4000	3.5	24	0.3	41
DB42M01	70	11	2.12	48	6000	5.2	48	0.45	61
DB42M02	70	7	1.63	48	8500	4.3	48	0.45	61
DB42M03	52.5	12.5	3.47	24	4000	3.6	48	0.45	61
DB42L01	77.5	18	5.14	24	4000	3.6	72	0.65	81
DB42C01	160	25	4.63	48	6000	5.4	96	0.75	100
DB42C02	160	10	3.57	48	14000	2.8	96	0.75	100
DB42C03	105	25	6.65	24	4000	3.76	96	0.75	100

ACCESSORIES

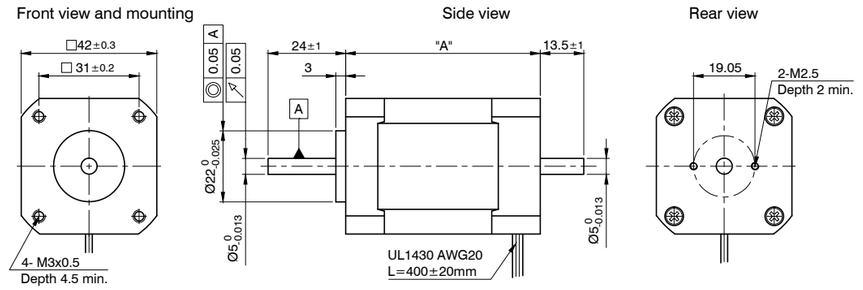
ZD-D28	Damper
ZD-D40	Damper

DB42

Brushless DC Motor

DIMENSIONS (IN MM)

DB42



DB57

Brushless DC Motor

OPTION

Gear

Controller

VERSIONS

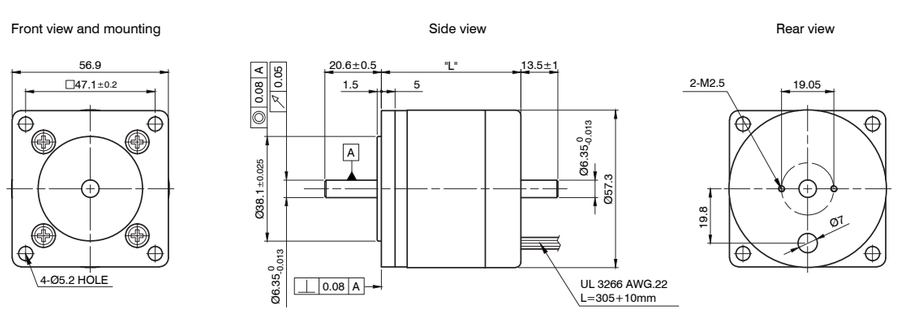
Type	Nominal Output W	Nominal Torque Ncm	Nominal Current A	Nominal Voltage V	Nominal Speed rpm	Torque Constant Ncm/A	Rotor Inertia gcm²	Weight kg	Length „A“ mm
DB57S01	50	19	3.58	24	2700	5.3	200	0.6	50.8
DB57L01	75	28	4.67	24	2740	6	330	1.1	76.2
DB57C01	110	37	6.5	24	2800	6.3	500	1.5	101.6

ACCESSORIES

ZD-D56	Damper

DIMENSIONS (IN MM)

DB57



DB59

Brushless DC Motor

OPTION

Gear

Controller

VERSIONS

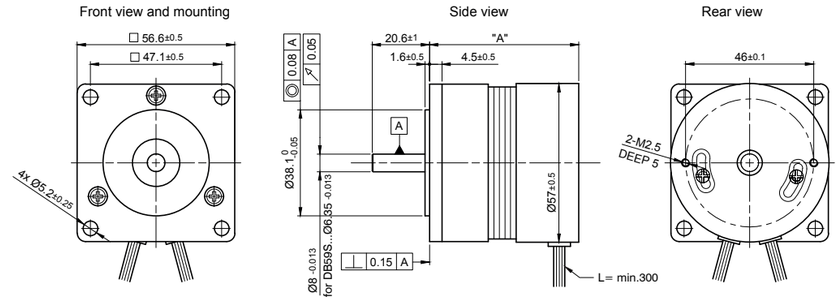
Type	Nominal Output W	Nominal Torque Ncm	Nominal Current A	Nominal Voltage V	Nominal Speed rpm	Torque Constant Ncm/A	Rotor Inertia gcm²	Weight kg	Length „A“ mm
DB59S024035-A	84	23	5	24	3500	4.5	75	0.52	54
DB59M024035-A	135	37	8	24	3500	4.6	105	0.65	69
DB59L024035-A	172	47	9.4	24	3500	5	119	0.72	74
DB59C024035-A	220	60	13.6	24	3500	4.4	173	0.95	94

ACCESSORIES

ZD-DF56	Damper

DIMENSIONS (IN MM)

DB59



DB87

Brushless DC Motor

OPTION

Gear · Brake · Controller · Encoder

VERSIONS

Type	Nominal Output W	Nominal Torque Ncm	Nominal Current A	Nominal Voltage V	Nominal Speed rpm	Torque Constant Ncm/A	Rotor Inertia gcm²	Weight kg	Length „A“ mm
DB87S01-S	250	70	6.25	48	3000	11.2	800	1.85	86
DB87M01-S	440	140	10.77	48	3000	13	1600	2.6	113
DB87L01-S	750	210	17.95	48	3000	11.7	2400	4	140

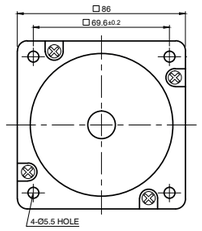
ACCESSORIES

ZD-D56	Damper

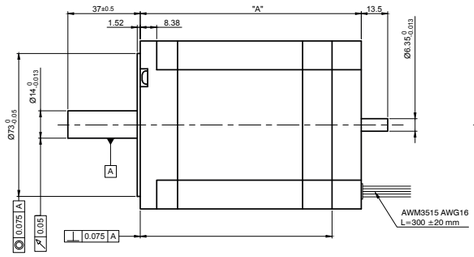
DIMENSIONS (IN MM)

DB87

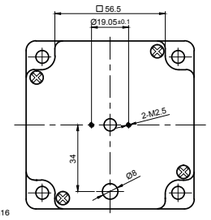
Front view and mounting



Side view



Rear view



Notes

DF45

Flat BLDC Motor

OPTION

Controller

VERSIONS

Type	Nominal Output W	Nominal Torque Ncm	Nominal Current A	Nominal Voltage V	Nominal Speed rpm	Torque Constant Ncm/A	Rotor Inertia gcm²	Weight kg	Length „A“ mm
DF45S024050	30	5	1.58	24	4840	3.55	99	0.08	18
DF45M024053	50	8.4	2.36	24	5260	3.35	135	0.12	21.6
DF45L024048	65	13	3.26	24	4840	3.69	181	0.15	27

BESTELLBEZEICHNUNG

DF45S024050-

A = PCB Connector

A2 = Connector with leads

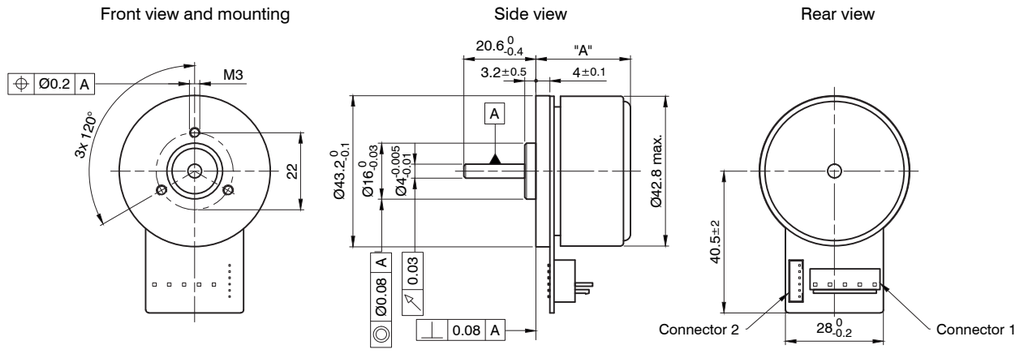
ACCESSORIES

ZK-JST-PHR-6-0.3M
Cable for PCB Version

ZK-JST-VHR-5N-0.3M
Cable for PCB Version

DIMENSIONS (IN MM)

DF45-A

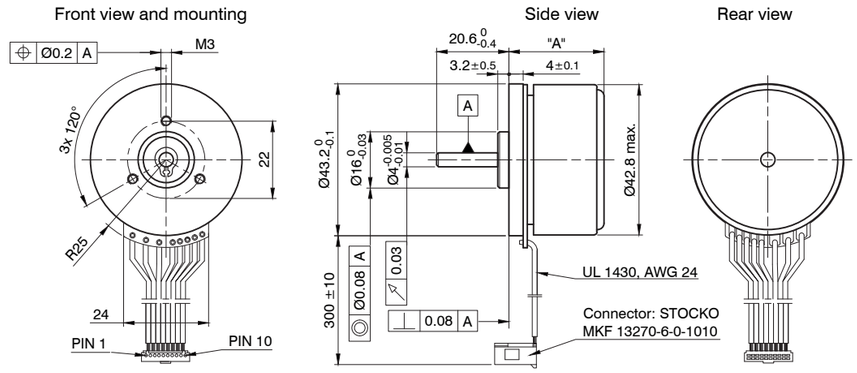


DF45

Flat BLDC Motor

DIMENSIONS (IN MM)

DF45-A2



Notes

Brushless DC Motors in Protection Class IP65

ASB42

Brushless DC Motor in Protection Class IP65

OPTION

Gear

Controller

DESCRIPTION

Due to its high-energy permanent magnets, the 3-phase BLDC motor ASB42 is ideally suited for applications where smooth running and a long service life are required. The housing of this motor with protection class IP 65 (except for shaft outlet) is sealed against humidity and dust. The ASB42 features M16 and M12 connectors for power and the rotary encoder.

Different motor versions offer torques ranging from 0.5 to 0.25 Nm and speeds ranging from 4000 to 14,000 rpm. The entire range of ASB BLDC motors include magnetic encoders which ensure precise positioning, even in challenging industrial environments.

VERSIONS

Type	Nominal Output W	Nominal Torque Ncm	Nominal Current A	Nominal Voltage V	Nominal Speed rpm	Torque Constant Ncm/A	Rotor Inertia gcm²	Weight kg	Length „A“ mm
ASB42C048060-ENM	160	25	4.63	48	6000	5.4	96	0.75	121

ORDER IDENTIFIER

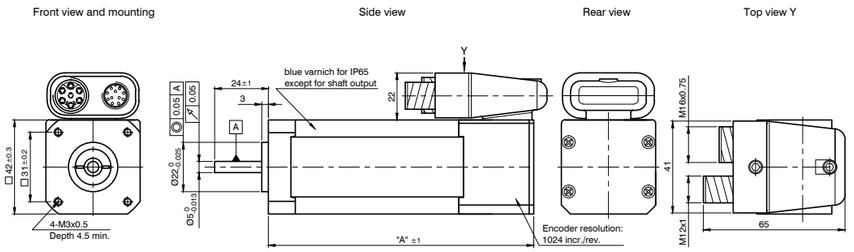
ASB42C048060-ENM

ACCESSORIES

ZK-M12-12-2M-1-PUR-S	M12 Cable
ZK-M12-12-2M-2-PUR-S	M12 Cable
ZK-M12-12-5M-1-PUR-S	M12 Cable
ZK-M12-12-5M-2-PUR-S	M12 Cable
ZK-TW-4-2M	M16 (TW) Cable

DIMENSIONS (IN MM)

ASB42C048060-ENM



ASB87

Brushless DC Motor in Protection Class IP65

OPTION

Gear

Controller

DESCRIPTION

The brushless DC motor ASB87 was developed especially for rugged environments. The housing of this motor with protection class IP 65 (except for shaft outlet) is sealed against humidity and dust. Complete IP rating is available for OEM customers upon request.

The ASB87 features a built-in 1024 CPR magnetic encoder and doesn't require additional hall sensors. The reference signal is synchronous to the hall phase for even more exact positioning.

VERSIONS

Type	Nominal Output W	Nominal Torque Ncm	Nominal Current A	Nominal Voltage V	Nominal Speed rpm	Torque Constant Ncm/A	Rotor Inertia gcm²	Weight kg	Length „A“ mm
ASB87S048030-ENM	250	70	6.25	48	3000	11.2	800	1.85	91.9

ORDER IDENTIFIER

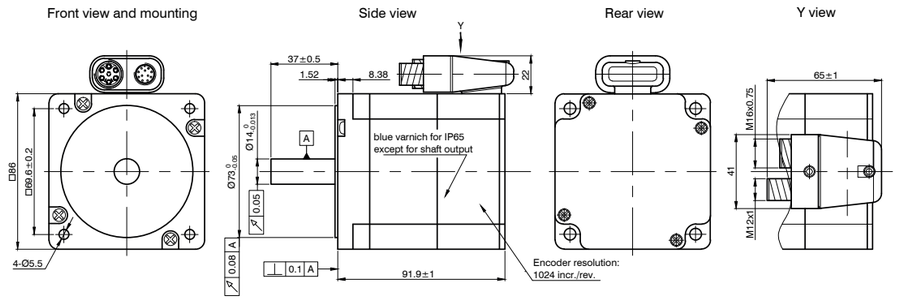
ASB87S048030-ENM

ACCESSORIES

ZK-TW-7-2M	M16 (TW) Cable

DIMENSIONS (IN MM)

ASB87S048030-ENM



Notes

LINEAR ACTUATORS

Linear Actuators

General information on linear actuators

WHAT LINEAR DRIVES ARE AVAILABLE?

1. **Linear actuator (non-captive)**

   A threaded nut is worked into the motor's hollow shaft. It converts the rotary motion of the motor into linear motion for a screw. The screw has to be prevented from rotating in order to achieve linear motion.

2. **Linear actuator with linear slide (captive)**

   The linear actuator's screw is coupled with a rod, thereby securing it from being twisted out of position.

3. **Linear positioning drive**

   The thread is attached to the motor shaft. A nut on the shaft carries out the linear motion.

NANOTEC LINEAR DRIVES

- Are constructed to be simple and flexible
- Offer a high and reproducible resolution (<1 µm) and fast feeding (>300 mm/sec.)
- Are mechanically exchangeable with standard motors and allow consistent construction platforms
- Are designed to be energy-saving
- Are partially self-locking and thus can be operated without a brake
- Are low-friction and low-wear due to the PEEK nuts being used
- Are designed in terms of performance to be an affordable and flexible alternative to hydraulic and pneumatic cylinders

SELECTING A SUITABLE DESIGN

1. Which stroke is necessary?
2. Should an encoder or a brake be connected?
3. Should a freely movable end move the load or is a fixed screw necessary?
4. Are there limits in the application design?

SELECTING THE MOTOR OUTPUT

In order to find a suitable linear drive, you need information about

1. The load being moved
2. The movement direction (vertical or horizontal)
3. The required feed speed
4. The acceleration torque
5. The required torque
6. The stroke
7. The positioning and repeatability
8. The maximum permitted screw clearance

ESTIMATED SERVICE LIFE

The force and power rating specified in the data sheets is based on a duty cycle of 10% to 20% and has to be reduced accordingly for higher values.

Linear Actuators

General information on linear actuators

PERFORMANCE CALCULATION FOR SELECTING LINEAR ACTUATORS

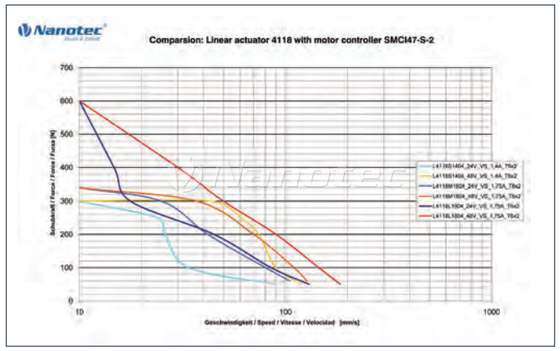
The achievable resolutions, feed speeds and forces are calculated based on the screw pitch (p in mm), torque (Md in Nm) and efficiency for a stepper motor as follows:

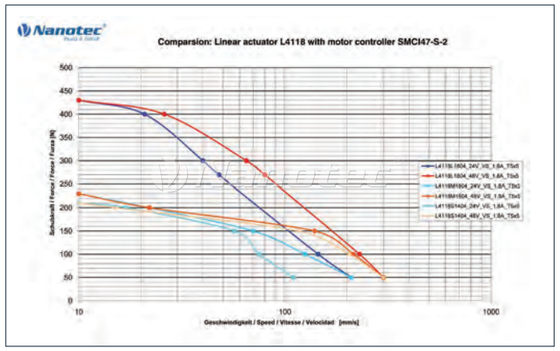
- **Resolution in mm/step**
  Formula: p/(360°/step angle)
  Example: 1 mm/(360°/0.9°) = 0.0025 mm/step
- **Feed speed**
  Formula: Speed x screw pitch
  Example: 900 rpm x 2 mm = 30 mm/s
- **Force in N**
  Formula: $Md_{Mot} \times 2\pi \times$ efficiency/p
  Example: Motor L4118S, approx. 0.22 Nm at 48 V, 900 rpm, with a screw pitch of 2 mm
  F = 0.22 Nm x 6.28 x 0.43/0.002 m = 297 N
- **Efficiency**
  The efficiency of a lead screw drive is approx. 0.3 – 0.6, depending on diameter, pitch, nut material and lubrication.
- **Acceleration torque**
  Formula: Linear: $F = m \bullet a$
  $(a = v_e - v_a/t)$
  v_e = end speed, v_a = starting speed
  Formula: Linear: $F = m \bullet g \bullet \mu$
  The **frictional force F** (N) is determined primarily by the mass = **m** (weight, kg) and the coefficient of friction = ***µ***.

The correct thread pitch, motor size and step angle have a substantial influence on the precision, the axial forces and the speed of the linear drive. A curve comparison can enable a specific model to be selected if framework data is known.

CURVE COMPARISON FOR SELECTING A LINEAR ACTUATOR

The curve comparison makes the differences obvious that need to be taken into account during the selection process.
Both graphics show the curves for a performance comparison using the L4118 linear actuator model with T5x5 and T6x2 threading as an example.





CAUTION

Ensure that no radial forces are being applied to the screw and that the screw is running concentrically relative to the motor shaft.
The screw has to be prevented from rotating in order to achieve linear motion.

ACCESSORIES

Suitable screws are available for each linear actuator under Accessories.

LUBRICATION

The PEEK material used for the thread nut and the nut is self-lubricating. However, we recommend lubricating these parts once during setup and installation for a longer service life. Suitable substances are dry lubricants (especially in the case of slower speeds and short duty cycles) or roller bearing greases such as Klüber Microlube GBUY131. You can also order a suitable grease directly from Nanotec under the order identifier "Nanolube".
The lubrication intervals, lubricant suitability and the resulting service life always depend on the application and the ambient conditions, and therefore need to be tested in the application.

LP25-LP35

Permanent Magnet Linear Actuators

OPTION

Controller

VERSIONS

Type	Force N	Resolution µm/step	Pitch of screw mm	Stroke „A“ mm	Current per Winding A/Winding	Resistance per Winding Ohm	Step Resolution ° (full step)	Weight kg	Length „A“ mm
LPV2515S0104-TR3,5X1	5	41.7	1	12	0.1	53	15	0.04	16
LP2515S0104-TR3,5X1	10	41.7	1	40	0.1	53	15	0.036	16.5
LP3575S0504-TR3.5X1	55	25.4	1.22	75	0.46	11	7.5	0.086	17.5

ACCESSORIES

Nanolube	Lubricant

CAUTION

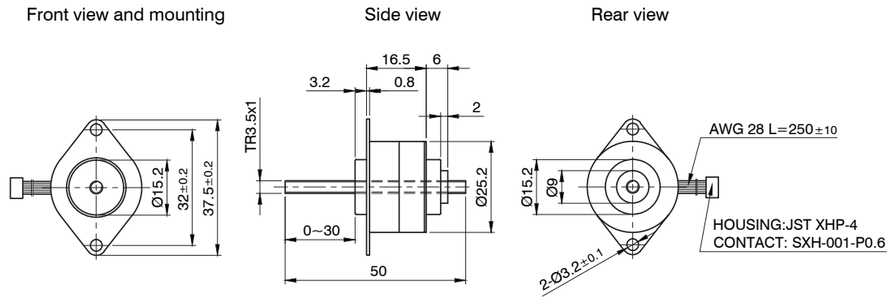
The force and power ratings specified in the datasheets are based on a power-up time of approx. 10% - 20% and must be reduced accordingly for higher values. Moving against fixed end stops should be avoided.

LP25-LP35

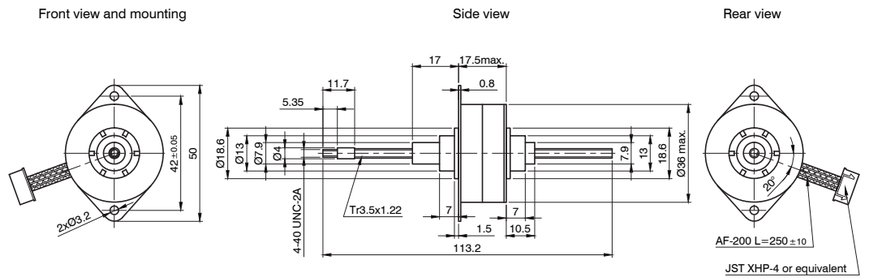
Permanent Magnet Linear Actuators

DIMENSIONS (IN MM)

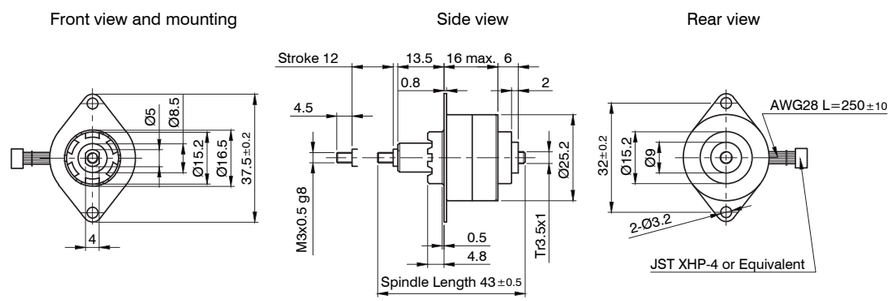
LP2515S0104



LP3575S0504



LPV2515S0104



LSP15-LSP42

Permanent Magnet Linear Positioning Drives LSP

OPTION

Encoder

VERSIONS

Type	Force N	Feed mm/s	Resolution µm/step	Pitch of screw mm	Thread Length mm	Current per Winding A/Winding	Resistance per Winding Ohm	Inductance per Winding mH	Weight kg	Length „A“ mm
LSP0818M0104-M2X0,25	0.8	20	14	0.25	11	0.12	13	1.5	0.003	7.8
LSP1018M0204-M2X0.25	4	20	14	0.25	13.5	0.22	15	3	0.0043	10
LSP1518M0104-M2X0,4	3	20	20	0.4	18	0.071	170	28	0.013	11
LSP2575M0506-M2X0,4	10	15	8	0.4	30	0.5	10	2	0.0312	15
LSP3575M0206-M3X0,5	40	10	10	0.5	30	0.22	60	45	0.094	22
LSP4275M0206-M3X0,5	50	10	10	0.5	30	0.18	70	72	0.134	22

ACCESSORIES

Nanolube Lubricant

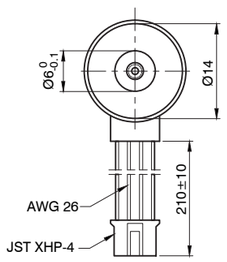
CAUTION

The force and power ratings specified in the datasheets are based on a power-up time of approx. 10% - 20% and must be reduced accordingly for higher values. Moving against fixed end stops should be avoided.

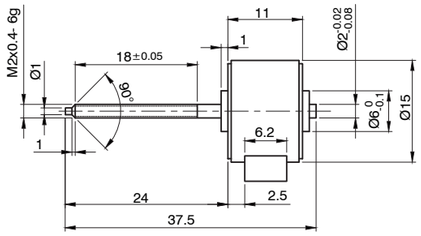
DIMENSIONS (IN MM)

LSP1518M0104

Front view and mounting



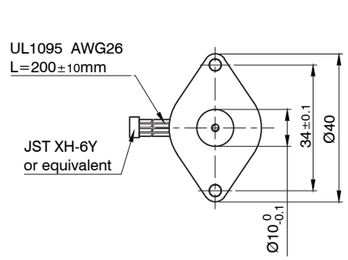
Side view



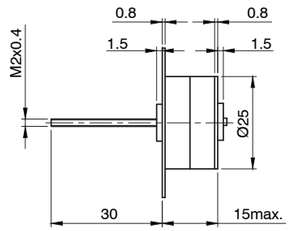
DIMENSIONS (IN MM)

LSP2575M0506

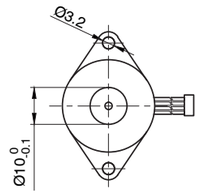
Front view and mounting



Side view

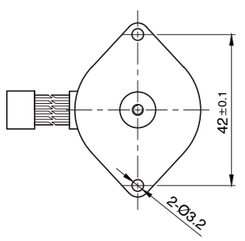


Rear view

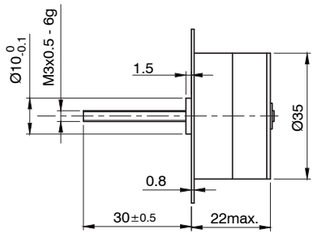


LSP3575M0206

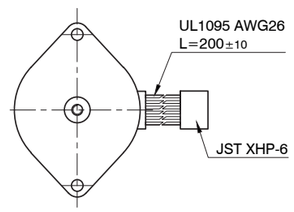
Front view and mounting



Side view

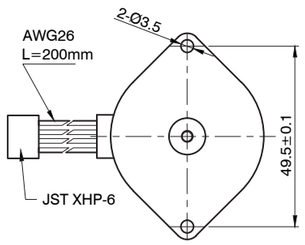


Rear view

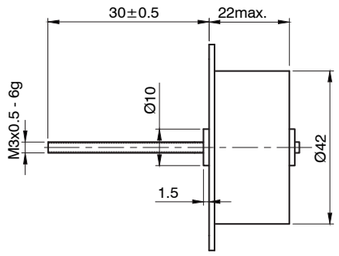


LSP4275M0206

Front view and mounting



Side view



L20

Linear Actuator with Lead Screw

OPTION

Controller

Encoder

VERSIONS

Type	Force N	Feed mm/s	Pitch of screw mm	Resolution µm/step	Current per Winding A/Winding	Resistance per Winding Ohm	Inductance per Winding mH	Weight kg	Bushing Length „L“ mm	Length „A“ mm
L2018S0604-T3,5X1	30	40	1	5	0.6	6.5	2	0.06	5	33

ACCESSORIES

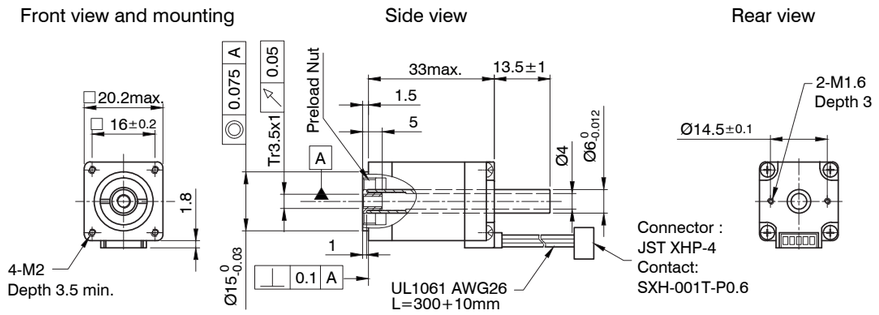
ZST3,5-1-200-1	Threaded Screw
ZST3,5-1-500	Threaded Screw
Nanolube	Lubricant

CAUTION

The force and power ratings specified in the datasheets are based on a power-up time of approx. 10% - 20% and must be reduced accordingly for higher values. Moving against fixed end stops should be avoided.

DIMENSIONS (IN MM)

L2018



L20-A

Linear Actuator with Lead Screw and Linear Slide

OPTION

Controller

Encoder

VERSIONS

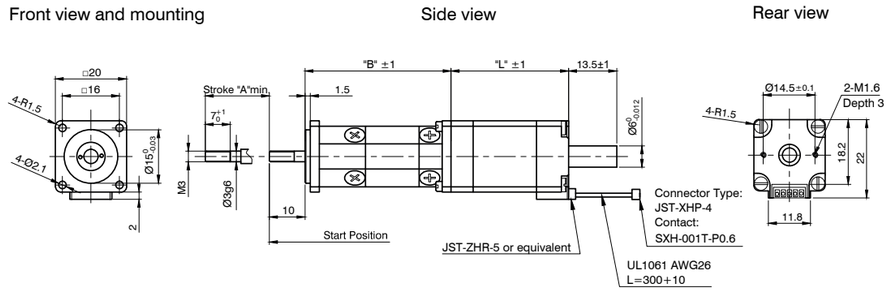
Type	Force N	Feed mm/s	Pitch of screw mm	Resolution µm/step	Current per Winding A/Winding	Resistance per Winding Ohm	Weight kg	Stroke „A“ mm	Housing Length „B“ mm	Length „A“ mm
L2018S0604-T3,5x1-25	30	40	1	5	0.6	6.5	0.09	25	41	33

CAUTION

The force and power ratings specified in the datasheets are based on a power-up time of approx. 10% - 20% and must be reduced accordingly for higher values. Moving against fixed end stops should be avoided.

DIMENSIONS (IN MM)

L2018-A



LS20

Linear Positioning Drive

OPTION

Controller

Encoder

VERSIONS

Type	Force N	Feed mm/s	Resolution µm/step	Current per Winding A/Winding	Resistance per Winding Ohm	Weight kg	Length „A“ mm
LS2018S0604-T3,5-A	30	40	5	0.6	6.5	0.06	33

ORDER IDENTIFIER

LS2018S0604-T3,5-

150 = 150 mm Thread Length

75 = 75 mm Thread Length

ACCESSORIES

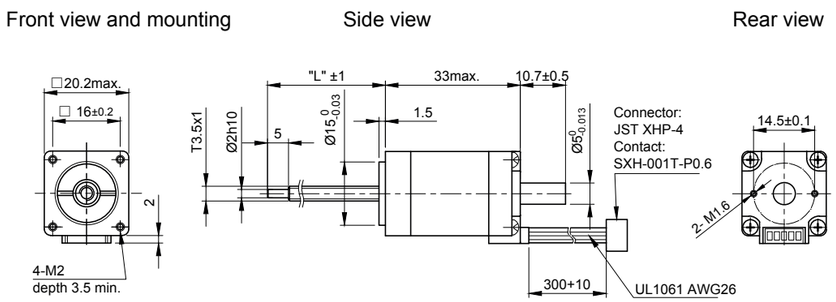
LSNUT_T3.5x1	Threaded Nut
Nanolube	Lubricant

CAUTION

The force and power ratings specified in the datasheets are based on a power-up time of approx. 10% - 20% and must be reduced accordingly for higher values. Moving against fixed end stops should be avoided.

DIMENSIONS (IN MM)

LS2018



L28

Linear Actuators with Lead Screw

OPTION

Controller

Encoder

VERSIONS

Type	Force N	Feed mm/s	Pitch of screw mm	Resolution µm/step	Current per Winding A/Winding	Resistance per Winding Ohm	Inductance per Winding mH	Weight kg	Bushing Length „L“ mm	Length „A“ mm
L2818S0604-T5X5	30	100	5	25	0.67	5.6	4	0.11	20	31.5
L2818L0604-T5X5	60	140	5	25	0.67	9.2	7.2	0.19	20	50.5

ORDER IDENTIFIER

L2818S0604-T5X5

ACCESSORIES

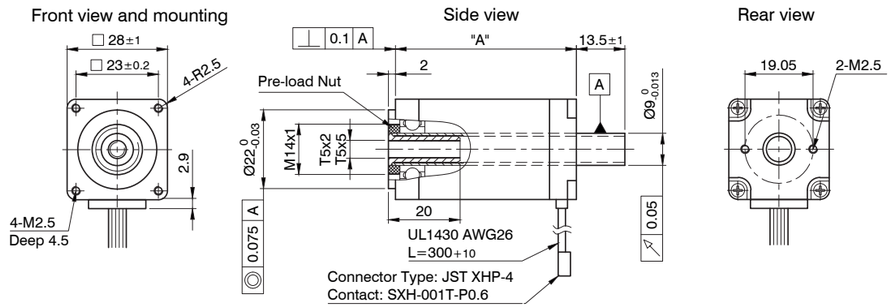
ZST5-5-200-1	Threaded Screw
ZST5-5-300-1	Threaded Screw
ZST5-5-1050	Threaded Screw
Nanolube	Lubricant

CAUTION

The force and power ratings specified in the datasheets are based on a power-up time of approx. 10% - 20% and must be reduced accordingly for higher values. Moving against fixed end stops should be avoided.

DIMENSIONS (IN MM)

L2818



L28-A

Linear Actuators with Lead Screw and Linear Slide

OPTION

Controller

Encoder

VERSIONS

Type	Force N	Feed mm/s	Pitch of screw mm	Resolution µm/step	Current per Winding A/Winding	Resistance per Winding Ohm	Weight kg	Stroke „A“ mm	Housing Length „B“ mm	Length „A“ mm
L2818S0604-T5x5-A	30	100	5	25	0.67	5.6	0.26	25-50	44	31.5
L2818L0604-T5x5-A	60	140	5	25	0.67	9.2	0.34	25-50	44	50.5

ORDER IDENTIFIER

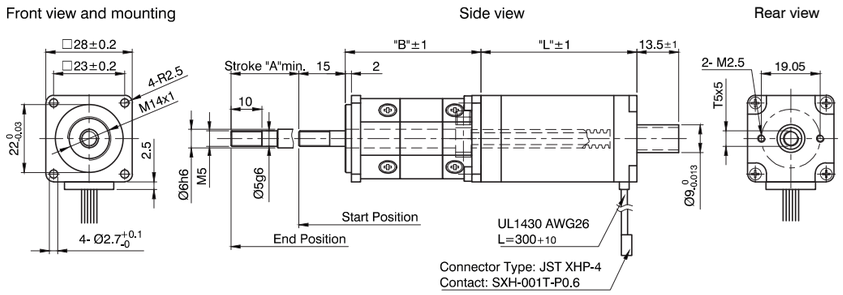
L2018S0604-T3,5X1

CAUTION

The force and power ratings specified in the datasheets are based on a power-up time of approx. 10% - 20% and must be reduced accordingly for higher values. Moving against fixed end stops should be avoided.

DIMENSIONS (IN MM)

L2818-A



Notes

LS28

Linear Positioning Drive

OPTION

Controller

Encoder

VERSIONS

Type	Force N	Feed mm/s	Resolution µm/step	Current per Winding A/Winding	Resistance per Winding Ohm	Weight kg	Length „A“ mm
LS2818S0604-T6x1-75	60	20	5	0.67	5.6	0.13	32
LS2818S0604-T6x2-75	60	20	10	0.67	5.6	0.2	32
LS2818S0604-T5x5-75	30	100	25	0.67	5.6	0.2	32
LS2818L0604-T6x1-75	120	30	5	0.67	9.2	0.28	51
LS2818L0604-T6x2-75	120	30	10	0.67	9.2	0.28	51
LS2818L0604-T5x5-75	60	140	25	0.67	9.2	0.28	51
LS2818L1404-T6x2-75	140	40	10	1.4	2.3	0.28	51

ORDER IDENTIFIER

LS2818S0604-T6x1-75

ACCESSORIES

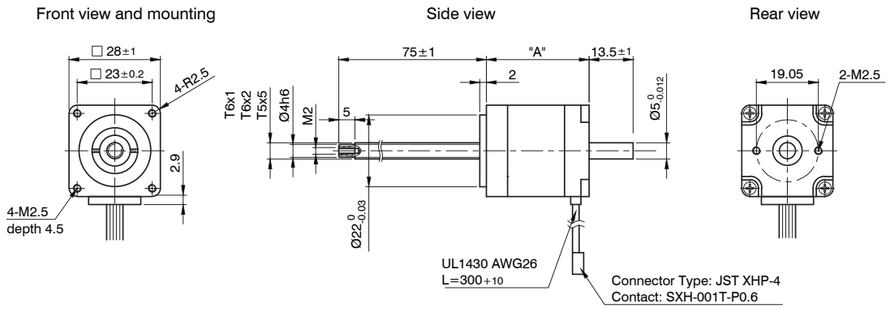
LSNUT-T5x5-F	Threaded Nut
LSNUT-T6x1-F	Threaded Nut
LSNUT-T6x2-F	Threaded Nut
Nanolube	Lubricant

CAUTION

The force and power ratings specified in the datasheets are based on a power-up time of approx. 10% - 20% and must be reduced accordingly for higher values. Moving against fixed end stops should be avoided.

DIMENSIONS (IN MM)

LS2818

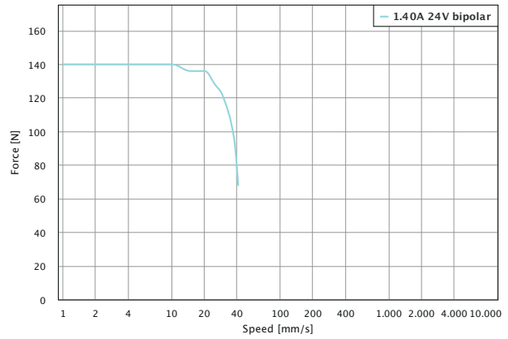


LS28

Linear Positioning Drive

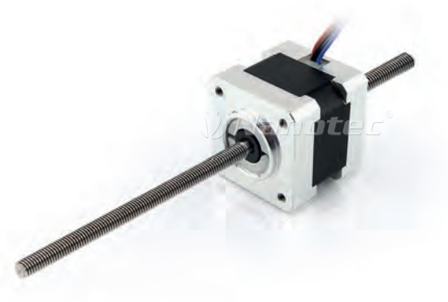
TORQUE CURVES

LS2818L1404-T6x2-75



L35

Linear Actuators with Lead Screw/Fine-Pitch Screw



OPTION

Controller

Encoder

VERSIONS

Type	Force N	Feed mm/s	Pitch of screw mm	Resolution µm/step	Current per Winding A/Winding	Resistance per Winding Ohm	Inductance per Winding mH	Weight kg	Bushing Length „L“ mm	Length „A“ mm
L3518S1204-T6X1	240	50	1	5	1.2	1.85	2	0.15	20	34
L3518S1204-T6X2	160	100	2	10	1.2	1.85	2	0.15	20	34
L3518S1204-T5X5	85	250	5	25	1.2	1.85	2	0.15	20	34

ORDER IDENTIFIER

L3518S1204-T6X1

ACCESSORIES

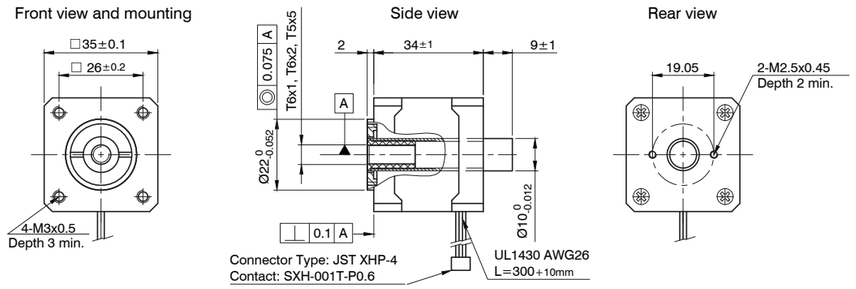
ZST5-5-200-1	Threaded Screw
ZST5-5-300-1	Threaded Screw
ZST5-5-1050	Threaded Screw
ZST6-1-200-1	Threaded Screw
ZST6-1-300-1	Threaded Screw
ZST6-1-1050	Threaded Screw
ZST6-2-200-1	Threaded Screw
ZST6-2-300-1	Threaded Screw
ZST6-2-1500	Threaded Screw
Nanolube	Lubricant

CAUTION

The force and power ratings specified in the datasheets are based on a power-up time of approx.10% - 20% and must be reduced accordingly for higher values. Moving against fixed end stops should be avoided.

DIMENSIONS (IN MM)

L3518

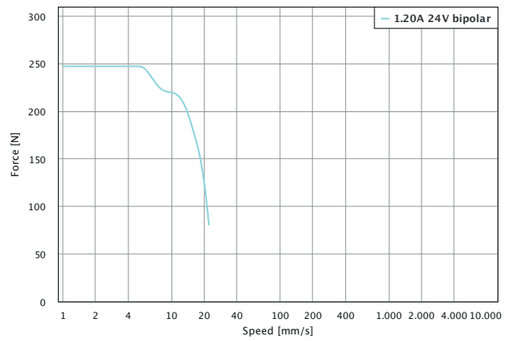


L35

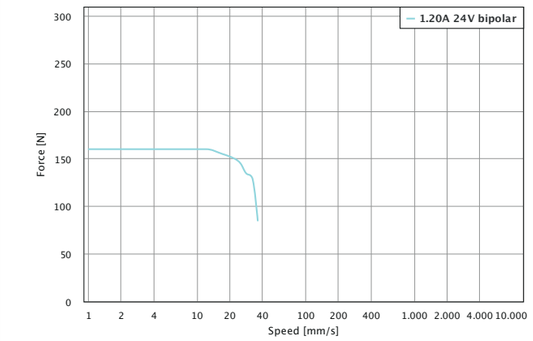
Linear Actuators with Lead Screw/Fine-Pitch Screw

TORQUE CURVES

L3518S1204-T6X1



L3518S1204-T6X2



L35-A

Linear Actuators with Lead Screw and Linear Slide

OPTION

Controller

Encoder

VERSIONS

Type	Force N	Feed mm/s	Pitch of screw mm	Resolution µm/step	Current per Winding A/Winding	Resistance per Winding Ohm	Weight kg	Stroke „A“ mm	Housing Length „B“ mm	Length „L“ mm
L3518S1204-T6X1-A	240	50	1	5	1.2	1.85	0.2-0.25	25-50	43-68	34
L3518S1204-T6X2-A	160	100	2	10	1.2	1.85	0.2-0.25	25-50	43-68	34
L3518S1204-T5X5-A	85	250	5	25	1.2	1.85	0.2-0.25	25-50	43-68	34

ORDER IDENTIFIER

L3518S1204-T6X1-

A25 = 25 mm Stroke „A“

A50 = 50 mm Stroke „A“

ACCESSORIES

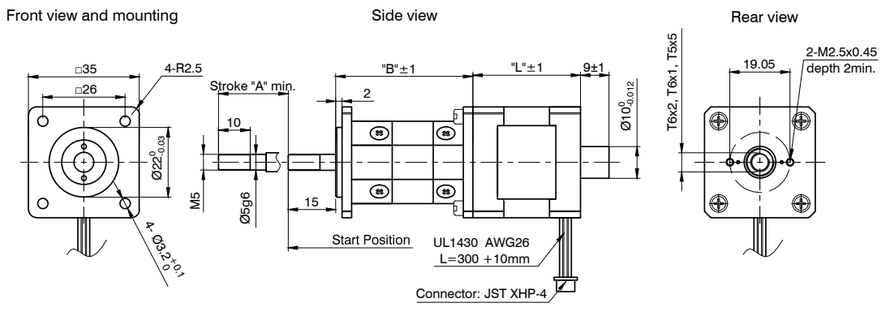
Nanolube Lubricant

CAUTION

The force and power ratings specified in the datasheets are based on a power-up time of approx.10% - 20% and must be reduced accordingly for higher values. Moving against fixed end stops should be avoided.

DIMENSIONS (IN MM)

L3518-A

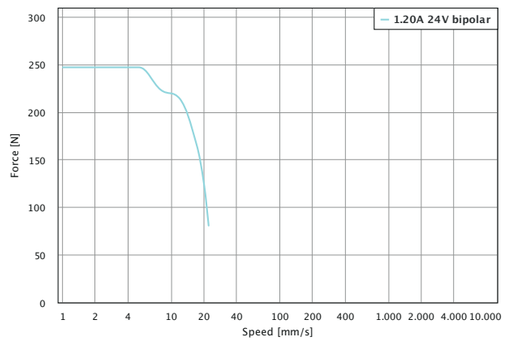


L35-A

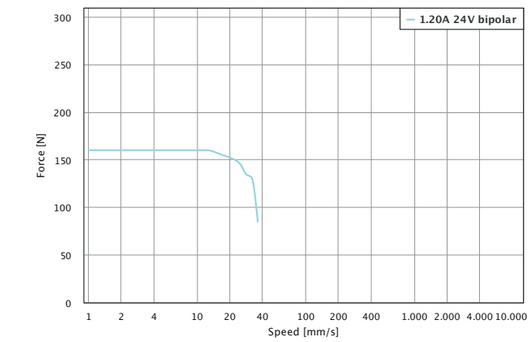
Linear Actuators with Lead Screw and Linear Slide

TORQUE CURVES

L3518S1204-T6X1-A

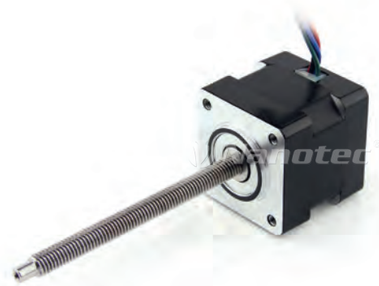


L3518S1204-T6X2-A



LS35

Linear Positioning Drive



OPTION

Controller

Encoder

VERSIONS

Type	Force N	Feed mm/s	Resolution µm/step	Current per Winding A/Winding	Resistance per Winding Ohm	Weight kg	Length „A“ mm
LS3518S1204-T6X1-75	240	50	5	1.2	1.9	0.15	34
LS3518S1204-T6X2-75	160	100	10	1.2	1.9	0.15	34
LS3518S1204-T5X5-75	85	250	25	1.2	1.9	0.15	34

ORDER IDENTIFIER

LS3518S1204-T6X1-75

ACCESSORIES

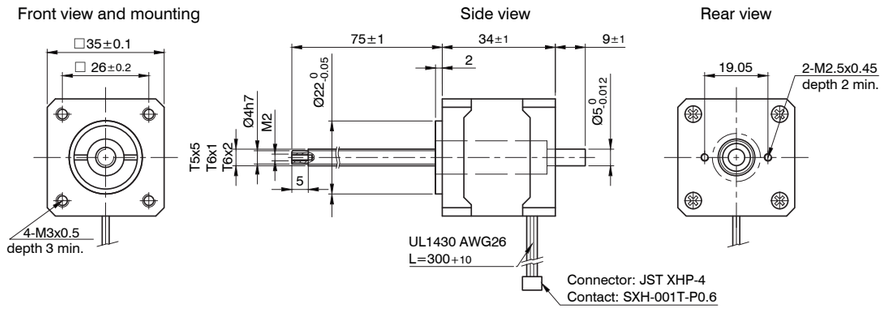
LSNUT-T5x5-F	Threaded Nut
LSNUT-T6x1-F	Threaded Nut
LSNUT-T6x2-F	Threaded Nut
Nanolube	Lubricant

CAUTION

The force and power ratings specified in the datasheets are based on a power-up time of approx.10% - 20% and must be reduced accordingly for higher values. Moving against fixed end stops should be avoided.

DIMENSIONS (IN MM)

LS3518

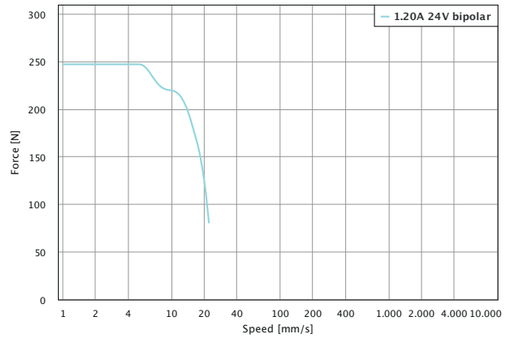


LS35

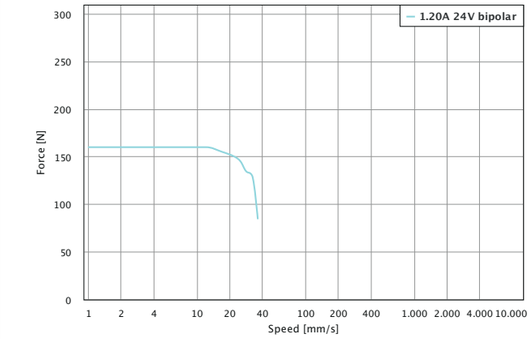
Linear Positioning Drive

TORQUE CURVES

LS3518S1204-T6X1-75

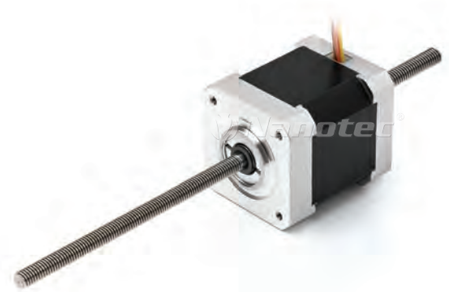


LS3518S1204-T6X2-75



L41

Linear Actuators with Lead Screw/Fine-Pitch Screw



OPTION

Controller

Encoder

VERSIONS

Type	Force N	Feed mm/s	Pitch of screw mm	Resolution µm/step	Current per Winding A/Winding	Resistance per Winding Ohm	Inductance per Winding mH	Weight kg	Bushing Length „L“ mm	Length „A“ mm
L4118S1404-M6X1	90	20	1	5	1.4	2	2.8	0.2	15	31
L4118L1804-M6X1	200	40	1	5	1.8	1.75	3.3	0.34	20	49
L4118S1404-T6X1	350	40	1	5	1.4	2	2.8	0.2	15	31
L4118S1404-T6X2	250	55	2	10	1.4	2	2.8	0.2	15	31
L4118S1404-T5X5	120	65	5	25	1.4	2	2.8	0.2	20	31
L4118M1804-T6X1	400	25	1	5	1.8	1.1	1.85	0.24	15	38
L4118M1804-T6X2	300	45	2	10	1.8	1.1	1.85	0.24	15	38
L4118M1804-T5X5	150	65	5	25	1.8	1.1	1.85	0.24	20	38
L4118L1804-T6X1	450	37	1	5	1.8	1.75	3.3	0.34	15	49
L4118L1804-T6X2	350	50	2	10	1.8	1.75	3.3	0.34	15	49
L4118L1804-T5X5	250	60	5	25	1.8	1.75	3.3	0.34	20	49

ORDER IDENTIFIER

L4118S1404-M6X1

ACCESSORIES

ZSM6-1-200	Threaded Screw
ZSM6-1-300	Threaded Screw
ZSM6-1-1000	Threaded Screw
ZST6-1-200-1	Threaded Screw
ZST6-1-300-1	Threaded Screw
ZST6-1-1050	Threaded Screw
ZST6-2-200-1	Threaded Screw
ZST6-2-300-1	Threaded Screw
ZST6-2-1500	Threaded Screw
ZST5-5-200-1	Threaded Screw
ZST5-5-300-1	Threaded Screw
ZST5-5-1050	Threaded Screw
Nanolube	Lubricant

CAUTION

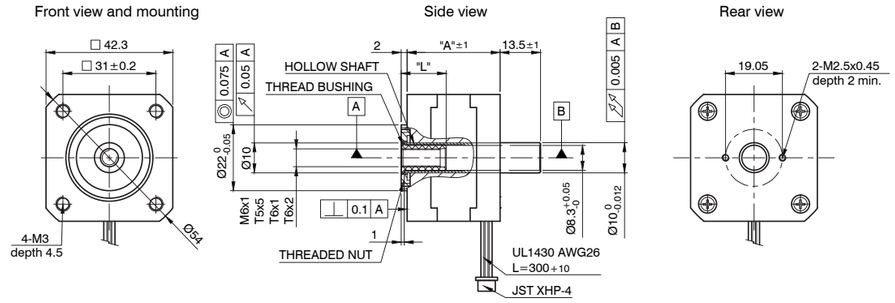
The force and power ratings specified in the datasheets are based on a power-up time of approx.10% - 20% and must be reduced accordingly for higher values. Moving against fixed end stops should be avoided.

L41

Linear Actuators with Lead Screw/Fine-Pitch Screw

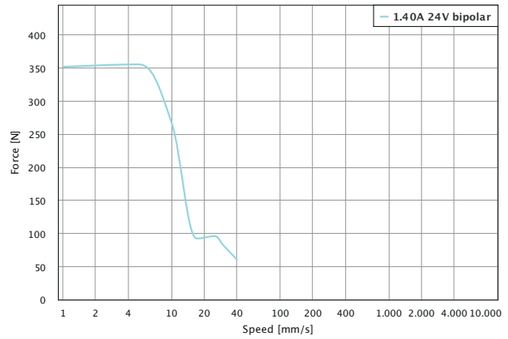
DIMENSIONS (IN MM)

L4118

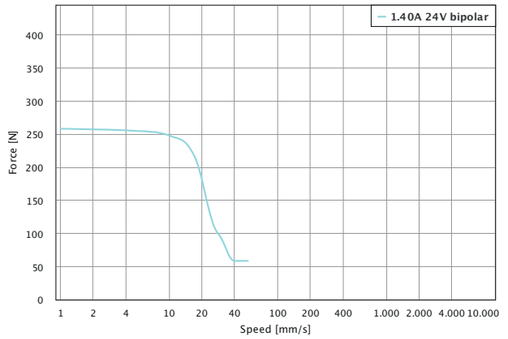


TORQUE CURVES

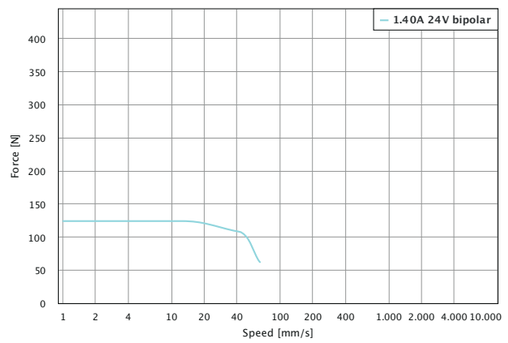
L4118S1404-T6X1



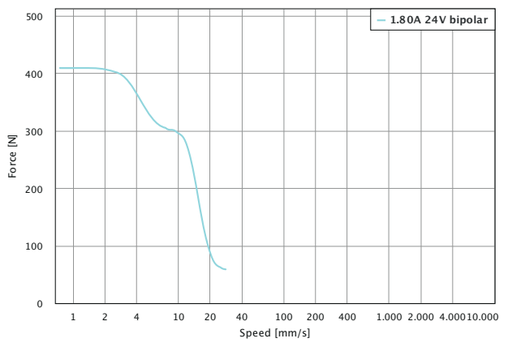
L4118S1404-T6X2



L4118S1404-T5X5

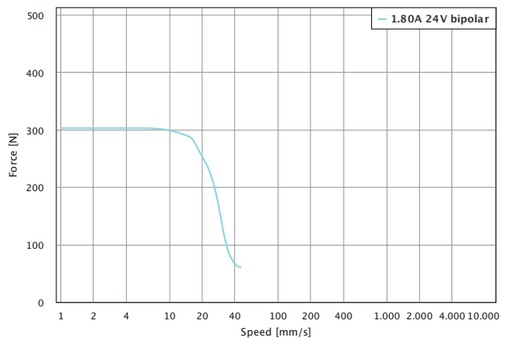


L4118M1804-T6X1

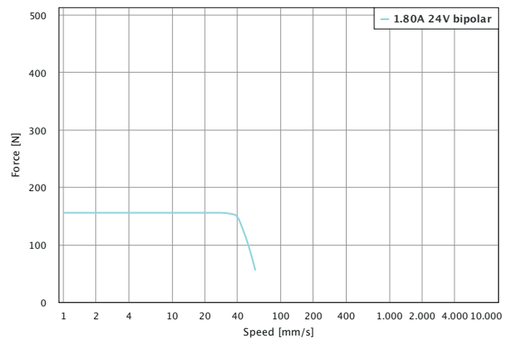


TORQUE CURVES

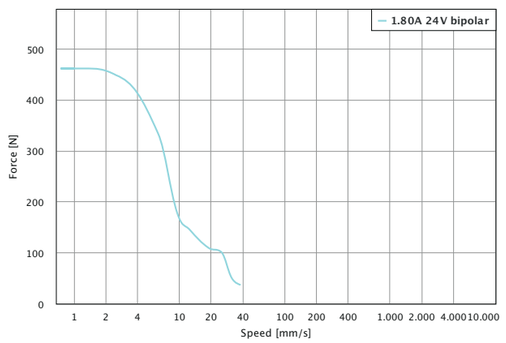
L4118M1804-T6X2



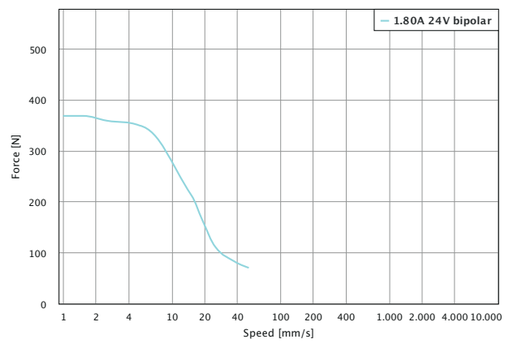
L4118M1804-T5X5



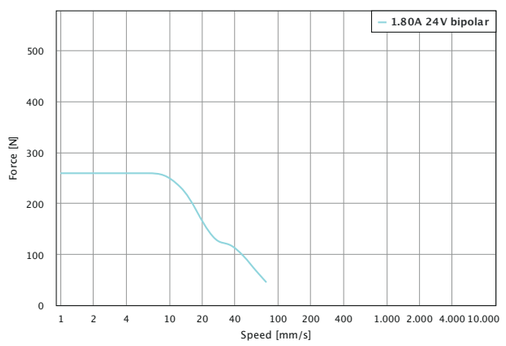
L4118L1804-T6X1



L4118L1804-T6X2



L4118L1804-T5X5



Notes

L41-A

Linear Actuators with Lead Screw and Linear Slide

OPTION

Controller

Encoder

VERSIONS

Type	Force N	Feed mm/s	Pitch of screw mm	Resolution µm/step	Current per Winding A/Winding	Resistance per Winding Ohm	Weight kg	Stroke „A“ mm	Housing Length „B“ mm	Length „A“ mm
L4118S1404-T6x1-A	350	40	1	5	1.4	2	0.35-0.4	25-50	47-72	31
L4118S1404-T6x2-A	250	55	2	10	1.4	2	0.35-0.4	25-50	47-72	31
L4118S1404-T5x5-A	120	65	5	25	1.4	2	0.35-0.4	25-50	47-72	31
L4118M1804-T6x1-A	400	25	1	5	1.8	1.1	0.35-0.4	25-50	47-72	38
L4118M1804-T6x2-A	300	45	2	10	1.8	1.1	0.35-0.4	25-50	47-72	38
L4118M1804-T5x5-A	150	65	5	25	1.8	1.1	0.35-0.4	25-50	47-72	38
L4118L1804-T6x1-A	450	37	1	5	1.8	1.75	0.35-0.4	25-50	47-72	49
L4118L1804-T6x2-A	350	50	2	10	1.8	1.75	0.35-0.4	25-50	47-72	49
L4118L1804-T5x5-A	250	60	5	25	1.8	1.75	0.35-0.4	25-50	47-72	49

ORDER IDENTIFIER

L4118S1404-T6X1-

A25 = 25 mm Stroke „A“

A50 = 50 mm Stroke „A“

CAUTION

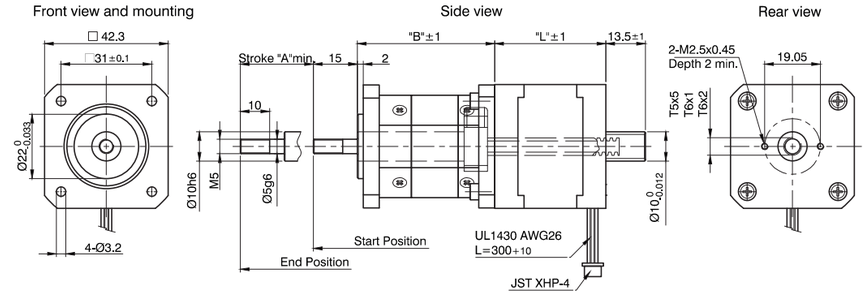
The force and power ratings specified in the datasheets are based on a power-up time of approx.10% - 20% and must be reduced accordingly for higher values. Moving against fixed end stops should be avoided.

L41-A

Linear Actuators with Lead Screw and Linear Slide

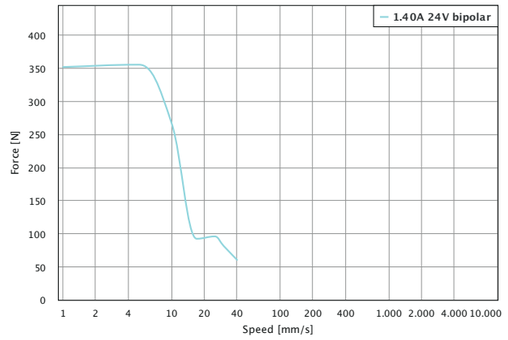
DIMENSIONS (IN MM)

L4118-A

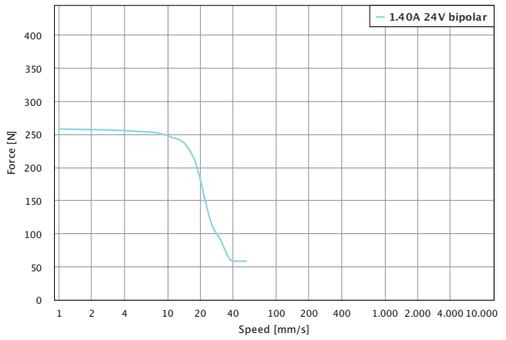


TORQUE CURVES

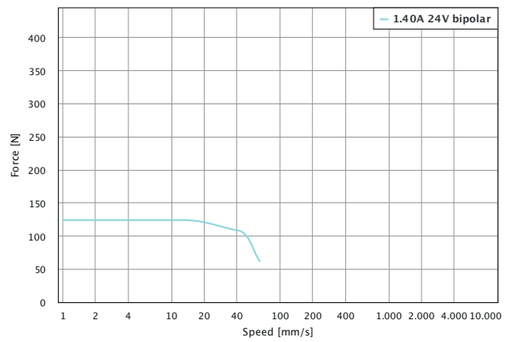
L4118S1404-T6x1-A



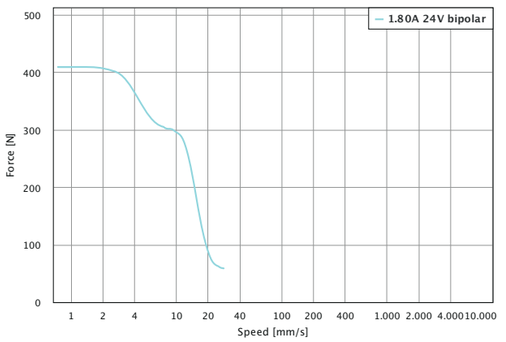
L4118S1404-T6x2-A



L4118S1404-T5x5-A

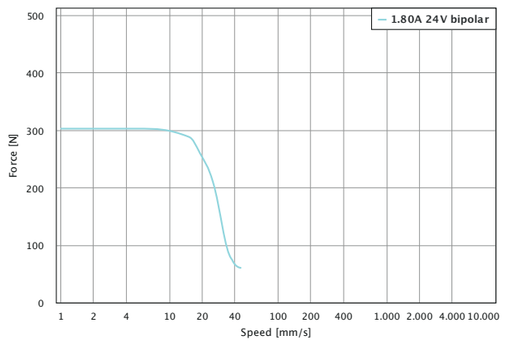


L4118M1804-T6x1-A

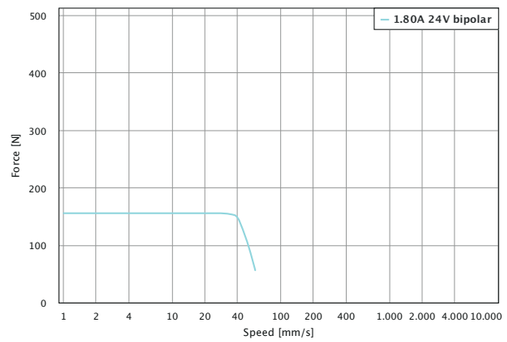


TORQUE CURVES

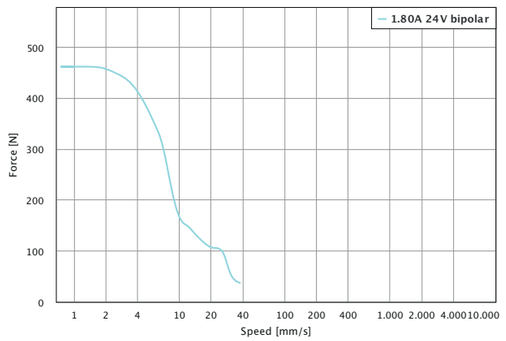
L4118M1804-T6x2-A



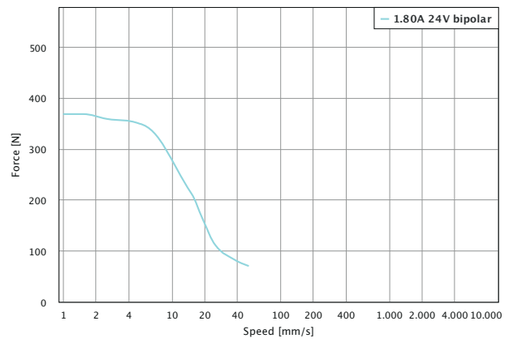
L4118M1804-T5x5-A



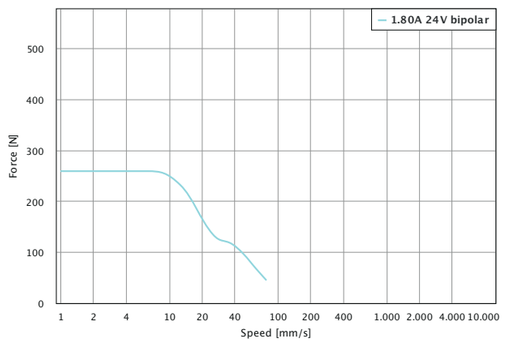
L4118L1804-T6x1-A



L4118L1804-T6x2-A



L4118L1804-T5x5-A



Notes

LS41

Linear Positioning Drive

OPTION

Controller Encoder

VERSIONS

Type	Force N	Feed mm/s	Resolution µm/step	Current per Winding A/Winding	Resistance per Winding Ohm	Thread Length mm	Weight kg
LS4118S1404-T6x1	200	50	5	1.4	2	75 mm - 150 mm	0.2
LS4118S1404-T6x2	200	50	10	1.4	2	75 mm - 150 mm	0.2
LS4118S1404-T5x5	100	250	25	1.4	2	75 mm - 150 mm	0.2

ORDER IDENTIFIER

LS4118S1404-T6x1-

150 = 150 mm Thread Length

75 = 75 mm Thread Length

ACCESSORIES

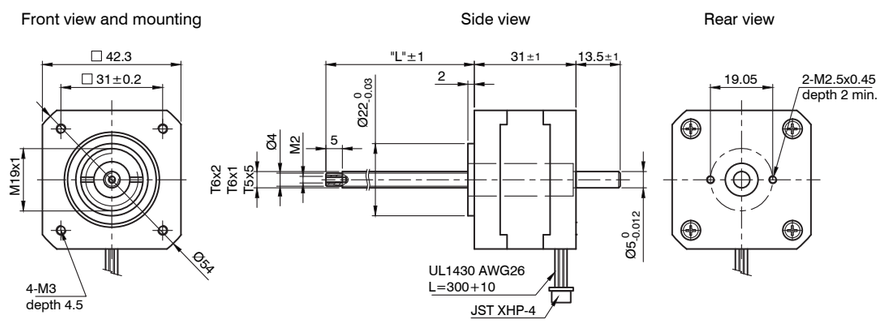
LSNUT-T5x5-F	Threaded Nut
LSNUT-T6x1-F	Threaded Nut
LSNUT-T6x2-F	Threaded Nut
Nanolube	Lubricant

CAUTION

The force and power ratings specified in the datasheets are based on a po-wer-up time of approx.10% - 20% and must be reduced accordingly for higher values. Moving against fixed end stops should be avoided.

DIMENSIONS (IN MM)

LS4118

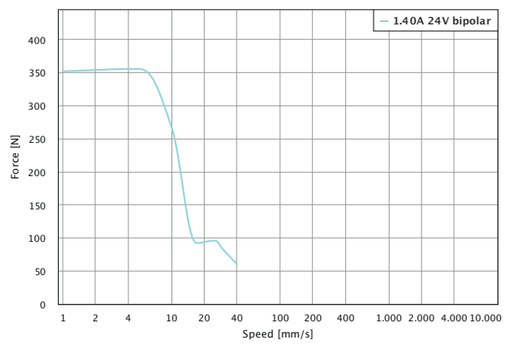


LS41

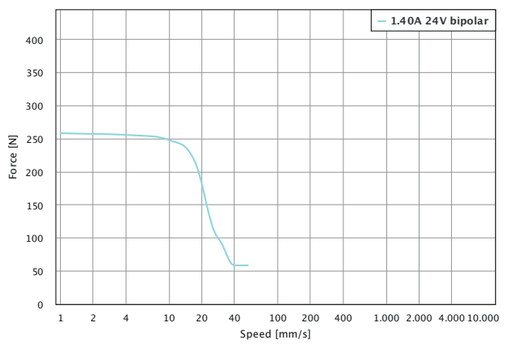
Linear Positioning Drive

TORQUE CURVES

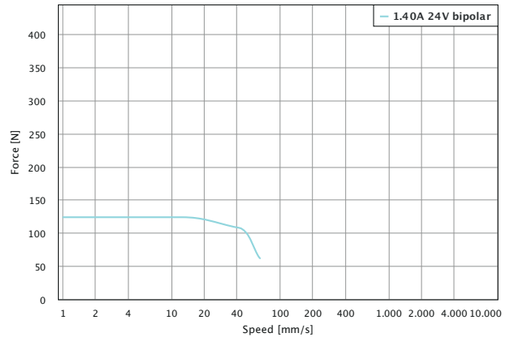
LS4118S1404-T6x1



LS4118S1404-T6x2



LS4118S1404-T5x5



L59

Linear Actuators with Lead Screw/Fine-Pitch Screw

OPTION

Controller

Encoder

VERSIONS

Type	Force N	Feed mm/s	Pitch of screw mm	Resolution µm/step	Current per Winding A/Winding	Resistance per Winding Ohm	Inductance per Winding mH	Weight kg	Bushing Length „L“ mm	Length „A“ mm
L5918S2008-T10X2	800	70	2	10	2	1.5	2.6	0.65	25	51
L5918L3008-T10X2	1000	80	2	10	3	1	2.2	1	25	76

ORDER IDENTIFIER

L5918S2008-T10X2

ACCESSORIES

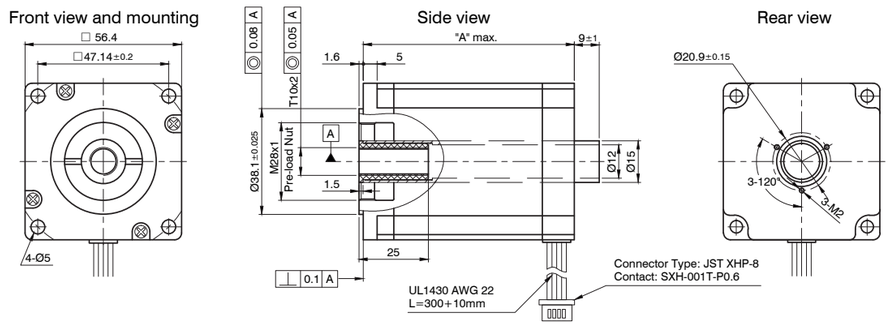
ZST10-2-200-1	Threaded Screw
ZST10-2-300-1	Threaded Screw
ZST10-2-1050	Threaded Screw
Nanolube	Lubricant

CAUTION

The force and power ratings specified in the datasheets are based on a power-up time of approx.10% - 20% and must be reduced accordingly for higher values. Moving against fixed end stops should be avoided.

DIMENSIONS (IN MM)

L5918

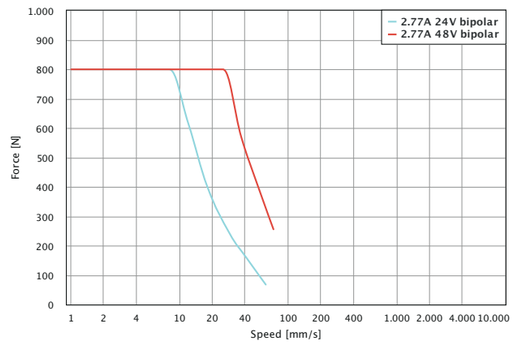


L59

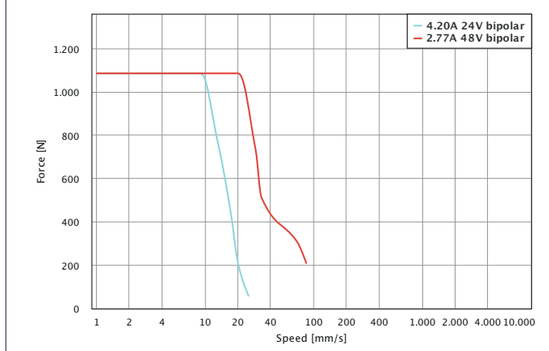
Linear Actuators with Lead Screw/Fine-Pitch Screw

TORQUE CURVES

L5918S2008-T10X2



L5918L3008-T10X2



L59-A

Linear Actuators with Lead Screw and Linear Slide

OPTION

Controller

Encoder

VERSIONS

Type	Force N	Feed mm/s	Pitch of screw mm	Resolution µm/step	Current per Winding A/Winding	Resistance per Winding Ohm	Weight kg	Stroke „A“ mm	Housing Length „B“ mm	Length „A“ mm
L5918S2008-T10x2-A	800	70	2	10	2	1.5	0.8-0.85	25-50	47-72	51
L5918L3008-T10x2-A	1000	80	2	10	3	1	1.15-1.20	25-50	47-72	76

ORDER IDENTIFIER

L5918S2008-

A25 = 25 mm Stroke „A“

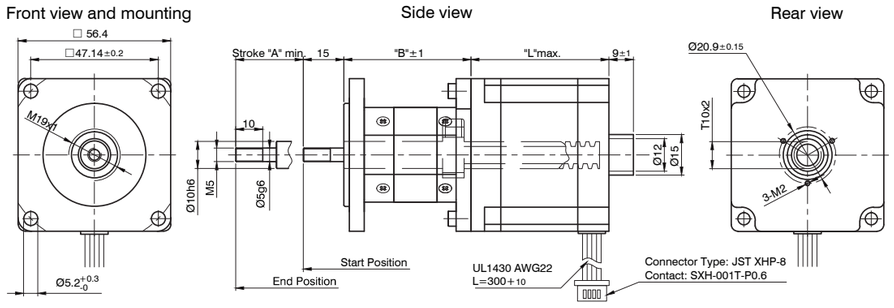
A50 = 50 mm Stroke „A“

CAUTION

The force and power ratings specified in the datasheets are based on a power-up time of approx.10% - 20% and must be reduced accordingly for higher values. Moving against fixed end stops should be avoided.

DIMENSIONS (IN MM)

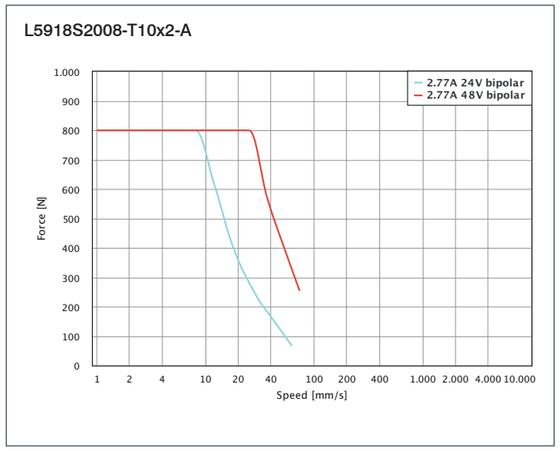
L5918-A

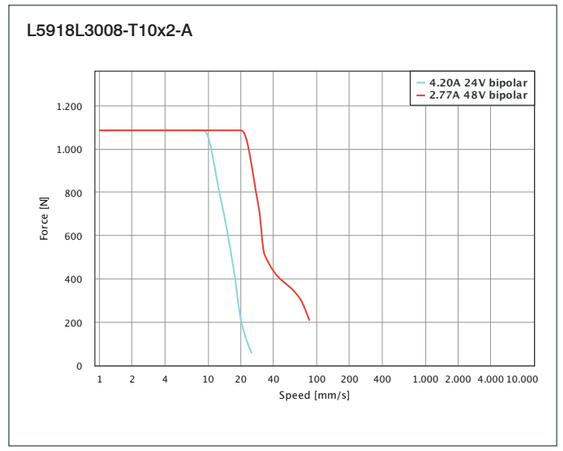


L59-A

Linear Actuators with Lead Screw and Linear Slide

TORQUE CURVES





LS59

Linear Positioning Drive

OPTION

Controller

Encoder

VERSIONS

Type	Force N	Feed mm/s	Resolution µm/step	Current per Winding A/Winding	Resistance per Winding Ohm	Weight kg	Length „A“ mm
LS5918S2008-T10X2-75	800	70	10	2	1.5	0.85	51

ORDER IDENTIFIER

LS5918S2008-T10X2-75

ACCESSORIES

LSNUT-T10X2-F	Threaded Nut
Nanolube	Lubricant

CAUTION

The force and power ratings specified in the datasheets are based on a power-up time of approx.10% - 20% and must be reduced accordingly for higher values. Moving against fixed end stops should be avoided.

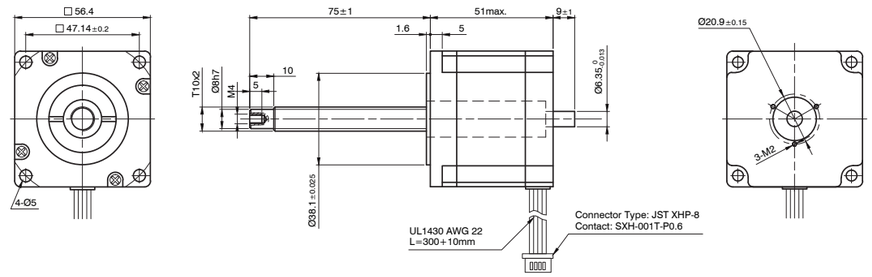
DIMENSIONS (IN MM)

LS5918

Front view and mounting

Side view

Rear view

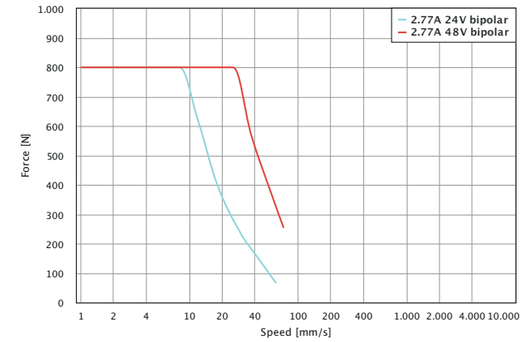


LS59

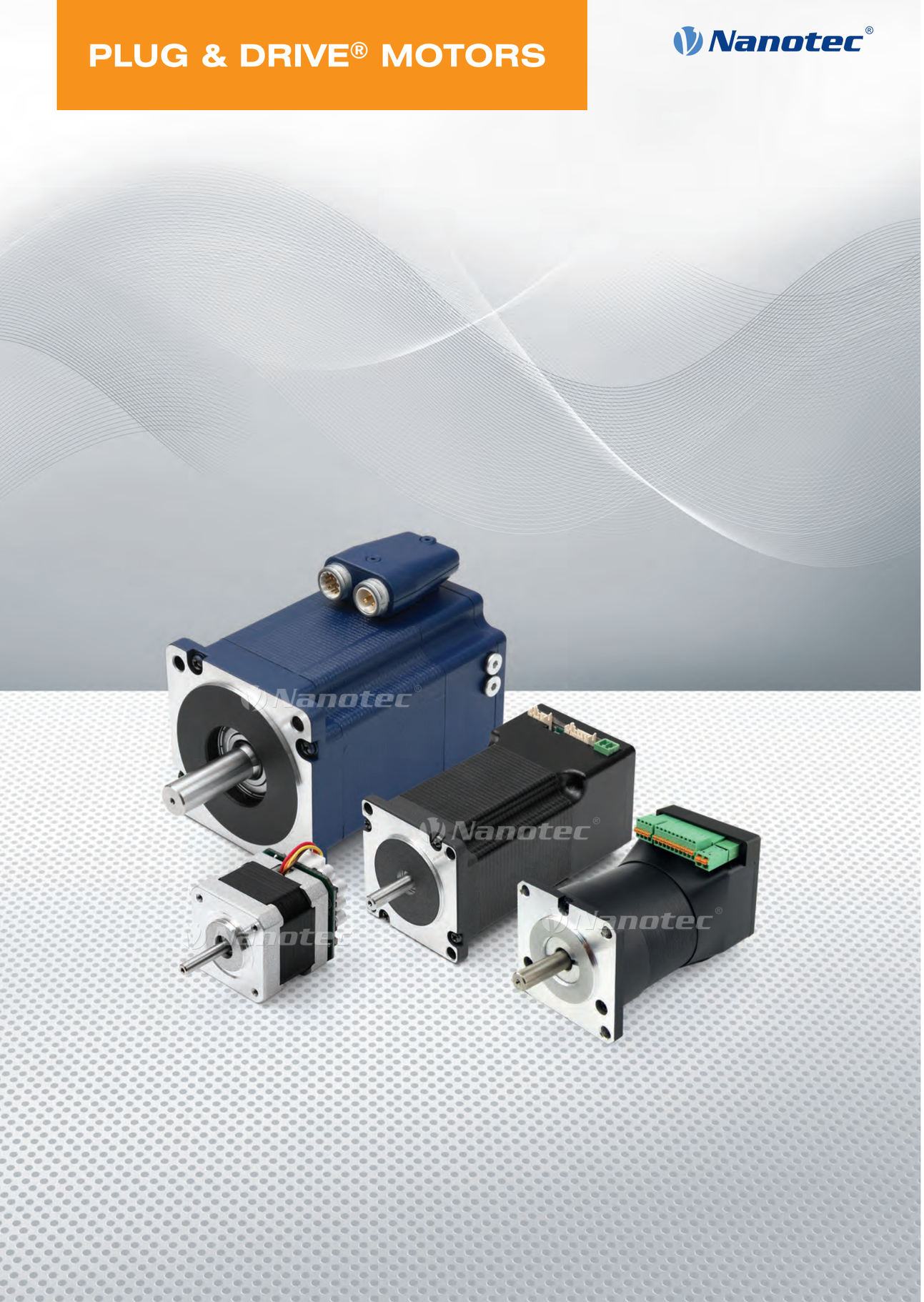
Linear Positioning Drive

TORQUE CURVES

LS5918S2008-T10X2-75

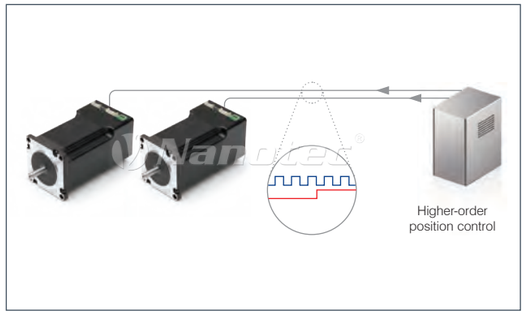


PLUG & DRIVE® MOTORS



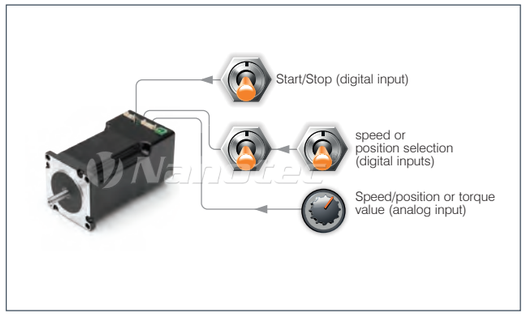
CONTROL OPTIONS FOR PLUG & DRIVE MOTORS AND MOTOR CONTROLLERS

Just as our motor controllers, our Plug & Drive motors can be controlled via a wide variety of methods. Dip switches, configuration files or software enable the user to switch between the different methods. Information on which control version can be used in each case is provided in the data sheets.
Our motor controllers are divided into two device generations:
SMCI, PD-N: motor controllers that can be easily configured with NanoPro and NanoCAN; for use with USB, RS485 and CANopen; programmable with NanoJ
C, N, PD-C: real-time motor controllers and PD motors with a large variety of field bus options; programmable with NanoJ V2



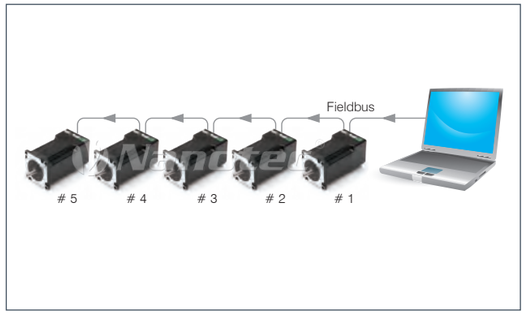
Clock & direction

- Microstep to one 64th of a step
- Step multiplication/microstep emulation so that the smooth running of the microstep can also be used with older higher-level controllers that only output full or half steps.



Control via digital and analog inputs

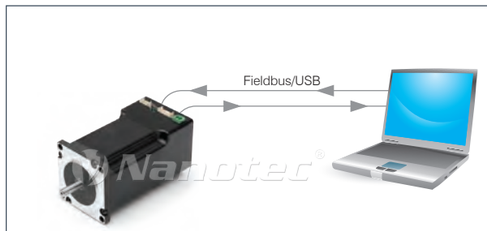
- Motor controllers that are configurable with NanoPro: Up to 32 movement sequences (position or speed profiles) can be stored in the motor controller, selected using digital inputs, started and stopped. Also speed, position or torque can be controlled via the analog input. For additional functions (e.g. reference switch, enable) Inputs are freely configurable.
- Motor controllers that are programmable with NanoJ V2: digital and analog I/Os can be read out every millisecond and processed in a sequence program.



Control via fieldbus

- Open protocol via RS232/RS485 with an adjustable baud rate of 9.6–115 Kbit for motor controllers configurable with NanoPro
- Diverse fieldbus options for Controller with NanoJ V2:

EtherCAT
Modbus
EtherNet/IP



Sequence control with NanoJ/NanoJ V2

- C-based programming language; these programs run autonomously (without a connected PC or master) directly on the motor controller or Plug & Drive motor
- Access to all controller parameters and inputs/outputs
- Variables, branches, loops, logical and mathematical functions
- Programs can be stored in the motor controller via Fieldbus/USB

NANOTEC CLOSED-LOOP TECHNOLOGY

Closed loop-capable stepper motors merge the benefits of stepper and servo motor technology. They are smooth-running with less resonance than stepper motors. They offer position feedback and control, short settling and release times and no longer exhibit step loss. They are an alternative to a stepper motor if energy efficiency, smooth running and load tolerance are required. Compared to servo motors, they have advantages due to high torque at low speeds, short settling times and correct positioning without back swing.

What is closed loop?
Sinusoidal commutation via encoder with field-oriented control is referred to as the closed-loop process. The rotor position is detected using the encoder's signals and sinusoidal phase currents are generated in the motor windings. Controlling the vector of the magnetic field ensures that the stator magnetic field is vertical relative to the rotor magnetic field and the field strength corresponds exactly to the desired torque. The controlled current level in the windings provides uniform motor force and leads to a particularly quiet-running motor that can be controlled precisely.

True/pseudo closed loop
There are stepper motors that dress themselves up as being closed loops and work with encoders but do not provide any field-oriented control with sinusoidally commutated current control. They only check the step position, and cannot correct step losses during operation. True closed loop with field-oriented regulation compensates step losses during the run or prevents them from occurring by increasing the motor current.

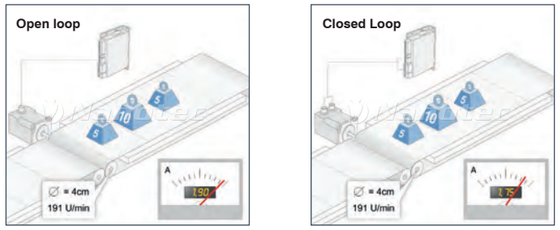
Advantages over standard stepper motors

A stepper motor is used wherever movement to fixed positions is required. The classic stepper motor transfers electric energy into precise mechanical movements as long as the motor's torque is not exceeded. Since there is no position feedback or control present, the motor loses steps if unexpected load jumps or resonance occurs and it no longer moves to the desired position. A closed-loop stepper motor can readjust in those instances and reach the specified position reliably. Using an open loop, a standard stepper motor is always operated with the same current regardless of the load and it therefore becomes relatively hot in many applications. By controlling current in a closed loop, the current level can be adapted to the required torque; no unnecessary lost heat is produced and energy consumption drops accordingly.

Advantages over servo motors
In many cases, closed-loop stepper motors from Nanotec are an alternative to servo drives, such as in winding applications or belt drives. The speed and position, and even the torque, can be controlled with precision. This not only achieves the highest maximum torque, the best efficiency and the best dynamics, it also achieves the lowest torque ripple and excellent running smoothness.

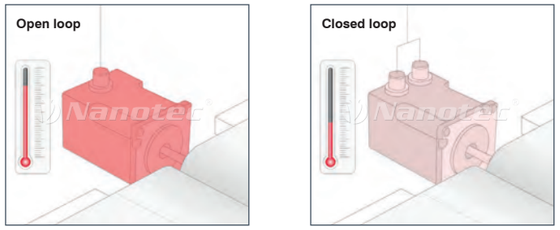
Applications for closed loop systems:
Dosing pumps, filler systems, semi-conductor mounting, wafer production, industrial sewing machines, and more. Textile machines, robotics, test and optical inspection systems, tape and belt drives, general multi-axis applications and applications requiring smooth operation, short settling times or accurate positioning.

Energy efficiency



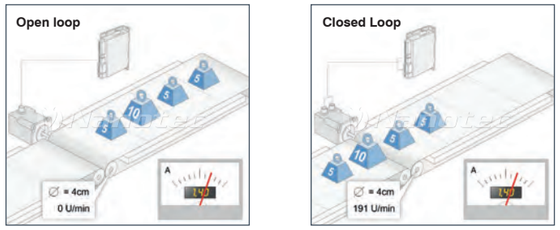
In an open loop, the stepper motor is dimensioned such that it is certain to move the maximum required load. For this reason, normally a safety factor of 20% is calculated, which amounts to wasted energy in the application. When the load is reduced, the open loop motor cannot react and wastes even more energy.

Service life



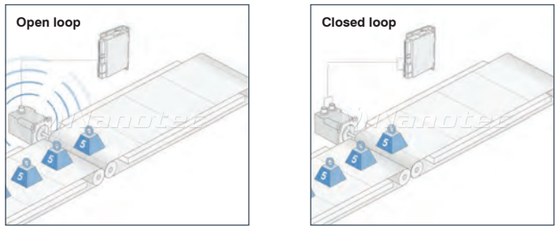
Efficient power regulation generates less heat in the motor, which stays significantly cooler. Reduced heating protects the motor bearings.

Overload



With a 20% safety reserve and a design for a continuous load of 20 kg, an additional load of only 5 kg exceeds the power reserve and the open-loop drive stops without an error message. By contrast, with its overload reserve the closed loop stepper motor can handle this load increase easily.

Resonances

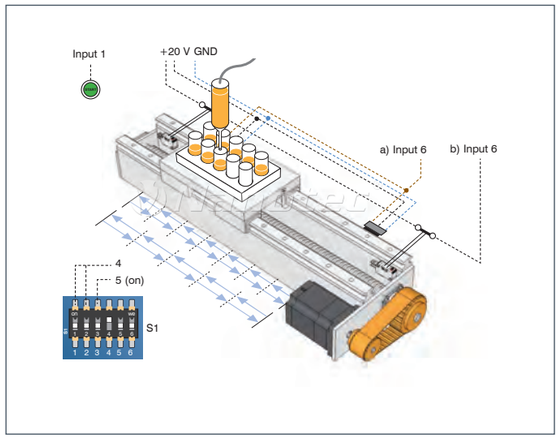


Resonance frequencies occurring in the open loop depend on external loads (the greater the torque reserve, the greater is the resonance stimulation) and can bring the motor to a stop. In closed loop mode, the motor receives only as much energy as needed for the external load; the torque reserve and its resonance stimulation do not exist, so there is practically no resonance behavior.

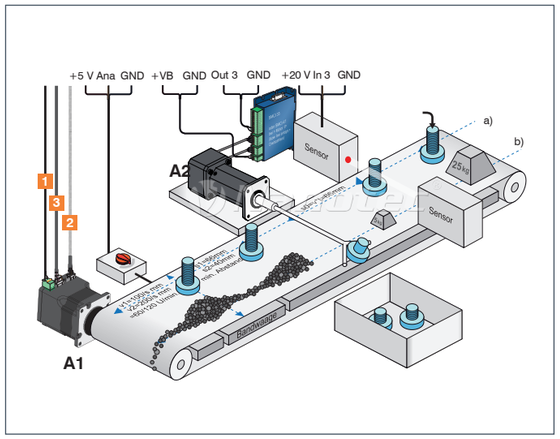
IDEAL APPLICATION AREAS FOR STEPPER MOTORS (DC SERVOS)

- Multi-axis applications (Ethernet, EtherCAT, CANopen)
- Positioning tasks with load changes
- Windings
- Belt drives (start/stop, positioning)
- Dosing pumps, filler systems
- Semi-conductor mounting
- Wafer production
- Textile machines, industrial sewing machines
- Robotics
- Testing and inspection systems
- Applications that require smooth operation, short settling times and precision positioning

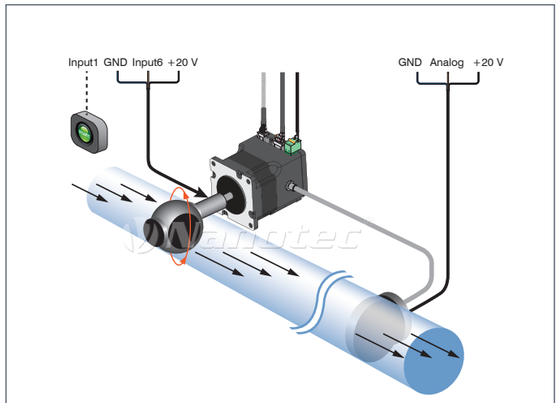
Linear axes (for processing, assembling, etc.)



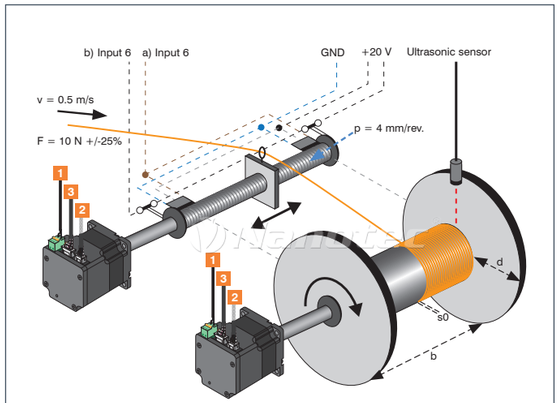
Conveyor belts



Decentralized flow control



Winding and laying



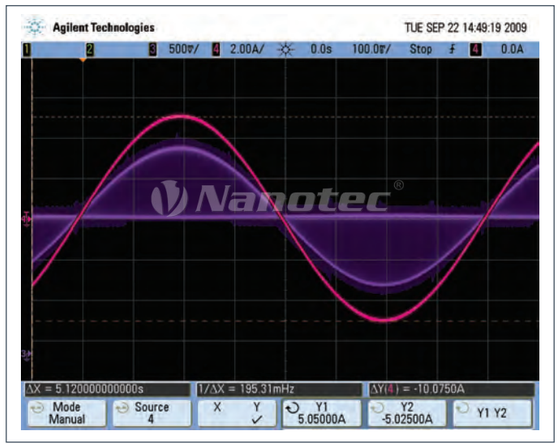
COMPREHENSIVE SOFTWARE FUNCTIONALITY

dspDrive® – Software-based current control with high resolution in the open loop

In the newest generation of Nanotec hardware, the current in the motor is no longer controlled by an integrated component but directly by a digital signal processor instead. Compared to commercially available ICs, which only provide a resolution of 6 or 8 bits for measuring current in the winding and specifying the target current, the entire control process can be carried out using 12-bit resolution with the new dspDrive. The parameters of the PI current controller are adjusted depending on speed.

This has the following application advantages:

- Very quiet, low-resonance operation with sinusoidal current waveform in the windings. Jumps and noise, which encourage the motor towards resonance, no longer occur thanks to the high resolution of the control.



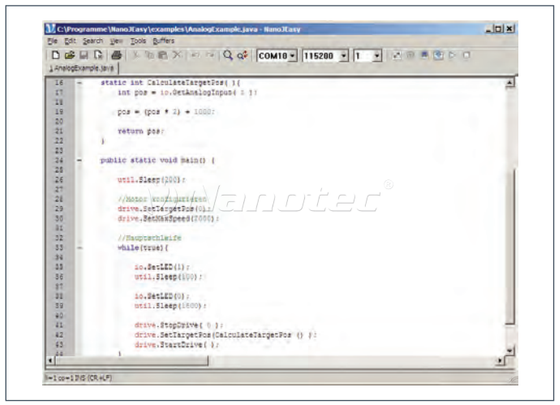
- Even more flexible: Now 3-phase stepper motors and BLDC motors can be controlled by the direct activation of half-bridges using DSP, just like their 2-phase counterparts.

Sinusoidal commutation with encoder in ClosedLoop operation

In contrast to conventional stepper motor controllers where only the motor is actuated or the position adjusted via the encoder, sinusoidal commutation controls the stator magnetic field via the encoder as in a servo motor. The stepper motor behaves no different than a multi-pole servo motor in this operating type, i.e. classic stepper motor noises and resonance are gone. The motor is capable of no longer loosing steps up to its maximum torque. The current level is always adjusted to the currently needed torque by the control; as a result, current consumption and heat generation are reduced significantly compared to a classic stepper motor controller if the maximum torque is not used continuously. Especially with speeds up to 1500 rpm or torques up to 10 Nm, the sinus commutated stepper motor presents an economic alternative to conventional servo systems as, in contrast to these, a direct drive without gears is often possible.

Application programs with NanoJ

The integrated Java-based NanoJ programming language can be used to implement complete autonomous application programs on the motor controllers. Querying and setting digital and analog I/Os and accessing all of the parameters for a movement program turns the motor controller into a full-fledged device controller in conjunction with variables, loops and mathematical functions and everything that distinguishes a full-fledged higher level language. The programs can be created, compiled directly and written to the motor controller with the free NanoJEasy editor.



NanoJ V2

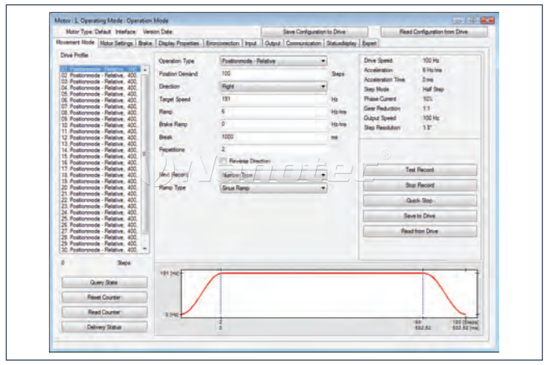
The second generation of our NanoJ programming language features two major improvements:
1. The internal operating system of the new control generation ensures that the program will run with a stable timing of 1 ms with minimal jitter. The mapped objects, such as the inputs or controller sizes, are updated every millisecond and can be processed by the NanoJ program. This makes it possible to employ user programs to create solutions for dynamic applications, which until now often required firmware adjustments.
2. Byte code is no longer executed in a virtual machine. Instead, real machine code is used, which accelerates execution several times over.

NanoIP

Our new motor controllers with an Ethernet interface can be comfortably configured using the browser-based NanoIP application. The motor controllers can be parameterized and started up using an Internet browser (e.g. Firefox, Chrome) without requiring additional software or plugins. Data can be read out or written to the object dictionary and configurations can be saved independently from (or in parallel to) the field bus. NanoJ programs can be uploaded and started as well.
The motor controllers integrate a webserver with which the NanoIP running in the browser exchanges data via the HTTP-based REST interface. This interface can also be used by customers to control the controller from their own applications if real-time capability is not required. In this case, the standard.
Ethernet interface is a simple alternative to the field bus interface, above all when it comes to integrating IT-oriented applications.

SIMPLE COMMISSIONING AND PARAMETER SETTING WITH NANOPRO/NANOCAN

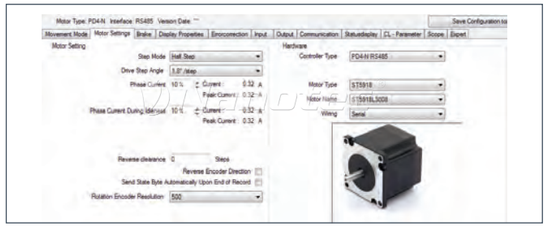
Via USB or the serial interface (or via a CAN converter from the manufacturers Ixxat or Peak for CANopen), all motor controllers and Plug & Drive motors can be quickly and easily parameterized and tested using the two free software tools NanoPro and NanoCAN (using the example of NanoPro below):



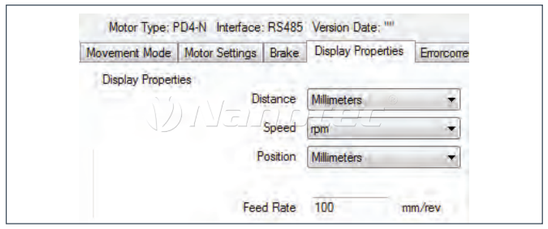
Start preset set 1 (relative positioning) with standard parameters (relative positioning, speed, ramp, etc.) in order to test whether the motor is connected properly.

Improve the motor operation for the application, e.g. speed mode with different start/target speeds, ramps and motor currents, open and closed loop.

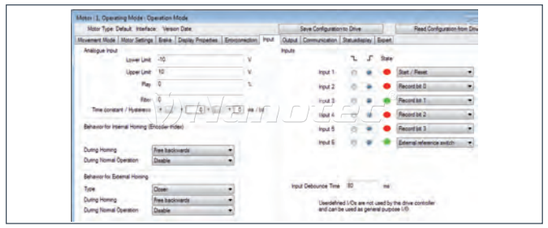
Select the relevant operation mode for the application (e.g. absolute positioning, speed control via analog input, torque, etc.) and save the parameters to the motor controller.



The connected motor controller is identified automatically and default values can be loaded for different motors. All motor-related parameters such as max. current level, current reduction, step mode, etc. are easily configurable here.



Machine settings make the parameters more transparent for the operator, thereby simplifying setup and installation. Thus, the travel and speed for a linear axis can be configured in mm and m/s and the user does not have to deal with converting to steps and Hz.

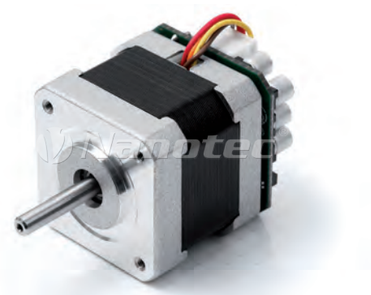


Switching states (pos./neg. signal edge) can be defined for the motor controller's digital inputs and the debouncing time for contact switches can be tested. The function of the inputs, such as release, reference switch, start, quick stop and set selection can also be set here. Even the voltage thresholds for the analog input can be configured here just like filtering and a dead zone for preventing jerking around the neutral position for joystick applications.

- A closed-loop assistant determines the necessary motor and encoder parameters for the closed loop. The load angle values are determined by an automatic calibration run.
- The control can be optimized further by autotuning and the option to adjust PID parameters manually.
- Easy switching between open-and closed-wloop operation to compare operating behavior, performance, positioning times, etc.

PD2-O41

High-Pole Plug & Drive DC Servo Motor - NEMA 17



OPTION

Gear

SOFTWARE

NanoPro | NanoCAN | NanoJ

TECHNICAL DATA

Operating voltage	12 to 48 VDC
Phase current	Max. 2.7 A (1% increments) = 150%, 1.8 A = 100%
Interface	RS485 or CANopen
Operating type	Clock-direction, position, speed, flag position, analog, joystickCANopen: profile positioning, velocity, homing
Step frequency	Up to 1 MHz at 1/64
Inputs	6 digital inputs (5 V TTL), 1 analog input max +10 V, min -10 V adjustable
Outputs	3 open collectors, 24 V/0.5 A max.
Current reduction	Adjustable in 1% increments
Protective circuit	Overvoltage, undervoltage and temperature >80 °C, integrated ballast switching
Temperature range	-10 to +40 °C
New functions	dspDrive/easily programmable as sequential controller using NanoJ easy (RS485)

ORDER IDENTIFIER

PD2-O4118S1404-

2 = RS485 Interface

3 = CANopen Interface

ACCESSORIES

ZK-RS485-USB	Converters
Z-K4700/50	Charging Capacitor
ZK-SMCI12	RS485 Cable
ZK-SMCI12-3	CANopen Cable
ZK-SMCI12-IO	IO Cable

CAUTION

For stabilizing the operating voltage, we recommend using a sufficiently dimensioned decoupling capacitor.

PD2-O41

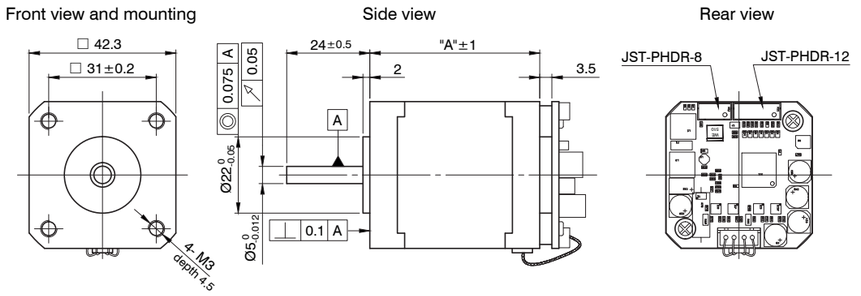
High-Pole Plug & Drive DC Servo Motor - NEMA 17

VERSIONS

Type	Holding Torque Ncm	Weight kg	Length „A“ mm	Interface
PD2-O4118S1404	20	0.21	31	RS485, CANopen
PD2-O4118L1804	50	0.39	49	RS485, CANopen

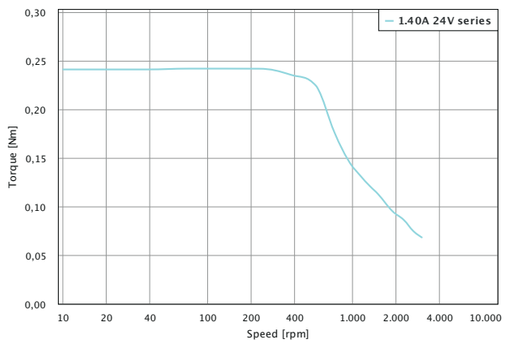
DIMENSIONS (IN MM)

PD2-O4118

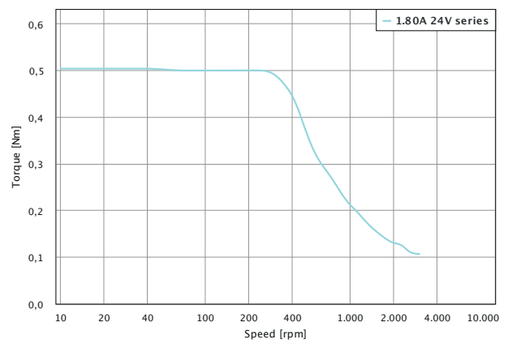


TORQUE CURVES

PD2-O4118S1404



PD2-O4118L1804



PLUG & DRIVE®

PD2-N41

High-Pole Plug & Drive DC Servo Motor - NEMA 17

OPTION

Gear

SOFTWARE

NanoPro NanoCAN NanoJ

TECHNICAL DATA

Operating voltage	12 to 48 V DC
Max. phase current	Adjustable via software up to 2.7 A (1% increments), 100% = 1.8 A
Interface	RS485 or CANopen
Operating type	RS485 interface: position, speed, reference run, flag position, clock-direction, analog and joystick, analog position, torque CANopen interface: profile position, speed, reference run, interpolated position, torque
Operating mode	1/1, 1/2, 1/4, 1/5, 1/8, 1/10, 1/16, 1/32, 1/64, adaptive microstep, feed constant
Step angle	1.8 °C
Step frequency	0 to 50 kHz in clock-direction mode, 0 to 25 kHz in all other modes
Encoder	Integrated magnetic encoder, 1024 pulses/rev.
Inputs	6 digital inputs (5–24 V), 1 analog input (+-10 V)
Outputs	3 outputs in open drain circuit (0 switching, max. 24 V/0.5 A)
Position monitoring	Automatic error correction up to 0.9 °
Current reduction	Adjustable in 1% increments
Protective circuit	Overvoltage and heat sink temperature >80 °C
Temperature range	-10 to +40 °C
Connection type	Plug connection with JST connectors
New functions	Closed loop/sinusoidal commutation/dspDrive/programmable as sequential controller using NanoJ easy (RS485)

ORDER IDENTIFIER

PD2-N4118L1804-

2 = RS485 Interface

3 = CANopen Interface

ACCESSORIES

ZK-PD2N	Connection cable
ZK-PD2N-3	Connection cable
ZK-RS485-USB	Converters
Z-K4700/50	Charging Capacitor

CAUTION

For stabilizing the operating voltage, we recommend using a sufficiently dimensioned decoupling capacitor.

PD2-N41

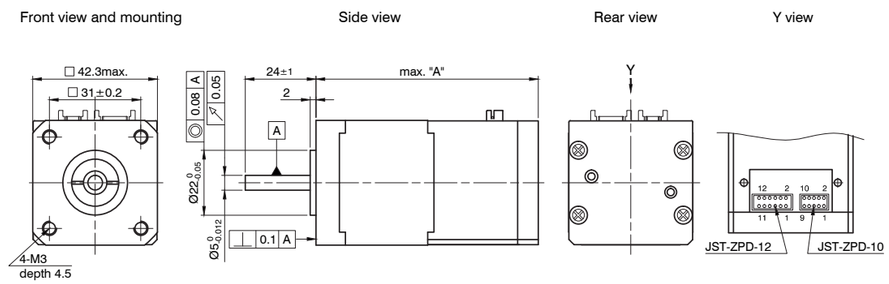
High-Pole Plug & Drive DC Servo Motor - NEMA 17

VERSIONS

Type	Holding Torque Ncm	Weight kg	Length „A“ mm
PD2-N4118L1804	50	0,42	76.5

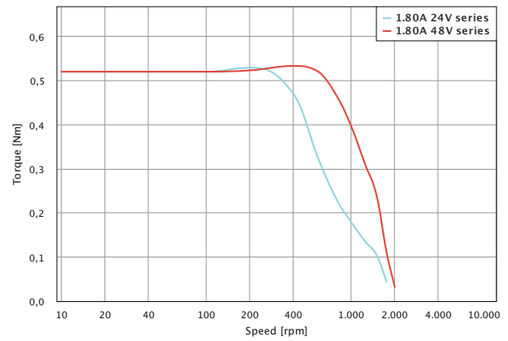
DIMENSIONS (IN MM)

PD2-N4118



TORQUE CURVES

PD2-N4118L1804



PLUG & DRIVE®

PD4-N59/N60

High-Pole Plug & Drive DC Servo Motor - NEMA 23/24

OPTION

Gear

SOFTWARE

NanoPro NanoCAN NanoJ

TECHNICAL DATA

Operating voltage	12 to 48 VDC
Max. phase current	Adjustable via software up to 4.8 A (1% increments), 100% = 3.2 A
Interface	RS485 or CANopen
Operating type	Position, speed, flag position, clock-direction, analog, analog position, torque
Operating mode	1/1, 1/2, 1/4, 1/5, 1/8, 1/10, 1/32, 1/64, adaptive (1/128)
Step frequency	0 to 50 kHz in clock-direction mode, 0 to 25 kHz in all other modes
Inputs	6 opto-coupler inputs (5 – 24 V)
Outputs	Open drain (0 switching, max. 24 V/0.5 A)
Position monitoring	Automatic error correction up to 0.9 °
Current reduction	Adjustable in 1% increments
Protective circuit	Overvoltage and heat sink temperature >80 °C
Temperature range	-10 to +40 °C
Connection type	Plug connection with JST connectors
New features	Closed loop/sinusoidal commutation/dspDrive/programmable as sequential controller using NanoJ easy (RS485)

VERSIONS

Type	Holding Torque Ncm	Weight kg	Length „A“ mm
PD4-N5918X4204	53.7	0.49	66.5
PD4-N5918M4204	113	0.8	80.6
PD4-N5918L4204	198	1.22	101.6
PD4-N6018L4204	354	1.48	112.5

ORDER IDENTIFIER

PD4-N5918X4204

ACCESSORIES

ZIB-PDx-N	Additional Board
Z-K4700/50	Charging Capacitor
ZK-PD4N	Connection cable
ZK-RS485-USB	Converters

CAUTION

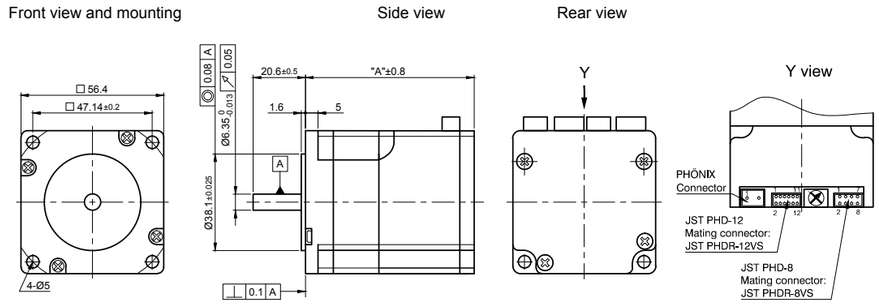
For stabilizing the operating voltage, we recommend using a sufficiently dimensioned decoupling capacitor.

PD4-N59/N60

High-Pole Plug & Drive DC Servo Motor - NEMA 23/24

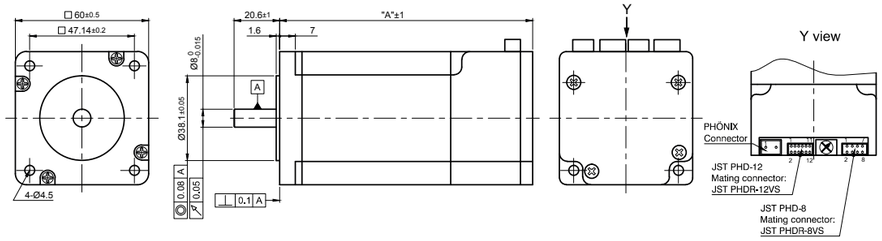
DIMENSIONS (IN MM)

PD4-N5918



DIMENSIONS (IN MM)

PD4-N6018



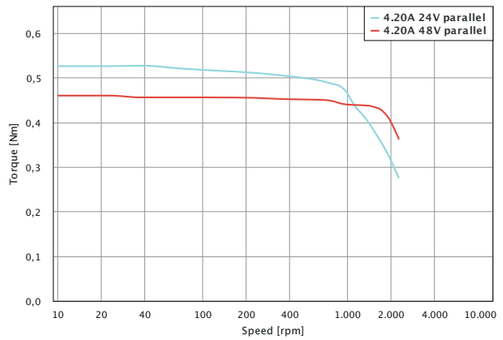
PLUG & DRIVE®

PD4-N59/N60

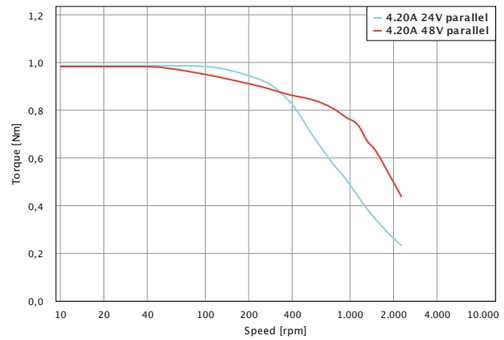
High-Pole Plug & Drive DC Servo Motor - NEMA 23/24

TORQUE CURVES

PD4-N5918X4204



PD4-N5918M4204



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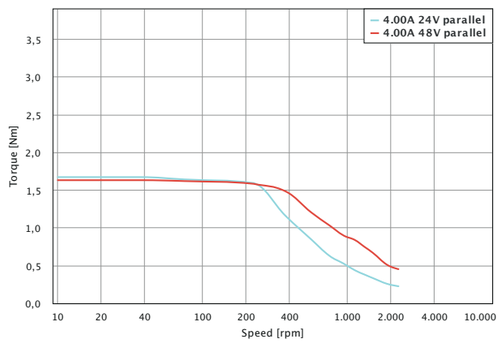
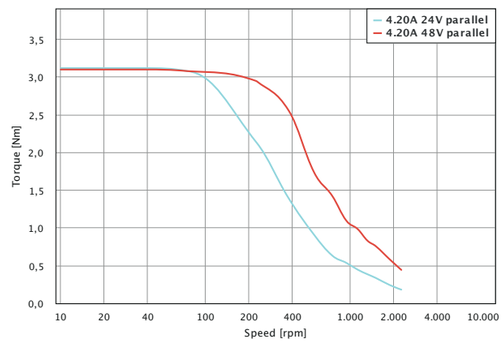


PD4-N6018L4204



Notes

PD4-C

High-Pole Plug & Drive DC Servo Motor - NEMA 23/24

OPTION

Gear

SOFTWARE

NanoJ V2

TECHNICAL DATA

Operating voltage	12 - 48 VDC
Phase current eff.	4.2 A
RMS for 1 S	max. 6.3 A
Version	**01 (USB)**
Operating types	Torque, speed, position, homing
Target value specification/programming	Clock-direction, analog input/NanoJ V2, USB
Inputs	Single/differential, clock/direction/enable (+5 V/+24 V), 3 digital inputs (+24 V), 1 analog input (0-10 V)
Outputs	1 Output, max. 0.5 A, open drain
Integrated encoder	Single turn, magnetic absolute encoder, 1024 CPR
Version	**08 (CAN)**
Operating types	Torque, speed, position, homing
Target value specification/programming	CANopen, analog input
Inputs	4 digital inputs (+5 V / +24 V), 1 analog input (0-10 V)
Outputs	2 outputs, max. 0.5 A, open drain
Integrated encoder	Single turn, magnetic absolute encoder, 1024 CPR

ORDER IDENTIFIER

PD4-C5918M4204-E-

01 = USB Interface

08 = CANopen Interface

ACCESSORIES

Z-K4700/50 Charging Capacitor

ZK-MICROUSB USB Cable

ZK-PD4-C-CAN-4-500-S
CANopen/RS485 Cable

CAUTION

For stabilizing the operating voltage, we recommend using a sufficiently dimensioned decoupling capacitor.

PD4-C

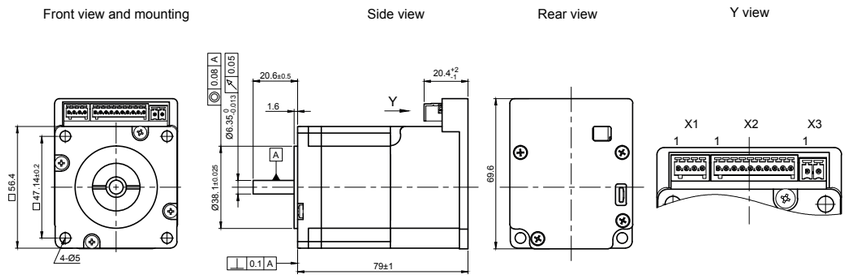
High-Pole Plug & Drive DC Servo Motor - NEMA 23/24

VERSIONS

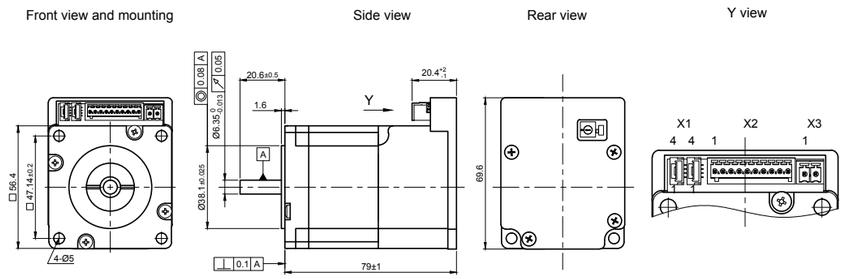
Type	Holding Torque Ncm	Max. Operating Voltage V	Nominal Torque Ncm	Length „A“ mm	Weight kg
PD4-C5918M4204-E	110	48	1.1	79	0,8
PD4-C5918L4204-E	198	48	1.1	100	1.2
PD4-C6018L4204-E	350	48	3.5	112.5	1.6

DIMENSIONS (IN MM)

PD4-C5918M4204-E-01

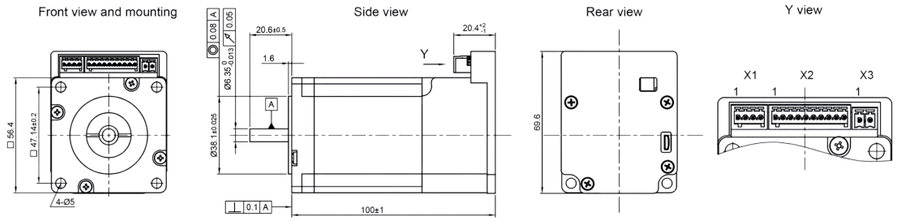


PD4-C5918M4204-E-08

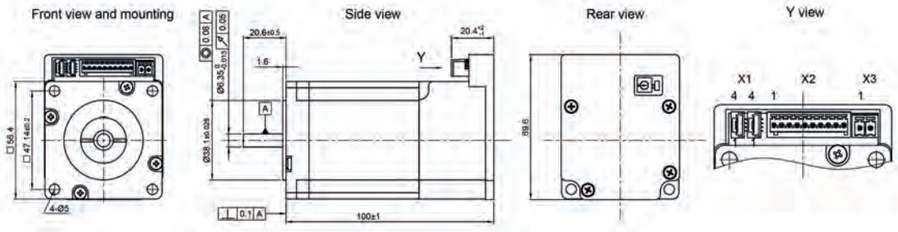


DIMENSIONS (IN MM)

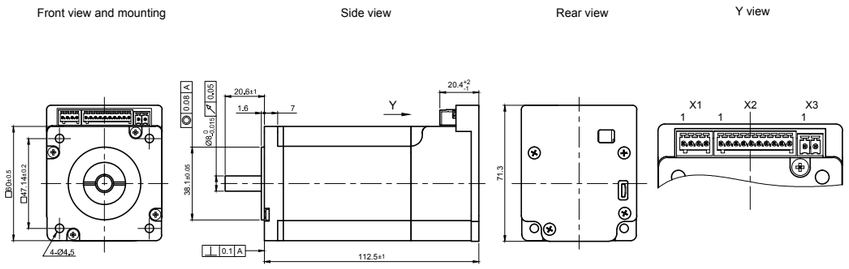
PD4-C5918L4204-E-01



PD4-C5918L4204-E-08



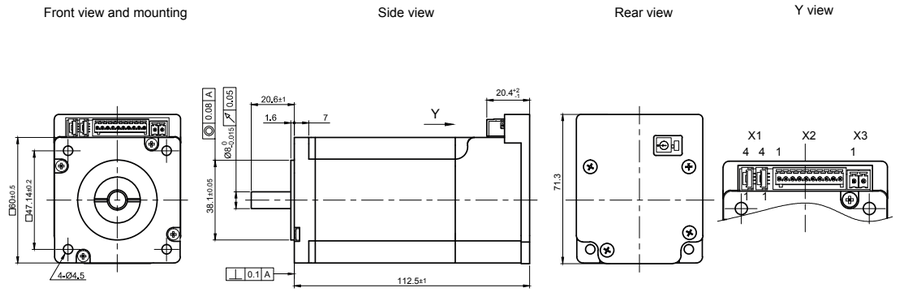
PD4-C6018L4204-E-01



PD4-C
High-Pole Plug & Drive DC Servo Motor - NEMA 23/24

DIMENSIONS (IN MM)

PD4-C6018L4204-E-08



PD4-CB

Low-Pole Plug & Drive DC Servo Motor - NEMA 23

OPTION

Gear

SOFTWARE

NanoJ V2

TECHNICAL DATA

Operating voltage	12 - 24 V DC
Phase current eff.	8 A
RMS for 1 S	max. 20 A
Version	01 (USB)
Operating types	Torque, speed, position, homing
Target value specification/programming	Clock-direction, analog input, NanoJ V2, USB
Inputs	Single/differential, clock/direction/enable (+5 V/+24 V), 3 digital inputs (+24 V), 1 Ananlog Input (0-10 V)
Outputs	1 output, max. 0.5 A, open drain
Integrated encoder	Single turn, magnetic absolute encoder, 1024 CPR
Version	08 (CAN)
Operating types	Torque, speed, position, homing
Target value specification/programming	CANopen, analog input
Inputs	4 digital inputs (+5 V/+24 V), 1 ananlog input (0-10 V)
Outputs	2 outputs, max. 0.5 A, open drain
Integrated encoder	Single turn, magnetic absolute encoder, 1024 CPR

ORDER IDENTIFIER

PD4-CB59M024035-E-

01 = USB Interface

08 = CANopen Interface

ACCESSORIES

Z-K4700/50 Charging Capacitor

ZK-MICROUSB USB Cable

ZK-PD4-C-CAN-4-500-S
CANopen/RS485 Cable

CAUTION

For stabilizing the operating voltage, we recommend using a sufficiently dimensioned decoupling capacitor.

PD4-CB

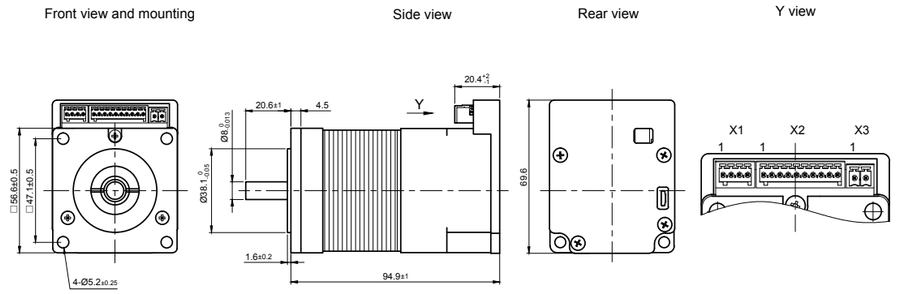
Low-Pole Plug & Drive DC Servo Motor - NEMA 23

VERSIONS

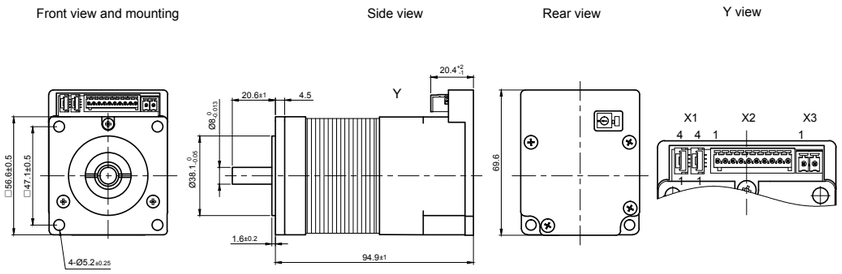
Type	Holding Torque Ncm	Nominal Speed rpm	Nominal Torque Ncm	Max. Operating Voltage V	Length „A“ mm	Weight kg
PD4-CB59M024035-E	37	3500	37	24	95	0.9

DIMENSIONS (IN MM)

PD4-CB59M024035-E-01



PD4-CB59M024035-E-08



PLUG & DRIVE®

PD6-N89

High-Pole Plug & Drive DC Servo Motor - NEMA 34

OPTION

Gear

SOFTWARE

NanoPro | NanoCAN | NanoJ

TECHNICAL DATA

Operating voltage	24 to 48 VDC
Max. phase current	Adjustable up to max. 10.5 A/phase, 7 A nominal current
Interface	RS485, or CANopen
Operating mode	Position, speed, flag position, clock-direction, analog, analog position, torque
Position monitoring	Automatic error correction up to 0.9 °
Operating mode	1/1, 1/2, 1/4, 1/5, 1/8, 1/10, 1/32, 1/64 adaptive (1/128)
Step frequency	0 to 50 kHz in clock-direction mode, 0 to 25 kHz in all other modes
Inputs	6 opto-coupler inputs (5–24 V), analog input
Outputs	Open drain (0 switching, max. 24 V/0.5 A)
Current reduction	Adjustable in 1% increments
Protective circuit	Overvoltage and heat sink temperature >80 °C
Temperature range	0 to +40 °C
Connection type	2x2 m cable
New functions	Closed loop/sinusoidal commutation programmable as sequential controller using NanoJ easy (RS485)

ORDER IDENTIFIER

PD6-N8918S6404

ACCESSORIES

Z-K4700/50	Charging Capacitor
Z-K10000/100	Charging Capacitor
ZK-RS485-USB	Converters
ZIB-PDx-N	Additional Board

CAUTION

For stabilizing the operating voltage, we recommend using a sufficiently dimensioned decoupling capacitor.

PD6-N89

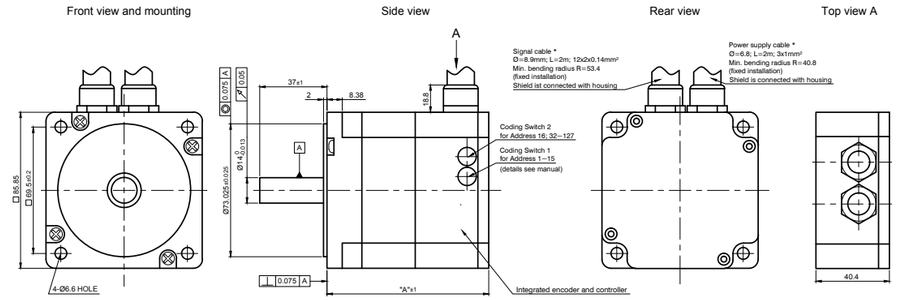
High-Pole Plug & Drive DC Servo Motor - NEMA 34

VERSIONS

Type	Holding Torque Ncm	Weight kg	Length „A“ mm	Twinuts Connector	Protection Class
PD6-N8918S6404	320	1.7	89		IP 65
PD6-N8918S6404-S	320	1.7	89	X	IP 65
PD6-N8918M9504	590	3.4	121		IP 65
PD6-N8918M9504-S	590	3.4	121	X	IP 65
PD6-N8918L9504	933	3.95	151		IP 65
PD6-N8918L9504-S	933	3.95	151	X	IP 65

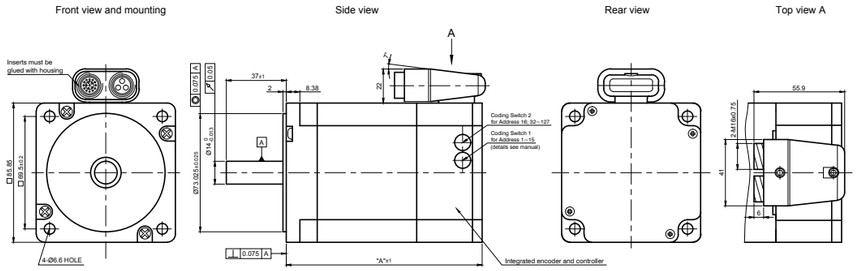
DIMENSIONS (IN MM)

PD6-N8918...



DIMENSIONS (IN MM)

PD6-N8918...-S

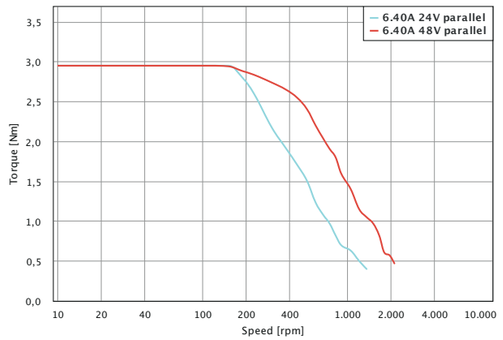


PD6-N89

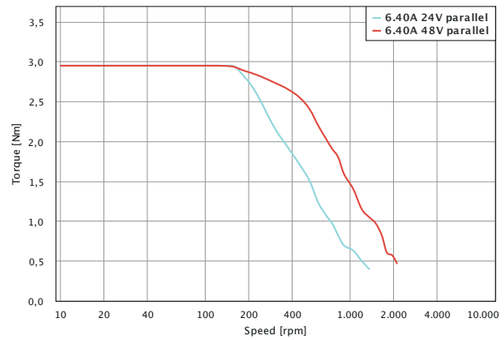
High-Pole Plug & Drive DC Servo Motor - NEMA 34

TORQUE CURVES

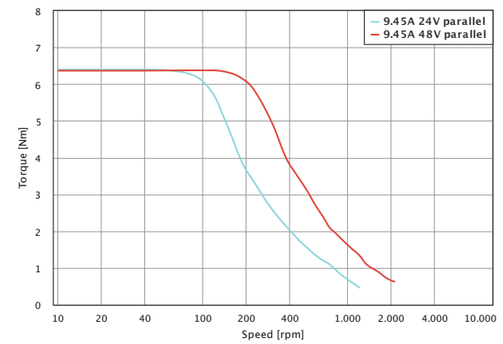
PD6-N8918S6404



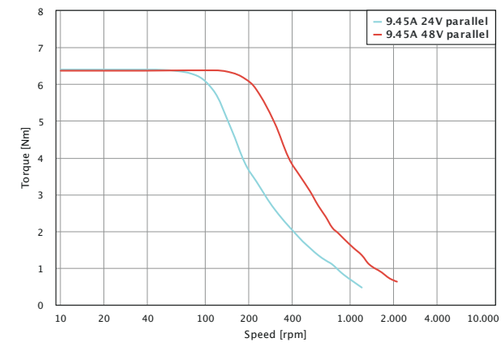
PD6-N8918S6404-S



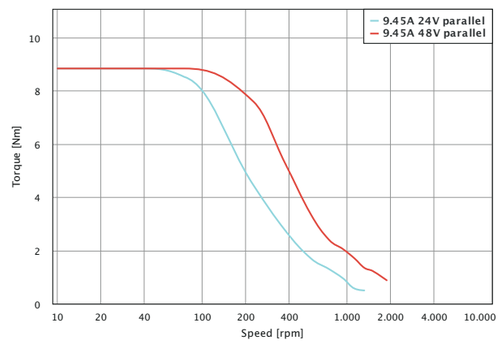
PD6-N8918M9504



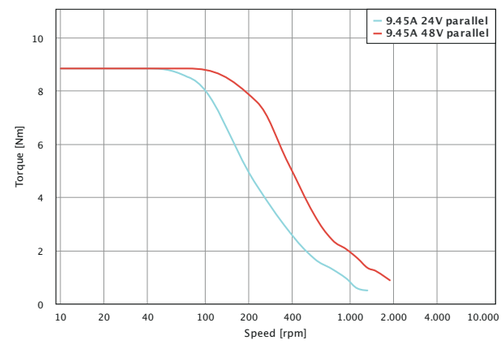
PD6-N8918M9504-S



PD6-N8918L9504



PD6-N8918L9504-S



Notes

PD2-N4118-IP

High-Pole Plug & Drive DC Servo Motor in Protection Class IP65 - NEMA 17

OPTION

Gear

SOFTWARE

NanoPro NanoCAN NanoJ

TECHNICAL DATA

Operating voltage	12 to 48 VDC
Max. phase current	Adjustable via software up to 2.7 A (1% increments), 100% = 1.8 A
Interface	RS485 or CANopen
Operating type	Position, speed, flag position, clock-direction, analog, analog position, torque
Operating mode	1/1, 1/2, 1/4, 1/5, 1/8, 1/10, 1/16, 1/32, 1/64, adaptive (1/128)
Step frequency	0 to 50 kHz in clock-direction mode, 0 to 25 kHz in all other modes
Inputs	6 digital inputs (5–24 V), 1 analog input (+-10 V)
Outputs	Open drain (0 switching, max. 24 V/0.5 A)
Position monitoring	Automatic error correction up to 0.9 °
Current reduction	Adjustable in 1% increments
Protective circuit	Overvoltage and heat sink temperature >80 °C
Temperature range	-10 to +40 °C
Connection type	Plug connection with 2 x M12
New functions	Closed loop/sinusoidal commutation/dspDrive/programmable as sequential controller using NanoJ easy (RS485)

VERSIONS

Type	Holding Torque Ncm	Weight kg	Length „A“ mm
PD2-N4118L1804-IP	50	0.5	76.5

ORDER IDENTIFIER

PD2-N4118L1804-IP-

2 = RS485 Interface

3 = CANopen Interface

ACCESSORIES

ZK-RS485-USB	Converters
Z-K4700/50	Charging Capacitor
ZK-M12-17-1M-2-S-FIN	M12 Cable
ZK-M12-17-1M-2-PUR-S	M12 Cable
ZK-M12-17-3M-2-PUR-S	M12 Cable

CAUTION

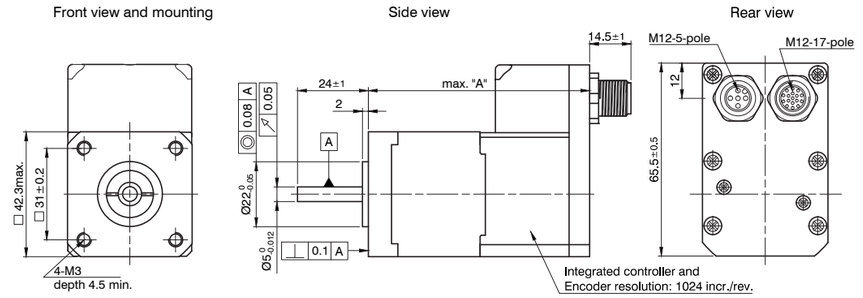
For stabilizing the operating voltage, we recommend using a sufficiently dimensioned decoupling capacitor.

PD2-N4118-IP

High-Pole Plug & Drive DC Servo Motor in Protection Class IP65 - NEMA 17

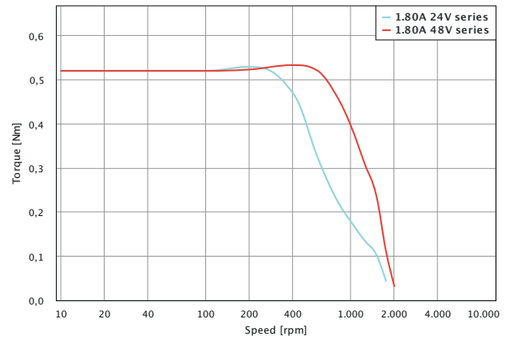
DIMENSIONS (IN MM)

PD2-N4118-IP



TORQUE CURVES

PD2-N4118L1804-IP



PD4-N59/N60-IP

High-Pole Plug & Drive DC Servo Motor in Protection Class IP64 - NEMA 23/24

OPTION

Gear

SOFTWARE

NanoPro | NanoCAN | Nanoj

TECHNICAL DATA

Operating voltage	12 to 48 VDC
Max. phase current	Adjustable via software up to 4.8 A (1% increments), 100% = 3.2 A
Interface	RS485 or CANopen
Operating type	Position, speed, flag position, clock-direction, analog, analog position, torque
Operating mode	1/1, 1/2, 1/4, 1/5, 1/8, 1/10, 1/16, 1/32, 1/64, adaptive (1/128)
Step frequency	0 to 50 kHz in clock-direction mode, 0 to 25 kHz in all other modes
Inputs	6 opto-coupler inputs (5–24 V)
Outputs	Open drain (0 switching, max. 24 V/0.5 A)
Position monitoring	Automatic error correction up to 0.9 °
Current reduction	Adjustable in 1% increments
Protective circuit	Overvoltage and heat sink temperature >80 °C
Temperature range	-10 to +40 °C
Connection type	M12
New functions	Closed loop/sinusoidal commutation/dspDrive/programmable as sequential controller using NanoJeasy (RS485)

ORDER IDENTIFIER

PD4-N5918X4204-IP-

2 = RS485 Interface

3 = CANopen Interface

ACCESSORIES

Z-K4700/50	Charging Capacitor
ZK-RS485-USB	Converters
ZIB-PDx-N	Additional Board

CAUTION

For stabilizing the operating voltage, we recommend using a sufficiently dimensioned decoupling capacitor.

PD4-N59/N60-IP

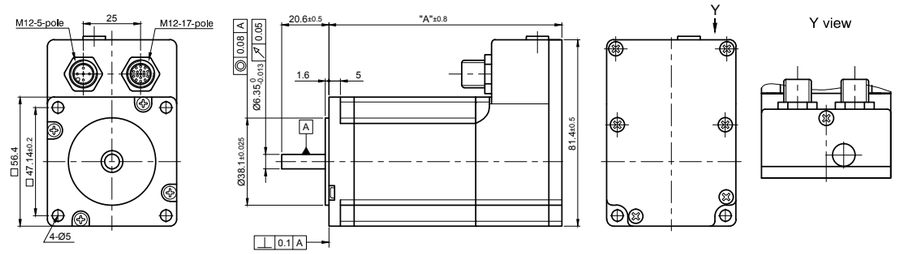
High-Pole Plug & Drive DC Servo Motor in Protection Class IP64 - NEMA 23/24

VERSIONS

Type	Holding Torque Ncm	Weight kg	Length „A“ mm
PD4-N5918X4204-IP	53.7	0.49	66.5
PD4-N5918M4204-IP	113	0.8	80.6
PD4-N5918L4204-IP	198	1.22	101.6
PD4-N6018L4204-IP	354	1.48	112

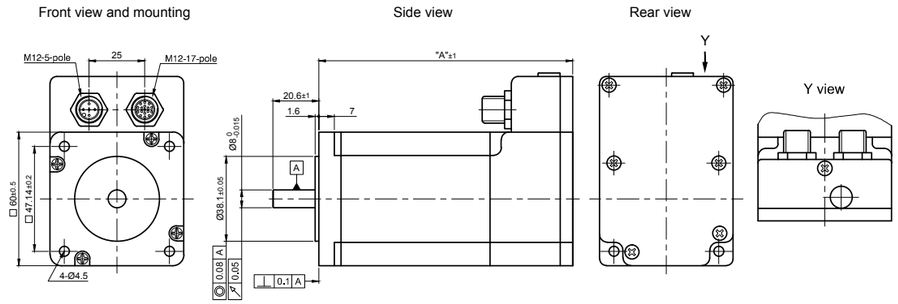
DIMENSIONS (IN MM)

PD4-N5918-IP



DIMENSIONS (IN MM)

PD4-N6018/-IP



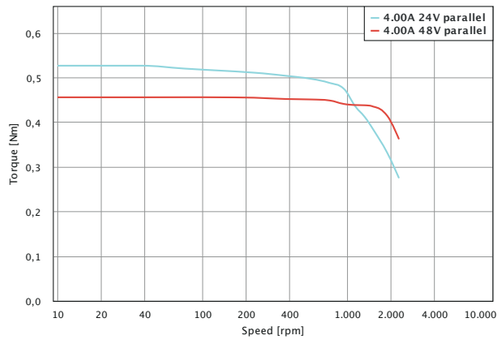
PLUG & DRIVE®

PD4-N59/N60-IP

High-Pole Plug & Drive DC Servo Motor in Protection Class IP64 - NEMA 23/24

TORQUE CURVES

PD4-N5918X4204-IP



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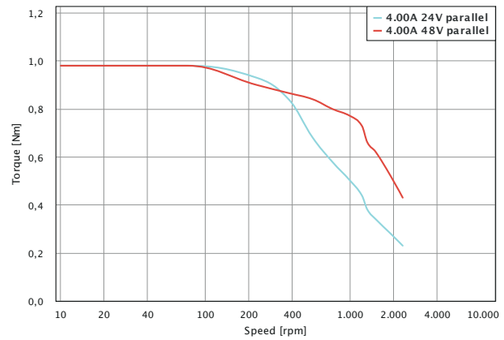
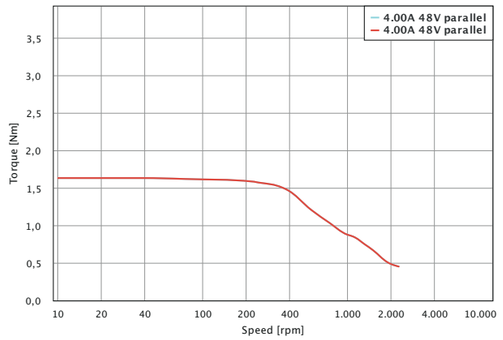
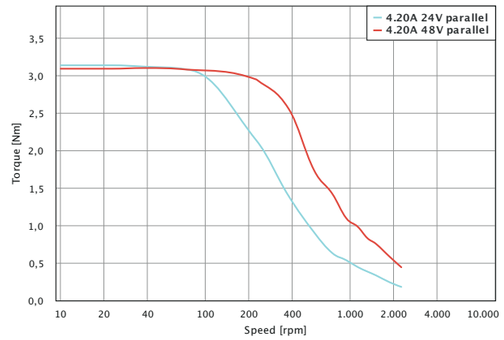


PD4-N5918L4204-IP



PD4-N6018L4204-IP



Notes

Notes

MOTOR CONTROLLERS

SMC11

Compact Microstep Controller

TECHNICAL DATA

Operating voltage	12 V to 35 VDC
Max. phase current	1.0 A/full step (1.25 A with cooling block), 1.4 A/microstep (1.8 A with cooling block)
Current setting	Via potentiometer
Operating type	Bipolar
Operating mode	1/1, 1/2, 1/4, 1/8 (preset)
Protection function	Overcurrent, overvoltage and over-temperature
Step frequency	0 to 200 kHz
Current reduction	Switchable to 40 %
Input signals	0 V active (L<0.8 V, 3.5 V<H<6 V or open)
Temperature range	0 to +40 °C
Connection type	JST connector
Weight	10 g
Fastening type	2 boreholes of Ø 19.05 mm for M2.5 – mounted directly on the stepper motor

VERSIONS

Type	Min. Operating Voltage V	Max. Operating Voltage V	Nominal Current A	Controller for	Interface	Weight kg
SMC11	12	35	1.4	Stepper Motors	Clock/Direction Only	0.01

ORDER IDENTIFIER

SMC11
= 1/8 Step Mode
SMC11-
2 = 1/16 Step Mode

ACCESSORIES

Z-K4700/50	Charging Capacitor
ZK-SMC11	Connection cable

CAUTION

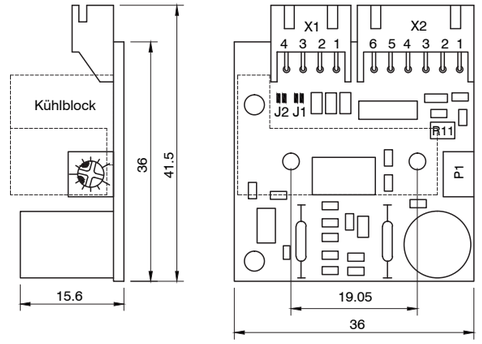
For stabilizing the operating voltage, we recommend using a sufficiently dimensioned decoupling capacitor.

SMC11

Compact Microstep Controller

DIMENSIONS (IN MM)

SMC11



SMCI12

Stepper Motor Controller

SOFTWARE

NanoPro | NanoCAN | NanoJ

TECHNICAL DATA

Operating voltage	12 V to 24 VDC
Phase current	Nominal current 1.8 A, adjustable up to 2.7 A
Interface	RS485 4-wire or CANopen
Operating type	RS485: position, speed, flag position, clock-direction, analog, joystick CANopen: position, homing mode, velocity mode, interpolated position mode (as per CAN standard DS402)
Operating mode	1/1, 1/2, 1/4, 1/5,1/8, 1/10, 1/32, 1/64, adaptive, feed constant
Step frequency	16 kHz in full step; in microstep corresponding multiples (e.g. up to 1 MHz at 1/64)
Inputs	6 digital inputs (TTL), 1 analog input +10/-10V
Outputs	3 open collector 24 V/0.5 A max.
Current reduction	Adjustable 0 – 100%
Protective circuit	Overvoltage, undervoltage and temperature >80 °C
Temperature range	0 to +40 °C

VERSIONS

Type	Min. Operating Voltage V	Max. Operating Voltage V	Nominal Current A	Controller for	Interface	Weight kg
SMCI12	12	24	1.8	Stepper Motors	RS485, CANopen	0.05

ORDER IDENTIFIER

SMCI12-

2 = RS485 Interface

3 = CANopen Interface

ACCESSORIES

ZK-RS485-USB	Converters
Z-K4700/50	Charging Capacitor
ZK-SMCI12	RS485 Cable
ZK-SMCI12-3	CANopen Cable
ZK-SMCI12-IO	IO Cable
ZK-XHP-4-300	Motor Cable

CAUTION

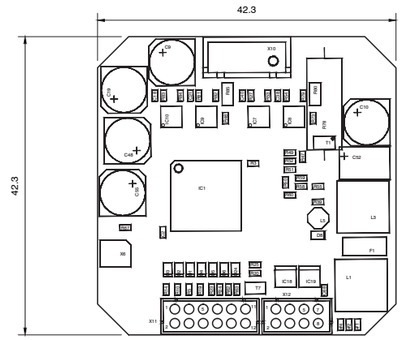
For stabilizing the operating voltage, we recommend using a sufficiently dimensioned decoupling capacitor.

SMCI12

Stepper Motor Controller

DIMENSIONS (IN MM)

SMCI12



SMCP33

Closed-Loop Stepper Motor Controller/Plug-In Module

SOFTWARE

NanoPro NanoJ

TECHNICAL DATA

Operating voltage	12 V to 48 VDC
Phase current	Nominal value 2 A (effective), with heat sink 4 A peak
Interface	RS485, USB
Operating type	Position, speed, flag position, clock-direction, analog, joystick, torque
Operating mode	1/1, 1/2, 1/4, 1/5, 1/8, 1/10, 1/32, 1/64, adaptive
Step frequency	0 to 50 kHz in clock-direction mode, 0 to 25 kHz in all other modes
Inputs	8 inputs (5 V), 2 analog inputs (-10 to +10 V)
Outputs	8 outputs (5 V, max. 20 mA TTL)
Position monitoring	Automatic error correction up to 0.9 °, only with optical encoder (e.g. WEDS5541 series)
Current reduction	Adjustable 0 – 100 %
Protective circuit	Overvoltage, undervoltage and temperature >80 °C
Temperature range	0 to +40 °C

VERSIONS

Type	Min. Operating Voltage V	Max. Operating Voltage V	Nominal Current A	Controller for	Interface	Weight kg
SMCP33	12	48	2	Stepper Motor, BLDC Motors	RS485	0.12
SMCP33-EVA	12	48	2	Stepper Motor, BLDC Motors		0.291

ORDER IDENTIFIER

SMCP33
= 2 A
SMCP33-
K= 4 A

ACCESSORIES

ZK-RS485-USB Converters
Z-K4700/50 Charging Capacitor
ZCEDA345050521202
Mating Connector / Base
ZCEDA345220088 Board Holder
ZCEDA345240318 Encoding Element

CAUTION

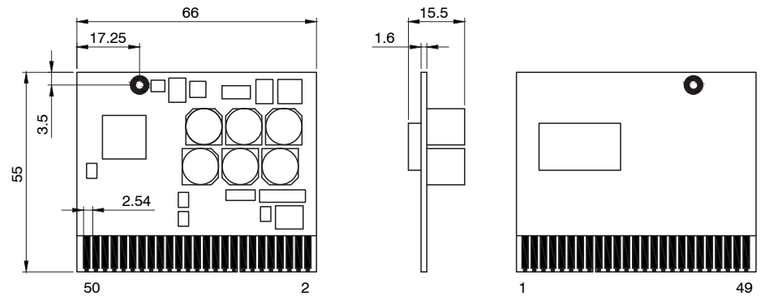
For stabilizing the operating voltage, we recommend using a sufficiently dimensioned decoupling capacitor.

SMCP33

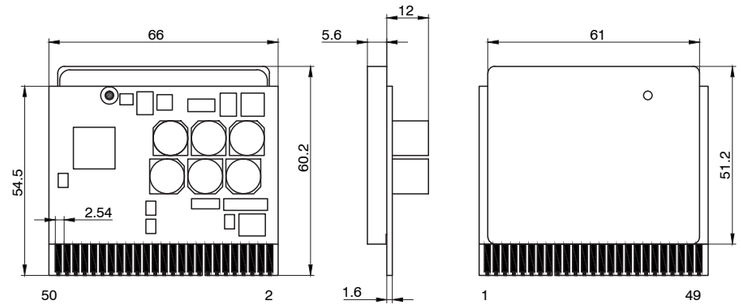
Closed-Loop Stepper Motor Controller/Plug-In Module

DIMENSIONS (IN MM)

SMCP33



SMCP33-K



SMCI33

Closed-Loop Stepper Motor Controller

SOFTWARE

NanoPro NanoJ

TECHNICAL DATA

Operating voltage	24 V to 48 VDC
Phase current	Nominal current 2 A, adjustable up to 3 A/phase
Interface	RS485 or USB
Operating type	Position, speed, flag position, clock-direction, analog, joystick, torque mode
Operating mode	1/1, 1/2, 1/4, 1/5, 1/8, 1/10, 1/32, 1/64, adaptive
Step frequency	0 to 50 kHz in clock-direction mode, 0 to 25 kHz in all other modes
Inputs	6 opto-coupler inputs (5 – 24 V)
Outputs	3 open collector 30 V/30 A max.
Position monitoring	Automatic error correction up to 0.9 °
Current reduction	Adjustable 0 – 100 %
Protective circuit	Overvoltage, undervoltage and temperature >80 °C
Temperature range	0 to +40 °C

VERSIONS

Type	Min. Operating Voltage V	Max. Operating Voltage V	Nominal Current A	Controller for	Interface	Weight kg
SMCI33	12	48	2	Stepper Motors	RS485, USB	0.13

ORDER IDENTIFIER

SMCI33-

1 = USB Interface

2 = RS485 Interface

ACCESSORIES

Z-K4700/50	Charging Capacitor
ZK-RS485-RS232	Converters
ZK-RS485-USB	Converters
ZK-USB	Connection cable
ZK-SMCI-LD	Encoder Cable

CAUTION

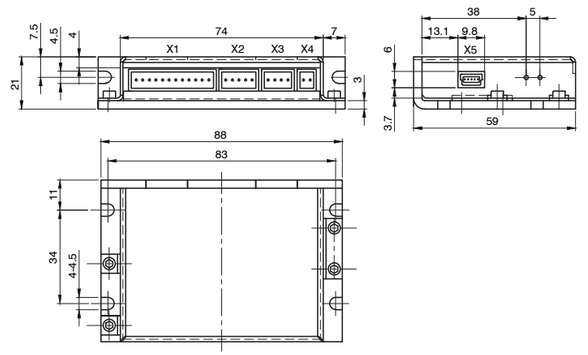
For stabilizing the operating voltage, we recommend using a sufficiently dimensioned decoupling capacitor.

SMCI33

Closed-Loop Stepper Motor Controller

DIMENSIONS (IN MM)

SMCI33



SMCI35

Closed-Loop Stepper Motor Controller

SOFTWARE

NanoPro | Nanoj

TECHNICAL DATA

Operating voltage	12 V to 48 VDC
Phase current	Max. 6 A
Interface	TTL-RS232 (3.3 V)
Operating type	Position, speed, flag position, clock-direction, analog, joystick, torque
Operating mode	1/1, 1/2, 1/4, 1/5, 1/8, 1/10, 1/32, 1/64, adaptive
Step frequency	16 kHz in full step; in microstep corresponding multiples (e.g. up to 1 MHz at 1/64)
Inputs	6 digital inputs (TTL), 1 analog input +10/-10 V
Outputs	3 digital outputs (TTL)
Position monitoring	Yes, depending on encoder
Current reduction	Adjustable 0 to 100 %
Protective circuit	Overvoltage, undervoltage and temperature >80 °C
Temperature range	0 to +40 °C

VERSIONS

Type	Min. Operating Voltage V	Max. Operating Voltage V	Nominal Current A	Controller for	Interface	Weight kg
SMCI35	12	48	4	Stepper Motors	RS232 (3.3 V)	0.9

ORDER IDENTIFIER

SMCI35

ACCESSORIES

ZK-RS232-USB-3.3V	Converters
Z-K4700/50	Charging Capacitor
ZK-WEDS-300-S-SMCI35	Encoder Cable
ZK-ZHR5-90	Connection cable
ZK-ZHR6-500	Connection cable
ZK-SMCI35-LD	Encoder Cable

CAUTION

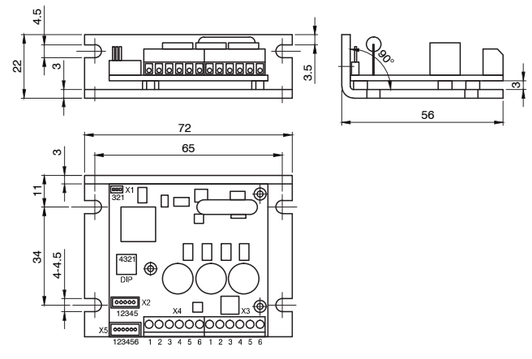
For stabilizing the operating voltage, we recommend using a sufficiently dimensioned decoupling capacitor.

SMCI35

Closed-Loop Stepper Motor Controller

DIMENSIONS (IN MM)

SMCI35



SMCI36

Closed-Loop Stepper and BLDC Motor Controller

SOFTWARE

NanoPro | NanoCAN | NanoJ

TECHNICAL DATA

Operating voltage	12 V to 72 VDC
Phase current	Nominal current 6 A, max. 9 A (eff)
Interface	RS485 4-wire or CANopen
Operating type	RS485: position, speed, flag position, clock-direction, analog, joystick CANopen: position, homing mode, velocity mode, interpolated position mode (as per CAN standard DS402), torque mode
Operating mode	1/1, 1/2, 1/4, 1/5, 1/8, 1/10, 1/32, 1/64, adaptive microstep, feed constant
Step frequency	16 kHz in full step; in microstep corresponding multiples (e.g. up to 1 MHz at 1/64)
Inputs	6 digital inputs (TTL), 1 analog input +10/-10 V
Outputs	3 digital outputs (open drain)
Position monitoring	Yes, depending on encoder
Current reduction	Adjustable 0 – 100 %
Protective circuit	Overvoltage, undervoltage and heatsink temperature >75 °C
Temperature range	0 to +40 °C

VERSIONS

Type	Min. Operating Voltage V	Max. Operating Voltage V	Nominal Current A	Controller for	Interface	Weight kg
SMCI36	12	72	6	Stepper Motor, BLDC Motors	RS485 or CANopen	0.11
SMCI36-L	12	72	2.2	Stepper Motor, BLDC Motors	RS485 or CANopen	0.11

ORDER IDENTIFIER

SMCI36
= RS485 Interface
SMCI36-
3=CANopen Interface

ACCESSORIES

ZK-RS485-USB	Converters
Z-K10000/100	Charging Capacitor
ZK-WEDS-300-S-SMCI35	Encoder Cable
ZK-ZHR5-90	Connection cable
ZK-ZHR6-500	Connection cable
ZK-SMCI35-LD	Encoder Cable

CAUTION

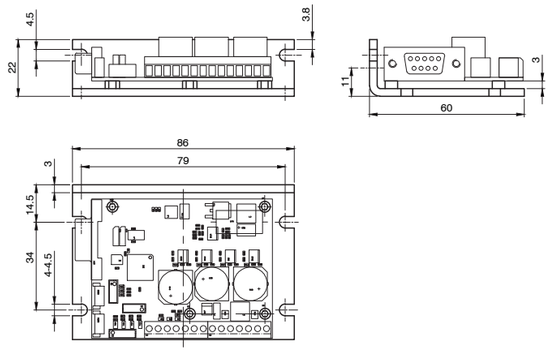
For stabilizing the operating voltage, we recommend using a sufficiently dimensioned decoupling capacitor.

SMCI36

Closed-Loop Stepper and BLDC Motor Controller

DIMENSIONS (IN MM)

SMCI36



SMCI47-S

Closed-Loop Stepper Motor Controller

SOFTWARE

NanoPro | NanoCAN | NanoJ

TECHNICAL DATA

Operating voltage	24 V to 48 VDC
Phase current	Nominal current 7.0 A, adjustable up to 10.5 A/phase
Interface	RS485 or CANopen
Operating type	RS485: position, speed, flag position, clock-direction, analog, joystick CANopen: position, homing mode, velocity mode, interpolated position mode, torque mode
Operating mode	1/1, 1/2, 1/4, 1/5, 1/8, 1/10, 1/32, 1/64, adaptive
Step frequency	0 to 50 kHz in clock-direction mode, 0 to 25 kHz in all other modes
Inputs	6 opto-coupler inputs (5 to 24 V)
Outputs	3 open collector, 30 V/2 A max., 1 output for brake, max. 1.5 A
Position monitoring	Automatic error correction up to 0.9 °
Current reduction	Adjustable 0 – 100%
Protective circuit	Overvoltage, undervoltage and heat sink temperature >80 °C
Temperature range	0 to +40 °C

VERSIONS

Type	Min. Operating Voltage V	Max. Operating Voltage V	Nominal Current A	Controller for	Interface	Weight kg
SMCI47-S	12	48	7	Stepper Motors	RS485, CANopen	0.15

ORDER IDENTIFIER

SMCI47-S-

2 = RS485 Interface

3 = CANopen Interface

ACCESSORIES

Z-K4700/50	Charging Capacitor
ZK-RS485-RS232	Converters
ZK-RS485-USB	Converters
ZK-SMCI-LD	Encoder Cable

CAUTION

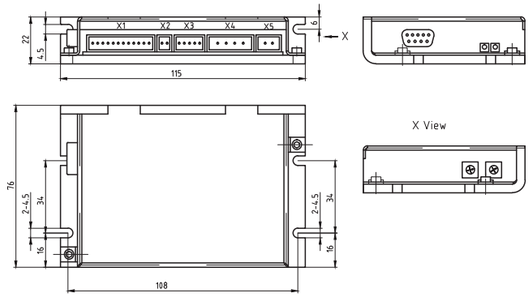
For stabilizing the operating voltage, we recommend using a sufficiently dimensioned decoupling capacitor.

SMCI47-S

Closed-Loop Stepper Motor Controller

DIMENSIONS (IN MM)

SMCI47-S



NP5

Plug-In Module

SOFTWARE

NanoJ V2

TECHNICAL DATA

Operating voltage	12-48 VDC +/-4 %
Max. continuous current	6 A (eff)
Peak current	10 A (eff. for 1 s)
Commutation	Open-loop stepper motor, closed-loop stepper motor with encoder, BLDC with sinusoidal commutation via hall sensor, BLDC with sinusoidal commutation via encoder
Operating mode	Profile position mode, profile velocity mode, profile torque mode, velocity mode, homing mode, cyclic sync position mode, cyclic sync velocity mode, cyclic sync torque mode, clock/direction mode, application program (NanoJ)
Interfaces	2xSPI, 1xI2C or CAN (external circuit required!)
Encoder/hall	2x encoder interface and 1x hall sensor interface (external circuit required!)
I/O	7x general I/O, 2x AD converter, 1x output for external brake
Connector	PCI Express 8x, 1.0 mm RM, 2x49 contacts
Current reduction	Adjustable from 0 to 100%
Protective circuit	Overtemperature protection at temperatures >70 °C, polarity reversal protection through PIN diode (short circuit between +VB and GND)

VERSIONS

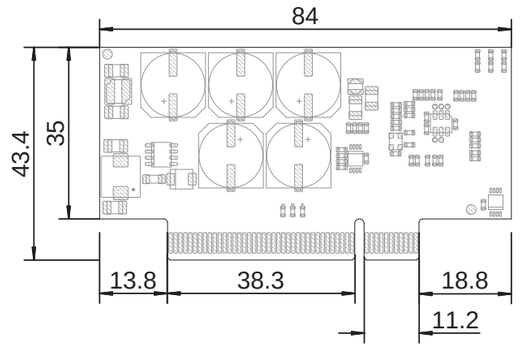
Type	Min. Operating Voltage V	Max. Operating Voltage V	Peak Current A	Controller for	Interface	Weight kg
NP5	12	48	10	Stepper Motor, BLDC Motors	CANopen, SPI	0.05

NP5

Plug-In Module

DIMENSIONS (IN MM)

NP5



N5

Motor Controller for EtherCAT or CANopen

SOFTWARE

NanoJ V2 | NanoIP

TECHNICAL DATA

Operating voltage	12-48 VDC (low-current version), or 12-48 V DC (high-current version)
Continuous current	10 A eff. (low-current version), or 18 A eff. (high-current version)
Peak current	10 A effective (low current version), or 54 A effective (high current version)
Commutation	Open-loop stepper motor, closed-loop stepper motor with encoder, BLDC with sinusoidal commutation via hall sensor, BLDC with sinusoidal commutation via encoder
Operating mode	Profile position mode, velocity mode, homing mode, cyclic syncposition mode, cyclic sync velocity mode, cyclic sync torque mode, clock/direction mode, application program (NanoJ)
Parameter setting	Browser-based via Ethernet with the NanoIP interface
Field-bus interfaces	EtherCAT or CANopen
Encoder input	5 V or 24 V signal, differential or single-ended, max. resolution 65536 CPR (16 bit), UVW connection for hall sensor
Inputs	4 inputs 5 V/24 V switchable in software (inputs 1 to 4); 2 inputs, wide range, 5-24 V (inputs 5 and 6); 2 analog inputs -10 to +10 V or 0-20 mA (switchable in software)
Outputs	2 transistor outputs, (open drain, 0 switching, max. 24 V/0.5 A)
Brake	1 open-drain output, max. 1.5 A
Protective circuit	Overvoltage and undervoltage, overtemperature: protective circuit at temperature >70 °C polarity reversal protection: in case of polarity reversal, short circuit between supply voltage and GND via PIN diode, therefore cable protection device (fuse) required in supply cable.

VERSIONS

Type	Min. Operating Voltage V	Max. Operating Voltage V	Nominal Current A	Controller for	Interface	Weight kg
N5-1	12	48	10	Stepper Motor, BLDC Motors	EtherCAT, CANopen	0.2
N5-2	12	48	18	Stepper Motor, BLDC Motors	EtherCAT, CANopen	0.2

ORDER IDENTIFIER

N5-1-

1 = EtherCAT Interface

2 = CANopen Interface

ACCESSORIES

ZK-M12-8-2M-2-PADP	M12 Cable
ZK-M12-12-2M-2-PADP	M12 Cable
ZK-NOE-10-500-S-PADP	Encoder Cable
ZK-PADP-12-500-S	Encoder Cable

CAUTION

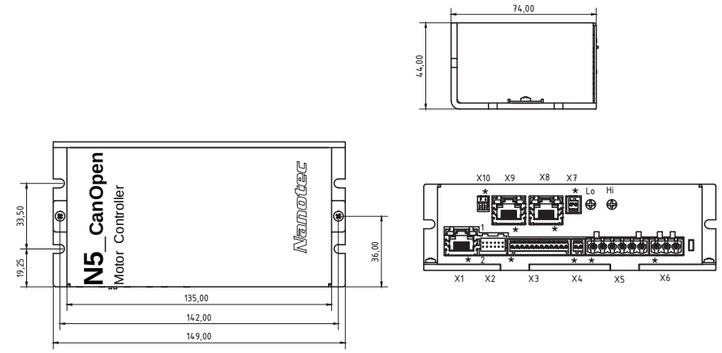
For stabilizing the operating voltage, we recommend using a sufficiently dimensioned decoupling capacitor.

N5

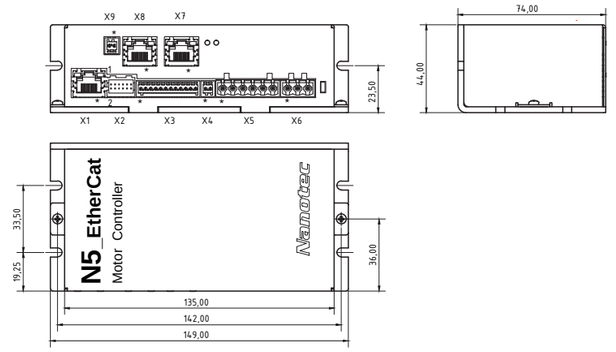
Motor Controller for EtherCAT or CANopen

DIMENSIONS (IN MM)

N5 CanOpen



N5 EtherCAT



MOTOR CONTROLLERS

C5

Open-Loop Stepper Motor Controller

SOFTWARE

NanoJ V2

TECHNICAL DATA

Operating voltage	12-48 VDC +/- 5%
Max. current (RMS)	6 A
Operating modes	Torque, speed, position, homing
Setpoint setting/programming	Clock-direction/analog/NanoJ
Digital inputs	3 Digital inputs, 24 V, 3 digital inputs switchable 5/24 V, single ended (inverted inputs not used) or differential
Analog inputs	1 analog input, switchable 0-10 V/0-20 mA
Digital outputs	2 digital outputs, open drain, 24 V/100 mA
DIP switch	1 DIP switch with 4 poles
Status LED	Bicolor red/green
Dimensions	88x56x22 mm
Protective function	Overtemperature, overvoltage (balance circuit), inverse polarity (needs fuse in supply cable)

VERSIONS

Type	Min. Operating Voltage V	Max. Operating Voltage V	Nominal Current A	Controller for	Interface	Weight kg
C5-01	12	48	6	Stepper Motors	USB	0.13

ORDER IDENTIFIER

C5-01

ACCESSORIES

ZK-MICROUSB USB Cable

CAUTION

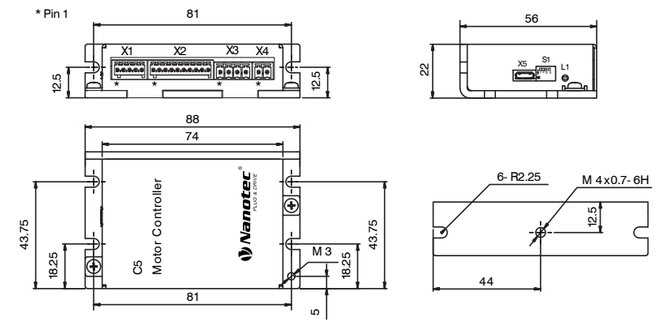
For stabilizing the operating voltage, we recommend using a sufficiently dimensioned decoupling capacitor.

C5

Open-Loop Stepper Motor Controller

DIMENSIONS (IN MM)

C5-01



C5-E

Motor Controller for Stepper and BLDC Motors

SOFTWARE

NanoJ V2

TECHNICAL DATA

Operating voltage	12-48 VDC +/- 5 %
Rated current	6 A (C5-E-1-09) or 10 A (C5-E-2-09)
Max. current (RMS)	6 A (C5-E-1-09) or 30 A (C5-E-2-09)
Operating modes	Profile position mode, profile velocity mode, profile torque mode, velocity mode, homing mode, cyclic sync position mode, cyclic sync velocity mode, cyclic sync torque mode, clock/direction mode and stand-alone mode (controlled by JAVA Program)
Interface	CANopen and Micro USB
Encoder	5 V single-ended or differential signal, switchable by software, maximum resolution 65536 CPR (16 Bit)
Hall sensor	5 V single-ended signal
Input	5 digital inputs (5 V or 24 V, separately switchable by software), 1 analog input 10 Bit, 0-10 V or 0 - 20 mA (switchable by software), 1 analog input 10 Bit, 0 - 10 V
Output	3 transistor outputs (Open - Drain, max. 24 V/100 mA)
Dimensions	140x74x28 mm
Protective function	Over-/under voltage protection, over temperature protection (>75 °C), reverse polarity protection(Short-circuit +UB and GND for reverse polarity, needs fuse in supply cable!)

VERSIONS

Type	Min. Operating Voltage V	Max. Operating Voltage V	Nominal Current A	Controller for	Weight kg
C5-E-1-09	12	48	6	Stepper Motor, BLDC Motors	0.27
C5-E-2-09	12	48	10	Stepper Motor, BLDC Motors	0.27

ORDER IDENTIFIER

C5-E-

1-09 = Low-Current Version

2-09 = High-Current Version

ACCESSORIES

ZK-M12-8-2M-2-PADP	M12 Cable
ZK-M12-12-2M-2-PADP	M12 Cable
ZK-MICROUSB	USB Cable
ZK-NOE-10-500-S-PADP	Encoder Cable
ZK-PADP-12-500-S	Encoder Cable

CAUTION

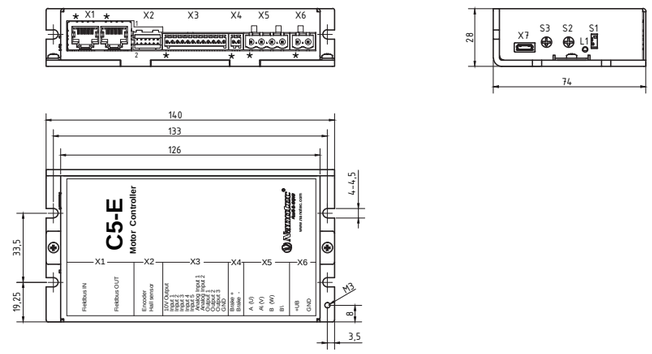
For stabilizing the operating voltage, we recommend using a sufficiently dimensioned decoupling capacitor.

C5-E

Motor Controller for Stepper and BLDC Motors

DIMENSIONS (IN MM)

C5-E



CL3-E

Motor Controller for Stepper or BLDC motors

TECHNICAL DATA

Operating voltage	12 - 24 VDC +/- 5 %
Max. current (RMS)	3 A (CL3-E-1), 6 A (CL3-E-2)
Operating modes	profile position mode, profile velocity mode, profile torque mode, velocity mode, homing mode, cyclic sync position mode, cyclic sync velocity mode, cyclic sync torque mode, clock/direction mode and stand-alone mode (controlled by JAVA Program)
Motor control	Stepper open loop, stepper closed loop with encoder, BLDC closed loop with Hall sensor and BLDC closed loop with encoder
Interface	CANopen, RS485 2-wires, RS232 and Micro USB
Encoder	5 V single-ended signal, maximum resolution 65536 CPR (16 Bit)
Hall sensor	5 V single-ended signal
Input	5 digital inputs (5 V), 1 analog input 10 Bit, 0-10 V or 0-20 mA (switchable by software), 1 analog input 10 Bit, 0 to 10 V
Output	3 transistor outputs (Open-drain, max. 24 V/100 mA)
Protection circuit	Over-/undervoltage protection, Overtemperature protection (>75 °C), reverse polarity protection (short-circuit +UB and GND for reverse polarity, needs fuse in supply cable!)

VERSIONS

Type	Min. Operating Voltage V	Max. Operating Voltage V	Peak Current A	Controller for	Weight kg
CL3-E-1-0F	12	24	3	Stepper Motor, BLDC Motors	0.02
CL3-E-2-0F	12	24	6	Stepper Motor, BLDC Motors	0.02

ORDER IDENTIFIER

CL3-E-

1-0F = Low-Current Version

2-0F = High-Current Version

ACCESSORIES

ZK-GHR3-500-S	RS232 Cable
ZK-GHR12-500-S	IO Cable
ZK-GHR10-500-S-GHR	Encoder Cable
ZK-GHR13-500-S-GHR	Encoder Cable
ZK-MICROUSB	USB Cable
ZK-PD4-C-CAN-4-500-S	CANopen/ RS485 Cable
ZK-XHP2-500-S	Power Cable

CAUTION

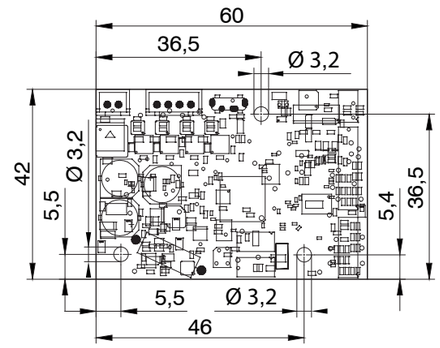
For stabilizing the operating voltage, we recommend using a sufficiently dimensioned decoupling capacitor.

CL3-E

Motor Controller for Stepper or BLDC motors

DIMENSIONS (IN MM)

CL3-E



OPTIONS

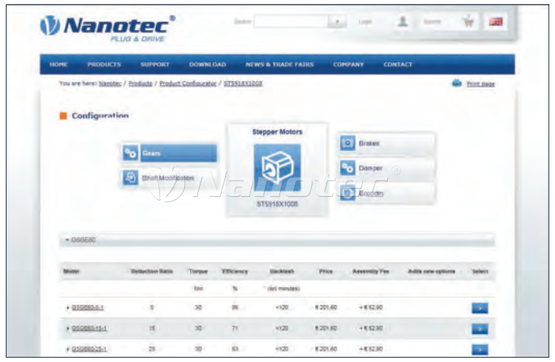
Modular motor configuration system:

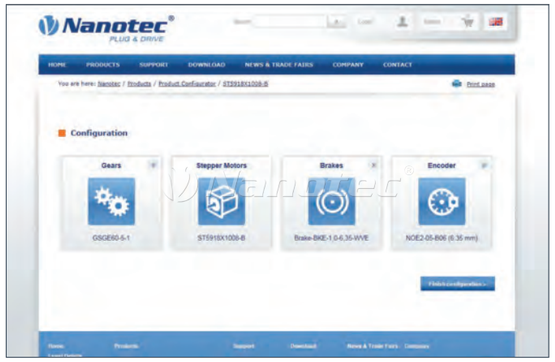
the quick and easy way to finding the right drive solution

Our stepper and BLDC motors, linear actuators and linear positioning drives, together with a wide selection of gears and encoders, create a modular system with over 4000 possible combinations. Our easy-to-use online configurator will help you select the right products for your particular application:

- Broad product spectrum
- Rapid and easy selection
- Comprehensive documentation
- Direct ordering

Extensive product information is available directly on the Nanotec website for viewing and downloading. This includes product details such as technical drawings, 3D data, delivery times and parts lists. Find out more at www.nanotec.com





GEAR

MOTOR

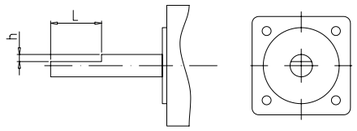
BRAKE

ENCODER

CUSTOM MACHINING

Nanotec also supplies shafts with customer-specific designs for all motors of the ST and DB series as well as IP motors. The tolerances specified below are standard for large order quantities. Please note that these cannot always be adhered to when post-machining bearing motors in small numbers. In addition, when a shaft is subsequently machined, a minimum distance of 3 mm must always be maintained to the surface of the centering flange.

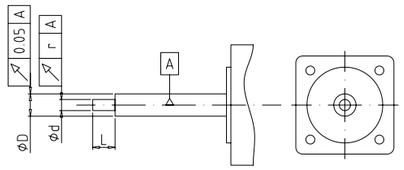
D-CUT



Motor size	L	h
20-35	±0.2	±0.1
39-42	±0.2	±0.1
59-60	±0.25	±0.15
89-110	±0.5	±0.2

In addition to D-cut, 90° and triangular flattening, we also produce shafts with flat surfaces for setting screws, relief grooves for lock rings and threaded blind holes according to customer specifications. The shaft is flattened to enable simple and form-fitting fixation and to effectively prevent the load from rotating.

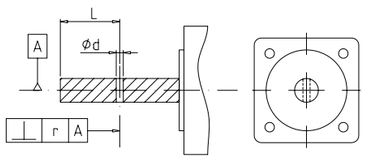
MACHINED SHAFT/THINNER SHAFT



Motor size	L	L	d	r
20-35	±0.1 (<20)	±0.15 (<20)	-0.012	<0.02
39-42	±0.1 (<20)	±0.15 (<20)	-0.012	<0.05
59-60	±0.1 (<20)	±0.15 (20-50)	-0.012	<0.05
89-110	±0.5 (<20)	±0.5 (20-50)	-0.012 (d≥4 L<20)	<0.02 (L<20)

Machined shafts are used primarily to attach transmission elements with smaller bore diameters directly onto the motor shaft. Additional machining is possible even if only a small number of pieces is ordered.

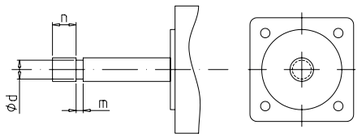
SIDE-DRILLED HOLE



Motor size	L	d	r
20-35	±0.1	+0.1	0.1
39-42	±0.15	+0.1 [1]	0.2
59-60	±0.2	+0.1	0.1
89-110	±0.5	+0.2	0.1

Side-drilled holes can be used to securely attach clamping pins in order to meet the high directional and load change requirements of transmission elements.

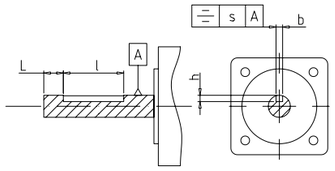
GROOVE



Motor size	n	m	d
20-35	±0.2	±0.2	±0.2
39-42	±0.2	[2]	[3]
59-60	±0.25	±0.15	±0.1
89-110	±0.5	±0.2	-0.022

Shaft grooves on motors are used for comfortably attaching safety disks that axially fix timing pulleys, spur gears, etc.

KEYWAY



Motor size	n	m	d
20-35	±0.2	±0.2	±0.2
39-42	±0.2	[2]	[3]
59-60	±0.25	±0.15	±0.1
89-110	±0.5	±0.2	-0.022

Systems that are subject to high load and directional changes benefit from shafts with keyways that provide reliable rotation protection.

ACCESSORIES/GEAR WHEELS

TIMING PULLEY

Nanotec supplies synchronous pulleys in metric and imperial dimensions, with and without a hub or tapered adapter sleeve, and with a variety of tooth profiles, forms and pitches.

SHAFT WITH METRIC THREAD

Shafts with a metric thread are an ideal solution for rotating elements and linear low-speed positioning drives.

TOOTHED SHAFT

Motors with toothed shafts are used for easy mounting on existing reduction ratios, gears, etc.

CLAMPING BOLT

Clamping bolts enable secure clamping with a relatively large displacement path and high clamping force. When space is restricted, they can also be used for automatic adjustment.

BRASS OR STEEL INPUT PINION

Motors with a pinion on the motor shaft are used for mounting directly on existing reduction ratios.

WORM GEARS

Motors with a mounted worm gear can be installed at a 90° angle to the load and thus provide a large reduction ratio in a very limited space. Their efficiency is between 30 and 70%, depending on the reduction ratio.

MODIFICATIONS IN QUANTITY

Nanotec offers machining for all motors of the ST and DB series as well as motors with protection class and Plug & Drive motors. Depending on the complexity of the machining a minimum order quantity between 100 and 1000 pcs is required.

LARGER SHAFT

Larger or thicker shafts are primarily used for high radial forces.

SPECIAL SHAFT FORMS

With square or hexagonal shafts, systems can be easily and quickly adapted to various tools and other equipment during manual or motorized adjustments.

HOLLOW SHAFT

Hollow shafts make it possible to pass cables, hoses, screws and laser beams through them.

TIMING BELT

Shafts with timing belts are very smooth running while exhibiting low belt tension and low bearing load.

Cable Assembly

CABLE ASSEMBLY OPTION

Customer-specific connectors and cables allow simple and fast connection to existing machines. For orders with a minimum quantity of 100 pcs Nanotec offers connector and cable assemblies ex works.

JST CONNECTOR

JST CONNECTOR

BERG CONNECTOR

LUMBERG CONNECTOR

AMP CONNECTOR

WAGO CONNECTOR

IDC

SUB-D CONNECTOR

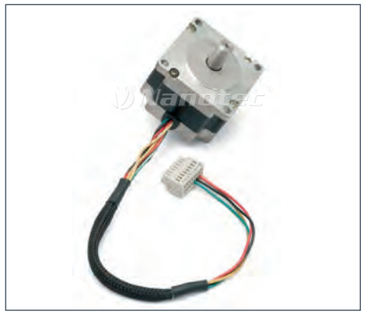
SUB-D CONNECTOR

M12 CONNECTOR

CABLE ASSEMBLY

HEAT-SHRINKABLE TUBE

PROTECTIVE BRAID



BRAIDING

INTEGRATED PLUG

TWINTUS CONNECTOR

M12 CONNECTOR

JST CONNECTOR

M12 CONNECTOR

Notes

WEDS/WEDL

5541/3-Channel Encoder

TECHNICAL DATA

Resolution	500, 1000 pulses/revolution
Signal form	Square wave signal
Output signals	WEDS: Phase A, B, I WEDL: Phase A, A\, B, B\, I, I\
Operating voltage	5 VDC
Current consumption	≤60 mA
Limit frequency	100 KHz
Limit speed	1000 pulses/revolution = 6000 rpm, 500 pulses/revolution = 12000 rpm
Pulse width	90 ° ± 45 °
Signal level	VH 85% VCC, VL ≤0.3 V
Max. output current per channel	±150 mA, recommended working current ±20
Working temperature	-25 °C to 100 °C
Storage temperature	-40 °C to 100 °C
Humidity	30 to 85%, non-condensing

VERSIONS

Type	Index	Line Driver	Signal Voltage V	Cycles per Revolution
WEDL5541-A	Yes	Yes	5	500
WEDL5541-B	Yes	Yes	5	1000
WEDS5541-A	Yes	No	5	500
WEDS5541-B	Yes	No	5	1000

WEDS/WEDL

5541/3-Channel Encoder

ORDER IDENTIFIER

WEDL5541-A

14 = 5 mm Shaft Diameter

06 = 6.35 mm Shaft Diameter

ACCESSORIES

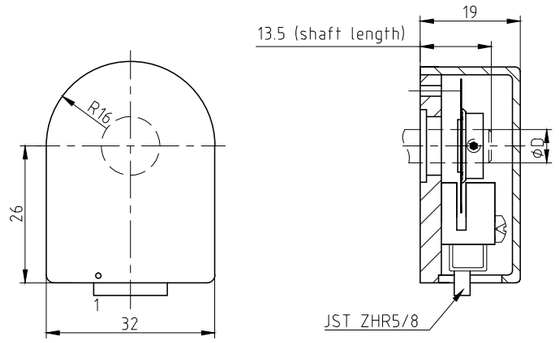
ZK-WEDL-8-1000-S Encoder Cable
ZK-WEDL-8-2000-S Encoder Cable
ZK-WEDL-8-500 Encoder Cable
ZK-WEDL-8-500-S Encoder Cable
ZK-WEDS-300-S-SMCI35 Encoder Cable
ZK-WEDS-5-150-S Encoder Cable
ZK-WEDS-5-500 Encoder Cable
ZK-WEDS-5-500-S Encoder Cable

CAUTION

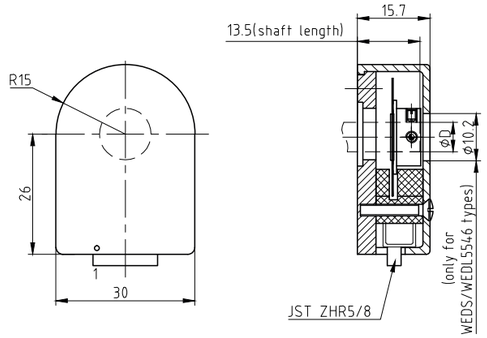
To mount the encoder the Nanotec Mounting KIT is required. Please refer to our website for ordering.

DIMENSIONS (IN MM)

WEDL-WEDS5541 (1000 Ink.)



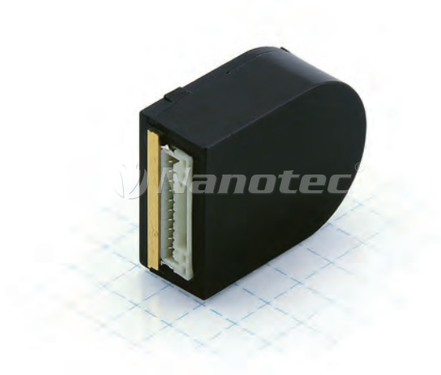
WEDL-WEDS5541 (500 Ink.)



OPTIONS

NOE1

3-Channel Miniature Encoder



TECHNICAL DATA

Resolution	500, 1000, 2000 pulses/revolution
Signal form	Square wave signal
Output signals	Phase A, A\, B, B\, I, I\
Operating voltage	5 VDC (7 VDC max.)
Current consumption	typical 100 mA
Limit frequency	60 KHz (500 CPR), 120 KHz (1000 CPR), 240 KHz (2000 CPR)
Limit speed	6600 rpm
Pulse width	180 ° ± 50 °
Phase shift	90 ° ± 50 °
Signal level	Low 0 V; High: +3,5 V (±10%, without lead), +3 V (±10%, with lead 20 mA)
Max. output current per channel	± 150 mA, recommended working current ±20
Working temperature	-20 to 85 °C
Storage temperature	-40 to 85 °C
Humidity	Max. 90%, non-condensing

VERSIONS

Type	Index	Line Driver	Signal Voltage V	Cycles per Revolution
NOE1-05-A	Yes	Yes	5	500
NOE1-05-B	Yes	Yes	5	1000
NOE1-05-C	Yes	Yes	5	2000

NOE1

3-Channel Miniature Encoder

ORDER IDENTIFIER

NOE1-05-A

12 = 6 mm, Type: Hollow Shaft

14 = 5 mm Shaft Diameter

ACCESSORIES

ZK-NOE1-10-500-S	Encoder Cable
ZK-NOE1-10-2000-S	Encoder Cable

CAUTION

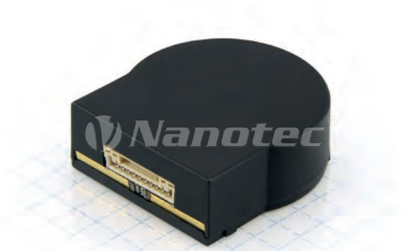
Please note that the NOE1 encoders are only available together with a motor and must be mounted by Nanotec.

DIMENSIONS (IN MM)

NOE1

NOE2

Optical 3-Channel Encoder



TECHNICAL DATA

	NOE2-05	NOE2-24
Resolution	1000, 2000, 4000 pulses/revolution	1000, 2000, 4000 pulses/revolution
Signal form	Square wave signal	Square wave signal
Output signals	Phase A, A\, B, B\, I, I\	Phase A, A\, B, B\, I, I\
Operating voltage	DC 4.5 V to 5.5 V	24 VDC
Current consumption	typical 30 mA	typical 15 mA
Limit frequency	60 KHz (1000 CPR), 120 KHz (2000 CPR), 240 KHz (4000 CPR)	60 KHz (1000 CPR), 120 KHz (2000 CPR), 240 KHz (4000 CPR)
Limit speed	3600 rpm	3600 rpm
Pulse width	180 ° ± 30 °e	180 ° ± 30 °e
Phase shift	90 ° ± 18 °e	90 ° ± 18 °e
Signal level	Low: 0 V; high: +3,5 V (±10 %, without lead), +3 V (±10 %, with lead 20 mA)	Low: 0 V, high: Vcc-0.5 V
Max. output current per channel	150 mA	200 mA
Working temperature	-20 to 85 °C	-20 to 85 °C
Storage temperature	-40 to 85 °C	-40 to 85 °C
Humidity	Max. 90%, non-condensing	Max. 90%, non-condensing

VERSIONS

Type	Index	Line Driver	Signal Voltage V	Cycles per Revolution
NOE2-05-B	Yes	Yes	5	1000
NOE2-05-K	Yes	Yes	5	4000
NOE2-24-B	Yes	Yes	24	1000
NOE2-24-K	Yes	Yes	24	4000

NOE2

Optical 3-Channel Encoder

ORDER IDENTIFIER

NOE2-05-B

14 = 5 mm Shaft Diameter

06 = 6.35 mm Shaft Diameter

10 = 10 mm, Type Hollow Shaft

15 = 15 mm, Type Hollow Shaft

ACCESSORIES

ZK-NOE1-10-500-S Encoder Cable

CAUTION

Please note that the NOE1 encoders are only available together with a motor and must be mounted by Nanotec.

DIMENSIONS (IN MM)

NOE2

NME1

Magnetic Encoder

TECHNICAL DATA

Resolution	max. 1024 CPR/4096 PPR, 12 Bit absolute
Signal form	Square wave signal, sine/cosine
Output signals	NME1-USW: A,/A, B, /B, I, /I, H1, H2, H3, NME1-SSI: sine, cosine, SSI (12 Bit)
Operating voltage	+5 bis +24 VDC, ±10%
Limit frequency	1000 HZ for sine signal and 500 HZ for 4096 interpolation
Limit speed	30.000 rpm
Pulse width	180 ° ± 30 °e
Phase shift	90° ± 18 °e
Signal level	incremental signal - low: 0 V, high: Vcc-0.5 V SSI: TTL, sine/cosine: 1.5 V ± 0.8 V
Max. output current per channel	150 mA
Working temperature	-20 to 85 °C
Storage temperature	-40 to 85 °C
Humidity	Max. 90 %, non-condensing

VERSIONS

Type	Index	Line Driver	Signal Voltage V	Cycles per Revolution
NME1-UVW-T	Yes	Yes	5-24	1024

ORDER IDENTIFIER

NME1-UVW-T-

06 = 5 mm Shaft Diameter

14 = 6.35 mm Shaft Diameter

ACCESSORIES

ZK-NME1-13-500-S Encoder Cable

CAUTION

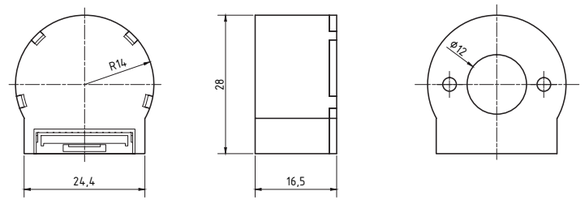
Please note that the NOE1 encoders are only available together with a motor and must be mounted by Nanotec.

NME1

Magnetic Encoder

DIMENSIONS (IN MM)

NME1



GPLE22

Precision Planetary Gears

CAUTION

Please note that the GPLE22 gears are only available together with a motor.

TECHNICAL DATA

IP protection	IP43
Service life	10.000 hours
Combination with motor	NEMA 8, 11, 17
Working temperature	-25 °C to 90 °C
Admissible radial/axial shaft load (N)	20/20
Moment of inertia kg mm²	0.09

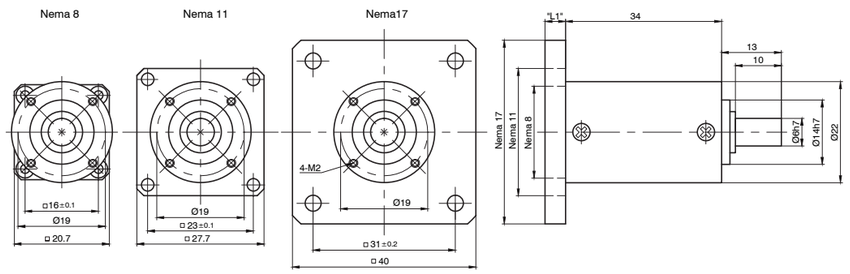
VERSIONS

Type	**Reduction Ratio**	**Output Torque Nominal** Nm	**Efficiency** %	**Backlash** ´ (arc minutes)	**Moment of Inertia** kg mm²	**Length „A“** mm	**Intermediate Flange L1** mm	**Weight** kg
GPLE22-2S-9	9	1.5	80	<55	0.09	34	4.3, 4.45*	0.1
GPLE22-2S-12	12	1.5	80	<55	0.09	34	4.3, 4.45*	0.1
GPLE22-2S-15	15	1.5	80	<55	0.09	34	4.3, 4.45*	0.1

* The intermediate flange size (L1) of NEMA 8 and 11 motors is 4.45 mm and 4.3 mm for NEMA 17 motors.

DIMENSIONS (IN MM)

GPLE22



Notes

GPLE40

Precision Planetary Gears

ORDER IDENTIFIER

GPLE40-1S-3

= for NEMA 17 Motor

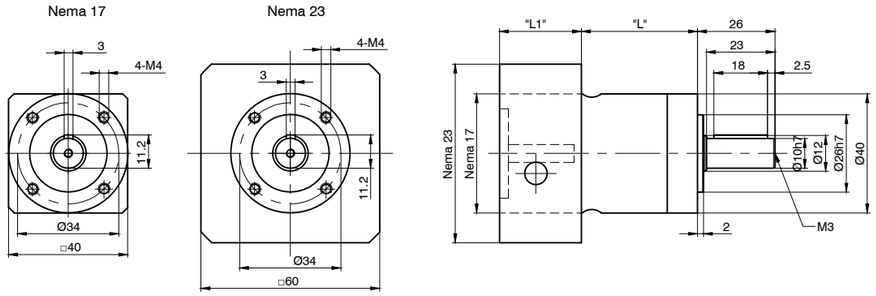
F56 = for NEMA 23, 24 Motor

TECHNICAL DATA

IP protection	IP54
Service life	30.000 hours
Combination with motor	NEMA 17, 23, 24
Working temperature	-25 °C to 90 °C
Admissible radial/axial shaft load (N)	200/200, (160/160)

DIMENSIONS (IN MM)

GPLE40



GPLE40

Precision Planetary Gears

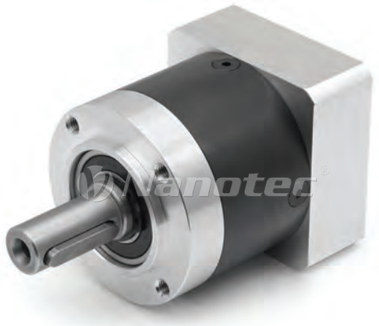
VERSIONS

Type	Reduction Ratio	Output Torque Nominal Nm	Output Torque Max. Value Nm	Efficiency %	Backlash ´ (arc minutes)	Moment of Inertia kg mm²	Length „A“ mm	Intermediate Flange L1 mm	Weight kg
GPLE40-1S-3	3	11	17.5	97	<15	3.1	39	24.5, 27.5*	0.35
GPLE40-1S-4	4	15	24	97	<15	2.2	39	24.5, 27.5*	0.35
GPLE40-1S-5	5	14	22	97	<15	1.9	39	24.5, 27.5*	0.35
GPLE40-1S-8	8	6	10	97	<15	1.7	39	24.5, 27.5*	0.35
GPLE40-2S-9	9	16.5	26	95	<19	3	52	24.5, 27.5*	0.45
GPLE40-2S-12	12	20	32	95	<19	2.9	52	24.5, 27.5*	0.45
GPLE40-2S-15	15	18	29	95	<19	2.3	52	24.5, 27.5*	0.45
GPLE40-2S-16	16	20	32	95	<19	2.2	52	24.5, 27.5*	0.45
GPLE40-2S-20	20	20	32	95	<19	1.9	52	24.5, 27.5*	0.45
GPLE40-2S-25	25	18	29	95	<19	1.9	52	24.5, 27.5*	0.45
GPLE40-2S-32	32	20	32	95	<19	1.7	52	24.5, 27.5*	0.45
GPLE40-2S-40	40	18	29	95	<19	1.6	52	24.5, 27.5*	0.45
GPLE40-2S-64	64	7.5	12	95	<19	1.6	52	24.5, 27.5*	0.45
GPLE40-3S-60	60	20	32	91	<22	2.9	64.5	24.5, 27.5*	0.55
GPLE40-3S-80	80	20	32	91	<22	1.9	64.5	24.5, 27.5*	0.55
GPLE40-3S-100	100	20	32	91	<22	1.9	64.5	24.5, 27.5*	0.55
GPLE40-3S-120	120	18	29	91	<22	2.9	64.5	24.5, 27.5*	0.55
GPLE40-3S-160	160	20	32	91	<22	1.6	64.5	24.5, 27.5*	0.55
GPLE40-3S-200	200	18	29	91	<22	1.6	64.5	24.5, 27.5*	0.55
GPLE40-3S-256	256	20	32	91	<22	1.6	64.5	24.5, 27.5*	0.55
GPLE40-3S-320	320	18	29	91	<22	1.6	64.5	24.5, 27.5*	0.55
GPLE40-3S-512	512	7.5	12	91	<22	1.6	64.5	24.5, 27.5*	0.55

* The intermediate flange size (L1) of NEMA 23 and 24 motors is 24.5 mm and 27.5 mm for NEMA 17 motors.

GPLE60

Precision Planetary Gears

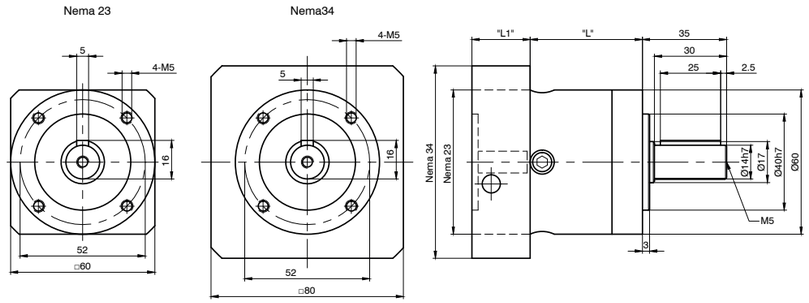


TECHNICAL DATA

IP protection	IP54
Service life	30.000 hours
Combination with motor	NEMA 23, 24, 34
Working temperature	-25 °C to 90 °C
Admissible radial/axial shaft load (N)	400/500, (340/450)

DIMENSIONS (IN MM)

GPLE60



ORDER IDENTIFIER

GPLE60-1S-3

= for NEMA 23, 24 Motor

-F87 = for NEMA 34 Motor

ACCESSORIES

MK-DH-8-11-GPLE Spacer Sleeve

GPLE60

Precision Planetary Gears

VERSIONS

Type	Reduction Ratio	Output Torque Nominal Nm	Output Torque Max. Value Nm	Efficiency %	Backlash ° (arc minutes)	Moment of Inertia kg mm²	Length „A“ mm	Intermediate Flange L1 mm	Weight kg
GPLE60-1S-3	3	28	45	97	<10	13.5	47	24, 39*	0.9
GPLE60-1S-4	4	38	61	97	<10	9.3	47	24, 39*	0.9
GPLE60-1S-5	5	40	64	97	<10	7.8	47	24, 39*	0.9
GPLE60-1S-8	8	18	29	97	<10	6.5	47	24, 39*	0.9
GPLE60-2S-9	9	44	70	95	<12	13.1	59.5	24, 39*	1.1
GPLE60-2S-12	12	44	70	95	<12	12.7	59.5	24, 39*	1.1
GPLE60-2S-15	15	44	70	95	<12	7.7	59.5	24, 39*	1.1
GPLE60-2S-16	16	44	70	95	<12	8.8	59.5	24, 39*	1.1
GPLE60-2S-20	20	44	70	95	<12	7.5	59.5	24, 39*	1.1
GPLE60-2S-25	25	40	64	95	<12	7.5	59.5	24, 39*	1.1
GPLE60-2S-32	32	44	70	95	<12	6.4	59.5	24, 39*	1.1
GPLE60-2S-40	40	40	64	95	<12	6.4	59.5	24, 39*	1.1
GPLE60-2S-64	64	18	29	95	<12	6.4	59.5	24, 39*	1.1
GPLE60-3S-60	60	44	70	91	<15	7.6	72	24, 39*	1.3
GPLE60-3S-80	80	44	70	91	<15	7.5	72	24, 39*	1.3
GPLE60-3S-100	100	44	70	91	<15	7.5	72	24, 39*	1.3
GPLE60-3S-120	120	44	70	91	<15	6.4	72	24, 39*	1.3
GPLE60-3S-160	160	44	70	91	<15	6.4	72	24, 39*	1.3
GPLE60-3S-200	200	40	64	91	<15	6.4	72	24, 39*	1.3
GPLE60-3S-256	256	44	70	91	<15	6.4	72	24, 39*	1.3
GPLE60-3S-320	320	40	64	91	<15	6.4	72	24, 39*	1.3
GPLE60-3S-512	512	18	29	91	<15	6.4	72	24, 39*	1.3

* The intermediate flange size (L1) of NEMA 23 and 24 motors is 24.5 mm and 39 mm for NEMA 34 motors.

GPLE80

Precision Planetary Gears

ORDER IDENTIFIER

GPLE80-1S-F87

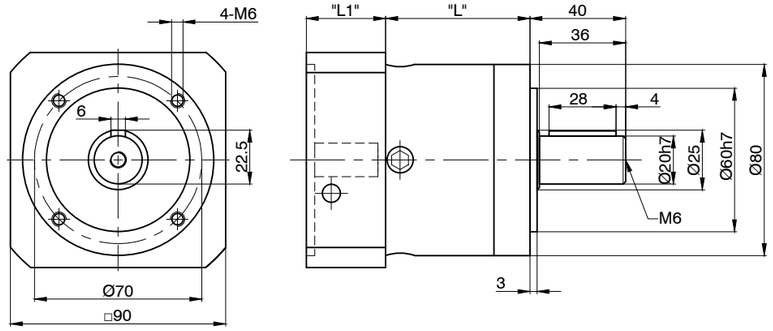
F87 = for NEMA 34 Motor

TECHNICAL DATA

IP protection	IP54
Service life	30.000 hours
Combination with motor	NEMA 34
Working temperature	-25 °C to 90 °C
Admissible radial/axial shaft load (N)	750/1000, (650/900)

DIMENSIONS (IN MM)

GPLE80



GPLE80

Precision Planetary Gears

VERSIONS

Type	Reduction Ratio	Output Torque Nominal Nm	Output Torque Max. Value Nm	Efficiency %	Backlash ´ (arc minutes)	Moment of Inertia kg mm²	Length „A“ mm	Intermediate Flange L1 mm	Weight kg
GPLE80-1S-3-F87	3	85	136	97	<7	77	60.5	41.5	2.1
GPLE80-1S-4-F87	4	115	184	97	<7	52	60.5	41.5	2.1
GPLE80-1S-5-F87	5	110	176	97	<7	45	60.5	41.5	2.1
GPLE80-1S-8-F87	8	50	80	97	<7	39	60.5	41.5	2.1
GPLE80-2S-9-F87	9	130	208	95	<9	74	77.5	41.5	2.6
GPLE80-2S-12-F87	12	120	192	95	<9	72	77.5	41.5	2.6
GPLE80-2S-15-F87	15	110	176	95	<9	71	77.5	41.5	2.6
GPLE80-2S-16-F87	16	120	192	95	<9	50	77.5	41.5	2.6
GPLE80-2S-20-F87	20	120	192	95	<9	44	77.5	41.5	2.6
GPLE80-2S-25-F87	25	110	176	95	<9	44	77.5	41.5	2.6
GPLE80-2S-32-F87	32	120	192	95	<9	39	77.5	41.5	2.6
GPLE80-2S-40-F87	40	110	176	95	<9	39	77.5	41.5	2.6
GPLE80-2S-64-F87	64	50	80	95	<9	39	77.5	41.5	2.6
GPLE80-3S-60-F87	60	110	176	91	<11	51	95	41.5	3.1
GPLE80-3S-80-F87	80	120	192	91	<11	50	95	41.5	3.1
GPLE80-3S-100-F87	100	120	192	91	<11	44	95	41.5	3.1
GPLE80-3S-120-F87	120	110	176	91	<11	70	95	41.5	3.1
GPLE80-3S-160-F87	160	120	192	91	<11	39	95	41.5	3.1
GPLE80-3S-256-F87	256	120	192	91	<11	39	95	41.5	3.1
GPLE80-3S-320-F87	320	110	176	91	<11	39	95	41.5	3.1
GPLE80-3S-512-F87	512	50	80	91	<11	39	95	41.5	3.1

GPLL

Economy Planetary Gears

CAUTION

Please note that the GPLL gears are only available together with a motor.

TECHNICAL DATA

	GPLL22	GPLL40	GPLL52
Combination with motor	ST20/28, DB28	ST40/41/42, DB42	ST57/58/59/60 DB57/87
Axial/radial load (N)	7/10	30/50	100/200
Expected lifetime	LH 10 > 1000 hours		
Operating temperature	-10 °C to +80 °C		
Protection class	IP54		

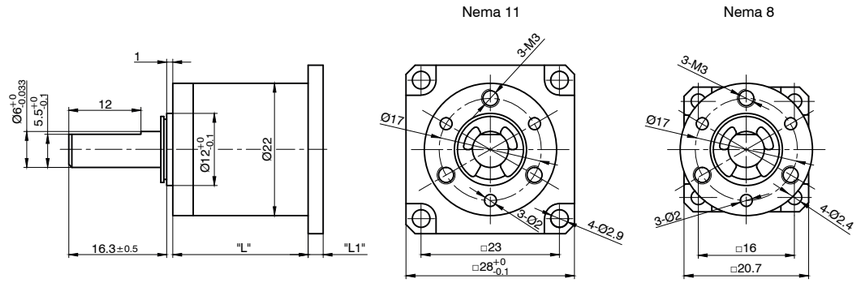
VERSIONS

Type	Reduction Ratio	Output Torque Nominal Nm	Output Torque Max. Value Nm	Efficiency %	Backlash ´ (arc minutes)	Length „A“ mm	Weight kg
GPLL22-5	5	0.2	60	80	<150	23.3	0.046
GPLL22-25	25	0.3	90	70	<150	29.5	0.051
GPLL22-90	90	0.4	120	60	<150	35.7	0.058
GPLL40-4	4	0.5	150	80	<180	27.5	0.191
GPLL40-14	14	1	300	70	<180	34.2	0.193
GPLL40-24	24	1	300	70	<180	34.2	0.193
GPLL40-49	49	1.8	540	60	<180	40.9	0.233
GPLL52-4	4	1.5	450	80	<180	53	0.475
GPLL52-15	15	5	1500	70	<180	68.5	0.66
GPLL52-53	53	10	3000	60	<180	84	0.85
GPLL52-100	100	10	3000	60	<180	84	0.85

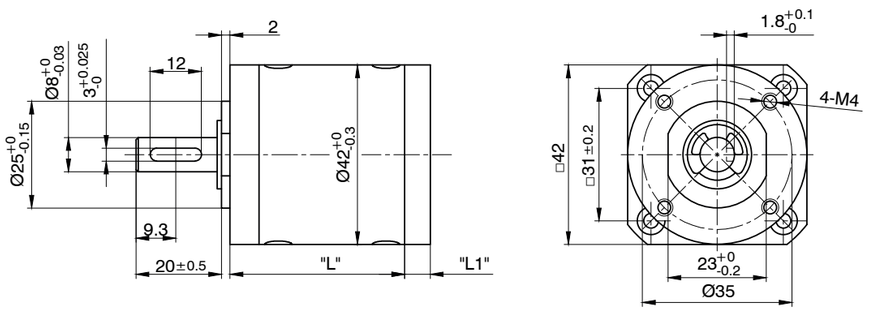
GPLL
Economy Planetary Gears

DIMENSIONS (IN MM)

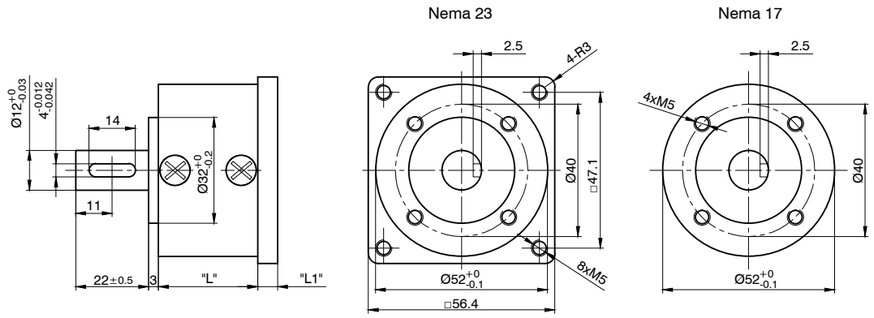
GPLL22



GPLL40



GPLL52



OPTIONS

GPLL-HT

High-Torque Economy Planetary Gears

CAUTION

Please note that the GPLL-HT gears are only available together with a motor.

TECHNICAL DATA

	GPLL28	GPLL41	GPLL59
Combination with motor	DB28	ST41/42, DB42	ST59, DB57/59
Axial/radial load (N)	25/35	30/80	100/250
Expected lifetime	3000 operating hours		
Operating temperature	-10 °C to +80 °C		
Protection class	IP54		

VERSIONS

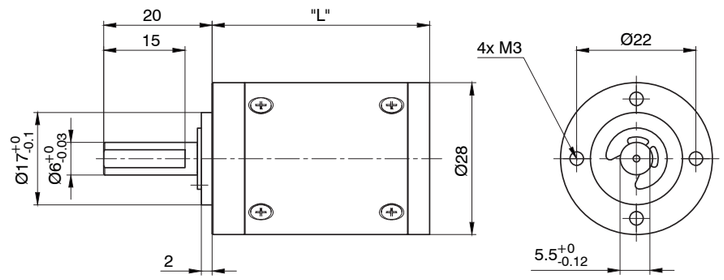
Type	Reduction Ratio	Output Torque Nominal Nm	Output Torque Max. Value Nm	Efficiency %	Backlash	Length „L“ mm	Weight kg
GPLL28-3,7	3.7	0.3	1	90	≤ 3°	31	0.077
GPLL28-14	14	1.2	3.5	81	≤ 3°	40.1	0.096
GPLL28-51	51	2.5	7.5	73	≤ 3°	120	0.12
GPLL41-4,44	4.44	2,0	6	90	≤ 3°	39	0.25
GPLL41-17	17	8	25	81	≤ 3°	49.5	0.32
GPLL41-65	65	16	50	73	≤ 3°	59.9	0.38
GPLL59-4	4	4	12	90	≤ 3°	46.6	0.6
GPLL59-15	15	16	50	81	≤ 3°	63.1	0.9
GPLL59-55	55	32	100	73	≤ 3°	82.6	1.23

GPLL-HT

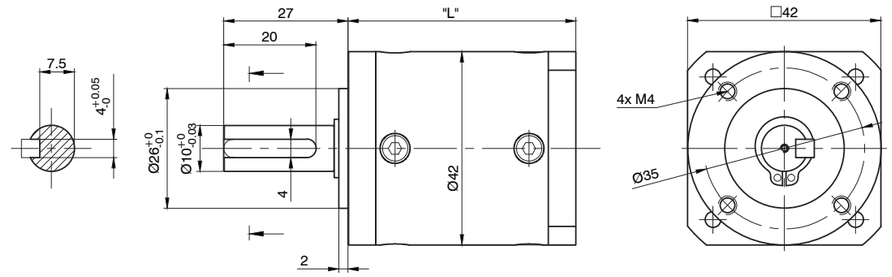
High-Torque Economy Planetary Gears

DIMENSIONS (IN MM)

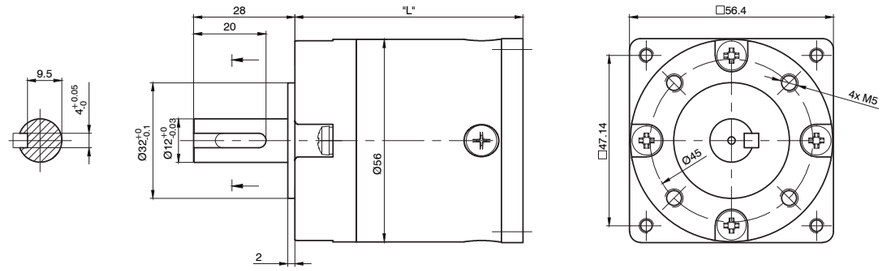
GPLL28



GPLL41



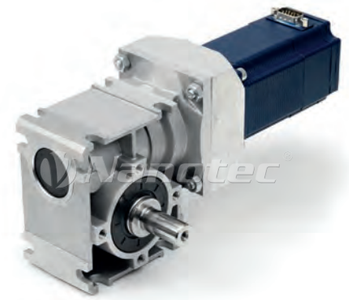
GPLL59



OPTIONS

GSGE60

Worm Gears



DESCRIPTION

Worm gears of the GSGE60 series can be mounted on any stepper motor size 56 x 56 mm (NEMA 23) and on stepper motors of the ST6018 series. They are pre-lubricated at the factory with a high-quality synthetic long-life lubricant and are maintenance free.

Because of their high backlash (appr. 1-2 °), worm gears are not suitable for positioning applications.

ACCESSORIES

Double Shaft	for GSGE60
Cover	for GSGE60

CAUTION

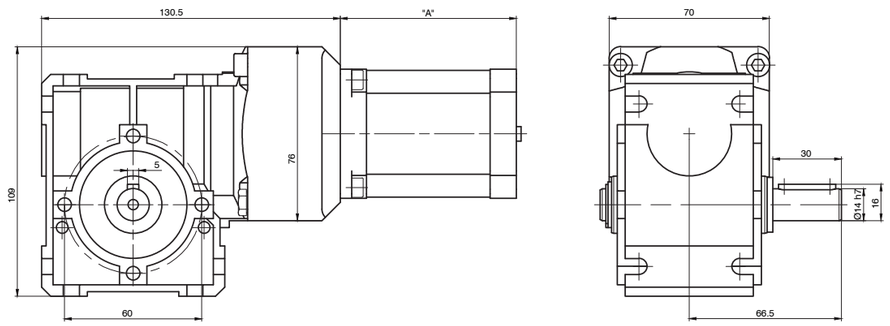
Please note that the GSGE60 gears are only available together with a motor.

VERSIONS

Type	Reduction Ratio	Output Torque Nominal Nm	Efficiency %	Backlash ´ (arc minutes)	Weight kg	Self-Locking Torque	Motor combination with
GSGE60-5-1	5	30	86	<120	2	No	Nema 23
GSGE60-15-1	15	30	71	<120	2	No	Nema 23
GSGE60-25-1	25	30	63	<120	2	No	Nema 23
GSGE60-50-1	50	30	45	<120	2	Yes	Nema 23

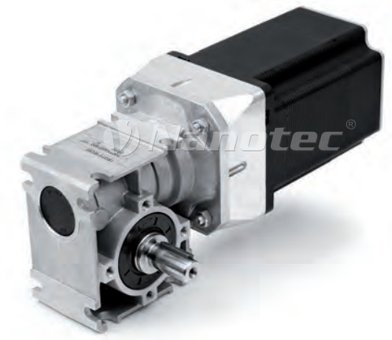
DIMENSIONS (IN MM)

GSGE60



GSGE80

Worm Gears



DESCRIPTION

The worm gears of the GSGE80 series can be mounted on any stepper motor size 86x86 mm (NEMA 34). They are pre-lubricated at the factory with a high-quality synthetic long-life lubricant and are maintenance free.

Because of their high backlash (appr. 1-2 °), worm gears are not suitable for positioning applications.

CAUTION

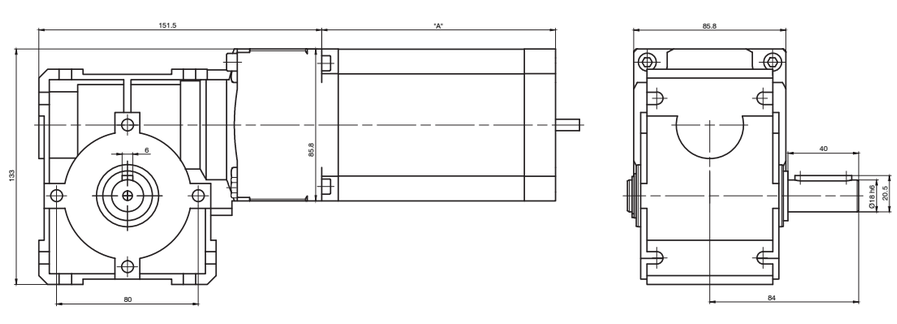
Please note that the GSGE80 gears are only available together with a motor.

VERSIONS

Type	Reduction Ratio	Output Torque Nominal Nm	Efficiency %	Backlash ´ (arc minutes)	Weight kg	Self-Locking Torque	Motor combination with
GSGE80-12.5-1	12.5	50	80	<120	3	No	Nema 34
GSGE80-25-1	25	50	68	<120	3	No	Nema 34
GSGE80-50-1	50	50	50	<120	3	Yes	Nema 34

DIMENSIONS (IN MM)

GSGE80



BL
Brake

CAUTION

Please use the brake only as a safety brake! The brakes must be mounted by Nanotec.

TECHNICAL DATA

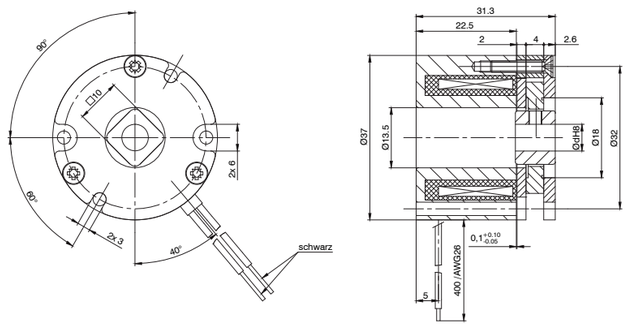
Electrical data	24 VDC/5 W
On/Off switching time	11 ms/17 ms
Hub	Borehole Ø5 H8 with 2 grub screws M3
Fastener	With 3 screws M2.5
Connection	Leads L=400 mm

VERSIONS

Type	Supply Voltage V	Holding Torque Ncm	Shaft Diameter mm	Moment of Inertia kg mm²	Size mm	Weight kg
BRAKE-BL-0,24-5,0	24	24	5	1	37	0.1

DIMENSIONS (IN MM)

BL-0.24-5.0



BW
Brake

CAUTION

Please use the brake only as a safety brake! The brakes must be mounted by Nanotec.

TECHNICAL DATA

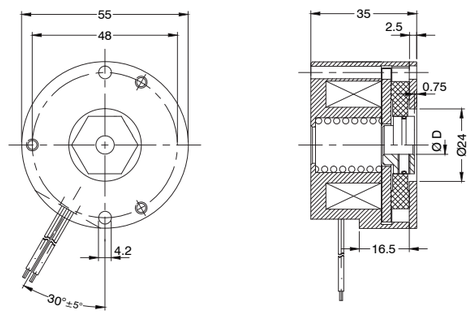
Electrical Data	24 VDC/10 W
On/Off switching time	35 ms/25 ms
Hub	Borehole Ø6.35 H7 with 2x setscrews M4x4 DIN916
Fastener	With 2 stud screws M3 or M4
Connection	Leads L = 400 mm

VERSIONS

Type	Supply Voltage V	Holding Torque Ncm	Shaft Diameter mm	Moment of Inertia kg mm²	Size mm	Weight kg
BRAKE-BW-1,4-KAGF	24	140	6.35	10	55	0.5

DIMENSIONS (IN MM)

BW-1.4



OPTIONS

BKE

Brake

CAUTION

Please use the brake only as a safety brake! The brakes must be mounted by Nanotec.

TECHNICAL DATA

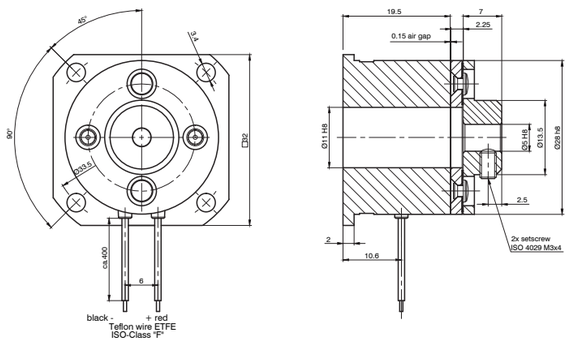
	BRAKE-BKE-0,4-5,0	BRAKE-BKE-1,0-6,35	BRAKE-BKE-2,0-6,35
Electrical data	24 VDC/8 W	24 VDC/10 W	24 VDC/11 W
On/Off switching time	10 ms/6 ms	12 ms/6 ms	25 ms / 6 ms
Hub	Borehole Ø5 H8 with 2 grub screws AM3x4	Borehole Ø6.35 H8 with 2 grub screws AM3x4	Borehole Ø6.35 H8 with 2 grub screws AM4x6
Fastener	With 4 M3 screws	With 4 M3 screws	With 4 M3 screws
Connection	Leads L=400 mm	Leads L=400 mm	Leads L=400 mm

VERSIONS

Type	Supply Voltage V	Holding Torque Ncm	Shaft Diameter mm	Moment of Inertia kg mm²	Size mm	Weight kg
Brake-BKE-0,4-5,0	24	40	5	1.3	32	0.08
Brake-BKE-1,0-6,35	24	100	6.35	2.1	34	0.11
Brake-BKE-2,0-6,35	24	200	6.35	6,7	42	0.185

DIMENSIONS (IN MM)

BKE-0.4-5.0

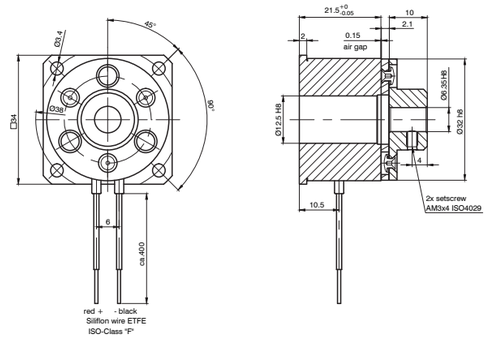


BKE

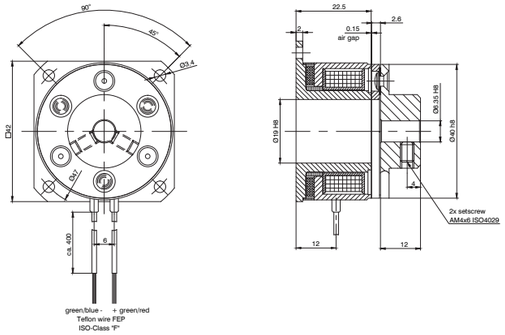
Brake

DIMENSIONS (IN MM)

BKE-1.0-6.35



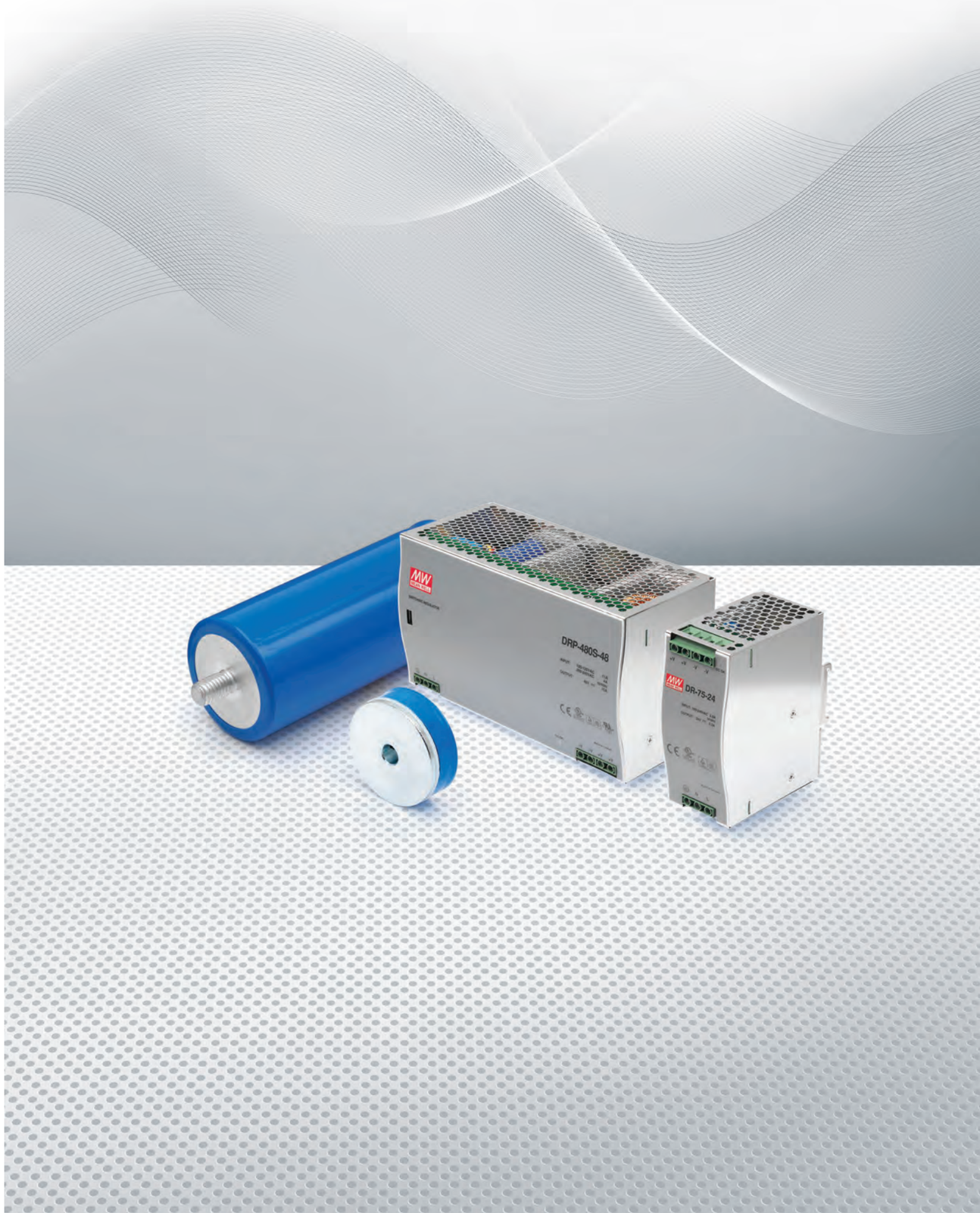
BKE-2.0-6.35



OPTIONS

Notes

ACCESSORIES



Threaded Screw

for Linear Actuators

ORDER IDENTIFIER

ZST6-1-

200-1 = Screw length 200 mm

with standard finishing

TECHNICAL DATA

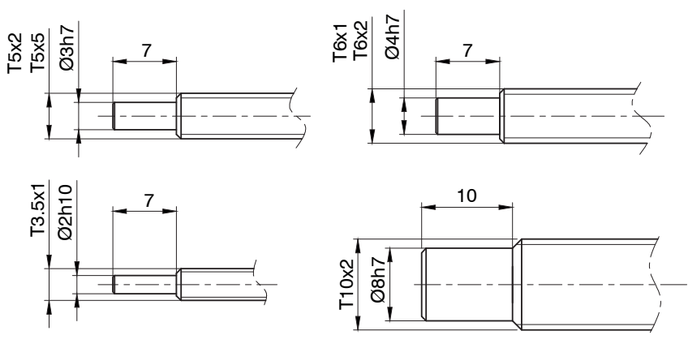
Screw material	Material no: 1.4021 = stainless (not resistant to acid and salt water), all lead screws except T6x2 (1.4404)
Tensile strength	760 N/mm²
Thread pitch delay mm/on section	± 0.1/300 mm

VERSIONS

Type	Pitch mm	Ø Exterior mm	Ø Core mm	Corresponding Motors	Max. Axial Play mm	Available Screw Lengths mm
ZST3.5-1	1	3.5	2.3	L.....-T3.5x1	±0.06	200,500
ZST6-1	1	6	4.7	L.....-T6x1	±0.05	200, 300, 1050
ZST6-2	2	6	4.7	L.....-T6x2	±0.05	200, 300, 1500
ZST5-5	5	5.4	3.6	L.....-T5x5	±0.1	200, 300, 1050
ZST10-2	2	9.7	8.2	L.....-T10x2	±0.07	200, 300, 1050
ZSM6-1	1	6	5	L.....-M6x1	±0.08	200, 300, 1000

DIMENSIONS (IN MM)

ZST



Notes

Threaded Nut

for Linear Actuators

ORDER IDENTIFIER

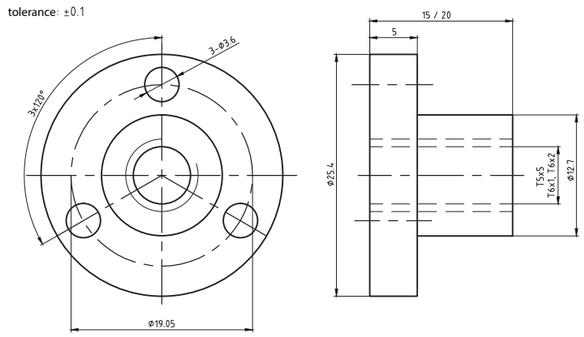
LSNUT_T3.5x1

VERSIONS

Type	Corresponding Motors
LSNUT_T3.5x1	L.....-T3.5x1
LSNUT-T5x5-F	L.....-T5x5
LSNUT-T6x1-F	L.....-T6x1
LSNUT-T6x2-F	L.....-T6x2
LSNUT-T10X2-F	L.....-T10x2

DIMENSIONS (IN MM)

LSNUT

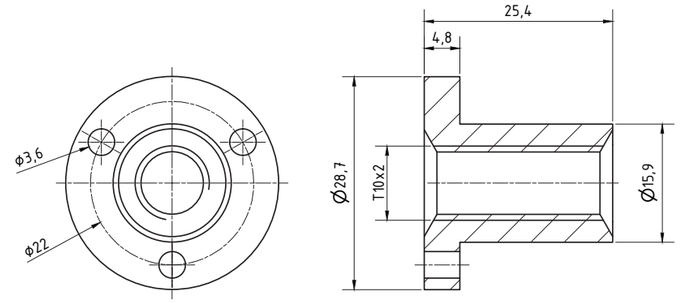


Threaded Nut

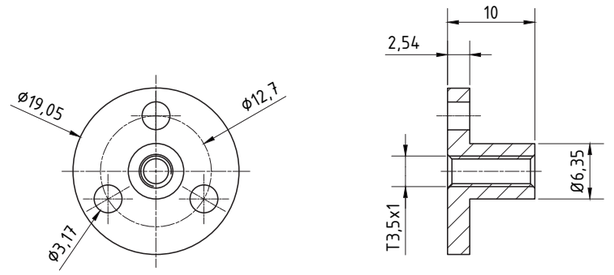
for Linear Actuators

DIMENSIONS (IN MM)

LSNUT-T10x2



LSNUT-T3.5x1



Switch-Mode Power Supply

DIN Rail

TECHNICAL DATA

Input voltage	180 VAC to 264 VAC
Output voltage	24 V, 48 V
Safety	Soft start
Protective circuit	Overload/overvoltage protection, over-bridging loss of power 20 ms below full load, short-circuit proof
Temperature range	- 10 °C to +50 °C (up to +70 °C at 60 % load)
Approvals	CE/UL/TÜV
Efficiency	86 %
Type of connection	Screw clamps
Fastening type	DIN carrying rail

VERSIONS

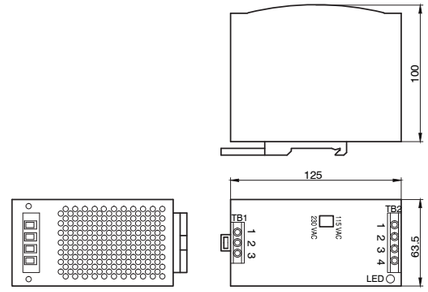
Type	Input Voltage V	Output Voltage V	Output current A	Power Output W	Weight kg
NTS-12V-3,5A	85...264VAC 120...370VDC	12	3.5	42	0.31
NTS-24V-2A	85...264VAC 120...370VDC	24	2	48	0.31
NTS-24V-3,2A	85...264VAC 120...370VDC	24	3.2	76.8	0.6
NTS-24V-5A	88...132/176...264VAC 248...370VDC	24	5	120	0.79
NTS-24V-10A	85...264VAC 120...370VDC	24	10	240	1.2
NTS-24V-20A	180...264	24	20	480	2.4
NTS-24V-40A	340...550VAC 3ph.	24	40	960	3.3
NTS-48V-2,5A	88...132/176...264VAC 248...370VDC	48	2.5	120	0.79
NTS-48V-5A	85...264VAC 120...370VDC	48	5	240	1.2
NTS-48V-10A	180...264 VAC 250...370 VAC	48	10	480	2.4
NTS-48V-20A	340...550VAC 3ph.	48	20	960	3.3

Switch-Mode Power Supply

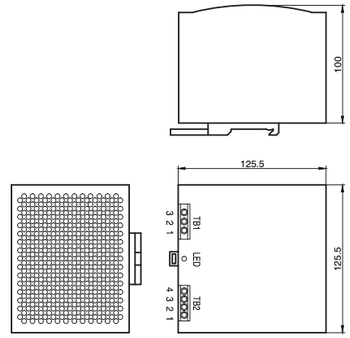
DIN Rail

DIMENSIONS (IN MM)

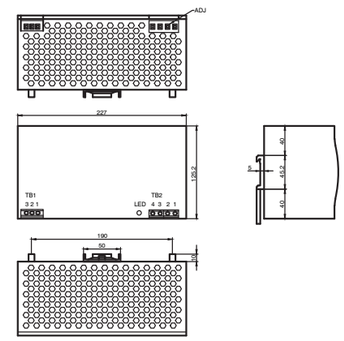
NTS-24V-5A



NTS-48V-5A



NTS-48V-10A



ACCESSORIES

Cable Set

Connection Cable

VERSIONS

Type	Suitable for	Cable Length
ZK-GHR3-500-S	CL3-E	0.5
ZK-GHR10-500-S-GHR	CL3-E	0.5
ZK-GHR12-500-S	CL3-E	0.5
ZK-GHR13-500-S-GHR	CL3-E	0.5
ZK-JST-EHR-6-0.5M-S	SC4118 Series	0.5
ZK-JST-EHR-6-2M-S	SC4118 Series	2
ZK-JST-PHR-6-0.3M	DF45	3
ZK-JST-VHR-5N-0.3M	DF45	3
ZK-JST-VHR-6N-0.5M-S	SC6018 Series	0.5
ZK-JST-VHR-6N-2M-S	SC6018 Series	2
ZK-MICROUSB	PD4-C	1.5
ZK-PD4N	PD4-N	0.5
ZK-PD2N	PD2-N4118L1804-3	-
ZK-PD2N-3	PD2-N4118L1804-3	-
ZK-PD4-C-CAN-4-500-S	PD4-C-CAN	0.5
ZK-SMC11	Cable Set for SMC11	0.3
ZK-SMCI12	SMCI12/PD2-O	-
ZK-SMCI12-3	Cable Set for SMCI12 with CANopen	0.15
ZK-SMCI12-IO	SMCI12/PD2-O (I/O and Power Only, Without D-SUB)	0.3
ZK-USB	Cable Set for SMCI33-1	1.5
ZK-XHP-4-300	SMCI12	0.3
ZK-XHP2-500-S	CL3-E	0.5
ZK-ZHR5-90	SMCI35/SMCI 36 (ENC + HALL Connection Cable)	0.09
ZK-ZHR6-500	SMCI35/SMCI36 (IO Cable)	0.5

Encoder Cable

VERSIONS

Type	Description	Cable Length	IP Protection	Cable Type
ZK-NME1-13-500-S	Cable for NME1 Encoder	0.5	Shielded	Free Cable Ends
ZK-NOE-10-500-S-PADP	Cable for NOE1/NOE2	0.5	Shielded	Adaptercable
ZK-NOE1-10-2000-S	Cable for NOE1/NOE2	2	Shielded	Free Cable Ends
ZK-NOE1-10-500-S	Cable for NOE1/NOE2	0.5	Shielded	Free Cable Ends
ZK-PADP-12-500-S	Cable for Controller	0.5	Shielded	Flying Leads
ZK-SMCI-LD	Encoder with Line Driver for SMCI33/47 (5 V)	0.175	Unshielded	Line Driver Converter
ZK-SMCI35-LD	Encoder with Line Driver for SMCI35/36	0.175	Unshielded	Line Driver Converter
ZK-WEDL-8-1000-S	Cable for WEDL5541	1	Shielded	Free Cable Ends
ZK-WEDL-8-2000-S	Cable for WEDL5541	2	Shielded	Free Cable Ends
ZK-WEDL-8-500	Flat-band Cable WEDL5541	0.5	Unshielded	Free Cable Ends
ZK-WEDL-8-500-S	Cable for WEDL5541	0.5	Shielded	Free Cable Ends
ZK-WEDS-300-S-SMCI35	Cable for WEDS5541	0.3	Shielded	ZHR5 Connector
ZK-WEDS-5-150-S	Cable for WEDS5541	0.15	Shielded	Free Cable Ends
ZK-WEDS-5-500	Flat-band Cable for WEDS5541	0.5	Unshielded	Free Cable Ends
ZK-WEDS-5-500-S	Cable for WEDS5541	0.5	Shielded	Free Cable Ends

M8 Cable

VERSIONS

Type	Number of Poles	Cable Length	Plug Type	IP Protection
ZK-M8-3-2M-1-PUR-S	3	2	Straight	Shielded
ZK-M8-3-5M-1-PUR-S	3	5	Straight	Shielded

M12 Cable

VERSIONS

Type	Suitable for	Number of Poles	Cable Length	Plug Type
ZK-M12-12-2M-1-PUR-S	ASB42	12	2	Straight
ZK-M12-12-5M-1-PUR-S	ASB42	12	5	Straight
ZK-M12-12-2M-2-PUR-S	ASB42	12	2	Angled
ZK-M12-12-5M-2-PUR-S	ASB42	12	5	Angled
ZK-M12-17-1M-2-S-FIN	PD2-N4118-IP	17	1.5	Angled
ZK-M12-8-2M-1-PUR-S	AS Motors with Encoder	8	2	Straight
ZK-M12-8-5M-1-PUR-S	AS Motors with Encoder	8	5	Straight
ZK-M12-8-2M-2-PUR-S	AS Motors with Encoder	8	2	Angled
ZK-M12-8-2M-2-PADP	ASB Motors to Controller	8	5	Angled
ZK-M12-8-5M-2-PUR-S	AS Motors with Encoder	8	5	Angled
ZK-M12-5-2M-1-PUR-S	AS Motors, PD2 IP and PD4 IP	5	2	Straight
ZK-M12-5-5M-1-PUR-S	AS Motors, PD2 IP and PD4 IP	5	5	Straight
ZK-M12-5-2M-2-PUR-S	AS Motors, PD2 IP and PD4 IP	5	2	Angled
ZK-M12-5-5M-2-PUR-S	AS Motors, PD2 IP and PD4 IP	5	5	Angled
ZK-M12-12-2M-2-PADP	AS Motors to Controller	12	2	Angled
ZK-M12-17-1M-2-PUR-S	PD2-IP and PD4-IP	17	1.5	Angled
ZK-M12-17-3M-2-PUR-S	PD2-IP and PD4-IP	17	3	Angled

M16 Cable (TW Cable)

VERSIONS

Type	Suitable for	Number of Poles	Cable Length	Cable Type
ZK-TW-3-2M	PD6-N8918...-S	3	2	Motor Cable
ZK-TW-3-5M	PD6-N8918...-S	3	5	Motor Cable
ZK-TW-3-10M	PD6-N8918...-S	3	10	Motor Cable
ZK-TW-3-2M-2	PD6-N8918...-S	3	2	Motor Cable
ZK-TW-3-5M-2	PD6-N8918...-S	3	5	Motor Cable
ZK-TW-3-10M-2	PD6-N8918...-S	3	10	Motor Cable
ZK-TW-7-2M	AS8918	7	2	Motor Cable
ZK-TW-18-2M	PD6-N8918...-S	18	2	Signal Cable
ZK-TW-18-5M	PD6-N8918...-S	18	5	Signal Cable
ZK-TW-18-10M	PD6-N8918...-S	18	10	Signal Cable
ZK-TW-18-2M-2	PD6-N8918...-S	18	2	Signal Cable
ZK-TW-18-5M-2	PD6-N8918...-S	18	5	Signal Cable
ZK-TW-18-10M-2	PD6-N8918...-S	18	10	Signal Cable
ZK-TW-4-2M	ASB42	7	2	Motor Cable

Extension Cable

Cable for XHP Plug

VERSIONS

Type	Number of Poles	Cable Length	Cable Type
ZK-JST-VL-4	4	2	for JST XHP-4 Connector
ZK-JST-VL-6	6	2	for JST XHP-6 Connector

Electronic Component

DESCRIPTION

The Nano brake module (PWM controller) not only reduces power and heat loss by 35%, but also extends motor life and activation times.

With the additional **ZIB-PD6-N** board, wiring Plug & Drive PD6-N motors is no longer a time-consuming task. Test board **ZIB2** can be used to quickly and easily commission Nanotec motor controllers and Plug & Drives. Additional LEDs and buttons serve to test and monitor the functions of the digital inputs and outputs. As well, signals can be conducted directly to external sensors and actuators via the connecting terminal. The board is not intended for permanent installation in machines.

VERSIONS

Type	Type	Max. Operating Voltage V	Dimensions
EB-Brake	PWM Controller for Brakes	24	25.4 x 12.5 mm
ZIB-PDx-N	Add-on Board for PD6-N Motors	24 - 48	45 x 110 mm
ZIB2-PDx-N	Interface Board Plug&Drive and SMCI Controller	24 - 48	100 x 130 mm

Connector

VERSIONS

Type	Description
ZCJST-XHP	Connector socket housing
ZCJST-SXH	Contacts for connector socket housing
ZCJST-XHP	Insulation displacement connection technology, connector for AWG24
ZC2	Pin connector for print installation RM 2.54 mm
ZCPHOFK-MC0,5	COMBICON connector socket housing
ZCPHOFKC-2,5HC	COMBICON HC connector socket housing

ORDER IDENTIFIER

ZCJST-XHP-
2 = 2 Pin configuration
3 = 3 Pin configuration
4 = 4 Pin configuration
5 = 5 Pin configuration
6 = 6 Pin configuration
8 = 8 Pin configuration

CAUTION

For mounting the connector, please use a crimping tool, e.g. JST WC-110.

Charging Capacitor

for SMC and PDx-I

VERSIONS

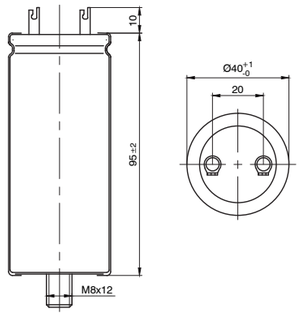
Type	Capacity µF	Max. Operating Voltage V	Temperature Range °C	Capacitance Tolerance	Grid Dimensions mm	Dimensions
Z-K4700/50	4700	50	-40 to +85	± 20%	10	Cylindrical aluminum cup, Ø 25 mm, 35 mm length
Z-K10000/100	10000	100	-40 to +105	-10% ~ 30%	20	Cylindrical aluminum cup, Ø 40 mm, 95 mm length

ORDER IDENTIFIER

Z-K4700/50

DIMENSIONS (IN MM)

Z-K10000-100

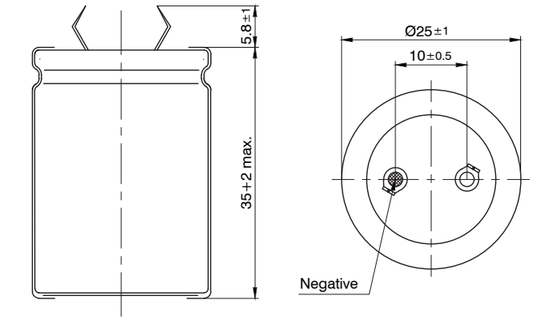


Charging Capacitor

for SMC and PDx-I

DIMENSIONS (IN MM)

Z-K4700-50



Damper
for B-Shaft

ORDER IDENTIFIER

ZD-D28

DESCRIPTION

The dampers D40, D56 and D56m from Nanotec can be installed on all stepper motors with a double shaft (size 40 – 58mm). Alongside the improved settling time, system resonances are suppressed, and vibrations and motor noises at lower speeds are greatly reduced.

In case of device-specific resonance and noise problems, device setup is made considerably easier by mounting a damper.

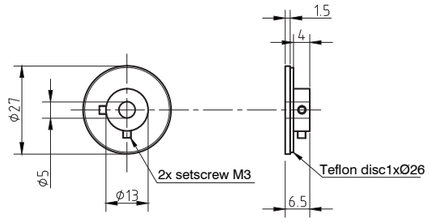
VERSIONS

Type	Corresponding Motors	Shaft Diameter mm	Weight kg
ZD-D28	ST28, ST35	5	0.026
ZD-D40	ST41, ST42	5	0.04
ZD-D56	ST59	6.35	0.1

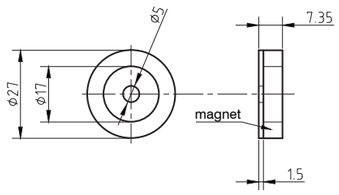
DIMENSIONS (IN MM)

ZD-D28

Part 1



Part 2 (magnet)

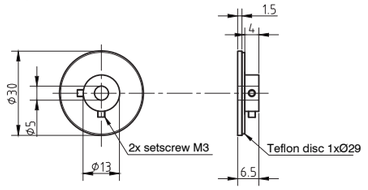


Damper
for B-Shaft

DIMENSIONS (IN MM)

ZD-D40

Part 1



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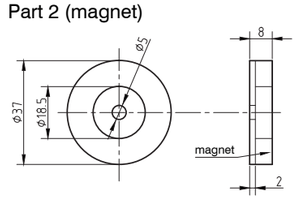
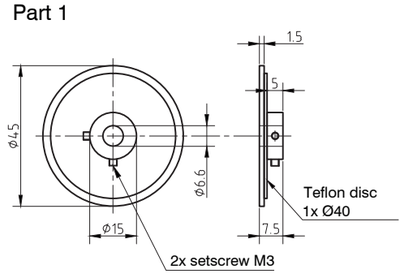


ZD-D56

Part 1



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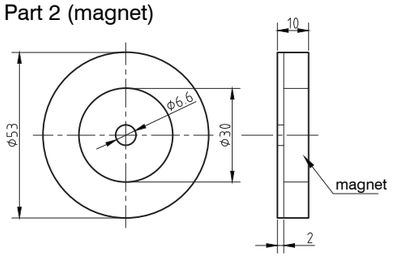


ACCESSORIES

Damper

for Mounting Flange

ORDER IDENTIFIER

ZD-DF40

DESCRIPTION

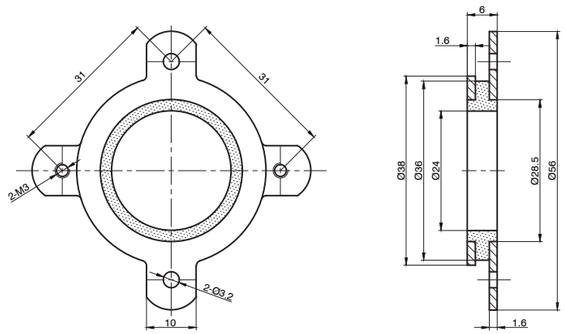
The vulcanized rubber between the two flange rings in ZD-... dampers serves first and foremost to suppress rigid-body sound. Depending on the frequency, sound can be reduced by 3–10 dB(A). The ZD-… damper cost-effectively attenuates noise due to the different sound speeds of steel/air/rubber (5000/331/50 m/s) and its damping oscillation tendency.

VERSIONS

Type	Corresponding Motors
ZD-DF40	ST41, ST42
ZD-DF56	ST59

DIMENSIONS (IN MM)

ZD-DF40

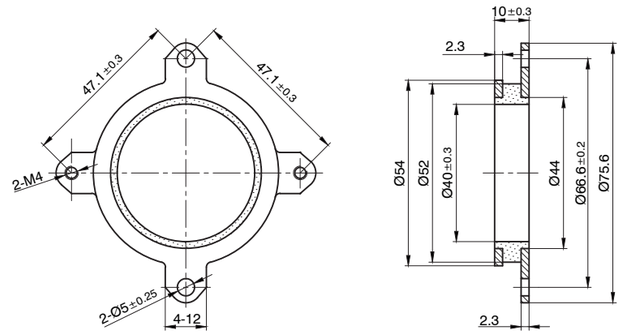


Damper

for Mounting Flange

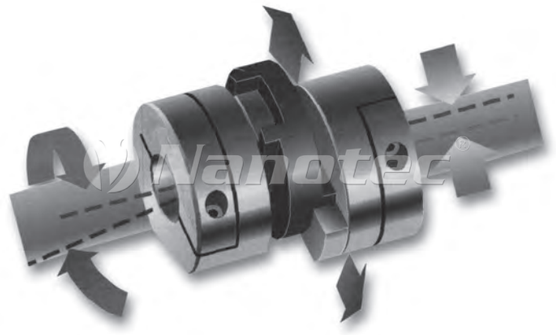
DIMENSIONS (IN MM)

ZD-DF56



Shaft Coupling

for Stepper and BLDC Motors



TECHNICAL DATA

Temperature range	-20 to +60 °C
Materials	Hub of aluminum alloy 2011T3 and 2011T8 BS4300/5FC1
Transmission disc	Nylon 11 (colorless)
Tapped blind hole	Length of the parallel borehole ±0.2. Boreholes end with 118 ° bevel
Operating factors	See data sheet

ORDER IDENTIFIER

ZW-235-19-20

(with a min. order of 50 pcs, custom specific boreholes are possible!)

CAUTION

The couplings from Nanotec are also available without hub hole for installation by the customer. Always order two couplings and one transmission disc.

VERSIONS

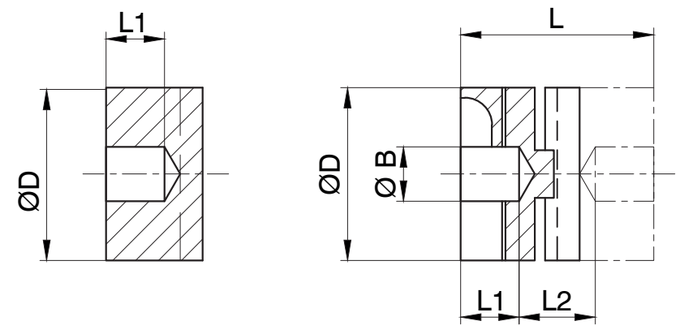
Type	Description
ZW-234-19-20	Shaft Coupling
ZW-234-19-0	Transmission Disc
ZW-234-25-24	Shaft Coupling
ZW-234-25-0	Transmission Disc
ZW-234-41-38	Shaft Coupling
ZW-234-41-0	Transmission Disc

Shaft Coupling

for Stepper and BLDC Motors

DIMENSIONS (IN MM)

Shaft Coupling



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