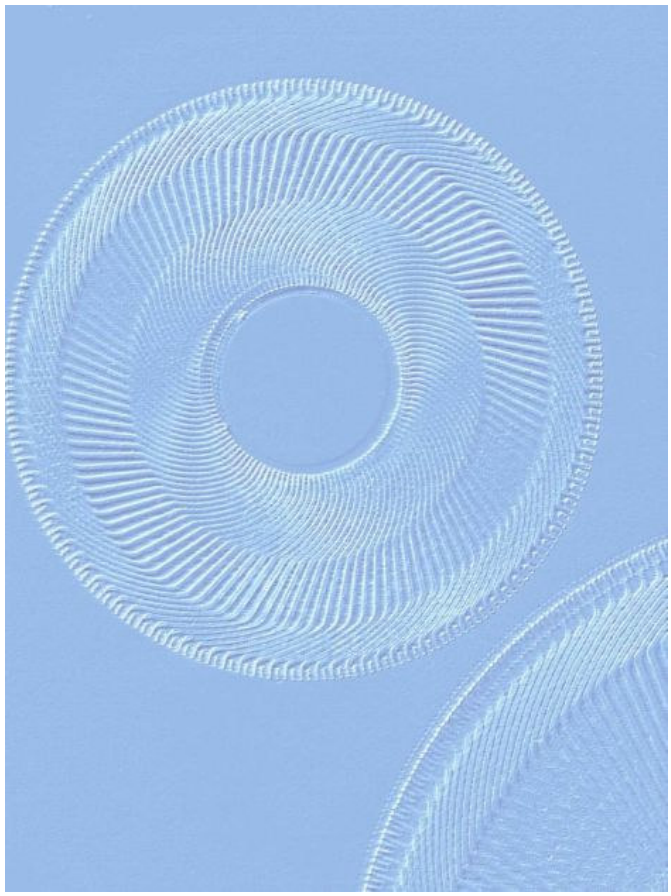
Performance Data

KN...- series *metric version*
with printed armature

ServoDisk® Motors

ver 1485.0

Nominal Torque:	***14 ... 320 Ncm***
Rated Voltage:	***17 … 128 VDC***
Nominal Output:	***43 ... 1000 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**
- **Wide speed range for maximum flexibility**
- **Zero cogging for smooth operation**
- **Available with or without integrated tacho**

Printed Motors GmbH
Industriestraße 20
DE74909 Meckesheim
Tel. *+49(0)6226/7870-0*
Fax *+49(0)6226/7870-29*
Email *info@printedmotors.com*
Web *www.printedmotors.com*

Printed Motors

DC-Servomotor KN 06 M4

Characteristics

Rated Values [1]

Nominal torque	M_N	13,7	Ncm
Nominal speed [2]	n_N	3000	min^{-1}
Nominal output [2]	P_N	43	W
Terminal voltage	U_N	17,3	V
Nominal current	I_N	4,9	A

Motor Performance

Peak torque [3]	M_{max}	144	Ncm
Max. peak current	I_{max}	48	A
Acceleration at peak torque	a_{max}	240	10^3 rad/s^2
Stall torque	M_0	12,3	Ncm
Current at stall torque	I_0	4,4	A
Max. load speed	n_{max}	4500	min^{-1}
Max. no load speed	n_0	5000	min^{-1}

Intrinsic Motor Constants

Torque constant	k_T	3,0	Ncm/A
Back E.M.F constant	k_E	3,15	V/10^3 min^{-1}
Viscous damping constant	k_D	0,11	Ncm/10^3 min^{-1}
Speed reg. at const. Voltage	k_n	89	min^{-1}/Ncm
Average friction torque	M_F	1	Ncm
Terminal resistance (25 °C)	R_A	1,2	Ω
Armature (Cu-)resistance (25 °C)	R_{Cu}	0,94	Ω
Armature inductance (10^3 Hz)	L_A	<0,08	mH
Mechanical time constant	T_m	6,2	ms
Electrical time constant	T_e	0,11	ms
Rotor inertia	J	0,06	kg cm^2

Thermal Characteristics

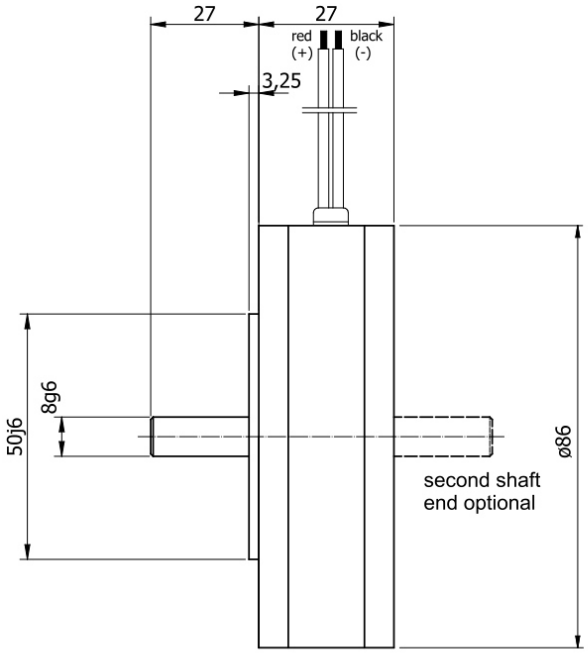
Time const. armature-housing	T_{th1}	0,44	min
Time const. housing-ambient [5]	T_{th2}	12,2	min
Resistance armature-housing	R_{th1}	2,1	K/W
Resistance housing-ambient [5]	R_{th2}	1,5	K/W
Temp.- coeff. of back EMF	c_{th}	-0,11	%/K
Max. cont. armature temp.	th	155	°C

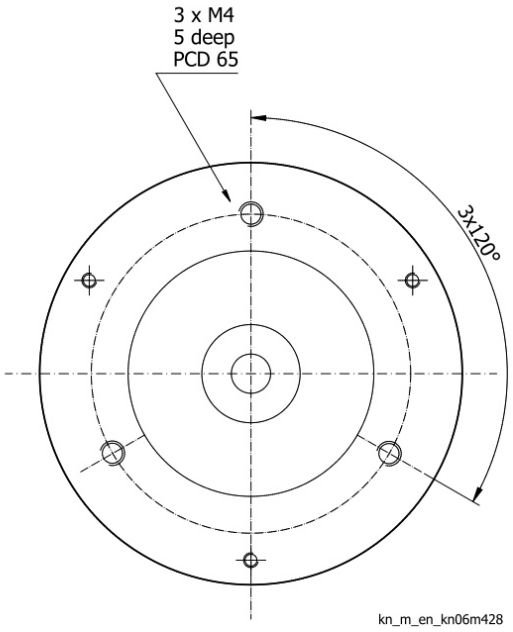
Physical Data

Number of magnet poles	2p	6	pcs
Number of commutator bars	z	82	pcs
Admitted shaft load, radial	F_R	90	N
Admitted shaft load, axial	F_A	45	N
Weight without extensions	m	0,6	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:





DC-Servomotor KN 09 M4

Characteristics

Rated Values [1]			
Nominal torque	M_N	45	Ncm
Nominal speed [2]	n_N	3000	min^{-1}
Nominal output [2]	P_N	141	W
Terminal voltage	U_N	30	V
Nominal current	I_N	7,8	A

Motor Performance			
Peak torque [3]	M_{max}	489	Ncm
Max. peak current [3]	I_{max}	79	A
Acceleration at peak torque	a_{max}	123	10^3 rad/s^2
Stall torque [4]	M_0	43	Ncm
Current at stall torque [4]	I_0	7,5	A
Max. load speed	n_{max}	5000	min^{-1}
Max. no load speed	n_0	6000	min^{-1}

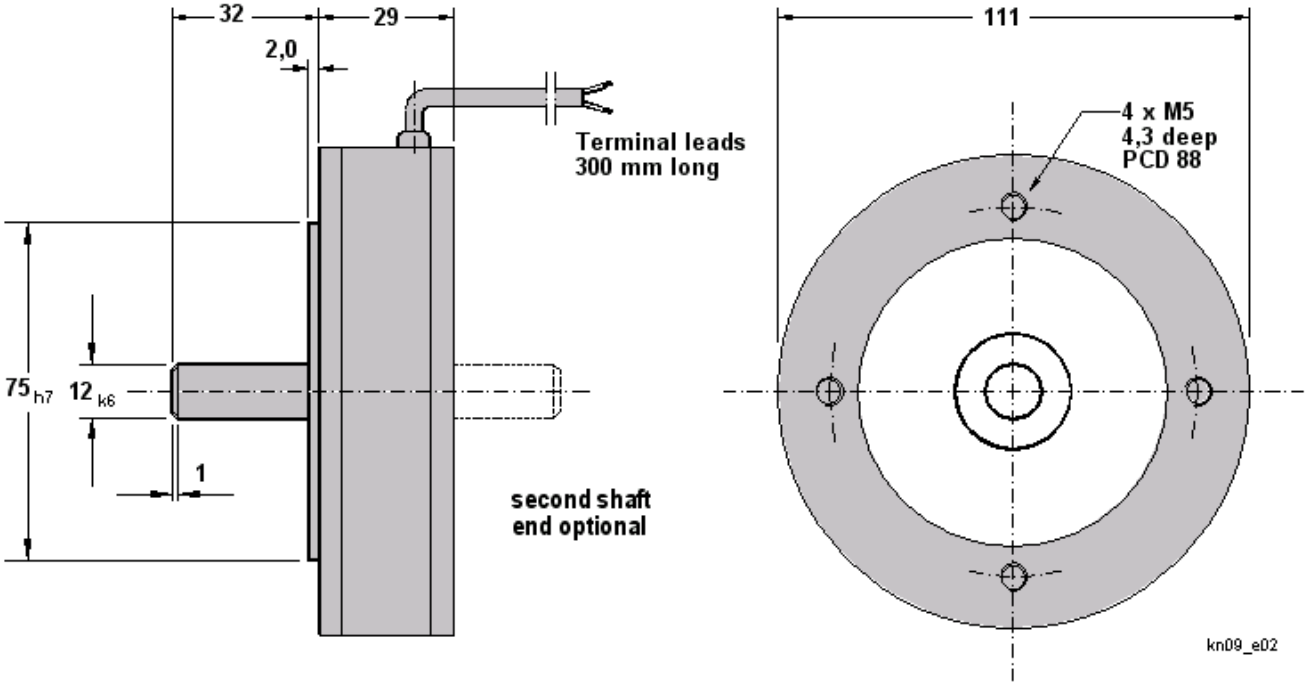
Intrinsic Motor Constants			
Torque constant	k_T	7,3	Ncm/A
Back E.M.F constant	k_E	7,6	V/10^3 min^{-1}
Viscous damping constant	k_D	0,78	Ncm/10^3 min^{-1}
Speed regulation at const. Voltage	k_n	10	min^{-1}/Ncm
Average friction torque	M_F	3	Ncm
Terminal resistance (+25 °C)	R_A	0,85	Ω
Armature (Cu) resistance (+25 °C)	R_{Cu}	0,66	Ω
Armature Inductance (10^3 Hz)	L_A	<0,01	mH
Mechanical time constant	T_m	4,9	ms
Electrical time constant	T_e	0,15	ms
Rotor Inertia	J	0,396	kg cm^2

Thermal Characteristics			
Time const. armature-housing	T_{th1}	0,6	min
Time const. housing-ambient [5]	T_{th2}	19	min
Resistance armature-housing	R_{th1}	2	K/W
Resistance housing-ambient [5]	R_{th2}	1,5	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	1,4	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:



DC-Servomotor KN 09 M4 T

Characterisitics

Rated Values [1]			
Nominal torque	M_N	42	Ncm
Nominal speed [2]	n_N	3000	min^{-1}
Nominal output [2]	P_N	132	W
Terminal voltage	U_N	28	V
Nominal current	I_N	7,8	A

Motor Performance			
Peak torque [3]	M_{max}	458	Ncm
Max. peak current [3]	I_{max}	79	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	7,5	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	6,8	Ncm/A
Back E.M.F constant	k_E	7,1	$V/10^3\ min^{-1}$
Viscous damping constant	k_D	0,73	$Ncm/10^3\ min^{-1}$
Viscous damping constant	k_n	10	min^{-1}/Ncm
Speed regulation at const. Voltage	M_F	3,2	Ncm
Terminal resistance (+25 °C)	R_A	0,85	Ω
Armature (Cu) resistance (+25 °C)	R_{Cu}	0,66	Ω
Armature Inductance (10^3 Hz)	L_A	<0,01	mH
Mechanical time constant	T_m	8,4	ms
Electrical time constant	T_e	<0,05	ms
Rotor inertia	J	0,568	kg cm^2

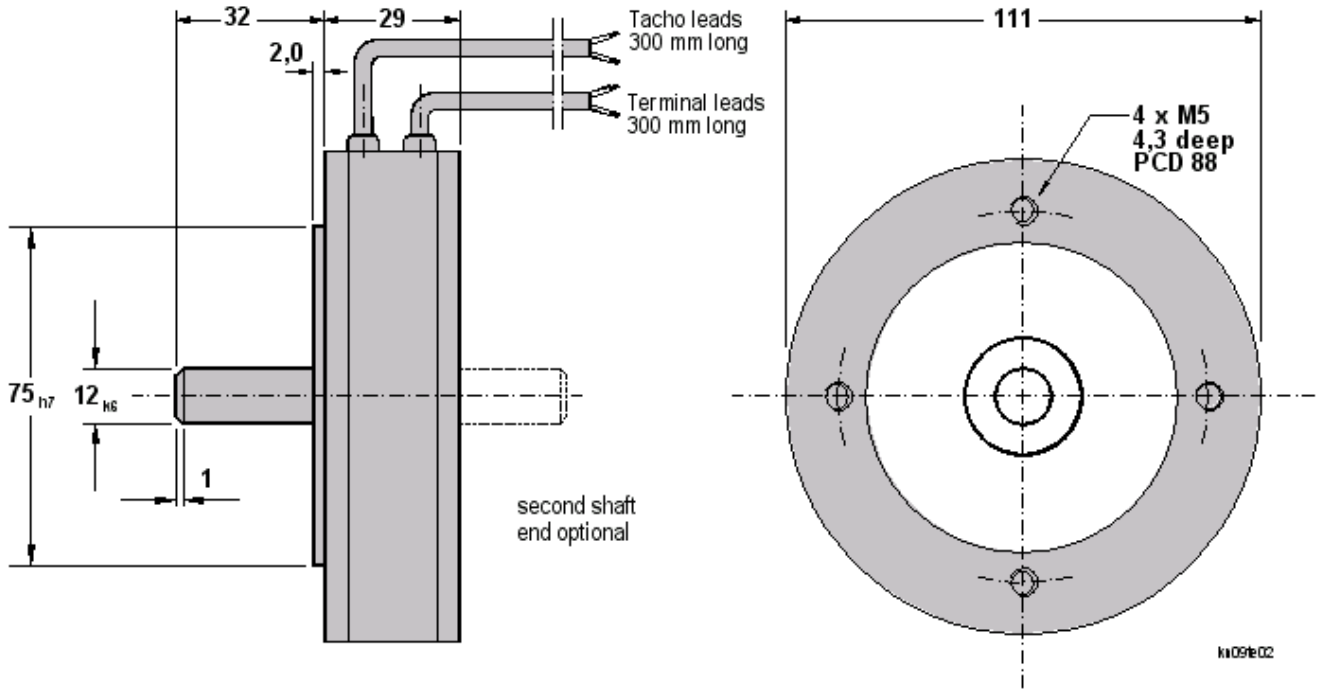
Thermal Characteristics			
Time const. armature-housing	T_{th1}	0,6	min
Time const. housing-ambient [5]	T_{th2}	19	min
Resistance armature-housing	R_{th1}	2	K/W
Resistance housing-ambient [5]	R_{th2}	1,5	K/W
Temp.- coeff. of back EMF	c_{th}	-0,11	%/K
Max. cont. armature temp.	th	155	°C

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	1,4	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 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.
[6] Tacho must not operate without load, RL,min = 10kΩ

Outline dimensions motor:



DC-Servomotor KN 12 M4

Characteristics

Rated Values [1]			
Nominal torque	M_N	136	Ncm
Nominal speed [2]	n_N	3000	min^{-1}
Nominal output [2]	P_N	426	W
Terminal voltage	U_N	46	V
Nominal current	I_N	9,2	A

Motor Performance			
Peak torque [3]	M_{max}	1438	Ncm
Max. peak current [3]	I_{max}	92	A
Acceleration at peak torque	a_{max}	107	10^3 rad/s^2
Stall torque [4]	M_0	124	Ncm
Current at stall torque [4]	I_0	8,8	A
Max. load speed	n_{max}	5000	min^{-1}
Max. no load speed	n_0	6000	min^{-1}

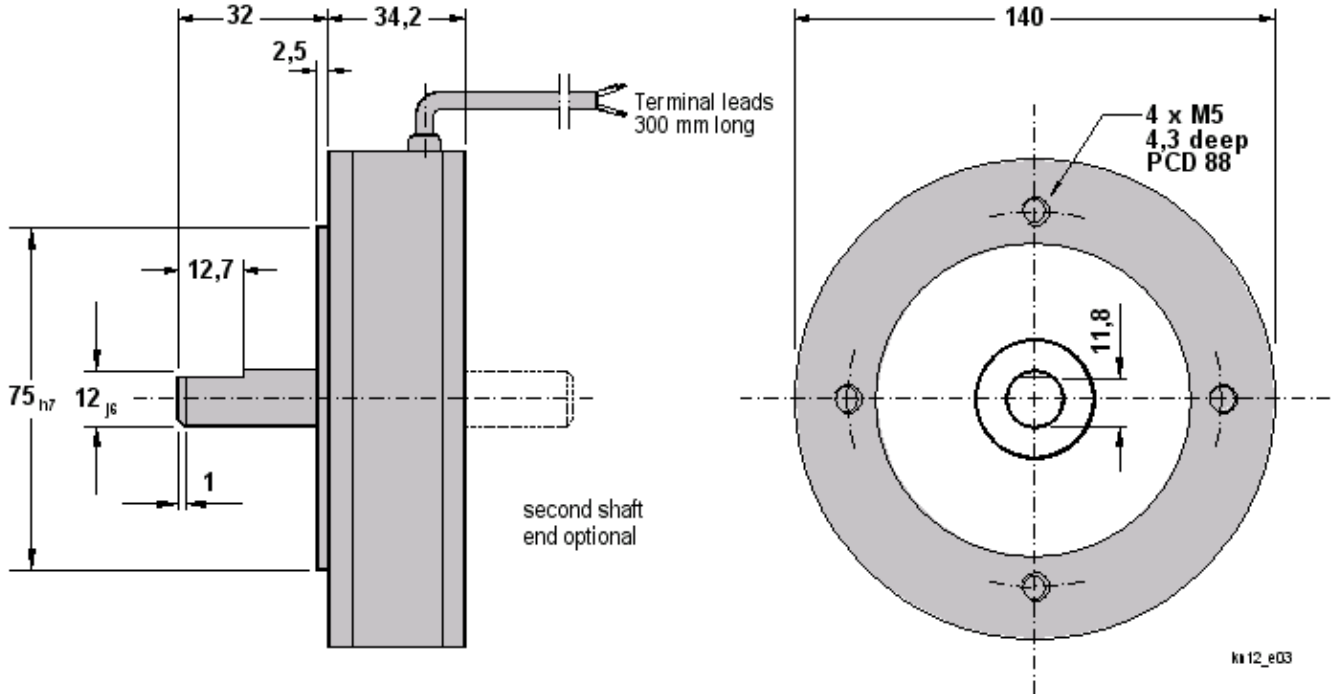
Intrinsic Motor Constants			
Torque constant	k_T	14,0	Ncm/A
Back E.M.F constant	k_E	14,7	V/10^3 min^{-1}
Viscous damping constant	k_D	1,9	Ncm/10^3 min^{-1}
Speed regulation at const. Voltage	k_n	4,44	min^{-1}/Ncm
Average friction torque	M_F	3,7	Ncm
Terminal resistance (+25 °C)	R_A	0,75	Ω
Armature (Cu) resistance (+25 °C)	R_{Cu}	0,61	Ω
Armature Inductance (10^3 Hz)	L_A	<0,05	mH
Mechanical time constant	T_m	4,5	ms
Electrical time constant	T_e	<0,07	ms
Rotor inertia	J	1,343	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}	1,6	K/W
Resistance housing-ambient [5]	R_{th2}	1,2	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:



DC-Servomotor KN 12 M4 T

Characteristics

Rated Values [1]			
Nominal torque	M_N	128	Ncm
Nominal speed [2]	n_N	3000	min^{-1}
Nominal output [2]	P_N	401	W
Terminal voltage	U_N	46	V
Nominal current	I_N	9,3	A

Motor Performance			
Peak torque [3]	M_{max}	1352	Ncm
Max. peak current [3]	I_{max}	92	A
Acceleration at peak torque	a_{max}	123	10^3 rad/s^2
Stall torque [4]	M_0	123	Ncm
Current at stall torque [4]	I_0	8,9	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	13,8	Ncm/A
Back E.M.F constant	k_E	14,4	V/10^3 min^{-1}
Viscous damping constant	k_D	1,7	Ncm/10^3 min^{-1}
Speed regulation at const. Voltage	k_n	4,44	min^{-1}/Ncm
Average friction torque	M_F	3,7	Ncm
Terminal resistance (+25 °C)	R_A	0,75	Ω
Armature (Cu) resistance (+25 °C)	R_{Cu}	0,61	Ω
Armature Inductance (10^3 Hz)	L_A	<0,05	mH
Mechanical time constant	T_m	7,1	ms
Electrical time constant	T_e	<0,07	ms
Rotor Inertia	J	1,838	kg cm^2

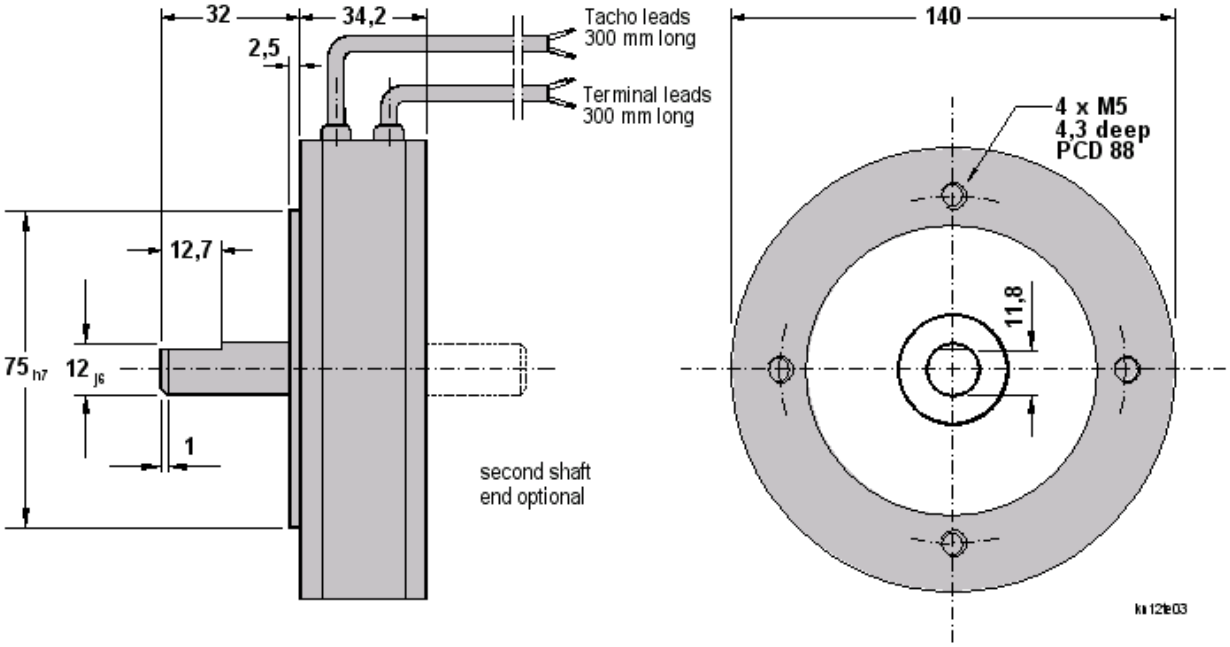
Thermal Characteristics			
Time const. armature-housing	T_{th1}	1	min
Time const. housing-ambient [5]	T_{th2}	32	min
Resistance armature-housing	R_{th1}	1,6	K/W
Resistance housing-ambient [5]	R_{th2}	1,2	K/W
Temp.- coeff. of back EMF	c_{th}	-0,11	%/K
Max. cont. armature temp.	th	155	°C

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

Tachometer characteristics [6]			
Output voltage (±5%)	U	6,6	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	100	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 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.
[6] Tacho must not operate without load, RL,min = 10kΩ

Outline dimensions motor:



DC-Servomotor KN 16 M4

Characteristics

Rated Values [1]			
Nominal torque	M_N	320	Ncm
Nominal speed [2]	n_N	3000	min^{-1}
Nominal output [2]	P_N	1000	W
Terminal voltage	U_N	128	V
Nominal current	I_N	9,3	A

Motor Performance			
Peak torque [3]	M_{max}	3500	Ncm
Max. peak current [3]	I_{max}	100	A
Acceleration at peak torque	a_{max}	63	10^3 rad/s^2
Stall torque [4]	M_0	325	Ncm
Current at stall torque [4]	I_0	8,8	A
Max. load speed	n_{max}	4000	min^{-1}
Max. no load speed	n_0	6000	min^{-1}

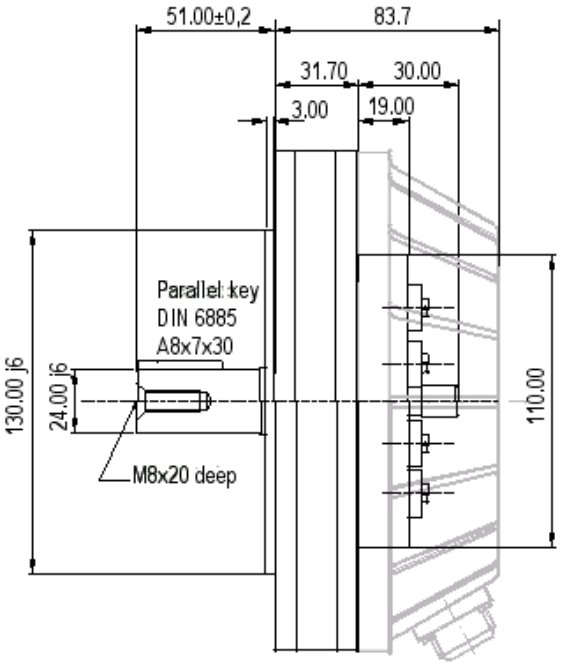
Intrinsic Motor Constants			
Torque constant	k_T	38,4	Ncm/A
Back E.M.F constant	k_E	40,2	$V/10^3$ min^{-1}
Viscous damping constant	k_D	6,5	Ncm/10^3 min^{-1}
Speed regulation at const. Voltage	k_n	0,65	min^{-1}/Ncm
Average Friction Torque	M_F	6,9	Ncm
Terminal resistance (+25 °C)	R_A	0,94	Ω
Armature (Cu) resistance (+25 °C)	R_{Cu}	0,74	Ω
Armature Inductance (10^3 Hz)	L_A	<0,06	mH
Mechanical time constant	T_m	3,9	ms
Electrical time constant	T_e	<0,08	ms
Rotor inertia	J	5,95	kg cm^2

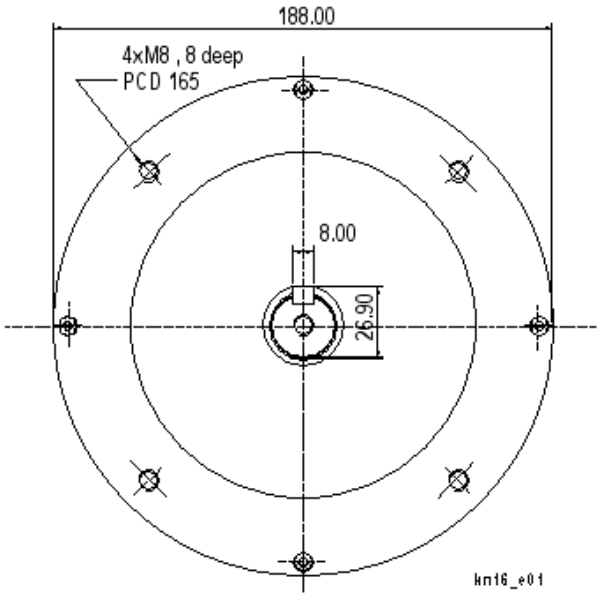
Thermal Characteristics			
Time const. armature-housing	T_{th1}	1,82	min
Time const. housing-ambient [5]	T_{th2}	32,8	min
Resistance armature-housing	R_{th1}	0,83	K/W
Resistance housing-ambient [5]	R_{th2}	0,59	K/W
Temp.- coeff. of back EMF	c_{th}	-0,08	%/K
Max. cont. armature temp.	th	155	°C

Physical Data			
Number of magnet poles	2p	8	pcs
Number of commutator bars	z	162	pcs
Admitted shaft load, radial	F_R	440	N
Admitted shaft load, axial	F_A	420	N
Weight without extensions	m	7,9	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:





DC-Servomotor KN 16 M4 T

Characteristics

Rated Values [1]			
Nominal torque	M_N	290	Ncm
Nominal speed [2]	n_N	3000	min^{-1}
Nominal output [2]	P_N	910	W
Terminal voltage	U_N	115	V
Nominal current	I_N	9,3	A

Motor Performance			
Peak torque [3]	M_{max}	3280	Ncm
Max. peak current	I_{max}	100	A
Acceleration at peak torque	a_{max}	42	10^3 rad/s^2
Stall torque	M_0	305	Ncm
Current at stall torque	I_0	8,8	A
Max. load speed	n_{max}	4000	min^{-1}
Max. no load speed	n_0	6000	min^{-1}

Intrinsic Motor Constants			
Torque constant	k_T	31,0	Ncm/A
Back E.M.F constant	k_E	32,5	V/10^3 min^{-1}
Viscous damping constant	k_D	9,8	Ncm/10^3 min^{-1}
Speed reg. at const. Voltage	k_n	1,59	min^{-1}/Ncm
Average friction torque	M_F	11,2	Ncm
Terminal resistance (25 °C)	R_A	0,94	Ω
Armature (Cu-)resistance (25 °C)	R_{Cu}	0,74	Ω
Armature inductance (10^3 Hz)	L_A	<0,01	mH
Mechanical time constant	T_m	5,9	ms
Electrical time constant	T_e	<0,08	ms
Rotor inertia	J	8,93	kg cm^2

Termal 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}	-0,11	%/K
Max. cont. armature temp.	th	155	°C

Physical Data			
Number of magnet poles	2p	8	pcs
Number of commutator bars	z	162	pcs
Admitted shaft load, radial	F_R	390	N
Admitted shaft load, axial	F_A	375	N
Weight without extensions	m	6,0	kg

Tachometer characteristics [6]			
Output voltage (±5%)	U	16,5	V/10^3 min^{-1}
Max. ripple peak to peak	U_{RH}	3,0	%
Temperature coeffizient of K_E	c_T	-0,1	%/K
Max. rated current	I_L	100	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 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.
[6] Tacho must not operate without load, $R_{L,min}$ = 10kΩ

Outline dimensions motor:

grey diagrammed hood optional