DRUM MOTOR
DM SERIES
DM 0113

Practice-oriented, scalable and thought out in detail: The new drum motor DM 0113 makes it easy to build a completely individual conveyor system and is dimensioned for the higher requirements of permissible belt tension now demanded from industry and belt manufacturers alike.

With a broader speed spectrum, the DM 0113 covers all possible applications. The clever plug-and-play connection significantly simplifies the installation. Each motor is approved, tested, and modularized so that it can be produced and delivered around the world in the shortest amount of time.

The modular design of the DM 0113 allows a free combination of individual module groups, such as shaft, end housing, shell or steel gear, asynchronous or synchronous motor winding, to perfectly meet the requirements of an application. In addition, various options, such as encoder, brake, backstop, rubber laggings, etc., as well as different accessories are available.

With the platform concept of the DM 0113, it is possible to cover all internal logistics applications in the food processing sector, as well as in industry, distribution and airports.

Technical data

	Asynchronous squirrel cage motor	AC synchronous permanent magnet motor
Insulation class of motor windings	Class F, IEC 34 (VDE 0530)	Class F, IEC 34 (VDE 0530)
Voltage	230/400 V ±5 % (IEC 34/38) Most of the common international voltages and frequencies are available upon request	230 or 400 V
Frequency	50 Hz	200 Hz
Shaft seal, internal	NBR	NBR
Protection rate Motor*	IP69K	IP69K
Thermal controller	Bi-metal switch	Bi-metal switch
Operating mode	S1	S1
Ambient temperature, 3-phase motor	+2 to +40 °C Low temperature ranges on request	+2 to +40 °C Low temperature ranges on request
Ambient temperature, 3-phase motor for applications with form-fit belts or no belt	+2 to +25 °C	+2 to +40 °C

* The protection rate of the cable connector may deviate.

Design variants and accessories

Laggings	Lagging for friction drive belts Lagging for modular plastic belts Lagging for positive drive solid homogeneous belts
Sprockets	Sprockets
Options	Backstop Electromagnetic holding brake and rectifier* Encoder* Balancing Plug connection*
Oils	Food-grade oils (EU, FDA, NSF H1)
Certificate	cULus safety certificates
Accessories	Idler pulleys; conveyor rollers; mounting brackets; cables; inverters

A combination of encoder and safety holding brake is not possible. In addition, the use of a backstop with a synchronous motor is technically not meaningful.

* Depending on the option, the motor extends by 50 – 70 mm.

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Material variants

The following components can be selected for the drum motor and the electrical connection. The combination of components depends on the material used.

Component	Version	Aluminum	Mild steel	Stainless steel	Brass/nickel	Technopolymer
Shell	Crowned		●	●		
	Cylindrical		●	●		
	Cylindrical + key for sprockets		●	●		
End housing	Standard	●		●		
Shaft	Standard			●		
	Cross-drilled thread			●		
Gear boxes	Planetary gear box		●			
Electrical connector	Straight connector			●	●	●
	Straight hygienic connector			●		
	Elbow connector			●		●
	Terminal box	●		●		●
	Straight plug connection			●		
	90° plug connection			●		
	90° hygienic connector			●		
Motor winding	Asynchronous motor					
	Synchronous motor					
External seal	PTFE					

Motor variants

Mechanical data for synchronous motors with steel gear

P_N [W]	n_P	gs	i	v [m/s]	n_A [min^{-1}]	M_A [Nm]	F_N [N]	M_{MAX}/M_A	FW_{MIN} [mm]	SL_{MIN} [mm]
300	8	3	120	0.15	25.0	98.8	1,740	1.6	228	221
300	8	3	100	0.18	30.0	82.3	1,450	2	228	221
300	8	3	80	0.22	37.5	65.8	1,160	2.5	228	221
300	8	2	63	0.28	47.6	54.6	962	3	208	201
300	8	2	45	0.40	66.7	39.0	687	3	208	201
300	8	2	36	0.49	83.3	31.2	550	3	208	201
300	8	2	30	0.59	100.0	26.0	458	3	208	201
300	8	2	24	0.74	125.0	20.8	366	3	208	201
300	8	2	20	0.89	150.0	17.3	305	3	208	201
300	8	2	16	1.11	187.5	13.9	244	3	208	201
300	8	2	12	1.48	250.0	10.4	183	3	208	201
300	8	1	9	1.98	333.3	8.2	145	3	208	201
300	8	1	6	2.97	500.0	5.5	96	3	208	201
700	8	2	63	0.28	47.6	126.8	2,234	1.3	258	251
700	8	2	45	0.40	66.7	90.6	1,596	1.8	258	251
700	8	2	36	0.49	83.3	72.5	1,277	1.4	258	251
700	8	2	30	0.59	100.0	60.4	1,064	1.7	258	251
700	8	2	24	0.74	125.0	48.3	851	2	258	251
700	8	2	20	0.89	150.0	40.3	709	2.5	258	251
700	8	2	16	1.11	187.5	32.2	567	3	258	251
700	8	2	12	1.48	250.0	24.2	426	3	258	251
700	8	1	9	1.98	333.3	19.1	336	3	258	251
700	8	1	6	2.97	500.0	12.7	224	3	258	251

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P_N [W]	n_P	gs	i	v [m/s]	n_A [min^{-1}]	M_A [Nm]	F_N [N]	M_{MAX}/M_A	FW_{MIN} [mm]	SL_{MIN} [mm]
1100	8	2	36	0.49	83.3	113.7	2,004	1.4	288	281
1100	8	2	30	0.59	100.0	94.8	1,670	1.6	288	281
1100	8	2	24	0.74	125.0	75.8	1,336	2	288	281
1100	8	2	20	0.89	150.0	63.2	1,113	2.5	288	281
1100	8	2	16	1.11	187.5	50.5	891	3	288	281
1100	8	2	12	1.48	250.0	37.9	668	3	288	281
1100	8	1	9	1.98	333.3	29.9	527	3	288	281
1100	8	1	6	2.97	500.0	20.0	352	3	288	281

P_N = Rated power
n_P = Number of poles
gs = Gear stages
i = Speed ratio
v = Speed
n_A = Shell rated speed
M_A = Drum motor rated torque
F_N = Drum motor rated belt pull
M_{MAX}/M_A = Ratio of max. acceleration torque to rated torque
FW_{MIN} = Minimum drum width
SL_{MIN} = Minimum shell length

Electrical data for synchronous motors

P_N [W]	n_P	U_N [V]	I_N [A]	I_0 [A]	I_{MAX} [A]	f_N [Hz]	η	n_N [1/min]	J_R [$kgcm^2$]	M_N [Nm]	M_0 [Nm]	M_{MAX} [Nm]	R_M [Ω]	L_{SD} [mH]	L_{SQ} [mH]	k_e [V/krpm]	T_e [ms]	k_{TN} [Nm/A]	U_{SH} [V]
300	8	230	1.25	1.25	3.76	200	0.85	3000	1.8	0.96	0.96	2.88	11.47	5.5	10.2	50.34	3.57	0.76	10.78
300	8	400	0.72	0.72	2.17	200	0.85	3000	1.8	0.96	0.96	2.88	34.40	16.5	30.7	87.20	3.57	1.32	18.68
700	8	230	2.67	2.67	8.00	200	0.89	3000	5.4	2.23	2.23	6.69	2.63	2.5	4.4	55.48	6.73	0.84	5.27
700	8	400	1.54	1.54	4.62	200	0.89	3000	5.4	2.23	2.23	6.69	7.90	7.4	13.3	96.10	6.73	1.45	9.12
1100	8	230	3.97	3.97	11.90	200	0.92	3000	7.2	3.50	3.50	10.49	1.88	1.9	3.2	56.52	6.78	0.88	5.61
1100	8	400	2.29	2.29	6.87	200	0.92	3000	7.2	3.50	3.50	10.49	5.66	5.8	9.6	97.90	6.78	1.53	9.72

P_N = Rated power
n_P = Number of poles
U_N = Rated voltage
I_N = Rated current
I_0 = Standstill current
I_{MAX} = Maximum current
f_N = Rated frequency
η = Efficiency
n_N = Rated torque of rotor
J_R = Rotor moment of inertia
M_N = Rated torque of rotor
M_0 = Standstill torque
M_{MAX} = Maximum torque
R_M = Phase to phase resistance
L_{SD} = d-axis inductance
L_{SQ} = q-axis inductance
k_e = EMF (mutual induction voltage constant)
T_e = Electrical time constant
k_{TN} = Torque constant
U_{SH} = Heating voltage

Mechanical data for synchronous motors with oil-free steel gear

P_N [W]	n_P	gs	i	v [m/s]	n_A [min^{-1}]	M_A [Nm]	F_N [N]	M_{MAX}/M_A	FW_{MIN} [mm]	SL_{MIN} [mm]
190	8	3	120	0.15	25.0	62.2	1,096	1.6	228	221
190	8	3	100	0.18	30.0	51.9	914	2	228	221
190	8	3	80	0.22	37.5	41.5	731	2.5	228	221
190	8	2	63	0.28	47.6	34.4	606	3	208	201
190	8	2	45	0.40	66.7	24.6	433	3	208	201
190	8	2	36	0.49	83.3	19.6	346	3	208	201
190	8	2	30	0.59	100.0	16.4	289	3	208	201
190	8	2	24	0.74	125.0	13.1	231	3	208	201
190	8	2	20	0.89	150.0	10.9	192	3	208	201
190	8	2	16	1.11	187.5	8.7	154	3	208	201
190	8	2	12	1.48	250.0	6.5	115	3	208	201
190	8	1	9	1.98	333.3	5.2	91	3	208	201
190	8	1	6	2.97	500.0	3.4	61	3	208	201
440	8	2	63	0.28	47.6	79.6	1,403	1.3	258	251
440	8	2	45	0.40	66.7	56.9	1,002	1.8	258	251
440	8	2	36	0.49	83.3	45.5	802	2.2	258	251
440	8	2	30	0.59	100.0	37.9	668	2.6	258	251
440	8	2	24	0.74	125.0	30.3	534	3	258	251
440	8	2	20	0.89	150.0	25.3	445	3	258	251
440	8	2	16	1.11	187.5	20.2	356	3	258	251
440	8	2	12	1.48	250.0	15.2	267	3	258	251
440	8	1	9	1.98	333.3	12.0	211	3	258	251
440	8	1	6	2.97	500.0	8.0	141	3	258	251

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P_N [W]	n_P	gs	i	v [m/s]	n_A [min^{-1}]	M_A [Nm]	F_N [N]	M_{MAX}/M_A	FW_{MIN} [mm]	SL_{MIN} [mm]
700	8	2	36	0.49	83.3	72.5	1,277	2.2	288	281
700	8	2	30	0.59	100.0	60.4	1,064	2.6	288	281
700	8	2	24	0.74	125.0	48.3	851	3	288	281
700	8	2	20	0.89	150.0	40.3	709	3	288	281
700	8	2	16	1.11	187.5	32.2	567	3	288	281
700	8	2	12	1.48	250.0	24.2	426	3	288	281
700	8	1	9	1.98	333.3	19.1	336	3	288	281
700	8	1	6	2.97	500.0	12.7	224	3	288	281

P_N = Rated power
n_P = Number of poles
gs = Gear stages
i = Speed ratio
v = Speed
n_A = Shell rated speed
M_A = Drum motor rated torque
F_N = Drum motor rated belt pull
M_{MAX}/M_A = Ratio of max. acceleration torque to rated torque
FW_{MIN} = Minimum drum width
SL_{MIN} = Minimum shell length

Electrical data for oil-free synchronous motors

P_N [W]	n_P	U_N [V]	I_N [A]	I_0 [A]	I_{MAX} [A]	f_N [Hz]	η	n_N [1/min]	J_R [$kgcm^2$]	M_N [Nm]	M_0 [Nm]	M_{MAX} [Nm]	R_M [Ω]	L_{SD} [mH]	L_{SQ} [mH]	k_e [V/krpm]	T_e [ms]	k_{TN} [Nm/A]	U_{SH} [V]
190	8	230	0.80	0.80	2.39	200	0.88	3000	1.8	0.60	0.60	1.81	11.47	5.5	10.2	50.34	3.57	0.76	6.85
190	8	400	0.46	0.46	1.38	200	0.88	3000	1.8	0.60	0.60	1.81	34.40	16.5	30.7	87.20	3.57	1.31	11.87
440	8	230	1.77	1.77	5.30	200	0.87	3000	5.4	1.40	1.40	4.20	2.49	2.5	4.4	55.48	7.13	0.79	3.29
440	8	400	1.02	1.02	3.06	200	0.87	3000	5.4	1.40	1.40	4.20	7.46	7.4	13.3	96.10	7.13	1.37	5.71
700	8	230	2.55	2.55	7.64	200	0.94	3000	7.2	2.23	2.23	6.69	1.88	1.9	3.2	56.52	6.78	0.88	3.60
700	8	400	1.47	1.47	4.41	200	0.94	3000	7.2	2.23	2.23	6.69	5.66	5.8	9.6	97.90	6.78	1.52	6.24

P_N = Rated power
n_P = Number of poles
U_N = Rated voltage
I_N = Rated current
I_0 = Standstill current
I_{MAX} = Maximum current
f_N = Rated frequency
η = Efficiency
n_N = Rated torque of rotor
J_R = Rotor moment of inertia
M_N = Rated torque of rotor
M_0 = Standstill torque
M_{MAX} = Maximum torque
R_M = Phase to phase resistance
L_{SD} = d-axis inductance
L_{SQ} = q-axis inductance
k_e = EMF (mutual induction voltage constant)
T_e = Electrical time constant
k_{TN} = Torque constant
U_{SH} = Heating voltage

Mechanical data for 3-phase asynchronous motor with steel gear

P_N [W]	n_P	gs	i	v [m/s]	n_A [min^{-1}]	M_A [Nm]	F_N [N]	FW_{MIN} [mm]	SL_{MIN} [mm]
160	4	3	168	0.05	8.3	157.0	2767	277	270
160	4	3	150	0.06	9.3	140.2	2470	277	270
160	4	3	120	0.07	11.6	112.1	1976	277	270
160	4	2	73.8	0.11	18.9	72.6	1279	257	250
160	4	2	63	0.13	22.2	62.0	1092	257	250
160	4	2	45	0.18	31.0	44.3	780	257	250
160	4	2	36	0.23	38.8	35.4	624	257	250
160	4	2	30	0.28	46.6	29.5	520	257	250
160	4	2	27	0.31	51.7	26.6	468	257	250
160	4	2	24	0.35	58.2	23.6	416	257	250
160	4	2	20	0.41	69.9	19.7	347	257	250
160	4	2	16	0.52	87.3	15.7	277	257	250
160	4	2	12	0.69	116.4	11.8	208	257	250
160	4	1	9	0.92	155.2	9.3	164	257	250
225	2	2	73.8	0.22	37.4	52.0	915	257	250
225	2	2	63	0.26	43.8	44.3	781	257	250
225	2	2	45	0.36	61.3	31.7	558	257	250
225	2	2	36	0.46	76.6	25.3	447	257	250
225	2	2	30	0.55	91.9	21.1	372	257	250
225	2	2	27	0.61	102.1	19.0	335	257	250
225	2	2	24	0.68	114.9	16.9	298	257	250
225	2	2	20	0.82	137.9	14.1	248	257	250
225	2	2	16	1.02	172.4	11.3	198	257	250
225	2	2	12	1.37	229.8	8.4	149	257	250
225	2	1	9	1.82	306.4	6.7	118	257	250
300	4	2	63	0.13	21.8	118.8	2094	307	300
300	4	2	45	0.18	30.5	84.9	1496	307	300
300	4	2	36	0.23	38.1	67.9	1197	307	300
300	4	2	30	0.27	45.7	56.6	997	307	300
300	4	2	27	0.30	50.8	50.9	897	307	300
300	4	2	24	0.34	57.1	45.3	798	307	300
300	4	2	20	0.41	68.6	37.7	665	307	300
300	4	2	16	0.51	85.7	30.2	532	307	300

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P_N [W]	n_P	gs	i	v [m/s]	n_A [min^{-1}]	M_A [Nm]	F_N [N]	FW_{MIN} [mm]	SL_{MIN} [mm]
370	2	2	73.8	0.22	37.7	84.6	1491	307	300
370	2	2	63	0.26	44.1	72.2	1272	307	300
370	2	2	49.2	0.34	56.5	56.4	994	307	300
370	2	2	45	0.37	61.8	51.6	909	307	300
370	2	2	42	0.39	66.2	48.1	848	307	300
370	2	2	36	0.46	77.2	41.3	727	307	300
370	2	2	32.8	0.50	84.7	37.6	662	307	300
370	2	2	30	0.55	92.6	34.4	606	307	300
370	2	2	27	0.61	102.9	30.9	545	307	300
370	2	2	24	0.69	115.8	27.5	485	297	290
370	2	2	20	0.83	139.0	22.9	404	307	300
370	2	2	18	0.92	154.4	20.6	364	307	300
370	2	2	16	1.03	173.7	18.3	323	307	300
370	2	1	9	1.83	308.8	10.9	191	307	300
550	2	2	42	0.40	67.0	70.9	1249	317	310
550	2	2	36	0.46	78.1	60.8	1071	317	310
550	2	2	32.8	0.51	85.8	55.4	975	317	310
550	2	2	30	0.56	93.8	50.6	892	317	310
550	2	2	27	0.62	104.2	45.6	803	317	310
550	2	2	24	0.70	117.2	40.5	714	317	310
550	2	2	20	0.84	140.7	33.8	595	317	310
550	2	2	16	1.04	175.8	27.0	476	317	310
550	2	2	12	1.39	234.4	20.3	357	317	310
550	2	1	9	1.86	312.6	16.0	282	317	310

P_N = Rated power
n_P = Number of poles
gs = Gear stages
i = Speed ratio
v = Speed
n_A = Shell rated speed
M_A = Drum motor rated torque
F_N = Drum motor rated belt pull
FW_{MIN} = Minimum drum width
SL_{MIN} = Minimum shell length

Electrical data for 3-phase asynchronous motor

P_N [W]	np	n_N [min^{-1}]	f_N [Hz]	U_N [V]	I_N [A]	I_0 [A]	cosφ	η [%]	J_R [$kgcm^2$]	I_S/I_N	M_S/M_N	M_B/M_N	M_P/M_N	M_N [Nm]	R_M [Ω]	$U_{SH\Delta}$ [V]	U_{SHY} [V]
160	4	1397	50	400	0.54	0.47	0.70	60.5	3.8	3.05	1.92	2.13	1.92	1.09	63.7		36.4
160	4	1397	50	230	0.94	0.82	0.70	60.5	3.8	3.05	1.92	2.13	1.92	1.09	64.0	21.0	
225	2	2758	50	400	0.56	0.33	0.86	67.8	2.5	4.32	2.57	2.62	2.57	0.78	39.3		28.1
225	2	2758	50	230	0.96	0.56	0.86	67.8	2.5	4.32	2.57	2.62	2.57	0.78	39.3	16.2	
300	4	1371	50	400	0.81	0.56	0.76	69.7	6.8	3.28	1.80	1.95	1.80	2.09	33.5		31.0
300	4	1371	50	230	1.40	0.96	0.76	69.7	6.8	3.28	1.80	1.95	1.80	2.09	33.5	17.9	
370	2	2779	50	400	0.82	0.4	0.87	74.2	4.40	5.47	2.91	2.91	2.88	1.27	19.85		21.29
370	2	2779	50	230	1.42	0.7	0.87	74.2	4.40	5.47	2.91	2.91	2.88	1.27	19.85	12.3	
550	2	2813	50	400	1.23	0.7	0.85	76.5	5.44	5.77	3.27	3.27	3.15	1.87	11.60		18.13
550	2	2813	50	230	2.13	1.2	0.85	76.5	5.44	5.77	3.27	3.27	3.15	1.87	11.60	10.5	

P_N = Rated power
n_P = Number of poles
n_N = Rated speed of rotor
f_N = Rated frequency
U_N = Rated voltage
I_N = Rated current
cosφ = Power factor
η = Efficiency
J_R = Rotor moment of inertia

I_S/I_N = Ratio of startup current – rated current
M_S/M_N = Ratio of startup torque – rated torque
M_B/M_N = Ratio of pull-out torque – rated torque
M_P/M_N = Ratio of pull-up torque – rated torque
M_N = Rated torque of rotor
R_M = Branch resistance
$U_{SH\Delta}$ = Heater voltage in delta connection
U_{SHY} = Heater voltage in star connection

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Mechanical data for 1-phase asynchronous motor with steel gear

P_N [W]	n_P	gs	i	v [m/s]	n_A [1/min]	M_A [Nm]	F_N [N]	FW_{MIN} [mm]	SL_{MIN} [mm]
250	4	2	45	0.18	30.2	71.5	1265	307	300
250	4	2	36	0.22	37.8	57.2	1012	307	300
250	4	2	30	0.27	45.3	47.7	843	307	300
250	4	2	27	0.3	50.4	42.9	759	307	300
250	4	2	24	0.34	56.7	38.1	675	307	300
250	4	2	20	0.4	68	31.8	562	307	300
250	4	2	16	0.5	85	25.4	450	307	300
250	4	2	12	0.67	113.3	19.1	337	307	300

P_N = Rated power
n_P = Number of poles
gs = Gear stages
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v = Speed
n_A = Shell rated speed
M_A = Drum motor rated torque
F_N = Drum motor rated belt pull
M_{MAX}/M_A = Ratio of max. acceleration torque to rated torque
FW_{MIN} = Minimum drum width
SL_{MIN} = Minimum shell length

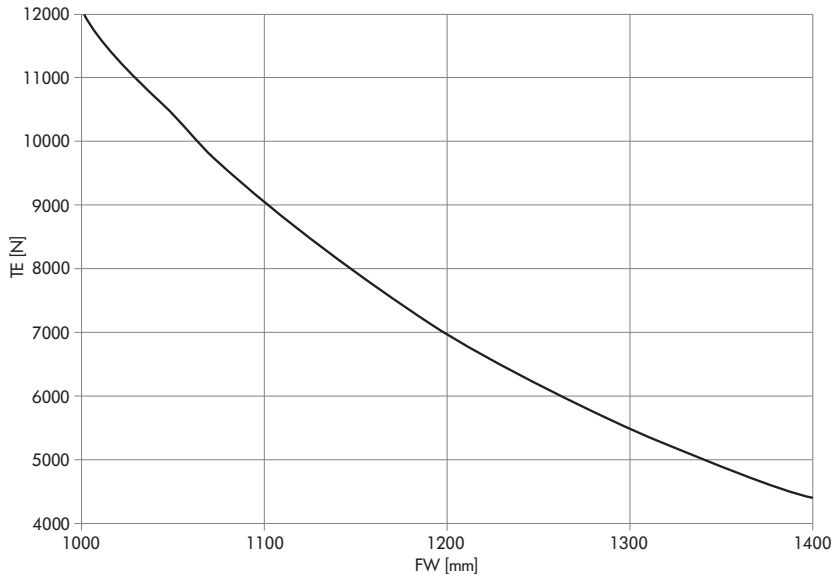
Electrical data for 1-phase asynchronous motor

P_N [W]	n_P	n_N [min^{-1}]	f_N [Hz]	U_N [V]	I_N [A]	cosφ	η [%]	J_R [$kgcm^2$]	I_S/I_N	M_S/M_N	M_B/M_N	M_P/M_N	M_N [Nm]	R_M [Ω]	$U_{SH\sim}$ [V DC]	C_R [µF]
250	4	1360	50	230	2.4	0.97	0.5	7.2	1.25	1.1	1.1	1.1	1.76	12.7	44.3	12

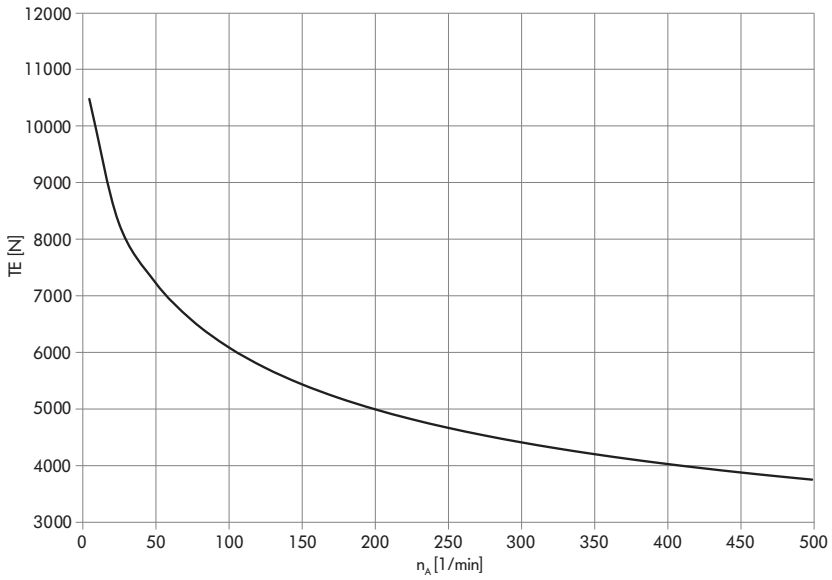
P_N = Rated power
n_P = Number of poles
n_N = Rated speed of rotor
f_N = Rated frequency
U_N = Rated voltage
I_N = Rated current
cosφ = Power factor
η = Efficiency
J_R = Rotor moment of inertia
I_S/I_N = Ratio of startup current – rated current
M_S/M_N = Ratio of startup torque – rated torque
M_B/M_N = Ratio of pull-out torque – rated torque
M_P/M_N = Ratio of pull-up torque – rated torque
M_N = Rated torque of rotor
R_M = Branch resistance
$U_{SH\sim}$ = Heater voltage for DC units
C_R = Capacitor size

Belt tension diagrams

Belt tension depending on drum width



Belt tension depending on rated speed of shell



Note: The correct value for the maximum permissible belt tension is determined from the speed of the drum motor. When selecting the motor, also check whether the maximum permissible TE value fits the desired drum width (FW). The belt tension diagrams apply only to standard shafts.

TE = Belt tension
n_A = Shell rated speed
FW = Drum width

DRUM MOTOR
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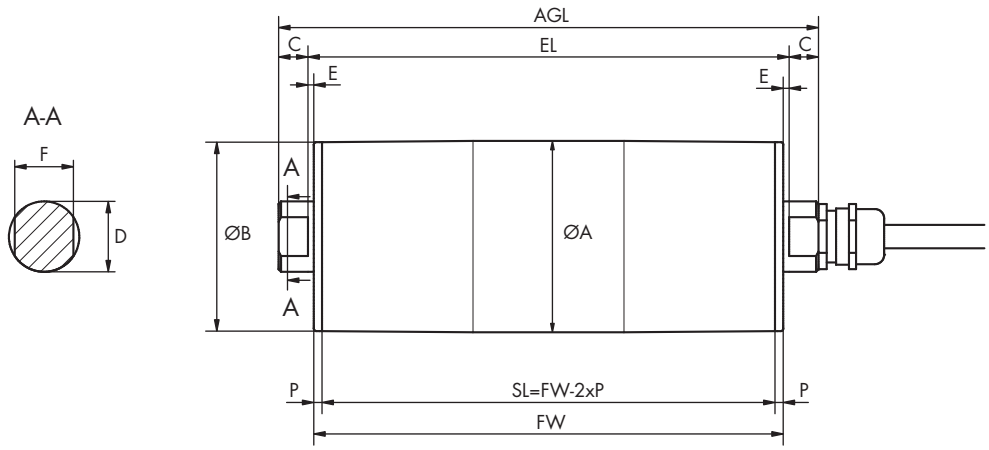
Dimensions

Drum motor



Type		A [mm]	B [mm]	C [mm]	D [mm]	S [mm]	F [mm]	P [mm]	SL [mm]	EL [mm]	AGL [mm]
DM 0113 crowned	Standard	113.5	112	25	30	6.5	25	3.5	FW – 7	FW + 13	FW + 63
	Optional	113.5	112	25	25	6.5	20	3.5	FW – 7	FW + 13	FW + 63
DM 0113 cylindrical	Standard	112	112	25	30	6.5	25	3.5	FW – 7	FW + 13	FW + 63
	Optional	112	112	25	25	6.5	20	3.5	FW – 7	FW + 13	FW + 63
DM 0113 cylindrical + key	Standard	113	113	25	30	6.5	25	3.5	FW – 7	FW + 13	FW + 63
	Optional	113	113	25	25	6.5	20	3.5	FW – 7	FW + 13	FW + 63

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