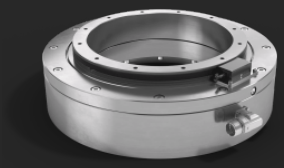
Bearing assembly with Torque-Motor Type LTD



Franke bearing assemblies with integrated direct drive (torque motor) are characterized by high dynamics, maximum energy efficiency and a compact installation space combined with center-free design.

Description

Bearing assemblies with direct drive are suitable for applications where high performance and low space requirements are important criteria. The integration of the drive into the bearing housing means that wear-prone assemblies for transmitting drive power, such as toothed belts, shafts or chains, can be dispensed with. This reduces the required drive energy and also benefits more accurate positioning.

Properties

Accuracy	●●●●
Speed	●●●●●
Ø-Range	●●●
Price	●●●

Technical data

Material
C45N (optionally aluminium)

Operating temperature
-10 °C to +80 °C

Mounting position
Any

Lubricant
With bearing grease via grease nipple

Options
Absolute measuring system, axial cable outlet, control units incl. cables, water-cooling

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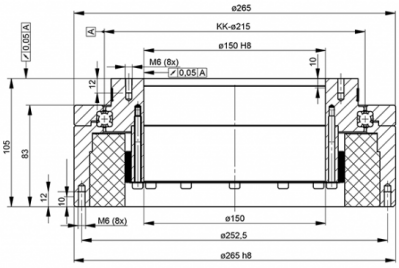
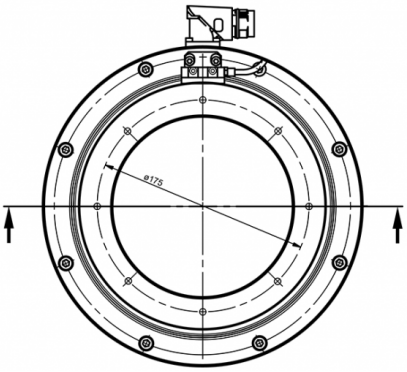
Data tables





LTD0215

Name	□□Ø mm	Load ratings kN				Torque Nm		Power A		Speed 1/min.	Weight kg	Order no.	Delivery time*	
		C_{0a}	C_{0r}	C_a	C_r	M_{Nom}	M_{Peak}	I_{Nom}	I_{Peak}	n_{max}				
LTD-0215	215	128	60	26	22	26,4	105	3,1	12,8	640	21,0	609885	21 weeks	

* Prices and delivery times are ex works Germany and are subject to change without notice. In other countries, prices and delivery times may vary due to different taxes, duties, charges and fees.
For actual sales prices and delivery conditions in your country, please contact our local representative.

Power comparison			LTD-0100	LTD-0215	LTD-0320	LTD-0385
Nominal Data (free air convection)						
Nominal Torque	T_{NomAC}	Nm	4,5	26,4	77	118
Nominal Current	I_{NomAC}	A_{rms}	1,8	3,1	4,3	4,3
Nominal Speed	$n_{NomACLk}$	rpm	2140	640	299	193
Nominal Power	NomAC	W	1005	1770	2409	2386
Winding Losses[1]	PV_{DAC}	W	54	131	230	309
Total Losses[2]	PD_{AC}	W	96	179	295	357
Holding Torque	TH_{AC}	Nm	3,2	18,7	54	83
Holding Current	IH_{AC}	A_{rms}	1,2	2,2	3	3
Peak Data						
Peak Torque	T_{Peak}	Nm	16	105	329	522
Peak Current	I_{Peak}	A_{rms}	7	12,8	21,6	21,7

Bearing assembly with Torque-Motor Type LTD

Power comparison			LTD-0100	LTD-0215	LTD-0320	LTD-0385
Speed at Peak Torque	n_{Peak}	rpm	1130	320	126	74
Peak Power	P_{Peak}	W	1897	3526	4343	4049
Winding Losses[1]	P_{Peak}	W	863	2236	5886	7876
Total Losses[2]	PD_{Peak}	W	877	2253	5904	7889

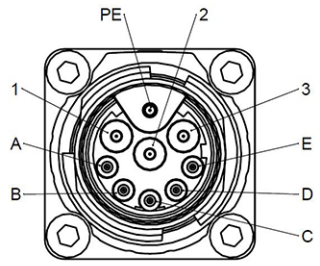
Power Data						
Torque Constant	kt	Nm/A_{rms}	2,549	8,51	18,037	27,449
		$V_{rms}/(rad/s)$	1,577	5,2	11,094	16,694
BEMF Constant (Phase - Phase)	ke	$V_{rms}/(rpm)$	0,165	0,545	1,162	1,748
Motor Constant	km	Nm/vW	0,459	1,973	4,483	6,25
Idle Speed	n_{Idle}	rpm	2390	727	340	226
max. Speed (Fieldweaking)	n_{max}	rpm	-	-	-	-
max. Frequency (Idle/Fieldweaking)	f_{max}	Hz	398	254	159	124
DC Bus Voltage	UDC	VDC	560	560	560	560
Ø Resistance per Phase (winding only)	RPh20	Ω	4,419	3,457	3,206	4,235
Ø Inductance per Phase (winding only)	LPh	mH	21,727	19,532	21,071	28,049
electr. Time Constant t=L/R	Tel	ms	4,92	5,65	6,57	6,62
Number of Polepairs	n		10	21	28	33
Winding Connection			Star	Star	Star	Star

Measuring System						
Measuring Method			incremental			
Reference mark			single coded			
Measuring principle			inductive			
Interface			1 Vss			
Cable length			1 m			
Grating period			1000 µm			
Line count			256	640	938	1200
Interpolation			10-fold			
Number of signal periods			2560	6400	9380	12000
Position error per grating period			±11"	±4,5"	±3"	±2,5"
Grating period accuracy (±10µm arc length)			±51"	±20"	±14"	±11"
Max. scaning frequency			40 kHz			
Voltage supply			4V to 7V DC			
Electrical connection			cable with M23, 12 pin male			

Bearing assembly with Torque-Motor Type LTD

Pin assignment motor

Socket 917, M17x1 (9-pin)

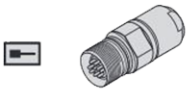


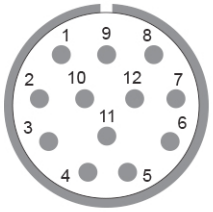
Pin assignment

PIN	Signal	PIN	Signal
1	Phase U	A	PT1000
2	Phase V	B	PT1000
3	Phase W	C	PTC 120°
PE	protective conductor	D	PTC 120°
		E	free

Pin assignment measuring system

03S12 12-pin coupling M23





Pin assignment

Power supply		Incremental signals		Other signals	
12	Up	5	A+	/	free
2	Sensor Up	6	A-	7	Diag+
10	0 V	8	B+	9	Diag-
11	Sensor 0 V	1	B-		
		3	R+		
		4	R-		

Annotations

[1] Winding Losses are referred to a Coil Temperature of 100°C.

[2] The total Losses are made up of: Winding Losses; Stator Iron Losses; Rotor Losses;
Calculation of total Losses: Winding Losses + Stator Iron Losses (at speed X) + Rotor Losses (at speed X)

Ensure that your servo drive can handle the Nominal- and Peakcurrent of the Motor. An adjustment of the Speed and DC Bus Voltage can be done after consultation. The nominal data in this datasheet are based on an ambient/coolant temperature of 20°C. The stated nominal Torques are without consideration of friction losses through Bearings or Sealings.

Because the exact duty type depends also on the thermal connection of the motor, the embedded thermal monitoring system has to be analysed and attented. However, attention has to be payed that the temperature sensors do not show the exact temperature of the winding and this could be up to 20 K higher due to thermal capacities. Despite an electrical insulation towards the winding, you are only allowed to connect the sensors to your controller by using a galvanic separation in between.

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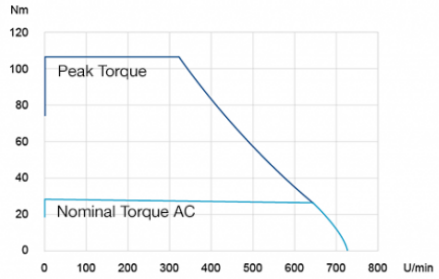
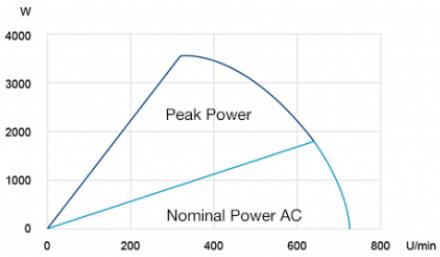
Power Graphs

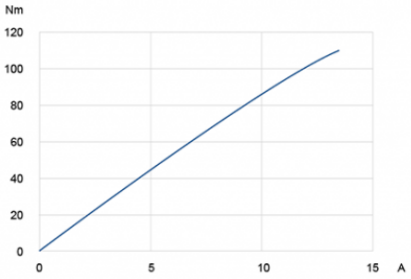
Speed-Torque-Graph



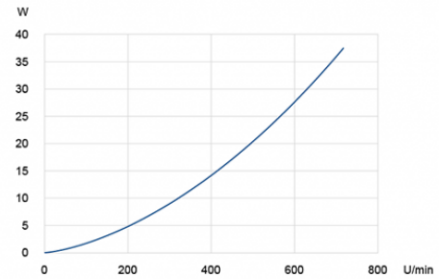
Speed-Power-Graph



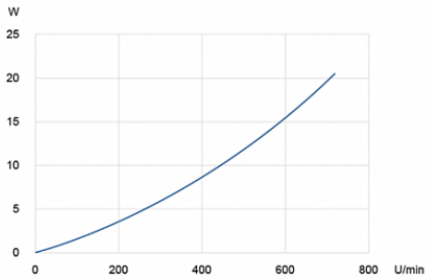
Current-Torque-Graph



Stator Iron Losses



Rotor Losses



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