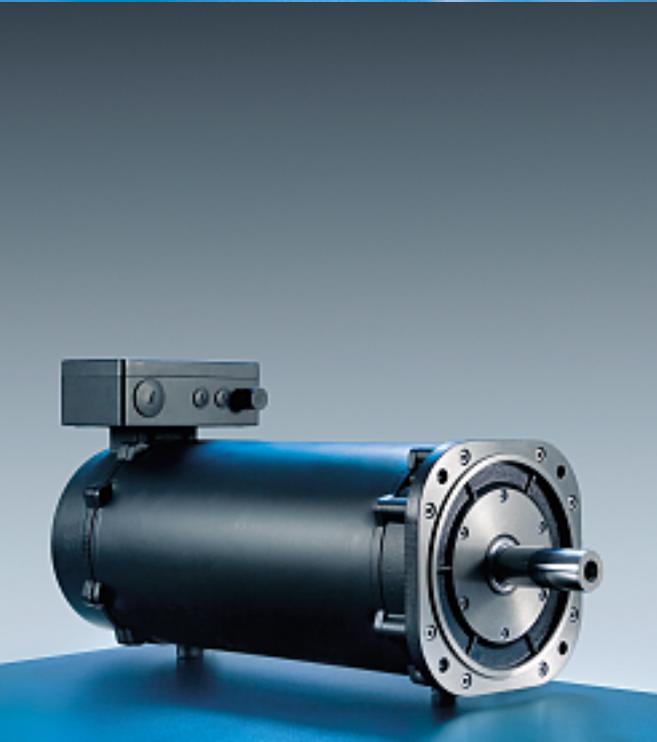


**DYNASYN**  
**Servomotors DS13**

**AMK**



**AMK**

DS13 synchronous servo motors are characterized by excellent synchronous properties and low field weakening currents that enable them to operate at a constant power.

They are used for synchronizing machine elements requiring large power, as well as in drive tasks that call for medium and high speeds over a long period of time.

The particularly robust bearing design supports operation with a toothed belt drives also.

This range is available with three different types of cooling:

- **Convection-cooled**

For applications that cannot be ventilated as a result of installation conditions (noise, contamination).

- **Force-ventilated**

For applications suited for forced ventilation that have high continuous powers and dynamic responses, as well as applications for which motors with large dimensions and high rotor inertias cannot be used.

- **Liquid-cooled**

For use in almost all installation conditions with extreme power densities and dynamic responses.

# General data overview

## Convection-cooled DS13 motors

Motor type	Square flange	Standstill data		Rating					Maximum data		Electr. data		Mechanical data						
	mm	M <sub>O</sub> [Nm]	I <sub>O</sub> [A]	M <sub>N</sub> [Nm]	P <sub>N</sub> [kW]	I <sub>N</sub> [A]	n <sub>N</sub> [1/min]	k <sub>T</sub> [Nm/A]	M <sub>max</sub> [Nm]	I <sub>max</sub> [A]	L <sub>tt</sub> [mH]	R <sub>tt</sub> [Ω]	n <sub>max</sub> [1/min]	J [kgcm <sup>2</sup> ]	L [mm]	L <sub>4</sub> [mm]	L <sub>5</sub> [mm]	L <sub>BR</sub> [mm]	m [kg]
DS13-85-6-EOO-2600	260	83	36	60	12.6	26	2000	2.3	400	200	4.1	0.12	5000	660	398	198	-	490	75
DS13-145-6-EOO-2600	260	145	76	90	14.2	55	1500	1.9	660	330	2.3	0.057	5000	1324	578	78	300	670	150

## Force-ventilated DS13 motors

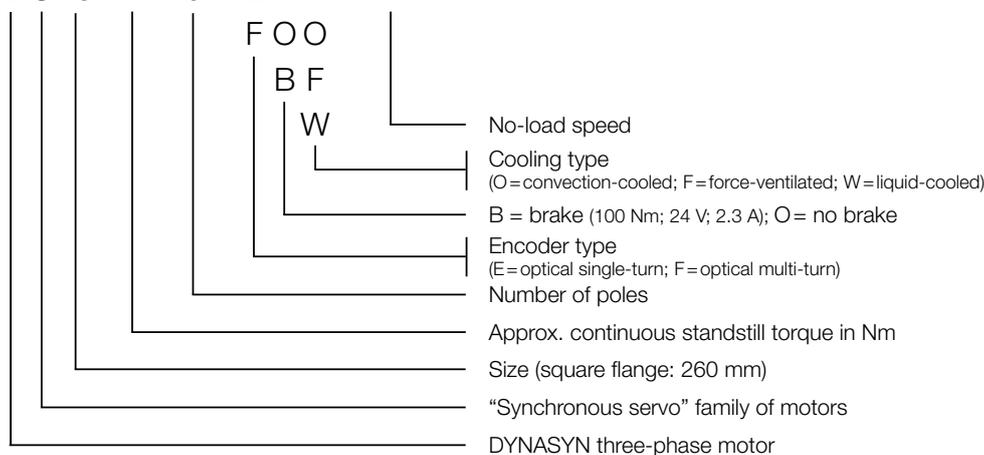
Motor type	Square flange	Standstill data		Rating					Maximum data		Electr. data		Mechanical data						
	mm	M <sub>O</sub> [Nm]	I <sub>O</sub> [A]	M <sub>N</sub> [Nm]	P <sub>N</sub> [kW]	I <sub>N</sub> [A]	n <sub>N</sub> [1/min]	k <sub>T</sub> [Nm/A]	M <sub>max</sub> [Nm]	I <sub>max</sub> [A]	L <sub>tt</sub> [mH]	R <sub>tt</sub> [Ω]	n <sub>max</sub> [1/min]	J [kgcm <sup>2</sup> ]	L [mm]	L <sub>4</sub> [mm]	L <sub>5</sub> [mm]	L <sub>BR</sub> [mm]	m [kg]
DS13-120-6-EOF-2600	260	120	52	100	21.1	44	2000	2.3	400	200	4.1	0.12	5000	660	560	198	-	650	82
DS13-190-6-EOF-2600	260	220	116	170	31.5	88	1800	1.9	660	330	2.3	0.057	5000	1324	740	78	300	830	156

## Liquid-cooled DS13 motors

Motor type	Square flange	Standstill data		Rating					Maximum data		Electr. data		Mechanical data							
	mm	M <sub>O</sub> [Nm]	I <sub>O</sub> [A]	M <sub>N</sub> [Nm]	P <sub>N</sub> [kW]	I <sub>N</sub> [A]	n <sub>N</sub> [1/min]	k <sub>T</sub> [Nm/A]	M <sub>max</sub> [Nm]	I <sub>max</sub> [A]	L <sub>tt</sub> [mH]	R <sub>tt</sub> [Ω]	n <sub>max</sub> [1/min]	J [kgcm <sup>2</sup> ]	L [mm]	L <sub>3</sub> [mm]	L <sub>4</sub> [mm]	L <sub>5</sub> [mm]	L <sub>BR</sub> [mm]	m [kg]
DS13-170-6-EOW-2600	260	160	129	150	28.1	110	2000	2.3	400	200	4.1	0.12	5000	660	400	137	181	-	495	88
DS13-250-6-EOW-2600	260	290	153	260	48	138	1800	1.9	660	330	2.3	0.057	5000	1324	580	317	160.5	226	675	160

## Type key

**D S 13 - x - 6 - E x x - xxxx**



## Convection-cooled design



### Features

- High continuous power without fans
- Very quiet operation
- High dynamic response
- Operation at a constant power possible

### Applications

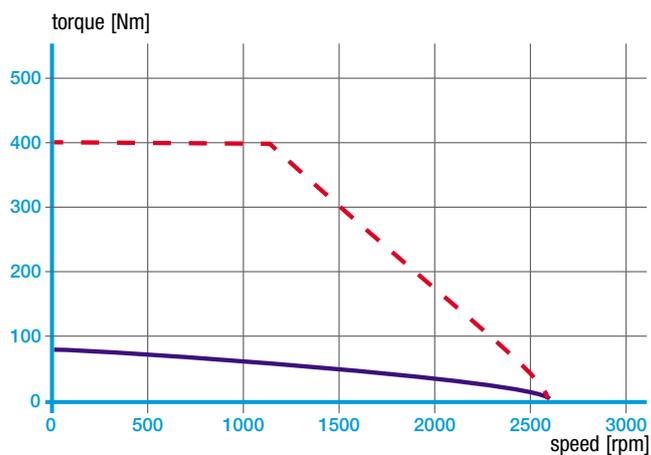
- Positioning and actuating drive for drive tasks with extremely high dynamic response and power density requirements
- Variable-speed drive for continuous running at low and medium speeds
- For applications running in harsh conditions

### Equipment

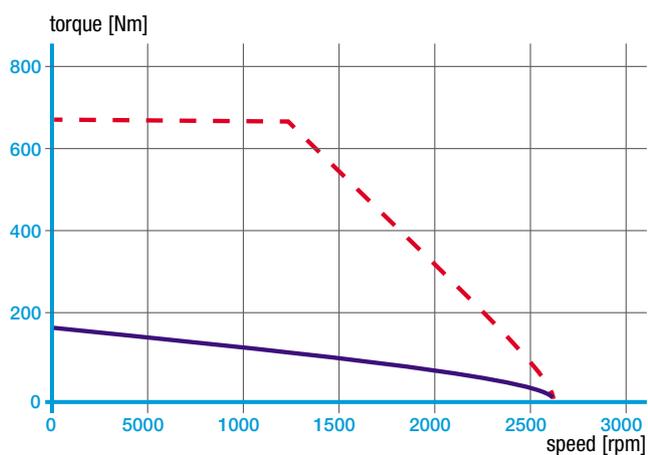
	Standard	Option
Brake	–	100 Nm
Encoder	E-encoder	F-encoder
Shaft	Smooth	Shaft key DIN6885 A12x8x80

**Connection cable:** Copper conductor rated cross-section  
DS13-85: 6 mm<sup>2</sup> · DS13-145: 16 mm<sup>2</sup>

### Characteristics



DS13-85-6-EOO-2600-B5

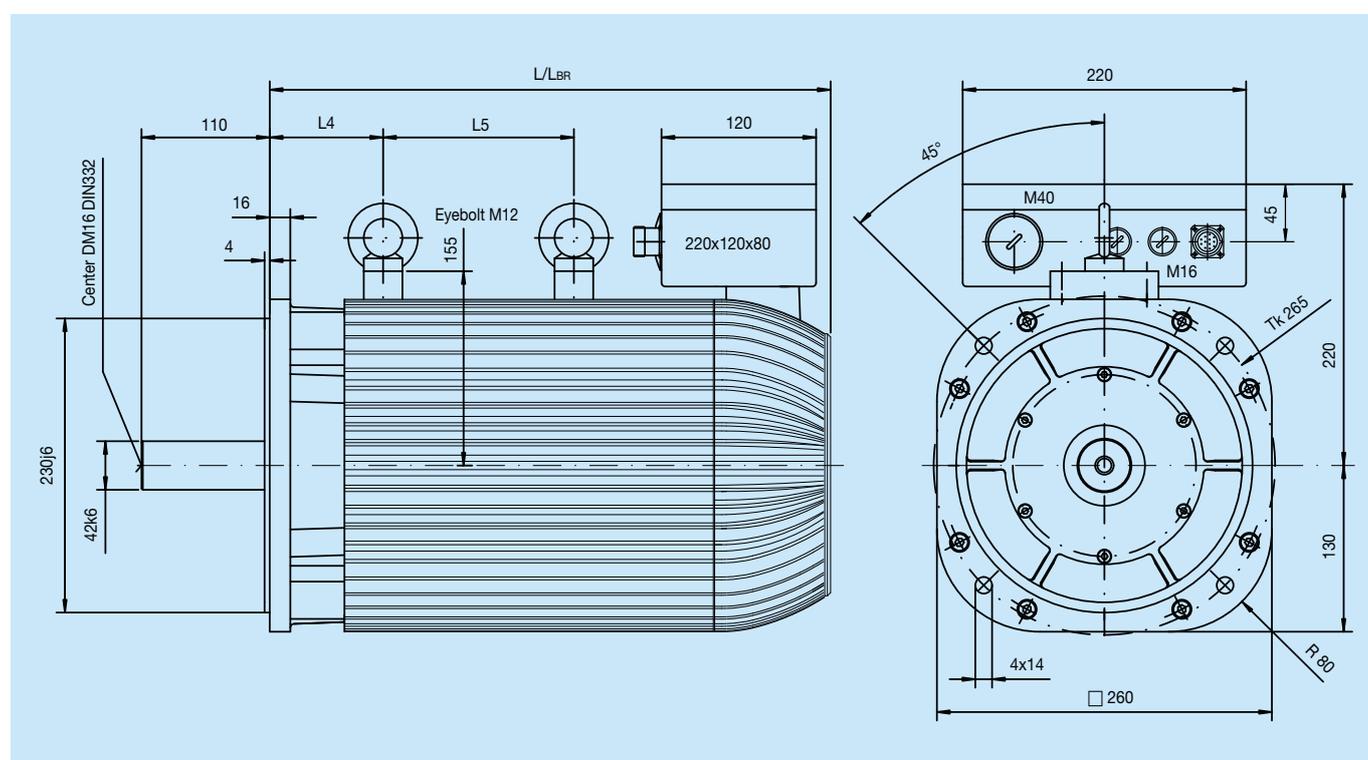


DS13-145-6-EOO-2600-B5

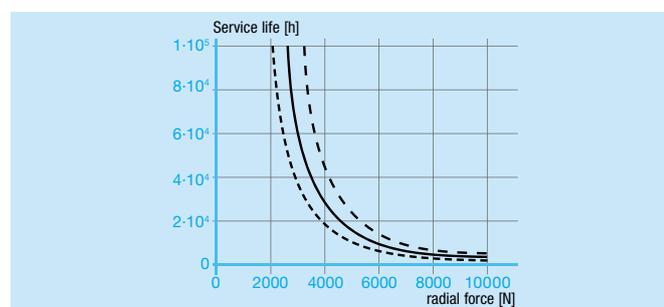
## Technical data

Motor type	Standstill data		Rating					Maximum data		Electr. data		Mechanical data						
	$M_o$ [Nm]	$I_o$ [A]	$M_N$ [Nm]	$P_N$ [kW]	$I_N$ [A]	$n_N$ [1/min]	$k_T$ [Nm/A]	$M_{max}$ [Nm]	$I_{max}$ [A]	$L_{tt}$ [mH]	$R_{tt}$ [Ω]	$n_{max}$ [1/min]	$J$ [kgcm <sup>2</sup> ]	$L$ [mm]	$L_4$ [mm]	$L_5$ [mm]	$L_{BR}$ [mm]	$m$ [kg]
DS13-85-6-EOO-2600	83	36	60	12.6	26	2000	2.3	400	200	4.1	0.12	5000	660	398	198	-	490	75
DS13-145-6-EOO-2600	145	76	90	14.2	55	1500	1.9	660	330	2.3	0.057	5000	1324	578	78	300	670	150

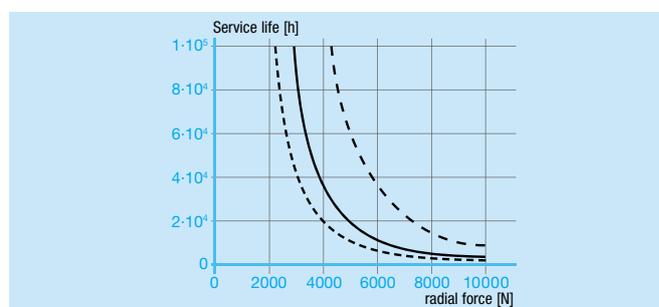
## Dimensions



## Bearing service life (L10h)



DS13-85-6-EOO-2600-B5



DS13-145-6-EOO-2600-B5

## Force-ventilated design



### Features

- Very high continuous power
- Very high torque and power density
- Very high dynamic response even at very short repetitive cycles
- Operation at a constant power over a wide speed range possible during continuous duty

### Applications

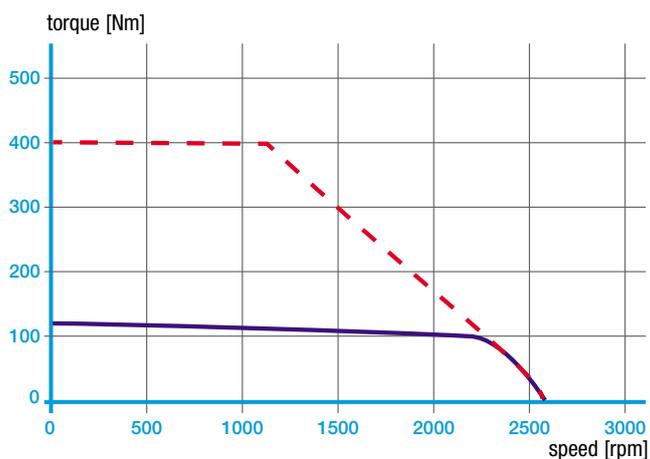
- Drive for tasks with high continuous power requirements
- Variable-speed drive for continuous running at low, medium and high speeds, e.g. synchronizing systems
- Winding application with a wide constant power range

### Equipment

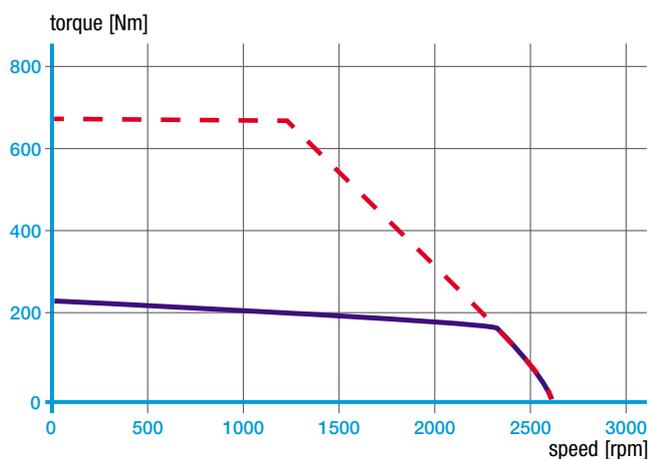
	Standard	Option
Brake	–	100 Nm
Encoder	E-encoder	F-encoder
Shaft	Smooth	Shaft key DIN6885 A12x8x80

**Connection cable:** Copper conductor rated cross-section  
DS13-120: 10 mm<sup>2</sup> · DS13-190: 25 mm<sup>2</sup>

### Characteristics



DS13-120-6-EOF-2600-B5

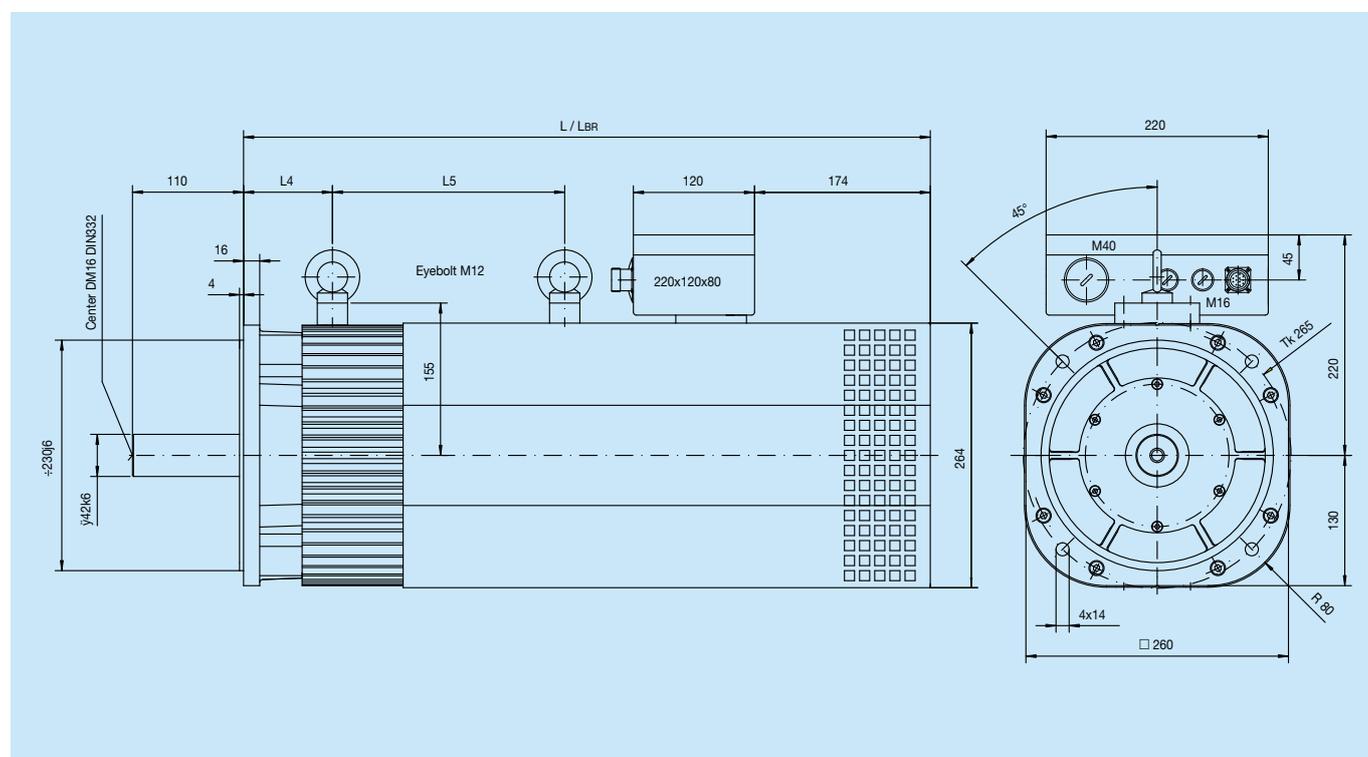


DS13-190-6-EOF-2600-B5

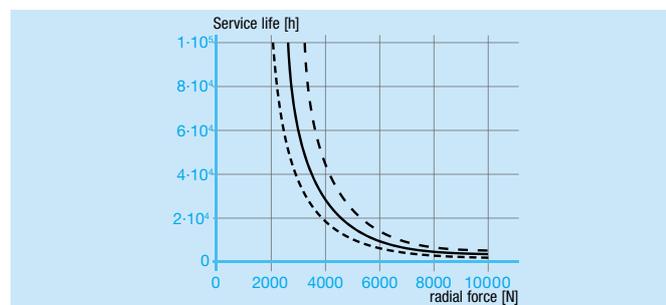
## Technical data

Motor type	Standstill data		Rating					Maximum data		Electr. data		Mechanical data						
	$M_o$ [Nm]	$I_o$ [A]	$M_N$ [Nm]	$P_N$ [kW]	$I_N$ [A]	$n_N$ [1/min]	$k_T$ [Nm/A]	$M_{max}$ [Nm]	$I_{max}$ [A]	$L_{tt}$ [mH]	$R_{tt}$ [Ω]	$n_{max}$ [1/min]	$J$ [kgcm <sup>2</sup> ]	$L$ [mm]	$L_4$ [mm]	$L_5$ [mm]	$L_{BR}$ [mm]	$m$ [kg]
DS13-120-6-EOF-2600	120	52	100	21.1	44	2000	2.3	400	200	4.1	0.12	5000	660	560	198	-	650	82
DS13-190-6-EOF-2600	220	116	170	31.5	88	1800	1.9	660	330	2.3	0.057	5000	1324	740	78	300	830	156

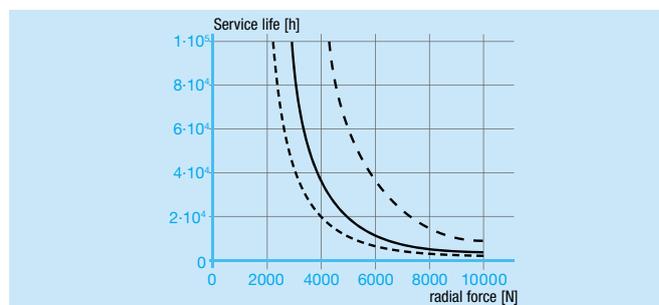
## Dimensions



## Bearing service life (L10h)



DS13-120-6-EOF-2600-B5



DS13-190-6-EOF-2600-B5

## Liquid-cooled design



### Features

- Maximum power density
- Maximum dynamic response even at very short repetitive cycles
- Operation at a constant power over a wide speed range possible
- High speeds possible

### Applications

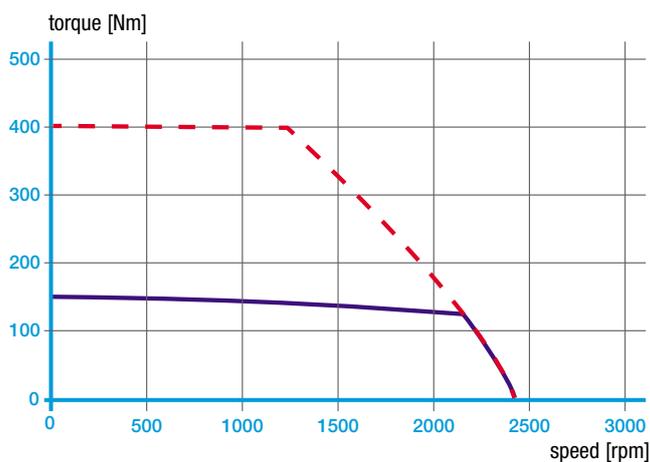
- Positioning and actuating drive for drive tasks with extremely high dynamic response and power density requirements
- Variable-speed drive for continuous running at low, medium and high speeds
- For applications running under difficult cooling conditions due to a high integration density, contamination or ambient temperature conditions

### Equipment

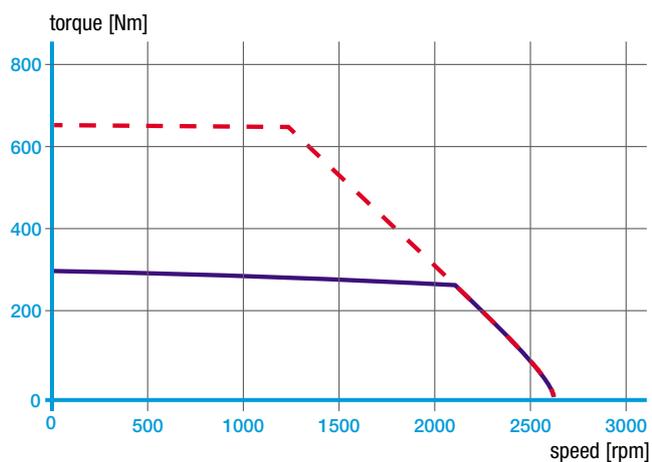
	Standard	Option
Brake	–	100 Nm
Encoder	E-encoder	F-encoder
Shaft	Smooth	Shaft key DIN6885 A12x8x80

**Connection cable:** Copper conductor rated cross-section  
DS13-170: 35 mm<sup>2</sup> · DS13-250: 50 mm<sup>2</sup>

### Characteristics



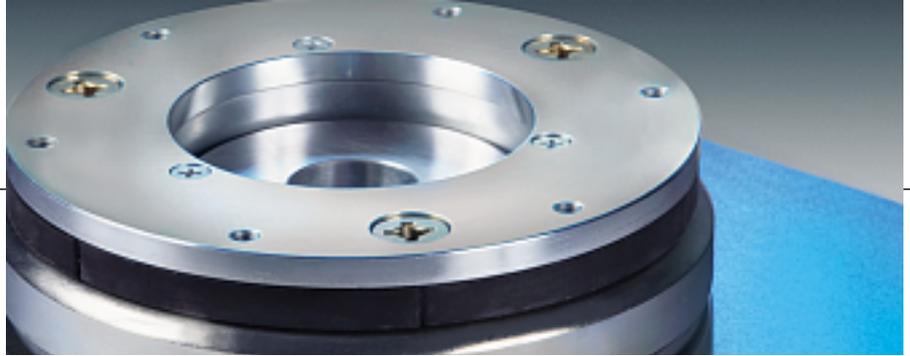
DS13-170-6-EOW-2600-B5



DS13-250-6-EOW-2600-B5



## Holding brake

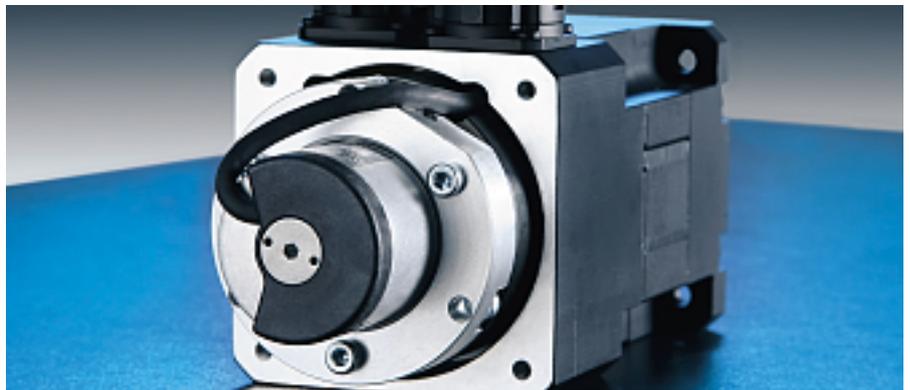


The motors can be fitted with a holding brake as an option. This is **not** suitable for use as an operational brake. The brakes are released with 24 V of unfiltered DC voltage.

Note: The maximum brake speed must also be taken into account when considering the maximum motor speed.

Series	Holding brake						
	M <sub>BR</sub> [Nm]	U <sub>BR</sub> [V]	I <sub>BR</sub> [A]	J <sub>BR</sub> [kgm <sup>2</sup> ]	n <sub>maxBR</sub> [1/min]	T <sub>ein</sub> [ms]	T <sub>aus</sub> [ms]
DS13	100	24	2.3	0.0016	3500	90	190

## Encoder

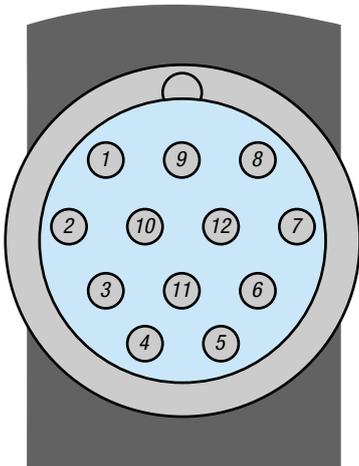


### Encoder types

The motors can be fitted with various position encoders.

Type	Design	Max. speed [1/min]
E, F	Optical absolute encoder, 512 cycles/revolution, EnDAT® interface, version 2.1 E = single-turn; F = multi-turn 4096 revolutions max.	12,000

### Connector pin assignment on motor side



PIN Motor-assignment	E-/F encoder	
	Signal	Description
1	G2N	Channel 2 not inverted
2	G2I	Channel 2 inverted
3	G1N	Channel 1 not inverted
4	G1I	Channel 1 inverted
5	05P	Supply 5 V DC, max. 250 mA
6	GND	Reference for supply
7	CLK+	EnDat encoder interface
8	CLK-	EnDat encoder interface
9	DAT+	EnDat encoder interface
10	DAT-	EnDat encoder interface
11	05P	Supply 5 V DC, max. 250 mA
12	GND	Reference for supply
Shield	Connector housing	



## Encoder cable

Pre-fabricated cables are available for connecting the position encoder to the KE/ KW or KU series servo drives. The shielded pair cables are available in any length in complete meters up to a maximum of 100 m.

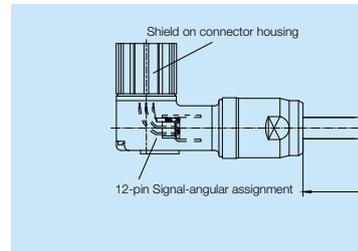
### Cable properties

Sheath: Polyurethane, TPE core

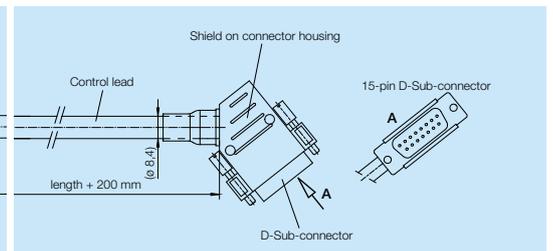
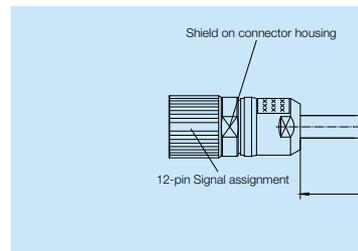
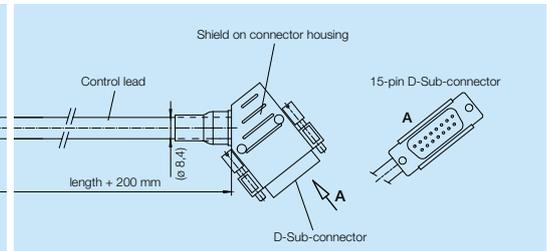
Trailing cable properties:

- Min. bending radius 100 mm
- Max. speed 1 m/s
- Max. acceleration 4 m/s<sup>2</sup>
- 5 million bending cycles

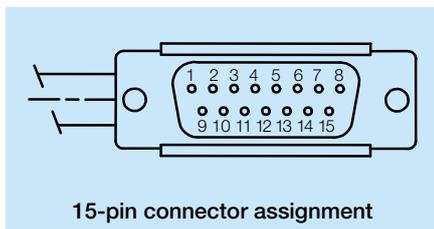
### Motor side



### Device side



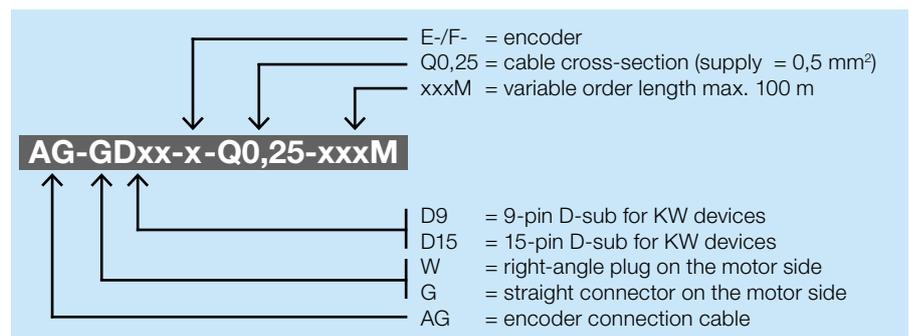
## Connector pin assignment on encoder side



15-pin connector assignment

Connector pin assignment on motor side	Connector pin assignment on device side, 15-pin D-sub	
	Signal	PIN
1	G2N	6
2	G2I	5
3	G1N	4
4	G1I	3
5	O5P	13
6	GND	8
7	CLK+	12
8	CLK-	11
9	DAT+	10
10	DAT-	9
11	O5P	7
12	GND	14
Shield	Connector housing	

## Order designation



## Control your Motion.



# AMK

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# Abbreviation

## Motor chart

Symbol	Unit	Meaning
$M_o$	Nm	Continuous standstill torque
$I_o$	A	Continuous standstill current
$M_N$	Nm	Rated torque
$P_N$	kW	Rated power
$I_N$	A	Rated current
$n_N$	1/min	Rated speed
$k_T$	Nm/A	Torque constant ( $M=I \cdot k_T$ )
$M_{max}$	Nm	Maximum torque
$I_{max}$	A	Maximum current
$L_{tt}$	mH	Terminal inductance
$R_{tt}$	$\Omega$	Terminal resistance
$n_{max}$	1/min	Maximum speed
$J$	kgcm <sup>2</sup>	Motor moment of inertia
$L$	mm	Length of motor
$L3$	mm	Distance between water supplys
$L4$	mm	Distance between square flange to eyebolt
$L5$	mm	Distance between the eyebolts
$L_{BR}$	mm	Length of motor with brake
$m$	kg	Motor mass
$M_{BR}$	Nm	Min. static braking torque
$U_{BR}$	V	Braking voltage
$I_{BR}$	A	Braking current
$J_{BR}$	kgcm <sup>2</sup>	Perm. brake inertia
$n_{maxBR}$	1/min	Brake maximum speed
$T_{app}$	ms	Brake application time
$T_{rel}$	ms	Brake release time

### Legends:

Characteristics:

----- maximum torque  
———— thermal continuous torque

Bearing service life

-----  $0.5 \times n_N$   
————  $n_N$   
-----  $2 \times n_N$

# Ambient conditions

## Degree of protection in compliance with EN 60529:

IP54 (IP 65 available as an option)

## Ambient operating temperature:

0°C to + 40°C

## Storage/transport temperature:

-25°C to + 55°C

## Relative humidity:

5% to 80%, without condensation

## Installation altitude:

Up to 1000 m a.m.s.l. In the case of altitudes over 1000 m up to max. 2000 m, the ratings must be reduced by 1% per 100 m.

# General technical data

## Ambient temperature:

+5 ... +40°C. In the case of higher ambient temperatures up to max. 60°C, the rating must be reduced by 1% per increase in temperature of 1 °K.

## Rating:

The rating refers to a winding overtemperature of 100 °K. The motor is checked by means of a thermally insulating flange.

## Insulation class:

F in accordance with DIN VDE 0530.

## Thermal protection:

PTC thermistor, cold resistance approx. 150 – 800  $\Omega$ .

## Motor bearings:

Ball bearings lubricated for life.

## Axial runout, shaft runout:

N in accordance with DIN 42955.

## Balance quality:

G 2.5 in accordance with VDI 2056.

## Vibrational quality:

N in accordance with DIN ISO 2373.

## Paint:

RAL 9005, black matt finish.

## Important Notes

- During operation, the motors can reach surface temperatures of over 100°C. Therefore, in order to avoid the risk of injury, the surface temperature must be checked before touching the motor.
- On motors with shaft keys, if there is a free-rotating shaft end the shaft key must either be removed or secured to protect against dangerous ejection.
- Before opening the terminal box or removing/inserting a connector from/into the motors, you must make sure that the terminals are not live. Even if the motor is at a standstill, the terminals may still be live. Non-compliance may pose a risk to life and limb.
- There must be a low-resistance connection between the motor and the earthing bar in the control cabinet to ensure finger-safe and fail-safe motor operation.
- The bearings and shaft may sustain damage if the motor shaft is subjected to impact or uncontrolled forces during transport, storage or installation of the motor in the machine.
- Impermissible axial and radial loads will reduce bearing service life. The bearing load diagrams must be observed.
- If couplings are used, their components must be assembled correctly. Bearing and coupling service life may be reduced if the coupling is misaligned or misplaced.
- None of the motors listed here may be directly connected to the mains. The motors are only intended for operation in an inverter system. The data and characteristics given have been verified with AMK type inverters.