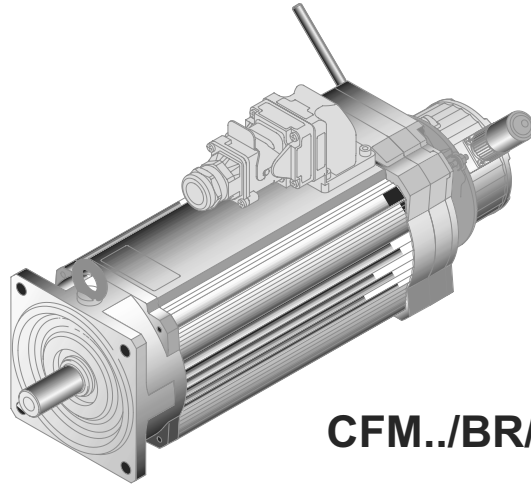
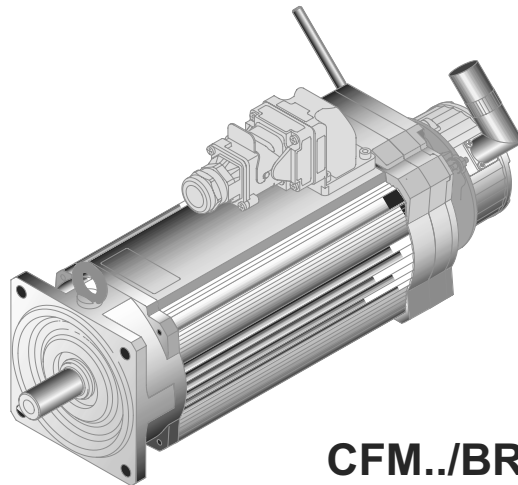


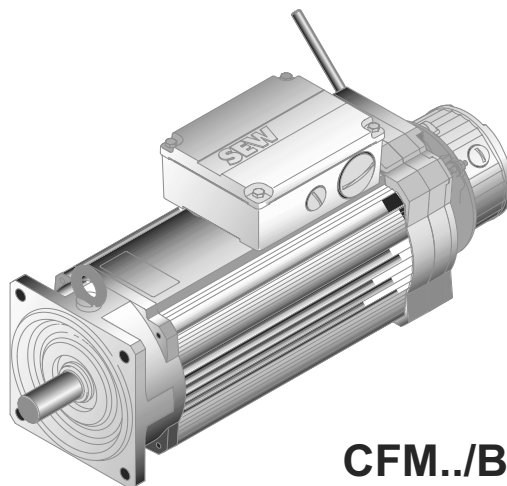
11 DFS/CFM Synchronous Servomotors



**CFM../BR/HR/RH1L/SB5.**

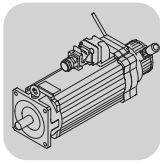


**CFM../BR/HR/RH1L/SB6.**



**CFM../BR/HR/RH1L/KK**

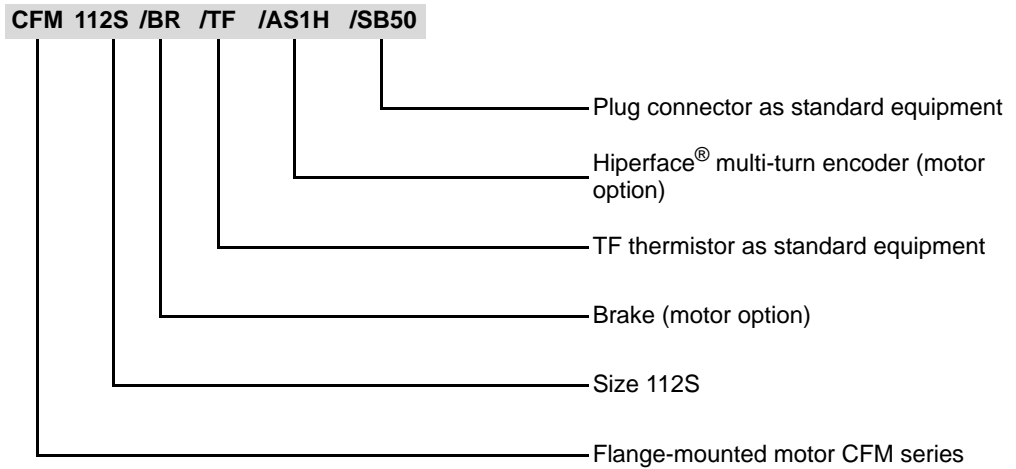
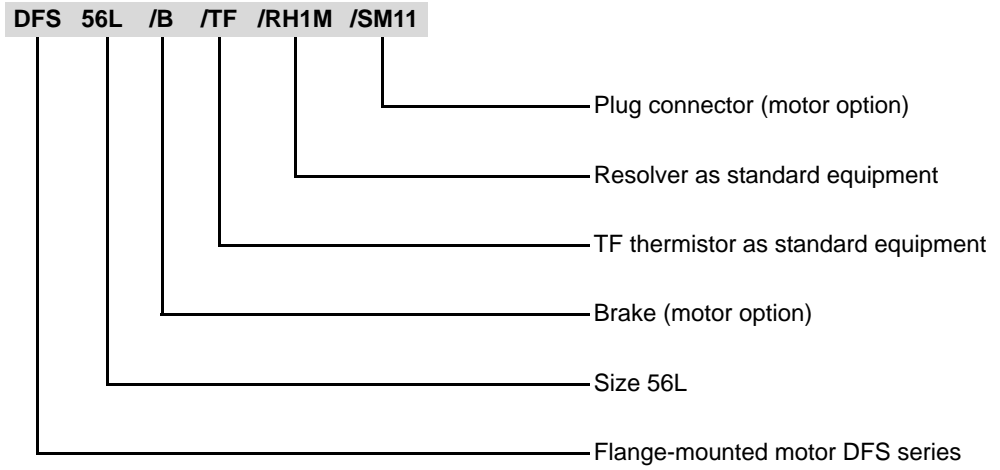
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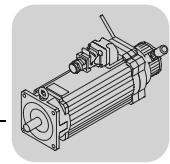


**DFS/CFM Synchronous Servomotors**  
 Unit designation of synchronous servomotors

**11.1 Unit designation of synchronous servomotors**

**Examples**





## 11.2 Standards and regulations

### Conformance to standards

The synchronous servomotors from SEW-EURODRIVE conform to the relevant standards and regulations, in particular to:

- IEC 34-1, EN 60034-1  
Rotating electrical machinery, rating and performance.
- EN 60529  
Degrees of protection provided by housings (IP code).
- EN 50 262  
Metric threads of cable glands.
- DIN 42925  
Terminal box cable entries for three-phase AC motors.
- DIN 44082 / DIN 44081  
Thermistors; PTC, technical terms and tests.


### Rated data

The specific data of an synchronous servomotor are:

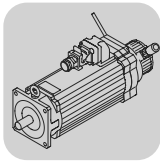
- Size
- Torque at standstill
- Rated speed
- Rated current
- Enclosure
- Thermal class

These data are indicated on the nameplate of the motor. In accordance with IEC34 (EN 60034), the nameplate data apply to a maximum ambient temperature of 40 °C and a maximum altitude of 1000 m above sea level.

### Motor nameplate

<b>SEW-EURODRIVE</b>		Bruchsal/Germany			
Typ	CFM 71M/BR/TF/RH1L			3~MEC 34	
Nr.	01.123456789001.01.0001			Permanentmagnet	
M O	6,5	Nm	I O	4,3	A f N 150 Hz
n N	3000	r/min	I max	17,2	A U max 400 V
IM	B5		kg	13	IP 65sol.Kl. F
Getriebe	r/min		Nm		i :1
Bremse	V 230		Nm	14	Gleichrichter BME
Schmierstoff		Made in Germany 199 081 0.10			

05103ADE



### 11.3 Circuit breaker and protective equipment

#### **Protective measures**

Permanent-field synchronous servomotors must be protected against overloads and short circuits.

Install the motors with sufficient space for air to cool them.

The surface temperature may be in excess of 100 °C during operation. The brake housing can heat up to 90° C with released brake and deenergized motor. Provide preventive measures against inadvertent contact.

The motors are available with temperature detection (TF or KTY) to protect the motor winding against overheating.

The standard equipment for these motors is **temperature sensor TF**.

TF temperature sensors meet DIN 44081 and DIN 44082. Motors of size DS56/CM71 ... 112 are also available with **temperature sensor KTY**.

The TF signal can be evaluated directly in the inverter when using a MOVIDRIVE® drive inverter.

Temperature sensors will respond at the maximum permitted winding temperature. Integrate the contacts of the temperature monitoring device into the monitoring circuit.

#### **EMC measures**

The designated use of SEW-EURODRIVE synchronous servomotors is as components for installation in machinery and systems. The designer of the machine or system is responsible for complying with the EMC Directive 89/336/EEC. Refer to the SEW publication "Drive Engineering - Practical Implementation, Drive Planning" for detailed information about this topic.

#### **Brake motors**

Install the brake cables of brake motors separately from the other power cables, maintaining a distance of at least 200 mm. Joint installation is only permitted if either the brake cable or the power cable is shielded.

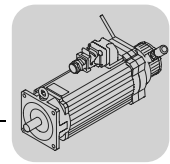
#### **Encoder connection**

Please observe the following instructions when connecting an encoder:

- Use a shielded cable with twisted pair conductors only.
- Connect the shield to the PE potential on both ends over a large surface area.
- Route signal cables separately from power cables or brake cables (min. distance 200 mm).

#### **Thermal motor protection**

Install the connecting lead of TF / KTY separately from other power cables, maintaining a distance of at least 200 mm. Joint installation is only permitted if either the TF / KTY cable or the power cable is shielded.



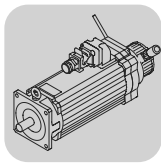
## 11.4 Technical data

### Mechanical / electrical characteristics

Version	DS56		CM71-112	
	Standard	Optional	Standard	Optional
Enclosure	IP65	–	IP65	–
Thermal class	F, but only class B classification is used	–	F	–
Motor protection	TF	KTY	TF	KTY
Connection	Plug connector	Terminal box	Plug connector	Terminal box
Shaft end	without key	with key, domed type A RZ Others on request	without key	with key, domed type A RZ Others on request
Ambient temperature	-20 °C to +40 °C	-40 °C to + 60 °C	-20 °C to +40 °C	-40 °C to + 60 °C
Mounting position	270 °	Random	270 °	Random
Standards	CE VDE	CSA NEMA UL	CE VDE	CSA NEMA UL
Noise levels /EN 60034)	below maximum value	–	below maximum value	–
Feedback	2-pole resolver	6-pole resolver 2-pole resolver <sup>1)</sup> Encoder	2-pole resolver	6-pole resolver 2-pole resolver <sup>1)</sup> Encoder
Brake	–	B	–	BR
Cooling	self-cooling	–	self-cooling	Forced cooling fan VR
2nd shaft end	–	–	–	with key
Vibration severity grade	"N" to EN/IEC 60034....			
Cogging	≤ 5 % M <sub>0</sub>		≤ 3% M <sub>0</sub>	

<sup>1)</sup> phase optimized

For other options, please contact our technical offices.



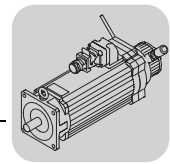
#### Structure of the data tables and combination overviews for synchronous servomotors

$n_N$ [min <sup>-1</sup> ]	Motor	$M_0$ [Nm]	$I_0$ [A]	$M_{DYN}$ [Nm]	$I_{max}$ [A]	$M_{OVR}$ [Nm]	$I_{OVR}$ [A]	$J_{mot}$ [10 <sup>-4</sup> kgm <sup>2</sup> ]	$J_{bmot}$	$M_{B1}$ [Nm]	$M_{B2}$	$W_{max1}$ [kJ]	$W_{max2}$
2000	CFM71S	5	2.2	16,5	8.8	7.3	3.2	4.89	6.65	10	5	18	22
	CFM71M	6.5	3	21,5	12	9.4	4.2	6.27	8.03	14	7	15	20
	CFM71L	9.5	4.2	31,4	16.8	13.8	6.1	9.02	10.8	14	10	15	18

$n_N$	Speed class
$M_0$	Torque at standstill
$I_0$	Standstill current
$M_{DYN}$	Dynamic limit torque of the servomotor
$I_{max}$	Maximum permitted motor current
$M_{OVR}$	Standstill torque with forced cooling fan
$I_{OVR}$	Standstill current with forced cooling fan
$J_{mot}$	Mass moment of inertia of the motor
$J_{bmot}$	Mass moment of inertia of the brake motor
$M_{B1}$	Standard braking torque
$M_{B2}$	Reduced braking torque
$W_{max1}$	Maximum possible braking work with standard braking torque during a maintenance interval.
$W_{max2}$	Maximum possible braking work with reduced braking torque during a maintenance interval.

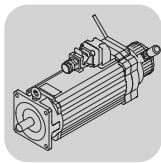
$n_N$ [min <sup>-1</sup> ]	Motor	$L_1$ [mH]	$R_1$ [mΩ]	$U_{p0}$ [V/1000 min <sup>-1</sup> ]	$m_{mot}$ [kg]	$m_{bmot}$
2000	CFM71S	52	7090	151	9.5	11.8
	CFM71M	36	4440	148	10.8	13.0
	CFM71L	24	2500	152	13.0	15.3

$L_1$	Inductance of the winding
$R_1$	Ohmic resistance of the winding
$U_{p0}$	Internal voltage at 1000 min <sup>-1</sup>
$m_{mot}$	Weight of the motor
$m_{bmot}$	Weight of the brake motor



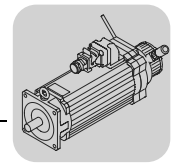
Synchronous servomotors with 400 V system voltage

$n_N$ [min <sup>-1</sup> ]	Motor	$M_0$	$I_0$	$M_{DYN}$	$I_{max}$	$M_{OVR}$	$I_{OVR}$	$J_{mot}$	$J_{bmot}$	$M_{B1}$	$M_{B2}$	$W_{max1}$	$W_{max2}$
		[Nm]	[A]	[Nm]	[A]	[Nm]	[A]	[10 <sup>-4</sup> kgm <sup>2</sup> ]	[Nm]	[Nm]	[kJ]	[kJ]	
2000	CFM71S	5	2.2	16.5	8.8	7.3	3.2	4.89	6.65	10	5	18	22
	CFM71M	6.5	3	21.5	12	9.4	4.2	6.27	8.03	14	7	15	20
	CFM71L	9.5	4.2	31.4	16.8	13.8	6.1	9.02	10.8	14	10	15	18
	CFM90S	11	4.9	39.6	19.6	16	7.1	17.4	21.2	28	14	17	24
	CFM90M	14.5	6.9	52.2	28	21	10	22.3	26.1	40	20	10.5	19.5
	CFM90L	21	9.9	75.6	40	30.5	14.4	32.1	35.9	40	28	10.5	17
	CFM112S	23.5	10	82.3	40	34	14.5	68.4	84	55	28	32	48
	CFM112M	31	13.5	108.5	54	45	19.6	88.2	104	90	40	18	44
	CFM112L	45	20	157.5	80	65	29	128	143	90	55	18	32
	CFM112H	68	30.5	238.0	122	95	42.5	190	209	90	55	18	32
3000	DFS56M	1	1.65	3.8	6.6	-	-	0.48	0.83	2.5	-	-	-
	DFS56L	2	2.4	7.6	9.6	-	-	0.83	1.18	2.5	-	-	-
	DFS56H	4	2.8	15.2	11.2	-	-	1.53	1.88	5	-	-	-
	CFM71S	5	3.3	16.5	13.2	7.3	4.8	4.89	6.65	10	5	14	20
	CFM71M	6.5	4.3	21.5	17.2	9.4	6.2	6.27	8.03	14	7	11	18
	CFM71L	9.5	6.2	31.4	25	13.8	9	9.02	10.8	14	10	11	14
	CFM90S	11	7.3	39.6	29	16	10.6	17.4	21.2	28	14	10	20
	CFM90M	14.5	10.1	52.2	40	21	14.6	22.3	26.1	40	20	4.5	15
	CFM90L	21	14.4	75.6	58	30.5	21	32.1	35.9	40	28	4.5	10
	CFM112S	23.5	15	82.3	60	34	22	68.4	84	55	28	18	36
	CFM112M	31	20.5	108.5	82	45	30	88.2	104	90	40	7	32
	CFM112L	45	30	157.5	120	65	44	128	143	90	55	7	18
	CFM112H	68	43	238.0	172	95	60	190	209	90	55	7	18
	4500	DFS56M	1	1.65	3.8	6.6	-	-	0.48	0.83	2.5	-	-
DFS56L		2	2.4	7.6	9.6	-	-	0.83	1.18	2.5	-	-	-
DFS56H		4	4	15.2	16	-	-	1.53	1.88	5	-	-	-
CFM71S		5	4.9	16.5	19.6	7.3	7.2	4.89	6.65	10	5	10	16
CFM71M		6.5	6.6	21.5	26	9.4	9.6	6.27	8.03	14	7	6	14
CFM71L		9.5	9.6	31.4	38	13.8	14	9.02	10.8	14	10	6	10
CFM90S		11	11.1	39.6	44	16	16.2	17.4	21.2	28	14	5	15
CFM90M		14.5	14.7	52.2	59	21	21.5	22.3	26.1	40	20	3	9
CFM90L		21	21.6	75.6	86	30.5	31.5	32.1	35.9	40	28	3	5
CFM112S		23.5	22.5	82.3	90	34	32.5	68.4	84	55	25	11	22
CFM112M		31	30	108.5	120	45	44	88.2	104	90	40	4	18
CFM112L		45	46	157.5	184	65	67	128	143	90	55	4	11
CFM112H		68	66	238.0	264	95	92	190	209	90	55	4	11
6000		DFS56M	1	1.65	3.8	6.6	-	-	0.48	0.83	2.5	-	-
	DFS56L	2	2.75	7.6	11	-	-	0.83	1.18	2.5	-	-	-
	DFS56H	4	5.3	15.2	21	-	-	1.53	1.88	5	-	-	-
	CFM71S	5	6.5	16.5	26	7.3	9.5	4.89	6.65	-	-	-	-
	CFM71M	6.5	8.6	21.5	34	9.4	12.5	6.27	8.03	-	-	-	-
	CFM71L	9.5	12.5	31.4	50	13.8	18.2	9.02	10.8	-	-	-	-
	CFM90S	11	14.5	39.6	58	16	21	17.4	21.2	-	-	-	-
	CFM90M	14.5	19.8	52.2	79	21	29	22.3	26.1	-	-	-	-
	CFM90L	21	29.5	75.6	118	30.5	43	32.1	35.9	-	-	-	-


**Synchronous servomotors with 400 V system voltage**

$n_N$	Motor	$L_1$	$R_1$	$U_{p0}$	$m_{mot}$	$m_{bmot}$
[ $\text{min}^{-1}$ ]		[mH]	[ $\text{m}\Omega$ ]	[ $\text{V}/1000 \text{ min}^{-1}$ ]	[kg]	
2000	CFM71S	52	7090	151	9.5	11.8
	CFM71M	36	4440	148	10.8	13.0
	CFM71L	24	2500	152	13.0	15.3
	CFM90S	18	1910	147	15.7	19.6
	CFM90M	12.1	1180	141	17.8	21.6
	CFM90L	8.4	692	146	21.9	26.5
	CFM112S	10	731	155	26.2	31.8
	CFM112M	7.5	453	153	30.5	36.0
	CFM112L	4.6	240	151	39.3	44.9
	CFM112H	2.6	115	147	54.2	59.8
3000	DFS56M	9.7	5700	40	2.8	2.9
	DFS56L	8.8	3700	56	3.5	3.6
	DFS56H	12.7	4500	97	4.8	5.3
	CFM71S	23	3150	101	9.5	11.8
	CFM71M	16	2000	100	10.8	13.0
	CFM71L	11	1120	102	13.0	15.3
	CFM90S	8.1	838	98	15.7	19.6
	CFM90M	5.7	533	96	17.8	21.6
	CFM90L	3.9	324	99	21.9	26.5
	CFM112S	4.6	325	103	26.2	31.8
	CFM112M	3.1	193	99	30.5	36.0
	CFM112L	2	103	101	39.3	44.9
	CFM112H	1.3	57	104	54.2	59.8
	4500	DFS56M	9.7	5700	40	2.8
DFS56L		8.8	3700	56	3.5	3.6
DFS56H		6.2	2200	67.5	4.8	5.3
CFM71S		10	1380	66	9.5	11.8
CFM71M		6.9	828	64	10.8	13.0
CFM71L		4.9	446	65	13.0	15.3
CFM90S		3.45	358	64	15.7	19.6
CFM90M		2.65	249	65	17.8	21.6
CFM90L		1.73	148	66	21.9	26.5
CFM112S		2	149	69	26.2	31.8
CFM112M		1.5	92	68	30.5	36.0
CFM112L		0.85	44	66	39.3	44.9
CFM112H		0.54	24	67	54.2	59.8
6000		DFS56M	9.70	5700	40	2.8
	DFS56L	6.80	2800	49	3.5	3.6
	DFS56H	3.50	1200	50.5	4.8	5.3
	CFM71S	5.75	780	50	9.5	-
	CFM71M	3.93	493	49	10.8	-
	CFM71L	2.68	277	50	13.0	-
	CFM90S	2.03	212	49	15.7	-
	CFM90M	1.48	136	48	17.8	-
	CFM90L	0.93	77	48	21.9	-

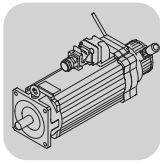




Combination overview of synchronous servomotors / servo controllers for 400 V system voltage, peak torque in Nm

Assignment to MOVIDRIVE® 0005 - 0075

n <sub>N</sub> [min <sup>-1</sup> ]	Motor	M <sub>max</sub> [Nm]	MOVIDRIVE®									
			0005	0008	0011	0014	0015	0022	0030	0040	0055	0075
			2.0 [A]	2.4 [A]	3.1 [A]	4.0 [A]	4.0 [A]	5.5 [A]	7.0 [A]	9.5 [A]	12.5 [A]	16 [A]
2000	CFM71S	M <sub>max</sub>	8.9	10.5	13.1	15.6	12.7	15.9	16.5			
	CFM71M		8.6	10.3	13.1	16.2	12.7	16.7	19.8	21.5		
	CFM71L			10.8	13.9	17.7	13.5	18.2	22.5	28.4	31.4	
	CFM90S				13.9	17.8	13.4	18.4	23.2	30.6	38.2	39.4
	CFM90M					16.8	12.6	17.3	21.9	29.5	38.0	46.9
	CFM90L							17.5	22.2	30.1	39.3	49.6
	CFM112S							19.3	24.6	33.4	43.6	54.8
	CFM112M								23.9	32.6	42.9	54.7
	CFM112L										42.0	53.9
	CFM112H											53.2
3000	DFS56M	M <sub>max</sub>	2.4	2.8	3.6	3.8	3.5	3.8				
	DFS56L		3.3	4.0	5.1	6.4	4.9	6.6	7.6			
	DFS56H		5.7	6.8	8.8	11.2	8.5	11.5	14.3	15.0		
	CFM71S		6.0	7.2	9.2	11.6	8.9	11.9	14.3	16.5		
	CFM71M			7.2	9.3	11.9	9.0	12.2	15.1	19.1	21.5	
	CFM71L				9.5	12.2	9.2	12.6	15.9	21.0	26.2	30.8
	CFM90S					12.0	9.0	12.4	15.7	21.2	27.4	34.0
	CFM90M							11.8	15.0	20.4	26.6	33.7
	CFM90L									20.7	27.3	34.7
	CFM112S									22.2	29.3	37.4
	CFM112M										28.2	36.2
	CFM112L											35.8
	CFM112H											
4500	DFS56M	M <sub>max</sub>	2.4	2.8	3.6	3.8	3.5	3.8				
	DFS56L		3.3	4.0	5.1	6.4	4.9	6.6	7.6			
	DFS56H		4.0	4.8	6.2	7.9	6.0	8.2	10.3	13.7	15.2	
	CFM71S				6.3	8.1	6.1	8.3	10.4	13.4	16.1	16.5
	CFM71M					7.9	5.9	8.1	10.2	13.6	17.1	20.3
	CFM71L							8.2	10.4	14.0	18.1	22.5
	CFM90S								10.4	14.1	18.4	23.4
	CFM90M									14.0	18.4	23.5
	CFM90L										18.2	23.3
	CFM112S										19.5	25.0
	CFM112M											24.6
	CFM112L											
	CFM112H											
6000	DFS56M	M <sub>max</sub>	2.4	2.8	3.6	3.8	3.5	3.8				
	DFS56L		2.9	3.5	4.5	5.7	4.3	5.8	7.3	7.6		
	DFS56H				4.7	6.0	4.5	6.2	7.9	10.5	13.6	15.1
	CFM71S					6.1	4.6	6.3	8.0	10.6	13.3	15.8
	CFM71M							6.2	7.9	10.6	13.7	16.8
	CFM71L								8.0	10.8	14.1	17.9
	CFM90S									10.8	14.2	18.1
	CFM90M										13.7	17.5
	CFM90L											17.1



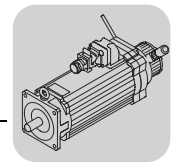
## DFS/CFM Synchronous Servomotors

### Technical data

Combination overview of synchronous servomotors / servo controllers for 400 V system voltage, peak torque in Nm

Assignment to MOVIDRIVE® 0110 - 1100

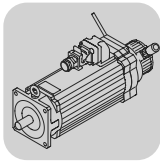
n <sub>N</sub> [min <sup>-1</sup> ]	Motor	M <sub>max</sub> [Nm]	MOVIDRIVE®											
			0110	0150	0220	0300	0370	0450	0550	0750	0900	1100		
			24 [A]	32 [A]	46 [A]	60 [A]	73 [A]	89 [A]	105 [A]	130 [A]	170 [A]	200 [A]		
2000	CFM71S	M <sub>max</sub>												
	CFM71M													
	CFM71L													
	CFM90S													
	CFM90M		52.5											
	CFM90L		70.3	75.8										
	CFM112S		76.2	81.9										
	CFM112M		79.3	99.6	108.0									
	CFM112L		80.3	104.9	141.5	156.8								
	CFM112H		80.1	106.5	150.3	189.2	220.1	237.0						
3000	DFS56M	M <sub>max</sub>												
	DFS56L													
	DFS56H													
	CFM71S													
	CFM71M													
	CFM71L		31.5											
	CFM90S		39.2											
	CFM90M		47.8	51.6										
	CFM90L		51.1	65.6	75.6									
	CFM112S		54.8	69.8	81.9									
	CFM112M		54.0	70.7	95.7	108.0								
	CFM112L		53.9	71.6	101.0	126.9	147.4	156.8						
	CFM112H		56.6	75.7	108.6	139.9	167.0	197.1	223.2	237.0				
	4500		DFS56M	M <sub>max</sub>										
DFS56L														
DFS56H														
CFM71S														
CFM71M		21.3												
CFM71L		30.3	31.2											
CFM90S		33.6	39.2											
CFM90M		34.6	44.5		52.1									
CFM90L		34.7	45.8		63.4	75.0								
CFM112S		37.4	49.2		67.5	81.9								
CFM112M		37.1	49.4		69.6	87.4	101.5	108.0						
CFM112L		35.0	46.8		67.2	86.9	104.1	123.5	140.7	156.8				
CFM112H					70.9	92.5	112.1	135.5	157.7	189.4	231.6	237.0		
6000		DFS56M	M <sub>max</sub>											
	DFS56L													
	DFS56H													
	CFM71S	16.5												
	CFM71M	21.3												
	CFM71L	25.2		30.7	31.4									
	CFM90S	26.6		34.2	39.4									
	CFM90M	26.1		34.3	46.9	51.9								
	CFM90L	25.6		33.9	48.0	60.9	71.3	75.2						



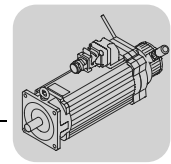
**Synchronous servomotors with 230 V system voltage**

$n_N$ [min <sup>-1</sup> ]	Motor	$M_0$	$I_0$	$M_{DYN}$	$I_{max}$	$M_{OVR}$	$I_{OVR}$	$J_{mot}$	$J_{bmot}$	$M_{B1}$	$M_{B2}$	$W_{max1}$	$W_{max2}$
		[Nm]	[A]	[Nm]	[A]	[Nm]	[A]	[10 <sup>-4</sup> kgm <sup>2</sup> ]	[Nm]	[kJ]	[kJ]		
2000	CFM71S	5	3.95	16.5	15.8	7.3	5.7	4.89	6.65	10	5	18	22
	CFM71M	6.5	5.3	21.5	21	9.4	7.7	6.27	8.03	14	7	15	20
	CFM71L	9.5	7.4	31.4	29.5	13.8	10.7	9.02	10.8	14	10	15	18
	CFM90S	11	8.7	39.6	35	16	12.6	17.4	21.2	28	14	17	24
	CFM90M	14.5	12.1	52.2	48.5	21	17.5	22.3	26.1	40	20	10.5	19.5
	CFM90L	21	17.1	75.6	68	30.5	25	32.1	35.9	40	28	10.5	17
	CFM112S	23.5	18	82.3	72	34	26	68.4	84	55	28	32	48
	CFM112M	31	24.5	108.5	98	45	35.5	88.2	104	90	40	18	44
	CFM112L	45	35.5	157.5	142	65	51	128	143	90	55	18	32
CFM112H	68	52	238	208	95	73	190	209	90	55	7	18	
3000	DFS56M	1	1.65	3.8	6.6	–	–	0.48	0.83	2.5	–	–	–
	DFS56L	2	2.4	7.6	9.6	–	–	0.83	1.18	2.5	–	–	–
	CFM71S	5	5.9	16.5	23.5	7.3	8.6	4.89	6.65	10	5	14	20
	CFM71M	6.5	7.6	21.5	30.5	9.4	11	6.27	8.03	14	7	11	18
	CFM71L	9.5	11.1	31.4	44.5	13.8	16.1	9.02	10.8	14	10	11	14
	CFM90S	11	12.7	39.6	51	16	18.4	17.4	21.2	28	14	10	20
	CFM90M	14.5	17.4	52.2	70	21	25	22.3	26.1	40	20	4.5	15
	CFM90L	21	25.5	75.6	102	30.5	37	32.1	35.9	40	28	4.5	10
	CFM112S	23.5	27	82.3	108	34	39	68.4	84	55	28	18	36
	CFM112M	31	35	108.5	140	45	51	88.2	104	90	40	7	32
	CFM112L	45	48	157.5	192	65	70	128	143	90	55	7	18
	CFM112H	68	73	238	292	95	102	190	209	90	55	7	18
4500	CFM71S	5	8.5	16.5	34	7.3	12.3	4.89	6.65	10	5	10	16
	CFM71M	6.5	11.3	21.5	45	9.4	16.4	6.27	8.03	14	7	6	14
	CFM71L	9.5	17.1	31.4	68	13.8	25	9.02	10.8	14	10	6	10
	CFM90S	11	18.9	39.6	76	16	27.5	17.4	21.2	28	14	5	15
	CFM90M	14.5	26	52.2	104	21	37.5	22.3	26.1	40	20	3	9
	CFM90L	21	39	75.6	156	30.5	57	32.1	35.9	40	28	3	5
	CFM112S	23.5	38.5	82.3	154	34	56	68.4	84	55	25	11	22
	CFM112M	31	54	108.5	216	45	78	88.2	104	90	40	4	18
6000	CFM71S	5	11.6	16.5	46.5	7.3	16.8	4.89	6.65	-	-	-	-
	CFM71M	6.5	14.1	21.5	56	9.4	20.5	6.27	8.03	-	-	-	-
	CFM71L	9.5	21.5	31.4	86	13.8	31	9.02	10.8	-	-	-	-
	CFM90S	11	23.5	39.6	94	16	34	17.4	21.2	-	-	-	-
	CFM90M	14.5	37	52.2	148	21	54	22.3	26.1	-	-	-	-
	CFM90L	21	51	75.6	204	30.5	74	32.1	35.9	-	-	-	-

Other DFS / 230 V motor variants on request.


**Synchronous servomotors with 230 V system voltage**

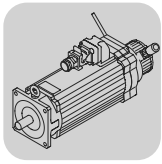
$n_N$ [min <sup>-1</sup> ]	Motor	$L_1$	$R_1$	$U_{p0}$	$m_{mot}$	$m_{bmot}$
		[mH]	[mΩ]	[V/1000 min <sup>-1</sup> ]	[kg]	
2000	CFM71S	16.3	2188	85	9.5	11.8
	CFM71M	11.4	1394	83	10.8	13.0
	CFM71L	7.7	802	86	13.0	15.3
	CFM90S	5.7	593	83	15.7	19.6
	CFM90M	3.95	382	81	17.8	21.6
	CFM90L	2.80	236	85	21.9	26.5
	CFM112S	3.10	225	86	26.2	31.8
	CFM112M	2.25	127	84	30.5	36.0
	CFM112L	1.46	76	85	39.3	44.9
	CFM112H	0.88	38	86	54.2	59.8
3000	DFS56M	9.7	5700	40	2.8	2.9
	DFS56L	8.8	3700	56	3.5	3.6
	CFM71S	7.2	973	57	9.5	11.8
	CFM71M	5.2	642	57	10.8	13.0
	CFM71L	3.45	347	57	13.0	15.3
	CFM90S	2.7	271	57	15.7	19.6
	CFM90M	1.91	182	56	17.8	21.6
	CFM90L	1.24	105	56	21.9	26.5
	CFM112S	1.42	100	57	26.2	31.8
	CFM112M	1.08	67	58	30.5	36.0
	CFM112L	0.78	35	63	39.3	44.9
	CFM112H	0.45	20	61	54.2	59.8
4500	CFM71S	3.30	449	38	9.5	11.8
	CFM71M	2.35	278	37.5	10.8	13.0
	CFM71L	1.55	149	36.5	13.0	15.3
	CFM90S	1.19	124	37.5	15.7	19.6
	CFM90M	0.84	81	36.5	17.8	21.6
	CFM90L	0.53	48	36.5	21.9	26.5
	CFM112S	0.68	50	40.5	26.2	31.8
	CFM112M	0.465	28	38	30.5	36.0
6000	CFM71S	1.80	243	28	9.5	-
	CFM71M	1.47	175	30	10.8	-
	CFM71L	0.91	89	29	13.0	-
	CFM90S	0.77	78	30	15.7	-
	CFM90M	0.42	42	25.5	17.8	-
	CFM90L	0.31	26	28	21.9	-



Combination overview of synchronous servomotors / servo controllers for 230 V system voltage, peak torque in Nm

Assignment to MOVIDRIVE® 0015 - 0300

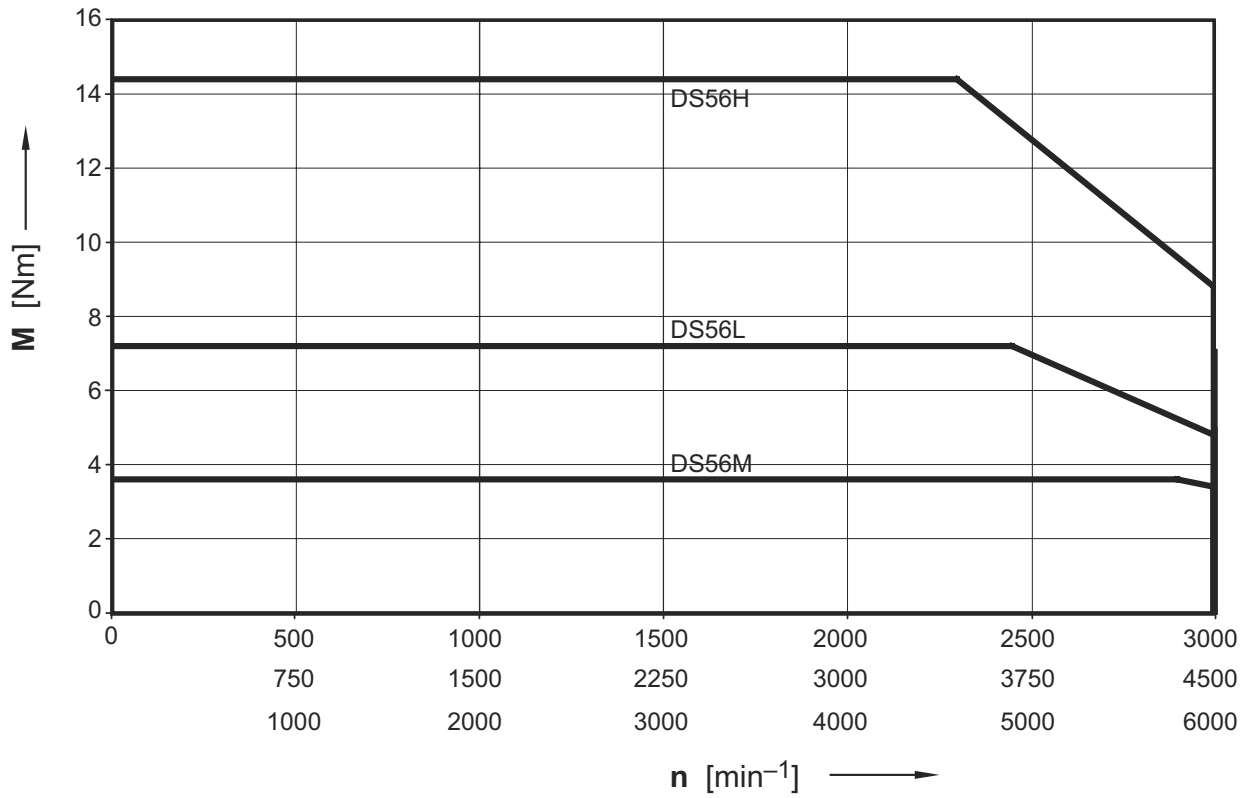
n <sub>N</sub> [min <sup>-1</sup> ]	Motor	M <sub>max</sub> [Nm]	MOVIDRIVE®								
			0015	0022	0037	0055	0075	0110	0150	0220	0300
			7.3 [A]	8.6 [A]	14.5 [A]	22 [A]	29 [A]	42 [A]	54 [A]	80 [A]	95 [A]
2000	CFM71S	M <sub>max</sub>	12.9	14.6	16.5						
	CFM71M		13.1	15.1	21.4						
	CFM71L		14.0	16.3	25.6	31.3					
	CFM90S		13.8	16.2	26.8	38.0	39.6				
	CFM90M		13.1	15.4	25.8	38.2	48.1	52.0			
	CFM90L			15.8	26.6	40.0	51.9	70.9	74.9		
	CFM112S				28.3	42.7	55.1	74.7	81.9		
	CFM112M				27.4	41.6	54.6	76.8	94.4	108.0	
	CFM112L					41.7	55.0	79.2	100.2	139.3	156.8
	CFM112H						56.6	82.2	105.5	153	177.9
3000	DFS56M	M <sub>max</sub>	3.8								
	DFS56L		7.6								
	CFM71S		9.1	10.6	15.8	16.5					
	CFM71M		9.3	10.9	17.2	21.5					
	CFM71L		9.4	11.0	18.2	25.8	31.0	31.4			
	CFM90S		9.5	11.2	18.7	27.7	35.1	39.5			
	CFM90M				18.1	27.2	35.3	48.4	52.2		
	CFM90L				17.9	27.1	35.5	50.5	63.1	75.2	
	CFM112S				18.8	28.7	37.7	53.4	66.3	81.9	
	CFM112M					29.1	38.4	55.3	69.9	97.0	108.0
	CFM112L						40.6	58.9	75.4	108.8	125.9
	CFM112H							58.4	75.3	111.1	131.1
4500	CFM71S	M <sub>max</sub>	6.4	7.5	12.1	16.3	16.5				
	CFM71M		6.3	7.4	12.2	17.4	21.0	21.4			
	CFM71L			7.2	12.1	17.9	22.8	29.9	31.3		
	CFM90S				12.6	19.0	24.8	34.4	39.6		
	CFM90M				12.1	18.3	24.1	34.3	42.8	52.0	
	CFM90L					17.7	23.4	33.7	42.9	61.4	70.5
	CFM112S					20.0	26.5	38.2	48.6	68.3	77.7
	CFM112M						24.8	36.1	46.3	67.4	78.5
6000	CFM71S	M <sub>max</sub>	4.7	5.6	9.2	13.2	15.9	16.6			
	CFM71M		5.0	5.9	9.9	14.6	18.2	21.4			
	CFM71L				9.6	14.5	18.7	25.6	30.3	31.4	
	CFM90S				10.2	15.4	20.1	28.5	35.3	39.4	
	CFM90M					12.9	17.0	24.5	31.2	44.3	50.6
	CFM90L						17.9	25.9	33.1	48.3	56.5



**Torques for 400 V / 230 V system voltage**

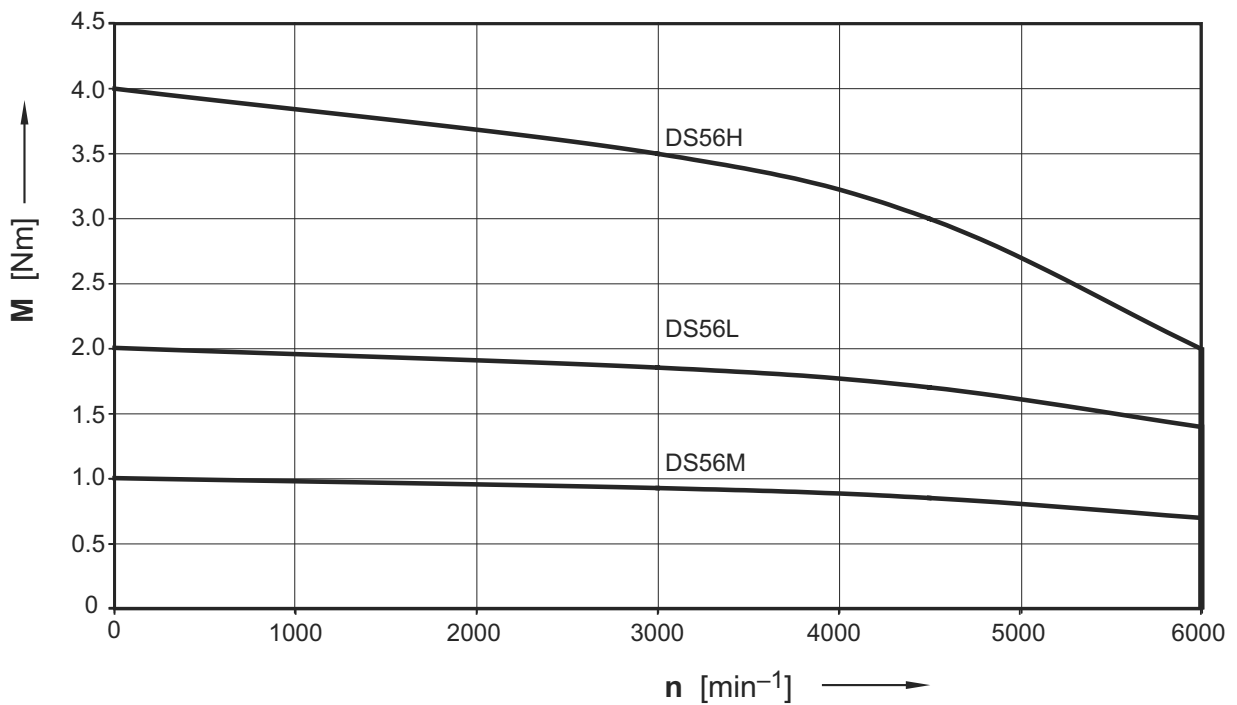
DS56

Dynamic limit torques

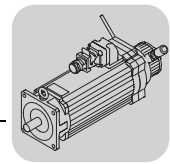


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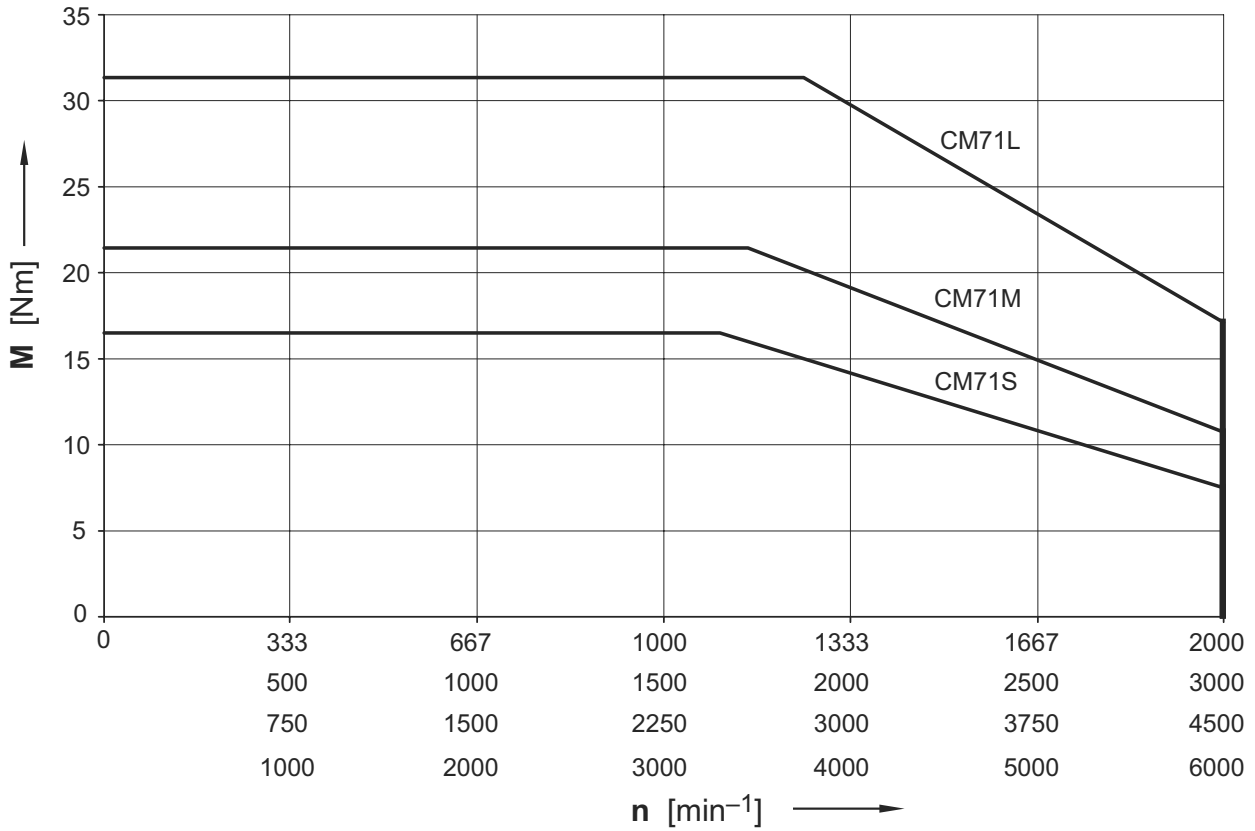
Thermal limit torques



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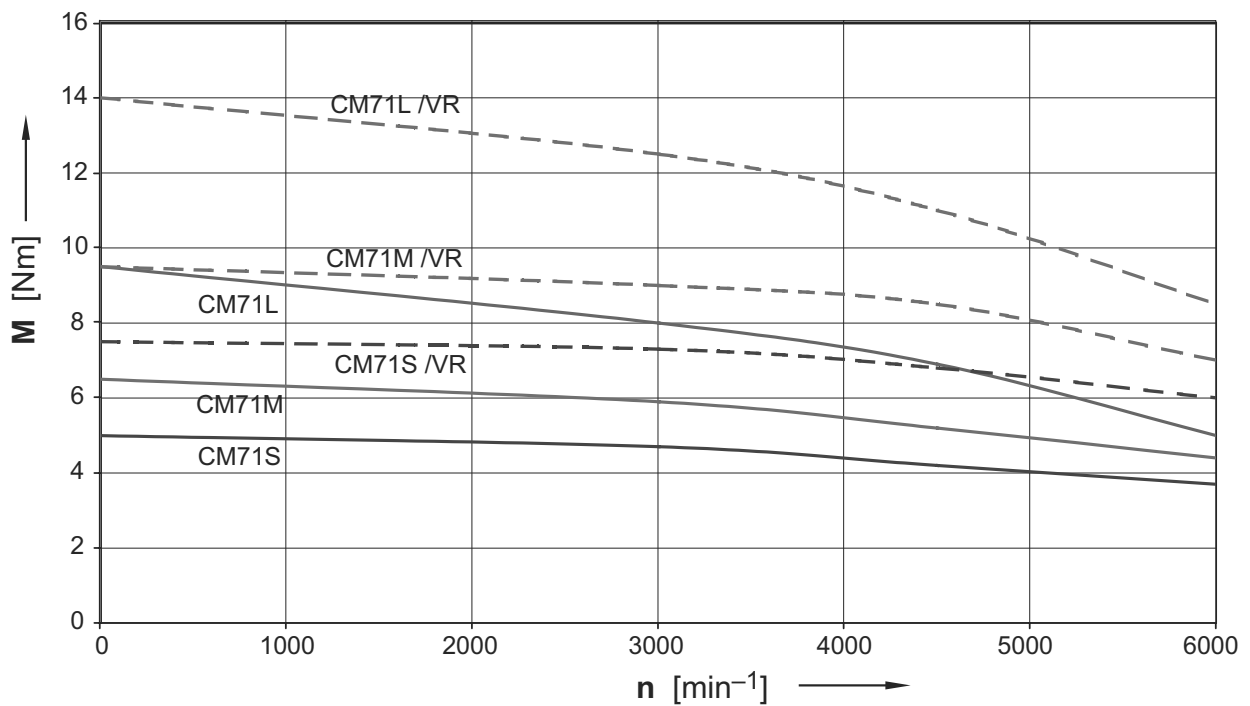


CM71 Dynamic limit torques

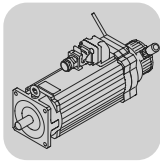


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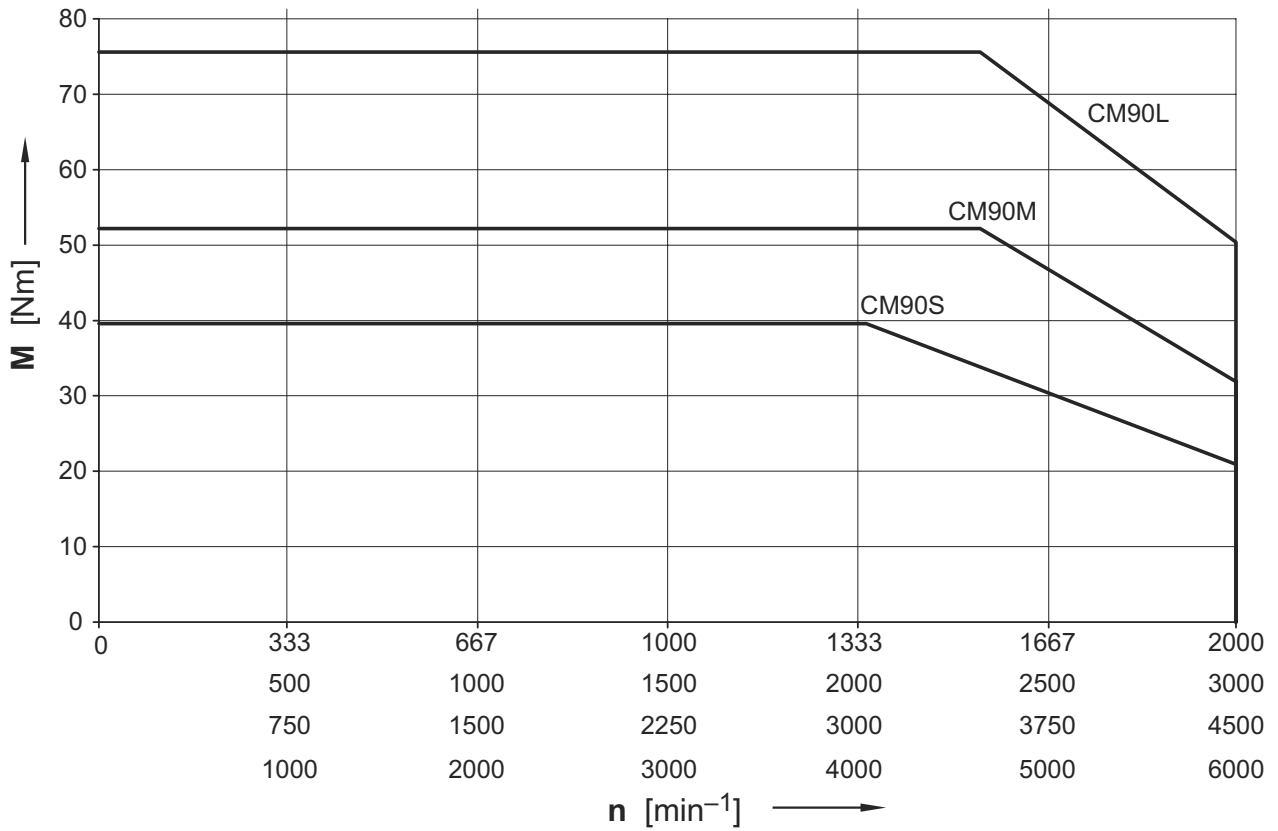
Thermal limit torques



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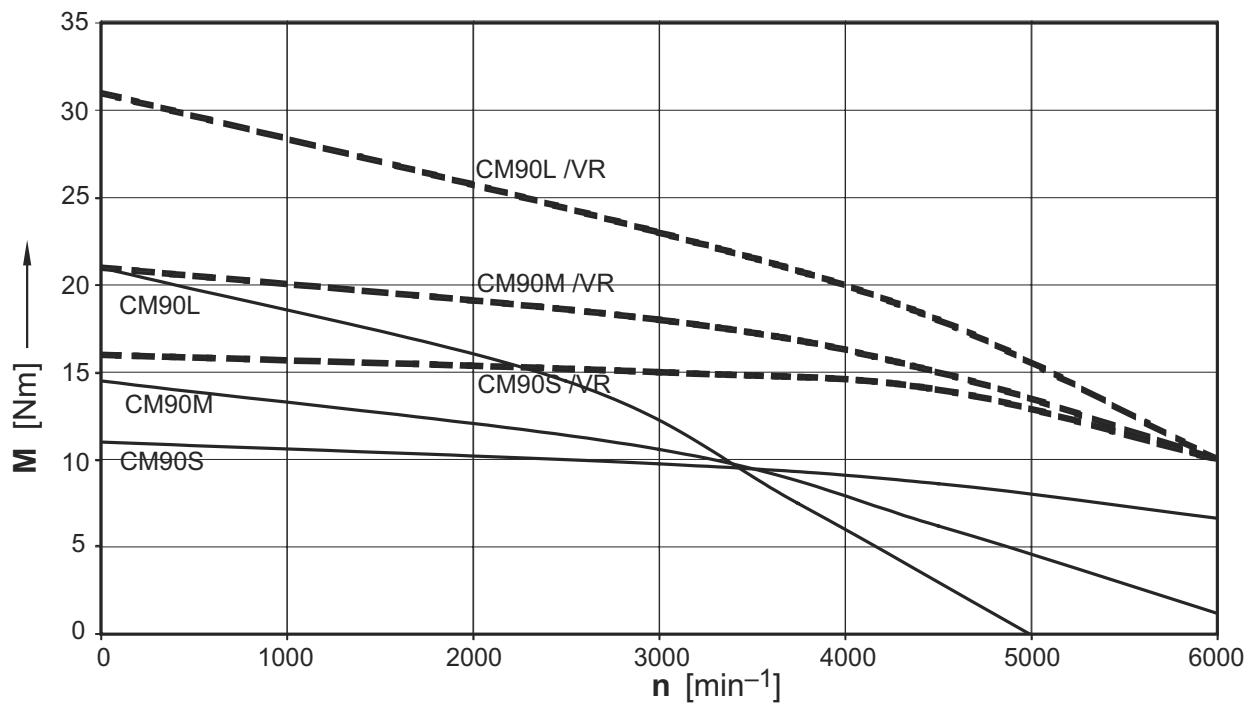


CM90 Dynamic limit torques



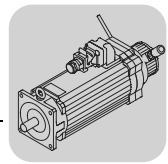
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Thermal limit torques

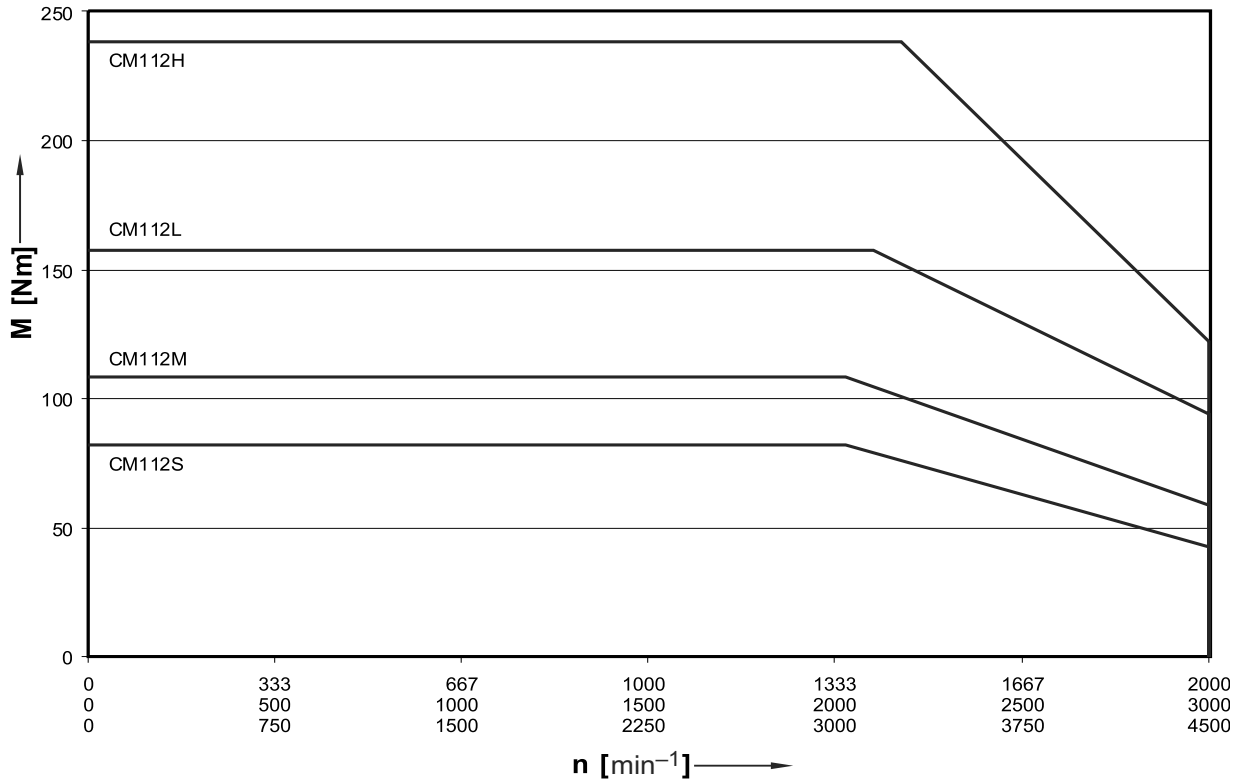


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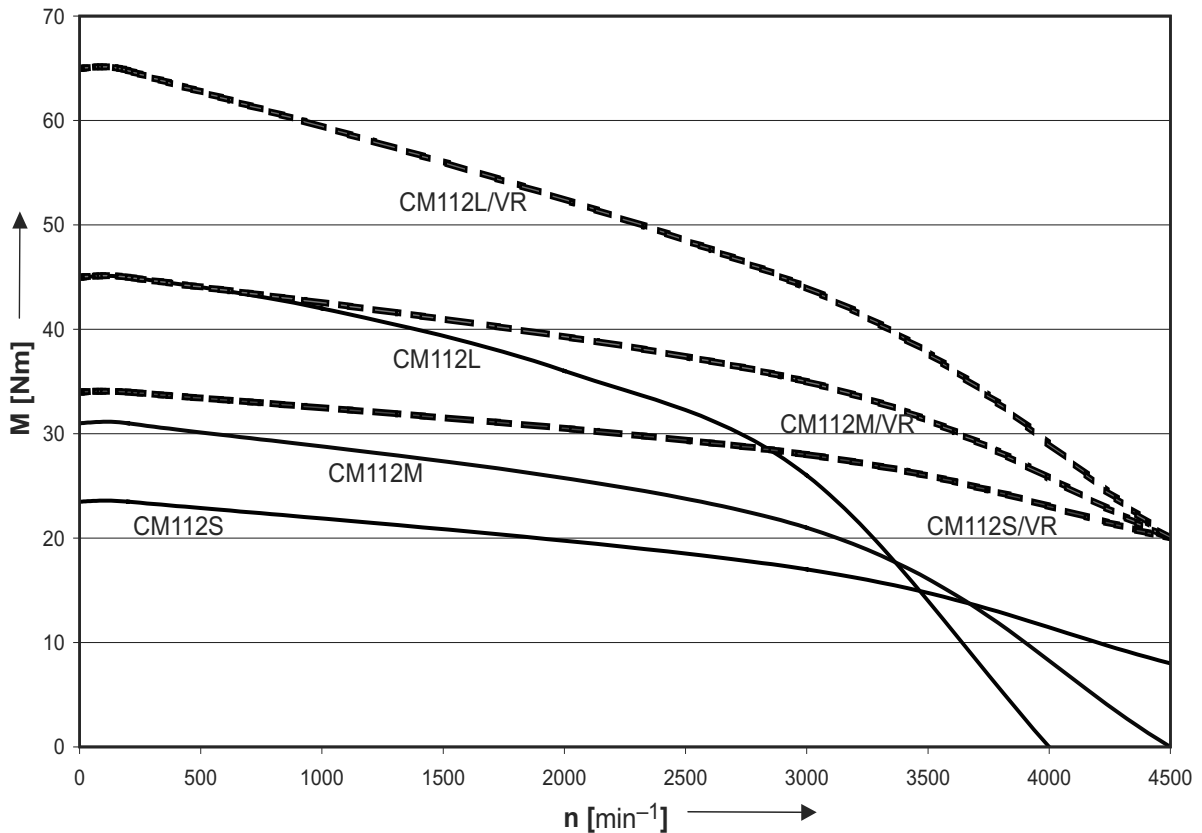


CM112 Dynamic limit torques

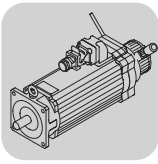


06159AXX

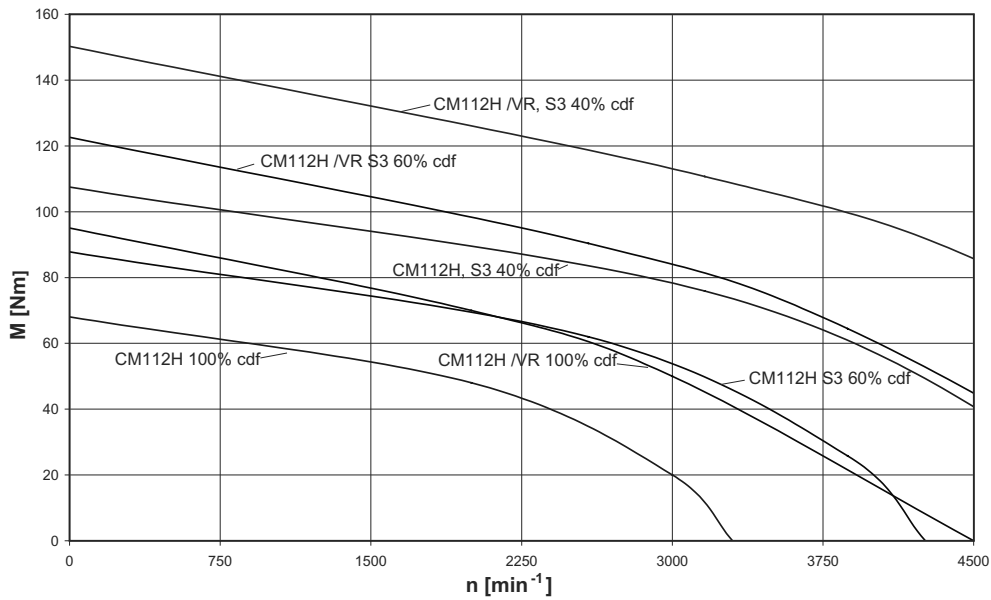
Thermal limit torques for CM112S-L



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#### Thermal limit torques for CM112H



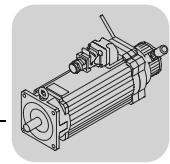
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Helical-bevel servo gearmotors and planetary servo gearmotors can be operated at **ambient temperatures of between  $-10\text{ °C}$  and  $+40\text{ °C}$** . It is essential that you contact SEW-EURODRIVE if ambient temperatures exceed this temperature range.



Helical-bevel servo gearmotors and planetary servo gearmotors can be operated up to **altitudes of 1000 m above sea level**. For operation at altitudes above 1000 m above sea level, contact SEW-EURODRIVE.



*Derating for increased ambient temperature*

The following applies to determining a first approximation of a random thermal limit curve: The thermal limit curve for higher ambient temperatures must be reduced in all points (limit torque with reference to speed) by  $\Delta M_{TH}$ :

$$\Delta M_{TH} = M_{TH} \times \left( 1 - \sqrt{\frac{145 - T_U}{105}} \right)$$

$$M_{TH\_re} = M_{TH} - \Delta M_{TH}$$

Example CM 112 H:

$$T_U = 60^\circ \text{ C}$$

$$M_{TH} = 48 \text{ Nm}$$

$$n = 2000 \text{ min}^{-1}$$

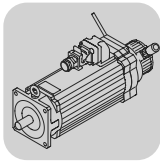
$$\Delta M_{TH} = 48 \times \left( 1 - \sqrt{\frac{145 - 60}{105}} \right) \text{ [Nm]}$$

$$\Delta M_{TH} = 9.14 \text{ Nm}$$

$$M_{TH\_re} = 48 - 9.14 \text{ [Nm]} = 38.86 \text{ [Nm]}$$

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$\Delta M_{TH}$	Thermal limit torque [Nm] difference
$M_{TH}$	Thermal limit torque [Nm]
$T_U$	Ambient temperature [°C]
$M_{TH\_re}$	Reduced thermal limit torque [Nm]

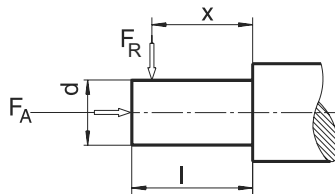


#### Overhung and axial loads

Refer to section 3.6 "Overhung and axial loads" for general information about overhung loads.

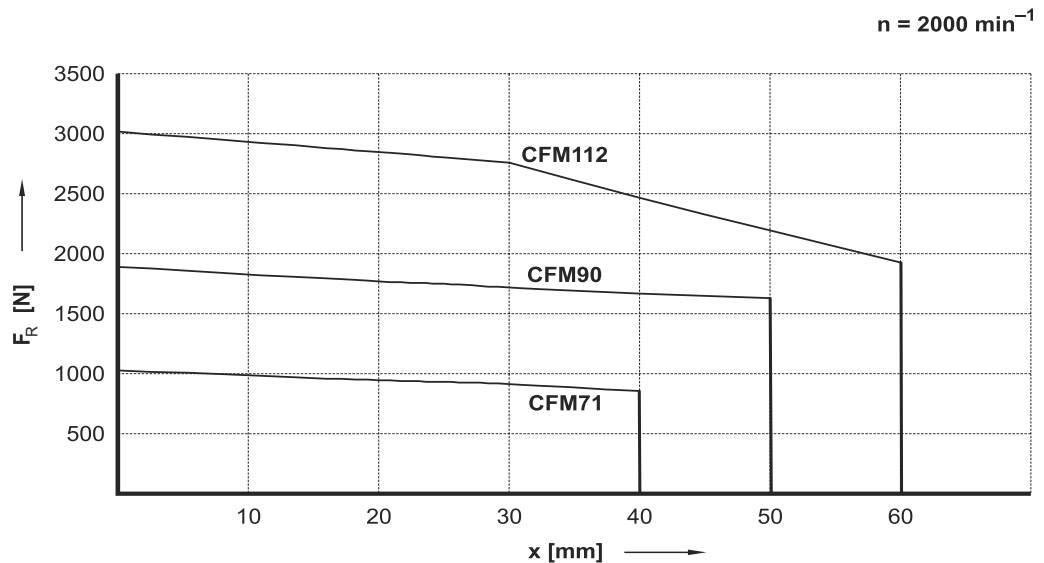
#### Determining overhung load

The permitted overhung loads  $F_R$  at point x (distance from the shaft shoulder to the application point) are determined using the diagrams below. The diagrams are based on a nominal bearing service life of  $L_{10h}=12\,500$  h.



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Figure 33: Determining the overhung load  $F_R$

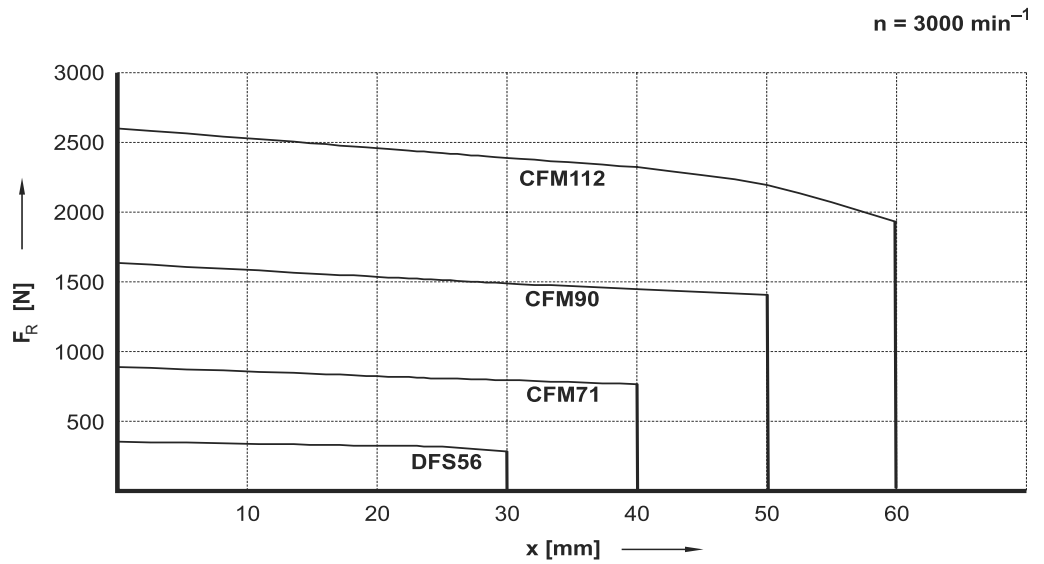
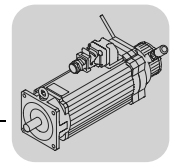


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Figure 34: Permitted overhung load  $F_R$  at  $n = 2000 \text{ min}^{-1}$

Permitted axial load  $F_A$  at  $2000 \text{ min}^{-1}$ :

CFM71:	300 N
CFM90:	550 N
CFM112:	900 N

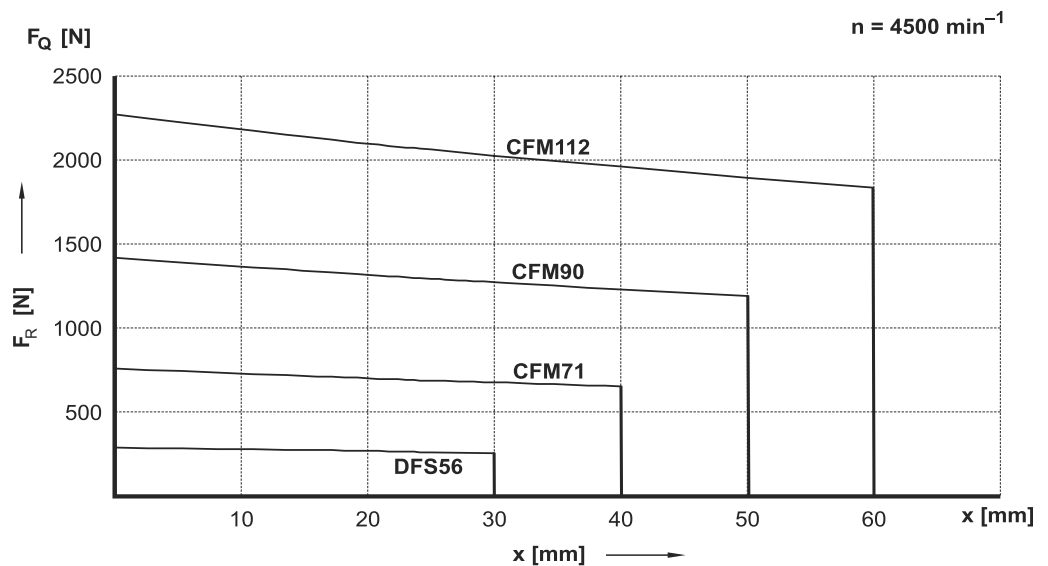


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Figure 35: Permitted overhung load  $F_R$  at  $n = 3000 \text{ min}^{-1}$

Permitted axial load  $F_A$  at  $3000 \text{ min}^{-1}$ :

DFS56:	130 N
CFM71:	250 N
CFM90:	500 N
CFM112:	800 N



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Figure 36: Permitted overhung load  $F_R$  at  $n = 4500 \text{ min}^{-1}$

Permitted axial load  $F_A$  at  $4500 \text{ min}^{-1}$ :

DFS56:	100 N
CFM71:	200 N
CFM90:	400 N
CFM112:	600 N

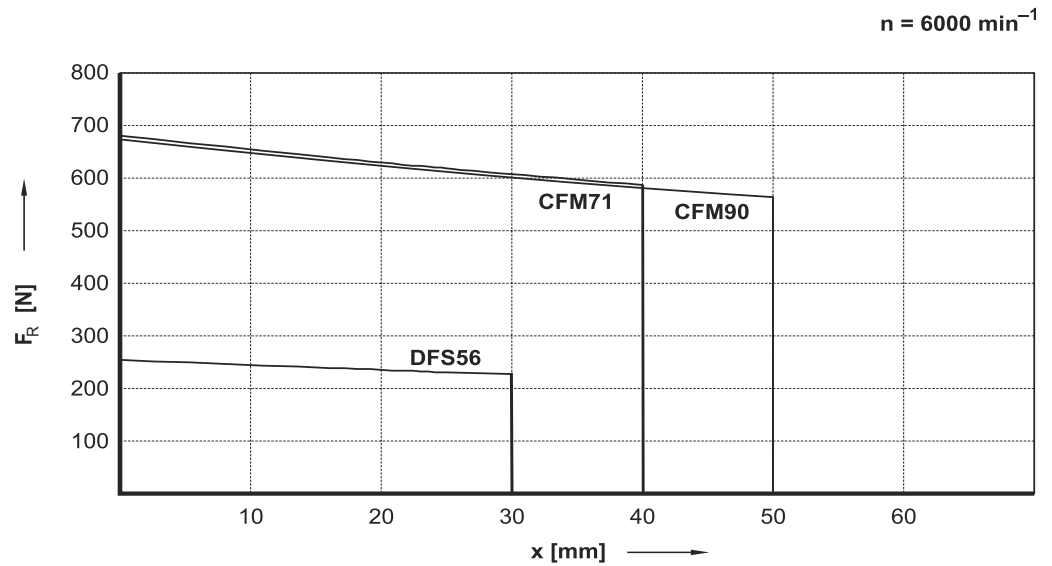
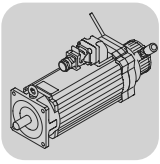


Figure 37: Permitted overhung load  $F_R$  at  $n = 6000 \text{ min}^{-1}$

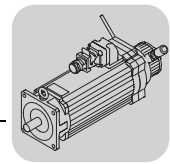
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Permitted axial load  $F_A$  at  $6000 \text{ min}^{-1}$ :

DFS56:	80 N
CFM71:	160 N
CFM90:	300 N

Motor bearings  
used

Motor type	Drive-end bearing	Non drive-end bearing
<b>DFS56M + L</b>	6202-2Z-J	6201-2Z-J
<b>DFS56H</b>	6003-2Z-J	6201-2Z-J
<b>CFM71</b>	6205-2Z-J	6303-2Z-J
<b>CFM90</b>	6207-2Z-J	6305-2Z-J
<b>CFM112</b>	6308-2Z-J	6207-2Z-J



## 11.5 Motor options

The following motor options are available for DFS56 and CFM71 - 112 motors:

1. SM / SB plug connector
2. Terminal box KK / KK5 / KK6
3. B / BR brake
4. RH1M / RH1L resolver
5. ES1H / AS1H absolute HIPERFACE® encoder.
6. AV1Y, AV1H, EV1H absolute encoder
7. VR forced cooling fan

Other motor options are available on request.

### 1. SM / SB plug connector

The power cable / power + brake cable for DFS motors is each connected to the motor axially at a right angle with a round connector (Intercontec).

CFM motors are connected via a rectangular plug connector (C148U, by Amphenol). This connector system offers the following advantages:

- One connector size for all connection cross sections from 1.5 mm<sup>2</sup> to 10 mm<sup>2</sup>.
- Metallic housing to ensure EMC
- Assembly without requiring special tools
- Control contacts in addition to the motor power contacts in one connector housing
- Separate insulation elements for power and control contacts
- UL certified

The other control contacts are assigned by SEW-EURODRIVE for connecting the BR brake. Socket contacts for core cross sections from 1 mm<sup>2</sup> or 1.5 mm<sup>2</sup> are used for this purpose.

#### Type designation

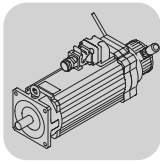
A four-digit type designation is assigned to the power plug connector and the encoder plug connector. The second position indicates whether only the motor power is connected, or the motor power combined with the brake. The fourth digit represents a code for the core cross section to be connected or indicates that the motor was delivered without mating connector.

#### DFS56

1s pos.:	<b>S</b>	Connection via plug connector
2nd pos.:	<b>M</b>	Motor
	<b>B</b>	Brake motor
3rd pos.:	<b>1</b>	Connector size
4th pos.:	<b>0</b>	Delivery without mating plug

M in the second position means: 1: 4 x 1.5 mm<sup>2</sup> (without brake)

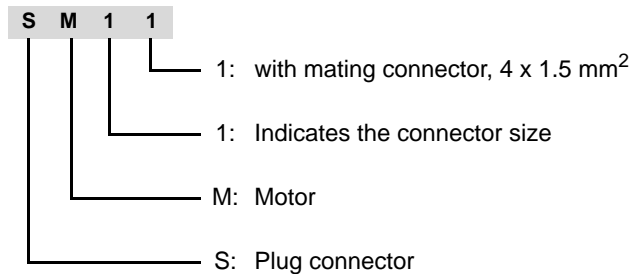
B in the second position means: 1: 4 x 1.5 mm<sup>2</sup> + 2 x 1 mm<sup>2</sup> (with brake)



## DFS/CFM Synchronous Servomotors

### Motor options

#### Example



In the basic version, SEW-EURODRIVE delivers DFS motors with the flange socket on the motor end and without mating connector. The encoder cable entry is axial.

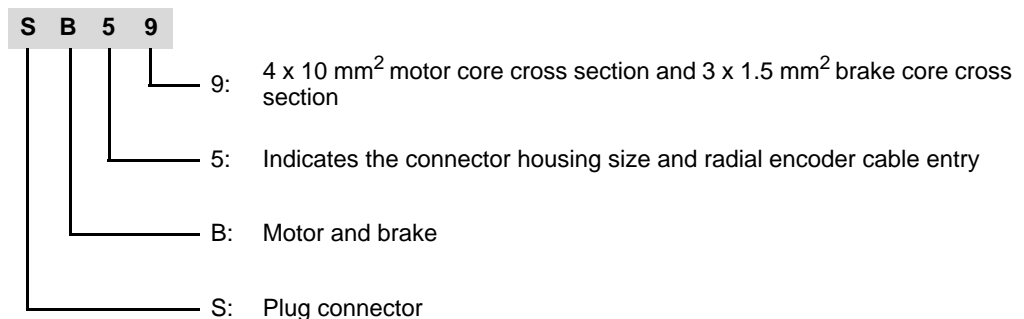
#### CFM

- 1st pos.: **S** Connection via plug connector  
 2nd pos.: **M** Motor  
           **B** Brake motor  
 3rd pos.: **5** Connector housing size and type of encoder cable entry (radial)  
           **6** Connector housing size and type of encoder cable entry (axial)  
 4th pos.: **0** Delivered without mating plug

- M** in 2nd pos. means
- 1: 4 x 1.5 mm<sup>2</sup>
  - 2: 4 x 2.5 mm<sup>2</sup>
  - 4: 4 x 4 mm<sup>2</sup>
  - 6: 4 x 6 mm<sup>2</sup>
  - 9: 4 x 10 mm<sup>2</sup>

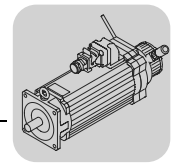
- B** in 2nd pos. means
- 1: 4 x 1.5 mm<sup>2</sup> + 3 x 1 mm<sup>2</sup>
  - 2: 4 x 2.5 mm<sup>2</sup> + 3 x 1 mm<sup>2</sup>
  - 4: 4 x 4 mm<sup>2</sup> + 3 x 1 mm<sup>2</sup>
  - 6: 4 x 6 mm<sup>2</sup> + 3 x 1.5 mm<sup>2</sup>
  - 9: 4 x 10 mm<sup>2</sup> + 3 x 1.5 mm<sup>2</sup>

#### Example



In the basic version, SEW-EURODRIVE delivers CFM motors with the flange socket on the motor end and without SM50 / SB50 mating connector. The encoder cable entry is radial.





**2. Connection with terminal box KK**

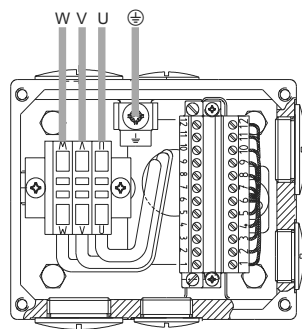
Motor type	Power connection			Encoder / resolver / thermal motor protection	
	Connection	Maximum connection cross section	Cable entry	Connection	Cable entry
DFS56..	Cage tension spring	4 x 2.5 mm <sup>2</sup>	M20 x 1.5	Screw terminal in terminal box	M16 x 1.5
CFM71..	3 x M5	4 x 6 mm <sup>2</sup>	M25 x 1.5	Spring cage terminal in the encoder housing	M16 x 1.5
CFM90../112S	3 x M6	4 x 10 mm <sup>2</sup>	M32 x 1.5		M16 x 1.5
CFM112M / H	3 x M8	4 x 25 mm <sup>2</sup>	M50 x 1.5		M16 x 1.5

Make sure that

*EMC compliant cabling*

- the line type corresponds to the applicable regulations (rated currents are indicated on the nameplate),
- the signal lines consist of twisted pair wires and are collectively shielded (resolver lead as example: one pair each for reference, sine and cosine signals),
- **the brake cables are routed separately from power cables, or that power cables and, if necessary, also brake cables are shielded to protect the brake against electro-magnetic interference.**

*DFS56 motor power connection*



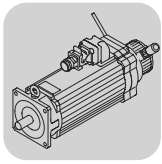
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Figure 38: DFS56 connection

- U U phase
- V V phase
- W W phase
- ⊕ Protective earth

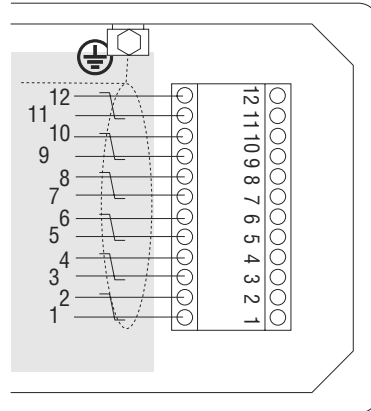
The power cables of the motor are connected to the terminal block using cage tension springs.

The direction of rotation cannot be changed by changing the phases.



**DFS/CFM Synchronous Servomotors**  
Motor options

Connection of resolver / encoder and thermal motor protection / brake for DFS56

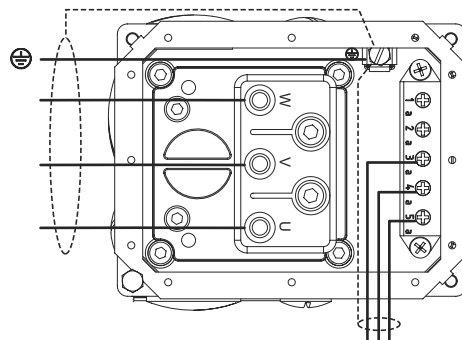


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Figure 39: Signal lines of resolver / encoder and thermal motor protection/brake

Resolver			Encoder		
1	ref +	Reference	1	cos +	Cosine
2	ref -		2	ref cos	Reference
3	cos +	Cosine	3	sin +	Sine
4	cos -		4	ref sin	Reference
5	sin +	Sine	5	D -	
6	sin -		6	D +	
7	-	-	7	GND	
8	-	-	8	Us	
9	TF/KTY +	Motor protection	9	TF/KTY +	Motor protection
10	TF/KTY -		10	TF/KTY -	
11	- / 6	Brake	11	- / 6	Brake
12	+ / 5		12	+ / 5	

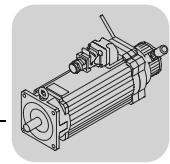
Motor power connection to CFM



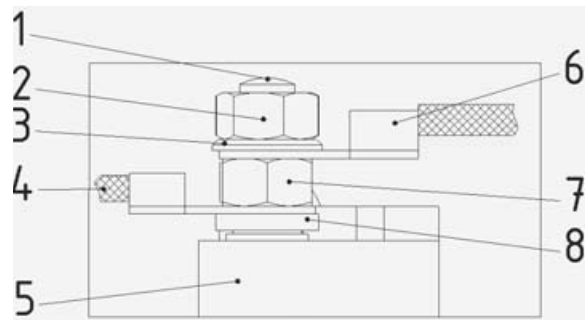
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Figure 40: CFM motor connection

Contact	Core identification	Connection
U	Black with white lettering U, V, W	U
V		V
W		W
PE	Green / yellow	PE



Contact of the auxiliary terminal strip	Core identification	Connection of BME, BMH, BMK, BMP brake rectifiers	Connection of BSG brake control unit
3a	Black with white lettering 1, 2, 3	14	1
4a		13	3
5a		15	5



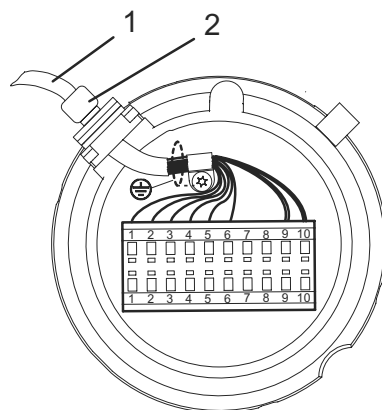
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Figure 41: Power connection in the terminal box

- |   |               |   |                  |
|---|---------------|---|------------------|
| 1 | Terminal stud | 5 | Terminal block   |
| 2 | Top nut       | 6 | Customer's cable |
| 3 | Washer        | 7 | Bottom nut       |
| 4 | Motor cable   | 8 | Lock washer      |

For designing the terminal box, positions 6, 7 and 4 are regarded as current-carrying.

*Resolver connection to CFM*



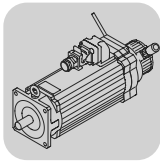
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Figure 42: Connection of an RH1M resolver

- |   |                |
|---|----------------|
| 1 | Feedback cable |
| 2 | Cable gland    |

*Encoder in delivery state*

The housing is closed with an M16 × 1.5 screw plug. Positions 1 and 2 are not included in the scope of delivery.



## DFS/CFM Synchronous Servomotors

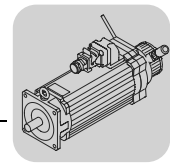
### Motor options

Contact	RH1M / RH1L connection	AS1H / ES1H connection
1	R1 (reference +)	cos +
2	R2 (reference -)	ref cos
3	S1 (cosine +)	sin +
4	S3 (cosine -)	ref sin
5	S2 (sine +)	D -
6	S4 (sine -)	D +
7		GND
8		Us
9 <sup>1)</sup>	TF (KTY+)	TF (KTY+)
10 <sup>1)</sup>	TF (KTY-)	TF (KTY-)

1) Double assignment to increase cross section

#### 2. Connection with terminal box variant KK5 / KK6

The expanded terminal box variant KK5 / KK6 in CM motors comprises the terminal box for power and the plug connector for signal evaluation.



### 3. Brakes

#### DFS

The mechanical brake is not used as service brake but as emergency brake or holding brake for general machine standstill (**DFS56: holding brake only**). The brake is designed as mounted brake.

Observe the notes in the relevant operating instructions for servo controllers concerning the switching sequence of motor enable and brake control during standard operation.

#### Motor size DFS 56

The standard voltage supply of the brake is DC 24 V. The brake operates with a constant braking torque of 2.5 Nm (DFS56M and DFS56L) and 5 Nm (DFS56H). The brake cannot be retrofitted and operates without brake rectifier or brake control unit. The overvoltage protection must be implemented by the customer, for example using varistors.

#### Speed classes

Brake B of the DFS56 motor can be used in all speed classes.

#### CFM

The optional BR disc brake from SEW-EURODRIVE is integrated in the motor. It operates as DC operated fail safe brake, which means the brake is released electrically. The brake is applied automatically when the voltage is switched off or there is a power outage.

#### Note

In view of the high current loading and the DC voltage to be switched at inductive load, contactors in utilization category AC 3 (EN 60947-4-1) must always be used for controlling the brake rectifiers or BSG brake control unit.

#### Motor size CFM 71, 90, 112

As standard, the brakes are available for AC 110 V, AC 230 V, AC 400 V, AC 460 V and DC 24 V supply voltages. If no supply voltage is indicated for the brake, the brake will be delivered with a supply voltage of AC 400 V.

#### Speed classes

The BR brake for CFM71, CFM90 and CFM112 motors can be operated **up to a maximum of 4500 min<sup>-1</sup>**.

#### Standard type

As standard, CFM /BR synchronous servomotors with BME brake control are supplied for AC connection or control unit BSG for DC 24 V connection. The motors are completely ready for connection.

#### Brake control (only sizes 71, 90, 112)

Only SEW brake control systems are used for controlling the brake. All brake control systems are protected against overvoltage by varistors as standard.

Refer to the "Brakes and Accessories" manual for detailed information about SEW-EURODRIVE brakes.

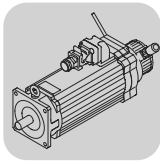
The brakes are available with DC and AC voltage connection.

- AC voltage connection:
  - BME**, equipped with DIN rail profile
- DC voltage connection:
  - BSG**

Two types of electrical cut-off are available:

- Normal application times: Cut-off in the AC circuit.
- Particularly short application times: Cut-off in the AC and DC circuits.

The brake control systems are mounted in the control cabinet. They are not included in the scope of delivery.



## DFS/CFM Synchronous Servomotors

### Motor options

The following options are available:

- AC supply, cut-off in the AC and DC circuits without additional switch contact, particularly short application times: **BMP**.
- AC supply, brake heating function when switched off: **BMH**.
- The **BMK / BMV** control system energizes the brake coil if the supply system and a DC 24 V signal (e.g. from the PLC) are present simultaneously. The brake is applied if one condition is not being met. BMK allows for shortest response and application times.

#### Control cabinet

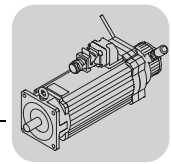
The following table lists SEW brake control systems for installation in the control cabinet. The different housings have different colors (= color code) to make them easier to distinguish.

Brake control	Function	Voltage	Holding current $I_{Hmax}$ (A)	Type	Part number	Color code
<b>BME</b>	One-way rectifier with electronic switching	AC 150..500 V	1.5	BME 1.5	825 722 1	Red
		AC 42...150 V	3.0	BME 3	825 723 X	Blue
<b>BMH</b>	One-way rectifier with electronic switching and heating function	AC 150..500 V	1.5	BMH 1.5	825 818 X	Green
		AC 42...150 V	3	BMH 3	825 819 8	Yellow
<b>BMP</b>	One-way rectifier with electronic switching, integrated voltage relay for cut-off in the DC circuit	AC 150..500 V	1.5	BMP 1.5	825 685 3	White
		AC 42...150 V	3.0	BMP 3	826 566 6	Light blue
<b>BMK</b>	One-way rectifier with electronic switching, DC 24 V control input and cut-off in the DC circuit	AC 150..500 V	1.5	BMK 1.5	826 463 5	Water blue
		AC 42...150 V	3.0	BMK 3	826 567 4	Bright red
<b>BSG</b>	Control unit for DC 24 V connection with electronic switching	DC 24 V	5.0	BSG	825 459 1	White
<b>BMV</b>	Electronic switching, DC 24 V control input and cut-off in the DC circuit	DC 24 V	5.0	BMVS	1 300 006 3	White

#### Short response times

A particular feature of the SEW brake is its patented two coil system. This system consists of accelerator coil and coil section. The special SEW brake control system ensures that the accelerator coil is switched on with a high current inrush when the brake is released, after which the coil section is switched on. The result is a particularly short response time when releasing the brake. The brake disk moves clear very swiftly and the motor starts up with hardly any brake friction.

This principle of the two coil system also reduces self-induction so that the brake is applied more rapidly. The result is a reduced braking distance. The SEW brake can be cut off in the DC and AC circuits to achieve particularly short response times when applying the brake, for example for hoists.



Basic structure of  
sizes 71, 90, 112

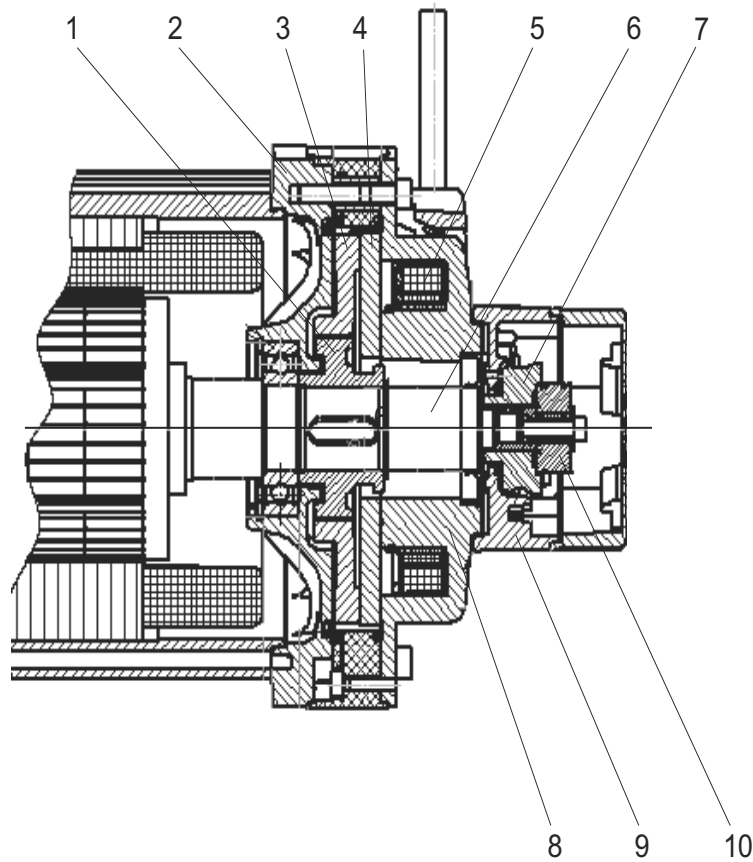
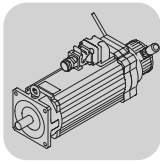


Figure 43: Basic structure of the brake with RH1L resolver

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- |   |                  |    |                 |
|---|------------------|----|-----------------|
| 1 | Carrier          | 6  | Motor shaft     |
| 2 | Brake end shield | 7  | Spacer          |
| 3 | Brake disc       | 8  | Brake coil body |
| 4 | Pressure plate   | 9  | Encoder housing |
| 5 | Brake coil       | 10 | RH1L resolver   |



## DFS/CFM Synchronous Servomotors

### Motor options

#### Technical data

The following table lists the technical data of SEW brakes. The type and number of brake springs determines the level of the braking torque. Unless specified otherwise in the order, the maximum braking torque  $M_{B1}$  is installed as standard. Other brake spring combinations can result in reduced braking torque values  $M_{B2}$ .

Motor type	$M_{B1}$ [Nm]	$M_{B2}$ [Nm]	W [ $10^6$ J]	$t_1$ [ $10^{-3}$ s]	$t_{2II}$ [ $10^{-3}$ s]	$t_{2I}$ [ $10^{-3}$ s]
DFS56M /B	2.5	–	–	7	–	5
DFS56L /B	2.5	–	–	7	–	5
DFS56H /B	5	–	–	8	–	5
CFM71S /BR1	10	5	60	20	40	100
CFM71M /BR1	14	7	60	25	30	90
CFM71L /BR1	14	10	60	30	20	80
CFM90S /BR2	28	14	90	30	35	120
CFM90M /BR2	40	20	90	35	25	90
CFM90L /BR2	40	28	90	40	25	90
CFM112S /BR8	55	28	180	35	50	140
CFM112M /BR8	90	40	180	40	40	120
CFM112L /BR8	90	55	180	45	35	100
CFM112H /BR8	90	55	180	45	85	100

$M_{B1}$  Maximum braking torque

$M_{B2}$  Reduced braking torque

W Braking work until service

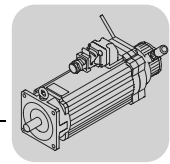
$t_1$  Response time

$t_{2II}$  Brake application time for cut-off in the DC and AC circuits

$t_{2I}$  Brake application time for cut-off in the AC circuit (with DFS56 cut-off in the DC circuit)

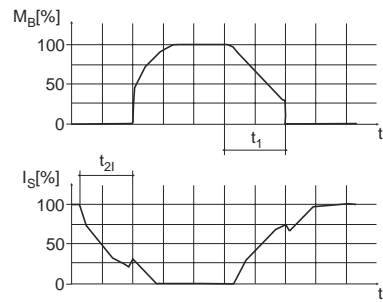
The response and application times are recommended values in relation to the maximum braking torque.





Current and  
braking torque

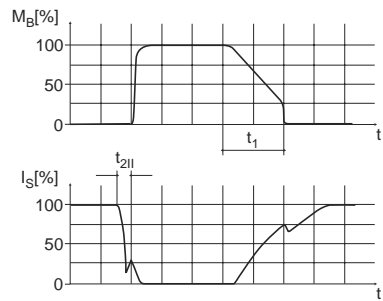
Cut-off in the AC circuit



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Figure 44: Current and braking torque for cut-off in the AC circuit

Cut-off in the DC and AC circuits

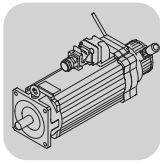


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Figure 45: Current and braking torque for cut-off in the DC and AC circuits

$M_B$  = Braking torque

$I_S$  = Coil current



## DFS/CFM Synchronous Servomotors

### Motor options

**Operating currents** The following tables list the operating currents of the brakes at different voltages. The following values are specified:

- Inrush current ratio  $I_B/I_H$ ;  $I_B$  = accelerator current,  $I_H$  = holding current
- Holding current  $I_H$
- Rated voltage  $U_N$

The accelerator current  $I_B$  (= inrush current) only flows for a short time (ca. 120 ms) when the brake is released or during voltage dips below 70 % of rated voltage.

The values for the holding currents  $I_H$  are r.m.s. values (arithmetic mean value at DC 24 V). Use suitable measuring instruments for current measurement.

Brake	B		BR1	BR2	BR8	
<b>For motor</b>	DFS56M/L	DFS56H	CFM71	CFM90	CFM112	
<b><math>M_{Bmax}</math> [Nm]</b>	2.5	5	20	40	90	
<b><math>P_B</math> [W]</b>	12	13.4	45	55	75	
<b>Inrush current ratio <math>I_B/I_H</math></b>	–	–	4.0	4.0	6.3	
<b>Rated voltage <math>U_N</math></b> (...) Voltage tolerances						
	<b><math>I</math> [A<sub>DC</sub>]</b>	<b><math>I</math> [A<sub>DC</sub>]</b>	<b><math>I_H</math> [A<sub>AC</sub>]</b>	<b><math>I_H</math> [A<sub>AC</sub>]</b>	<b><math>I_H</math> [A<sub>AC</sub>]</b>	
<b>[V<sub>AC</sub>]</b>						
	<b>[V<sub>DC</sub>]</b>					
	<b>24 (24-25)</b>	0.5	0.56	1.5	1.7	2.6
<b>110 (99-121)</b>		–	–	0.71	0.9	1.2
<b>230 (218-243)</b>		–	–	0.31	0.39	0.53
<b>400 (380-431)</b>		–	–	0.18	0.22	0.29
<b>460 (432-484)</b>		–	–	0.16	0.21	0.26

**Cross section of the brake cable**

Select the cross section of the brake cables according to the currents in your application. Bear in mind the inrush current of the brake when selecting the cross section. The voltage drop resulting from the inrush current must not cause the voltage to fall below 90 % of the supply voltage.

**Note**

Wire cross sections of max. 2.5 mm<sup>2</sup> can be connected to the terminals of the brake control systems. Intermediate terminals must be used in case of larger cross sections. Keep the distance between the intermediate terminal and the brake control system as short as possible.

Observe the voltage drop that occurs along the cable in particular with the DC 24 V brake coil when dimensioning the cross sections for the brake cable. The accelerator current is decisive for the calculation.

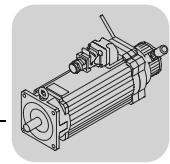
The permitted tolerance for the rated voltage outside the range limit is  $\pm 5\%$  (BR1, BR2, BR8).

The permitted tolerance for the B brake on a DS56 motor is  $\pm 10\%$ .

**Manual brake release**

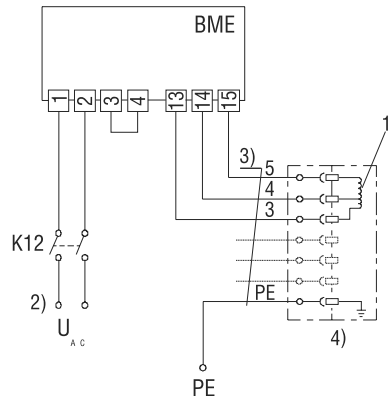
A manual brake release kit according to the brake size can be ordered for retrofitting the manual brake release.

Part number	Contents
BR1 manual brake release kit 0 196 602 2	1 releasing lever, 1 hand lever, 2 hex nuts
BR2 manual brake release kit 0 196 603 0	
BR8 manual brake release kit 0 196 604 9	

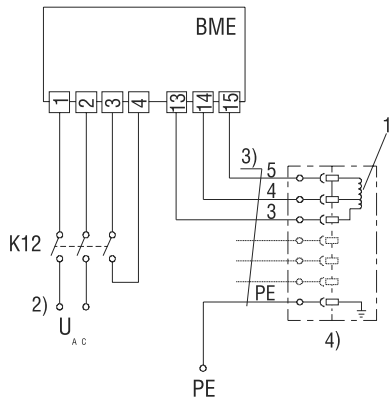


*Brake connection*

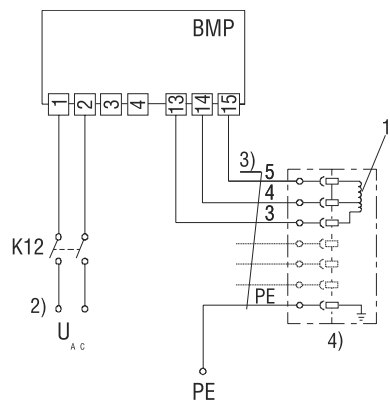
*BME brake rectifier* Cut-off in the AC circuit / normal application of the brake.

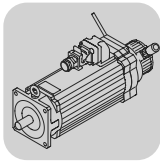


Cut-off in the DC and AC circuits / rapid application of the brake.



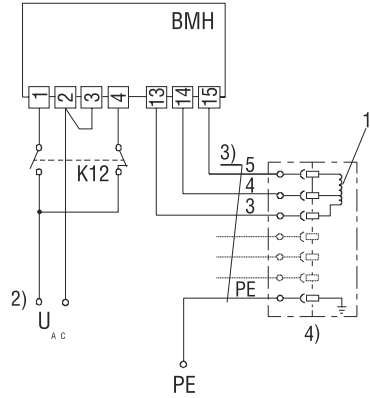
*BMP brake rectifier* Cut-off in the DC and AC circuits / rapid application of the brake / integrated voltage relay.



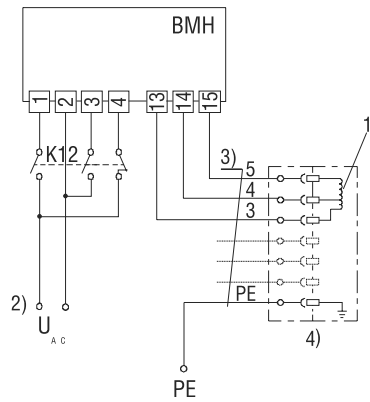


**DFS/CFM Synchronous Servomotors**  
Motor options

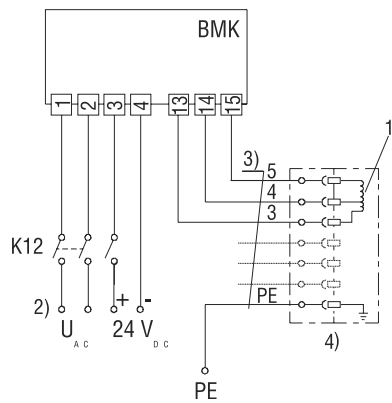
*BMH brake rectifier* Cut-off in the AC circuit / normal application of the brake.

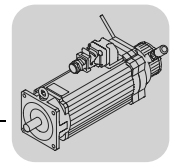


Cut-off in the DC and AC circuits / rapid application of the brake.

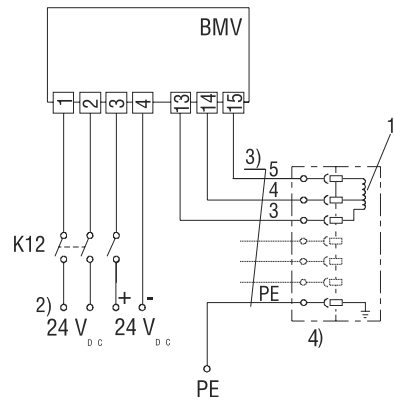


*BMK brake rectifier* Cut-off in the DC and AC circuits / rapid application of the brake / integrated voltage relay / integrated DC 24 V control input.

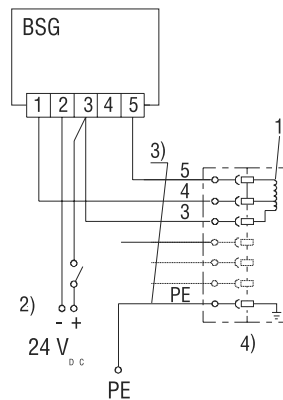




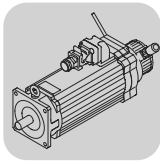
*BMV brake control* Cut-off in the DC and AC circuits / rapid application of the brake / integrated DC 24 V control input.



*BSG control unit* For DC voltage supply with DC 24 V.

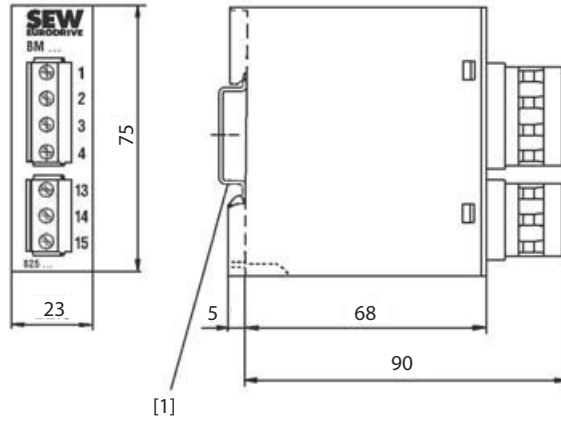


- 1) Brake coil
- 2) To release the brake, apply voltage as indicated on the nameplate, **switch contacts according to utilization category AC3 to EN 60947-4.1. BMH:** To release and heat the brake at zero speed, apply the voltage as indicated on the nameplate. K12 not activated: Heating mode Contact rating of terminals 1 and 4 at BMH: AC11, terminal 3: AC3 according to EN 60 947-4-1
- 3) Brake cable
- 4) BME / BMV angular connector 185 871 8, BSG terminal screws



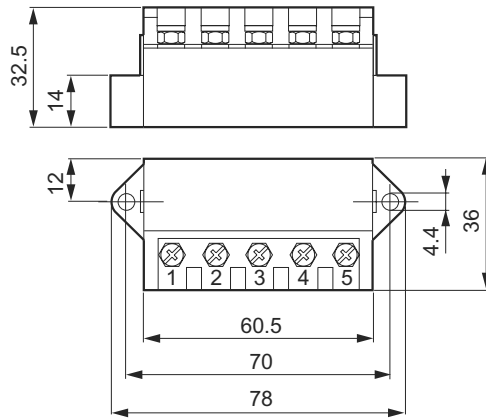
**DFS/CFM Synchronous Servomotors**  
Motor options

*Dimensions BME, BMP, BMH, BMK, BMV*

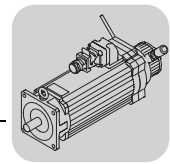


[1] DIN rail mounting EN 50022-35 x 7.5

*Dimensions BSG*



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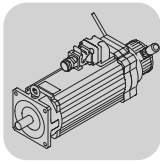


#### 4. Resolvers

Resolvers for  
motor sizes  
DFS56,  
CFM71...112

Part number for RH1M / RH1L	0199 031 4
No. of poles	2
Primary	Rotor
Input voltage	7 V
Input frequency	7 kHz
Gear ratio $\pm 10\%$	0.5
Phase shift $\pm 5^\circ$	$+13^\circ$
Input impedance $\pm 15\%$	$130 + j 120 \Omega$
Output impedance $\pm 15\%$	$200 + j 270 \Omega$
Input resistance $\pm 10\%$	$82 \Omega$
Output resistance $\pm 10\%$	$68 \Omega$
Max. electrical fault	$\pm 6'$
Temperature range	$-55^\circ\text{C}$ to $+150^\circ\text{C}$

SEW servo gearmotors are supplied with 2-pole resolvers as standard. Further information on other resolvers is available on request.



#### 5. AS1H / ES1H Hiperface encoder

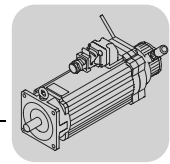
SEW-EURODRIVE offers Hiperface encoders as alternative for resolvers.

Type		ES1H 0199 443 3	AS1H 0199 442 5
Supply voltage	$U_B$	7 ... 8 ... 12 V <sub>DC</sub> polarity reversal protected	
Max. current consumption	$I_{in}$	140 mA	
Maximum operating frequency	$f_{Grenz}$	200 kHz	
Pulses (sine cycles) per revolution	A, B	1024	
Output amplitude per track		1 V <sub>SS</sub> sin/cos	
Single-turn resolution		32768 increments/revolution (15 bit)	
Multi-turn resolution		-	4096 revolutions (12-bit)
Transmission protocol		Hiperface	
Serial data output		Driver according to EIA RS-485	
Vibration (55...2000 Hz)		≤ 200 m/s <sup>2</sup> (DIN IEC 68-2-6)	
Maximum speed	$n_{max}$	6000 min <sup>-1</sup>	
Connection		12-pin round connector plug (Intercontec)	

#### 6. AV1Y, AV1H, EV1H absolute encoders

Type		AV1Y 0198 889 1	AV1H 0187 189 7	EV1H 0187 287 7
Supply voltage	$U_B$	DC 10...15...24...30 V polarity reversal protected	DC 7...12 V polarity reversal protected	
Max. current consumption	$I_{in}$	250 mA	80 mA	
Max. operating frequency	$f_{Grenz}$	≥ 100 kHz	200 kHz	
Pulses (sine cycles) per revolution	A, B	512	1024	
Output amplitude per track		1 V <sub>SS</sub> sin/cos		
Scanning code		Gray code	-	
Single-turn resolution		4096 increments/revolution	32768 increments/revolution	
Multi-turn resolution		4096 revolutions (12 bit)		-
Data transmission absolute values		synchronous, serial (SSI)	Hiperface	
Serial data output		Driver according to EIA RS-485		
Serial clock input		Opto-coupler, recommended driver to EIA RS-485	-	
Cycle frequency		permitted range: 90...300... 1100 kHz. (max. 100 m cable length with 300 kHz)	-	
Switching gap time		12...35 μs	-	
Vibration (55...2000 Hz)		≤ 100 m/s <sup>2</sup> (DIN 150 68-2-6)	200 m/s <sup>2</sup> (DIN 150 68-2-6)	
Max. speed	$n_{max}$	6000 min <sup>-1</sup>		
Weight	m	0.30 kg	0.55 kg	
Operating temperature	$\vartheta_B$	-15°C...+60°C (EN 60721-3-3, class 3K3)	-20°C...+85°C (EN 60721-3-3, class 3K3)	
Enclosure		IP65 (EN 60529)		
Connection		1 m (3.3 ft) cable with 17-pin round connector, suitable for female connector SPUC 17B FRAN	1 m (3.3 ft) cable with 12-pin round connector (Intercontec)	





**7. VR forced cooling fan**

CFM synchronous servomotors can be equipped with a forced cooling fan if required. The VR forced cooling fan is available for DC 24 V and AC 100 V ... 240 V.

Forced cooling fan type	VR		
	CFM71	CFM90	CFM112
For motor size	CFM71	CFM90	CFM112
Supply voltage DC [V]	24 ± 10 %		
Current consumption [DC A]	0.46		0.75
Power consumption [W]	11		18
Air discharge rate [m <sup>3</sup> /h]	118	118	275
Ambient temperature [°C]	-20 ... + 60		
Enclosure	IP54 / IP55		
Electrical connection	Plug connector		
Max. cable cross section [mm <sup>2</sup> ]	3 × 1		
Connection cable, max. Ø	7 mm		

**UWU51A  
switched-mode  
power supply**

The AC voltage type includes a VR forced cooling fan and the UWU51A switched-mode power supply.

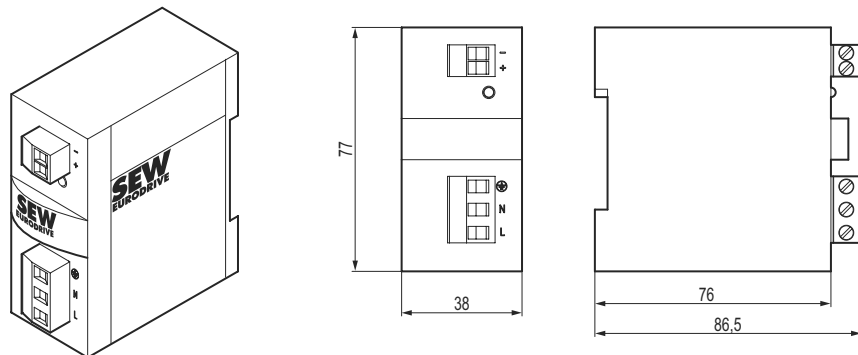
Input: AC 100 ... 240 V – 6 % / + 10 %, 50/60 Hz.

Output: DC 24 V – 1 % / + 2 %, 1.3 A.

Connection: Terminal screws 0.2 ... 2.5 mm<sup>2</sup>, separable.

Enclosure: IP20; installation on support rail EN 50022 in the control cabinet.

Part number: 187 441 1.

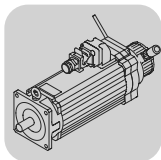


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Figure 46: UWU51A switched-mode power supply

**Forced cooling fan,  
cpl.**

Forced cooling fan for motor type	Part number
24 V, CFM71	0 187 380 6
24 V, CFM71BR	0 187 381 4
24 V, CFM90	0 187 382 2
24 V, CFM90BR	0 187 479 9
24 V, CFM112	0 187 384 9
24 V, CFM112BR	0 187 383 0
24 V, CFM71BR KK	0 187 622 8
24 V, CFM90BR KK	0 187 624 4



## DFS/CFM Synchronous Servomotors

### Motor options

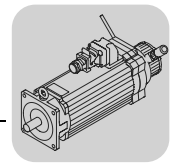
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#### *Retrofitting forced cooling fan*

An accessory bag must be ordered for retrofitting a forced cooling fan.

Accessory bag for motor type	Part number
CFM71	0 187 945 6
CFM90	0 199 322 4
CFM112	0 199 323 2
CFM71 - 112BR	0 199 324 0

Refer to the operating instructions of the motor for details on retrofitting a forced cooling fan.

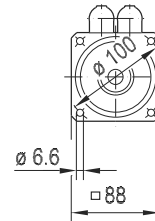
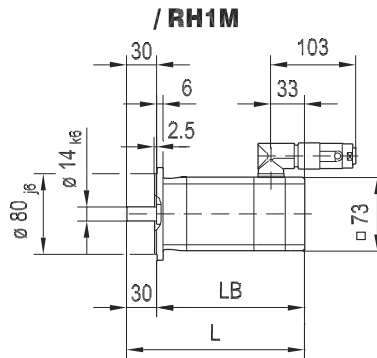
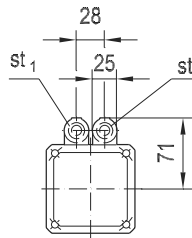


11.6 Dimension sheets for synchronous servomotors

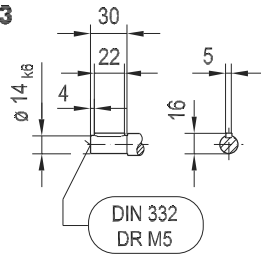
Synchronous servo (brake) motors DFS56.. (/B) with plug connector

08 016 03 98

DFS56M/SM..  
DFS56L/SM..

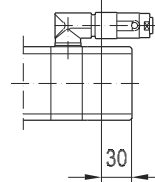


DIN 748 / 3

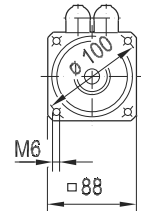
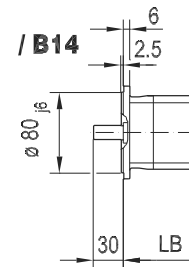


/ RH1M

/ AS1H  
/ ES1H

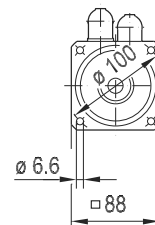
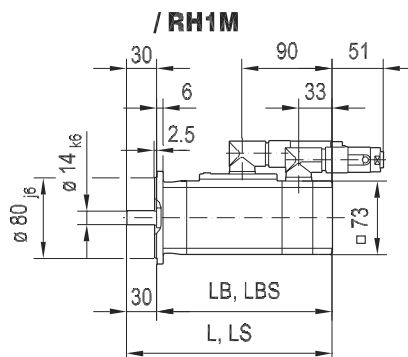
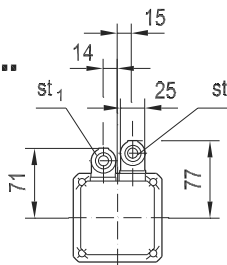


/ B14

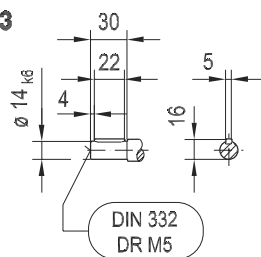


11

DFS56H/SM..  
DFS56../B/SB..

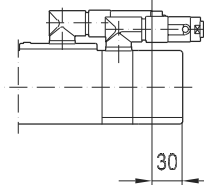


DIN 748 / 3

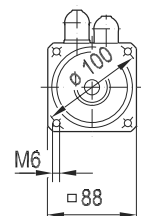
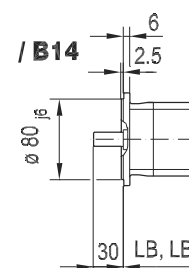


/ RH1M

/ AS1H  
/ ES1H

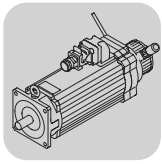


/ B14



(→ 105)	DFS56M/SM..	DFS56M/B/SB..	DFS56L/SM..	DFS56L/B/SB..	DFS56H/SM..	DFS56H/B/SB..
L, LS	174	204	206	236	309	309
LB, LBS	144	174	176	206	279	279
st <sup>1)</sup>	9-14	9-14	9-14	9-14	9-14	9-14
st <sub>1</sub> <sup>2)</sup>	5,5-14	5,5-14	5,5-14	5,5-14	5,5-14	5,5-14

1) Round connector, power  
2) Round connector, signal

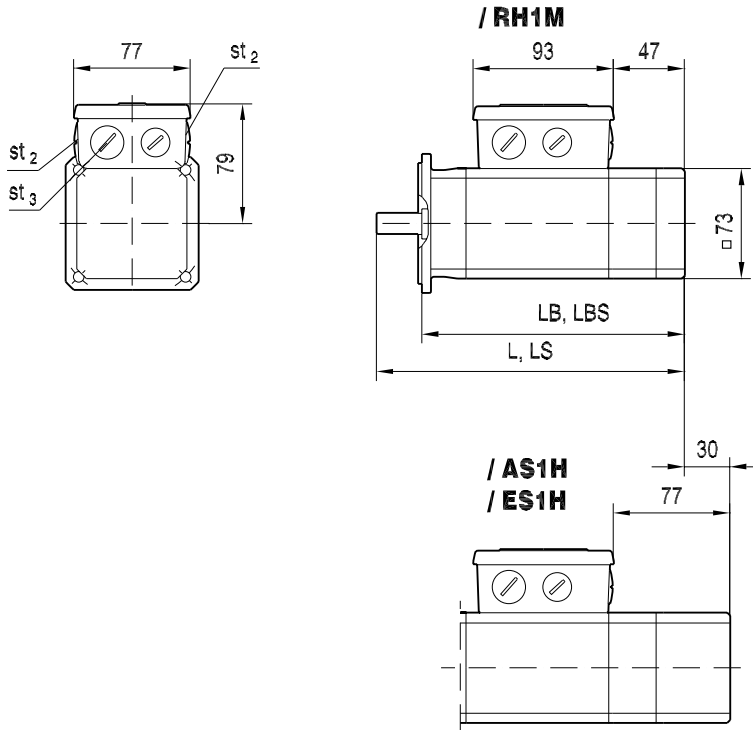


**DFS/CFM Synchronous Servomotors**  
Dimension sheets for synchronous servomotors

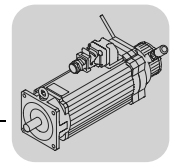
*Synchronous servo (brake) motors DFS56.. (/B) with terminal box*

08 005 00 04

**DFS56.. /KK**  
**DFS56.. /B /KK**



(→ 105)	DFS56M/KK	DFS56M/B/KK	DFS56L/KK	DFS56L/B/KK	DFS56H/KK	DFS56H/B/KK
L, LS	204	204	236	236	309	309
LB, LBS	174	174	206	206	279	279
st <sub>2</sub>	1xM20x1.5 1xM16x1.5	1xM20x1.5 1xM16x1.5	1xM20x1.5 1xM16x1.5	1xM20x1.5 1xM16x1.5	1xM20x1.5 1xM16x1.5	1xM20x1.5 1xM16x1.5
st <sub>3</sub>	1xM20x1.5 1xM16x1.5	1xM20x1.5 1xM16x1.5	1xM20x1.5 1xM16x1.5	1xM20x1.5 1xM16x1.5	1xM20x1.5 1xM16x1.5	1xM20x1.5 1xM16x1.5

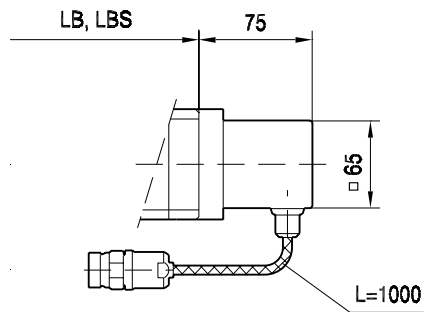


Synchronous servo (brake) motors DFS56..(IB) with encoder

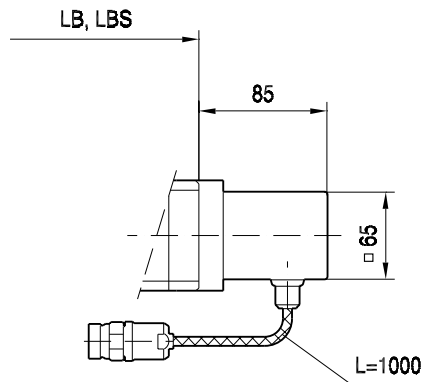
08 119 02 99

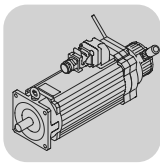
DFS56..

/ AV1Y



/ AV1H  
/ EV1H





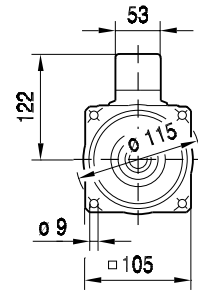
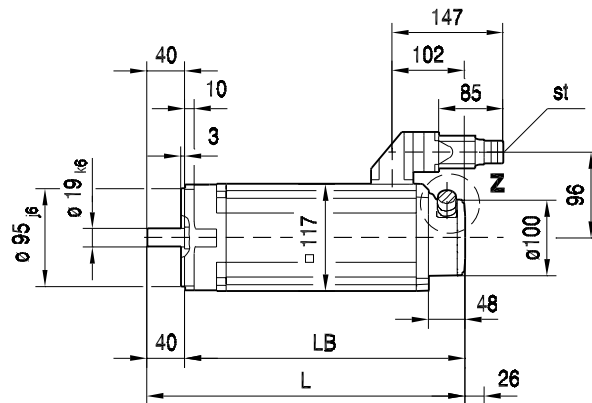
**DFS/CFM Synchronous Servomotors**  
Dimension sheets for synchronous servomotors

*Synchronous servomotors CFM71.. with plug connector and absolute encoder/resolver*

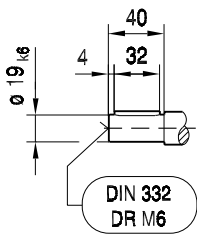
08 172 02 01

**CFM71S/SM..**  
**CFM71M/SM..**  
**CFM71L/SM..**

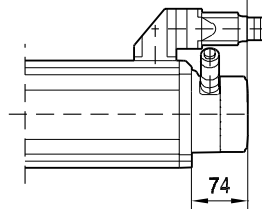
**/ RH1M**



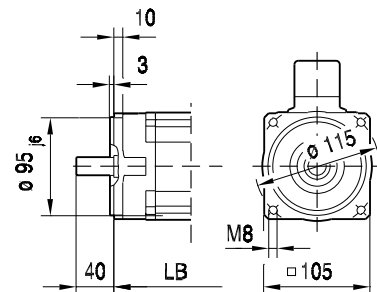
**DIN 748 / 3**



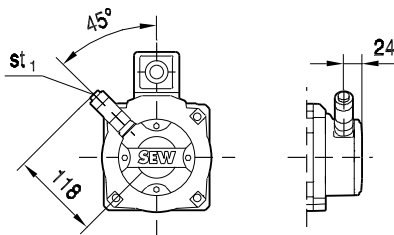
**/ AS1H**  
**/ ES1H**



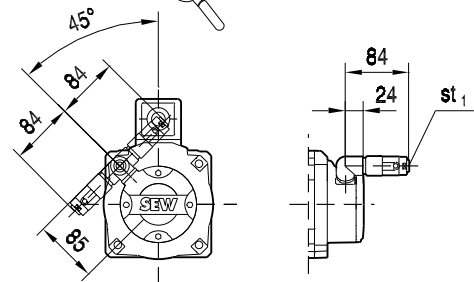
**/ B14**



**/ SM5.**

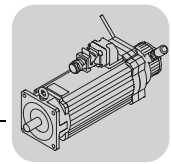


**/ SM6.**



(→ 105)	CFM71S/SM..	CFM71M/SM..	CFM71L/SM..
L	289	309	349
LB	249	269	309
st <sup>1)</sup>	8 ...14	14 ...17	14 ...17
st <sub>1</sub> <sup>1)</sup>	5.5 ... 10.5	5.5 ... 10.5	5.5 ... 10.5

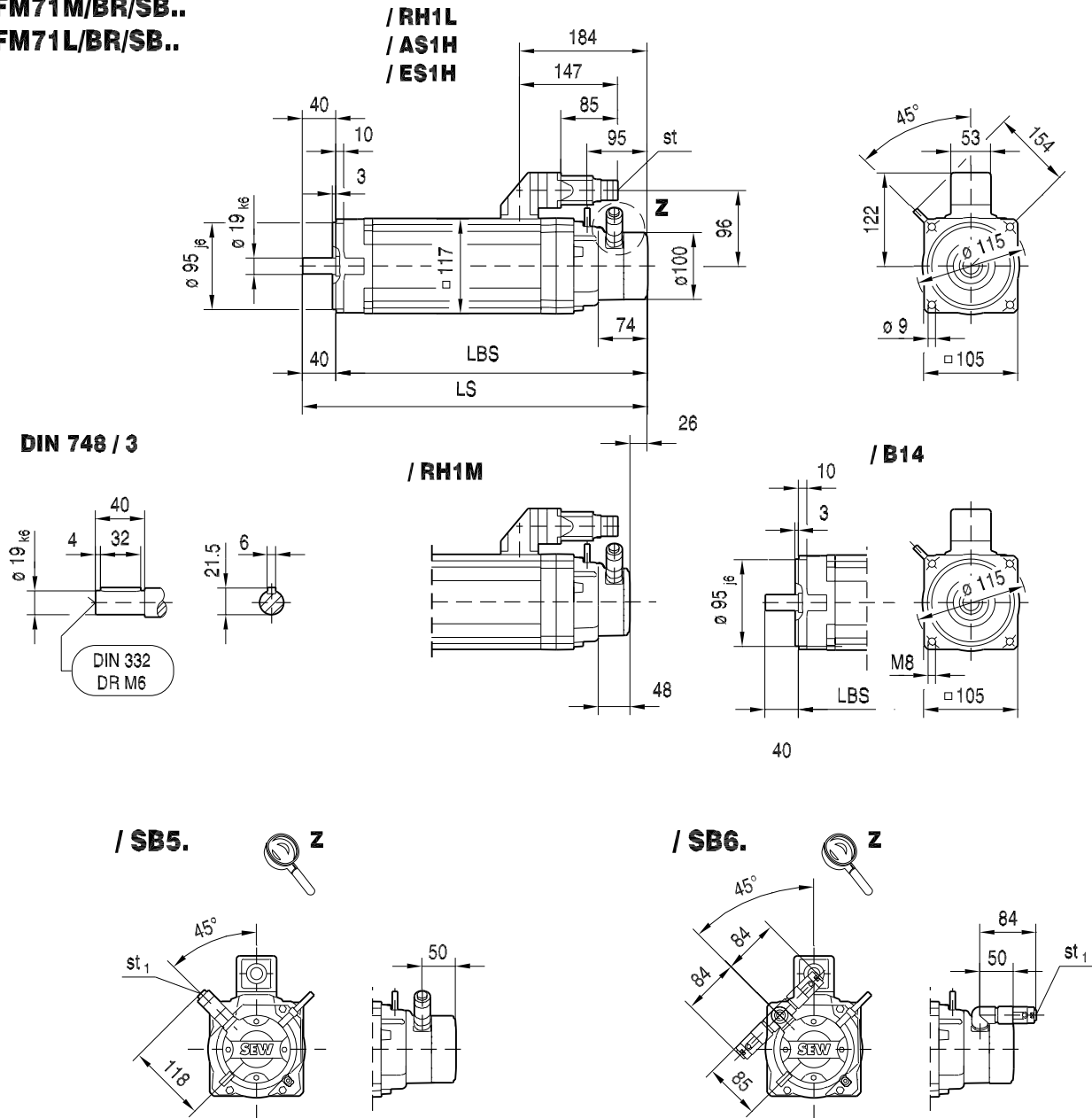
1) Diameter of cable to be connected



Synchronous servo brake motors CFM71/BR.. with plug connector and absolute encoder/resolver

09 033 02 01

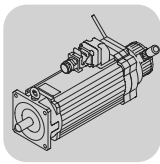
**CFM71S/BR/SB..**  
**CFM71M/BR/SB..**  
**CFM71L/BR/SB..**



11

(→ 105)	CFM71S/BR/SB..	CFM71M/BR/SB..	CFM71L/BR/SB..
LS	371	391	431
LBS	331	351	391
st <sup>1)</sup>	8 ...14	14 ...17	14 ...17
st <sub>1</sub> <sup>1)</sup>	5.5 ... 10.5	5.5 ... 10.5	5.5 ... 10.5

1) Diameter of cable to be connected



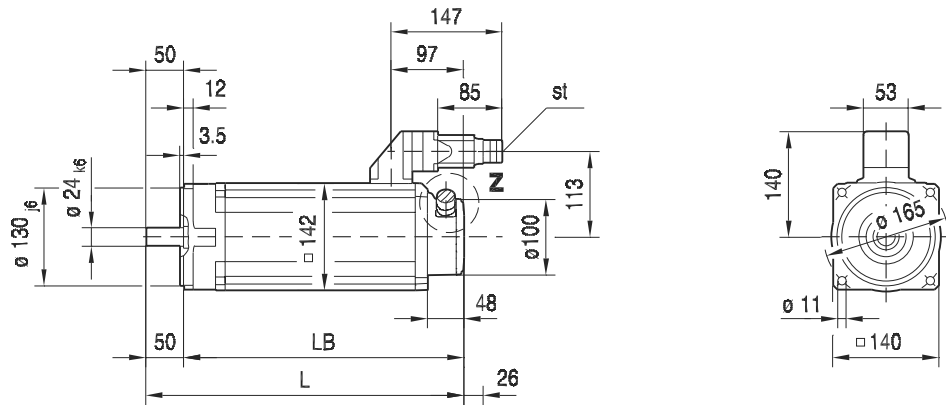
**DFS/CFM Synchronous Servomotors**  
Dimension sheets for synchronous servomotors

*Synchronous servomotors CFM90.. with plug connector and absolute encoder/resolver*

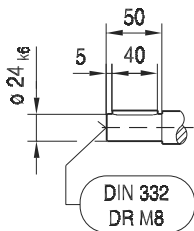
08 173 02 01

**CFM90S/SM..**  
**CFM90M/SM..**  
**CFM90L/SM..**

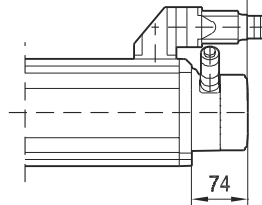
**/ RH1M**



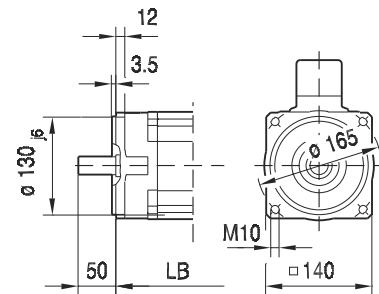
**DIN 748 / 3**



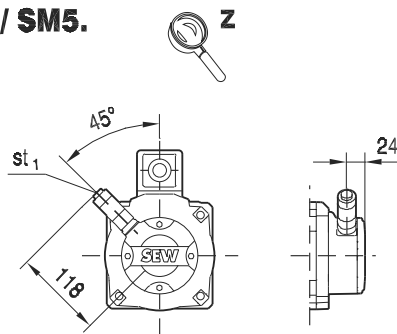
**/ AS1H**  
**/ ES1H**



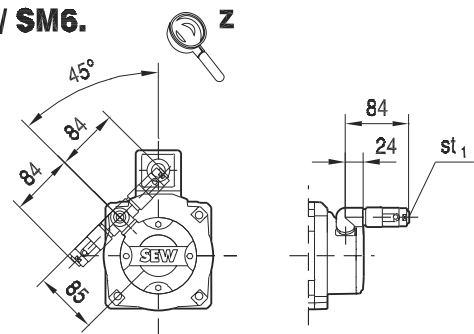
**/ B14**



**/ SM5.**



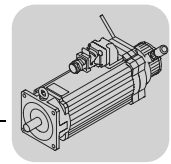
**/ SM6.**



(→ 105)	CFM90S/SM..	CFM90M/SM..	CFM90L/SM..
L	341	368	422
LB	291	318	372
st <sup>1)</sup>	8 ... 14	14 ... 17	14 ... 17
st <sub>1</sub>	5.5 ... 10.5	5.5 ... 10.5	5.5 ... 10.5

1) Diameter of cable to be connected

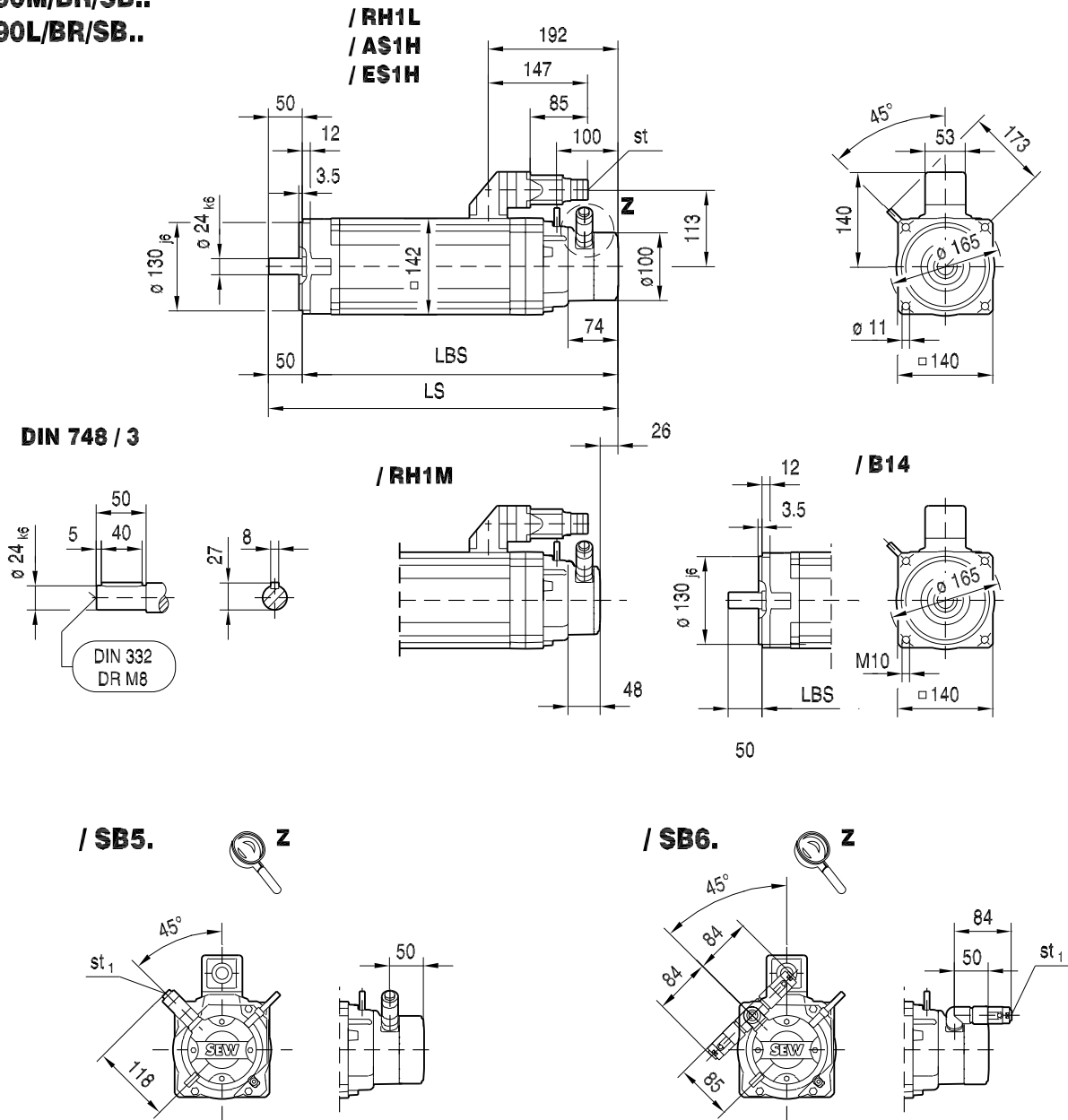




Synchronous servo brake motors CFM90/BR.. with plug connector and absolute encoder/resolver

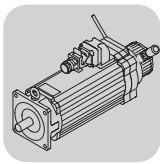
09 034 02 01

CFM90S/BR/SB..  
CFM90M/BR/SB..  
CFM90L/BR/SB..



(→ 105)	CFM90S/BR/SB..	CFM90M/BR/SB..	CFM90L/BR/SB..
LS	436	463	517
LBS	386	413	467
st <sup>1)</sup>	8 ... 14	14 ... 17	14 ... 17
st <sub>1</sub> <sup>1)</sup>	5.5 ... 10.5	5.5 ... 10.5	5.5 ... 10.5

1) Diameter of cable to be connected



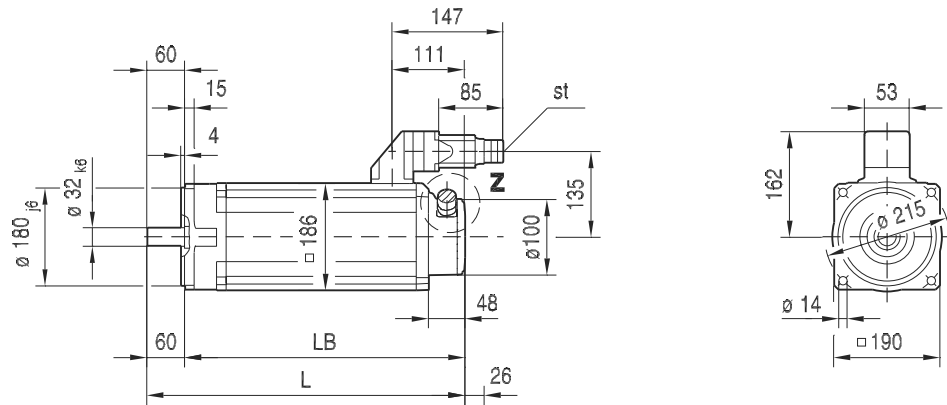
**DFS/CFM Synchronous Servomotors**  
Dimension sheets for synchronous servomotors

**Synchronous servomotors CFM112.. with plug connector and absolute encoder/resolver**

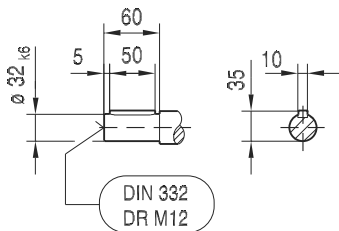
08 174 02 01

**CFM112S/SM..**  
**CFM112M/SM..**  
**CFM112L/SM..**

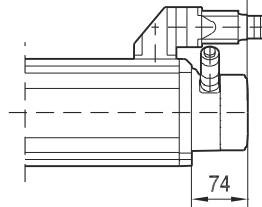
**/ RH1M**



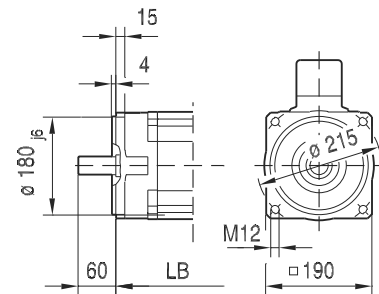
**DIN 748 / 3**



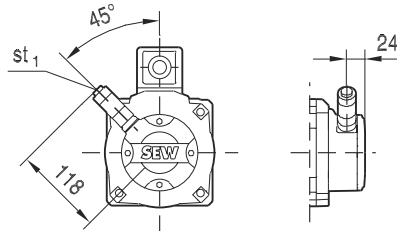
**/ AS1H**  
**/ ES1H**



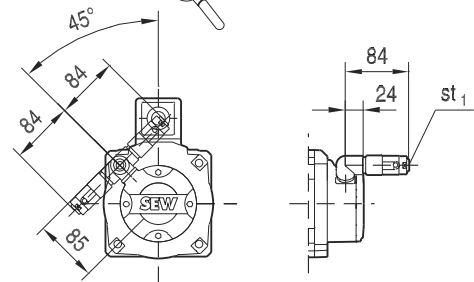
**/ B14**



**/ SM5.**

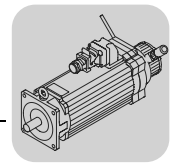


**/ SM6.**



(→ 105)	CFM112S/SM..	CFM112M/SM..	CFM112L/SM..
L	379	406	460
LB	319	346	400
st <sup>1)</sup>	14 ...17	17 ... 23	17 ...23
st <sub>1</sub> <sup>1)</sup>	5.5 ... 10.5	5.5 ... 10.5	5.5 ... 10.5

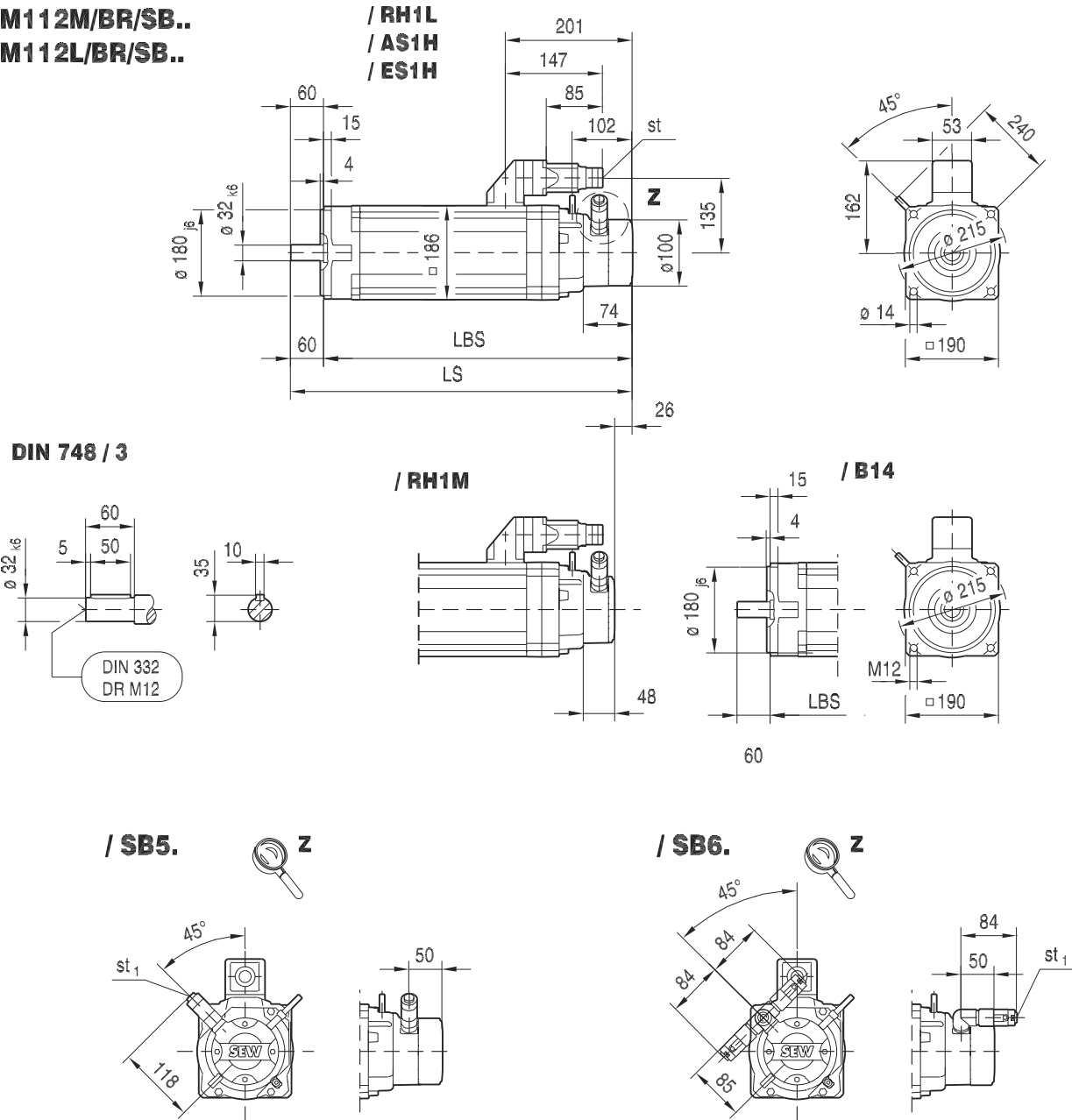
1) Diameter of cable to be connected



Synchronous servo brake motors CFM112/BR.. with plug connector and absolute encoder/resolver

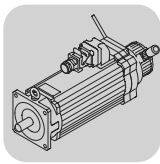
09 035 02 01

CFM112S/BR/SB..  
CFM112M/BR/SB..  
CFM112L/BR/SB..



(→ 105)	CFM112S/BR/SB..	CFM112M/BR/SB..	CFM112L/BR/SB..
LS	469	496	550
LBS	409	436	490
st <sup>1)</sup>	14 ... 17	17 ... 23	17 ... 23
st <sub>1</sub> <sup>1)</sup>	5.5 ... 10.5	5.5 ... 10.5	5.5 ... 10.5

1) Diameter of cable to be connected

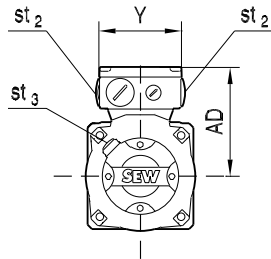


**DFS/CFM Synchronous Servomotors**  
Dimension sheets for synchronous servomotors

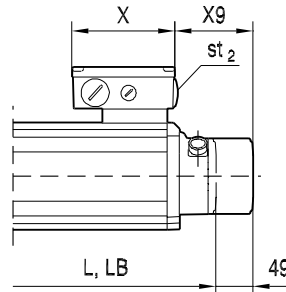
**Synchronous servo brake motors CFM.. with terminal box and absolute encoder/resolver/brake**

08 178 01 01

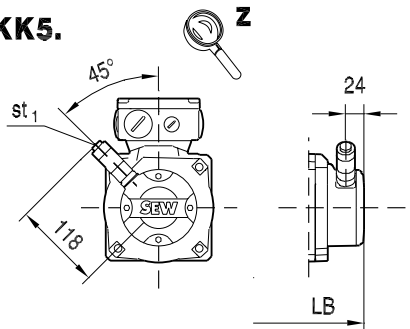
**CFM../KK..**



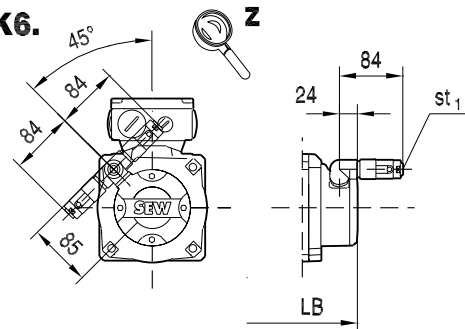
**/ RH1M  
/ AS1H  
/ ES1H**



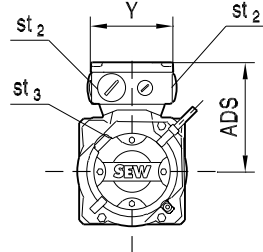
**/ KK5.**



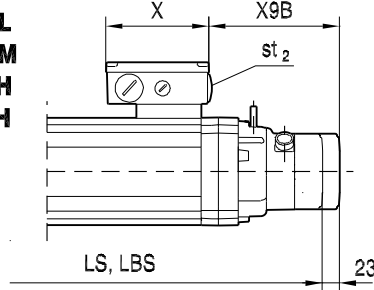
**/ KK6.**



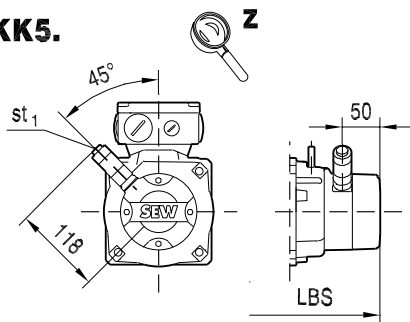
**CFM../BR/KK..**



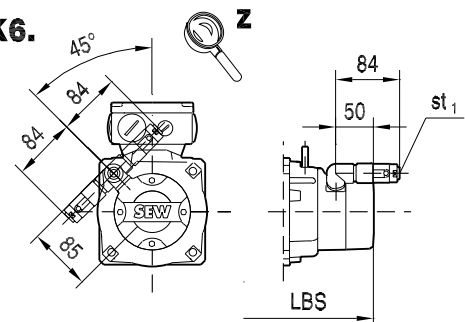
**/ RH1L  
/ RH1M  
/ AS1H  
/ ES1H**



**/ KK5.**



**/ KK6.**



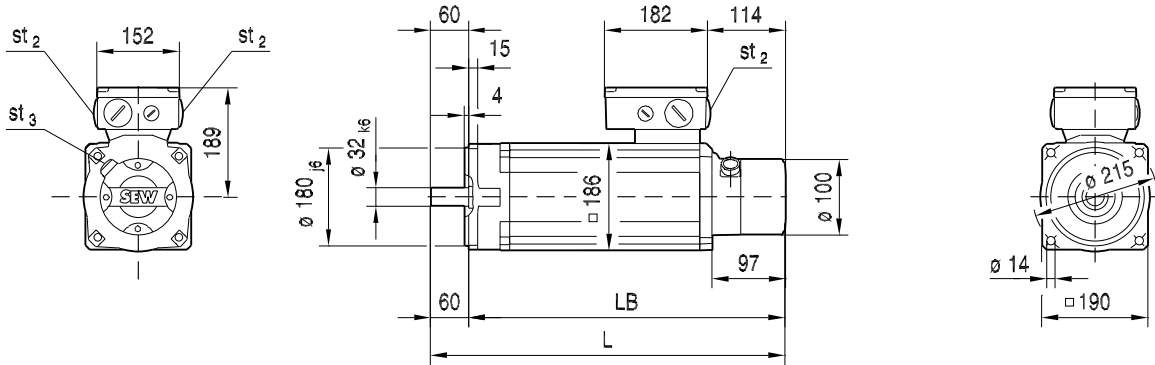
(→ 105)	CFM71S..	CFM71M..	CFM71L..	CFM90S..	CFM90M..	CFM90L..	CFM112S..	CFM112M..	CFM112L..
AD, ADS	125	125	125	139	139	139	161	190	190
st <sub>2</sub>	1xM25x1.5 1xM16x1.5	1xM25x1.5 1xM16x1.5	1xM25x1.5 1xM16x1.5	1xM32x1.5 1xM16x1.5	1xM32x1.5 1xM16x1.5	1xM32x1.5 1xM16x1.5	1xM32x1.5 1xM16x1.5	1xM50x1.5 1xM16x1.5	1xM50x1.5 1xM16x1.5
st <sub>3</sub>	1xM16x1.5	1xM16x1.5	1xM16x1.5	1xM16x1.5	1xM16x1.5	1xM16x1.5	1xM16x1.5	1xM16x1.5	1xM16x1.5
X	127	127	127	139	139	139	139	182	182
X9	114	114	114	107	107	107	121	114	114
X9B	170	170	170	176	176	176	185	178	178
Y	97	97	97	109	109	109	109	152	152

Synchronous servomotors CFM112H.. with terminal box and absolute encoder/resolver

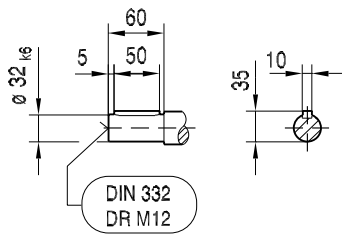
08 220 01 02

CFM112H

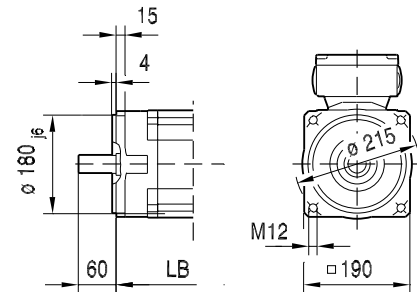
/ RH1M  
/ AS1H  
/ ES1H



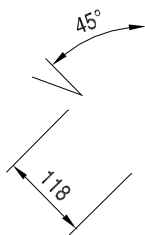
DIN 748 / 3



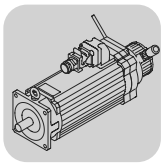
/ B14



/ KK5.



(→ 105)	CFM112H/KK..		
L	590		
LB	530		
st <sub>2</sub>	1xM50x1.5 1xM16x1.5		
st <sub>3</sub>	1xM16x1.5		



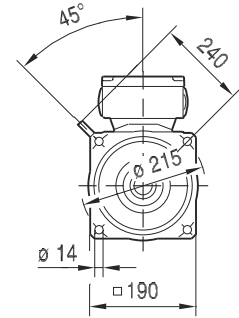
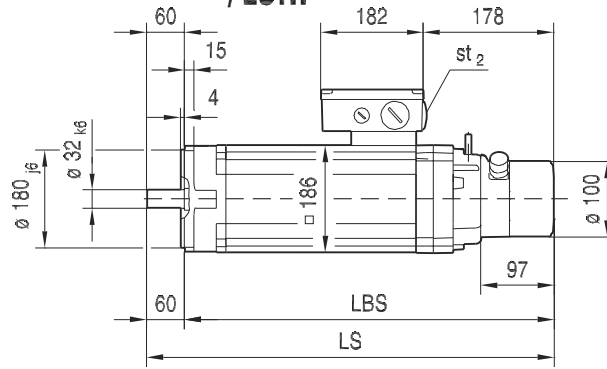
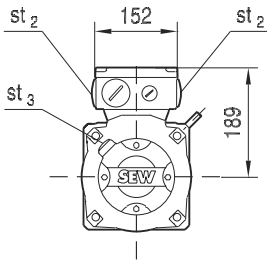
**DFS/CFM Synchronous Servomotors**  
Dimension sheets for synchronous servomotors

*Synchronous servo brake motors CFM112H/BR.. with terminal box and absolute encoder/resolver*

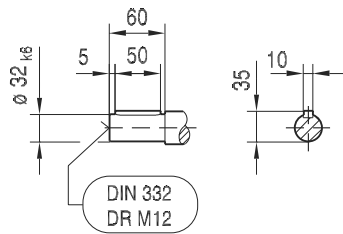
09 069 01 02

**CFM112H/BR**

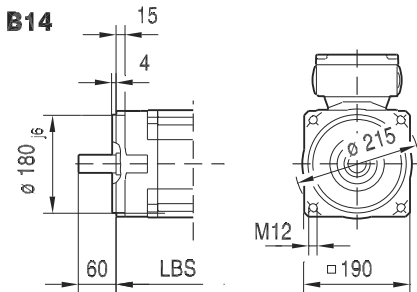
**/RH1M  
/RH1L  
/AS1H  
/ES1H**



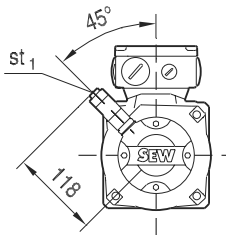
**DIN 748 / 3**



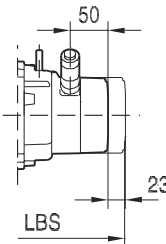
**/B14**



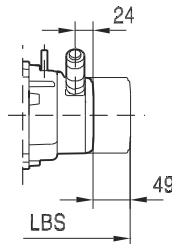
**/KK5.**



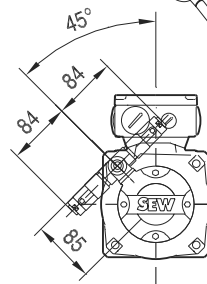
**/RH1L  
/AS1H  
/ES1H**



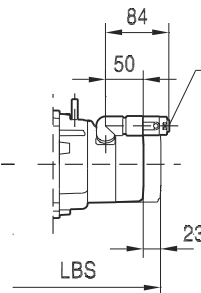
**/RH1M**



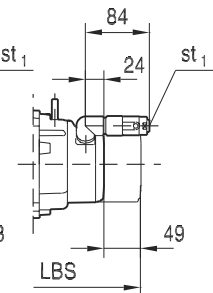
**/KK6.**



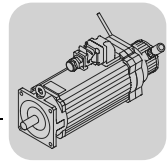
**/RH1L  
/AS1H  
/ES1H**



**/RH1M**



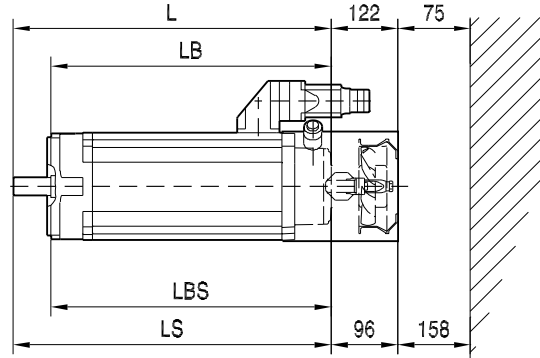
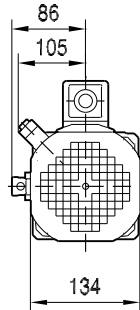
(→ 105)	CFM112H/BR/KK..		
LS	655		
LBS	595		
st <sub>2</sub>	1xM50x1.5 1xM16x1.5		
st <sub>3</sub>	1xM16x1.5		



Synchronous servo (brake) motors CFM..(IBR) with forced cooling fan

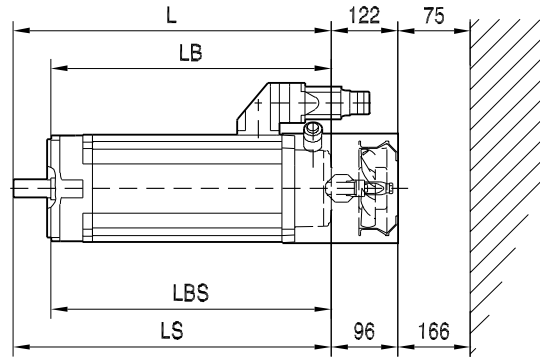
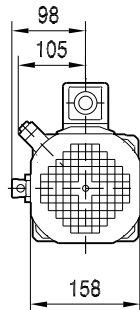
08 177 01 01

**CFM71.. /VR**



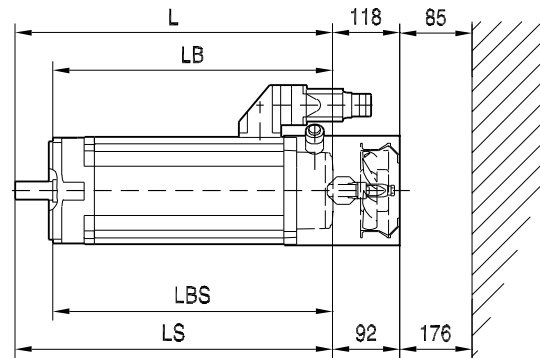
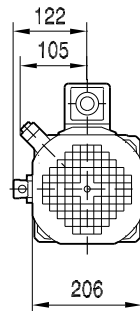
**CFM71.. /BR /VR**

**CFM90.. /VR**



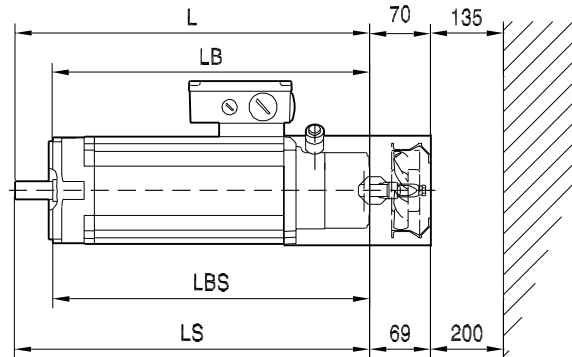
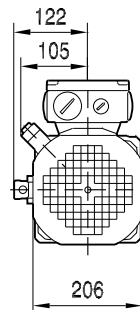
**CFM90.. /BR /VR**

**CFM112.. /VR**



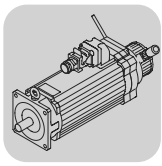
**CFM112.. /BR /VR**

**CFM112H.. /VR**



**CFM112H.. /BR /VR**

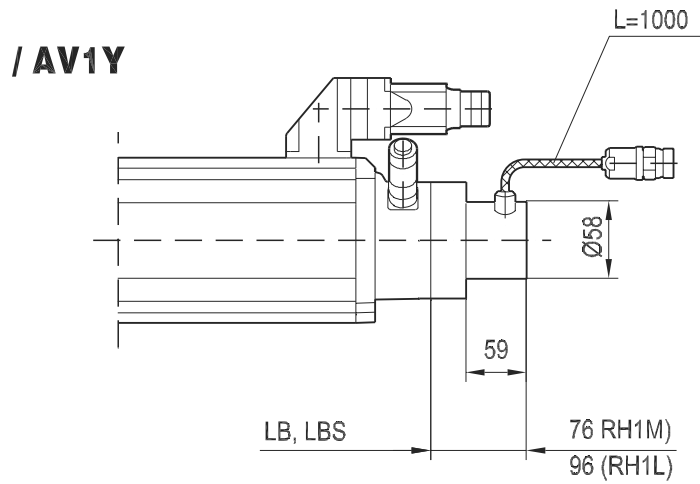
11



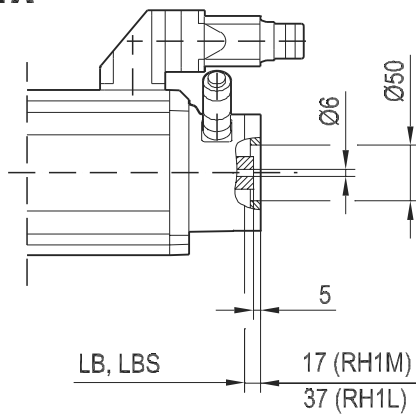
*Synchronous servo (brake) motors CFM.. (/B.) with resolver/encoder*

CFM...

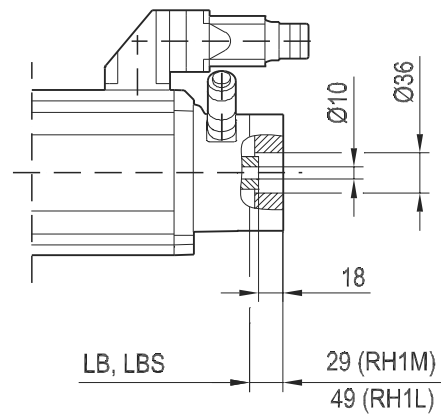
08 241 00 04



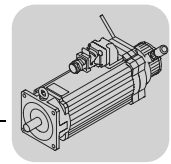
**/ AV1A  
/ EV1A**



**/ XV2A**



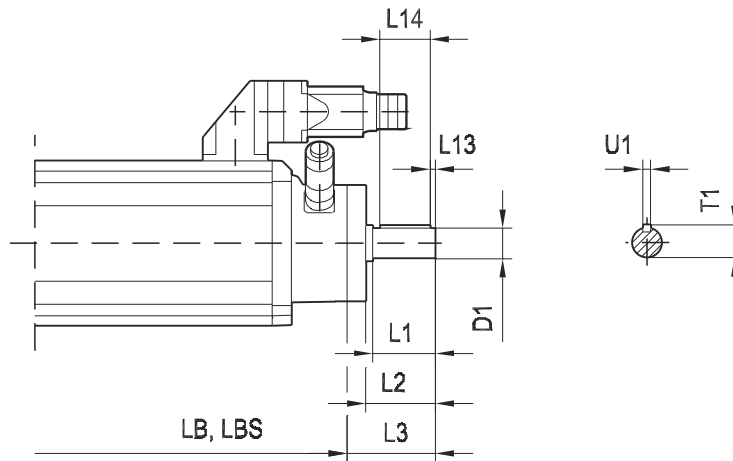




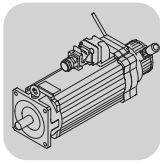
Synchronous servo (brake) motors CFM.. with 2nd shaft end and RH1M resolver

CFM...

08 243 00 04



(→ 105)	CFM71..	CFM90..	CFM112..
D1	14	19	28
L1	30	40	60
L2	35	46	67
L3	50	61	85
L13	4	4	5
L14	22	32	50
U1	5	6	8
T1	16	21.5	31



#### 11.7 Hybrid cables

##### *Prefabricated cables*

SEW-EURODRIVE offers pre-fabricated hybrid cables with plugs for straightforward and reliable motor connection. Cable and contact are connected using the crimp technique. The following cables are available in 1 m steps:

- Motor power
- Motor power + brake
- Resolver / motor protection
- Absolute encoder / motor protection
- Forced cooling fan.

Cables from Lapp are used for fixed installation, cables from Nexans are used in cable carriers.

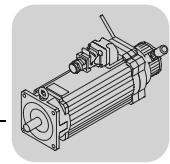


For cable specifications, such as bending radius, certification and temperature range, please refer to the cable specification section on page 380 .

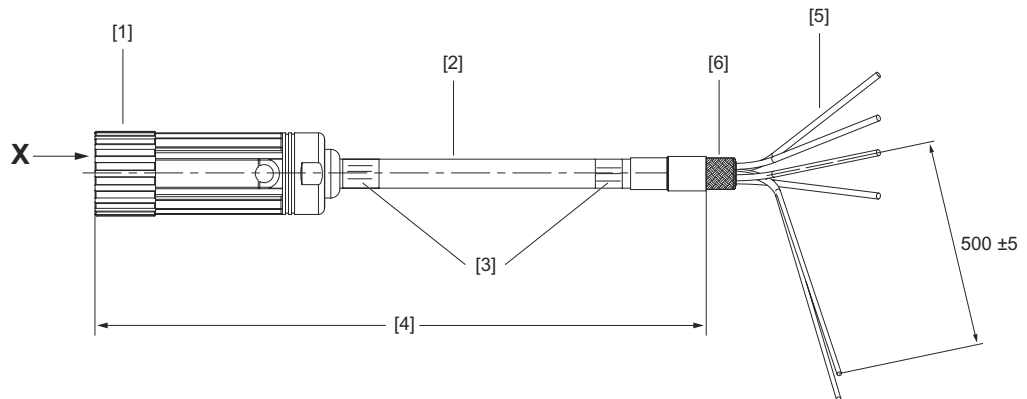
The size of the plug connector depends on the current level and the maximum cable length according to the speed (see page 354).

Hybrid cables are divided into:

- Power cables (motor cable, brake motor cable, extension cable)
- and into
- feedback cables (resolver cable, encoder cable, extension cable).



**Structure of power cables for DFS motors**



54069AXX

Figure 47: Motor cable for DFS motor

- [1] Connector: Intercontec BSTA 078
- [2] SEW-EURODRIVE logo printed on cable
- [3] Nameplate
- [4] Line length  $\leq 10$  m: +200 mm tolerance  
Line length  $\geq 10$  m: +2 % tolerance  
Permitted line length according to the technical documents.
- [5] Pre-fabricated cable end for inverter.  
Required loose parts are supplied with the cable.
- [6] Shielding pulled back ca. 20 mm + 5 mm.

*Pre-fabricated cables for motor end*

The power cables on the motor end consist of an 8-pin plug connector and socket contacts.

The shield is connected with the connector housing according to EMC aspects. All plug connectors seal the plug on the cable end with a lamellar seal and ensure cable relief according to EN 61884.

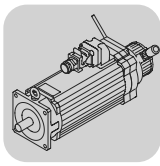
*Pre-fabricated cables for inverter end*

The individual cable strands of the power and brake power cables are exposed and the shield is prepared for being connected in the control cabinet. The cable for the inverter end has yet to be assembled. The required loose parts are supplied with the cable in a separate bag.

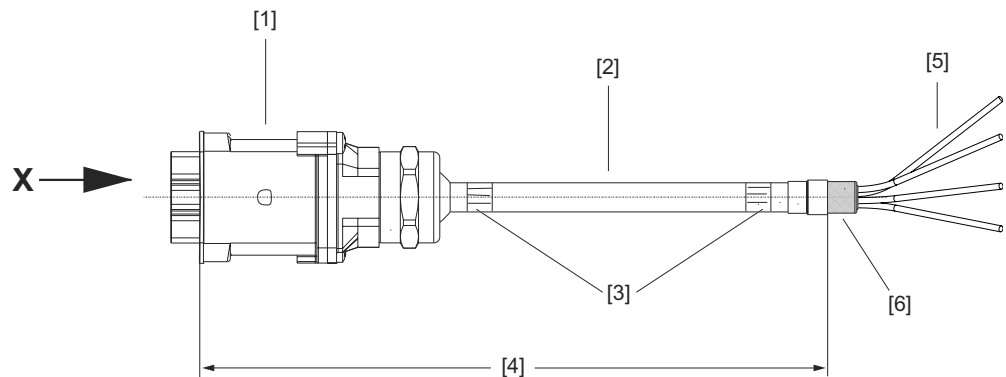
*Loose parts*

The following loose parts are supplied in accordance with the core cross sections for connection to the power terminals on the inverter:

Bag no.	Contents
1	4 x conductor end sleeves 1.5 mm <sup>2</sup> , insulated 4 x M6 U-shaped cable lugs 1.5 mm <sup>2</sup>



#### Structure of power cables for CFM motors



54102AXX

Figure 48: Motor cable for CFM motor

- [1] Connector: Amphenol
- [2] SEW-EURODRIVE logo printed on cable
- [3] Nameplate
- [4] Line length  $\leq 10$  m: +200 mm tolerance  
Line length  $\geq 10$  m: +2 % tolerance  
Permitted line length according to the technical documents.
- [5] Pre-fabricated cable end for inverter.  
Required loose parts are supplied with the cable.
- [6] Shielding pulled back ca. 20 mm + 5 mm.

#### Pre-fabricated cables for motor end

The power cables on the motor end have a 6-pin EMC Amphenol plug connector and socket contacts.

The shield is connected with the connector housing according to EMC aspects. All plug connectors seal the plug on the cable end with a lamellar seal and ensure cable relief according to EN 61884.

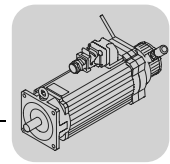
#### Pre-fabricated cables for inverter end

The individual cable strands of the power and brake power cables are exposed and the shield is prepared for being connected in the control cabinet. The cable for the inverter end has yet to be assembled. The required loose parts are supplied with the cable in a separate bag.

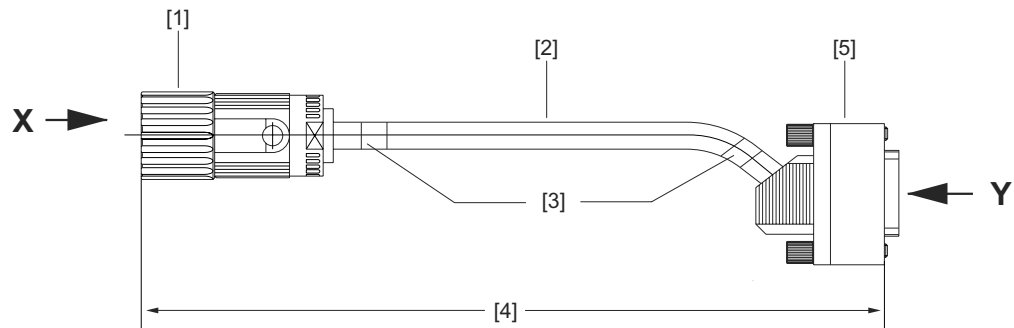
#### Loose parts

The following loose parts are supplied in accordance with the core cross sections for connection to the power terminals on the inverter:

Bag no.	Contents
1	4 x conductor end sleeves 1.5 mm <sup>2</sup> , insulated 4 x M6 U-shaped cable lugs 1.5 mm <sup>2</sup>
2	4 x conductor end sleeves 2.5 mm <sup>2</sup> , insulated 4 x M6 U-shaped cable lugs 2.5 mm <sup>2</sup>
3	4 x conductor end sleeves 4 mm <sup>2</sup> , insulated 4 x M6 U-shaped cable lugs 4 mm <sup>2</sup> 4 x M10 U-shaped cable lugs 4 mm <sup>2</sup>
4	4 x M6 U-shaped cable lugs 6 mm <sup>2</sup> 4 x M10 U-shaped cable lugs 6 mm <sup>2</sup>
5	4 x M6 U-shaped cable lugs 10 mm <sup>2</sup> 4 x M10 ring-type cable lugs 10 mm <sup>2</sup>



**Structure of the feedback cables**



54635AXX

Figure 49: Resolver plug connector

- [1] Connector: Intercontec ASTA
- [2] Printed on connector: SEW-EURODRIVE
- [3] Nameplate
- [4] Line length  $\leq 10$  m: +200 mm tolerance  
Line length  $\geq 10$  m: +2 % tolerance  
Permitted line length according to the technical documents.
- [5] Sub D plug

*Pre-fabricated cables for motor end*

A 12-pin EMC signal plug connector from Intercontec with socket contacts is used on the motor end for RH.M / RH.L / AS1H / ES1H. The shield is connected in the connector housing according to EMC aspects. All plug connectors seal the plug on the cable end with a lamellar seal.

A feedback cable is alternatively available for the corresponding terminal box. The individual cable strands are exposed and prepared for connection to the terminal box.

*Pre-fabricated cables for inverter end*

A commercially available sub-D EMC connector with pin contacts is used on the inverter end. A 9-pin or 15-pin connector matching the inverter is used.

*Hybrid cables*

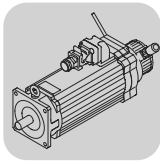
The outer cable sheath on the motor and inverter end bears a nameplate with part number and logo of the pre-fabricated cable manufacturer. Interrelation of permitted tolerance and ordered length:

- Line length  $\leq 10$  m: 200 mm tolerance
- Line length  $\geq 10$  m: + 2 % tolerance



Refer to the system manual of the inverter for determining the maximum cable length.

Make sure during project planning that an EMC compliant environment is maintained.



#### Project planning for cable cross section

Cable dimensioning according to EN60402

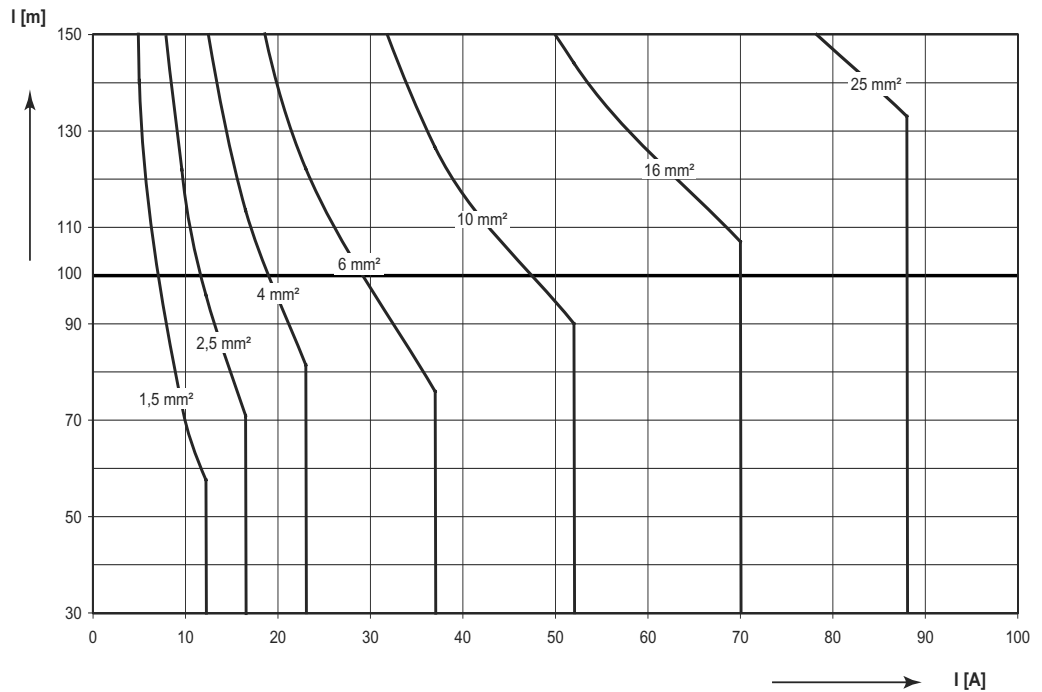


Figure 50: Minimum required cable cross section depending on cable length  $l$  [m] and current  $I$  [A]

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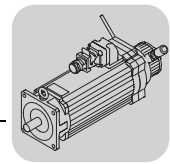
Hybrid cables with cross sections of 1.5 mm<sup>2</sup> to 10 mm<sup>2</sup> can be ordered from SEW-EURODRIVE.

Cable load through current  $I$  in [A] according to EN 60204-1 table 5, ambient temperature 40 °C

Cable cross section [mm <sup>2</sup> ]	Three-core sheathed line in pipe or cable [A]	Three-core sheathed cable on top of each other on wall [A]	Three-core sheathed cable lined up horizontally [A]
1.5	12.2	15.2	16.1
2.5	16.5	21.0	22
4	23	28.0	30
6	29	36.0	37
10	40	50.0	52
16	53	66.0	70
25	67	84.0	88
35	83	104.0	114

These data are merely recommended values and are **no substitute for the detailed project planning** of the cables depending on the concrete application considering the applicable regulations.

Observe the voltage drop that occurs along the cable in particular with the DC 24 V brake coil when dimensioning the cross sections for the brake cable. The accelerator current is decisive for the calculation.

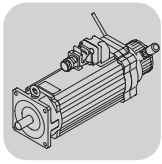


Assignment of  
servomotor and  
cable cross section

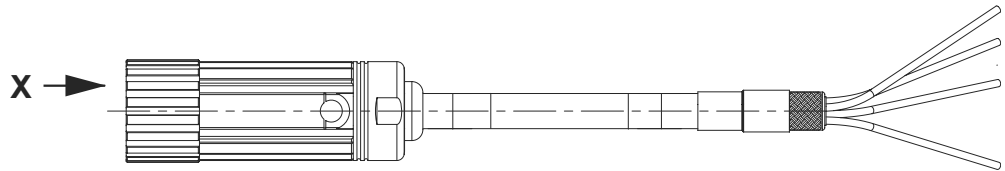
$n_N$ [min <sup>-1</sup> ]	Motor	$M_0$ [Nm]	$I_0$ [A]	SM SB
2000	CFM71S	5	2.2	51
	CFM71M	6.5	3	51
	CFM71L	9.5	4.2	51
	CFM90S	11	4.9	51
	CFM90M	14.5	6.9	51
	CFM90L	21	9.9	51
	CFM112S	23.5	10	51
	CFM112M	31	13.5	52
	CFM112L	45	20	54
3000	DFS56M	1	1.65	11
	DFS56L	2	2.4	11
	DFS56H	4	2.8	11
	CFM71S	5	3.3	51
	CFM71M	6.5	4.3	51
	CFM71L	9.5	6.2	51
	CFM90S	11	7.3	51
	CFM90M	14.5	10.1	51
	CFM90L	21	14.4	52
	CFM112S	23.5	15	52
	CFM112M	31	20.5	54
	CFM112L	45	30	56
4500	DFS56M	1	1.65	11
	DFS56L	2	2.4	11
	DFS56H	4	4	11
	CFM71S	5	4.9	51
	CFM71M	6.5	6.6	51
	CFM71L	9.5	9.6	51
	CFM90S	11	11.1	51
	CFM90M	14.5	14.7	52
	CFM90L	21	21.6	54
	CFM112S	23.5	22.5	54
	CFM112M	31	30	56
	CFM112L	45	46	59
6000	DFS56M	1	1.65	11
	DFS56L	2	2.75	11
	DFS56H	4	5.3	11
	CFM71S	5	6.5	51
	CFM71M	6.5	8.6	51
	CFM71L	9.5	12.5	52
	CFM90S	11	14.5	52
	CFM90M	14.5	19.8	54
	CFM90L	21	29.5	56



The assignments of SM / SB plug connectors are not binding. Given the dynamic properties in the system, other cross sections can also be implemented.



**Power cable for DFS**



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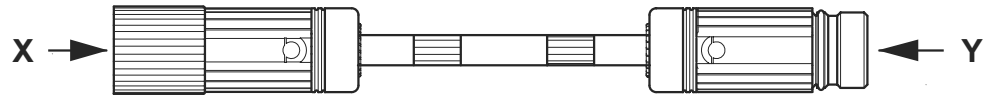
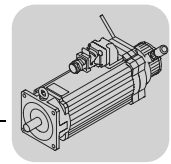
Figure 51: Motor cable for DFS

*Pin assignment of the motor cable*

Plug connector	Contact	Core identification	Assigned	Extra
<b>BSTA 078</b>  <b>View X</b>	1	Black with white lettering U, V, W	U	Bag of loose parts
	4		V	
	3		W	
	2	Green/yellow	PE	

Plug connector type	Number of cores and line cross section	Part number	Installation type
SM 11	4×1.5 mm <sup>2</sup> (AWG 16)	0590 454 4	Fixed installation
SM 11	4×1.5 mm <sup>2</sup> (AWG 16)	0590 477 3	Cable carrier installation





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Figure 52: Motor extension cable

Pin assignment of  
motor extension  
cable

Plug connector	Contact	Core identification	Assigned	Contact	Plug connector
<b>BSTA 078</b>  <b>View X</b>	1	Black with white lettering U, V, W	U	1	<b>BKUA 199</b>  <b>View Y</b>
	4		V	4	
	3		W	3	
	2	Green/yellow	PE	2	

Plug connector type	Number of cores and line cross section	Part number	Installation type
SM11	4×1.5 mm <sup>2</sup> (AWG 16)	0590 361 0	Cable carrier installation

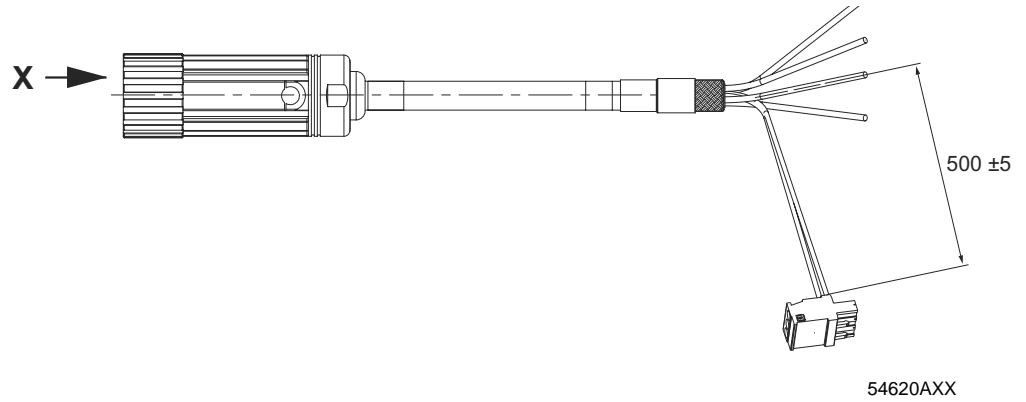
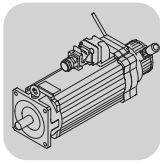
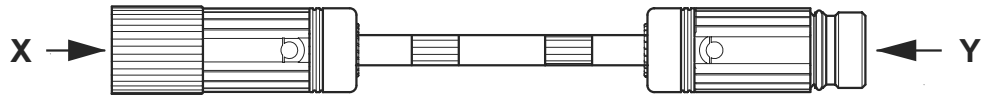
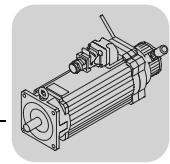


Figure 53: DFS brake motor cable

Pin assignment of  
brake motor cable

Plug connector	Contact	Core identification	Assigned	Extra
<b>BSTA 078</b>  <b>View X</b>	1	Black with white lettering U, V, W	U	Bag of loose parts
	4		V	
	3		W	
	2	Green/yellow	PE	
	A	–	Unassigned	
	B	–	Unassigned	
	C	Black with white lettering 1, 2, 3	2	
	D		1	

Plug connector type	Number of cores and line cross section	Part number	Installation type
SB 11	4×1.5 mm <sup>2</sup> (AWG 16) 3×1 mm <sup>2</sup> (AWG 17)	1332 485 3	Fixed installation
SB 11	4×1.5 mm <sup>2</sup> (AWG 16) 3×1 mm <sup>2</sup> (AWG 17)	1332 486 1	Cable carrier installation



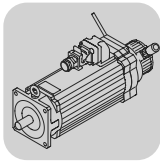
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Figure 54: Brake motor extension cable

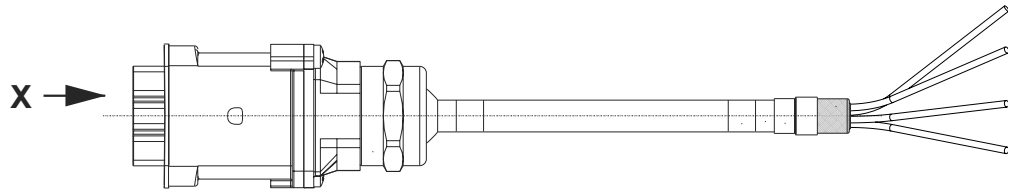
Pin assignment of  
brake motor extension  
cable

Plug connector	Contact	Core identification	Assigned	Contact	Plug connector
<b>BSTA 078</b>  <b>View X</b>	1	Black with white lettering U, V, W	U	1	<b>BKUA 199</b>  <b>View Y</b>
	4		V	4	
	3		W	3	
	2	Green/yellow	PE	2	
	A		Unassigned	A	
	B		Unassigned	B	
	C	Black with white lettering 1, 2, 3	2	C	
	D		1	D	

Plug connector type	Number of cores and line cross section	Part number	Installation type
SB11	4×1.5 mm <sup>2</sup> (AWG 16)	0593 650 0	Cable carrier installation



**Power cable for CFM**



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Figure 55: Motor cable for CFM

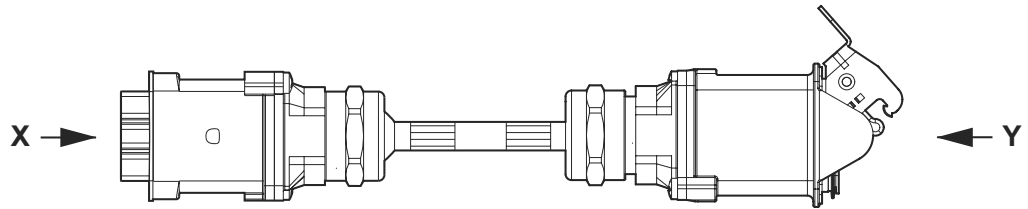
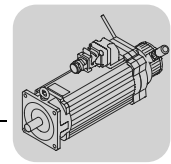
Pin assignment of the motor cable

Plug connector	Contact	Core identification	Assigned	Contact type	Extra
<b>C148U connector with socket contacts</b>	U1	Black with white lettering U, V, W	U	Cut-off, length ca. 250 mm	Bag of loose parts
	V1		V		
	W1		W		
 <b>View X</b>	PE	Green/yellow	(protective earth)	with Phoenix plug connector GMVSTBW 2.5/3 ST	

Motor cable types

The cables are equipped with a plug for motor connection and conductor end sleeves for inverter connection.

Plug connector type	Number of cores and line cross section	Part number	Installation type
SM 51 / SM 61	4×1.5 mm <sup>2</sup> (AWG 16)	199 179 5	Fixed installation
SM 52 / SM 62	4×2.5 mm <sup>2</sup> (AWG 12)	199 181 7	
SM 54 / SM 64	4×4 mm <sup>2</sup> (AWG 10)	199 183 3	
SM 56 / SM 66	4×6 mm <sup>2</sup> (AWG 10)	199 185 X	
SM 59 / SM 69	4×10 mm <sup>2</sup> (AWG 8)	199 187 6	
SM 51 / SM 61	4×1.5 mm <sup>2</sup> (AWG 16)	199 180 9	Cable carrier installation
SM 52 / SM 62	4×2.5 mm <sup>2</sup> (AWG 12)	199 182 5	
SM 54 / SM 64	4×4 mm <sup>2</sup> (AWG 10)	199 184 1	
SM 56 / SM 66	4×6 mm <sup>2</sup> (AWG 10)	199 186 8	
SM 59 / SM 69	4×10 mm <sup>2</sup> (AWG 8)	199 188 4	



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Figure 56: Motor extension cable

Pin assignment of  
motor extension  
cable

Plug connector	Contact	Core identification	Contact	Plug connector
<b>C148U adapter with pin contacts</b>	U1	Black with white lettering U, V, W	U1	<b>C148U connector with socket contacts</b>
	V1		V1	
	W1		W1	
	PE	Green/yellow	PE	
	3	Black with white lettering 1, 2, 3	3	
	4		4	
	5		5	

The motor extension cable has the same pin assignment as all other contacts.

Types of motor  
extension cables

The cables are equipped with a plug and adapter for extending the CFM motor cable.

Plug connector type	Number of cores and line cross section	Part number	Installation type
SM 51 / SM 61	4×1.5 mm <sup>2</sup> (AWG 16)	199 549 9	Fixed installation
SM 52 / SM 62	4×2.5 mm <sup>2</sup> (AWG 12)	199 551 0	
SM 54 / SM 64	4×4 mm <sup>2</sup> (AWG 10)	199 553 7	
SM 56 / SM 66	4×6 mm <sup>2</sup> (AWG 10)	199 555 3	
SM 59 / SM 69	4×10 mm <sup>2</sup> (AWG 8)	199 557 X	
SM 51 / SM 61	4×1.5 mm <sup>2</sup> (AWG 16)	199 550 2	Cable carrier installation
SM 52 / SM 62	4×2.5 mm <sup>2</sup> (AWG 12)	199 552 9	
SM 54 / SM 64	4×4 mm <sup>2</sup> (AWG 10)	199 554 5	
SM 56 / SM 66	4×6 mm <sup>2</sup> (AWG 10)	199 556 1	
SM 59 / SM 69	4×10 mm <sup>2</sup> (AWG 8)	199 558 8	

Alternative plug  
connectors

Plug connectors for power supply with socket contacts (complete):

Type	Cross sections	Part no.
SM51 / SM61	4 x 1.5 mm <sup>2</sup>	199 135 3
SM52 / SM62	4 x 2.5 mm <sup>2</sup>	199 136 1
SM54 / SM64	4 x 4 mm <sup>2</sup>	199 137 X
SM56 / SM66	4 x 6 mm <sup>2</sup>	199 138 8
SM59 / SM69	4 x 10 mm <sup>2</sup>	199 139 6

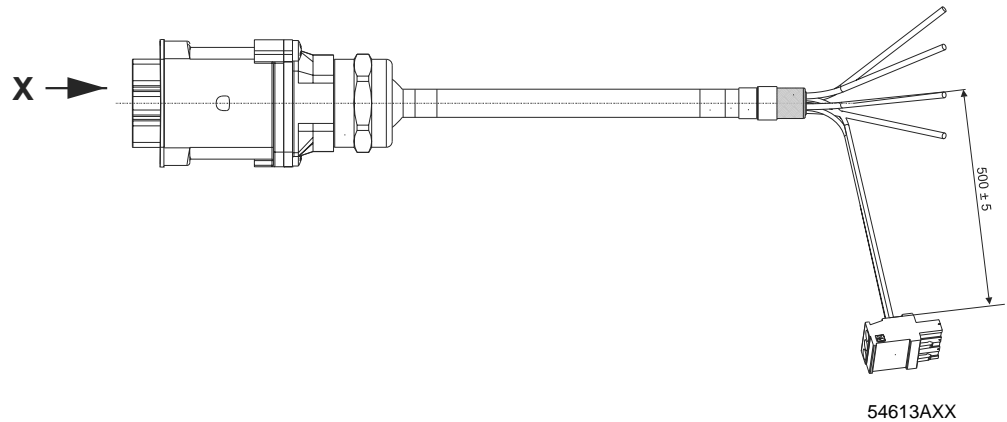
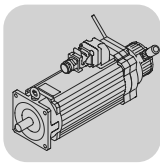


Figure 57: CFM brake motor cable

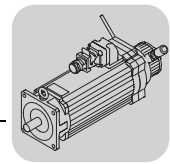
*Pin assignment of brake motor cable*

The brake motor cable is fabricated for the BME, BMP, BMH, BMK and BMV brake rectifiers. For the BSG control unit, the customers have to assemble the cable themselves.

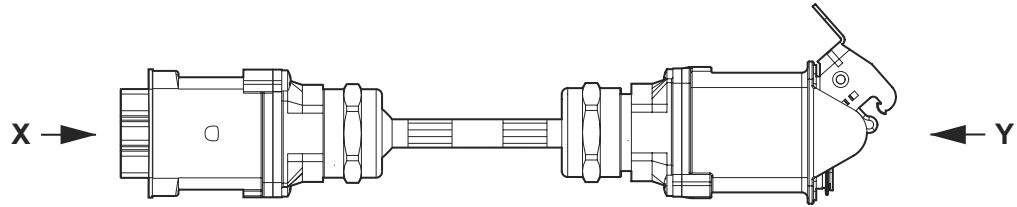
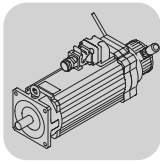
Plug connector	Contact	Core identification	Assigned	Contact type	Extra
<b>C148U connector with socket contacts</b>	U1	Black with white lettering U, V, W	U	Cut-off, length ca. 250 mm	Bag of loose parts
	V1		V		
	W1		W		
<p><b>View X</b></p>	PE	Green/yellow	(protective earth)	with Phoenix plug connector GMVSTBW 2.5/3ST	
	3	Black with white lettering 1, 2, 3	1		
	4		2		
	5		3		

*Types of brake motor cables*

Plug connector type, complete	Number of cores and line cross section	Part number	Installation type
SB 51 / SB 61	4x1.5 mm <sup>2</sup> (AWG 16) + 3x1.0 mm <sup>2</sup> (AWG 17)	199 189 2	Fixed installation
SB 52 / SB 62	4x2.5 mm <sup>2</sup> (AWG 12)+ 3x1.0 mm <sup>2</sup> (AWG 17)	199 191 4	
SB 54 / SB 64	4x4 mm <sup>2</sup> (AWG 10)+ 3x1.0 mm <sup>2</sup> (AWG 17)	199 193 0	
SB 56 / SB 66	4x6 mm <sup>2</sup> (AWG 10) + 3x1.5 mm <sup>2</sup> (AWG 17)	199 195 7	
SB 59 / SB 69	4x10 mm <sup>2</sup> (AWG 10) + 3x1.5 mm <sup>2</sup> (AWG 17)	199 197 3	



Plug connector type, complete	Number of cores and line cross section	Part number	Installation type
SB 51 / SB 61	4x1.5 mm <sup>2</sup> (AWG 16) + 3x1.0 mm <sup>2</sup> (AWG 17)	199 190 6	Cable carrier installation
SB 52 / SB 62	4x2.5 mm <sup>2</sup> (AWG 12)+ 3x1.0 mm <sup>2</sup> (AWG 17)	199 192 2	
SB 54 / SB 64	4x4 mm <sup>2</sup> (AWG 10)+ 3x1.0 mm <sup>2</sup> (AWG 17)	199 194 9	
SB 56 / SB 66	4x6 mm <sup>2</sup> (AWG 10)+ 3x1.5 mm <sup>2</sup> (AWG 16)	199 196 5	
SB 59 / SB 69	4x10 mm <sup>2</sup> (AWG 10) + 3x1.5 mm <sup>2</sup> (AWG 17)	199 198 1	



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Figure 58: Brake motor extension cable

Pin assignment of  
brake motor  
extension cable

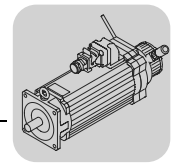
Plug connector	Contact	Core identification	Contact	Plug connector
<b>C148U adapter with pin contacts</b>	U1	Black with white lettering U, V, W	U1	<b>C148U connector with socket contacts</b>
	V1		V1	
	W1		W1	
	PE	Green/yellow	PE	
	3	Black with white lettering 1, 2, 3	3	
	4		4	
	5		5	

The brake motor extension cable has the same pin assignment as all other contacts.

Types of brake  
motor extension  
cables

Plug connector type, complete	Number of cores and line cross section	Part number	Installation type
SK 51 / SK 61	4x1.5 mm <sup>2</sup> (AWG 16) + 3x1.0 mm <sup>2</sup> (AWG 17)	199 199 X	Fixed installation
SK 52 / SK 62	4x2.5 mm <sup>2</sup> (AWG 12)+ 3x1.0 mm <sup>2</sup> (AWG 17)	199 201 5	
SK 54 / SK 64	4x4 mm <sup>2</sup> (AWG 10)+ 3x1.0 mm <sup>2</sup> (AWG 17)	199 203 1	
SK 56 / SK 66	4x6 mm <sup>2</sup> (AWG 10)+ 3x1.5 mm <sup>2</sup> (AWG 17)	199 205 8	
SK 59 / SK 69	4x10 mm <sup>2</sup> (AWG 10) + 3x1.5 mm <sup>2</sup> (AWG 17)	199 207 4	
SK 51 / SK 61	4x1.5 mm <sup>2</sup> (AWG 16) + 3x1.0 mm <sup>2</sup> (AWG 17)	199 200 7	Cable carrier installation
SK 52 / SK 62	4x2.5 mm <sup>2</sup> (AWG 12)+ 3x1.0 mm <sup>2</sup> (AWG 17)	199 202 3	
SK 54 / SK 64	4x4 mm <sup>2</sup> (AWG 10)+ 3x1.0 mm <sup>2</sup> (AWG 17)	199 204 X	
SK 56 / SK 66	4x6 mm <sup>2</sup> (AWG 10)+ 3x1.5 mm <sup>2</sup> (AWG 16)	199 206 6	
SK 59 / SK 69	4x10 mm <sup>2</sup> (AWG 10) + 3x1.5 mm <sup>2</sup> (AWG 17)	199 208 2	

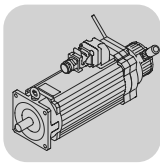




*Alternative plug connectors*

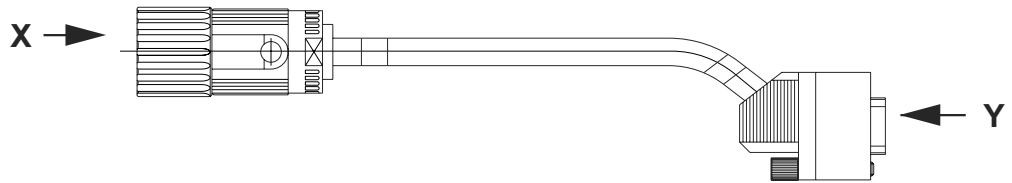
Plug connectors for power supply with socket contacts (complete).

Type	Cross sections	Part no.
<b>SB51 / SB61</b>	4x1.5 mm <sup>2</sup> (AWG 16) + 3x1.0 mm <sup>2</sup> (AWG 17)	199 142 6
<b>SB52 / SB62</b>	4x2.5 mm <sup>2</sup> (AWG 12)+ 3x1.0 mm <sup>2</sup> (AWG 17)	199 143 4
<b>SB54 / SB64</b>	4x4 mm <sup>2</sup> (AWG 10)+ 3x1.0 mm <sup>2</sup> (AWG 17)	199 144 2
<b>SB56 / SB66</b>	4x6 mm <sup>2</sup> (AWG 10)+ 3x1.5 mm <sup>2</sup> (AWG 16)	199 145 0
<b>SB59 / SB69</b>	4x10 mm <sup>2</sup> (AWG 10) + 3x1.5 mm <sup>2</sup> (AWG 17)	199 146 9



**Feedback cable**

Resolver cable  
plug connector  
MOVIDRIVE®  
MDX..B

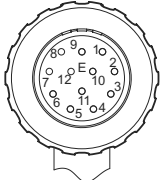
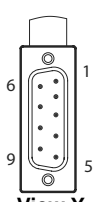


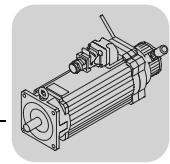
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Figure 59: Resolver cable plug connector MOVIDRIVE® MDX..B

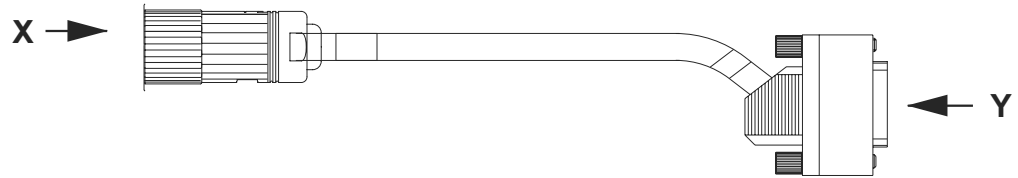
Type	Installation	Part number
DFS/CFM	Fixed installation	199 487 5
DFS/CFM	Cable carrier installation	199 319 4

Pin assignment of  
resolver cable  
RH.M / RH.L

Pin assignment of resolver cable RH1M						
Motor connection end		Description	Cable core colors	Description	Connection MOVIDRIVE® MDX..B	
Plug connector	Contact no.				Contact no.	Plug connector
<b>ASTA021FR</b>  <b>198 921 9</b>  12-pin with socket contacts   <b>View X</b>	1	R1 (reference +)	Pink (PK)	R1 (reference +)	3	<b>Sub-D 9-pin</b>   <b>View Y</b>
	2	R2 (reference -)	Gray (GY)	R2 (reference -)	8	
	3	S1 (cosine +)	Red (RD)	S1 (cosine +)	2	
	4	S3 (cosine -)	Blue (BU)	S3 (cosine -)	7	
	5	S2 (sine +)	Yellow (YE)	S2 (sine +)	1	
	6	S4 (sine -)	Green (GN)	S4 (sine -)	6	
	7	Unassigned	-	-	-	
	8	Unassigned	-	-	-	
	9	TF/KTY +	Brown (BN)/ violet (VT)	TF (KTY+)	9	
	10	TF / KTY-	White (WH) / black (BK)	TF / KTY-	5	
	11	Unassigned	-	-	-	
	12	Unassigned	-	Unassigned	4	



Resolver cable  
plug connector  
MOVIAXIS® MXA

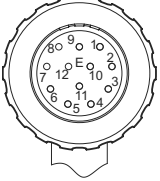
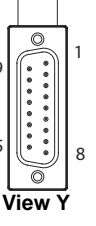


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Figure 60: Resolver cable plug connector MOVIAXIS® MXA

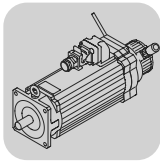
Type	Installation	Part number
DFS/CFM	Fixed installation	1332 742 9
DFS/CFM	Cable carrier installation	1332 743 7

Pin assignment of  
resolver cable  
RH.M / RH.L

Pin assignment of resolver cable RH1M						
Motor connection end		Description	Cable core color	Description	Connection MOVIAXIS® MXA	
Plug connector	Contact no.				Contact no.	Plug connector
<b>ASTA021FR</b>  <b>198 921 9</b>  12-pin with socket contacts   <b>View X</b>	1	R1 (reference +)	Pink (PK)	R1 (reference +)	5	Sub-D 15-pin   <b>View Y</b>
	2	R2 (reference -)	Gray (GY)	R2 (reference -)	13	
	3	S1 (cosine +)	Red (RD)	S1 (cosine +)	2	
	4	S3 (cosine -)	Blue (BU)	S3 (cosine -)	10	
	5	S2 (sine +)	Yellow (YE)	S2 (sine +)	1	
	6	S4 (sine -)	Green (GN)	S4 (sine -)	9	
	7	Unassigned	-	Unassigned	3	
	8	Unassigned	-	Unassigned	4	
	9	TF/KTY +	Brown (BN)/ violet (VT) <sup>1)</sup>	TF/KTY +	14	
	10	TF/KTY -	White (WH) / black (BK) <sup>1)</sup>	TF/KTY -	6	
	11	Unassigned	-	Unassigned	7	
	12	Unassigned	-	Unassigned	8	
-	-	-	Unassigned	11		
-	-	-	Unassigned	12		
-	-	-	Unassigned	15		

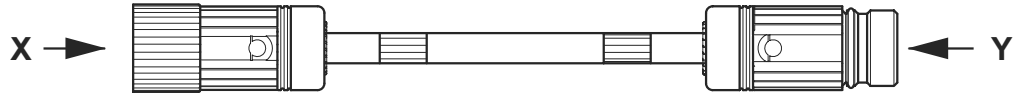
1) Double assignment to increase cross section

All connectors are shown with view onto the pins.



**DFS/CFM Synchronous Servomotors**  
Hybrid cables

Extension cable for resolver RH.M / RH.L

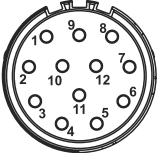
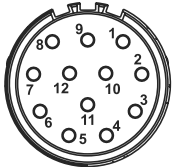


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Figure 61: Extension cable for resolver RH.M / RH.L

Type	Installation	Part number
DFS/CFM	Fixed installation	199 542 1
DFS/CFM	Cable carrier installation	199 541 3

Pin assignment of extension cable for resolver RH.M / RH.L

Pin assignment of extension cable for resolver RH.M / RH.L						
Plug connector	Contact no.	Description	Cable core colors	Description	Contact no.	Plug connector
<b>ASTA021FR</b> <b>198 673 2</b> 12-pin with socket contacts  <b>View X</b>	1	R1 (reference +)	Pink (PK)	R1 (reference +)	1	<b>AKUA020MR</b> <b>199 647 9</b> 12-pin with pin contacts  <b>View Y</b>
	2	R1 (reference -)	Gray (GY)	R1 (reference -)	2	
	3	S1 (cosine +)	Red (RD)	S1 (cosine +)	3	
	4	S3 (cosine -)	Blue (BU)	S3 (cosine -)	4	
	5	S2 (sine +)	Yellow (YE)	S2 (sine +)	5	
	6	S4 (sine -)	Green (GN)	S4 (sine -)	6	
	7	Unassigned	-	Unassigned	7	
	8	Unassigned	-	Unassigned	8	
	9	TF/KTY +	Brown (BN)/ violet (VT) <sup>1)</sup>	TF/KTY +	9	
	10	TF/KTY -	White (WH) / black (BK) <sup>1)</sup>	TF/KTY -	10	
	11	Unassigned	-	Unassigned	11	
	12	Unassigned	-	Unassigned	12	

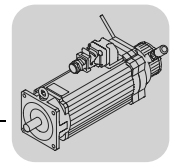
1) Double assignment to increase cross section

The extension cable has the same pin assignment as all other contacts.

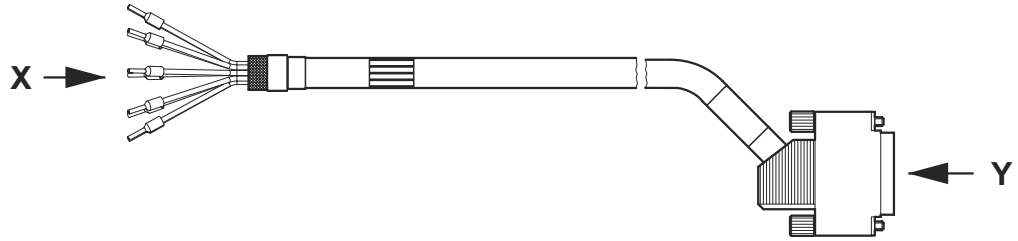
Alternative plug connectors

Signal plug connector with socket contacts (complete)

Type	Cross sections which can be connected	Part no.
RH.M / RH.L	6 x 2 x 0.06 ... 1 mm <sup>2</sup>	198 673 2



Cable from resolver cable to terminal box DFS/CFM for MOVIDRIVE® MDX..B with DC 5 V supply



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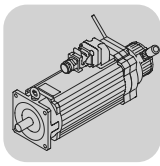
Figure 62: Cable from resolver to terminal box DFS for MOVIDRIVE® MDX..B

Type	Installation	Part number
DFS	Fixed installation	1332 817 4
DFS	Cable carrier installation	1332 844 1
CFM	Fixed installation	199 589 8
CFM	Cable carrier installation	199 590 1

Pin assignment of resolver cable RH.M / RH.L

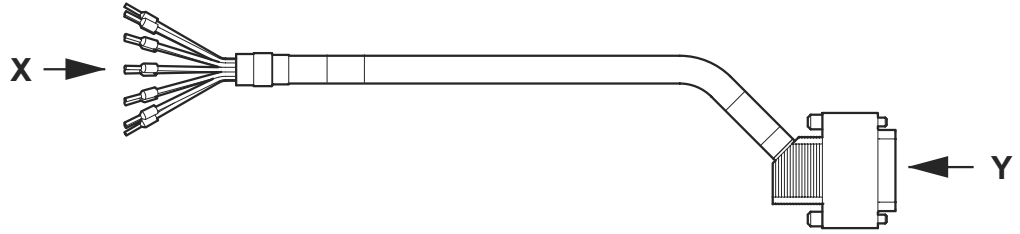
Cable from RH1M resolver to terminal box for DFS/CFM motors					
Motor connection end				Connection MOVIDRIVE® MDX..B	
Terminal strip	Contact no.	Description	Cable core color	Description	Contact no. Plug connector
<p>View X</p>	1	R1 (reference +)	Pink (PK)	R1 (reference +)	3
	2	R2 (reference -)	Gray (GY)	R2 (reference -)	8
	3	S1 (cosine +)	Red (RD)	S1 (cosine +)	2
	4	S3 (cosine -)	Blue (BU)	S3 (cosine -)	7
	5	S2 (sine +)	Yellow (YE)	S2 (sine +)	1
	6	S4 (sine -)	Green (GN)	S4 (sine -)	6
	7	Unassigned	-	Unassigned	4
	8	Unassigned	-	-	-
	9	TF/KTY +	Brown (BN)/ violet (VT) <sup>1)</sup>	TF/KTY +	9
	10	TF/KTY -	White (WH) / black (BK) <sup>1)</sup>	TF/KTY -	5
					<p>View Y</p>

1) Double assignment to increase cross section



**DFS/CFM Synchronous Servomotors**  
Hybrid cables

Cable from resolver to terminal box DFS/CFM for MOVIAXIS® MXA



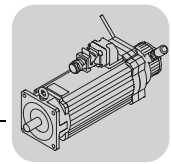
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Figure 63: Cable from resolver to terminal box DFS with MOVIAXIS® MXA

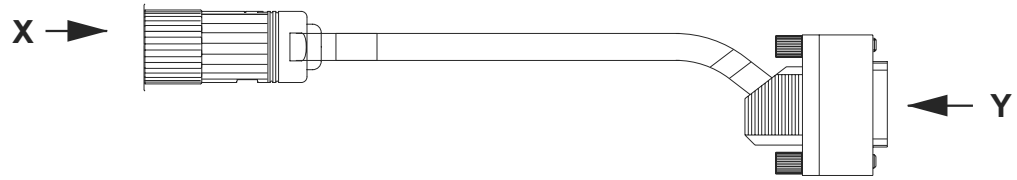
Type	Installation	Part number
DFS	Fixed installation	1332 744 5
DFS	Cable carrier installation	1332 745 3
CFM	Fixed installation	1332 762 3
CFM	Cable carrier installation	1332 763 1

Pin assignment of resolver cable RH.M / RH.L

Cable from resolver RH.M/RH.L to terminal box MOVIAXIS® MXA with DS/CM motors						
Motor connection end				Connection MOVIAXIS® MXA		
Terminal strip	Contact no.	Description	Cable core color	Description	Contact no.	Plug connector
<p>View X</p>	1	R1 (REF +)	Pink (PK)	R1 (reference +)	5	<p>Sub-D 15-pin View Y</p>
	2	R2 (REF -)	Gray (GY)	R2 (reference -)	13	
	3	S1 (COS +)	Red (RD)	S1 (cosine +)	2	
	4	S3 (COS -)	Blue (BU)	S3 (cosine -)	10	
	5	S2 (SIN +)	Yellow (YE)	S2 (sine +)	1	
	6	S4 (SIN -)	Green (GN)	S4 (sine -)	9	
	7	Unassigned	-	Unassigned	3	
	8	Unassigned	-	Unassigned	4	
	9	TF / TH / KTY +	Brown (BN)/ violet (VT)	TF / TH / KTY +	14	
	10	TF / TH / KTY -	White (WH) / black (BK)	TF / TH / KTY -	6	
	11	-	-	Unassigned	7	
	12	-	-	Unassigned	8	
	13	-	-	Unassigned	11	
	14	-	-	Unassigned	12	
	15	-	-	Unassigned	15	



HIPERFACE®  
encoder cable for  
plug connector  
MOVIAXIS® MXA,  
MOVIDRIVE®  
MDX..B

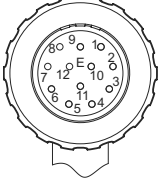
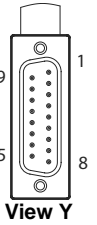


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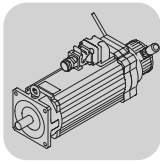
Figure 64: HIPERFACE® encoder cable for plug connector

Type	Installation	Part number
DFS/CFM	Fixed installation	1332 453 5
DFS/CFM	Cable carrier installation	1332 455 1

Cable pin assign-  
ment for  
HIPERFACE®  
encoder AS1H /  
ES1H / AV1H

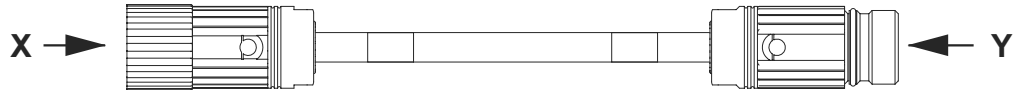
Cable pin assignment for HIPERFACE® encoder AS1H /ES1H /AV1H						
Motor connection end		Description	Cable core color	Description	Connection MOVIAXIS® MXA MOVIDRIVE®MDX..B	
Plug connector	Contact no.				Contact no.	Plug connector
<b>ASTA021FR</b> <b>198 921 9</b> 12-pin with socket contacts  <b>View X</b>	1	Unassigned	Unassigned	Unassigned	3	Sub-D 15-pin  <b>View Y</b>
	2	Unassigned	Unassigned	Unassigned	5	
	3	S1 (cosine +)	Red (RD)	S1 (cosine +)	1	
	4	S3 (cosine -)	Blue (BU)	S3 (cosine -)	9	
	5	S2 (sine +)	Yellow (YE)	S2 (sine +)	2	
	6	S4 (sine -)	Green (GN)	S4 (sine -)	10	
	7	DATA-	Violet (VT)	DATA-	12	
	8	DATA+	Black (BK)	DATA+	4	
	9	TF/KTY +	Brown (BN)	TF/KTY +	14	
	10	TF/KTY -	White (WH)	TF/KTY -	6	
	11	GND	Gray/pink (GY/PK) <sup>1)</sup>	GND	8	
	12	U <sub>s</sub>	Red/Blue (RD/BU) <sup>1)</sup>	U <sub>s</sub>	15	
	-	-	Unassigned	7		
	-	-	Unassigned	11		
	-	-	Unassigned	13		

1) Double assignment to increase cross section



**DFS/CFM Synchronous Servomotors**  
Hybrid cables

Extension cable for  
HIPERFACE®  
encoder AS1H /  
ES1H / AV1H

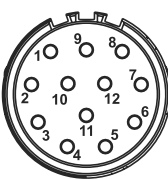
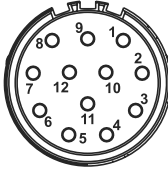


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Figure 65: Extension cable for HIPERFACE® encoder

Type	Installation	Part number
DFS/CFM	Fixed installation	199 539 1
DFS/CFM	Cable carrier installation	199 540 5

Pin assignment of  
extension cable for  
HIPERFACE®  
encoder AS1H /  
ES1H / AV1H

Pin assignment of extension cable for RH.M resolver						
Plug connector	Contact no.	Description	Cable core color	Description	Contact no.	Plug connector
<b>ASTA021FR</b>  <b>198 673 2</b>  12-pin with socket contacts    <b>View X</b>	1	Unassigned	-	Unassigned	1	<b>AKUA020MR</b>  <b>199 647 9</b>  12-pin with pin contacts    <b>View Y</b>
	2	Unassigned	-	Unassigned	2	
	3	S1 (cosine +)	Red (RD)	S1 (cosine +)	3	
	4	S3 (cosine -)	Blue (BU)	S3 (cosine -)	4	
	5	S2 (sine +)	Yellow (YE)	S2 (sine +)	5	
	6	S4 (sine -)	Green (GN)	S4 (sine -)	6	
	7	DATA-	Violet (VT)	DATA-	7	
	8	DATA+	Black (BK)	DATA+	8	
	9	TF/KTY +	Brown (BN)	TF/KTY +	9	
	10	TF/KTY -	White (WH)	TF/KTY -	10	
	11	GND	Gray/pink (GY/PK) / pink (PK)	GND	11	
	12	U <sub>s</sub>	Red/blue (RD/BU) / gray (GY)	U <sub>s</sub>	12	

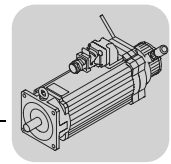
The extension cable has the same pin assignment as all other contacts.

*Alternative plug connectors*

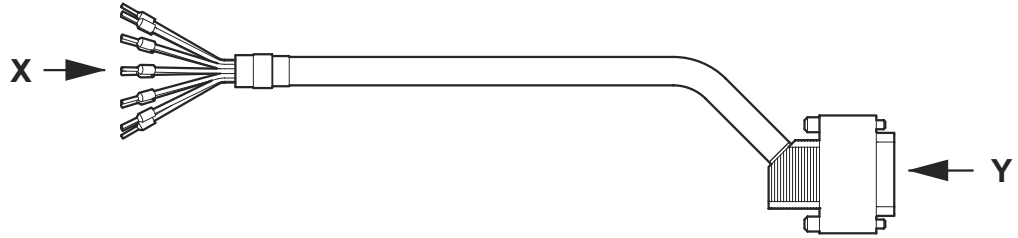
Signal plug connector with socket contacts (complete)

Type	Cross sections which can be connected	Part no.
AS1H ES1H AV1H	6 x 2 x 0.06 ... 1 mm <sup>2</sup>	198 673 2





HIPERFACE®  
encoder cable to  
terminal box DFS  
for MOVIAXIS®  
MXA,  
MOVIDRIVE®  
MDX..B



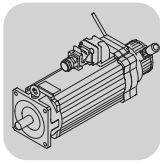
54640AXX

Figure 66: HIPERFACE® encoder cable with terminal box connection on motor end for DFS motors

Type	Installation	Part number
DFS	Fixed installation	1332 765 8
DFS	Cable carrier installation	1332 766 6

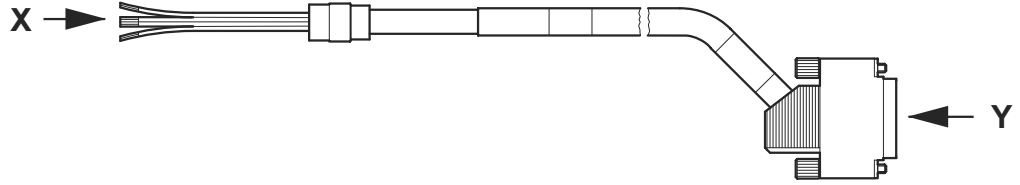
Cable pin assign-  
ment for  
HIPERFACE®  
encoder AS1H /  
ES1H / AV1H

HIPERFACE® cable to terminal box MOVIAXIS® MXA, MOVIDRIVE® MDX..B with DFS motors						
Motor connection end				Connection MOVIAXIS®MXA MOVIDRIVE®MDX..B		
Terminal strip	Contact no.	Description	Cable core color	Description	Contact no.	Plug connector
<p>View X</p>	6	Data +	Black (BK)	Data +	4	<p>View Y</p>
	5	Data -	Violet (VT)	Data -	12	
	1	S1 (COS +)	Red (RD)	S1 (COS +)	1	
	2	S3 (COS -)	Blue (BU)	S3 (COS -)	9	
	3	S2 (SIN +)	Yellow (YE)	S2 (SIN +)	2	
	4	S4 (SIN -)	Green (GN)	S4 (SIN -)	10	
	7	GND	Gray pink (GYPK) / pink (PK)	GND	8	
	8	Us	Red blue (RDBU)	Us	15	
	9	TF / TH / KTY +	Brown (BN)	TF / TH / KTY +	14	
	10	TF / TH / KTY -	White (WH)	TF / TH / KTY -	6	



**DFS/CFM Synchronous Servomotors**  
Hybrid cables

HIPERFACE®  
encoder cable to  
terminal box CFM  
for MOVIAXIS®  
MXA,  
MOVIDRIVE®  
MDX..B



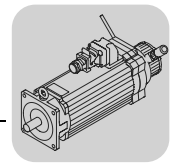
54641AXX

Figure 67: HIPERFACE® encoder cable with terminal box connection on motor end for CFM motors

Type	Installation	Part number
CFM	Fixed installation	1332 457 8
CFM	Cable carrier installation	1332 454 3

Pin assignment for  
HIPERFACE®  
encoder cable  
AS1H / ES1H

HIPERFACE® cable to terminal box MOVIAXIS® MXA, MOVIDRIVE® MDX..B with CFM motors						
Motor connection end				Connection MOVIAXIS® MXA MOVIDRIVE® MDX..B		
Terminal strip	Contact no.	Description	Cable core color	Description	Contact no.	Plug connector
<p>View X</p>	6	Data +	Black (BK)	Data +	4	<p>Sub-D 15-pin</p> <p>View Y</p>
	5	Data -	Violet (VT)	Data -	12	
	1	S1 (COS +)	Red (RD)	S1 (COS +)	1	
	2	S3 (COS -)	Blue (BU)	S3 (COS -)	9	
	3	S2 (SIN +)	Yellow (YE)	S2 (SIN +)	2	
	4	S4 (SIN -)	Green (GN)	S4 (SIN -)	10	
	7	GND	Gray pink (GYPK) / pink (PK)	GND	8	
	8	Us	Red blue (RDBU)	Us	15	
	9	TF / TH / KTY +	Brown (BN)	TF / TH / KTY +	14	
	10	TF / TH / KTY -	White (WH)	TF / TH / KTY -	6	



Encoder cable  
AV1Y / DIP11A / B  
for MOVIDRIVE®  
MDX..B

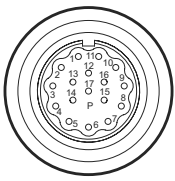
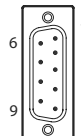


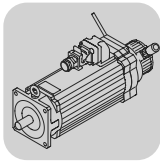
54627AXX

Figure 68: Encoder cable AV1Y / DIP11A / B

Type	Installation	Part number
DFS/CFM	Fixed installation	0198 929 4
DFS/CFM	Cable carrier installation	0198 930 8

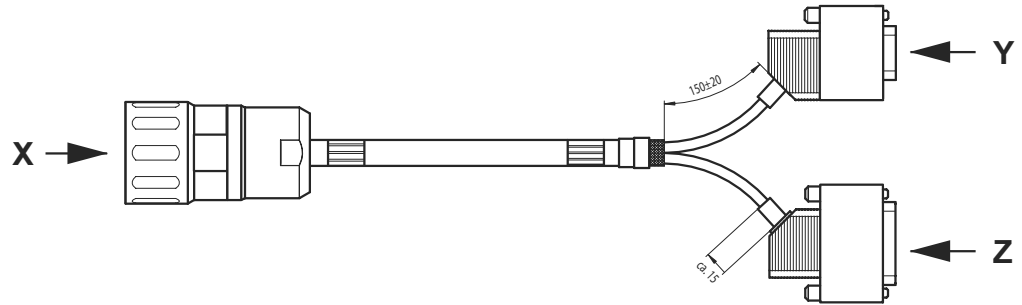
Pin assignment of  
encoder cable  
AV1Y / DIP11A / B

Motor connection end		Pin assignment			Connection MOVIDRIVE® MDX..B	
Round connector plug	Contact no.	Resolver signal	Cable core color	Resolver signal	Contact no.	Plug connector
<b>SPUC 17H FRON 005 17-pole</b>   <b>View X</b>	1	Unassigned	-	Unassigned	-	<b>Sub-D 9-pin</b>   <b>View Y</b>
	2	Unassigned	-	Unassigned	-	
	3	Unassigned	-	Unassigned	-	
	4	Unassigned	-	Unassigned	-	
	5	Unassigned	-	Unassigned	-	
	6	Unassigned	-	Unassigned	-	
	7	UB	White (WH)	UB	9	
	8	T+	Pink (PK)	T+	3	
	9	T-	Gray (GY)	T-	8	
	10	GND	Brown (BN)	GND	5	
	11	Unassigned	-	Unassigned	-	
	12	Unassigned	-	Unassigned	-	
	13	Unassigned	-	Unassigned	-	
	14	D +	Yellow (YE)	D +	1	
	15	Unassigned	-	Unassigned	-	
	16	Unassigned	-	Unassigned	-	
	17	D -	Green (GN)	D -	6	



**DFS/CFM Synchronous Servomotors**  
Hybrid cables

Encoder cable  
AV1Y for  
MOVIDRIVE®  
MDX..B



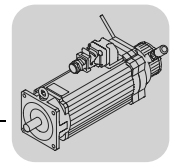
54645AXX

Figure 69: Encoder cable AV1Y MOVIDRIVE® MDX..B

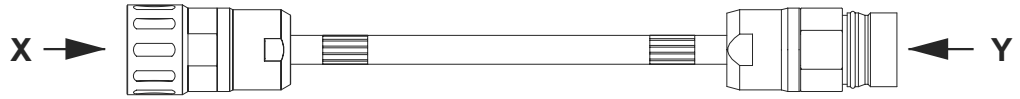
Type	Installation	Part number
DFS/CFM	Fixed installation	1332 813 1
DFS/CFM	Cable carrier installation	1332 812 3

Pin assignment of  
encoder cable  
AV1Y  
MOVIDRIVE®  
MDX..B

Motor connection end		Pin assignment			Connection MOVIDRIVE® MDX..B	
Round connector plug	Contact no.	Encoder signal	Cable core color	Encoder signal	Contact no.	Plug connector
<p>SPUC 17H FRON 005 17-pole</p> <p>View X</p>	1	Unassigned	-	Unassigned	-	<p>Sub-D 9-pin</p> <p>View Y</p>
	2	Unassigned	-	Unassigned	-	
	3	Unassigned	-	Unassigned	-	
	4	Unassigned	-	Unassigned	-	
	5	Unassigned	-	Unassigned	-	
	6	Unassigned	-	Unassigned	-	
	7	UB	White (WH)	UB	9	<p>Sub-D 15-pin</p> <p>View Z</p>
	8	T+	Pink (PK)	T+	3	
	9	T-	Gray (GY)	T-	8	
	10	GND	Brown (BN)	GND	5	
	11	Unassigned	-	Unassigned	-	
	14	D +	Black (BK)	D +	1	
	17	D -	Violet (VT)	D -	6	
	12	B	Red (RD)	B	2	
	13	B	Blue (BU)	B	10	
	15	A	Yellow (YE)	A	1	
	16	A	Green (GN)	A	9	



Extension cable for  
AV1Y encoder

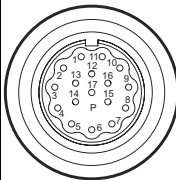
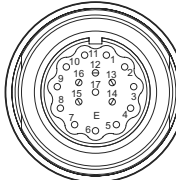


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Figure 70: Extension cable for AV1Y encoder

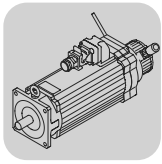
Type	Installation	Part number
DFS/CFM	Cable carrier installation	0593 968 2

Pin assignment of  
extension cable for  
AV1Y encoder

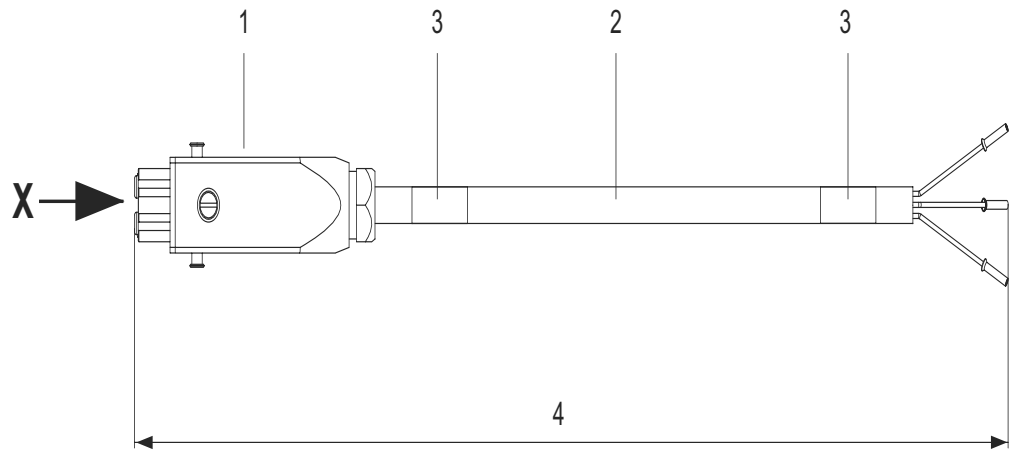
Plug connector	Pin assignment						Plug connector
	Contact no.	Resolver signal	Cable core colors	Resolver signal	Contact no.		
<b>Round connector SPUC 17H</b> <b>0198 886 7</b> 17-pin contact socket  <b>View X</b>	1	Unassigned	-	Unassigned	1	<b>SRUC 17G adapter</b> <b>0593 403 6</b> 17-pin with pin contacts  <b>View Y</b>	
	2	Unassigned	-	Unassigned	2		
	3	Unassigned	-	Unassigned	3		
	4	Unassigned	-	Unassigned	4		
	5	Unassigned	-	Unassigned	5		
	6	Unassigned	-	Unassigned	6		
	7	UB	White (WH)	UB	7		
	8	T+	Pink (PK)	T+	8		
	9	T-	Gray (GY)	T-	9		
	10	GND	Brown (BN)	GND	10		
	11	Unassigned	-	Unassigned	11		
	12	B	Red (RD)	B	12		
	13	B	Blue (BU)	B	13		
	14	D +	Black (BK)	D +	14		
	15	A	Yellow (YE)	A	15		
	16	A	Green (GN)	A	16		
	17	D -	Violet (VT)	D -	17		

11

The extension cable has the same pin assignment as all other contacts.



Cable for VR forced cooling fan



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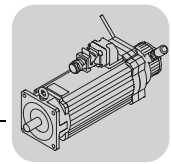
Figure 71: Cable for VR forced cooling fan

- [1] Connector: STAK 200
- [2] Printed on connector: SEW-EURODRIVE
- [3] Nameplate
- [4] Line length  $\leq 5$  m: +200 mm tolerance  
Line length  $\geq 5$  m: +2 % tolerance  
Permitted line length according to the technical documents.

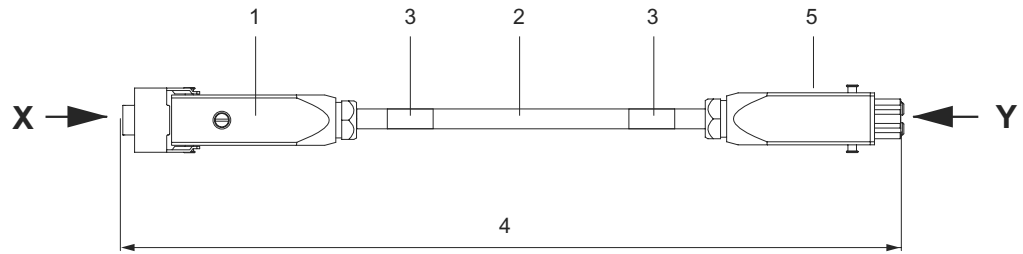
Type	Installation	Part number
CFM	Fixed installation	198 634 1
CFM	Cable carrier installation	199 560 X

Pin assignment of cable for VR forced cooling fan

STAK 200 plug connector	Contact	Core identification	Assigned	Contact	Connection type
<p>View X Connector with two socket contacts</p>	1	First digit	24 V +	Cut-off, length ca. 250 mm	Conductor end sleeves
	2	Second digit	0 V		



Extension cable for  
VR forced cooling  
fan



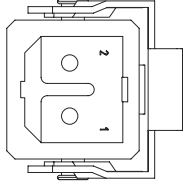
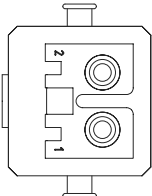
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Figure 72: Extension cable for VR forced cooling fan

- [1] Connector: STAS 200
- [2] Printed on connector: SEW-EURODRIVE
- [3] Nameplate
- [4] Line length  $\leq 5$  m: +200 mm tolerance  
Line length  $\geq 5$  m: +2 % tolerance  
Permitted line length according to the technical documents.
- [5] Socket: STAK 200

Type	Installation	Part number
CFM	Fixed installation	199 561 8
CFM	Cable carrier installation	199 562 6

Pin assignment of  
extension cable for  
forced cooling fan

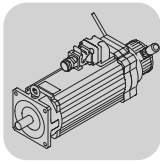
STAS 200 plug connector	Contact	Core identification	Assigned	Contact	Connection type STAK 200
 <p>View X Connector with two pin contacts</p>	1	First digit	24 V +	1	 <p>View Y Connector with two socket contacts</p>
	2	Second digit	0 V	2	

The extension cable has the same pin assignment as all other contacts.

Alternative plug  
connector for  
CFM71, CFM90,  
CFM112

Signal plug connector with socket contacts (complete)

Type	Cross sections which can be connected	Part no.
VR	3 x 1 mm <sup>2</sup>	198 498 5




### 11.8 Cable specification

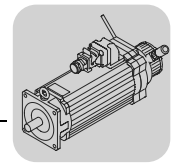
#### Fixed installation of the power cables

Manufacturer	Cable cross sections	Lapp				
		4 x 1.5 mm <sup>2</sup>	4 x 2.5 mm <sup>2</sup>	4 x 4 mm <sup>2</sup>	4 x 6 mm <sup>2</sup>	4 x 10 mm <sup>2</sup>
Manufacturer designation		TPE/CY				
Operating voltage U <sub>o</sub> /	[V <sub>AC</sub> ]	600/1000				
Temperature range	[°C]	fixed installation -10 to +90				
Max. temperature	[°C]	90	90	90	90	90
Min. bending radius	[mm]	44	48	56	61	84
Diameter D	[mm]	9.3 ± 0.3	10 ± 0.3	12.3 ± 0.3	13.6 ± 0.4	17.0 ± 0.6
Core identification		BK with lettering WH + GN/YE				
Sheath color		Orange, similar to RAL 2003				
Approval(s)		DESINA / VDE / UL				
Capacitance core/shielding	[nF/km]	135	140	150	155	155
Capacitance core/core	[nF/km]	75	85	90	95	95
Halogen free		No				
Silicone-free		Yes				
CFC-free		No				
Inner insulation (core)		TPE				
Outer insulation (sheath)		PVC				
Flame-inhibiting/self-extinguishing		No				
Conductor material		Cu				
Shielding		Tinned Cu				
Weight (cable)	[kg/km]	196	254	371	472	825

#### Cable carrier installation of power cables

Manufacturer	Cable cross sections	Nexans				
		4 x 1.5 mm <sup>2</sup>	4 x 2.5 mm <sup>2</sup>	4 x 4 mm <sup>2</sup>	4 x 6 mm <sup>2</sup>	4 x 10 mm <sup>2</sup>
Manufacturer designation		PSL(LC)C11Y-J 4 x ... mm <sup>2</sup>		PSL11YC11Y-J 4 x ... mm <sup>2</sup>		
Operating voltage U <sub>o</sub> /	[V <sub>AC</sub> ]	600 / 1000				
Temperature range	[°C]	-20 to +60				
Max. temperature	[°C]	+ 90 (on the conductor)				
Min. bending radius	[mm]	135	170	130	155	180
Diameter D	[mm]	12.4 ± 1.1	15.1 ± 1.6	13.1 ± 0.4	15.3 ± 0.4	17.7 ± 0.5
Max. acceleration	[m/s <sup>2</sup> ]	20 (travel distance: 4 m horizontal, 1.5 m vertical)				
Max. velocity	[m/min]	200 at max. travel distance of 5 m				
Bending cycles		min. 5 mio.				
Core identification		BK with lettering WH + GN/YE				
Sheath color		Orange similar to RAL 2003				
Approval(s)		DESINA / VDE / UL /  US				
Capacitance core/shielding <sub>≤</sub>	[nF/km]	95	95	170	170	170
Capacitance core/core <sub>≤</sub>	[nF/km]	65	65	95	95	95
Halogen free		Yes				
Silicone-free		Yes				
CFC-free		Yes				
Inner insulation (core)		TPO		TPM		
Outer insulation (sheath)		TPU (PUR)				
Table continued on next page						






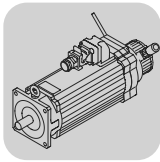
**Fixed installation  
of brake power  
cables**

Manufacturer		Nexans				
Cable cross sections		4 x 1.5 mm <sup>2</sup>	4 x 2.5 mm <sup>2</sup>	4 x 4 mm <sup>2</sup>	4 x 6 mm <sup>2</sup>	4 x 10 mm <sup>2</sup>
Flame-inhibiting/self-extinguishing		Yes				
Conductor material		E-Cu blank				
Shielding		Braided tinned Cu shield (optically covered > 85 %)				
Weight (cable)	[kg/km]	190	300	320	420	640

Manufacturer		Lapp				
Cable cross sections		4 x 1.5 mm <sup>2</sup> + 3 x 1 mm <sup>2</sup>	4 x 2.5 mm <sup>2</sup> + 3 x 1 mm <sup>2</sup>	4 x 4 mm <sup>2</sup> + 3x 1 mm <sup>2</sup>	4 x 6 mm <sup>2</sup> + 3x 1.5 mm <sup>2</sup>	4 x 10 mm <sup>2</sup> + 3x 1.5 mm <sup>2</sup>
Manufacturer designation		TPE/CY				
Operating voltage U <sub>o</sub> /	[V <sub>AC</sub> ]	600 / 1000				
Temperature range	[°C]	Fixed installation: -10 to +90				
Max. temperature	[°C]	90	90	90	90	90
Min. bending radius	[mm]	54	57	64	72	92
Diameter D	[mm]	11.8 ± 0.4	13.4 ± 0.5	15.0 ± 0.5	17.0 ± 0.6	20.0 ± 0.5
Core identification		BK with lettering WH + GN/YE				
Sheath color		Orange similar to RAL 2003				
Approval(s)		DESINA / VDE / UL				
Capacitance core/shield- ing	[nF/km]	135	145	150	155	155
Capacitance core/core	[nF/km]	75	85	90	95	95
Halogen free		No				
Silicone-free		Yes				
CFC-free		No				
Inner insulation (core)		TPE				
Outer insulation (sheath)		PVC				
Flame-inhibiting/self-extin- guishing		No				
Conductor material		Cu				
Shielding		Tinned Cu				
Weight (cable)	[kg/km]	300	370	476	625	1024

**Cable carrier  
installation brake  
power cables**

Manufacturer		Nexans				
Cable cross sections		4 x 1.5 mm <sup>2</sup> + 3 x 1 mm <sup>2</sup>	4 x 2.5 mm <sup>2</sup> + 3 x 1 mm <sup>2</sup>	4 x 4 mm <sup>2</sup> + 3x 1 mm <sup>2</sup>	4 x 6 mm <sup>2</sup> + 3x 1.5 mm <sup>2</sup>	4 x 10 mm <sup>2</sup> + 3x 1.5 mm <sup>2</sup>
Manufacturer designation		PSL(LC)C11Y-J 4 x ... mm <sup>2</sup>		PSL11YC11Y-J 4x... +3A.../C		
Operating voltage U <sub>o</sub> /	[V <sub>AC</sub> ]	600 / 1000				
Temperature range	[°C]	-20 to +60				
Max. temperature	[°C]	+ 90 (conductor)				
Min. bending radius	[mm]	165	170	155	175	200
Diameter D	[mm]	15.1 ± 1.6	16.3 ± 0.8	15.3 ± 0.5	17.4 ± 0.5	20.5 ± 0.5
Max. acceleration	[m/s <sup>2</sup> ]	20 (travel distance: 4 m horizontal, 1.5 m vertical)				
Max. velocity	[m/min]	200 at max. travel distance of 5 m				
Bending cycles		min. 5 mio.				
Core identification		BK with lettering WH + GN/YE				
Sheath color		Orange similar to RAL 2003				
Approval(s)		DESINA / VDE / UL /  US				
Table continued on next page						




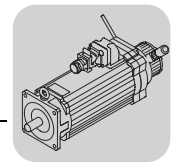
## DFS/CFM Synchronous Servomotors

### Cable specification


Manufacturer		Nexans				
		4 x 1.5 mm <sup>2</sup> + 3 x 1 mm <sup>2</sup>	4 x 2.5 mm <sup>2</sup> + 3 x 1 mm <sup>2</sup>	4 x 4 mm <sup>2</sup> + 3 x 1 mm <sup>2</sup>	4 x 6 mm <sup>2</sup> + 3 x 1.5 mm <sup>2</sup>	4 x 10 mm <sup>2</sup> + 3 x 1.5 mm <sup>2</sup>
Capacitance core/shield- ing≤	[nF/km]	95	95	170	170	170
Capacitance core/core≤	[nF/km]	65	65	95	95	95
Halogen free		Yes				
Silicone-free		Yes				
CFC-free		Yes				
Inner insulation (cable)		TPO		TPM		
Outer insulation (sheath)		TPU (PUR)				
Flame-inhibiting/self- extinguishing		Yes				
Conductor material		E-Cu blank				
Shielding		Braided tinned Cu shield (optically covered > 85 %)				
Weight (cable)	[kg/km]	280	380	410	540	750

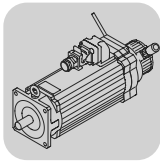
### Fixed installation of accessory cables

Accessory designation		AS1H / ES1H	RH.M/RH.L	VR
Manufacturer		Lapp		
Cable cross sections		6 x 2 x 0.25 mm <sup>2</sup>	5 x 2 x 0.25 mm <sup>2</sup>	3 x 1 mm <sup>2</sup>
Manufacturer designation		TPE/CY		Öflex 110 Classic
Operating voltage U <sub>o</sub> /	[V <sub>AC</sub> ]	300		300 / 500
Temperature range	[°C]	-10 to +80		- 30 to + 70
Max. temperature	[°C]	+ 80		+ 70
Min. bending radius	[mm]	41.5	37.5	24
Diameter D	[mm]	8.3 ± 0,3	7.5 ± 0,3	6.0 ± 0.3
Core identification		DIN 47 100		VDE 0293
Sheath color		Green, similar to RAL 6018		Silver gray, RAL 7001
Approval(s)		DESINA / VDE /  US		VDE
Capacitance core/shielding	[nF/km]	110		-
Capacitance core/core	[nF/km]	83		-
Halogen free		No		
Silicone-free		Yes		
CFC-free		No		
Inner insulation (core)		TPE		PVC
Outer insulation (sheath)		PVC		
Flame-inhibiting/self-extinguishing		No		
Conductor material		Cu blank		
Shielding		Braided tinned Cu		-
Weight (cable)	[kg/km]	131	103	65



**Cable carrier  
installation of  
accessory cables**

Accessory designation		AS1H / ES1H	RH.M/RH.L	VR
Manufacturer		Nexans		
Cable cross sections		6 x 2 x 0.25 mm <sup>2</sup>	5 x 2 x 0.25 mm <sup>2</sup>	3 x 1 mm <sup>2</sup>
Manufacturer designation		SSL11YC11Y ... x 2 x 0.25		PSL 3 x 1.0
Operating voltage Vo/	[V <sub>AC</sub> ]	300		300
Temperature range	[°C]	-20 to +60		- 30 to + 70
Max. temperature	[°C]	+90 (on the conductor)		+ 90 (on the conductor)
Min. bending radius	[mm]	100	95	45
Diameter D	[mm]	9.8 ± 0.2	9,5 ± 0.2	5,7 ± 0.2
Max. acceleration	[m/s <sup>2</sup> ]	20		10
Max. velocity	[m/min]	200		50
Core identification		WH/BN, GN/YE, GY/PK, BU/RD, BK/VT, GY-PK/RD-BU	WH/BN, GN/YE, GY/PK, BU/RD, BK/VT	2 x WH with digit + 1 x GN/YE
Sheath color		Green similar to RAL 6018		Black RAL 9005
Approval(s)		DESINA / VDE /  US		VDE / UL
Capacitance core/shielding	[nF/km]	100		-
Capacitance core/core	[nF/km]	55		-
Halogen free		Yes		Yes
Silicone-free		Yes		Yes
CFC-free		Yes		Yes
Inner insulation (core)		PP		TPM
Outer insulation (sheath)		TPE-U		TPE-U
Flame-inhibiting/self-extinguishing		Yes		Yes
Conductor material		E-Cu blank		E-Cu blank
Shielding		Braided tinned Cu		-
Weight	[kg/km]	130	120	50



#### 11.9 Crimping tools

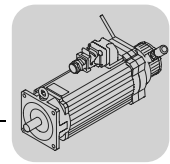
An alternative for purchasing the pre-fabricated cables from SEW-EURODRIVE for motors with plug connectors is to purchase the required plug connectors.



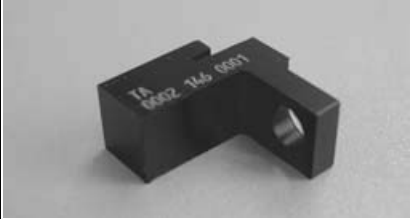


In this case, the customers have to wire the plug connectors themselves. SEW-EURODRIVE offers the matching crimping tools to ensure correct connection of cable core and contact. Please quote the required part number in your order.

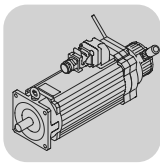
#### Power motor DFS and brake

Tools required for assembly			
Type	for	SEW part number	Figure
Crimping tool		019 243 0	
Positioning tool	Motor contact 2 mm ∅ Core cross section 0.5 ... 2.5 mm <sup>2</sup>	019 245 7	
	Brake contact 1 mm ∅ Core cross section 0.06 ... 1 mm <sup>2</sup>	019 244 9	
Tools required for removal			
Removal tool	Motor contact 2 mm ∅	019 247 3	
	Brake contact 1 mm ∅	019 246 5	
Removal tool <sup>1)</sup>	Insulator	019 248 1	

<sup>1)</sup> The removal tool is **only required for removal on the motor end.**

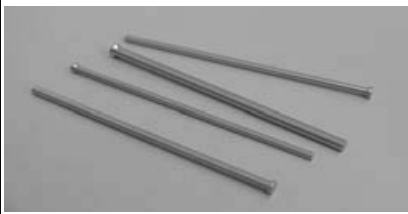


Tools required for assembly			
Type	for	SEW part number	Figure
Crimping tool for brake contacts / power contacts	Contact 1.6 mm $\varnothing$ Contact 3.6 mm $\varnothing$	019 070 5	
Crimping jaws for brake contacts / power contacts	Contact 1.6 mm $\varnothing$ Core cross section 0.5 ... 1.5 mm <sup>2</sup> Contact 3.6 mm $\varnothing$ 1.5 ... 2.5 mm <sup>2</sup> 4.0 ... 6.0 mm <sup>2</sup>	019 086 1 019 012 8 019 013 6	
Contact receptacle for brake contacts / powercontacts	Contact 1.6 mm $\varnothing$ Core cross section 0.5 ... 1.5 mm <sup>2</sup> Contact 3.6 mm $\varnothing$ 1.5 ... 2.5 mm <sup>2</sup> 4.0 ... 6.0 mm <sup>2</sup>	019 087 X 019 014 4 019 015 2	
Crimping tool for power contacts	Contact 3.6 mm $\varnothing$ Core cross sections 1.5 ... 10 mm <sup>2</sup>	019 069 1	
Contact receptacle for power contacts	Contact 3.6 mm $\varnothing$ Core cross sections 1.5 ... 10 mm <sup>2</sup>	019 071 3	






## DFS/CFM Synchronous Servomotors

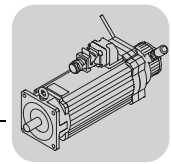
### Crimping tools

Tools required for assembly			
Type	for	SEW part number	Figure
Test probe set for power contacts	Contact 3.6 mm $\varnothing$ Core cross sections 1.5 ... 10 mm <sup>2</sup>	019 085 3	
Tools required for removal			
No special tools are required for removal.			



### Resolver encoder system, single and multi-turn Hiperface

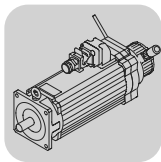
Tools required for assembly			
Type	for	SEW part number	Figure
Crimping tool		019 243 0	
Positioning tool	Contact 1 mm $\varnothing$ Core cross section 0.06 ... 1 mm <sup>2</sup>	019 244 9	
Tools required for removal			
Removal tool	Contact 1 mm $\varnothing$ Core cross section 0.06 ... 1 mm <sup>2</sup>	019 246 5	
Removal tool <sup>1)</sup>	Insulator	019 248 1	

1) The removal tool is **only** required for removal on the motor end.



**SSI multi-turn  
encoder system**

Tools required for assembly			
Type	for	SEW part number	Figure
Crimping tool		019 243 0	
Tools required for removal			
Removal tool	Contact 1 mm $\varnothing$ Core cross section 0.24 ... 1 mm <sup>2</sup>	019 260 0	



## DFS/CFM Synchronous Servomotors

Crimping tools

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