12 Technical Data of the Motors

12.1 Key to the data tables

The following table lists the short symbols used in the "Technical data" tables:

P_N	Rated power
M_N	Rated torque
Mpk D1 Mpk D2	Peak torque of double-brakemotors DRL.. in connection to dynamics package 1 or dynamics package 2
n_N	Rated speed
I_N	Rated current
cosφ	Power factor
IE	International energy efficiency class
$\eta_{50\%}$	Efficiency at 50% of the rated power
$\eta_{75\%}$	Efficiency at 75% of the rated power
$\eta_{100\%}$	Efficiency at 100% of the rated power
BF../BT..	Assigned double brake
M_B	Assigned standard braking torque
J_{BMot}	Mass moment of inertia of the double-brakemotor
m_{BMot}	Mass of the double-brakemotor

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12.2 4-pole DRS.. double-brakemotors for 400 V (380 – 420 V), 50 Hz, IE1

The following motors are designed for **continuous duty (S1)** and are fan-cooled. They can be combined with BF.. or BF..(FS) brakes.

Motor type DRS..	P_N kW	M_N Nm	n_N min^{-1}	I_N A	cosφ	BF../ BF..(FS)	M_B Nm	J_{BMot} 10^{-4} kgm^2	m_{BMot} kg
DRS112M4	4	26.5	1435	8.1	0.84	11	2 x 55	189	70
DRS132S4	5.5	36.5	1445	11.1	0.82	11	2 x 80	233	75
DRS132M4	7.5	49.5	1445	14.4	0.85	11	2 x 110	296	89
DRS132MC4	9.2	60	1465	18.6	0.81	11	2 x 110	384	92
DRS160S4	9.2	60	1460	18.9	0.79	20	2 x 150	472	120
DRS160M4	11	72	1460	22	0.81	20	2 x 150	547	130
DRS160MC4	15	97	1470	30	0.8	20	2 x 200	715	135
DRS180S4	15	98	1460	29	0.83	30	2 x 200	1140	195
DRS180M4	18.5	121	1465	34.5	0.85	30	2 x 300	1360	210
DRS180L4	22	143	1465	41.5	0.84	30	2 x 300	1550	225
DRS180LC4	30	195	1470	57	0.84	30	2 x 300	1930	230

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12.3 4-pole DRS../U motors with double brake for 400 V (380 – 420 V), 50 Hz

The following motors are designed for **intermittent duty (S3/15%)** and are non-ventilated (/U). They can be combined with BF.., BF..(FS) or BT..(FS) brakes.

Motor type DRS../U	P_N kW	M_N Nm	n_N min^{-1}	I_N A	cosφ	BF../ BF..(FS)/ BT..(FS)	M_B Nm	J_{BMot} 10^{-4} kgm^2	m_{BMot} kg
DRS112M4/U	4	26.5	1435	8.1	0.84	11	2 x 55	189	70
DRS132S4/U	5.5	36.5	1445	11.1	0.82	11	2 x 80	233	75
DRS132M4/U	7.5	49.5	1445	14.4	0.85	11	2 x 110	296	89
DRS160S4/U	9.2	60	1460	18.9	0.79	20	2 x 150	472	120
DRS160M4/U	11	72	1460	22	0.81	20	2 x 150	547	130
DRS160MC4/U	15	97	1470	30	0.8	20	2 x 200	715	135
DRS180S4/U	15	98	1460	29	0.83	30	2 x 200	1140	195
DRS180M4/U	18.5	121	1465	34.5	0.85	30	2 x 300	1360	210
DRS180L4/U	22	143	1465	41.5	0.84	30	2 x 300	1550	225

In case you require motors for other operating mode (short-time duty S2 or intermittent duty S3 with deviating cdf), contact SEW-EURODRIVE.

INFORMATION

For further information on operating modes, refer to the chapter "Drive dimensioning and drive selection" in the catalog DR.71-315, DT56, DR63.

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12.4 4-pole DRL.. motors with double brake for 400 V, 50 Hz

n_N rpm	DRL.. motor type	M_N Nm	I_N A	M_{pk} D1 Nm	M_{pk} D2 Nm	BF../ BF..(FS)	M_B Nm	J_{BMot} 10^{-4} kgm^2	m_{BMot} kg
1200	**DRL132S4**	42	12.6	80	150	11	2 x 80	233	75
	DRL132MC4	56	17.6	130	200	11	2 x 110	384	92
	DRL160M4	85	25.5	165	280	20	2 x 150	547	130
	DRL160MC4	90	28	185	320	20	2 x 150	715	135
	DRL180S4	120	34.5	210	380	30	2 x 200	1140	195
	DRL180M4	135	38	250	430	30	2 x 200	1360	210
	DRL180L4	165	47	320	520	30	2 x 300	1550	225
	DRL180LC4	175	52	420	600	30	2 x 300	1930	230
1700	**DRL132S4**	42	17.8	80	150	11	2 x 80	233	75
	DRL132MC4	56	24.9	130	200	11	2 x 110	384	92
	DRL160M4	85	35	165	280	20	2 x 150	547	130
	DRL160MC4	90	36	185	320	20	2 x 150	715	135
	DRL180S4	120	47.5	210	380	30	2 x 200	1140	195
	DRL180M4	135	52	250	430	30	2 x 200	1360	210
	DRL180L4	165	63	320	520	30	2 x 300	1550	225
	DRL180LC4	175	72	420	600	30	2 x 300	1930	230
2100	**DRL132S4**	41	21.4	80	150	11	2 x 80	233	75
	DRL132MC4	52	28.8	130	200	11	2 x 110	384	92
	DRL160M4	83	43	165	280	20	2 x 150	547	130
	DRL160MC4	88	48	185	320	20	2 x 150	715	135
	DRL180S4	110	55.3	210	380	30	2 x 200	1140	195
	DRL180M4	130	64	250	430	30	2 x 200	1360	210
	DRL180L4	160	78	320	520	30	2 x 300	1550	225
	DRL180LC4	170	87	420	600	30	2 x 300	1930	230
3000	**DRL132S4**	35	25.5	80	150	11	2 x 80	233	75
	DRL132MC4	42	34.8	130	200	11	2 x 110	384	92
	DRL160M4	79	57	165	280	20	2 x 150	547	130
	DRL160MC4	83	59	185	320	20	2 x 150	715	135
	DRL180S4	100	70.1	210	380	30	2 x 200	1140	195
	DRL180M4	105	73	250	430	30	2 x 200	1360	210
	DRL180L4	130	90	320	520	30	2 x 300	1550	225
	DRL180LC4	140	105	420	600	30	2 x 300	1930	230

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13 Technical data of the double brake

13.1 Braking torques and brake springs

The braking torque settings for both partial brakes are always identical. It is not permitted to use different spring types in the partial brakes of a double brake.

Brake type	Braking torque settings							
	Nominal torque M_B	Type and number of springs per partial brake			Damping plate BF.. and BF..(FS)		Pressure plate BT..(FS)	
	Nm	Normal	Blue	White	Part number Partial brake 1	Part number Partial brake 2	Part number Partial brake 1	Part number Partial brake 2
BF11, BF11(FS), BT11(FS)	2×110	6	–	–	18477100	18477119	18477380	18477372
	2×80	2	4	–				
	2×55	2	4	–				
	2×40	–	4	–	20681437	20681526	21196508	21196494
	2×28	–	3	–				
	2×20	–	–	4	2×18477100	2×18477119		
BF20, BF20(FS), BT20(FS)	2×200	8	–	–	18477089	18477097	18477143	18477151
	2×150	6	–	–				
	2×110	2	4	–				
	2×80	–	6	–	20681585	20681534	18476015	18476023
	2×55	–	2	4				
	2×40	–	–	6	2×18477089	2×18477097		
BF30, BF30(FS), BT30(FS)	2×300	8	–	–	20681704	20681720	18477240	18477232
	2×200	4	4	–				
	2×150	4	–	–				
	2×100	–	8	–	20682166	20682174	18476562	18476570
	2×75	–	6	–				

INFORMATION

Adhere to a symmetrical arrangement of the brake springs (see examples in the following table).

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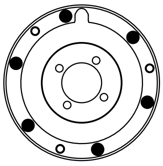
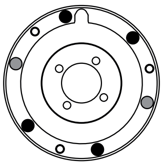
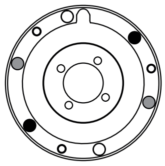
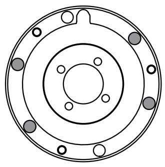
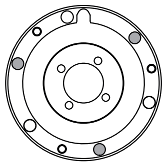
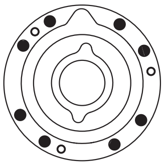
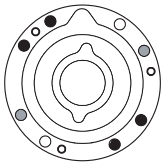
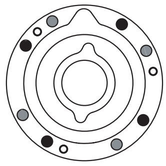
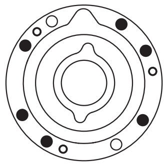
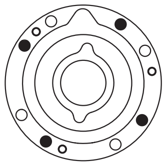
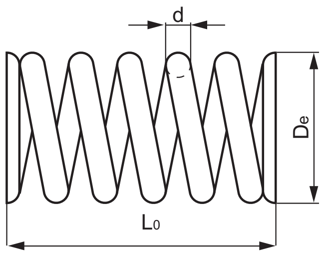
The following table shows the number, designs and position of the brake springs in the coil body:

BF11, BF11(FS), BT11(FS)				
6 springs	**4 + 2 springs**	**2 + 2 springs**	**4 springs**	**3 springs**
				
BF20 – 30, BF20 – 30(FS), BT20 – 30(FS)				
8 springs	**4 + 2 springs**	**4 + 4 springs**	**6 springs**	**4 springs**
				

○	No spring (empty spring bore)
◍	Spring color 1 (see table (→ 🗎 546))
●	Spring color 2 (see table (→ 🗎 546))

Technical data of the brake springs:



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Brake type	Spring color	Part number	Dimensions			
			Length	Outer diameter	Wire diameter	Number of turns
			L_0 mm	D_e mm	d mm	n_t -
BF11 BF11(FS) BT11(FS)	Normal	13741837	50.7	13.3	2.9	12.5
	Blue (BU)	13741845	51.3		2.6	
	White (WH)	13747789	52.9		2.2	
BF20 BF20(FS) BT20(FS)	Normal	18476791	46.1	15.2	3.2	10
	Blue (BU)	18476805	46.2		2.8	10.5
	White (WH)	21196753	46.5		2.5	11
BF30 BF30(FS) BT30(FS)	Normal	01874551	52	19.2	3.6	10
	Blue (BU)	13744356	51.7		3.0	11

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13.2 Work done, working air gap, brake disk thickness

Brake type	Braking work done until maintenance	Working air gap		Brake disk thickness
		min.[1)]	max.	min.
	MJ	mm		mm
BF11, BF11(FS)	2×425	0.3	0.9	10
BF20, BF20(FS)	2×670	0.3	0.9	10
BF30, BF30(FS)	2×1000	0.3	0.9	10
BT11(FS)	2×285	0.4	0.8	10
BT20(FS)	2×445	0.4	0.8	10
BT30(FS)	2×670	0.4	0.8	10

1) When checking the working air gap, note: Parallelism tolerances on the brake disk may give rise to deviations of ± 0.15 mm after a test run.

13.3 Brake control

INFORMATION

Operation without brake control at AC or DC voltage is not permitted.

Controllers for control cabinet installation are available for the BF.., BF..(FS), and BT..(FS) double brake. Use the same brake controllers for the partial brakes **I** and **II**.

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13.3.1 Brake control for BF.. and BF..(FS) double brake

BF.. and BF..(FS) double brakes are compatible to the current portfolio of brake control systems of single brakes.

The following table lists the technical data of brake control systems for installation in the control cabinet, and the assignment regarding the motor size and connection technology. The different housings have different colors (= color code) to make them easier to distinguish.

Type	Function	Voltage range V	Holding current I_{Hmax} in A	Type designation	Part number	Color code
BME.	One-way rectifier with electronic switching for fast release of the double brake	AC 230 – 575	1.0	BME 1.4	08298319	Red
		AC 150 – 500	1.5	BME 1.5	08257221	Red
		AC 42 – 150	3.0	BME 3.0	0825723X	Blue
BMH.	One-way rectifier with electronic switching and heating function	AC 230 – 575	1.0	BMH 1.4	08298343	Green
		AC 150 – 500	1.5	BMH 1.5	0825818X	Green
		AC 42 – 150	3.0	BMH 3.0	08258198	Yellow
BMP.	One-way rectifier with electronic switching, integrated voltage relay for cut-off in the DC circuit	AC 230 – 575	1.0	BMP 1.4	08298327	White
		AC 150 – 500	1.5	BMP 1.5	08256853	White
		AC 42 – 150	3.0	BMP 3.0	08265666	Light blue
BMK.	One-way rectifier with electronic switch mode, 24 V_{DC} control input and separation in the DC circuit	AC 230 – 575	1.0	BMK 1.4	08298335	Water blue
		AC 150 – 500	1.5	BMK 1.5	08264635	Water blue
		AC 42 – 150	3.0	BMK 3.0	08265674	Bright red
BMV.	Brake control unit with electronic switching, 24 V_{DC} control input and fast cut-off	DC 24	5.0	BMV 5.0	13000063	White
BST.	Safety-related brake control with electronic switching and DC link supply	AC 460	0.6	BST 0.6S	08299714	-
		AC 400	0.7	BST 0.7S	13000772	-
		AC 230	1.2	BST 1.2S	13001337	-

13.3.2 Brake control for the BT..(FS) double brake

In combination with the BT..(FS) double brake, SEW-EURODRIVE stipulates that the following brake control exclusively for control cabinet installation:

Type	Function	Voltage range V_{AC}	Holding current I_{Hmax} in A	Type designation	Part number	Color
BMT.	Bridge/one-way rectifier with automatic switching	200 – 500	2.8	BMT 2.2	28215036	Orange

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13.4 Operating currents for the BF.., BF..(FS), and BT..(FS) double brake

The following table shows the operating currents of the double brake for different connection voltages. The power and current values specified in the table apply to an ambient temperature of +20 °C and per partial brake.

The specified holding currents I_H are r.m.s. values in the brake control supply cable. Only use current measurement units that are designed to measure r.m.s. values.

Observe that the high-speed excitation of the brake controllers from SEW-EURODRIVE may result in an increased current (accelerator current I_B) flowing for a short time during switch-on:

- Approx. 160 ms for BF.. and BF..(FS)
- Approx. 500 ms for BT..(FS)

The amount of acceleration current I_B can be calculated using the inrush current ratio ESV and the relevant holding current I_H. It must be considered during the dimensioning of the power supply cables.

Operating currents	**BF11, BF11(FS)**	**BF20, BF20(FS)**	**BF30, BF30(FS)**	**BT11(FS)**	**BT20(FS)**	**BT30(FS)**
Nominal power per brake coil in W	65	85	105	75	95	120
Inrush current ratio (ESV)	7.5	8	7.7	2	2	2

Nominal voltage (nominal voltage range)	**BF11, BF11(FS)**	**BF20, BF20(FS)**	**BF30, BF30(FS)**	**BT11(FS)**	**BT20(FS)**	**BT30(FS)**
V_N V	I_H A_{AC}/A_{DC}			I_H A_{AC}/A_{DC}		
DC 24 (23 – 26)	2.26	2.92	-	-	-	-
AC 120 (111 – 123)	0.87	1.08	1.42	-	-	-
AC 230 (218 – 243)	0.44	0.54	0.71	0.66	0.80	0.66
AC 360 (344 – 379)	0.28	0.34	0.45	0.41	0.51	0.41
AC 400 (380 – 431)	0.25	0.30	0.45	0.37	0.45	0.37
AC 460 (432 – 484)	0.22	0.27	0.36	0.33	0.40	0.33
AC 500 (485 – 542)	0.20	0.24	0.32	0.29	0.36	0.29
AC 575 (543 – 600)	0.17	0.22	0.28	-	-	-

ESV Inrush current ratio I_B/I_H

I_B Acceleration current in Ampere (AC or DC) when operated with SEW-EURODRIVE brake control for high-speed excitation

I_H Holding current in Ampere (AC or DC), r.m.s. value of the braking current in the supply cable to the SEW-EURODRIVE brake control

V_N Nominal voltage (nominal voltage range) of the double brake in V (AC or DC)

Permitted tolerances for nominal voltage: Nominal voltage range ± 5%

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13.5 Resistance of brake coils

13.5.1 BF../BF..(FS) double brake

	BF11 BF11(FS)	BF20 BF20(FS)	BF30 BF30(FS)
Nominal power per brake coil in W	65	85	105
Inrush current ratio (ESV)	7.5	8	7.7

Nominal voltage (nominal voltage range)	**BF11 BF11(FS)**		**BF20 BF20(FS)**		**BF30 BF30(FS)**	
V_N in V	**R_B Ω**	**R_T Ω**	**R_B Ω**	**R_T Ω**	**R_B Ω**	**R_T Ω**
DC 24 (23 – 26)	1.4	8.8	1	6.7	-	-
AC 120 (111 – 123)	5.4	35.1	4	26.8	3.1	20.7
AC 230 (218 – 243)	21.6	140	15.8	107	12.4	82.5
AC 360 (344 – 379)	54.3	351	39.6	268	31.1	207
AC 400 (380 – 431)	68.3	442	49.8	338	39.2	261
AC 460 (432 – 484)	86	557	62.7	425	49.4	328
AC 500 (485 – 542)	108	701	79	536	62.1	414
AC 575 (543 – 600)	136	882	99	675	78	521

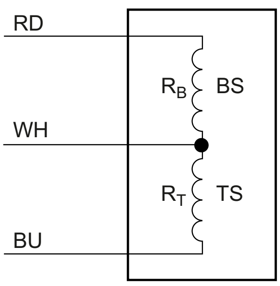
Key:

ESV Inrush current ratio I_B/I_H

I_B Acceleration current in Ampere (AC or DC) when operated with SEW-EURODRIVE brake control for high-speed excitation

I_H Holding current in Ampere (AC or DC), r.m.s. value of the braking current in the supply cable to the SEW-EURODRIVE brake control.

V_N Nominal voltage (nominal voltage range) of the double brake in V (AC or DC)
Approved tolerances for nominal voltage: Nominal voltage range +/-5 %



BS Accelerator coil

TS Coil section

R_B Accelerator coil nominal resistance (refers to an ambient temperature of +20 °C)

R_T Coil section nominal resistance (refers to an ambient temperature of +20 °C)

RD Lead color red

WH Lead color white

BU Lead color blue

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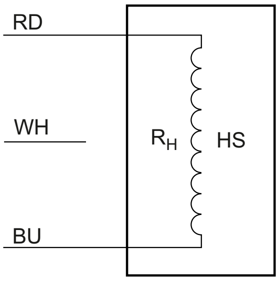
13.5.2 BT..(FS) double brake

	BT11(FS)	BT20(FS)	BT30(FS)
Nominal power per brake coil in W	75	95	120
Inrush current ratio (ESV)	2	2	2

Nominal voltage (nominal voltage range)	**BT11(FS)**	**BT20(FS)**	**BT30(FS)**
V_N in V	**R_H Ω**	**R_H Ω**	**R_H Ω**
DC 24 (23 – 26)	-	-	-
AC 120 (111 – 123)	-	-	-
AC 230 (218 – 243)	156	120	96
AC 360 (344 – 379)	392	301	241
AC 400 (380 – 431)	494	379	303
AC 460 (432 – 484)	621	477	382
AC 500 (485 – 542)	782	601	481
AC 575 (543 – 600)	-	-	-

Key:

ESV	Inrush current ratio I_B/I_H
I_B	Acceleration current in Ampere (AC or DC) when operated with SEW-EURODRIVE brake control for high-speed excitation
I_H	Holding current in Ampere (AC or DC), r.m.s. value of the braking current in the supply cable to the SEW-EURODRIVE brake control.
V_N	Nominal voltage (nominal voltage range) of the double brake in V (AC or DC) Approved tolerances for nominal voltage: Nominal voltage range +/-5 %
HS	Holding coil
R_H	Holding coil nominal resistance (refers to an ambient temperature of +20 °C)
RD	Lead color red
BU	Lead color blue
WH	Lead color white, is not connected to the brake coil



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13.6 Switching times

The switching times of the double brake depend on the used brake control.

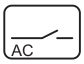
The switching times of the double brake depend on various factors, e.g. operating temperature of the brake and state of wear. The set braking torque and the used brake control are particularly decisive for the switching times. Depending on the braking torque, the following table shows the response times (t_1) and the applications times for cut-off in the AC circuit ($t_{2,I}$) and cut-off in the DC and AC circuits ($t_{2,II}$).

The following table gives guide values for the switching times of the double brakes.

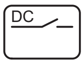
The following indexes show the distinction between:

- $t_{1,I}$: Response time without high-speed excitation
- $t_{1,II}$: Response time with high-speed excitation
- $t_{2,I}$: Application time cut-off in the AC circuit (AC)
- $t_{2,II}$: Application time cut-off in the DC and AC circuits (AC/DC)

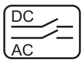
Observe the wiring diagrams in chapter "Brake control wiring diagrams" (→ 🗎 562) to correctly determine the application time for your application. The relevant connection type is displayed with icons.



Use of $t_{2,I}$



Use of $t_{2,II}$



Use of $t_{2,II}$

13.6.1 BF11, BF11(FS) double brake

Braking torque Nm	Response time $t_{1,I}$ ms	Response time $t_{1,II}$ ms	Application time $t_{2,I}$ ms	Application time $t_{2,II}$ ms
110	-	55	120	35
80	-	55	120	35
55	-	55	240	50
40	-	55	240	50
28	-	55	450	65
20	-	55	450	65

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13.6.2 BF20, BF20(FS) double brake

Braking torque Nm	Response time $t_{1,I}$ ms	Response time $t_{1,II}$ ms	Application time $t_{2,I}$ ms	Application time $t_{2,II}$ ms
200	-	70	165	35
150	-	70	165	35
110	-	70	300	65
80	-	70	300	65
55	-	70	420	100
40	-	70	420	100

13.6.3 BF30, BF30(FS) double brake

Braking torque Nm	Response time $t_{1,I}$ ms	Response time $t_{1,II}$ ms	Application time $t_{2,I}$ ms	Application time $t_{2,II}$ ms
300	-	125	280	65
200	-	125	280	65
150	-	125	460	110
100	-	125	460	110
75	-	125	660	170

13.6.4 BT11(FS) double brake

Braking torque Nm	Response time $t_{1,I}$ ms	Response time $t_{1,II}$ ms	Application time $t_{2,I}$ ms	Application time $t_{2,II}$ ms
110	-	110	190	60
80	-	110	190	60
55	-	110	190	60
40	-	110	190	60
28	-	110	190	60
20	-	110	190	60

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13.6.5 BT20(FS) double brake

Braking torque Nm	Response time $t_{1,I}$ ms	Response time $t_{1,II}$ ms	Application time $t_{2,I}$ ms	Application time $t_{2,II}$ ms
200	-	210	270	80
150	-	210	270	80
110	-	210	270	80
80	-	210	270	80
55	-	210	270	80
40	-	210	270	80

13.6.6 BT30(FS) double brake

Braking torque Nm	Response time $t_{1,I}$ ms	Response time $t_{1,II}$ ms	Application time $t_{2,I}$ ms	Application time $t_{2,II}$ ms
300	-	290	390	100
200	-	290	390	100
150	-	290	390	100
100	-	290	390	100
75	-	290	390	100

13.7 Permitted braking work

The maximum permitted braking work $W_{permitted}$ of the double brake for emergency stop braking depends on the operating speed and the application. For information on project planning, refer to the "Gearmotors with BF../BT.. Double Brake" catalog.

The limits of the permitted maximum braking work must not be exceeded, not even for emergency stop braking.

INFORMATION

Double brakes are not approved as service brakes but as holding brakes with emergency stop properties. The number of emergency stop brakings is limited to 6050 braking operations.

Emergency stop braking may negatively influence the braking effect. This is why SEW-EURODRIVE recommends performing brake diagnostics after an emergency stop braking.

Double brakes for vertical direction of movement

In lifting applications, the limits of the permitted maximum braking work may not be exceeded, not even for emergency stop braking (standard range, limit curve S).

Double brakes for horizontal direction of movement

For horizontal movements, such as travel drive applications, increased braking work in emergency stop situations is permitted under the following conditions (overload range, limit curve A to D).

- A maximum of 75% of the maximum nominal braking torque is permitted.
- The specific wear of the brake lining with increased braking work increases significantly in case of emergency stops. It can reach factor 100 under certain circumstances. This additional wear must be considered when determining the maintenance cycle.
- During the braking process, the effective dynamic braking torque can be reduced due to the heating of the brake lining during braking. In extreme cases, the effective braking torque can be reduced to 60% of the rated value. Take this into account when you determine the braking distance.

13.7.1 Terms and definitions

	Explanation
$n_{emergency\ stop}$	The actual speed at the moment of the emergency stop braking. This value is used for calculating the situational permitted maximum braking work.
n_{base}	The lower base speed for calculating the minimum value of the permitted braking work.
n_{Max}	The maximum permitted emergency stop speed.
W_{perm}	The speed-dependent permitted braking work. For determining the braking work, the actual speed at the time of the emergency stop braking is decisive.
K_{Wperm}	An additional calculation value for determining the speed-dependent maximum permitted braking work.

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13.7.2 Determining the maximum permitted braking work

For information on how to calculate the actual braking work W_1, refer to chapter "Project planning" in the catalog. Compare W_1 to the permitted braking work W_{perm}.

The following basic correlations apply to determining the maximum permitted braking work W_{perm}:

$n_{base} \leq n_{emergency\ stop} \leq n_{Max}$

The following applies to speeds in the range between the lower base speed n_{base} and the upper maximum speed n_{Max}:

$$W_{perm}\left(n_{em.stop}\right) = \frac{K_{Wperm}}{n_{em.stop}}$$

$n_{emergency\ stop} < n_{base}$

For speeds $n_{emergency\ stop} < n_{base}$, the work is limited to the following maximum value:

$$W_{perm}\left(n_{em.stop} \leq n_{base}\right) = \frac{K_{Wperm}}{n_{base}}$$

$n_{emergency\ stop} > n_{Max}$

For speeds $n_{emergency\ stop} > n_{Max}$, no emergency stop braking operations are permitted:

$$W_{perm}\left(n_{em.stop} > n_{Max}\right) = 0$$

INFORMATION

Refer to the following tables for the required values.

Depending on the application, the following values apply to the factor K_{Wperm}:

For vertical applications or applications with lifting parts, the standard values must be used.

For horizontal applications, the values from the overload ranges A to D can additionally be considered.

Type	Factor K_{Wperm} kJ/min				
	Standard S	Overload A	Overload B	Overload C	Overload D
BF11, BF11(FS), BT11(FS)	22 600	32 600	53 400	77 100	88 900
BF20, BF20(FS), BT20(FS)	30 800	47 500	77 700	112 000	130 000
BF30, BF30(FS), BT30(FS)	46 900	55 700	91 200	130 000	153 000

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The following values apply to the speed limits:

Type	Lower base speed n_{base} 1/min	Max. speed n_{Max} for standard range 1/min	Max. speed n_{Max} for overload range A to D 1/min
BF11, BF11(FS), BT11(FS)	1 250	3 600	3 600
BF20, BF20(FS), BT20(FS)	1 250	3 600	3 600
BF30, BF30(FS), BT30(FS)	1 250	1 800	3 600

13.7.3 Overload ranges

"Standard S" always applies to vertical applications. Refer to column "Standard S" for the values for calculating the permitted braking work.

For horizontal approved, refer to the column "Standard S" and also the columns "Overload range A to D" for the values for calculating the maximum permitted braking work.

INFORMATION

Using the values from the overload ranges A to D leads to further restrictions for calculating the permitted braking work for horizontal applications.

On the one hand, the permitted braking work increases in the overload ranges A to D. On the other hand, the values for brake wear change. This is first achieved by limiting the permitted braking torque steps. The lower tolerance of the braking torque expands as follows:

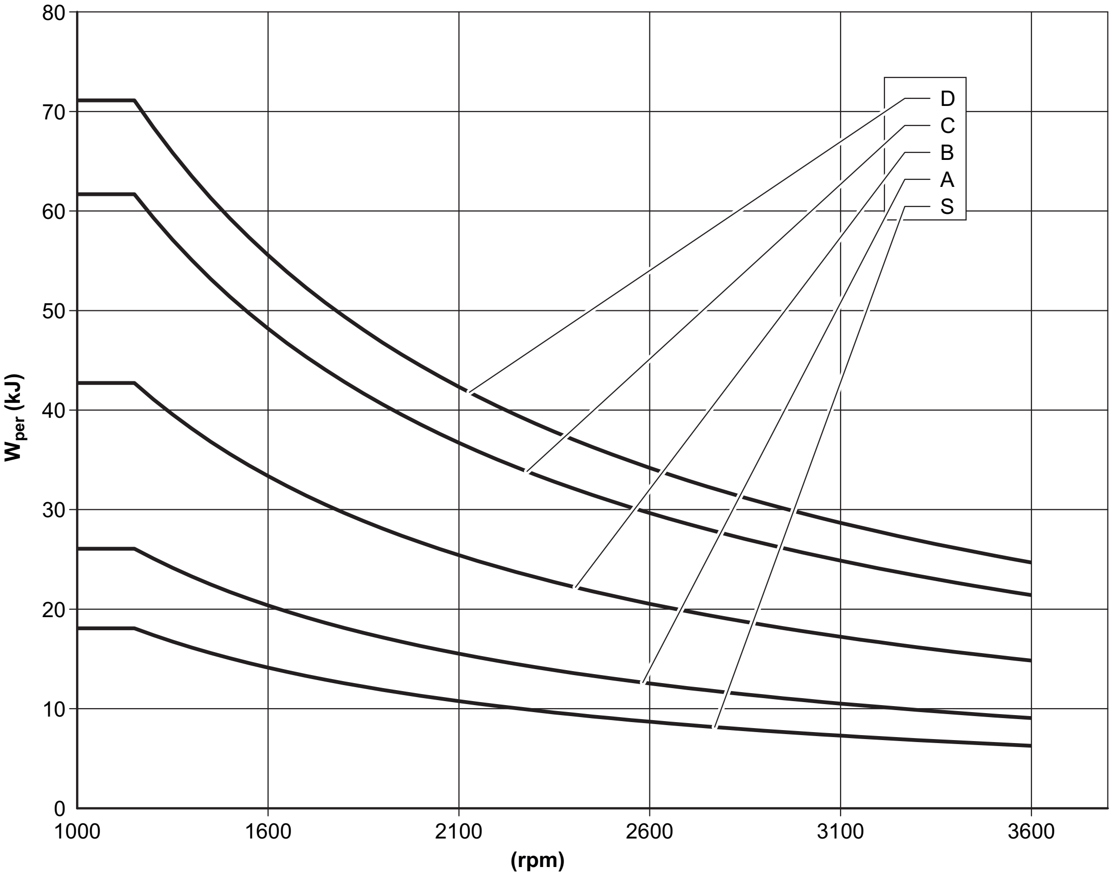
- Increase brake wear from overload range A to D.
- Lowered tolerance limit of the braking torque f_{Mmin} from overload range A to D.

The following applications are distinguished according to the project planning guideline:

Area	Standard S	Overload range A	Overload range B	Overload range C	Overload range D
Permitted for	All applications	Horizontal applications	Horizontal applications	Horizontal applications	Horizontal applications
Permitted braking torque steps	All steps	Maximum 75% M_{Bmax}	Maximum 75% M_{Bmax}	Maximum 75% M_{Bmax}	Maximum 75% M_{Bmax}
Wear factor f_V	Normal	Normal	Slightly increased	Significantly increased	Massively increased
	1	1	10	50	100
Tolerance for M_B	Normal	Normal	Slightly expanded	Significantly expanded	Extremely expanded
Min. (f_{Mmin})	0.9	0.9	0.8	0.7	0.6
Max. (f_{Mmax})	1.5	1.5	1.5	1.5	1.5

The following diagrams show the permitted braking work depending on the speed. The lower base speed n_{base} is defined as 1250 1/min.

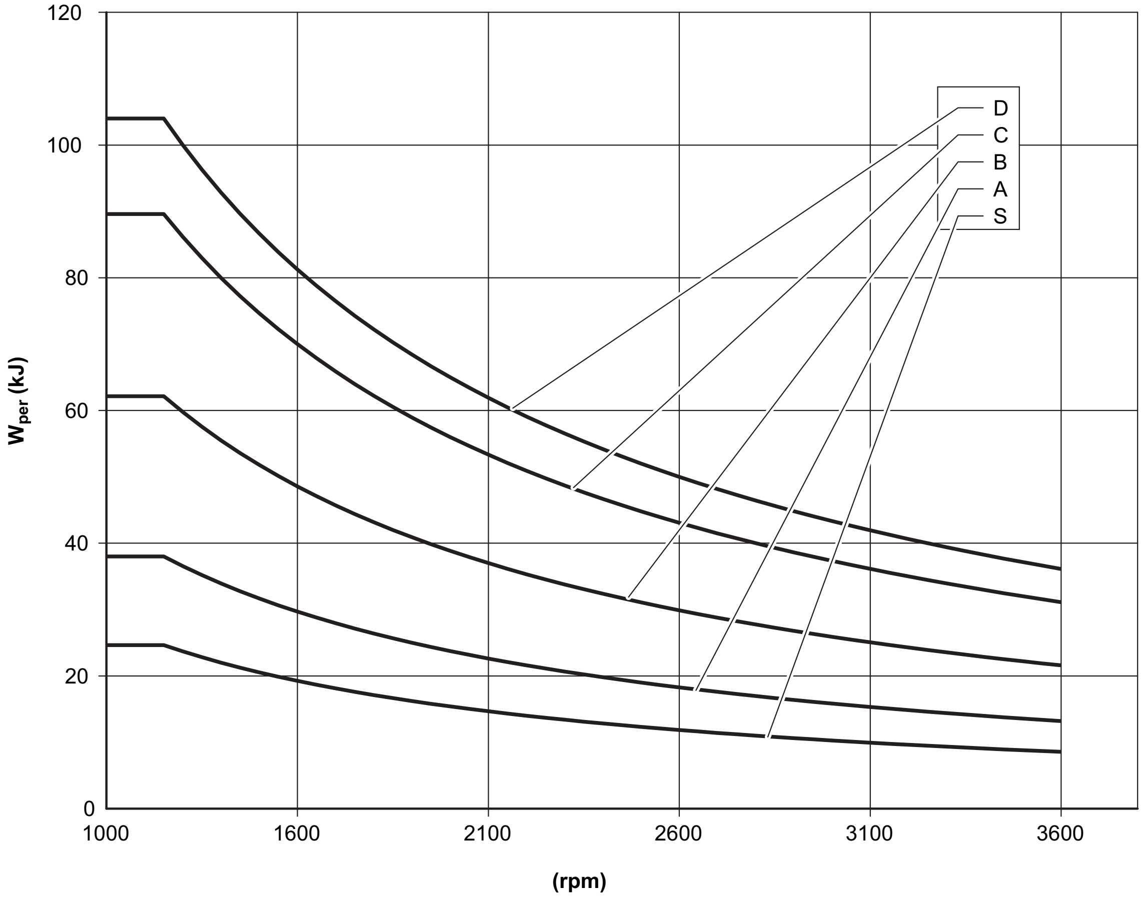
Permitted braking work W_{perm} of the BF11, BF11(FS), and BT11(FS) double brake:



14664282507

A	Overload limit curve A
B	Overload limit curve B
C	Overload limit curve C
D	Overload limit curve D
S	Standard limit curve S

Permitted braking work W_{perm} of the BF20, BF20(FS), and BT20(FS) double brake:



14664873739

A Overload limit curve A
B Overload limit curve B
C Overload limit curve C
D Overload limit curve D
S Standard limit curve S

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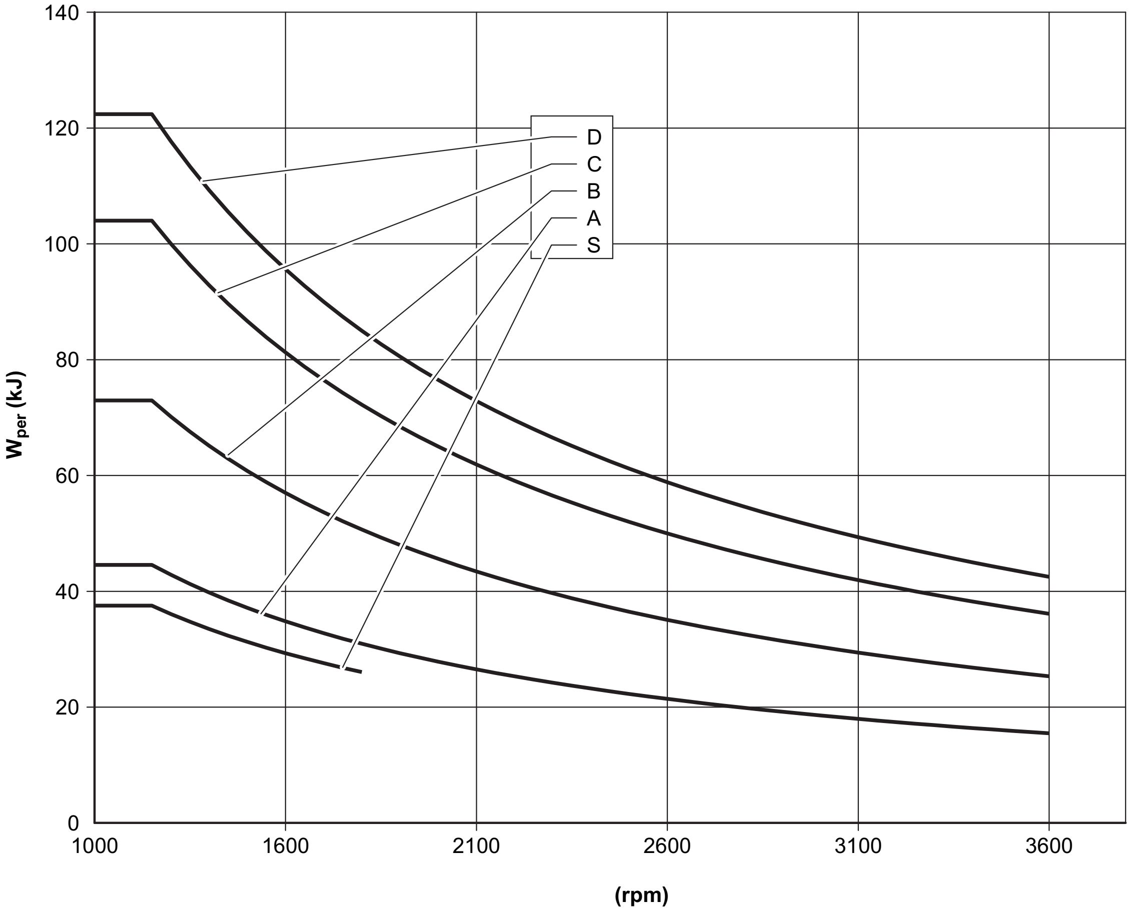
Permitted braking work W_{perm} of the BF30, BF30(FS), and BT30(FS) double brake:

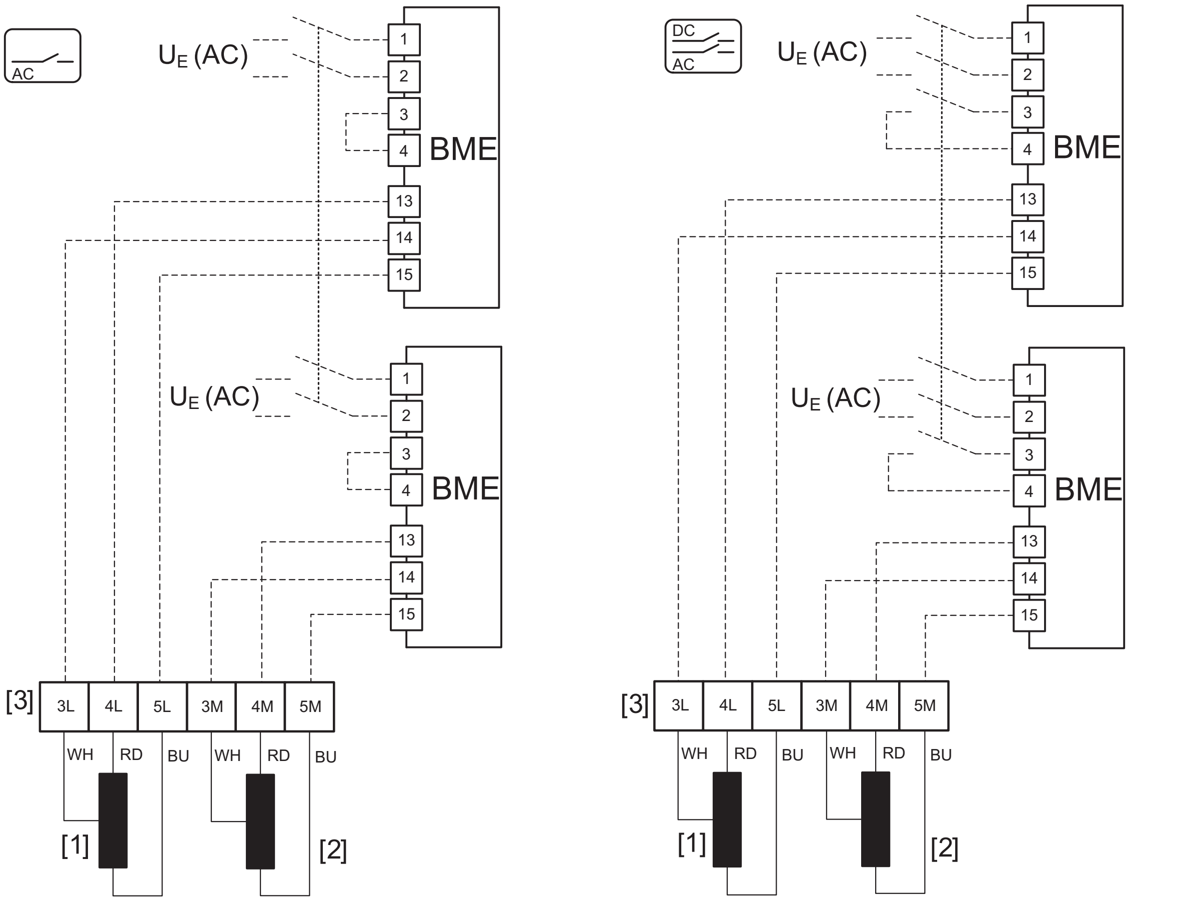


14664876171

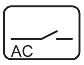
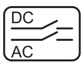
A Overload limit curve A
B Overload limit curve B
C Overload limit curve C
D Overload limit curve D
S Standard limit curve S

13.8 Brake control wiring diagrams

13.8.1 BME. brake control



9007214040100235

- - - -	Customer side
———	Factory
	Cut-off in the AC circuit (standard application of the brake)
	Cut-off in the DC and AC circuits (rapid application of the brake)
[1]	Brake coil partial brake I
[2]	Brake coil partial brake II
[3]	Terminal strip
V_I (AC)	Input voltage power supply

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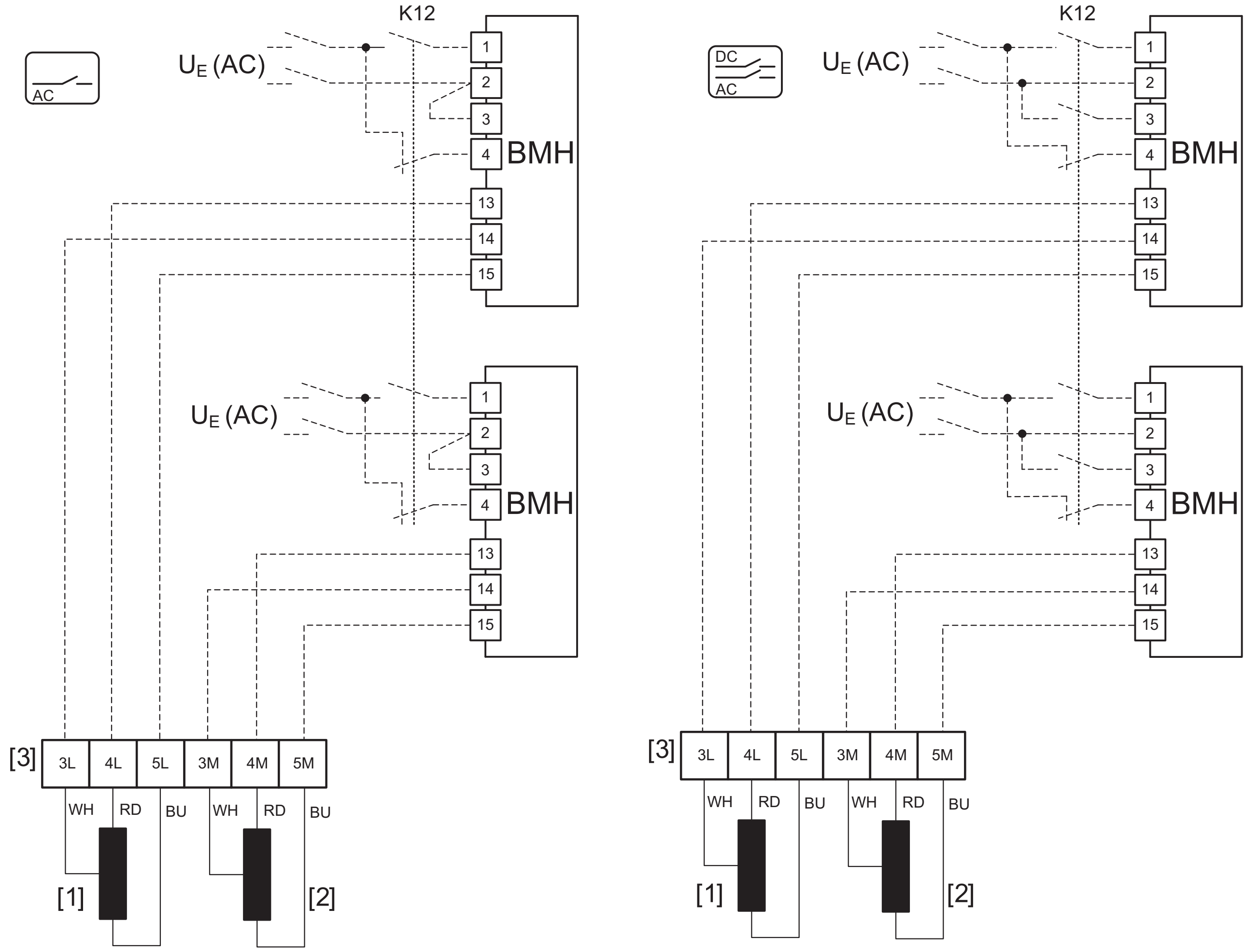
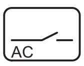
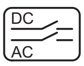
13.8.2 BMH. brake control



14785364107

- - - -	Customer
———	Factory
	Cut-off in the AC circuit (standard application of the brake)
	Cut-off in the DC and AC circuits (rapid application of the brake)
[1]	Brake coil partial brake I
[2]	Brake coil partial brake II
[3]	Terminal strip
V_I (AC)	Input voltage power supply

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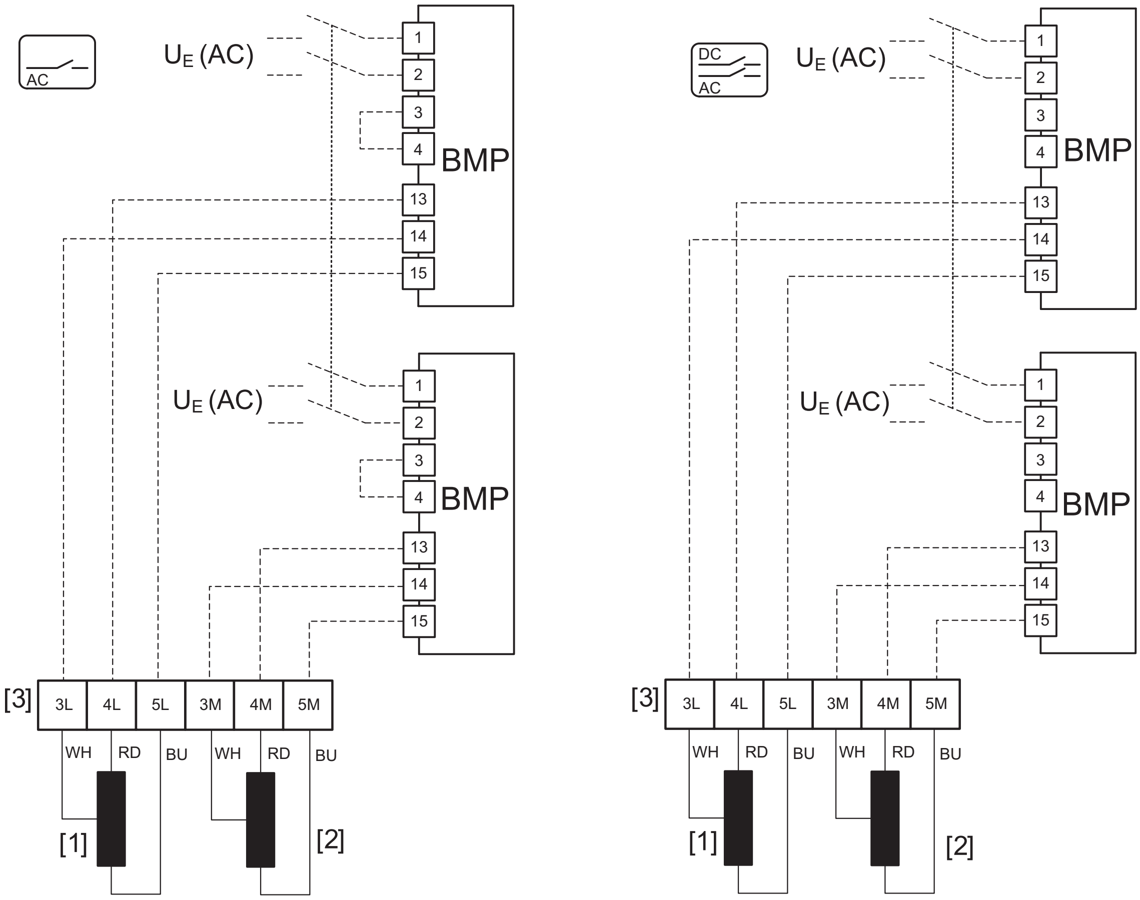
13.8.3 BMP. brake control



14785361675

- - - -	Customer
———	Factory
AC	Cut-off in the AC circuit (standard application of the brake)
DC / AC	Cut-off in the DC and AC circuits (rapid application of the brake)
[1]	Brake coil partial brake I
[2]	Brake coil partial brake II
[3]	Terminal strip
V_I (AC)	Input voltage power supply

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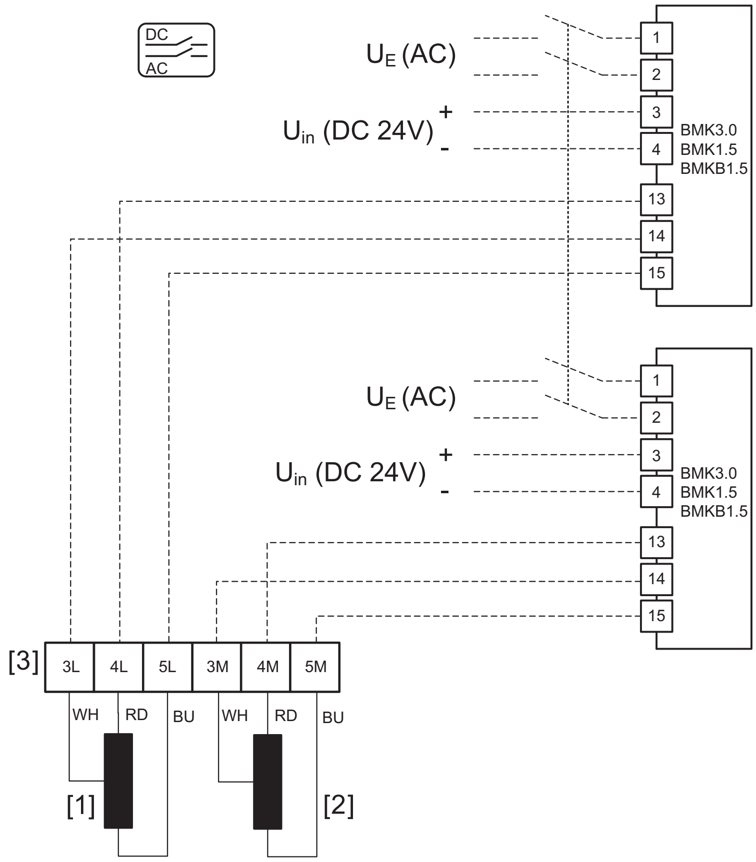
13.8.4 BMK 3.0, BMK 1.5 brake control



14785368971

– – – –	Customer
———	Factory
DC / AC	Cut-off in the DC and AC circuits (rapid application of the brake)
[1]	Brake coil partial brake I
[2]	Brake coil partial brake II
[3]	Terminal strip
V_I (AC)	Input voltage power supply
V_{IN} (DC24V)	Functional control voltage

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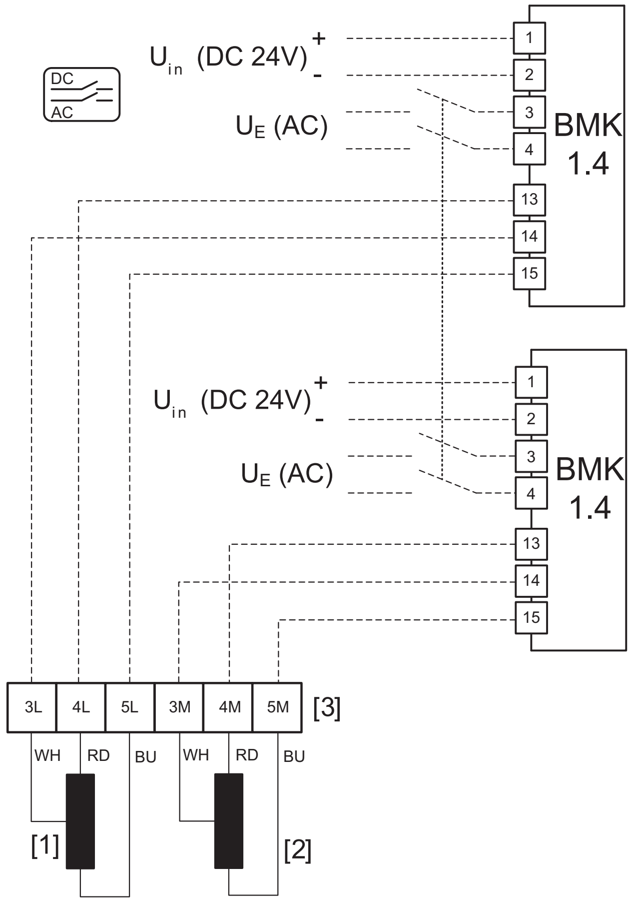
13.8.5 BMK 1.4 brake control



14785373835

- - - -	Customer
———	Factory
DC/AC	Cut-off in the DC and AC circuits (rapid application of the brake)
[1]	Brake coil partial brake I
[2]	Brake coil partial brake II
[3]	Terminal strip
V_I (AC)	Input voltage power supply
V_{IN} (DC24V)	Functional control voltage

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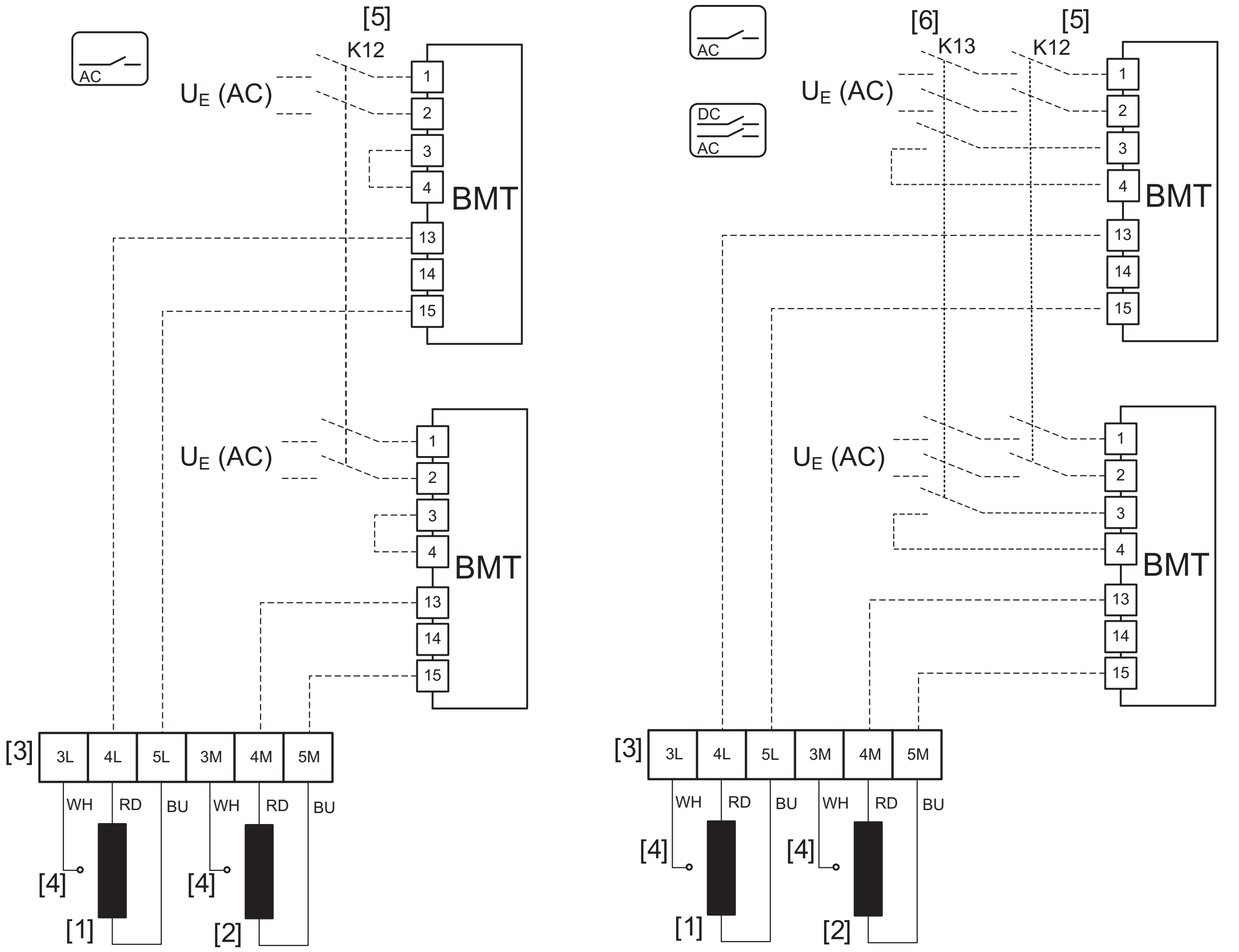
13.8.6 BMT 2.2 brake control



14785376267

- - - -	Customer
———	Factory
	Cut-off in the AC circuit (standard application of the brake)
	Cut-off in the DC and AC circuits (rapid application of the brake)
[1]	Brake coil partial brake I
[2]	Brake coil partial brake II
[3]	Terminal strip
[4]	Litz wire not connected to brake coil
[5]	Operating contactor AC cut-off
[6]	Emergency switching off contactor AC-DC cut-off
V_I (AC)	Input voltage power supply

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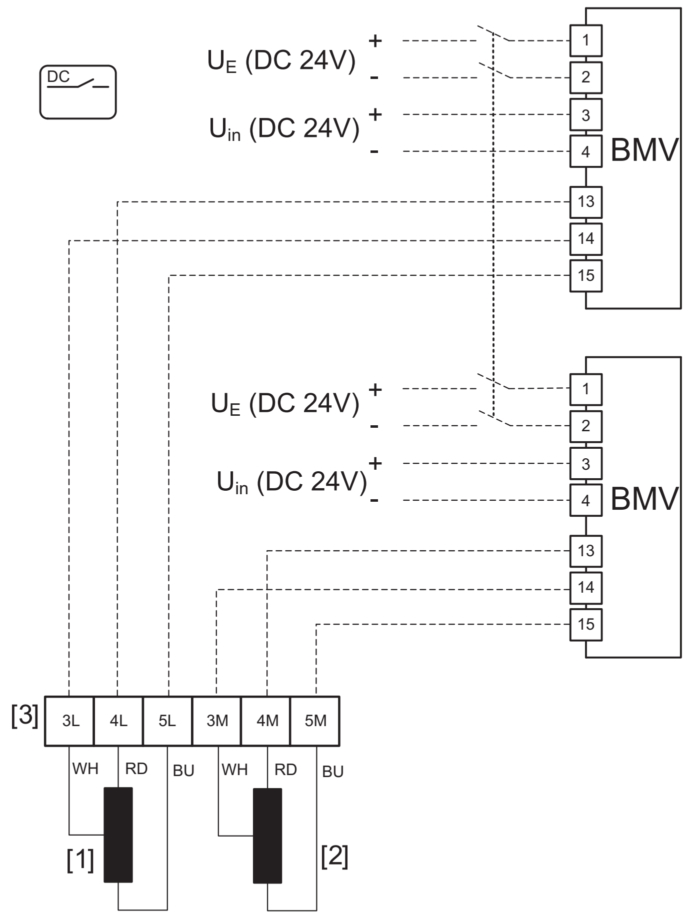
INFORMATION

BMT 2.2 brake control is only approved for the BT..(FS) double brake.

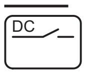
The connection example in the wiring diagram on the right side allows for applying the double brake fast in case of emergency. The functional control is carried out with noise reduction via K12 [5] (cut-off in the AC circuit). In case of emergency, safe control via K13 [6] (cut-off in the DC and AC circuit) for fast disconnection. Observe the resulting reduced noise reduction when the double brake is used.

Safe disconnection in case of emergency (safety function SBC) via contactors must meet the requirements of the required performance level of the double brake. Usually, 2 contactors (redundancy) with contactor monitoring via a safety controller is required.

13.8.7 BMV. brake control



14785366539

- - - -	Customer side
———	Factory
	Cut-off in the DC circuit (fast application of the brake)
[1]	Brake coil partial brake I
[2]	Brake coil partial brake II
[3]	Terminal strip
U_E (DC24V)	Input voltage power supply
V_{IN} (DC24V)	Functional control voltage

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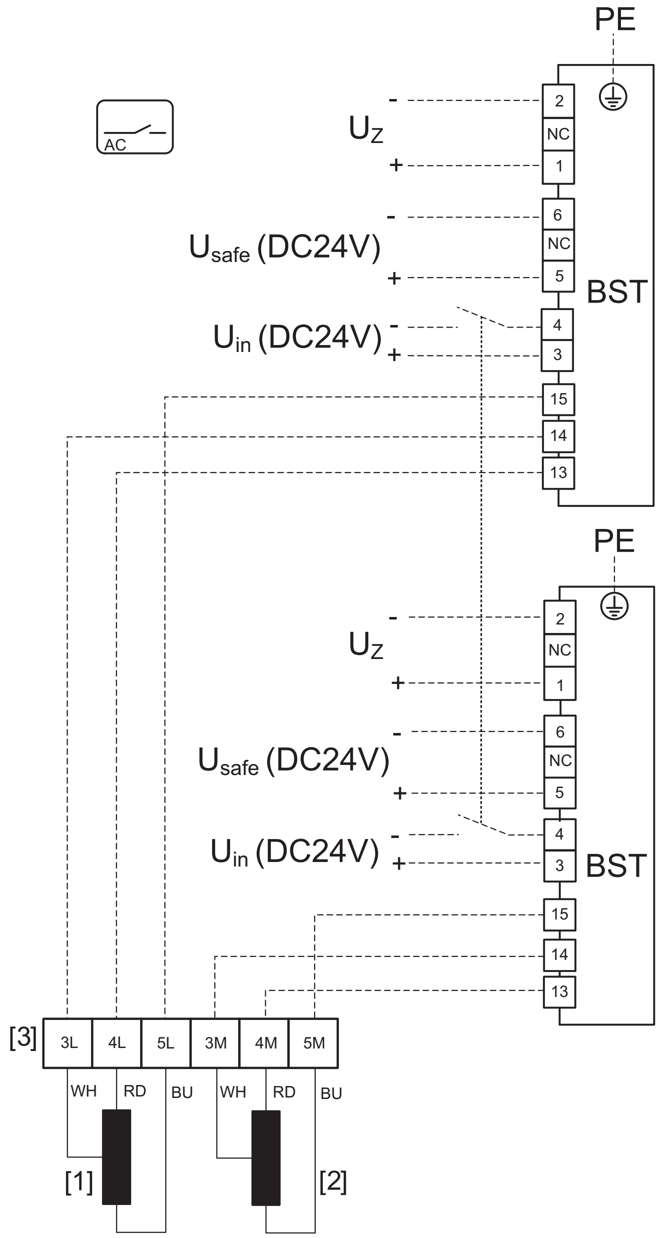
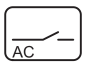
13.8.8 BST. brake control



14785371403

- - - -	Customer side
———	Factory
	Fast disconnection (cut-off in the DC circuit) of the brake by the BST brake control is not part of the safety function (SBC). The brake application time for cut-off in the AC circuit must be consulted.
[1]	Brake coil partial brake I
[2]	Brake coil partial brake II
[3]	Terminal strip
V_{safe} (DC24V)	Safe control voltage
V_{IN} (DC24V)	Functional control voltage
V_Z	DC link voltage frequency inverter

Observe the "Safety-Related BST Brake Module for Control Cabinet Installation" operating instructions.

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13.9 Safety characteristics

Definition of the safety architecture (category):

The safety architecture (category) classifies safety-related components regarding their resistance to errors and their response in the event of an error based on the reliability and/or the structural arrangement of the parts. A higher resistance to errors means a higher potential to reduce risk.

13.9.1 BF.. double brake

Characteristic	Characteristic to EN ISO 13849-1
Classification	Category B

13.9.2 BF..(FS) and BT..(FS) double brake

Feature	Characteristic to EN ISO 13849-1
Classification	Category 3[1)]
System structure	2 channels
Common Cause Failure (CCF)	80
Probability of dangerous failure per hour (PFH_d value)	Calculation by user via B_{10d} value
Service life (depending on the starting frequency)	Maximum 20 years (or a maximum operating time T_{10d}), after which the component must be replaced.
Safe condition	Supply voltage of BF..(FS) and BT..(FS) double brake is switched off. Double brake is applied.
Safety function	• Safe brake hold (SBH) • Safe brake actuation (SBA)

1) According to the standard, category 3 requires brake diagnostics of the double brake. This is not part of the double brake and must be realized within the braking system.

INFORMATION

The brake diagnostics of the double brake that is to be implemented in the system must meet the requirements according to the standard.

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13.10 Characteristic safety values

Definition of the characteristic safety value B_{10d}:

The value B_{10d} specifies the number of switching cycles at which 10% of components have failed dangerously (definition according to standard EN ISO 13849-1). Failed dangerously means in this context that the double brake does not realize at least one of the safety functions when required. This means the brake does not deliver the necessary braking torque.

Brake type			B_{10d} value
BF11	BF11(FS)	BT11(FS)	8 000 000
BF20	BF20(FS)	BT20(FS)	5 000 000
BF30	BF30(FS)	BT30(FS)	3 000 000

13.11 Manual release forces

The following table lists the forces required for manual release of BF../BT.. double brakes.

The listed values apply to the indicated braking torques in case of simultaneous application of both partial brakes (by /HR or /HT design). When actuated separately (/HT design) or in case of low braking torque steps, the specified values are reduced proportionally.

Brake type			Nominal braking torque N	Manual release force double brake N
BF11	BF11(FS)	BT11(FS)	2 x 110	200
BF20	BF20(FS)	BT20(FS)	2 x 200	300
BF30	BF30(FS)	BT30(FS)	2 x 300	350

13.12 Diagnostic unit /DUE for function and wear monitoring

Sensor Ø 8 mm		**DUE-d8-00**
Measuring range (MB)	mm	2.0
Protection class		IP66
Operating temperature (sensor and cable)		-50 to +150 °C

Evaluation unit			**DUE-2K-00**
Part number			21195536
Signal outputs (2 channels)			**Partial brake 1** Out1: 4 – 20 mA FCT1: DC 24 V (150 mA) WEAR1: DC 24 V (150 mA) **Partial brake 2** Out2: 4 – 20 mA FCT2: DC 24 V (150 mA) WEAR2: DC 24 V (150 mA)
Current consumption	Max.	mA	360
	Min.	mA	80
Supply voltage			DC 24 V (± 15%)
Electromagnetic compatibility			DIN EN 61800-3
Operating temperature (evaluation unit)			-40 to +105 °C
Humidity			≤ 90 % rF
Protection class			IP20 (in the closed terminal box IP66)

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13.12.1 Setting the switching points of the evaluation unit

The evaluation unit has a 5-switch DIP switch array that is labeled with the numbers 1 to 5. Use it to set the measuring range and the maximum permitted wear limit (maximum working air gap). The set maximum permitted wear limit and the measuring range apply to both partial brakes.

S1	S2	S3	S4	S5	Wear limit	BF11 – 30 BF11 – 30(FS)	BT11 – 30(FS)
Sensor Ø 8 mm					mm		
1	0	0	0	0	1.2		
1	0	0	0	1	1.1		
1	0	0	1	0	1.0		
1	0	0	1	1	0.9	X	
1	0	1	0	0	0.8		X
1	0	1	0	1	0.7		
1	0	1	1	0	0.6		
1	0	1	1	1	0.5		

X = Factory setting

Setting permitted

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14 Technical data of the helical-worm gear unit

14.1 Technical data S. SF. SA. SAF 67

3400 - 2800 1/min

i_{tot}	i_{worm}	n_e = 3400 1/min				n_e = 3200 1/min				n_e = 2800 1/min			
		n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %
75.06	29/2	45	435	2.5	82	43	435	2.4	82	37	435	2.1	81
65.63		52	435	2.9	82	49	435	2.7	82	43	435	2.4	82
62.35		55	435	3.0	83	51	435	2.8	82	45	435	2.5	82
54.70		62	435	3.4	83	59	435	3.2	83	51	435	2.8	83
46.40		73	395	3.6	83	69	415	3.6	83	60	435	3.3	83
41.89		81	355	3.6	83	76	380	3.6	83	67	430	3.6	83
36.85		92	310	3.6	83	87	335	3.6	84	76	380	3.6	84
34.80		98	295	3.6	83	92	315	3.6	84	80	365	3.7	84
29.63		115	250	3.6	83	108	270	3.7	83	94	310	3.7	84
26.93		126	220	3.5	83	119	240	3.6	83	104	280	3.6	84
23.33		146	182	3.4	82	137	200	3.5	83	120	245	3.7	84
20.30		167	141	3.1	81	158	164	3.3	82	138	205	3.6	83
24.44	27/5	139	315	5.1	90	131	315	4.8	90	115	315	4.2	89
23.22		146	315	5.4	90	138	315	5.1	90	121	315	4.4	90
20.37		167	315	6.1 *	90	157	315	5.8 *	90	137	315	5.0	90
17.28		197	270	6.2 *	90	185	290	6.2 *	90	162	315	5.9 *	90
15.60		218	245	6.2 *	90	205	260	6.2 *	90	179	295	6.1 *	90
13.73		248	215	6.2 *	90	233	230	6.2 *	90	204	265	6.3 *	90
12.96		262	200	6.1 *	90	247	215	6.1 *	90	216	250	6.3 *	90
11.03		308	169	6.1 *	90	290	183	6.2 *	90	254	215	6.3 *	90
10.03		339	151	6.0 *	90	319	164	6.1 *	90	279	194	6.3 *	90
8.69		391	124	5.7 *	89	368	137	5.9 *	90	322	166	6.2 *	90
7.56		450	95	5.1	88	423	112	5.6 *	89	370	141	6.1 *	90

* P_{emax} = 5.5 kW

2200 - 1400 1/min

i_{tot}	i_{worm}	n_e = 2200 1/min				n_e = 1700 1/min				n_e = 1400 1/min			
		n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %
75.06	29/2	29	480	1.8	81	23	480	1.4	79	19	480	1.2	79
65.63		34	480	2.1	81	26	480	1.6	80	21	480	1.4	79
62.35		35	480	2.2	81	27	480	1.7	80	22	480	1.4	79
54.70		40	480	2.5	82	31	480	1.9	81	26	480	1.6	80
46.40		47	480	2.9	82	37	480	2.3	82	30	480	1.9	81
41.89		53	480	3.2	83	41	480	2.5	82	33	480	2.1	81
36.85		60	475	3.6	83	46	480	2.8	82	38	480	2.3	82
34.80		63	450	3.6	83	49	480	3.0	83	40	480	2.5	82
29.63		74	395	3.7	84	57	480	3.5	83	47	480	2.9	83
26.93		82	360	3.7	84	63	455	3.6	83	52	480	3.2	83
23.33		94	320	3.8	84	73	405	3.7	84	60	480	3.6	83
20.30		108	280	3.8	84	84	360	3.8	84	69	425	3.7	84

24.44	27/5	90	340	3.6	89	70	340	2.8	88	57	340	2.3	88
23.22		95	340	3.8	89	73	340	2.9	89	60	340	2.4	88
20.37		108	340	4.3	89	83	340	3.3	89	69	340	2.8	88
17.28		127	340	5.0	90	98	340	3.9	89	81	340	3.2	89
15.60		141	340	5.6 *	90	109	340	4.3	89	90	340	3.6	89
13.73		160	330	6.1 *	90	124	340	4.9	90	102	340	4.1	89
12.96		170	315	6.2 *	90	131	340	5.2	90	108	340	4.3	89
11.03		199	275	6.3 *	90	154	340	6.1 *	90	127	340	5.0	90
10.03		219	250	6.3 *	91	169	315	6.2 *	90	140	340	5.5	90
8.69		253	220	6.4 *	91	196	280	6.3 *	91	161	335	6.3 *	90
7.56		291	192	6.5 *	91	225	250	6.5 *	91	185	295	6.3 *	91

* P_{emax} = 5.5 kW

1100 - 700 1/min

i_{tot}	i_{worm}	n_e = 1100 1/min				n_e = 900 1/min				n_e = 700 1/min			
		n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %
75.06	29/2	15	525	1.0	77	12	525	0.86	76	9.3	525	0.68	75
65.63		17	525	1.2	78	14	525	0.98	77	11	525	0.77	76
62.35		18	525	1.2	78	14	525	1.0	77	11	525	0.81	76
54.70		20	525	1.4	79	16	525	1.2	78	13	525	0.92	77
46.40		24	525	1.6	80	19	525	1.4	79	15	525	1.1	78
41.89		26	525	1.8	80	21	525	1.5	79	17	525	1.2	78
36.85		30	525	2.0	81	24	525	1.7	80	19	525	1.3	79
34.80		32	525	2.1	81	26	525	1.8	80	20	525	1.4	79
29.63		37	525	2.5	82	30	525	2.1	81	24	525	1.6	80
26.93		41	525	2.7	82	33	525	2.3	81	26	525	1.8	80
23.33		47	525	3.1	83	39	525	2.6	82	30	525	2.0	81
20.30		54	520	3.5	83	44	525	3.0	82	34	525	2.3	81
24.44	27/5	45	355	1.9	87	37	360	1.6	87	29	365	1.3	86
23.22		47	355	2.0	87	39	360	1.7	87	30	365	1.3	86
20.37		54	355	2.3	88	44	355	1.9	87	34	365	1.5	86
17.28		64	355	2.7	88	52	355	2.2	88	41	360	1.8	87
15.60		71	350	2.9	88	58	355	2.4	88	45	355	1.9	87
13.73		80	350	3.3	89	66	355	2.8	88	51	355	2.2	88
12.96		85	350	3.5	89	69	350	2.9	88	54	355	2.3	88
11.03		100	350	4.1	89	82	350	3.4	89	63	355	2.7	88
10.03		110	345	4.4	90	90	350	3.7	89	70	355	2.9	88
8.69		127	345	5.1	90	104	350	4.2	89	81	350	3.3	89
7.56		146	345	5.8 *	90	119	345	4.8	90	93	350	3.8	89

* P_{emax} = 5.5 kW

500 - 10 1/min

i_{tot}	i_{worm}	n_e = 500 1/min				n_e = 250 1/min				n_e = 10 1/min			
		n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %
75.06	29/2	6.7	570	0.54	73	3.3	570	0.28	70	0.13	570	< 0.05	68
65.63		7.6	570	0.61	74	3.8	570	0.32	71	0.15	570	< 0.05	68
62.35		8.0	570	0.64	74	4.0	570	0.34	71	0.16	570	< 0.05	69
54.70		9.1	570	0.73	75	4.6	570	0.38	71	0.18	570	< 0.05	69
46.40		11	570	0.85	76	5.4	570	0.44	72	0.22	570	< 0.05	69
41.89		12	570	0.93	76	6.0	570	0.49	73	0.24	570	< 0.05	69
36.85		14	570	1.1	77	6.8	570	0.55	73	0.27	570	< 0.05	69
34.80		14	570	1.1	77	7.2	570	0.58	74	0.29	570	< 0.05	69
29.63		17	565	1.3	78	8.4	570	0.68	75	0.34	570	< 0.05	70
26.93		19	565	1.4	79	9.3	570	0.74	75	0.37	570	< 0.05	70
23.33		21	565	1.6	79	11	570	0.84	76	0.43	570	< 0.05	70
20.30		25	565	1.8	80	12	570	0.96	77	0.49	570	< 0.05	70
24.44	27/5	20	365	0.93	85	10	355	0.46	82	0.41	355	0,019	80
23.22		22	365	0.97	85	11	355	0.49	82	0.43	355	< 0.05	80
20.37		25	380	1.1	85	12	365	0.57	83	0.49	365	< 0.05	80
17.28		29	365	1.3	86	14	435	0.79	83	0.58	435	< 0.05	81
15.60		32	365	1.4	86	16	430	0.86	84	0.64	430	< 0.05	81
13.73		36	365	1.6	87	18	415	0.94	84	0.73	415	< 0.05	81
12.96		39	360	1.7	87	19	410	0.98	84	0.77	410	< 0.05	81
11.03		45	355	1.9	87	23	390	1.1	85	0.91	390	< 0.05	81
10.03		50	355	2.1	88	25	380	1.2	85	1.0	380	< 0.05	81
8.69		58	355	2.4	88	29	370	1.3	86	1.2	370	0.06	81
7.56		66	355	2.8	88	33	365	1.5	86	1.3	365	0.06	81

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14.2 Technical data S. SF. SA. SAF 77

3400 - 2800 1/min

i_{tot}	i_{worm}	n_e = 3400 1/min				n_e = 3200 1/min				n_e = 2800 1/min			
		n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %
75.09	40/3	45	1020	5.6	86	43	1020	5.3	86	37	1020	4.6	86
71.33		48	1020	5.9	87	45	1020	5.5	86	39	1020	4.9	86
63.03		54	1020	6.6	87	51	1020	6.2	87	44	1020	5.5	86
53.87		63	980	7.4	87	59	1000	7.1	87	52	1020	6.4	87
49.38		69	950	7.8	87	65	970	7.5	87	57	1010	6.9	87
43.33		78	910	8.5	88	74	930	8.2	88	65	970	7.5	87
41.07		83	900	8.9	88	78	910	8.5	88	68	950	7.8	87
35.94		95	800	9.0	88	89	850	9.0	88	78	910	8.5	88
32.38		105	725	9.1	88	99	770	9.1	88	86	880	9.1	88
28.41		120	635	9.1	88	113	680	9.1	88	99	780	9.1	88
25.07		136	560	9.1	88	128	600	9.1	88	112	695	9.2	88
22.22		153	485	8.9	88	144	525	9.0	88	126	615	9.2	88
18.97		179	395	8.5	87	169	440	8.9	88	148	520	9.1	88
22.89	34/6	149	590	10.0 *	91	140	590	9.5 *	91	122	590	8.3	91
20.99		162	590	10.9 *	92	152	590	10.3 *	92	133	590	9.0	91
18.42		185	590	12.4 *	92	174	590	11.7 *	92	152	590	10.3 *	92
17.45		195	590	13.1 *	92	183	590	12.4 *	92	160	590	10.8 *	92
15.28		223	530	13.5 *	92	209	560	13.4 *	92	183	590	12.3 *	92
13.76		247	480	13.5 *	92	233	505	13.4 *	92	203	585	13.6 *	92
12.07		282	415	13.3 *	92	265	445	13.4 *	92	232	515	13.6 *	92
10.65		319	365	13.3 *	92	300	390	13.4 *	92	263	455	13.6 *	92
9.44		360	315	13.0 *	92	339	345	13.3 *	92	297	405	13.7 *	92
8.06		422	260	12.6 *	91	397	285	12.9 *	92	347	340	13.5 *	92

* P_{emax} = 9.2 kW

2200 - 1400 1/min

i_{tot}	i_{worm}	n_e = 2200 1/min				n_e = 1700 1/min				n_e = 1400 1/min			
		n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %
75.09	40/3	29	1100	4.0	85	23	1100	3.1	84	19	1100	2.6	83
71.33		31	1100	4.2	85	24	1100	3.2	85	20	1100	2.7	84
63.03		35	1100	4.7	86	27	1100	3.7	85	22	1100	3.0	84
53.87		41	1100	5.5	86	32	1100	4.3	86	26	1100	3.5	85
49.38		45	1080	5.8	87	34	1100	4.6	86	28	1100	3.8	85
43.33		51	1050	6.4	87	39	1100	5.2	86	32	1100	4.3	86
41.07		54	1030	6.6	87	41	1100	5.5	86	34	1100	4.6	86
35.94		61	980	7.2	87	47	1060	6.1	87	39	1100	5.2	86
32.38		68	960	7.8	88	53	1040	6.6	87	43	1090	5.7	87
28.41		77	920	8.5	88	60	990	7.1	87	49	1050	6.2	87
25.07		88	870	9.1	88	68	960	7.8	88	56	1020	6.8	87
22.22		99	790	9.3 *	88	77	920	8.4	88	63	980	7.4	87
18.97		116	680	9.4 *	88	90	860	9.2	88	74	930	8.2	88

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22.89	34/6	96	710	7.9	91	74	705	6.1	90	61	705	5.0	90
20.99		105	710	8.6	91	81	705	6.6	91	67	705	5.5	90
18.42		119	720	9.9 *	91	92	710	7.6	91	76	705	6.2	90
17.45		126	720	10.4 *	91	97	710	8.0	91	80	710	6.6	91
15.28		144	720	11.9 *	92	111	720	9.2	91	92	710	7.5	91
13.76		160	725	13.2 *	92	124	720	10.2 *	91	102	710	8.3	91
12.07		182	650	13.5 *	92	141	725	11.7 *	92	116	720	9.6 *	91
10.65		207	580	13.6 *	92	160	725	13.2 *	92	131	720	10.8 *	92
9.44		233	520	13.8 *	92	180	655	13.4 *	92	148	725	12.3 *	92
8.06		273	445	13.8 *	92	211	575	13.8 *	92	174	680	13.5 *	92

* P_{emax} = 9.2 kW

1100 - 700 1/min

i_{tot}	i_{worm}	n_e = 1100 1/min				n_e = 900 1/min				n_e = 700 1/min			
		n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %
75.09	40/3	15	1120	2.1	83	12	1130	1.7	82	9.3	1170	1.4	81
71.33		15	1120	2.2	83	13	1130	1.8	82	9.8	1120	1.4	81
63.03		17	1120	2.5	83	14	1120	2.0	82	11	1130	1.6	81
53.87		20	1120	2.9	84	17	1120	2.4	83	13	1120	1.9	82
49.38		22	1120	3.1	84	18	1120	2.6	83	14	1120	2.0	82
43.33		25	1130	3.5	85	21	1120	2.9	84	16	1120	2.3	83
41.07		27	1130	3.7	85	22	1120	3.1	84	17	1120	2.4	83
35.94		31	1150	4.3	85	25	1130	3.5	85	19	1120	2.7	84
32.38		34	1130	4.7	86	28	1130	3.9	85	22	1120	3.0	84
28.41		39	1110	5.2	86	32	1150	4.5	86	25	1130	3.4	85
25.07		44	1080	5.7	87	36	1120	4.9	86	28	1130	3.9	85
22.22		50	1050	6.3	87	41	1100	5.4	86	32	1150	4.4	86
18.97		58	1010	7.0	87	47	1060	6.1	87	37	1120	5.0	86
22.89	34/6	48	695	3.9	89	39	695	3.2	89	31	705	2.6	88
20.99		52	705	4.3	90	43	695	3.5	89	33	705	2.8	88
18.42		60	700	4.9	90	49	700	4.0	89	38	700	3.1	89
17.45		63	700	5.1	90	52	700	4.2	90	40	700	3.3	89
15.28		72	710	5.9	90	59	700	4.8	90	46	700	3.8	89
13.76		80	710	6.6	91	65	700	5.3	90	51	700	4.2	90
12.07		91	710	7.5	91	75	710	6.1	90	58	700	4.7	90
10.65		103	715	8.5	91	85	710	6.9	91	66	710	5.4	90
9.44		117	720	9.6 *	91	95	715	7.8	91	74	710	6.1	90
8.06		136	725	11.3 *	92	112	720	9.2	91	87	710	7.1	91

* P_{emax} = 9.2 kW

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500 - 10 1/min

i_{tot}	i_{worm}	n_e = 500 1/min				n_e = 250 1/min				n_e = 10 1/min			
		n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %
75.09	40/3	6.7	1160	1.0	79	3.3	1120	0.51	76	0.13	1120	< 0.05	75
71.33		7.0	1110	1.0	79	3.5	1060	0.51	77	0.14	1060	< 0.05	75
63.03		7.9	1230	1.3	80	4.0	1200	0.65	77	0.16	1200	< 0.05	76
53.87		9.3	1180	1.4	81	4.6	1240	0.77	78	0.19	1240	< 0.05	76
49.38		10	1160	1.5	81	5.1	1240	0.84	78	0.20	1240	< 0.05	76
43.33		12	1120	1.7	82	5.8	1240	0.95	79	0.23	1240	< 0.05	76
41.07		12	1120	1.7	82	6.1	1240	1.0	79	0.24	1240	< 0.05	76
35.94		14	1120	2.0	82	7.0	1240	1.1	79	0.28	1240	< 0.05	76
32.38		15	1120	2.2	83	7.7	1240	1.3	80	0.31	1240	0.05	76
28.41		18	1120	2.5	83	8.8	1190	1.4	80	0.35	1190	0.06	76
25.07		20	1120	2.8	84	10	1170	1.5	81	0.40	1170	0.06	76
22.22		23	1130	3.2	84	11	1130	1.6	81	0.45	1130	0.07	76
18.97		26	1130	3.7	85	13	1120	1.9	82	0.53	1120	0.08	76
22.89	34/6	22	690	1.8	87	11	675	0.91	85	0.44	675	< 0.05	83
20.99		24	725	2.1	87	12	740	1.1	85	0.48	740	< 0.05	83
18.42		27	705	2.3	88	14	830	1.4	86	0.54	830	0.06	83
17.45		29	705	2.4	88	14	810	1.4	86	0.57	810	0.06	83
15.28		33	705	2.7	88	16	785	1.6	86	0.65	785	0.06	83
13.76		36	695	3.0	89	18	770	1.7	87	0.73	770	0.07	83
12.07		41	695	3.4	89	21	750	1.9	87	0.83	750	0.08	83
10.65		47	695	3.8	89	23	725	2.0	87	0.94	725	0.09	83
9.44		53	705	4.4	90	26	705	2.2	88	1.1	705	0.09	83
8.06		62	705	5.1	90	31	705	2.6	88	1.2	705	0.11	83

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14.3 Technical data S. SF. SA. SAF 87

3400 - 2800 1/min

i_{tot}	i_{worm}	n_e = 3400 1/min				n_e = 3200 1/min				n_e = 2800 1/min			
		n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %
91.20	38/3	37	1470	6.6	88	35	1470	6.2	87	31	1470	5.4	87
81.76		42	1470	7.3	88	39	1470	6.9	88	34	1470	6.0	87
70.43		48	1470	8.4	88	45	1470	7.9	88	40	1470	7.0	88
64.27		53	1470	9.2	88	50	1470	8.7	88	44	1470	7.6	88
57.00		60	1470	10.4	88	56	1470	9.8	88	49	1470	8.6	88
47.91		71	1470	12.3	89	67	1470	11.6	89	58	1470	10.2	88
44.03		77	1470	13.4	89	73	1470	12.6	89	64	1470	11.0	89
39.10		87	1300	13.3	89	82	1400	13.5	89	72	1470	12.4	89
34.96		97	1140	13.1	89	92	1240	13.4	89	80	1440	13.6	89
31.43		108	1000	12.8	88	102	1090	13.1	89	89	1290	13.5	89
27.28		125	810	12.1	88	117	910	12.7	88	103	1110	13.4	89
24.43		139	660	11.1	87	131	775	12.1	88	115	960	13.0	89
20.27		168	395	8.4	82	158	490	9.6	84	138	755	12.4	88
25.50	34/6	133	990	15.0	92	125	990	14.1	92	110	990	12.4	92
21.43		159	990	17.8 *	92	149	990	16.8 *	92	131	990	14.7	92
19.70		173	990	19 *	92	162	990	18.3 *	92	142	990	16.0 *	92
17.49		194	870	19 *	92	183	930	19 *	92	160	990	18.0 *	92
15.64		217	760	19 *	92	205	830	19 *	92	179	960	19 *	92
14.06		242	660	18.2 *	92	228	725	19 *	92	199	860	19 *	92
12.21		278	540	17.2 *	91	262	605	18.1 *	92	229	730	19 *	92
10.93		311	440	15.8 *	90	293	510	17.1 *	91	256	645	19 *	92
9.07		375	255	11.5	87	353	325	13.5	89	309	500	17.7 *	92
7.88		431	200	10.5	86	406	230	11.3	87	355	375	15.5 *	90

* P_{emax} = 15 kW

2200 - 1400 1/min

i_{tot}	i_{worm}	n_e = 2200 1/min				n_e = 1700 1/min				n_e = 1400 1/min			
		n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %
91.20	38/3	24	1540	4.5	87	19	1520	3.5	86	15	1510	2.9	85
81.76		27	1600	5.2	87	21	1600	4.0	86	17	1600	3.4	86
70.43		31	1600	6.0	87	24	1600	4.7	87	20	1600	3.9	86
64.27		34	1600	6.6	88	26	1600	5.1	87	22	1600	4.2	86
57.00		39	1600	7.4	88	30	1600	5.7	87	25	1600	4.8	87
47.91		46	1600	8.7	88	35	1600	6.8	88	29	1600	5.6	87
44.03		50	1600	9.5	88	39	1600	7.4	88	32	1600	6.1	87
39.10		56	1600	10.6	89	43	1600	8.3	88	36	1600	6.8	88
34.96		63	1600	11.9	89	49	1600	9.2	88	40	1600	7.6	88
31.43		70	1600	13.2	89	54	1600	10.2	89	45	1600	8.5	88
27.28		81	1450	13.7	89	62	1600	11.7	89	51	1600	9.7	89
24.43		90	1310	13.8	89	70	1600	13.1	89	57	1600	10.8	89
20.27		109	1080	13.8	89	84	1420	14.0	89	69	1600	13.0	89

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25.50	34/6	86	1240	12.2	92	67	1240	9.5	91	55	1240	7.8	91
21.43		103	1240	14.5	92	79	1240	11.2	92	65	1240	9.3	91
19.70		112	1240	15.7 *	92	86	1240	12.2	92	71	1240	10.1	91
17.49		126	1240	17.7 *	92	97	1240	13.7	92	80	1240	11.3	92
15.64		141	1230	20 *	92	109	1240	15.3 *	92	90	1240	12.7	92
14.06		156	1110	20 *	92	121	1240	17.0 *	92	100	1240	14.1	92
12.21		180	970	20 *	93	139	1240	20 *	92	115	1240	16.1 *	92
10.93		201	870	20 *	93	156	1130	20 *	93	128	1240	18.0 *	92
9.07		243	720	20 *	92	187	950	20 *	93	154	1140	20 *	93
7.88		279	605	19 *	92	216	830	20 *	93	178	1010	20 *	93

* P_{emax} = 15 kW

1100 - 700 1/min

i_{tot}	i_{worm}	n_e = 1100 1/min				n_e = 900 1/min				n_e = 700 1/min			
		n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %
91.20	38/3	12	1490	2.2	84	9.9	1480	1.8	83	7.7	1460	1.4	82
81.76		13	1760	2.9	85	11	1760	2.4	84	8.6	1760	1.9	83
70.43		16	1760	3.4	85	13	1760	2.8	85	9.9	1760	2.2	83
64.27		17	1760	3.7	86	14	1760	3.0	85	11	1760	2.4	84
57.00		19	1760	4.1	86	16	1760	3.4	85	12	1760	2.7	84
47.91		23	1760	4.9	87	19	1760	4.0	86	15	1760	3.2	85
44.03		25	1760	5.3	87	20	1760	4.4	86	16	1760	3.4	85
39.10		28	1760	6.0	87	23	1760	4.9	87	18	1760	3.9	86
34.96		31	1760	6.6	88	26	1760	5.5	87	20	1760	4.3	86
31.43		35	1760	7.4	88	29	1760	6.1	87	22	1760	4.7	87
27.28		40	1760	8.4	88	33	1760	6.9	88	26	1760	5.4	87
24.43		45	1760	9.4	88	37	1760	7.7	88	29	1760	6.0	87
20.27		54	1760	11.3	89	44	1760	9.3	88	35	1760	7.2	88
25.50	34/6	43	1340	6.7	90	35	1340	5.5	90	27	1340	4.3	89
21.43		51	1340	7.9	91	42	1340	6.5	90	33	1340	5.1	90
19.70		56	1340	8.6	91	46	1340	7.1	91	36	1340	5.5	90
17.49		63	1340	9.7	91	51	1340	7.9	91	40	1340	6.2	90
15.64		70	1340	10.8	92	58	1340	8.9	91	45	1340	6.9	91
14.06		78	1340	12.0	92	64	1340	9.8	91	50	1340	7.7	91
12.21		90	1340	13.8	92	74	1340	11.3	92	57	1340	8.8	91
10.93		101	1340	15.3 *	92	82	1340	12.6	92	64	1340	9.8	91
9.07		121	1340	18.4 *	92	99	1340	15.1 *	92	77	1340	11.8	92
7.88		140	1260	20 *	93	114	1340	17.4 *	92	89	1340	13.6	92

* P_{emax} = 15 kW

500 - 10 1/min

i_{tot}	i_{worm}	n_e = 500 1/min				n_e = 250 1/min				n_e = 10 1/min			
		n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %
91.20	38/3	5.5	1450	1.0	81	2.7	1390	0.51	79	0.11	1390	< 0.05	78
81.76		6.1	1960	1.5	82	3.1	1880	0.76	79	0.12	1880	< 0.05	78
70.43		7.1	1980	1.8	82	3.5	1980	0.92	80	0.14	1980	< 0.05	79
64.27		7.8	1980	2.0	83	3.9	1980	1.0	80	0.16	1980	< 0.05	79
57.00		8.8	1980	2.2	83	4.4	1980	1.1	80	0.18	1980	< 0.05	79
47.91		10	1980	2.6	84	5.2	1980	1.3	81	0.21	1980	0.06	79
44.03		11	1980	2.8	84	5.7	1980	1.4	81	0.23	1980	0.06	79
39.10		13	1980	3.1	85	6.4	1980	1.6	82	0.26	1980	0.07	79
34.96		14	1980	3.5	85	7.2	1980	1.8	82	0.29	1980	0.08	79
31.43		16	1980	3.9	85	8.0	1980	2.0	83	0.32	1980	0.08	79
27.28		18	1980	4.4	86	9.2	1980	2.3	83	0.37	1980	0.10	79
24.43		20	1980	4.9	86	10	1980	2.5	84	0.41	1980	0.11	79
20.27		25	1980	5.9	87	12	1980	3.0	85	0.49	1980	0.13	79
25.50	34/6	20	1430	3.3	88	9.8	1390	1.6	87	0.39	1390	0.07	85
21.43		23	1420	3.9	89	12	1510	2.1	87	0.47	1510	0.09	85
19.70		25	1410	4.2	89	13	1570	2.4	87	0.51	1570	0.10	85
17.49		29	1390	4.6	89	14	1570	2.7	88	0.57	1570	0.11	85
15.64		32	1390	5.2	90	16	1540	2.9	88	0.64	1540	0.12	85
14.06		36	1390	5.7	90	18	1510	3.2	88	0.71	1510	0.13	85
12.21		41	1390	6.6	90	20	1460	3.5	89	0.82	1460	0.15	85
10.93		46	1390	7.3	91	23	1430	3.9	89	0.91	1430	0.16	85
9.07		55	1410	8.9	91	28	1390	4.5	89	1.1	1390	0.19	85
7.88		63	1410	10.3	91	32	1390	5.1	90	1.3	1390	0.22	85

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14.4 Technical data S. SF. SA. SAF 97

3400 - 2800 1/min

i_{tot}	i_{worm}	n_e = 3400 1/min				n_e = 3200 1/min				n_e = 2800 1/min			
		n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %
80.85	37/3	42	3150	15.5	89	40	3150	14.6	89	35	3150	12.8	89
71.43		48	3090	17.2	90	45	3150	16.5	89	39	3150	14.5	89
60.59		56	2910	19	90	53	2970	18.3	90	46	3120	16.9	90
55.79		61	2820	20	90	57	2880	19	90	50	3030	17.8	90
49.87		68	2710	22	90	64	2760	21	90	56	2910	19	90
44.89		76	2430	21	90	71	2630	22	90	62	2790	20	90
40.65		84	2170	21	90	79	2350	22	90	69	2680	21	90
36.05		94	1830	20	89	89	2020	21	89	78	2400	22	90
32.60		104	1560	19	89	98	1760	20	89	86	2150	22	90
27.63		123	1010	15.2	86	116	1320	18.2	88	101	1740	21	89
24.13		141	725	12.9	83	133	820	13.6	84	116	1390	19	88
26.39	35/6	129	1750	25 *	93	121	1750	24 *	93	106	1750	21	93
23.59		144	1750	28 *	93	136	1750	27 *	93	119	1750	23 *	93
21.23		160	1750	32 *	93	151	1750	30 *	93	132	1750	26 *	93
19.23		177	1550	31 *	93	166	1680	31 *	93	146	1750	29 *	93
17.05		199	1320	30 *	93	188	1450	31 *	93	164	1730	32 *	93
15.42		220	1110	28 *	92	208	1260	30 *	93	182	1540	31 *	93
13.07		260	725	22	90	245	940	26 *	92	214	1240	30 *	93
11.41		298	515	18.3	88	280	585	19	89	245	1000	28 *	92
9.55		356	375	16.2	87	335	435	17.5	87	293	580	20	89
8.26		412	290	14.7	85	387	335	15.8	86	339	455	18.4	88

* P_{emax} = 22 kW

2200 - 1400 1/min

i_{tot}	i_{worm}	n_e = 2200 1/min				n_e = 1700 1/min				n_e = 1400 1/min			
		n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %
80.85	37/3	27	3300	10.6	89	21	3270	8.2	88	17	3230	6.7	88
71.43		31	3300	12.0	89	24	3300	9.3	88	20	3300	7.7	88
60.59		36	3300	14.1	89	28	3300	10.9	89	23	3300	9.0	88
55.79		39	3270	15.1	89	30	3300	11.8	89	25	3300	9.8	88
49.87		44	3170	16.3	90	34	3300	13.2	89	28	3300	10.9	89
44.89		49	3050	17.5	90	38	3300	14.6	89	31	3300	12.1	89
40.65		54	2950	19	90	42	3230	15.8	90	34	3300	13.3	89
36.05		61	2810	20	90	47	3110	17.1	90	39	3300	15.0	89
32.60		67	2700	21	90	52	2980	18.1	90	43	3200	16.0	90
27.63		80	2390	22	90	62	2810	20	90	51	3010	17.8	90
24.13		91	2060	22	90	70	2670	22	90	58	2870	19	90
26.39	35/6	83	2550	24 *	93	64	2600	19	93	53	2600	15.6	92
23.59		93	2450	26 *	93	72	2600	21	93	59	2600	17.5	93
21.23		104	2380	28 *	93	80	2570	23 *	93	66	2600	19	93
19.23		114	2280	29 *	93	88	2500	25 *	93	73	2600	21	93
17.05		129	2170	31 *	93	100	2400	27 *	93	82	2570	24 *	93
15.42		143	2040	33 *	93	110	2300	28 *	93	91	2470	25 *	93
13.07		168	1720	32 *	93	130	2170	32 *	93	107	2330	28 *	93
11.41		193	1480	32 *	93	149	2000	33 *	93	123	2210	30 *	93
9.55		230	1200	31 *	93	178	1670	33 *	93	147	2040	33 *	94
8.26		266	980	30 *	93	206	1440	33 *	93	169	1770	34 *	94

* P_{emax} = 22 kW

1100 - 700 1/min

i_{tot}	i_{worm}	n_e = 1100 1/min				n_e = 900 1/min				n_e = 700 1/min			
		n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %
80.85	37/3	14	3230	5.3	87	11	3200	4.3	86	8.7	3170	3.4	85
71.43		15	3600	6.7	87	13	3600	5.5	87	9.8	3600	4.3	86
60.59		18	3600	7.8	88	15	3600	6.4	87	12	3600	5.0	86
55.79		20	3600	8.5	88	16	3600	7.0	87	13	3600	5.5	87
49.87		22	3600	9.4	88	18	3600	7.8	88	14	3600	6.1	87
44.89		25	3600	10.4	88	20	3600	8.6	88	16	3600	6.7	87
40.65		27	3600	11.5	89	22	3600	9.5	88	17	3600	7.4	88
36.05		31	3530	12.7	89	25	3600	10.6	89	19	3600	8.3	88
32.60		34	3420	13.5	89	28	3600	11.7	89	21	3600	9.2	88
27.63		40	3260	15.2	90	33	3460	13.2	89	25	3600	10.8	89
24.13		46	3130	16.6	90	37	3320	14.5	89	29	3560	12.2	89
26.39	35/6	42	2650	12.6	92	34	2620	10.2	92	27	2620	8.0	91
23.59		47	2650	14.0	92	38	2650	11.5	92	30	2620	8.9	91
21.23		52	2650	15.6	92	42	2650	12.8	92	33	2620	9.9	92
19.23		57	2650	17.2	93	47	2650	14.1	92	36	2620	10.9	92
17.05		65	2670	19	93	53	2650	15.9	92	41	2650	12.4	92
15.42		71	2670	21	93	58	2650	17.5	93	45	2650	13.7	92
13.07		84	2540	24 *	93	69	2670	21	93	54	2650	16.1	92
11.41		96	2420	26 *	93	79	2590	23 *	93	61	2650	18.4	93
9.55		115	2280	29 *	93	94	2440	26 *	93	73	2650	22	93
8.26		133	2140	32 *	94	109	2320	28 *	93	85	2540	24 *	93

* P_{emax} = 22 kW

500 - 10 1/min

i_{tot}	i_{worm}	n_e = 500 1/min				n_e = 250 1/min				n_e = 10 1/min			
		n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %	n_a 1/min	M_{amax} Nm	P_e kW	η %
80.85	37/3	6.2	3110	2.4	84	3.1	3010	1.2	82	0.12	3010	< 0.05	80
71.43		7.0	4200	3.6	85	3.5	4160	1.9	82	0.14	4160	0.08	81
60.59		8.3	4200	4.3	85	4.1	4080	2.1	83	0.17	4080	0.09	81
55.79		9.0	4200	4.6	86	4.5	4200	2.4	83	0.18	4200	0.10	81
49.87		10	4200	5.1	86	5.0	4200	2.6	83	0.20	4200	0.11	81
44.89		11	4160	5.6	86	5.6	4200	2.9	84	0.22	4200	0.12	81
40.65		12	4120	6.1	87	6.2	4200	3.2	84	0.25	4200	0.13	81
36.05		14	4080	6.8	87	6.9	4200	3.6	85	0.28	4200	0.15	81
32.60		15	3990	7.3	87	7.7	4200	4.0	85	0.31	4200	0.17	81
27.63		18	3910	8.4	88	9.0	4200	4.7	86	0.36	4200	0.20	81
24.13		21	3800	9.3	88	10	4200	5.3	86	0.41	4200	0.23	81
26.39	35/6	19	2590	5.7	90	9.5	2540	2.8	89	0.38	2540	0.12	87
23.59		21	2590	6.3	91	11	2540	3.2	89	0.42	2540	0.13	87
21.23		24	2590	7.0	91	12	2570	3.6	89	0.47	2570	0.15	87
19.23		26	2620	7.8	91	13	2570	3.9	89	0.52	2570	0.16	87
17.05		29	2620	8.8	91	15	2570	4.4	90	0.59	2570	0.18	87
15.42		32	2620	9.7	92	16	2570	4.8	90	0.65	2570	0.20	87
13.07		38	2650	11.6	92	19	2590	5.7	90	0.77	2590	0.24	87
11.41		44	2650	13.2	92	22	2590	6.6	91	0.88	2590	0.27	87
9.55		52	2650	15.7	92	26	2620	7.9	91	1.0	2620	0.33	87
8.26		61	2650	18.1	93	30	2620	9.1	91	1.2	2620	0.38	87

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W

Inquiry for (Gear)Motor with BF../BT.. double brake

Customer data:

Company: ______________________ Customer no.: ______________________
Department: ______________________
Name: ______________________ Phone: ______________________
Street/P.O. box: ______________________ Fax: ______________________
______________________ Email: ______________________
Zip code/city: ______________________

Contact at SEW:

Name: ______________________ Phone: ______________________
Technical office: ______________________ Fax: ______________________

Technical data:

Quantity: ________ Desired delivery date: ______________

Motor type: ☐ DRS.. ☐ DRL.. Size: __________ Motor power: ________ kW
Output speed: ________ 1/min Output torque: ________ Nm
Switching cycles/h: __________ c/h Cyclic duration: S ______ / ______ % cdf

Gear unit type:
☐ Helical gear units ☐ Parallel-shaft helical gear units ☐ Helical-bevel gear unit ☐ Helical-worm gear unit ☐ Miscellaneous: _____

Mounting position: M1 ☐ M2 ☐ M3 ☐ M4 ☐ M5 ☐ M6 ☐ Pivoted ☐

Housing form: ☐ Foot-mounted ☐ Flange (bore) ☐ Flange (thread) ☐ Torque arm ☐ Miscellaneous: ______________

Shaft design:
☐ Solid shaft with key
☐ Hollow shaft with key

Shaft/hollow shaft Ø : __________ mm
Flange Ø : __________ mm

Shaft position (for right-angle gear units): ☐ A | ☐ B | ☐ AB

Terminal box position: ☐ 0°(R) ☐ 90°(B) | ☐ 180°(L) | ☐ 270°(T)

Cable entry: ☐X ☐1 | ☐2 | ☐3

Degree of protection: IP54 ☐ IP55 ☐ IP56 ☐ IP65 ☐ IP66 ☐

Thermal class: 130(B) ☐ 155(F) ☐ 180(H) ☐

Surface/corrosion protection: KS ☐ OS1 ☐ OS2 ☐ OS3 ☐ OS4 ☐

Required SEW-EURODRIVE inverter: ______________________ Max. frequency: __________ Hz
Inverter control range: ______________

Brake type: ☐BF.. ☐BF..(FS) ☐BT..(FS) Brake size: ☐ 11 ☐ 20 ☐ 30
Braking torque: ________ Nm Brake voltage ______ V Brake control: ________

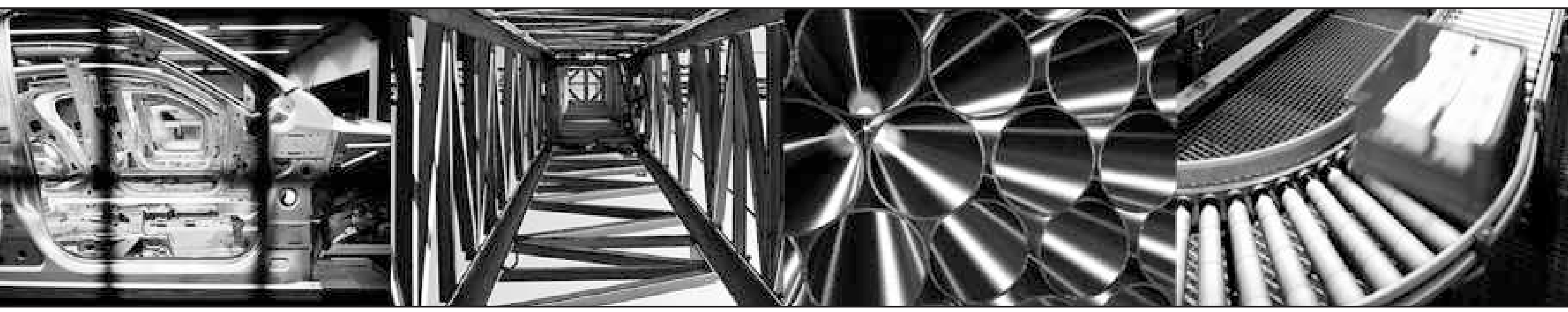
Required options:
☐ Motor protection: ☐ TF or ☐ TH
☐ Manual brake release: ☐ HR or ☐ HF
☐ Forced cooling fan: Forced cooling fan voltage: _____ V
☐ Temperature monitoring: ☐ KTY or ☐ PT100
☐ Encoder: ______________ ☐ Safety-rated encoder (FS)
☐ Function and wear monitoring /DUE
☐ Second shaft end: ______________________
☐ Plug connector connection: ______________________
☐ RAL 7031 or ☐ RAL __________

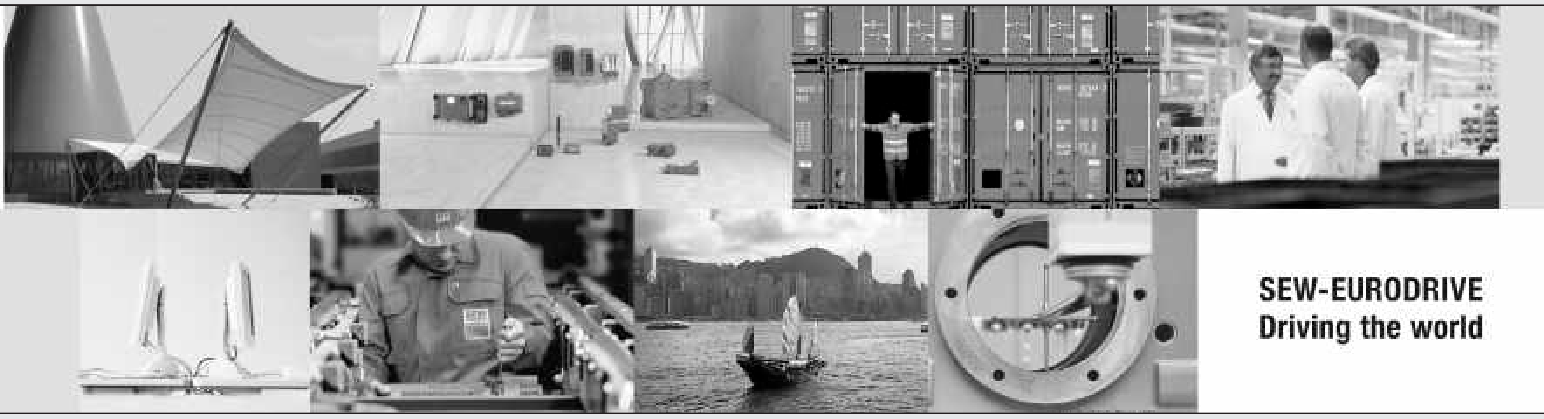
Further options:

Special ambient conditions in a temperature from -20 °C to +40 °C :
☐ Operation outdoors ☐ Installation altitude >1000m above NN
Further environmental conditions: ______________________________

Miscellaneous: ______________________________

Place, date ______________________ Signature: ______________________





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