Ketterer DRIVES

Torque-Motors t-Rex

WE GET IDEAS MOVING

The spirit of innovation and a sense of ideas beyond the familiar has made us into a pioneering company over more than 185 years.

For a quarter of a century, we have been offering customized drive solutions for office and workplace workstations, as well as for shading systems and building technology.

Through our tradition of innovation, we have succeeded in establishing ourselves as a specialist and problem-solver in numerous areas.

Over 185 years' experience

More than 60 standard solutions for four different market segments

100% Made in Black Forest

THE RIGHT PRODUCT FOR EACH APPLICATION

Bevel gears

Torque-Motors t-Rex 3200 & 3206

3200
Long Version

3200
Short Version

3206
Long Version

3206
Short Version

Our technology - Your benefit

- High overload capability and dynamics
- Enormous performance density in the smallest installation space
- No gearbox – no wear
- Much longer service life compared to conventional drive technology with a gear stage
- Increased machine uptime through maintenance-free operation
- No maintenance – no operating costs
- Reduced noise due to elimination of the transmission mechanism

One Family – Countless Possible Applications

Ketterer t-Rex BLDC motors are high-performance, compact and reliable.
As a standard they are available in 2 sizes (3200: Ø44mm and 3206: Ø65mm) and in 2 lengths each. The torque spectrum of the t-Rex family begins at 0.2 Nm and ranges to 8 Nm. Drive speed range up to 6000 rpm.

Compared to other products on the market in the same size, the t-Rex family features three times the torque density in the smallest installation space. This allows use as a direct drive, also referred to as torque motor. Here, the rotating machines are directly coupled to the load. The transmission free configuration offers a host of advantages over the classical motor-gearbox combinations, such as:

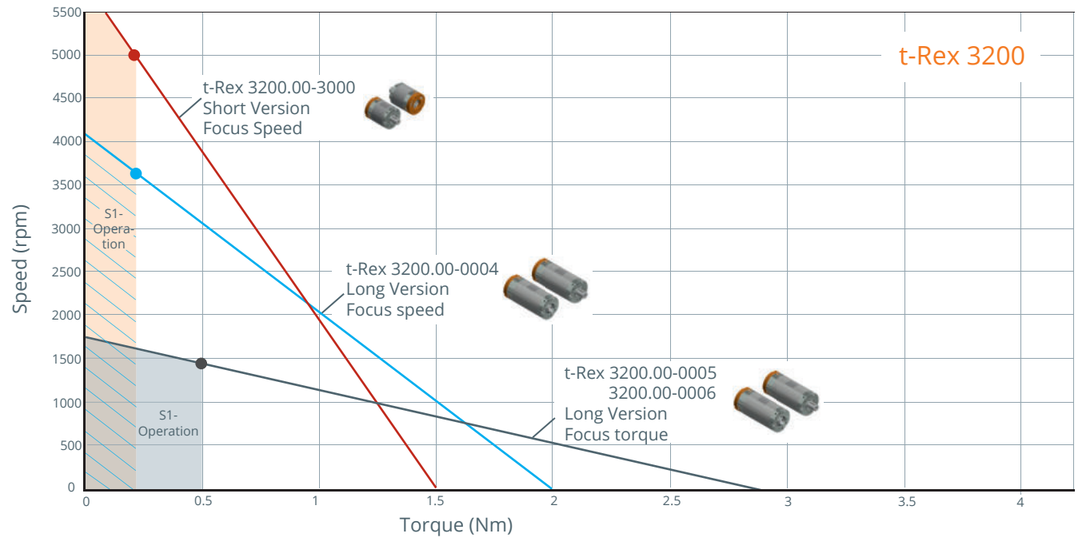
- Improved density
- Better energy efficiency
- Lower maintenance costs

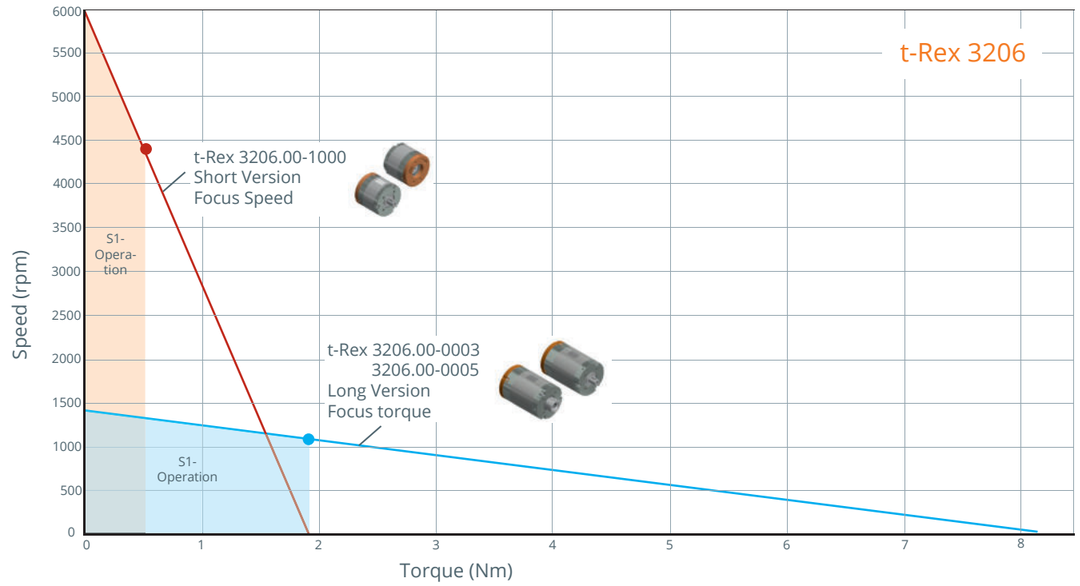
Easier installation and logistics due to a reduced number of components and high efficiency and productivity are what make the gearbox-less drive solutions so attractive.

Flexibility and customer orientation are our strengths: You make the choice – we implement it!

- Flexible low voltage range from 24 V to 48 V:
  Battery operation or mobile use of devices also possible
- Solid shaft with feather key or hollow shaft on customer request
- Ideal motor layout:
  Based on standard components, the motors can be delivered in application-specific number of windings and as custom wiring variants. This helps save resources and avoid overdimensioning
- Flexibility in motor design: Adaptations for mechanical integration and system connection
- Freely combinable with gearboxes, encoders and brakes as well as with controllers from numerous manufacturers

t-Rex 3200/3206 family: Variant Overview & Selection Guide





t-Rex 3200 (short version, focus rotational speed)

I-44-47-L41 S2

Description

14-pole BLDC motor with high-performance neodymium magnets and three digital Hall sensors to detect the rotor position. The electrical connections are designed as a plug-in system. Additional power electronics are required to operate the motor. Motor design with a hollow shaft is also available upon request. This allows the cables to run through the motor or the implementation of output on both sides.

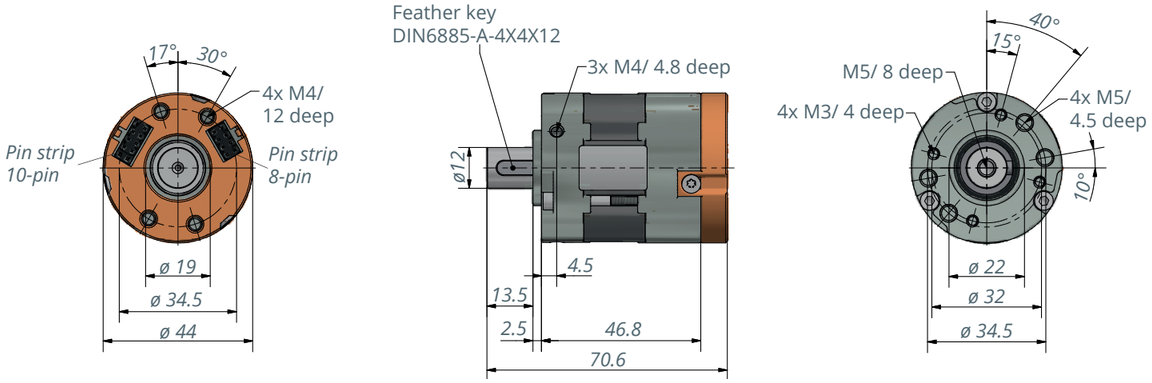
Special features

- Designed with **focus on rotational speed**
- Enormous performance density – 3 times stronger than motors of comparable size
- High overload resistance
- Ideally suited as direct drive, or generator for gearless applications
- Special winding upon request
- Design and manufacture of motor to specified operating point is possible

t-Rex 3200-I-44-47 L41 S2 DH	*3200.00-3000*		
Rated voltage	24 VDC	36 VDC	48 VDC
Rated current	2.6 A	2.6 A	2.8 A
Rated torque	0.2 Nm	0.2 Nm	0.2 Nm
Rated speed	2000 rpm	3187 rpm	4437 rpm
Shaft power (output)	42 W	67 W	93 W
Max. efficiency	70 %	72 %	72 %
Idle speed	2702 rpm	4089 rpm	5483 rpm
No-load current	0.4 A	0.4 A	0.4 A
Stall torque	1.0 Nm	1.3 Nm	1.5 Nm
Starting current at idle speed	14 A	18 A	20 A
Torque constant	0.077 Nm/A	0.073 Nm/A	0.073 Nm/A
Speed constant	113 rpm/V	114 rpm/V	114 rpm/V
Motor parameters			
Terminal resistance (phase to phase)		1.09 Ohm	
Terminal inductance (phase to phase)		98 mH	
Rotor inertia		125 kg* mm²	
Number of poles		14	
Interconnection of the motor		Star	
Number of coils per phase		2	
Interconnection of coils		2 Series	
Direction of rotation		bidirectional	

Note: Max. ambient temperature = 40 °C, controller-specific
At the nominal point (TU = 20°C), controller-specific

3200.00-3000 with shaft



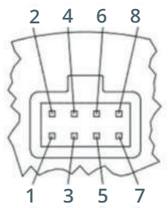
Digital Hall-sensors

Supply of sensors
Voltage range: 4.5 to 5.5 V DC
Optional: voltage regulator for 5 V
Input current: < 70 mA

Output signals of sensors
Differential output
(RS422 standard, datasheet AM26 C31-TI)
Typical voltage range: 0.2/ 3.4 V @ 20 mA
Output current: max. 20 mA

Signal structure: The Hall sensors have a 120° phase shift to each other
Due to the 14-pole design the
Signal frequency is seven times higher than the speed

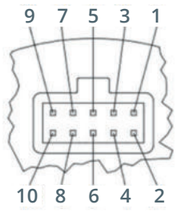
Hall-sensors



1= H3-
2= H1-
3= 5 V
4= H3+
5= H1+
6= GND
7= H2+
8= H2-

Socket strip RM 2.54 / 8 PIN
W+P 3491-08

Motor phases



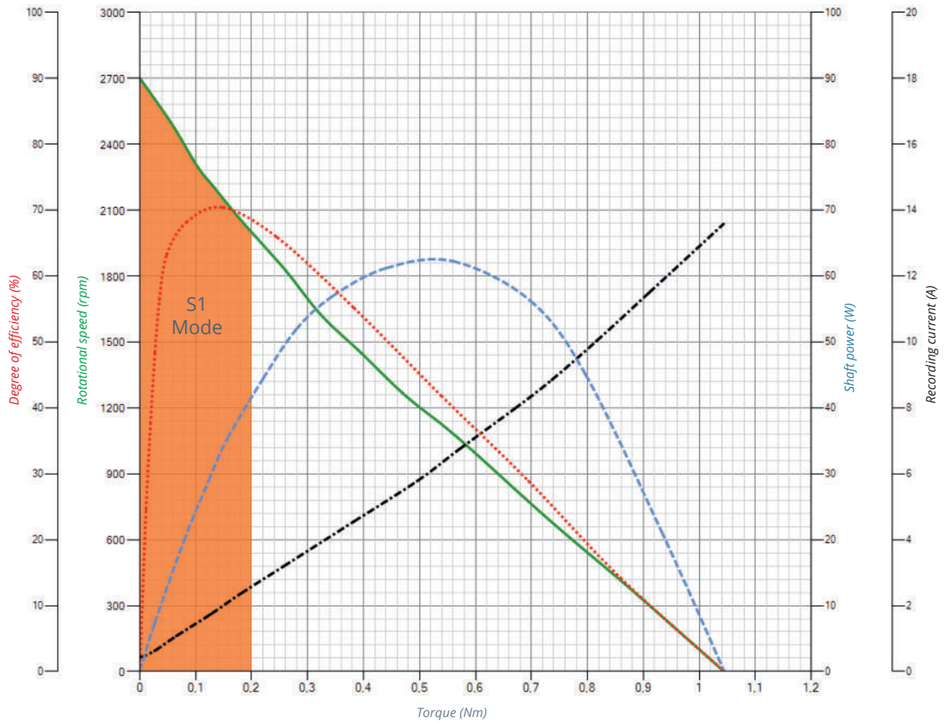
1= U-Phase
2= n.c.
3= U-Phase
4= U-Phase
5= V-Phase
6= V-Phase
7= W-Phase
8= V-Phase
9= W-Phase
10= W-Phase

n.c.= please do not connect
RM 2.54 / 10 PIN
W+P 3491-10

Motor cable approx. 1.5 m

Item number: 3200.53-05

Motor characteristics at 24 V



t-Rex 3200 (long version, focus torque)

I-44-89-L41 S2

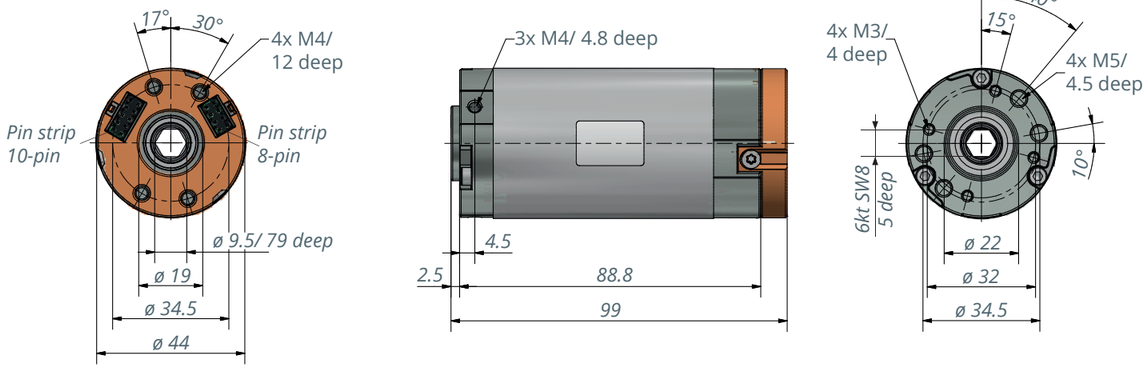
Description

14-pole BLDC motor with high-performance neodymium magnets and three digital Hall sensors to detect the rotor position. The electrical connections are designed as a plug-in system. Additional power electronics are required to operate the motor. The design of the motor with a hollow shaft allows the cables to run through the motor or output on both sides.

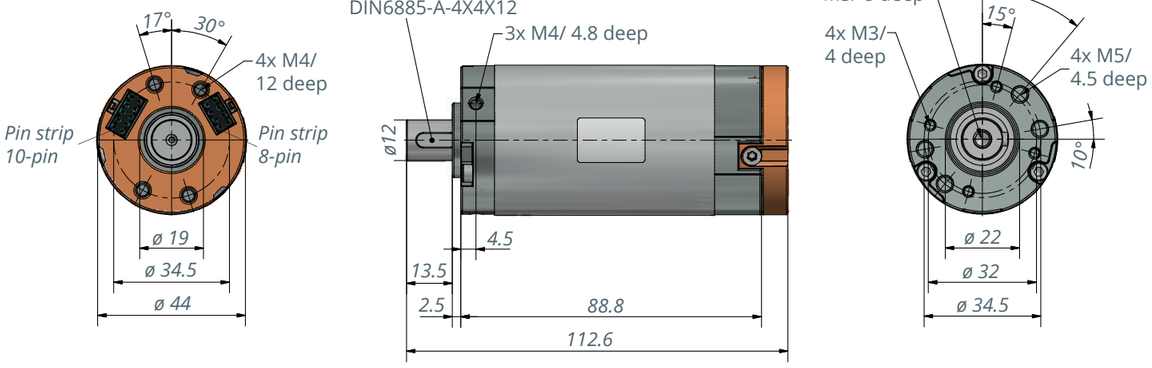
Special features

- Designed with **focus on max. torque**
- Enormous performance density – 3 times stronger than motors of comparable size
- High overload resistance
- Ideally suited as direct drive, or generator for gearless applications
- Special winding upon request
- Design and manufacture of motor to specified operating point is possible

3200.00-0005 with hollow shaft



3200.00-0006 with shaft

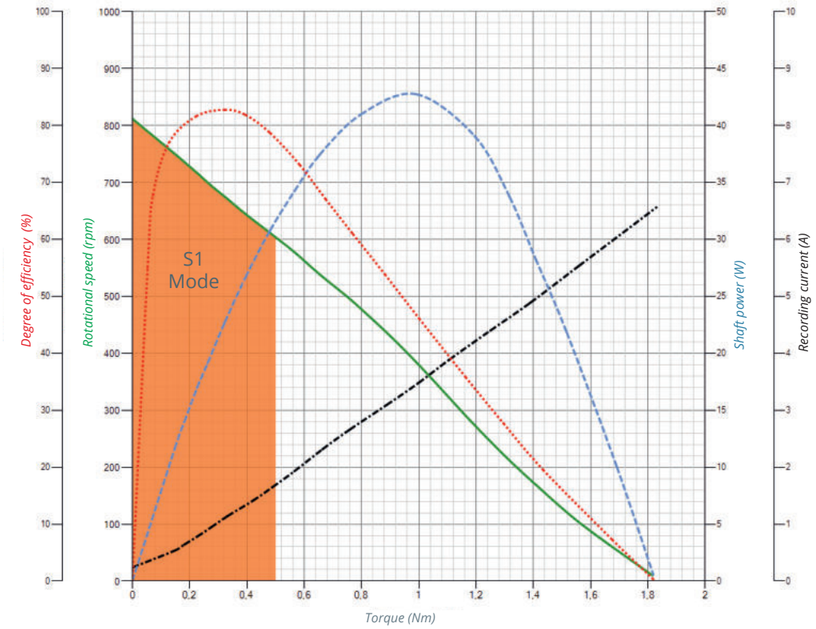


t-Rex 3200 I-44-89 L41 S2 DH	*3200.00-0005 / 3200.00-0006*		
Rated voltage	24 VDC	36 VDC	48 VDC
Rated current	1.7A	1.8 A	1.7 A
Rated torque	0.5 Nm	0.5 Nm	0.5 Nm
Rated speed	600 rpm	960 rpm	1347 rpm
Shaft power (output)	31 W	50 W	70 W
Max. efficiency	83 %	83 %	83 %
Idle speed	812 rpm	1221 rpm	1653 rpm
No-load current	0.3 A	0.2 A	0.2 A
Stall torque	1.8 Nm	2.3 Nm	2.9 Nm
Starting current at idle speed	6.6 A	8.7 A	11.2 A
Torque constant	0.279 Nm/A	0.264 Nm/A	0.261 Nm/A
Speed constant	34 rpm/V	34 rpm/V	34 rpm/V
Motor parameters			
Terminal resistance (phase to phase)	2.6 Ohm		
Terminal inductance (phase to phase)	1.6 mH		
Rotor inertia	26.5 kg* mm²		
Number of poles	14		
Interconnection of the motor	Star		
Number of coils per phase	2		
Interconnection of coils	2 Series		
Direction of rotation	bidirectional		

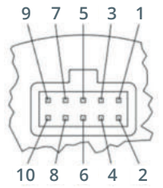
Note: Max. ambient temperature = 40 °C, controller-specific
At the nominal point (TU = 20°C), controller-specific

Motor cable approx.1.5 m | ***Item number: 3200.53-05***

Motor characteristics at 24 V



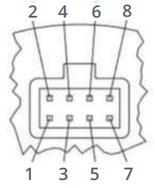
Motor phases



1= U-Phase
2= n.c.
3= U-Phase
4= U-Phase
5= V-Phase
6= V-Phase
7= W-Phase
8= V-Phase
9= W-Phase
10= W-Phase

n.c.= please do not connect
RM 2.54 / 10 PIN
W+P 3491-10

Hall-sensors



1= H3-
2= H1-
3= 5 V
4= H3+
5= H1+
6= GND
7= H2+
8= H2-

Socket strip RM 2.54 / 8 PIN
W+P 3491-08

Digital Hall-sensors

Supply of sensors: Voltage range: 4.5 to 5.5 V DC / Optional: voltage regulator for 5 V, Input current: < 70 mA
Output signals of sensors: Differential output, (RS422 standard, datasheet AM26 C31-TI)
Typical voltage range: 0.2/ 3.4 V @ 20 mA / Output current: max. 20 mA
Signal structure: The Hall sensors have a 120° phase shift to each other. Due to the 14-pole design the
Signal frequency is seven times higher than the speed

t-Rex 3200 (long version, focus rotational speed)

I-44-89-L12 S2

Description

14-pole BLDC motor with high-performance neodymium magnets and three digital Hall sensors to detect the rotor position. The electrical connections are designed as a plug-in system. Additional power electronics are required to operate the motor. Motor design with a hollow shaft is also available upon request. This allows the cables to run through the motor or the implementation of output on both sides.

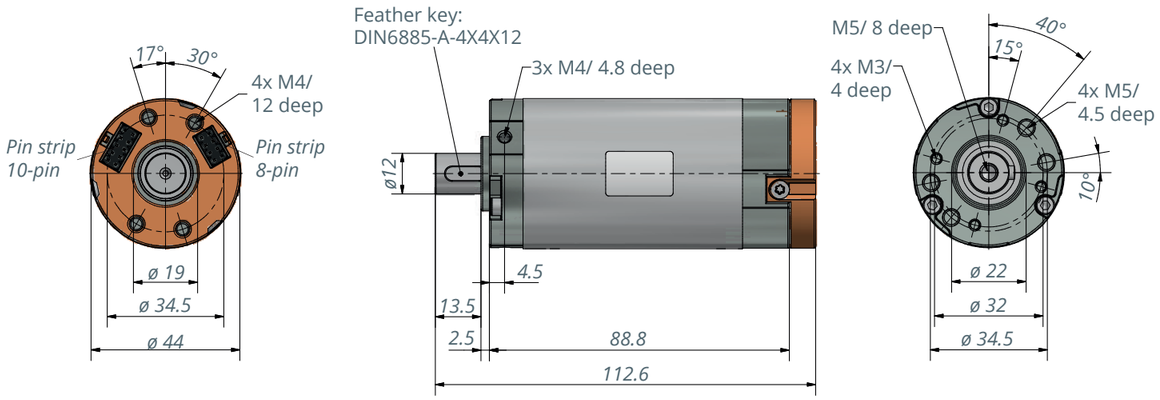
Special feature

- Designed with **focus on rotational speed**
- Enormous performance density – 3 times stronger than motors of comparable size
- High overload resistance
- Ideally suited as direct drive, or generator for gearless applications
- Special winding upon request
- Design and manufacture of motor to specified operating point is possible

t-Rex 3200 I-44-89 L12 S2 DH	*3200.00-0004*	
Rated voltage	24 VDC	36 VDC
Rated current	4.0 A	4.0 A
Rated torque	0.3 Nm	0.2 Nm
Rated speed	2418 rpm	3767 rpm
Shaft power (output)	67 W	79 W
Max. efficiency	74 %	76 %
Idle speed	2680 rpm	4053 rpm
No-load current	0.55 A	0.56 A
Stall torque	2 Nm	2 Nm
Starting current at idle speed	22.7 A	21.6 A
Torque constant	0.09 Nm/A	0.09 Nm/A
Speed constant	112 rpm/V	113 rpm/V
Motor parameters		
Terminal resistance (phase to phase)	27 Ohm	
Terminal inductance (phase to phase)	45 mH	
Rotor inertia	26.5 kg* mm²	
Number of poles	14	
Interconnection of the motor	Star	
Number of coils per phase	2	
Interconnection of coils	2 Series	
Direction of rotation	bidirectional	

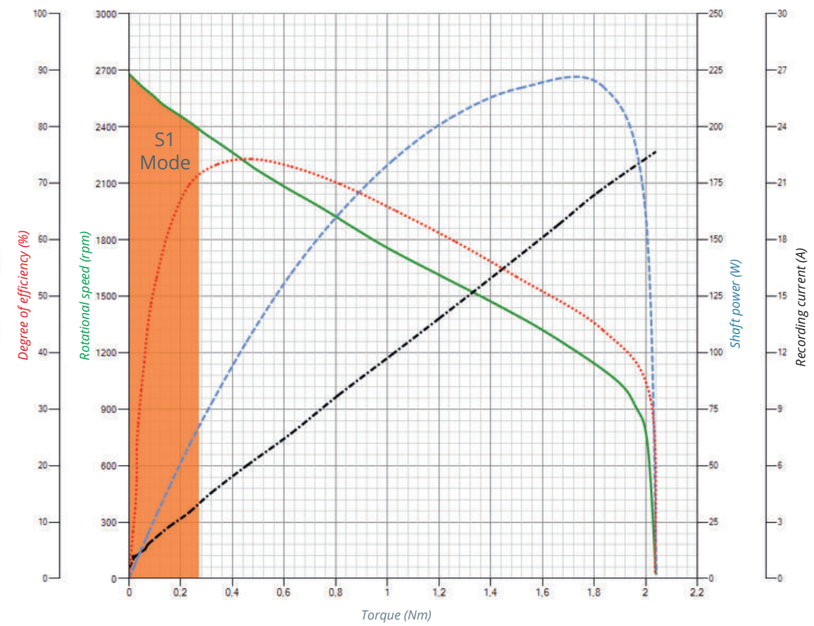
Note: Max. ambient temperature = 40 °C, controller-specific
At the nominal point (TU = 20°C), controller-specific

3200.00-0004 with shaft

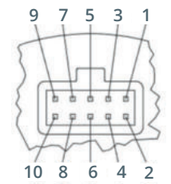


Motor cable approx. 1.5 m | ***Item number: 3200.53-05***

Motor characteristics at 24 V



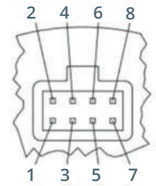
Motor phases



1= U-Phase
2= n.c.
3= U-Phase
4= U-Phase
5= V-Phase
6= V-Phase
7= W-Phase
8= V-Phase
9= W-Phase
10= W-Phase

n.c.= please do not connect
RM 2,54 / 10 PIN
W+P 3491-10

Hall-sensors



1= H3-
2= H1-
3= 5 V
4= H3+
5= H1+
6= GND
7= H2+
8= H2-

Socket strip RM 2.54 / 8 PIN
W+P 3491-08

Digital Hall-sensors

Supply of sensors: Voltage range: 4.5 to 5.5 V DC / Optional: voltage regulator for 5 V, Input current: < 70 mA
Output signals of sensors: Differential output (RS422 standard, datasheet AM26 C31-TI)
Typical voltage range: 0.2/ 3.4 V @ 20 mA, Output current: max. 20 mA
Signal structure: The Hall sensors have a 120° phase shift to each other. Due to the 14-pole design the
Signal frequency is seven times higher than the speed

t-Rex 3206 (short version, focus rotational speed)
I-65-51-L36 S2

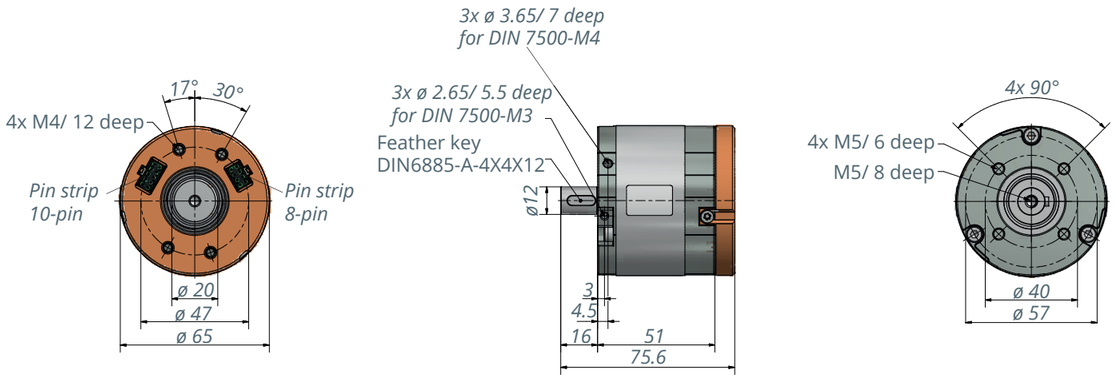
Description

14-pole BLDC motor with high-performance neodymium magnets and three digital Hall sensors to detect the rotor position. The electrical connections are designed as a plug-in system. Additional power electronics are required to operate the motor. Motor design with a hollow shaft is also available upon request. This allows the cables to run through the motor or the implementation of output on both sides.

Special features

- Designed with **focus on rotational speed**
- Enormous performance density – 3 times stronger than motors of comparable size
- High overload resistance
- Special winding upon request
- Design and manufacture of motor to specified operating point is possible

3206.00-1000 with shaft



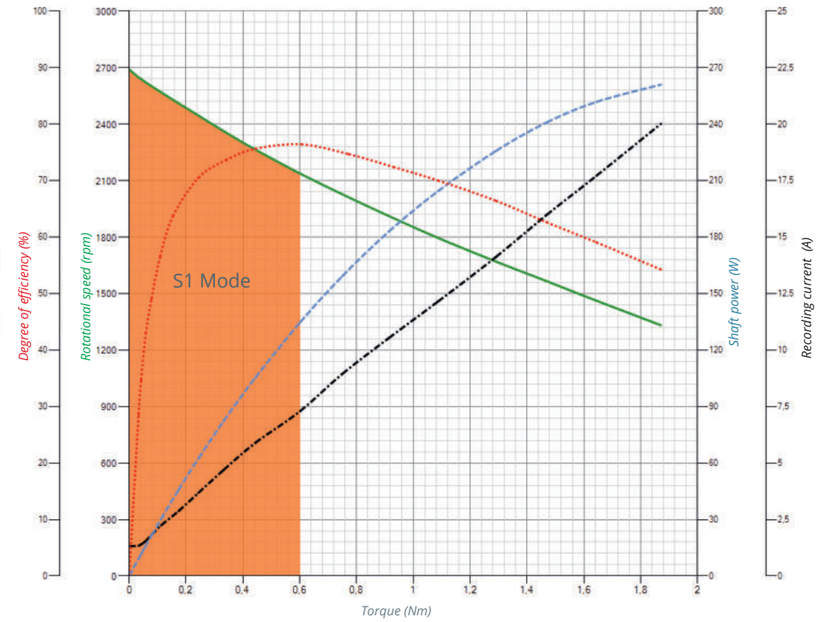
Motor cable approx. 1.5 m	*Item number: 3200.53-05*

t-Rex 3206 I-65-51 L36 S2 DH	*3206.00-1000*		
Rated voltage	24 VDC	36 VDC	48 VDC
Rated current	7.3 A	5.6 A	5.6 A
Rated torque	0.6 Nm	0.6 Nm	0.6 Nm
Rated speed	2139 rpm	3208 rpm	4812 rpm
Shaft power (output)	134 W	201 W	301 W
Max. efficiency	76 %	77 %	77 %
Idle speed	2680 rpm	4053 rpm	6054 rpm
No-load current	0.5 A	0.6 A	0.6 A
Stall torque*	1.9 Nm	1.9 Nm	1.9 Nm
Starting current at idle speed	20 A	20 A	20 A
Torque constant	0.094 Nm/A	0.094 Nm/A	0.094 Nm/A
Speed constant	112 rpm/V	112 rpm/V	126 rpm/V

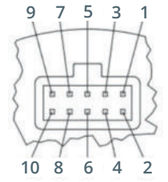
Motor parameters	
Terminal resistance (phase to phase)	0.348 Ohm
Terminal inductance (phase to phase)	0.36 mH
Rotor inertia	65 kg* mm²
Number of poles	14
Interconnection of the motor	Star
Number of coils per phase	2
Interconnection of coils	2 Series
Direction of rotation	bidirectional

* Is limited by the current carrying capacity of the coils
Note: Max. ambient temperature = 40 °C, controller-specific
At the nominal point (T_U = 20°C), controller-specific

Motor characteristics at 24 V



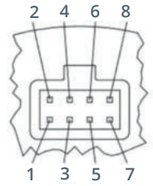
Motor phases



1= U-Phase
2= n.c.
3= U-Phase
4= U-Phase
5= V-Phase
6= V-Phase
7= W-Phase
8= V-Phase
9= W-Phase
10= W-Phase

n.c.= please do not connect
RM 2.54 / 10 PIN
W+P 3491-10

Hall-sensors



1= H3-
2= H1-
3= 5 V
4= H3+
5= H1+
6= GND
7= H2+
8= H2-

Socket strip RM 2.54 / 8 PIN
W+P 3491-08

Digital Hall-sensors

Supply of sensors: Voltage range: 4.5 to 5.5 V DC / Optional: voltage regulator for 5 V, Input current: < 70 mA
Output signals of sensors: Differential output, (RS422 standard, datasheet AM26 C31-TI)
Typical voltage range: 0.2/ 3.4 V @ 20 mA / Output current: max. 20 mA
Signal structure: The Hall sensors have a 120° phase shift to each other. Due to the 14-pole design the
Signal frequency is seven times higher than the speed

t-Rex 3206 (long version, focus torque)

I-65-86-L36 S2

Description

14-pole BLDC motor with high-performance neodymium magnets and three digital Hall sensors to detect the rotor position. The electrical connections are designed as a plug-in system. Additional power electronics are required to operate the motor. The design of the motor with a hollow shaft allows the cables to run through the motor or output on both sides.

Special features

- Designed with **focus on max. torque**
- Enormous performance density – 3 times stronger than motors of comparable size
- High overload resistance
- Ideally suited as direct drive, or generator for gearless applications
- Special winding upon request
- Design and manufacture of motor to specified operating point is possible

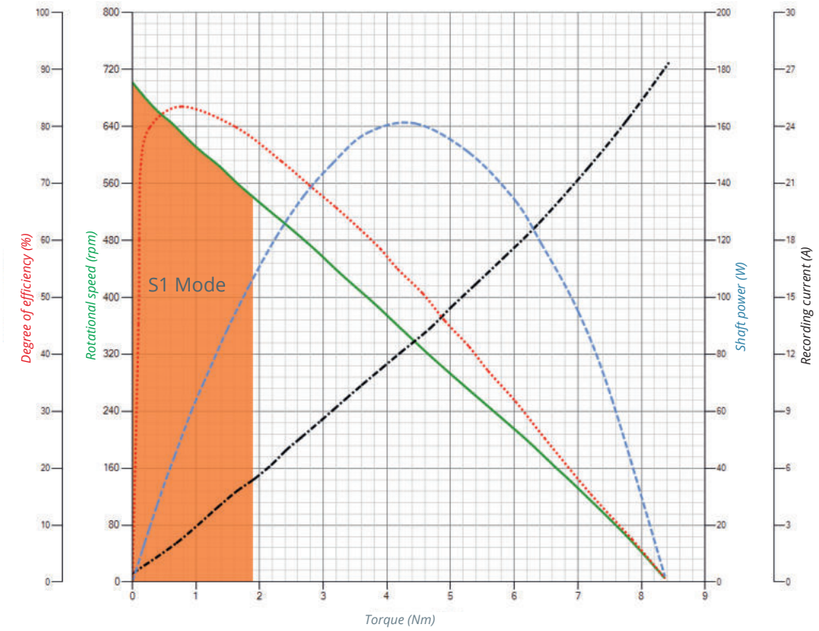
t-Rex 3206 I-65-86 L36 S2 DH	*3206.00-0005/ 3200.00-0003*		
Rated voltage	24 VDC	36 VDC	48 VDC
Rated current	5.4 A	5.6 A	5.6 A
Rated torque	1.9 Nm	1.9 Nm	1.9 Nm
Rated speed	535 rpm	865 rpm	1185 rpm
Shaft power (output)	106 W	167 W	232 W
Max. efficiency	84 %	82 %	83 %
Idle speed	702 rpm	1052 rpm	1390 rpm
No-load current	0.45 A	0.43 A	0.43 A
Stall torque	8 Nm	9 Nm	9 Nm
Starting current at idle speed	27 A	28 A	26.5 A
Torque constant	0.308 Nm/A	0.330 Nm/A	0.343 Nm/A
Speed constant	29 rpm/V	29 rpm/V	29 rpm/V

Motor parameters	
Terminal resistance (phase to phase)	121 Ohm
Terminal inductance (phase to phase)	0.9 mH
Rotor inertia	104 kg* mm²
Number of poles	14
Interconnection of the motor	Star
Number of coils per phase	2
Interconnection of coils	2 Series
Direction of rotation	bidirectional

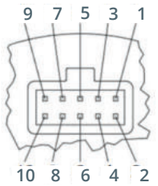
Note: Max. ambient temperature = 40 °C, controller-specific
At the nominal point (TU = 20°C), controller-specific

Motor cable approx. 1.5 m | ***Item number: 3200.53-05***

Motor characteristics at 24 V



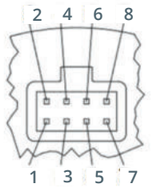
Motor phases



1= U-Phase
2= n.c.
3= U-Phase
4= U-Phase
5= V-Phase
6= V-Phase
7= W-Phase
8= V-Phase
9= W-Phase
10= W-Phase

n.c.= please do not connect
RM 2.54 / 10 PIN
W+P 3491-10

Hall-sensors



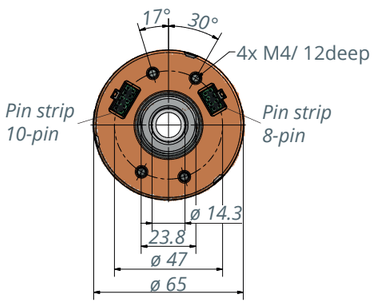
1= H3-
2= H1-
3= 5 V
4= H3+
5= H1+
6= GND
7= H2+
8= H2-

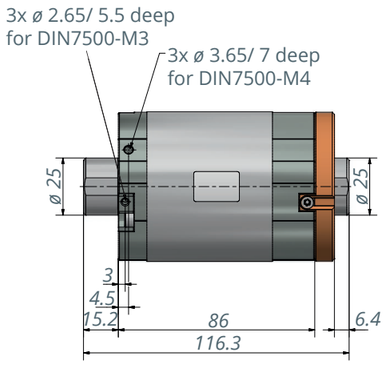
Socket strip RM 2.54 / 8 PIN
W+P 3491-08

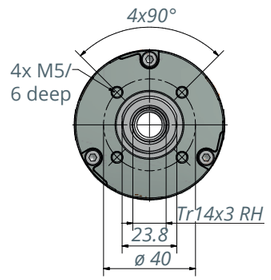
Digital Hall-sensors

Supply of sensors: Voltage range: 4.5 to 5.5 V DC / Optional: voltage regulator for 5 V, Input current: < 70 mA
Output signals of sensors: Differential output, (RS422 standard, datasheet AM26 C31-TI)
Typical voltage range: 0.2/ 3.4 V @ 20 mA / Output current: max. 20 mA
Signal structure: The Hall sensors have a 120° phase shift to each other. Due to the 14-pole design the
Signal frequency is seven times higher than the speed

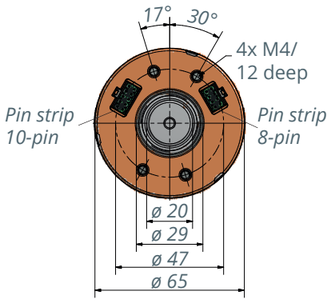
3206.00-0005 with nut

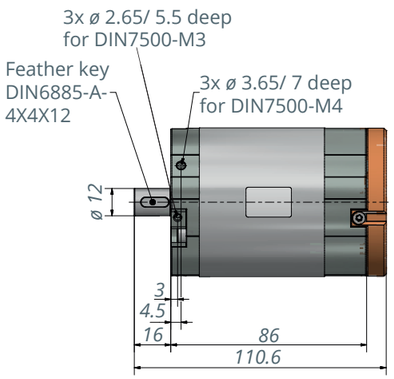


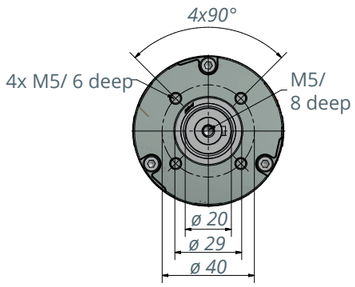




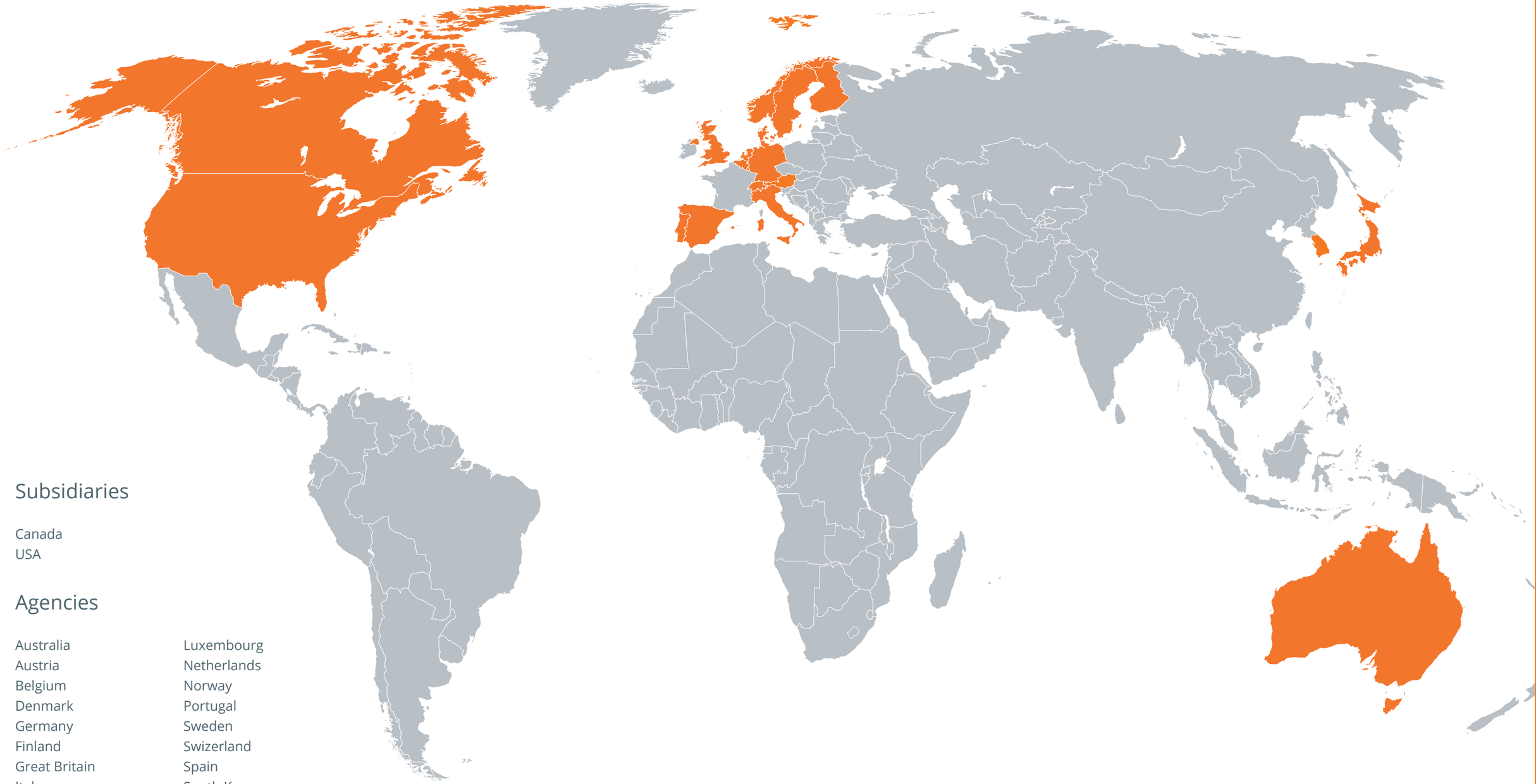
3206.00-0003 with shaft







USED AROUND THE WORLD



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