DRUM MOTOR
DM SERIES
DM 0138

Practice-oriented, scalable and thought out in detail: The new drum motor DM 0138 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 0138 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 0138 allows a free combination of individual module groups, such as shaft, end housing, shell or steel gear, 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 0138, it is possible to cover all internal logistics applications in the food processing sector, as well as in industry, distribution and airports.



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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	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
Transmission of force	Sprockets
Options	Backstop Electromagnetic holding brake and rectifier* Encoder* Balancing Plug connection*
Oils	Food-grade oils (NSF H1)
Certificate	cULus safety certificates
Accessories	Deflection drums; 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 drum motor is extended by 50 – 70 mm.

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DRUM MOTOR
DM SERIES
DM 0138

Material variants

The following components can be selected for the drum motor and the electrical connection:

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					

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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]
1800	8	2	30	0.72	100.0	155.1	2248	1.35	357	350
1800	8	2	27	0.80	111.1	139.6	2024	1.55	357	350
1800	8	2	24	0.90	125.0	124.1	1799	1.65	357	350
1800	8	2	20	1.08	150.0	103.4	1499	2.3	357	350
1800	8	2	16	1.35	187.5	82.7	1199	2.8	357	350
1800	8	2	12	1.81	250.0	62.1	899	3	357	350
1800	8	1	9	2.41	333.3	49.0	710	3	357	350

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_P [Ω]	L_{SD} [mH]	L_{SQ} [mH]	k_e [V/kpm]	T_e [ms]	k_{TN} [Nm/A]	U_{SH} [V]
1800	8	230	5.94	5.94	17.82	200	0.85	3000	15.2	5.73	5.73	17.19	1.33	3.9	5.6	63.62	15.58	0.96	1.98
1800	8	400	3.43	3.43	10.29	200	0.85	3000	15.2	5.73	5.73	17.19	4.00	11.6	16.9	110.20	15.58	1.67	3.43

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_P = 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

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DRUM MOTOR
DM SERIES
DM 0138

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]
1000	8	2	49.2	0.44	61.0	141.2	2046	1.6	357	350
1000	8	2	45	0.48	66.7	129.1	1872	1.8	357	350
1000	8	2	42	0.52	71.4	120.5	1747	1.9	357	350
1000	8	2	36	0.60	83.3	103.3	1497	2.2	357	350
1000	8	2	30	0.72	100.0	86.1	1248	2.7	357	350
1000	8	2	27	0.80	111.1	77.5	1123	3	357	350
1000	8	2	24	0.90	125.0	68.9	998	3	357	350
1000	8	2	20	1.08	150.0	57.4	832	3	357	350
1000	8	2	16	1.35	187.5	45.9	665	3	357	350
1000	8	2	12	1.81	250.0	34.4	499	3	357	350
1000	8	1	9	2.41	333.3	27.2	394	3	357	350

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_P [Ω]	L_{SD} [mH]	L_{SQ} [mH]	k_e [V/kpm]	T_e [ms]	k_{TN} [Nm/A]	U_{SH} [V]
1000	8	230	3.36	3.36	10.08	200	0.89	3000	15.2	3.18	3.18	9.54	1.33	3.9	5.6	63.62	15.58	0.96	1.12
1000	8	400	1.94	1.94	5.82	200	0.89	3000	15.2	3.18	3.18	9.54	4.00	11.6	16.9	110.20	15.58	1.67	1.94

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_P = 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

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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	252	0.04	5.5	238	3454	307	300
160	4	3	150	0.07	9.2	142	2056	307	300
160	4	3	120	0.08	11.5	113	1645	307	300
160	4	3	100	0.1	13.9	95	1371	307	300
370	4	2	73.8	0.14	18.8	169	2452	307	300
370	4	2	63	0.16	22.0	144	2093	307	300
370	4	2	49.2	0.2	28.2	113	1635	307	300
370	4	2	42	0.24	33.1	96	1395	307	300
370	4	2	36	0.28	38.6	83	1196	307	300
370	4	2	30	0.33	46.3	69	997	307	300
370	4	2	27	0.37	51.4	62	897	307	300
370	4	2	24	0.42	57.9	55	797	307	300
370	4	2	20	0.5	69.5	46	664	307	300
370	4	2	16	0.63	86.8	37	532	307	300
370	4	2	12	0.84	115.8	28	399	307	300
370	4	1	9	1.11	154.3	22	315	307	300
550	2	2	73.8	0.28	38.7	123	1776	307	300
550	2	2	63	0.33	45.3	105	1516	307	300
550	2	2	49.2	0.42	58.0	82	1184	307	300
550	2	2	42	0.49	68.0	70	1011	307	300
550	2	2	36	0.57	79.3	60	866	307	300
550	2	2	30	0.69	95.2	50	722	307	300
550	2	2	27	0.76	105.7	45	650	307	300
550	2	2	24	0.86	119.0	40	578	307	300
550	2	2	20	1.03	142.8	33	481	307	300
550	2	2	16	1.29	178.4	27	385	307	300
550	2	2	12	1.72	237.9	20	289	307	300
550	2	1	9	2.29	317.2	16	228	307	300

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DRUM MOTOR
DM SERIES
DM 0138

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]
750	4	2	42	0.24	33.3	194	2807	357	350
750	4	2	36	0.28	38.9	166	2406	357	350
750	4	2	30	0.34	46.7	138	2005	357	350
750	4	2	27	0.37	51.9	125	1805	357	350
750	4	2	20	0.51	70.0	92	1337	357	350
750	4	2	16	0.63	87.5	74	1069	357	350
750	4	2	12	0.84	116.7	55	802	357	350
750	4	1	9	1.12	155.6	44	633	357	350
1000	2	2	49.2	0.42	57.9	150	2169	357	350
1000	2	2	42	0.49	67.9	128	1851	357	350
1000	2	2	36	0.57	79.2	109	1587	357	350
1000	2	2	30	0.69	95.0	91	1322	357	350
1000	2	2	27	0.76	105.6	82	1190	357	350
1000	2	2	24	0.86	118.8	73	1058	357	350
1000	2	2	20	1.03	142.6	61	882	357	350
1000	2	2	16	1.29	178.2	49	705	357	350
1000	2	2	12	1.72	237.6	36	529	357	350
1000	2	1	9	2.29	316.8	29	418	357	350

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

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Electrical data for 3-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]	$U_{SHΔ}$ [V]	U_{SHY} [V]
160	4	1390	50	400	0.46	0.76	0.66	4.77	3.5	1.86	2.13	1.86	1.10	59.7		31.3
160	4	1390	50	230	0.79	0.76	0.67	4.77	3.5	1.86	2.13	1.86	1.10	59.7	17.9	
370	4	1389	50	400	1.01	0.75	0.71	7.74	4.07	2.24	2.28	2.00	2.54	22.5		25.6
370	4	1389	50	230	1.74	0.75	0.71	7.74	4.07	2.24	2.28	2.00	2.54	22.5	14.7	
550	2	2855	50	400	1.28	0.77	0.81	5.16	5.49	2.82	3.26	2.82	1.84	11.8		17.4
550	2	2855	50	230	2.22	0.77	0.81	5.16	5.49	2.82	3.26	2.82	1.84	11.8	10.1	
750	4	1400	50	400	1.86	0.77	0.76	13.70	4.47	2.29	2.41	2.07	5.11	9.1		19.5
750	4	1400	50	230	3.22	0.77	0.76	13.70	4.47	2.29	2.41	2.07	5.11	9.1	11.3	
1000	2	2850	50	400	2.04	0.84	0.84	9.13	6.25	2.91	3.12	2.91	3.36	6.1		15.7
1000	2	2850	50	230	3.54	0.84	0.84	9.13	6.25	2.91	3.12	2.91	3.36	6.1	9.1	

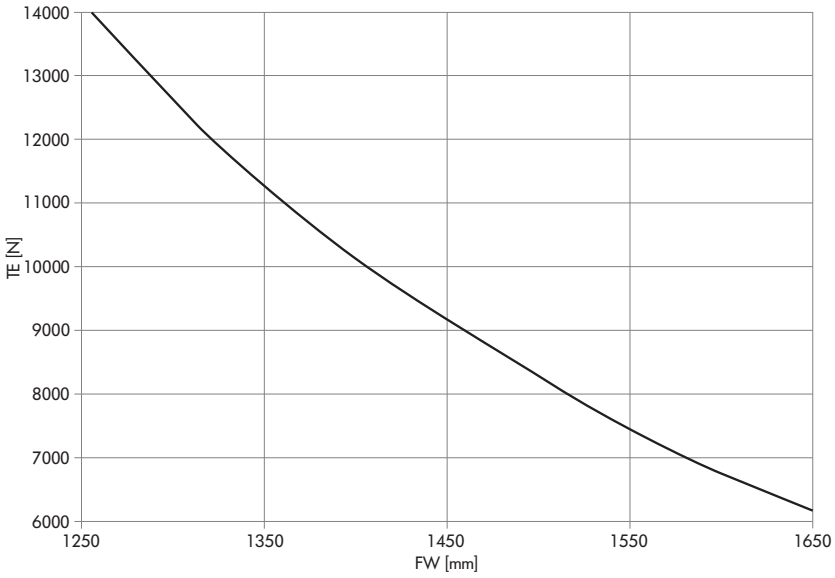
P_N = Rated power
n_P = Number of poles
n_N = Rated speed of rotor
f_N = Rated frequency
U_N = Rated voltage
I_N = Rated current
cosφ = Power factor
η = Efficiency
J_R = Rotor moment of inertia
I_S/I_N = Ratio of startup current – rated current
M_S/M_N = Ratio of startup torque – rated torque
M_B/M_N = 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
$U_{SHΔ}$ = Heater voltage in delta connection
U_{SHY} = Heater voltage in star connection

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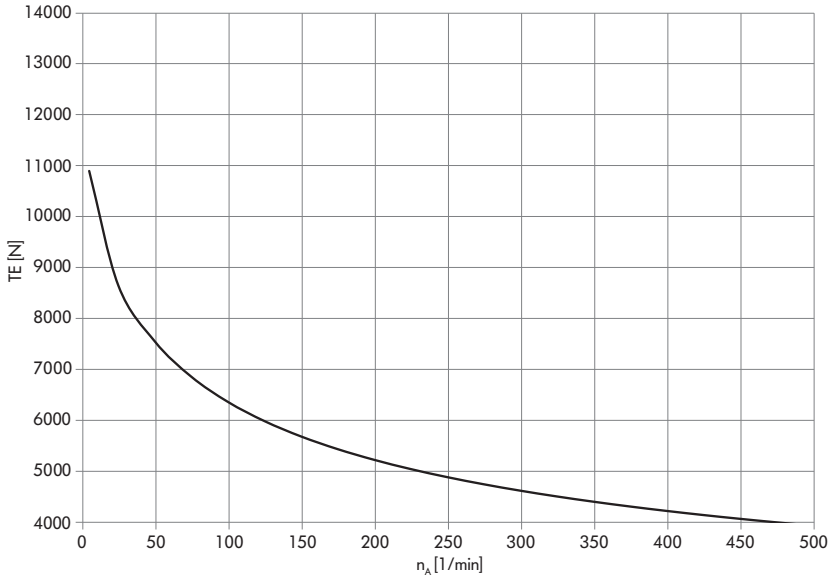
DRUM MOTOR
DM SERIES
DM 0138

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

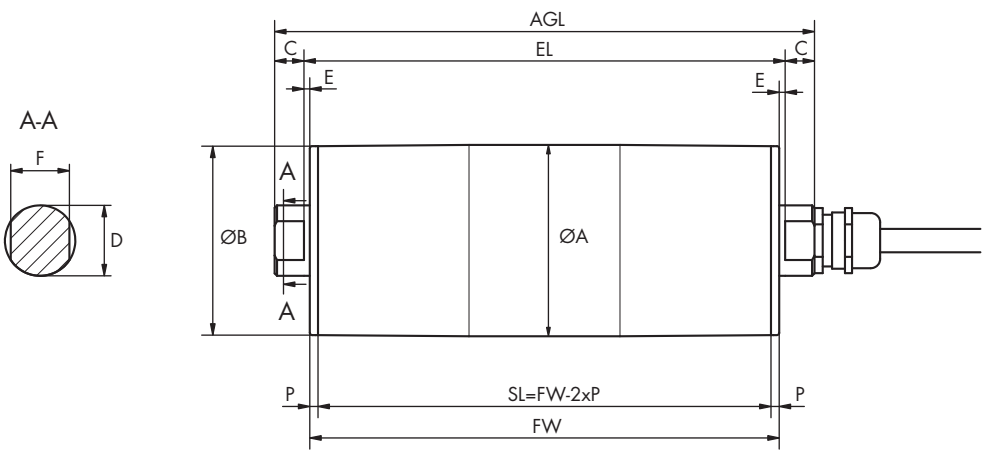
n_A = Shell rated speed

FW = Drum width

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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 0138 crowned	Standard	138	136	25	30	11.5	25	3.5	FW – 7	FW + 23	FW + 73
	Optional	138	136	25	30	11.5	20	3.5	FW – 7	FW + 23	FW + 73
DM 0138 cylindrical	Standard	136	136	25	30	11.5	25	3.5	FW – 7	FW + 23	FW + 73
	Optional	136	136	25	30	11.5	20	3.5	FW – 7	FW + 23	FW + 73
DM 0138 cylindrical + key	Standard	137	137	25	30	11.5	25	3.5	FW – 7	FW + 23	FW + 73
	Optional	137	137	25	30	11.5	20	3.5	FW – 7	FW + 23	FW + 73

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DRUM MOTOR
DM SERIES
DM 0138

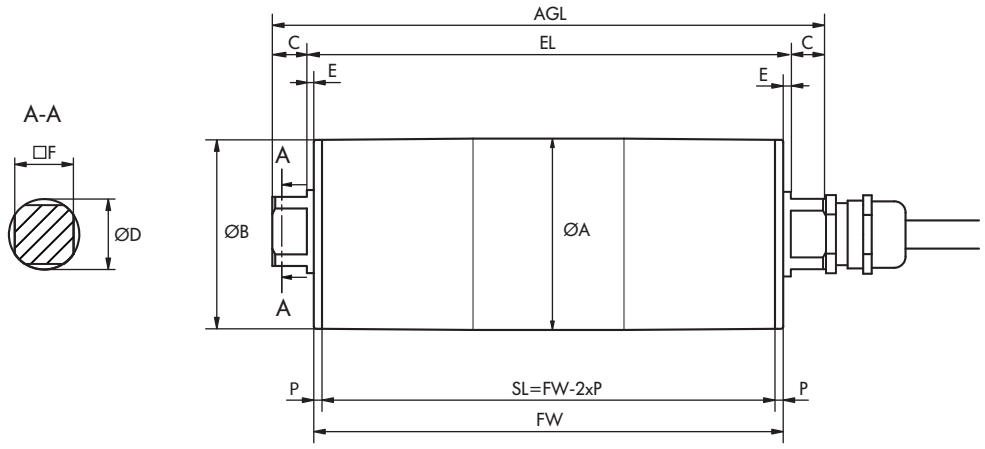


Fig.: Square shaft

Type		A [mm]	B [mm]	C [mm]	D [mm]	S [mm]	F [mm]	P [mm]	SL [mm]	EL [mm]	AGL [mm]
DM 0138 crowned	Standard	138	136	25	30	11.5	25	3.5	FW – 7	FW + 23	FW + 73
DM 0138 cylindrical	Standard	136	136	25	30	11.5	25	3.5	FW – 7	FW + 23	FW + 73
DM 0138 cylindrical + key	Standard	137	137	25	30	11.5	25	3.5	FW – 7	FW + 23	FW + 73

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