

# AC M2n

## AC servo motors



**Short -  
Description**

## The most important thing first

We thank you for the trust that you have shown in our product.

The short description presents themselves as an overview of the mounting and connecting-up.

Please read the product - manuals before putting the product to use.

If you have any questions, please contact your nearest SSD Drives representative.

Improper application of the product in connection with dangerous voltage, can lead to injuries.

In addition, damage can also occur to motors or other products.

Therefore please observe strictly our safety precautions.

### **Topic: Safety precautions**

We assume that as an expert, you are familiar with the relevant safety regulations, especially in accordance with VDE 0100, VDE 0113, VDE 0160, EN 50178, the accident prevention regulations of the employers liability insurance company and the DIN regulations and that you can use and apply them.

Also the regulations are to be observed the relevant European directive.

Depending on the kind of application, additional norms e.g. UL, DIN are to be observed.

If our products are employed in connection with components from other manufacturers, their operating instructions are also to be strictly observed.

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Changes are subject to change without notice.

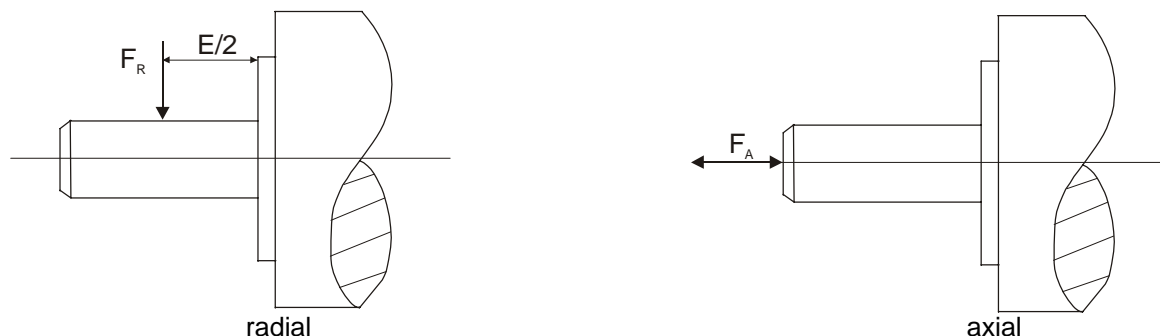
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Made in Germany, 2004

# 1 Shaft loads

## 1.1 Notation of definition



## 1.2 Technical dates of the max. radial $F_R$ (N) and axial $F_A$ (N) shaft load

Motor-Type	rated speed I	maximum radial shaft load	maximum axial shaft load
(-)	$n_n$ (1/min)	$F_R$ (N)	$F_A$ (N)
AC M2n 0012	6000	51	72
AC M2n 0010	4000	220 (138)	80 (33)
AC M2n 0030	4000	220 (155)	80 (33)
AC M2n 0045	4000	220 (163)	80 (33)
AC M2n 0070	4000	220 (169)	80 (33)
AC M2n 0130	4000	220 (175)	80 (33)
AC M2n 0055	4000	250 (156)	90 (45)
AC M2n 0090	4000	250 (171)	90 (45)
AC M2n 0150	4000	250 (181)	90 (45)
AC M2n 0220	4000	250 (189)	90 (45)
AC M2n 0290	4000	250 (195)	90 (45)
AC M2n 0320	4000	300 (333)	100 (71)
AC M2n 0480	4000	300 (346)	100 (71)
AC M2n 0650	4000	300 (362)	100 (71)
AC M2n 0830	4000	300 (391)	100 (71)
AC M2n 0960	4000	570 (383)	200 (83)
AC M2n 1200	4000	570 (398)	200 (83)
AC M2n 2000	4000	570 (427)	200 (83)

The values in bracket relate to simultaneous radial and axial shaft loads.

The specifications refers to 20000 hours of operation !

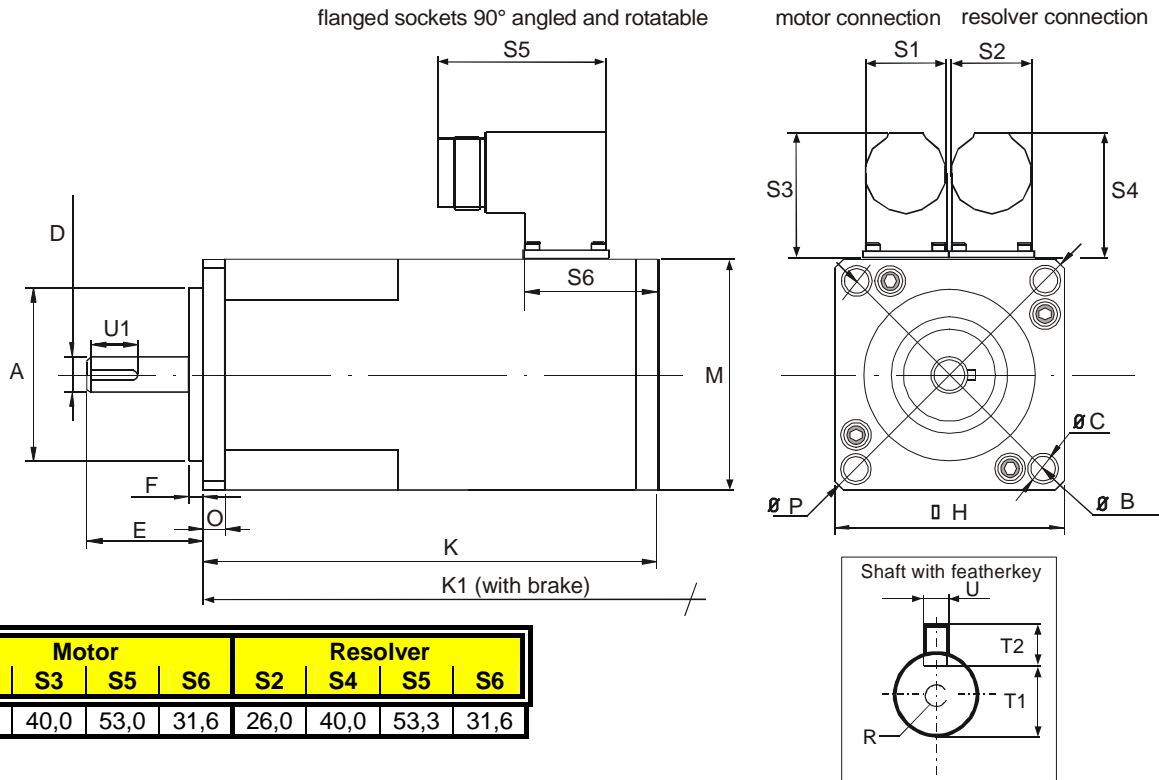
## 1.3 Use Ball bearing type

Motor-size	Ball bearing type	
	A-side	B-side
Y	607	607
0	6001	6001
1	6003	6001
2	6004	6002
3	6205	6004

## 2 Dimensions

### 2.1 Standard design Motor size Y...3

#### 2.1.1 Connections via connectors



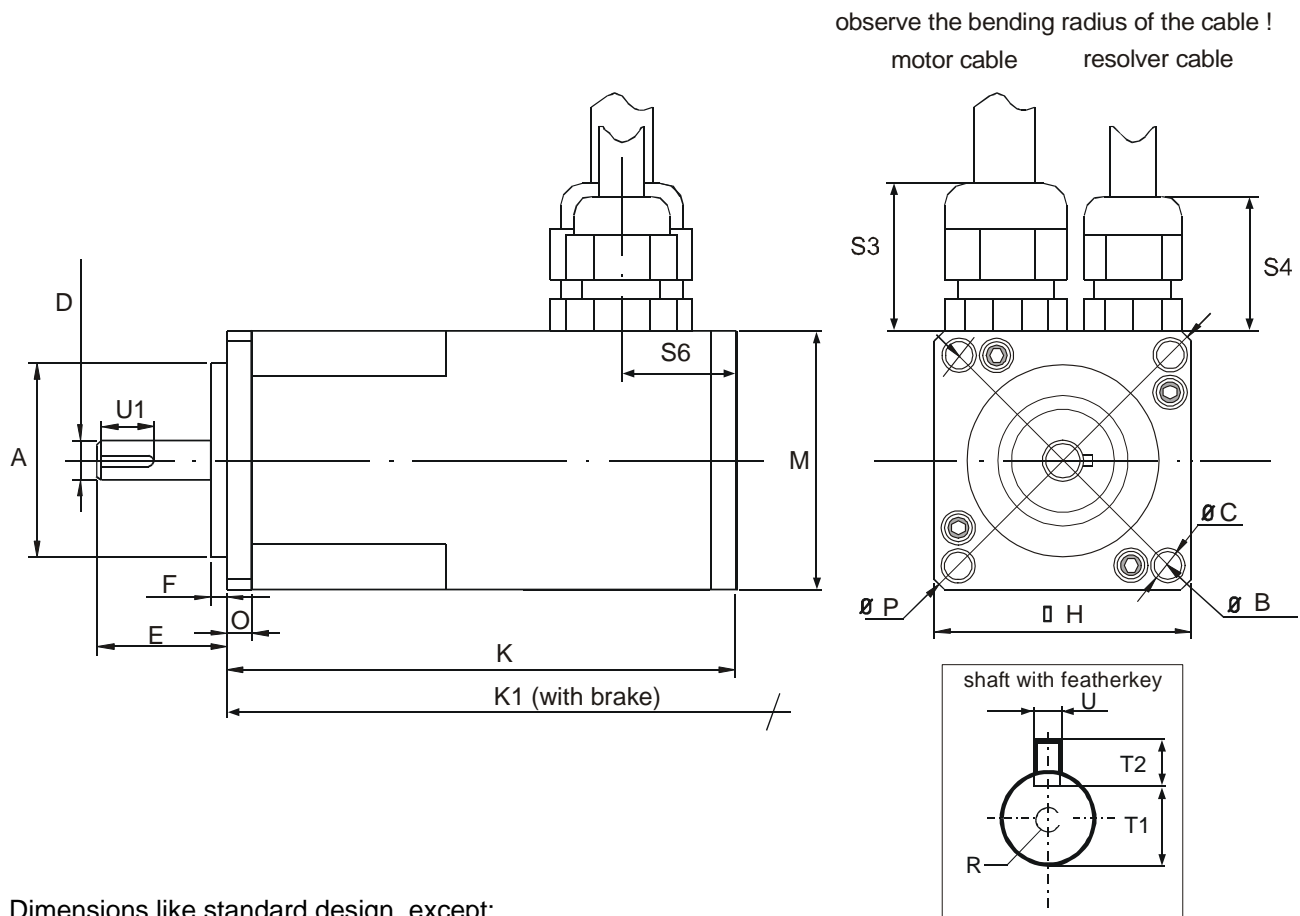
model	size	A (j6)	B	C	D (k6)	E	F	H	K	K1	M	O	P	R	T1	T2 (h9)	U (h9)	U1
AC M2n0012.. <sup>1)3)</sup>	Y	30	46	4,3	6	20	2,5	40	130	-	40	0	54	-	-	-	-	-
AC M2n0010..	0	40	63	5,8	9	24	2,5	55	98	131	55	8	74	M3-10	7,2	3	3	14
AC M2n0030..		40	63	5,8	9	24	2,5	55	123	156	55	8	74	M3-10	7,2	3	3	14
AC M2n0045..		40	63	5,8	9	24	2,5	55	143	176	55	8	74	M3-10	7,2	3	3	14
AC M2n0070..		40	63	5,8	9	24	2,5	55	163	196	55	8	74	M3-10	7,2	3	3	14
AC M2n0130.. <sup>1)</sup>		40	63	5,8	9	24	2,5	55	234	-	55	8	74	M3-10	7,2	3	3	14
AC M2n0055..	1	80	100	7	14	30	3	88	112	153	82	10	115	M4-12	11,1	5	5	20
AC M2n0090..		80	100	7	14	30	3	88	132	173	82	10	115	M4-12	11,1	5	5	20
AC M2n0150..		80	100	7	14	30	3	88	152	193	82	10	115	M4-12	11,1	5	5	20
AC M2n0220..		80	100	7	14	30	3	88	172	213	82	10	115	M4-12	11,1	5	5	20
AC M2n0290.. <sup>2)</sup>		80	100	7	14	30	3	88	202	249	82	10	115	M4-12	11,1	5	5	20
AC M2n0290.. <sup>2)</sup>		80	100	7	14	30	3	88	202	249	82	10	115	M4-12	11,1	5	5	20
AC M2n0320..	2	95	115	9	19	40	3	105	178	218	105	12	134	M6-15	15,5	6	6	30
AC M2n0480..		95	115	9	19	40	3	105	208	248	105	12	134	M6-15	15,5	6	6	30
AC M2n0650..		95	115	9	19	40	3	105	228	268	105	12	134	M6-15	15,5	6	6	30
AC M2n0830.. <sup>3)</sup>		95	115	9	19	40	3	105	273	313	105	12	115	M6-15	15,5	6	6	30
AC M2n0960..	3	130	165	11	24	50	3,5	145	260	303	145	12	188	M8-25	19,9	7	8	40
AC M2n1200..		130	165	11	24	50	3,5	145	300	343	145	12	188	M8-25	19,9	7	8	40
AC M2n2000..		130	165	11	24	50	3,5	145	420	463	145	12	188	M8-25	19,9	7	8	40

- 1) not with holding brake equip  
 2) K1 with 6 Nm holding brake  
 3) design only with smooth shaft and PG coupling  
 all specifications in "mm"

## Dimensions

### 2.2 Special design Motor size Y...3

#### 2.2.1 Connections via PG couplings and cables



Dimensions like standard design, except:

AC <u>M2n</u> size	S3		S4		S6	Motor connection via PG coupling	Resolver connection via PG coupling	Comments
	Design Skintop	EMV	Design Skintop	EMV				
Y	25	-	22	-	16	-	-	cable low cost
0	28	21	25	20	18	13,5	9	-
1	28	21	25	20	18	13,5	9	-
2	28	21	25	20	20	13,5	9	-
3	-	-	-	-	-	-	-	Dimensions on request

### Important !

- Observe the bending radius of the cables, see cable documentation **12-02-01 !**

### 2.3 B - side Motor - mounting of Encodern

Please, request when required separate dimensional drawing.

### Important !

- Additional connection plug connector or cable end
- Change of the engine length, dimension K or K1

### 3 Connector assignment

#### 3.1 Connector

## Power connector

**motor side**

SSD Drives - motor - size Y

Type: AC M2n

**reguator side**

SSD Drives - Servo drive

Type: 631/635 und 637/637+/637f  
in the compact enclosure

PG - gland	K MB BG 0/2-BLC KA.0003.xxxx		terminal strip
	colour	function	Pin - No.
	black 1	motor connection	M1
	yello/green	ground connection	PE
	black 2	motor connection	M2
	black 3	motor connection	M3
		screen	case

				Maßstab / scale:	
				Typ / Type: PG-Low cost	
				Bezeichnung / designation: Blue low cost motor cable for SSD Drives standard motors BG Y and servo drives	
				Zeichnungsnummer / drawing No: Z-MK.PG.xxxx	
				Blatt 1	
01	637f	16.04.03	DL	DL	Dateiname / file name: Z-MK-PG-E.cdr
Zust.	Änderung	Datum	Name	Ursprung	

# Connector assignment

## Connector

### Power connector

#### motor side

SSD Drives - motor size 0...2

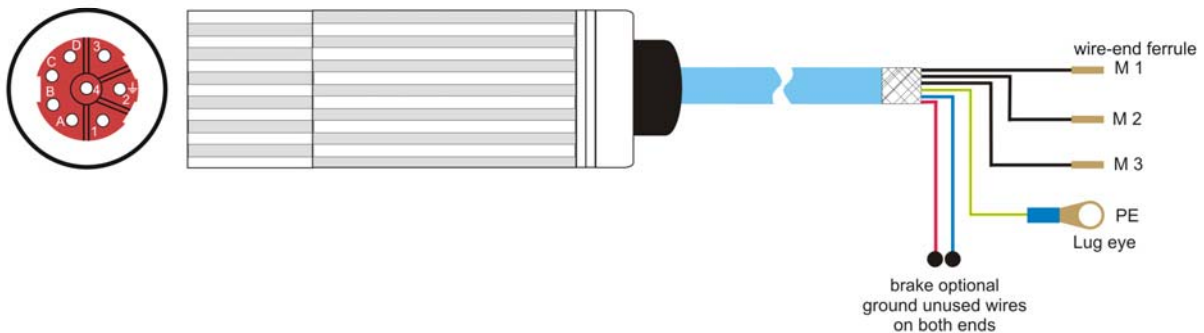
Model: AC G, AC M2n; ACM2G; AC M2K  
**AC MHS / MHM**

#### regulator side

SSD Drives - Servo drives

Model: 631/635 and 637/637+/637f  
**637+/637f**  
in the compact enclosure

#### view solder / crimp connector - side



S MB GM2nRn BG 0/3-C+L ST.0100.3001		K MB BG 0/2-B KA.0003.6304		terminal strip	
PIN - Nr.		colour		function	
1		black 1		motor connection	
2		1) yellow/green		ground connection	
3		black 2		motor connection	
4		black 3		motor connection	
A		red		2) brake +24V DC	
B		blue		2) brake 0V DC	
C		-		-	
D		-		-	
case		1)		screen	

1) motor mating plug  
the screen is connected to  
the groundpin and also  
extensively to the case.

2) **Attention ! Security and insulation:**  
The brake must be insulated for secure division (PELV). Otherwise,  
the insulation class of the drive becomes reduced or the effort  
of an additional galvanic separation is required.

				Maßstab / scale:		Typ / model:													
						KK MB GM2nRn 0/2.K - XX.X / B													
<table border="1"> <tr> <td>Bear.</td> <td>06.02.02</td> <td>DL</td> </tr> <tr> <td>Gep.</td> <td>14.02.02</td> <td>EH</td> </tr> <tr> <td>DL</td> <td>Norm</td> <td></td> </tr> </table>				Bear.	06.02.02	DL	Gep.	14.02.02	EH	DL	Norm		<b>Bezeichnung / designation:</b> Blue motor cable (compact enclosure) for SSD Drives standard motors and servo drives						
Bear.	06.02.02	DL																	
Gep.	14.02.02	EH																	
DL	Norm																		
<table border="1"> <tr> <td>04</td> <td>ACM2K</td> <td>10.08.04</td> </tr> <tr> <td>03</td> <td>ACM2G</td> <td>15.08.03</td> </tr> <tr> <td>02</td> <td>637f</td> <td>16.04.03</td> </tr> <tr> <td>01</td> <td>Motor-size</td> <td>06.02.02</td> </tr> </table>				04	ACM2K	10.08.04	03	ACM2G	15.08.03	02	637f	16.04.03	01	Motor-size	06.02.02	<b>Zeichnungsnummer / drawing No:</b> Z-MK.6400.xxxx			
04	ACM2K	10.08.04																	
03	ACM2G	15.08.03																	
02	637f	16.04.03																	
01	Motor-size	06.02.02																	
Zust. Änderung Datum Name Ursprung				Dateiname / File name: Z-MK-6400-E.cdr															
						Blatt sheet 1													

# Connector assignment

## Connector

### Power connector

motor side

SSD Drives - motor size 3

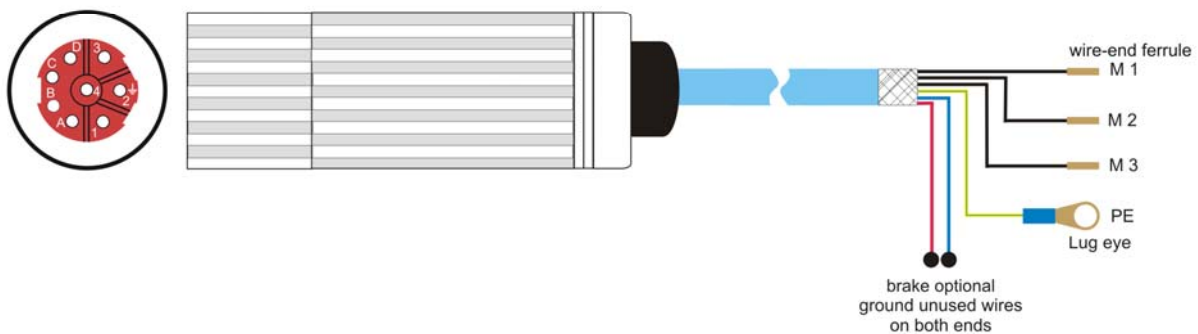
Model: AC M2n  
**AC MHS / MHM**  
**AC MRW**

regulator side

SSD Drives - Servo drives

Model: 631/635 and 637/637+/637f  
**637+/637f**  
in the compact enclosure

view solder / crimp connector - side



S MB GM2nRn BG 0/3-C+L ST.0100.3001		K MB BG 3-B KA.0003.6302		terminal strip	
PIN - Nr.		colour	function		PIN - Nr.
1		black 1	motor connection		M1
2	1)	yellow/green	ground connection		PE
3		black 2	motor connection		M2
4		black 3	motor connection		M3
A		red	brake +24V DC	2)	Connection
B		blue	brake 0V DC	2)	not on terminal
C		-	-		-
D		-	-		-
case	1)		screen		case

1) motor mating plug  
the screen is connected to  
the groundpin and also  
extensively to the case.

2) **Attention ! Security and insulation:**  
The brake must be insulated for secure division (PELV). Otherwise,  
the insulation class of the drive becomes reduced or the effort  
of an additional galvanic separation is required.

**Caution !** at X50 connector a terminal block must be employed

				Maßstab / scale:		Typ / model:	
						KK MB M2nRn 3	
Bear.		06.02.02	DL		<b>Bezeichnung / designation:</b> Blue motor cable for SSD Drives AC M2n size 3 motors and servo drives		
Gep.		14.02.02	EH				
Norm							
01		637f	16.04.03	DL	<b>Zeichnungsnummer / drawing No:</b> Z-MK.6401.xxxx		
Zust.	Änderung	Datum	Name	Ursprung	Dateiname / File name:		Blatt sheet
					Z-MK.6401-E.cdr		1



# Connector assignment

## 3.2 X50 - connector

**motor side**

SSD Drives - motor size 0...2

Model: AC M2n; ACM2G; AC M2K  
**AC MHS / MHM**

**X50 - connector**

**regulator side**

SSD Drives - servo drives

Model: 635 and 637/637+/637f  
**637+/637f**  
in the Rack

**view solder / crimp connector - side**

S MB GM2nRn BG 0/3-C+L ST.0100.3001		K MB BG 0/2-B KA.0003.6304		X50 connector strip <sup>3)</sup>	
PIN - Nr.		colour	function	PIN - Nr.	
1		black 1	motor connection	10	12
2	<sup>1)</sup>	yellow/green	ground connection	ground	
3		black 2	motor connection	14	16
4		black 3	motor connection	18	20
A		red	brake +24V DC <sup>2)</sup>	-	-
B		blue	brake 0V DC <sup>2)</sup>	-	-
C		-	-	-	-
D		-	-	-	-
case	<sup>1)</sup>		screen	case	

<sup>1)</sup> motor mating plug the screen is connected to the groundpin and also extensively to the case.

<sup>2)</sup> **Attention ! Security and insulation:**  
The brake must be insulated for secure division (PELV). Otherwise, the insulation class of the drive becomes reduced or the effort of an additional galvanic separation is required.

<sup>3)</sup> not in the Scope of delivery

				Maßstab / scale:		Typ / model: KK MB GM2nRn 0/2.R - XX.X / B	
				Bear.	10.05.01		
04	ACM2K	10.08.04	DL	Gep.	11.05.01	Bezeichnung / designation: Blue motor cable (plugs/terminal strip) for SSD Drives standard motors and servo drives	
03	ACM2G	15.08.03	DL	Norm			
02	637f	16.04.03	DL	Zeichnungsnummer / drawing No: Z-MK.0400.xxxx			Blatt sheet 1
01	Motor-size	06.02.02	DL				
Zust	Änderung	Datum	Name	Ursprung	Dateiname / File name: Z-MK-0400-E.cdr		

## Connector assignment

### 3.3 Resolver connector

## Resolver connector

**motor side**

SSD Drives - motor size 0...4

Type: AC G, AC R, AC Mn,  
AC M2n, AC M2K; ACM2G  
AC MRW, AC MRL

**view solderside**

**regulator side**

SSD Drives - servo drives

Model: 631/635 and 637/637+/637f

**view solderside**

SIR ST.0200.0001	KIR -B KA.0003.6301		SUB - D 09 S/M ST.1002.2001
PIN - Nr.	colour	function	PIN - Nr.
1	white	sin +	4
2	brown	sin -	8
3	green	cos +	3
4	yellow	cos -	7
5	red	PTC optional	2
6	blue	PTC optional	6
7	pink	carrier -	9
8	gray	carrier +	5
case		screen	case

				Maßstab / scale:																																												
				Typ / model: KK RT GMR-xx.x/B																																												
<table border="1" style="width: 100%; border-collapse: collapse; font-size: small;"> <tr> <td style="width: 5%;">05</td> <td style="width: 15%;">ACM2K</td> <td style="width: 10%;">10.08.04</td> <td style="width: 5%;">DL</td> <td style="width: 5%;">Bear.</td> <td style="width: 10%;">09.05.01</td> <td style="width: 5%;">DL</td> </tr> <tr> <td>04</td> <td>ACMRL</td> <td>27.11.03</td> <td>DL</td> <td>Gep.</td> <td>10.05.01</td> <td>EH</td> </tr> <tr> <td>03</td> <td>ACMRW</td> <td>02.10.03</td> <td>DL</td> <td>Norm</td> <td></td> <td></td> </tr> <tr> <td>02</td> <td>ACM2G</td> <td>15.08.03</td> <td>DL</td> <td></td> <td></td> <td></td> </tr> <tr> <td>01</td> <td>637f</td> <td>16.04.03</td> <td>DL</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Zust.</td> <td>Änderung</td> <td>Datum</td> <td>Name</td> <td>Ursprung</td> <td colspan="2"></td> </tr> </table>				05	ACM2K	10.08.04	DL	Bear.	09.05.01	DL	04	ACMRL	27.11.03	DL	Gep.	10.05.01	EH	03	ACMRW	02.10.03	DL	Norm			02	ACM2G	15.08.03	DL				01	637f	16.04.03	DL				Zust.	Änderung	Datum	Name	Ursprung			Bezeichnung / designation: Blue resolver cable for SSD Drives standard motors and servo drives		
				05	ACM2K	10.08.04	DL	Bear.	09.05.01	DL																																						
				04	ACMRL	27.11.03	DL	Gep.	10.05.01	EH																																						
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Zust.	Änderung	Datum	Name	Ursprung																																												
Zeichnungsnummer / drawing No: Z-RK.6300.xxxx						Blatt sheet 1																																										
Dateiname / File name: Z-R-6300-E.cdr																																																

## Connector assignment

### 3.4 Cabling instructions

#### Important rules when operating servo regulators and servomotors:

1. A radio interference suppression level cannot be maintained without an interference suppression filter at the line input. Moreover, line filter increase the immunity of the system to interference.
2. The cable between the power electronics and the motor must be shielded as YCY. A SY shield is not suitable. The shield support for the power cable (motor cable) must be on both ends. We recommend using SSD Drives motor cables K M BG xx – B!
3. Metal parts in the switching cabinet must be connected with each other having large areas of contact and must carry high frequencies very well. Avoid anodized, yellow-passivized and painted surfaces which can have very high resistance values based on the frequency! Make sure that the metals lie close together in the chemical circuit voltage class! Use the good conductivity and the large surface of the galvanized mounting plate as earth potential!
4. Relays, contactors and solenoid valves build into the same circuit must be connected with spark-suppressing combinations or components limiting over voltage, respectively. This applies also if these parts are not mounted in the same cabinet as the servo regulator.
5. The shield for the analog signal lines must be installed on one end and, if possible, in the switching cabinet. Ensure a connection which provides extensive contact and which is low-resistant! The shield for the digital signal lines must be installed on both ends, must have extensive contact and must be low resistance. An additional equalizer is to be laid parallel when there are potential differences. It is necessary to use plugs with metal enclosures with separable connections.
6. Avoid unnecessary extra loops on all connecting cables. All measures regarding filtering and shielding can be short circuited on them with high frequency. Connect unused litz wires in cables on both ends to the equipment ground conductor.
7. Unshielded cables of a circuit, the conductors going out and returning, should be twisted due to symmetrical interferences.
8. Separate physically "live" and "dead" wires even in the planning phase. Give special attention to the motor cables. The area of the common terminal strip-line input and motor output is especially endangered.
9. Relays, contactors and solenoid valves. The cables should be laid in the switching cabinet as close as possible to the ground; wires hanging freely in the air are preferred EMC victims as well as active and passive aerials.
10. When operating with more than one line component in a common network, EMC problems are to be expected. From the start, the installation planner must integrate in his concept high frequency emitted interference as well as the electromagnetic susceptibility of the components to one another and take measures against it.
11. It is absolutely necessary to run cable shields completely up to the connectors. The connection of the cable shields to ground must be in the near field of the servo regulator (10 - 50 cm). Sensitive measuring leads should be removed as far as possible from this area; this applies also when they are shielded!
12. It is mandatory to run the motor cables in a separate cable channel and to lay flexible cable shielding also when these are shielded. This channel must be separated by at least 30 - 40 cm from the channel for the signal lines.

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