

# BRUSHLESS MOTORS WITH INTEGRAL CONTROL

**dc**mind  
BRUSHLESS  
MOTORS



# ABOUT CROUZET

The Motion product line provides innovative engineering expertise, high quality service and a complete offer of standard direct drives, geared motors and motion control solutions for applications where performance is key. Our ability to customize solutions as per virtually any customers' request makes us the right partner to tackle the most demanding projects.

Crouzet is a brand of InnoVista Sensors™.

With a long-term commitment to technological excellence, the engineering teams have mastered the following core technologies and know-how:

- › Electromagnetism
- › Thermal dynamics
- › Electromechanical systems
- › Electronic drives

Covering the power range from 1 to 1000 W peak (1/100 to 1HP+) and available with spur, worm or planetary gearboxes, plus adapted controllers, our offer is specifically designed for access control systems, pumps and valves, railway applications, electrical equipment, medical equipment and the industry.

## INNOVISTA SENSORS

InnoVista Sensors™ is a worldwide industrial specialist of sensors, controllers and actuators for automated systems.

Through its brands, Crouzet and Systron Donner Inertial, InnoVista Sensors™ offers a wide range of reliable, efficient and customizable components dedicated to the Aerospace & Defense, Transportation and Industrial markets and segments.

Thanks to the recognized expertise of its teams and a strong innovation policy, InnoVista Sensors™ brings performance enhancing solutions to its customers worldwide.

InnoVista Sensors™: your trusted partner of choice to face industrial challenges of today and tomorrow.

[www.innovistasensors.com](http://www.innovistasensors.com)

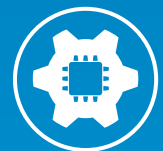
### Designs & Manufactures



Sensors



Controls



Actuators

### For



Aerospace  
& Defense



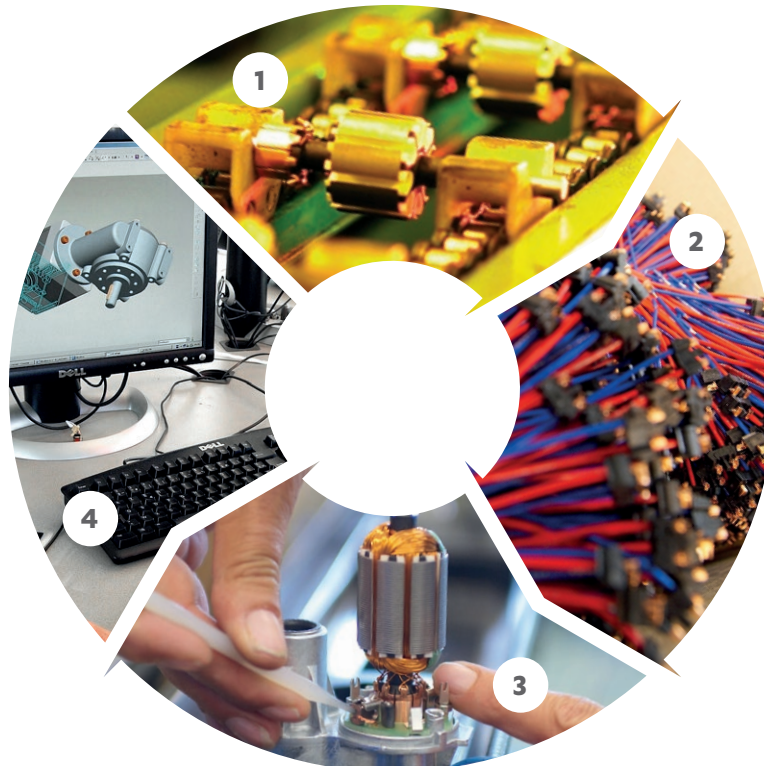
Transportation



Industry

# ADAPTATION WHEEL

To meet market expectations and provide customers with the right solutions within the shortest timeframes, Crouzet has structured its processes around the different types of product available: standard products, adapted products or products specially developed for a customer.  
Introducing the adaptation wheel...



## 1 STANDARD PRODUCTS

### Sales service

A full range of motors, geared motors and associated controllers. You can create your automation control applications as quickly as possible

## 2 PRODUCTS WITH ADDED VALUE

### Customer Adaptation Centre

All our standard products can have additional factory-mounted auxiliaries or accessories: connectors, leads, special terminals, customized shafts, adaptor plates, etc. Seamless integration in your equipment means you benefit from simpler logistics and optimum installation reliability.

## 3 ADAPTED PRODUCTS

### Customer Adaptation Centre

Defined in coordination between your project teams and our specialists, these adapted products have exactly the right levels of performance and functionality you need for your applications.

## 4 SPECIAL PRODUCTS

### Engineers and teams Dedicated project

From the very start of a project, Crouzet' experts work closely with your teams to develop the specification. All our design, industrialization and approval expertise goes into developing Motion Control solutions that are tailored to your requirements.

# DCmind BRUSHLESS

Crouzet, a specialist in customized motorization solutions, now presents its latest generation of High Performance Brushless motors with integrated electronics TNi21 and SMi21.

A pioneer on the European market in 2002 with the Motomate, a Brushless motor with integrated electronics incorporating an intuitive visual programming interface, Crouzet is blazing a new trail for compact standalone applications.

Crouzet, a company continually evolving to meet customer needs, has upgraded its ranges with accessories, gearboxes, part numbers and now, thanks to these electronic devices, has enhanced the performance of its products with:

- › more power
- › more accuracy
- › more functions
- › simplicity of use and ease of integration.

## TWO ELECTRONIC PILOT CONTROL DEVICES

- › The TNi21 for simpler applications, dedicated to speed and torque control.
- › The SMi21, dedicated to motion control for applications that require accuracy. Thanks to a 4096-point encoder, it offers all the following control functions: position, torque, speed, direction, braking, etc.

## THE MOTOR'S INTEGRATED ELECTRONICS ALLOW YOU TO:

### PRODUCT ADVANTAGES

- › **Easy and accurate** control thanks to an optimized control loop
- › Improved **safety** with internal thermal protection
- › **Safe, reliable operation** as a result of its excellent EMC characteristics, due to the shortest possible wiring and shielding with a metal cover

### USER ADVANTAGES

- › **Save time and improve reliability** due to less wiring and fewer connections.
- › **Control the logistic problem** better with fewer part numbers to manage
- › **Save space** thanks to a more compact solution

### BRAKING AND HOLDING

With or without failsafe holding brake (active braking is performed by the motor electronics).

### CONTROL

- › TNi21: 4 inputs and 3 outputs, torque and speed control on analog inputs with 10-bit resolution.
- › SMi21: 6 inputs and 4 outputs, the motor has a wide selection of programs which can be set via a PC (position, speed and torque) and can reach as many as 65,000 positions.

### POWER SUPPLY

- Single supply voltage needed across the whole voltage range:
- › TNi21 (10 - 36 VDC)
  - › SMi21 (9 - 56 VDC)

### COMMUNICATING

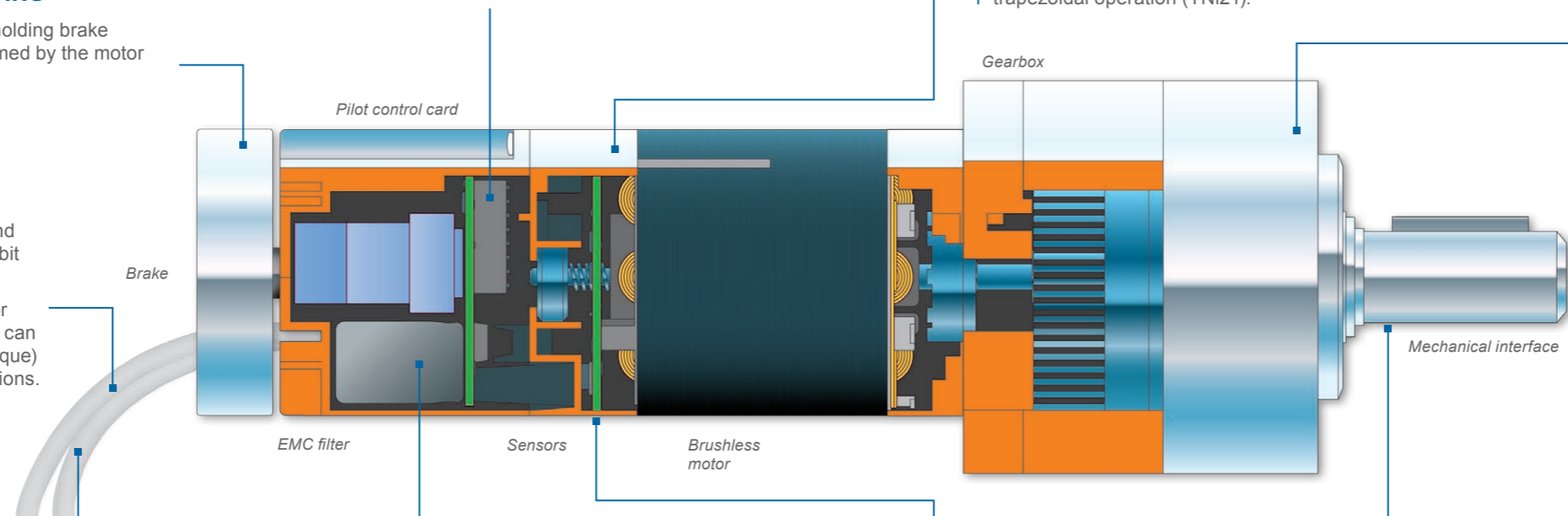
- › A micro-USB socket on the motor (SMi21) can be used to link this directly to a PC.
- › Option CANopen in addition available.

### PILOT CONTROL

Motor pilot control card for operation in 4 quadrants, sine operation (SMi21) or trapezoidal operation (TNi21).

### GEARBOXES

Using Crouzet gearboxes, the motor speed and torque can be adapted to your applications from 0.01 to 4000 rpm and 0.1 to 120 Nm (0.9 to 1062 in-lbs).



### FILTERING AND PROTECTING

- › Short-circuits, undervoltages
- › EMC (received and transmitted)
- › Temperature
- › Mechanical (vibrations, shocks, etc.)

### SENSING

3 Hall effects for identifying the rotor position.  
SMi21: plus 1 encoder (4096 pulses per motor revolution) for precision of regulation and sinusoidal power supply to the coils.

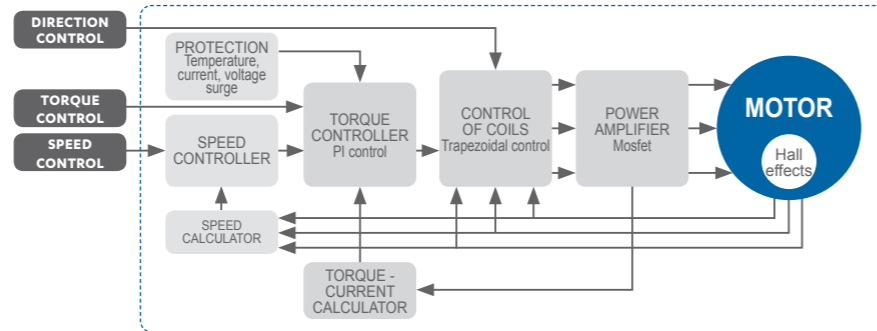
### INTEGRATION

Crouzet adapts the mechanical interfaces of its solutions for perfect integration in your equipment: fixing plate, transmission shafts, special pinions.

# INTEGRATED ELECTRONICS

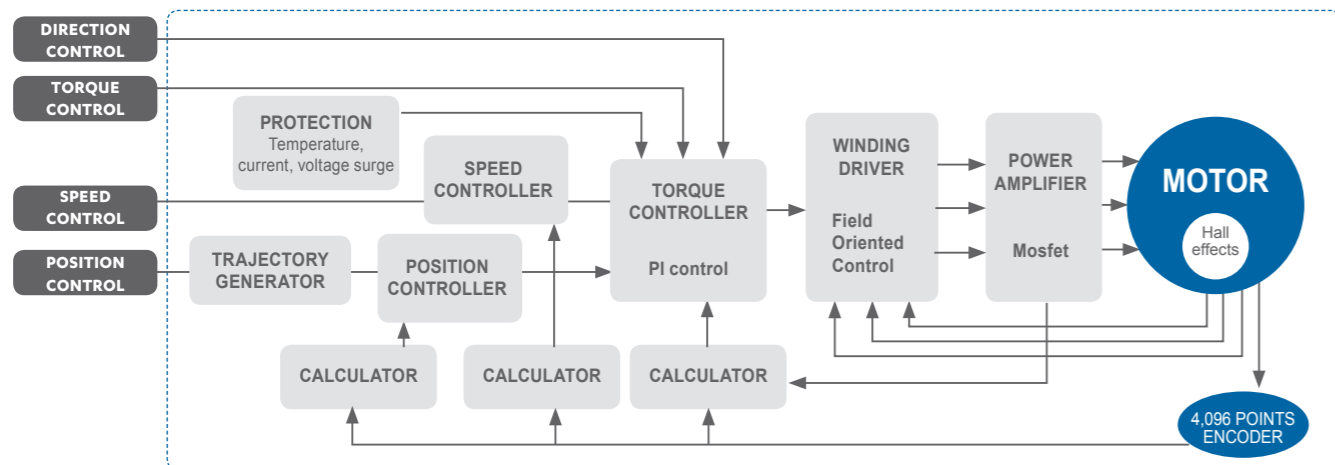
## TNi21 SPEED AND TORQUE CONTROL:

- › 4 inputs, 3 outputs.
- › 2 x 10-bit analog inputs for fine-tuned speed and torque control.
- › 4 retractive quadrants.
- › Use on its own or in combination with other motors or controlled by a PLC.
- › Can be used in production immediately (without setup stage).
- › Also suitable for a 12 V or 24 V battery power supply (voltage range between 10 and 36 volts).



## SMi21 POSITION, SPEED AND TORQUE CONTROL:

- › 6 inputs and 4 outputs, 2 of which are 10-bit analog inputs.
- › Intuitive, easy-to-use setup software - with application mode for quick start-up.
- › Very flexible thanks to the various programs on offer. All the parameters are adjustable and can be used to optimise application operation.
- › Also suitable for a 12 V, 24 V or 48 V battery power supply (voltage range between 9 and 56 volts).
- › Low power consumption when idling (1 W).
- › Rotor position controlled with 4096-point encoder and use of sinusoidal vector control.
- › Reprogramming and re-use of motors as required by changing the application program or by modifying the configuration.
- › Firmware updating made easier with the "bootloader" function.
- › Use on its own, in combination with other motors or controlled by a PLC.
- › Also available with CANopen communication bus.



# THE RANGE

MOTOR TYPE	Nominal usable power at 24 VDC	Max. usable power	TYPE OF GEARBOX				
			P52 25 Nm max.	P62 50 Nm max.	P81 120 Nm max.	RAD10 10 Nm max.	
80140	TNi21	77 W	150 W	801495 TNi21	801496 TNi21	-	801410 TNi21
	SMi21	92 W	184 W	801495 SMi21	801496 SMi21	-	801410 SMi21
	SMi21 CANOPEN	92 W	184 W	*	*	-	*
80180	TNi21	100 W	211 W	-	801896 TNi21	801897 TNi21	801810 TNi21
	SMi21	105 W	314 W	-	801896 SMi21	801897 SMi21	801810 SMi21
	SMi21 CANOPEN	105 W	314 W	-	*	*	*
80280	TNi21	133 W	251 W	-	-	802897 TNi21	802810 TNi21
	SMi21	170 W	419 W	-	-	802897 SMi21	802810 SMi21
	SMi21 CANOPEN	170 W	419 W	-	-	*	*

\*On request

Nominal power ratings may vary according to the supply voltage. Maximum power ratings are given for the maximum permissible motor voltage. Example: the 80 280 SMi21 motor develops peak mechanical power of 419 W at 48 VDC.

### OPTIONS AND ACCESSORIES

#### TNi21

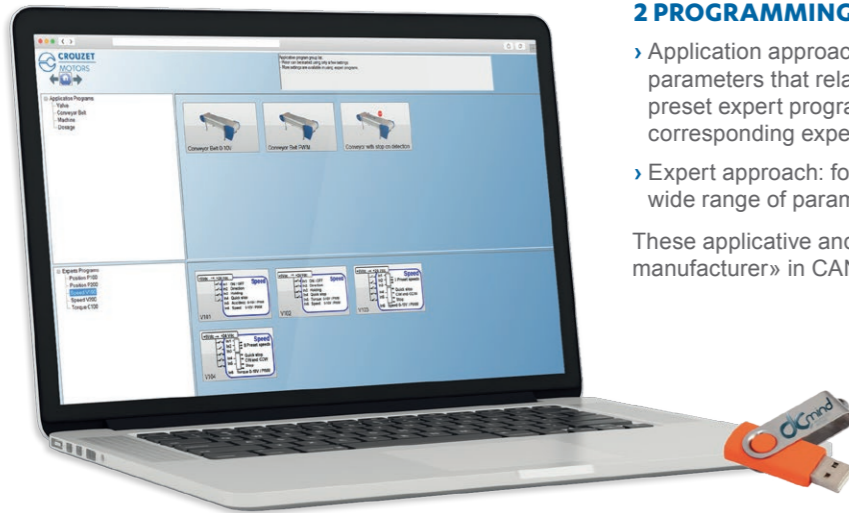
- › Motors available with or without mechanical brake for holding at breaking current.
- › Supplied with 1 control cable and a power supply cable or with a M16 12-pin connector output including all the connections (motors 80140 and 80180).
- › Accessory, shielded cable and 12-pin M16 connector.

#### SMi21

- › Motors available with or without mechanical brake for holding at breaking current.
- › Requires a standard commercially-available USB/ micro-USB cable and the setup software. This can be downloaded free of charge from the Crouzet website or ordered in the form of a "starter kit".

# SMi21: DCmind SOFT SIMPLIFIED PROGRAMMING

www.crouzet-motors.com



## SIMPLE AND INTUITIVE SOFTWARE

Available in several languages, with multiple possible uses, at any level of performance.

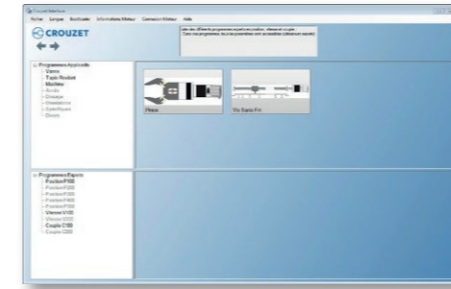
### 2 PROGRAMMING MODES

- › Application approach: Select an application template, then set only those parameters that relate directly to your application. These programs use preset expert programs. You can fine-tune these settings by calling up the corresponding expert program.
- › Expert approach: for automation system programs and settings covering a wide range of parameters.

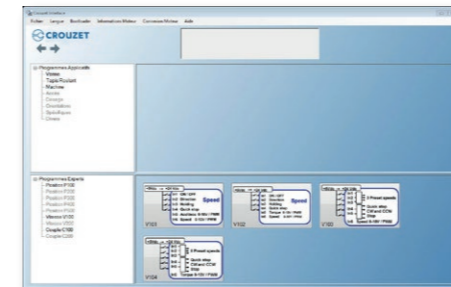
These applicative and expert programs are also available as «program manufacturer» in CANopen.

### DCmind SOFT & DCmind SOFT + CANopen

Available on our website [www.crouzet-motors.com](http://www.crouzet-motors.com), or can be supplied on a USB stick in the "starter kits".



"Application" menu



"Expert" menu



"Parameter definition" mode

## CHARACTERISTICS

### 3 languages:

English, French, German. (English for CANopen)

### Operating system:

XP Family, XP Pro, Vista, Windows 7.

### Application programs:

Valve, conveyor belt, clamp, format adjustment, peristaltic pump, etc.

### Expert programs:

Position, speed, torque with digital and analog inputs.

› Numerous programs are available, offering:

- 65,000 proportional positions which can be selected by two 0/10V inputs
- 30 independent positions which can be selected by digital encoding
- A variety of outputs which can be selected to suit your requirements
- The option of setting inverted inputs, selecting 0/10V or PWM operation on the analog inputs, and even setting their operating limit stops
- The option of modifying the control loop PID parameters for difficult applications
- Automatic detection of the reference position for position control ("homing" function)

› Special programs created on request, firmware updating made easier with the "Bootloader" function

› Loading programs simplified with a USB connection

› Other programs to come, please visit our website

## SOME EXAMPLES OF APPLICATIONS

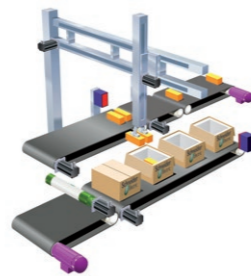
Format adjustment, automatic feed, synchronization, flow control, accurate dosage.

# APPLICATIONS

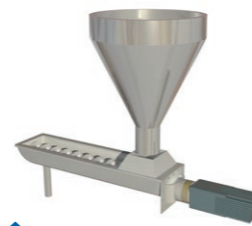
Varied applications where position control, repeated movement and accuracy are key factors.



Stepper operation, detection of thrust and proportional adjustment of forces.



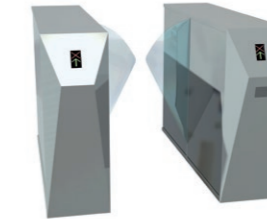
Performing cyclical operation, adjustment of speed and forces. Set to safety mode in the event of a fault.



Several motors combined, operation without a PLC, ease of assembly.



Operation on 12 V battery, low consumption.



S curve pilot control and operation on 12 V backup battery.



Speed pilot control

# DCmind: BRUSHLESS MOTORS

## Motors 38 to 145 W nominal output power range with TNi21 Speed and Torque Control



- › For control speed and torque applications
- › Very high power density
- › 4 inputs (where 2 of them analog) / 3 outputs integrated electronic controls
- › Holding torque function
- › Battery supply compatible 12 V and 24 V

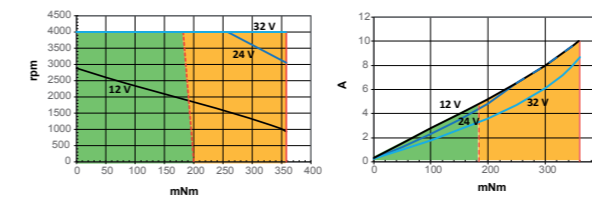
### Part numbers

Type	38 to 75 W	45 to 102 W	72 to 145 W
Part numbers	80140 TNi21	80180 TNi21	80280 TNi21
PWM speed mode, cable output	80140059	80180056	80280013
0-10 V speed mode, cable output	80140051	80180050	80280007
PWM speed mode, connector M16 - 12 pins	80140079	80180072	
0-10 V speed mode, connector M16 - 12 pins	80140071	80180066	
Nominal power supply range (V <sup>---</sup> )	12 - 32	12 - 32	12 - 32
Min. max. power supply (V <sup>---</sup> )	10 - 36	10 - 36	10 - 36
No-load characteristics	12 V <sup>---</sup> 24 V <sup>---</sup> 32 V <sup>---</sup>	12 V <sup>---</sup> 24 V <sup>---</sup> 32 V <sup>---</sup>	12 V <sup>---</sup> 24 V <sup>---</sup> 32 V <sup>---</sup>
Speed of rotation (rpm)	2900 4000 4000	2100 4000 3950	2000 3950 3950
Absorbed current (A)	0.34 0.29 0.27	0.35 0.39 0.34	0.5 0.7 0.6
Nominal characteristics	12 V <sup>---</sup> 24 V <sup>---</sup> 32 V <sup>---</sup>	12 V <sup>---</sup> 24 V <sup>---</sup> 32 V <sup>---</sup>	12 V <sup>---</sup> 24 V <sup>---</sup> 32 V <sup>---</sup>
Speed (rpm)	1900 4000 4000	1250 3350 3900	1400 3250 3900
Absorbed current (A)	5.2 4.4 3.2	6.7 5.4 4	8.5 6.9 6
Torque (mNm)	193 184 178	340 285 250	490 390 355
Output power (W)	38 77 75	45 100 102	72 133 145
Maximal characteristics	12 V <sup>---</sup> 24 V <sup>---</sup> 32 V <sup>---</sup>	12 V <sup>---</sup> 24 V <sup>---</sup> 32 V <sup>---</sup>	12 V <sup>---</sup> 24 V <sup>---</sup> 32 V <sup>---</sup>
Speed (rpm)	1600 3050 4000	1040 2160 3100	800 1900 2400
Absorbed current (A)	6.5 10 10	7.2 11 12	15 15 12.5
Torque (mNm)	250 358 358	400 600 650	1000 1000 1000
Output power (W)	42 114 150	44 136 211	84 199 251
General characteristics			
Regulation (quadrants)	4	4	4
Conformity to EMC Directive in accordance with (EN 55022)	Class B	Class B	Class B
Insulation conforming to IEC60085	Class E	Class E	Class B
Thermal time constant (mn)	20	30	30
Noise level (dBA)	40	40	50
Inertia (g.cm <sup>2</sup> )	75	115	120
Number of rotor poles	4	4	8
Ambient operating temperature (°C)	-30 +70	-30 +70	-30 +70
Service life (h)	20000	20000	20000
Ball bearing			
Weight (kg)	0.95	1.34	1.44
0-10 V or PWM Speed input characteristics			
Input impedance (kΩ)	69	69	69
Speed control (rpm)	120 4000	120 4000	120 4000
Level 0 input voltage (V)	0 2	0 2	0 2
Level 1 input voltage (V)	7.5 39	7.5 39	7.5 39
Frequency range (Hz)	100 2000	100 2000	100 2000
0-10 V or PWM Torque input characteristics			
Input impedance (kΩ)	69	69	69
Torque limit (mNm)	360 35	700 30	1000 40
Holding limit (mNm)	150 35	230 30	310 40
Level 0 input voltage (V)	0 2	0 2	0 2
Level 1 input voltage (V)	7.5 39	7.5 39	7.5 39
Frequency range (Hz)	100 2000	100 2000	100 2000
On/Off and Direction digital input characteristics			
Input impedance (kΩ)	57	57	57
Level 0 input voltage (V <sup>---</sup> )	0 2	0 2	0 2
Level 1 input voltage (V <sup>---</sup> )	4 39	4 39	4 39
Torque alarm, Encoder and Direction output characteristics			
Type of output-Maximum admissible current (mA)	PNP	PNP	PNP
Maximum admissible current (mA)	50	50	50
IP65 over the whole motor apart from the shaft output. Versions with brake are IP20			
Accessory			15275008
2 metre shielded cable with 12-pin female M16 connector			

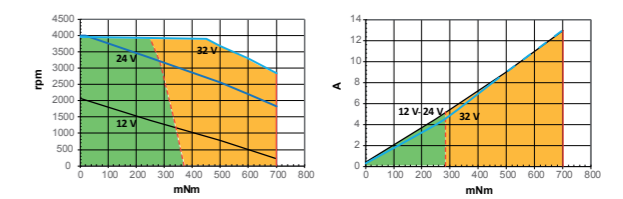
Product made to order

### Curves

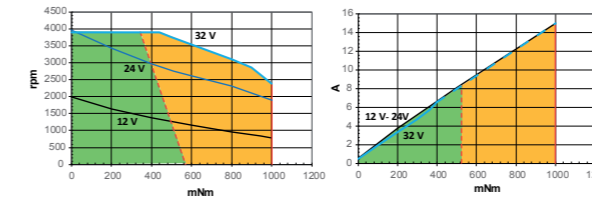
Speed / Torque 80140 TNi21 - Current / Torque 80140 TNi21



Speed / Torque 80180 TNi21 - Current / Torque 80180 TNi21



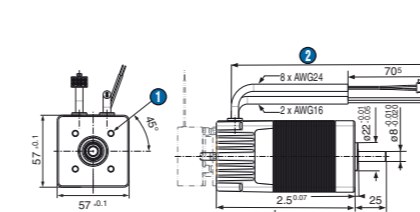
Speed / Torque 80280 TNi21 - Current / Torque 80280 TNi21



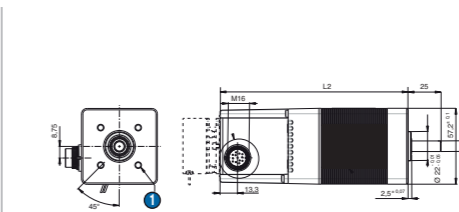
- Continuous running area
- Cycling running area
- Maximum continuous torque
- Maximum peak torque

### Dimensions (mm)

Cable output versions



M16 connector version - 12 pins



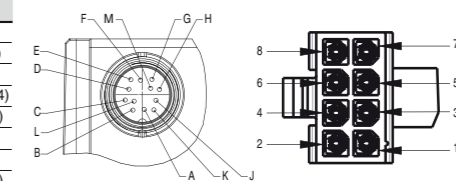
L: 80140: 92 max  
L: 80180 / 80280: 112 max

L2: 80140: 123 max  
L2: 80180 / 80280: 143 max

More information: see page 16

### Connections

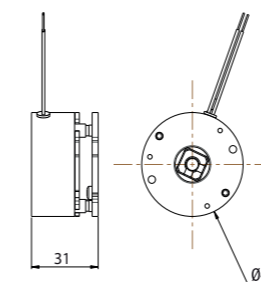
	Connector M16	Cable color
Power ground	G+M	AWG16 Blue
Power supply +12 to +32 V DC	E+F	AWG16 Brown
Logic ground	H	AWG24 Black (5)
Input 1: On/Off	C	AWG24 Green (1)
Input 2: Direction	B	AWG24 Yellow (2)
Input 3: Speed	J	AWG24 Orange (4)
Output 1: Tachometer*	A	AWG24 Brown (6)
Output 2: Real direction	L	AWG24 Red (8)
Input 4: Torque	D	AWG24 Blue (3)
Output 3: Torque at max.	K	AWG24 Purple (7)



\* 12 p/rev. and 24 for 80280 motor

### Options

Holding brake 0.5 Nm - 24 V<sup>---</sup>



- › Shaft, pinion, pulley dimensions
- › Cable wire length
- › Powerful controlled brake (directed)
- › Programs evolution

### User information

Notice available on website, please read it before use.

# DCmind: BRUSHLESS MOTORS

## Motors 34 to 192 W nominal output power range with SMI21 Position, Speed and Torque Control

- > Servomotor for position, speed and torque control applications
- > Large voltage supply range
- > Very high power density
- > Built-in electronics with 6 inputs (2 of which are analog) and 4 outputs
- > Built-in 4096-pulse encoder
- > With application programs already preset and saved in the motor
- > Expert programs can be used to adapt to the requirements of difficult applications
- > Parameters set on the PC via USB connection
- > Integrated bootloader for embedding special customer firmware



### Parts number

	34 to 94 W			40 to 145 W			82 to 192 W		
Type	80140 SMI21			80180 SMI21			80280 SMI21		
<b>Part numbers</b>									
IP65 option	80140043			80180044			80280001		
Holding torque brake 0.5 Nm option	80140044			80180045			80280002		
Nominal operating range (V <sub>DC</sub> )	12 - 48			12 - 48			12 - 48		
Min. max. operating range (V <sub>DC</sub> )	9 - 75			9 - 75			9 - 75		
<b>No-load characteristics</b>	12 V <sub>DC</sub>	24 V <sub>DC</sub>	48 V <sub>DC</sub>	12 V <sub>DC</sub>	24 V <sub>DC</sub>	48 V <sub>DC</sub>	12 V <sub>DC</sub>	24 V <sub>DC</sub>	48 V <sub>DC</sub>
Speed of rotation (rpm)	2400	4000	4000	1700	3500	4000	1500	3050	4000
Absorbed current (A)	0.3	0.3	0.2	0.3	0.33	0.2	0.38	0.44	0.35
<b>Nominal characteristics</b>	12 V <sub>DC</sub>	24 V <sub>DC</sub>	48 V <sub>DC</sub>	12 V <sub>DC</sub>	24 V <sub>DC</sub>	48 V <sub>DC</sub>	12 V <sub>DC</sub>	24 V <sub>DC</sub>	48 V <sub>DC</sub>
Speed (rpm)	1460	3900	4000	1100	2900	4000	1100	2863	4000
Torque (mNm)	225	225	225	350	350	350	685	565	460
Absorbed current (A)	5.2	5.2	2.6	5.65	5.40	3.65	10	8	5
Output power (W)	34	92	94	40	105	145	82	170	192
<b>Maximal characteristics</b>	12 V <sub>DC</sub>	24 V <sub>DC</sub>	48 V <sub>DC</sub>	12 V <sub>DC</sub>	24 V <sub>DC</sub>	48 V <sub>DC</sub>	12 V <sub>DC</sub>	24 V <sub>DC</sub>	48 V <sub>DC</sub>
Speed of rotation (rpm)	1100	3000	4000	1000	2400	4000	740	2250	4000
Torque (mNm)	300	400	440	400	600	750	1000	1000	1000
Absorbed current (A)	7	9.5	6.1	6.4	10	10.1	14	14	11.5
Output power (W)	34	125	184	42	151	314	77	235	419
<b>General characteristics</b>									
Rotor inertia (gcm <sup>2</sup> )	75			115			120		
Number of rotor poles	4			4			8		
Ambient operating temperature (°C)	-30 +70			-30 70			-30 +70		
Service life (h)	20000			20000			20000		
Ball bearing									
Weight (kg)	1.17			1.52			1.62		
<b>Integrated software</b>									
Applications software									
Positioning mode									
Speed mode									
Torque mode									
<b>Inputs / Outputs</b>									
Analog inputs (PWM and 0-10 V)	2			2			2		
Digital inputs	4			4			4		
(PWM) output	2			2			2		
Digital output	2			2			2		
IP65 over the whole motor apart from the shaft output. Versions with brake are IP20									
<b>Accessory</b>									
Starter kit, DCmind soft program and USB cable							79298008		

### Product adaptations

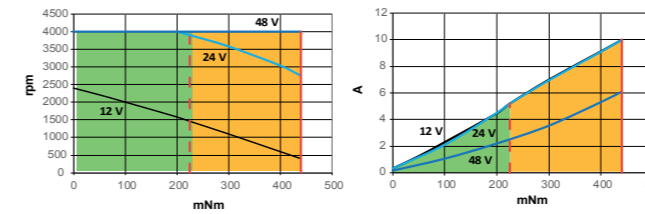


- > Other specific applications software
- > Specific PC interface
- > Special cable length
- > Special shaft
- > Other connectors

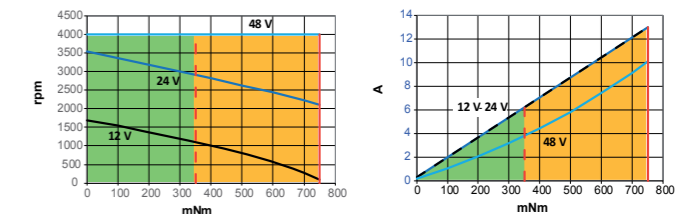
Product made to order

## Curves

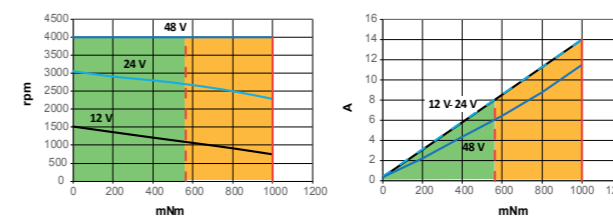
Speed / Torque 80140 SMI21 - Current / Torque 80140 SMI21



Speed / Torque 80180 SMI21 - Current / Torque 80180 SMI21



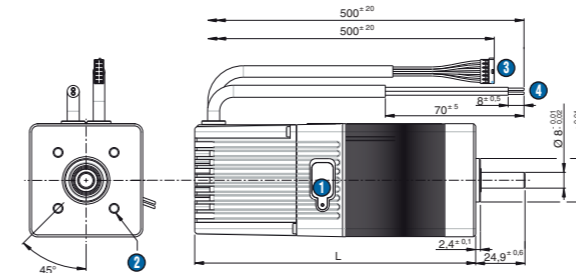
Speed / Torque 80280 SMI21 - Current / Torque 80280 SMI21



- Continuous running area
- Cycling running area
- Maximum continuous torque
- Maximum peak torque

## Dimensions (mm)

80140 - 80180 - 80280 SMI21



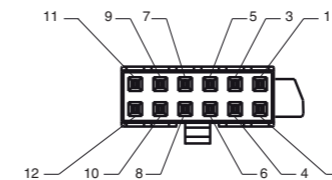
- USB connection type B
- 4 x M5 over Ø 40 depth 4.5
- Command cable 12 x AWG26
- Power cable 2 x AWG16

L: 80140: 123 max  
L: 80180 / 80280: 143 max

More information: see page 16

## Connection

Connector (Molex 0430251200)



Pin	Logic cable		Power cable	
	Description	Wires color	Description	Wires color
1	Input 1 - logic	Green	+12 V <sub>DC</sub> → 48 V <sub>DC</sub>	Brown
2	Input 2 - logic	Yellow	0 V <sub>DC</sub>	Blue
3	Input 3 - logic	White		
4	Input 4 - logic	White-brown		
5	Input 5 - analog	Blue		
6	Input 6 - analog	Orange		
7	0 V <sub>DC</sub>	Black		
8	0 V <sub>DC</sub>	White-black		
9	Output 1 - PWM	Brown		
10	Output 2 - PWM	Purple		
11	Output 3 - logic	Red		
12	Output 4 - logic	Grey		

## User information

Notice available on website, please read it before use.



# DCmind: BRUSHLESS MOTORS

## Motors 34 to 192 W nominal output power range with SMi21 Position, Speed and Torque Control with CANopen

- > Servomotor for position, speed and torque control applications
- > Large voltage supply range
- > Very high power density
- > Built-in electronics with 6 inputs (2 of which are analog) and 4 outputs
- > Built-in 4096-pulse encoder
- > With application programs already preset and saved in the motor
- > Expert programs can be used to adapt to the requirements of difficult applications
- > Parameters set on the PC via USB and CANopen connections
- > Integrated bootloader for embedding special customer firmware
- > CANopen and USB work together



### Parts number

	34 to 94 W			40 to 145 W			82 to 192 W		
Type	80140 SMi21 CAN			80180 SMi21 CAN			80280 SMi21CAN		
Part numbers	80140301			80180301			80280302		
IP65 option	12 - 48			12 - 48			12 - 48		
Nominal operating range (V <sub>DC</sub> )	9 - 75			9 - 75			9 - 75		
Min. max. operating range (V <sub>DC</sub> )	12 V <sub>DC</sub> 24 V <sub>DC</sub> 48 V <sub>DC</sub>			12 V <sub>DC</sub> 24 V <sub>DC</sub> 48 V <sub>DC</sub>			12 V <sub>DC</sub> 24 V <sub>DC</sub> 48 V <sub>DC</sub>		
No-load characteristics									
Speed of rotation (rpm)	2400	4000	4000	1700	3500	4000	1500	3050	4000
Absorbed current (A)	0.3	0.3	0.2	0.3	0.33	0.2	0.38	0.44	0.35
Nominal characteristics									
Speed (rpm)	1460	3900	4000	1100	2900	4000	1100	2863	4000
Torque (mNm)	225	225	225	350	350	350	685	565	460
Absorbed current (A)	5.2	5.2	2.6	5.65	5.40	3.65	10	8	5
Output power (W)	34	92	94	40	105	145	82	170	192
Maximal characteristics									
Speed of rotation (rpm)	1100	3000	4000	1000	2400	4000	740	2250	4000
Torque (mNm)	300	400	440	400	600	750	1000	1000	1000
Absorbed current (A)	7	9.5	6.1	6.4	10	10.1	14	14	11.5
Output power (W)	34	125	184	42	151	314	77	235	419
General characteristics									
Rotor inertia (gcm <sup>2</sup> )	75			115			120		
Number of rotor poles	4			4			8		
Ambient operating temperature (°C)	-30 +70			-30 70			-30 +70		
Service life (h)	20000			20000			20000		
Ball bearing									
Weight (kg)	1.17			1.52			1.62		
Integrated software									
Applications software									
Positioning mode									
Speed mode									
Torque mode									
Inputs / Outputs									
Analog inputs (PWM and 0-10 V)	2			2			2		
Digital inputs	4			4			4		
(PWM) output	2			2			2		
Digital output	2			2			2		
IP65 over the whole motor apart from the shaft output. Versions with brake are IP20									
Accessory							79298662		
Starter kit : DCmind Soft+CAN / USB-CAN converter / cables / CAN accessories									

### Product adaptations

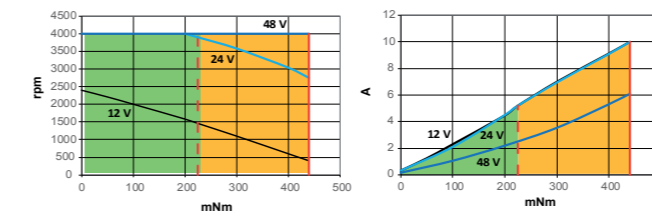


- > Other specific applications software
- > Specific PC interface
- > Special cable length
- > Special shaft
- > Other connectors
- > STO inputs
- > Logic's power backup

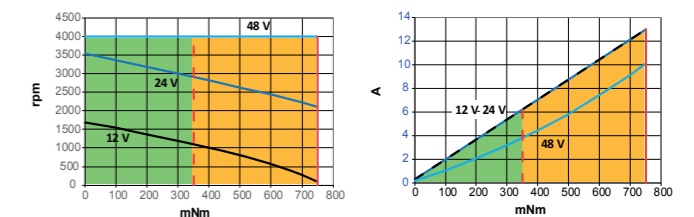
Product made to order

### Curves

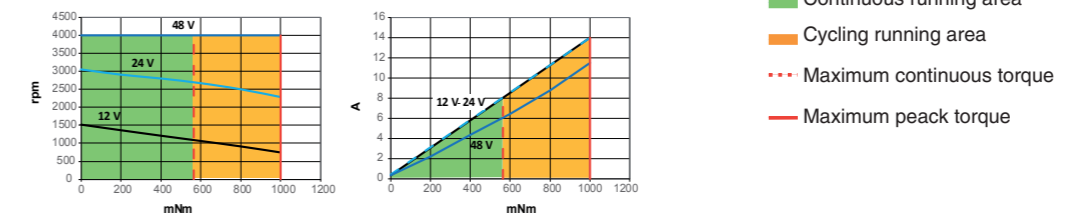
80140 SMi21 CAN: Speed Torque - Current / Torque



80180 SMi21 CAN: Speed Torque - Current / Torque

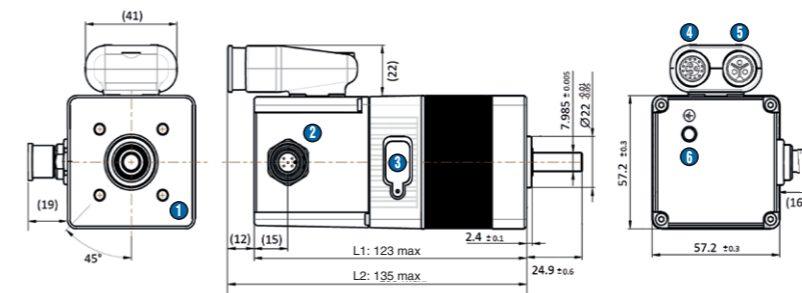


80280 SMi21 CAN: Speed Torque - Current / Torque



### Dimensions (mm)

80140 - 80180 - 80280 SMi21 CAN

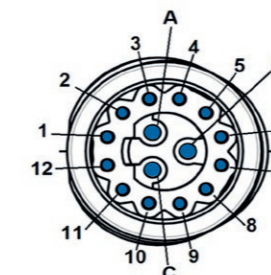


- 4 x M5 threaded holes on 40mm diameter, 4,5 mm thread depth
- CAN connector - M12
- Micro-USB B connector
- Input/output connector - M16 - Hummel 7.003.985.101
- Voltage supply connector - M16 - Hummel 7.003.983.101
- Earth: M6 threaded hole - 10mm thread depth

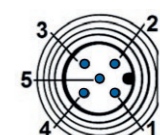
L1: 80140: 123 max L1: 80180 / 80280: 143 max  
L2: 80140: 135 max L2: 80140 / 80280: 154 max

More information: see page 16

### Connection



Pin	Input / Output M16 - 15 pins	Description	Pin	Power supply M16 - 3 pins	Description
1	Input 1 (digital)		1	Not connected	
2	Input 2 (digital)		2	+12 Vc → 48 Vc	
3	Input 3 (digital)		3	0V	
4	Input 4 (digital)				
5	Input 5 (analogic)				
6	Input 6 (analogic)				
7	0V				
8	Output 1 (digital - PWM)				
9	Output 2 (digital - PWM)				
10	Output 3 (digital)				
11	Output 4 (digital)				
12	Not connected				
A - B - C	Not connected				



### User information

Notice available on website, please read it before use.

# GEARBOXES FOR DCmind BRUSHLESS RANGE

## 4 to 120 Nm

- › Planetary and worm gearboxes
- › Shafts on ball bearings
- › Long service life
- › IP65



### Part numbers

Gearboxes	Planetary Ø 52			Planetary Ø 62			Planetary Ø 81			Worm
Type	810495			810496			810497			810410
Associated motors	Part number			Part number			Part number			Part number
80140 TNi21	801495 TNi21			801496 TNi21			801897 TNi21			801410 TNi21
80180 TNi21				801896 TNi21			802897 TNi21			801810 TNi21
80280 TNi21										802810 TNi21
80140 SMi21	801495 SMi21			801496 SMi21			801897 SMi21			801410 SMi21
80180 SMi21				801896 SMi21			802897 SMi21			801810 SMi21
80280 SMi21										802810 SMi21
80140 SMi21 CAN	801495 SMi21 CAN			801496 SMi21 CAN			801897 SMi21 CAN			801410 SMi21 CAN
80180 SMi21 CAN				801896 SMi21 CAN			802897 SMi21 CAN			801810 SMi21 CAN
80280 SMi21 CAN										802810 SMi21 CAN
Gearbox characteristics										
Number of stages	1	2	3	1	2	3	1	2	3	1
Maximum permitted torque (Nm)	4	12	25	8	25	50	20	60	120	10
Efficiency	0.8	0.75	0.7	0.9	0.8	0.7	0.9	0.8	0.7	0.6 → 0.3
Axial dynamic load (daN)	6	10	15	7	10	15	8	12	20	10
Radial dynamic load (daN)	20	32	45	24	36	52	40	60	100	15
Operating temperature	-20 → +70°C			-20 → +70°C			-20 → +70°C			-20 → +70°C
Weight (kg)	0.7	0.8	1.1	0.8	1.2	1.6	1.8	2.5	3.2	0.7
Standard reduction ratios	6.75	25	93	5.16	19	100	5	19	100	5 - 10 - 20 - 30 - 50
		46	169	6.75	27	139		27	139	
			308		46	236			236	
Other ratios possible										15 - 100

### Comments

**Ø 52 planetary gearbox:** Metal gears on all stages. IP65 apart from the output shaft.

**Ø 62 planetary gearbox:** On the first stage, the planet gears are made of composite materials which improve efficiency and service life. On the other stages, the metal gears turn on needle bearings. IP65 apart from the output shaft.

**Ø 81 planetary gearbox:** All gears are metal and turn on needle bearings, resulting in excellent robustness and a very long service life. IP65 apart from the output shaft.

**Worm gearbox:** This gearbox combines a tempered steel worm and a hard bronze helical gear wheel, thus ensuring a long service life. The wheel is coated with grease, ensuring an excellent slip coefficient and good heat dissipation. O-rings and lipseals are used in combination with a compression spring to create a tight seal at the gearbox output shaft and the motor input shaft. IP65 gearbox.

The casing is made of aluminium to maximise heat exchanges with its supporting surface on the machine.

However, due to the high power that can be transmitted by this gearbox and the low efficiency inherent in large worm gearbox reduction ratios, make sure that the gearbox casing temperature does not exceed 75°C during operation.

The output shaft can be placed on the right or left, or can be a double shaft (shaft output on both sides).

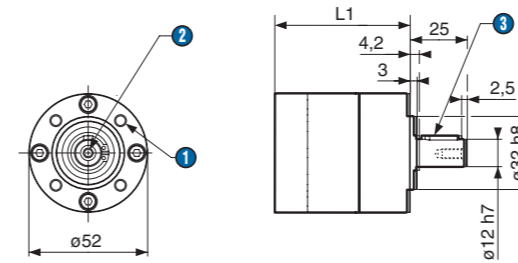
### Made to order products, available on request

- › Special shafts
- › Other reduction ratios
- › Other fixing holes
- › Special mounting flange

Product made to order

### Dimensions (mm)

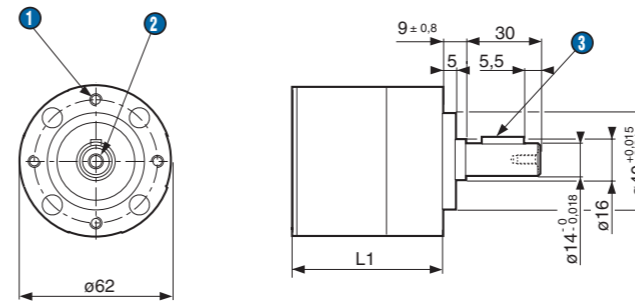
Planetary gearbox Ø 52 (810495)



- 1 4 x M5 at 90°, depth 10 over Ø 40
- 2 M4 x 10
- 3 Parallel key 4 x 4 x 16 DIN 6885 A

L1 1 stage: 55.3 ± 0.5  
L1 2 stages: 69.5 ± 0.5  
L1 3 stages: 83.7 ± 0.5

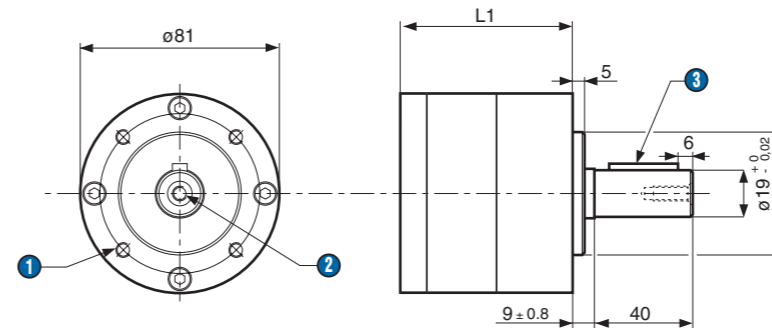
Planetary gearbox Ø 62 (810496)



- 1 4 x M5 at 90°, depth 10 over Ø 52
- 2 M5, depth 12.5
- 3 Parallel key 5 x 5 x 18 DIN 6885 A

L1 1 stage: 52.1 ± 0.7  
L1 2 stages: 67.9 ± 0.7  
L1 3 stages: 83.8 ± 0.7

Planetary gearbox Ø 81 (810497)

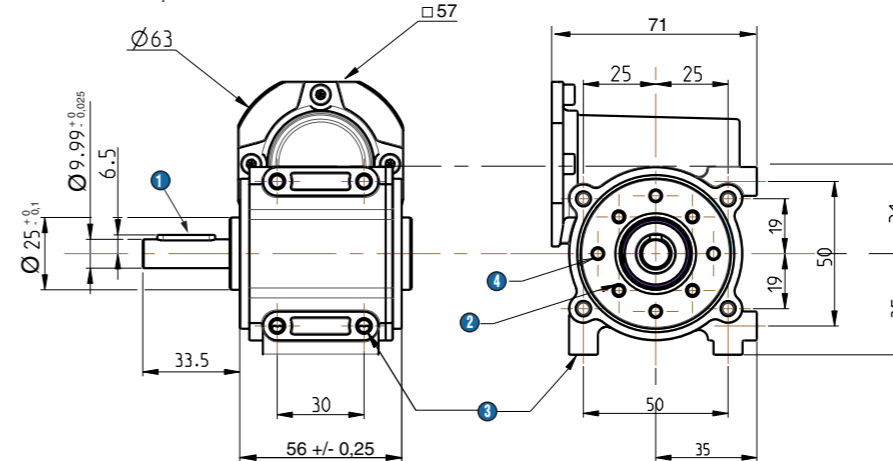


- 1 4 x M6, depth 12 over Ø 65
- 2 M6 x 16
- 3 Parallel key 6 x 6 x 28 DIN 6885 A

L1 1 stage: 70.5 ± 0.6  
L1 2 stages: 92.2 ± 0.6  
L1 3 stages: 113.8 ± 0.6

Worm gearbox RAD10 (810410)

Version with output shaft on left



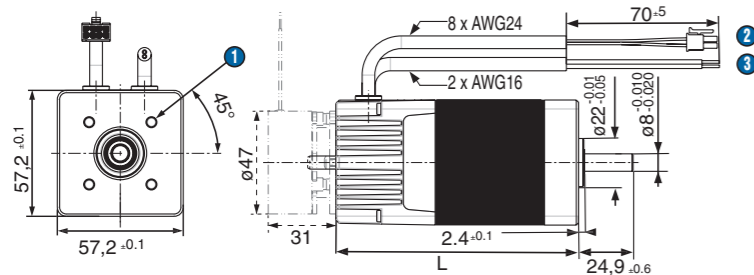
- 1 Parallel key 4 x 4 x 20 DIN6885
- 2 4 x M4, depth 8 over Ø 36
- 3 8 x M5, depth 8
- 4 4 x Ø 3.8 depth 10 over Ø 40

The left-hand and right-hand sides of the gearbox are identical.

# DCmind BRUSHLESS DIRECT MOTOR TNi21 & SMi21 CABLE OUTPUT OR WITH CONNECTOR

## Dimensions (mm)

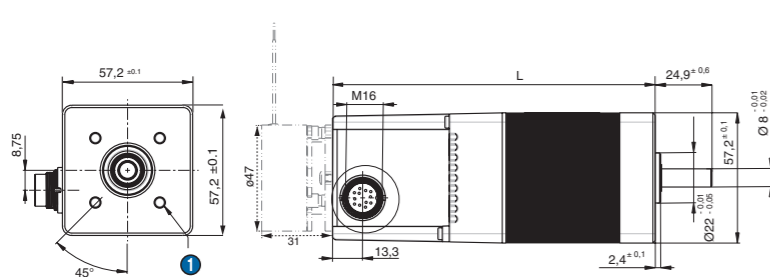
80140 - 80180 - 80280 - TNi21 version output cable with or without brake



L 80140: 92 max.  
L 80180: 112 max.  
L 80280: 112 max.

- 1 4 x M5 at 90°, depth 6 over Ø 40
- 2 Command cable 8 x AWG24 / 500 mm
- 3 Power cable 2 x AWG16 / 500 mm

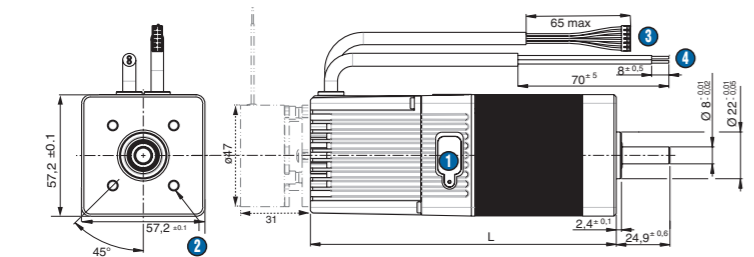
80140 - 80180 - TNi21 version connector M16 - 12 pins with or without brake



L 80140: 123 max.  
L 80180: 143 max.

- 1 4 x M5 at 90°, depth 6 over Ø 40

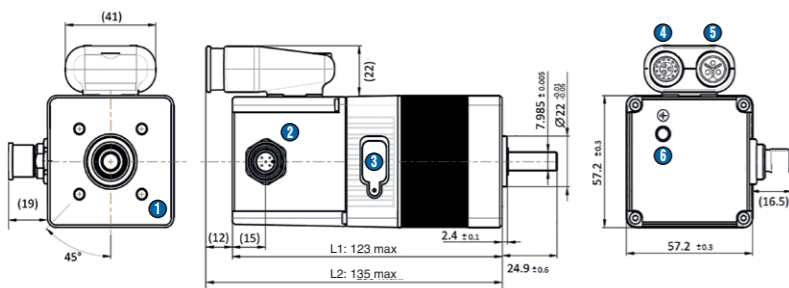
80140 - 80180 - 80280 - SMi21 with or without brake



L 80140: 123 max.  
L 80180: 143 max.  
L 80280: 143 max.

- 1 USB connection type B
- 2 4 x M5 at 90°, depth 6 over Ø 40
- 3 Command cable 10 x AWG24 / 500 mm
- 4 Power cable 2 x AWG16 / 500 mm

80140 - 80180 - 80280 - SMi21 with CANopen



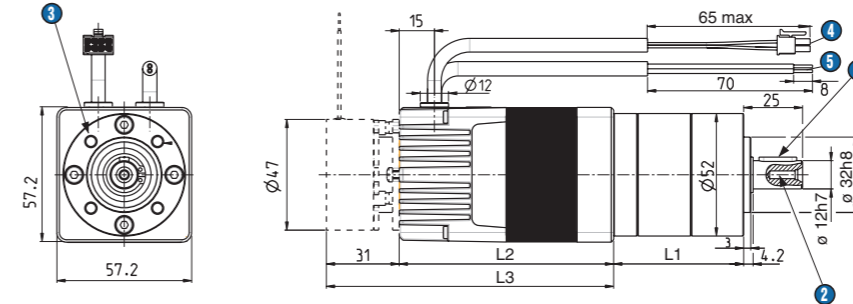
L1: 80140: 123 max  
L2: 80140: 135 max  
L1: 80180 / 80280: 143 max  
L2: 80140 / 80280: 154 max

- 1 4 x M5 threaded holes on 40mm diameter, 4,5 mm thread depth
- 2 CAN connector - M12
- 3 Micro-USB B connector
- 4 Input/output connector - M16 - Hummel 7.003.985.101
- 5 Voltage supply connector - M16 - Hummel 7.003.983.101
- 6 Earth: M6 threaded hole - 10mm thread depth

# DCmind BRUSHLESS GEARED MOTOR TNi21 CABLE OUTPUT

## Dimensions (mm)

801495 - TNi21 + P52 with or without brake



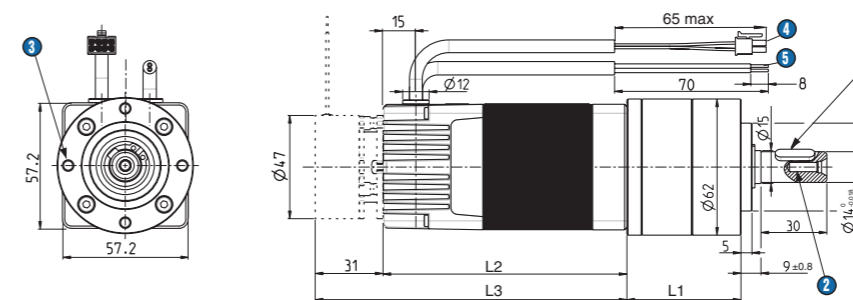
L1 1 stage: 55.3 ±0.5  
L1 2 stages: 69.5 ±0.5  
L1 3 stages: 83.7 ±0.5

L2 80140: 92 max.

L3 80140: 123 max.

- 1 Parallel key 4 x 4 x 16 DIN 6885 A
- 2 M4 x 10
- 3 4 x M5 at 90°, depth 10 over Ø 40
- 4 Command cable 8 x AWG24 / 500 mm
- 5 Power cable 2 x AWG16 / 500 mm

801496 - 801896 - TNi21 + P62 with or without brake



L1 1 stage: 52.1 ±0.7  
L1 2 stages: 67.9 ±0.7  
L1 3 stages: 83.8 ±0.7

L2 80140: 92 max.

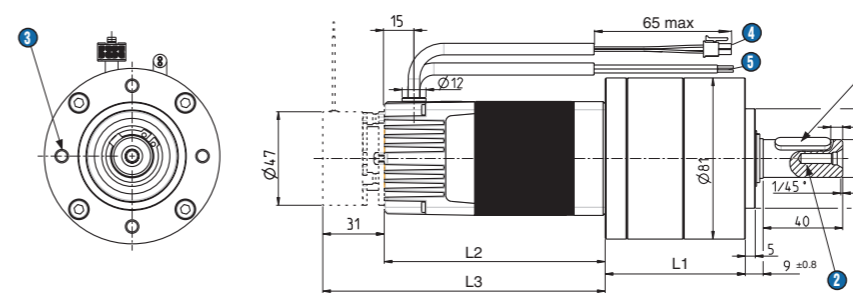
L2 80180: 112 max.

L3 80140: 123 max.

L3 80180: 143 max.

- 1 Parallel key 5 x 5 x 18 DIN 6885 A
- 2 M5 x 12
- 3 4 x M5 at 90°, depth 10 over Ø 52
- 4 Command cable 8 x AWG24 / 500 mm
- 5 Power cable 2 x AWG16 / 500 mm

801897 - 802897 - TNi21 + P81 with or without brake



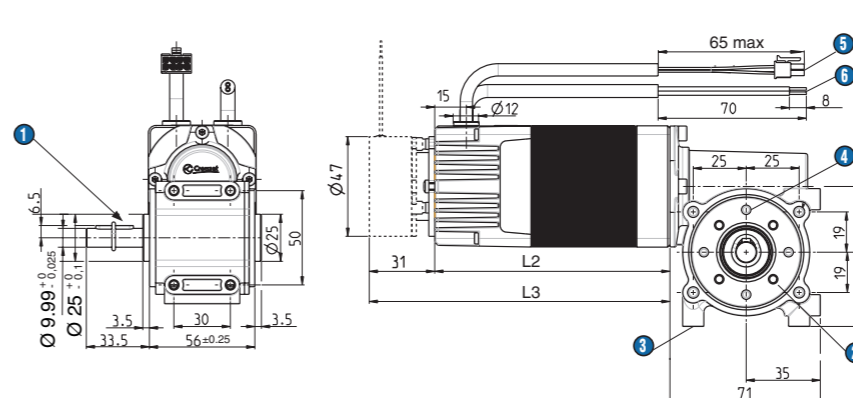
L1 1 stage: 70.5 ±0.6  
L1 2 stages: 92.2 ±0.6  
L1 3 stages: 113.8 ±0.6

L2 80180-80280: 112 max.

L3 80180-80280: 143 max.

- 1 Parallel key 6 x 6 x 28 DIN 6885 A
- 2 M6 x 16
- 3 4 x M6 at 90°, depth 12 over Ø 65
- 4 Command cable 8 x AWG24 / 500 mm
- 5 Power cable 2 x AWG16 / 500 mm

801410 - 801810 - 802810 - TNi21 + RAD10 with or without brake



L2 80140: 92 max.

L2 80180-80280: 112 max.

L3 80140: 123 max.

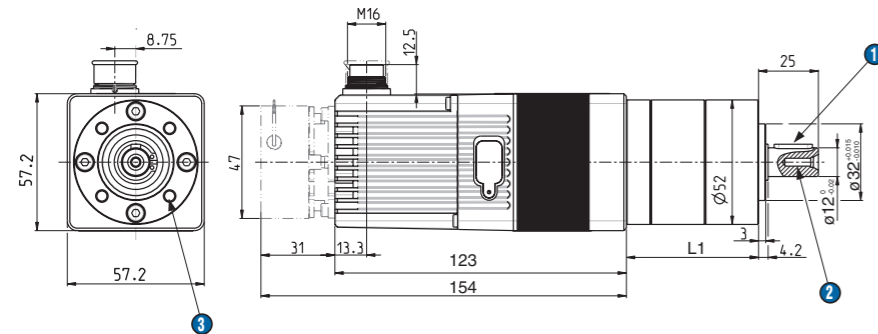
L3 80180-80280: 143 max.

- 1 Parallele key 4 x 4 x 20 DIN 6885 A
- 2 4 x M4, depth 8 over Ø 36
- 3 8 x M5 depth 8
- 4 4 x Ø 3,8, depth 10 over Ø 40
- 5 Command cable 8 x AWG24 / 500 mm
- 6 Power cable 2 x AWG16 / 500 mm

# DCmind BRUSHLESS GEARED MOTOR TNi21 WITH CONNECTOR

## Dimensions (mm)

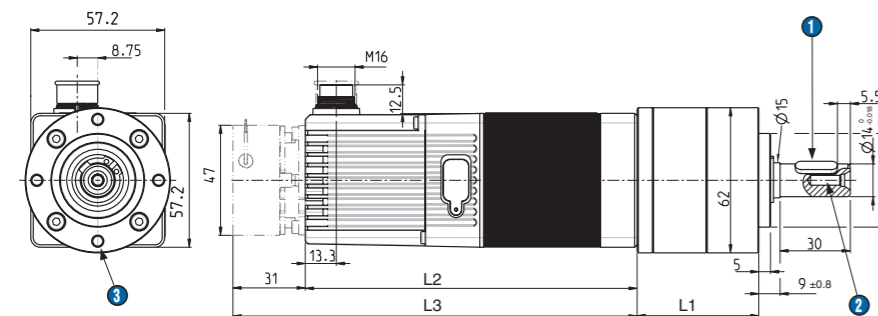
801495 - TNi21 + P52 M16 connector with or without brake



L1 1 stage: 55.3 ±0.5  
 L1 2 stages: 69.5 ±0.5  
 L1 3 stages: 83.7 ±0.5

- 1 Parallel key 4 x 4 x 16 DIN 6885 A
- 2 M4 x 10
- 3 4 x M5 at 90°, depth 10 over Ø 40

801496 - 801896 - TNi21 + P62 M16 connector with or without brake



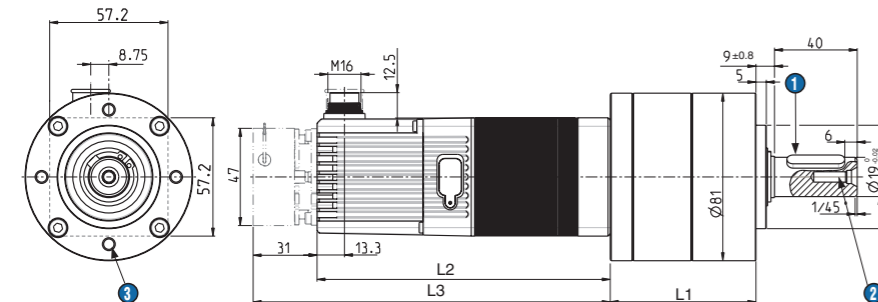
L1 1 stage: 52.1 ±0.7  
 L1 2 stages: 67.9 ±0.7  
 L1 3 stages: 83.8 ±0.7

L2 80140: 123 max.  
 L2 80180: 143 max.

L3 80140: 154 max.  
 L3 80180: 174 max.

- 1 Parallel key 5 x 5 x 18 DIN 6885 A
- 2 M5 x 12
- 3 4 x M5 at 90°, depth 10 over Ø 52

801897 - TNi21 + P81 M16 connector with or without brake

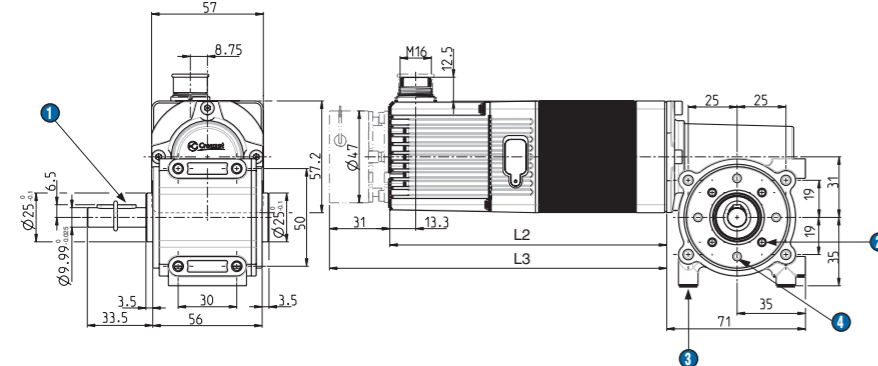


L1 1 stage: 70.5 ±0.6  
 L1 2 stages: 92.2 ±0.6  
 L1 3 stages: 113.8 ±0.6

L2 80180: 143 max.  
 L3 80180: 174 max.

- 1 Parallel key 6 x 6 x 28 DIN 6885 A
- 2 M6 x 16
- 3 4 x M6, depth 12 over Ø 65

801410 - 801810 - TNi21 + RAD10 M16 connector with or without brake



L2 80140: 123 max.  
 L2 80180-80280: 143 max.

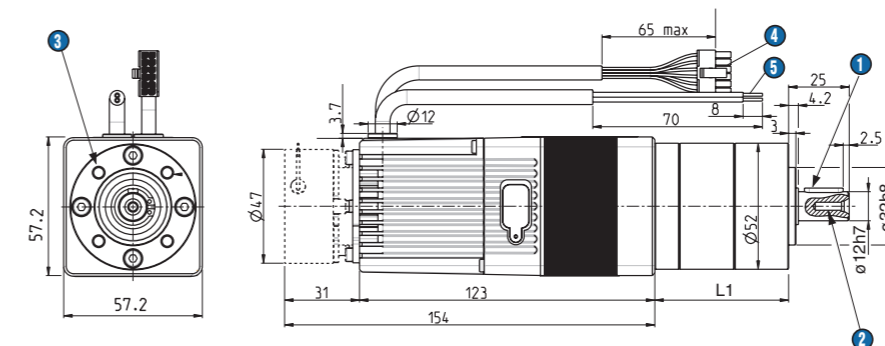
L3 80140: 154 max.  
 L3 80180-80280: 174 max.

- 1 Parallel key 4 x 4 x 20 DIN 6885 A
- 2 4 x M4, depth 8 over Ø 36
- 3 8 x M5, depth 8
- 4 4 x 3.8, depth 10 over Ø 40

# DCmind BRUSHLESS GEARED MOTOR SMi21 CABLE OUTPUT

## Dimensions (mm)

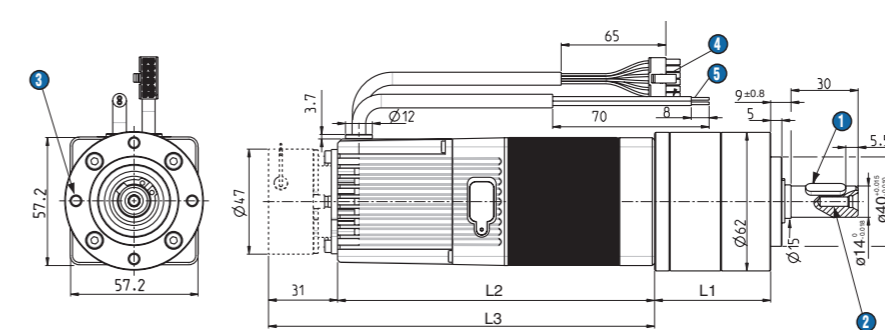
801495 - SMi21 + P52 with or without brake



L1 1 stage: 55.3 ±0.5  
 L1 2 stages: 69.5 ±0.5  
 L1 3 stages: 83.7 ±0.5

- 1 Parallel key 4 x 4 x 16 DIN 6885 A
- 2 M4 x 10
- 3 4 x M5 at 90°, depth 10 over Ø 40
- 4 Command cable 12 x AWG26 / 500 mm
- 5 Power cable 2 x AWG16 / 500 mm

801496 - 801896 - SMi21 + P62 with or without brake



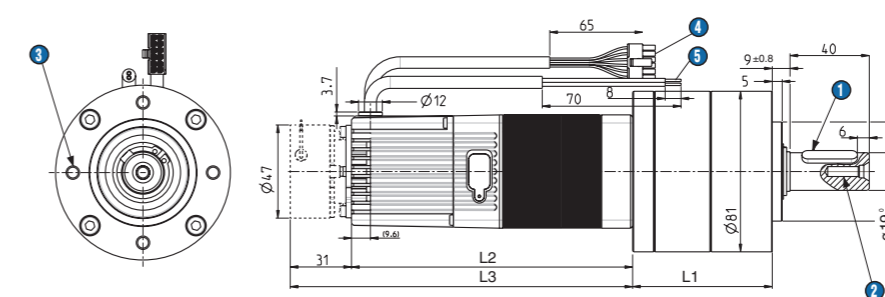
L1 1 stage: 52.1 ±0.7  
 L1 2 stages: 67.9 ±0.7  
 L1 3 stages: 83.8 ±0.7

L2 80140: 123 max.  
 L2 80180: 143 max.

L3 80140: 154 max.  
 L3 80180: 174 max.

- 1 Parallel key 5 x 5 x 18 DIN 6885 A
- 2 M5 x 12
- 3 4 x M5 at 90°, depth 10 over Ø 52
- 4 Command cable 12 x AWG26 / 500 mm
- 5 Power cable 2 x AWG16 / 500 mm

801897 - 802897 - SMi21 + P81 with or without brake

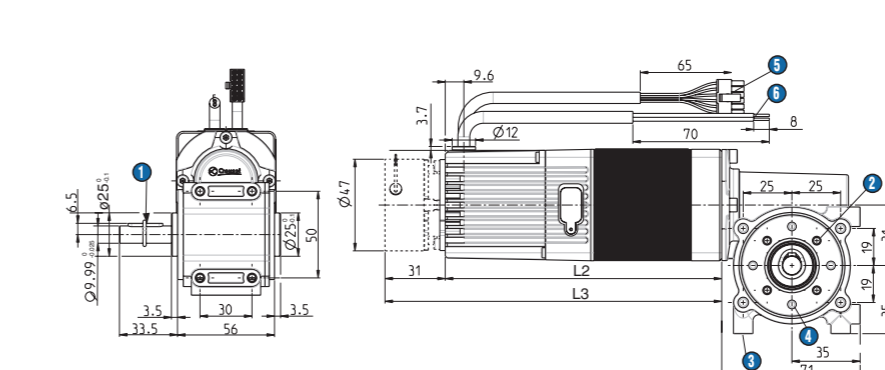


L1 1 stage: 70.5 ±0.6  
 L1 2 stages: 92.2 ±0.6  
 L1 3 stages: 113.8 ±0.6

L2 80180 - 80280: 143 max.  
 L3 80180 - 80280: 174 max.

- 1 Parallel key 6 x 6 x 28 DIN 6885 A
- 2 M6 x 16
- 3 4 x M6 at 90°, depth 12 over Ø 65
- 4 Command cable 12 x AWG26 / 500 mm
- 5 Power cable 2 x AWG16 / 500 mm

801410 - 801810 - 802810 - SMi21 + RAD10 with or without brake



L2 80140: 123 max.  
 L2 80180 - 80280: 143 max.

L3 80140: 154 max.  
 L3 80180 - 80280: 174 max.

- 1 Parallel key 4 x 4 x 20 DIN 6885 A
- 2 4 x M4, depth 8 over Ø 36
- 3 8 x M5, depth 8
- 4 4 x Ø 3.8, depth 10 over Ø 40
- 5 Command cable 12 x AWG26 / 500 mm
- 6 Power cable 2 x AWG16 / 500 mm

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