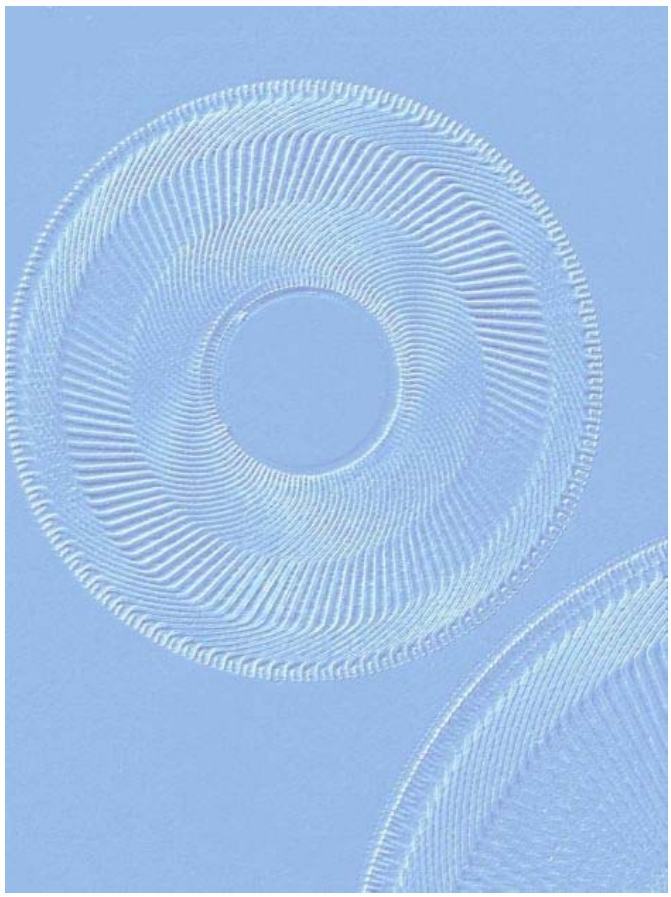
Performance Data

KN…LR- series *metric version*
with printed armature

ServoDisk® Motors

ver 1082.0

Nominal Torque:	***37 ... 215 Ncm***
Rated Voltage:	***17 … 24 VDC***
Nominal Output:	***115 ... 700 W***
Speed:	***0 ... 3000 ... 5000 min^{-1}***



- **Unique ServoDisk armature for high performance**
- **Neodymium Magnet Technology**
- **Ultra-Thin compact size for easy design integration**
- **Fast acceleration for higher throughput**
- **Low voltage for battery operation**
- **Wide speed range for maximum flexibility**
- **Zero cogging for smooth operation**
- **Available with or without integrated tacho**

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Printed Motors

DC-Servomotor KN 09 M4 LR

Characteristics

Rated Values [1]			
Nominal torque	M_N	40	Ncm
Nominal speed [2]	n_N	3000	min^{-1}
Nominal output [2]	P_N	125	W
Terminal voltage	U_N	17	V
Nominal current	I_N	15,5	A

Motor Performance			
Peak torque [3]	M_{max}	400	Ncm
Max. peak current [3]	I_{max}	135	A
Acceleration at peak torque	a_{max}	85	10^3 rad/s^2
Stall torque [4]	M_0	42	Ncm
Current at stall torque [4]	I_0	14,6	A
Max. load speed	n_{max}	5000	min^{-1}
Max. no load speed	n_0	6000	min^{-1}

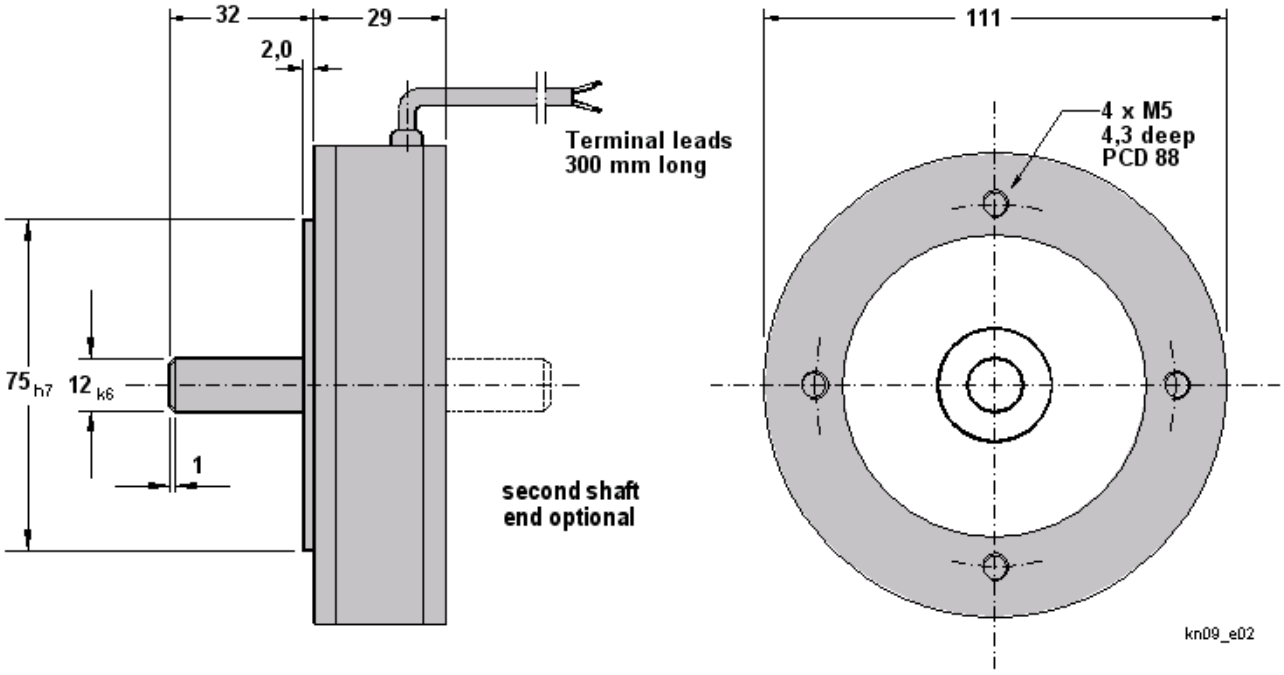
Intrinsic Motor Constants			
Torque constant	k_T	2,9	Ncm/A
Back E.M.F constant	k_E	3,0	V/10^3 min^{-1}
Viscous damping constant	k_D	0,84	Ncm/10^3 min^{-1}
Speed regulation at const. Voltage	k_n	15,4	min^{-1}/Ncm
Average friction torque	M_F	2,5	Ncm
Terminal resistance (+25 °C)	R_A	0,34	Ω
Armature (Cu) resistance (+25 °C)	R_{Cu}	0,18	Ω
Armature Inductance (10^3 Hz)	L_A	<0,01	mH
Mechanical time constant	T_m	5,8	ms
Electrical time constant	T_e	0,16	ms
Rotor Inertia	J	0,47	kg cm^2

Thermal Characteristics			
Time const. armature-housing	T_{th1}	0,56	min
Time const. housing-ambient [5]	T_{th2}	19	min
Resistance armature-housing	R_{th1}	1,2	K/W
Resistance housing-ambient [5]	R_{th2}	0,92	K/W
Temp.- coeff. of back EMF	c_{th}	-0,11	%/K
Max. cont. armature temp.	th	155	°C

Physical Data			
Number of magnet poles	2p	8	pcs
Number of commutator bars	z	117	pcs
Admitted shaft load, radial	F_R	180	N
Admitted shaft load, axial	F_A	150	N
Weight without extensions	m	1,6	kg

[1] for DC current with formfactor 1,05, uncooled execution, protection IP 54, ambient temperature +40 °C.
[2] Continuous operation S1 (VDE 530), part 1,4. Motor can be run at all points of the torque speed curve S1, continuous speed beyond 4000 min^{-1} is not recommended, please check the torque speed curve.
[3] Incremental motion cycle S3, VDE 530, part 1,4. Pulse duration 50 ms, 1% of duty cycle.
[4] Point of intersection torque speed curve S1 with torque co-ordinate at speed zero. Permitted at very low speed < 1min^{-1}. Works the motor with blocked shaft longer than 20 s, the stall current must be reduced to appr. 70%.
[5] Based upon mounted motors, heat transfer from motor to equipment.

Outline dimensions motor (in mm):



DC-Servomotor KN 09 M4 LR T

Characteristics

Rated Values [1]			
Nominal torque	M_N	37	Ncm
Nominal speed [2]	n_N	3000	min^{-1}
Nominal output [2]	P_N	115	W
Terminal voltage	U_N	17	V
Nominal current	I_N	15,5	A

Motor Performance			
Peak torque [3]	M_{max}	370	Ncm
Max. peak current [3]	I_{max}	125	A
Acceleration at peak torque	a_{max}	78	10^3 rad/s^2
Stall torque [4]	M_0	40	Ncm
Current at stall torque [4]	I_0	13,9	A
Max. load speed	n_{max}	5000	min^{-1}
Max. no load speed	n_0	6000	min^{-1}

Intrinsic Motor Constants			
Torque constant	k_T	2,66	Ncm/A
Back E.M.F constant	k_E	2,72	V/10^3 min^{-1}
Viscous damping constant	k_D	0,79	Ncm/10^3 min^{-1}
Viscous damping constant	k_n	14,4	min^{-1}/Ncm
Speed regulation at const. Voltage	M_F	2,5	Ncm
Terminal resistance (+25 °C)	R_A	0,34	Ω
Armature (Cu) resistance (+25 °C)	R_{Cu}	0,18	Ω
Armature Inductance (10^3 Hz)	L_A	<0,01	mH
Mechanical time constant	T_m	6,5	ms
Electrical time constant	T_e	0,16	ms
Rotor inertia	J	0,68	kg cm^2

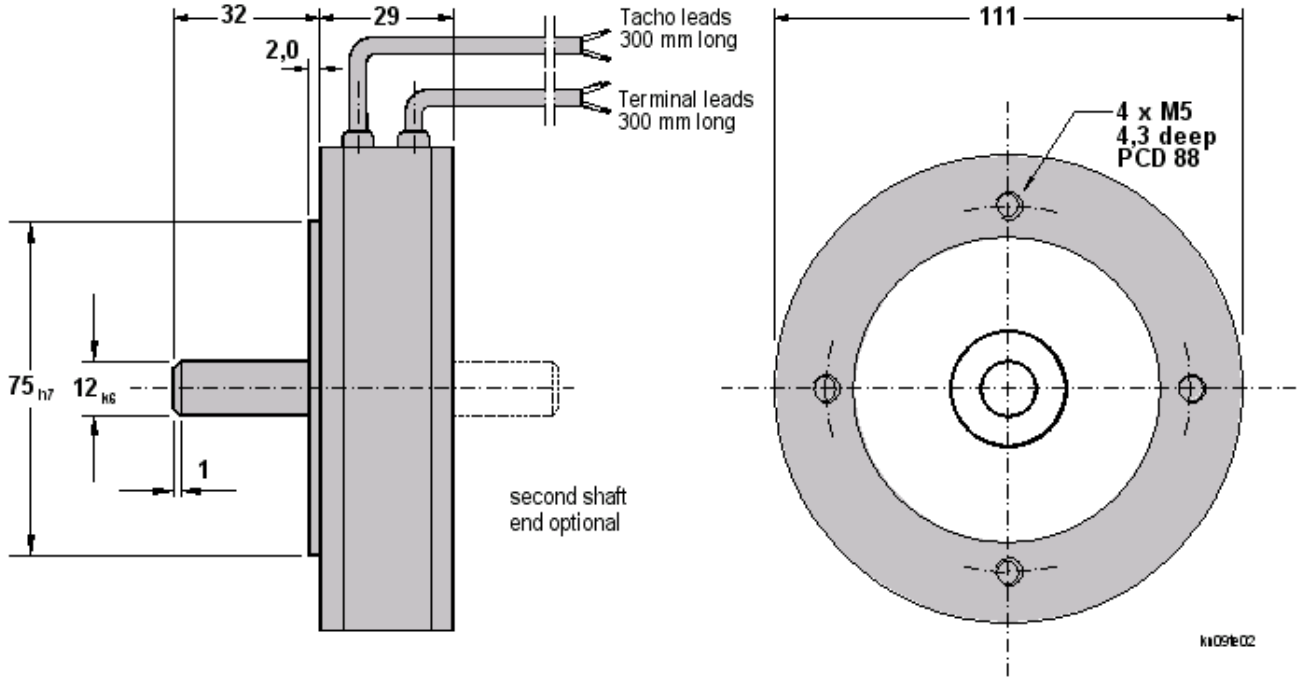
Thermal Characteristics			
Time const. armature-housing	T_{th1}	0,56	min
Time const. housing-ambient [5]	T_{th2}	19	min
Resistance armature-housing	R_{th1}	1,2	K/W
Resistance housing-ambient [5]	R_{th2}	0,92	K/W
Temp.- coeff. of back EMF	c_{th}	-0,11	%/K
Max. cont. armature temp.	th	155	°C

Physical Data			
Number of magnet poles	2p	8	pcs
Number of commutator bars	z	117	pcs
Admitted shaft load, radial	F_R	180	N
Admitted shaft load, axial	F_A	150	N
Weight without extensions	m	1,6	kg

Tachometer characteristics [6]			
Output voltage (±5%)	U	3,5	V/10^3 min^{-1}
Max. ripple peak to peak	U_{RH}	3,0	%
Temperature coefficient of K_E	c_T	-0,1	%/K
Max. rated current	I_L	370	mA

[1] for DC current with formfactor 1,05, uncooled execution, protection IP 54, ambient temperature +40 °C.
[2] Continuous operation S1 (VDE 530), part 1,4. Motor can be run at all points of the torque speed curve S1, continuous speed beyond 4000 rpm is not recommended, please check the torque speed curve.
[3] Incremental motion cycle S3, VDE 530, part 1,4. Pulse duration 50 ms, 1% of duty cycle.
[4] Point of intersection torque speed curve S1 with torque co-ordinate at speed zero. Permitted at very low speed < 1min^{-1}. Works the motor with blocked shaft longer than 20 s, the stall current must be reduced to appr. 70%.
[5] Based upon mounted motors, heat transfer from motor to equipment.
[6] Tacho must not operate without load, RL,min = 10kΩ

Outline dimensions motor (in mm):



DC-Servomotor KN 12 M4 LR

Characteristics

Rated Values [1]			
Nominal torque	M_N	80	Ncm
Nominal speed [2]	n_N	3000	min^{-1}
Nominal output [2]	P_N	250	W
Terminal voltage	U_N	24	V
Nominal current	I_N	14,5	A

Motor Performance			
Peak torque [3]	M_{max}	720	Ncm
Max. peak current [3]	I_{max}	130	A
Acceleration at peak torque	a_{max}	55	10^3 rad/s^2
Stall torque [4]	M_0	85	Ncm
Current at stall torque [4]	I_0	13,8	A
Max. load speed	n_{max}	5000	min^{-1}
Max. no load speed	n_0	6000	min^{-1}

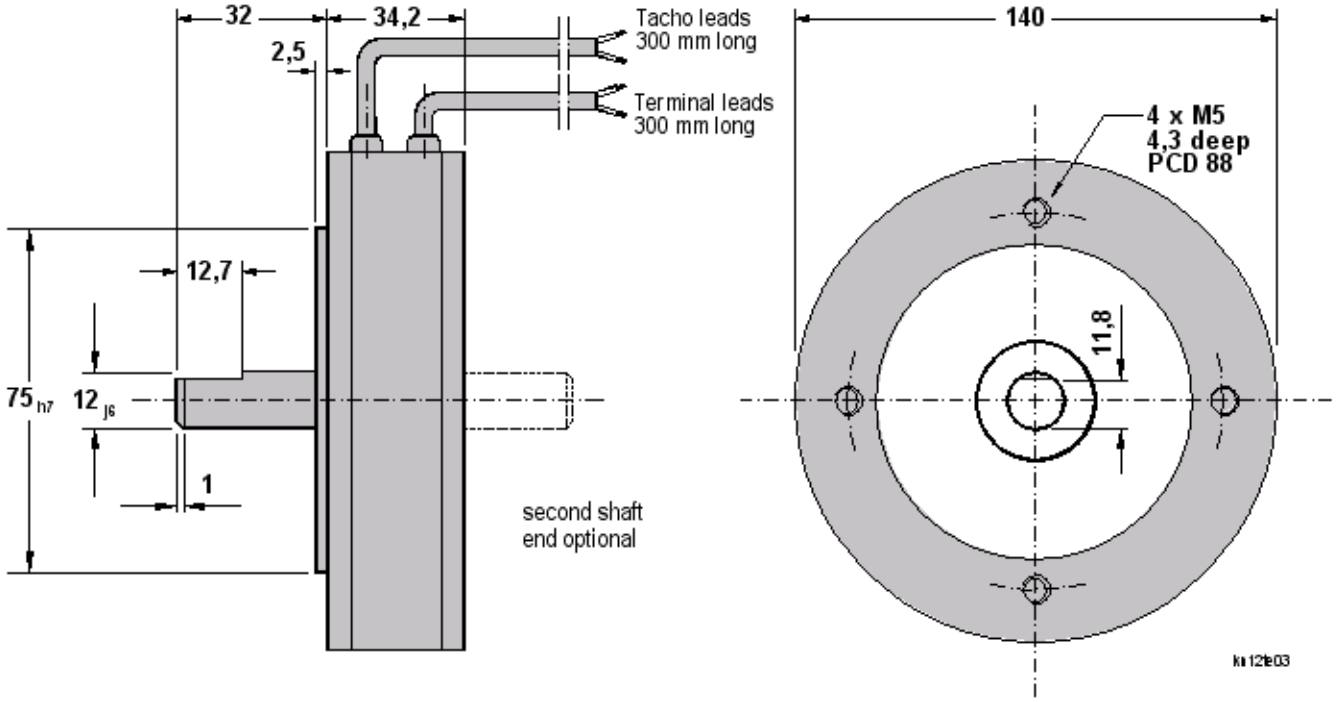
Intrinsic Motor Constants			
Torque constant	k_T	5,9	Ncm/A
Back E.M.F constant	k_E	6,1	V/10^3 min^{-1}
Viscous damping constant	k_D	1,62	Ncm/10^3 min^{-1}
Speed regulation at const. Voltage	k_n	3,6	min^{-1}/Ncm
Average friction torque	M_F	2,9	Ncm
Terminal resistance (+25 °C)	R_A	0,31	Ω
Armature (Cu) resistance (+25 °C)	R_{Cu}	0,20	Ω
Armature Inductance (10^3 Hz)	L_A	<0,05	mH
Mechanical time constant	T_m	4,9	ms
Electrical time constant	T_e	0,22	ms
Rotor inertia	J	1,44	kg cm^2

Thermal Characteristics			
Time const. armature-housing	T_{th1}	1	min
Time const. housing-ambient [5]	T_{th2}	32	min
Resistance armature-housing	R_{th1}	0,83	K/W
Resistance housing-ambient [5]	R_{th2}	0,59	K/W
Temp.- coeff. of back EMF	c_{th}	-0,11	%/K
Max. cont. armature temp.	th	155	°C

Physical Data			
Number of magnet poles	2p	8	pcs
Number of commutator bars	z	141	pcs
Admitted shaft load, radial	F_R	220	N
Admitted shaft load, axial	F_A	180	N
Weight without extensions	m	2,8	kg

[1] for DC current with formfactor 1,05, uncooled execution, protection IP 54, ambient temperature +40 °C.
[2] Continuous operation S1 (VDE 530), part 1,4. Motor can be run at all points of the torque speed curve S1, continuous speed beyond 4000 min^{-1} is not recommended, please check the torque speed curve.
[3] Incremental motion cycle S3, VDE 530, part 1,4. Pulse duration 50 ms, 1% of duty cycle.
[4] Point of intersection torque speed curve S1 with torque co-ordinate at speed zero. Permitted at very low speed < 1min^{-1}. Works the motor with blocked shaft longer than 20 s, the stall current must be reduced to appr. 70%.
[5] Based upon mounted motors, heat transfer from motor to equipment.

Outline dimensions motor (in mm):



DC-Servomotor KN 16 M4 LR

Characteristics

Rated Values [1]			
Nominal torque	M_N	215	Ncm
Nominal speed [2]	n_N	3000	min^{-1}
Nominal output [2]	P_N	700	W
Terminal voltage	U_N	24	V
Nominal current	I_N	35	A

Motor Performance			
Peak torque [3]	M_{max}	1505	Ncm
Max. peak current	I_{max}	245	A
Acceleration at peak torque	a_{max}	25,4	10^3 rad/s^2
Stall torque	M_0	236	Ncm
Current at stall torque	I_0	38	A
Max. load speed	n_{max}	5000	min^{-1}
Max. no load speed	n_0	6000	min^{-1}

Intrinsic Motor Constants			
Torque constant	k_T	9,5	Ncm/A
Back E.M.F constant	k_E	7,0	$V/10^3$ min^{-1}
Viscous damping constant	k_D	6,2	Ncm/10^3 min^{-1}
Speed reg. at const. Voltage	k_n	2,1	min^{-1}/Ncm
Average friction torque	M_F	14,0	Ncm
Terminal resistance (25 °C)	R_A	0,050	Ω
Armature (Cu-)resistance (25 °C)	R_{Cu}	0,025	Ω
Armature inductance (10^3 Hz)	L_A	<5	mH
Mechanical time constant	T_m	3,31	ms
Electrical time constant	T_e	<0,20	ms
Rotor inertia	J	5,95	kg cm^2

Thermal Characteristics			
Time const. armature-housing	T_{th1}	1,82	min
Time const. housing-ambient [5]	T_{th2}	32,8	min
Resistance armature-housing	R_{th1}	0,83	K/W
Resistance housing-ambient [5]	R_{th2}	0,59	K/W
Temp.- coeff. of back EMF	c_{th}	-0,08	%/K
Max. cont. armature temp.	th	155	°C

Physical Data			
Number of magnet poles	2p	8	pcs
Number of commutator bars	z	183	pcs
Admitted shaft load, radial	F_R	390	N
Admitted shaft load, axial	F_A	375	N
Weight without extensions	m	6,0	kg

1) for DC current with formfactor 1,05, uncooled execution, protection IP 54, ambient temperature +40 °C.
2) Continuous operation S1 (VDE 530), part 1,4. Motor can be run at all points of the torque speed curve S1, continuous speed beyond 4000 min^{-1} is not recommended, please check the torque speed curve.
3) Incremental motion cycle S3, VDE 530, part 1,4. Pulse duration 50 ms, 1% of duty cycle.
4) Point of intersection torque speed curve S1 with torque co-ordinate at speed zero. Permitted at very low speed < 1min^{-1}. Works the motor with blocked shaft longer than 20 s, the stall current must be reduced to appr. 70%.
5) Based upon mounted motors, heat transfer from motor to equipment.

Outline dimensions motor (in mm):

grey diagrammed hood optional