Bühler Motor

>>> fast forward solutions

Product Range

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Contents.

HEALTH CARE

AUTO MOTIVE

GREEN TECH

GENERAL INDUSTRIES

» When reliability is crucial,
your decision to use Buehler Motor,
might be one of the best investments
you have ever made. «

swift flexible
cooperative personal
authentic

» As an independent family owned business we do more than just pay attention to short-term shareholder value. Natural growth and the willingness to pass the company heritage on to the next generation go hand in hand with wise usage of resources and being environmentally responsible.

It's therefore no surprise that Buehler Motor today is at the forefront of new developments in drive solutions that save energy and reduce emissions. Greentech for Buehler is an all-encompassing passion. «

Peter Muhr, President of Bühler Motor GmbH

› forward

›› fast forward

››› Bühler fast forward solutions

»The development of mission critical devices is our core business. That's why market leaders of every industry rely on us.«

»All of our development projects over the last three years have met every key timing and quality milestone.«




Driving solutions.

Be it the next generation infusion pumps, intelligent devices for the realignment of solar panels, the thermal management of batteries in hybrid and electric vehicles or air inflow in energy efficient housing: Buehler Motor is your number one source for demanding mechatronic drive solutions.

The expertise of our customer-specific drive solutions goes into all of the drives in our standard program as well. Buehler Motor is the right partner to provide not only outstanding quality but also highly cost-efficient products.

»In fact, we have never met an engineering challenge we didn't like.«

Accountable.

Buehler Motor is determined to remain an independent family owned business: flexible, swift, personal, cooperative, and authentic.

Flat, multidimensional hierarchies support fast interdisciplinary actions. The company's global footprint allows Buehler to act swiftly according to customers' ever changing needs.

Long term partnerships with market leaders in a wide variety of industries emphasize Buehler's ongoing commitment to continuous improvement and quality.

»Unique to the industry, we do both, the design and the manufacturing.«

And competent.

With engineering, project execution, prototyping, testing and industrialization capabilities Buehler Motor serves its clients as a strong development partner.

Every tenth employee at Buehler Motor works in research and development. In-house sample shops and design engineering, combined with state-of-the-art test labs, enable Buehler to concentrate completely on quick and flexible development of customer-specific drive solutions.

>>> fast forward solutions

» Our clients know: Even when the going get's rough, we stand solid as a rock.«

»However demanding the circumstances might become, we are always determined to deliver.«

» Wherever our engineers are in action, they always stick to our core values of "German Engineering".«

HEALTH CARE

AUTO MOTIVE

GREEN TECH

GENERAL INDUSTRIES

swift

cooperative

authentic

flexible

personal

Driving power.

- 8 sites on 3 continents
- Germany, United Kingdom, USA, Mexico, Czech Republic, and the People's Republic of China
- 1,200+ qualified employees worldwide
- More than 22 million units shipped per year
- Quality management certification under ISO TS 16949:2002
- Environmental certification under DIN EN ISO 14001:2004

Driving solutions.

- Permanent magnet brushed DC motors
- Permanent magnet brushless (BLDC) motors
- Planetary, spur and worm gear motors
- Pumps
- Actuators
- Motion systems
- Complete drive assembly and electronics package
- Incorporation of client's surrounding motion components to ease assembly
- Standard catalog offerings
- Standard modified projects
- Custom development

► Nuremberg | Germany

► Monheim | Germany

► Hradec Králové | Czech Republic

> forward

» fast forward

»» Bühler fast forward solutions

GENERAL INDUSTRIES

- Industrial automation
- Building automation
- Vending machines
- Paper Handling
- Office equipment
- Aircraft seat actuators

GREEN TECH

- Renewables
  e.g. Alignment of solar panels
- CO2-Reduction
  e.g. cooling of batteries for hybrid and electric vehicles
  Maintaining oil pressure in stop/start automatic transmissions
  Building shades
  Controlling air inflow in energy efficient housing

Driving green**tech**.

80 – 90% of the complete product life-cycle (material, production, energy and disposal) are determined in the design phase.
Buehler Motor's specially designed environmental protection program for research and development guarantees focus on the environment as a right from the start.

- Constant use of finite element (FE)-simulations for minimized material use and weight
- FE-simulation eliminates the need for cost- and time-intensive prototype testing
- Maximum efficiency with innovative technologies such as segmented stators

Buehler Motor focuses consistently on an integrated three-pronged strategy to improve its environmental responsiveness: Greentech production of custom-made greentech drive solutions to support the reduction of our carbon footprint in many different greentech applications.


► Andover | Great Britain


► Morrisville, N.C | USA


► Chihuahua | Mexico


► Zhuhai | PR China

>>> fast forward solutions

HEALTH CARE

- **Near patient devices**
  Glucose monitoring products
  Thermometry products
  Drug delivery pumps
- **Fluid/air movement**
  Infusion pumps
  Respiratory therapy
- **Lab, testing & pharmaceuticals**
  Test equipment
  Vital signs equipment
  Lab diagnostic machines
  Pharmaceutical dispensing

AUTO MOTIVE

- **Powertrain**
  e.g. Shift- and clutch actuators
- **Under the hood**
  e.g. BLDC water pumps
- **Interior**
  e.g. actuators for seats and rear blinds
- **Car body**
  e.g. power closure systems

HEALTH CARE

AUTO MOTIVE

GREEN TECH

GENERAL INDUSTRIES

swift flexible
cooperative personal
authentic

Driving processes.

At Buehler development expertise is combined with process competence and large-scale production experience. As a supplier of drive solutions, Buehler Motor is accustomed to combining the most stringent quality requirements with consistent cost consciousness.

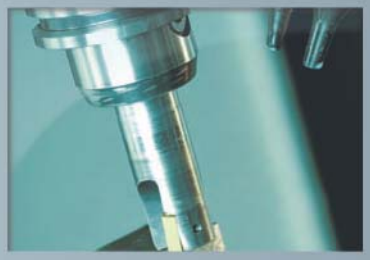
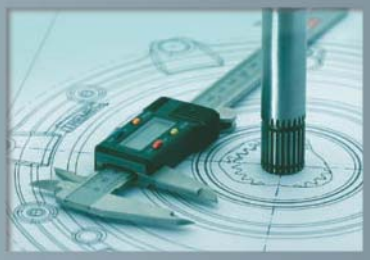
Our sales staff will help you define a motor or gear motor that meets your exact need. Our engineers will determine the feasibility and cost of your project. You will receive a proposal to meet your requirement from us very quickly.

Driving flexibility.

Bühler small-lot production means maximum flexibility. Proven Buehler Designs may be widely modified realizing winding changes, different shafts, alternative brushes, different gear ratios and even gear material.

All these changes may be combined with a nearly endless number of accessory parts such as Hall sensors, encoders, sheetmetal parts, gears, pulleys, flexible leads, connectors, machined and molded parts, adapters and brackets.

- Small-lot production, ranging from 50 to 5000 units
- Expertise as a supplier of drive solutions
- Quality standards of a large-scale manufacturer

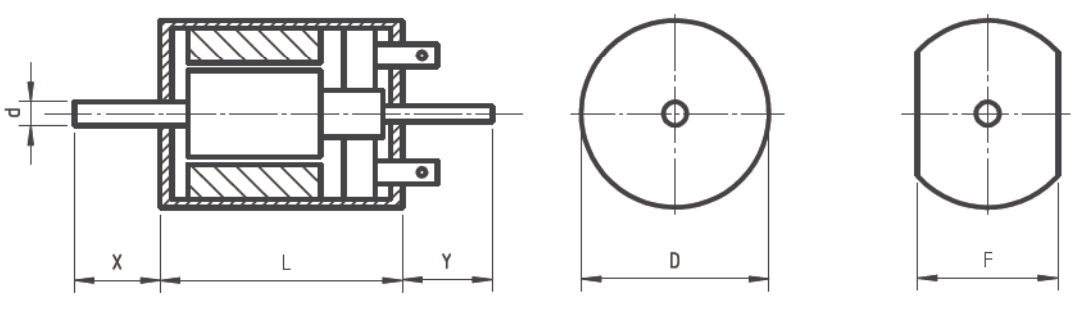

+ Molded parts
+ Sheetmetal parts
+ Special perfomance
+ Connectors
+ Hall sensors
+ Adaptors
Bühler
small-lot
production
+ Flexible leads
+ Pulleys
+ Encoders
+ Customized interface
+ Brakes
+ Pinions and gears
+ Brackets
+ Machined parts

We have the motor to fit your needs.

STOCK SERVICE Motors

STOCK SERVICE motors can be purchased in small quantities (subject to availability)

Part number	Voltage	Power	Rated value			Dimensions			Shaft Ø	Page
	V DC	W	Torque	Current	Speed	D	F	L	d	
			mNm	A	rpm	mm	mm	mm	mm	
1.16.011.532	12	2.1	4.0	0.35	5000	23.5	18.0	30.0	2.0	12
1.16.011.179	12	3.6	5.0	0.59	6850	23.5	18.0	30.0	2.0	12
1.16.011.304	12	3.8	4.5	0.65	8000	23.5	18.0	30.0	2.0	12
1.13.078.011	12	4.3	10	0.63	4060	23.0	-	48.0	2.0	14
1.13.021.701	12	2.8	10	0.45	2650	31.0	-	42.0	2.5	16
1.13.021.343	12	6.3	20	0.90	3000	31.0	-	51.0	2.5	16
1.13.021.605	12	10	32	1.20	3000	31.0	-	75.5	3.0	16
1.13.055.220	12	13	40	2.00	3100	35.0	-	60.0	4.0	18
1.13.046.403	12	19	60	2.40	3000	40.0	-	78.0	4.0	20
1.13.044.235	12	47	150	6.20	3000	51.6	-	88.6	6.0	22
1.13.044.413	12	56	180	7.30	3000	51.6	-	103.6	6.0	22
1.13.054.304	12	77	250	9.30	3000	54.0	-	94.0	6.0	24
1.13.063.220	12	115	350	15.0	3150	63.5	-	103.0	8.0	26
1.13.063.407	12	150	400	17.0	3400	63.5	-	126.0	8.0	26
1.16.011.545	24	1.9	4.0	0.18	4600	23.5	18.0	30.0	2.0	12
1.16.011.200	24	3.6	5.0	0.30	6850	23.5	18.0	30.0	2.0	12
1.13.078.012	24	4.3	10	0.32	4100	23.0	-	48.0	2.0	14
1.13.021.344	24	6.3	20	0.50	3000	31.0	-	51.0	2.5	16
1.13.021.318	24	8.8	21	0.54	4000	31.0	-	51.0	2.5	16
1.13.021.606	24	10	32	0.60	3000	31.0	-	75.5	3.0	16
1.13.055.221	24	13	40	1.00	3000	35.0	-	60.0	4.0	18
1.13.046.404	24	19	60	1.20	3000	40.0	-	78.0	4.0	20
1.13.044.236	24	47	150	3.10	3000	51.6	-	88.6	6.0	22
1.13.044.414	24	56	180	3.50	3000	51.6	-	103.6	6.0	22
1.13.054.305	24	77	250	4.70	3000	54.0	-	94.0	6.0	24
1.13.063.221	24	115	350	7.50	3150	63.5	-	103.0	8.0	26
1.13.063.408	24	150	400	8.5	3400	63.5	-	126.0	8.0	26
1.13.075.016	24	130	400	8.0	3200	76.0	-	102.5	8.0	28
1.13.075.214	24	200	600	12.0	3200	76.0	-	102.5	8.0	28
1.25.037.403	24	95	200	5.3	4500	39	-	100	6.0	30



Standard Motors

Standard motors, subject to minimum order quantities, not kept in stock											
More detailed information on request.											
Type	Voltage range	max. Output power	max. No load speed	No. of commutator segments	Encoder Option	Motor type	Overall lengths			Ø	Page
	V DC	W	rpm					mm		mm	
1.16.011	1.5 - 24	3	18000	3 / 5	-	DC			30.0	18 / 24	12
1.13.078	1.5 - 24	5	16000	3	X	DC			48.0	22.8	14
1.13.021	3 - 30	10	12000	7	X	DC	42.0	51.0	75.5	31.0	16
1.13.055	6 - 42	16	12000	5 / 8	X	DC	51.0	60.0	76.0	35.0	18
1.13.046	6 - 42	29	8000	7	X	DC	47.3	56.5	78.0	40.0	20
1.13.044	9 - 42	85	7000	12	X	DC	73.6	88.6	103.6	51.6	22
1.13.054	9 - 42	110	7000	12	X	DC	81.0	94.0	102.0	54.0	24
1.13.063	9 - 42	150	7000	12	X	DC	94.0	110.0	126.0	63.5	26
1.13.075	9 - 42	370	6000	12	X	DC		102.5	123.0	76.0	28

The data shows the range at which these motors can be operated.
The base motors for various applications are part of our standard production.
Please call to find out whether we already have the motor for your application.
We will also be glad to help you determine which motor would fit your specific requirements.

Upon receipt of your firm order, we can configure and produce the motor you need.
We will modify one of our standard motors or, in some cases, design an entirely new motor for you.
Depending on your needs, investments for tooling, equipment, and design may be necessary.

We have the gear motor to fit your needs.

STOCK SERVICE gear motors can be purchased in small quantities (subject to availability)

Type	Rated voltage V DC				Rated torque mNm		Rated speed rpm	Gear ratio :1	Page
0.5 W	6	12	18	24	**Spur gear with DC motor**				32
1.61.065.	x	x	x	x	45	136		27,4	
	x	x	x	x	90	64		56.6	
	x	x	x	x	150	34		116.9	
	x	x	x	x	200	18		241.5	
	x	x	x	x	200	10		499.2	
	x	x	x	x	300	5		1031.6	
							1 10 100 1000 10000		
2.7 W	6	12	18	24	**Spur gear with DC motor**				34
1.61.046		x	x	x	25	1040		2.9	
		x	x	x	70	335		9.9	
		x	x	x	150	121		30.8	
		x	x	x	300	43.5		96.0	
		x	x	x	300	15.5		299.0	
							1 10 100 1000 10000		
2.4 W	6	12	18	24	**Spur gear with DC motor**				36
1.61.042		x		x	150	150		22.5	
		x		x	300	64		55.5	
		x		x	600	27		137.0	
		x		x	600	12		338.0	
		x		x	600	5.5		834.0	
							1 10 100 1000 10000		
2.2 W	6	12	18	24	**Planetary gear with DC motor**				38
1.61.117.		x		x	150	205		19.2	
		x		x	200	145		28.4	
		x		x	350	65		69.1	
		x		x	400	47		102.0	
		x		x	400	34		152.0	
		x		x	450	21		249.0	
		x		x	500	15		369.0	
		x		x	600	10		546.0	
		x		x	650	7		809.0	
							1 10 100 1000 10000		

Make your selection

- 1. Select desired power level
- 2. Select desired voltage
- 3. Select desired torque and speed
- 4. Find your motor on the page indicated in the last column of the table

STOCK SERVICE gear motors can be purchased in small quantities (subject to availability)

Type	Rated voltage				Rated torque	Rated speed		Gear ratio	Page
	V DC				mNm	rpm		:1	
8.5 W	6	12	18	24	**Planetary gear with DC motor**				40
1.61.077		x		x	100	900		3.4	
		x		x	300	260		11.6	
		x		x	550	140		21.4	
		x		x	1000	75		39.7	
		x		x	1000	40		72.0	
		x		x	1800	23		135.0	
		x		x	2000	14		250.0	
19 W	6	12	18	24	**Spur gear with DC motor**				42
1.61.050		x		x	400	460		6.3	
		x		x	800	240		12.0	
		x		x	900	92		24.7	
		x		x	1500	116		24.7	
		x		x	1800	48		46.7	
		x		x	2900	61		46.7	
		x		x	3300	24		96.5	
		x		x	4000	14		183.0	
		x		x	5000	7		377.0	
		x		x	5000	4		714.0	

STOCK SERVICE pumps can be purchased in small quantities (subject to availability)

Type	Rated voltage				Feed output	Feed pressure			
	V DC				l/h	bar			
	6	12	18	24	**Water pump with BLDC motor**				44
1.24.021		x			720	0.14			

Bühler Motor

DC Motor Ø 24

1.16.011. XXX

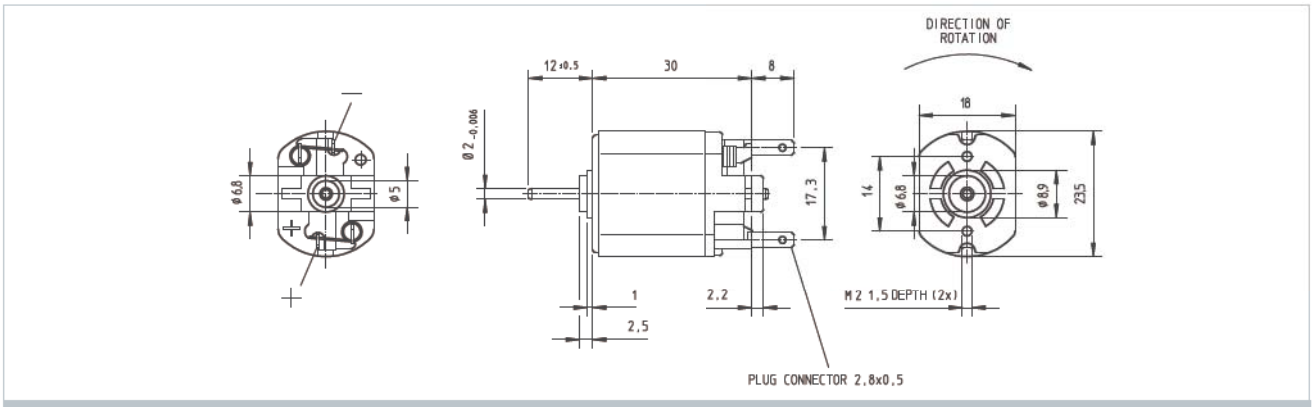
1.16.011.532/545

Design	
Commutator	Copper/3-segments Copper/5-segments (only 1.16.011.304)
RFI Protection	VDR (only 1.16.011.200)
Insulation class	Winding F, otherwise A
Protection class	IP20
Commutation	carbon brushes
Armature	straight slot
Magnet system	Permanent magnets, 2-pole
Bearings	2 sintered bronze bearings
Housing	Steel, corrosion protected
End shields	brush end plastic (1.16.011.532/545) brush end zinc die-cast (1.16.011.179/304/200) drive end zinc die-cast

Type 1.16.011.XXX			532	545	179	304	200
Characteristics*							
Rated voltage	V	V	12	24	12	12	24
Rated power	P_N	W	2.1	1.9	3.6	3.8	3.6
Rated torque	T_N	mNm	4.0	4.0	5.0	4.5	5.0
Rated speed	n_N	rpm	5000	4600	6850	8000	6850
Rated current	I_N	A	0.35	0.18	0.59	0.65	0.30
No load characteristics*							
No load speed	n_O	rpm	7400	7500	10350	12000	10150
No load current	I_O	A	0.05	0.03	0.09	0.12	0.08
Starting characteristics*							
Starting torque	T_S	mNm	12	10	14	14	16
Starting current	I_S	A	0.90	0.40	1.60	1.75	0.81
Performance characteristics*							
max. Output power	P_{max}	W	2.4	2.0	3.9	4.4	4.2
max. Constant torque	T_{max}	mNm	2.4	2.3	3.2	3.0	3.8
Motor parameters*							
Weight	G	g	35	35	40	40	40
Rotor inertia	J	gcm²	3.2	3.2	3.2	3.2	3.2
Terminal resistance	R	Ohm	13	61	7.5	6.9	30
Mech. time constant	τ_m	ms	-	-	-	-	-
Electr. time constant	τ_e	ms	-	-	-	-	-
Speed regulation constant	R_m	rpm/mNm	600	725	715	858	620
Torque constant	k_t	mNm/A	14	28	9.9	8.8	22
Thermal resistance	R_{th1}	K/W	23	23	23	23	23
Thermal resistance	R_{th2}	K/W	21	21	21	21	21
Axial play		mm	0.05 - 0.6	0.05 - 0.6	0.05 - 0.6	0.05 - 0.6	0.05 - 0.6
Direction of rotation			bidirectional				

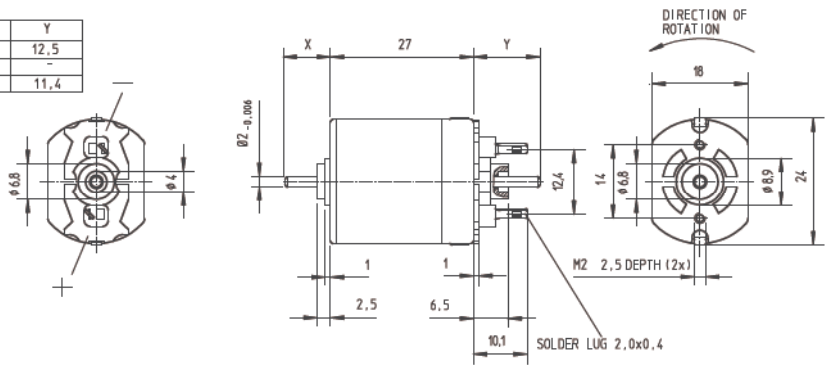
Operational conditions			
Temperature range	T	°C	-10 - +70
Axial force	F_A	N	2
Radial force, 5 mm from mounting surface	F_R	N	5

* at 25 °C



1.16.011.532/545

Typ:	X±0,4	Y
1.16.011.179	8,5	12,5
1.16.011.200	11,5	-
1.16.011.304	21,6	11,4



1.16.011.179/304/200

Customized versions

The following modifications are available upon request:

- External RFI board or internal VDR
- Speed adjustment by winding change
- Modification of shaft length on both ends
- Modification of shaft configuration (flat, groove, etc.)
- Assembly of gears, pinions, worms, etc.
- Assembly of adapters and mounting plates

Note: Is used with Buehler gear motor types 1.61.065.xxx and 1.61.117.xxx

Bühler Motor

DC Motor Ø 23

1.13.078.XXX

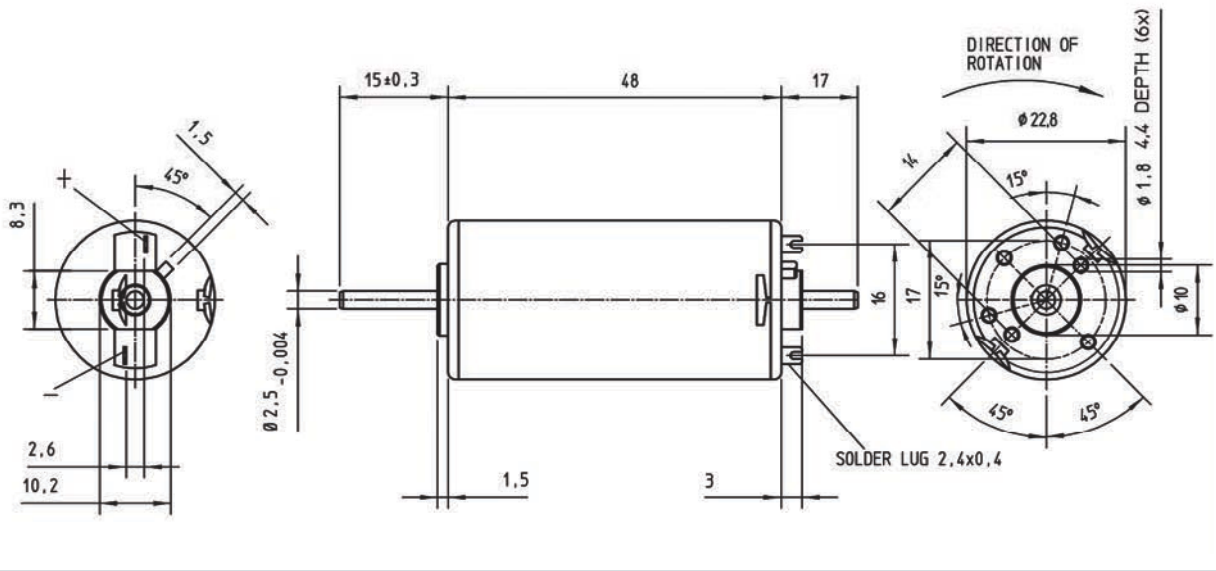
1.13.078.XXX

Design	
Commutator	Copper/3-segments
RFI Protection	VDR; 2 capacitors
Insulation class	Winding F, otherwise A
Protection class	IP20
Commutation	carbon brushes
Armature	straight slot
Magnet system	Permanent magnets, 2-pole
Bearings	2 sintered bronze bearings
Housing	Steel, corrosion protected
End shields	brush end plastic drive end zinc die-cast

Type 1.13.078.XXX			011	012
Characteristics*				
Rated voltage	V	V	12	24
Rated power	P_N	W	4.3	4.3
Rated torque	T_N	mNm	10	10
Rated speed	n_N	rpm	4060	4100
Rated current	I_N	A	0.63	0.32
No load characteristics*				
No load speed	n_o	rpm	5900	6100
No load current	I_o	A	0.09	0.04
Starting characteristics*				
Starting torque	T_s	mNm	31	31
Starting current	I_s	A	1.8	0.9
Performance characteristics*				
max. Output power	P_{max}	W	5.0	5.0
max. Constant torque	T_{max}	mNm	6.0	6.0
Motor parameters*				
Weight	G	g	78	78
Rotor inertia	J	gcm²	8.1	8.1
Terminal resistance	R	Ohm	6.7	27
Mech. time constant	τ_m	ms	18	19
Electr. time constant	τ_e	ms	0.9	0.8
Speed regulation constant	R_m	rpm/mNm	184	198
Torque constant	k_t	mNm/A	18	35
Thermal resistance	R_{th1}	K/W	16	16
Thermal resistance	R_{th2}	K/W	18	18
Axial play		mm	0.05 - 0.7	0.05 - 0.7
Direction of rotation			bidirectional	

Operational conditions			
Temperature range	T	°C	-10 - +70
Axial force	F_A	N	5
Radial force, 10 mm from mounting surface	F_R	N	10

* at 25 °C



1.13.078.XXX

Customized versions

The following modifications are available upon request:

- Encoder possible
- Speed adjustment by winding change
- Modification of shaft length on both ends
- Modification of shaft configuration (flat, groove, etc.)
- Assembly of gears, pinions, worms, etc.
- Assembly of adapters and mounting plates

Note: Is used with Buehler gear motor type 1.61.117.xxx

Bühler Motor

DC Motor Ø 31

1.13.021.XXX

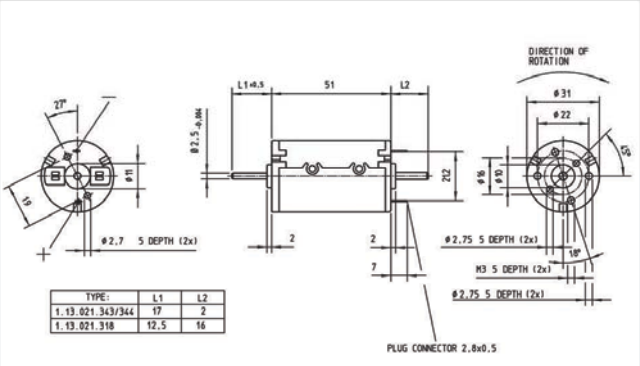
1.13.021.XXX

Design	
Commutator	Copper/7-segments
RFI Protection	2 chokes (not 1.13.021.701)
Insulation class	Winding H, otherwise A
Protection class	IP40
Commutation	carbon brushes
Armature	straight slot
Magnet system	Permanent magnets, 2-pole
Bearings	2 sintered bronze bearings, drive end with ball bearing on model 1.13.021.605/606
Housing	Steel, corrosion protected
End shields	brush end plastic drive end zinc die-cast

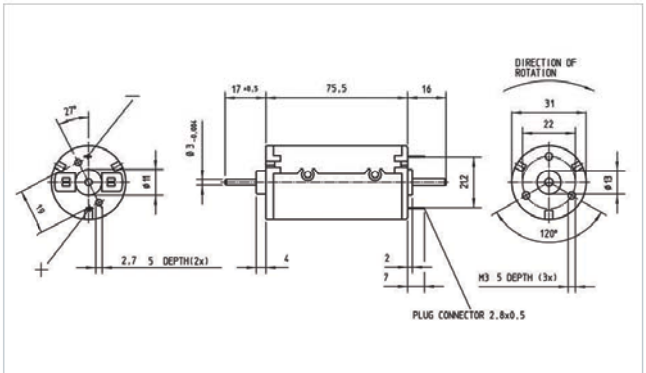
Type 1.13.021.XXX			343	344	318	605	606	701
Characteristics*								
Rated voltage	V	V	12	24	24	12	24	12
Rated power	P_N	W	6.3	6.3	8.8	10	10	2.8
Rated torque	T_N	mNm	20	20	21	32	32	10
Rated speed	n_N	rpm	3000	3000	4000	3000	3000	2650
Rated current	I_N	A	0.90	0.50	0.54	1.20	0.60	0.45
No load characteristics*								
No load speed	n_0	rpm	4400	4200	5250	4100	4200	4100
No load current	I_0	A	0.10	0.05	0.07	0.10	0.07	0.07
Starting characteristics*								
Starting torque	T_s	mNm	61	61	85	120	120	28
Starting current	I_s	A	2.50	1.30	2.00	4.80	2.40	1.15
Performance characteristics*								
max. Output power	P_{max}	W	7.0	7.0	10	15	15	3.0
max. Constant torque	T_{max}	mNm	11	11	14	19	19	6
Motor parameters*								
Weight	G	g	135	135	135	235	235	105
Rotor inertia	J	gcm²	16	16	16	33	33	9.1
Terminal resistance	R	Ohm	4.8	19	12	2.4	11	10
Mech. time constant	τ_m	ms	11	11	11	15	15	10
Electr. time constant	τ_e	ms	0.8	0.8	0.8	0.8	0.8	0.8
Speed regulation constant	R_m	rpm/mNm	71	65	61	35	35	146
Torque constant	k_t	mNm/A	25	48	42	27	55	25
Thermal resistance	R_{th1}	K/W	10	10	10	5	5	13
Thermal resistance	R_{th2}	K/W	11	11	11	8	8	13
Axial play		mm	0.05 - 0.7	0.05 - 0.7	0.05 - 0.7	< 0.1	< 0.1	0.05 - 0.7
Direction of rotation			bidirectional					

Operational conditions			
Temperature range	T	°C	-10 - +70
Axial force	F_A	N	5
Radial force, 15 mm from mounting surface	F_R	N	20/1.13.021.605/606=40

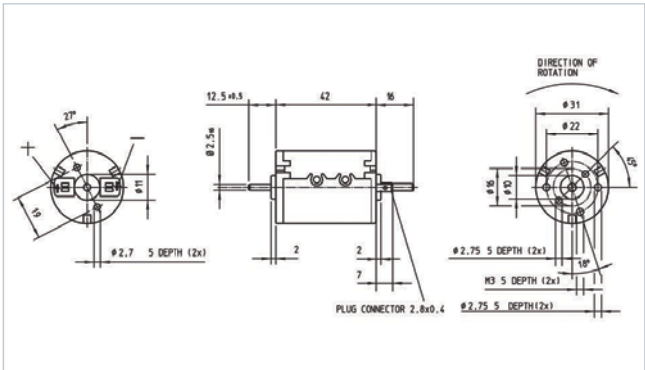
* at 25 °C



1.13.021.343/344/318



1.13.021.605/606



1.13.021.701

Customized versions

The following modifications are available upon request:

- Encoder possible
- Internal chokes and/or capacitors
- Speed adjustment by winding change
- Addition of wire harnesses
- Modification of shaft length on both ends
- Modification of shaft configuration (flat, groove, etc.)
- Assembly of gears, pinions, worms, etc.
- Assembly of adapters and mounting plates

Note: Is used with Buehler gear motor types 1.61.046.xxx, 1.61.042.xxx and 1.61.077.xxx

Bühler Motor

DC Motor Ø 35

1.13.055.XXX

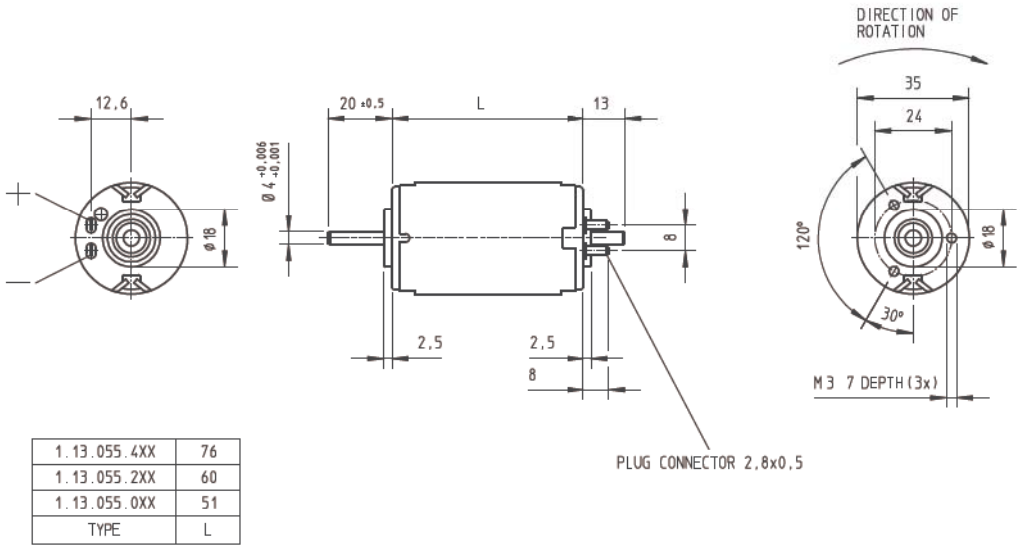
1.13.055.XXX

Design	
Commutator	Copper/8-segments
RFI Protection	2 chokes
Insulation class	Winding H, otherwise A
Protection class	IP40
Commutation	carbon brushes
Armature	straight slot
Magnet system	Permanent magnets, 2-pole
Bearings	brush end self-aligning bearing, drive end ball bearing
Housing	Steel, corrosion protected
End shields	zinc die-cast on both sides

Type 1.13.055.XXX			220	221
Characteristics*				
Rated voltage	V	V	12	24
Rated power	P_N	W	13	13
Rated torque	T_N	mNm	40	40
Rated speed	n_N	rpm	3100	3000
Rated current	I_N	A	2.0	1.0
No load characteristics*				
No load speed	n_o	rpm	4500	4500
No load current	I_o	A	0.32	0.16
Starting characteristics*				
Starting torque	T_s	mNm	120	120
Starting current	I_s	A	5.85	2.90
Performance characteristics*				
max. Output power	P_{max}	W	16	16
max. Constant torque	T_{max}	mNm	27	27
Motor parameters*				
Weight	G	g	200	200
Rotor inertia	J	gcm²	44	44
Terminal resistance	R	Ohm	2.1	8.4
Mech. time constant	τ_m	ms	16	16
Electr. time constant	τ_e	ms	0.8	0.8
Speed regulation constant	R_m	rpm/mNm	35	35
Torque constant	k_t	mNm/A	24	48
Thermal resistance	R_{th1}	K/W	7	7
Thermal resistance	R_{th2}	K/W	9	9
Axial play		mm	< 0.01	< 0.01
Direction of rotation			bidirectional	

Operational conditions			
Temperature range	T	°C	-10 - +70
Axial force	F_A	N	10
Radial force, 15 mm from mounting surface	F_R	N	70

* at 25 °C



1.13.055.4XX	76
1.13.055.2XX	60
1.13.055.0XX	51
TYPE	L

1.13.055.XXX

Customized versions

The following modifications are available upon request:

- Encoder possible
- Internal chokes and/or capacitors
- Speed adjustment by winding change
- Addition of wire harnesses
- Modification of shaft length on both ends
- Modification of shaft configuration (flat, groove, etc.)
- Assembly of gears, pinions, worms, etc.
- Assembly of 2 adapters and mounting plates

Bühler Motor

DC Motor Ø 40

1.13.046.XXX

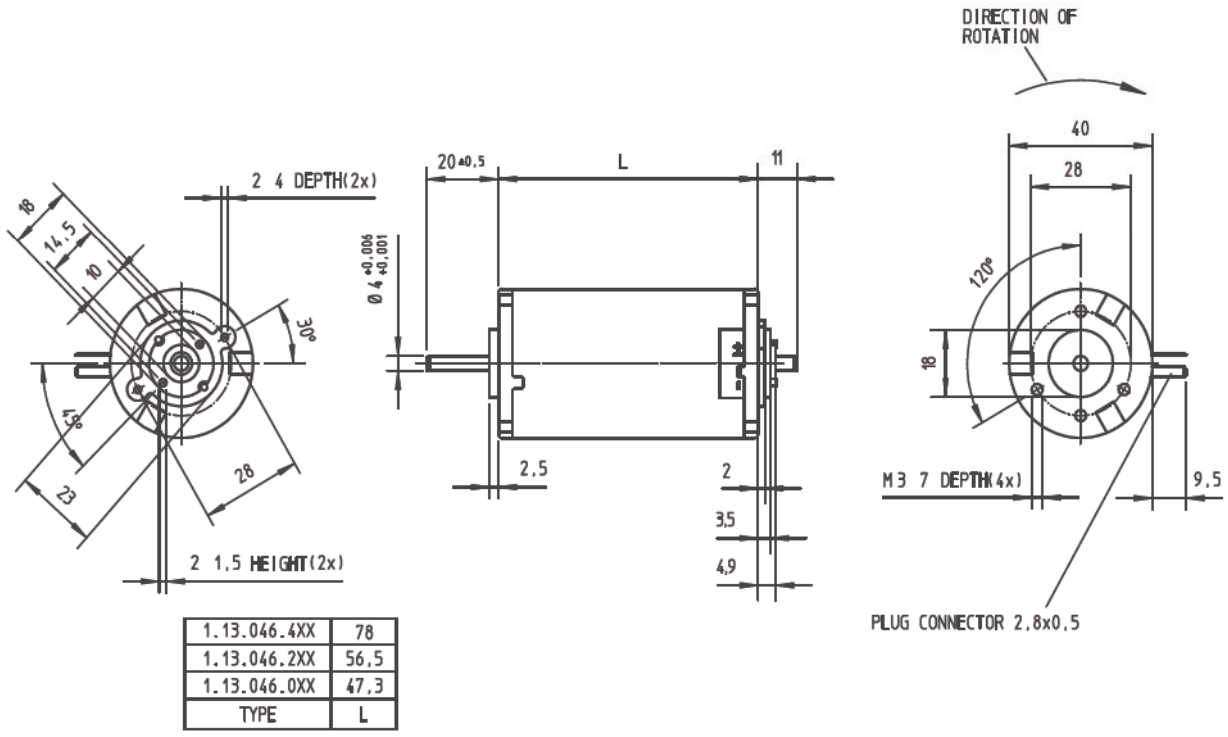
1.13.046.XXX

Design	
Commutator	Copper/7-segments
RFI Protection	2 chokes
Insulation class	Winding H, otherwise A
Protection class	IP40
Commutation	carbon brushes
Armature	skewed slot
Magnet system	Permanent magnets, 2-pole
Bearings	2 preloaded ball bearings
Housing	Steel, corrosion protected
End shields	brush end plastic drive end zinc die-cast

Type 1.13.046.XXX			403	404
Characteristics*				
Rated voltage	V	V	12	24
Rated power	P_N	W	19	19
Rated torque	T_N	mNm	60	60
Rated speed	n_N	rpm	3000	3000
Rated current	I_N	A	2.4	1.2
No load characteristics*				
No load speed	n_O	rpm	3800	3800
No load current	I_O	A	0.30	0.15
Starting characteristics*				
Starting torque	T_S	mNm	290	290
Starting current	I_S	A	10	5.2
Performance characteristics*				
max. Output power	P_{max}	W	29	29
max. Constant torque	T_{max}	mNm	45	45
Motor parameters*				
Weight	G	g	440	440
Rotor inertia	J	gcm²	64	64
Terminal resistance	R	Ohm	1.2	4.3
Mech. time constant	τ_m	ms	9	9
Electr. time constant	τ_e	ms	0.8	0.8
Speed regulation constant	R_m	rpm/mNm	13	13
Torque constant	k_t	mNm/A	29	58
Thermal resistance	R_{th1}	K/W	6	6
Thermal resistance	R_{th2}	K/W	7	7
Axial play		mm	< 0.01	< 0.01
Direction of rotation			bidirectional	

Operational conditions			
Temperature range	T	°C	-10 - +70
Axial force	F_A	N	20
Radial force, 15 mm from mounting surface	F_R	N	80

* at 25 °C



TYPE	L
1.13.046.4XX	78
1.13.046.2XX	56,5
1.13.046.0XX	47,3

1.13.046.XXX

Customized versions

The following modifications are available upon request:

- Encoder possible
- Internal chokes and/or capacitors
- Speed adjustment by winding change
- Modification of shaft length on both ends
- Modification of shaft configuration (flat, groove, etc.)
- Assembly of gears, pinions, worms, etc.
- Assembly of adapters and mounting plates

Bühler Motor

DC Motor Ø 52

1.13.044.XXX

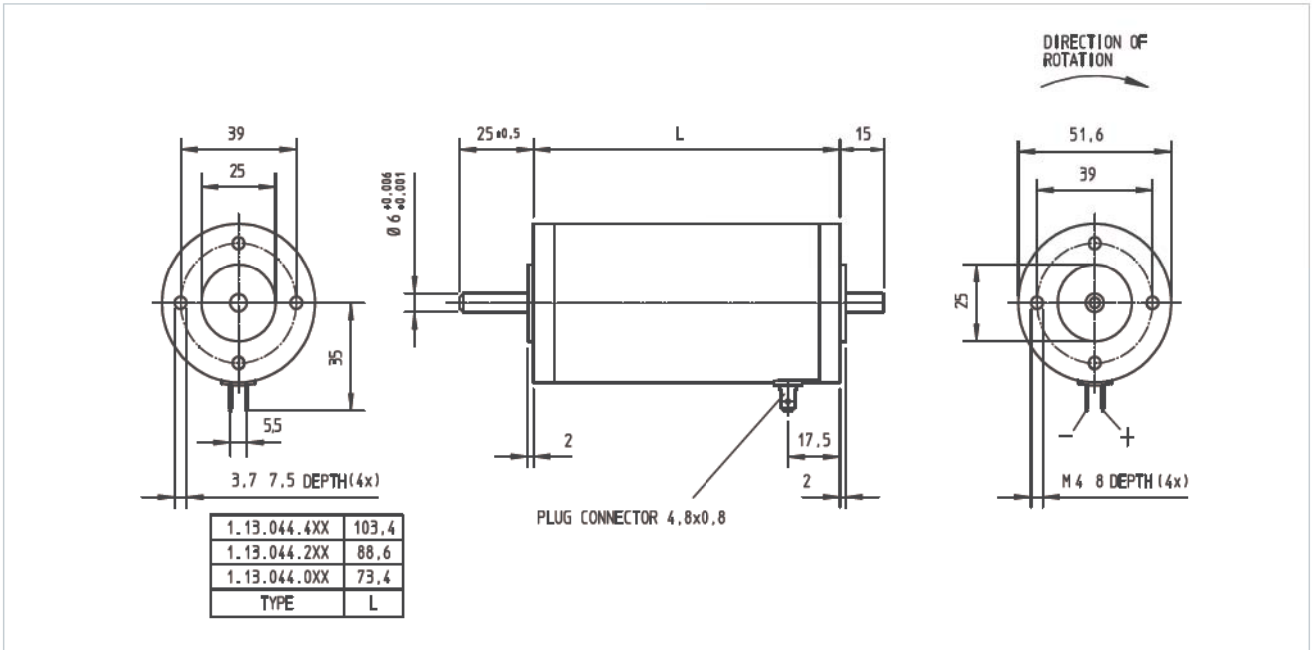
1.13.044.XXX

Design	
Commutator	Copper/12-segments
RFI Protection	-
Insulation class	Winding H, otherwise A
Protection class	IP40
Commutation	carbon brushes
Armature	skewed slot
Magnet system	Permanent magnets, 2-pole
Bearings	2 preloaded ball bearings
Housing	Steel, corrosion protected
End shields	zinc die-cast on both sides

Type 1.13.044.XXX			235	236	413	414
Characteristics*						
Rated voltage	V	V	12	24	12	24
Rated power	P_N	W	47	47	56	56
Rated torque	T_N	mNm	150	150	180	180
Rated speed	n_N	rpm	3000	3000	3000	3000
Rated current	I_N	A	6.2	3.1	7.3	3.5
No load characteristics*						
No load speed	n_o	rpm	3900	3900	3900	3800
No load current	I_o	A	0.40	0.20	0.40	0.20
Starting characteristics*						
Starting torque	T_s	mNm	640	640	840	940
Starting current	I_s	A	24	12	31	16
Performance characteristics*						
max. Output power	P_{max}	W	65	65	85	85
max. Constant torque	T_{max}	mNm	100	100	120	120
Motor parameters*						
Weight	G	g	765	765	940	940
Rotor inertia	J	gcm²	180	180	250	250
Terminal resistance	R	Ohm	0.5	2.0	0.40	1.4
Mech. time constant	τ_m	ms	13	13	13	13
Electr. time constant	τ_e	ms	1.0	1.0	1.0	1.0
Speed regulation constant	R_m	rpm/mNm	6	6	4.7	4.1
Torque constant	k_t	mNm/A	28	56	27	57
Thermal resistance	R_{th1}	K/W	5.0	5.0	3.5	3.5
Thermal resistance	R_{th2}	K/W	4.5	4.5	4.0	4.0
Axial play		mm	< 0.01	< 0.01	< 0.01	< 0.01
Direction of rotation			bidirectional			

Operational conditions			
Temperature range	T	°C	-10 - +70
Axial force	F_A	N	30
Radial force, 15 mm from mounting surface	F_R	N	120

* at 25 °C



1.13.044.XXX

Customized versions

The following modifications are available upon request:

- Encoder possible
- Internal chokes and/or capacitors
- Speed adjustment by winding change
- Addition of wire harnesses
- Modification of shaft length on both ends
- Modification of shaft configuration (flat, groove, etc.)
- Assembly of gears, pinions, worms, etc.
- Assembly of adapters and mounting plates

Note: Is used with Buehler gear motor types 1.61.050.xxx, 1.61.090.xxx

Bühler Motor

DC Motor Ø 54

1.13.054.XXX

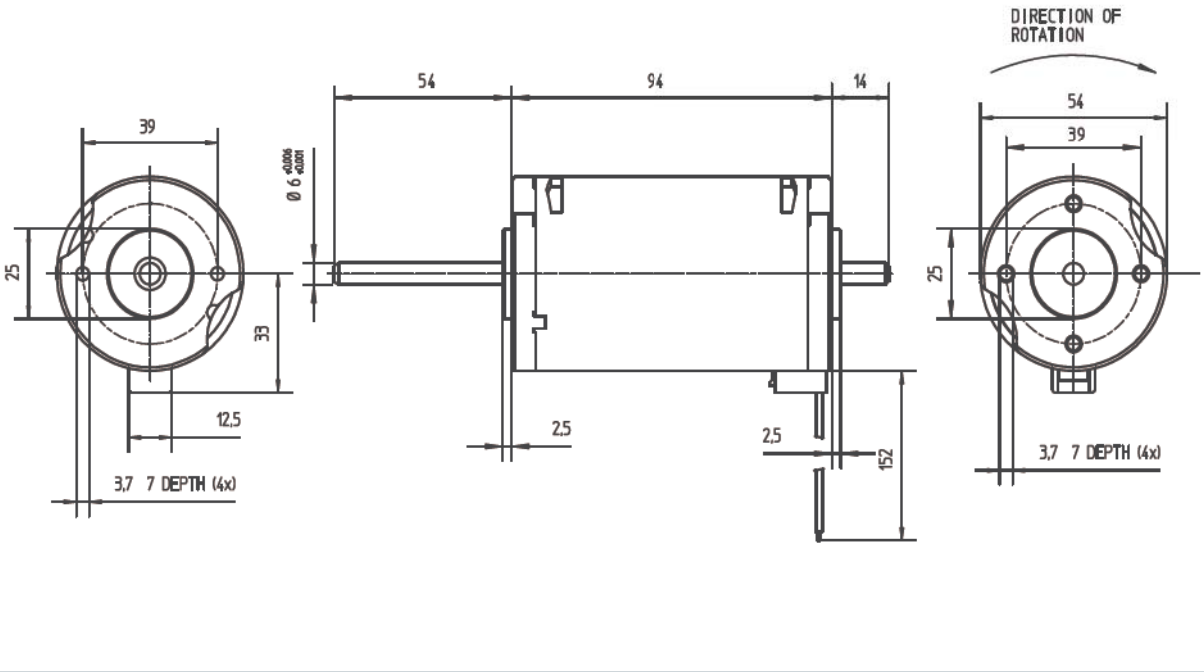
1.13.054.XXX

Design	
Commutator	Copper/12-segments
RFI Protection	-
Insulation class	Winding H, otherwise A
Protection class	IP40
Commutation	carbon brushes
Armature	straight slot
Magnet system	Permanent magnets, 2-pole
Bearings	2 sintered bronze bearings
Housing	Steel, corrosion protected
End shields	brush end plastic, drive end zinc die-cast

Type 1.13.054.XXX			304	305
Characteristics*				
Rated voltage	V	V	12	24
Rated power	P_N	W	77	77
Rated torque	T_N	mNm	250	250
Rated speed	n_N	rpm	3000	3000
Rated current	I_N	A	9.3	4.7
No load characteristics*				
No load speed	n_O	rpm	3900	3700
No load current	I_O	A	1.1	0.5
Starting characteristics*				
Starting torque	T_S	mNm	1160	1160
Starting current	I_S	A	43	22
Performance characteristics*				
max. Output power	P_{max}	W	110	110
max. Constant torque	T_{max}	mNm	150	150
Motor parameters*				
Weight	G	g	750	750
Rotor inertia	J	gcm²	330	330
Terminal resistance	R	Ohm	0.3	1.2
Mech. time constant	τ_m	ms	12.6	12.6
Electr. time constant	τ_e	ms	1.4	1.4
Speed regulation constant	R_m	rpm/mNm	3.35	3.35
Torque constant	k_M	mNm/A	28	57
Thermal resistance	R_{th1}	K/W	3.0	3.0
Thermal resistance	R_{th2}	K/W	4.0	4.0
Axial play			< 0.1	< 0.1
Direction of rotation			bidirectional	

Operational conditions			
Temperature range	T	°C	-10 - +70
Axial force	F_A	N	30
Radial force, 15 mm from mounting surface	F_R	N	120

* at 25 °C



1.13.054.XXX

Customized versions

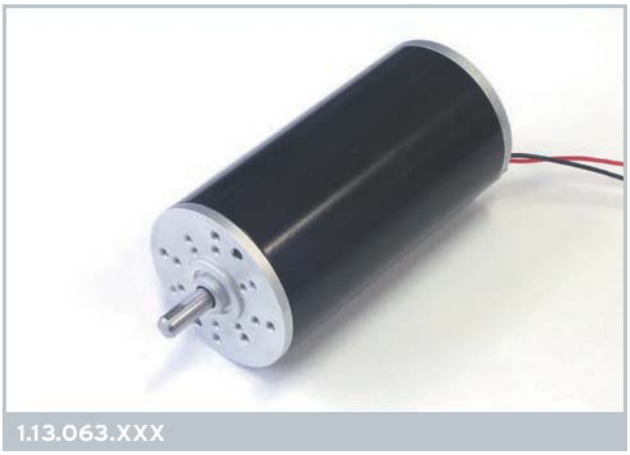
The following modifications are available upon request:

- Encoder possible
- Internal chokes and/or capacitors
- Speed adjustment by winding change
- Modification of shaft length on both ends
- Modification of shaft configuration (flat, groove, etc.)
- Assembly of gears, pinions, worms, etc.
- Assembly of adapters and mounting plates

Bühler Motor

DC Motor Ø 64

1.13.063.XXX



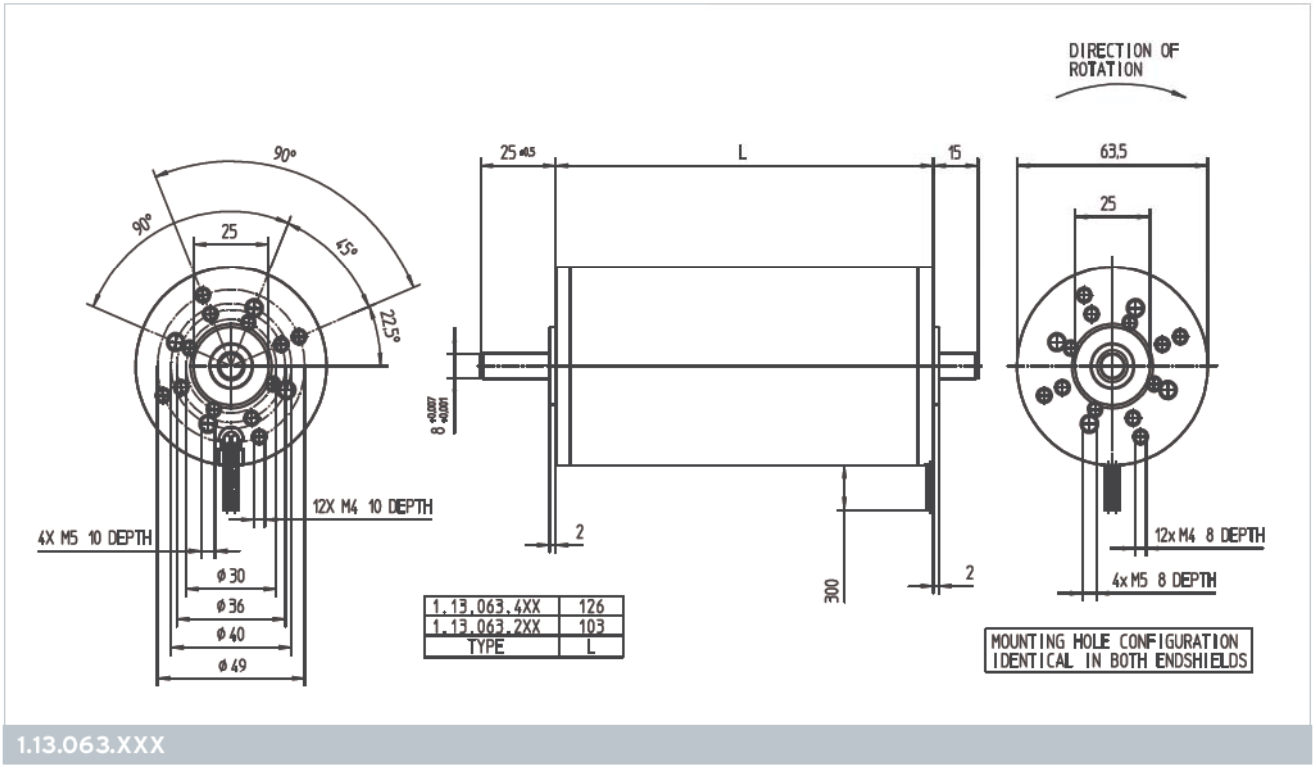
1.13.063.XXX

Design	
Commutator	Copper/12-segments
RFI Protection	2 chokes
Insulation class	Winding H, otherwise A
Protection class	IP40
Commutation	carbon brushes
Armature	straight slot
Magnet system	Permanent magnets, 2-pole
Bearings	2 preloades ball bearings
Housing	Steel, black paint
End shields	zinc die-cast on both sides

Type 1.13.063.XXX			220	221	407	408
Characteristics*						
Rated voltage	V	V	12	24	12	24
Rated power	P_N	W	115	115	150	150
Rated torque	T_N	mNm	350	350	400	400
Rated speed	n_N	rpm	3150	3150	3400	3400
Rated current	I_N	A	15	7.5	17	8.5
No load characteristics*						
No load speed	n_O	rpm	3700	3700	3900	3900
No load current	I_O	A	2.6	1.3	2.0	1.0
Starting characteristics*						
Starting torque	T_S	mNm	2500	2500	3400	3400
Starting current	I_S	A	95	47	128	64
Performance characteristics*						
max. Output power	P_{max}	W	230	230	340	340
max. Constant torque	T_{max}	mNm	350	350	400	400
Motor parameters*						
Weight	G	g	1300	1300	1600	1600
Rotor inertia	J	gcm²	850	850	1050	1050
Terminal resistance	R	Ohm	0.125	0.5	0.1	0.4
Mech. time constant	τ_m	ms	15	15	11	11
Electr. time constant	τ_e	ms	2.0	2.0	2.5	2.5
Speed regulation constant	R_m	rpm/mNm	1.5	1.5	1.02	0.98
Torque constant	k_M	mNm/A	27	54	31	63
Thermal resistance	R_{th1}	K/W	2.8	2.8	2.5	2.5
Thermal resistance	R_{th2}	K/W	3.3	3.3	3.0	3.0
Axial play			< 0.1	< 0.1	< 0.1	< 0.1
Direction of rotation			bidirectional			

Operational conditions			
Temperature range	T	°C	-10 - +70
Axial force	F_A	N	50
Radial force, 15 mm from mounting surface	F_R	N	200

* at 25 °C



1.13.063.XXX

Customized versions

The following modifications are available upon request:

- Encoder possible
- Additional RFI supression components
- Speed adjustment by winding change
- Modification of shaft length on both ends
- Modification of shaft configuration (flat, groove, etc.)
- Assembly of gears, pinions, worms, etc.
- Assembly of adapters and mounting plates

Bühler Motor

DC Motor Ø 76

1.13.075.XXX

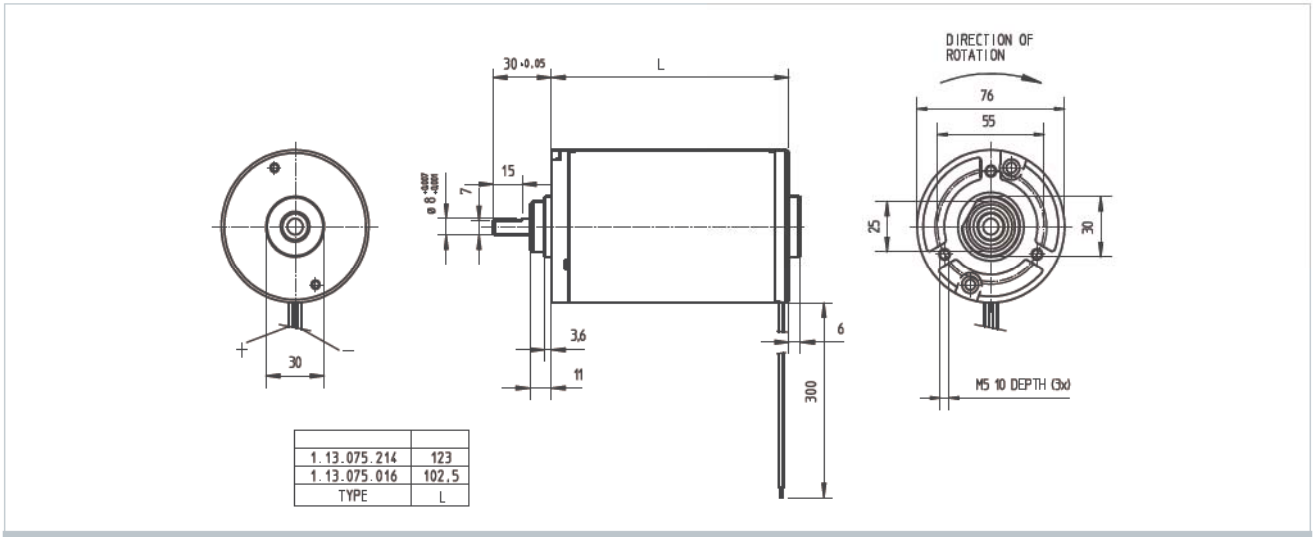
1.13.075.XXX

Design	
Commutator	Copper, 12-sements
RFI Protection	2 Chokes
Insulation class	Winding H, otherwise A
Protection class	IP40
Commutation	carbon brushes
Armature	straight slot
Magnet system	Permanent magnets, 2-pole
Bearings	2 preloaded ball bearings
Housing	Steel, corrosion protected
End shields	Zinc die-cast on both sides

Type 1.13.075.XXX			016	214
Characteristics*				
Rated voltage	V	V	24	24
Rated power	P_N	W	130	200
Rated torque	T_N	mNm	400	600
Rated speed	n_N	rpm	3200	3200
Rated current	I_N	A	8.0	12.0
No load characteristics*				
No load speed	n_o	rpm	3900	3900
No load current	I_o	A	0.7	0.8
Starting characteristics*				
Starting torque	T_s	mNm	2250	3450
Starting current	I_s	A	42	64
Performance Characteristics*				
max. Output power	P_{max}	W	230	370
max. Constant torque	T_{max}	mNm	280	400
Motor parameters*				
Weight	G	g	1500	1800
Rotor inertia	J	gcm²	1300	1800
Terminal resistance	R	Ohm	0.6	0.4
Mech. time constant	τ_m	ms	27	29
Electr. time constant	τ_e	ms	2.4	2.0
Speed regulation constant	R_m	rpm/mNm	1.7	1.1
Torque constant	k_t	mNm/A	55	55
Thermal resistance	R_{th1}	K/W	2.2	2.0
Thermal resistance	R_{th2}	K/W	2.5	2.2
Axial play		mm	< 0.01	< 0.01
Direction of rotation			bidirectional	

Operational conditions			
Temperature range	T	°C	-10 - +70
Axial force	F_A	N	50
Radial force, 15 mm from mounting surface	F_R	N	200

* at 25 °C



1.13.075.214	123
1.13.075.016	102,5
TYPE	L

1.13.075.XXX

Customized versions

The following modifications are available upon request:

- Speed adjustment by winding change
- Modification of shaft configuration (flat, groove, etc.)
- Assembly of gears, pinions, worms, etc.
- Assembly of adapters and mounting plates

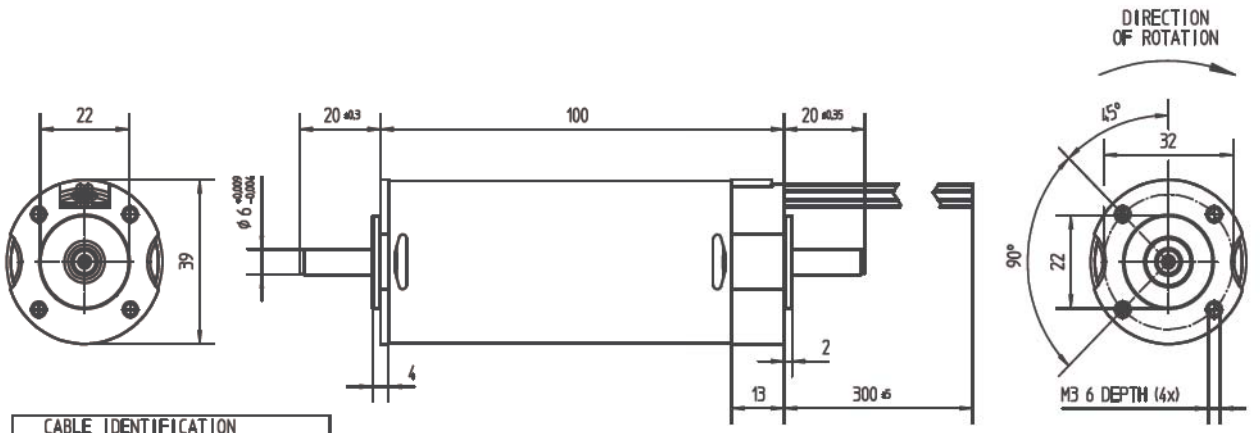
EC Motor Ø 40/L 100 1.25.037.4XX

1.25.037.4XX

Design	
Commutation	3 Hall sensors
Protection class	up to IP40
Rotor	4 pole-pairs, bonded NeFeB magnets
Stator	3 phase, star connection
Housing	Steel, corrosion protected
End shields	zinc die-cast
Bearings	Ball bearing
Shaft	6 mm
Direction of rotation	Bidirectional, no phase advance
Electronical connection	300 mm flying leads, exit axial/radial from rear

Type 1.13.063.XXX			403
Characteristics*			
Rated voltage	V	V	24
Rated power	P_N	W	95
Rated torque	T_N	mNm	200
Rated speed	n_N	rpm	4500
Rated current	I_N	A	5.3
No load characteristics*			
No load speed	n_O	rpm	6600
No load current	I_O	A	0.6
Starting characteristics*			
Starting torque	T_S	mNm	1000
Starting current	I_S	A	26
Performance characteristics*			
Max. power	P_{max}	W	155
Max. efficiency	η_{max}	%	74
Motor parameters*			
Weight	G	g	500
Rotor Inertia	J	gcm²	52
Shaft axial force	F_A	N	50
Shaft radial force, 15 mm from mounting surface	F_R	N	120
Max. environment temperature	T_{emax}	°C	65
Min. environment temperature	T_{emin}	°C	-30

* at 25 °C



CABLE IDENTIFICATION		
SIZE	COLOUR	FUNCTION
26 AWG	BROWN	SUPPLY +
26 AWG	YELLOW	SUPPLY -
26 AWG	BLUE	HALL EFFECT A
26 AWG	GREEN	HALL EFFECT B
26 AWG	GREY	HALL EFFECT C
18 AWG	RED	PHASE A
18 AWG	WHITE	PHASE B
18 AWG	BLACK	PHASE C

1.25.037.4XX

Customized versions

The following modifications are available upon request:

- **Shaft: Available with custom length, splines and keyways etc.**
- **Rear shaft exit: Available with custom length, splines and keyways etc.**
- **Direction of rotation: Unidirectional, with fixed phase advance to suit performance requirements**
- **Brake: Upon request**
- **Encoder: Upon request**
- **Custom winding: For specific rated voltage and performance characteristics**
- **Interface: Custom adaptors and mounting interfaces and actuation available**
- **Sealing: Improved sealing (protection class) available**
- **Operating conditions: Harsh environment options available on request**
- **Electrical connection: Custom lead length and termination connector**

Bühler Motor

DC Gear Motor 1.61.065.XXX

Type 1.61.065.XXX

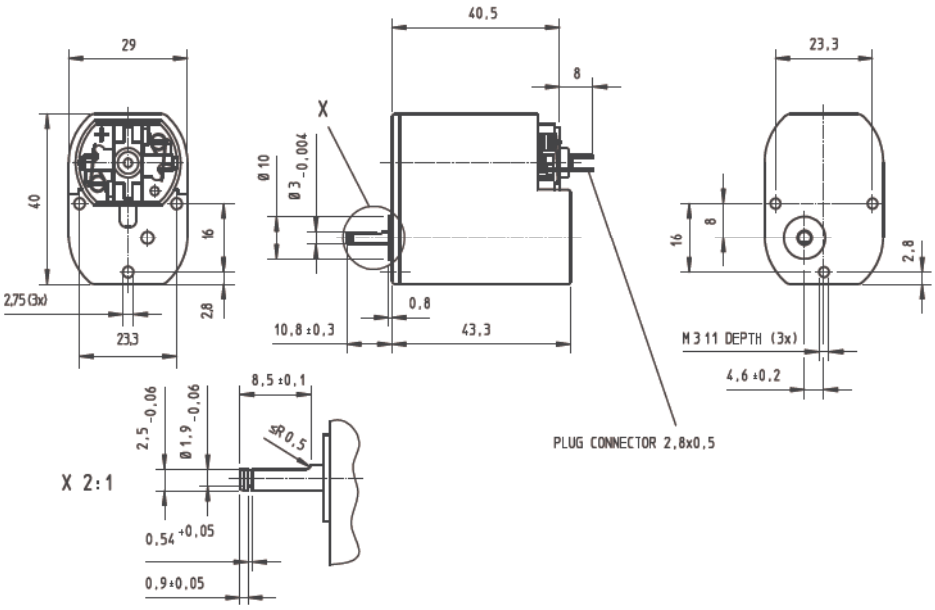
		Characteristics*				max.	Terminal	Stages	Gear
		Rated current	Rated torque	Rated speed	No load speed	Torque*	resistance		ratio
V =	XXX	I_N / A	T_N / mNm	n_N / rpm	n_O / rpm	T_{max} / mNm	Ra / Ω		
6 V	403	0.330	45	136	190	63	6.5	4	27.4
	404	0.330	90	64	91	126	6.5	5	56.6
	405	0.280	150	34	44	210	6.5	6	116.9
	406	0.240	200	18	22	280	6.5	7	241.5
	407	0.170	200	9.5	10.5	280	6.5	8	499.2
	408	0.170	300	4.6	5.1	420	6.5	9	1031.6
12 V	423	0.170	45	136	190	63	27	4	27.4
	424	0.170	90	64	91	126	27	5	56.6
	425	0.140	150	34	44	210	27	6	116.9
	426	0.120	200	18	22	280	27	7	241.5
	427	0.075	200	9.5	10.5	280	27	8	499.2
	428	0.075	300	4.6	5.1	420	27	9	1031.6
18 V	443	0.120	45	136	190	63	61	4	27.4
	444	0.120	90	64	91	126	61	5	56.6
	445	0.100	150	34	44	210	61	6	116.9
	446	0.080	200	18	22	280	61	7	241.5
	447	0.065	200	9.5	10.5	280	61	8	499.2
	448	0.065	300	4.6	5.1	420	61	9	1031.6
24 V	463	0.090	45	136	202	63	93	4	27.4
	464	0.090	90	64	97	126	93	5	56.6
	465	0.080	150	34	47	210	93	6	116.9
	466	0.065	200	18	23	280	93	7	241.5
	467	0.044	200	9.5	11	280	93	8	499.2
	468	0.044	300	4.6	5.1	420	93	9	1031.6

Operational conditions			
Temperature range	T	°C	-10 - +70
Axial force	F_A	N	15
Radial force, 5 mm from mounting surface	F_R	N	40

* at 25 °C

Design	
Weight	150 g
Gear housing	Zinc die-cast
Commutator	Copper / 3-segments
RFI protection	VDR
Insulation class	Winding F, otherwise A
Protection class	IP20
Commutation	carbon brushes
Armature	straight slot
Magnet system	Permanent magnets, 2-pole
Bearings	2 sintered bronze bearings
Motor housing	Steel, corrosion protected
Motor end shields	brush end plastic drive end zinc die-cast
Spur gear	Metal and plastic gears
Axial play output shaft	0.05 - 0.6 mm

1.61.065.XXX



1.61.065.XXX

Customized versions

The following modifications are available upon request:

- Speed adjustment by winding change
- Addition of wire harnesses
- Modification of shaft length
- Modification of shaft configuration (flat, groove, etc.)
- Assembly of gears, pinions, etc.
- Assembly of adapters and mounting plates
- Gear ratios i=6.4 / 10.2 / 2132 and 4406 on request

DC Gear Motor 1.61.046.XXX

Type 1.61.046.XXX

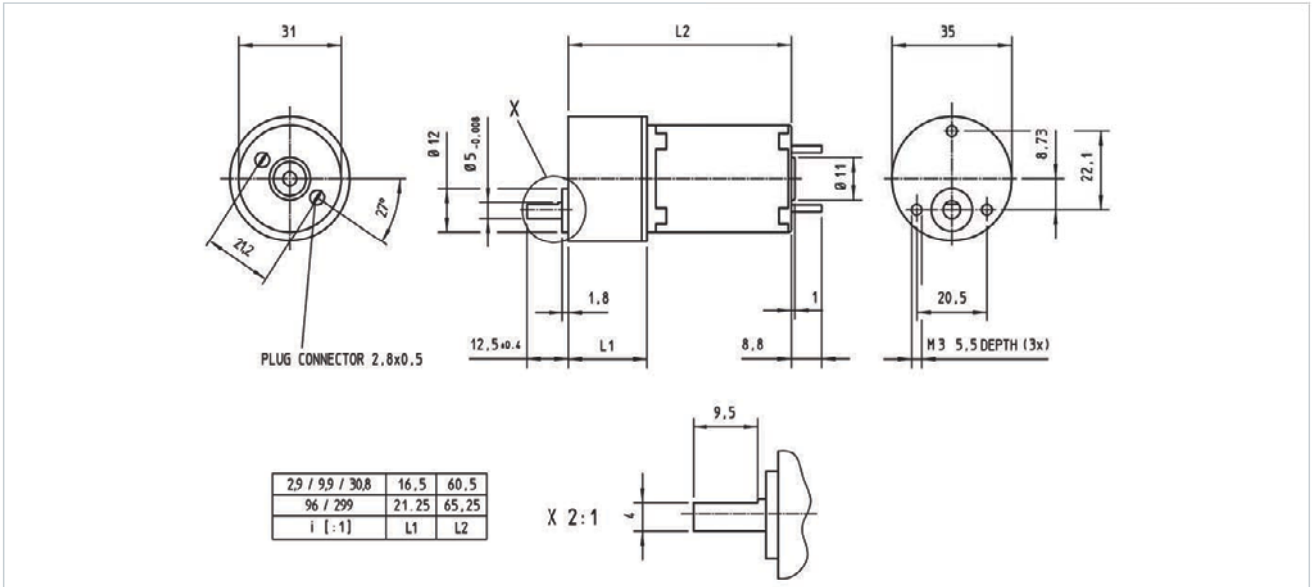
		Characteristics*				max.	Terminal	Stages	Gear
		Rated current	Rated torque	Rated speed	No load speed	Torque*	resistance		ratio
V =	XXX	I_N / A	T_N / mNm	n_N / rpm	n_O / rpm	T_{max} / mNm	Ra / Ω		
12 V	311	0.700	25	1040	1710	35	9	1	2.9
	312	0.600	70	335	500	98	9	2	9.9
	313	0.500	150	121	160	210	9	3	30.8
	314	0.390	300	43.5	52.0	420	9	4	96.0
	315	0.220	300	15.5	16.5	420	9	5	299.0
18 V	321	0.470	25	1040	1710	35	20	1	2.9
	323	0.400	70	335	500	98	20	2	9.9
	324	0.340	150	121	160	210	20	3	30.8
	325	0.260	300	43.5	52.0	420	20	4	96.0
	326	0.150	300	15.5	16.5	420	20	5	299.0
24 V	331	0.350	25	1040	1710	35	35	1	2.9
	332	0.300	70	335	500	98	35	2	9.9
	333	0.250	150	121	160	210	35	3	30.8
	334	0.195	300	43.5	52.0	420	35	4	96.0
	335	0.110	300	15.5	16.5	420	35	5	299.0

Operational conditions			
Temperature range	T	°C	-10 - +70
Axial force	F_A	N	15
Radial force, 5 mm from mounting surface	F_R	N	40

* at 25 °C

Design	
Weight	150 g
Gear housing	Zinc die-cast
Commutator	Copper / 7-segments
RFI protection	2 chokes
Insulation class	Winding H, otherwise A
Protection class	IP40
Commutation	carbon brushes
Armature	straight slot
Magnet system	Permanent magnets, 2-pole
Bearings	2 sintered bronze bearings
Motor housing	Steel, corrosion protected
Motor end shields	brush end plastic drive end zinc die-cast
Spur gear	Metal and plastic gears
Axial play output shaft	0.05 - 0.6 mm

1.61.046.XXX



1.61.046.XXX

Customized versions

The following modifications are available upon request:

- Encoder possible
- Internal ckokes and/or capacitors
- Speed adjustment by winding change
- Addition of wire harnesses
- Modification of shaft length
- Modification of shaft configuration (flat, groove, etc.)
- Assembly of gears, pinions, etc.
- Assembly of adapters and mounting plates
- Gear ratios i=20.1 / 64.3 / 200 / 621 / 927 / 1900 and 2873 upon request

DC Gear Motor 1.61.042.XXX

Type 1.61.042.XXX

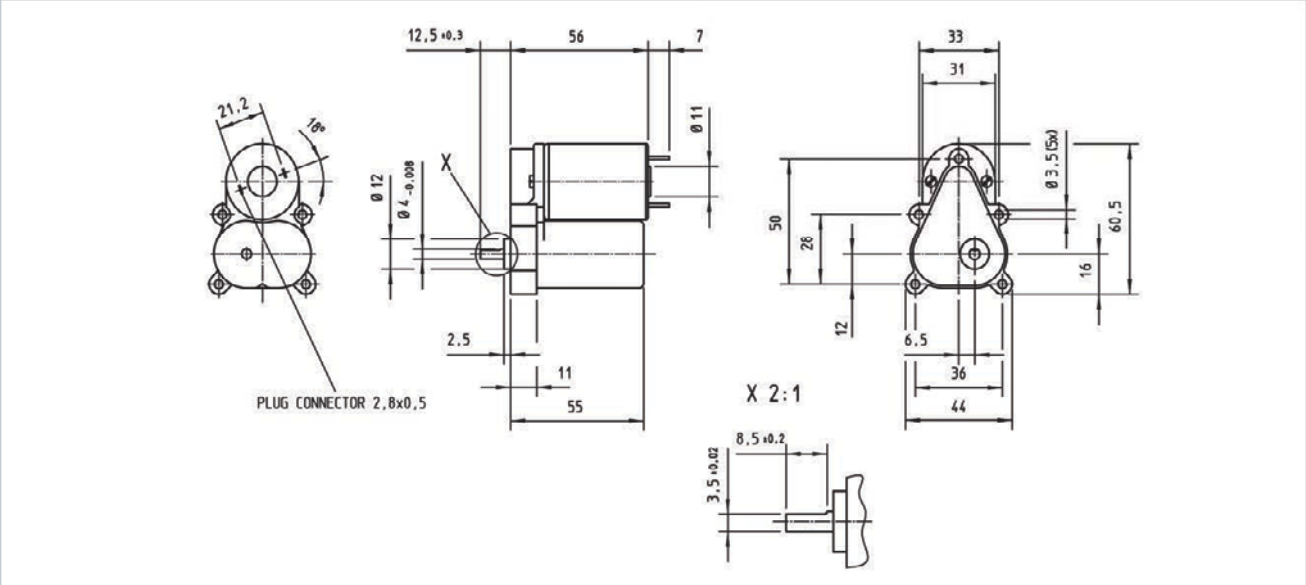
		Characteristics*				max.	Terminal	Stages	Gear
		Rated current	Rated torque	Rated speed	No load speed	Torque*	resistance		ratio
V =	XXX	I_N / A	T_N / mNm	n_N / rpm	n_O / rpm	T_{max} / mNm	Ra / Ω		
12 V	328	0.540	150	150	218	210	9	3	22.5
	322	0.520	300	64	88	420	9	4	55.5
	323	0.460	600	27	36	840	9	5	137.0
	324	0.280	600	12	14.5	840	9	6	338.0
	325	0.200	600	5.5	5.8	840	9	7	834.0
24 V	341	0.270	150	150	218	210	35	3	22.5
	342	0.260	300	64	88	420	35	4	55.5
	343	0.230	600	27	36	840	35	5	137.0
	344	0.140	600	12	14.5	840	35	6	338.0
	345	0.100	600	5.5	5.8	840	35	7	834.0

Operational conditions			
Temperature range	T	°C	-10 - +70
Axial force	F_A	N	15
Radial force, 5 mm from mounting surface	F_R	N	40

* at 25 °C

Design	
Weight	180 g
Gear housing	Plastic
Commutator	Copper / 7-segments
RFI protection	2 chokes
Insulation class	Winding H, otherwise A
Protection class	IP40
Commutation	carbon brushes
Armature	straight slot
Magnet system	Permanent magnets, 2-pole
Bearings	2 sintered bronze bearings
Motor housing	Steel, corrosion protected
Motor end shields	brush end plastic drive end zinc die-cast
Spur gear	Metal and plastic gears
Axial play output shaft	0.05 - 0.6 mm

1.61.042.XXX



1.61.042.XXX

Customized versions

The following modifications are available upon request:

- Encoder possible
- Internal ckokes and/or capacitors
- Speed adjustment by winding change
- Addition of wire harnesses
- Modification of shaft length
- Modification of shaft configuration (flat, groove, etc.)
- Assembly of gears, pinions, etc.
- Assembly of adapters and mounting plates
- Gear ratios i=2056 and 5070 on request

DC Gear Motor 1.61.117.XXX

Type 1.61.117.XXX

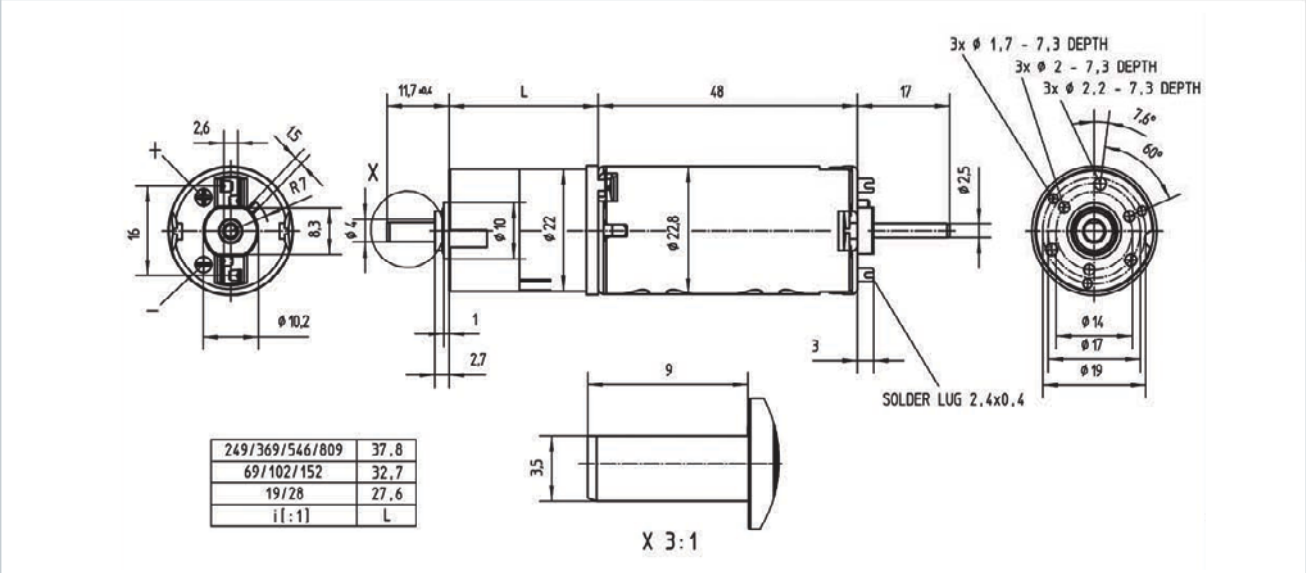
		Characteristics*				max.	Terminal	Stages	Gear
		Rated current	Rated torque	Rated speed	No load speed	Torque*	resistance		ratio
V =	XXX	I_N / A	T_N / mNm	n_N / rpm	n_O / rpm	T_{max} / mNm	Ra / Ω		
12 V	310	0.720	150	205	301	300	6.7	2	19.2
	311	0.660	200	145	203	300	6.7	2	28.4
	312	0.580	350	65	82	600	6.7	3	69.1
	313	0.490	400	47	55.5	600	6.7	3	102.0
	314	0.380	400	34	37.5	600	6.7	3	152.0
	315	0.360	450	21	22.5	800	6.7	4	249.0
	316	0.320	500	15	15	800	6.7	4	369.0
	317	0.290	600	10	10	800	6.7	4	546.0
	318	0.260	650	7	7	800	6.7	4	809.0
24 V	360	0.360	150	205	301	300	27	2	19.2
	361	0.330	200	145	203	300	27	2	28.4
	362	0.290	350	65	82	600	27	3	69.1
	363	0.240	400	47	55.5	600	27	3	102.0
	364	0.190	400	34	37.5	600	27	3	152.0
	365	0.180	450	21	22.5	800	27	4	249.0
	366	0.150	500	15	15	800	27	4	369.0
	367	0.140	600	10	10	800	27	4	546.0
	368	0.130	650	7	7	800	27	4	809.0

Operational conditions			
Temperature range	T	°C	-10 - +70
Axial force	F_A	N	8
Radial force, 5 mm from mounting surface	F_R	N	15

* at 25 °C

Design	
Weight	95 g
Gear housing	Plastic
Commutator	Copper / 3-segments
RFI protection	VDR
Insulation class	Winding F, otherwise A
Protection class	IP20
Commutation	carbon brushes
Armature	straight slot
Magnet system	Permanent magnets, 2-pole
Bearings	2 sintered bronze bearings
Motor housing	Steel, corrosion protected
Motor end shields	brush end plastic drive end zinc die-cast
Planetary gear	Plastic gears
Axial play output shaft	0.05 - 0.6 mm

1.61.117.XXX



249/369/546/809	37.8
69/102/152	32,7
19/28	27.6
i[:1]	L

1.61.117.XXX

self tapping screw EJOT DELTA PT® K20 for Ø 1.7 bore
K25 for Ø 2.0 bore
K28 for Ø 2.2 bore may be used

Customized versions

The following modifications are available upon request:

- **Encoder possible**
- **Speed adjustment by winding change**
- **Modification of shaft length**
- **Modification of shaft configuration (flat, groove, etc.)**
- **Assembly of gears, pinions, etc.**
- **Assembly of adapters and mounting plates**

DC Gear Motor 1.61.077.XXX

Type 1.61.077.XXX

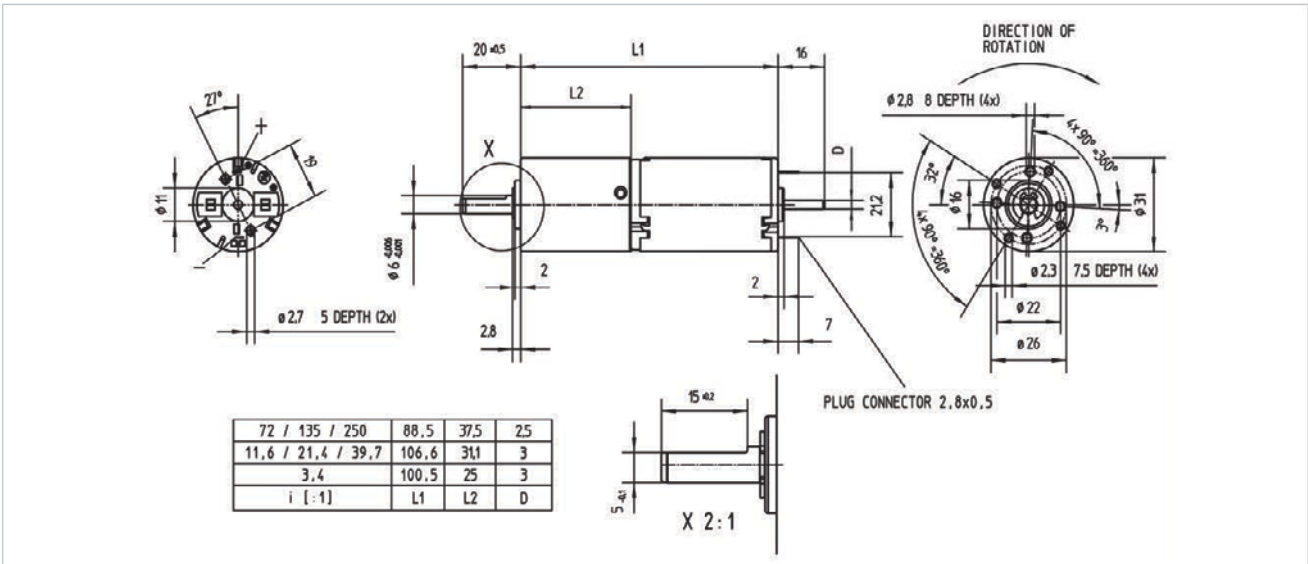
		Characteristics*				max.	Terminal	Stages	Gear
		Rated current	Rated torque	Rated speed	No load speed	Torque*	resistance		ratio
V =	XXX	I_N / A	T_N / mNm	n_N / rpm	n_O / rpm	T_{max} / mNm	Ra / Ω		
12 V	410	1.400	100	900	1215	100	2.7	1	3.4
	411	1.400	300	260	355	420	2.7	2	11.6
	412	1.400	550	140	190	770	2.7	2	21.4
	413	1.400	1000	75	105	1400	2.7	2	39.7
	414	0.850	1000	40	60	1400	4.8	3	72.0
	415	0.850	1800	23	33	2520	4.8	3	135.0
	416	0.550	2000	14	18	2800	4.8	3	250.0
24 V	420	0.700	100	900	1215	100	10	1	3.4
	421	0.700	300	260	355	420	10	2	11.6
	422	0.700	550	140	190	770	10	2	21.4
	423	0.700	1000	75	105	1400	10	2	39.7
	424	0.425	1000	40	60	1400	18	3	72.0
	425	0.425	1800	23	33	2520	18	3	135.0
	426	0.275	2000	14	18	2800	18	3	250.0

Operational conditions			
Temperature range	T	°C	-10 - +70
Axial force	F_A	N	10
Radial force, 5 mm from mounting surface	F_R	N	30

* at 25 °C

Design	
Weight	250 g
Gear housing	Plastic
Commutator	Copper / 7-segments
RFI protection	2 chokes
Insulation class	Winding H, otherwise A
Protection class	IP40
Commutation	carbon brushes
Armature	sintered, straight slot
Magnet system	Permanent magnets, 2-pole
Bearings	2 sintered bronze bearings
Motor housing	Steel, corrosion protected
Motor end shields	brush end plastic drive end zinc die-cast
Planetary gear	Plastic gears
Axial play output shaft	0.05 - 0.6 mm

1.61.077.XXX



72 / 135 / 250	88,5	37,5	25
11,6 / 21,4 / 39,7	106,6	31,1	3
3,4	100,5	25	3
i [:1]	L1	L2	D

1.61.077.XXX

self tapping screw EJOT DELTA PT® K30 for Ø 2.3 bore may be used

Customized versions

The following modifications are available upon request:

- Encoder possible
- Internal ckokes and/or capacitors
- Speed adjustment by winding change
- Addition of wire harnesses
- Modification of shaft length
- Modification of shaft configuration (flat, groove, etc.)
- Assembly of gears, pinions, etc.
- Assembly of adapters and mounting plates
- Gear ratio i=6.3 on request

DC Gear Motor 1.61.050.XXX

Type 1.61.050.XXX

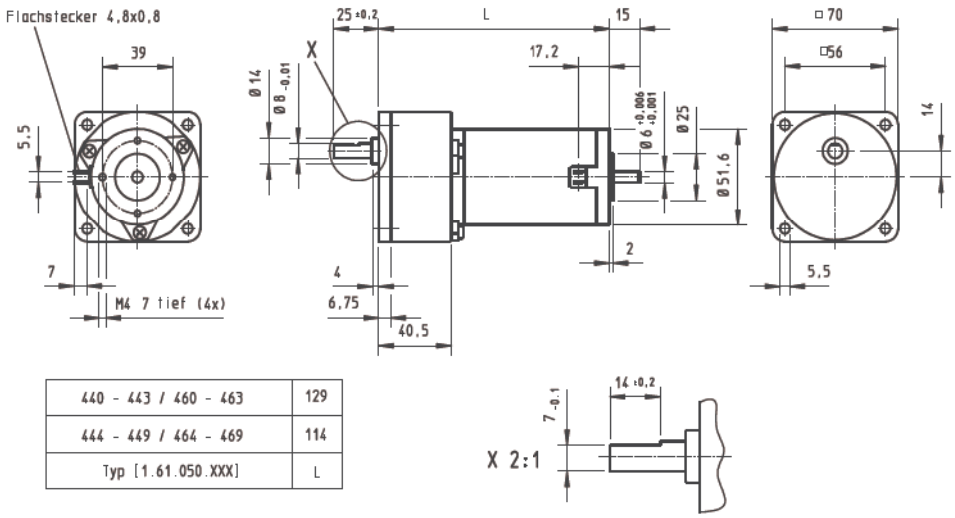
		Characteristics*				max.	Terminal	Stages	Gear
		Rated current	Rated torque	Rated speed	No load speed	Torque*	resistance		ratio
V =	XXX	I_N / A	T_N / mNm	n_N / rpm	n_O / rpm	T_{max} / mNm	Ra / Ω		
12 V	440	3.300	400	460	535	560	0.7	2	6.3
	441	3.500	800	240	281	1120	0.7	2	12.0
	442	3.500	1500	116	136	2100	0.7	3	24.7
	443	3.600	2900	61	72	4060	0.7	3	46.7
	444	2.400	900	92	121	1260	1.9	3	24.7
	445	2.500	1800	48	64	2520	1.9	3	46.7
	446	2.500	3300	24	31	4620	1.9	4	96.5
	447	1.900	4000	14	16	5600	1.9	4	183.0
	448	1.500	5000	7.2	8	7000	1.9	5	377.0
	449	1.200	5000	4.0	4.2	7000	1.9	5	714.0
24 V	460	1.650	400	460	535	560	2.8	2	6.3
	461	1.750	800	240	281	1120	2.8	2	12.0
	462	1.750	1500	116	136	2100	2.8	3	24.7
	463	1.800	2900	61	72	4060	2.8	3	46.7
	464	1.200	900	92	121	1260	7.6	3	24.7
	465	1.250	1800	48	64	2520	7.6	3	46.7
	466	1.250	3300	24	31	4620	7.6	4	96.5
	467	0.950	4000	14	16	5600	7.6	4	183.0
	468	0.750	5000	7.2	8	7000	7.6	5	377.0
	469	0.600	5000	4.0	4.2	7000	7.6	5	714.0

Operational conditions			
Temperature range	T	°C	-10 - +70
Axial force	F_A	N	30
Radial force, 5 mm from mounting surface	F_R	N	100

* at 25 °C

Design	
Weight	1200 g
Gear housing	Zinc die-cast
Commutator	Copper / 12-segments
RFI protection	-
Insulation class	Winding H, otherwise A
Protection class	IP40
Commutation	carbon brushes
Armature	skewed slot
Magnet system	Permanent magnets, 2-pole
Bearings	2 sintered bronze bearings
Motor housing	Steel, corrosion protected
Motor end shields	zinc die-cast on both sides
Spur gear	Metal and plastic gears
Axial play output shaft	0.05 - 0.5 mm

1.61.050.XXX



440 - 443 / 460 - 463	129
444 - 449 / 464 - 469	114
Typ [1.61.050.XXX]	L

1.61.050.XXX

Customized versions

The following modifications are available upon request:

- Encoder possible
- Internal ckokes and/or capacitors
- Speed adjustment by winding change
- Addition of wire harnesses
- Modification of shaft length
- Modification of shaft configuration (flat, groove, etc.)
- Assembly of gears, pinions, etc.
- Assembly of adapters and mounting plates

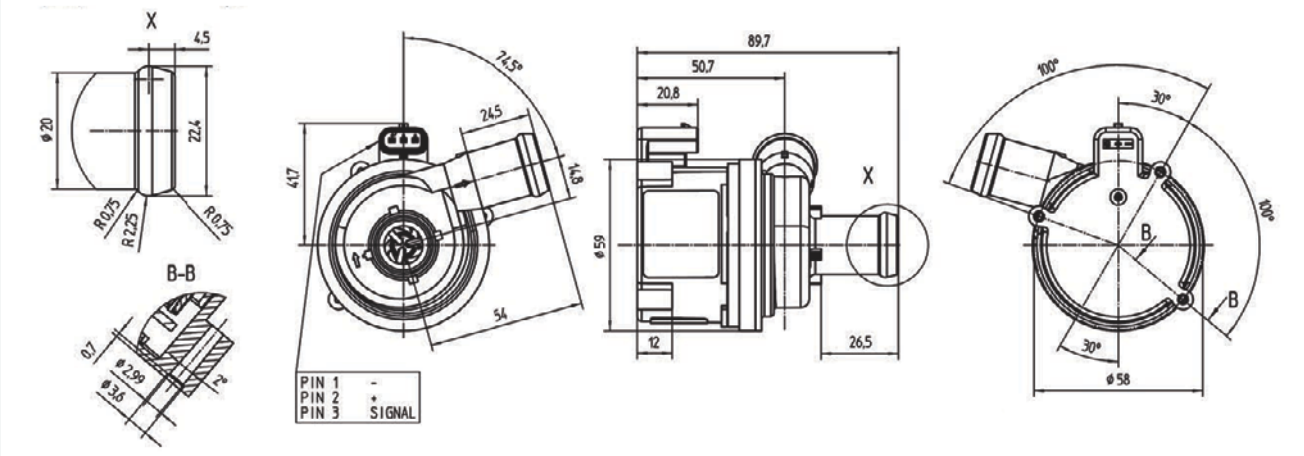
BLDC Water Pump 1.24.021.XXX

1.24.021.XXX

Design	
Pump	Wet-rotor principle not self-priming Intake fitting axial
Motor	Inner rotor design Overload protection Integrated RFI Protection against false polarity
Protection class	IP6K6K / IPX9K

Type 1.24.021.XXX			301
Characteristics*			**axial**
Rated voltage	U	V	12
Feed pressure	ΔP_D	bar	0.14
Feed output	V	l / h	720
Current	I_N	A	0.95
Overall efficiency	η	%	17
max. Constant current	I_{max}	A	1.2
max. Feed pressure	ΔP_{Dmax}	bar	0.22
max. Feed output	V_{max}	l / h	1000

Motor Parameters*			
Weight	G	g	255



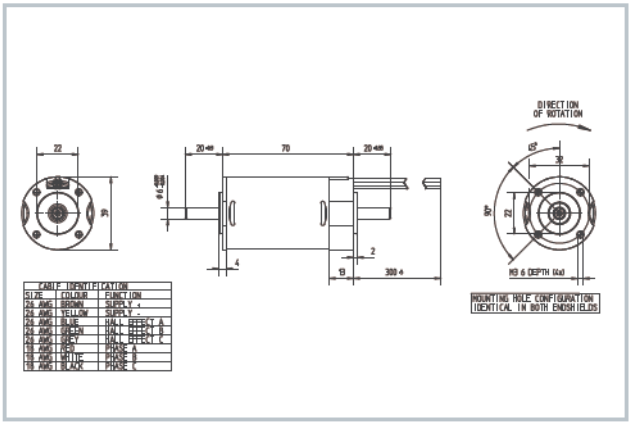
1.24.021.301

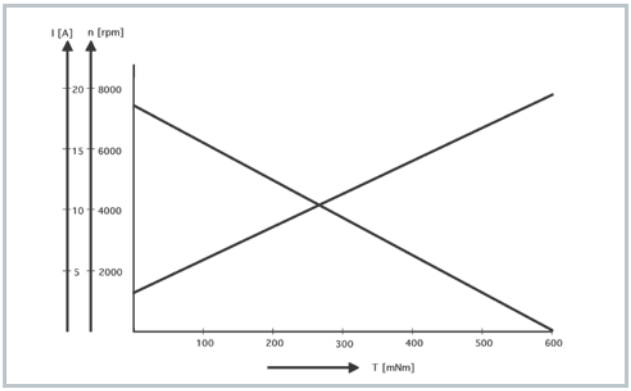
* Lead wire 300 mm long will be included

Operational conditions			
Temperature range	T	°C	-40 - +125
Medium temperature	TM	°C	-40 - +125
Pressure range (absolute) - constant operations	P	bar	0.1 - 3.0

* at 25 °C

BLDC Motor Ø 40/L 70 — 1.25.037.2XX





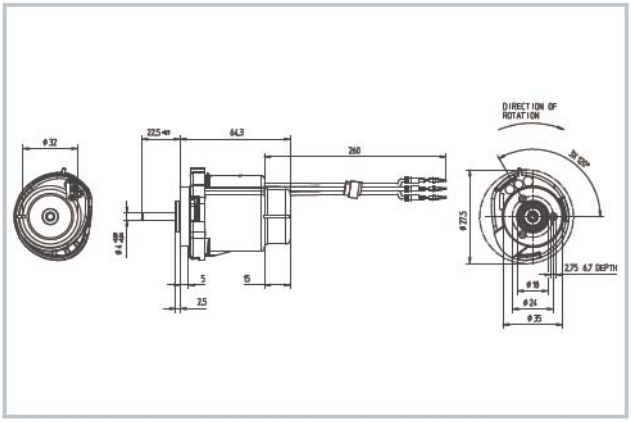
1.25.037.2XX

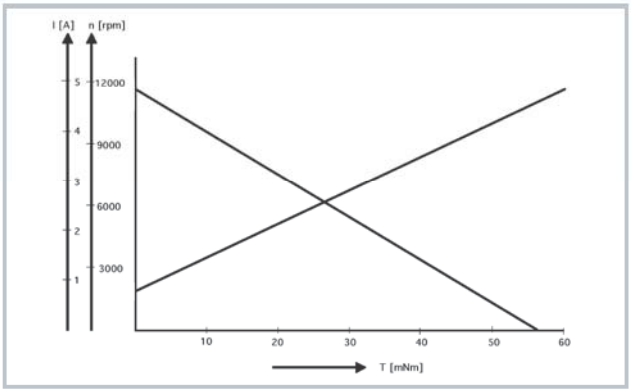
Type 1.25.037.			2XX
Operating voltage	U	V	24
Operating voltage range	U	V	12 - 48
No load speed	n_O	rpm	7400
No load current	I_O	A	< 1
max. continuous torque	T_{cont}	mNm	75
Rated speed	n_N	rpm	5300
Rated current	I_N	A	2.5
Operating temperature range	T	°C	-30 - +65

performance at 25 °C

Motor operation by external electronic module, 3 Hallsensors integrated in motor

BLDC Motor with integrated electronics — 1.26.055.XXX





1.26.055.XXX

Type 1.26.055.			XXX
Operating voltage	U	V	12.8
Operating voltage range	U	V	7 - 32
No load speed	n_O	rpm	11700
No load current	I_O	A	< 1.5
max. continuous torque	T_{cont}	mNm	15
Rated speed	n_N	rpm	8000
Rated current	I_N	A	2
Operating temperature range	T	°C	-40 - +105

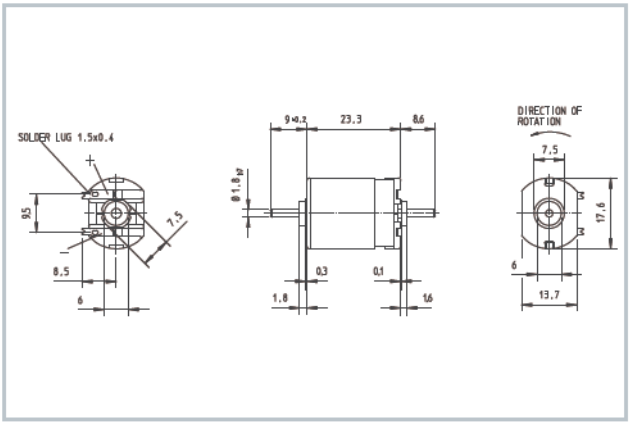
performance at 25 °C

Additional functions:

Signal output: 1 pulse per motor revolution, speed control by PWM, 7 V - Version available (operating voltage range: 3.5 - 16 V)

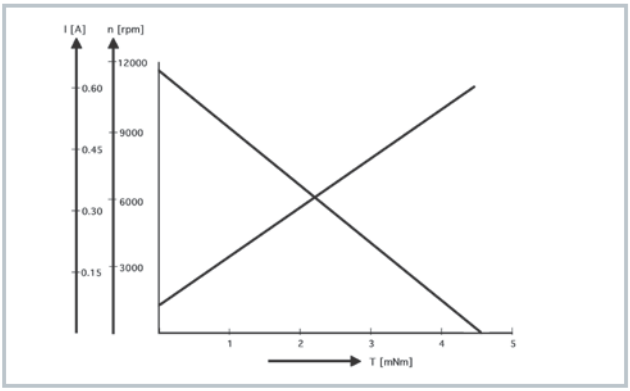
DC Motor Ø 18 — 1.16.018.XXX

1.16.018.XXX



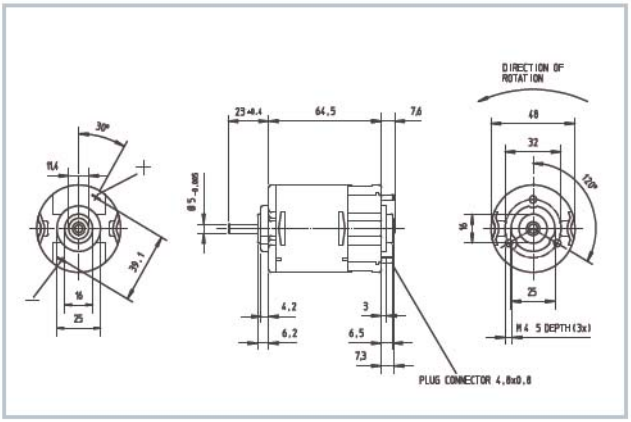
Type 1.16.018.			XXX
Operating voltage	U	V	12
Operating voltage range	U	V	3 - 16
No load speed	n_0	rpm	11700
No load current	I_0	A	< 0.1
max. continuous torque	T_{cont}	mNm	2
Rated speed	n_N	rpm	6500
Rated current	I_N	A	0.3
Operating temperature range	T	°C	-10 - +70

performance at 25 °C



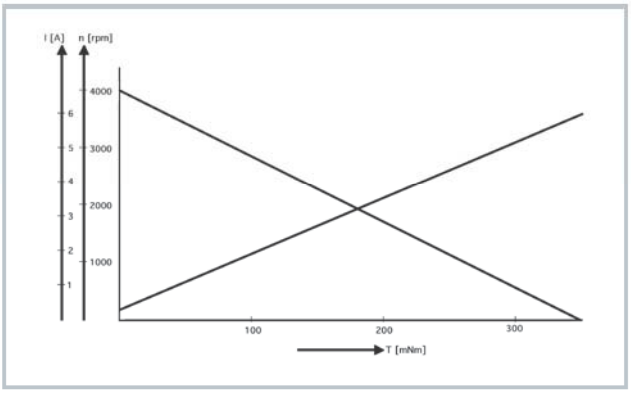
DC Motor Ø 48 — 1.13.018.XXX

1.13.018.XXX

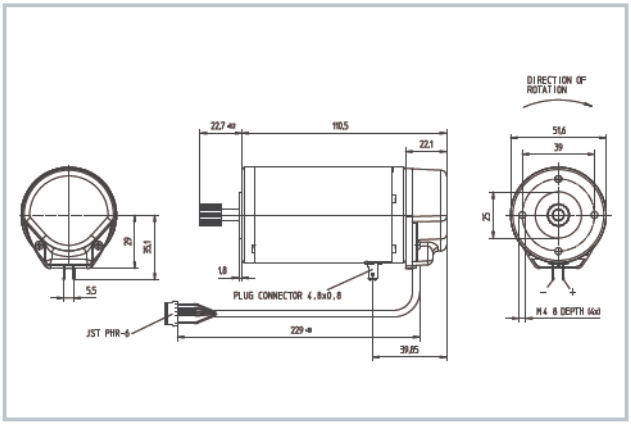


Type 1.13.018.			XXX
Operating voltage	U	V	24
Operating voltage range	U	V	6 - 42
No load speed	n_0	rpm	4000
No load current	I_0	A	< 0.3
max. continuous torque	T_{cont}	mNm	80
Rated speed	n_N	rpm	3000
Rated current	I_N	A	1.7
Operating temperature range	T	°C	-10 - +70

performance at 25 °C



DC Motor with Encoder 1.13.044.XXX

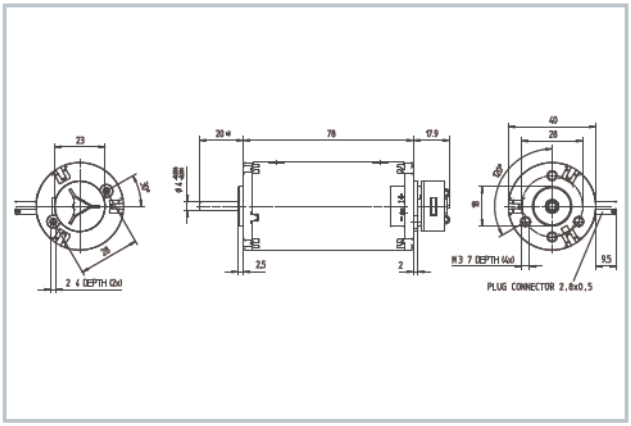


1.13.044.XXX

Encoder		CPR	°	V	°C
Functional principle:					
Reflectiv optical encoder					
Number of channels	2				
Resolution		500			
Phase angle between channel A and Channel B			90		
Electrical output	TTL compatible				
Supply voltage				4.5 - 5.5	
Operating temperature range:					0 - +85

performance at 25 °C

DC Motor with Encoder 1.13.046.XXX



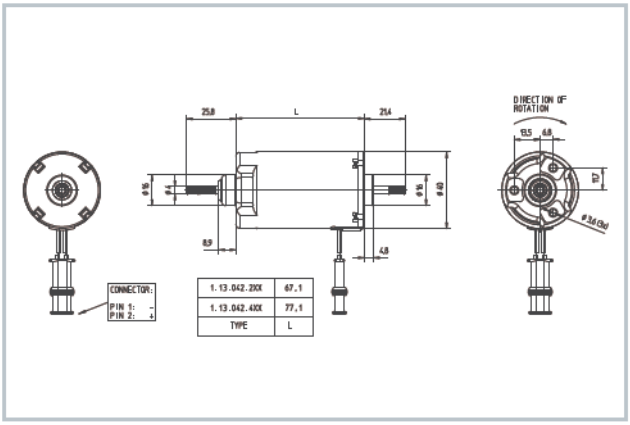
1.13.046.XXX

Encoder		CPR	°	V	°C
Functional principle:					
Reflectiv optical encoder					
Number of channels	2				
Resolution		200			
Phase angle between channel A and Channel B			90		
Electrical output	TTL compatible				
Supply voltage				4.5 - 5.5	
Operating temperature range:					-10 - +85

performance at 25 °C

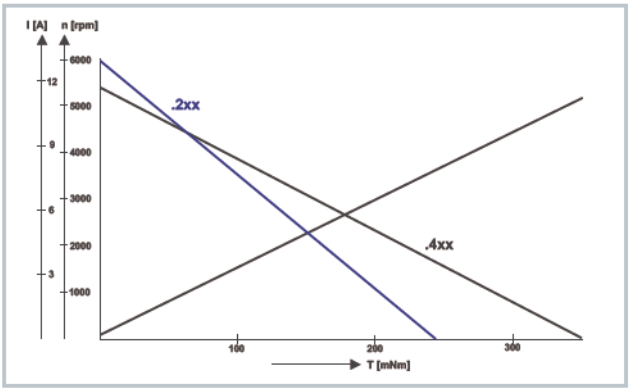
Drawn can motor 1.13.042.XXX

1.13.042.XXX



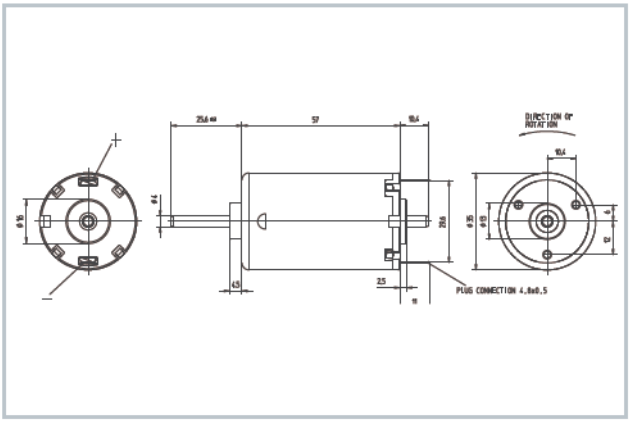
Type 1.13.042.			2XX	4XX
Operating voltage	U	V	18	18
Operating voltage range	U	V	13 - 30	13 - 30
No load speed	n_0	rpm	6000	5400
No load current	I_0	A	< 0.5	< 0.5
max. continuous torque	T_{cont}	mNm	40	50
Rated speed	n_N	rpm	4700	4400
Rated current	I_N	A	1.8	2.0
Operating temperature range	T	°C	-40 - +85	-40 - +85

performance at 25 °C



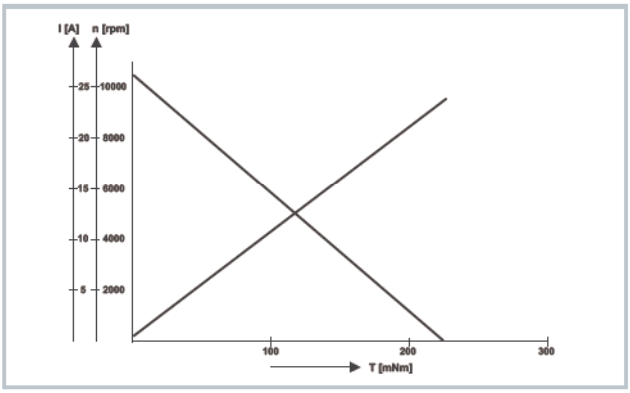
Drawn can motor 1.13.052.XXX

1.13.052.XXX

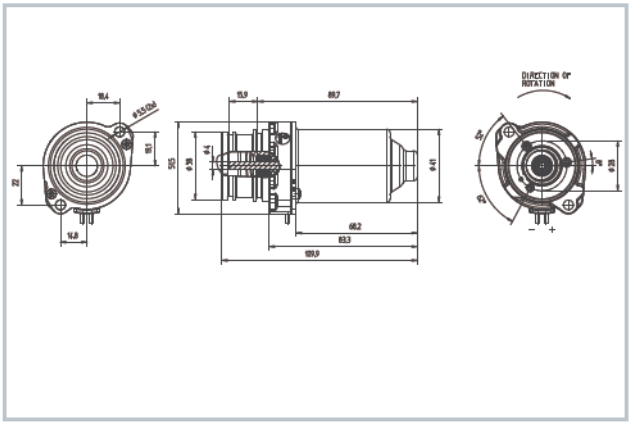


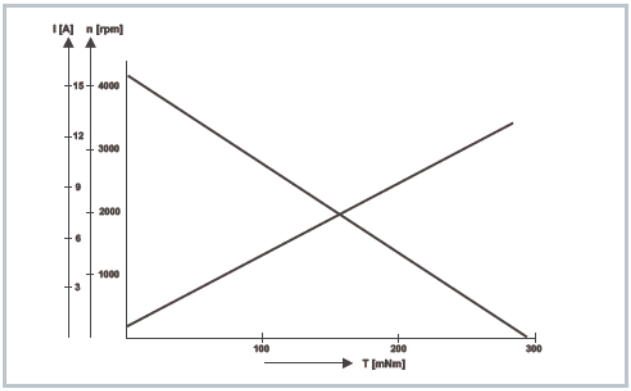
Type 1.13.052.			XXX
Operating voltage	U	V	10
Operating voltage range	U	V	9 - 16
No load speed	n_0	rpm	10800
No load current	I_0	A	< 1.0
max. continuous torque	T_{cont}	mNm	33
Rated speed	n_N	rpm	9000
Rated current	I_N	A	3.3
Operating temperature range	T	°C	-40 - +85

performance at 25 °C



Drawn can motor 1.13.048.XXX



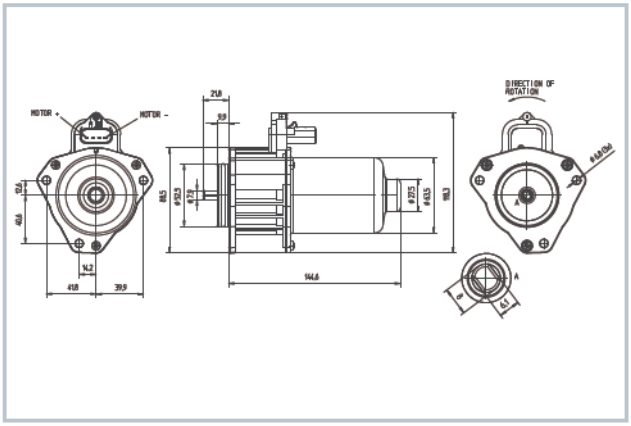


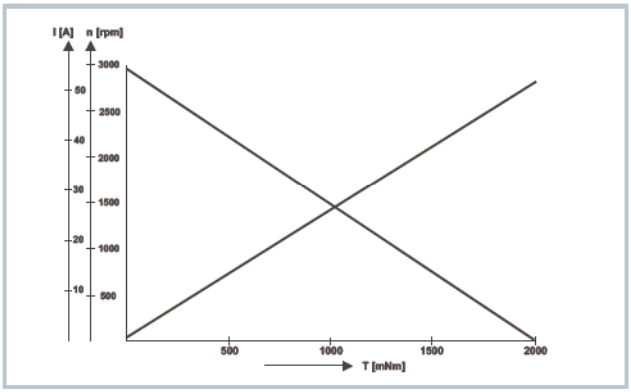
1.13.048.XXX

Type 1.13.048.			XXX
Operating voltage	U	V	12
Operating voltage range	U	V	9 - 16
No load speed	n_O	rpm	4400
No load current	I_o	A	< 0.7
max. continuous torque	T_{cont}	mNm	48
Rated speed	n_N	rpm	3500
Rated current	I_N	A	2.4
Operating temperature range	T	°C	-40 - +125

performance at 25 °C

Drawn can motor 1.13.064.XXX





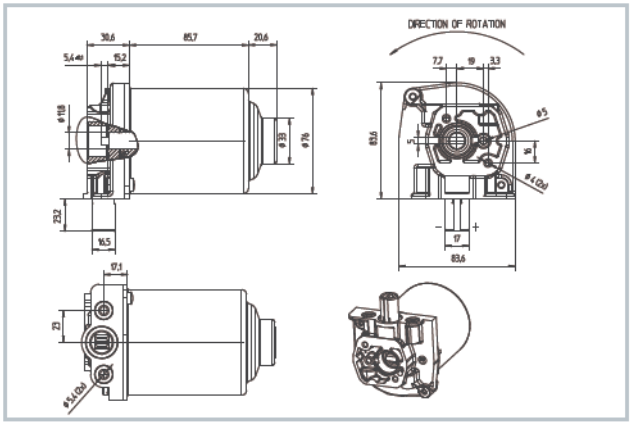
1.13.064.XXX

Type 1.13.064.			XXX
Operating voltage	U	V	13.5
Operating voltage range	U	V	9 - 16
No load speed	n_O	rpm	2900
No load current	I_o	A	< 2.5
max. continuous torque	T_{cont}	mNm	330
Rated speed	n_N	rpm	2400
Rated current	I_N	A	10
Operating temperature range	T	°C	-40 - +85

performance at 25 °C

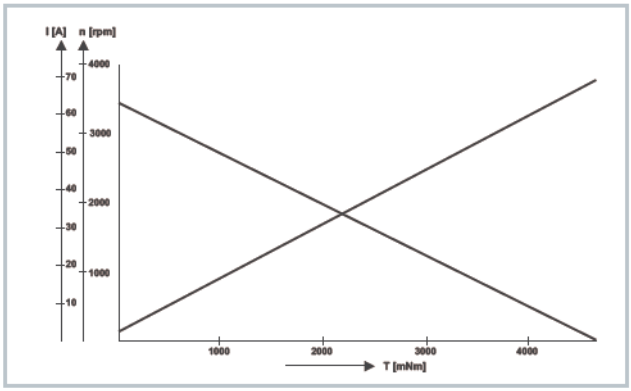
Drawn can motor 1.13.077.XXX

1.13.077.XXX

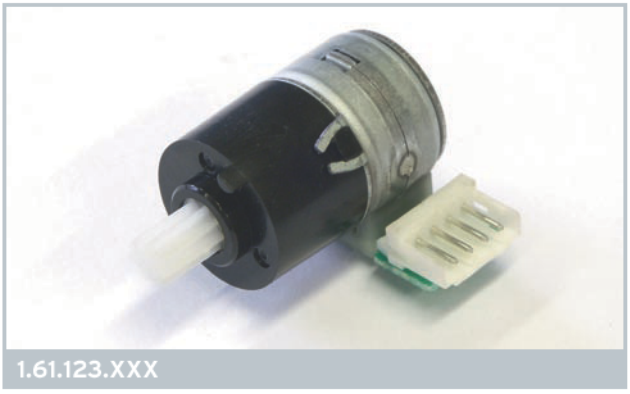


Type 1.13.077.			XXX
Operating voltage	U	V	24
Operating voltage range	U	V	16 - 30
No load speed	n_o	rpm	3500
No load current	I_o	A	< 4.0
maximum continuous torque	T_{cont}	mNm	850
Rated speed	n_N	rpm	2700
Rated current	I_N	A	15
Operating temperature range	T	°C	-30 - +125

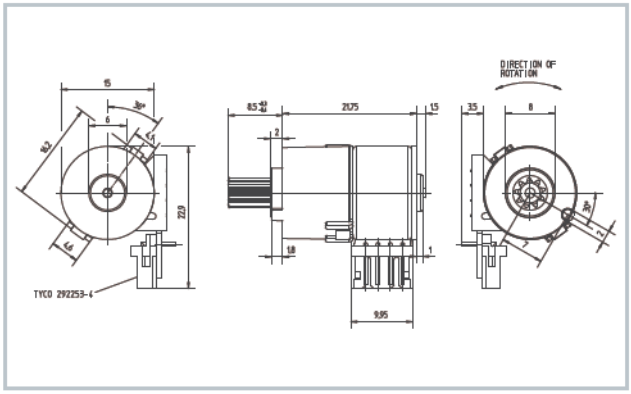
performance at 25 °C



Special gear motor 1.61.123.XXX



1.61.123.XXX

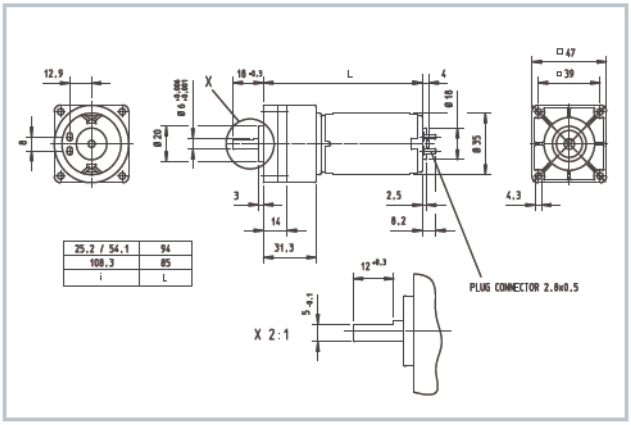


Type 1.61.123.			XXX
Average input voltage	U	V	6.75
Coil resistance / Phase		Ω	15
Coil inductance / Phase		mH	5.4
Holding torque		mNm	170
Pull-out torque (at 2000 pps)		mNm	100
Step angle motor		°	18
Gear ratio			110.6
Operating temperature range	T	°C	-40 - +80

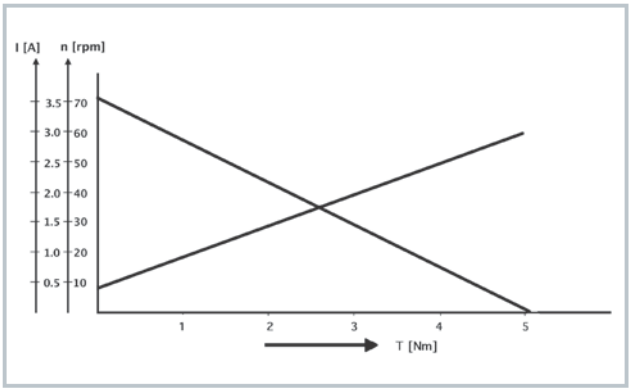
performance at 25 °C

Note:
Gearmotor driven by a 2 phase - bipolar stepper motor
To operate the gearmotor a stepper motor driver electronic is necessary

Special gear motor 1.61.070.XXX



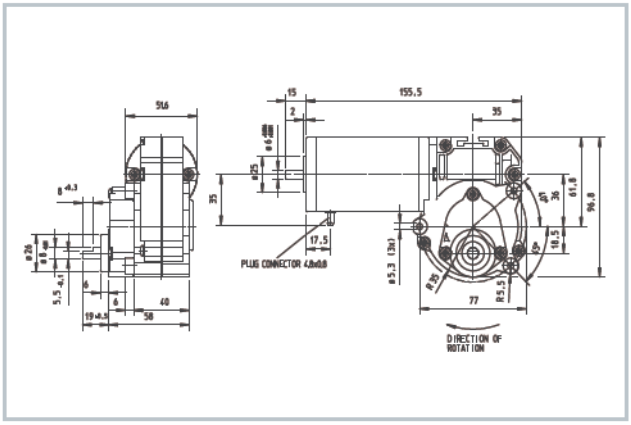
1.61.070.XXX



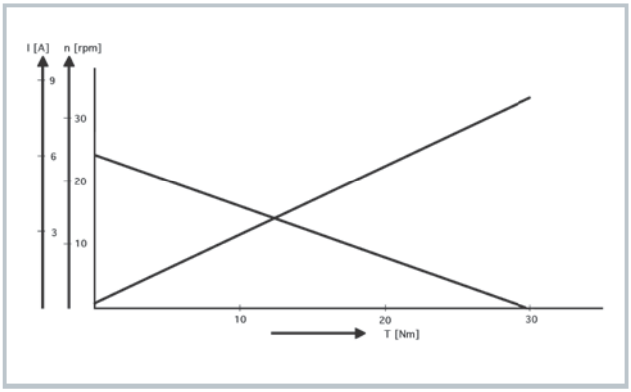
Type 1.61.070.			XXX
Operating voltage	U	V	24
Operating voltage range	U	V	9 - 42
No load speed	n_o	rpm	71
No load current	I_o	A	< 0.5
maximum continuous torque	T_{cont}	mNm	1.3
Rated speed	n_N	rpm	53
Rated current	I_N	A	< 1
Gear ratio			54.1
Operating temperature range	T	°C	-10 - +70

performance at 25 °C
gear ratios 25.2 and 108.3 also available

Special gear motor 1.61.090.XXX



1.61.090.XXX



Type 1.61.090.			XXX
Operating voltage	U	V	24
Operating voltage range	U	V	9 - 42
No load speed	n_o	rpm	24
No load current	I_o	A	< 0.5
max. continuous torque	T_{cont}	Nm	7
Rated speed	n_N	rpm	20
Rated current	I_N	A	< 2
Gear ratio			170.5
Operating temperature range	T	°C	-10 - +70

performance at 25 °C
Gear ratio 55 also available

Special gear Motor with Encoder 1.61.117.XXX / 1.61.065.XXX / 1.61.077.XXX

1.61.117.XXX / 1.61.065.XXX

Encoder		CPR	°	V	°C
Functional principle:					
Reflectiv optical encoder					
Number of channels	2				
Resolution		100			
Phase angle between channel A and B			90		
Electrical output	TTL com-patible				
Supply voltage				3 - 5.5	
Operating tempe-rature range:					-20 - +85

performance at 25 °C

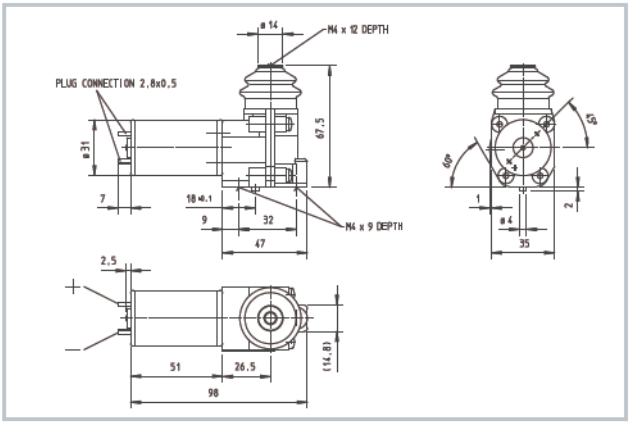
1.61.077.XXX

Encoder		mA	°	V	°C
Functional principle:					
Magnetic encoder					
Number of Hall sensors	2				
Resolution pulses per Hall sensor	2				
Phase angle between Hall sensor 1 and Hall sensor 2			90		
„open collector" output		< 50			
Hall sensor supply voltage				-3.5 - 24	
Operating tempe-rature range:					-20 - +85

performance at 25 °C

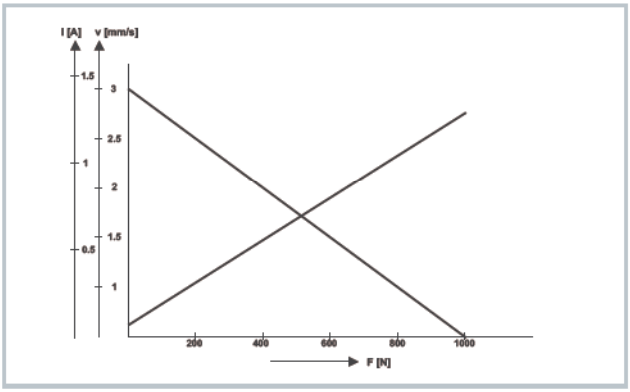
Special gear motor 1.61.087.XXX

1.61.087.XXX

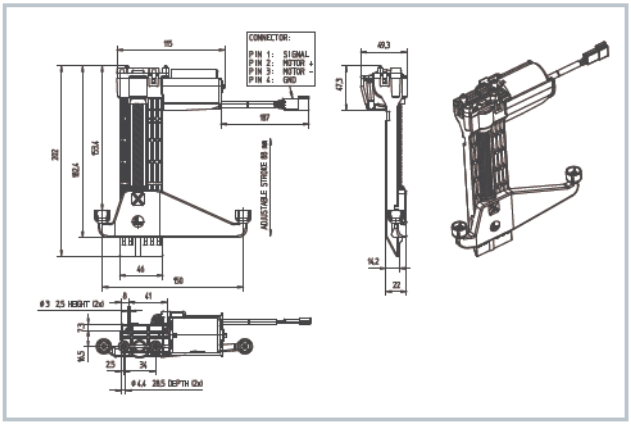


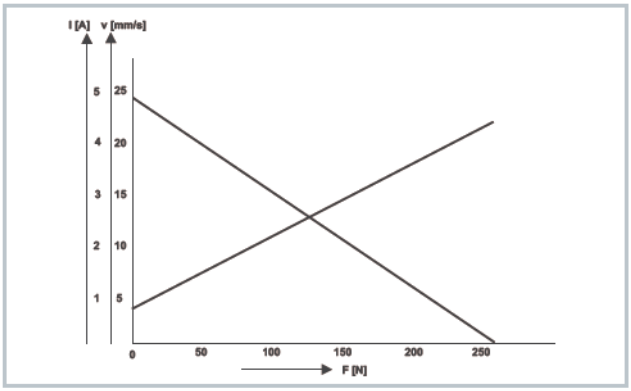
Type 1.61.087.			XXX
Operating voltage	U	V	24
Operating voltage range	U	V	20 - 26
No load travel speed	V_N	mm/s	3.0
No load current	I_o	A	< 0.1
maximum force	F_{max}	N	200
Rated travel speed	n_N	mm/s	2.5
Rated current	I_N	A	0.3
maximum travel		mm	10
Operating temperature range	T	°C	-10 - +80

performance at 25 °C



Special gear motor 1.61.084.XXX





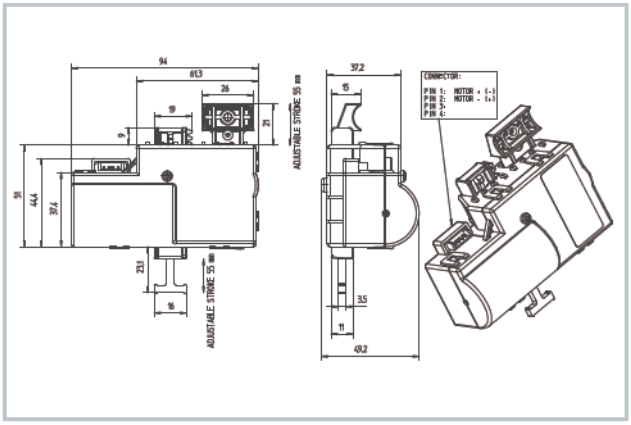
1.61.084.XXX

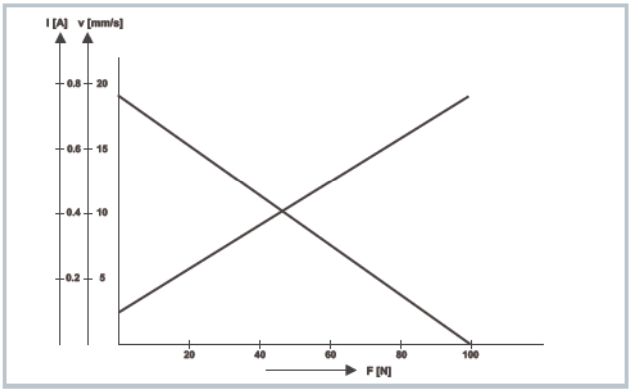
Type 1.61.084.			XXX
Operating voltage	U	V	13
Operating voltage range	U	V	9 - 15
No load travel speed	V_N	mm/s	24
No load current	I_o	A	< 1.0
maximum force	F_{max}	N	70
Rated travel speed	n_N	mm/s	18
Rated current	I_N	A	< 2.0
maximum travel		mm	88
Operating temperature range	T	°C	-30 - +80

Sensor: Hall sensor
1 pulse per motor revolution
PTC temperature sensor

performance at 25 °C

Special gear motor 1.61.092.XXX





1.61.092.XXX

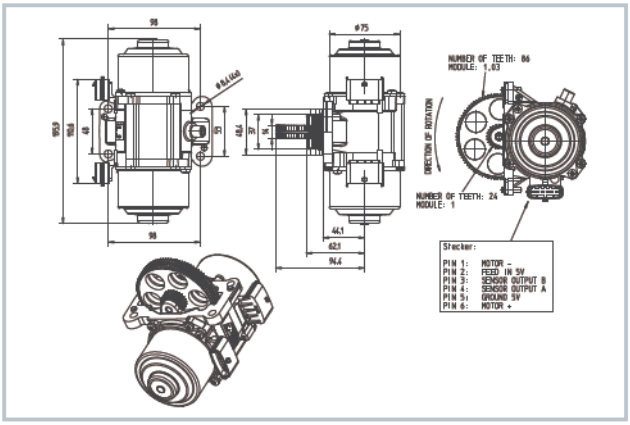
Type 1.61.092.			XXX
Operating voltage	U	V	12
Operating voltage range	U	V	9 - 15
No load travel speed	V_N	mm/s	18
No load current	I_o	A	< 0.15
maximum force	F_{max}	N	36
Rated travel speed	n_N	mm/s	11.5
Rated current	I_N	A	< 0.5
maximum travel		mm	55
Operating temperature range	T	°C	-40 - +80

Sensor: Hall sensor
1 pulse per motor revolution
PTC temperature sensor

performance at 25 °C

Special gear motor 1.61.100.XXX

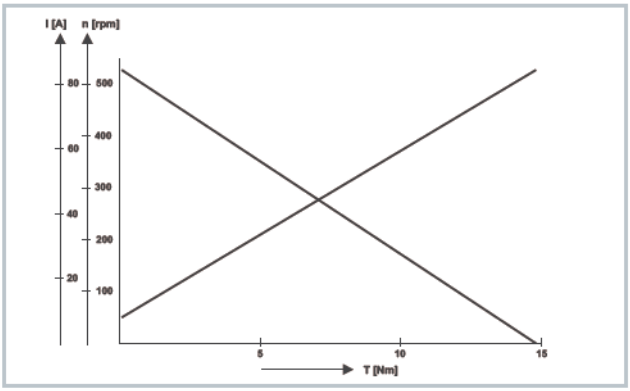
1.61.100.XXX



Type 1.61.100.			XXX
Operating voltage	U	V	13
Operating voltage range	U	V	9 - 16
No load speed	n_0	rpm	525
No load current	I_0	A	< 10
maximum torque	T_{max}	Nm	3
Rated speed	n_N	rpm	420
Rated current	I_N	A	23
Operating temperature range	T	°C	-25 - +100

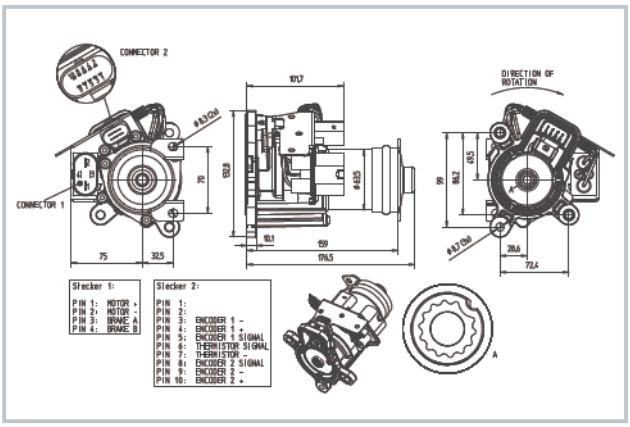
Sensor: Hall sensor
30 pulses per motor revolution

performance at 25 °C



Special gear motor 1.61.111.XXX

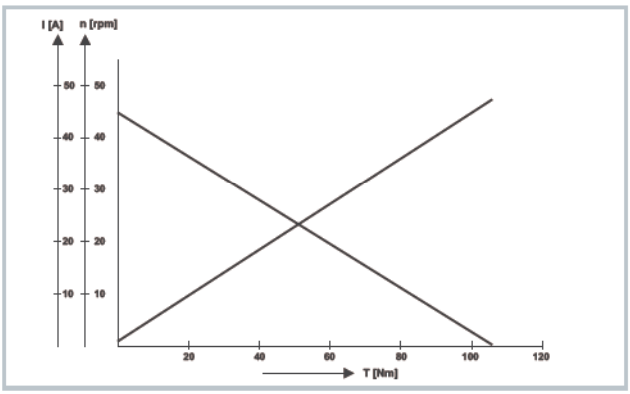
1.61.111.XXX



Type 1.61.111.			XXX
Operating voltage	U	V	13
Operating voltage range	U	V	9 - 16
No load speed	n_0	rpm	45
No load current	I_0	A	< 1.5
maximum torque	T_{max}	Nm	14
Rated speed	n_N	rpm	38
Rated current	I_N	A	< 8.0
Operating temperature range	T	°C	-40 - +105

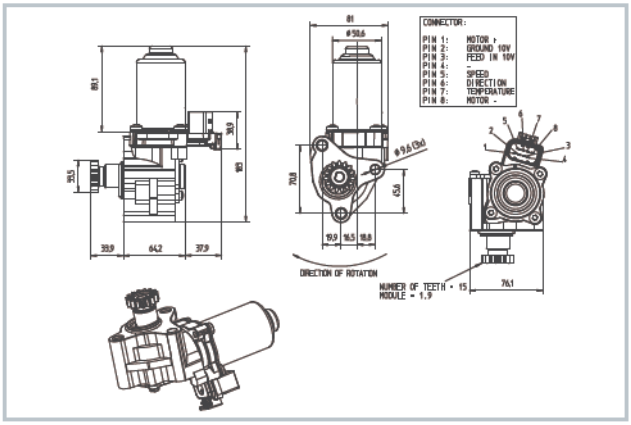
performance at 25 °C

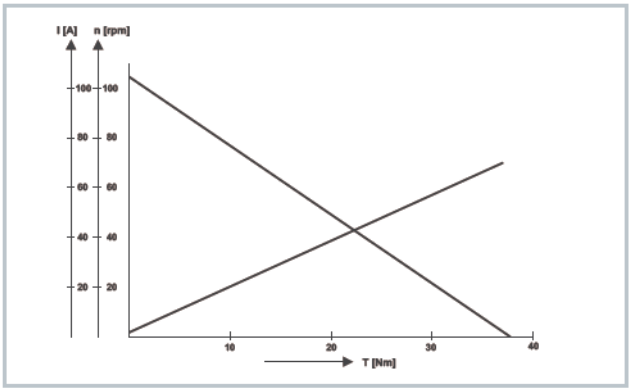
Sensor: Potentiometer for detection of output shaft position	
Analog signal	0.5 to 4.5 V
Supply voltage:	5 V
Temperatur sensor:	
resistance value: temp. coefficient:	1 Kohm -3,5%/°C



Brake	
Power on - brake	
maximum current:	1.8 A at 16 V

Special gear motor 1.61.113.XXX





1.61.113.XXX

Type 1.61.113.			XXX
Operating voltage	U	V	12
Operating voltage range	U	V	9 - 16
No load speed	n_o	rpm	102
No load current	I_o	A	< 2.0
maximum torque	T_{max}	Nm	15.5
Rated speed	n_N	rpm	67
Rated current	I_N	A	26
Operating temperature range	T	°C	-40 - +105

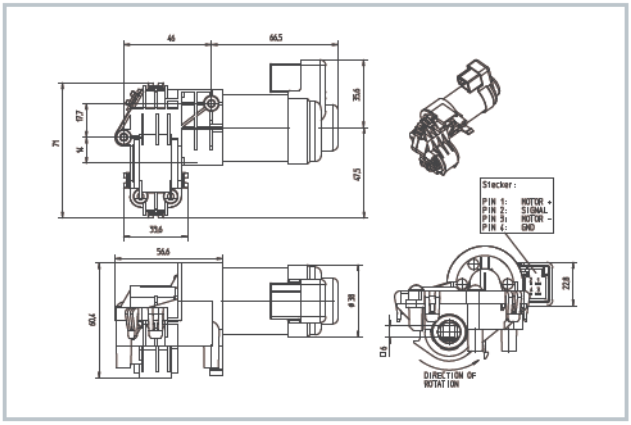
performance at 25 °C

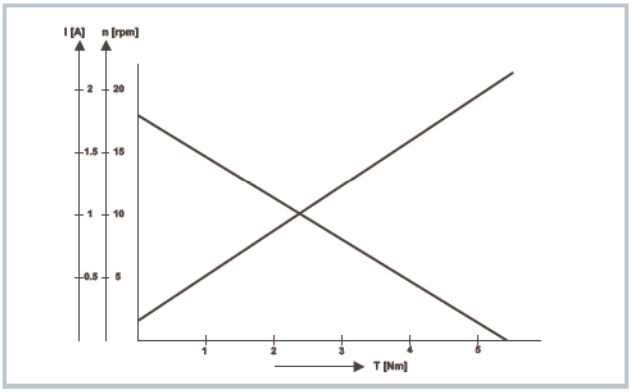
Sensor: incremental sensor for speed and direction

20 pulses per motor revolution
Supply voltage: 5 V

PTC temperature sensor: KTY 13 - 6

Special gear motor 1.61.108.XXX





1.61.108.XXX

Type 1.61.108.			XXX
Operating voltage	U	V	13
Operating voltage range	U	V	9 - 16
No load speed	n_o	rpm	18
No load current	I_o	A	< 0.2
maximum torque	T_{max}	Nm	1.2
Rated speed	n_N	rpm	14
Rated current	I_N	A	< 1.0
Operating temperature range	T	°C	-30 - +80

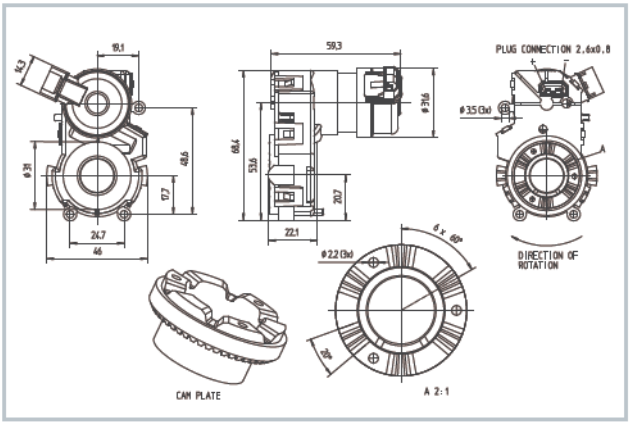
performance at 25 °C

Sensor: Hall sensor

1 pulse per motor revolution

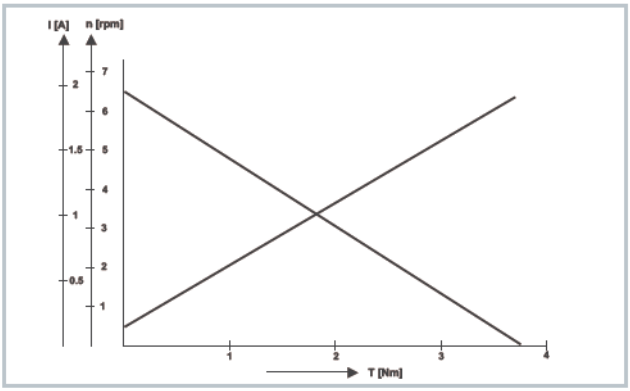
Special gear motor 1.41.002.XXX

1.41.002.XXX



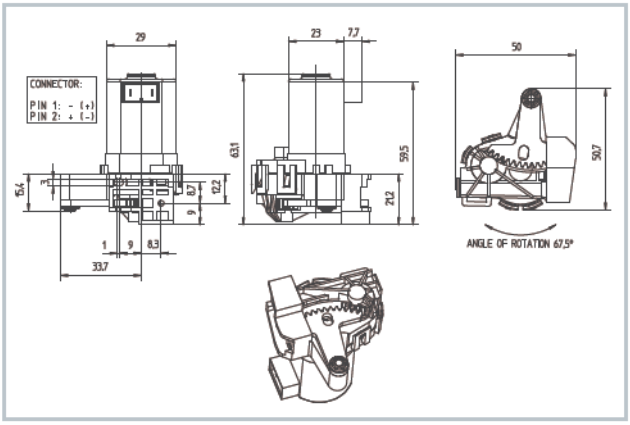
Type 1.41.002.			XXX
Operating voltage	U	V	13
Operating voltage range	U	V	9 - 15
No load speed	n_0	rpm	6.5
No load current	I_0	A	< 0.2
maximum torque	T_{max}	Nm	1.0
Rated speed	n_N	rpm	5.0
Rated current	I_N	A	< 1.0
Operating temperature range	T	°C	-40 - +80

performance at 25 °C



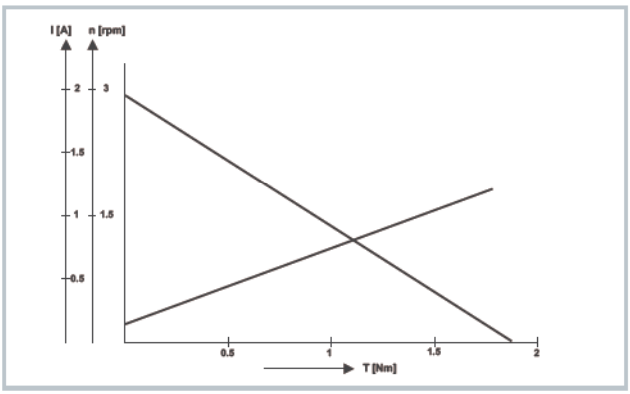
Special gear motor 1.42.002.XXX

1.42.002.XXX

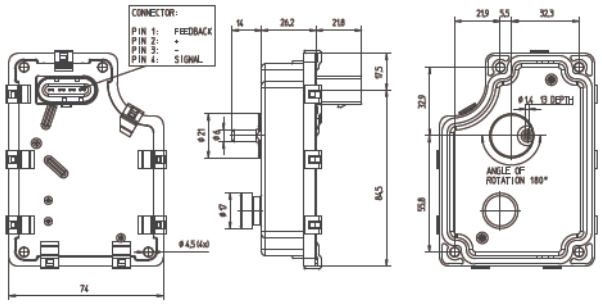


Type 1.42.002.			XXX
Operating voltage	U	V	13
Operating voltage range	U	V	9 - 15
Operating angle		°	67.5
Operating time		sec	< 4.0
No load current	I_0	A	0.15
maximum torque	T_{max}	Nm	1.0
Operating temperature range	T	°C	-40 - +80

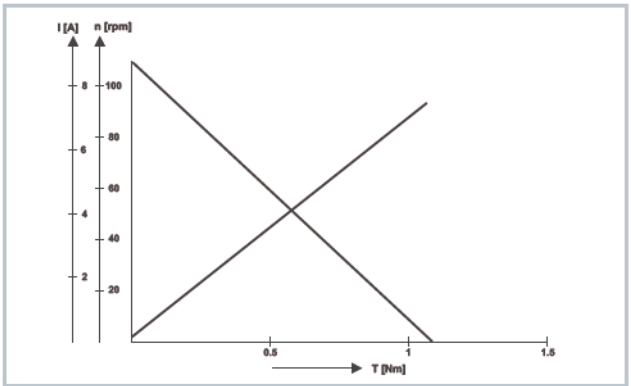
performance at 25 °C



Special gear motor 1.61.078.XXX



1.61.078.XXX



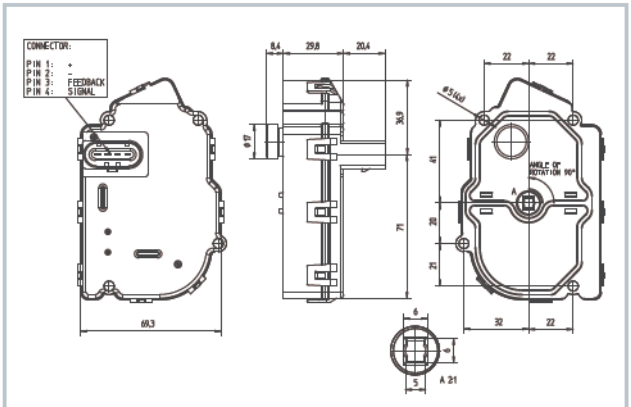
Type 1.61.078.			XXX
Operating voltage	U	V	12
Operating voltage range	U	V	9 - 16
Rated torque	T_N	Nm	0.1
Current consumption		A	< 1.0
Adjusting time for 180° act. angle		ms	< 500
Actuation angle		°	180
Operating temperature range	T	°C	-30 - +85

performance at 25 °C

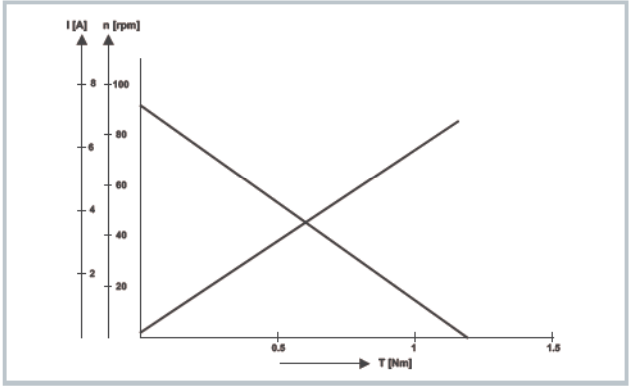
Additional functions:

integrated switches at end positions

Special gear motor 1.61.079.XXX



1.61.079.XXX



Type 1.61.079.			XXX
Operating voltage	U	V	12
Operating voltage range	U	V	9 - 16
Rated torque	T_N	Nm	0.1
Current consumption		A	< 1.0
Adjusting time for 180° act. angle		ms	< 300
Actuation angle		°	180
Operating temperature range	T	°C	-30 - +85

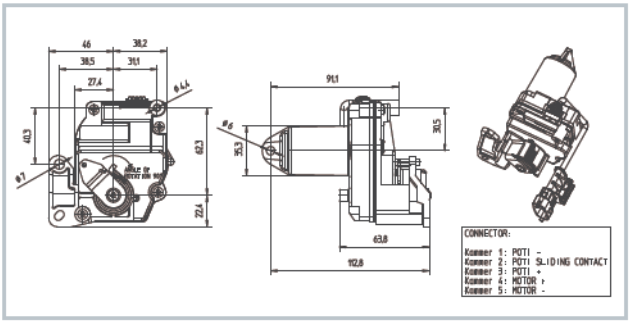
performance at 25 °C

Additional functions:

integrated switches at end positions

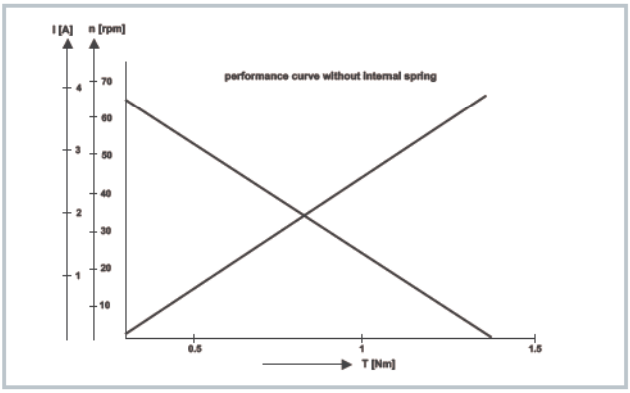
Special gear motor 1.61.094.XXX

1.61.094.XXX



Type 1.61.094.			XXX
Operating voltage	U	V	14
Operating voltage range	U	V	9 - 18
Rated torque	T_N	Nm	0.1
Current consumption		A	< 1.5
Adjusting time for 90° act. angle		ms	< 300
Actuation angle		°	90
maximum torque	T_{max}	Nm	0.3
max. current consumption		A	< 2.1
Adjusting time for max. torque		ms	< 700
Operating temperature range	T	°C	-30 - +125

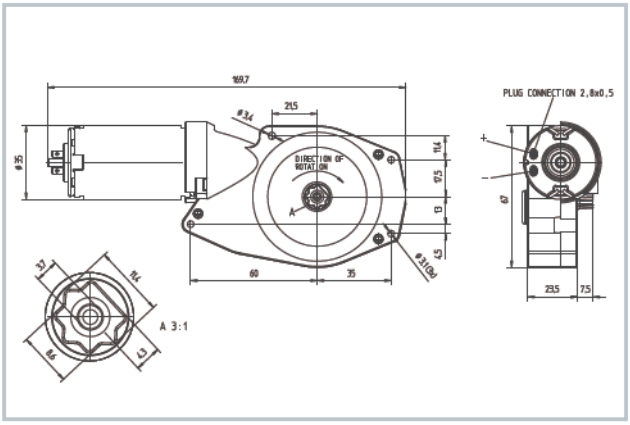
performance at 25 °C



Additional functions:
integrated spring as relocation function
integrated potentiometer for detection of output shaft position

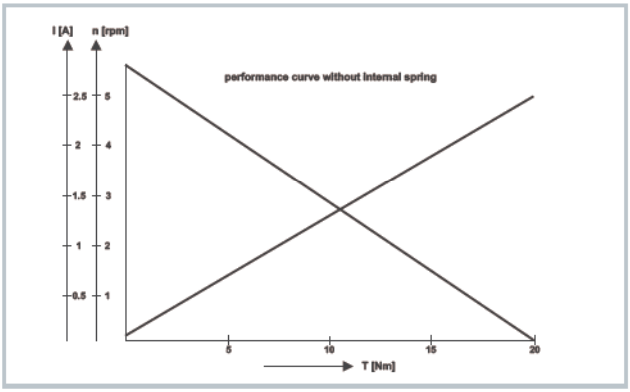
Special gear motor 1.61.068.XXX

1.61.068.XXX



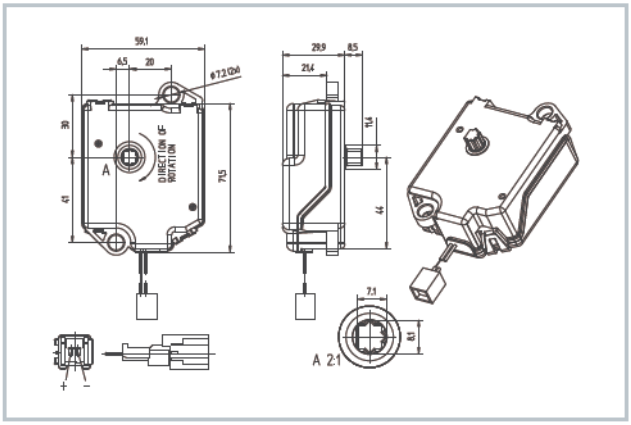
Type 1.61.068.			5XX
Operating voltage	U	V	13.5
Operating voltage range	U	V	9 - 18
No load speed	n_0	rpm	5.7
No load current	I_0	A	< 0.5
maximum torque	T_{max}	Nm	7.5
Rated speed	n_N	rpm	3.5
Rated current	I_N	A	< 1.0
Operation angle		°	140
Operating temperature range	T	°C	-40 - +95

performance at 25 °C

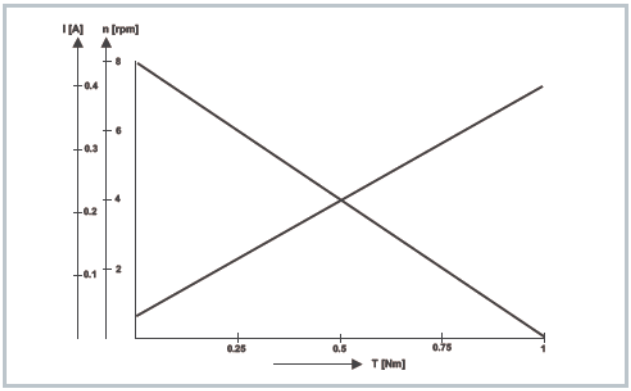


Additional functions:
integrated spring as relocation function
overload protection integrated in motor

Special gear motor 1.61.072.XXX



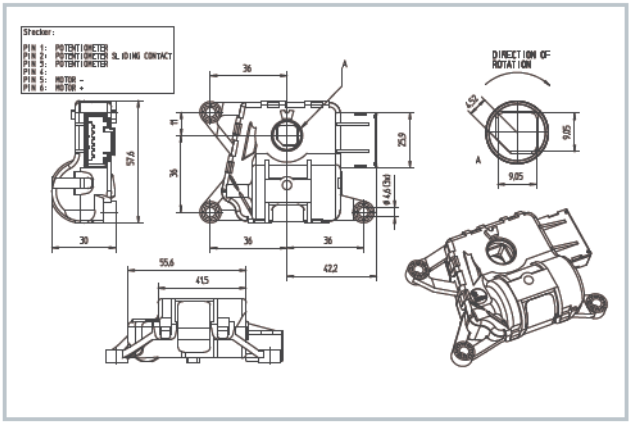
1.61.072.XXX



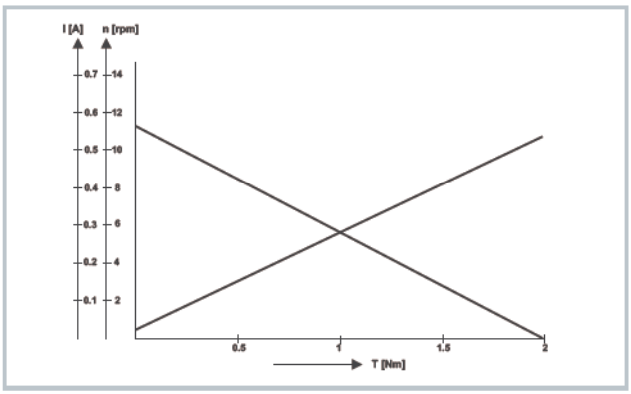
Type 1.61.072.			XXX
Operating voltage	U	V	11
Operating voltage range	U	V	6 - 15
No load speed	n_o	rpm	8.0
No load current	I_o	A	< 0.05
maximum torque	T_{max}	Nm	0.5
Rated speed	n_N	rpm	5.0
Rated current	I_N	A	< 0.2
Operating temperature range	T	°C	-40 - +85

performance at 25 °C

Special gear motor 1.81.020.XXX



1.81.020.XXX



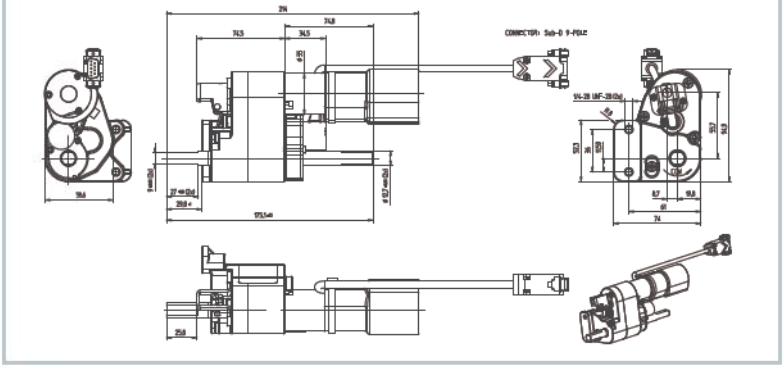
Type 1.81.020.			XXX
Operating voltage	U	V	12
Operating voltage range	U	V	9 - 15
No load speed	n_o	rpm	11.5
No load current	I_o	A	< 0.05
maximum torque	T_{max}	Nm	0.65
Rated speed	n_N	rpm	7.8
Rated current	I_N	A	< 0.3
Operating temperature range	T	°C	-40 - +70

performance at 25 °C

Sensor:
integrated potentiometer for determination of output position

Rotary Actuator 1.61.118.XXX

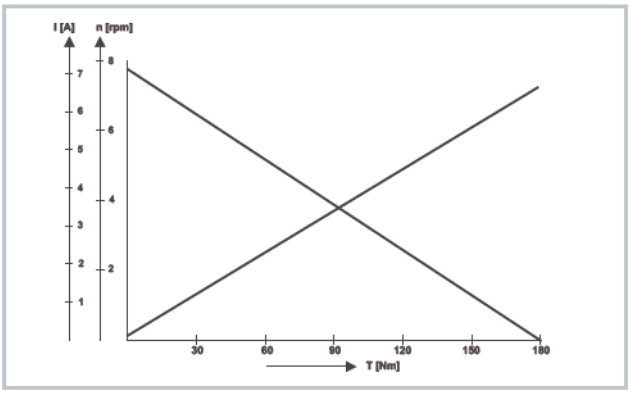
1.61.118.XXX



Type 1.61.118.			XXX
Operating voltage	U	V	28
Operating voltage range	U	V	24 - 32
No load speed	n_o	rpm	7.8
No load current	I_o	A	< 0.5
maximum torque	T_{max}	Nm	45
Rated speed	n_N	rpm	5.5
Rated current	I_N	A	< 3.0
Operating temperature range	T	°C	-20 - +60

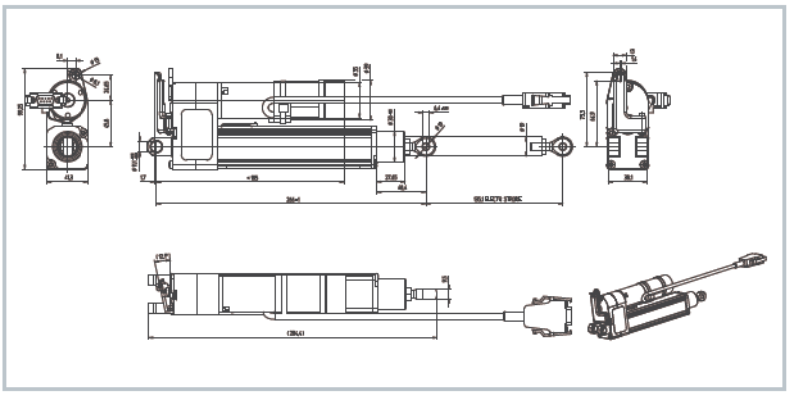
performance at 25 °C

Sensor:
integrated potentiometer for position feedback



Linear Actuator 1.61.122.XXX

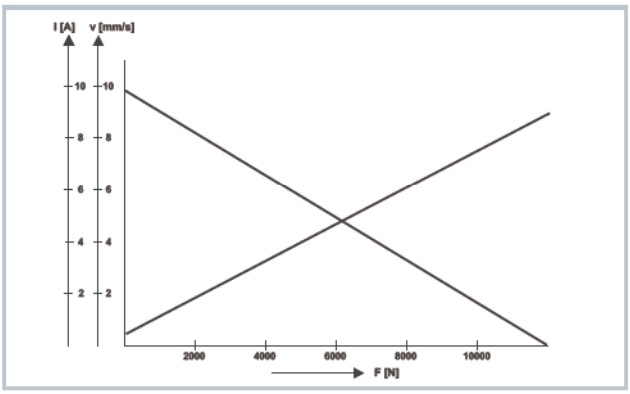
1.61.122.XXX



Type 1.61.122.			XXX
Operating voltage	U	V	28
Operating voltage range	U	V	24 - 32
No load travel speed		mm/s	9.7
No load current	I_o	A	< 0.4
maximum force	F_{max}	N	4000
Rated travel speed		mm/s	6.15
Rated current	I_N	A	< 3.0
maximum travel		mm	127
Operating temperature range	T	°C	-20 - +60

performance at 25 °C

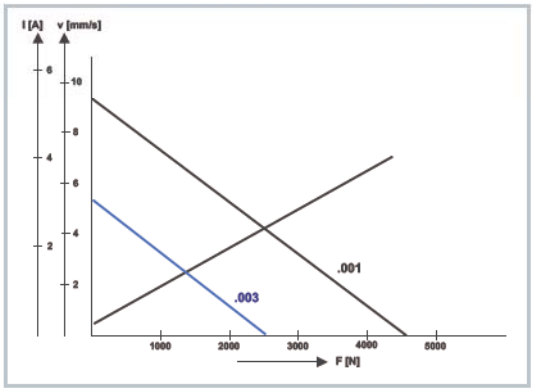
Sensor:
integrated potentiometer for position feedback



Linear Actuator 1.61.121.XXX

1.61.121.001

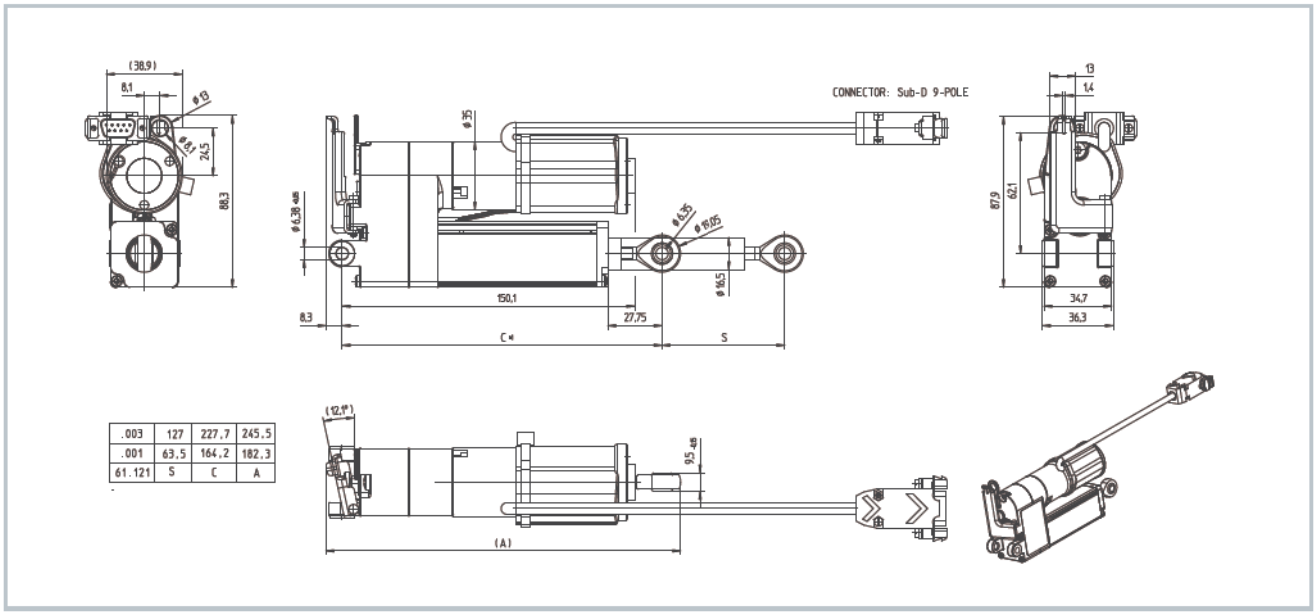
1.61.121.003

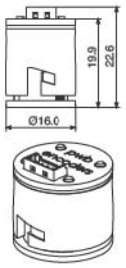
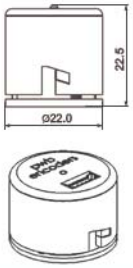
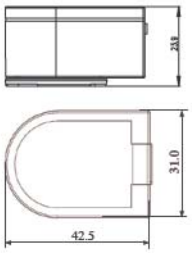
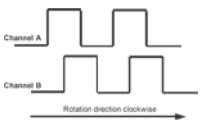
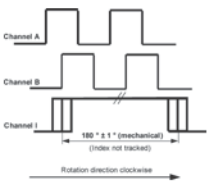
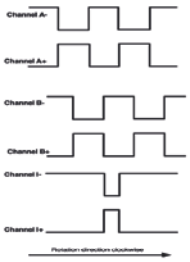


Type 1.61.121.			001	003
Operating voltage	U	V	28	28
Operating voltage range	U	V	24 - 32	24 - 32
No load travel speed		mm/s	9.3	5.3
No load current	I_o	A	< 0.4	< 0.3
maximum force	F_{max}	N	712	712
Rated travel speed		mm/s	7.9	3.9
Rated current	I_N	A	< 1.0	< 0.6
maximum travel		mm	63.5	127
Operating temperature range	T	°C	-20 - +60	-20 - +60

performance at 25 °C

Sensor:
integrated potentiometer for position feedback



Optical encoder		ME16	ME22	AE30
Diameter x Length	dmr x l / mm	16 x 22.6	22 x 22.5	
Width x Length x Height	b x l x h / mm			31.0 x 42.5 x 23.9
				
Electrical connection		Molex connector Contact 4x 50079-800 Housing 1x 51021-0400 cable output only on request	Molex connector Contact 5x 50079-800 Housing 1x 51021-0500 cable output only on request	Wennmacher connector Contact 8x CX-T125F Housing 1x CX-H-125-8
No. of counts per rotation	Z / cpr	75 up to 200	1 up to 360	100 up to 1024
Output signal		A / B 2 square outputs 90° phase shifted TTL compatible quadrature possible	A / B / I 3 square outputs 90° phase shifted TTL compatible quadrature possible	A(+/-)- / B(+/-)- / I (+/-) 3 square outputs 90° phase shifted TTL compatible quadrature possible
				

Output option			Pull-up / Push-pull / Line driver	Pull-up / Push-pull / Line driver
Operating temperature max.		-20 up to 85°C	-20 up to 85°C	-40 up to 100°C
Supply voltage	V_{cc} / V	typ. 5 / -0.5 up to 7	typ. 5 / -0.5 up to 7	typ. 5 / -0.5 up to 7
Supply current	I_{cc} / mA	typ. 15 / max. 18	typ. 15 / max. 38	typ. 17 / max. 85
Supply current / push-pull	I_{cc} / mA		max. 100	max. 150
Supply current / line driver	I_{cc} / mA		max. 65	max. 88
Output voltage	V_o / V	-0.5 up to V_{CC}	-0.5 up to V_{CC}	-0.5 up to V_{CC}
Load capacitance (2.7 kΩ)	C_L / pF	100	100	
Load capacitance (3.3 kΩ)	C_L / pF			100
Channel A and B				
High level output voltage	V_{oH} / V	min. 2.4	min. 2.4	min. 2.4
Low level output voltage	V_{oL} / V	max. 0.4	max. 0.4	max. 0.4
Rise time	T_r / µs	typ. 500	typ. 500	typ. 200
Fall time	T_f / µs	typ. 100	typ. 100	typ. 50
Output current per channel	I_{out} / mA	max. 8	max. 8	max. 8
Index Channel				
High level output voltage	V_{oH} / V		min. 2.4	min. 2.4
Level output voltage	V_{oL} / V		max. 0.4	max. 0.4
Rise time	T_r / µs		typ. 7	typ. 200
Fall time	T_f / µs		typ. 1.3	typ. 50
Output current	I_{cc} / mA		max. 8	max. 8
Push-pull option				
High level output voltage	V_{oH} / V		min. 3.8	min. 3.8
Low level output voltage	V_{oL} / V		max. 0.55	max. 0.55
Rise time	T_r / µs		typ. 5	typ. 5
Fall time	T_f / µs		typ. 5	typ. 5
Output current per channel	I_{out} / mA		max. 32	max. 32
Line driver option				
High level output voltage	V_{oH} / V		min. 2.5	min. 2.4
Low level output voltage	V_{oL} / V		max. 0.5	max. 0.4
Rise time	T_r / µs		typ. 20	typ. 12
Fall time	T_f / µs		typ. 20	typ. 12
Output current per channel	I_{out} / mA		max. 50	max. 20
Count frequency	kHz	typ. 30 / max. 60	typ. 30 / max. 60	max. 100
Pulse width error	ΔP / °e	typ. 15 / max. 75	typ. 15 / max. 75	typ. 7 / max. 30
Phase error	Δϕ / °e	typ. 8 / max. 60	typ. 8 / max. 60	typ. 2 / max. 15
Position error	Δϴ / °m	typ. 0.4 / 0 up to 1.3	typ. 0.4 / 0 up to 1.3	

Regulations governing small PMDC motors

RoHS

Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment. This regulation summarizes the EG Guideline 2002/95/EG, which prohibits the use of certain substances in the manufacturing of electronic appliances and components, and the guidelines application in national laws. Buehler Motor motors and gear motors adhere to this regulation.

CE -symbol

The CE-mark is an administrative symbol for the supervisory authorities. It informs the officials that the marked product „conforms to the guidelines" and is „approved for the domestic market" so that distribution within the EU domestic market is not subject to restrictions (free transport symbol, market import symbol).

It is not

- a quality symbol
- a safety symbol

Principles for CE-Marking
The legal basis for CE-marking is established in the EU guidelines and the resulting national implentation (e.g. EMC codes). The following guidelines can be used for small electric motors:

The following guidelines may be used:

a) EMC guideline	2004/108/EG
b) Low voltage guideline	2006/95/EG
c) Equipment guideline	2006/42/EG
d) CE marking guideline	93/68/EWG

EMC Guideline

Since the motors are shipped to companies for incorporation into larger assemblies and Buehler has no influence on their future use, the CE symbol is not required.
Therefore, Buehler explicitly emphasizes that the system manufacturer is responsible for specifying an EMC device for their production, and must provide for EMC-compliant assembly and operation in their end product.
Instructions for EMC-compliant installation and EMC protection processes may be found in IEC 61000-5-x.

Low Voltage Guideline

This guideline does not apply to the drives in this catalog, since their nominal voltage is less than 75 V.

Equipment Guideline

The products listed in this catalog are components to be used in higher level assemblies. Installation in appliances, assemblies, and systems must be done by experienced personnel. It is the system manufacturer's responsibility to ensure that the end product adheres to the requirements of the equipment guideline.

Therefore the CE marking is not required on Buehler drives.

Application-specific guidelines and specifications

The many different applications and uses for appliances, assemblies, and systems require compliance with a multitude of application-specific guidelines and specifications. Compliance in all cases is to be ensured by the end product manufacturer.
Based on Buehler's experience, we will provide our customers with advice regarding guidelines and specifications.

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